BOROUGH OF MOUNTAIN LAKES
MORRIS COUNTY, NJ

2017 YEAR-END REPORT
LAKES MANAGEMENT PROGRAM
BOROUGH OF MOUNTAIN LAKES

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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 2017. 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 2017 summary discussions, additional topics such as the fecal coliform sampling that occurred at Birchwood and Mountain Lake, water clarity at Mountain Lake, the Lakes Cleaning Program, and nutrient loading in all of the lakes will be discussed. Finally, a 2017 summary is presented as well as specific Lake Management strategies for 2018. Copies of all of 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 2017	Last Observed
Myriophyllum spicatum	Eurasian Water milfoil	**X**	
Potamogeton epihydrus	Ribbon-leaf Pondweed	**X**	
Utricularia vulgaris	Common Bladderwort		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		2011
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	**X**	

The table above depicts a list of aquatic plants observed at Mountain Lakes in 2017 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.

2017 Aquatic Macrophyte Management

Birchwood Lake			
Date	**Product Applied**	**Acres Treated**	**Target Species**
5/24/16	Copper Sulfate	3.0	Filamentous Algae
	Clipper	0.5	Pondweeds/lilies
6/13/16	AquaNeat	1.0	Water lilies

Birchwood Lake			
Date	**Product Applied**	**Acres Treated**	**Target Species**
5/2/17	Clipper	1.0	Pondweeds
6/8/17	AquaNeat	0.15	Water lilies

In early 2017 at Birchwood Lake, surveys of the lake were highlighted by observations of usually trace to sparse curly-leaf pondweed, and traces of leafy pondweed. By the middle of April white water lilies were emerging to the lake surface in the shallow areas of the lake, including areas adjacent to the beach and swim lanes. On May 2nd, an application of the herbicide Clipper was applied to control growth of curly-leaf pondweed throughout the swimming areas of the lake. Through the middle of May to early June the plant assemblage increased in density to include trace to sparse density bassweed, and trace occurrences of ribbon-leaf pondweed, water shield, spatterdock and creeping bladderwort.

On June 8th an application of AquaNeat was performed as a foliar application for targeted control of nuisance density water lily growth near the beach and around the areas of the swim docks. Only two herbicide applications were required to maintain suitable conditions within the recreational portion of the lake. In late July, traces of Robbins' pondweed developed near the outlet. Throughout the remainder of the management season, generally acceptable densities of desirable plant species were observed in the recreational area of the lake.

Crystal Lake			
Date	**Product Applied**	**Acres Treated**	**Target Species**
5/19/16	Copper Sulfate	1.0	Filamentous Algae
7/22/16	Schooner	0.56	Bassweed/pondweeds
8/18/16	Aquathol K	0.85	Bassweed/pondweeds
	Copper Sulfate	0.10	Filamentous Algae

Crystal Lake			
Date	**Product Applied**	**Acres Treated**	**Target Species**
5/4/17	Reward	6	Curly-leaf pondweed
	Copper Sulfate	1	Filamentous Algae
6/6/17	Copper Sulfate	4	Filamentous Algae

Early season conditions at Crystal Lake included trace amounts of curly-leaf pondweed and bassweed developing by early April. Through the end of April densities of these two plant species remained at trace to sparse density. On May 4th an application of the herbicide Reward was conducted for management of curly-leaf pondweed, and an application of copper sulfate was implemented for minor densities of filamentous algae that were developing along portions of the perimeter, mostly in the upper end of the lake. A supplemental algaecide treatment was conducted on June 6th, for increased filamentous algae densities that were present along most areas of the shoreline edge. Outside of the two algaecide application dates, algae densities were generally limited to trace shoreline occurrences.

From early July through the end of the management season, growth of bassweed and water lilies increased in density, most specifically in the upper shallow portions of the lake basin. Although some moderate density growth was present, herbicide application was not required to maintain suitable lake conditions. During the month of September development of trace densities of water shield and brittle naiad were noted.

Sunset Lake			
Date	**Product Applied**	**Acres Treated**	**Target Species**
4/28/16	Copper Sulfate	3.0	Filamentous Algae
7/27/16	Copper Sulfate	2.0	Filamentous Algae
8/18/16	Copper Sulfate	4.0	Filamentous Algae
	Reward	4.0	Naiad sp.

Sunset Lake			
Date	**Product Applied**	**Acres Treated**	**Target Species**
4/18/17	Copper Sulfate	5	Filamentous Algae
6/22/17	Copper Sulfate	1.9	Filamentous Algae
7/6/17	Copper Sulfate	2.9	Filamentous/Unicellular Algae

Management of Sunset Lake in 2017 was limited to three applications of copper sulfate for management of filamentous algae on three occasions, and additionally, control of unicellular algae on July 6th. In the early part of the season, submersed aquatic plant growth was limited to trace density of curly-leaf and leafy pondweed. Lake conditions remained fairly consistent through late May, when water lilies started to breach the surface in the upper end of the lake adjacent to the inlet. Creeping bladderwort was observed initially in early June, and remained present through the season at low densities. By early September water lilies achieved densities that will likely result in the need for

management during the 2018 season. Overall, this lake maintained suitable conditions for the majority of the management season.

Olive Lake			
Date	**Product Applied**	**Acres Treated**	**Target Species**
7/14/16	Clipper	0.4	Watermeal
8/5/16	SeClear	0.4	Unicellular Algae

Olive Lake			
Date	**Product Applied**	**Acres Treated**	**Target Species**
5/4/17	Clipper	0.4	Curly-leaf Pondweed
8/2/17	Clipper	0.3	Water meal
8/23/17	Clipper	0.12	Water meal
9/26/17	Clipper	0.2	Water meal

Surveys of Olive Pond through the spring and early summer indicated overall favorable conditions at this water body, with a clean water surface, and occasionally turbid water conditions. An application of the herbicide Clipper was performed on May 4th to control sparse densities of curly-leaf pondweed.

From the third week in June through the remainder of the management season, Olive Pond supported sparse to heavy densities of water meal and blue-green algae. On many dates of monitoring the dissolved oxygen concentrations were below the limits that support herbicide or algaecide treatments without risk of fish mortality. On three dates the herbicide Clipper was able to be applied for control of water meal when water quality was suitable to allow an application. Due to the intense "blooming" of water meal, the plants were able to rapidly propagate and recolonize significant portions of the pond surface between permitted treatment intervals. Additional discussion regarding Olive Pond will be addressed in the recommendations portion of this report.

Shadow Lake			
Date	**Product Applied**	**Acres Treated**	**Target Species**
4/19/16	SeClear	1.3	Filamentous Algae
7/14/16	Clipper	0.8	Watermeal/duckweeds
8/5/16	SeClear	1.3	Unicellular Algae

Shadow Lake			
Date	**Product Applied**	**Acres Treated**	**Target Species**
5/4/17	Clipper	1.3	Curly-leaf pondweed
	Copper Sulfate	1.3	Filamentous Algae
7/6/17	Clipper	0.25	Water meal
8/2/17	Clipper	0.6	Water meal
8/23/17	Clipper	0.18	Duckweed
9/7/17	Clipper	0.18	Water meal
9/26/17	Clipper	0.5	Water meal

Shadow Lake supported similar seasonal aesthetics and aquatic vegetation growth as Olive Pond during the 2017 season. The spring and early summer only saw minimal filamentous algae growth, and an herbicide application for control of curly-leaf pondweed. By late June, water meal and blue-green algae growth dominated the aquatic habitat. Due to the aeration system that is installed in Shadow Lake, dissolved oxygen concentrations through the season remained healthy, and allowed for more aggressive treatment. There were five herbicide applications conducted to manage nuisance growth of water meal and duckweed. Similar to Olive Pond, additional discussion and recommendations will be offered at the end of this report.

Cove Lake			
Date	**Product Applied**	**Acres Treated**	**Target Species**
5/24/16	Copper Sulfate	0.45	Filamentous Algae

Cove Lake			
Date	**Product Applied**	**Acres Treated**	**Target Species**
8/2/17	Clipper	0.45	Water meal

Throughout the 2017 management season, Cove Lake maintained favorable aesthetics, although the water had a turbid appearance during most inspections. The lake supported usually trace amounts of filamentous algae, curly-leaf pondweed, duckweed and water meal, and only required one herbicide application in early August for water meal management. Water lilies are also established in the lake, but currently at desirable densities.

Grunden's Pond			
Date	**Product Applied**	**Acres Treated**	**Target Species**
5/4/16	Reward	1.0	Curly-leaf Pondweed
5/24/16	Copper Sulfate	0.86	Filamentous Algae
6/21/16	Clipper	0.5	Duckweeds
9/8/16	Clipper	1.25	Pondweeds

Grunden's Pond

Date	Product Applied	Acres Treated	Target Species
4/5/17	Seclear	1.0	Filamentous Algae
4/19/17	Captain	0.5	Filamentous Algae
4/26/17	Reward	1.3	Curly-leaf pondweed
5/2/17	Captain	0.83	Filamentous Algae
5/16/17	Seclear	1.3	Filamentous Algae
6/8/17	Seclear	1.0	Filamentous Algae
	AquaNeat	0.05	Water Primrose
6/26/17	Captain	0.1	Filamentous Algae
7/6/17	Clipper	0.75	Leafy Pondweed
8/2/17	Clipper	0.25	Watermeal
8/23/17	Clipper	0.25	Duckweed
9/7/17	Captain	0.5	Filamentous Algae

During the 2017 management season Grunden's Pond experienced repetitive growth of filamentous algae, curly-leaf pondweed and water primrose that occupied varying portions of the pond throughout the season. This pond also experienced low water levels throughout most of the year as a result of an unconfirmed leak near the outlet into Mountain Lake. This reduced water level, coupled with nutrient loading, enabled the continued development of nuisance aquatic vegetation growth. Through the season a total of eleven application dates were required to control nuisance growth. Due to the shallow water depth, water primrose was able to develop more extensively along the shoreline edge.

Mountain Lake

Date	Product Applied	Acres Treated	Target Species
4/16/16	Sonar AS	76.6	Eurasian Water Milfoil
	Copper Sulfate	9.6	Filamentous Algae
5/23/16	Copper Sulfate	13.0	Filamentous Algae
6/17/16	Copper Sulfate	3.7	Filamentous Algae
9/7/16	Copper Sulfate	38.3	Unicellular Algae

Mountain Lake			
Date	**Product Applied**	**Acres Treated**	**Target Species**
5/4/17	Reward	6	Curly-leaf Pondweed
	Copper Sulfate	5	Filamentous Algae
6/6/17	Copper Sulfate	6.2	Filamentous Algae
6/8/17	Cutrine Plus	0.1	Filamentous Algae
6/28/17	Schooner	2	Bassweed
7/6	Clipper	1	Leafy Pondweed
7/12/17	Tribune	38.3	Leafy Pondweed
	Schooner	2	Bassweed
	Copper Sulfate	10	Filamentous Algae
8/29/17	Cutrine Plus	1	Filamentous Algae
9/7/17	Cutrine Plus	0.1	

Overall, management at Mountain Lake in 2017 was limited, 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 herbicide Reward was performed for management of curly-leaf pondweed in specific areas of the lake. Two small localized herbicide applications were required to manage nuisance growth of bassweed in the southern end of the lake. The only large scale herbicide application of the season was conducted on July 12th to control widespread growth of leafy pondweed that was inhabiting many areas of the lake at moderate density, and growing to the lake surface. Through the season a total of six algaecide applications were required to manage nuisance densities of filamentous algae, although the total treatment area was limited to 22.4 acres.

Wildwood Lake			
Date	**Product Applied**	**Acres Treated**	**Target Species**
4/20/16	Reward	5.0	Curly-leaf Pondweed
4/28/16	Alum	15.7	Nutrient Inactivation
6/23/16	Reward	4.0	Leafy Pondweed
	Copper Sulfate	4.0	Filamentous Algae
7/19/16	Reward	7.85	Naiad sp.
8/3/16	Alum	15.7	Nutrient Inactivation
Canal			
6/21/16	Reward	0.4	Coontail
8/25/16	Clipper	1.0	Fanwort

Wildwood Lake			
Date	**Product Applied**	**Acres Treated**	**Target Species**
4/17/17	Copper Sulfate	7	Filamentous Algae
4/18/17	Aluminum Sulfate	15.7	Total Phosphorous
5/4/17	Reward	7	Curly-leaf Pondweed
5/26/17	Copper Sulfate	7.8	Filamentous Algae
6/28/17	Copper Sulfate	3.2	Filamentous Algae
7/6/17	Tribune	3.5	Leafy Pondweed
7/20/17	Aluminum Sulfate	15.7	Total Phosphorus
8/8/17	Tribune	7.8	Brittle naiad
	Copper Sulfate	7.8	Filamentous algae
10/2017	Clipper	0.8	Fanwort

In 2017, Wildwood Lake required numerous management efforts to maintain suitable conditions throughout the season, which is typical for this shallow-water basin which traditionally is quite productive.

Filamentous algae were targeted on four dates in 2017. The applications targeted a total of 25.8 acres from early April through the end of the season. Three herbicide applications were required in the main basin in 2017. This included a 7.0 acre early season curly-leaf pondweed application, an early July 3.5 acre treatment targeting leafy pondweed, and a August application targeting naiad growth.

A usual lake management practice has been the use of Alum early in the season and late in the season at Wildwood Lake. The early season application is typically conducted in late April, which is typical. The late season Alum application was conducted on July 20th.

In 2017, the canal between Wildwood Lake and Mountain Lake was treated once for fanwort growth as a rapid response treatment to attempt eradication of fanwort, an aggressive exotic submersed plant not documented at Mountain Lakes until 2016. The canal and Wildwood Lake will require additional survey effort in 2018 to monitor any re-growth of fanwort.

Water Quality Monitoring Program

In 2017, 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 5, July 10, and

August 14. The water chemistry data sheets from a NJ certified laboratory are located in the Appendix of this report.

Below is a brief description of the different water quality parameters measured at Mountain Lakes in 2017, and a primer on phytoplankton. Following these descriptions are brief summaries of the 2017 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 2018.

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.

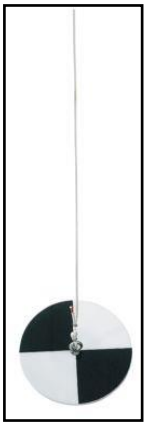
Temperature preferences vary among aquatic biota. Since water temperature typically varies between 5 ºC and 30 ºC during the season, most aquatic biota can flourish under this wide range of temperatures. Of more concern is thermal shock, which occurs when temperature rapidly changes in a short amount 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. A 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 actually 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.

A Phytoplankton Primer

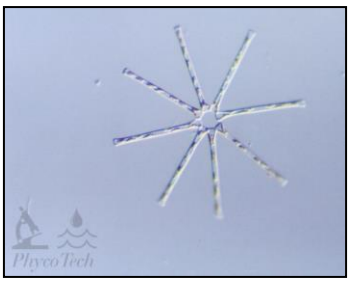
Lakes typically contain three broad categories of phytoplankton (also sometimes referred to as algae). These include filamentous phytoplankton, macroscopic multi-branched phytoplankton (which appear similar to submersed plants), and unicellular phytoplankton. Each category shall be discussed in turn, although the results of the 2017 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.

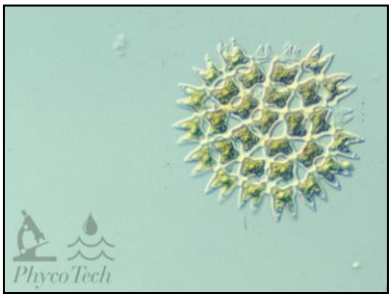
Phytoplankton Group Summary



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).

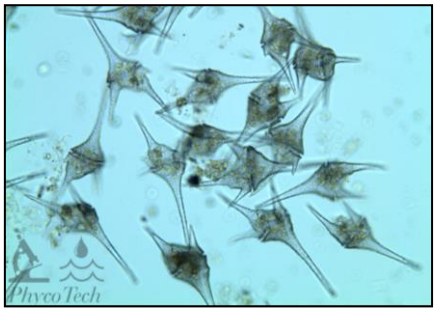
Golden Algae are typically yellow or light brown in color. Cell size is usually small oval shaped with a partially empty area, but several genera create colonies of smaller cells. Most have two flagella, and some type of scales or a rigid coating that grants it a fuzzy appearance. However, a few filamentous 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 algae 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 actually 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 sometime 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*.

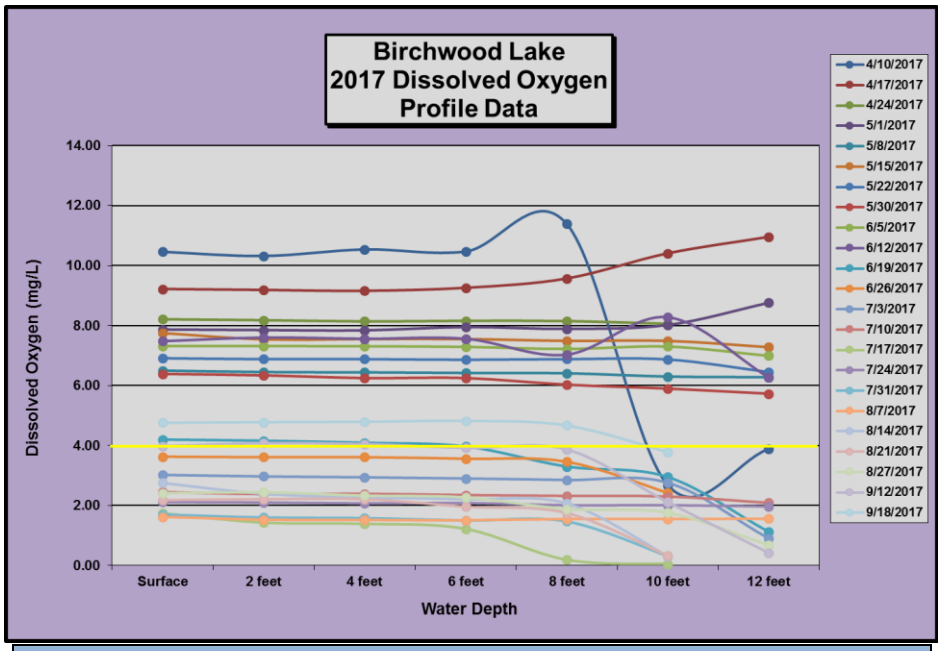
2017 Water Quality Results for Mountain Lakes

Birchwood Lake

Birchwood Lake	units	6/5/17	7/10/17	8/14/17
Temperature	ºC	19.1	24.3	23.5
Dissolved Oxygen	mg/L	7.32	**2.45**	**2.75**
Alkalinity	mg/L	44	60	40
pH	SU	6.75	6.5	6.75
Nitrate	mg/L	ND	ND	0.083
Total Phosphorus	mg/L	0.011	0.01	**0.05**
Turbidity	NTU	0.95	1.0	1.4
Water Clarity	feet	8.5	5 est.	6.5

In 2017, water temperature readings were seasonally appropriate in Birchwood Lake, ranging from 19.1°C in June to 24.3 °C in July, and finally 23.5 °C in August. Surface water temperatures were similar to data collected in previous seasons. Despite the addition of a second compressor a few seasons ago, dissolved oxygen values throughout the water column continue to be depressed, especially on weeks later than early June. This pattern has been observed over the past several years.

On the next page is a graph depicting all of the dissolved oxygen profiles conducted at Birchwood Lake in 2017, followed by graphs of the 2008 through 2015 profile data. The 2017 data was similar to data collected in previous years. 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 late 2015 (and in 2014).


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
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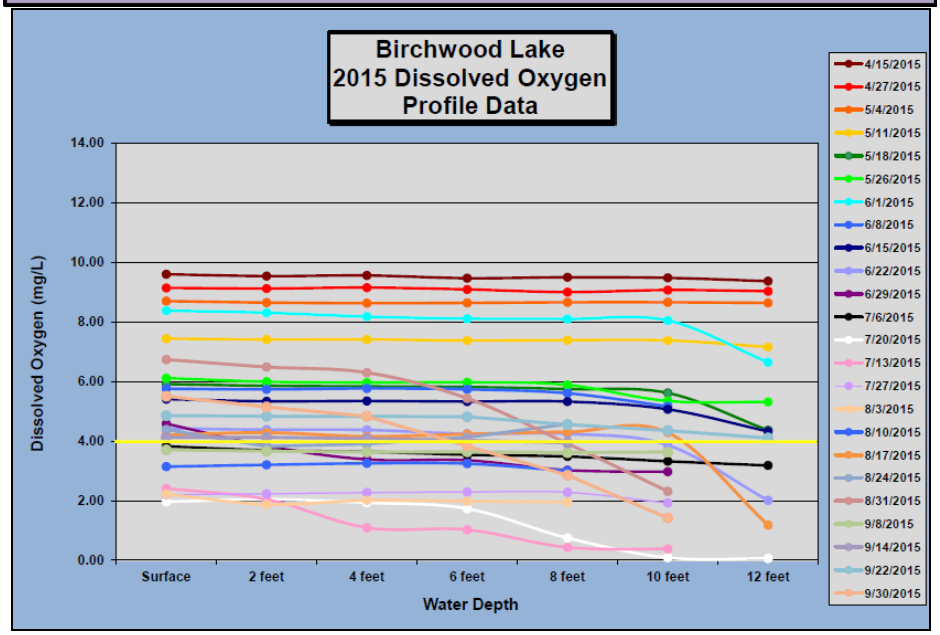
8/14/2017
8/21/2017
8/27/2017
9/12/2017
9/18/2017


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
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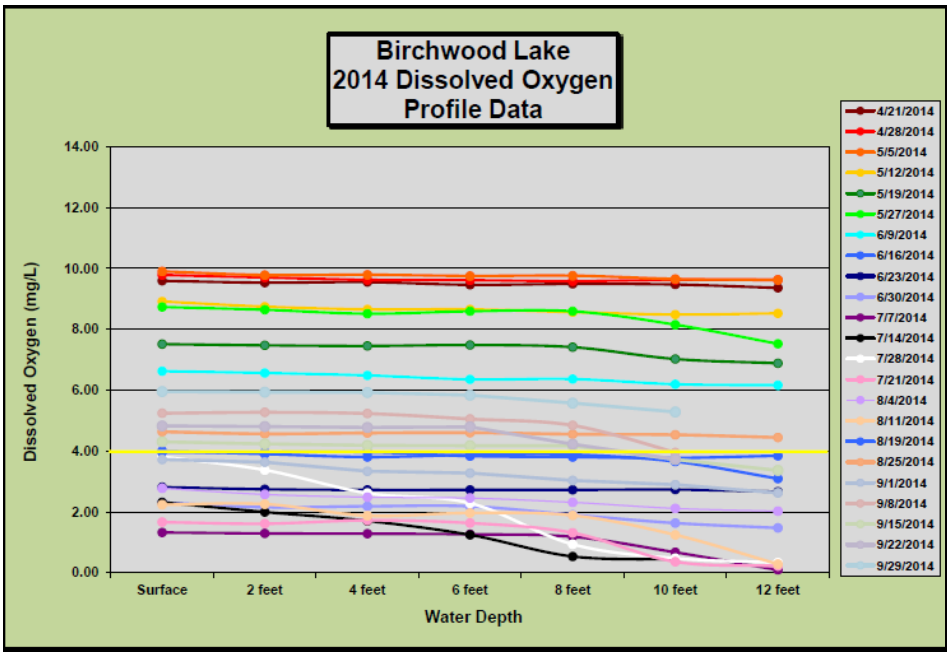
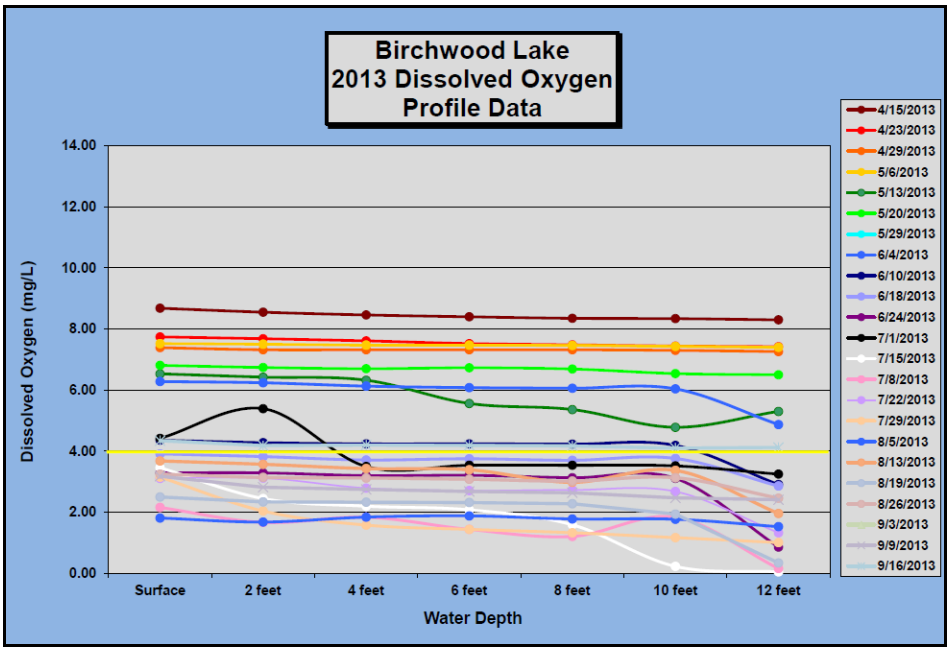
9/8/2015
9/14/2015
9/22/2015
9/30/2015


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
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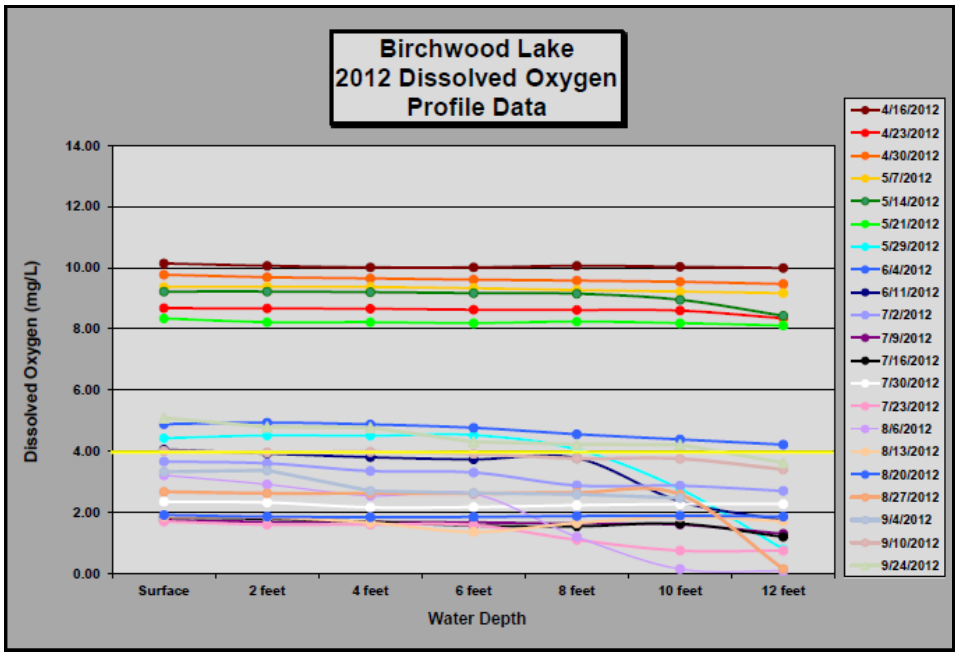
8/26/2013
9/3/2013
9/9/2013
9/16/2013


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
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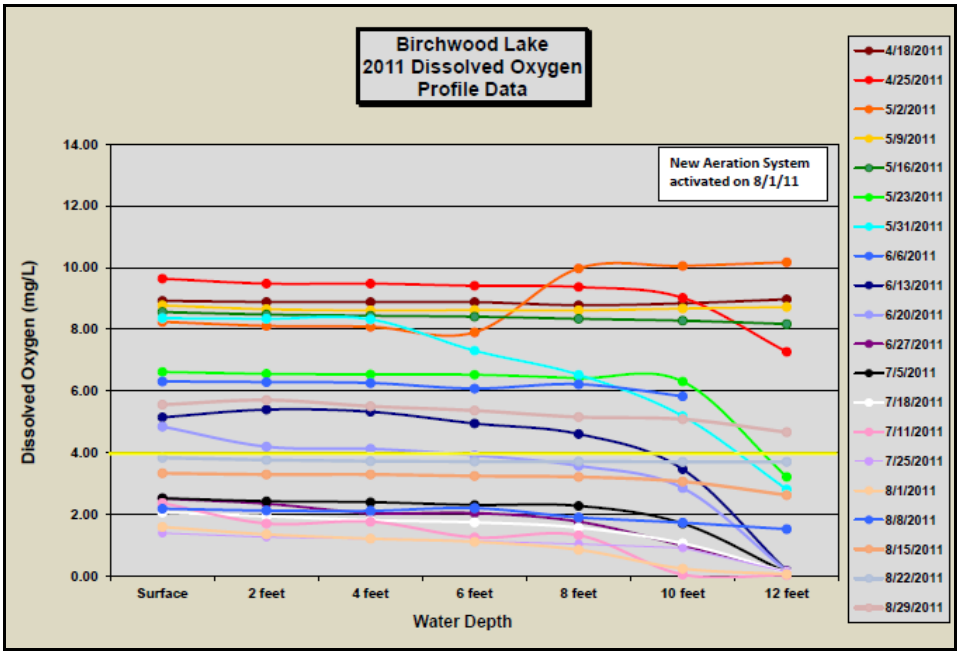
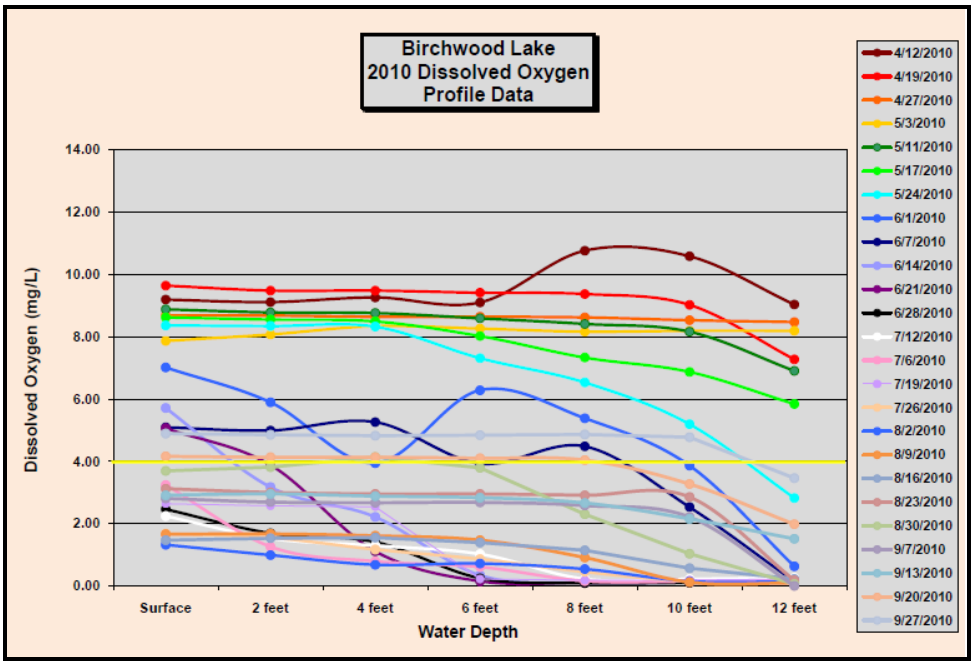
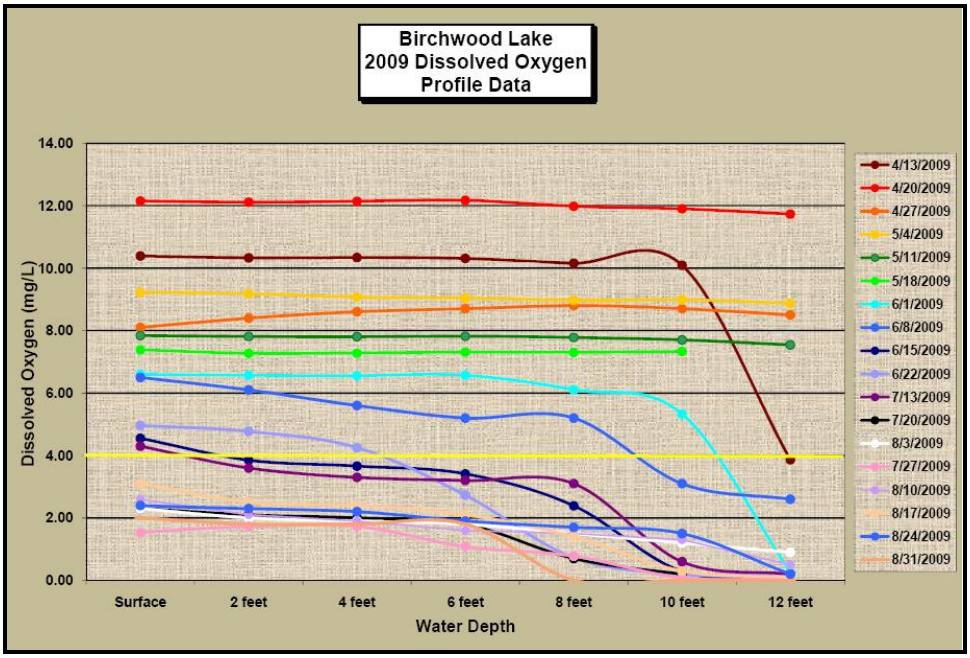
8/27/2012
9/4/2012
9/10/2012
9/24/2012


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


Birchwood Lake
2009 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
4/13/2009
4/20/2009
4/27/2009
5/4/2009
5/11/2009
5/18/2009
6/1/2009
6/8/2009
6/15/2009
6/22/2009
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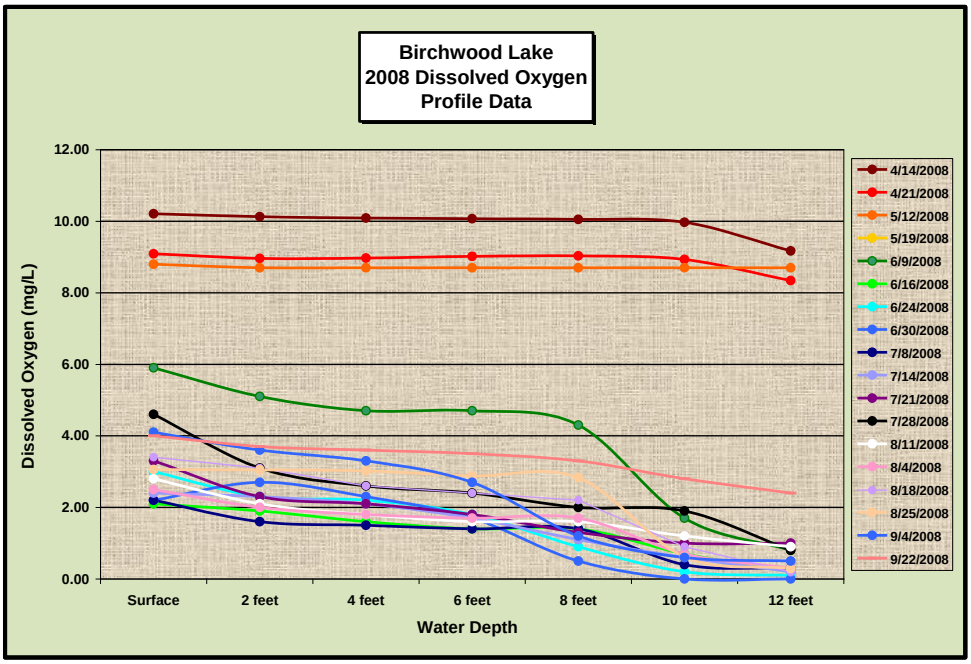
8/17/2009
8/24/2009
8/31/2009



The alkalinity of Birchwood Lake continues to be the lowest in the Mountain Lakes chain. In 2017, it ranged from 40 mg/L to 60 mg/L, a slight increase when compared to historic measurements in this basin. Birchwood Lake also traditionally has the lowest pH (slightly acidic) of all the Mountain Lakes. In 2017, the pH was 6.50 to 6.75 on all dates. This is suitable when compared to historical pH values in this basin. Nitrate levels were undetected during two sampling events in 2017, while in August the Nitrate level was recorded as 0.083 mg/L. The total phosphorus in Birchwood Lake was suitable during June and July, at 0.011 mg/L and 0.01 mg/L, respectively, and then increased to 0.05 mg/L in August. The August reading is elevated to eutrophic levels, and may be contributed to the depressed benthic oxygen levels allowing for increased release of phosphorous from the sediment. The turbidity of Birchwood Lake was consistent all season long, ranging from 0.95 in June to 1.40 NTU in August, well within acceptable values. Water clarity ranged from 5.0 feet to 8.5 feet, which is favorable through the season.

