ADIRONDACK LAKE ASSESSMENT PROGRAM

2018 REPORT

A citizen science lake monitoring program in its 21st year

Adirondack Lake Assessment Program: 2018 Report

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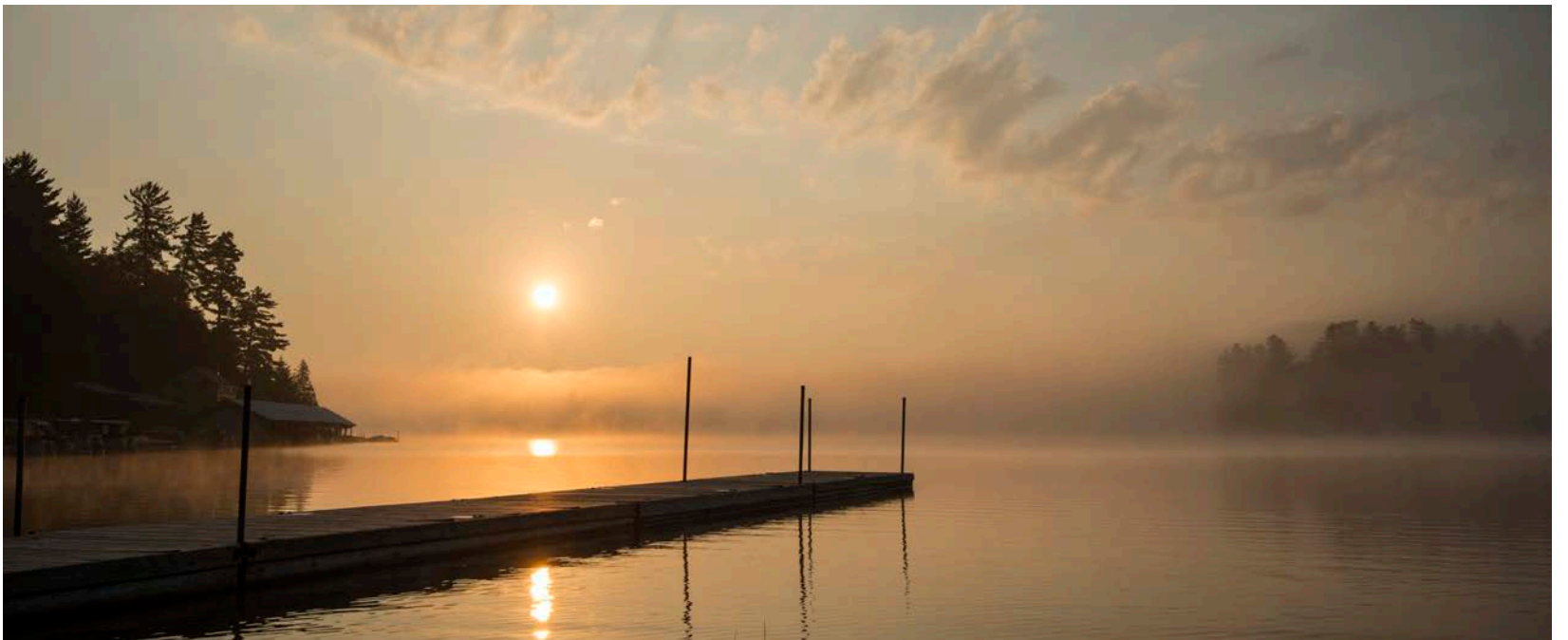
EXECUTIVE SUMMARY

The Adirondack Lake Assessment Program (ALAP) is a research and monitoring collaboration between scientists and volunteers. Citizen science collaborations, such as ALAP, expand opportunities for scientific data collection and provide citizens with the benefit of knowing they helped advance the understanding of Adirondack lakes.

ALAP is a cooperative effort between Protect the Adirondacks (PROTECT) and the Paul Smith's College Adirondack Watershed Institute (AWI). The objectives of ALAP are to: (1) develop a long-term water quality database for Adirondack lakes and document historical trends in their limnological condition, (2) provide a repository for water quality data that multiple stakeholders can use to make informed decisions, and (3) engender lake stewardship by providing opportunities for citizens to participate in scientific monitoring. This report provides readers with appropriate background information on lake science, a regional analysis of the current water quality characteristics of Adirondack lakes, and a synthesis of current and historical water quality data for each of the participating lake. The report can be summarized in the following key points:

1. ALAP continues to be a highly successful program. Established in 1998 with only nine participating lakes, the program has grown to include up to 73 lakes, with 68 participating in 2018. Currently, the program supports 37 lakes with 15 or more years of consecutive data, and 11 lakes with 20 or more years of data. ALAP lakes are from all across the Adirondack Region, and for many of these lakes, the ALAP dataset represents the only available source for information on water quality.

2. We assessed that 65% of the participating lakes were oligotrophic in 2018. Oligotrophic lakes have low biological productivity due to relatively low nutrient availability. As a result, oligotrophic lakes tend to have high transparency, low algal abundance, and decreased probability of persistent algal blooms. We determined that 32% of the lakes were mesotrophic, an intermediate trophic status, and 3% were eutrophic, a status that is typified by low transparency and relatively high nutrient availability.

3. The average transparency of the participating lakes in 2018 ranged from an average of 1.2 meters in Otter Pond to as high as 8.7 meters in Brandreth Lake. The majority of lakes had an average transparency greater than 4 meters in depth. We found that 12% of the study lakes have exhibited a statistical decrease in transparency over time.

4. Chlorophyll-a concentration, a surrogate measure for algal productivity, ranged from 0.5 µg/L in Brandreth Lake, to as high as 17.2 µg/L in Amber Lake. Analysis of the historical data revealed that 73% of participating lakes showed no statistical change in algal productivity over time and that 27% had a decreasing trend in chlorophyll-a concentration.

5. In 2018, the average total phosphorus concentrations ranged from a low of 2.4 µg/L in Brandreth Lake to as high as 36 µg/L in Indian Lake (Franklin County). The majority of lakes (66%) had average values less than 10 µg/L.

6. The average pH values in 2018 ranged from a low 5.9 in Otter Pond to a high of to 8.6 in Augur Lake. The majority of lakes (75%) fell in the circumneutral range, defined as pH values between 6.5 and 7.5 pH units. Analysis of the historical data reveals that 25% of the lakes with long-term data have exhibited an increasing trend in pH (less acidic).

7. Wide spread use of road salt (primarily sodium chloride) over the last several decades has significantly increased the concentration of sodium and chloride in the environment. Many lakes in the Adirondacks now contain anywhere from 10 to 300 times the background concentration of chloride. The average chloride concentrations ranged from 0.3 mg/L in Otter Pond, to as high as 68 mg/L in Butternut Pond. Based on the chloride concentrations alone, we believe that roughly 72% of the participating ALAP lakes are influenced by road salt.

INTRODUCTION

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). Lake monitoring is a crucial component of understanding our environment and costs very little relative to the value of the resource it protects and the policy it informs.

ALAP is a cooperative effort between Protect the Adirondacks (PROTECT) and the Paul Smith's College Adirondack Watershed Institute (AWI). The objectives of ALAP are to: (1) develop a long-term water quality database for Adirondack lakes and document historical trends in their limnological condition, (2) provide a repository for water quality data that multiple stakeholders can use to make informed decisions, 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 nine participating lakes, the program has grown to include up to 73 lakes, with 68 participating in 2018. 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 for information on water quality.

Report Format

This report is designed to provide information to the informed layperson, scientific community, lake managers, and other interested individuals. As such, it is written in a way to provide something for everyone. The section titled Methods delivers a general description of the field and laboratory methods used to collect and analyze the data. Readers that desire more detailed descriptions should contact the report authors. The section, titled Understanding and Interpreting ALAP Data, provides the readers with background information on lake science and a basic understanding of how to interpret lake data. In addition, this section presents a region wide summary of key water quality variables and historical trends for the study lakes. The last section of the report, titled Individual Lake Reports, summarizes the limnology and water quality of the 68 individual lakes enrolled in the program in 2018. 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. Information on converting the metric units of measurement to imperial units are readily available through internet searches and mobile apps.

Table 1. Adirondack Lake Assessment Program lakes for 2018. Lakes are organized by the number by years of program participation.

Lake	Years	Lake	Years
Blue Mountain Lake	21	Raquette Lake	16
Cranberry Lake	21	Tupper Lake	16
Eagle Lake	21	Indian Lake- HC	15
Loon Lake- Franklin	21	Fern Lake	14
Silver Lake	21	Big Moose Lake	14
Brandreth Lake	20	Indian Lake- FC	14
Eli Pond	20	Moss Lake	14
Gull Pond	20	Mountain View Lake	14
Little Long Lake	20	Lake Abanakee	13
Stony Creek Ponds	20	Chazy Lake	12
Thirteenth Lake	20	Lake Adirondack	12
Austin Pond	19	Lower Chateaugay	12
Middle Saranac Lake	19	Upper Chateaugay	12
Osgood Pond	19	Simon Pond	11
Trout Lake	19	Chapel Pond	11
White Lake	19	Hewitt Lake	10
Arbutus Lake	18	Augur Lake	9
Catlin Lake	18	Lake Titus	9
Deer Lake	18	Star Lake	9
Hoel Pond	18	Amber Lake	8
Lake of the Pines	18	Jordan Lake	8
Long Pond	18	Lake Clear	8
Pine Lake	18	Otter Pond	8
Pleasant Lake	18	Loon Lake- WC	7
Rich Lake	18	Schroon Lake	5
Tripp Lake	18	Paradox Lake	5
Twitchell Lake	18	Chase's Lake	4
Wolf Lake	18	Frank Pond	4
Garnet Lake	17	Mink Pond	4
Lens Lake	17	Butternut Pond	3
Lower Saranac Lake	17	East Caroga Lake	3
Canada Lake	16	Long Lake	3
Kiwassa Lake	16	West Caroga Lake	3
Lake Colby	16	Windover Lake	1
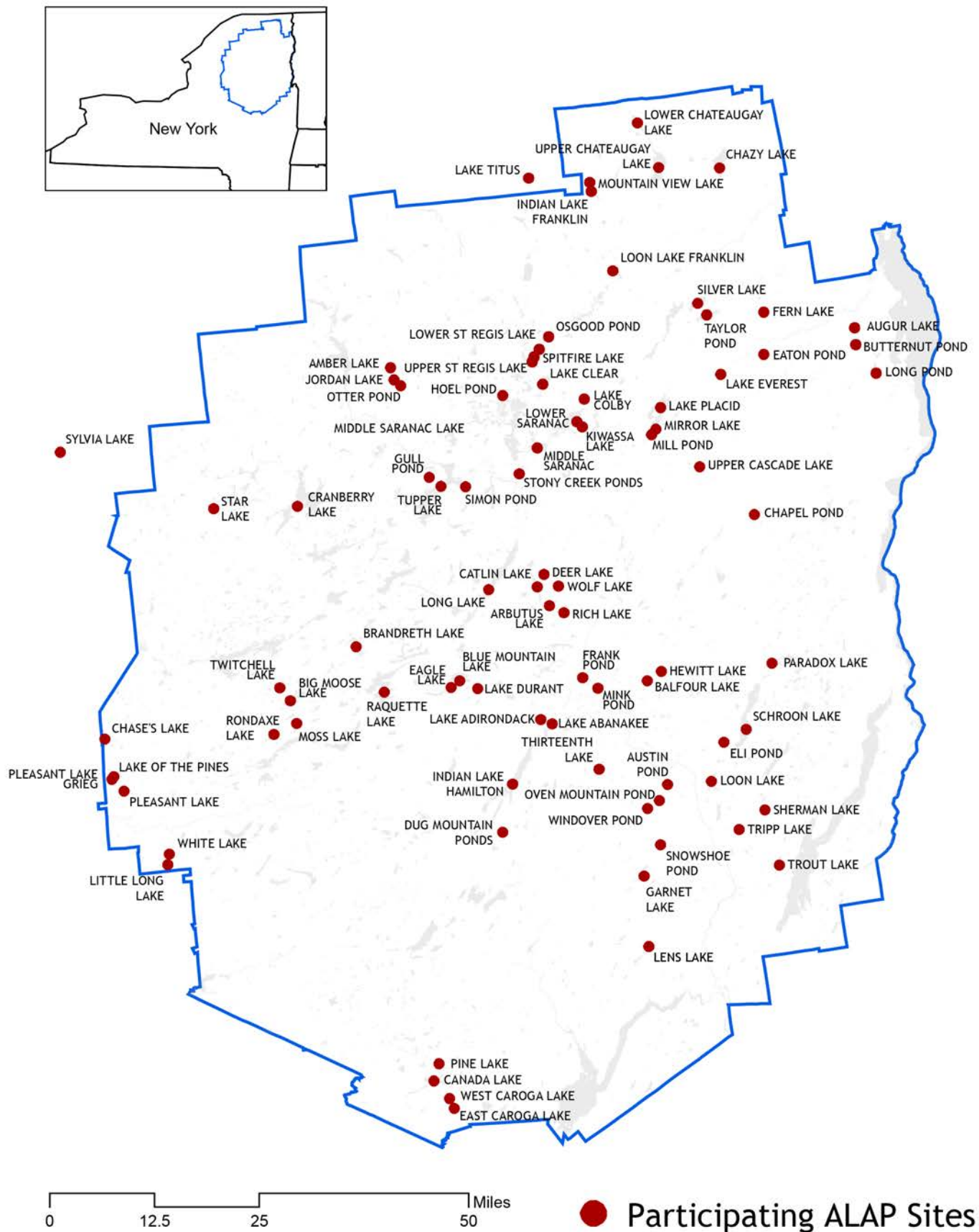
Figure 1. ALAP participating lakes, 2010-2018

METHODS

ALAP volunteers were trained in standard limnological sampling methods by AWI and PROTECT. Data was collected from the deepest location of each lake, 3 to 5 times during the summer months. During each sampling event, volunteers observed the transparency 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 transparency 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.

Water samples were analyzed for laboratory pH, alkalinity, conductivity, total phosphorus, chlorophyll-a, color, chloride, calcium and sodium at the AWI Environmental Research Lab following the analytical methods listed in Appendix 1. Alkalinity, chloride, sodium, and calcium were only analyzed on one sample per season, typically in August. 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 in 2018) using Kendall's Tau, a rank correlation coefficient that tests the hypothesis "there is no association between the indicator and time". For visual purposes, simple linear trend lines were fit to data with significant trends ($p < 0.05$) and displayed on the corresponding chart.
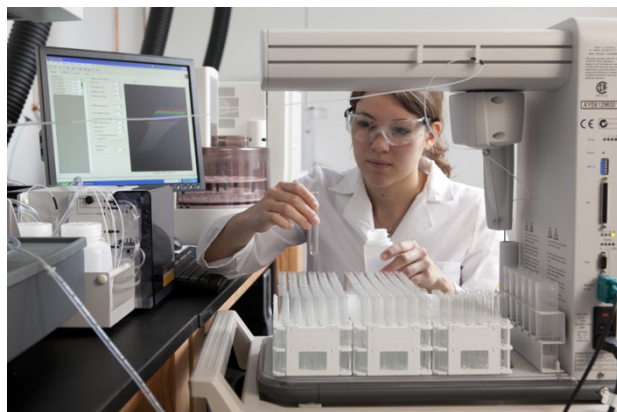
Collecting and analyzing lake samples for the Adirondack Lake Assessment Program. Clockwise from upper left: AWI technician preparing to analyses samples for sodium and calcium at the AWI Environmental Research Lab. ALAP volunteers receiving training aboard the R/V Clearwater. Young citizen scientists from Camp Whippoorwill preparing to collect water samples from Augur Lake.

Understanding and Interpreting ALAP Data

Transparency

Transparency depth 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 is the most widely used limnological tool because it integrates many characteristics of a lake into a simple metric.

The depth to which the Secchi disk can be seen is ultimately a function of light penetration through the water. Pure H2O absorbs light and transforms it into heat in a predictable and relatively slow pattern. The amount of light that is absorbed (or scattered) rapidly increases as the amount of dissolved and suspended materials rises, resulting in suppressed transparencies. Transparency data is used most often to assess 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 decrease (see Trophic State). Many other factors can affect transparency, such as turbidity, suspended sediment, dissolved chemicals, and water color. For example, the transparency of many lakes is influenced by the quality and quantity of dissolved organic matter (DOM), which can selectively attenuate solar radiation and reduce transparency (Zhang et al. 2010; Williamson et al. 1999).

In 2018, average ALAP transparencies ranged from 1.2 meters in Otter Pond to as high as 8.7 meters in Brandreth Lake. The majority of lakes (75%) had an average transparency that was greater than 4 meters in depth (Figure 2). Analysis of the historical data revealed that 85% of study lakes had no observable change in transparency over time and 12% had a decreasing trend in transparency (less transparent).

The Italian astronomer, Angelo Secchi (1818-178), and the limnological tool named after him. Secchi initially developed the disk to measure the depths of Venetian Canals

Chlorophyll-a

Chlorophyll-a is the primary photosynthetic pigment found in all freshwater species of algae and cyanobacteria. Quantifying algal biomass in a lake is a difficult undertaking; however, a measurement of chlorophyll is a relatively simple and inexpensive analysis that can provide a surrogate measure of algal productivity (Wetzel 2001). Chlorophyll 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 (Carlson 1977). Generally speaking, lakes of low productivity (oligotrophic) tend to have chlorophyll-a concentrations less than 2 µg/L, while highly productive lakes (eutrophic) often have chlorophyll concentrations greater than 8 µg/L (NYS DEC assessment criteria). Typically, major changes in algal biomass (e.g. an algae bloom) are related to changes in the availability of nutrients, primarily phosphorus or nitrogen, or at times, silica or inorganic carbon (Wetzel 2001).

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. In the laboratory, the filter is macerated and the chlorophyll- is extracted into acetone, which is then analyzed with a fluorimeter.

In 2018, average chlorophyll-a concentrations ranged from 0.5 µg/L in Brandreth Lake to a high of 17.2 µg/L in Amber Lake. The majority of lakes (66%) had concentrations less than 3.0 µg/L (Figure 2). Analysis of the historical data revealed that 73% of participating lakes showed no statistical change in algal productivity over time and that 27% had a decreasing trend in chlorophyll-a concentration.

Phosphorus

Phosphorus is of major importance to structure and metabolism of all organisms. Decades of experimental and observational research have demonstrated that phosphorus is typically the limiting nutrient for algal productivity in lakes (Hecky and Kilham 1988). In freshwater systems, phosphorus exists in relatively small amounts compared to other essential nutrients such as carbon, nitrogen, oxygen, and sulfur. The addition of extra phosphorus allows production to increase greatly because all other essential elements are usually available in excess (Schindler 1977). Natural weathering slowly releases phosphorus from rocks and soils into aquatic systems;
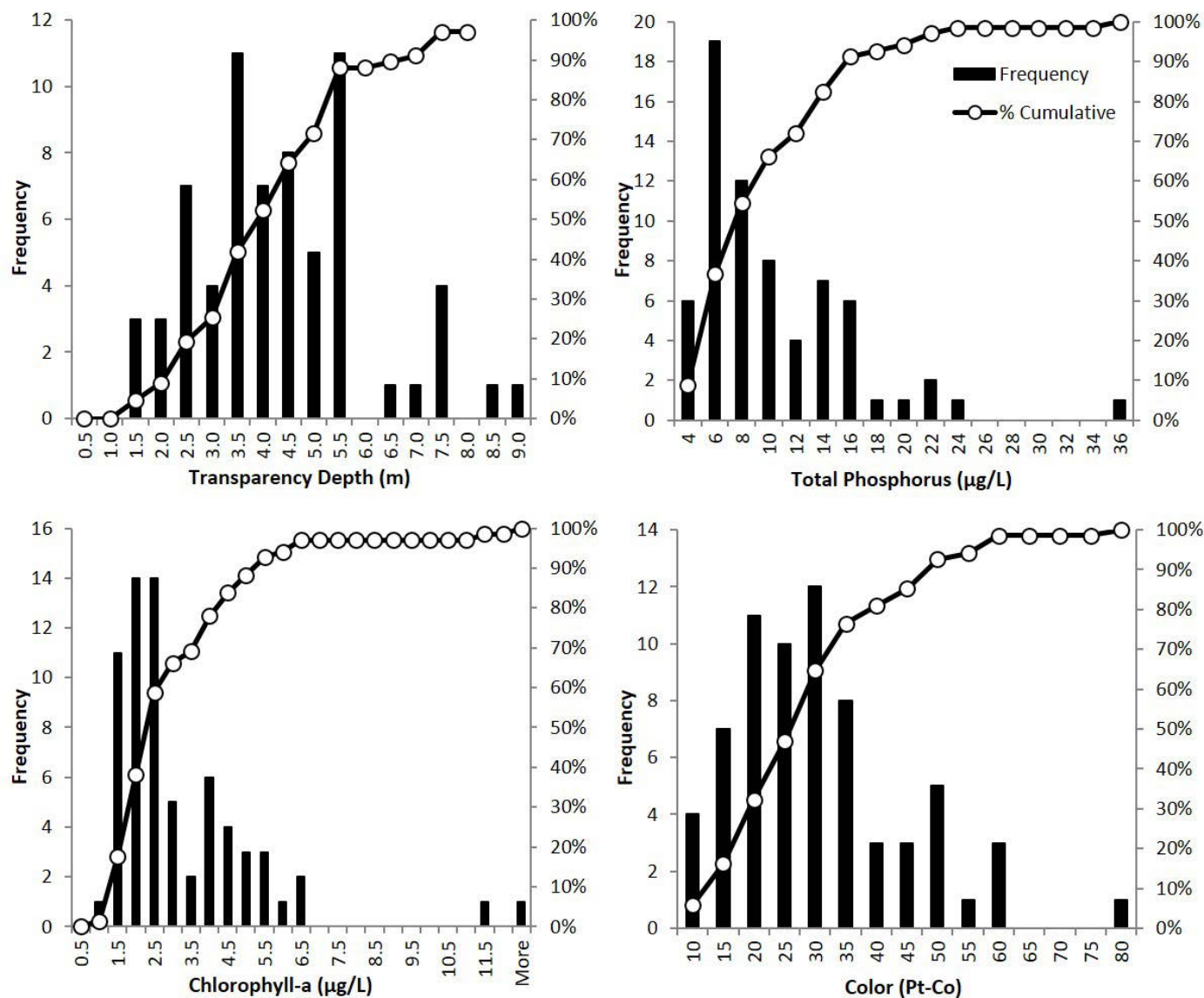
Figure 2. Frequency histograms of the average values for transparency, total phosphorus, chlorophyll, and color. Data from year 2018 (n = 68).

however, phosphorus can rapidly enter water through fertilizer application, wastewater effluent, and agricultural runoff. Phosphorus exists in a number of forms in aquatic systems, including readily available dissolved phosphate, and organically and inorganically bound phosphorus.

Total phosphorus is 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 20 µg/L (NYS DEC assessment criteria).

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.

In 2018, the average total phosphorus concentrations ranged from a low of 2.4 µg/L in Brandreth Lake to as high as 36 µg/L in Indian Lake (Franklin County). The majority of lakes (66%) had average values less than 10 µg/L (Figure 2). Analysis of the historical data revealed that 55% of participating lakes showed no statistical change in phosphorus concentration over time and that 45% exhibited a decreasing trend. Although these statistics suggest a regional decrease in phosphorus availability, data interpretation should proceed with caution. The method used to analyze phosphorus on the ALAP lakes has undergone numerous changes since the

project began. The analytical modifications have certainly had a positive influenced on quality control, including detection limits, accuracy, precision, and probability of contamination. Most recently, the AWI implemented substantial changes to the total phosphorus methodology in 2010 by switching from a manual benchtop method to fully automated flow injection analysis. The history of method changes may be responsible for the decreasing trend in phosphorus observed in the ALAP dataset.

Tropic State

Trophic state, a term derived from the Greek word trophi (meaning food or nourishment), is used by limnologists to explain the overall lake productivity. 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 root 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 word meso (meaning middle), mesotrophic 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 a trophic index method. Fixed boundary methods use predetermined ranges of transparency, total phosphorus,

Paddling on Blue Mountain Lake, a classic oligotrophic lake (photo courtesy of Brendan Wiltse).

and chlorophyll to classify the lake's trophic status, although most lake managers consider chlorophyll to be the most direct measure. A good example of a fixed boundary is the traditional method employed by the NYSDEC that appears in Table 2 (NYSDEC Clean Lakes Assessment).

The most commonly used tropic index (TSI) is Carlson's TSI (Carlson 1977). The trophic classification index is based on algal biomass as determined by the three variables of transparency, total phosphorus, and chlorophyll. The range of the index is from 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.

Of the 68 lakes participating in 2018, we classified 44 lakes (65%) as oligotrophic, 22 lakes (32%) as mesotrophic, and 2 lakes (3%) as eutrophic using the Carlson's TSI value for chlorophyll-a (Figure 3).

The strength of Carlson's TSI is that resource managers can use it to detect unusual conditions. For example, the TSI score for phosphorus may not lead to the same trophic classification as the TSI score for transparency or chlorophyll if the lake is experiencing phosphorus limitation. Similarly, the TSI score for transparency may suggest a more productive state than the TSI scores for phosphorus and chlorophyll if the lake possesses high amounts of dissolved color, which effectively reduce light penetration. These discrepancies, known as TSI

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

Parameter	Oligotrophic	Mesotrophic	Eutrophic
Transparency (m)	>5	2 - 5	<2
Total phosphorus (µg/L)	<10	10 - 20	>20
Chlorophyll-a (µg/L)	<2	2 - 8	>8
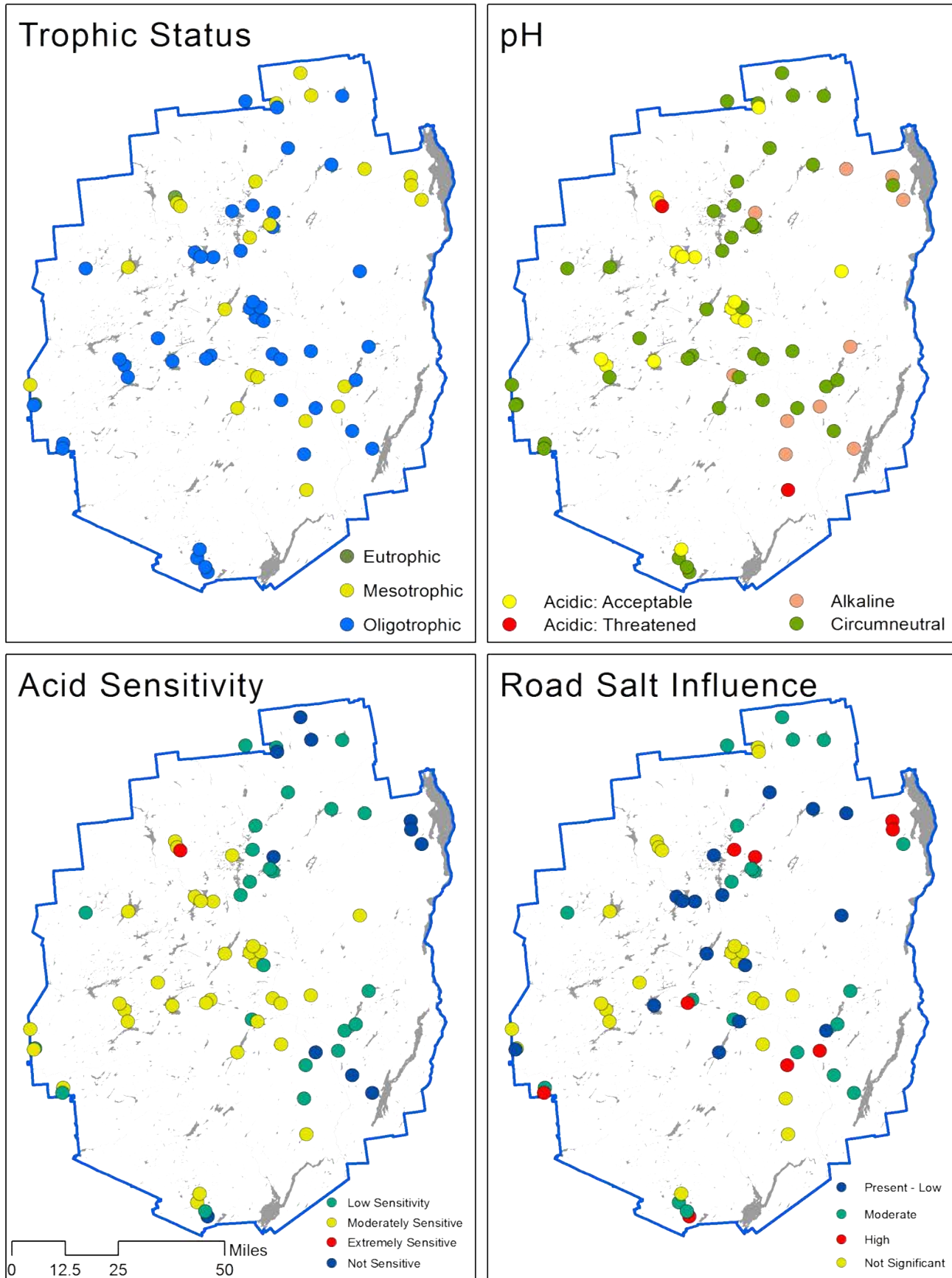
Figure 3. Condition of the 2018 ALAP lakes in terms of trophic state, acidity, acid sensitivity, and road salt influence.
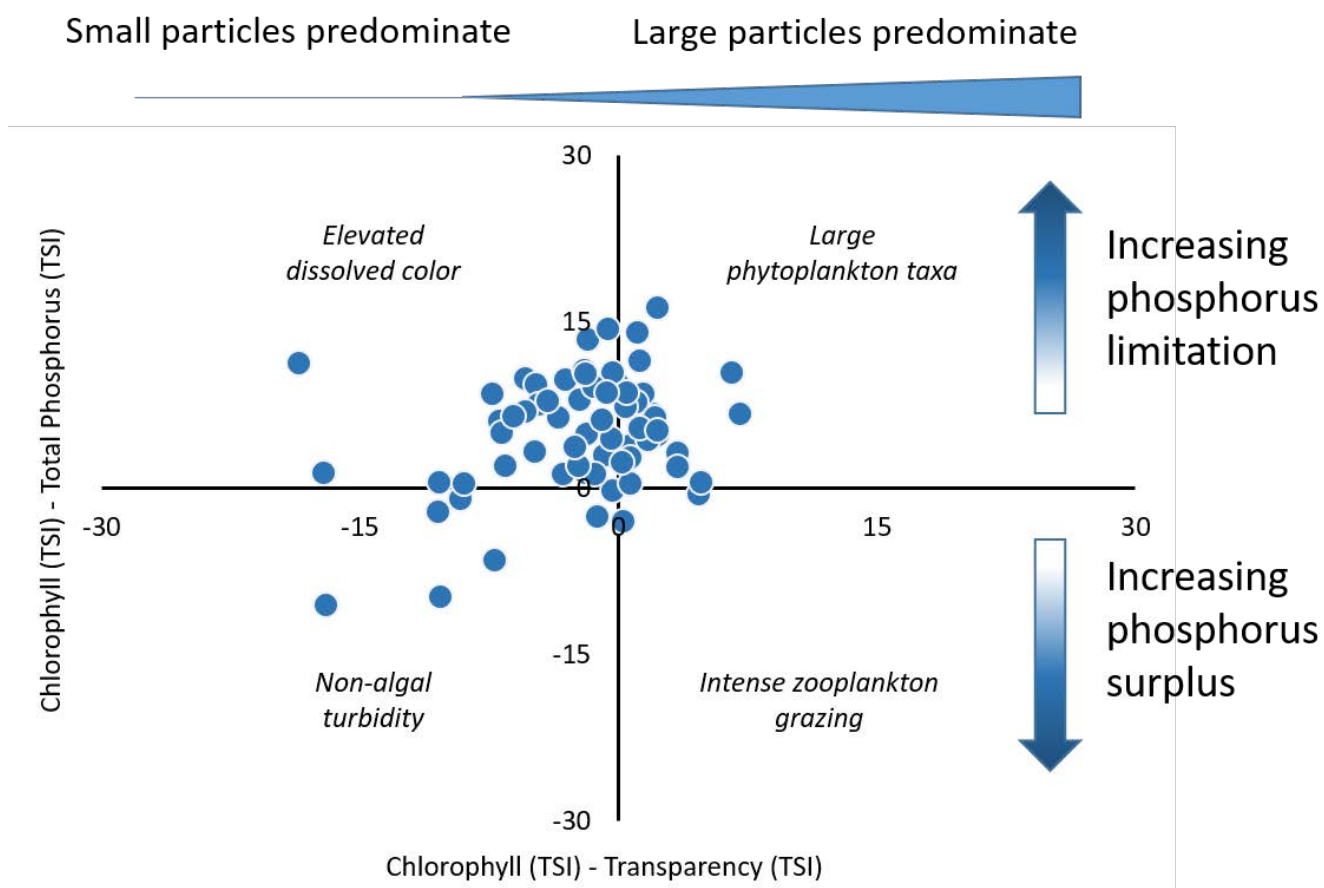
Figure 4. Trophic state deviation and the likely conditions experienced for each of the 2018 ALAP lakes (based on Carlson and Havens 2005).

deviations, can illuminate interesting lake dynamics (Carlson and Havens 2005). TSI deviations for the 2018 ALAP lakes are illustrated in Figure 4. We found that 59 of the lakes (87%) had a greater TSI score derived from chlorophyll than from total phosphorus concentration, suggesting that phosphorus limits algal biomass in these lakes. The remaining 9 lakes (13%) exhibited signs of phosphorus surplus. We found that 42 lakes (62%) had TSI values calculated from transparency that overestimate the productivity as calculated by chlorophyll, suggesting that other particles besides algae attenuate light and reduce transparency. In Adirondack lakes, colored dissolved organic matter is typically responsible for this scenario.

Regardless of the lakes trophic classification, it is 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).

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).

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.

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

In 2018, the average color values ranged from less than 10 PtCo in White Lake to 77 PtCo in Jordan Lake. We found that the majority of lakes (77%) had color values between 10 and 40 PtCo units. (Figure 2). Analysis of the historical data revealed that 93% of participating lakes showed no statistical change in color over time and that 7% have exhibited an increasing trend.

ph
In chemistry, pH is used to communicate acidity. Technically, pH is a surrogate measure of the concentration of hydrogen ions in water. 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. The pH unit 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. Acidification occurs through the introduction of organic acids from wetland, or acidic deposition. Acid deposition is the addition of sulfuric and nitric acids to watersheds from the atmosphere. The acidic compounds are the result of chemical reactions between water, oxygen and the oxides of sulfur and nitrogen emitted to the atmosphere from the burning of fossil fuels. The deposition of acidic compounds has resulted in adverse ecological effects to the aquatic and terrestrial environment of the region (reviewed by Driscoll et al. 2003) In the Adirondacks, acidification status can be generally assed from pH values based on the guidelines outlined in Table 3.

In 2018, the average pH values ranged from a low 5.9 in Otter Pond to a high of to 8.6 in Augur Lake. The majority of lakes (75%) fell in the circumneutral range

between 6.5 and 7.5 (Figures 3 and 5). Analysis of the historical data reveals that 75% of participating lakes showed no statistical change in pH over time and that 25% have exhibited an increasing trend (less acidic).

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

A wide range of buffering abilities exists across the Adirondack Region. We analyzed one alkalinity sample from each lake in the 2018 season. During that time the alkalinity values ranged from 1.6 mg/L in Otter Pond to 51 mg/L in Long Pond, with 49% of the lakes exhibiting moderate or extreme acid sensitivity (Figures 3 and 5). Analysis of the historical data revealed that 72% of participating lakes showed no statistical change in alkalinity over time and that 25% have exhibited a negative trend.

Table 3. Assessment of lake acidification based on pH value.

Lake acidity	Assessment
pH < 5.0	Acidic: critically impaired
pH 5.0 – 6.0	Acidic: threatened
pH 6.0 – 6.5	Acidic: acceptable
pH 6.5 – 7.5	Circumneutral: non-impacted
pH >7.5	Alkaline: non-impacted

Table 4. Assessment of sensitivity to acid deposition based on alkalinity concentraion (mg/L).

Alkalinity	Neutralizing 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
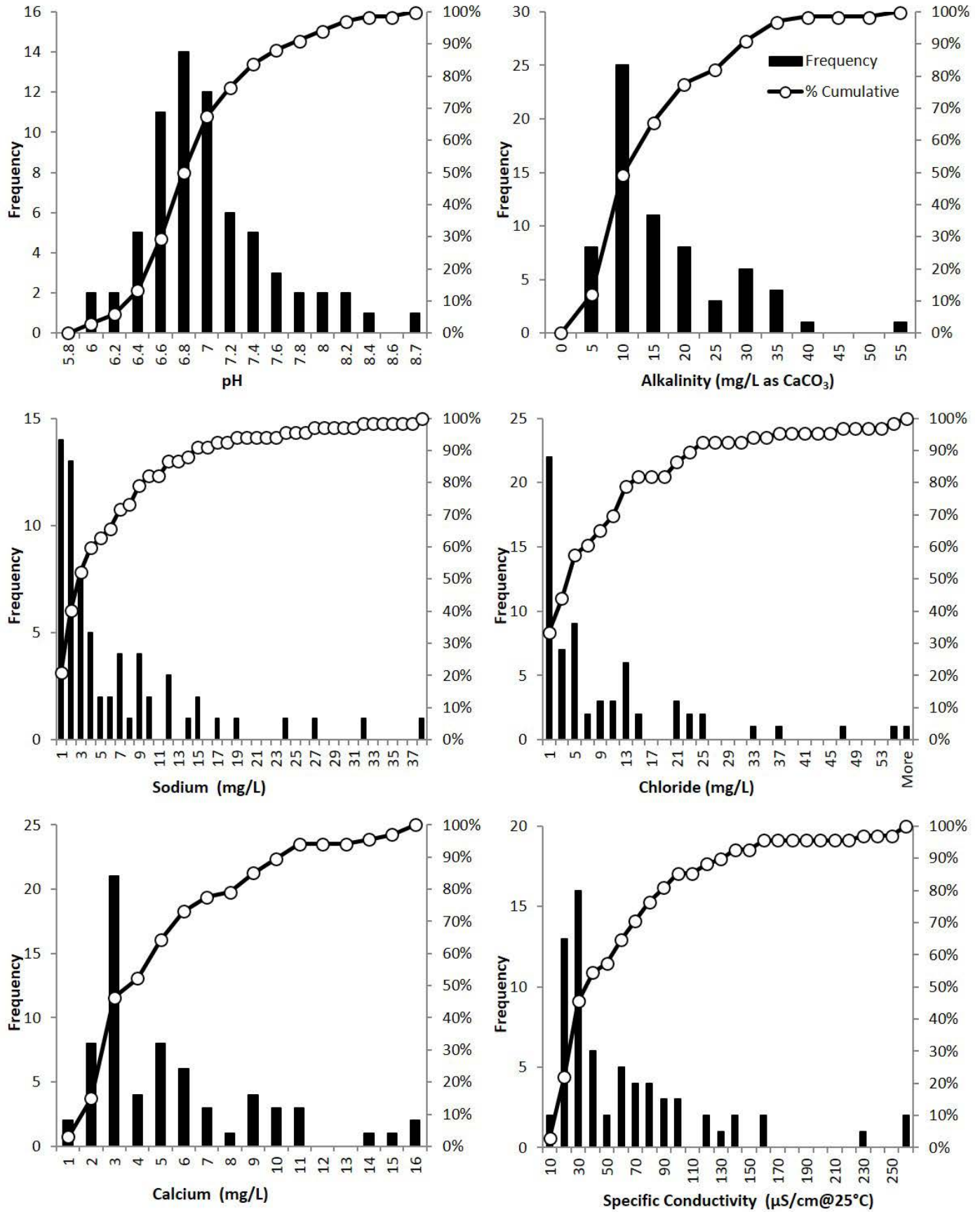
Figure 5. Frequency histograms of the average values for pH, alkalinity, sodium, chloride, calcium, and specific conductivity. Data from year 2018 (n = 68).

Rock salt (sodium chloride) being loaded into the back of a salt truck (left). AWI technician, Hunter Favreau, collecting a sample of direct road runoff from NYS Rt. 28/30 in the hamlet of Blue Mountain Lake in March of 2017. This sample contained over 700 mg/L of chloride, which is approximately 1,400 times the concentration of unimpacted surface runoff (right).

Road Salt Influence

Lakes in the Adirondack region have naturally low concentrations of both chloride and sodium, with median background concentrations of 0.3 mg/L and 0.5 mg/L respectively (Kelting et al. 2012). Wide spread use of road salt (primarily sodium chloride) over the last several decades has significantly increased the concentration of these ions in the environment. Many lakes in the Adirondacks now contain anywhere from 10 to 170 times the background concentration of chloride. Adirondack roads receive approximately 208,000 metric tons of road deicers each year, with an annual average of 23 tons of salt applied to each lane kilometer of state roads (NYSSOGS 2013). At a regional scale, salted roads are hydrologically connected to 77% of the surface water in the Adirondack Park (Regalado and Kelting 2015). Recent research has highlighted that road salt application has significantly elevated the concentrations of sodium and chloride in Adirondack lakes, and that the extent of concentration increase is directly proportional to the density of state roads within the watershed (Kelting et al. 2012).

Road salt can have direct and indirect effects on aquatic ecosystems and drinking water supply. 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 runoff such as roadside streams or vernal pools (reviewed by Findlay and Kelly

2011; Kelting and Laxson 2010). Researchers have also documented indirect effects to aquatic systems. For example, sodium actively displaces base cations (Ca, K, and Mg) as well as heavy metals from the soil, elevating their concentration in surface waters (Kelting and Laxson 2018). In some extreme cases, the sheer volume of road salt runoff that enters a lake can interfere with lake stratification, causing numerous negative consequences for oxygen availability, nutrient cycling and habitat availability (Wiltse et al. 2018; Bubeck et al. 1971; Kjensmo 1997). Sodium and chloride can impart an undesirable taste to drinking water, the United States Environmental Protection Agency has a guideline of 250 mg/L for chloride and 20 mg/L for sodium, but these are for public drinking water supplies only and are not enforceable standards.

Although it is difficult to use sodium and chloride concentration to assess impact to the aquatic environment, the concentration of these chemicals serves 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 XX as a general guideline for gauging road salt influence on a lake.

Table 5. General assessment of road salt influence based on chloride concentration.

Chloride (mg/L)	Road Salt Influence
Less than 1.0	Not significant
1 - 5	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 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 data that extends before 2010.

As expected, a wide range of salt concentrations existed across the region in 2018, driven primarily by the density of salted roads in the watershed. The average sodium and chloride concentrations ranged from 0.5 and 0.3 mg/L, respectively, in Otter Pond, to as high as 38 and 68 mg/L, respectively, in Butternut Pond. Based on the chloride concentrations alone, we believe that roughly 72% of the participating ALAP lakes are influenced by road salt (Figures 3 and 5. Analysis of the limited historical data revealed that 81% of participating lakes showed no statistical change in chloride since year 2010, and that 10% have exhibited an increasing trend.

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). Many 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 underlying most of the Adirondack region weathers slowly, resulting in a low rate of calcium generation. There are, however, many lakes in the Adirondacks where calcium rich bedrock results in elevated calcium concentrations, examples include Lake George (Ca = 12 mg/L), Augur Lake (Ca = 11 mg/L), Long Pond (Ca = 13 mg/L), and Lake Champlain (Ca = 12 mg/L).

Environmental stressors can affect the calcium concentration of lakes (Jeziorski et al. 2008). Research in the northeastern United States, southern Ontario, and northern Europe has demonstrated that acid deposition has leached calcium and other cations from sensitive soils, severely depleting calcium stores in the watershed. The leaching of calcium by acidic deposition may result in an initial increase of calcium concentration

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

in surface water followed by long-term calcium decline over time (Stoddard et al. 1999; 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 increased calcium concentrations in the ground and surfaces water. Kelting and Laxson (2018) observed that calcium export from watersheds with salted roads was 31% higher than watersheds without salted 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 globally. Relatively low calcium concentration serves to insulate the majority of Adirondack lakes from invasion by the zebra mussel. 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, much higher than most lakes in the Adirondacks (Whittier et al. 2008).

Calcium concentration is analyzed alongside sodium and other metals using an atomic emission spectrophotometer and has only been analyzed regularly since 2010. In 2018 the average calcium concentrations values ranged from 0.7 mg/L in Otter Pond to a high of 15.6 mg/L in Augur Lake. The majority of lakes (64%) have calcium concentrations less than 5 mg/L (Figure 5). We found three lakes with calcium concentrations within the range needed to support a viable zebra mussel population (Augur Lake, Lake Colby, Butternut Pond, and Long Pond). Trend analysis was not performed on calcium concentrations in 2018.

Conductivity

Conductivity is a measurement of the ability of a water sample to conduct electricity. Pure H2O 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 a strong indicator of the amount of dissolved ions in water. Typically, the

conductivity of least-impacted and undeveloped lakes in the Adirondacks is quite low, and typically in the range of 10 to 25 μS/cm. Elevated conductivity may be indicative of road salt pollution, faulty septic systems or the influence of bogs and wetlands in the watershed.

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 2018 the average conductance values ranged from 8 μS/cm in Otter Pond to as high as 259 μS/cm in Butternut Pond (Figure 5). 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 the conductivity data (Figure 6; P <0.001, R^2 = 0.86). Analysis of the historical data revealed that 55% of participating lakes showed no statistical change in conductivity over time and that 38% exhibited a significant downward trend in conductivity.
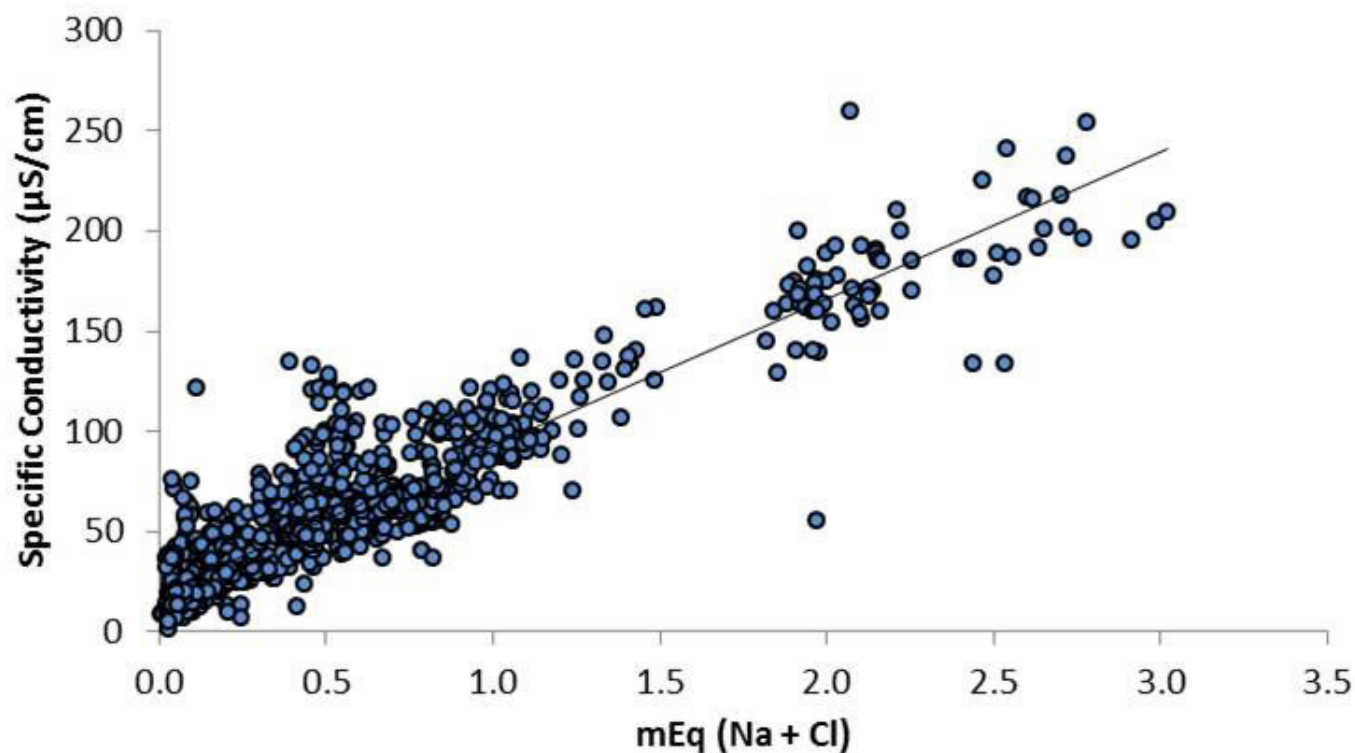
Figure 5. Relationship between conductivity and the combination of sodium and chloride in ALAP lakes, 2011-2017. (P < 0.001, R^2 = 0.86, n = 1383).

Individual Lake Reports

The data and accompanying analysis provided in this section give insight into the current and historical water quality condition of participating ALAP lakes. A more detailed analysis may be necessary to produce management recommendations or specific trend analysis. Readers interested in additional information or access to the raw data are encouraged to contact the corresponding author. Each lake description includes lake and watershed characteristics, general water quality assessment, tabulated data for year 2018, historical trend analysis, and a brief summary of the findings. An example of the lake report format is illustrated below.

Location map as well as tabular data and lake and watershed morphometry.

CRANBERRY LAKE

Location		County:	St Lawrence
		Town	Clifton

Lake Characteristics	Surface Area (ha):	2760
	Shoreline Length (km):	128
	Max. Depth (m):	11.8
	Volume (m³):	52200000
	Flush rate (times/year):	4.36

Watershed Characteristics	Watershed Area (ha):	37476
	Surface water (%):	10
	Deciduous Forest (%):	60
	Evergreen Forest (%):	9
	Mixed Forest (%):	3
	Wetlands (%):	18
	Agriculture (%):	0
	Residential (%):	0
	Local Roads (km):	17
	State Roads (km):	1.3

General water quality assessment for 2018 based on the details provided in the text.

TROPHIC STATE	ACIDITY	ACID NEUTRALIZING CAPACITY	ROAD SALT INFLUENCE
Mesotrophic	Circumneutral	Moderate	Not Significant

2018 DATA

Water quality values and historical trends for Cranberry Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

Tabular data for each sample submitted to the lab during the 2018 as well as indication of historical trend. Trend analysis only performed on lakes with 5+ years of data.

Water Quality Indicator	6/20/2018	7/21/2018	8/18/2018	Average	Trend
Transparency (m)	3.6	4.2	3.5	3.8	Decreasing
Total Phosphorus (µg/L)	7.4	6.8	8.2	7.5	Decreasing
Chlorophyll-a (µg/L)	3.3	3.0	2.9	3.0	No Trend
Laboratory pH	6.8	6.6	6.8	6.7	Increasing
Sp. Conductance (µS/cm)	14.8	15.0	16.2	15.3	Decreasing
Color (Pt-Co)	40.7	34.3	31.1	35.4	No Trend
Alkalinity (mg/L)			5.5	5.5	No Trend
Chloride (mg/L)			0.4	0.4	No Trend
Calcium (mg/L)			1.8	1.8	Not Analyzed
Sodium (mg/L)			1.0	1.0	No Trend

Time series of the annual average values key of water quality indicators. A solid line, when present, denotes a statistically significant trend in the historical data.

HISTORICAL DATA

Annual average values of select water quality indicators for Cranberry Lake, 1998-2018. 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 since 1998. Total phosphorus is also trending down, although the trend appears related to methodological improvements made in 2010-2011. 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 2018 were circumneutral in terms of their pH, with an average pH value of 6.7 The pH of the water has exhibited an increasing trend since 2018. The alkalinity of the 2018 sample was 5.5 mg/L, indicating that the lake has moderate sensitivity to acid deposition.

- The sodium and chloride concentration of Cranberry Lake was 1.0 and 0.4 mg/L respectively for both analytes, indicating that the lake is not significantly influenced by road salt.

A brief summary of the findings

AMBER LAKE
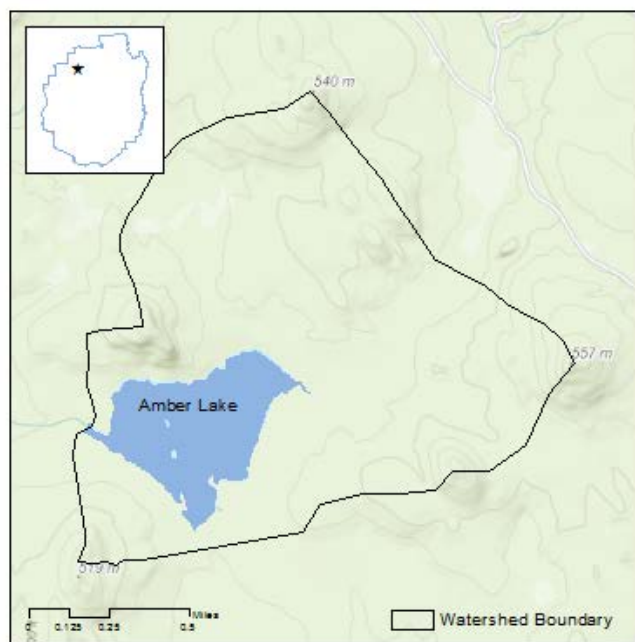
Location		
	County:	St Lawrence
	Town:	Hopkinton

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	Acidic (acceptable)	Moderate	Not Significant

2018 DATA

Water quality values and historical trends for Amber Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. VOB=Secchi disk is visible on the bottom of the lake.

Water Quality Indicator	6/22/2018	7/20/2018	8/24/2018	Average	Trend
Transparency (m)	VOB	1.5	VOB	1.5	No Trend
Total Phosphorus (µg/L)	5.1	48.5	7.7	20.4	No Trend
Chlorophyll-*a* (µg/L)	4.2	37.1	10.4	17.2	No Trend
Laboratory pH	6.1	6.8	6.3	6.4	No Trend
Sp. Conductance (µS/cm)	20.6	20.0	27.3	22.6	No Trend
Color (Pt-Co)	37.5	72.9	34.3	48.2	No Trend
Alkalinity (mg/L)			8.3	8.3	No Trend
Chloride (mg/L)			0.3	0.3	Decreasing
Calcium (mg/L)			3.0	3.0	Not Analyzed
Sodium (mg/L)			1.2	1.2	No Trend

HISTORICAL DATA
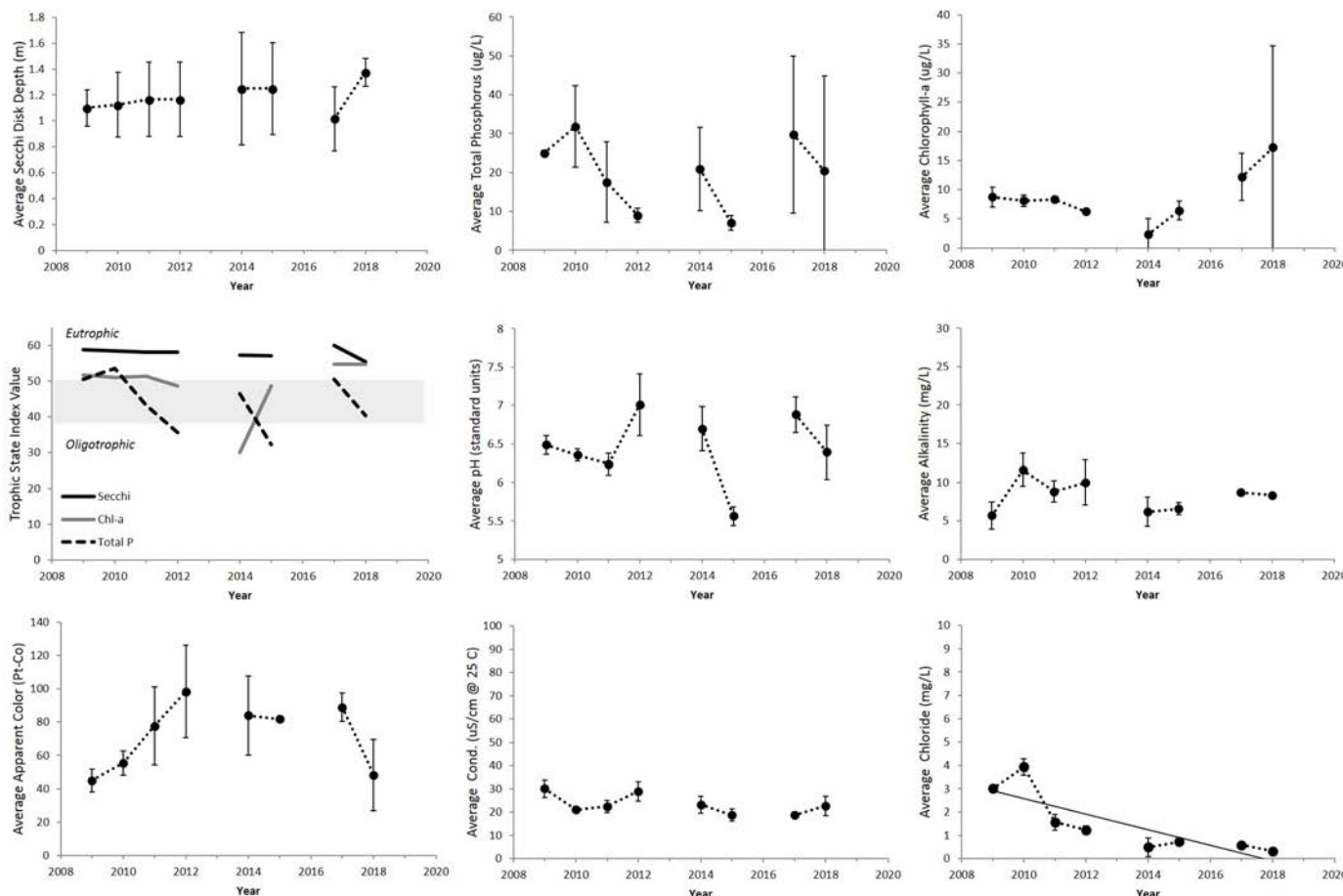
Annual average values of select water quality indicators for Amber Lake 2009-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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 (average TP > 95% of lakes, average Chl-a > 100% of lakes). The transparency averaged 1.5 meters in 2018, which was lower than 99% of the participating ALAP lakes.

• The relatively low transparency may be partially explained by the water color. In 2018, the color of Amber Lake averaged 89 PtCo units, greater than 97% or participating lakes.

• Field notes from the volunteer monitor indicate a possible algea bloom on July 20th.

ARBUTUS LAKE
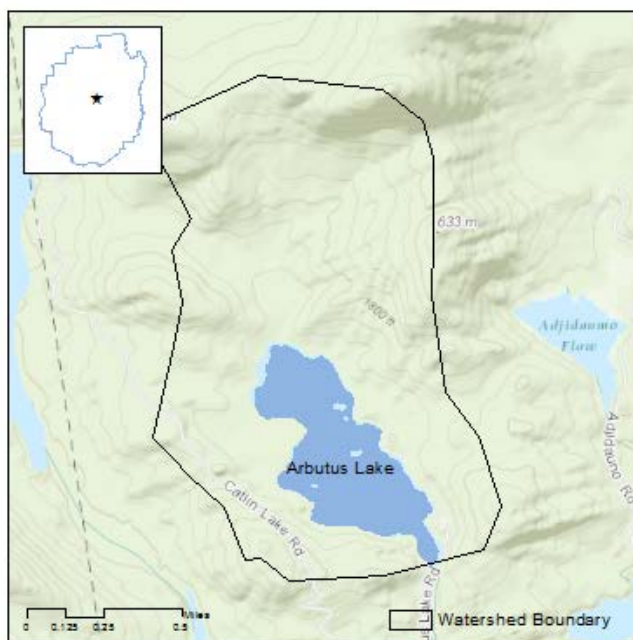
Location	County:	Essex
	Town:	Newcomb

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	Acidic (acceptable)	Moderate	Not Significant

2018 DATA

Water quality values and historical trends for Arbutus Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

Water Quality Indicator	6/21/2018	7/19/2018	8/20/2018	Average	Trend
Transparency (m)	2.3	3.1	4.5	3.3	No Trend
Total Phosphorus (µg/L)	5.5	5.9	4.5	5.3	Decreasing
Chlorophyll-*a* (µg/L)	2.8	2.0	1.7	2.2	Decreasing
Laboratory pH	6.3	6.3	6.5	6.4	No Trend
Sp. Conductance (µS/cm)	15.5	16.0	16.5	16.0	Decreasing
Color (Pt-Co)	27.9	34.3	21.4	27.9	No Trend
Alkalinity (mg/L)			6.1	6.1	No Trend
Chloride (mg/L)			0.5	0.5	No Trend
Calcium (mg/L)			2.3	2.3	Not Analyzed
Sodium (mg/L)			0.8	0.8	No Trend

HISTORICAL DATA
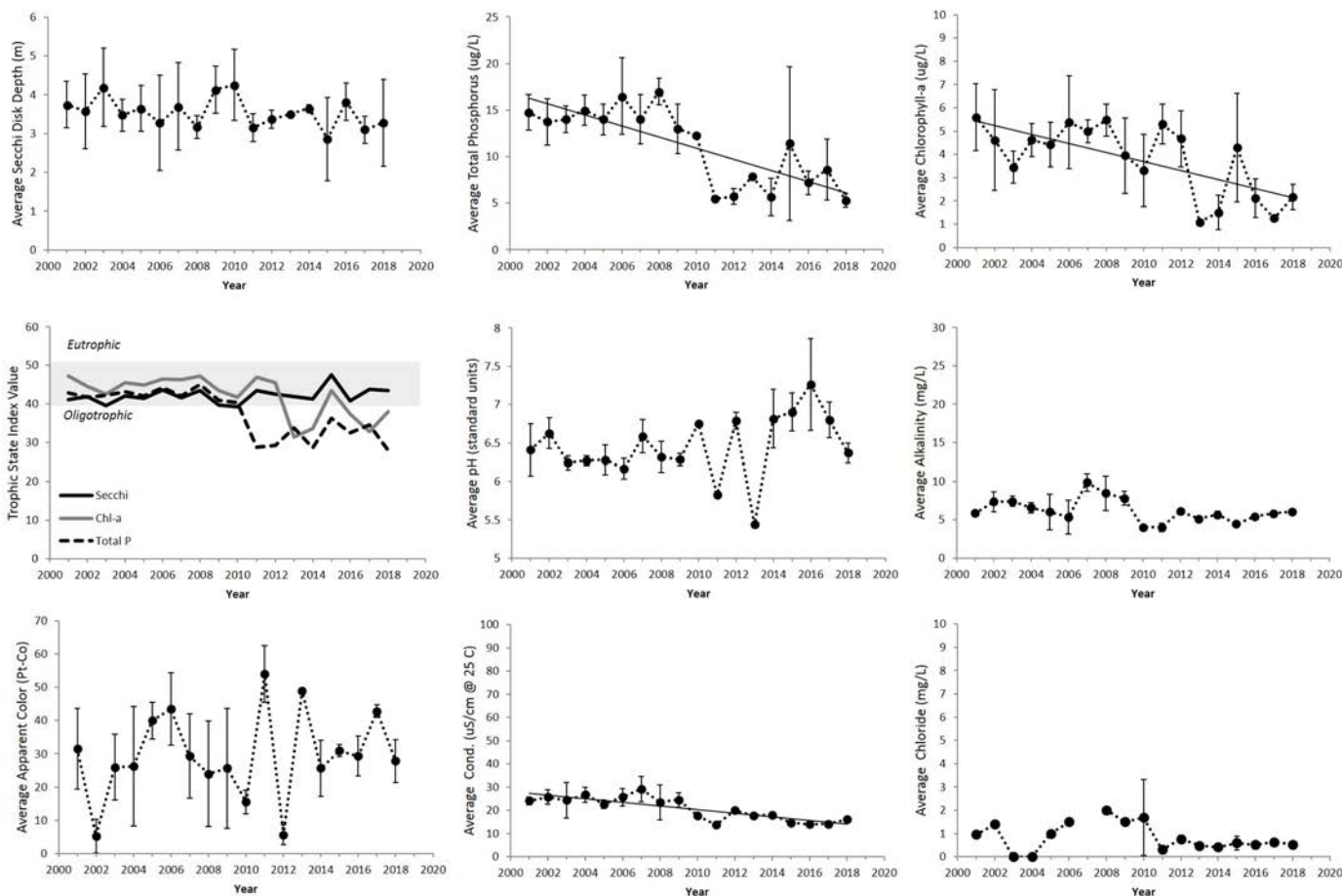
Annual average values of select water quality indicators for Arbutus Lake, 2001-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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 2018 were found to be slightly acidic in terms of their acidity with moderate sensitivity to acid deposition. We observed no statistical change in acidity or alkalinity since 2001.

