BOROUGH OF MOUNTAIN LAKES
MORRIS COUNTY, NJ

2019 YEAR-END REPORT
LAKES MANAGEMENT PROGRAM
BOROUGH OF MOUNTAIN LAKES

310 East Washington Avenue, Suite C
Washington, NJ 07882
908-850-0303

December 3, 2019

Introduction

The following report is submitted to the Borough of Mountain Lakes as a Year End Report summarizing the Aquatic Vegetation Management Program for Mountain Lakes in 2019. As in previous years, the program included weekly surveys of all lakes, biweekly unicellular phytoplankton sampling during June through August, and herbicide and algaecide applications to control nuisance plants and phytoplankton, and a water quality monitoring program. Each lake shall be discussed individually regarding aquatic plant and phytoplankton management and water chemistry results.

After the 2019 summary discussions, additional topics such as the E. coli sampling that occurred at Birchwood and Mountain Lake, water clarity at Mountain Lake, the Lakes Cleaning Program, and nutrient loading in each of the lakes will be discussed. Finally, a 2019 summary is presented as well as specific Lake Management strategies for 2020. Copies of all the graphs and data utilized in this report are included in the Appendix of this report.

Submersed Aquatic Macrophyte Summaries

Scientific Name	Common Name	Observed 2019	Last Observed
Myriophyllum spicatum	Eurasian Water milfoil	**X**	
Potamogeton epihydrus	Ribbon-leaf Pondweed	**X**	
Utricularia vulgaris	Common Bladderwort	**X**	2012
Ceratophyllum echinatum	Spiny Hornwort		2009
Ceratophyllum demersum	Coontail	**X**	
Najas guadalupensis	Southern Naiad	**X**	
Najas flexilis	Slender Naiad		2015
Potamogeton foliosus	Leafy Pondweed	**X**	
Nymphaea odorata	White Water Lily	**X**	
Nuphar variegata	Spatterdock	**X**	
Brasenia schreberi	Watershield	**X**	
Chara sp.	Muskgrass	**X**	
Potamogeton robbinsii	Robbin's Pondweed	**X**	
Myriophyllum humile	Low Water Milfoil	**X**	
Lemna minor	Small Duckweed	**X**	
Potamogeton amplifolius	Bass Weed	**X**	
Ludwigia sp.	Red Ludwigia	**X**	
Utricularia gibba	Creeping Bladderwort	**X**	
Potamogeton crispus	Curly-leaf Pondweed	**X**	
Riccia fluitans	Slender Riccia	**X**	
Potamogeton diversifolius	Variable-leaf Pondweed		2013
Nitella sp.	Stonewort	**X**	
Fontinalis sp.	Watermoss		2013
Ludwigia peploides	Creeping Water Primrose	**X**	
Najas minor	Brittle Naiad	**X**	
Potamogeton pusillus	Small Pondweed	**X**	
Cabomba caroliniana	Fanwort		2017
Wolffia sp.	Water meal	**X**	

The table above depicts a list of aquatic plants observed at Mountain Lakes in 2019 and in recent (back to 2006) seasons. The table lists the scientific name and common name and should be used as reference while reading this report. Note that this table only includes submersed and floating aquatic plants. A detailed description of each of the observed submersed aquatic species can be found in the Mountain Lakes Aquatic Plant Guide. Red font indicates exotic species.

2019 Aquatic Macrophyte Management

Birchwood Lake

Date	Product Applied	Acres Treated	Target Species
5/28/18	Schooner	1	Water lilies/pondweeds
9/7/18	Rodeo/Garlon3A	Dam/0.05	Terrestrial vegetation/lilies
9/28/18	AquaNeat	0.1	cattails

Birchwood Lake

Date	Product Applied	Acres Treated	Target Species
5/9/19	Tribune	1.5	Curly-leaf Pondweed
5/9/19	Flumioxazin (RE)	0.5	Bass Weed
7/25/19	Aqua neat	6	Water lilies
8/20/19	Aqua neat	5	Water lilies

The management season in 2019 at Birchwood Lake was partially dictated by the new NJDEP regulations requiring permits for hydro raking activity for any bottom disturbance. The focus of management for 2019 became management of water lilies through foliar applications of herbicide to kill the water lily plants and associated plant biomass, which would facilitate decomposition of the plant material floating it to the lake surface, where the material could be removed through physical removal without permit.

On May 9th an application of Tribune and Red eagle was performed as an in-water application for targeted control of nuisance growth of curly-leaf pondweed and bass weed that was growing within and near the beach and around the areas of the swim docks. Through the duration of the management season submersed and floating aquatic plant growth was not at growth height or density that interfered with swimming and other recreational activity at Birchwood Lake requiring supplemental herbicide application. On two dates, July 25th and August 20th, foliar applications of Rodeo were performed to provide management of water lilies throughout the lake to create open water areas as well as increase the productivity of unregulated hydro-raking activity. Results of hydro-raking will be discussed later in the report; however, the herbicide treatments were highly effective and created substantial open water in the upper end of the lake for recreation and improved water depth.

Crystal Lake			
Date	**Product Applied**	**Acres Treated**	**Target Species**
5/4/18	Copper Sulfate	3	Filamentous Algae
6/7/18	Copper Sulfate	2	Filamentous algae
6/11/18	Aquathol K	3.3	Bassweed
	Schooner	0.5	Water lilies
7/11/18	Copper Sulfate	4	Filamentous Algae
8/30/18	Copper Sulfate	7.7	Unicellular algae
9/7/18	Rodeo/Garlon 3A	Dam	Terrestrial vegetation
9/28/18	AquaNeat	0.03	Cattails

Crystal Lake			
Date	**Product Applied**	**Acres Treated**	**Target Species**
5/6/19	Tribune	10	Curly-leaf pondweed
8/27/19	Copper Sulfate	5	Unicellular algae
8/27/19	Aqua neat	0.5	Water lilies, cattails

During 2019, growth of curly-leaf pondweed required a large-scale herbicide treatment for control in early May, which has been typical for the management of this lake. Compared to 2018, there were no required algaecide treatments required specifically for the management of filamentous algae, and only a single algaecide treatment was performed in 2019 for management of planktonic algae due to a decline in water clarity. Although bassweed was observed through much of the summer and early fall season, this plant did not require specific herbicide management for control in 2019.

The cattail application that was performed in 2018 was highly effective at controlling most of this growth. In 2019, a supplemental treatment was performed to provide further management of this plant infestation, as well as target increasing growth of water lilies that was observed at various areas of the lake, and most specifically adjacent to the inlet area.

Sunset Lake			
Date	**Product Applied**	**Acres Treated**	**Target Species**
6/7/18	AquaNeat	2	Water Lilies
6/19/18	Copper Sulfate	7.8	Filamentous Algae
7/18/18	Schooner	0.5	Bassweed
	Copper Sulfate	5	Filamentous algae
	AquaNeat	0.5	Water Lilies
9/7/18	Rodeo/Garlon 3A	Dam	Terrestrial Vegetation
9/21/18	AquaNeat	0.13	Water lilies

Sunset Lake			
Date	**Product Applied**	**Acres Treated**	**Target Species**
6/25/19	Copper Sulfate	7.8	Filamentous algae
6/25/19	Flumioxazin (RE)	3	Bass Weed
7/25/19	Aqua neat	1.5	Water lilies
7/25/19	Copper Sulfate	1.25	Filamentous algae
8/27/19	Aqua neat	2.5	Water lilies

The management program at Sunset Lake in 2019 was primarily focused on continuing to reduce water lily density throughout the lake, and two foliar applications were performed during July and August. Growth of the native pondweed bass weed was observed in areas of the lake during the 2019 season, with elevated densities especially in the northeast portion of the lake. This plant is considered favorable habitat and management has ben limited to promote beneficial densities, but reduced management allowed this plant to develop at nuisance densities in certain areas of the lake.

Algal management at Sunset Lake in 2019 was limited to two applications of copper sulfate for management of filamentous algae. Overall, algal growth was fairly limited in this lake, and may be a result of the increase in the submersed plant community. Although additional submersed plant species did not require management, sparse to moderate densities of naiad and pondweeds were observed throughout the season in the lake.

Olive Lake			
Date	**Product Applied**	**Acres Treated**	**Target Species**
8/28/18	Earthtec	0.4	Unicellular algae

Olive Lake			
Date	**Product Applied**	**Acres Treated**	**Target Species**
4/12/19	Captain	0.1	Filamentous algae
5/6/19	Tribune	0.5	Curly-leaf pondweed
5/6/19	Nature's Blend	0.8	-
6/26/19	Earthtec	0.5	Unicellular algae
7/1/19	Earthtec	0.5	Unicellular algae
7/1/19	Nature's Blend	0.8	-
7/18/19	Earthtec	0.5	Unicellular algae
7/30/19	Earthtec	0.5	Unicellular algae
8/26/19	Nature's Blend	0.8	-
9/20/19	Earthtec	0.5	Unicellular algae

Management of Olive Pond through the end of June was limited to a small-scale treatment of filamentous algae growth, the only required herbicide treatment for curly-leaf pondweed growth, and an application of Earthtec for management of planktonic

algae. Applications of beneficial aerobic bacteria were also initiated in May to promote decomposition of organic material in the basin.

Through the duration of the management season an additional four applications of the algaecide Earthtec were applied to Olive Pond, which were also applied with the intention that the algaecide would provide algae management in Shadow Pond from intended drift of the algaecide. While the treatment regime showed an increase in required application in Olive Pond, the overall reduction of applications, and improved algae conditions in Shadow Pond was also evident.

Shadow Lake

Date	Product Applied	Acres Treated	Target Species
5/2/18	Precise Pond	-	Bacterial Enhancement
	Schooner	1	Curly-leaf pondweed
	Cutrine Plus	0.6	Filamentous algae
6/5/18	Precise Pond	-	Bacterial Enhancement
6/21/18	Earthtec	1.3	Unicellular algae
7/5/18	Cutrine Plus	0.7	Unicellular algae
	Schooner	0.3	Water meal

Shadow Lake

Date	Product Applied	Acres Treated	Target Species
4/12/19	Captain	0.8	Filamentous algae

As noted in the Olive Pond management notes, increased management focus in Olive Pond proved to provide a reduction in plant and algae growth in Shadow Lake, and an overall reduction in algae management during 2019. During the 2019 management season only a single application of the algaecide Captain was performed to provide management of filamentous algae growth early in the management season.

Cove Pond

Date	Product Applied	Acres Treated	Target Species
5/2/18	Schooner	0.45	Curly-leaf Pondweed
	Cutrine Plus	0.2	Filamentous algae

Cove Pond

Date	Product Applied	Acres Treated	Target Species
5/16/19	Flumioxazin (RE)	0.35	Curly-leaf Pondweed

Throughout the 2019 management season, Cove Pond maintained favorable aesthetics, although the water had a turbid appearance during most inspections. The pond supported moderate density curly-leaf pondweed in the spring requiring a single herbicide application for control. Water lilies are also established in the lake, but currently at

desirable densities. While the pond has only required a minimal amount of management effort, additional focus should be placed on nutrient reduction to ensure that this water body can sustain a healthy aquatic environment during future seasons.

Grunden's Pond

Date	Product Applied	Acres Treated	Target Species
4/29/18	Earthtec	1.3	Filamentous algae
6/8/18	Captain	0.65	Filamentous algae
	Schooner	0.65	Pondweeds
6/21/18	Cutrine Plus	0.2	Filamentous algae
7/5/18	Captain	0.2	Filamentous algae
8/10/18	Captain	0.5	Filamentous algae
8/28/18	Cutrine Plus	0.5	Filamentous algae

Grunden's Pond

Date	Product Applied	Acres Treated	Target Species
4/30/19	Flumioxazin (RE)	0.5	Curly-leaf pondweed
4/30/19	SeClear	0.5	Filamentous algae
7/2/19	Captain	1.3	Filamentous algae

The 2019 management season was highlighted by an overall dramatic reduction in required herbicide and algaecide treatments to retain favorable conditions through the end of August. Short term repairs and persistent rainfall through the early part of the management season aided in improving overall aesthetic improvements and reduction in filamentous algae growth. Only two treatments were conducted in 2019 for nuisance filamentous algae growth.

During the month of September when limited rainfall allowed water level reduction in Grunden's Pond, filamentous algae growth was persistent along certain portions of the pond. While the weekly survey reports at this time continued to indicate persistent growth of filamentous algae, due to the shallow water conditions of areas of the pond algae treatments were not performed as those areas only contained a few inches of water depth. Once the weather pattern shifted to allow for more rainfall, the water level of the pond increased, and the conditions of the pond improved.

Mountain Lake

Date	Product Applied	Acres Treated	Target Species
5/21/18	Tribune	11.5	Curly-leaf pondweed
	Copper Sulfate	4.8	Filamentous Algae
6/4/18	Copper Sulfate	16	Filamentous Algae
6/8/18	Captain	0.6	Filamentous Algae

6/21/18	Aquathol-k	4.6	Bassweed
	Copper Sulfate	12	Filamentous algae
7/3/18	Schooner	0.5	Pondweeds
7/10/18	Copper Sulfate	14.4	Filamentous algae
8/31/18	Copper Sulfate	19.2	Unicellular algae
9/7/18	Rodeo/Garlon 3A	Dam	Terrestrial vegetation

Mountain Lake

Date	Product Applied	Acres Treated	Target Species
5/7/19	Copper Sulfate	10	Filamentous algae
5/7/19	Tribune	23.3	Curly-leaf pondweed
5/7/19	Aquathol K	5.3	Bass Weed
5/30/19	Copper Sulfate	14.4	Filamentous algae
6/28/19	Copper Sulfate	9.6	Filamentous algae
7/3/19	Flumioxazin (RE)	2	Eurasian watermilfoil
7/23/19	Copper Sulfate	5.75	Filamentous algae
8/9/19	Copper Sulfate	3.8	Filamentous algae
8/9/19	Tribune	2.4	Naiads
8/28/19	Copper Sulfate	38	Unicellular algae
8/28/19	Tribune	3.5	Eurasian water milfoil
9/20/19	Flumioxazin (RE)	0.9	Eurasian water milfoil

Overall, management at Mountain Lake in 2019 was limited in acreage, although numerous site selective surgical applications were conducted. Surveys performed through most of the season indicated favorable lake conditions and usually minor amounts of submersed aquatic plant and algae growth. In early May an application of the herbicides Tribune and Aquathol-k were performed for management of curly-leaf pondweed and bassweed in specific areas of the lake. The Aquathol-K application was performed much earlier in the season in 2019 compared to 2018 knowing the density that this plant achieved in 2018 with the goal of preventing the observed nuisance growth conditions. This approach approved successful as bassweed did not present any management challenges through the remainder of the 2019 management season. Also, like 2018, only a single algaecide treatment was needed at the latter part of the season for increased blue-green and green algae growth reducing water clarity.

The largest distinction in the management of Mountain Lake compared to the past few seasons was the observed growth of Eurasian water milfoil. The last Sonar application for systemic milfoil control was performed in 2015, and growth of this invasive plant in 2019 supports a return to systemic management in 2020. The most notable growth in 2019 was adjacent to the canal leading to Island beach, however lake surveys indicated widespread trace to sparse growth in numerous areas of the lake. The growth of water primrose will also require specific attention in 2020 and is expected that this plant will require foliar treatment along areas of the shoreline edge to limit growth and encroachment to additional areas of the lake.

Wildwood Lake			
Date	**Product Applied**	**Acres Treated**	**Target Species**
4/24/18	Copper Sulfate	6.4	Filamentous algae
4/26/18	Aluminum Sulfate	15.7	Nutrient Inactivation
5/9/18	Copper Sulfate	3.5	Filamentous algae
5/28/18	Copper Sulfate	7	Filamentous Algae
6/12/18	Copper Sulfate	6.4	Filamentous algae
6/27/18	Copper Sulfate	5.8	Filamentous algae
	Tribune	7.7	Naiad
	Schooner	0.5	Naiad
7/18/18	Schooner	4	Naiad
8/8/18	Aluminum Sulfate	15.7	Nutrient Inactivation
9/7/18	Rodeo/Garlon3A	Dam	Terrestrial vegetation

Wildwood Lake			
Date	**Product Applied**	**Acres Treated**	**Target Species**
4/12/19	Copper Sulfate	7.2	Filamentous algae
4/22/19	Alum	19.7	--
5/20/19	Copper Sulfate	8.7	Filamentous algae
6/4/19	Copper Sulfate	9.6	Filamentous algae
7/1/19	Aquastrike	7.5	Naiads
7/1/19	Copper Sulfate	6.4	Filamentous algae
8/9/19	Aquastrike	1.5	Naiads

The management season at Wildwood Lake was initiated with an application of copper sulfate for control of shoreline filamentous algae growth prior to the spring aluminum sulfate application, which was conducted on April 22nd. Following this date, three additional applications of copper sulfate were required for filamentous algae control, which was generally limited to the immediate shoreline edge of the lake.

The most notable growth condition of wildwood lake was the increase in density of brittle naiad, which occupied an estimated 70% of the lake basin, and can grow to the surface in approximately 50 % of the lake. A relatively new herbicide formulation Aquastrike was employed for 2019 and proved to be a great management tool for this lake for both naiad, and other submersed aquatic plants for localized management to limit nutrient release during the peak season for water temperatures.

An additional intentional change in management strategy was the cancellation of the summer aluminum sulfate application. While this nutrient inactivation treatment has been a standard in the management program for some time, a consideration in 2019 was whether the reduction in in-water nutrient availability was beneficial compared to the

Water Quality Monitoring Program

In 2019, the water quality monitoring program consisted of weekly surveys, phytoplankton analysis, and water chemistry analysis. Phytoplankton samples were examined bi-weekly for Birchwood Lake, Crystal Lake, Sunset Lake, Shadow Lake, Mountain Lake and Wildwood Lake from June through August. Phytoplankton samples for Olive Pond, Cove Pond and Grunden's Pond were examined monthly from June through August. Phytoplankton data sheets for these examinations are in the Appendix of this report. Water chemistry sampling occurred on three dates: June 10th, July 15th, and August 12th. The water chemistry data sheets from a NJ certified laboratory are in the Appendix of this report.

Below is a brief description of the different water quality parameters measured at Mountain Lakes in 2019, and a primer on phytoplankton. Following these descriptions are brief summaries of the 2019 results for each lake in question, including a table of this season's results, and comments regarding the previous season. We anticipate a similar water quality program in 2020.

Temperature

Temperature is measured in degrees Celsius and is very important to aquatic biota. Several factors affect temperature in a lake system, including air temperature, season, wind, water flow through the system, and shade trees. Turbidity can also increase water temperature as suspended particles absorb sun rays more efficiently. Water depth also affects temperature. In general, deeper water remains cooler during the summer months.

Temperature preferences vary among aquatic biota. Since water temperature typically varies between 5 ºC and 30 ºC during the season, most aquatic biota can flourish under this wide range of temperatures. Of more concern is thermal shock, which occurs when temperature rapidly changes in a short amount of time. Some aquatic biota can become stressed when temperature changes as little as 1-2 ºC in a 24-hour period.

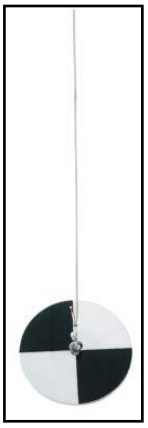
Dissolved Oxygen

Dissolved oxygen is the measurement of the amount of oxygen freely available to aquatic biota in water. Several factors play a role in affecting the amount of dissolved oxygen in the water. These factors include temperature (warmer water holds less dissolved oxygen), low atmospheric pressure (such as higher altitude) decreases the solubility of oxygen, mineral content of the water can reduce the water's dissolved oxygen capacity, and water mixing (via wind, flow over rocks, or thermal upwelling) increases dissolved oxygen in the water. In addition, an over abundance of organic matter, such as dead algae or plants causes rapid aerobic bacteria growth. During this growth, bacteria consume oxygen during respiration, which can cause the water's dissolved oxygen to decrease.

Dissolved oxygen has a wide range, from 0.0 mg/L to 20.0 mg/L. To support diverse aquatic biota, 5.0-6.0 mg/L is minimally required, but 9.0-10.0 mg/L is an indicator of

better overall water quality. Dissolved oxygen below 4.0 mg/L is stressful to most aquatic organisms, especially fish.

Water Clarity



Water clarity (sometimes referred to as transparency or visibility) is easily measured in lakes with a Secchi disc and can provide an experienced biologist with a quick determination of a lake's water quality. In short, higher visibility indicates a cleaner (and healthier) aquatic system. Cloudy conditions could indicate nutrient rich sediments entering the lake or excessive algal blooms due to nutrient availability, leading to a degradation of water quality. Clear conditions allow greater light penetration and the establishment of a deeper photic zone. The photic zone is the depth of active photosynthesis carried out by plants and algae. A byproduct of photosynthesis is dissolved oxygen, required for use by higher aquatic organisms, such as zooplankton and fish.

Alkalinity

Alkalinity is the measure of the water's capacity to neutralize acids. A higher alkalinity can buffer the water against rapid pH changes, which in turn prevents undue stress on aquatic biota due to fluctuating pH levels. The alkalinity of a lake is primarily a function of the watersheds soil and rock composition. Limestone, dolomite and calcite are all a source of alkalinity. High levels of precipitation in a short amount of time can decrease the waters alkalinity. A typical freshwater lake has an alkalinity of 20-200 mg/L. A lake with a low alkalinity typically also has a low pH, which can limit the diversity of aquatic biota.

pH

The measurement of acidity or alkalinity of the water is called pH (the "potential for hydrogen"). Several factors can impact the pH of a lake, including precipitation in a short amount of time, rock and soil composition of the watershed, algal blooms (increase the pH), and aquatic plant decomposition (decreases the pH). A pH level of 6.5 to 7.5 is considered excellent, but most lake systems fall in the range of 6.0 to 8.5. Aquatic biota can become stressed if the pH drops below 6.0 or increases above 8.5 for an extended amount of time.

Most aquatic biota are adapted to specific pH ranges. When the pH fluctuates rapidly, it can cause changes in aquatic biota diversity. Immature stages of aquatic insects and juvenile fish are more sensitive to low pH values than their adult counterparts. Therefore, a low pH can inhibit the hatch rate and early development of these organisms.

Nitrate

Nitrates are chemical compounds derived from nitrogen and oxygen. Nitrogen is needed by all plants and animals to make proteins needed for growth and reproduction. Nitrates

are generated during plant and animal decomposition, from man-made sources, and from livestock and waterfowl sources. Man-made sources of nitrates include septic system leaching, fertilizer runoff, and improperly treated wastewater. Freshwater lake systems can potentially receive large nitrate inputs from waterfowl, specifically large flocks of Canada geese. An increase in nitrate levels can in turn cause an increase in total Phosphorus levels. A nitrate level greater than 0.3 mg/L can promote excessive growth of aquatic plants and algae.

Total Phosphorus

Total Phosphorus is a chemical compound derived from phosphorus and oxygen. Total phosphorus is usually present in freshwater in low concentrations and is often the limiting nutrient to aquatic plant growth. However, man-made sources of phosphorus include septic system leaching, fertilizer runoff, and improperly treated wastewater. These phosphorus inputs usually enter a freshwater lake system during rain events, and bank erosion.

A total phosphorus level greater than 0.03 mg/L can promote excessive aquatic plant growth and decomposition, either in the form of algal blooms, or nuisance quantities of aquatic plants. This process is called eutrophication, and when induced or sped up by man-made nutrient inputs, it is called cultural eutrophication. As a result of this excessive growth, recreational activities, such as swimming, boating, and fishing in the lake can be negatively impacted. In addition, aerobic bacteria will thrive under these conditions, causing a decrease in dissolved oxygen levels which can negatively impact aquatic biota such as fish.

Turbidity

Turbidity is the measurement of lack of water clarity and is measured in NTU. Suspended solids in the water column cause an increase in turbidity. Therefore, the lower the turbidity measurement, the clearer the water is. The leading sources of turbidity include soil erosion, waste discharge, urban runoff, flooding, dredging operations, increased flow rates, or algae blooms. An overabundance of bottom feeding fish, such as carp, can also increase turbidity due to constant grazing and disturbing of fine bottom sediments. A turbidity of 25 NTU or less is desirable for a lake. Ideal trout waters have a turbidity of 10 NTU or less, but most aquatic biota can be sustained in water with a turbidity of 50 NTU or less. Although a turbidity level of 5.0 NTU or greater is generally considered visible to the observer, there is some industry discussion on value of turbidity measurements in relation to aesthetics

Turbidity can affect a lake in many ways. These include temperature increases (as suspended particles absorb more sunlight), reduced light penetration (which reduces aquatic plant habitat in the littoral zone), and negative fish impacts. Negative impacts on fish population include suspended solids clogging and damaging fish gills, reduced clarity affecting the ability of predatory fish to locate food by sight and inhibit proper egg and larval development.

Conductivity

Conductivity is the measure of water's ability to conduct an electrical current, and is measured in umhos/cm, the higher the number of charged particles (ions) in the water, the easier for electricity to pass through it. Conductivity is useful in lake management by estimating the dissolved ionic matter in the water, the lower the conductivity, the higher the quality of water (oligotrophic). A higher conductivity usually indicates an abundance of plant nutrients (total phosphorous and nitrate), or eutrophic conditions. Industrial discharge, road salt runoff, and septic tank leaching can increase conductivity. Distilled water has a conductivity of 0.5 to 2.0 umhos/cm, while drinking water conductivity typically ranges from 50to 1,500 umhos/cm. Conductivity below 500 umhos/cm is considered ideal in a lake system.

A Phytoplankton Primer

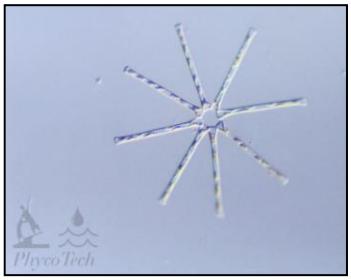
Lakes typically contain three broad categories of phytoplankton (also sometimes referred to as algae). These include filamentous phytoplankton, macroscopic multi-branched phytoplankton (which appear like submersed plants), and unicellular phytoplankton. Each category shall be discussed in turn, although the results of the 2018 sampling will focus on the unicellular phytoplankton population.

Filamentous phytoplankton are typically macroscopic (that is, visible with the naked eye), composed of long chains of cells that are attached to a substrate, typically the lake bottom, submersed or emergent vegetation, or rocks. This is called benthic filamentous algae (BFA), and rampant growth can become visible at the surface. As pieces of benthic filamentous algae break apart, it often floats on the surface as dense unsightly mats called floating filamentous algae (FFA). Typically, genera of green algae or blue-green algae develop into nuisance filamentous mats. Abundant nuisance growth of filamentous phytoplankton creates numerous negative impacts to a lake. These can include a decrease in aesthetics, a decrease in recreational uses, increased fishing frustration, and water quality degradation.

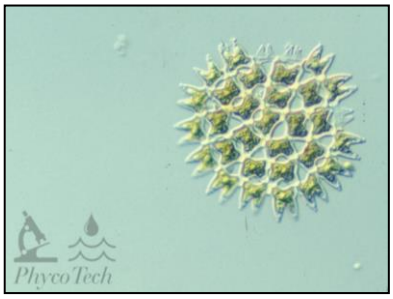
Macroscopic multi-branched phytoplankton appears to be submersed plants, especially when viewed in the water column. Physical examination reveals simple structures, no conductive tissue, and a lack of roots (instead having simplified rhizoids). Although typically only reaching heights of a few inches, under ideal conditions, this type of phytoplankton can reach lengths of several feet and create a dense carpet on the bottom of a lake. Therefore, it typically does not reach nuisance levels in a lake, save for high use areas such as beaches and other popular swim areas. Since this phytoplankton occupies a similar ecological niche as submersed plants, it's often included in detailed and visual aquatic plant surveys. It provides numerous benefits to a lake system, including sediment stabilization, acting as a nutrient sink, providing invertebrate and fish shelter and habitat, and is one of the first to re-colonize a disturbed area. In the Northeast, muskgrass (*Chara* sp.) and stonewort (*Nitella* sp.) are two of the most common macroscopic multi-branched phytoplankton.

Unicellular phytoplankton are typically microscopic and consist of individual cells or colonies of cells suspended in the water column. At high enough densities (often called a bloom), they can impart a green or brown (and sometimes, even red) tint to the water column. Unicellular phytoplankton belongs to several taxonomic groups with density and diversity of these groups often varying due to seasonality. When unicellular phytoplankton density becomes elevated it can reduce water clarity (giving the water a "pea soup" appearance) and impart undesirable odors. Usually blue-green algae are responsible for these odors, but other groups or extremely elevated densities can impart them as well. In addition to decreased aesthetics, unicellular phytoplankton blooms can cause degradation of water quality, increase the water temperature (turbid water warms faster than clear water), and can possibly produce a variety of toxins (in the case of blue-green algae), depending on the type of genera present and environmental conditions. Numerous groups of unicellular phytoplankton are common in the Northeast, including diatoms, golden algae, green algae, blue-green algae, euglenoids and dinoflagellates.

Phytoplankton Group Summary



Diatoms are ubiquitous as a group, and often possess a rigid silica shell with ornate cell wall markings or etchings. The silica shells settle to the bottom substrate after they die, and under ideal conditions can become stratified. Limnologists can then study historical (and possibly even ancient) population characteristics of diatoms. Some are round and cylindrical (centric) in shape, while others are long and wing-shaped (pennales). They are usually brown in color and reach maximum abundance in colder or acidic water. Therefore, they tend to dominate in winter and early spring. Common diatoms in the Northeast include *Fragilaria*, *Cyclotella, Navicula*, and *Asterionella* (pictured).

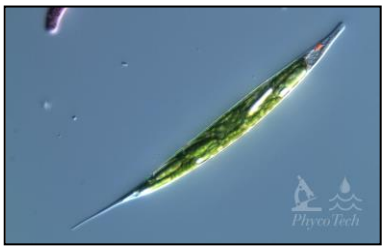


Golden Algae are typically yellow or light brown in color. Cell size is usually small oval shaped with a partially empty area, but several genera create colonies of smaller cells. Most have two flagella, and some type of scales or a rigid coating that grants it a fuzzy appearance. However, a few filamentous forms are possible as well. They typically prefer cooler water, so they dominate in the late fall, winter, or early spring. They also tend to bloom at deeper (cooler) depths. They are common in low nutrient water, and numerous forms produce taste and odor compounds. Common golden algae in the Northeast include *Dinobryon* (pictured), *Mallomonas*, and *Synura*.

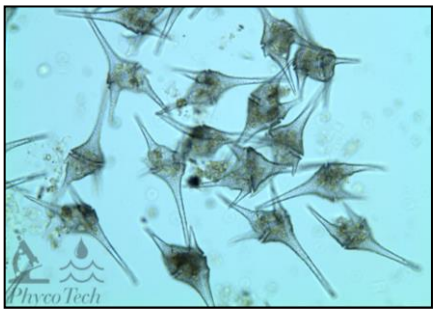
Green Algae are a very diverse group of unicellular phytoplankton. There is tremendous variability in this group which varies from family to family and sometimes even genus to genus. There are flagellated single cells, multi-cell colonies (some motile), filamentous forms and attached forms, typically with distinct cell shapes light

green in color. Some prefer acidic waters, and others highly eutrophic (sewage) conditions. A green alga bloom usually occurs in water with high nitrogen levels. Green algae typically dominate in mid to late summer in the Northeast. Common genera include *Chlorella*, *Scenedesmus*, *Spirogyra* and *Pediastrum* (pictured).

Blue-green algae are photosynthetic bacteria. Therefore, they tend to be small, simple in structure and lacking interior cell details. Blue-green algae are typically encased in a mucilaginous outer layer. Some genera are adorned with heterocysts, swollen structures capable of fixing nitrogen, a competitive advantage. These types tend to bloom in nitrogen-poor or eutrophic systems. Yet, blue-green algae are tolerant of a wide variety of water chemistries and boast many oligotrophic forms as well. Blue-green algae often have gas vesicles which provide increased buoyancy another competitive advantage over other groups of phytoplankton, due to their propensity to shade out others by blooming at the surface. Numerous blue-green algae are documented taste and odor (T&O) producers, and under certain environmental conditions and high enough densities, can produce toxins dangerous to fish, livestock, and possibly humans. Blue-green algae typically dominate a lake system in late summer to early fall. Common blue-green algae that occur in the Northeast include *Anabaena* (pictured), *Aphanizomenon*, *Microcystis* and *Coelosphaerium.*



Euglenoids are typically motile with 0 to 3 (typically 2) flagella, one of which is longer. Euglenoids has plasticity of shape, and usually are grass green in color (although sometimes they are clear or even red). Most forms have a distinct red “eyespot. They are often associated with high organic content water, and eutrophic conditions. Common euglenoids that occur in the Northeast include *Euglena* (pictured), *Phacus*, and *Trachelomonas*.



Dinoflagellates are very common in marine environments, in which they often cause toxic blooms. However, toxin production in freshwater genera is very rare. Dinoflagellates are typically single ovoid to spherical cells, but large compared to phytoplankton from other groups. They usually possess two flagella (one wrapped around the middle of the cell) which grant them rotation while they move through the water column. Cellulose plates (armored dinoflagellates) are more common, but genera without cellulose plates (naked dinoflagellates) also occur. They generally prefer organic-rich or acidic waters and can impart a coffee-like brown tint to the water at high enough densities. Common dinoflagellates in the Northeast include *Ceratium* (pictured) and *Peridinium*.

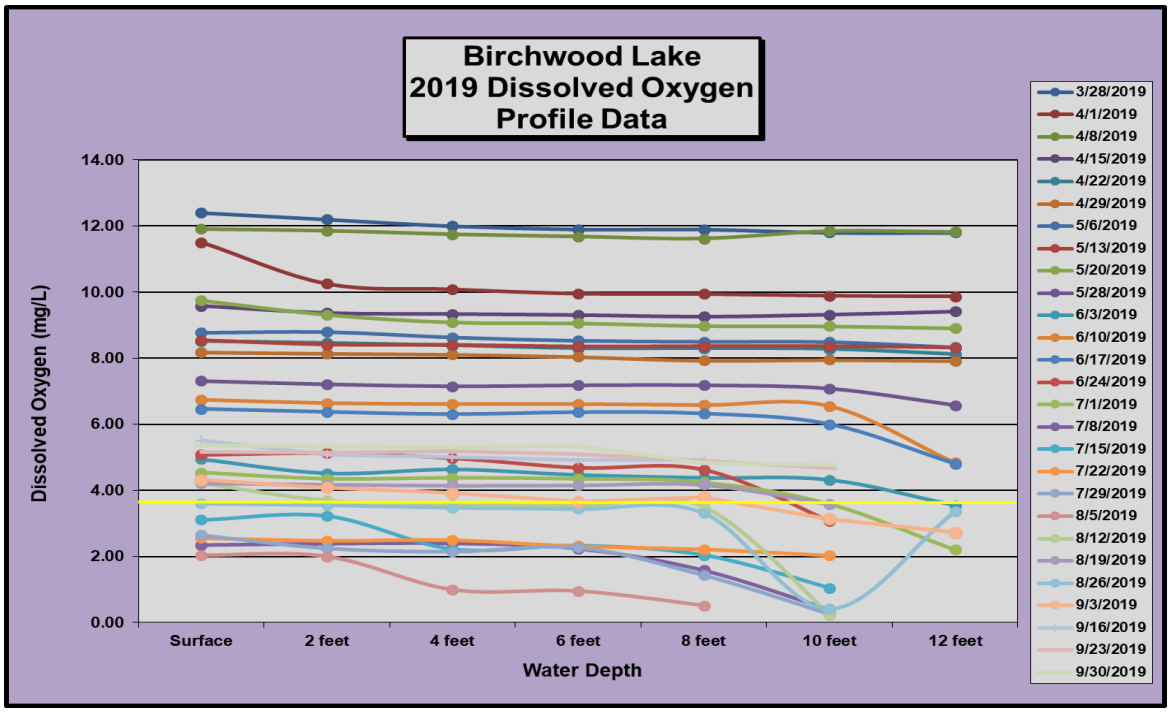
2019 Water Quality Results for Mountain Lakes

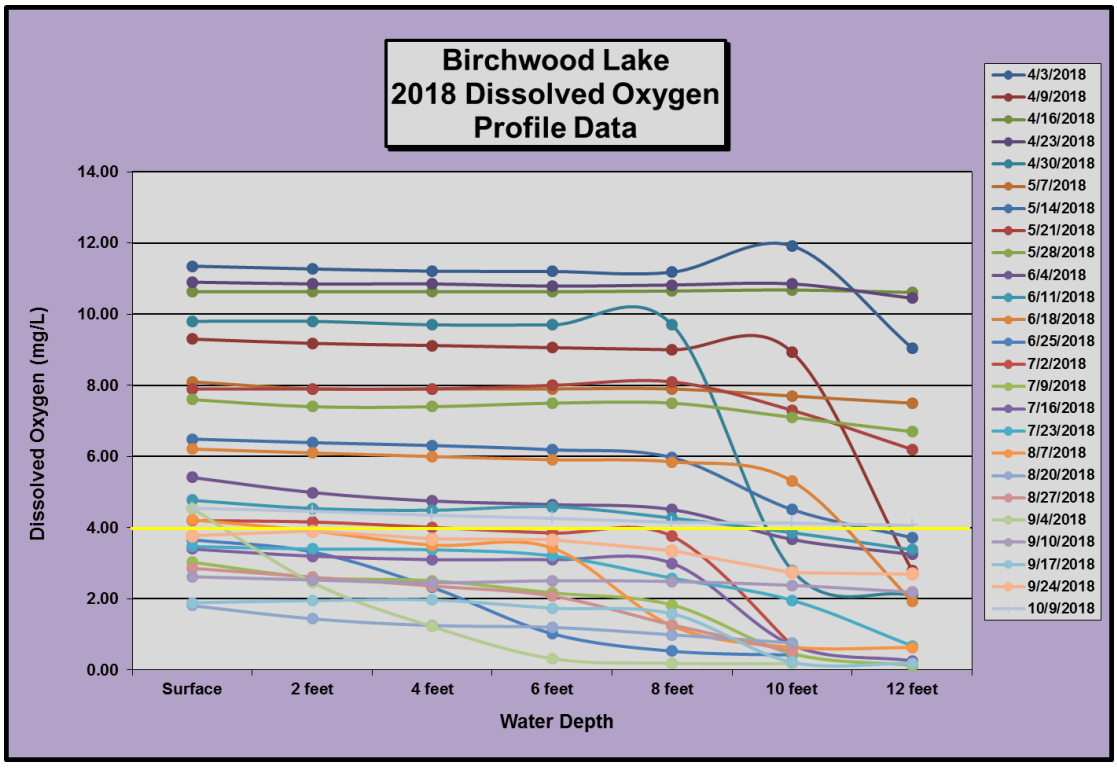
Birchwood Lake

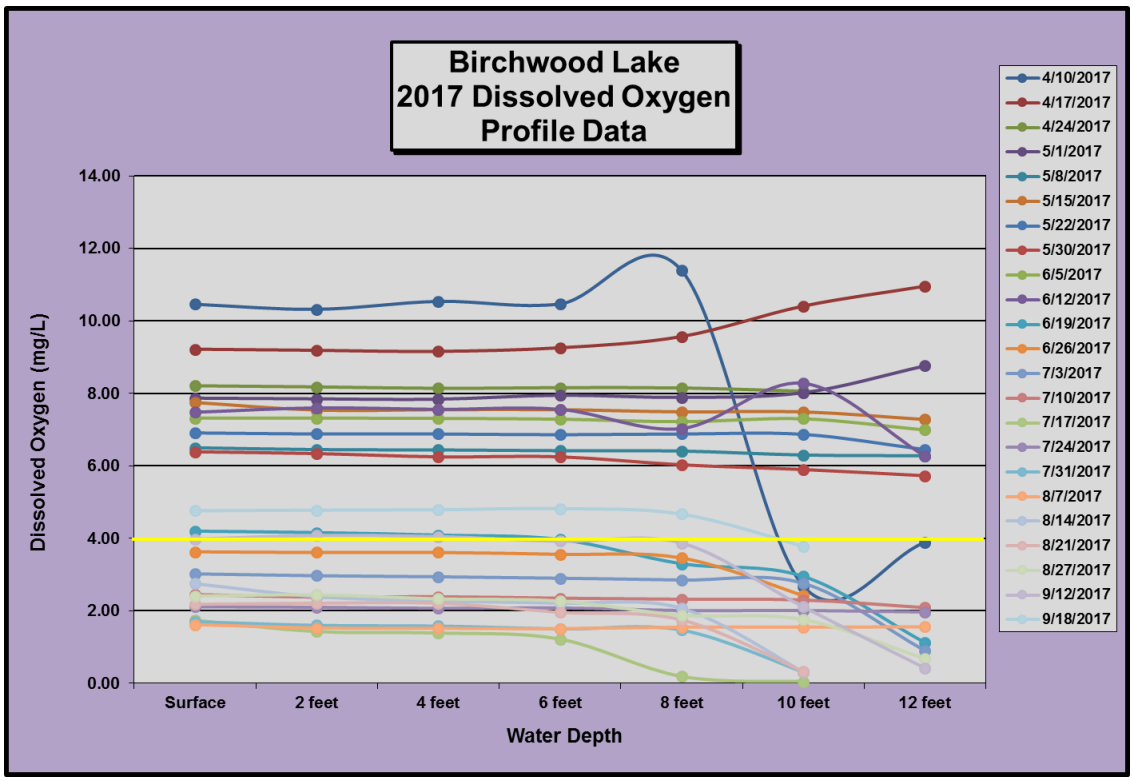
Birchwood Lake	units	6/10/2019	7/15/2019	8/12/2019
Temperature	ºC	22.4	25.9	24.9
Dissolved Oxygen	mg/L	6.74	**3.11**	4.22
Alkalinity	mg/L	44	62	60
pH	SU	6.75	6.5	6.5
Nitrate	mg/L	ND	ND	ND
Total Phosphorus	mg/L	0.007	0.016	0.019
Turbidity	NTU	1.3	1.7	1.4
Water Clarity	feet	5	6	6

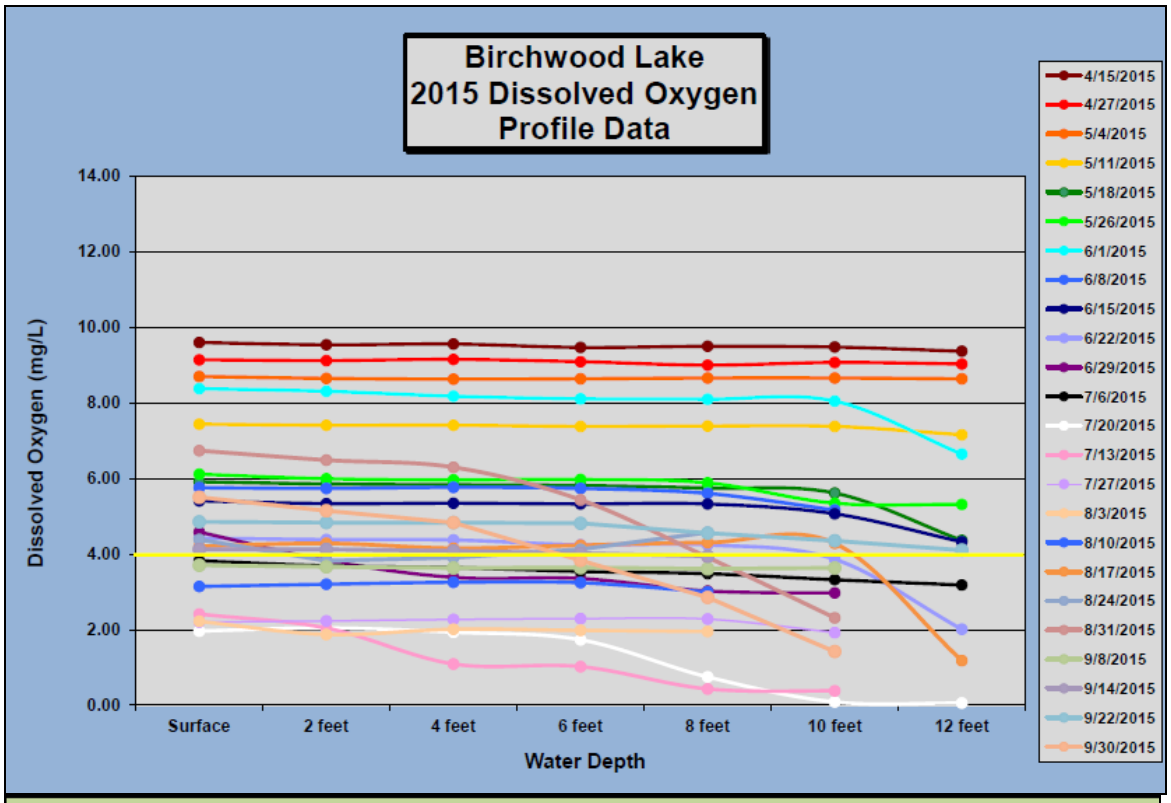
In 2019, water temperature readings were seasonally appropriate in Birchwood Lake, ranging from 22.4 °C in June to 25.9 °C in July, and finally 24.9 °C in August. Surface water temperatures were like data collected in previous seasons. Despite the addition of a second compressor several seasons ago, dissolved oxygen values throughout the water column continue to be depressed, especially during July and August. This pattern has been observed over the past several years.

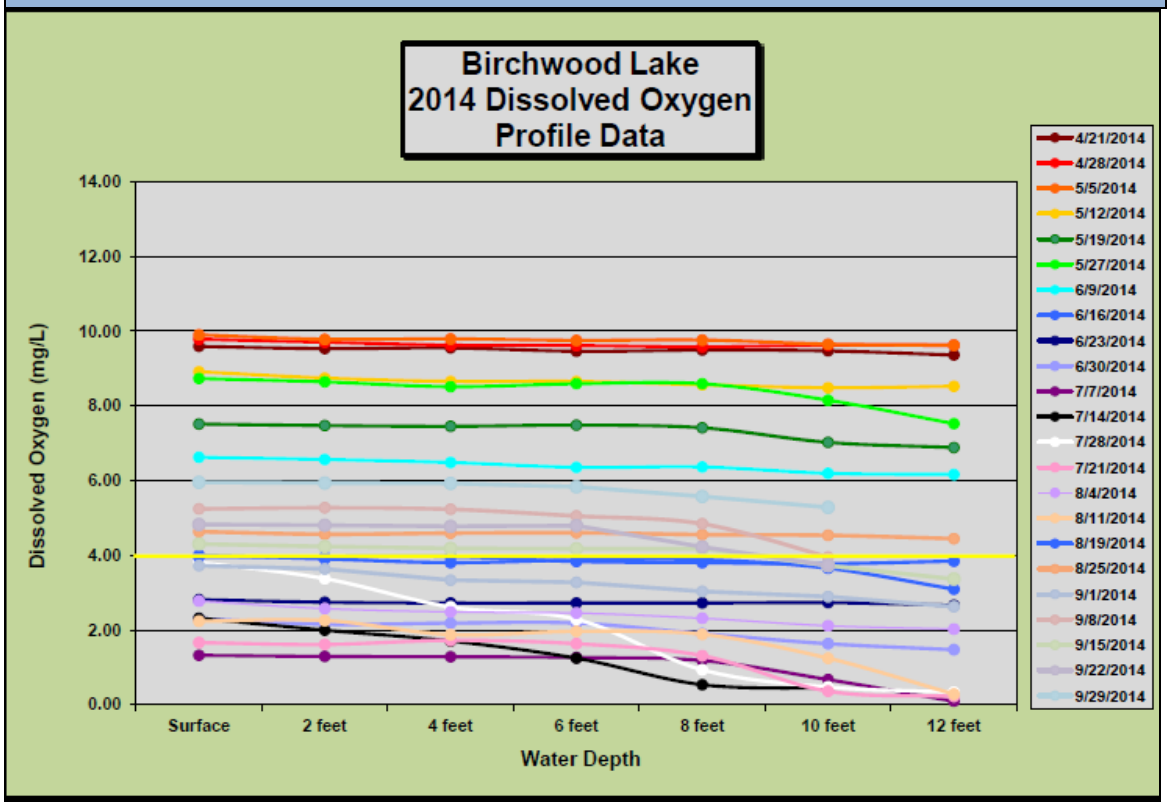
On the next page is a graph depicting all the dissolved oxygen profiles conducted at Birchwood Lake in 2019, followed by graphs of the 2008 through 2018 profile data. The 2019 data was like data collected in previous years, although there were less profiles with oxygen below the threshold in 2019 season compared to previous management seasons. Early season dissolved oxygen is suitable, then by late June, surface dissolved oxygen is about 4.0 mg/L or less, and possibly becomes limiting for aquatic biota. Again, having two separate systems is likely a benefit when one is down for repair, as we observed in 2015 and in 2014.

