

## Sleepy Hollow Lake Questions and Answers, 2015 CSLAP

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

A1. Conditions in Sleepy Hollow Lake were probably more favorable than normal in 2015. Algae levels were lower than usual, due to lower phosphorus readings, resulting in higher water clarity and no evidence of shoreline blue green algae blooms. Aquatic plant coverage was higher than usual, but may have been kept in check by previous management actions.

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

A2. Chloride sampling results were typical of lakes with moderate impacts from road salt runoff, although no biological impacts were reported or measured.

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

A3. Sleepy Hollow Lake had lower water clarity, but similar to slightly lower algae and nutrient readings than the typical nearby lake in 2015. Plant coverage was higher than in many nearby lakes in 2015, but may have still been kept in check due to previous management.

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

A4. Conductivity and temperature readings have increased slightly in the last several years, but it is not known if this is part of a longer-term trend. Each of the other indicators has varied slightly from year to year.

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

A5. Sleepy Hollow Lake appears to be susceptible to shoreline blue green algae blooms, although the trigger point for these blooms is not known, and no blooms were reported in 2015. Any nutrient sources along the shoreline or in the watershed (eroding shorelines, sediment,...) should be identified and reduced working with local agencies.

**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.

<b>Lake Use</b>				
	PWL	Average Year	2015	Primary issue
<b>Potable Water</b>				Algae levels
<b>Swimming</b>				Algae levels
<b>Recreation</b>				Algae levels
<b>Aquatic Life</b>				Road salt
<b>Aesthetics</b>				Algae blooms
<b>Habitat</b>				Invasive plants
<b>Fish Consumption</b>				

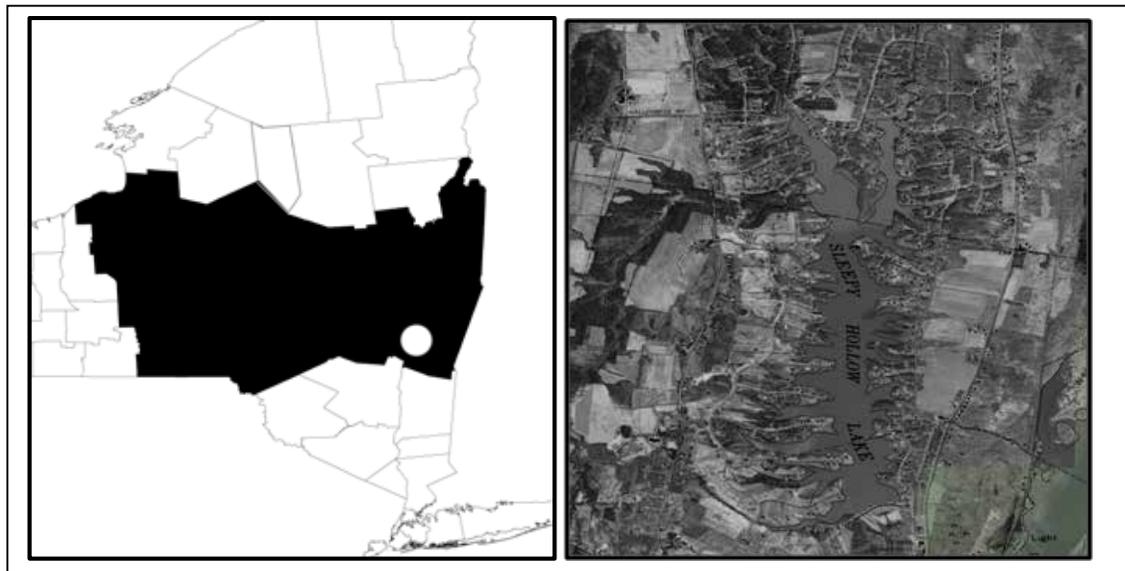
Supported / Good  
 Threatened / Fair  
 Stressed / Poor  
 Impaired  
 Not Known

## CSLAP 2015 Lake Water Quality Summary: Sleepy Hollow Lake

### General Lake Information

<b>Location</b>	Town of Athens
<b>County</b>	Greene
<b>Basin</b>	Lower Hudson River
<b>Size</b>	131.9 hectares (325.8 acres)
<b>Lake Origins</b>	Augmented by 83ft by 730ft earthen dam (1972)
<b>Watershed Area</b>	3,650 hectares (9,015 acres)
<b>Retention Time</b>	0.8 years
<b>Mean Depth</b>	8.9 meters
<b>Sounding Depth</b>	19 meters
<b>Public Access?</b>	community boat and swimming access
<b>Major Tributaries</b>	Murderers Creek
<b>Lake Tributary To...</b>	Sleepy Hollow outlet to Hudson River
<b>WQ Classification</b>	A (potable water)
<b>Lake Outlet Latitude</b>	42.280
<b>Lake Outlet Longitude</b>	-43.805
<b>Sampling Years</b>	2009-2013, 2015
<b>2015 Samplers</b>	Laurel Mann, Karen Fusco and Jordan Davenport
<b>Main Contact</b>	Laurel Mann

### Lake Map



## **Background**

Sleepy Hollow Lake is a 326 acre, class A lake found in the town of Athens in Greene County in the mid-Hudson River basin. The lake was first sampled as part of CSLAP in 2009.

It is the only CSLAP lake among the nearly 320 lakes, ponds and reservoirs found in Greene County, and one of 67 CSLAP lakes among the more than 3680 lakes and ponds in the Lower Hudson River drainage basin.

## **Lake Uses**

Sleepy Hollow Lake is a Class A lake; this means that the best intended use for the lake is for potable water—drinking, contact recreation—swimming and bathing, non-contact recreation—boating and angling, aquatic life, and aesthetics. The lake is used by lake residents for swimming, power boating and other recreation via shoreline properties; the lake also supports a community access point for the residents of the Sleepy Hollow Lake community.

It is not known whether Sleepy Hollow Lake has been stocked through any private stocking programs; the lake is not stocked by the state.

General statewide fishing regulations are applicable in Sleepy Hollow Lake.

## **Historical Water Quality Data**

CSLAP sampling was conducted on Sleepy Hollow Lake from 2009 to 2013, and in 2015. The CSLAP reports for each of the past several years can be found on the NYSFOLA website at <http://nysfola.mylaketown.com>. The most recent CSLAP report and scorecard for Sleepy Hollow Lake can also be found on the NYSDEC web page at <http://www.dec.ny.gov/lands/77868.html>.

Sleepy Hollow Lake was sampled as part of the DEC small lakes TMDL project, in which a select group of small lakes and their tributaries are sampled in support of developing a desktop TMDL (total maximum daily load) calculation for lakes on the federal 303d list. The lake was sampled monthly and the main tributary (the Murderers Kill) was fitted with an automated sampler and gages to collect storm event water samples and continual water level measurements. The results from this study will be summarized in a DEC report.

There are no NYSDEC RIBS monitoring or stream biomonitoring sites near Sleepy Hollow Lake.

## **Lake Association and Management History**

Sleepy Hollow Lake is served by the Sleepy Hollow Lake Association. Most of the management of the lake is conducted by the Sleepy Hollow Lake manager. These activities include:

- Conducting water quality monitoring, including CSLAP, macrophyte mapping, and zooplankton surveying
- Enforcing boating, swimming, water skiing rules
- Maintaining sewer and water companies that serve the lake community
- Conducting aquatic plant management
- Hosting an annual bass tournament (state white crappie record on the lake)
- Coordinating a wide variety of social activities
- Managing boating (50 HP limit- no jet skiing), swimming, fishing, waterskiing

- Implementing long-term management plan

The Sleepy Hollow Lake Association maintains a website at <http://www.sleepyhollowlake.org>.

## **Summary of 2015 CSLAP Sampling Results**

### **Evaluation of 2015 Annual and Monthly Results Relative to 2006-2013**

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

### **Evaluation of Eutrophication Indicators**

Water clarity readings were higher in 2015 than in any previous CSLAP sampling season, consistent with lower than normal nutrient and algae levels. None of these indicators has exhibited any clear long-term trends, so it is not yet known if the 2015 results are indicative of a long-term change or represent normal variability.

Water clarity typically increases from June through September, but so does chlorophyll *a*, while phosphorus levels are stable after a decrease from June to July, most likely associated with dilution of spring runoff. Water clarity also increased during the same period from June through September in 2015, consistent with a decrease in phosphorus and chlorophyll *a* over the same period in 2015.

The lake can be characterized as *mesoeutrophic*, or moderately to highly productive, based on total phosphorus, water clarity (both typical of *eutrophic*, or highly productive lakes) and chlorophyll *a* (typical of *mesotrophic*, or moderately productive lakes) readings, although phosphorus readings in 2015 were also typical of *mesotrophic* lakes in 2015. The trophic state indices (TSI) evaluation suggests that water clarity and chlorophyll *a* readings are lower than expected given the total phosphorus readings in the lake. This discrepancy is due to the influence of (non-algal) turbidity on water transparency; it is not yet known if (but not expected that) this will change in response to the zebra mussel colonization in the lake. Overall trophic conditions are summarized on the Lake Scorecard and Lake Condition Summary Table.

### **Evaluation of Potable Water Indicators**

Algae levels may be 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 it is not known if any of these impacts occur. Hypolimnetic phosphorus, arsenic and ammonia readings are slightly higher than those measured at the lake surface, although these readings are well below the state water quality standards. Deepwater iron and manganese levels are at times elevated and exceed the state standards. This suggests that deepwater intakes may be compromised for any potable water use. 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 2015, and these readings have increased since CSLAP sampling began in 2009. NO<sub>x</sub> and ammonia readings were higher than normal in 2015,

but no long-term trends have been apparent. It is now known if the drop in calcium levels in 2015 and color readings in recent years represent a trend.

Chloride levels in the 2015 samples, collected for the first time through CSLAP and cited in Appendix A, ranged from 25 to 26 mg/l. These values fall within the “moderate” road salt runoff levels cited by the New Hampshire DES. These readings are well below the state potable water quality standard of 250 mg/l, and within the range of values found in most NYS lakes. These readings suggest a low to moderate likelihood of biological impacts from road salt. Additional data will help to determine if these represent normal readings for the lake.

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

### **Evaluation of Biological Condition**

Macrophyte surveys conducted through CSLAP and the LCI showed few aquatic plants, and at least three exotic plant species (*Myriophyllum spicatum*, Eurasian watermilfoil; *Najas minor*, brittle naiad; and *Trapa natans*, water chestnut) have been found in the lake. The modified floristic quality index (FQI) data indicate very poor aquatic plant diversity, although it is likely that a detailed aquatic plant survey would identify additional plant species. The composition of the fish community in the lake has not been reported.

Zooplankton surveys have not been conducted through CSLAP at Sleepy Hollow Lake. The fluoroprobe screening samples analyzed by SUNY ESF indicate low algae levels and a low percentage of blue green algae in the open water, although elevated open water algae levels in mid-August of 2013 were dominated by *Microcystis* (a toxin-producing blue green algae species) and green algae. Shoreline blooms at times are dominated by blue green algae- 2013 shoreline bloom samples found a mix of blue green algae species (particularly *Aphanizomenon* (often not associated with toxins) and *Nostoc* in early summer, and *Woronichina* (also not associated with toxins) and lesser amounts of *Anabaena*, *Aphanizomenon*, and some *Microcystis* in later summer). No shoreline blooms were reported or sampled in 2015.

