Deans Pond Questions and Answers, 2015 CSLAP

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

A1. Water quality conditions in Deans Pond continue to be very unfavorable- open water and shoreline algae blooms are common and dominated by blue green algae, leading to poor water clarity and unsafe swimming conditions. However, these conditions were somewhat more favorable in 2015, based on lower nutrient and algae levels and higher water clarity.

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

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

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

A3. Deans Pond has much lower water clarity, and higher algae and nutrient levels, with many instances of blooms along the shoreline. Many of these blooms contain high levels of toxins. The lake also does not typically suffer from invasive weed problems, but is susceptible to invasion from Eurasian watermilfoil migrating from nearby lakes.

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

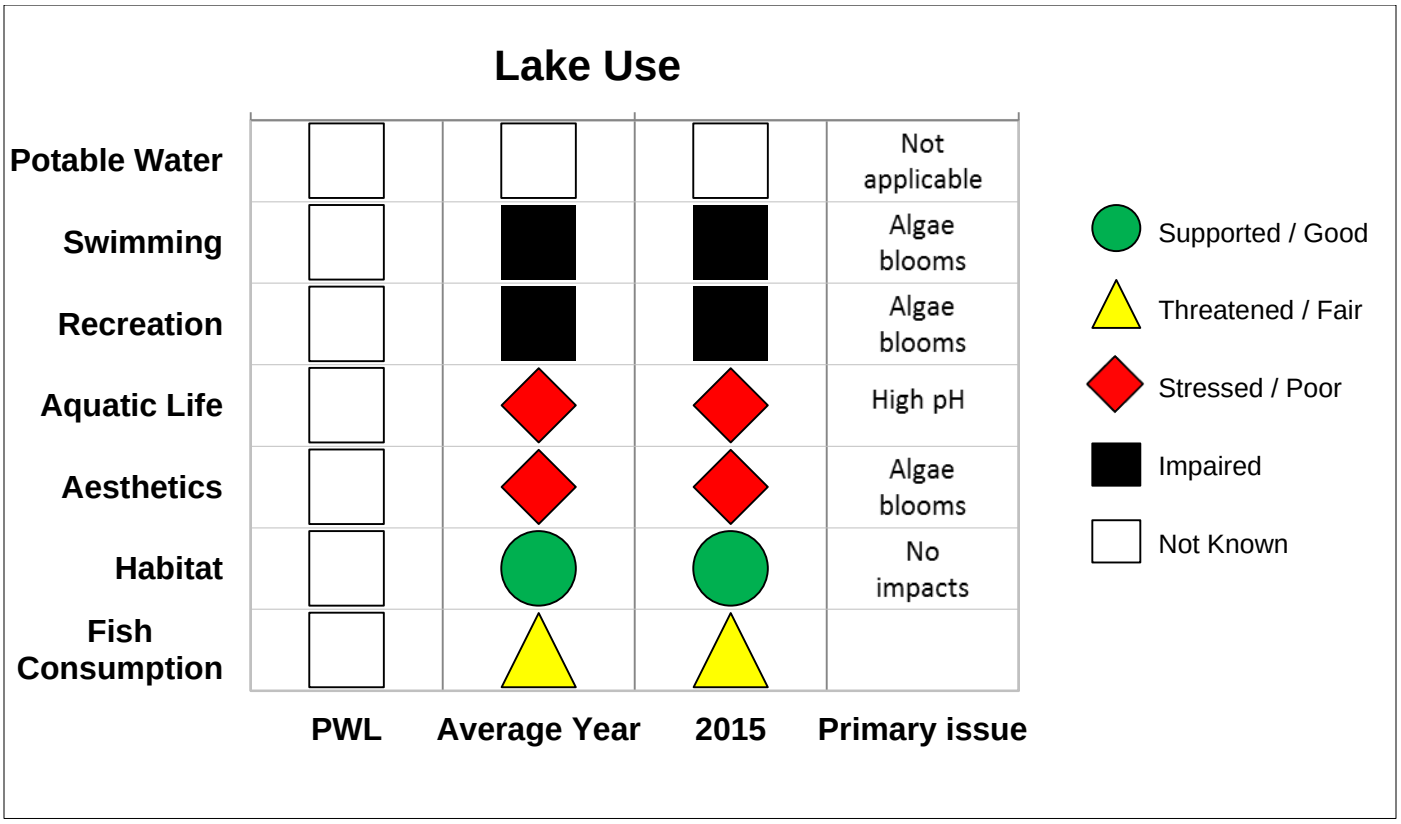
A4. Trends can't be evaluated with such a limited dataset.

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

A5. Deans Pond has exhibited extensive shoreline and open water blue green algae blooms, and some of these have high toxins. Efforts should be undertaken to reduce nutrient loading to the lake (http://www.dec.ny.gov/chemical/82123.html), since elevated phosphorus readings are the reason for these blooms.

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 are needed to reduce 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:
Deans Pond

General Lake Information

Location	Town of Marathon
County	Cortland
Basin	Susquehanna River
Size	15.5 hectares (38 acres)
Lake Origins	Natural
Watershed Area	225 hectares (556 acres)
Retention Time	0.4 years (estimated)
Mean Depth	2.2 meters (estimated)
Sounding Depth	4.8 meters
Public Access?	none
Major Tributaries	No named tributaries
Lake Tributary To…	Unnamed outlet to Merritt Creek to Millet Creek to Otselic River to Susquehanna River
WQ Classification	B (contact recreation = swimming)
Lake Outlet Latitude	42.4478
Lake Outlet Longitude	-76.00335
Sampling Years	2014-2015
2015 Samplers	Dave Snutes
Main Contact	Dave Snutes

Lake Map

Background

Deans Pond is a 38 acre, class B lake found in the Town of Marathon in Cortland County, in the Central region of New York State. It was first sampled as part of CSLAP in 2014.

It is one of five CSLAP lakes among the more than 65 lakes and ponds found in Cortland County and one of 25 CSLAP lakes among the nearly 900 lakes and ponds in the Susquehanna River drainage basin.

Lake Uses

Deans Pond 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. There is no public access to the lake.

It is not known by the report authors if Deans Pond 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 Deans Pond.

There are no lake-specific fish consumption advisories on Deans Pond.

Historical Water Quality Data

CSLAP sampling was conducted on Deans Pond for the first time in 2014. The CSLAP reports for the lake can be found on the NYSFOLA website at http://nysfola.mylaketown.com, and the most recent CSLAP report can be found on the NYSDEC web page at http://www.dec.ny.gov/lands/77829.html.

No other water quality data for the lake have been provided to the NYSDEC. DEC visited the lake in early August of 2014 as part of the Lake Classification and Inventory (LCI) survey of the Susquehanna River basin. This monitoring found water quality conditions similar to those measured through CSLAP. It also found no oxygen below a depth of 2 meters, and high levels of organic carbon, typical of lakes with high oxygen levels.

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

Lake Association and Management History

Deans Pond is served by the Save the Pond Homeowners Association. It is not yet known what activities this lake association conducts, or if they maintain a web page.

Summary of 2015 CSLAP Sampling Results

Evaluation of 2015 Annual Results

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 – Deans Pond” section in Appendix C.

Evaluation of Eutrophication Indicators

Deans Pond again exhibited very high phosphorus levels, resulting in highly elevated algae levels and very low water clarity. However, water clarity readings were higher (about 50% higher during the summer) in 2015 than in 2014, consistent with 25% lower phosphorus levels and 30% lower algae levels. These data suggest that some of the on-going nutrient control measures in the watershed may have results in some lake improvements, although far more nutrient reduction is needed (and additional data will help to determine if the 2015 conditions were representative of the lake).

Lake productivity increases slightly during the summer, with water clarity readings decreasing and nutrient and algae levels increase. This productivity peaked in August, and then decreased slightly in September. Algae levels exceed the DEC bloom criteria during much of the summer.