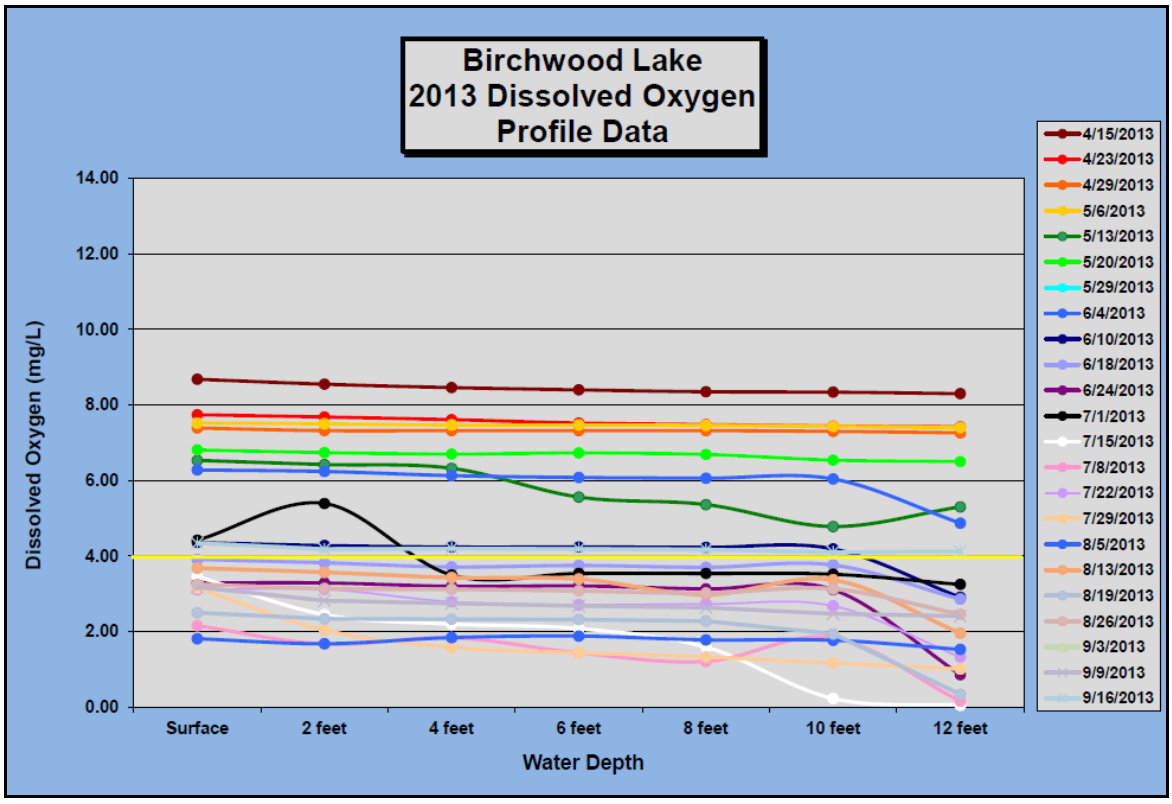


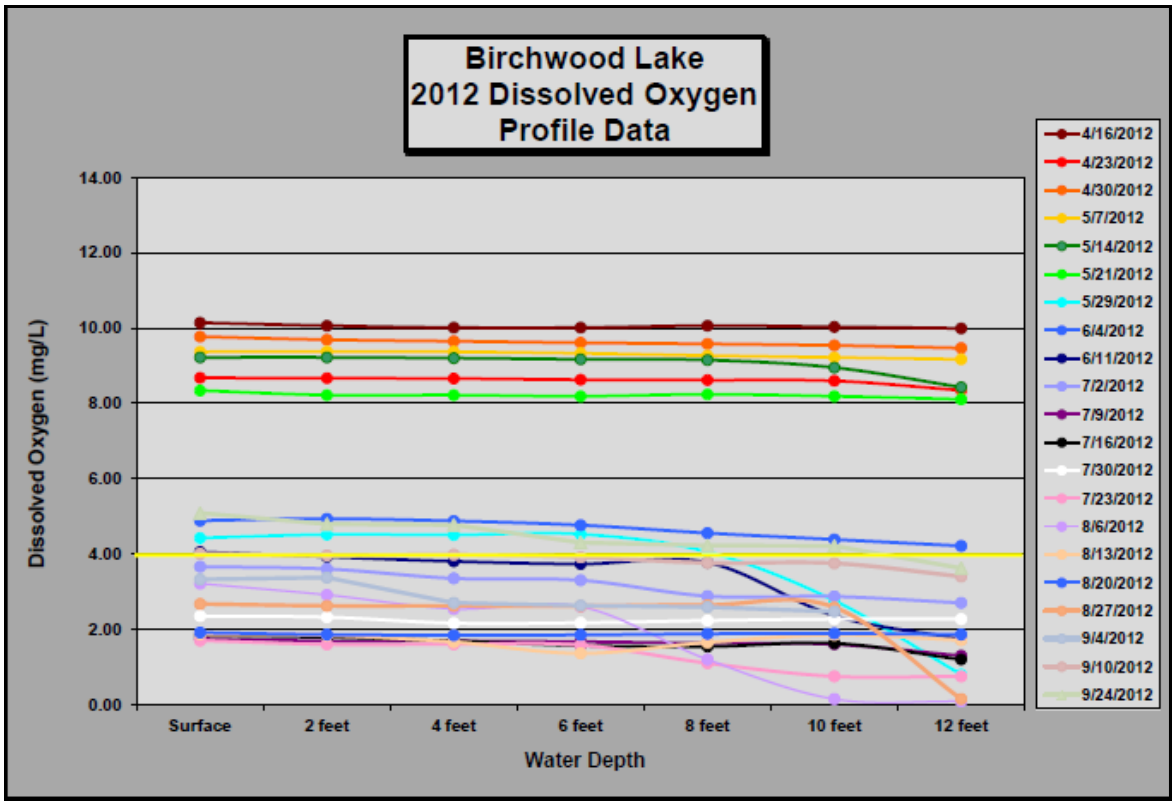

Birchwood Lake
2018 Dissolved Oxygen
Profile Data
Dissolved Oxygen (mg/L)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Surface
2 feet
4 feet
6 feet
8 feet
10 feet
12 feet
Water Depth
4/3/2018
4/9/2018
4/16/2018
4/23/2018
4/30/2018
5/7/2018
5/14/2018
5/21/2018
5/28/2018
6/4/2018
6/11/2018
6/18/2018
6/25/2018
7/2/2018
7/9/2018
7/16/2018
7/23/2018
8/7/2018
8/20/2018
8/27/2018
9/4/2018
9/10/2018
9/17/2018
9/24/2018
10/9/2018

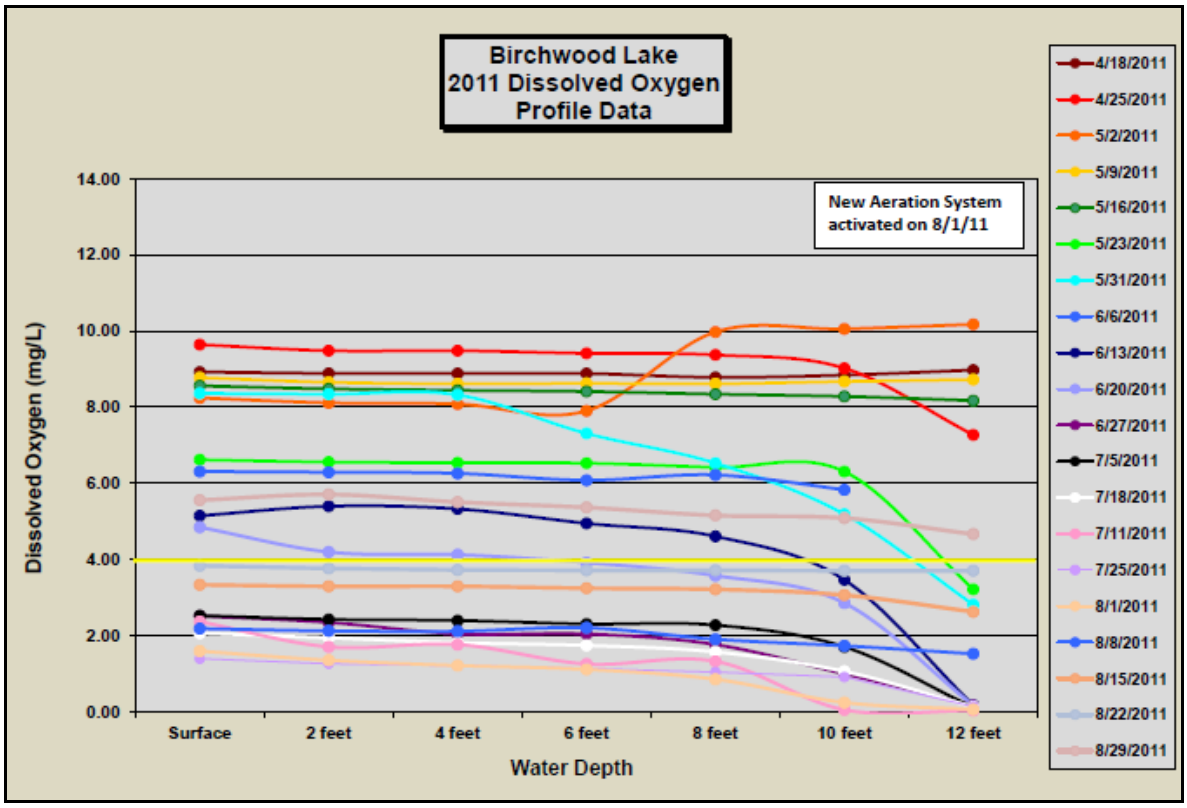

Birchwood Lake
2017 Dissolved Oxygen
Profile Data
Dissolved Oxygen (mg/L)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Surface
2 feet
4 feet
6 feet
8 feet
10 feet
12 feet
Water Depth
4/10/2017
4/17/2017
4/24/2017
5/1/2017
5/8/2017
5/15/2017
5/22/2017
5/30/2017
6/5/2017
6/12/2017
6/19/2017
6/26/2017
7/3/2017
7/10/2017
7/17/2017
7/24/2017
7/31/2017
8/7/2017
8/14/2017
8/21/2017
8/27/2017
9/12/2017
9/18/2017

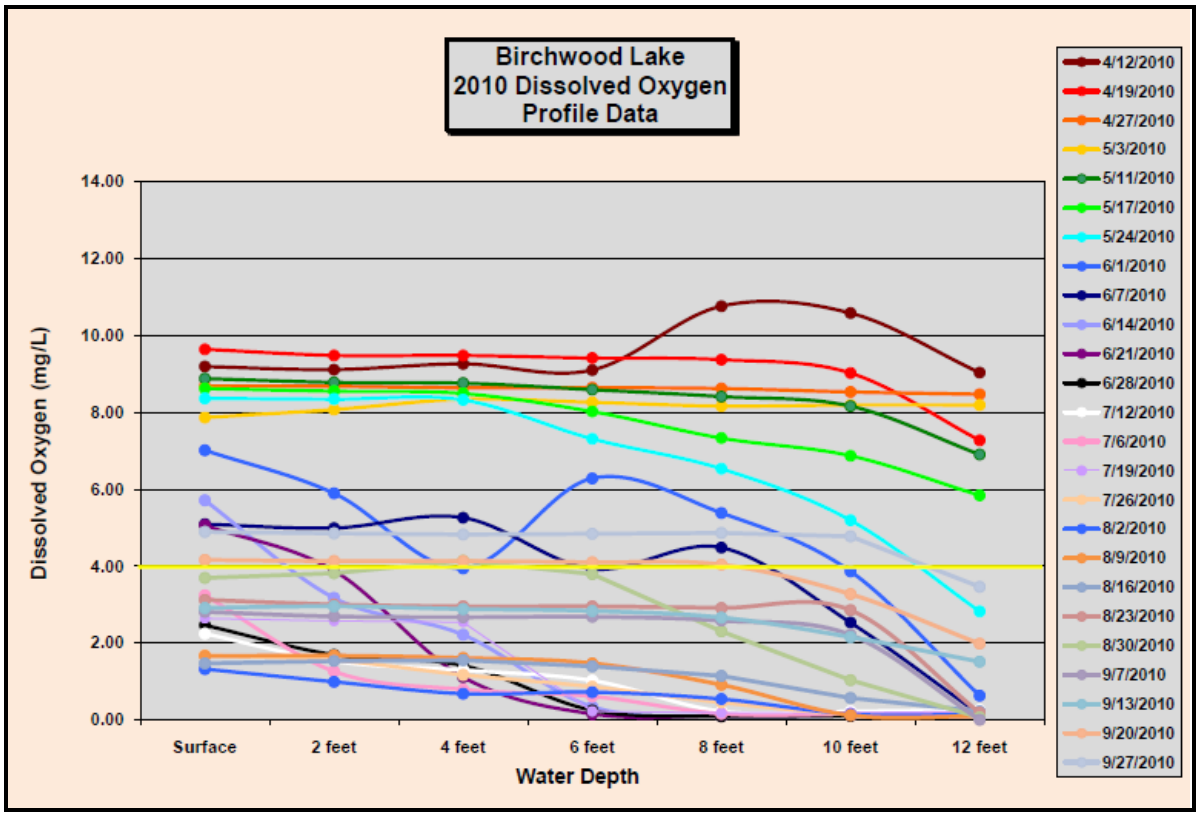

Birchwood Lake
2015 Dissolved Oxygen
Profile Data
Dissolved Oxygen (mg/L)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Surface
2 feet
4 feet
6 feet
8 feet
10 feet
12 feet
Water Depth
4/15/2015
4/27/2015
5/4/2015
5/11/2015
5/18/2015
5/26/2015
6/1/2015
6/8/2015
6/15/2015
6/22/2015
6/29/2015
7/6/2015
7/20/2015
7/13/2015
7/27/2015
8/3/2015
8/10/2015
8/17/2015
8/24/2015
8/31/2015
9/8/2015
9/14/2015
9/22/2015
9/30/2015

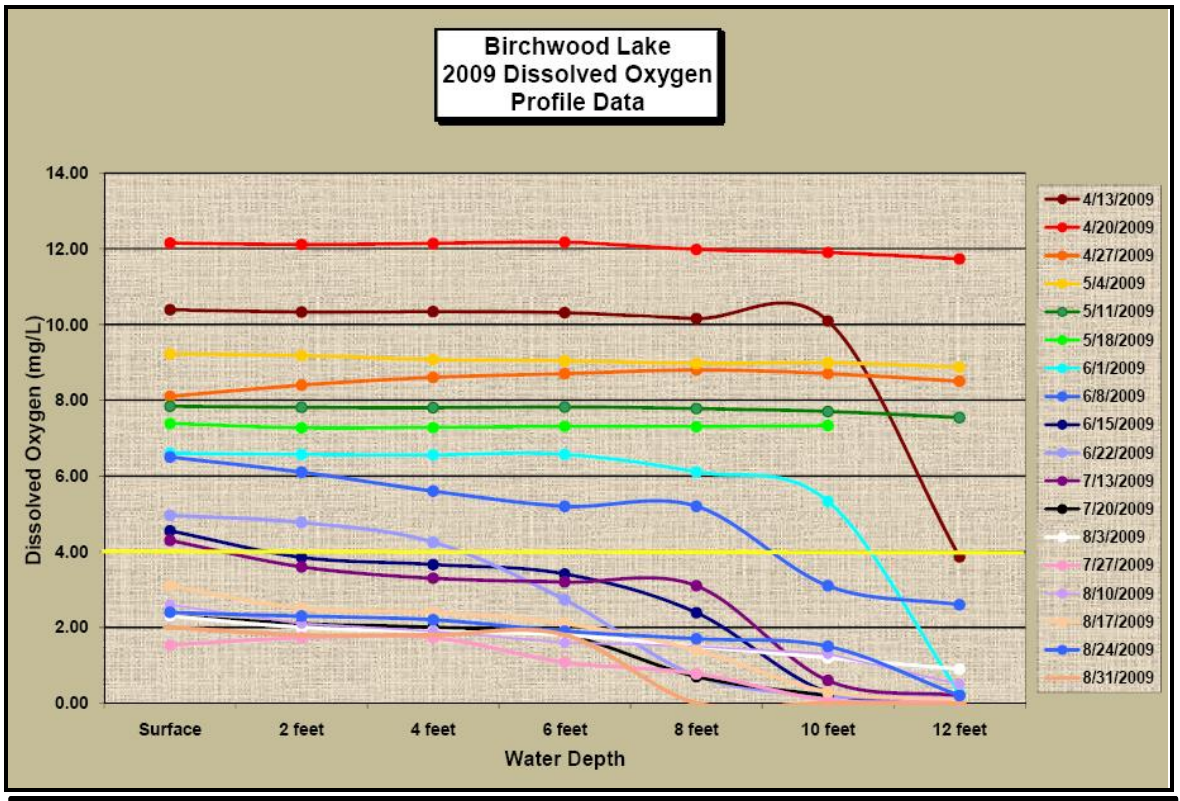

Birchwood Lake
2014 Dissolved Oxygen
Profile Data
Dissolved Oxygen (mg/L)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Surface
2 feet
4 feet
6 feet
8 feet
10 feet
12 feet
Water Depth
4/21/2014
4/28/2014
5/5/2014
5/12/2014
5/19/2014
5/27/2014
6/9/2014
6/16/2014
6/23/2014
6/30/2014
7/7/2014
7/14/2014
7/28/2014
7/21/2014
8/4/2014
8/11/2014
8/19/2014
8/25/2014
9/1/2014
9/8/2014
9/15/2014
9/22/2014
9/29/2014

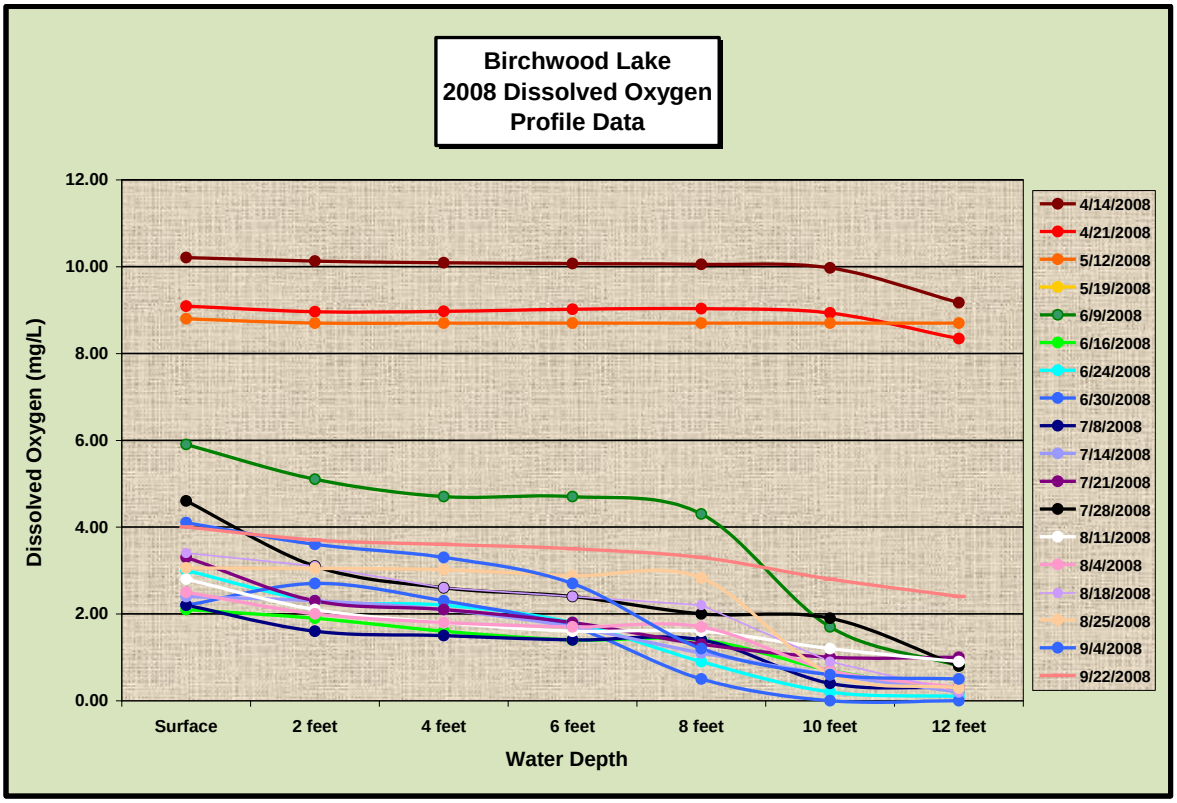

Birchwood Lake
2013 Dissolved Oxygen
Profile Data
Dissolved Oxygen (mg/L)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Surface
2 feet
4 feet
6 feet
8 feet
10 feet
12 feet
Water Depth
4/15/2013
4/23/2013
4/29/2013
5/6/2013
5/13/2013
5/20/2013
5/29/2013
6/4/2013
6/10/2013
6/18/2013
6/24/2013
7/1/2013
7/15/2013
7/8/2013
7/22/2013
7/29/2013
8/5/2013
8/13/2013
8/19/2013
8/26/2013
9/3/2013
9/9/2013
9/16/2013


Birchwood Lake
2012 Dissolved Oxygen
Profile Data
Dissolved Oxygen (mg/L)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Surface
2 feet
4 feet
6 feet
8 feet
10 feet
12 feet
Water Depth
4/16/2012
4/23/2012
4/30/2012
5/7/2012
5/14/2012
5/21/2012
5/29/2012
6/4/2012
6/11/2012
7/2/2012
7/9/2012
7/16/2012
7/30/2012
7/23/2012
8/6/2012
8/13/2012
8/20/2012
8/27/2012
9/4/2012
9/10/2012
9/24/2012


Birchwood Lake
2011 Dissolved Oxygen
Profile Data
New Aeration System
activated on 8/1/11
Dissolved Oxygen (mg/L)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Surface
2 feet
4 feet
6 feet
8 feet
10 feet
12 feet
Water Depth
4/18/2011
4/25/2011
5/2/2011
5/9/2011
5/16/2011
5/23/2011
5/31/2011
6/6/2011
6/13/2011
6/20/2011
6/27/2011
7/5/2011
7/18/2011
7/11/2011
7/25/2011
8/1/2011
8/8/2011
8/15/2011
8/22/2011
8/29/2011


Birchwood Lake
2010 Dissolved Oxygen
Profile Data
Dissolved Oxygen (mg/L)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Surface
2 feet
4 feet
6 feet
8 feet
10 feet
12 feet
Water Depth
4/12/2010
4/19/2010
4/27/2010
5/3/2010
5/11/2010
5/17/2010
5/24/2010
6/1/2010
6/7/2010
6/14/2010
6/21/2010
6/28/2010
7/12/2010
7/6/2010
7/19/2010
7/26/2010
8/2/2010
8/9/2010
8/16/2010
8/23/2010
8/30/2010
9/7/2010
9/13/2010
9/20/2010
9/27/2010





The alkalinity of Birchwood Lake continues to be the lowest in the Mountain Lakes chain. In 2019, it ranged from 44 mg/L to 62 mg/L. Birchwood Lake also traditionally has the lowest pH (slightly acidic) of all the Mountain Lakes. In 2019, the pH was 6.50 to

7.0 on all dates. This is suitable when compared to historical pH values in this basin. Nitrate levels were undetected during three sampling events in 2019. The surface total phosphorus in Birchwood Lake was suitable during each sampling event falling below established threshold of 0.03 mg/L, with the highest reading of 0.019 mg/L in August. The turbidity of Birchwood Lake was consistent all season long, ranging from 1.3 in June to 1.7 NTU in July, well within acceptable values. Water clarity ranged from 5.0 feet to 6.0 feet, which is favorable through the season. Water clarity measurements recorded on additional survey dates were generally even greater. In 2019, conductivity was measured on site during August, and had a value of 155 umhos / cm, which was consistent with the value of 140 umhos/cm from 2018 and are both within an acceptable range for a lake system.

Birchwood Lake

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae (orgs/mL)
6/10/2019		**1110**	120					1230
6/24/2019	20	10	**200**				10	240
7/15/2019	60	10	**460**					530
7/29/2019	50	20	**210**			10		290
8/12/2019	**220**	50	80			10		360
8/26/2019	10	30	**150**	30			10	230

In 2019, phytoplankton assemblages at Birchwood Lake were light and favorable from late June through the end of August, with the algal community consisting of mostly golden and green algae genera and diatoms. On June 10th, the assemblage was elevated in density with a bloom of *Dinobryon*, a golden algae genus accounting for most of the assemblage. Overall, the algal community was still favorable. Blue green algae were only observed during the final sampling event in August, although density was only a trace.

On August 15th of 2019, an additional water quality sampling event was performed at Birchwood Lake to perform testing of nutrient levels from the lake bottom to try and provide more insight into the poor dissolved oxygen conditions that are present during most of the summer season. On this date testing was performed for the following parameters: Ammonia Nitrogen, Nitrate Nitrogen, Nitrate Nitrogen, Total Kjeldahl Nitrogen and Total Phosphorous. The results of total phosphorous was 0.026 mg/L, and although higher than the surface sampling indicated, this result is still below the threshold and is not likely contributing to the dissolved oxygen suppression. The ammonia nitrogen level, which is a combination of nitrogen compounds, was 0.148 mg/L, which is still a relatively low value, but its presence is indicative of accumulated organic compounds at the bottom of the lake. Ammonia is broken down (oxidized) by bacteria into nitrate and nitrite, and dissolved oxygen is consumed as part of the oxidation process and exerts a biological oxygen demand (BOD) as the oxygen is consumed due to bacterial decomposition. Ammonia also accumulates in bottom sediments from bacterial

decomposition of organic matter, so it is highly likely that the sediment ammonia level is exponentially higher than the in-water concentrations and being slowly released from the bottom sediments as dissolved oxygen declines. An additional nitrogen test performed was Total Kjeldahl Nitrogen, which is a measurement of total nitrogen, returning a concentration of 0.578 mg/L. The results of Nitrate and Nitrite were non detected, so the TKN value is indicative that there are other organic forms of nitrogen present in the water being the difference between the value of TKN and Ammonia, roughly.

In summary, the testing confirms that there are elevated concentrations of nitrogen forms in the water as a result of accumulated organic material that are being oxidized and reducing dissolved oxygen concentration. Ammonia is typically absorbed by algae and macrophyte growth, reducing these levels, but Birchwood Lake is not supportive of high biomass of either, so there is more available in the water column through the season. The answer to the water quality dilemma at Birchwood lake continues to be increasing the aeration within the lake, and combining the aeration with the supplementing with nitrogen fixing bacteria to enable the ammonia to be broken down into more finite forms of nitrogen, which can then be more easily released from the water column as a result of aeration.

Crystal Lake

Crystal Lake	units	6/10/2019	7/15/2019	8/12/2019
Temperature	ºC	22.3	27.3	26.0
Dissolved Oxygen	mg/L	7.02	7.56	8.02
Alkalinity	mg/L	48	60	60
pH	SU	7.25	7.5	7.5
Nitrate	mg/L	ND	ND	ND
Total Phosphorus	mg/L	0.006	0.014	0.02
Turbidity	NTU	0.98	1.8	3.2
Water Clarity	feet	6	5.5	4

In 2019, surface water temperature and dissolved oxygen values all fell within acceptable seasonal ranges. Dissolved oxygen values were suitable on all three dates this season, ranging from 7.02 mg/L to 8.02 mg/L. Alkalinity ranged from 48 mg/L to 60 mg/L, which is typical for this basin and like last season. The pH of Crystal Lake ranged from 7.25 in June to 7.5 in July and August. This is suitable and comparable to previous year's measurements. Water clarity was considered good to moderate throughout much of the season this year. It was estimated on most dates, although the August 12th reading was accurate, and reduced from a bloom of *Staurastrum*, a genus of green algae. Nitrate was undetected during the three sampling events. Total phosphorus was below threshold levels for all three sampling dates. In 2019, turbidity ranged from 0.98 NTU in June, and increased to 3.2 NTU in August. At Crystal Lake the conductivity value measured on site in August was 273 umhos/cm, significantly below the 3400 umhos/cm value recorded in 2018.

Crystal Lake								
Date	**Diatoms**	**Golden Algae**	**Green Algae**	**Blue-green Algae**	**Protozoa**	**Euglenoids**	**Dinoflagellates**	**Total Algae (orgs/mL)**
6/10/2019	100	**240**					90	430
6/24/2019	10		90					100
7/15/2019	30		**360**	10				400
7/29/2019	30		**820**	30			40	920
8/12/2019	90	20	**1410**	200			20	1740
8/27/2019			**1330**	220				1550

In 2019, phytoplankton abundance at Crystal Lake was considered light and favorable on five out the six sampling events. On July 29th the phytoplankton density increased from a bloom of *Sphaerocystis*, a genus of green algae. During both August sampling events a bloom of Staurastrum, other genera of green algae, increased phytoplankton densities, and resulted in reduced water clarity through this time. An application of copper sulfate was performed on August 27th for the persistent bloom. This year, phytoplankton abundance ranged from 100 organisms per mL on June 24th to 1,740 organisms per mL on August 12th. In the past this basin often hosted a late season blue-green algae bloom that required treatment, although in 2018 and 2019 blue-green algae did not achieve densities requiring management.

Sunset Lake

Sunset Lake	units	6/10/2019	7/15/2019	8/12/2019
Temperature	ºC	22.4	27.4	25.5
Dissolved Oxygen	mg/L	6.23	7.37	8.25
Alkalinity	mg/L	42	44	58
pH	SU	7.25	7.5	7.5
Nitrate	mg/L	0.044	ND	ND
Total Phosphorus	mg/L	0.016	0.022	**0.032**
Turbidity	NTU	1.8	1.7	3.0
Water Clarity	feet	5	4	4

In 2019, surface water temperature and dissolved oxygen all fell within acceptable seasonal ranges at Sunset Lake. Dissolved oxygen values were suitable on all three dates, ranging from 6.23 mg/L to 8.25 mg/L. Alkalinity results in 2019 ranged from 42 mg/L in June to 58 mg/L in August. The 2019 average alkalinity was calculated at 48 mg/L, which is like previous management seasons average. In 2019, the pH ranged from 7.25 in June to 7.5 in July and August. These values are suitable, and like data collected in previous seasons. Nitrate was undetected during July and August in 2019, while there was a trace concentration in June. Total phosphorus levels were low during each sampling event, ranging from 0.016 mg/L in June to 0.032 mg/L in August, which is only slightly above threshold value. Turbidity was 1.7 NTU in July and increased to 3.0 NTU in August. At Sunset Lake the conductivity value was 180 umhos/cm in 2018, and was 227 umhos/cm in 2019, which are both within an acceptable range for a lake system.

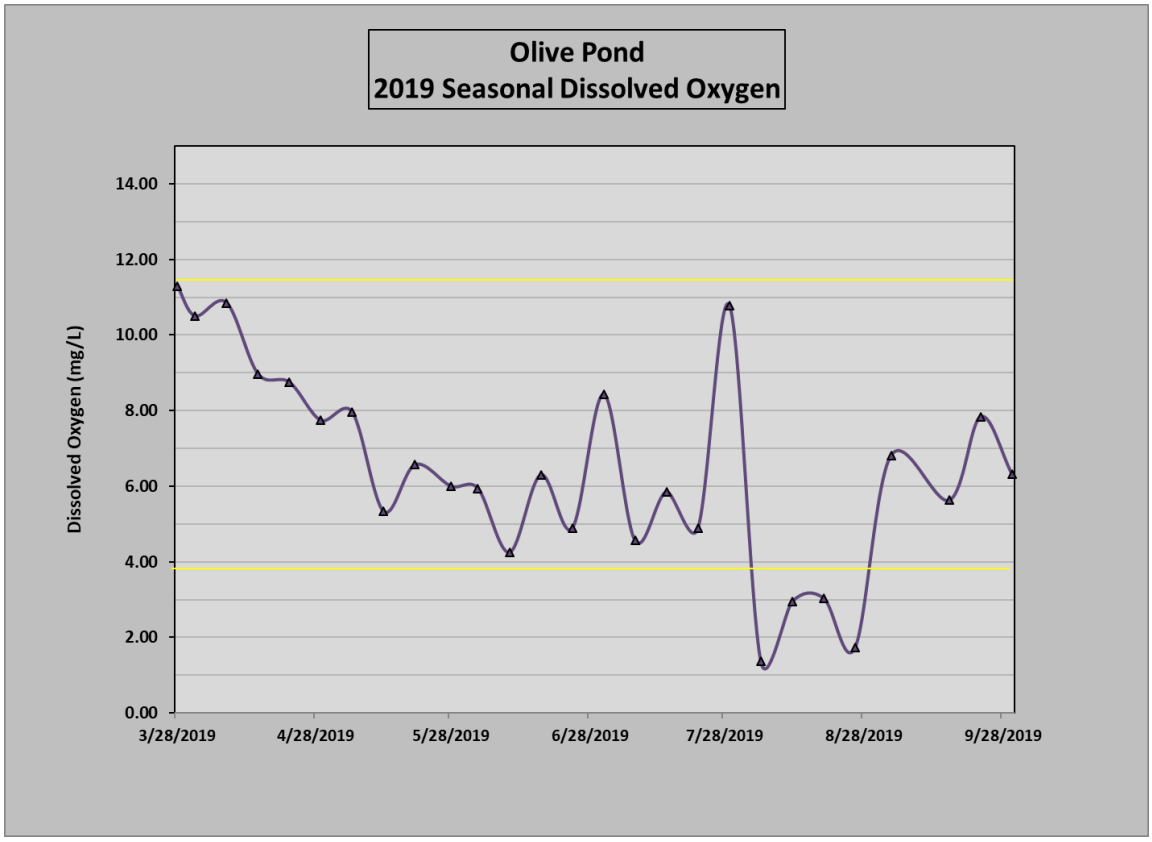
Sunset Lake								
Date	**Diatoms**	**Golden Algae**	**Green Algae**	**Blue-green Algae**	**Protozoa**	**Euglenoids**	**Dinoflagellates**	**Total Algae**
6/10/2019		**50**	40					90
6/24/2019	10		**90**					100
7/15/2019	**220**	50				10	70	350
7/29/2019	**50**		10					60
8/12/2019	130	**1310**	110	30				1580
8/26/2019			**260**					260

Phytoplankton abundance was suitable on all six of the sampling dates in 2019, supporting lighter densities than the upstream basins, and only traces of blue-green algae on one occasion. On five dates, the abundance was considered light with counts less than 350 organisms per mL. On August 12th there was a bloom of *Synura*, a genus of golden algae.

Olive Lake

Olive Lake	units	6/10/2019	7/15/2019	8/12/2019
Temperature	ºC	20.7	25.7	24.2
Dissolved Oxygen	mg/L	4.25	5.85	**2.95**
Alkalinity	mg/L	48	92	72
pH	SU	7.0	7.25	6.5
Nitrate	mg/L	ND	0.12	ND
Total Phosphorus	mg/L	**0.062**	**0.21**	**0.085**
Turbidity	NTU	3.2	**33**	2.8
Water Clarity	feet	3.5	**3**	4

In 2019, surface water temperature measurements fell within acceptable seasonal ranges at Olive Lake. Dissolved oxygen values in Olive Lake were suitable during the June and July sampling dates but was below 3 mg/L on the August sampling date. Overall during other inspections, dissolved oxygen levels were generally suitable for this basin for the season. The dissolved oxygen for this basin is depicted on the graph, below. This depicts that dissolved oxygen was lower than the acceptable threshold (4.0 mg/L) on four dates. This condition, especially if it persists, could be stressful to aquatic biota in the basin, and these depressed values have been occasionally observed at this site in previous seasons.



The alkalinity at Olive Lake ranged from 48 mg/L to 92 mg/L. This increase in alkalinity is like previous data on record. The pH at Olive Lake was suitable on all three dates ranging from 6.5 in August to 7.25 in July. Nitrate was undetected in June and August during the 2019 season, although there was a low concentration reported in July. This was the first detection of nitrate over the past ten years. Like previous seasons, the total phosphorus was elevated throughout 2019, with levels two to three times the threshold to support nuisance aquatic vegetation growth. Total phosphorous ranged from 0.062 mg/L in June, to 0.21 in July, which is an extremely high phosphorous value. Turbidity was suitable for this small basin in June and August, but spiked dramatically in July, likely from growth of phytoplankton from the corresponding high phosphorus and nitrate levels. At Olive Pond the conductivity value was 2,000 umhos/cm in 2018, which is very high for a lake system. The recorded value on site during 2019 was 299 umhos/cm, which is much more representative for an aquatic system. It is difficult to determine the cause of the elevated turbidity since phytoplankton densities were low, although total phosphorous was high at this time, and can influence conductivity.

Olive Pond

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/10/2019		60	**150**					210
7/15/2019	100		50	**600**		180		930
8/12/2019	**170**		60	10		50	10	300

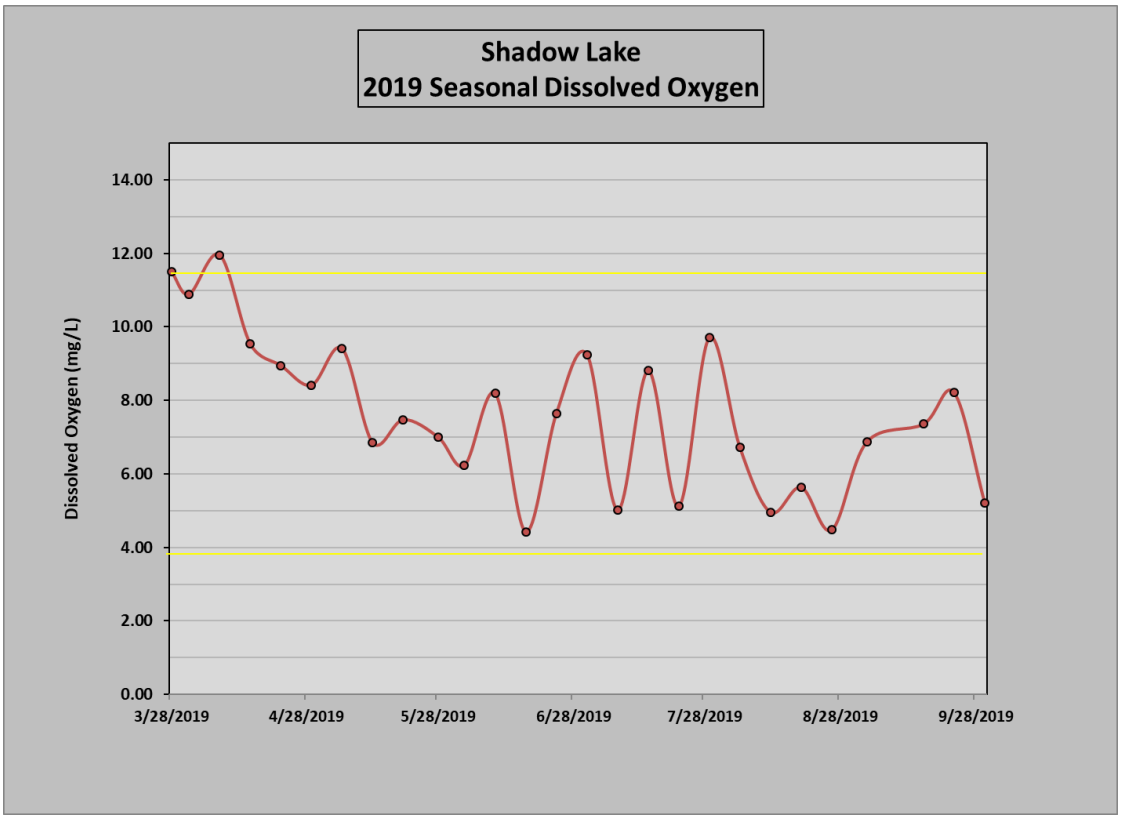
In 2019, phytoplankton density was favorable on the June and August sampling dates, with the highest plankton density occurring on July 15th with 930 organisms/mL. The July sampling indicated that there was a bloom of *Anabaena*, a genus of blue-green algae. The second two sampling events of the season on July 9th and August 6th were 170 organisms per mL and 130 organisms per mL, respectively. During 2019, plant and algae growth was limited at Olive Pond, despite the elevated total phosphorous levels observed through the season. Olive Pond also saw repetitive treatments of the algaecide Earthtec, which was applied to help suppress algae growth due to its longer residence time in the water column compared to typical copper algaecides.

Shadow Lake

Shadow Lake	units	6/10/2019	7/15/2019	8/12/2019
Temperature	ºC	20.7	25.4	24.0
Dissolved Oxygen	mg/L	8.19	8.81	4.96
Alkalinity	mg/L	42	80	82
pH	SU	7.5	7.5	7.25
Nitrate	mg/L	ND	ND	ND
Total Phosphorus	mg/L	**0.057**	**0.112**	**0.063**
Turbidity	NTU	1.9	**23**	2.5
Water Clarity	feet	3.5	**2.5**	4.5

In 2019, surface water temperature measurements fell within acceptable seasonal ranges at Shadow Lake. Dissolved oxygen values were considered suitable throughout the season on each of the water quality monitoring visits. The dissolved oxygen for this basin is depicted on the graph, below, and shows that dissolved oxygen was not lower than the acceptable threshold (4.0 mg/L) on any observed date. The aeration system is likely directly responsible for preventing any suppression of dissolved oxygen in this basin compared to the adjoining Olive Pond.

Alkalinity in 2019 represented more typical levels, ranging only from 42 mg/L to 82 mg/L. The pH at Shadow Lake ranged from 7.25 in August to 7.5 in June and July. These measurements are suitable for this basin. In 2019, nitrate was undetected during all three sampling events, and may also be attributed to the aeration system preventing the nutrient from building up in the water column. Total phosphorus levels were elevated once again the entire 2019 season at Shadow Lake. In June the concentration was 0.057 mg/L, before increasing to 0.112 mg/L in July and then 0.063 mg/L in August. The elevated phosphorous levels in July of 2019 contributed to blue green phytoplankton growth during July, when blooms of *Anabaena* were persistent. Turbidity levels were suitable in 2019 during June and August, but this parameter was elevated in July from presence of higher density phytoplankton in the water column. At Shadow Lake the conductivity value was 260 umhos/cm in 2018, and 305 umhos/cm in 2019, which are within an acceptable range for a lake system.



Shadow Lake

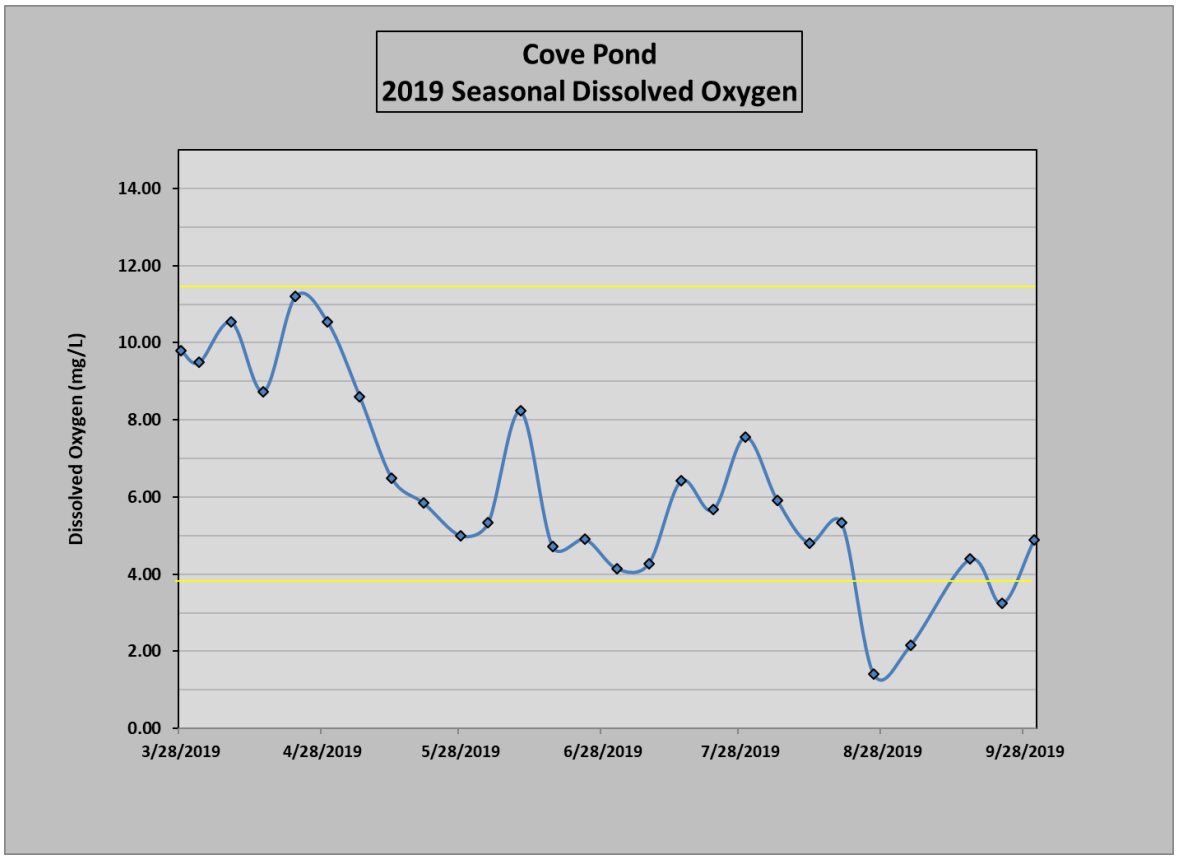
Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/10/2019	80	**440**	320				220	1060
6/24/2019	**60**	50	30				10	140
7/15/2019	40		30	**2110**		120		2300
7/22/2019	40	10	220	**4530**		20	30	4850
8/12/2019	**60**		**60**	30		20		170
8/26/2019	140		**230**					370

Phytoplankton conditions in 2019 were suitable on four out of six dates. The first sampling event in June showed a bloom of golden algae, which did not impact water quality of the pond. Phytoplankton assemblages on June 24th, August 12th and August 26th were favorable with only a trace of blue green algae on August 12th among these three dates. During both July 15th and July 22nd sampling events, the blue green alga *Anabaena* was blooming, as well as *Aphanezomenon*, on the 22nd. On these two dates water clarity was impaired, and the pond was supporting a film of blue-green algae on the pond surface.

Cove Pond

Cove Pond	units	6/10/2019	7/15/2019	8/12/2019
Temperature	ºC	20.4	24.5	23.0
Dissolved Oxygen	mg/L	8.23	6.42	4.81
Alkalinity	mg/L	44	80	80
pH	SU	7.5	7.25	7.25
Nitrate	mg/L	ND	ND	ND
Total Phosphorus	mg/L	**0.09**	**0.091**	**0.039**
Turbidity	NTU	6.5	8.1	3.3
Water Clarity	feet	4	3	**2**

In 2019, surface water temperature measurements fell within acceptable seasonal ranges at Cove Pond. Dissolved oxygen levels were favorable for most of this season, with all but one observed reading exceeding 4 mg/L. In August, the dissolved oxygen was 4.81 mg/L, which is close to the threshold. The dissolved oxygen for this basin is depicted on the graph, below.



In 2019, alkalinity ranged from 44 mg/L to 80 mg/L, for an annual average of 68 mg/L. We continue to see an annual average increase from 2013, when the annual average was 32.0 mg/L. Nitrate levels were undetected during each of the sampling events. The total phosphorus at Cove Pond was elevated on all three sampling dates in 2019, like previous seasons. In June, the total phosphorus was 0.09 mg/L, or three times the ideal threshold. In July, the total phosphorus was consistent at 0.091 mg/L, and decreased significantly to 0.039 mg/L in August. However, these elevated phosphorus measurements did not translate into excessive aquatic plant or phytoplankton growth during the season.

Turbidity was elevated compared to historic data, with levels ranging from 3.3 NTU in August, to 58.1 NTU in July. At Cove Pond the conductivity value was 290 umhos/cm in 2018 and 322 umhos/cm in 2019, which are within an acceptable range for a lake system, and like Shadow Lake.

Cove Pond

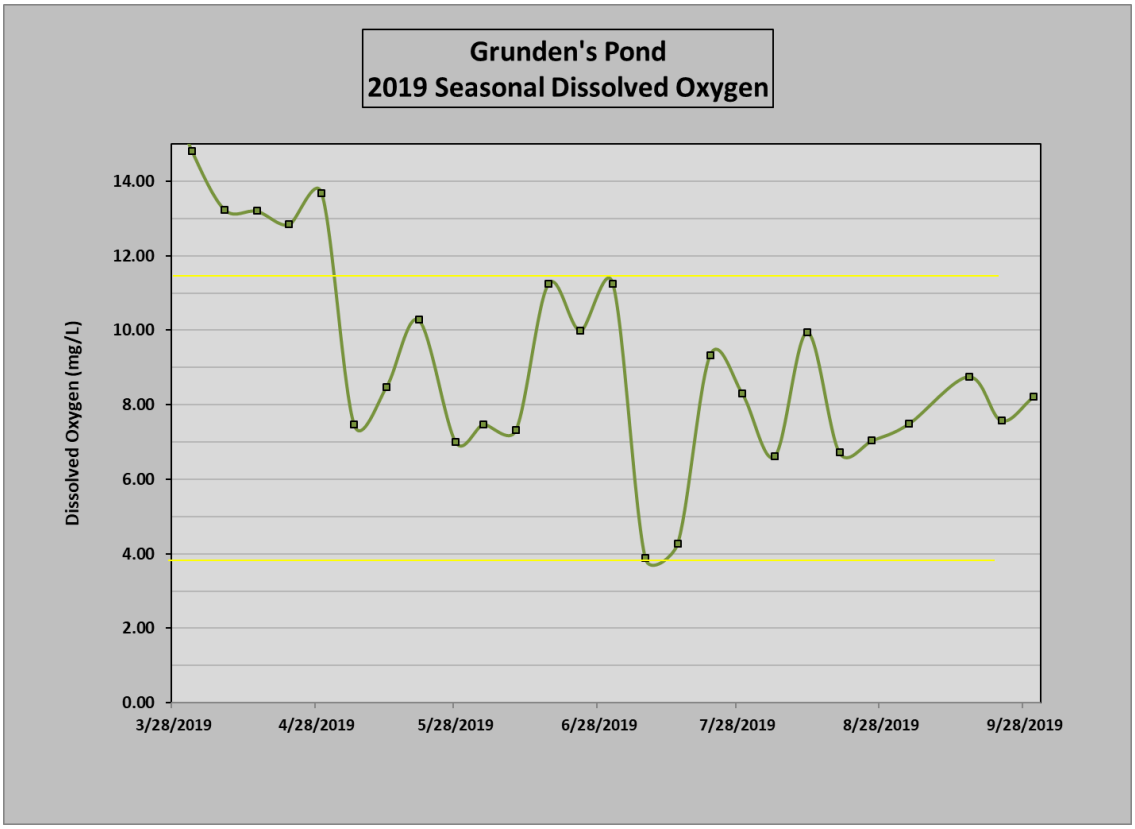
Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/10/2019	20	**650**	20				40	730
7/15/2019	40	60		**630**		110	440	1280
8/12/2019	20	50	20			**60**	**60**	210

In 2019, unicellular phytoplankton abundance at Cove Pond was light and favorable during June and August. During June a bloom of golden algae elevated the overall phytoplankton community, while the assemblage in August was a low-density favorable community. In July, a bloom of Anabaena was also present like Olive and Shadow Ponds.

Grunden's Pond

Grunden's Pond	units	6/10/2019	7/15/2019	8/12/2019
Temperature	ºC	21.2	27.2	26.2
Dissolved Oxygen	mg/L	7.32	4.28	9.95
Alkalinity	mg/L	44	***160***	80
pH	SU	8.0	7.0	7.5
Nitrate	mg/L	ND	ND	ND
Total Phosphorus	mg/L	**0.044**	**0.088**	**0.056**
Turbidity	NTU	2.7	4.3	3.4
Water Clarity	feet	3	**2**	**1.5**

In 2019, surface water temperature measurements fell within acceptable seasonal ranges at Grunden's Pond. Weekly dissolved oxygen measurements were collected at this site again in 2019 as depicted on the graph below. Dissolved oxygen was not observed to be lower than the ideal threshold (4.0 mg/L). but exceeded the ideal threshold (12.0 mg/L) on five dates during the early part of the season, which could indicate overabundance of growth in the basin. This was likely not caused by phytoplankton abundance (see discussion, below) but more likely from filamentous algae or aquatic plant growth. This dissolved oxygen excess was observed the past four years as well.



Alkalinity in 2019 at Grunden's Pond ranged from 44 mg/L in June to 160 mg/L in July, although based on historical data and compared to other basins could be an error in the test reagents. Nitrate was undetected during each of the sampling events in 2019. Total phosphorus was elevated throughout 2019 on all three sampling dates, like the previous seasons at this site, and other small basins. In June, it was 0.044 mg/L, and increased to 0.088 mg/L in July. In August, total phosphorus declined to 0.056 mg/L. Turbidity was acceptable on all dates this year ranging from 2.7 NTU in June to 4.3 NTU in July. At Grunden's Pond the conductivity value was 2,600 umhos/cm in 2018, which is very high for a lake system, but was only 284 umhos/cm on the sampling event in 2019.

Grunden's Pond

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/10/2019	10	80	40			30	**880**	1040
7/15/2019	50		100	**130**		90	40	410
8/12/2019	60		**430**	10				500

In 2019, total phytoplankton abundance varied from the other small basins, with the highest density observed in June from growth of a dinoflagellate. On the sampling events in July and August blue-green algae were only present at trace density, with the August sampling represented primarily by several genera of green algae.

Mountain Lake

Mountain Lake	units	6/10/2019	7/15/2019	8/12/2019
Temperature	ºC	20.8	27.1	25.5
Dissolved Oxygen	mg/L	8.19	4.45	7.25
Alkalinity	mg/L	42	100	80
pH	SU	8.0	7.25	7.25
Nitrate	mg/L	0.035	ND	ND
Total Phosphorus	mg/L	0.012	0.017	**0.03**
Turbidity	NTU	1.2	1.3	1.9
Water Clarity	feet	7	6	6

In 2019, surface water temperature measurements fell within acceptable seasonal ranges at Mountain Lake. It's not uncommon for July and/or August surface water temperatures to be approaching 30.0°C at this site. Dissolved oxygen values were ideal throughout the entire 2019 season, which is typical for this basin. In June, the dissolved oxygen was 8.19 mg/L. In July, the dissolved oxygen experienced a decline to 4.45 mg/L, and was likely a result of the elevated water temperatures that support less dissolved oxygen, and the timing of the sampling. By August, dissolved oxygen increased to 7.25 mg/L, and was a healthier oxygen concentration. See below for a discussion of the water clarity at Mountain Lake in 2019.

Alkalinity at Mountain Lake in 2019 ranged from 42 mg/L in June to 100 mg/L in July. This is slightly higher than data recorded over past several years, but from a historical standpoint is still suitable. In July and August of 2019, pH was 7.25, but in June and the pH was 8.0. The nitrate level was undetectable during July and August but was recorded at 0.035 mg/L in June, which is a low concentration for this nutrient parameter. Total phosphorus levels varied minimally throughout the 2019 season at this site. Total phosphorus was 0.012 mg/L in June and increased to 0.017 mg/L in July. This year, in August the total phosphorus increased to 0.03 mg/L. This is elevated compared to previous seasons, and likely a result of nutrient runoff from the excessive rainfall. Each of the total phosphorus levels are below threshold levels, and favorable, especially compared to the small basins in the borough. Turbidity measurements this season were also ideal on all dates, with measurements only ranging from 1.2 NTU in June to 1.9 NTU in August. At Mountain Lake the conductivity value was 530 umhos/cm in 2018 and was measured at 457 umhos/cm in 2019, which is elevated compared to the other basins, but within an acceptable range for a lake system.

Mountain Lake

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/10/2019	**70**		10			20		100
6/24/2019	60	30					**110**	200
7/15/2019	20		**100**					120
7/29/2019	40	20	**130**	110			10	310
8/12/2019	30	270	80	**440**			10	830
8/26/2019	10	30	**1110**	400				1550

The phytoplankton abundance data was light and favorable throughout the 2019 season, although green algae increased late in August requiring an algaecide application. Total phytoplankton counts ranged from 100 organisms per mL to 1,550 organisms per mL, very similar to recent seasons. Green algae dominated the phytoplankton community on three dates. Also, blue-green algae were at trace to moderate density on August 12th and August 26th. The overall seasonal assemblage shifted away from blue green algae and is representative of the low total phosphorous levels. This is also favorable given the duration since the last application of aluminum sulfate. The water quality numbers in 2019 do not indicate an immediate need for alum in 2020, unless observed water quality through the season displays a shift in water quality.

Wildwood Lake

Wildwood Lake	units	6/10/2019	7/15/2019	8/12/2019
Temperature	ºC	20.7	27.8	26.6
Dissolved Oxygen	mg/L	8.52	4.45	6.33
Alkalinity	mg/L	32	100	80
pH	SU	7.5	7.25	7.0
Nitrate	mg/L	ND	ND	ND
Total Phosphorus	mg/L	0.025	0.024	0.019
Turbidity	NTU	2.7	1.3	1.1
Water Clarity	feet	6	6.5	5

In 2019, surface water temperature measurements fell within acceptable seasonal ranges at Wildwood Lake. Dissolved oxygen ranged from 4.45 mg/L in July to 8.52 mg/L in June. These values are seasonally ideal for this basin, and like results obtained in previous seasons.

Alkalinity levels in 2019 ranged from 32 mg/L to 100 mg/L, for a seasonal average of 70.6 mg/L. This is consistent with data prior to the 2017 season, when alkalinity showed an increase. Wildwood Lake typically has the highest pH of the lakes in the Mountain Lakes community, but in 2019 the pH was recorded at 7.0 to 7.5 through the season, which is ideal. In 2019, nitrate was undetected during each of the sampling dates at this site. Total phosphorus measurements were suitable during each of the sampling dates for the 2019 season at only 0.025 mg/L in June, which was the seasons highest level, and decreased to 0.024 mg/L in July, and then 0.019 mg/L in August. Turbidity was also stable this season, ranging from 1.1 NTU in August to 2.7 NTU in June. Despite this increase later in the season, these amounts remain within acceptable measurements. At Wildwood Lake the conductivity value was 2,800 umhos/cm in 2018 but was recorded at only 392 umhos/cm in 2019.

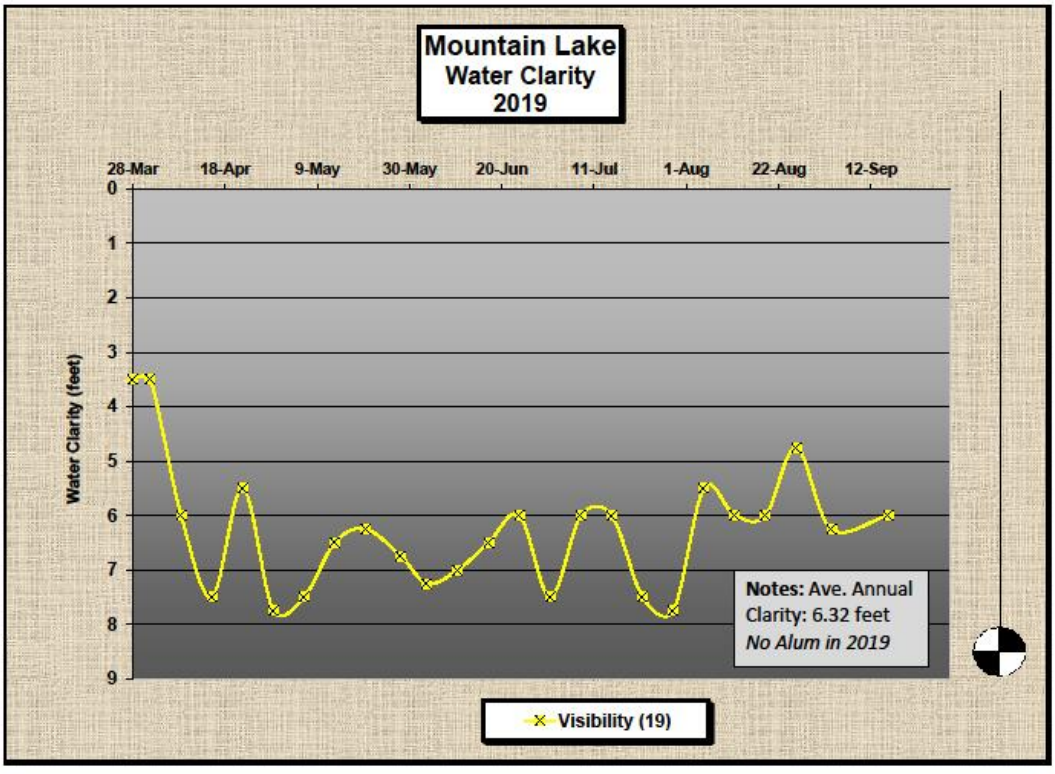
Wildwood Lake

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/10/2019	**40**						10	50
6/24/2019	**70**							70
7/15/2019	**50**		**50**			20		120
7/29/2019		**90**	70			20		180
8/12/2019	**40**	30	**40**	10			10	130
8/26/2019	10	30	**170**			10		220

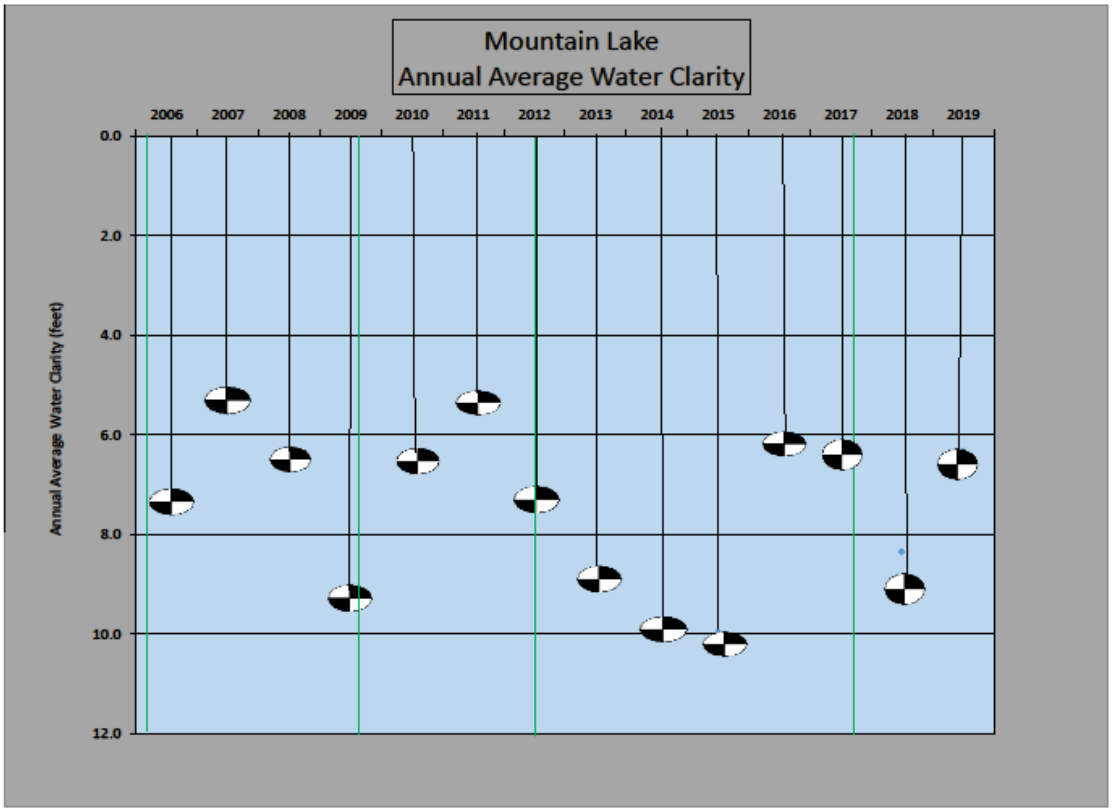
In 2019, overall unicellular phytoplankton counts at Wildwood Lake were low on all dates, ranging from 50 organisms per mL to only 220 organisms per mL. On three dates, green algae were the dominant group, as expected. Blue-green algae were only present during one sampling event in August, but that does not necessarily mean there weren't short term occurrences at other times during the season. During the first three sampling event, diatoms were the dominant group.

2006 to 2019 Water Clarity at Mountain Lake

Below is a graph that depicts the water clarity at Mountain Lake in 2019. Keep in mind the x axis is reversed, representing the water line at the top and deeper water (and therefore greater water clarity) as one travel down the x-axis. There was no Alum application in this basin again this year, the seventh consecutive year. This graph is also included in the Appendix at the end of this report. As can be seen on the graph, water clarity in 2019 ranged from 3.5 feet to nearly eight feet on several occasions throughout the season. Water clarity was estimated on most sampling dates because the clarity exceeded water depth at the standardized sampling location (the end of the dock at the Midvale launch). Compared to previous seasons, water clarity was not recorded at greater than eight feet, and average water clarity declined in 2019 compared to previous seasons. Water clarity was a critical factor in determining the use of Alum this season and was a strong factor in alum not being applied in this basin this season.