Zooplankton surveys have been conducted through the lake association. Macroinvertebrates were sampled through the DEC biomonitoring survey in 2012, but these results are not yet available.

### **Evaluation of Lake Perception**

Water quality assessments and recreational conditions were close to normal in 2015, despite higher water clarity readings and a slight increase in plant coverage in recent years (the latter has been managed by aquatic herbicides in some years). Water quality assessments improve from June through October in many years, consistent with seasonal increases in water clarity, but plant coverage and recreational assessments do not exhibit clear seasonal variability. Recreational assessments degraded seasonally in 2015, perhaps consistent with a seasonal increase in plant coverage in 2015 and despite seasonal improvements in water quality assessments. Overall lake perception is summarized on the Lake Scorecard and Lake Condition Summary Table.

### **Evaluation of Local Climate Change**

Water and air temperature readings in the summer index period were higher than usual in 2015, and water temperatures have increased over the last several years.

## 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 are usually, but not always, below the threshold for harmful algal blooms (HABs) in the open water, but open water algae levels were low in 2015. Shoreline blooms at times show very high blue green algae levels, with occasionally elevated algal toxin (microcystin-LR) levels. It is not known if and to what extent this may affect treated drinking water, but swimmers and other lake users should avoid exposure to any surface scums or heavily discolored water.

## Lake Condition Summary

Category	Indicator	Min	Annual Avg	Max	2015 Avg	Classification	2015 Change?	Long-term Change?
Eutrophication Indicators	Water Clarity	0.45	1.19	2.90	1.69	Eutrophic	Higher Than Normal	No Change
	Chlorophyll <i>a</i>	1.30	6.47	33.10	3.09	Mesotrophic	Lower Than Normal	No Change
	Total Phosphorus	0.013	0.023	0.048	0.018	Eutrophic	Lower Than Normal	No Change
Potable Water Indicators	Hypolimnetic Ammonia	0.01	0.12	0.53	0.08	Close to Surface NH <sub>4</sub> Readings	Lower Than Normal	Not known
	Hypolimnetic Arsenic	0.50	1.33	2.70		Elevated Deepwater As		Not known
	Hypolimnetic Iron	0.01	0.71	2.75		Elevated Deepwater Fe		Not known
	Hypolimnetic Manganese	0.01	0.34	1.07		Elevated Deepwater Mn		Not known
Limnological Indicators	Hypolimnetic Phosphorus	0.000	0.033	0.117	0.022	Close to Surface TP Readings	Lower Than Normal	Not known
	Nitrate + Nitrite	0.00	0.03	0.15	0.04	Low NO <sub>x</sub>	Higher than Normal	No Change
	Ammonia	0.01	0.03	0.05	0.04	Low Ammonia	Higher than Normal	No Change
	Total Nitrogen	0.18	0.48	0.77	0.45	Low Total Nitrogen	Within Normal Range	No Change
	pH	6.58	7.62	8.30	7.73	Alkaline	Within Normal Range	No Change
	Specific Conductance	167	249	322	298	Intermediate Hardness	Higher than Normal	Increasing Slightly
	True Color	10	26	66	15	Intermediate Color	Within Normal Range	No Change
	Calcium	22.5	28.3	35.0	24.3	Highly Susceptible to Zebra Mussels	Lower Than Normal	No Change
Lake Perception	WQ Assessment	1	2.0	3	2.0	Not Quite Crystal Clear	Within Normal Range	No Change
	Aquatic Plant Coverage	1	2.6	3	2.9	Surface Plant Growth	Within Normal Range	No Change
	Recreational Assessment	1	1.9	3	2.0	Excellent	Within Normal Range	No Change
Biological Condition	Phytoplankton					Not measured through CSLAP	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					Not yet analyzed through CSLAP	Not known	Not known
	Fish					Limited information	Not known	Not known
	Invasive Species					Zebra mussels, Eurasian watermilfoil, water chestnut, curly-leaved pondweed, brittle naiad	Not known	Not known
Local Climate Change	Air Temperature	9	23.5	33	27.1		Higher Than Normal	Increasing Slightly
	Water Temperature	13	24.0	30	25.3		Higher Than Normal	No Change

Category	Indicator	Min	Annual Avg	Max	2015 Avg	Classification	2015 Change?	Long-term Change?
Harmful Algal Blooms	Open Water Phycocyanin	1	39	200	11	Most readings indicate low risk of BGA	Not known	Not known
	Open Water FP Chl.a	0	4	24	2	Few readings indicate high algae levels	Not known	Not known
	Open Water FP BG Chl.a	0	2	22	0	Few readings indicate high BGA levels	Not known	Not known
	Open Water Microcystis	<DL	<DL	0.8	<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	387.0	1624.3	3611.0		All readings indicate high risk of BGA	Not known	Not known
	Shoreline FP Chl.a	5.9	3133.6	23515.0		Most readings indicate high algae levels	Not known	Not known
	Shoreline FP BG Chl.a	3.6	3127.3	23515.0		Most readings indicate high BGA levels	Not known	Not known
	Shoreline Microcystis	<DL	4.7	45.0		Occasionally high shoreline bloom MC-LR	Not known	Not known
	Shoreline Anatoxin a	<DL	<DL	<DL		Shoreline bloom Anatoxin-a consistently not detectable	Not known	Not known

## Evaluation of Lake Condition Impacts to Lake Uses

The 2008 NYSDEC Priority Waterbody Listings (PWL) for the Lower Hudson River drainage basin indicate that bathing is *impaired*, recreation and aesthetics are *stressed*, and water supply is *threatened* in Sleepy Hollow Lake. The PWL listing for Sleepy Hollow Lake is listed in Appendix B—it incorrectly notes that the lake was sampled through CSLAP (rather than the small lakes TMDL monitoring program) in 2004.

### Potable Water (Drinking Water)

The CSLAP dataset at Sleepy Hollow Lake, including water chemistry data, physical measurements, and volunteer samplers' perception data, is inadequate to evaluate the use of the lake for potable water. The limited data suggest that potable water may be *stressed* by excessive algae and *threatened* by elevated deepwater iron and manganese, although lower algae levels in 2015 indicated lesser impacts. Additional data may be needed to verify this preliminary assessment, and these assessments may vary from year to year.

### Public Bathing

The CSLAP dataset at Sleepy Hollow Lake, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggests that public bathing may be *impaired* by excessive algae and nutrients, algal blooms, and poor water clarity, although lesser impacts were apparent in 2015. 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 Sleepy Hollow Lake, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggest that recreation may at times be *impaired* by shoreline algae blooms, and this use may ultimately be *threatened* by Eurasian watermilfoil, brittle naiad, and water chestnut. This use may be supported by the active management of invasive weeds. However, no shoreline blooms were reported in 2015.

### **Aquatic Life**

The CSLAP dataset on Sleepy Hollow Lake, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggest that aquatic life may be *threatened* by road salt runoff, deepwater anoxia and invasive species, particularly zebra mussels. Additional data are needed to evaluate the food and habitat conditions for aquatic organisms in the lake.

### **Aesthetics and Habitat**

The CSLAP dataset on Sleepy Hollow Lake, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggest that aesthetics may be *poor* due to shoreline algae blooms, although these impacts are highly variable and largely appear to be limited to isolated locations in the lake, not the open water. Habitat may be *fair* due to poor weed growth in some areas and invasive plant growth in other places.

### **Fish Consumption**

There are no fish consumption advisories posted for Sleepy Hollow Lake.

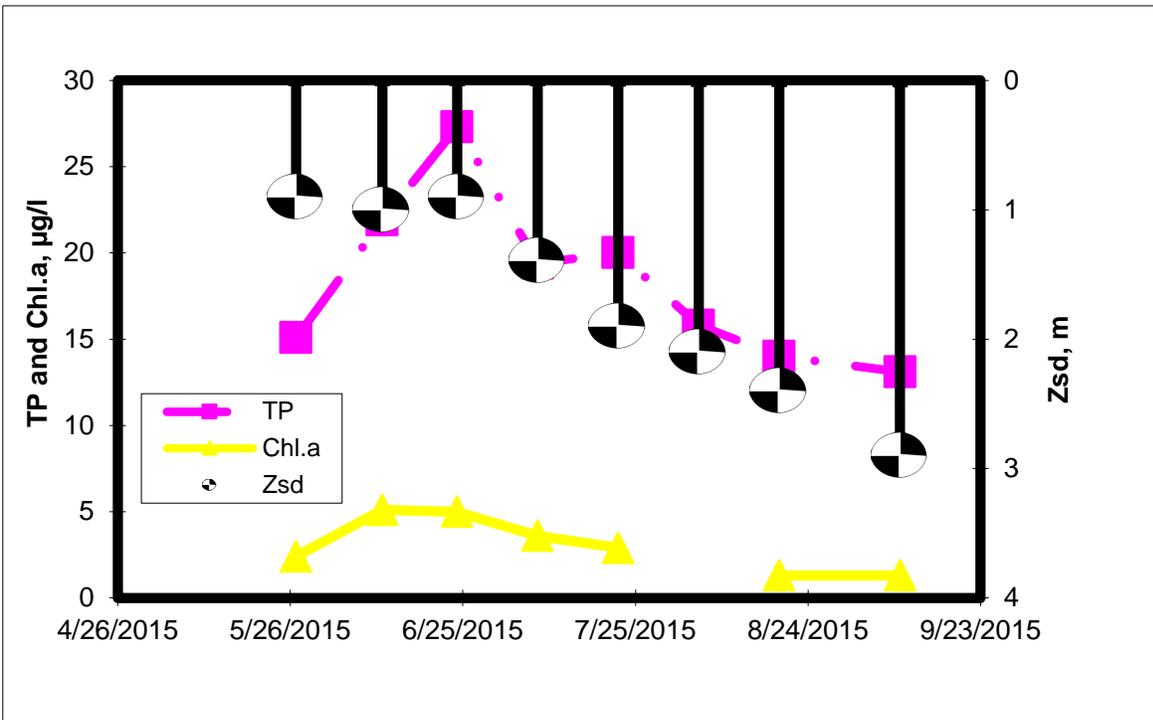
### **Additional Comments and Recommendations**

Additional water quality data should be collected to determine the extent to which water quality conditions and aquatic plant coverage are changing in response to active plant management, zebra mussels, and shoreline algae blooms. Lake residents are advised to report and avoid exposure to any shoreline blooms.