• 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
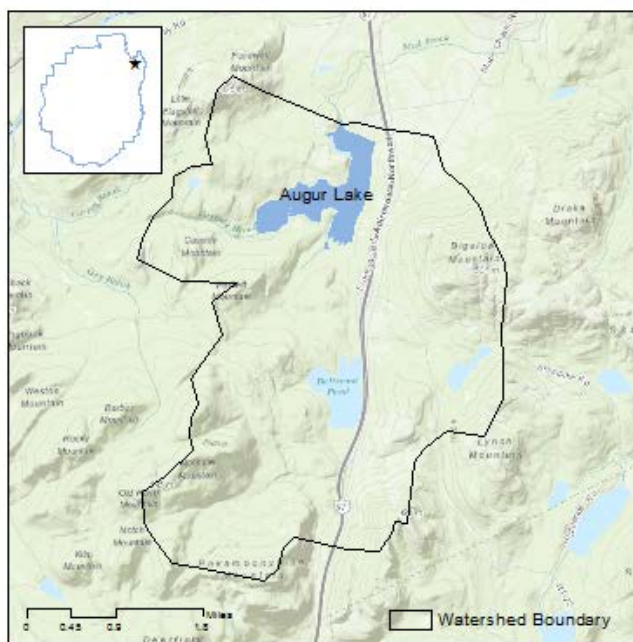
Location	County:	Essex
	Town:	Chesterfield

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	High

2018 DATA

Water quality values and historical trends for Augur Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

| Water Quality Indicator	7/2/2018	7/28/2018	8/31/2018	Average	Trend
Transparency (m)	3.3	3.5	2.8	3.2	Increasing
Total Phosphorus (µg/L)	11.6	10.7	11.6	11.3	Decreasing
Chlorophyll-a (µg/L)	5.1	2.9	6.4	4.8	No Trend
Laboratory pH	8.8	8.8	8.4	8.6	No Trend
Sp. Conductance (µS/cm)	215.0	219.0	235.0	223.0	No Trend
Color (Pt-Co)	18.2	21.4	37.5	25.7	No Trend
Alkalinity (mg/L)			39.2	39.2	No Trend
Chloride (mg/L)			46.9	46.9	No Trend
Calcium (mg/L)			15.6	15.6	Not Analyzed
Sodium (mg/L)			26.7	26.7	No Trend

HISTORICAL DATA
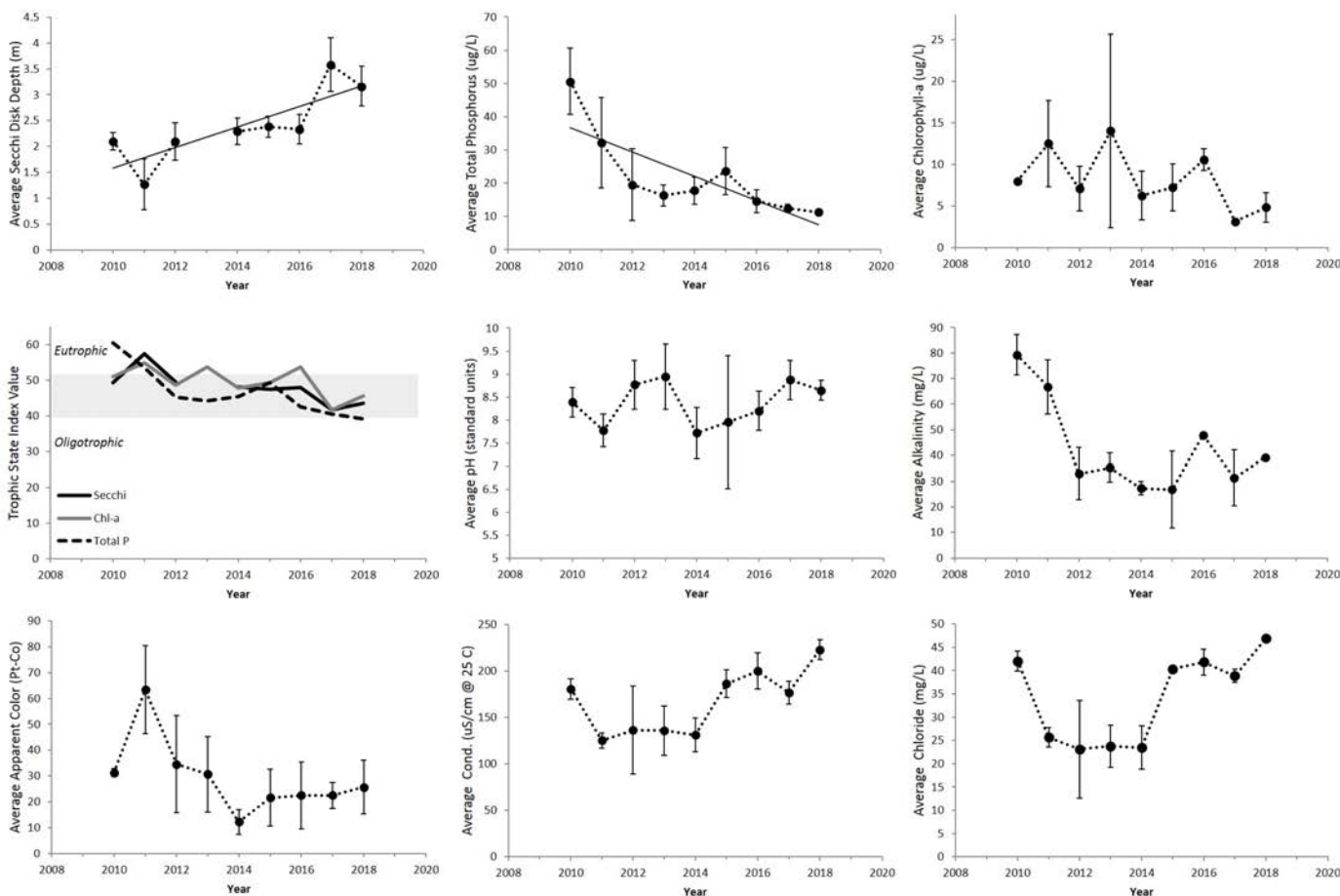
Annual average values of select water quality indicators for Augur Lake, 2010-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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. In 2018 average pH was found to be 8.6 pH units, which is greater than 99% of participating lakes. The alkalinity of the lake averaged 39.2 mg/L in 2018, demonstrating that the lake is well buffered against changed in pH.

- The 2018 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 averaged 15.6 mg/L, which is within the range needed to support a variable zebra mussel population.

AUSTIN POND
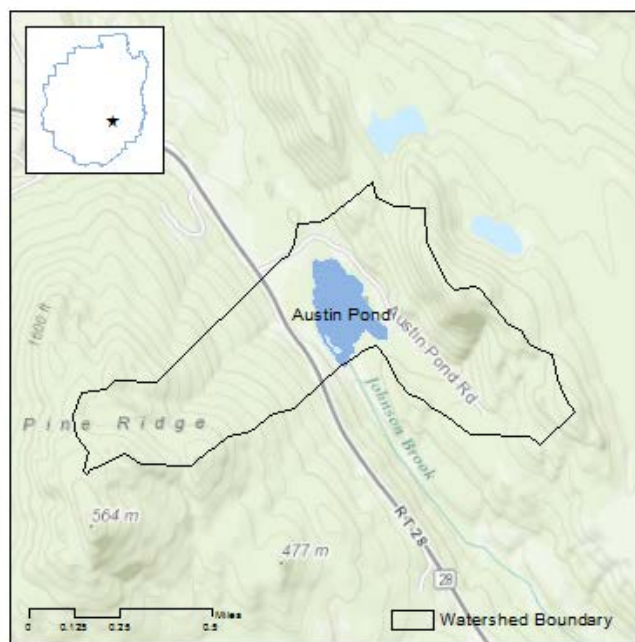
Location	County:	Warren
	Town:	Johnsburg

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	Moderate

2018 DATA

Water quality values and historical trends for Austin Pond during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

| Water Quality Indicator	6/20/2018	7/15/2018	August	Average	Trend
Transparency (m)	2.6	2.3		2.4	No Trends
Total Phosphorus (µg/L)	12.8	27.3		20.1	No Trends
Chlorophyll-*a* (µg/L)	3.5	1.9		2.7	Decreasing
Laboratory pH	6.9	7.6		7.3	No Trends
Sp. Conductance (µS/cm)	109.0	118.4		113.7	No Trends
Color (Pt-Co)	27.9	60.0		43.9	No Trends
Alkalinity (mg/L)					Decreasing
Chloride (mg/L)					No Trends
Calcium (mg/L)					Not Analyzed
Sodium (mg/L)					No Trends

HISTORICAL DATA
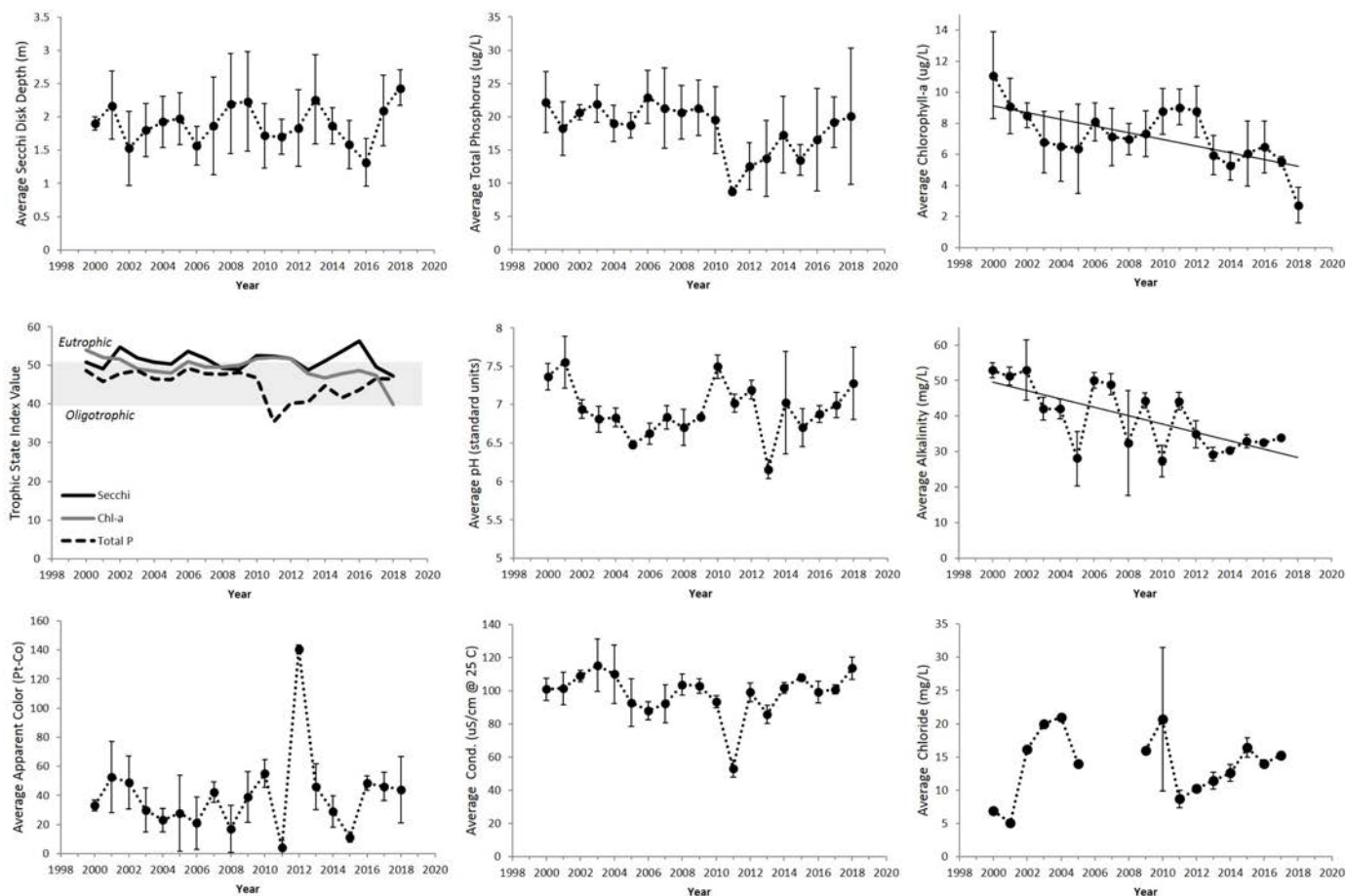
Annual average values of select water quality indicators for Austin Pond, 2000-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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.

• The August sample was not recived by the laboratory, as a result there is no 2018 data for alkalinity, chloride, or metals.

• Austin pond is best classified as a mesotrophic lake. Although the transparency has been relatively stable over time, the chlorophyll-a concentration has exhibited a significant downward trend .

• The pond is circumneutral in terms of its acidity (average pH = 7.3) and is well buffered against changes in pH. However, we did detect a slight, yet statistically significant downward trend in alkalinity since 2000

• Sodium and chloride concentrations averaged 7.7 mg/L and 15.3 mg/L respectively in 2018 demonstrating that the chemistry of the pond is influenced by NYS Rt. 28. Chloride concentration in Austin Pond was greater than 70% of the participating ALAP lakes. Calcium was 10.6 mg/L in 2018 which is just below the suggested lower threshold required for a viable zebra mussel population.

BIG MOOSE LAKE
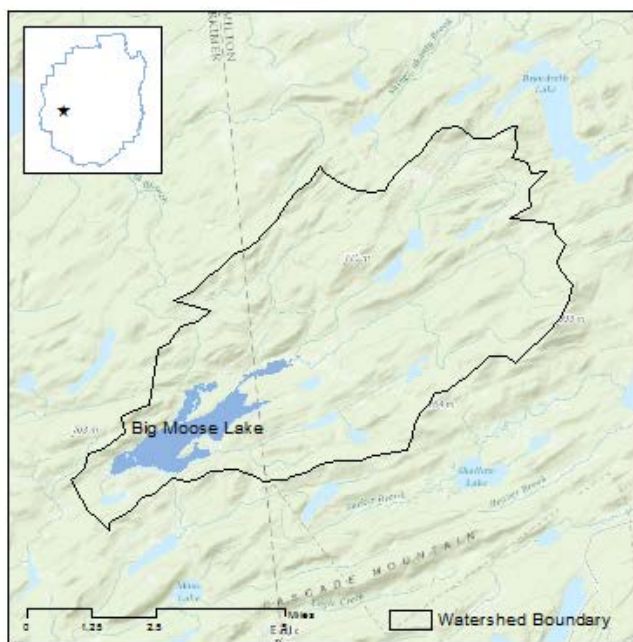
Location	County:	Herkimer
	Town:	Webb

Lake Characteristics	Surface Area (ha):	499
	Shoreline Length (km):	32
	Max. Depth (m):	21.3
	Volume (m³):	36400000
	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 (acceptable)	Moderate	Not Significant

2018 DATA

Water quality values and historical trends for Big Moose Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

Water Quality Indicator	7/8/2018	7/29/2018	8/25/2018	Average	Trends
Transparency (m)	3.3	3.1	3.5	3.3	Decreasing
Total Phosphorus (µg/L)	7.0	5.0	4.7	5.5	Decreasing
Chlorophyll-*a* (µg/L)	1.6	2.8	2.1	2.2	No Trend
Laboratory pH	6.2	6.9	6.2	6.4	Increasing
Sp. Conductance (µS/cm)	11.2	10.7	10.6	10.8	Decreasing
Color (Pt-Co)	31.1	21.4	18.2	23.6	No Trend
Alkalinity (mg/L)			9.1	9.1	No Trend
Chloride (mg/L)			0.6	0.6	No Trend
Calcium (mg/L)			1.4	1.4	Not Analyzed
Sodium (mg/L)			0.7	0.7	No Trend

HISTORICAL DATA
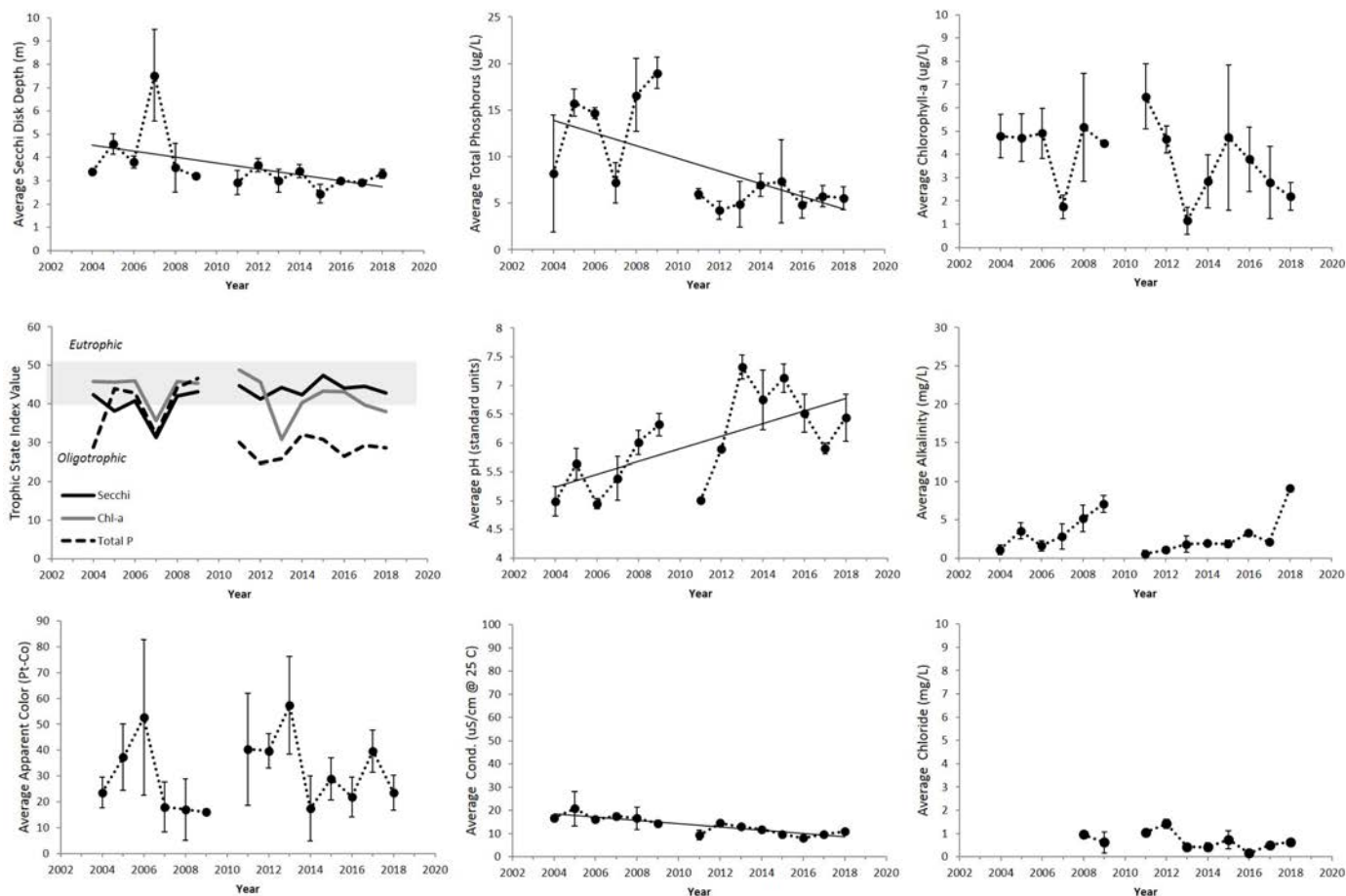
Annual average values of select water quality indicators for Big Moose Lake, 2004-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

## 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 since 2004.

• Big Moose is an acidified lake, with an average pH of 6.4 in the summer of 2018. We detected a significant rise in pH since 2004.

• The acid neutralizing ability of Big Moose is typically low, with alkalinity values historically in the range 1 – 7 mg/L. In August of 2018, the Alkalinity of the surface water was found to be 9.1 mg/L

• Sodium and chloride concentration in Big Moose were found to be 0.7 and 0.6 mg/L, respectively, in August of 2018. These values are within the range expected for a lake lacking salted state roads in the watershed.

BLUE MOUNTAIN LAKE
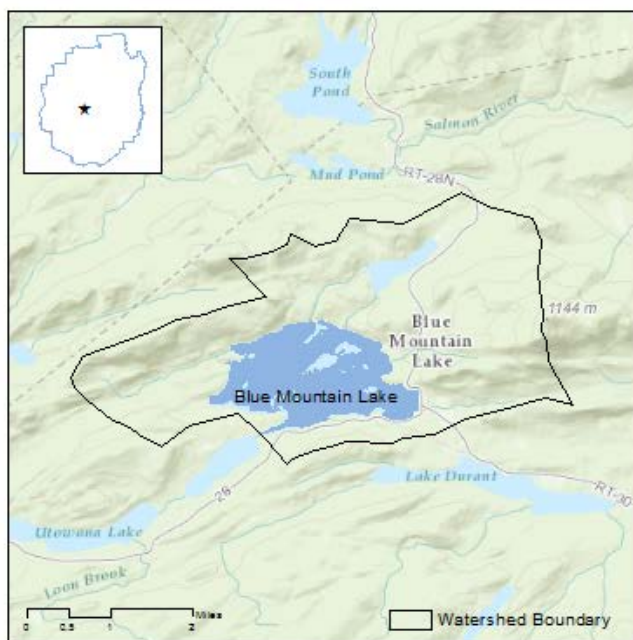
Location	County:	Hamilton
	Town:	Indian Lake

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	High

2018 DATA

Water quality values and historical trends for the Town Bay location of Blue Mountain Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit, VOB=Secchi disk is visible on the bottom of the lake

Water Quality Indicator	5/29	6/30	7/28	8/23	9/23	Average	Trend
			Town Bay				
Transparency (m)	VOB	VOB	VOB	VOB	VOB		No Trend
Total Phosphorus (µg/L)	3.8	4.2	3.0	5.4	5.0	4.3	No Trend
Chlorophyll-*a* (µg/L)	1.3	0.6	1.1	1.5	1.6	1.2	No Trend
Laboratory pH	7.0	6.6	6.9	6.8	8.5	7.2	Increasing
Sp. Conductance (µS/cm)	65.3	66.1	71.9	88.3	83.0	74.9	No Trend
Color (Pt-Co)	11.8	2.1	8.6	11.8	8.6	8.6	No Trend
Alkalinity (mg/L)				8.9		8.9	No Trend
Chloride (mg/L)				19.9		19.9	No Trend
Calcium (mg/L)				4.3		4.3	Not Analyzed
Sodium (mg/L)				14.0		14.0	No Trend

Water quality values and historical trends for the East, West, and Halsch Bay locations of Blue Mountain Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit, VOB=Secchi disk is visible on the bottom of the lake

| Water Quality Indicator	5/29	6/30	7/28	8/23	9/23	Average
East Bay						
Transparency (m)	7.6	8.8	9.1	8.8	8.8	8.6
Total Phosphorus (µg/L)	13.0	3.1	5.1	5.9	3.9	6.2
Chlorophyll-a (µg/L)	1.4	0.7	0.9	1.5	1.6	1.2
Laboratory pH	6.9	6.2	6.8	6.7	8.4	7.0
Sp. Conductance (µS/cm)	45.1	77.2	53.7	88.1	81.4	69.1
Color (Pt-Co)	11.8	2.1	11.8	5.3	5.3	7
Alkalinity (mg/L)				9.2		9.2
Chloride (mg/L)				20.3		20.3
Calcium (mg/L)				4.1		4.1
Sodium (mg/L)				13.4		13.4
West Bay						
Transparency (m)	7.3	10.1	9.4	9.2	9.1	9.0
Total Phosphorus (µg/L)	7.5	2.8	4.5	2.6	3.8	4.2
Chlorophyll-a (µg/L)	1.2	0.5	0.9	1.5	1.4	1.1
Laboratory pH	7.2	6.6	6.7	6.8	7.4	6.9
Sp. Conductance (µS/cm)	79.1	64.3	83.0	87.6	85.3	79.9
Color (Pt-Co)	24.6	5.3	11.8	11.8	8.6	12.4
Alkalinity (mg/L)				9.2		9.2
Chloride (mg/L)				20.6		20.6
Calcium (mg/L)				4.1		4.1
Sodium (mg/L)				13.4		13.4
Halsch Bay						
Transparency (m)	VOB	VOB	VOB	VOB	VOB	
Total Phosphorus (µg/L)	4.2	3.2	3.3	2.6	4.0	3.5
Chlorophyll-a (µg/L)	1.2	0.5	0.9	1.5	1.6	1.1
Laboratory pH	6.9	6.6	6.6	6.8	7.7	6.9
Sp. Conductance (µS/cm)	75.4	75.9	80.3	88.1	84.1	80.8
Color (Pt-Co)	11.8	8.6	11.8	8.6	11.8	10.5
Alkalinity (mg/L)				9.3		9.3
Chloride (mg/L)				19.5		19.5
Calcium (mg/L)				4.1		4.1
Sodium (mg/L)				13.2		13.2

HISTORICAL DATA
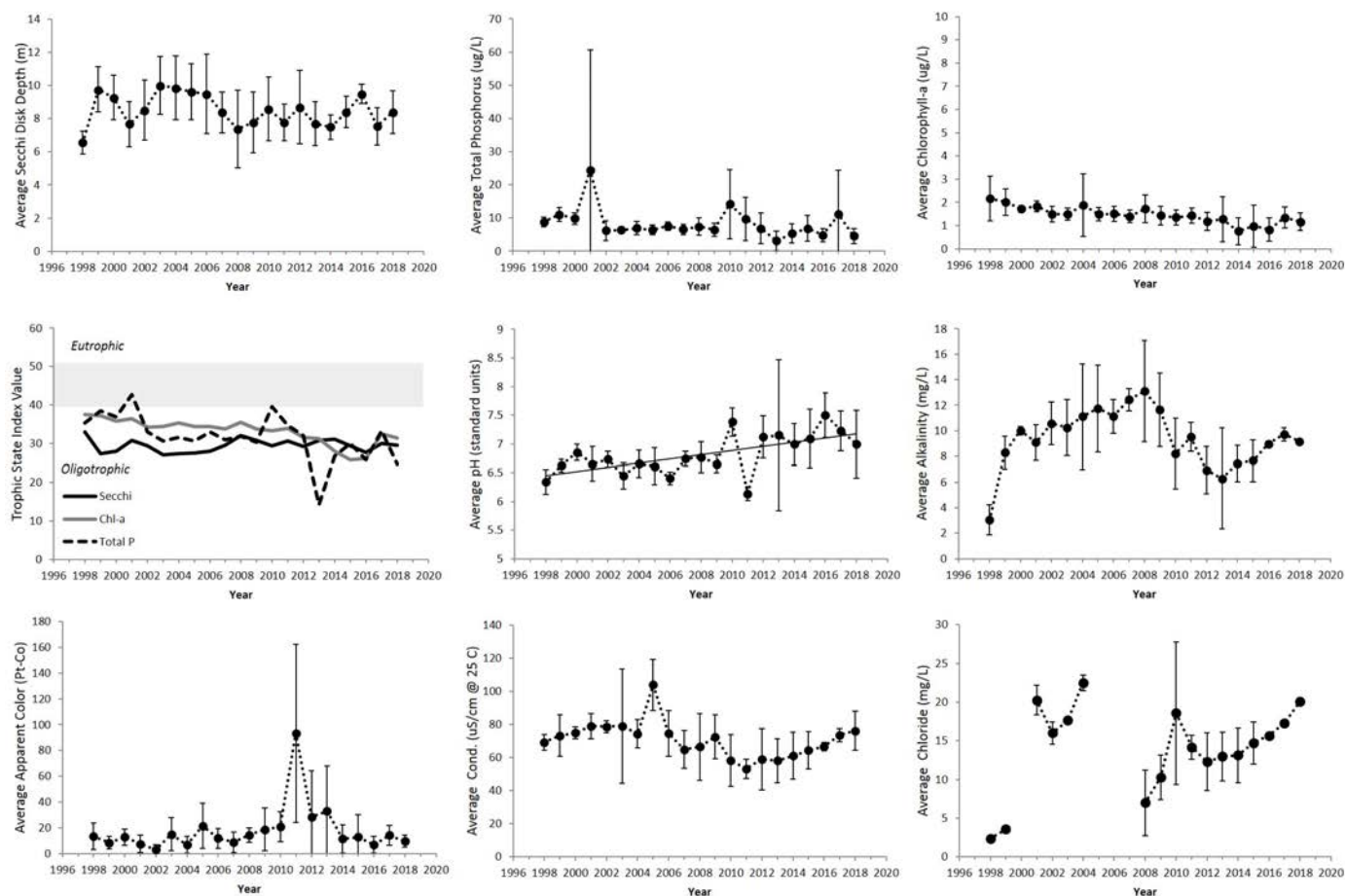
Lake wide annual average values of select water quality indicators for Blue Mountain Lake, 1998-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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. Transparency ranged from 7.3 to 10.1 meters in 2018, which is greater than 97% of participating ALAP lakes.

- Transparency depth, as well as total phosphorus and chlorophyll-a concentrations have not exhibited any significant trends, indicating that the trophic status of the lake is stable.

- The samples from 2018 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 8.9 in 2018, indicating that the water is moderately sensitive to acid deposition.

- Sodium and chloride concentrations were 14 mg/L and 19.9 mg/L respectively, indicating that salted roads in the watershed influence the chemistry of the lake. Chloride concentration is greater than 86% of participating ALAP lakes and is approximately 100 times higher than background concentration.

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BRANDRETH LAKE
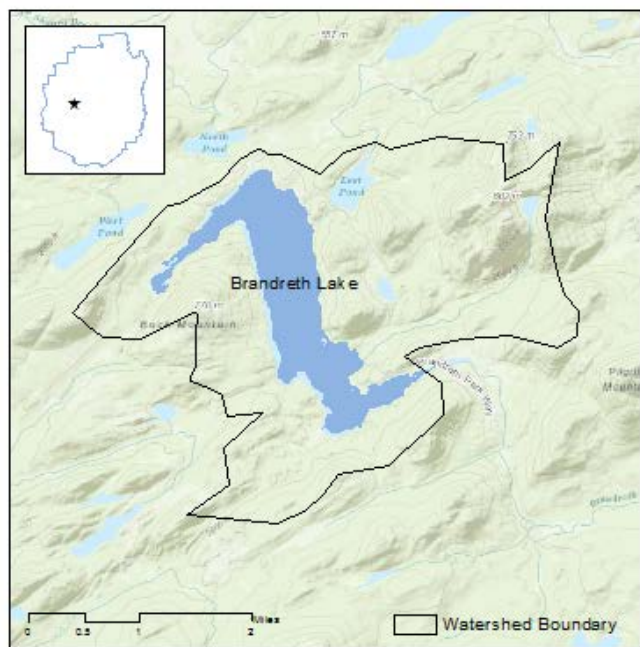
Location	County:	Hamilton
	Town:	Long Lake

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

2018 DATA

Water quality values and historical trends for Brandreth Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

Water Quality Indicator	6/27/2018	7/20/2018	8/19/2018	Average	Trend
Transparency (m)	7.8	10.1	8.4	8.7	Decreasing
Total Phosphorus (µg/L)	2.7	2.8	1.8	2.4	No Trend
Chlorophyll-*a* (µg/L)	0.5	0.6	0.4	0.5	No Trend
Laboratory pH	6.5	6.8	6.4	6.6	Increasing
Sp. Conductance (µS/cm)	11.6	11.5	11.3	11.5	Decreasing
Color (Pt-Co)	11.8	11.8	5.3	9.6	No Trend
Alkalinity (mg/L)			3.2	3.2	No Trend
Chloride (mg/L)			0.4	0.4	No Trend
Calcium (mg/L)			1.3	1.3	Not Analyzed
Sodium (mg/L)			0.7	0.7	No Trend

HISTORICAL DATA
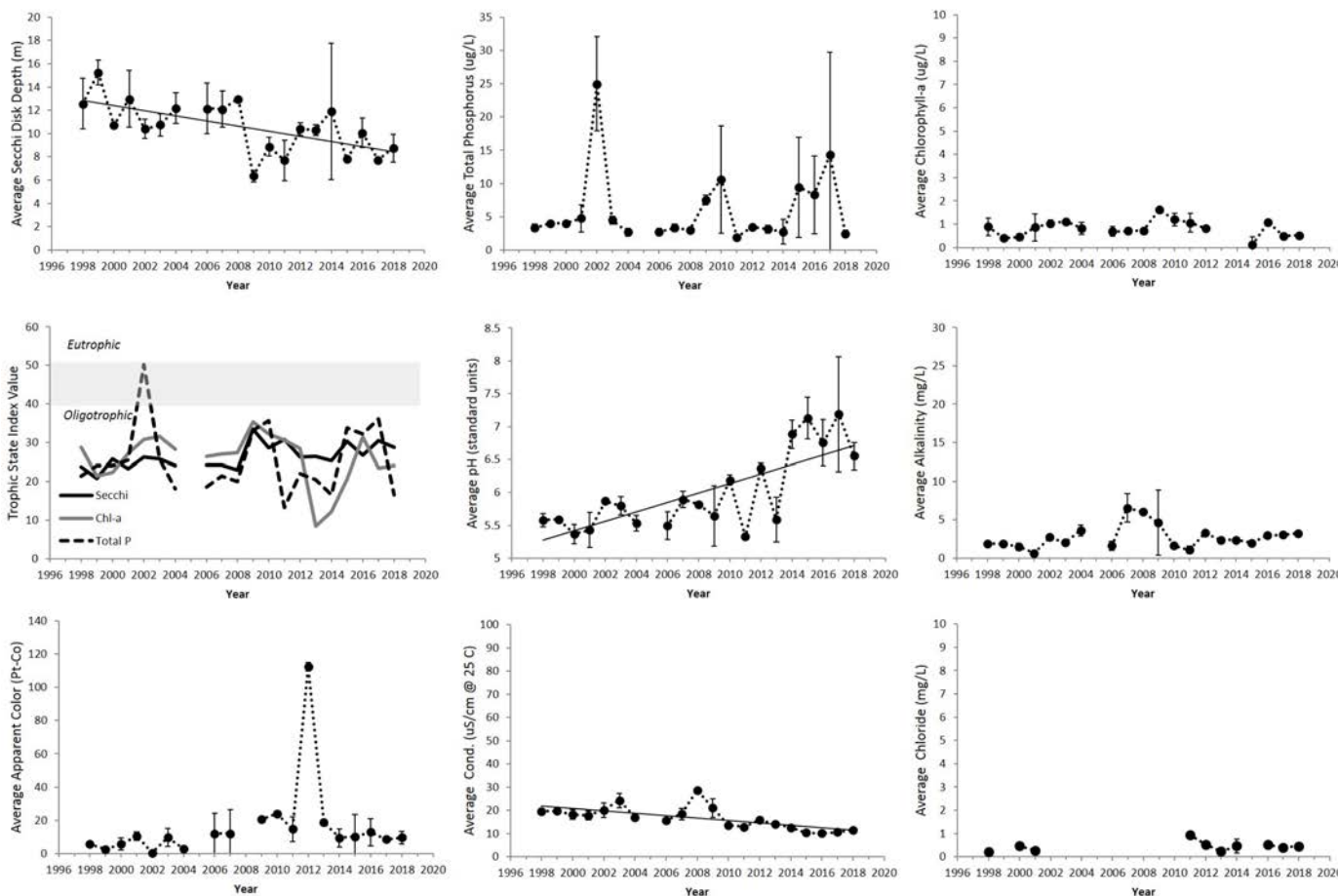
Annual average values of select water quality indicators for Brandreth Lake, 1998-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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 8.7 meters in 2018, and was the most transparent lake in the ALAP database. We detected a substantial decrease in the transparency of the lake since 1998.

- The acid neutralizing ability of Brandreth Lake is low to moderate, with an alkalinity value observed to be 3.2 mg/L in August of 2018. Despite the relatively low alkalinity, the pH of the lake has been significantly increasing since 1998.

- Sodium and chloride concentration in the lake averaged 0.7 and 0.4 mg/L in 2018. These values are within the range expected for a lake lacking salted state roads in the watershed.

BUTTERNUT POND
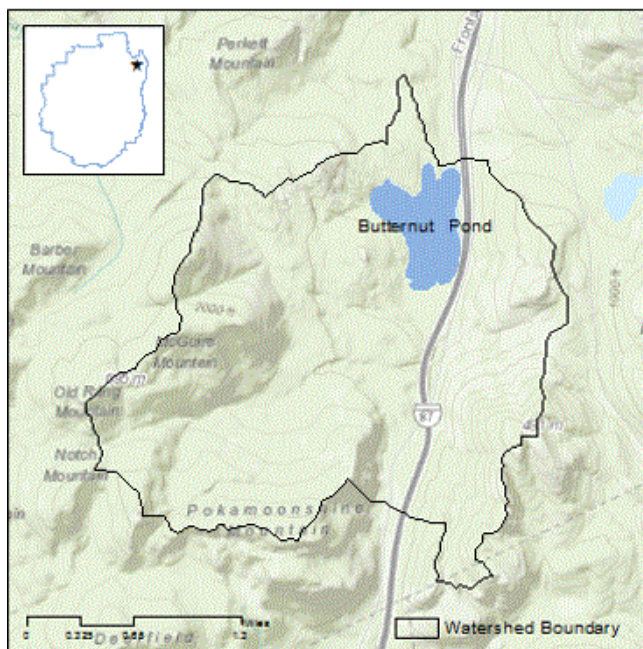
Location	County:	Essex
	Town:	Chesterfield

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	Circumneutral	Well buffered	High

2018 DATA

Water quality values and historical trends for Butternut Pond during the 2018 sampling season. Trend analysis will be performed after five years of consecutive data collection. BDL=below detection limit.

| Water Quality Indicator	6/26/2018	7/27/2018	8/27/2018	Average	Trend
Transparency (m)	2.8	2.5	3.7	3.0	Not Analyzed
Total Phosphorus (μg/L)	15.7	14.5	11.8	14.0	Not Analyzed
Chlorophyll-*a* (μg/L)	5.2	4.8	2.8	4.3	Not Analyzed
Laboratory pH	7.8	7.8	7.0	7.5	Not Analyzed
Sp. Conductance (μS/cm)	242.0	247.0	288.0	259.0	Not Analyzed
Color (Pt-Co)	21.4	27.9	15.0	21.4	Not Analyzed
Alkalinity (mg/L)			31.0	31.0	Not Analyzed
Chloride (mg/L)			68.3	68.3	Not Analyzed
Calcium (mg/L)			14.3	14.3	Not Analyzed
Sodium (mg/L)			37.8	37.8	Not Analyzed

HISTORICAL DATA
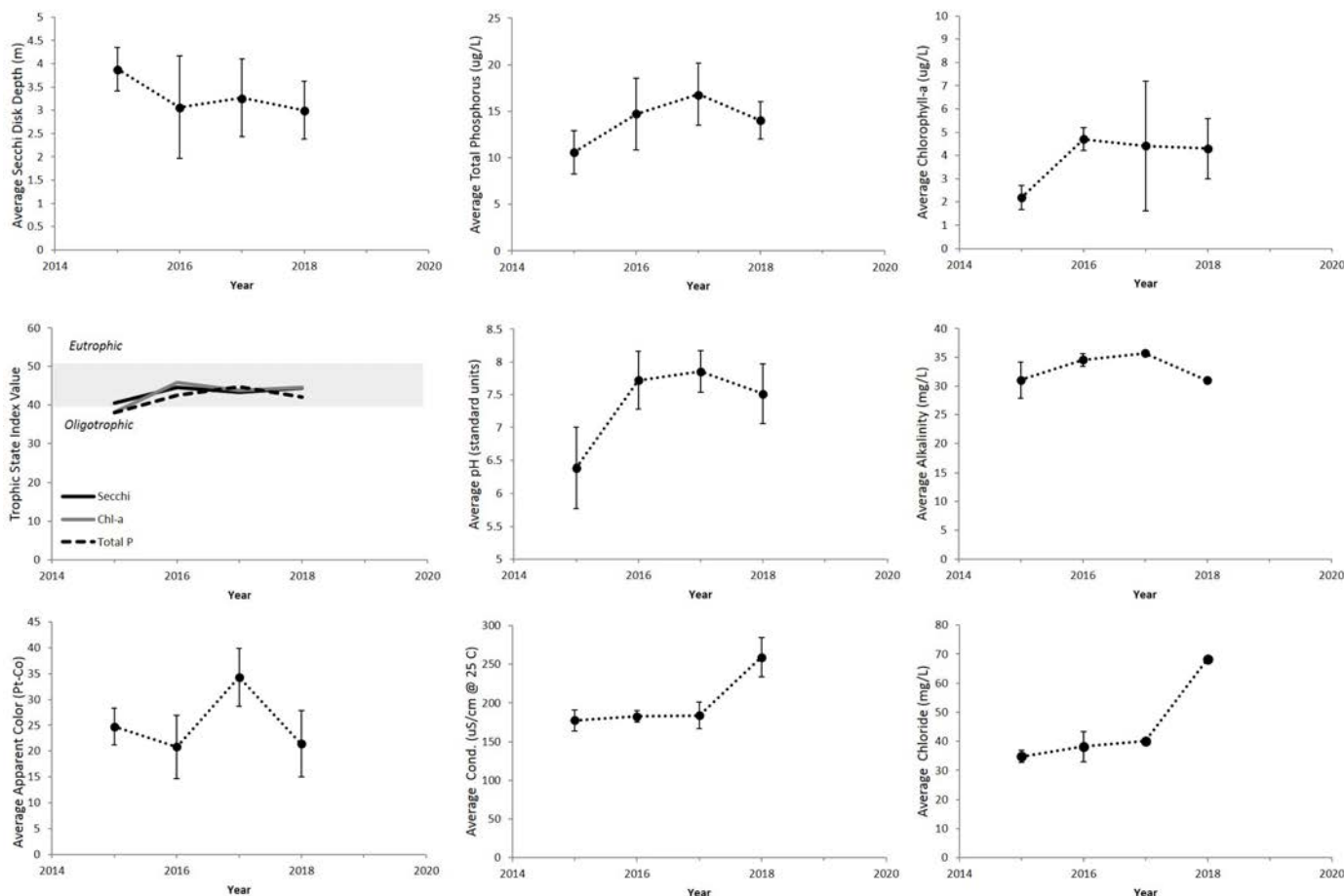
Annual average values of select water quality indicators for Butternut Pond 2015-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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 Pond 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-values all indicate that Butternut Pond is a mesotrophic waterbody.

- The pH of the 2018 samples averaged 7.5, indicating that the pond is slightly alkaline. The pond is well buffered from acid deposition. The alkalinity of the pond was found to be 31 mg/L as CaCO3, which is greater than 97% of participating lakes.

- Butternut Pond is highly influenced by road salt. The sodium and chloride concentrations in 2018 were found to be 38 mg/L and 68 mg/L respectively, which is greater than 100% of the participating ALAP lakes.

- Calcium was observed at a concentration of 14.3 mg/L, which is within the threshold for a viable zebra mussel population.

CANADA LAKE
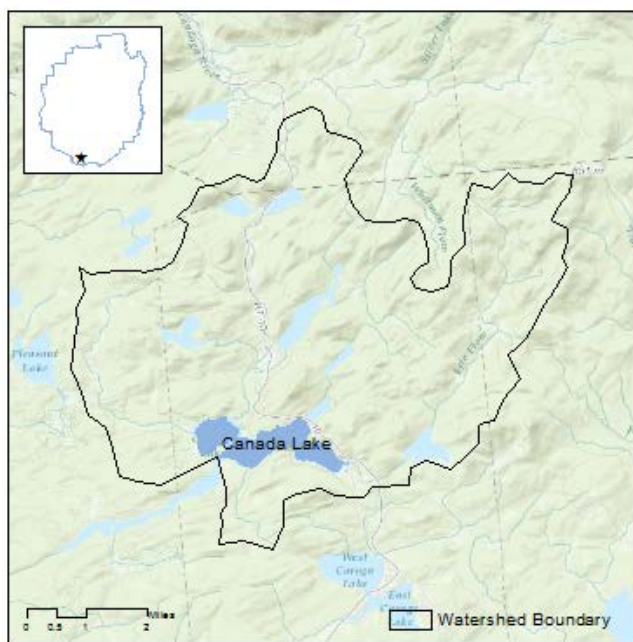
Location	County:	Fulton
	Town:	Caroga

Lake Characteristics	Surface Area (ha):	294
	Shoreline Length (km):	14
	Max. Depth (m):	45.7
	Volume (m³):	11056640
	Flush rate (times/year):	10

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
Oligotrophic	*Circumneutral*	*Moderate*	*Moderate*

2018 DATA

Water quality values and historical trends for Canada Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

Water Quality Indicator	6/17/2018	7/23/2018	8/25/2018	Average	Trend
Transparency (m)	4.0	3.7	5.8	4.5	No Trend
Total Phosphorus (µg/L)	5.0	32.3	4.0	13.8	No Trend
Chlorophyll-*a* (µg/L)	1.6	1.8	2.3	1.9	No Trend
Laboratory pH	6.4	6.6	7.0	6.7	No Trend
Sp. Conductance (µS/cm)	38.9	37.1	43.7	39.9	No Trend
Color (Pt-Co)	21.4	24.6	15.0	20.4	No Trend
Alkalinity (mg/L)			6.4	6.4	No Trend
Chloride (mg/L)			9.2	9.2	Increasing
Calcium (mg/L)			2.3	2.3	Not Analyzed
Sodium (mg/L)			5.3	5.3	No Trend

HISTORICAL DATA
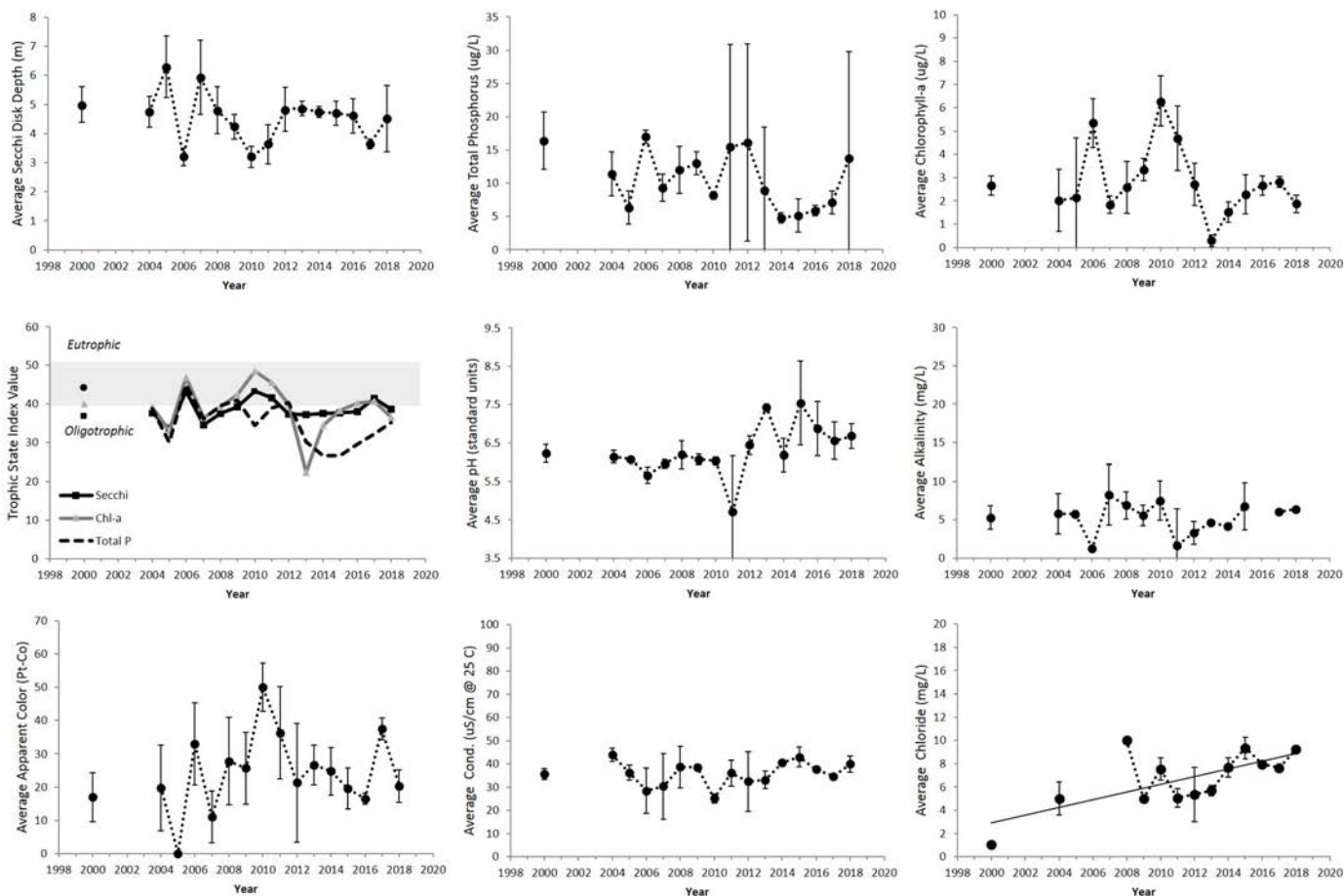
*Annual average values of select water quality indicators for Canada Lake, 2000-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

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 1999.

- Canada Lake is best classified as an oligotrophic 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 2018 were found to be circumneutral in terms of their acidity, with an average pH of 6.7 units. We observed the alkalinity in August to be 6.4 mg/L, indicating that the lake has moderate sensitivity to acid deposition.

- Sodium and chloride concentrations in 2018 were 5.3 and 9.2 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 65% 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):	25

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
Oligotrophic	Acidic (acceptable)	Moderate	Not Significant

2018 DATA

Water quality values and historical trends for Catlin Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

Water Quality Indicator	6/20/2018	7/16/2018	8/20/2018	Average	Trend
Transparency (m)	3.6		5.1	4.3	No Trend
Total Phosphorus (µg/L)	6.5	4.7	6.5	5.9	Decreasing
Chlorophyll-a (µg/L)	2.7	1.9	2.6	2.4	No Trend
Laboratory pH	6.3	6.3	6.7	6.4	No Trend
Sp. Conductance (µS/cm)	16.9	16.9	17.9	17.2	Decreasing
Color (Pt-Co)	34.3	27.9	21.4	27.9	No Trend
Alkalinity (mg/L)			7.4	7.4	No Trend
Chloride (mg/L)			0.6	0.6	No Trend
Calcium (mg/L)			2.5	2.5	Not Analyzed
Sodium (mg/L)			1.0	1.0	No Trend

HISTORICAL DATA
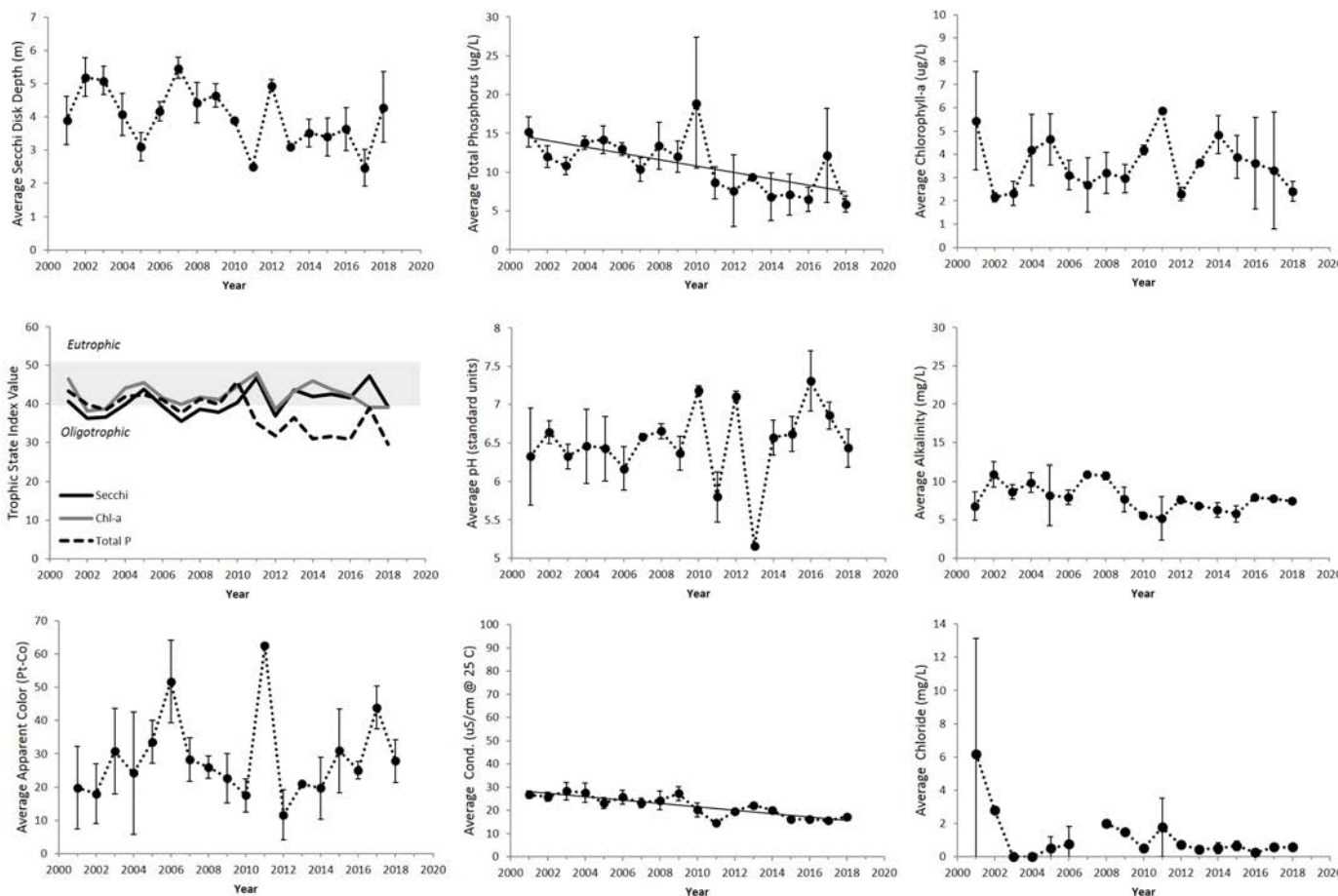
Annual average values of select water quality indicators for Catlin Lake, 2001-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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 an oligotrophic lake. Historically, the lake has fluctuated around the oligotrophic-mesotrophic boundary. The transparency of the lake has been variable, and has averaged as low as 2.5 meters, and as high as 5.5 meters. Total phosphorus has exhibited a statistical decrease since monitoring began.

- Catlin Lake is a slightly acidic water body, with moderate sensitivity to acid deposition.

- The sodium and chloride concentrations were 1.0 and 0.6 mg/L, respectively, and are within the range expected for a lake that lacks salted roads in the watershed. Elevated chloride levels in 2001 occurred before major methodological improvements were made and are thus highly suspect.

CHAPEL POND
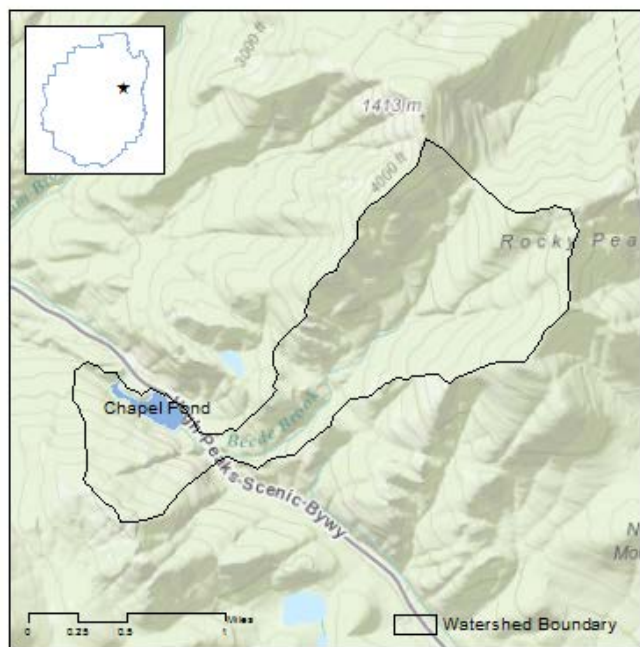
Location	County:	Essex
	Town:	Keene

Lake Characteristics	Surface Area (ha):	8
	Shoreline Length (km):	2
	Max. Depth (m):	23.8
	Volume (m²):	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	Acidic (acceptable)	Moderate	Present - Low

2018 DATA

Water quality values and historical trends for Chapel Pond during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

| Water Quality Indicator	6/17/2018	7/24/2018	8/25/2018	Average	Trend
Transparency (m)	5.2		5.1	5.1	No Trend
Total Phosphorus (µg/L)	6.1	28.5	7.7	14.1	No Trend
Chlorophyll-*a* (µg/L)	1.0	2.5	2.0	1.8	No Trend
Laboratory pH	6.8	6.3	6.3	6.5	No Trend
Sp. Conductance (µS/cm)	19.5	19.1	22.8	20.4	No Trend
Color (Pt-Co)	18.2	15.0	18.2	17.1	No Trend
Alkalinity (mg/L)			6.3	6.3	No Trend
Chloride (mg/L)			2.4	2.4	No Trend
Calcium (mg/L)			2.5	2.5	Not Analyzed
Sodium (mg/L)			2.3	2.3	No Trend

HISTORICAL DATA
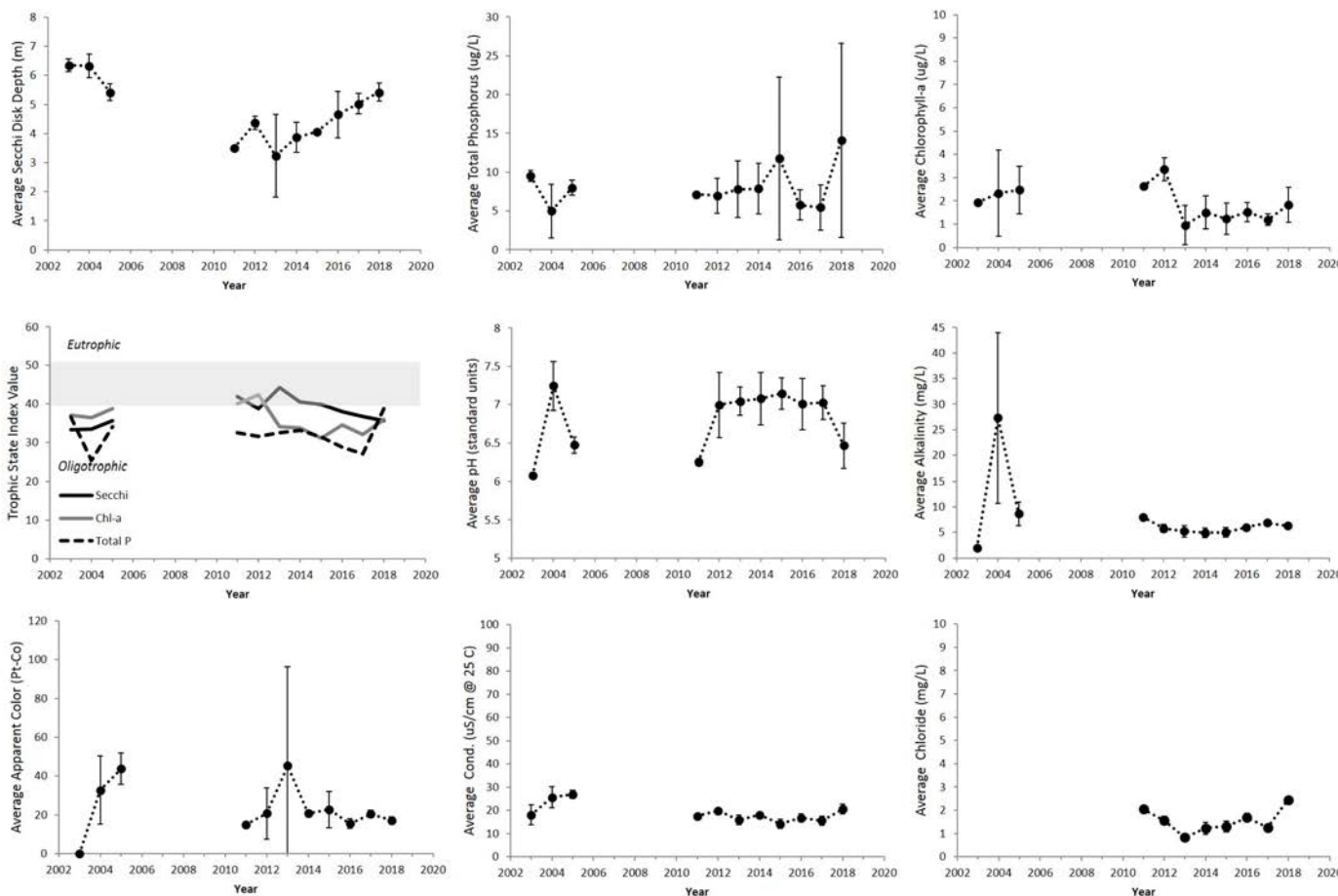
Annual average values of select water quality indicators for Chapel Pond, 2003-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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. 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 2.3 mg/L and 2.4 mg/L respectively, suggesting that road salt influence is present in the pond, but it is fairly low.