The lake can be characterized as *eutrophic*, or highly productive, based on water clarity, total phosphorus readings, and chlorophyll *a* readings (all typical of *eutrophic* lakes). The trophic state indices (TSI) evaluation suggests that each of the trophic indicators is "internally consistent"- each indicator (clarity, algae, or nutrients) can be predicted from the value of the other indicators, although phosphorus readings are higher than expected (suggesting that other nutrients may also be limited algae growth and water clarity). Overall trophic conditions are summarized on the Lake Scorecard and Lake Condition Summary Table.

Evaluation of Potable Water Indicators

Algae levels are high enough to render the lake susceptible to taste and odor compounds or elevated DBP (disinfection by product) compounds that could affect the potability of the water, but 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

Deans Pond can be characterized as an alkaline lake with intermediate hardness and color, and high total nitrogen levels; the latter is consistent with high algae levels. However, NOx and ammonia readings are low, which commonly occurs in eutrophic lakes. Most of these indicators were lower than or similar to the readings from 2014.

Chloride levels in the 2015 samples, collected for the first time through CSLAP and cited in Appendix A, ranged from 20 to 23 mg/l. These values fall within the range of "moderate" road salt runoff levels cited by the New Hampshire DES. These readings are well below the state potable water quality standard of 250 mg/l and below the typical range of values found in most NYS lakes. These readings suggest a low to moderate likelihood of biological impacts from road salt. Additional data will help to determine if these represent normal readings for the lake.

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

Evaluation of Biological Condition

It is not known if phytoplankton, zooplankton, macrophyte, or macroinvertebrate studies have been conducted at the lake. The fluoroprobe data indicates very high algae levels, and many of the highest overall algae levels were comprised primarily of blue green algae. The dominance of blue green algae increases over the summer and increases as total algae levels rise. Shoreline

blooms are dominated by blue green algae throughout the summer. The highest algae levels were measured in mid to late summer, although it is likely that extremely high algae levels are apparent as long as air and water temperatures support algae growth. Fluoroprobe algae levels were probably similar in 2014 and 2015 along the shoreline-very high values were recorded in both years and prevented a clear evaluation of “representative” conditions. Open water values were also comparable in both years.

Water hyacinth was reported in the lake, but this has been removed by lake residents (and was unlikely to overwinter in the lake). The balance of the aquatic plant community is not yet known.

DEC sampling found oxygen depletion near the lake bottom- this may impact aquatic life.

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

Evaluation of Lake Perception

The lake is most often described as “substantially impaired” for most recreational uses, due water quality conditions described as having “high algae levels”. This is consistent with the water quality conditions in the lake. Aquatic plants usually grow below the lake surface, growing to the lake surface (only) in late summer. Additional years of data will help to determine if these assessments are representative of normal conditions in the lake; water quality and recreational assessments were less favorable in 2015 than in 2014. 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. Air and water temperatures were slightly higher in 2015 than in 2014, and may have contributed to fluoroprobe algae levels that continued to be very high despite a slight drop in phosphorus readings.

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 readings regularly exceed levels associated with harmful algal blooms (HABs) in the main body of the lake, and shoreline blooms are regularly found along the north shore of the lake. Both microcystin-LR (liver toxin) and anatoxin-a (nerve toxin) levels were elevated at times during the summer, at levels well above the World Health Organization (WHO) recommended threshold for supporting safe swimming. As reported regularly during the summer, lake residents and pets should avoid exposure to any discolored water or surface scums on the lake.

Lake Condition Summary

Category	Indicator	Min	Overall Avg	Max	2015 Avg	Classification	2015 Change?	Long-term Change?
Eutrophication Indicators	Water Clarity	0.40	0.74	1.30	0.84	Eutrophic	Higher in 2015?	
	Chlorophyll *a*	11.50	63.42	121.80	45.94	Eutrophic	Lower in 2015?	
	Total Phosphorus	0.016	0.144	0.291	0.125	Eutrophic	Lower in 2015?	
Potable Water Indicators	Hypolimnetic Ammonia							
	Hypolimnetic Arsenic							
	Hypolimnetic Iron							
	Hypolimnetic Manganese							
Limnological Indicators	Hypolimnetic Phosphorus							
	Nitrate + Nitrite	0.00	0.02	0.10	0.01	Low NOx	Similar in both years	
	Ammonia	0.02	0.17	0.45	0.10	Intermediate Ammonia	Lower in 2015?	
	Total Nitrogen	0.63	1.43	2.27	1.16	High Total Nitrogen	Lower in 2015?	
	pH	7.01	7.92	9.10	7.89	Alkaline	Similar in both years	
	Specific Conductance	134	146	156	148	Intermediate Hardness	Similar in both years	
	True Color	22	38	95	33	Intermediate Color	Lower in 2015?	
	Calcium	10.1	11.7	12.6	10.8	May be Susceptible to Zebra Mussels	Similar in both years	
Lake Perception	WQ Assessment	2	3.4	5	3.8	Definite Algal Greenness	Less favorable 2015?	
	Aquatic Plant Coverage	3	3.0	3	3.0	Surface Plant Growth	Similar in both years	
	Recreational Assessment	2	3.8	5	4.1	Substantially Impaired	Less favorable 2015?	
Biological Condition	Phytoplankton					Open water-high blue green algae biomass	Not known	
	Macrophytes					Excellent quality of the aquatic plant community	Not known	
	Zooplankton					Not measured through CSLAP	Not known	
	Macroinvertebrates					Not measured through CSLAP	Not known	
	Fish					Warmwater fishery	Not known	
	Invasive Species					Water hyacinth	Not known	
Local Climate Change	Air Temperature	10	21.1	28	22.0		Higher in 2015?	
	Water Temperature	16	20.8	25	21.4		Higher in 2015?	
Harmful Algal Blooms	Open Water Phycocyanin	2	91	290	80	Some readings indicate high risk of BGA	Not known	
	Open Water FP Chl.a	0	26	62	24	Some readings indicate high algae levels	Not known	
	Open Water FP BG Chl.a	0	17	55	14	Some readings indicate high BGA levels	Not known	
	Open Water Microcystis	<DL	0.2	0.9	0.2	Mostly undetectable open water MC-LR	Not known	
	Open Water Anatoxin a	<DL	0.1	0.5	0.1	Open water Anatoxin-a at times detectable	Not known	
	Shoreline Phycocyanin					No shoreline blooms sampled for PC	Not known	
	Screening FP Chl.a	136	53092	395250	70876	All readings indicate very high algae levels	Not known	
	Screening FP BG Chl.a	129	52994	395250	70703	All readings indicate very high BGA levels	Not known	
	Shoreline Microcystis	<DL	194.7	1400.0	323.0	Very high shoreline bloom MC-LR	Not known	
	Shoreline Anatoxin a	<DL	3.8	56.9	<DL	Shoreline bloom Anatoxin-a at times detectable	Not known	

Evaluation of Lake Condition Impacts to Lake Uses

Deans Pond is not presently among the lakes listed on the Susquehanna River drainage basin Priority Waterbody List (PWL).

Potable Water (Drinking Water)

The CSLAP dataset at Deans Pond, including water chemistry data, physical measurements, and volunteer samplers' perception data, is inadequate to evaluate the use of the lake for potable water, and the lake is not used for this purpose. The high algae levels indicate significant threats to any "unofficial" potable water use.

Public Bathing

The CSLAP dataset at Deans Pond, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggests that public bathing, if conducted at a public swimming beach, would be *impaired* due to poor water clarity, excessive algae and nutrient levels, and intense blooms and elevated toxins along the (northern) shoreline. 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 Deans Pond, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggest that recreation is *impaired* by shoreline and open water algae blooms, excessive algae, and poor water clarity.

Aquatic Life

The CSLAP dataset on Deans Pond, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggest that aquatic life is *stressed* by elevated pH, oxygen deficits and shoreline algae blooms. Aquatic life might be *threatened* by road salt runoff, although no impacts have been observed. Additional data are needed to evaluate the food and habitat conditions for aquatic organisms in the lake.

