Big Bowman Pond, Rensselaer Co., Bowman Lake Association

NEW YORK STATE OF OPPORTUNITY | **Department of Environmental Conservation**

Lakes and Wetlands Agricultural Urban
Forest, shrubs, and grasses Residential

Lake Characteristics			
Surface Area (ac/ha)		32	13
Max Depth (ft/m)		27	8
Mean Depth (ft/m)		15	5
Retention Time (years)		0.41	
Water Class		B	
Dam Class		A	

Watershed Characteristics		
Watershed Area(ac/ha)	294	119
Watershed/Lake Ratio	9	
Lake and Wetlands	13.9%	
Agricultural	1.2%	
Forests, shrubs, grasses	77.2%	
Residential	7.7%	
Urban	0.0%	

CSLAP Participation		
Years	2013-2017	
Volunteers	John Walsh, Matt LeFleur	

Trophic State	HABs Susceptibility	Invasive Vulnerability	PWL Assessment
Mesotrophic	Low	Low	Unassessed

Open Water Indicators	2017 Sampling Results								Seasonal Change	Long Term Avg.
	6/11	6/23	7/10	7/23	8/6	8/20	9/4	9/17		
Chl.a (µg/L)	7.4	14.8	5.6	6.5	6.4	9.9	3.2	1.9		7.5
BG Chl.a (µg/L)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Clarity (m)	2	1.8	2	2.3	1.9	1.7	2	2.8		2.1
pH	7.4	8.3	7.6	7.6	7.6	7.5	7.8	6.9		7.4
Cond (µmho/cm)	134.9	104.3	115.1	126.4	127.6	115.6	95.8	97.8		126
Surf Temp (°C)	22	25	27	26	23	27	20	24		22
TN (mg/L)	.324	.505	.339	.446	.211	.375	.229	.35		0.330
TP (mg/L)	.016	.021	.011	.014	.013	.013	.011	.011		0.014
N:P Ratio	20	24	31	32	16	29	21	32		

Shoreline bloom and HABs notifications

Date of first listing	Date of last listing	# of weeks on DEC notification list	# of weeks with updates
		0	

Shoreline HAB Sample Dates 2017														
HAB Indicators	HAB Criteria													
BGA	25 µg/L	NA												
Microcystin	20 µg/L	NA												
Anatoxin-a		NA												

HAB Status

2017 Open Water Algae Samples

2017 Open Water Algae Samples

Chloropyhll a (µg/L)

10.00	
1.00	
0.10	
0.01	

6/11 6/23 7/10 7/23 8/6 8/20 9/4 9/17

■ Green ■ Diatoms ■ Cryptophyta
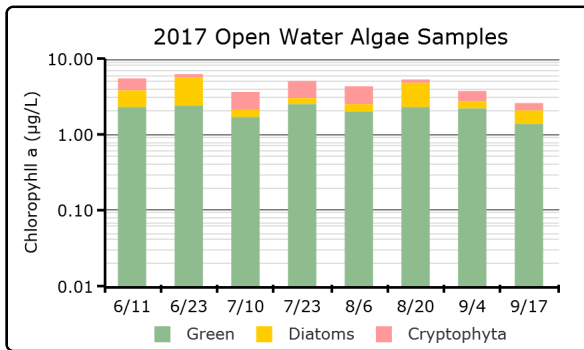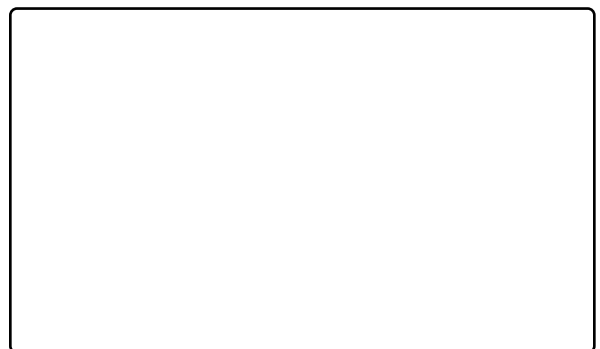
2017 Shoreline Algae Samples

