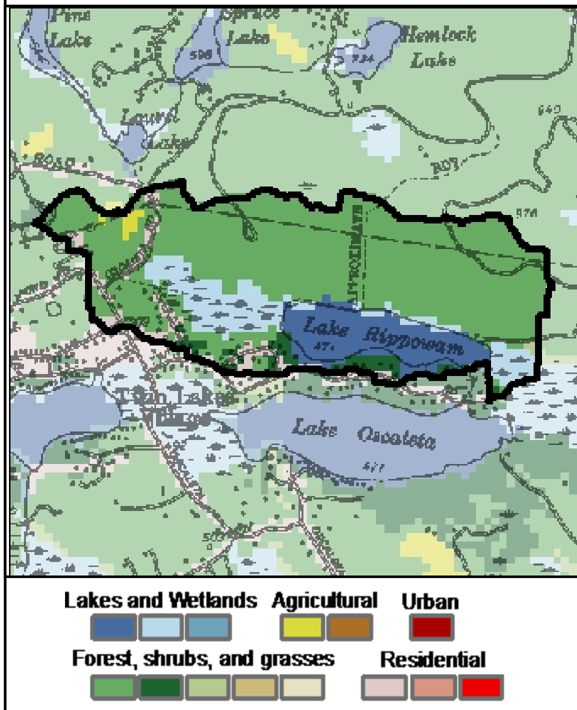
Lake Rippowam, Westchester Co., Three Lakes Council

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation



Lake Characteristics	Surface Area (ac/ha)	32	13
	Max Depth (ft/m)	19	6
	Mean Depth (ft/m)	9	3
	Retention Time (years)	0.15	
	Water Class	B	
	Dam Class		
Watershed Characteristics	Watershed Area(ac/ha)	278	112
	Watershed/Lake Ratio	9	
	Lake and Wetlands	23.8%	
	Agricultural	1.0%	
	Forests, shrubs, grasses	70.2%	
	Residential	5.0%	
	Urban	0.0%	
CSLAP Participation	Years	2006-2011, 2013-2017	
	Volunteers	Janet Andersen, Lou Feeney	

Trophic State	HABs Susceptibility	Invasive Vulnerability	PWL Assessment
Mesoeutrophic	Moderate	High	Stressed

Open Water Indicators	2017 Sampling Results								Seasonal Change	Long Term Avg.
	6/10	6/25	7/9	7/23	8/6	8/20	9/4	9/16		
Chl.a (µg/L)	6.1	10.4	27.5	8.8	8.5	5.5	14.3	9.7		12.9
BG Chl.a (µg/L)	0.9	5.2	14.2	1.5	1.7	2.2	3.2	1.6		97.3
Clarity (m)	2.3	1.9	1.1	2.1	2.7	2.3	2	2.4		2.2
pH	7.4	8.3	8.5	8.0	8.3	6.9	7.1	8.3		8.0
Cond (µmho/cm)	216.3	213.4	191.2	192.4	230.4	224.5	197.4	168.7		179
Surf Temp (°C)	21	27	26	29	25	27	21	23		24
Bott Temp (°C)	16	18	16	19	19	23	21	21		20
TN (mg/L)	.546	.729	.984	.912	.504	.667	.708	.723		0.568
TP (mg/L)	.025	.025	.022	.018	.017	.018	.029	.023		0.023
Deep TP (mg/L)	.064	.056	.1	.14	.073	.031	.026	.066		0.052
N:P Ratio	22	29	45	51	30	37	24	31		

Shoreline bloom and HABs notifications

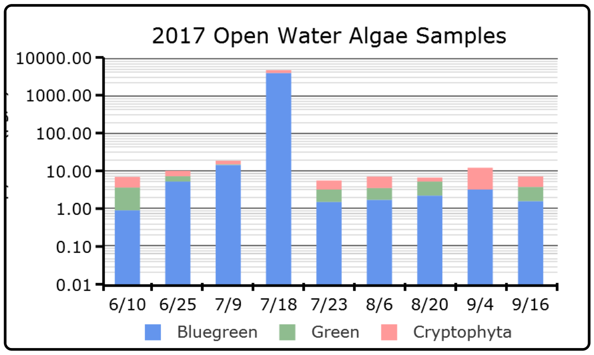
Date of first listing	Date of last listing	# of weeks on DEC notification list	# of weeks with updates
7/21/2017	7/21/2017	1	1