CHASE LAKE
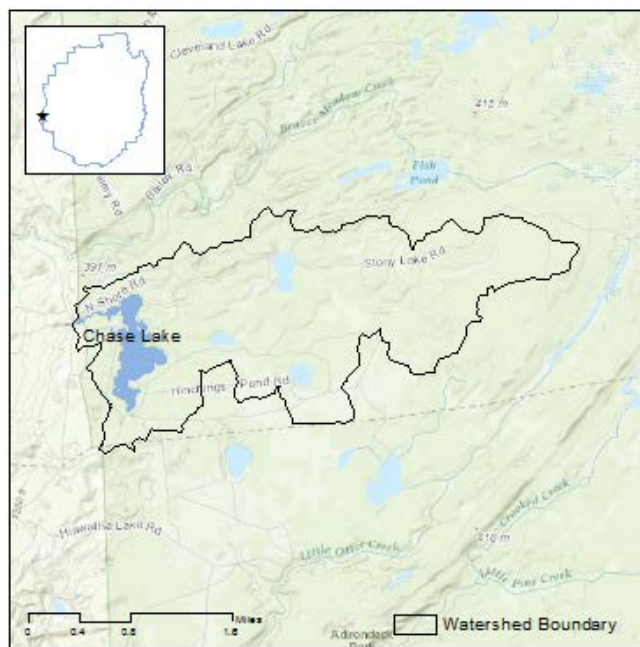
Location	County:	Lewis
	Town:	Watson

Lake Characteristics	Surface Area (ha):	47
	Shoreline Length (km):	7
	Max. Depth (m):	-
	Volume (m²):	-
	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	Not Significant

2018 DATA

Water quality values and historical trends for Chase's Lake during the 2018 sampling season. Trend analysis will be performed after five years of data have been analyzed. BDL=below detection limit.

| Water Quality Indicator	6/18/2018	7/16/2018	8/25/2018	Average	Trend
Transparency (m)	2.6	2.5	2.1	2.4	Not Analyzed
Total Phosphorus (µg/L)	9.0	7.4	9.9	8.8	Not Analyzed
Chlorophyll-a (µg/L)	3.1	2.6	13.1	6.2	Not Analyzed
Laboratory pH	6.7	7.1	6.2	6.6	Not Analyzed
Sp. Conductance (µS/cm)	23.3	22.5	24.5	23.4	Not Analyzed
Color (Pt-Co)	50.4	31.1	40.7	40.7	Not Analyzed
Alkalinity (mg/L)			8.9	8.9	Not Analyzed
Chloride (mg/L)			0.7	0.7	Not Analyzed
Calcium (mg/L)			2.9	2.9	Not Analyzed
Sodium (mg/L)			1.5	1.5	Not Analyzed

HISTORICAL DATA
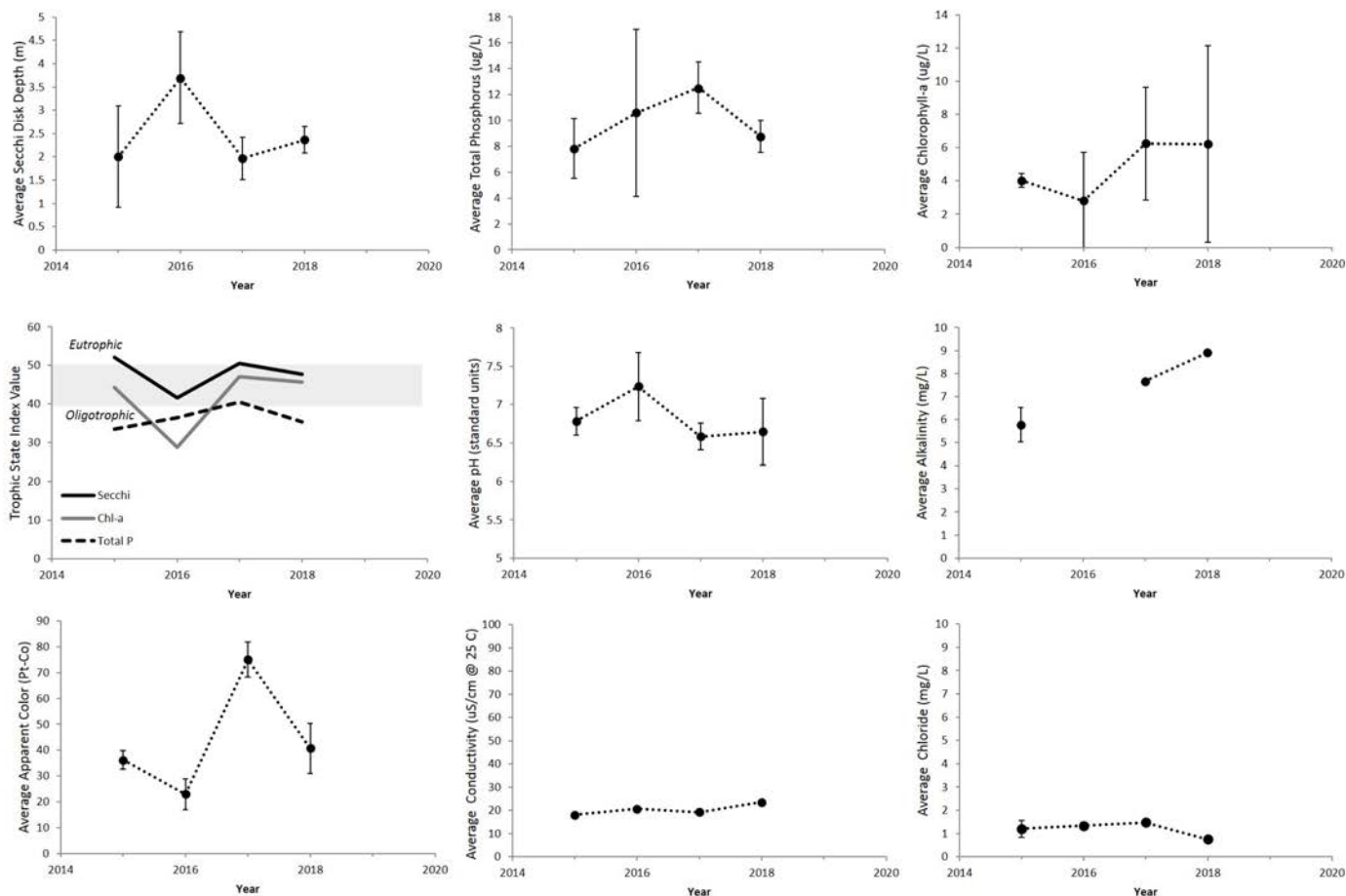
Annual average values of select water quality indicators for Chase's Lake 2015-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

SUMMARY OF FINDINGS

Chase 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 Lakes fourth 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 2018 data, the lake is a mesotrophic waterbody with considerably variability in its trophic classification.

- The samples analyzed in 2018 were circumneutral in terms of their pH, with an average pH value of 6.6. The alkalinity was found to be 8.9 mg/L, indicating that the pond has moderate sensitivity to acid deposition.

- Sodium and chloride concentration averaged 1.5 and 0.7 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
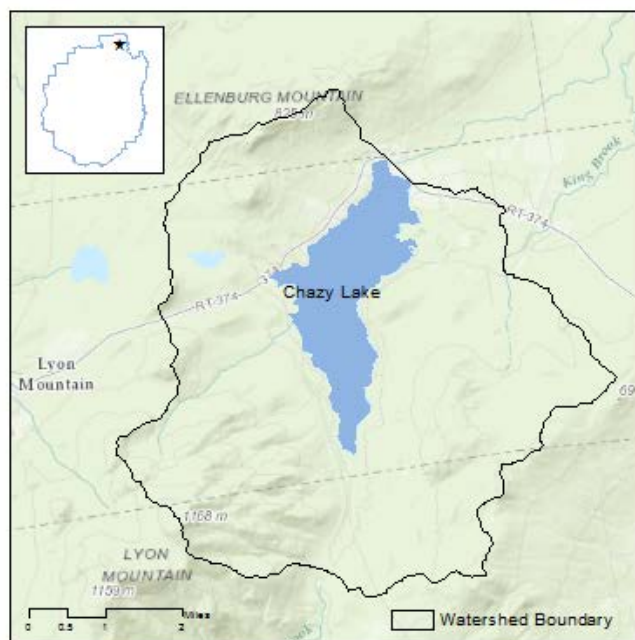
Location	County:	Clinton
	Town:	Dannemora

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
Oligotrophic	Circumneutral	Adequate - Low Sensitivity	Moderate

2018 DATA

Water quality values and historical trends for Chazy Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit. VOB=Secchi disk is visible on the bottom of the lake.

Water Quality Indicator	6/20/2018	7/16/2018	8/19/2018	Average	Trend
Eagle Point					
Transparency (m)	3.5	6.0	4.7	4.7	Decreasing
Total Phosphorus (µg/L)	6.5	5.6	9.6	7.2	No Trend
Chlorophyll-*a* (µg/L)	2.0	2.0	3.0	2.3	No Trend
Laboratory pH	7.8	7.1	7.3	7.4	No Trend
Sp. Conductance (µS/cm)	72.8	66.3	71.4	70.2	No Trend
Color (Pt-Co)	11.8	11.8	11.8	11.8	Increasing
Alkalinity (mg/L)			23.2	23.2	No Trend
Chloride (mg/L)			10.1	10.1	No Trend
Calcium (mg/L)			7.0	7.0	Not Analyzed
Sodium (mg/L)			6.2	6.2	No Trend

| Water Quality Indicator	6/20/2018	7/16/2018	8/19/2018	Average
Halfway Point				
Transparency (m)	4.3	5.6	6.3	5.4
Total Phosphorus (µg/L)	5.9	6.3	4.4	5.6
Chlorophyll-*a* (µg/L)	1.9	1.4	2.5	1.9
Laboratory pH	7.2	7.0	7.0	7.1
Sp. Conductance (µS/cm)	72.4	66.1	71.1	69.9
Color (Pt-Co)	21.4	11.8	21.4	18.2
Alkalinity (mg/L)			22.6	22.6
Chloride (mg/L)			10.2	10.2
Calcium (mg/L)			7.1	7.1
Sodium (mg/L)			6.2	6.2
South Inlet				
Transparency (m)	2.2	VOB	VOB	2.2
Total Phosphorus (µg/L)	10.5	6.0	6.9	7.8
Chlorophyll-*a* (µg/L)	2.3	1.5	2.7	2.1
Laboratory pH	7.2	6.7	7.6	7.2
Sp. Conductance (µS/cm)	67.2	66.7	70.5	68.1
Color (Pt-Co)	27.9	15.0	18.2	20.3
Alkalinity (mg/L)			23.8	23.8
Chloride (mg/L)			10.2	10.2
Calcium (mg/L)			6.7	6.7
Sodium (mg/L)			5.8	5.8

HISTORICAL DATA
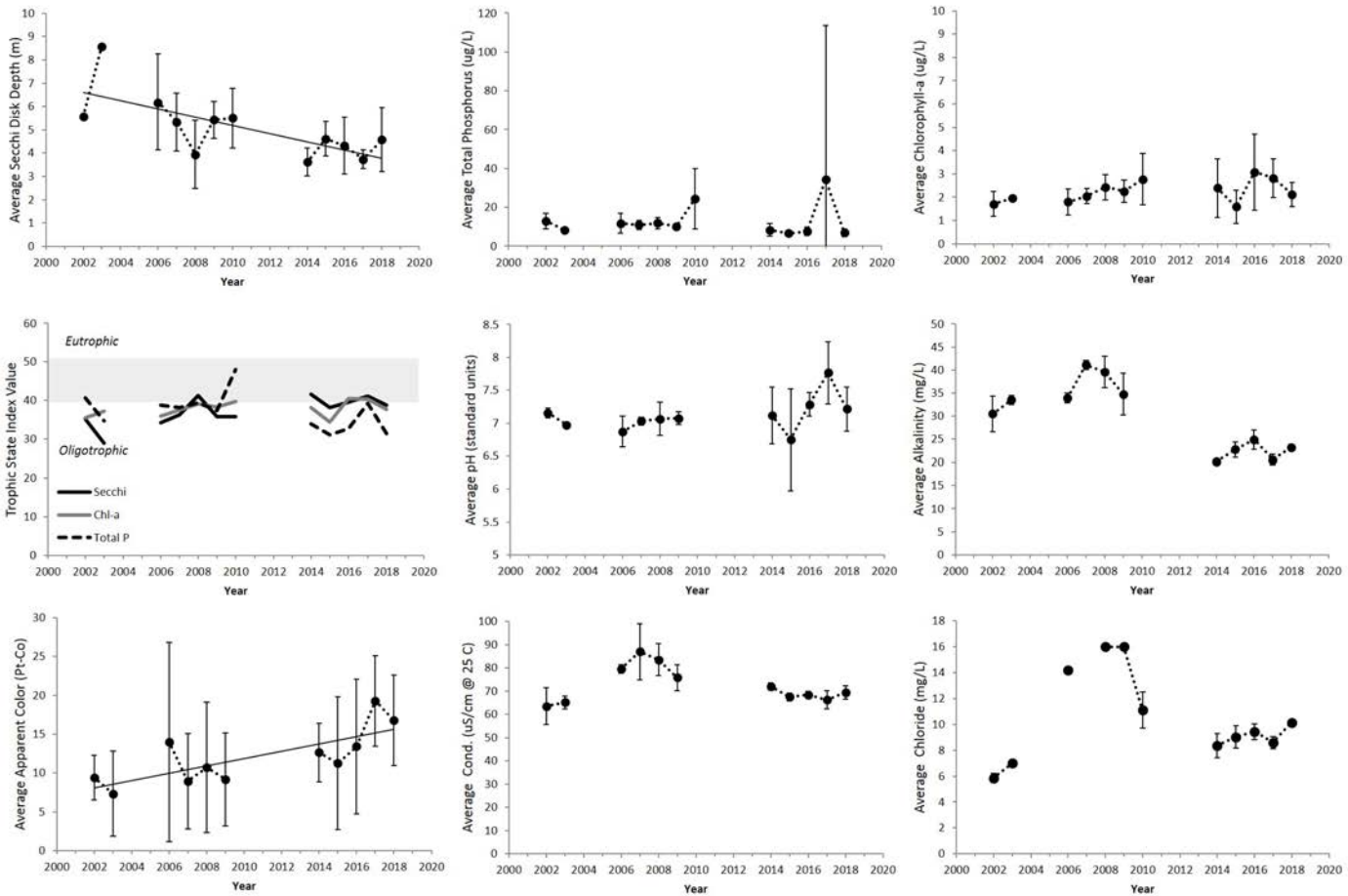
Lake wide annual average values of select water quality indicators for Chazy Lake, 2002-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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. ALAP volunteers and the Adirondack Watershed Institute have monitored Chazy Lake off and on since 2002.

- Chazy Lake is an oligotrophic lake based on the 2018 dataset. Historically, the trophic state of the lake has fluctuated around the oligotrophic-mesotrophic boundary. We observed a significant downward trend in transparency, decreasing at a rate of approximately 20cm/year. Some of the change in transparency may be related to the observed increase in color; however, we did detect an increase in chlorophyll-a concentration over time.

- Water samples analyzed in 2018 were circumneutral in terms of their acidity, with a lake wide average of 7.2 pH units. The alkalinity of the water averaged 23.2 mg/L indicating that the lake is adequately buffered and not sensitive to acid deposition.

- Sodium and chloride concentrations averaged 6.2 and 10.2 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 67% of participating ALAP lakes.

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CRANBERRY LAKE
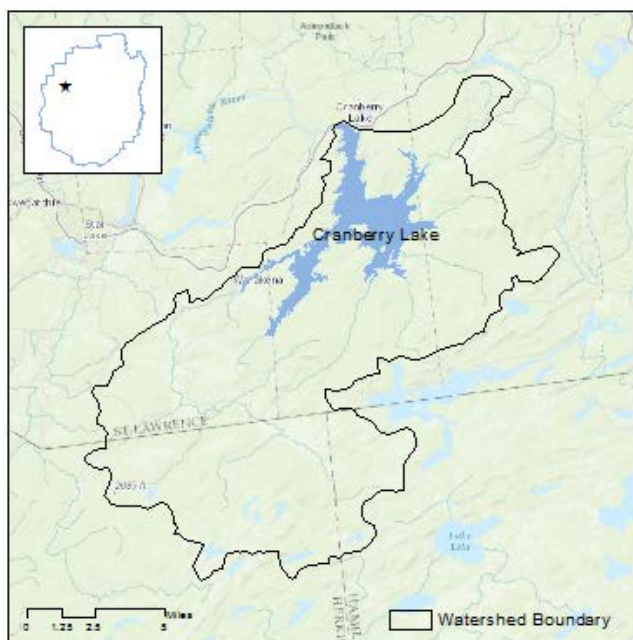
Location	County:	St Lawrence
	Town:	Clifton

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

2018 DATA

Water quality values and historical trends for Cranberry Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

Water Quality Indicator	6/20/2018	7/21/2018	8/18/2018	Average	Trend
Transparency (m)	3.6	4.2	3.5	3.8	Decreasing
Total Phosphorus (µg/L)	7.4	6.8	8.2	7.5	Decreasing
Chlorophyll-*a* (µg/L)	3.3	3.0	2.9	3.0	No Trend
Laboratory pH	6.8	6.6	6.8	6.7	Increasing
Sp. Conductance (µS/cm)	14.8	15.0	16.2	15.3	Decreasing
Color (Pt-Co)	40.7	34.3	31.1	35.4	No Trend
Alkalinity (mg/L)			5.5	5.5	No Trend
Chloride (mg/L)			0.4	0.4	No Trend
Calcium (mg/L)			1.8	1.8	Not Analyzed
Sodium (mg/L)			1.0	1.0	No Trend

HISTORICAL DATA

Annual average values of select water quality indicators for Cranberry Lake, 1998-2018. 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 since 1998. Total phosphorus is also trending down, although the trend appears related to methodological improvements made in 2010-2011. 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 2018 were circumneutral in terms of their pH, with an average pH value of 6.7 The pH of the water has exhibited an increasing trend since 1998. The alkalinity of the 2018 sample was 5.5 mg/L, indicating that the lake has moderate sensitivity to acid deposition.

- The sodium and chloride concentration of Cranberry Lake was 1.0 and 0.4 mg/L respectively 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
Oligotrophic	Acidic (acceptable)	Moderate	Not Significant

2018 DATA

Water quality values and historical trends for Deer Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit. VOB=Secchi disk was visible on the bottom of the lake.

Water Quality Indicator	6/20/2018	7/18/2018	8/20/2018	Average	Trend
Transparency (m)	VOB	3.0	VOB	3.0	No Trend
Total Phosphorus (µg/L)	9.0	9.1	8.4	8.9	Decreasing
Chlorophyll-*a* (µg/L)	2.8	0.7	1.3	1.6	No Trend
Laboratory pH	6.3	6.4	6.5	6.4	No Trend
Sp. Conductance (µS/cm)	18.0	20.1	20.8	19.6	Decreasing
Color (Pt-Co)	31.1	40.7	105.1	59.0	No Trend
Alkalinity (mg/L)			9.3	9.3	Decreasing
Chloride (mg/L)			0.5	0.5	No Trend
Calcium (mg/L)			2.8	2.8	Not Analyzed
Sodium (mg/L)			1.2	1.2	No Trend

HISTORICAL DATA
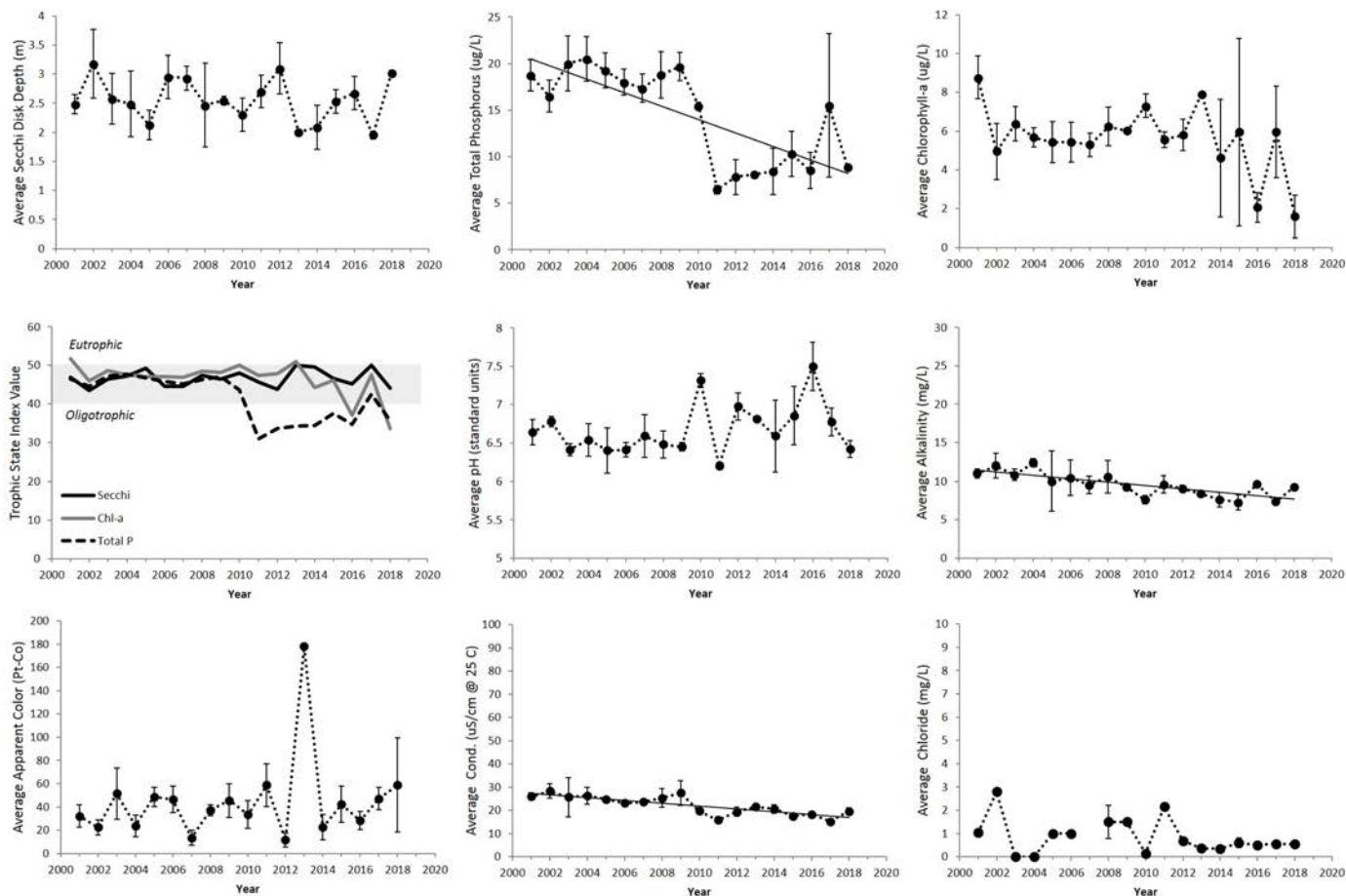
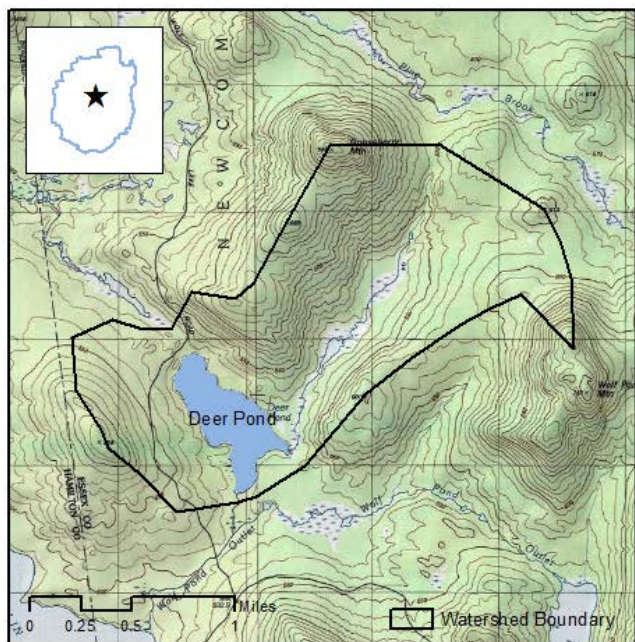*Annual average values of select water quality indicators for Deer Lake, 2001-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

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 was best classified as a Oligotrophic lake in 2018 . Average secchi disk transparency has typically been between 2 and 3 meters over the 18 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 since 2001. The strong shift in phosphorus concentration in 2010 is likely due to upgraded laboratory methods.

- The acidity of the 2018 water samples averaged 6.4 pH units, indicating that the surface water is slightly acidic. The alkalinity of the 2018 sample was 9.3 mg/L, indicating moderate sensitivity to acid deposition. We detected a slight, yet statistically significant downward trend in alkalinity since 2001.

- Sodium and chloride concentrations were 1.2 and 0.5 mg/L respectively, which is in the range expected for a watershed lacking salted roads.

EAGLE LAKE
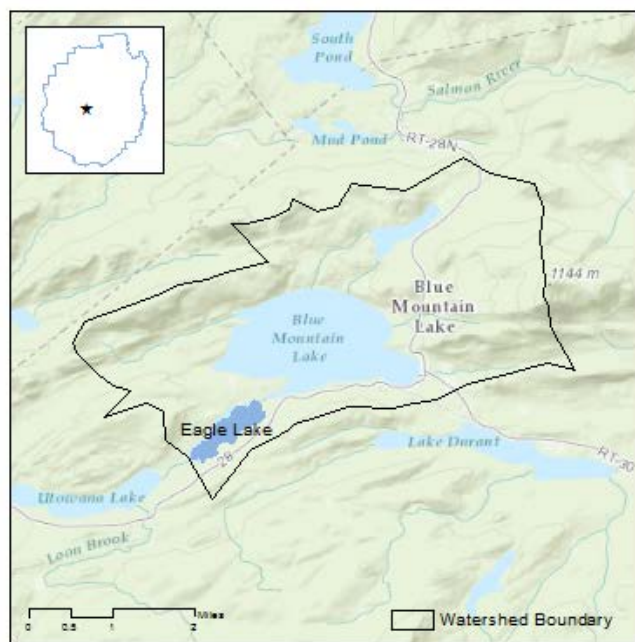
Location	County:	Hamilton
	Town:	Indian Lake

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	High

2018 DATA

Water quality values and historical trends for Eagle Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

| Water Quality Indicator	6/29/2018	7/31/2018	8/30/2018	Average	Trend
Transparency (m)	7.0	7.5	6.9	7.1	No Trend
Total Phosphorus (µg/L)	6.1	8.7	5.6	6.8	No Trend
Chlorophyll-*a* (µg/L)	1.0	1.1	1.2	1.1	Decreasing
Laboratory pH	6.3	6.3	7.4	6.6	No Trend
Sp. Conductance (µS/cm)	95.1	96.2	100.1	97.1	No Trend
Color (Pt-Co)	8.6	8.6	11.8	9.6	No Trend
Alkalinity (mg/L)			9.8	9.8	No Trend
Chloride (mg/L)			23.8	23.8	No Trend
Calcium (mg/L)			4.4	4.4	Not Analyzed
Sodium (mg/L)			14.7	14.7	No Trend

HISTORICAL DATA
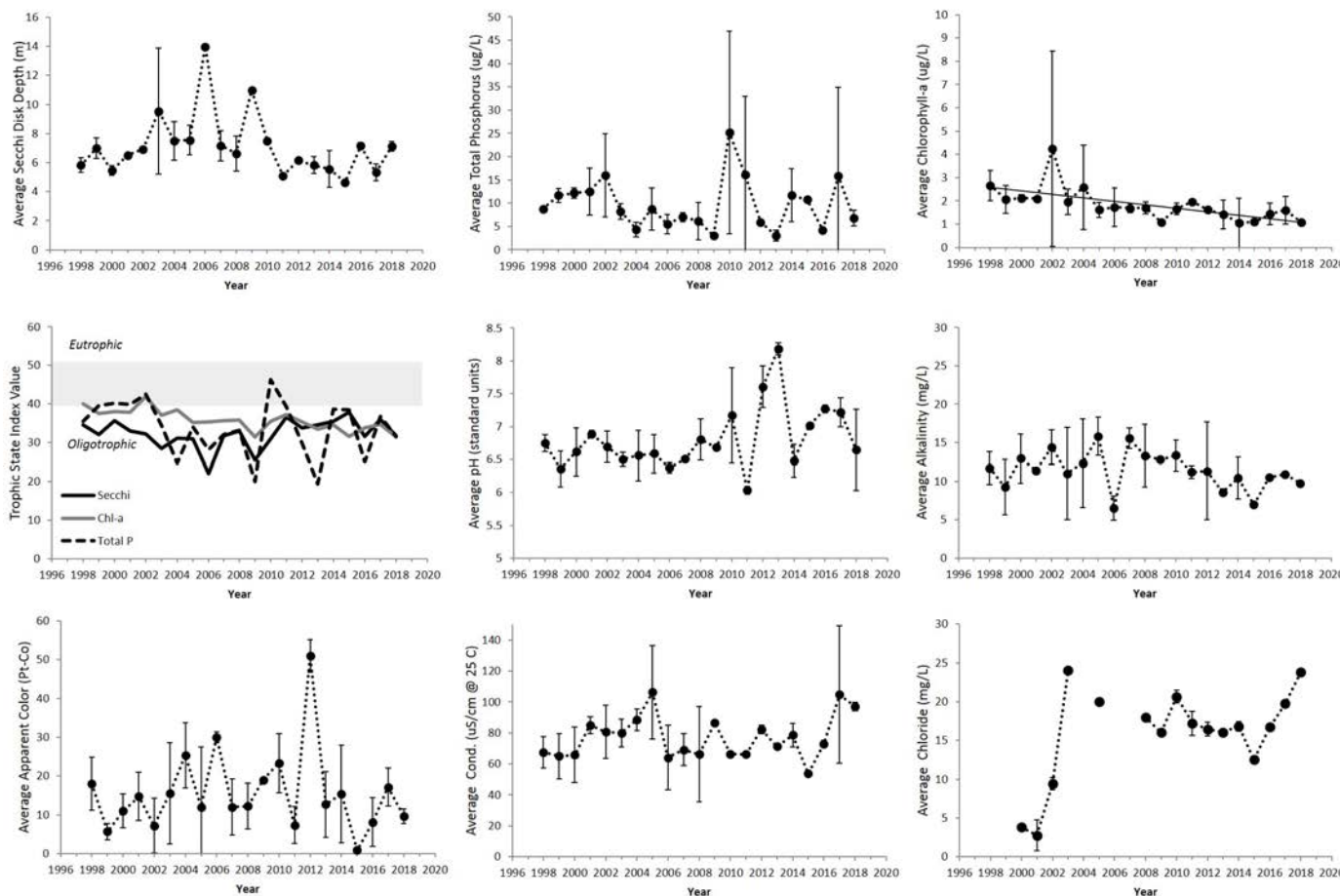
Annual average values of select water quality indicators for Eagle Lake, 1998-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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 since 1998. Total phosphorus and transparency have been variable over time, but have not exhibited any statistical trends. The transparency of Eagle Lake averaged 7.1 meters, which is greater than 91% of the participating ALAP lakes.

- The water samples analyzed in 2018 were found to be circumneutral in terms of their acidity. The alkalinity was found to be 9.8 mg/L, indicating moderate sensitivity to acid deposition.

- Sodium and chloride concentration were 14.7 and 23.8 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
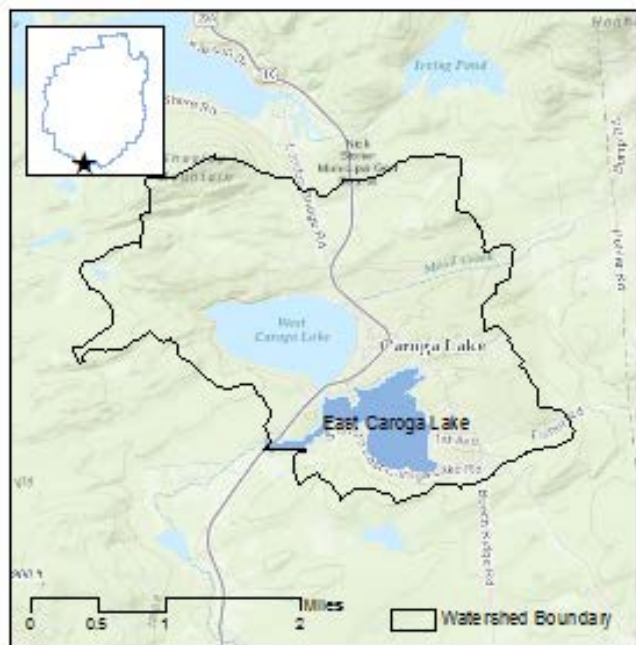
Location	County:	Fulton
	Town:	Caroga Lake

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
Oligotrophic	*Circumneutral*	*Well buffered – not sensitive*	*High*

2018 DATA

Water quality values for East Caroga Lake during the 2018 sampling season. Trend analysis will be performed after five years of consecutive data collection. BDL=below detection limit.

Water Quality Indicator	6/23/2018	7/15/2018	8/26/2018	Average	Trend
Transparency (m)	3.9	4.2	4.3	4.1	Not Analyzed
Total Phosphorus (µg/L)	7.6	28.6	6.5	14.2	Not Analyzed
Chlorophyll-*a* (µg/L)	0.1	1.4	3.6	1.7	Not Analyzed
Laboratory pH	7.5	6.8	7.3	7.2	Not Analyzed
Sp. Conductance (µS/cm)	159.7	147.4	162.9	156.7	Not Analyzed
Color (Pt-Co)	18.2	18.2	18.2	18.2	Not Analyzed
Alkalinity (mg/L)			27.1	27.1	Not Analyzed
Chloride (mg/L)			32.6	32.6	Not Analyzed
Calcium (mg/L)			10.5	10.5	Not Analyzed
Sodium (mg/L)			18.4	18.4	Not Analyzed

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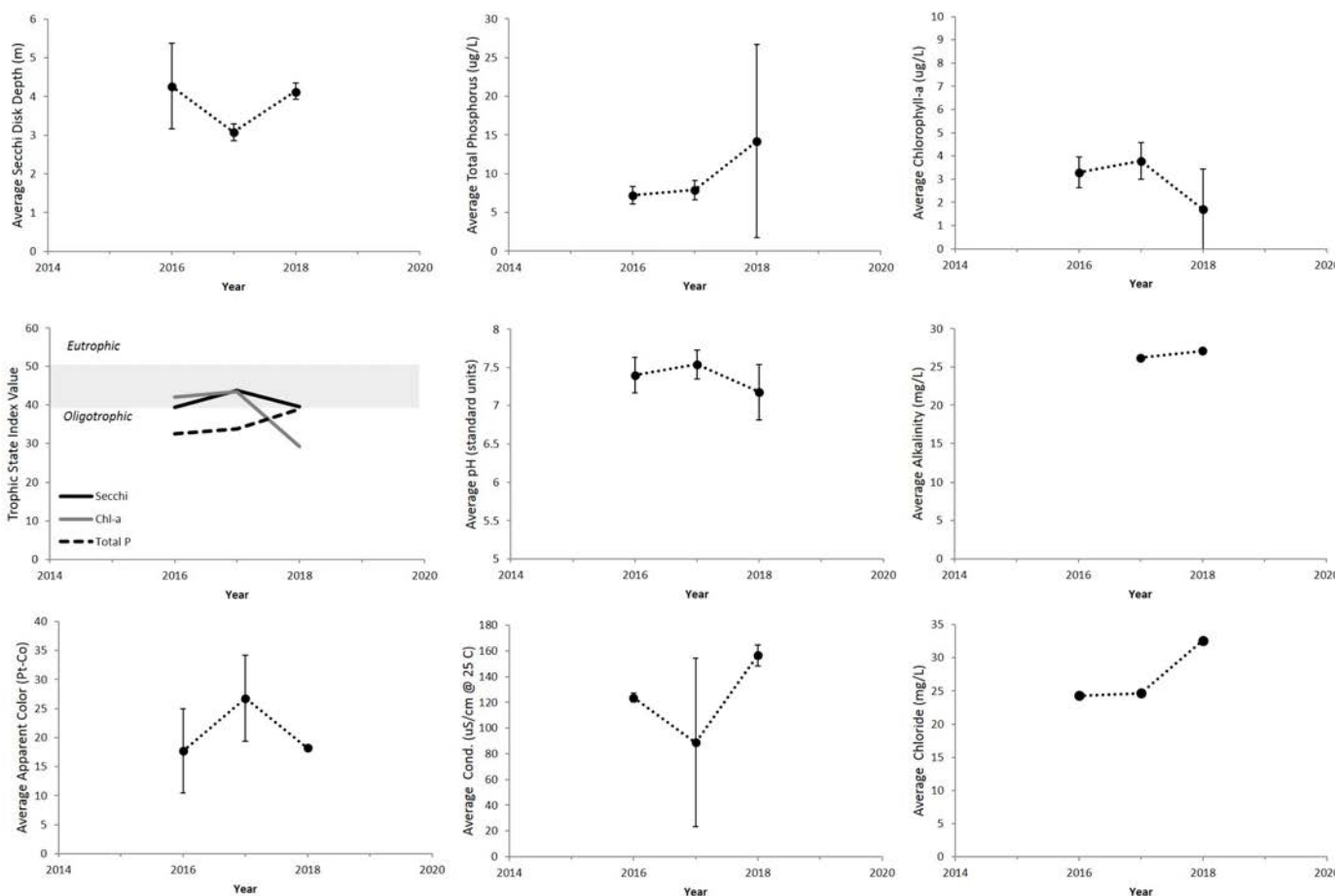
*Annual average values of select water quality indicators for East Caroga Lake. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

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.

- Based on the 2018 data, East Caroga is best characterized as an oligotrophic lake, on the border of mesotrophic.

- The lake is circumneutral in terms of its pH, and averaged 7.2 pH units in 2018.

- Alkalinity in 2018 was 27.1, indicating that the lake is not sensitive to acid deposition. Alkalinity of East Caroga is greater than 91% of participating ALAP lakes.

- Sodium and chloride values for the lake were 18.4 and 32.6 mg/L respectivly in 2018, 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 160 times higher than unimpacted lakes in the Adirondacks.

ELI POND
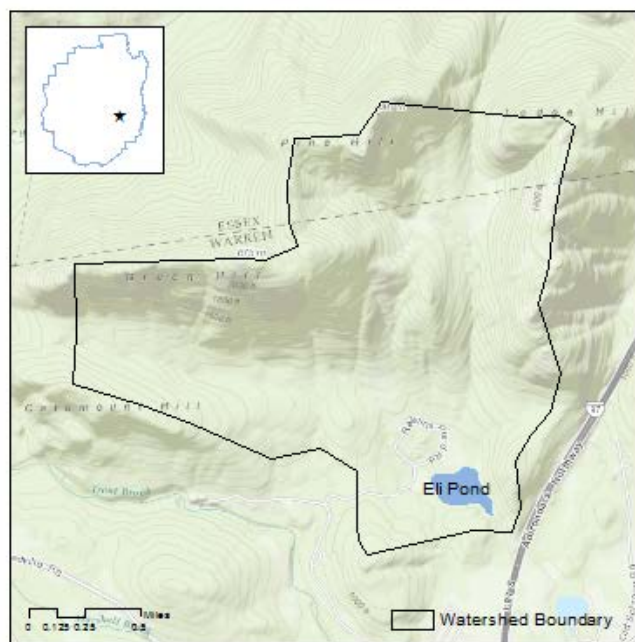
Location	County:	Warren
	Town:	Chester

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

2018 DATA

Water quality values and historical trends for Eli Pond during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

| Water Quality Indicator	6/23/2018	7/14/2018	8/18/2018	Average	Trend
Transparency (m)	3.7	3.7	3.7	3.7	No Trend
Total Phosphorus (µg/L)	17.1	10.2	13.4	13.6	No Trend
Chlorophyll-*a* (µg/L)	6.0	6.2	5.9	6.0	No Trend
Laboratory pH	6.9	6.3	7.5	6.9	No Trend
Sp. Conductance (µS/cm)	31.1	34.3	37.2	34.2	Decreasing
Color (Pt-Co)	24.6	40.7	53.6	39.7	No Trend
Alkalinity (mg/L)			18.6	18.6	Decreasing
Chloride (mg/L)			1.0	1.0	No Trend
Calcium (mg/L)			5.8	5.8	Not Analyzed
Sodium (mg/L)			1.4	1.4	No Trend

HISTORICAL DATA
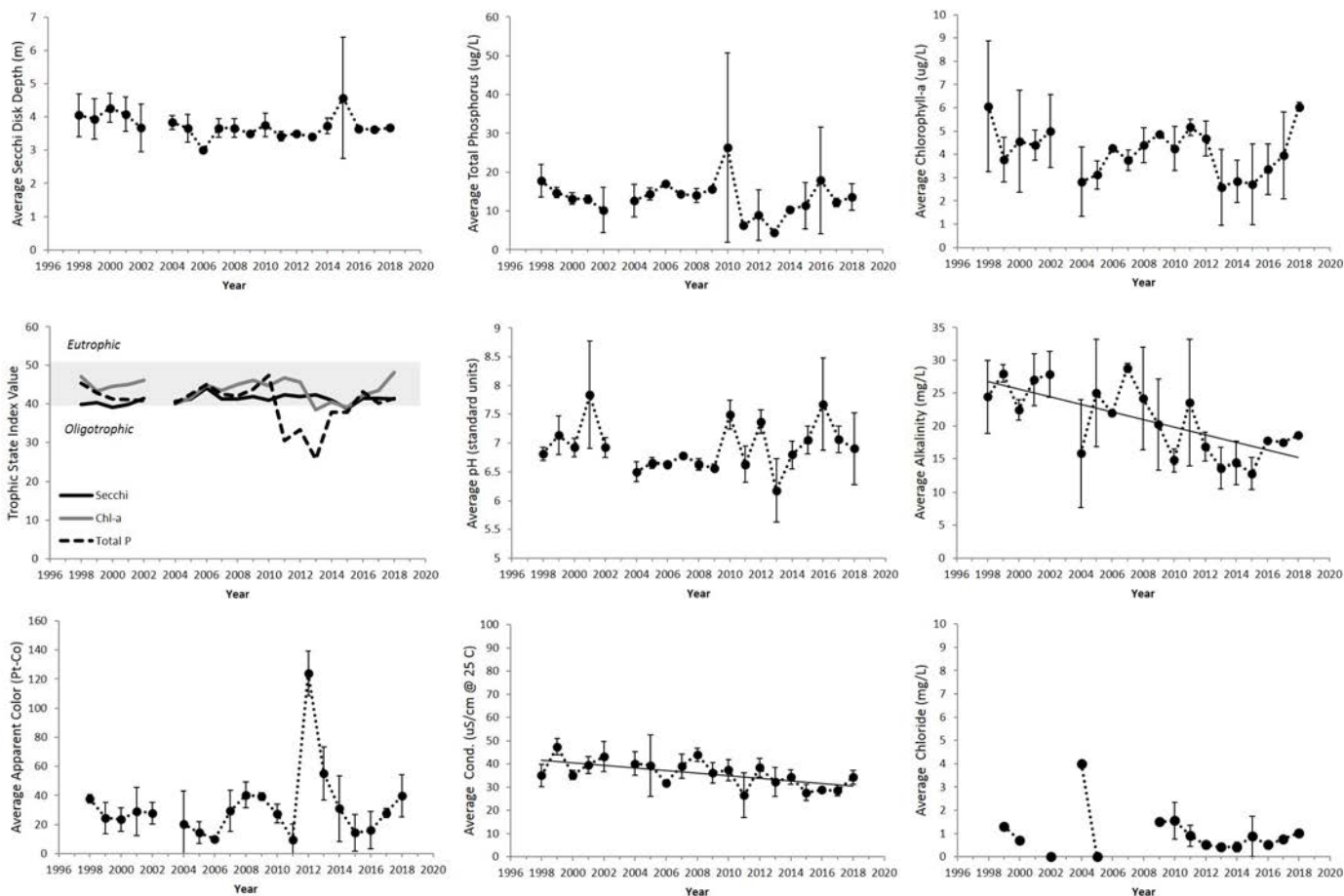
Annual average values of select water quality indicators for Eli Pond, 1998-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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. Chlorophyll-a and total phosphorus has been variable, and have exhibited no positive or negative trend.

- The water samples analyzed in 2018 were found to be circumneutral in terms of their acidity. The alkalinity was 18.6 mg/L, indicating low sensitivity to acid deposition. We detected a decreasing trend in alkalinity since 1998. There is considerable variability in the ponds alkalinity; this may be related to the high flushing rate of the pond, which is estimated at 20 times per year on average.

- Sodium and chloride concentration averaged 1.4 and 1.0 mg/L respectively, these values are within the range we would expect for a lake that lacks salted roads in the watershed.

FERN LAKE
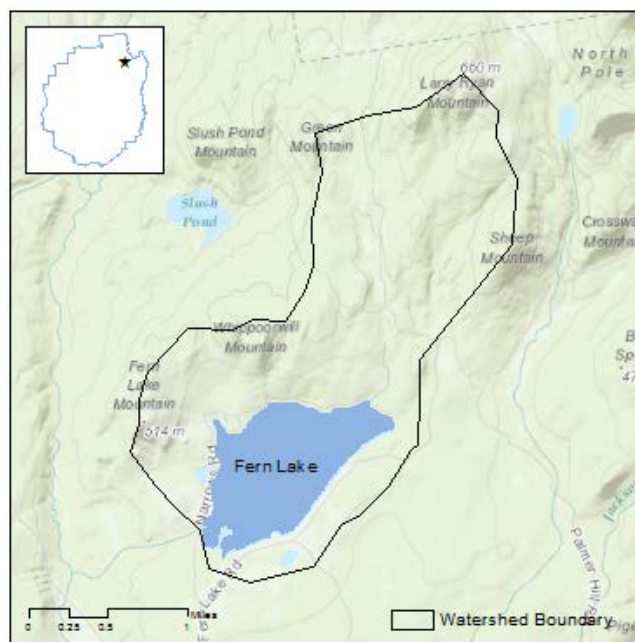
Location	County:	Clinton
	Town:	Black Brook

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

2018 DATA

Water quality values and historical trends for Fern Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

Water Quality Indicator	7/5/2018	8/15/2018	9/19/2018	Average	Trend
Deep Hole					
Transparency (m)	3.5	3.5	3.0	3.3	No Trend
Total Phosphorus (µg/L)	3.9	8.1	9.3	7.1	No Trend
Chlorophyll-*a* (µg/L)	3.2	3.1	6.0	4.1	No Trend
Laboratory pH	8.4	8.7	7.4	8.1	No Trend
Sp. Conductance (µS/cm)	46.6	47.8	48.0	47.5	No Trend
Color (Pt-Co)	11.8	27.9	31.1	23.6	No Trend
Alkalinity (mg/L)			18.0	18.0	No Trend
Chloride (mg/L)			4.1	4.1	No Trend
Calcium (mg/L)			5.1	5.1	Not Analyzed
Sodium (mg/L)			2.9	2.9	No Trend

| Water Quality Indicator	7/5/2018	8/15/2018	9/19/2018	Average
Beach				
Transparency (m)	3.0	3.0	3.0	3.0
Total Phosphorus (µg/L)	3.0	10.5	6.7	6.7
Chlorophyll-*a* (µg/L)	3.9	3.3	4.4	3.9
Laboratory pH	8.4	8.6	7.6	8.2
Sp. Conductance (µS/cm)	48.9	47.5	47.3	47.9
Color (Pt-Co)	5.3	27.9	18.2	17.1
Alkalinity (mg/L)			17.9	17.9
Chloride (mg/L)			4.0	4.0
Calcium (mg/L)			5.1	5.1
Sodium (mg/L)			2.9	2.9
Marsh				
Transparency (m)	3.1	3.0	3.0	3.0
Total Phosphorus (µg/L)	3.3	9.5	7.4	6.7
Chlorophyll-*a* (µg/L)	6.1	3.3	6.2	5.2
Laboratory pH	8.7	8.0	7.3	8.0
Sp. Conductance (µS/cm)	46.1	47.8	47.7	47.2
Color (Pt-Co)	11.8	24.6	24.6	20.4
Alkalinity (mg/L)			18.4	18.4
Chloride (mg/L)			4.5	4.5
Calcium (mg/L)			5.0	5.0
Sodium (mg/L)			2.8	2.8

HISTORICAL DATA
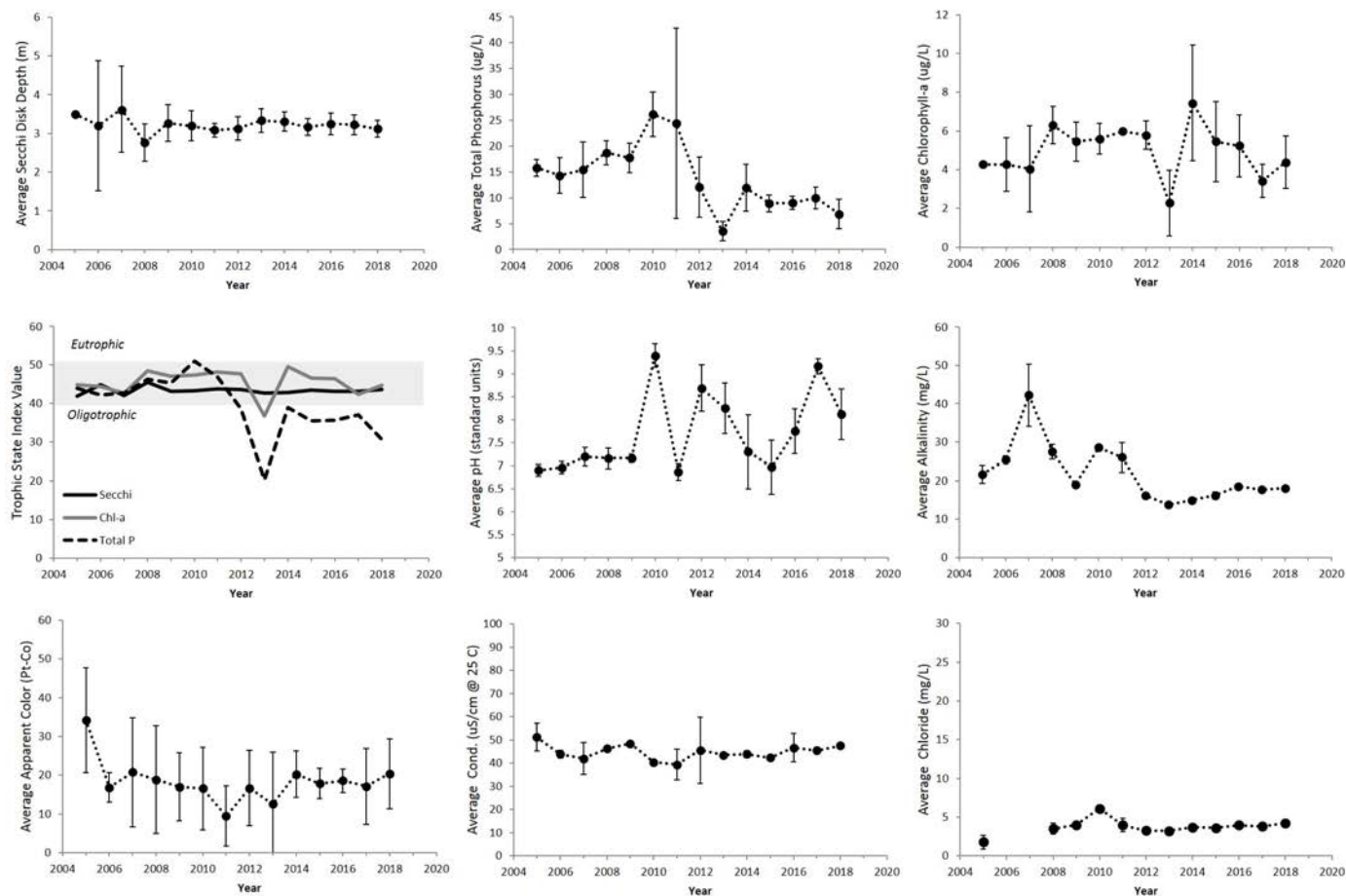
Lake wide annual average values of select water quality indicators for Fern Lake, 2005-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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 2018 samples from Fern Lake did not conform to our quality control procedures, as all nine samples were received in late September.

- Fern Lake is a mesotrophic lake. The average transparency has been stable since monitoring began, and is typically near 4 meters. Chlorophyll-a and total phosphorus have been variable, and have exhibited no positive or negative trend.

- The water samples analyzed in 2018 were found to be alkaline in terms of their acidity. The alkalinity was 18 mg/L, indicating low sensitivity to acid deposition.

- Sodium and chloride concentration averaged 2.9 and 4.1 mg/L respectively, these values indicate that the lake is influenced by road salt, but the influence is relatively low.

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FRANK POND
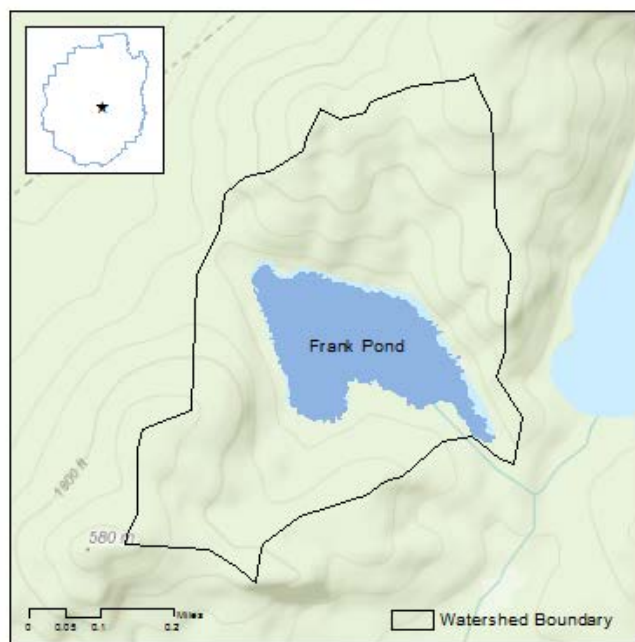
Location	County:	Essex
	Town:	Minerva

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

2018 DATA

Water quality values and historical trends for Frank Pond during the 2018 sampling season. Trend analysis will be performed after five years of data collection. BDL=below detection limit.

Water Quality Indicator	6/29/2018	8/2/2018	8/31/2018	Average	Trend
Transparency (m)	4.6	4.6	5.8	5.0	Not Analyzed
Total Phosphorus (µg/L)	5.3	7.5	6.1	6.3	Not Analyzed
Chlorophyll-*a* (µg/L)		1.9	1.1	1.5	Not Analyzed
Laboratory pH	7.2	7.5	7.1	7.3	Not Analyzed
Sp. Conductance (µS/cm)	13.6	12.5	12.6	12.9	Not Analyzed
Color (Pt-Co)	21.4	18.2	18.2	19.3	Not Analyzed
Alkalinity (mg/L)			4.1	4.1	Not Analyzed
Chloride (mg/L)			0.7	0.7	Not Analyzed
Calcium (mg/L)			1.6	1.6	Not Analyzed
Sodium (mg/L)			0.7	0.7	Not Analyzed

HISTORICAL DATA
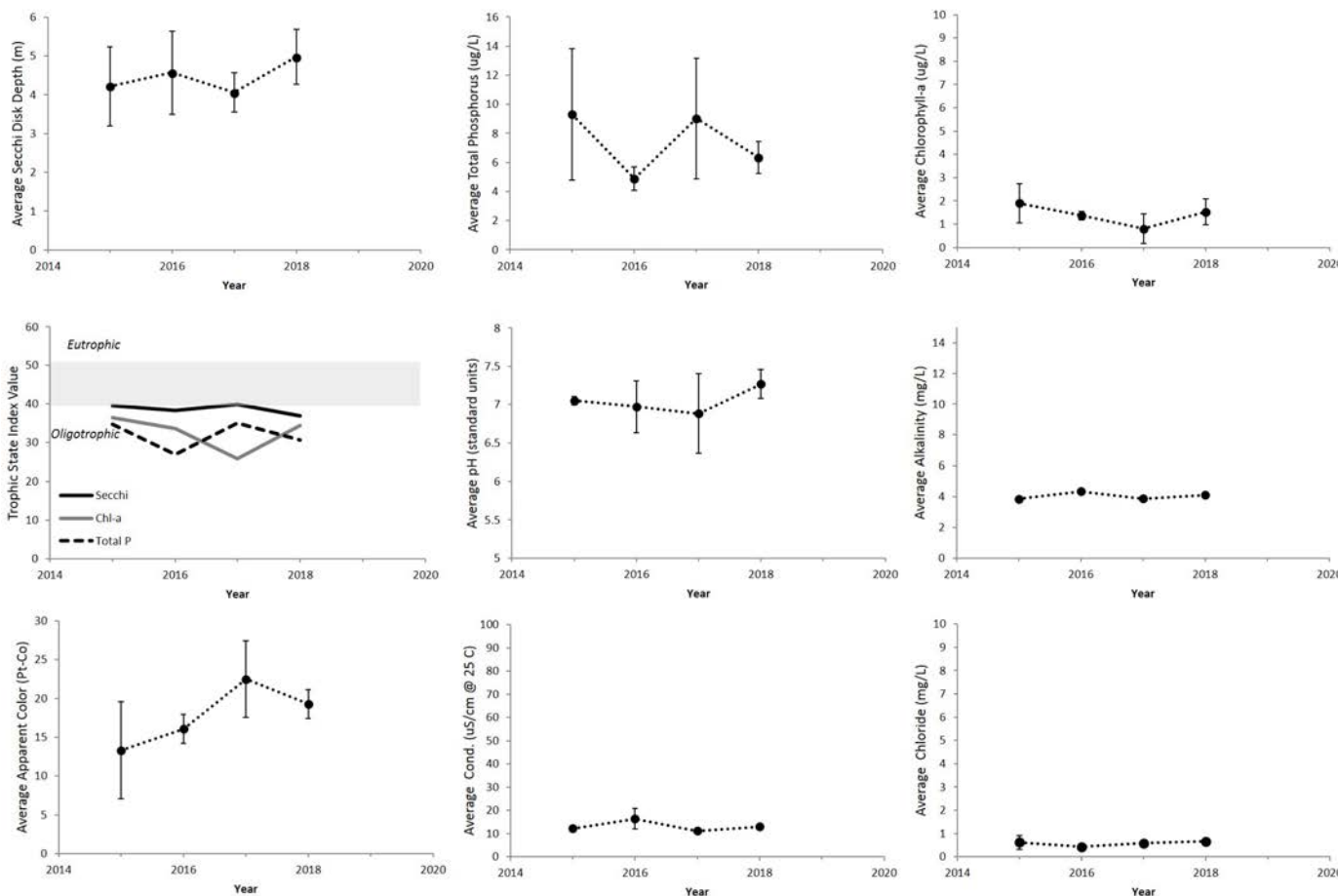
Annual average values of select water quality indicators for Frank Pond, 2015-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

## 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 between 4 and 5 meters since 2015. The chlorophyll concentration, a surrogate for algal productivity, averaged 1.5 µg/L, which is lower than 82% of participating lakes in 2018.

- Water samples received in 2018 were found to be circumneutral in terms of their acidity. The alkalinity was 4.1 mg/L, indicating moderate sensitivity to acid deposition.

- Sodium and chloride concentration averaged 0.7 mg/L for both ions. These values are within the range we would expect for a pond with no salted roads in the watershed.

