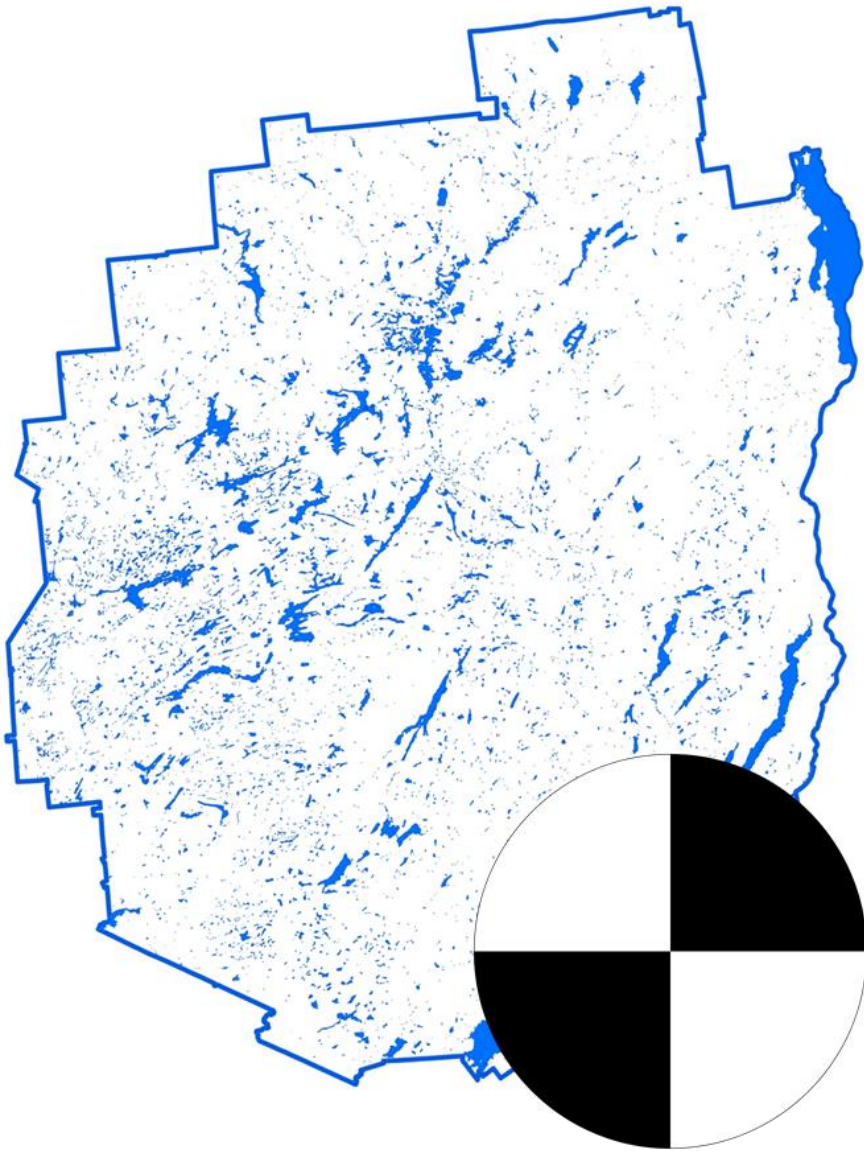# ALAP

## Adirondack Lake Assessment Program



# 20th
## YEAR

## 2017 REPORT

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# Acknowledgments

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*Corresponding author Corey Laxson at claxson@paulsmiths.edu

# Special thanks to our ALAP 2017 Volunteers

| | | |
|---|---|---|
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| Peter Halsch | John Merriman | Alan Woodruff |
| Joe Hancock | LJ Mills | |

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# How to Use This Report

Welcome to the 2017 ALAP Report! Two years ago we enacted a major change to the reporting format. Instead of issuing individual lake reports we designed a single report that encompasses all the information of the old style reports plus plenty of new material as well. We believe the move to a single report represents a substantial upgrade for the program for several reasons. First, a single report highlighting the water quality across the entire region will attract wider interest than dozens of lake specific reports; and it will be much more useful for academics, government agencies, non-profits, lake associations, and interested individuals. Secondly, ALAP participants will now have easy access to lake information from all of the participating lakes without having to search and download files from a website. Lastly, a single document greatly improves our reporting efficiency, allowing ALAP to be cost effective and affordable.

This report is designed to provide lake information to the informed lay person, scientific community, lake managers, and other interested individuals. As such, it is written in a way to provide something for everyone. New last year is a section titled "*Understanding and Interpreting ALAP Data*". We hope this section will provide readers with greater appreciation for lake science as well as improved ability to interpret the data for their lake. The data for each participating lake has been reduced down to a 2-page description and can be found in the section titled "*Individual Lake Reports*". Participating lakes that wish to have a full stand-alone report produced for them are encouraged to contact the corresponding author.

The data in this document are reported in metric units. Although this system has not been fully adopted in the United States, it is the standard system of measurement used by scientists and lake managers throughout the world. Information on converting the metric units of measurements used in this report to English units are readily available through internet searches. The amount of chemical elements dissolved in the lake samples are always described using metric concentration units. The most common ways to express chemical data are milligrams per liter (mg/L) and micrograms per liter (µg/L). One milligram per liter is equal to one part analyte to one million parts water. One microgram per liter is equal to one part analyte to one billion parts water.



**Image 1. Sunset on Middle Saranac Lake (photo courtesy of Brendan Wiltse).**

# Overview of ALAP

The Adirondack Lake Assessment Program (ALAP) is a highly successful citizen science lake monitoring program that combines the enthusiasm of volunteers with the technology and expertise of scientists in the environmental field. Citizen science programs like ALAP are quickly becoming the 21st century model for handling large scale research and monitoring projects. These collaborations are mutually beneficial in that they address the scientific communities need for more researchers, and provide citizens with the benefit of knowing they helped advance the understanding of a cherished resource (Toerpe 2013). There are many citizen science lake monitoring programs across the country, the vast majority of which are administered at the state level. ALAP is the only program to focus on a specific region.



**Image 2. Young citizen scientists from Camp Whippoorwill preparing to collect an ALAP sample from Augur Lake (photo courtesy of Nancy Gucker-Birdsall).**

ALAP is a cooperative effort between Protect the Adirondacks (Protect) and the Adirondack Watershed Institute (AWI). The objectives of ALAP are to (1) develop a long term water quality database for Adirondack lakes and ponds that can be used by multiple stakeholders, (2) document historical trends in their limnological condition, and (3) engender lake stewardship by providing opportunities for citizens to participate in scientific monitoring.

ALAP continues to be a highly successful program. Established in 1998 with 9 participating lakes, the program has grown to 67 participating lakes 2017. ALAP lakes are from all across the Adirondack Region (Figure 1 and Table 1). For many lakes the ALAP dataset represents the only available source of information on water quality.

# Methods

ALAP volunteers were trained in standard limnological sampling methods by AWI and PROTECT. Data was collected from the deepest location of the lake, 3 to 5 times during the summer months. During each sampling event volunteers observed the secchi transparency reading by lowering a standard 20 cm black and white secchi disk to a depth where it could no longer be seen. This process was repeated and the average secchi depth for that day was recorded. Surface water samples were collected using a 2-meter integrated tube sampler. The contents of the tube were poured into a 1 liter brown bottle and thoroughly mixed. A 250 mL aliquot of the integrated sample was collected for chemical analysis and a second 250 mL aliquot was filtered through a 0.45 μm cellulose membrane filter for chlorophyll-a analysis. The filter was retrieved and wrapped in foil. The water sample and chlorophyll filter were frozen immediately after collection and delivered frozen to the AWI Environmental Research Lab, generally within a 10 day period.
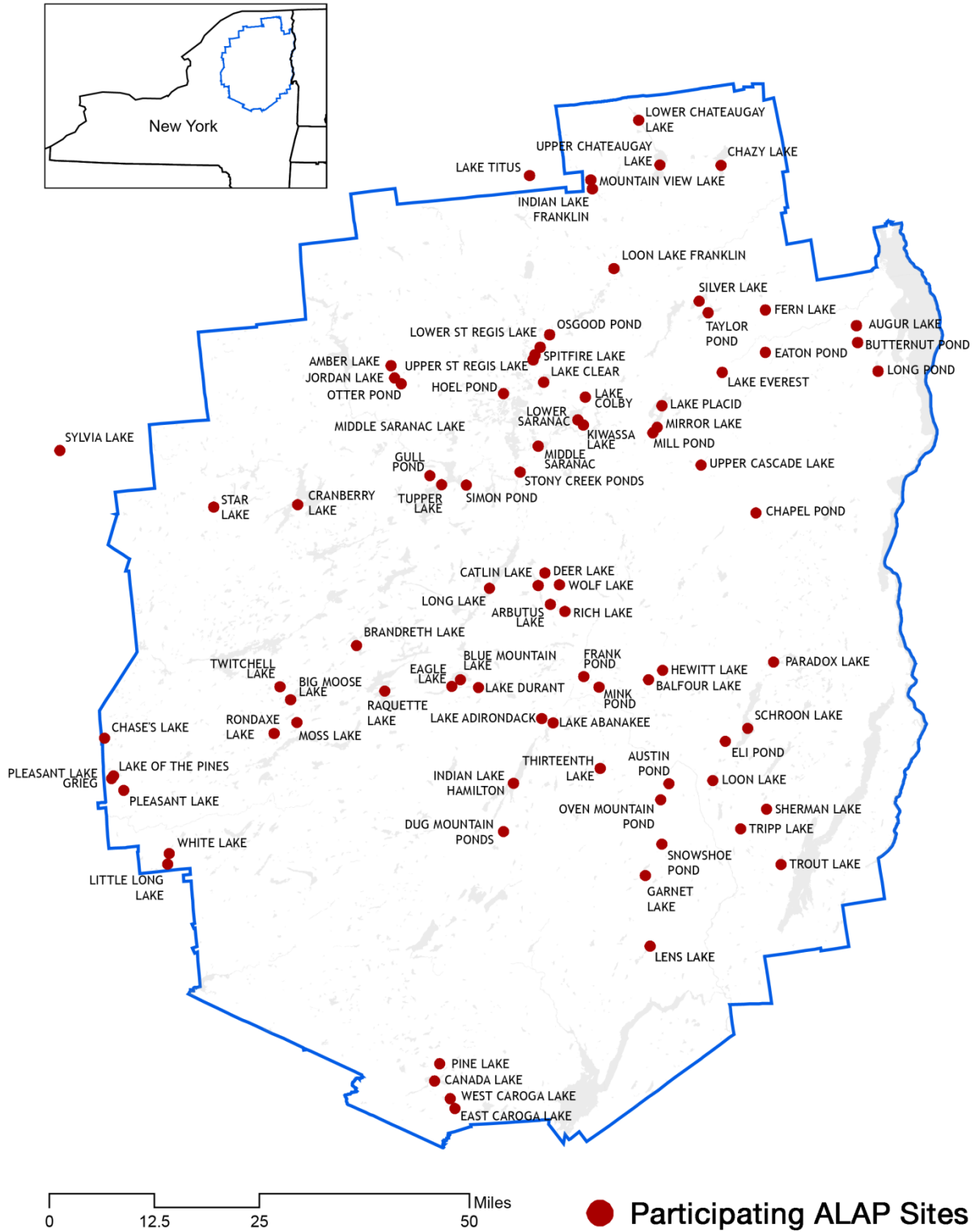
Figure 1. ALAP participating lakes, 2010-2017.

**Table 1. 2017 ALAP Lakes organized by the number of years of program participation.**

| Lake Name | Years | | Years | | Years |
|---|---|---|---|---|---|
| Blue Mountain Lake | 20 | Pine Lake | 17 | Lake Abanakee | 12 |
| Cranberry Lake | 20 | Pleasant Lake | 17 | Chazy Lake | 11 |
| Eagle Lake | 20 | Rich Lake | 17 | Lake Adirondack | 11 |
| Loon Lake- Franklin | 20 | Tripp Lake | 17 | Lower Chateaugay | 11 |
| Silver Lake | 20 | Twitchell Lake | 17 | Upper Chateaugay | 11 |
| Brandreth Lake | 19 | Wolf Lake | 17 | Simon Pond | 10 |
| Eli Pond | 19 | Garnet Lake | 16 | Chapel Pond | 9 |
| Gull Pond | 19 | Lens Lake | 16 | Hewitt Lake | 9 |
| Little Long Lake | 19 | Lower Saranac Lake | 16 | Augur Lake | 8 |
| Stony Creek Ponds | 19 | Canada Lake | 15 | Lake Titus | 8 |
| Thirteenth Lake | 19 | Kiwassa Lake | 15 | Star Lake | 8 |
| Austin Pond | 18 | Lake Colby | 15 | Amber Lake | 7 |
| Middle Saranac Lake | 18 | Raquette Lake | 15 | Jordan Lake | 7 |
| Osgood Pond | 18 | Schroon Lake | 15 | Lake Clear | 7 |
| Trout Lake | 18 | Tupper Lake | 15 | Otter Pond | 7 |
| White Lake | 18 | Fern Lake | 14 | Loon Lake- WC | 6 |
| Arbutus Lake | 17 | Indian Lake- HC | 14 | Chase's Lake | 3 |
| Catlin Lake | 17 | Paradox Lake | 14 | Frank Pond | 3 |
| Deer Lake | 17 | Big Moose Lake | 13 | Mink Pond | 3 |
| Hoel Pond | 17 | Indian Lake- FC | 13 | Butternut Pond | 2 |
| Lake of the Pines | 17 | Moss Lake | 13 | East Caroga Lake | 2 |
| Long Pond | 17 | Mountain View Lake | 13 | Long Lake | 2 |
| | | | | West Caroga Lake | 2 |

Each sample was analyzed for laboratory pH, conductivity, total phosphorus, chlorophyll-a, and color. One sample from the season was analyzed for alkalinity, chloride, calcium and sodium at the AWI Environmental Research Lab following the analytical methods listed in Appendix 1. Results for the current year were tabulated and time series charts were constructed from the annual average value for each indicator. Trend analysis was conducted on lakes with five or more years of data (60 lakes) using Kendall's non-parametric regression to test the hypothesis "there is no relationship between the indicator and time". Simple linear trend lines were fit to data with significant trends ($P<0.05$) and displayed on the corresponding chart.

# Understanding and Interpreting ALAP Data

## Transparency

Transparency is a simple and inexpensive measurement of water clarity and light penetration. It is measured by lowering a 20 cm black and white disk, called a secchi disk, through the water to the depth where it is no longer visible from the surface. The secchi disk was created by the Italian astronomer Pietro Angelo Secchi in the mid-19th century (Image 3).

Transparency is a great indicator of lake condition because it is influenced by many factors related to water quality and human perception. Secchi data is used most often to interpret the productivity of a lake. In general, lakes that have low productivity and low algal abundance have greater transparency. As algal productivity increases the transparency of the water body tends to decreases (see Trophic State). There are a number of other water quality issues that can

influence transparency depth such as turbidity (cloudiness of the water), suspended sediment, and dissolved chemicals. For example, the transparency of many lakes in the Adirondacks is influenced by the amount of colored dissolved organic material in the water (see Color).
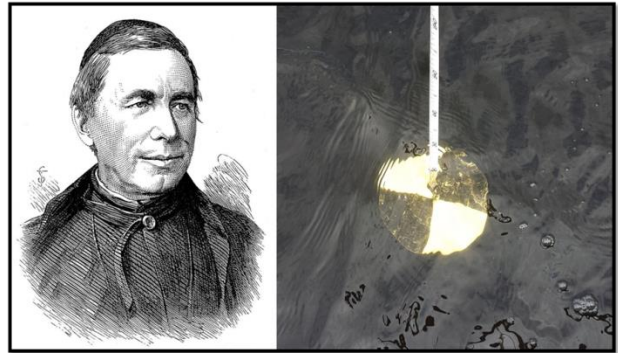


Image 3. Pietro Angelo Secchi (1818 - 1878) and the limnological tool named after him.

In 2017, average ALAP transparencies ranged from 0.9 meter to as high as 7.7 meters in depth. The majority of lakes (71%) had average transparency depths of 4.0 meters or less (Figure 2). Analysis of the historical data reveals that 82% of study lakes had no observable change over time and 15% had a decreasing trend in transparency (less transparent).

## Chlorophyll-a

Chlorophyll-a is the primary photosynthetic pigment found in all freshwater species of algae and cyanobacteria. Studying actual algal productivity in a lake is a difficult and expensive undertaking. A measurement of chlorophyll-a however is relatively simple and inexpensive, and provides a surrogate measure of algal productivity (Wetzel 2001). Chlorophyll-a is not a direct measure of algal biomass as the concentration of chlorophyll varies somewhat by species and environmental conditions. This said, increases in chlorophyll are generally associated with increased algal production, and the

concentration of chlorophyll is widely considered as the most direct measure of the trophic state of lakes. Algal biomass is affected by the interaction of nutrient availability, light, water temperature, and grazing so there can be considerable variation in chlorophyll concentrations throughout the year depending on which of these factors is limiting growth at a particular time. Typically, major changes in algal biomass (e.g. an algae bloom), and thus chlorophyll, are usually related to changes in the availability of phosphorus, nitrogen, silica or inorganic carbon (Wetzel 2001; Klemer 1990).

**Image 4. A chlorophyll filter clogged with algae. The sample was taken during a cyanobacteria bloom on Spitfire Lake in August, 2014.**

Chlorophyll-a is analyzed by filtering a known volume of lake water through a fine (0.45μm) cellulose-acetate filter, which captures the small photosynthetic organisms (Image 4). In the laboratory the filter is macerated and the chlorophyll- is extracted into acetone and is then analyzed with a flourometer.

In 2017, average chlorophyll-a concentrations ranged from less than 0.5 μg/L to as high as 12.2 μg/L. The majority of lakes (65%) had values less than 4.0 μg/L (Figure 2). Analysis of the historical data reveals that 80% of participating lakes showed no statistical change in algal productivity over time and that 20% had a decreasing trend in chlorophyll-a concentration.

# Phosphorus

Phosphorus is of major importance to structure and metabolism of all organisms. However, it exists in relatively small amounts in freshwater systems compared to other essential nutrients such as carbon, hydrogen, oxygen, and sulfur. The addition of extra phosphorus to an aquatic system allows production to increase greatly because all other essential elements are typically available in excess. Thus phosphorus is typically the limiting nutrient in aquatic systems, and widely considered as the most important contributor to reduced water quality in lakes (Schindler 1977; Søndergaard et al. 2003). Natural weathering releases phosphorus from rocks and soils, and it also enters our watersheds in fertilizers, human and animal waste, and atmospheric deposition. Phosphorus exists in a number of forms in aquatic systems, including readily available dissolved phosphorus, and organically and inorganically bound phosphorus. Total phosphorus is a measurement of all of the forms of phosphorus combined and serves as an important indicator of overall trophic status of a lake. Generally speaking, lakes of low productivity (oligotrophic) have total phosphorus concentrations less than 10 μg/L, while highly productive lakes (eutrophic) have total phosphorus concentrations greater than 20μg/L (NYSDEC Clean Lakes Assessment).

Total phosphorus is analyzed by digesting the lake water sample with a strong acid (sulfuric acid) and an oxidizing agent (ammonia persulfate). All of the numerous forms of phosphorus are converted to phosphate, which is then quantified with an automated spectrophotometer (Image 5)
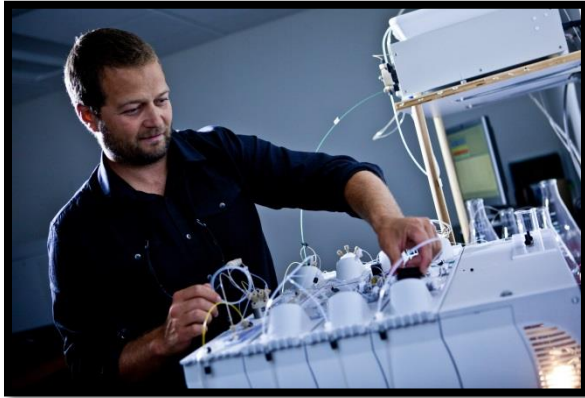
**Image 5. Preparing the Lachat QC 8500 for chemical analysis of ALAP samples in the Environmental Research Lab of the AWI.**

In 2017, the average total phosphorus concentrations ranged from below 4 µg/L to as high as 42 µg/L. The majority of lakes (67%) had average values less than 14 µg/L (Figure 2). Analysis of the historical data reveals that 60% of participating lakes showed no statistical change in phosphorus concentration over time and that 40% exhibited a decreasing trend. Significant improvements were made to our phosphorus methodology in 2010. The method change may be partially responsible for the decreasing trend exhibited by some lakes.

## Trophic State

Trophic status is a term derived from the Greek word *trophi*, meaning food or nourishment, and is used by limnologists to explain the overall productivity of a lake. Lake productivity is naturally influenced by the rate of nutrient supply from the watershed, climatic condition, and lake and watershed morphology. Human activities and development within a watershed have the potential to increase the rate of nutrient supply into the lake and thereby accelerate lake productivity, a process known as cultural eutrophication.

Most Lakes in the Adirondacks can be assigned into one of three trophic classes; oligotrophic, mesotrophic, or eutrophic based on their overall level of biological productivity.

Oligotrophic - From the Greek words *oligo*, meaning few and *trophi*, meaning nourishment; oligotrophic lakes have low biological productivity due to relatively low nutrient content. As a result of low nutrients oligotrophic lakes have high transparency, low algal abundance, low organic matter in the sediments, sparse aquatic plant growth, and abundant dissolved oxygen throughout the water column the entire year. Oligotrophic lakes are most likely to support a cold water fishery (trout and salmon).

Eutrophic - From the Greek words *Eu*, meaning good. Eutrophic lakes have high biological productivity due to abundant levels of nutrients. As a result of high nutrient availability eutrophic lakes are typified by high algal productivity, low transparency, high organic matter in the sediments, and periods of anoxia in the bottom of the water column (the hypolimnion). Eutrophic lakes tend to support dense aquatic plant growth in the littoral zone. Eutrophic lakes are unlikely to support a viable cold water fishery

Mesotrophic - from the Greek words *Meso*, is an intermediate trophic classification on the continuum between oligotrophy and eutrophy.

Trophic status is typically determined by analyzing lake data on transparency, chlorophyll and total phosphorus and employing one of the two most commonly used classification approaches, the fixed boundary method or the trophic index method. The fixed boundary method uses predetermined ranges of transparency, total phosphorus, and chlorophyll to classify the lakes trophic status. A good example of a fixed boundary is the traditional

method employed by the NYS DEC that appears in Table 2 (NYSDEC Clean Lakes Assessment).

**Table 2. Fixed boundary trophic status determination employed by the NYSDEC.**

| Parameter | Oligotrophic | Mesotrophic | Eutrophic |
|---|---|---|---|
| Transparency | >5 | 2-5 | <2 |
| Total Phosphorus | <10 | 10-20 | >20 |
| Chlorophyll-a | <2 | 2-8 | >8 |

The most commonly used tropic state index is Carlson's TSI (Carlson 1977). This index uses algal biomass as determined by the three variables of transparency, total phosphorus, and chlorophyll as the basis for the trophic state classification. The range of the index is from approximately zero to 100, although technically there are no upper or lower bounds. Each major TSI division (10, 20, 30, etc.) represents a doubling in algal biomass. The Traditional trophic classification scheme can be overlaid on the index as follows:

TSI < 40 = oligotrophic, TSI 40-50 = mesotrophic, TSI > 50 = Eutrophic.

Regardless of the lakes trophic state, or the method used to classify it, it's important to remember that "trophic state" is just an organizing concept limnologists use to locate a particular waterbody on a continuum of productivity, thereby connecting the lake to previous information and knowledge from other lakes. An oligotrophic lake and its biota do not possess a distinct identity or wholeness that separates it from a mesotrophic lake. The physical variables of a lake system are dynamic and exist across a wide gradient and the biological components of a lake change continuously as well (Carlson and Simpson 1996).

Of the 67 lakes participating in 2017 we classified 48% as oligotrophic, 49% as mesotrophic, and 3% as eutrophic using the average of the three Carlson's TSI values (Figure 3).

# Color

The observed color of a lake is an optical property that results from light being scattered upwards after selective absorption by water molecules as well as dissolved (metallic ions, organic acids) and suspended materials (silt, plant pigments). For example, alkaline lakes with high concentrations of calcium carbonate scatter light in the green and blue wavelength and thus appear turquoise in color. Lakes rich in dissolved organic matter and humic compounds absorb shorter wavelengths of light such as green and blue and scatter the longer wavelengths of red and yellow, thus these lakes appear to be brown in color (Image 7; Wetzel 2001). Analysis of color can provide us with information about the quantity of dissolved organic matter (DOM) in the water. However, caution should be taken when using color as a surrogate for DOM as color has been shown to behave differently than the total DOM pool in a lake, making it a crude predictor of DOM (Dillon and Molot 1997; Thurman 1985).



Image 7. Dissolved organic matter can make a lake appear different shades of brown due to its selective light absorption.

For objective quantification of apparent color water samples are compared to standards of platinum-cobalt solution (PtCo units) via spectrophotometry. "True color" is the color transmitted by a solution after the removal of suspended material, "apparent color" is the color transmitted without any filtration.

In 2017 the average color values ranged from less than 10 to nearly 122 PtCo, with the majority of lakes (60%) falling between 10 and 40 PtCo units. (Figure 2). Analysis of the historical data reveals that 90% of participating lakes showed no statistical change in color over time and that 10% have exhibited an increasing trend.

# pH

In chemistry, pH is used to communicate the acidity or alkalinity of a solution. Technically pH is a surrogate measure of the concentration of hydrogen ions in water (acidity). Hydrogen ions are very active, and their interaction with other molecules determines the solubility and biological activity of gasses, nutrients, and heavy metals; thus pH is considered a master variable for its influence on chemical processes and aquatic life. pH exists on a logarithmic scale from 0-14, with 7 being neutral. pH values less than 7 indicate increasing acidity, whereas pH values greater than 7 indicate increasingly alkaline conditions. Because pH exists on a logarithmic scale a decrease in 1 pH unit represents a 10 fold increase in hydrogen ion activity.

Table 3. Assessment of lake acidification based on pH

| Lake acidity | Status |
|---|---|
| pH less than 5 | Acidic: Critically Impaired |
| pH 5.0 – 6.0 | Acidic: Threatened |
| pH 6 – 6.5 | Acidic: Acceptable |
| pH 6.5 – 7.5 | Circumneutral: non-impacted |
| pH >7.5 | Alkaline: non-impacted |

Lakes can become acidified when they are influenced by organic acids from wetlands and bogs or when acidic precipitation falls on a poorly buffered watershed (Driscoll et al. 2003, Wetzel 2001). In the Adirondacks acidification status can

be assed from pH values based on the guidelines outlined in Table 3.

In 2017 the average pH values ranged from 5.8 to 9.2. The majority of lakes (62%) fell in the circumneutral range between 6.5 and 7.5 (Figures 3 and 4). Analysis of the historical data reveals that 75% of participating lakes showed no statistical change in pH over time and that 15% have exhibited an increasing trend (less acidic).

## Alkalinity

Alkalinity (or acid neutralizing ability) is the capacity of water body to neutralize acids and thereby resist changes in pH. The alkalinity of a lake plays a major role in whether or not a lake is impacted by acid deposition.

Alkalinity is a function of the amount of calcium carbonate in the water which is derived mainly from the watershed.

Most Adirondack lakes exist on slowly weathering granitic bedrock that has a slow rate of calcium carbonate generation, and therefore lower acid neutralizing ability. The opposite is true for lakes that exist on bedrock derived from ancient ocean deposits, such as limestone or dolomite. Soil depth also plays a role in acid neutralizing capacity, with deeper soils offering more buffering ability than shallower soils. Alkalinity is quantified by analyzing them amount of dilute acid is required to lower the pH of a lake sample to 4.3 pH units, the point at which all of the carbonate and bicarbonate alkalinity is consumed. The acid neutralizing ability of a lake can be generally assessed following the parameters presented in Table 4.
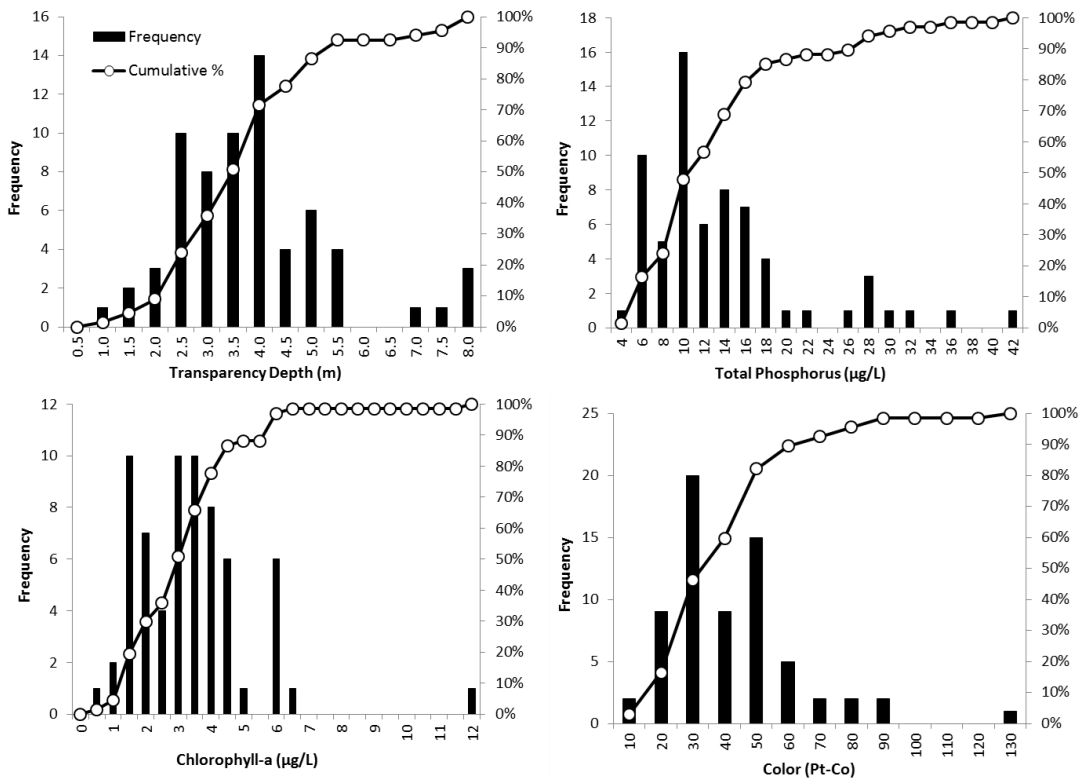


Figure 2. Frequency histograms of average 2017 ALAP values for transparency, total phosphorus, chlorophyll, and color.
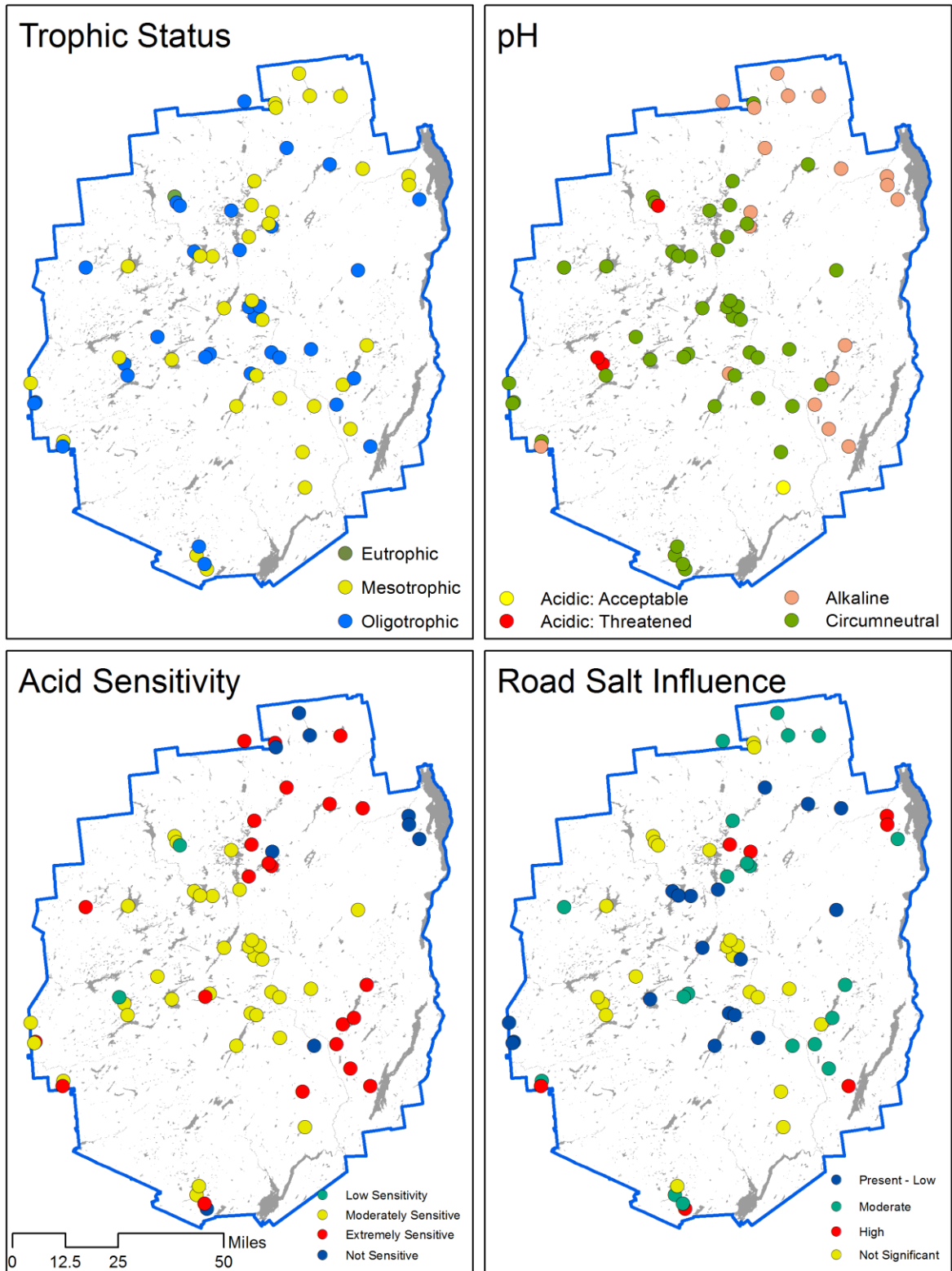
**Figure 3. Condition of the 2017 ALAP lakes in terms of trophic state, acidity, acid sensitivity, and road salt influence.**
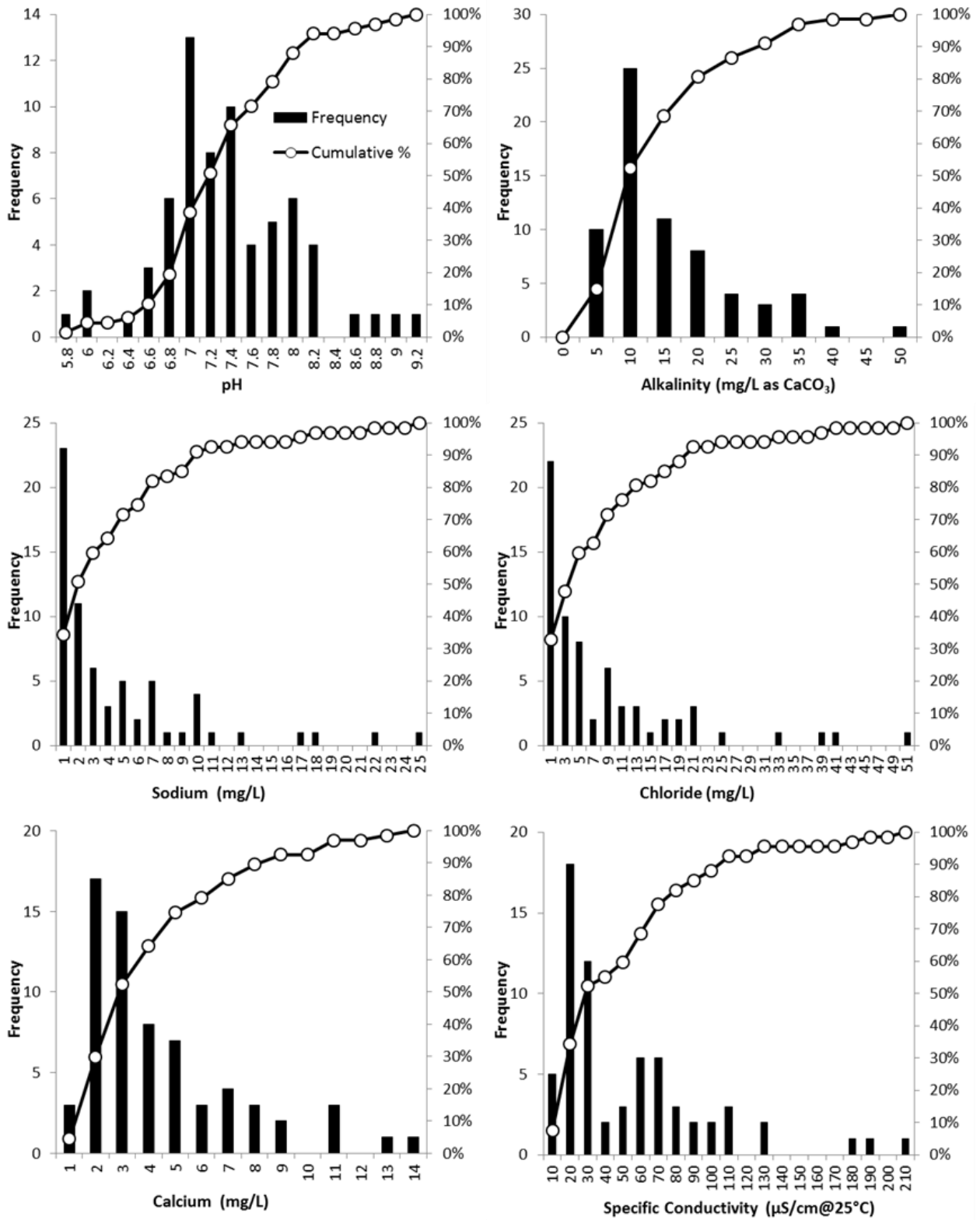
Figure 4. Frequency histograms of average 2017 ALAP values for pH, alkalinity, chloride, sodium, calcium and conductivity.

A wide range of buffering abilities exists across the Adirondack Region. We analyzed one alkalinity sample from each lake in the 2017 season. In 2017 the alkalinity values ranged from 1.7mg/L to nearly 50 mg/L, with 52% of the lakes exhibiting moderate or extreme acid sensitivity (Figures 3 and 4). Analysis of the historical data reveals that 70% of participating lakes showed no statistical change in alkalinity over time and that 26% have exhibited a negative trend.

**Table 4. Acid neutralizing ability and acidification status assessment based on alkalinity concentration (mg/L as CaCO$_3$).**

| Alkalinity (mg/L) | Buffering Ability | Acidification status |
|---|---|---|
| < 0 | none | acidified |
| 0 - 2 | low | extremely sensitive |
| 2 - 10 | moderate | moderately sensitive |
| 10 - 25 | adequate | low sensitivity |
| > 25 | high | not sensitive |

# Sodium and Chloride

Lakes in the Adirondack region have naturally low concentrations of chloride and sodium, with average background concentrations of 0.2 mg/L and 0.5 mg/L respectively (Kelting et al. 2012). However, wide spread use of road deicers (primarily sodium chloride) have significantly increased the concentration of these chemicals in the environment. Each year approximately 98,000 metric tons of road deicers are spread across state roads in the Adirondacks. (Kelting and Laxson 2014). Recent research by Kelting et al. (2012) highlighted that concentrations of sodium and chloride in Adirondack Lakes are directly proportional to the density of state roads within the watershed.

Road salt can have direct and indirect effects on aquatic ecosystems. It is clear that the direct impact of road deicers on organisms is not well understood, and is highly variable across taxa. Based on laboratory studies the lethal concentration for most aquatic organisms is much higher than concentrations encountered in a lake environment. However, at times lethal concentrations can be encountered in near-road environments that receive direct run-off such as road side streams or vernal pools (reviewed by Findlay and Kelly 2011; Kelting and Laxson 2010).

Indirect effects to aquatic systems have also been documented. For example sodium actively displaces base cations (Ca, K, and Mg) as well as heavy metals from the soil, potentially elevating their concentration in surface waters. In some extreme cases excessive road salt pollution can interfere with lake stratification due to salts effect on water density (Bubeck et al. 1971; Kjensmo 1997). Sodium and chloride impart an undesirable taste to drinking water. The US EPA has guideline of 250 mg/L for chloride and 20 mg/L for sodium, but these are for drinking water only and are not enforceable standards.



**Image 8. Road Salt (NaCl) being loaded into the back of a plow truck (photo by Paul Sancya/AP).**

Although it is difficult to use sodium and chloride concentration to assess impact to the aquatic environment, the concentration of these chemicals serve as a reliable index for the level of hydrologic connectivity a lake has with salted roads in its watershed. We propose the

boundaries presented in Table 5 as a general guideline for gauging road salt influence on a lake.

**Table 5. Assessment of road salt influence based on chloride concentration.**

| Chloride (mg/L) | Road Salt Influence |
|---|---|
| Less than 1.0 | Not significant |
| 1 - 5 mg/L | Present - Low |
| 5 - 20 | Moderate |
| 20 - 50 | High |

Sodium and chloride are analyzed separately from each other in the laboratory using two automated methods. Chloride is measured by injecting the water sample through an ion chromatograph where the chloride is separated from other negatively charged ions by a selective resin and then quantified with a voltmeter. Sodium is analyzed with an atomic emission spectrophotometer. The water sample is introduced into a very hot argon plasma torch that excites the sodium ion into a higher energy state. When the ion relaxes it emits light in a characteristic wavelength, the intensity of which is proportional to the amount of sodium in the sample. Regular analysis of sodium and chloride was initiated by the AWI in 2010. Only a handful of lakes have chloride data that extends before 2010.

As expected, a wide range of salt concentrations existed across the region in 2017, driven primarily by the density of salted roads in the watershed. The average chloride concentration ranged from less than 0.5 mg/L to as high as 50 mg/L. Based on these concentrations alone we believe that roughly 37% of the participating ALAP lakes are influenced by road salt (Figures 3 and 4). Analysis of the limited historical data reveals that 81% of participating lakes showed no statistical change in chloride since year 2010, and that 10% have exhibited an increasing trend.



**Image 9. Direct road salt runoff coming off of NYS RT 30 during a thawing event in the spring of 2015. The chloride concentration of this melt water was approaching 5,000 mg/L which is ¼ the concentration of sea water.**

# Calcium

Calcium plays an important role in lake ecology because it is an essential element for the structure and physiology of all organisms. For example, calcium is needed for bones and teeth in vertebrates, exoskeletons and shells in invertebrates, and biochemical regulation in plants to name a few. The ultimate source of calcium in lakes is weathering of the bedrock, and to a lesser extent atmospheric deposition (dust). The majority of lakes in the Adirondacks have low concentrations of calcium, typically between 2 and 5 mg/L. The reason for the relatively low concentration is that the granite bedrock under the Adirondacks weathers slowly resulting in a low rate of calcium generation. There are however many lakes in the Adirondacks that reside on calcium rich bedrock resulting in much higher calcium concentrations, examples include Augur Lake (Ca = 11 mg/L), Long Pond (Ca = 13 mg/L), and Lake Colby (Ca = 12 mg/L).

Environmental stressors can affect the calcium concentration of lakes. Research on northeastern lakes has demonstrated that acid deposition has depleted calcium stores in soils leading to reduced calcium concentrations over time (Strock et al. 2014; Keller et al. 2001). The influence that road salting has on calcium concentrations is an emerging research area. Some municipalities utilize calcium chloride to deice roads, thereby increasing the calcium content of the watershed. When rock salt is used as a deicer the sodium can displace calcium in the soil, potentially leading to increase calcium concentrations in the ground and surfaces water. Kelting and Laxson (2014) observed that the combined concentration of calcium, magnesium and potassium in lakes with paved roads in the watershed was 62% greater than lakes with no paved roads.

Calcium concentration is a good indicator of the overall habitat suitability for the zebra mussel, a non-indigenous species from Eurasia that has been spreading through the world. Researchers have reported that the minimum calcium concentrations needed to support a viable zebra mussel population is in the range of 12-20 mg/L, lower than most, but not all lakes in the Adirondacks (Whittier et al. 2008).

**Image 10. Zebra mussel distribution in NYS (left) and an aggregation of zebra mussels growing attached to a native mussel (from USFWS).**



Calcium concentration is analyzed alongside sodium and other metals using an atomic emission spectrophotometer and has only been analyzed regularly since 2010 (see Sodium and Chloride). In 2017 the average calcium concentrations values ranged from 0.6 mg/L to 13 mg/L. The majority of lakes (74%) have calcium concentrations less than 5 mg/L (Figure 4). We found three lakes with calcium concentrations close to the range needed to support a viable zebra mussel population (Augur Pond, Lake Colby, and Long Pond). Trend analysis was not performed on calcium concentrations in 2017.

## Conductivity

Conductivity is a measurement of the ability of a water sample to conduct electricity. Pure $H_2O$ is a poor conductor of electricity. The ability of water to conduct electricity increases as the concentration of dissolved ions in the water increases. Thus, conductivity is considered a strong indicator of the amount of dissolved ions in water. Typically the conductivity of a clean undeveloped lake in the Adirondacks is in the range of 10-25 µS/cm. Elevated conductance may be indicative of road salt pollution, faulty septic systems or the influence of bogs and wetlands in the watershed. Conductivity is a very useful surrogate when the relationships between ion concentrations and conductivity are known. For example, conductivity can be used to estimate sodium and chloride concentrations in streams (Daley et al. 2009).

Conductivity is measured in the laboratory with a conductivity meter. The instrument applies an alternating electrical current to two electrodes immersed in the water sample and measures the resulting voltage. Electrical conductance is influenced by water temperature so all measurements are scaled to the conductance at 25° C, known as specific conductivity.

In 2017 the average conductance values ranged from 8 µS/cm to as high as 207 µS/cm (Figure 4). We found sodium and chloride concentration to be the main driver in lake conductance in the ALAP dataset; the combination of these two ions explained 86% of the variability in lake conductivity data that was pooled from 2011 – 2017 (Figure 5; P <0.001, $r^2$ = 0.86).

Analysis of the historical data reveals that 52% of participating lakes showed no statistical change in conductivity over time and that 34% exhibited a significant downward trend in conductivity.
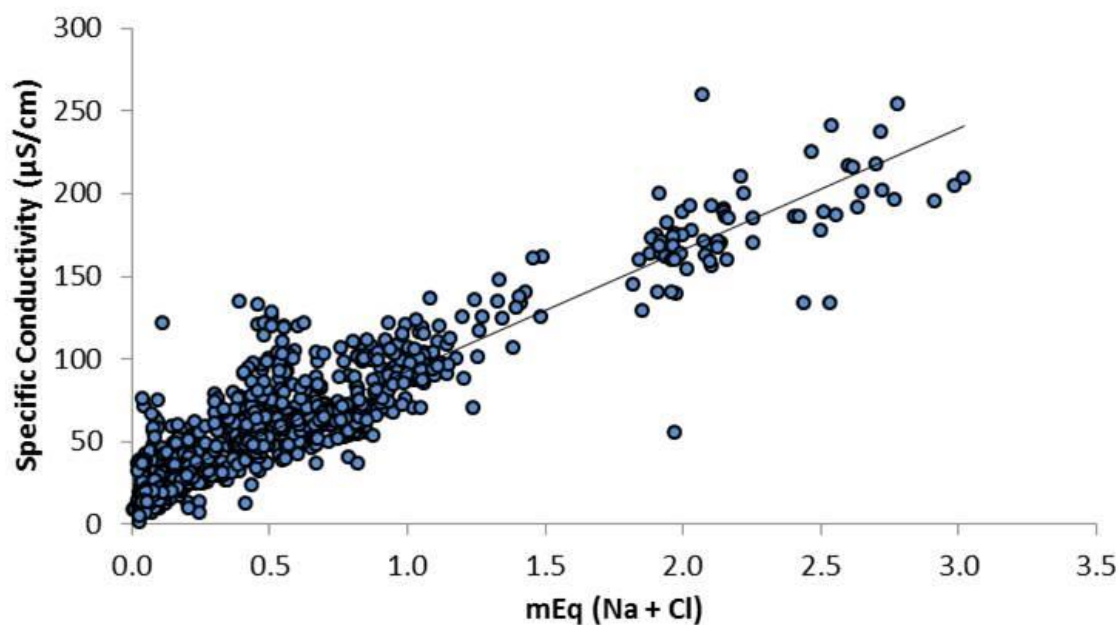


**Figure 5. . Relationship between conductivity and the combination of sodium and chloride in ALAP lakes, 2011-2017. (P < 0.001, $r^2$ = 0.86, n = 1383).**

# Individual Lake Reports

The data and accompanying analysis provided in this report give insight into the water quality of the study lakes, more detailed limnological studies may be necessary to produce management recommendations or specific trend interpretations. Readers interested in additional information or accesses to the raw data are encouraged to contact the corresponding author.  Each lake description includes lake and watershed characteristics, general water quality assessment, tabulated 2017 data, historical analysis and a brief summary. An example of the lake report format can be seen below.
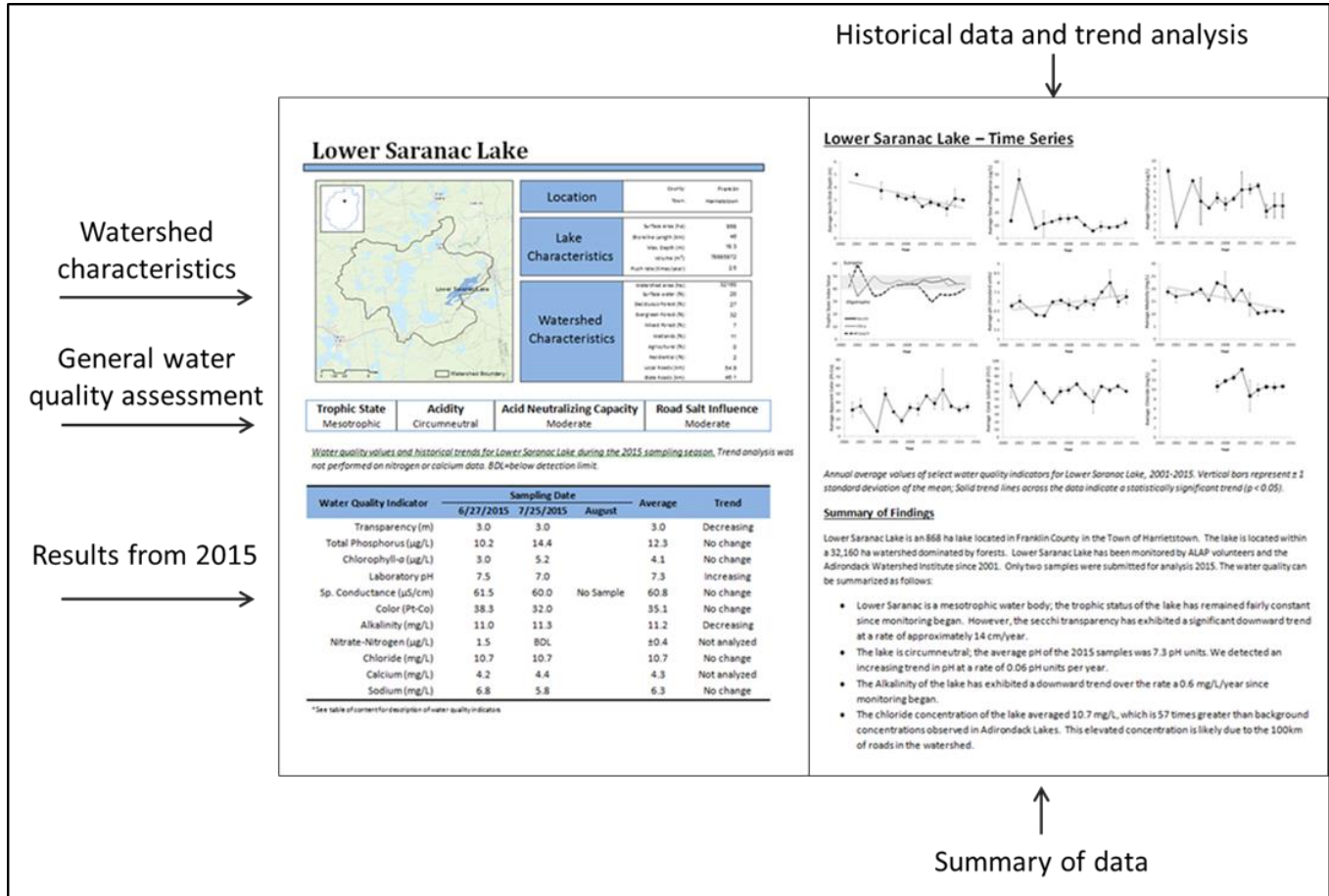
# Amber Lake
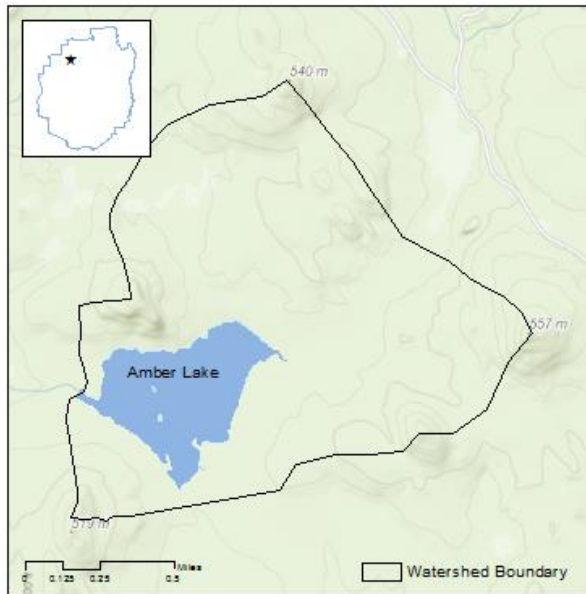


| Location | County: | St Lawrence |
|---|---|---|
| | Town: | Hopkinton |

| Lake Characteristics | Surface Area (ha): | 45 |
|---|---|---|
| | Shoreline Length (km): | 4 |
| | Max. Depth (m): | 2.1 |
| | Volume (m³): | 451290 |
| | Flush rate (times/year): | 5.2 |

| Watershed Characteristics | Watershed Area (ha): | 370 |
|---|---|---|
| | Surface water (%): | 13 |
| | Deciduous Forest (%): | 25 |
| | Evergreen Forest (%): | 35 |
| | Mixed Forest (%): | 6 |
| | Wetlands (%): | 20 |
| | Agricultural (%): | 0 |
| | Residential (%): | 0 |
| | Local Roads (km): | 0 |
| | State Roads (km): | 0 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Eutrophic | Circumneutral | Moderate | Not Significant |

*Water quality values and historical trends for Amber Lake during the 2017 sampling season. Trend analysis was not performed on sodium or calcium data.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 6/24/2017 | 7/20/2017 | 8/20/2017 | | |
| Transparency (m) | 1.3 | 0.9 | 0.9 | 1.0 | No Trend |
| Total Phosphorus (µg/L) | 11.4 | 51.4 | 26.6 | 29.8 | No Trend |
| Chlorophyll-*a* (µg/L) | 13.7 | 15.2 | 7.6 | 12.2 | No Trend |
| Laboratory pH | 6.9 | 7.1 | 6.7 | 6.9 | No Trend |
| Sp. Conductance (µS/cm) | 17.2 | 19.1 | 19.7 | 18.7 | No Trend |
| Color (Pt-Co) | 95.4 | 79.3 | 92.2 | 89.0 | No Trend |
| Alkalinity (mg/L) | | | 8.7 | 8.7 | No Trend |
| Chloride (mg/L) | | | 0.6 | 0.6 | Decreasing |
| Calcium (mg/L) | | | 2.4 | 2.4 | Not Analyzed |
| Sodium (mg/L) | | | 0.8 | 0.8 | Not Analyzed |

*See table of content for description of water quality indicators

# Amber Lake- Time Series
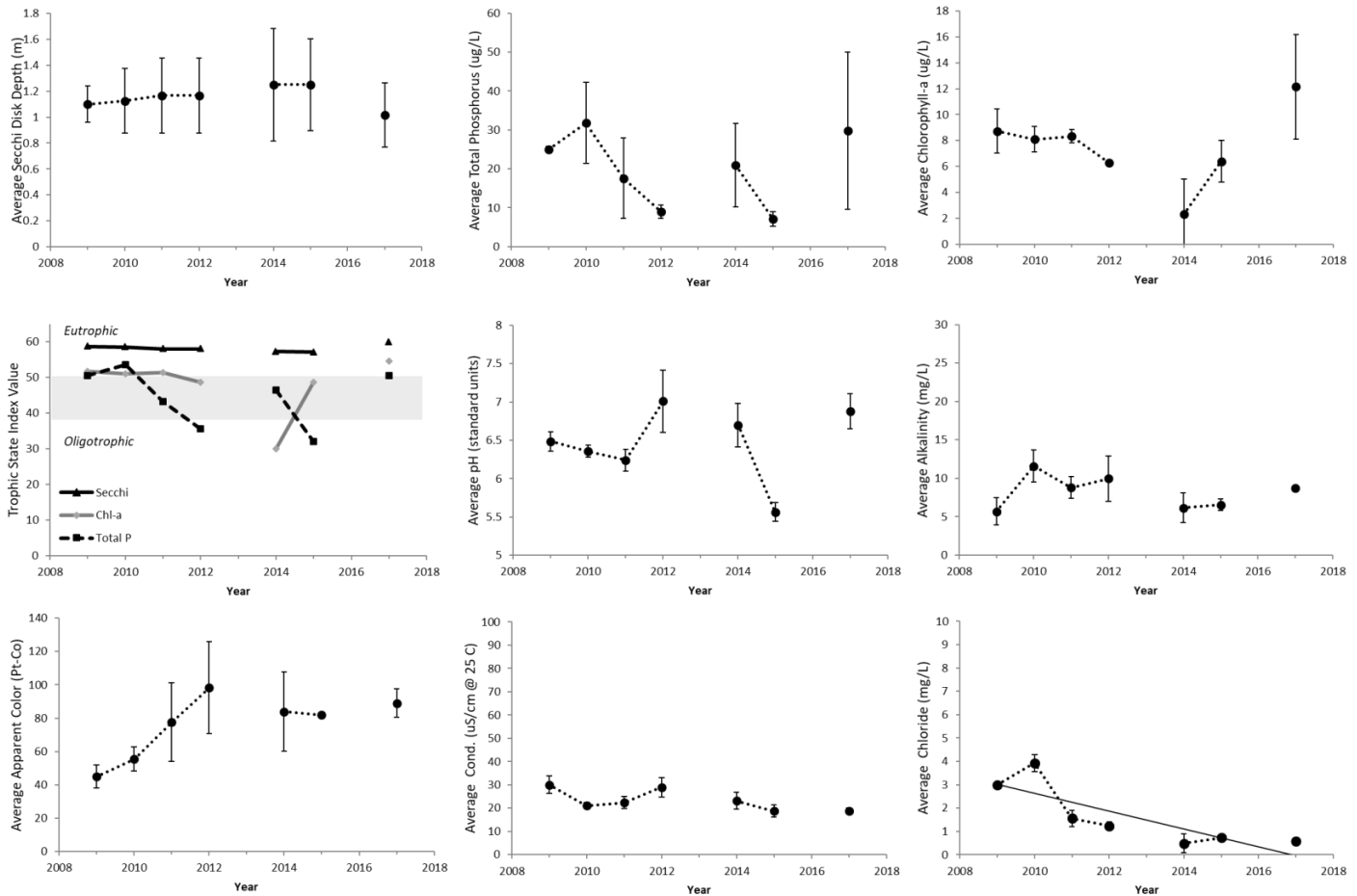


*Annual average values of select water quality indicators for Amber Lake 2009-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Amber Lake is a 45 ha lake located in St. Lawrence County in the Town of Hopkinton. The lake is located within a 370 ha watershed dominated by forests. Amber Lake has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 2009.

- Many of the water quality indicators of Amber Lake have exhibited a large amount of variability over time. This is likely due to the high flushing rate of the waterbody, estimated at over 5 times per year.

- Amber Lake is a productive and highly colored lake that is best classified as eutrophic. The total phosphorus and chlorophyll-a concentrations are both elevated, and greater than the vast majority of participating lakes (TP > 94% of lakes, Chl-a > 100% of lakes). The transparency averaged 1.0 meters in 2017, which was lower than 99% of the participating ALAP lakes.

- The relatively low transparency may be partially explained by the water color. In 2017, the color of Amber Lake averaged 89 PtCo units, greater than 99% or participating lakes.

# Arbutus Lake
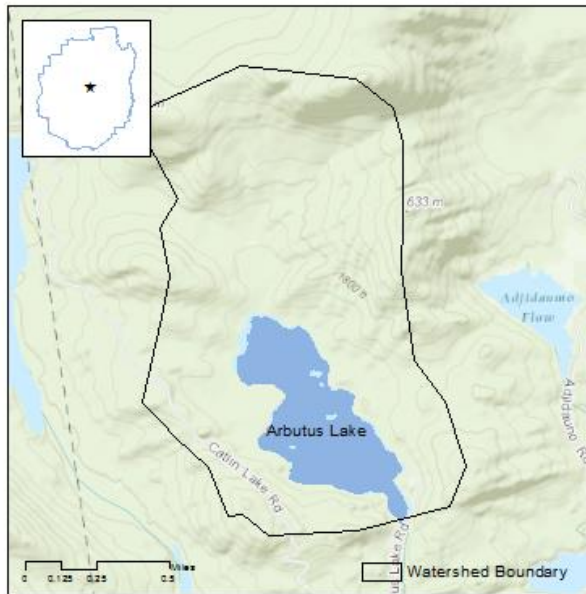


| Location | | |
|---|---|---|
| | County: | Essex |
| | Town: | Newcomb |

| Lake Characteristics | | |
|---|---|---|
| | Surface Area (ha): | 48 |
| | Shoreline Length (km): | 5 |
| | Max. Depth (m): | - |
| | Volume (m³): | 1530320 |
| | Flush rate (times/year): | 1.8 |

| Watershed Characteristics | | |
|---|---|---|
| | Watershed Area (ha): | 353 |
| | Surface water (%): | 14 |
| | Deciduous Forest (%): | 46 |
| | Evergreen Forest (%): | 14 |
| | Mixed Forest (%): | 16 |
| | Wetlands (%): | 9 |
| | Agricultural (%): | 0 |
| | Residential (%): | 0 |
| | Local Roads (km): | 0 |
| | State Roads (km): | 0 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Oligotrophic | Circumneutral | Moderate | Not Significant |

*Water quality values and historical trends for Arbutus Lake during the 2017 sampling season. Trend analysis was not performed on sodium or calcium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 6/22/2017 | 7/18/2017 | 8/21/2017 | | |
| Transparency (m) | 2.7 | 3.3 | 3.4 | 3.1 | No Trend |
| Total Phosphorus (µg/L) | 6.7 | 6.7 | 12.4 | 8.6 | Decreasing |
| Chlorophyll-*a* (µg/L) | 1.2 | 1.3 | 1.3 | 1.3 | Decreasing |
| Laboratory pH | 6.7 | 6.7 | 7.1 | 6.8 | Increasing |
| Sp. Conductance (µS/cm) | 13.7 | 13.1 | 15.4 | 14.1 | Decreasing |
| Color (Pt-Co) | 43.9 | 40.7 | 43.9 | 42.9 | No Trend |
| Alkalinity (mg/L) | | | 5.8 | 5.8 | No Trend |
| Chloride (mg/L) | | | 0.6 | 0.6 | No Trend |
| Calcium (mg/L) | | | 1.8 | 1.8 | Not Analyzed |
| Sodium (mg/L) | | | 0.6 | 0.6 | Not Analyzed |

*See table of content for description of water quality indicators

# Arbutus Lake – Time Series
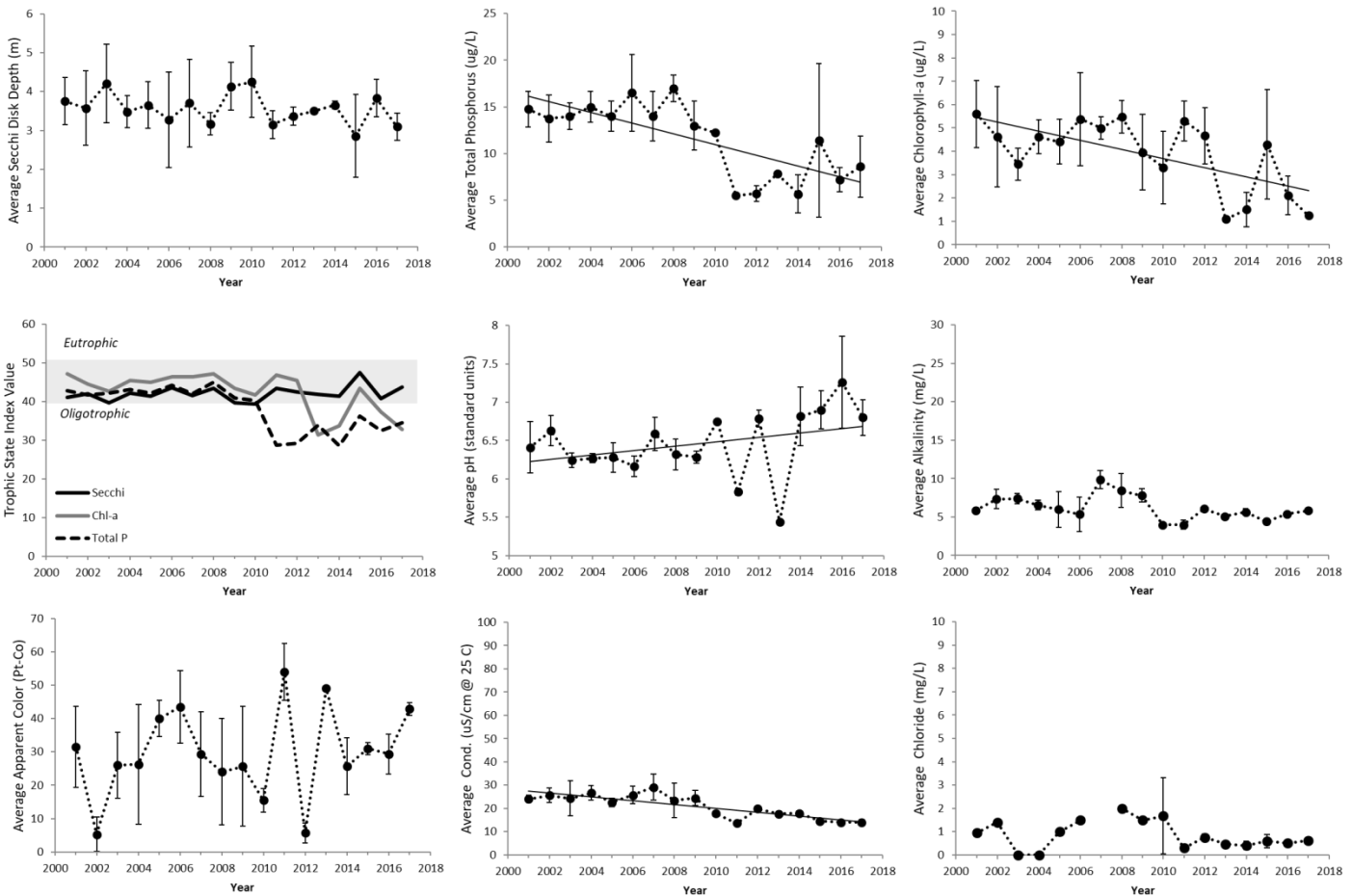


*Annual average values of select water quality indicators for Arbutus Lake, 2001-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Arbutus Lake is a 48 ha lake located in Essex County in the town of Newcomb.  The lake is located within a 353 ha watershed dominated by forests.  Arbutus Lake has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 2001.

- Arbutus Lake is best classified as an oligotrophic lake, bordering on mesotrophic. Secchi disk transparency has remained relatively stable since 2001, and has exhibited no significant trend. Concentrations of total phosphorus and chlorophyll-a on the other hand have both exhibited significant downward trends. Some of this decrease in total phosphorus may be attributed to methodology upgrades in 2010.
- Samples from 2017 were found to be circumneutral in terms of their acidity with moderate sensitivity to acid deposition. We observed a statistical increase in pH over time, increasing at a rate of approximately 0.03 pH units/year.
- Arbutus Lake serves as a good example of the inherently low concentrations of chloride and sodium found in watersheds that lack maintained paved roads.

# Augur Lake
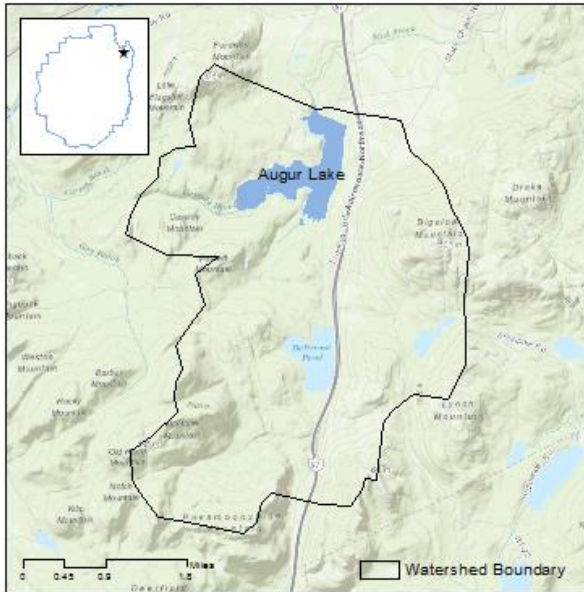


| Location | County: | Essex |
| --- | --- | --- |
| | Town: | Chesterfield |

| Lake Characteristics | Surface Area (ha): | 146 |
| --- | --- | --- |
| | Shoreline Length (km): | 10 |
| | Max. Depth (m): | 6.4 |
| | Volume (m³): | 4242477 |
| | Flush rate (times/year): | 3.8 |

| Watershed Characteristics | Watershed Area (ha): | 3397 |
| --- | --- | --- |
| | Surface water (%): | 7 |
| | Deciduous Forest (%): | 44 |
| | Evergreen Forest (%): | 13 |
| | Mixed Forest (%): | 21 |
| | Wetlands (%): | 3 |
| | Agricultural (%): | 1 |
| | Residential (%): | 7 |
| | Local Roads (km): | 9.9 |
| | State Roads (km): | 25.4 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
| --- | --- | --- | --- |
| Mesotrophic | Alkaline | Well Buffered- Not Sensitive | High |

*Water quality values and historical trends for Augur Lake during the 2017 sampling season. Trend analysis was not performed on sodium or calcium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
| --- | --- | --- | --- | --- | --- |
| | 8/2/2017 | 9/2/2017 | 9/23/2017 | | |
| Transparency (m) | 3.8 | 3.0 | 4.0 | 3.6 | Increasing |
| Total Phosphorus (µg/L) | 11.7 | 13.8 | 11.8 | 12.4 | Decreasing |
| Chlorophyll-*a* (µg/L) | 2.9 | 3.2 | 3.2 | 3.1 | No trend |
| Laboratory pH | 9.2 | 9.0 | 8.4 | 8.9 | No trend |
| Sp. Conductance (µS/cm) | 163.8 | 178.7 | 188.0 | 176.8 | No trend |
| Color (Pt-Co) | 18.2 | | | 18.2 | No trend |
| Alkalinity (mg/L) | 20.0 | | | 20.0 | No trend |
| Chloride (mg/L) | 37.8 | | | 37.8 | No trend |
| Calcium (mg/L) | 10.5 | | | 10.5 | Not analyzed |
| Sodium (mg/L) | 17.7 | | | 17.7 | Not analyzed |

*See table of content for description of water quality indicators

# Augur Lake – Time Series
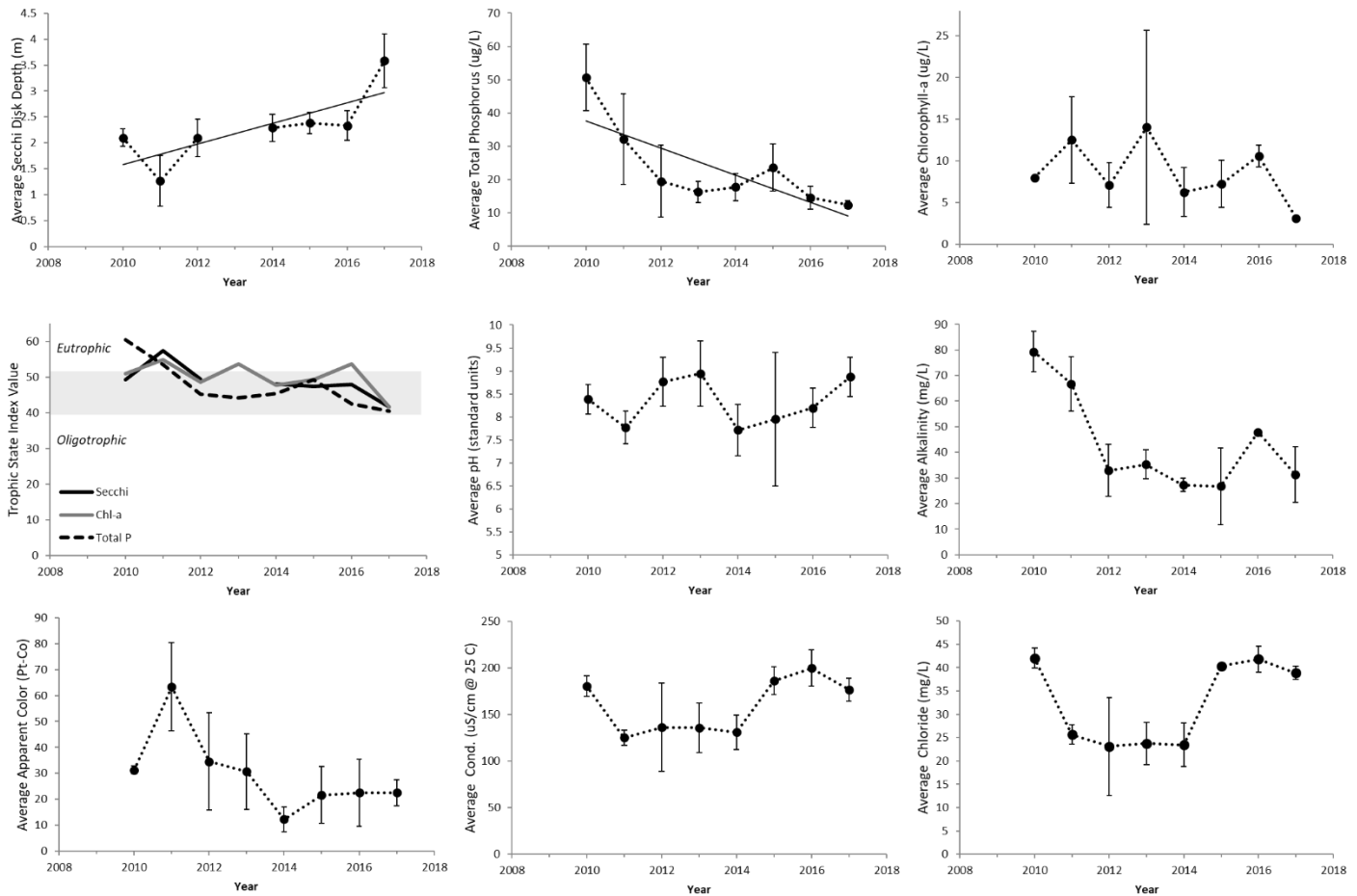


*Annual average values of select water quality indicators for Augur Lake, 2010-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Augur Lake is a 146 ha lake located in Essex County in the Town of Chesterfield.  This lake is located within a 3,397 ha watershed dominated by forests. Augur Lake has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 2010

- Augur Lake is best classified as a mesotrophic lake. We found that the transparency of the lake has exhibited a statistical increase, and that the total phosphorus has exhibited a decrease.
- Augur Lake is one of the few alkaline water bodies in the ALAP data set. The 2017 average pH was found to be 8.9 pH units, which is greater than 99% of participating lakes. The alkalinity of the lake was 20.0 mg/L in 2017, demonstrating that the lake is well buffered against changes in pH.
- The 2017 sodium and chloride concentrations in Augur Lake are greater than 97% of participating lakes, demonstrating that the lake's chemistry is influenced by the 35.4 km of salted roads in the watershed.
- Calcium concentrations in the lake was 10.5 mg/L, just below the suggested threshold for a variable zebra mussel population.