Aesthetics and Habitat

The CSLAP dataset on Deans Pond, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggest that aesthetics is *poor* due to excessive algae (including shoreline blue green algae blooms) and poor water clarity, consistent with reports that the lake "looks bad". Habitat may be good.

Fish Consumption

There are no fish consumption advisories posted for Deans Pond; this use may be *threatened* by algae blooms.

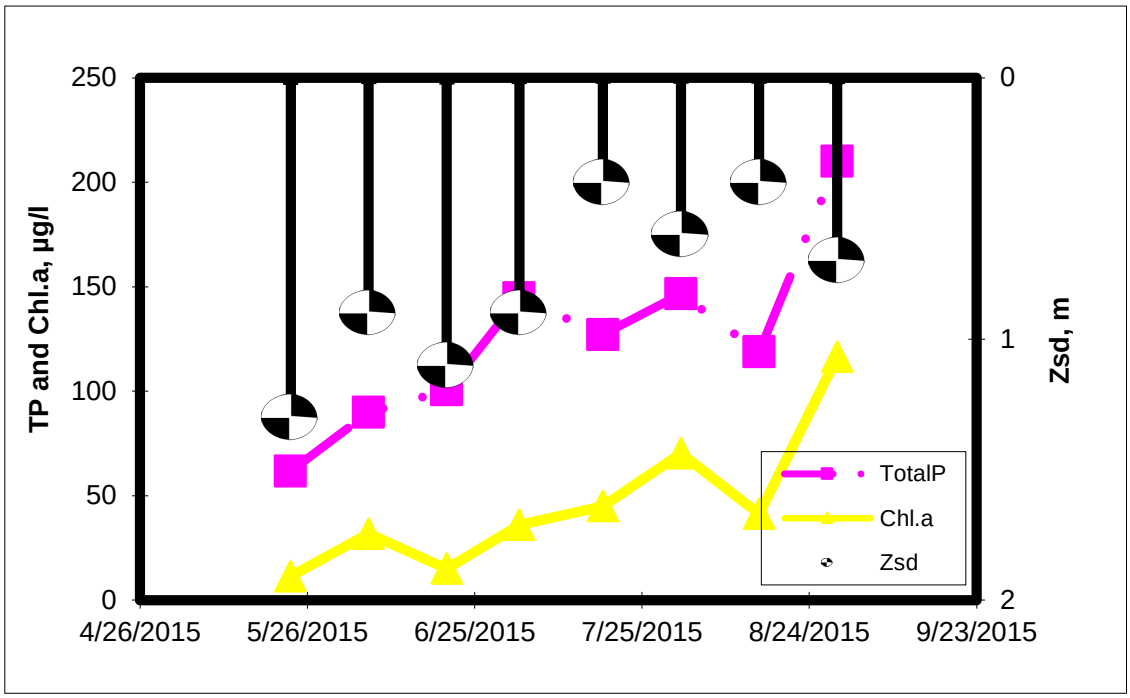
Additional Comments and Recommendations

Aquatic plant surveys should be conducted at Deans Pond to determine if other invasive species found in nearby lakes, including Eurasian watermilfoil, are present in the lake. Shoreline surveillance should continue to look for the presence of shoreline algae blooms, continuing the work started in 2013.

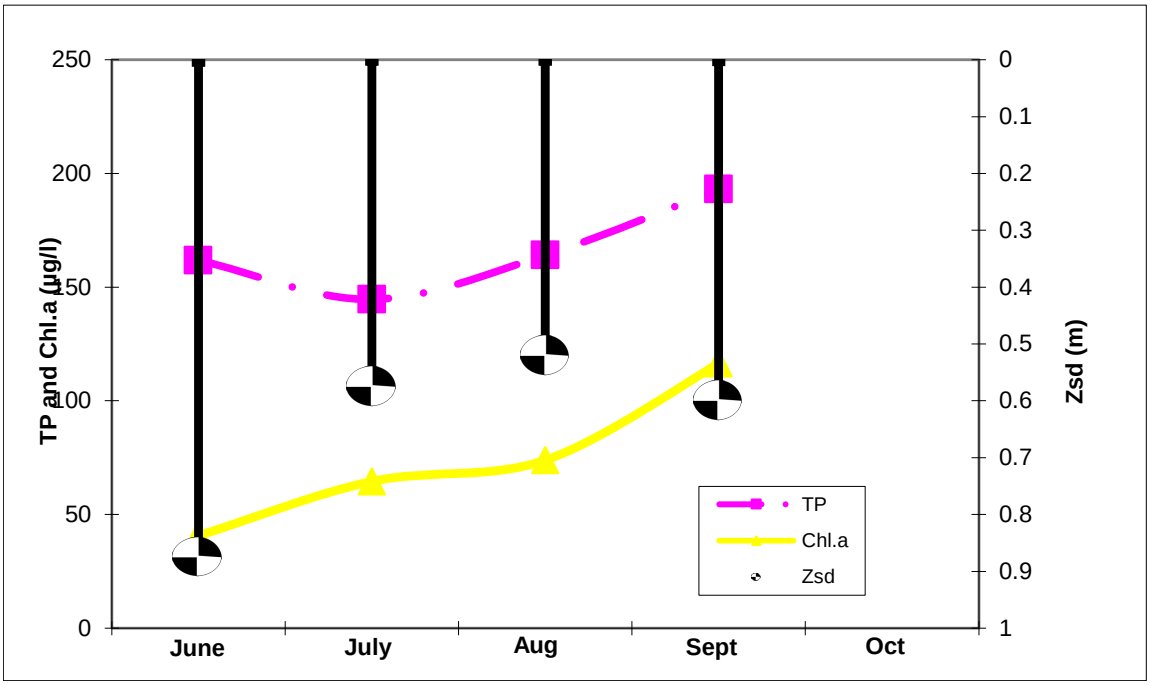
Aquatic Plant IDs-2015

None submitted for identification.