In 2019, the annual average water clarity was 6.32 feet, which is nearly two feet lower than the 2018 average water clarity. Since the water clarity measurements are collected at the same site, using a standard Secchi disc, and on the roughly the same dates from season to season, these values are an accurate representation of the water clarity of the lake. Several factors negatively impact the water clarity of a lake. These include unicellular phytoplankton in the water column, suspended solids, or nutrient-rich sediments entering via storm runoff. Unicellular phytoplankton abundance was light and favorable in this basin this year, although we did observe non-problematic blue-green algae on several dates. Submersed plant abundance also plays a major role in the water clarity of a lake. Despite reduced plant density observed throughout the season, the lack of established plant beds did not seem to influence water clarity at Mountain Lake. In short, although average clarity declined from 2018, Mountain Lake is enjoying a consecutive streak with outstanding water clarity.

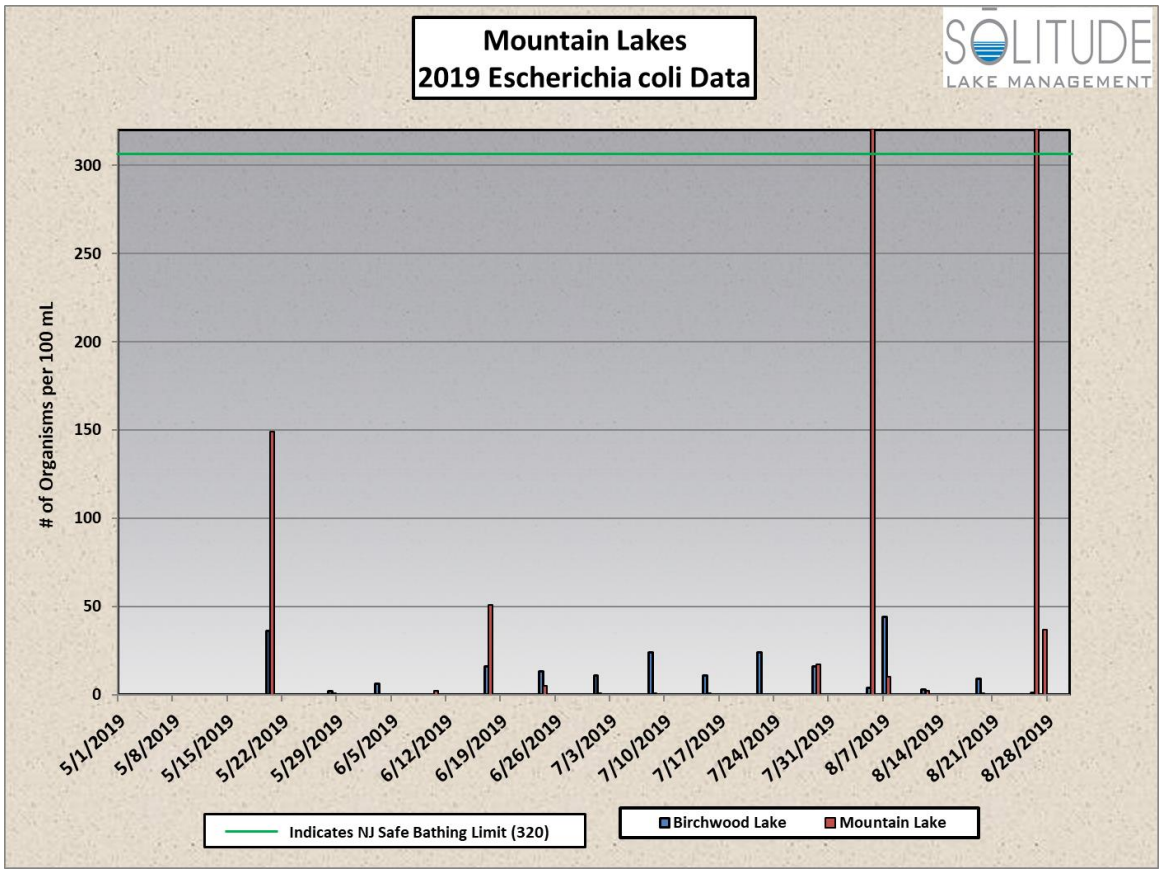


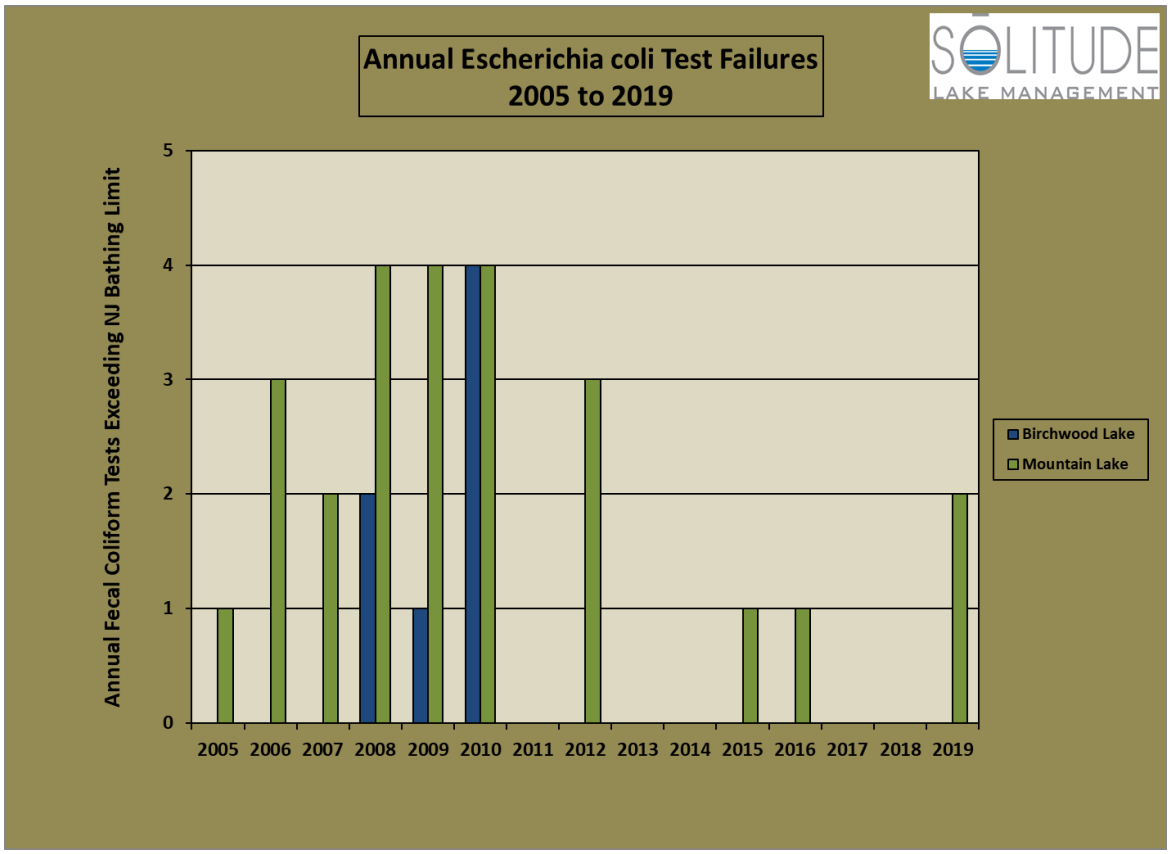
2019 E. coli Testing at Birchwood and Mountain Lake

E. coli sampling was performed at Birchwood Lake's beach and Mountain Lake's Island Beach in 2019. In 2018 New Jersey Department of health imposed revised sampling requirements that dictated a shift from fecal coliform sampling to more specifically E. coli. Sampling occurred weekly during surveys and was conducted from Memorial Day through August 27th (the week before Labor Day). E coli counts are measured as a

number of colony forming units (cfu) per 100 mL sample, and New Jersey has set a safe bathing limit of 320 cfu per 100 mL, depicted by the green line on the graph presented above. Consult the graph for a summary of the fecal coliform counts at both sites for 2019. The Appendix of this report contains a reproduction of this graph, and a table summarizing the 2019 data. On these tables, numbers highlighted in red exceed the NJ bathing limit of 320 cfu per 100 ml. In 2019, field biologists once again donned hip waders on all dates and entered the water to a depth of about mid-thigh. The sample container was then submerged in front of the body and opened under water. The container was then sealed securely underwater, and the sample was promptly placed in a dark cooler stocked with blue ice packs.

In 2019, no failures were observed at Birchwood Lake, the ninth consecutive year that no failures occurred at this site. This is a promising trend. At Mountain Lake, there were two failures, but the retests conducted within two days then passed. Sampling failures were likely a result of collection after a rain event, or higher waterfowl activity at the beach area. Waterfowl continues to be the likely source of bacteria loading at Island Beach, but the effects of rainfall can't be ignored. The graph below depicts the number of failures at each site from 2005 through 2019. This graph depicts very different conditions in the first six years of the dataset as compared to the last seven years.





2019 Lakes Cleaning Project

In 2019, the Lakes Cleaning Project was conducted in October at Birchwood Lake. The table below is a summary of the dates, loads removed, estimated cubic yards of consolidated organic debris removed, and the number of hours raked.

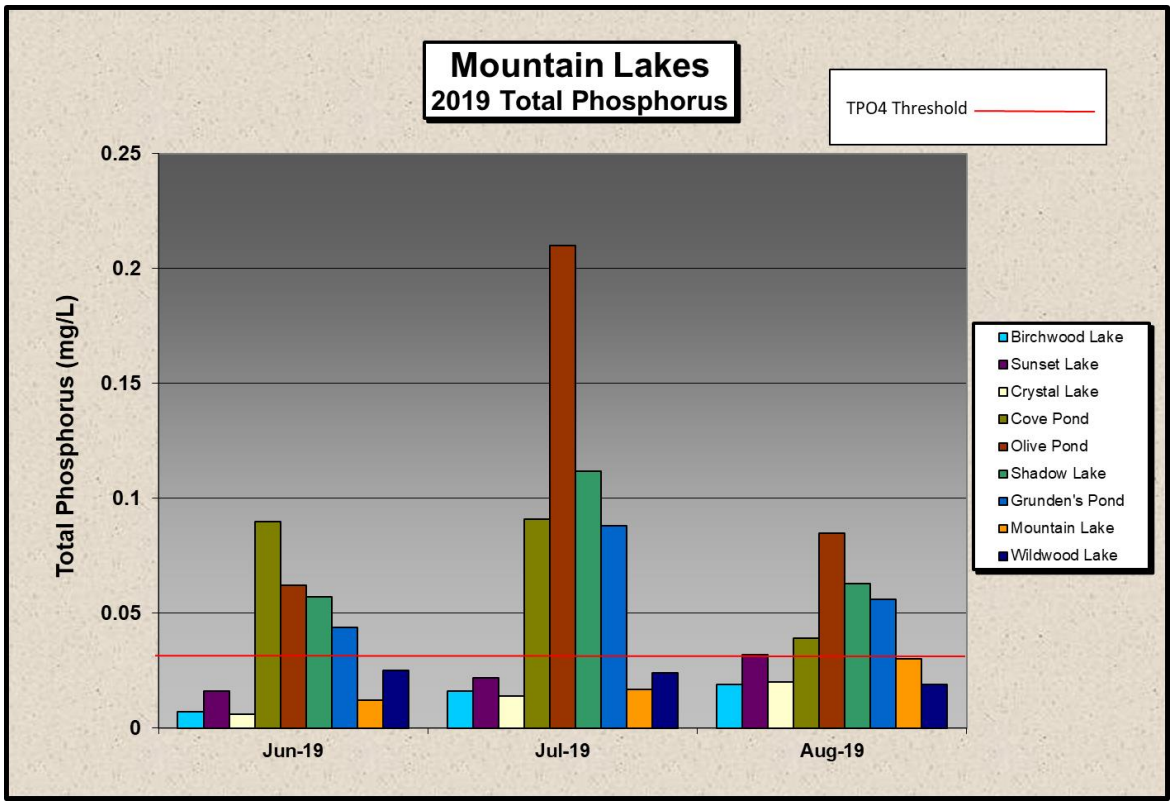
Hydro-raking			
Lake	**Dates**	**Hours**	**Material Removed (yds3)**
Birchwood	October	~80	~400

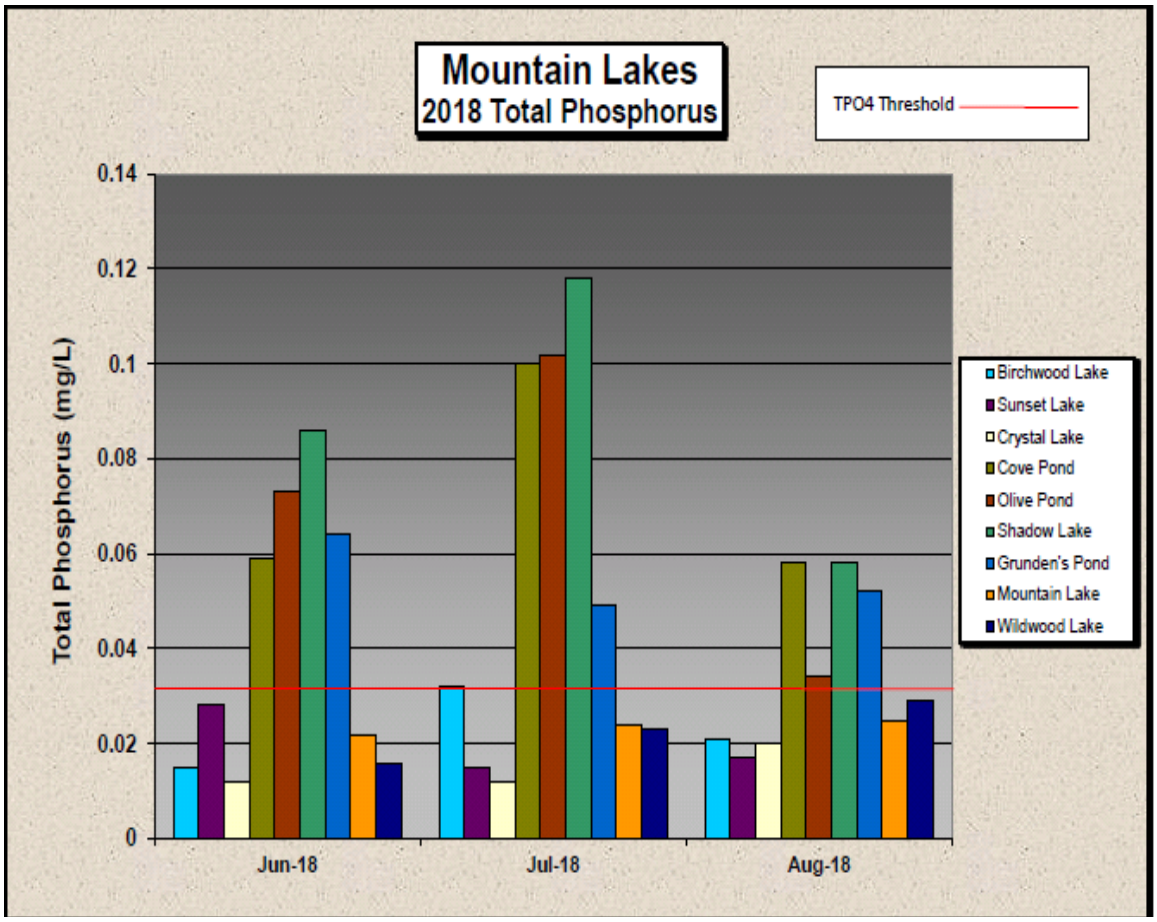
Hydro-raking activities focused on the upper basin area of Birchwood Lake to begin a three to five-year restoration program to remove floating debris, as well as accumulated bottom organics. It is anticipated that one week of hydro-raking can continue in 2020 without dredging permits, although permits will be required to complete the project as projected and proposed.

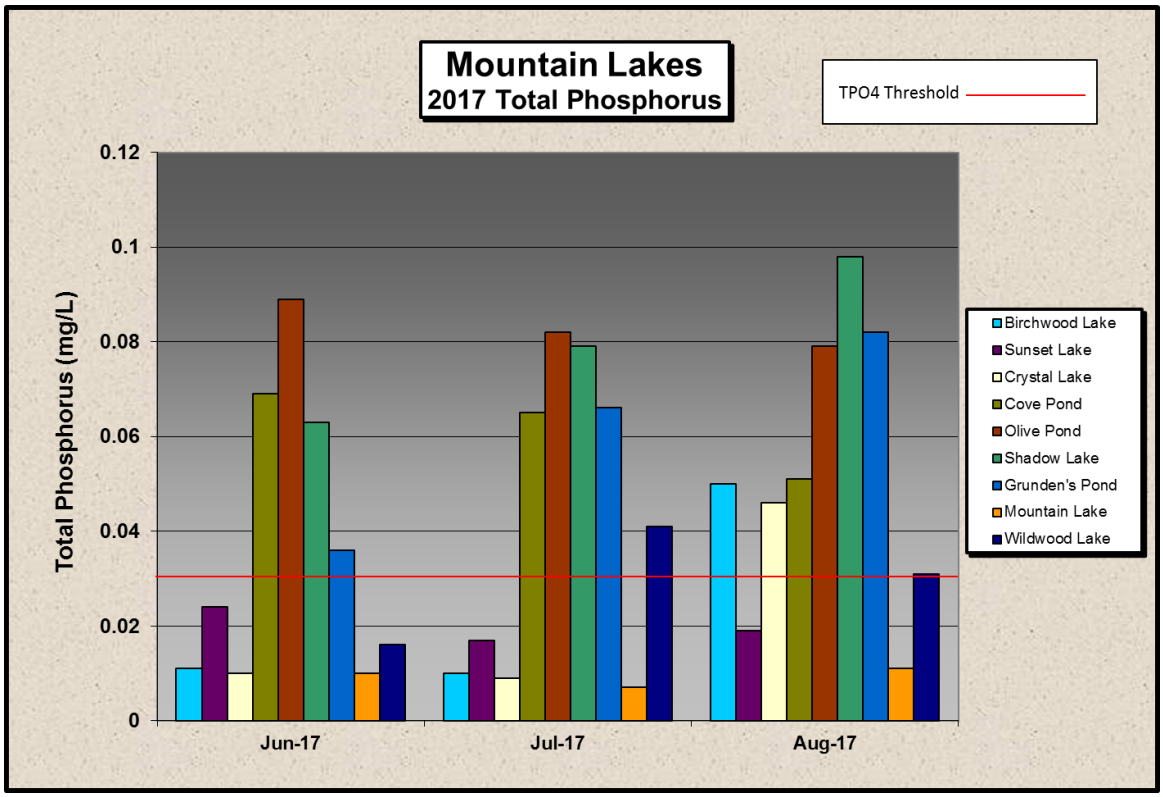
2006 to 2019 Total Phosphorus at Mountain Lakes

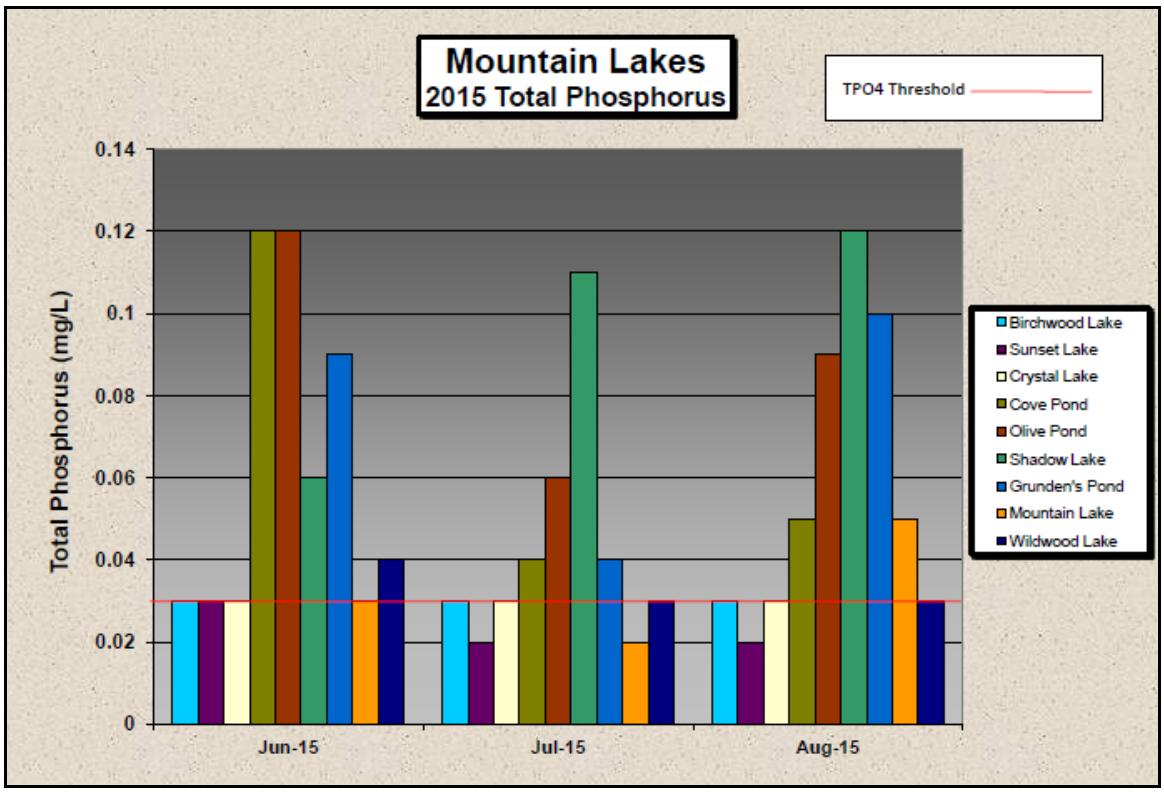
Below are twelve graphs, each representing total phosphorus data collected at all nine lakes for all three seasonal sampling events. Each graph depicts a different year, 2006 through 2019. Total phosphorus in 2019 continues to be elevated at the smaller basins on all three dates. As the season progressed from June to July, total phosphorous levels

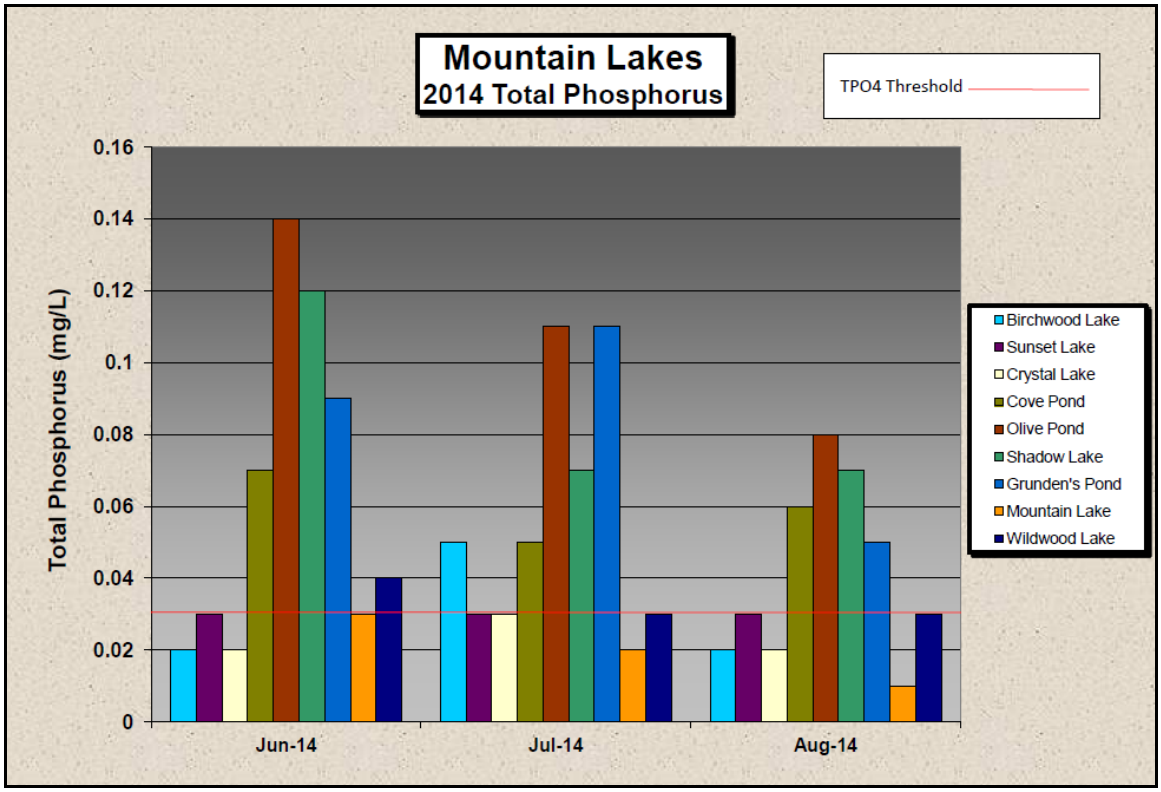
increased at several locations, although by August total phosphorous at each of the smaller basins decreased significantly. Birchwood Lake, Sunset Lake, Crystal Lake, Mountain Lake and Sunset Lake all maintained total phosphorous levels below the threshold on all three sampling events. This is a significant increase from only Mountain Lake and Wildwood Lake accomplishing that water quality goal in 2017. The acceptable total phosphorus threshold for lakes is 0.03 mg/L, depicted with the red line on the graphs below.

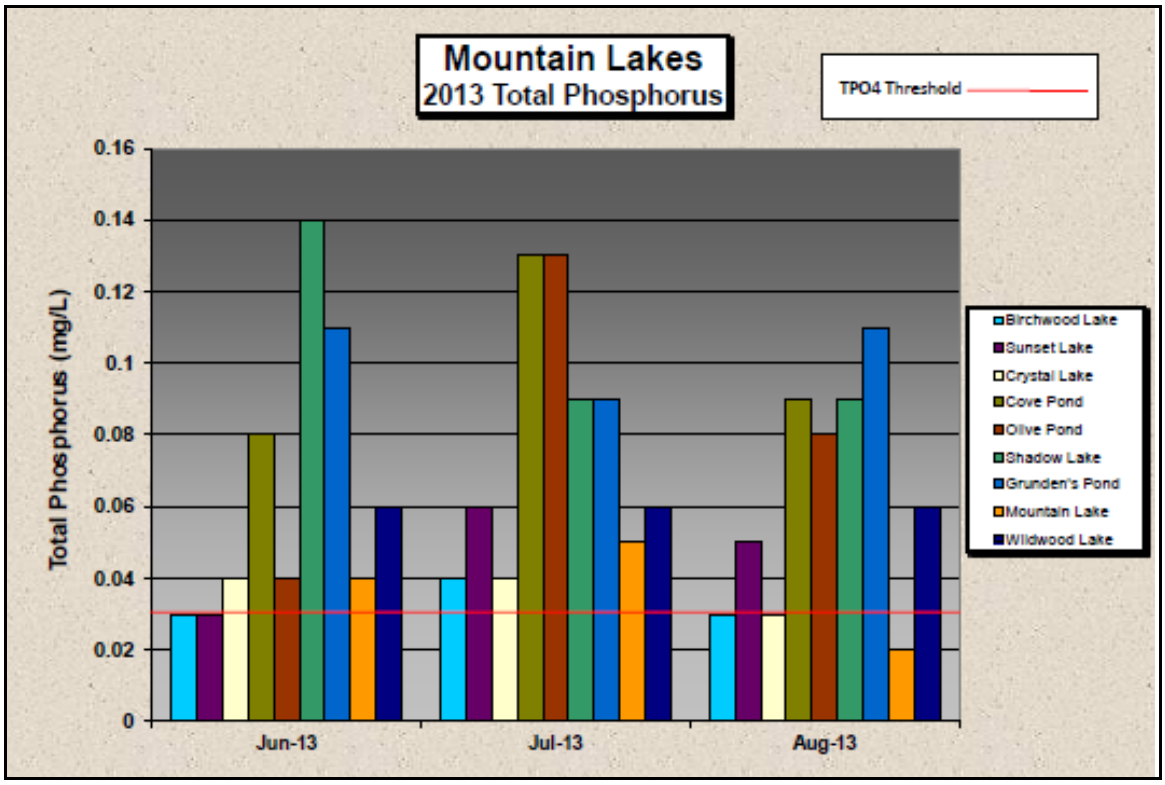


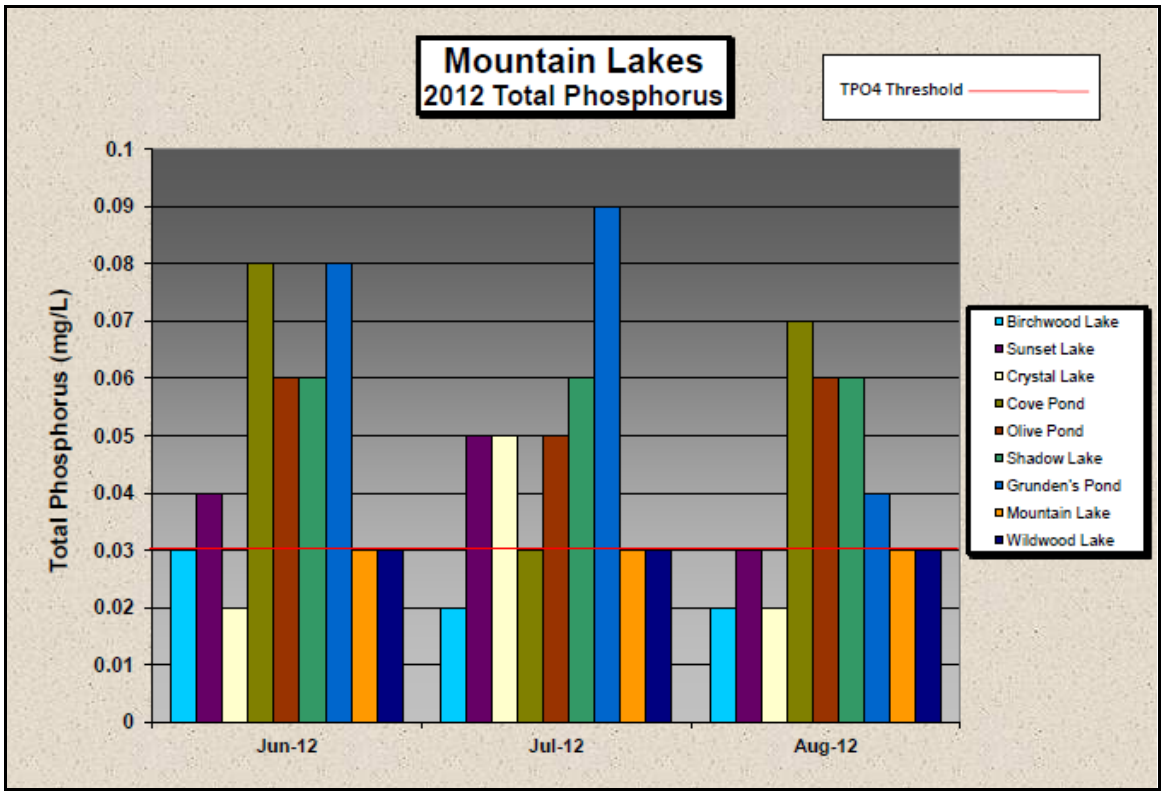

Mountain Lakes
2018 Total Phosphorus
TPO4 Threshold
Total Phosphorus (mg/L)
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
Jun-18
Jul-18
Aug-18
Birchwood Lake
Sunset Lake
Crystal Lake
Cove Pond
Olive Pond
Shadow Lake
Grunden's Pond
Mountain Lake
Wildwood Lake

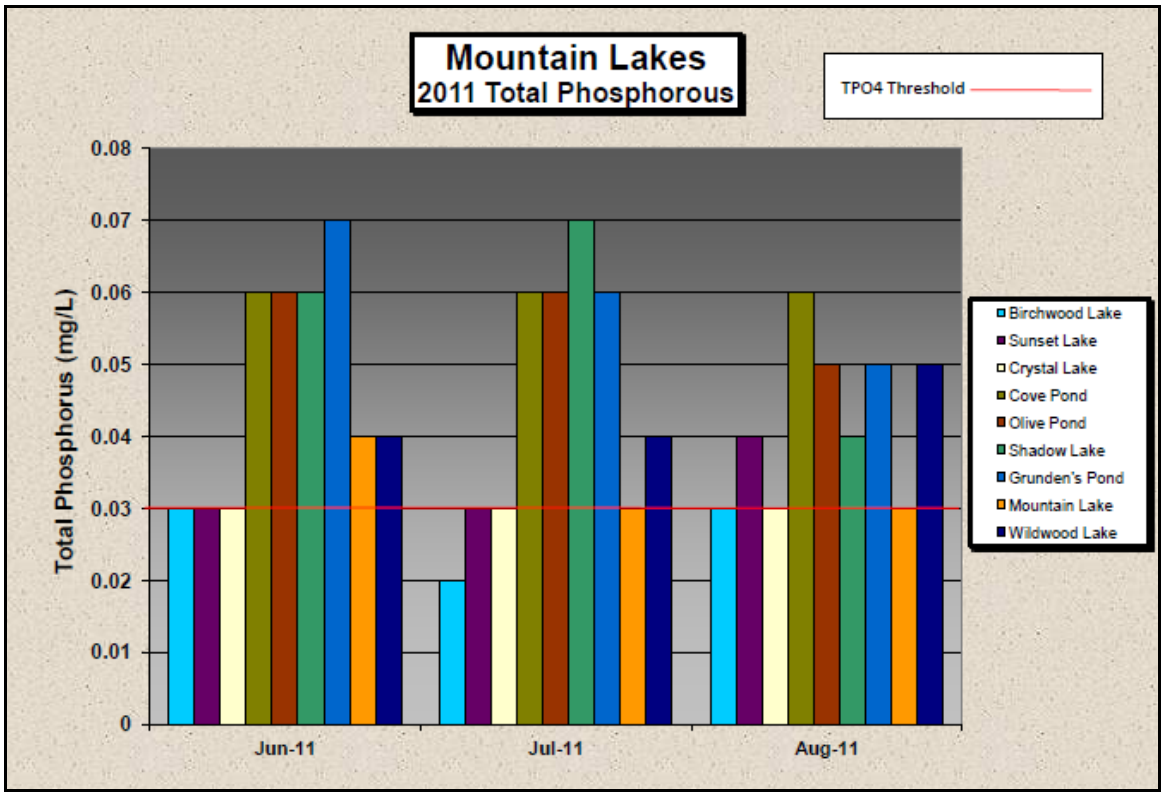

Mountain Lakes
2017 Total Phosphorus
TPO4 Threshold
Total Phosphorus (mg/L)
0.12
0.1
0.08
0.06
0.04
0.02
0
Jun-17
Jul-17
Aug-17
Birchwood Lake
Sunset Lake
Crystal Lake
Cove Pond
Olive Pond
Shadow Lake
Grunden's Pond
Mountain Lake
Wildwood Lake

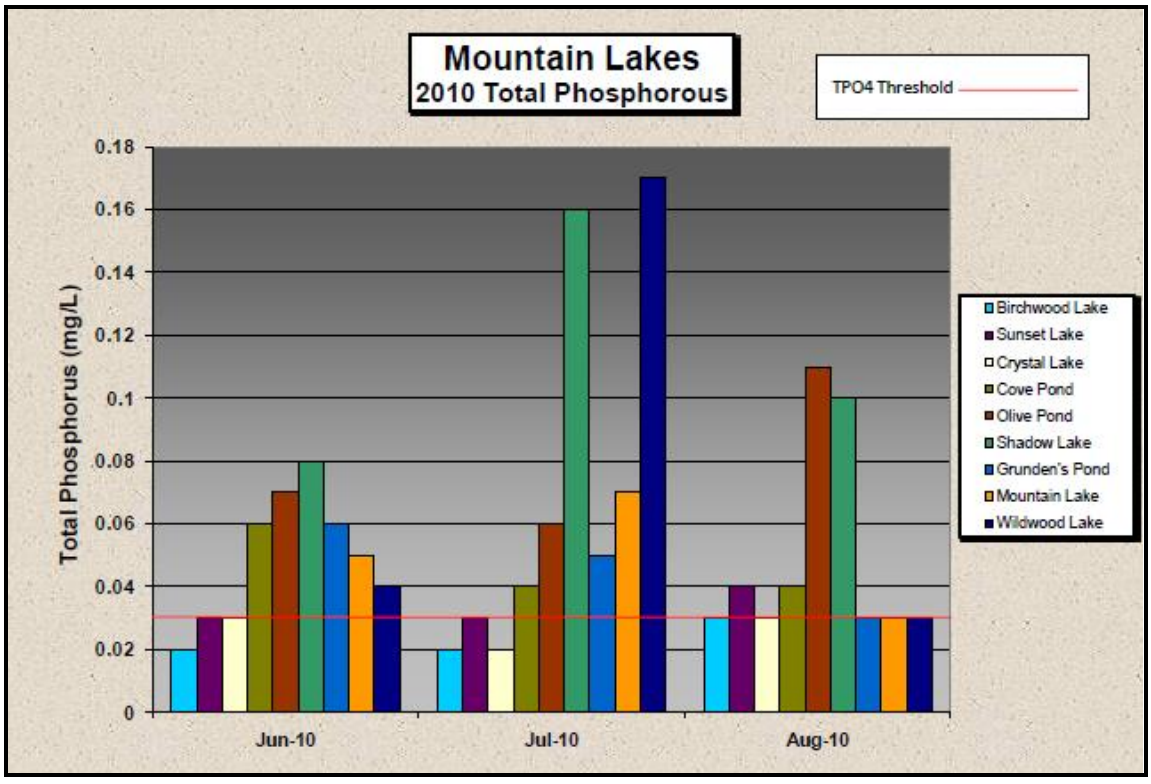

Mountain Lakes
2015 Total Phosphorus
TPO4 Threshold
Total Phosphorus (mg/L)
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
Jun-15
Jul-15
Aug-15
Birchwood Lake
Sunset Lake
Crystal Lake
Cove Pond
Olive Pond
Shadow Lake
Grunden's Pond
Mountain Lake
Wildwood Lake

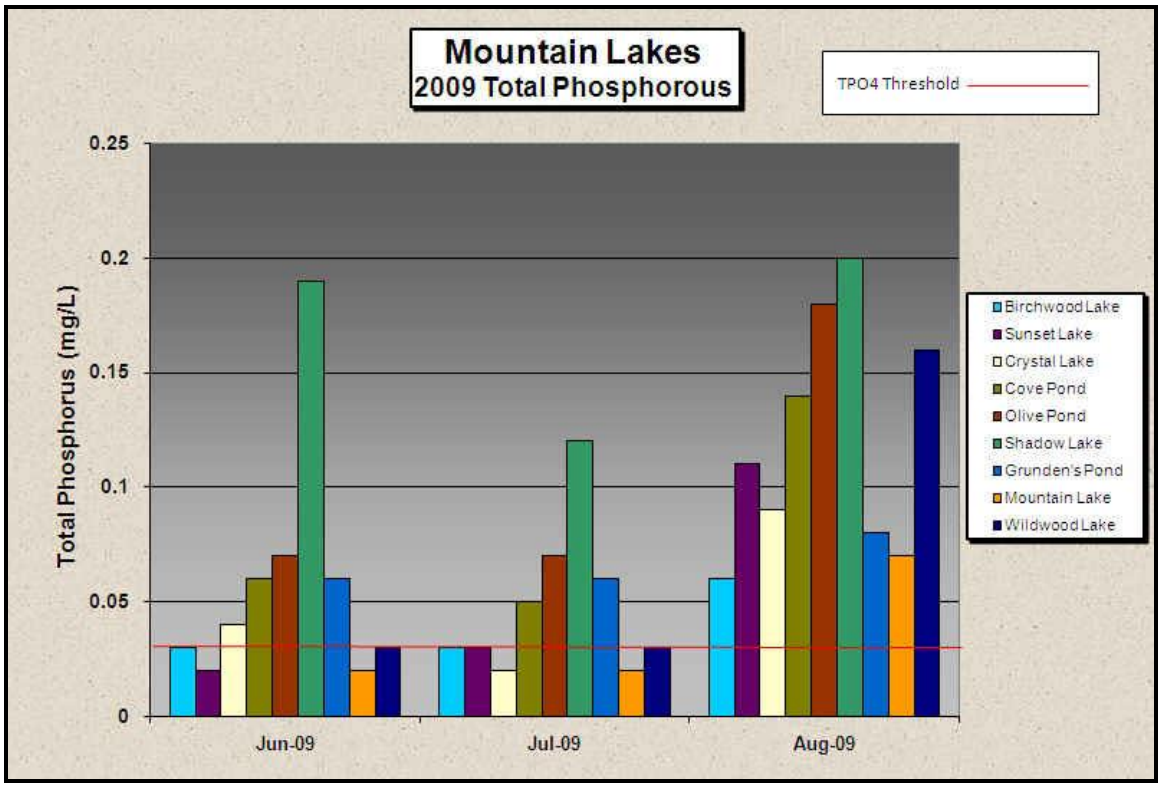

Mountain Lakes
2014 Total Phosphorus
TPO4 Threshold
Total Phosphorus (mg/L)
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
Jun-14
Jul-14
Aug-14
Birchwood Lake
Sunset Lake
Crystal Lake
Cove Pond
Olive Pond
Shadow Lake
Grunden's Pond
Mountain Lake
Wildwood Lake

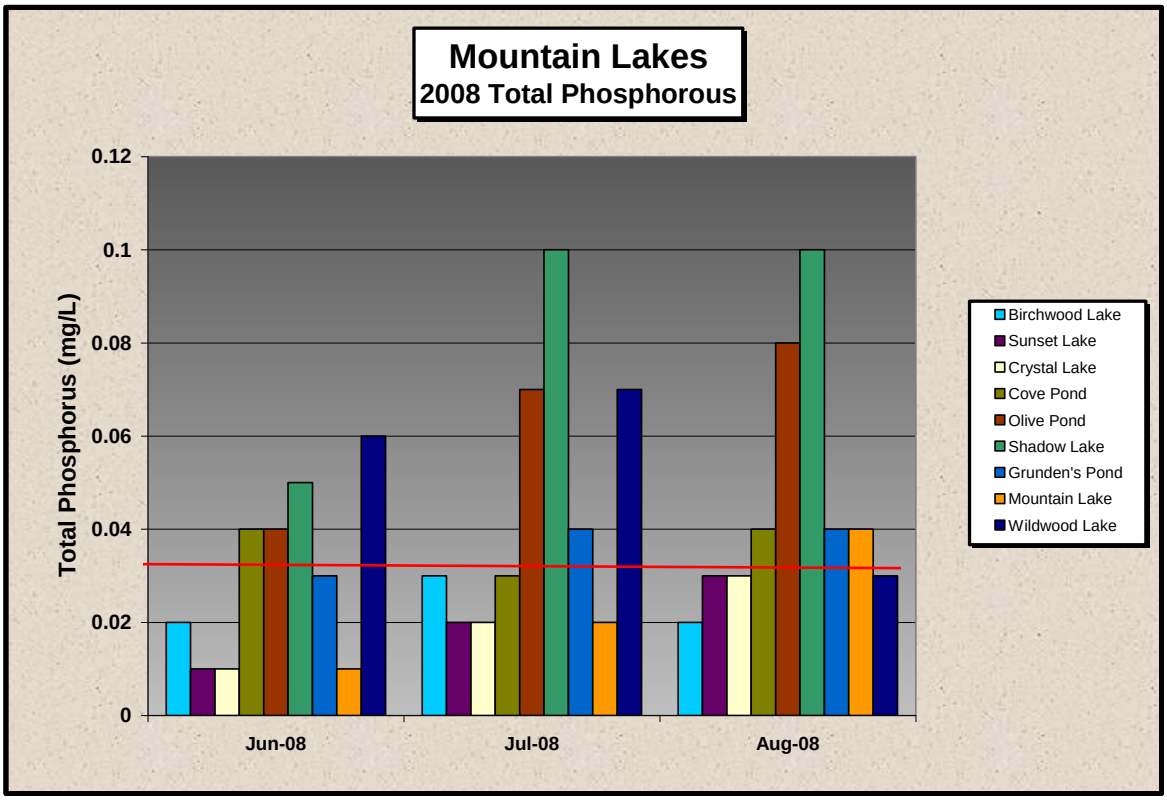

Mountain Lakes
2013 Total Phosphorus
TPO4 Threshold
Total Phosphorus (mg/L)
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
Jun-13
Jul-13
Aug-13
Birchwood Lake
Sunset Lake
Crystal Lake
Cove Pond
Olive Pond
Shadow Lake
Grunden's Pond
Mountain Lake
Wildwood Lake

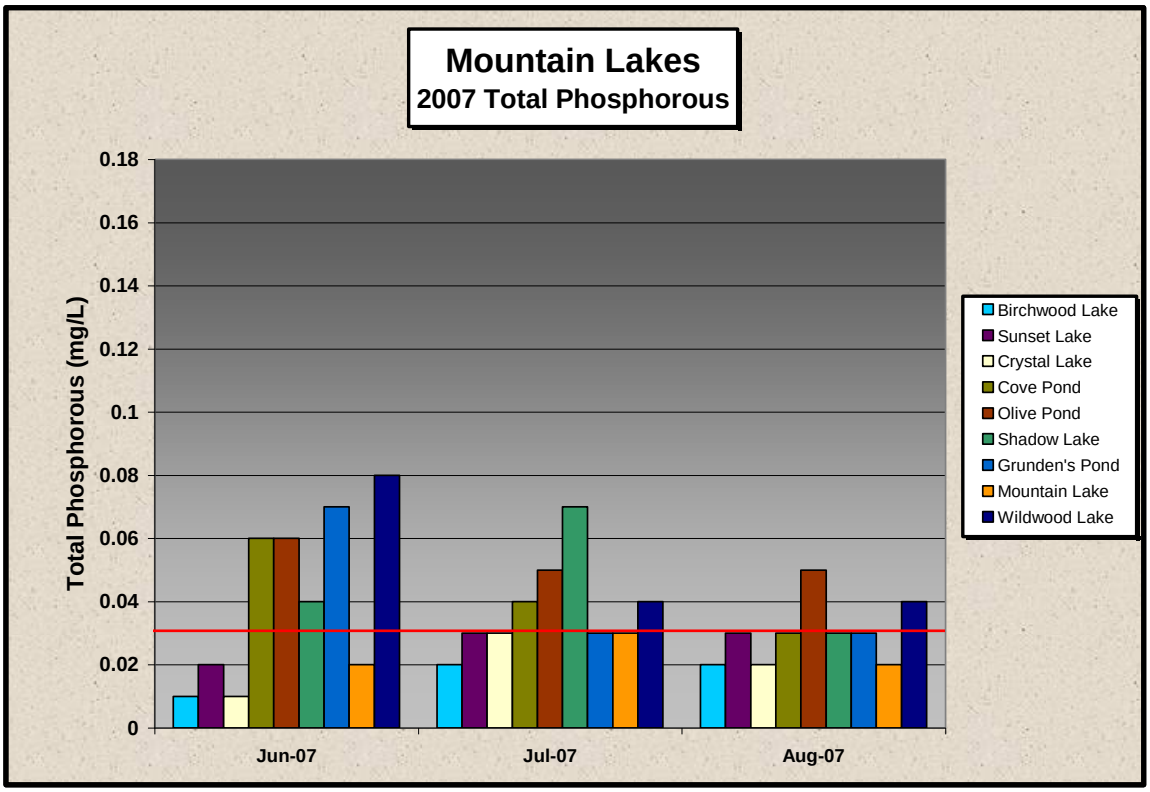

Mountain Lakes
2012 Total Phosphorus
TPO4 Threshold
Total Phosphorus (mg/L)
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
Jun-12
Jul-12
Aug-12
Birchwood Lake
Sunset Lake
Crystal Lake
Cove Pond
Olive Pond
Shadow Lake
Grunden's Pond
Mountain Lake
Wildwood Lake

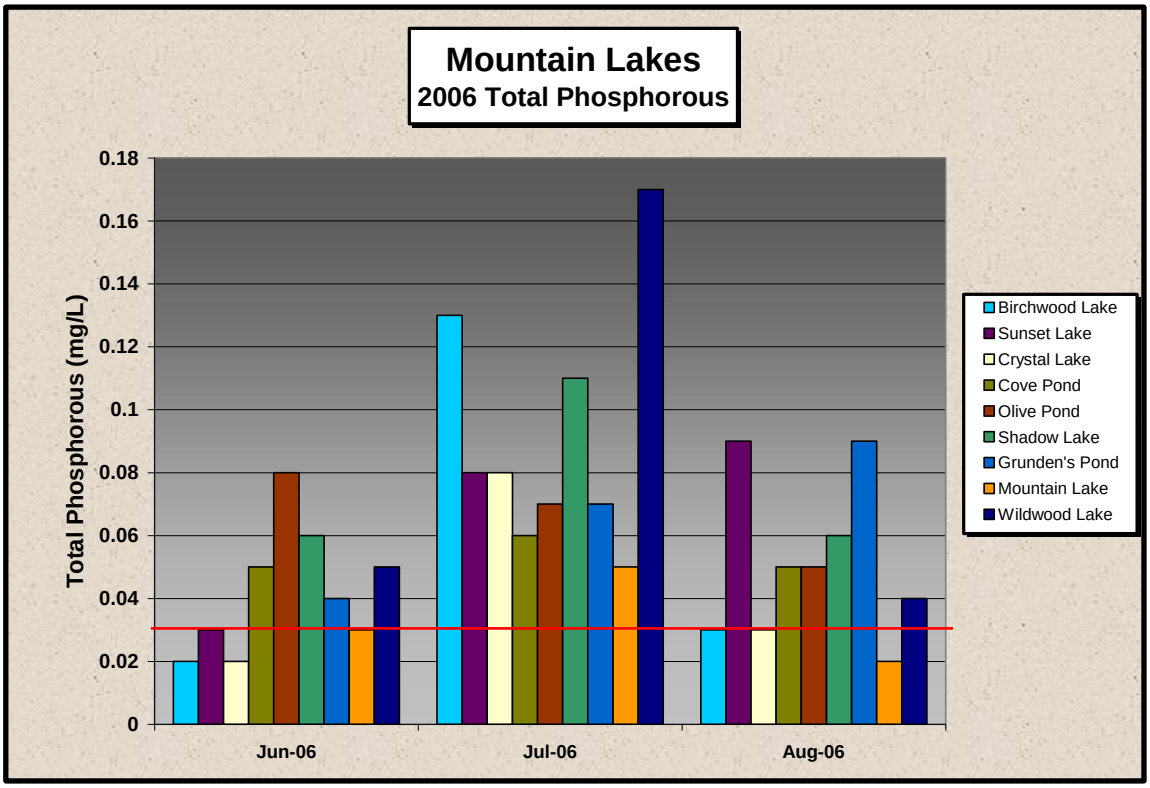

Mountain Lakes
2011 Total Phosphorous
TPO4 Threshold
Total Phosphorus (mg/L)
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
Jun-11
Jul-11
Aug-11
Birchwood Lake
Sunset Lake
Crystal Lake
Cove Pond
Olive Pond
Shadow Lake
Grunden's Pond
Mountain Lake
Wildwood Lake


Mountain Lakes
2010 Total Phosphorous
TPO4 Threshold
Total Phosphorus (mg/L)
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
Jun-10
Jul-10
Aug-10
Birchwood Lake
Sunset Lake
Crystal Lake
Cove Pond
Olive Pond
Shadow Lake
Grunden's Pond
Mountain Lake
Wildwood Lake


Mountain Lakes
2009 Total Phosphorous
TPO4 Threshold
Total Phosphorus (mg/L)
0.25
0.2
0.15
0.1
0.05
0
Jun-09
Jul-09
Aug-09
Birchwood Lake
Sunset Lake
Crystal Lake
Cove Pond
Olive Pond
Shadow Lake
Grunden's Pond
Mountain Lake
Wildwood Lake


Mountain Lakes
2008 Total Phosphorous
Total Phosphorus (mg/L)
0.12
0.1
0.08
0.06
0.04
0.02
0
Jun-08
Jul-08
Aug-08
Birchwood Lake
Sunset Lake
Crystal Lake
Cove Pond
Olive Pond
Shadow Lake
Grunden's Pond
Mountain Lake
Wildwood Lake


Mountain Lakes
2007 Total Phosphorous
Total Phosphorous (mg/L)
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
Jun-07
Jul-07
Aug-07
Birchwood Lake
Sunset Lake
Crystal Lake
Cove Pond
Olive Pond
Shadow Lake
Grunden's Pond
Mountain Lake
Wildwood Lake


Mountain Lakes
2006 Total Phosphorous
Total Phosphorous (mg/L)
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
Jun-06
Jul-06
Aug-06
Birchwood Lake
Sunset Lake
Crystal Lake
Cove Pond
Olive Pond
Shadow Lake
Grunden's Pond
Mountain Lake
Wildwood Lake

2019 Summary of Lake Management Activities

- In 2019, temperature departures were higher than average with the 4th warmest April 5th warmest July, and the 9th warmest September and October. The 2019 summer season was also the 5th warmest on record. March was about one degree below average.
- For the most part, monthly rainfall averages were significantly exceeded in every month from February through October. The only exception was September which was nearly three inches below average for rainfall.
- Eurasian water milfoil was observed at Mountain Lake in 2019 at trace to moderate density and distribution. Spot applications of contact herbicides were employed throughout the season to provide short term management of this invasive plant, but lake-wide systemic control will be necessary in 2020 to ensure thorough management. A few shoreline accumulations of blue-green algae were observed at this lake late in the management season, but the lake was generally spared of any widespread occurrences. Bassweed was well managed from an early season herbicide application and did not present any management challenge through the balance of the year.
- Schooner was used to control lilies and pondweeds in the swim lanes at Birchwood Lake. Extensive foliar application of water lilies was utilized to provide control throughout the upper end of the lake. A volunteer shoreline clearing adjacent to the dam was conducted to improve the aesthetic look of the lake in this area at the end of the season. Supplemental water quality was collected to continue to investigate the causes of dissolved oxygen suppression during the summer season. Hydro-raking was conducted in Birchwood Lake in October removing extensive floating islands of water lilies, organic debris and sediment.
- Overall, total phosphorus levels were elevated at the smaller basins in 2019, as well as other lakes during various sampling events, most specifically in June and July.
- Overall, unicellular phytoplankton abundance was favorable (low to moderate) at all the larger basins this season, and on most sampling dates at the smaller basins.
- All E. coli tests passed at Birchwood Lake and there were only two failures at Mountain Lake.
- Alum was applied on only one date at Wildwood Lake. A relatively new herbicide Aquastrike was applied on two dates that provided excellent control of naiad growth, and earlier season treatments will be utilized in future management seasons that will prevent extensive growth and impacts to recreation and aesthetics.
- Alum **was not** applied at Mountain Lake this season. Favorable water clarity and low total phosphorus measurements did not justify the use of Alum in 2019.
- Terrestrial plant management was conducted in 2019 at each of dam locations for each lake as appropriate.

2020 Recommendations

The water quality monitoring program continues to be an important facet of the lake management program. The current program seems to be fulfilling the needs of the lakes and providing suitable datasets. In 2020, it is recommended that weekly dissolved oxygen monitoring continue at the smaller basins. For the past several years, dissolved oxygen levels have been depressed on select dates throughout the season, and each of these basins could benefit from the use of aeration. The borough should consider a feasibility study of aeration system for Olive Pond in 2020. Grunden's Pond should be explored following completion of all dam construction and refilling.

Dissolved oxygen throughout the water column at Birchwood Lake continues to be depressed as well. Also, at Birchwood Lake in 2020, water lilies will be aggressively managed through foliar herbicide application. In Birchwood Lake, a limited application of Clipper (or equivalent) is planned for the nuisance water lilies and pondweeds around the swimming docks. It is recommended to initiate a bacterial enhancement program to accelerate the breakdown of nitrogen nutrient compounds to continue to improve the seasonal water quality of the lake. Following the shoreline clearing of Birchwood Lake, planting of desirable aesthetically improving wetland emergent plants will continue to be explored along this area of the lake.

Once again, once per month surveys of the canal should also be implemented, focusing on exotic invasive emergent and submersed aquatic plants such as creeping water primrose, fanwort and potential control efforts.

Surgical management of water lilies in Sunset Lake should continue to be implemented to ensure suitable control while providing for desirable densities for aquatic habitat. A more aggressive management plan for bassweed will also be implemented to limit growth to the upper portion of the lake to prevent extensive the potential for extensive infestation along the residential shorelines. A shoreline survey of Sunset Lake will be conducted during June, with an herbicide application to target any growth of loosestrife in early to mid-July for those areas where it is growing at nuisance densities.

At Crystal Lake, we will monitor the nuisance pondweed growth to determine how aggressive we need to be to maintain suitable conditions. We anticipate contact herbicides this season at this site. In 2018 and 2019, the cattail growth along the western shoreline was sprayed from the shoreline utilizing backpack sprayer, or from the boat. It is anticipated that the plants that were sprayed may require cutting to remove the dead plant and organic material. Growth of bassweed will be targeted with Aquathol-K as required to ensure only desirable densities are present.