Shoreline HAB Sample Dates 2017

HAB Indicators	HAB Criteria										
BGA	25 µg/L	NA									
Microcystin	20 µg/L	NA									
Anatoxin-a		NA									

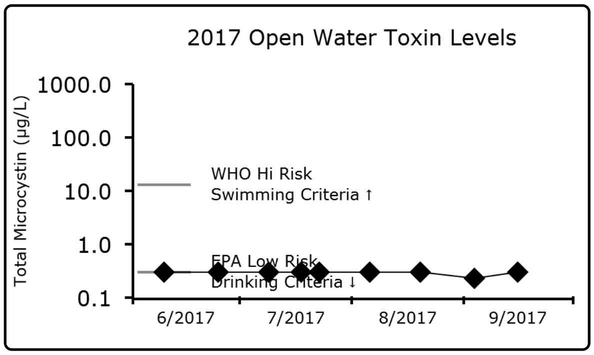
HAB Status

2017 Open Water Algae Samples



2017 Shoreline Algae Samples

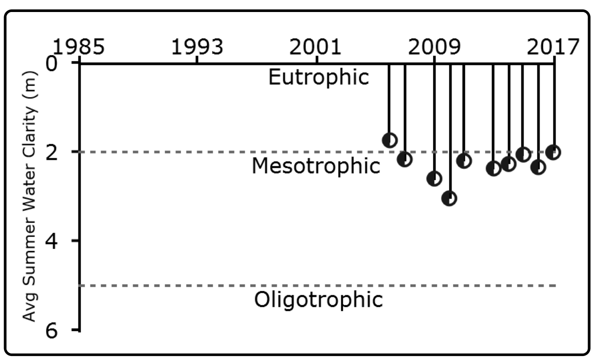
2017 Open Water Toxin Levels



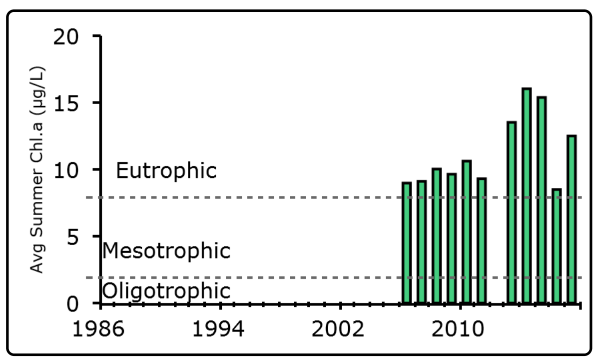
2017 Shoreline Toxin Levels

Lake Rippowam Long Term Trend Analysis

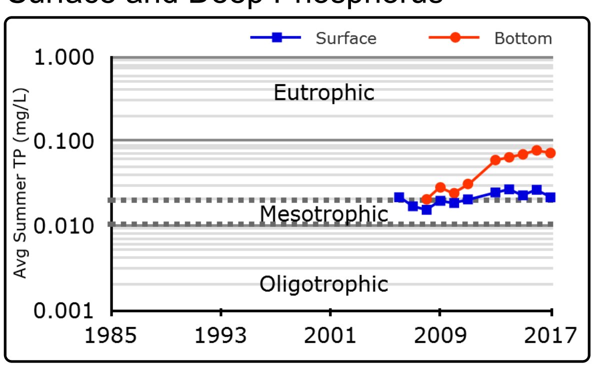
Clarity



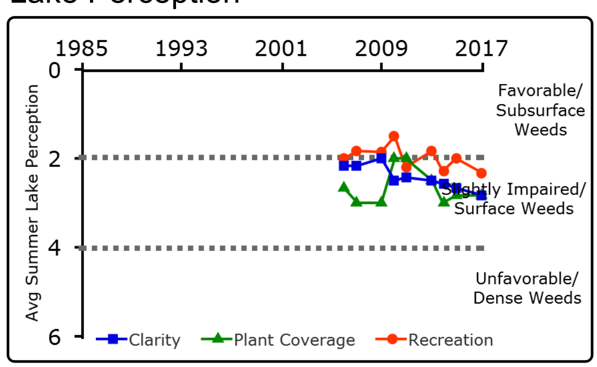
Chlorophyll a



Surface and Deep Phosphorus

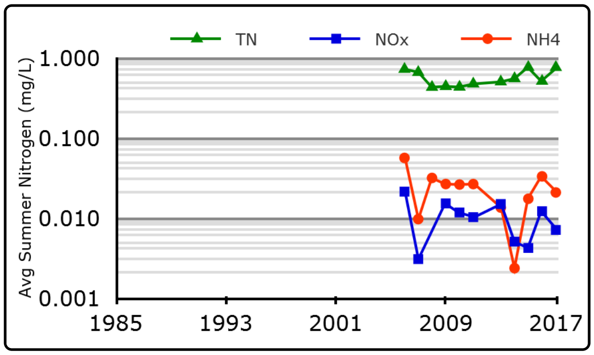


Lake Perception

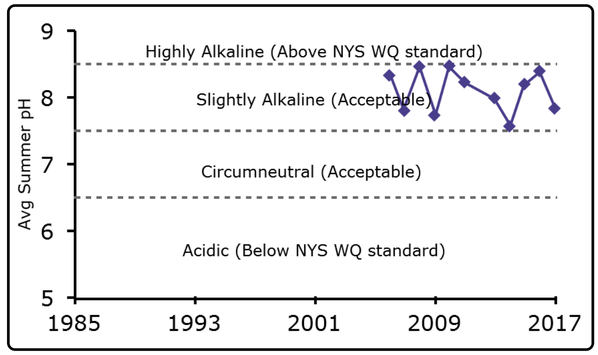


Lake Rippowam Long Term Trend Analysis

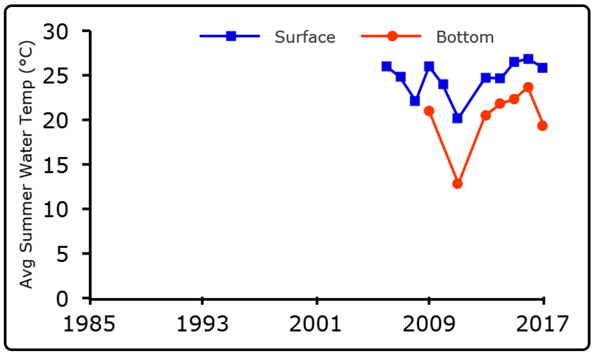
Nitrogen



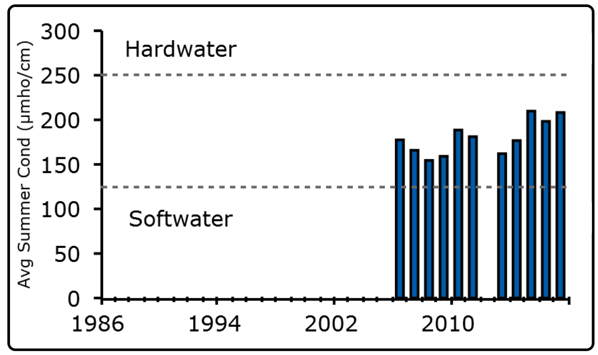
pH



Temperature

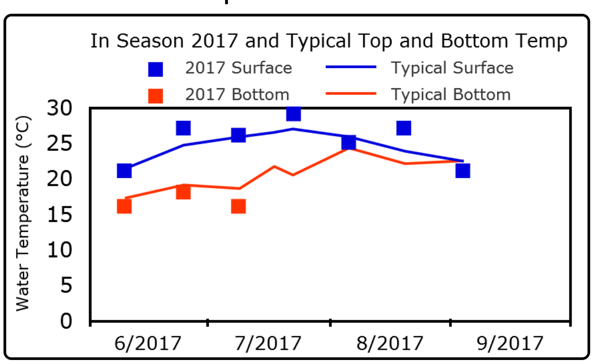


Specific Conductance

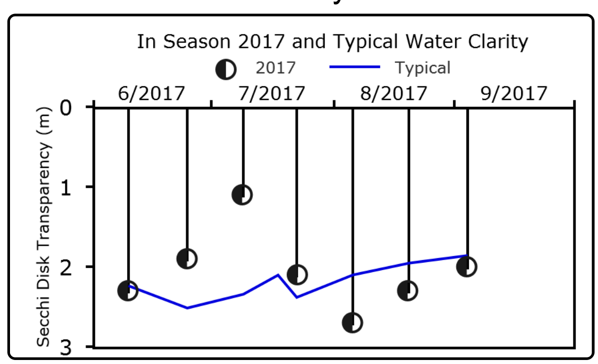


Lake Rippowam In-Season Analysis

In Season Temperature



In Season Water Clarity



Scorecard

Lake Use

	PWL	Average Year	2017	Primary Issue
Potable Water	Not Known	Not Known	Not Known	**Not applicable**
Swimming	Supported/Good	Supported/Good	Stressed/Poor	**No impacts**
Recreation	Stressed/Poor	Stressed/Poor	Stressed/Poor	**Algae levels**
Aquatic Life	Not Known	Supported/Good	Supported/Good	**No impacts**
Aesthetics	Not Known	Stressed/Poor	Stressed/Poor	**Poor perception**
Habitat	Not Known	Threatened/Fair	Threatened/Fair	**Invasive plants**