Birchwood Lake

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae (orgs/mL)
6/5/2017	4%	67%	29%					**240**
6/19/2017		33%	50%				17%	**180**
7/10/2017			100%					**140**
7/24/2017			92%				8%	**130**
8/7/2017	2%	2%	56%	38%		2%		**500**
8/21/2017	43%	4%	45%	7%		1%		**830**

In 2017, phytoplankton assemblages at Birchwood Lake were light and favorable through the end of July, with the algal community consisting of mostly golden and green algae genera. On August 7th, the assemblage increased in density with green algae still dominant with 280 orgs./mL, but low density of blue-green algae (190 orgs./mL) also present, but not a density that would create any negative impact to water quality. This trend continued in late August, with diatoms increasing in density. Overall, the algal community was still favorable. Blue green algae were only observed during the month of August, which corresponds with the spike of total phosphorous observed in August, providing the appropriate nutrient loading to support higher density algae blooms.

Crystal Lake

Crystal Lake	units	6/5/17	7/10/17	8/14/17
Temperature	ºC	19.9	24.6	25.4
Dissolved Oxygen	mg/L	9.59	6.38	7.62
Alkalinity	mg/L	48	65	42
pH	SU	7.25	7.25	8.0
Nitrate	mg/L	ND	ND	0.092
Total Phosphorus	mg/L	0.01	0.009	**0.046**
Turbidity	NTU	1.1	1.4	1.4
Water Clarity	feet	6 est	5 est	6

In 2017, 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 6.38 mg/L to 9.59 mg/L. Alkalinity ranged from 42 mg/L to 65 mg/L, which is typical for this basin and similar to last season. The pH of Crystal Lake ranged from 7.25 (in June and July) to 8.0 in August. This is suitable to previous year's measurements, although the reading of 8.0 is slightly elevated compared to seasonally normal values. Water clarity was considered good to moderate throughout much of the season this year. It was estimated on all dates. In June it was 6.0 feet, which is good for early in the summer. In July, it was estimated at 5.0 feet, which is still suitable for mid-season. In August, it increased back up to 6.0 feet. Nitrate was undetected during the first two sampling events, and was elevated during the August sampling event, and represented the first detected measurement over the past five years or longer. Total phosphorus was during June and July in 2017, and increased to 0.046 mg/L in August. This increase in total phosphorous corresponds to the increase observed in Birchwood Lake. In 2017, turbidity ranged from 1.1 NTU in June, and increased to 1.4 NTU in July and August.

Crystal Lake

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae (orgs/mL)
6/5/2017		16%	68%	5%			11%	**190**
6/19/2017			91%				9%	**230**
7/10/2017		33%	56%	11%				**90**
7/24/2017		26%	68%	6%				**190**
8/7/2017	9%		84%	7%				**760**
8/21/2017	7%	4%	89%					**460**

In 2017, phytoplankton abundance at Crystal Lake was considered light and favorable on five out the six sampling events. On August 7th, the phytoplankton density increased from increased density of green algae genera, with only traces of blue-green algae. During the last sampling event on August 21st, green algae comprised 89% of the total assemblage, with no observed blue-green algae. This year, phytoplankton abundance ranged from 190 organisms per mL to 760 organisms per mL.. Golden algae were observed on four dates, and diatoms were observed during the two sampling events in August. In the past this basin often hosted a late season blue-green algae bloom that required treatment. Trace dinoflagellates were observed in June only. Although total phytoplankton abundance increased in August, there was no visual impact to water clarity, and no treatments were required in 2017 to target phytoplankton growth.

Sunset Lake

Sunset Lake	units	6/5/17	7/10/17	8/14/17
Temperature	ºC	19.8	24.4	25.9
Dissolved Oxygen	mg/L	9.46	6.82	8.02
Alkalinity	mg/L	52	45	62
pH	SU	7	7.25	8.0
Nitrate	mg/L	ND	ND	0.075
Total Phosphorus	mg/L	0.024	0.017	0.019
Turbidity	NTU	2.3	2.2	1.2
Water Clarity	feet	5 est	4 est	5 est

In 2017, 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 6.82 mg/L to 9.46 mg/L. Alkalinity results in 2017 ranged from 45 mg/L in July to 62 mg/L in August. The 2017 average Alkalinity was calculated at 53 mg/L, which is higher than the previous season average, but suitable when compared to seasonal regional data. In 2017, the pH ranged from 7.0 in June to 8.0 in August. These values are suitable, and similar to data collected in previous seasons. Nitrate was undetected during June and July in 2017, a similar trend observed the last several seasons in this basin. However, in August Nitrate was recorded at 0.075 mg/L, which is below thresholds for nuisance growth, but is unusual for this lake. Total phosphorus levels were low during each sampling event, ranging from 0.017 mg/L in July to 0.024 mg/L in June. Turbidity was 2.3 NTU in June, decreased slightly to 2.2 NTU in July and then decreased further to 1.2 NTU in August. Since 2014, average turbidity has declined, and that trend continued in 2017 with an average of 1.9 NTU.

Sunset Lake

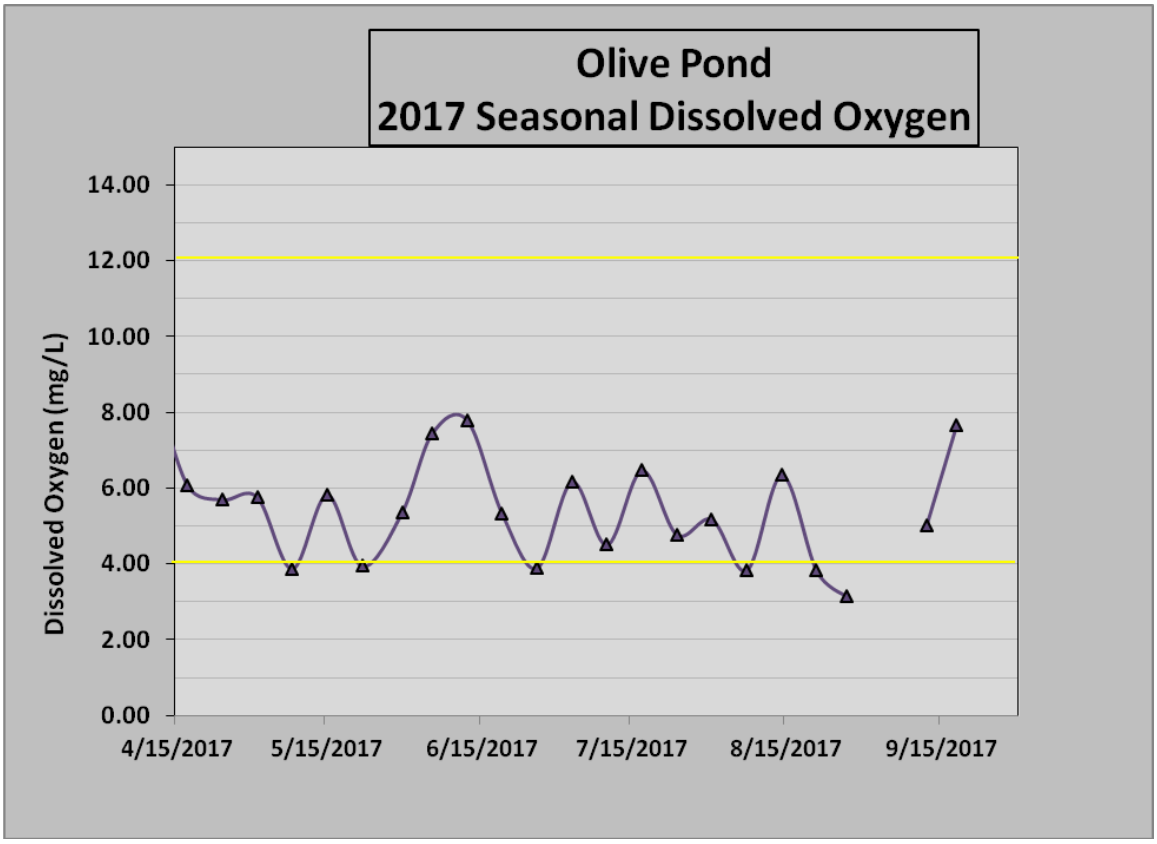
Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/5/2017	19%	65%	13%				3%	**310**
6/19/2017	46%	6%	24%	12%			12%	**170**
7/10/2017	44%		44%	12%				**90**
7/24/2017	47%		53%					**170**
8/7/2017	18%	5%	77%					**220**
8/21/2017	22%	22%	34%			22%		**90**

Phytoplankton abundance was suitable on all six of the sampling dates in 2017, supporting lighter densities than the upstream basins, and only traces of blue-green algae on two occasions. On all dates, the abundance was considered light with counts less than 310 organisms per mL, with the highest total abundance occurring on June 5th, and was highlighted by 65% golden algae. As is typical for this site, on most dates this season, green and golden algae and diatoms were the dominant groups in the assemblage. Blue-green algae genera represented only 12% of the assemblage on June 19th and July 10th, which is generally consistent with Crystal Lake, and does not represent a population that will negatively impact water quality.

Olive Lake

Olive Lake	units	6/5/17	7/10/17	8/14/17
Temperature	ºC	18.5	25.0	25.3
Dissolved Oxygen	mg/L	7.44	4.51	6.35
Alkalinity	mg/L	56	NA	60
pH	SU	7.25	7.25	7.5
Nitrate	mg/L	ND	ND	ND
Total Phosphorus	mg/L	**0.089**	**0.082**	**0.079**
Turbidity	NTU	3.9	2.9	3.9
Water Clarity	feet	4 est	**2 est**	3 est

In 2017, surface water temperature measurements fell within acceptable seasonal ranges at Olive Lake. Dissolved oxygen values in Olive Lake were suitable on all three of the water quality monitoring dates in this basin. However, in July the dissolved oxygen was less than 5.0 mg/L, which is getting close to the threshold for healthy aquatic habitat. Also, on numerous dates of inspection for potential herbicide and or algaecide treatment, dissolved oxygen levels were suppressed, and management was not able to be conducted at all times when required to restore favorable conditions. 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 six 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. This basin could benefit from the addition of aeration, especially since numerous treatments were postponed due to low dissolved oxygen this year.



The alkalinity at Olive Lake ranged from 56 mg/L to 60 mg/L, although one date was note tested. This increase in alkalinity is similar to previous data on record. The pH at Olive Lake was suitable on all three dates. In June and July, the pH was 7.25, and increased to 7.5 in August. Nitrate was undetected throughout the 2017 season, and this marks the tenth consecutive year this parameter has been undetected during the growing season. Similar to previous seasons, the total phosphorus was elevated throughout 2017, with levels two to three times the threshold to support nuisance aquatic vegetation growth. Total phosphorous ranged from 0.079 mg/L in June, to 0.089 in June. These values are significantly higher compared to data from previous seasons and are directly attributable to the increase in water meal and blue-green algae growth. The excess of nutrients is also reflected in the phytoplankton sampling results for numerous dates. Turbidity was suitable for this small basin throughout the season. It ranged from 2.9 NTU in July to 3.9 NTU in June and August.

Olive Pond

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/5/2017	56%	19%	25%					**3,020**
6/19/2017	4%	80%	3%	6%			7%	**700**
7/10/2017	10%		15%	20%			55%	**200**
7/24/2017			3%	88%			9%	**2,660**
8/7/2017	3%		9%	83%			5%	**1,760**

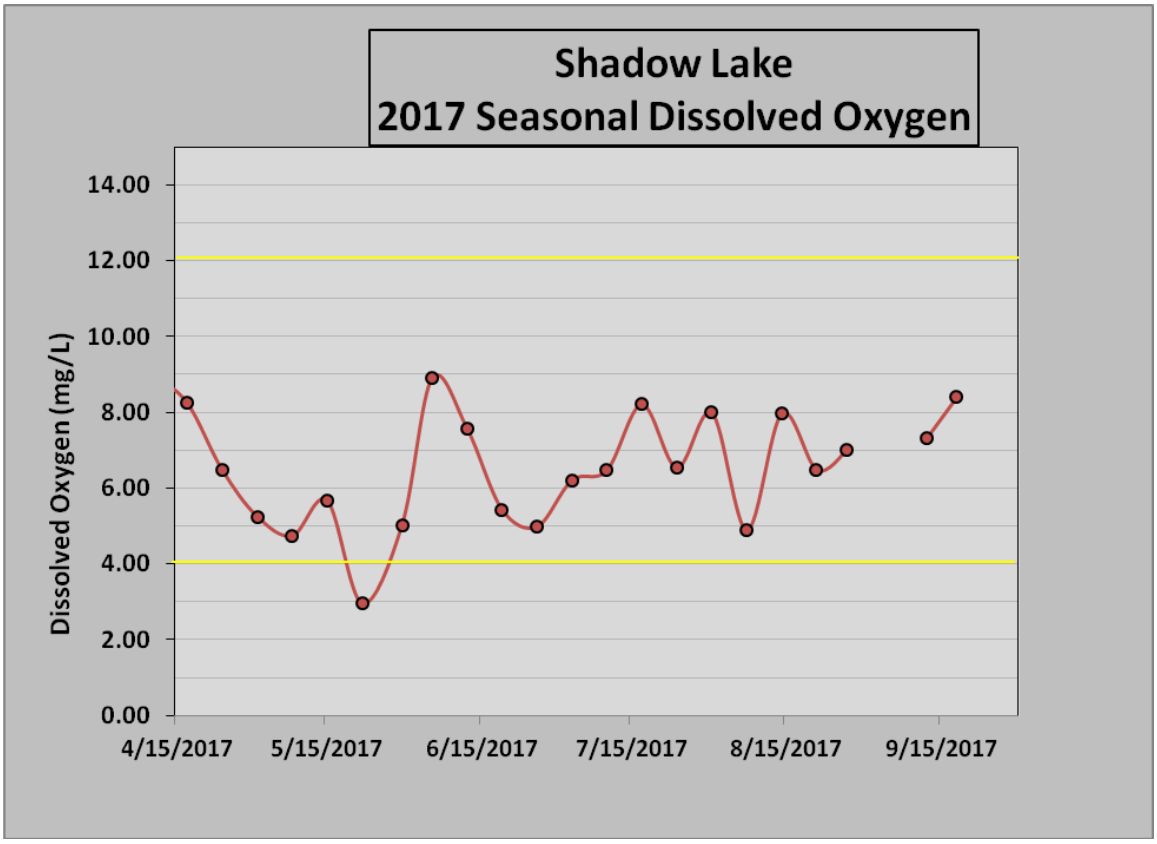
In 2017, phytoplankton density was favorable on only one date, which occurred on July 10th, when density was limited to only 200 orgs./mL. On June 19th, the phytoplankton assemblage was elevated at 700 orgs./mL, but was dominated by golden algae, and Olive Pond supported suitable conditions. On June 5th, the initial sampling date, algal density was high with over 3,000 orgs,/mL, but was dominated by diatoms and green algae, which provided a dark appearance to the water column of the pond, but provided for a clean water surface and minimal submersed plant growth.

On July 24th and August 7th, Olive Pond was supporting a high density bloom of blue-green phytoplankton growth. During both sampling events, *Anabaena*, a genera of blue-green algae, was dominating the assemblage on each date. Due to poor water quality conditions that were a result of blue-green algae, as well as water meal, proactive management through algaecide treatment was restricted.

Shadow Lake

Shadow Lake	units	6/5/17	7/10/17	8/14/17
Temperature	ºC	18.7	24.6	24.4
Dissolved Oxygen	mg/L	8.91	6.47	7.97
Alkalinity	mg/L	60	65	60
pH	SU	7.25	7.25	7.5
Nitrate	mg/L	ND	ND	0.09
Total Phosphorus	mg/L	**0.063**	**0.079**	**0.098**
Turbidity	NTU	3.2	3.0	**5.6**
Water Clarity	feet	3.5 est	**2.5 est**	3 est

In 2017, 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. During other visits to Shadow Lake, there were times when herbicide and/or algaecide treatments could not be performed due to depressed dissolved oxygen concentrations. On numerous occasions during our routine surveys at this site, we observed poor or uneven bubbler action via the submersed diffusers. The dissolved oxygen for this basin is depicted on the graph, below. Although the aeration system is not optimal for this basin, the graph depicts that dissolved oxygen was lower than the acceptable threshold (4.0 mg/L) on only one date.



Alkalinity in 2017 represented more typical levels, ranging only from 60 mg/L to 65 mg/L. The pH at Shadow Lake ranged from 7.25 in June and July to 7.5 in August. These measurements are suitable for this basin. In 2017, nitrate was undetected during June and July, but increased to 0.09 in August, which is still below critical threshold. Total phosphorus levels were elevated once again the entire 2017 season at Shadow Lake, and also continued a recent trend in that we observed an increase in total phosphorus as the season progressed. In June it was 0.063 mg/L, before increasing to 0.079 mg/L in July and then 0.098 mg/L in August. The elevated phosphorous levels in 2017 contributed to an increase in blue-green algae and water meal abundance. Turbidity levels returned to more suitable levels in 2015. The turbidity ranged from 3.0 NTU in July to 3.2 NTU in June, and finally peaking at 5.6 NTU in August. The August reading being elevated above 5.0 NTU does represent a level above threshold, and is higher than a typical measurement for Shadow Lake.

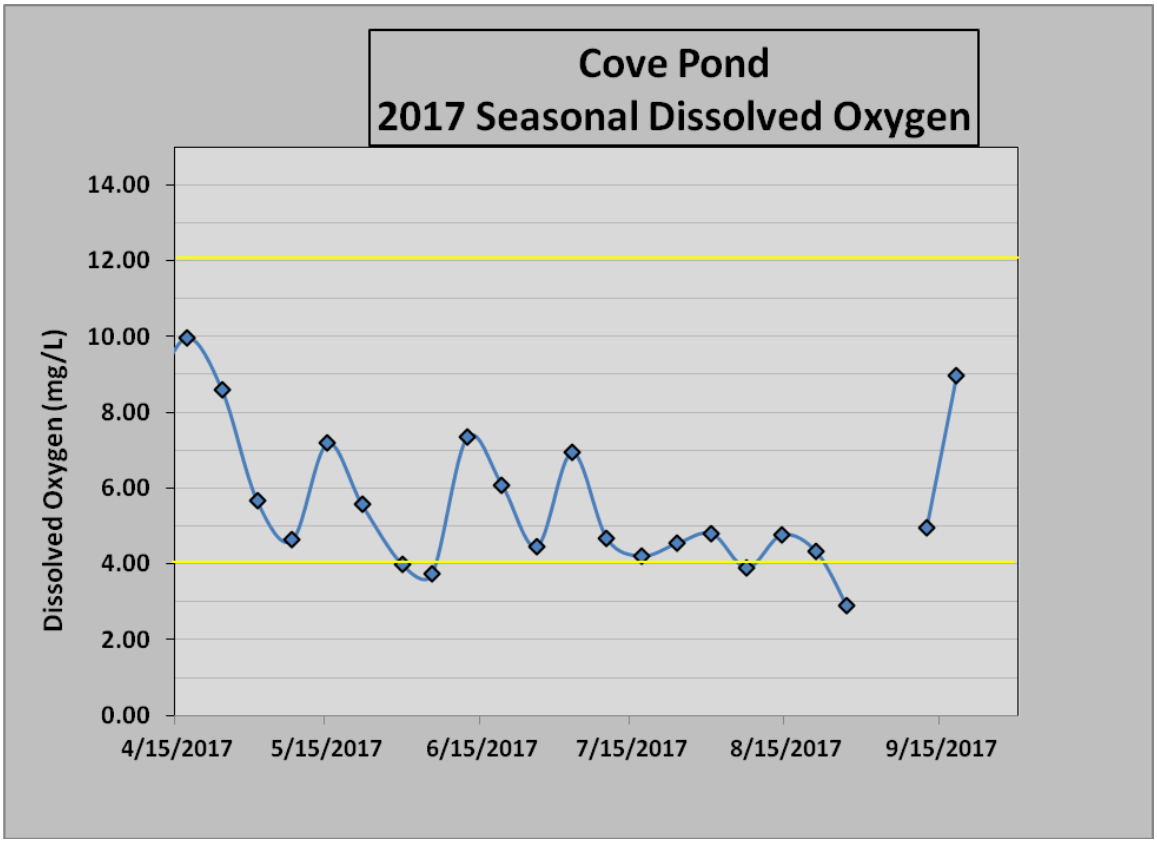
Shadow Lake								
Date	**Diatoms**	**Golden Algae**	**Green Algae**	**Blue-green Algae**	**Protozoa**	**Euglenoids**	**Dinoflagellates**	**Total Algae**
6/5/2017	71%	9%	20%					**3,670**
6/19/2017	4%	42%	50%	4%				**240**
7/10/2017		55%	24%	2%			19%	**420**
7/24/2017	2%		2%	91%			5%	**1,840**
8/7/2017	9%	38%	32%	15%			6%	**650**
8/21/2017	58%	17%	25%					**120**

Phytoplankton conditions in 2015 were suitable on five out of six dates. On the first sampling event on June 5th, the total phytoplankton assemblage was over 3,600 orgs/mL, but was comprised of mostly diatoms, and no blue-green algae were present. During this time Shadow Lake displayed a dark appearance to the water column, which maintained a clean lake surface and minimal submersed plant growth. The phytoplankton sampling on July 24th revealed that the lake was supporting a high density of blue-green algae (2,340 orgs./mL), which was also dominated by *Anabaena*. Numerous partial applications of Clipper were conducted for management of water meal and duckweed, and there was likely some incidental control of algae as a result of these applications.

Cove Lake

Cove Lake	units	6/5/17	7/10/17	8/14/17
Temperature	ºC	18.7	21.1	23.1
Dissolved Oxygen	mg/L	**3.75**	4.68	4.78
Alkalinity	mg/L	68	80	80
pH	SU	7.0	7.25	7.25
Nitrate	mg/L	ND	ND	0.106
Total Phosphorus	mg/L	**0.069**	**0.065**	**0.051**
Turbidity	NTU	4.4	4.2	3.2
Water Clarity	feet	3.5 est	**2.5 est**	**2 est**

In 2017, surface water temperature measurements fell within acceptable seasonal ranges at Cove Lake. Dissolved oxygen levels were somewhat depressed for most of this season. In June, the dissolved oxygen was 3.75 mg/L, which is below the 4.0 mg/L threshold and if it persists could negatively impact aquatic biota. In July, dissolved oxygen increased to 4.68 mg/L, which is suitable, but yet not ideal. Similar values were obtained in August, when dissolved oxygen values increased to 4.78 mg/L. These measurements are similar to data recorded for the past several management seasons. Only one herbicide application was required in this basin, and there none that were postponed due to low dissolved oxygen. But it's likely that if algaecides or herbicides were needed more extensively, low dissolved oxygen could have been a deterrent. 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 and just above the threshold on seven additional dates.



In 2015, alkalinity ranged from 68 mg/L to 80 mg/L, for an annual average of 76 mg/L. We continue to see an annual average has increase from 2013, when the annual average was 32.0 mg/L. Nitrate levels were undetected during the June and July sampling events, but increased to 0.106 mg/L in August. The total phosphorus at Cove Lake was elevated on all three sampling dates in 2017, similar to previous seasons. In June, the total phosphorus was 0.069 mg/L, or two times the ideal threshold. In July, the total phosphorus decreased to 0.065 mg/L, and decreased slightly to 0.051 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 3.2 NTU in August, to 4.4 NTU in June.

Cove Pond

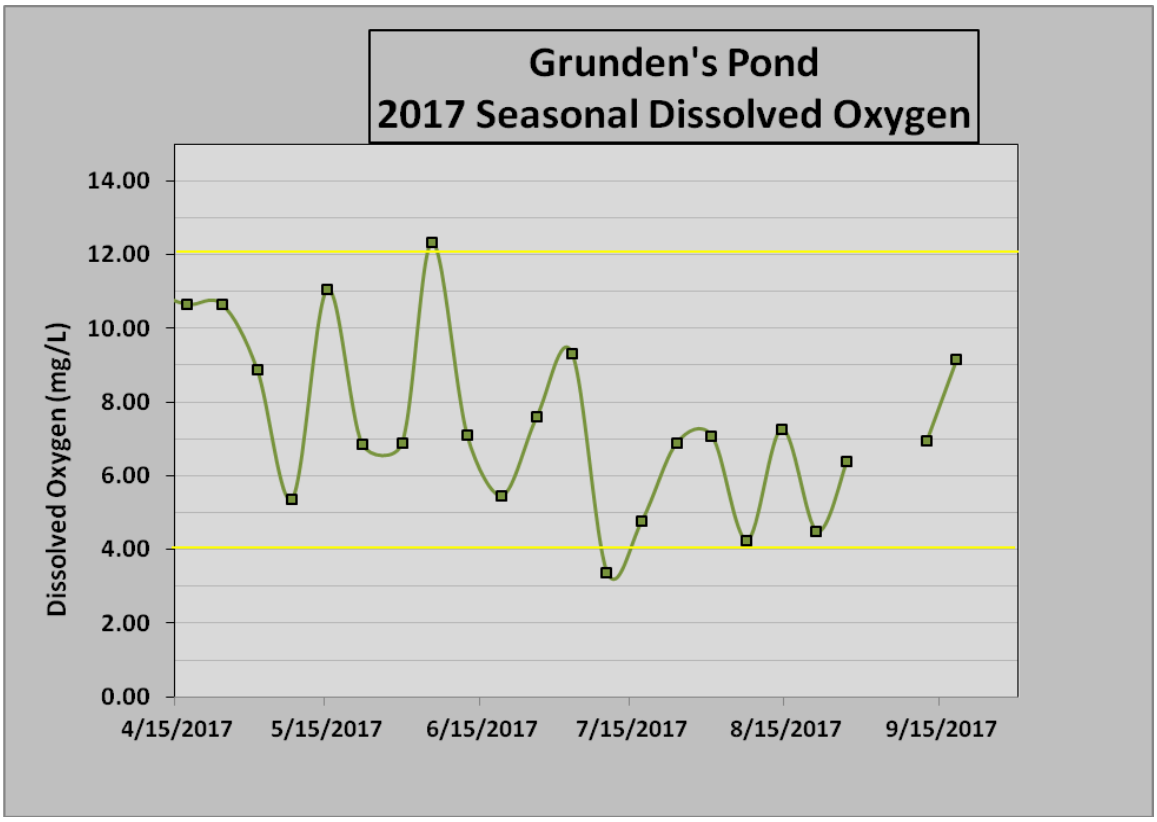
Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/5/2017	31%	27%	40%				2%	**830**
6/19/2017		88%	2%				10%	**500**
7/10/2017		28%	3%				69%	**320**
7/24/2017	5%		10%	5%			80%	**210**
8/7/2017	23%	7%	7%	23%			40%	**300**

In 2017, unicellular phytoplankton abundance at Cove Lake was light and favorable throughout the season. On all dates, overall phytoplankton abundance was less than 500 organisms per mL., with the exception of June 5th, although the assemblage was still dominated by a favorable algal community of diatoms, green and golden algae. Through August, overall abundance remained low, but group dominance shifted to dinoflagellates (*Peridinium*). In August, the group dominance remained dinoflagellate, but light density blue-green algae were also present.

Grunden's Pond

Grunden's Pond	units	6/5/17	7/10/17	8/14/17
Temperature	ºC	19.6	26.1	25.5
Dissolved Oxygen	mg/L	12.33	**3.30**	7.26
Alkalinity	mg/L	56	80	80
pH	SU	7.75	7.0	7.25
Nitrate	mg/L	ND	ND	0.083
Total Phosphorus	mg/L	**0.036**	**0.066**	**0.082**
Turbidity	NTU	5.5	5.8	5.8
Water Clarity	feet	3 est	3 est	4 est

In 2017, surface water temperature measurements fell within acceptable seasonal ranges at Grunden's Pond. Weekly dissolved oxygen measurements were collected at this site again in 2017 as depicted on the graph below. Dissolved oxygen was lower than the ideal threshold (4.0 mg/L) on only one date, but also exceeded the ideal threshold (12.0 mg/L) on one date, 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 two years as well.



Alkalinity in 2017 at Grunden's Pond ranged from 56 mg/L in June to 80 mg/L in July and August this year, which is similar to most other basins. The annual average was calculated at 72 mg/L, representing an increase as compared to the previous seasons. Rampant filamentous algae growth, which required treatment throughout the season, could have contributed to the increase in pH. Nitrate was undetected during June and July in 2017, but increased to 0.083 mg/L in August, which is comparable to most other basins in 2017. Total phosphorus was elevated throughout 2017 on all three sampling dates, similar to the previous seasons at this site. In June, it was 0.0.36 mg/L, with an increase to 0.066 mg/L in July. In August, total phosphorus peaked at 0.082 mg/L. Turbidity was elevated on all dates this year ranging from 5.5 in June to 5.8 NTU in July and August.

Grunden's Pond

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/5/2017	13%	81%	3%				3%	**1,810**
6/19/2017		71%	3%				26%	**340**
7/10/2017	20%	20%		20%			40%	**100**
7/24/2017	12%		32%	4%			53%	**570**
8/7/2017	7%		21%	71%			1%	**2,740**

In 2017, total phytoplankton abundance varied throughout the entire season, but early in the season on June 5th it was elevated due to a bloom of golden algae. Overall abundance was low from late June through late July, with assemblages that included several genera of algae, and only light density blue-green algae growth. Phytoplankton abundance decreased to very low on July 10th. In August the phytoplankton peaked at this site to 2,740 organisms per mL, which is considered high. The assemblage was dominated by blue-green algae (specifically *Anabaena*) on this date. Grunden's Pond seemed to be dominated by filamentous algae in 2017, which required seven algaecide applications this season. The reduction in water level likely contributed as much as any water quality parameter to the production of filamentous algae.