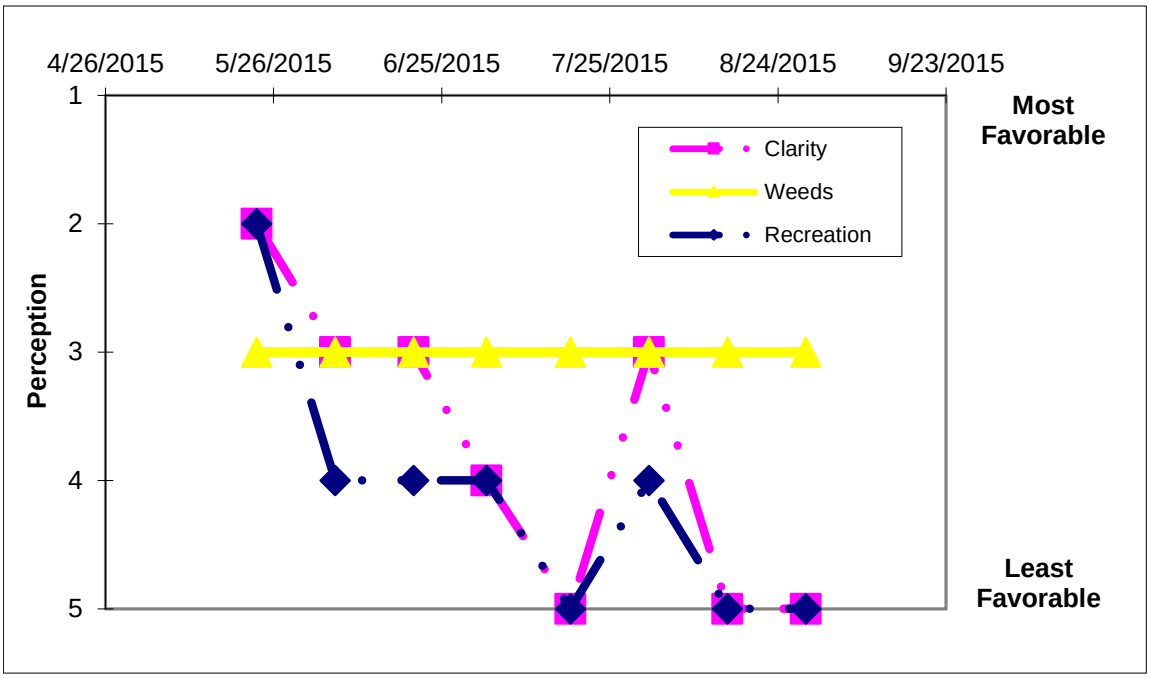
Time Series: Trophic Indicators, 2015



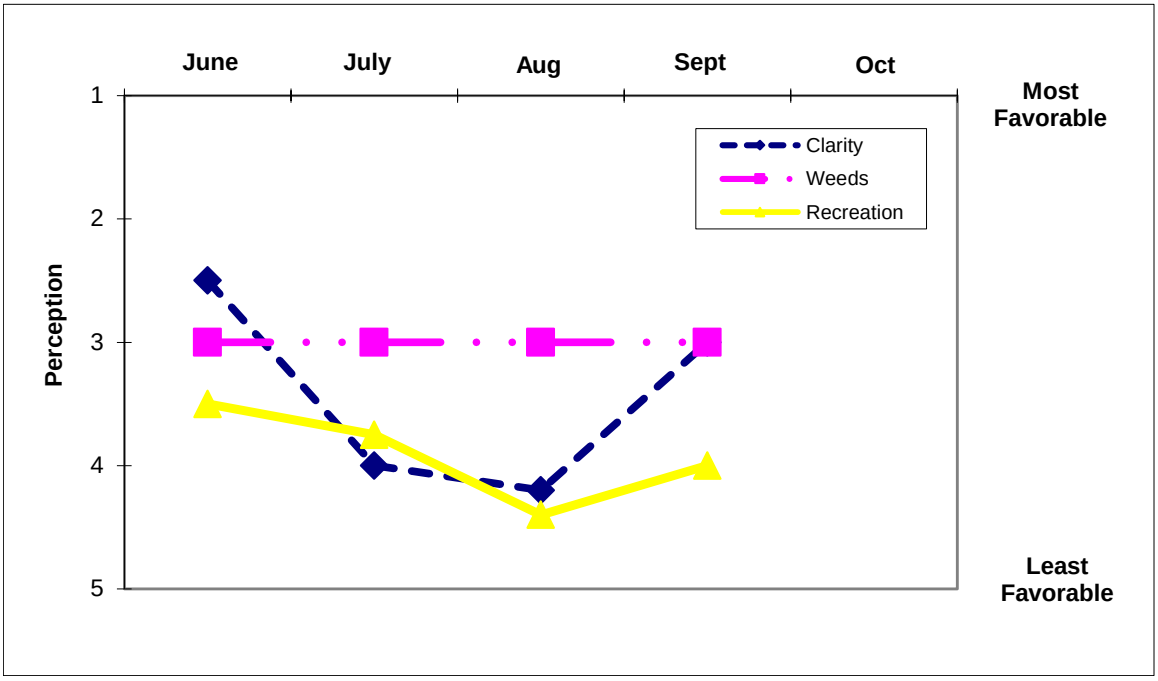
Time Series: Trophic Indicators, Typical Year (2014-2015)



Time Series: Lake Perception Indicators, 2015



Time Series: Lake Perception Indicators, Typical Year (2014-2015)



Appendix A- CSLAP Water Quality Sampling Results for Deans Pond

LNum	PName	Date	Zbot	Zsd	Zsamp	Tot.P	NO3	NH4	TDN	TN/TP	TColor	pH	Cond25	Ca	Chl.a	Cl
242	Deans Pond	6/7/2014	4.7	0.90	1.5	0.166	0.10	0.40	1.32	17.57	28	7.50	156	12.6	18.5	
242	Deans Pond	6/8/2014			bloom											
242	Deans Pond	6/21/2014			Bloom											
242	Deans Pond	6/21/2014	4.8	0.60	1.5	0.291			1.40	10.54	50	8.26	142		97.3	
242	Deans Pond	7/5/2014	4.8	0.50	1.5	0.170	0.02	0.04	1.74	22.52	95	9.10	134		59.2	
242	Deans Pond	7/6/2014			Bloom											
242	Deans Pond	7/19/2014			Bloom											
242	Deans Pond	7/19/2014	4.5	0.50	1.5	0.137			2.27	36.27	34	8.84	142		118.0	
242	Deans Pond	8/2/2014			Bloom											
242	Deans Pond	8/2/2014	4.6	0.45	1.5	0.173	0.01	0.06	1.52	19.39	28	8.06	142	12.6	70.6	
242	Deans Pond	8/16/2014			Bloom											
242	Deans Pond	8/16/2014	4.8	0.63	1.5	0.154			1.60	22.74	41	7.52	146		50.8	
242	Deans Pond	9/13/2014			Bloom											
242	Deans Pond	9/13/2014	4.7	0.60	1.5	0.183	0.01	0.45	1.96	23.55	37	7.19	144		111.0	
242	Deans Pond	9/27/2014			Bloom											
242	Deans Pond	9/28/2014			Bloom											
242	Deans Pond	10/18/2014			Bloom											
242	Deans Pond	9/27/2014	4.6	0.60	1.5	0.203			1.88	20.32	28	7.09	147		121.8	
242	Deans Pond	5/23/2015	4.7	1.30	1.5	0.062	0.03	0.02	0.72	11.70	35	7.65	139	10.1	11.5	
242	Deans Pond	6/6/2015	4.7	0.90	1.5	0.090			0.66	7.37	26	7.81	151		31.8	
242	Deans Pond	6/20/2015	4.7	1.10	1.5	0.101	0.00	0.04	0.63	6.29	22	7.01	150		15.1	22.6
242	Deans Pond	7/3/2015	4.9	0.90	1.5	0.145			0.90	6.22	38	7.74	154		36.0	
242	Deans Pond	7/18/2015	4.8	0.40	1.5	0.127	0.02	0.10	0.96	7.58	33	7.63	152	11.4	45.0	
242	Deans Pond	8/1/2015	4.7	0.60	1.5	0.147			1.63	11.12	55	8.40	144		70.3	
242	Deans Pond	8/15/2015	4.8	0.40	1.5	0.119	0.00	0.23	1.54	12.97	28	8.56	149		41.3	20.9
242	Deans Pond	5/24/2015	4.7	1.20	1.5											
242	Deans Pond	6/6/2015			Bloom											
242	Deans Pond	6/20/2015	4.7	1.15	1.5											
242	Deans Pond	7/3/2015	4.9	0.91	1.5											
242	Deans Pond	7/17/2015			Bloom											
242	Deans Pond	7/18/2015			Bloom											
242	Deans Pond	8/1/2015	4.7	0.55	1.5											
242	Deans Pond	8/14/2015			Bloom											
242	Deans Pond	8/15/2015			Bloom											
242	Deans Pond	8/28/2015			Bloom											
242	Deans Pond	8/29/2015			Bloom											
242	Deans Pond	9/12/2015			Bloom											
242	Deans Pond	9/26/2015			Bloom											
242	Deans Pond	10/17/2015			Bloom											
242	Deans Pond	8/29/2015	4.7	0.70	1.5	0.210			2.19	10.42	30	8.31	147		116.5	