# Austin Pond
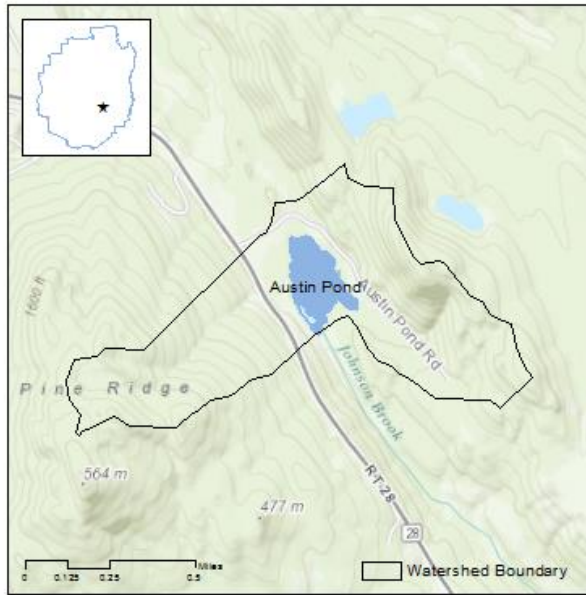


| Location | County: | Warren |
|---|---|---|
| | Town: | Johnsburg |

| Lake Characteristics | | |
|---|---|---|
| Surface Area (ha): | | 9 |
| Shoreline Length (km): | | 2 |
| Max. Depth (m): | | - |
| Volume (m³): | | 138289 |
| Flush rate (times/year): | | 4.9 |

| Watershed Characteristics | | |
|---|---|---|
| Watershed Area (ha): | | 121 |
| Surface water (%): | | 10 |
| Deciduous Forest (%): | | 26 |
| Evergreen Forest (%): | | 18 |
| Mixed Forest (%): | | 37 |
| Wetlands (%): | | 4 |
| Agricultural (%): | | 0 |
| Residential (%): | | 6 |
| Local Roads (km): | | 0.9 |
| State Roads (km): | | 0.5 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Mesotrophic | Circumneutral | Well buffered – not sensitive | Moderate |

*Water quality values and historical trends for Austin Pond during the 2017 sampling season. Trend analysis was not performed on sodium or calcium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 6/20/2017 | 7/21/2017 | 8/21/2017 | | |
| Transparency (m) | 2.5 | 1.5 | 2.3 | 2.1 | No Trends |
| Total Phosphorus (µg/L) | 15.1 | 22.6 | 19.8 | 19.2 | Decreasing |
| Chlorophyll-*a* (µg/L) | 5.8 | 5.7 | 5.2 | 5.5 | Decreasing |
| Laboratory pH | 7.2 | 6.9 | 6.9 | 7.0 | No Trends |
| Sp. Conductance (µS/cm) | 101.3 | 98.1 | 103.4 | 100.9 | No Trends |
| Color (Pt-Co) | 37.5 | 43.9 | 56.8 | 46.1 | No Trends |
| Alkalinity (mg/L) | | | 33.8 | 33.8 | Decreasing |
| Chloride (mg/L) | | | 15.3 | 15.3 | No Trends |
| Calcium (mg/L) | | | 10.6 | 10.6 | Not Analyzed |
| Sodium (mg/L) | | | 7.7 | 7.7 | Not Analyzed |

*See table of content for description of water quality indicators

# Austin Pond – Time Series
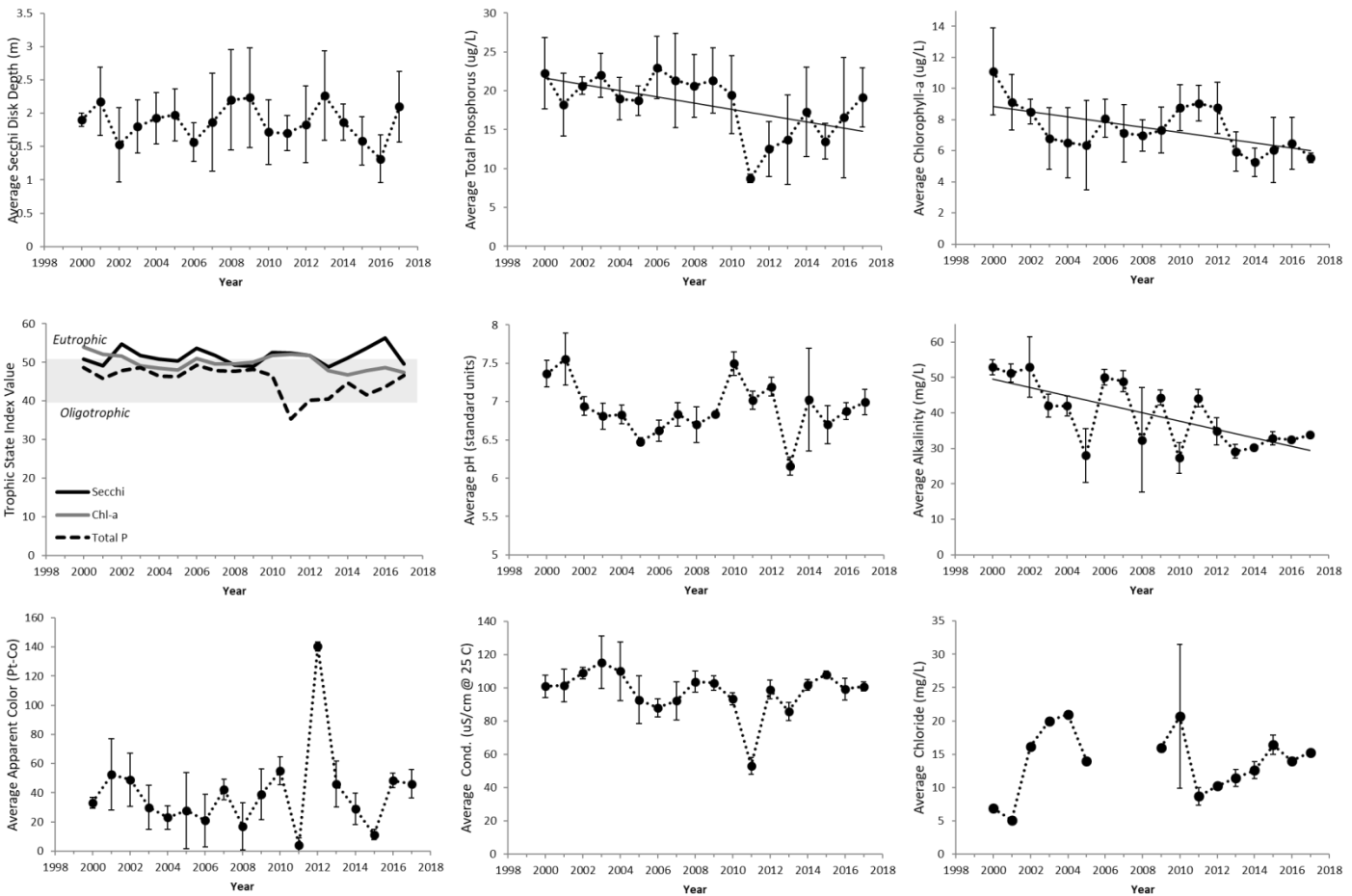


*Annual average values of select water quality indicators for Austin Pond, 2000-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Austin Pond is an 8.6 ha lake located in Warren County in the Town of North Creek.  The lake is located within a 120 ha watershed dominated by forests.  Austin Pond has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 2000.

- Austin pond is best classified as a mesotrophic lake. Although the transparency has been relatively stable over time. The total phosphorus and chlorophyll-a concentration has exhibited a significant downward trend at a rate of approximately 0.4 µg/L/year and 0.17 µg/L/year respectively.
- The pond is circumneutral in terms of its acidity (average pH = 7.0) and is well buffered against changes in pH. However, we did detect a slight, yet statistically significant downward trend in alkalinity at a rate of approximately 1.2mg/L/year.
- Sodium and chloride concentrations 7.7 mg/L and 15.3 mg/L respectively in 2017, demonstrating that the chemistry of the pond is influenced by NYS Rt. 28. Chloride concentration in Austin Pond is greater than 70% of the participating ALAP lakes.  Calcium was 10.6 mg/L in 2017 which is just below the suggested lower threshold required for a viable zebra mussel population.

# Big Moose Lake
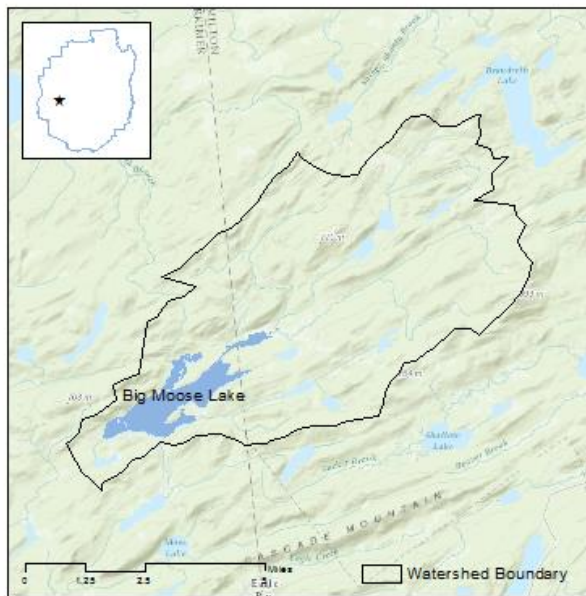


| Location | County: | Herkimer |
|---|---|---|
| | Town: | Webb |

| Lake Characteristics | | |
|---|---|---|
| Surface Area (ha): | | 499 |
| Shoreline Length (km): | | 32 |
| Max. Depth (m): | | 21.3 |
| Volume (m³): | | 38400000 |
| Flush rate (times/year): | | 2 |

| Watershed Characteristics | | |
|---|---|---|
| Watershed Area (ha): | | 9685 |
| Surface water (%): | | 10 |
| Deciduous Forest (%): | | 29 |
| Evergreen Forest (%): | | 27 |
| Mixed Forest (%): | | 8 |
| Wetlands (%): | | 24 |
| Agricultural (%): | | 0 |
| Residential (%): | | 0 |
| Local Roads (km): | | 9 |
| State Roads (km): | | 0 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Oligotrophic | Acidic (threatened) | Moderate | Not Significant |

*Water quality values and historical trends for Big Moose Lake during the 2017 sampling season. Trend analysis was not performed on sodium or calcium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 6/22/2017 | 7/16/2017 | 8/26/2017 | | |
| Transparency (m) | 3.0 | 2.8 | 3.0 | 2.9 | Decreasing |
| Total Phosphorus (µg/L) | 4.8 | 7.0 | 5.4 | 5.8 | No Trend |
| Chlorophyll-*a* (µg/L) | 1.8 | 2.0 | 4.6 | 2.8 | No Trend |
| Laboratory pH | 5.8 | 6.0 | 5.9 | 5.9 | Increasing |
| Sp. Conductance (µS/cm) | 9.7 | 10.2 | 9.2 | 9.7 | Decreasing |
| Color (Pt-Co) | 47.1 | 31.1 | 40.7 | 39.6 | No Trend |
| Alkalinity (mg/L) | | | 2.1 | 2.1 | No Trend |
| Chloride (mg/L) | | | 0.5 | 0.5 | No Trend |
| Calcium (mg/L) | | | 1.1 | 1.1 | Not Analyzed |
| Sodium (mg/L) | | | 0.5 | 0.5 | Not Analyzed |

*See table of content for description of water quality indicators

# Big Moose Lake – Time Series
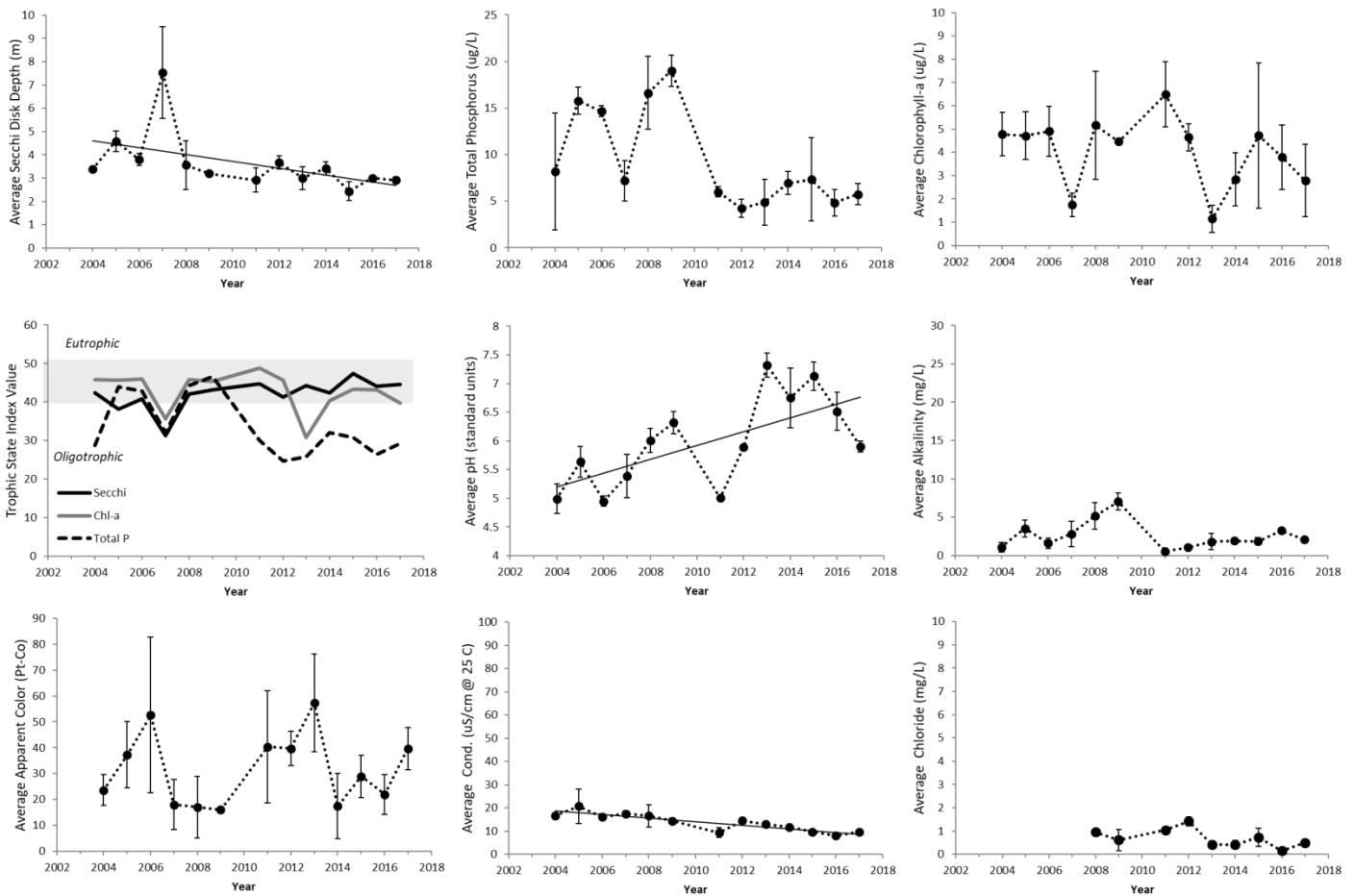


*Annual average values of select water quality indicators for Big Moose Lake, 2004-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Big Moose Lake is a 499 ha lake located in Herkimer County in the Town of Webb.  The lake is located within a 9,685 ha watershed dominated by forests.  Big Moose Lake has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 2004.

- Big Moose Lake is best classified as an oligotrophic lake on the boundary of being mesotrophic. We detected a significant downward trend in transparency at a rate of approximately 15cm/year.
- Big Moose Lake is an acidified lake, with an average pH of 5.9 in the summer of 2017. We detected a significant rise in pH since 2004 at a rate of approximately 0.12 pH units/year.
- The acid neutralizing ability of Big Moose is low, with alkalinity values typically in the range 1 – 2 mg/L.
- Sodium and chloride concentration in Big Moose were both 0.5 mg/L in the summer of 2017. These values are within the range expected for a lake lacking salted state roads in the watershed. We detected a slight but statistically significant downward trend in conductivity at a rate of 0.8 µS/cm/year.

# Blue Mountain Lake
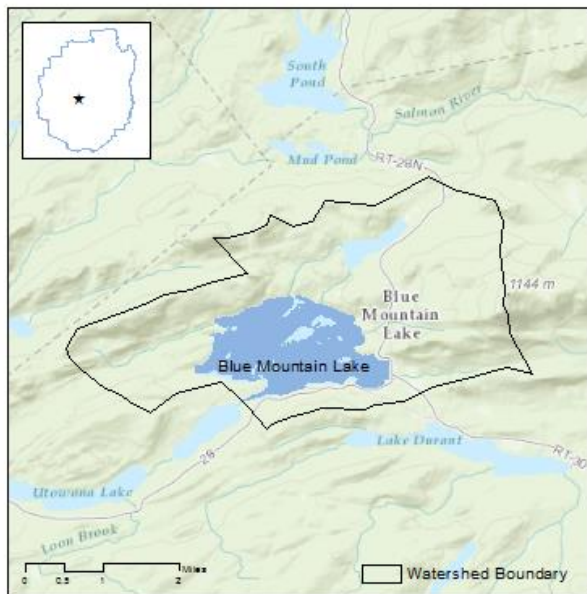


| Location | | |
|---|---|---|
| | County: | Hamilton |
| | Town: | Indian Lake |

| Lake Characteristics | | |
|---|---|---|
| | Surface Area (ha): | 500 |
| | Shoreline Length (km): | 25 |
| | Max. Depth (m): | 30.5 |
| | Volume (m³): | 75723176 |
| | Flush rate (times/year): | 0.28 |

| Watershed Characteristics | | |
|---|---|---|
| | Watershed Area (ha): | 2972 |
| | Surface water (%): | 21 |
| | Deciduous Forest (%): | 42 |
| | Evergreen Forest (%): | 16 |
| | Mixed Forest (%): | 11 |
| | Wetlands (%): | 6 |
| | Agricultural (%): | 0 |
| | Residential (%): | 3 |
| | Local Roads (km): | 4 |
| | State Roads (km): | 9 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Oligotrophic | Circumneutral | Moderate | Moderate |

*Water quality values and historical trends for Blue Mountain Lake during the 2017 sampling season. Trend analysis was not performed on sodium or calcium data. BDL=below detection limit, ± = estimated vale (< quantitation limit).*

| Water Quality Indicator | Sampling Date | | | | | Average | Trend |
|---|---|---|---|---|---|---|---|
| | 5/20 | 6/20 | 7/26 | 8/23 | 9/25 | | |
| *Town Bay* | | | | | | | |
| Transparency (m) | | Visible on Bottom | | | | | No Trend |
| Total Phosphorus (µg/L) | 5.7 | 28.2 | 5.7 | 16.6 | 3.8 | 12.0 | No Trend |
| Chlorophyll-*a* (µg/L) | 1.2 | 2.0 | 1.3 | 1.5 | 0.9 | 1.4 | Decreasing |
| Laboratory pH | 7.1 | 7.2 | 6.9 | 7.1 | 7.5 | 7.1 | Increasing |
| Sp. Conductance (µS/cm) | 73.0 | 70.3 | 73.5 | 71.0 | 89.3 | 75.4 | Decreasing |
| Color (Pt-Co) | 11.8 | 15.0 | 15.0 | 18.2 | BDL | ±12.0 | No Trend |
| Alkalinity (mg/L) | | | | 9.7 | | 9.7 | No Trend |
| Chloride (mg/L) | | | | 17.4 | | 17.4 | No Trend |
| Calcium (mg/L) | | | | 3.1 | | 3.1 | Not Analyzed |
| Sodium (mg/L) | | | | 9.0 | | 9.0 | Not Analyzed |

*See table of content for description of water quality indicators

| Water Quality Indicator | Sampling Date | | | | | Average |
|---|---|---|---|---|---|---|
| | 5/20 | 6/20 | 7/26 | 8/23 | 9/25 | |
| *East Bay* | | | | | | |
| Transparency (m) | 8.6 | | 7.2 | 5.8 | 7.9 | 7.9 |
| Total Phosphorus (µg/L) | 8.8 | 24.0 | 7.8 | 10.6 | 2.8 | 10.8 |
| Chlorophyll-*a* (µg/L) | 1.8 | 1.8 | 1.3 | 1.8 | 0.9 | 1.5 |
| Laboratory pH | 7.2 | 7.2 | 7.0 | 7.1 | 7.7 | 7.2 |
| Sp. Conductance (µS/cm) | 72.8 | 73.3 | 71.9 | 72.3 | 75.8 | 73.2 |
| Color (Pt-Co) | 15.0 | 18.2 | 24.6 | 27.9 | BDL | ±17.1 |
| Alkalinity (mg/L) | | | | 9.4 | | 9.4 |
| Chloride (mg/L) | | | | 17.5 | | 17.5 |
| Calcium (mg/L) | | | | 3.2 | | 3.2 |
| Sodium (mg/L) | | | | 9.3 | | 9.3 |
| *West Bay* | | | | | | |
| Transparency (m) | 8.6 | | 7.0 | 6.4 | 8.8 | 8.1 |
| Total Phosphorus (µg/L) | 4.8 | 10.3 | 5.8 | 4.6 | 4.0 | 5.9 |
| Chlorophyll-*a* (µg/L) | 1.5 | 0.2 | 1.4 | 1.7 | 0.7 | 1.1 |
| Laboratory pH | 7.0 | 7.4 | 7.1 | 6.9 | 8.1 | 7.3 |
| Sp. Conductance (µS/cm) | 71.0 | 72.9 | 72.7 | 69.6 | 75.9 | 72.4 |
| Color (Pt-Co) | 8.6 | 18.2 | 15.0 | 21.4 | BDL | ±12.6 |
| Alkalinity (mg/L) | | | | 9.3 | | 9.3 |
| Chloride (mg/L) | | | | 17.1 | | 17.1 |
| Calcium (mg/L) | | | | 3.1 | | 3.1 |
| Sodium (mg/L) | | | | 8.8 | | 8.8 |
| *Halsch Bay* | | | | | | |
| Transparency (m) | | | N/A (visible on bottom) | | | |
| Total Phosphorus (µg/L) | 5.0 | 5.9 | 4.3 | 59.2 | 3.5 | 15.6 |
| Chlorophyll-a (µg/L) | 1.7 | 1.42 | 1.4 | 1.6 | 0.9 | 2.7 |
| Laboratory pH | 7.4 | 7.2 | 7.0 | 6.7 | 8.0 | 7.3 |
| Sp. Conductance (µS/cm) | 73.1 | 73.5 | 71.7 | 72.1 | 75.3 | 73.1 |
| Color (Pt-Co) | 18.2 | 15.0 | 15.0 | 21.4 | 5.3 | 15.0 |
| Alkalinity (mg/L) | | | | 10.5 | | 10.5 |
| Chloride (mg/L) | | | | 17.2 | | 17.2 |
| Calcium (mg/L) | | | | 3.2 | | 3.2 |
| Sodium (mg/L) | | | | 9.1 | | 9.1 |

# Blue Mountain Lake – Time Series
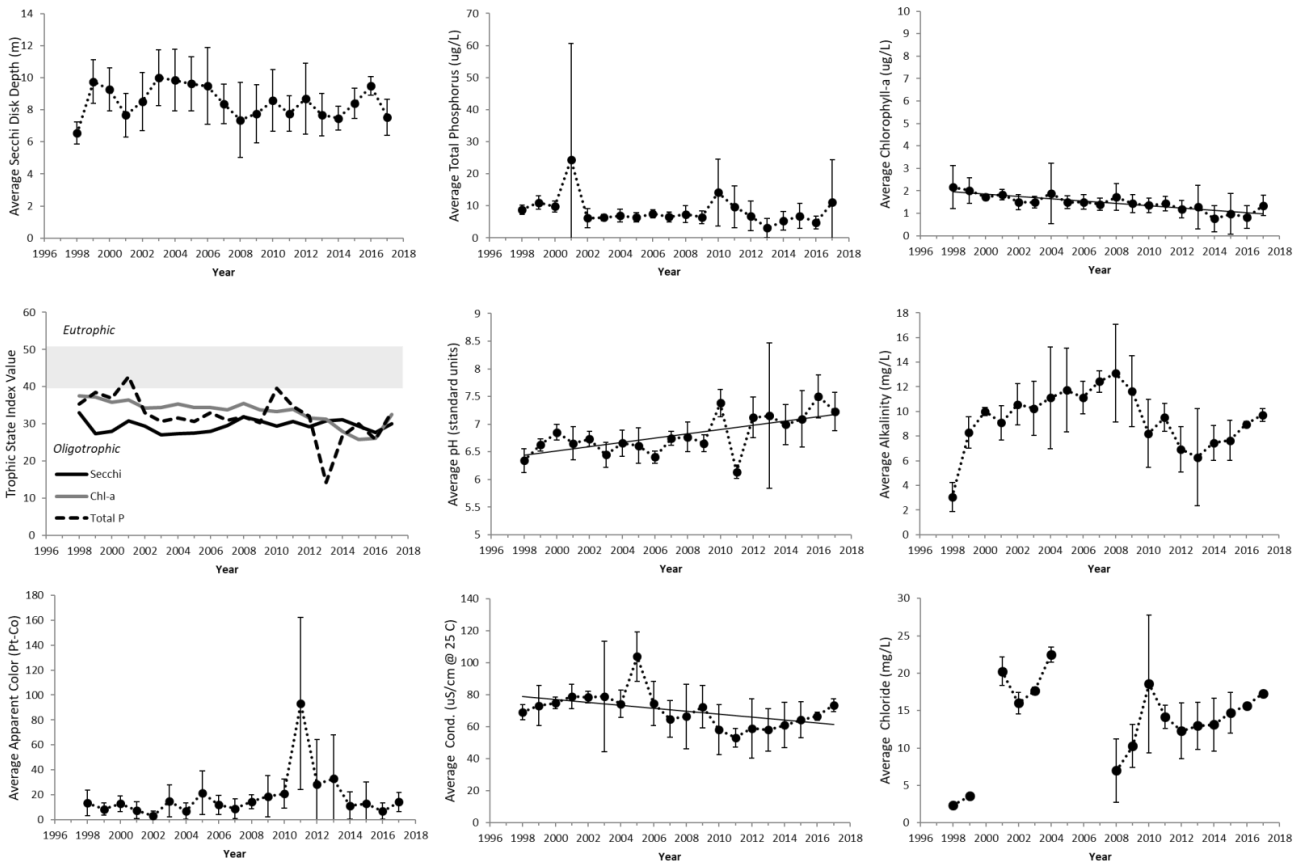


*Lake wide annual average values of select water quality indicators for Blue Mountain Lake, 1998-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Blue Mountain Lake is a 500 ha lake located in Hamilton County in the Town of Indian Lake.  The lake is located within a 2,972 ha watershed dominated by forests.  Blue Mountain Lake has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 1998.

- Blue Mountain Lake is an oligotrophic lake. The lake wide average transparency was 7.5 meters in 2017, which is greater than 96% of participating ALAP lakes this year.  Secchi transparency was not collected during June of 2017 due to rough waters. The chlorophyll-a concentration has exhibited a slight, yet significant, downward trend at a rate of approximately 0.07 µg/L/year.
- The samples from 2017 were found to be circumneutral in terms of their acidy (average pH = 7.2), and trending up from a low of 6.4 in 1998.  The alkalinity averaged 9.7 in 2017, indicating that the water is moderately sensitive to acid deposition.
- Sodium and chloride concentrations were 9.0 mg/L and 17.3 mg/L respectively, indicating that the chemistry of the lake is influenced by salted roads in the watershed. Chloride concentration is greater than 86% of participating ALAP lakes and is approximately 86 times higher than background concentration.

# Brandreth Lake
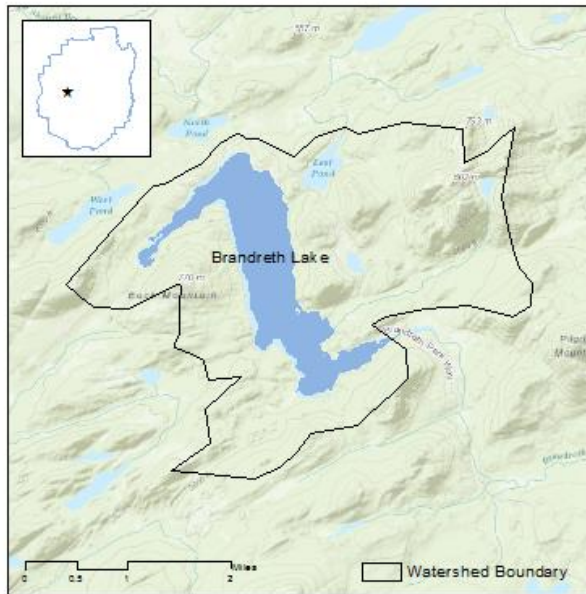


| Location | | |
|---|---|---|
| County: | Hamilton |
| Town: | Long Lake |

| Lake Characteristics | | |
|---|---|---|
| Surface Area (ha): | 362 |
| Shoreline Length (km): | 18 |
| Max. Depth (m): | 54 |
| Volume (m³): | 90379940 |
| Flush rate (times/year): | 0.18 |

| Watershed Characteristics | | |
|---|---|---|
| Watershed Area (ha): | 2298 |
| Surface water (%): | 19 |
| Deciduous Forest (%): | 44 |
| Evergreen Forest (%): | 7 |
| Mixed Forest (%): | 16 |
| Wetlands (%): | 13 |
| Agricultural (%): | 0 |
| Residential (%): | 1 |
| Local Roads (km): | 0 |
| State Roads (km): | 0 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Oligotrophic | Circumneutral | Moderate | Not Significant |

*Water quality values and historical trends for Brandreth Lake during the 2017 sampling season. Trend analysis was not performed on sodium or calcium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 7/4/2017 | August | 9/15/2017 | | |
| Transparency (m) | 7.6 | | 7.8 | 7.7 | Decreasing |
| Total Phosphorus (µg/L) | 3.4 | | 25.2 | 14.3 | No Trend |
| Chlorophyll-*a* (µg/L) | 0.4 | | 0.6 | 0.5 | No Trend |
| Laboratory pH | 6.6 | No Sample | 7.8 | 7.2 | Increasing |
| Sp. Conductance (µS/cm) | 10.3 | | 10.9 | 10.6 | Decreasing |
| Color (Pt-Co) | 8.6 | | 8.6 | 8.6 | No Trend |
| Alkalinity (mg/L) | | | 3.0 | 3.0 | No Trend |
| Chloride (mg/L) | | | 0.4 | 0.4 | No Trend |
| Calcium (mg/L) | | | 1.1 | 1.1 | Not Analyzed |
| Sodium (mg/L) | | | 0.5 | 0.5 | Not Analyzed |

*See table of content for description of water quality indicators

# Brandreth Lake – Time Series
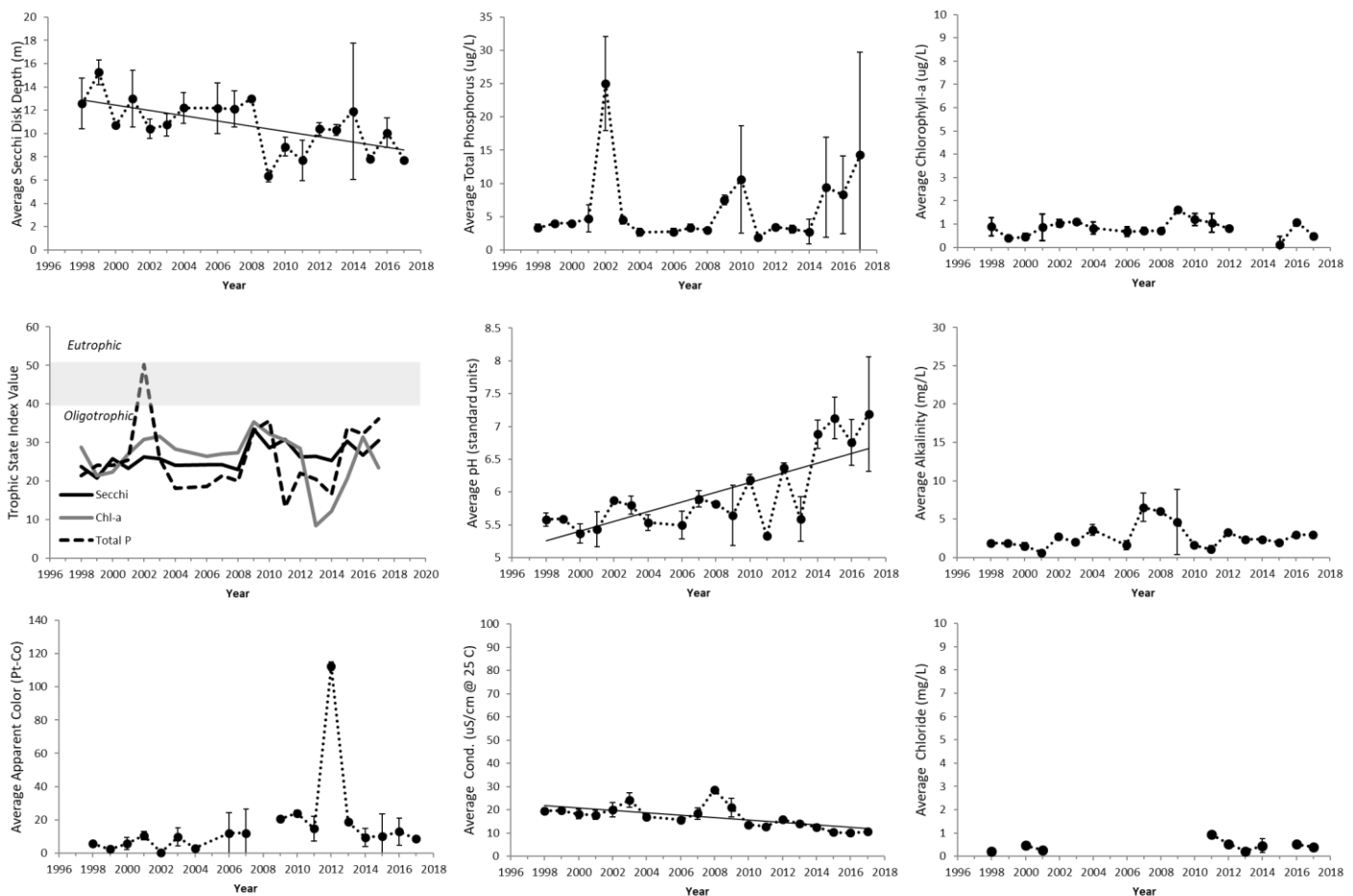


*Annual average values of select water quality indicators for Brandreth Lake, 1998-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Brandreth Lake is a 362 ha lake located in Hamilton County in the Town of Long Lake. The lake is located within a 2,298 ha watershed dominated by forests. Brandreth Lake has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 1998.

- Brandreth Lake is an oligotrophic lake with low concentrations of phosphorus and chlorophyll-a. The transparency of the lake averaged 7.7 meters in 2017, and was the most transparent lake in the ALAP database. We detected a slight yet significant decrease in the transparency of the lake at a rate of approximately 23 cm/year.
- The acid neutralizing ability of Brandreth Lake is low, with an alkalinity value observed to be 3.0 mg/L. Despite the low alkalinity, the pH of the lake has been significantly increasing since 1998 at a rate of approximately 0.7 pH units/year. This trend is likely part of a regional decrease in acid deposition rate.
- Sodium and chloride concentration in the lake averaged 0.4 and 0.5 mg/L in 2017. These values are within the range expected for a lake lacking salted state roads in the watershed.

# Butternut Pond
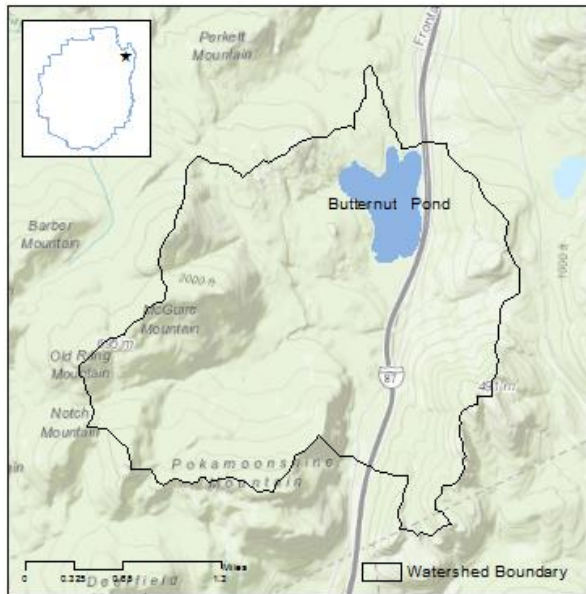
| Location | | County: | Essex |
|---|---|---|---|
| | | Town: | Chesterfield |

| Lake Characteristics | | | |
|---|---|---|---|
| | | Surface Area (ha): | 66 |
| | | Shoreline Length (km): | 4 |
| | | Max. Depth (m): | - |
| | | Volume (m³): | - |
| | | Flush rate (times/year): | - |

| Watershed Characteristics | | | |
|---|---|---|---|
| | | Watershed Area (ha): | 1347 |
| | | Surface water (%): | 5 |
| | | Deciduous Forest (%): | 45 |
| | | Evergreen Forest (%): | 12 |
| | | Mixed Forest (%): | 24 |
| | | Wetlands (%): | 4 |
| | | Agricultural (%): | 0 |
| | | Residential (%): | 6 |
| | | Local Roads (km): | 0 |
| | | State Roads (km): | 10.8 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Mesotrophic | Alkaline | Well buffered – not sensitive | High |

*Water quality values and historical trends for Butternut Pond during the 2017 sampling season. Trend analysis will be performed after five years of consecutive data collection. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 6/29/2017 | 7/31/2017 | 8/30/2017 | | |
| Transparency (m) | 2.3 | 3.7 | 3.8 | 3.3 | Not Analyzed-5 years of data needed |
| Total Phosphorus (µg/L) | 18.9 | 18.6 | 13.0 | 16.8 | |
| Chlorophyll-*a* (µg/L) | 7.5 | 2.1 | 3.6 | 4.4 | |
| Laboratory pH | 8.2 | 7.7 | 7.7 | 7.9 | |
| Sp. Conductance (µS/cm) | 203.0 | 170.7 | 177.5 | 183.7 | |
| Color (Pt-Co) | 37.5 | 37.5 | 27.9 | 34.3 | |
| Alkalinity (mg/L) | | | 35.7 | 35.7 | |
| Chloride (mg/L) | | | 40.1 | 40.1 | |
| Calcium (mg/L) | | | 10.4 | 10.4 | |
| Sodium (mg/L) | | | 21.1 | 21.1 | |

*See table of content for description of water quality indicators

# Butternut Pond- Time Series
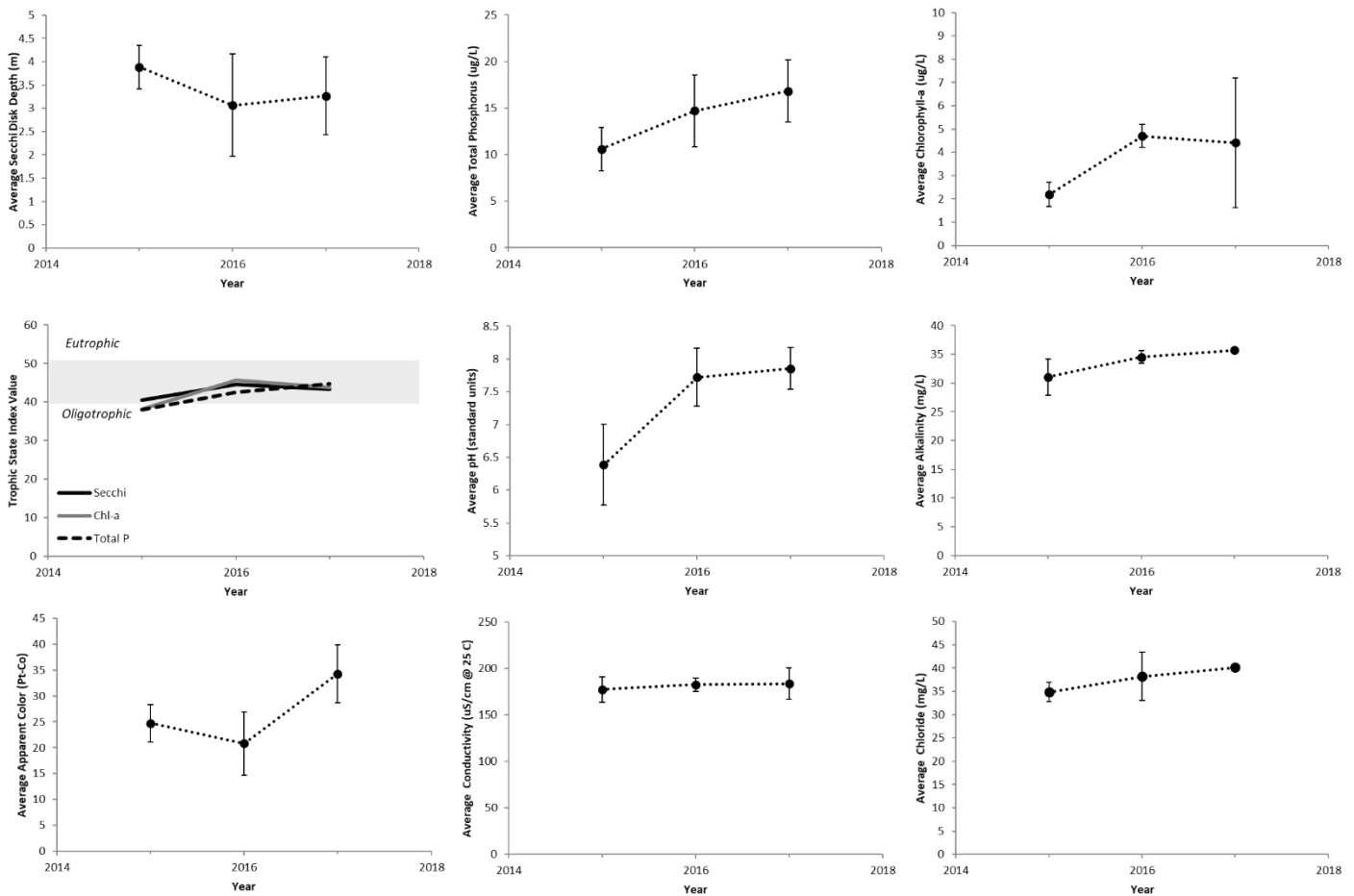


*Annual average values of select water quality indicators for Butternut Pond 2015-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Butternut Pond is a 66 ha pond located in Essex County in the Town of Chesterfield.  The pond is located within a 1,347 ha watershed dominated by forests. Butternut Ponds has participated in ALAP since 2015. Trend analysis will be performed on water quality indicators after five years of data have been collected.

- Total phosphorus, transparency, and chlorophyll-a values all indicate that Butternut Pond is a mesotrophic waterbody.
- The pH of the 2017 samples averaged 7.7, indicating that the pond is slightly alkaline. The pond is well buffered from acid deposition. The alkalinity of the pond was found to be 34.5 mg/L as $CaCO_3$, which is greater than 97% of participating lakes.
- Butternut Pond is highly influenced by road salt. The sodium and chloride concentrations in 2017 were found to be 21.1 mg/L and 40.1 mg/L respectively, which is greater than 98% of the participating ALAP lakes.
- Calcium was observed at a concentration of 10.4 mg/L, slightly below the threshold for a viable zebra mussel population.

# Canada Lake
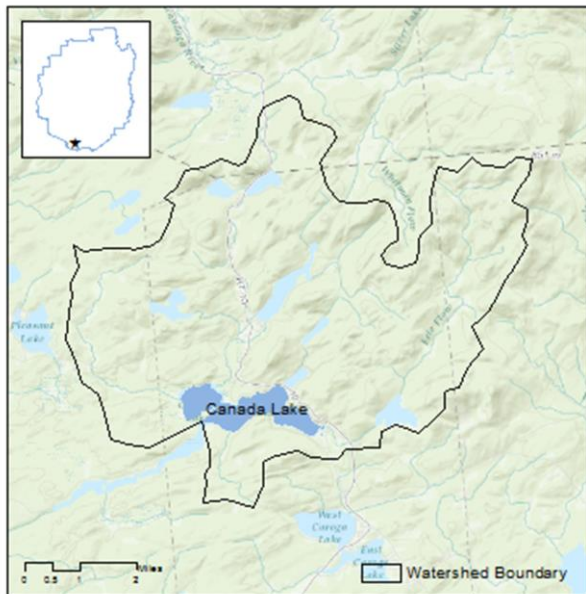
| Location | County: | Fulton |
|---|---|---|
| | Town: | Caroga |

| Lake Characteristics | Surface Area (ha): | 294 |
|---|---|---|
| | Shoreline Length (km): | 14 |
| | Max. Depth (m): | 45.7 |
| | Volume (m³): | |
| | Flush rate (times/year): | |

| Watershed Characteristics | Watershed Area (ha): | 9040 |
|---|---|---|
| | Surface water (%): | 8 |
| | Deciduous Forest (%): | 52 |
| | Evergreen Forest (%): | 5 |
| | Mixed Forest (%): | 12 |
| | Wetlands (%): | 19 |
| | Agricultural (%): | 0 |
| | Residential (%): | 1 |
| | Local Roads (km): | 16.5 |
| | State Roads (km): | 18.7 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Mesotrophic | Circumneutral | Moderate | Moderate |

*Water quality values and historical trends for Canada Lake during the 2017 sampling season. Trend analysis was not performed on sodium or calcium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 6/25/2017 | 7/18/2017 | 8/27/2017 | | |
| Transparency (m) | 3.7 | 3.4 | 3.8 | 3.6 | No Trend |
| Total Phosphorus (µg/L) | 6.2 | 9.1 | 6.0 | 7.1 | No Trend |
| Chlorophyll-*a* (µg/L) | 2.6 | 3.0 | 2.9 | 2.8 | No Trend |
| Laboratory pH | 6.0 | 6.7 | 7.0 | 6.6 | No Trend |
| Sp. Conductance (µS/cm) | 34.5 | 34.1 | 35.1 | 34.6 | No Trend |
| Color (Pt-Co) | 37.5 | 40.7 | 34.3 | 37.5 | No Trend |
| Alkalinity (mg/L) | | | 6.0 | 6.0 | No Trend |
| Chloride (mg/L) | | | 7.6 | 7.6 | Increasing |
| Calcium (mg/L) | | | 1.9 | 1.9 | Not Analyzed |
| Sodium (mg/L) | | | 3.8 | 3.8 | Not Analyzed |

*See table of content for description of water quality indicators

# Canada Lake – Time Series
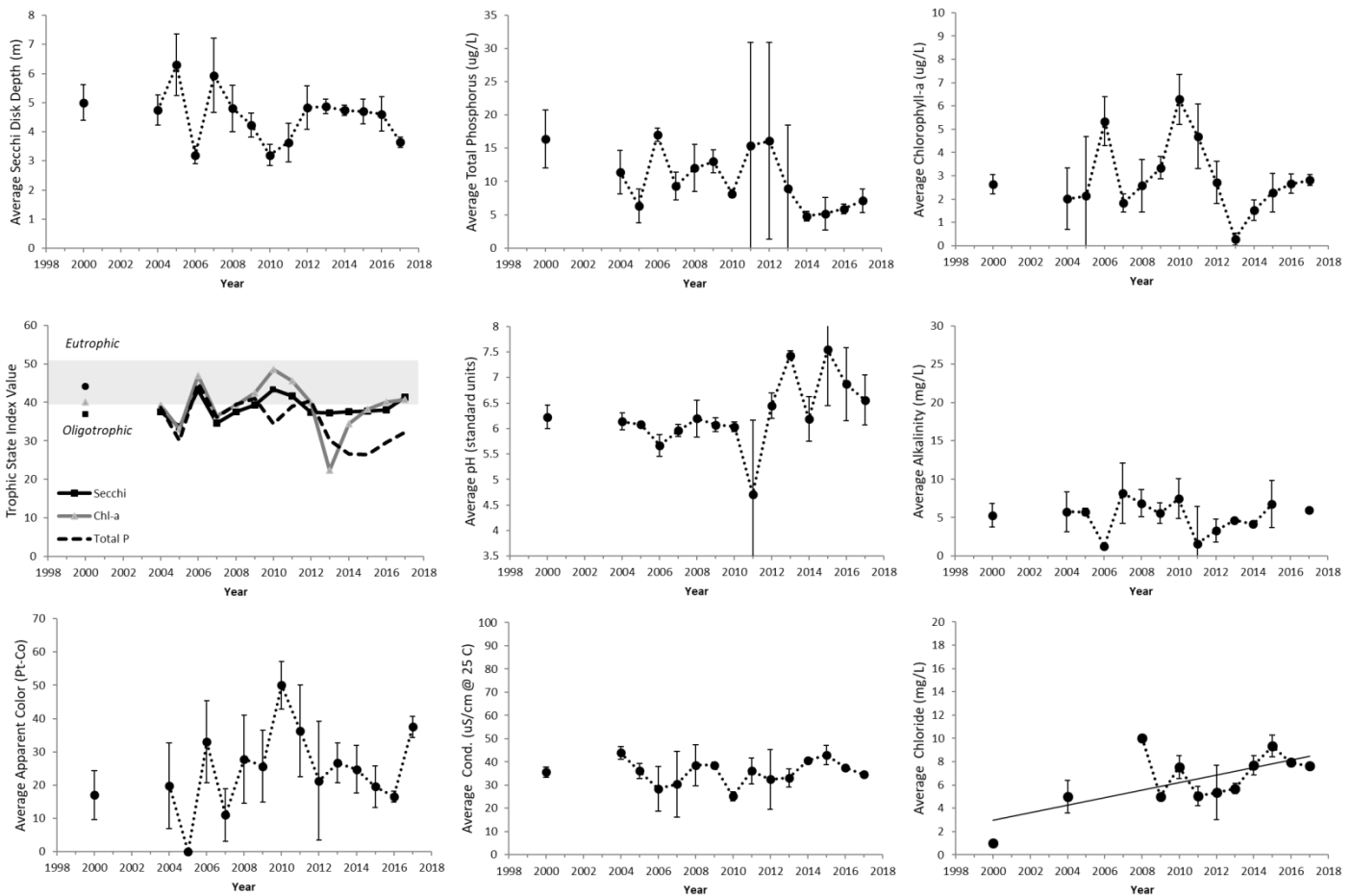


*Annual average values of select water quality indicators for Canada Lake, 2000-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Canada Lake is a 294 ha lake located in Fulton County in the Town of Caroga.  This lake is located within a 9,040 ha watershed dominated by forests.  Canada Lake has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 2000.

- Canada Lake is best classified as a mesotrophic lake. The trophic state of the lake has been variable, but typically fluctuates around the oligotrophic – mesotrophic boundary.   We did not detect a significant trend in any of the trophic indicators.
- Water samples from 2017 were found to be circumneutral in terms of their acidity, with an average pH of 6.6 units. We observed the alkalinity in August to be 6.0 mg/L, indicating that the lake has moderate sensitivity to acid deposition.
- Sodium and chloride concentrations in 2017 were 3.8 and 7.6 mg/L respectively, suggesting that the chemistry of the lake is influenced by the 35.2 km of roads in the watershed. Chloride concentration of Canada Lake is exhibiting a significant increase and is currently greater than 67% of lakes participating in ALAP.

# Catlin Lake
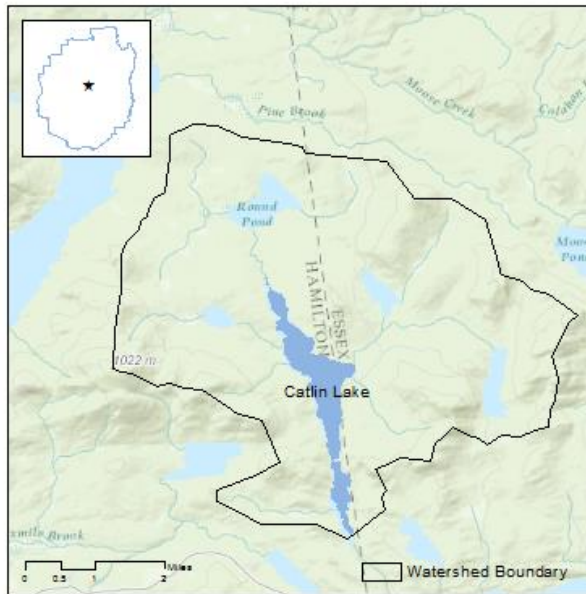


| Location | County: | Hamilton |
|---|---|---|
| | Town: | Long Lake |

| Lake Characteristics | Surface Area (ha): | 261 |
|---|---|---|
| | Shoreline Length (km): | 16 |
| | Max. Depth (m): | - |
| | Volume (m³): | 19303122 |
| | Flush rate (times/year): | 2.5 |

| Watershed Characteristics | Watershed Area (ha): | 6390 |
|---|---|---|
| | Surface water (%): | 9 |
| | Deciduous Forest (%): | 57 |
| | Evergreen Forest (%): | 13 |
| | Mixed Forest (%): | 7 |
| | Wetlands (%): | 13 |
| | Agricultural (%): | 0 |
| | Residential (%): | 0 |
| | Local Roads (km): | 0 |
| | State Roads (km): | 0 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Mesotrophic | Circumneutral | Moderate | Not Significant |

*Water quality values and historical trends for Catlin Lake during the 2017 sampling season. Trend analysis was not performed on sodium or calcium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 6/22/2017 | 7/20/2017 | 8/21/2017 | | |
| Transparency (m) | 2.4 | 2.0 | 3.1 | 2.5 | Decreasing |
| Total Phosphorus (µg/L) | 11.3 | 6.6 | 18.6 | 12.2 | Decreasing |
| Chlorophyll-*a* (µg/L) | 5.7 | 3.6 | 0.7 | 3.3 | No Trend |
| Laboratory pH | 6.8 | 6.7 | 7.1 | 6.9 | No Trend |
| Sp. Conductance (µS/cm) | 15.5 | 14.5 | 16.6 | 15.5 | Decreasing |
| Color (Pt-Co) | 37.5 | 43.9 | 50.4 | 43.9 | No Trend |
| Alkalinity (mg/L) | | | 7.7 | 7.7 | No Trend |
| Chloride (mg/L) | | | 0.6 | 0.6 | No Trend |
| Calcium (mg/L) | | | 2.2 | 2.2 | Not Analyzed |
| Sodium (mg/L) | | | 0.7 | 0.7 | Not Analyzed |

*See table of content for description of water quality indicators

# Catlin Lake – Time Series
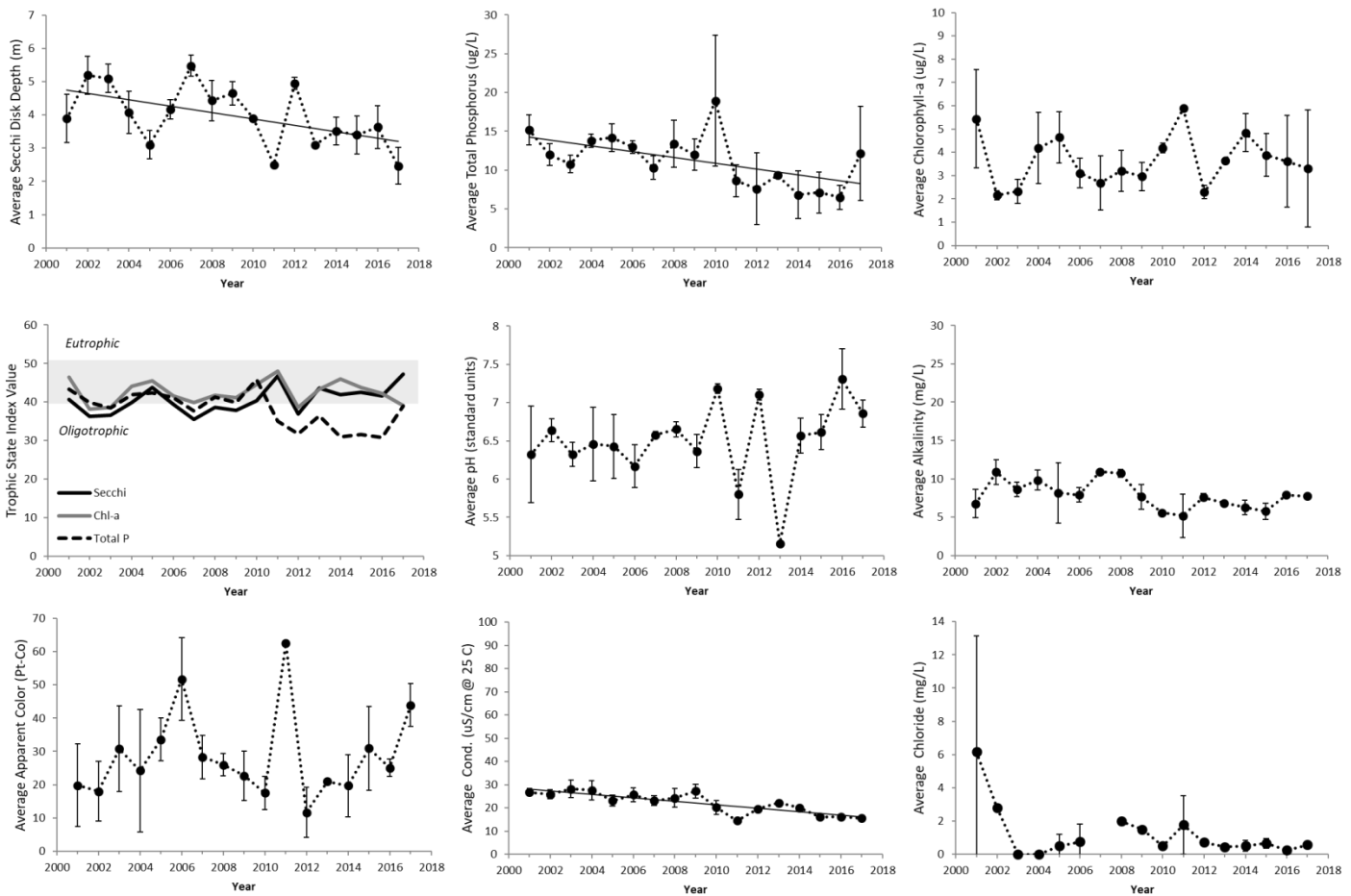


*Annual average values of select water quality indicators for Catlin Lake, 2001-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Catlin Lake is a 261 ha lake located in Hamilton County in the Town of Long Lake.  The lake is located within a 6,390 ha watershed dominated by forests.  Catlin Lake has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 2001.

- Catlin Lake is a mesotrophic lake. Historically, the lake has fluctuated at the oligotrophic-mesotrophic boundary. Transparency of the lake averaged 2.5 meters in 2017 and has exhibited a significant downward trend at a rate of approximately 10 cm/year.  Average total phosphorous concentration has also exhibited a significant downward trend over the 18 years of ALAP participation, with an annual decrease at the rate of 0.40 µg/L.
- Catlin Lake is a circumneutral water body in terms of its acidity, with moderate sensitivity to acid deposition.
- The sodium and chloride concentrations were 0.7 mg/L and 0.6 mg/L, respectively, and are within the range expected for a lake that lacks salted state roads in the watershed.  Elevated chloride levels in 2001 occurred before major methodological improvements were made in our ability to quantify chloride, and are thus highly suspect.

# Chapel Pond
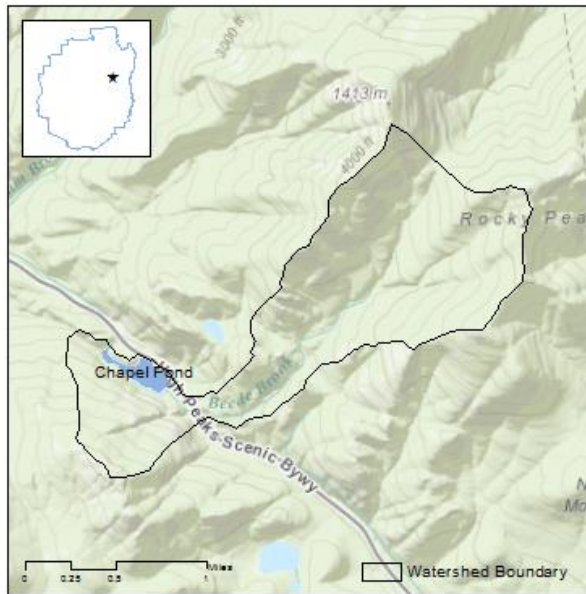


| Location | County: | Essex |
| --- | --- | --- |
| | Town: | Keene |

| Lake Characteristics | Surface Area (ha): | 8 |
| --- | --- | --- |
| | Shoreline Length (km): | 2 |
| | Max. Depth (m): | 23.8 |
| | Volume (m³): | 685476 |
| | Flush rate (times/year): | 4.1 |

| Watershed Characteristics | Watershed Area (ha): | 449 |
| --- | --- | --- |
| | Surface water (%): | 2 |
| | Deciduous Forest (%): | 11 |
| | Evergreen Forest (%): | 51 |
| | Mixed Forest (%): | 33 |
| | Wetlands (%): | 1 |
| | Agricultural (%): | 0 |
| | Residential (%): | 1 |
| | Local Roads (km): | 0 |
| | State Roads (km): | 0.6 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
| --- | --- | --- | --- |
| Oligotrophic | Circumneutral | Moderate | Present - Low |

*Water quality values and historical trends for Chapel Pond during the 2017 sampling season. Trend analysis was not performed on sodium or calcium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
| --- | --- | --- | --- | --- | --- |
| | 6/29/2017 | 7/31/2017 | 8/31/2017 | | |
| Transparency (m) | 4.7 | 5.4 | 5.0 | 5.0 | No Trend |
| Total Phosphorus (µg/L) | 5.3 | 8.4 | 2.6 | 5.5 | No Trend |
| Chlorophyll-*a* (µg/L) | 1.0 | 1.1 | 1.5 | 1.2 | No Trend |
| Laboratory pH | 6.8 | 7.3 | 7.0 | 7.0 | No Trend |
| Sp. Conductance (µS/cm) | 13.8 | 15.3 | 17.5 | 15.5 | No Trend |
| Color (Pt-Co) | 21.4 | 21.4 | 18.2 | 20.3 | No Trend |
| Alkalinity (mg/L) | | | 6.9 | 6.9 | No Trend |
| Chloride (mg/L) | | | 1.2 | 1.2 | No Trend |
| Calcium (mg/L) | | | 1.8 | 1.8 | Not Analyzed |
| Sodium (mg/L) | | | 1.1 | 1.1 | Not Analyzed |

*See table of content for description of water quality indicators

# Chapel Pond – Time Series
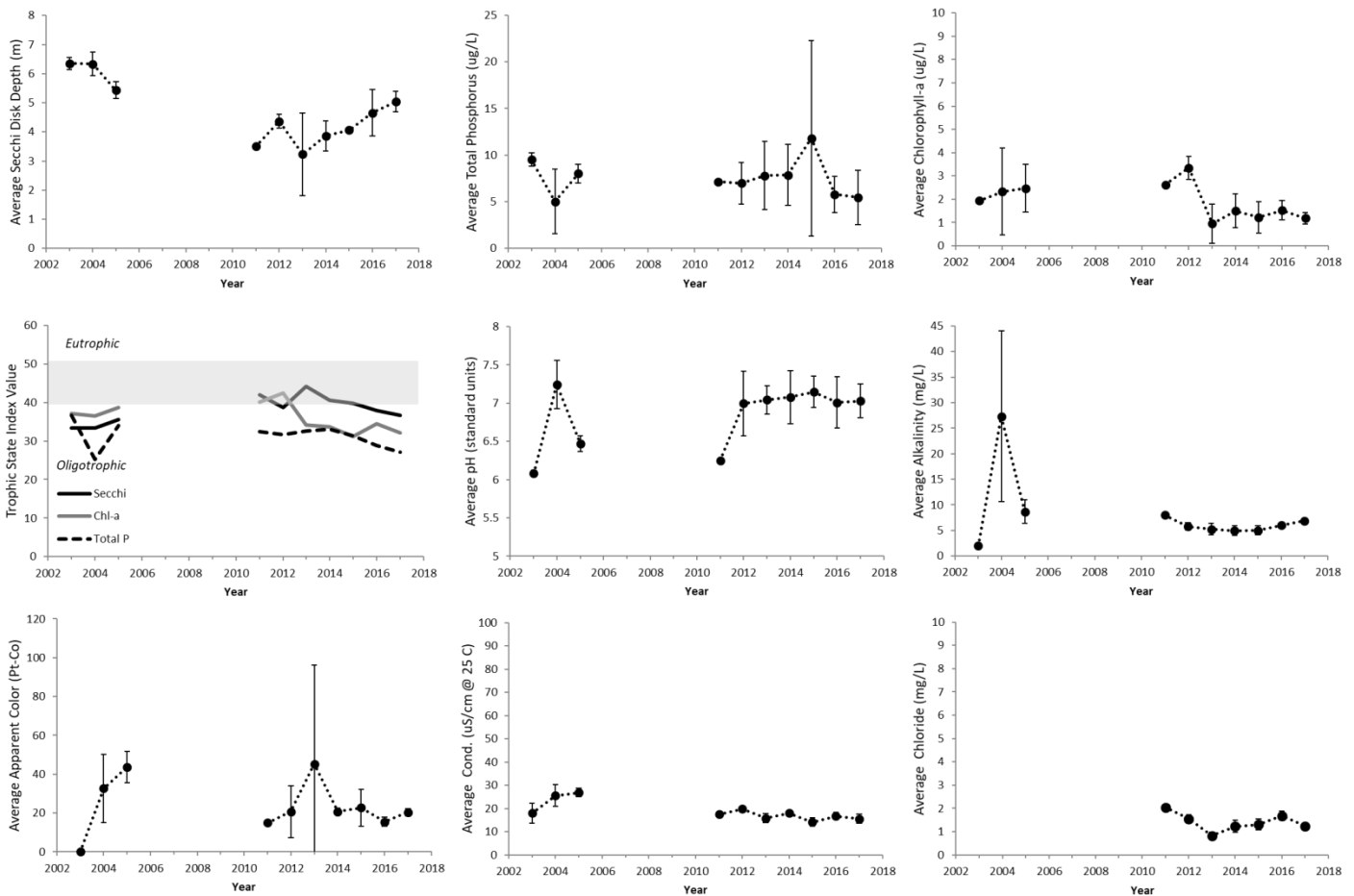


*Annual average values of select water quality indicators for Chapel Pond, 2003-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Chapel Pond is an 8 ha lake located in Essex County in the Town of Keene.  The lake is located within a highly sloped 449 ha watershed dominated by forests.  Chapel Pond has been monitored by ALAP volunteers and the Adirondack Watershed Institute from 2003 to 2005 and 2011 to present.

- Chapel Pond is an oligotrophic water body.  Transparency, total phosphorus and chlorophyll concentrations of Chapel Pond have been variable over the period of ALAP participation. For example, average annual transparency values have ranged from 3.9 to 6.4 meters, and total phosphorus concentrations have ranged from 4.9 to 12 µg/L. Despite the range of data observed over the 10 years of monitoring, no statistical positive or negative trend was detected in any of the three trophic indicators. Inter-annual variability in the trophic indicator values is likely related to the high turnover rate of the pond, which has been estimated to flush over four times per year.
- The pond is circumneutral with moderate sensitivity to acid deposition.
- The sodium and chloride concentration in chapel pond was 1.1 mg/L and 1.2 mg/L respectively, suggesting that road salt influence is present in the pond, but it is fairly low.

# Chase's Lake
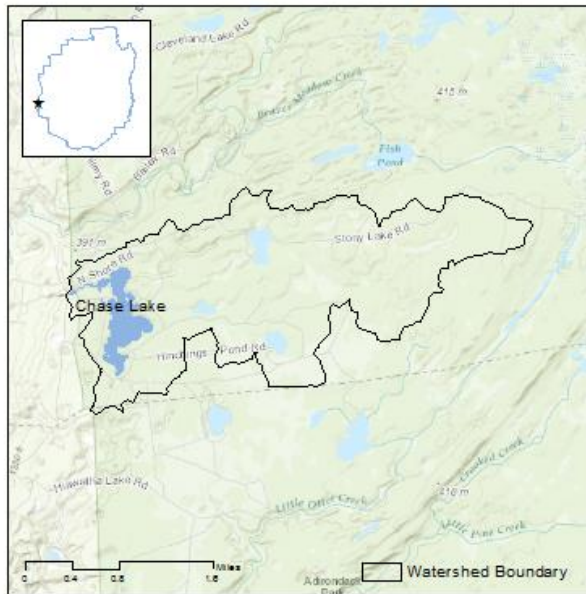


| Location | County: | Lewis |
| --- | --- | --- |
| | Town: | Watson |

| Lake Characteristics | Surface Area (ha): | 47 |
| --- | --- | --- |
| | Shoreline Length (km): | 7 |
| | Max. Depth (m): | - |
| | Volume (m³): | - |
| | Flush rate (times/year): | - |

| Watershed Characteristics | Watershed Area (ha): | 1041 |
| --- | --- | --- |
| | Surface water (%): | 7 |
| | Deciduous Forest (%): | 13 |
| | Evergreen Forest (%): | 46 |
| | Mixed Forest (%): | 4 |
| | Wetlands (%): | 14 |
| | Agricultural (%): | 0 |
| | Residential (%): | 0 |
| | Local Roads (km): | 5.5 |
| | State Roads (km): | 0 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
| --- | --- | --- | --- |
| Mesotrophic | Circumneutral | Moderate | Present - low |

*Water quality values and historical trends for Chase's Lake during the 2017 sampling season. Trend analysis will be performed after five years of data have been analyzed. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
| --- | --- | --- | --- | --- | --- |
| | 6/28/2017 | 7/23/2017 | 8/23/2017 | | |
| Transparency (m) | 2.4 | 1.5 | 2.0 | 2.0 | Not Analyzed-5 years of data needed |
| Total Phosphorus (µg/L) | 11.2 | 11.6 | 14.8 | 12.5 | |
| Chlorophyll-*a* (µg/L) | 7.9 | 8.5 | 2.3 | 4.6 | |
| Laboratory pH | 6.8 | 6.6 | 6.4 | 6.6 | |
| Sp. Conductance (µS/cm) | 19.1 | 17.9 | 20.5 | 19.1 | |
| Color (Pt-Co) | 72.9 | 82.5 | 69.7 | 75.0 | |
| Alkalinity (mg/L) | | | 7.7 | 7.7 | |
| Chloride (mg/L) | | | 1.5 | 1.5 | |
| Calcium (mg/L) | | | 2.2 | 2.2 | |
| Sodium (mg/L) | | | 1.0 | 1.0 | |

*See table of content for description of water quality indicators

## Chases Lake –- Time Series
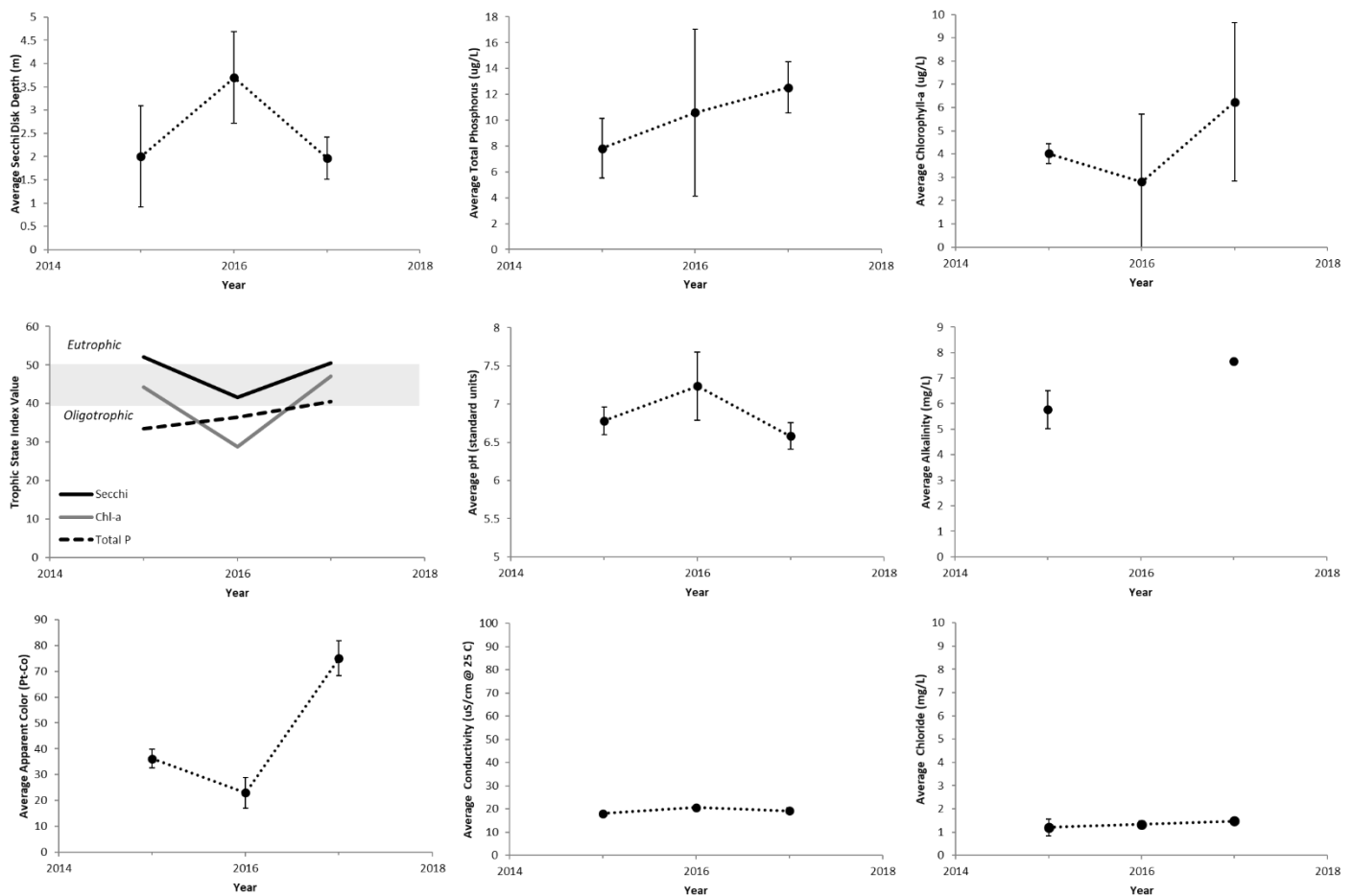


*Annual average values of select water quality indicators for Chase's Lake 2015-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Chases Lake is a 47 ha lake located in Lewis County in the town of Watson.  The lake is located within a 1,041 ha watershed dominated by forests. This is Chase's Lake third year participating in ALAP. Trend analysis will be performed on water quality indicators after five years of data have been collected.