2017 Open Water Toxin Levels

2017 Open Water Toxin Levels

Total Microcystin (µg/L)

1000.0	
100.0	
10.0	WHO Hi Risk Swimming Criteria ↑
1.0	
	EPA Low Risk Drinking Criteria ↓
0.1	

6/2017 7/2017 8/2017 9/2017
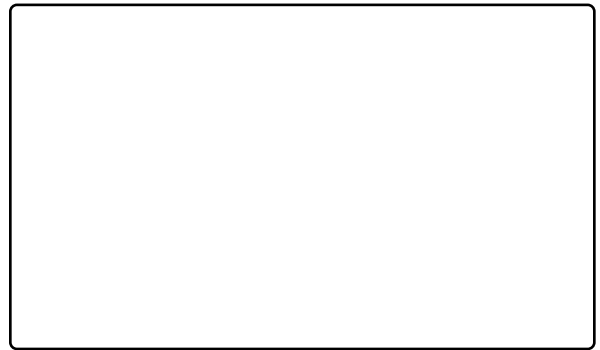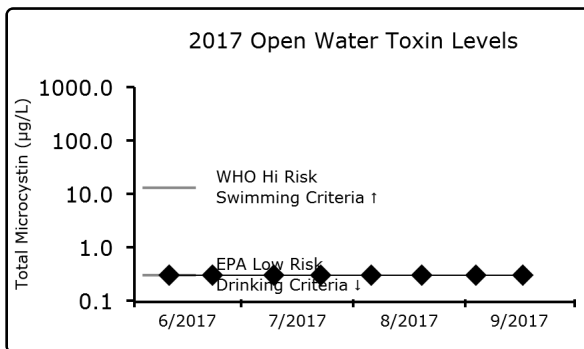
2017 Shoreline Toxin Levels

Big Bowman Pond Long Term Trend Analysis

Clarity

Avg Summer Water Clarity (m)

1985 1993 2001 2009 2017

Eutrophic

Mesotrophic

Oligotrophic

0	
2	
4	
6	

Chlorophyll a

Avg Summer Chl.a (µg/L)

10	Eutrophic
5	Mesotrophic
0	Oligotrophic

1986 1994 2002 2010
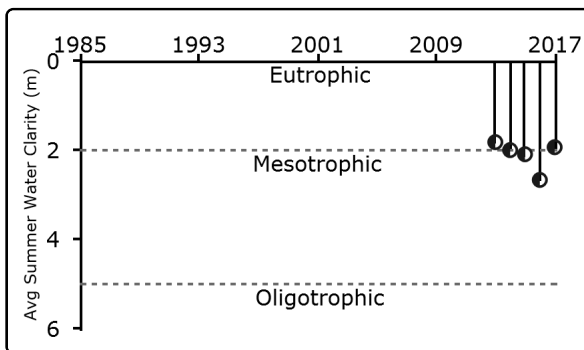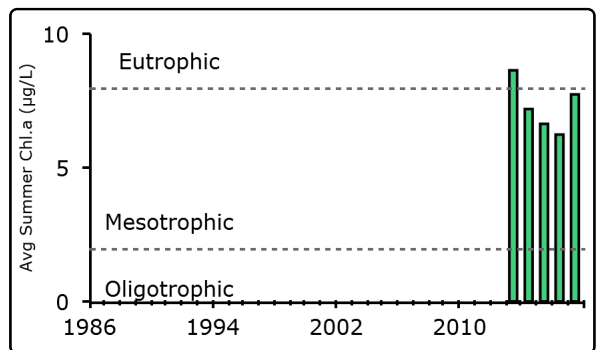
Surface and Deep Phosphorus