Mountain Lake

Mountain Lake	units	6/5/17	7/10/17	8/14/17
Temperature	ºC	18.7	26.1	26.9
Dissolved Oxygen	mg/L	8.12	7.82	8.32
Alkalinity	mg/L	60	60	60
pH	SU	7.5	8.0	7.25
Nitrate	mg/L	ND	ND	0.059
Total Phosphorus	mg/L	0.01	0.007	0.011
Turbidity	NTU	0.9	1.1	0.88
Water Clarity	feet	10.5 est	6.5'	7 est

In 2017, 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 2017 season, which is typical for this basin. In June, the dissolved oxygen was 8.12 mg/L, which is equivalent to 89% saturation. In July, the dissolved oxygen experienced a decline to 7.82, but this is

equivalent to 98% saturation (due to the increase in water temperature). By August, dissolved oxygen increased to 8.32 mg/L, yet this was still equivalent to 106% saturation. See below for a discussion of the water clarity at Mountain Lake in 2017.

Alkalinity at Mountain Lake in 2017 remained at 60 mg/L on all three sampling dates. This is slightly higher than data recorded over past several years, but from a historical standpoint is still suitable. In 2017, pH varied throughout the season. In July, it was 8.0, but in June and August the pH was 7.5 and 7.25, respectively. All values were suitable for this basin. Nitrate levels were undetectable through June and July for the 2017 season, but increased to 0.059 mg/L in August, which again, is similar to the other basins in the borough. Total phosphorus levels varied slightly throughout the 2017 season at this site. Total phosphorus was 0.01 mg/L in June and decreased to 0.007 mg/L in July. This is exactly the same trend observed in 2014. However, this year, in August the total phosphorus actually increased to 0.011 mg/L. Each of the total phosphorus levels are below threshold levels, and favorable, especially compared to the other basins in the borough. Turbidity measurements this season were also ideal on all dates, with measurements only ranging from 0.88 in August to 1.1 in July.

Mountain Lake

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/5/2017	38%		24%				38%	**80**
6/19/2017	29%	42%					29%	**140**
7/10/2017	73%		27%					**260**
7/24/2017	43%	7%	29%				21%	**140**
8/7/2017	8%	3%	39%	44%			6%	**360**
8/21/2017	8%	5%	87%					**370**

The phytoplankton abundance data was light and favorable throughout the 2017 season. Total phytoplankton counts ranged from 80 organisms per mL to 370 organisms per mL, very similar to recent seasons. Green algae only dominated the phytoplankton community on one dates, occurring on August 21st, the final sampling date. Also, nuisance blue-green algae dominated the assemblage on only one date on August 7th, but given the total abundance, were still light and did not negatively impact water quality. Since the overall phytoplankton counts were low (less than 370 organisms per mL) on each date, these abundances were considered non-problematic and did not require treatment. 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 2017 do not indicate an immediate need for alum in 2018, unless observed water quality through the displays a shift in water quality.

Wildwood Lake

Wildwood Lake	units	6/5/17	7/10/17	8/14/17
Temperature	ºC	18.9	27.1	26.9
Dissolved Oxygen	mg/L	8.91	7.26	8.29
Alkalinity	mg/L	48	80	65
pH	SU	7.75	7.5	8.0
Nitrate	mg/L	**0.28**	ND	0.091
Total Phosphorus	mg/L	0.016	**0.041**	**0.031**
Turbidity	NTU	2.0	4.6	3.5
Water Clarity	feet	4.5 est	3.5 est	6

In 2017, surface water temperature measurements fell within acceptable seasonal ranges at Wildwood Lake. Dissolved oxygen ranged from 7.26 mg/L in July to 8.91 mg/L in June. These values are seasonally ideal for this basin, and similar to results obtained in previous seasons.

Alkalinity levels in 2017 ranged from 48 mg/L to 80 mg/L, for a seasonal average of 64.3 mg/L. This is shows an increase compared to recent data collected at this lake. Wildwood Lake typically has the highest pH of the lakes in the Mountain Lakes chain. In 2017 the pH was recorded at 7.5 in July, which is ideal. Although it did increase to 8.0 in August, this value is still suitable and in balance with the phytoplankton abundances we observed throughout the season. In 2017, nitrate was undetected only during the July sampling at this site. During June nitrate level was 0.28, which is near the critical threshold, and was reduced in August to only 0.091 mg/L. This is the only basin that had a recorded level in June, and may be a result of hydro raking activity releasing this nutrient into the water body. Since it was reduced to ND levels in July, it was not a cause for concern. Total phosphorus measurements were suitable during the June sampling for the 2017 season at only 0.016 mg/L. In July, the total phosphorus was slightly elevated at 0.041 mg/L, but this is not unusual for this site. In August, it decreased to 0.031 mg/L which is at the limit of the acceptable threshold. Turbidity was elevated this season, ranging from 2.0 NTU in June to 4.6 NTU in July. Despite this increase later in the season, these amounts remain within acceptable measurements.

Wildwood Lake

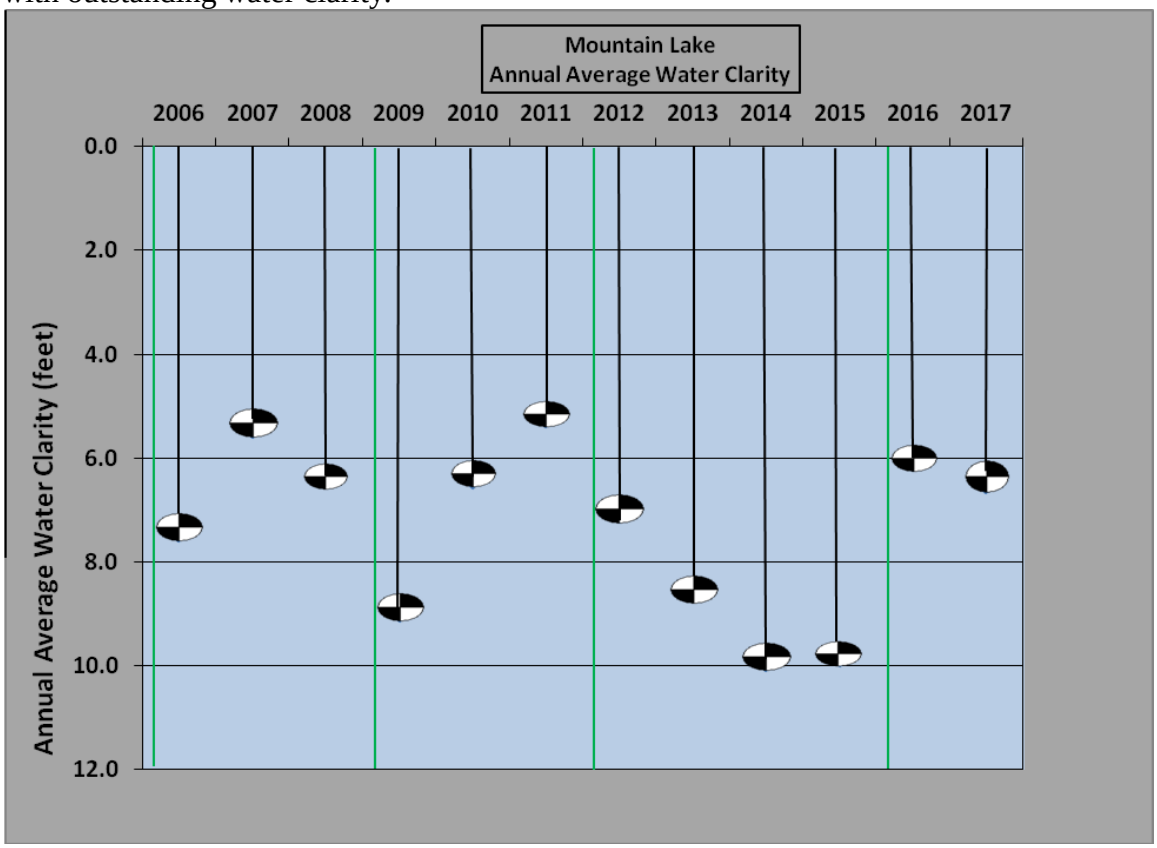
Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/5/2017	62%	15%	23%					**130**
6/19/2017	24%		51%				25%	**510**
7/10/2017		27%	18%				55%	**110**
7/24/2017	4%		96%					**250**
8/7/2017	18%	15%	65%				2%	**340**
8/21/2017	15%		62%				23%	**260**

In 2017, overall unicellular phytoplankton counts at Wildwood Lake were low on all dates, ranging from 110 organisms per mL to 510 organisms per mL. On four dates, green algae were the dominant group, as expected. These dates were scattered about, with one each in June and July, and both sampling events in August. Blue-green algae were not present at any time during each of the sampling events, but that does not necessarily mean there weren't short term occurrences at other times during the season. During the first sampling event, diatoms were the dominant group, and during the first sampling event in July, dinoflagellates were the dominant group.

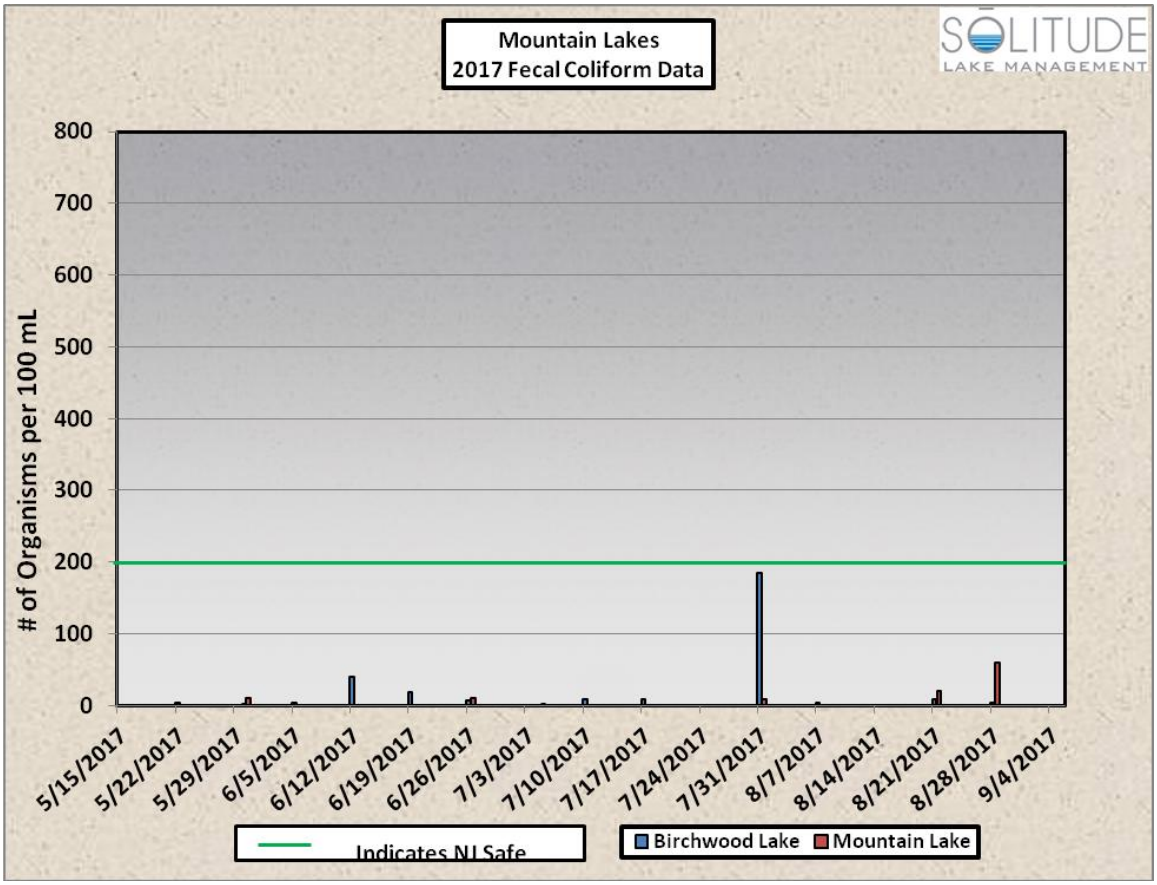
2006 to 2017 Water Clarity at Mountain Lake

Below is a graph that depicts the water clarity at Mountain Lake in 2017. 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 travels down the x-axis. There was no Alum application in this basin again this year, the fifth 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 2017 ranged from 4.0 feet to 14.0 feet (estimated) 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). On three dates water clarity equaled or exceeded 10 feet, which is considered outstanding for an urban shallow lake in the Northeast. On most dates, water clarity was at or exceeded 6.0 feet. Water clarity was a critical factor in determining the use of Alum this season, and was one reason Alum was not applied in this basin this season.

In 2017, the annual average water clarity was 6.61 feet, which is lower than the average of the past several seasons, and similar to the value from 2016. 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 have an effect on water clarity at Mountain Lake. In short, Mountain Lake is enjoying a consecutive streak of several years with outstanding water clarity.



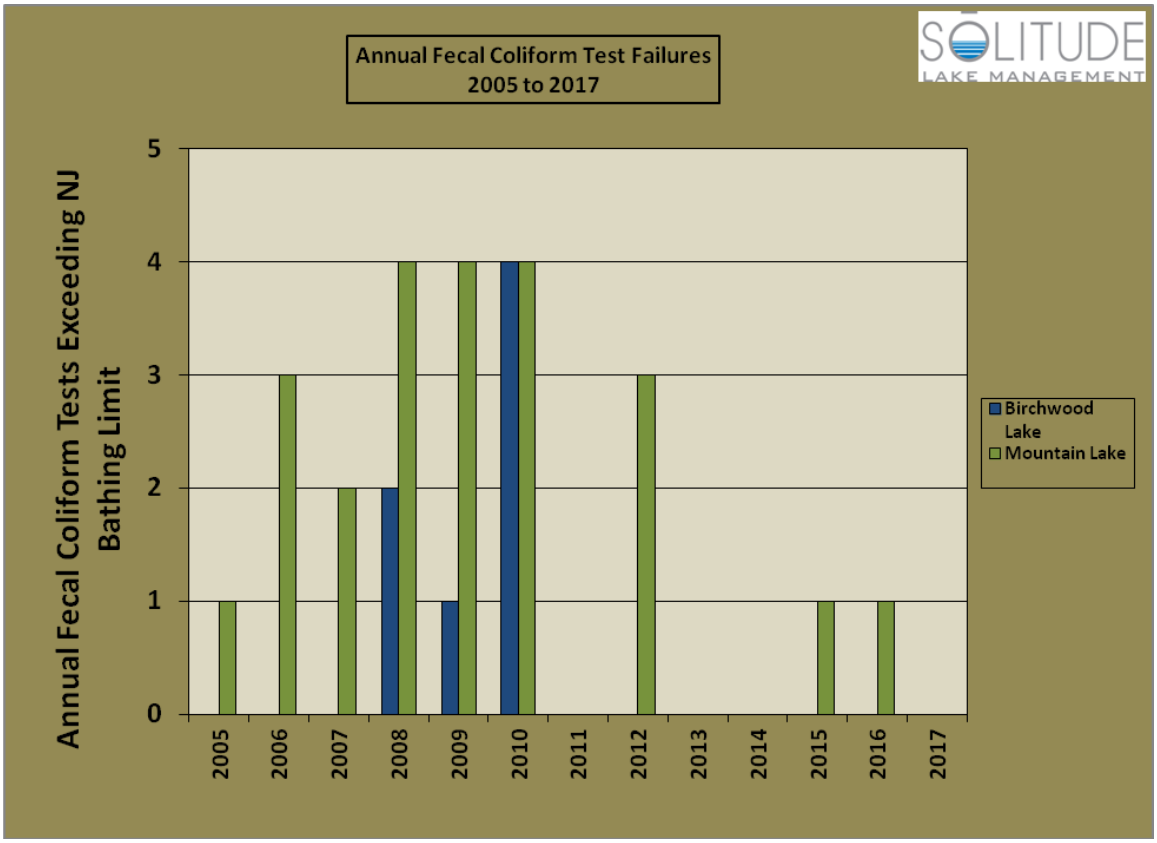
2017 Fecal Coliform Testing at Birchwood and Mountain Lake



Fecal coliform sampling was performed at Birchwood Lake's beach and Mountain Lake's Island Beach in 2017. Sampling occurred weekly during surveys, and was conducted from Memorial Day through August 29th (the week before Labor Day). Fecal Coliform 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 200 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 2017. The Appendix of this report contains a reproduction of this graph, and a table summarizing the 2017 data. On these tables, numbers highlighted in red exceed the NJ bathing limit of 200 cfu per 100 ml. In 2017, 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 2017, no failures were observed at Birchwood Lake, the seventh consecutive year that no failures occurred at this site. This is a promising trend. At Mountain Lake, there were also no failures. In 2015, there was one failure, and previous to that there were three elevated fecal counts during the 2012 season. As can be seen by the chart below, two to four failures is typical per year at this basin, but that is not the case since 2011 with three out of five years not reporting any failures , and only one failure in 2015. 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 2017. This graph depicts very different conditions in the first six years of the dataset as compared to the last five years.



2017 Lakes Cleaning Project

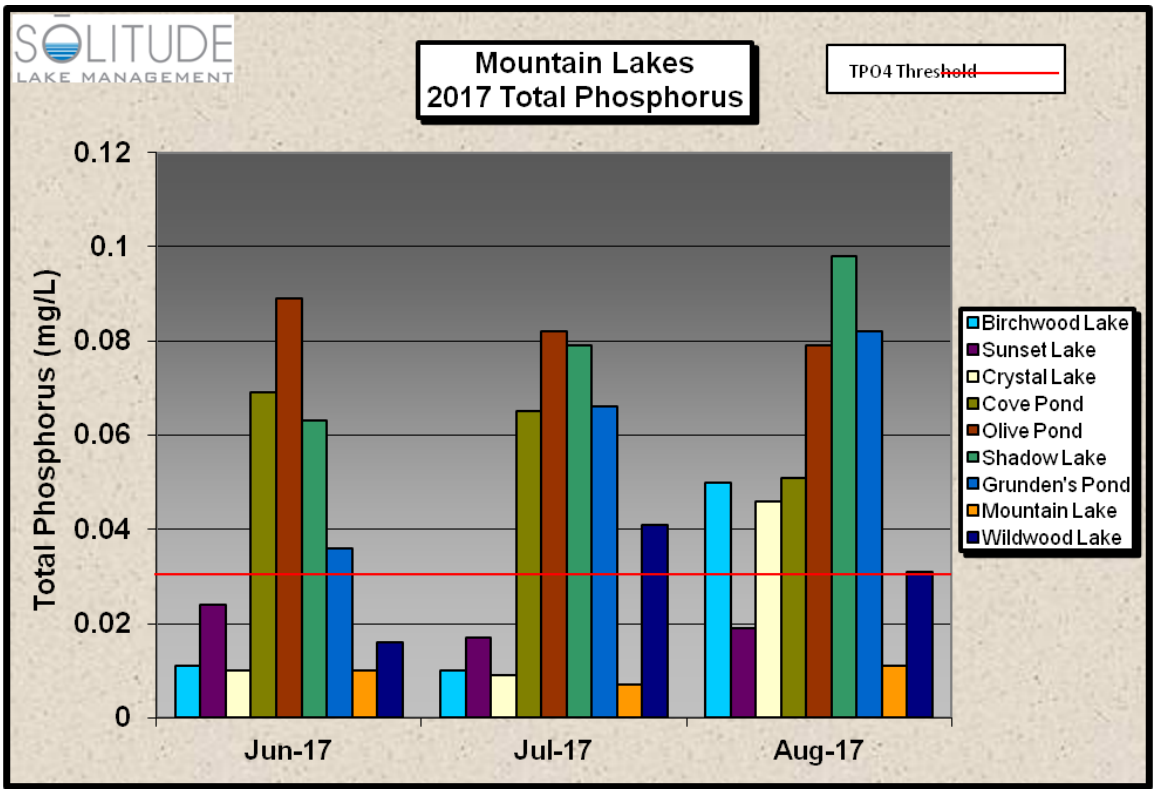
In 2017, the Lakes Cleaning Project was conducted in March and April at Wildwood Lake, Cove Pond, Olive Pond and Shadow Lake. The decision to target each of these water bodies was made following examination of sediment probing data collected in 2016, and the nuisance development of cattails in numerous areas of Wildwood 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.

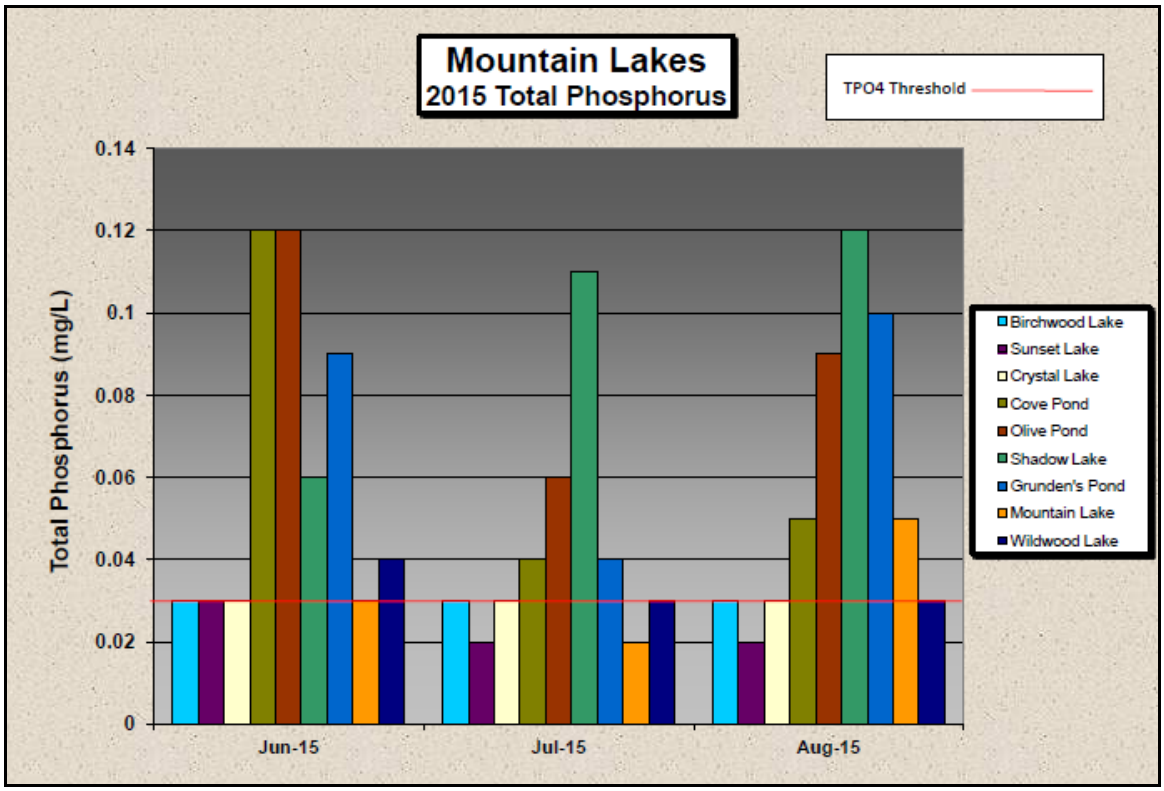
Hydro-raking			
Lake	**Dates**	**Hours**	**Material Removed (yds2)**
Wildwood Lake	3/29, 3/30, 3/31, 4/3	19.5	312
Cove Pond	4/5, 4/6	9	135
Olive Pond	4/11, 4/18	10	160
Shadow Lake	4/12, 4/13, 4/14, 4/17, 4/18	34	510
	Totals	72.5 hrs	1,117

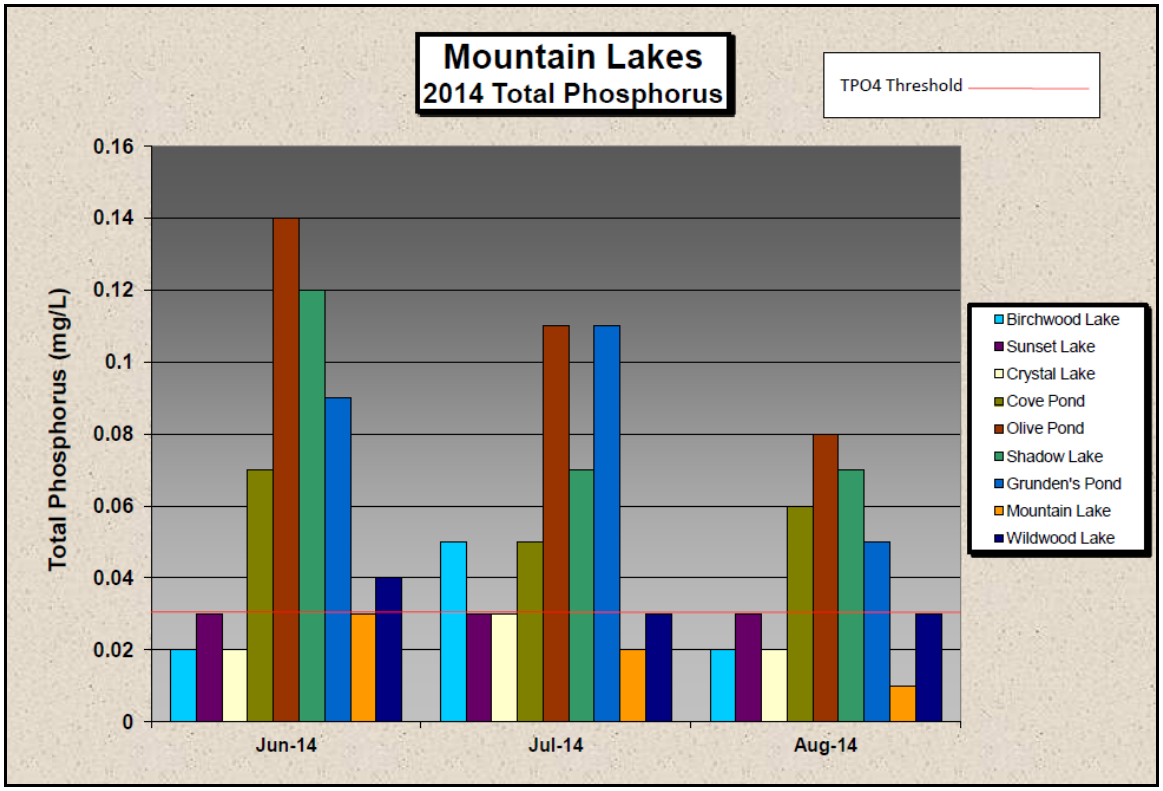
Hydro-raking activities focused on several areas of cattail growth in Wildwood Lake where plants were encroaching along residential shorelines and extending into the lake basin. Hydro-raking effort also focused near the primary inlet to remove accumulated organic material in this area. The variable amount of material removed and efficiency of the raking is largely dependent on the amount of material to be removed and the distance to the offload site. In the smaller basins, hydro raking was conducted throughout each basin for the removal of unconsolidated organic material.

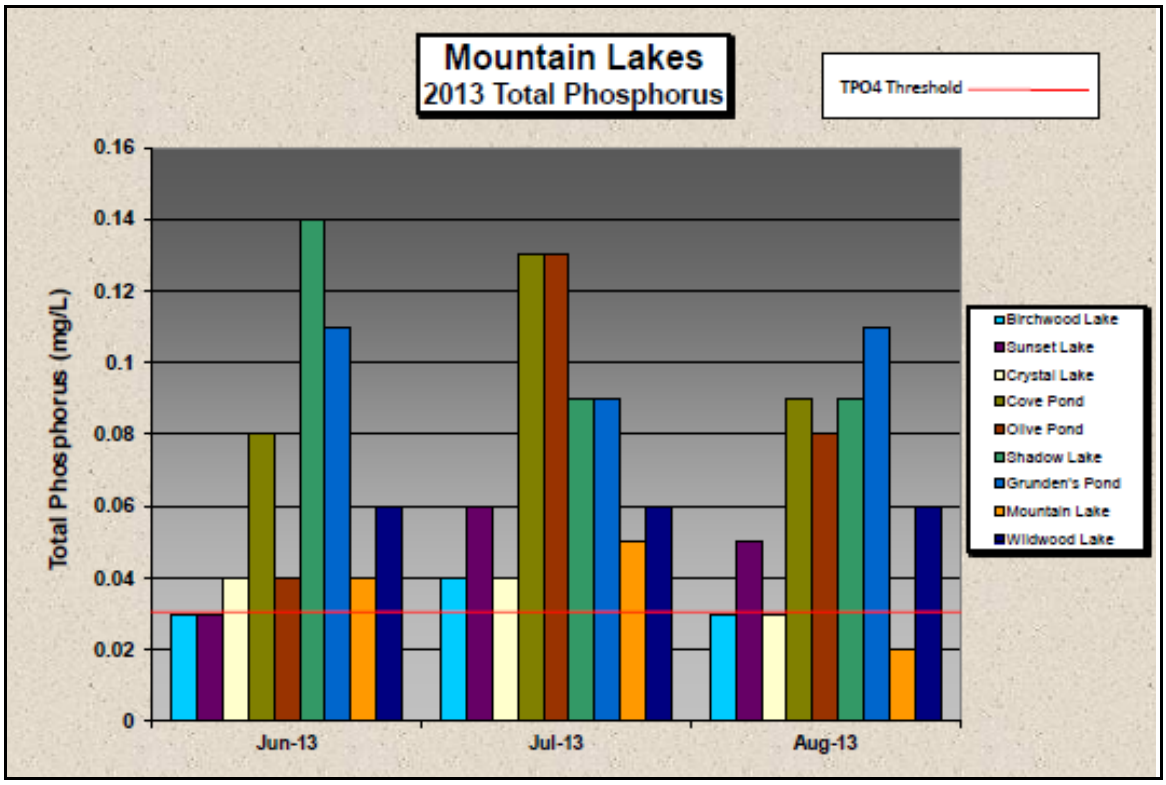
2006 to 2017 Total Phosphorus at Mountain Lakes

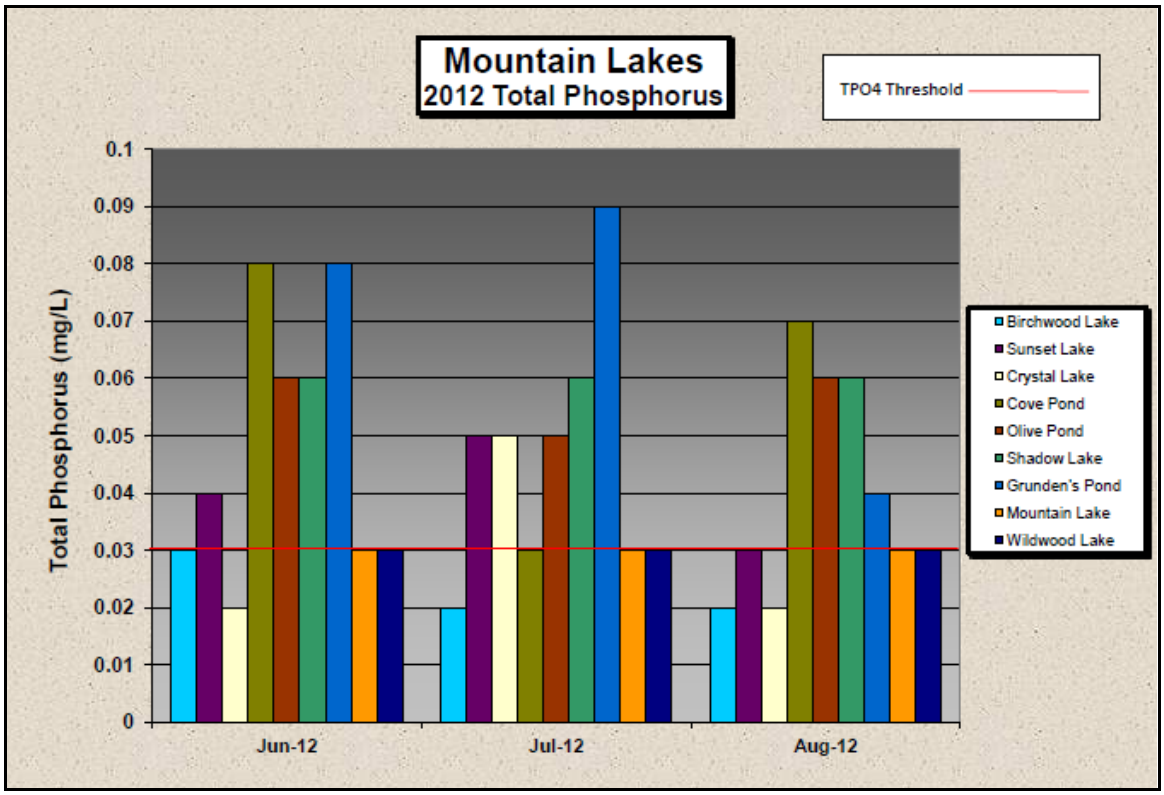
Below are eleven graphs, each representing total phosphorus data collected at all nine lakes for all three seasonal sampling events. Each graph depicts a different year, 2006 through 2017. Total phosphorus in 2017 continues to be elevated at the smaller basins on all three dates. As the season progressed, total phosphorous levels increased at several locations, and by August seven out of the nine basins contained elevated phosphorous levels. Mountain Lake and Sunset Lake were the only two basins that maintained total phosphorous levels below the threshold on all three sampling events. The acceptable total phosphorus threshold for lakes is 0.03 mg/L, depicted with the red line on the graphs below.