- Currently we lack any comprehensive information on the morphometry of the lake

- Based on the 2017 data, the lake is a mesotrophic waterbody with considerably variability in its trophic classification.

- The samples analyzed in 2017 were circumneutral in terms of their pH, with an average pH value of 6.6. The alkalinity was found to be 6.8 mg/L, indicating that the pond has moderate sensitivity to acid deposition.

- Sodium and chloride concentration averaged 1.0 and 1.5 mg/L respectively. These values are slightly higher than background values in the Adirondack region, suggesting that road salt influence is present, but low.

# Chazy Lake
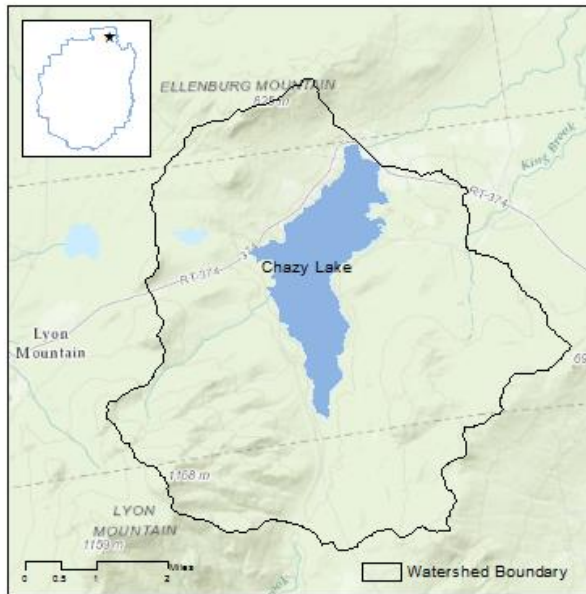


| Location | | County: | Clinton |
|---|---|---|---|
| | | Town: | Dannemora |

| Lake Characteristics | | | |
|---|---|---|---|
| | Surface Area (ha): | | 740 |
| | Shoreline Length (km): | | 20 |
| | Max. Depth (m): | | 21.9 |
| | Volume (m³): | | 65399532 |
| | Flush rate (times/year): | | 0.33 |

| Watershed Characteristics | | | |
|---|---|---|---|
| | Watershed Area (ha): | | 6896 |
| | Surface water (%): | | 11 |
| | Deciduous Forest (%): | | 61 |
| | Evergreen Forest (%): | | 16 |
| | Mixed Forest (%): | | 4 |
| | Wetlands (%): | | 2 |
| | Agricultural (%): | | 0 |
| | Residential (%): | | 1 |
| | Local Roads (km): | | 16.4 |
| | State Roads (km): | | 8.3 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Mesotrophic | Alkaline | Adequate – low sensitivity | Moderate |

*Water quality values and historical trends for Chazy Lake during the 2017 sampling season. Trend analysis was not performed on calcium or sodium, data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 6/17/2017 | 7/19/2017 | 8/25/2017 | | |
| *Eagle Point* | | | | | |
| Transparency (m) | 4.0 | 4.0 | 3.8 | 3.9 | Decreasing |
| Total Phosphorus (µg/L) | 9.3 | 246.0 | 7.1 | 87.5 | No Trend |
| Chlorophyll-*a* (µg/L) | 3.3 | 2.3 | 3.1 | 2.9 | Increasing |
| Laboratory pH | 7.4 | 7.6 | 7.8 | 7.6 | No Trend |
| Sp. Conductance (µS/cm) | 67.4 | 68.1 | 64.3 | 66.6 | No Trend |
| Color (Pt-Co) | 21.4 | 15.0 | 21.4 | 19.3 | Increasing |
| Alkalinity (mg/L) | | | 21.8 | 21.8 | No Trend |
| Chloride (mg/L) | | | 8.1 | 8.1 | No Trend |
| Calcium (mg/L) | | | 5.6 | 5.6 | Not Analyzed |
| Sodium (mg/L) | | | 4.3 | 4.3 | Not Analyzed |

| Water Quality Indicator | Sampling Date | | | Average |
|---|---|---|---|---|
| | 6/17/2017 | 7/19/2017 | 8/25/2017 | |
| *Halfway Point* | | | | |
| Transparency (m) | 3.9 | 4.1 | 3.7 | 3.9 |
| Total Phosphorus (µg/L) | 6.7 | 8.5 | 6.5 | 7.2 |
| Chlorophyll-*a* (µg/L) | 3.5 | 2.2 | 3.9 | 3.2 |
| Laboratory pH | 7.8 | 7.6 | 7.2 | 7.5 |
| Sp. Conductance (µS/cm) | 68.5 | 67.5 | 56.4 | 64.1 |
| Color (Pt-Co) | 21.4 | 11.8 | 15.0 | 16.1 |
| Alkalinity (mg/L) | | | 19.5 | 19.5 |
| Chloride (mg/L) | | | 8.8 | 8.8 |
| Calcium (mg/L) | | | 5.2 | 5.2 |
| Sodium (mg/L) | | | 4.6 | 4.6 |
| *South Inlet* | | | | |
| Transparency (m) | 3.2 | 4.1 | 3.0 | 3.4 |
| Total Phosphorus (µg/L) | 7.8 | 10.3 | 6.7 | 8.3 |
| Chlorophyll-*a* (µg/L) | 3.3 | 1.3 | 2.6 | 2.4 |
| Laboratory pH | 7.8 | 7.8 | 8.9 | 8.2 |
| Sp. Conductance (µS/cm) | 68.4 | 67.3 | 67.6 | 67.8 |
| Color (Pt-Co) | 31.1 | 15.0 | 21.4 | 22.5 |
| Alkalinity (mg/L) | | | 20.4 | 20.4 |
| Chloride (mg/L) | | | 8.9 | 8.9 |
| Calcium (mg/L) | | | 5.5 | 5.5 |
| Sodium (mg/L) | | | 4.6 | 4.6 |

*See table of content for description of water quality indicators

# Chazy Lake – Time Series



*Lake wide annual average values of select water quality indicators for Chazy Lake, 2002-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Chazy Lake is a 740 ha lake located in Clinton County in the Town of Dannemora. The lake is located within a 6,896 ha watershed dominated by forests. Chazy Lake has been monitored by ALAP volunteers and the Adirondack Watershed Institute off and on since 2002.

- Chazy Lake is an oligotrophic lake, on the border of mesotrophic. We observed a significant downward trend in transparency, decreasing trend at a rate of approximately 20cm/year. Some of the change in transparency may be related to the observed increase in color; however, we have also observed a slight, yet significant increase in chlorophyll-a concentration over time. We documented an unusually high concentration of total phosphorus at Eagle Point during the July measurement (246 µg/L).
- Water samples analyzed in 2017 were circumneutral to slightly alkaline in terms of their acidity, with a lake wide average of 7.7 pH units. The alkalinity of the water averaged 24.9 mg/L indicating that the lake is adequately buffered and not sensitive to acid deposition.
- Sodium and chloride concentrations averaged 5.6 and 9.4 mg/L respectively, indicating that the chemistry of the lake is influenced by the 25 km of roads in the watershed. The chloride concentration of Chazy is greater than 72% of participating ALAP lakes.

# Cranberry Lake
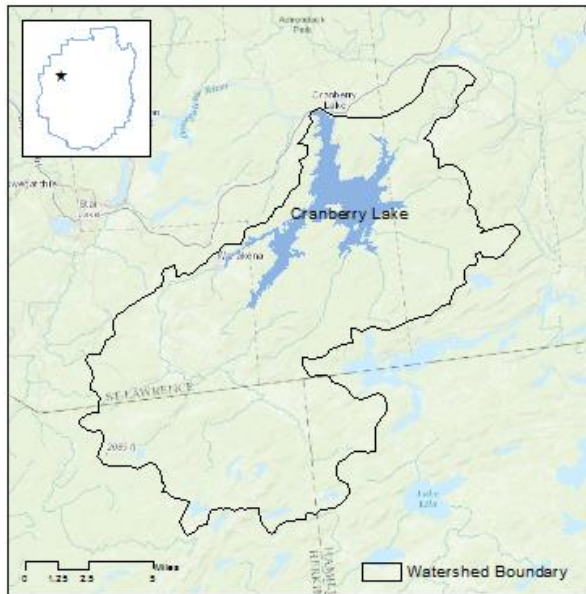


| Location | County: | St Lawrence |
|---|---|---|
| | Town: | Clifton |

| Lake Characteristics | Surface Area (ha): | 2750 |
|---|---|---|
| | Shoreline Length (km): | 128 |
| | Max. Depth (m): | 11.6 |
| | Volume (m³): | 52200000 |
| | Flush rate (times/year): | 4.35 |

| Watershed Characteristics | Watershed Area (ha): | 37478 |
|---|---|---|
| | Surface water (%): | 10 |
| | Deciduous Forest (%): | 60 |
| | Evergreen Forest (%): | 8 |
| | Mixed Forest (%): | 3 |
| | Wetlands (%): | 18 |
| | Agricultural (%): | 0 |
| | Residential (%): | 0 |
| | Local Roads (km): | 17 |
| | State Roads (km): | 1.3 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Mesotrophic | Circumneutral | Moderate | Not Significant |

*Water quality values and historical trends for Cranberry Lake during the 2017 sampling season. Trend analysis was not performed on sodium or nitrogen data. BDL=below detection limit.*
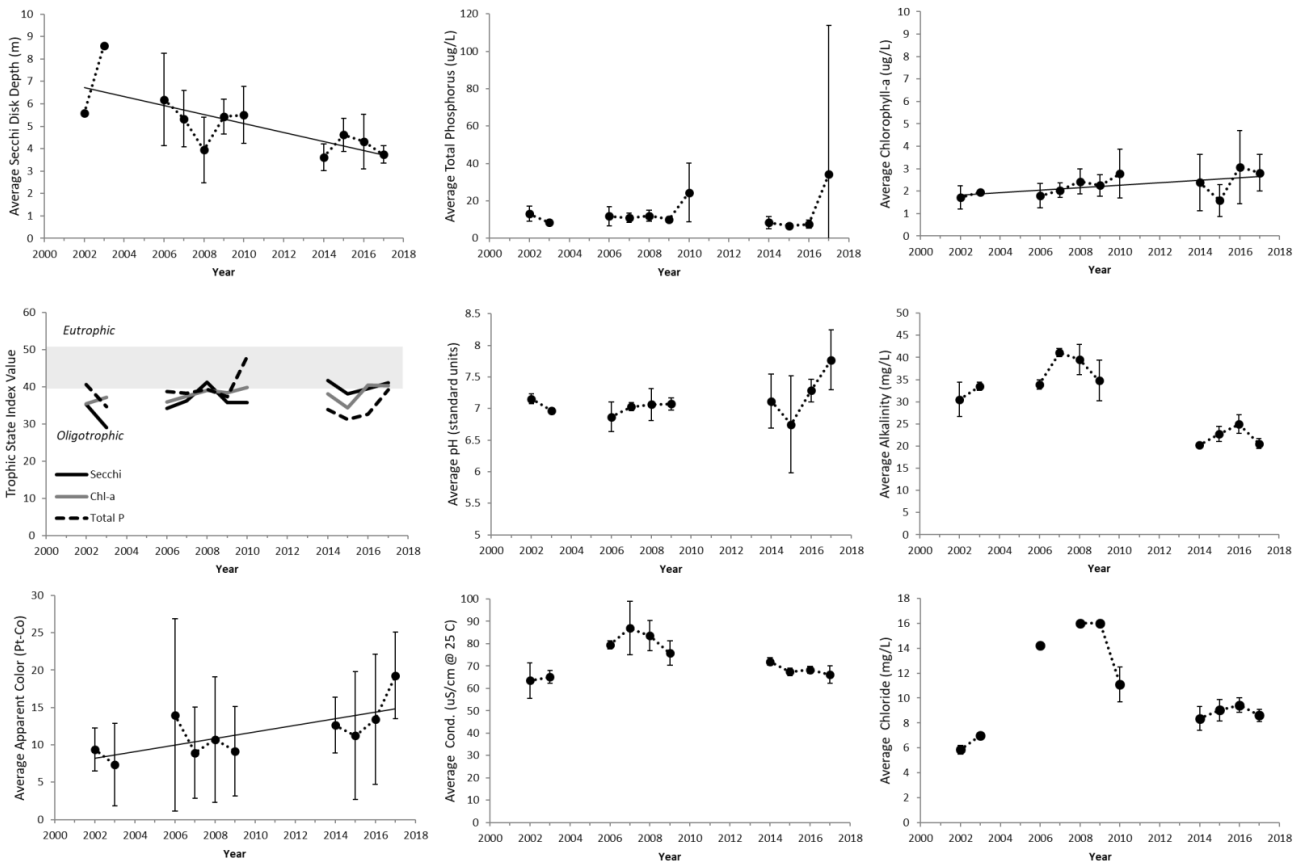
| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 6/16/2017 | 7/16/2017 | 8/18/2017 | | |
| Transparency (m) | 3.7 | 3.5 | 3.5 | 3.6 | Decreasing |
| Total Phosphorus (µg/L) | 10.3 | 9.2 | 7.9 | 9.1 | Decreasing |
| Chlorophyll-*a* (µg/L) | 5.3 | 1.4 | 2.9 | 3.2 | No Trend |
| Laboratory pH | 6.4 | 6.7 | 7.2 | 6.8 | Increasing |
| Sp. Conductance (µS/cm) | 16.4 | 13.3 | 14.3 | 14.7 | Decreasing |
| Color (Pt-Co) | 43.9 | 53.6 | 60.0 | 52.5 | No Trend |
| Alkalinity (mg/L) | | | 4.7 | 4.7 | No Trend |
| Chloride (mg/L) | | | 0.7 | 0.7 | No Trend |
| Calcium (mg/L) | | | 1.5 | 1.5 | Not Analyzed |
| Sodium (mg/L) | | | 0.7 | 0.7 | Not Analyzed |

*See table of content for description of water quality indicators

# Cranberry Lake – Time Series
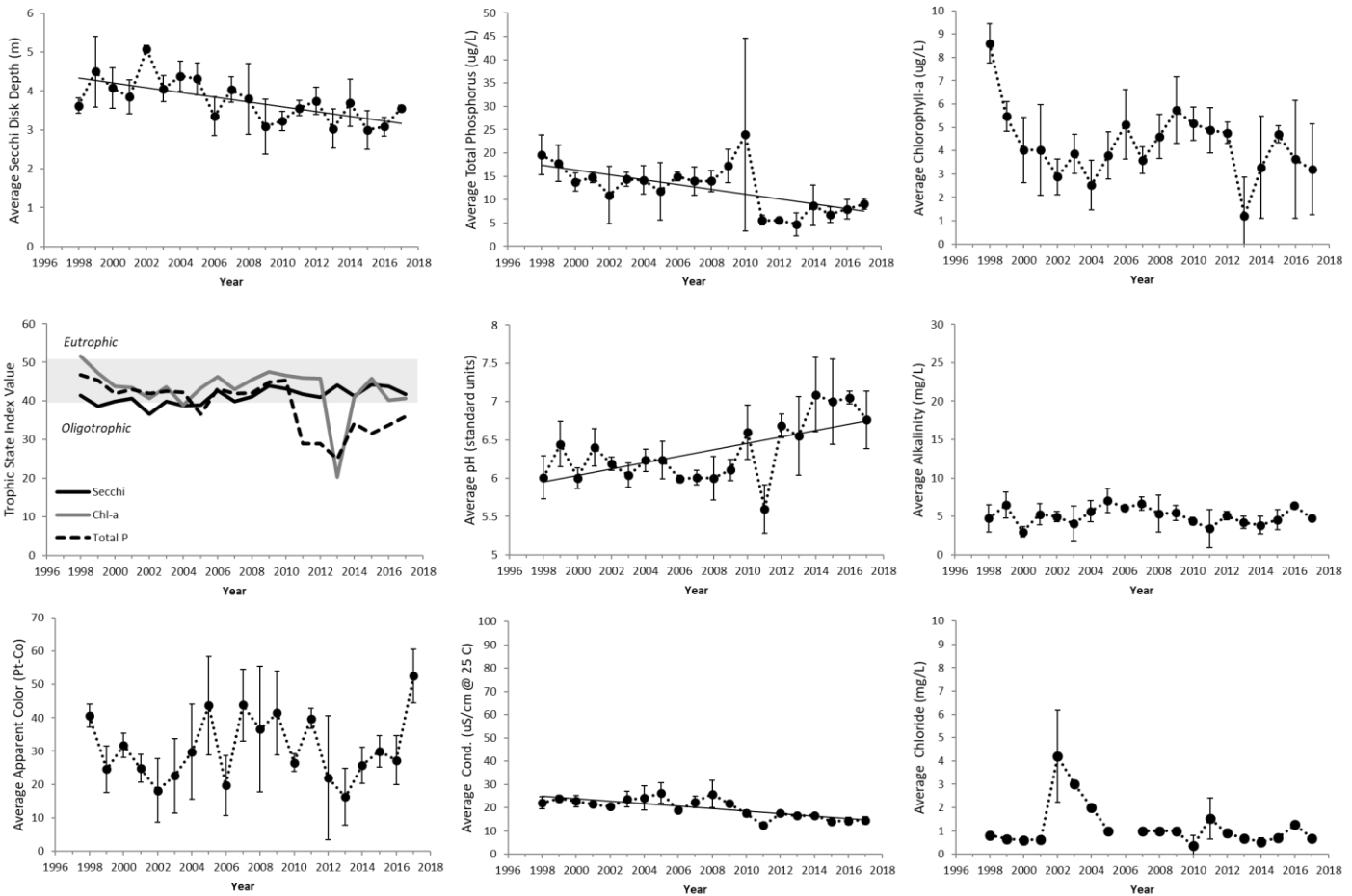


*Annual average values of select water quality indicators for Cranberry Lake, 1998-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Cranberry Lake is a 2,750 ha lake located in St. Lawrence County in the Town of Clifton.  The lake is located within a 34,478 ha watershed dominated by forests.  Cranberry Lake has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 1998.

- Cranberry Lake is a mesotrophic lake. The transparency of the lake has exhibited a slight, yet significant downward trend at a rate of approximately 6 cm/year.  Total phosphorus is also trending down, at a rate of approximately 0.5 µg/L/year. Chlorophyll concentration has been variable over the length of the study but has not shown a significant positive or negative trend.

- The samples analyzed in 2017 were circumneutral in terms of their pH, with an average pH value of 6.8. The pH of the water has exhibited an increasing trend at a rate of 0.04 pH units per year. The alkalinity of the 2017 sample was 4.7 mg/L, indicating that the lake has moderate sensitivity to acid deposition.

- The sodium and chloride concentration of Cranberry was 0.7 mg/L for both analytes, indicating that the lake is not significantly influenced by road salt.

# Deer Pond
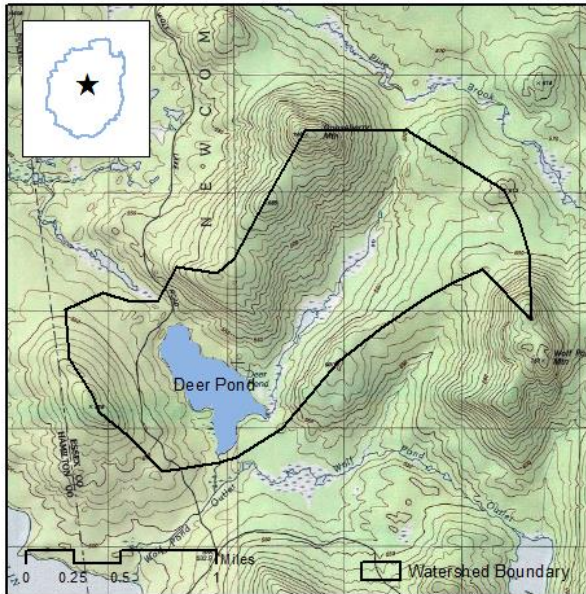


| Location | County: | Essex |
| | Town: | Newcomb |

| Lake Characteristics | Surface Area (ha): | 38 |
| | Shoreline Length (km): | 4 |
| | Max. Depth (m): | |
| | Volume (m³): | 0.7 |
| | Flush rate (times/year): | |

| Watershed Characteristics | Watershed Area (ha): | 0 |
| | Surface water (%): | 0 |
| | Deciduous Forest (%): | 92 |
| | Evergreen Forest (%): | 3 |
| | Mixed Forest (%): | 3 |
| | Wetlands (%): | 2 |
| | Agricultural (%): | 0 |
| | Residential (%): | 0 |
| | Local Roads (km): | 0 |
| | State Roads (km): | 0 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Mesotrophic | Circumneutral | Moderate | Not Significant |

*Water quality values and historical trends for Deer Lake during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit. VOB=Secchi disk was visible on the bottom of the lake.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
| | 6/22/2017 | 7/20/2017 | 8/21/2017 | | |
|---|---|---|---|---|---|
| Transparency (m) | VOB | 2.0 | VOB | 2.0 | No Trend |
| Total Phosphorus (µg/L) | 13.2 | 9.2 | 24.1 | 15.5 | Decreasing |
| Chlorophyll-*a* (µg/L) | 3.9 | 5.4 | 8.5 | 6.0 | No Trend |
| Laboratory pH | 6.6 | 7.0 | 6.8 | 6.8 | No Trend |
| Sp. Conductance (µS/cm) | 15.2 | 15.2 | 15.0 | 15.1 | Decreasing |
| Color (Pt-Co) | 37.5 | 47.2 | 56.8 | 47.2 | No Trend |
| Alkalinity (mg/L) | | | 7.4 | 7.4 | Decreasing |
| Chloride (mg/L) | | | 0.6 | 0.6 | No Trend |
| Calcium (mg/L) | | | 1.9 | 1.9 | Not Analyzed |
| Sodium (mg/L) | | | 0.8 | 0.8 | Not Analyzed |

*See table of content for description of water quality indicators

# Deer Lake – Time Series
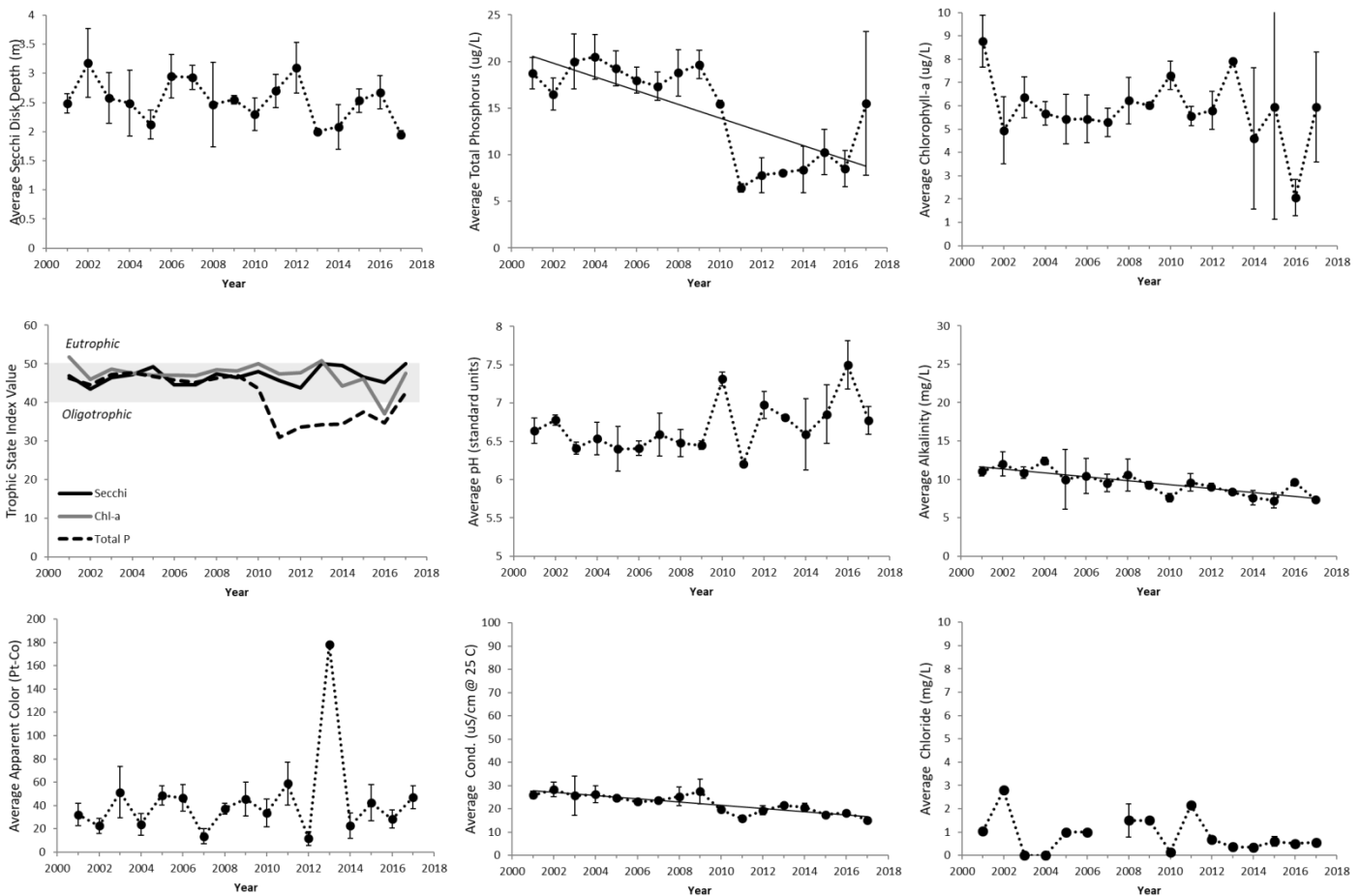


*Annual average values of select water quality indicators for Deer Lake, 2001-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Deer Lake is a 38 ha lake located in Essex County in the Town of Newcomb.  The lake is located within a 550 ha watershed dominated by forests.  Deer Lake has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 2001.

- Deer Lake is best classified as a mesotrophic lake. Average secchi disk transparency has typically been between 2 and 3 meters over the 17 years of monitoring with no significant trend detected in the data. Chlorophyll –a concentration, a surrogate for algal productivity, has been variable over time but also exhibits no statistical trend. Total phosphorus has exhibited a significant downward trend at a rate of 0.7 µg/L per year.  The strong shift in phosphorus concentration in 2010 is likely due to upgraded laboratory methods.
- The acidity of the 2017 water samples averaged 6.8 pH units, indicating that the surface water is circumneutral. The alkalinity of the 2017 sample was 9.6 mg/L, indicating moderate sensitivity to acid deposition. We detected a statistically significant downward trend in alkalinity at a rate of approximately 0.3mg/L per year.
- Sodium and chloride concentrations were 0.8 and 0.6 mg/L respectively, which is in the range expected for a watershed lacking salted roads.

# Eagle Lake
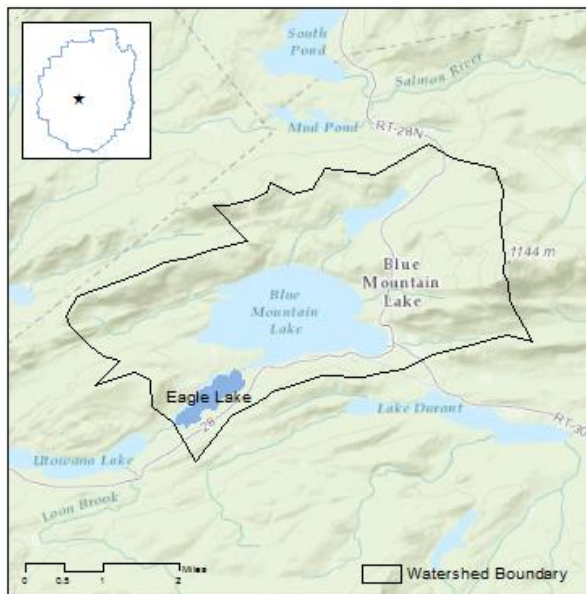


| Location | | |
|---|---|---|
| County: | Hamilton | |
| Town: | Indian Lake | |

| Lake Characteristics | | |
|---|---|---|
| Surface Area (ha): | 64 | |
| Shoreline Length (km): | 4 | |
| Max. Depth (m): | 9.4 | |
| Volume (m³): | 3169395 | |
| Flush rate (times/year): | 7.7 | |

| Watershed Characteristics | | |
|---|---|---|
| Watershed Area (ha): | 3290 | |
| Surface water (%): | 21 | |
| Deciduous Forest (%): | 42 | |
| Evergreen Forest (%): | 15 | |
| Mixed Forest (%): | 10 | |
| Wetlands (%): | 7 | |
| Agricultural (%): | 0 | |
| Residential (%): | 4 | |
| Local Roads (km): | 4 | |
| State Roads (km): | 11 | |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Oligotrophic | Circumneutral | Moderate | Moderate |

*Water quality values and historical trends for Eagle Lake during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 6/30/2017 | 7/31/2017 | 8/31/2017 | | |
| Transparency (m) | 6.0 | 5.0 | 5.0 | 5.3 | No Trend |
| Total Phosphorus (µg/L) | 5.0 | 37.9 | 4.7 | 15.9 | No Trend |
| Chlorophyll-*a* (µg/L) | 1.7 | 2.2 | 1.0 | 1.6 | Decreasing |
| Laboratory pH | 7.0 | 7.3 | 7.4 | 7.2 | No Trend |
| Sp. Conductance (µS/cm) | 77.6 | 156.0 | 80.9 | 104.8 | No Trend |
| Color (Pt-Co) | 21.4 | 18.2 | 11.8 | 17.1 | No Trend |
| Alkalinity (mg/L) | | | 10.9 | 10.9 | No Trend |
| Chloride (mg/L) | | | 19.7 | 19.7 | No Trend |
| Calcium (mg/L) | | | 3.7 | 3.7 | Not Analyzed |
| Sodium (mg/L) | | | 10.8 | 10.8 | Not Analyzed |

*See table of content for description of water quality indicators

# Eagle Lake – Time Series
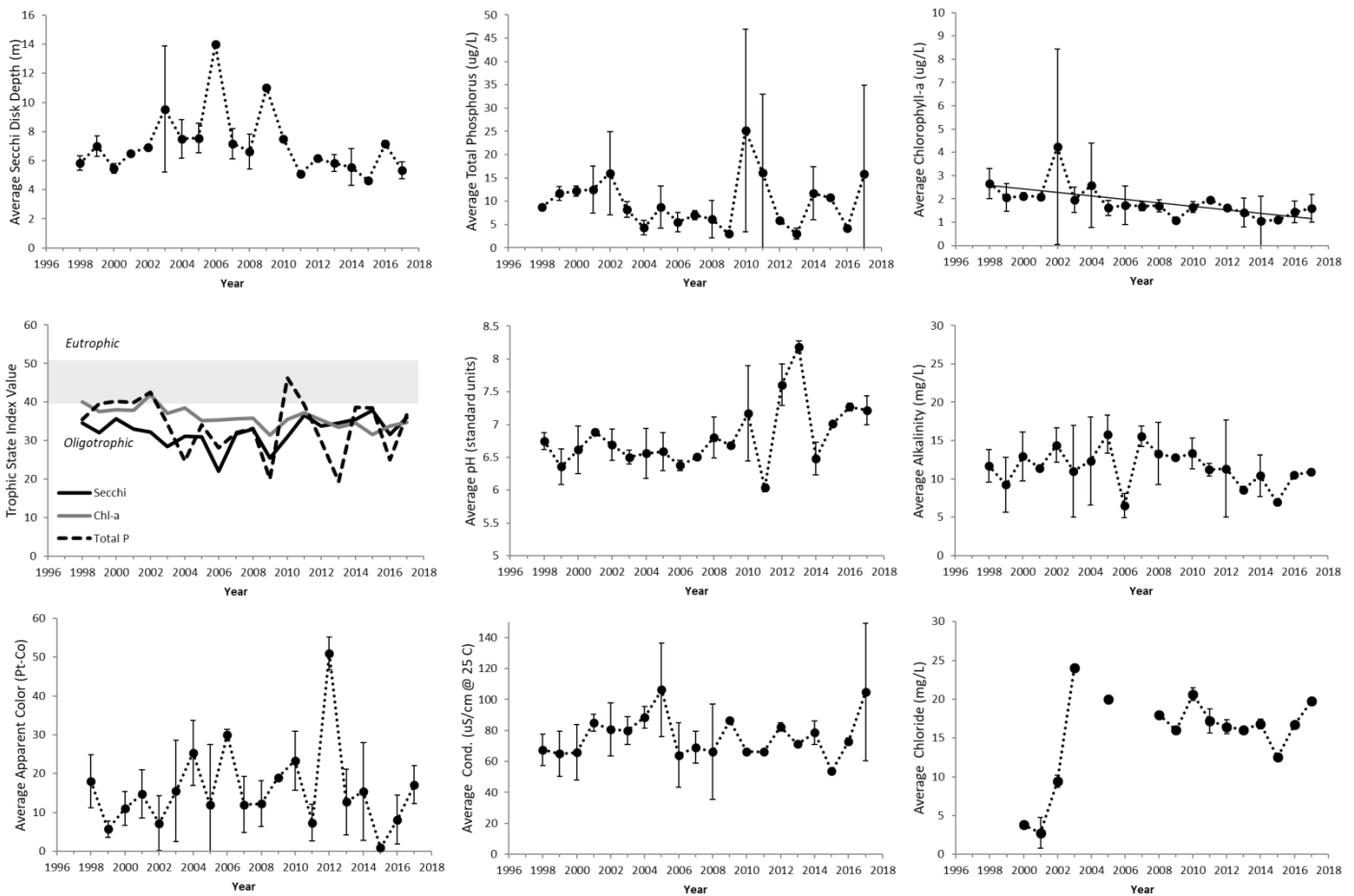


*Annual average values of select water quality indicators for Eagle Lake, 1998-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Eagle Lake is a 64 ha lake located in Hamilton County in the Town of Indian Lake.  The lake is located within a 3,289 ha watershed dominated by forests.  Eagle Lake has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 1998.

- Eagle Lake is an oligotrophic lake. The annual average chlorophyll-a concentration, a surrogate for algal productivity, has exhibited a slight downward trend at a rate of approximately 0.08 µg/L/year. Total phosphorus and transparency have been variable over time, but have not exhibited any statistical trends. The transparency of Eagle Lake averaged 5.3 meters, which is greater than 93% of the participating ALAP lakes.
- The water samples analyzed in 2017 were found to be circumneutral in terms of their acidity. The alkalinity was found to be 10.9 mg/L, indicating moderate sensitivity to acid deposition.
- Sodium and chloride concentration were 10.8 and 19.7 mg/L respectively, indicating that the chemistry of the lake is highly influenced by the 15 km of roads in the watershed. Chloride concentration of Eagle Lake was greater than 91% of participating lakes.

# East Caroga Lake



| Location | | |
|---|---|---|
| | County: | Fulton |
| | Town: | Caroga Lake |

| Lake Characteristics | | |
|---|---|---|
| | Surface Area (ha): | 94 |
| | Shoreline Length (km): | 8 |
| | Max. Depth (m): | 12.4 |
| | Volume (m³): | 3176316 |
| | Flush rate (times/year): | 0.71 |

| Watershed Characteristics | | |
|---|---|---|
| | Watershed Area (ha): | 1490 |
| | Surface water (%): | 6 |
| | Deciduous Forest (%): | 30 |
| | Evergreen Forest (%): | 10 |
| | Mixed Forest (%): | 9 |
| | Wetlands (%): | 20 |
| | Agricultural (%): | 0 |
| | Residential (%): | 8 |
| | Local Roads (km): | 21 |
| | State Roads (km): | 6.6 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Mesotrophic | Circumneutral | Well buffered – not sensitive | High |

*Water quality values for East Caroga Lake during the 2017 sampling season. Trend analysis will be performed after five years of consecutive data collection. BDL=below detection limit.*

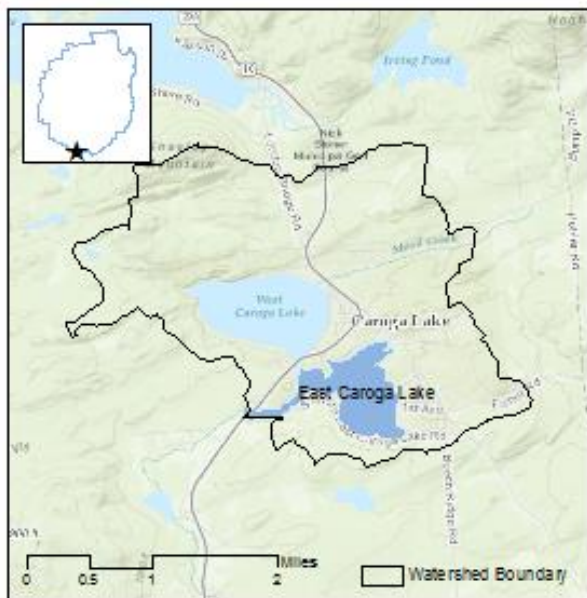| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 6/25/2017 | 7/17/2017 | 8/27/2017 | | |
| Transparency (m) | 3.3 | 2.9 | 3.1 | 3.1 | Not Analyzed-5 years of data needed |
| Total Phosphorus (µg/L) | 7.6 | 9.3 | 6.8 | 7.9 | |
| Chlorophyll-*a* (µg/L) | 4.6 | 3.6 | 3.1 | 3.8 | |
| Laboratory pH | 7.8 | 7.5 | 7.4 | 7.5 | |
| Sp. Conductance (µS/cm) | 128.1 | 124.9 | 13.2 | 88.7 | |
| Color (Pt-Co) | 31.0 | 31.1 | 18.2 | 26.8 | |
| Alkalinity (mg/L) | | | 26.2 | 26.2 | |
| Chloride (mg/L) | | | 24.7 | 24.7 | |
| Calcium (mg/L) | | | 8.5 | 8.5 | |
| Sodium (mg/L) | | | 12.6 | 12.6 | |

# East Caroga Lake- Time Series
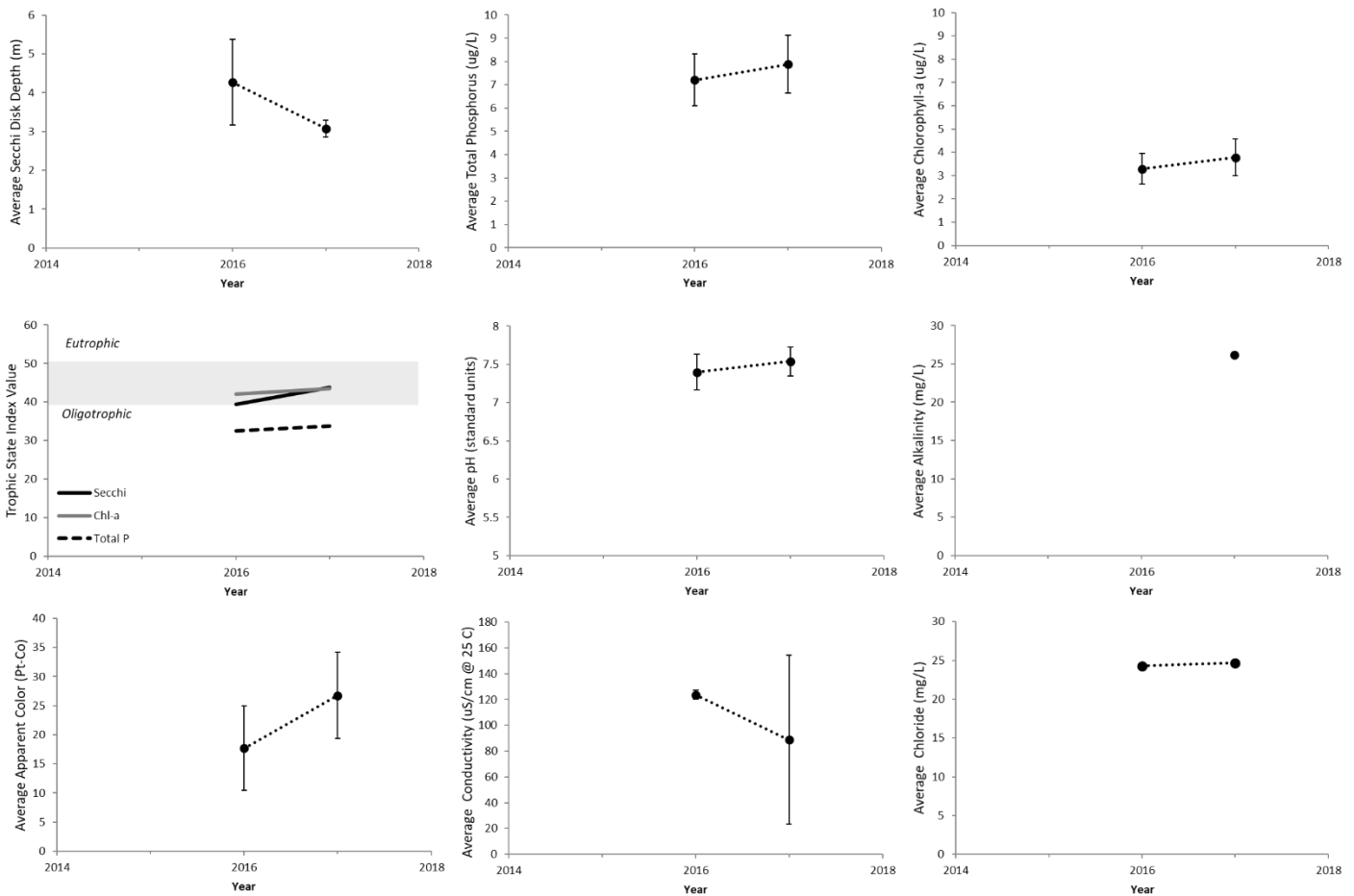


*Annual average values of select water quality indicators for East Caroga Lake, 2016-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

East Caroga Lake is a 94 ha lake located in Futon County in the Town of Caroga.  The lake is located within a 1,490 ha watershed dominated by forests.  East Caroga joined the ALAP program in 2016.

- East Caroga is best characterized as a mesotrophic lake.
- The lake is circumneutral in terms of its pH, and averaged 7.5 pH units in 2017.
- Alkalinity in 2017 was 26.2, indicating that the lake is not sensitive to acid deposition. Alkalinity of East Caroga is greater than 88% of participating ALAP lakes in 2017.
- Sodium and chloride values for the lake were 12.6 and 24.7 mg/L in 2017, indicating that the chemistry of the lake is highly influenced by road salt. Chloride concentration in East Caroga is greater than 94% of the participating lakes and approximately 120 times higher than unimpacted lakes in the Adirondacks.

# Eli Pond
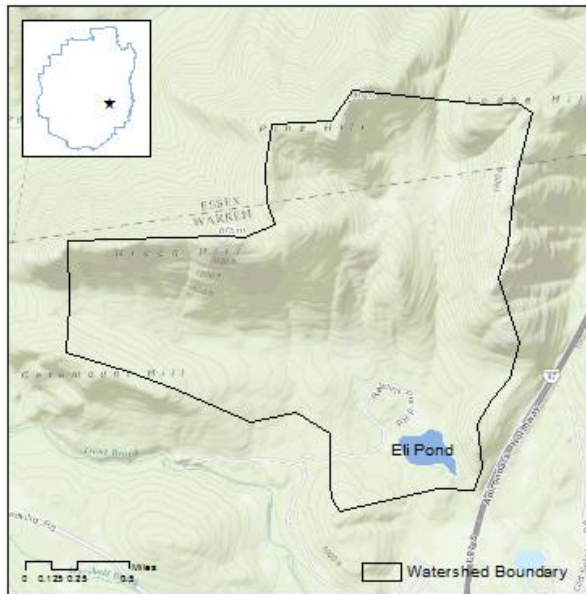


| Location | | |
|---|---|---|
| | County: | Warren |
| | Town: | Chester |

| Lake Characteristics | | |
|---|---|---|
| | Surface Area (ha): | 9 |
| | Shoreline Length (km): | 1 |
| | Max. Depth (m): | - |
| | Volume (m³): | 159105 |
| | Flush rate (times/year): | 26 |

| Watershed Characteristics | | |
|---|---|---|
| | Watershed Area (ha): | 714 |
| | Surface water (%): | 2 |
| | Deciduous Forest (%): | 68 |
| | Evergreen Forest (%): | 17 |
| | Mixed Forest (%): | 11 |
| | Wetlands (%): | 2 |
| | Agricultural (%): | 0 |
| | Residential (%): | 1 |
| | Local Roads (km): | 0 |
| | State Roads (km): | 0 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Mesotrophic | Circumneutral | Adequate – low sensitivity | Not Significant |

*Water quality values and historical trends for Eli Pond during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 6/17/2017 | 7/22/2017 | 8/19/2017 | | |
| Transparency (m) | 3.5 | 3.7 | 3.7 | 3.6 | Decreasing |
| Total Phosphorus (µg/L) | 13.4 | 11.5 | 11.7 | 12.2 | No Trend |
| Chlorophyll-*a* (µg/L) | 3.0 | 2.8 | 6.1 | 4.0 | No Trend |
| Laboratory pH | 6.9 | 6.9 | 7.3 | 7.1 | No Trend |
| Sp. Conductance (µS/cm) | 27.0 | 27.4 | 31.2 | 28.5 | Decreasing |
| Color (Pt-Co) | 27.9 | 24.6 | 31.1 | 27.9 | No Trend |
| Alkalinity (mg/L) | | | 17.5 | 17.5 | Decreasing |
| Chloride (mg/L) | | | 0.8 | 0.8 | No Trend |
| Calcium (mg/L) | | | 4.6 | 4.6 | Not Analyzed |
| Sodium (mg/L) | | | 1.1 | 1.1 | Not Analyzed |

*See table of content for description of water quality indicators

# Eli Pond – Time Series
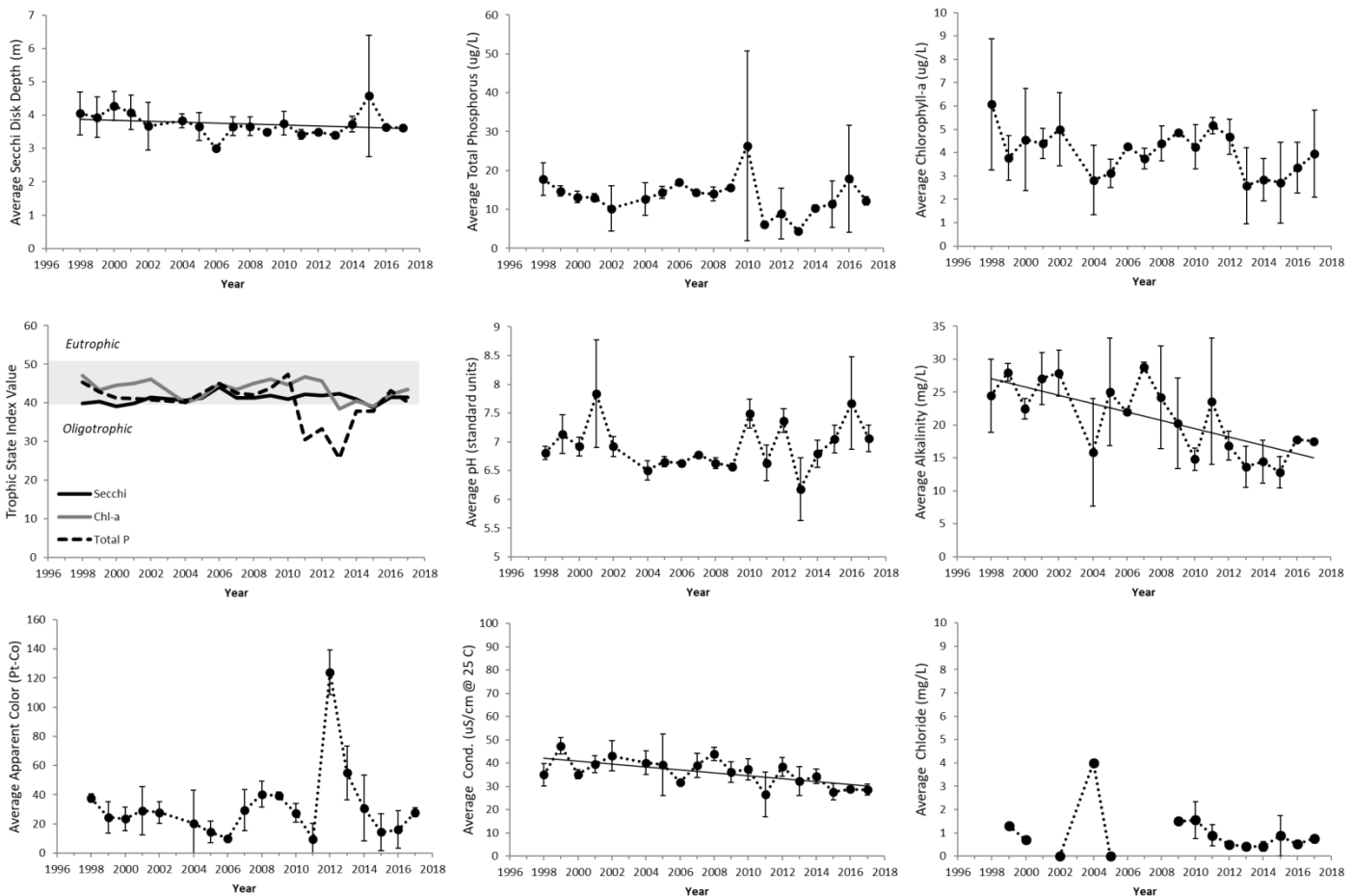


*Annual average values of select water quality indicators for Eli Pond, 1998-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Eli Pond is a 9 ha lake located in Warren County in the Town of Chester. The lake is located within a 714 ha watershed dominated by forests.  Eli Pond has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 1998.

- Eli Pond is a mesotrophic lake. Transparency has typically ranged between 3 and 5 meters. We detected a very slight, yet statistically significant downward trend in transparency. Chlorophyll-a and total phosphorus has been variable, and have exhibited no positive of negative trend.
- The water samples analyzed in 2017 were found to be circumneutral in terms of their acidity. The alkalinity was 17.5 mg/L, indicating low sensitivity to acid deposition. We did detect a decreasing trend in alkalinity at a rate of 0.6 mg/L/year. There is considerable variability in alkalinity; this is likely related to the flushing rate of the pond, which is estimated at 20 times per year on average.
- Sodium and chloride concentration averaged 1.1 and 0.8 mg/L respectively, these values are within the range we would expect for a lake that lacks salted roads in the watershed.

# Fern Lake
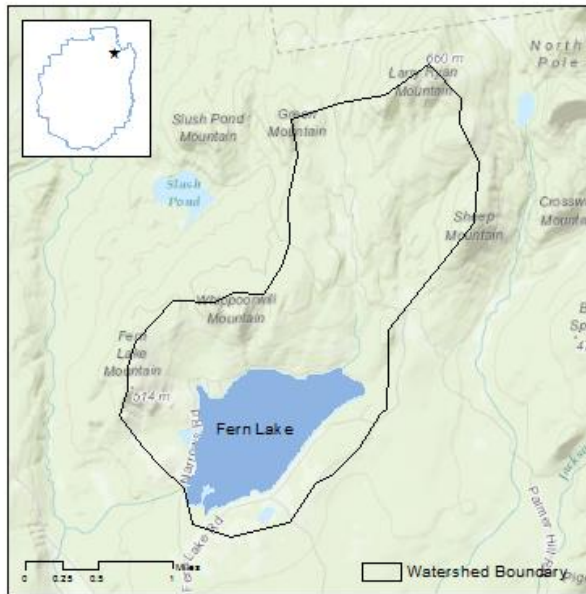


| Location | County: | Clinton |
|---|---|---|
| | Town: | Black Brook |

| Lake Characteristics | | |
|---|---|---|
| Surface Area (ha): | | 169 |
| Shoreline Length (km): | | 7 |
| Max. Depth (m): | | - |
| Volume (m³): | | 3887513 |
| Flush rate (times/year): | | 1.9 |

| Watershed Characteristics | | |
|---|---|---|
| Watershed Area (ha): | | 1014 |
| Surface water (%): | | 17 |
| Deciduous Forest (%): | | 59 |
| Evergreen Forest (%): | | 8 |
| Mixed Forest (%): | | 10 |
| Wetlands (%): | | 3 |
| Agricultural (%): | | 0 |
| Residential (%): | | 1 |
| Local Roads (km): | | 4.3 |
| State Roads (km): | | 0 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Mesotrophic | Alkaline | Adequate – low sensitivity | Present - Low |

*Water quality values and historical trends for Fern Lake during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 7/29/2017 | 8/24/2017 | 9/29/2017 | | |
| | *Deep Hole* | | | | |
| Transparency (m) | 3.5 | 3.5 | 3.0 | 3.3 | No Trend |
| Total Phosphorus (µg/L) | 8.6 | 7.1 | 8.2 | 8.0 | No Trend |
| Chlorophyll-*a* (µg/L) | 2.9 | 4.3 | 2.7 | 3.3 | No Trend |
| Laboratory pH | 9.3 | 9.2 | 9.2 | 9.2 | No Trend |
| Sp. Conductance (µS/cm) | 43.6 | 44.7 | 47.3 | 45.2 | No Trend |
| Color (Pt-Co) | 11.8 | 24.6 | 5.3 | 13.9 | No Trend |
| Alkalinity (mg/L) | | 17.7 | | 17.7 | No Trend |
| Chloride (mg/L) | | 3.8 | | 3.8 | Not Analyzed |
| Calcium (mg/L) | | 4.1 | | 4.1 | Not Analyzed |
| Sodium (mg/L) | | 2.2 | | 2.2 | Not Analyzed |

| Water Quality Indicator | Sampling Date | | | Average |
|---|---|---|---|---|
| | 7/29/2017 | 8/24/2017 | 9/29/2017 | |
| *Beach* | | | | |
| Transparency (m) | 3.5 | 3.0 | 3.0 | 3.2 |
| Total Phosphorus (µg/L) | 11.2 | 12.6 | 8.1 | 10.6 |
| Chlorophyll-*a* (µg/L) | 2.9 | 5.0 | 2.6 | 3.5 |
| Laboratory pH | 9.1 | 9.2 | 9.2 | 9.2 |
| Sp. Conductance (µS/cm) | 43.7 | 44.7 | 47.7 | 45.4 |
| Color (Pt-Co) | 37.5 | 11.8 | 8.6 | 19.3 |
| Alkalinity (mg/L) | | 17.9 | | 17.9 |
| Chloride (mg/L) | | 3.8 | | 3.8 |
| Calcium (mg/L) | | 4.1 | | 4.1 |
| Sodium (mg/L) | | 2.1 | | 2.1 |
| *Marsh* | | | | |
| Transparency (m) | 3.5 | 3.0 | 3.0 | 3.2 |
| Total Phosphorus (µg/L) | 10.1 | 12.8 | 11.1 | 11.3 |
| Chlorophyll-*a* (µg/L) | 2.8 | 3.9 | 3.7 | 3.5 |
| Laboratory pH | 9.2 | 9.3 | 8.8 | 9.1 |
| Sp. Conductance (µS/cm) | 45.7 | 46.1 | 45.5 | 45.8 |
| Color (Pt-Co) | 15.0 | 21.4 | 18.2 | 18.2 |
| Alkalinity (mg/L) | | 17.4 | | 17.4 |
| Chloride (mg/L) | | 3.8 | | 3.8 |
| Calcium (mg/L) | | 4.3 | | 4.3 |
| Sodium (mg/L) | | 2.2 | | 2.2 |

*See table of content for description of water quality indicators

# Fern Lake – Time Series
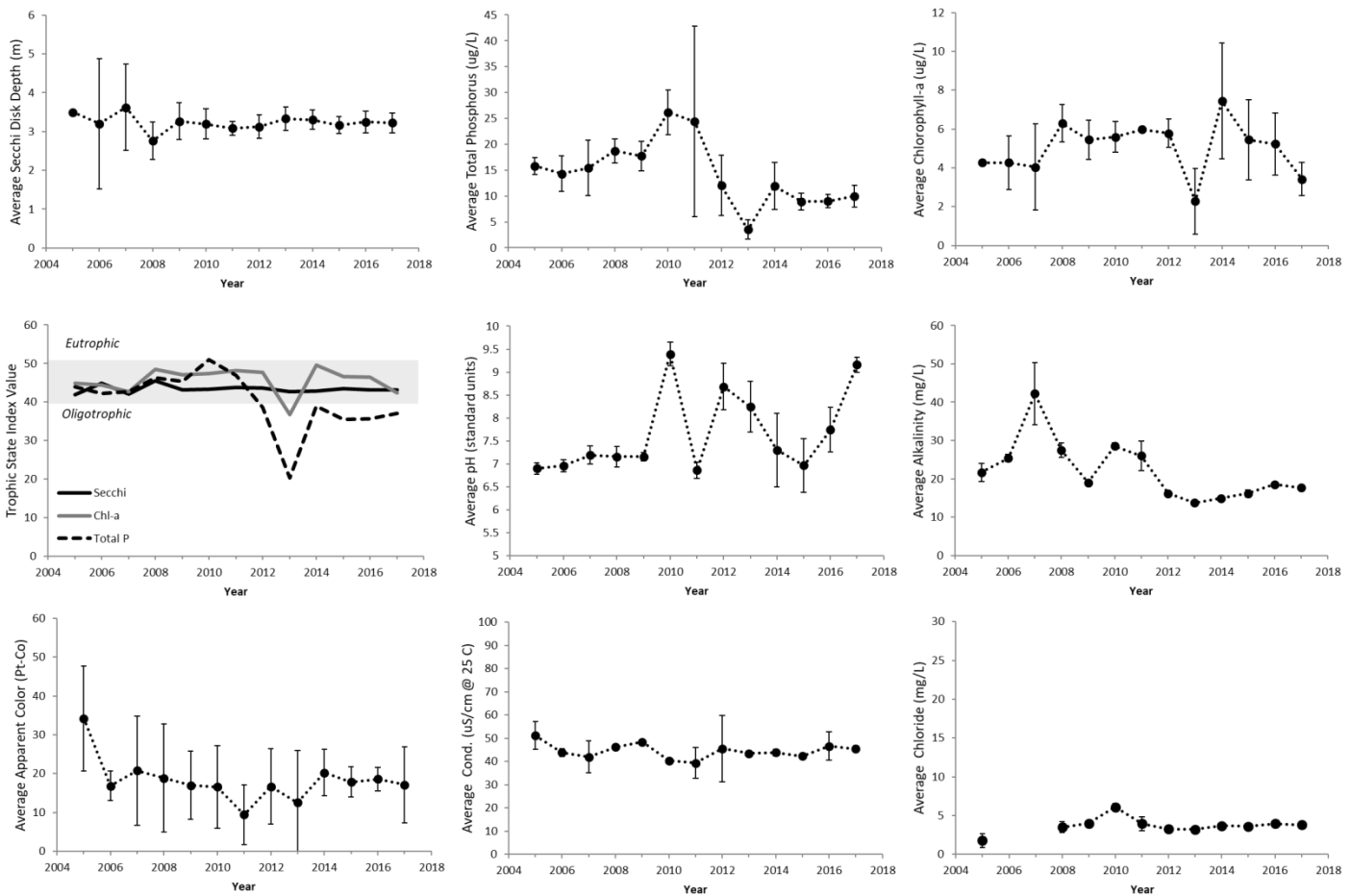


*Lake wide annual average values of select water quality indicators for Fern Lake, 2005-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Fern Lake is a 169 ha lake located in Clinton County in the Town of Black Brook. The lake is located within a 1,014 ha watershed dominated by forests. Fern Lake has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 2005.

- The 2017 samples from Fern Lake did not conform to our quality control procedures, as all nine samples were received in late October.
- Fern Lake is a mesotrophic lake. The average transparency has been fairly stable since monitoring began, and is typically near 3 meters. Chlorophyll-a and total phosphorus have been variable, and have exhibited no positive of negative trend.
- The water samples analyzed in 2017 were found to be circumneutral in terms of their acidity. The alkalinity was 17.7 mg/L, indicating low sensitivity to acid deposition.
- Sodium and chloride concentration averaged 2.8 and 4.0 mg/L respectively, these values indicate that the lake is influenced by road salt, but the influence is relatively low. We were unable to perform a trend analysis on chloride due to late sample submission.

# Frank Pond
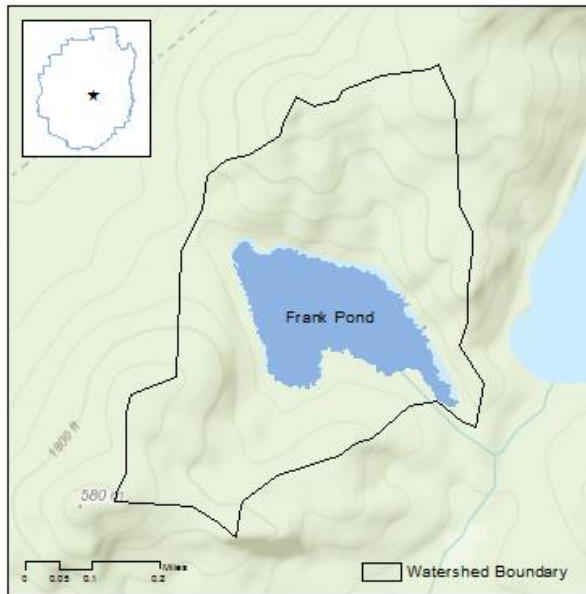


| Location | County: | Essex |
| --- | --- | --- |
| | Town: | Minerva |

| Lake Characteristics | | |
| --- | --- | --- |
| Surface Area (ha): | | 10 |
| Shoreline Length (km): | | 2 |
| Max. Depth (m): | | - |
| Volume (m³): | | - |
| Flush rate (times/year): | | - |

| Watershed Characteristics | | |
| --- | --- | --- |
| Watershed Area (ha): | | 61 |
| Surface water (%): | | 22 |
| Deciduous Forest (%): | | 70 |
| Evergreen Forest (%): | | 0 |
| Mixed Forest (%): | | 6 |
| Wetlands (%): | | 3 |
| Agricultural (%): | | 0 |
| Residential (%): | | 0 |
| Local Roads (km): | | 0 |
| State Roads (km): | | 0 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
| --- | --- | --- | --- |
| Oligotrophic | Circumneutral | Moderate | Not Significant |

*Water quality values and historical trends for Frank Pond during the 2017 sampling season. Trend analysis will be performed after five years of data collection. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
| --- | --- | --- | --- | --- | --- |
| | 7/9/2017 | 8/8/2017 | 9/10/2017 | | |
| Transparency (m) | 4.4 | 3.5 | 4.4 | 4.1 | Not analyzed – 5 years of data needed |
| Total Phosphorus (µg/L) | 6.8 | 13.8 | 6.4 | 9.0 | |
| Chlorophyll-*a* (µg/L) | 0.7 | 1.5 | 0.2 | 0.8 | |
| Laboratory pH | 6.6 | 6.5 | 7.5 | 6.9 | |
| Sp. Conductance (µS/cm) | 10.7 | 11.0 | 11.7 | 11.1 | |
| Color (Pt-Co) | 27.9 | 21.4 | 18.2 | 22.5 | |
| Alkalinity (mg/L) | | 3.9 | | 3.9 | |
| Chloride (mg/L) | | 0.6 | | 0.6 | |
| Calcium (mg/L) | | 1.3 | | 1.3 | |
| Sodium (mg/L) | | 0.5 | | 0.5 | |

*See table of content for description of water quality indicators

# Frank Pond- Time Series
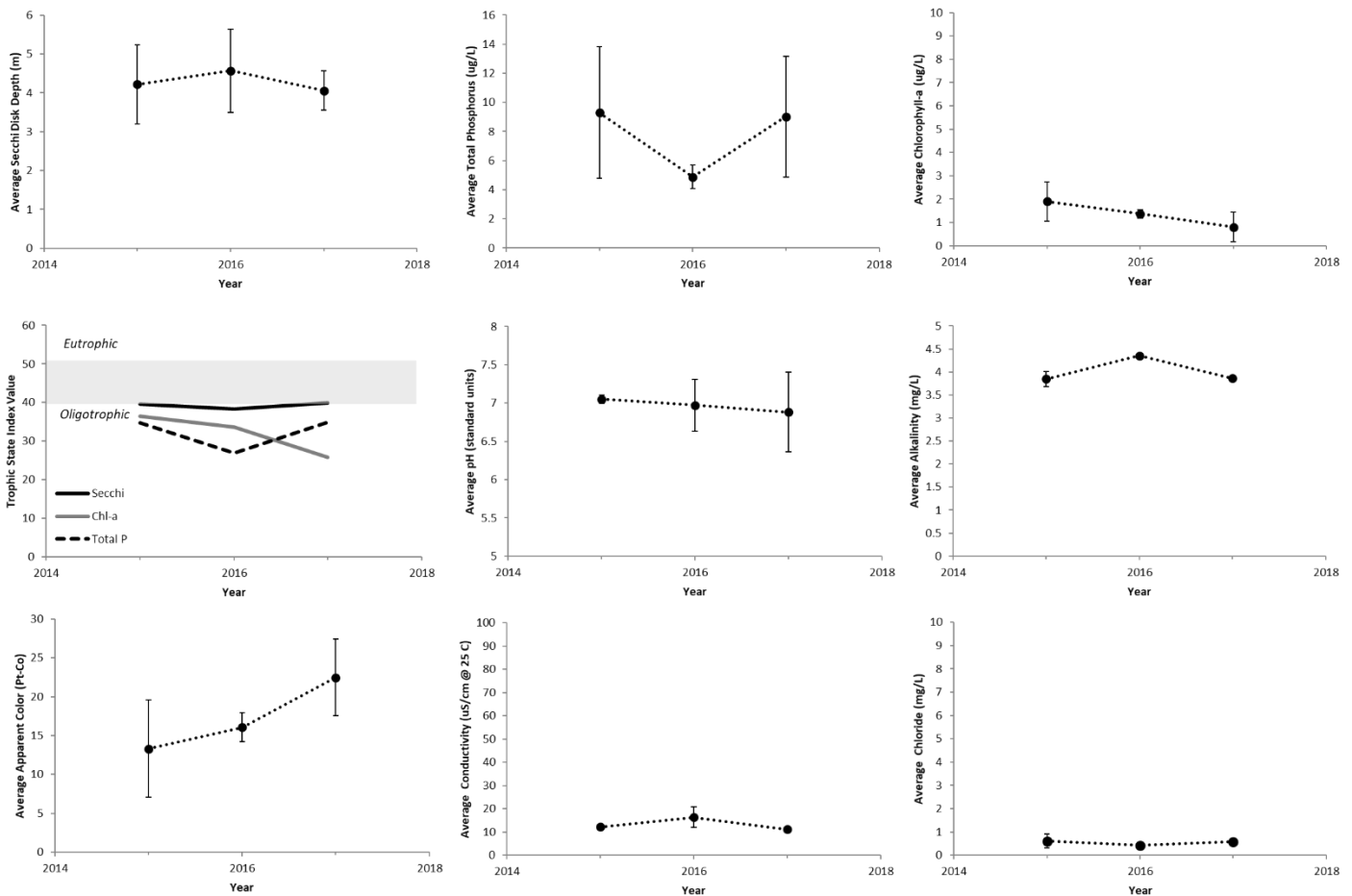


*Annual average values of select water quality indicators for Frank Pond, 2015-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Frank Pond is a 10 ha pond located in Essex County in the Town of Minerva. The pond is located within a 61 ha watershed dominated by forests. Frank Ponds has been in ALAP since 2015. Trend analysis will be performed on water quality indicators after five years of data collection. Currently, we have access to very little data exists on the morphology of the pond.

- Frank Pond is best classified as an oligotrophic pond. Average transparency has been near 4 meters since 2015. The chlorophyll concentration, a surrogate for algal productivity, averaged 0.8 µg/L, which is lower than 98% of participating lakes in 2017.
- Water samples received in 2017 were found to be circumneutral in terms of their acidity. The alkalinity was 4.4 mg/L, indicating moderate sensitivity to acid deposition.
- Sodium and chloride concentration averaged 0.7 mg/L and 0.4 mg/L respectively. These values are within the range we would expect for a pond with no salted roads in the watershed.

# Garnet Lake
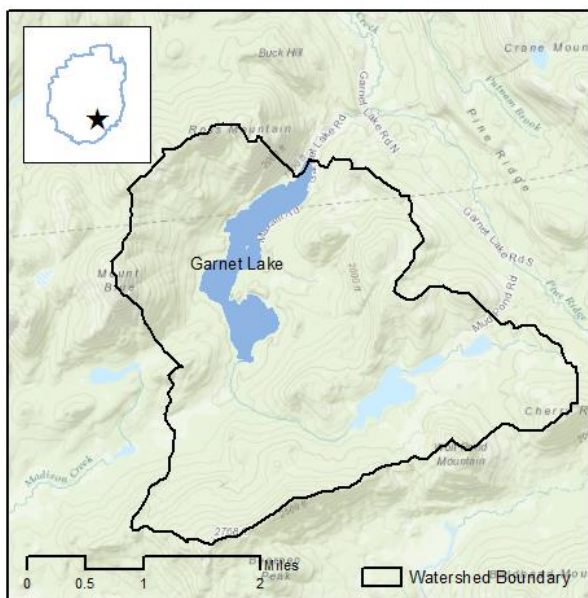


| Location | | |
|---|---|---|
| | County: | Warren |
| | Town: | Thurman |

| Lake Characteristics | | |
|---|---|---|
| | Surface Area (ha): | 133 |
| | Shoreline Length (km): | 10 |
| | Max. Depth (m): | - |
| | Volume (m³): | 4250058 |
| | Flush rate (times/year): | 3.8 |

| Watershed Characteristics | | |
|---|---|---|
| | Watershed Area (ha): | 2261 |
| | Surface water (%): | 6 |
| | Deciduous Forest (%): | 48 |
| | Evergreen Forest (%): | 25 |
| | Mixed Forest (%): | 15 |
| | Wetlands (%): | 5 |
| | Agricultural (%): | 0 |
| | Residential (%): | 0 |
| | Local Roads (km): | 10.1 |
| | State Roads (km): | 0 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Mesotrophic | Circumneutral | Adequate – low sensitivity | Not Significant |

*Water quality values and historical trends for Garnet Lake during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 6/20/2017 | 7/16/2017 | 8/20/2017 | | |
| Transparency (m) | | 3.7 | 3.4 | 3.5 | No Trend |
| Total Phosphorus (µg/L) | 18.9 | 15.1 | 18.6 | 17.5 | No Trend |
| Chlorophyll-*a* (µg/L) | 2.3 | 4.2 | 6.9 | 4.5 | No Trend |
| Laboratory pH | 7.1 | 7.1 | 7.9 | 7.4 | No Trend |
| Sp. Conductance (µS/cm) | 22.8 | 22.3 | 21.2 | 22.1 | Decreasing |
| Color (Pt-Co) | 27.9 | 31.1 | 27.9 | 28.9 | No Trend |
| Alkalinity (mg/L) | | | 12.3 | 12.3 | Decreasing |
| Chloride (mg/L) | | | 0.6 | 0.6 | No Trend |
| Calcium (mg/L) | | | 2.6 | 2.6 | Not Analyzed |
| Sodium (mg/L) | | | 0.6 | 0.6 | Not Analyzed |

*See table of content for description of water quality indicators

# Garnet Lake – Time Series
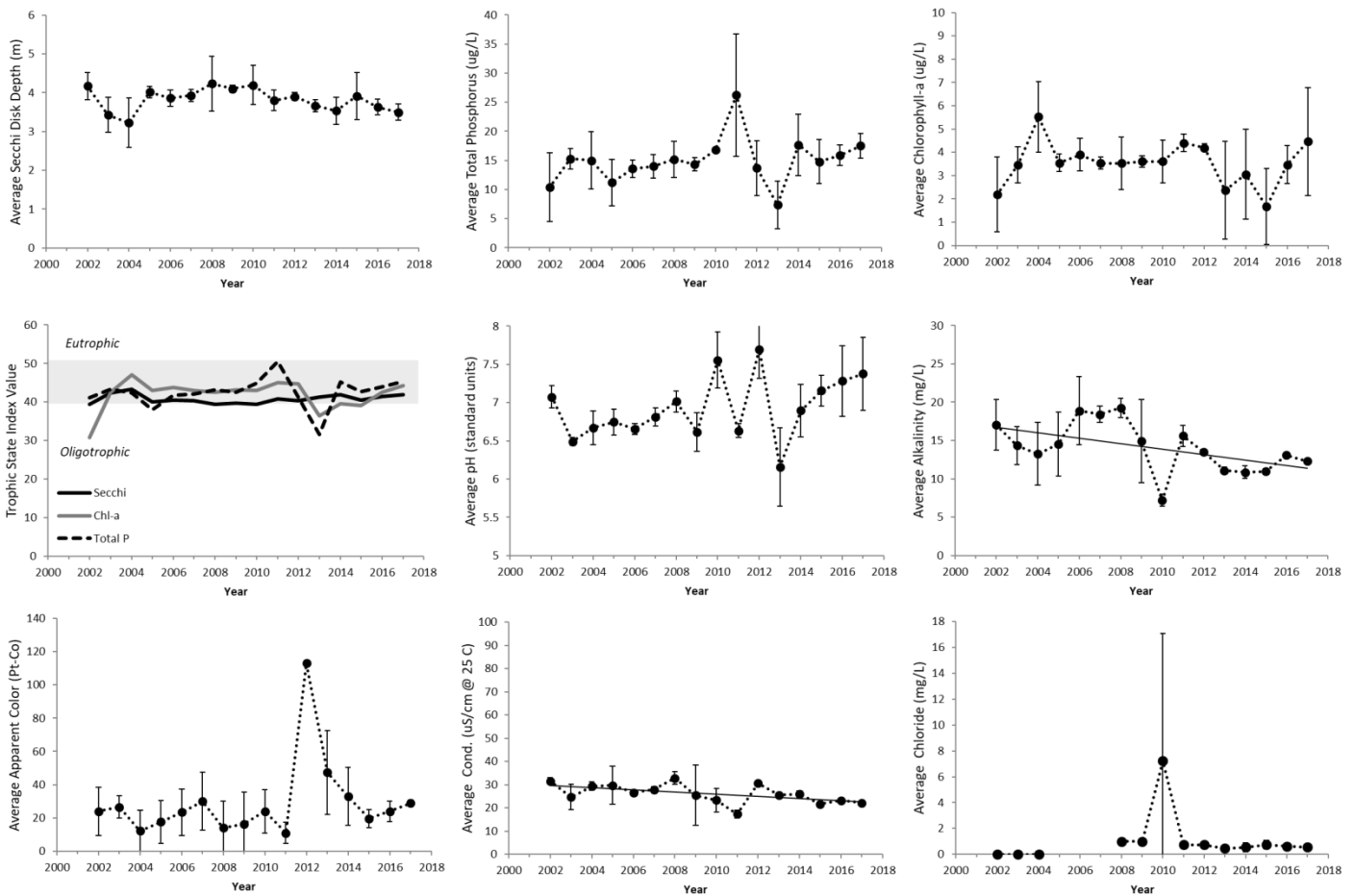


*Annual average values of select water quality indicators for Garnet Lake, 2002-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Garnet Lake is a 133 ha lake located in Warren County in the Town of Johnsburg.  The lake is located within a 2,121 ha watershed dominated by forests.  Garnet Lake has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 2002.