■ Surface ▪▪▪▪

Avg Summer TP (mg/L)

1.000	Eutrophic
0.100	
0.010	Mesotrophic
0.001	Oligotrophic

1985 1993 2001 2009 2017

Lake Perception

Avg Summer Lake Perception

1985 1993 2001 2009 2017

0	
2	Favorable/ Subsurface Weeds
	Slightly Impaired/ Surface Weeds
4	Unfavorable/ Dense Weeds
6	
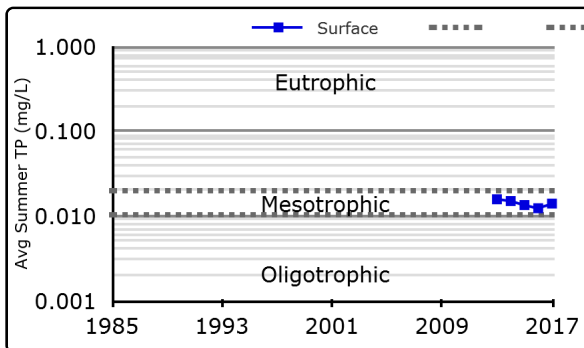
■ Clarity ▲ Plant Coverage ● Recreation
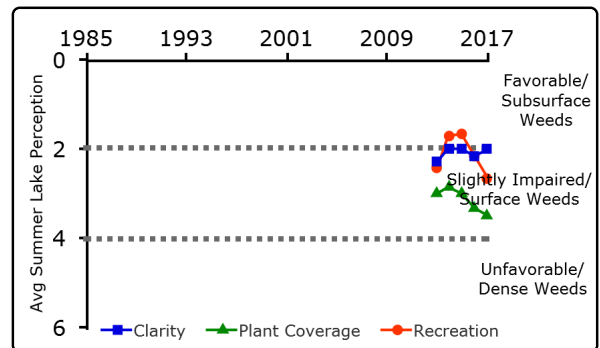
Big Bowman Pond Long Term Trend Analysis

Nitrogen

Avg Summer Nitrogen (mg/L)

Legend: TN, NOx, NH4

pH

Avg Summer pH

- Highly Alkaline (Above NYS WQ standard)
- Slightly Alkaline (Acceptable)
- Circumneutral (Acceptable)
- Acidic (Below NYS WQ standard)

Temperature

Avg Summer Water Temp (°C)

Legend: Surface

Specific Conductance

Avg Summer Cond (µmho/cm)