GARNET LAKE
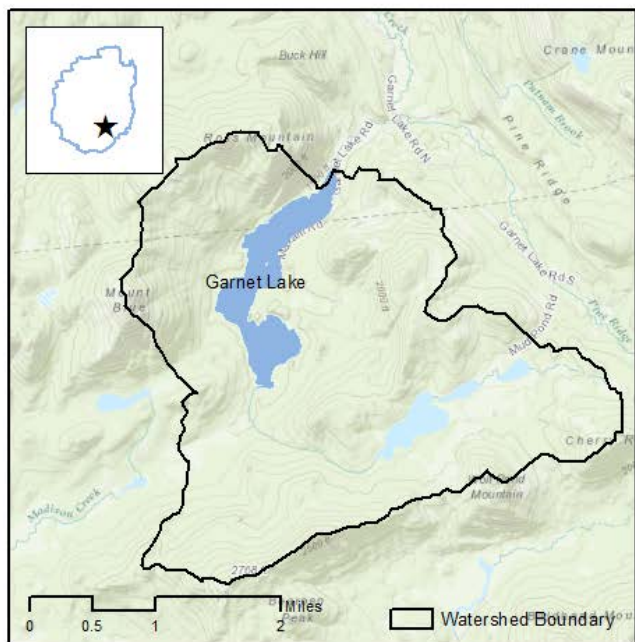
Location	County:	Warren
	Town:	Thurman

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
Oligotrophic	Alkaline	Adequate – low sensitivity	Not Significant

2018 DATA

Water quality values and historical trends for Garnet Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

| Water Quality Indicator	6/16/2018	7/21/2018	8/24/2018	Average	Trend
Transparency (m)	3.7	4.0	3.9	3.8	No Trend
Total Phosphorus (µg/L)	18.1	11.4	12.4	14.0	No Trend
Chlorophyll-a (µg/L)	2.5	2.5	2.3	2.5	No Trend
Laboratory pH	7.6	8.1	7.7	7.8	Increasing
Sp. Conductance (µS/cm)	24.8	24.7	23.6	24.4	Decreasing
Color (Pt-Co)	24.6	27.9	27.9	26.8	No Trend
Alkalinity (mg/L)			12.4	12.4	Decreasing
Chloride (mg/L)			0.6	0.6	No Trend
Calcium (mg/L)			3.0	3.0	Not Analyzed
Sodium (mg/L)			0.8	0.8	No Trend

HISTORICAL DATA
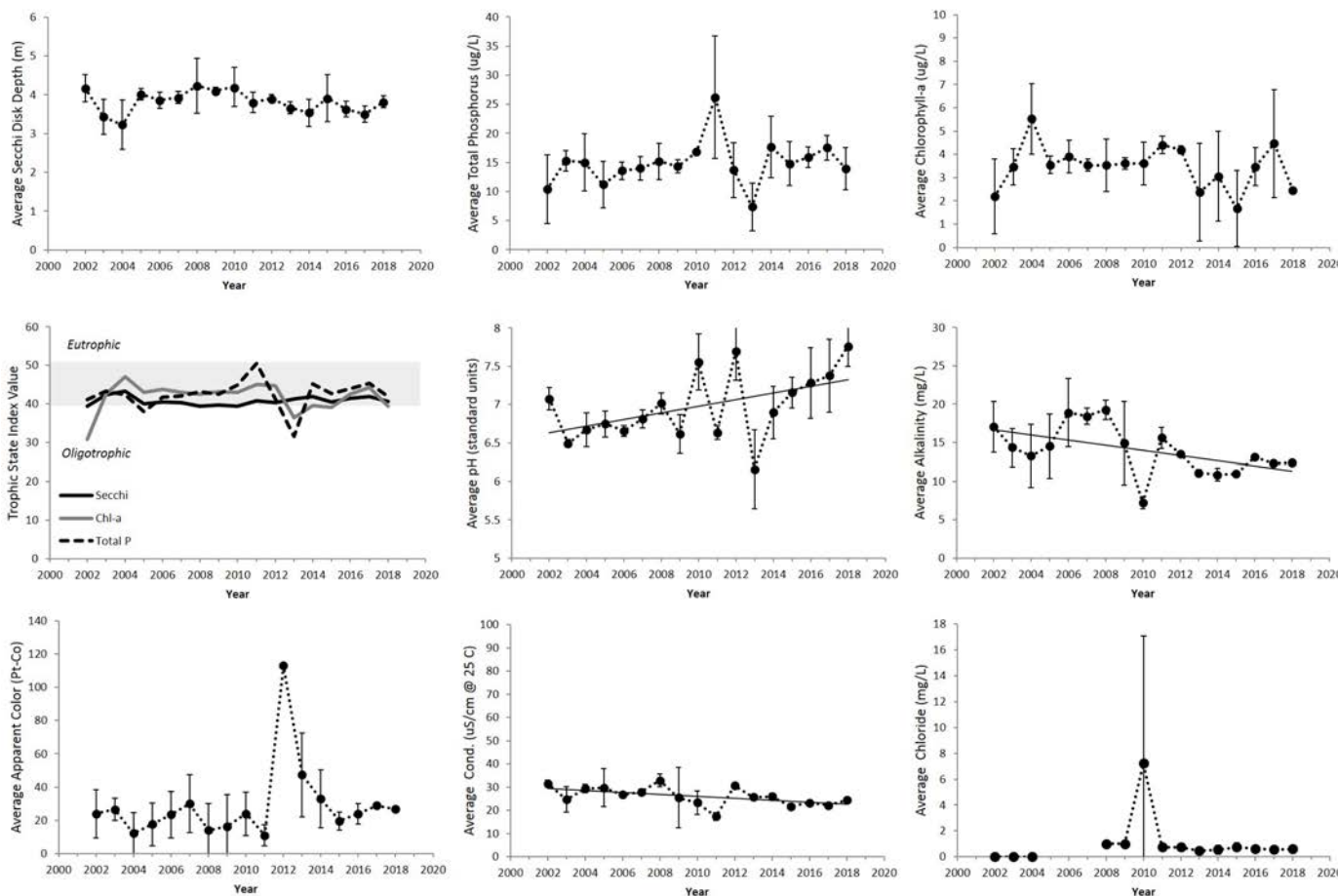
Annual average values of select water quality indicators for Garnet Lake, 2002-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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.

• Based on the 2018 data, Garnet Lake is an oligotrophic lake. Transparency has been stable since monitoring began and has ranged between 3 and 4 meters. Chlorophyll-a and total phosphorus concentrations have been variable over time and have not exhibited a positive or negative trend.

• The water samples analyzed in 2018 were found to be primarily alkaline in terms of their acidity, with an increasing trend in pH detected since 2002. The alkalinity was 12.4 mg/L, indicating low sensitivity to acid deposition.

• Sodium and chloride concentration averaged 0.8 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
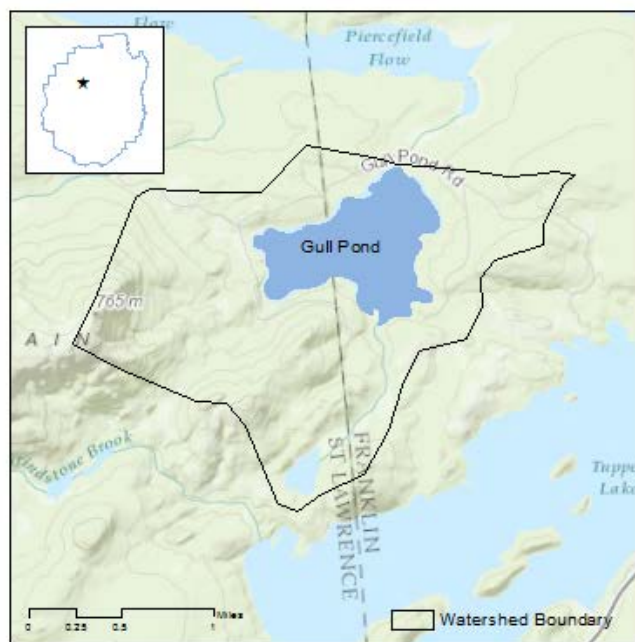
Location	County:	Franklin
	Town:	Tupper Lake

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	Acidic - acceptable	Moderate	Present - Low

2018 DATA

Water quality values and historical trends for Gull Pond during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

| Water Quality Indicator	6/19/2018	7/18/2018	8/21/2018	Average	Trend
Transparency (m)	4.7	6.6	4.6	5.3	No Trend
Total Phosphorus (µg/L)	4.1	3.3	3.9	3.8	Decreasing
Chlorophyll-*a* (µg/L)	1.7	1.0	1.2	1.3	Decreasing
Laboratory pH	6.6	6.6	6.2	6.5	No Trend
Sp. Conductance (µS/cm)	21.9	20.1	21.8	21.3	Decreasing
Color (Pt-Co)	21.4	11.8	11.8	15.0	No Trend
Alkalinity (mg/L)			6.5	6.5	No Trend
Chloride (mg/L)			1.2	1.2	No Trend
Calcium (mg/L)			2.3	2.3	Not Analyzed
Sodium (mg/L)			1.4	1.4	No Trend

HISTORICAL DATA
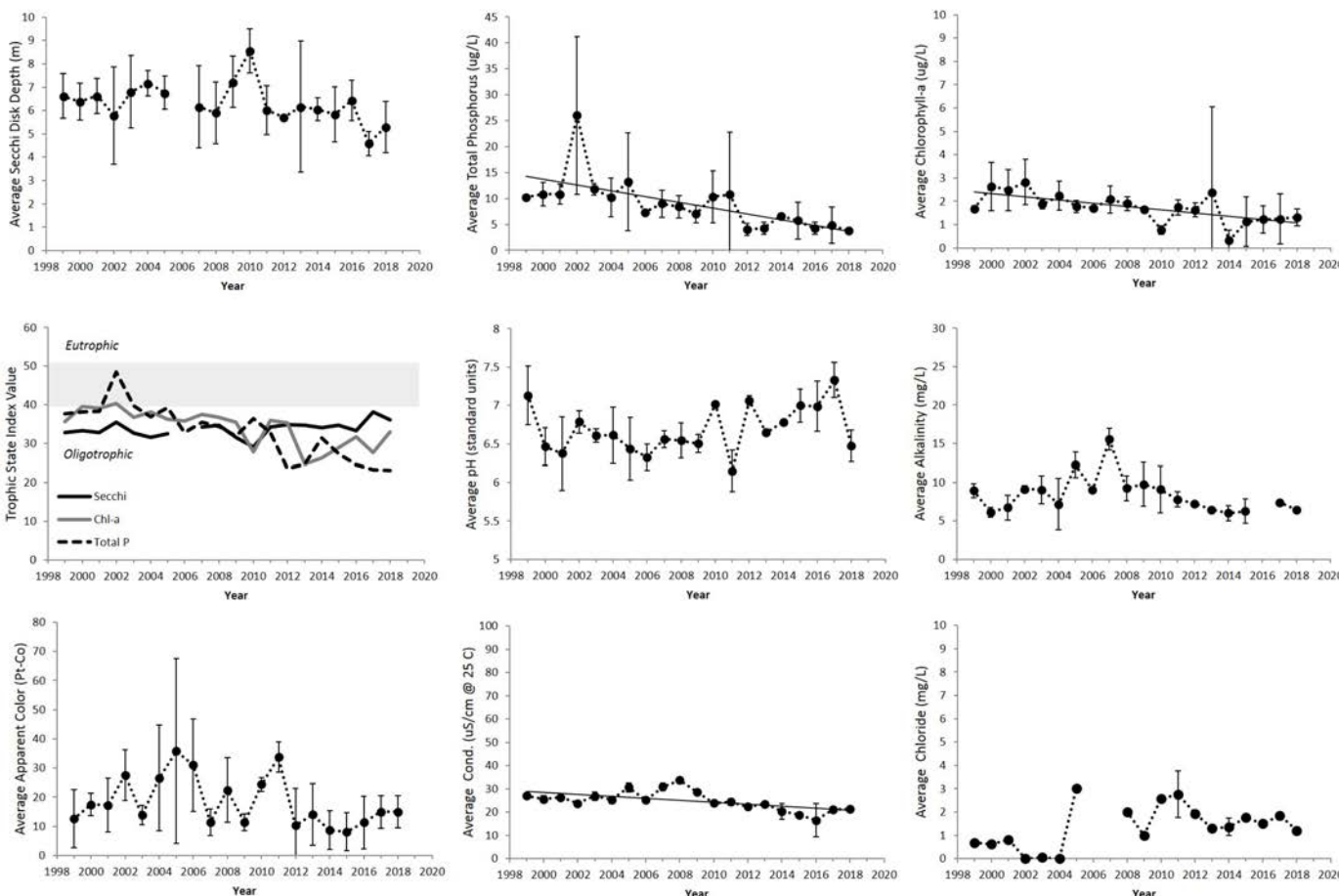
Annual average values of select water quality indicators for Gull Pond, 1999-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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 5 and 7 meters. We observed that both chlorophyll-a and total phosphorus concentrations have exhibited a slight, yet significant downward trend since 1999.

• The water samples analyzed in 2018 were found to be circumneutral in terms of their acidity. We found the alkalinity in the August sample to be 6.5 mg/L, indicating moderate sensitivity to acid deposition.

• Sodium and chloride concentration were 1.4 and 1.2 mg/L, respectively. These values are slightly higher than we would expect for a watershed that lacks salted roads.

HEWITT LAKE
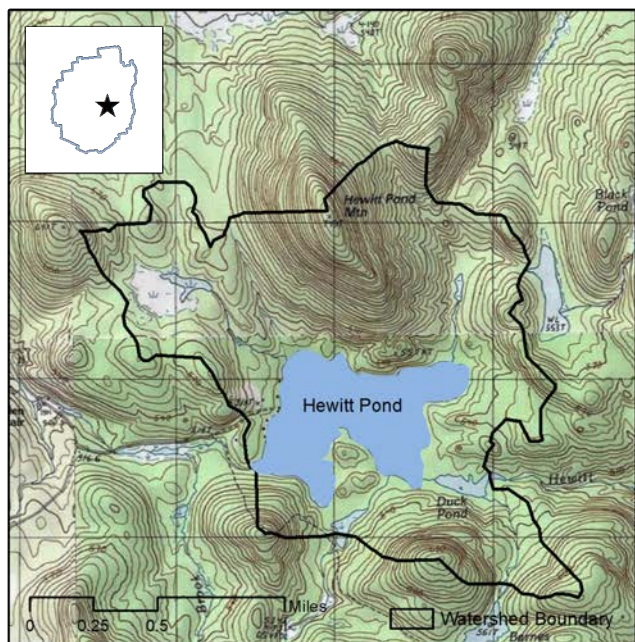
Location	County:	Essex
	Town:	Minerva Lake

Lake Characteristics		
	Surface Area (ha):	166
	Shoreline Length (km):	5
	Max. Depth (m):	16.5
	Volume (m^3):	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

2018 DATA

Water quality values and historical trends for Hewitt Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

Water Quality Indicator	June	July	8/25/2018	Average	Trend
Transparency (m)					No Trend
Total Phosphorus (µg/L)			3.5	3.5	Decreasing
Chlorophyll-*a* (µg/L)			2.4	2.4	No Trend
Laboratory pH			7.3	7.3	Increasing
Sp. Conductance (µS/cm)			17.0	17.0	Decreasing
Color (Pt-Co)			21.4	21.4	No Trend
Alkalinity (mg/L)			6.7	6.7	No Trend
Chloride (mg/L)			0.7	0.7	No Trend
Calcium (mg/L)			2.2	2.2	Not Analyzed
Sodium (mg/L)			0.9	0.9	No Trend

HISTORICAL DATA
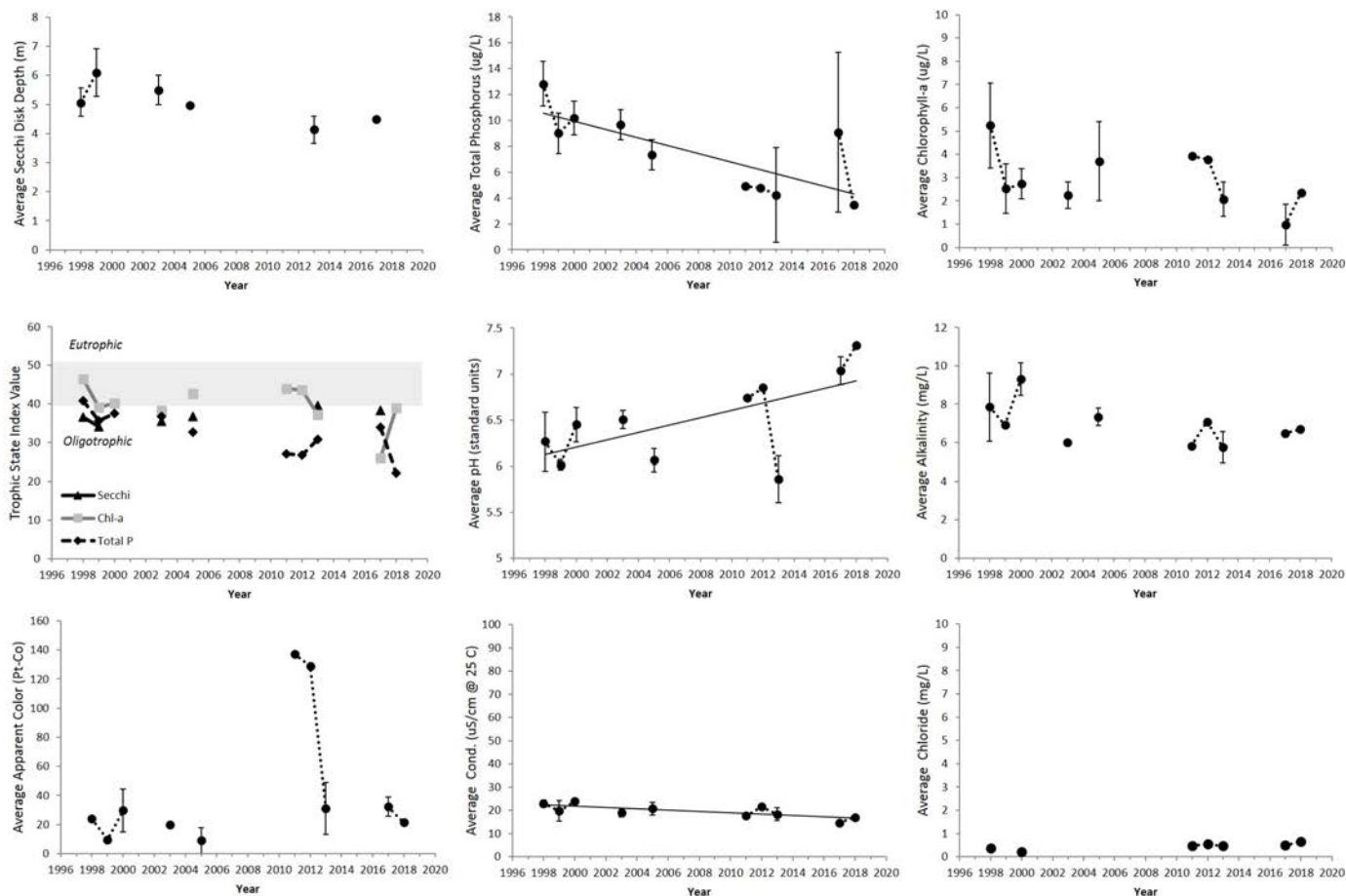
*Annual average values of select water quality indicators for Hewitt Lake, 1998-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

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. ALAP volunteers and the Adirondack Watershed Institute have monitored Hewitt Lake sporadically since 1998.

- The lab received only one sample in 2018 and transparency depth was not reported correctly. Regular participation would improve our ability to assess the water quality of the lake and analyze historical trends.

- Hewitt Lake is an oligotrophic lake. Average annual total phosphorus concentration has exhibited a downward trend since the lakes first year of ALAP participation.

- The single sample analyzed in 2018 was circumneutral in terms of its acidity. The alkalinity was 6.7 mg/L, indicating that the lake has moderate sensitivity to acid deposition.

- The sodium and chloride concentration of Hewitt Lake was 0.9 and 0.7 mg/L respectively, which is in the range we would expect for a lake that lacks salted roads in the watershed.

HOEL POND
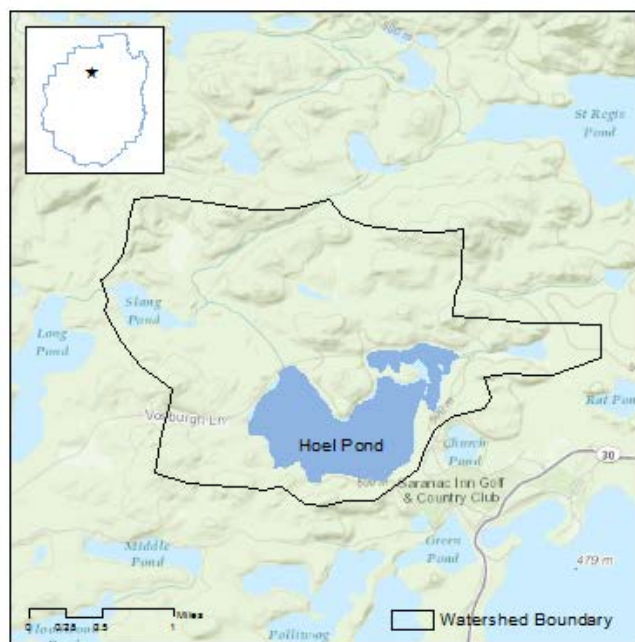
Location	County:	Franklin
	Town:	Santa Clara

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	Present - low

2018 DATA

Water quality values and historical trends for Hoel Pond during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

| Water Quality Indicator	6/16/2018	7/20/2018	8/16/2018	Average	Trend
Transparency (m)	4.3	7.1	7.2	6.2	No Trend
Total Phosphorus (µg/L)	5.0	3.2	3.7	4.0	Decreasing
Chlorophyll-*a* (µg/L)	2.8	1.2	1.2	1.8	No Trend
Laboratory pH	6.5	6.6	6.5	6.5	Increasing
Sp. Conductance (µS/cm)	14.2	12.8	14.1	13.7	No Trend
Color (Pt-Co)	18.2	15.0	15.0	16.1	No Trend
Alkalinity (mg/L)			5.0	5.0	No Trend
Chloride (mg/L)			1.3	1.3	No Trend
Calcium (mg/L)			1.9	1.9	Not Analyzed
Sodium (mg/L)			0.7	0.7	No Trend

HISTORICAL DATA
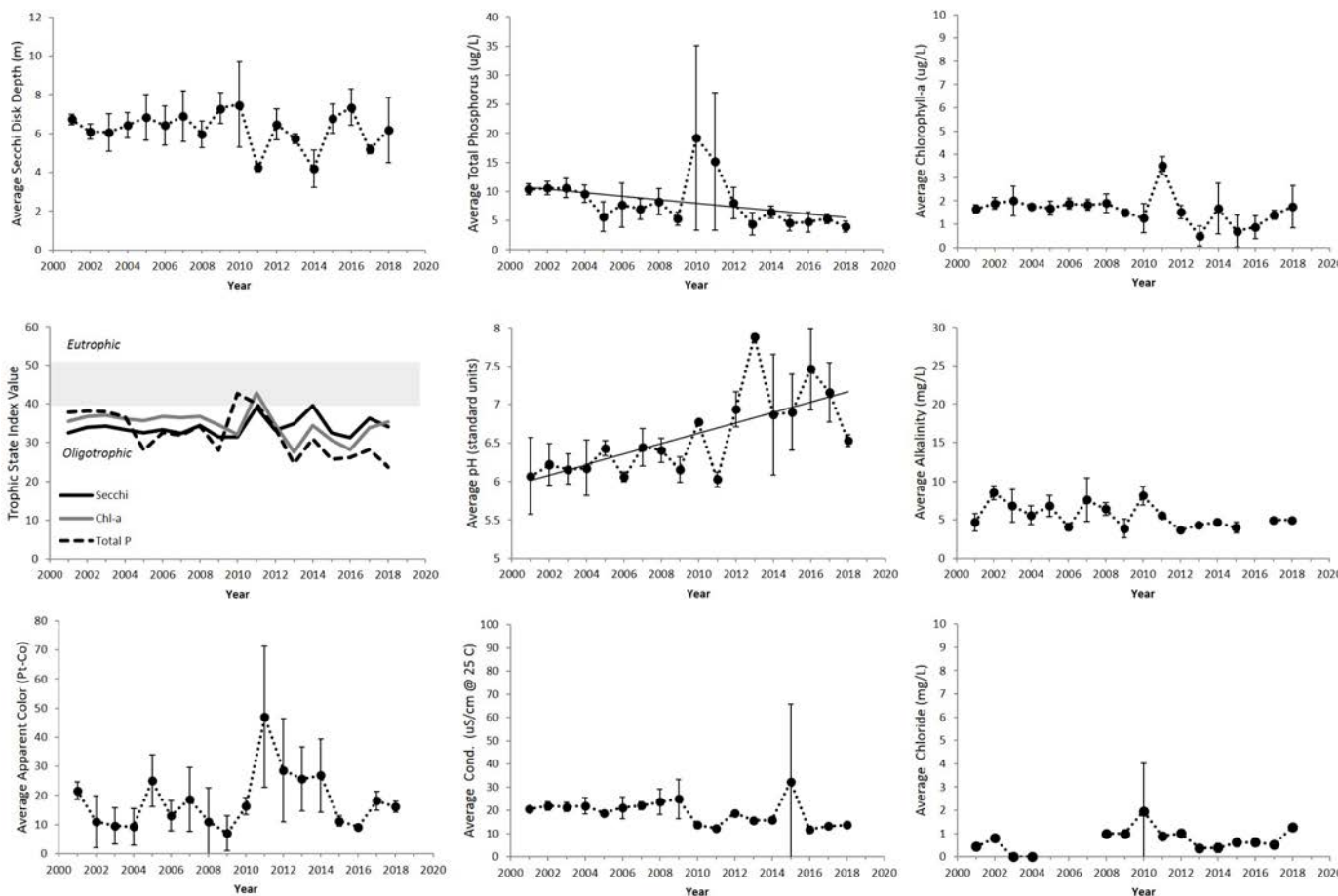
Annual average values of select water quality indicators for Hoel Pond, 2001-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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 average transparency has typically fluctuated between 6 and 7 meters in depth.   Total phosphorus concentrations have exhibited a slight, yet statistically significant, downward trend since 2001.

- The water samples analyzed in 2018 were found to be circumneutral in terms of their acidity. The pH of the water has exhibited a significant upward trend since 2001.

- Sodium and chloride concentration were 0.7 and 1.3 mg/L respectively. These values are slightly higher than what we would expect for a pond with no salted roads in the watershed.

INDIAN LAKE- FRANKLIN CNTY.
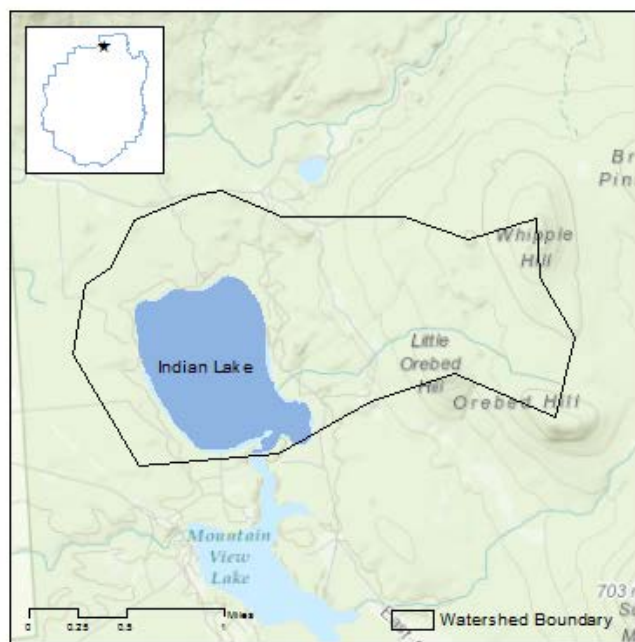
Location	County:	Franklin
	Town:	Bellmont

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	Adequate – low sensitivity	Not Significant

2018 DATA

Water quality values and historical trends for Indian Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

| Water Quality Indicator	6/21/2018	7/18/2018	8/19/2018	Average	Trend
Transparency (m)	2.4	1.9	2.7	2.3	No Trend
Total Phosphorus (µg/L)	16.4	12.7	17.4	15.5	No Trend
Chlorophyll-*a* (µg/L)	8.5	3.3	3.6	5.1	No Trend
Laboratory pH	6.5	6.7	7.1	6.7	No Trend
Sp. Conductance (µS/cm)	21.7	20.4	24.7	22.3	Decreasing
Color (Pt-Co)	43.9	47.2	40.7	43.9	No Trend
Alkalinity (mg/L)			10.8	10.8	Decreasing
Chloride (mg/L)			0.4	0.4	No Trend
Calcium (mg/L)			2.7	2.7	Not Analyzed
Sodium (mg/L)			1.1	1.1	No Trend

HISTORICAL DATA
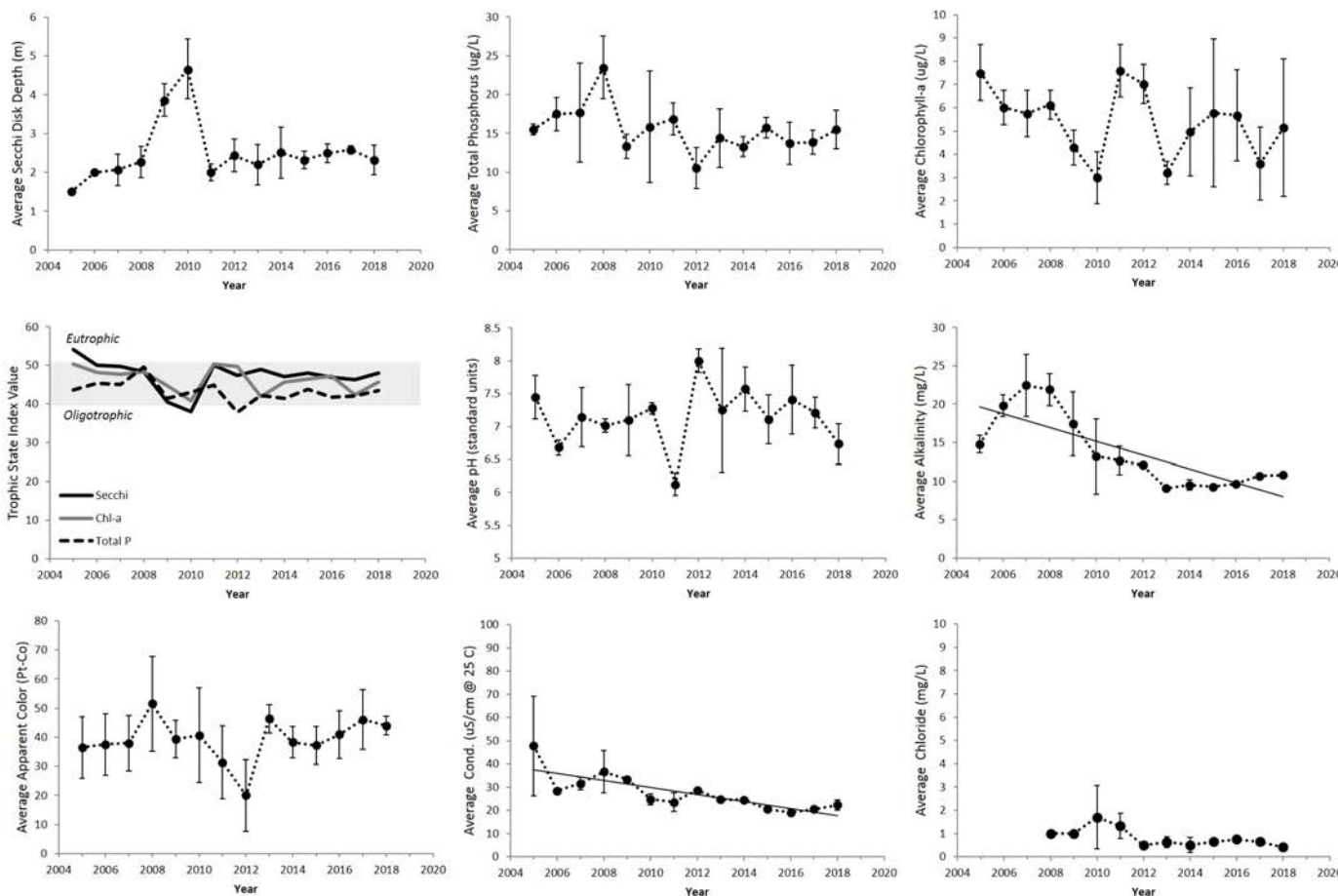
Annual average values of select water quality indicators for Indian Lake, 2005-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

SUMMARY OF FINDINGS

Indian Lake (FC) 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. ALAP volunteers and the Adirondack Watershed Institute have monitored Indian Lake since 2005.

- Indian Lake is a best classified as a mesotrophic lake. The trophic indicators (transparency, total phosphorus, and chlorophyll) have been variable over time, and have not exhibited any significant positive or negative trends since monitoring began.

- The water samples analyzed in 2018 were found to be circumneutral in terms of their acidity. The alkalinity was 10.8 mg/L, indicating low sensitivity to acid deposition. We detected a significant downward trend in alkalinity since 2005.

- Sodium and chloride concentration averaged 1.1 and 0.4 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 CNTY.
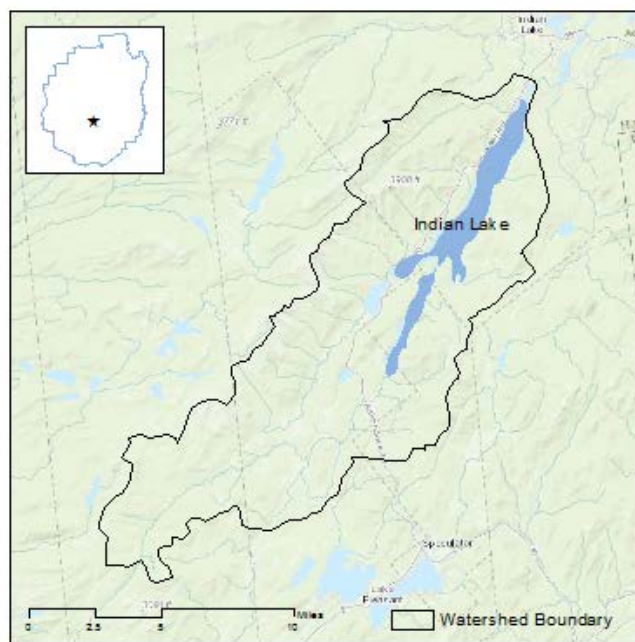
| Location | County: | Hamilton |
| | Town: | Indian Lake |

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*	*Adequate – low sensitivity*	*Not Significant*

2018 DATA

Water quality values and historical trends for Indian Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

| Water Quality Indicator	7/7/2018	8/11/2018	9/2/2018	Average	Trend
Transparency (m)	5.3	4.0	3.5	4.2	No Trend
Total Phosphorus (µg/L)	93.4	7.5	6.4	35.7	No Trend
Chlorophyll-*a* (µg/L)	3.1	4.2	4.7	4.0	No Trend
Laboratory pH	6.5	6.5	7.4	6.8	Increasing
Sp. Conductance (µS/cm)	24.4	25.6	28.4	26.1	No Trend
Color (Pt-Co)	21.4	21.4	34.3	25.7	No Trend
Alkalinity (mg/L)		6.6		6.6	No Trend
Chloride (mg/L)		5.2		5.2	No Trend
Calcium (mg/L)		2.1		2.1	Not Analyzed
Sodium (mg/L)		2.4		2.4	No Trend

HISTORICAL DATA
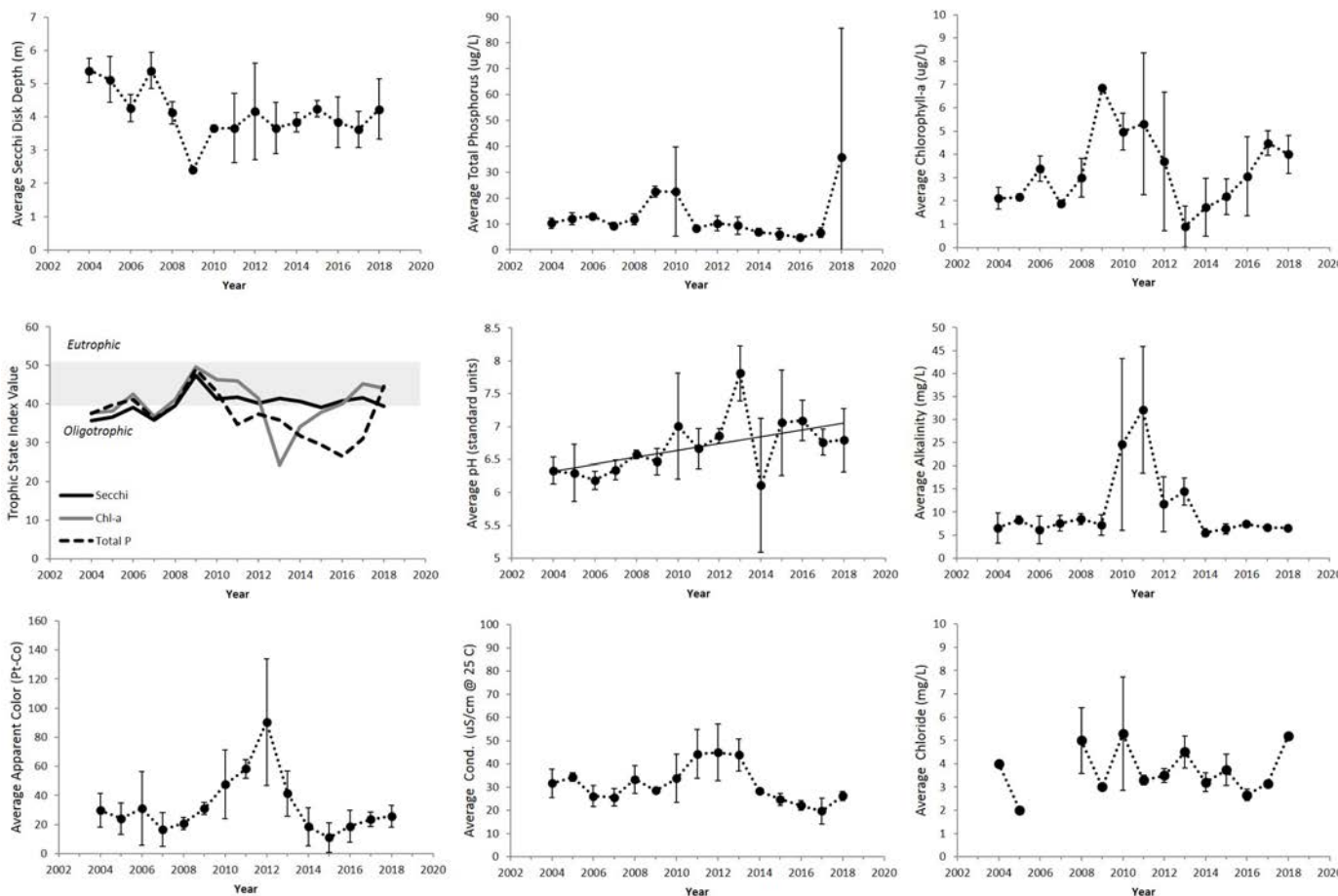
Annual average values of select water quality indicators for Indian Lake, 2004-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

SUMMARY OF FINDINGS

Indian Lake (HC) 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. ALAP volunteers and the Adirondack Watershed Institute have monitored Indian Lake 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. The total phosphorous for the July sample was 93.4, which is unusually high and most likely represents a non-representative sample or a contamination error.

• The water samples analyzed in 2018 were found to be circumneutral in terms of their acidity. The pH of the water has exhibited a significant upward trend. The alkalinity in 2018 was 6.6 mg/L, indicating moderate sensitivity to acid deposition.

• Sodium and chloride concentration averaged 2.4 and 5.2 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	Acidic (acceptable)	Moderate	Not Significant

2018 DATA

Water quality values and historical trends for Jordan Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

Water Quality Indicator	6/22/2018	7/20/2018	8/24/2018	Average	Trend
Transparency (m)	2.3	1.4	1.9	1.9	No Trend
Total Phosphorus (µg/L)	9.8	12.9	5.1	9.3	No Trend
Chlorophyll-*a* (µg/L)	2.6	6.1	3.7	4.1	Decreasing
Laboratory pH	6.1	6.5	5.8	6.1	No Trend
Sp. Conductance (µS/cm)	21.3	19.5	22.5	21.1	No Trend
Color (Pt-Co)	76.1	89.0	66.5	77.2	No Trend
Alkalinity (mg/L)			6.6	6.6	No Trend
Chloride (mg/L)			0.6	0.6	No Trend
Calcium (mg/L)			2.8	2.8	Not Analyzed
Sodium (mg/L)			1.0	1.0	No Trend

HISTORICAL DATA
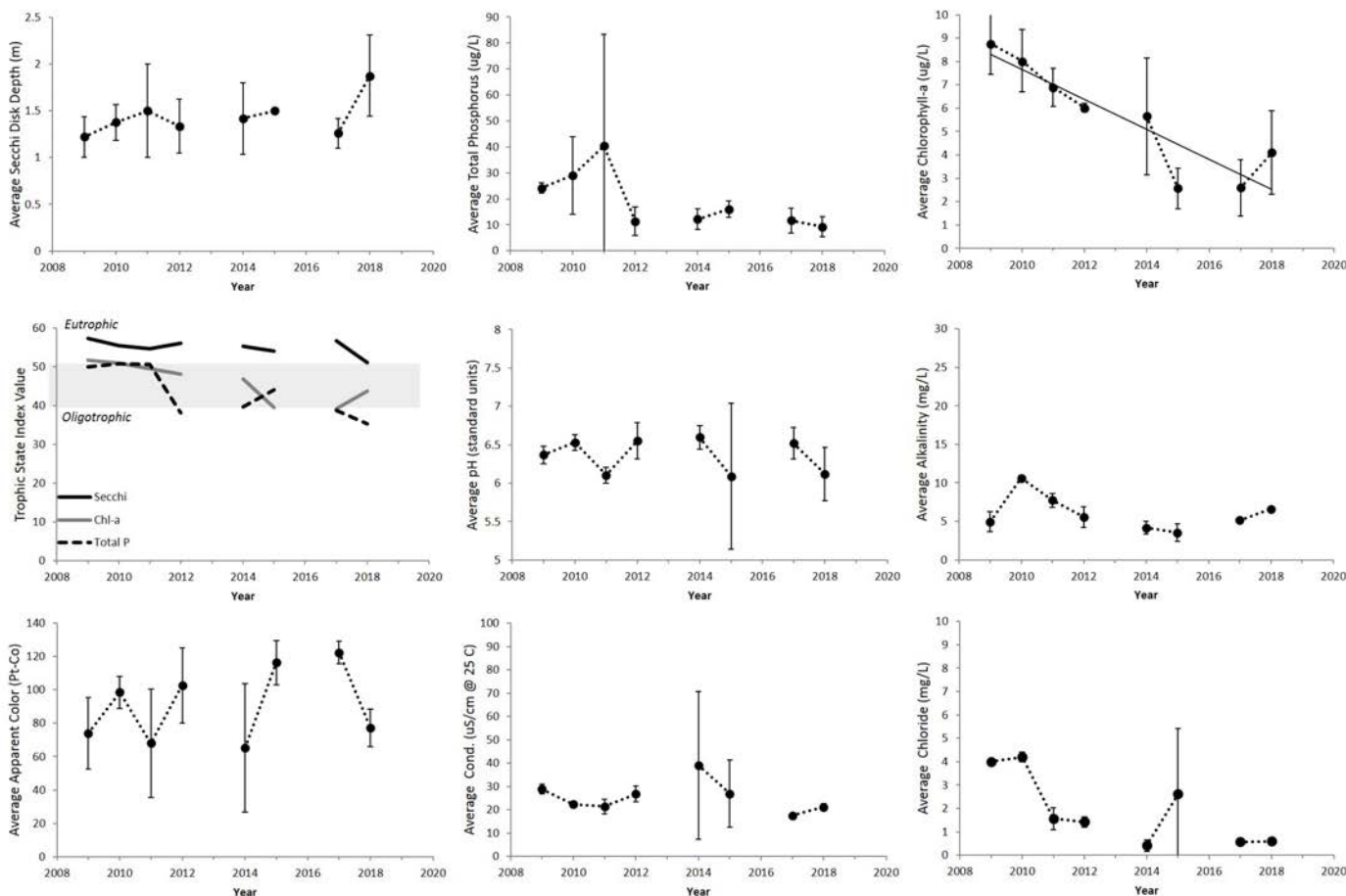
Annual average values of select water quality indicators for Jordan Lake, 2009-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

SUMMARY OF FINDINGS

Jordan Lake is a 72 ha lake located in St. Lawrence County in the Town of Hopkinton. 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 chlorophyll-a; however, the transparency is more typical 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 2018. 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 since 2009.

- Water samples received in 2018 were slightly acidic, with moderate sensitivity to acid deposition.

- Chloride concentration was found to be 0.6 mg/L, which is in the range we would expect for a lake that lacks salted roads in its watershed.

KIWASSA LAKE
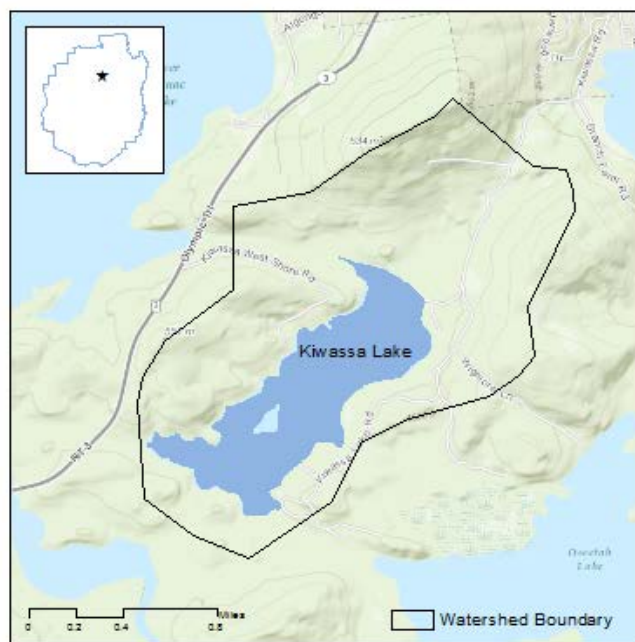
Location	County:	Franklin
	Town:	Harrietstown

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	Circumneutral	Adequate – low sensitivity	Moderate

2018 DATA

Water quality values and historical trends for Kiwassa Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

| Water Quality Indicator	6/15/2018	7/20/2018	8/16/2018	Average	Trend
Transparency (m)	5.1	4.6	5.7	5.1	No Trend
Total Phosphorus (µg/L)	7.6	7.6	7.3	7.5	No Trend
Chlorophyll-*a* (µg/L)	2.8	1.6	1.6	2.0	No Trend
Laboratory pH	6.7	6.7	6.7	6.7	No Trend
Sp. Conductance (µS/cm)	56.6	58.6	41.6	52.3	No Trend
Color (Pt-Co)	21.4	18.2	18.2	19.3	No Trend
Alkalinity (mg/L)			11.0	11.0	Decreasing
Chloride (mg/L)			6.5	6.5	No Trend
Calcium (mg/L)			3.8	3.8	Not Analyzed
Sodium (mg/L)			3.4	3.4	No Trend

HISTORICAL DATA
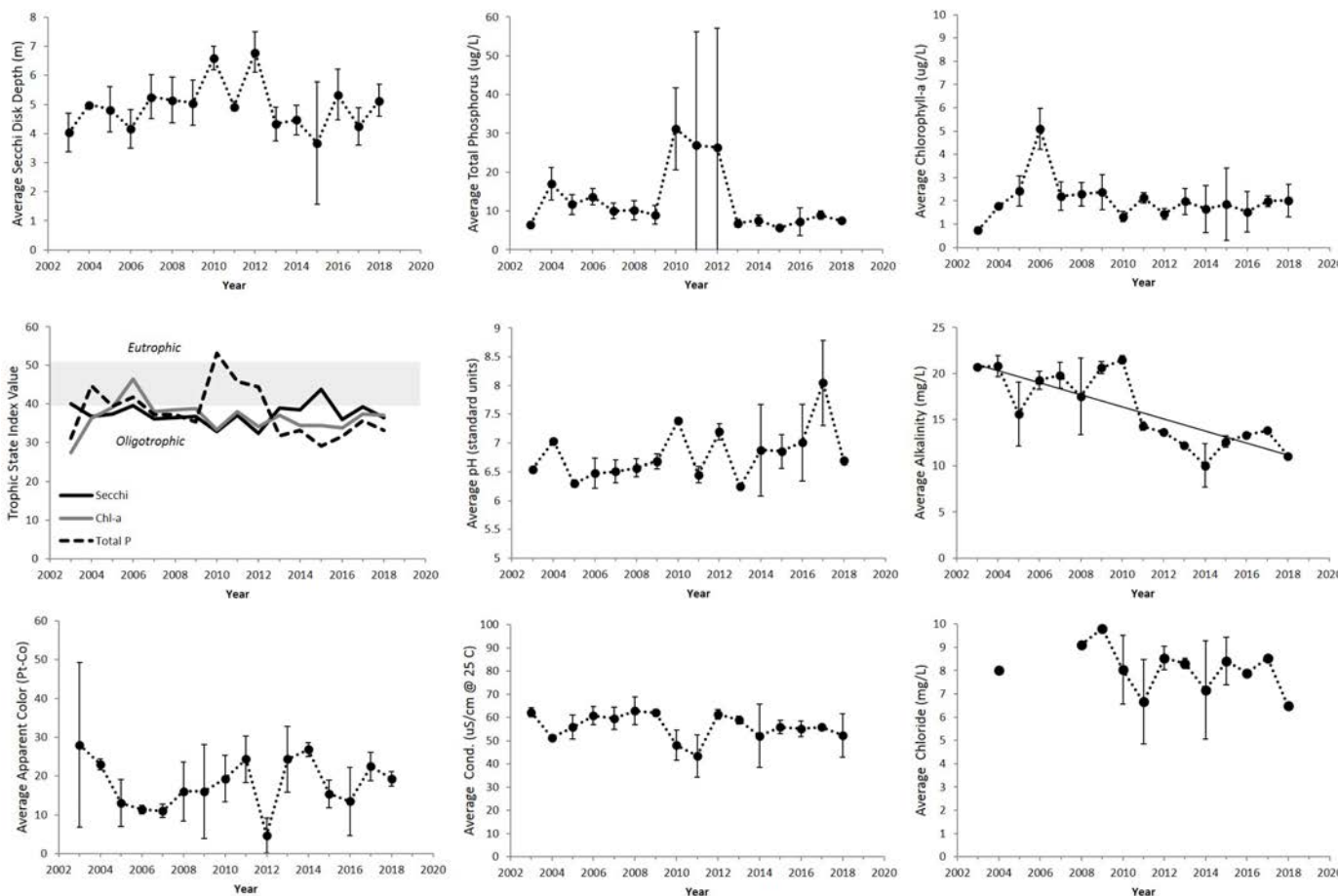
Annual average values of select water quality indicators for Kiwassa Lake, 2003-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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 2018 were found to be circumneutral in terms of their acidity, with an average pH of 6.7 units. The alkalinity was 11.0 mg/L, indicating low sensitivity to acid deposition. We detected a significant downward trend in alkalinity since 2003.

- Sodium and chloride concentration were 3.4 and 6.5 mg/L respectively, indicating moderate influence from road salting.

LAKE ABANAKEE
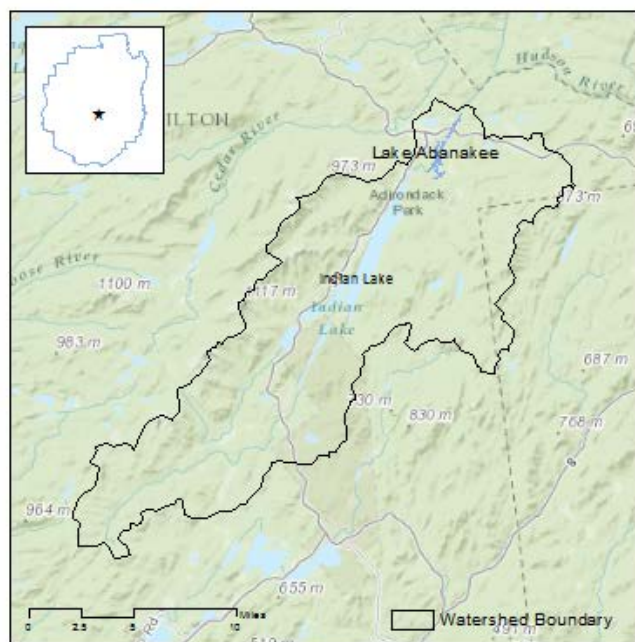
Location	County:	Hamilton
	Town:	Indian Lake

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

2018 DATA

Water quality values and historical trends for Lake Abanakee during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

| Water Quality Indicator	6/24/2018	7/20/2018	8/26/2018	Average	Trend
Transparency (m)	2.5	2.6	1.9	2.3	No Trend
Total Phosphorus (µg/L)	10.4	11.6	5.6	9.2	No Trend
Chlorophyll-*a* (µg/L)	3.9	2.5	3.8	3.4	Decreasing
Laboratory pH	6.0	7.5	6.9	6.8	No Trend
Sp. Conductance (µS/cm)	30.3	28.7	28.8	29.3	Decreasing
Color (Pt-Co)	21.4	27.9	18.2	22.5	No Trend
Alkalinity (mg/L)			7.6	7.6	No Trend
Chloride (mg/L)			3.3	3.3	No Trend
Calcium (mg/L)			2.7	2.7	Not Analyzed
Sodium (mg/L)			2.9	2.9	No Trend

HISTORICAL DATA
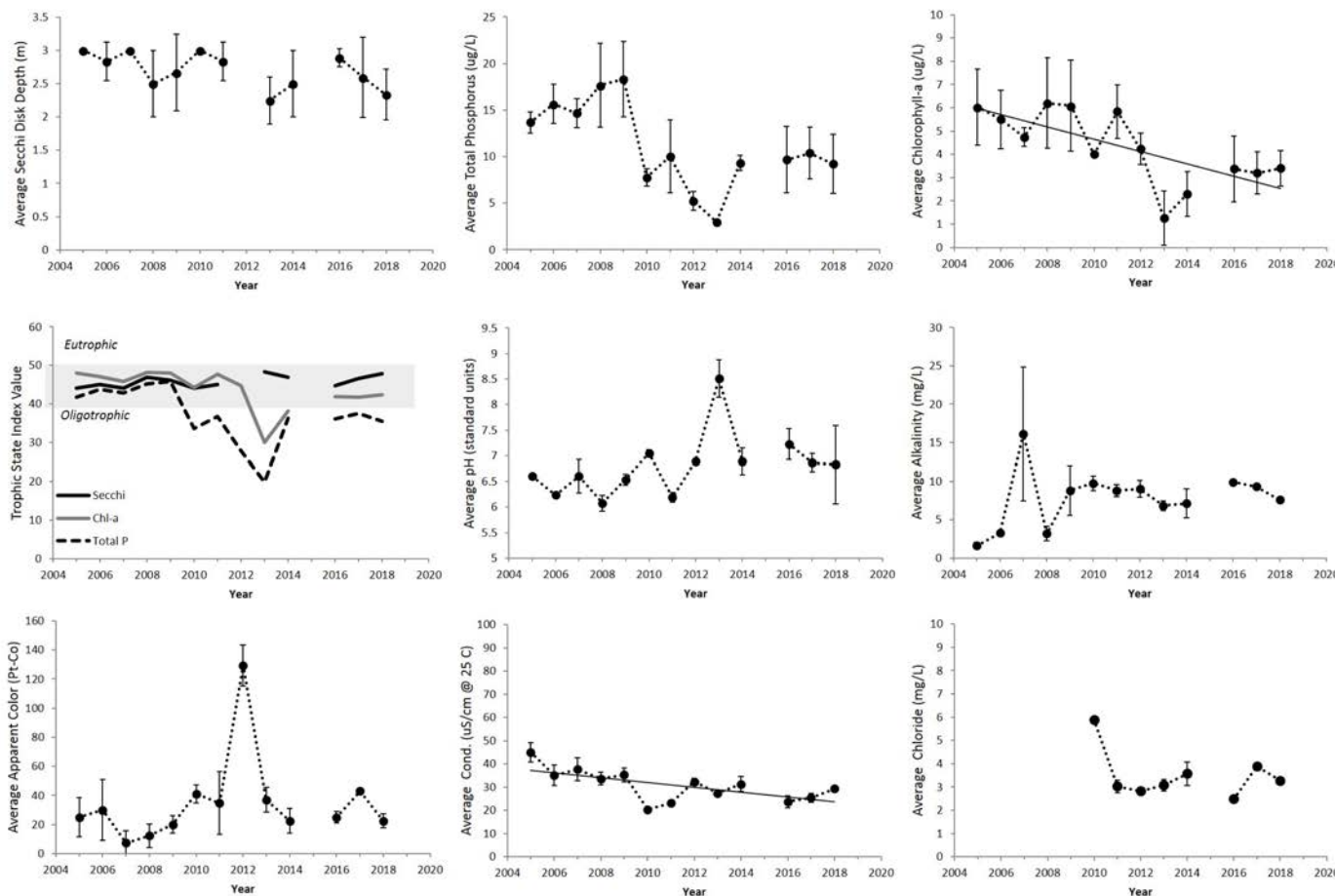
Annual average values of select water quality indicators for Lake Abanakee 2005-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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 since monitoring began in 2003.

- The water samples analyzed in 2018 were found to be circumneutral in terms of their acidity, and ranged from 6.0 to 7.5 pH units. The alkalinity was found to be 7.6 mg/L, indicating moderate sensitivity to acid deposition.

- Sodium and chloride concentration averaged 2.9 and 3.3 mg/L respectively, indicating that road salt influence is present, but relatively low.

LAKE ADIRONDACK
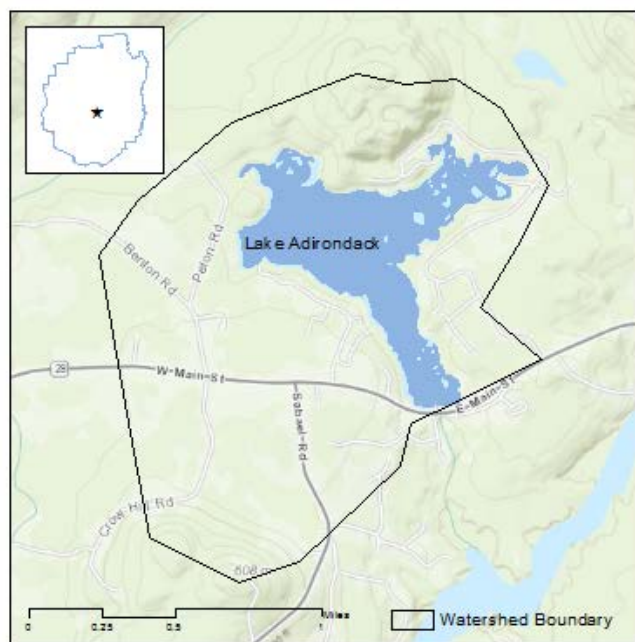
Location	County:	Hamilton
	Town:	Indian Lake

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	High– Not Sensitive	Moderate

2018 DATA

Water quality values and historical trends for Lake Adirondack during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

| Water Quality Indicator	6/17/2018	8/26/2018	9/16/2018	Average	Trend
Transparency (m)	2.05	2.2	2.5	2.2	No Trend
Total Phosphorus (µg/L)	13.4	9.1	8.7	10.4	No Trend
Chlorophyll-a (µg/L)	5.94	6.4	5.5	6.0	No Trend
Laboratory pH	7.93	7.3	8.2	7.8	No Trend
Sp. Conductance (µS/cm)	87.9	96.6	84.5	89.7	No Trend
Color (Pt-Co)	24.64	27.9	24.6	25.7	No Trend
Alkalinity (mg/L)		25.6		25.6	Decreasing
Chloride (mg/L)		12.2		12.2	No Trend
Calcium (mg/L)		9.5		9.5	Not Analyzed
Sodium (mg/L)		8.3		8.3	No Trend

HISTORICAL DATA
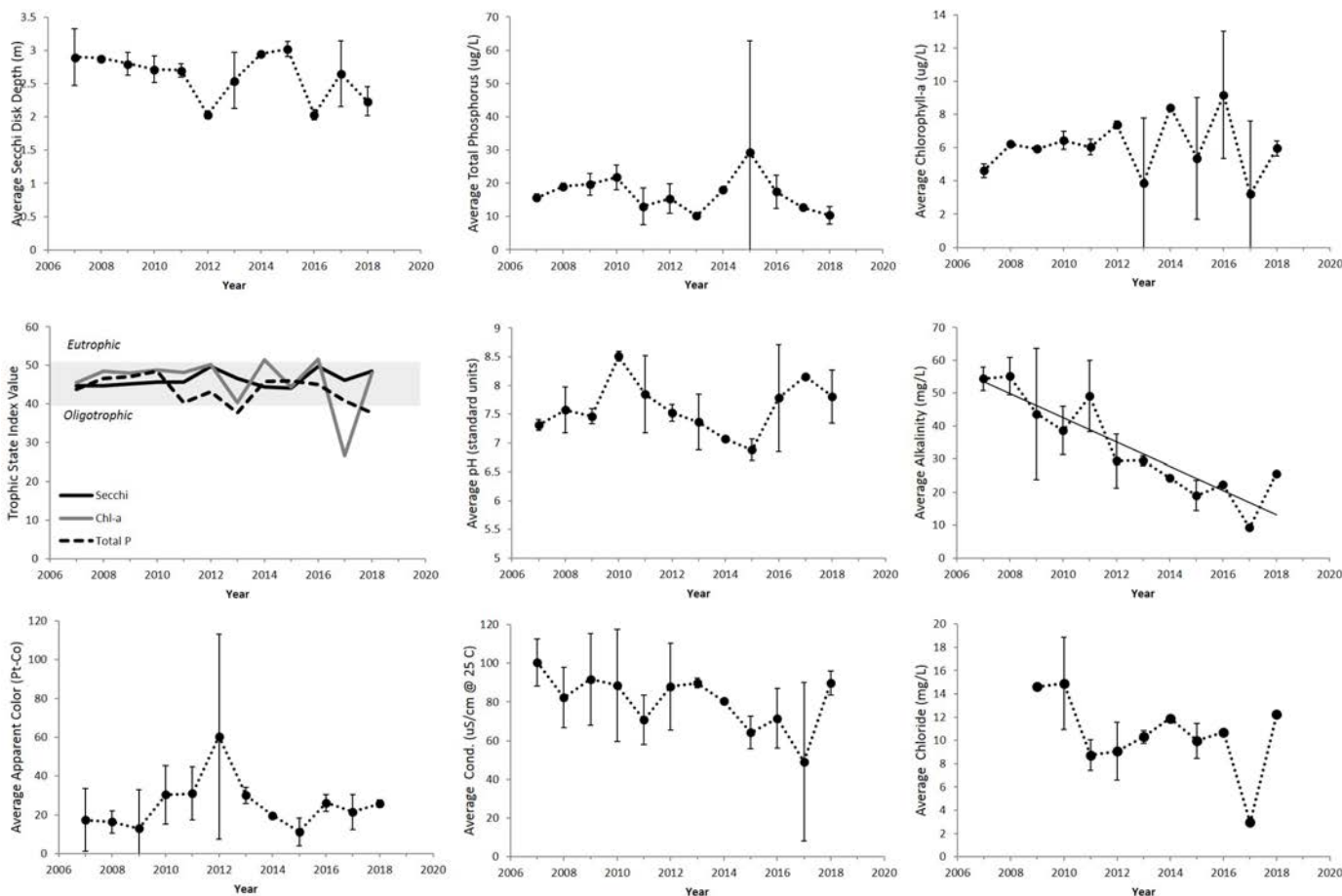
Annual average values of select water quality indicators for Lake Adirondack, 2007-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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.

- 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 2018 were found to be alkaline in terms of their acidity, with an average pH of 7.8 units. The alkalinity was 25.6 mg/L, indicating that the lake is not sensitive to acid deposition.

- Sodium and chloride concentration in 2018 were 8.3 and 12.2 mg/L respectively, indicating that the lake is influenced by the 9km of roads in the watershed.

