

## Memorandum

**To:** Ms. Colleen Conover, Lake Hopatcong Commission

**From:** Katie Walston, Princeton Hydro

**Date:** 16 August 2019

**CC:** Lake Hopatcong Commission  
Fred Lubnow, Ph.D., Princeton Hydro

**RE:** 12 August 2019 – Cyanotoxin Testing – Lake Hopatcong

**Pages:** Seven

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Princeton Hydro conducted the second of two cyanobacteria / cyanotoxin testing events at Lake Hopatcong on 12 August 2019. The data collected as part of this effort are provided below.

### *Methodology*

Princeton Hydro sampled at eight (8) stations on 12 August 2019. At each station, plankton grab samples were collected, preserved with Lugol's. The phytoplankton were identified down to genus by Princeton Hydro and densities were quantified as cells / mLs. In addition, at each site, sub-surface samples were collected in glass vials and analyzed the same day for the cyanotoxins microcystins, cylindrospermopsin and anatoxin-a utilizing Abraxis Algal Toxin Test Strip Kits and read with an Abraxis Field Meter. It should be noted that this analytical methodology is not NJ-State certified however, the resulting data can be used for informational and management purposes. In addition, *in-situ* monitoring at each station was conducted utilizing a Hach MS5 water quality meter which was calibrated prior to use; Princeton Hydro is State certified in its use of field meters (#10006). The locations of the sample stations are shown in the Figure attached to the end of this memo. Please note that only Stations B1-B8 were sampled during this event, as B9 and B10 were supplemental stations sampled during the previous year. Photos of some of the sampling stations are also attached at the end of this memo.

### *Results*

The results of the sampling effort are listed in the following tables (Tables 1 through 4).



Table 1: Cyanotoxin Data

Lake Hopatcong Cyanotoxin Results 8/12/19			
Station	Microcystin	Cylindrospermopsin	Anatoxin-a
B1	Negative	Negative	Negative
B2	Negative	Negative	Negative
B3	1 ppb	Negative	<0.4 ppb
B4	Negative	Negative	1 ppb
B5	Negative	Negative	Negative
B6	Negative	Negative	Negative
B7	<1 ppb	Negative	Negative
B8	Negative	Negative	Negative
NJDEP Recreational Health Advisory	3 ppb	8 ppb	27 ppb

Table 2: *In-situ* Data

Lake Hopatcong In-situ 8/12/19							
Station	Secchi	Temperature	Specific Conductance	Dissolved Oxygen		pH	Notes
		°C	mS/cm	mg/L	% Sat.	units	
B1	0.7	25.24	0.324	8.45	104.3	7.86	Water slightly clouded and green by dock, Valisneria and eurasian watermilfoil (EWM) on shore, two dead fish observed on shore
B2	0.4	25.49	0.399	8.23	102.0	7.81	Water clear at beach with green tint, Secchi bottomed out, floating EWM and broadleaf pondweed
B3	0.7	25.04	0.631	8.59	105.2	8.09	Green surface scum observed along with dense mat algae at station
B4	0.7	26.52	0.673	11.55	146.2	8.73	Beach clear, greener in deeper waters/cloudy by the docks, rooted EWM past beach line
B5	1.6	26.53	0.424	8.44	106.6	8.16	Beach clear, deeper water greener, Secchi taken from boat, two dead fish noted in area adjacent (but separate) from beach amongst harvested <i>Valisneria</i>
B6	0.3	25.90	0.427	9.03	112.9	8.08	Clear, Secchi bottomed out, green tint further out
B7	0.3	26.22	0.429	8.96	112.5	8.12	Clear, Secchi bottomed out, green tint further out
B8	1.3	25.81	0.412	8.19	102.1	7.99	Water green, particulates in water column