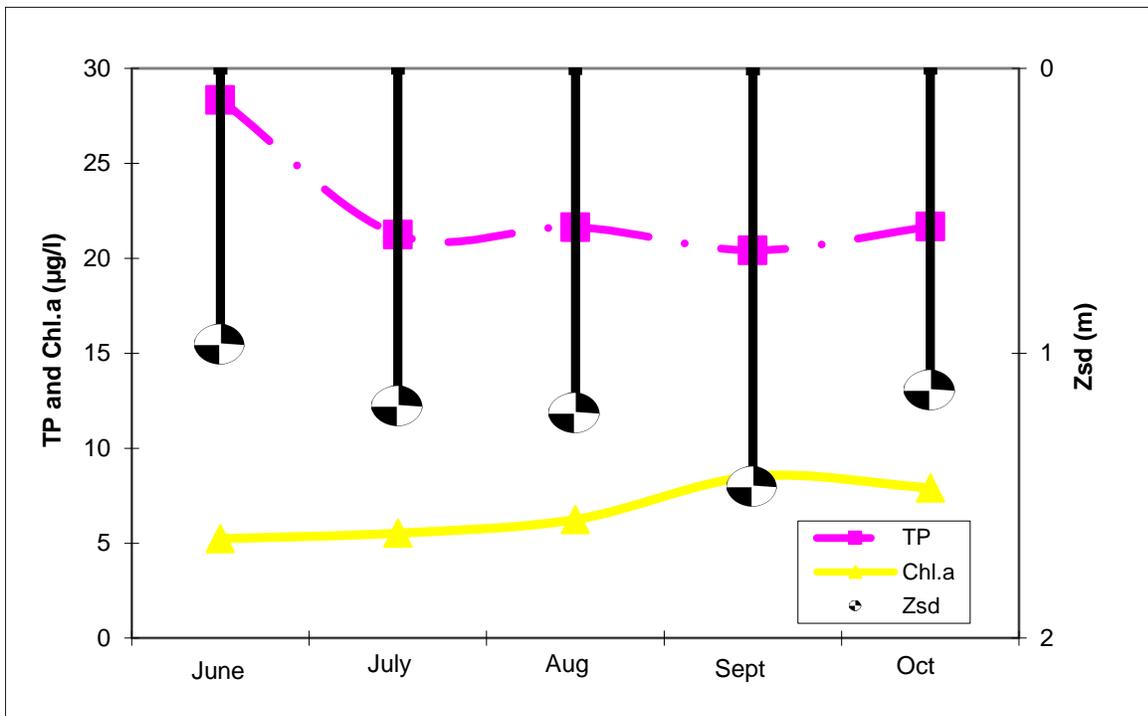
### **Aquatic Plant IDs-2015**

No plants submitted for identification through CSLAP in 2015.

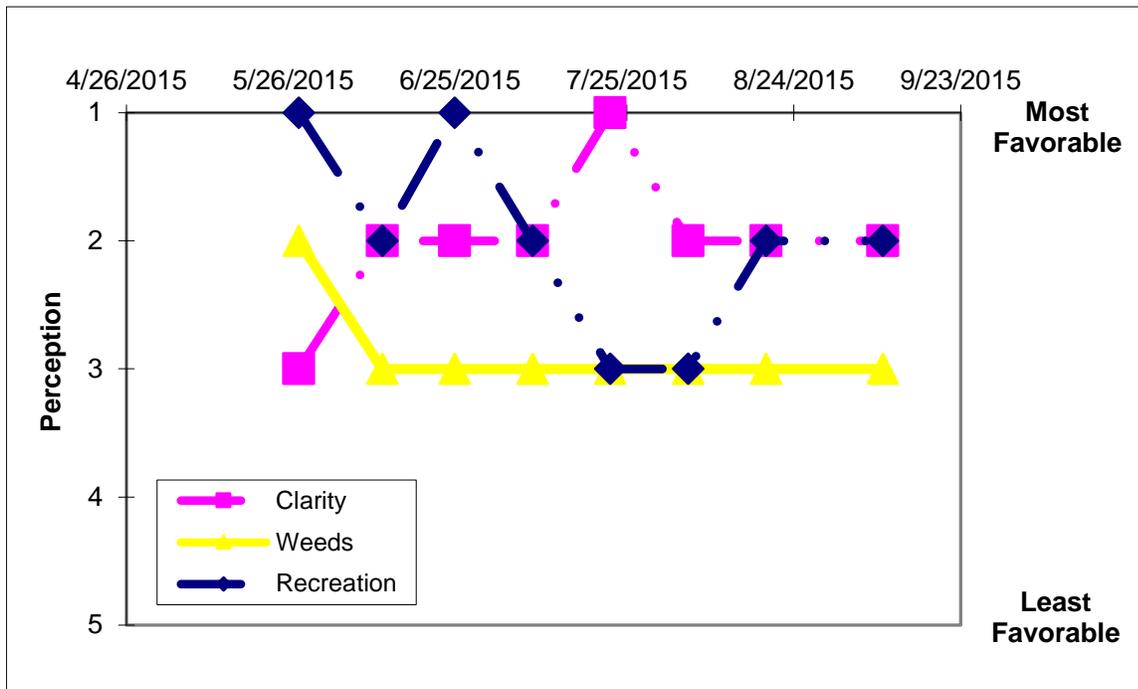
### Time Series: Trophic Indicators, 2015



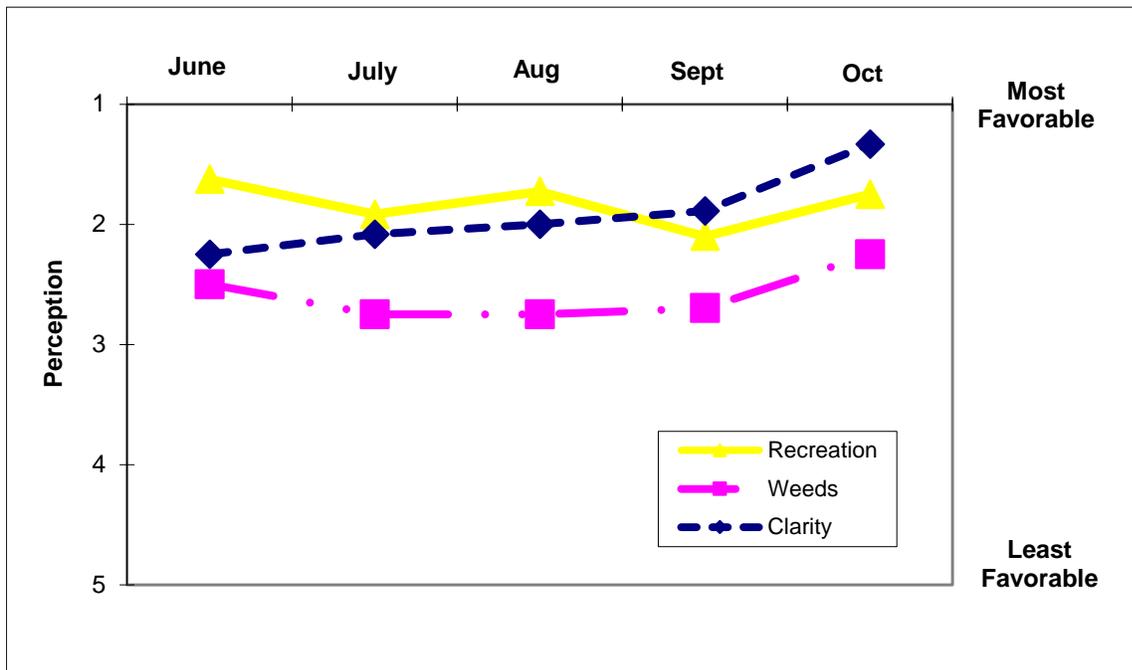
### Time Series: Trophic Indicators, Typical Year (2009-2015)