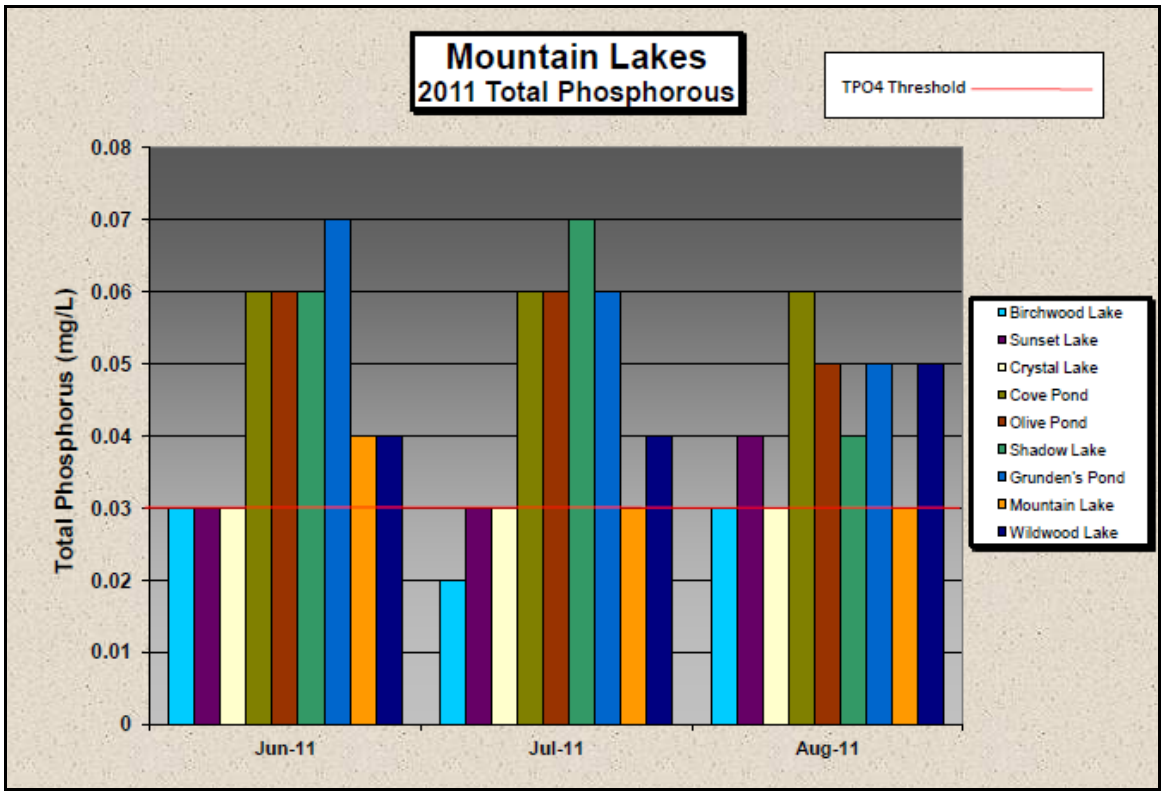


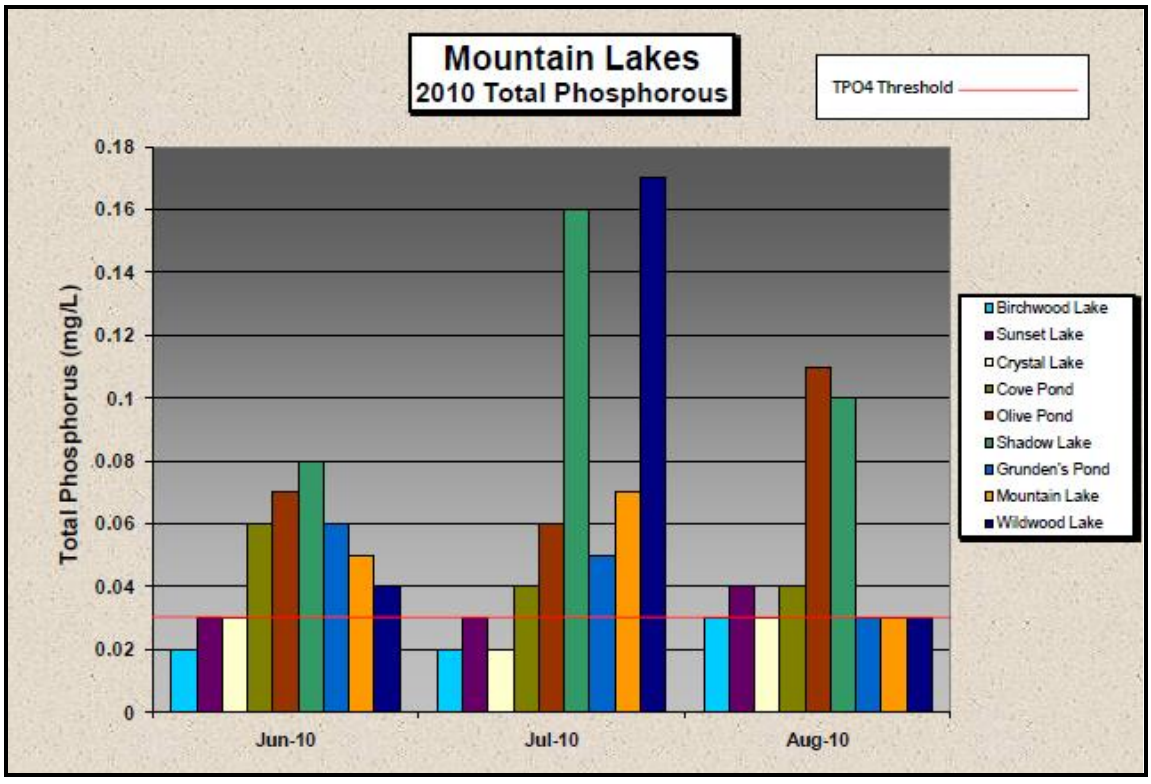

Mountain Lakes
2015 Total Phosphorus
TPO4 Threshold
Total Phosphorus (mg/L)
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
Jun-15
Jul-15
Aug-15
Birchwood Lake
Sunset Lake
Crystal Lake
Cove Pond
Olive Pond
Shadow Lake
Grunden's Pond
Mountain Lake
Wildwood Lake

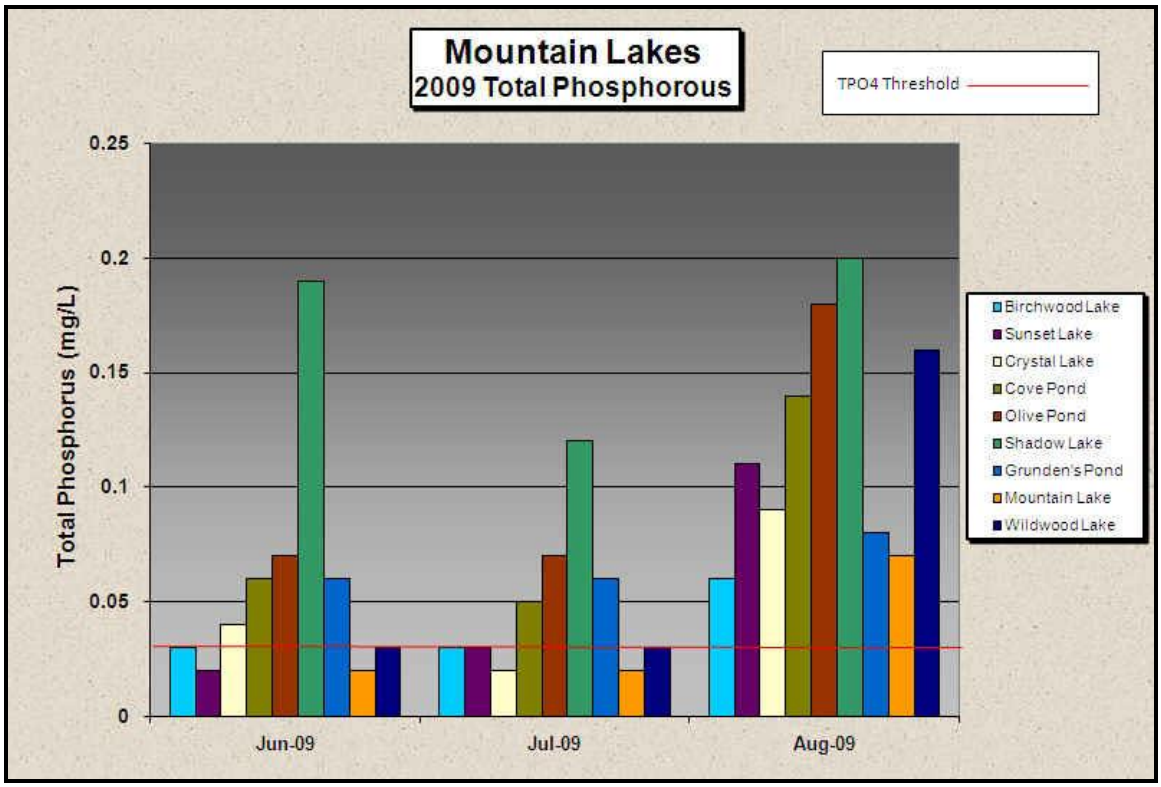

Mountain Lakes
2014 Total Phosphorus
TPO4 Threshold
Total Phosphorus (mg/L)
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
Jun-14
Jul-14
Aug-14
Birchwood Lake
Sunset Lake
Crystal Lake
Cove Pond
Olive Pond
Shadow Lake
Grunden's Pond
Mountain Lake
Wildwood Lake

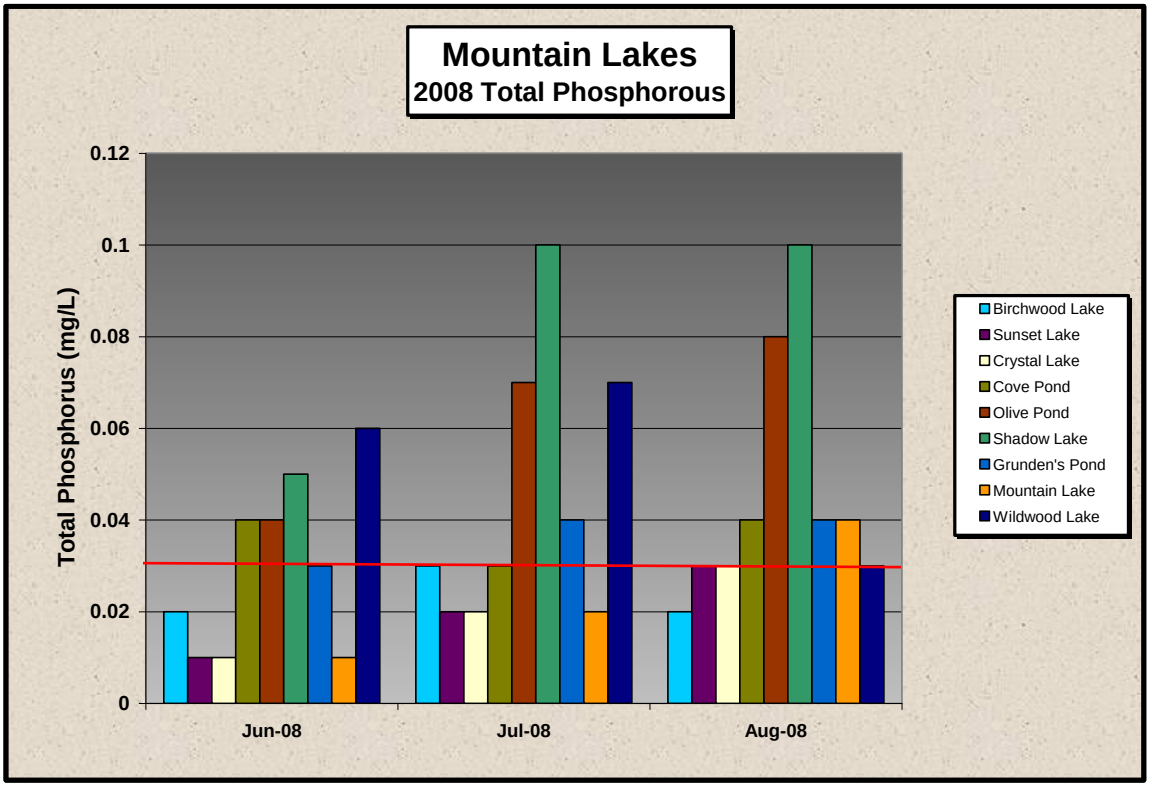

Mountain Lakes
2013 Total Phosphorus
TPO4 Threshold
Total Phosphorus (mg/L)
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
Jun-13
Jul-13
Aug-13
Birchwood Lake
Sunset Lake
Crystal Lake
Cove Pond
Olive Pond
Shadow Lake
Grunden's Pond
Mountain Lake
Wildwood Lake

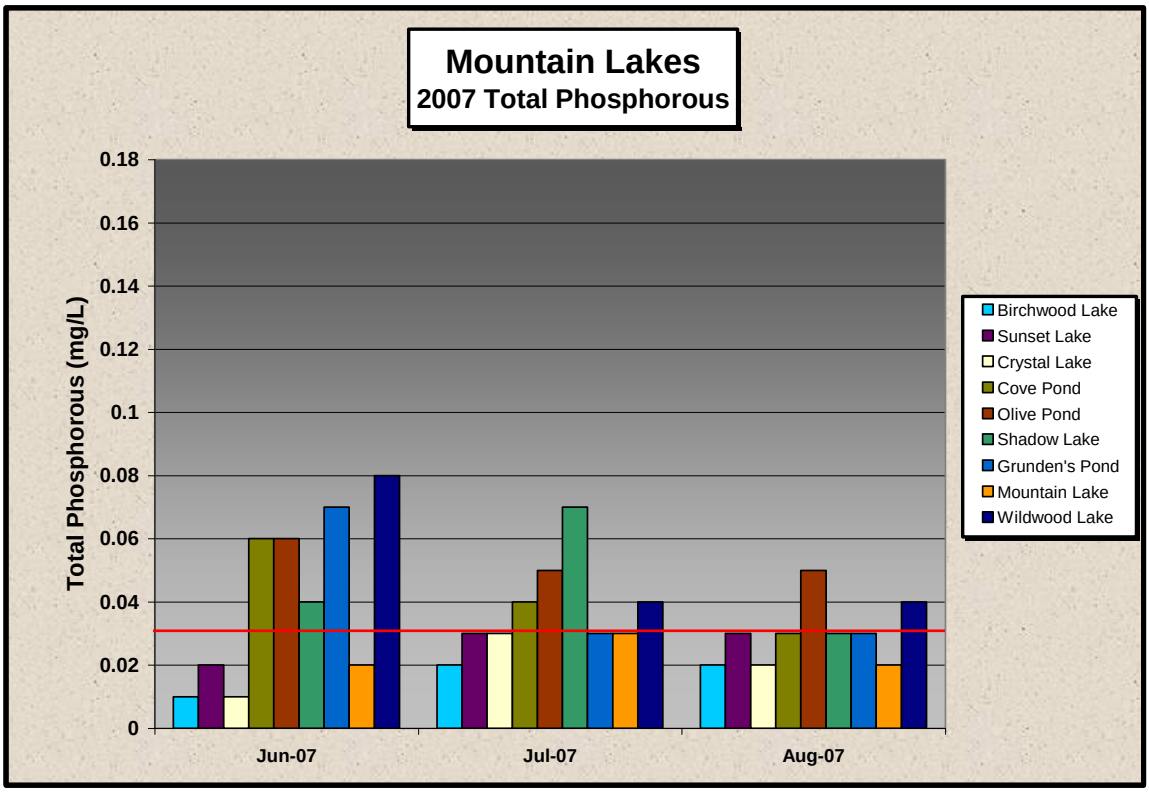

Mountain Lakes
2012 Total Phosphorus
TPO4 Threshold
Total Phosphorus (mg/L)
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
Jun-12
Jul-12
Aug-12
Birchwood Lake
Sunset Lake
Crystal Lake
Cove Pond
Olive Pond
Shadow Lake
Grunden's Pond
Mountain Lake
Wildwood Lake

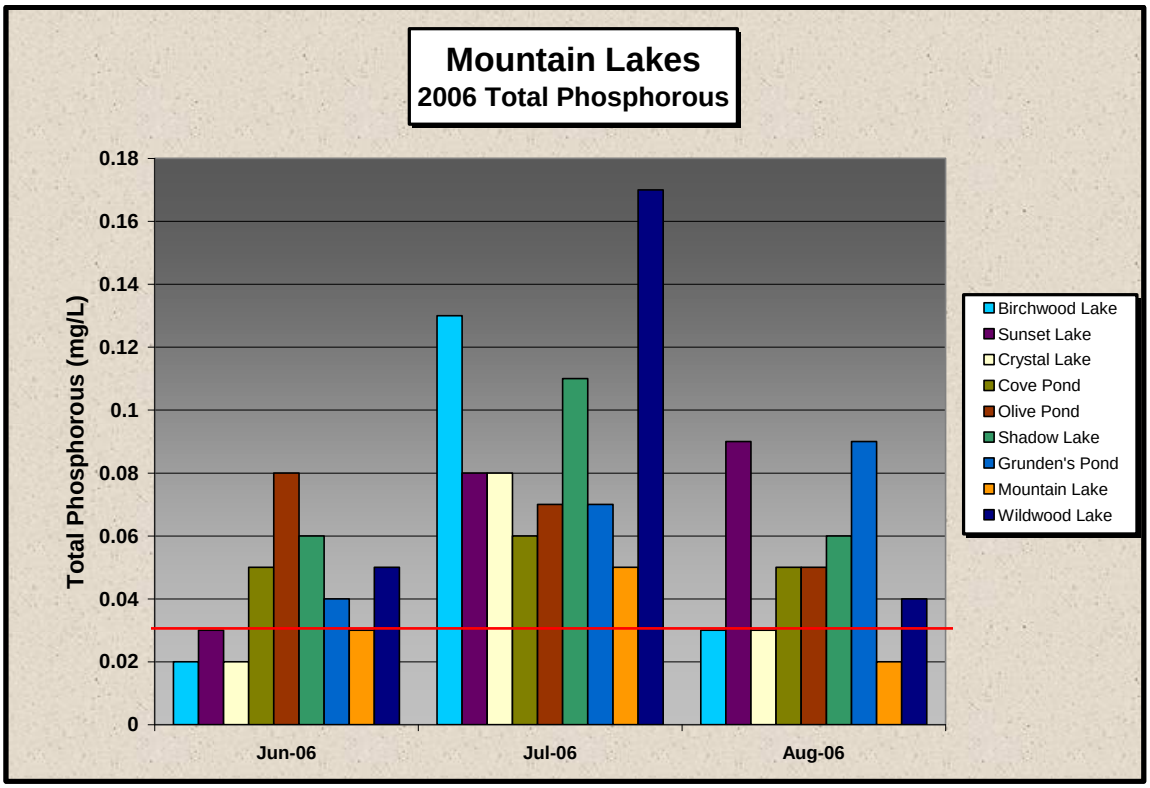

Mountain Lakes
2011 Total Phosphorous
TPO4 Threshold
Total Phosphorus (mg/L)
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
Jun-11
Jul-11
Aug-11
Birchwood Lake
Sunset Lake
Crystal Lake
Cove Pond
Olive Pond
Shadow Lake
Grunden's Pond
Mountain Lake
Wildwood Lake


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

2017 Summary of Lake Management Activities

- In 2017, temperature departures were much higher than average from January through April, with the warmest February and April on record, and sixth warmest winter overall. But then from May through August, temperatures were fairly average, and September was the 10th warmest on record.
- For the most part, monthly rainfall averages were average in 2017, except for May, which was the 9th wettest May on record. July and August were wetter than average, and September was dry, and lead to many lakes seeing a reduction in water level.
- Eurasian water milfoil was not observed at Mountain Lake in 2017, but was found at Wildwood Lake at very limited abundance and distribution, and was not found following the initial early season herbicide application.
- Clipper was again used to control lilies and pondweeds in the swim lanes at Birchwood Lake.
- There was no use of the systemic herbicide Sonar in 2017.
- Olive Pond, Grunden's Pond and Shadow Lake each contained nuisance densities of watermeal throughout the months of July and August, and depressed dissolved oxygen concentrations provided for difficult management strategy.
- Grunden's Lake, primarily due to reduced water level, required higher than average algaecide applications for control of filamentous algae growth.
- Hydro-raking was conducted in Wildwood Lake, Cove Pond, Shadow Lake and Olive Pond in March and April of 2017.
- Overall, total phosphorus levels were elevated at the smaller basins in 2017, as well as other lakes during various sampling events, most specifically in August.
- Overall, unicellular phytoplankton abundance was favorable (low to moderate) at all of the larger basins this season. The smaller basins, mostly Olive Pond and Shadow Lake supported elevated blue-green algae densities during the months of July and August.
- All fecal coliform tests passed at Birchwood Lake and Mountain Lake.
- Alum was applied on two dates at Wildwood Lake.
- Alum **was not** applied at Mountain Lake this season. Excellent water clarity and low total phosphorus measurements did not justify the use of Alum.
- Terrestrial plant management was not conducted in 2017, but should also be a focus in 2018.

2018 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 2018, 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 systems for these small basins in 2018. Dissolved oxygen throughout

the water column at Birchwood Lake continues to be depressed as well. Hiring an aeration consultant is an option to investigate this situation before it turns dire. It is recommended that the aeration system be activated in approximately mid-March, or upon ice out, whichever occurs first.

The additional phytoplankton sampling at Shadow Lake will continue in 2018. 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. Additionally, surgical management of water lilies in Sunset Lake should be implemented to ensure suitable control while providing for desirable densities for aquatic habitat. Management of bassweed should 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.

Herbicide and algaecide use will continue in many of the Mountain Lakes basins to control nuisance densities of aquatic plants and algae. In Birchwood Lake, a limited application of Clipper is planned for the nuisance water lilies and pondweeds around the swimming docks. 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. At Sunset Lake, contact herbicides should be suitable for control of SAV and/or water lilies, but depending on the growth of the latter, a systemic product might be a better option in 2018. Since this is the second year after treatment (YAT) using Sonar at Mountain Lake, Sonar use or aggressive use of contact products are likely needed in 2018. Conditions shall be confirmed with early season on-water surveys. 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 copper sulfate, or alternative chelated copper algaecides to control nuisance algae growth. Several of the smaller basins had rampant growth of water meal species in 2017, which prompted complaints from residents. Therefore, we will aggressively treat nuisance water meal as needed in 2018 with Clipper or Sonar, or other herbicides that may have a potential fit. Grunden's Pond demands specific attention to the dam structure to determine the cause of the extended period of water level decline, which has created nuisance growth conditions, and prompted complaints from residents.

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 aluminum sulfate 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 (early and late season applications) continues to be beneficial to the basin. Two Wildwood Lake applications will occur as planned in 2018. In the past, the use of Alum at Mountain Lake has provided numerous benefits. However conditions (notably water clarity and total phosphorus) have been ideal, and Alum has not been applied in several years. A potential Mountain Lake Alum application will only occur following a review of total phosphorus data, water clarity data and phytoplankton conditions.

We plan on conducting additional sediment probing studies early in the season to recommend hydro-raking sites in the spring of 2018. Probing will be utilized to determine the overall extent of required hydro-raking at each of the basins.

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 2018, 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. Any observation of fanwort needs to be aggressively and immediately treated with the contact herbicide Clipper to ensure rapid response and control.

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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

2017 Rainfall and Temperature Data
2017 Water Quality Graphs
2017 Water Chemistry Data
2007 to 2017 Treatment History Graphs
2017 Phytoplankton Distribution Graphs
2017 Phytoplankton Data Sheets
2017 Alpha Water Chemistry Data Sheets
2017 Phytoplankton Data
2017 Fecal Coliform Data
2017 Weekly Surveys

2017 Rainfall Data
Mountain Lakes, NJ

Date	Rainfall
4/4/2017	0.6
4/5/2017	0.02
4/21/2017	0.18
4/25/2017	0.07
4/26/2017	0.03
4/29/2017	0.02

Date	Rainfall
5/2/2017	0.3
5/5/2017	0.02
5/6/2017	0.05
5/13/2017	0.17
5/22/2017	0.01
5/24/2017	0.02
5/25/2017	0.33
5/26/2017	0.11
5/29/2017	0.09
5/31/2017	0.04

Total Monthly Rainfall

Month	2017	
	Inches	Days
April	0.92	6
May	1.14	10
June	0.87	8
July	0.79	9
August	0.65	6
September	0.49	7
October	0.83	9

Date	Rainfall
6/5/2017	0.01
6/6/2017	0.04
6/14/2017	0.03
6/19/2017	0.02
6/23/2017	0.03
6/24/2017	0.64
6/27/2017	0.08
6/30/2017	0.02

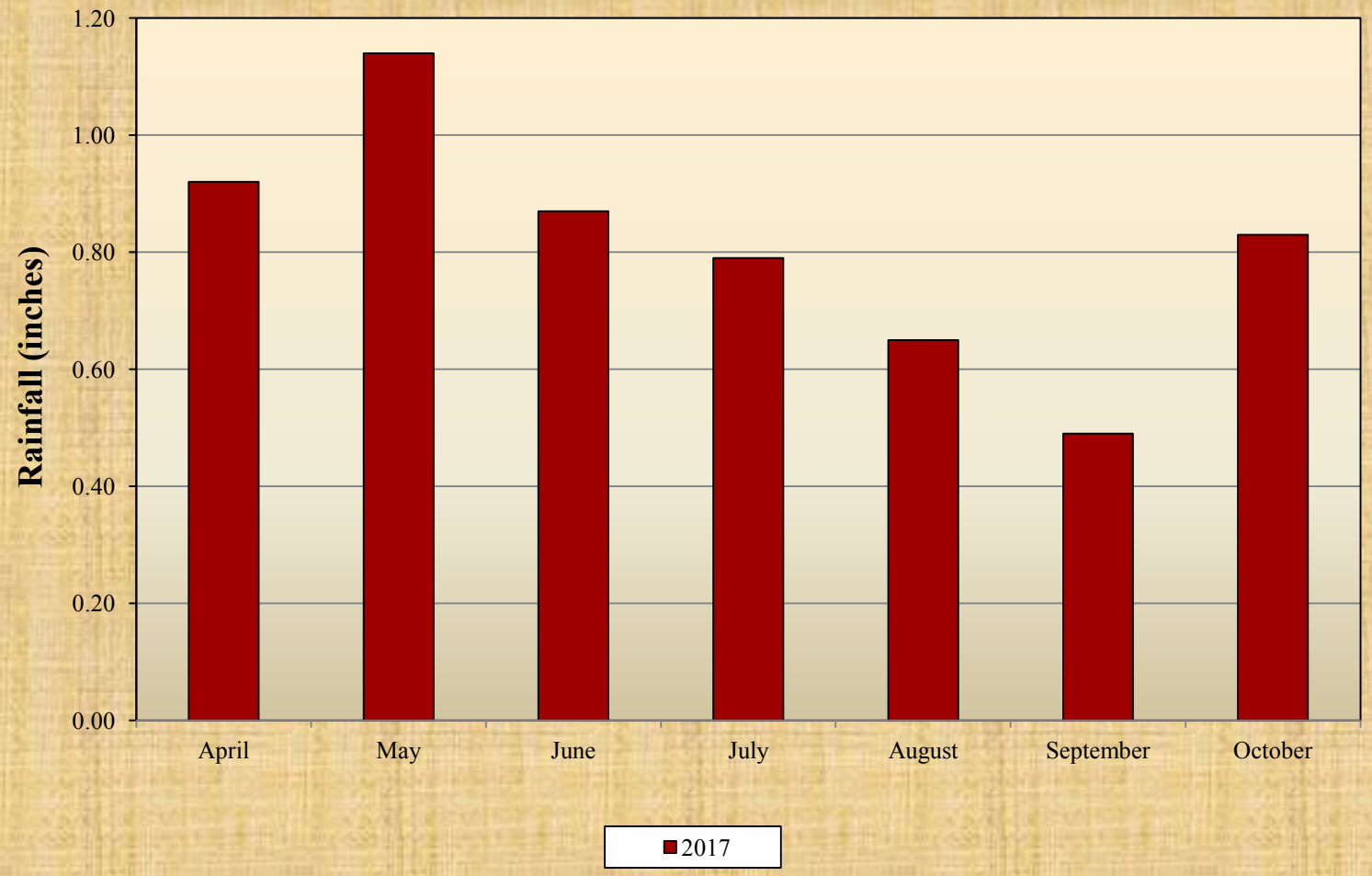
Date	Rainfall
7/7/2017	0.08
7/8/2017	0.05
7/10/2017	0.01
7/13/2017	0.15
7/14/2017	0.03
7/15/2017	0.01
7/22/2017	0.26
7/23/2017	0.04
7/24/2017	0.16

Date	Rainfall
8/5/2017	0.27
8/12/2017	0.08
8/15/2017	0.08
8/18/2017	0.03
8/22/2017	0.18
8/23/2017	0.01

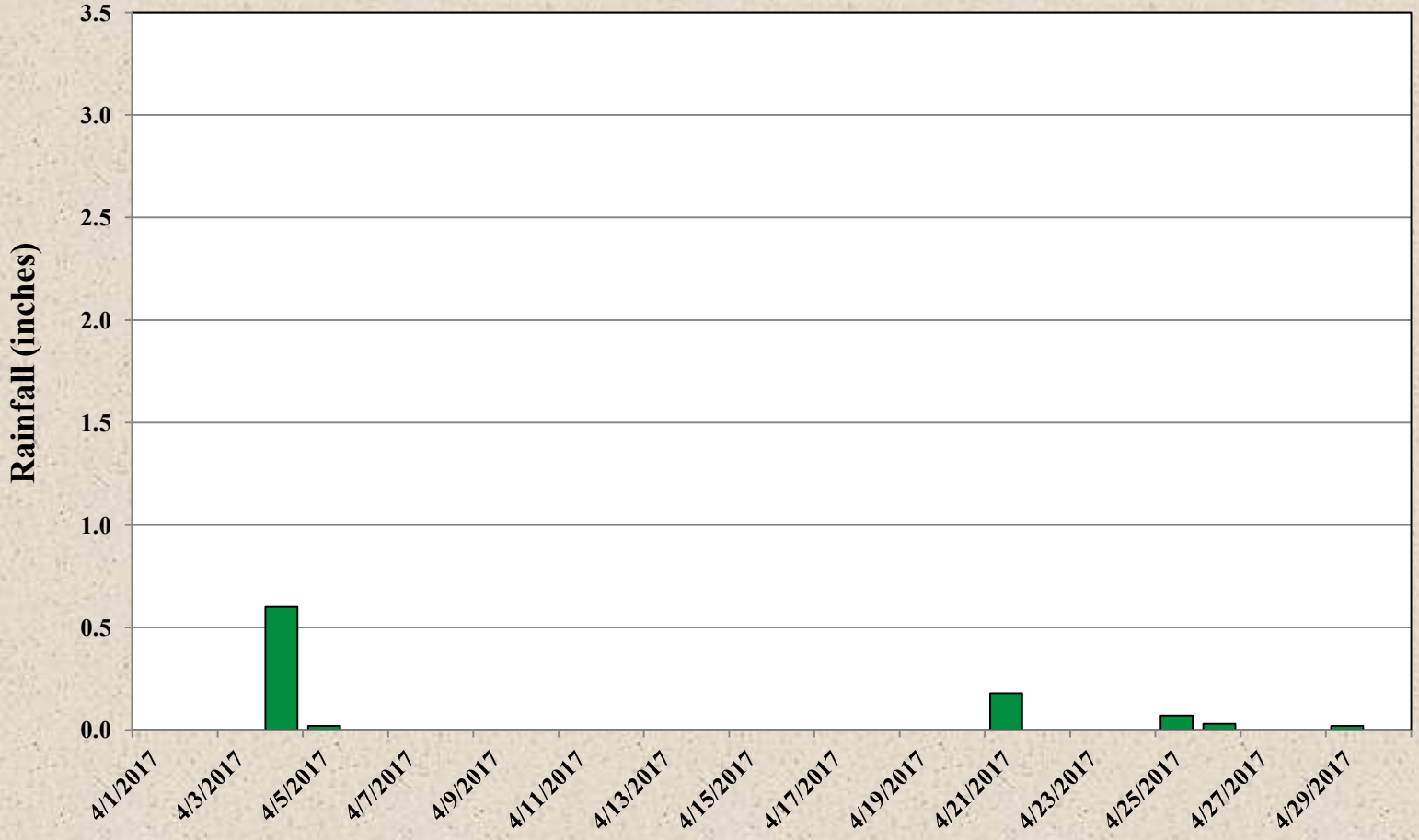
Date	Rainfall
9/2/2017	0.06
9/3/2017	0.06
9/5/2017	0.02
9/6/2017	0.28
6/7/2017	0.05
9/9/2017	0.01
9/17/2017	0.01