Since this is the fifth year after treatment (YAT) using Sonar at Mountain Lake, Sonar application will be conducted in 2020. Conditions shall be confirmed with early season on-water surveys. Due to the permitting costs of hydro raking, SOLitude is recommending a more aggressive bacterial enhancement trial program to a cove of the lake, to be determined between the Lake Committee and SLM. The program would include a label recommended prescribed rate on a monthly basis, with visual observation

to determine if improvement is occurring. An application of alum in 2020 to Mountain Lake is expected to continue to be more reactive in nature based on observed clarity, phytoplankton density and phosphorous levels.

It will be planned to perform an aluminum sulfate application to both Wildwood and Mountain lake on the same date during April of 2020, with low dose applications to both lakes. Contact herbicides will be the products of choice in Wildwood Lake, to control early-season curly-leaf pondweed and later season naiad growth.

In the smaller basins, we expect to continue the use of chelated copper algaecides, or Earthtec, a copper sulfate formulation, to control nuisance algae growth. Solitude will aggressively treat nuisance water meal as needed in 2020 with Schooner or Sonar, or other herbicides that may have a potential fit if necessary, although this plant was not at nuisance density in 2019. It is recommended that Olive Pond and Shadow Lake be targeted with an early season dose of sodium aluminate, an alternative to aluminum sulfate that has a built-in buffer to changes in alkalinity. It is also recommended that each of these basins be targeted with monthly bacterial enhancement, like what was initiated at Shadow Lake in 2018, and Olive Pond in 2019.

The installation of aeration systems at Grunden's, Olive and Cove Pond would provide substantial seasonal benefit for each of these basins. The addition of natural biological bacteria to each of the small basins would also promote the increased breakdown of organic materials. The proposed budget does not include the implementation of this type of program, but this management alternative should be implemented immediately following hydro-raking activity to prolong the duration between required raking events and improve water quality conditions. Early season applications of Phoslock to the smaller basins could also be part of the management program to provide management of phosphorous following future hydro raking activities, or to basins that are not anticipated to require raking in the immediate future.

The use of Alum at Wildwood Lake continues to be beneficial to the basin. Only one alum treatment was performed in 2019, and this proved to be beneficial by not improving the water clarity dramatically during the mid-summertime frame, and there was a noted reduction in filamentous alga planktonic algae in 2019. Aquastrike will continue to be the herbicide of choice for Wildwood Lake due to its local application selectivity, and excellent results on growth of naiad, especially in the shallow areas of the lake.

The plant guide that was prepared for the Borough in the spring should be updated to ensure all observed aquatic plants are included with updated information.

The increased awareness of invasive emergent vegetation occurring throughout the Borough is proving to be beneficial as several small colonies of invasive emergent plants have been observed and treated over the past four seasons. It is prudent to continue this program as the costs to spray small stands or individual plants is minimal compared to larger scale infestations. In 2020, previously sprayed locations will be re-surveyed, in addition to surveying most lake margins and dams throughout the borough.

Consistent surveys of Mountain Lake and Wildwood Lake for the potential presence of fanwort will continue. Any observation of fanwort needs to be aggressively and immediately treated with the contact herbicide Schooner to ensure rapid response and control.

References

Borman, et al. 1999. *Through the Looking Glass: A Field Guide to Aquatic Plants.* Wisconsin Lakes Partnership, University of Wisconsin-Extension. Reindl Printing, Inc. Merrill, WI.

Fairbrothers, et al. 1962. *Aquatic Vegetation of New Jersey*. Extension Bulletin 382. Extension Service, College of Agriculture, Rutgers University, New Brunswick, NJ.

Fassett, Norman C. 1972. *A Manual of Aquatic Plants*. The University of Wisconsin Press, Milwaukee.

Johnson, Robert L. 2009. *Cazenovia Lake Plant Community Response to the 2009 Application of the Herbicide Triclopyr to Control Eurasian Water Milfoil.* Racine-Johnson Ecologists.

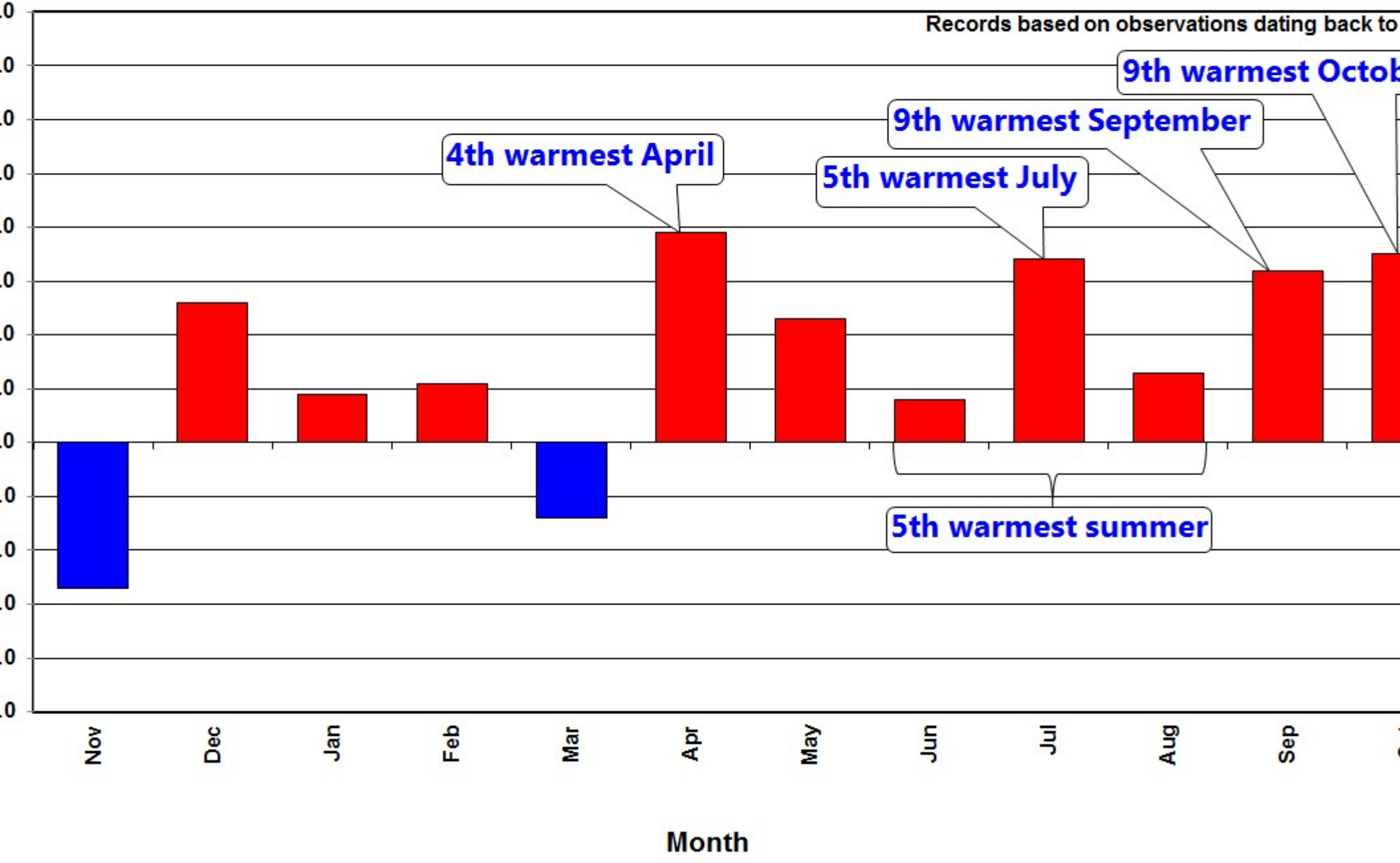
Tarver, et al. 1979. *Aquatic and Wetland Plants of Florida*. Bureau of Aquatic Plant Research and Control, Florida Department of Natural Resources. Tallahassee, Florida.

APPENDIX

2019 Rainfall and Temperature Data
2019 Water Quality Graphs
2019 Water Chemistry Data
2008 to 2019 Treatment History Graphs
2019 Phytoplankton Distribution Graphs
2019 Phytoplankton Data Sheets
2019 Alpha Water Chemistry Data Sheets
2019 Phytoplankton Data
2019 Fecal Coliform Data
2019 Weekly Surveys9

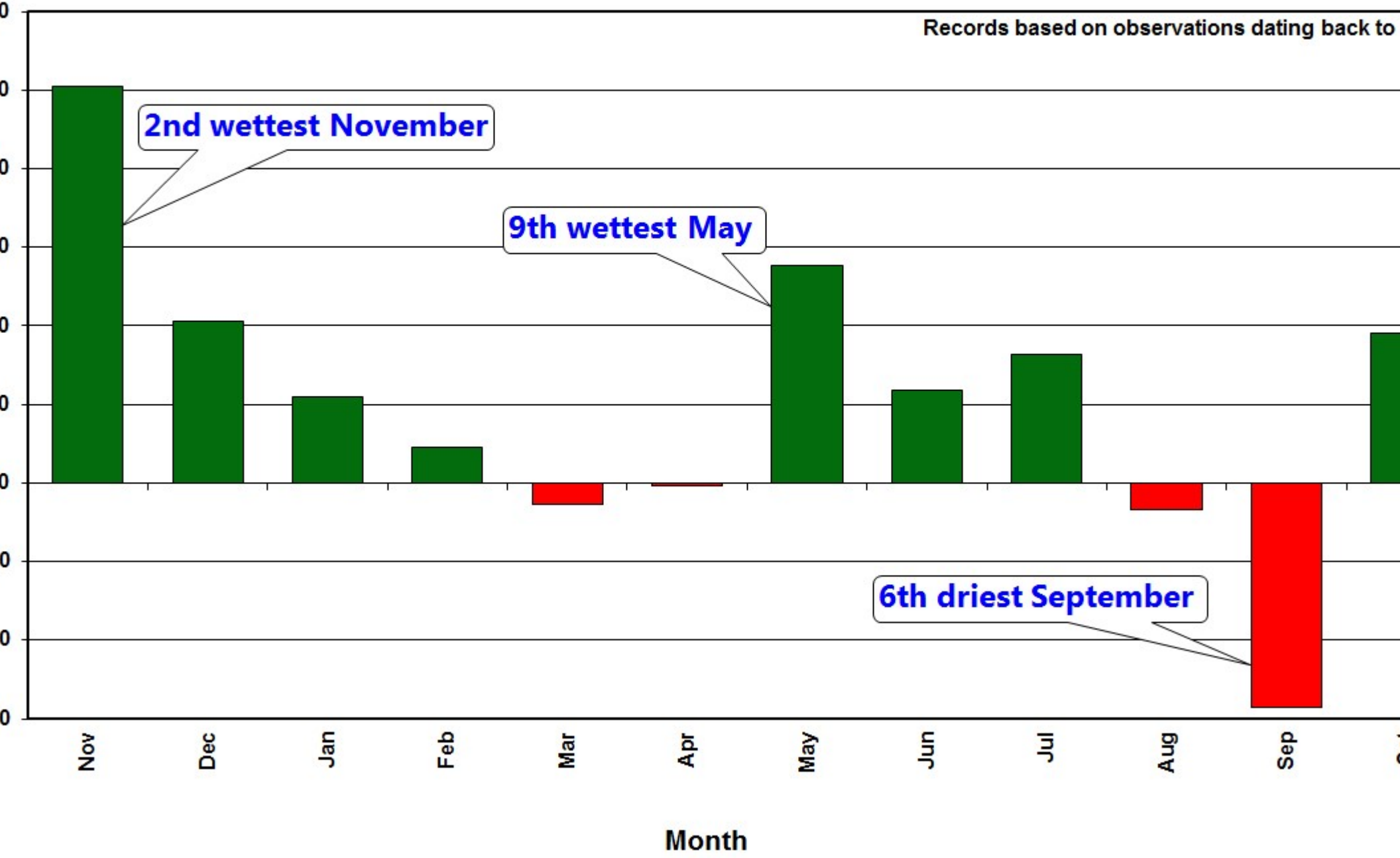
NJ Monthly Temperature Departures (November 2018 – October 2019)

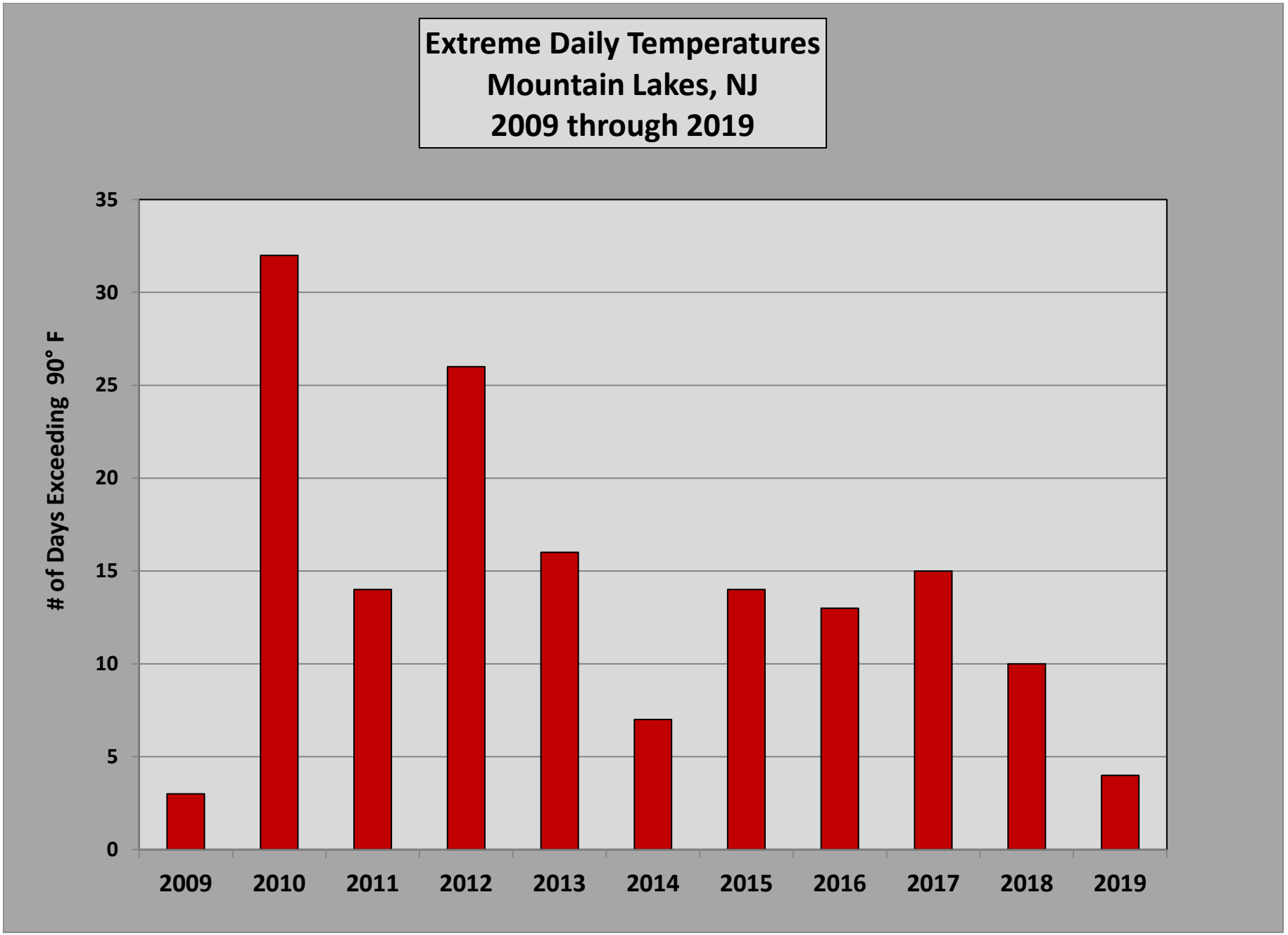
Departures calculated from differences between observed monthly temperatures and 1981–2010 monthly averages

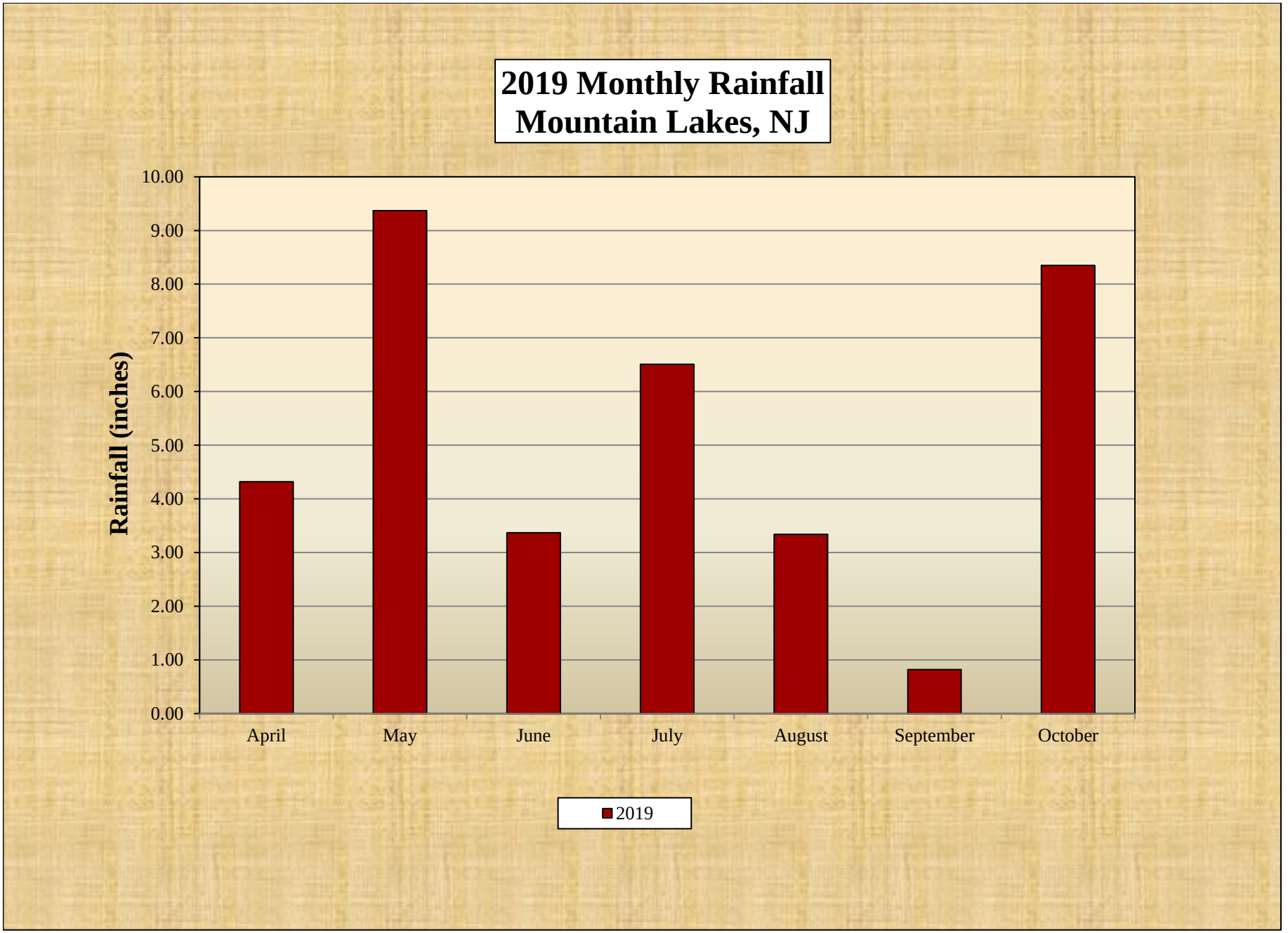


NJ Monthly Precipitation Departures (November 2018 – October 2019)

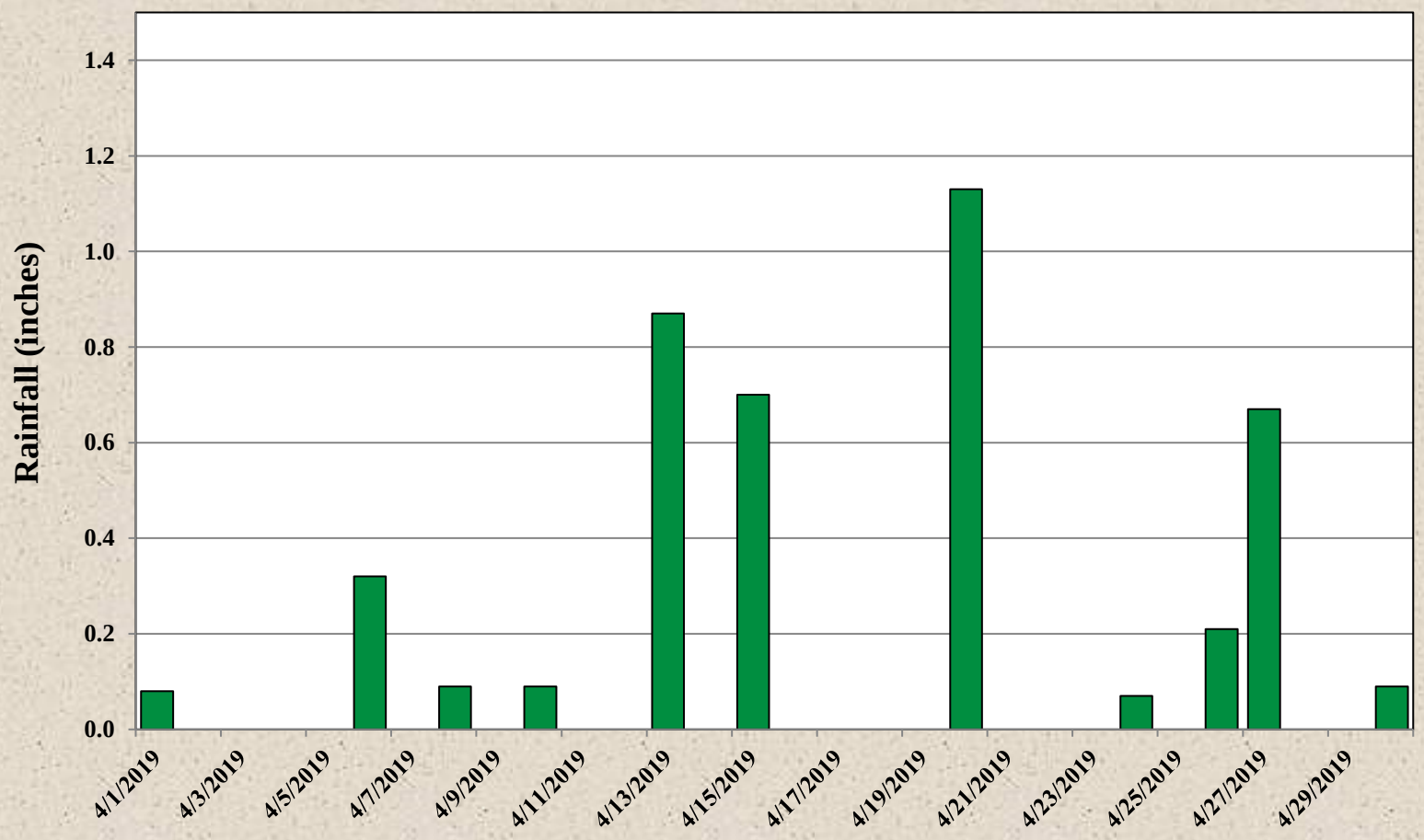
Departures calculated from differences between observed monthly precipitation and 1981–2010 monthly averages



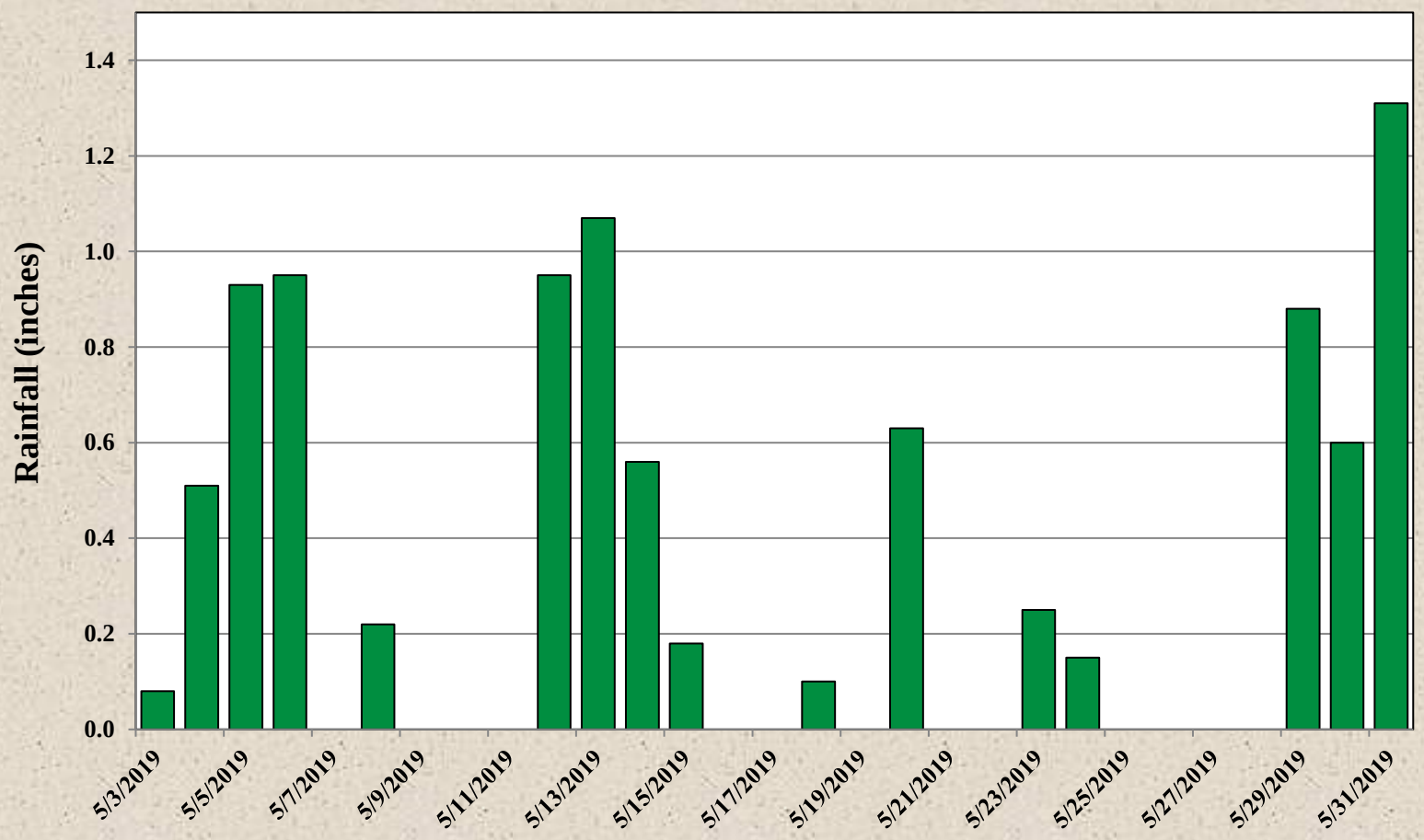

Extreme Daily Temperatures
Mountain Lakes, NJ
2009 through 2019
# of Days Exceeding 90° F
35
30
25
20
15
10
5
0
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019


2019 Monthly Rainfall
Mountain Lakes, NJ
Rainfall (inches)
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
April
May
June
July
August
September
October
2019

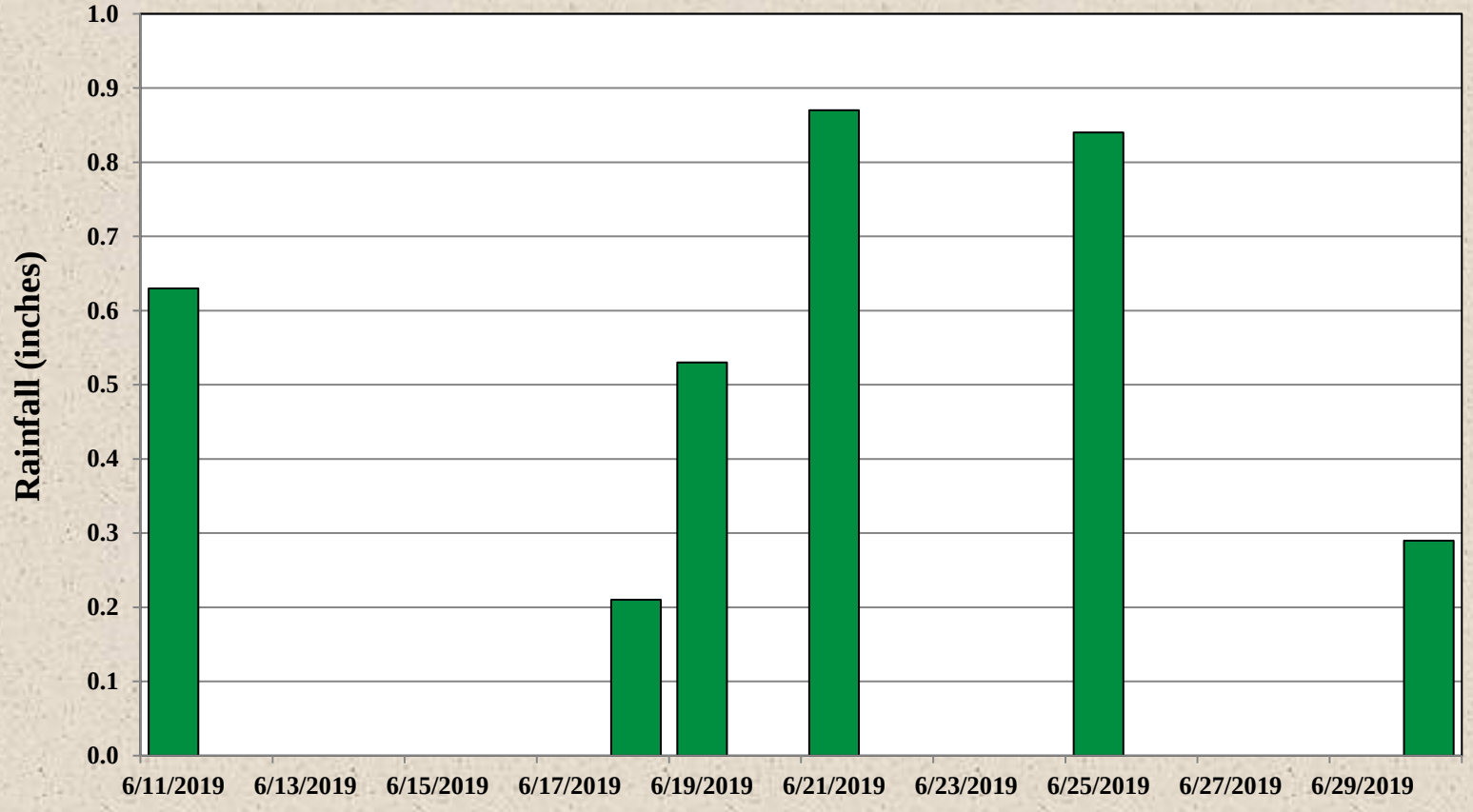
April 2019 Rainfall
Mountain Lakes, NJ



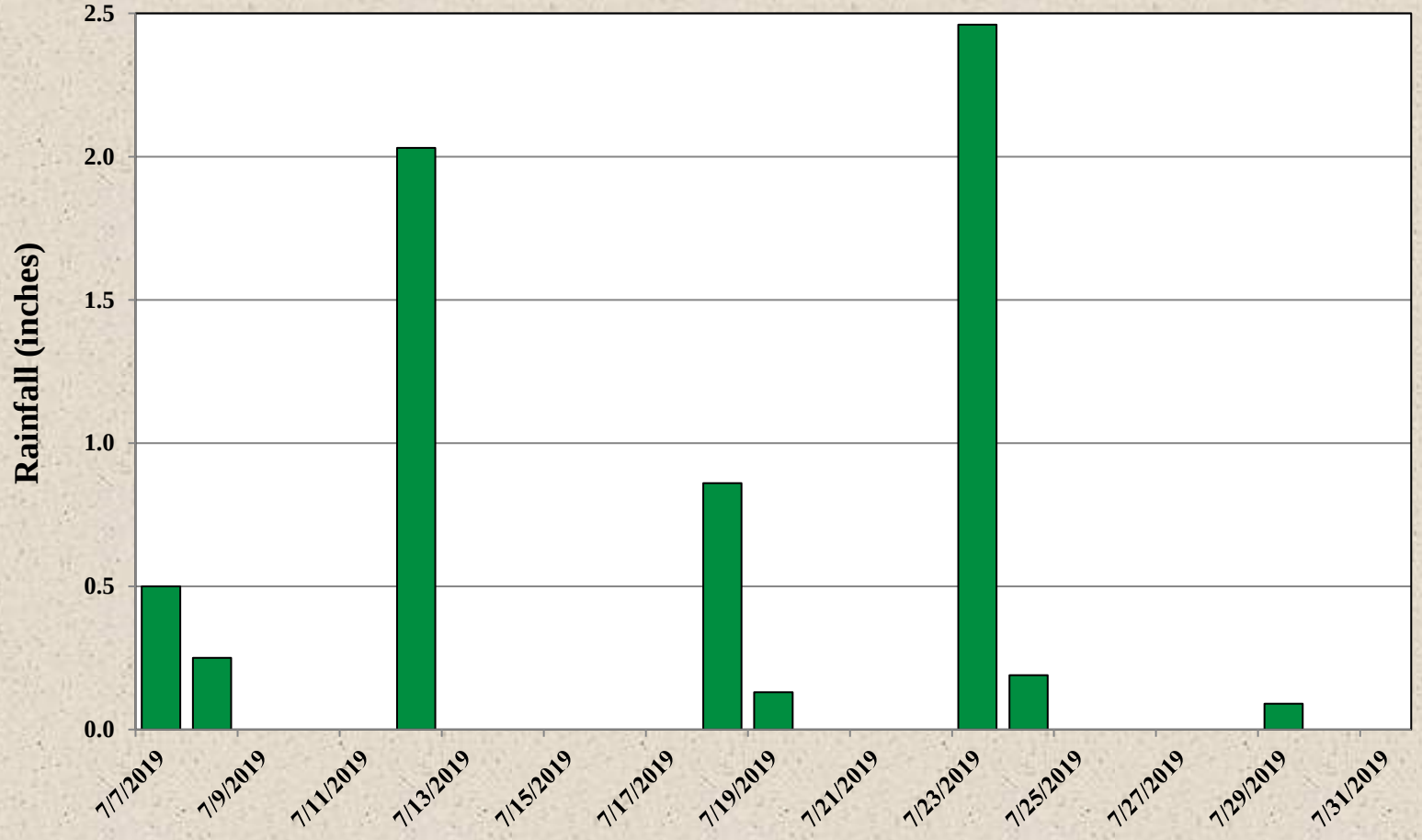
May 2019 Rainfall
Mountain Lakes, NJ



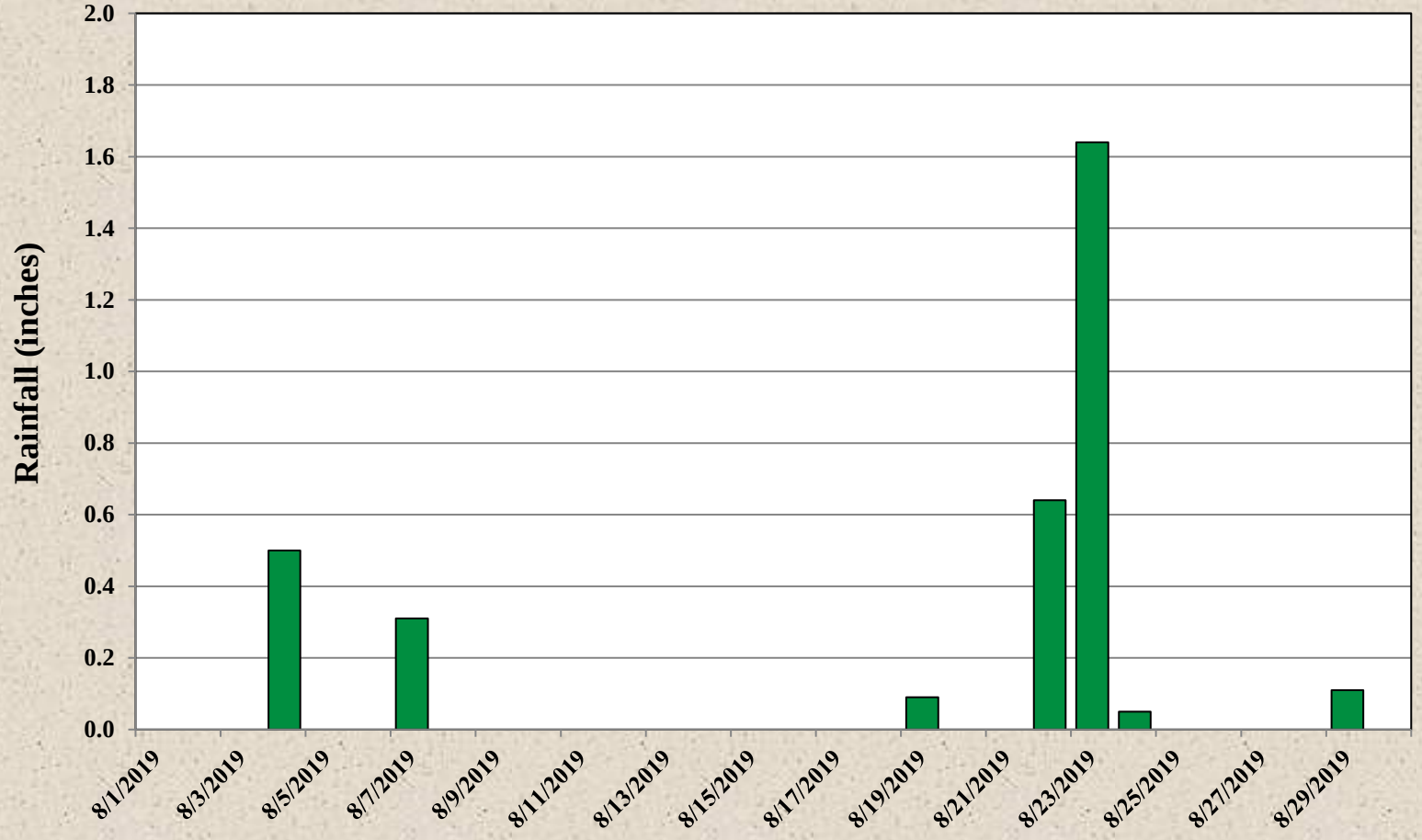
June 2019 Rainfall
Mountain Lakes, NJ

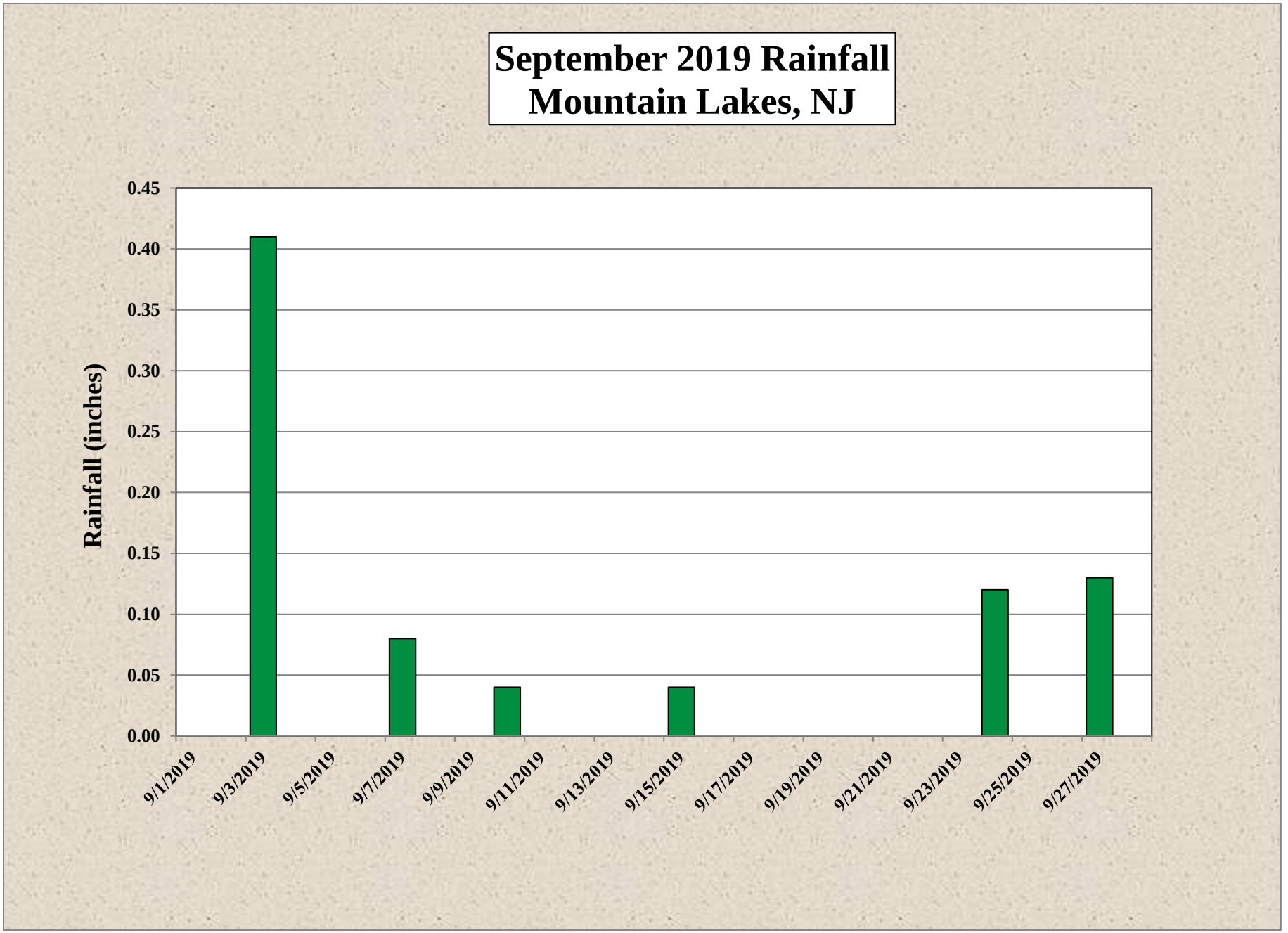


July 2019 Rainfall
Mountain Lakes, NJ

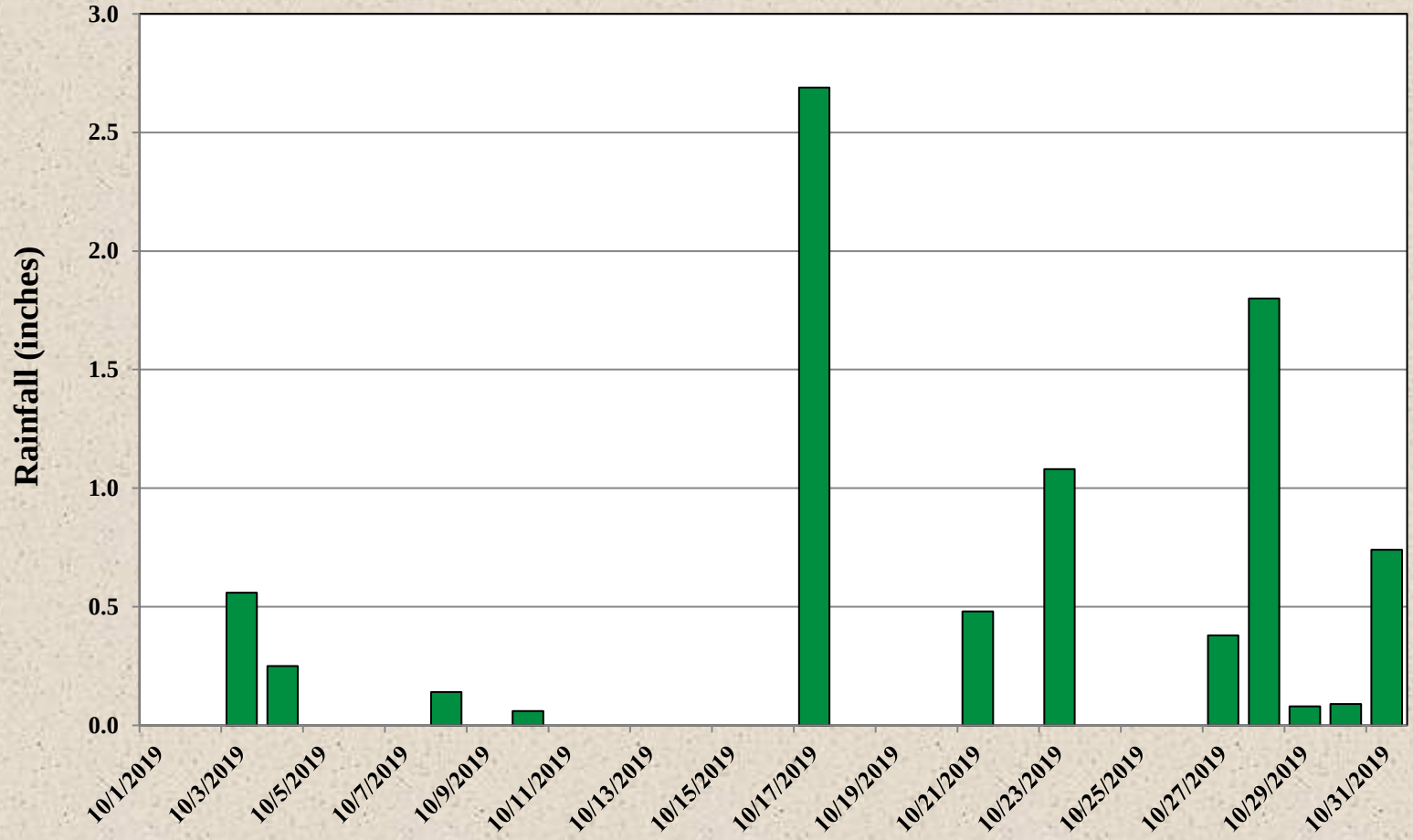


August 2019 Rainfall
Mountain Lakes, NJ




September 2019 Rainfall
Mountain Lakes, NJ
Rainfall (inches)
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
9/1/2019
9/3/2019
9/5/2019
9/7/2019
9/9/2019
9/11/2019
9/13/2019
9/15/2019
9/17/2019
9/19/2019
9/21/2019
9/23/2019
9/25/2019
9/27/2019

October 2019 Rainfall
Mountain Lakes, NJ



Mountain Lakes
2019 Water Quality Data Summary

SOLITUDE LAKE MANAGEMENT

Wildwood Lake				
Parameter	**Units**	**6/10/2019**	**7/15/2019**	**8/12/2019**
Nitrate	mg/L	ND	ND	ND
Turbidity	NTU	2.7	1.3	1.1
Total Phosphorous	mg/L	0.025	0.024	0.019

Olive Pond				
Parameter	**Units**	**6/10/2019**	**7/15/2019**	**8/12/2019**
Nitrate	mg/L	ND	0.12	ND
Turbidity	NTU	3.2	33	2.8
Total Phosphorous	mg/L	0.062	0.210	0.085

Shadow Pond				
Parameter	**Units**	**6/10/2019**	**7/15/2019**	**8/12/2019**
Nitrate	mg/L	ND	ND	ND
Turbidity	NTU	1.9	23.0	2.5
Total Phosphorous	mg/L	0.057	0.112	0.063

Sunset Lake				
Parameter	**Units**	**6/10/2019**	**7/15/2019**	**8/12/2019**
Nitrate	mg/L	0.044	ND	ND
Turbidity	NTU	1.8	1.7	3.0
Total Phosphorous	mg/L	0.016	0.0220	0.032

Cove Pond				
Parameter	**Units**	**6/10/2019**	**7/15/2019**	**8/12/2019**
Nitrate	mg/L	ND	ND	ND
Turbidity	NTU	6.5	8.1	3.3
Total Phosphorous	mg/L	0.090	0.091	0.039

Birchwood Lake				
Parameter	**Units**	**6/10/2019**	**7/15/2019**	**8/12/2019**
Nitrate	mg/L	ND	ND	ND
Turbidity	NTU	1.3	1.7	1.4
Total Phosphorous	mg/L	0.007	0.016	0.019

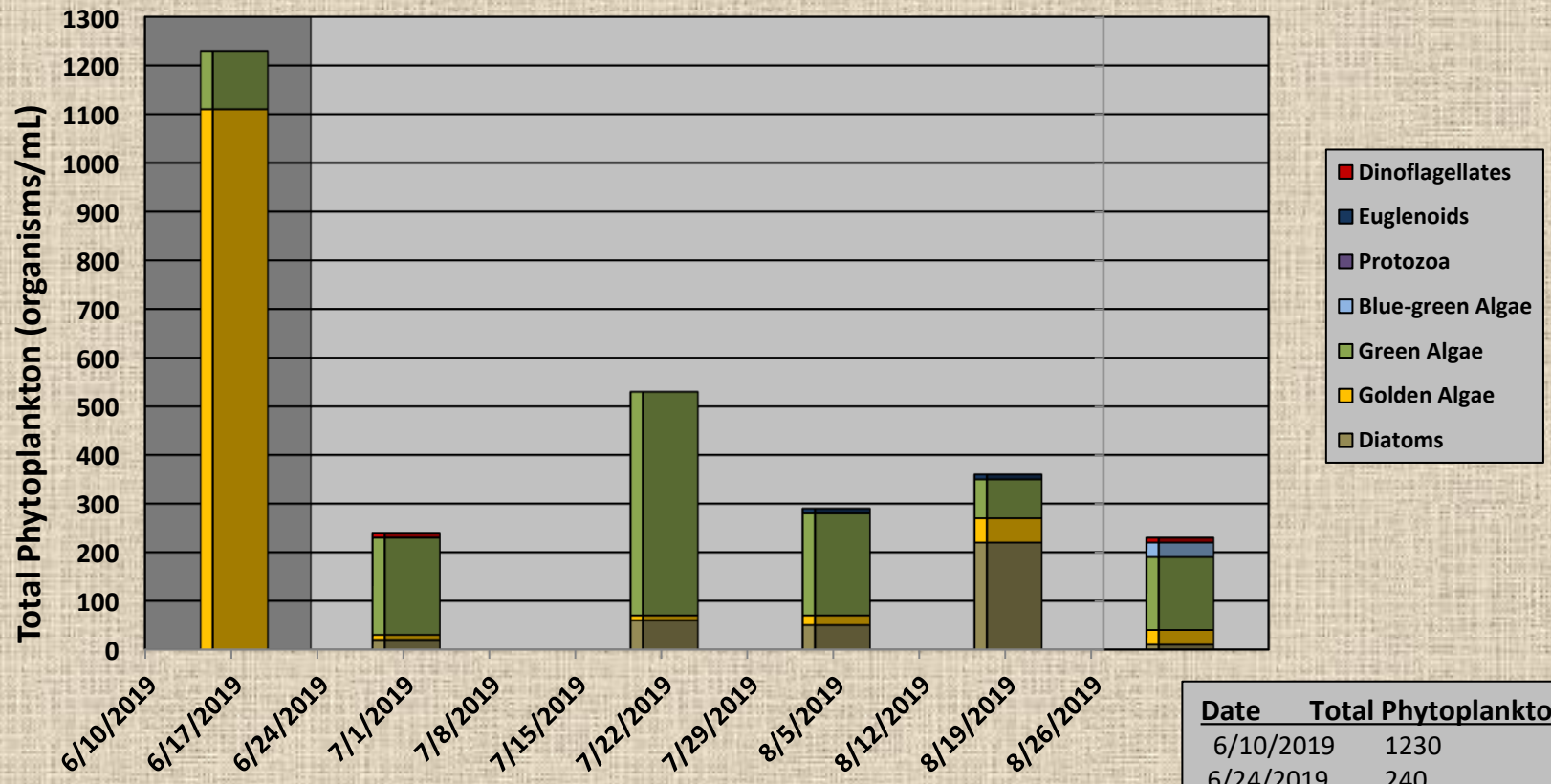
Grundens Pond				
Parameter	**Units**	**6/10/2019**	**7/15/2019**	**8/12/2019**
Nitrate	mg/L	ND	ND	ND
Turbidity	NTU	2.7	4.3	3.4
Total Phosphorous	mg/L	0.044	0.088	0.056

Crystal Lake				
Parameter	**Units**	**6/10/2019**	**7/15/2019**	**8/12/2019**
Nitrate	mg/L	ND	ND	ND
Turbidity	NTU	0.98	1.8	3.2
Total Phosphorous	mg/L	0.006	0.014	0.020

Mountain Lake				
Parameter	**Units**	**6/10/2019**	**7/15/2019**	**8/12/2019**
Nitrate	mg/L	0.035	ND	ND
Turbidity	NTU	1.2	1.3000	1.9
Total Phosphorous	mg/L	0.012	0.0170	0.030

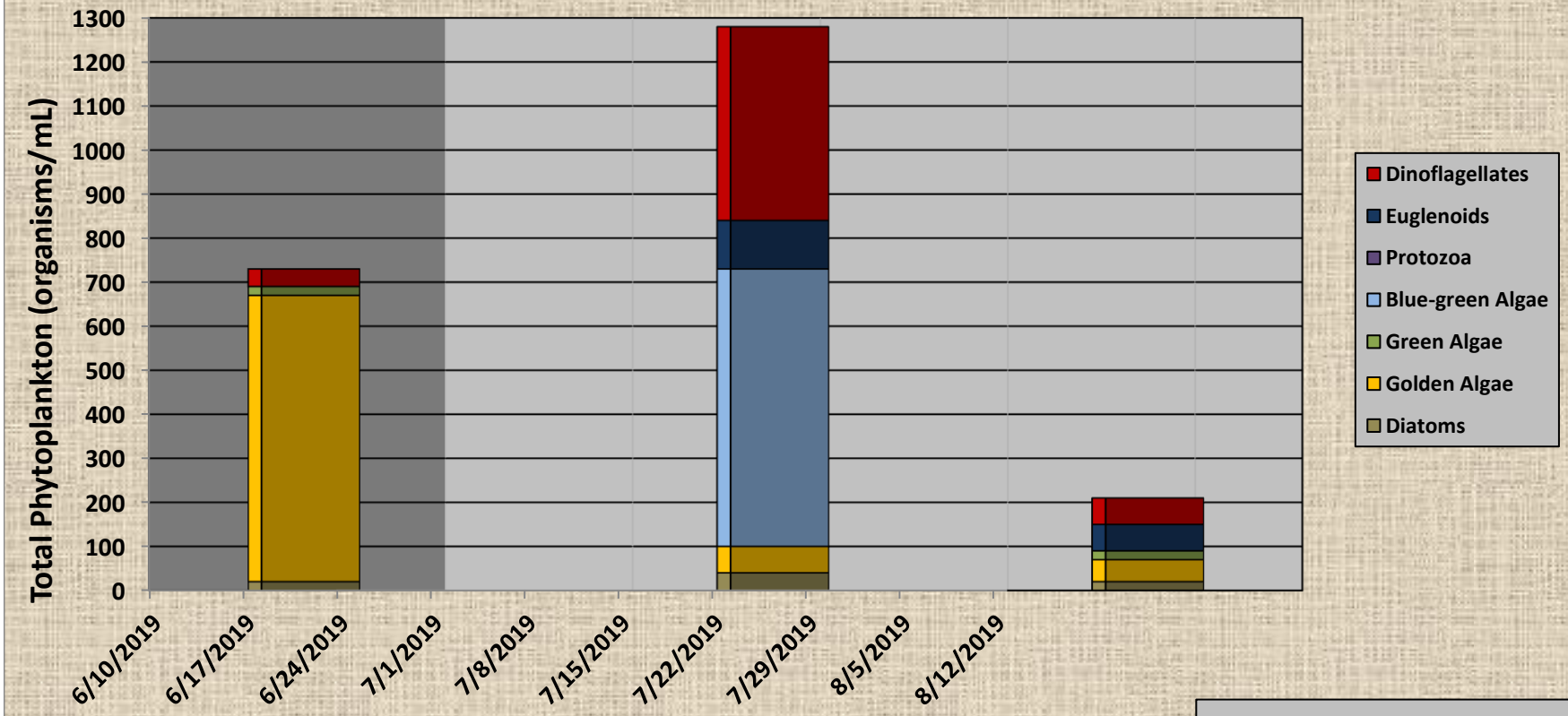
Note:

Birchwood Lake
2019 Phytoplankton Distribution



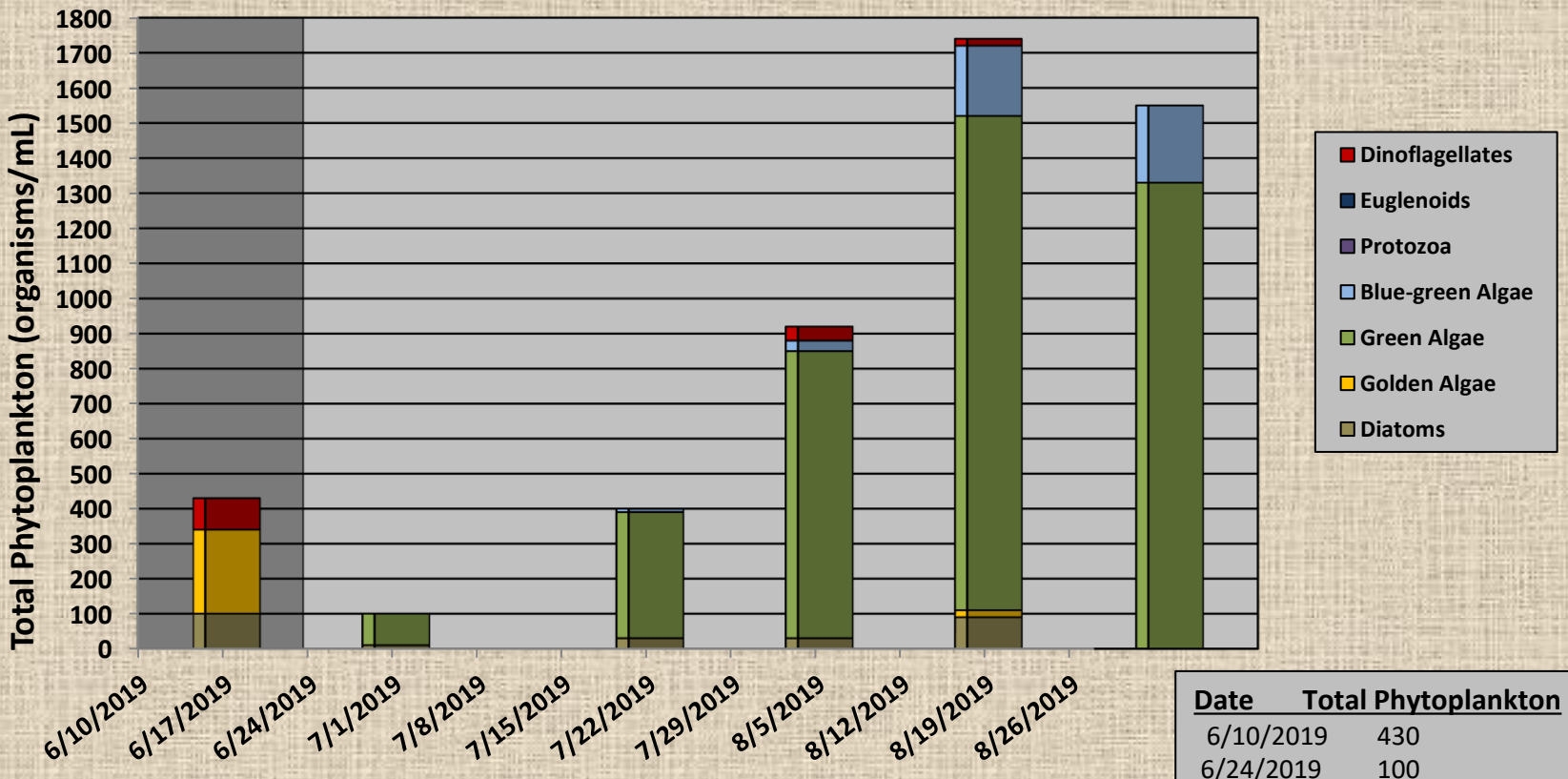
Date	Total Phytoplankton
6/10/2019	1230
6/24/2019	240
7/15/2019	530
7/29/2019	290
8/12/2019	360

Cove Pond
2019 Phytoplankton Distribution



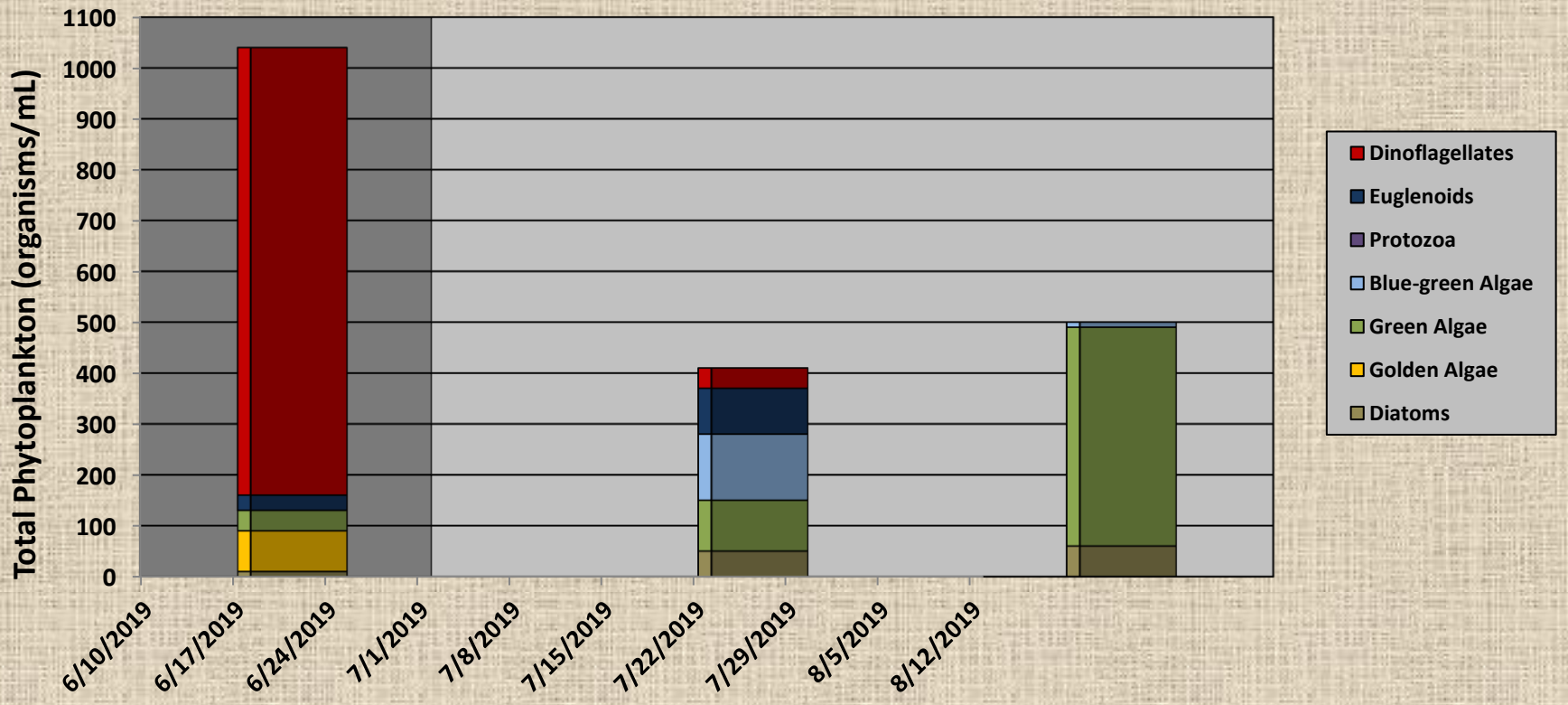
Date	Total Phytoplankton
6/10/2019	730
7/15/2019	1280
8/12/2019	210

Crystal Lake
2019 Phytoplankton Distribution



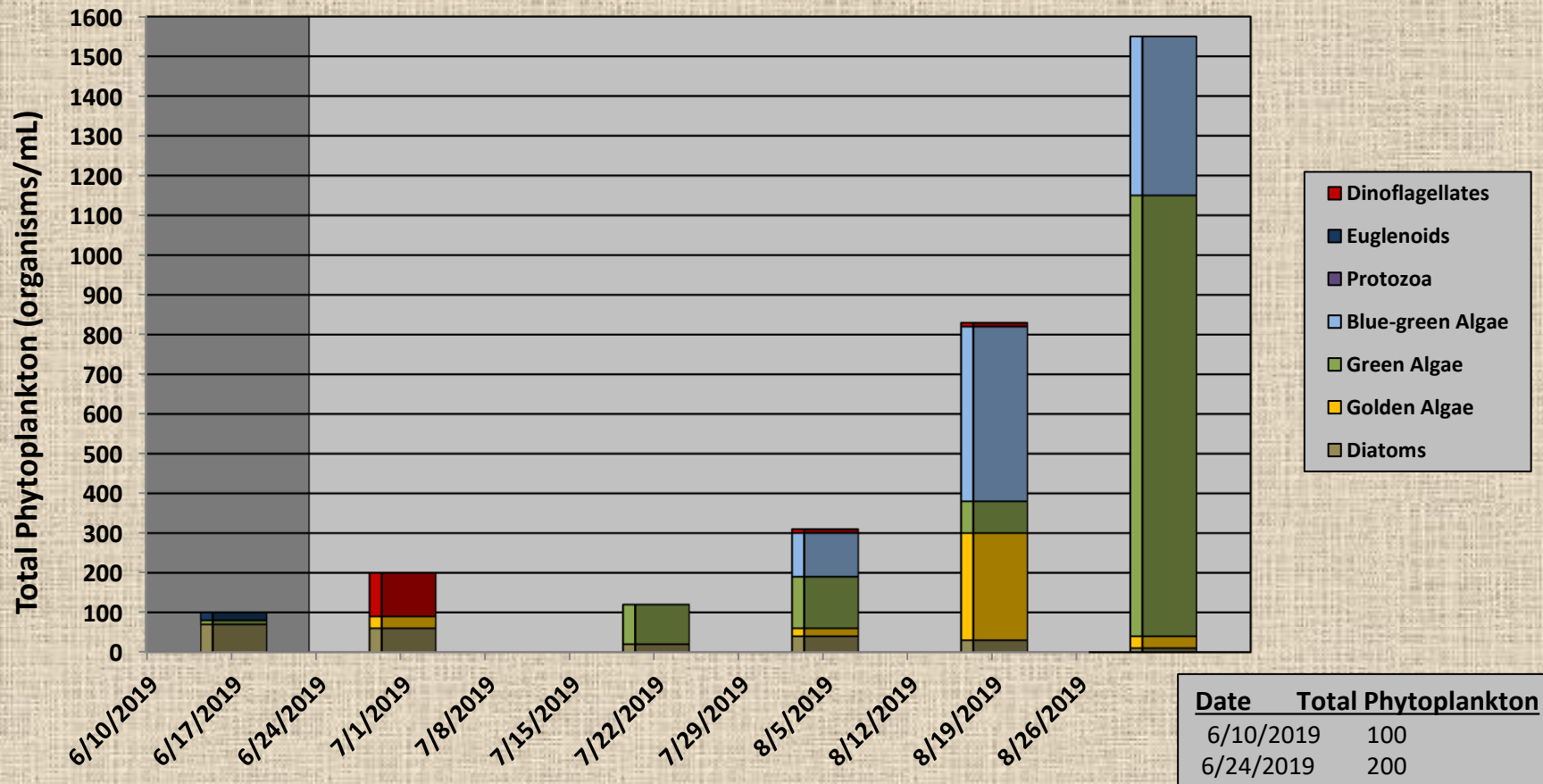
Date	Total Phytoplankton
6/10/2019	430
6/24/2019	100
7/15/2019	400
7/29/2019	920
8/12/2019	1740
8/26/2019	1550

Grunden's Pond
2019 Phytoplankton Distribution



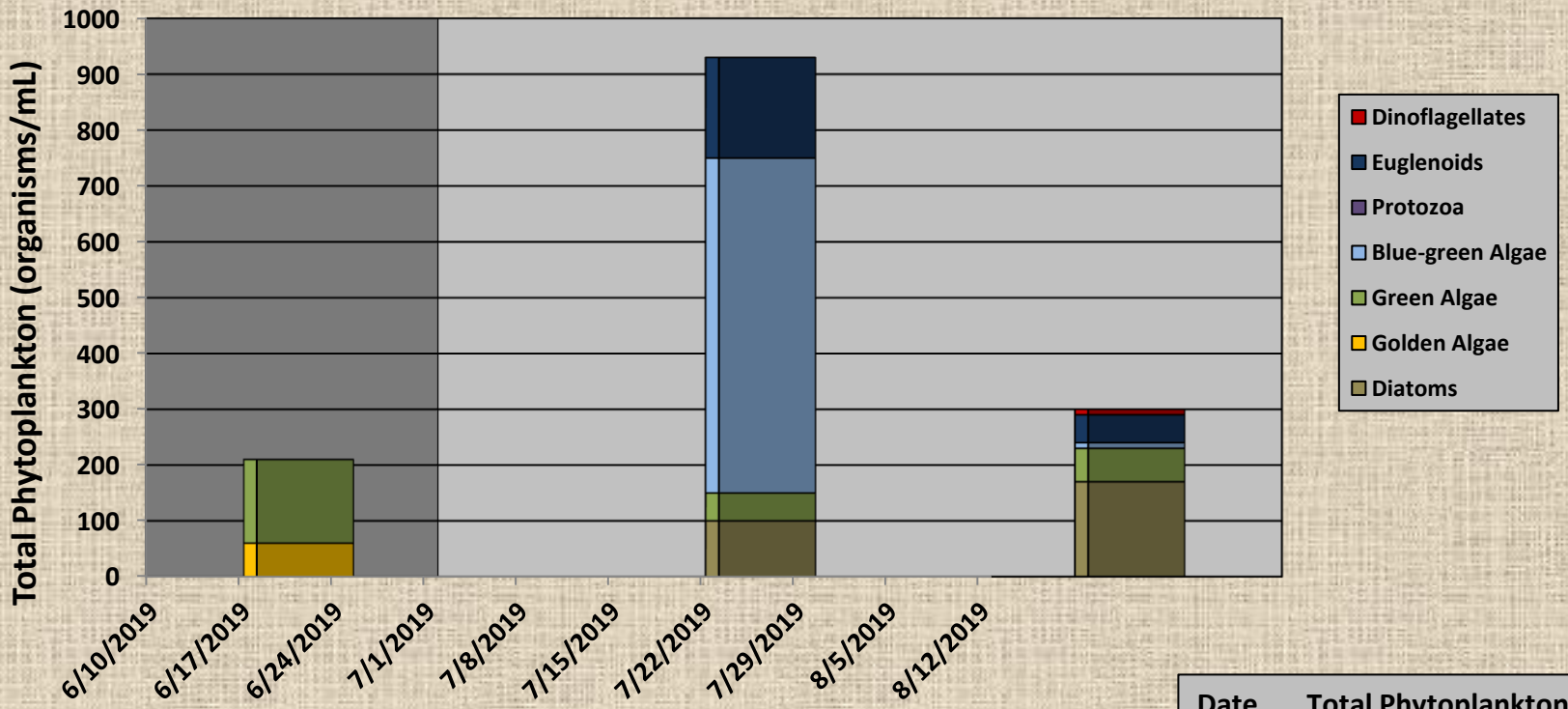
Date	Total Phytoplankton
6/10/2019	1040
7/15/2019	410
8/12/2019	500

Mountain Lake
2019 Phytoplankton Distribution



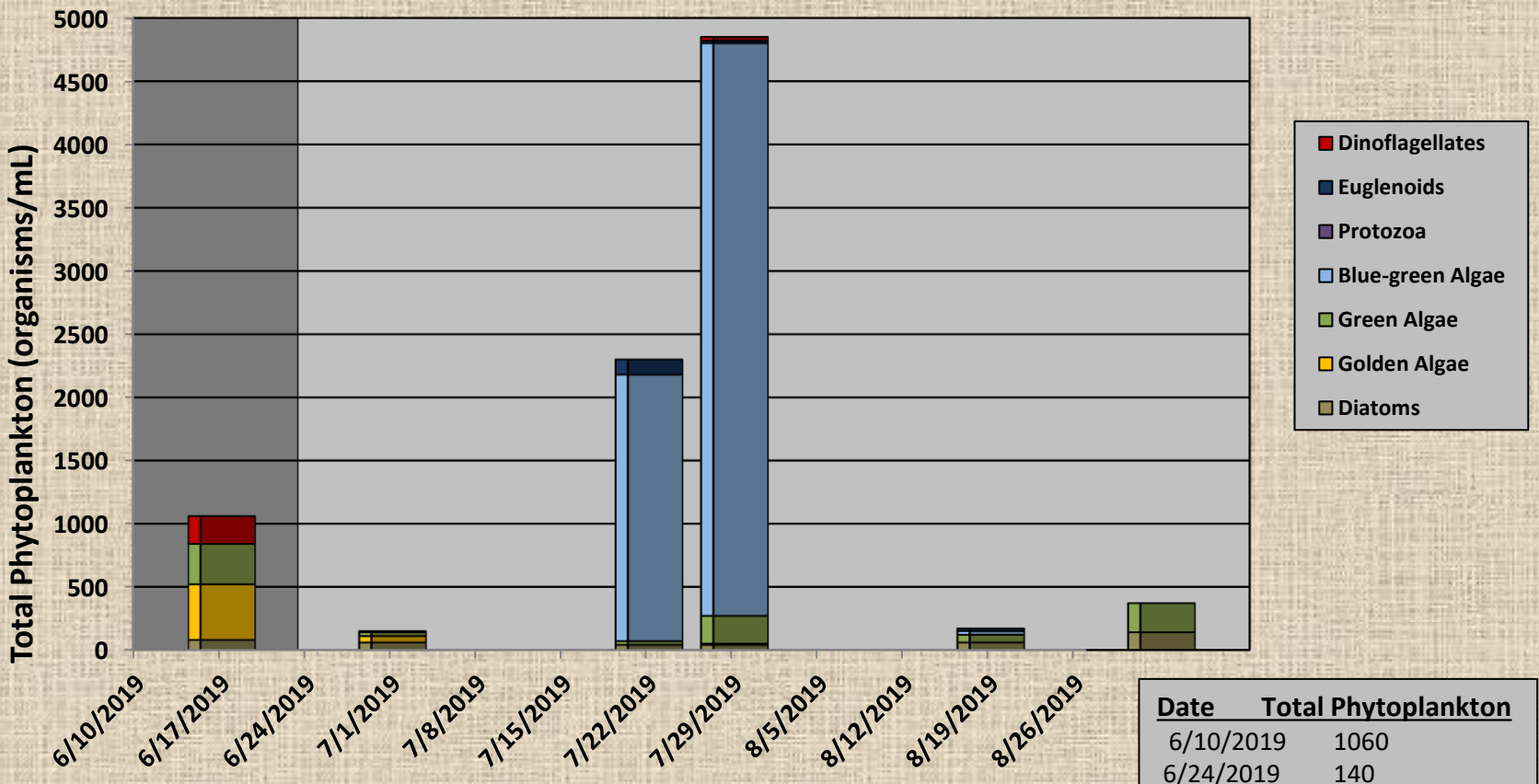
Date	Total Phytoplankton
6/10/2019	100
6/24/2019	200
7/15/2019	120
7/29/2019	310
8/12/2019	830
8/26/2019	1550

Olive Pond
2019 Phytoplankton Distribution



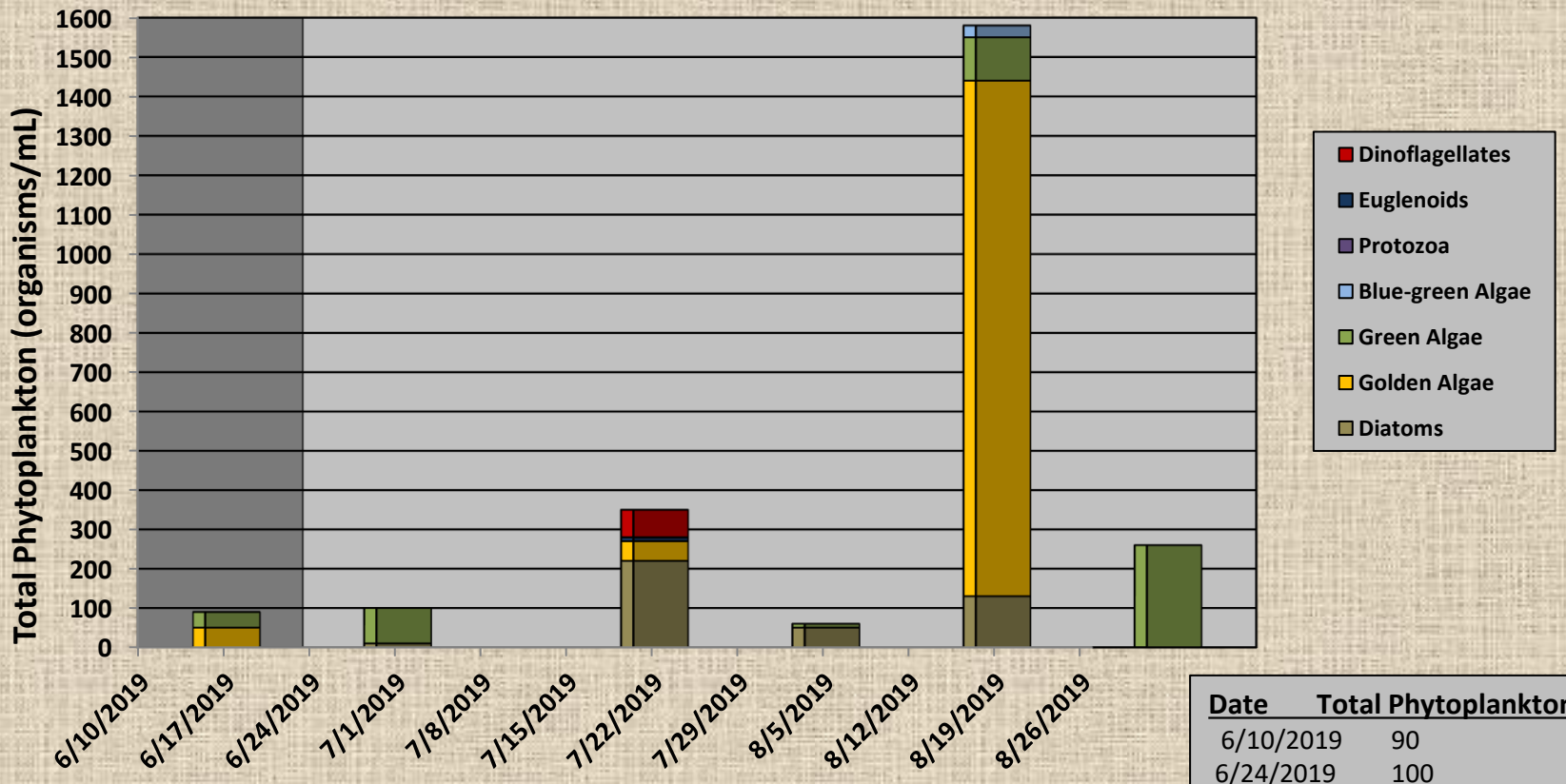
Date	Total Phytoplankton
6/10/2019	210
7/15/2019	930
8/12/2019	300

Shadow Lake
2019 Phytoplankton Distribution



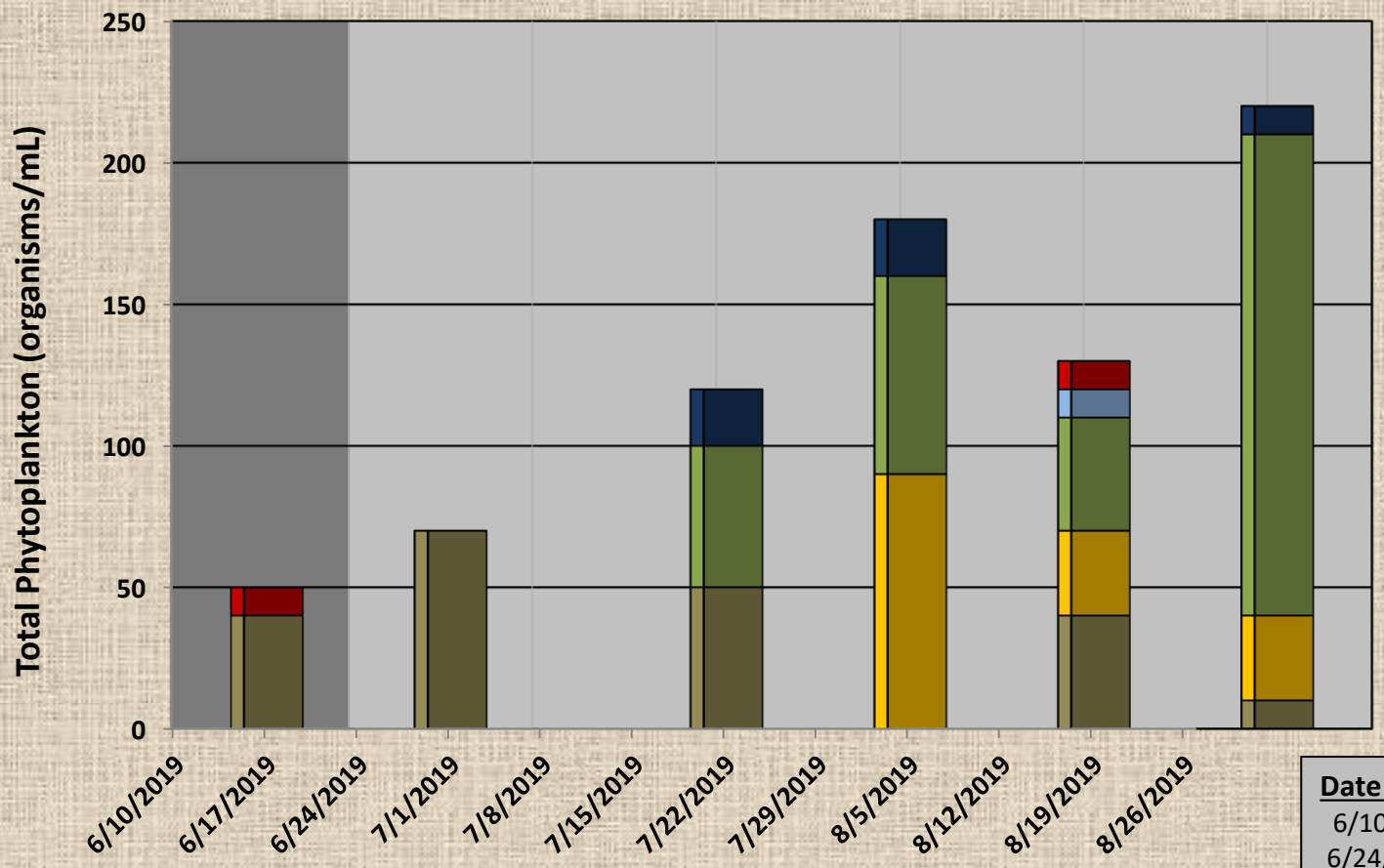
Date	Total Phytoplankton
6/10/2019	1060
6/24/2019	140
7/15/2019	2300
7/29/2019	4850
8/12/2019	170
8/26/2019	370

Sunset Lake
2019 Phytoplankton Distribution

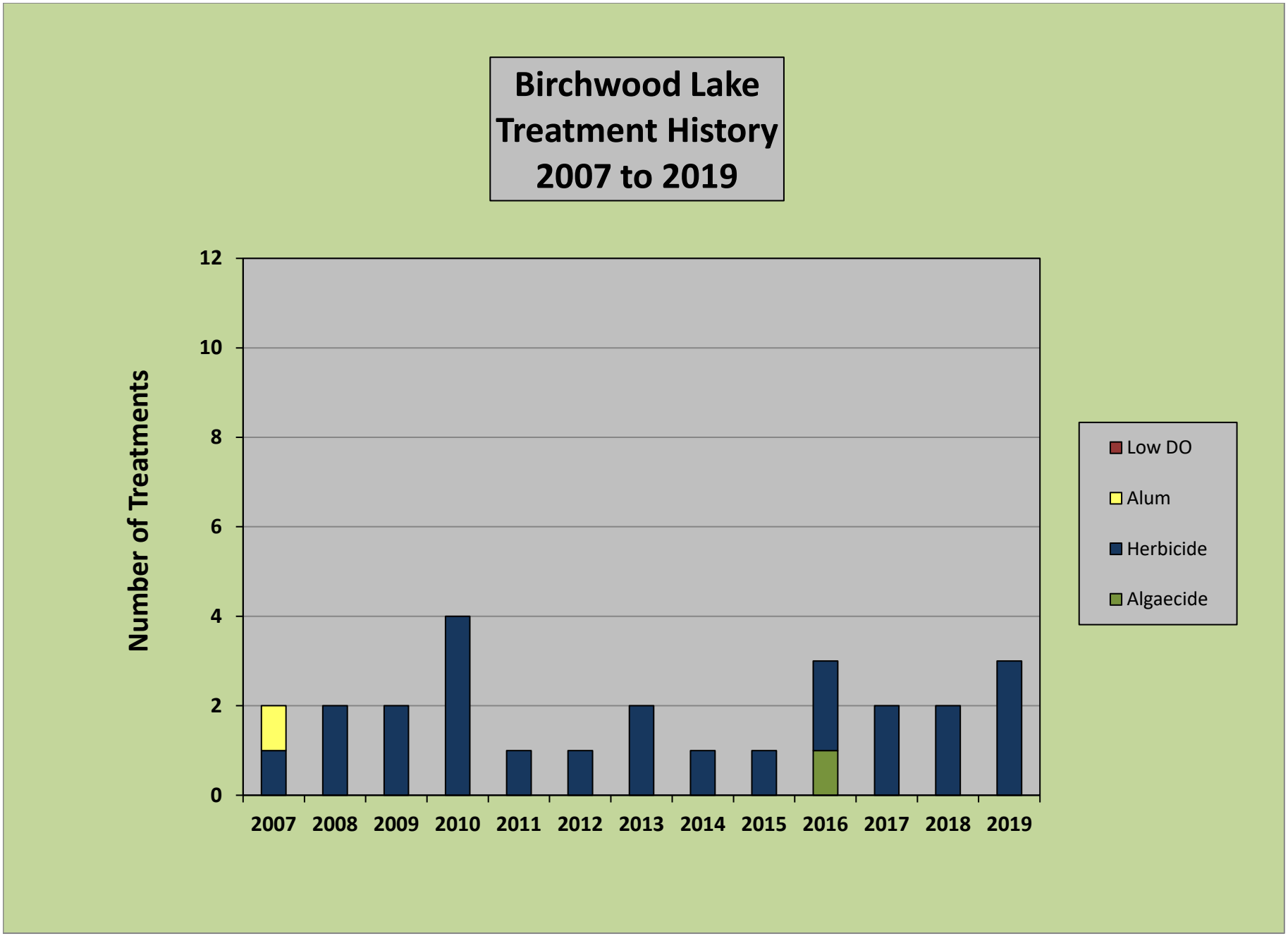


Date	Total Phytoplankton
6/10/2019	90
6/24/2019	100
7/15/2019	350
7/29/2019	60
8/12/2019	1580
8/26/2019	260

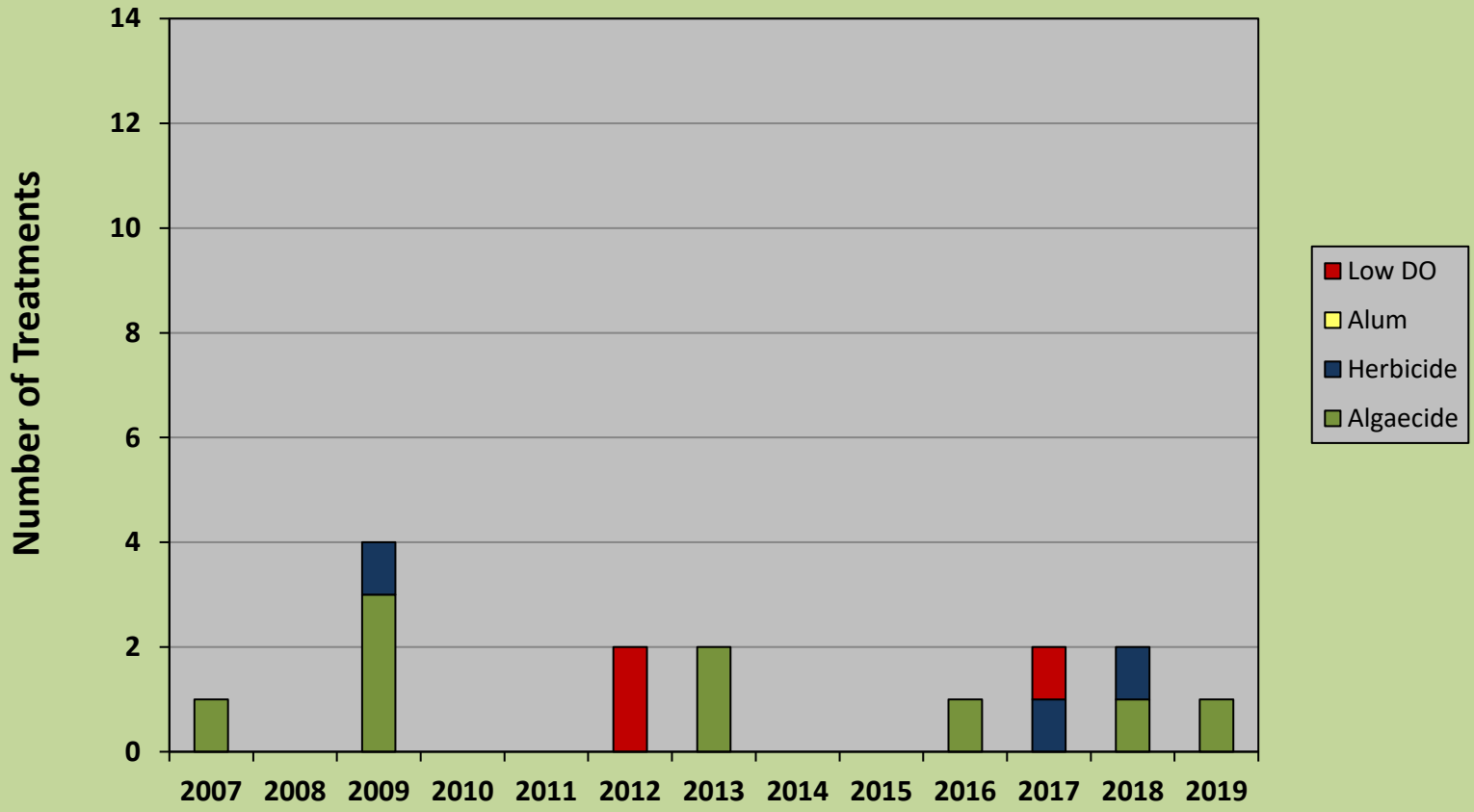
Wildwood Lake
2019 Phytoplankton Distribution



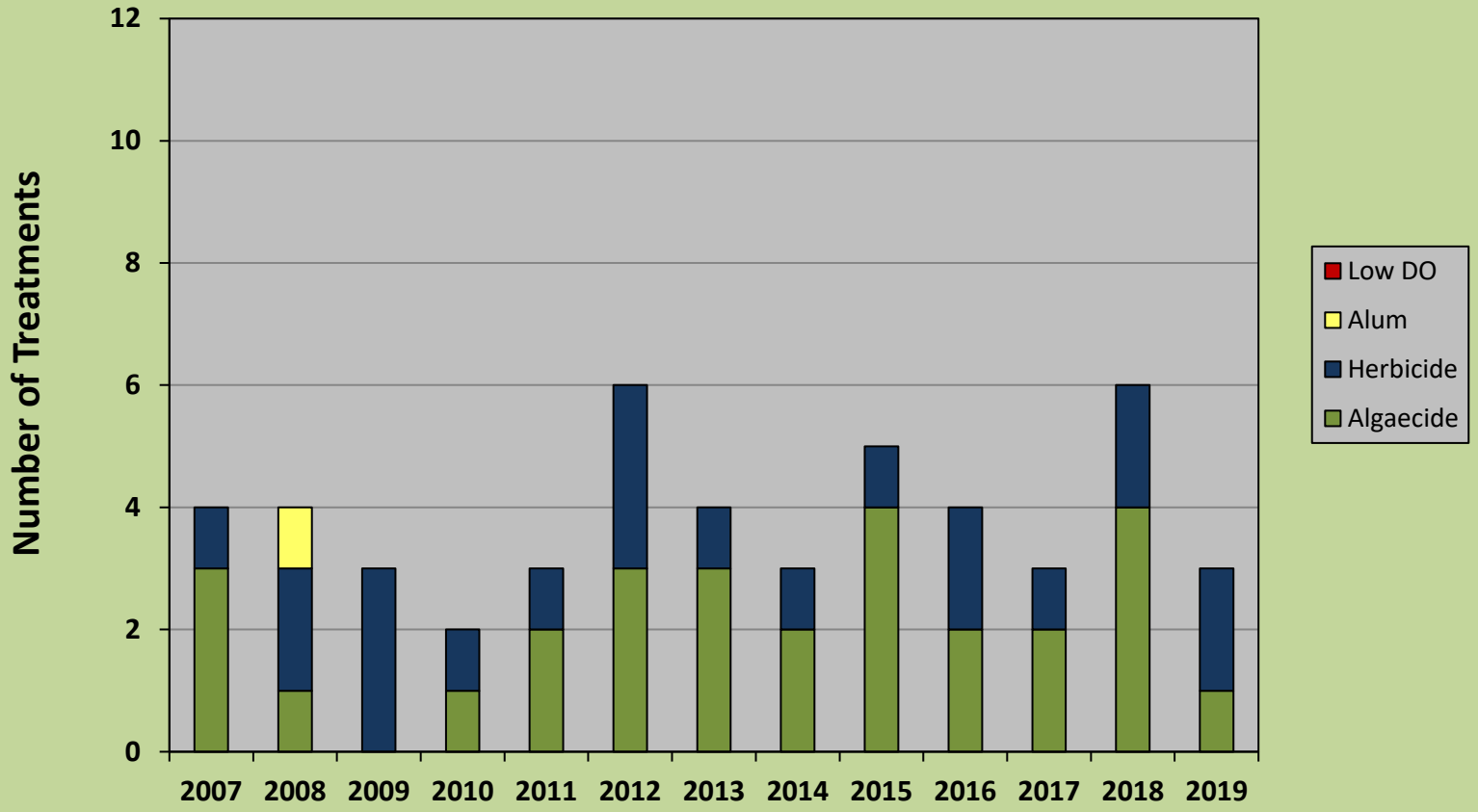
Date	Total Phytoplankton
6/10/2019	50
6/24/2019	70
7/15/2019	120
7/29/2019	180
8/12/2019	130
8/26/2019	220

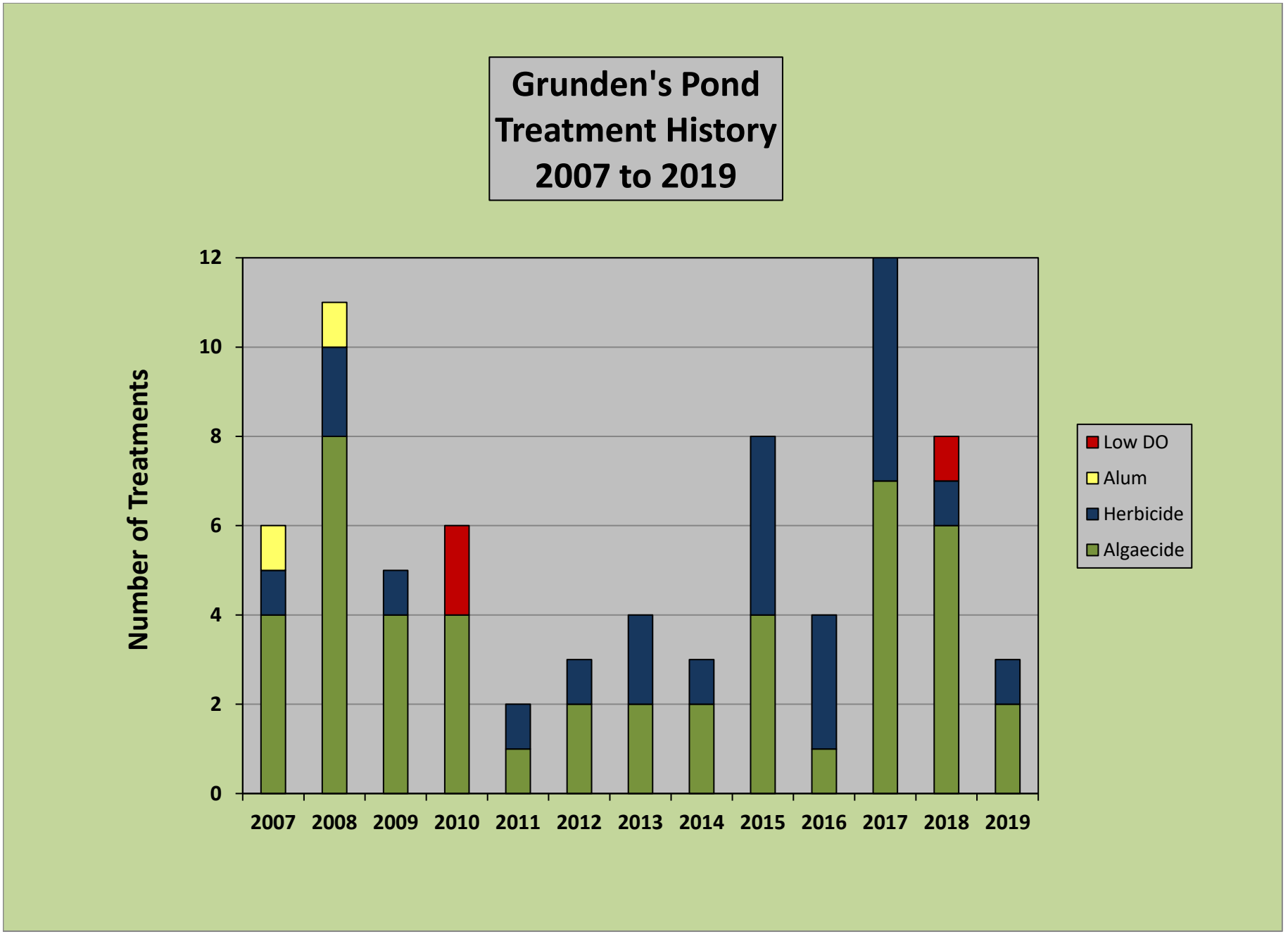

Birchwood Lake
Treatment History
2007 to 2019
Number of Treatments
12
10
8
6
4
2
0
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
Low DO
Alum
Herbicide
Algaecide

Cove Pond Treatment History 2007 to 2019

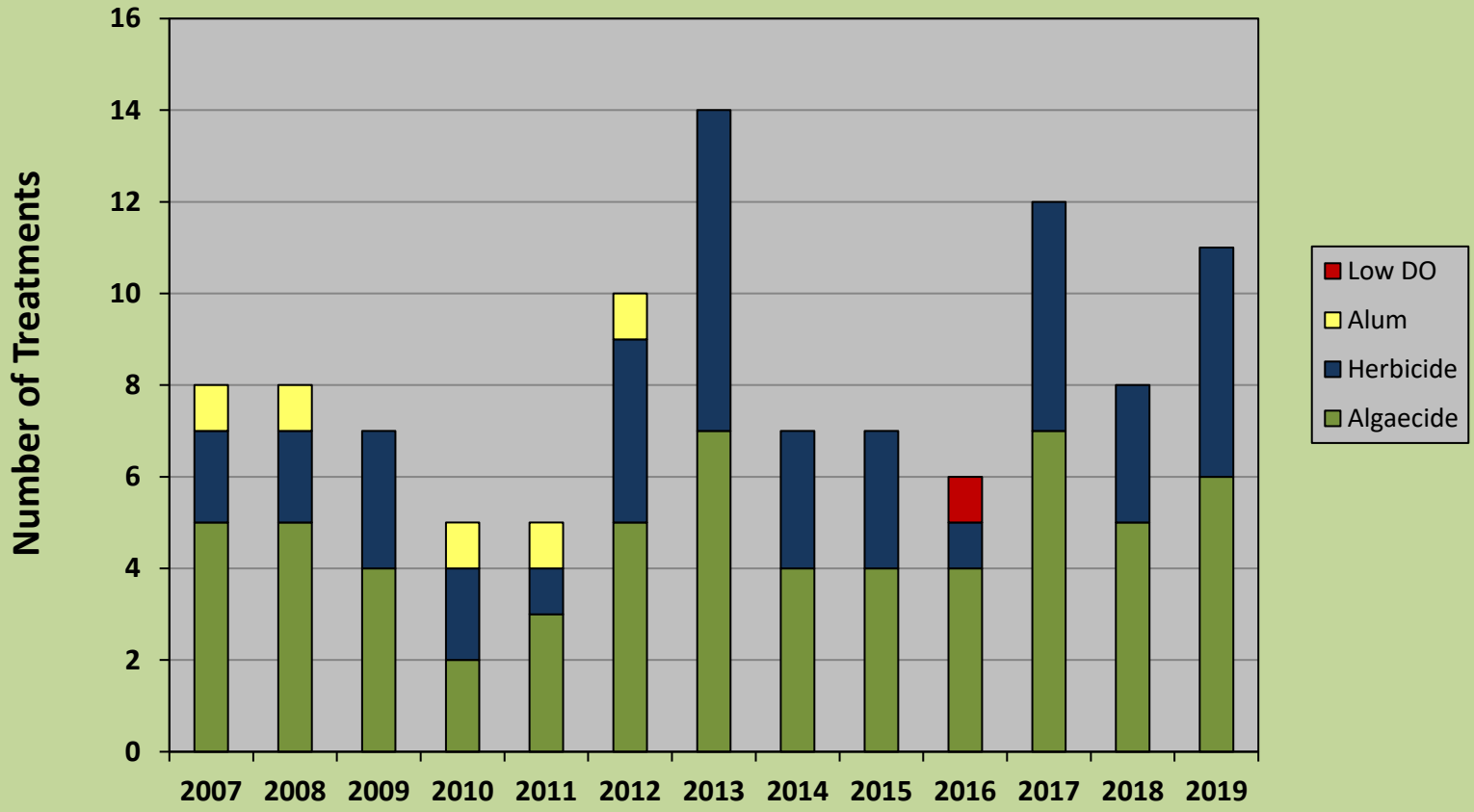


Crystal Lake Treatment History 2007 to 2019

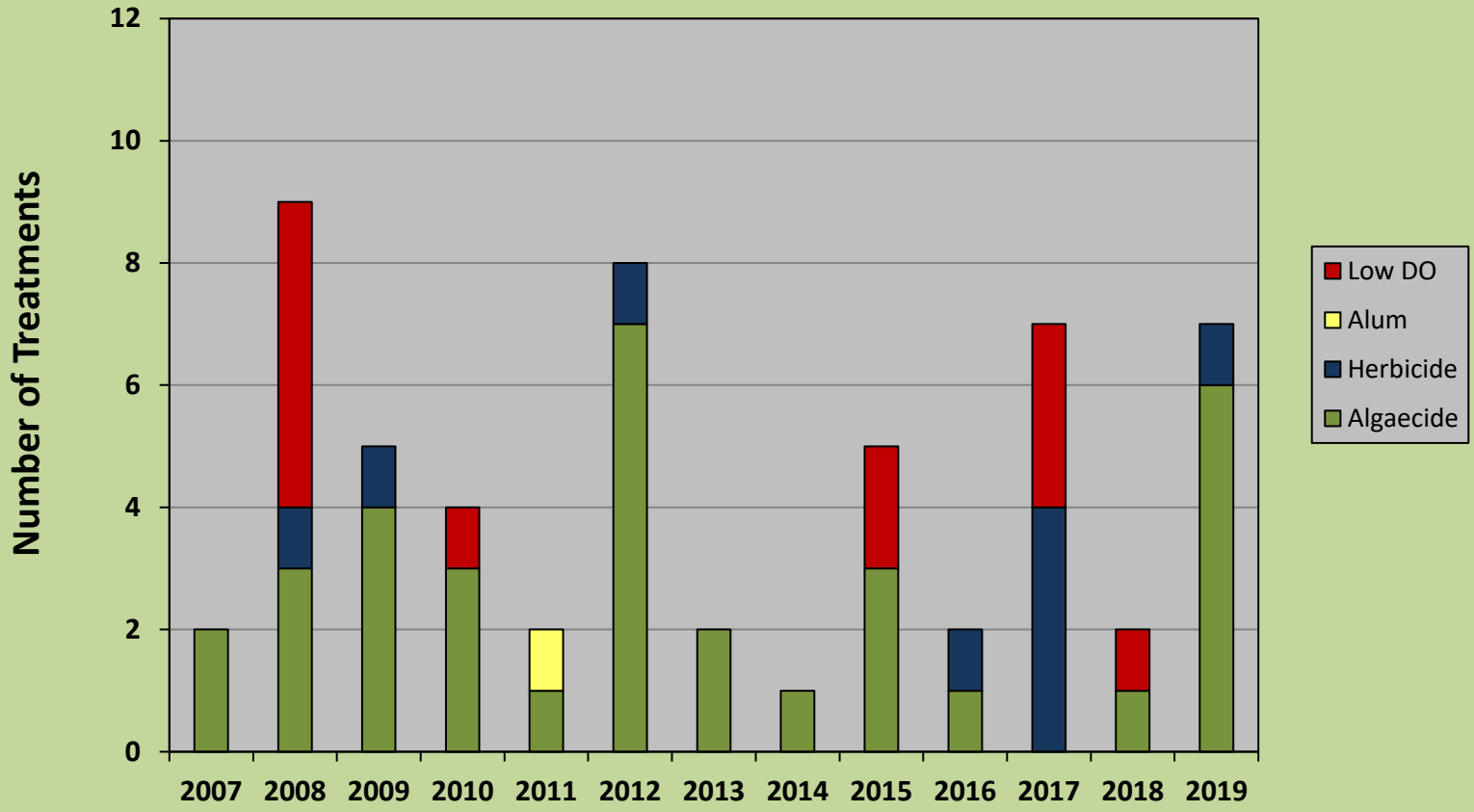



Grunden's Pond
Treatment History
2007 to 2019
Number of Treatments
0
2
4
6
8
10
12
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
Low DO
Alum
Herbicide
Algaecide

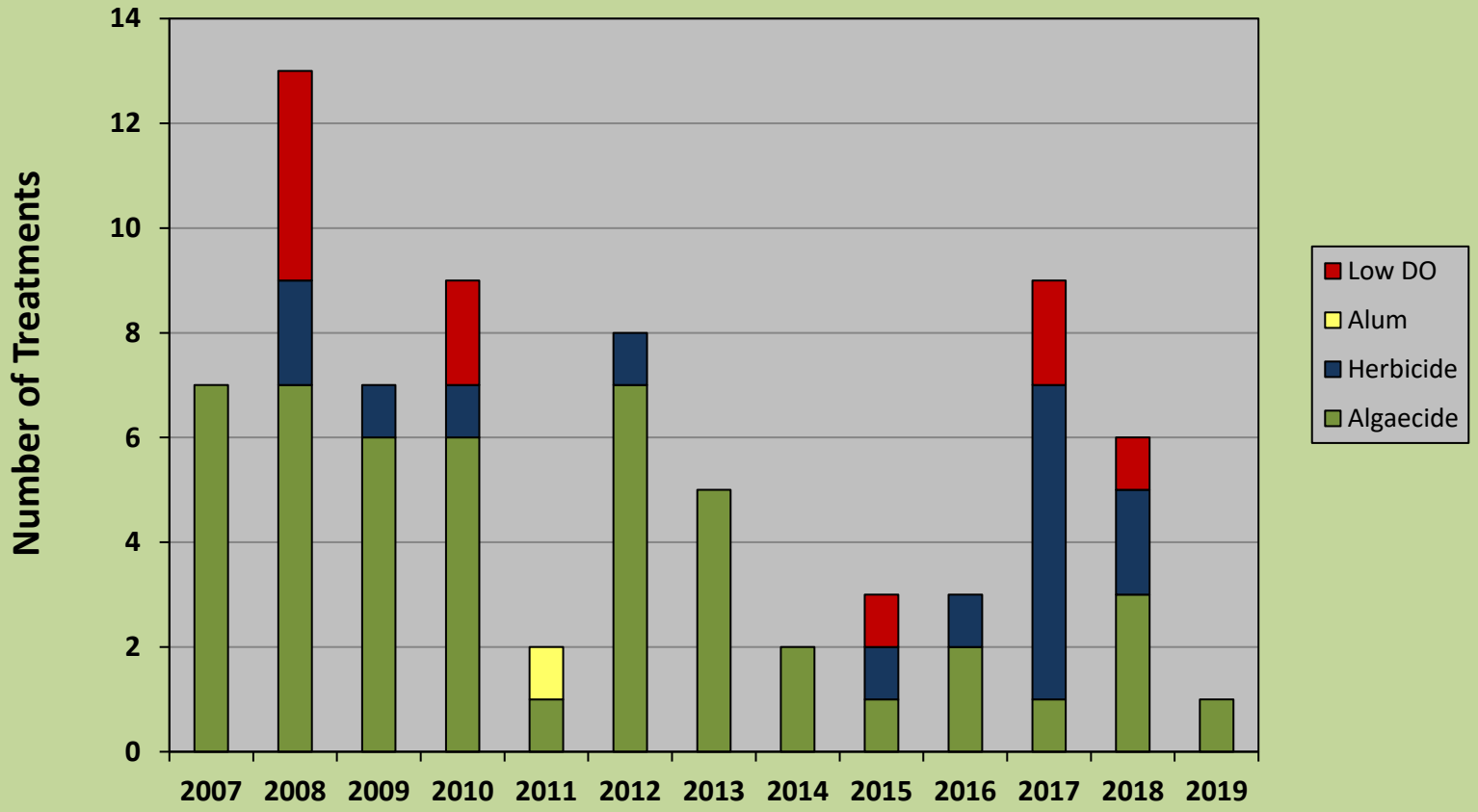
Mountain Lake Treatment History 2007 to 2019



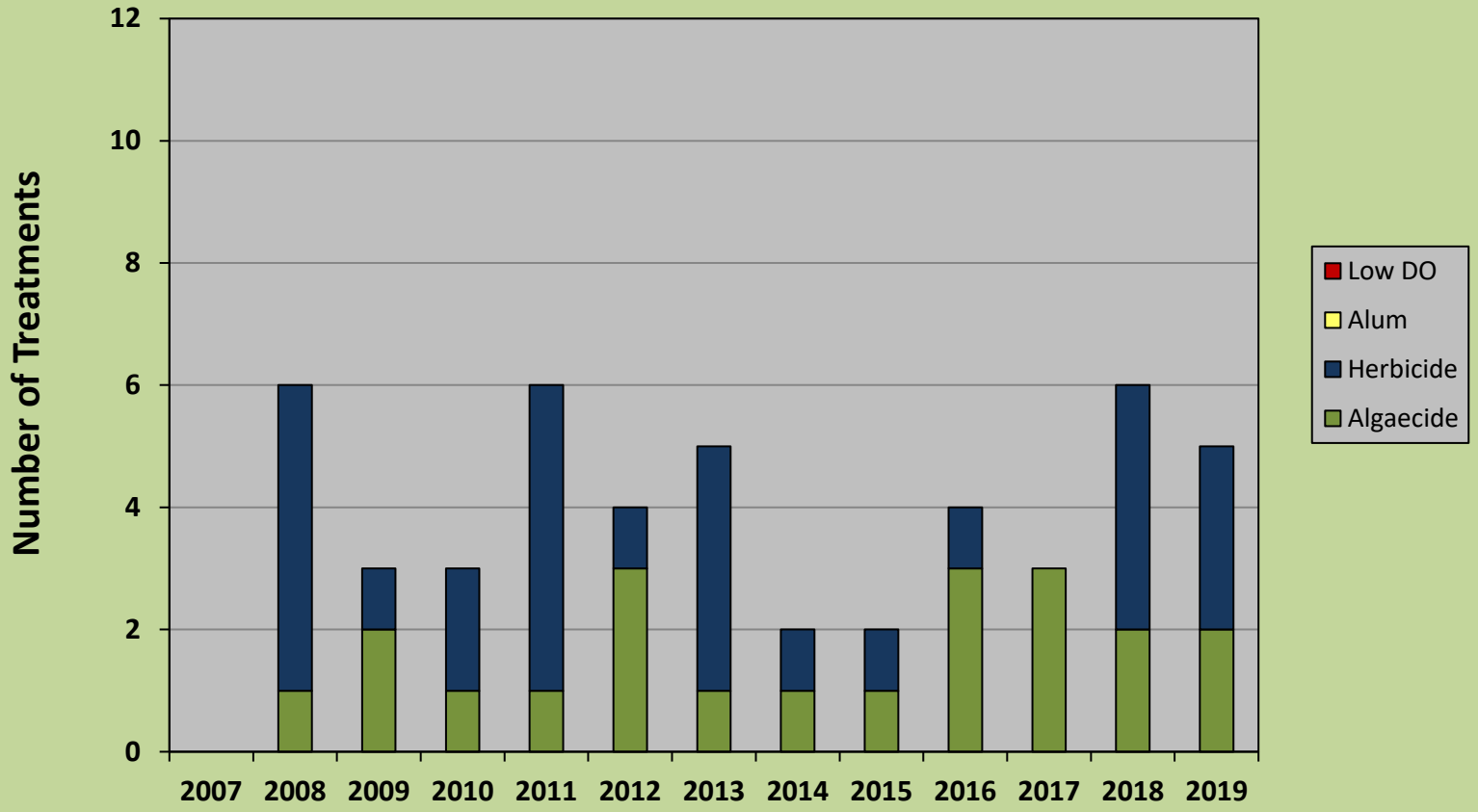
Olive Pond Treatment History 2007 to 2019



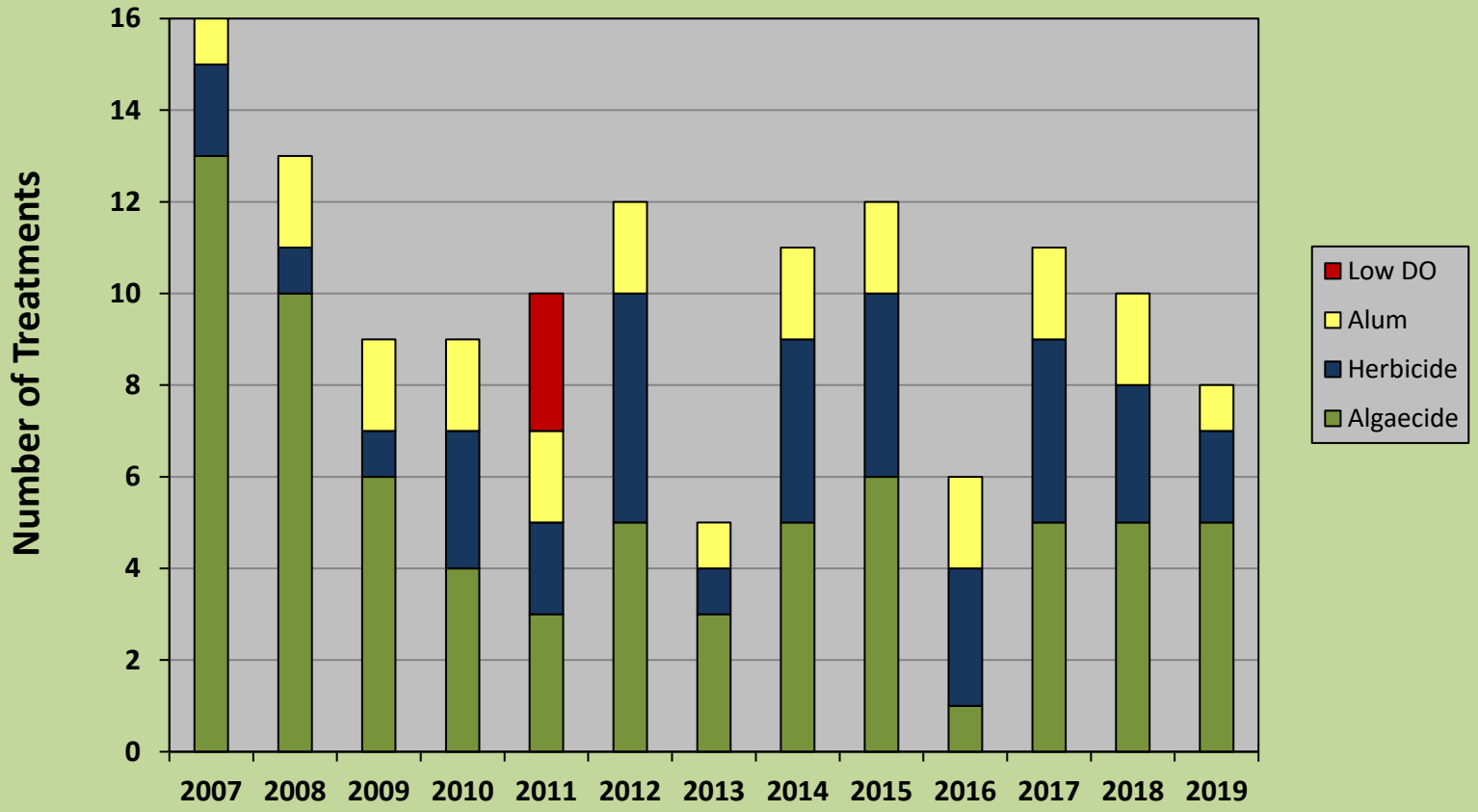
Shadow Lake Treatment History 2007 to 2019



Sunset Lake Treatment History 2007 to 2019



Wildwood Lake Treatment History 2007 to 2019



BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Bob Schindler, Solitude Lake Management
DATE: 3/29/2019
INSPECTION DATE: 3/28/2019

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 11:30AM)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	7.2	12.4
2’	7.0	12.2
4’	6.9	12.0
6’	6.9	11.9
8’	6.9	11.9
10’	6.8	11.8
12’	6.7	11.8
13’	6.6	11.6

BIRCHWOOD LAKE	Outlet Cove: Only a few stems of dormant cattails.
Secchi: 8.5’	Inside Swim Lane: No plant or algae growth observed.
Aeration: Beach only	Outside Swim Lane: Traces of benthic fil. Algae (Spirogyra)
Fecal Sample: NA	Beach: No plant or algae growth observed.
SUNSET LAKE	Launch: No plant or algae growth observed.
Secchi: est. 7’	Outlet: No plant or algae growth observed.
	Sunset Road Cove: No plant or algae growth observed.
	Inlet Cove: No plant or algae growth observed.
CRYSTAL LAKE	Birchwood Outlet: No plant or algae growth observed.
	Lake Shore Road Shoreline: No plant or algae growth observed.
Secchi: est. 9’	Crystal Outlet: No plant or algae growth observed.
OLIVE POND **Dissolved Oxygen: 11.3 mg/L.**	Secchi: est. 5’ Temp: 8.4°C Trace amounts of *Spirogyra* filamentous algae on the bottom.
SHADOW LAKE Aeration: No **Dissolved Oxygen: 11.5 mg/L.**	Secchi: est. 4’ Sparse to moderate amounts of Spirogyra at the northern end of the pond.
COVE POND	Secchi: est. 4.5’

Dissolved Oxygen: 9.8 mg/L.	No plant or algae growth observed.
GRUNDEN'S POND **Dissolved Oxygen: 16.2 mg/L.**	Secchi: est. 6' Trace to sparse Spirogyra on the surface along portions of the shoreline edge. A few stems of curly-leaf pondweed observed.
MOUNTAIN LAKE	Cove End: See additional survey report
Secchi: 3.5'	Sailboat Cove:
Water Level: 499.2	Outlet Cove:
7.1°C	Midvale Launch:
Fecal Sample: NA	Island Beach:
WILDWOOD LAKE	Park: No plant or algae growth observed.
Secchi: 8'+	Dam: No plant or algae growth observed.
Water Level: 499.2	Launch: Trace benthic filamentous algae
7.6°C	

NOTES:

1.