## Time Series: Lake Perception Indicators, 2015



## Time Series: Lake Perception Indicators, Typical Year (2009-15)



## Appendix A- CSLAP Water Quality Sampling Results for Sleepy Hollow Lake

LNum	PName	Date	Zbot	Zsd	Zsamp	Tot.P	NO3	NH4	TDN	TN/TP	TColor	pH	Cond25	Ca	Chl.a	Cl
223	Sleepy Hollow L	7/13/2009	15.0	1.10	1.5	0.028	0.01	0.01	0.40	31.15	36	7.16	204	30.7	9.45	
223	Sleepy Hollow L	7/27/2009	14.0	1.38	1.5	0.024	0.01	0.02	0.37	33.46	42	7.76	202		6.11	
223	Sleepy Hollow L	8/10/2009	14.0	0.65	1.5	0.029	0.01	0.05	0.45	33.72	53	7.17	180		8.80	
223	Sleepy Hollow L	8/10/2009	grab	bloom												
223	Sleepy Hollow L	8/10/2009	grab	bloom												
223	Sleepy Hollow L	8/21/2009	13.0	1.25	1.5	0.025	0.01	0.02	0.46	41.16	66	7.82	170		8.30	
223	Sleepy Hollow L	9/9/2009	19.0	1.00	1.5	0.025	0.15	0.02	0.48	41.92	55	7.67	167	25.4	11.90	
223	Sleepy Hollow L	9/9/2009	grab	bloom												
223	Sleepy Hollow L	9/9/2009	grab	bloom												
223	Sleepy Hollow L	9/21/2009	14.0	0.90	1.5	0.027	0.01	0.01	0.48	39.27	50	7.58	186		33.10	
223	Sleepy Hollow L	10/6/2009	18.0	1.25	1.5	0.019	0.01	0.01	0.45	52.57	40	7.45	193		11.85	
223	Sleepy Hollow L	10/19/2009	18.0	0.80	1.5	0.024	0.02	0.04	0.62	55.95	43	7.68	193		5.40	
223	Sleepy Hollow L	6/3/2010														
223	Sleepy Hollow L	6/10/2010														
223	Sleepy Hollow L	6/24/2010	16.5	1.00	1.0	0.018	0.03	0.02	0.65	78.69	17	8.00	259	29.6	2.90	
223	Sleepy Hollow L	7/8/2010	13.0	1.10	1.0	0.020	0.07	0.02	0.53	58.85	11	8.23	261		4.90	
223	Sleepy Hollow L	7/20/2010	14.2	1.20	1.0	0.016	0.01	0.05	0.38	52.83	11	7.95	268		2.20	
223	Sleepy Hollow L	8/4/2010	12.8	1.00	1.0	0.019	0.01	0.02	0.18	20.87	24	7.47	276		6.70	
223	Sleepy Hollow L	8/4/2010														
223	Sleepy Hollow L	8/19/2010		1.65	1.0	0.014	0.01	0.01	0.25	40.33	22	7.96	278	29.6	4.60	
223	Sleepy Hollow L	9/2/2010	16.5	1.90	1.0	0.019	0.01	0.01	0.42	49.44	11	8.30	281		3.10	
223	Sleepy Hollow L	9/7/2010														
223	Sleepy Hollow L	9/16/2010	15.0	1.70	1.0	0.020	0.03	0.02	0.35	38.91	10	7.69	283		4.80	
223	Sleepy Hollow L	10/7/2010	17.0	1.10	1.0	0.019	0.04	0.03	0.35	40.64	39	7.41	274		6.10	
223	Sleepy Hollow L	5/31/2011	17.0	0.45	1.0	0.040	0.01	0.02	0.55	29.96	54	7.46	239	25.3	7.70	
223	Sleepy Hollow L	6/15/2011	16.0	0.98	1.0	0.026	0.11	0.05	0.30	25.05	39	6.58	280		2.00	
223	Sleepy Hollow L	6/28/2011	17.0	1.30	1.0	0.048	0.02	0.04	0.37	17.29	21	7.62	219		2.80	
223	Sleepy Hollow L	7/12/2011	12.0	1.30	1.0	0.020	0.02	0.03	0.67	72.39	29	7.39	251		4.20	
223	Sleepy Hollow L	7/26/2011	17.0	0.78	1.0	0.023	0.02	0.03	0.49	47.06	38	7.59	250	35.0	5.90	
223	Sleepy Hollow L	7/26/2011														
223	Sleepy Hollow L	8/10/2011	14.0	0.93	1.5	0.016	0.01	0.01	0.50	67.36	16	8.09	240		6.70	
223	Sleepy Hollow L	8/10/2011			open											
223	Sleepy Hollow L	8/10/2011			bloom											
223	Sleepy Hollow L	8/10/2011			bloom											
223	Sleepy Hollow L	8/24/2011	16.0	1.28	1.5	0.019	0.04	0.03	0.53	60.64	23	7.88	247		3.50	
223	Sleepy Hollow L	8/24/2011														
223	Sleepy Hollow L	9/6/2011	17.0	0.95	1.5	0.020	0.06	0.03	0.54	59.25	34	7.50	218		5.40	
223	Sleepy Hollow L	9/13/2011			open											
223	Sleepy Hollow L	9/19/2011			bloom											
223	Sleepy Hollow L	9/19/2011			open											
223	Sleepy Hollow L	9/19/2011	grab		bloom											
223	Sleepy Hollow L	9/26/2011			open											
223	Sleepy Hollow L	9/26/2011	Raw 1		open											
223	Sleepy Hollow L	9/26/2011	Raw 2		open											
223	Sleepy Hollow L	9/26/2011	Raw 3		bloom											
223	Sleepy Hollow L	10/5/2011			open											
223	Sleepy Hollow L	10/5/2011	marina		bloom											
223	Sleepy Hollow L	10/12/2011			open											
223	Sleepy Hollow L	10/12/2011			bloom											
223	Sleepy Hollow L	6/11/2012	17.0	0.68	1.5	0.027	0.01	0.02	0.35	28.02	21	7.70	209	28.8	5.10	
223	Sleepy Hollow L	6/25/2012	13.0	1.25	1.5	0.022	0.01	0.03	0.42	42.57	17	7.63	245		7.30	
223	Sleepy Hollow L	7/16/2012	13.0	1.10	1.5	0.019	0.01	0.03	0.41	47.47	13	7.59	245		2.50	
223	Sleepy Hollow L	7/16/2012														
223	Sleepy Hollow L	7/31/2012	15.0	1.08	1.5	0.022	0.01	0.03	0.49	48.98	12	7.02	256		6.50	
223	Sleepy Hollow L	8/14/2012	15.0	1.50	1.5	0.024	0.01	0.03	0.59	54.63	13	7.20	235	29.9	6.60	
223	Sleepy Hollow L	8/14/2012			open											
223	Sleepy Hollow L	9/4/2012	15.0	1.30	1.5	0.020	0.01	0.03	0.39	42.16	13	7.55	251		9.10	
223	Sleepy Hollow L	9/17/2012	18.0	1.48	1.5	0.022	0.01	0.02	0.53	53.10	13	7.13	249		7.50	
223	Sleepy Hollow L	9/17/2012			open											
223	Sleepy Hollow L	10/2/2012	16.0	1.38	1.5	0.024	0.01	0.02	0.41	36.61	20	7.34	240		8.30	
223	Sleepy Hollow L	10/2/2012			open											
223	Sleepy Hollow L	10/20/2012			open											
223	Sleepy Hollow L	6/18/2013	18.0	0.65	1.5	0.037	0.10	0.02	0.71	42.63	25	7.88	259		11.70	
223	Sleepy Hollow L	6/18/2013			bloom											

LNum	PName	Date	Zbot	Zsd	Zsamp	Tot.P	NO3	NH4	TDN	TN/TP	TColor	pH	Cond25	Ca	Chl.a	Cl
223	Sleepy Hollow L	7/2/2013	17.0	0.95	1.5	0.024			0.67	62.44	41	7.92	262		7.80	
223	Sleepy Hollow L	7/15/2013	18.0	0.95	1.5	0.020	0.01	0.01	0.50	54.25	25	7.91	256		10.30	
223	Sleepy Hollow L	7/31/2013			bloom											
223	Sleepy Hollow L	8/2/2013	18.0	0.48	1.5	0.030			0.77	56.17	29	7.75	251		10.40	
223	Sleepy Hollow L	8/14/2013	18.0	0.60	1.5	0.029	0.01	0.03	0.77	57.52	22	7.85	245			
223	Sleepy Hollow L	8/14/2013			bloom											
223	Sleepy Hollow L	8/27/2013	18.0	0.70	1.5	0.024			0.66	59.84	23	7.34	256		5.60	
223	Sleepy Hollow L	9/10/2013	18.0	1.23	1.5	0.020	0.01	0.05	0.54	58.40	26	7.34	263		4.20	
223	Sleepy Hollow L	9/19/2013			bloom											
223	Sleepy Hollow L	9/19/2013			bloom											
223	Sleepy Hollow L	10/3/2013			bloom											
223	Sleepy Hollow L	9/24/2013	18.0	1.35	1.5	0.018			0.55	68.75	18	7.39	241		4.80	
223	Sleepy Hollow L	5/27/2015	19.0	0.90	1.5	0.015	0.06	0.04	0.42	2.81	14	7.34	322	26.1	2.40	
223	Sleepy Hollow L	6/11/2015	18.0	1.00	1.5	0.022			0.43	19.54	12	7.98	302		5.10	
223	Sleepy Hollow L	6/24/2015	18.0	0.90	1.5	0.027	0.09	0.04	0.42	15.35	12	7.16	295		5.00	25.6
223	Sleepy Hollow L	7/8/2015	18.0	1.40	1.5	0.019			0.56	28.76	19	7.69	301		3.60	
223	Sleepy Hollow L	7/22/2015	16.0	1.90	1.5	0.020	0.02	0.04	0.45	22.50	19	7.74	279	22.5	2.90	
223	Sleepy Hollow L	8/5/2015	18.0	2.10	1.5	0.016			0.50	31.71	19	8.01	305			
223	Sleepy Hollow L	8/19/2015	18.0	2.40	1.5	0.014	0.00	0.03	0.48	33.93	14	8.16	286		1.30	25.7
223	Sleepy Hollow L	9/9/2015	19.0	2.90	1.5	0.013			0.35	26.72	12	7.74	294		1.30	
LNum	PName	Date	Zbot	Zsd	Zsamp	Tot.P	NO3	NH4		Fe	Mn	As	NO2			
223	Sleepy Hollow L	07/13/2009	15.0		15.0	0.040		0.35								
223	Sleepy Hollow L	07/27/2009	14.0		13.0	0.021		0.08								
223	Sleepy Hollow L	08/10/2009	14.0		13.0	0.036		0.16								
223	Sleepy Hollow L	08/21/2009	13.0		12.0	0.033		0.20								
223	Sleepy Hollow L	09/09/2009	19.0		13.0	0.050		0.02		1.45	0.92					
223	Sleepy Hollow L	09/21/2009	14.0		13.0	0.065		0.35								
223	Sleepy Hollow L	10/06/2009	18.0		15.0	0.074				2.75	1.07					
223	Sleepy Hollow L	10/19/2009	18.0		15.0	0.117		0.53								
223	Sleepy Hollow L	6/24/2010	16.5		13.0	0.029		0.01								
223	Sleepy Hollow L	7/20/2010	14.2		13.0	0.029		0.02								
223	Sleepy Hollow L	8/4/2010	12.8		12.0					0.82	0.60					
223	Sleepy Hollow L	8/19/2010			12.0	0.029		0.19		1.01	0.79	1.80				
223	Sleepy Hollow L	9/16/2010	15.0		14.0	0.040		0.27				2.70				
223	Sleepy Hollow L	10/7/2010	17.0		15.0					2.39	0.94					
223	Sleepy Hollow L	5/31/2011	17.0		15.0	0.038		0.03		0.01	0.01					
223	Sleepy Hollow L	6/28/2011	17.0		16.0	0.024		0.04		0.17	0.01					
223	Sleepy Hollow L	7/26/2011	17.0		12.0	0.024		0.03		0.24	0.01	0.50				
223	Sleepy Hollow L	8/24/2011	16.0		15.0	0.019		0.03		0.01	0.01	1.00				
223	Sleepy Hollow L	6/11/2012			16.0	0.028		0.02								
223	Sleepy Hollow L	6/25/2012			12.0					0.03	0.02					
223	Sleepy Hollow L	7/16/2012			12.0	0.024		0.03								
223	Sleepy Hollow L	7/31/2012			14.0					0.06	0.02					
223	Sleepy Hollow L	8/14/2012			14.0	0.022		0.02								
223	Sleepy Hollow L	9/4/2012			14.0					0.12	0.02	1.00				
223	Sleepy Hollow L	9/17/2012			18.0	0.021		0.02								
223	Sleepy Hollow L	10/2/2012			15.0					0.19	0.05	1.00				
223	Sleepy Hollow L	6/18/2013			16.5	0.035		0.03								
223	Sleepy Hollow L	7/2/2013			16.0	0.025										
223	Sleepy Hollow L	7/15/2013			17.0	0.022		0.01								
223	Sleepy Hollow L	8/2/2013			17.0	0.033										
223	Sleepy Hollow L	8/14/2013			17.0	0.023		0.23								
223	Sleepy Hollow L	8/27/2013			17.0	0.025										
223	Sleepy Hollow L	9/10/2013			17.0	0.026		0.31								
223	Sleepy Hollow L	9/24/2013			17.0	0.049										
223	Sleepy Hollow L	5/27/2015			17.0	0.043		0.07								
223	Sleepy Hollow L	6/11/2015			17.0	0.068										
223	Sleepy Hollow L	6/24/2015			16.0	0.013		0.06								
223	Sleepy Hollow L	7/8/2015			16.5	0.024										
223	Sleepy Hollow L	7/22/2015			14.5	0.014		0.04								
223	Sleepy Hollow L	8/5/2015			17.0	0.008										
223	Sleepy Hollow L	8/19/2015			16.5	0.000		0.16								
223	Sleepy Hollow L	9/9/2015			17.5	0.007										