- Hardwater
- Softwater
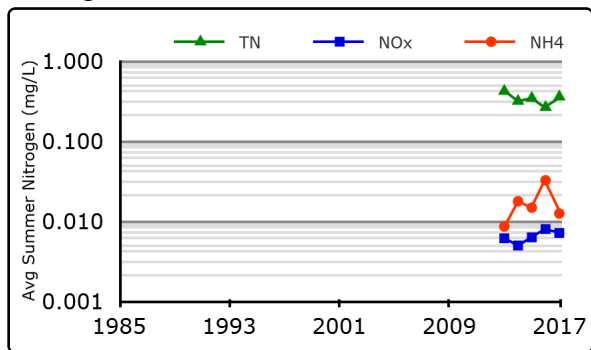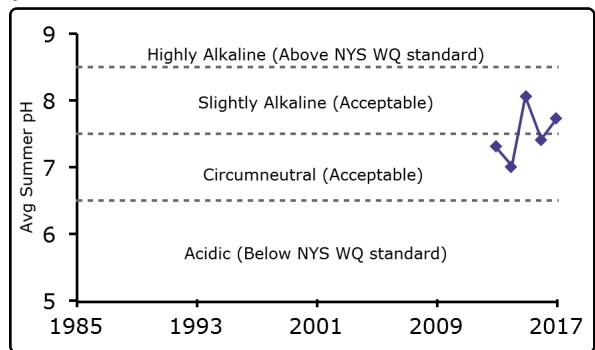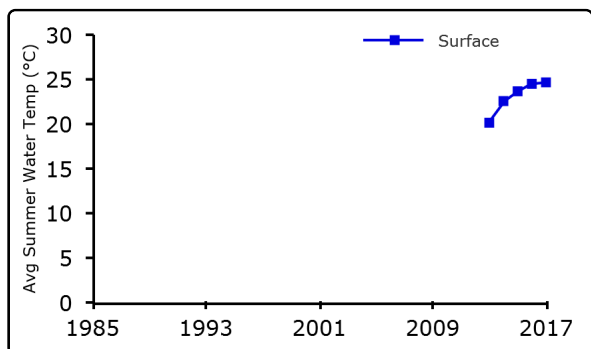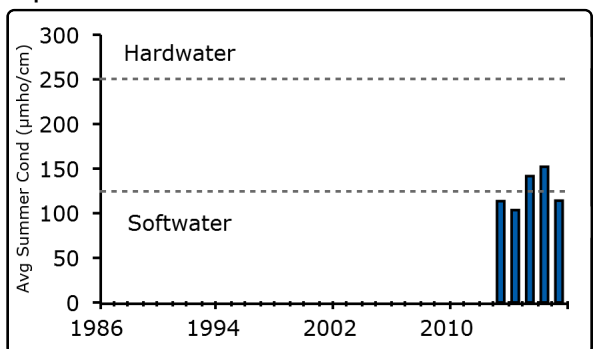
Big Bowman Pond In-Season Analysis

In Season Temperature

In Season 2017 and Typical Top Temperature

Water Temperature (°C)

Legend: 2017 Surface, Typical Surface

In Season Water Clarity

In Season 2017 and Typical Water Clarity

Secchi Disk Transparency (m)

Legend: 2017, Typical
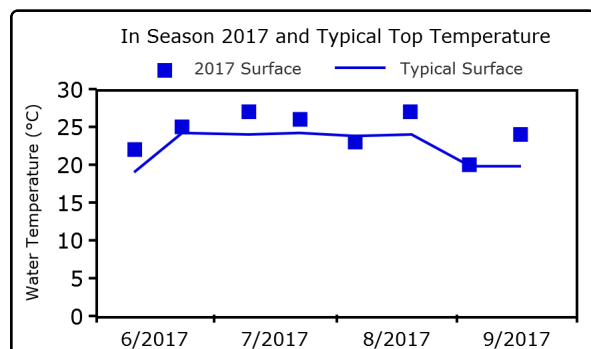
Scorecard

Lake Use
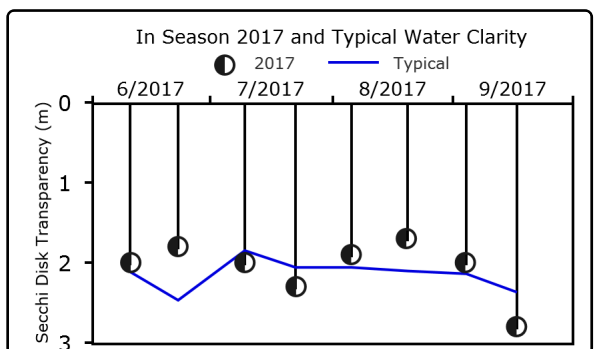
	PWL	Average Year	2017	Primary Issue
Potable Water	☐	☐	☐	**No impacts**
Swimming	☐	🔴	🟢	**Algae blooms**
Recreation	☐	🔴	🔴	**Algae levels**
Aquatic Life	☐	🟢	🟢	**No impacts**
Aesthetics	☐	🔴	🔴	**Algae blooms**
Habitat	☐	🟢	🟢	**No impacts**
Fish Consumption	☐	☐	☐	**Not applicable**

🟢 Supported/Good
🔺 Threatened/Fair
🔴 Stressed/Poor
⬛ Impaired
☐ Not Known

Summary

2017 compared to prior years: Big Bowman Lake is mesotrophic, or moderately productive. Water quality conditions in the lake were nearly identical to those in measured in previous years (through CSLAP), with very similar water clarity, nutrient and algae levels.