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Bob Schindler, Solitude Lake Management
DATE: 4/1/2019
INSPECTION DATE: 4/2/2019

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 9:45AM)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	9.9	11.51
2’	9.8	10.25
4’	9.7	10.08
6’	9.6	9.95
8’	9.5	9.94
10’	9.5	9.89
12’	9.5	9.87
13’	9.5	9.54

BIRCHWOOD LAKE	Outlet Cove: Only a few stems of dormant cattails. Bassweed stems appear to have lifted from the bottom, possibly from the rapid warm weather Saturday, and shallow water depth.
Secchi: 8’	Inside Swim Lane: No plant or algae growth observed.
Aeration: Beach only	Outside Swim Lane: Traces of benthic fil. Algae (Spirogyra)
Fecal Sample: NA	Beach: No plant or algae growth observed.
SUNSET LAKE	Launch: No plant or algae growth observed.
Secchi: est. 7’	Outlet: No plant or algae growth observed.
	Sunset Road Cove: No plant or algae growth observed.
	Inlet Cove: No plant or algae growth observed.
CRYSTAL LAKE	Birchwood Outlet: No plant or algae growth observed.
	Lake Shore Road Shoreline: No plant or algae growth observed.
Secchi: est. 9’	Crystal Outlet: No plant or algae growth observed.
OLIVE POND **Dissolved Oxygen: 10.5 mg/L.**	Secchi: est. 5’ Temp: 9.2°C Trace amounts of *Spirogyra* filamentous algae on the bottom.
SHADOW LAKE Aeration: No	Secchi: est. 4’ Sparse to moderate amounts of Spirogyra at the northern end

Dissolved Oxygen:10.89 mg/L.	of the pond.
COVE POND **Dissolved Oxygen: 9.5 mg/L.**	Secchi: est. 4.5’ No plant or algae growth observed.
GRUNDEN’S POND **Dissolved Oxygen: 14.8 mg/L.**	Secchi: est. 6’ Trace to sparse Spirogyra on the surface along portions of the shoreline edge. A few stems of curly-leaf pondweed observed.
MOUNTAIN LAKE	Cove End: No plant or algae growth observed.
Secchi: 3.5’	Sailboat Cove: Trace amounts of Spirogyra at the bottom and surface along shoreline edge.
Water Level: 499.3	Outlet Cove: No plant or algae growth observed.
9.4°C	Midvale Launch: No plant or algae growth observed.
Fecal Sample: NA	Island Beach: Trace amounts of Spirogyra, and dormant plant stems along rock wall and around bridge canal.
WILDWOOD LAKE	Park: No plant or algae growth observed.
Secchi: 8’+	Dam: No plant or algae growth observed.
Water Level: 499.3	Launch: Trace benthic filamentous algae.
8.4°C	

NOTES:

1.

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Bob Schindler, Solitude Lake Management
DATE: 4/9/2019
INSPECTION DATE: 4/8/2019

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 3:50PM)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	13.1	11.91
2’	12.8	11.86
4’	12.7	11.75
6’	12.5	11.68
8’	12.2	11.62
10’	10.7	11.85
12’	10.3	11.82
13’	10.1	11.54

BIRCHWOOD LAKE	Outlet Cove: Only a few stems of dormant cattails. Bassweed growth is visible standing in water column, but not actively growing further at this time.
Secchi: 10’+	Inside Swim Lane: No algae growth observed. A few stems of low water milfoil along the immediate shoreline edge in one small area.
Aeration: Beach only	Outside Swim Lane: Traces of benthic fil. Algae (Spirogyra)
Fecal Sample: NA	Beach: No plant or algae growth observed.
SUNSET LAKE	Launch: No plant or algae growth observed.
Secchi: est. 8’	Outlet: No plant or algae growth observed.
	Sunset Road Cove: No plant or algae growth observed.
	Inlet Cove: No plant or algae growth observed.
CRYSTAL LAKE	Birchwood Outlet: No plant or algae growth observed.
	Lake Shore Road Shoreline: No plant or algae growth observed.
Secchi: est. 10’	Crystal Outlet: No plant or algae growth observed.
OLIVE POND **Dissolved Oxygen: 10.85 mg/L.**	Secchi: est. 6’ Temp: 15.2°C Trace amounts of *Spirogyra* filamentous algae on the bottom.
SHADOW LAKE	Secchi: est. 5’

Aeration: Yes **Dissolved Oxygen: 11.96mg/L.**	Pond looks improved compared to last visit with generally light densities of filamentous algae. The initial treatment of the pond will be scheduled for late this week to early next week.
COVE POND **Dissolved Oxygen: 10.54 mg/L.**	Secchi: est. 5' No plant or algae growth observed.
GRUNDEN'S POND **Dissolved Oxygen: 13.24 mg/L.**	Secchi: est. 6' The pond conditions have improved since previous survey visit. At this time only traces of surface filamentous algae, and a few stems of curly-leaf pondweed visible.
MOUNTAIN LAKE	Cove End: No plant or algae growth observed.
Secchi: 6'	Sailboat Cove: Trace amounts of Spirogyra at the bottom and surface along shoreline edge.
Water Level: 499.2	Outlet Cove: No plant or algae growth observed.
14.8°C	Midvale Launch: No plant or algae growth observed.
Fecal Sample: NA	Island Beach: Trace amounts of Spirogyra, and dormant plant stems along rock wall and around bridge canal.
WILDWOOD LAKE	Park: Sparse density filamentous algae along shoreline edge.
Secchi: 8'+	Dam: Trace to sparse density filamentous algae along dam edge.
Water Level: 499.2	Launch: Sparse filamentous algae visible along the majority of the lake perimeter. An algae treatment will be scheduled soon.
14.9°C	

NOTES:

1. **Due to the small size, presence of aeration, and ease of monitoring, the outlet cove of Birchwood Lake will be targeted with bacterial enhancement product throughout the 2019 management season, with organic material and water depth recorded through season to monitor results.**
2. **Shadow Lake and Wildwood Lake will be scheduled for algae treatments soon.**
3. **Wildwood Lake alum treatment will be scheduled within the next two weeks.**
4. **Due to the variable temperatures, and observed fish kills in other lakes in what appears to be the result of the fluctuating temperatures in shallow water, algaecide treatments will be carefully scheduled. Later this week overnight temperatures will drop to near freezing again, and can influence water temperatures in shallow water where fish may already be creating spawning beds due to the rapid warming of the water temperatures over the past week.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Bob Schindler, Solitude Lake Management
DATE: 4/16/2019
INSPECTION DATE: 4/15/2019

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 12:40PM)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	16.3	9.58
2’	16.0	9.37
4’	15.8	9.34
6’	15.7	9.31
8’	15.4	9.26
10’	15.1	9.32
12’	13.0	9.41
13’	12.8	9.14

BIRCHWOOD LAKE	Outlet Cove: Bassweed has continued to develop in the shallow water near the outlet.
Secchi: 9’	Inside Swim Lane: Traces of low water milfoil starting to appear along the immediate edge along the wall.
Aeration: Beach only	Outside Swim Lane: Traces of benthic fil. Algae (Spirogyra)
Fecal Sample: NA	Beach: No plant or algae growth observed.
SUNSET LAKE	Launch: No plant or algae growth observed.
Secchi: est. 7’	Outlet: No plant or algae growth observed.
	Sunset Road Cove: No plant or algae growth observed.
	Inlet Cove: No plant or algae growth observed.
CRYSTAL LAKE	Birchwood Outlet: No algae growth observed at this time. A few water lily stems were observed at the surface along the shoreline edge.
	Lake Shore Road Shoreline: No plant or algae growth observed.
Secchi: est. 9’	Crystal Outlet: No plant or algae growth observed.
OLIVE POND **Dissolved Oxygen: 8.97 mg/L.**	Secchi: est. 5’ Temp: 17.2°C No plant or algae growth observed at this time.
SHADOW LAKE	Secchi: est. 4’

Aeration: Yes **Dissolved Oxygen:9.54 mg/L.**	Only a trace amount of filamentous algae along small portion of shoreline edge. Overall looks good at this time.
COVE POND **Dissolved Oxygen: 8.74mg/L.**	Secchi: est. 4' No plant or algae growth observed.
GRUNDEN'S POND **Dissolved Oxygen: 13.2 mg/L.**	Secchi: est. 6' Trace amounts of filamentous algae along a small portion of shoreline along and adjacent to BLVD. A few stems of curly-leaf pondweed still observed.
MOUNTAIN LAKE	Cove End: No plant or algae growth observed.
Secchi: 7.5'	Sailboat Cove: Trace amount of filamentous algae in one small cove area by the road.
Water Level: 499.55	Outlet Cove: No plant or algae growth observed.
16.5°C	Midvale Launch: No plant or algae growth observed.
Fecal Sample: NA	Island Beach: Trace amounts of Spirogyra, and dormant plant stems along rock wall and around bridge canal.
WILDWOOD LAKE	Park: No plant or algae growth observed.
Secchi: est.5' "turbid"	Dam: No plant or algae growth observed.
Water Level: 499.55	Launch: No plant or algae growth observed.
16.8°C	

NOTES:

1. **Treatments at both Shadow Lake and Wildwood Lake Friday showed significant improvement for both of those lakes.**
2. **Olive Pond phoslock treatment will be performed this week, likely Wednesday.**
3. **The aluminum sulfate treatment for Wildwood Lake is scheduled for Friday, however, due to forecast rain, it will likely be rescheduled for Monday April 22nd.**
4. **On water boat surveys for Mountain and Crystal were intended for this day, but due to wind, additional lake surveys will be performed this Wednesday.**
5. **NJDEP attended NJ COLA meeting this past Saturday. I will update Mitchell more in depth, but the short story is that DEP is hydro-raking previously was reviewed as a "Permit-by-Rule", meaning that as long as certain criteria were followed, it was a not a permitted activity. NOW, DEP is now categorizing that any disturbance to the lake bottom through mechanical means, regardless of project or material removal, is considered dredging.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Bob Schindler, Solitude Lake Management
DATE: 4/22/2019
INSPECTION DATE: 4/22/2019

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 12:55 PM)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	16.6	8.52
2’	16.5	8.46
4’	16.4	8.39
6’	16.3	8.30
8’	16.3	8.30
10’	16.3	8.28
12’	16.2	8.12
13’	15.9	6.91

BIRCHWOOD LAKE	Outlet Cove: Only a few stems of dormant cattails. Bassweed growth consistent with past several surveys, with light growth adjacent to shoreline edge.
Secchi: 8.5’	Inside Swim Lane: Only traces of low water milfoil along the wall.
Aeration: Beach only	Outside Swim Lane: No plant or algae growth observed.
Fecal Sample: NA	Beach: No plant or algae growth observed.
SUNSET LAKE	Launch: No plant or algae growth observed.
Secchi: est. 7’	Outlet: No plant or algae growth observed.
	Sunset Road Cove: A few trace densities of surface filamentous algae.
	Inlet Cove: No plant or algae growth observed.
CRYSTAL LAKE	Birchwood Outlet: Only a few individual stems of both bassweed and water lilies along the immediate shoreline edge
	Lake Shore Road Shoreline: No plant or algae growth observed.
Secchi: est. 8’	Crystal Outlet: No plant or algae growth observed.
OLIVE POND **Dissolved Oxygen: 8.75**	Secchi: est. 4’ Temp: 17.1°C No plant or algae growth observed. Pollen and seeds

mg/L.	collecting on the pond surface.
SHADOW LAKE Aeration: YES **Dissolved Oxygen: 8.95 mg/L.**	Secchi: est. 4' A trace amount of filamentous algae and tree seeds along the northern shoreline edge. Overall, pond continues to look good.
COVE POND **Dissolved Oxygen: 11.21 mg/L.**	Secchi: est. 3.5' No plant or algae growth observed.
GRUNDEN'S POND **Dissolved Oxygen: 12.84 mg/L.**	Secchi: est. 5' At this time only a trace amount of filamentous algae growth was present along the BLVD shoreline edge. A few stems of curly-leaf pondweed observed.
MOUNTAIN LAKE	Cove End: No plant or algae growth observed.
Secchi: 5.5'	Sailboat Cove: No plant or algae growth observed.
Water Level: 499.8	Outlet Cove: No plant or algae growth observed.
16.2 °C	Midvale Launch: No plant or algae growth observed.
Fecal Sample: NA	Island Beach: Trace amounts of Spirogyra, and dormant plant stems along rock wall and around bridge canal.
WILDWOOD LAKE	Park: No plant or algae growth observed.
Secchi: 6.5'	Dam: No plant or algae growth observed.
Water Level: 499.8	Launch: Trace benthic filamentous algae.
16.1°C	

NOTES:

1. **The spring aluminum sulfate treatment was performed today at Wildwood Lake. Treatment completed at 12:00.**
2. **A boat survey of Mountain Lake was performed last week, and overall the lake is looking good. Coontail was found adjacent to the mouth of the canal, and in the south western portion of the lake, with some occurences of sparse growth. Curly-leaf pondweed was developing across the northern lake basin area north of Island Beach.**
3. **Overall all of the small basins are looking good at this time.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Bob Schindler, Solitude Lake Management
DATE: 4/29/2019
INSPECTION DATE: 4/29/2019

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 12:10 PM)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	16.2	8.18
2’	15.7	8.14
4’	15.6	8.11
6’	15.4	8.04
8’	15.3	7.93
10’	15.2	7.95
12’	15.1	7.92
13’	15.1	6.58

BIRCHWOOD LAKE	Outlet Cove: Growth of bassweed has remained consistent adjacent to the outlet. At this time trace growth of curly-leaf pondweed, ribbon-leaf pondweed and low water milfoil were present in areas of the swim lanes.
Secchi: 8.75’	Inside Swim Lane: At this time trace growth of curly-leaf pondweed, ribbon-leaf pondweed and low water milfoil were present in areas of the swim lanes.
Aeration: Beach only	Outside Swim Lane: No plant or algae growth observed.
Fecal Sample: NA	Beach: No plant or algae growth observed.
SUNSET LAKE	Launch: No plant or algae growth observed.
Secchi: est. 6’	Outlet: Trace patches of filamentous algae were observed along the shoreline edge.
	Sunset Road Cove: A few trace densities of surface filamentous algae.
	Inlet Cove: No plant or algae growth observed.
CRYSTAL LAKE	Birchwood Outlet: Trace to sparse growth of bassweed was observed along the shoreline edge.
	Lake Shore Road Shoreline: No plant or algae growth observed.
Secchi: est. 8’	Crystal Outlet: Filamentous algae was present at sparse density along the bottom of the lake along the dam edge.

OLIVE POND **Dissolved Oxygen: 7.74 mg/L.**	Secchi: est. 5’ Temp: 16.7°C Overall the pond looks good with only traces of curly-leaf pondweed observed.
SHADOW LAKE Aeration: YES **Dissolved Oxygen: 8.42 mg/L.**	Secchi: est. 5’ No pond or algae growth was observed at this time. Pond looks good.
COVE POND **Dissolved Oxygen: 10.54 mg/L.**	Secchi: est. 3.5’ Trace densities of curly-leaf pondweed was observed in areas of the cove.
GRUNDEN’S POND **Dissolved Oxygen: 13.68 mg/L.**	Secchi: est. 5’ Trace to sparse densities of filamentous algae along portions of the lake surface. Trace to sparse density curly-leaf pondweed also present scattered throughout the pond.
MOUNTAIN LAKE	Cove End: No plant or algae growth observed.
Secchi: 7.75’	Sailboat Cove: Trace to sparse density growth of curly-leaf pondweed and bassweed could be seen in areas of the cove.
Water Level: 499.65	Outlet Cove: No plant or algae growth observed.
15.8 °C	Midvale Launch: Curly-leaf pondweed observed growing around the dock.
Fecal Sample: NA	Island Beach: Trace amounts of Spirogyra, and dormant plant stems along rock wall and around bridge canal. A few stems of curly-leaf pondweed developing in the channel.
WILDWOOD LAKE	Park: No plant or algae growth observed.
Secchi: est. 12’	Dam: No plant or algae growth observed.
Water Level: 499.6	Launch: Trace benthic filamentous algae.
16.0°C	

NOTES:

1. **Wildwood aluminum sulfate treatment successful at providing an excellent aesthetic appearance for lake. Lake looks great.**
2. **Additional treatments for lakes will likely not occur until week of May 6th due to persistent rain and storms anticipated for the entirety of the week. Water temperatures also remaining consistently in the high 50’s to low 60’s delaying nuisance density plant and algae growth.**
3. **Birchwood lake will be scheduled week of May 6th for herbicide treatment and bottom probing and bacterial treatment adjacent to the outlet.**
4. **Crystal Lake will be thoroughly surveyed on May 6th, and anticipate curly-leaf pondweed treatment.**
5. **Olive Pond will be treated on May 6th as needed including an application for nutrient remediation, as well as bacterial enhancement treatment for Olive and Shadow Lake will be initiated.**

6. **Cove pond is anticipated to require herbicide treatment on May 6th for curly-leaf pondweed.**
7. **Grundens Pond is scheduled for treatment on Tuesday April 30th.**
8. **Mountain Lake will be thoroughly surveyed on May 6th, and herbicide treatment is anticipated for that week.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Bob Schindler, Solitude Lake Management
DATE: 5/6/2019
INSPECTION DATE: 5/7/2019

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 2:30 PM)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	16.7	8.77
2’	16.8	8.79
4’	16.6	8.63
6’	16.5	8.53
8’	16.4	8.50
10’	16.3	8.49
12’	16.1	8.33
13’	15.9	7.84

BIRCHWOOD LAKE	Outlet Cove: Growth of bassweed has remained consistent adjacent to the outlet.
Secchi: 8.75’	Inside Swim Lane: At this time trace growth of curly-leaf pondweed and low water milfoil were present in areas of the swim lanes. Ribbon leaf pondweed has expanded to sparse density in portions of the swim lanes.
Aeration: Bob	Outside Swim Lane: Trace density curly-leaf pondweed observed adjacent to and just outside of the swim lanes.
Fecal Sample: NA	Beach: No plant or algae growth observed.
SUNSET LAKE	Launch: No plant or algae growth observed.
Secchi: est. 6.5’	Outlet: Trace patches of filamentous algae were observed along the shoreline edge.
	Sunset Road Cove: A few trace densities of surface filamentous algae.
	Inlet Cove: Trace density filamentous algae and water lilies breaching the water’s surface.
CRYSTAL LAKE	Birchwood Outlet: Trace to sparse growth of bassweed and water lilies were observed along the shoreline edge.
	Lake Shore Road Shoreline: Sparse to moderate density bassweed and curly-leaf pondweed observed throughout the upper end of the lake.

Secchi: 8.75’	Crystal Outlet: Filamentous algae was present at sparse density along the bottom of the lake along the dam edge.
OLIVE POND **Dissolved Oxygen: 7.96 mg/L.**	Secchi: est. 5’ Temp: 19.6°C Overall the pond looks good with only traces of curly-leaf pondweed observed.
SHADOW LAKE Aeration: YES **Dissolved Oxygen: 9.41 mg/L.**	Secchi: est. 5’ No pond or algae growth was observed at this time. Pond looks good, with only tree pollen and seeds collection along areas of the pond surface.
COVE POND **Dissolved Oxygen: 8.61 mg/L.**	Secchi: est. 3.5’ Moderate density curly-leaf pondweed observed in the upper end of the pond. Otherwise, pond looks good at this time.
GRUNDEN’S POND **Dissolved Oxygen: 7.48 mg/L.**	Secchi: est. 5’ Trace to sparse density curly-leaf pondweed present in the central area of the pond. No filamentous algae observed at this time.
MOUNTAIN LAKE	Cove End:
Secchi: 7.5’	Sailboat Cove:
Water Level: 499.75	Outlet Cove:
17.4 °C	Midvale Launch:.
Fecal Sample: NA	Island Beach:
WILDWOOD LAKE	Park: Trace density filamentous algae along the shoreline edge.
Secchi: est. 9’	Dam: No plant or algae growth observed.
Water Level: 499.8	Launch: Trace benthic filamentous algae.
16.8°C	

NOTES:

1. **A boat survey of Mountain Lake was performed, and survey details provided in separate report. Mountain Lake will be treated afternoon of 5/7.**
2. **Crystal Lake was supporting sparse to moderate curly-leaf pondweed in approximately fifty-percent of the basin. Tribune was applied on 5/6 for pondweed management. See attached survey report.**
3. **Cove Pond will need an herbicide treatment, and will be scheduled soon.**
4. **Grundens pond will be treated again week of 5/13.**
5. **Olive and Shadow Ponds looked good. Tribune was applied for curly-leaf pondweed to Olive Pond, as well as bacterial enhancement.**
6. **Birchwood Lake will be treated afternoon of 5/7.**
7. **Wildwood Lake supporting only trace density filamentous algae, overall looks good at this time.**
8. **Sunset Lake looks good overall, with generally trace algae and lilies.**

9. **Birchwood Lake outlet area would be a good candidate for project. Shoreline clearing of organic debris. Relocate diffuser closer to center of area. Remove cattail biomass. Hand pull knotweed stems before they grow beyond the ability for hand pulling.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Bob Schindler, Solitude Lake Management
DATE: 5/14/2019
INSPECTION DATE: 5/13/2019

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 2:30 PM)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	16.1	8.54
2’	16.1	8.41
4’	16.1	8.40
6’	16.1	8.35
8’	16.1	8.36
10’	16.1	8.36
12’	16.1	8.32
13’	15..9	8.24

BIRCHWOOD LAKE	Outlet Cove: Growth of bassweed has remained consistent adjacent to the outlet.
Secchi: 7.5’	Inside Swim Lane: Curly-leaf pondweed has dropped from the water column from last week’s herbicide treatment. Low water milfoil and ribbon-leaf pondweed is showing impact, and also settling to the lake bottom.
Aeration: ON	Outside Swim Lane: Traces of bassweed still present along shoreline, while pondweed growth has been controlled.
Fecal Sample: NA	Beach: No plant or algae growth observed.
SUNSET LAKE	Launch: No plant or algae growth observed.
Secchi: est. 6.5’	Outlet: Trace patches of filamentous algae were observed along the shoreline edge.
	Sunset Road Cove: A few trace densities of surface filamentous algae.
	Inlet Cove: Trace density filamentous algae and water lilies breaching the water’s surface.
CRYSTAL LAKE	Birchwood Outlet: Trace to sparse growth of bassweed and water lilies were observed along the shoreline edge.
	Lake Shore Road Shoreline: Sparse to moderate density bassweed observed throughout the upper end of the lake.
Secchi: 7.75’	Crystal Outlet: Filamentous algae was present at sparse

	density along the bottom of the lake along the dam edge.
OLIVE POND **Dissolved Oxygen: 5.33 mg/L.**	Secchi: est. 5’ Temp: 14.5°C Overall the pond looks good with no plant or algae growth observed.
SHADOW LAKE Aeration: YES **Dissolved Oxygen: 6.85 mg/L.**	Secchi: est. 5’ No plant or algae growth was observed at this time.
COVE POND **Dissolved Oxygen: 6.49 mg/L.**	Secchi: est. 3’ Moderate density curly-leaf pondweed observed in the upper end of the pond. Otherwise, pond looks good at this time.
GRUNDEN’S POND **Dissolved Oxygen: 8.48 mg/L.**	Secchi: est. 5’ Trace to sparse density curly-leaf pondweed present in the central area of the pond. No filamentous algae observed at this time.
MOUNTAIN LAKE	Cove End: A trace amount of filamentous algae along the shoreline edge, but overall the area looks good.
Secchi: 6.5’	Sailboat Cove: There was no observed algae growth, and the only plant growth observed was bassweed along the shoreline edge that was showing impact from last week’s herbicide treatment.
Water Level: 499.85	Outlet Cove: No plant or algae growth observed.
16.2 °C	Midvale Launch: Traces of bassweed observed showing impact from herbicide treatment. Otherwise no plant or algae growth observed.
Fecal Sample: NA	Island Beach: A trace amount of curly-leaf pondweed and milfoil present in the canal, but overall from this vantage the lake looks good.
WILDWOOD LAKE	Park: Trace density filamentous algae along the shoreline edge.
Secchi: est. 10’	Dam: No plant or algae growth observed.
Water Level: 499.85	Launch: Trace benthic filamentous algae.
16.2°C	

NOTES:

1. **Cove Pond dissolved oxygen was suppressed during treatment visit last week, and will be visited again later this week to assess and perform treatment.**
2. **Grunden’s pond will have a supplemental application this week for curly-leaf pondweed.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Bob Schindler, Solitude Lake Management
DATE: 5/23/2019
INSPECTION DATE: 5/20/2019

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 1:45 PM)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	19.4	9.75
2’	19.4	9.32
4’	19.3	9.09
6’	19.3	9.06
8’	19.2	8.98
10’	18.8	8.97
12’	18.1	8.91
13’	17.6	8.14

BIRCHWOOD LAKE	Outlet Cove: Growth of bassweed has remained consistent adjacent to the outlet.
Secchi: 8.75’	Inside Swim Lane: Trace densities of ribbon leaf pondweed along a small portion of the edge of the swim lanes.
Aeration: ON	Outside Swim Lane: Traces of bassweed still present along shoreline, while pondweed growth has been controlled.
E Coli Sample: collected	Beach: No plant or algae growth observed.
SUNSET LAKE	Launch: No plant or algae growth observed.
Secchi: est. 5.75’	Outlet: Trace patches of filamentous algae were observed along the shoreline edge.
	Sunset Road Cove: A few trace densities of surface filamentous algae.
	Inlet Cove: Trace density filamentous algae and water lilies across the water’s surface.
CRYSTAL LAKE	Birchwood Outlet: Trace to sparse growth of bassweed and water lilies were observed along the shoreline edge.
	Lake Shore Road Shoreline: Sparse to moderate density bassweed observed throughout the upper end of the lake.
Secchi: 7.75’	Crystal Outlet: Filamentous algae was present at sparse density along the bottom of the lake along the dam edge.

OLIVE POND **Dissolved Oxygen: 6.57 mg/L.**	Secchi: est. 3.5' Temp: 18.7°C Overall the pond looks good with no plant or algae growth observed.
SHADOW LAKE Aeration: YES **Dissolved Oxygen: 7.48 mg/L.**	Secchi: est. 4' Trace to sparse density filamentous algae along a small portion of the shoreline edge.
COVE POND **Dissolved Oxygen: 5.84 mg/L.**	Secchi: est. 3' Moderate density curly-leaf pondweed observed in the upper end of the pond. Otherwise, pond looks good at this time.
GRUNDEN'S POND **Dissolved Oxygen: 10.28 mg/L.**	Secchi: est. 4.5' At this time no filamentous algae for plant growth was observed.
MOUNTAIN LAKE	Cove End: A trace amount of filamentous algae along the shoreline edge, but overall the area looks good.
Secchi: 6.25'	Sailboat Cove: There was no observed algae growth, and the only plant growth observed was bassweed along the shoreline edge.
Water Level: 499.6	Outlet Cove: No plant or algae growth observed.
18.4 °C	Midvale Launch: Traces of bassweed observed showing impact from herbicide treatment.
E Coli Sample: collected	Island Beach: A trace amount of filamentous algae observed in the canal channel. Overall, area looks good.
WILDWOOD LAKE	Park: Sparse density filamentous algae along the shoreline edge.
Secchi: est. 9.5'	Dam: Sparse filamentous algae along shoreline edge.
Water Level: 499.6	Launch: Sparse to moderate amounts of filamentous algae along the shoreline edge.
18.5°C	

NOTES:

1. **Cove Pond was treated for curly-leaf pondweed on May 16th.**
2. **Wildwood Lake was treated for filamentous algae on May 20th.**
3. **Shadow Lake will need a treatment week of 5/28.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Bob Schindler, Solitude Lake Management
DATE: 5/29/2019
INSPECTION DATE: 5/28/2019

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 12:45 PM)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	22.0	7.31
2’	22.0	7.21
4’	22.0	7.15
6’	22.0	7.18
8’	22.0	7.18
10’	22.0	7.08
12’	22.0	
13’		

BIRCHWOOD LAKE	Outlet Cove: Bassweed is still present at this area, although densities have declined.
Secchi: 7.75’	Inside Swim Lane: Overall area looks good with only a few remnant stems of ribbon-leaf pondweed along the edge.
Aeration: ON	Outside Swim Lane: Traces of bassweed present along shoreline.
Fecal Sample: NA	Beach: No plant or algae growth observed.
SUNSET LAKE	Launch: Trace density filamentous algae growth.
Secchi: est. 6.5’	Outlet: Trace patches of filamentous algae were observed along the shoreline edge.
	Sunset Road Cove: A few trace densities of surface filamentous algae.
	Inlet Cove: Trace to sparse density filamentous algae and water lilies breaching the water’s surface.
CRYSTAL LAKE	Birchwood Outlet: Trace to sparse growth of bassweed and water lilies were observed along the shoreline edge.
	Lake Shore Road Shoreline: Sparse to moderate density bassweed observed throughout the upper end of the lake.
Secchi: 7.5’	Crystal Outlet: No plant or algae growth observed at this time.

OLIVE POND **Dissolved Oxygen: 6 mg/L.**	Secchi: est. 4' Temp: 21°C A few sparse patches of filamentous algae growth on the surface.
SHADOW LAKE Aeration: YES **Dissolved Oxygen: 7 mg/L.**	Secchi: est. 4' Sparse density filamentous algae were present in patches, mostly along the northern shoreline, with a few scattered patches in the central area.
COVE POND **Dissolved Oxygen: 5 mg/L.**	Secchi: est. 3' Overall pond looks good at this time with no observed plant or algae growth.
GRUNDEN'S POND **Dissolved Oxygen: 7 mg/L.**	Secchi: est. 5' Overall, pond looks good at this time with no observed plant or algae growth.
MOUNTAIN LAKE	Cove End: At this time sparse densities of filamentous algae were present along portions of the shoreline edge.
Secchi: 6.75'	Sailboat Cove: At this time only a trace amount of filamentous algae was observed.
Water Level: 499.3	Outlet Cove: Trace amounts of filamentous algae were present along the adjacent shoreline areas.
20 °C	Midvale Launch: No plant growth was observed at this time. Filamentous algae were found growing along a small portion of the adjacent shoreline edge.
E Coli Sample: Collected	Island Beach: Growth of filamentous algae was developing within the channel, and along portions of the shoreline edge. The most abundant growth was within the cove south of the beach.
WILDWOOD LAKE	Park: Trace density filamentous algae along the shoreline edge.
Secchi: est. 9'	Dam: Trace to sparse density filamentous algae present along most of the dam shoreline.
Water Level: 499.3	Launch: Trace to sparse amounts of filamentous algae along a significant portion of the shoreline edge.
20°C	

NOTES:

1. **Cove pond looks good following the previous herbicide treatment.**
2. **Grundens pond looks good at this time, and maintains a full pool elevation from the excessive rain.**
3. **Olive and Shadow ponds are both supporting trace to sparse amounts of filamentous algae and will be treated by early next week once weather improves and flow declines.**

4. **Mountain Lake overall looks good with the exceptions of the shoreline infestations of filamentous algae growth. Mountain Lake will be treated by the end of this week.**
5. **Wildwood Lake continues to support nuisance densities of filamentous algae. Wildwood Lake will be treated again on Monday once the appropriate between treatment intervals for treatment have lapsed.**
6. **Birchwood Lake looks good within the recreational areas; however, growth of water lilies is increasing in the upper end of the pond. An initial herbicide treatment for lilies will be conducted in mid-June.**
7. **Crystal Lake looks good at this time.**
8. **Sunset Lake overall looks good, but will be a focus of attention on Monday as well with treatments to be performed as needed.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Bob Schindler, Solitude Lake Management
DATE: 6/4/2019
INSPECTION DATE: 6/3/2019

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 11:50 AM)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	22.2	4.95
2’	22.1	4.52
4’	22.1	4.64
6’	22.0	4.47
8’	22.0	4.38
10’	21.9	4.32
12’	21.8	3.54
13’	21.7	3.18

BIRCHWOOD LAKE	Outlet Cove: Growth of bassweed has remained consistent adjacent to the outlet.
Secchi: 8.75’	Inside Swim Lane: Only traces of plant stems observed in swim lane area. Pollen accumulating along portions of the shoreline and within docks.
Aeration: ON	Outside Swim Lane: Traces of bassweed still present along shoreline, while pondweed growth has been controlled.
E. Coli: Collected	Beach: No plant or algae growth observed.
SUNSET LAKE	Launch: No plant or algae growth observed.
Secchi: est. 6.75’	Outlet: Trace patches of filamentous algae were observed along the shoreline edge.
	Sunset Road Cove: A few trace densities of surface filamentous algae.
	Inlet Cove: Trace density filamentous algae and water lilies breaching the water’s surface.
CRYSTAL LAKE	Birchwood Outlet: Trace to sparse growth of bassweed and water lilies were observed along the shoreline edge.
	Lake Shore Road Shoreline: Sparse to moderate density bassweed observed throughout the upper end of the lake.
Secchi: 8.25’	Crystal Outlet: No plant or algae growth observed at this time.

OLIVE POND **Dissolved Oxygen: 5.94 mg/L.**	Secchi: est. 4’ Temp: 22.9°C Overall the pond looks good with only a trace amount of surface filamentous algae.
SHADOW LAKE Aeration: YES **Dissolved Oxygen: 6.24 mg/L.**	Secchi: est. 5’ At this time only traces of filamentous algae along the northern shoreline. Pond improved since previous survey.
COVE POND **Dissolved Oxygen: 5.34 mg/L.**	Secchi: est. 3’ No plant or algae growth observed at this time.
GRUNDEN’S POND **Dissolved Oxygen: 7.48 mg/L.**	Secchi: est. 5’ No filamentous algae or plant growth observed at this time. Overall pond looks good.
MOUNTAIN LAKE	Cove End: A trace amount of filamentous algae along the shoreline edge, but overall the area looks good.
Secchi: 7.25’	Sailboat Cove: No plant or algae growth observed at this time.
Water Level: 499.7	Outlet Cove: No plant or algae growth observed.
16.2 °C	Midvale Launch: Traces of bassweed observed showing impact from herbicide treatment. Otherwise no plant or algae growth observed.
Fecal Sample: NA	Island Beach: A trace amount of milfoil present in the canal, but overall from this vantage the lake looks good.
WILDWOOD LAKE	Park: Trace to sparse amounts of filamentous algae present.
Secchi: est. 6.25’	Dam: Sparse algae growth along most of the dam edge.
Water Level: 499.7	Launch: Sparse to moderate filamentous algae along the shoreline, and open water. Pondweed and naiad developing in shallow areas of the lake.
21.5°C	

NOTES:

1. **Cove Pond and Grundens Pond look good.**
2. **Olive and Shadow improved since the previous survey. Treatment will likely be required early next week.**
3. **Wildwood Lake was treated on June 3rd for filamentous algae control. This lake will need an herbicide treatment within the next two weeks.**
4. **Crystal and Mountain look good at this time.**
5. **Sunset Lake still supports favorable growth, but will need a herbicide treatment soon.**
6. **Birchwood Lake will be treated for water lily control around mid-June.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Emily Mayer, Solitude Lake Management
DATE: 06/11/19
INSPECTION DATE: 06/10/19

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 10:40AM)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	22.4	6.74
2’	22.5	6.64
4’	22.5	6.61
6’	22.5	6.61
8’	22.6	6.58
10’	22.6	6.55
12’	22.5	4.84
13’		

BIRCHWOOD LAKE	Outlet Cove: Trace to sparse amounts of rooted Bassweed observed. Surface looked clean and clear.
Secchi: 5.0’	Inside Swim Lane: Traces of floating creeping bladderwort and tree debris was observed in the swim lanes.
Aeration: ON	Outside Swim Lane: A sparse patch of Bassweed was observed. Traces of benthic filamentous algae were observed along the rocks.
E. Coli Sample: 10:42 am	Beach: Clean and clear.
SUNSET LAKE	Launch: Clean and clear.
Secchi: 5.0’	Outlet: Sparse to moderate amounts of Bassweed were observed along with heavy amount of leaf litter. Traces of benthic filamentous algae was observed.
	Sunset Road Cove: Sparse amounts of white lilies were observed. Water looked slightly turbid.
	Inlet Cove: Traces of benthic filamentous algae were observed. Water looked turbid.
CRYSTAL LAKE	Birchwood Outlet: Moderate amounts of white lilies along with sparse patches of watershield were observed. Moderate amounts of rooted Bassweed was observed.
	Lake Shore Road Shoreline: Traces of filamentous algae were observed. Heavy amount of leaf litter lined the main

	shorelines. Spare amounts of benthic filamentous algae was observed, along with floating pieces of Bassweed.
Secchi: 6.0’	Crystal Outlet: Floating clumps of benthic filamentous algae were observed at the surface. Open water looked clean and clear.
OLIVE POND **Dissolved Oxygen: 4.25 mg/L.**	Secchi: 3.5’ Olive pond had floating tree debris and pollen on the surface. Pond looked slightly green.
SHADOW LAKE Aeration: ON **Dissolved Oxygen: 8.19 mg/L.**	Secchi: 3.5’ Heavy leaf litter lined the main shorelines. Open water looked clean and clear.
COVE POND **Dissolved Oxygen: 8.23 mg/L.**	Secchi: 4’ Water looked slightly turbid. No plant or algae growth was observed.
GRUNDEN’S POND **Dissolved Oxygen: 7.32 mg/L.**	Secchi: 3’ Water looked very turbid.
MOUNTAIN LAKE	Cove End: Traces of decaying pondweed was observed. Right side of bridge: Trace to sparse amounts of decaying filamentous algae were observed along the shoreline. Left side of the bridge: Clean and clear.
Secchi: 7’	Sailboat Cove: Clean and clear.
Water Level: 499.7	Outlet Cove: Clean and clear.
	Midvale Launch: Traces of rooted coontail were observed along with heavy leaf litter lining the shorelines.
E. Coli Sample: 12:15pm	Island Beach: Clean and clear.
WILDWOOD LAKE	Park: Sparse amounts of southern naiad were observed along the dock. Traces of decaying curly leaf pondweed were observed.
Secchi: 6’	Dam: Clean and clear.
Water Level: 499.7	Launch: Traces of benthic filamentous algae were observed along the shorelines.

NOTES:

1. **E. Coli samples were collected at both swimming beaches, results will be delivered 6/11/19.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Emily Mayer, Solitude Lake Management
DATE: 6/17/19
INSPECTION DATE: 6/17/19

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 9:30AM)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	21.8	6.46
2’	21.7	6.37
4’	21.7	6.30
6’	21.7	6.36
8’	21.7	6.32
10’	21.6	6.00
12’	21.4	4.80
13’		

BIRCHWOOD LAKE	Outlet Cove: Trace amounts of tree debris observed. Traces of creeping bladderwort and bassweed were also observed.
Secchi: 5.5’	Inside Swim Lane: Floating pieces of tree debris and pollen on the surface was observed. Otherwise the swim lanes were clear of any algae and plant growth.
Aeration: ON	Outside Swim Lane: Trace amounts of white lilies were observed. A light amount of pollen was observed on the surface.
E. Coli Sample: 9:49AM	Beach: Clean and clear.
SUNSET LAKE	Launch: Clean and clear.
Secchi: 4.5’	Outlet: Sparse to moderate amounts of flowering bassweed was observed along the shoreline, extending out by 2 to 3 feet towards the open water.
	Sunset Road Cove: Trace sized patches of white lilies were observed. Water appeared to be turbid.
	Inlet Cove: Water was tinted green and turbid.
CRYSTAL LAKE	Birchwood Outlet: Moderate amounts of watershield and flowering bassweed were observed. Moderate amounts of white lilies were also observed at the outlet.
	Lake Shore Road Shoreline: Traces of benthic filamentous algae was observed floating at surface. Fragments of

	bassweed and leaf litter were also observed.
Secchi: 6.0’	Crystal Outlet: Traces of benthic filamentous algae was observed at the surface and on the rocks.
OLIVE POND **Dissolved Oxygen: 6.30 mg/L.**	Secchi: 4.0’est A light coverage of pollen was observed on the surface of Olive Pond. A heavy amount of leaf litter was observed along the main shorelines.
SHADOW LAKE Aeration: ON **Dissolved Oxygen: 4.43 mg/L.**	Secchi: 3.0’ Heavy leaf litter was observed along the main shorelines. A light film of tree pollen was observed on the surface in the open water.
COVE POND **Dissolved Oxygen: 4.72 mg/L.**	Secchi: 3.0’ Open water was turbid throughout the pond.
GRUNDEN’S POND **Dissolved Oxygen: 11.24 mg/L.**	Secchi: 2.5’ Traces of benthic filamentous algae were observed. Water appeared to be very turbid throughout the pond.
MOUNTAIN LAKE	Cove End: Clean and clear. Right side of bridge: Traces of rooted bassweed were observed. Left side of the bridge: Traces of rooted bassweed were observed along with decaying patches of filamentous algae.
Secchi: 6.5’	Sailboat Cove: Clean and clear.
Water Level: 499.9	Outlet Cove: Clean and clear.
	Midvale Launch: Clean and clear.
E. Coli Sample: 11:16AM	Island Beach: Traces of rooted Eurasian watermilfoil were observed on the right side of the bridge leading to Island Beach. However, Island Beach was clean and clear.
WILDWOOD LAKE	Park: Sparse to moderate amounts of southern naiad and decaying curly-leaf pondweed were observed.
Secchi: 6.5’	Dam: Clean and clear.
Water Level: 499.9	Launch: Clean and clear.

NOTES:

1. **<u>No fanwort</u> was observed in canal based off of visual observation. Traces of rooted curly-leaf pondweed were observed. An on-the-water survey via kayak or canoe will be performed within in the next two weeks to further confirm visual observations.**
2. **E. Coli samples were collected today (06/17/19). Results to follow.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Emily Mayer, Solitude Lake Management
DATE: 06/25/19
INSPECTION DATE: 06/24/19

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 9:20am)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	22.1	5.08
2’	22.2	5.13
4’	22.1	4.98
6’	22.0	4.69
8’	22.0	4.63
10’	21.6	3.07
12’		
13’		

BIRCHWOOD LAKE	Outlet Cove: Sparse amounts of bassweed were observed. A light film of pollen was observed on the surface.
Secchi: 5.5’	Inside Swim Lane: Clear of plant and algae growth.
Aeration: ON	Outside Swim Lane: Trace amounts of white lilies and watershield were observed.
E. Coli Sample: 9:25 am	Beach: Clean and clear.
SUNSET LAKE	Launch: Trace sized patches of white lilies scattered throughout the open water.
Secchi: 5.0’	Outlet: Moderate to sparse amounts of bassweed were observed.
	Sunset Road Cove: Moderate to dense amounts of bassweed were observed throughout the area. Scattered trace sized patches of white lilies were observed.
	Inlet Cove: Water appeared to be turbid.
CRYSTAL LAKE	Birchwood Outlet: A moderate amount of white lilies were observed at the outlet. Trace to sparse amounts of watershield patches were observed along the lilies.
	Lake Shore Road Shoreline: A heavy amount of leaf litter

	was observed. Traces of filamentous algae were also observed. Moderate to sparse sized patches of bassweed were observed.
Secchi: 6.0’	Crystal Outlet: Clean and clear.
OLIVE POND **Dissolved Oxygen: 4.89 mg/L.**	Secchi: 2.5’ Water was tinted green and appeared to be turbid. A layer of tree pollen was observed on the surface.
SHADOW LAKE Aeration: ON **Dissolved Oxygen: 7.64 mg/L.**	Secchi: 3.0’ Heavy amount of leaf litter was observed along the main shoreline. Open water looked clean and clear.
COVE POND **Dissolved Oxygen: 4.92 mg/L.**	Secchi: 2.0’ Water appeared to be turbid. Otherwise pond was clear of plant and algae growth.
GRUNDEN’S POND **Dissolved Oxygen: 9.99 mg/L.**	Secchi: 2.0’ A light pollen was observed on the surface along with decaying patches of filamentous algae along the dock area. Overall, the water was turbid.
MOUNTAIN LAKE	Cove End: Clear of any plant or algae growth. Right side of bridge: Sparse patches of decaying filamentous algae were observed along the shorelines. Left side of bridge: Trace patches of filamentous algae were observed.
Secchi: 6.0’	Sailboat Cove: Clean and clear.
Water Level: 499.8	Outlet Cove: Clean and clear.
	Midvale Launch: Clean and clear.
E Coli Sample: 11:45	Island Beach: Dock area contained sparse to moderate patches of filamentous algae. Sparse amounts of Eurasian water milfoil were observed alongside the dock. Traces of filamentous algae were observed on the ropes lining the swimming area. The rest of the beach area was clear of plant growth and algae.
WILDWOOD LAKE	Park: Sparse to moderate amounts of southern naiad were observed. Trace amounts of curly-leaf pondweed were also observed.
Secchi: 6.0’	Dam: Traces of decaying filamentous algae were observed.
Water Level: 499.7	Launch: Traces of decaying filamentous algae were also

	observed.

NOTES:

1. **E. Coli samples were collected and delivered to a certified lab. Results to follow.**
2. **Traces of rooted Coontail were observed in the canal. Water appeared to be turbid throughout the canal as well.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Bob Schindler, Solitude Lake Management
DATE: 7/01/2019
INSPECTION DATE: 7/02/2019

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 1:45 PM)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	26.4	4.54
2’	26.0	4.35
4’	25.7	4.38
6’	25.5	4.35
8’	25.2	4.24
10’	25.0	3.59
12’	24.5	2.21
13’	23.7	-

BIRCHWOOD LAKE	Outlet Cove: Light density bassweed observed.
Secchi: 6.25	Inside Swim Lane: Overall, looks good with a trace amount of water starwort along the edge of the wall.
Aeration: ON	Outside Swim Lane: Trace densities of water lilies.
Fecal Sample:collected	Beach: No plant or algae growth observed.
SUNSET LAKE	Launch: White water lilies observed in the open water.
Secchi: est. 5.75’	Outlet: Sparse bassweed present, although plants showing signs of previous treatment.
	Sunset Road Cove: Bassweed showing signs of mortality from treatment.
	Inlet Cove: Trace amount of filamentous algae.
CRYSTAL LAKE	Birchwood Outlet: Sparse to moderate water lilies and water shield along shoreline edge.
	Lake Shore Road Shoreline: Sparse to moderate density bassweed observed throughout the upper end of the lake.
Secchi: est. 8’	Crystal Outlet: Traces of filamentous algae along the rocks.
OLIVE POND **Dissolved Oxygen: 8.43 mg/L.**	Secchi: est. 3.5’ Temp: 28.9°C Overall the pond looks good with light density unicellular algae in the water column.
SHADOW LAKE	Secchi: est. 5’

Aeration: YES **Dissolved Oxygen: 9.25 mg/L.**	Overall appearance is good, although unicellular algae is observed in the water column.
COVE POND **Dissolved Oxygen: 4.15 mg/L.**	Secchi: est. 3' Water appears turbid, but overall appearance is favorable.
GRUNDEN'S POND **Dissolved Oxygen: 11.25 mg/L.**	Secchi: est. 2.5' Unicellular algae present in the water column. Trace amounts of filamentous algae along portions of the shoreline edge.
MOUNTAIN LAKE	Cove End: A trace amount of filamentous algae along the shoreline edge.
Secchi: 7.5'	Sailboat Cove: There was no observed plant or algae growth
Water Level: 499.8	Outlet Cove: No plant or algae growth observed.
27.5 °C	Midvale Launch: Overall looks good with a few individual stems of milfoil growth.
Fecal Sample: NA	Island Beach: Sparse amounts of milfoil in the canal.
WILDWOOD LAKE	Park: Moderate density naiad growth, and traces of filamentous algae along portions of the shoreline, with some areas of moderate growth.
Secchi: est. 8'	Dam: Sparse density filamentous algae growth along the dam edge.
Water Level: 499.8	Launch: Trace to sparse filamentous algae, with moderate density growth of naiad.
28.4°C	

NOTES:

1. **Birchwood Lake water lily treatment will need to be conducted next week with an airboat to perform a suitable treatment.**
2. **Olive Pond was treated 7/1 for unicellular algae.**
3. **Shadow Lake and Grundens Pond will be treated 7/2 for unicellular algae.**
4. **Mountain Lake was treated on 6/28 for filamentous algae. Traces of milfoil were observed during the treatment.**
5. **Wildwood Lake was treated on 7/1 for filamentous algae and naiad control.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Emily Mayer, Solitude Lake Management
DATE: 07/09/19
INSPECTION DATE: 07/08/19

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 9:30AM)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	26.6	2.35
2’	26.6	2.39
4’	26.6	2.40
6’	25.5	2.24
8’	25.3	1.58
10’	25.1	0.39
12’		
13’		

BIRCHWOOD LAKE	Outlet Cove: Sparse amounts of bassweed were observed with trace sized patches of white lilies.
Secchi: 5.0’	Inside Swim Lane: Traces of ribbon-leaf pondweed and creeping bladderwort floating in the some of the swim lanes.
Aeration: ON	Outside Swim Lane: Traces of watershield, white lilies, creeping bladderwort and sparse amounts of common bladderwort were observed.
E. Coli Sample: 9:45am	Beach: Clean and clear.
SUNSET LAKE	Launch: Clean and clear.
Secchi: 5.0’	Outlet: Sparse to moderate amounts of decaying bassweed were observed. Traces of creeping bladderwort was adjacent to the shoreline.
	Sunset Road Cove: Sparse patches of white lilies were observed. Water appeared to be turbid.
	Inlet Cove: Traces of rooted watershield were observed in the turbid water.
CRYSTAL LAKE	Birchwood Outlet: Moderate to sparse patches of white lilies and watershield were observed.
	Lake Shore Road Shoreline: Sparse amounts of bassweed were observed. A heavy amount of leaf litter was observed.
Secchi: 5.0’	Crystal Outlet: Water appeared to be turbid, due to heavy

	rainfall during the inspection. Area was clear of algae and plant growth.
OLIVE POND **Dissolved Oxygen: 4.56 mg/L.**	Secchi: 2.0' Water was very turbid with a light amount of pollen on the surface.
SHADOW LAKE Aeration: ON **Dissolved Oxygen: 5.02 mg/L.**	Secchi: 3.0'est Heavy leaf litter was observed along the main shoreline. Open water looked clean and clear.
COVE POND **Dissolved Oxygen: 4.28 mg/L.**	Secchi: 3.0'est Water appeared to be turbid. Cove Pond was clear of algae and plant growth.
GRUNDEN'S POND **Dissolved Oxygen: 3.89 mg/L.**	Secchi: 2.0' Sparse to moderate decaying filamentous algae patches were scattered throughout the pond. Water appeared to be very turbid.
MOUNTAIN LAKE	Cove End: Road leading to bridge area was closed. Other area of cove end was clear of plant and algae growth.
Secchi: 6.0'	Sailboat Cove: Clean and clear.
Water Level: 499.7	Outlet Cove: Water appeared to be slightly turbid. Area was clear of plant and algae growth.
	Midvale Launch: Clean and clear.
E. Coli Sample: 11:30am	Island Beach: Traces of decaying plant matter were observed at the surface near the dock area. Beach area was clean and clear.
WILDWOOD LAKE	Park: Sparse to moderate amounts of rooted naiad species was observed.
Secchi: 5.0'	Dam: Scattered sparse patches of filamentous algae were observed along the dam.
Water Level: 499.7	Launch: Trace to sparse patches of filamentous algae were observed.