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

2018 DATA

Water quality values and historical trends for Lake Clear during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

Water Quality Indicator	6/20/2018	7/21/2018	8/20/2018	Average	Trend
Transparency (m)	4.8	5.8	6.0	5.5	No Trend
Total Phosphorus (µg/L)	9.5	4.5	3.6	5.9	Decreasing
Chlorophyll-*a* (µg/L)	2.4	1.6	1.8	1.9	No Trend
Laboratory pH	7.2	6.9	6.5	6.9	No Trend
Sp. Conductance (µS/cm)	100.5	93.1	101.9	98.5	Increasing
Color (Pt-Co)	21.4	24.6	15.0	20.4	No Trend
Alkalinity (mg/L)			16.3	16.3	Increasing
Chloride (mg/L)			21.8	21.8	Increasing
Calcium (mg/L)			5.8	5.8	Not Analyzed
Sodium (mg/L)			12.0	12.0	No Trend

HISTORICAL DATA
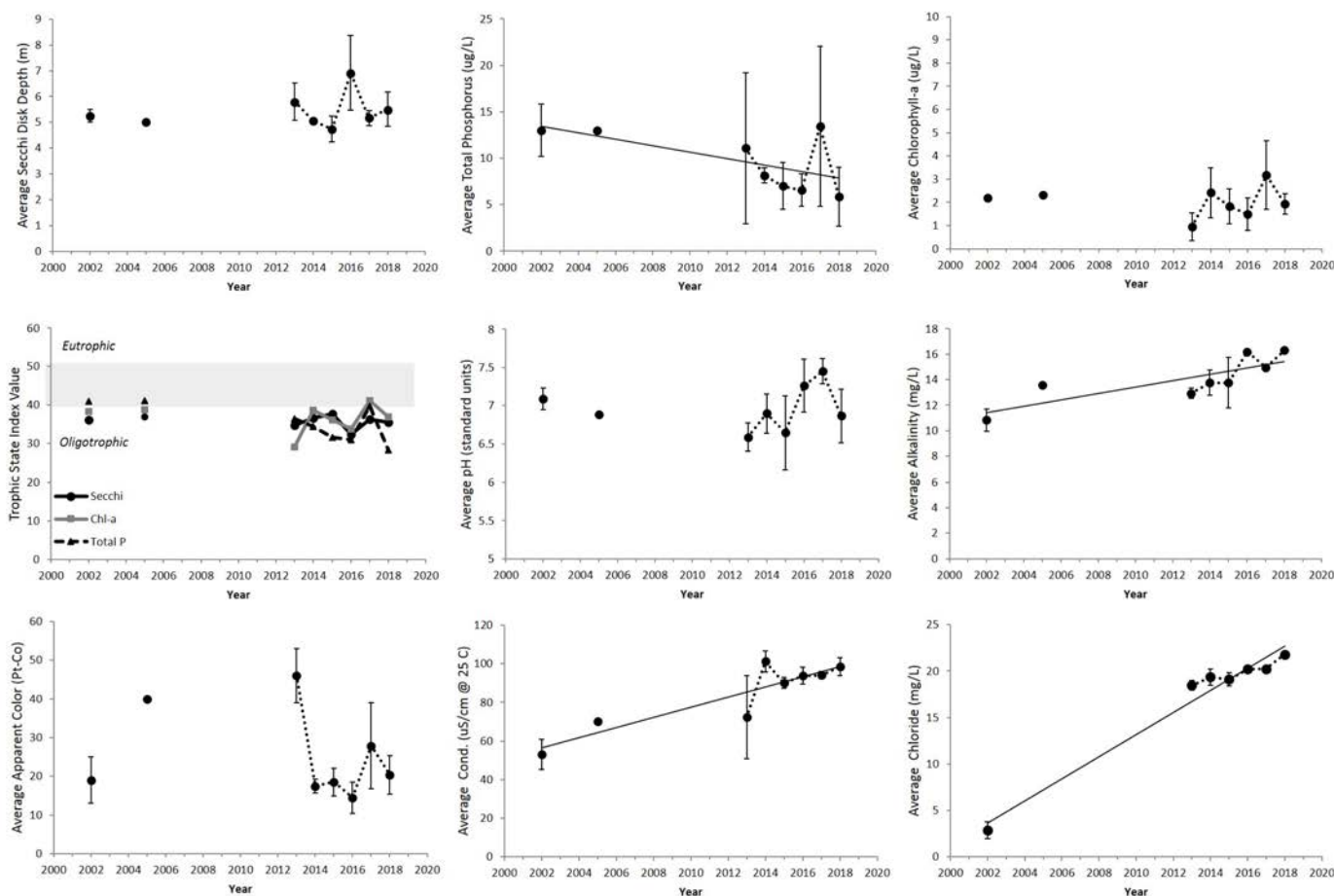
Annual average values of select water quality indicators for Lake Clear, 2002-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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 near the border of mesotrophy. Transparency and chlorophyll-a have not exhibited any significant positive or negative trends since monitoring began; however, total phosphorus has exhibited a statistically significant downward trend since 2002. The average transparency depth in 2018 was 5.5 meters, which is greater than 92% of participating ALAP lakes.

- The water samples analyzed in 2018 were found to be circumneutral in terms of their acidity. The alkalinity was 16.3 mg/L, indicating low sensitivity to acid deposition.

- Sodium and chloride concentration averaged 12.0 and 21.8 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 88% of participating ALAP lakes, and approximately 100 times greater than background concentrations for least impacted lakes in the Adirondack region.

LAKE COLBY
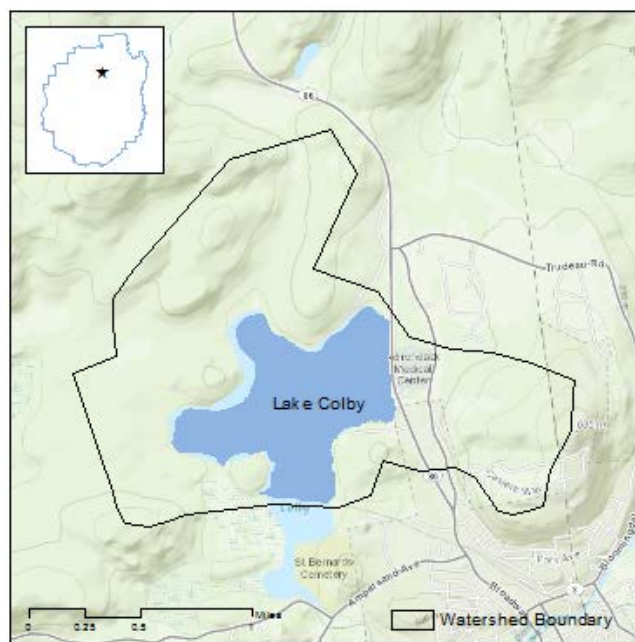
Location	County:	Franklin
	Town:	Harrietstown

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
Oligotrophic	Alkaline	HIgh – Not Sensitive	High

2018 DATA

Water quality values and historical trends for Lake Colby during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

| Water Quality Indicator	6/9/2018	8/9/2018	9/13/2018	Average	Trend
Transparency (m)	4.5	4.0	4.5	4.3	No Trend
Total Phosphorus (µg/L)	4.0	7.3	5.9	5.7	No Trend
Chlorophyll-*a* (µg/L)	1.8	1.0	2.5	1.8	No Trend
Laboratory pH	8.5	8.5	8.0	8.3	No Trend
Sp. Conductance (µS/cm)	240.0	255.0	263.0	252.7	No Trend
Color (Pt-Co)	15.0	11.8	11.8	12.8	No Trend
Alkalinity (mg/L)			34.5	34.5	No Trend
Chloride (mg/L)			54.0	54.0	No Trend
Calcium (mg/L)			15.2	15.2	Not Analyzed
Sodium (mg/L)			31.1	31.1	No Trend

HISTORICAL DATA
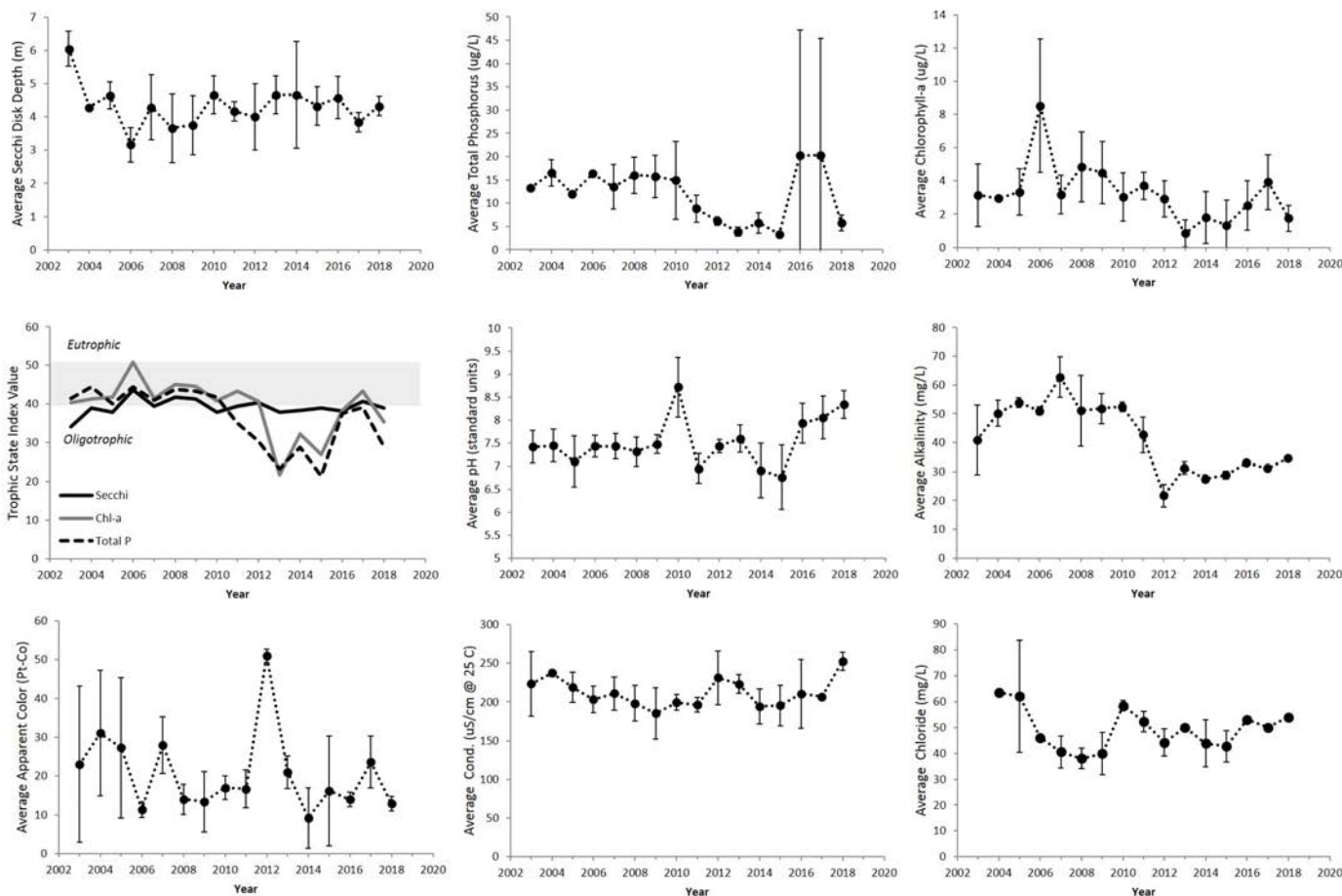
Annual average values of select water quality indicators for Lake Colby, 2003-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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 an oligotrophic lake. The lake typically fluctuates around the oligotrophic – mesotrophic boundary.

• Water samples received in 2018 were alkaline in terms of their acidity. The alkalinity was 34.5 mg/L, indicating the lake is not sensitive to acid deposition. The calcium concentration was 15.2 mg/L, indicating that the chemistry of the lake is suitable for the establishment of a viable zebra mussel population.

• Sodium and chloride concentrations were 31.1 and 54.0 mg/L respectively, indicating that the chemistry of the lake is heavily influenced by the 2.6 km of roads in the watershed. The chloride concentration of Lake Colby was greater than 98% participating ALAP lakes in the 2018, and approximately 270 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
Eutrophic	Circumneutral	Adequate – low sensitivity	Low

2018 DATA

Water quality values and historical trends for Lake of the Pines during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit. VOB=Secchi disk is visible on the bottom of the lake.

Water Quality Indicator	6/17/2018	7/21/2018	8/26/2018	Average	Trend
Transparency (m)	VOB	VOB	3.0	3.0	No Trend
Total Phosphorus (µg/L)	8.8	17.5	11.8	12.7	Decreasing
Chlorophyll-*a* (µg/L)	23.9	2.7	7.4	11.3	No Trend
Laboratory pH	6.4	6.8	6.9	6.7	No Trend
Sp. Conductance (µS/cm)	29.3	27.6	26.4	27.8	No Trend
Color (Pt-Co)	34.9	63.2	63.2	53.8	No Trend
Alkalinity (mg/L)			11.1	11.1	Decreasing
Chloride (mg/L)			0.8	0.8	Decreasing
Calcium (mg/L)			3.4	3.4	Not Analyzed
Sodium (mg/L)			1.6	1.6	No Trend

HISTORICAL DATA
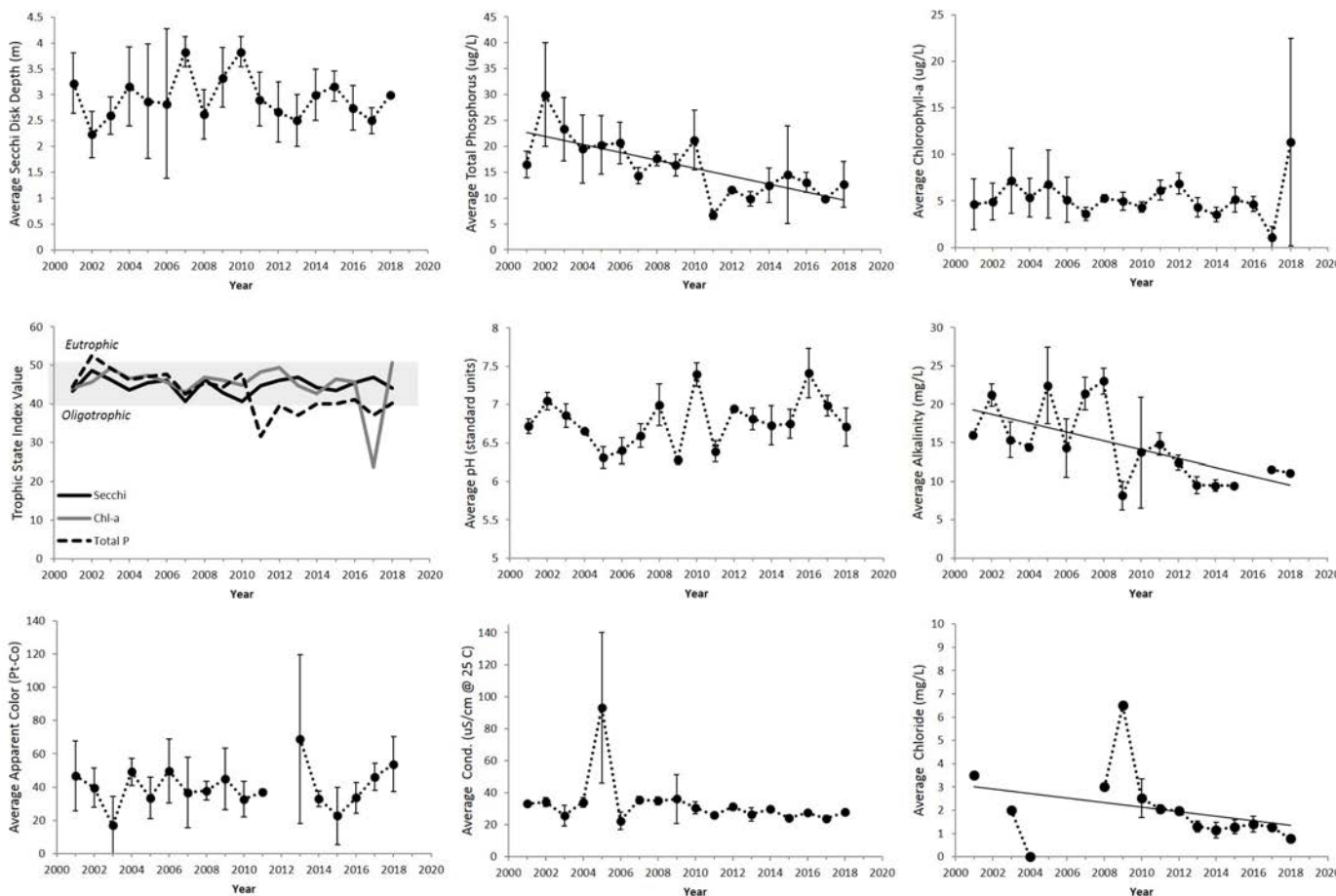
Annual average values of select water quality indicators for Lake of the Pines, 2001-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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 was best classified as eutrophic in 2018. The trophic indicators of the lake have been variable over time, with total phosphorus exhibiting a significant downward trend since 2001.

- Water samples from 2018 were found to be circumneutral in terms of their acidity. The alkalinity of the lake was 11.1 mg/L, indicating that the lake has moderate sensitivity to acid deposition. Alkalinity exhibited a statistically significant downward trend since 2001.

- Sodium and chloride concentrations averaged 1.6 and 0.8 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
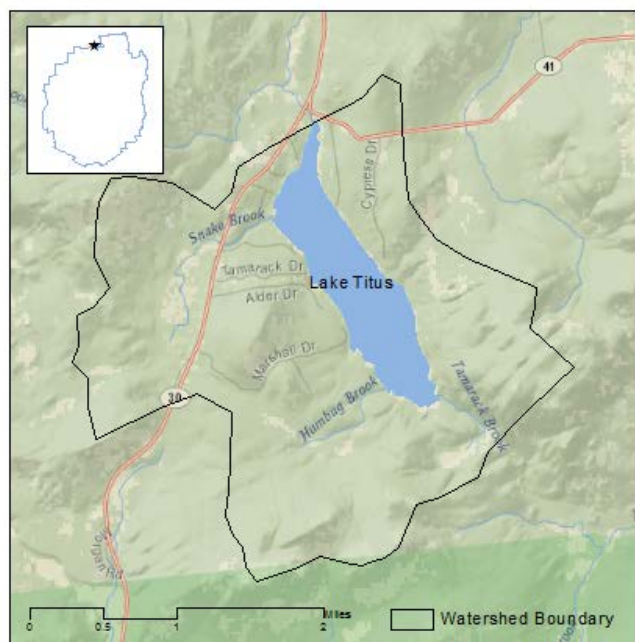
Location	County:	Franklin
	Town:	Malone

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):	13
	State Roads (km):	15

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

2018 DATA

Water quality values and historical trends for Lake Titus during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

| Water Quality Indicator	7/7/2018	8/6/2018	9/2/2018	Average	Trend
Transparency (m)	3.5	3.8	3.3	3.5	No Trend
Total Phosphorus (µg/L)	7.1	6.1	7.1	6.7	Decreasing
Chlorophyll-*a* (µg/L)	2.4	1.8	3.8	2.6	No Trend
Laboratory pH	6.5	6.7	6.7	6.6	No Trend
Sp. Conductance (µS/cm)	78.0	82.8	86.0	82.3	No Trend
Color (Pt-Co)	27.9	24.6	21.4	24.6	No Trend
Alkalinity (mg/L)		17.6		17.6	No Trend
Chloride (mg/L)		15.3		15.3	No Trend
Calcium (mg/L)		5.8		5.8	Not Analyzed
Sodium (mg/L)		9.1		9.1	No Trend

HISTORICAL DATA
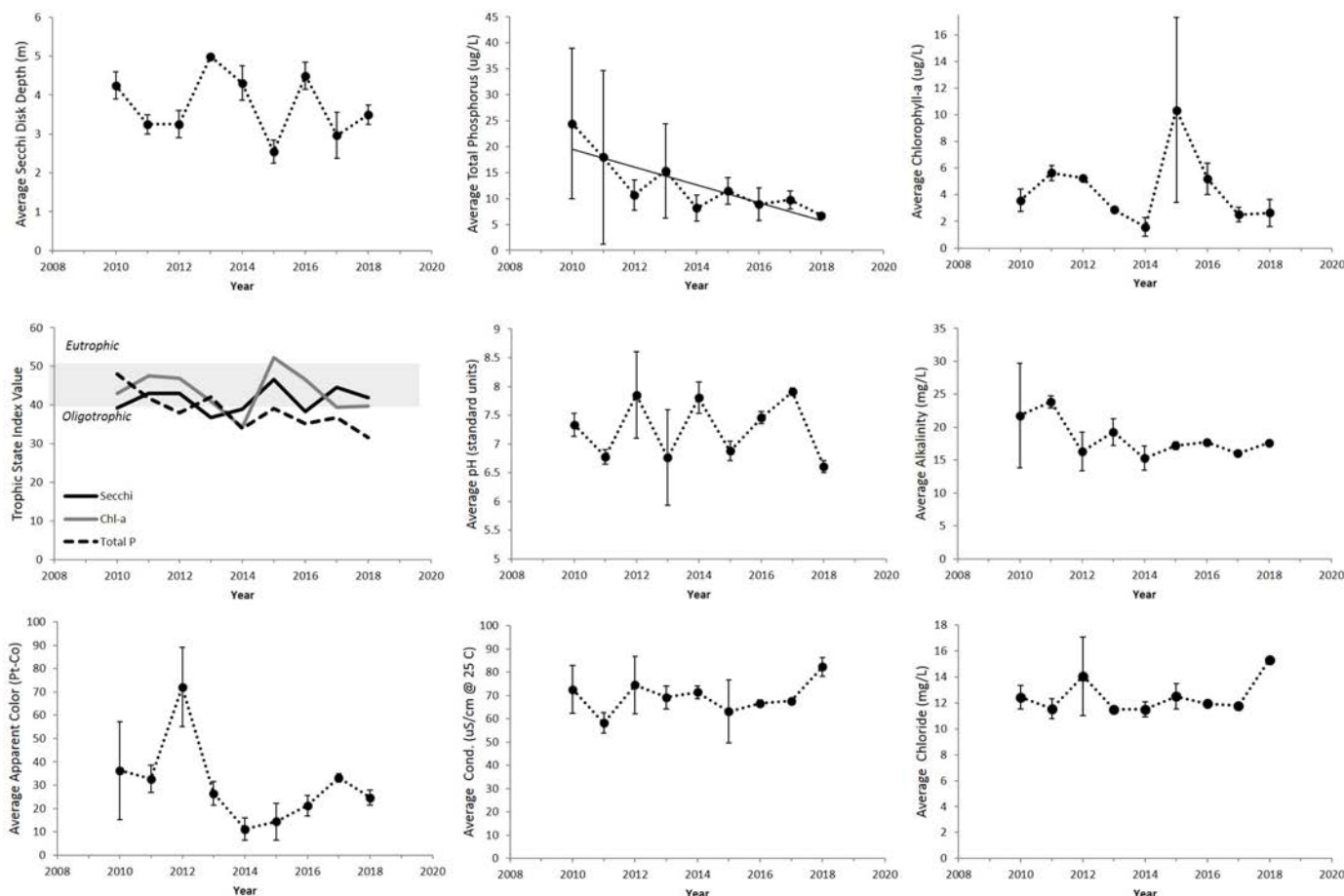
Annual average values of select water quality indicators for Lake Titus, 2010-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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 oligotrophic-mesotrophic range since monitoring began. Total phosphorus has exhibited a significant negative trend since 2010.

- The water samples analyzed in 2018 were found to be circumneutral in terms of their acidity. The alkalinity averaged 17.6 mg/L, indicating low sensitivity to acid deposition.

- Sodium and chloride concentration averaged 9.1 and 15.3 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 81% of lakes participating in ALAP in 2018 and approximately 76 times greater than background concentrations for unimpacted lakes in the Adirondack region.

LENS LAKE
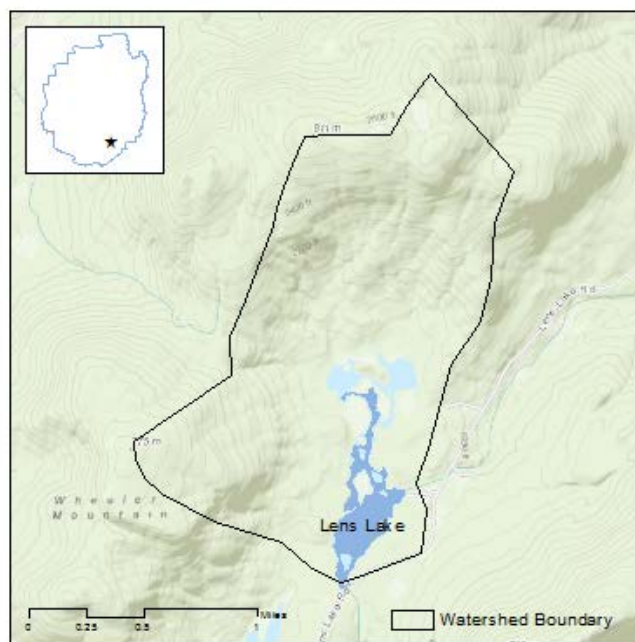
Location	County:	Warren
	Town:	Stony Creek

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

2018 DATA

Water quality values and historical trends for Lens Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

| Water Quality Indicator	5/25/2018	6/22/2018	9/19/2018	Average	Trend
Transparency (m)	2.0	1.5	1.8	1.8	No Trend
Total Phosphorus (µg/L)	14.5	19.5	13.2	15.7	No Trend
Chlorophyll-*a* (µg/L)	2.8	3.2	4.7	3.5	No Trend
Laboratory pH	5.6	5.5	6.9	6.0	No Trend
Sp. Conductance (µS/cm)	9.8	10.7	12.0	10.8	Decreasing
Color (Pt-Co)	47.2	56.8	37.5	47.2	No Trend
Alkalinity (mg/L)			4.0	4.0	No Trend
Chloride (mg/L)			1.0	1.0	No Trend
Calcium (mg/L)			1.4	1.4	Not Analyzed
Sodium (mg/L)			0.7	0.7	No Trend

HISTORICAL DATA
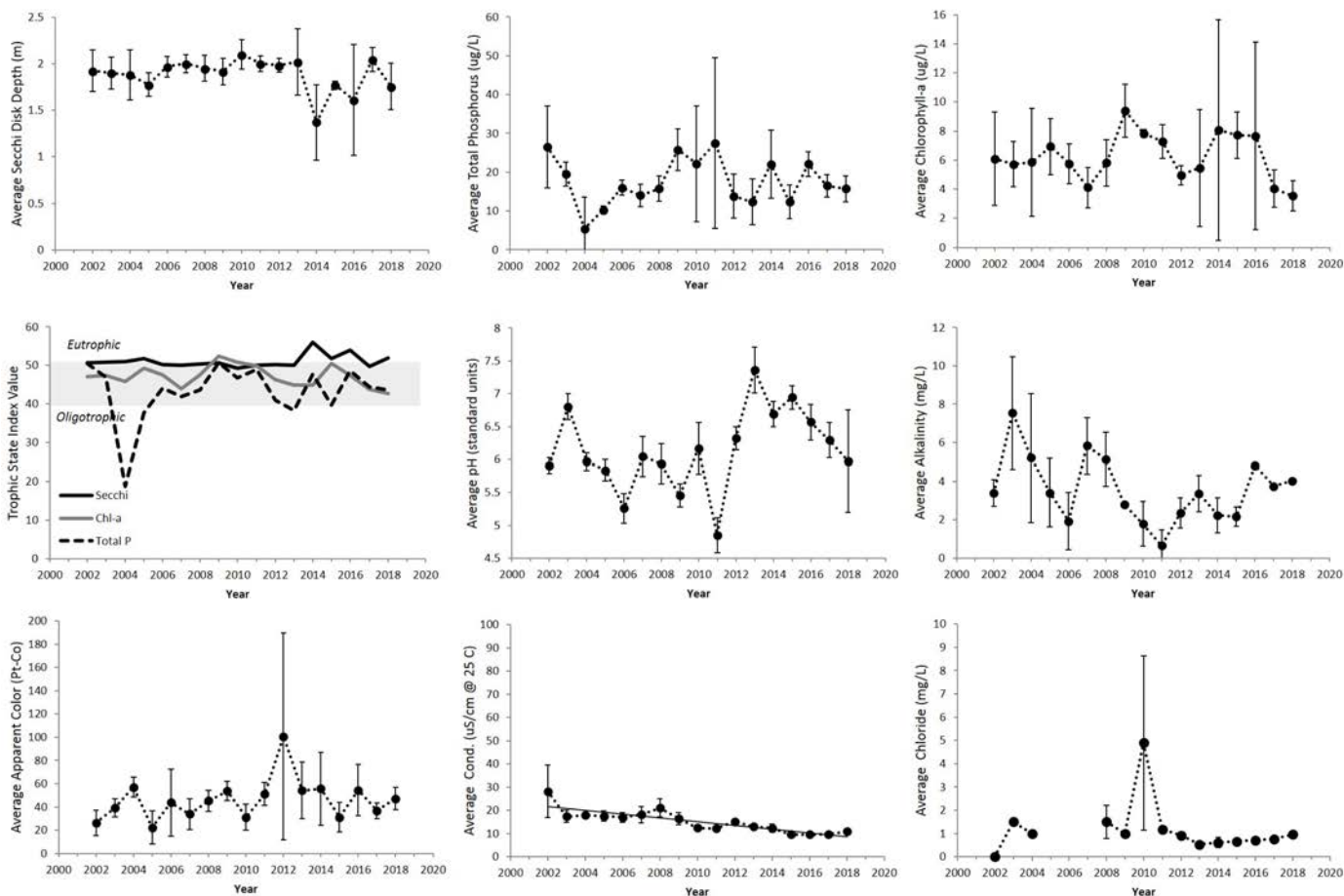
Annual average values of select water quality indicators for Lens Lake, 2002-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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 trends since monitoring began in 2002.

- The water samples analyzed in 2018 were found to be slightly acidic, with an average of 6.0 pH units. The alkalinity was 4.0 mg/L, indicating that the lake has moderate sensitivity to acid deposition.

- Sodium and chloride concentration were 0.7and 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
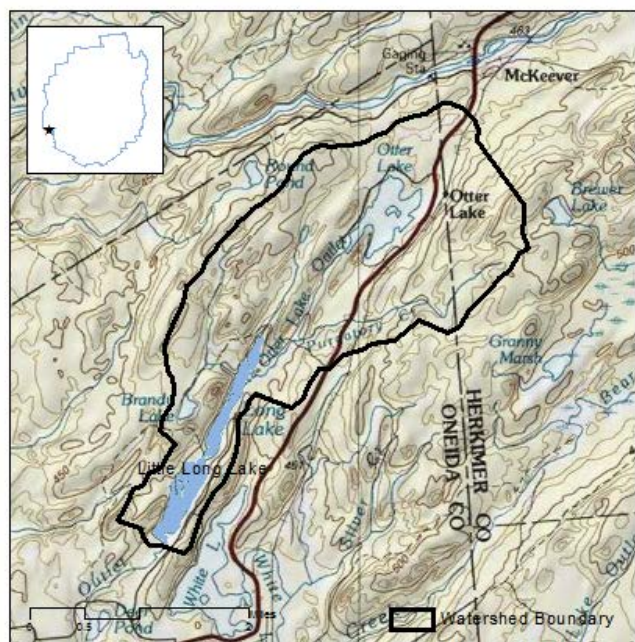
Location	County:	Oneida
	Town:	Forestport

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
Oligotrophic	Circumneutral	Moderate	Moderate

2018 DATA

Water quality values and historical trends for Little Long Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

| Water Quality Indicator	6/17/2018	7/16/2018	8/23/2018	Average	Trend
Transparency (m)	2.8	3.5	2.6	3.0	Decreasing
Total Phosphorus (µg/L)	9.3	9.2	8.3	8.9	Decreasing
Chlorophyll-*a* (µg/L)	2.8	1.2	2.8	2.2	No Trend
Laboratory pH	7.5	6.1	6.2	6.6	No Trend
Sp. Conductance (µS/cm)	51.6	56.0	61.8	56.5	No Trend
Color (Pt-Co)	40.7	34.3	43.9	39.7	No Trend
Alkalinity (mg/L)			8.6	8.6	No Trend
Chloride (mg/L)			11.6	11.6	No Trend
Calcium (mg/L)			4.3	4.3	Not Analyzed
Sodium (mg/L)			8.0	8.0	No Trend

HISTORICAL DATA
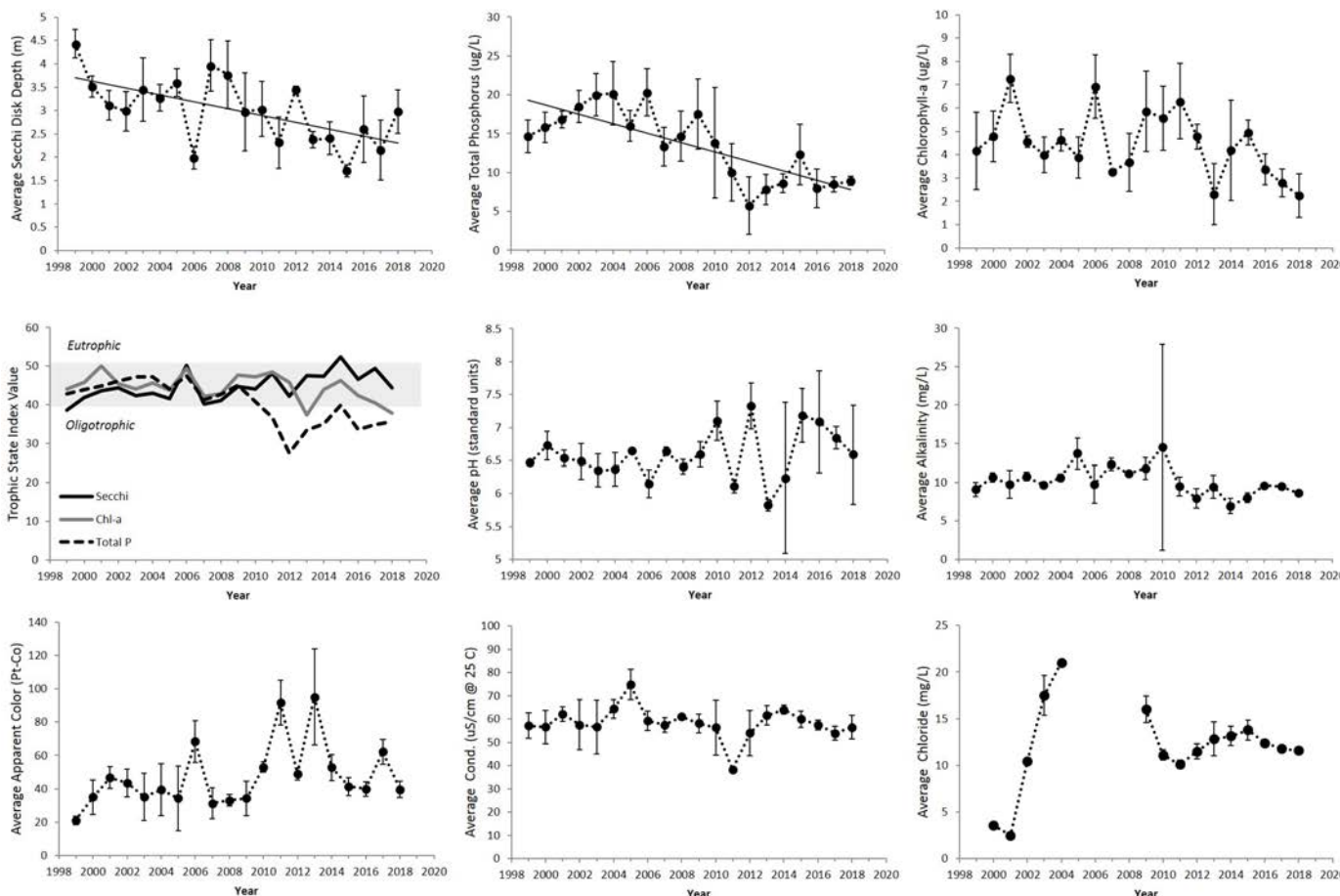
Annual average values of select water quality indicators for Little Long Lake, 1999-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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.

- Based on the 2018 data, Little Long Lake is best classified as an oligotrophic lake. Transparency depth and total phosphorus concentration have both exhibited significant downward trends since 1999.

- The water samples analyzed in 2018 were found to be circumneutral in terms of their acidity with an average of 6.6 pH units. The alkalinity was 8.6 mg/L, indicating that the lake is moderately sensitive to acid deposition.

- Sodium and chloride concentration were 8.0 and 11.6 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

2018 DATA

Water quality values for Long Lake during the 2018 sampling season. Trend analysis will be performed after five years of consecutive data collection. BDL=below detection limit.

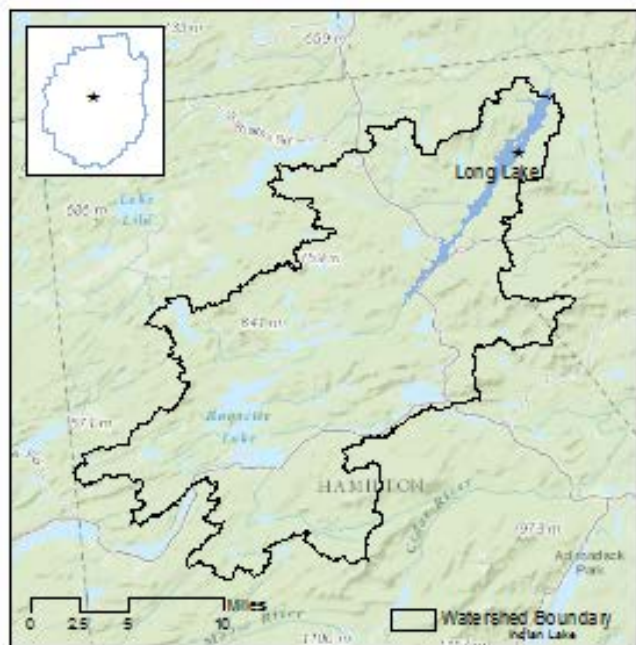| Water Quality Indicator	6/23/2018	7/19/2018	8/20/2018	Average	Trend
Transparency (m)	3.2	4.5	3.5	3.7	Not Analyzed
Total Phosphorus (µg/L)	5.5	4.8	4.5	5.0	Not Analyzed
Chlorophyll-*a* (µg/L)	4.7	3.4	3.2	3.8	Not Analyzed
Laboratory pH	7.4	6.5	7.6	7.2	Not Analyzed
Sp. Conductance (µS/cm)	27.9	29.2	30.4	29.2	Not Analyzed
Color (Pt-Co)	31.1	31.1	27.9	30.0	Not Analyzed
Alkalinity (mg/L)			6.4	6.4	Not Analyzed
Chloride (mg/L)			3.8	3.8	Not Analyzed
Calcium (mg/L)			2.4	2.4	Not Analyzed
Sodium (mg/L)			3.1	3.1	Not Analyzed

HISTORICAL DATA
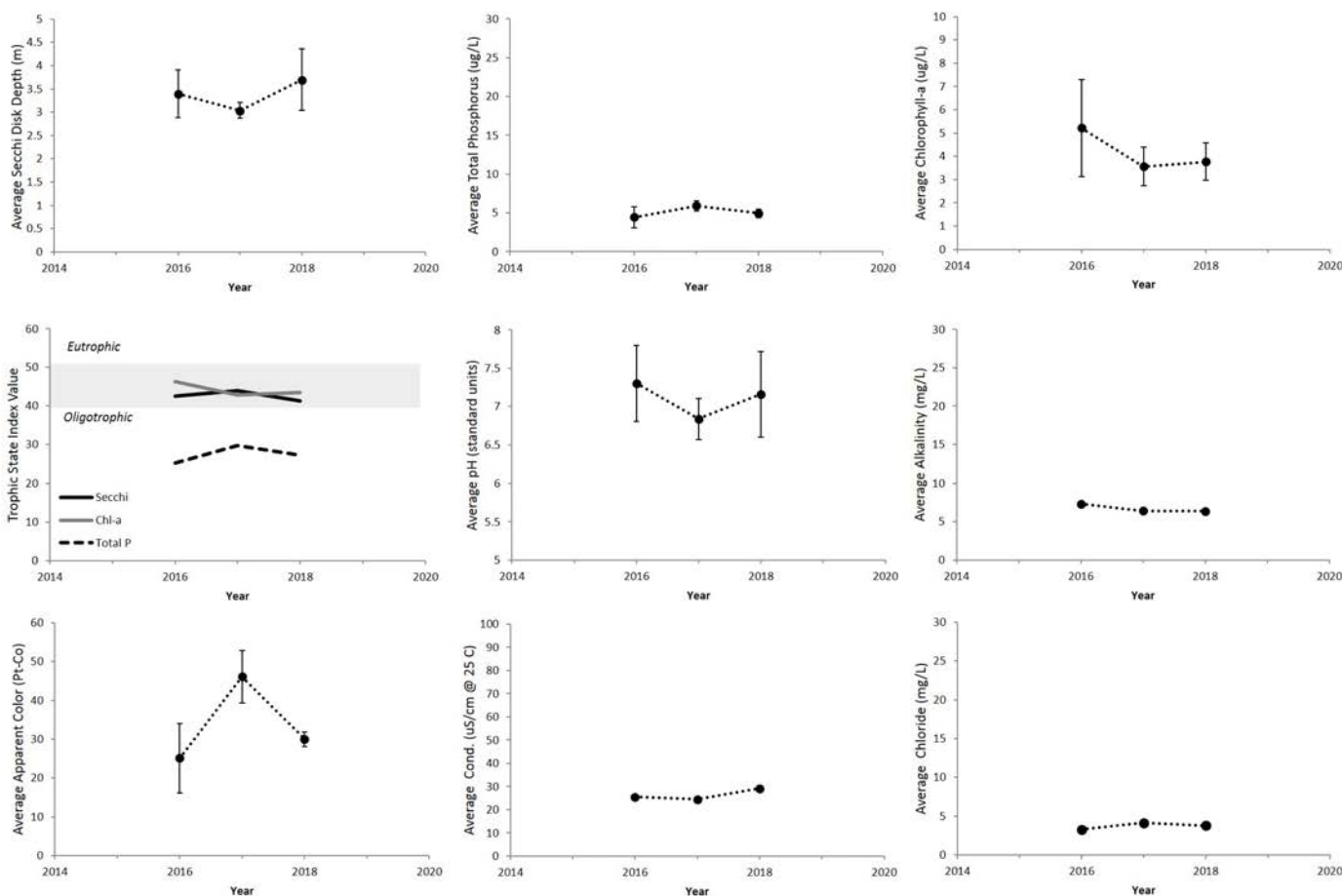
Annual average values of select water quality indicators for Long Lake, 2016-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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 third 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 a mesotrophic lake based on transparency depth and chlorophyll-a concentration, and as an oligotrophic lake based on total phosphorus concentration. A disparity such as this is typical for lakes experiencing phosphorus limitation.

- Water samples submitted in 2018 were circumneutral in terms of their acidity, with an average of 7.2 pH units. The alkalinity was 6.4 mg/L, indicating moderate sensitivity to acid deposition.

- Sodium and chloride concentration were 3.1 and 3.8 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
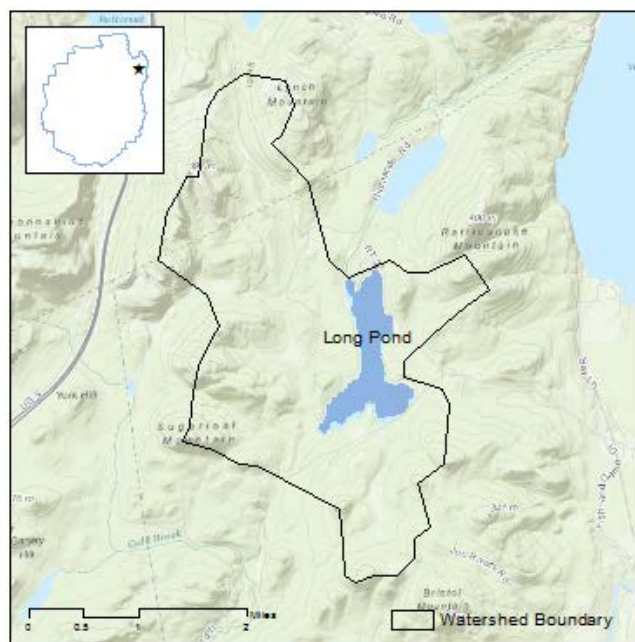
Location	County:	Essex
	Town:	Willsboro

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

2018 DATA

Water quality values and historical trends for Long Pond during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

Water Quality Indicator	6/24/2018	7/22/2018	8/27/2018	Average	Trend
Transparency (m)	2.6	3.4	3.5	3.1	No Trend
Total Phosphorus (µg/L)	18.5	9.0	9.8	12.5	Decreasing
Chlorophyll-a (µg/L)	5.9	2.4	3.1	3.8	No Trend
Laboratory pH	8.3	7.9	7.4	7.9	No Trend
Sp. Conductance (µS/cm)	140.4	139.0	133.4	137.6	No Trend
Color (Pt-Co)	34.3	31.1	15.0	26.8	No Trend
Alkalinity (mg/L)			51.3	51.3	Decreasing
Chloride (mg/L)			11.4	11.4	No Trend
Calcium (mg/L)			13.1	13.1	Not Analyzed
Sodium (mg/L)			8.7	8.7	No Trend

HISTORICAL DATA
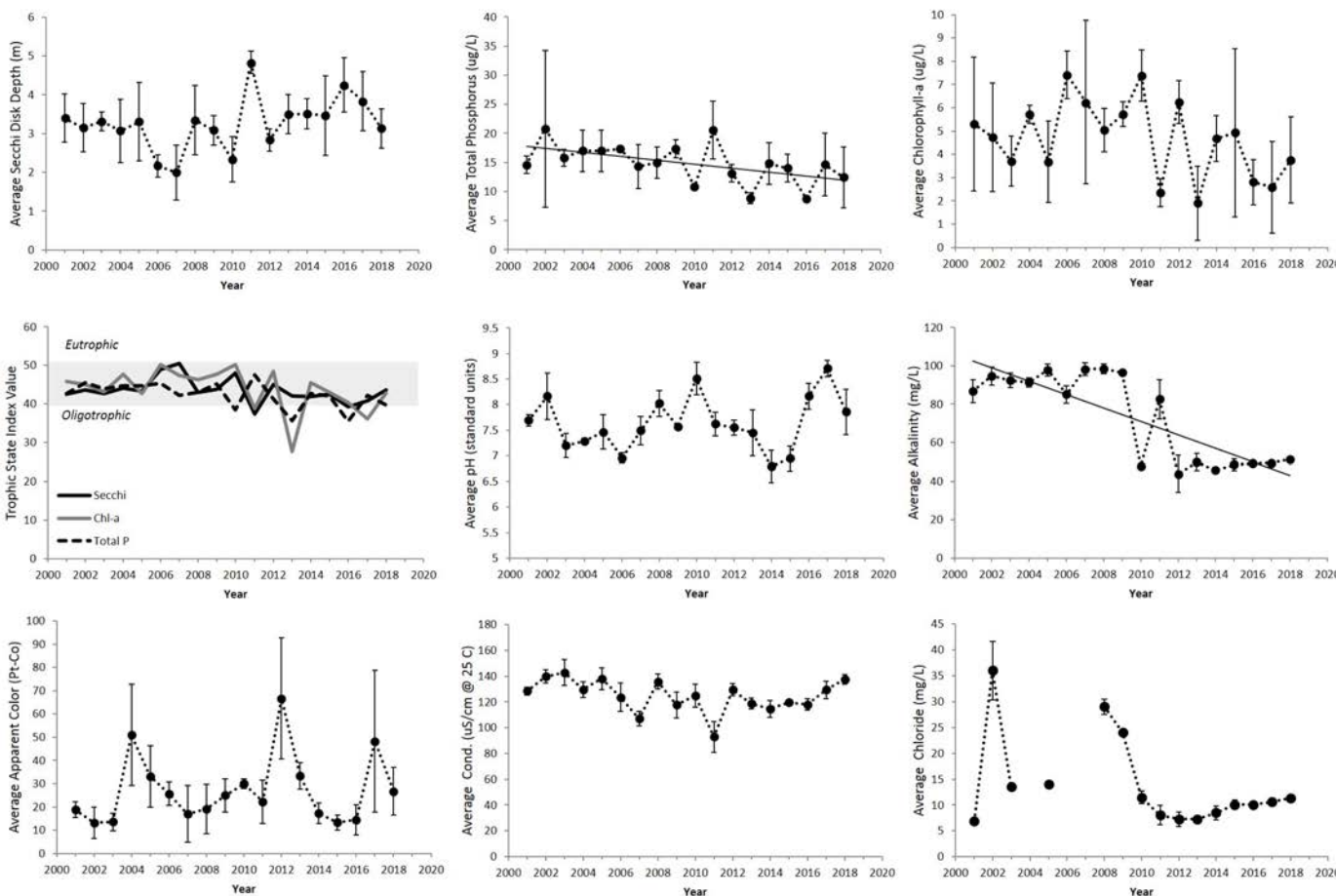
*Annual average values of select water quality indicators for Long Pond, 2001-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

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. Total phosphorus has exhibited a slight, yet statistically significant, downward trend since monitoring began in 2001.

- The water samples analyzed in 2018 were found to be alkaline in terms of their acidity, with an average pH of 7.9 units. The alkalinity averaged 51.3 mg/L, which is greater than any of the other participating ALAP lakes. We detected a significant downward trend in alkalinity since 2001.

- Sodium and chloride concentration were 6.2 and 10.6 mg/L respectivel. These elevated values indicate that salted roads in the watershed influence the chemistry of the lake.

- Calcium concentration averaged 13.1 mg/L in 2018, near the range needed to support a viable zebra mussel population.

LOON LAKE- FRANKLIN CNTY
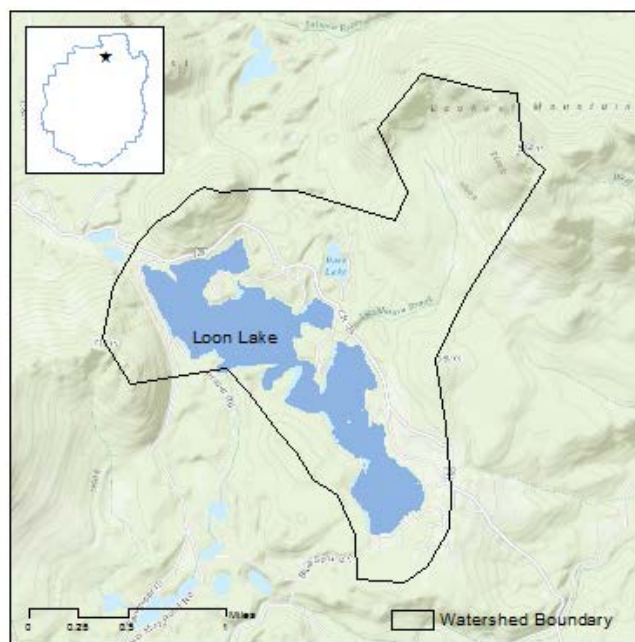
Location	County:	Franklin
	Town:	Franklin

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	CIrcumneutral	Adequate - Low Sensitivity	Present - Low

2018 DATA

Water quality values and historical trends for Loon Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

Water Quality Indicator	6/16/2018	7/25/2018	8/19/2018	Average	Trend
North Basin					
Transparency (m)	6.2	5.6	6.2	6.0	No Trend
Total Phosphorus (µg/L)	6.23	6.6	6.1	6.3	Decreasing
Chlorophyll-*a* (µg/L)	1.36	2.2	1.7	1.7	Decreasing
Laboratory pH	6.26	6.4	8.0	6.9	Increasing
Sp. Conductance (µS/cm)	32.8	33.8	37.2	34.6	Decreasing
Color (Pt-Co)	14.99	11.8	27.9	18.2	No Trend
Alkalinity (mg/L)			14.6	14.6	No Trend
Chloride (mg/L)			2.1	2.1	No Trend
Calcium (mg/L)			4.2	4.2	Not Analyzed
Sodium (mg/L)			2.3	2.3	No Trend

Water Quality Indicator	6/16/2018	7/25/2018	8/19/2018	Average
South Basin				
Transparency (m)	5	4.95	5.8	5.2
Total Phosphorus (µg/L)	6.43	11.3	4.4	7.4
Chlorophyll-*a* (µg/L)	1.71	2.77	1.9	2.1
Laboratory pH	6.79	6.54	7.6	7.0
Sp. Conductance (µS/cm)	30.9	32.8	38.7	34.1
Color (Pt-Co)	18.2	11.77	15.0	15.0
Alkalinity (mg/L)			14.6	14.6
Chloride (mg/L)			2.3	2.3
Calcium (mg/L)			4.0	4.0
Sodium (mg/L)			2.1	2.1

HISTORICAL DATA
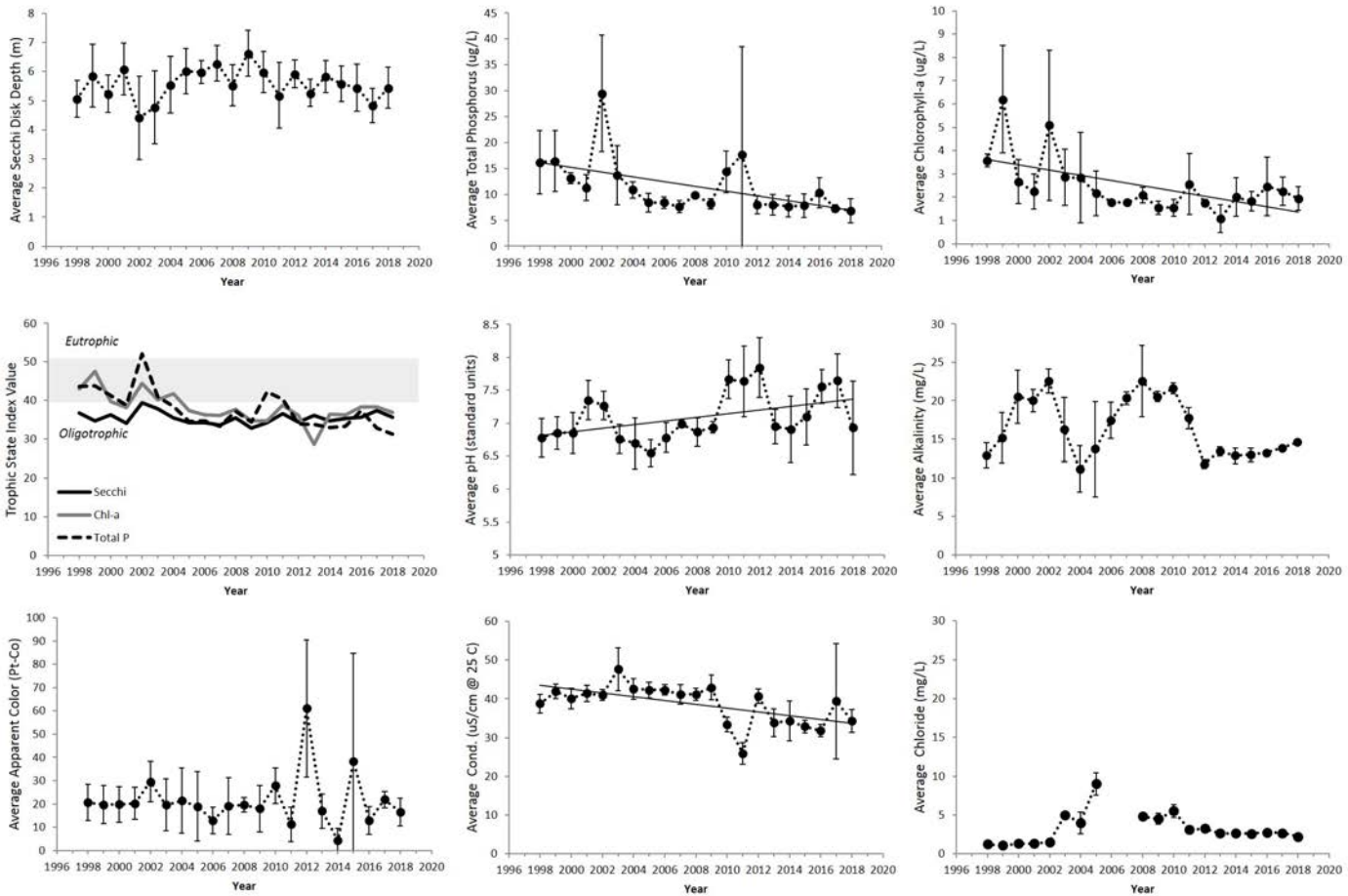
Annual average values of select water quality indicators for Loon Lake, 1998-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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 since 1998.

- Water samples from 2018 were found to be circumneutral in terms of their acidity, with a lake wide average pH of 7.0 units. We detected a significant upward trend in pH since 1998. The alkalinity of the Lake averaged 14.6 mg/L, indicating that the lake has low sensitivity to acid deposition.

- Sodium and chloride concentrations averaged 2.2 mg/L for both ions. 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.