Date	Rainfall
10/5/2017	0.03
10/9/2017	0.06
10/12/2017	0.12
10/14/2017	0.02
10/16/2017	0.01
10/24/2017	0.04
10/25/2017	0.01
10/29/2017	0.42
10/30/2017	0.12

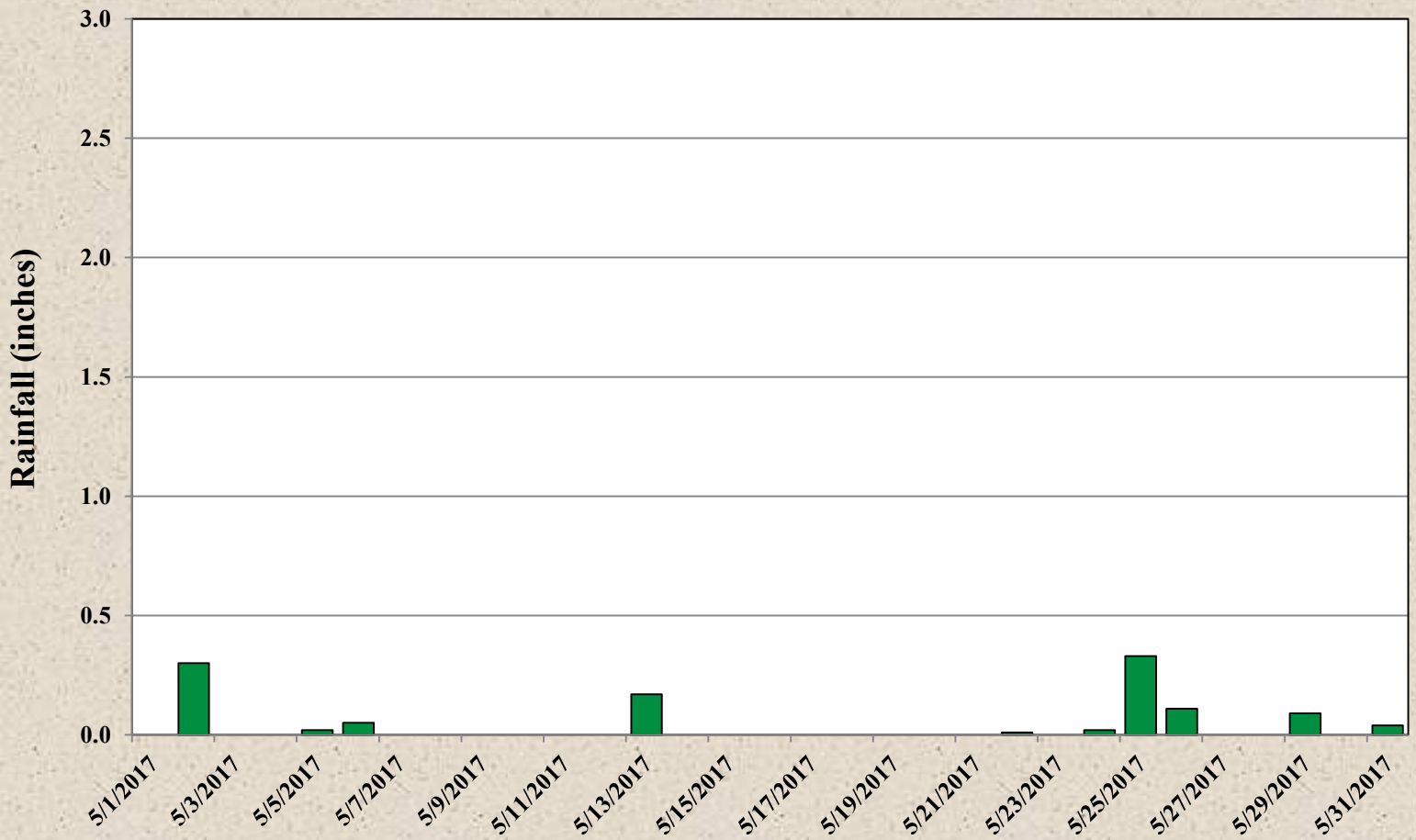
2017 Monthly Rainfall
Mountain Lakes, NJ



April 2017 Rainfall
Mountain Lakes, NJ

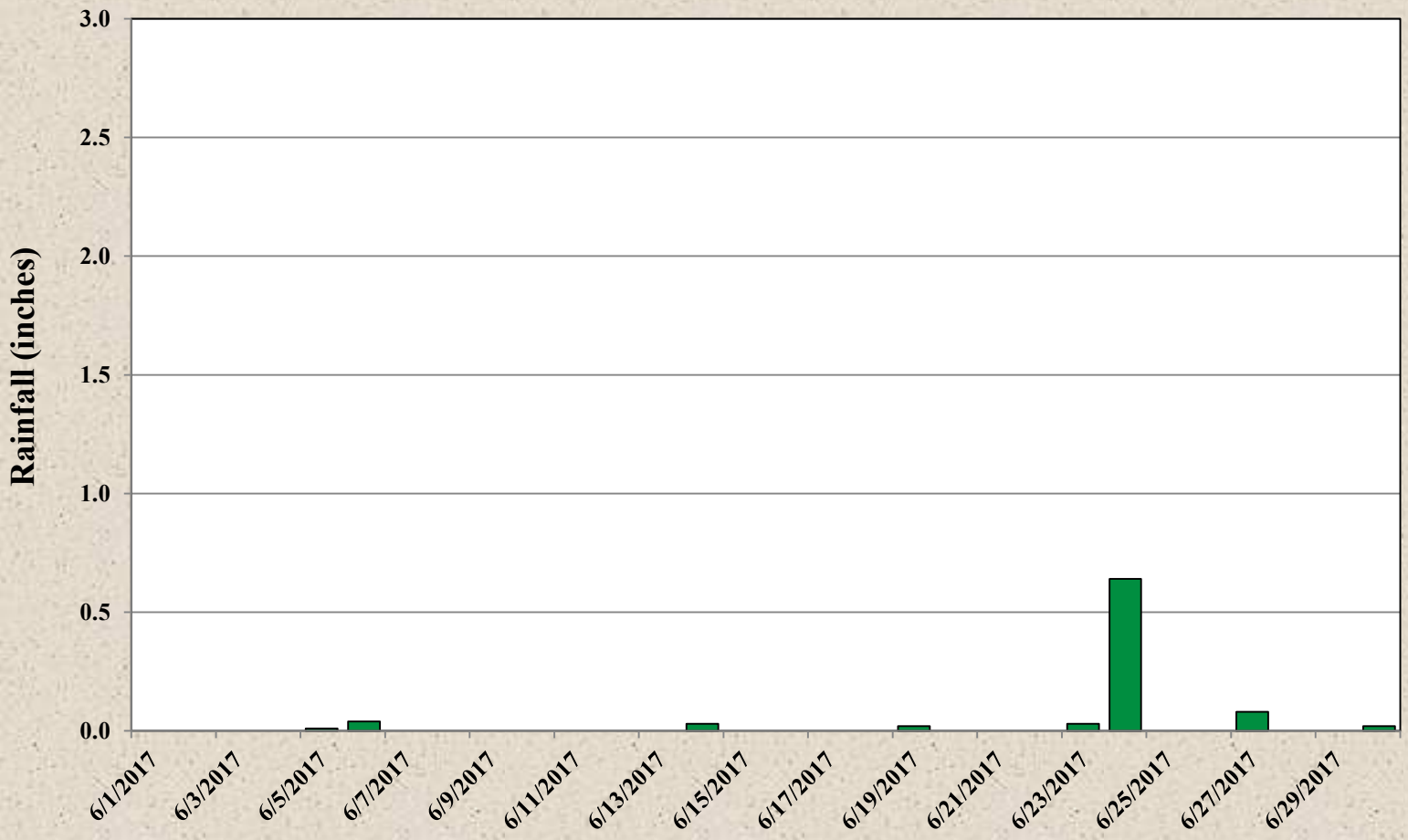


May 2017 Rainfall
Mountain Lakes, NJ

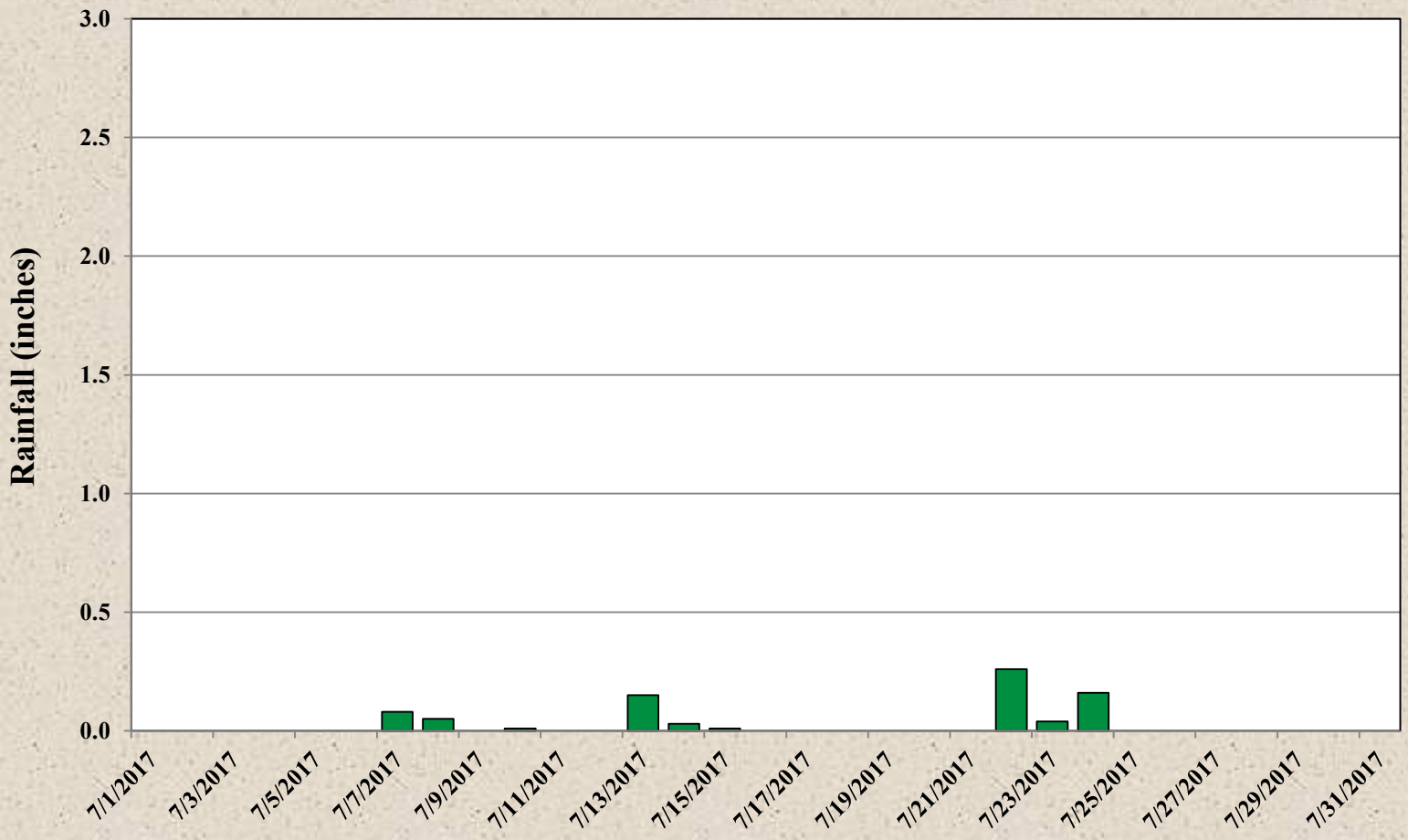


June 2017 Rainfall
Mountain Lakes, NJ

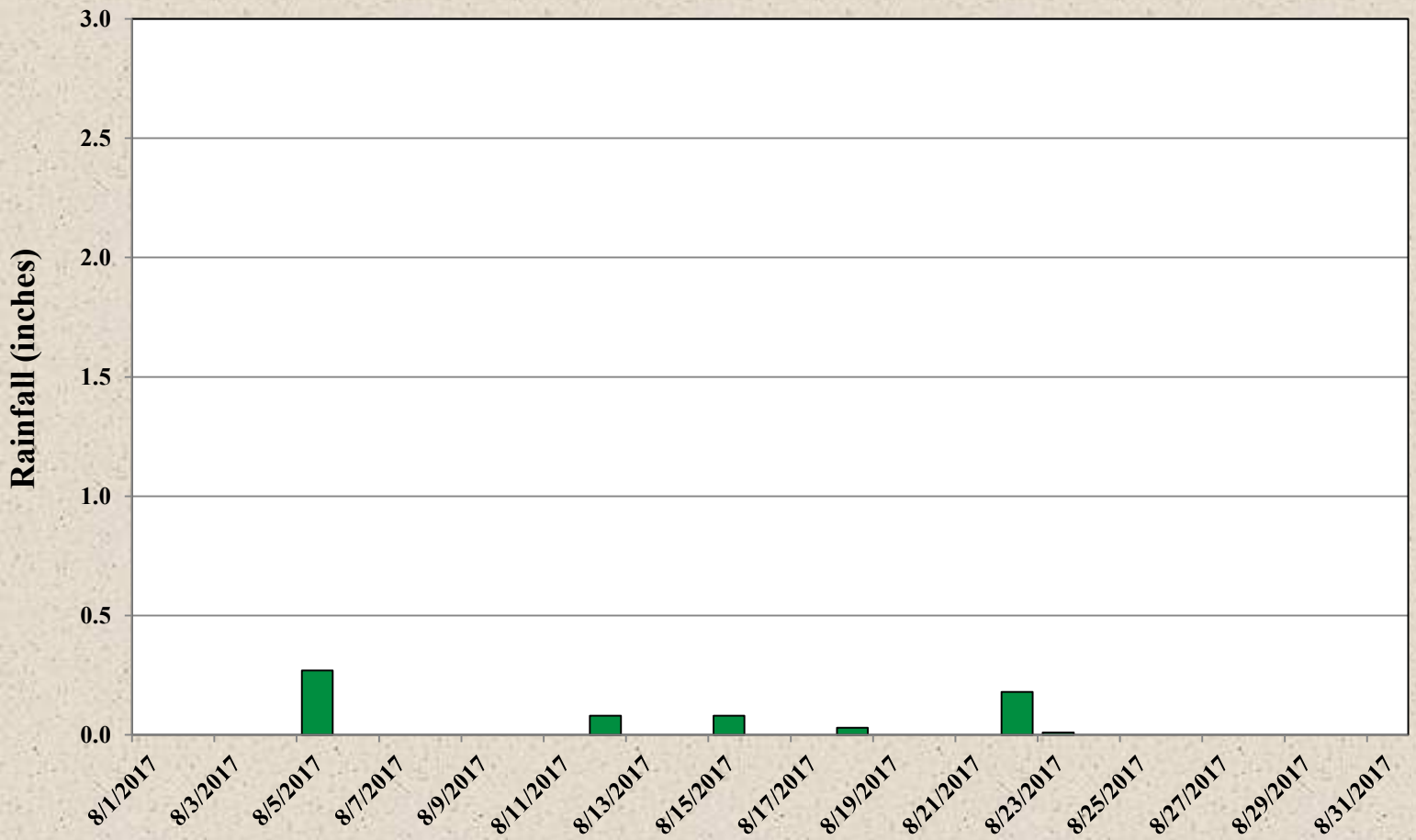
SOLITUDE LAKE MANAGEMENT



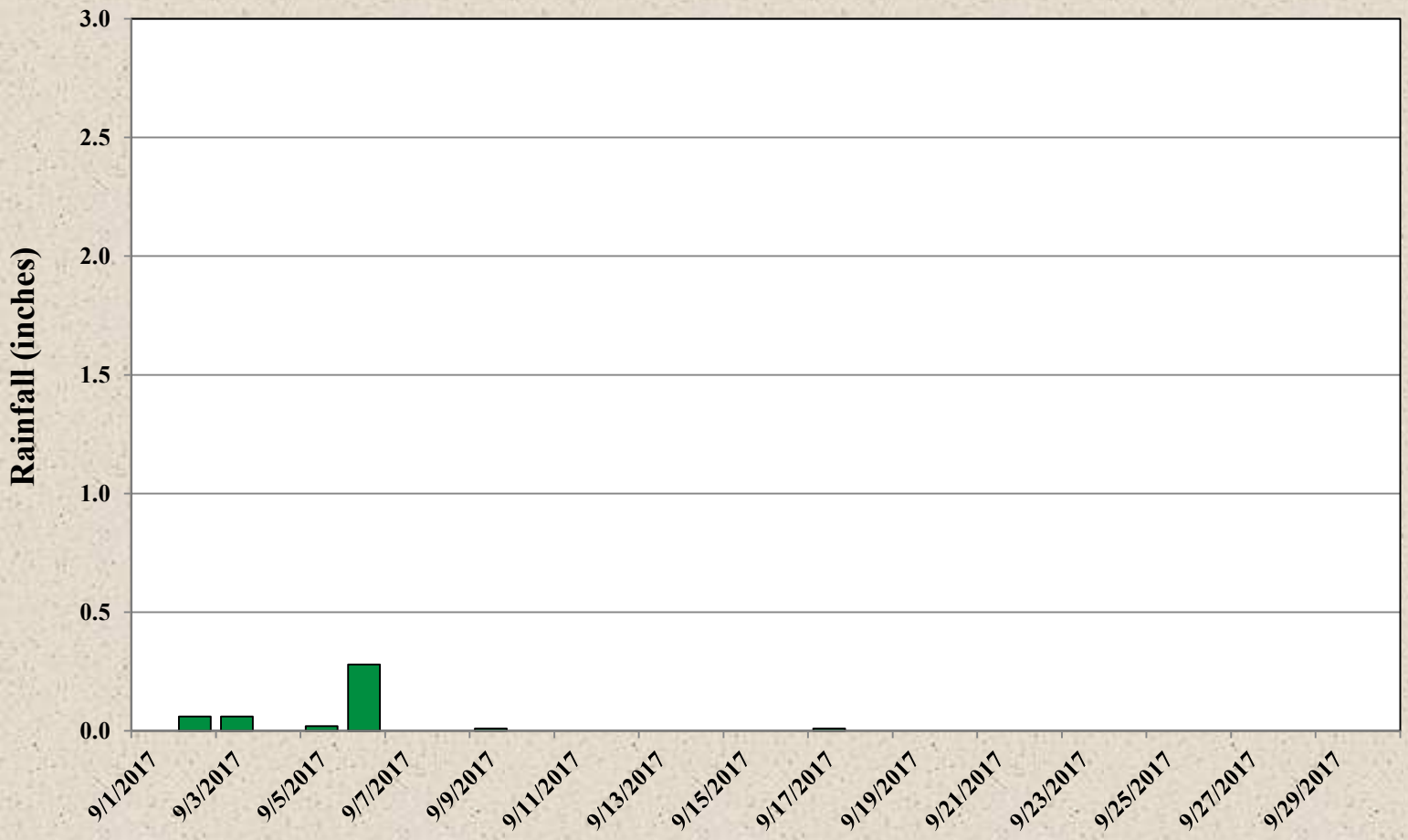
July 2017 Rainfall
Mountain Lakes, NJ



August 2017 Rainfall
Mountain Lakes, NJ

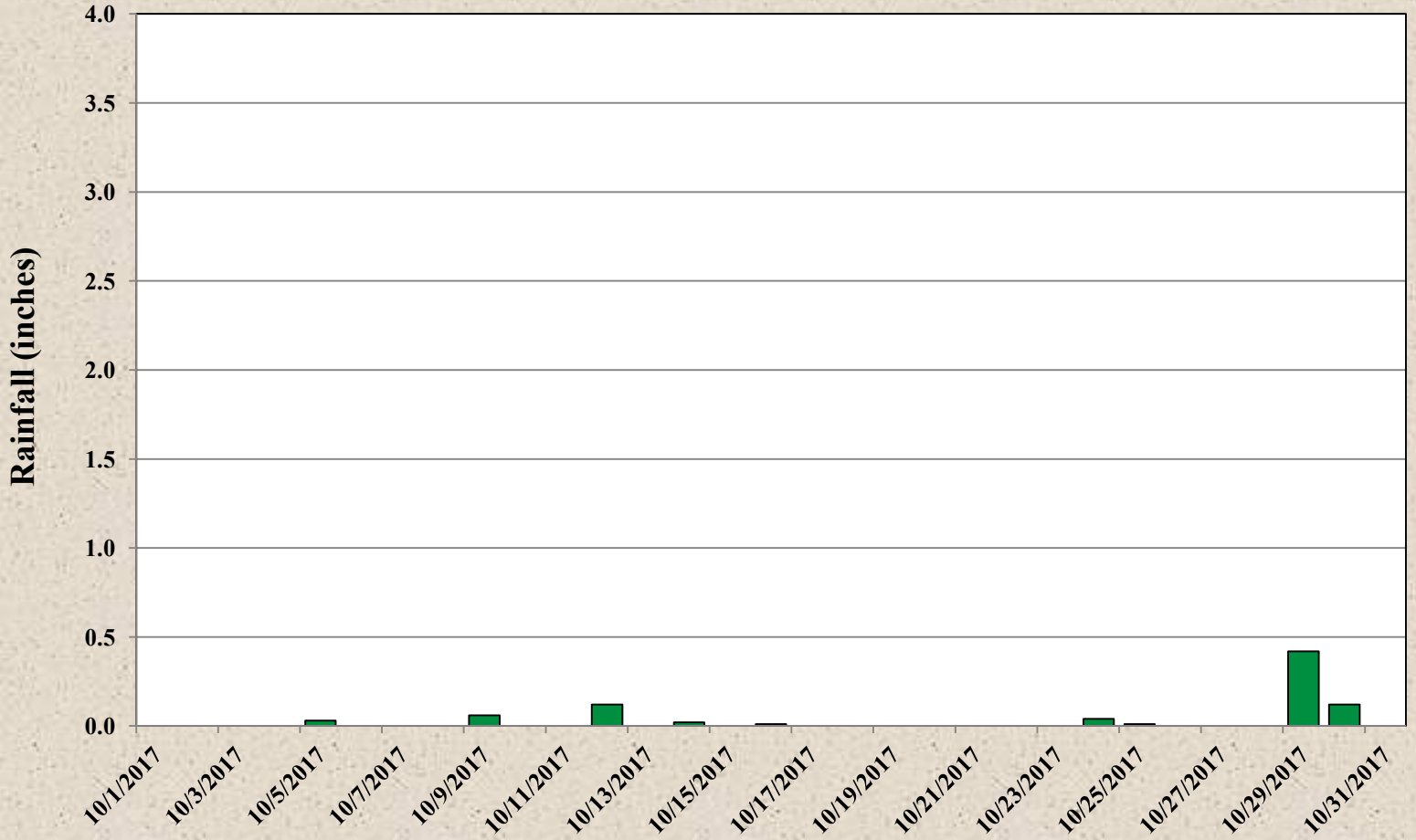


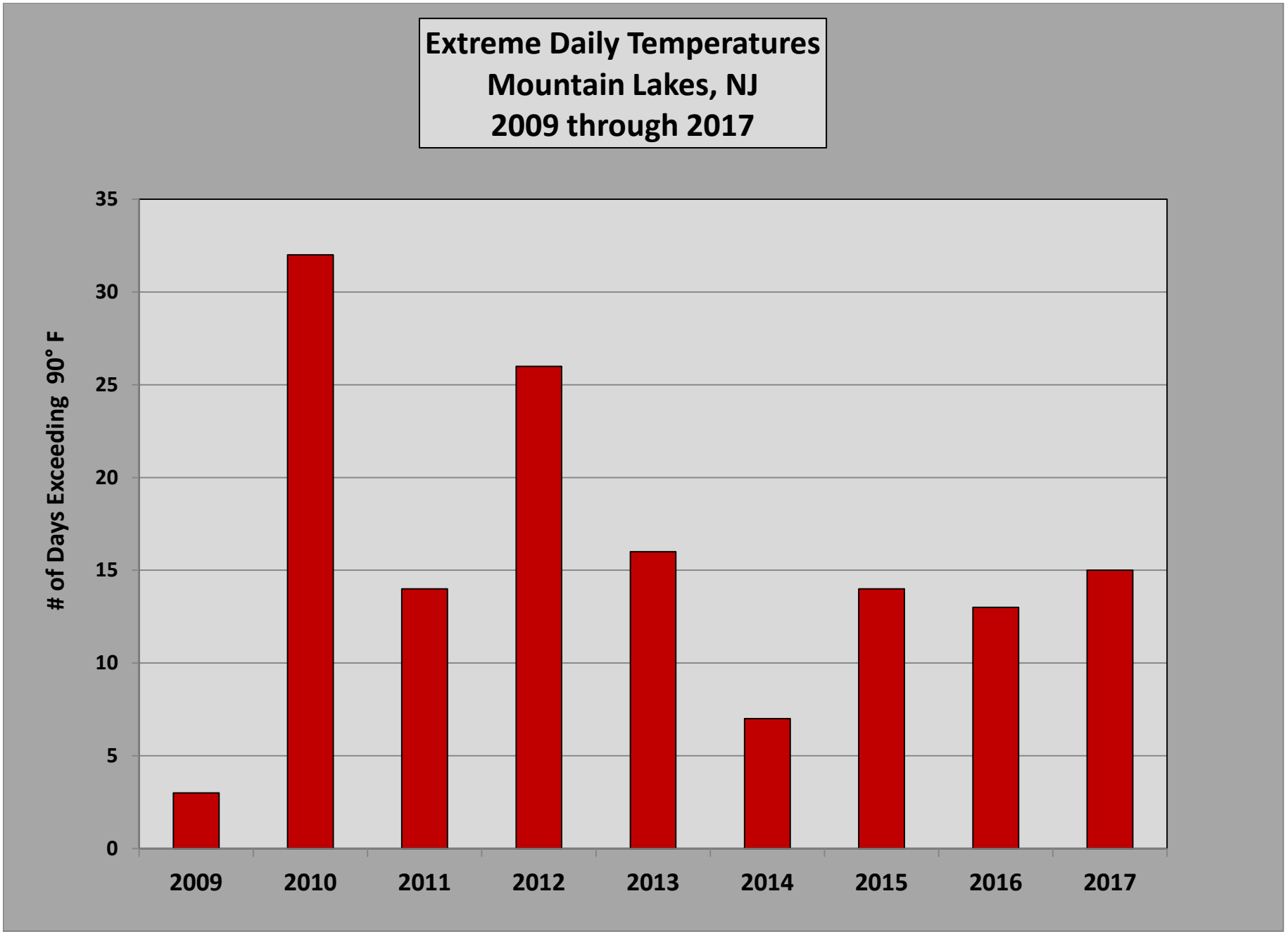
September 2017 Rainfall
Mountain Lakes, NJ

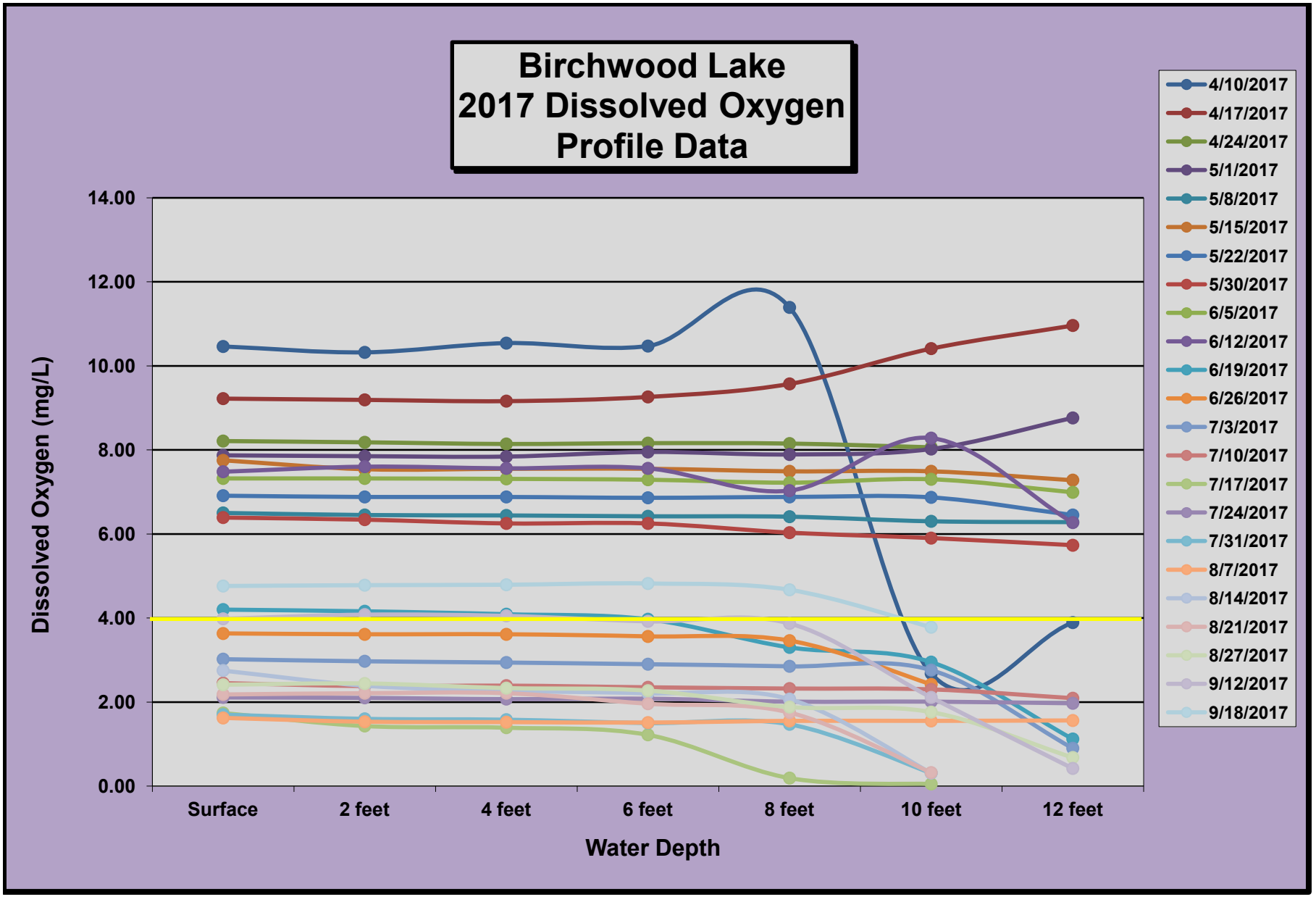


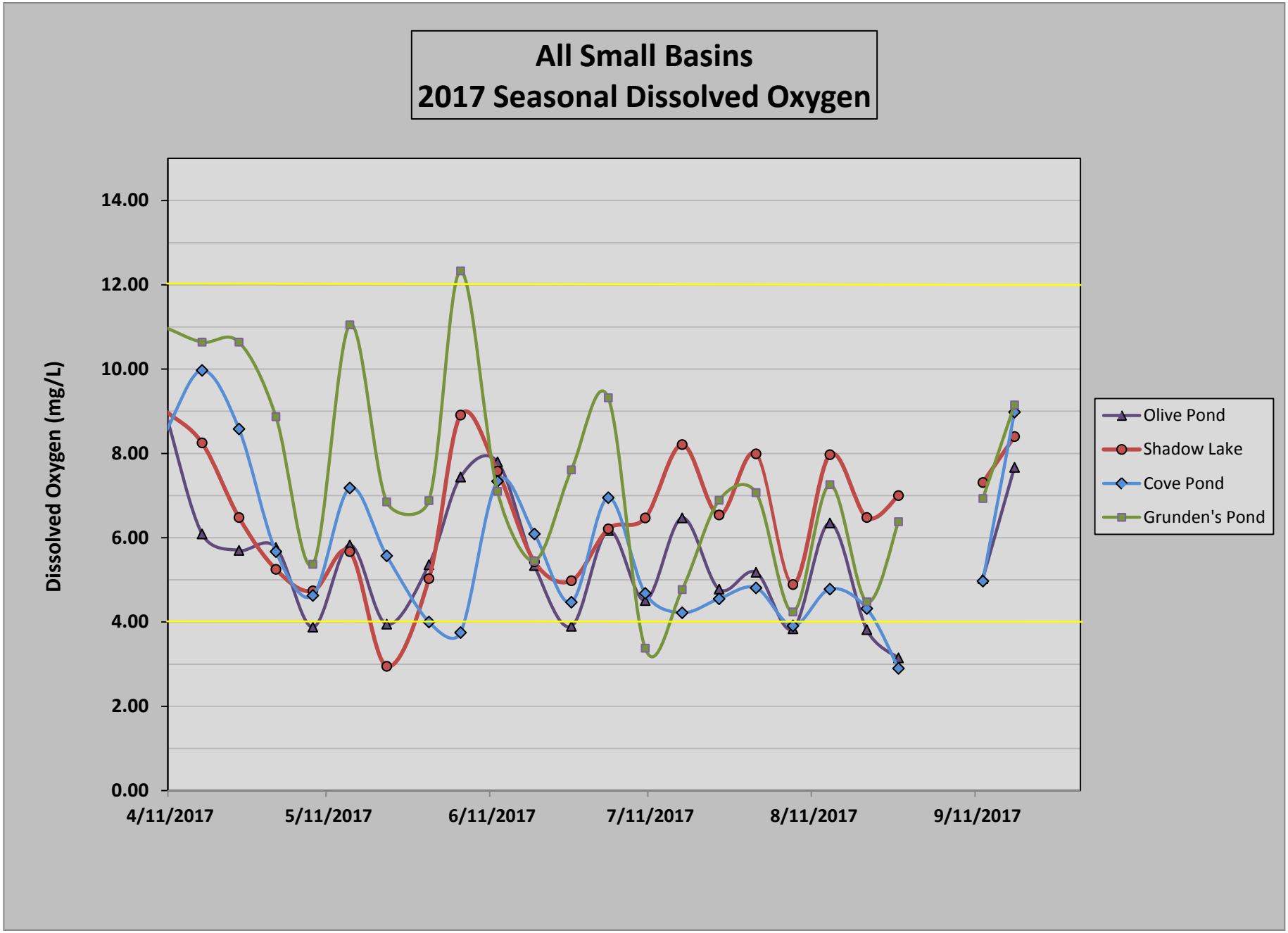
October 2017 Rainfall
Mountain Lakes, NJ