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
242	Deans Pond	6/7/2014	epi	27	21	2	3	3	0	0	0	3.8	3.6	<1.83	<0.17	<0.001	13.0	6.8	i	
242	Deans Pond	6/8/2014	bloom											71.79	<0.20	<0.003	444.8	444.8		a
242	Deans Pond	6/21/2014	epi											96.69	20.85	<0.008	9390.5	9390.5		ac
242	Deans Pond	6/21/2014	epi	20	21	2	3	3	1	0	4	90.2	1.5	<0.58	<0.44	<0.002	35.9	25.4	i	
242	Deans Pond	7/5/2014	epi	23	22	3	3	2	1	0	4	2.2	0.3	<0.62	<0.03	<0.002	0.3	0.0	i	
242	Deans Pond	7/6/2014	epi											91.40	<0.39	<0.020	75575.0	75575.0		
242	Deans Pond	7/19/2014	epi											<0.78	<0.19	<0.004	43500.0	43500.0	c	ab
242	Deans Pond	7/19/2014	epi	22	22	4	3	4	134	4	4	220.4	1.5	<0.39	<0.21	<0.003	56.7	54.1	ab	
242	Deans Pond	8/2/2014	epi											20.45	<0.06	<0.006	105631.3	105631.3	c	ab
242	Deans Pond	8/2/2014	epi	22	22	4	3	4	134	4	4	128.5	1.2	<0.33	<0.01	<0.002	38.8	35.2	ab	abc
242	Deans Pond	8/16/2014	epi											150.51	<0.06	<0.002	29193.8	29193.8	c	ab
242	Deans Pond	8/16/2014	epi	18	20	4	3	4	134	4	4	101.6	1.2	<0.35	<0.03	<0.001	30.7	25.7	abc	c
242	Deans Pond	9/13/2014	epi											<0.48	0.68	<0.002	135.6	129.1		
242	Deans Pond	9/13/2014	epi	10	18	3	3	4	134	4	4	180.3	1.8	<0.24	<0.03	<0.001	21.5	15.2	ac	abc
242	Deans Pond	9/27/2014	epi											<1.12	11.16	<0.005	2105.8	2105.8	c	b
242	Deans Pond	9/28/2014	epi											<1.12	56.86	<0.005	14612.5	14612.5	c	b
242	Deans Pond	10/18/2014	epi											<2.12	<0.23	<0.004	19143.0	19143.0		
242	Deans Pond	9/27/2014	epi	19	16	3	3	4	124	4	4	74.3	4.7	<0.19	<0.12	<0.001	32.3	1.0	ac	abc
242	Deans Pond	5/23/2015	epi	2	3	2	0	0	0	2	3	23.7	1.1	<1.34	<0.032	<0.080	6.2	0.0	i	i
242	Deans Pond	6/6/2015	epi	3	3	4	13	4	4	3	3	13.9	0.2	<0.77	<0.126	<1.739	20.8	0.0	a	a
242	Deans Pond	6/20/2015	epi	3	3	4	3	4	4	3	3	33.4	1.0	<0.55	<0.004	<0.024	7.6	4.0	a	a
242	Deans Pond	7/3/2015	epi	4	3	4	3	4	4	4	3	12.7	3.8	<0.63	0.001	<32.565	20.0	0.0	a	a
242	Deans Pond	7/18/2015	epi	5	3	5	134	4	4	5	3	79.3	3.2	<0.30	<0.004	<0.015	18.9	5.7	a	a
242	Deans Pond	8/1/2015	epi	3	3	4	134	0	0	3	3	290.0	2.6	<0.23	0.474	<0.015	39.8	29.3	i	i
242	Deans Pond	8/15/2015	epi	5	3	5	134	4	4	5	3	105.9	1.0	<0.44	<0.002	<0.014	15.7	14.0	b	b
242	Deans Pond	5/24/2015	epi											110.62	<0.044	<0.130	983.8	974.3		
242	Deans Pond	6/6/2015	epi																	
242	Deans Pond	6/20/2015	epi											32.02	<0.008	<0.048	924.5	891.3		
242	Deans Pond	7/3/2015	epi											371.63	<0.020	<65.129	4957.5	4873.0		
242	Deans Pond	7/17/2015	epi											49.33	<0.019	<0.098	19907.5	19907.5		
242	Deans Pond	7/18/2015	epi											4.53	<0.019	<0.098	4961.3	4961.3		
242	Deans Pond	8/1/2015	epi											59.65	<0.004	<0.028	1467.8	1420.0		
242	Deans Pond	8/14/2015	epi											<2.15	<0.017	<0.042	395250.0	395250.0		
242	Deans Pond	8/15/2015	epi											<2.15	<0.017	<0.042	222668.8	222668.8		
242	Deans Pond	8/28/2015	epi											620.2	<0.024	<0.061	38015.0	37407.5		
242	Deans Pond	8/29/2015	epi											390.63	<0.024	<0.061	125437.5	125437.5		
242	Deans Pond	9/12/2015	epi											193.8	<0.007	<0.027	28911.3	27967.5		
242	Deans Pond	9/26/2015	epi											966	<0.024	<0.049	60156.3	60156.3		
242	Deans Pond	10/17/2015	epi											1400	<0.010	<0.041	17752.5	17230.0		
242	Deans Pond	8/29/2015	epi	5	3	5	13	4	4	5	3			0.4	<0.004	<0.012	61.6	55.0	A	A

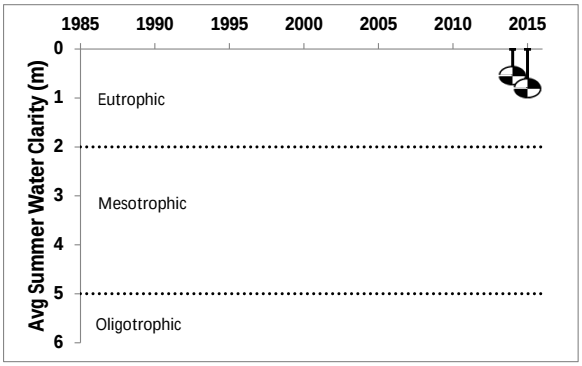
Legend Information

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

Appendix C: Long Term Trends: Deans Pond

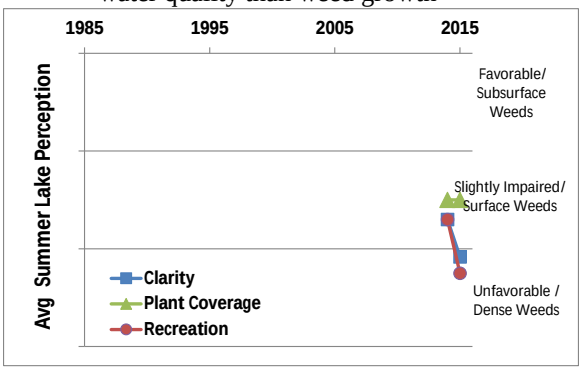
Long Term Trends: Water Clarity

- Slightly higher in 2015
- Most readings typical of *eutrophic* lakes



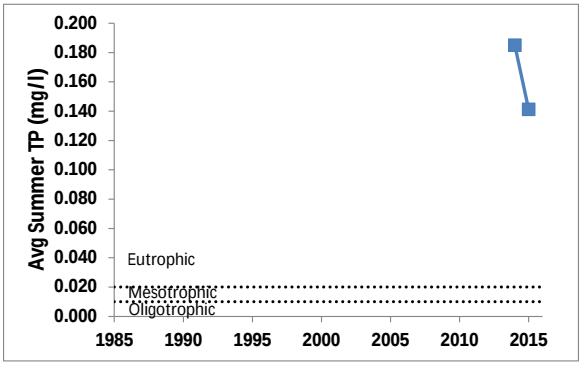
Long Term Trends: Lake Perception

- Less favorable WQ/recr. assessments 2015
- Recreational perception more closely tied to water quality than weed growth