- Garnet Lake is a mesotrophic lake. Transparency has been fairly stable since monitoring began, ranging between 3 and 4 meters.  We did not receive a transparency measurement in June of 2017. Chlorophyll-a and total phosphorus concentrations have been variable over time but have not exhibited a positive of negative trend.
- The water samples analyzed in 2017 were found to be circumneutral in terms of their acidity. The alkalinity was 12.3 mg/L, indicating low sensitivity to acid deposition. We did detect a decreasing trend in alkalinity at a rate of 0.4 mg/L.
- Sodium and chloride concentration averaged 0.6 mg/L and 0.6 mg/L respectively, these values are within the range we would expect for a lake that lacks salted state roads in the watershed.

# Gull Pond
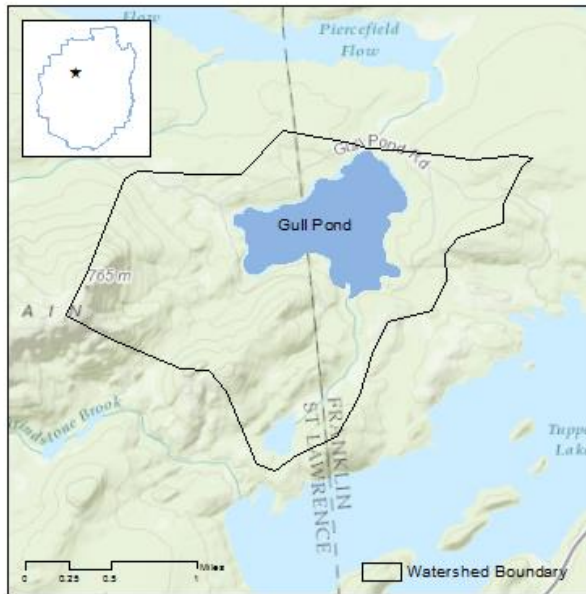


| Location | County: | Franklin |
|---|---|---|
| | Town: | Tupper Lake |

| Lake Characteristics | | |
|---|---|---|
| Surface Area (ha): | | 117 |
| Shoreline Length (km): | | 6 |
| Max. Depth (m): | | 23.2 |
| Volume (m³): | | 11975150 |
| Flush rate (times/year): | | 0.4 |

| Watershed Characteristics | | |
|---|---|---|
| Watershed Area (ha): | | 738 |
| Surface water (%): | | 18 |
| Deciduous Forest (%): | | 73 |
| Evergreen Forest (%): | | 2 |
| Mixed Forest (%): | | 0 |
| Wetlands (%): | | 5 |
| Agricultural (%): | | 0 |
| Residential (%): | | 2 |
| Local Roads (km): | | 0 |
| State Roads (km): | | 0 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Oligotrophic | Circumneutral | Moderate | Present - Low |

*Water quality values and historical trends for Gull Pond during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 6/18/2017 | 7/16/2017 | 8/21/2017 | | |
| Transparency (m) | 4.3 | 5.2 | 4.3 | 4.6 | No Trend |
| Total Phosphorus (µg/L) | 1.3 | 8.2 | 4.9 | 4.8 | Decreasing |
| Chlorophyll-*a* (µg/L) | 1.3 | 2.3 | 0.1 | 1.2 | Decreasing |
| Laboratory pH | 7.5 | 7.1 | 7.4 | 7.3 | No Trend |
| Sp. Conductance (µS/cm) | 22.5 | 20.1 | 20.9 | 21.2 | Decreasing |
| Color (Pt-Co) | 8.5 | 18.2 | 18.2 | 15.0 | No Trend |
| Alkalinity (mg/L) | | | 7.4 | 7.4 | No Trend |
| Chloride (mg/L) | | | 1.8 | 1.8 | No Trend |
| Calcium (mg/L) | | | 2.0 | 2.0 | Not Analyzed |
| Sodium (mg/L) | | | 1.1 | 1.1 | Not Analyzed |

*See table of content for description of water quality indicators

# Gull Pond – Time Series
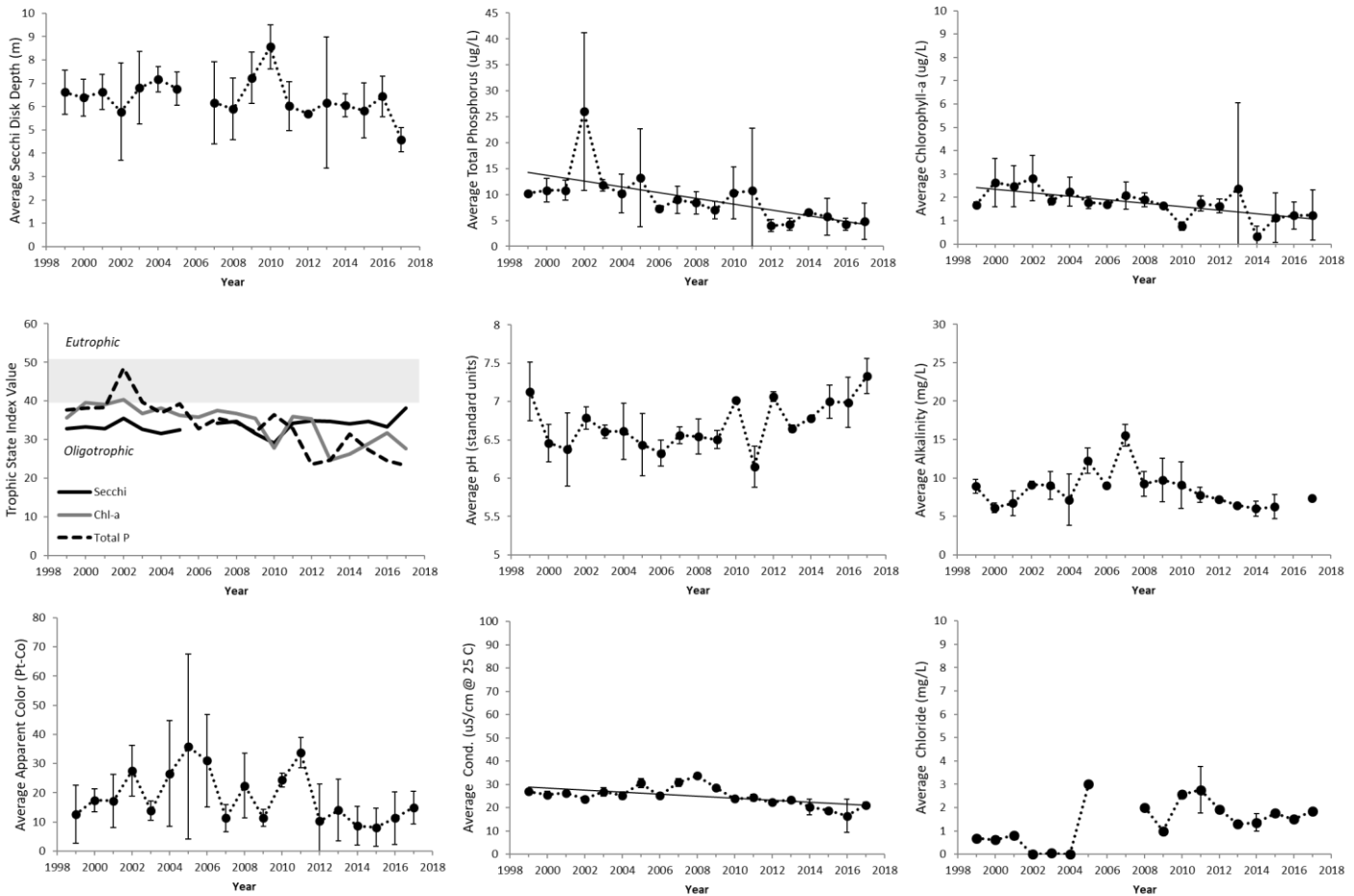


*Annual average values of select water quality indicators for Gull Pond, 1999-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Gull Pond is a 117 ha lake located in Franklin County in the Town of Tupper Lake.  This 117 ha lake is located within a 737 ha watershed dominated by forests.  Gull Pond has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 1999.

- Gull Pond is an oligotrophic waterbody. Annual average transparency typically fluctuates between 6 and 7 meters. We observed that both chlorophyll-a and total phosphorus concentrations have exhibited a slight, yet significant, downward trend at a rate of approximately 0.07 μg/L/year and 0.4 μg/L/year respectively.

- The water samples analyzed in 2017 were found to be circumneutral in terms of their acidity. We found the alkalinity in the august sample to be 7.4 mg/L, indicating moderate sensitivity to acid deposition.

- Sodium and chloride concentration were found to be 1.1 and 1.8 mg/L, respectively. These values are slightly higher than we would expect for a watershed that lacks salted roads.

# Hewitt Pond
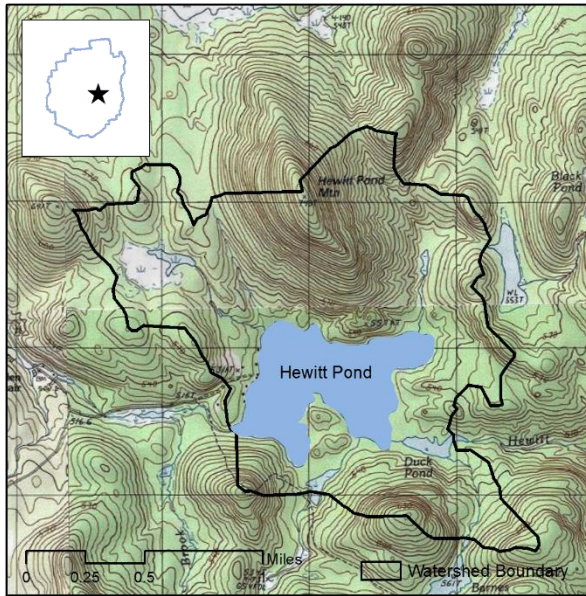


| Location | County: | Essex |
|---|---|---|
| | Town: | Minerva Lake |

| Lake Characteristics | | |
|---|---|---|
| Surface Area (ha): | | 166 |
| Shoreline Length (km): | | 5 |
| Max. Depth (m): | | 16.5 |
| Volume (m³): | | 5092620 |
| Flush rate (times/year): | | 0.9 |

| Watershed Characteristics | | |
|---|---|---|
| Watershed Area (ha): | | 489 |
| Surface water (%): | | 16 |
| Deciduous Forest (%): | | 45 |
| Evergreen Forest (%): | | 19 |
| Mixed Forest (%): | | 11 |
| Wetlands (%): | | 7 |
| Agricultural (%): | | 0 |
| Residential (%): | | 1 |
| Local Roads (km): | | 0 |
| State Roads (km): | | 0 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Oligotrophic | Circumneutral | Moderate | Not Significant |

*Water quality values and historical trends for Hewitt Pond during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 7/22/2017 | 8/21/2017 | 9/19/2017 | | |
| Transparency (m) | 4.5 | 4.5 | 4.5 | 4.5 | No Trend |
| Total Phosphorus (µg/L) | 5.8 | 16.2 | 5.2 | 9.1 | Decreasing |
| Chlorophyll-*a* (µg/L) | 0.2 | 0.9 | 1.9 | 1.0 | No Trend |
| Laboratory pH | 7.2 | 7.0 | 7.0 | 7.0 | No Trend |
| Sp. Conductance (µS/cm) | 14.2 | 14.8 | 15.1 | 14.7 | No Trend |
| Color (Pt-Co) | 34.3 | 37.5 | 24.6 | 32.1 | No Trend |
| Alkalinity (mg/L) | | 6.5 | | 6.5 | No Trend |
| Chloride (mg/L) | | 0.5 | | 0.5 | No Trend |
| Calcium (mg/L) | | 1.9 | | 1.9 | Not Analyzed |
| Sodium (mg/L) | | 0.7 | | 0.7 | Not Analyzed |

*See table of content for description of water quality indicators

# Hewitt Pond – Time Series
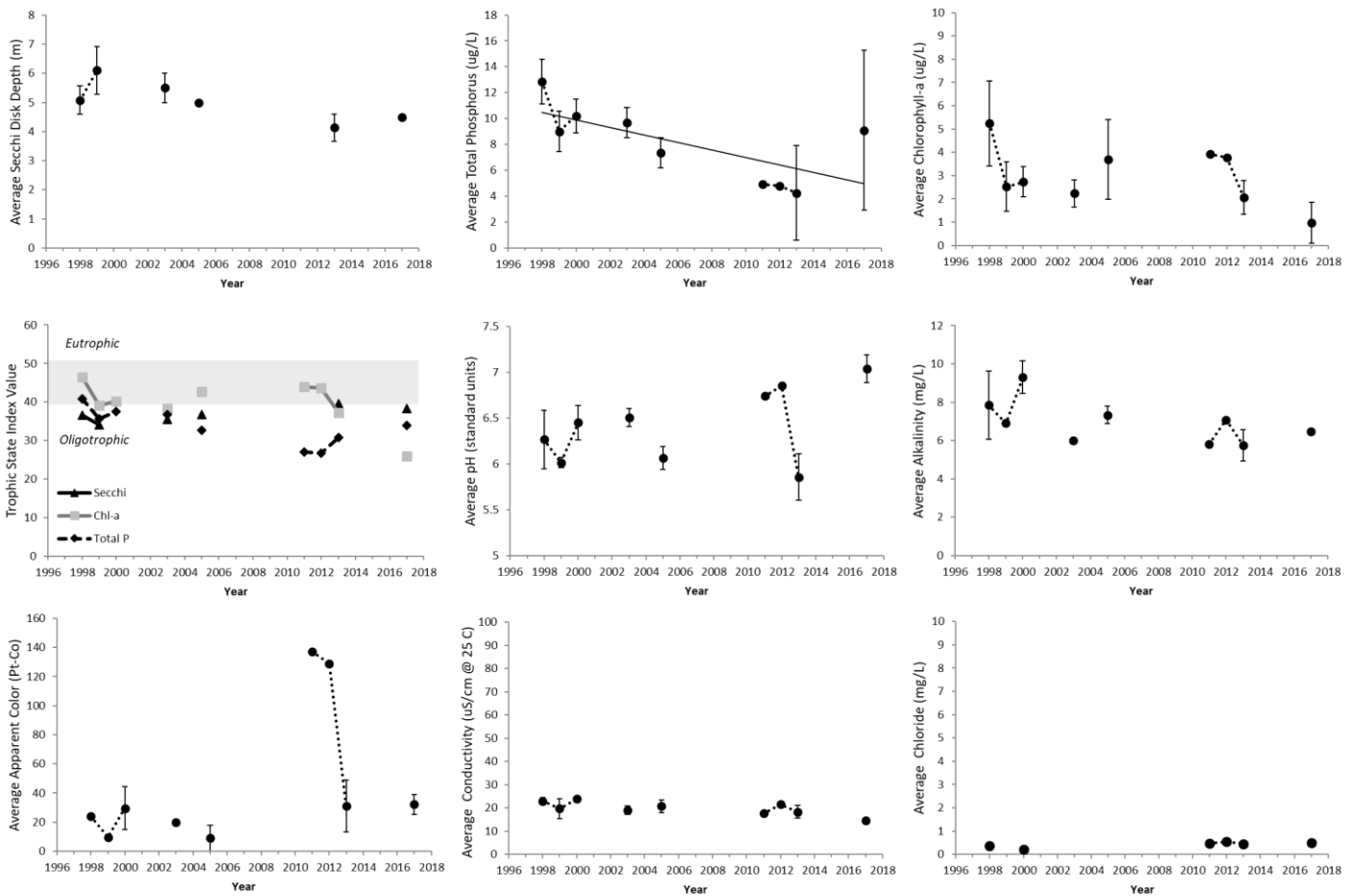


*Annual average values of select water quality indicators for Hewitt Pond, 1998-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Hewitt Lake is a 166 ha lake located in Essex County in the Town of Minerva. The lake is located within a 489 ha watershed dominated by forests. Hewitt Pond has been monitored by ALAP volunteers and the Adirondack Watershed Institute sporadically since 1998. Regular participation would improve our ability to analyze historical trends in the water quality data of Hewitt Lake.

- Hewitt Pond is an oligotrophic lake. The annual average transparency of the lake has been observed between 4 and 6 meters. Average annual total phosphorus concentration has exhibited a downward trend at a rate of approximately 0.29 µg/L/year.

- The samples analyzed in 2017 were circumneutral in terms of their acidity, with an average pH value of 7.0. The alkalinity of the 2017 sample was 6.5 mg/L, indicating that the lake has moderate sensitivity to acid deposition.

- The sodium and chloride concentration of Hewitt Pond was 0.7 and 0.5 mg/L respectively which is in the range we would expect for a lake that lacks salted roads in the watershed.

# Hoel Pond
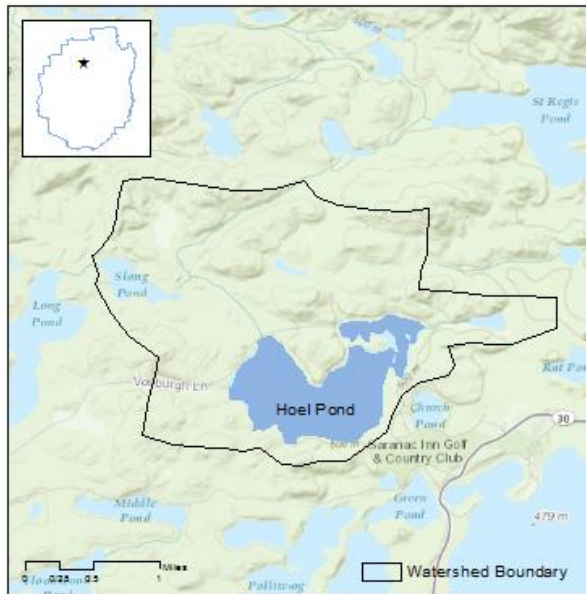


| Location | | |
|---|---|---|
| County: | Franklin |
| Town: | Santa Clara |

| Lake Characteristics | | |
|---|---|---|
| Surface Area (ha): | 185 |
| Shoreline Length (km): | 10 |
| Max. Depth (m): | 24.2 |
| Volume (m³): | 14777670 |
| Flush rate (times/year): | 0.3 |

| Watershed Characteristics | | |
|---|---|---|
| Watershed Area (ha): | 1174 |
| Surface water (%): | 23 |
| Deciduous Forest (%): | 46 |
| Evergreen Forest (%): | 15 |
| Mixed Forest (%): | 3 |
| Wetlands (%): | 12 |
| Agricultural (%): | 0 |
| Residential (%): | 0 |
| Local Roads (km): | 0 |
| State Roads (km): | 0 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Oligotrophic | Circumneutral | Moderate | Not Significant |

*Water quality values and historical trends for Hoel Pond during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 6/22/2017 | 7/18/2017 | 8/22/2017 | | |
| Transparency (m) | 5.0 | 5.4 | 5.2 | 5.2 | No Trend |
| Total Phosphorus (µg/L) | 6.3 | 5.1 | 4.7 | 5.3 | Decreasing |
| Chlorophyll-*a* (µg/L) | 1.4 | 1.2 | 1.6 | 1.4 | Decreasing |
| Laboratory pH | 7.2 | 6.8 | 7.5 | 7.2 | Increasing |
| Sp. Conductance (µS/cm) | 13.2 | 13.2 | 13.3 | 13.2 | No Trend |
| Color (Pt-Co) | 15.0 | 18.2 | 21.4 | 18.2 | No Trend |
| Alkalinity (mg/L) | | | 5.0 | 5.0 | No Trend |
| Chloride (mg/L) | | | 0.5 | 0.5 | No Trend |
| Calcium (mg/L) | | | 1.5 | 1.5 | Not Analyzed |
| Sodium (mg/L) | | | 0.5 | 0.5 | Not Analyzed |

*See table of content for description of water quality indicators

# Hoel Pond – Time Series
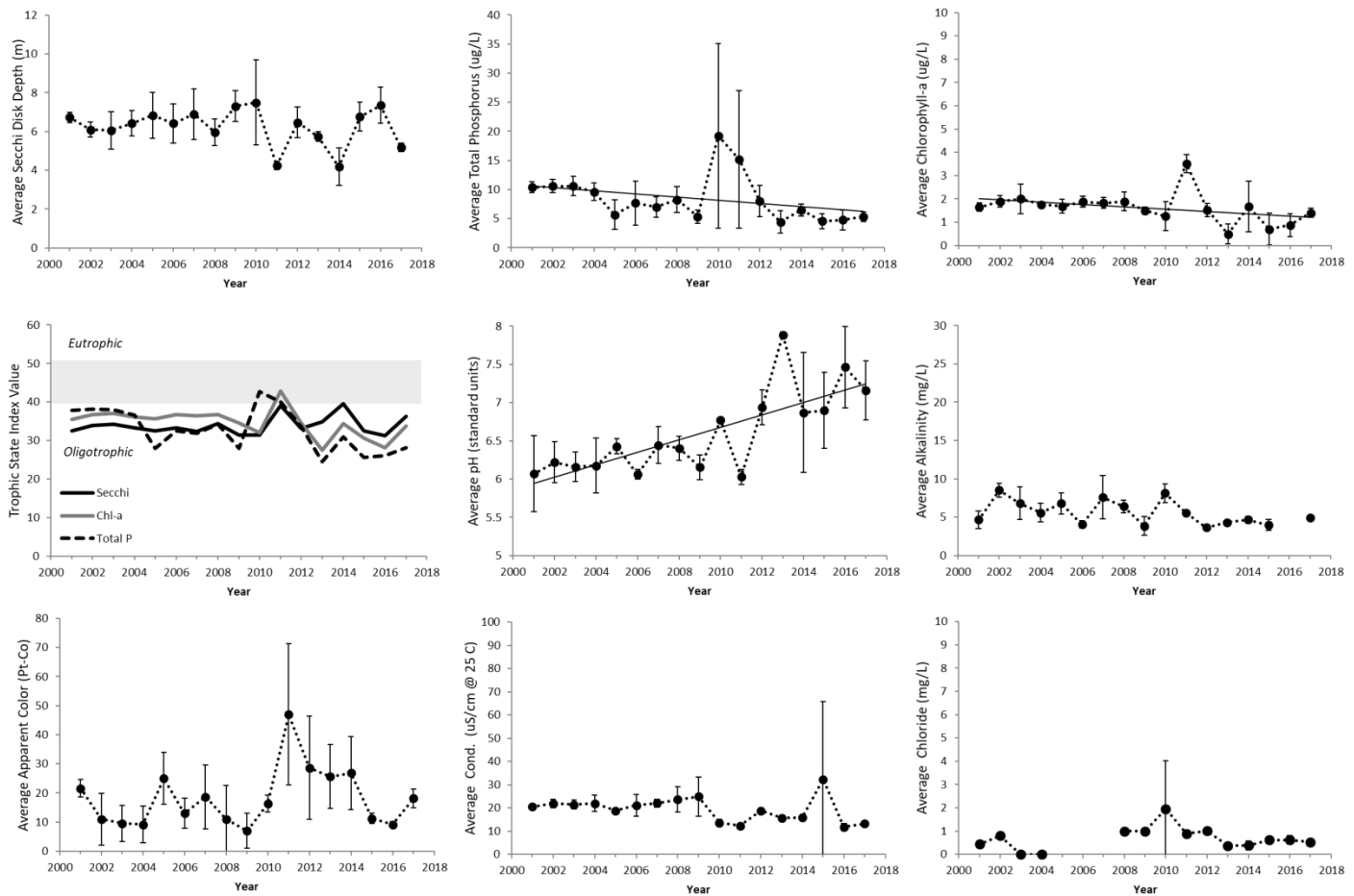


*Annual average values of select water quality indicators for Hoel Pond, 2001-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Hoel Pond is a 185 ha lake located in Franklin County in the Town of Santa Clara. The lake is located within a 1,174 ha watershed dominated by forests. Hoel Pond has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 2001.

- Hoel Pond is an oligotrophic lake. The transparency has been relatively stable relatively stable over time and was greater than 92% of participating lakes in 2017. Both chlorophyll-a and total phosphorus concentrations have exhibited a slight, yet statistically significant, downward trend at a rate of 0.04 and 0.3 µg/L/year respectively.
- The water samples analyzed in 2017 were found to be circumneutral in terms of their acidity. The pH of the water has exhibited a significant upward trend since 2001, increasing at a rate of approximately 0.08 pH units/year.
- Sodium and chloride concentration were 0.8 and 0.5 mg/L respectively. These values are within the range we would expect for a pond with no salted roads in the watershed.

# Indian Lake- Franklin County
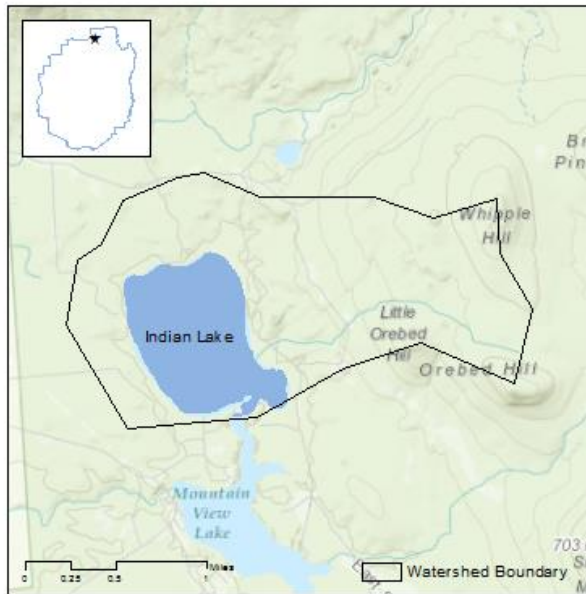


| Location | | County: | Franklin |
| --- | --- | --- | --- |
| | | Town: | Bellmont |

| Lake Characteristics | | | |
| --- | --- | --- | --- |
| | Surface Area (ha): | | 134 |
| | Shoreline Length (km): | | 5 |
| | Max. Depth (m): | | 4.9 |
| | Volume (m³): | | 3769281 |
| | Flush rate (times/year): | | 1.2 |

| Watershed Characteristics | | | |
| --- | --- | --- | --- |
| | Watershed Area (ha): | | 651 |
| | Surface water (%): | | 21 |
| | Deciduous Forest (%): | | 54 |
| | Evergreen Forest (%): | | 16 |
| | Mixed Forest (%): | | 2 |
| | Wetlands (%): | | 5 |
| | Agricultural (%): | | 0 |
| | Residential (%): | | 2 |
| | Local Roads (km): | | 1.5 |
| | State Roads (km): | | 0 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
| --- | --- | --- | --- |
| Mesotrophic | Circumneutral | Moderate | Not Significant |

*Water quality values and historical trends for Indian Lake during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
| --- | --- | --- | --- | --- | --- |
| | 6/21/2017 | 7/20/2017 | 8/17/2017 | | |
| Transparency (m) | 2.5 | 2.7 | 2.6 | 2.6 | Increasing |
| Total Phosphorus (µg/L) | 12.5 | 13.5 | 15.6 | 13.9 | No Trend |
| Chlorophyll-*a* (µg/L) | 4.3 | 1.8 | 4.7 | 3.6 | No Trend |
| Laboratory pH | 6.9 | 7.4 | 7.3 | 7.2 | No Trend |
| Sp. Conductance (µS/cm) | 19.6 | 19.8 | 21.9 | 20.4 | Decreasing |
| Color (Pt-Co) | 34.3 | 50.4 | 53.6 | 46.1 | No Trend |
| Alkalinity (mg/L) | | | 10.7 | 10.7 | Decreasing |
| Chloride (mg/L) | | | 0.6 | 0.6 | No Trend |
| Calcium (mg/L) | | | 2.2 | 2.2 | Not Analyzed |
| Sodium (mg/L) | | | 0.9 | 0.9 | Not Analyzed |

*See table of content for description of water quality indicators

# Indian Lake Franklin County – Time Series
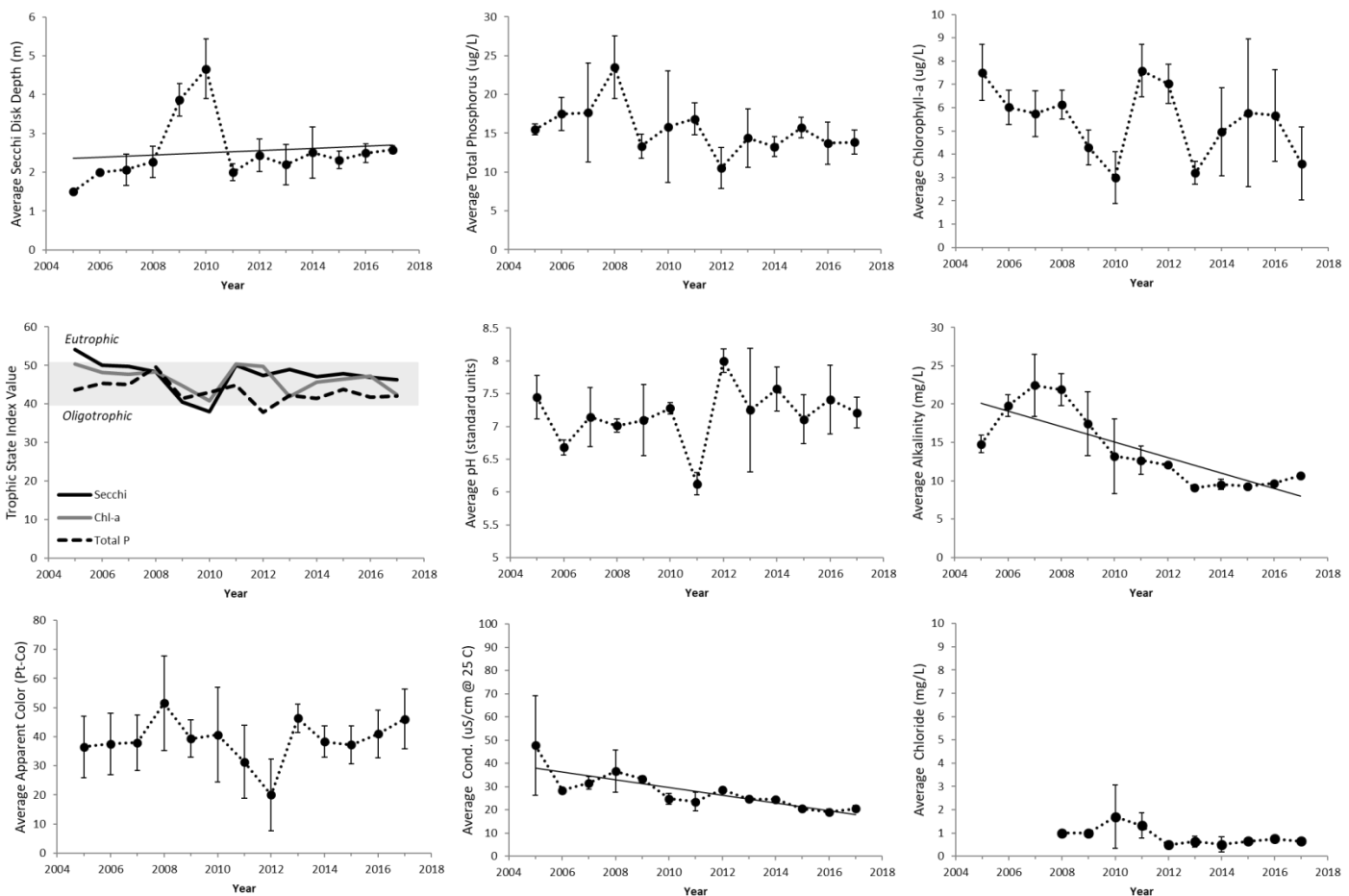


*Annual average values of select water quality indicators for Indian Lake, 2005-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Indian Lake is a 134 ha lake located in Franklin County in the Town of Bellmont.  The lake is located within a 651 ha watershed dominated by forests.  Indian Lake has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 2005.

- Indian Lake is a best classified as a mesotrophic lake, an improvement over our initial classification of eutrophic in 2005. We detected a statistically significant increase in transparency over time, increasing at a rate of approximately 2 cm/year since 2005.  Total phosphorus, and chlorophyll-a concentrations have both been variable, and have not exhibited any significant positive of negative trends since monitoring began.
- The water samples analyzed in 2017 were found to be circumneutral in terms of their acidity. The alkalinity averaged 10.7 mg/L, indicating moderate sensitivity to acid deposition. We detected a significant downward trend in alkalinity at a rate of approximately 1.0 mg/L/year.
- Sodium and chloride concentration averaged 0.9 and 0.7 mg/L respectively, these values are within the range we would expect for a pond with few salted roads in the watershed.

# Indian Lake- Hamilton County
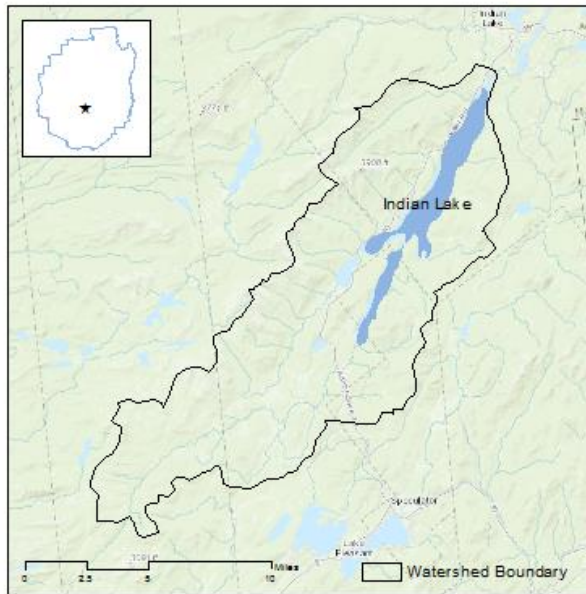


| Location | | |
|---|---|---|
| | County: | Hamilton |
| | Town: | Indian Lake |

| Lake Characteristics | | |
|---|---|---|
| | Surface Area (ha): | 2155 |
| | Shoreline Length (km): | 51 |
| | Max. Depth (m): | 25.9 |
| | Volume (m³): | 210069990 |
| | Flush rate (times/year): | 1.11 |

| Watershed Characteristics | | |
|---|---|---|
| | Watershed Area (ha): | 33838 |
| | Surface water (%): | 7 |
| | Deciduous Forest (%): | 63 |
| | Evergreen Forest (%): | 12 |
| | Mixed Forest (%): | 5 |
| | Wetlands (%): | 10 |
| | Agricultural (%): | 0 |
| | Residential (%): | 1 |
| | Local Roads (km): | 10.3 |
| | State Roads (km): | 28.7 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Mesotrophic | Circumneutral | Moderate | Present - Low |

*Water quality values and historical trends for Indian Lake during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 7/9/2017 | 8/4/2017 | 9/10/2017 | | |
| Transparency (m) | 3.9 | 4.0 | 3.0 | 3.6 | No Trend |
| Total Phosphorus (µg/L) | 6.5 | 4.8 | 8.5 | 6.6 | Decreasing |
| Chlorophyll-*a* (µg/L) | 4.0 | 5.0 | 4.4 | 4.5 | No Trend |
| Laboratory pH | 6.9 | 6.9 | 6.5 | 6.8 | Increasing |
| Sp. Conductance (µS/cm) | 13.3 | 21.9 | 23.8 | 19.7 | No Trend |
| Color (Pt-Co) | 24.6 | 18.2 | 27.9 | 23.6 | No Trend |
| Alkalinity (mg/L) | | | 6.6 | 6.6 | No Trend |
| Chloride (mg/L) | | | 3.1 | 3.1 | No Trend |
| Calcium (mg/L) | | | 1.9 | 1.9 | Not Analyzed |
| Sodium (mg/L) | | | 1.8 | 1.8 | Not Analyzed |

*See table of content for description of water quality indicators

# Indian Lake Hamilton County – Time Series
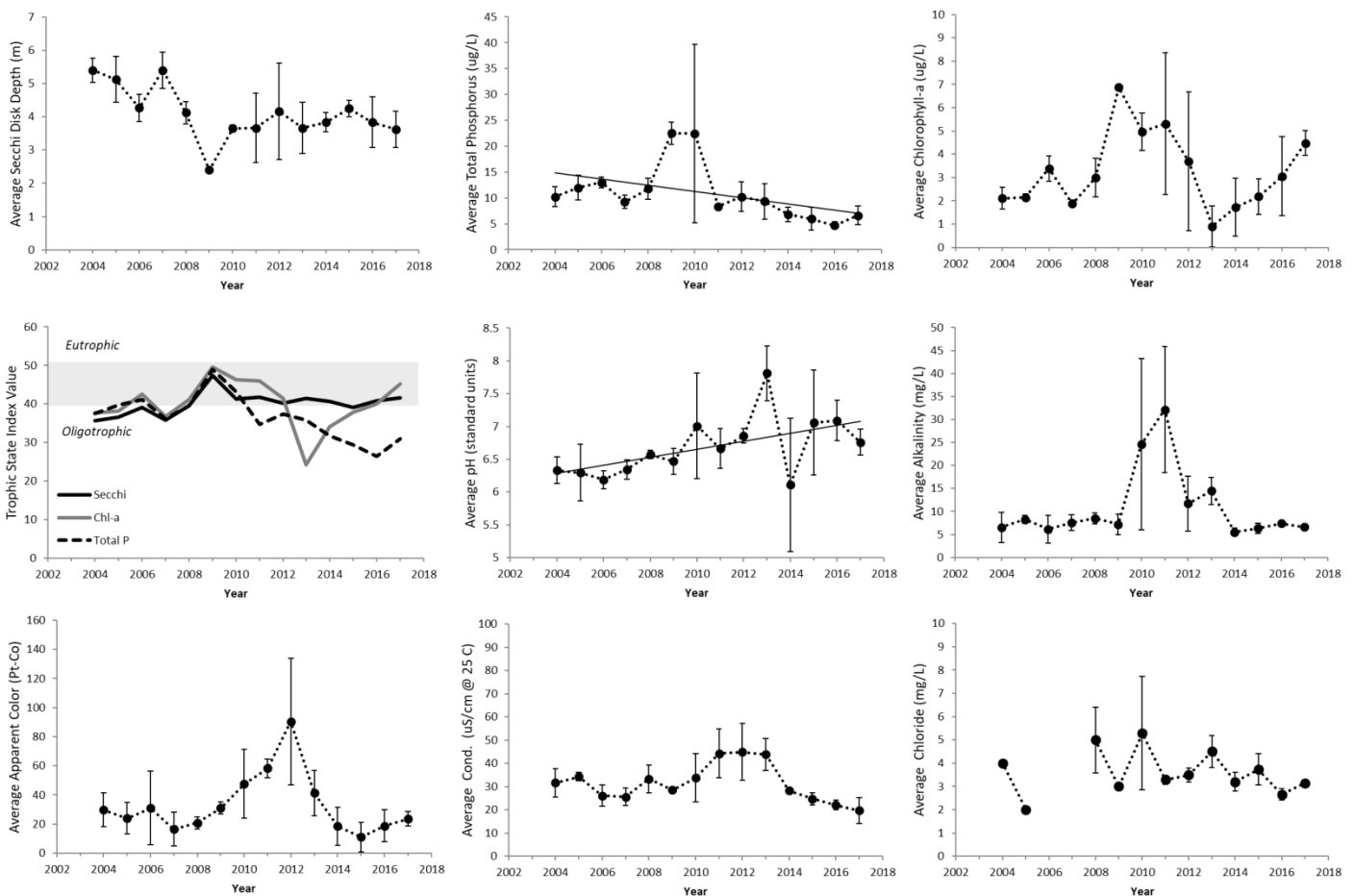


*Annual average values of select water quality indicators for Indian Lake, 2004-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Indian Lake is a 2,155 ha lake located in Hamilton County in the Town of Indian Lake.  The lake is located within a 33,838 ha watershed dominated by forests.  Indian Lake has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 2004.

- Indian Lake is a mesotrophic lake with a high degree of annual variability in the key trophic indicators. The lake has fluctuated around the mesotrophic – oligotrophic boundary since monitoring began in 2004. Annual average total phosphorus concentration has exhibited a significant downward trend at a rate of approximately 0.6 µg/L./year.
- The water samples analyzed in 2017 were found to be circumneutral in terms of their acidity. The pH of the water has exhibited a significant upward trend at a rate of approximately 0.06 pH units/year. The alkalinity in 2017 was 6.6 mg/L, indicating moderate sensitivity to acid deposition.
- Sodium and chloride concentration were 2.2 and 2.8 mg/L respectively, indicating that the chemistry of the lake is influenced by the 39 km of roads in the watershed, but the influence is relatively low.

# Jordan Lake

| Location | | |
|---|---|---|
| County: | St Lawrence |
| Town: | Hopkinton |

| Lake Characteristics | | |
|---|---|---|
| Surface Area (ha): | 72 |
| Shoreline Length (km): | 5 |
| Max. Depth (m): | 9.8 |
| Volume (m³): | 2684394 |
| Flush rate (times/year): | 2 |

| Watershed Characteristics | | |
|---|---|---|
| Watershed Area (ha): | 862 |
| Surface water (%): | 10 |
| Deciduous Forest (%): | 16 |
| Evergreen Forest (%): | 49 |
| Mixed Forest (%): | 9 |
| Wetlands (%): | 17 |
| Agricultural (%): | 0 |
| Residential (%): | 0 |
| Local Roads (km): | 0 |
| State Roads (km): | 0 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Mesotrophic | Circumneutral | Moderate | Not Significant |

*Water quality values and historical trends for Jordan Lake during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 6/24/2017 | 7/20/2017 | 8/20/2017 | | |
| Transparency (m) | 1.1 | 1.3 | 1.4 | 1.3 | No Trend |
| Total Phosphorus (µg/L) | 17.1 | 9.0 | 8.9 | 11.6 | No Trend |
| Chlorophyll-*a* (µg/L) | 4.0 | 1.7 | 2.1 | 2.6 | Decreasing |
| Laboratory pH | 6.3 | 6.7 | 6.6 | 6.5 | No Trend |
| Sp. Conductance (µS/cm) | 16.6 | 17.8 | 18.1 | 17.5 | No Trend |
| Color (Pt-Co) | 127.6 | 124.4 | 114.7 | 122.2 | No Trend |
| Alkalinity (mg/L) | | | 5.1 | 5.1 | No Trend |
| Chloride (mg/L) | | | 0.6 | 0.6 | No Trend |
| Calcium (mg/L) | | | 2.4 | 2.4 | Not Analyzed |
| Sodium (mg/L) | | | 0.7 | 0.7 | Not Analyzed |

*See table of content for description of water quality indicators

# Jordan Lake – Time Series
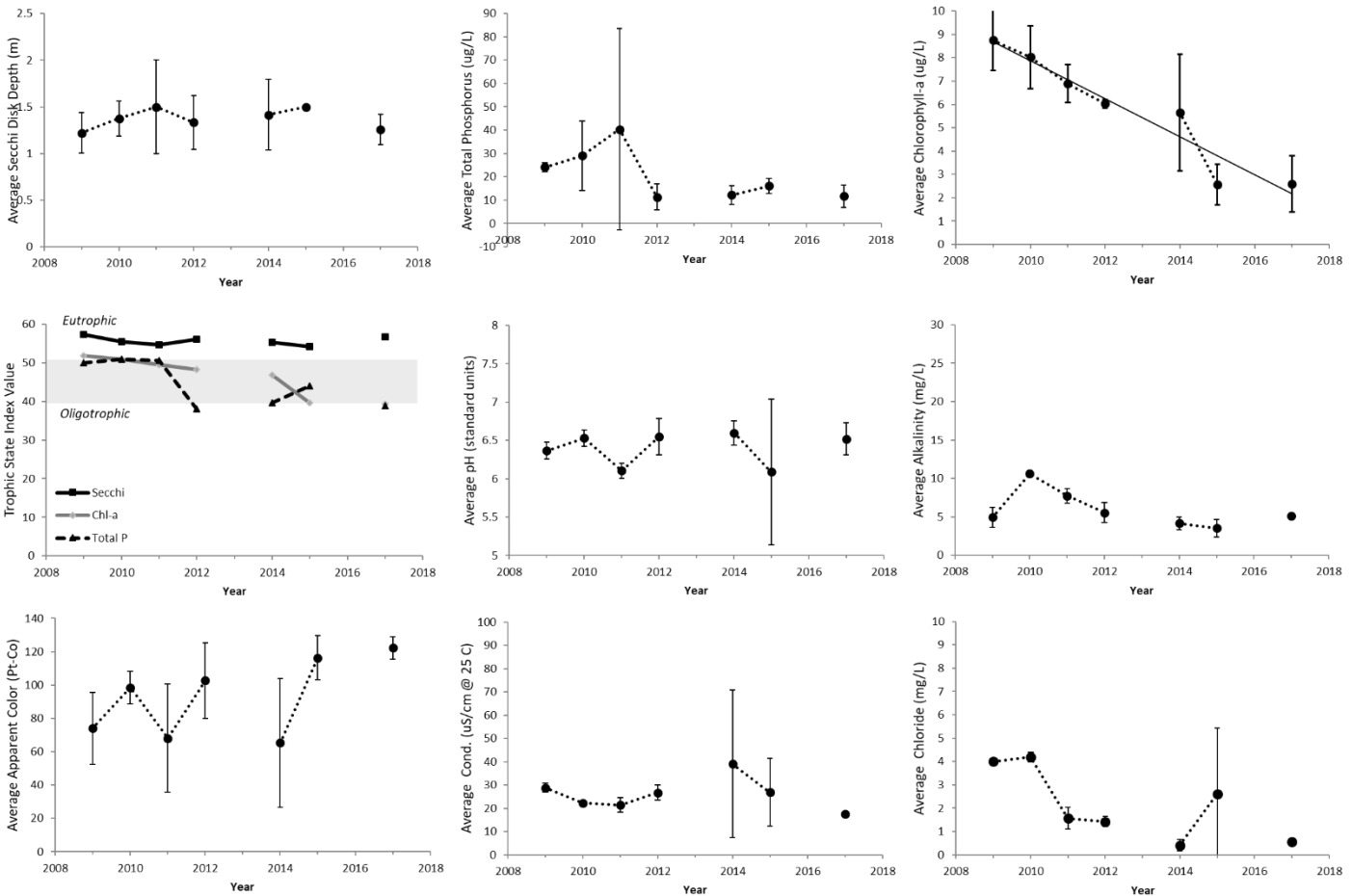


*Annual average values of select water quality indicators for Jordan Lake, 2009-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Jordan Lake is a 72 ha lake located in St. Lawrence County in the Town of Hopkington. The lake is located within an 862 ha watershed dominated by forests. Jordan Lake has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 2009.

- Jordon lake is classified as mesotrophic based on the concentrations of total phosphorus and chlorophyll-a, however, the transparency of the lake is more characteristic of a eutrophic lake. The low transparency is undoubtedly related to the color of the water, which is greater than any of the participating ALAP lakes in 2017. Elevated color is indicative of high amounts of dissolved organic material. In the case of Jordon Lake, this material is likely the result the low topography and the presence of wetlands, which make up 17% of the watershed.
- Chlorophyll-a has exhibited a significant downward trend at a rate of approximately 0.8 µg/L/year.
- Water samples received in 2017 were slightly acidic to circumneutral, with moderate sensitivity to acid deposition.
- Chloride concentrations averaged 2.7 mg/L, which is higher than we would expect for a lake that lacks salted roads in the watershed.

# Kiwassa Lake
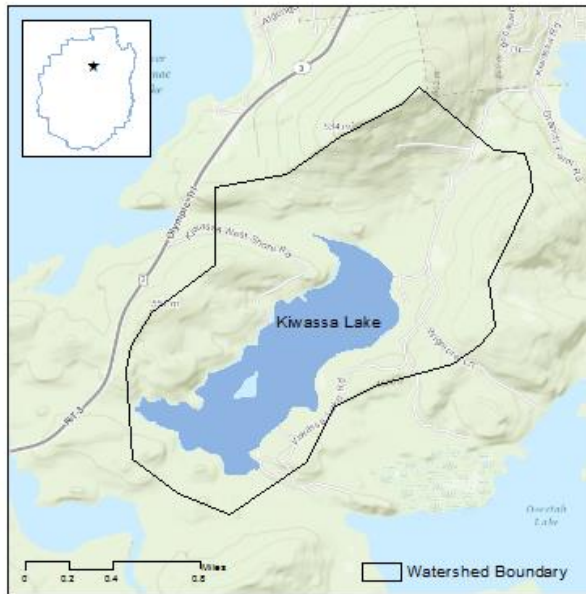
| Location | | |
|---|---|---|
| County: | Franklin |
| Town: | Harrietstown |

| Lake Characteristics | | |
|---|---|---|
| Surface Area (ha): | 114 |
| Shoreline Length (km): | 8 |
| Max. Depth (m): | 13.7 |
| Volume (m³): | 7307748 |
| Flush rate (times/year): | 0.1 |

| Watershed Characteristics | | |
|---|---|---|
| Watershed Area (ha): | 549 |
| Surface water (%): | 22 |
| Deciduous Forest (%): | 37 |
| Evergreen Forest (%): | 16 |
| Mixed Forest (%): | 15 |
| Wetlands (%): | 6 |
| Agricultural (%): | 0 |
| Residential (%): | 2 |
| Local Roads (km): | 3.4 |
| State Roads (km): | 0.5 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Oligotrophic | Alkaline | Adequate – low sensitivity | Moderate |

*Water quality values and historical trends for Kiwassa Lake during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 6/23/2017 | 7/23/2017 | 8/21/2017 | | |
| Transparency (m) | 5.0 | 4.1 | 3.7 | 4.2 | No Trend |
| Total Phosphorus (µg/L) | 10.2 | 8.2 | 8.4 | 8.9 | No Trend |
| Chlorophyll-*a* (µg/L) | 2.0 | 1.8 | 2.2 | 2.0 | No Trend |
| Laboratory pH | 7.3 | 8.8 | 8.1 | 8.0 | No Trend |
| Sp. Conductance (µS/cm) | 55.0 | 55.7 | 56.7 | 55.8 | No Trend |
| Color (Pt-Co) | 18.2 | 24.6 | 24.6 | 22.5 | No Trend |
| Alkalinity (mg/L) | | | 13.8 | 13.8 | Decreasing |
| Chloride (mg/L) | | | 8.5 | 8.5 | No Trend |
| Calcium (mg/L) | | | 4.4 | 4.4 | Not Analyzed |
| Sodium (mg/L) | | | 4.4 | 4.4 | Not Analyzed |

*See table of content for description of water quality indicators

# Kiwassa Lake – Time Series
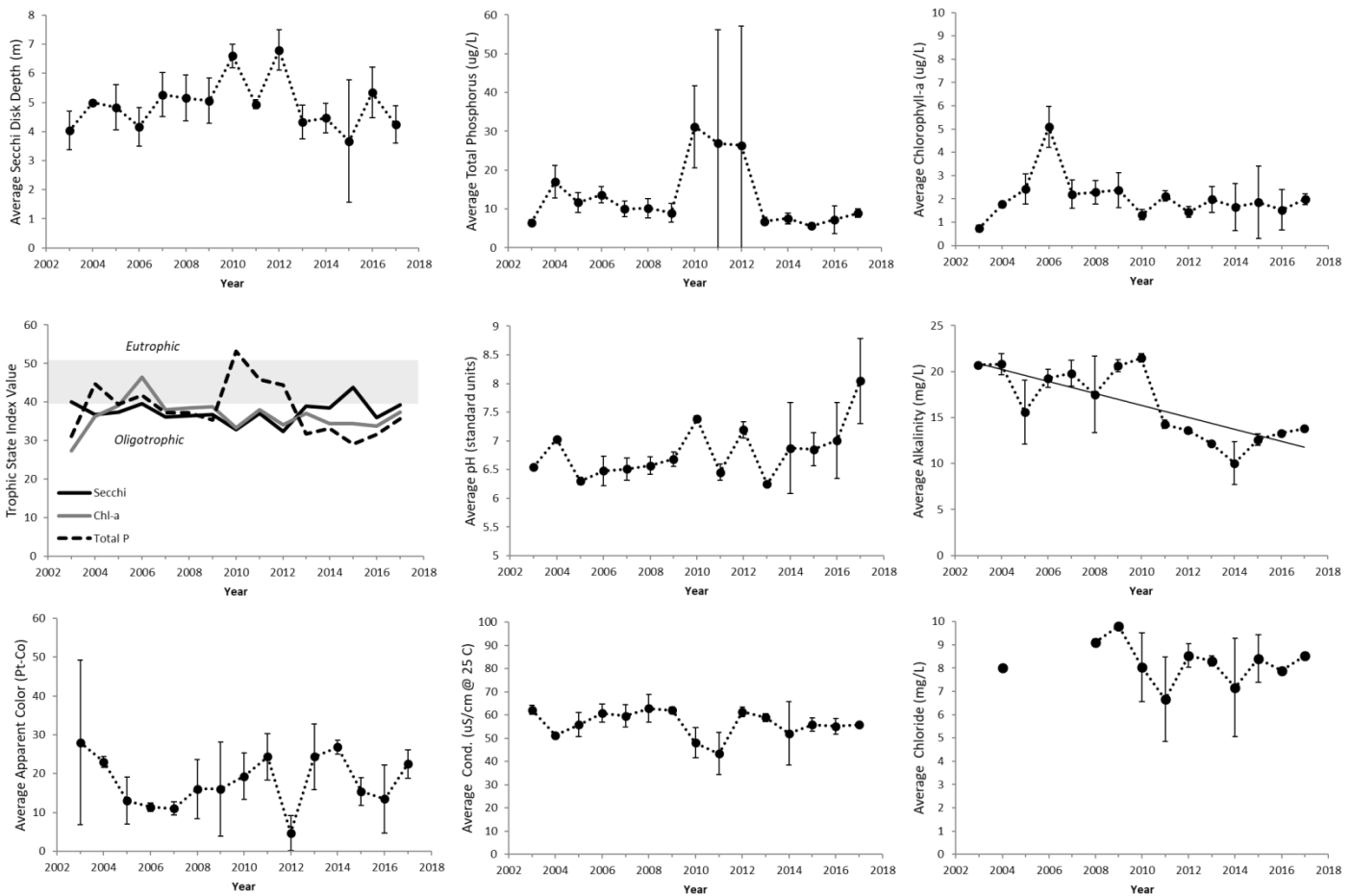


*Annual average values of select water quality indicators for Kiwassa Lake, 2003-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Kiwassa Lake is a 114 ha lake located in Franklin County in the Town of Harrietstown.  The lake is located within a 549 ha watershed dominated by forests.  Kiwassa Lake has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 2003.

- Kiwassa Lake is an oligotrophic water body. Historically the trophic status of the lake has fluctuated around the oligo-mesotrophic boundary. Transparency, total phosphorus, and chlorophyll-a have not exhibited any significant positive of negative trends since monitoring began in 2003.
- The water samples analyzed in 2017 were found to be alkaline in terms of their acidity, with an average pH of 8.0 units.  The alkalinity was 13.8 mg/L, indicating low sensitivity to acid deposition. We detected a significant downward trend in alkalinity at a rate of approximately 0.7 mg/L/year.
- Sodium and chloride concentration were 4.4 and 8.5 mg/L respectively, indicating moderate influence from road salting.

# Lake Abanakee
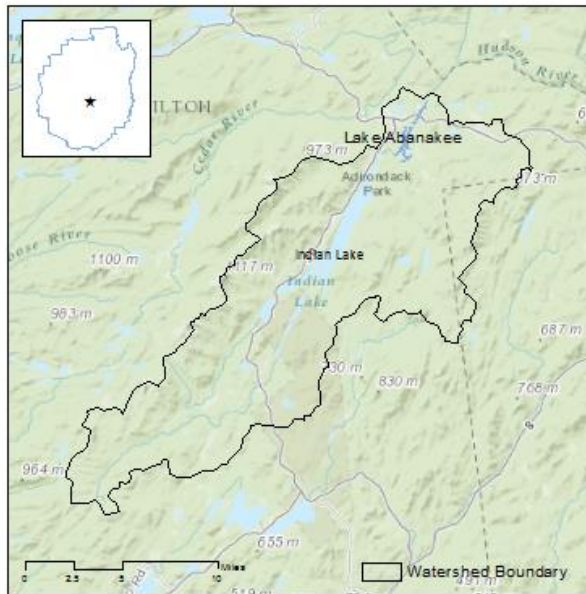


| Location | County: | Hamilton |
|---|---|---|
| | Town: | Indian Lake |

| Lake Characteristics | | |
|---|---|---|
| | Surface Area (ha): | 208 |
| | Shoreline Length (km): | 30 |
| | Max. Depth (m): | - |
| | Volume (m³): | 15391566.83 |
| | Flush rate (times/year): | 22.1 |

| Watershed Characteristics | | |
|---|---|---|
| | Watershed Area (ha): | 49953 |
| | Surface water (%): | 6 |
| | Deciduous Forest (%): | 56 |
| | Evergreen Forest (%): | 16 |
| | Mixed Forest (%): | 6 |
| | Wetlands (%): | 12 |
| | Agricultural (%): | 0 |
| | Residential (%): | 1 |
| | Local Roads (km): | 53.7 |
| | State Roads (km): | 43.6 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Mesotrophic | Circumneutral | Moderate | Present - Low |

*Water quality values and historical trends for Lake Abanakee during the 2017 sampling season. Trend analysis was not performed on sodium or calcium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 6/20/2017 | 7/22/2017 | 8/20/2017 | | |
| Transparency (m) | 2.6 | 2.0 | 3.2 | 2.6 | No Trend |
| Total Phosphorus (µg/L) | 12.1 | 11.9 | 7.2 | 10.4 | No Trend |
| Chlorophyll-*a* (µg/L) | 2.2 | 4.0 | 3.4 | 3.2 | Decreasing |
| Laboratory pH | 6.7 | 6.8 | 7.1 | 6.9 | No Trend |
| Sp. Conductance (µS/cm) | 26.1 | 23.2 | 26.8 | 25.4 | Decreasing |
| Color (Pt-Co) | 43.9 | 40.7 | 43.9 | 42.9 | No Trend |
| Alkalinity (mg/L) | | | 9.3 | 9.3 | No Trend |
| Chloride (mg/L) | | | 3.9 | 3.9 | No Trend |
| Calcium (mg/L) | | | 2.6 | 2.6 | Not Analyzed |
| Sodium (mg/L) | | | 2.1 | 2.1 | Not Analyzed |

# Lake Abanakee – Time Series
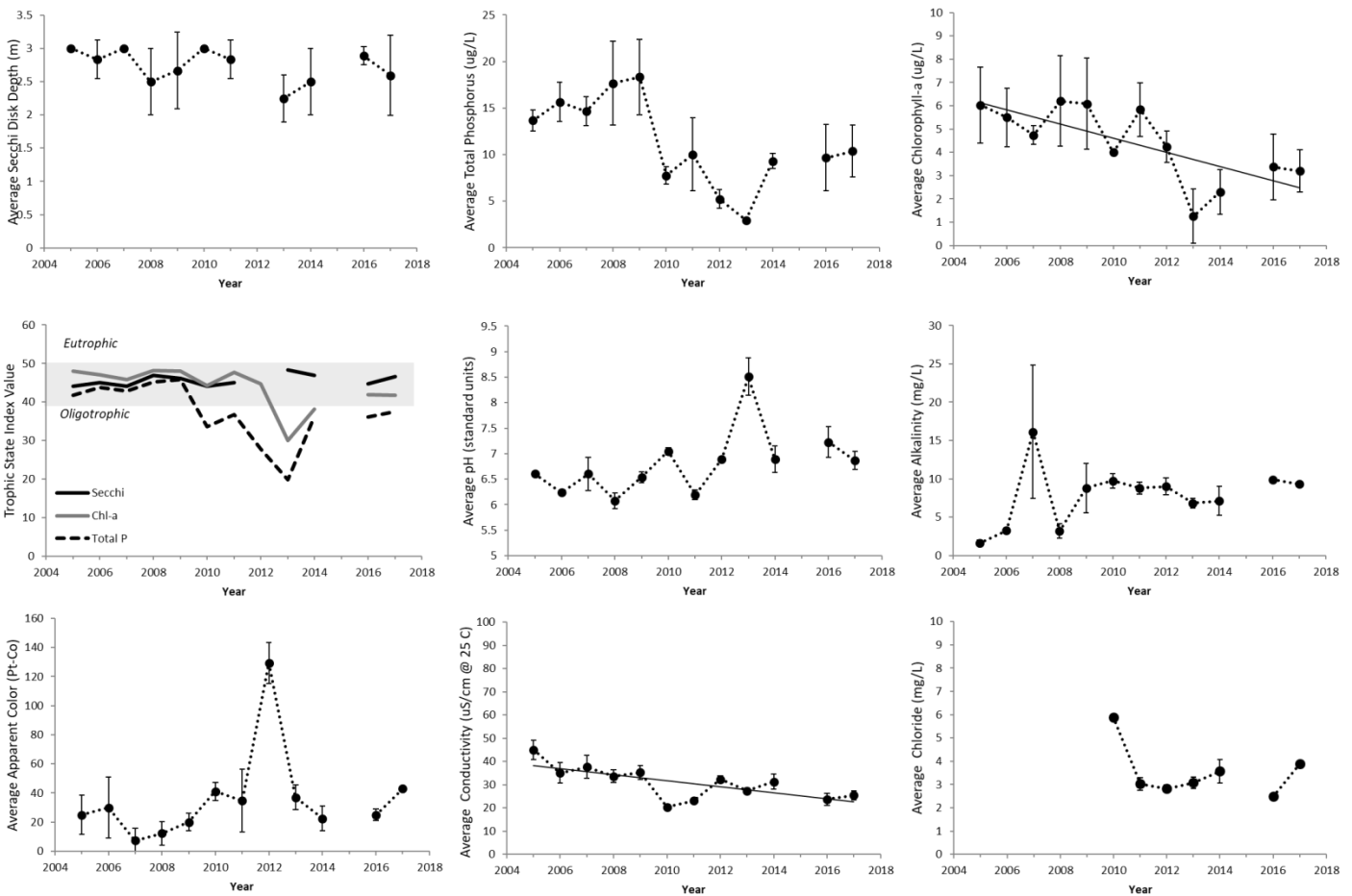


*Annual average values of select water quality indicators for Lake Abanakee 2005-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Lake Abanakee is a 208 ha lake located in Hamilton County in the Town of Indian Lake.  The lake is located within a 49,953 ha watershed dominated by forests.  Lake Abanakee has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 2005.

- Lake Abanakee is best classified as a mesotrophic lake.  The transparency typically fluctuated between 2.5 and 3 meters in depth. We detected a significant downward trend in chlorophyll-a concentration at a rate of approximately 0.3 µg/L/year.
- The water samples analyzed in 2017 were found to be circumneutral in terms of their acidity, and ranged from 6.7 to 7.1 pH units.  The alkalinity was found to be 9.3 mg/L, indicating moderate sensitivity to acid deposition.
- Sodium and chloride concentration averaged 2.1 and 3.9 mg/L respectively, indicating that road salt influence is present, but relatively low.

# Lake Adirondack
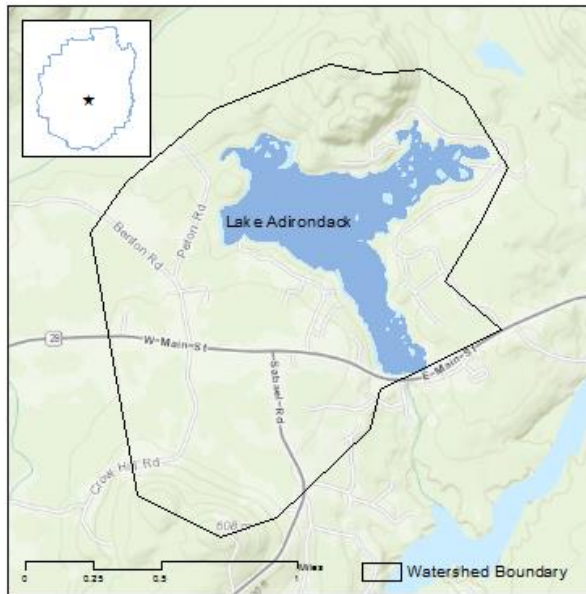


| Location | County: | Hamilton |
|---|---|---|
| | Town: | Indian Lake |

| Lake Characteristics | | |
|---|---|---|
| Surface Area (ha): | | 78 |
| Shoreline Length (km): | | 10 |
| Max. Depth (m): | | 5.8 |
| Volume (m³): | | 1772330 |
| Flush rate (times/year): | | 1.9 |

| Watershed Characteristics | | |
|---|---|---|
| Watershed Area (ha): | | 469 |
| Surface water (%): | | 19 |
| Deciduous Forest (%): | | 11 |
| Evergreen Forest (%): | | 12 |
| Mixed Forest (%): | | 4 |
| Wetlands (%): | | 39 |
| Agricultural (%): | | 1 |
| Residential (%): | | 13 |
| Local Roads (km): | | 6.6 |
| State Roads (km): | | 2.6 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Mesotrophic | Alkaline | Moderate | Present - low |

*Water quality values and historical trends for Lake Adirondack during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | June | 7/23/2017 | 8/20/2017 | | |
| Transparency (m) | | 2.3 | 3.0 | 2.7 | No Trend |
| Total Phosphorus (µg/L) | | 12.8 | 12.7 | 12.8 | No Trend |
| Chlorophyll-*a* (µg/L) | | 6.3 | 0.1 | 3.2 | No Trend |
| Laboratory pH | No Sample Submitted | 8.2 | 8.2 | 8.2 | No Trend |
| Sp. Conductance (µS/cm) | | 78.0 | 20.2 | 49.1 | Decreasing |
| Color (Pt-Co) | | 27.9 | 15.0 | 21.4 | No Trend |
| Alkalinity (mg/L) | | | 9.3 | 9.3 | Decreasing |
| Chloride (mg/L) | | | 2.9 | 2.9 | No Trend |
| Calcium (mg/L) | | | 2.4 | 2.4 | Not Analyzed |
| Sodium (mg/L) | | | 1.2 | 1.2 | Not Analyzed |

*See table of content for description of water quality indicators

# Lake Adirondack – Time Series
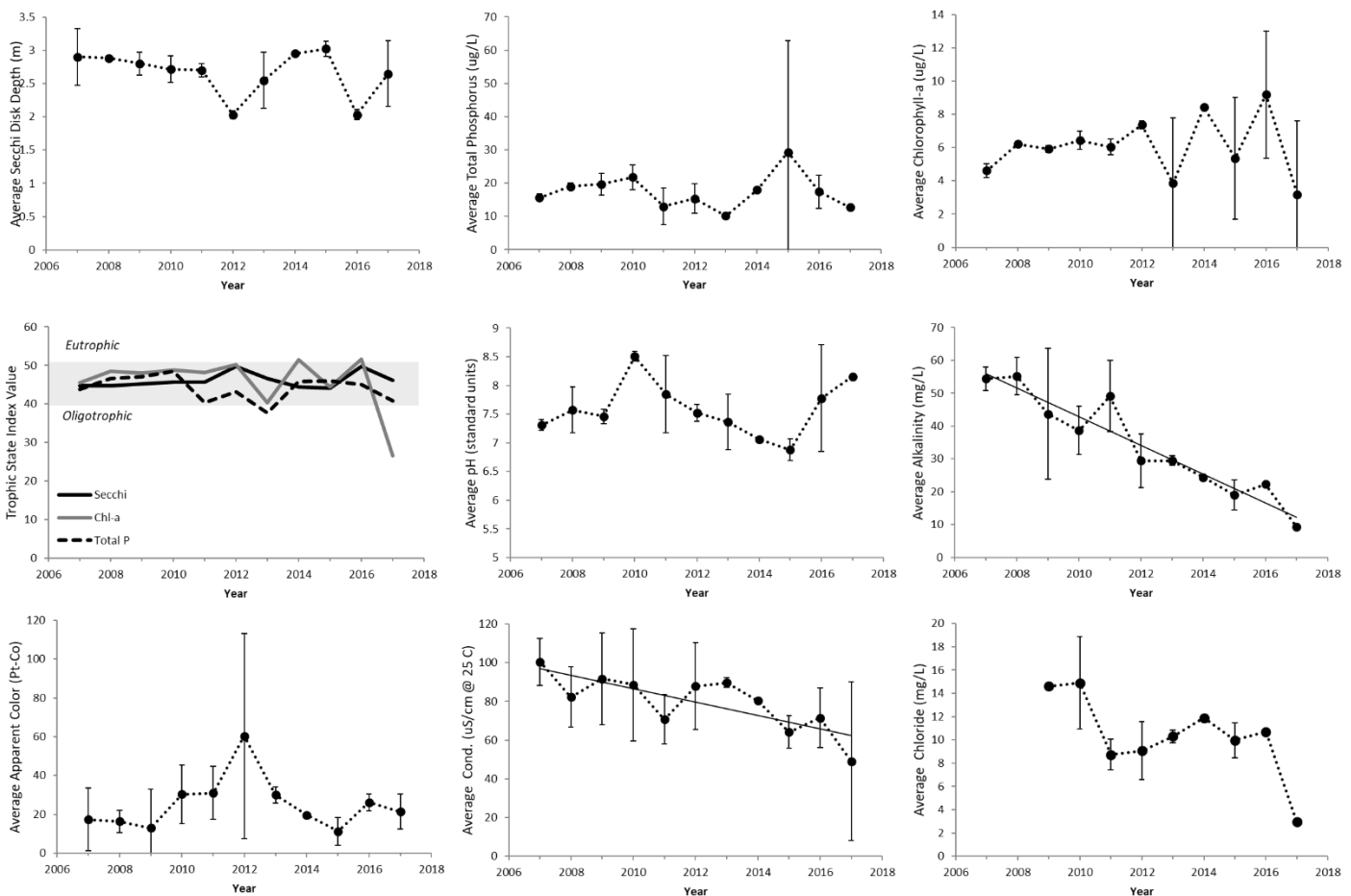


*Annual average values of select water quality indicators for Lake Adirondack, 2007-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Lake Adirondack is a 78 ha lake located in Hamilton County in the Town of Indian Lake.  The lake is located within a 469 ha watershed dominated by forests.  Lake Adirondack has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 2007.

- Only two samples were submitted to the lab in 2017.
- Lake Adirondack is a mesotrophic lake. The lake has typically fluctuated within the mesotrophic boundary since monitoring began in 2007.
- The water samples analyzed in 2017 were found to be alkaline in terms of their acidity, with an average pH of 8.2 units.  The alkalinity was 9.3 mg/L, indicating moderate sensitivity to acid deposition. We detected a significant downward trend in alkalinity at a rate of approximately 4.4 mg/L/year. This year marked the lowest recorded alkalinity value to date.
- Sodium and chloride concentration in 2017 were 1.2 and 2.9 mg/L respectively, these values were three times higher in 2016. Chloride was only analyzed on one sample in 2017, which may explain some of the variability between years.