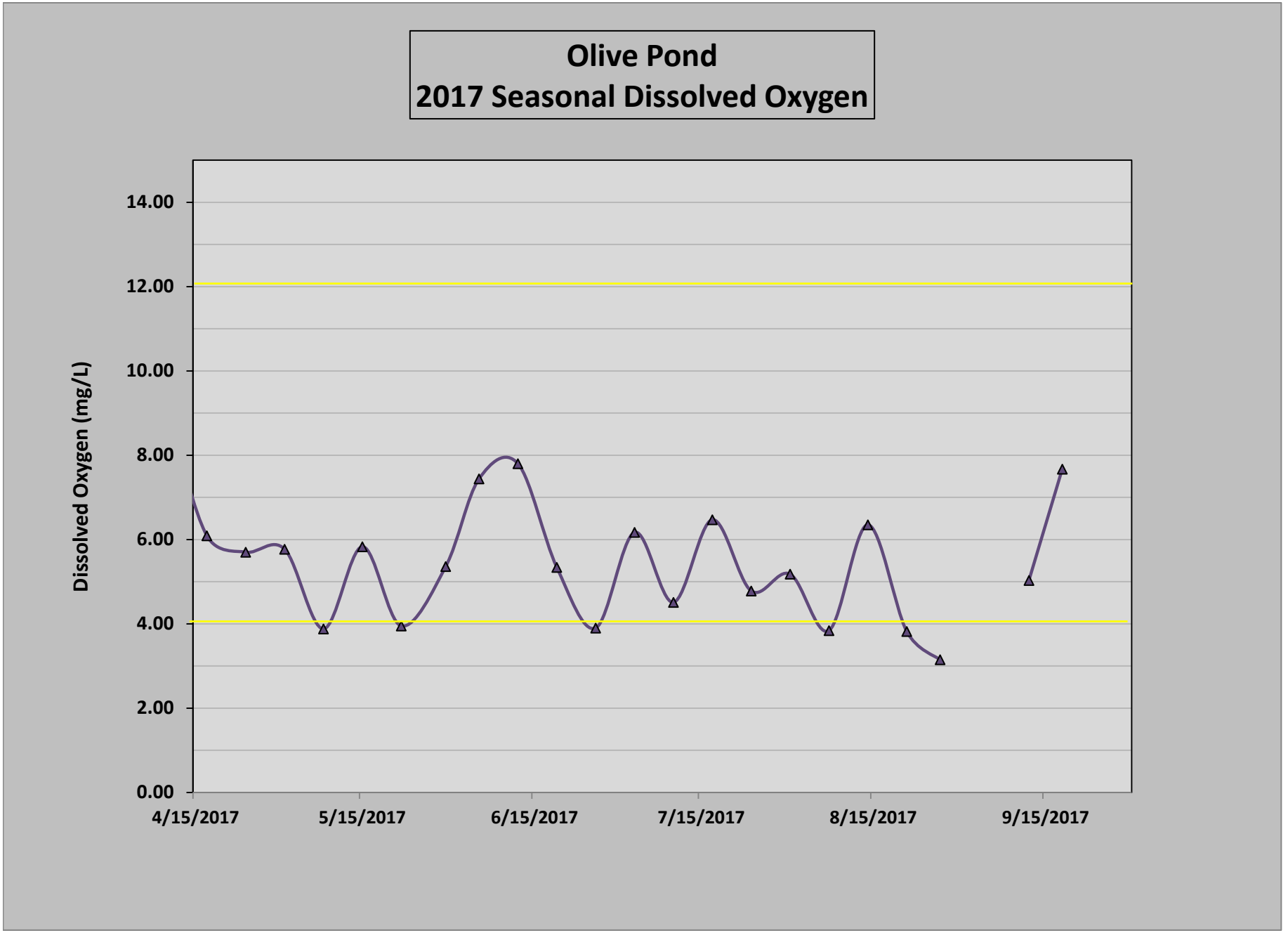
SOLITUDE LAKE MANAGEMENT

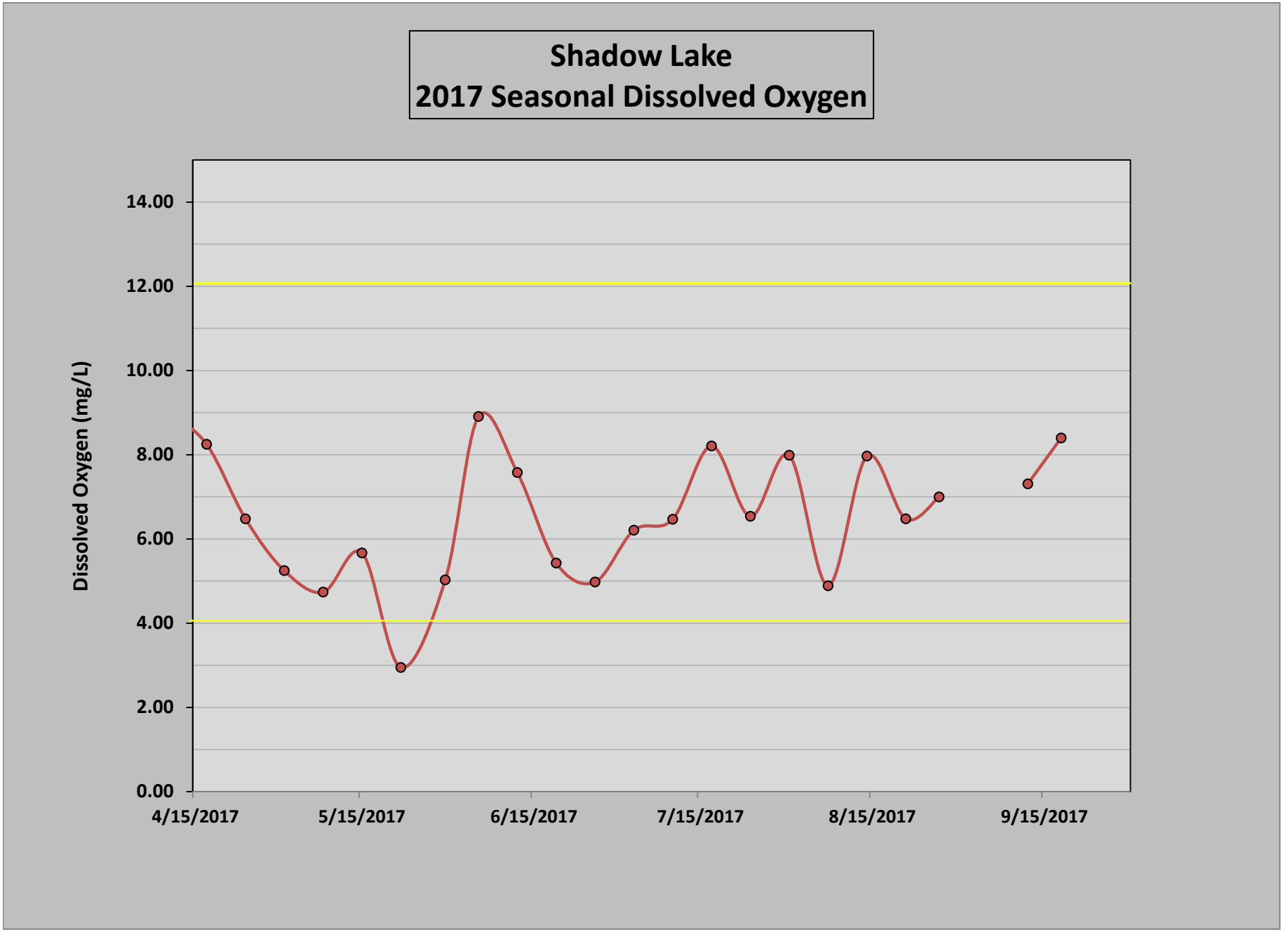


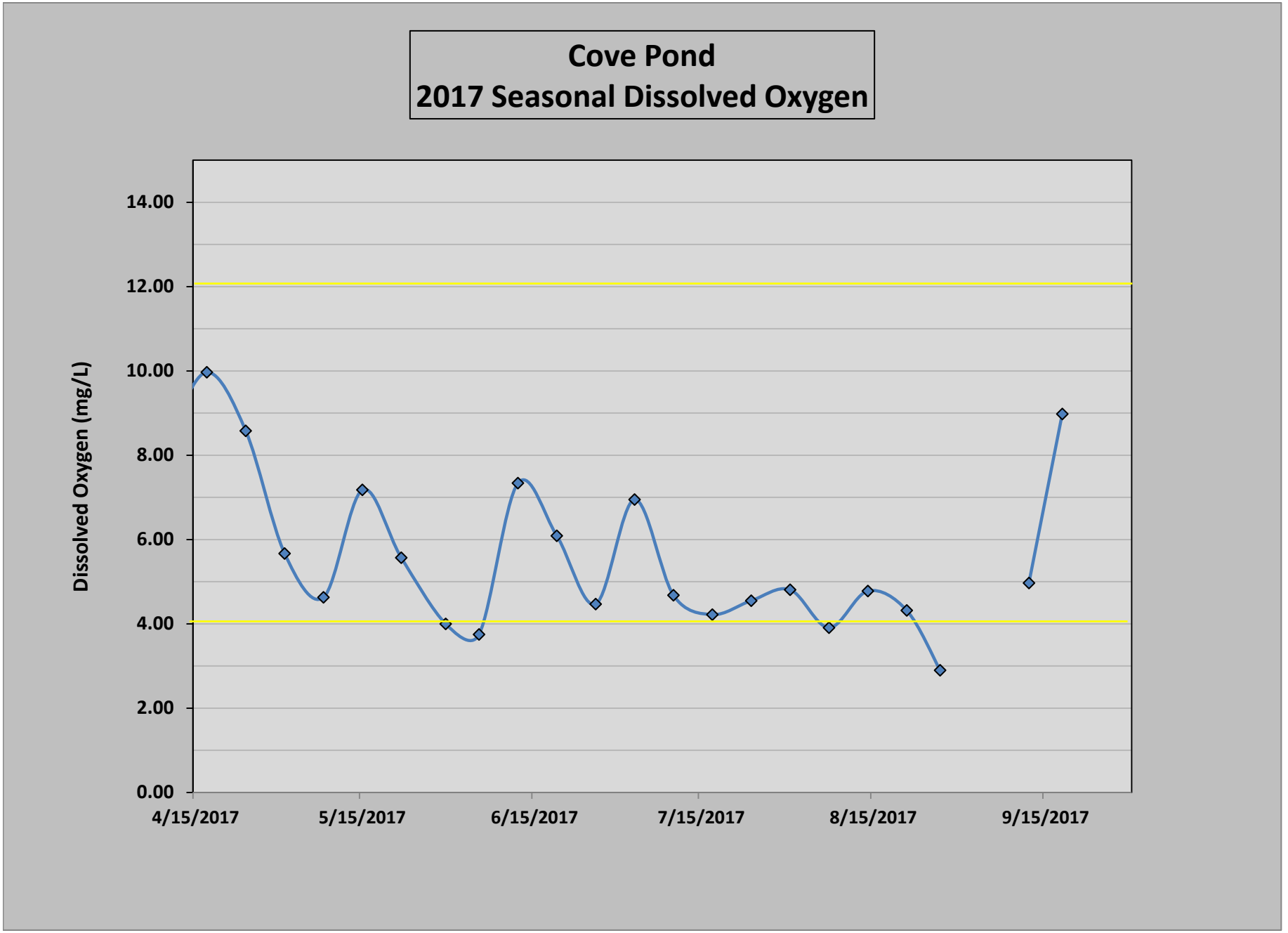

Extreme Daily Temperatures
Mountain Lakes, NJ
2009 through 2017
# of Days Exceeding 90° F
35
30
25
20
15
10
5
0
2009
2010
2011
2012
2013
2014
2015
2016
2017

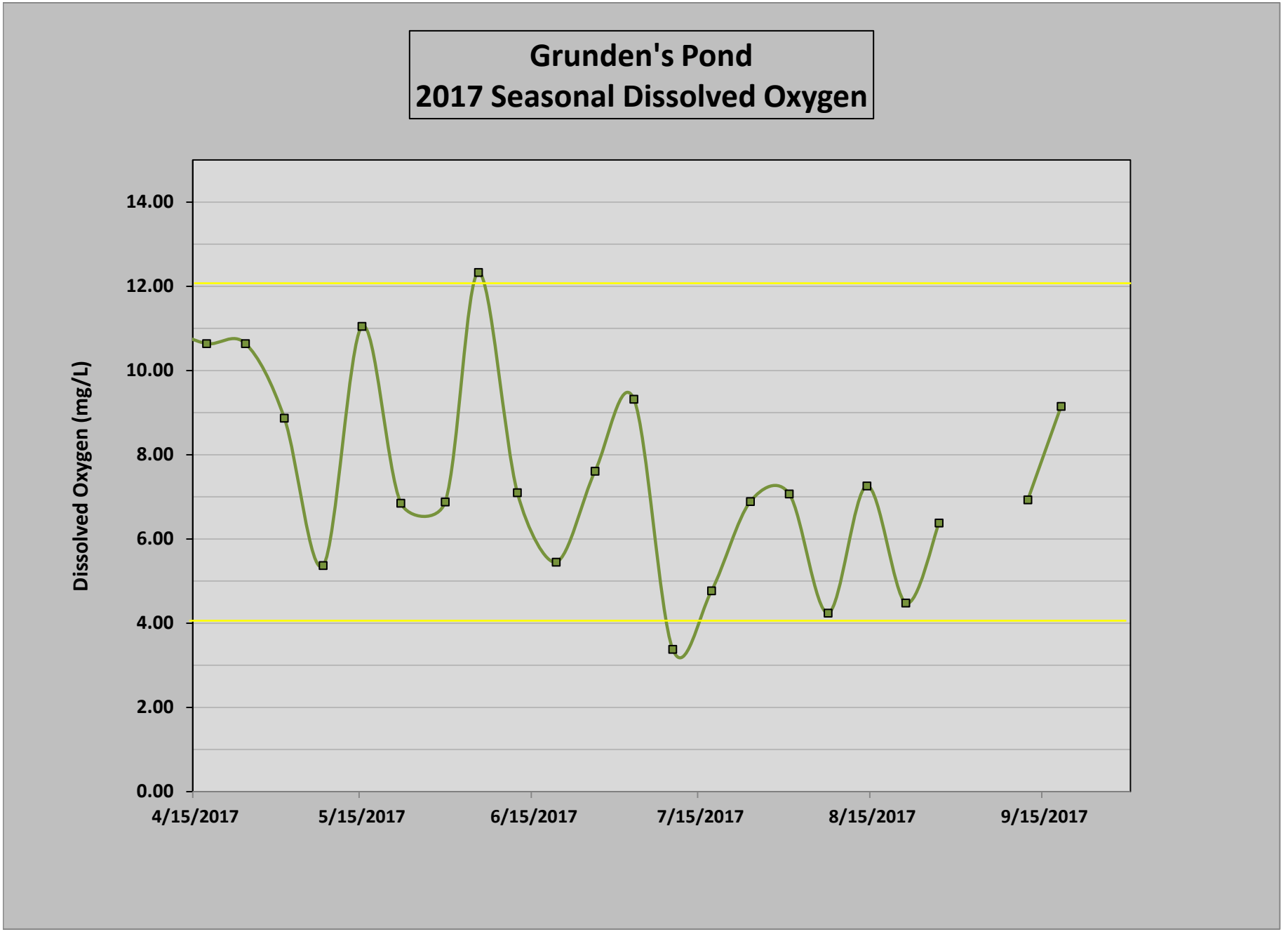

Birchwood Lake
2017 Dissolved Oxygen
Profile Data
Dissolved Oxygen (mg/L)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Surface
2 feet
4 feet
6 feet
8 feet
10 feet
12 feet
Water Depth
4/10/2017
4/17/2017
4/24/2017
5/1/2017
5/8/2017
5/15/2017
5/22/2017
5/30/2017
6/5/2017
6/12/2017
6/19/2017
6/26/2017
7/3/2017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


All Small Basins
2017 Seasonal Dissolved Oxygen
Dissolved Oxygen (mg/L)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
4/11/2017
5/11/2017
6/11/2017
7/11/2017
8/11/2017
9/11/2017
Olive Pond
Shadow Lake
Cove Pond
Grunden's Pond


Olive Pond
2017 Seasonal Dissolved Oxygen
Dissolved Oxygen (mg/L)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
4/15/2017
5/15/2017
6/15/2017
7/15/2017
8/15/2017
9/15/2017


Shadow Lake
2017 Seasonal Dissolved Oxygen
Dissolved Oxygen (mg/L)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
4/15/2017
5/15/2017
6/15/2017
7/15/2017
8/15/2017
9/15/2017


Cove Pond
2017 Seasonal Dissolved Oxygen
Dissolved Oxygen (mg/L)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
4/15/2017
5/15/2017
6/15/2017
7/15/2017
8/15/2017
9/15/2017


Grunden's Pond
2017 Seasonal Dissolved Oxygen
Dissolved Oxygen (mg/L)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
4/15/2017
5/15/2017
6/15/2017
7/15/2017
8/15/2017
9/15/2017

Mountain Lakes WQ Data Summary 2017

June 5, 2017

Lake	Temp (ºC)	DO (mg/L)	pH	Alkalinity	Secchi (ft)
Birchwood	19.1	7.32	6.75	44	8.5
Crystal	19.9	9.59	7.25	48	6'est
Sunset	19.8	9.46	7.00	52	5'est
Olive	18.5	7.44	7.25	56	4'est
Shadow	18.7	8.91	7.25	60	3.5'est
Cove	18.7	3.75	7.00	68	3.5'est
Grunden's	19.6	12.33	7.75	56	3'est
Mountain	18.7	8.12	7.50	60	10.5'est
Wildwood	18.9	8.91	7.75	48	4.5'est

Mountain Lakes WQ Data Summary 2017

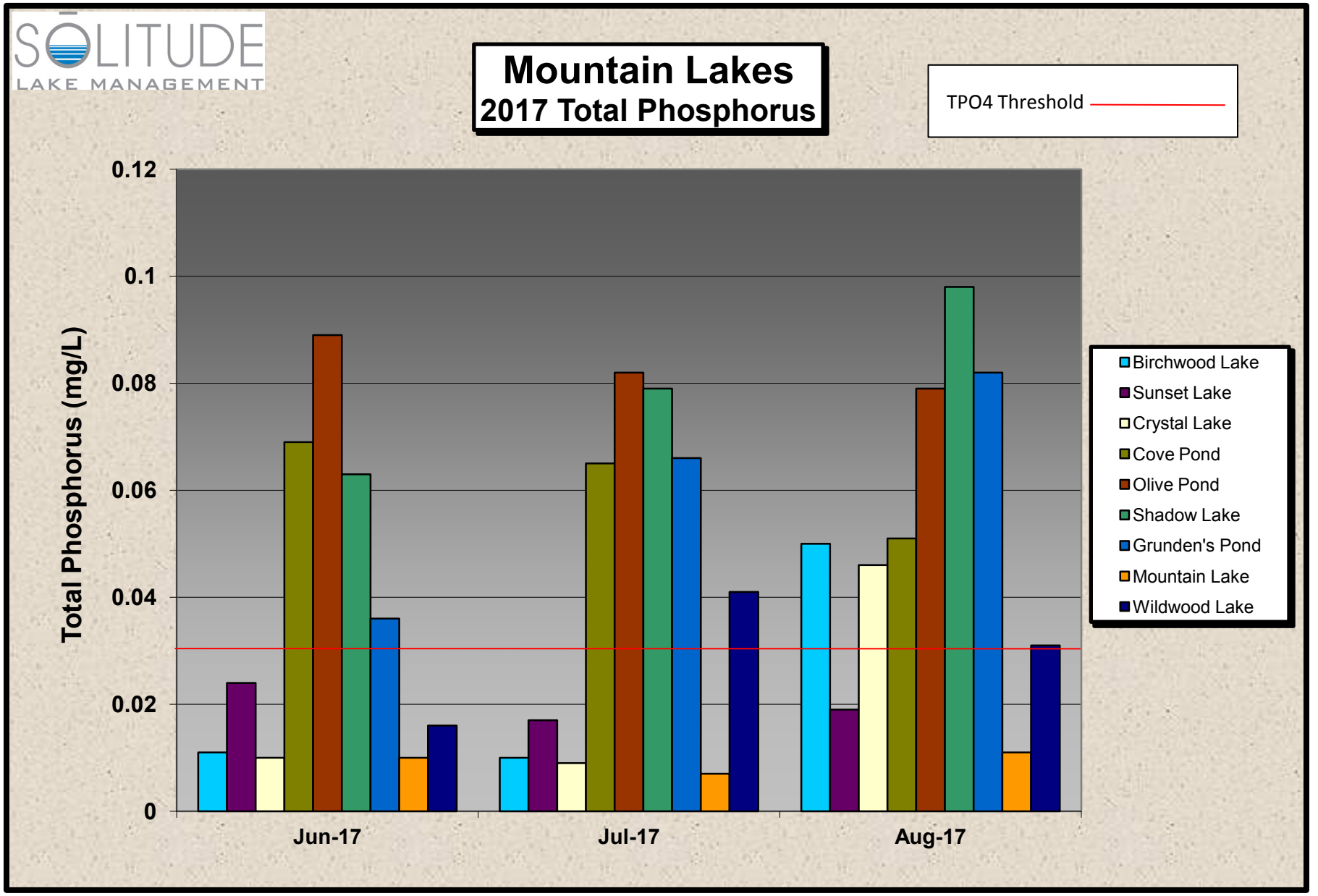
July 10, 2017

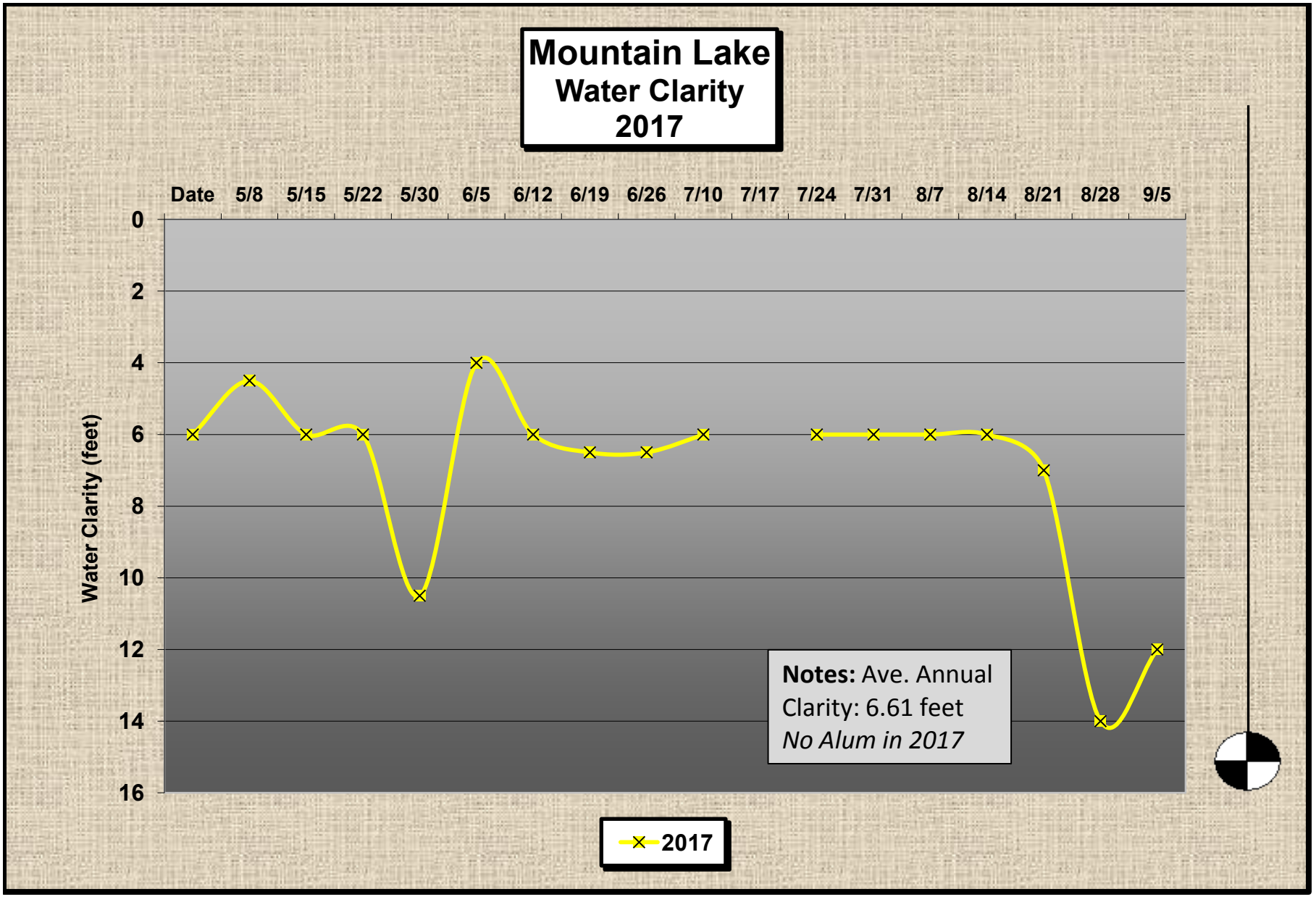
Lake	Temp (ºC)	DO (mg/L)	pH	Alkalinity	Secchi (ft)
Birchwood	24.3	2.45	6.5	60	5'est
Crystal	24.6	6.38	7.25	65	5'est
Sunset	24.4	6.82	7.25	45	4'est
Olive	25.0	4.51	7.25	NA	2'est
Shadow	24.6	6.47	7.25	65	2.5'est
Cove	21.1	4.68	7.25	80	2.5'est
Grunden's	26.1	3.30	7.0	80	3'est
Mountain	26.1	7.82	8.0	60	6.5'
Wildwood	27.1	7.26	7.5	80	3.5'est

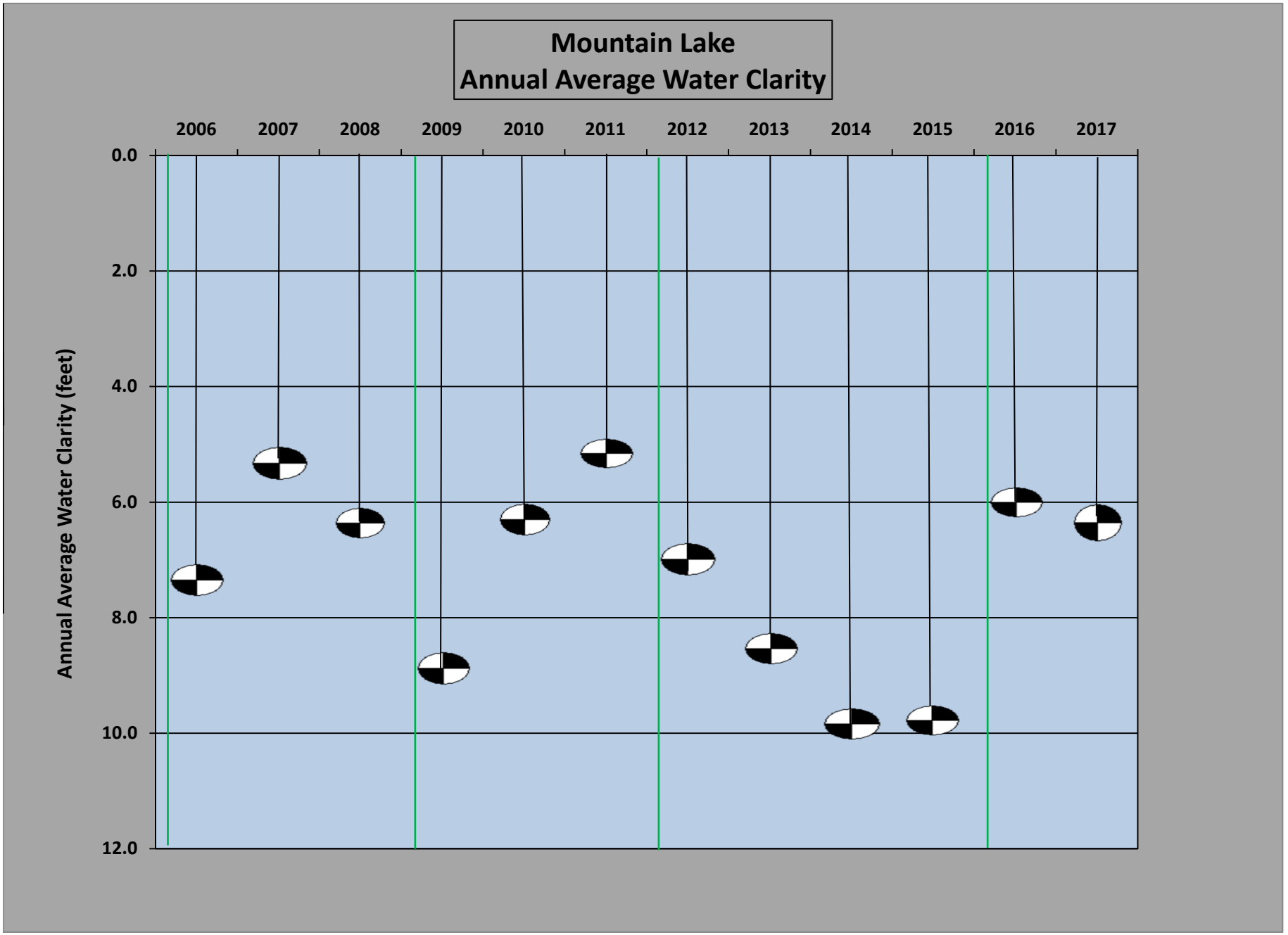
Mountain Lakes WQ Data Summary 2017

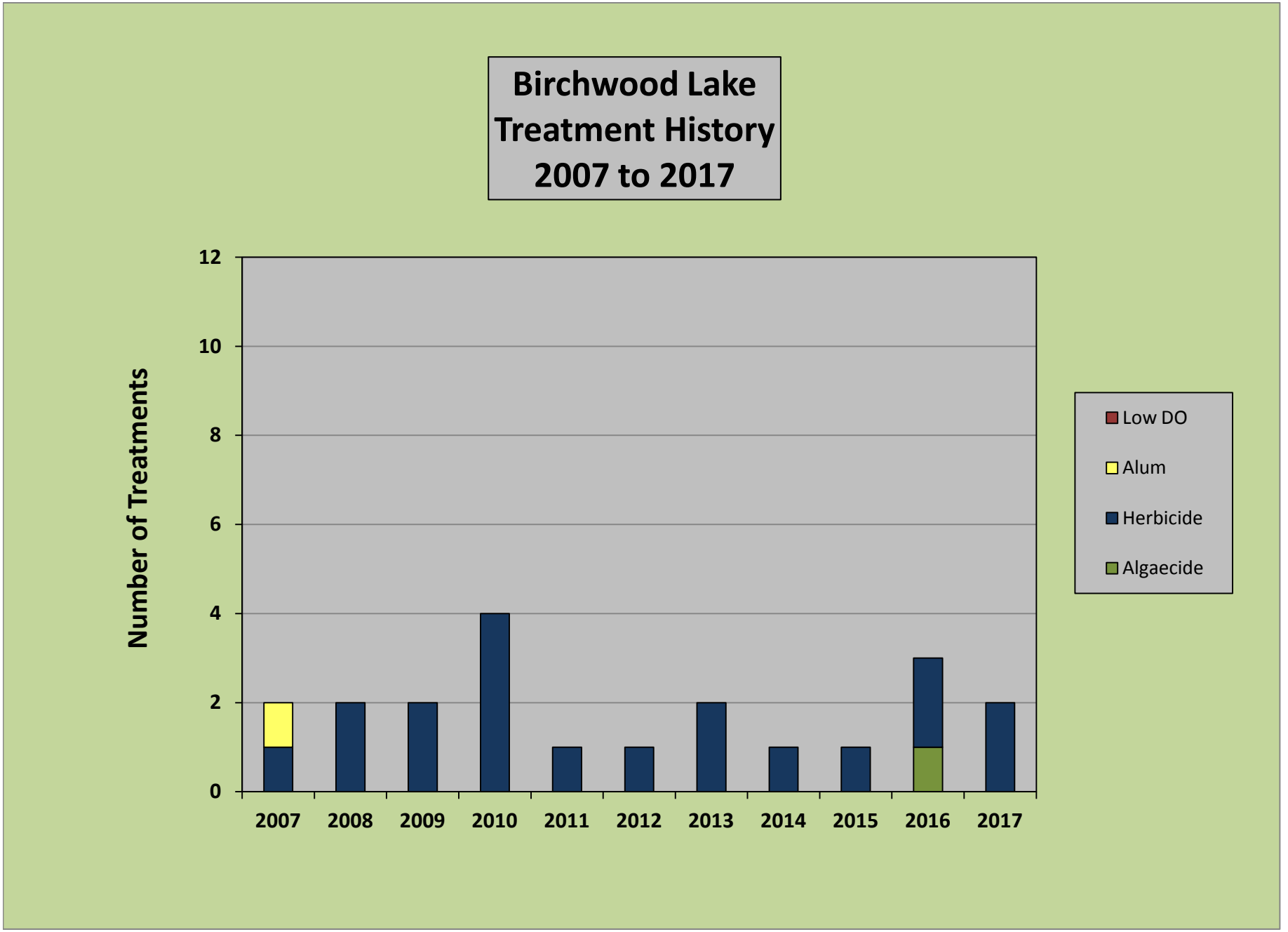
August 14, 2017

Lake	Temp (ºC)	DO (mg/L)	pH	Alkalinity	Secchi (ft)
Birchwood	23.5	2.75	6.75	40	6.5’
Crystal	25.4	7.62	8.0	42	6’
Sunset	25.9	8.02	8.0	62	5’ est
Olive	25.3	6.35	7.5	60	3’ est
Shadow	24.4	7.97	7.5	60	3’ est
Cove	23.1	4.78	7.25	80	2’ est
Grunden’s	25.5	7.26	7.25	80	4’ est
Mountain	26.9	8.32	7.25	60	7’ est
Wildwood	26.9	8.29	8.0	65	6’ est