### Table 3: Plankton Data

Phytoplankton and Zooplankton Community Composition Analysis																											
Sampling Location: Lake Hopatcong									Sampling Date:8/12/19									Examination Date:8/13/19									
Phytoplankton																											
Bacillariophyta (Diatoms)									Chlorophyta (Green Algae)									Cyanophyta (Blue-Green Algae)									
Melosira	6890	2433	122			3517	1640		Eudorina					585	828	1969		Aphanizomenon	41457	13706	37736	48918	20471	21930	21326	18565	
Fragilaria	238					414		1219	Pediastrum		1425	890					1406	Dolichospermum		1187	9982	6648		3931	8202	1219	
Navicula	119	178	61		84				Chlorella		475	890	852	695	501	310	219	281	Coelosphaerium					8379	9624		
Synedra	5345	949	2678	3473	2507	1862	1422	2344	Terastrum		832	178							Microcystis					7758	3281		
Cymbella			365					109	Phacotus			59							Chroococcus	238	119	730	595	1504	414	656	375
Tabellaria	6058	237						984	188	Desmidiium			119						Raphidiopsis	238	119	61	99		109		
Asterionella				198				109	Haematacoccus				61						Pseudanabaena	6652	1424	8886	14586	7019	9517	11265	16127
Stephanodiscus	119							109	Actinostrium				61			828			Lyngbya			10680				18753	
Cyclotella	119	59						109	Scenedesmus	1901	1187	1948	595	334	621	656	1125		Aphanocapsa				2005	3414	3937		
									Quadrigula				198						Cryptomonads								
Chrysophyta (Golden Algae)									Gloeocystis	3682	593								Cryptomonas	119	475	426	397	501	931	328	94
Mallomonas				99					Franceia	119							109		Pyrrhophyta (Dinoflagellates)								
									Chlamydomonas	238		183	99	84	207				Gymnodium	119							
									Staurostrum	238		61	198	251													
									Crucigenia	1425	237	974															
									Ankistrodesmus		475	183			931				Euglenophyta (Euglenoids)								
									Sphaerocystis	1187					828				Trachelomonas			61	99	84	103		
									Pandorina			794							Euglena						109		
									Gloeotila	1663		609	501														
									Coelastrum	1188																	
									Oocystis		356	243	595	334	207	219											
									Cosmarium			243				109	94										
									Centritractus			365		167													
									Selenastrum					84	207												
									Treubaria							109	94										
Sites:	B1	B2	B3	B4	B5	B6	B7	B8	Comments:																		
Total Cells/mL	80897	38686	66891	78286	37016	67137	66709	61884																			
Total Cyanobacteria Cells/mL	48585	28184	57395	70846	30999	55343	58400	55039																			
Sample Volume (mL)	Phytoplankton Key: Bloom (B), Common (C), Present (P), and Rare (R)																										

**Table 4: Cyanobacteria cell counts for July Cyanotoxin sampling event**

Nearshore Sampling Station	Cyanobacteria cells / mLs
Beach in Northern Jefferson (B-1)	48,585
CAPP Beach (B-2)	28,184
Western shoreline of Crescent Cove (B-3)	57,395
Borough of Hopatcong Beach (B-4)	70,846
Barnes Brothers Beach (B-5)	30,999
Hopatcong State Park Beach – northern end (B-6)	55,343
Hopatcong State Park Beach – southern end (B-7)	58,400
Mid-Lake (B-8)	55,039
State's recommended threshold of concern	20,000

Overall, the plankton communities were generally diverse with a mixture of diatoms, cryptomonads, euglenoids, greens and blue-greens (cyanobacteria). A total of nine genera of cyanobacteria were identified in the near-shore samples. Total cyanobacteria cell counts ranged from a minimum of 28,184 cells / mLs at B2 to a maximum of 70,846 cells / mLs at B4. The dominant cyanobacteria genus was *Aphanizomenon*, which is a filament made up of very small cells. It should be noted that all eight nearshore sampling sites had cyanobacteria cell counts that exceeded the NJ Health Advisory Guidance Level for cyanobacteria cells counts, which is 20,000 cells / mLs.

Cylindrospermopsin values were negative at all eight stations, meaning concentrations were well below 0.5 ppb or absent from the sample. Microcystins were negative at six of the eight stations, indicating that concentrations were absent or well below the detection limit for these tests (<1 ppb). Stations B3 and B7 were the only stations that yielded a numerical hit for microcystins, with measurements of 1 ppb and < 1 ppb, respectively. The measurement at B7 indicates that microcystins was present in the sample, but below the detection limit. Anatoxin-a values were also negative at six of the eight stations, indicating concentrations were absent or below 0.4 ppb. Numerical hits were observed at stations B3 and B4, with measurements of < 0.4 ppb and 1 ppb, respectively. All of these values were below the draft recreational health advisories set by the NJDEP for each of the cyanotoxins tested (Microcystins: 3 ppb; Cylindrospermopsin: 8 ppb; Anatoxin: 27 ppb).

Finally, most of the near-shore sampling sites appeared to be visually acceptable, with mostly clear water adjacent to the beach and slightly cloudier or green tints farther out. B3 was the only station that produced a scum-like appearance on the surface as well as high densities of mat algae at the sampling area and nearby. While B8 was less green in color than the previous (July)

sampling event, particulates within the water column were high. Photos of stations B2, B3, B4 and B8 can be found at the end of this document.