Compared to nearby lakes: Big Bowman Lake had similar water clarity, and slightly lower nutrient levels and algae levels, than other nearby lakes. Aquatic plant coverage is slightly higher than in many of these other lakes. Chloride levels are in the 50th to 75th percentile of New York state lakes, indicating the potential for aquatic life impacts from road salt if these levels rise. This may be coincident with the proximity to Route 42 and Lawson Road.

Trends: Water temperatures have increased slightly over the last five years, but none of the other water quality indicators measured through CSLAP have indicated any long-term trends.

Algal blooms and HABS: Although Big Bowman Lake previously exhibited some short-term shoreline blooms dominated by *Oscillatoria,* blooms were not reported in 2017. It is not yet known why blooms occur in some years but not other years, but these phenomena are being closely studied throughout New York state.

Aquatic invasive species: No invasive species have been documented on Big Bowman Lake, although some AIS, particularly Eurasian watermilfoil, have been found in nearby lower elevation lakes. The lake is less susceptible to AIS than other lakes due to the lack of public access and the distance to other infested lakes. However, many nearby lakes have exhibited periodic problems with native plants, particularly bladderwort (*Utricularia* sp).

Indicated Actions: 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 improve 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 this lake. Continued monitoring for invasive species is warranted. Continued algae bloom education and monitoring for HABs is recommended, given the periodic reports of blooms on the lake and the need to alert the public to the ephemeral blooms.

How to Read the Report

This guide provides a description of the CSLAP report by section and a glossary. The sampling site is indicated in the header for lakes with more than one routine sampling site.

Physical Characteristics influence lake quality:
- Surface area is the lake's surface in acres and hectares.
- Max depth is the water depth measured at the deepest part of the lake in feet and meters.
- Mean depth is either known from lake bathymetry or is 0.46 of the maximum depth.
- Retention time is the time it takes for water to pass through a lake in years. This indicates the influence of the watershed on lake conditions.
- Lake classification describes the "best uses" for this lake. Class AA, AAspec, and A lakes may be used as sources of potable water. Class B lakes are suitable for contact recreational activities, like swimming. Class C lakes are suitable for non-contact recreational activities, including fishing, although they may still support swimming. The addition of a T or TS to any of these classes indicates the ability of a lake to support trout populations and/or trout spawning.
- Dam classification defines the hazard class of a dam. Class A, B, C, and D dams are defined as low, intermediate, high, or negligible/no hazard dams in that order. "0" indicates that no class has been assigned to a particular dam, or that no dam exists.

Watershed characteristics influence lake water quality:
- Watershed area in acres and hectares
- Land use data come from the most recent (2011) US Geological Survey National Land Use Cover dataset

CSLAP Participation lists the sampling years and the current year volunteers.

Key lake status indicators summarize lake conditions:
- Trophic state of a lake refers to its nutrient loading and productivity, measured by phosphorus, algae, and clarity. An oligotrophic lake has low nutrient and algae levels (low productivity) and high clarity while a eutrophic lake has high nutrient and algae levels (high productivity) and low clarity. Mesotrophic lakes fall in the middle.
- Harmful algal bloom susceptibility summarizes the available historical HAB data and indicates the potential for future HAB events.
- Invasive vulnerability indicates whether aquatic invasive species are found in this lake or in nearby lakes, indicating the potential for further introductions.
- Priority waterbody list (PWL) assessment is based on the assessment of use categories and summarized as fully supported, threatened, stressed,

impaired, or precluded. Aesthetics and habitat are evaluated as good, fair, or poor. The cited PWL assessment reflects the "worst" assessment for the lake. The full PWL assessment can be found at http://www.dec.ny.gov/chemical/36730.html#WIPWL.