# Lake Clear



| Location | County: | Franklin |
| --- | --- | --- |
| | Town: | Harrietstown |

| Lake Characteristics | Surface Area (ha): | 395 |
| --- | --- | --- |
| | Shoreline Length (km): | 11 |
| | Max. Depth (m): | 8.5 |
| | Volume (m³): | 34482896 |
| | Flush rate (times/year): | 0.35 |

| Watershed Characteristics | Watershed Area (ha): | 1952 |
| --- | --- | --- |
| | Surface water (%): | 22 |
| | Deciduous Forest (%): | 37 |
| | Evergreen Forest (%): | 23 |
| | Mixed Forest (%): | 4 |
| | Wetlands (%): | 8 |
| | Agricultural (%): | 0 |
| | Residential (%): | 3 |
| | Local Roads (km): | 0.8 |
| | State Roads (km): | 5.5 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
| --- | --- | --- | --- |
| Oligotrophic | Circumneutral | Adequate – low sensitivity | High |

*Water quality values and historical trends for Lake Clear during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
| --- | --- | --- | --- | --- | --- |
| | 6/25/2017 | 7/22/2017 | 8/20/2017 | | |
| Transparency (m) | 5.5 | 5.0 | 5.0 | 5.2 | No Trend |
| Total Phosphorus (µg/L) | 23.2 | 10.1 | 7.0 | 13.4 | Decreasing |
| Chlorophyll-*a* (µg/L) | 1.7 | 3.2 | 4.7 | 3.2 | No Trend |
| Laboratory pH | 7.4 | 7.4 | 7.6 | 7.5 | No Trend |
| Sp. Conductance (µS/cm) | 96.3 | 92.4 | 93.8 | 94.2 | Increasing |
| Color (Pt-Co) | 21.4 | 40.7 | 21.4 | 27.8 | No Trend |
| Alkalinity (mg/L) | | | 15.0 | 15.0 | Increasing |
| Chloride (mg/L) | | | 20.2 | 20.2 | No Trend |
| Calcium (mg/L) | | | 4.9 | 4.9 | Not Analyzed |
| Sodium (mg/L) | | | 9.3 | 9.3 | Not Analyzed |

*See table of content for description of water quality indicators

# Lake Clear – Time Series
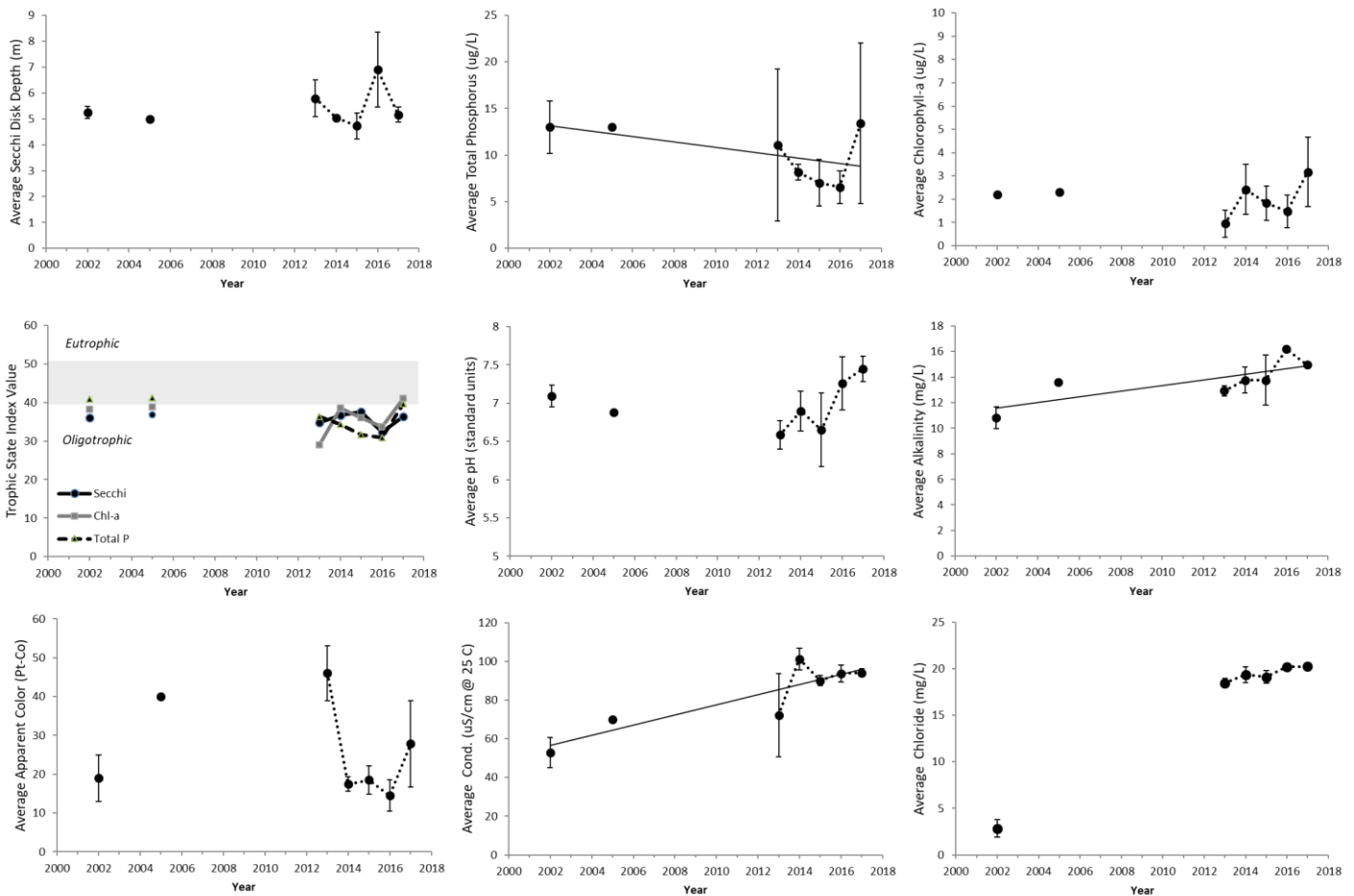


*Annual average values of select water quality indicators for Lake Clear, 2002-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Lake Clear is a 395 ha lake located in Franklin County in the Town of Harrietstown.  The lake is located within a 1,952 ha watershed dominated by forests.  ALAP monitoring of Lake Clear began in 2002, again in 2005 and most recently 2013-present.

- Lake Clear is an oligotrophic lake that has historically fluctuated on the border of mesotrophic. Transparency and chlorophyll-a have not exhibited any significant positive of negative trends since monitoring began in 2002. However, total phosphorus has exhibited a statistically significant downward trend at a rate of 0.3µg/L per year. The average transparency depth in 2017 was 5.2 meters, which is greater than 92% of participating ALAP lakes.
- The water samples analyzed in 2017 were found to be circumneutral in terms of their acidity. The alkalinity was 15 mg/L, indicating low sensitivity to acid deposition.
- Sodium and chloride concentration averaged 9.3 and 20.2 mg/L respectively, indicating that the chemistry of the lake is influenced by the 6.3 km of roads in the watershed. The chloride concentration is greater than 93% of participating ALAP lakes, and approximately 100 times greater than background concentrations for least impacted lakes in the Adirondack region.

# Lake Colby
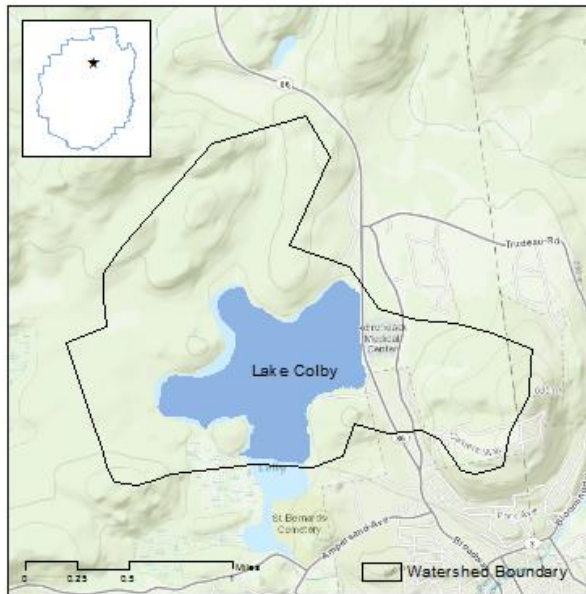


| Location | | |
|---|---|---|
| County: | | Franklin |
| Town: | | Harrietstown |

| Lake Characteristics | | |
|---|---|---|
| Surface Area (ha): | | 119 |
| Shoreline Length (km): | | 6 |
| Max. Depth (m): | | 14.3 |
| Volume (m³): | | 7873631 |
| Flush rate (times/year): | | 0.7 |

| Watershed Characteristics | | |
|---|---|---|
| Watershed Area (ha): | | 577 |
| Surface water (%): | | 22 |
| Deciduous Forest (%): | | 25 |
| Evergreen Forest (%): | | 25 |
| Mixed Forest (%): | | 3 |
| Wetlands (%): | | 20 |
| Agricultural (%): | | 0 |
| Residential (%): | | 5 |
| Local Roads (km): | | 1.4 |
| State Roads (km): | | 1.2 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Mesotrophic | Alkaline | Well buffered – not sensitive | High |

*Water quality values and historical trends for Lake Colby during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 7/2/2017 | 8/21/2017 | 9/11/2017 | | |
| Transparency (m) | 4.0 | 3.5 | 4.0 | 3.8 | No Trend |
| Total Phosphorus (µg/L) | 7.9 | 49.2 | 3.7 | 20.3 | No Trend |
| Chlorophyll-*a* (µg/L) | 4.1 | 2.2 | 5.5 | 3.9 | No Trend |
| Laboratory pH | 7.8 | 8.6 | 7.8 | 8.1 | No Trend |
| Sp. Conductance (µS/cm) | 205.0 | 208.0 | 207.0 | 206.7 | No Trend |
| Color (Pt-Co) | 31.1 | 21.4 | 18.2 | 23.6 | No Trend |
| Alkalinity (mg/L) | | 31.2 | | 31.2 | No Trend |
| Chloride (mg/L) | | 50.0 | | 50.0 | No Trend |
| Calcium (mg/L) | | 12.2 | | 12.2 | Not Analyzed |
| Sodium (mg/L) | | 24.8 | | 24.8 | Not Analyzed |

*See table of content for description of water quality indicators

# Lake Colby – Time Series
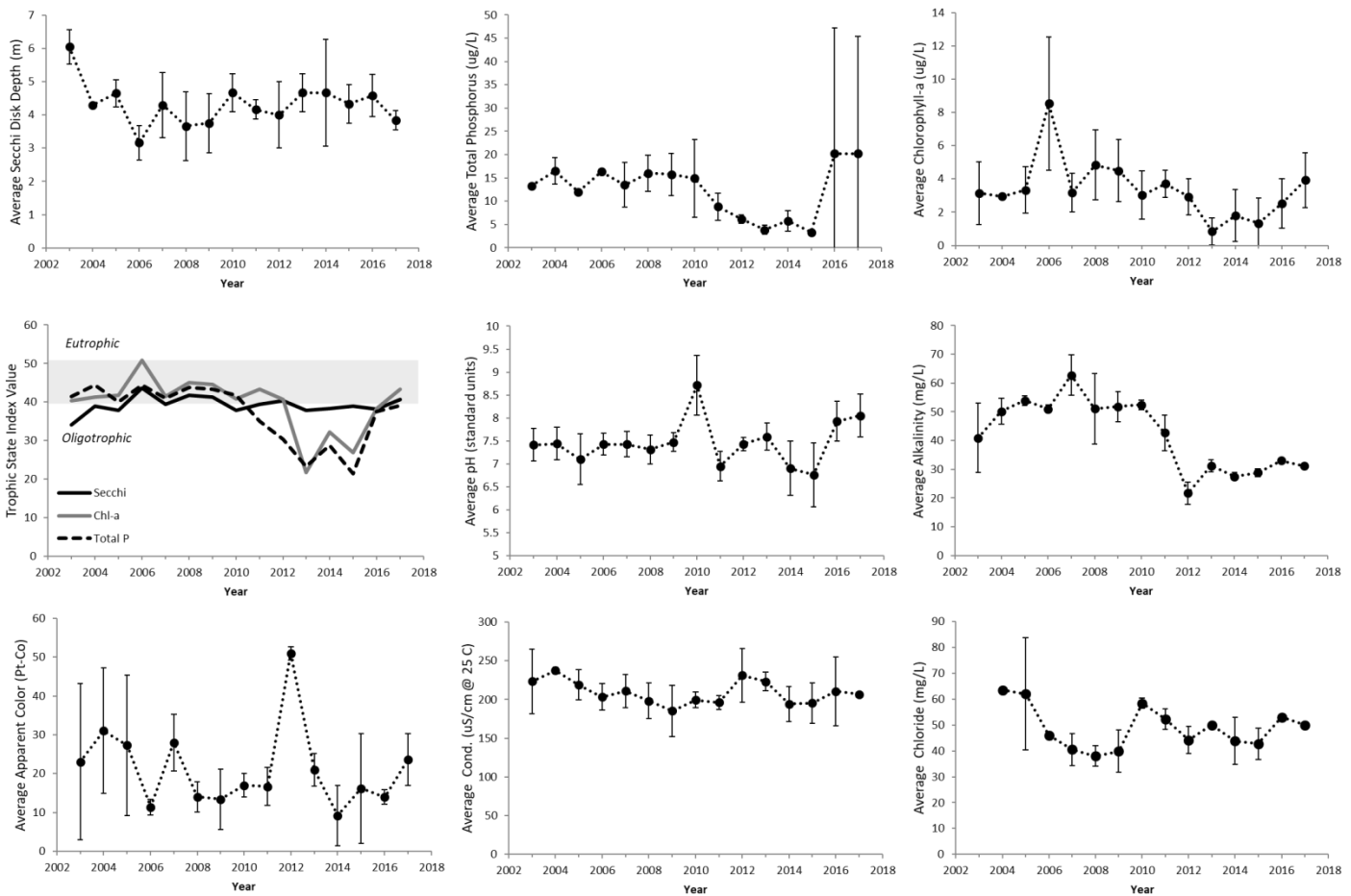


*Annual average values of select water quality indicators for Lake Colby, 2003-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Lake Colby is a 119 ha lake located in Franklin County in the Town of Harrietstown.  The lake is located within a 577 ha watershed dominated by forests, but with significant residential and commercial development in the eastern portion of the watershed.  Lake Colby has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 2003.

- Lake Colby is currently classified as a mesotrophic lake, a change from the oligotrophic classification between the period of 2012-2016. For the second year in a row we have encountered an unusually high total phosphorus concentration. In 2016 we documented a concentration if 51 µg/L, and this past July we documented 50 µg/L.
- Water samples received in 2017 were alkaline in terms of their acidity. The alkalinity was 31.0 mg/L, indicating the lake is not sensitive to acid deposition. The calcium concentration was 12.2 mg/L, putting the lake near the suitability range for zebra mussels.
- Sodium and chloride concentration were 24.8 and 50.0 mg/L respectively, indicating that the chemistry of the lake is heavily influenced by the 2.6 km of roads in the watershed.  The sodium and chloride concentrations of Lake Colby are greater than any of the other participating ALAP lakes in the 2017 and approximately 250 times greater than background concentrations for lakes in the Adirondack region.

# Lake of the Pines
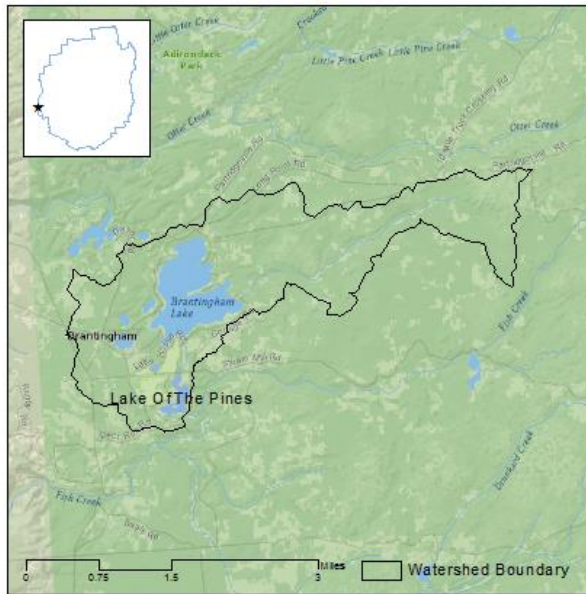


| Location | | |
|---|---|---|
| | County: | lewis |
| | Town: | Greig |

| Lake Characteristics | | |
|---|---|---|
| | Surface Area (ha): | 3 |
| | Shoreline Length (km): | 1 |
| | Max. Depth (m): | |
| | Volume (m³): | |
| | Flush rate (times/year): | |

| Watershed Characteristics | | |
|---|---|---|
| | Watershed Area (ha): | 1315 |
| | Surface water (%): | 12 |
| | Deciduous Forest (%): | 34 |
| | Evergreen Forest (%): | 21 |
| | Mixed Forest (%): | 3 |
| | Wetlands (%): | 1 |
| | Agricultural (%): | 2 |
| | Residential (%): | 0 |
| | Local Roads (km): | 16 |
| | State Roads (km): | 0 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Oligotrophic | Circumneutral | Adequate – low sensitivity | Present - low |

*Water quality values and historical trends for Lake of the Pines during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 6/22/2017 | 7/18/2017 | 8/19/2017 | | |
| Transparency (m) | 2.5 | 2.8 | 2.3 | 2.5 | No Trend |
| Total Phosphorus (µg/L) | 10.2 | 10.0 | 9.2 | 9.8 | Decreasing |
| Chlorophyll-*a* (µg/L) | 0.7 | 2.4 | 0.1 | 1.0 | No Trend |
| Laboratory pH | 6.9 | 7.0 | 7.1 | 7.0 | No Trend |
| Sp. Conductance (µS/cm) | 23.2 | 22.4 | 25.8 | 23.8 | No Trend |
| Color (Pt-Co) | 53.6 | 47.2 | 37.5 | 46.1 | No Trend |
| Alkalinity (mg/L) | | | 11.5 | 11.5 | Decreasing |
| Chloride (mg/L) | | | 1.3 | 1.3 | Decreasing |
| Calcium (mg/L) | | | 2.8 | 2.8 | Not Analyzed |
| Sodium (mg/L) | | | 1.1 | 1.1 | Not Analyzed |

*See table of content for description of water quality indicators

# Lake of the Pines – Time Series
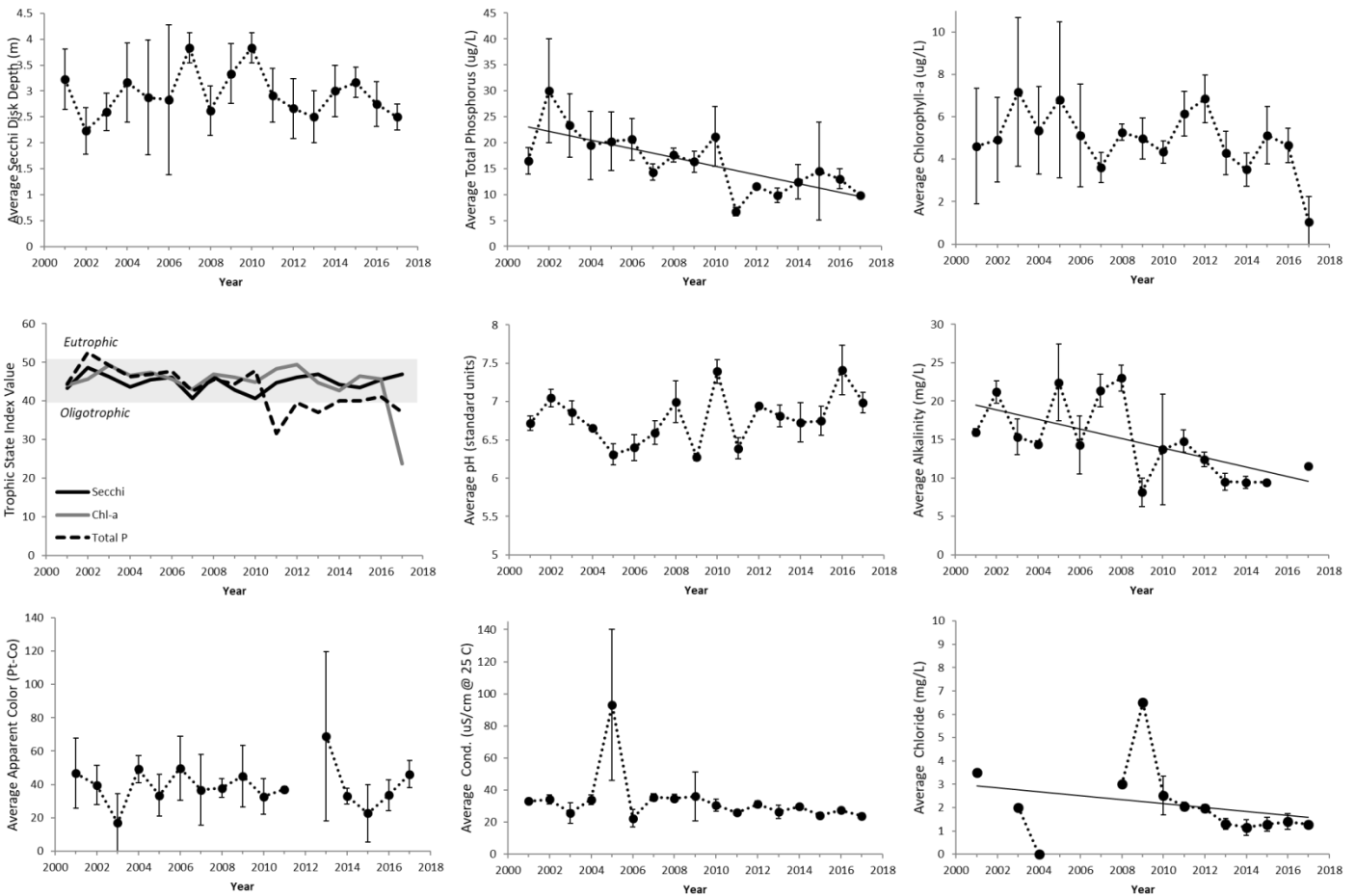


*Annual average values of select water quality indicators for Lake of the Pines, 2001-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Lake of the Pines is a 3 ha lake located in Lewis County in the Town of Greig.  The lake is located within a 1,315 ha watershed dominated by forests.  Lake of the Pines has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 2001.

- Lake of the Pines is an oligotrophic lake. The trophic indicators of the lake have been fairly stable over time with the exception of total phosphorus, which has exhibited a significant downward trend at a rate of approximately 0.8 µg/L/year.
- Water samples from 2017 were found to be circumneutral in terms of their acidity. The alkalinity of the lake was 11.5 mg/L in 2017, indicating that the lake has moderate sensitivity to acid deposition. Alkalinity exhibited a statistically significant downward trend at a rate of 0.6 mg/L/year.
- Sodium and chloride concentrations averaged 1.1 and 1.3 mg/L respectively.  These concentrations suggest that the chemistry of the lake is influenced by the 16 km of roads in the watershed, but the influence is relatively low.

# Lake Titus
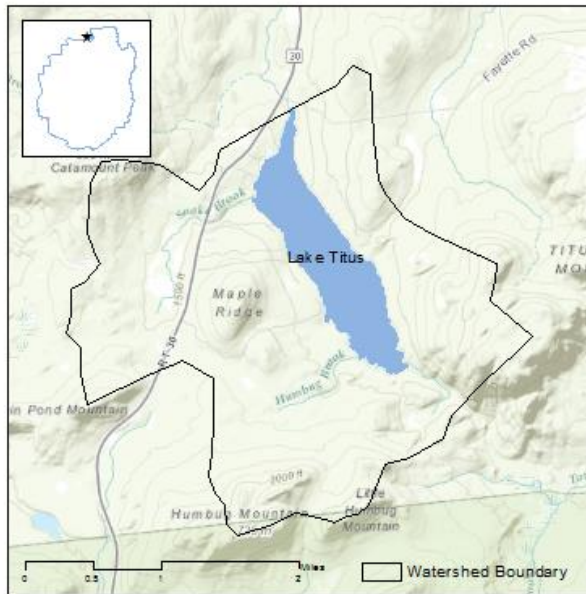


| Location | | |
|---|---|---|
| | County: | Franklin |
| | Town: | Malone |

| Lake Characteristics | | |
|---|---|---|
| | Surface Area (ha): | 177 |
| | Shoreline Length (km): | 8 |
| | Max. Depth (m): | 9.1 |
| | Volume (m³): | 8637690 |
| | Flush rate (times/year): | 1.2 |

| Watershed Characteristics | | |
|---|---|---|
| | Watershed Area (ha): | 1658 |
| | Surface water (%): | 12 |
| | Deciduous Forest (%): | 64 |
| | Evergreen Forest (%): | 9 |
| | Mixed Forest (%): | 3 |
| | Wetlands (%): | 8 |
| | Agricultural (%): | 1 |
| | Residential (%): | 3 |
| | Local Roads (km): | 0 |
| | State Roads (km): | 0 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Mesotrophic | Alkaline | Adequate – low sensitivity | Moderate |

*Water quality values and historical trends for Lake Titus during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 7/7/2017 | 8/11/2017 | 9/2/2017 | | |
| Transparency (m) | 2.8 | 2.5 | 3.6 | 3.0 | No Trend |
| Total Phosphorus (µg/L) | 8.6 | 11.8 | 8.8 | 9.7 | No Trend |
| Chlorophyll-*a* (µg/L) | 2.1 | 2.3 | 3.1 | 2.5 | No Trend |
| Laboratory pH | 8.0 | 7.9 | 7.9 | 7.9 | No Trend |
| Sp. Conductance (µS/cm) | 67.6 | 67.1 | 68.3 | 67.7 | No Trend |
| Color (Pt-Co) | 34.3 | 34.3 | 31.1 | 33.2 | No Trend |
| Alkalinity (mg/L) | | 16.0 | | 16.0 | No Trend |
| Chloride (mg/L) | | 11.8 | | 11.8 | No Trend |
| Calcium (mg/L) | | 4.5 | | 4.5 | Not Analyzed |
| Sodium (mg/L) | | 6.3 | | 6.3 | Not Analyzed |

*See table of content for description of water quality indicators

# Lake Titus – Time Series
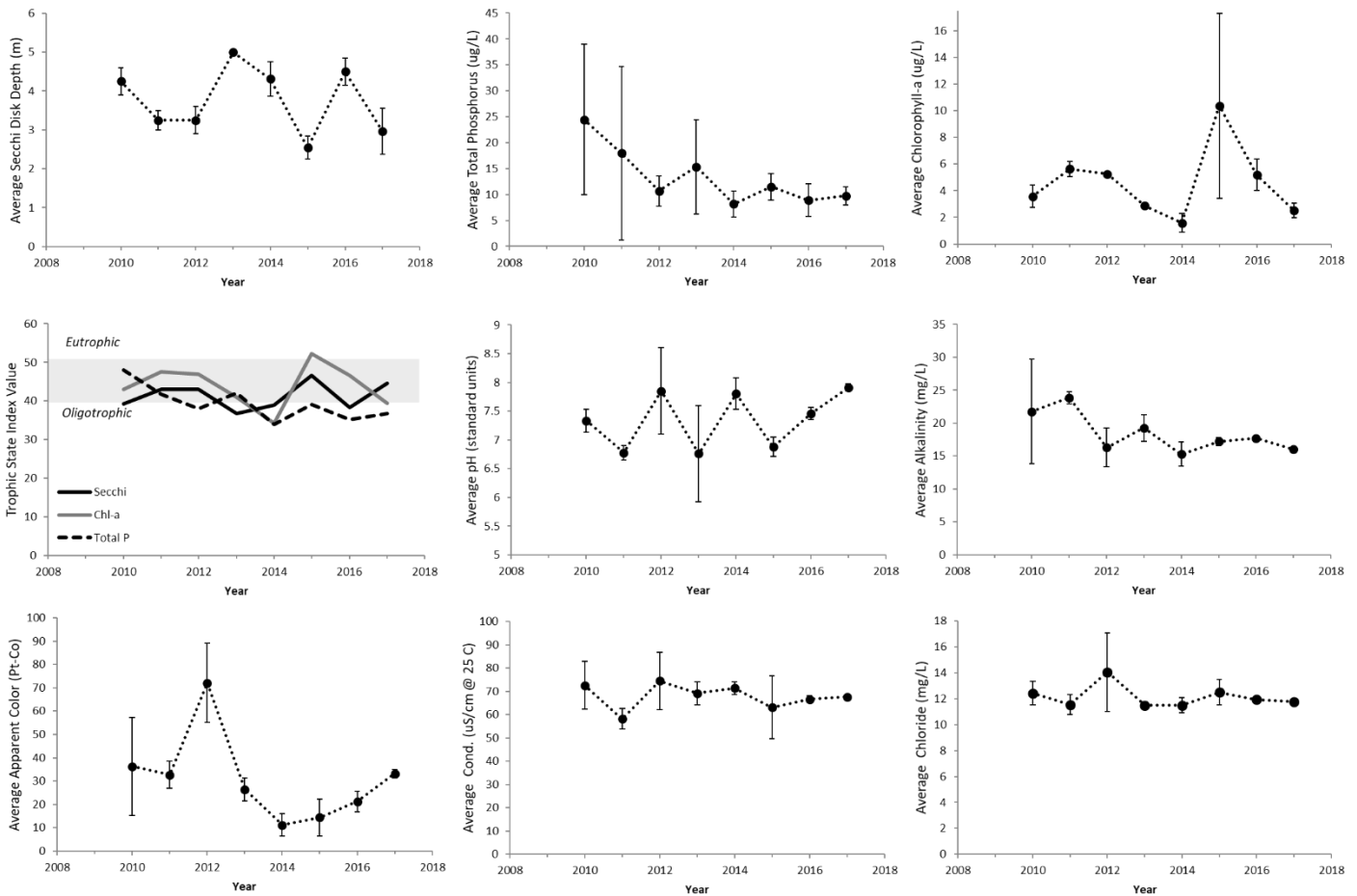


*Annual average values of select water quality indicators for Lake Titus, 2010-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Lake Titus is a 177 ha lake located in Franklin County in the Town of Malone.  The lake is located within a 1,658 ha watershed dominated by forests.  Lake Titus has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 2010.

- Lake Titus is a mesotrophic lake, bordering on oligotrophic. The lake has fluctuated around the mesotrophic range since monitoring began. Transparency, total phosphorus, and chlorophyll-a have not exhibited any significant positive of negative trends.
- The water samples analyzed in 2017 were found to be alkaline in terms of their acidity. The alkalinity averaged 16.0 mg/L, indicating low sensitivity to acid deposition.
- Sodium and chloride concentration averaged 6.3 and 11.8 mg/L respectively, indicating that the chemistry of the lake is influenced by the 3.8 km of roads in the watershed.  The chloride concentration of Lake Titus is greater than 78% of lakes participating in ALAP in 2017, and approximately 59 times greater than background concentrations for unimpacted lakes in the Adirondack region.

# Lens Lake
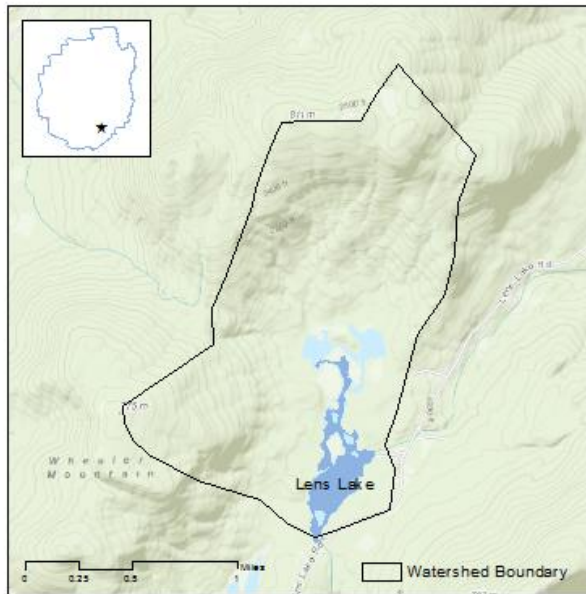


| Location | | |
|---|---|---|
| | County: | Warren |
| | Town: | Stony Creek |

| Lake Characteristics | | |
|---|---|---|
| | Surface Area (ha): | 22 |
| | Shoreline Length (km): | 6 |
| | Max. Depth (m): | - |
| | Volume (m³): | 201674 |
| | Flush rate (times/year): | 17.3 |

| Watershed Characteristics | | |
|---|---|---|
| | Watershed Area (ha): | 514 |
| | Surface water (%): | 7 |
| | Deciduous Forest (%): | 64 |
| | Evergreen Forest (%): | 8 |
| | Mixed Forest (%): | 10 |
| | Wetlands (%): | 12 |
| | Agricultural (%): | 0 |
| | Residential (%): | 0 |
| | Local Roads (km): | 0.2 |
| | State Roads (km): | 0 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Mesotrophic | Acidic (acceptable) | Moderate | Not Significant |

*Water quality values and historical trends for Lens Lake during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit. VOB=Secchi disk is visible on the bottom of the lake.*

| Water Quality Indicator | Sampling Date | | | | | Average | Trend |
|---|---|---|---|---|---|---|---|
| | 6/4 | 6/28 | 7/16 | 8/19 | 9/10 | | |
| Transparency (m) | VOB | VOB | 2.1 | 1.9 | 1.9 | 2.0 | No Trend |
| Total Phosphorus (µg/L) | 14.4 | 13.0 | 20.3 | 16.4 | 18.3 | 16.5 | No Trend |
| Chlorophyll-*a* (µg/L) | 2.4 | 3.7 | 3.5 | 4.9 | 5.7 | 4.0 | No Trend |
| Laboratory pH | 6.1 | 6.1 | 6.2 | 6.3 | 6.7 | 6.3 | No Trend |
| Sp. Cond. (µS/cm) | 9.7 | 9.0 | 10.0 | 9.7 | 10.2 | 9.7 | Decreasing |
| Color (Pt-Co) | 31.1 | 31.1 | 47.2 | 37.5 | 36.8 | 36.7 | No Trend |
| Alkalinity (mg/L) | | | | 3.7 | | 3.7 | No Trend |
| Chloride (mg/L) | | | | 0.8 | | 0.8 | No Trend |
| Calcium (mg/L) | | | | 1.0 | | 1.0 | Not Analyzed |
| Sodium (mg/L) | | | | 0.6 | | 0.6 | Not Analyzed |

*See table of content for description of water quality indicators

# Lens Lake – Time Series
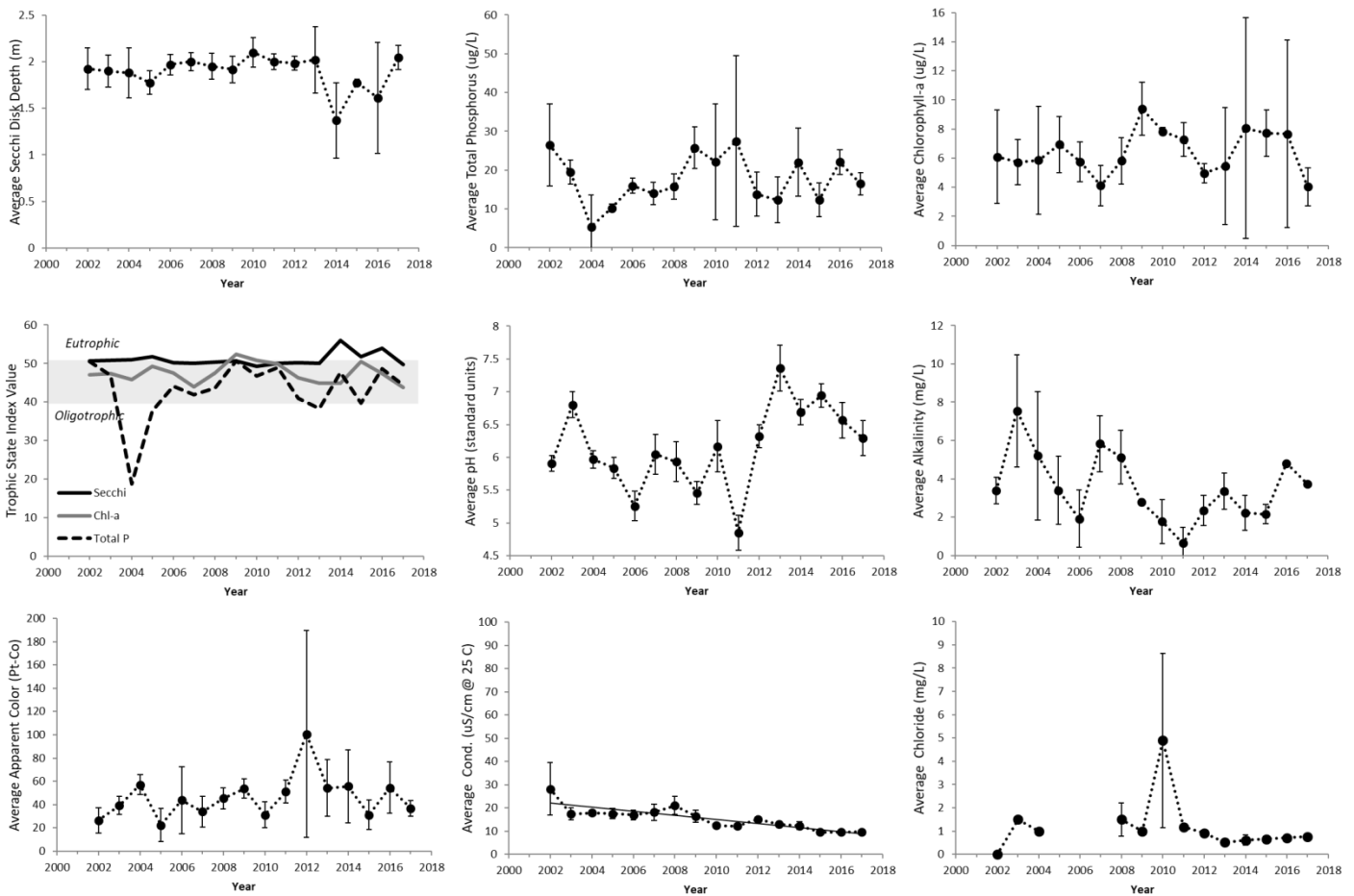


*Annual average values of select water quality indicators for Lens Lake, 2002-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Lens Lake is a 22 ha lake located in Warren County in the town of Stony Creek.  The lake is located within a 514 ha watershed dominated by forests.  Lens Lake has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 2002.

- Lens Lake is a shallow mesotrophic lake with a rapid turnover rate calculated at 17 times/year.  Transparency, total phosphorus, and chlorophyll-a have not exhibited any significant positive of negative trends since monitoring began in 2002. In this case, transparency is not a good indicator of trophic state due to the shallow depth of the lake.

- The water samples analyzed in 2017 were found to be slightly acidic. With an average of 6.3 pH units. The alkalinity was 3.7 mg/L, indicating that the lake is sensitive to acid deposition.

- Sodium and chloride concentration were 0.6 and 0.8 mg/L respectively; these values are within the range we would expect for a lake that lacks salted roads in the watershed.

# Little Long Lake
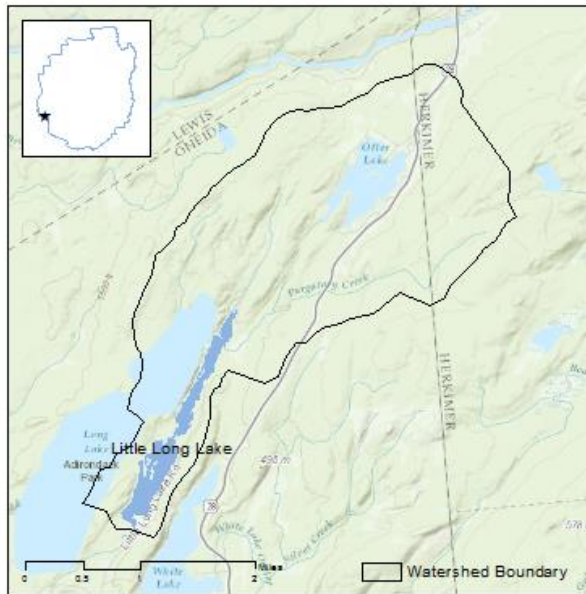


| Location | County: | Oneida |
|---|---|---|
| | Town: | Forestport |

| Lake Characteristics | | |
|---|---|---|
| Surface Area (ha): | | 64 |
| Shoreline Length (km): | | 11 |
| Max. Depth (m): | | 10.7 |
| Volume (m³): | | 1600000 |
| Flush rate (times/year): | | 9.1 |

| Watershed Characteristics | | |
|---|---|---|
| Watershed Area (ha): | | 1637 |
| Surface water (%): | | 8 |
| Deciduous Forest (%): | | 64 |
| Evergreen Forest (%): | | 3 |
| Mixed Forest (%): | | 1 |
| Wetlands (%): | | 14 |
| Agricultural (%): | | 0 |
| Residential (%): | | 1 |
| Local Roads (km): | | 6.3 |
| State Roads (km): | | 4.5 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Mesotrophic | Circumneutral | Moderate | Moderate |

*Water quality values and historical trends for Little Long Lake during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 6/20/2017 | 7/16/2017 | 8/20/2017 | | |
| Transparency (m) | 2.0 | 2.9 | 1.6 | 2.2 | Decreasing |
| Total Phosphorus (µg/L) | 8.6 | 7.4 | 9.3 | 8.5 | Decreasing |
| Chlorophyll-*a* (µg/L) | 3.2 | 2.1 | 3.1 | 2.8 | No Trend |
| Laboratory pH | 7.0 | 6.7 | 6.9 | 6.8 | No Trend |
| Sp. Conductance (µS/cm) | 51.6 | 52.9 | 57.2 | 53.9 | No Trend |
| Color (Pt-Co) | 66.5 | 53.6 | 66.5 | 62.2 | Increasing |
| Alkalinity (mg/L) | | | 9.5 | 9.5 | No Trend |
| Chloride (mg/L) | | | 11.8 | 11.8 | No Trend |
| Calcium (mg/L) | | | 3.5 | 3.5 | Not Analyzed |
| Sodium (mg/L) | | | 6.4 | 6.4 | Not Analyzed |

*See table of content for description of water quality indicators

# Little Long Lake – Time Series
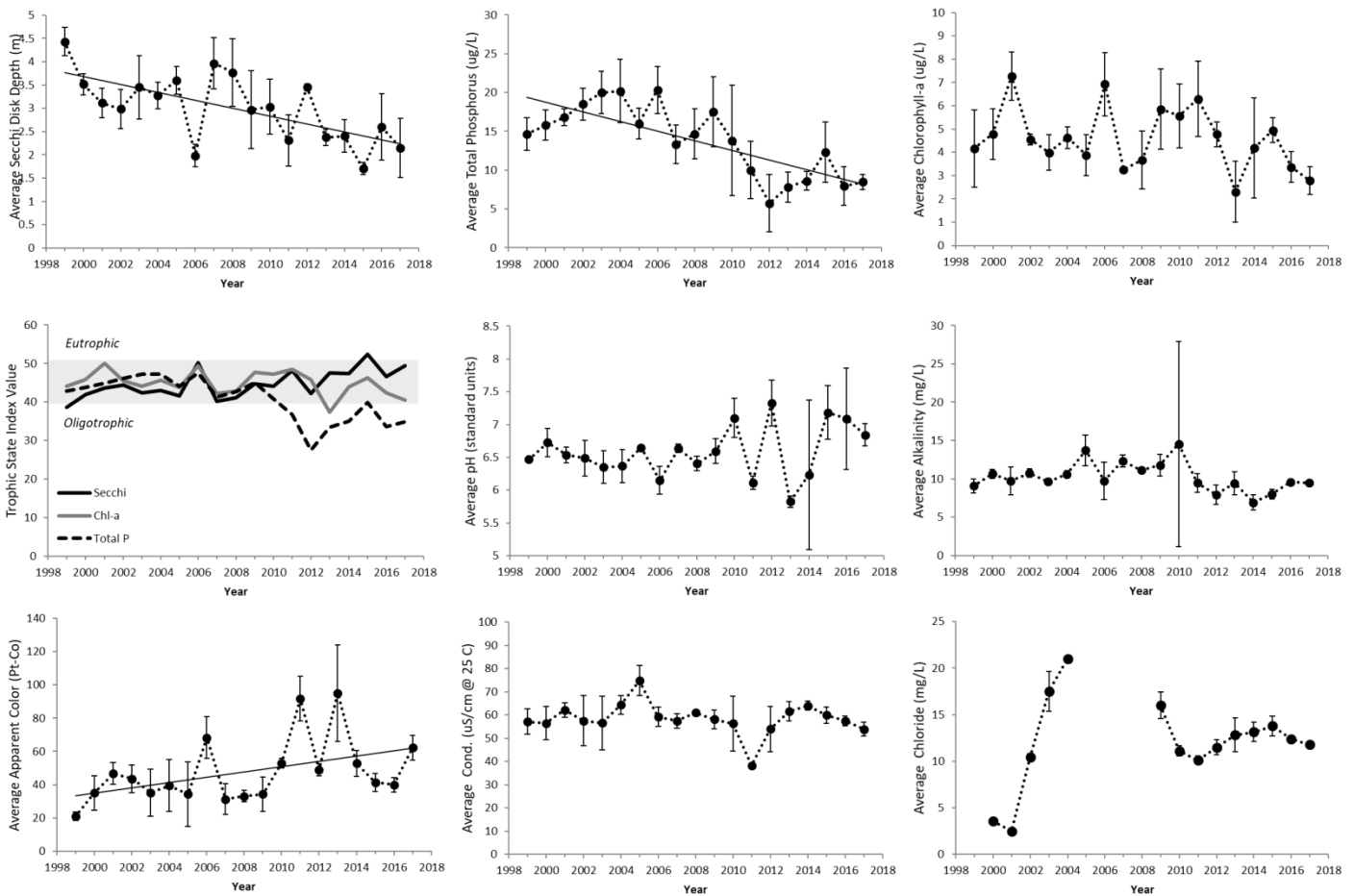


*Annual average values of select water quality indicators for Little Long Lake, 1999-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Little Long Lake is a 64 ha lake located in Oneida County in the Town of Forestport.  The lake is located within a 1,637 ha watershed dominated by forests.  Little Long Lake has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 1999.

- Little Long Lake is a mesotrophic lake. Transparency depth has exhibited a significant downward trend at a rate of approximately 9 cm/year. Some of the decrease in transparency may be explained by the color of the lake, which has been significantly increasing since 1999.

- The water samples analyzed in 2017 were found to be circumneutral in terms of their acidity with an average of 6.8 pH units. The alkalinity was 9.6 mg/L, indicating that the lake is moderately sensitive to acid deposition.

- Sodium and chloride concentration were 7.5 and 12.4 mg/L respectively, indicating that the chemistry of the lake is influenced by the 11 km of roads in the watershed.  The chloride concentration in Little Long Lake is greater than 78% of participating ALAP lakes.

# Long Lake



| Location | County: | Hamilton |
|---|---|---|
| | Town: | Long Lake |

| Lake Characteristics | Surface Area (ha): | 1685 |
|---|---|---|
| | Shoreline Length (km): | 78 |
| | Max. Depth (m): | 13.7 |
| | Volume (m³): | 65403234 |
| | Flush rate (times/year): | 10 |

| Watershed Characteristics | Watershed Area (ha): | 76376 |
|---|---|---|
| | Surface water (%): | 2 |
| | Deciduous Forest (%): | 41 |
| | Evergreen Forest (%): | 19 |
| | Mixed Forest (%): | 8 |
| | Wetlands (%): | 17 |
| | Agricultural (%): | 0 |
| | Residential (%): | 1 |
| | Local Roads (km): | 62 |
| | State Roads (km): | 60 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Mesotrophic | Circumneutral | Moderate | Present - Low |

*Water quality values for Long Lake during the 2017 sampling season. Trend analysis will be performed after five years of consecutive data collection. BDL=below detection limit.*

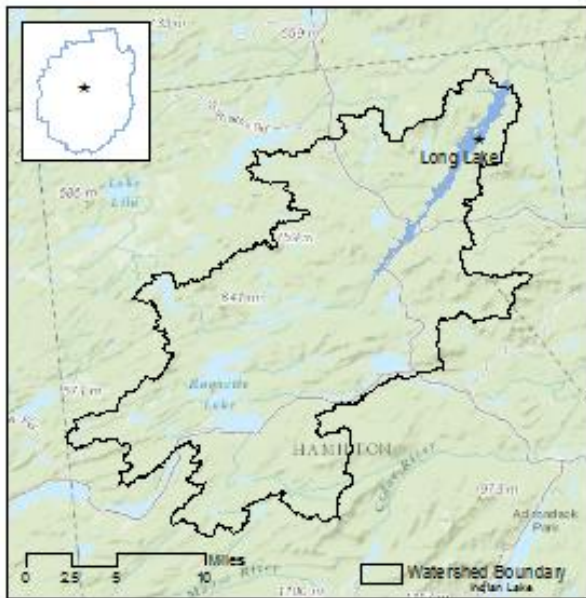| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 6/24/2017 | 7/20/2017 | 8/24/2017 | | |
| Transparency (m) | 3.1 | 2.9 | 3.2 | 3.0 | |
| Total Phosphorus (µg/L) | 6.7 | 5.7 | 5.4 | 5.9 | Not Analyzed – 5 years of data needed |
| Chlorophyll-*a* (µg/L) | 3.3 | 4.5 | 2.9 | 3.6 | |
| Laboratory pH | 6.7 | 6.7 | 7.2 | 6.8 | |
| Sp. Conductance (µS/cm) | 24.9 | 23.4 | 25.2 | 24.5 | |
| Color (Pt-Co) | 40.7 | 53.6 | 43.9 | 46.1 | |
| Alkalinity (mg/L) | | | 6.4 | 6.4 | |
| Chloride (mg/L) | | | 4.1 | 4.1 | |
| Calcium (mg/L) | | | 2.0 | 2.0 | |
| Sodium (mg/L) | | | 2.3 | 2.3 | |

# Long Lake- Time Series
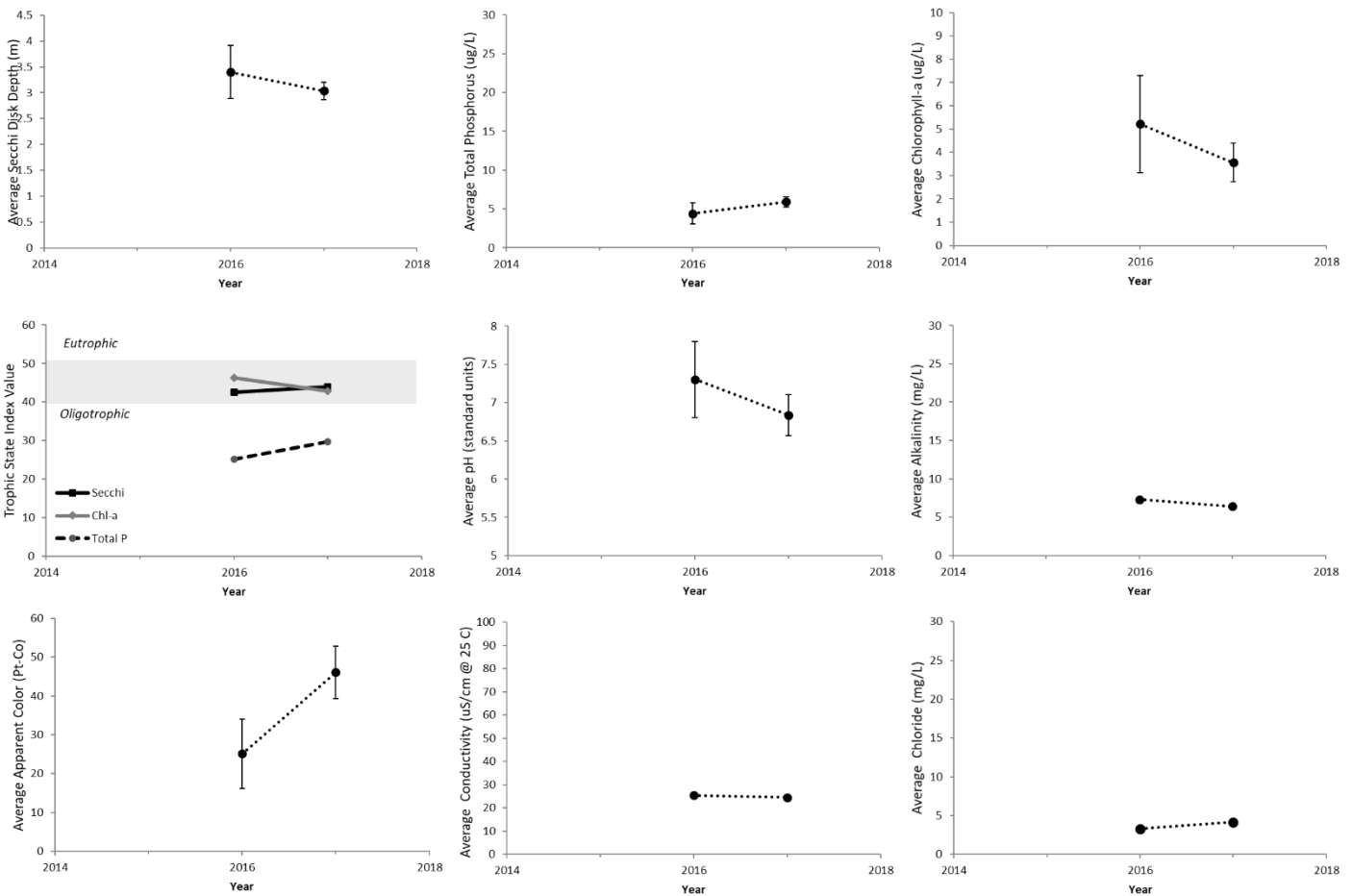


*Annual average values of select water quality indicators for Long Lake, 2004-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Long Lake is a 1,685 ha lake located in Hamilton County in the Town of Long Lake.  The lake is located within a 76,376 ha watershed dominated by forests.  This is Long Lake first year in the Adirondack Lake Assessment Program. Trend analysis will be conducted after five years of data have been collected.

- Long Lake is classified as an oligotrophic lake based on chlorophyll-a concentration, and a mesotrophic lake based on transparency depth and total phosphorus concentration.

- Water samples submitted in 2017 were circumneutral in terms of their acidity, with an average of 6.8 pH units. The alkalinity was 6.4 mg/L, indicating moderate sensitivity to acid deposition.

- Sodium and chloride concentration were 3.0 and 3.3 mg/L respectively, indicating that the chemistry of the lake is influenced by the 122 km of roads in the watershed, but the influence is rather low.

# Long Pond
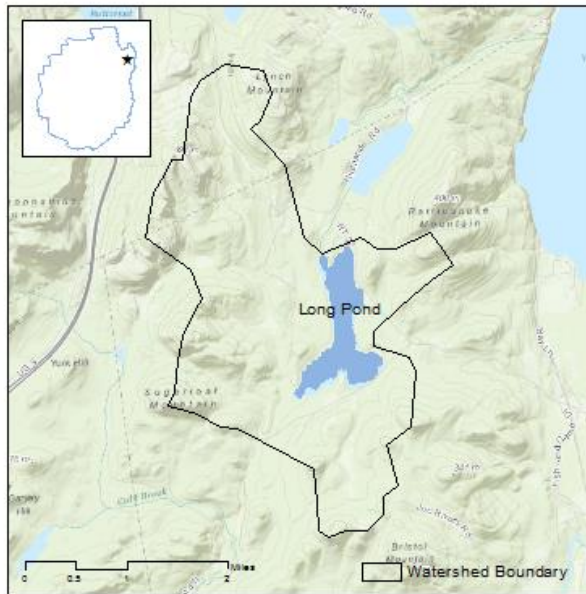


| Location | | |
|---|---|---|
| | County: | Essex |
| | Town: | Willsboro |

| Lake Characteristics | | |
|---|---|---|
| | Surface Area (ha): | 120 |
| | Shoreline Length (km): | 8 |
| | Max. Depth (m): | - |
| | Volume (m³): | 2767201 |
| | Flush rate (times/year): | 3.7 |

| Watershed Characteristics | | |
|---|---|---|
| | Watershed Area (ha): | 1757 |
| | Surface water (%): | 7 |
| | Deciduous Forest (%): | 24 |
| | Evergreen Forest (%): | 29 |
| | Mixed Forest (%): | 30 |
| | Wetlands (%): | 4 |
| | Agricultural (%): | 0 |
| | Residential (%): | 3 |
| | Local Roads (km): | 4.2 |
| | State Roads (km): | 4.2 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Mesotrophic | Alkaline | Well buffered – not sensitive | Moderate |

*Water quality values and historical trends for Long Pond during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 6/18/2017 | 7/20/2017 | 8/27/2017 | | |
| Transparency (m) | 4.6 | 3.1 | 3.8 | 3.8 | No Trend |
| Total Phosphorus (µg/L) | 20.8 | 12.4 | 10.7 | 14.6 | No Trend |
| Chlorophyll-*a* (µg/L) | 4.3 | 0.4 | 3.1 | 2.6 | No Trend |
| Laboratory pH | 8.9 | 8.7 | 8.6 | 8.7 | No Trend |
| Sp. Conductance (µS/cm) | 127.6 | 123.6 | 137.0 | 129.4 | Decreasing |
| Color (Pt-Co) | 82.5 | 37.5 | 24.6 | 48.2 | No Trend |
| Alkalinity (mg/L) | | | 49.4 | 49.4 | Decreasing |
| Chloride (mg/L) | | | 10.6 | 10.6 | No Trend |
| Calcium (mg/L) | | | 13.4 | 13.4 | Not Analyzed |
| Sodium (mg/L) | | | 6.2 | 6.2 | Not Analyzed |

*See table of content for description of water quality indicators

# Long Pond – Time Series
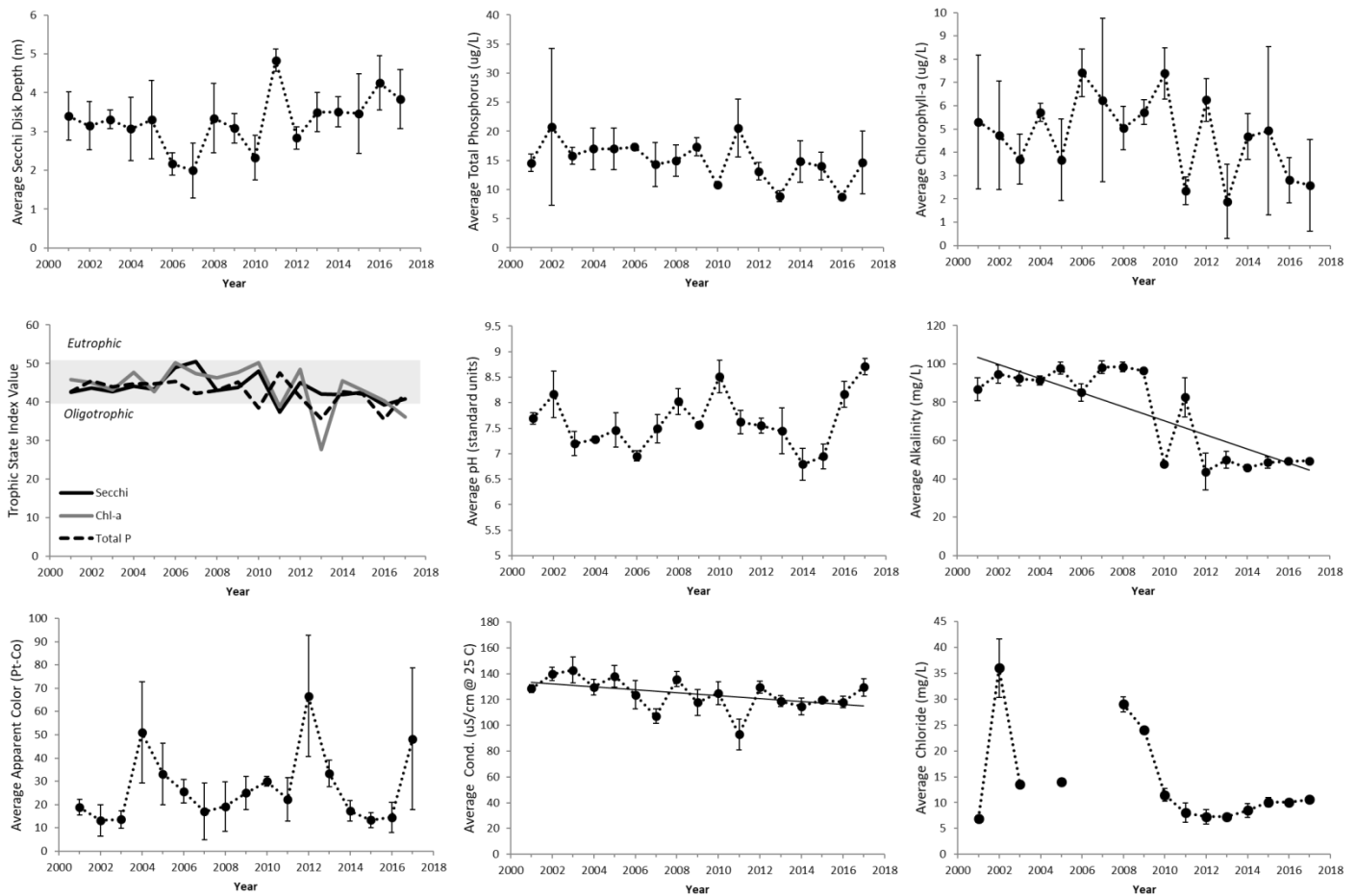


*Annual average values of select water quality indicators for Long Pond, 2001-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Long Pond is a 120 ha lake located in Essex County in the Town of Willsboro.  The lake is located within a 1,757 ha watershed dominated by forests.  Long Pond has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 2001.

- Long Pond is a mesotrophic lake. Transparency, total phosphorus, and chlorophyll-a have not exhibited any significant positive of negative trends since monitoring began in 2001.
- The water samples analyzed in 2017 were found to be alkaline in terms of their acidity, with an average pH of 8.7 units. The alkalinity averaged 49.4 mg/L, indicating that the lake is not sensitive to acid deposition. The alkalinity of the pond is greater than any of the other participating ALAP lakes. We detected a significant downward trend in alkalinity at a rate of approximately 3.7 mg/L/year.
- Sodium and chloride concentration were 6.2 and 10.6 mg/L respectively; these elevated values indicate that the chemistry of the lake is influenced by salted roads in the watershed.
- Calcium concentration averaged 13.4 mg/L in 2017, greater than any of the other participating ALAP lakes. The concentration of calcium is near range needed to support a viable zebra mussel population.

# Loon Lake- Franklin County
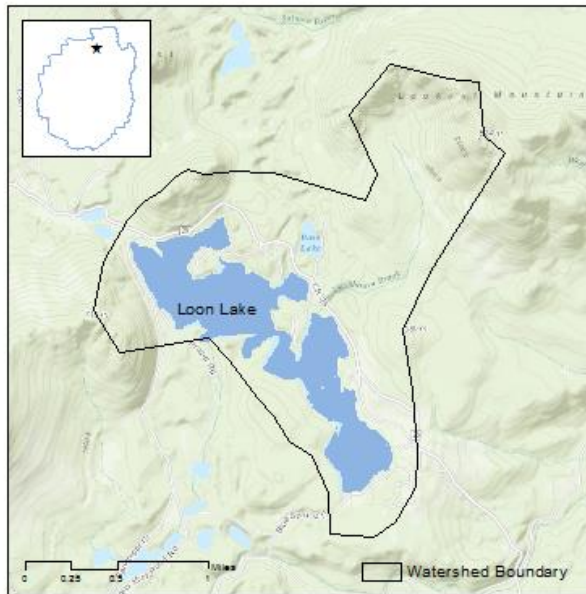


| Location | | |
|---|---|---|
| | County: | Franklin |
| | Town: | Franklin |

| Lake Characteristics | | |
|---|---|---|
| | Surface Area (ha): | 144 |
| | Shoreline Length (km): | 13 |
| | Max. Depth (m): | 16.5 |
| | Volume (m³): | 7399735 |
| | Flush rate (times/year): | 0.7 |

| Watershed Characteristics | | |
|---|---|---|
| | Watershed Area (ha): | 692 |
| | Surface water (%): | 23 |
| | Deciduous Forest (%): | 49 |
| | Evergreen Forest (%): | 12 |
| | Mixed Forest (%): | 1 |
| | Wetlands (%): | 6 |
| | Agricultural (%): | 1 |
| | Residential (%): | 4 |
| | Local Roads (km): | 6.7 |
| | State Roads (km): | 0 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Oligotrophic | Alkaline | Adequate – low sensitivity | Present - Low |

*Water quality values and historical trends for Loon Lake during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit.*

| North Basin | | | | | |
|---|---|---|---|---|---|
| **Water Quality Indicator** | **Sampling Date** | | | **Average** | **Trend** |
| | **June** | **7/28/2017** | **8/28/2017** | | |
| Transparency (m) | | 5.4 | 5.4 | 5.4 | No Trend |
| Total Phosphorus (µg/L) | | 7.5 | 6.7 | 7.1 | Decreasing |
| Chlorophyll-*a* (µg/L) | | 1.4 | 2.2 | 1.8 | Decreasing |
| Laboratory pH | No sample | 7.3 | 8.0 | 7.7 | Increasing |
| Sp. Conductance (µS/cm) | | 32.2 | 61.7 | 47.0 | Decreasing |
| Color (Pt-Co) | | 21.4 | 18.2 | 19.8 | No Trend |
| Alkalinity (mg/L) | | | 13.8 | 13.8 | No Trend |
| Chloride (mg/L) | | | 2.8 | 2.8 | No Trend |
| Calcium (mg/L) | | | 3.3 | 3.3 | Not Analyzed |
| Sodium (mg/L) | | | 1.7 | 1.7 | Not Analyzed |

| Water Quality Indicator | South Basin | | | Average |
| --- | --- | --- | --- | --- |
| | **Sampling Date** | | | |
| | June | 7/28/2017 | 8/28/2017 | |
| Transparency (m) | No sample | 4.3 | 4.4 | 4.3 |
| Total Phosphorus (μg/L) | | 8.2 | 6.9 | 7.5 |
| Chlorophyll-*a* (μg/L) | | 2.4 | 2.9 | 2.7 |
| Laboratory pH | | 7.3 | 8.0 | 7.6 |
| Sp. Conductance (μS/cm) | | 30.6 | 33.0 | 31.8 |
| Color (Pt-Co) | | 21.4 | 26.7 | 24.1 |
| Alkalinity (mg/L) | | | 13.9 | 13.9 |
| Chloride (mg/L) | | | 2.5 | 2.5 |
| Calcium (mg/L) | | | 3.2 | 3.2 |
| Sodium (mg/L) | | | 1.5 | 1.5 |

*See table of content for description of water quality indicators

# Loon Lake Franklin County– Time Series
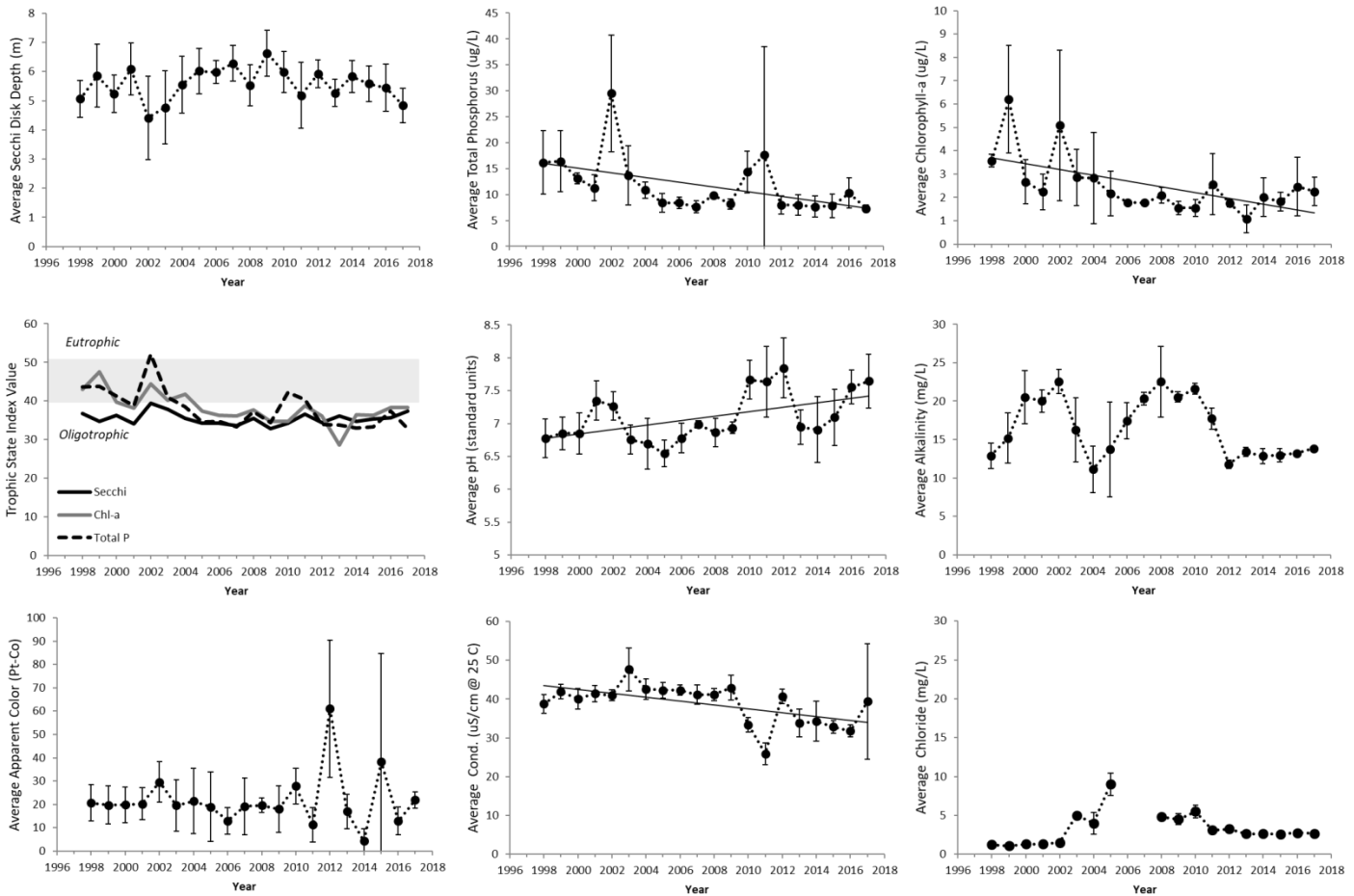


*Annual average values of select water quality indicators for Loon Lake, 1998-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Loon Lake is a 144 ha lake located in Franklin County in the Town of Franklin.  The lake is located within a 692 ha watershed dominated by forests.  Loon Lake has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 1998.

- Loon Lake is an oligotrophic lake. The transparency has been relatively stable over the past 20 years, with a historical average of 5.5 meters. Both total phosphorus and chlorophyll-a concentrations have exhibited a significant downward trend at a rate of approximately 0.5 and 0.1 µg/L/year respectively.
- Water samples from 2017 were found to be alkaline in terms of their acidity, with a lake wide average pH of 7.8 units. We detected a significant upward trend in pH at a rate of 0.03 units/year. The alkalinity of the Lake averaged 13.8 mg/L, indicating that the lake has low sensitivity to acid deposition.
- Sodium and chloride concentrations averaged 1.6 and 2.7 mg/L respectively.  These concentrations suggest that the chemistry of the lake is influenced by the 6.7 km of roads in the watershed, but that influence is relatively low.

# Loon Lake- Warren County
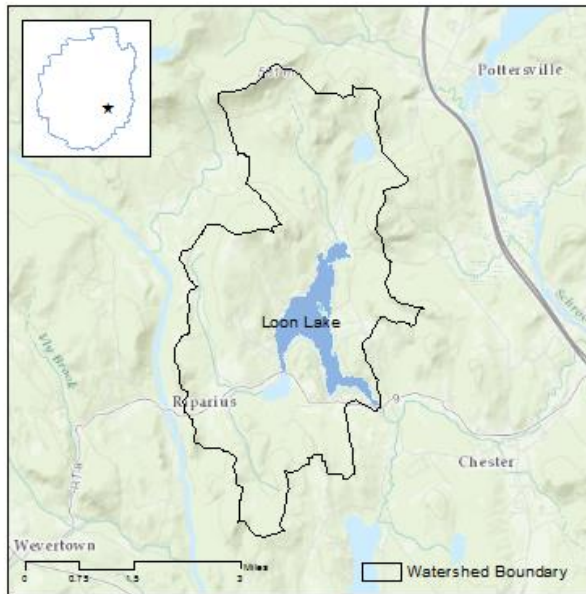


| Location | | |
|---|---|---|
| | County: | Warren |
| | Town: | Chester |

| Lake Characteristics | | |
|---|---|---|
| | Surface Area (ha): | 212 |
| | Shoreline Length (km): | 20 |
| | Max. Depth (m): | - |
| | Volume (m³): | - |
| | Flush rate (times/year): | - |

| Watershed Characteristics | | |
|---|---|---|
| | Watershed Area (ha): | 3363 |
| | Surface water (%): | 9 |
| | Deciduous Forest (%): | 16 |
| | Evergreen Forest (%): | 35 |
| | Mixed Forest (%): | 24 |
| | Wetlands (%): | 10 |
| | Agricultural (%): | 0 |
| | Residential (%): | 6 |
| | Local Roads (km): | 22 |
| | State Roads (km): | 10.6 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Mesotrophic | Alkaline | Adequate – low sensitivity | Moderate |

*Water quality values and historical trends for Loon Lake during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 6/25/2017 | 7/29/2017 | 8/21/2017 | | |
| Transparency (m) | 4.4 | 3.2 | 2.7 | 3.4 | Not Analyzed-5 years of data needed |
| Total Phosphorus (µg/L) | 25.0 | 10.4 | 89.1 | 41.5 | |
| Chlorophyll-*a* (µg/L) | 2.3 | 2.3 | 0.8 | 1.8 | |
| Laboratory pH | 7.4 | 8.4 | 8.4 | 8.1 | |
| Sp. Conductance (µS/cm) | 98.2 | 94.5 | 90.8 | 94.5 | |
| Color (Pt-Co) | 31.1 | 34.3 | 34.3 | 33.2 | |
| Alkalinity (mg/L) | | | 19.2 | 19.2 | |
| Chloride (mg/L) | | | 17.5 | 17.5 | |
| Calcium (mg/L) | | | 6.8 | 6.8 | |
| Sodium (mg/L) | | | 9.6 | 9.6 | |

*See table of content for description of water quality indicators

# Loon Lake Warren County – Time Series
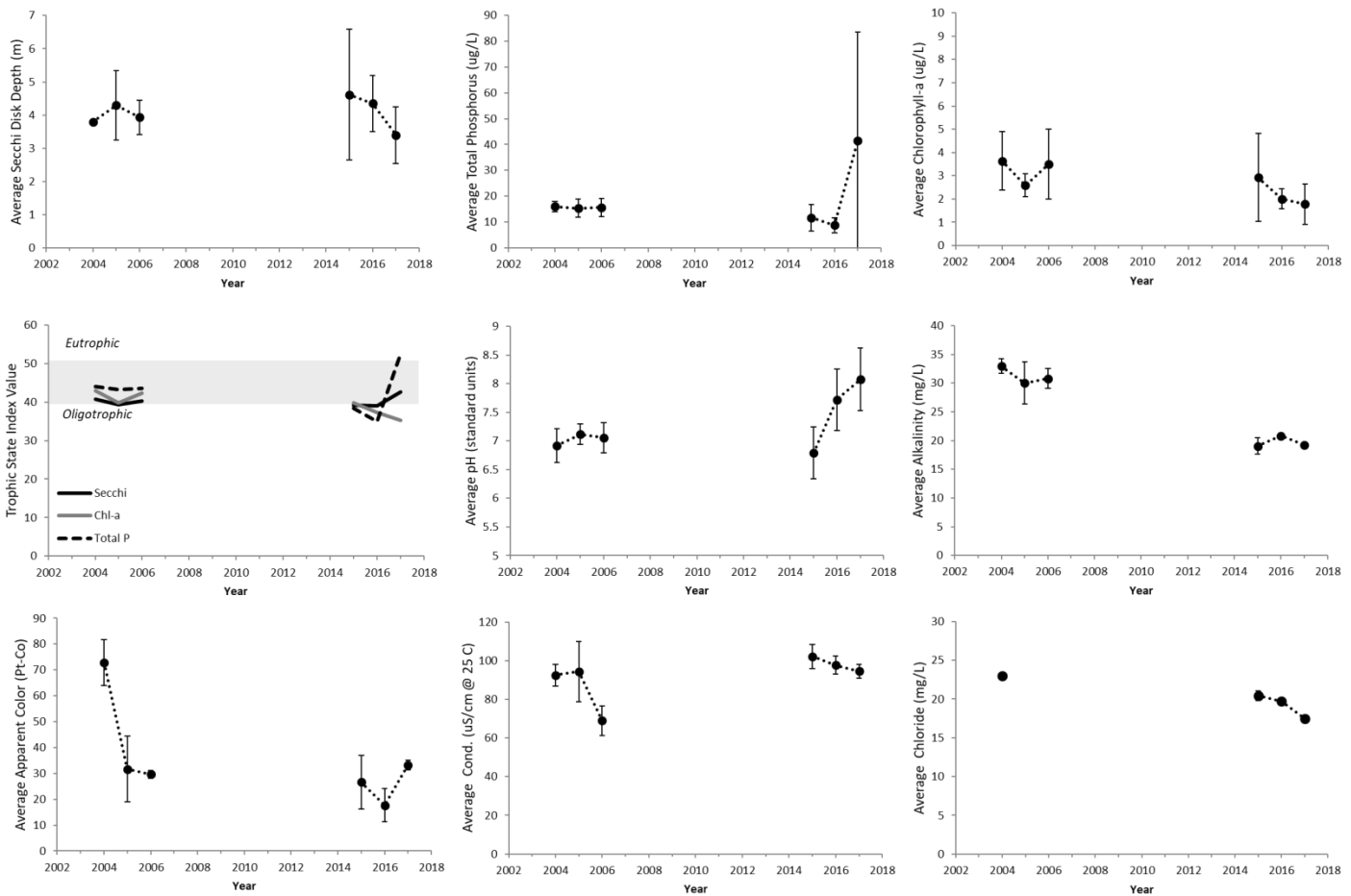


*Annual average values of select water quality indicators for Loon Lake, 2004-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Loon Lake is a 212 ha lake located in Warren County in the Town of Franklin.  The lake is located within a 3,363 ha watershed dominated by forests.  Loon Lake began participation in ALAP in 2004-2006, and again in 2015-present. Trend analysis will be performed on the data after five consecutive years of collection.