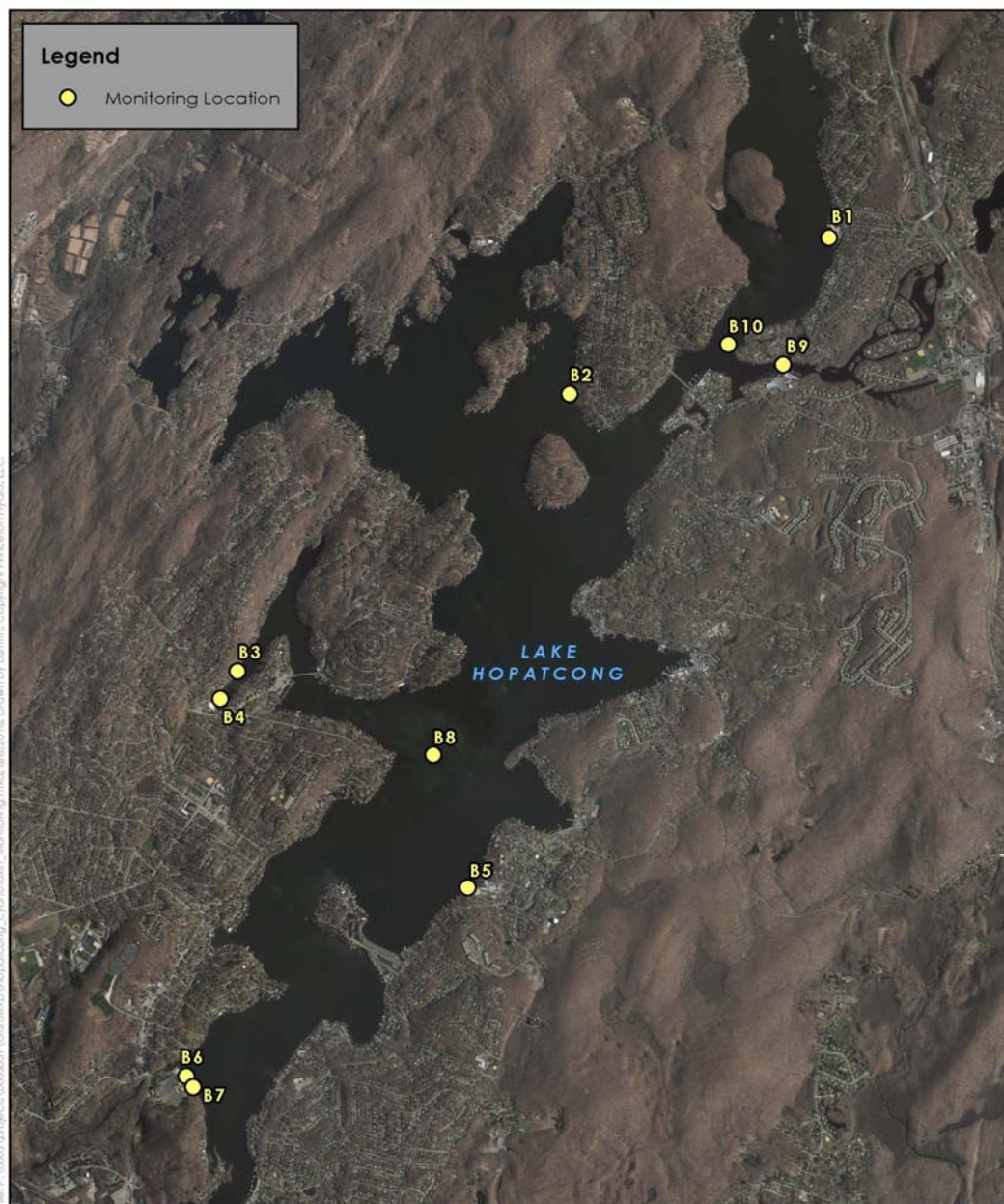
Thank you for your review of this brief summary. Please feel free to contact me or Dr. Fred Lubnow with any questions or concerns.

Sincerely,

A handwritten signature in black ink that reads "Katie Walston". The script is cursive and fluid.

Katie Walston  
Senior Scientist  
Princeton Hydro, LLC

## Site Location Map



NOTES:  
1. Monitoring locations are approximate.  
2. 2015 orthomage obtained from NJ Office of Information Technology (NJOT), Office of Geographic Information Systems (OGIS).

0 2,000 4,000 Feet  
Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

## CYANOTOXIN MONITORING LOCATION MAP

LAKE HOPATCONG  
MORRIS AND SUSSEX COUNTIES  
NEW JERSEY



Photographs of Near-Shore Sampling Sites

B2



B3



B4



B8