LN	Num	PName	Date	Type	TAir	TH20	QA	QB	QC	QD	QE	QF	QG	AQ-PC	AQ-Chla	MC-LR	Ana-a	Cylin	FP-Chl	FP-BG	HABform	ShoreHAB		
223		Sleepy Hollow Lake	07/13/2009	epi	26	24	3	3	2	1														
223		Sleepy Hollow Lake	07/27/2009	epi	24	24	2	3	2	1														
223		Sleepy Hollow Lake	08/10/2009	epi	27	23	2	3	2	1							0.04							
223		Sleepy Hollow Lake	08/10/2009	bloom													0.13							
223		Sleepy Hollow Lake	08/10/2009	bloom													0.04							
223		Sleepy Hollow Lake	08/21/2009	epi	26	25	2	3	1	5														
223		Sleepy Hollow Lake	09/09/2009	epi	19	23	2	3	3	1				115.5		0.01								
223		Sleepy Hollow Lake	09/09/2009	bloom													0.34							
223		Sleepy Hollow Lake	09/09/2009	bloom													0.08							
223		Sleepy Hollow Lake	09/21/2009	epi	21	19	2	3	2	1				56.24										
223		Sleepy Hollow Lake	10/06/2009	epi	16	17		3	2	0				146.4		0.01								
223		Sleepy Hollow Lake	10/19/2009	epi	9	13	1	1	2	1														
223		Sleepy Hollow Lake	06/03/2010	epi										84.00		0.01								
223		Sleepy Hollow Lake	06/10/2010	bloom										874.80		0.20								
223		Sleepy Hollow Lake	6/24/2010	epi	26	25	3	2	2	0	4	0												
223		Sleepy Hollow Lake	7/8/2010	epi	30	29	3	2	2	0	46	4												
223		Sleepy Hollow Lake	7/20/2010	epi	25	28	3	2	2	0	4	4												
223		Sleepy Hollow Lake	8/4/2010	epi	25	25	2	2	2	0	0	0	44.00		0.00									
223		Sleepy Hollow Lake	8/4/2010	bloom									3611.00		0.01									
223		Sleepy Hollow Lake	8/4/2010	bloom									387.00		0.01									
223		Sleepy Hollow Lake	8/19/2010	epi	23	25	3	2	2	0	6	0	113.60											
223		Sleepy Hollow Lake	9/2/2010	epi	28	27	2	3	2	0	6	0	64.34											
223		Sleepy Hollow Lake	9/7/2010	epi									65.00		0.00									
223		Sleepy Hollow Lake	9/16/2010	epi	17	20	2	3	2	0	0	0												
223		Sleepy Hollow Lake	10/7/2010	epi	12	17	2	2	2	1	0	0	200.00		0.00									
223		Sleepy Hollow Lake	5/31/2011	epi	25	28	3	3	2	16	0	0												
223		Sleepy Hollow Lake	6/15/2011	epi	22	23	3	2	2	1	0	0	20.50	4.80										
223		Sleepy Hollow Lake	6/28/2011	epi	25	25	2	2		0	0	0	14.30	5.20										
223		Sleepy Hollow Lake	7/12/2011	epi	31	29	2	2	1	0	0	0	12.80	3.10										
223		Sleepy Hollow Lake	7/26/2011	epi	24	27	2	3	2	0	4	4	56.20	6.79	0.29	<0.500	<0.1							
223		Sleepy Hollow Lake	7/26/2011	bloom																				
223		Sleepy Hollow Lake	8/10/2011	epi	27	28	3	3	2	1	5	5	27.30	5.80										
223		Sleepy Hollow Lake	8/10/2011	epi												0.01								
223		Sleepy Hollow Lake	8/10/2011	bloom												0.00								
223		Sleepy Hollow Lake	8/10/2011	bloom												0.30	<0.900	<0.1						
223		Sleepy Hollow Lake	8/24/2011	epi	24	24	1	2	1	0	0	0	3.90	34.10										
223		Sleepy Hollow Lake	9/6/2011	epi	19	23	3	2	3	15	0	0	62.60	6.70										
223		Sleepy Hollow Lake	9/13/2011	epi												0.08								
223		Sleepy Hollow Lake	9/19/2011	bloom												0.98	<0.800	<0.1						
223		Sleepy Hollow Lake	9/19/2011	epi												0.09								
223		Sleepy Hollow Lake	9/19/2011	bloom												0.05								
223		Sleepy Hollow Lake	9/26/2011	epi												0.09								
223		Sleepy Hollow Lake	9/26/2011	epi												0.10								
223		Sleepy Hollow Lake	9/26/2011	epi												0.10								
223		Sleepy Hollow Lake	9/26/2011	bloom												8.73								
223		Sleepy Hollow Lake	10/5/2011	epi												0.19								
223		Sleepy Hollow Lake	10/5/2011	bloom												1.80								
223		Sleepy Hollow Lake	10/12/2011	epi												0.06								
223		Sleepy Hollow Lake	10/12/2011	bloom												1.68								
223		Sleepy Hollow Lake	6/11/2012	epi		24	2	2	2	5	0	0	1.30	0.90	<0.30	<0.417			2.17	0.16		I		
223		Sleepy Hollow Lake	6/25/2012	epi	24	26	1	3	1	0	4	5	10.20	0.70	<0.30	<0.428			2.65	1.69		I		
223		Sleepy Hollow Lake	7/16/2012	epi	31	30	2	3	2	0	4	4	22.40	0.50	<0.30	<0.328			3.90	3.00				
223		Sleepy Hollow Lake	7/16/2012	bloom												2.24	<0.846			34.75	4.45		H	
223		Sleepy Hollow Lake	7/31/2012	epi	24	25	1	3	1	0	0	0	15.40	0.60	<0.30	<0.330			3.29	1.98		I		
223		Sleepy Hollow Lake	8/14/2012	epi	24	26	1	3	1	0	0	0	14.00	0.90	0.43	<0.552			3.69	2.21		I		
223		Sleepy Hollow Lake	9/4/2012	epi	23	24	1	3	1	0	0	0	14.90	0.90	0.33	<0.725			4.08	2.45		I		
223		Sleepy Hollow Lake	9/17/2012	epi	15	23	1	3	1	0	0	0	16.20	0.60	<0.30	<3.299			1.87	1.22		I		
223		Sleepy Hollow Lake	10/2/2012	epi	17	18	1	3	1	0	0	0	8.20	0.70	<0.30	<3.205			2.36	0.98		I		
223		Sleepy Hollow Lake	10/20/2012	bloom												0.90	<6.409			537.00	537.00			
223		Sleepy Hollow Lake	6/18/2013	epi	20	22	3	3	3	15	46	0	24.20	7.30	<0.30	<0.440			8.00	2.20		I		
223		Sleepy Hollow Lake	6/18/2013	bloom												<0.60	<0.740			559.30	559.30		d	

LN	Num	PName	Date	Type	TAir	TH20	QA	QB	QC	QD	QE	QF	QG	AQ-PC	AQ-Chla	MC-LR	Ana-a	Cylin	FP-Chl	FP-BG	HAB form	Shore HAB		
223		Sleepy Hollow Lake	7/2/2013	epi	27	26	1	3	2	0	0	0	0	3.90	1.70	<0.30	<0.510		2.70	0.80	I			
223		Sleepy Hollow Lake	7/15/2013	epi	30	29	3	3	2	123	4	4	0	50.60	2.70	<0.30	<0.910		7.80	6.00	I			
223		Sleepy Hollow Lake	7/31/2013	bloom												<0.60	<0.680		23515.00	23515.00				
223		Sleepy Hollow Lake	8/2/2013	epi	24	25	3	3		3	4	4	0	19.70	2.30	0.82	<0.390		5.10	4.00	D			
223		Sleepy Hollow Lake	8/14/2013	epi		24	2	3	2	0	0	4	0	190.10	4.40	<0.30	<0.390		23.70	21.50	C			
223		Sleepy Hollow Lake	8/14/2013	bloom												<0.60	<0.760		23.40	22.20				
223		Sleepy Hollow Lake	8/27/2013	epi	23	24	1	3	1	0	0	0	0	5.50	1.30	<0.30	<0.570		0.70	0.10	I			
223		Sleepy Hollow Lake	9/10/2013	epi	23	22	2	2	3	5	0	0	0	2.30	0.90	<0.30	<19.130		0.30	0.00	I			
223		Sleepy Hollow Lake	9/19/2013	bloom												37.20	<2.200		369.20	355.60				
223		Sleepy Hollow Lake	9/19/2013	bloom												1.26	<2.200		24.10	21.30		bc		
223		Sleepy Hollow Lake	10/3/2013	bloom												<0.60	<21.210		5.90	3.60		c		
223		Sleepy Hollow Lake	9/24/2013	epi	12	18		2	2	0	0	4	0	17.90	2.60	<0.30	<19.130		3.70	1.70	I			
223		Sleepy Hollow Lake	5/27/2015	epi	26	21	3	2	1	0	7	0	0	7.50	0.70	<0.45	<0.089	<0.199	1.31	0.02	I	I		
223		Sleepy Hollow Lake	6/11/2015	epi	27	22	2	3	2	0	0	0	0	8.50	0.50	<0.55	<0.018	<0.139	1.24	0.00	I	E		
223		Sleepy Hollow Lake	6/24/2015	epi	24	24	2	3	1	0	0	0	0	13.20	0.90	<0.65	<0.007	<0.000	2.37	0.22	I	I		
223		Sleepy Hollow Lake	7/8/2015	epi	24	25	2	3	2	0	0	0	0	13.70	0.50	<0.30	<0.005	<0.028	2.04	0.41	I	I		
223		Sleepy Hollow Lake	7/22/2015	epi	27	29	1	3	3	25	0	0	0			<0.30	<0.002	<0.014	1.37	0.36	I	I		
223		Sleepy Hollow Lake	8/5/2015	epi	27	28	2	3	3	128	6	6	0									I	I	
223		Sleepy Hollow Lake	8/19/2015	epi	29	27	2	3	2	23	46	46	0	17.80	0.60	<0.28	<0.003	<0.010	0.99	0.15	I	I		
223		Sleepy Hollow Lake	9/9/2015	epi	33	26	2	3	2	0	0	0	0	3.60	0.20	<0.27	<0.009	<0.022	1.35	0.62	I	I		
223		Sleepy Hollow Lake	07/13/2009	hypo		9																		
223		Sleepy Hollow Lake	07/27/2009	hypo		10																		
223		Sleepy Hollow Lake	08/10/2009	hypo		10																		
223		Sleepy Hollow Lake	08/21/2009	hypo		10																		
223		Sleepy Hollow Lake	09/09/2009	hypo		11																		
223		Sleepy Hollow Lake	09/21/2009	hypo		11																		
223		Sleepy Hollow Lake	10/06/2009	hypo		10																		
223		Sleepy Hollow Lake	10/19/2009	hypo		9																		
223		Sleepy Hollow Lake	6/24/2010	hypo		10																		
223		Sleepy Hollow Lake	7/20/2010	hypo		11																		
223		Sleepy Hollow Lake	8/4/2010	hypo		11																		
223		Sleepy Hollow Lake	8/19/2010	hypo		11																		
223		Sleepy Hollow Lake	9/16/2010	hypo		10																		
223		Sleepy Hollow Lake	10/7/2010	hypo		10																		
223		Sleepy Hollow Lake	5/31/2011	hypo		25																		
223		Sleepy Hollow Lake	6/28/2011	hypo		24																		
223		Sleepy Hollow Lake	7/26/2011	hypo		26																		
223		Sleepy Hollow Lake	8/24/2011	hypo		23																		
223		Sleepy Hollow Lake	6/11/2012	hypo		22																		
223		Sleepy Hollow Lake	6/25/2012	hypo		26																		
223		Sleepy Hollow Lake	7/16/2012	hypo		29																		
223		Sleepy Hollow Lake	7/31/2012	hypo		25																		
223		Sleepy Hollow Lake	8/14/2012	hypo		26																		
223		Sleepy Hollow Lake	9/4/2012	hypo		25																		
223		Sleepy Hollow Lake	9/17/2012	hypo		22																		
223		Sleepy Hollow Lake	10/2/2012	hypo		18																		
223		Sleepy Hollow Lake	6/18/2013	hypo		21																		
223		Sleepy Hollow Lake	7/2/2013	hypo		25																		
223		Sleepy Hollow Lake	7/15/2013	hypo		28																		
223		Sleepy Hollow Lake	8/2/2013	hypo		24																		
223		Sleepy Hollow Lake	8/14/2013	hypo		11																		
223		Sleepy Hollow Lake	8/27/2013	hypo		11																		
223		Sleepy Hollow Lake	9/10/2013	hypo		12																		
223		Sleepy Hollow Lake	9/24/2013	hypo		10																		
223		Sleepy Hollow Lake	5/27/2015	hypo		9																		
223		Sleepy Hollow Lake	6/11/2015	hypo		13																		
223		Sleepy Hollow Lake	6/24/2015	hypo		10																		
223		Sleepy Hollow Lake	7/8/2015	hypo		9																		
223		Sleepy Hollow Lake	7/22/2015	hypo		10																		
223		Sleepy Hollow Lake	8/5/2015	hypo		9																		