NOTES:

1. **E. Coli samples were collected, results to follow.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Emily Mayer, Solitude Lake Management
DATE: 7/16/19
INSPECTION DATE: 7/15/19

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 8:30AM)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	27.6	3.11
2’	27.1	3.23
4’	26.8	2.22
6’	26.8	2.33
8’	25.1	2.04
10’	25.7	1.04
12’		
13’		

BIRCHWOOD LAKE	Outlet Cove: Sparse amounts of rooted bassweed were observed. Traces of common bladderwort and creeping bladderwort were also observed.
Secchi: 6.0’	Inside Swim Lane: All swim lanes are clear of plant and algae growth.
Aeration: ON	Outside Swim Lane: A light film of pollen was observed at the surface. Traces of rooted white lilies and common bladderwort were observed.
Fecal Sample: 08:45 am	Beach: Traces of floating common bladderwort were observed. Otherwise the area was clean and clear.
SUNSET LAKE	Launch: Open water contained scattered patches of white lilies. Launch area was clear of plant and algae growth.
Secchi: 4.0’	Outlet: A film of tree pollen was observed on the surface. Traces of decaying filamentous algae were observed along the main shoreline. Water appeared to be turbid.
	Sunset Road Cove: Trace benthic filamentous algae observed. Sparse scattered patches of white lilies were present.
	Inlet Cove: Trace to sparse benthic filamentous algae observed, with moderate to dense water lilies (both white

	lilies and spatterdock) observed further out in cove.
CRYSTAL LAKE	Birchwood Outlet: Moderate to dense patches of white lilies and watershield observed at the outlet. Along with traces of benthic filamentous algae near the shoreline.
	Lake Shore Road Shoreline: One developed bed of lilies at the tip of island. Sparse amounts of rooted bassweed along the shoreline.
Secchi: 5.5’	Crystal Outlet: Traces of benthic filamentous algae on the rocks. Otherwise open area was clean and clear.
OLIVE POND **Dissolved Oxygen: 5.85 mg/L.**	Secchi: 3.0’ Olive pond looked green overall, and water appeared to be slightly turbid.
SHADOW LAKE Aeration: ON **Dissolved Oxygen: 8.81 mg/L.**	Secchi: 2.5’ Heavy tree debris was observed along the main shoreline. Shadow Lake appears to have an algal bloom going on.
COVE POND **Dissolved Oxygen: 6.42 mg/L.**	Secchi: 3.0’ Small scattered clumps of algae were observed along the shoreline. Water appeared to be turbid.
GRUNDEN’S POND **Dissolved Oxygen: 4.28 mg/L.**	Secchi: 2.0’ Water appears to be turbid. Scattered patches of decaying floating filamentous algae observed near the Boulevard end of the pond.
MOUNTAIN LAKE	Cove End: Bridge closed due to road work and could not access. Other area contains sparse amounts of rooted southern naiad. Open water looks clean and clear.
Secchi: 6.0’	Sailboat Cove: Clean and clear.
Water Level: 499.6	Outlet Cove: Traces of rooted coontail were observed. Area is clean and clear.
	Midvale Launch: Clean and clear of algae and plant growth.
Fecal Sample: 11:30 am	Island Beach: Traces benthic filamentous algae and milfoil were observed in around the dock area. Beach area was clean and clear.
WILDWOOD LAKE	Park: Traces of southern naiad observed. Water looks turbid.
Secchi: 6.5’	Dam: Open water is clear of plant and algae growth. Surface looks good, but water is turbid.
Water Level: 499.6	Launch: Heavy leaf litter was observed along the shoreline. Otherwise area was clean and clear.

NOTES: 1. A treatment will be performed on the lilies at Sunset Lake today (7/16/19).

2. An algaecide treatment will be performed at Shadow Lake (7/16/19).

3. E. Coli samples were collected on 7/15/19, results to follow later today.

SOLITUDE
LAKE MANAGEMENT

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Solitude Lake Management
DATE: 7/22/19
INSPECTION DATE: 7/22/19

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time:)

Depth	Temp. (°C)	D.O. (mg/L)
surface	27.7	2.56
2'	27.8	2.48
4'	27.7	2.50
6'	27.6	2.31
8'	27.4	2.22
10'	27.0	2.03
12'		
13'		

BIRCHWOOD LAKE	Outlet Cove: Sparse common bladderwort observed with some on the surface. Trace creeping bladderwort mixed in with other plants. Trace to sparse bassweed, some nearing the surface along with trace ribbon-leaf pondweed. Trace benthic filamentous algae observed and trace white lilies and water shield on the surface.
Secchi: 7.0'	Inside Swim Lane: Trace white lilies but non-problematic. Trace to sparse ribbon-leaf pondweed patches with bladderworts mixed in.
Aeration: All on	Outside Swim Lane: Trace to sparse white lilies. Trace to sparse common and creeping bladderwort mixed in, with some on the surface. A few scattered patches of ribbon-leaf pondweed were observed.
Fecal Sample: 0811 hrs.	Beach: Clean and clear. Water lilies coming in heavy on shore opposite the beach.
SUNSET LAKE	Launch: Trace benthic filamentous algae observed along with a few floating stems of bass weed. Several patches of submersed plants (likely bassweed and maybe a thin-leaf pondweed) nearing the surface. Could use treatment. Open water has many patches of water lilies that could use touch up treatments if lake is not to be de-watered this fall.

Secchi: 5.0'	Outlet: Along most of the outlet shoreline are patches of submersed weeds nearing/reaching the surface. Most are 10-20 feet in diameter. Treatment recommended.
	Sunset Road Cove: Scattered patches of water lilies and submersed weeds near surface observed in this cove.
	Inlet Cove: Water was turbid and cloudy, receiving some flow from recent rain events. A large patch of filamentous algae observed to the left. Further out in the cove is covered with water lilies.
CRYSTAL LAKE	Birchwood Outlet: Sparse to moderate white lilies at the base of the hill by outlet, with a patch of watershield coming into the right. Trace to sparse bassweed and a thin-leaf type of pondweed nearing the surface in shallows. One non-nuisance patch of water lilies in the open water, along with the usual dense patch of lilies off the island.
	Lake Shore Road Shoreline: Trace benthic filamentous algae along with some bassweed and bladderworts mixed in.
Secchi: 10' est.	Crystal Outlet: Trace benthic filamentous algae. Water is gray-green, but the open water looks good.
OLIVE POND **Dissolved Oxygen: 4.89 mg/L.**	Secchi: 2.5' estimated. Water is turbid. Two patches (10' diameter) of floating filamentous and/or bladderwort observed in the open water. A large tree limb is down, and in the water.
SHADOW LAKE Aeration: On **Dissolved Oxygen: 5.12 mg/L.**	Secchi: 2.0' estimated. The water was still green with a unicellular algae bloom ongoing. A water sample was collected for analysis. Algae accumulating on the shoreline. Treatment recommended.
COVE POND ***Dissolved Oxygen: 5.67 mg/L.***	Secchi: 2.0' estimated. Trace filamentous algae observed, but otherwise the surface looks good. Established water lilies still present along shore on opposite side.
GRUNDEN'S POND **Dissolved Oxygen: 9.33 mg/L.**	Secchi: 2.0' estimated. Water appears low; some exposed shoreline on edges. Filamentous algae observed along Boulevard and along near shoreline among the docks. Treatment recommended, if possible with water depths.
MOUNTAIN LAKE	Cove End: To the right, the cove is covered with at least 30% bright green floating filamentous algae. To the left, in small basin, filamentous algae covers 20% of the surface, but submersed weeds also coming in and nearing the surface. Both areas need a treatment.
Secchi: 7.5'	Sailboat Cove: Surface looks good. Trace to sparse submersed vegetation (naiads or thin-leaf pondweeds) observed on the bottom.
Water Level: 499.5	Outlet Cove: Clean and clear with only trace smartweed observed.

	Midvale Launch: Trace to sparse naiad growth to the left of the dock. Occasional stems of Eurasian water milfoil poking through the naiad growth.
Fecal Sample: 0930 hrs.	Island Beach: Sparse to moderate naiad growth in the shallows around the launch, dock and bridge. A few patches of muskgrass mixed in as well as pondweed growth. Scattered small patches of individual stems of Eurasian water milfoil observed. Southern cove supports some algae on the surface. Beach is clean and clear.
WILDWOOD LAKE	Park: Clean and clear with only trace creeping bladderwort observed.
Secchi: 3.5'	Dam: Clean and clear.
Water Level: 499.5	Launch: Trace benthic filamentous algae.

NOTES:

1. **Treatment of submersed weeds/lilies recommended at Sunset Lake, especially if lake will not be de-watered this fall.**
2. **Shadow Lake needs an algaecide treatment. Unicellular bloom is still ongoing. Collected a sample to conduct counts.**
3. Met and talked to the new residents (moved in over the weekend) that own the house on Shadow Lake where we collect samples. Granted us permission to access the lake shore at this location. Had many questions about the lake. I answered them, and encouraged the residents (TJ and Kristen, IIRC) to attend the December Year-End Summary presentation.
4. **Grunden's Pond needs a treatment for filamentous algae, but the water level appears low.**
5. **Cove End of Mountain Lake (both areas) need an algaecide treatment.**
6. Mountain Lake might need some contact herbicide touch up on the Eurasian water milfoil. We should schedule a detailed late-season survey to (Oct) to confirm systemic treatment for next year (targeting milfoil).
7. E. coli samples collected. Results to follow.

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Bob Schindler, Solitude Lake Management
DATE: 7/31/2019
INSPECTION DATE: 7/29/2019

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 9:45 AM)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	26.9	2.65
2’	26.6	2.25
4’	26.5	2.15
6’	26.3	2.27
8’	26.2	1.43
10’	25.8	0.25
12’	25.1	
13’		

BIRCHWOOD LAKE	Outlet Cove: Trace growth of water lilies.
Secchi: 7.75’	Inside Swim Lane: A few stems of water lilies along the rock wall.
Aeration: Beach ON	Outside Swim Lane: Traces of water lilies along the shoreline edge.
E. Coli: Collected	Beach: No plant or algae growth observed.
SUNSET LAKE	Launch: No plant or algae growth observed.
Secchi: est. 5.5’	Outlet: Sparse to moderate growth of bassweed present.
	Sunset Road Cove:Sparse to moderate bassweed and water lilies.
	Inlet Cove: Sparse density filamentous algae and water lilies.
CRYSTAL LAKE	Birchwood Outlet: Moderate growth of water lilies, bassweed and water shield along the shoreline edge.
	Lake Shore Road Shoreline: Sparse to moderate density bassweed observed throughout the upper end of the lake.
Secchi: 7.75’	Crystal Outlet: Trace density filamentous algae was present along the rip rap of the dam.
OLIVE POND **Dissolved Oxygen: 10.78 mg/L.**	Secchi: est. 2.5’ Temp: 30.0 °C The pond maintains a fair aesthetic appearance, although planktonic algae still at elevated densities in the water

	column.
SHADOW LAKE Aeration: YES **Dissolved Oxygen: 9.71 mg/L.**	Secchi: est. 2.5' At this time, the surface has a light accumulation of planktonic algae, as well as elevated densities in the water column. Overall most of the surface was clear at this time.
COVE POND **Dissolved Oxygen: 7.56 mg/L.**	Secchi: est. 3' No plant or algae growth observed at this time.
GRUNDEN'S POND **Dissolved Oxygen: 8.30 mg/L.**	Secchi: est. 3.5' Overall the pond supports a favorable aesthetic appearance. Traces of filamentous algae were present along certain areas of the shoreline edge due to the water level dropping.
MOUNTAIN LAKE	Cove End: A trace amount of filamentous algae along the shoreline edge, but overall the area looks good.
Secchi: 7.75'	Sailboat Cove: Trace density filamentous algae observed as a few scattered patches of growth.
Water Level: 499.6	Outlet Cove: No plant or algae growth observed.
28.4 °C	Midvale Launch: No plant or algae growth observed.
Fecal Sample: NA	Island Beach: A trace amount of milfoil present in the island beach canal, but overall from this vantage the lake looks good.
WILDWOOD LAKE	Park: No plant or algae growth was observed.
Secchi: est. 9'	Dam:No plant or algae growth observed.
Water Level: 499.55	Launch: Traces of filamentous algae observed in small portions of the shoreline edge. Naiad could be seen along areas of the shoreline edge.
28.6°C	

NOTES:

1. **Birchwood Lake was treated for water lily growth on 7/25.**
2. **Sunset Lake was treated for filamentous algae and water lilies on 7/25.**
3. **Mountain Lake was treated for filamentous algae growth on 7/23.**
4. **Olive pond was treated for algae growth on 7/30.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Emily Mayer, Solitude Lake Management
DATE: 08/06/19
INSPECTION DATE: 08/05/19

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 9:30AM)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	26.4	2.04
2’	26.4	2.00
4’	26.4	0.99
6’	26.4	0.95
8’	26.4	0.51
10’		
12’		
13’		

BIRCHWOOD LAKE	Outlet Cove: Moderate amounts of bassweed were observed. Traces of white lilies and common bladderwort were also observed. A light film of tree pollen was observed on the surface.
Secchi: 4.0’	Inside Swim Lane: Floating fragments of common bladderwort and tree pollen was observed on the surface.
Aeration: ON	Outside Swim Lane: Traces of rooted white lilies and tree pollen was observed.
E. Coli Sample: 9:29am	Beach: Clean and clear.
SUNSET LAKE	Launch: Heavy amount of leaf litter was observed. Trace sized patches of white lilies were observed in the open water.
Secchi: 3.0’	Outlet: Moderate patches of rooted bassweed were observed along the main shoreline. Water appeared to be turbid throughout the lake.
	Sunset Road Cove: Sparse sized patches of white lilies were observed.
	Inlet Cove: Water appears to be turbid. Sparse to moderate rooted white lilies were observed.
CRYSTAL LAKE	Birchwood Outlet: Dense patches of white lilies, watershield, and scattered (moderate) patches of bassweed were observed.
	Lake Shore Road Shoreline: Floating fragments of

	watershield were observed along the main shoreline. Sparse to moderate amounts of rooted bassweed were observed. Sparse amounts of benthic filamentous algae were present topping out at the surface.
Secchi: 4.0’	Crystal Outlet: Moderate patches of benthic filamentous algae were observed topping out at the surface. Water was slightly turbid.
OLIVE POND **Dissolved Oxygen: 1.37 mg/L.**	Secchi: 2.5’ Water appeared to be turbid. Traces of benthic filamentous algae were observed along the shoreline.
SHADOW LAKE Aeration: ON **Dissolved Oxygen: 6.72 mg/L.**	Secchi: 3.5’ Heavy leaf litter was observed along the main shoreline with traces of floating duckweed mixed in. Open water looked clean and clear.
COVE POND **Dissolved Oxygen: 5.92 mg/L.**	Secchi: 3.0’ Water overall looked turbid, no algal or plant growth was observed.
GRUNDEN’S POND **Dissolved Oxygen: 6.62 mg/L.**	Secchi: 2.5’ Moderate patches of both decaying and viable filamentous algae was observed along the main shoreline. Water was turbid and looked green throughout the water column.
MOUNTAIN LAKE	Cove End: Moderate amounts of rooted southern naiad and traces of brittle naiad were present. Open water looked clean and clear.
Secchi: 5.5’	Sailboat Cove: Trace to sparse amounts of rooted Eurasian Water Milfoil starting to top out at the surface was observed.
Water Level: 499.5	Outlet Cove: Traces of coontail were observed. Otherwise area was clean and clear.
	Midvale Launch: Along the main shoreline sparse patches of Eurasian Water Milfoil were observed. Traces of brittle naiad and coontail were also present near the dock area. The open water looked clean and clear.
E. Coli Sample: 11:28am	Island Beach: Dock Area: Sparse to moderate amounts of Eurasian Water Milfoil and Chara species were observed. Traces of rooted coontail, and brittle naiad were also observed. Beach: Clean and clear.
WILDWOOD LAKE	Park: Water looked slightly turbid. Traces of brittle naiad and creeping bladderwort were observed.
Secchi: 5.0’	Dam: Water appeared to be turbid. Area was clear of plant and algae growth.
Water Level: 499.4	Launch: Heavy amounts of leaf litter were observed. Water was turbid.

NOTES:

1. **E. Coli samples were collected on 8/5/19. Results to follow.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Emily Mayer, Solitude Lake Management
DATE: 08/13/19
INSPECTION DATE: 08/12/19

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 9:30am)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	24.9	4.22
2’	24.8	3.70
4’	24.8	3.58
6’	24.8	3.53
8’	24.8	3.50
10’	24.8	0.22
12’		
13’		

BIRCHWOOD LAKE	Outlet Cove: Trace to sparse patches of rooted bassweed were observed. Small patches of white lilies were present in the outlet cove.
Secchi: 6.0’	Inside Swim Lane: A light film of pollen was observed, otherwise lanes were clean and clear.
Aeration: ON	Outside Swim Lane: Traces of common bladderwort were observed. Trace sized patches of white lilies were observed.
Fecal Sample: 9:30am	Beach: Clean and clear.
SUNSET LAKE	Launch: Trace amounts of creeping bladderwort and benthic filamentous algae were present along the shoreline. Scattered patches of white lilies were observed in the open water.
Secchi: 4.0’	Outlet: Moderate amounts of bassweed were observed topping out at the surface. A heavy accumulation of pollen was observed. Water looked turbid overall.
	Sunset Road Cove: Scattered moderate and sparse sized patches were observed along the main shoreline. Water was turbid in this area.
	Inlet Cove: Water was turbid with moderate to dense patches of white lilies leading out to the island.
CRYSTAL LAKE	Birchwood Outlet: Dense patches of white lilies, watershield and bassweed were observed along the shoreline of the

	outlet.
	Lake Shore Road Shoreline: Heavy amounts of leaf litter were observed along the shoreline. Sparse amounts of rooted bassweed were observed. Sparse amounts of benthic filamentous algae were present.
Secchi: 4.0’	Crystal Outlet: Traces of unicellular algae were observed throughout the water column. The open water looked turbid.
OLIVE POND **Dissolved Oxygen: 2.95 mg/L.**	Secchi: 4.0’est Open water looked turbid overall. Traces of creeping bladderwort were observed along the main shoreline. Eastern shoreline appeared to have an accumulation of pollen on the surface.
SHADOW LAKE Aeration: On **Dissolved Oxygen: 4.96 mg/L.**	Secchi: 4.5’ A heavy amount of leaf litter and duckweed was observed along the shoreline. The open water had a light film of tree pollen on the surface.
COVE POND **Dissolved Oxygen: 4.81 mg/L.**	Secchi: 2.0’ Water appeared to have a green tint to it and was turbid overall.
GRUNDEN’S POND **Dissolved Oxygen: 9.95 mg/L.**	Secchi: 1.5’ Decaying filamentous algae was observed along the western shoreline. Traces of spiral fruited pondweed were observed. Water level looked low and turbid.
MOUNTAIN LAKE	Cove End: Moderate amounts of rooted naiad species was observed.
Secchi: 6.0’	Sailboat Cove: Sparse to moderate amounts of Eurasian water milfoil were observed.
Water Level: 499.5	Outlet Cove: Clean and clear.
	Midvale Launch: Sparse amounts of brittle naiad and Eurasian water milfoil were observed.
Fecal Sample: 11:40am	Island Beach: Sparse amounts of rooted chara were observed. Along with scattered sparse and moderate amounts of Eurasian water milfoil. The beach area looked clean and clear.
WILDWOOD LAKE	Park: Traces of brittle naiad were present along the shoreline. Heavy leaf litter was also observed and the open water was turbid.
Secchi: 5.0’	Dam: Water appeared turbid. No plant or algae growth was observed.
Water Level: 499.5	Launch: Heavy amounts of leaf litter were observed along the main shoreline.

NOTES:

1. **Canal water is turbid, but no vascular plant growth was observed.**
2. **Water Chemistry Samples collected at all 9 lakes.**
3. **Algae samples collected at all 9 lakes. Results to follow.**
4. **E. Coli results to follow as well.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Emily Mayer, Solitude Lake Management
DATE: 08/21/19
INSPECTION DATE: 08/19/19

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 9:23am)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	25.8	4.22
2’	25.9	4.18
4’	25.9	4.15
6’	25.9	4.16
8’	25.9	4.17
10’	25.8	3.58
12’		
13’		

BIRCHWOOD LAKE	Outlet Cove: Moderate amounts of rooted bassweed were observed. Sparse amounts of common bladderwort were present. Traces of robbin’s pondweed, white lilies, and creeping bladderwort was observed.
Secchi: 6.25’	Inside Swim Lane: Clean and clear.
Aeration: ON	Outside Swim Lane: Sparse sized white lilies were observed. Moderate patches of rooted bassweed were present. Traces of creeping bladderwort were also observed.
Fecal Sample: 9:30am	Beach: Clean and clear.
SUNSET LAKE	Launch: Trace amounts of creeping bladderwort were observed along the main shoreline. Scattered patches of white lilies were observed in the open water.
Secchi: 3.5’	Outlet: Moderate to dense amounts of bassweed were observed topping out at the surface. A heavy accumulation of pollen was observed. Water looked turbid overall.
	Sunset Road Cove: Scattered moderate and sparse sized patches were observed along the main shoreline. Water was turbid in this area.
	Inlet Cove: Water was turbid with moderate to dense patches of white lilies leading out to the island.
CRYSTAL LAKE	Birchwood Outlet: Dense patches of white lilies, watershield

	and bassweed were observed along the shoreline of the outlet.
	Lake Shore Road Shoreline: Heavy amounts of leaf litter were observed along the shoreline. Sparse amounts of rooted bassweed were observed.
Secchi: 4.0’	Crystal Outlet: No plant or algae growth was observed. The open water looked turbid.
OLIVE POND **Dissolved Oxygen: 3.04 mg/L.**	Secchi: 4.0’est Open water looked turbid overall. Traces of creeping bladderwort were observed along the main shoreline.
SHADOW LAKE Aeration: On **Dissolved Oxygen: 5.64 mg/L.**	Secchi: 4.5’ A heavy amount of leaf litter and duckweed was observed along the shoreline. The open water had a light film of tree pollen on the surface. Water overall looked turbid.
COVE POND **Dissolved Oxygen: 5.34 mg/L.**	Secchi: 3.0’ Water appeared to be turbid overall. No plant or algae growth was observed.
GRUNDEN’S POND **Dissolved Oxygen: 6.72 mg/L.**	Secchi: 1.5’ Decaying filamentous algae was observed along the western shoreline. Traces of spiral fruited pondweed were observed. Water level looked low and turbid.
MOUNTAIN LAKE	Cove End: Sparse to moderate amounts of rooted naiad species was observed. Open water looked clean and clear.
Secchi: 6.0’	Sailboat Cove: Sparse to moderate amounts of Eurasian water milfoil were observed. Traces of filamentous algae were observed near the sailboats.
Water Level: 499.5	Outlet Cove: No plant or algae growth was observed. Water looked turbid.
	Midvale Launch: Sparse to moderate amounts of rooted brittle naiad and Eurasian water milfoil were observed.
Fecal Sample: 11:40am	Island Beach: Sparse to moderate amounts of rooted chara were observed. Along with scattered sparse and moderate amounts of Eurasian water milfoil. The beach area looked clean and clear.
WILDWOOD LAKE	Park: Traces of brittle naiad were present along the shoreline. The open water looked turbid.
Secchi: 3.5’	Dam: Water appeared turbid. No plant or algae growth was observed.
Water Level: 499.5	Launch: Heavy amounts of leaf litter were observed along the main shoreline. Traces of benthic filamentous algae were observed. Water looked turbid in this area.

NOTES:

1. **Overall the canal water looked turbid. Traces of spiny hornwort and leafy pondweed were observed.**
2. **E. Coli results to follow as well.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Bob Schindler, Solitude Lake Management
DATE: **08/26/19**
INSPECTION DATE: **08/28/19**

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 9:15AM)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	24.3	3.61
2’	24.3	3.56
4’	24.3	3.48
6’	24.3	3.44
8’	24.3	3.32
10’	24.4	3.42
12’	24.4	3.37
13’		

BIRCHWOOD LAKE	Outlet Cove: No plant or algae growth observed at this time.
Secchi: 6.75’ Conductivity: 155	Inside Swim Lane: A few stems of water lilies.
Aeration: ON	Outside Swim Lane: Traces of rooted white lilies and tree pollen was observed.
E. Coli Sample: 9:22am	Beach: Clean and clear.
SUNSET LAKE	Launch: Heavy amount of leaf litter was observed. Trace sized patches of white lilies were observed in the open water.
Secchi: 6.5’	Outlet: Moderate patches of rooted bassweed were observed along the main shoreline.
Conductivity: 227	Sunset Road Cove: Sparse sized patches of white lilies were observed.
	Inlet Cove: Sparse to moderate rooted white lilies were observed.
CRYSTAL LAKE	Birchwood Outlet: Dense patches of white lilies, watershield, and scattered (moderate) patches of bassweed were observed.
Conductivity: 273	Lake Shore Road Shoreline: Floating fragments of watershield were observed along the main shoreline. Sparse to moderate amounts of rooted bassweed were observed.
Secchi: 4.75’	Crystal Outlet: Area looks good, but water has a turbind/green appearance.

OLIVE POND **Dissolved Oxygen: 1.73 mg/L.** **Conductivity: 299**	Secchi: 2.75' Water appeared to be turbid. Traces of benthic filamentous algae were observed along the shoreline.
SHADOW LAKE Aeration: ON **Dissolved Oxygen: 4.48 mg/L.**	Secchi: 3.25' Heavy leaf litter was observed along the main shoreline with traces of floating duckweed mixed in. Open water looked clean and clear.
COVE POND **Dissolved Oxygen: 1.42 mg/L.** **Conductivity: 322**	Secchi: 1.5' No plant or algae growth observed, but water looks muddy brown.
GRUNDEN'S POND **Dissolved Oxygen: 7.04 mg/L.**	Secchi: 5' Moderate patches of both decaying and viable filamentous algae was observed along the main shoreline. A few stems of curly-leaf pondweed observed. Water looks clear at this time.
MOUNTAIN LAKE	Cove End: Moderate amounts of rooted southern naiad and traces of brittle naiad were present. Open water looked clean and clear.
Secchi: 4.75'	Sailboat Cove: No plant growth observed at this time, although minor amounts of filamentous algae growth were present.
Water Level: 499.7	Outlet Cove: Traces of coontail were observed. Otherwise area was clean and clear.
Conductivity: 457	Midvale Launch: Along the main shoreline sparse patches of Eurasian Water Milfoil were observed. Traces of brittle naiad and coontail were also present near the dock area. The open water looked clean and clear.
E. Coli Sample: 10:22 am	Island Beach: Dock Area: Sparse to moderate amounts of Eurasian Water Milfoil and Chara species were observed. Traces of rooted coontail, and brittle naiad were also observed. Beach: Clean and clear.
WILDWOOD LAKE	Park: Water looked slightly turbid. Traces of brittle naiad and creeping bladderwort were observed.
Secchi: 6.5'	Dam: Water appeared to be turbid. Area was clear of plant and algae growth.
Water Level: 499.65	Launch: Heavy amounts of leaf litter were observed.
Conductivity: 392	

NOTES:

1. **E. Coli samples were collected on 8/26/19. Results to follow.**
2. **Birchwood Lake has received two extensive water lily treatments over the past month. Results look good with significant open water in the upper area of the lake, and minimal water lily growth remains in the lower part of the lake. At this time, there is a substantial volume of floating organic debris, which should result in a productive fall raking effort. Supplemental water quality sampling has been conducted and will be evaluated in early winter to determine if additional management would be beneficial in improving summer water quality.**
3. **Sunset Lake was treated again this week for water lily growth.**
4. **Crystal Lake was treated this week for planktonic algae growth, as well as water lilies and cattails.**
5. **Olive received an additional dose of bacterial enhancement.**
6. **Mountain Lake is supporting a low density bloom of green and blue-green algae and is scheduled for treatment Thursday 8/29. Some areas of milfoil growth will also be addressed. Based on the observed growth of milfoil over the past couple of weeks, a Sonar application will be recommended in 2020. I know ProCellaCOr has been discussed, but given the great results of the last Sonar treatment, and additional cost of ProcellaCor, Sonar would be the best choice again in 2020.**
7. **Wildwood Lake continues to look good at this time.**
8. **The Dam treatment will also be planned for Thursday 8/29.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Bob Schindler, Solitude Lake Management
DATE: **09/06/19**
INSPECTION DATE: **09/03/19**

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 6:45 PM)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	23.9	4.32
2’	24.0	4.08
4’	23.9	3.92
6’	23.8	3.65
8’	23.7	3.80
10’	23.4	3.13
12’	23.3	2.72
13’		

BIRCHWOOD LAKE	Outlet Cove: No plant or algae growth observed at this time.
Secchi: 7.25’	Inside Swim Lane: A few stems of water lilies.
Aeration: ON	Outside Swim Lane: Traces of rooted white lilies and tree pollen was observed.
E. Coli Sample: NA	Beach: Clean and clear.
SUNSET LAKE	Launch: Trace sized patches of white lilies were observed in the open water. Water lilies showing signs of treatment.
Secchi: 6.25’	Outlet: Moderate patches of rooted bassweed were observed along the main shoreline.
	Sunset Road Cove: Sparse sized patches of white lilies were observed.
	Inlet Cove: Sparse to moderate rooted white lilies were observed.
CRYSTAL LAKE	Birchwood Outlet: Dense patches of white lilies, watershield, and scattered (moderate) patches of bassweed were observed. Water lilies treated showing signs of impact.
	Lake Shore Road Shoreline: Sparse to moderate amounts of rooted bassweed were observed.
Secchi: 5.75	Crystal Outlet: Area looks good at this time.
OLIVE POND	Secchi: 3’

Dissolved Oxygen: 6.81 mg/L.	Traces of benthic filamentous algae were observed along the shoreline. Heavy accumulation of pollen on the surface.
SHADOW LAKE Aeration: ON **Dissolved Oxygen: 6.87 mg/L.**	Secchi: 3.25' Heavy leaf litter was observed along the main shoreline with traces of floating duckweed mixed in. Open water looked clean and clear.
COVE POND **Dissolved Oxygen: 2.15 mg/L.**	Secchi: 1' No plant or algae growth observed, but water looks muddy brown.
GRUNDEN'S POND **Dissolved Oxygen: 7.49 mg/L.**	Secchi: 5' Moderate patches of both decaying and viable filamentous algae was observed along the main shoreline. A few stems of curly-leaf pondweed observed. Water looks clear at this time.
MOUNTAIN LAKE	Cove End: Moderate amounts of rooted southern naiad and traces of brittle naiad were present. Open water looked clean and clear.
Secchi: 6.25	Sailboat Cove: No plant growth observed at this time, although minor amounts of filamentous algae growth were present.
Water Level: 499.6	Outlet Cove: Traces of coontail were observed. Otherwise area was clean and clear.
	Midvale Launch: Along the main shoreline sparse patches of Eurasian Water Milfoil were observed. Traces of brittle naiad and coontail were also present near the dock area. The open water looked clean and clear.
E. Coli Sample: NA	Island Beach: Dock Area: Sparse to moderate amounts of Eurasian Water Milfoil and Chara species were observed. Traces of rooted coontail, and brittle naiad were also observed. Beach: Clean and clear.
WILDWOOD LAKE	Park: Traces of brittle naiad and creeping bladderwort were observed. Overall lake looks good.
Secchi: 6.25'	Dam: Area was clear of plant and algae growth.
Water Level: 499.6	Launch: Heavy amounts of leaf litter were observed.

NOTES:

1. **Supplemental dam treatment will take place during September.**
2. **Grundens pond will likely need an algaecide treatment week of 9/9.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Emily Mayer, Solitude Lake Management
DATE: 09/17/19
INSPECTION DATE: 09/16/19

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 9:23am)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	22.0	5.51
2’	22.0	5.07
4’	22.0	5.00
6’	22.0	4.92
8’	22.0	4.91
10’		
12’		
13’		

BIRCHWOOD LAKE	Outlet Cove: Moderate amounts of rooted bassweed were observed. Trace sized patches of white lilies were also observed.
Secchi: 5.5’	Inside Swim Lane: A light film of pollen was observed on the surface.
Aeration: ON	Outside Swim Lane: Sparse sized white lilies were observed. Moderate patches of rooted bassweed were present.
E.Coli Sample: NA	Beach: Clean and clear.
SUNSET LAKE	Launch: Trace amounts of creeping bladderwort were observed along the main shoreline. Scattered patches of white lilies were observed in the open water.
Secchi: 5.0’	Outlet: Moderate to dense amounts of bassweed were observed topping out at the surface. Traces amounts of white lilies were observed in the open water.
	Sunset Road Cove: Sparse amounts of rooted bassweed were observed. Moderate to sparse patches of flowering bassweed were observed along the main shoreline.
	Inlet Cove: Water was turbid with moderate to dense patches of white lilies leading out to the island.
CRYSTAL LAKE	Birchwood Outlet: Dense patches of white lilies, watershield and bassweed were observed along the shoreline of the

	outlet. Open water looked clean and clear.
	Lake Shore Road Shoreline: Heavy amounts of leaf litter were observed along the shoreline. Sparse amounts of rooted and floating bassweed were also observed.
Secchi: 5.5’	Crystal Outlet: A light amount of pollen was observed accumulating along the main shoreline. Water appeared to be slightly turbid. No plant or algae growth was observed.
OLIVE POND **Dissolved Oxygen: 5.63 mg/L.**	Secchi: 2.25’ A film of green algae was observed on the surface.
SHADOW LAKE Aeration: On **Dissolved Oxygen: 7.36 mg/L.**	Secchi: 4.0’ A heavy amount of leaf litter was observed along the shoreline. Moderate amounts of benthic filamentous algae were observed. Traces of common bladderwort and creeping bladderwort were also observed. Traces of floating filamentous algae were also observed. The open water had a light film of tree pollen on the surface.
COVE POND **Dissolved Oxygen: 4.39 mg/L.**	Secchi: 1.5’ Water appeared to be turbid overall with a light film of pollen at the surface. No plant or algae growth was observed.
GRUNDEN’S POND **Dissolved Oxygen: 8.76 mg/L.**	Secchi: 1.25’ Decaying and viable filamentous algae was observed along the western shoreline. Traces of spiral fruited pondweed were observed. Dense to moderate amounts of filamentous algae and benthic filamentous algae were observed throughout the main shorelines. Water level looked low and turbid.
MOUNTAIN LAKE	Cove End: Moderate amounts of rooted southern naiad was observed. Traces of rooted bassweed were also observed. Open water looked clean and clear. Right side of bridge: Moderate amounts of rooted bassweed were observed. A light amount of pollen was observed on the surface. Left side of bridge: Clean and clear.
Secchi: 6.0’	Sailboat Cove: Sparse amounts of Eurasian water milfoil were observed.
Water Level: 499.5	Outlet Cove: A green film of algae was observed accumulating along the shoreline of the outlet. Open water looked clean and clear.
	Midvale Launch: A green film of algae was observed from the main shoreline extending out to the end of the dock.
E.Coli Sample: NA	Island Beach: Moderate amounts of rooted milfoil was observed. Traces of leafy pondweed was also observed along the shoreline. The beach area looked clean and clear.

WILDWOOD LAKE	Park: Heavy amounts of leaf litter were observed along the main shoreline. Floating moderate patches of brittle naiad were observed.
Secchi: 5.25’	Dam: Clean and clear.
Water Level: 499.4	Launch: Trace amounts of floating brittle naiad were present along the shoreline. The open water looked turbid.

NOTES:

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Bob Schindler, Solitude Lake Management
DATE: 09/26/19
INSPECTION DATE: 09/23/19

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 2:35 pm)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	21.8	5.17
2’	21.6	5.13
4’	21.6	5.18
6’	21.6	5.09
8’	21.5	4.89
10’	21.3	4.68
12’		
13’		

BIRCHWOOD LAKE	Outlet Cove: Moderate amounts of rooted bassweed were observed. Trace sized patches of white lilies were also observed.
Secchi: 6’	Inside Swim Lane: A few stems of water lilies along wall.
Aeration: ON	Outside Swim Lane: Sparse sized white lilies were observed. Moderate patches of rooted bassweed were present.
E.Coli Sample: NA	Beach: Clean and clear.
SUNSET LAKE	Launch: Trace amounts of creeping bladderwort were observed along the main shoreline. Scattered patches of white lilies were observed in the open water.
Secchi: 5.5’	Outlet: Moderate to dense amounts of bassweed were observed topping out at the surface. Traces amounts of white lilies were observed in the open water.
	Sunset Road Cove: Sparse amounts of rooted bassweed were observed. Moderate to sparse patches of flowering bassweed were observed along the main shoreline.
	Inlet Cove: Water was turbid with moderate to dense patches of white lilies leading out to the island.
CRYSTAL LAKE	Birchwood Outlet: Dense patches of white lilies, watershield and bassweed were observed along the shoreline of the outlet. Open water looked clean and clear.

	Lake Shore Road Shoreline: Heavy amounts of leaf litter were observed along the shoreline. Sparse amounts of rooted and floating bassweed were also observed.
Secchi: 5.25’	Crystal Outlet: Water appeared to be slightly turbid. No plant or algae growth was observed.
OLIVE POND **Dissolved Oxygen: 7.84 mg/L.**	Secchi: 3.5’ No plant or algae growth observed. Surface clear.
SHADOW LAKE Aeration: On **Dissolved Oxygen: 8.21 mg/L.**	Secchi: 4.0’ A heavy amount of leaf litter was observed along the shoreline. Moderate amounts of benthic filamentous algae were observed. Traces of common bladderwort and creeping bladderwort were also observed. Open water appears clear at this time.
COVE POND **Dissolved Oxygen: 3.24 mg/L.**	Secchi: 1.25’ Water appeared to be turbid overall with a light film of pollen at the surface. No plant or algae growth was observed.
GRUNDEN’S POND **Dissolved Oxygen: 7.58 mg/L.**	Secchi: 4.5’ Decaying and viable filamentous algae was observed along the western shoreline. Dense to moderate amounts of filamentous algae and benthic filamentous algae were observed throughout the main shorelines. Water level about 15-18 inches low, with good clarity.
MOUNTAIN LAKE	Cove End: Moderate amounts of rooted southern naiad was observed. Traces of rooted bassweed were also observed. Open water looked clean and clear. Right side of bridge: Moderate amounts of rooted bassweed were observed. Left side of bridge: Clean and clear.
Secchi: 6.5’	Sailboat Cove: Sparse amounts of Eurasian water milfoil were observed.
Water Level: 499.4	Outlet Cove: Open water looked clean and clear.
	Midvale Launch: A few stems of milfoil observed, otherwise area looks good.
E.Coli Sample: NA	Island Beach: Moderate amounts of rooted milfoil was observed, although starting to decay from previous weeks herbicide treatment.. Traces of leafy pondweed was also observed along the shoreline. The beach area looked clean and clear.
WILDWOOD LAKE	Park: Heavy amounts of leaf litter were observed along the main shoreline. A few stems of floating naiad observed.
Secchi: 5.25’	Dam: Clean and clear.
Water Level: 499.35	Launch: Trace amounts of floating brittle naiad were present

	along the shoreline. The open water looked turbid.

NOTES:

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Emily Mayer, Solitude Lake Management
DATE: 9/30/19
INSPECTION DATE: 9/30/19

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 1430 hrs)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	20.8	5.36
2’	20.8	5.32
4’	20.8	5.30
6’	20.8	5.33
8’	20.8	4.84
10’	20.6	4.77
12’		
13’		

BIRCHWOOD LAKE	Outlet Cove: Sparse to medium bassweed, some reaching the surface in the cove. Appears to be dying back. Trace benthic filamentous algae and creeping bladderwort mixed in along with sparse white lilies and ribbon-leaf pondweed. A few pads of watershield also noted.
Secchi: 6.5 ft.	Inside Swim Lane: Mostly clean and clear except for a few lily pads at the surface and some non-problematic ribbon-leaf pondweed on the bottom. Sparse to moderate amounts algae covers the bottom.
Aeration: All on	Outside Swim Lane: Trace patches of bassweed, with a few reaching the surface. Bladderworts (both common and creeping) mixed in with traces of ribbon-leaf pondweed. A few scattered water lilies and watershield observed, along with numerous golf ball-sized tufts of floating filamentous algae.
Fecal Sample: NA	Beach: Clean and clear.
SUNSET LAKE	Launch: Water level down 1-2 feet. Scattered lilies in open basin, along with several patches of submersed aquatic vegetation (SAV, probably bassweed) in open water and around docks. Some of it is a nuisance near or at the surface. Possibly needed treatment earlier in the season, and likely

	will require more proactive control in 2020.
Secchi: 4.0 ft. est.	Outlet: Numerous patches of bassweed and other SAV along the shore and around nearby docks. Some observed in the open water, and algae was accumulating around the plants. Lilies observed in the open water. See notes above regarding treatment.
	Sunset Road Cove: About 20 to 30% of the cove was covered with lilies and bassweed at the surface. See treatment notes above.
	Inlet Cove: Most of the cove was de-watered. Water was turbid and shallow. Further out moderate to dense water lilies choked the cove.
CRYSTAL LAKE	Birchwood Outlet: A band of water lilies and watershield was along the shore approximately 20 feet out. Bassweed and other SAV was mixed in. To the right was a patch of cattails (roughly 15 feet in diameter). In the open water a few scattered patches of water lilies observed but otherwise looks good. The usual water lilies were present at the tip of the island.
	Lake Shore Road Shoreline: Traces of benthic filamentous algae observed along with accumulating fragments of SAV.
Secchi: 7.0' est.	Crystal Outlet: Trace benthic filamentous algae on the rocks. Open basin looks good.
OLIVE POND **Dissolved Oxygen: 6.31 mg/L.**	Secchi: 3.0 ft. est. Many leaves on the surface. Looks clean and clear with a covering of benthic filamentous algae on the bottom that is non-problematic.
SHADOW LAKE Aeration: On **Dissolved Oxygen: 5.22 mg/L.**	Secchi: 3.5' est. Water level down at least 1 foot. Exposed shoreline has accumulating algae along with trace amounts of small duckweed. A single rooted stem of bassweed was observed.
COVE POND ***Dissolved Oxygen: 4.89 mg/L.***	Secchi: 2.0' est. Water is turbid. A film and leaves were accumulating on surface. The water lilies on the opposite shore appear very healthy and are expanding out into the open water.
GRUNDEN'S POND **Dissolved Oxygen: 8.22 mg/L.**	Secchi: 3.0' est. Water level down 1-2 feet. The Boulevard end is very shallow. This area is covered with bright green filamentous algae on bottom, and brownish algae floating in patches on the surface. The surface algae covers about 20% of this end of the basin. Lake needed treatment, but likely inhibited by lack of water.
MOUNTAIN LAKE	Cove End: To the right, the surface looks good, with SAV (Eurasian water milfoil, coontail and bladderworts) at non-problematic abundance. To the left: Unicellular algae is accumulating along the resident's shoreline. The cove supports abundant SAV growth, including bladderworts,

	Eurasian water milfoil and coontail.
Secchi: 7.5 ft.	Sailboat Cove: Surface looks good. The bottom does support non-problematic SAV growth, mostly naiads and thin-leaf pondweeds
Water Level: 499.3	Outlet Cove: Surface looks good. Accumulating fragments of coontail, Eurasian water milfoil and bassweed observed.
	Midvale Launch: Scattered SAV patches, some reaching the surface, along the dock (includes coontail, Eurasian water milfoil and bassweed).
Fecal Sample: NA	Island Beach: In the cove to the south, SAV and/or algae reaching the surface in 15-20% of the cove. Around the dock, abundant mixture of SAV (coontail, Eurasian water milfoil and bassweed plus naiads) observed. Abundance increases in the shallow water toward the bridge and muskgrass covers the bottom here. Some SAV reaching the surface near the sailboats. The beach is clean and clear.
WILDWOOD LAKE	Park: Brittle naiad and creeping bladderwort accumulating along the shoreline, around the docks (At the surface) and in the shallow water. Probably needed to be treated a few weeks ago, but abundance is compounded by reduced water level.
Secchi: 4.5' est.	Dam: Clean and clear.
Water Level: 499.3	Launch: Trace benthic filamentous algae along with brittle naiad accumulating at the launch site.

NOTES:

1. **This is the final survey of the 2019 season.**
2. **The water level at all lakes was down 1-2 feet.**
3. **Hydro-rake not mobilized at Birchwood Lake (later this week).**
4. **I was confronted by an angry resident at Birchwood Lake. He claimed we "destroyed the wetland (northern part of the lake) by chemically treating the lilies. Said its now a wasteland, and our company does not know how to manage the environment". I tried to explain our relationship with the Borough and encouraged him to attend or reach out to the Lakes Committee to learn more about how the lakes are managed.**

E-mail Transmission

DATE: 05/21/19

TOTAL NUMBER OF PAGES: 3

TO: Cara Fox

E-MAIL: cfox@mtnlakes.org

FROM: Emily Mayer

RE: Mountain Lakes E. Coli Sampling

WEEKLY BEACH SAMPLING

E. Coli: results in organisms per 100 mL

Date of Sampling	05/20/19
Birchwood Lake	36
Mountain Lake	149

ND= Non-Detect

E-mail Transmission

DATE: 05/28/19

TOTAL NUMBER OF PAGES: 3

TO: Cara Fox

E-MAIL: cfox@mtnlakes.org

FROM: Emily Mayer

RE: Mountain Lakes E. Coli Sampling

WEEKLY BEACH SAMPLING

E. Coli: results in organisms per 100 mL

Date of Sampling	05/28/19
Birchwood Lake	2
Mountain Lake	1

ND= Non-Detect

E-mail Transmission

DATE: 06/04/19

TOTAL NUMBER OF PAGES: 3

TO: Cara Fox

E-MAIL: cfox@mtnlakes.org

FROM: Emily Mayer

RE: Mountain Lakes E. Coli Sampling

WEEKLY BEACH SAMPLING

E. Coli: results in organisms per 100 mL

Date of Sampling	06/03/19
Birchwood Lake	6
Mountain Lake	ND

ND= Non-Detect

SOLITUDE
LAKE MANAGEMENT

E-mail Transmission

DATE: 06/11/19

TOTAL NUMBER OF PAGES: 3

TO: Cara Fox

E-MAIL: cfox@mtnlakes.org

FROM: Emily Mayer

RE: Mountain Lakes E. Coli Sampling

WEEKLY BEACH SAMPLING

E. Coli: results in organisms per 100 mL

Date of Sampling	06/10/19
Birchwood Lake	ND
Mountain Lake	2

ND= Non-Detect

E-mail Transmission

DATE: 06/18/19

TOTAL NUMBER OF PAGES: 3

TO: Cara Fox

E-MAIL: cfox@mtnlakes.org

FROM: Emily Mayer

RE: Mountain Lakes E. Coli Sampling

WEEKLY BEACH SAMPLING

E. Coli: results in organisms per 100 mL

Date of Sampling	06/17/19
Birchwood Lake	16
Mountain Lake	51

ND= Non-Detect

E-mail Transmission

DATE: 06/25/19

TOTAL NUMBER OF PAGES: 3

TO: Cara Fox

E-MAIL: cfox@mtnlakes.org

FROM: Emily Mayer

RE: Mountain Lakes E. Coli Sampling

WEEKLY BEACH SAMPLING

E. Coli: results in organisms per 100 mL

Date of Sampling	06/24/19
Birchwood Lake	13
Mountain Lake	5

ND= Non-Detect

E-mail Transmission

DATE: 07/02/19

TOTAL NUMBER OF PAGES: 3

TO: Cara Fox

E-MAIL: cfox@mtnlakes.org

FROM: Emily Mayer

RE: Mountain Lakes E. Coli Sampling

WEEKLY BEACH SAMPLING

E. Coli: results in organisms per 100 mL

Date of Sampling	07/01/19
Birchwood Lake	11
Mountain Lake	1

ND= Non-Detect

E-mail Transmission

DATE: 07/09/19

TOTAL NUMBER OF PAGES: 3

TO: Cara Fox

E-MAIL: cfox@mtnlakes.org

FROM: Emily Mayer

RE: Mountain Lakes E. Coli Sampling

WEEKLY BEACH SAMPLING

E. Coli: results in organisms per 100 mL

Date of Sampling	07/08/19
Birchwood Lake	24
Mountain Lake	1

ND= Non-Detect

E-mail Transmission

DATE: 07/16/19

TOTAL NUMBER OF PAGES: 3

TO: Cara Fox

E-MAIL: cfox@mtnlakes.org

FROM: Emily Mayer

RE: Mountain Lakes E. Coli Sampling

WEEKLY BEACH SAMPLING

E. Coli: results in organisms per 100 mL

Date of Sampling	07/15/19
Birchwood Lake	11
Mountain Lake	1

ND= Non-Detect

E-mail Transmission

DATE: 07/23/19

TOTAL NUMBER OF PAGES: 3

TO: Cara Fox

E-MAIL: cfox@mtnlakes.org

FROM: Emily Mayer

RE: Mountain Lakes E. Coli Sampling

WEEKLY BEACH SAMPLING

E. Coli: results in organisms per 100 mL

Date of Sampling	07/22/19
Birchwood Lake	24.0
Mountain Lake	ND

ND= Non-Detect

E-mail Transmission

DATE:07/30/19 **TOTAL NUMBER OF PAGES: 3**

TO: Cara Fox **E-MAIL:** cfox@mtnlakes.org

FROM: Emily Mayer **RE:** Mountain Lakes E. Coli Sampling

WEEKLY BEACH SAMPLING

E. Coli: results in organisms per 100 mL

Date of Sampling	07/29/19
Birchwood Lake	16
Mountain Lake	17

ND= Non-Detect

E-mail Transmission

DATE: 08/08/19

TOTAL NUMBER OF PAGES: 3

TO: Cara Fox

E-MAIL: cfox@mtnlakes.org

FROM: Emily Mayer

RE: Mountain Lakes E. Coli Sampling

WEEKLY BEACH SAMPLING

E. Coli: results in organisms per 100 mL

Date of Sampling	08/07/19
Mountain Lake	10

ND= Non-Detect

E-mail Transmission

DATE: 08/13/19

TOTAL NUMBER OF PAGES: 3

TO: Cara Fox

E-MAIL: cfox@mtnlakes.org

FROM: Emily Mayer

RE: Mountain Lakes E. Coli Sampling

WEEKLY BEACH SAMPLING

E. Coli: results in organisms per 100 mL

Date of Sampling	08/12/19
Birchwood Lake	3
Mountain Lake	2

ND= Non-Detect

E-mail Transmission

DATE: 08/20/19

TOTAL NUMBER OF PAGES: 3

TO: Cara Fox

E-MAIL: cfox@mtnlakes.org

FROM: Emily Mayer

RE: Mountain Lakes E. Coli Sampling

WEEKLY BEACH SAMPLING

E. Coli: results in organisms per 100 mL

Date of Sampling	08/19/19
Birchwood Lake	9
Mountain Lake	1

ND= Non-Detect

E-mail Transmission

DATE: 08/28/19 **TOTAL NUMBER OF PAGES: 6**

TO: Cara Fox **E-MAIL:** cfox@mtnlakes.org

FROM: Emily Mayer **RE:** Mountain Lakes E. Coli Sampling

WEEKLY BEACH SAMPLING

E. Coli: results in organisms per 100 mL

Date of Sampling	08/26/19
Birchwood Lake	1
Mountain Lake	384*

Will re-sample for E. Coli at Mountain Lake on 8/27/19.
ND= Non-Detect

E-mail Transmission

DATE: 08/28/19

TOTAL NUMBER OF PAGES: 6

TO: Cara Fox

E-MAIL: cfox@mtnlakes.org

FROM: Emily Mayer

RE: Mountain Lakes E. Coli Sampling

WEEKLY BEACH SAMPLING

E. Coli: results in organisms per 100 mL

Date of Sampling	08/27/19
Mountain Lake	37

ND= Non-Detect

MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 6/10/2019	Examination Date: 6/11/2019	Amount Examined: 200 ml.
Site A: Birchwood Lake	Site B: Crystal Lake	Site C: Sunset Lake

BACILLARIOPHYTA (Diatoms)	**A**	**B**	**C**
Asterionella		80	
Cyclotella			
Cymbella			
Diatoma			
Fragilaria			
Melosira			
Navicula			
Nitzschia			
Pinnularia			
Urosolenia			
Stephanodiscus			
Stauroneis			
Synedra		20	
Tabellaria			

CHRYSOPHYTA (Golden Algae)	**A**	**B**	**C**
Dinobryon	1090	10	20
Mallomonas	20	230	30
Synura			
Tribonema			
Uroglenopsis			

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			
Coelastrum			
Eudorina			
Mougeotia	20		10
Oedogonium			
Oocystis			
Pandorina			
Pediastrum			
Phytoconis			
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum	10		10
Sphaerocystis	90		20
Ulothrix			
Volvox			
Zygnema			
Gloeocystis			
Sphareocystis			
Cosmarium			
Tetraedron			
Dictyosphaerium			

CYANOPHYTA (Blue-green Algae)	**A**	**B**	**C**
Anabaena			
Anacystis			
Aphanizomenon			
Coelosphaerium			
Gomphosphseria			
Lyngbya			
Microcystis			
Oscillatoria			
Pseudoanabaena			
Synechocystis			
Agmenellum			
PROTOZOA			
Actinophyrs			

EUGLENOPHYTA (Euglenoids)	**A**	**B**	**C**
Euglena			
Phacus			
Trachelomonas			

PYRRHOPHYTA (Dinoflagellates)	**A**	**B**	**C**
Ceratium		90	
Peridinium			

SITE	**A**	**B**	**C**
TOTAL GENERA:	5	5	5
TRANSPARENCY:	5.0'	6.0'	5.0'
ORGANISMS PER MILLILITER:	**1,230**	**430**	**90**

NOTES: This was the first sampling event of 2019. Algal density is considered high at site A and low at sites B and C. Algal diversity is the same at all three sites and considered low. The assemblage is dominated by a variety of golden algae. Low amounts of diatoms and dinoflagellates were present at site B. Low amounts of green algae were observed at sites A and C. Water clarity is considered fair-good at all three sites currently.

Solitude Lake Management, Inc.
310 East Washington Ave, Suite C, Washington, NJ 07882
Phone (908) 850-0303 Fax (908) 850-4994

MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 6/24/2019	Examination Date: 6/26/2019	Amount Examined: 200 ml.
Site A: Birchwood Lake	Site B: Crystal Lake	Site C: Sunset Lake

BACILLARIOPHYTA (Diatoms)	**A**	**B**	**C**
Asterionella	10	10	
Cyclotella			
Cymbella			
Diatoma			
Fragilaria			
Melosira			
Navicula			10
Nitzschia			
Pinnularia			
Urosolenia			
Stephanodiscus	10		
Stauroneis			
Synedra			
Tabellaria			

CHRYSOPHYTA (Golden Algae)	**A**	**B**	**C**
Dinobryon			
Mallomonas	10		
Synura			
Tribonema			
Uroglenopsis			

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			
Coelastrum			
Eudorina			
Mougeotia		10	
Oedogonium			
Oocystis			
Pandorina			
Pediastrum			
Phytoconis			
Rhizoclonium			
Scenedesmus			
Spirogyra		10	
Staurastrum			10
Sphaerocystis	200	70	80
Ulothrix			
Volvox			
Zygnema			
Gloeocystis			
Sphareocystis			
Cosmarium			
Tetraedron			
Dictyosphaerium			

CYANOPHYTA (Blue-green Algae)	**A**	**B**	**C**
Anabaena			
Anacystis			
Aphanizomenon			
Coelosphaerium			
Gomphosphseria			
Lyngbya			
Microcystis			
Oscillatoria			
Pseudoanabaena			
Synechocystis			
Agmenellum			
PROTOZOA			
Actinophyrs			

EUGLENOPHYTA (Euglenoids)	**A**	**B**	**C**
Euglena			
Phacus			
Trachelomonas			

PYRRHOPHYTA (Dinoflagellates)	**A**	**B**	**C**
Ceratium	10		
Peridinium			

SITE	**A**	**B**	**C**
TOTAL GENERA:	5	4	3
TRANSPARENCY:	5.5'	6.0'	5.0'
ORGANISMS PER MILLILITER:	**240**	**100**	**100**

NOTES: Since the last sampling event, algal density decreased at sites A and B but increased slightly at site C. All three sites now have low density. Algal diversity decreased at sites B and C but was unchanged at site A. All three sites continue to have low diversity. The assemblage consists mainly of green algae as well as trace amounts of diatoms. Traces of golden algae were observed at site A only. Water clarity only changed at site A by a slight increase. Sites A and C are considered fair while site B is fair-good.