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LOON LAKE- WARREN CNTY.
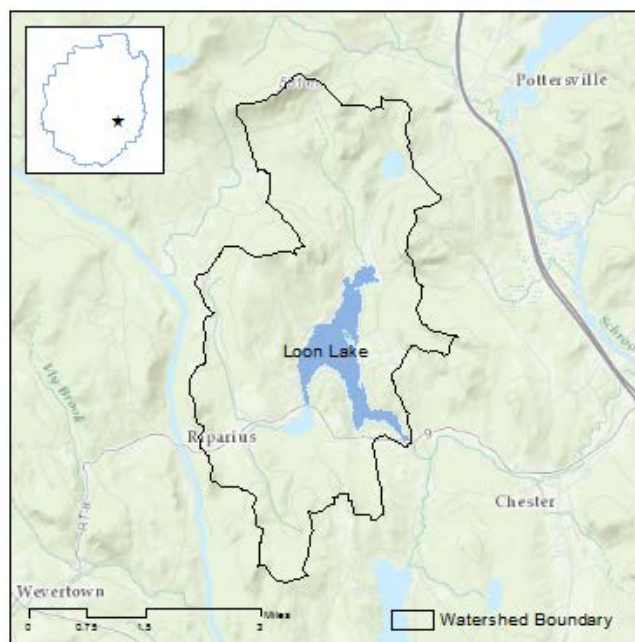
Location	County:	Warren
	Town:	Chester

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	High

2018 DATA

Water quality values and historical trends for Loon Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

Water Quality Indicator	6/21/2018	7/19/2018	8/21/2018	Average	Trend
Transparency (m)	4.1	4.7	4.9	4.5	No Trend
Total Phosphorus (µg/L)	10.7	9.0	6.7	8.8	No Trend
Chlorophyll-*a* (µg/L)	3.1	2.5	2.6	2.7	No Trend
Laboratory pH	8.6	8.4	7.4	8.1	No Trend
Sp. Conductance (µS/cm)	111.3	114.6	115.4	113.8	No Trend
Color (Pt-Co)	21.4	21.4	24.6	22.5	No Trend
Alkalinity (mg/L)			20.7	20.7	No Trend
Chloride (mg/L)			21.5	21.5	No Trend
Calcium (mg/L)			8.2	8.2	Not Analyzed
Sodium (mg/L)			14.1	14.1	No Trend

HISTORICAL DATA
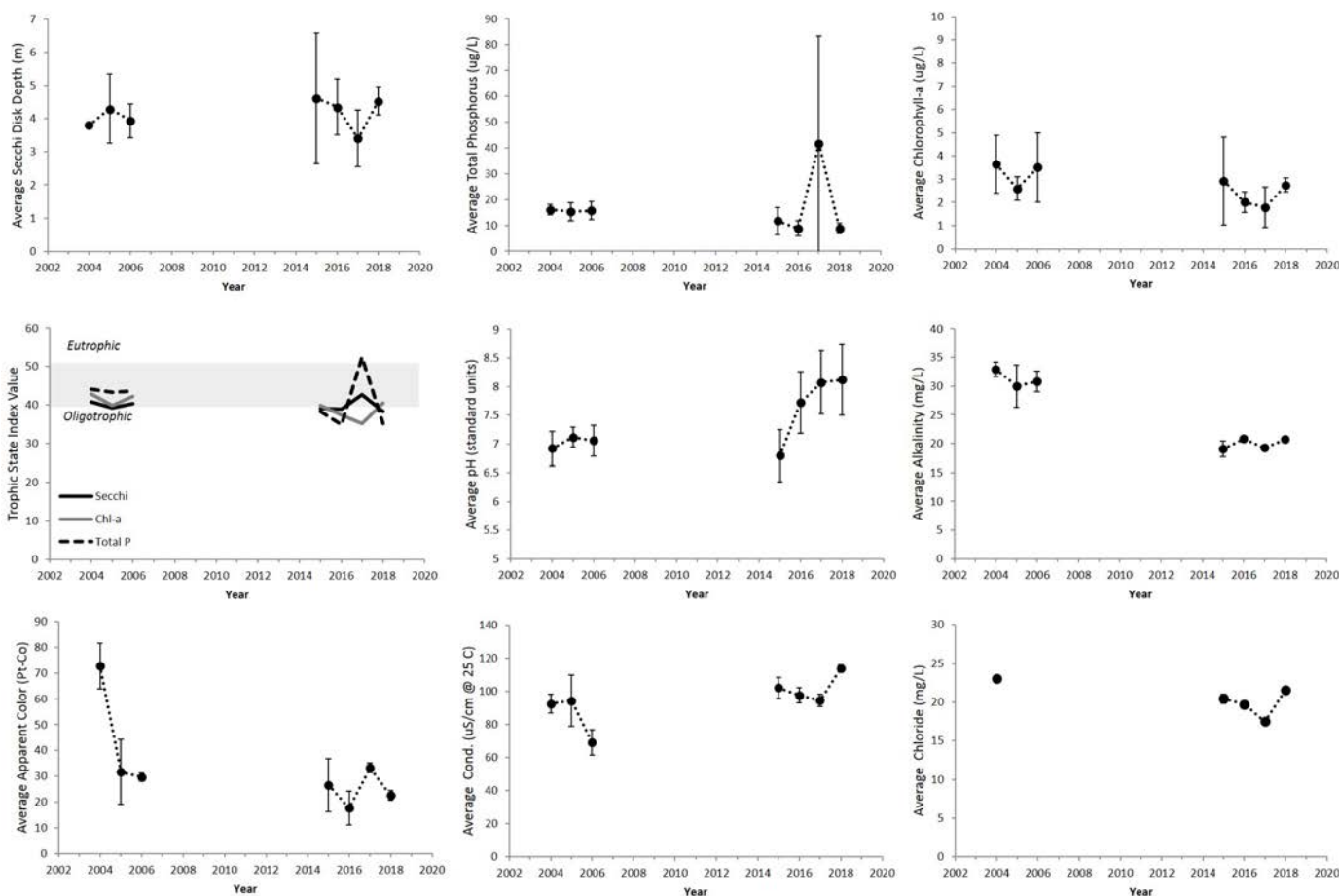
Annual average values of select water quality indicators for Loon Lake, 2004-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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 2018 were found to be alkaline in terms of their acidity. The alkalinity was 20.7 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 14.1 and 21.5 mg/L respectively in 2018 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
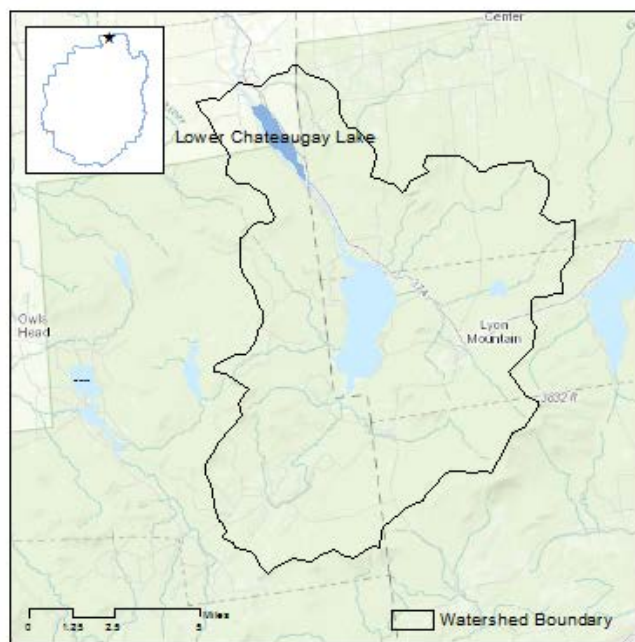
Location	County:	Franklin
	Town:	Bellmont

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	Circumneutral	Well buffered – not sensitive	Moderate

2018 DATA

Water quality values and historical trends for Lower Chateaugay Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

Water Quality Indicator	6/23/2018	7/16/2018	8/26/2018	Average	Trend
Transparency (m)	2.8	3.6	3.7	3.4	No Trend
Total Phosphorus (µg/L)	12.6	12.2	11.2	12.0	No Trend
Chlorophyll-*a* (µg/L)	4.4	5.1	3.5	4.3	Decreasing
Laboratory pH	7.3	6.9	7.0	7.0	No Trend
Sp. Conductance (µS/cm)	76.8	73.7	88.4	79.6	No Trend
Color (Pt-Co)	34.3	31.1	24.6	30.0	No Trend
Alkalinity (mg/L)			33.5	33.5	Decreasing
Chloride (mg/L)			7.4	7.4	No Trend
Calcium (mg/L)			9.4	9.4	Not Analyzed
Sodium (mg/L)			5.4	5.4	No Trend

HISTORICAL DATA
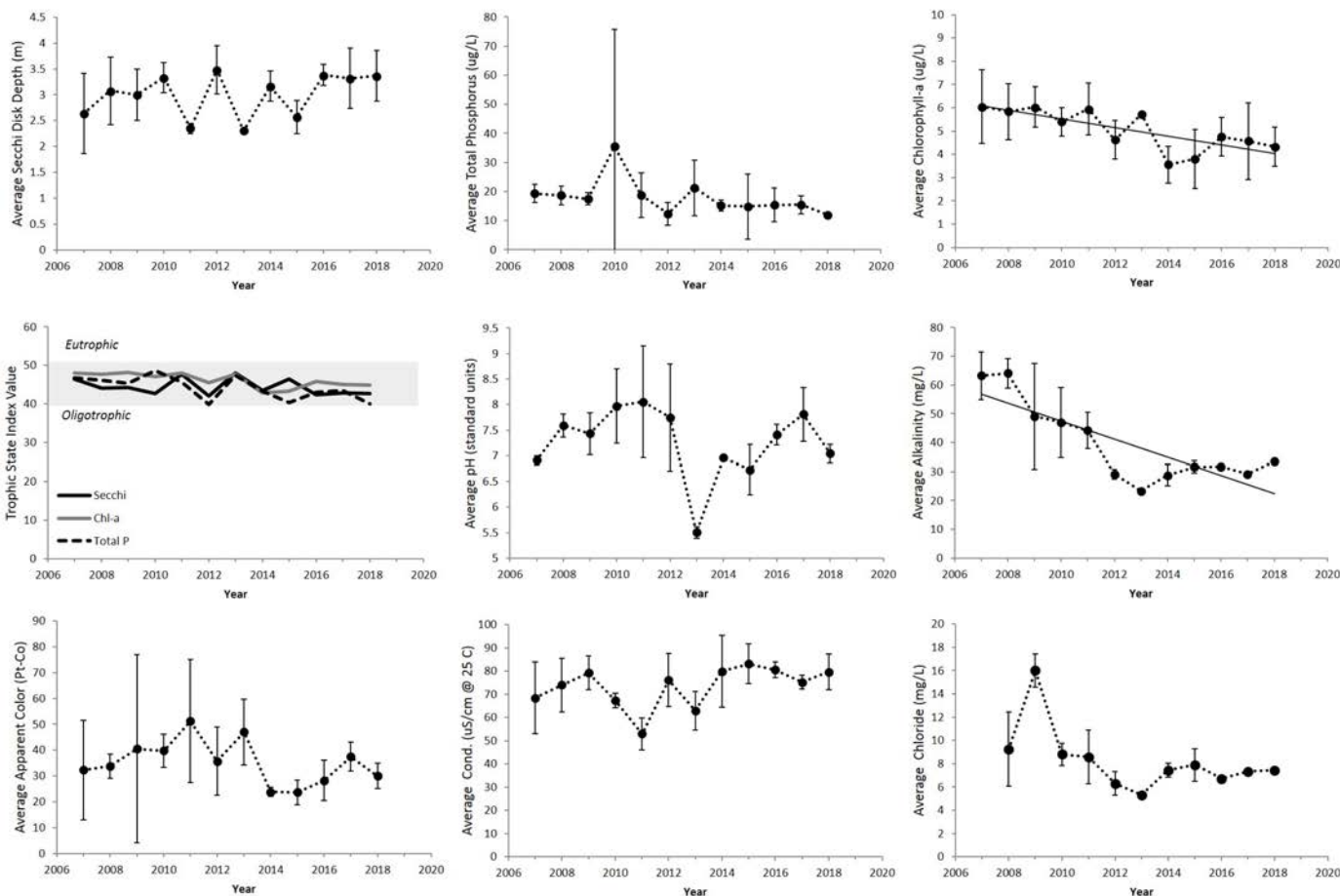
Annual average values of select water quality indicators for Lower Chateaugay Lake, 2007-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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. Chlorophyll-a concentration has been trending down since 2007.

- The water samples analyzed in 2018 were found to be circumneutral in terms of their acidity. The alkalinity of the lake was 33.5 mg/L, indicating that the lake is not sensitive to acid deposition. The alkalinity of Lower Chateaugay is greater than 97% of participating ALAP lakes in 2018. 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 5.4 and 7.4 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
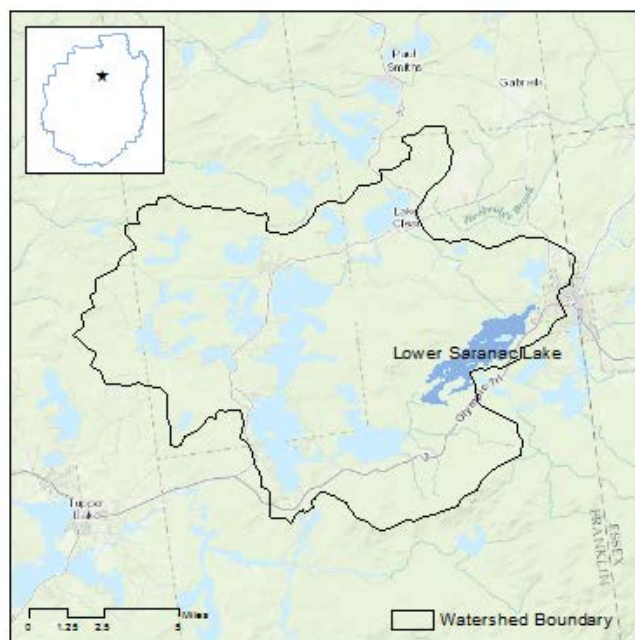
Location	County:	Franklin
	Town:	Harrietstown

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*

2018 DATA

Water quality values and historical trends for Lower Saranac Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

Water Quality Indicator	6/24/2018	7/22/2018	8/19/2018	Average	Trend
Transparency (m)	3	2.5	3.5	3.0	No Trend
Total Phosphorus (µg/L)	22.9	16.4	11.5	16.9	No Trend
Chlorophyll-*a* (µg/L)	6.15	4.8	2.7	4.6	No Trend
Laboratory pH	6.67	6.8	6.6	6.7	No Trend
Sp. Conductance (µS/cm)	62.1	54.8	63.6	60.2	No Trend
Color (Pt-Co)	40.72	34.3	27.9	34.3	No Trend
Alkalinity (mg/L)			13.0	13.0	Decreasing
Chloride (mg/L)			11.0	11.0	No Trend
Calcium (mg/L)			4.8	4.8	Not Analyzed
Sodium (mg/L)			6.4	6.4	No Trend

HISTORICAL DATA
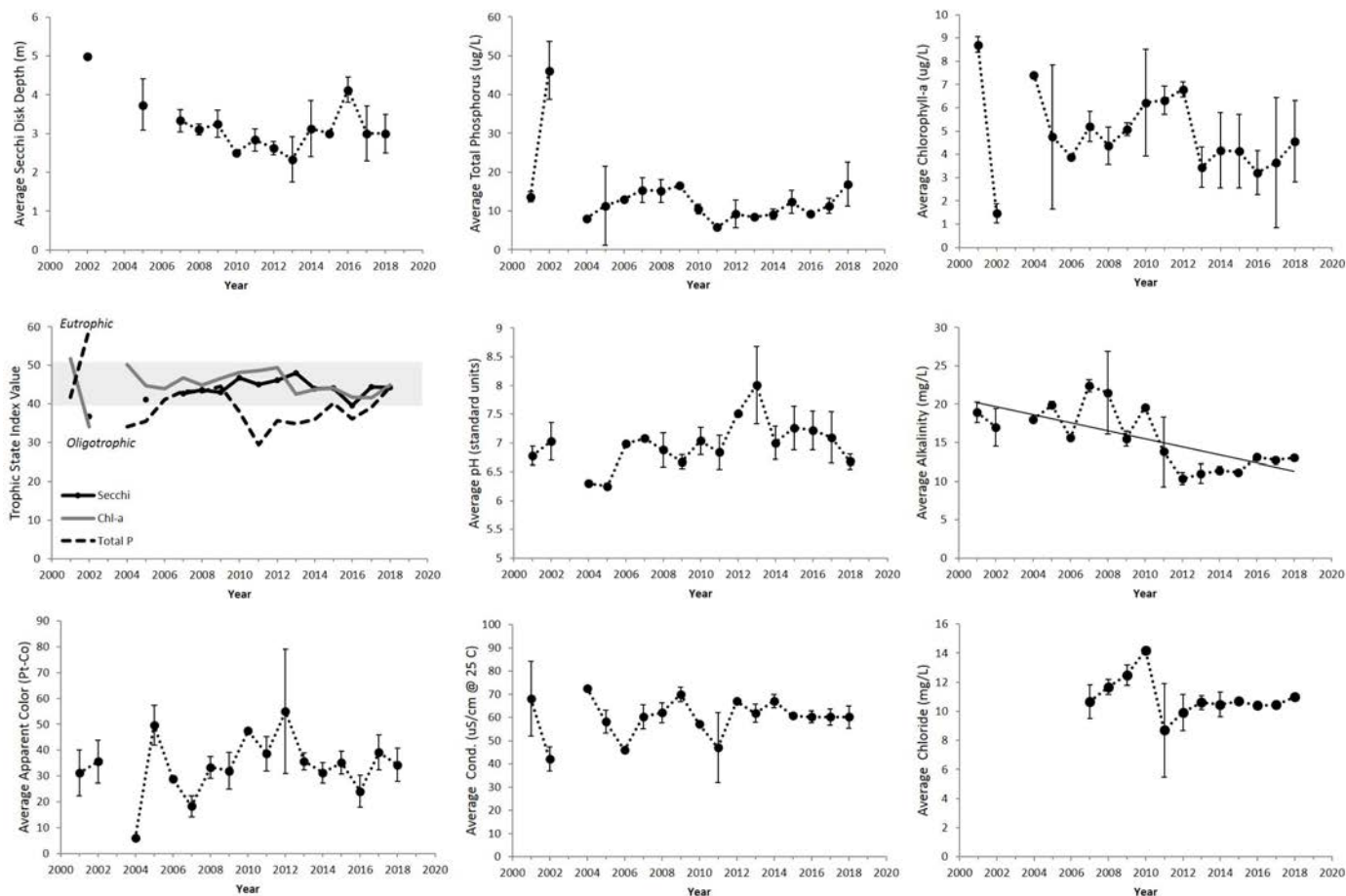
Annual average values of select water quality indicators for Lower Saranac Lake, 2001-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05). (p < 0.05).
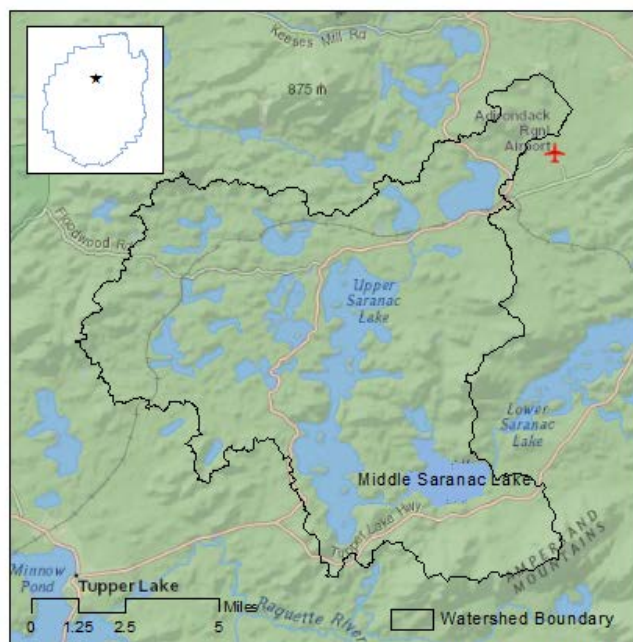
SUMMARY OF FINDINGS

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 2018 samples was 6.7 pH units. The alkalinity of the lake was 13.0 mg/L in 2018, indicating moderate acid neutralizing capacity.

- The chloride concentration of the lake was 11 mg/L, which is 55 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

2018 DATA

Water quality values and historical trends for Middle Saranac Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

Water Quality Indicator	6/22/2018	7/18/2018	8/18/2018	Average	Trend
Transparency (m)	3.1	3.0	3.0	3.0	No Trend
Total Phosphorus (µg/L)	13.9	13.2	12.3	13.1	No Trend
Chlorophyll-a (µg/L)	3.8	7.8	3.4	5.0	No Trend
Laboratory pH	6.8	6.9	7.4	7.0	No Trend
Sp. Conductance (µS/cm)	52.4	49.3	65.5	55.7	No Trend
Color (Pt-Co)	34.3	37.5	31.1	34.3	Increasing
Alkalinity (mg/L)			13.7	13.7	Decreasing
Chloride (mg/L)			11.2	11.2	No Trend
Calcium (mg/L)			5.0	5.0	Not Analyzed
Sodium (mg/L)			6.7	6.7	No Trend

HISTORICAL DATA
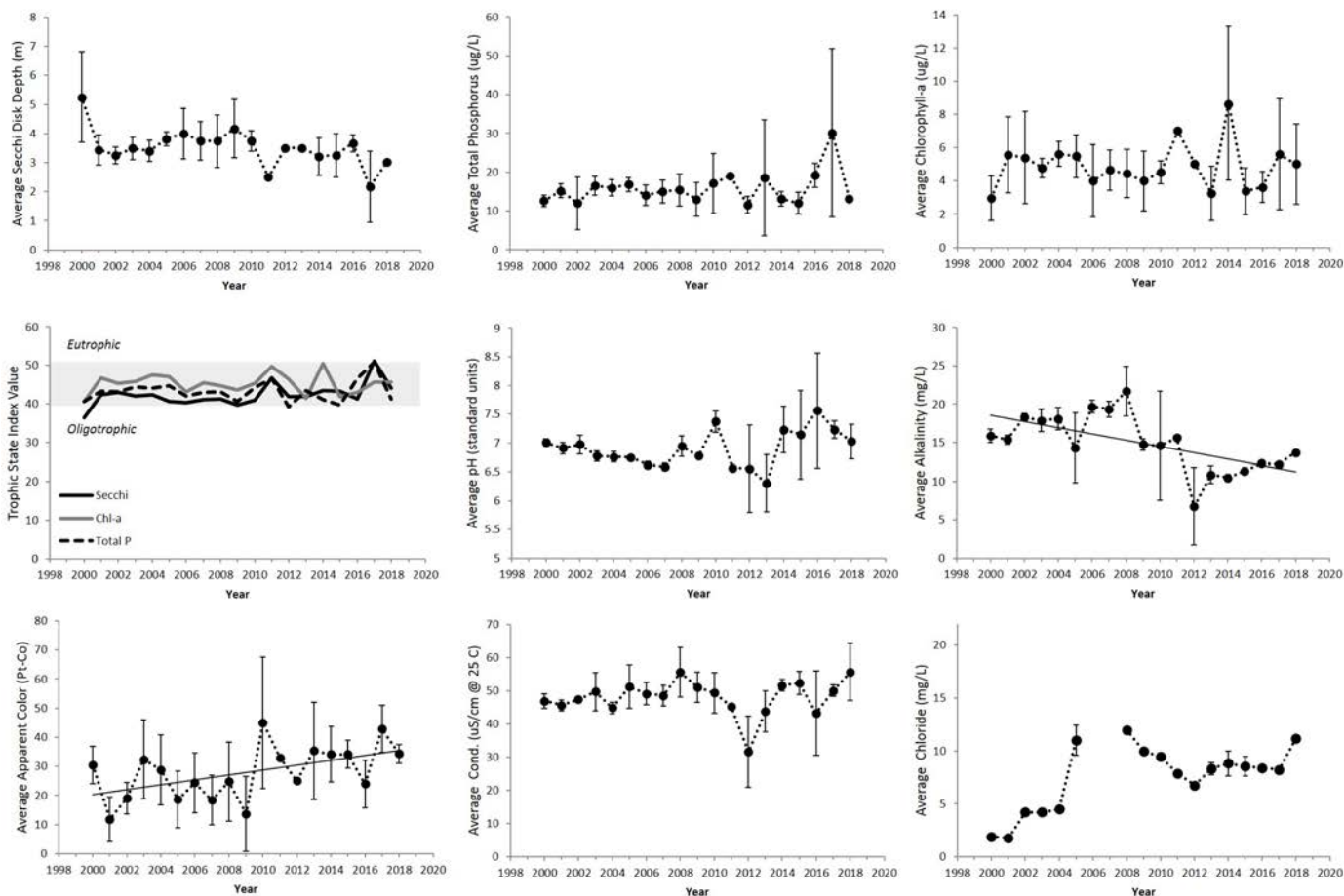
Annual average values of select water quality indicators for Middle Saranac Lake, 2000-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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 2018 were circumneutral in terms of their acidity. The alkalinity was 13.7 mg/L indicating low sensitivity to acid deposition.

- Sodium and chloride concentration were 6.7 and 11.2 mg/L respectively, indicating that the chemistry of the lake is influenced by the 64 km of roads in the watershed.

MINK POND
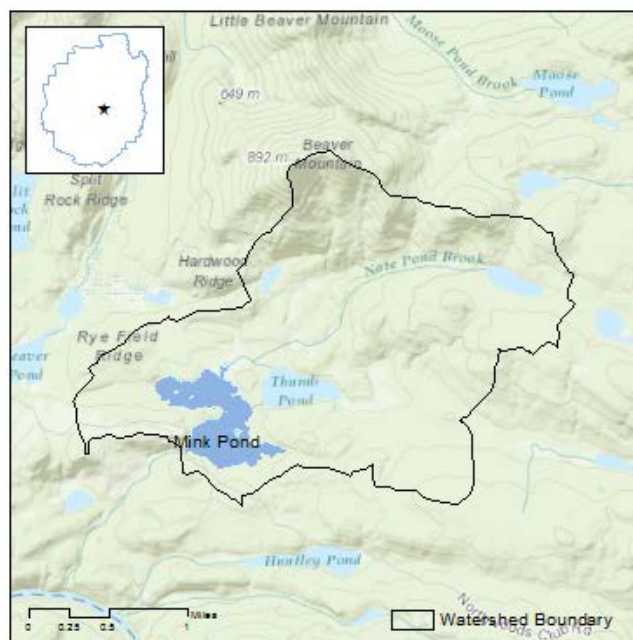
Location	County:	Essex
	Town:	Minerva

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

2018 DATA

Water quality values and historical trends for Mink Pond during the 2018 sampling season. Trend analysis will be performed after five years of consecutive data collection. BDL=below detection limit.

Water Quality Indicator	6/29/2018	8/2/2018	8/31/2018	Average	Trend
Transparency (m)	3.5	3.4	3.8	3.6	Not Analyzed
Total Phosphorus (µg/L)	7.0	4.5	6.3	5.9	Not Analyzed
Chlorophyll-a (µg/L)		1.8	2.2	2.0	Not Analyzed
Laboratory pH	6.9	7.2	7.4	7.2	Not Analyzed
Sp. Conductance (µS/cm)	18.9	20.3	21.3	20.2	Not Analyzed
Color (Pt-Co)	37.5	31.1	31.1	33.2	Not Analyzed
Alkalinity (mg/L)			9.1	9.1	Not Analyzed
Chloride (mg/L)			0.8	0.8	Not Analyzed
Calcium (mg/L)			3.1	3.1	Not Analyzed
Sodium (mg/L)			0.8	0.8	Not Analyzed

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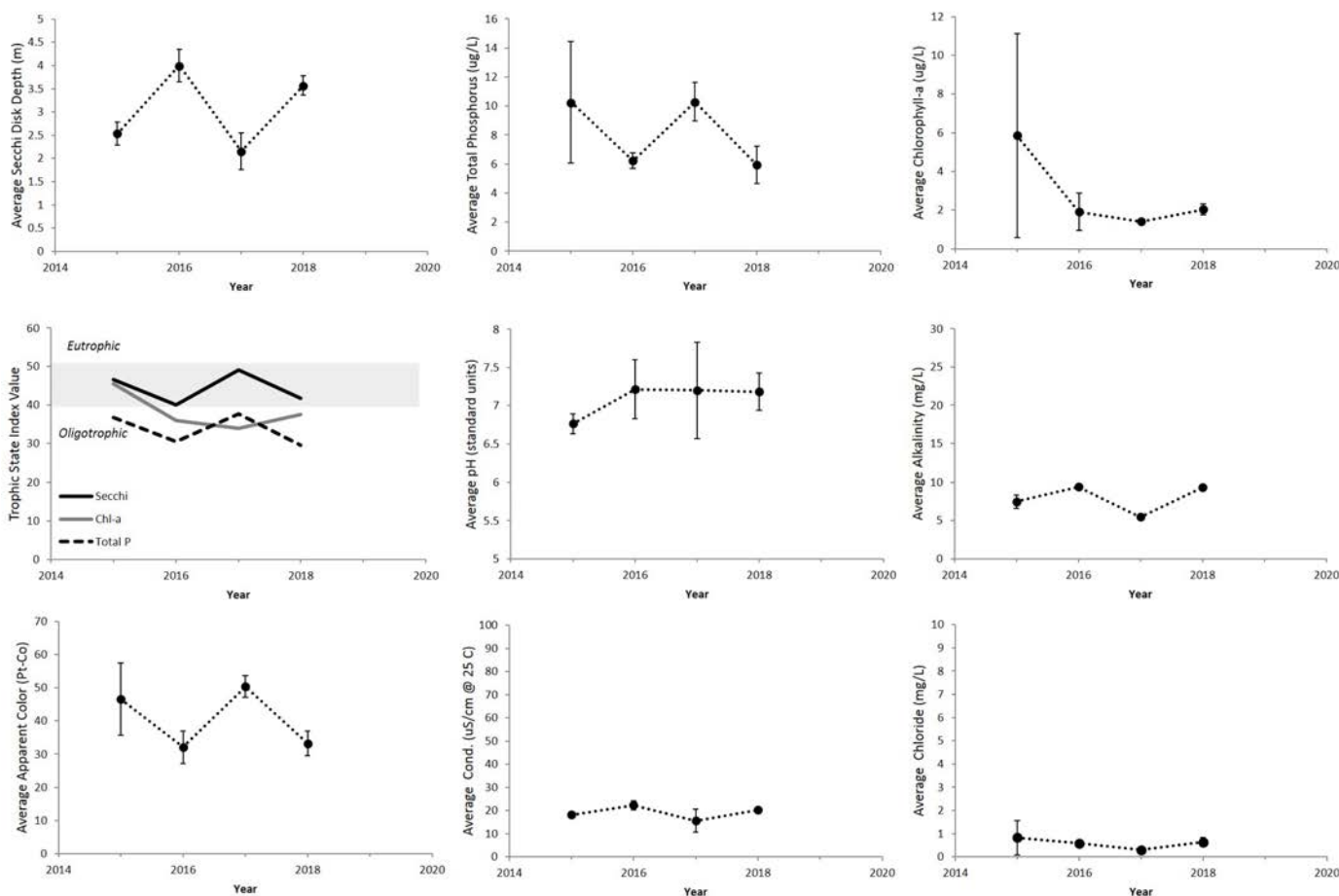
Annual average values of select water quality indicators for Mink Pond. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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 93% of participating ALAP lakes in 2018.

- The pH of the water samples received in 2018 were found to be circumneutral in terms of their acidity. The alkalinity was 9.1 mg/L, indicating moderate sensitivity to acid deposition.

- Sodium and chloride concentration were 0.8 for both ions, and these values are within the range we would expect for a pond with no salted roads in the watershed.

MOSS LAKE
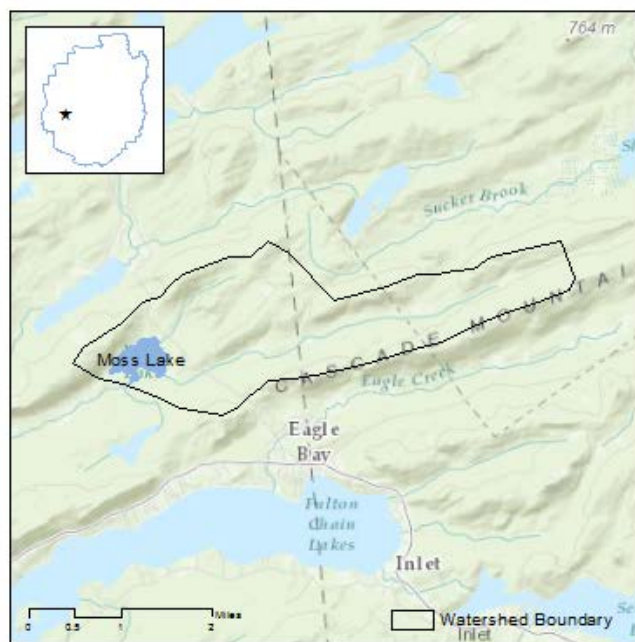
Location	County:	Herkimer
	Town:	Webb

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*

2018 DATA

Water quality values and historical trends for Moss Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

Water Quality Indicator	6/15/2018	7/18/2018	8/17/2018	Average	Trend
Transparency (m)	2.8	4.3	5.0	4.0	No Trend
Total Phosphorus (µg/L)	5.0	5.7	4.2	5.0	Decreasing
Chlorophyll-*a* (µg/L)	2.4	1.3	0.7	1.5	Decreasing
Laboratory pH	7.0	6.5	6.6	6.7	No Trend
Sp. Conductance (µS/cm)	19.6	21.3	24.3	21.7	Decreasing
Color (Pt-Co)	31.07	18.2	21.42	23.6	No Trend
Alkalinity (mg/L)			8.6	8.6	No Trend
Chloride (mg/L)			0.8	0.8	No Trend
Calcium (mg/L)			2.8	2.8	Not Analyzed
Sodium (mg/L)			1.4	1.4	No Trend

HISTORICAL DATA
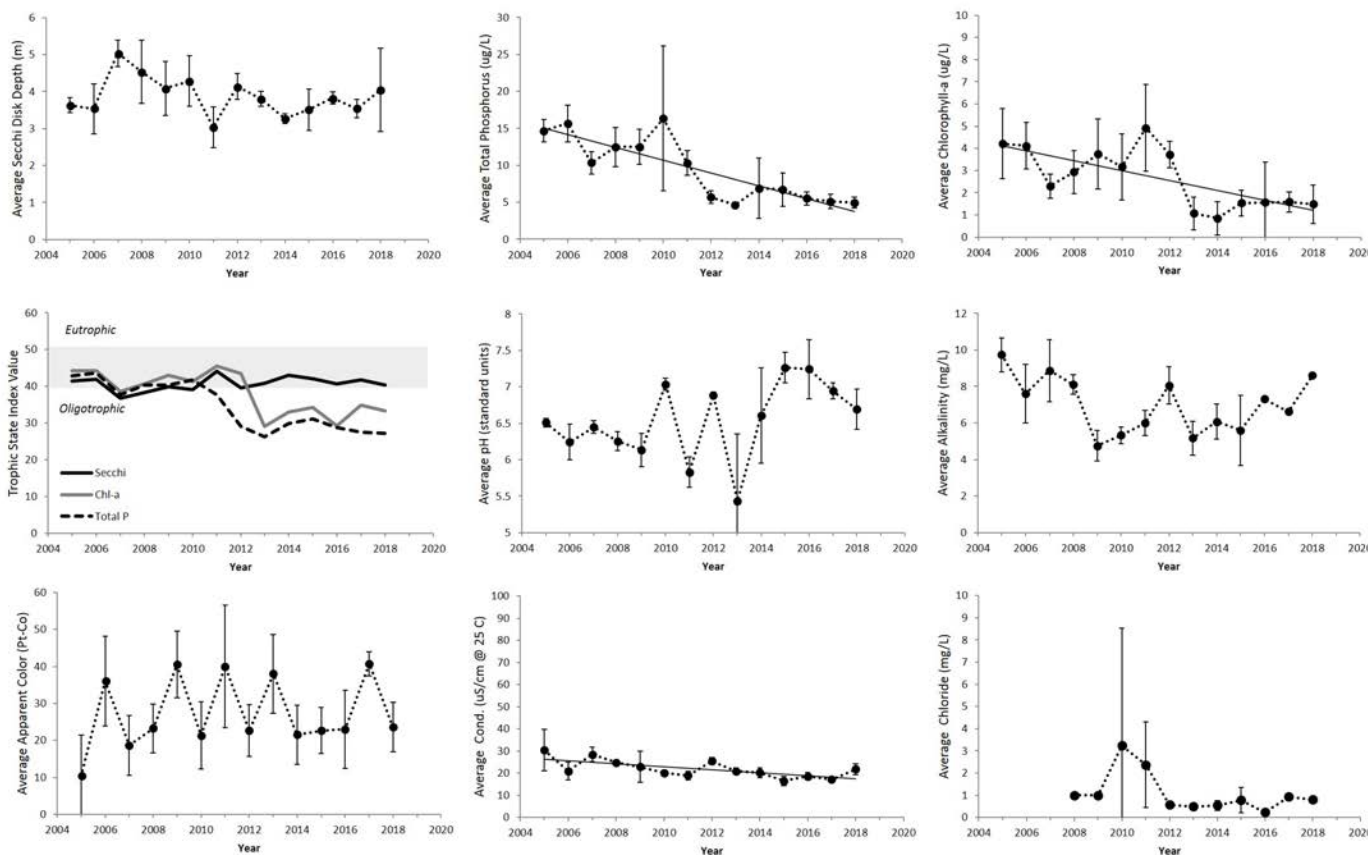
Annual average values of select water quality indicators for Moss Lake, 2005-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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 and chlorophyll-a have both exhibited a downward trend since 2005.

- The water samples analyzed in 2018 were found to be circumneutral in terms of their acidity. The alkalinity was 8.6 mg/L, indicating moderate sensitivity to acid deposition.

- Sodium and chloride concentration were 1.4 and 0.8 mg/L, these values are within the range expected for lake with few roads in the watershed.

MOUNTAIN VIEW LAKE
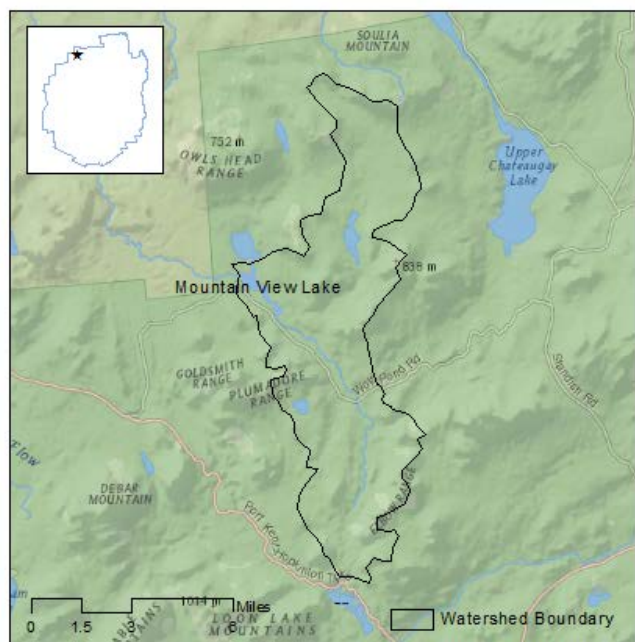
Location	County:	St Lawrence
	Town:	Bellmont

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
Mesotrophic	Circumneutral	Well buffered- not sensitivity	Not Significant

2018 DATA

Water quality values and historical trends for Mountain View Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit. VOB=Secchi disk is visible on the bottom of the lake.

Water Quality Indicator	6/21/2018	7/18/2018	8/19/2018	Average	Trend
Transparency (m)	1.1	1.4	VOB	1.2	No Trend
Total Phosphorus (µg/L)	24.7	25.5	16.4	22.2	No Trend
Chlorophyll-a (µg/L)	2.6	4.9	0.8	2.8	Decreasing
Laboratory pH	6.4	6.2	6.9	6.5	No Trend
Sp. Conductance (µS/cm)	28.5	59.5	66.5	51.5	No Trend
Color (Pt-Co)	95.4	40.7	40.7	59.0	No Trend
Alkalinity (mg/L)			34.5	34.5	No Trend
Chloride (mg/L)			0.3	0.3	No Trend
Calcium (mg/L)			8.5	8.5	Not Analyzed
Sodium (mg/L)			1.4	1.4	Decreasing

HISTORICAL DATA
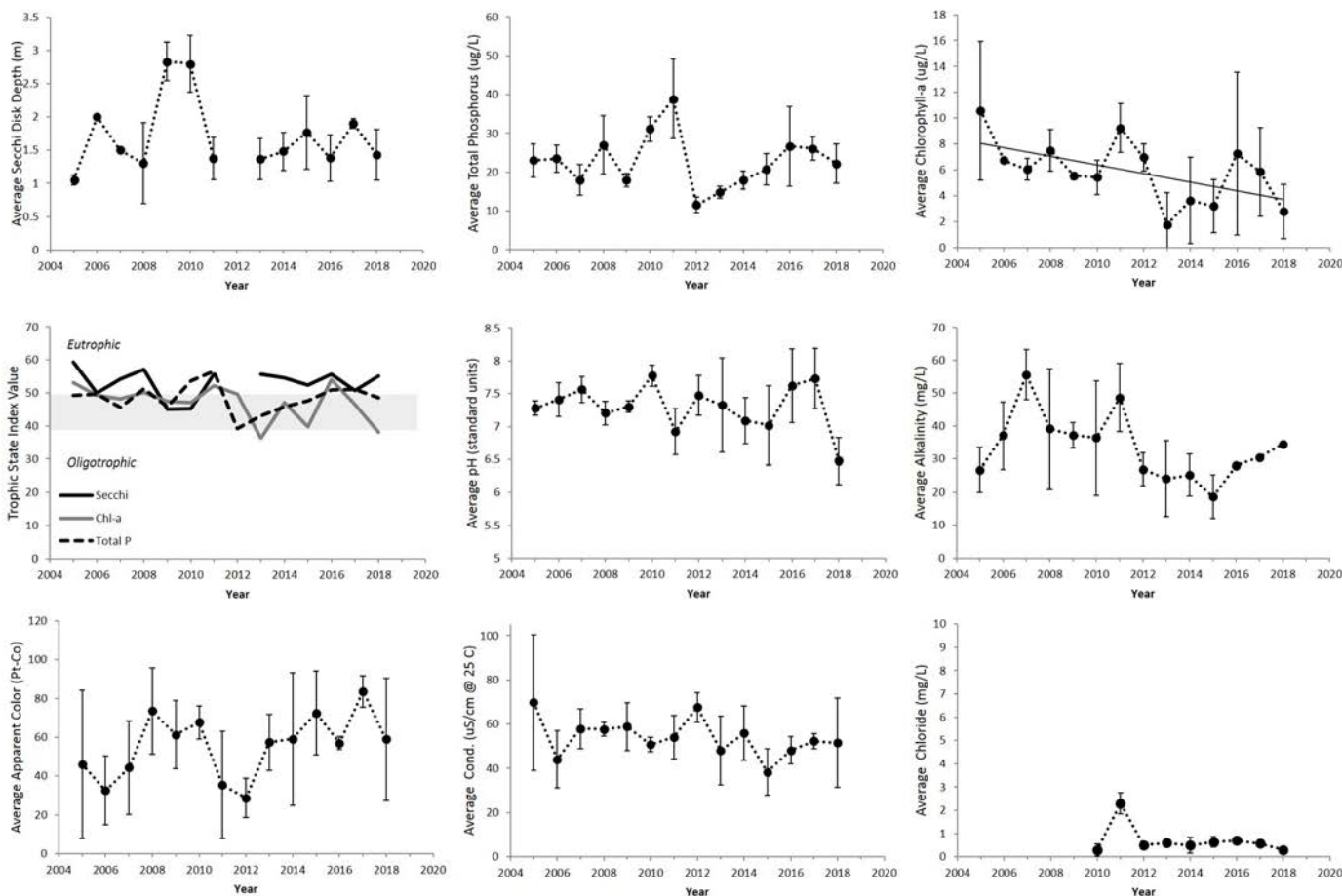
*Annual average values of select water quality indicators for Mountain View Lake, 2005-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).*

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.

- Based on the 2018 data, Mountain View Lake is best classified as a mesotrophic lake. Water quality indicators of the lake are highly variable within years and across years. This variability is likely the result of the high flushing rate through the shallow reservoir, estimated to be 135 times/year. The lake is highly colored; as a result, the transparency is relatively low. The color of the water averaged 59 Pt-Co units in 2018, which is greater than 98% of the participating ALAP lakes.

- The water samples analyzed in 2018 were found to be slightly acidic to circumneutral in terms of their acidity. The alkalinity was 34.5 mg/L, indicating that the lake is well buffered against pH change.

- Sodium and chloride concentration averaged 1.4 and 0.3 mg/L respectively, indicating that the chemistry of the lake is not significantly influenced by road salt.

OSGOOD POND
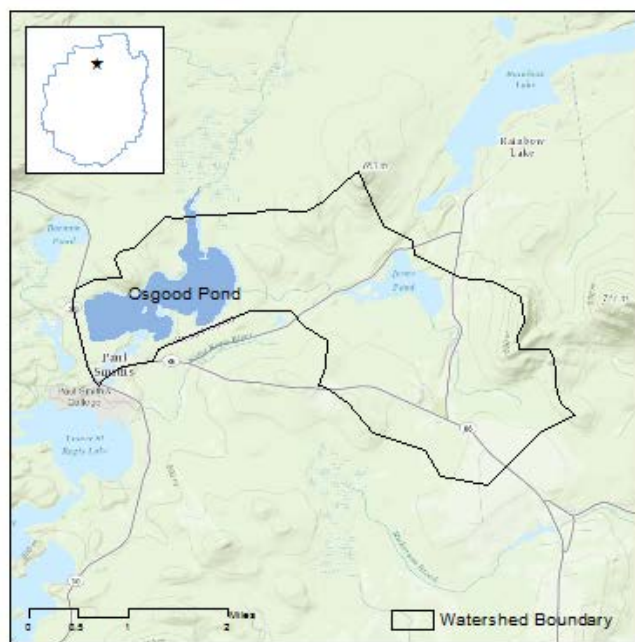
Location	County:	Franklin
	Town:	Brighton

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

2018 DATA

Water quality values and historical trends for Osgood Pond during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

Water Quality Indicator	6/19/2018	7/19/2018	8/17/2018	Average	Trend
Transparency (m)	1.8	2.3	2.7	2.3	No Trend
Total Phosphorus (µg/L)	19.5	21.6	13.1	18.1	No Trend
Chlorophyll-*a* (µg/L)	7.1	4.9	4.2	5.4	No Trend
Laboratory pH	6.6	7.1	7.2	7.0	No Trend
Sp. Conductance (µS/cm)	57.4	59.8	63.7	60.3	Increasing
Color (Pt-Co)	63.2	66.5	47.2	59.0	No Trend
Alkalinity (mg/L)			17.7	17.7	Decreasing
Chloride (mg/L)			8.8	8.8	No Trend
Calcium (mg/L)			5.5	5.5	Not Analyzed
Sodium (mg/L)			4.5	4.5	No Trend

HISTORICAL DATA
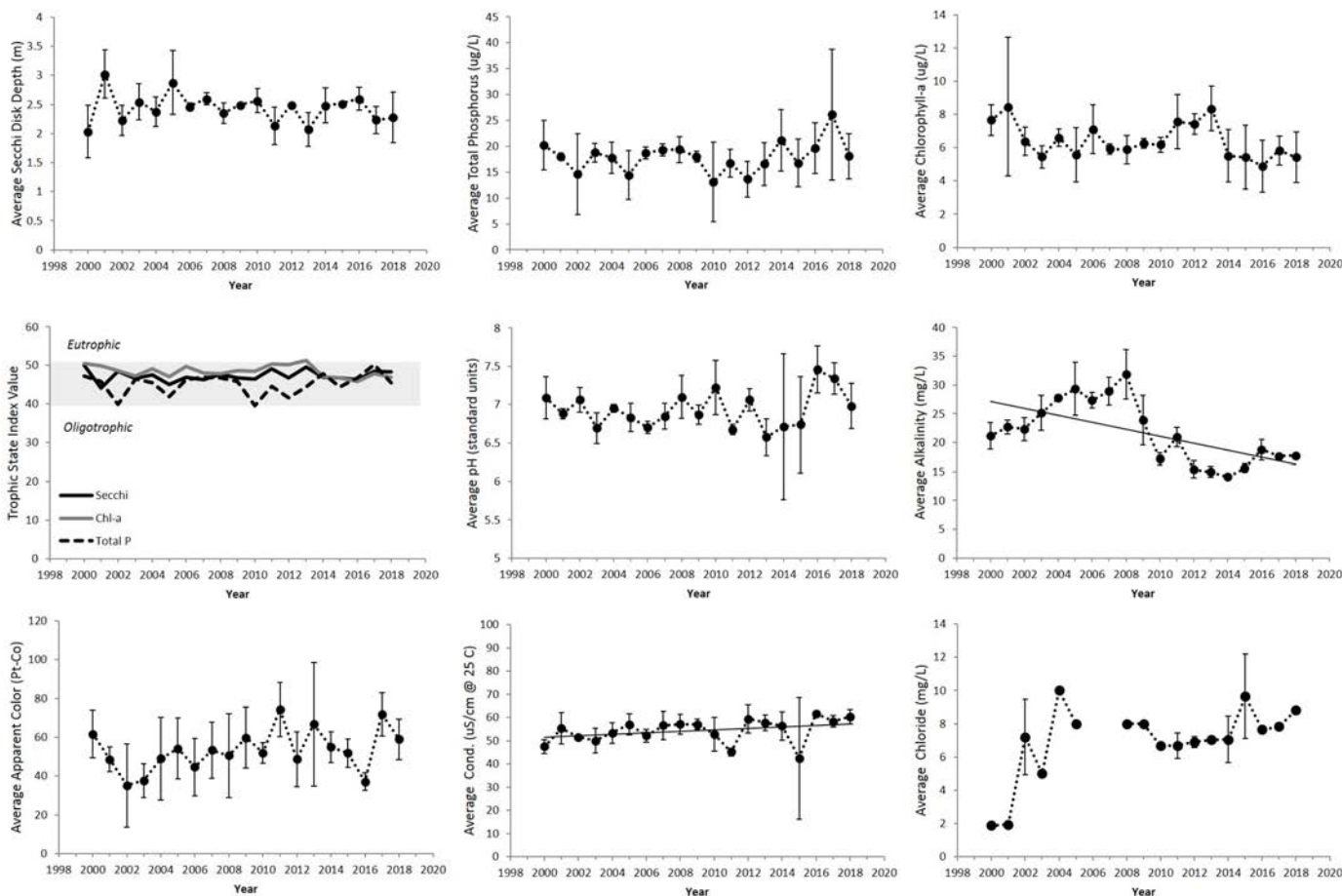
Annual average values of select water quality indicators for Osgood Pond, 2000-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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 19 years of monitoring. Transparency depth, and concentrations of chlorophyll-a and total phosphorus have not exhibited any statistical trends.

- The water samples analyzed in 2018 were found to be circumneutral in terms of their acidity, averaging 7.0 pH units. The alkalinity of the lake was 17.7 mg/L, indicating that the lake has low sensitivity to acid deposition. The alkalinity of Osgood Pond has exhibited a downward trend since 2000.

- Sodium and chloride concentrations of the lake were 4.5 and 8.8 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

2018 DATA

Water quality values and historical trends for Otter Pond during the 2018 sampling season. Trend analysis was not performed on calcium data. VOB=Secchi disk is visible on the bottom of the lake.

| Water Quality Indicator	6/22/2018	7/20/2018	8/24/2018	Average	Trend
Transparency (m)	VOB	1.9	0.6	1.2	No Trend
Total Phosphorus (µg/L)	5.1	19.5	19.1	14.6	No Trend
Chlorophyll-a (µg/L)	5.4	3.9	1.5	3.6	No Trend
Laboratory pH	5.8	5.4	6.4	5.9	No Trend
Sp. Conductance (µS/cm)	8.1	7.1	8.1	7.8	Decreasing
Color (Pt-Co)	47.2	53.6	47.2	49.3	No Trend
Alkalinity (mg/L)			1.6	1.6	No Trend
Chloride (mg/L)			0.3	0.3	Decreasing
Calcium (mg/L)			0.7	0.7	Not Analyzed
Sodium (mg/L)			0.5	0.5	No Trend

HISTORICAL DATA
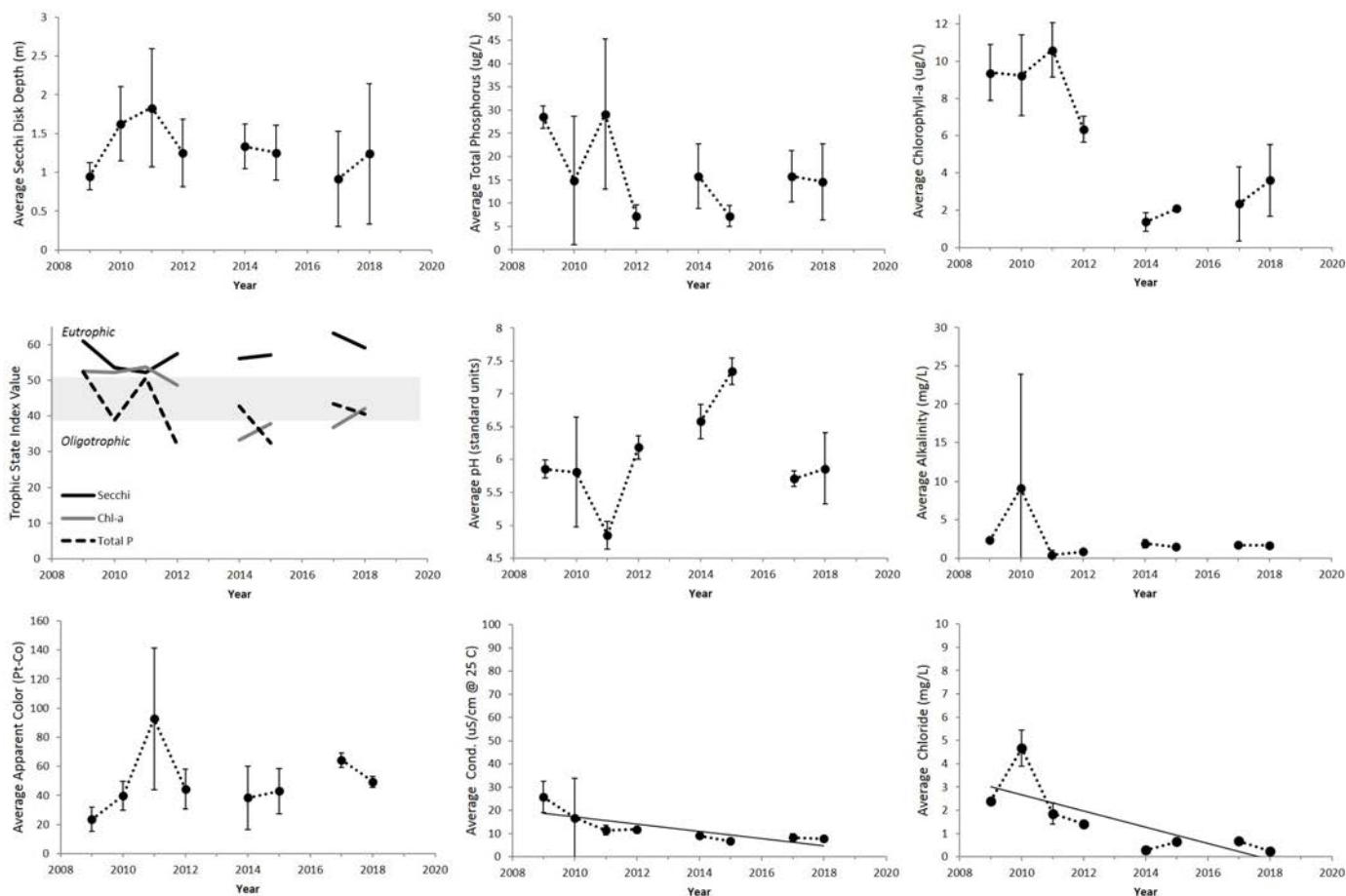
Annual average values of select water quality indicators for Otter Pond 2009-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

SUMMARY OF FINDINGS

Otter Pond is a 4 ha pond located in St. Lawrence County in the Town of Hopkinton. 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 pH of the water samples were slightly acidic to circumneutral in terms of their acidity. The alkalinity of the pond averaged 1.6 mg/L, indicating that the lake is sensitive to acid deposition.

- Sodium and chloride concentration averaged 0.5 and 0.3 mg/L respectively, and are within the range we would expect for a watershed that lacks roads.

PARADOX LAKE
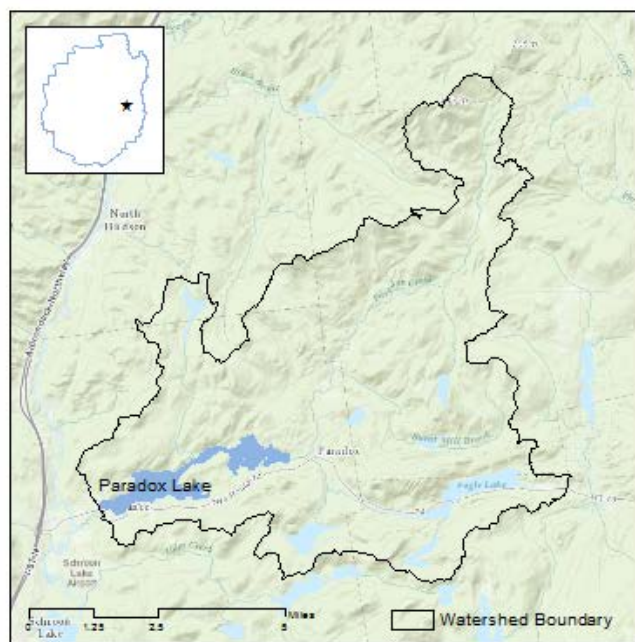
Location	County:	Essex
	Town:	Schroon

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
Oligotrophic	*Alkaline*	*Adequate - Low Sensitivity*	*Moderate*

2018 DATA

Water quality values and historical trends for Paradox Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

Water Quality Indicator	5/23	6/20	7/19	8/13	9/20	Average	Trend
Upper							
Transparency (m)	3.5	4.5	4.5	5.5	5.0	4.6	No Trend
Total Phosphorus (µg/L)	7.7	6.7	5.3	5.0	5.1	6.0	No Trend
Chlorophyll-*a* (µg/L)	3.9	2.5	1.9	2.3	2.7	2.6	No Trend
Laboratory pH	7.6	7.0	8.0	6.7	8.3	7.5	No Trend
Sp. Conductance (µS/cm)	74.9	76.0	76.4	80.5	81.1	77.8	No Trend
Color (Pt-Co)	24.6	21.4	27.9	21.4	18.2	22.7	No Trend
Alkalinity (mg/L)				27.3		27.3	No Trend
Chloride (mg/L)				7.7		7.7	No Trend
Calcium (mg/L)				9.8		9.8	Not Analyzed
Sodium (mg/L)				6.1		6.1	No Trend

Water Quality Indicator	5/23	6/21	7/19	8/12	9/20	Average
Lower						
Transparency (m)	4.0	4.1	5.8	5.3	6.8	5.2
Total Phosphorus (µg/L)	5.8	6.0	3.5	3.1	5.6	4.8
Chlorophyll-a (µg/L)	1.5	1.7	1.2	1.2	1.1	1.4
Laboratory pH	7.5	7.8	8.0	7.0	7.9	7.6
Sp. Conductance (µS/cm)	71.5	67.7	76.4	78.8	78.6	74.6
Color (Pt-Co)	15.0	21.4	18.2	11.8	15.0	16.3
Alkalinity (mg/L)				23.9		23.9
Chloride (mg/L)				8.3		8.3
Calcium (mg/L)				8.4		8.4
Sodium (mg/L)				6.5		6.5

HISTORICAL DATA
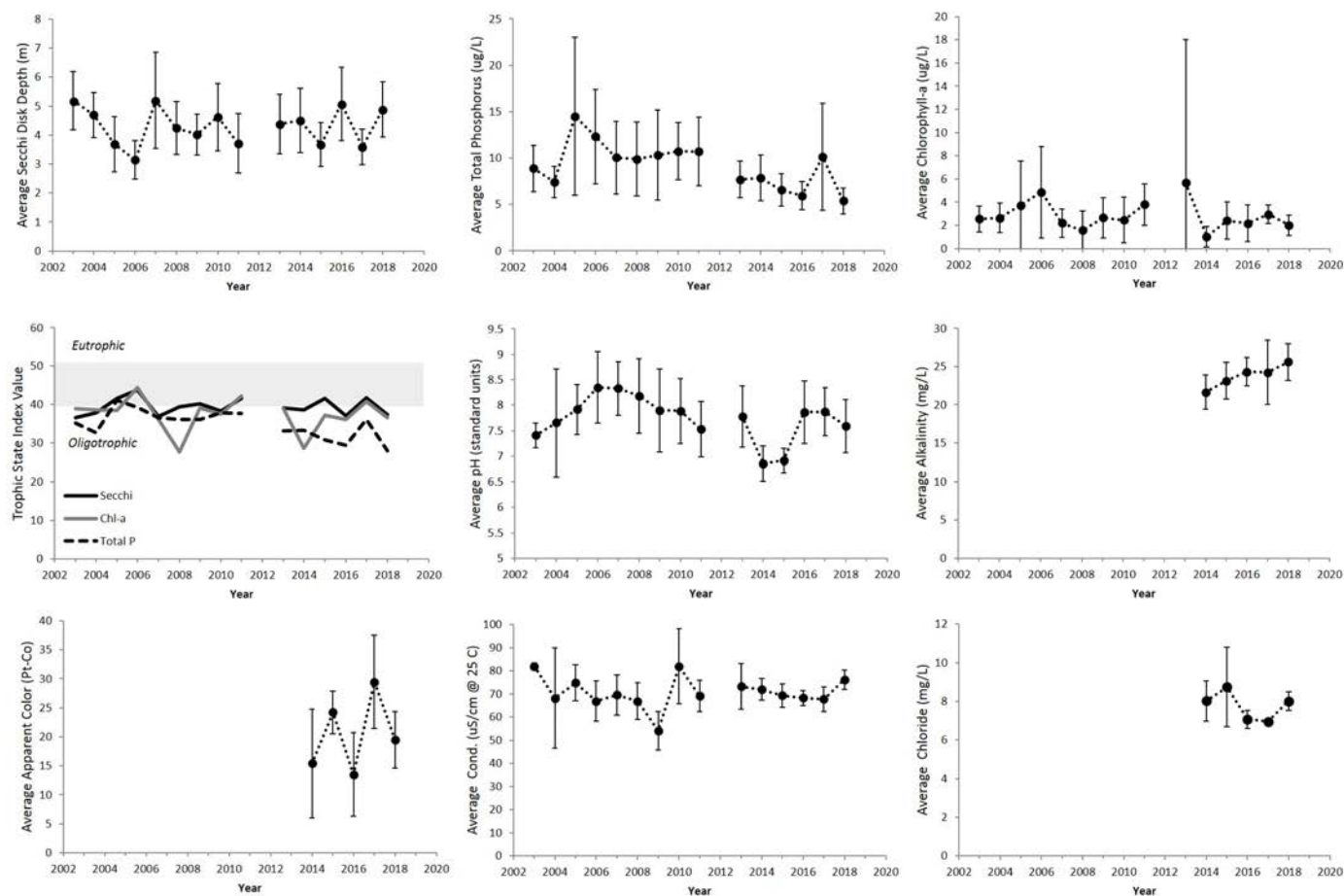
Lake wide annual average values of select water quality indicators for Paradox Lake, 2003-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05). Data from 2003-2013 from CSLAP, Data from 2014-present from 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.

- Based on the 2018 data, Paradox Lake is an oligotrophic lake. The lake commonly fluctuates on the border of mesotrophy. Transparency depth, and the concentrations of total phosphorus and chlorophyll-a have not exhibited any statistical trends since monitoring began 1998.

- Water samples from 2018 were found to be alkaline in terms of their acidity, with a lake wide average of 7.9 pH units. Alkalinity averaged 25 mg/L, indicating that the lake is well buffered, and not sensitive to acid deposition.

- Sodium and chloride concentration averaged 6.5 and 8.3 mg/L in 2018, indicating the chemistry of the lake is influenced by the 50 km of roads in the watershed.

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PINE LAKE
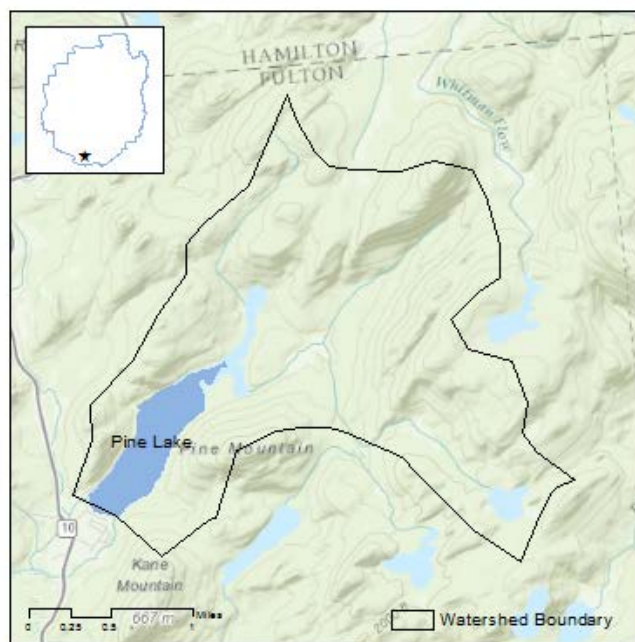
Location	County:	Fulton
	Town:	Caroga

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	Acidic (acceptable)	Moderate	Not Significant

2018 DATA

Water quality values and historical trends for Pine Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

| Water Quality Indicator	6/20/2018	7/19/2018	8/22/2018	Average	Trend
Transparency (m)	6.0	7.0	7.0	6.7	No Trend
Total Phosphorus (µg/L)	7.8	6.4	4.8	6.3	No Trend
Chlorophyll-a (µg/L)	1.5	1.0	1.6	1.3	Decreasing
Laboratory pH	6.1	6.2	6.7	6.3	Increasing
Sp. Conductance (µS/cm)	10.8	10.8	10.9	10.8	Decreasing
Color (Pt-Co)	15.0	15.0	15.0	15.0	No Trend
Alkalinity (mg/L)			3.3	3.3	No Trend
Chloride (mg/L)			0.3	0.3	Decreasing
Calcium (mg/L)			1.1	1.1	Not Analyzed
Sodium (mg/L)			0.8	0.8	No Trend

HISTORICAL DATA
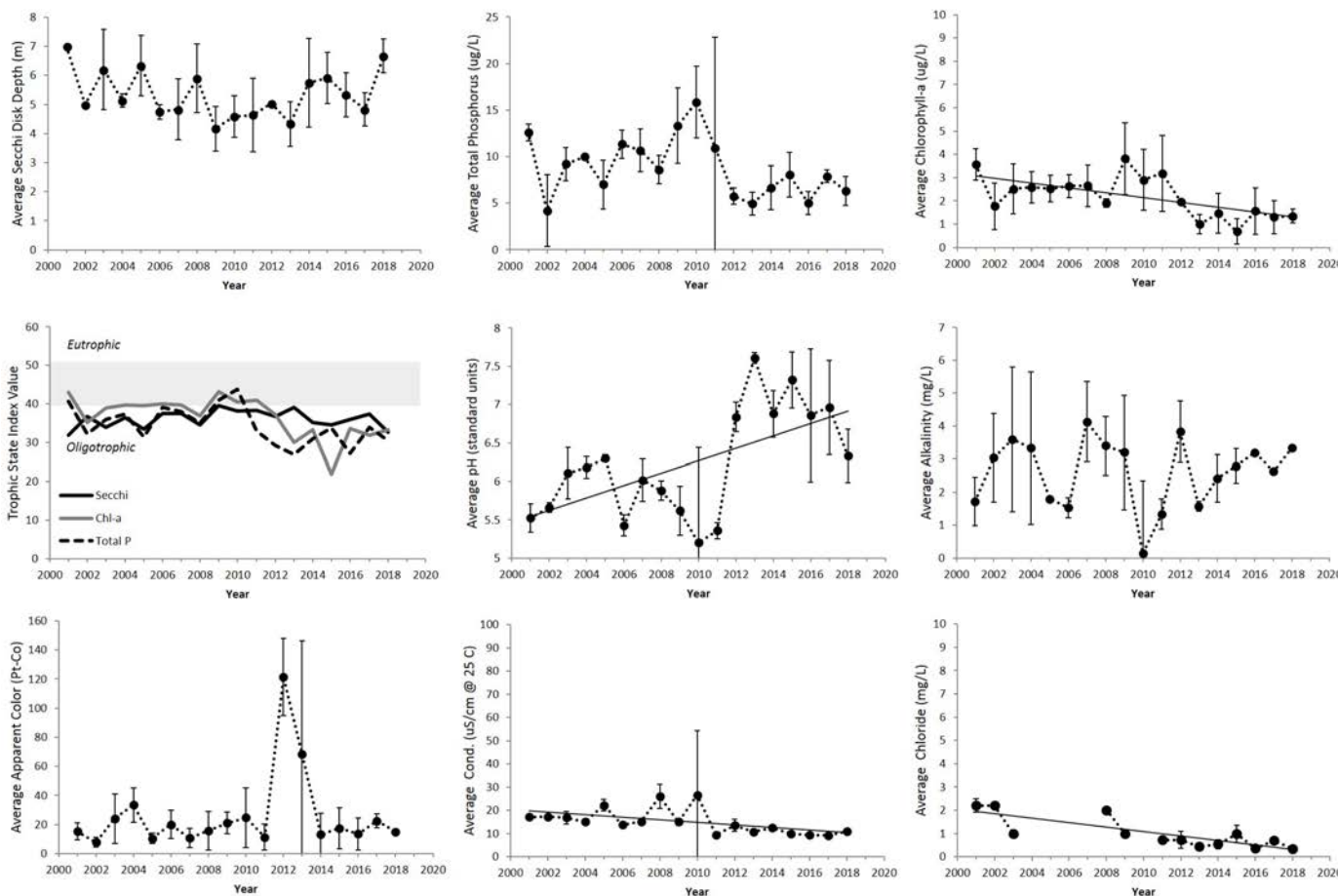
Annual average values of select water quality indicators for Pine Lake, 2001-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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. Due to dam issues, the water level in Pine Lake was down by approximate 3 feet in June of 2018.