Fish Consumption	Not Known	Not Known	Not Known	**Not applicable**

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

Summary

2017 compared to prior years: Lake Rippowam is *mesoeutrophic*, or moderately to highly productive, based on high nutrient (phosphorus) and algae (chlorophyll *a*) readings, and intermediate water clarity. Phosphorus and chlorophyll *a* readings were slightly lower than usual in 2017, but water transparency was close to normal, suggesting that these readings represent normal variability. Total nitrogen and conductivity readings were higher than normal in 2017, but it is not known if these changes otherwise affected water quality conditions in the lake. Water quality and recreational assessments were slightly less favorable than usual, perhaps consistent with slightly more frequent surface coverage of aquatic plants.

Compared to nearby lakes: Lake Rippowam has similar water clarity, but slightly lower nutrient and algae levels, than other nearby (Lower Hudson region) lakes. Aquatic plant coverage is usually similar to the coverage in many of these other lakes. Chloride levels are between the 50th and 75th percentile of New York state lakes, indicating the potential for aquatic life impacts (although none have been documented). Water quality conditions are similar in Lake Oscaleta and Lake Waccabuc, but productivity in Lake Rippowam is slightly higher.

Trends: Surface and deepwater phosphorus readings have increased, and conductivity has increased over the last decade in Lake Rippowam. Algae levels and deepwater temperatures appear to have increased, and water quality perception appears to have degraded slightly over this period, but these changes are not statistically significant. However, most of these indicators suggest that lake productivity may be increasing.

Algal blooms and HABS: Lake Rippowam rarely exhibits shoreline blooms, comprised of *Anabaena* and other cyanobacteria species, with moderate blue green algae and toxin levels. Open water algae levels increase during the typical summer, as do the percentage of cyanobacteria, but toxin levels are low in these samples. A shoreline bloom comprised of *Synechococcus*, *Planktothrix,* and *Worochininia* (along with other taxa) was documented in 2017, but toxin levels were low in this sample, No open water blooms were detected in 2017.

Aquatic invasive species: Eurasian watermilfoil has been reported on Lake Rippowam, indicating that the lake is susceptible to other new AIS introductions, despite the lack of public access. Calcium levels do not appear to be high enough to support zebra mussels, and these invasive mussels have not been found in the lake.

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, and continued monitoring for invasive species is warranted. Continued algae bloom education and monitoring for HABs is recommended, particularly since shoreline HABs are periodically reported in the lake. These blooms should be avoided.

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 **NH_4** (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.