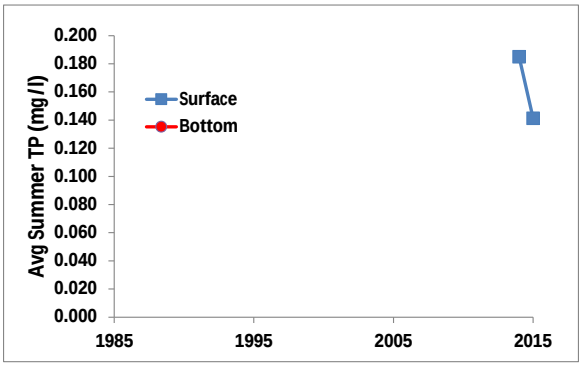
Long Term Trends: Phosphorus

- Lower TP in 2015
- Most readings typical of *eutrophic* lakes



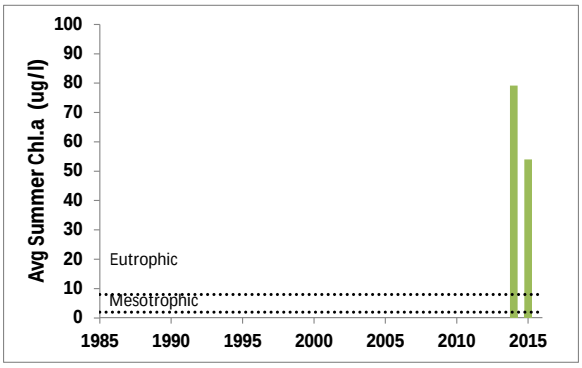
Long Term Trends: Bottom Phosphorus

- Deans Pond not thermally stratified
- Deepwater TP levels probably similar to surface TP levels



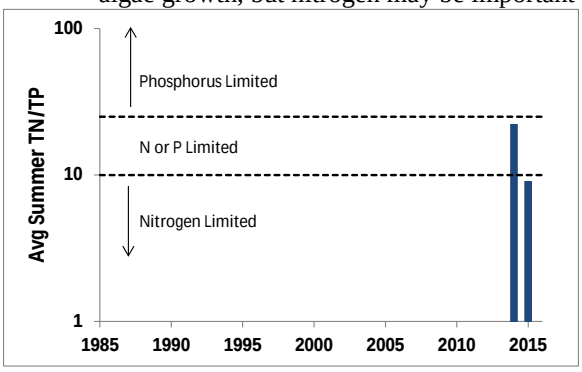
Long Term Trends: Chlorophyll a

- Lower algae levels in 2015
- Most readings typical of *eutrophic* lakes with seasonal increases



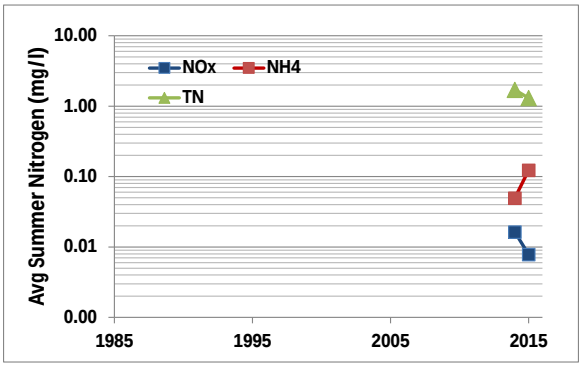
Long Term Trends: N:P Ratio

- Lower ratios in 2015
- Most readings indicate phosphorus limits algae growth, but nitrogen may be important



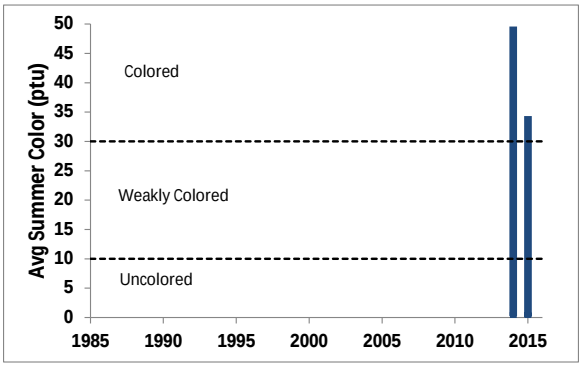
Long Term Trends: Nitrogen

- Lower NOx and TN; higher NH4 in 2015
- Relatively high total nitrogen, but low ammonia and NOx



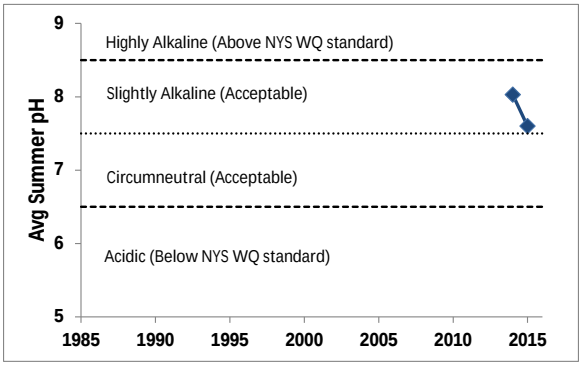
Long Term Trends: Color

- Lower color in 2015
- Most readings typical of *weakly colored* lakes



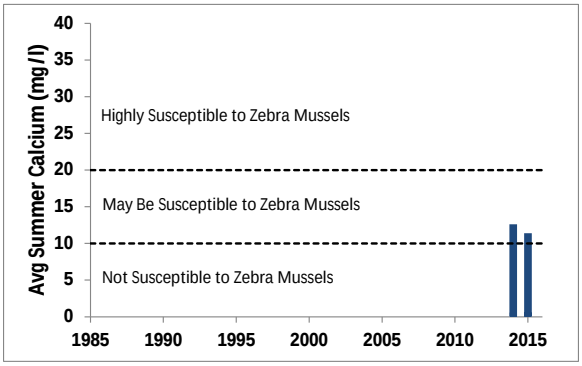
Long Term Trends: pH

- Similar but slightly lower in 2015
- Most readings typical of *circumneutral* lakes



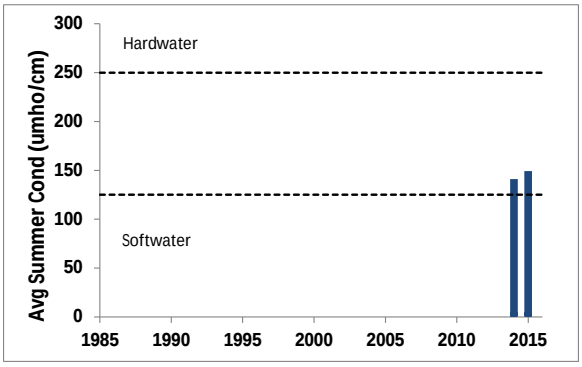
Long Term Trends: Calcium

- Similar but slightly lower in 2015
- 2014 data indicate intermediate susceptibility to zebra mussels



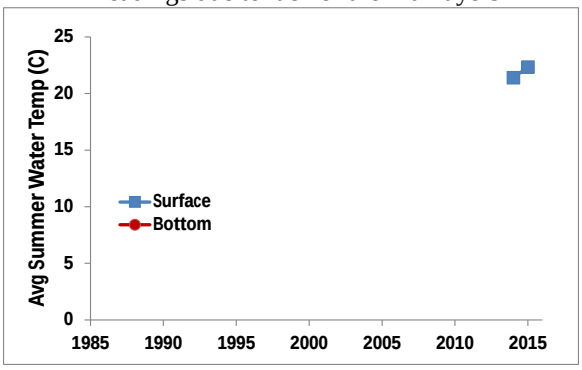
Long Term Trends: Conductivity

- Similar but slightly higher in 2015
- Most readings typical of lakes with *intermediate* hardness



Long Term Trends: Water Temperature

- Similar but slightly higher in 2015
- Deepwater temperature similar to surface readings due to lack of thermal layers