• Pine Lake is an oligotrophic Lake. Chlorophyll-a has exhibited a downward trend since monitoring began in 2001. The secchi transparency of Pine Lake averaged 6.7 meters, which was greater than 91% of participating ALAP lakes in 2018.

• Water samples from 2018 were found to be slightly acidic in terms of their acidity, with an average pH of 6.3 units. The pH of the samples has exhibited an increasing trend since 2001.

• Sodium and chloride concentration averaged 0.8 and 0.3 mg/L in 2018 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
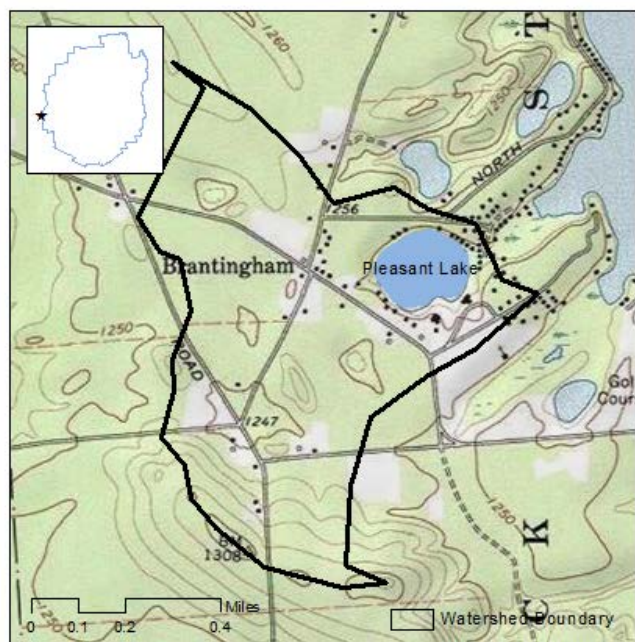
Location	County:	Lewis
	Town:	Greig

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

2018 DATA

Water quality values and historical trends for Pleasant Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

| Water Quality Indicator	June	7/16/2018	8/24/2018	Average	Trend
Transparency (m)		7.5	7.5	7.5	No Trend
Total Phosphorus (µg/L)		7.1	10.4	8.8	No Trend
Chlorophyll-*a* (µg/L)		1.9	1.5	1.7	No Trend
Laboratory pH		6.8	6.9	6.8	Increasing
Sp. Conductance (µS/cm)		12.9	12.4	12.7	Decrease
Color (Pt-Co)		11.8	8.6	10.2	No Trend
Alkalinity (mg/L)			4.1	4.1	No Trend
Chloride (mg/L)			1.3	1.3	No Trend
Calcium (mg/L)			1.4	1.4	Not Analyzed
Sodium (mg/L)			1.1	1.1	No Trend

HISTORICAL DATA
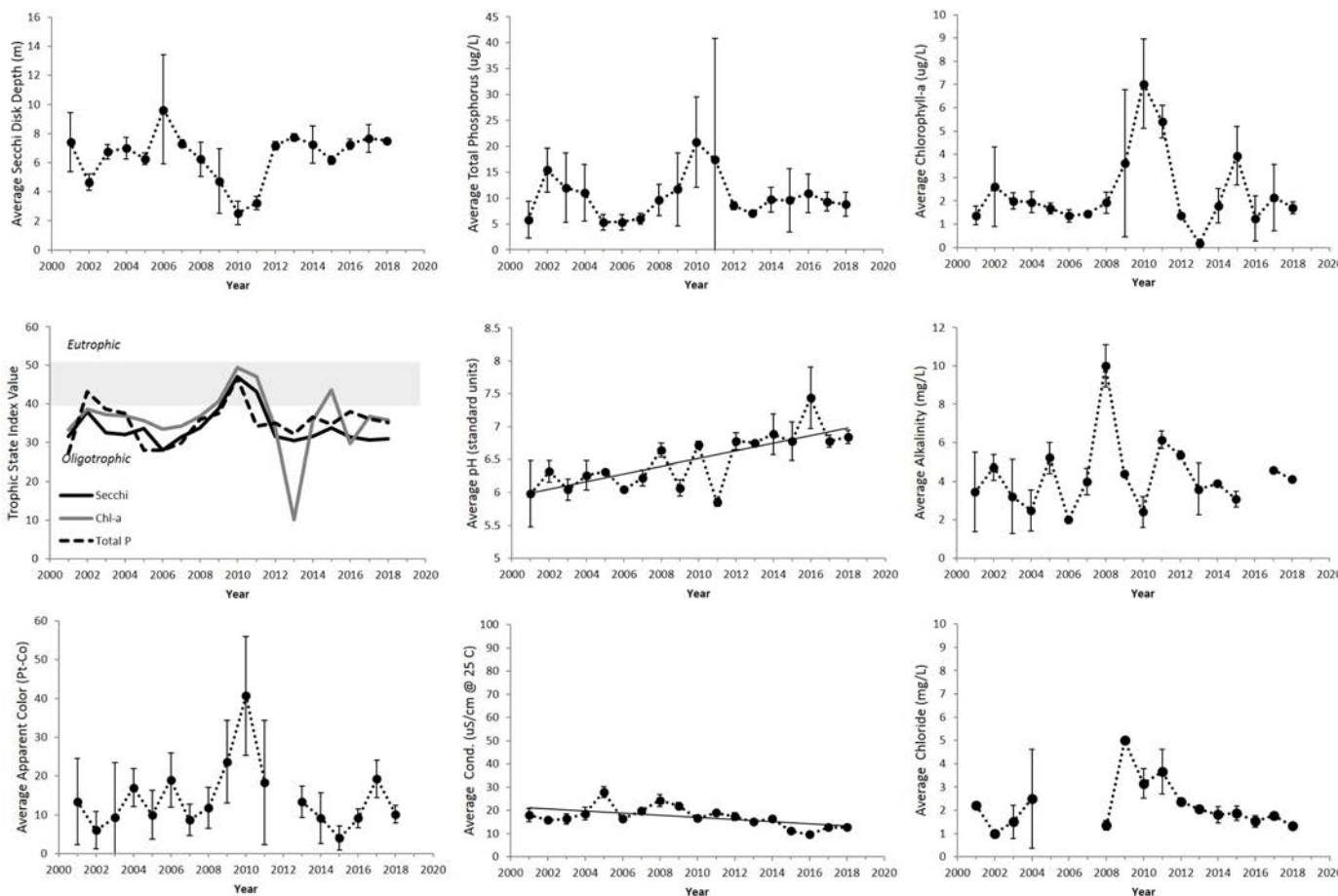
Annual average values of select water quality indicators for Pleasant Lake, 2001-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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. ALAP volunteers and the Adirondack Watershed Institute have monitored Pleasant Lake 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 2018 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 4.1 mg/L in 2018, indicating moderate sensitivity to acid deposition.

- Sodium and chloride concentration averaged 1.1 and 1.3 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
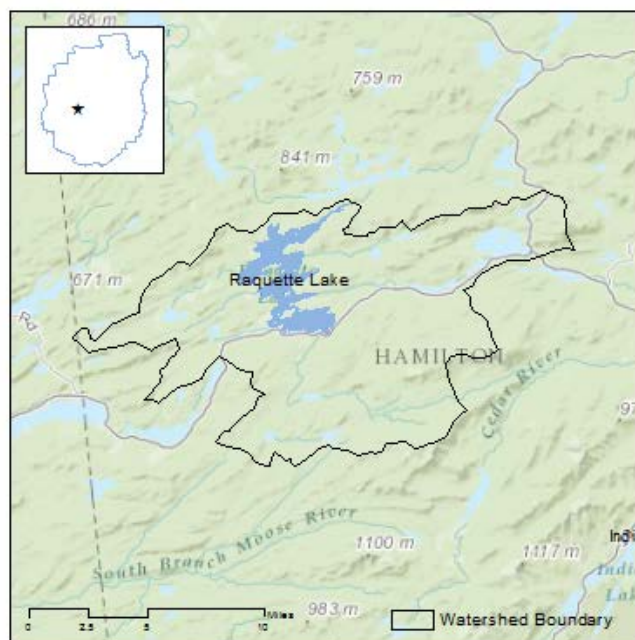
Location	County:	Hamilton
	Town:	Long Lake

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
Oligotrophic	Acidic (acceptable)	Moderate	Present - Low

2018 DATA

Water quality values and historical trends for Raquette Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

| Water Quality Indicator	6/21/2018	7/21/2018	8/20/2018	Average	Trend
Transparency (m)	3.5	3.4	4.1	3.7	Decreasing
Total Phosphorus (µg/L)	5.8	4.5	3.6	4.6	Decreasing
Chlorophyll-*a* (µg/L)	3.7	1.7	2.4	2.6	No Trend
Laboratory pH	6.9	6.2	6.3	6.5	Increasing
Sp. Conductance (µS/cm)	29.5	30.8	31.0	30.4	No Trend
Color (Pt-Co)	34.3	34.3	27.9	32.1	No Trend
Alkalinity (mg/L)			5.8	5.8	Increasing
Chloride (mg/L)			4.0	4.0	No Trend
Calcium (mg/L)			2.5	2.5	Not Analyzed
Sodium (mg/L)			3.5	3.5	No Trend

HISTORICAL DATA
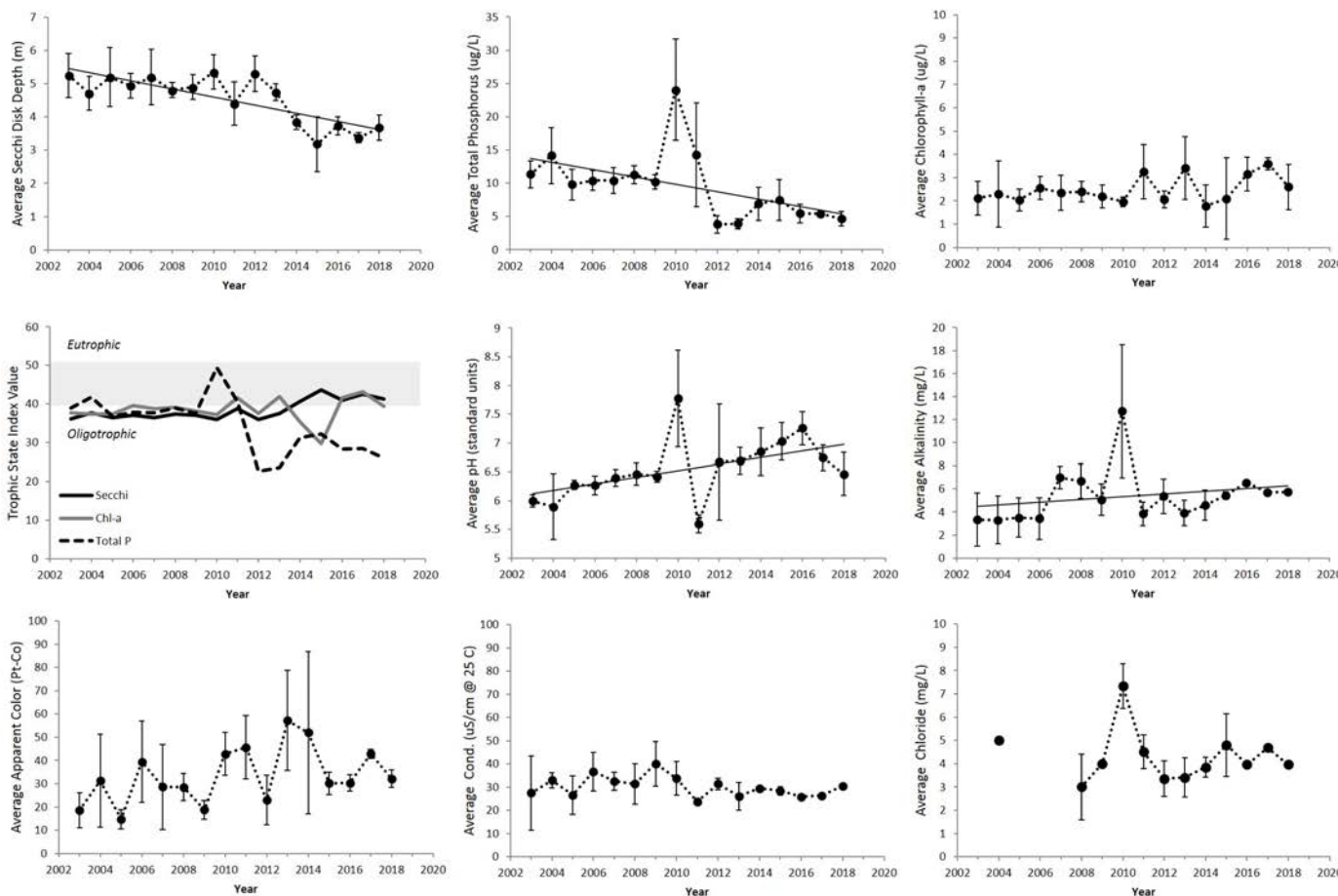
Annual average values of select water quality indicators for Raquette Lake, 2003-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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. ALAP volunteers and the Adirondack Watershed Institute have monitored Raquette Lake since 2003.

- Based on the 2018 data, Raquette Lake is classified as an oligotrophic lake. We detected a downward trend in both transparency and total phosphorus concentration since 2003.

- The water samples analyzed in 2018 were found to be circumneutral in terms of their acidity, averaging 6.5 pH units. The pH of the lake has exhibited a slight increasing trend since 2003.   The alkalinity of the lake was 5.8 mg/L, indicating that the lake has moderate sensitivity to acid deposition.

- Sodium and chloride concentrations were 3.5 and 4.0 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
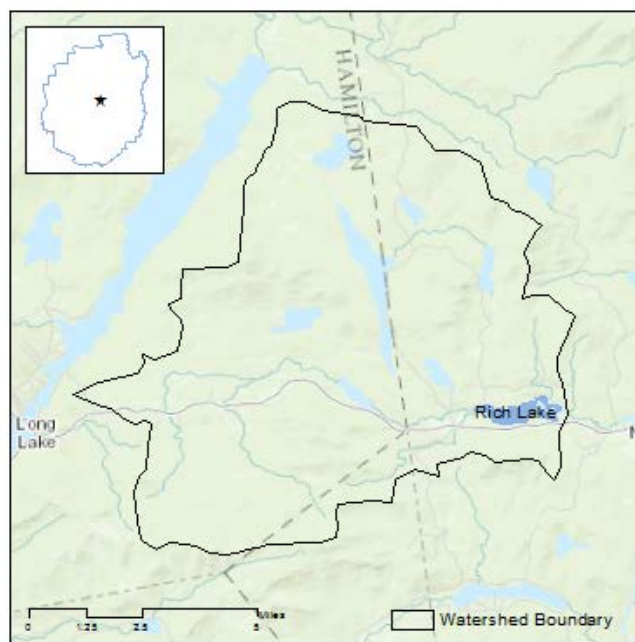
Location	County:	Essex
	Town:	Newcomb

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
Oligotrophic	Acidic (acceptable)	Adequate – low sensitivity	Present - Low

2018 DATA

Water quality values and historical trends for Rich Lake during the 2018 sampling season. Trend analysis was not performed on calcium. BDL=below detection limit.

| Water Quality Indicator	6/20/2018	7/20/2018	8/23/2018	Average	Trend
Transparency (m)	2.8	3.9	3.4	3.4	No Trend
Total Phosphorus (µg/L)	8.8	5.7	6.1	6.9	Decreasing
Chlorophyll-*a* (µg/L)	1.9	1.4	0.6	1.3	Decreasing
Laboratory pH	6.4	6.5	6.5	6.5	No Trend
Sp. Conductance (µS/cm)	33.7	37.5	41.2	37.5	No Trend
Color (Pt-Co)	27.9	34.3	31.1	31.1	No Trend
Alkalinity (mg/L)			10.7	10.7	No Trend
Chloride (mg/L)			4.8	4.8	Increasing
Calcium (mg/L)			4.0	4.0	Not Analyzed
Sodium (mg/L)			3.7	3.7	No Trend

HISTORICAL DATA
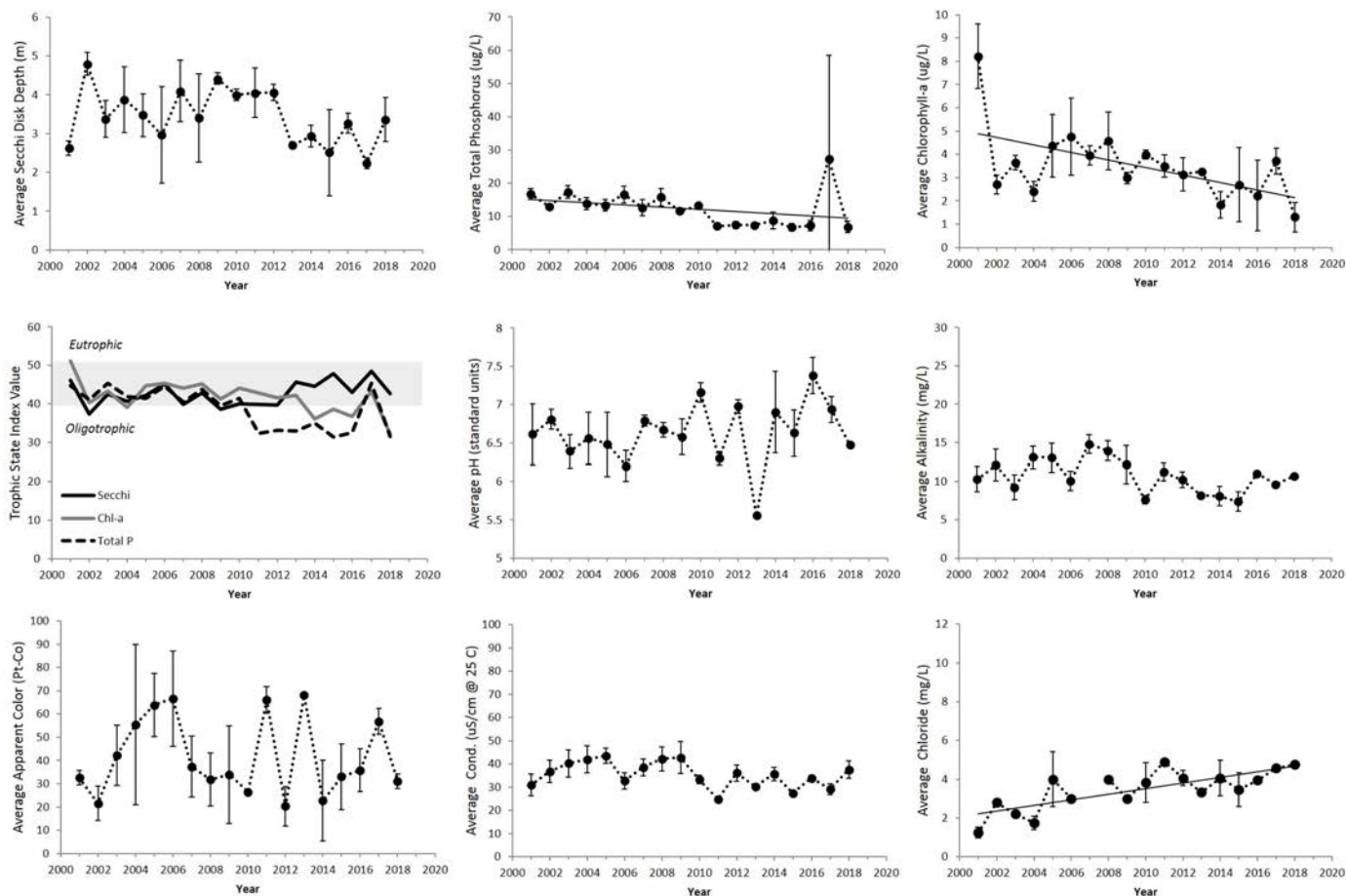
Annual average values of select water quality indicators for Rich Lake, 2001-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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.

- Based on the 2018 data, Rich Lake is best classified as a mesotrophic lake. Total phosphorus and chlorophyll-a concentrations have both has exhibited a significant, downward trend since 1999.

- The water samples analyzed in 2018 were found to be circumneutral in terms of their acidity, with an average pH of 6.5 units. The alkalinity was 10.7 mg/L, indicating moderate sensitivity to acid deposition.

- Sodium and chloride concentration were 3.7 and 4.8 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 since 1999.

SCHROON LAKE
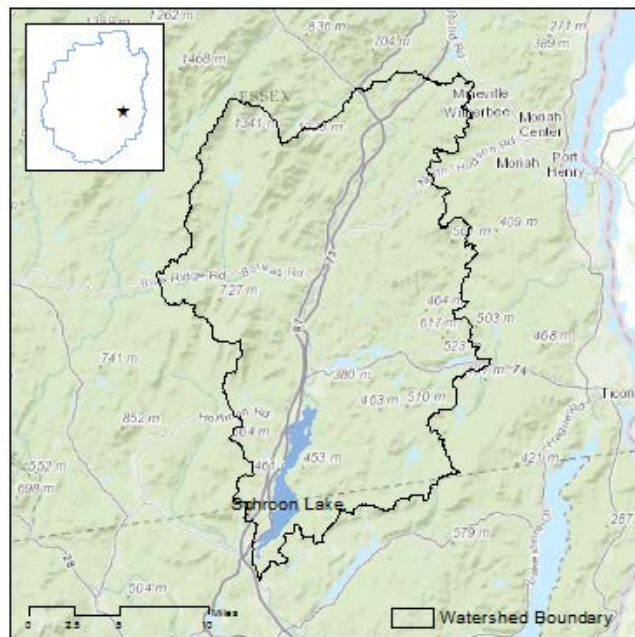
Location	County:	Warren
	Town:	Horicon

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*

2018 DATA

Water quality values and historical trends for Schroon Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

Water Quality Indicator	6/19/2018	7/29/2018	8/28/2018	Average
North				
Transparency (m)	4.4	4.5	4.7	4.5
Total Phosphorus (µg/L)	3.5	1.9	2.0	2.5
Chlorophyll-*a* (µg/L)	1.5	1.3	1.4	1.4
Laboratory pH	7.6	7.0	6.7	7.1
Sp. Conductance (µS/cm)	68.5	78.1	78.8	75.1
Color (Pt-Co)	15.0	15.0	8.6	12.8
Alkalinity (mg/L)			16.3	16.3
Chloride (mg/L)			12.5	12.5
Calcium (mg/L)			6.6	6.6
Sodium (mg/L)			8.5	8.5

Water Quality Indicator	6/19/2018	7/29/2018	8/28/2018	Average	Trend
South					
Transparency (m)	4.4	4.7	4.5	4.5	No Trend
Total Phosphorus (µg/L)	3.8	4.5	3.1	3.8	No Trend
Chlorophyll-a (µg/L)	0.5	1.0	1.2	0.9	No Trend
Laboratory pH	6.2	7.2	6.8	6.7	No Trend
Sp. Conductance (µS/cm)	61.7	75.5	75.5	70.9	No Trend
Color (Pt-Co)	15.0	11.8	5.3	10.7	No Trend
Alkalinity (mg/L)			15.6	15.6	No Trend
Chloride (mg/L)			11.5	11.5	No Trend
Calcium (mg/L)			6.3	6.3	Not Analyzed
Sodium (mg/L)			8.0	8.0	No Trend

HISTORICAL DATA
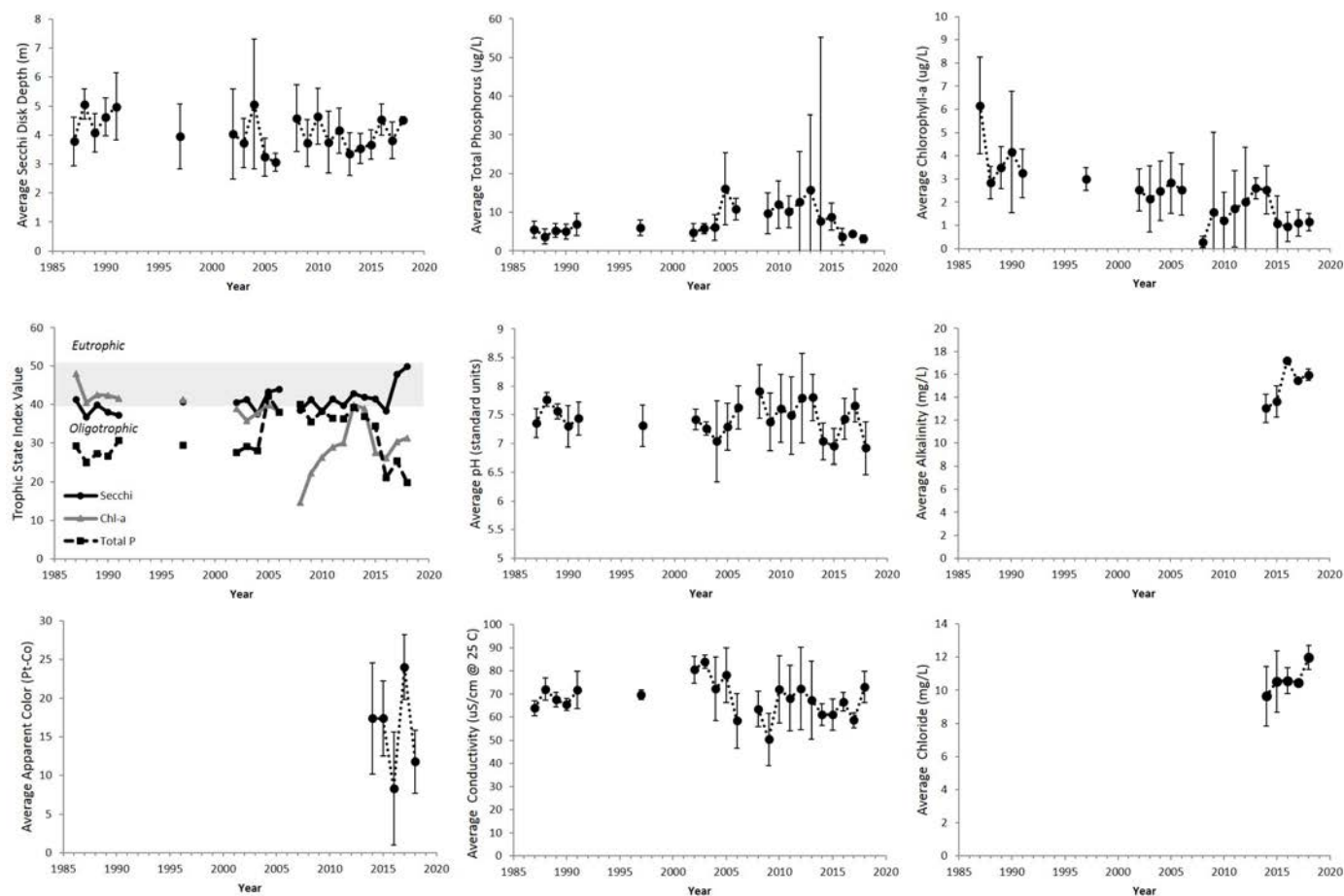
Lake wide annual average values of select water quality indicators for Schroon Lake, 1985-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05). Data from 1987-2013 form CSLAP, data from 2014-present from 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.

- Based on the 2018 data, Schroon Lake is best classified as an oligotrophic Lake. Historically the lake has fluctuated around the oligotrophic – mesotrophic boundary, with no statistical trend observed in transparency, total phosphorus, or transparency.

- Water samples from 2018 were found to be circumneutral in terms of their acidity. Alkalinity averaged 16 mg/L in, indicating that the lake is adequately buffered, with low sensitivity to acid deposition.

- Sodium and chloride concentration was 8.0 and 11.5 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 was greater than 70% of the lakes participating in ALAP.

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SILVER LAKE
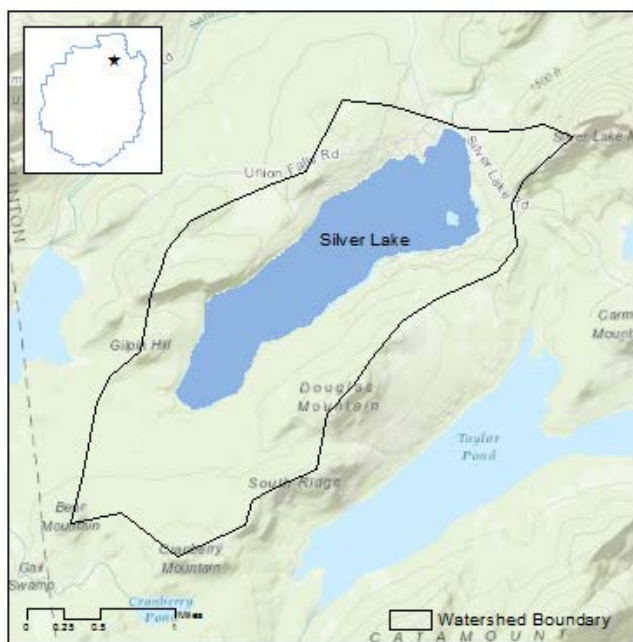
Location	County:	Clinton
	Town:	Black Brook

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

2018 DATA

Water quality values and historical trends for Silver Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

| Water Quality Indicator	6/20/2018	7/14/2018	8/23/2018	Average	Trend
Transparency (m)	5.0	5.3	5.5	5.3	No Trend
Total Phosphorus (µg/L)	5.5	7.9	4.3	5.9	Decreasing
Chlorophyll-*a* (µg/L)	2.9	1.3	1.9	2.1	No Trend
Laboratory pH	7.3	6.6	6.7	6.9	No Trend
Sp. Conductance (µS/cm)	45.3	41.4	46.5	44.4	Increasing
Color (Pt-Co)	15.0	11.8	15.0	13.9	No Trend
Alkalinity (mg/L)			14.4	14.4	No Trend
Chloride (mg/L)			4.4	4.4	Increasing
Calcium (mg/L)			4.6	4.6	Not Analyzed
Sodium (mg/L)			3.1	3.1	No Trend

HISTORICAL DATA
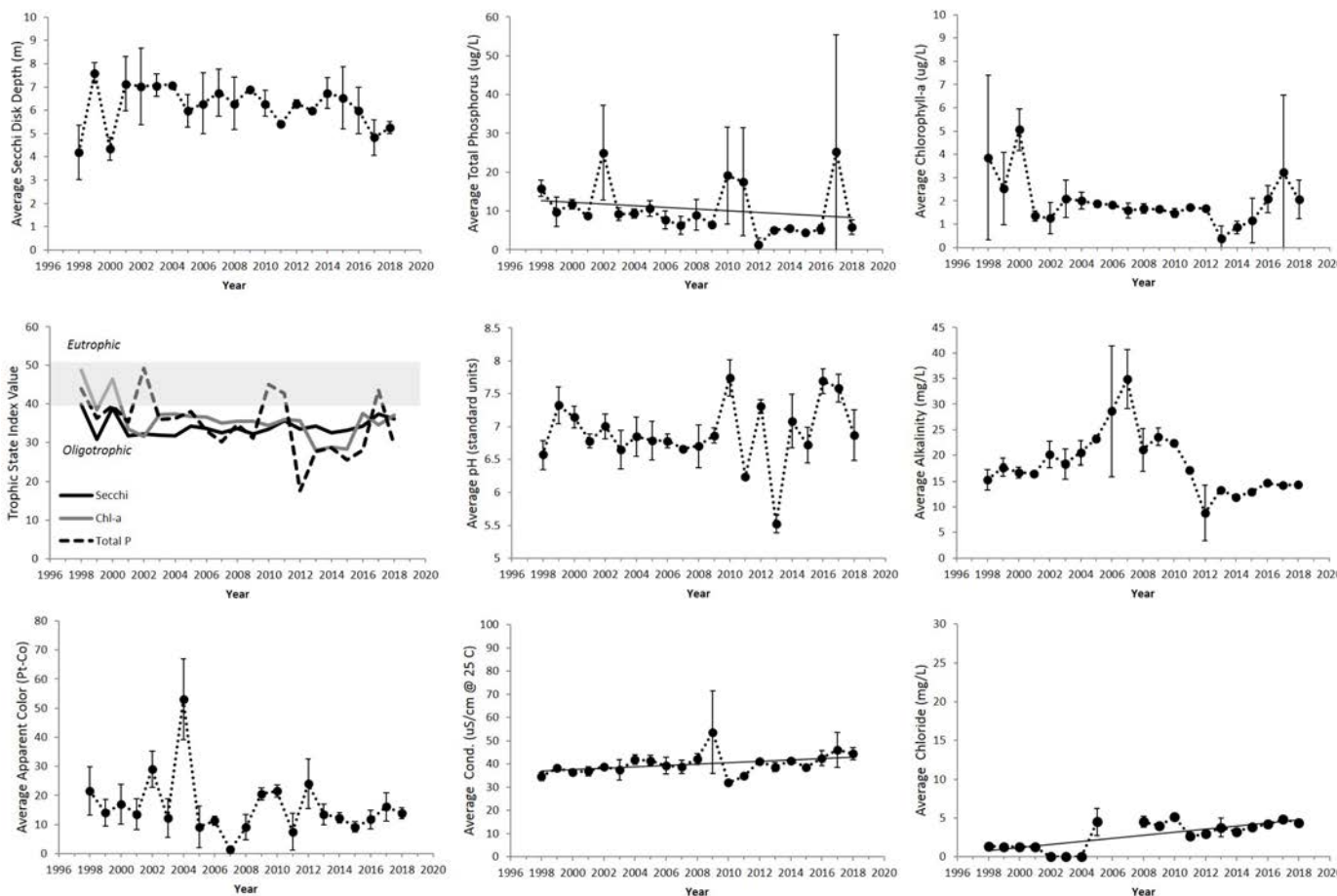
Annual average values of select water quality indicators for Silver Lake, 1998-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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. The transparency of Silver Lake typically fluctuated between 5 and 6 meters, and was greater than 80% of participating lakes in 2018. We observed a slight, yet statistically significant, downward trend in total phosphorus since 1998.

- Water samples from 2018 were found to be circumneutral in terms of their acidity. Alkalinity was 14.4 mg/L, indicating that the lake is not particularly sensitive to acid deposition.

- Sodium and chloride concentration were 3.1 and 4.4 mg/L in 2018, 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
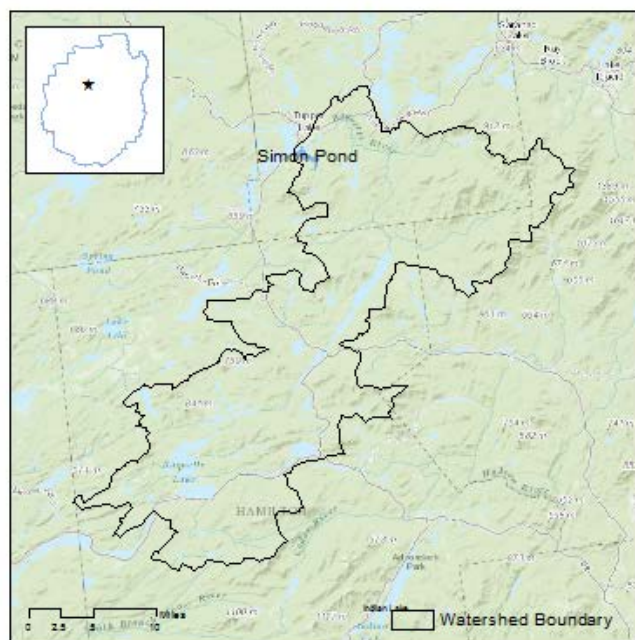
Location	County:	Franklin
	Town:	Tupper Lake

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	Acidic (acceptable)	Moderate	Present - Low

2018 DATA

Water quality values and historical trends for Simon Pond during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

| Water Quality Indicator	6/25/2018	7/15/2018	8/11/2018	Average	Trend
Transparency (m)	4.2	4.5	7.5	5.4	Increasing
Total Phosphorus (µg/L)	6.8	5.9	4.5	5.7	No Trend
Chlorophyll-*a* (µg/L)	1.4	2.5	1.8	1.9	Decreasing
Laboratory pH	6.4	6.4	6.2	6.3	No Trend
Sp. Conductance (µS/cm)	22.4	24.7	27.4	24.8	Decreasing
Color (Pt-Co)	27.9	27.9	27.9	27.9	No Trend
Alkalinity (mg/L)			7.2	7.2	No Trend
Chloride (mg/L)			2.5	2.5	No Trend
Calcium (mg/L)			2.7	2.7	Not Analyzed
Sodium (mg/L)			2.3	2.3	No Trend

HISTORICAL DATA
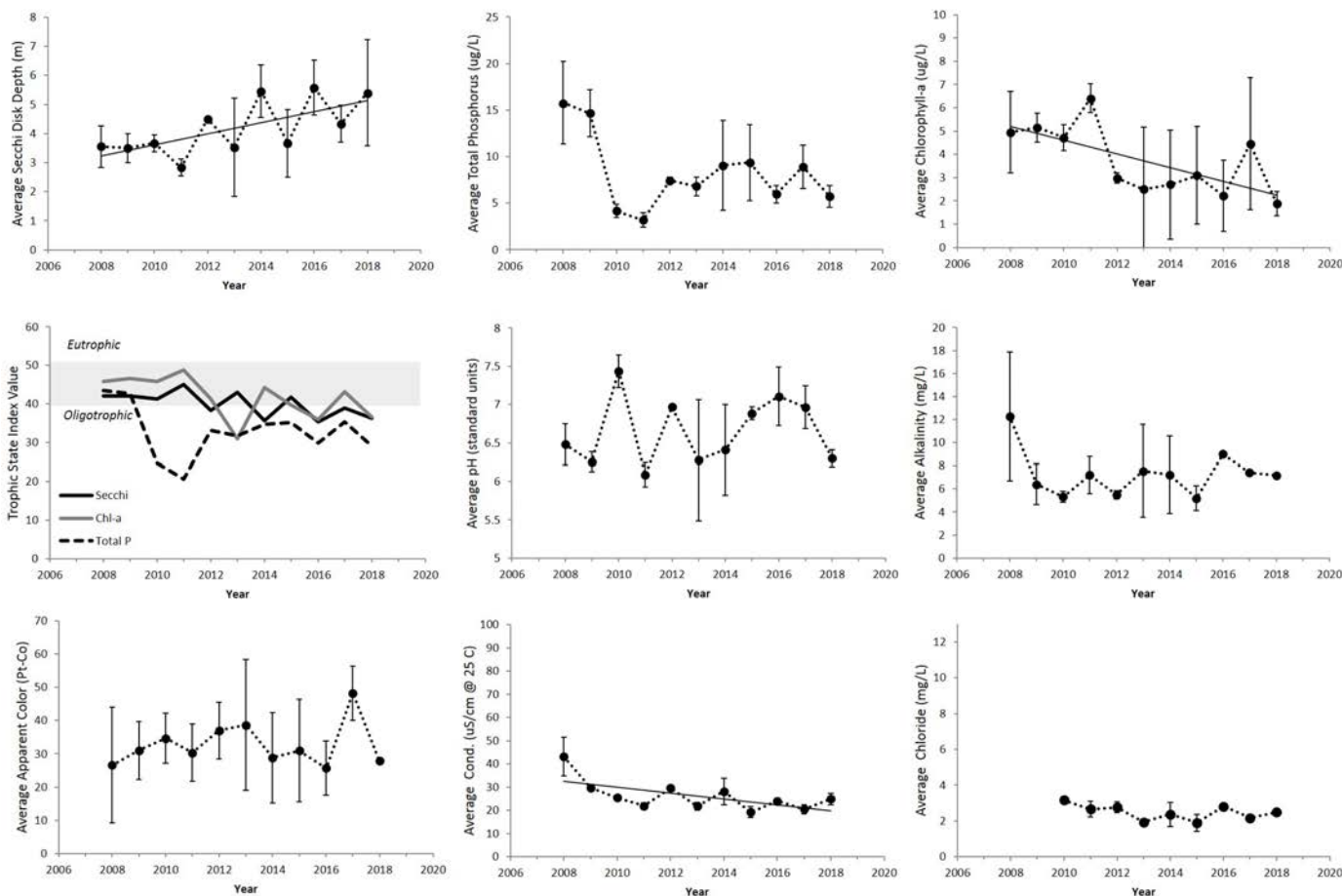
Annual average values of select water quality indicators for Simon Pond, 2008-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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 massive 132,235 ha watershed that is dominated by forests. Simon Pond has been monitored by ALAP volunteers and the Adirondack Watershed Institute since 2008.

- Simon Pond is best classified as an oligotrophic lake. Trophic indicators and water quality variables have been highly variable over time. This variability is certainly related to the flushing rate of the pond, which is estimated to be 54 times per year.   We detected a significant reduction in chlorophyll-a since monitoring began in 2008.

- The water samples analyzed in 2018 were found to be slightly acidic in terms of their acidity, averaging 6.3 pH units. The alkalinity of the lake was 7.2 mg/L, indicating that the lake has moderate sensitivity to acid deposition.

- Sodium and chloride concentrations of the lake were 2.3 and 2.5 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
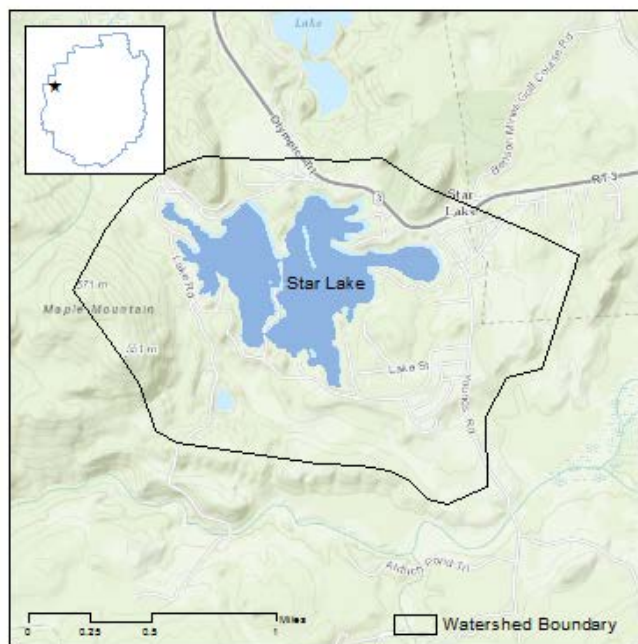
Location	County:	St Lawrence
	Town:	Fine

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

2018 DATA

Water quality values and historical trends for Star Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

| Water Quality Indicator	6/20/2018	7/22/2018	8/24/2018	Average	Trend
Transparency (m)	6.0		5.0	5.5	No Trend
Total Phosphorus (µg/L)	6.3	4.8	4.0	5.0	Decreasing
Chlorophyll-*a* (µg/L)	0.9	0.9	1.1	1.0	No Trend
Laboratory pH	6.4	7.3	7.1	6.9	No Trend
Sp. Conductance (µS/cm)	39.0	66.1	67.0	57.4	No Trend
Color (Pt-Co)	11.8	18.2	8.6	12.8	No Trend
Alkalinity (mg/L)			13.4	13.4	No Trend
Chloride (mg/L)			13.0	13.0	No Trend
Calcium (mg/L)			4.4	4.4	Not Analyzed
Sodium (mg/L)			8.1	8.1	No Trend

HISTORICAL DATA
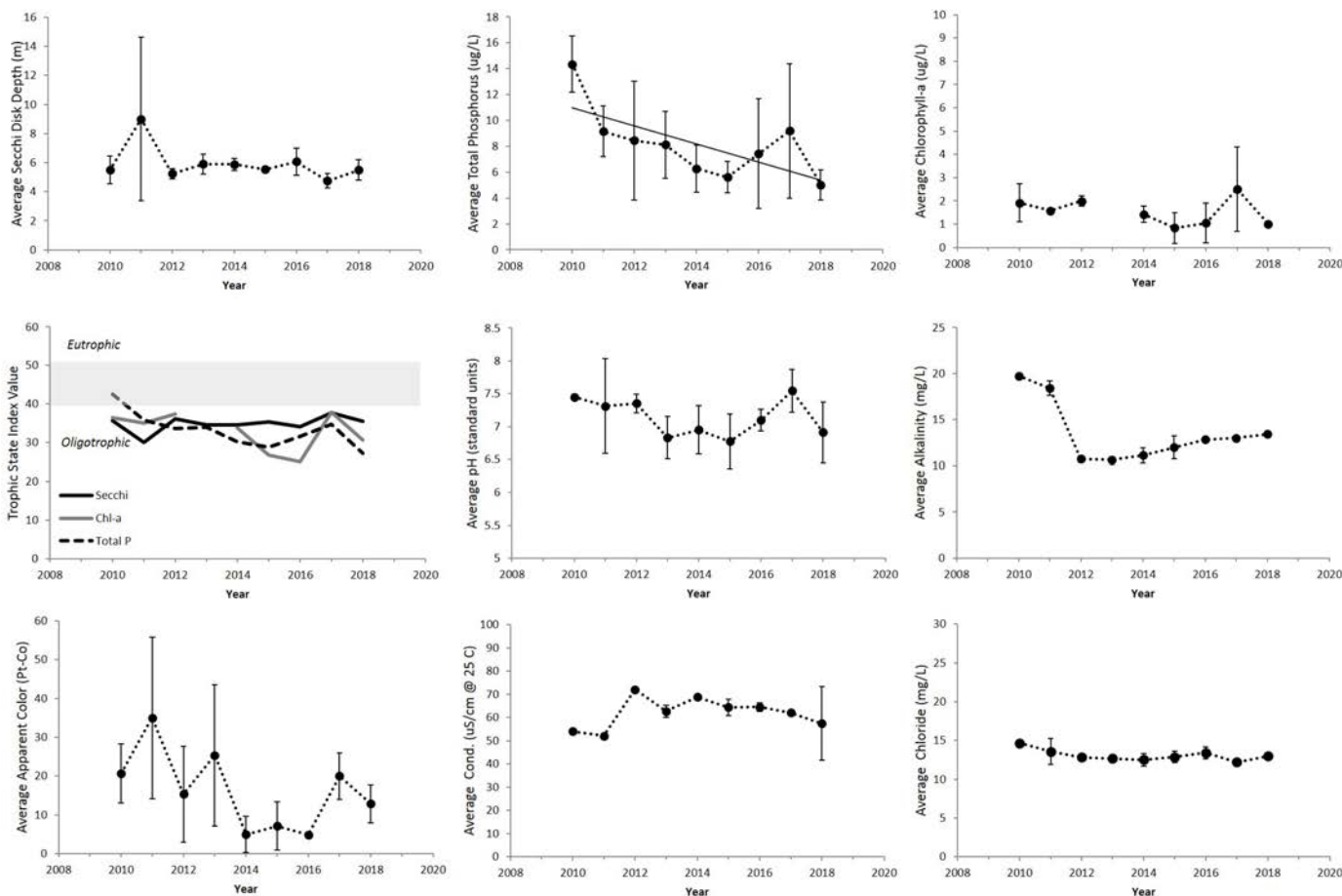
Annual average values of select water quality indicators for Star Lake, 2010-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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 5.5 meters in 2018, which is greater than 88% of participating ALAP lakes. We detected a downward trend in total phosphorus since monitoring began in 2010.

- The water samples analyzed in 2018 were found to be circumneutral in terms of its acidity, with an average of 6.9 pH units. The alkalinity was 13.4 mg/L, indicating relatively low sensitivity to acid deposition.

- Sodium and chloride concentration were 8.1 and 13.0 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 79% of participating ALAP lakes and approximately 65 times greater than background concentration for least impacted lakes in the Adirondack region.

STONY CREEK POND
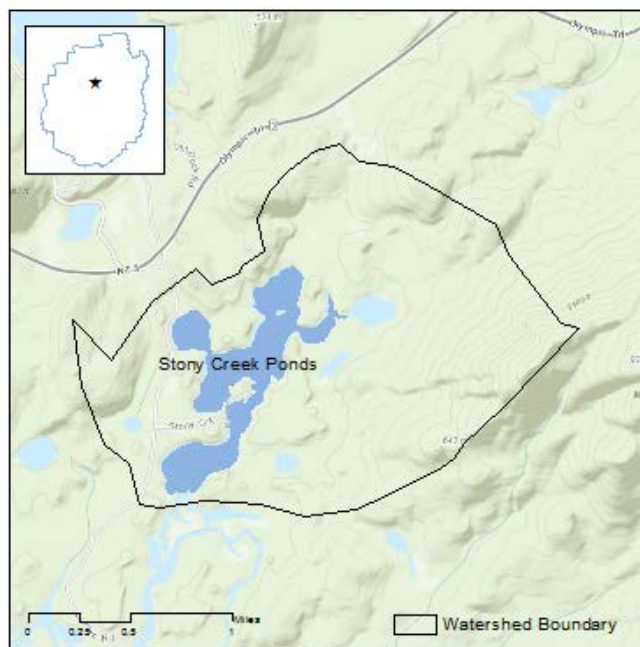
Location	County:	Franklin
	Town:	Harrietstown

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	Adequate – low sensitivity	Present - Low

2018 DATA

Water quality values and historical trends for Stony Creek Pond during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

| Water Quality Indicator	5/24	6/22	7/18	8/24	9/16	Average	Trend
Transparency (m)	3.0	3.3	3.5	3.6	3.8	3.4	No Trend
Total Phosphorus (µg/L)	8.1	7.0	10.2	5.3	6.9	7.5	Decreasing
Chlorophyll-*a* (µg/L)	2.5	2.2	1.8	1.9	0.2	1.7	Decreasing
Laboratory pH	7.1	7.2	6.6	6.8	7.3	7.0	No Trend
Sp. Conductance (µS/cm)	26.3	34.7	33.9	40.2	41.3	35.3	No Trend
Color (Pt-Co)	37.5	31.1	34.3	21.4	21.4	29.1	No Trend
Alkalinity (mg/L)				13.1		13.1	Decreasing
Chloride (mg/L)				3.6		3.6	No Trend
Calcium (mg/L)				4.3		4.3	Not Analyzed
Sodium (mg/L)				2.4		2.4	No Trend

HISTORICAL DATA
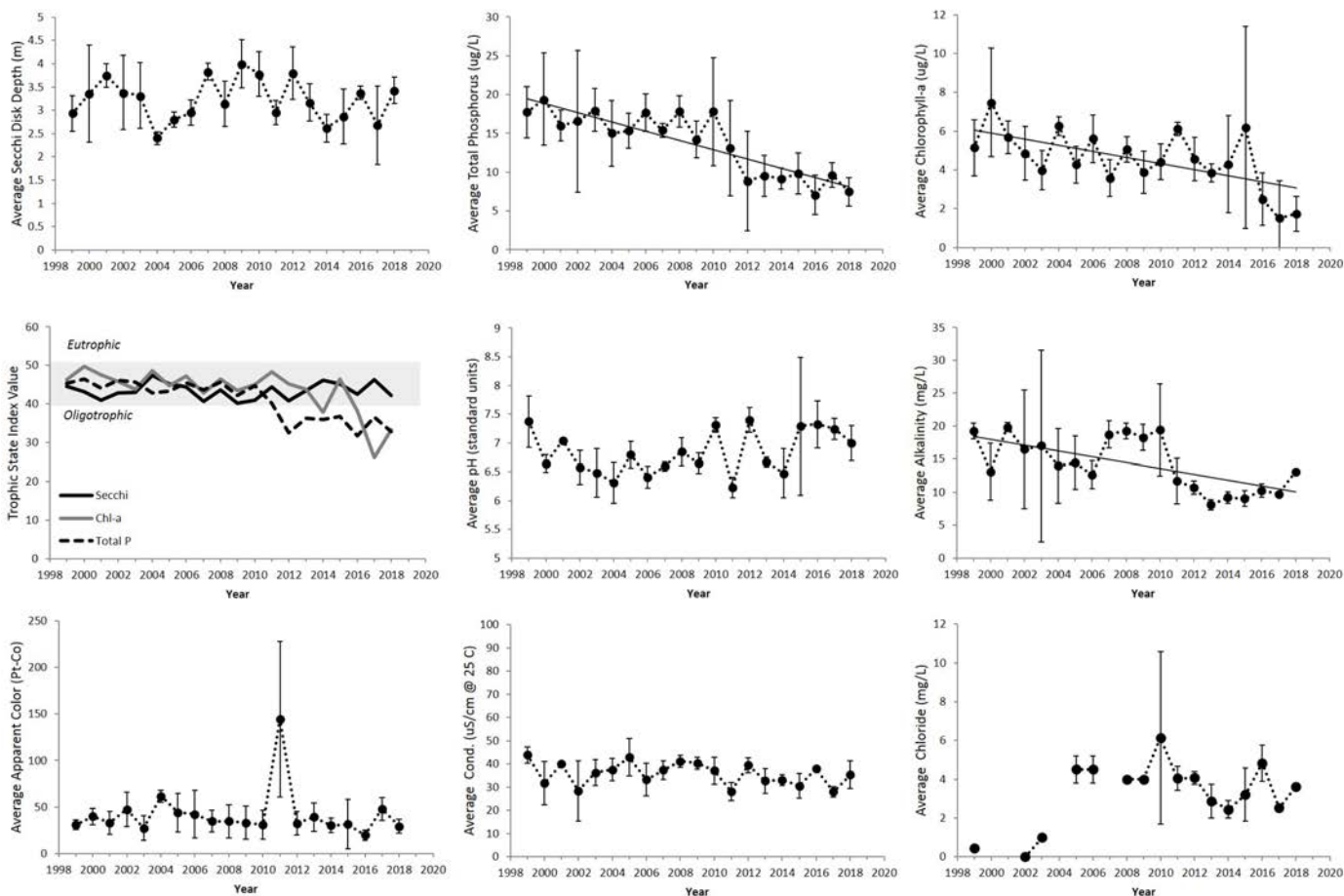
Annual average values of select water quality indicators for Stony Creek Pond, 1999-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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 since monitoring began in 1999.

- The water samples analyzed in 2018 were found to be circumneutral in terms of their acidity, with an average pH of 7.0 units. The alkalinity was 13.1 mg/L, indicating low sensitivity to acid deposition.

- Sodium and chloride concentration were 2.4 and 3.6 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
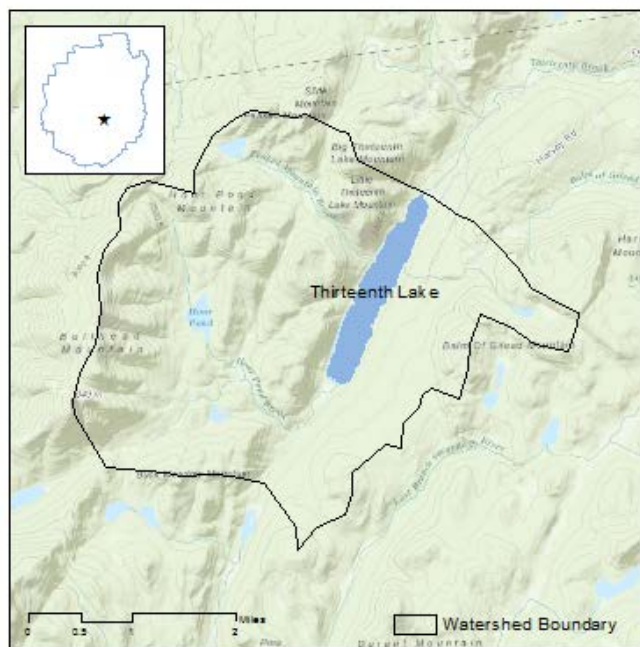
Location		
	County:	Warren
	Town:	Johnsburg

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
Oligotrophic	*Circumneutral*	*Moderate*	*Not Significant*

2018 DATA

Water quality values and historical trends for Thirteenth Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

| Water Quality Indicator	June	7/20/2018	8/19/2018	Average	Trend
Transparency (m)		4.8	6.1	5.4	No Trend
Total Phosphorus (µg/L)		3.9	3.5	3.7	No Trend
Chlorophyll-*a* (µg/L)		1.1	1.8	1.4	No Trend
Laboratory pH		7.0	7.6	7.3	Increasing
Sp. Conductance (µS/cm)		20.7	21.4	21.1	Decreasing
Color (Pt-Co)		21.4	15.0	18.2	No Trend
Alkalinity (mg/L)			8.6	8.6	No Trend
Chloride (mg/L)			1.0	1.0	No Trend
Calcium (mg/L)			2.7	2.7	Not Analyzed
Sodium (mg/L)			1.1	1.1	No Trend

HISTORICAL DATA
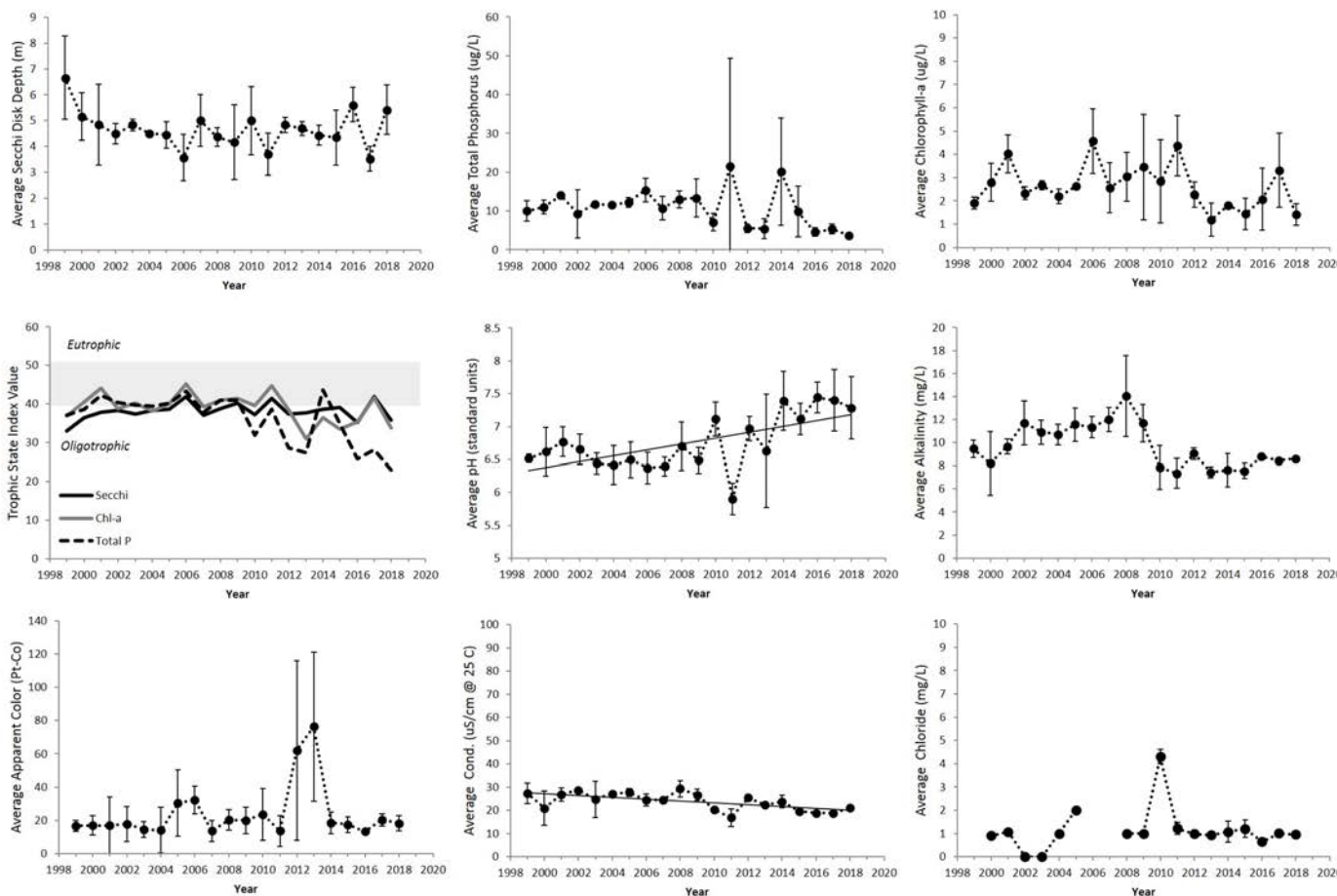
Annual average values of select water quality indicators for Thirteenth Lake, 1999-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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. ALAP volunteers and the Adirondack Watershed Institute have monitored Thirteenth Lake since 1999. Only two samples were received by the lab in 2018.