- Loon Lake is a mesotrophic water body. The average transparency depth and chlorophyll-a concentration, are similar to the values observed in the early 2000's; however, the average total phosphorus concentration was elevated in 2017. An unusually high value of 89.1 µg/L was detected in the August sample.
- Water sample from 2017 were found to be alkaline in terms of their acidity. The alkalinity was 19.2 mg/L, indicating that the lake has low sensitivity to acid deposition. The alkalinity is greater than 80% of participating ALAP Lakes.
- Sodium and chloride concentrations were 9.6 and 17.5 mg/L respectively in 2017, indicating that the chemistry of the lake is highly influenced by the 32.6 km of roads in the watershed. The chloride concentration of Loon Lake is greater than 87% of participating lakes.

# Lower Chateaugay Lake
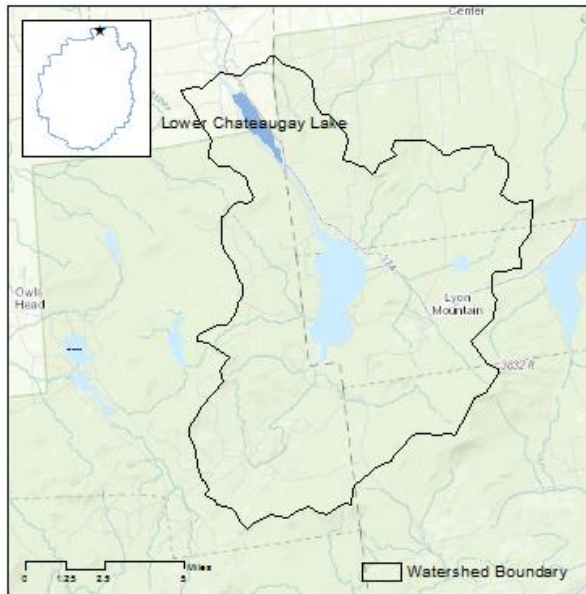


| Location | | |
|---|---|---|
| | County: | Franklin |
| | Town: | Bellmont |

| Lake Characteristics | | |
|---|---|---|
| | Surface Area (ha): | 234 |
| | Shoreline Length (km): | 10 |
| | Max. Depth (m): | 7.6 |
| | Volume (m³): | 8410944 |
| | Flush rate (times/year): | 16.67 |

| Watershed Characteristics | | |
|---|---|---|
| | Watershed Area (ha): | 26000 |
| | Surface water (%): | 6 |
| | Deciduous Forest (%): | 54 |
| | Evergreen Forest (%): | 17 |
| | Mixed Forest (%): | 8 |
| | Wetlands (%): | 9 |
| | Agricultural (%): | 0 |
| | Residential (%): | 2 |
| | Local Roads (km): | 73.8 |
| | State Roads (km): | 20.3 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Mesotrophic | Alkaline | Well buffered – not sensitive | Moderate |

*Water quality values and historical trends for Lower Chateaugay Lake during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 6/25/2017 | 7/16/2017 | 8/19/2017 | | |
| Transparency (m) | 4.0 | 3.2 | 2.8 | 3.3 | No Trend |
| Total Phosphorus (µg/L) | 13.8 | 13.6 | 19.0 | 15.5 | No Trend |
| Chlorophyll-*a* (µg/L) | 2.8 | 4.8 | 6.1 | 4.6 | Decreasing |
| Laboratory pH | 8.4 | 7.5 | 7.6 | 7.8 | No Trend |
| Sp. Conductance (µS/cm) | 77.3 | 71.7 | 76.3 | 75.1 | No Trend |
| Color (Pt-Co) | 34.3 | 43.9 | 34.3 | 37.5 | No Trend |
| Alkalinity (mg/L) | | | 29.1 | 29.1 | Decreasing |
| Chloride (mg/L) | | | 7.3 | 7.3 | No Trend |
| Calcium (mg/L) | | | 7.4 | 7.4 | Not Analyzed |
| Sodium (mg/L) | | | 4.1 | 4.1 | Not Analyzed |

*See table of content for description of water quality indicators

# Lower Chateaugay Lake – Time Series
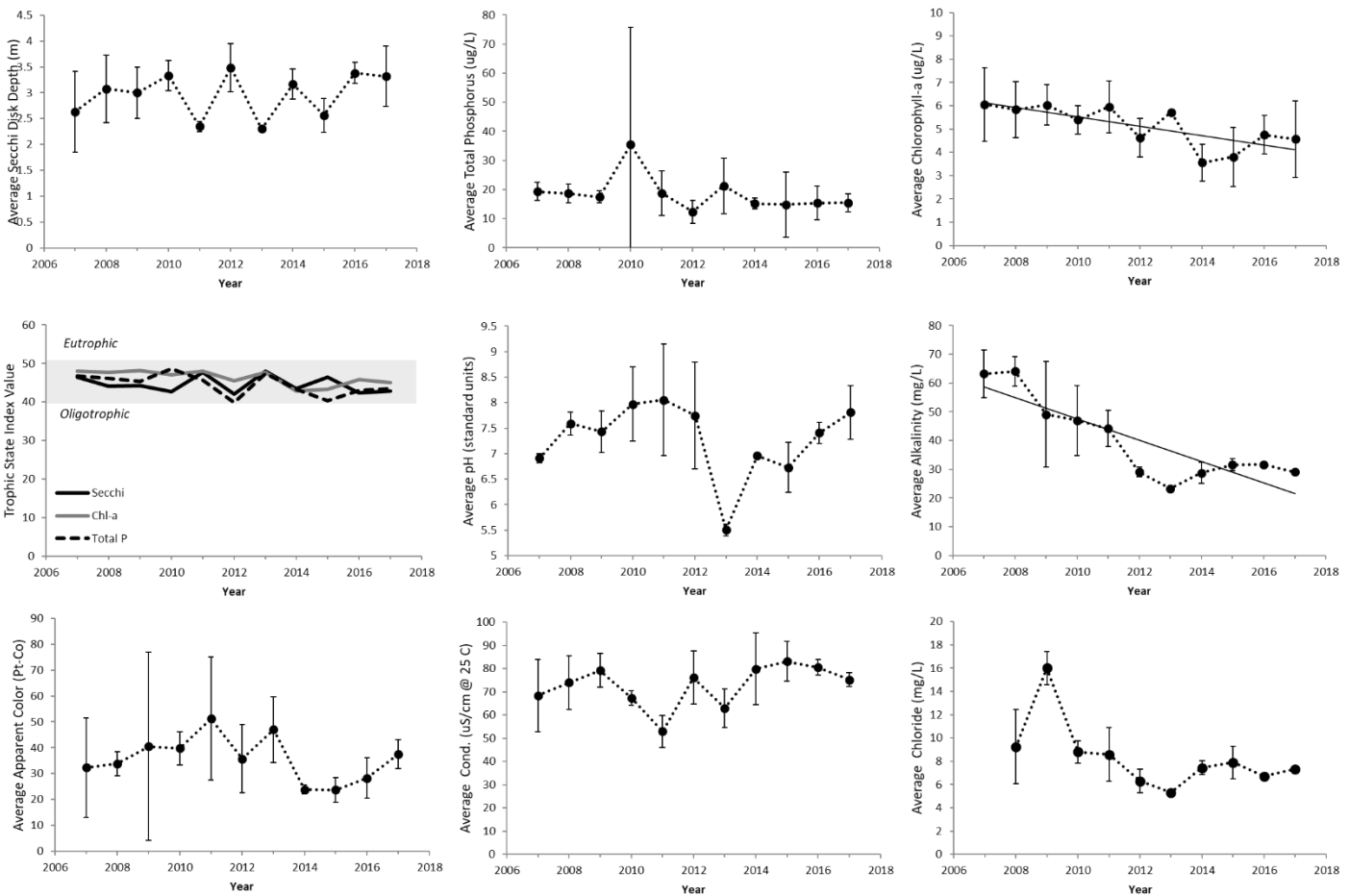


*Annual average values of select water quality indicators for Lower Chateaugay Lake, 2007-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Lower Chateaugay Lake is a 234 ha lake located in Franklin County in the Town of Bellmont.  The lake is located within a 26,000 ha watershed dominated by forests.  Lower Chateaugay Lake has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 2007.

- Lower Chateaugay is a mesotrophic lake; the trophic status has been stable since monitoring began.  The transparency depth and total phosphorus concentration have not exhibited a positive or negative trend since 2007. Chlorophyll-a concentration has been trending down at a rate of approximately 0.2 µg/L/year.
- The water samples analyzed in 2017 were found to be alkaline in terms of their acidity.  The alkalinity of the lake was 29.1 mg/L, indicating that the lake is not sensitive to acid deposition. The alkalinity of Lower Chateaugay is greater than 91% of participating ALAP lakes in 2017. Although the alkalinity has been similar over the last six seasons, a statistically significant downward trend of 3.7 mg/L/year exists for the entire historical dataset.
- Sodium and chloride concentrations of the lake were 4.1 and 7.3 mg/L respectively. These values indicate that the chemistry of the lake is influenced by the 94km of roads in the watershed.

# Lower Saranac Lake
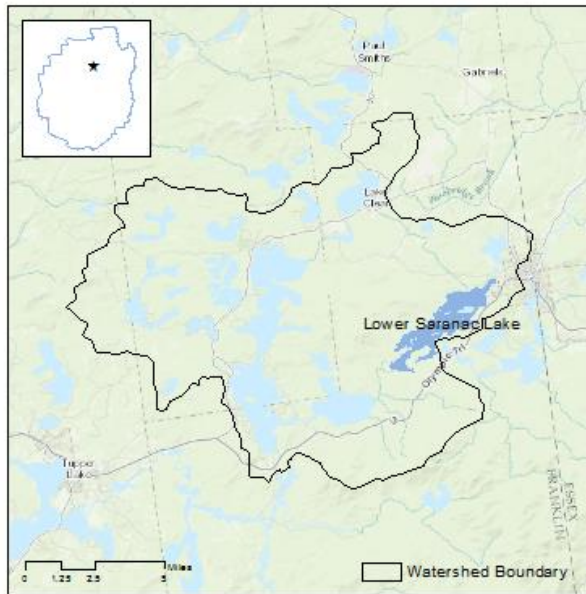


| Location | | |
|---|---|---|
| | County: | Franklin |
| | Town: | Harrietstown |

| Lake Characteristics | | |
|---|---|---|
| | Surface Area (ha): | 868 |
| | Shoreline Length (km): | 46 |
| | Max. Depth (m): | 18.3 |
| | Volume (m³): | 78985872 |
| | Flush rate (times/year): | 2.5 |

| Watershed Characteristics | | |
|---|---|---|
| | Watershed Area (ha): | 32160 |
| | Surface water (%): | 20 |
| | Deciduous Forest (%): | 27 |
| | Evergreen Forest (%): | 32 |
| | Mixed Forest (%): | 7 |
| | Wetlands (%): | 11 |
| | Agricultural (%): | 0 |
| | Residential (%): | 2 |
| | Local Roads (km): | 54.9 |
| | State Roads (km): | 46.1 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Mesotrophic | Circumneutral | Adequate – low sensitivity | Moderate |

*Water quality values and historical trends for Lower Saranac Lake during the 2017 sampling season. Trend analysis was not performed on sodium or calcium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 5/28/2017 | July | 8/27/2017 | | |
| Transparency (m) | 3.5 | | 2.5 | 3.0 | No Trend |
| Total Phosphorus (µg/L) | 10.0 | | 12.7 | 11.3 | No Trend |
| Chlorophyll-*a* (µg/L) | 1.7 | | 5.6 | 3.6 | No Trend |
| Laboratory pH | 6.8 | | 7.4 | 7.1 | Increasing |
| Sp. Conductance (µS/cm) | 57.7 | No Sample | 62.7 | 60.2 | No Trend |
| Color (Pt-Co) | 34.3 | | 43.9 | 39.1 | No Trend |
| Alkalinity (mg/L) | | | 12.8 | 12.8 | Decreasing |
| Chloride (mg/L) | | | 10.4 | 10.4 | No Trend |
| Calcium (mg/L) | | | 4.3 | 4.3 | Not Analyzed |
| Sodium (mg/L) | | | 5.3 | 5.3 | Not Analyzed |

*See table of content for description of water quality indicators

# Lower Saranac Lake – Time Series
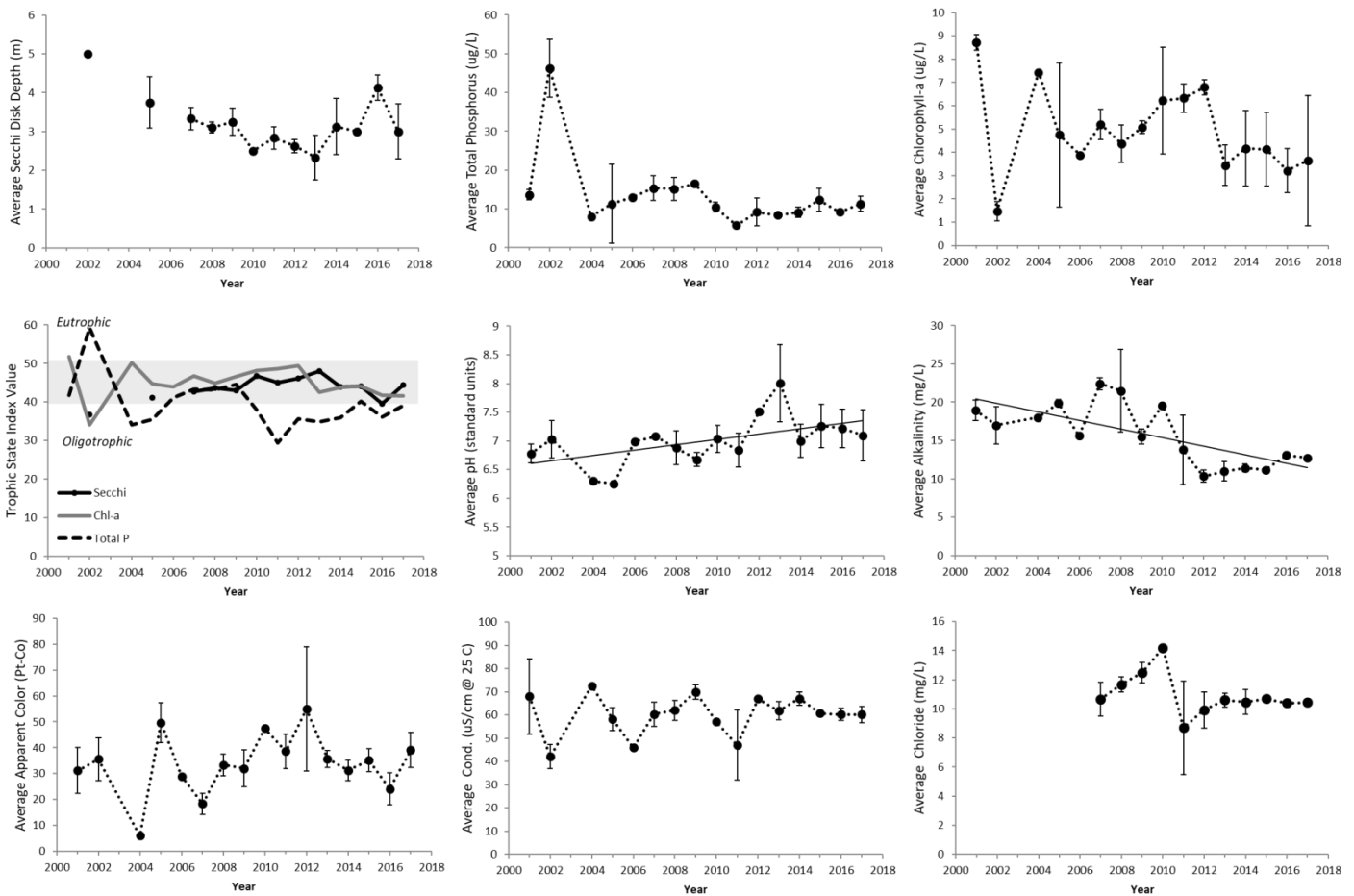


*Annual average values of select water quality indicators for Lower Saranac Lake, 2001-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Lower Saranac Lake is an 868 ha lake located in Franklin County in the Town of Harrietstown.  The lake is located within a 32,160 ha watershed dominated by forests.  Lower Saranac Lake has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 2001.

- Lower Saranac is a mesotrophic water body. The trophic status of the lake typically fluctuates around the oligotrophic mesotrophic boundary. The total phosphorus concentration has remained relatively stable over the last decade, however, chlorophyll-a concentration exhibits a high amount of variability.
- The lake is circumneutral; the average pH of the 2017 samples was 7.1 pH units. We detected an increasing trend in pH at a rate of 0.05 pH units per year.
- The alkalinity of the lake was 12.8 mg/L in 2017, indicating moderate acid neutralizing capacity. Alkalinity has exhibited a downward trend at a rate of 0.6 mg/L/year since monitoring began.
- The chloride concentration of the lake was 10.4 mg/L, which is 52 times greater than background concentrations observed in Adirondack Lakes.  This elevated concentration is likely due to the 100km of roads in the watershed.

# Middle Saranac Lake
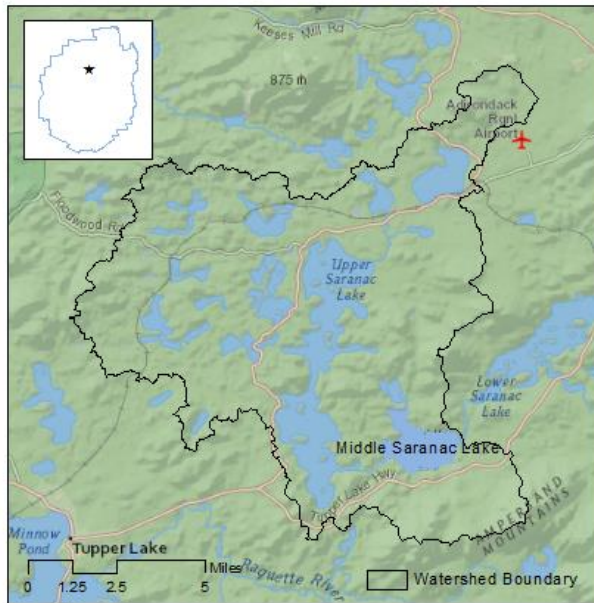


| Location | | County: | Franklin |
|---|---|---|---|
| | | Town: | Harrietstown |

| Lake Characteristics | Surface Area (ha): | 572 |
|---|---|---|
| | Shoreline Length (km): | 18 |
| | Max. Depth (m): | |
| | Volume (m³): | |
| | Flush rate (times/year): | |

| Watershed Characteristics | Watershed Area (ha): | 24007 |
|---|---|---|
| | Surface water (%): | 22 |
| | Deciduous Forest (%): | 28 |
| | Evergreen Forest (%): | 30 |
| | Mixed Forest (%): | 6 |
| | Wetlands (%): | 10 |
| | Agricultural (%): | 0 |
| | Residential (%): | 0 |
| | Local Roads (km): | 30 |
| | State Roads (km): | 34 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Mesotrophic | Circumneutral | Adequate – low sensitivity | Moderate |

*Water quality values and historical trends for Middle Saranac Lake during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 6/11/2017 | 7/15/2017 | 8/17/2017 | | |
| Transparency (m) | 2.7 | 0.8 | 3.0 | 2.2 | No Trend |
| Total Phosphorus (µg/L) | 13.8 | 54.8 | 21.8 | 30.1 | No Trend |
| Chlorophyll-*a* (µg/L) | 1.8 | 8.1 | 6.9 | 5.6 | No Trend |
| Laboratory pH | 7.2 | 7.4 | 7.1 | 7.2 | No Trend |
| Sp. Conductance (µS/cm) | 52.0 | 49.5 | 48.7 | 50.1 | No Trend |
| Color (Pt-Co) | 34.3 | 50.4 | 43.9 | 42.9 | Increasing |
| Alkalinity (mg/L) | | | 12.2 | 12.2 | Decreasing |
| Chloride (mg/L) | | | 8.2 | 8.2 | No Trend |
| Calcium (mg/L) | | | 3.6 | 3.6 | Not Analyzed |
| Sodium (mg/L) | | | 4.2 | 4.2 | Not Analyzed |

*See table of content for description of water quality indicators

# Middle Saranac Lake – Time Series
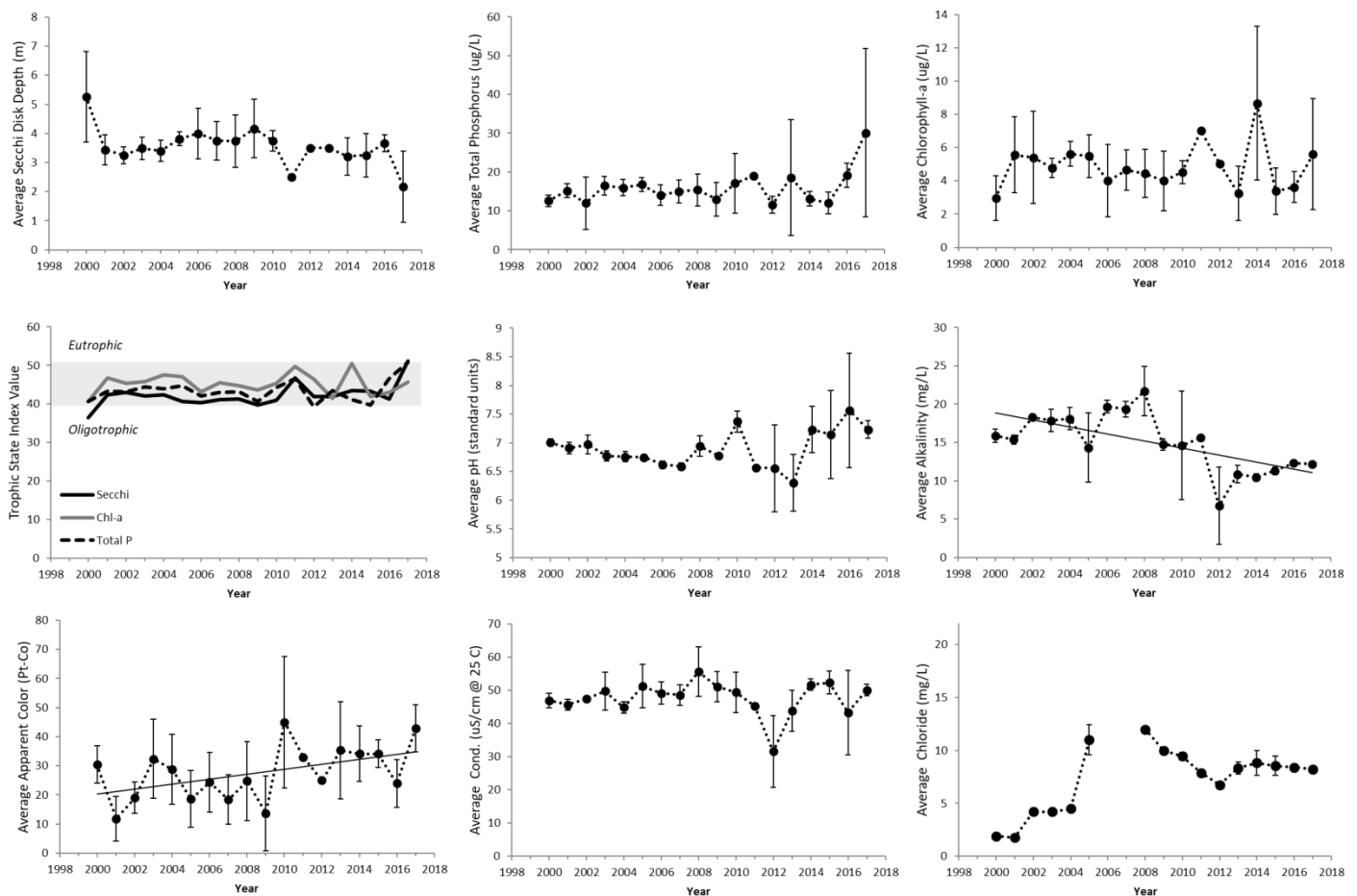


*Annual average values of select water quality indicators for Middle Saranac Lake, 2000-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Middle Saranac Lake is a 572 ha lake located in Franklin County in the Town of Harrietstown. The lake is located within a 24,000 ha watershed dominated by forests. Middle Saranac Lake has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 2000.

- Middle Saranac Lake is a stable mesotrophic lake. The transparency depths as well as the total phosphorus and chlorophyll concentrations have not exhibited any significant trend since 2000.
- We detected a slight, yet significant increasing trend in water color. Color is a surrogate measure of the amount of dissolved organic material in the water.
- Water samples analyzed from 2017 were circumneutral in terms of their acidity. The alkalinity was 12.2 mg/L indicating low sensitivity to acid deposition. The alkalinity has exhibited a significant down ward trend at a rate of approximately 0.5 mg/L/year.
- Sodium and chloride concentration were 4.2 and 8.2 mg/L respectively, indicating that the chemistry of the lake is influenced by the 64 km of roads in the watershed.

# Mink Pond
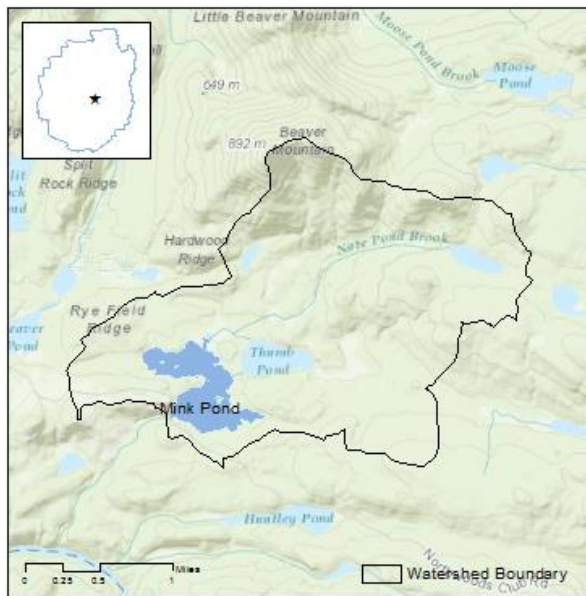


| Location | County: | Essex |
|---|---|---|
| | Town: | Minerva |

| Lake Characteristics | Surface Area (ha): | 56 |
|---|---|---|
| | Shoreline Length (km): | 9 |
| | Max. Depth (m): | - |
| | Volume (m³): | - |
| | Flush rate (times/year): | - |

| Watershed Characteristics | Watershed Area (ha): | 1024 |
|---|---|---|
| | Surface water (%): | 10 |
| | Deciduous Forest (%): | 54 |
| | Evergreen Forest (%): | 18 |
| | Mixed Forest (%): | 16 |
| | Wetlands (%): | 2 |
| | Agricultural (%): | 0 |
| | Residential (%): | 1 |
| | Local Roads (km): | 0 |
| | State Roads (km): | 0 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Oligotrophic | Circumneutral | Moderate | Not Significant |

*Water quality values and historical trends for Mink Pond during the 2017 sampling season. Trend analysis will be performed after five years of consecutive data collection. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 7/9/2017 | 8/8/2017 | 9/11/2017 | | |
| Transparency (m) | 2.0 | 1.9 | 2.6 | 2.2 | |
| Total Phosphorus (µg/L) | 11.7 | 9.1 | 10.1 | 10.3 | |
| Chlorophyll-*a* (µg/L) | 1.5 | 1.3 | | 1.4 | |
| Laboratory pH | 7.1 | 6.6 | 7.9 | 7.2 | Not analyzed |
| Sp. Conductance (µS/cm) | 17.5 | 9.9 | 19.4 | 15.6 | |
| Color (Pt-Co) | 47.2 | 50.4 | 53.6 | 50.4 | |
| Alkalinity (mg/L) | | 5.5 | | 5.5 | |
| Chloride (mg/L) | | 0.3 | | 0.3 | |
| Calcium (mg/L) | | 1.6 | | 1.6 | |
| Sodium (mg/L) | | 0.3 | | 0.3 | |

*See table of content for description of water quality indicators

# Mink Pond – Time Series
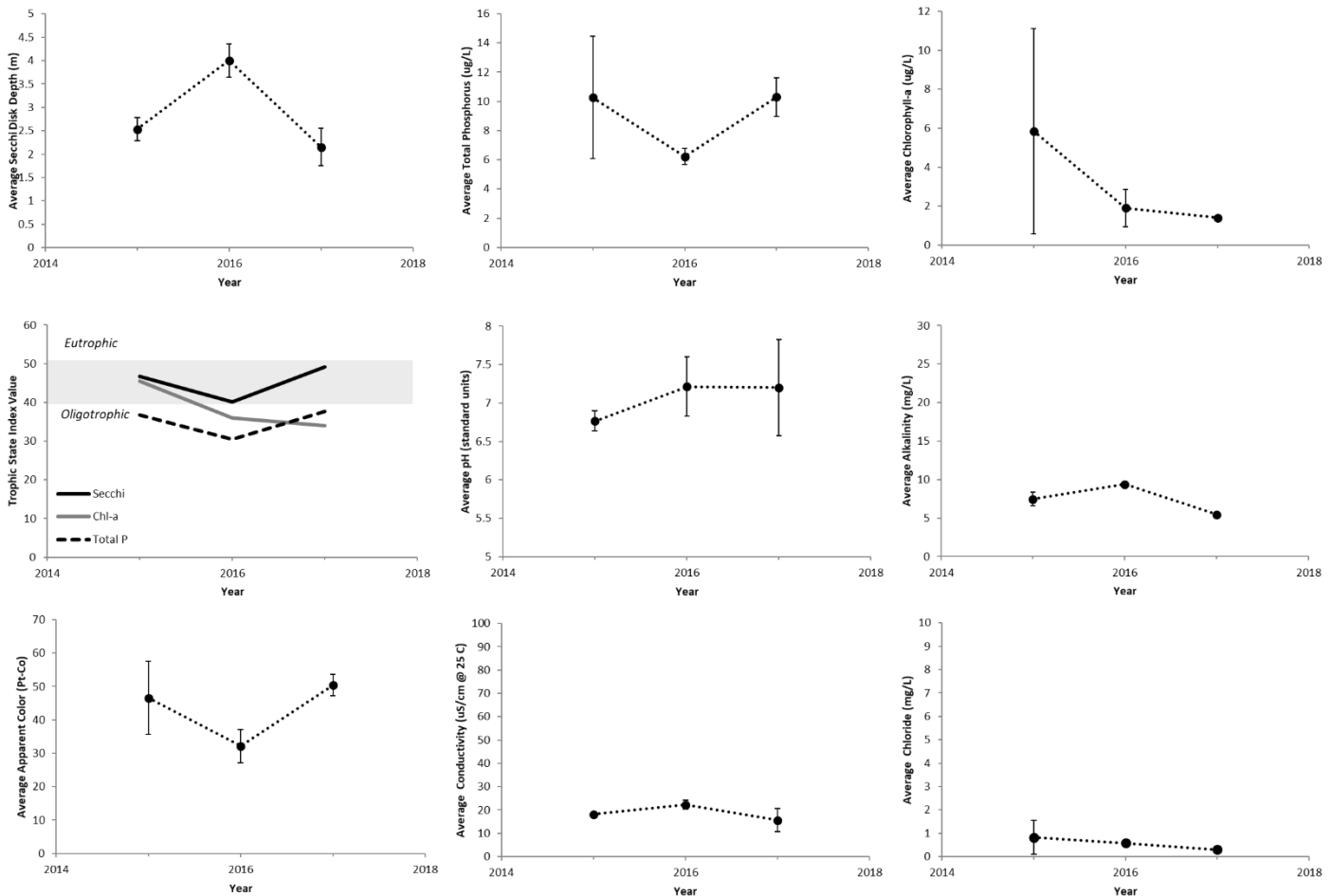


*Annual average values of select water quality indicators for Mink Pond, 2005-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Mink Pond is a 56 ha pond located in Essex County in the Town of Minerva. The pond is located within a 1,024 ha watershed dominated by forests. Trend analysis will be performed on water quality indicators after five years of data collection. Currently little data exists on the morphology of the pond

- Mink Pond is best classified as an oligotrophic waterbody based on the values for total phosphorus and chlorophyll-a; however, the transparency depth suggests the lake is more mesotrophic. A disparity of this type is likely caused by the elevated color in the water. Color is a surrogate measure of dissolved organic matter, which has a strong ability to attenuate light, and therefore transparency depth. The color of Mink Pond averaged 50.4 Pt-Co units, which is greater than 82% of participating ALAP lakes in 2017.
- The pH of the water samples received in 2017 were found to be circumneutral in terms of their acidity. The alkalinity was 5.5 mg/L, indicating moderate sensitivity to acid deposition.
- Sodium and chloride concentration were 0.3 and 0.3 mg/L respectively; these values are within the range we would expect for a pond with no salted roads in the watershed.

# Moss Lake
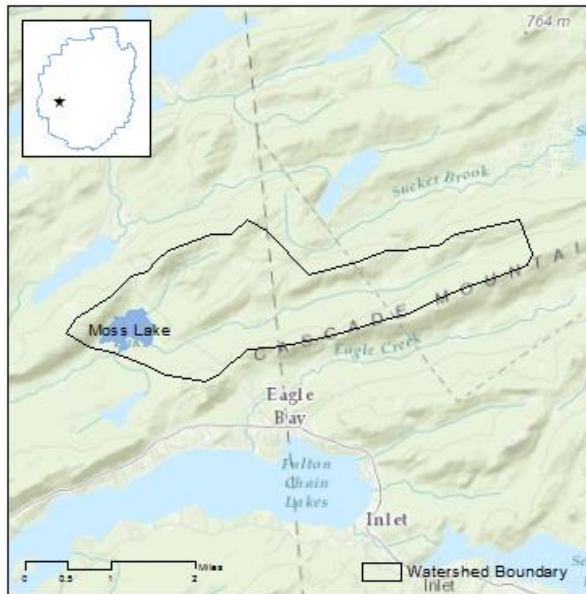


| Location | | |
|---|---|---|
| | County: | Herkimer |
| | Town: | Webb |

| Lake Characteristics | | |
|---|---|---|
| | Surface Area (ha): | 49 |
| | Shoreline Length (km): | 4 |
| | Max. Depth (m): | 15.2 |
| | Volume (m³): | 2597578 |
| | Flush rate (times/year): | 1.6 |

| Watershed Characteristics | | |
|---|---|---|
| | Watershed Area (ha): | 1312 |
| | Surface water (%): | 9 |
| | Deciduous Forest (%): | 37 |
| | Evergreen Forest (%): | 4 |
| | Mixed Forest (%): | 9 |
| | Wetlands (%): | 38 |
| | Agricultural (%): | 0 |
| | Residential (%): | 0 |
| | Local Roads (km): | 2.7 |
| | State Roads (km): | 0 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Oligotrophic | Circumneutral | Moderate | Not Significant |

*Water quality values and historical trends for Moss Lake during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 6/22/2017 | 7/27/2017 | 8/21/2017 | | |
| Transparency (m) | 3.7 | 3.7 | 3.3 | 3.5 | No Trend |
| Total Phosphorus (µg/L) | 4.1 | 5.4 | 5.9 | 5.1 | Decreasing |
| Chlorophyll-*a* (µg/L) | 2.0 | 1.1 | 1.6 | 1.6 | No Trend |
| Laboratory pH | 6.9 | 6.9 | 7.1 | 6.9 | No Trend |
| Sp. Conductance (µS/cm) | 16.7 | 17.0 | 17.6 | 17.1 | Decreasing |
| Color (Pt-Co) | 40.7 | 37.5 | 43.9 | 40.7 | No Trend |
| Alkalinity (mg/L) | | | 6.6 | 6.6 | No Trend |
| Chloride (mg/L) | | | 0.9 | 0.9 | No Trend |
| Calcium (mg/L) | | | 2.1 | 2.1 | Not Analyzed |
| Sodium (mg/L) | | | 0.8 | 0.8 | Not Analyzed |

*See table of content for description of water quality indicators

# Moss Lake – Time Series
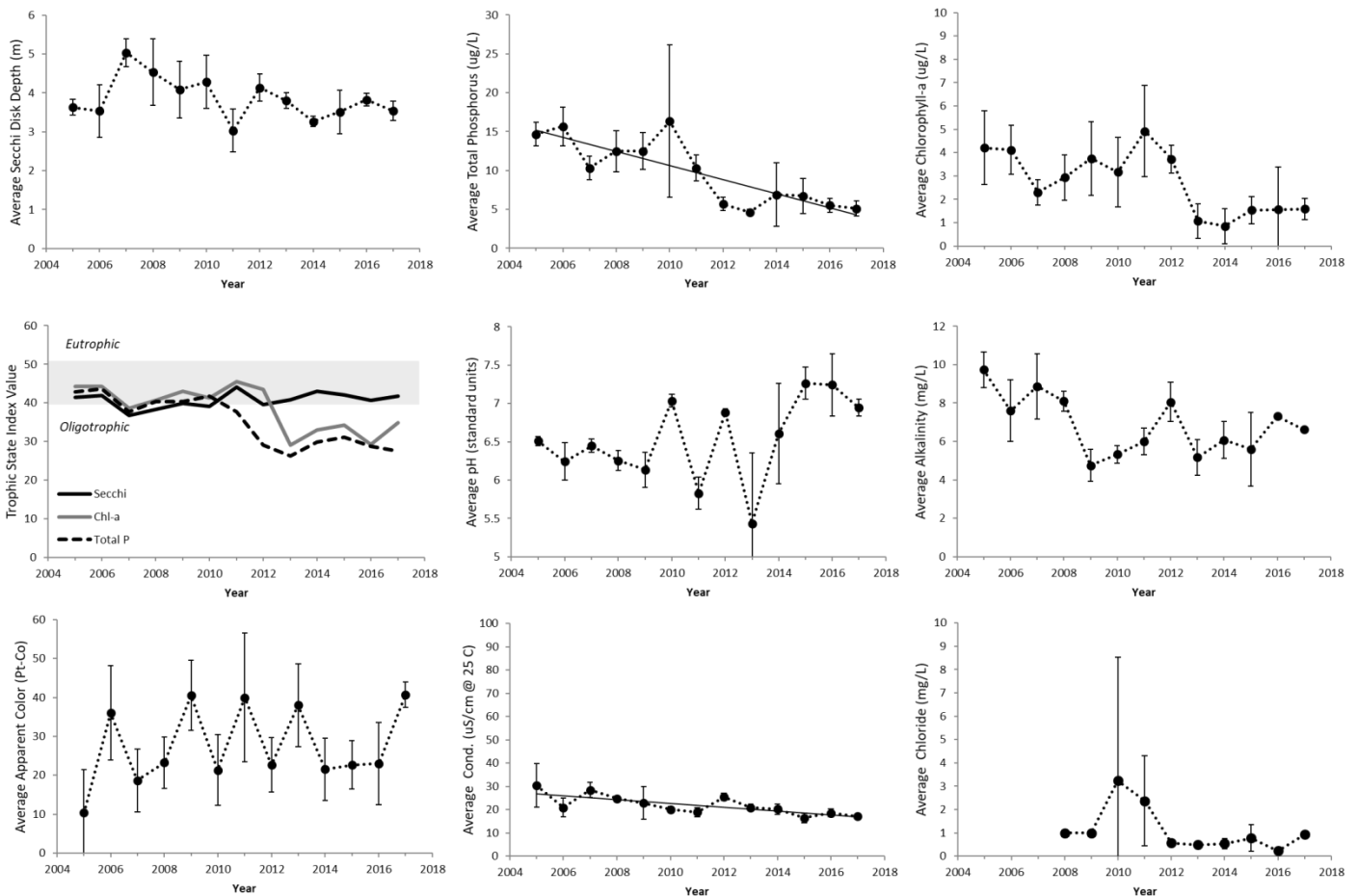


*Annual average values of select water quality indicators for Moss Lake, 2005-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Moss Lake is a 49 ha lake located in Herkimer County in the Town of Webb.  The lake is located within a 1,312 ha watershed dominated by forests.  Moss Lake has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 2005.

- Moss Lake is classified as oligotrophic based on phosphorus and chlorophyll concentrations. However, the secchi transparency is more indicative of a mesotrophic lake. A disparity of this nature is typically the result of elevated dissolved organic material or non-algal turbidity; since the watershed of Moss Lake is composed of 38% wetland, it is likely the former. Total phosphorus has exhibited a significant downward trend at a rate of approximately 0.9 µg/L/year. Secchi transparency and chlorophyll-a have been variable, and exhibited no significant trend.
- The water samples analyzed in 2017 were found to be circumneutral in terms of their acidity. The alkalinity was 6.6 mg/L, indicating moderate sensitivity to acid deposition.
- Sodium and chloride concentration were 0.8 and 0.9 mg/L, these values are within the range expected for lake with few roads in the watershed.

# Mountain View Lake
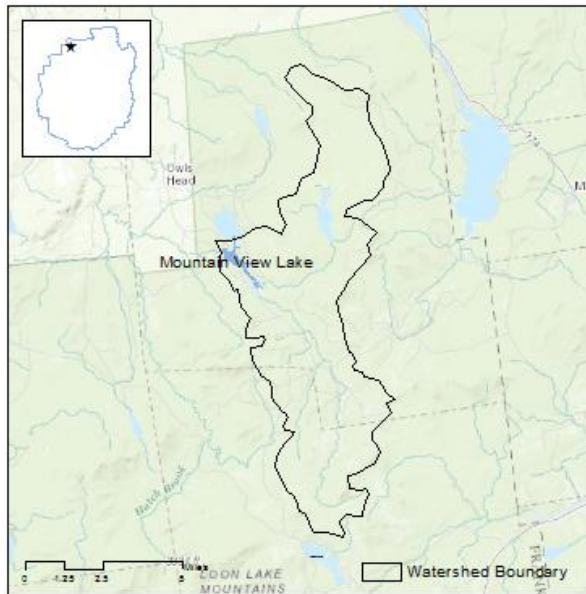


| Location | | | |
|---|---|---|---|
| | | County: | St Lawrence |
| | | Town: | Hopkinton |

| Lake Characteristics | | | |
|---|---|---|---|
| | | Surface Area (ha): | 95 |
| | | Shoreline Length (km): | 12 |
| | | Max. Depth (m): | 2.7 |
| | | Volume (m³): | 542542 |
| | | Flush rate (times/year): | 135.4 |

| Watershed Characteristics | | | |
|---|---|---|---|
| | | Watershed Area (ha): | 11448 |
| | | Surface water (%): | 5 |
| | | Deciduous Forest (%): | 60 |
| | | Evergreen Forest (%): | 12 |
| | | Mixed Forest (%): | 2 |
| | | Wetlands (%): | 16 |
| | | Agricultural (%): | 0 |
| | | Residential (%): | 1 |
| | | Local Roads (km): | 12.8 |
| | | State Roads (km): | 0 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Eutrophic | Alkaline | Well buffered- not sensitivity | Not Significant |

*Water quality values and historical trends for Mountain View Lake during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 6/21/2017 | 7/20/2017 | 8/17/2017 | | |
| Transparency (m) | 2.0 | 1.9 | VOB | 1.9 | No Trend |
| Total Phosphorus (µg/L) | 22.7 | 27.4 | 28.2 | 26.1 | No Trend |
| Chlorophyll-*a* (µg/L) | 2.5 | 5.8 | 9.3 | 5.9 | No Trend |
| Laboratory pH | 7.5 | 8.3 | 7.5 | 7.7 | No Trend |
| Sp. Conductance (µS/cm) | 53.4 | 48.4 | 55.1 | 52.3 | No Trend |
| Color (Pt-Co) | 92.2 | 76.1 | 82.5 | 83.6 | No Trend |
| Alkalinity (mg/L) | | | 30.5 | 30.5 | No Trend |
| Chloride (mg/L) | | | 0.6 | 0.6 | No Trend |
| Calcium (mg/L) | | | 6.6 | 6.6 | Not Analyzed |
| Sodium (mg/L) | | | 1.2 | 1.2 | Not Analyzed |

*See table of content for description of water quality indicators

# Mountain View Lake – Time Series
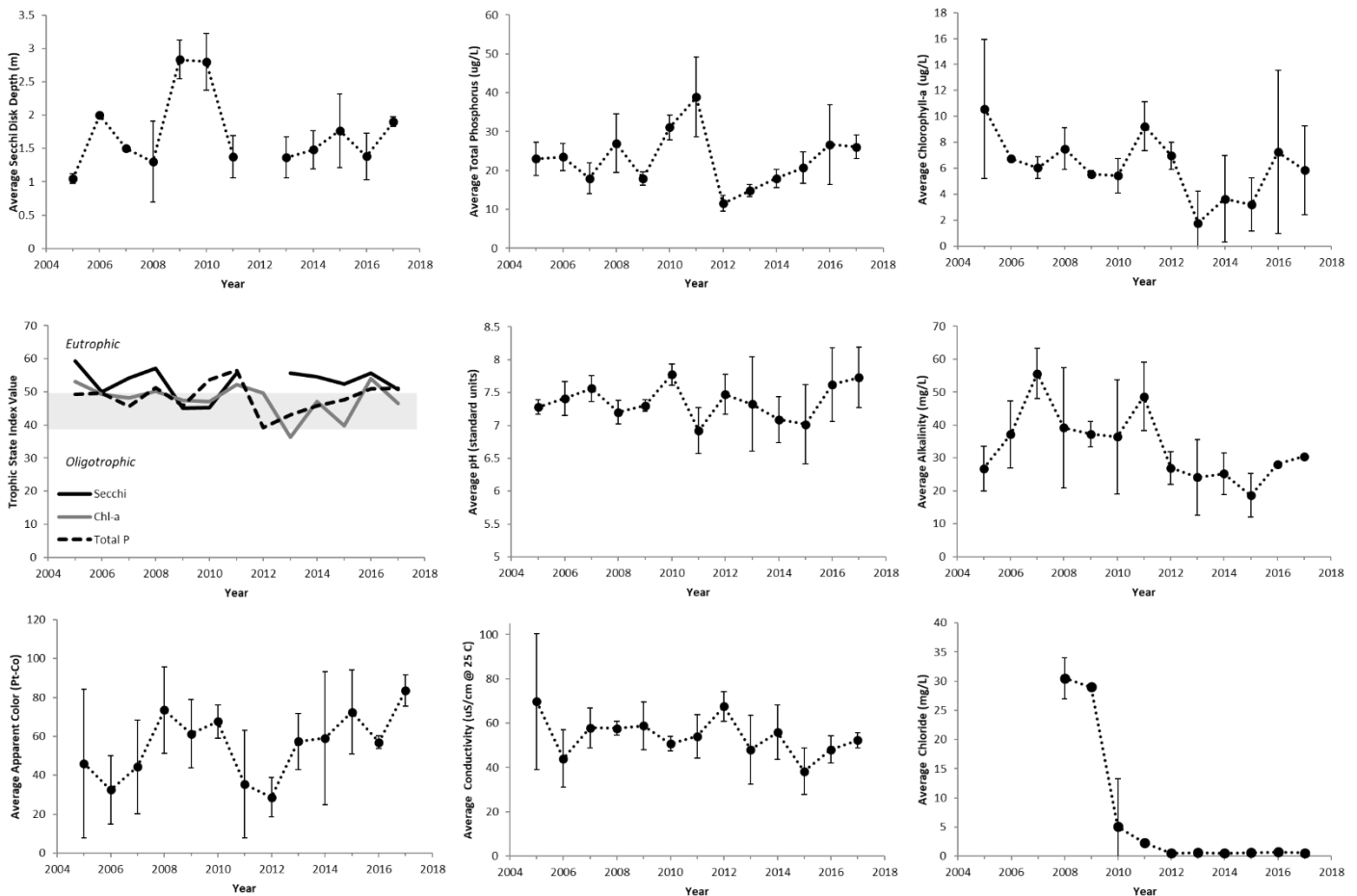


*Annual average values of select water quality indicators for Mountain View Lake, 2005-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Mountain View Lake is a 95 ha lake located in Franklin County in the Town of Bellmont.  The lake is located within a 11,448 ha watershed dominated by forests.  Mountain View Lake has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 2005.

- Mountain View Lake is best classified as a eutrophic lake. Water quality indicators of the lake are highly variable within years and across years. This variability is a result of the high flushing rate through the shallow reservoir, estimated to be 135 times/year. The lake is highly colored and as a result the transparency is relatively low. The color of the water averaged 83.6 Pt-Co units, greater than 97% of the participating ALAP lakes.
- The water samples analyzed in 2017 were found to be circumneutral to slightly alkaline in terms of their acidity. The alkalinity was 30.5 mg/L, indicating that the lake is well buffered against pH change.
- Sodium and chloride concentration averaged 1.2 and 0.6 mg/L respectively, indicating that the chemistry of the lake is not significantly influenced by road salt. Elevated chloride concentrations detected in 2008-2009 are almost certainly an error.  Significant modifications were made in our analytical method for chloride in 2011, since that time the chloride concentration has been low and stable.

# Osgood Pond
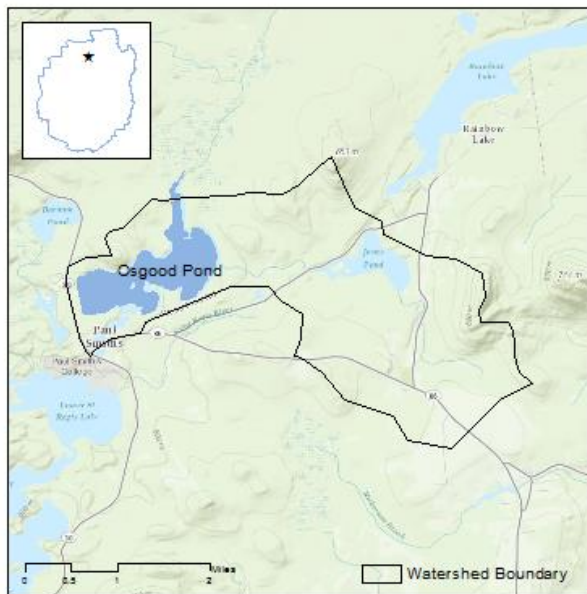


| Location | | |
|---|---|---|
| | County: | Franklin |
| | Town: | Brighton |

| Lake Characteristics | | |
|---|---|---|
| | Surface Area (ha): | 108 |
| | Shoreline Length (km): | 12 |
| | Max. Depth (m): | - |
| | Volume (m³): | 8277726 |
| | Flush rate (times/year): | 1.4 |

| Watershed Characteristics | | |
|---|---|---|
| | Watershed Area (ha): | 1871 |
| | Surface water (%): | 15 |
| | Deciduous Forest (%): | 22 |
| | Evergreen Forest (%): | 43 |
| | Mixed Forest (%): | 2 |
| | Wetlands (%): | 10 |
| | Agricultural (%): | 2 |
| | Residential (%): | 4 |
| | Local Roads (km): | 8.9 |
| | State Roads (km): | 4.7 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Mesotrophic | Circumneutral | Adequate – low sensitivity | Moderate |

*Water quality values and historical trends for Osgood Pond during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 6/15/2017 | 7/18/2017 | 8/21/2017 | | |
| Transparency (m) | 2.5 | 2.1 | 2.1 | 2.2 | No Trend |
| Total Phosphorus (µg/L) | 40.7 | 18.0 | 19.7 | 26.1 | No Trend |
| Chlorophyll-*a* (µg/L) | 5.0 | 5.8 | 6.7 | 5.8 | No Trend |
| Laboratory pH | 7.6 | 7.3 | 7.2 | 7.3 | No Trend |
| Sp. Conductance (µS/cm) | 60.9 | 56.1 | 57.7 | 58.2 | Increasing |
| Color (Pt-Co) | 60.1 | 82.5 | 72.9 | 71.8 | No Trend |
| Alkalinity (mg/L) | | | 17.6 | 17.6 | Decreasing |
| Chloride (mg/L) | | | 7.8 | 7.8 | No Trend |
| Calcium (mg/L) | | | 4.9 | 4.9 | Not Analyzed |
| Sodium (mg/L) | | | 3.6 | 3.6 | Not Analyzed |

*See table of content for description of water quality indicators

# Osgood Pond – Time Series
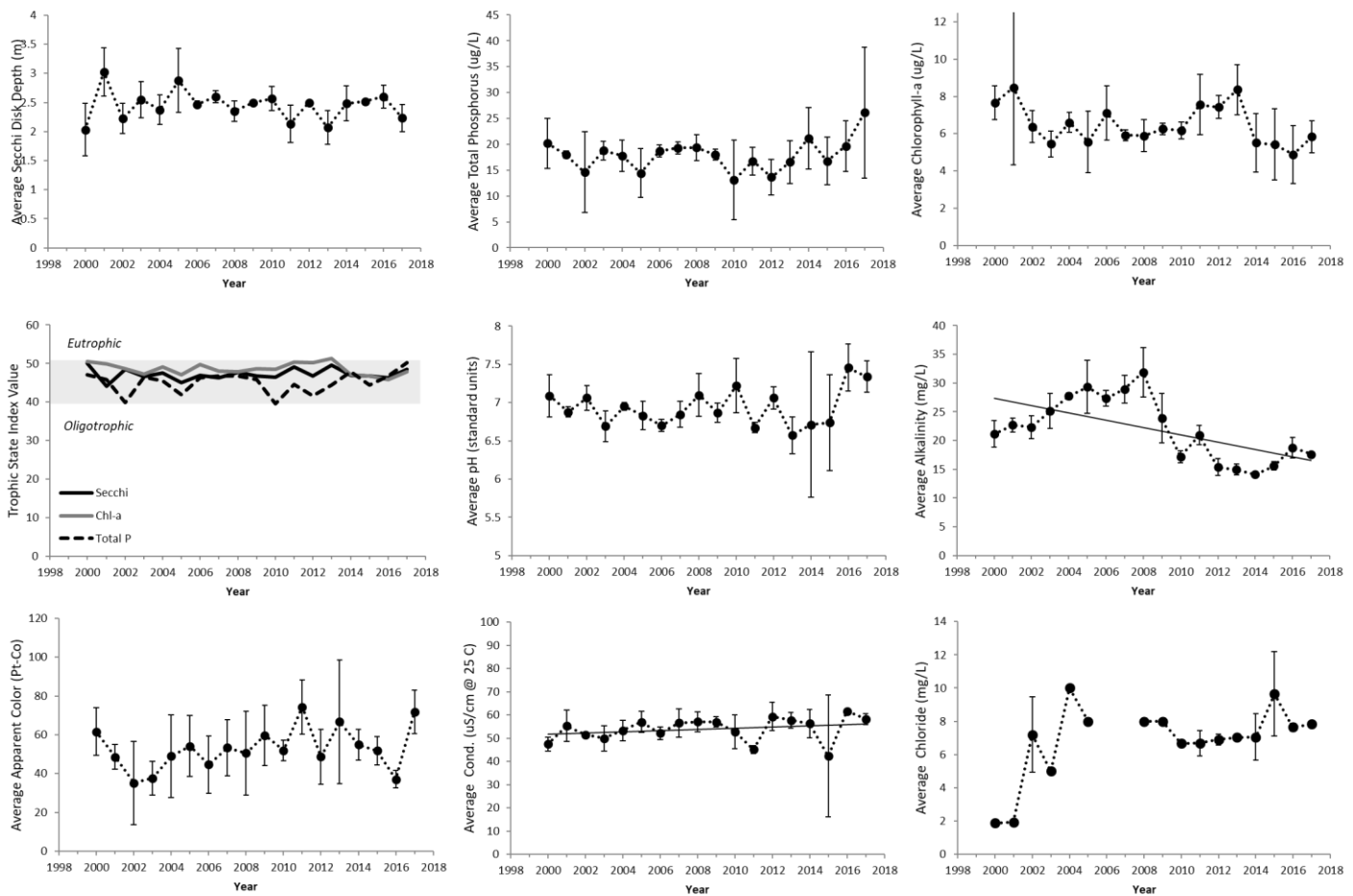


*Annual average values of select water quality indicators for Osgood Pond, 2000-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Osgood Pond is a 108 ha lake located in Franklin County in the Town of Brighton. The lake is located within a 1,871 ha watershed dominated by forests. Osgood Pond has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 2000.

- Osgood Pond is a mesotrophic lake; the trophic status has been fairly stable over the 18 years of monitoring. Transparency depth, and concentrations of chlorophyll-a, and total phosphorus have not exhibited any statistical trends.
- The water samples analyzed in 2017 were found to be circumneutral in terms of their acidity, averaging 7.3 pH units. The alkalinity of the lake was 17.6 mg/L, indicating that the lake has low sensitivity to acid deposition. The alkalinity of Osgood Pond has exhibited a downward trend at a rate of approximately 0.6 mg/L/year.
- Sodium and chloride concentrations of the lake were 3.6 and 7.8 mg/L respectively. These values indicate that the chemistry of the lake is moderately influenced by the 13.6 km of roads in the watershed. Low chloride concentrations recorded in 2000 and 2001 are likely an error. Chloride methodology was greatly improved in 2010.

# Otter Pond



| Location | | |
|---|---|---|
| | County: | St Lawrence |
| | Town: | Hopkinton |

| Lake Characteristics | | |
|---|---|---|
| | Surface Area (ha): | 4 |
| | Shoreline Length (km): | 1 |
| | Max. Depth (m): | 2.4 |
| | Volume (m³): | 32967 |
| | Flush rate (times/year): | 22.5 |

| Watershed Characteristics | | |
|---|---|---|
| | Watershed Area (ha): | 95 |
| | Surface water (%): | 5 |
| | Deciduous Forest (%): | 0 |
| | Evergreen Forest (%): | 35 |
| | Mixed Forest (%): | 43 |
| | Wetlands (%): | 17 |
| | Agricultural (%): | 0 |
| | Residential (%): | 0 |
| | Local Roads (km): | 0 |
| | State Roads (km): | 0 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Mesotrophic | Acidic (threatened) | Low | Not Significant |

*Water quality values and historical trends for Otter Pond during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 6/24/2017 | 7/20/2017 | 8/20/2017 | | |
| Transparency (m) | 1.6 | 0.5 | 0.6 | 0.9 | No Trend |
| Total Phosphorus (µg/L) | 15.2 | 10.6 | 21.5 | 15.8 | No Trend |
| Chlorophyll-*a* (µg/L) | 4.6 | 1.3 | 1.1 | 2.3 | No Trend |
| Laboratory pH | 5.7 | 5.9 | 5.6 | 5.7 | No Trend |
| Sp. Conductance (µS/cm) | 7.3 | 7.2 | 10.2 | 8.2 | Decreasing |
| Color (Pt-Co) | 63.2 | 60.0 | 69.7 | 64.3 | No Trend |
| Alkalinity (mg/L) | | | 1.7 | 1.7 | No Trend |
| Chloride (mg/L) | | | 0.7 | 0.7 | No Trend |
| Calcium (mg/L) | | | 0.6 | 0.6 | Not Analyzed |
| Sodium (mg/L) | | | 0.4 | 0.4 | Not Analyzed |

*See table of content for description of water quality indicators

# Otter Pond- Time Series
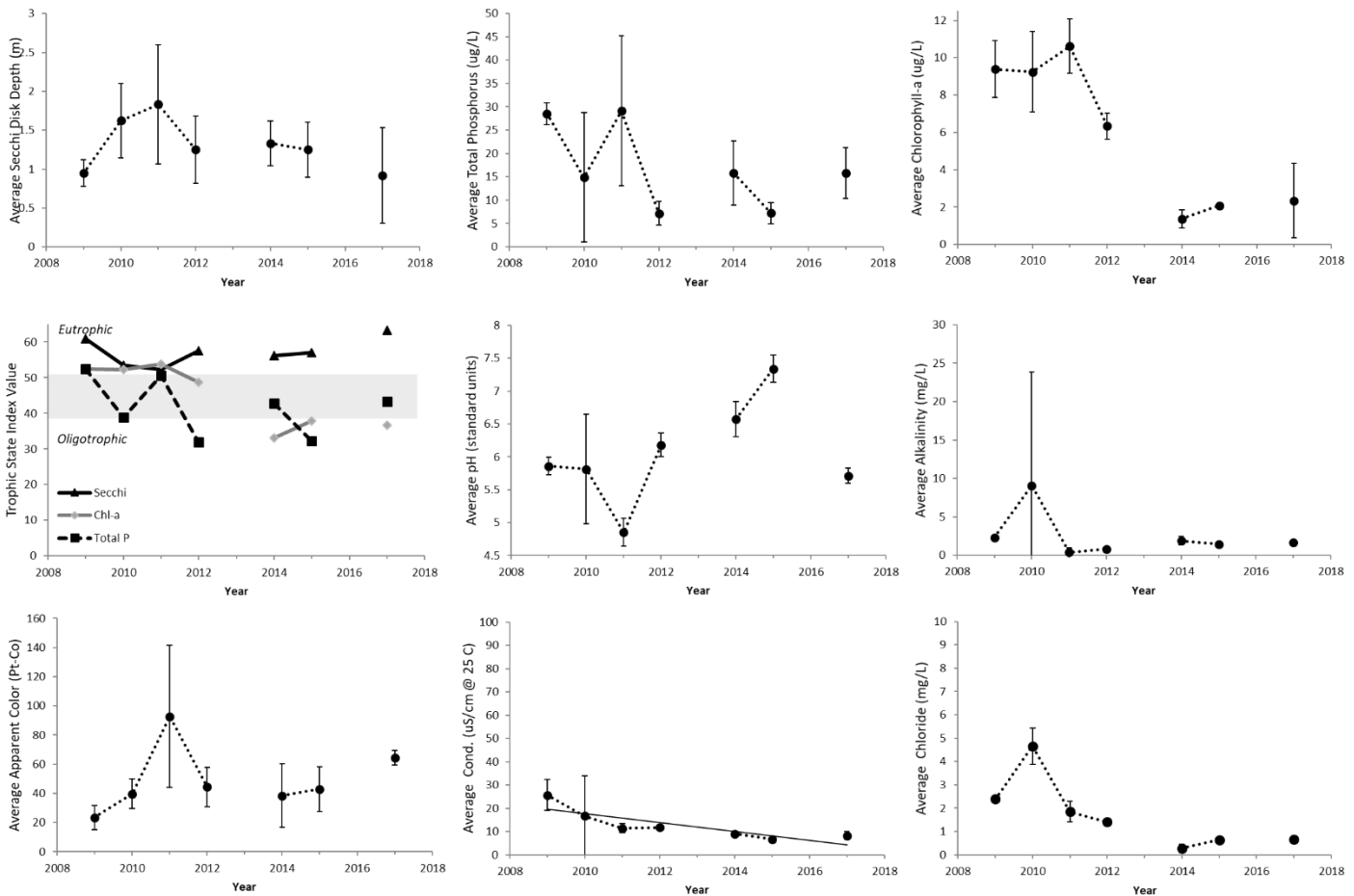


*Annual average values of select water quality indicators for Otter Pond 2009-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Otter Pond is a 4 ha pond located in St. Lawrence County in the Town of Hopkington.  The lake is located within a 95 ha watershed dominated by forests.  Otter Pond has been monitored by ALAP volunteers and the Adirondack Watershed Institute on and off since 2009.

- The water quality indicators of the pond are highly variable within years as well as between years. This variability is certainly due to the high flushing rate of the shallow pond, which is estimated to be 22 times per year.
- Total phosphorus and chlorophyll-concentrations suggest a mesotrophic classification of the lake. However, transparency depth suggests a eutrophic classification. A disparity of this nature is typically due to elevated amounts of dissolved organic material that attenuate light and result in decreased transparency.  The color of Otter Pond averaged 61.4 Pt-Co units, which is greater than 91% of participating lakes in 2017.
- The pH of the water samples were circumneutral in terms of their acidity. The alkalinity of the pond averaged 1.7 mg/L, indicating that the lake is sensitive to acid deposition.
- Sodium and chloride concentration averaged 0.4 and 0.7 mg/L respectively, and are within the range we would expect for a watershed that lacks roads.

# Paradox Lake
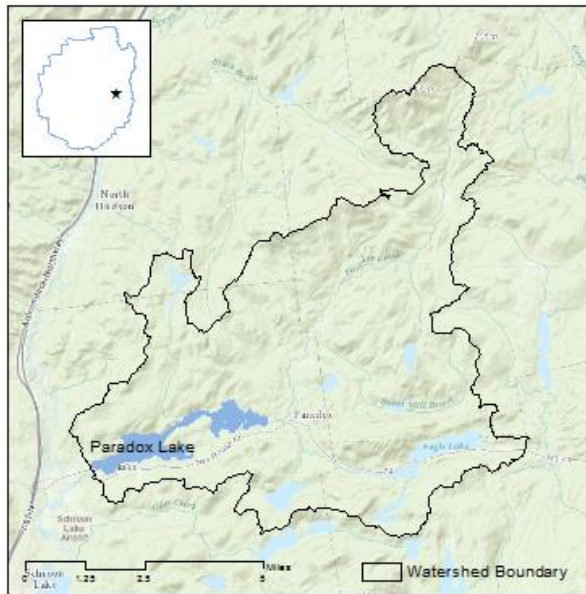


| Location | County: | Essex |
| | Town: | Schroon |

| Lake Characteristics | Surface Area (ha): | 377 |
| | Shoreline Length (km): | 23 |
| | Max. Depth (m): | 18.5 |
| | Volume (m³): | 29745000 |
| | Flush rate (times/year): | 0.4 |

| Watershed Characteristics | Watershed Area (ha): | 11978 |
| | Surface water (%): | 8 |
| | Deciduous Forest (%): | 21 |
| | Evergreen Forest (%): | 42 |
| | Mixed Forest (%): | 20 |
| | Wetlands (%): | 7 |
| | Agricultural (%): | 0 |
| | Residential (%): | 1 |
| | Local Roads (km): | 34 |
| | State Roads (km): | 16.4 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Mesotrophic | Alkaline | Adequate – low sensitivity | Moderate |

*Water quality values and historical trends for Paradox Lake during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | | | Average | Trend |
|---|---|---|---|---|---|---|---|
| | 5/23 | 6/25 | 7/21 | 8/24 | 9/21 | | |
| *Upper Basin* | | | | | | | |
| Transparency (m) | 3.5 | 3.0 | 2.5 | 3.0 | 4.0 | 3.2 | No Trend |
| Total Phosphorus (µg/L) | 6.5 | 10.6 | 9.1 | 25.9 | 6.5 | 11.7 | No Trend |
| Chlorophyll-*a* (µg/L) | 3.9 | 3.6 | 2.7 | 4.3 | 2.3 | 3.4 | No Trend |
| Laboratory pH | 7.6 | 7.5 | 7.8 | 8.5 | 8.5 | 8.0 | No Trend |
| Sp. Cond. (µS/cm) | 66.5 | 71.1 | 65.7 | 70.5 | 78.1 | 70.4 | No Trend |
| Color (Pt-Co) | 24.6 | 34.3 | 40.7 | 34.3 | 21.4 | 31.1 | No Trend |
| Alkalinity (mg/L) | | | | 27.2 | | 27.2 | No Trend |
| Chloride (mg/L) | | | | 6.9 | | 6.9 | No Trend |
| Calcium (mg/L) | | | | 8.3 | | 8.3 | Not Analyzed |
| Sodium (mg/L) | | | | 4.1 | | 4.1 | Not Analyzed |

| Water Quality Indicator | Sampling Date | | | | | Average |
|---|---|---|---|---|---|---|
| | 5/23 | 6/24 | 7/21 | 8/19 | 9/22 | |
| *Lower Basin* | | | | | | |
| Transparency (m) | 4.0 | 4.3 | 3.5 | 3.8 | 4.4 | 4.0 |
| Total Phosphorus (µg/L) | 7.8 | 8.4 | 10.2 | 10.1 | 6.3 | 8.5 |
| Chlorophyll-*a* (µg/L) | 2.0 | 2.0 | 3.0 | 3.2 | 2.5 | 2.5 |
| Laboratory pH | 7.3 | 7.5 | 7.6 | 8.1 | 8.5 | 7.8 |
| Sp. Cond. (µS/cm) | 66.2 | 67.1 | 63.2 | 58.1 | 70.6 | 65.0 |
| Color (Pt-Co) | 21.4 | 27.9 | 40.7 | 31.1 | 18.2 | 27.9 |
| Alkalinity (mg/L) | | | | 21.2 | | 21.2 |
| Chloride (mg/L) | | | | 7.0 | | 7.0 |
| Calcium (mg/L) | | | | 6.7 | | 6.7 |
| Sodium (mg/L) | | | | 3.9 | | 3.9 |

*See table of content for description of water quality indicators

# Paradox Lake– Time Series
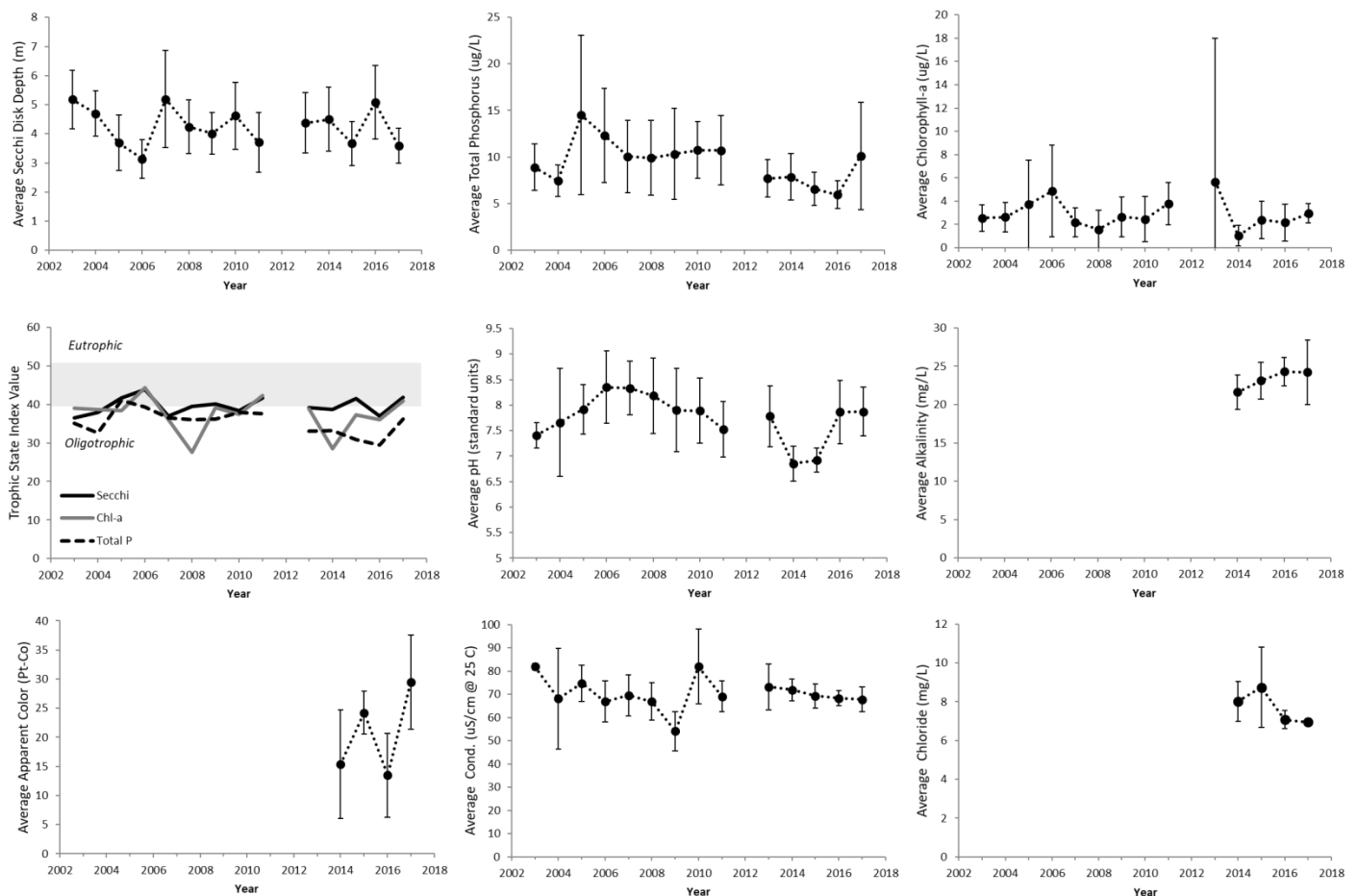


*Lake wide annual average values of select water quality indicators for Paradox Lake, 2003-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05). Data from 2003-2013 from CSLAP, Data from 2014-present from ALAP.*

## Summary of Findings

Paradox Lake is a 377 ha lake located in Essex County in the Town of Schroon.  The lake is located within an 11,978 ha watershed dominated by forests.  Paradox Lake has participated in ALAP since 2014, having been enrolled in CSLAP since 2003.

