Eagle Lake, Essex Co., Eagle Lake Property Owners Association

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

Lake Characteristics			
Surface Area (ac/ha)		422	171
Max Depth (ft/m)		42	13
Mean Depth (ft/m)		19	6
Retention Time (years)		1.40	
Water Class		BT	
Dam Class		A	

Watershed Characteristics			
Watershed Area(ac/ha)		3288	1330
Watershed/Lake Ratio		8	
Lake and Wetlands		19.1%	
Agricultural		0.0%	
Forests, shrubs, grasses		79.5%	
Residential		1.4%	
Urban		0.0%	

CSLAP Participation		
Years	2000-2017	
Volunteers	Dianne Tiedemann, Keith Park, Rolf Tiedemann	

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

Trophic State	HABs Susceptibility	Invasive Vulnerability	PWL Assessment
Oligotrophic	Low	High	Stressed

Open Water Indicators	2017 Sampling Results								Seasonal Change	Long Term Avg.
	6/11	7/3	7/18	7/31	8/13	8/27	9/10	9/24		
Chl.a (µg/L)	1.4	1.1		1.4	1	1.4	1.7	.3		1.1
BG Chl.a (µg/L)	0.0	1.4	0.7	0.5	0.4	0.2	1.2	0.4		0.3
Clarity (m)	2.5	5.9	6.3	6.7	5.6	6	6	7.3		6.5
pH	6.8	7.1	7.7	7.6	7.5	8.1	7.5	7.7		7.7
Cond (µmho/cm)	183.2	165.7	167.3	167.3	160.3	121.3	162.2	158.8		144
Surf Temp (°C)	17	22	24	24	24	22	19	22		22
Bott Temp (°C)	12	14	16	17	18	17	18	19		17
TN (mg/L)	.276	.411	.37	.139	.439	.445	.461	.343		0.390
TP (mg/L)	.011	.007	.006	.008	.006	.007	.005	.006		0.006
Deep TP (mg/L)	.009	.014	.016	.008	.007	.009	.009	.007		0.007
N:P Ratio	25	59	62	17	73	64	92	57		

Shoreline bloom and HABs notifications

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

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 7/3 7/18 7/31 8/13 8/27 9/10 9/24

■ Bluegreen ■ Green ■ Diatoms ■ Cryptophyta
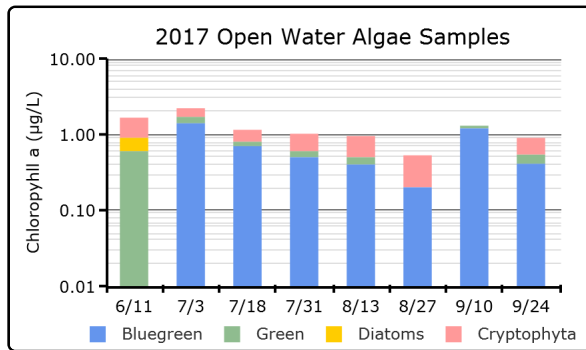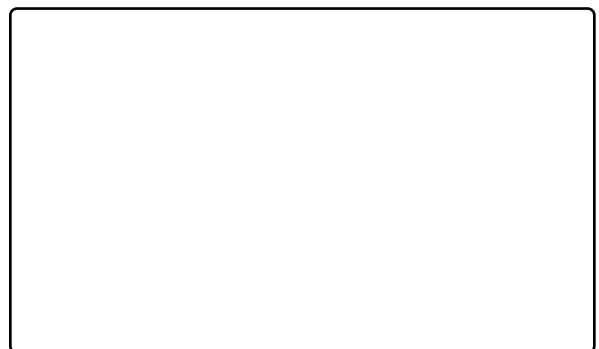
2017 Shoreline Algae Samples

2017 Open Water Toxin Levels

2017 Open Water Toxin Levels

Total Microcystin (µg/L)

1000.0

100.0

10.0

1.0

0.1

WHO Hi Risk
Swimming Criteria ↑

EPA Low Risk
Drinking Criteria ↓

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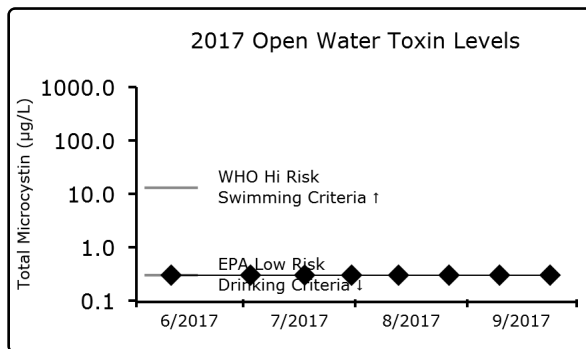
2017 Shoreline Toxin Levels

Eagle Lake Long Term Trend Analysis

Clarity

1985 1993 2001 2009 2017

Avg Summer Water Clarity (m)

0

5

10

Eutrophic

Mesotrophic

Oligotrophic

Chlorophyll a

Avg Summer Chl.a (µg/L)