Current year sampling results
- Results for each of the sampling sessions in the year are in tabular form. The seasonal change graphically shows the current year results. Red shading indicates eutrophic readings.
- HAB notification periods on the DEC website, updated weekly http://www.dec.ny.gov/chemical/83310.html
- Shoreline HAB sample dates and results. Samples are collected from the area that appears to have the worst bloom. Red shading indicates a confirmed HAB.
- HAB sample algae analysis. Algae types typically change during the season. These charts show the amount of the different types of algae found in each mid-lake or shoreline sample. Samples with high levels of BGA are HABs. The second set of charts show the level of toxins found in open water and shoreline samples compared to the World Health Organization (WHO) guidelines.
- If there are more than ten shoreline bloom samples collected in a year, bloom sample information is instead summarized by month (May-Oct.) as minimum, average, and maximum values for blue-green algae and microcystin.

Long Term Trend Analysis puts the current year findings in context. Summer averages (mid-June thru mid-September) for each of the CSLAP years show trends in key water quality indicators. The graphs include relevant criteria (trophic categories, water quality standards, etc.) and boundaries separating these criteria.

In-Season Analysis shows water temperature and water clarity during the sampling season. These indicate seasonal changes and show the sample year results compared to the typical historical readings for those dates.

The Lake Use Scorecard presents the results of the existing Priority Waterbody List assessment for this lake in a graphical form and compares it to information from the current year and average values from CSLAP data and other lake information. Primary issues that could impact specific use categories are identified, although more issues could also affect each designated use.

The Lake Summary reviews and encapsulates the data in the lake report, and provides suggested actions for lake management.

Glossary of water quality and HAB indicators

Clarity (m): The depth to which a Secchi disk lowered into the water is visible, measured in meters. Water clarity is one of the trophic indicators for each lake.

TP (mg/L): Total phosphorus, measured in milligrams per liter at the lake surface (1.5 meters below the surface). TP includes all dissolved and particulate forms of phosphorus.

Deep TP: Total phosphorus measured in milligrams per liter at depth (1-2 meters above the lake bottom at the deepest part of the lake)

TN: Total nitrogen, measured in milligrams per liter at the lake surface. TN includes all forms of nitrogen, including **NOx** (nitrite and nitrate) and **NH₄** (ammonia).

N:P Ratio: The ratio of total nitrogen to total phosphorus, unitless (mass ratio). This ratio helps determine if a lake is phosphorous or nitrogen limited.

Chl.a (µg/L): Chlorophyll a, measured in micrograms per liter. Indicates the amount of algae in the water column.

pH: A range from 0 to 14, with 0 being the most acidic and 14 being the most basic or alkaline. A healthy lake generally ranges between 6.5 and 8.5.

Cond (µmho/cm): Specific conductance is a measure of the conductivity of water. A higher value indicates the presence of more dissolved ions. High ion concentrations indicate hardwater, and low show softwater.

Upper Temp (°C): Surface temperature, measured in degrees Celsius

Deep Temp (°C): Bottom temperature, measured in degrees Celsius

BG Chl.a (µg/L): Chlorophyll a from blue-green algae, measured in micrograms per liter

HABs: Harmful Algal Blooms. Algal blooms that have the appearance of cyanobacteria (BGA)

BGA: Blue-green algae, also known as cyanobacteria

Microcystin (µg/L): The most common HAB liver toxin; total microcystin above 20 micrograms per liter indicates a "high toxin" bloom. However, ALL BGA blooms should be avoided, even if toxin levels are low.

Anatoxin-a (µg/L): A toxin that may be produced in a HAB which targets the central nervous system. Neither EPA nor NYS has developed a risk threshold for anatoxin-a, although readings above 4 micrograms per liter are believed to represent an elevated risk.