- Paradox Lake is a mesotrophic Lake that commonly fluctuates on the border of oligotrophy.  Transparency depth, and the concentrations of total phosphorus and chlorophyll-a have not exhibited any statistical trends since monitoring began 1998.

- Water samples from 2017 were found to be alkaline in terms of their acidity, with a lake wide average of 7.9 pH units. Alkalinity averaged 27.2 mg/L, indicating that the lake is well buffered, and not sensitive to acid deposition.

- Sodium and chloride concentration averaged 4.1 and 6.9 mg/L in 2017, indicating the chemistry of the lake is influenced by the 50 km of roads in the watershed.

# Pine Lake
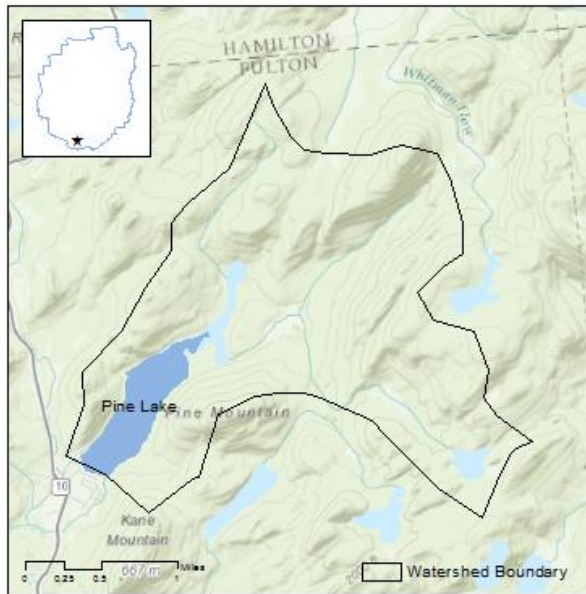


| Location | County: | Fulton |
|---|---|---|
| | Town: | Caroga |

| Lake Characteristics | Surface Area (ha): | 67 |
|---|---|---|
| | Shoreline Length (km): | 5 |
| | Max. Depth (m): | - |
| | Volume (m³): | 2490981 |
| | Flush rate (times/year): | 3.5 |

| Watershed Characteristics | Watershed Area (ha): | 1129 |
|---|---|---|
| | Surface water (%): | 8 |
| | Deciduous Forest (%): | 49 |
| | Evergreen Forest (%): | 5 |
| | Mixed Forest (%): | 15 |
| | Wetlands (%): | 21 |
| | Agricultural (%): | 0 |
| | Residential (%): | 0 |
| | Local Roads (km): | 0.8 |
| | State Roads (km): | 0 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Oligotrophic | Circumneutral | Moderate | Not Significant |

*Water quality values and historical trends for Pine Lake during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 6/21/2017 | 7/18/2017 | 8/25/2017 | | |
| Transparency (m) | 4.5 | 4.5 | 5.5 | 4.8 | No Trend |
| Total Phosphorus (µg/L) | 8.5 | 7.1 | 8.1 | 7.9 | No Trend |
| Chlorophyll-*a* (µg/L) | 1.4 | 2.0 | 0.6 | 1.3 | No Trend |
| Laboratory pH | 6.7 | 6.6 | 7.7 | 7.0 | Increasing |
| Sp. Conductance (µS/cm) | 10.1 | 9.3 | 8.3 | 9.2 | Decreasing |
| Color (Pt-Co) | 21.4 | 27.9 | 18.2 | 22.5 | No Trend |
| Alkalinity (mg/L) | | | 2.6 | 2.6 | No Trend |
| Chloride (mg/L) | | | 0.7 | 0.7 | Decreasing |
| Calcium (mg/L) | | | 0.9 | 0.9 | Not Analyzed |
| Sodium (mg/L) | | | 0.6 | 0.6 | Not Analyzed |

*See table of content for description of water quality indicators

# Pine Lake – Time Series
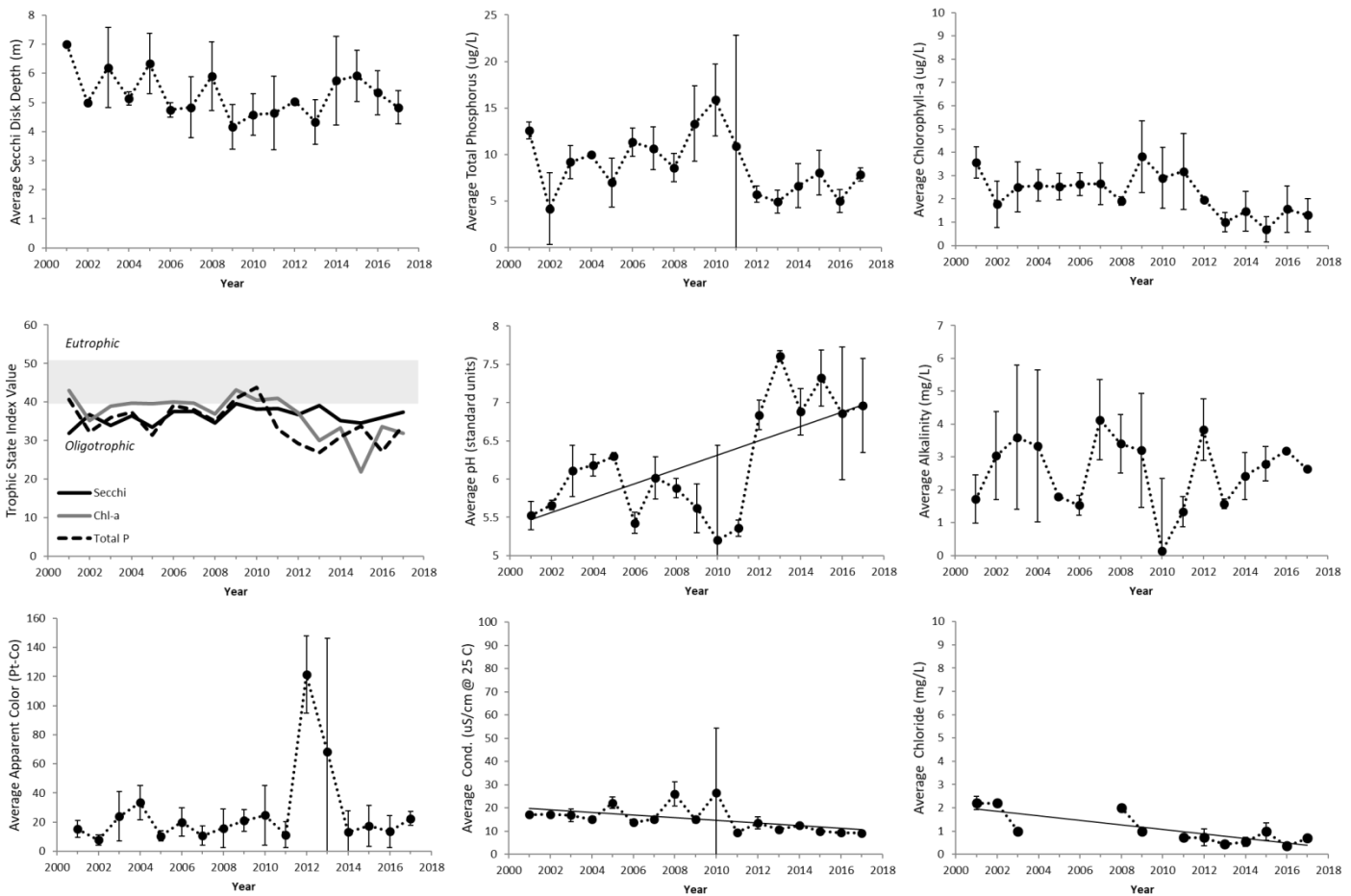


*Annual average values of select water quality indicators for Pine Lake, 2001-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Pine Lake is a 67 ha lake located in Fulton County in the Town of Caroga.  The lake is located within a 1,129 ha watershed dominated by forests.  Pine Lake has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 2001.

- Pine Lake is an oligotrophic Lake. Transparency depth, and the concentrations of total phosphorus, and chlorophyll-a have not exhibited any statistical trends since monitoring began 2001. The secchi transparency of Pine Lake averaged 4.8 meters, which was greater than 87% of participating ALAP lakes in 2017.
- Water samples from 2017 were found to be circumneutral in terms of their acidity, with an average pH of 7.0 units. The pH of the samples has exhibited a statistically significant increasing trend, at a rate of approximately 0.09 pH units/year. Alkalinity averaged 2.6 mg/L, indicating that the lake has moderate sensitivity to acid deposition.
- Sodium and chloride concentration averaged 0.6 and 0.7 mg/L in 2017, indicating the chemistry of the lake is not significantly influenced by road salt, in fact, chloride concentration as well as the conductivity of the lake have been trending down since 2001.

# Pleasant Lake
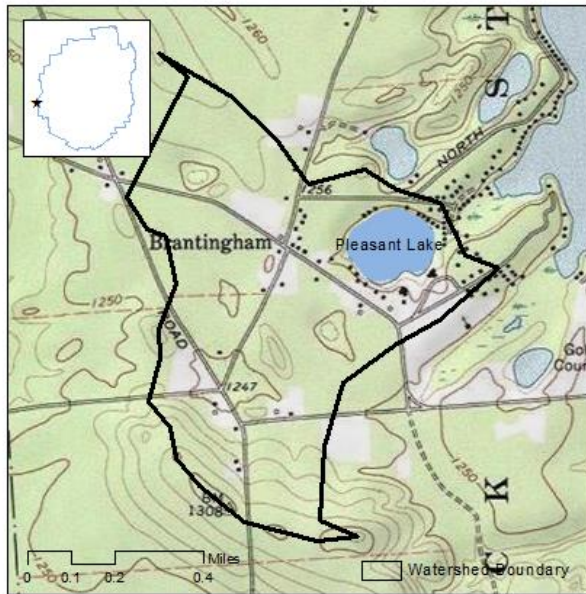


| Location | County: | Lewis |
| --- | --- | --- |
| | Town: | Greig |

| Lake Characteristics | Surface Area (ha): | 6 |
| --- | --- | --- |
| | Shoreline Length (km): | 1 |
| | Max. Depth (m): | 10.4 |
| | Volume (m³): | 264475 |
| | Flush rate (times/year): | 0.9 |

| Watershed Characteristics | Watershed Area (ha): | 117 |
| --- | --- | --- |
| | Surface water (%): | 6 |
| | Deciduous Forest (%): | 8 |
| | Evergreen Forest (%): | 59 |
| | Mixed Forest (%): | 3 |
| | Wetlands (%): | 3 |
| | Agricultural (%): | 0 |
| | Residential (%): | 3 |
| | Local Roads (km): | 4.3 |
| | State Roads (km): | 0 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
| --- | --- | --- | --- |
| Oligotrophic | Circumneutral | Moderate | Present - Low |

*Water quality values and historical trends for Pleasant Lake during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
| --- | --- | --- | --- | --- | --- |
| | 6/24/2017 | 7/15/2017 | 8/20/2017 | | |
| Transparency (m) | 7.0 | | 8.4 | 7.7 | No Trend |
| Total Phosphorus (µg/L) | 7.8 | 11.3 | 8.8 | 9.3 | No Trend |
| Chlorophyll-*a* (µg/L) | 3.8 | 1.5 | 1.2 | 2.1 | No Trend |
| Laboratory pH | 6.8 | 6.7 | 6.9 | 6.8 | Increasing |
| Sp. Conductance (µS/cm) | 11.9 | 11.9 | 14.0 | 12.6 | No Trend |
| Color (Pt-Co) | 24.6 | 18.2 | 15.0 | 19.3 | No Trend |
| Alkalinity (mg/L) | | | 4.6 | 4.6 | No Trend |
| Chloride (mg/L) | | | 1.8 | 1.8 | No Trend |
| Calcium (mg/L) | | | 1.1 | 1.1 | Not Analyzed |
| Sodium (mg/L) | | | 0.7 | 0.7 | Not Analyzed |

*See table of content for description of water quality indicators

# Pleasant Lake – Time Series
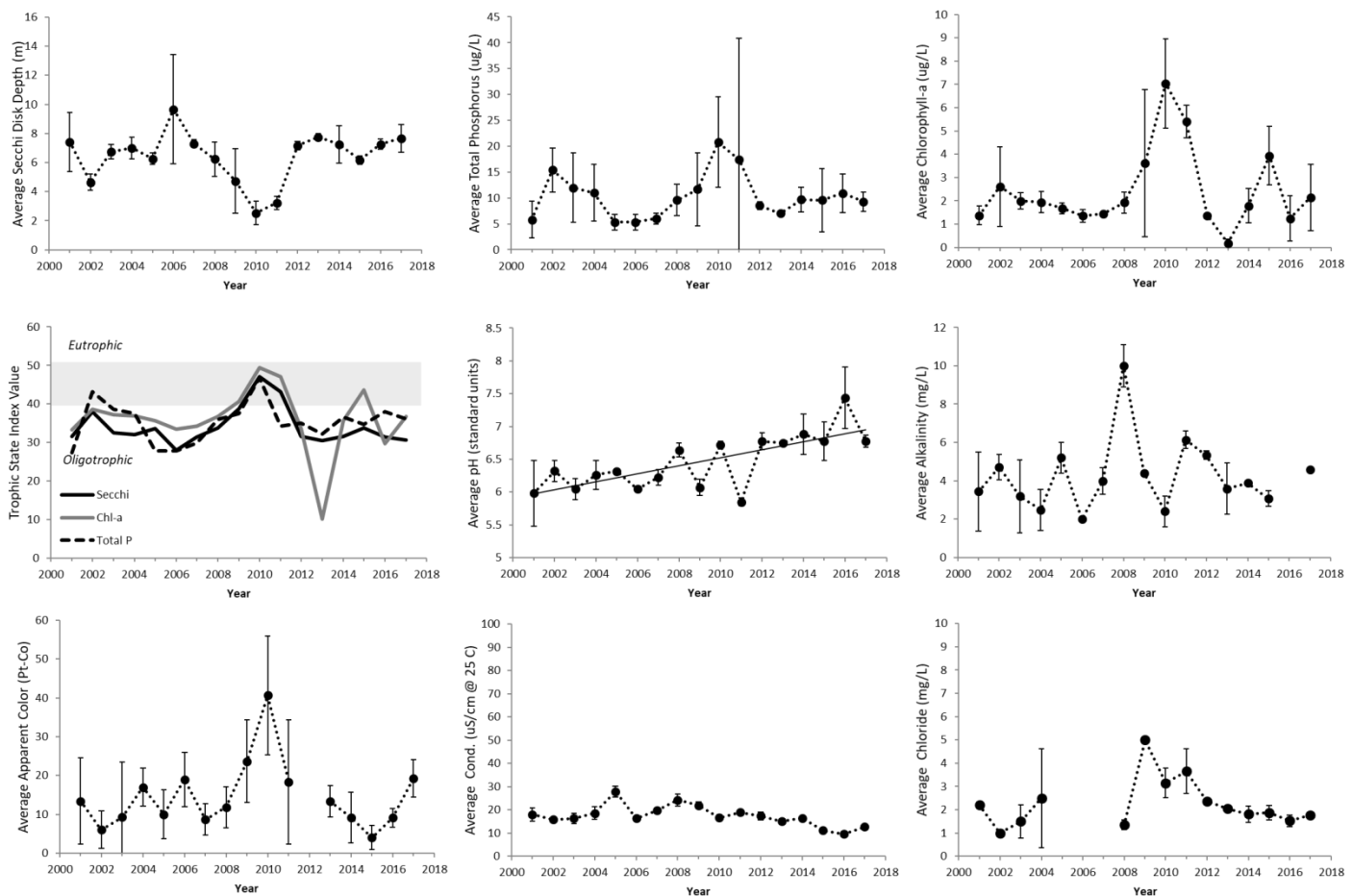


*Annual average values of select water quality indicators for Pleasant Lake, 2001-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Pleasant Lake is a 6 ha lake located in Lewis County in the Town of Greig.  The lake is located within a 108 ha watershed dominated by forests.  Pleasant Lake has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 1999.

- Pleasant Lake is best classified as an oligotrophic lake that commonly fluctuates in the mesotrophic range. The trophic indicators have been variably since monitoring began and have exhibited no statistical trend.

- The water samples analyzed in 2017 were found to be circumneutral in terms of their acidity, averaging 6.8 pH units. We observed that the pH of the samples has exhibited an increasing trend at a rate of approximately 0.06 pH units/year. The alkalinity was 4.6 mg/L in 2017, indicating moderate sensitivity to acid deposition.

- Sodium and chloride concentration averaged 0.7 and 1.8 mg/L respectively, indicating that the chemistry of the lake is influenced by the 4.3km of roads in the watershed, but the influence is relatively low.

# Raquette Lake
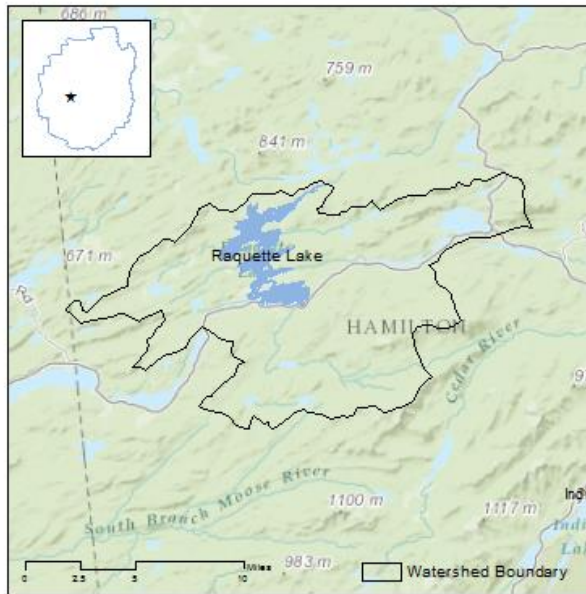


| Location | | |
|---|---|---|
| County: | Hamilton | |
| Town: | Long Lake | |

| Lake Characteristics | | |
|---|---|---|
| Surface Area (ha): | 2183 | |
| Shoreline Length (km): | 78 | |
| Max. Depth (m): | 29 | |
| Volume (m³): | 285759848 | |
| Flush rate (times/year): | 0.91 | |

| Watershed Characteristics | | |
|---|---|---|
| Watershed Area (ha): | 33147 | |
| Surface water (%): | 12 | |
| Deciduous Forest (%): | 32 | |
| Evergreen Forest (%): | 20 | |
| Mixed Forest (%): | 7 | |
| Wetlands (%): | 26 | |
| Agricultural (%): | 0 | |
| Residential (%): | 1 | |
| Local Roads (km): | 26.8 | |
| State Roads (km): | 31.1 | |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Mesotrophic | Circumneutral | Moderate | Present- low |

*Water quality values and historical trends for Raquette Lake during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 6/21/2017 | 7/20/2017 | 8/22/2017 | | |
| Transparency (m) | 3.4 | 3.2 | 3.5 | 3.4 | Decreasing |
| Total Phosphorus (µg/L) | 5.7 | 5.5 | 5.1 | 5.4 | Decreasing |
| Chlorophyll-*a* (µg/L) | 3.3 | 3.8 | 3.7 | 3.6 | No Trend |
| Laboratory pH | 6.8 | 6.5 | 7.0 | 6.7 | Increasing |
| Sp. Conductance (µS/cm) | 26.3 | 25.5 | 27.0 | 26.3 | No Trend |
| Color (Pt-Co) | 40.7 | 43.9 | 43.9 | 42.9 | Increasing |
| Alkalinity (mg/L) | | | 5.7 | 5.7 | Increasing |
| Chloride (mg/L) | | | 4.7 | 4.7 | No Trend |
| Calcium (mg/L) | | | 2.0 | 2.0 | Not Analyzed |
| Sodium (mg/L) | | | 2.5 | 2.5 | Not Analyzed |

*See table of content for description of water quality indicators

# Raquette Lake – Time Series
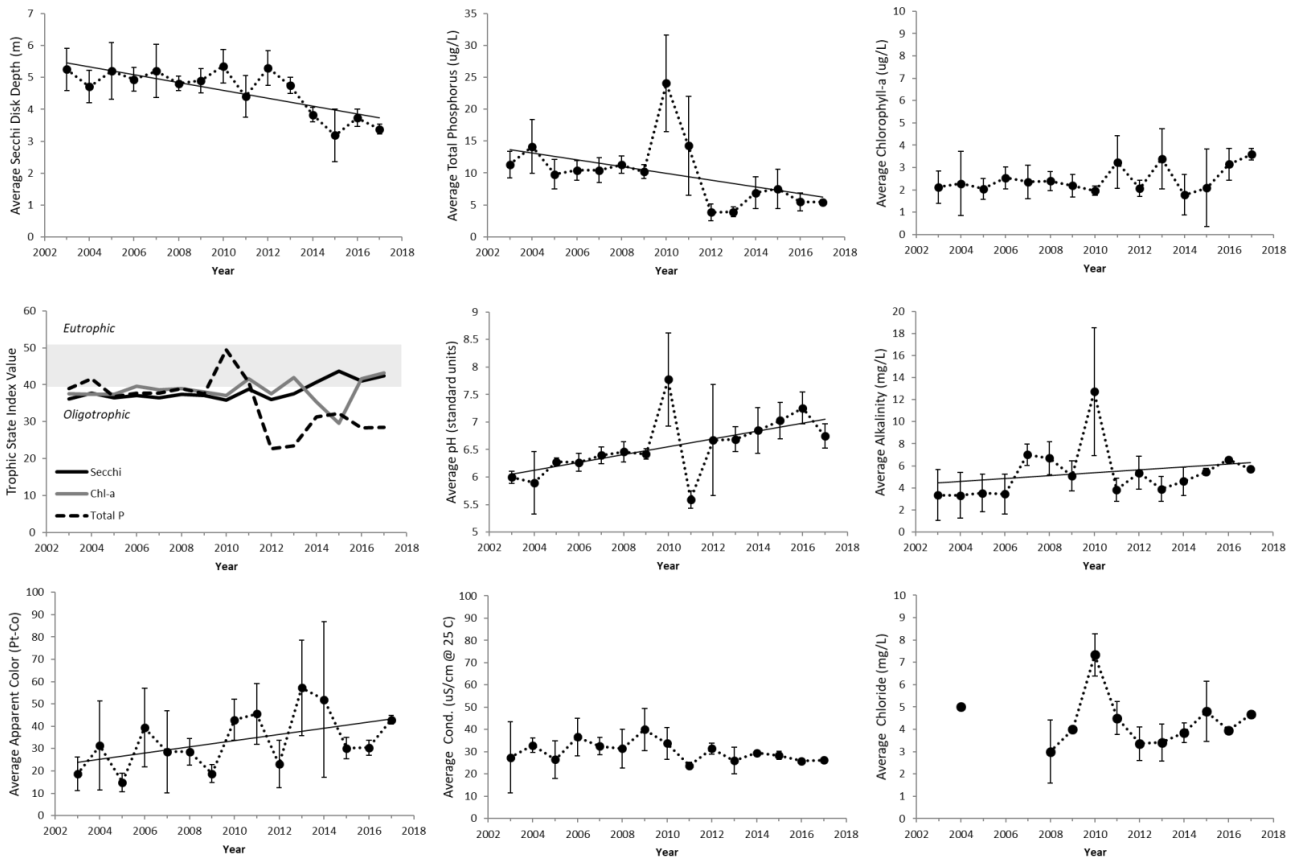


*Annual average values of select water quality indicators for Raquette Lake, 2003-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Raquette Lake is a 2,183 ha lake located in Hamilton County in the Town of Long Lake.  The lake is located within a 33,147 ha watershed dominated by forests.  Raquette Lake has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 2003.

- The trophic state of Raquette Lake is classified as oligotrophic based on total phosphorus, however, the transparency depth and chlorophyll-a concentration are more indicative of a mesotrophic state. A disparity of this nature is common for lakes that experience phosphorus limitation.   We detected a downward trend in transparency at approximately 12 cm/year and a downward trend in total phosphorus TP at a rate 0.5 µg/L/year.
- The decrease in transparency may be related to an increase in color. Color is a surrogate measure of dissolved organic material, which can decrease the transparency depth by absorbing visible light.
- The water samples analyzed in 2017 were found to be circumneutral in terms of their acidity, averaging 6.7 pH units. The pH of the lake has exhibited a slight increasing trend at a rate of approximately 0.07 pH units/year.  The alkalinity of the lake was 5.7 mg/L, indicating that the lake has moderate sensitivity to acid deposition.
- Sodium and chloride concentrations were 2.5 and 4.7 mg/L respectively. These values indicate that the chemistry of the lake is influenced by the 58 km of roads in the watershed, but that influence is relatively low.

# Rich Lake



| Location | County: | Essex |
|---|---|---|
| | Town: | Newcomb |

| Lake Characteristics | Surface Area (ha): | 154 |
|---|---|---|
| | Shoreline Length (km): | 11 |
| | Max. Depth (m): | 19.8 |
| | Volume (m³): | 12660840 |
| | Flush rate (times/year): | 10 |

| Watershed Characteristics | Watershed Area (ha): | 16883 |
|---|---|---|
| | Surface water (%): | 6 |
| | Deciduous Forest (%): | 56 |
| | Evergreen Forest (%): | 18 |
| | Mixed Forest (%): | 7 |
| | Wetlands (%): | 11 |
| | Agricultural (%): | 0 |
| | Residential (%): | 1 |
| | Local Roads (km): | 0.8 |
| | State Roads (km): | 17 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Mesotrophic | Circumneutral | Moderate | Present - Low |

*Water quality values and historical trends for Rich Lake during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 6/22/2017 | 7/19/2017 | 8/21/2017 | | |
| Transparency (m) | 2.2 | 2.2 | 2.4 | 2.2 | No Trend |
| Total Phosphorus (µg/L) | 7.5 | 11.3 | 63.3 | 27.4 | Decreasing |
| Chlorophyll-*a* (µg/L) | 3.1 | 4.2 | 3.9 | 3.7 | No Trend |
| Laboratory pH | 7.1 | 6.8 | 6.9 | 6.9 | No Trend |
| Sp. Conductance (µS/cm) | 29.3 | 26.8 | 31.5 | 29.2 | No Trend |
| Color (Pt-Co) | 50.4 | 60.0 | 60.0 | 56.8 | No Trend |
| Alkalinity (mg/L) | | | 9.6 | 9.6 | No Trend |
| Chloride (mg/L) | | | 4.6 | 4.6 | Increasing |
| Calcium (mg/L) | | | 3.0 | 3.0 | Not Analyzed |
| Sodium (mg/L) | | | 2.5 | 2.5 | Not Analyzed |

*See table of content for description of water quality indicators

# Rich Lake – Time Series
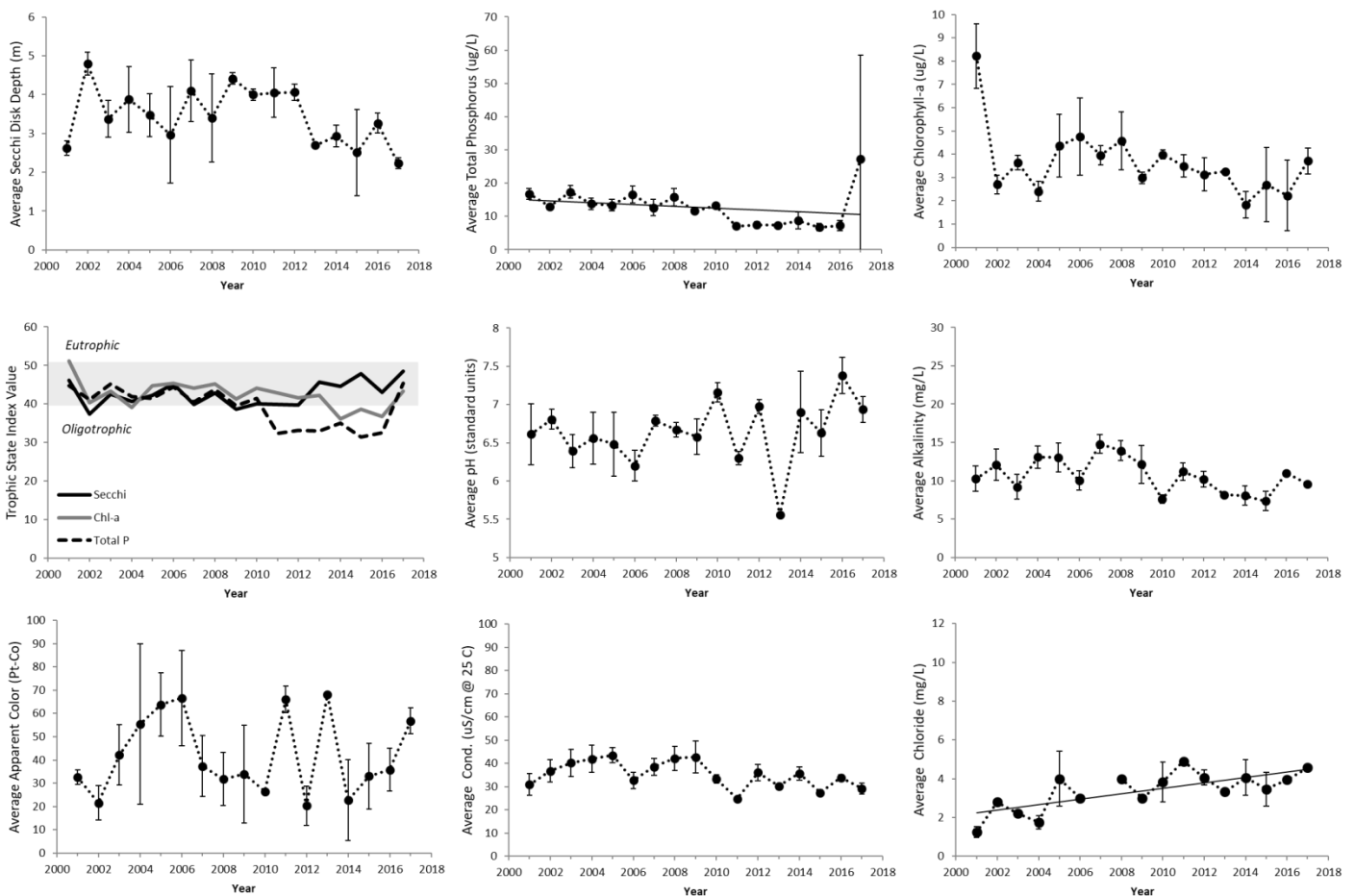


*Annual average values of select water quality indicators for Rich Lake, 2001-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Rich Lake is a 154 ha lake located in Essex County in the Town of Newcomb.  The lake is located within a 16,883 ha watershed dominated by forests.  Rich Lake has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 1999.

- Rich Lake is best classified as a mesotrophic lake.  Total phosphorus has exhibited a slight, yet significant, downward trend at a rate of approximately 0.3 µg/L/year.  We observed an unusually high concentration of total phosphorus in the August sample in 2017.

- The water samples analyzed in 2017 were found to be circumneutral in terms of their acidity, with an average pH of 6.9 units.  The alkalinity was 9.6 mg/L, indicating moderate sensitivity to acid deposition.

- Sodium and chloride concentration were 2.5 and 4.6 mg/L respectively, indicating that the chemistry of the lake is influenced by the 18 km of roads in the watershed, but that influence is relatively low. We detected an increasing trend in chloride concentration at a rate of approximately 0.14 mg/L/year.

# Schroon Lake
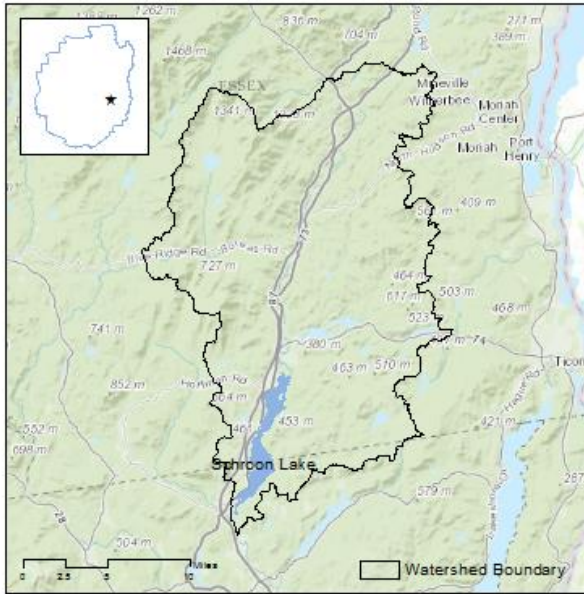


| Location | | |
|---|---|---|
| | County: | Warren |
| | Town: | Horicon |

| Lake Characteristics | | |
|---|---|---|
| | Surface Area (ha): | 1722 |
| | Shoreline Length (km): | 53 |
| | Max. Depth (m): | 46.4 |
| | Volume (m³): | 276623312 |
| | Flush rate (times/year): | 2.5 |

| Watershed Characteristics | | |
|---|---|---|
| | Watershed Area (ha): | 81866 |
| | Surface water (%): | 5 |
| | Deciduous Forest (%): | 30 |
| | Evergreen Forest (%): | 37 |
| | Mixed Forest (%): | 17 |
| | Wetlands (%): | 8 |
| | Agricultural (%): | 0 |
| | Residential (%): | 2 |
| | Local Roads (km): | 167.8 |
| | State Roads (km): | 160.7 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Oligotrophic | Circumneutral | Adequate – low sensitivity | Moderate |

*Water quality values and historical trends for Schroon Lake during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit.*

| South Basin | | | | | |
|---|---|---|---|---|---|
| **Water Quality Indicator** | **Sampling Date** | | | **Average** | **Trend** |
| | **6/24/2017** | **7/19/2017** | **8/28/2017** | | |
| Transparency (m) | 1.0 | 4.4 | 4.3 | 3.2 | No Trend |
| Total Phosphorus (µg/L) | 4.2 | 4.8 | 4.8 | 4.6 | No Trend |
| Chlorophyll-*a* (µg/L) | 1.0 | 0.9 | 0.4 | 0.7 | No Trend |
| Laboratory pH | 7.5 | 7.8 | 7.4 | 7.6 | No Trend |
| Sp. Conductance (µS/cm) | 57.6 | 54.6 | 61.9 | 58.0 | Decreasing |
| Color (Pt-Co) | 18.2 | 24.6 | 27.9 | 23.6 | No Trend |
| Alkalinity (mg/L) | | | 15.5 | 15.5 | No Trend |
| Chloride (mg/L) | | | 10.5 | 10.5 | No Trend |
| Calcium (mg/L) | | | 5.3 | 5.3 | Not Analyzed |
| Sodium (mg/L) | | | 5.8 | 5.8 | Not Analyzed |

| Water Quality Indicator | North Basin | | | |
|---|---|---|---|---|
| | Sampling Date | | | Average |
| | 6/24/2017 | 7/19/2017 | August | |
| Transparency (m) | 0.9 | 4.2 | | 2.5 |
| Total Phosphorus (µg/L) | 3.2 | 4.9 | | 4.1 |
| Chlorophyll-*a* (µg/L) | 1.7 | 1.7 | No Sample | 1.7 |
| Laboratory pH | 7.5 | 8.1 | | 7.8 |
| Sp. Conductance (µS/cm) | 62.1 | 56.9 | | 59.5 |
| Color (Pt-Co) | 21.4 | 27.9 | | 24.6 |
| Alkalinity (mg/L) | | | | |
| Chloride (mg/L) | | | | |
| Calcium (mg/L) | | | | |
| Sodium (mg/L) | | | | |

*See table of content for description of water quality indicators

# Schroon Lake– Time Series
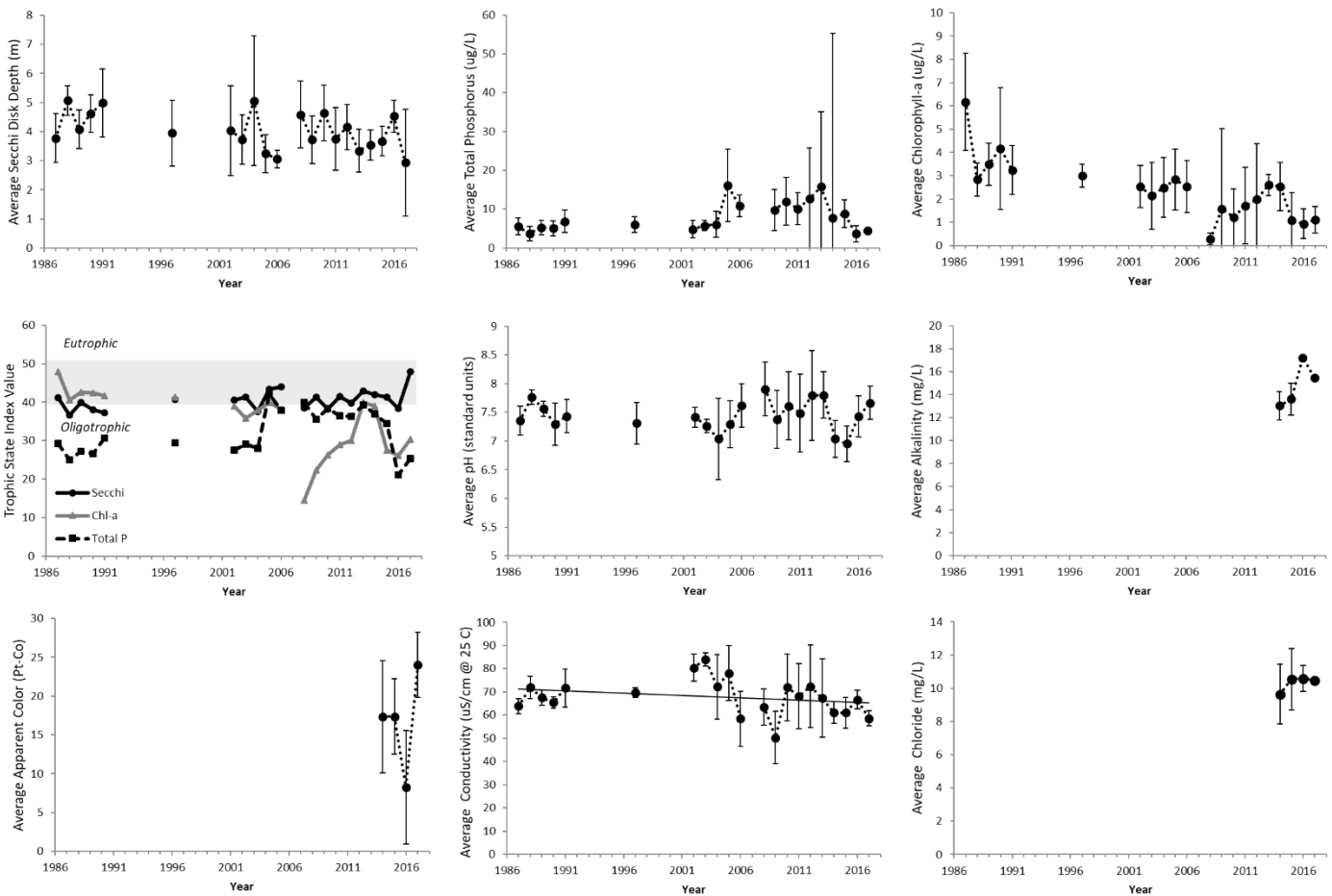


*Lake wide annual average values of select water quality indicators for Schroon Lake, 1985-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05). Data from 1987-2013 form CSLAP, data from 2014-present from ALAP.*

## Summary of Findings

Schroon Lake is a 1,722 ha lake located within an 81,866 ha watershed dominated by forests.  Schroon Lake has participating in ALAP since 2014, having been enrolled in CSLAP periodically since 1987.

- Typically, we receive five samples from Schroon Lake, this year we received three from the south basin and only two from the north basin. We were unable to run alkalinity, chloride, and metals on the north basin because we did not receive an August sample.
- Schroon Lake is best classified as an oligotrophic Lake. Historical data on the lake wide averages of transparency depth, and the concentrations of total phosphorus and chlorophyll-a have not exhibited any statistical trends.
- Water samples from 2017 were found to be circumneutral to slightly alkaline in terms of their acidity. Alkalinity was 15.5 mg/L in the south basin, indicating that the lake is well buffered, and not sensitive to acid deposition.
- Sodium and chloride concentration were 5.8 and 10.5 mg/L in the south basin, indicating the chemistry of the lake is influenced by the 329 km of roads in the watershed. The chloride concentration of Schroon greater than 76% of the lakes participating in ALAP.

# Silver Lake
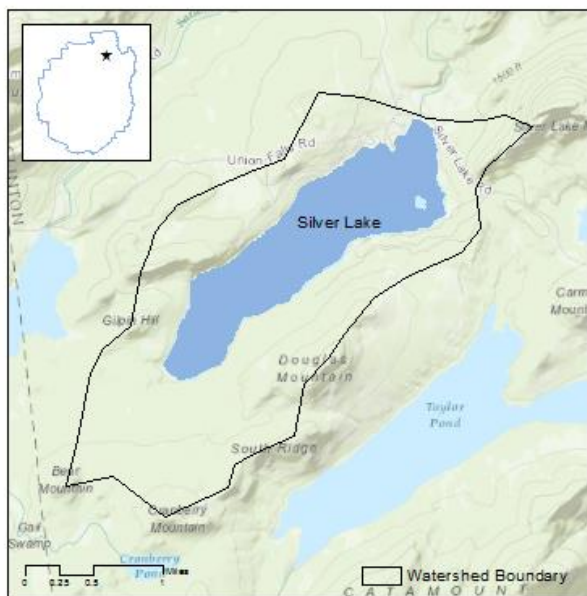


| Location | County: | Clinton |
|---|---|---|
| | Town: | Black Brook |

| Lake Characteristics | | |
|---|---|---|
| Surface Area (ha): | | 324 |
| Shoreline Length (km): | | 11 |
| Max. Depth (m): | | - |
| Volume (m³): | | 25613064 |
| Flush rate (times/year): | | 0.3 |

| Watershed Characteristics | | |
|---|---|---|
| Watershed Area (ha): | | 1245 |
| Surface water (%): | | 26 |
| Deciduous Forest (%): | | 44 |
| Evergreen Forest (%): | | 14 |
| Mixed Forest (%): | | 9 |
| Wetlands (%): | | 3 |
| Agricultural (%): | | 0 |
| Residential (%): | | 3 |
| Local Roads (km): | | 5.5 |
| State Roads (km): | | 0 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Oligotrophic | Circumneutral | Adequate – low sensitivity | Present- low |

*Water quality values and historical trends for Silver Lake during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 6/22/2017 | 7/14/2017 | 8/23/2017 | | |
| Transparency (m) | 5.5 | 4.0 | 5.0 | 4.8 | No Trend |
| Total Phosphorus (µg/L) | 60.0 | 9.1 | 6.9 | 25.3 | Decreasing |
| Chlorophyll-*a* (µg/L) | 6.7 | 0.2 | 2.8 | 3.2 | No Trend |
| Laboratory pH | 7.5 | 7.8 | 7.5 | 7.6 | No Trend |
| Sp. Conductance (µS/cm) | 54.8 | 41.4 | 42.0 | 46.1 | Increasing |
| Color (Pt-Co) | 11.8 | 21.4 | 15.0 | 16.1 | No Trend |
| Alkalinity (mg/L) | | | 14.2 | 14.2 | No Trend |
| Chloride (mg/L) | | | 4.8 | 4.8 | Increasing |
| Calcium (mg/L) | | | 3.8 | 3.8 | Not Analyzed |
| Sodium (mg/L) | | | 2.2 | 2.2 | Not Analyzed |

*See table of content for description of water quality indicators

# Silver Lake – Time Series
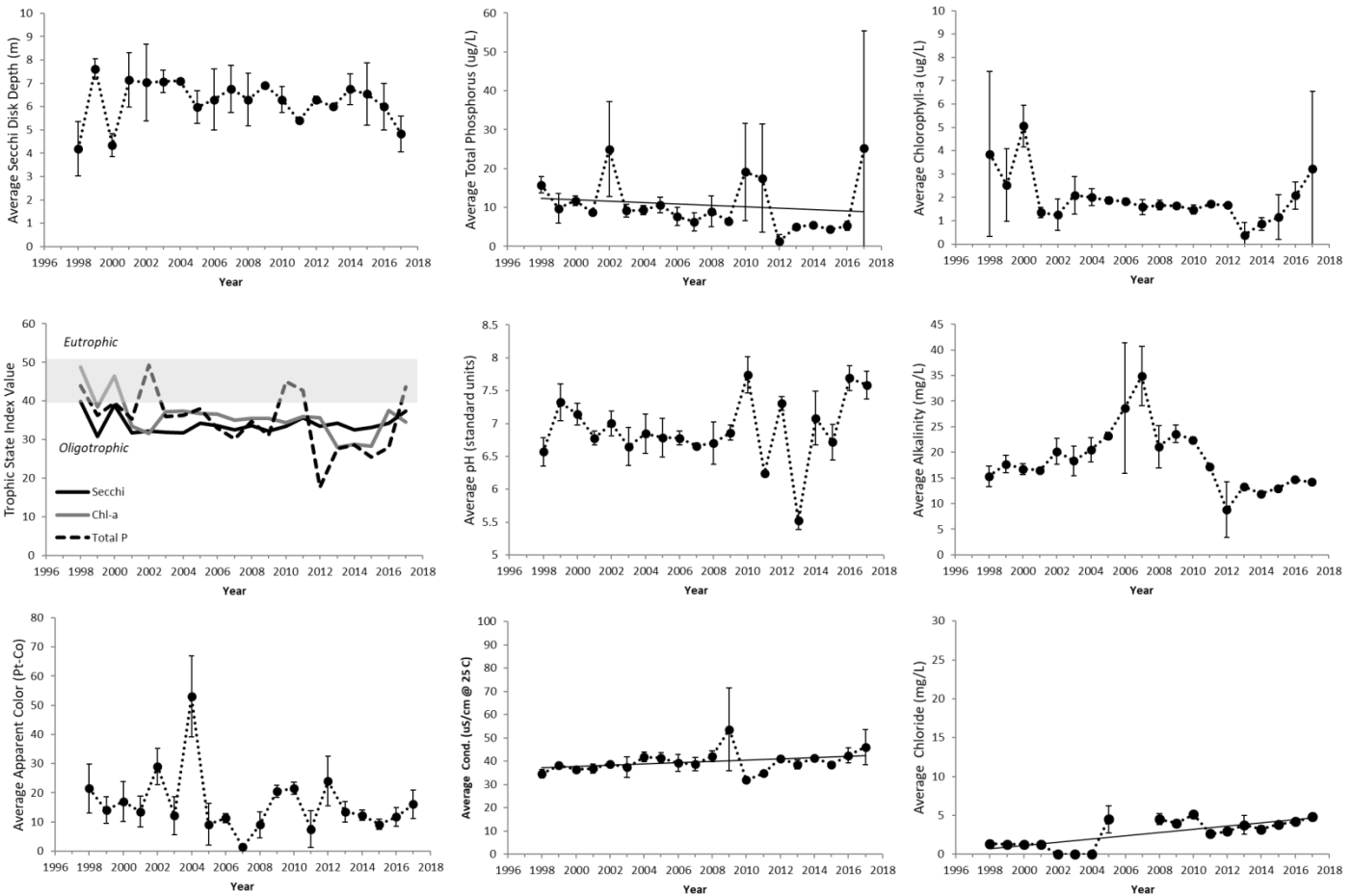


*Annual average values of select water quality indicators for Silver Lake, 1998-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Silver Lake is a 324 ha lake located in Clinton County in the Town of Black Brook. The lake is located within a 1,245 ha watershed dominated by forests. Silver Lake has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 1998.

- Silver Lake is best classified as an oligotrophic Lake. Although the June sample had an unusually high concentration of total phosphorus, we observed a statistical downward trend in the historical concentration, decreasing at a rate of 0.2 µg/L/year.

- Water samples from 2017 were found to be circumneutral in terms of their acidity. Alkalinity was 14.2 mg/L, indicating that the lake is not particularly sensitive to acid deposition.

- Sodium and chloride concentration were 2.2 and 4.8 mg/L in 2017, indicating the chemistry of the lake is influenced by the 5.5 km of roads in the watershed. We detected a statistical increase in both the chloride concentration and the conductivity of the lake since 1998.

# Simon Pond
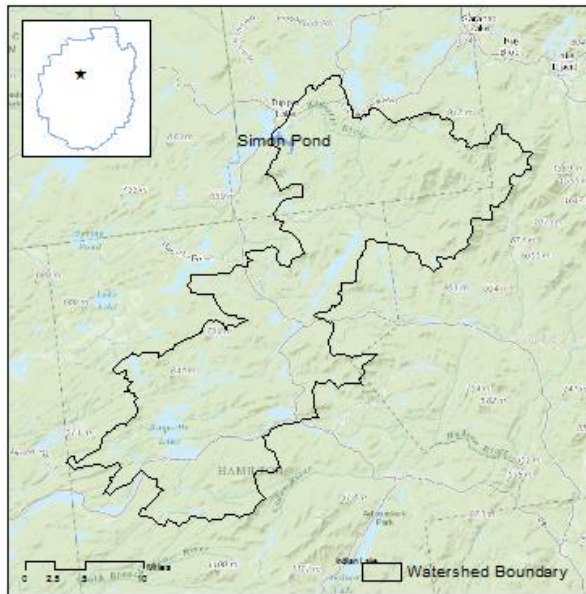


| Location | | |
|---|---|---|
| | County: | Franklin |
| | Town: | Tupper Lake |

| Lake Characteristics | | |
|---|---|---|
| | Surface Area (ha): | 287 |
| | Shoreline Length (km): | 16 |
| | Max. Depth (m): | - |
| | Volume (m³): | 15534637 |
| | Flush rate (times/year): | 53.6 |

| Watershed Characteristics | | |
|---|---|---|
| | Watershed Area (ha): | 132235 |
| | Surface water (%): | 8 |
| | Deciduous Forest (%): | 40 |
| | Evergreen Forest (%): | 27 |
| | Mixed Forest (%): | 9 |
| | Wetlands (%): | 14 |
| | Agricultural (%): | 0 |
| | Residential (%): | 1 |
| | Local Roads (km): | 76.4 |
| | State Roads (km): | 71.3 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Oligotrophic | Circumneutral | Moderate | Present - Low |

*Water quality values and historical trends for Simon Pond during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 6/30/2017 | 7/11/2017 | 8/20/2017 | | |
| Transparency (m) | 4.3 | 5.0 | 3.8 | 4.3 | No Trend |
| Total Phosphorus (µg/L) | 9.7 | 10.8 | 6.3 | 8.9 | No Trend |
| Chlorophyll-*a* (µg/L) | 6.7 | 5.5 | 1.3 | 4.5 | No Trend |
| Laboratory pH | 6.7 | 7.0 | 7.2 | 7.0 | No Trend |
| Sp. Conductance (µS/cm) | 20.3 | 18.6 | 22.4 | 20.4 | Decreasing |
| Color (Pt-Co) | 56.8 | 47.2 | 40.7 | 48.2 | No Trend |
| Alkalinity (mg/L) | | | 7.4 | 7.4 | No Trend |
| Chloride (mg/L) | | | 2.2 | 2.2 | No Trend |
| Calcium (mg/L) | | | 2.2 | 2.2 | Not Analyzed |
| Sodium (mg/L) | | | 1.4 | 1.4 | Not Analyzed |

*See table of content for description of water quality indicators

# Simon Pond – Time Series
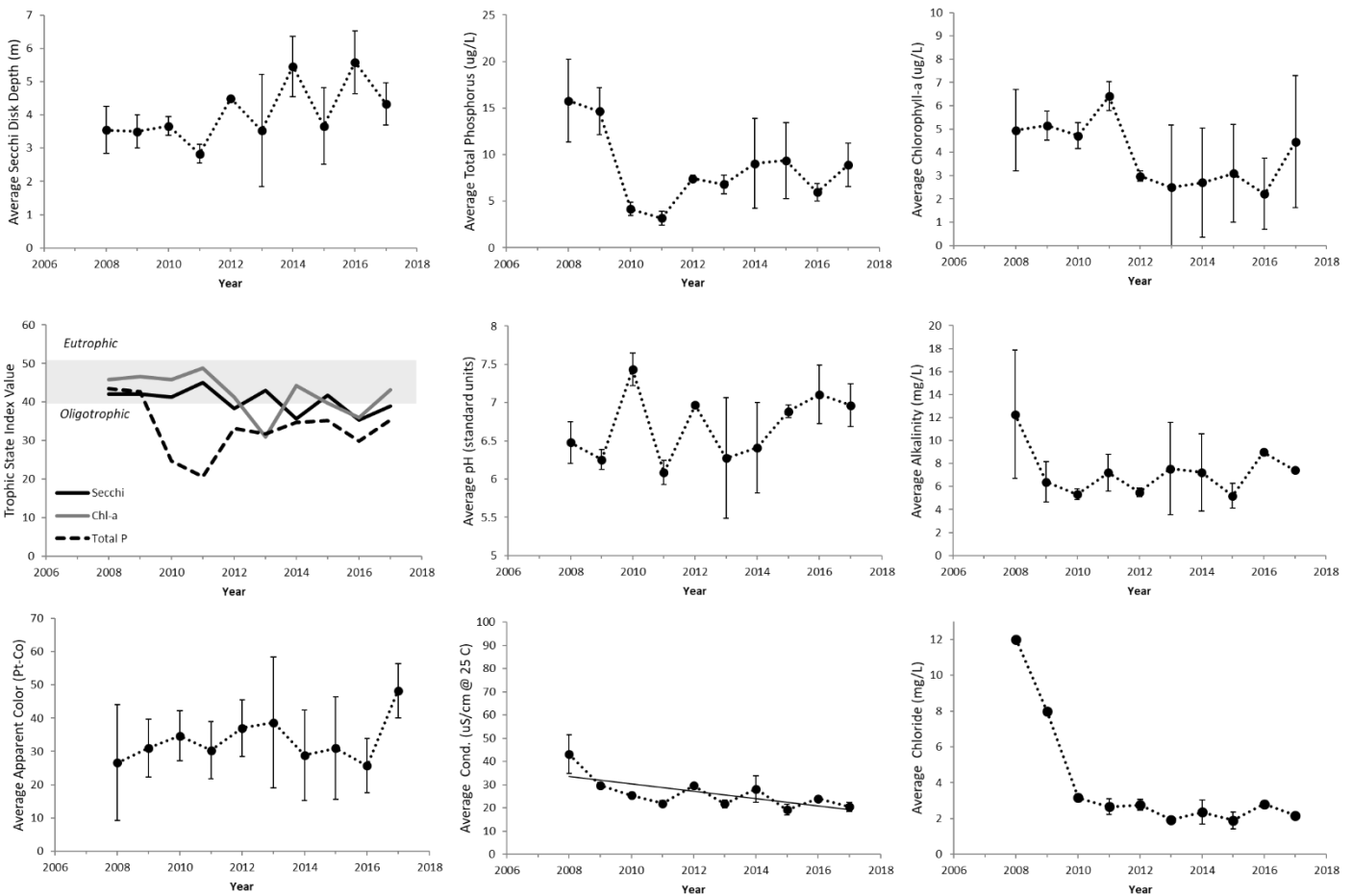


*Annual average values of select water quality indicators for Simon Pond, 2008-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Simon Pond is a 287 ha lake located in Franklin County in the Town of Tupper Lake.  The lake is located within a 132,235 ha watershed dominated by forests.  Simon Pond has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 2008.

- Simon Pond is an oligotrophic lake.  Trophic indicators and water quality variables have been highly variable. This variability is likely related to flushing rate, which is estimated to be 54 times per year.

- The water samples analyzed in 2017 were found to be circumneutral in terms of their acidity, averaging 7.0 pH units. The alkalinity of the lake was 7.4 mg/L, indicating that the lake has moderate sensitivity to acid deposition.

- Sodium and chloride concentrations of the lake were 1.4 and 2.2 mg/L respectively. These values indicate that the chemistry of the lake is influenced by the 147 km of roads in the watershed, but that influence is relatively low.

# Star Lake
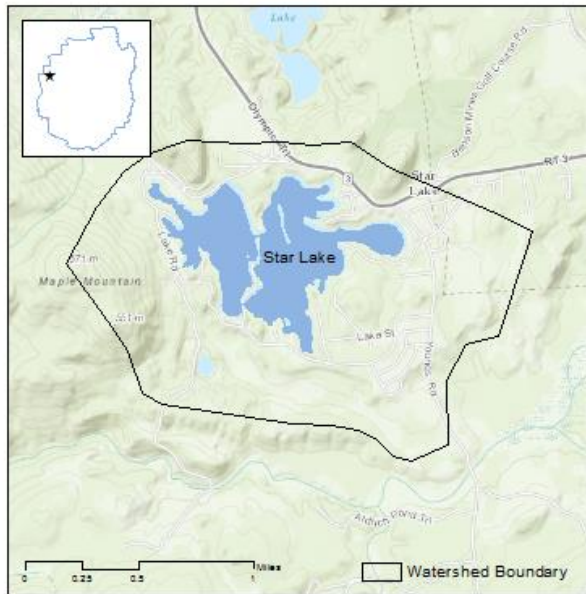


| Location | | |
|---|---|---|
| County: | St Lawrence |
| Town: | Fine |

| Lake Characteristics | | |
|---|---|---|
| Surface Area (ha): | 83 |
| Shoreline Length (km): | 11 |
| Max. Depth (m): | 19.8 |
| Volume (m³): | 5288762 |
| Flush rate (times/year): | 0.4 |

| Watershed Characteristics | | |
|---|---|---|
| Watershed Area (ha): | 509 |
| Surface water (%): | 20 |
| Deciduous Forest (%): | 61 |
| Evergreen Forest (%): | 2 |
| Mixed Forest (%): | 2 |
| Wetlands (%): | 3 |
| Agricultural (%): | 2 |
| Residential (%): | 9 |
| Local Roads (km): | 12.2 |
| State Roads (km): | 1.3 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Oligotrophic | Circumneutral | Adequate – low sensitivity | Moderate |

*Water quality values and historical trends for Star Lake during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 6/22/2017 | 7/16/2017 | 8/22/2017 | | |
| Transparency (m) | 4.7 | 5.3 | 4.3 | 4.7 | No Trend |
| Total Phosphorus (µg/L) | 15.2 | 6.4 | 6.0 | 9.2 | No Trend |
| Chlorophyll-*a* (µg/L) | 2.1 | 4.5 | 1.0 | 2.5 | No Trend |
| Laboratory pH | 7.7 | 7.2 | 7.8 | 7.5 | No Trend |
| Sp. Conductance (µS/cm) | 62.4 | 61.6 | 62.2 | 62.1 | No Trend |
| Color (Pt-Co) | 18.2 | 15.0 | 26.7 | 20.0 | No Trend |
| Alkalinity (mg/L) | | | 13.0 | 13.0 | No Trend |
| Chloride (mg/L) | | | 12.2 | 12.2 | No Trend |
| Calcium (mg/L) | | | 3.5 | 3.5 | Not Analyzed |
| Sodium (mg/L) | | | 6.4 | 6.4 | Not Analyzed |

*See table of content for description of water quality indicators

# Star Lake – Time Series
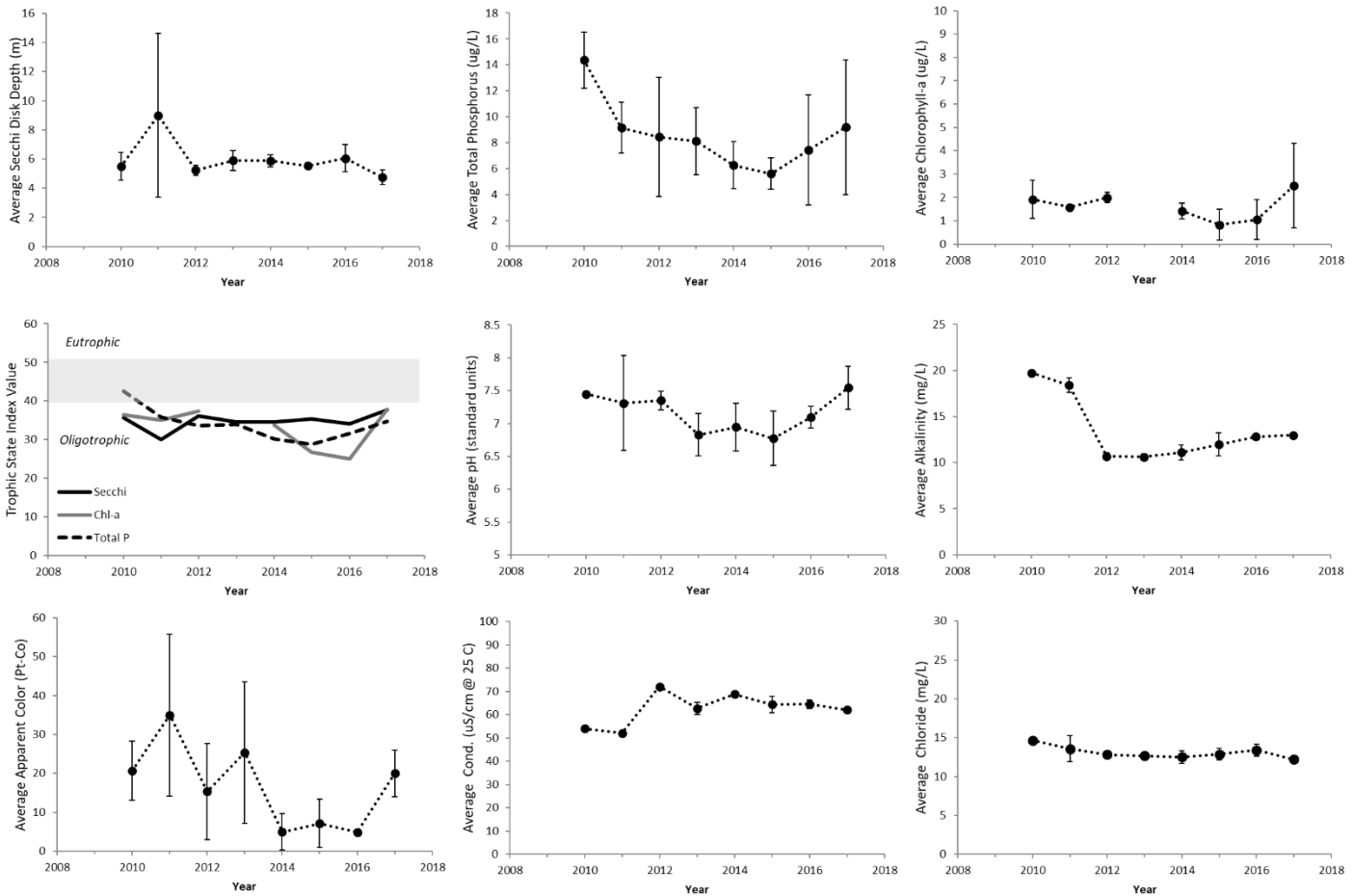


*Annual average values of select water quality indicators for Star Lake, 2010-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Star Lake is an 83 ha lake located in St. Lawrence County in the Town of Fine.  The lake is located within a 509 ha watershed dominated by forests.  Star Lake has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 2010.

- Star Lake is an oligotrophic lake. The transparency of the lake averaged 4.7 meters in 2017, which is greater than 87% of participating ALAP lakes in 2017.  We did not detect any statistical trends in the trophic indicators.

- The water samples analyzed in 2017 were found to be circumneutral in terms of its acidity, with an average of 7.5 pH units. The alkalinity was 13.0 mg/L, indicating relatively low sensitivity to acid deposition.

- Sodium and chloride concentration were 6.4 and 12.2 mg/L respectively, indicating that the chemistry of the lake is influenced by the 13.5 km of roads in the watershed.  Chloride concentration of Star Lake is greater than 78% of participating ALAP lakes and approximately 61 times greater than background concentration for least impacted lakes in the Adirondack region.

# Stony Creek Pond
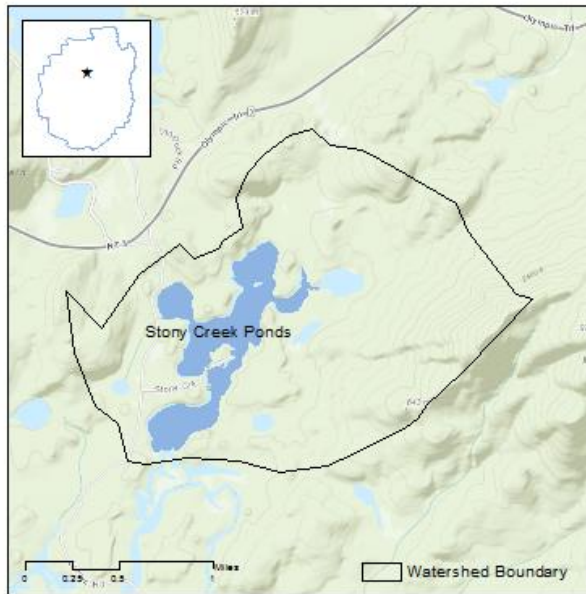


| Location | County: | Franklin |
| --- | --- | --- |
| | Town: | Harrietstown |

| Lake Characteristics | | |
| --- | --- | --- |
| Surface Area (ha): | | 76 |
| Shoreline Length (km): | | 9 |
| Max. Depth (m): | | 12.5 |
| Volume (m³): | | 2825129 |
| Flush rate (times/year): | | 1.5 |

| Watershed Characteristics | | |
| --- | --- | --- |
| Watershed Area (ha): | | 710 |
| Surface water (%): | | 13 |
| Deciduous Forest (%): | | 26 |
| Evergreen Forest (%): | | 38 |
| Mixed Forest (%): | | 10 |
| Wetlands (%): | | 12 |
| Agricultural (%): | | 0 |
| Residential (%): | | 1 |
| Local Roads (km): | | 1.8 |
| State Roads (km): | | 0 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
| --- | --- | --- | --- |
| Oligotrophic | Circumneutral | Moderate | Present - Low |

*Water quality values and historical trends for Stony Creek Pond during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | | Average | Trend |
| --- | --- | --- | --- | --- | --- | --- |
| | 7/17 | 8/14 | 8/28 | 9/20 | | |
| Transparency (m) | 1.7 | 2.4 | 2.9 | 3.8 | 2.7 | No Trend |
| Total Phosphorus (µg/L) | 10.0 | 11.7 | 8.7 | 8.2 | 9.6 | Decreasing |
| Chlorophyll-*a* (µg/L) | 2.9 | | 0.1 | BDL | ±1.5 | Decreasing |
| Laboratory pH | 7.4 | 7.4 | 7.0 | 7.2 | 7.2 | No Trend |
| Sp. Cond. (µS/cm) | 26.9 | 27.1 | 26.6 | 31.2 | 28.0 | No Trend |
| Color (Pt-Co) | 60.0 | 50.4 | 50.4 | 31.1 | 48.0 | No Trend |
| Alkalinity (mg/L) | | 9.7 | | | 9.7 | Decreasing |
| Chloride (mg/L) | | 2.5 | | | 2.5 | No Trend |
| Calcium (mg/L) | | 2.9 | | | 2.9 | Not Analyzed |
| Sodium (mg/L) | | 1.5 | | | 1.5 | Not Analyzed |

*See table of content for description of water quality indicators

# Stony Creek Pond – Time Series
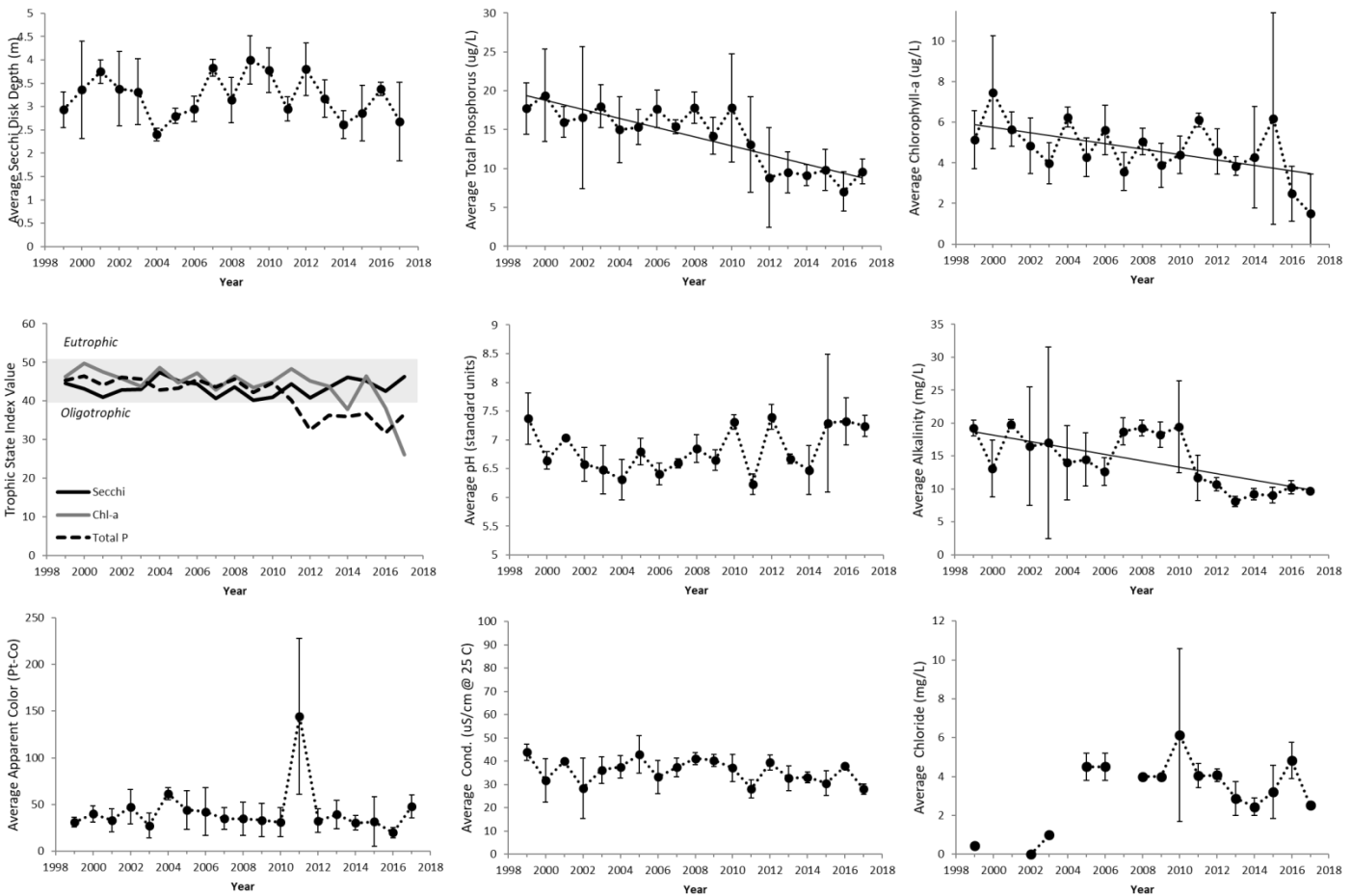


*Annual average values of select water quality indicators for Stony Creek Pond, 1999-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Stony Creek Ponds is a 76 ha lake located in Franklin County in the Town of Harrietstown. The lake is located within a 710 ha watershed dominated by forests. Stony Creek Ponds has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 1999.

- Stony Creek Pond is an oligotrophic lake on the border of mesotrophic. Transparency depth has typically ranged between 2.5 and 4 meters, with no statistical trend detected in the historical data. The concentrations of both total phosphorus and chlorophyll-a have exhibited a significant downward trend at a rate of approximately 0.6 µg/L/year and 0.13 µg/L/year respectively.
- The water samples analyzed in 2017 were found to be circumneutral in terms of their acidity, with an average pH of 7.2 units. The alkalinity was 9.7 mg/L, indicating moderate sensitivity to acid deposition. Alkalinity has exhibited a significant downward trend at a rate of 0.5 mg/L/year.
- Sodium and chloride concentration were 1.5 and 2.8 mg/L respectively, indicating that the chemistry of the lake is influenced by the 1.8 km of roads in the watershed, but the influence is relatively low.

