

Memorandum

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Resource Management

To: Mr. Getz Obstfeld, Lake Sagamore
From: Michael Hartshorne, Princeton Hydro
Cc: Fred Lubnow, Ph.D., Princeton Hydro
Date: 11 September 2017
Re: September 2017 Monitoring

Princeton Hydro conducted the annual water quality and aquatic vegetation monitoring event of the 2017 season on 8 September 2017. The following memo provides the *in-situ*, plankton and plant data collected during this event as it relates to the trophic state and management objectives of the lake. The discrete laboratory data will be provided upon its receipt from the laboratory.

In-situ Data

Temperatures at the dam station ranged from a minimum of 19.79°C (67.62°F) at the bottom (3.5 m) to 20.27°C (68.49°F) at the surface. DO concentrations were stratified throughout the water column ranging from near hypoxic conditions (2.36 mg/L) at the bottom to 8.19 mg/L at the surface. Typically, DO concentrations 4.0 mg/L and greater are necessary for the maintenance of warm-water fisheries while concentrations less than 1 mg/L may lead to accelerated internal loading of phosphorus from the sediments. pH values were within a normal range (pH 7-8) with slight stratification throughout the water column due to prevailing rates of photosynthesis versus respiration. 2017 Transparency measures were lower (1.2 m) than those measured in 2016 (1.8 m). Princeton Hydro has established a lower and upper Secchi disc threshold for Lake Sagamore of 1.0 and 2.0 m, respectively. As such, while transparency was lower than in 2016, measures were still above the lower threshold. Slightly decreased clarity in 2017 may be attributed to increased planktonic algal growth.

Plankton

The plankton community was comprised primarily by diatoms, golden-algae and green-algae while cyanobacteria were rare or present in small densities. Diatoms were the dominant group which led to the brownish water coloration observed at the time of sampling. The zooplankton were comprised primarily by the rotifers and copepods. Cyanotoxin (Microcystin) analysis was conducted at the dam station and showed a concentration of 0.3 ppb. Tentative recreational water quality standards for this toxin are 4 ppb. As such, there is little concern with cyanotoxin toxicity at this time.

Princeton Hydro, LLC

1108 Old York Road • PO Box 720 • Ringoes, NJ 08551 • t: 908.237.5660 • f: 908.237.5666
1200 Liberty Place • Sicklerville, NJ 08081 • t: 856.629.8889 • f: 856.629.8866
120 East Uwchlan Avenue • Suite 204 • Exton, PA 19341 • t: 610.524.4220 • f: 610.524.9434
931 Main Street • Suite 2 • South Glastonbury, CT 06073 • t: 860.652.8911 • f: 860.652.8922
www.PrincetonHydro.com

SAV

The SAV community was sparse with only several small areas of low-growing, non- nuisance vegetation. Biomass estimates were considerably low and similar to those measured in the previous five years of data collection.

Clearly should be between 1.5 - 2.0 for quality

Dissolved Oxygen

Lake Sagamore - In-situ Data - September 8, 2017											
Station	Depth		Sample (m)	Temp	SpC	DO	DO%		pH	2016	
	Max (m)	Secchi (m)		(°C)	(mS/cm)	(mg/L)	(%)	(units)			
Dam	3.7	1.2	0.2	20.27 ²⁰¹⁶	0.225	8.19	53	190.6	62.7	7.89	8.34
			1	20.09	0.226	7.14	5.64	78.8	65.9	7.73	8.37
			2	20.02	0.225	7.03	5.68	77.4	66.5	7.66	8.46
			3	19.96	0.224	5.38	5.69	59.4	59.1	7.57	8.67
			3.5	19.79 ²⁰¹⁶	0.227	2.36	0	25.9	0	7.47	8.80
South	0.9	0.9	0.2	17.34 ²⁰¹⁶	0.191	7.40	6.97	77.1	85	7.54	9.41 @ 3
			0.7	16.46	0.141	8.20	83.9	7.47			

Lake Sagamore - Dam - September 8, 2017			
Phytoplankton		Zooplankton	
Taxon	Abundance	Taxon	Abundance
Diatoms		Cladocerans	
<i>Melosira</i>	C		
<i>Synedra</i>	R		
<i>Fragilaria</i>	R		
<i>Navicula</i>	R		
<i>Tabellaria</i>	C		
Chrysophytes		Copepods	
<i>Dinobryon</i>	C	<i>Diaptomus</i>	R
<i>Mallomonas</i>	R	<i>Cyclops</i>	P
		<i>nauplii</i>	C
Cyanobacteria		Rotifers	
<i>Microcystis</i>	R	<i>Polyarthra</i>	P
<i>Anabaena</i>	P	<i>Keratella</i>	P
		<i>Conochilus</i>	R
		<i>Asplanchna</i>	R
Chlorophytes			
<i>Golenkinia</i>	P		
<i>Pediastrum</i>	R		
*Small celled greens	C		

2016

Lake Sagamore - South - September 8, 2017			
Phytoplankton		Zooplankton	
Taxon	Abundance	Taxon	Abundance
Chlorophytes		Cladocerans	
<i>Chlamydomonas</i>	R	<i>Bosmina</i>	P A
<i>Micrasterias</i>	R		
Diatoms		Copepods	
<i>Melosira</i>	C	<i>Cyclops</i>	P P
		<i>nauplii</i>	C C
Chrysophytes		Rotifers	
<i>Dinobryon</i>	C	<i>Asplanchna</i>	R
Dinoflagellates		<i>Polyarthra</i>	C
<i>Ceratium</i>	P	<i>Keratella</i>	C
Cyanobacteria			
<i>Anabaena</i>	P		
<i>Microcystis</i>	R		

Key – (A) Abundant, (C) Common, (P) Present, (R) Rare

Lake Sagamore - September 8, 2017 - SAV								
Transect	Species	Scientific	20	40	60	80	100	Biomass (g/m2)
T1	Chara	<i>Chara sp.</i>	Tr	X	X	X	Tr*	1
T2	Quillwort	<i>Isoetes sp.</i>	Tr	X	X	X	Tr*	1
T3	None	N/A	N/A	N/A	N/A	N/A	N/A	0
T4	None	N/A	N/A	N/A	N/A	N/A	N/A	0
T5	Water moss	<i>Fontinalis sp.</i>	X	X	X	Tr	X	N/A
	Un-Identified		P*	X	X	X	X	3

Key – (A) Abundant, (C) Common, (P) Present, (R) Rare, (Tr) Trace. * - Harvested