LNum	PName	Date	Type	TAir	TH20	QA	QB	QC	QD	QF	QG	AQ-PC	AQ-Chla	MC-LR	Ana-a	Cylin	FP-Chl	FP-BG	HABform	Shore HAB
223	Sleepy Hollow Lake	8/19/2015	hypo		10															
223	Sleepy Hollow Lake	9/9/2015	hypo		11															
223	Sleepy Hollow Lake	5/27/2015	hypo		9															
223	Sleepy Hollow Lake	6/11/2015	hypo		13															
223	Sleepy Hollow Lake	6/24/2015	hypo		10															
223	Sleepy Hollow Lake	7/8/2015	hypo		9															
223	Sleepy Hollow Lake	7/22/2015	hypo		10															
223	Sleepy Hollow Lake	8/5/2015	hypo		9															
223	Sleepy Hollow Lake	8/19/2015	hypo		10															
223	Sleepy Hollow Lake	9/9/2015	hypo		11															

## Legend Information

<i>Indicator</i>	<i>Description</i>	<i>Detection Limit</i>	<i>Standard (S) / Criteria (C)</i>
<b>General Information</b>			
Lnum	lake number (unique to CSLAP)		
Lname	name of lake (as it appears in the Gazetteer of NYS Lakes)		
Date	sampling date		
<b>Field Parameters</b>			
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
<b>Laboratory Parameters</b>			
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
<b>Lake Assessment</b>			
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 Sleepy Hollow Lake

### Sleepy Hollow Lake (1301-0059)

Impaired Seg

#### Waterbody Location Information

Revised: 07/15/2008

<b>Water Index No:</b> H-202-P8f	<b>Drain Basin:</b> Lower Hudson River	
<b>Hydro Unit Code:</b> 02020006/130	<b>Str Class:</b> A	Middle Hudson River
<b>Waterbody Type:</b> Lake	<b>Reg/County:</b> 4/Greene Co. (20)	
<b>Waterbody Size:</b> 257.9 Acres	<b>Quad Map:</b> HUDSON NORTH (L-25-3)	
<b>Seg Description:</b> entire lake		

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

Use(s) Impacted	Severity	Problem Documentation
Water Supply	Threatened	Suspected
PUBLIC BATHING	Impaired	Known
Recreation	Stressed	Suspected
Aesthetics	Stressed	Suspected

#### Type of Pollutant(s)

Known: ALGAL/WEED GROWTH, SILT/SEDIMENT  
Suspected: Nutrients  
Possible: Pesticides

#### Source(s) of Pollutant(s)

Known: ---  
Suspected: STREAMBANK EROSION, URBAN/STORM RUNOFF, Agriculture  
Possible: ---

#### Resolution/Management Information

**Issue Resolvability:** 1 (Needs Verification/Study (see STATUS))  
**Verification Status:** 4 (Source Identified, Strategy Needed)  
**Lead Agency/Office:** DOW/WQMS  
**TMDL/303d Status:** 1 (Individual Waterbody Impairment Requiring a TMDL)  
**Resolution Potential:** Medium

#### Further Details

##### Overview

Public bathing use in Sleepy Hollow Lake is impaired and other recreational uses impacted by excessive aquatic weeds and algal growth, elevated turbidity and silt/sediment loadings from various nonpoint sources. Water supply use of the reservoir is also considered to be threatened due to the elevated turbidity. Moderate nutrient levels in the lake also result in a potential for the formation of disinfection by-products when water is treated with chlorine for public water use.

##### Water Quality Sampling

Sleepy Hollow Lake was sampled as part of the NYSDEC Lake Classification and Inventory (LCI) Program in 2004. The results of this sampling indicate that the lake is best characterized as mesoeutrophic, or moderately highly productive. Phosphorus levels in the lake occasionally exceed the state guidance values indicating impacted/stressed recreational uses. Corresponding transparency measurements typically fail to meet what is the recommended minimum for swimming beaches. Chlorophyll measurements in the lake were found to be in a range indicative of mesotrophic conditions. (DEC/DOW, BWAM/CSLAP, October 2005)

#### Lake Uses

This lake waterbody is designated class A, suitable for use as a water supply, public bathing beach, general recreation and aquatic life support. 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.

#### NYSDOH Source Waters Assessment

##### The NYSDOH Source Waters Assessment

Program (SWAP) compiles, organizes, and evaluates information regarding possible and actual threats to the quality of public water supply (PWS) sources. The information contained in SWAP assessment reports assists in the oversight and protection of public water systems. It is important to note that SWAP reports estimate the potential for untreated drinking water sources to be impacted by contamination. These reports do not address the safety or quality of treated finished potable tap water. This water supply reservoir provides water to the Sleepy Hollow Water Company and is an alternate supply for the Village of Athens. This assessment found an elevated susceptibility to contamination for this source of drinking water. The amount of pasture in the assessment area results in a high potential for contamination. There is also a moderate density of sanitary wastewater discharges which results in elevated susceptibility for all contaminate categories. However, the total amount of wastewater discharged to surface water in this assessment area is not high enough to further raise the potential for contamination. There are also noteworthy contamination potential associated with other discrete contaminant sources, such as chemical storage, hazardous waste sites and other sources. Finally, it should be noted that hydrologic characteristics (e.g. basin shape and flushing rates) generally make reservoirs highly sensitive to existing and new sources of phosphorus and microbial contamination. (NYSDOH, Source Water Assessment Program, 2005)

#### Source Assessment

Various nonpoint sources are the most significant contributor of pollutant loadings the lake. Storm runoff from increasing areas of residential development and streambank erosion contribute to siltation and increased sediment loads. Agricultural activity (dairy, cropland) in the watershed is another source of sediment and nutrient loads to the lake. There is also some concern about pesticides from former orchard lands in the watershed. Water and sewer districts serve the Sleepy Hollow community. (DEC/DOW, Region 4, 1999)

#### Water Quality Management

The Sleepy Hollow Lake Association directs lake watershed management activities in cooperation with the Greene County SWCD.

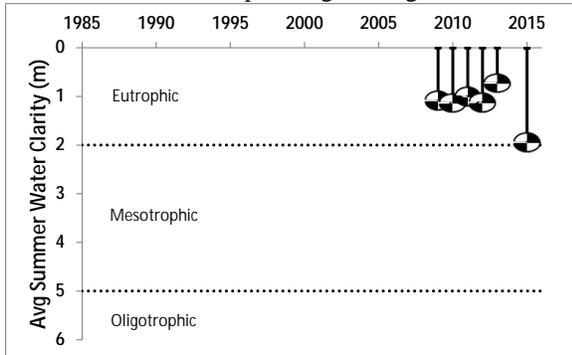
#### Section 303(d) Listing

Sleepy Hollow Lake is included on the NYS 2008 Section 303(d) List of Impaired Waters. The lake is included on Part 1 of the List as a Waterbody Requiring TMDL Development (or other strategy to attain water quality standards). The lake is currently listed as being impaired by silt/sediment. This waterbody was first listed on the 2002 Section 303(d) List. (DEC/DOW, BWAM/WQAS, June 2008)

# Appendix C- Long Term Trends: Sleepy Hollow Lake

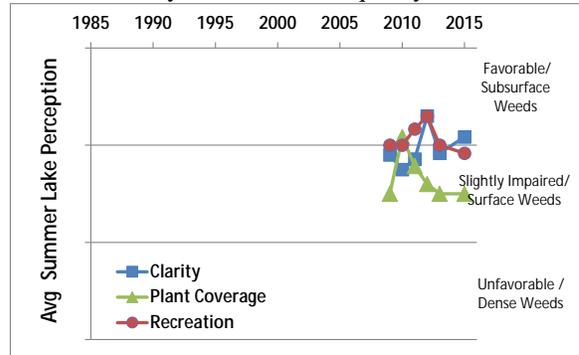
## Long Term Trends: Water Clarity

- Much higher in 2015; no clear trends
- Most readings typical of *eutrophic* lakes, but lower than expected given algae levels



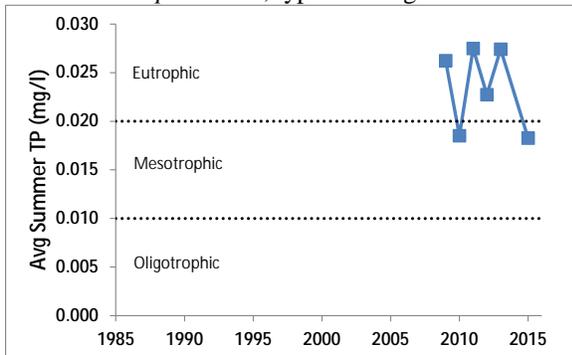
## Long Term Trends: Lake Perception

- No trends apparent; close to “normal” 2015
- Changes in recreational perception more closely linked to water quality than weeds



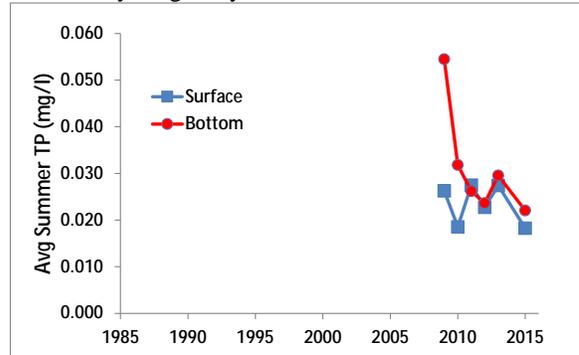
## Long Term Trends: Phosphorus

- Variable; ↓ 2015 TP linked to ↑ clarity
- Most readings typical of *mesotrophic* to *eutrophic* lakes, typical of algae levels