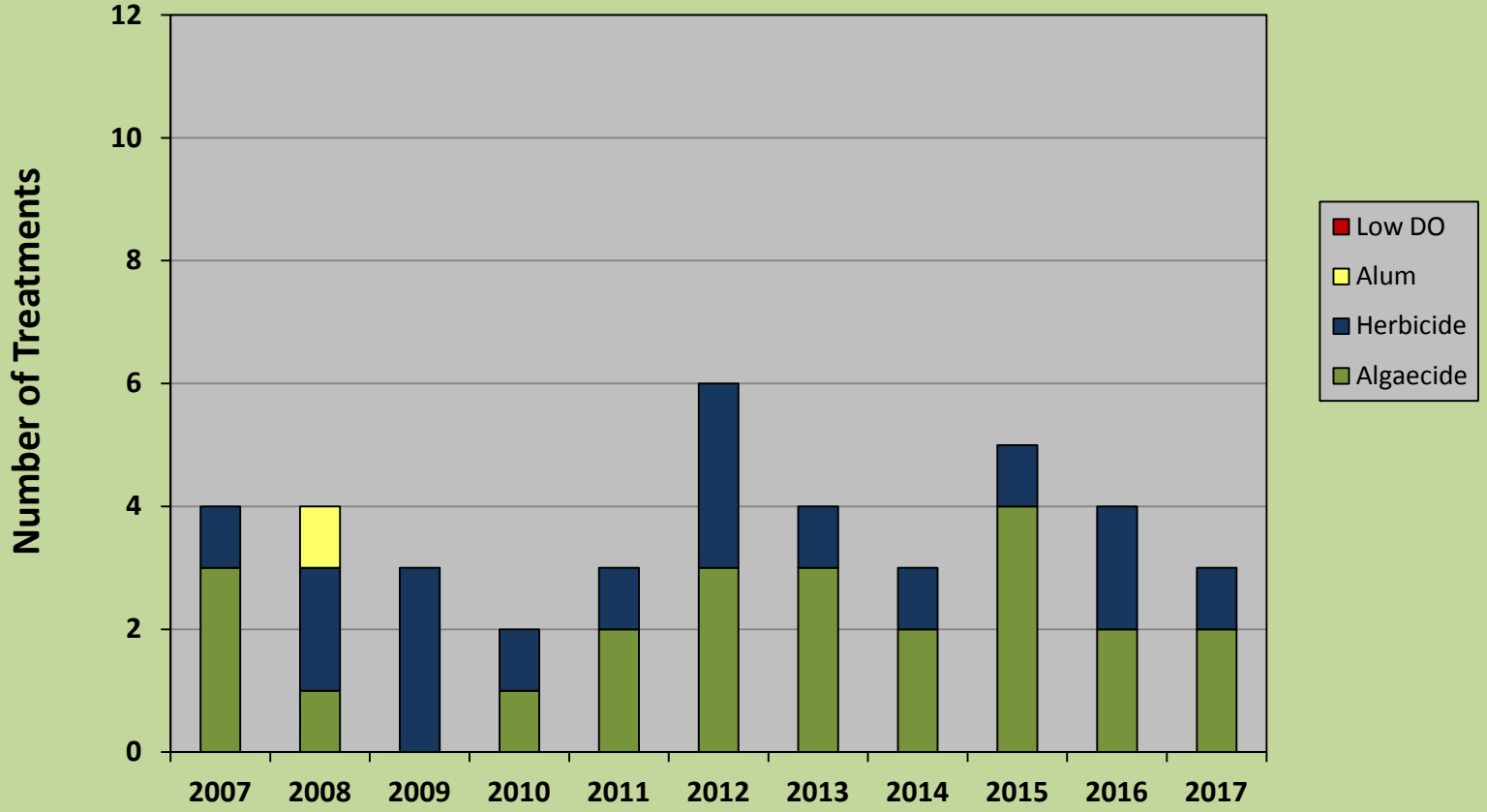

SOLITUDE
LAKE MANAGEMENT
Mountain Lakes
2017 Total Phosphorus
TPO4 Threshold
Total Phosphorus (mg/L)
0.12
0.1
0.08
0.06
0.04
0.02
0
Jun-17
Jul-17
Aug-17
Birchwood Lake
Sunset Lake
Crystal Lake
Cove Pond
Olive Pond
Shadow Lake
Grunden's Pond
Mountain Lake
Wildwood Lake

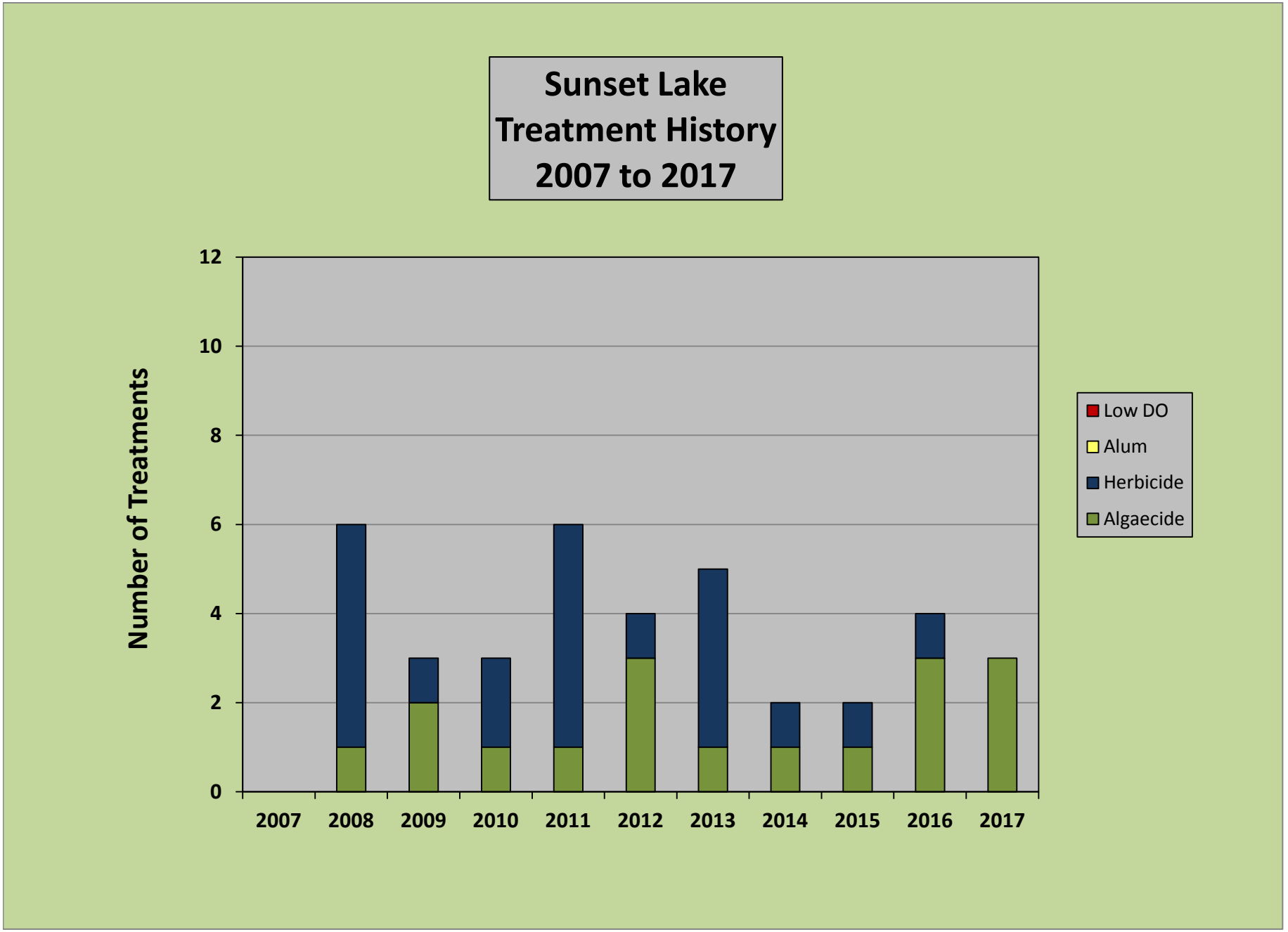

Mountain Lake
Water Clarity
2017
Date
5/8
5/15
5/22
5/30
6/5
6/12
6/19
6/26
7/10
7/17
7/24
7/31
8/7
8/14
8/21
8/28
9/5
Water Clarity (feet)
0
2
4
6
8
10
12
14
16
Notes: Ave. Annual Clarity: 6.61 feet
No Alum in 2017
2017


Mountain Lake
Annual Average Water Clarity
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
0.0
2.0
4.0
6.0
8.0
10.0
12.0
Annual Average Water Clarity (feet)

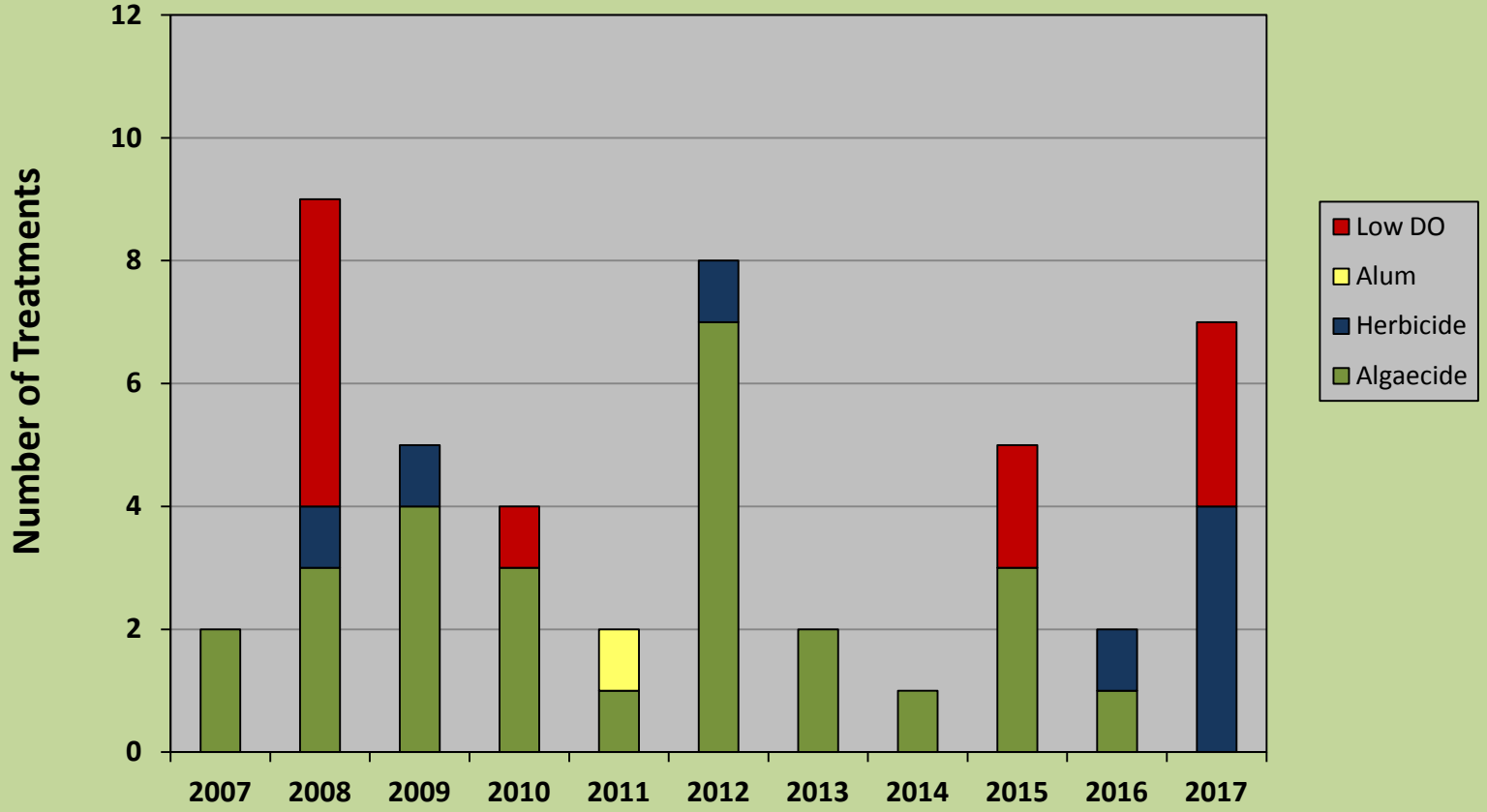

Birchwood Lake
Treatment History
2007 to 2017
Number of Treatments
12
10
8
6
4
2
0
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
Low DO
Alum
Herbicide
Algaecide

Crystal Lake Treatment History 2007 to 2017

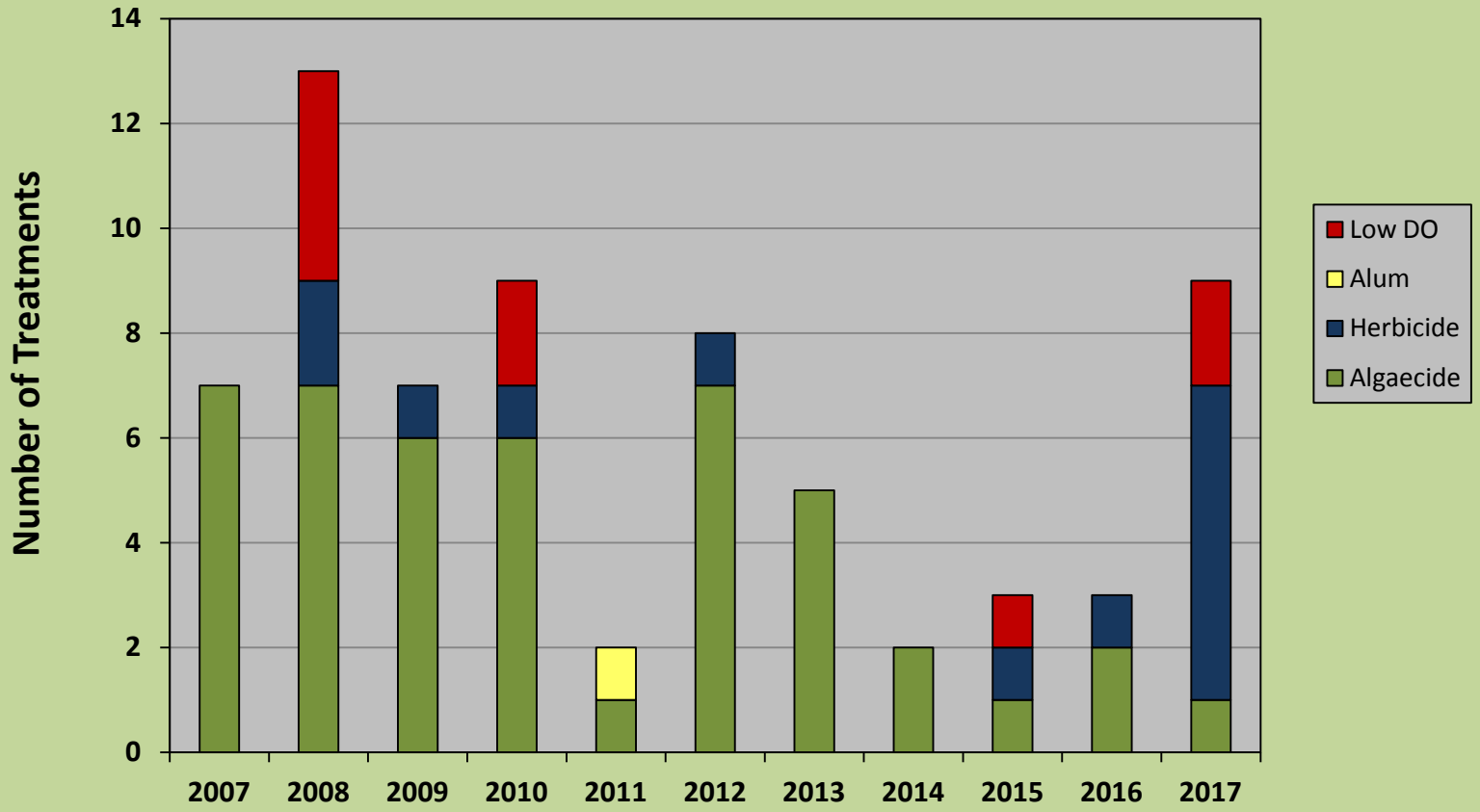



Sunset Lake
Treatment History
2007 to 2017
Number of Treatments
12
10
8
6
4
2
0
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
Low DO
Alum
Herbicide
Algaecide

Olive Pond Treatment History 2007 to 2017



Shadow Lake Treatment History 2007 to 2017



MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 06/05/17	Examination Date: 06/05/17	Amount Examined: 200 ml.
Site A: Birchwood Lake	Site B: Crystal Lake	Site C: Sunset Lake

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

CHRYSOPHYTA (Golden Algae)	**A**	**B**	**C**
Dinobryon	100	20	140
Mallomonas	60	10	50
Synura			10
Tribonema			
Uroglenopsis			

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			
Coelastrum	20	110	20
Eudorina			
Mougeotia			
Oedogonium	10		10
Oocystis			
Pandorina			
Pediastrum			10
Phytoconis			
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum		20	
Sphaerocystis			
Ulothrix			
Volvox			
Zygnema			
Gloeocystis	40		
Sphareocystis			
Cosmarium			
Tetraedron			
Dictyosphaerium			

CYANOPHYTA (Blue-green Algae)	**A**	**B**	**C**
Anabaena		10	
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		20	10
Peridinium			

SITE	**A**	**B**	**C**
TOTAL GENERA:	6	6	9
TRANSPARENCY:	8.5’	6’est	5’est
ORGANISMS PER MILLILITER:	**240**	**190**	**310**

NOTES: This is the first sampling event of 2017. Algal diversity is considered moderate for each site. Algal density is considered to be low at all sites. Sites A and C are dominated by the golden algae *Dinobryon*. Site B is dominated by the green algae *Coelastrum*. Diatoms were also observed this week. Trace amounts of dinoflagellates (sites B and C only) and blue-green algae (site B only) were observed. Water clarity for sites A and B are considered to be good while site C is fair.

Solitude Lake Management, Inc.
580 Rockport Road Hackettstown, NJ 07840 Phone (908) 850-0303 Fax (908) 850-4994

MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 6/19/17	Examination Date: 6/20/17	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			80
Tabellaria			

CHRYSOPHYTA (Golden Algae)	**A**	**B**	**C**
Dinobryon	20		
Mallomonas	40		10
Synura			
Tribonema			
Uroglenopsis			

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			
Coelastrum	60	150	
Eudorina			
Mougeotia			
Oedogonium		10	
Oocystis			
Pandorina			
Pediastrum			
Phytoconis			
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum	20	50	30
Sphaerocystis			
Ulothrix			
Volvox			
Zygnema			
Gloeocystis	10		10
Sphareocystis			
Cosmarium			
Tetraedron			
Dictyosphaerium			

CYANOPHYTA (Blue-green Algae)	**A**	**B**	**C**
Anabaena			20
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	30	20	20
Peridinium			

SITE	**A**	**B**	**C**
TOTAL GENERA:	6	4	6
TRANSPARENCY:	6.5’	6’	5.5’est
ORGANISMS PER MILLILITER:	**180**	**230**	**170**

NOTES: Algal diversity remains the same at site A and decreased at sites B and C since the last sampling event. Diversity is now considered to be moderate at sites A and C while site B is low. Algal density decreased at sites A and C while site B increased. Density is still considered to be low at all three sites. Sites A and B are now dominated by the green algae *Coelastrum*. Site C is dominated by the diatom *Synedra*. Trace amounts of golden algae (sites A and C only), blue-green algae (site C only), and dinoflagellates (all three sites) were also observed. Water clarity decreased at site A, stayed the same at site B and increased at site C. Clarity is now considered to be good at site A, fair to good at site B and fair at site C.

Solitude Lake Management, Inc.
580 Rockport Road Hackettstown, NJ 07840 Phone (908) 850-0303 Fax (908) 850-4994

MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 7/10/17	Examination Date: 7/11/17	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			40
Tabellaria			

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

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

CYANOPHYTA (Blue-green Algae)	**A**	**B**	**C**
Anabaena		10	
Anacystis			
Aphanizomenon			
Coelosphaerium			
Gomphosphseria			
Lyngbya			
Microcystis			10
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:	4	5	5
TRANSPARENCY:	6.5’	3.5’	5’est
ORGANISMS PER MILLILITER:	**140**	**90**	**90**

NOTES: Algal diversity decreased at sites A and B while site C increased since the last sampling event. Diversity is now considered to be low at all three sites. Algal density decreased at each site and is still considered to be low. Sites A and B continue to be dominated by green algae. Site C continues to be dominated by the diatom *Synedra*. Trace amounts of golden algae (site B only) and blue-green algae (sites B and C only) were also observed. Water clarity decreased at sites B and C while site A remains the same. Clarity is still considered to be good at site A and fair at site C while site B is now fair.

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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 7/24/17	Examination Date: 7/26/17	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			10
Melosira			
Navicula			
Nitzschia			
Pinnularia			20
Urosolenia			
Stephanodiscus			
Stauroneis			
Synedra			50
Tabellaria			

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

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			20
Coelastrum	120	130	40
Eudorina			
Mougeotia			
Oedogonium			20
Oocystis			
Pandorina			
Pediastrum			
Phytoconis			
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum			10
Sphaerocystis			
Ulothrix			
Volvox			
Zygnema			
Gloeocystis			
Sphareocystis			
Cosmarium			
Tetraedron			
Dictyosphaerium			

CYANOPHYTA (Blue-green Algae)	**A**	**B**	**C**
Anabaena		10	
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:	2	3	7
TRANSPARENCY:	6.5’	6.0’	6.0’
ORGANISMS PER MILLILITER:	**130**	**190**	**170**

NOTES: Since the last sampling event, algal diversity decreased at sites A and B while site C increased. Diversity continues to be low at sites A and B while site C is now moderate. Algal density decreased at site A while sites B and C increased. Density is still considered to be low at each site. Sites A and B continue to be dominated by green algae. Site C continues to be dominated by diatoms. A mix of dinoflagellates (site A only), blue-green algae (site B only) and golden algae (site B only) were also observed. Water clarity remains the same at site A while sites B and C increased. Clarity is now considered to be good at all three sites.

Solitude Lake Management, Inc.
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Phone (908) 850-0303 Fax (908) 850-4994

MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 8/7/17	Examination Date: 8/8/17	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	10	10	10
Melosira			
Navicula			
Nitzschia			
Pinnularia			
Urosolenia			
Stephanodiscus			
Stauroneis			
Synedra		60	30
Tabellaria			

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

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium	20	10	10
Coelastrum	90	350	40
Eudorina			
Mougeotia			
Oedogonium	10	20	
Oocystis			
Pandorina			
Pediastrum			10
Phytoconis			
Rhizoclonium			
Scenedesmus			10
Spirogyra			
Staurastrum	10	190	80
Sphaerocystis			
Ulothrix			
Volvox			
Zygnema			
Gloeocystis	150	70	20
Sphareocystis			
Cosmarium			
Tetraedron			
Dictyosphaerium			

CYANOPHYTA (Blue-green Algae)	**A**	**B**	**C**
Anabaena		40	
Anacystis			
Aphanizomenon		10	
Coelosphaerium	10		
Gomphosphseria			
Lyngbya			
Microcystis	180		
Oscillatoria			
Pseudoanabaena			
Synechocystis			
Agmenellum			
PROTOZOA			
Actinophyrs			

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

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

SITE	**A**	**B**	**C**
TOTAL GENERA:	10	9	9
TRANSPARENCY:	5’	4’est	4’est
ORGANISMS PER MILLILITER:	**500**	**760**	**220**

NOTES: Algal diversity increased at all three sites since the last sampling event and is now considered to be moderate at each site. Algal density increased at each site as well. Density is now considered to be moderate at sites A and B while site C is still low. Site A is now dominated by blue-green algae while site C is now dominated by green algae. Site B continues to be dominated by green algae. A mix of euglenoids (site A only), golden algae (sites A and B only) and diatoms (all three sites) were also observed. Water clarity decreased at all three sites and is now considered to be fair at each site.

Solitude Lake Management, Inc.
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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 8/21/17	Examination Date: 8/22/17	Amount Examined: 200 ml.
Site A: Birchwood Lake	Site B: Crystal Lake	Site C: Sunset Lake

BACILLARIOPHYTA (Diatoms)	**A**	**B**	**C**
Asterionella			
Cyclotella	360		
Cymbella			
Diatoma			
Fragilaria			
Melosira			
Navicula		10	20
Nitzschia			
Pinnularia			
Urosolenia			
Stephanodiscus			
Stauroneis			
Synedra		10	
Tabellaria		10	

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

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium	10		
Coelastrum			10
Eudorina			
Mougeotia			
Oedogonium			
Oocystis		10	
Pandorina			
Pediastrum	10		
Phytoconis	70	110	
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum	50	160	10
Sphaerocystis	230	130	
Ulothrix			
Volvox			
Zygnema			
Gloeocystis			
Sphareocystis			
Cosmarium			
Tetraedron			
Dictyosphaerium			
Desmidium			10

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

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

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

SITE	**A**	**B**	**C**
TOTAL GENERA:	9	8	6
TRANSPARENCY:	6.5’	5’est	4’est
ORGANISMS PER MILLILITER:	**830**	**460**	**90**

NOTES: Since the last sampling event, algal diversity decreased at all three sites but continues to be moderate. Algal density decreased at sites B and C while site A increased. Density is now considered to be moderate at site A while sites B and C are low. Site A is now dominated by diatoms. Site B continues to be dominated by green algae. Site C is now dominated by a mix of diatoms, golden algae, and euglenoids. Trace amounts of blue-green algae were also observed at site A only. Water clarity increased at sites A and B while site C remains the same. Clarity is now considered to be good at site A while sites B and C continue to be fair.

Solitude Lake Management, Inc.
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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 06/05/17	Examination Date: 06/05/17	Amount Examined: 200 ml.
Site A: Grunden's Pond	Site B: Mountain Lake	Site C: Wildwood Lake

BACILLARIOPHYTA (Diatoms)	**A**	**B**	**C**
Asterionella	40		
Cyclotella			
Cymbella			
Diatoma			
Fragilaria	180	10	
Melosira			
Navicula	10		
Nitzschia			
Pinnularia		10	20
Urosolenia			
Stephanodiscus			
Stauroneis			
Synedra	20	10	60
Tabellaria			
Surriella			

CHRYSOPHYTA (Golden Algae)	**A**	**B**	**C**
Dinobryon	1430		20
Mallomonas	40		
Synura			
Tribonema			
Uroglenopsis			

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			
Coelastrum	50		
Eudorina			
Mougeotia			
Oedogonium	10	20	
Oocystis			
Pandorina			
Pediastrum			20
Phytoconis			
Rhizoclonium			
Scenedesmus			10
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	30	30	
Peridinium			

SITE	**A**	**B**	**C**
TOTAL GENERA:	9	5	5
TRANSPARENCY:	3'est	10.5'est	4.5'est
ORGANISMS PER MILLILITER:	**1,810**	**80**	**130**

NOTES: This is the first sampling event of 2017. Algal diversity is considered to be low at sites B and C, while site A is moderate. Algal density is considered to be high at site A while sites B and C are low. Site A is dominated by the golden algae *Dinobryon*. A light mixture of diatoms and green algae dominates sites B and C. Trace amounts of dinoflagellates were observed at sites A and B only. Water clarity is considered to be fair at sites A and C while site B is excellent.

Solitude Lake Management, Inc.
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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 6/19/17	Examination Date: 6/20/17	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			20
Nitzschia			
Pinnularia			30
Urosolenia			
Stephanodiscus			
Stauroneis			
Synedra		30	70
Tabellaria			
Surriella			

CHRYSOPHYTA (Golden Algae)	**A**	**B**	**C**
Dinobryon	100		
Mallomonas	140		
Synura			
Tribonema			
Uroglenopsis			

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			
Coelastrum			210
Eudorina			
Mougeotia			
Oedogonium		10	
Oocystis			
Pandorina			
Pediastrum	10	40	
Phytoconis			
Rhizoclonium			
Scenedesmus			50
Spirogyra			
Staurastrum		10	
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	90	40	130
Peridinium			

SITE	**A**	**B**	**C**
TOTAL GENERA:	4	6	6
TRANSPARENCY:	2'est	6'	4'est
ORGANISMS PER MILLILITER:	**340**	**140**	**510**

NOTES: Algal diversity decreased at site A while sites B and C increased since the last sampling event. Diversity is now considered to be low at site A while sites B and C are moderate. Algal density decreased at site A while sites B and C increased. Density is now considered to be low at sites A and B while site C is low to moderate. Site A is now dominated by the golden algae *Mallomonas.* Site B is dominated by a mix of green algae and dinoflagellates. Site C is dominated by the green algae *Coelastrum*. Trace amounts of diatoms were observed at sites B and C only. Water clarity decreased at all three sites. Clarity is now considered to be poor at site A, fair to good at site B and fair at site C.

Solitude Lake Management, Inc.
580 Rockport Road Hackettstown, NJ 07840 Phone (908) 850-0303 Fax (908) 850-4994

MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 7/10/17	Examination Date: 7/11/17	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		10	
Urosolenia			
Stephanodiscus			
Stauroneis			
Synedra	20	180	
Tabellaria			
Surriella			

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			
Eudorina			
Mougeotia			
Oedogonium		20	10
Oocystis			
Pandorina			
Pediastrum			10
Phytoconis			
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum		30	
Sphaerocystis			
Ulothrix		10	
Scenedesmus			
Zygnema			
Gloeocystis		10	
Cosmarium			
Quadriguia			
Tetraspora			

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

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

PYRRHOPHYTA (Dinoflagellates)	**A**	**B**	**C**
Ceratium	40		60
Peridinium			

SITE	**A**	**B**	**C**
TOTAL GENERA:	4	6	4
TRANSPARENCY:	3'est	6.5'	3.5'est
ORGANISMS PER MILLILITER:	**100**	**260**	**110**

NOTES: Since the last sampling event, algal diversity decreased at site C while sites A and B remained the same. Diversity is now considered to be low at sites A and C while site B is still moderate. Algal density increased at site B while site A and C decreased. Density continues to be low at all three sites. Sites A and C are now dominated by dinoflagellates while site B is dominated by diatoms. A mix of blue-green algae (site A only), golden algae (sites A and C only) and green algae (sites B and C only) were also observed. Water clarity increased at sites A and B while site C decreased. Clarity is now considered to be poor to fair at site A, good at site B and fair at site C.