Solitude Lake Management, Inc.
310 East Washington Ave, Suite C, Washington, NJ 07882
Phone (908) 850-0303 Fax (908) 850-4994

MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 7/15/2019	Examination Date: 7/16/2019	Amount Examined: 200 ml.
Site A: Birchwood Lake	Site B: Crystal Lake	Site C: Sunset Lake

BACILLARIOPHYTA (Diatoms)	**A**	**B**	**C**
Asterionella			
Cyclotella	40	20	150
Cymbella		10	
Diatoma			
Fragilaria			10
Melosira			
Navicula			
Nitzschia			
Pinnularia			
Urosolenia			
Stephanodiscus	20		
Stauroneis			
Synedra			60
Tabellaria			

CHRYSOPHYTA (Golden Algae)	**A**	**B**	**C**
Dinobryon			50
Mallomonas	10		
Synura			
Tribonema			
Uroglenopsis			

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			
Coelastrum		10	
Eudorina			
Mougeotia			
Oedogonium			
Oocystis			
Pandorina			
Pediastrum			
Phytoconis	250	110	
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum	10		
Sphaerocystis	200	240	
Ulothrix			
Volvox			
Zygnema			
Gloeocystis			
Sphareocystis			
Cosmarium			
Tetraedron			
Dictyosphaerium			

CYANOPHYTA (Blue-green Algae)	**A**	**B**	**C**
Anabaena			
Anacystis			
Aphanizomenon			
Coelosphaerium			
Gomphosphseria			
Lyngbya			
Microcystis			
Oscillatoria			
Pseudoanabaena			
Synechocystis			
Agmenellum			
PROTOZOA			
Actinophyrs		10	

EUGLENOPHYTA (Euglenoids)	**A**	**B**	**C**
Euglena			10
Phacus			
Trachelomonas			

PYRRHOPHYTA (Dinoflagellates)	**A**	**B**	**C**
Ceratium			
Peridinium			70

SITE	**A**	**B**	**C**
TOTAL GENERA:	6	6	6
TRANSPARENCY:	6.0’	5.5’	4.0’
ORGANISMS PER MILLILITER:	**530**	**400**	**350**

NOTES: Since the last sampling event, algal density increased at all three sites but remains low at sites B and C. Site A is now has moderate density. Algal diversity increased at all three sites and is now moderate. The assemblage consists mainly of green algae and diatoms. Traces of golden algae was observed at sites A and C, protozoa at site B, euglenoids at site C, and dinoflagellates at site C. Water clarity increased at site A but decreased at sites B and C. All three sites are now considered fair.

Solitude Lake Management, Inc.
310 East Washington Ave, Suite C, Washington, NJ 07882
Phone (908) 850-0303 Fax (908) 850-4994

MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 7/29/2019	Examination Date: 7/30/2019	Amount Examined: 200 ml.
Site A: Birchwood Lake	Site B: Crystal Lake	Site C: Sunset Lake

BACILLARIOPHYTA (Diatoms)	**A**	**B**	**C**
Asterionella			10
Cyclotella			
Cymbella			
Diatoma			
Fragilaria			
Melosira			
Navicula	30	10	
Nitzschia			
Pinnularia			
Urosolenia			
Stephanodiscus	20	10	40
Stauroneis			
Synedra		10	
Tabellaria			

CHRYSOPHYTA (Golden Algae)	**A**	**B**	**C**
Dinobryon			
Mallomonas	10		
Synura	10		
Tribonema			
Uroglenopsis			

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			
Coelastrum	10	20	
Eudorina			
Mougeotia		220	
Oedogonium			
Oocystis			
Pandorina			
Pediastrum			
Phytoconis			
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum		150	
Sphaerocystis	200	430	10
Ulothrix			
Volvox			
Zygnema			
Gloeocystis			

CYANOPHYTA (Blue-green Algae)	**A**	**B**	**C**
Anabaena			
Anacystis			
Aphanizomenon		10	
Coelosphaerium			
Gomphosphseria			
Lyngbya			
Microcystis		20	
Oscillatoria			
Pseudoanabaena			
Synechocystis			
Agmenellum			
PROTOZOA			
Actinophyrs			

EUGLENOPHYTA (Euglenoids)	**A**	**B**	**C**
Euglena			
Phacus	10		
Trachelomonas			

PYRRHOPHYTA (Dinoflagellates)	**A**	**B**	**C**
Ceratium		10	
Peridinium		30	

SITE	**A**	**B**	**C**
TOTAL GENERA:	7	11	3
TRANSPARENCY:			
ORGANISMS PER MILLILITER:	**290**	**920**	**60**

NOTES: Since the last sampling event, algal density decreased at sites A and C while increasing at site B. Sites A and C are now low while site B is moderate. Algal diversity increased at sites A and B but decreased at site C. Site C is low, site A is moderate, and site B is high. The assemblage consists mainly of green algae. Traces of diatoms were present at all three sites, golden algae at site A, blue-green algae at site B, euglenoids at site A, and dinoflagellates at site B.

Solitude Lake Management, Inc.
310 East Washington Ave, Suite C, Washington, NJ 07882
Phone (908) 850-0303 Fax (908) 850-4994

MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 8/12/2019	Examination Date: 8/13/2019	Amount Examined: 200 ml.
Site A: Birchwood Lake	Site B: Crystal Lake	Site C: Sunset Lake

BACILLARIOPHYTA (Diatoms)	**A**	**B**	**C**
Asterionella			
Cyclotella			10
Cymbella			
Diatoma			
Fragilaria		20	
Melosira			
Navicula	40		
Nitzschia			
Pinnularia			
Urosolenia			
Stephanodiscus	180	70	120
Stauroneis			
Synedra			
Tabellaria			

CHRYSOPHYTA (Golden Algae)	**A**	**B**	**C**
Dinobryon		10	
Mallomonas	30		
Synura	20	10	1310
Tribonema			
Uroglenopsis			

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			
Coelastrum			
Eudorina			
Mougeotia		40	
Oedogonium			
Oocystis			
Pandorina			
Pediastrum			10
Phytoconis			
Rhizoclonium			
Scenedesmus	10		
Spirogyra			
Staurastrum		1280	40
Sphaerocystis	60	90	60
Ulothrix			
Volvox	10		
Zygnema			
Gloeocystis			

CYANOPHYTA (Blue-green Algae)	**A**	**B**	**C**
Anabaena		190	
Anacystis			
Aphanizomenon			10
Coelosphaerium			
Gomphosphseria			
Lyngbya			20
Microcystis		10	
Oscillatoria			
Pseudoanabaena			
Synechocystis			
Agmenellum			
PROTOZOA			
Actinophyrs			

EUGLENOPHYTA (Euglenoids)	**A**	**B**	**C**
Euglena			
Phacus	10		
Trachelomonas			

PYRRHOPHYTA (Dinoflagellates)	**A**	**B**	**C**
Ceratium		10	
Peridinium		10	

SITE	**A**	**B**	**C**
TOTAL GENERA:	8	11	8
TRANSPARENCY:	6.0'	4.0'	4.0'
ORGANISMS PER MILLILITER:	**360**	**1,740**	**1,580**

NOTES: Since the last sampling event, algal density increased at all three sites and is now high at sites B and C. Site A remains low. Algal diversity increased at sites A and C but was unchanged at site B. Sites A and C are now moderate while site B has high diversity. The assemblage consists mainly of green algae, golden algae, and diatoms. Low amounts of blue-green algae was observed, mainly at site B. Traces of euglenoids (site A) and dinoflagellates (site B) were present. Water clarity is considered fair-good at site A but fair at sites B and C.

Solitude Lake Management, Inc.
310 East Washington Ave, Suite C, Washington, NJ 07882
Phone (908) 850-0303 Fax (908) 850-4994

MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 8/26/2019	Examination Date: 8/27/2019	Amount Examined: 200 ml.
Site A: Birchwood Lake	Site B: Crystal Lake	Site C: Sunset Lake

BACILLARIOPHYTA (Diatoms)	**A**	**B**	**C**
Asterionella			
Cyclotella			
Cymbella			
Diatoma			
Fragilaria			
Melosira			
Navicula			
Nitzschia			
Pinnularia			
Urosolenia			
Stephanodiscus			
Stauroneis			
Synedra	10		
Tabellaria			

CHRYSOPHYTA (Golden Algae)	**A**	**B**	**C**
Dinobryon	10		
Mallomonas	20		
Synura			
Tribonema			
Uroglenopsis			

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus	20		
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium		10	
Coelastrum	70	40	250
Eudorina			
Mougeotia			
Oedogonium	60		
Oocystis			
Pandorina			
Pediastrum			
Phytoconis			
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum		1270	
Sphaerocystis			
Ulothrix			
Volvox			
Zygnema			
Gloeocystis		10	
Sphearocystis			10
Cosmarium			
Tetraedron			
Dictyosphaerium			

CYANOPHYTA (Blue-green Algae)	**A**	**B**	**C**
Anabaena		110	
Anacystis			
Aphanizomenon		70	
Coelosphaerium	30		
Gomphosphseria			
Lyngbya			
Microcystis		10	
Oscillatoria			
Pseudoanabaena			
Synechocystis			
Nodularia		30	
PROTOZOA			
Actinophyrs			

EUGLENOPHYTA (Euglenoids)	**A**	**B**	**C**
Euglena			
Phacus			
Trachelomonas			

PYRRHOPHYTA (Dinoflagellates)	**A**	**B**	**C**
Ceratium	10		
Peridinium			

SITE	**A**	**B**	**C**
TOTAL GENERA:	8	8	2
TRANSPARENCY:	6.75'	4.75'	6.5'
ORGANISMS PER MILLILITER:	**230**	**1,550**	**260**

NOTES: Since the last sampling event, algal density decreased at all three sites and is now low at sites A and C but high at site B. Algal diversity decreased at sites B and C. Diversity is now moderate at sites A and B and low at site C. The assemblage consists mainly of green algae. Blue green algae was observed at sites A and B only. Trace amounts of diatoms, golden algae, and dinoflagellates were observed at site A only. Water clarity increased at sites A and C but decreased at site B. Site B is considered fair while sites A and C are good.

Solitude Lake Management, Inc.
310 East Washington Ave, Suite C, Washington, NJ 07882
Phone (908) 850-0303 Fax (908) 850-4994

MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 6/10/2019	Examination Date: 6/11/2019	Amount Examined: 200 ml.
Site A: Grunden's Pond	Site B: Mountain Lake	Site C: Wildwood Lake

BACILLARIOPHYTA (Diatoms)	**A**	**B**	**C**
Asterionella	10		
Cyclotella			
Cymbella			
Diatoma			
Fragilaria		10	
Melosira			
Navicula		50	30
Nitzschia			
Pinnularia			
Urosolenia			
Stephanodiscus			10
Stauroneis			
Synedra		10	
Tabellaria			
Surriella			

CHRYSOPHYTA (Golden Algae)	**A**	**B**	**C**
Dinobryon			
Mallomonas	80		
Synura			
Tribonema			
Uroglenopsis			

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			
Coelastrum		10	
Eudorina			
Mougeotia			
Oedogonium			
Oocystis			
Pandorina			
Pediastrum			
Phytoconis			
Rhizoclonium			
Scenedesmus			
Spirogyra	10		
Staurastrum			
Sphaerocystis	30		
Ulothrix			
Scenedesmus			
Zygnema			
Gloeocystis			
Cosmarium			
Quadriguia			
Tetraspora			

CYANOPHYTA (Blue-green Algae)	**A**	**B**	**C**
Anabaena			
Anacystis			
Aphanizomenon			
Coelosphaerium			
Gomphosphseria			
Lyngbya			
Microcystis			
Oscillatoria			
Pseudoanabaena			
Synechocystis			
Scytonema			
PROTOZOA			
Actinophyrs			

EUGLENOPHYTA (Euglenoids)	**A**	**B**	**C**
Euglena	20	20	
Phacus	10		
Trachelomonas			

PYRRHOPHYTA (Dinoflagellates)	**A**	**B**	**C**
Ceratium	880		10
Peridinium			

SITE	**A**	**B**	**C**
TOTAL GENERA:	7	5	3
TRANSPARENCY:	3.0'	7.0'	6.0'
ORGANISMS PER MILLILITER:	**1,040**	**100**	**50**

NOTES: This was the first sampling event of 2019. Algal density is considered high at site A and low at the other two sites. Algal diversity is currently moderate at site A and low at sites B and C. Sites B and C are dominated by diatoms, while site A is dominated by dinoflagellates. Site A also contained low amounts of golden algae. Trace amounts of green algae and euglenoids were observed at sites A and B. Water clarity is considered poor at site A, whereas sites B and C are considered good.

Solitude Lake Management, Inc.
310 East Washington Ave, Suite C, Washington, NJ 07882
Phone (908) 850-0303 Fax (908) 850-4994

MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 6/24/2019	Examination Date: 6/26/2019	Amount Examined: 200 ml.
Site A: Grunden's Pond	Site B: Mountain Lake	Site C: Wildwood Lake

BACILLARIOPHYTA (Diatoms)	**A**	**B**	**C**
Asterionella			
Cyclotella			
Cymbella			
Diatoma			
Fragilaria			40
Melosira			
Navicula			20
Nitzschia			
Pinnularia			
Urosolenia			
Stephanodiscus		60	10
Stauroneis			
Synedra			
Tabellaria			
Surriella			

CHRYSOPHYTA (Golden Algae)	**A**	**B**	**C**
Dinobryon			
Mallomonas		30	
Synura			
Tribonema			
Uroglenopsis			

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			
Coelastrum			
Eudorina			
Mougeotia			
Oedogonium			
Oocystis			
Pandorina			
Pediastrum			
Phytoconis			
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum			
Sphaerocystis			
Ulothrix			
Scenedesmus			
Zygnema			
Gloeocystis			
Cosmarium			
Quadriguia			
Tetraspora			

CYANOPHYTA (Blue-green Algae)	**A**	**B**	**C**
Anabaena			
Anacystis			
Aphanizomenon			
Coelosphaerium			
Gomphosphseria			
Lyngbya			
Microcystis			
Oscillatoria			
Pseudoanabaena			
Synechocystis			
Scytonema			
PROTOZOA			
Actinophyrs			

EUGLENOPHYTA (Euglenoids)	**A**	**B**	**C**
Euglena			
Phacus			
Trachelomonas			

PYRRHOPHYTA (Dinoflagellates)	**A**	**B**	**C**
Ceratium		110	
Peridinium			

SITE	**A**	**B**	**C**
TOTAL GENERA:		3	3
TRANSPARENCY:		6.0'	6.0'
ORGANISMS PER MILLILITER:		**200**	**70**

NOTES: Since the last sampling event, algal density increased at both sites B and C. Density remains low at this time for both sites. Algal diversity decreased at site B and was unchanged at site C. Both sites continue to have low diversity. The assemblage consists mainly of diatoms with dinoflagellates and golden algae at site B only. Water clarity decreased at site B and was unchanged at site C. Both sites now have fair-good clarity.

Solitude Lake Management, Inc.
310 East Washington Ave, Suite C, Washington, NJ 07882
Phone (908) 850-0303 Fax (908) 850-4994

MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 7/15/2019	Examination Date: 7/16/2019	Amount Examined: 200 ml.
Site A: Grunden's Pond	Site B: Mountain Lake	Site C: Wildwood Lake

BACILLARIOPHYTA (Diatoms)	**A**	**B**	**C**
Asterionella			
Cyclotella	30	10	
Cymbella			
Diatoma			
Fragilaria	10		20
Melosira			
Navicula		10	20
Nitzschia			
Pinnularia			10
Urosolenia			
Stephanodiscus			
Stauroneis	10		
Synedra			
Tabellaria			
Surriella			

CHRYSOPHYTA (Golden Algae)	**A**	**B**	**C**
Dinobryon			
Mallomonas			
Synura			
Tribonema			
Uroglenopsis			

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium	10		
Coelastrum			
Eudorina			
Mougeotia			
Oedogonium			
Oocystis			
Pandorina			
Pediastrum			
Phytoconis	30	60	
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum	50		10
Sphaerocystis	10	40	30
Ulothrix			
Scenedesmus			
Zygnema			
Gloeocystis			
Cosmarium			10
Quadriguia			
Tetraspora			

CYANOPHYTA (Blue-green Algae)	**A**	**B**	**C**
Anabaena	70		
Anacystis			
Aphanizomenon	60		
Coelosphaerium			
Gomphosphseria			
Lyngbya			
Microcystis			
Oscillatoria			
Pseudoanabaena			
Synechocystis			
Scytonema			
PROTOZOA			
Actinophyrs			

EUGLENOPHYTA (Euglenoids)	**A**	**B**	**C**
Euglena			
Phacus			
Trachelomonas	90		20

PYRRHOPHYTA (Dinoflagellates)	**A**	**B**	**C**
Ceratium	40		
Peridinium			

SITE	**A**	**B**	**C**
TOTAL GENERA:	11	4	7
TRANSPARENCY:	2.0'	6.0'	6.5'
ORGANISMS PER MILLILITER:	**410**	**120**	**120**

NOTES: Since the last sampling event, algal density decreased at sites A and B and increased at site C. All three sites and now low. Algal diversity increased at all three sites and is now high at site A, low at site B, and moderate at site C. The assemblage consists mainly of green algae and diatoms. Low amounts of blue-green algae was observed at site A, euglenoids at sites A and C, and dinoflagellates at site A. Water clarity decreased at site A, unchanged at site B, and increased at site C. Clarity at site A now is considered poor while site B is fair and site C is good.

Solitude Lake Management, Inc.
310 East Washington Ave, Suite C, Washington, NJ 07882
Phone (908) 850-0303 Fax (908) 850-4994

MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 7/29/2019	Examination Date: 7/30/2019	Amount Examined: 200 ml.
Site A: Grunden's Pond	Site B: Mountain Lake	Site C: Wildwood Lake

BACILLARIOPHYTA (Diatoms)	**A**	**B**	**C**
Asterionella			
Cyclotella			
Cymbella			
Diatoma			
Fragilaria			
Melosira			
Navicula			
Nitzschia			
Pinnularia			
Urosolenia			
Stephanodiscus		40	
Stauroneis			
Synedra			
Tabellaria			
Surriella			

CHRYSOPHYTA (Golden Algae)	**A**	**B**	**C**
Dinobryon			
Mallomonas		20	90
Synura			
Tribonema			
Uroglenopsis			

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			
Coelastrum		10	20
Eudorina			
Mougeotia			
Oedogonium			
Oocystis			
Pandorina			
Pediastrum			
Phytoconis			
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum		30	10
Sphaerocystis		90	40
Ulothrix			
Scenedesmus			
Zygnema			
Gloeocystis			
Cosmarium			
Quadriguia			
Tetraspora			

CYANOPHYTA (Blue-green Algae)	**A**	**B**	**C**
Anabaena		10	
Anacystis			
Aphanizomenon		100	
Coelosphaerium			
Gomphosphseria			
Lyngbya			
Microcystis			
Oscillatoria			
Pseudoanabaena			
Synechocystis			
Scytonema			
PROTOZOA			
Actinophyrs			

EUGLENOPHYTA (Euglenoids)	**A**	**B**	**C**
Euglena			10
Phacus			
Trachelomonas			10

PYRRHOPHYTA (Dinoflagellates)	**A**	**B**	**C**
Ceratium			
Peridinium		10	

SITE	**A**	**B**	**C**
TOTAL GENERA:		8	6
TRANSPARENCY:			
ORGANISMS PER MILLILITER:		**310**	**180**

NOTES: Since the last sampling event, algal density increased slightly at both sites B and C but remain low. Algal diversity increased and site B and decreased at site C. Both sites now have moderate diversity. The assemblage consists mainly of golden algae and green algae. Blue-green algae was only present at site B. Traces of diatoms were observed at site B, euglenoids at site C, and dinoflagellates at site B.

Solitude Lake Management, Inc.
310 East Washington Ave, Suite C, Washington, NJ 07882
Phone (908) 850-0303 Fax (908) 850-4994

MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 8/12/2019	Examination Date: 8/13/2019	Amount Examined: 200 ml.
Site A: Grunden's Pond	Site B: Mountain Lake	Site C: Wildwood Lake

BACILLARIOPHYTA (Diatoms)	**A**	**B**	**C**
Asterionella			
Cyclotella			
Cymbella			
Diatoma			
Fragilaria			
Melosira			
Navicula	30		30
Nitzschia			
Pinnularia	10		10
Urosolenia			
Stephanodiscus	10	20	
Stauroneis			
Synedra	10	10	
Tabellaria			
Surriella			

CHRYSOPHYTA (Golden Algae)	**A**	**B**	**C**
Dinobryon		250	30
Mallomonas		20	
Synura			
Tribonema			
Uroglenopsis			

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium	10		
Coelastrum	60		
Eudorina			
Mougeotia	260	30	10
Oedogonium			
Oocystis			
Pandorina			
Pediastrum			
Phytoconis			
Rhizoclonium			
Scenedesmus	10		
Spirogyra			
Staurastrum	90	30	
Sphaerocystis		20	30
Ulothrix			
Scenedesmus			
Zygnema			
Gloeocystis			
Cosmarium			
Quadriguia			
Tetraspora			

CYANOPHYTA (Blue-green Algae)	**A**	**B**	**C**
Anabaena		10	
Anacystis			
Aphanizomenon		430	10
Coelosphaerium			
Gomphosphseria			
Lyngbya			
Microcystis	10		
Oscillatoria			
Pseudoanabaena			
Synechocystis			
Scytonema			
PROTOZOA			
Actinophyrs			

EUGLENOPHYTA (Euglenoids)	**A**	**B**	**C**
Euglena			
Phacus			
Trachelomonas			

PYRRHOPHYTA (Dinoflagellates)	**A**	**B**	**C**
Ceratium		10	10
Peridinium			

SITE	**A**	**B**	**C**
TOTAL GENERA:	10	10	7
TRANSPARENCY:	1.5'	6.0'	5.0'
ORGANISMS PER MILLILITER:	**500**	**830**	**130**

NOTES: Since the last sampling event, algal density increased at sites A and B but decreased slightly at site C. Density is now low-moderate at site A, moderate at site B, and low at site C. Algal diversity decreased at site A but increased at sites B and C. All three sites now have moderate diversity. The assemblage consists mainly of green algae, blue-green algae, and diatoms. Golden algae was present at sites B and C only. Trace amounts of dinoflagellates were observed at site B and C. Water clarity decreased at site A and is now poor. Sites B and C currently have fair-good water clarity.

Solitude Lake Management, Inc.
310 East Washington Ave, Suite C, Washington, NJ 07882
Phone (908) 850-0303 Fax (908) 850-4994

MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 8/26/2019	Examination Date: 8/27/2019	Amount Examined: 200 ml.
Site A: Grunden's Pond	Site B: Mountain Lake	Site C: Wildwood Lake

BACILLARIOPHYTA (Diatoms)	**A**	**B**	**C**
Asterionella			
Cyclotella			
Cymbella			
Diatoma			
Fragilaria			10
Melosira			
Navicula			
Nitzschia			
Pinnularia			
Urosolenia			
Stephanodiscus			
Stauroneis			
Synedra		10	
Tabellaria			
Surriella			

CHRYSOPHYTA (Golden Algae)	**A**	**B**	**C**
Dinobryon		20	
Mallomonas		10	30
Synura			
Tribonema			
Uroglenopsis			

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			
Coelastrum		60	160
Eudorina			
Mougeotia			
Oedogonium			
Oocystis			
Pandorina			
Pediastrum			
Phytoconis			
Rhizoclonium			
Scenedesmus			10
Spirogyra			
Staurastrum		20	
Sphaerocystis			
Ulothrix		1010	
Scenedesmus			
Zygnema			
Gloeocystis		20	
Cosmarium			
Quadriguia			
Tetraspora			

CYANOPHYTA (Blue-green Algae)	**A**	**B**	**C**
Anabaena		50	
Anacystis			
Aphanizomenon		350	
Coelosphaerium			
Gomphosphseria			
Lyngbya			
Microcystis			
Oscillatoria			
Pseudoanabaena			
Synechocystis			
Scytonema			
PROTOZOA			
Actinophyrs			

EUGLENOPHYTA (Euglenoids)	**A**	**B**	**C**
Euglena			
Phacus			10
Trachelomonas			

PYRRHOPHYTA (Dinoflagellates)	**A**	**B**	**C**
Ceratium			
Peridinium			

SITE	**A**	**B**	**C**
TOTAL GENERA:		9	5
TRANSPARENCY:		4.75'	6.5'
ORGANISMS PER MILLILITER:		**1,550**	**220**

NOTES: Since the last sampling event, algal density increased at both sites. Site B now has high density while site C remains low. Algal diversity decreased and is now moderate at site B and low at site C. The assemblage consists mainly of green algae. Blue-green algae was present at site B only. Trace amounts of diatoms, golden algae, and euglenoids (site C only) were also observed. Water clarity decreased at site B but increased at site C. Clarity at site B is now considered fair while site C is good.

Solitude Lake Management, Inc.
310 East Washington Ave, Suite C, Washington, NJ 07882
Phone (908) 850-0303 Fax (908) 850-4994

MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 6/10/2019	Examination Date: 6/11/2019	Amount Examined: 200 ml.
Site A: Olive Pond	Site B: Shadow Lake	Site C: Cove Pond

BACILLARIOPHYTA (Diatoms)	**A**	**B**	**C**
Asterionella		40	
Cyclotella			
Cymbella			
Diatoma			
Fragilaria			20
Melosira			
Navicula		20	
Nitzschia			
Pinnularia			
Rhizosolenia			
Stephanodiscus			
Stauroneis			
Synedra		20	
Tabellaria			
Cocconeis			

CHRYSOPHYTA (Golden Algae)	**A**	**B**	**C**
Dinobryon	40	390	540
Mallomonas	10	50	110
Synura	10		
Tribonema			
Uroglenopsis			

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			
Coelastrum			
Eudorina			
Mougeotia			10
Oedogonium			
Oocystis			
Pandorina			
Pediastrum			
Phytoconis			
Rhizoclonium		320	10
Scenedesmus			
Spirogyra			
Staurastrum			
Sphaerocystis	150		
Ulothrix			
Volvox			
Zygnema			
Quadrigula			
Gloeocystis			
Cosmarium			
Treubaria			

CYANOPHYTA (Blue-green Algae)	**A**	**B**	**C**
Anabaena			
Anacystis			
Aphanizomenon			
Coelosphaerium			
Gomphosphseria			
Lyngbya			
Microcystis			
Oscillatoria			
Pseudoanabaena			
Synechocystis			
Agmenellum			
PROTOZOA			
Actinophyrs			

EUGLENOPHYTA (Euglenoids)	**A**	**B**	**C**
Euglena			
Phacus			
Trachelomonas			

PYRRHOPHYTA (Dinoflagellates)	**A**	**B**	**C**
Ceratium		220	40
Peridinium			

SITE	**A**	**B**	**C**
TOTAL GENERA:	4	7	6
TRANSPARENCY:	3.5'	3.5'	4.0'
ORGANISMS PER MILLILITER:	**210**	**1,060**	**730**

NOTES: This was the first sampling event of 2019. Algal density is considered low at site A, high at site B, and moderate at site C. Algal diversity is low at site A and moderate at sites B and C. The assemblage is dominated by golden algae (sites B and C), green algae (sites A and B) and dinoflagellates (site B). Trace amounts of diatoms were observed at sites B and C only. Water clarity is considered poor to fair at all three sites.

Solitude Lake Management, Inc.
310 East Washington Ave, Suite C, Washington, NJ 07882
Phone (908) 850-0303 Fax (908) 850-4994

MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 6/24/2019	Examination Date: 6/26/2019	Amount Examined: 200 ml.
Site A: Olive Pond	Site B: Shadow Lake	Site C: Cove Pond

BACILLARIOPHYTA (Diatoms)	**A**	**B**	**C**
Asterionella			
Cyclotella			
Cymbella			
Diatoma			
Fragilaria		60	
Melosira			
Navicula			
Nitzschia			
Pinnularia			
Rhizosolenia			
Stephanodiscus			
Stauroneis			
Synedra			
Tabellaria			
Cocconeis			

CHRYSOPHYTA (Golden Algae)	**A**	**B**	**C**
Dinobryon		10	
Mallomonas		40	
Synura			
Tribonema			
Uroglenopsis			

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			
Coelastrum			
Eudorina			
Mougeotia			
Oedogonium			
Oocystis			
Pandorina			
Pediastrum			
Phytoconis			
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum			
Sphaerocystis		30	
Ulothrix			
Volvox			
Zygnema			
Quadrigula			
Gloeocystis			
Cosmarium			
Treubaria			

CYANOPHYTA (Blue-green Algae)	**A**	**B**	**C**
Anabaena			
Anacystis			
Aphanizomenon			
Coelosphaerium			
Gomphosphseria			
Lyngbya			
Microcystis			
Oscillatoria			
Pseudoanabaena			
Synechocystis			
Agmenellum			
PROTOZOA			
Actinophyrs			

EUGLENOPHYTA (Euglenoids)	**A**	**B**	**C**
Euglena			
Phacus			
Trachelomonas			

PYRRHOPHYTA (Dinoflagellates)	**A**	**B**	**C**
Ceratium		10	
Peridinium			

SITE	**A**	**B**	**C**
TOTAL GENERA:		5	
TRANSPARENCY:		3.0’	
ORGANISMS PER MILLILITER:		**150**	

NOTES: Since the last sampling event, algal density decreased greatly and is now considered low. Algal diversity also decreased at is now low. The assemblage consists mainly of golden algae, diatoms, and green algae. Trace amounts of dinoflagellates were observed. Water clarity decreased slightly and is now considered poor-fair.

Solitude Lake Management, Inc.
310 East Washington Ave, Suite C, Washington, NJ 07882
Phone (908) 850-0303 Fax (908) 850-4994

MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 7/15/2019	Examination Date: 7/16/2019	Amount Examined: 200 ml.
Site A: Olive Pond	Site B: Shadow Lake	Site C: Cove Pond

BACILLARIOPHYTA (Diatoms)	**A**	**B**	**C**
Asterionella			
Cyclotella	80	40	40
Cymbella			
Diatoma			
Fragilaria			
Melosira			
Navicula			
Nitzschia	20		
Pinnularia			
Rhizosolenia			
Stephanodiscus			
Stauroneis			
Synedra			
Tabellaria			
Cocconeis			

CHRYSOPHYTA (Golden Algae)	**A**	**B**	**C**
Dinobryon			10
Mallomonas			50
Synura			
Tribonema			
Uroglenopsis			

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium	20		
Coelastrum	10		
Eudorina			
Mougeotia			
Oedogonium			
Oocystis			
Pandorina	10	10	
Pediastrum			
Phytoconis			
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum	10	10	
Sphaerocystis			
Ulothrix			
Volvox			
Zygnema			
Quadrigula			
Gloeocystis			
Cosmarium			
Treubaria			
Cosmarium		10	

CYANOPHYTA (Blue-green Algae)	**A**	**B**	**C**
Anabaena	530	1730	590
Anacystis			
Aphanizomenon	60	330	10
Coelosphaerium			
Gomphosphseria			
Lyngbya			
Microcystis	10	50	
Oscillatoria			30
Pseudoanabaena			
Synechocystis			
Agmenellum			
PROTOZOA			
Actinophyrs			

EUGLENOPHYTA (Euglenoids)	**A**	**B**	**C**
Euglena			
Phacus			
Trachelomonas	180	120	110

PYRRHOPHYTA (Dinoflagellates)	**A**	**B**	**C**
Ceratium			440
Peridinium			

SITE	**A**	**B**	**C**
TOTAL GENERA:	10	8	8
TRANSPARENCY:	3.0'	2.5'	3.0'
ORGANISMS PER MILLILITER:	**930**	**2,300**	**1,280**

NOTES: Since the last sampling event, algal density increased at all three sites and is now moderate at site A but high at site B and C. Algal diversity increased at all three sites and is now moderate. The assemblage consists mainly of blue-green algae. Lower amounts of euglenoids, diatoms, and green algae were also observed. Moderate amounts of dinoflagellates were present at site C only. Traces of golden algae were observed at site C only. Water clarity decreased at all three sites and is now considered poor.

Solitude Lake Management, Inc.
310 East Washington Ave, Suite C, Washington, NJ 07882
Phone (908) 850-0303 Fax (908) 850-4994

MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 7/22/19	Examination Date: 7/22/19	Amount Examined: 200 ml.
Site A: Shadow Lake	Site B:	Site C:

BACILLARIOPHYTA (Diatoms)	**A**	**B**	**C**
Asterionella			
Cyclotella			
Cymbella			
Diatoma			
Fragilaria			
Melosira			
Navicula			
Nitzschia			
Pinnularia			
Rhizosolenia			
Stephanodiscus	40		
Stauroneis			
Synedra			
Tabellaria			
Cocconeis			

CHRYSOPHYTA (Golden Algae)	**A**	**B**	**C**
Dinobryon			
Mallomonas	10		
Synura			
Tribonema			
Uroglenopsis			

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus	20		
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			
Coelastrum	60		
Eudorina			
Mougeotia			
Oedogonium			
Oocystis			
Pandorina			
Pediastrum			
Phytoconis			
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum	50		
Sphaerocystis	80		
Ulothrix			
Volvox	10		
Zygnema			
Quadrigula			
Gloeocystis			
Cosmarium			
Treubaria			

CYANOPHYTA (Blue-green Algae)	**A**	**B**	**C**
Anabaena	2320		
Anacystis			
Aphanizomenon	2210		
Coelosphaerium			
Gomphosphseria			
Lyngbya			
Microcystis			
Oscillatoria			
Pseudoanabaena			
Synechocystis			
Agmenellum			
PROTOZOA			
Actinophyrs			

EUGLENOPHYTA (Euglenoids)	**A**	**B**	**C**
Euglena			
Phacus	20		
Trachelomonas			

PYRRHOPHYTA (Dinoflagellates)	**A**	**B**	**C**
Ceratium	20		
Peridinium	10		

SITE	**A**	**B**	**C**
TOTAL GENERA:	12		
TRANSPARENCY:	2.0'		
ORGANISMS PER MILLILITER:	**5350**		

NOTES: Sample collected due to a visible bloom observed in the field. The algal density is high with high diversity. The algal density has more than doubled since last week. The assemblage continues to be dominated by nuisance blue-green algae. Trace other groups of algae were also observed. Water clarity continues to be poor. Treatment recommended as soon as possible.

Solitude Lake Management, Inc.
310 East Washington Ave, Suite C, Washington, NJ 07882
Phone (908) 850-0303 Fax (908) 850-4994

MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 8/12/2019	Examination Date: 8/13/2019	Amount Examined: 200 ml.
Site A: Olive Pond	Site B: Shadow Lake	Site C: Cove Pond

BACILLARIOPHYTA (Diatoms)	**A**	**B**	**C**
Asterionella			
Cyclotella			
Cymbella			
Diatoma			
Fragilaria			
Melosira			
Navicula		10	
Nitzschia			
Pinnularia			
Rhizosolenia			
Stephanodiscus	160	20	
Stauroneis			
Synedra	10	30	20
Tabellaria			
Cocconeis			

CHRYSOPHYTA (Golden Algae)	**A**	**B**	**C**
Dinobryon			20
Mallomonas			30
Synura			
Tribonema			
Uroglenopsis			

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			
Coelastrum		30	
Eudorina			
Mougeotia	10	30	10
Oedogonium			
Oocystis			
Pandorina			
Pediastrum			
Phytoconis			
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum	30		10
Sphaerocystis	20		
Ulothrix			
Volvox			
Zygnema			
Quadrigula			
Gloeocystis			
Cosmarium			
Treubaria			

CYANOPHYTA (Blue-green Algae)	**A**	**B**	**C**
Anabaena	10	10	
Anacystis		20	
Aphanizomenon			
Coelosphaerium			
Gomphosphseria			
Lyngbya			
Microcystis			
Oscillatoria			
Pseudoanabaena			
Synechocystis			
Agmenellum			
PROTOZOA			
Actinophyrs			

EUGLENOPHYTA (Euglenoids)	**A**	**B**	**C**
Euglena			
Phacus	10		
Trachelomonas	40	20	60

PYRRHOPHYTA (Dinoflagellates)	**A**	**B**	**C**
Ceratium			60
Peridinium	10		

SITE	**A**	**B**	**C**
TOTAL GENERA:	9	8	7
TRANSPARENCY:	4.0'	4.5'	2.0'
ORGANISMS PER MILLILITER:	**300**	**170**	**210**

NOTES: Since the last sampling event, algal density decreased at all three sites and is now low. Algal diversity decreased at sites A and C but all three remain moderate. The assemblage consists mainly of euglenoids, green algae and diatoms. Low amounts of golden algae (site C), dinoflagellates (sites A and C), and blue-green algae (sites A and B) were also observed. Water clarity increased at sites A and B but decreased at site C. Sites A and B now have fair clarity while site C is poor.

Solitude Lake Management, Inc.
310 East Washington Ave, Suite C, Washington, NJ 07882
Phone (908) 850-0303 Fax (908) 850-4994

MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 8/27/2019	Examination Date: 8/28/2019	Amount Examined: 200 ml.
Site A: Olive Pond	Site B: Shadow Lake	Site C: Cove Pond

BACILLARIOPHYTA (Diatoms)	**A**	**B**	**C**
Asterionella			
Cyclotella			
Cymbella			
Diatoma			
Fragilaria			
Melosira			
Navicula			
Nitzschia			
Pinnularia			
Rhizosolenia			
Stephanodiscus		10	
Stauroneis			
Synedra		130	
Tabellaria			
Cocconeis			

CHRYSOPHYTA (Golden Algae)	**A**	**B**	**C**
Dinobryon			
Mallomonas			
Synura			
Tribonema			
Uroglenopsis			

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			
Coelastrum		180	
Eudorina			
Mougeotia			
Oedogonium			
Oocystis			
Pandorina			
Pediastrum			
Phytoconis			
Rhizoclonium			
Scenedesmus		40	
Spirogyra			
Staurastrum			
Sphaerocystis			
Ulothrix			
Volvox			
Zygnema			
Quadrigula		10	
Gloeocystis			
Cosmarium			
Treubaria			

CYANOPHYTA (Blue-green Algae)	**A**	**B**	**C**
Anabaena			
Anacystis			
Aphanizomenon			
Coelosphaerium			
Gomphosphseria			
Lyngbya			
Microcystis			
Oscillatoria			
Pseudoanabaena			
Synechocystis			
Agmenellum			
PROTOZOA			
Actinophyrs			

EUGLENOPHYTA (Euglenoids)	**A**	**B**	**C**
Euglena			
Phacus			
Trachelomonas			

PYRRHOPHYTA (Dinoflagellates)	**A**	**B**	**C**
Ceratium			
Peridinium			

SITE	**A**	**B**	**C**
TOTAL GENERA:		5	
TRANSPARENCY:		3.25’	
ORGANISMS PER MILLILITER:		**370**	

NOTES: Since the last sampling event, algal density increased but remains low at Shadow Lake. Algal diversity decreased and is now low. The assemblage consists mainly of green algae and diatoms. Water clarity decreased and is now considered fair.

Solitude Lake Management, Inc.
310 East Washington Ave, Suite C, Washington, NJ 07882
Phone (908) 850-0303 Fax (908) 850-4994

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1924711
Report Date: 06/20/19

SAMPLE RESULTS

Lab ID: L1924711-09
Client ID: WILDWOOD LAKE
Sample Location: DENVILLE, NJ

Date Collected: 06/10/19 12:30
Date Received: 06/10/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	2.7		NTU	0.20	0.06	1	-	06/11/19 02:18	121,2130B	JW
Nitrogen, Nitrate	ND		mg/l	0.100	0.032	1	-	06/11/19 19:21	121,4500NO3-F	MR
Phosphorus, Total	0.025		mg/l	0.010	0.003	1	06/14/19 10:30	06/17/19 09:45	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1924711
Report Date: 06/20/19

SAMPLE RESULTS

Lab ID: L1924711-08
Client ID: MOUNTAIN LAKE
Sample Location: DENVILLE, NJ

Date Collected: 06/10/19 12:10
Date Received: 06/10/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	1.2		NTU	0.20	0.06	1	-	06/11/19 02:18	121,2130B	JW
Nitrogen, Nitrate	0.035	J	mg/l	0.100	0.032	1	-	06/11/19 19:20	121,4500NO3-F	MR
Phosphorus, Total	0.012		mg/l	0.010	0.003	1	06/14/19 10:30	06/17/19 09:41	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1924711
Report Date: 06/20/19

SAMPLE RESULTS

Lab ID: L1924711-07
Client ID: GRUNDEN'S POND
Sample Location: DENVILLE, NJ

Sample Depth:
Matrix: Water

Date Collected: 06/10/19 11:45
Date Received: 06/10/19
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	2.7		NTU	0.20	0.06	1	-	06/11/19 02:18	121,2130B	JW
Nitrogen, Nitrate	ND		mg/l	0.100	0.032	1	-	06/11/19 19:18	121,4500NO3-F	MR
Phosphorus, Total	0.044		mg/l	0.010	0.003	1	06/12/19 12:50	06/13/19 10:56	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1924711
Report Date: 06/20/19

SAMPLE RESULTS

Lab ID: L1924711-06
Client ID: COVE LAKE
Sample Location: DENVILLE, NJ

Date Collected: 06/10/19 12:01
Date Received: 06/10/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	6.5		NTU	0.20	0.06	1	-	06/11/19 02:18	121,2130B	JW
Nitrogen, Nitrate	ND		mg/l	0.100	0.032	1	-	06/11/19 19:17	121,4500NO3-F	MR
Phosphorus, Total	0.090		mg/l	0.010	0.003	1	06/12/19 12:50	06/13/19 10:55	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1924711
Report Date: 06/20/19

SAMPLE RESULTS

Lab ID: L1924711-05
Client ID: SHADOW LAKE
Sample Location: DENVILLE, NJ

Date Collected: 06/10/19 11:35
Date Received: 06/10/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	1.9		NTU	0.20	0.06	1	-	06/11/19 02:18	121,2130B	JW
Nitrogen, Nitrate	ND		mg/l	0.100	0.032	1	-	06/11/19 19:12	121,4500NO3-F	MR
Phosphorus, Total	0.057		mg/l	0.010	0.003	1	06/12/19 12:50	06/13/19 10:55	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1924711
Report Date: 06/20/19

SAMPLE RESULTS

Lab ID: L1924711-04
Client ID: OLIVE POND
Sample Location: DENVILLE, NJ

Date Collected: 06/10/19 11:27
Date Received: 06/10/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	3.2		NTU	0.20	0.06	1	-	06/11/19 02:18	121,2130B	JW
Nitrogen, Nitrate	ND		mg/l	0.100	0.032	1	-	06/11/19 19:11	121,4500NO3-F	MR
Phosphorus, Total	0.062		mg/l	0.010	0.003	1	06/12/19 12:50	06/13/19 10:54	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1924711
Report Date: 06/20/19

SAMPLE RESULTS

Lab ID: L1924711-03
Client ID: SUNSET LAKE
Sample Location: DENVILLE, NJ

Date Collected: 06/10/19 11:00
Date Received: 06/10/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	1.8		NTU	0.20	0.06	1	-	06/11/19 02:18	121,2130B	JW
Nitrogen, Nitrate	0.044	J	mg/l	0.100	0.032	1	-	06/11/19 19:09	121,4500NO3-F	MR
Phosphorus, Total	0.016		mg/l	0.010	0.003	1	06/12/19 12:50	06/13/19 10:53	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1924711
Report Date: 06/20/19

SAMPLE RESULTS

Lab ID: L1924711-02
Client ID: CRYSTAL LAKE
Sample Location: DENVILLE, NJ

Date Collected: 06/10/19 11:15
Date Received: 06/10/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	0.98		NTU	0.20	0.06	1	-	06/11/19 02:18	121,2130B	JW
Nitrogen, Nitrate	ND		mg/l	0.100	0.032	1	-	06/11/19 19:08	121,4500NO3-F	MR
Phosphorus, Total	0.006	J	mg/l	0.010	0.003	1	06/12/19 12:50	06/13/19 10:52	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1924711
Report Date: 06/20/19

SAMPLE RESULTS

Lab ID: L1924711-01
Client ID: BIRCHWOOD LAKE
Sample Location: DENVILLE, NJ

Date Collected: 06/10/19 10:40
Date Received: 06/10/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	1.3		NTU	0.20	0.06	1	-	06/11/19 02:18	121,2130B	JW
Nitrogen, Nitrate	ND		mg/l	0.100	0.032	1	-	06/11/19 19:07	121,4500NO3-F	MR
Phosphorus, Total	0.007	J	mg/l	0.010	0.003	1	06/12/19 12:50	06/13/19 10:51	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1930993
Report Date: 07/25/19

SAMPLE RESULTS

Lab ID: L1930993-09
Client ID: OLIVE POND
Sample Location: MOUNTAIN LAKES, NJ

Sample Depth:
Matrix: Water

Date Collected: 07/15/19 10:00
Date Received: 07/15/19
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	33		NTU	0.20	--	1	-	07/16/19 00:27	121,2130B	JW
Nitrogen, Nitrate	0.120		mg/l	0.100	--	1	-	07/16/19 18:59	121,4500NO3-F	MR
Phosphorus, Total	0.210		mg/l	0.010	--	1	07/18/19 12:10	07/19/19 10:00	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1930993
Report Date: 07/25/19

SAMPLE RESULTS

Lab ID: L1930993-08
Client ID: SUNSET LAKE
Sample Location: MOUNTAIN LAKES, NJ

Date Collected: 07/15/19 09:20
Date Received: 07/15/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	1.7		NTU	0.20	--	1	-	07/16/19 00:27	121,2130B	JW
Nitrogen, Nitrate	ND		mg/l	0.100	--	1	-	07/16/19 18:58	121,4500NO3-F	MR
Phosphorus, Total	0.022		mg/l	0.010	--	1	07/18/19 12:10	07/19/19 10:00	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1930993
Report Date: 07/25/19

SAMPLE RESULTS

Lab ID: L1930993-07
Client ID: SHADOW LAKE
Sample Location: MOUNTAIN LAKES, NJ

Date Collected: 07/15/19 10:13
Date Received: 07/15/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	23		NTU	0.20	--	1	-	07/16/19 00:27	121,2130B	JW
Nitrogen, Nitrate	ND		mg/l	0.100	--	1	-	07/16/19 18:57	121,4500NO3-F	MR
Phosphorus, Total	0.112		mg/l	0.010	--	1	07/18/19 12:10	07/19/19 09:59	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1930993
Report Date: 07/25/19

SAMPLE RESULTS

Lab ID: L1930993-06
Client ID: COVE POND
Sample Location: MOUNTAIN LAKES, NJ

Sample Depth:
Matrix: Water

Date Collected: 07/15/19 10:30
Date Received: 07/15/19
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	8.1		NTU	0.20	--	1	-	07/16/19 00:27	121,2130B	JW
Nitrogen, Nitrate	ND		mg/l	0.100	--	1	-	07/16/19 18:55	121,4500NO3-F	MR
Phosphorus, Total	0.091		mg/l	0.010	--	1	07/18/19 12:10	07/19/19 09:58	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1930993
Report Date: 07/25/19

SAMPLE RESULTS

Lab ID: L1930993-05
Client ID: GRUNDEN'S POND
Sample Location: MOUNTAIN LAKES, NJ

Date Collected: 07/15/19 10:38
Date Received: 07/15/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	4.3		NTU	0.20	--	1	-	07/16/19 00:27	121,2130B	JW
Nitrogen, Nitrate	ND		mg/l	0.100	--	1	-	07/16/19 18:50	121,4500NO3-F	MR
Phosphorus, Total	0.088		mg/l	0.010	--	1	07/18/19 12:10	07/19/19 09:57	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1930993
Report Date: 07/25/19

SAMPLE RESULTS

Lab ID: L1930993-04
Client ID: CRYSTAL LAKE
Sample Location: MOUNTAIN LAKES, NJ

Date Collected: 07/15/19 09:41
Date Received: 07/15/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	1.8		NTU	0.20	--	1	-	07/16/19 00:27	121,2130B	JW
Nitrogen, Nitrate	ND		mg/l	0.100	--	1	-	07/16/19 18:49	121,4500NO3-F	MR
Phosphorus, Total	0.014		mg/l	0.010	--	1	07/18/19 12:10	07/19/19 09:53	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1930993
Report Date: 07/25/19

SAMPLE RESULTS

Lab ID: L1930993-03
Client ID: WILDWOOD LAKE
Sample Location: MOUNTAIN LAKES, NJ

Date Collected: 07/15/19 11:36
Date Received: 07/15/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	1.3		NTU	0.20	--	1	-	07/16/19 00:27	121,2130B	JW
Nitrogen, Nitrate	ND		mg/l	0.100	--	1	-	07/16/19 18:48	121,4500NO3-F	MR
Phosphorus, Total	0.024		mg/l	0.010	--	1	07/18/19 12:10	07/19/19 09:52	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1930993
Report Date: 07/25/19

SAMPLE RESULTS

Lab ID: L1930993-02
Client ID: MOUNTAIN LAKE
Sample Location: MOUNTAIN LAKES, NJ

Date Collected: 07/15/19 11:04
Date Received: 07/15/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	1.3		NTU	0.20	--	1	-	07/16/19 00:27	121,2130B	JW
Nitrogen, Nitrate	ND		mg/l	0.100	--	1	-	07/16/19 18:46	121,4500NO3-F	MR
Phosphorus, Total	0.017		mg/l	0.010	--	1	07/18/19 12:10	07/19/19 09:51	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1930993
Report Date: 07/25/19

SAMPLE RESULTS

Lab ID: L1930993-01
Client ID: BIRCHWOOD LAKE
Sample Location: MOUNTAIN LAKES, NJ

Date Collected: 07/15/19 08:45
Date Received: 07/15/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	1.7		NTU	0.20	--	1	-	07/16/19 00:27	121,2130B	JW
Nitrogen, Nitrate	ND		mg/l	0.100	--	1	-	07/16/19 18:45	121,4500NO3-F	MR
Phosphorus, Total	0.016		mg/l	0.010	--	1	07/18/19 12:10	07/19/19 09:50	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1936141
Report Date: 08/22/19

SAMPLE RESULTS

Lab ID: L1936141-09
Client ID: SHADOW LAKE
Sample Location: DENVILLE, NJ

Date Collected: 08/12/19 10:25
Date Received: 08/12/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	2.5		NTU	0.20	--	1	-	08/12/19 23:40	121,2130B	AS
Nitrogen, Nitrate	ND		mg/l	0.100	--	1	-	08/13/19 06:38	121,4500NO3-F	MR
Phosphorus, Total	0.063		mg/l	0.010	--	1	08/16/19 10:00	08/19/19 09:39	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1936141
Report Date: 08/22/19

SAMPLE RESULTS

Lab ID: L1936141-08
Client ID: GRUNDENS POND
Sample Location: DENVILLE, NJ

Date Collected: 08/12/19 10:50
Date Received: 08/12/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	3.4		NTU	0.20	--	1	-	08/12/19 23:40	121,2130B	AS
Nitrogen, Nitrate	ND		mg/l	0.100	--	1	-	08/13/19 06:37	121,4500NO3-F	MR
Phosphorus, Total	0.056		mg/l	0.010	--	1	08/16/19 10:00	08/19/19 09:38	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1936141
Report Date: 08/22/19

SAMPLE RESULTS

Lab ID: L1936141-07
Client ID: CRYSTAL LAKE
Sample Location: DENVILLE, NJ

Date Collected: 08/12/19 10:00
Date Received: 08/12/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	3.2		NTU	0.20	--	1	-	08/12/19 23:40	121,2130B	AS
Nitrogen, Nitrate	ND		mg/l	0.100	--	1	-	08/13/19 06:35	121,4500NO3-F	MR
Phosphorus, Total	0.020		mg/l	0.010	--	1	08/16/19 10:00	08/19/19 09:35	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1936141
Report Date: 08/22/19

SAMPLE RESULTS

Lab ID: L1936141-06
Client ID: BIRCHWOOD LAKE
Sample Location: DENVILLE, NJ

Date Collected: 08/12/19 09:30
Date Received: 08/12/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	1.4		NTU	0.20	--	1	-	08/12/19 23:40	121,2130B	AS
Nitrogen, Nitrate	ND		mg/l	0.100	--	1	-	08/13/19 06:30	121,4500NO3-F	MR
Phosphorus, Total	0.019		mg/l	0.010	--	1	08/16/19 10:00	08/19/19 09:34	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1936141
Report Date: 08/22/19

SAMPLE RESULTS

Lab ID: L1936141-05
Client ID: SUNSET LAKE
Sample Location: DENVILLE, NJ

Date Collected: 08/12/19 09:50
Date Received: 08/12/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	3.0		NTU	0.20	--	1	-	08/12/19 23:40	121,2130B	AS
Nitrogen, Nitrate	ND		mg/l	0.100	--	1	-	08/13/19 06:29	121,4500NO3-F	MR
Phosphorus, Total	0.032		mg/l	0.010	--	1	08/16/19 10:00	08/19/19 09:32	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1936141
Report Date: 08/22/19

SAMPLE RESULTS

Lab ID: L1936141-04
Client ID: OLIVE POND
Sample Location: DENVILLE, NJ

Date Collected: 08/12/19 10:15
Date Received: 08/12/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	2.8		NTU	0.20	--	1	-	08/12/19 23:40	121,2130B	AS
Nitrogen, Nitrate	ND		mg/l	0.100	--	1	-	08/13/19 06:28	121,4500NO3-F	MR
Phosphorus, Total	0.085		mg/l	0.010	--	1	08/16/19 10:00	08/19/19 09:31	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1936141
Report Date: 08/22/19

SAMPLE RESULTS

Lab ID: L1936141-03
Client ID: COVE POND
Sample Location: DENVILLE, NJ

Date Collected: 08/12/19 10:40
Date Received: 08/12/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	3.3		NTU	0.20	--	1	-	08/12/19 23:40	121,2130B	AS
Nitrogen, Nitrate	ND		mg/l	0.100	--	1	-	08/13/19 06:26	121,4500NO3-F	MR
Phosphorus, Total	0.039		mg/l	0.010	--	1	08/16/19 10:00	08/19/19 09:30	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1936141
Report Date: 08/22/19

SAMPLE RESULTS

Lab ID: L1936141-02
Client ID: WILDWOOD LAKE
Sample Location: DENVILLE, NJ

Date Collected: 08/12/19 11:45
Date Received: 08/12/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	1.1		NTU	0.20	--	1	-	08/12/19 23:40	121,2130B	AS
Nitrogen, Nitrate	ND		mg/l	0.100	--	1	-	08/13/19 06:25	121,4500NO3-F	MR
Phosphorus, Total	0.019		mg/l	0.010	--	1	08/16/19 10:00	08/19/19 09:29	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1936141
Report Date: 08/22/19

SAMPLE RESULTS

Lab ID: L1936141-01
Client ID: MOUNTAIN LAKE
Sample Location: DENVILLE, NJ

Date Collected: 08/12/19 11:15
Date Received: 08/12/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	1.9		NTU	0.20	--	1	-	08/12/19 23:40	121,2130B	AS
Nitrogen, Nitrate	ND		mg/l	0.100	--	1	-	08/13/19 06:24	121,4500NO3-F	MR
Phosphorus, Total	0.030		mg/l	0.010	--	1	08/16/19 10:00	08/19/19 09:28	121,4500P-E	SD

Project Name: BIRCHWOOD
Project Number: BIRCHWOOD

Lab Number: L1936869
Report Date: 08/24/19

SAMPLE RESULTS

Lab ID: L1936869-01
Client ID: BIRCHWOOD
Sample Location: MTN LAKES, NJ

Date Collected: 08/15/19 13:30
Date Received: 08/15/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Nitrogen, Ammonia	0.148		mg/l	0.075	--	1	08/16/19 16:00	08/19/19 22:46	121,4500NH3-BH	AT
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	08/16/19 06:18	121,4500NO3-F	MR
Nitrogen, Nitrate	ND		mg/l	0.100	--	1	-	08/16/19 06:18	121,4500NO3-F	MR
Nitrogen, Total Kjeldahl	0.578		mg/l	0.300	--	1	08/20/19 12:37	08/20/19 23:31	121,4500NH3-H	AT
Phosphorus, Total	0.026		mg/l	0.010	--	1	08/20/19 12:25	08/21/19 10:24	121,4500P-E	SD