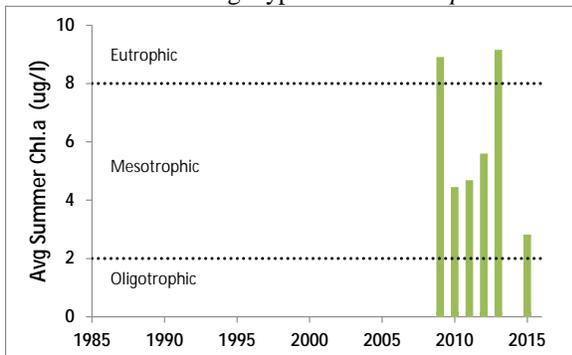
## Long Term Trends: Bottom Phosphorus

- Deepwater/surface TP levels usually similar
- Deepwater TP indicates little internal nutrient cycling; may need re-evaluation



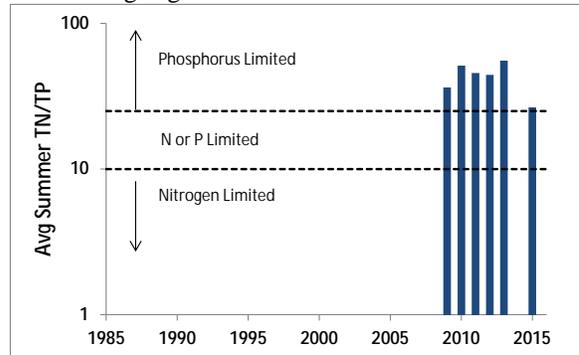
## Long Term Trends: Chlorophyll a

- Highly variable; lower algae levels 2015 linked to lower TP and higher clarity
- Most readings typical of *mesotrophic* lakes



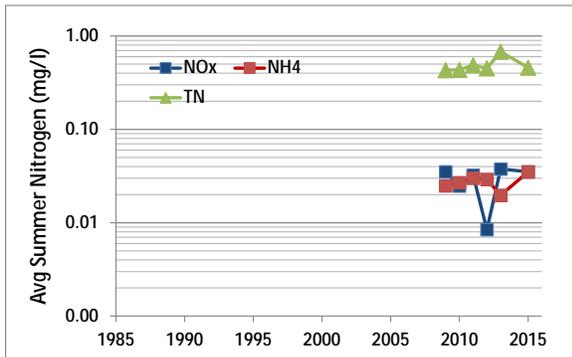
## Long Term Trends: N:P Ratio

- No trends yet apparent; lower in 2015
- Most readings indicate phosphorus limits algae growth



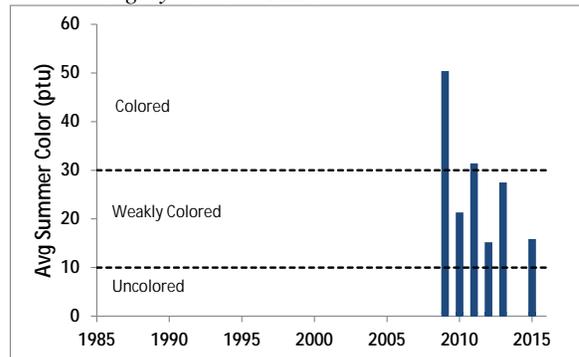
### Long Term Trends: Nitrogen

- No trends yet apparent
- Low NOx, ammonia and total nitrogen



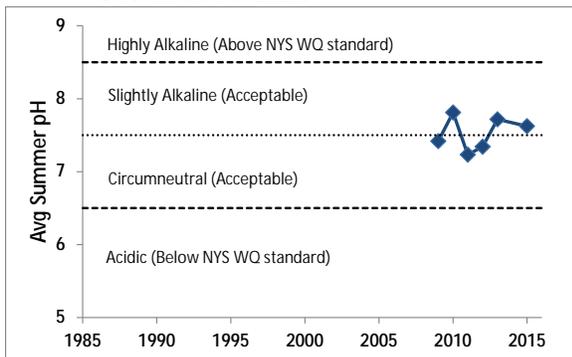
### Long Term Trends: Color

- Color decreasing or part of long term cycle
- Most readings typical of *weakly colored* to *highly colored* lakes



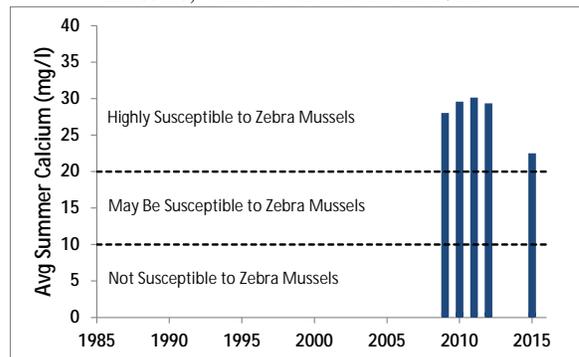
### Long Term Trends: pH

- No trends yet apparent; fairly stable
- Most readings typical of *slightly alkaline* to *circumneutral* lakes



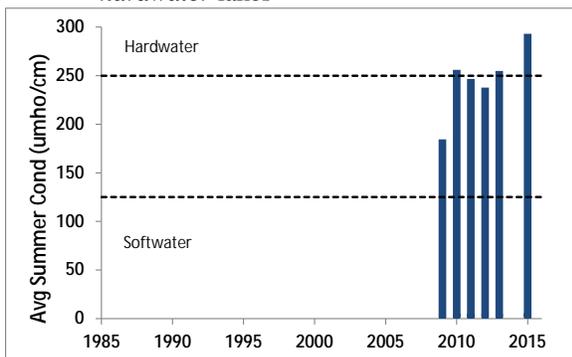
### Long Term Trends: Calcium

- No trends yet apparent, but much ↓ 2015
- Data indicates high susceptibility to zebra mussels, which were found in 2012



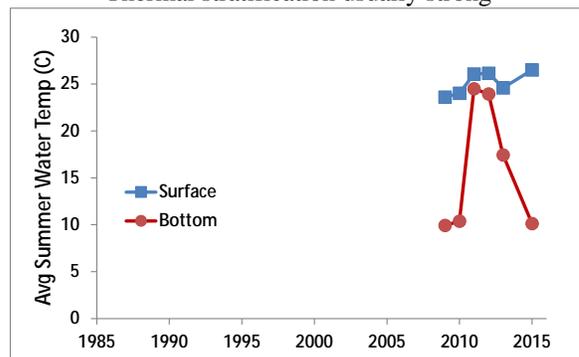
### Long Term Trends: Conductivity

- Increasing?
- Most readings typical of *moderate* to *hardwater* lakes



### Long Term Trends: Water Temperature

- Surface T increasing; bottom T highly variable due to varying sample depths?
- Thermal stratification usually strong



## **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

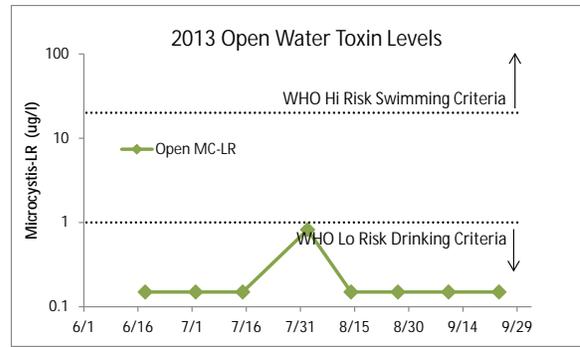
Some of these results are reported in other portions of these reports. This appendix the seasonal change in blue green algae, other algae types, and the primary algal toxin (microcystin-LR, a liver toxin). Analysis was completed on open water samples and, for some lakes, shoreline samples that were collected 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.



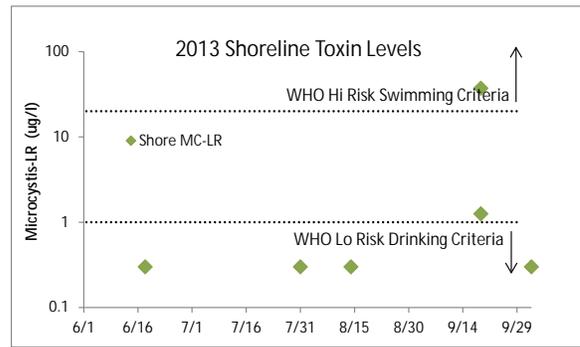
**Figure D1:**  
2013 Open Water Total and BGA Chl.a



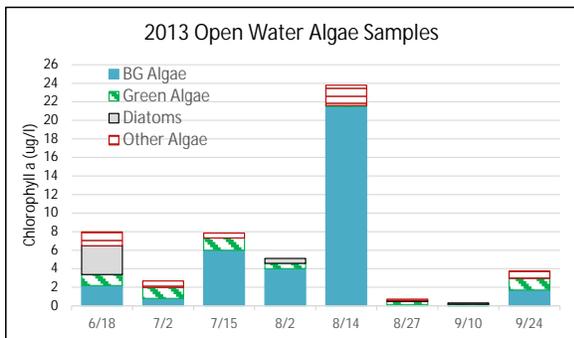
**Figure D2:**  
2013 Open Water Microcystin-LR



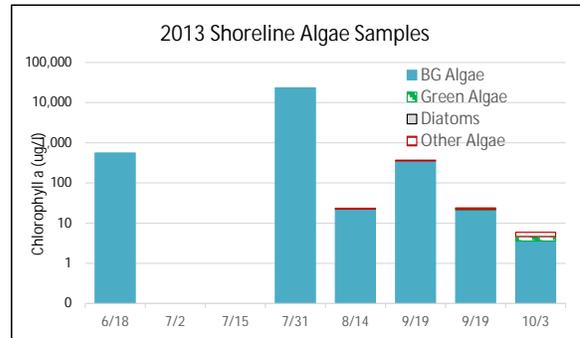
**Figure D3:**  
2013 Shoreline Total and BGA Chl.a



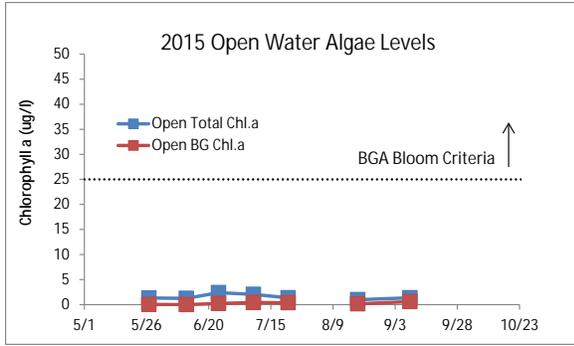
**Figure D4:**  
2013 Shoreline Microcystin-LR