Appendix D:
Algae Testing Results from SUNY ESF Study

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

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

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

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

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

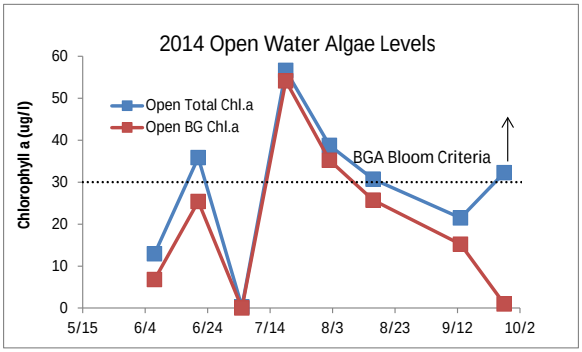


Figure D1:
2014 Open Water Total and BGA Chl.a

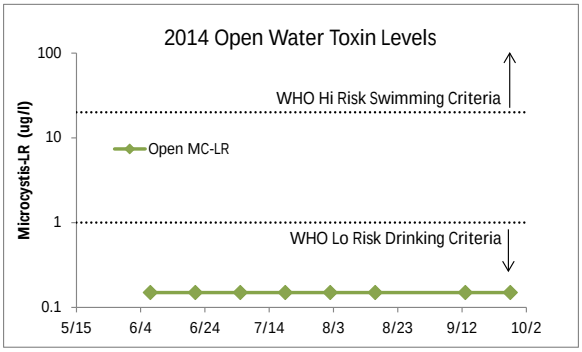


Figure D2:
2014 Open Water Microcystin-LR

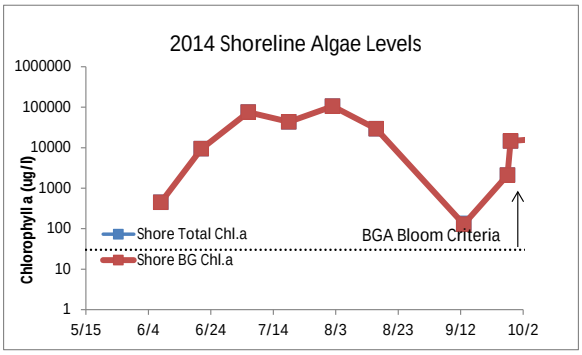


Figure D3:
2014 Shoreline Total and BGA Chl.a

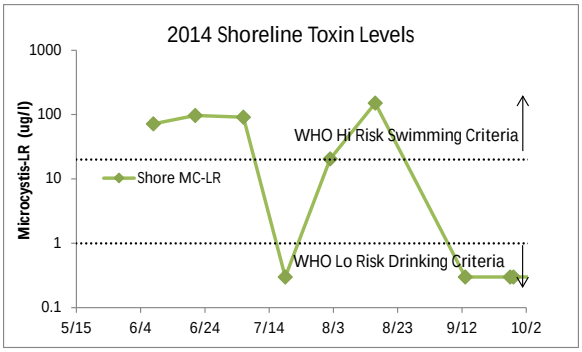


Figure D4:
2014 Shoreline Microcystin-LR

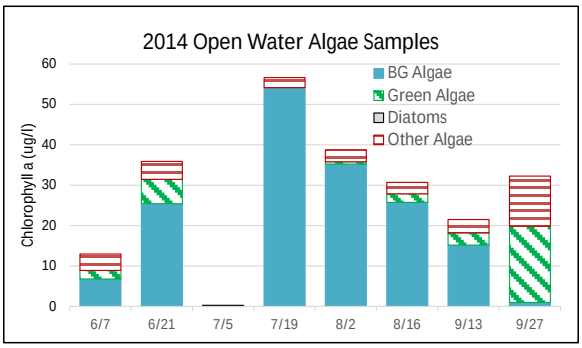


Figure D5:
2014 Open Water Algae Types

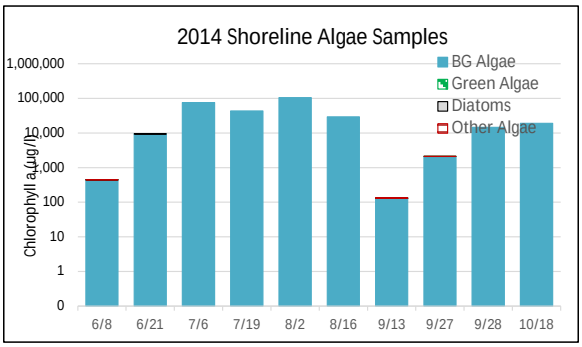


Figure D6:
2014 Shoreline Algae Types

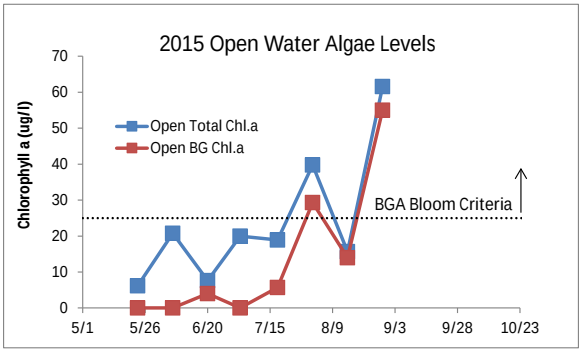


Figure D1:
2015 Open Water Total and BGA Chl.a

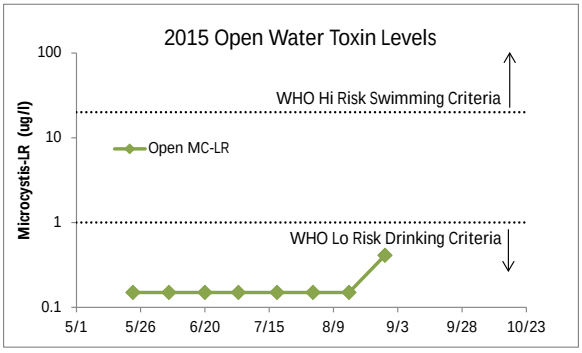


Figure D2:
2015 Open Water Microcystin-LR

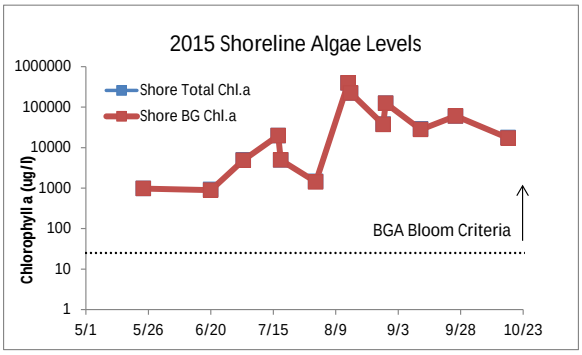


Figure D3:
2015 Shoreline Total and BGA Chl.a

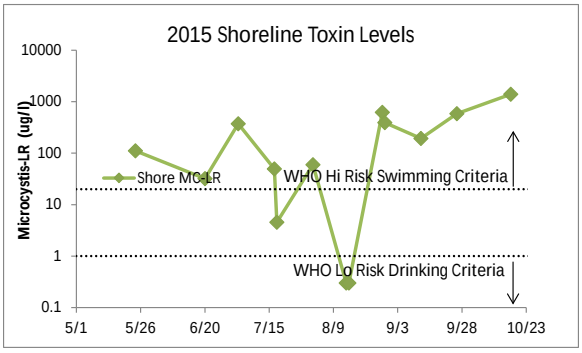


Figure D4:
2015 Shoreline Microcystin-LR

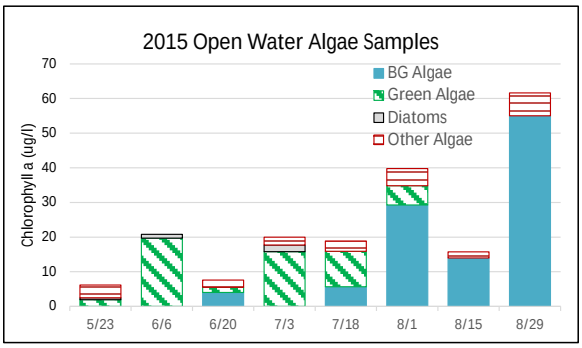


Figure D5:
2015 Open Water Algae Types

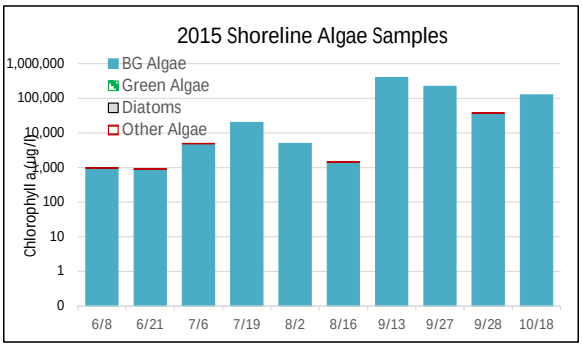


Figure D6:
2015 Shoreline Algae Types

Appendix E:
AIS Species in Cortland County

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

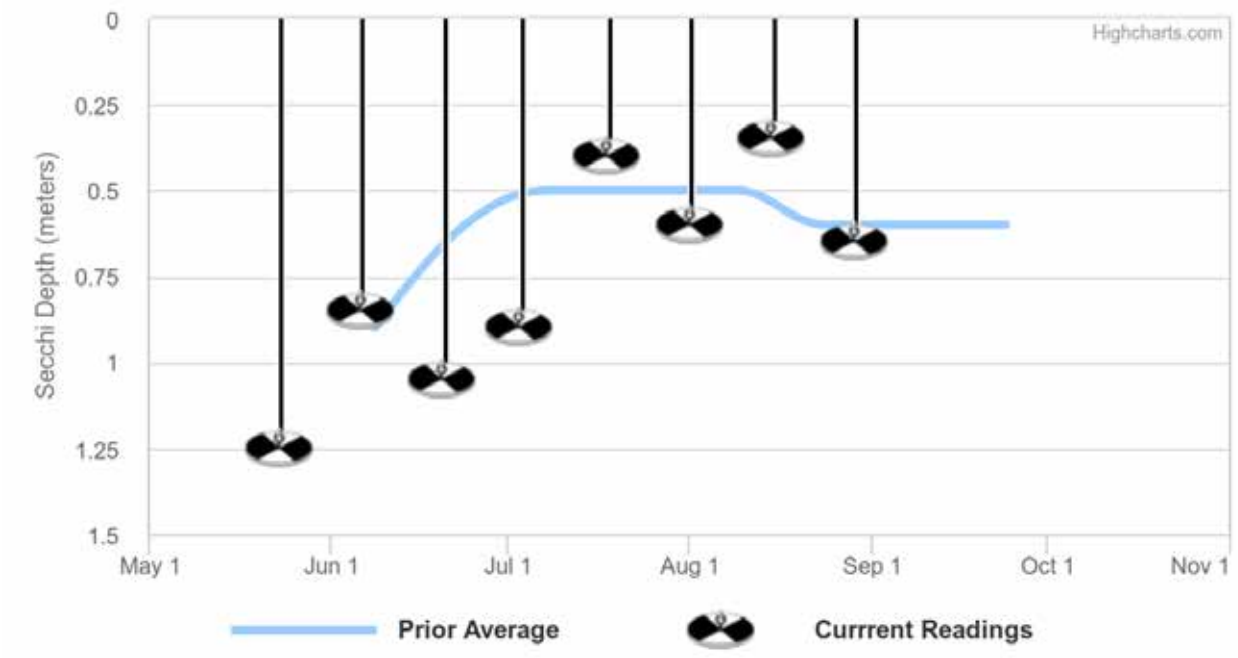