10

5

0

1986 1994 2002 2010

Eutrophic

Mesotrophic

Oligotrophic
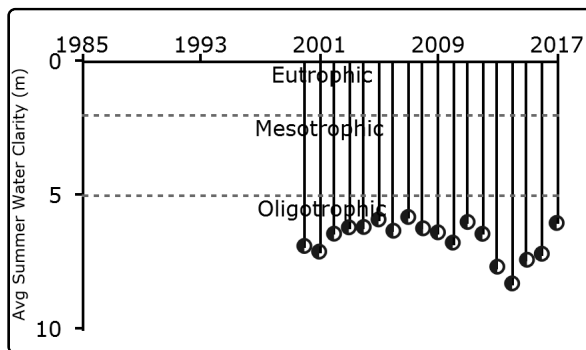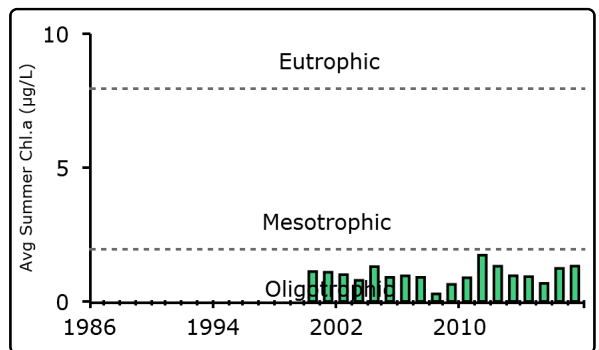
Surface and Deep Phosphorus

■ Surface ● Bottom

Avg Summer TP (mg/L)

1.000

0.100

0.010

0.001

Eutrophic

Mesotrophic

Oligotrophic

1985 1993 2001 2009 2017

Lake Perception

1985 1993 2001 2009 2017

Avg Summer Lake Perception

0

2

4

6

Favorable/
Subsurface
Weeds

Slightly Impaired/
Surface Weeds

Unfavorable/
Dense Weeds
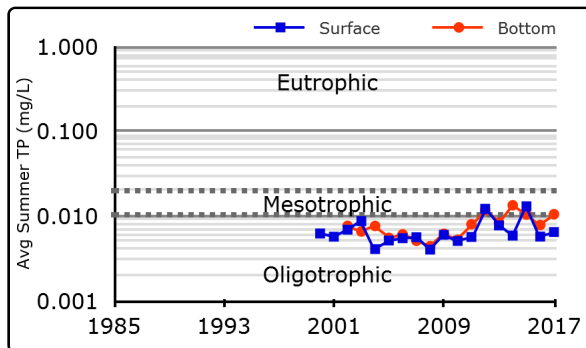
■ Clarity ▲ Plant Coverage ● Recreation
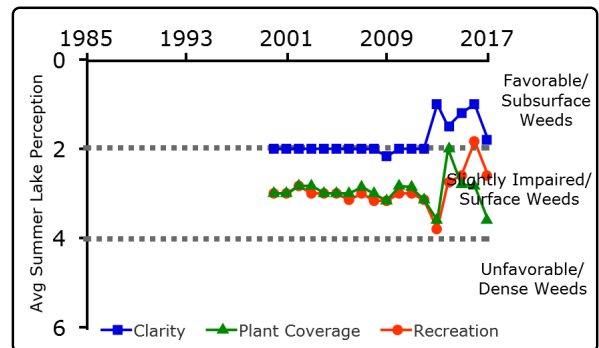
Eagle Lake Long Term Trend Analysis

Nitrogen
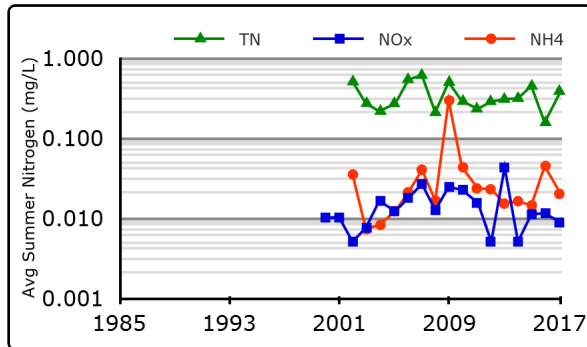
pH
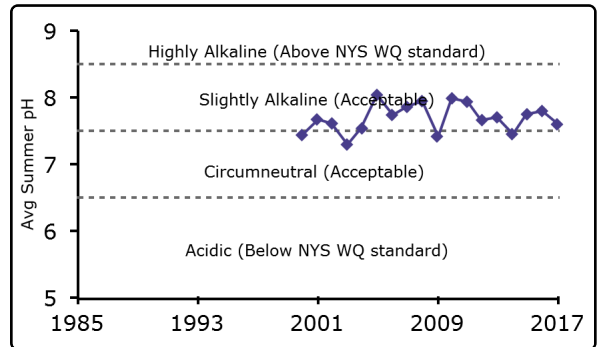
Temperature
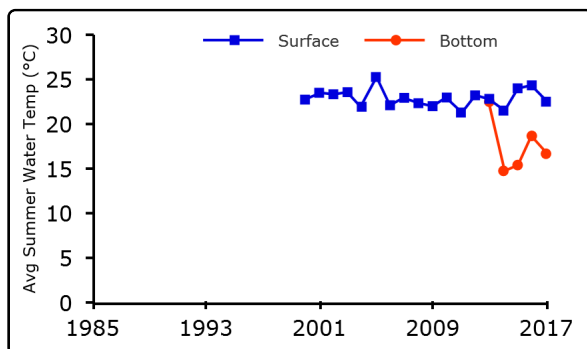
Specific Conductance
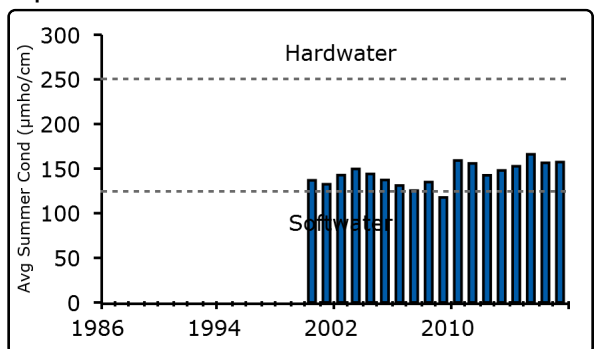
Eagle Lake In-Season Analysis