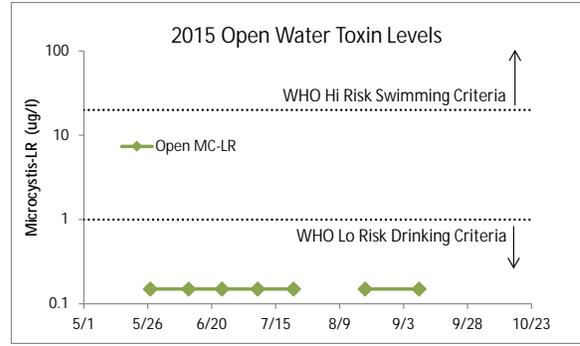
**Figure D5:**  
2013 Open Water Algae Types



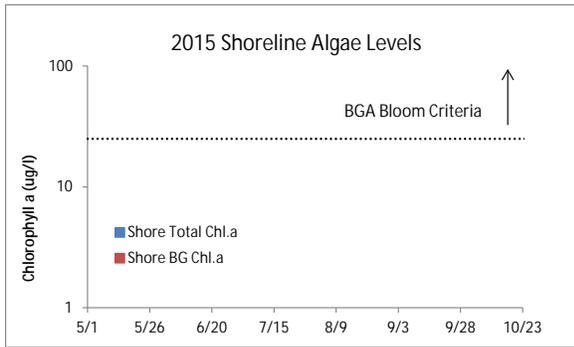
**Figure D6:**  
2013 Shoreline Algae Types



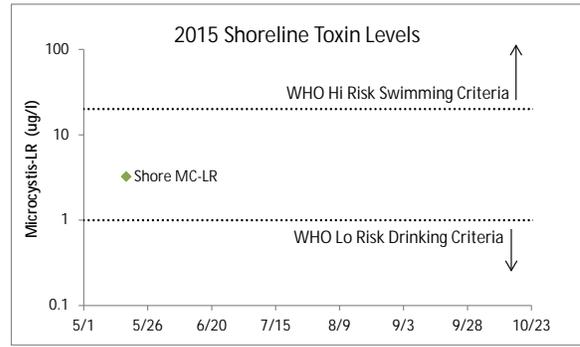
**Figure D7:**  
2015 Open Water Total and BGA Chl.a



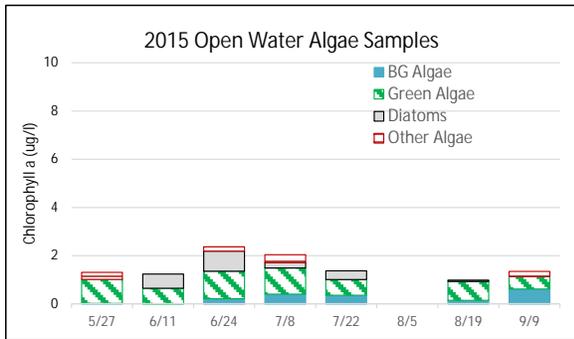
**Figure D8:**  
2015 Open Water Microcystin-LR



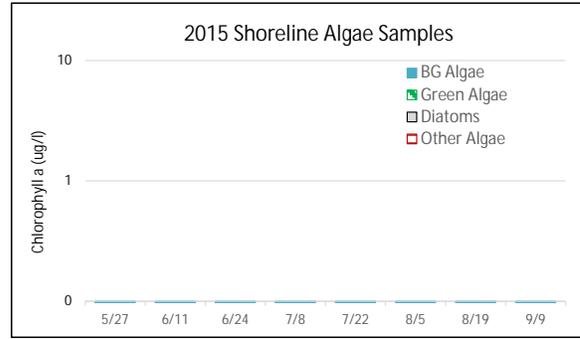
**Figure D9:**  
2015 Shoreline Total and BGA Chl.a



**Figure D10:**  
2015 Shoreline Microcystin-LR



**Figure D11:**  
2015 Open Water Algae Types



**Figure D12:**  
2015 Shoreline Algae Types

## Appendix E: AIS Species in Greene County

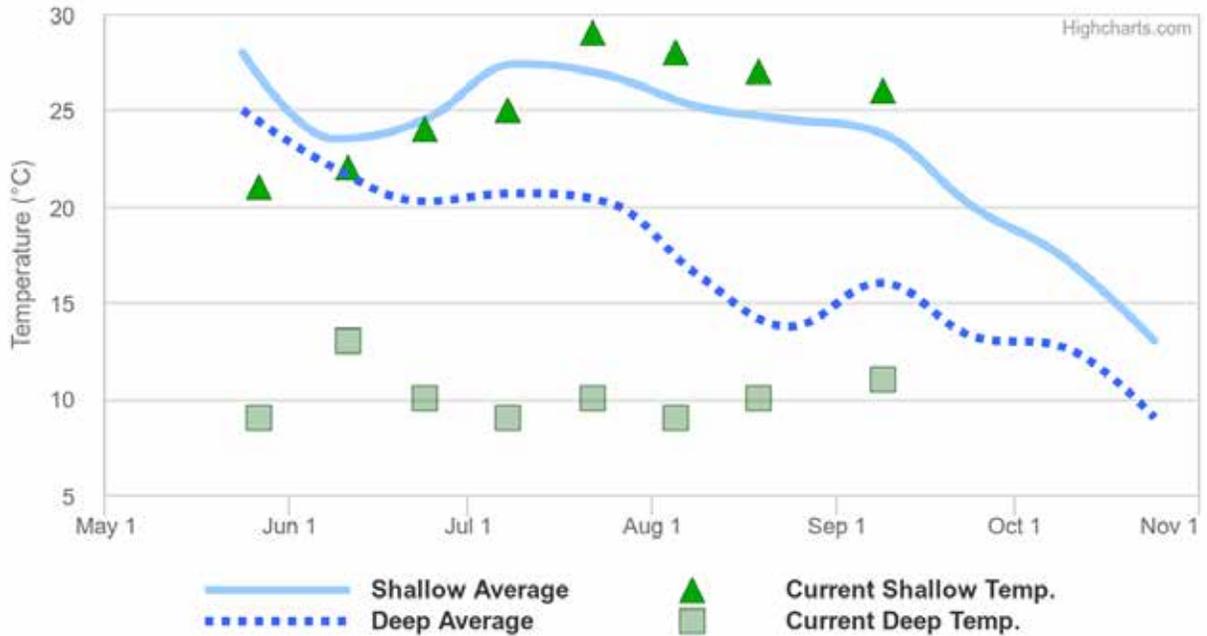
The table below shows the invasive aquatic plants and animals that have been documented in Greene County, as cited in either the iMapInvasives database (<http://www.imapinvasives.org/>) or in the NYSDEC Division of Water database. These databases may include some, but not all, non-native plants or animals 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](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](mailto:dowinfo@dec.ny.gov).

<b>Aquatic Invasive Species - Greene County</b>			
<b>Waterbody</b>	<b>Kingdom</b>	<b>Common name</b>	<b>Scientific name</b>
Beaver Dam Lake	Plant	Eurasian watermilfoil	<i>Myriophyllum spicatum</i>
Beaver Dam Lake	Plant	Curly leafed pondweed	<i>Potamogeton crispus</i>
Beaver Dam Lake	Plant	Water chestnut	<i>Trapa natans</i>
Coxsackie Correctional Fac. Reservoir	Plant	Eurasian watermilfoil	<i>Myriophyllum spicatum</i>
Hudson River	Animal	Zebra mussel	<i>Dreissena polymorpha</i>
Hudson River	Plant	Water chestnut	<i>Trapa natans</i>
Murderer’s Creek	Plant	Eurasian watermilfoil	<i>Myriophyllum spicatum</i>
Sleepy Hollow Lake	Animal	Zebra mussel	<i>Dreissena polymorpha</i>
Sleepy Hollow Lake	Plant	Eurasian watermilfoil	<i>Myriophyllum spicatum</i>
Sleepy Hollow Lake	Plant	Brittle naiad	<i>Najas minor</i>
Sleepy Hollow Lake	Plant	Curly leafed pondweed	<i>Potamogeton crispus</i>
Sleepy Hollow Lake	Plant	Water chestnut	<i>Trapa natans</i>

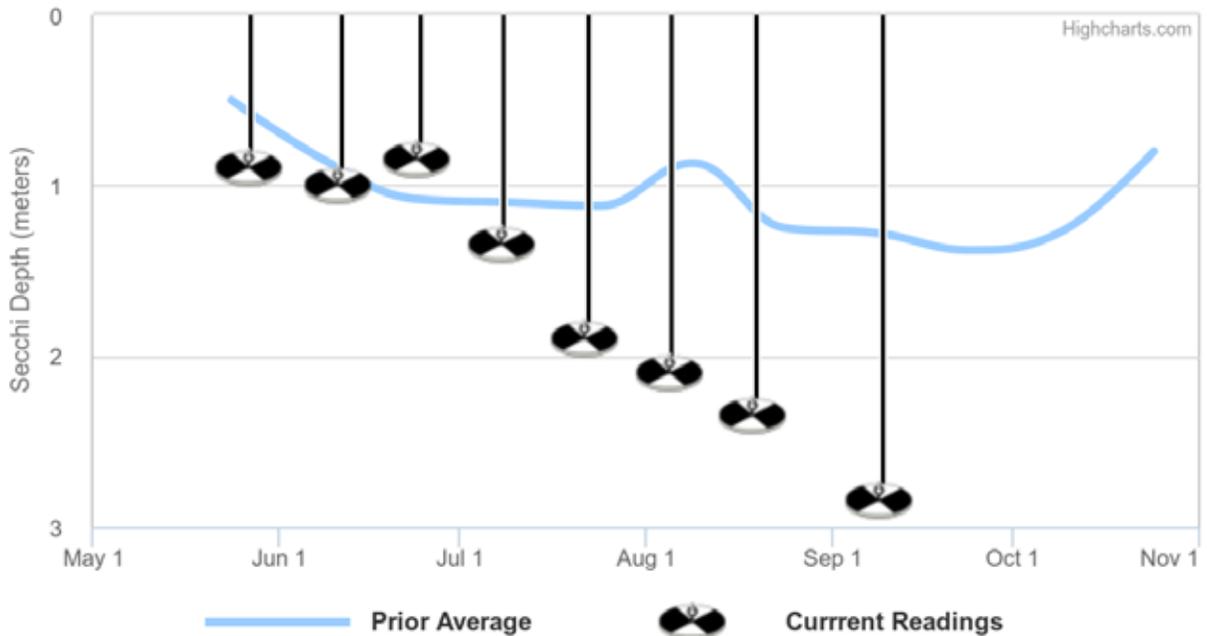
## Appendix F: Current Year vs. Prior Averages for Sleepy Hollow Lake

### Current Year Water Temperatures vs. Prior Average



This year's shallow water sample temperatures are tending to be higher than normal when compared to the average of readings collected from 2009 to 2013. There are not enough deep water sample temperatures to determine a trend for the current year when compared to the average of readings collected from 2009 to 2013.

### Current Year Secchi Readings vs. Prior Average



This year's session Secchi readings are tending to be higher than normal when compared to the average of readings collected from 2009 to 2013



## Appendix G: Watershed and Land Use Map for Sleepy Hollow 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.