Aquatic Invasive Species - Cortland County			
Waterbody	**Kingdom**	**Common name**	**Scientific name**
Cincinnatus Lake	Plant	Water chestnut	*Trapa natans*
Ellis Lake	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Goodale Lake	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Melody Lake	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Otselic River near Landers Corners	Animal	Asian clam	*Corbicula fluminea*
Skaneateles Lake	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Skaneateles Lake	Plant	Curly leafed pondweed	*Potamogeton crispus*
Solon Pond	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Tully Lake	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Tully Lake	Plant	Starry stonewort	*Nitellopsis obtusa*
Tully Lake	Plant	Curly leafed pondweed	*Potamogeton crispus*
Upper Little York Lake	Animal	Zebra mussel	*Dreissena polymorpha*
Upper Little York Lake	Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Upper Little York Lake	Plant	Starry stonewort	*Nitellopsis obtusa*
Upper Little York Lake	Plant	Curly leafed pondweed	*Potamogeton crispus*
West Branch Tioughnioga River	Animal	Zebra mussel	*Dreissena polymorpha*

Appendix F: Current Year vs. Prior Averages for Deans Pond

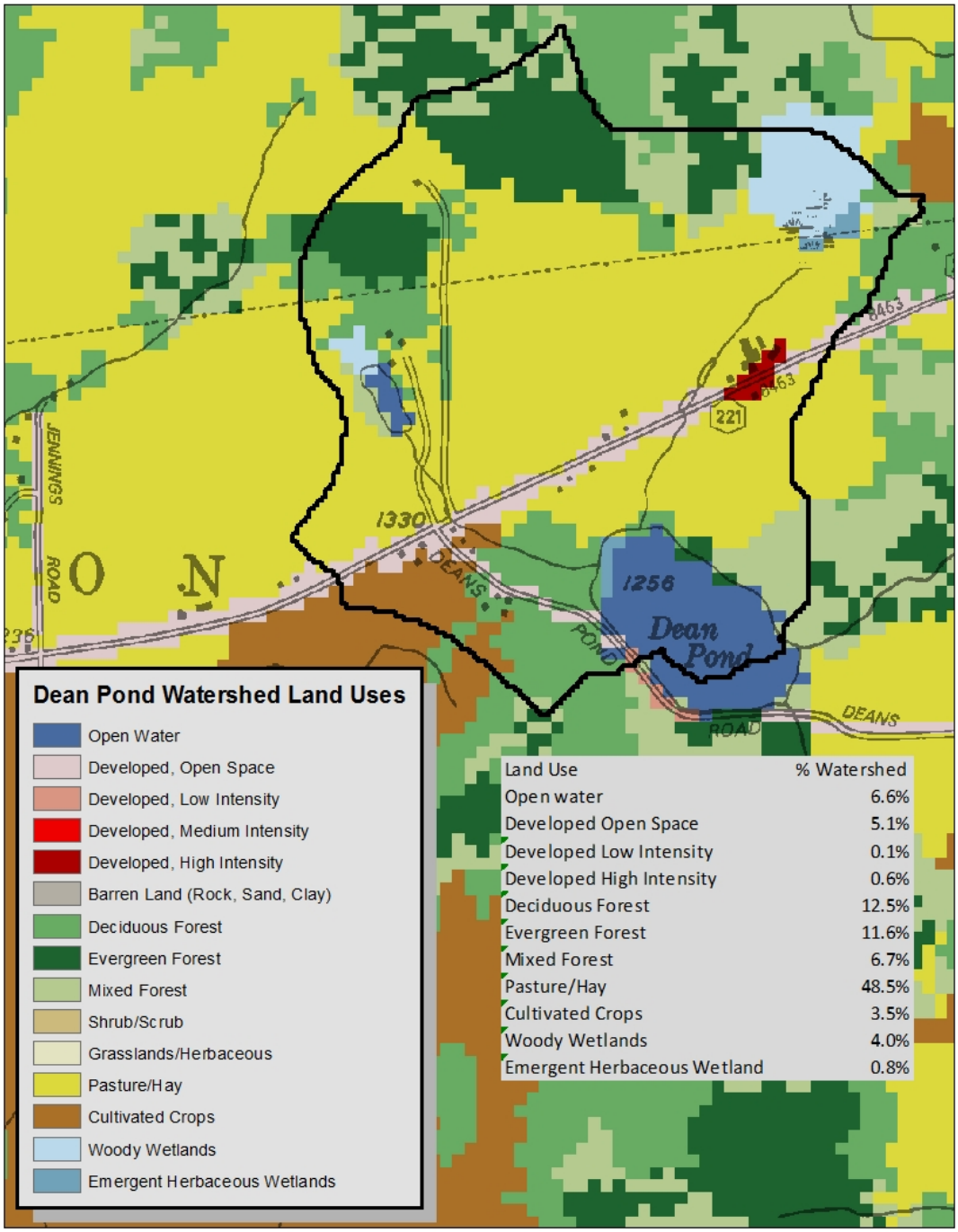
Current Year Water Temperatures vs. Prior Average

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

Appendix G: Watershed and Land Use Map for Deans Pond

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