# Thirteenth Lake
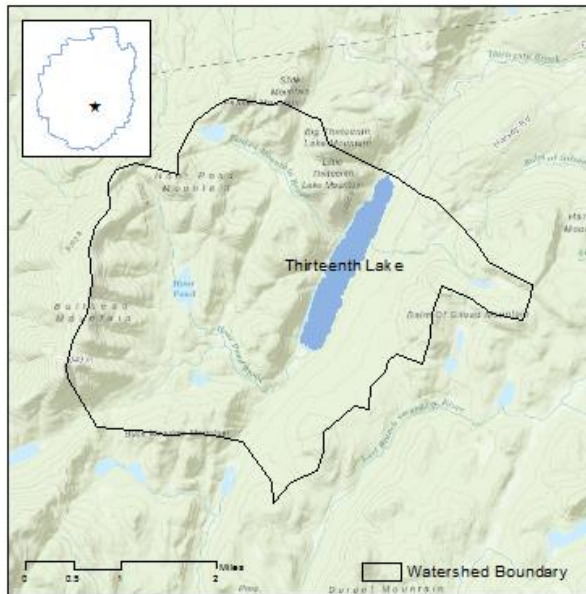


| Location | | |
|---|---|---|
| | County: | Warren |
| | Town: | Johnsburg |

| Lake Characteristics | | |
|---|---|---|
| | Surface Area (ha): | 128 |
| | Shoreline Length (km): | 7 |
| | Max. Depth (m): | 14.9 |
| | Volume (m³): | 7961956 |
| | Flush rate (times/year): | 2.3 |

| Watershed Characteristics | | |
|---|---|---|
| | Watershed Area (ha): | 2915 |
| | Surface water (%): | 6 |
| | Deciduous Forest (%): | 62 |
| | Evergreen Forest (%): | 12 |
| | Mixed Forest (%): | 19 |
| | Wetlands (%): | 1 |
| | Agricultural (%): | 0 |
| | Residential (%): | 0 |
| | Local Roads (km): | 5.1 |
| | State Roads (km): | 0 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Mesotrophic | Circumneutral | Moderate | Not Significant |

*Water quality values and historical trends for Thirteenth Lake during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 6/22/2017 | 7/22/2017 | 8/22/2017 | | |
| Transparency (m) | 4.0 | 3.6 | 3.0 | 3.5 | No Trend |
| Total Phosphorus (µg/L) | 6.8 | 4.4 | 4.8 | 5.3 | No Trend |
| Chlorophyll-*a* (µg/L) | 3.2 | 1.8 | 5.0 | 3.3 | No Trend |
| Laboratory pH | 7.3 | 7.0 | 7.9 | 7.4 | Increasing |
| Sp. Conductance (µS/cm) | 18.0 | 19.0 | 19.3 | 18.8 | Decreasing |
| Color (Pt-Co) | 24.6 | 18.2 | 18.2 | 20.3 | No Trend |
| Alkalinity (mg/L) | | | 8.4 | 8.4 | No Trend |
| Chloride (mg/L) | | | 1.0 | 1.0 | No Trend |
| Calcium (mg/L) | | | 2.2 | 2.2 | Not Analyzed |
| Sodium (mg/L) | | | 0.8 | 0.8 | Not Analyzed |

*See table of content for description of water quality indicators

# Thirteenth Lake – Time Series
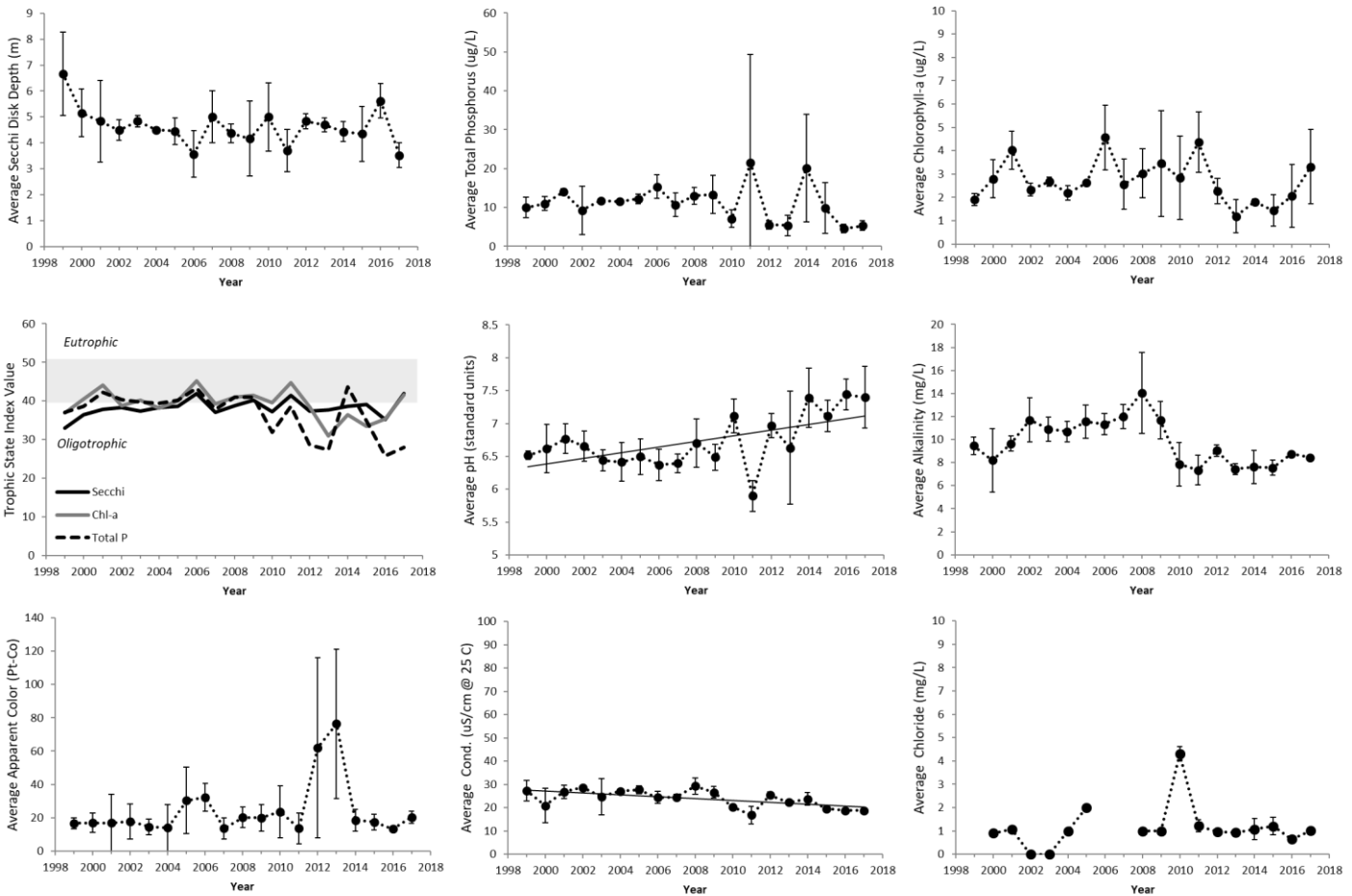


*Annual average values of select water quality indicators for Thirteenth Lake, 1999-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Thirteenth Lake is a 128 ha lake located in Warren County in the Town of Johnsburg. This lake is located within a 2,915 ha watershed dominated by forests. Thirteenth Lake has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 1999.

- Thirteenth Lake is a mesotrophic lake that commonly borders on oligotrophy. The historical data on transparency depth, and the concentrations of total phosphorus and chlorophyll-a have not exhibited any statistical trends.
- The water samples analyzed in 2017 were found to be circumneutral in terms of their acidity, with an average pH of 7.4 units. We detected a statistically significant increasing trend in pH, at a rate of 0.04 units/year. The alkalinity was 8.4 mg/L, indicating moderate sensitivity to acid deposition.
- Sodium and chloride concentration were 0.8 and 1.0 mg/L respectively, indicating that the chemistry of the lake is not significantly influenced by the 5.1 km of roads in the watershed.

# Tripp Pond
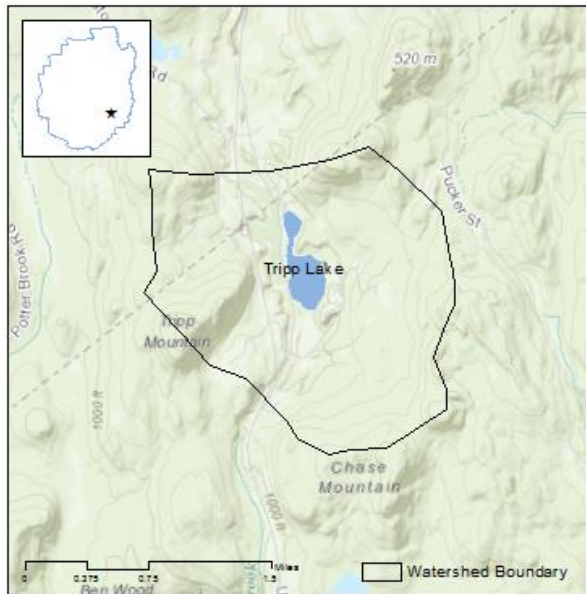


| Location | | |
|---|---|---|
| | County: | Warren |
| | Town: | Warrensburg |

| Lake Characteristics | | |
|---|---|---|
| | Surface Area (ha): | 19 |
| | Shoreline Length (km): | 3 |
| | Max. Depth (m): | - |
| | Volume (m³): | 623980 |
| | Flush rate (times/year): | 8 |

| Watershed Characteristics | | |
|---|---|---|
| | Watershed Area (ha): | 668 |
| | Surface water (%): | 3 |
| | Deciduous Forest (%): | 15 |
| | Evergreen Forest (%): | 36 |
| | Mixed Forest (%): | 28 |
| | Wetlands (%): | 5 |
| | Agricultural (%): | 2 |
| | Residential (%): | 10 |
| | Local Roads (km): | 5.6 |
| | State Roads (km): | 2.3 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Mesotrophic | Alkaline | Adequate – low sensitivity | Moderate |

*Water quality values and historical trends for Tripp Lake during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 7/2/2017 | 7/19/2017 | 8/20/2017 | | |
| Transparency (m) | 3.4 | 2.9 | 4.5 | 3.6 | No Trend |
| Total Phosphorus (µg/L) | 9.2 | 8.9 | 25.7 | 14.6 | No Trend |
| Chlorophyll-*a* (µg/L) | 2.9 | 3.6 | 2.1 | 2.9 | No Trend |
| Laboratory pH | 8.3 | 7.7 | 7.8 | 7.9 | No Trend |
| Sp. Conductance (µS/cm) | 65.9 | 79.9 | 90.4 | 78.7 | No Trend |
| Color (Pt-Co) | 24.6 | 24.6 | 24.6 | 24.6 | No Trend |
| Alkalinity (mg/L) | | | 24.4 | 24.4 | Decreasing |
| Chloride (mg/L) | | | 13.4 | 13.4 | No Trend |
| Calcium (mg/L) | | | 7.9 | 7.9 | Not Analyzed |
| Sodium (mg/L) | | | 6.4 | 6.4 | Not Analyzed |

*See table of content for description of water quality indicators

# Tripp Lake – Time Series
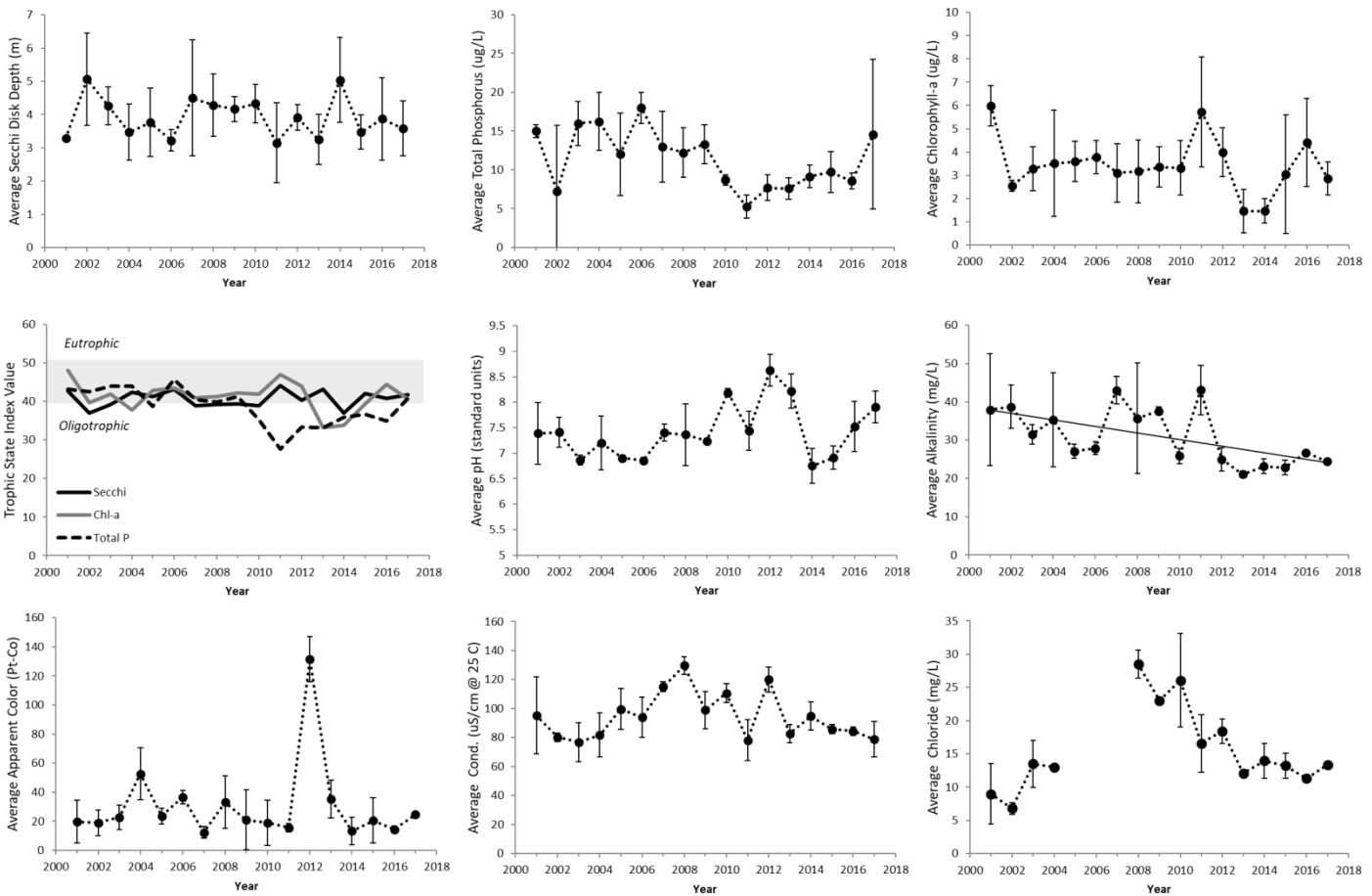


*Annual average values of select water quality indicators for Tripp Lake, 2001-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Tripp Pond is a 19 ha lake located in Warren County in the Town of Warrensburg. The lake is located within a 668 ha watershed dominated by forests. Tripp Pond has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 1999.

- Tripp Pond is a mesotrophic lake. Transparency depth has been fairly stable over time, while total phosphorus and chlorophyll-concentrations have been more variable. None of the trophic indicators have exhibited any significant trends.

- The water samples analyzed in 2017 were found to be alkaline in terms of their acidity. The alkalinity was 24.4 mg/L, indicating that the pond is well buffered and has low sensitivity to acid deposition. Alkalinity has exhibited a significant decreasing trend at a rate of 0.85 mg/L/year.

- Sodium and chloride concentration were 6.4 and 13.4 mg/L respectively, indicating that the chemistry of the lake is influenced by the 8 km of roads in the watershed. For example, the chloride concentration of Tripp is 67 times greater than the median concentration for least impacted lakes in the Adirondack region.

# Trout Lake
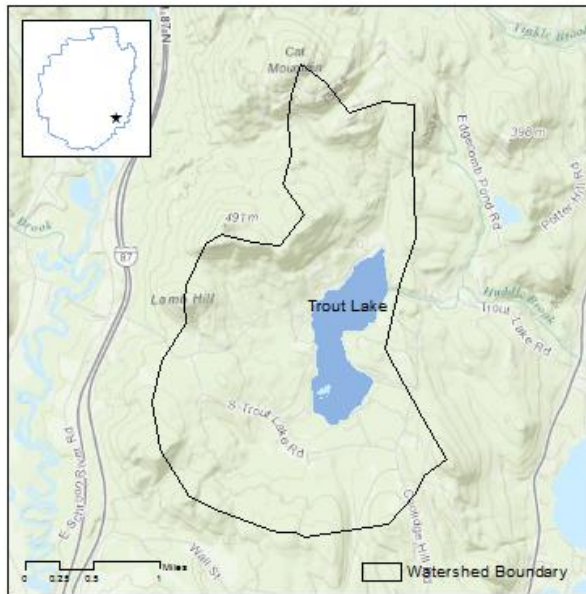


| Location | County: | Warren |
|---|---|---|
| | Town: | Bolton |

| Lake Characteristics | Surface Area (ha): | 103 |
|---|---|---|
| | Shoreline Length (km): | 7 |
| | Max. Depth (m): | 22.9 |
| | Volume (m³): | 6646143 |
| | Flush rate (times/year): | 0.9 |

| Watershed Characteristics | Watershed Area (ha): | 1211 |
|---|---|---|
| | Surface water (%): | 9 |
| | Deciduous Forest (%): | 31 |
| | Evergreen Forest (%): | 33 |
| | Mixed Forest (%): | 15 |
| | Wetlands (%): | 5 |
| | Agricultural (%): | 0 |
| | Residential (%): | 5 |
| | Local Roads (km): | 9.3 |
| | State Roads (km): | 0 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Oligotrophic | Alkaline | Adequate – low sensitivity | High |

*Water quality values and historical trends for Trout Lake during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 6/26/2017 | 7/23/2017 | 8/26/2017 | | |
| Transparency (m) | 5.2 | 6.4 | 8.0 | 6.5 | No Trend |
| Total Phosphorus (µg/L) | 7.4 | 7.5 | 33.8 | 16.2 | Decreasing |
| Chlorophyll-*a* (µg/L) | 1.8 | 1.4 | 2.0 | 1.7 | No Trend |
| Laboratory pH | 8.8 | 8.1 | 8.4 | 8.4 | Increasing |
| Sp. Conductance (µS/cm) | 109.0 | 111.1 | 109.5 | 109.9 | Increasing |
| Color (Pt-Co) | 27.9 | 15.0 | 18.2 | 20.3 | No Trend |
| Alkalinity (mg/L) | | | 24.8 | 24.8 | No Trend |
| Chloride (mg/L) | | | 20.2 | 20.2 | Increasing |
| Calcium (mg/L) | | | 8.4 | 8.4 | Not Analyzed |
| Sodium (mg/L) | | | 9.6 | 9.6 | Not Analyzed |

*See table of content for description of water quality indicators

# Trout Lake – Time Series
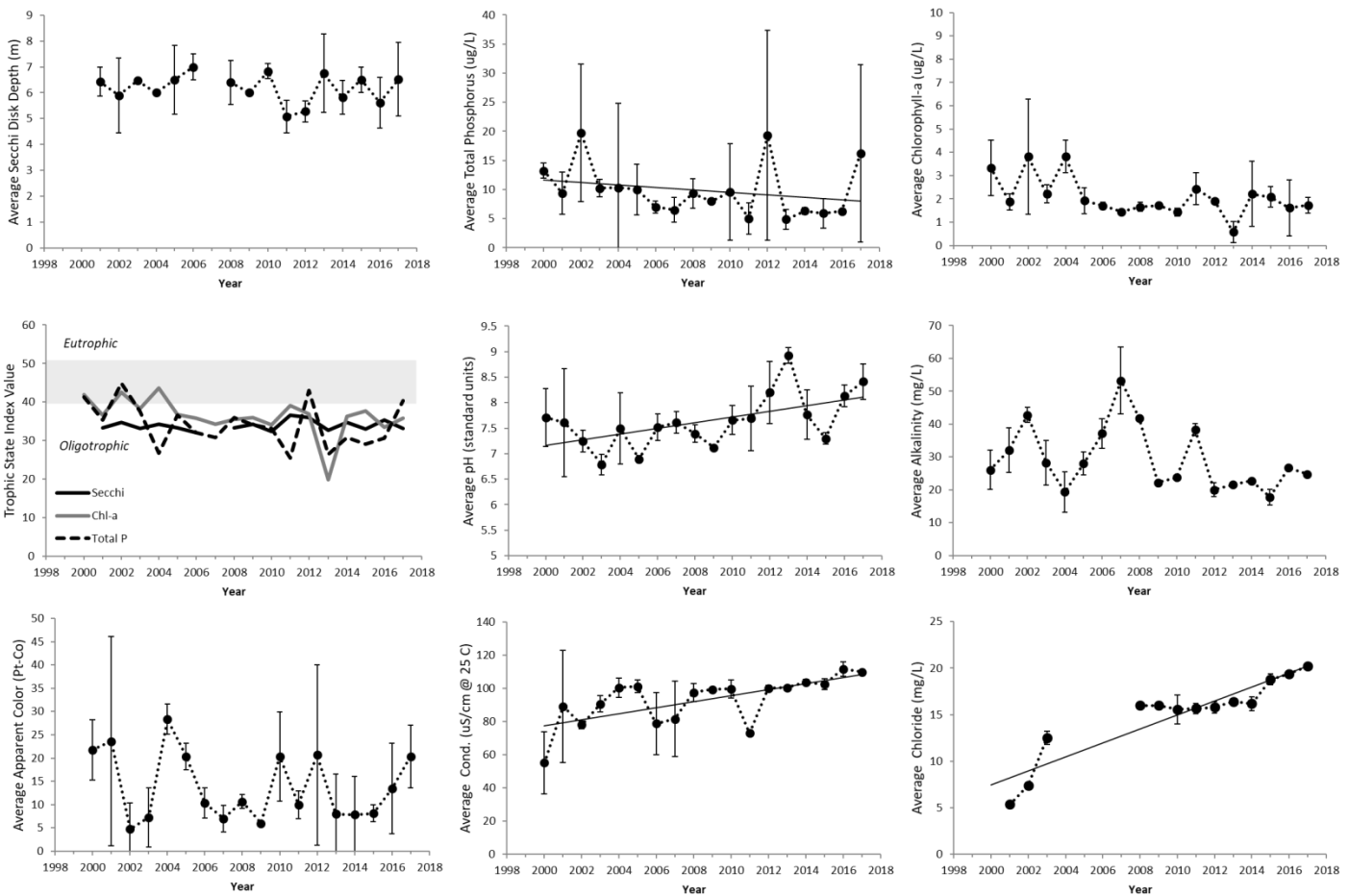


*Annual average values of select water quality indicators for Trout Lake, 2000-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Trout Lake is a 103 ha lake located in Warren County in the Town of Bolton. The lake is located within a 1,211 ha watershed dominated by forests. Trout Lake has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 2000.

- Trout Lake is an oligotrophic lake with a high and stable transparency. The transparency of Trout Lake averaged 6.5 meters in 2017, which was greater than 94% of participating ALAP lakes. Average annual total phosphorus concentration has exhibited a significant downward trend at a rate of approximately 0.2 μg/L/year.

- The water samples analyzed in 2017 were found to be alkaline in terms of their acidity, averaging 8.4 pH units. The alkalinity was 24.8 mg/L, indicating that the lake is well buffered and has low sensitivity to acid deposition.

- Sodium and chloride concentration were 9.6 and 20.2 mg/L respectively, indicating that the chemistry of the lake is moderately influenced by the 9.3 km of roads in the watershed. The chloride concentration of Trout Lake is greater than 92% of participating ALAP Lakes, and is trending up at a rate of 0.8 mg/L/year.

# Tupper Lake
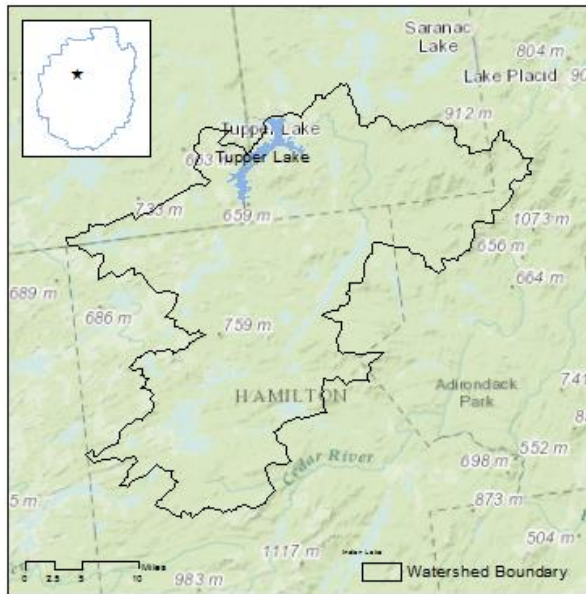


| Location | County: | Franklin |
|----------|---------|----------|
|          | Town:   | Tupper Lake |

| Lake Characteristics | | |
|----------------------|-----|--------|
| Surface Area (ha): | | 2447 |
| Shoreline Length (km): | | 118 |
| Max. Depth (m): | | 25.9 |
| Volume (m³): | | 299680602 |
| Flush rate (times/year): | | 1 |

| Watershed Characteristics | | |
|---------------------------|-----|--------|
| Watershed Area (ha): | | 178856 |
| Surface water (%): | | 10 |
| Deciduous Forest (%): | | 44 |
| Evergreen Forest (%): | | 23 |
| Mixed Forest (%): | | 7 |
| Wetlands (%): | | 14 |
| Agricultural (%): | | 0 |
| Residential (%): | | 1 |
| Local Roads (km): | | 131.2 |
| State Roads (km): | | 108.4 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---------------|---------|----------------------------|---------------------|
| Oligotrophic | Circumneutral | Moderate | Present - Low |

*Water quality values and historical trends for Tupper Lake during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|-------------------------|-----------|-----------|-----------|---------|-------|
|  | 6/30/2017 | 7/11/2017 | 8/20/2017 | | |
| Transparency (m) | 5.0 | 5.0 | 4.3 | 4.8 | No Trend |
| Total Phosphorus (µg/L) | 9.7 | 13.7 | 12.9 | 12.1 | No Trend |
| Chlorophyll-*a* (µg/L) | 3.9 | 4.8 | | 4.3 | No Trend |
| Laboratory pH | 6.9 | 6.9 | 7.4 | 7.0 | No Trend |
| Sp. Conductance (µS/cm) | 22.4 | 21.4 | 21.1 | 21.6 | Decreasing |
| Color (Pt-Co) | 53.6 | 53.6 | 43.9 | 50.4 | No Trend |
| Alkalinity (mg/L) | | | 5.5 | 5.5 | No Trend |
| Chloride (mg/L) | | | 4.5 | 4.5 | No Trend |
| Calcium (mg/L) | | | 1.8 | 1.8 | Not Analyzed |
| Sodium (mg/L) | | | 1.4 | 1.4 | Not Analyzed |

*See table of content for description of water quality indicators

# Tupper Lake – Time Series
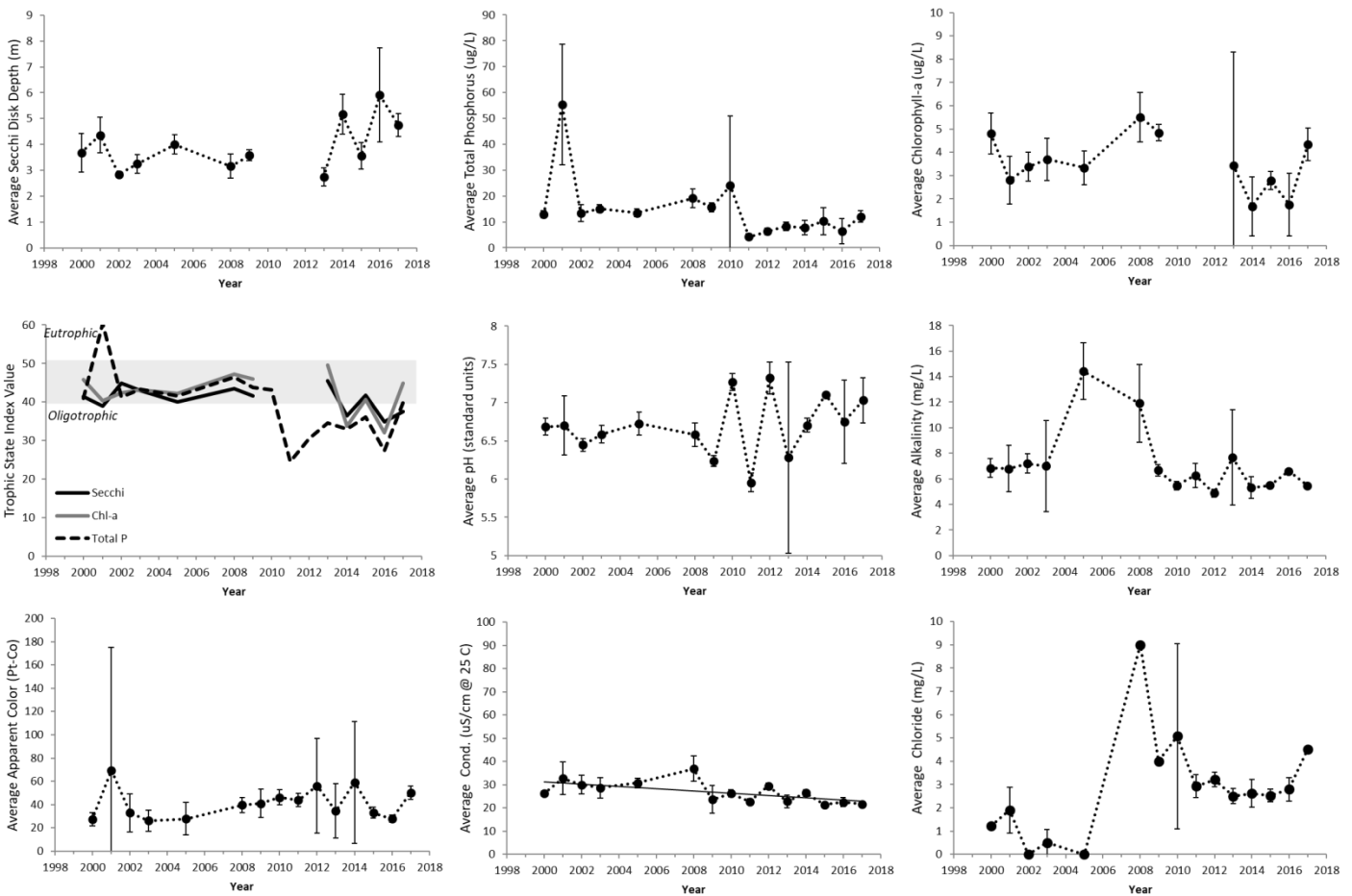


*Annual average values of select water quality indicators for Tupper Lake, 2000-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Tupper Lake is a 2,132 ha lake located in Franklin County in the Town of Tupper Lake.  The lake is located within a 178,856 ha watershed dominated by forests.  Tupper Lake has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 2000.

- Tupper Lake is an oligotrophic lake, on the border of mesotrophy.  Trophic indicators have been highly variable over time, and have not exhibited any statistical trends in the data. Some of the historical variability may be related to shifting sampling locations, there are several different sampling locations listed in the database.

- The water samples analyzed in 2017 were found to be circumneutral in terms of their acidity, with an average pH of 7.0 units. The alkalinity was 5.5 mg/L in 2017, indicating moderate sensitivity to acid deposition.

- Sodium and chloride concentration were 1.4 and 4.5 mg/L respectively, indicating that the chemistry of the lake is influenced by the 140 km of roads in the watershed, however, this influence is relatively low.

# Twitchell Lake
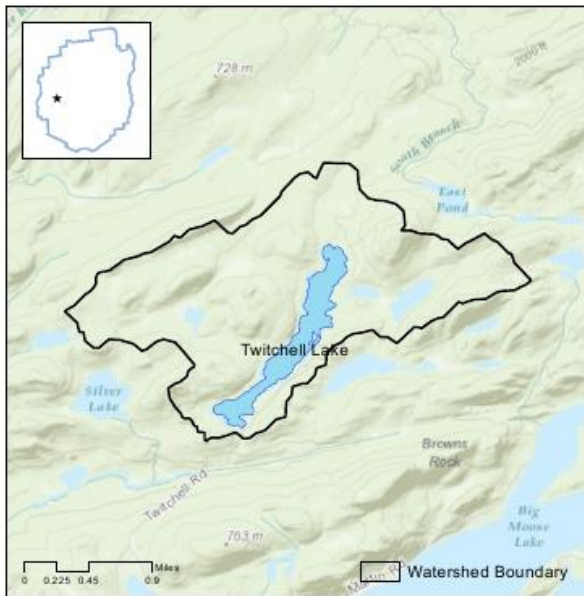


| Location | County: | Herkimer |
|---|---|---|
| | Town: | Webb |

| Lake Characteristics | Surface Area (ha): | 58 |
|---|---|---|
| | Shoreline Length (km): | 7 |
| | Max. Depth (m): | 10.4 |
| | Volume (m³): | 1822596 |
| | Flush rate (times/year): | 3.1 |

| Watershed Characteristics | Watershed Area (ha): | 757 |
|---|---|---|
| | Surface water (%): | 12 |
| | Deciduous Forest (%): | 54 |
| | Evergreen Forest (%): | 16 |
| | Mixed Forest (%): | 8 |
| | Wetlands (%): | 7 |
| | Agricultural (%): | 0 |
| | Commercial (%): | 0 |
| | Local Roads (km): | 0.3 |
| | State Roads (km): | 0 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Mesotrophic | Acidic (threatened) | Low | Not Significant |

*Water quality values and historical trends for Twitchell Lake during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 6/17/2017 | 7/16/2017 | 8/11/2017 | | |
| Transparency (m) | 2.8 | 2.3 | 2.3 | 2.4 | No Trend |
| Total Phosphorus (µg/L) | 8.6 | 10.0 | 10.6 | 9.7 | Decreasing |
| Chlorophyll-*a* (µg/L) | 6.1 | 4.6 | 6.1 | 5.6 | No Trend |
| Laboratory pH | 5.7 | 5.7 | 6.1 | 5.8 | Increasing |
| Sp. Conductance (µS/cm) | 7.5 | 7.7 | 8.1 | 7.7 | Decreasing |
| Color (Pt-Co) | 50.3 | 53.6 | 53.6 | 52.5 | Increasing |
| Alkalinity (mg/L) | | | 1.9 | 1.9 | No Trend |
| Chloride (mg/L) | | | 0.5 | 0.5 | No Trend |
| Calcium (mg/L) | | | 0.9 | 0.9 | Not Analyzed |
| Sodium (mg/L) | | | 0.4 | 0.4 | Not Analyzed |

*See table of content for description of water quality indicators

# Twitchell Lake – Time Series
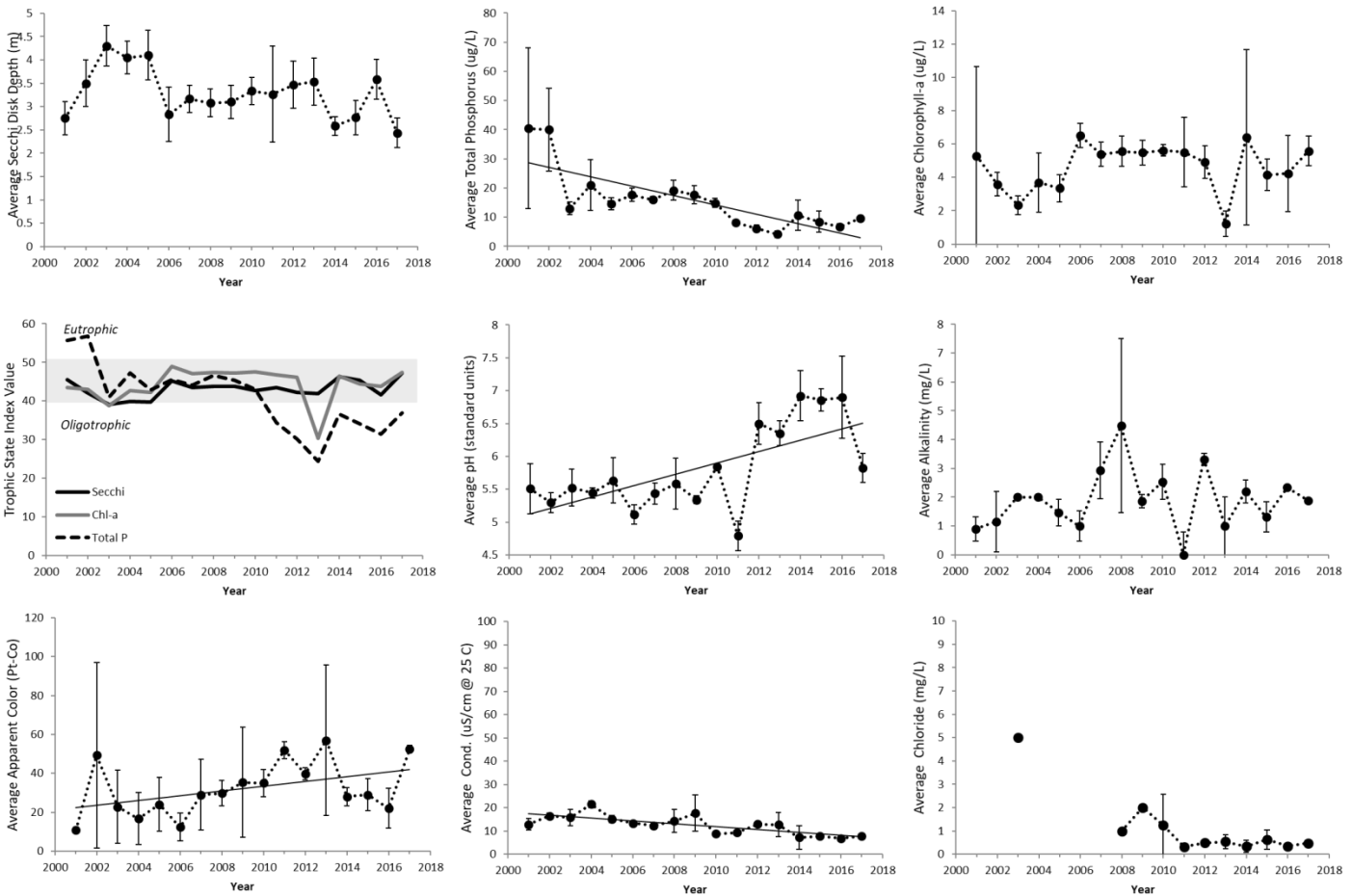


*Annual average values of select water quality indicators for Twitchell Lake, 2001-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Twitchell Lake is a 58 ha lake located in Herkimer County in the Town of Webb.  The lake is located within a 757 ha watershed dominated by forests.  Twitchell Lake has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 2001.

- Twitchell Lake is best classified as a mesotrophic lake. The transparency depth has been relatively stable between 2 and 4 meters, with no statistical trend detected.  Total phosphorus concentration has exhibited a significant downward trend at a rate of approximately 1.6 µg/L/year. This downward trend is largely driven by unusually high phosphorus concentrations in 2001-2002.
- The water samples analyzed in 2017 were found to be acidic, with an average pH of 5.8 units; however, pH values have been substantially higher in recent years and have displayed an increasing trend at a rate of 0.1 pH units/ year. The alkalinity was 1.9 mg/L, indicating that the lake is still highly sensitive to acid deposition.
- Sodium and chloride concentration were 0.4 and 0.5 mg/L respectively. These values are within the range we would expect for a watershed lacking salted state roads.

# Upper Chateaugay Lake
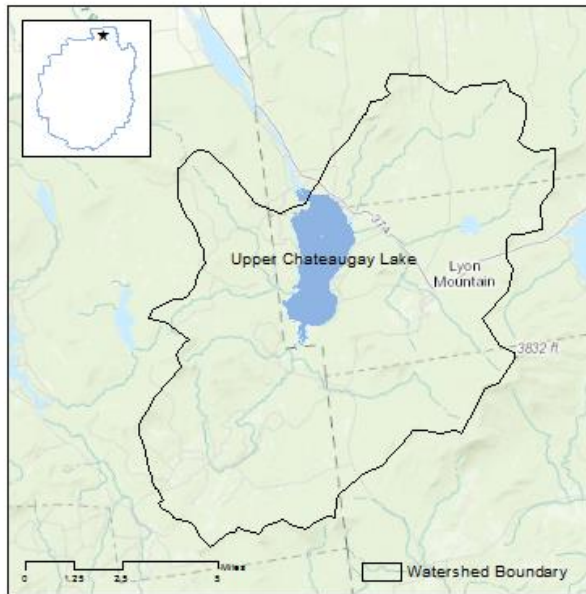


| Location | | |
|---|---|---|
| | County: | Clinton |
| | Town: | Dannemora |

| Lake Characteristics | | |
|---|---|---|
| | Surface Area (ha): | 1038 |
| | Shoreline Length (km): | 29 |
| | Max. Depth (m): | 21.9 |
| | Volume (m³): | 105632868 |
| | Flush rate (times/year): | 1 |

| Watershed Characteristics | | |
|---|---|---|
| | Watershed Area (ha): | 20856 |
| | Surface water (%): | 6 |
| | Deciduous Forest (%): | 52 |
| | Evergreen Forest (%): | 18 |
| | Mixed Forest (%): | 9 |
| | Wetlands (%): | 10 |
| | Agricultural (%): | 1 |
| | Residential (%): | 2 |
| | Local Roads (km): | 50.2 |
| | State Roads (km): | 10.3 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Mesotrophic | Alkaline | Well buffered – not sensitive | Moderate |

*Water quality values and historical trends for Upper Chateaugay Lake during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 6/25/2017 | 7/16/2017 | 8/19/2017 | | |
| Transparency (m) | 4.0 | 3.8 | 3.5 | 3.8 | No Trend |
| Total Phosphorus (µg/L) | 8.1 | 9.8 | 8.3 | 8.7 | Decreasing |
| Chlorophyll-*a* (µg/L) | 3.3 | 2.5 | 3.8 | 3.2 | Decreasing |
| Laboratory pH | 8.2 | 7.4 | 7.7 | 7.7 | No Trend |
| Sp. Conductance (µS/cm) | 65.0 | 62.7 | 65.2 | 64.3 | No Trend |
| Color (Pt-Co) | 34.3 | 47.2 | 40.7 | 40.7 | No Trend |
| Alkalinity (mg/L) | | | 25.7 | 25.7 | No Trend |
| Chloride (mg/L) | | | 5.9 | 5.9 | No Trend |
| Calcium (mg/L) | | | 6.5 | 6.5 | Not Analyzed |
| Sodium (mg/L) | | | 3.3 | 3.3 | Not Analyzed |

*See table of content for description of water quality indicators
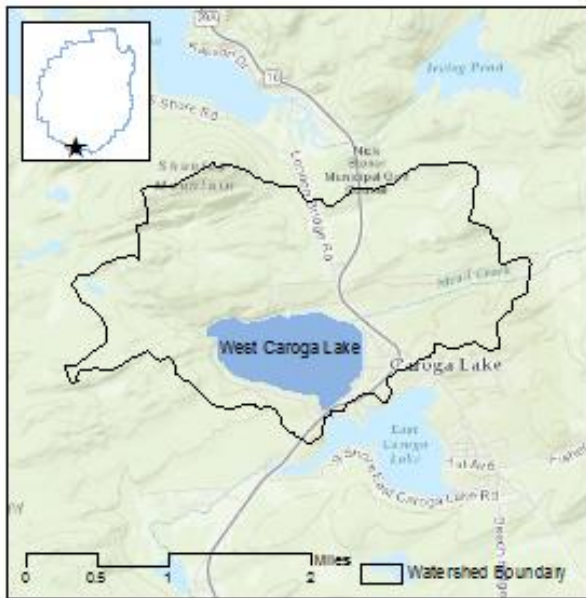
# Upper Chateaugay Lake – Time Series
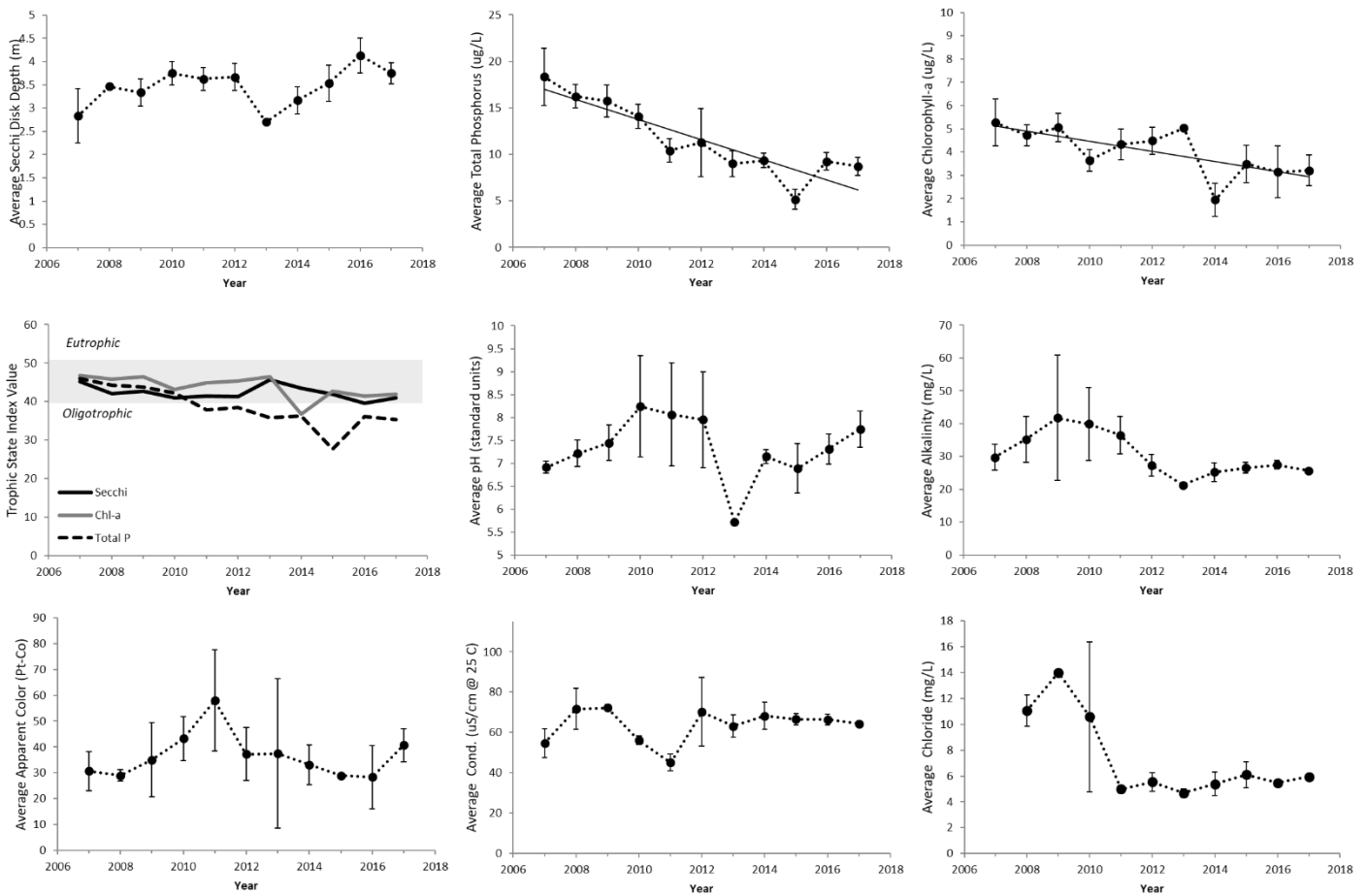


*Annual average values of select water quality indicators for Upper Chateaugay Lake, 2007-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Upper Chateaugay Lake is a 1,038 ha lake located in Clinton County in the Town of Dannemora.  The lake is located within a 20,856 ha watershed dominated by forests.  Upper Chateaugay Lake has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 2007.

- Upper Chateaugay is a mesotrophic Lake that has been trending towards an oligotrophic classification. Transparency depth has typically ranged between 2.5 and 4.0 meters with no apparent statistical trend; however, both total phosphorus and chlorophyll-a concentrations have exhibited a significant downward trend at a rate of 1.1 and 0.2 µg/L/year respectively.
- The water samples analyzed in 2017 were found to be slightly alkaline in terms of their acidity, with an average pH of 7.7 units. The alkalinity was 25.7 mg/L, indicating that the lake is not sensitive to acid deposition.
- Sodium and chloride concentration averaged 3.3 and 5.9 mg/L respectively, indicating that the chemistry of the lake is moderately influenced by the 61 km of roads in the watershed.
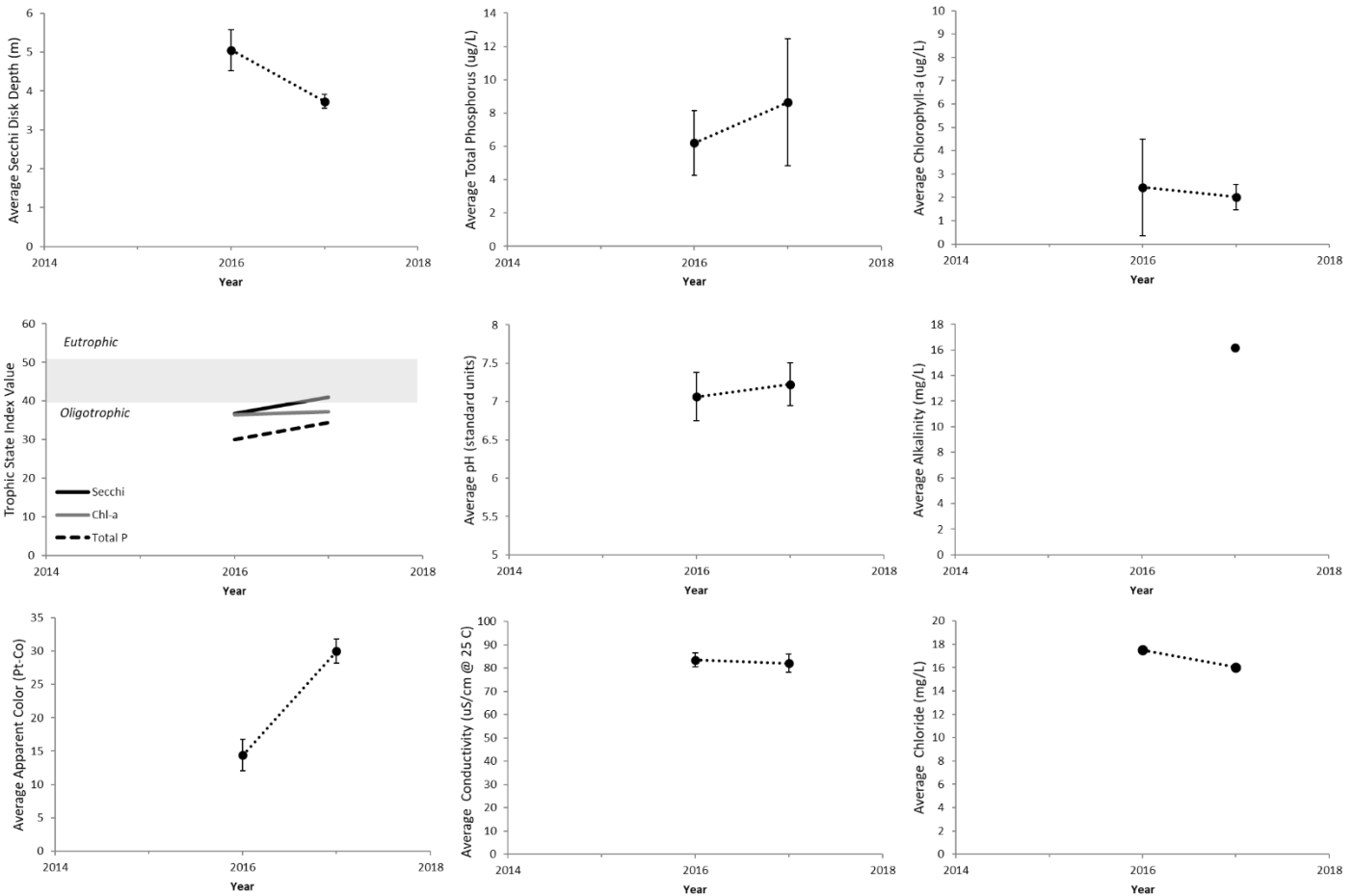
# West Caroga Lake



| Location | County: | Fulton |
|----------|---------|--------|
| | Town: | Caroga Lake |

| Lake Characteristics | | |
|----------------------|---|---|
| Surface Area (ha): | | 129 |
| Shoreline Length (km): | | 5 |
| Max. Depth (m): | | 21.3 |
| Volume (m³): | | 11537900 |
| Flush rate (times/year): | | 0.71 |

| Watershed Characteristics | | |
|---------------------------|---|---|
| Watershed Area (ha): | | 1019 |
| Surface water (%): | | 13 |
| Deciduous Forest (%): | | 34 |
| Evergreen Forest (%): | | 9 |
| Mixed Forest (%): | | 10 |
| Wetlands (%): | | 22 |
| Agricultural (%): | | 0 |
| Residential (%): | | 5 |
| Local Roads (km): | | 11 |
| State Roads (km): | | 3.9 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---------------|---------|----------------------------|---------------------|
| Oligotrophic | Circumneutral | Adequate – low sensitivity | Moderate |

*Water quality values for West Caroga Lake during the 2017 sampling season. Trend analysis will be performed after five years of consecutive data collection. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|-------------------------|:---:|:---:|:---:|:---:|:---:|
| | 6/25/2017 | 7/17/2017 | 8/27/2017 | | |
| Transparency (m) | 3.8 | 3.9 | 3.6 | 3.7 | |
| Total Phosphorus (µg/L) | 5.9 | 7.0 | 13.0 | 8.6 | |
| Chlorophyll-*a* (µg/L) | 2.2 | 1.4 | 2.4 | 2.0 | |
| Laboratory pH | 7.4 | 7.4 | 6.9 | 7.2 | Not Analyzed |
| Sp. Conductance (µS/cm) | 81.7 | 78.3 | 86.1 | 82.0 | |
| Color (Pt-Co) | 31.0 | 31.1 | 27.9 | 30.0 | |
| Alkalinity (mg/L) | | | 16.2 | 16.2 | |
| Chloride (mg/L) | | | 16.0 | 16.0 | |
| Calcium (mg/L) | | | 5.0 | 5.0 | |
| Sodium (mg/L) | | | 8.2 | 8.2 | |

# West Caroga Lake- Time Series



*Annual average values of select water quality indicators for West Caroga Lake, 2016-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

West Caroga Lake is a 129 ha lake located in Futon County in the Town of Caroga. The lake is located within a 1,019 ha watershed dominated by forests. West Caroga has participated in ALAP since 2016. Trend analysis on the key water quality indicators will be performed after a minimum of five years of data collection.

- West Caroga is best classified as an oligotrophic lake on the border of mesotrophy.

- The lake is circumneutral in terms of its pH, with an average pH of 7.2 units in 2017. The alkalinity was 16.2 mg/L, indicating that the lake is well buffered against changes in pH with a low sensitivity to acid deposition.

- Sodium and chloride values for the lake were 8.2 and 16.0 mg/L in 2017, indicating that the chemistry of the lake is moderately influenced by road salt. Chloride concentration in West Caroga is greater than 83% of the participating lakes and is approximately 88 times higher than background concentrations for least impacted lakes of the Adirondack region.

# White Lake
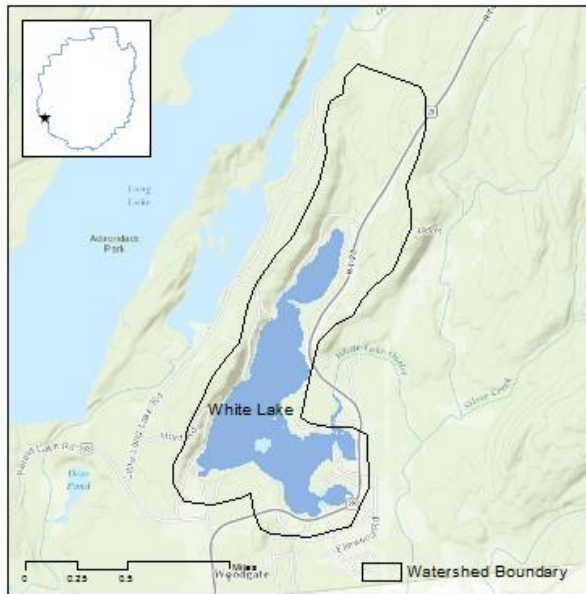


| Location | | |
|---|---|---|
| County: | | Oneida |
| Town: | | Forestport |

| Lake Characteristics | | |
|---|---|---|
| Surface Area (ha): | | 97 |
| Shoreline Length (km): | | 10 |
| Max. Depth (m): | | 22.9 |
| Volume (m³): | | 6912525 |
| Flush rate (times/year): | | 0.4 |

| Watershed Characteristics | | |
|---|---|---|
| Watershed Area (ha): | | 329 |
| Surface water (%): | | 30 |
| Deciduous Forest (%): | | 38 |
| Evergreen Forest (%): | | 7 |
| Mixed Forest (%): | | 2 |
| Wetlands (%): | | 11 |
| Agricultural (%): | | 1 |
| Residential (%): | | 2 |
| Local Roads (km): | | 1.7 |
| State Roads (km): | | 3.6 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Oligotrophic | Alkaline | Adequate – low sensitivity | High |

*Water quality values and historical trends for White Lake during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 6/24/2017 | 7/20/2017 | 8/20/2017 | | |
| Transparency (m) | 7.3 | 8.3 | 6.8 | 7.4 | No Trend |
| Total Phosphorus (µg/L) | 4.7 | 2.8 | 3.7 | 3.7 | Decreasing |
| Chlorophyll-*a* (µg/L) | 0.7 | 1.5 | 1.4 | 1.2 | Decreasing |
| Laboratory pH | 7.8 | 8.1 | 7.6 | 7.8 | No Trend |
| Sp. Conductance (µS/cm) | 108.0 | 151.4 | 128.6 | 129.3 | No Trend |
| Color (Pt-Co) | 11.8 | 8.6 | 8.6 | 9.6 | No Trend |
| Alkalinity (mg/L) | | | 15.9 | 15.9 | No Trend |
| Chloride (mg/L) | | | 31.7 | 31.7 | Increasing |
| Calcium (mg/L) | | | 6.1 | 6.1 | Not Analyzed |
| Sodium (mg/L) | | | 16.4 | 16.4 | Not Analyzed |

*See table of content for description of water quality indicators

# White Lake – Time Series
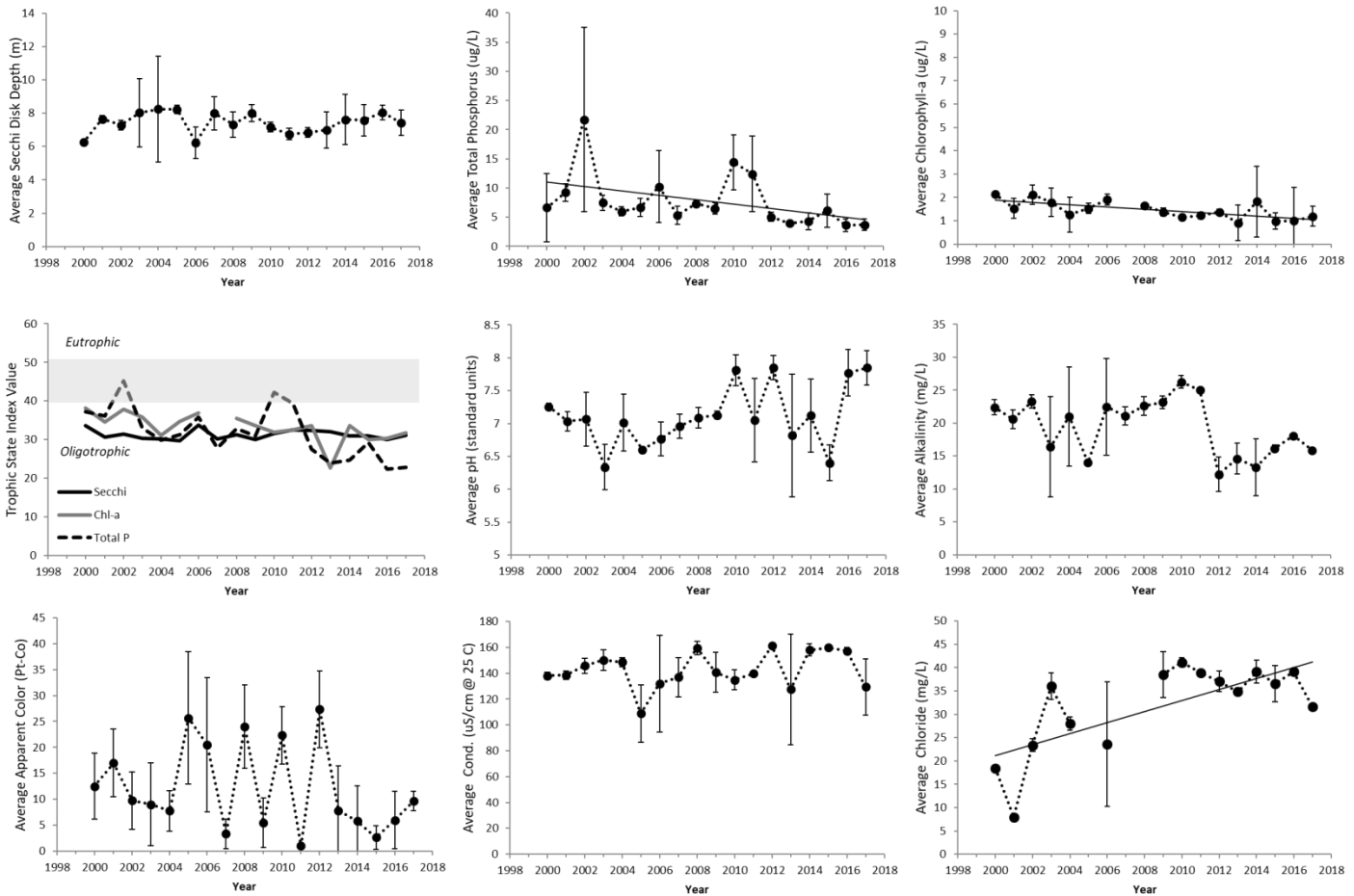


*Annual average values of select water quality indicators for White Lake, 2000-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

White Lake is a 97 ha lake located in Oneida County in the Town of Forestport. The lake is located within a 329 ha watershed dominated by forests. White Lake has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 2000.

- White Lake is a highly transparent oligotrophic lake. The transparency depth in 2017 averaged 7.5 meters, which was greater than 95.5% of ALAP participants. Concentrations of both chlorophyll-a and total phosphorus have exhibited a slight, yet significant, downward trend at a rate of approximately 0.05 and 0.4 µg/L/year respectively.
- The surface water samples analyzed in 2017 were found to be slightly alkaline in terms of their acidity, with an average pH of 7.8 units. The alkalinity was 15.9 mg/L, indicating that the lake is well buffered, with a low sensitivity to acid deposition.
- Sodium and chloride concentration were 16.4 and 31.7 mg/L respectively. These values indicate that the lake is highly influenced by the 5.3 km of roads in the watershed. Chloride concentration of White Lake is greater than 95% of participating lakes, and 150 times greater than chloride concentration in lakes without paved roads. In their watershed.

# Wolf Lake
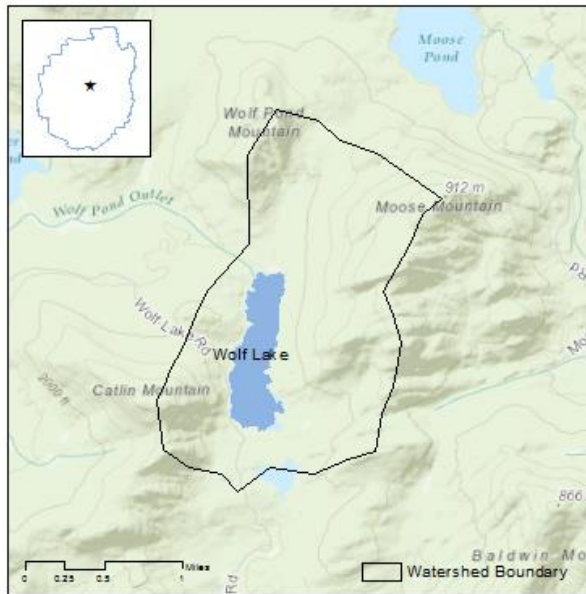


| Location | | |
|---|---|---|
| County: | Essex |
| Town: | Newcomb |

| Lake Characteristics | | |
|---|---|---|
| Surface Area (ha): | 59 |
| Shoreline Length (km): | 5 |
| Max. Depth (m): | - |
| Volume (m³): | 3389892 |
| Flush rate (times/year): | 1.5 |

| Watershed Characteristics | | |
|---|---|---|
| Watershed Area (ha): | 673 |
| Surface water (%): | 10 |
| Deciduous Forest (%): | 67 |
| Evergreen Forest (%): | 10 |
| Mixed Forest (%): | 10 |
| Wetlands (%): | 3 |
| Agricultural (%): | 0 |
| Residential (%): | 0 |
| Local Roads (km): | 0 |
| State Roads (km): | 0 |

| Trophic State | Acidity | Acid Neutralizing Capacity | Road Salt Influence |
|---|---|---|---|
| Oligotrophic | Circumneutral | Moderate | Not Significant |

*Water quality values and historical trends for Wolf Lake during the 2017 sampling season. Trend analysis was not performed on calcium or sodium data. BDL=below detection limit.*

| Water Quality Indicator | Sampling Date | | | Average | Trend |
|---|---|---|---|---|---|
| | 6/22/2017 | 7/19/2017 | 8/22/2017 | | |
| Transparency (m) | 2.8 | 2.8 | 4.2 | 3.3 | Decreasing |
| Total Phosphorus (µg/L) | 5.1 | 5.9 | 4.5 | 5.2 | Decreasing |
| Chlorophyll-*a* (µg/L) | 2.5 | 1.9 | 1.4 | 1.9 | No Trend |
| Laboratory pH | 7.0 | 6.8 | 6.9 | 6.9 | No Trend |
| Sp. Conductance (µS/cm) | 14.5 | 13.2 | 14.8 | 14.2 | Decreasing |
| Color (Pt-Co) | 21.4 | 21.4 | 24.6 | 22.5 | Increasing |
| Alkalinity (mg/L) | | | 6.3 | 6.3 | Decreasing |
| Chloride (mg/L) | | | 0.7 | 0.7 | No Trend |
| Calcium (mg/L) | | | 1.8 | 1.8 | Not Analyzed |
| Sodium (mg/L) | | | 0.6 | 0.6 | Not Analyzed |

*See table of content for description of water quality indicators

# Wolf Lake – Time Series
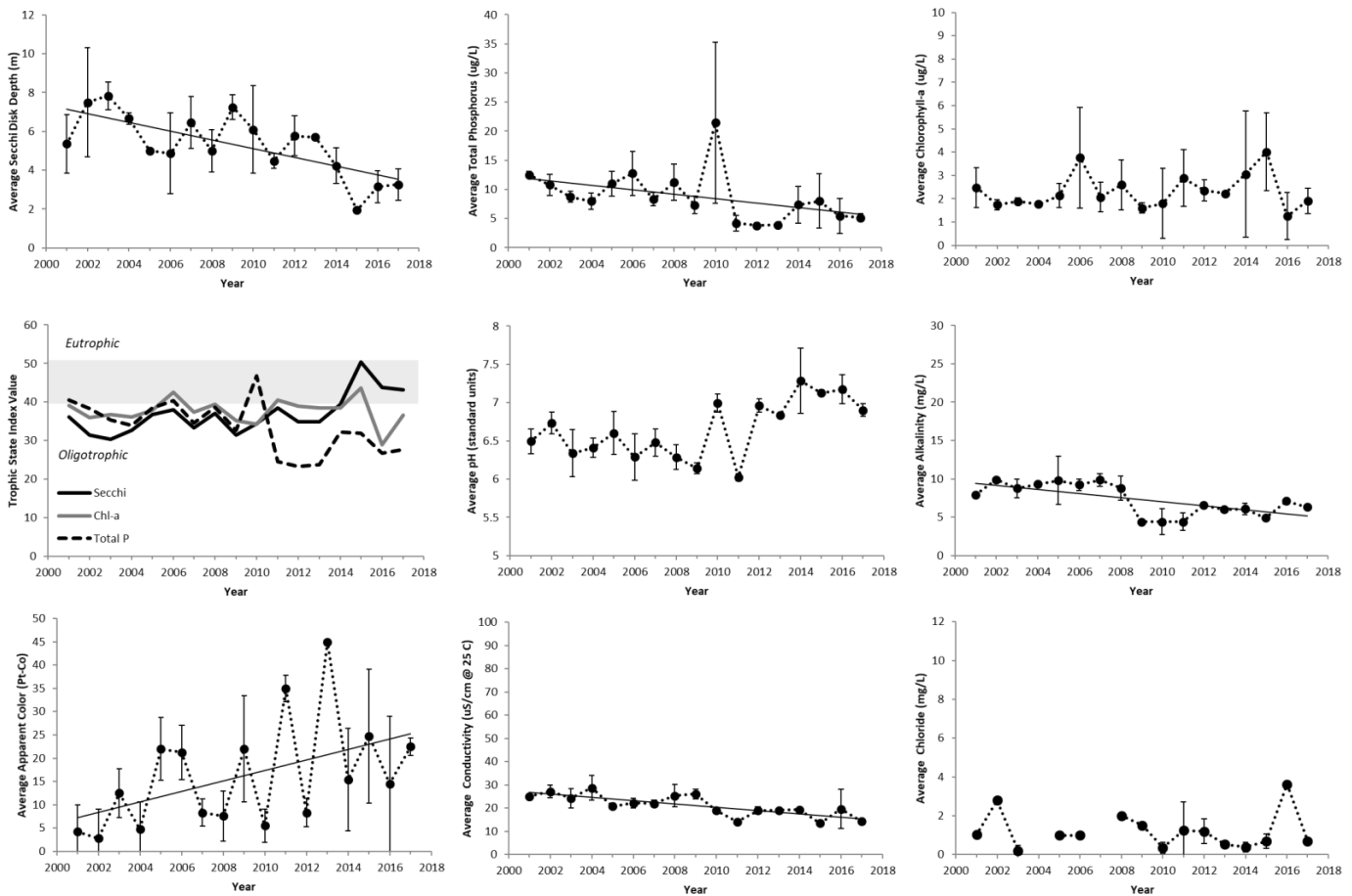


*Annual average values of select water quality indicators for Wolf Lake, 2001-2017. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

## Summary of Findings

Wolf Lake is a 59ha lake located in Essex County in the Town of Newcomb. The lake is located within a 673 ha watershed dominated by forests. Wolf Lake has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 2001.

- Wolf Lake is best classified as an oligotrophic lake based on the concentrations of chlorophyll-a and total phosphorus; however, transparency depths indicate the lake is better classified as a mesotrophic lake. Disparities of this nature typically indicate non-algal turbidity or elevated dissolved organic material.
- Transparency depth has exhibited a significant downward trend since 2001 at a rate of approximately 23 cm/year. Some of this decrease could be explained by an increasing trend in color, a surrogate measure of dissolved organic material. Elevated dissolved organic material rapidly attenuates light resulting in depressed transparency.
- The water samples analyzed in 2017 were found to be circumneutral in terms of their acidity, with an average pH of 6.9 units. The pH of the water had been higher over the past few years, but a statistical trend is not yet apparent. The alkalinity was found to be 6.3 mg/L, indicating that the lake is moderately sensitive to acid deposition. We detected a slight, yet significant, downward trend in alkalinity at a rate of approximately 0.3 mg/L/year.

# Literature Cited

Bubeck, R.C., Diment, W.H., Deck, B.L., Baldwin, A.L. and Lipton, S.D., 1971. Runoff of deicing salt: effect on Irondequoit Bay, Rochester, New York. Science, 172(3988), pp.1128-1132.

Carlson, R.E. 1977. A trophic state index for lakes. Limnology and Oceanography, 22(2):361-369.

Carlson, R.E. and Simpson, J., 1996. A coordinator's guide to volunteer lake monitoring methods. North American Lake Management Society, 96, p.305.

Daley, M.L., J.D. Potter, and W.H. McDowell. 2009. Salinization of urbanizing New Hampshire streams and groundwater: effects of road salt and hydrologic variability. Journal of the North American Benthological Society, 28(4):929–940.

Driscoll, C.T., K.M. Driscoll, M.J. Mitchell, and D.J. Raynal. 2003. Effects of acidic deposition on forest and aquatic ecosystems in New York State. Environmental Pollution, 123:327–336.

Findlay, S.E. and Kelly, V.R., 2011. Emerging indirect and long-term road salt effects on ecosystems. Annals of the New York Academy of Sciences, 1223(1), pp.58-68.

Keller, W., Dixit, S.S. and Heneberry, J., 2001. Calcium declines in northeastern Ontario lakes. Canadian Journal of Fisheries and Aquatic Sciences, 58(10), pp.2011-2020.

Kelting, D.L. and Laxson, C.L., 2010. Review of effects and costs of road de-icing with recommendations for winter road management in the Adirondack Park. Adirondack Watershed Institute of Paul Smith's College, Adirondack Watershed Institute Report# AWI2010-01.

Kelting, D.L., C.L. Laxson, E.C. Yerger. 2012. A regional analysis of the effect of paved roads on sodium and chloride in lakes. Water Research, 46(8):2749-2758.

Kelting, D.L., and C.L. Laxson 2014. Effect of road salt load on cation and anion export from forested watersheds in the Adirondack Park. 38th annual conference of the New England Association of Environmental Biologists, March 27th, 2014, Burlington VT.

Kjensmo, J., 1997. The influence of road salts on the salinity and the meromictic stability of Lake Svinsjøen, southeastern Norway. Hydrobiologia, 347(1-3), pp.151-159.

Molot, L.A. and Dillon, P.J., 1997. Colour-mass balances and colour-dissolved organic carbon relationships in lakes and streams in central Ontario. Canadian Journal of Fisheries and Aquatic Sciences, 54(12), pp.2789-2795.

Klemer, A.R. 1991. Effects of nutritional status on cyanobacterial buoyancy, blooms, and dominance, with special reference to inorganic carbon. Canadian Journal of Botany, 69: 1133-1138.

Schindler, D.W., 1977. Evolution of phosphorus limitation in lakes. Science, 195(4275), pp.260-262.

Søndergaard, M., J.P. Jensen, and E. Jeppesen. 2003. Role of sediment and internal loading of phosphorus in shallow lakes. Hydrobiologia, 506-509:135-145.

Strock, K. E., Nelson, S. J., Kahl, J. S., Saros, J. E., & McDowell, W. H. (2014). Decadal trends reveal recent acceleration in the rate of recovery from acidification in the Northeastern US. Environmental science & technology, 48(9), 4681-4689.

Thurman, E.M., 2012. Organic geochemistry of natural waters (Vol. 2). Springer Science & Business Media.

Toerpe, K., 2013. The rise of citizen science. The Futurist, 47(4), p.25.

Wetzel, R.G. 2001. Limnology, Lake and River Ecosystems, 3rd Edition. Academic Press, New York. 1006pp.

Whittier, T.R., Ringold, P.L., Herlihy, A.T. and Pierson, S.M., 2008. A calcium-based invasion risk assessment for zebra and quagga mussels (Dreissena spp). Frontiers in Ecology and the Environment, 6(4), pp.180-184.

# Appendix 1. Analytical methods performed on ALAP samples at the AWI Environmental Research Lab.

| Analyte | Method Description | Reference |
|---------|-------------------|-----------|
| Lab pH | Mettler Toledo standard pH electrode | APHA |
| Conductivity | Conductivity at 25° C via Mettler Toledo conductivity cell | APHA 2510 B |
| Apparent Color | Single wavelength method with PtCO standards | APHA 2120 C |
| Chlorophyll-a | Trichromatic method uncorrected for phaeophyton | APHA 10200 H |
| Total Phosphorus | Acid-persulfate digestion, automated ascorbic acid reduction | APHA 4500-P H |
| Nitrate + Nitrite | Automated cadmium reduction | APHA 4500-$NO_3$ I |
| Alkalinity | Automated methyl orange method | EPA 301.2 |
| Chloride | Automated ion chromatography | EPA 300.0 |
| Calcium and Sodium | Inductively coupled plasma optical emission spectroscopy | EPA 200.7 |