- Based on the 2018 data Thirteenth Lake is best classified as an oligotrophic lake. Historically, the lake has fluctuated around the oligotrophic-mesotrophic boundary.   Data on transparency depth, and the concentrations of total phosphorus and chlorophyll-a have not exhibited any statistical trends over time.

- The water samples analyzed in 2018 were found to be circumneutral in terms of their acidity, with an average pH of 7.3 units. We detected a statistically significant increasing trend in pH since monitoring began in 1999. The alkalinity was 8.6 mg/L, indicating moderate sensitivity to acid deposition.

- Sodium and chloride concentration were 1.1 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
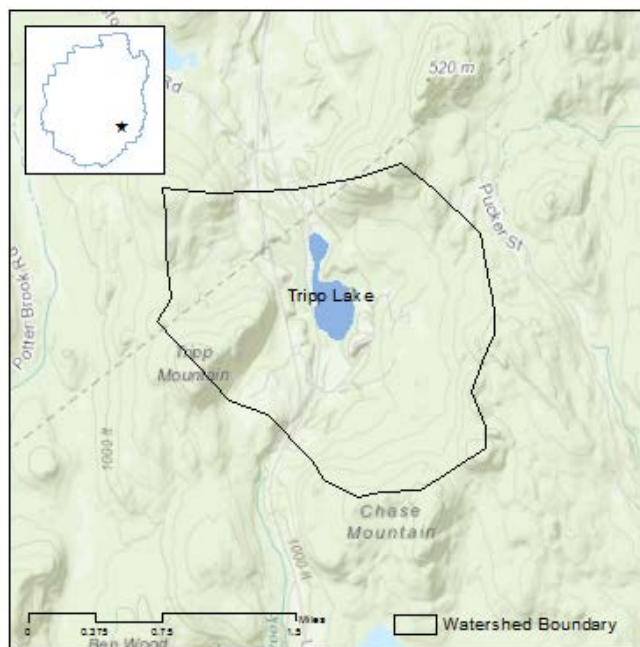
Location	County:	Warren
	Town:	Warrensburg

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
Oligotrophic	*Circumneutral*	*Well buffered – not sensitive*	*Moderate*

2018 DATA

Water quality values and historical trends for Tripp Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

| Water Quality Indicator	6/17/2018	7/15/2018	8/19/2018	Average	Trend
Transparency (m)	4.5	3.6	3.9	4.0	No Trend
Total Phosphorus (µg/L)	6.3	6.2	5.0	5.8	No Trend
Chlorophyll-*a* (µg/L)	2.4	1.8	2.7	2.3	No Trend
Laboratory pH	6.9	6.3	6.8	6.7	No Trend
Sp. Conductance (µS/cm)	84.6	103.8	109.6	99.3	No Trend
Color (Pt-Co)	15.0	24.6	15.0	18.2	No Trend
Alkalinity (mg/L)			27.6	27.6	Decreasing
Chloride (mg/L)			13.8	13.8	No Trend
Calcium (mg/L)			10.8	10.8	Not Analyzed
Sodium (mg/L)			9.1	9.1	No Trend

HISTORICAL DATA
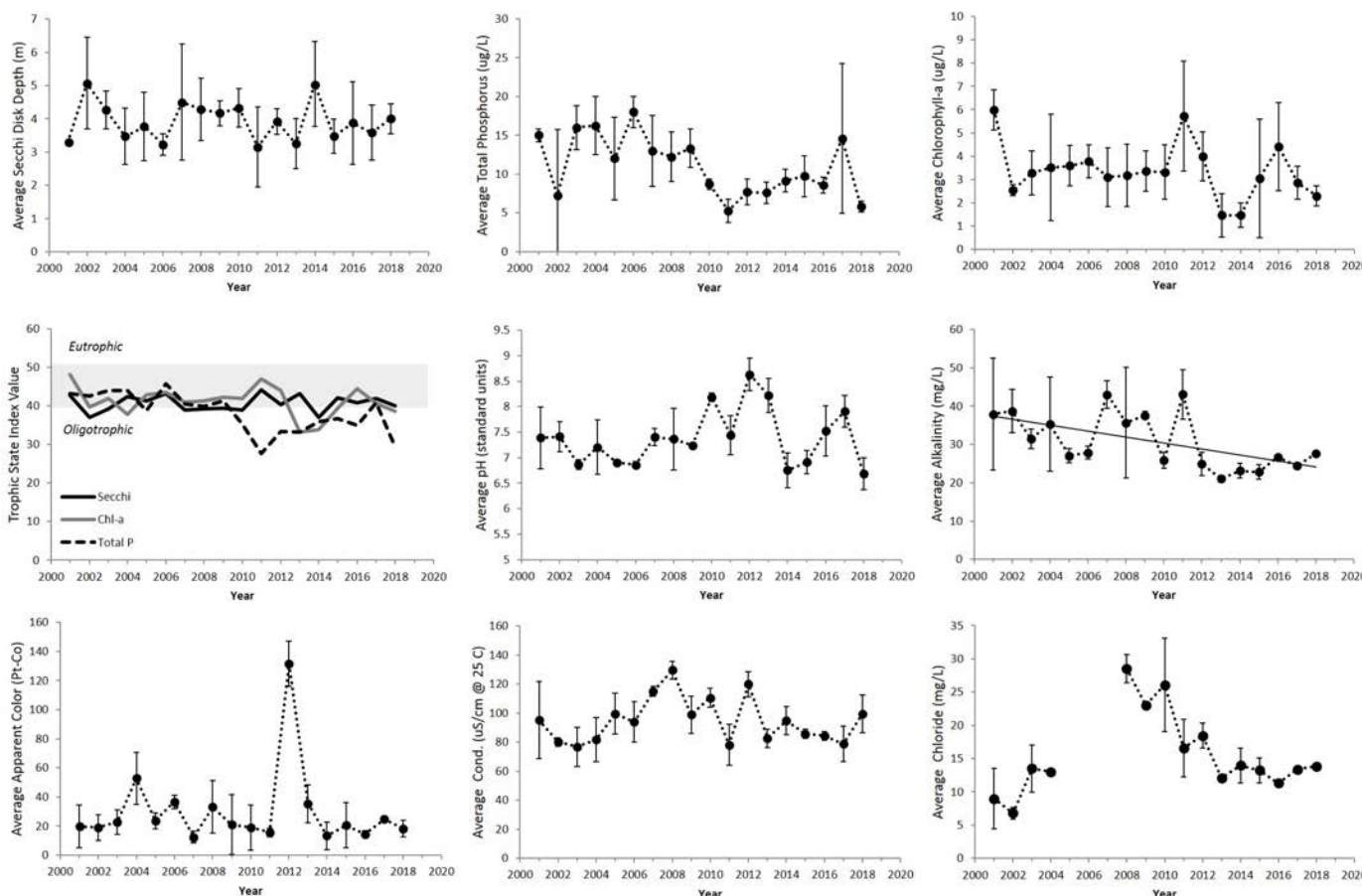
Annual average values of select water quality indicators for Tripp Lake, 2001-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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. ALAP volunteers and the Adirondack Watershed Institute have monitored Tripp Pond since 1999.

• Based on the 2018 data Tripp Pond is best classified as an oligotrophic lake. Historically, the lake has fluctuated around the oligotrophic-mesotrophic boundary.   Data on transparency depth, and the concentrations of total phosphorus and chlorophyll-a have not exhibited any statistical trends over time.

• The water samples analyzed in 2018 were found to be circumneutral in terms of their acidity. The alkalinity was 27.6 mg/L, indicating that the lake is well buffered and has low sensitivity to acid deposition.

• Sodium and chloride concentration were 9.1 and 13.8 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 70 times greater than the median concentration for least impacted lakes in the Adirondack region.

TROUT LAKE
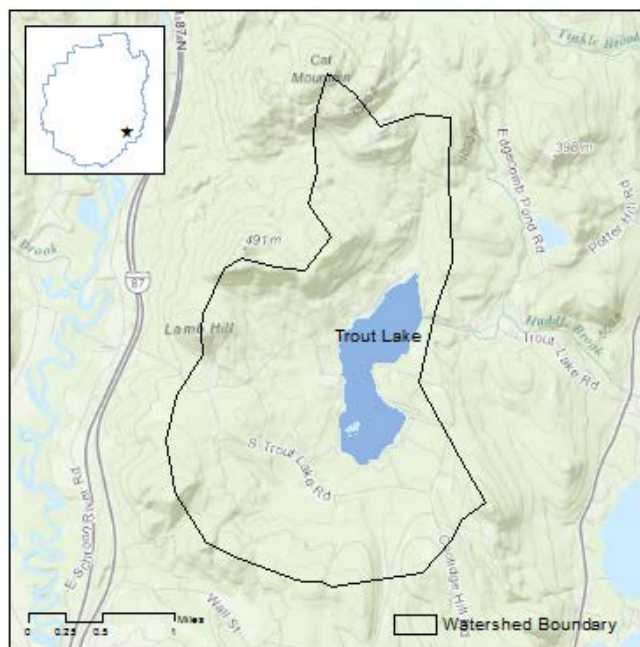
Location	County:	Warren
	Town:	Bolton

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*	*Well buffered – not sensitive*	*Moderate*

2018 DATA

Water quality values and historical trends for Trout Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

| Water Quality Indicator	6/22/2018	7/22/2018	8/24/2018	Average	Trend
Transparency (m)	7.0	5.5	9.4	7.3	No Trend
Total Phosphorus (µg/L)	5.4	7.4	7.9	6.9	Decreasing
Chlorophyll-*a* (µg/L)	1.1	1.6	2.2	1.6	No Trend
Laboratory pH	7.7	7.6	7.8	7.7	Increasing
Sp. Conductance (µS/cm)	116.7	124.1	124.7	121.8	Increasing
Color (Pt-Co)	8.6	21.4	18.2	16.1	No Trend
Alkalinity (mg/L)			26.7	26.7	No Trend
Chloride (mg/L)			19.8	19.8	Increasing
Calcium (mg/L)			10.3	10.3	Not Analyzed
Sodium (mg/L)			11.9	11.9	No Trend

HISTORICAL DATA
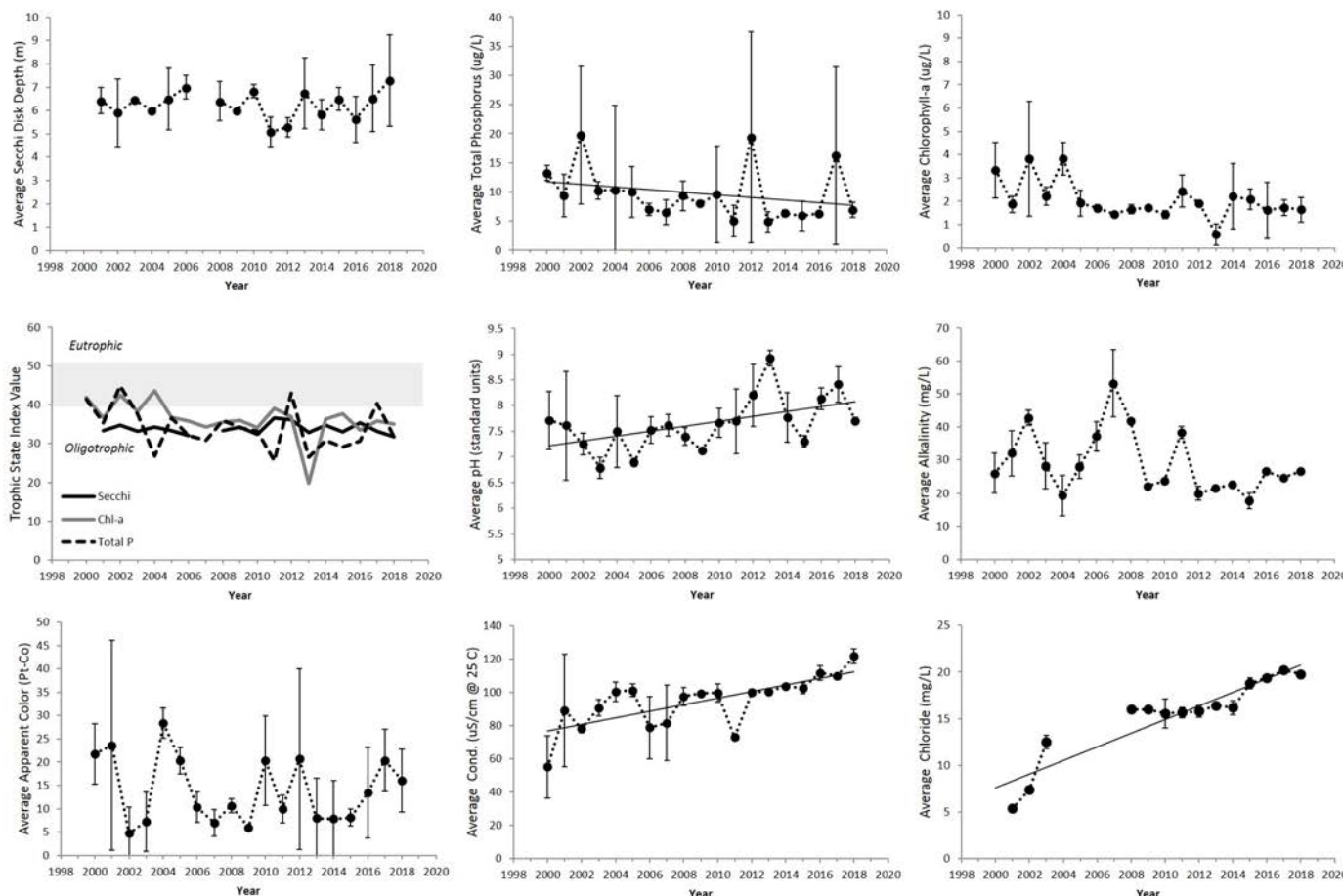
Annual average values of select water quality indicators for Trout Lake, 2000-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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 stable transparency that was greater than 90% of ALAP participants in 2018. Average annual total phosphorus concentration has exhibited a slight, yet statistically significant, downward trend since 2000.

• The water samples analyzed in 2018 were found to be slightly alkaline in terms of their acidity, averaging 7.7 pH units. The alkalinity was 26.7 mg/L, indicating that the lake is well buffered and has low sensitivity to acid deposition.

• Sodium and chloride concentration were 11.9 and 19.8 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 86% of participating ALAP Lakes, and is exhibiting an increasing trend over time.

TUPPER LAKE
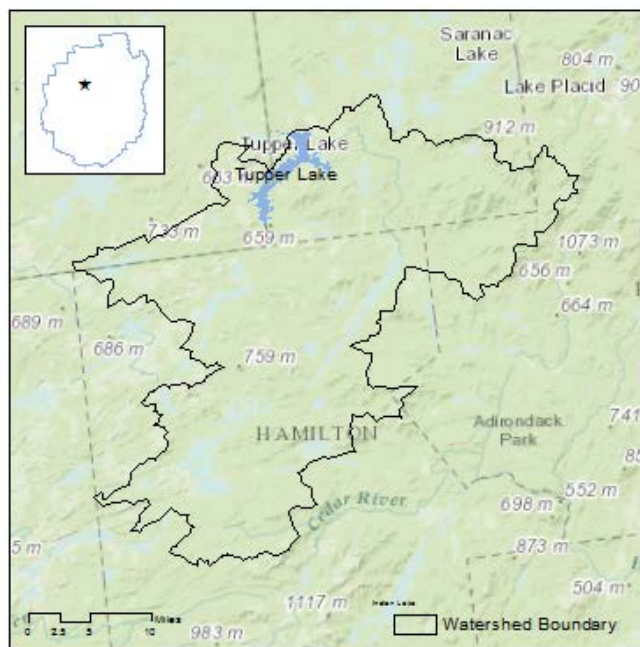
Location	County:	Franklin
	Town:	Tupper Lake

Lake Characteristics	Surface Area (ha):	2447
	Shoreline Length (km):	118
	Max. Depth (m):	25.9
	Volume (m²):	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	Acidic (acceptable)	Moderate	Present - Low

2018 DATA

Water quality values and historical trends for Tupper Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

| Water Quality Indicator	6/25/2018	7/15/2018	8/11/2018	Average	Trend
Transparency (m)	3.3	4.5	8.0	5.3	No Trend
Total Phosphorus (µg/L)	5.5	6.1	5.0	5.5	Decreasing
Chlorophyll-*a* (µg/L)	1.8	2.9	1.6	2.1	No Trend
Laboratory pH	6.4	6.4	6.3	6.3	No Trend
Sp. Conductance (µS/cm)	23.3	23.8	27.3	24.8	Decreasing
Color (Pt-Co)	34.3	31.1	31.1	32.1	No Trend
Alkalinity (mg/L)			6.7	6.7	No Trend
Chloride (mg/L)			3.2	3.2	No Trend
Calcium (mg/L)			2.5	2.5	Not Analyzed
Sodium (mg/L)			2.4	2.4	No Trend

HISTORICAL DATA
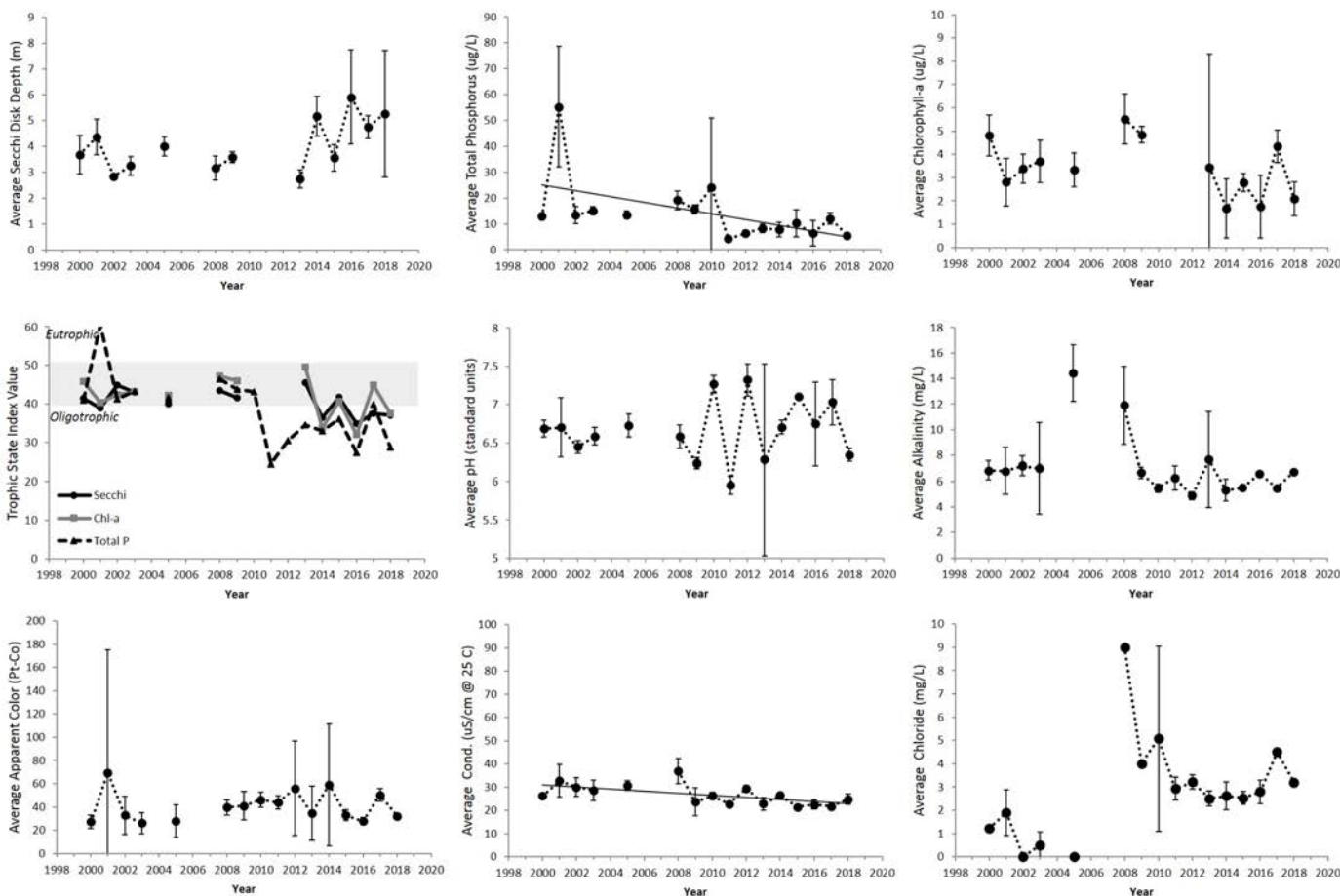
Annual average values of select water quality indicators for Tupper Lake, 2000-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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. Some of the historical variability may be related to shifting sampling locations, as there are several different sampling locations listed in the database. We detected a significant downward trend in total phosphorus since monitoring began.

- The water samples analyzed in 2018 were found to be slightly acidic in terms of their acidity, with an average pH of 6.3 units. The alkalinity was 6.7 mg/L, indicating moderate sensitivity to acid deposition.

- Sodium and chloride concentration were 3.2 and 2.4 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
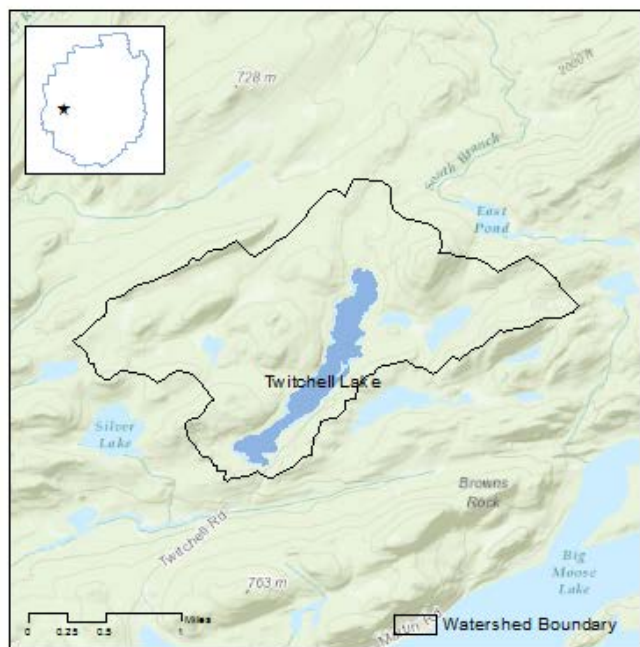
Location	County:	Herkimer
	Town:	Webb

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
	Residential (%):	0
	Local Roads (km):	0.3
	State Roads (km):	0

| TROPHIC STATE	ACIDITY	ACID NEUTRALIZING CAPACITY	ROAD SALT INFLUENCE
Oligotrophic	Acidic (acceptable)	Moderate	Not Significant

2018 DATA

Water quality values and historical trends for Twitchell Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

| Water Quality Indicator	6/16/2018	7/14/2018	8/19/2018	Average	Trend
Transparency (m)	3.9	4.1	3.5	3.8	No Trend
Total Phosphorus (µg/L)	9.1	11.7	7.4	9.4	Decreasing
Chlorophyll-*a* (µg/L)	1.3	2.7	2.4	2.1	No Trend
Laboratory pH	6.1	5.9	6.5	6.2	Increasing
Sp. Conductance (µS/cm)	8.8	8.1	8.3	8.4	Decreasing
Color (Pt-Co)	27.9	27.9	24.6	26.8	Increasing
Alkalinity (mg/L)			2.7	2.7	No Trend
Chloride (mg/L)			0.6	0.6	No Trend
Calcium (mg/L)			1.0	1.0	Not Analyzed
Sodium (mg/L)			0.6	0.6	No Trend

HISTORICAL DATA
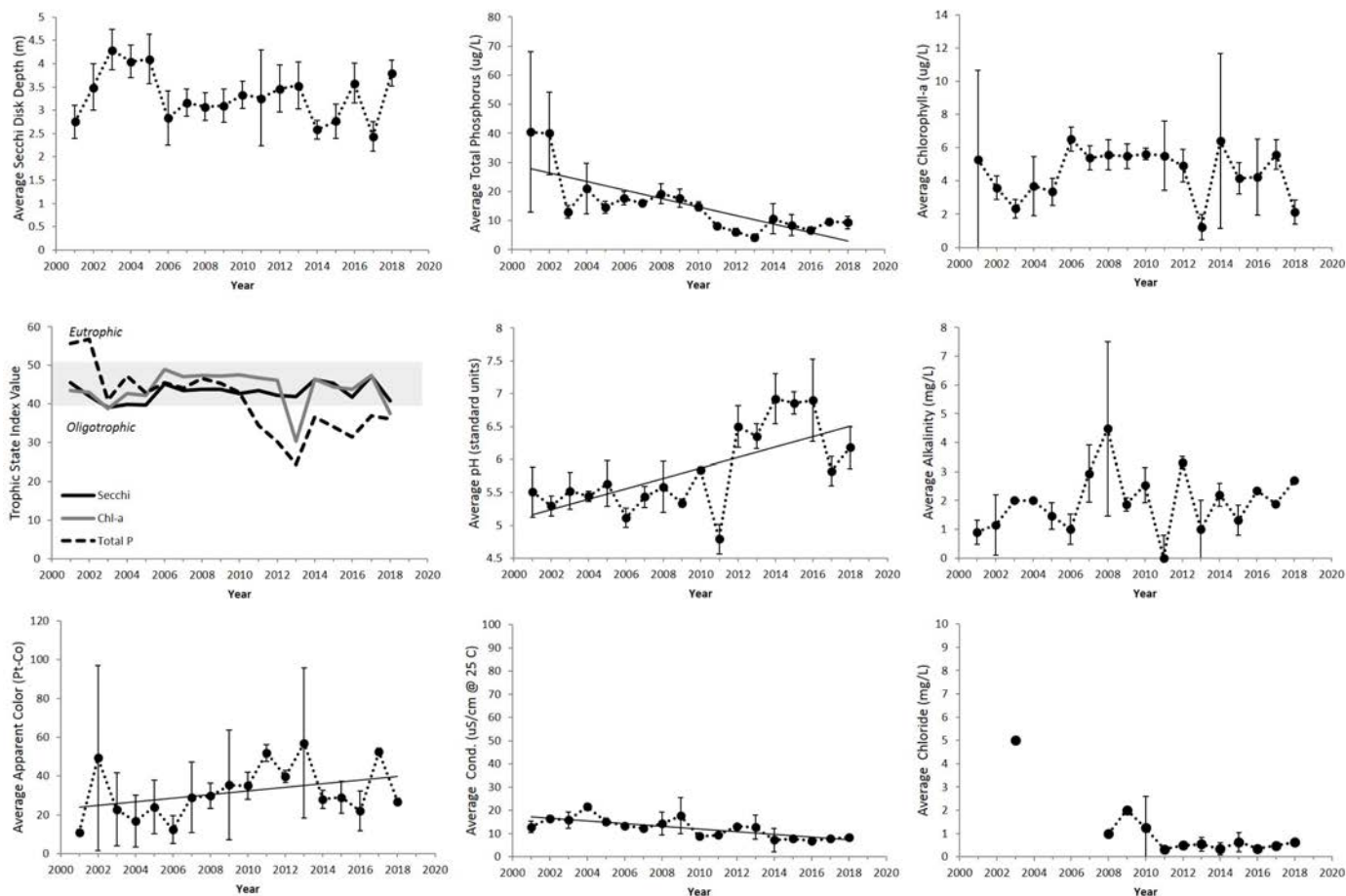
Annual average values of select water quality indicators for Twitchell Lake, 2001-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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 since monitoring began. This downward trend is largely driven by unusually high phosphorus concentrations in 2001-2002.

- The water samples analyzed in 2018 were found to be acidic, with an average pH of 6.2 units; however, pH values have been substantially higher in recent years and have displayed an increasing trend since 2001. The alkalinity was 2.7 mg/L, indicating that the lake is still highly sensitive to acid deposition.

- Sodium and chloride concentration were 0.6 for both ions. These values are within the range we would expect for a watershed lacking salted state roads.

UPPER CHATEAUGAY LAKE
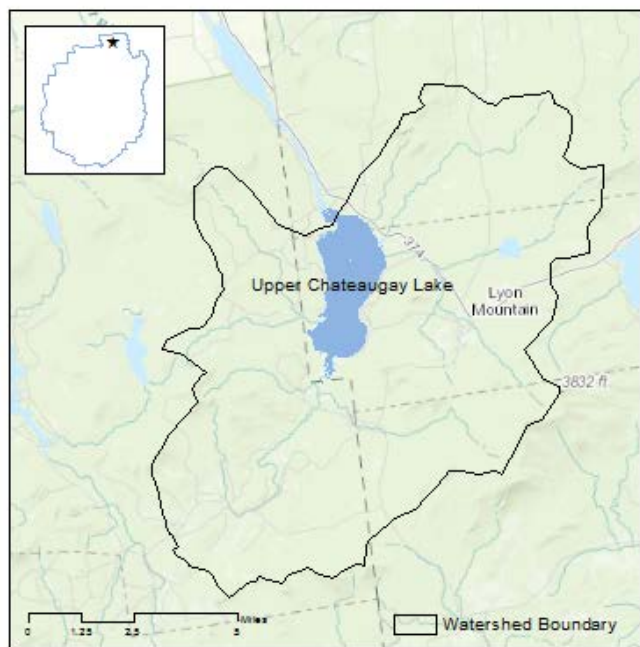
Location	County:	Clinton
	Town:	Dannemora

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	Circumneutral	Well buffered – not sensitive	Moderate

2018 DATA

Water quality values and historical trends for Upper Chateaugay Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

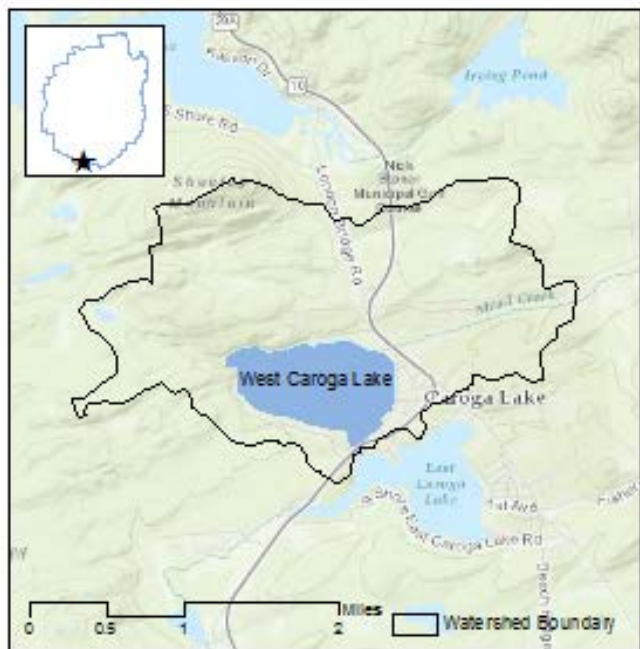| Water Quality Indicator	6/23/2018	7/16/2018	8/26/2018	Average	Trend
Transparency (m)	4.2	4.2	3.9	4.1	No Trend
Total Phosphorus (µg/L)	9.4	9.3	26.0	14.9	Decreasing
Chlorophyll-*a* (µg/L)	3.5	4.3	3.2	3.7	Decreasing
Laboratory pH	7.5	7.0	6.8	7.1	No Trend
Sp. Conductance (µS/cm)	65.1	61.3	70.8	65.7	No Trend
Color (Pt-Co)	34.3	37.5	27.9	33.2	No Trend
Alkalinity (mg/L)			27.8	27.8	No Trend
Chloride (mg/L)			6.3	6.3	No Trend
Calcium (mg/L)			7.9	7.9	Not Analyzed
Sodium (mg/L)			4.1	4.1	No Trend

HISTORICAL DATA
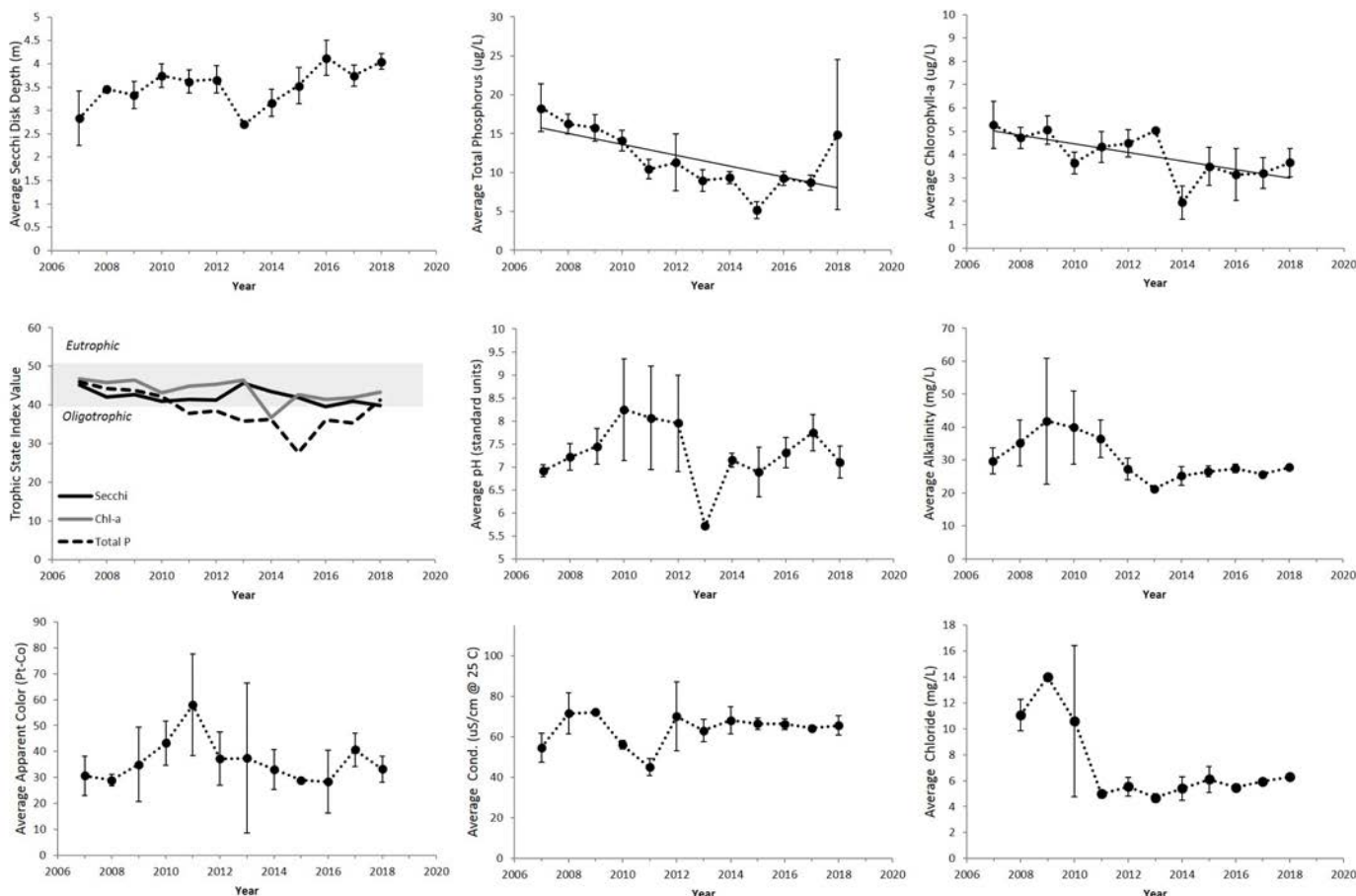
Annual average values of select water quality indicators for Upper Chateaugay Lake, 2007-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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. ALAP volunteers and the Adirondack Watershed Institute have monitored Upper Chateaugay Lake 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 since 2007.

- The water samples analyzed in 2018 were found to be circumneutral in terms of their acidity, with an average pH of 7.1 units. The alkalinity was 27.8 mg/L, indicating that the lake is not sensitive to acid deposition.

- Sodium and chloride concentration averaged 4.1 and 6.3 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

2018 DATA

Water quality values for West Caroga Lake during the 2018 sampling season. Trend analysis will be performed after five years of consecutive data collection. BDL=below detection limit.

| Water Quality Indicator	6/23/2018	7/15/2018	8/26/2018	Average	Trend
Transparency (m)	3.8	5.2	4.5	4.5	Not Analyzed
Total Phosphorus (µg/L)	5.0	4.5	4.8	4.8	Not Analyzed
Chlorophyll-*a* (µg/L)	0.4	1.6	2.6	1.5	Not Analyzed
Laboratory pH	7.3	6.5	7.2	7.0	Not Analyzed
Sp. Conductance (µS/cm)	90.8	81.8	96.2	89.6	Not Analyzed
Color (Pt-Co)	21.4	21.4	18.2	20.3	Not Analyzed
Alkalinity (mg/L)			16.4	16.4	Not Analyzed
Chloride (mg/L)			19.0	19.0	Not Analyzed
Calcium (mg/L)			6.0	6.0	Not Analyzed
Sodium (mg/L)			11.2	11.2	Not Analyzed

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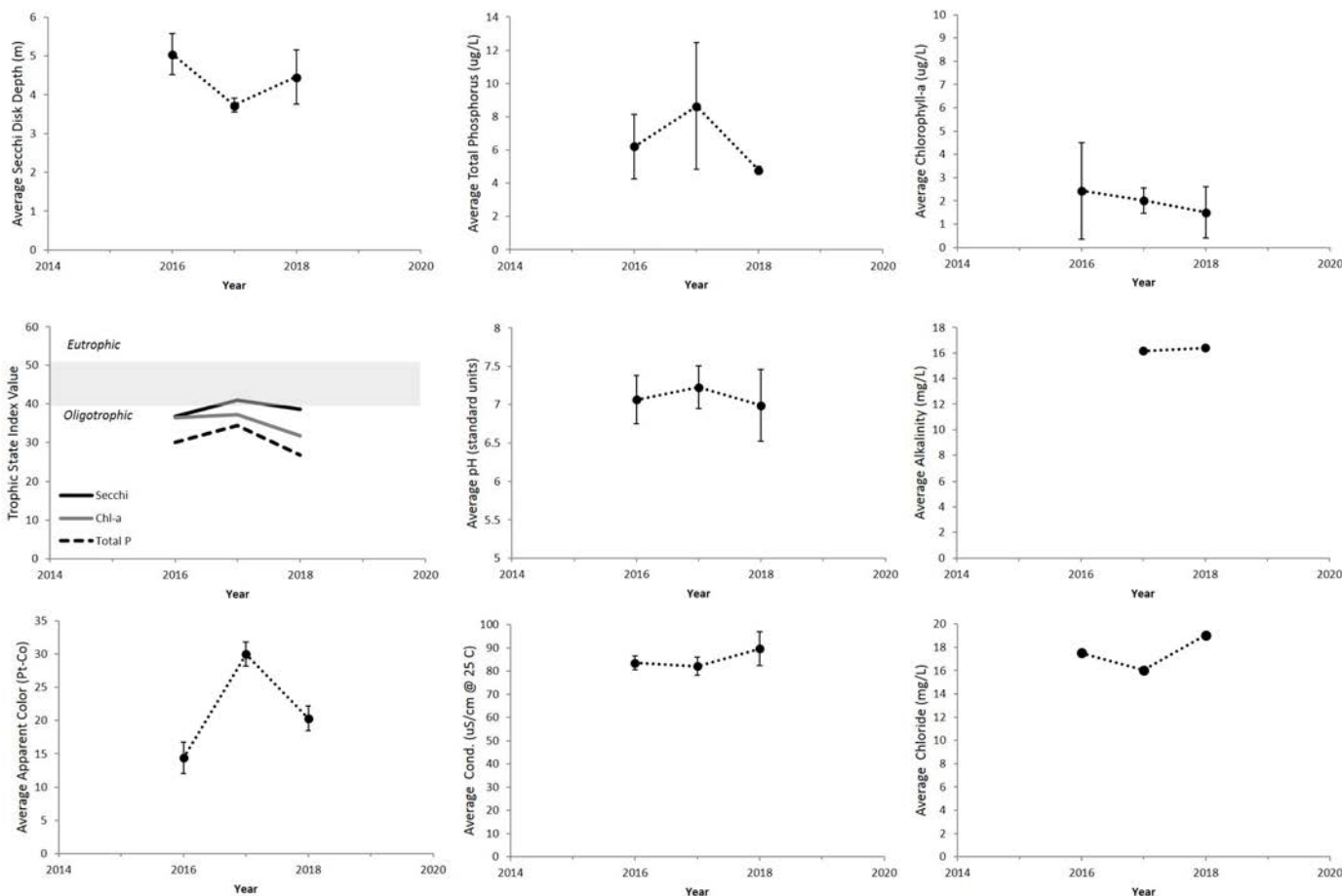
Annual average values of select water quality indicators for West Caroga Lake. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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 7.0 units in 2018. The alkalinity was 16.4 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 11.2 and 19.0 mg/L in 2018 indicating that the chemistry of the lake is moderately influenced by road salt. Chloride concentration in West Caroga is greater than 81% of the participating lakes and is approximately 88 times higher than background concentrations for least impacted lakes of the Adirondack region.

WHITE LAKE
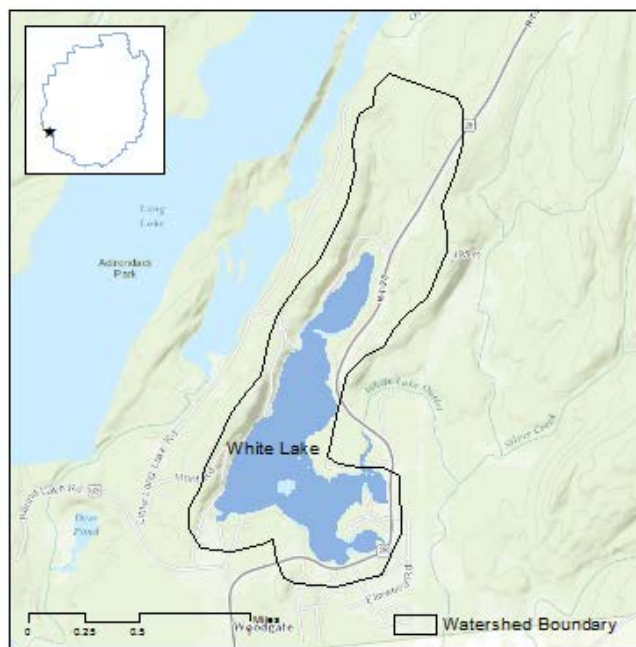
Location	County:	Oneida
	Town:	Forestport

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	Circumneutral	Adequate – low sensitivity	High

2018 DATA

Water quality values and historical trends for White Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

| Water Quality Indicator	6/17/2018	7/19/2018	8/18/2018	Average	Trend
Transparency (m)	8.6	6.2	7.4	7.4	No Trend
Total Phosphorus (µg/L)	8.1	3.7	3.4	5.0	Decreasing
Chlorophyll-*a* (µg/L)	0.8	0.7	1.8	1.1	Decreasing
Laboratory pH	6.9	6.2	6.9	6.7	No Trend
Sp. Conductance (µS/cm)	160.7	152.6	165.2	159.5	No Trend
Color (Pt-Co)	8.6	5.3	8.6	7.5	No Trend
Alkalinity (mg/L)			17.4	17.4	No Trend
Chloride (mg/L)			36.2	36.2	Increasing
Calcium (mg/L)			8.1	8.1	Not Analyzed
Sodium (mg/L)			23.0	23.0	No Trend

HISTORICAL DATA
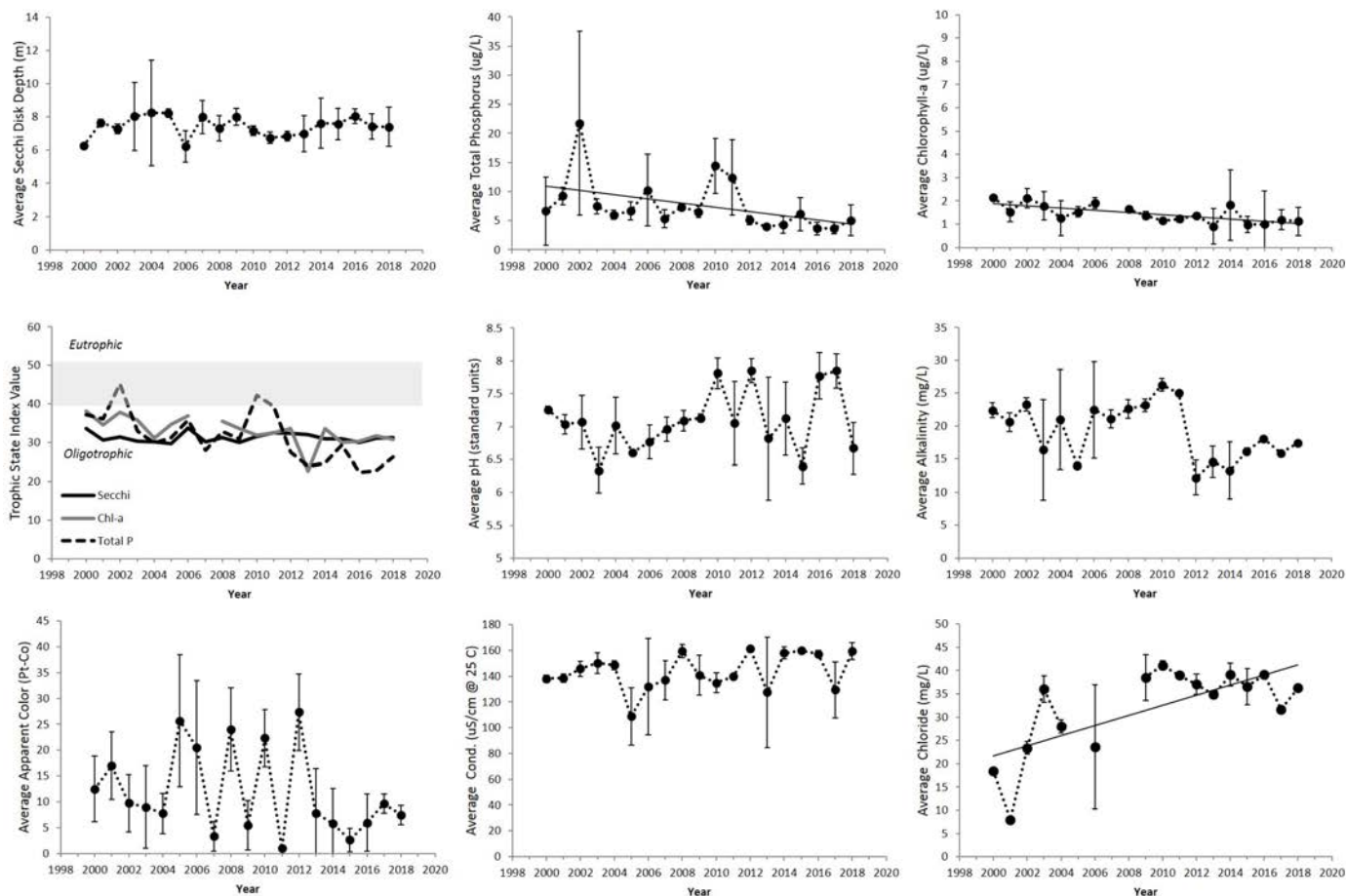
Annual average values of select water quality indicators for White Lake, 2000-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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 2018 averaged 7.4 meters, which was greater than 97% of ALAP participants.   Concentrations of both chlorophyll-a and total phosphorus have exhibited a slight, yet significant, downward trend since 2000.

- The surface water samples analyzed in 2018 were found to be circumneutral in terms of their acidity, with an average pH of 6.7 units. The alkalinity was 17.4 mg/L, indicating that the lake is well buffered, with a low sensitivity to acid deposition.

- Sodium and chloride concentration were 23 and 36.2 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 180 times greater than background concentration in Adirondack lakes.

WINDOVER LAKE
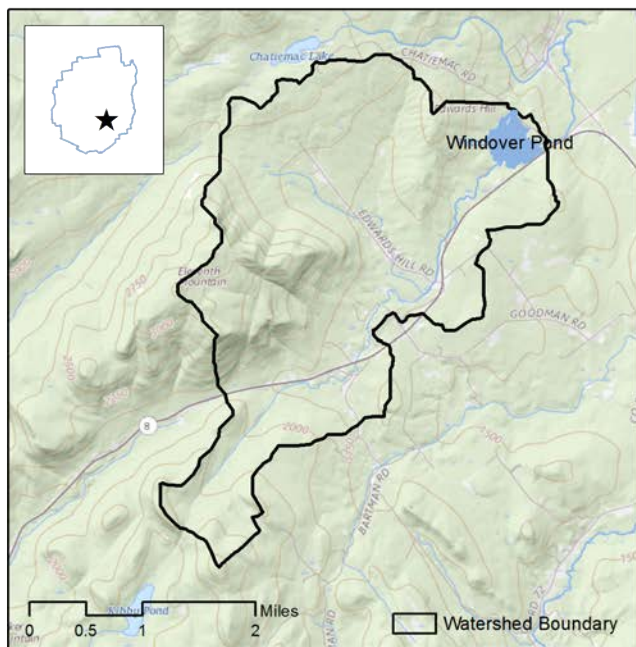
Location	County:	Warren
	Town:	Johnsburg

Lake Characteristics	Surface Area (ha):	38
	Shoreline Length (km):	25
	Max. Depth (m):	3.1
	Volume (m^3):	579000
	Flush rate (times/year):	19.6

Watershed Characteristics	Watershed Area (ha):	2029
	Surface water (%):	2
	Deciduous Forest (%):	65
	Evergreen Forest (%):	8
	Mixed Forest (%):	18
	Wetlands (%):	4
	Agricultural (%):	0
	Residential (%):	2
	Local Roads (km):	7.7
	State Roads (km):	5.5

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

2018 DATA

Water quality values for Windover Lake during the 2018 sampling season. Trend analysis will be performed after five years of consecutive data collection. BDL=below detection limit.

| Water Quality Indicator	8/6/2018	8/19/2018	9/24/2018	Average	Trend
Transparency (m)	1.9	1.9	1.6	1.8	Not Analyzed
Total Phosphorus (µg/L)	10.9	13.5	9.4	11.3	Not Analyzed
Chlorophyll-*a* (µg/L)	2.7	6.5	5.4	4.8	Not Analyzed
Laboratory pH	7.8	7.5	7.4	7.6	Not Analyzed
Sp. Conductance (µS/cm)	125.3	136.9	143.1	135.1	Not Analyzed
Color (Pt-Co)	60.0	43.9	37.5	47.2	Not Analyzed
Alkalinity (mg/L)		25.3		25.3	Not Analyzed
Chloride (mg/L)		25.7		25.7	Not Analyzed
Calcium (mg/L)		8.7		8.7	Not Analyzed
Sodium (mg/L)		16.8		16.8	Not Analyzed

HISTORICAL DATA
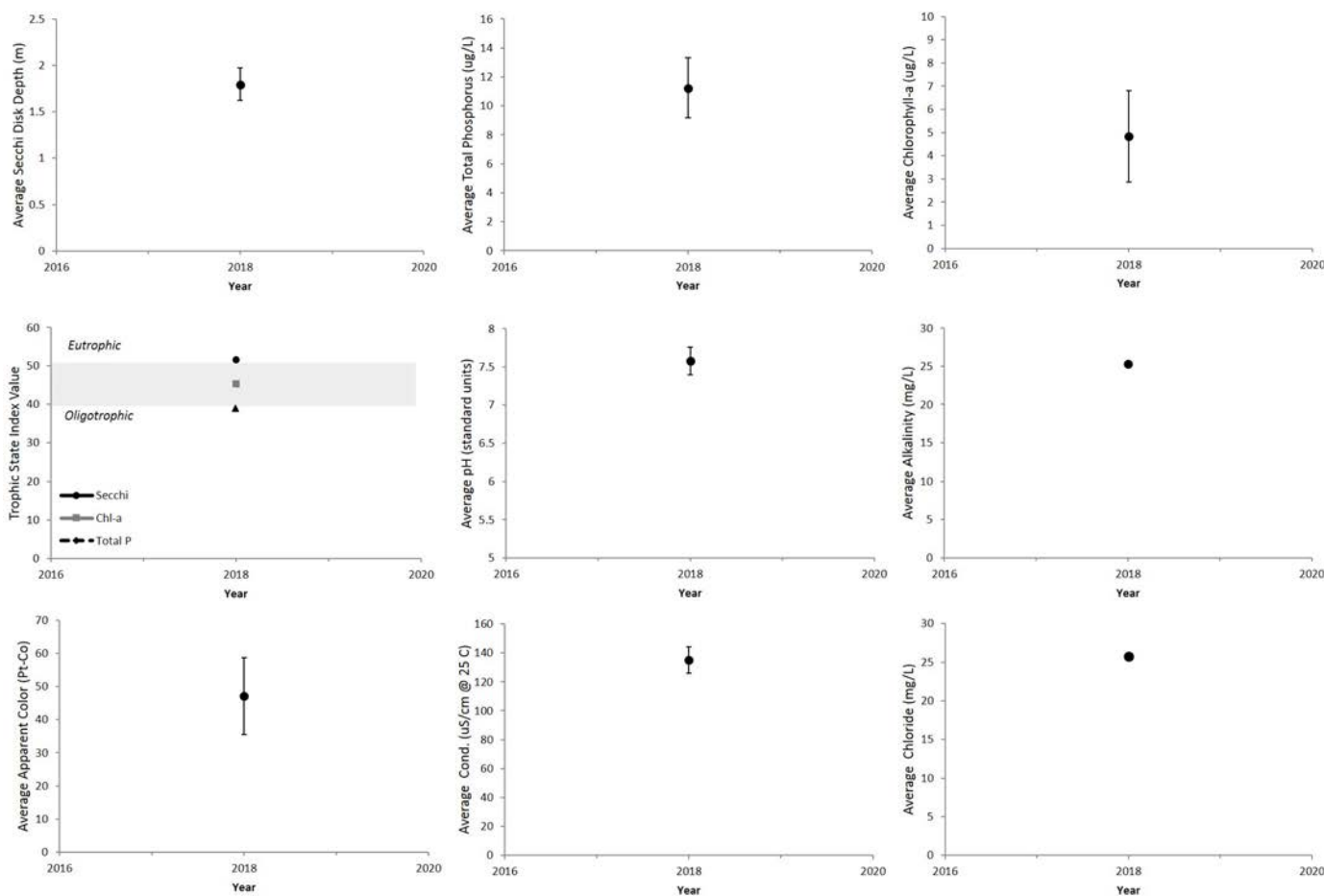
Annual average values of select water quality indicators for Windover Lake, 2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

SUMMARY OF FINDINGS

Windover Lake is a 38 ha lake located in Warren County in the Town of Johnsburg. The lake is located within a 2,029 ha watershed dominated by forests. Year 2018 marks Windover's first year of participation in ALAP. Trend analysis will be conducted when five years of data have been accumulated.

- WIndover Lake is best classified as a mesotrophic lake. The transparency of the lake averaged 1.8 meters, which is less than 97% of the participating lakes in 2018.

- The surface water samples analyzed in 2018 were found to be slightly alkaline in terms of their acidity, with an average pH of 7.6 units. The alkalinity was 25.3 mg/L, indicating that the lake is well buffered, with a low sensitivity to acid deposition.

- Sodium and chloride concentration were 16.8 and 25.7 mg/L respectively. These values indicate that the lake is highly influenced by the 13.2 km of roads in the watershed. Chloride concentration of Windover is greater than 92% of participating lakes, and 125 times greater than background concentration in Adirondack lakes.

WOLF LAKE
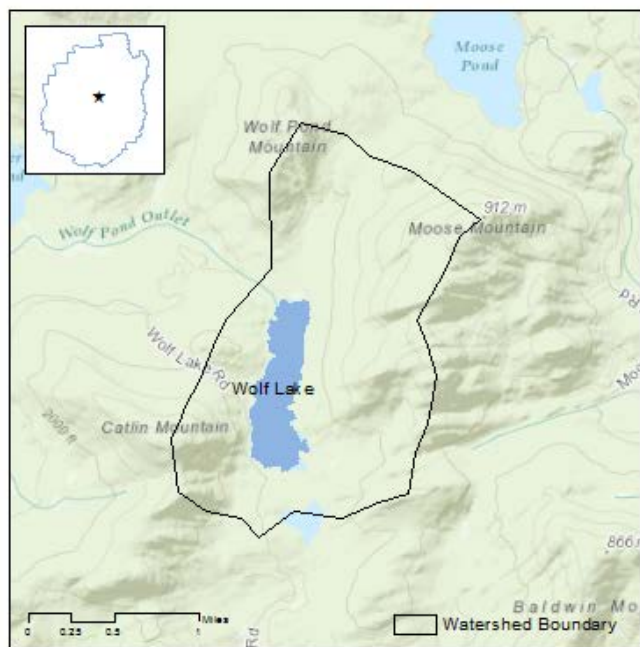
Location	County:	Essex
	Town:	Newcomb

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

2018 DATA

Water quality values and historical trends for Wolf Lake during the 2018 sampling season. Trend analysis was not performed on calcium data. BDL=below detection limit.

Water Quality Indicator	6/21/2018	7/18/2018	8/20/2018	Average	Trend
Transparency (m)	5.1		5.4	5.3	Decreasing
Total Phosphorus (µg/L)	5.6	6.4	5.1	5.7	Decreasing
Chlorophyll-*a* (µg/L)	0.9	1.9	1.7	1.5	No Trend
Laboratory pH	6.9	6.6	6.9	6.8	No Trend
Sp. Conductance (µS/cm)	17.1	17.1	17.0	17.1	Decreasing
Color (Pt-Co)	11.8	24.6	11.8	16.1	Increasing
Alkalinity (mg/L)			6.6	6.6	No Trend
Chloride (mg/L)			0.5	0.5	No Trend
Calcium (mg/L)			2.5	2.5	Not Analyzed
Sodium (mg/L)			0.9	0.9	No Trend

HISTORICAL DATA
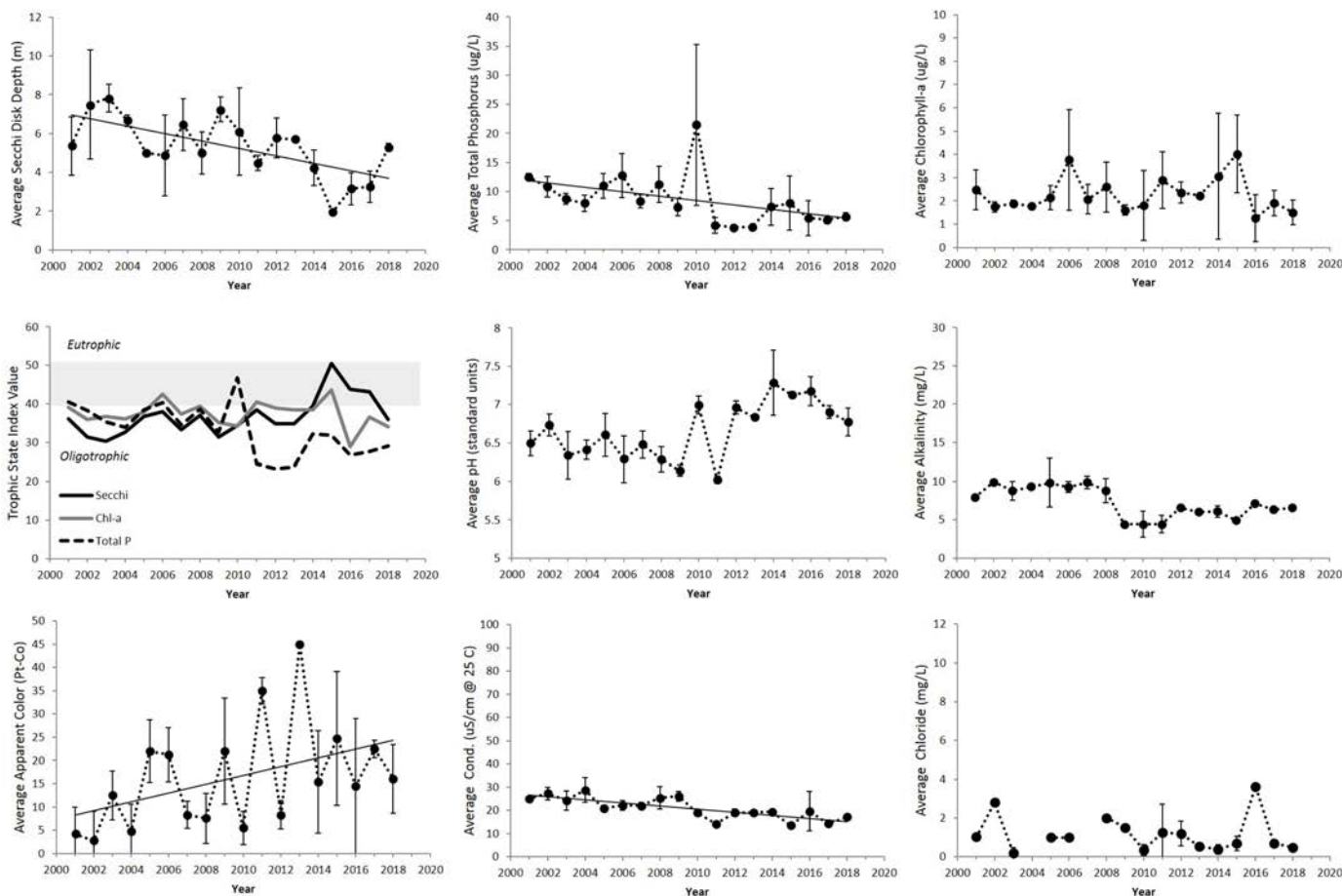
Annual average values of select water quality indicators for Wolf Lake, 2001-2018. Vertical bars represent ± 1 standard deviation of the mean; Solid trend lines across the data indicate a statistically significant trend (p < 0.05).

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. The transparency depth has exhibited a significant downward trend since monitoring began in 2001. 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 2018 were found to be circumneutral in terms of their acidity, with an average pH of 6.8 units. The pH of the water had been elevated over the past few years, but a statistical trend is not yet apparent. The alkalinity was found to be 6.6 mg/L, indicating that the lake is moderately sensitive to acid deposition.

- The volunteer lake monitor for Wolf Lake noted a visible algae bloom on June 21st, 2018.

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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