In Season Temperature
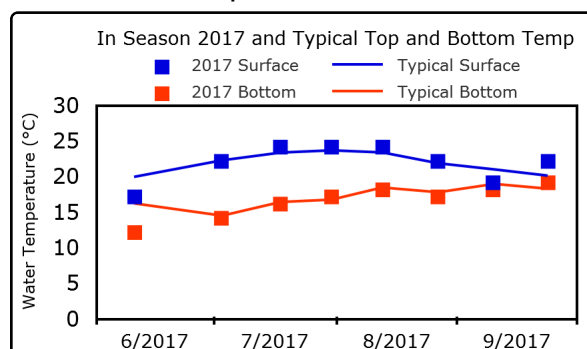
In Season Water Clarity

Scorecard

Lake Use
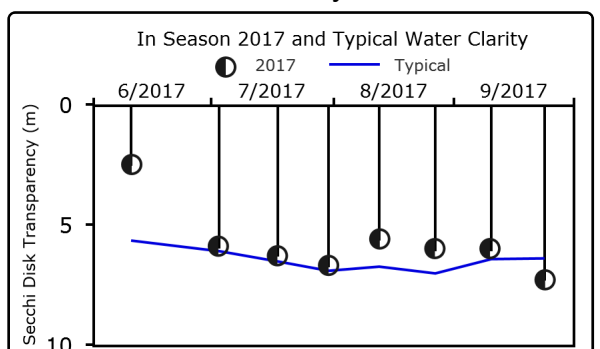
	PWL	Average Year	2017	Primary Issue
Potable Water	☐	☐	☐	**No impacts**
Swimming	🟢	🟢	🟢	**No impacts**
Recreation	🔴	🟢	🟢	**No impacts**
Aquatic Life	☐	🟢	🟢	**No impacts**
Aesthetics	☐	🔴	🔴	**Poor perception**
Habitat	☐	🔴	🔴	**Invasive plants**
Fish Consumption	☐	☐	☐	**Not applicable**

Legend:

🟢 Supported/Good

🔺 Threatened/Fair

🔴 Stressed/Poor

⬛ Impaired

☐ Not Known

Summary

2017 compared to prior years: Eagle Lake is *oligotrophic*, or highly unproductive, based on high water clarity and low nutrient and algae levels. Water clarity was slightly lower than usual, and conductivity and aquatic plant coverage were higher than usual in 2017, but most CSLAP indicators were similar to the long-term average for Eagle Lake.

Compared to nearby lakes: Eagle Lake has higher water clarity, due to lower nutrient and algae levels, than other eastern Adirondack lakes. Aquatic plant coverage is usually higher than many of these other lakes, although hand harvesting and other active management reduces this coverage in some years. Chloride levels are the 50th to 75th percentile of New York state lakes, indicating some potential for aquatic life impacts from road salt. However, any impacts have not been measured in Eagle Lake.

Trends: Deepwater phosphorus readings have increased over the last decade, although surface TP readings have been more stable. Ammonia, pH and conductivity have increased, but these changes have not been statistically significant. Water quality and recreational assessments have degraded in recent years, despite high water clarity. The latter might reflect some variability in aquatic plant coverage in response to local management.

Algal blooms and HABS: Water quality conditions indicated a low susceptibility to blooms, and none have been reported on the lake. The algae community in the open water samples is comprised of several different taxa, and overall algae levels are low.

Aquatic invasive species: The Eagle Lake Property Owners Association has been dealing with Eurasian watermilfoil for many years. Overall vulnerability to AIS is high; there is a state boat launch at 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. Although blooms have not been reported in Eagle Lake, blooms have been found in other lakes with low nutrient levels.

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.