Solitude Lake Management, Inc.
580 Rockport Road Hackettstown, NJ 07840 Phone (908) 850-0303 Fax (908) 850-4994

MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 7/24/17	Examination Date: 7/26/17	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		50	
Nitzschia			
Pinnularia			
Urosolenia			
Stephanodiscus			
Stauroneis			
Synedra	70	10	10
Tabellaria			
Surriella			

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

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			
Coelastrum		30	170
Eudorina			
Mougeotia			
Oedogonium	110		
Oocystis			
Pandorina			
Pediastrum		10	10
Phytoconis			
Rhizoclonium			
Scenedesmus			20
Spirogyra			
Staurastrum	60		40
Sphaerocystis			
Ulothrix			
Scenedesmus			
Zygnema			
Gloeocystis	10		
Cosmarium			
Quadriguia			
Tetraspora			

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

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

PYRRHOPHYTA (Dinoflagellates)	**A**	**B**	**C**
Ceratium	300	30	
Peridinium			

SITE	**A**	**B**	**C**
TOTAL GENERA:	6	6	5
TRANSPARENCY:	2.0'est	12.0'est	8.5'est
ORGANISMS PER MILLILITER:	**570**	**140**	**250**

NOTES: Algal diversity increased at sites A and C while site B remained the same since the last sampling event. Diversity is still considered to be moderate at site B and low at site C while site A is now moderate. Algal density increased at sites A and C while site B decreased. Density is now moderate at site A while sites B and C remain low. Site A continues to be dominated by dinoflagellates. Site B continues to be dominated by diatoms. Site C is now dominated by green algae. Trace amounts of blue-green algae (site A only) and golden algae (site B only) were also observed. Water clarity decreased at site A while sites B and C increased. Clarity remains poor at site A while site B is now considered to be excellent and site C is now 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: 8/7/17	Examination Date: 8/8/17	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		10	
Nitzschia			
Pinnularia	40		
Urosolenia			
Stephanodiscus			
Stauroneis			
Synedra	150	10	60
Tabellaria			
Surriella			

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

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium	150		20
Coelastrum	10	110	60
Eudorina			
Mougeotia			
Oedogonium	370	10	20
Oocystis			
Pandorina			
Pediastrum			10
Phytoconis			
Rhizoclonium			
Scenedesmus	10		
Spirogyra			
Staurastrum	10	10	70
Sphaerocystis			
Ulothrix			
Scenedesmus			10
Zygnema			
Gloeocystis	20	10	10
Cosmarium			20
Quadriguia			
Tetraspora			

CYANOPHYTA (Blue-green Algae)	**A**	**B**	**C**
Anabaena	1,780	160	
Anacystis			
Aphanizomenon	120		
Coelosphaerium	20		
Gomphosphseria			
Lyngbya			
Microcystis	50		
Oscillatoria			
Pseudoanabaena			
Synechocystis			
Scytonema			
PROTOZOA			
Actinophyrs			

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

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

SITE	**A**	**B**	**C**
TOTAL GENERA:	13	10	12
TRANSPARENCY:	4'est	6'	4'est
ORGANISMS PER MILLILITER:	**2,740**	**360**	**340**

NOTES: Since the last sampling event, algal diversity increased at all three sites. Diversity is now considered to be high at sites A and C while site B is moderate. Algal density increased at each site as well. Site A is now considered to be high while sites B and C continue to be low. Sites A and B are now dominated by blue-green algae while site C continues to be dominated by green algae. A mix of golden algae (sites B and C only), diatoms (all three sites) and dinoflagellates (all three sites) were also observed. Water clarity increased at site A while sites B and C decreased. Clarity is now considered to be fair at sites A and C while site B is now fair to good.

Solitude Lake Management, Inc.
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Phone (908) 850-0303 Fax (908) 850-4994

MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 8/21/17	Examination Date: 8/22/17	Amount Examined: 200 ml.
Site A: Grunden's Pond	Site B: Mountain Lake	Site C: Wildwood Lake

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

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

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			10
Coelastrum		30	10
Eudorina			
Mougeotia			
Oedogonium			
Oocystis			
Pandorina			
Pediastrum			
Phytoconis		290	
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum			70
Sphaerocystis			40
Ulothrix			
Scenedesmus			
Zygnema			
Gloeocystis			
Cosmarium			20
Quadriguia			
Tetraspora			
Euastrum			10

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			60
Peridinium			

SITE	**A**	**B**	**C**
TOTAL GENERA:		6	8
TRANSPARENCY:		6'	4.5'est
ORGANISMS PER MILLILITER:		**370**	**260**

NOTES: Algal diversity decreased at sites B and C since the last sampling event. Diversity is now considered to be moderate at both sites. Algal density increased at site B while site C decreased. Density is still considered to be low at both sites. Site B is now dominated by green algae while site C continues to be dominated by green algae. A mix of golden algae (site B only), dinoflagellates (site C only), and diatoms were also observed. Water clarity remains the same at site B while site C increased. Clarity continues to be fair to good at site B and fair at site C.

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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: 06/05/17	Examination Date: 06/05/17	Amount Examined: 200 ml.
Site A: Grunden's Pond	Site B: Mountain Lake	Site C: Wildwood Lake

BACILLARIOPHYTA (Diatoms)	**A**	**B**	**C**
Asterionella	40		
Cyclotella			
Cymbella			
Diatoma			
Fragilaria	180	10	
Melosira			
Navicula	10		
Nitzschia			
Pinnularia		10	20
Urosolenia			
Stephanodiscus			
Stauroneis			
Synedra	20	10	60
Tabellaria			
Surriella			

CHRYSOPHYTA (Golden Algae)	**A**	**B**	**C**
Dinobryon	1430		20
Mallomonas	40		
Synura			
Tribonema			
Uroglenopsis			

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			
Coelastrum	50		
Eudorina			
Mougeotia			
Oedogonium	10	20	
Oocystis			
Pandorina			
Pediastrum			20
Phytoconis			
Rhizoclonium			
Scenedesmus			10
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	30	30	
Peridinium			

SITE	**A**	**B**	**C**
TOTAL GENERA:	9	5	5
TRANSPARENCY:	3'est	10.5'est	4.5'est
ORGANISMS PER MILLILITER:	**1,810**	**80**	**130**

NOTES: This is the first sampling event of 2017. Algal diversity is considered to be low at sites B and C, while site A is moderate. Algal density is considered to be high at site A while sites B and C are low. Site A is dominated by the golden algae *Dinobryon*. A light mixture of diatoms and green algae dominates sites B and C. Trace amounts of dinoflagellates were observed at sites A and B only. Water clarity is considered to be fair at sites A and C while site B is excellent.

Solitude Lake Management, Inc.
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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 6/19/17	Examination Date: 6/20/17	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			20
Nitzschia			
Pinnularia			30
Urosolenia			
Stephanodiscus			
Stauroneis			
Synedra		30	70
Tabellaria			
Surriella			

CHRYSOPHYTA (Golden Algae)	**A**	**B**	**C**
Dinobryon	100		
Mallomonas	140		
Synura			
Tribonema			
Uroglenopsis			

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			
Coelastrum			210
Eudorina			
Mougeotia			
Oedogonium		10	
Oocystis			
Pandorina			
Pediastrum	10	40	
Phytoconis			
Rhizoclonium			
Scenedesmus			50
Spirogyra			
Staurastrum		10	
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	90	40	130
Peridinium			

SITE	**A**	**B**	**C**
TOTAL GENERA:	4	6	6
TRANSPARENCY:	2'est	6'	4'est
ORGANISMS PER MILLILITER:	**340**	**140**	**510**

NOTES: Algal diversity decreased at site A while sites B and C increased since the last sampling event. Diversity is now considered to be low at site A while sites B and C are moderate. Algal density decreased at site A while sites B and C increased. Density is now considered to be low at sites A and B while site C is low to moderate. Site A is now dominated by the golden algae *Mallomonas.* Site B is dominated by a mix of green algae and dinoflagellates. Site C is dominated by the green algae *Coelastrum*. Trace amounts of diatoms were observed at sites B and C only. Water clarity decreased at all three sites. Clarity is now considered to be poor at site A, fair to good at site B and fair at site C.

Solitude Lake Management, Inc.
580 Rockport Road Hackettstown, NJ 07840 Phone (908) 850-0303 Fax (908) 850-4994

MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 7/10/17	Examination Date: 7/11/17	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		10	
Urosolenia			
Stephanodiscus			
Stauroneis			
Synedra	20	180	
Tabellaria			
Surriella			

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			
Eudorina			
Mougeotia			
Oedogonium		20	10
Oocystis			
Pandorina			
Pediastrum			10
Phytoconis			
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum		30	
Sphaerocystis			
Ulothrix		10	
Scenedesmus			
Zygnema			
Gloeocystis		10	
Cosmarium			
Quadriguia			
Tetraspora			

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

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

PYRRHOPHYTA (Dinoflagellates)	**A**	**B**	**C**
Ceratium	40		60
Peridinium			

SITE	**A**	**B**	**C**
TOTAL GENERA:	4	6	4
TRANSPARENCY:	3'est	6.5'	3.5'est
ORGANISMS PER MILLILITER:	**100**	**260**	**110**

NOTES: Since the last sampling event, algal diversity decreased at site C while sites A and B remained the same. Diversity is now considered to be low at sites A and C while site B is still moderate. Algal density increased at site B while site A and C decreased. Density continues to be low at all three sites. Sites A and C are now dominated by dinoflagellates while site B is dominated by diatoms. A mix of blue-green algae (site A only), golden algae (sites A and C only) and green algae (sites B and C only) were also observed. Water clarity increased at sites A and B while site C decreased. Clarity is now considered to be poor to fair at site A, good at site B and fair at site C.

Solitude Lake Management, Inc.
580 Rockport Road Hackettstown, NJ 07840 Phone (908) 850-0303 Fax (908) 850-4994

MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 7/24/17	Examination Date: 7/26/17	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		50	
Nitzschia			
Pinnularia			
Urosolenia			
Stephanodiscus			
Stauroneis			
Synedra	70	10	10
Tabellaria			
Surriella			

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

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			
Coelastrum		30	170
Eudorina			
Mougeotia			
Oedogonium	110		
Oocystis			
Pandorina			
Pediastrum		10	10
Phytoconis			
Rhizoclonium			
Scenedesmus			20
Spirogyra			
Staurastrum	60		40
Sphaerocystis			
Ulothrix			
Scenedesmus			
Zygnema			
Gloeocystis	10		
Cosmarium			
Quadriguia			
Tetraspora			

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

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

PYRRHOPHYTA (Dinoflagellates)	**A**	**B**	**C**
Ceratium	300	30	
Peridinium			

SITE	**A**	**B**	**C**
TOTAL GENERA:	6	6	5
TRANSPARENCY:	2.0'est	12.0'est	8.5'est
ORGANISMS PER MILLILITER:	**570**	**140**	**250**

NOTES: Algal diversity increased at sites A and C while site B remained the same since the last sampling event. Diversity is still considered to be moderate at site B and low at site C while site A is now moderate. Algal density increased at sites A and C while site B decreased. Density is now moderate at site A while sites B and C remain low. Site A continues to be dominated by dinoflagellates. Site B continues to be dominated by diatoms. Site C is now dominated by green algae. Trace amounts of blue-green algae (site A only) and golden algae (site B only) were also observed. Water clarity decreased at site A while sites B and C increased. Clarity remains poor at site A while site B is now considered to be excellent and site C is now 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: 8/7/17	Examination Date: 8/8/17	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		10	
Nitzschia			
Pinnularia	40		
Urosolenia			
Stephanodiscus			
Stauroneis			
Synedra	150	10	60
Tabellaria			
Surriella			

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

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium	150		20
Coelastrum	10	110	60
Eudorina			
Mougeotia			
Oedogonium	370	10	20
Oocystis			
Pandorina			
Pediastrum			10
Phytoconis			
Rhizoclonium			
Scenedesmus	10		
Spirogyra			
Staurastrum	10	10	70
Sphaerocystis			
Ulothrix			
Scenedesmus			10
Zygnema			
Gloeocystis	20	10	10
Cosmarium			20
Quadriguia			
Tetraspora			

CYANOPHYTA (Blue-green Algae)	**A**	**B**	**C**
Anabaena	1,780	160	
Anacystis			
Aphanizomenon	120		
Coelosphaerium	20		
Gomphosphseria			
Lyngbya			
Microcystis	50		
Oscillatoria			
Pseudoanabaena			
Synechocystis			
Scytonema			
PROTOZOA			
Actinophyrs			

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

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

SITE	**A**	**B**	**C**
TOTAL GENERA:	13	10	12
TRANSPARENCY:	4'est	6'	4'est
ORGANISMS PER MILLILITER:	**2,740**	**360**	**340**

NOTES: Since the last sampling event, algal diversity increased at all three sites. Diversity is now considered to be high at sites A and C while site B is moderate. Algal density increased at each site as well. Site A is now considered to be high while sites B and C continue to be low. Sites A and B are now dominated by blue-green algae while site C continues to be dominated by green algae. A mix of golden algae (sites B and C only), diatoms (all three sites) and dinoflagellates (all three sites) were also observed. Water clarity increased at site A while sites B and C decreased. Clarity is now considered to be fair at sites A and C while site B is now fair to good.

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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 8/21/17	Examination Date: 8/22/17	Amount Examined: 200 ml.
Site A: Grunden's Pond	Site B: Mountain Lake	Site C: Wildwood Lake

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

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

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			10
Coelastrum		30	10
Eudorina			
Mougeotia			
Oedogonium			
Oocystis			
Pandorina			
Pediastrum			
Phytoconis		290	
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum			70
Sphaerocystis			40
Ulothrix			
Scenedesmus			
Zygnema			
Gloeocystis			
Cosmarium			20
Quadriguia			
Tetraspora			
Euastrum			10

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			60
Peridinium			

SITE	**A**	**B**	**C**
TOTAL GENERA:		6	8
TRANSPARENCY:		6'	4.5'est
ORGANISMS PER MILLILITER:		**370**	**260**

NOTES: Algal diversity decreased at sites B and C since the last sampling event. Diversity is now considered to be moderate at both sites. Algal density increased at site B while site C decreased. Density is still considered to be low at both sites. Site B is now dominated by green algae while site C continues to be dominated by green algae. A mix of golden algae (site B only), dinoflagellates (site C only), and diatoms were also observed. Water clarity remains the same at site B while site C increased. Clarity continues to be fair to good at site B and fair at site C.

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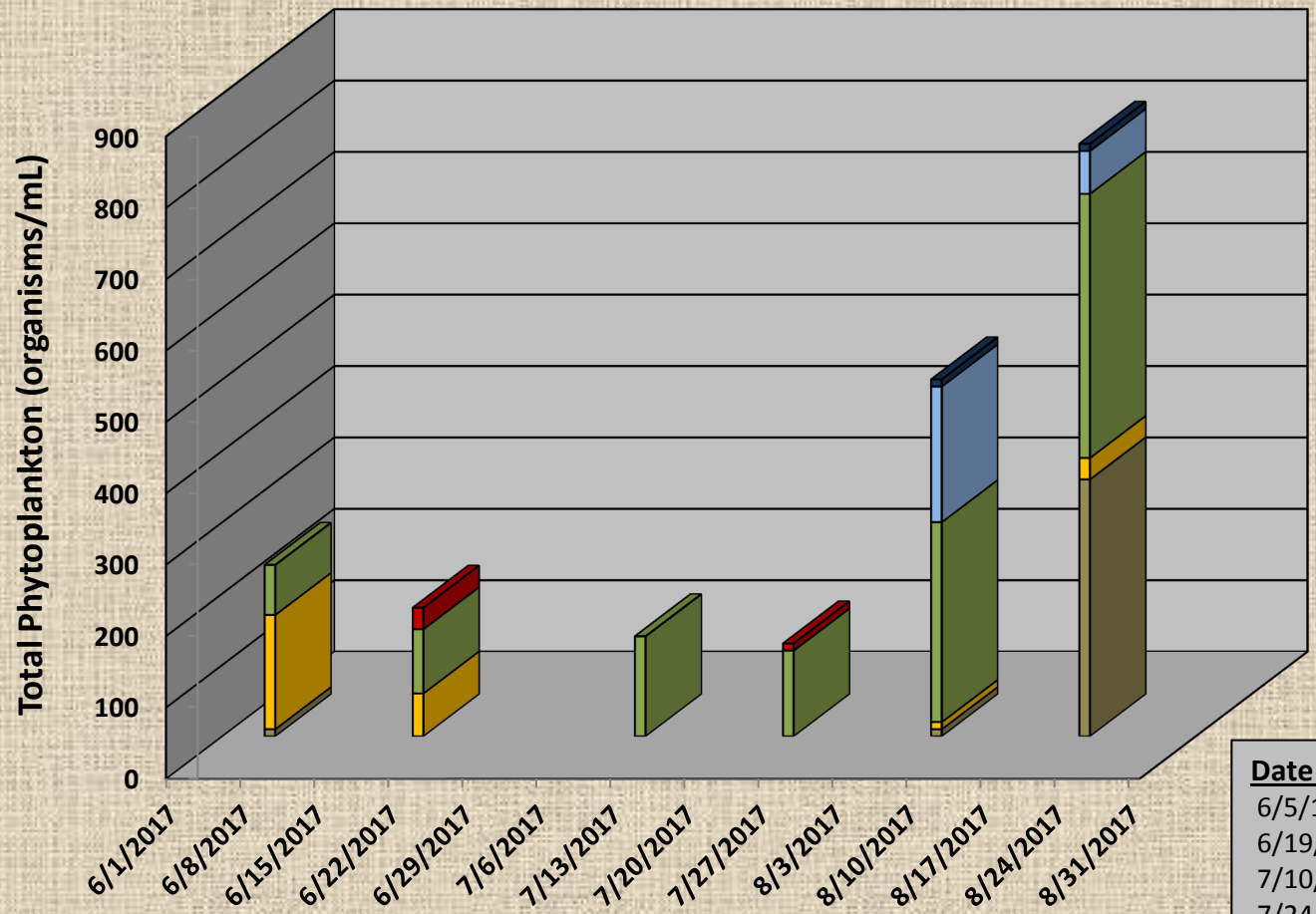
SOLITUDE LAKE MANAGEMENT

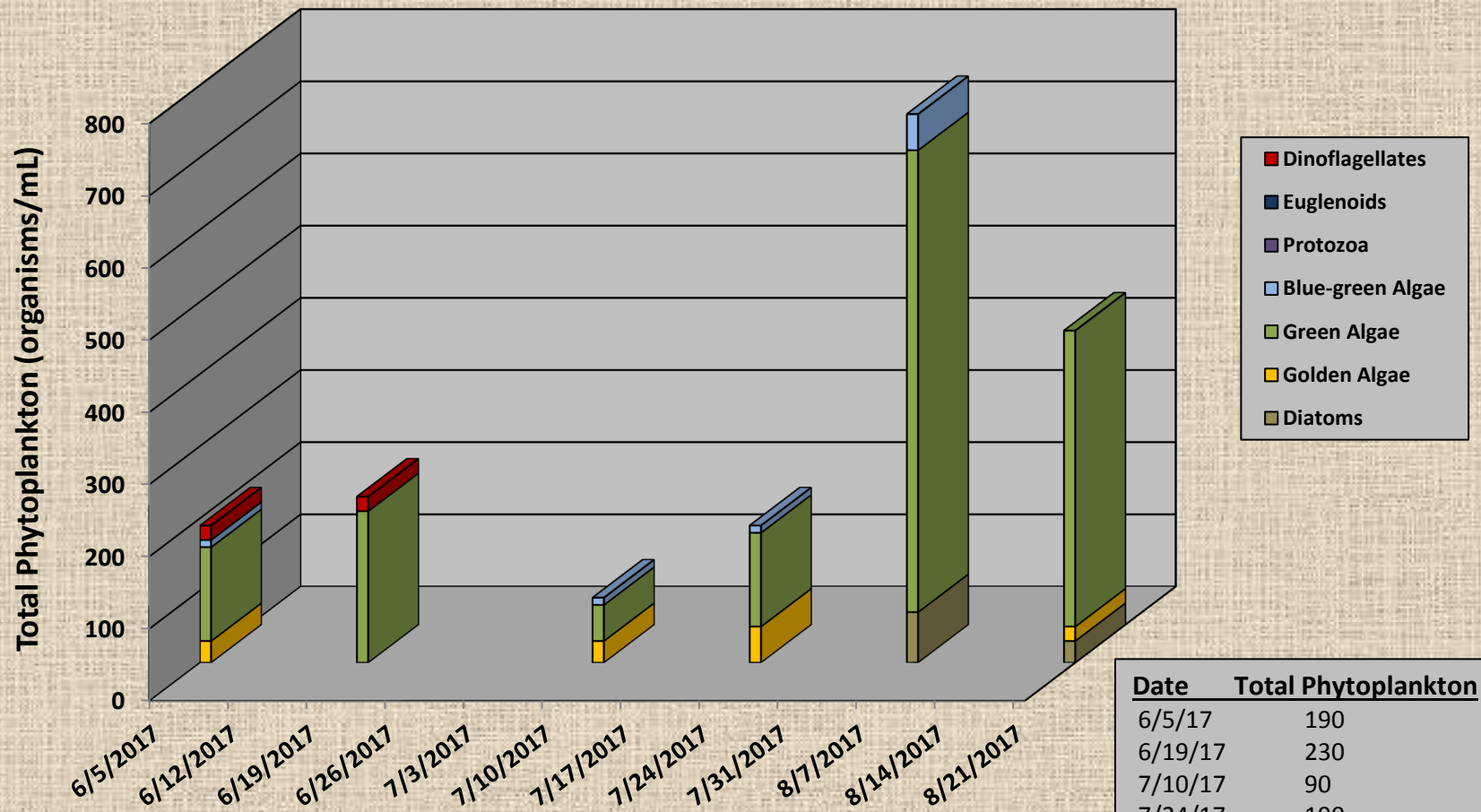
Birchwood Lake
2017 Phytoplankton Distribution



Date	Total Phytoplankton
6/5/17	240
6/19/17	180
7/10/17	140
7/24/17	130
8/7/17	500
8/21/17	830

SOLITUDE LAKE MANAGEMENT

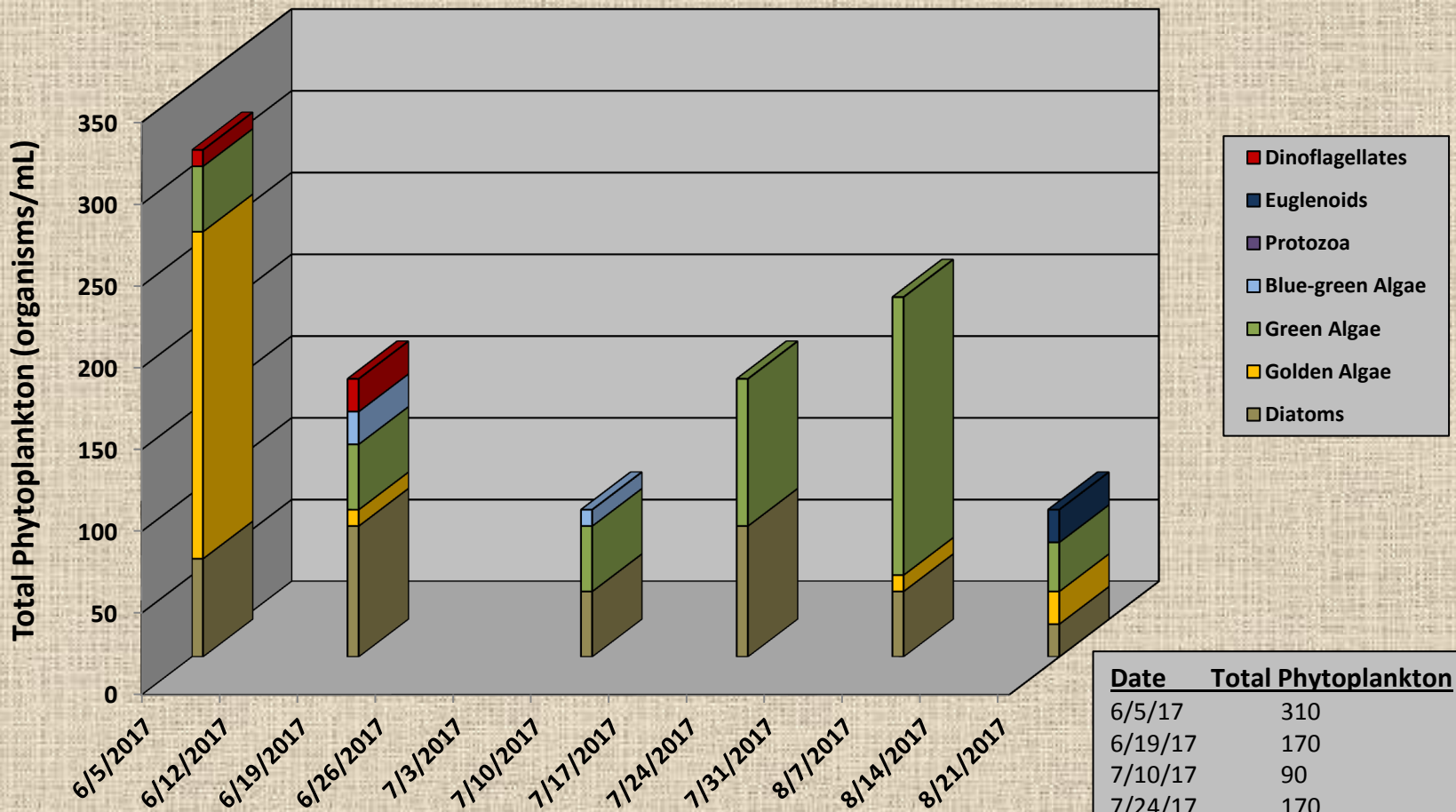
Crystal Lake
2017 Phytoplankton Distribution



Date	Total Phytoplankton
6/5/17	190
6/19/17	230
7/10/17	90
7/24/17	190
8/7/17	790
8/21/17	460

SOLITUDE LAKE MANAGEMENT

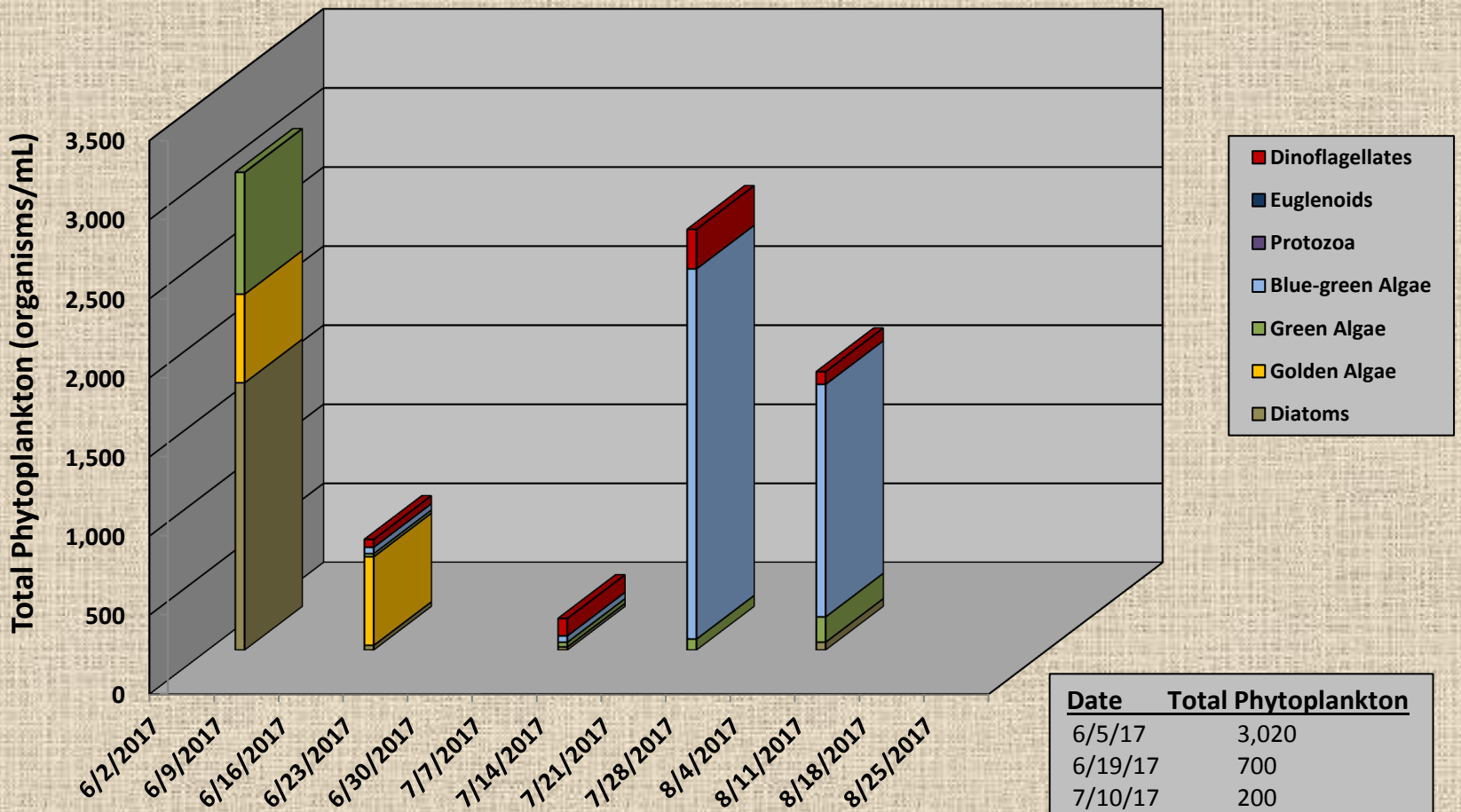
Sunset Lake
2017 Phytoplankton Distribution



Date	Total Phytoplankton
6/5/17	310
6/19/17	170
7/10/17	90
7/24/17	170
8/7/17	220
8/21/17	90

SOLITUDE LAKE MANAGEMENT

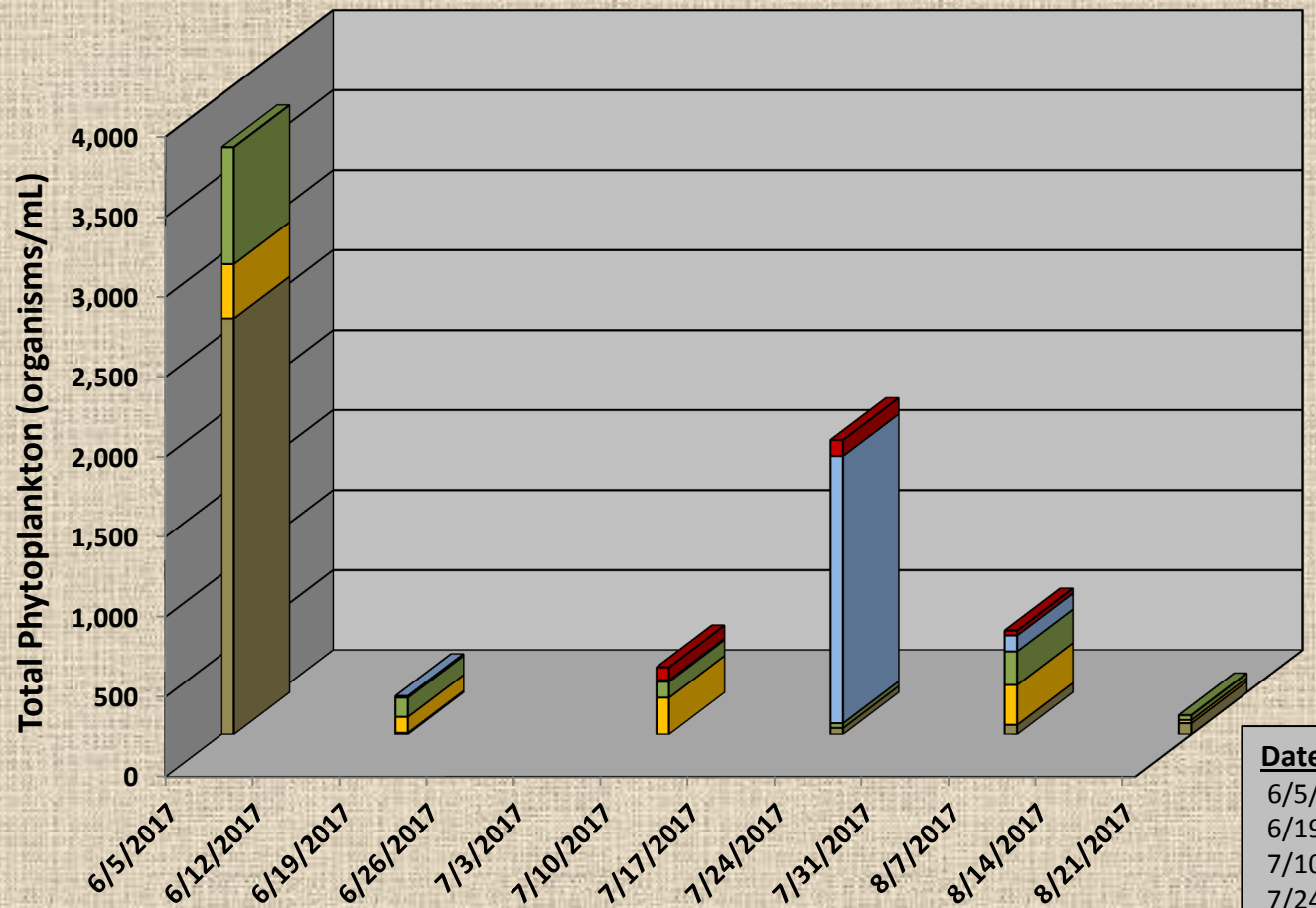
Olive Pond
2017 Phytoplankton Distribution



Date	Total Phytoplankton
6/5/17	3,020
6/19/17	700
7/10/17	200
7/24/17	2,660
8/7/17	1,760

SOLITUDE LAKE MANAGEMENT

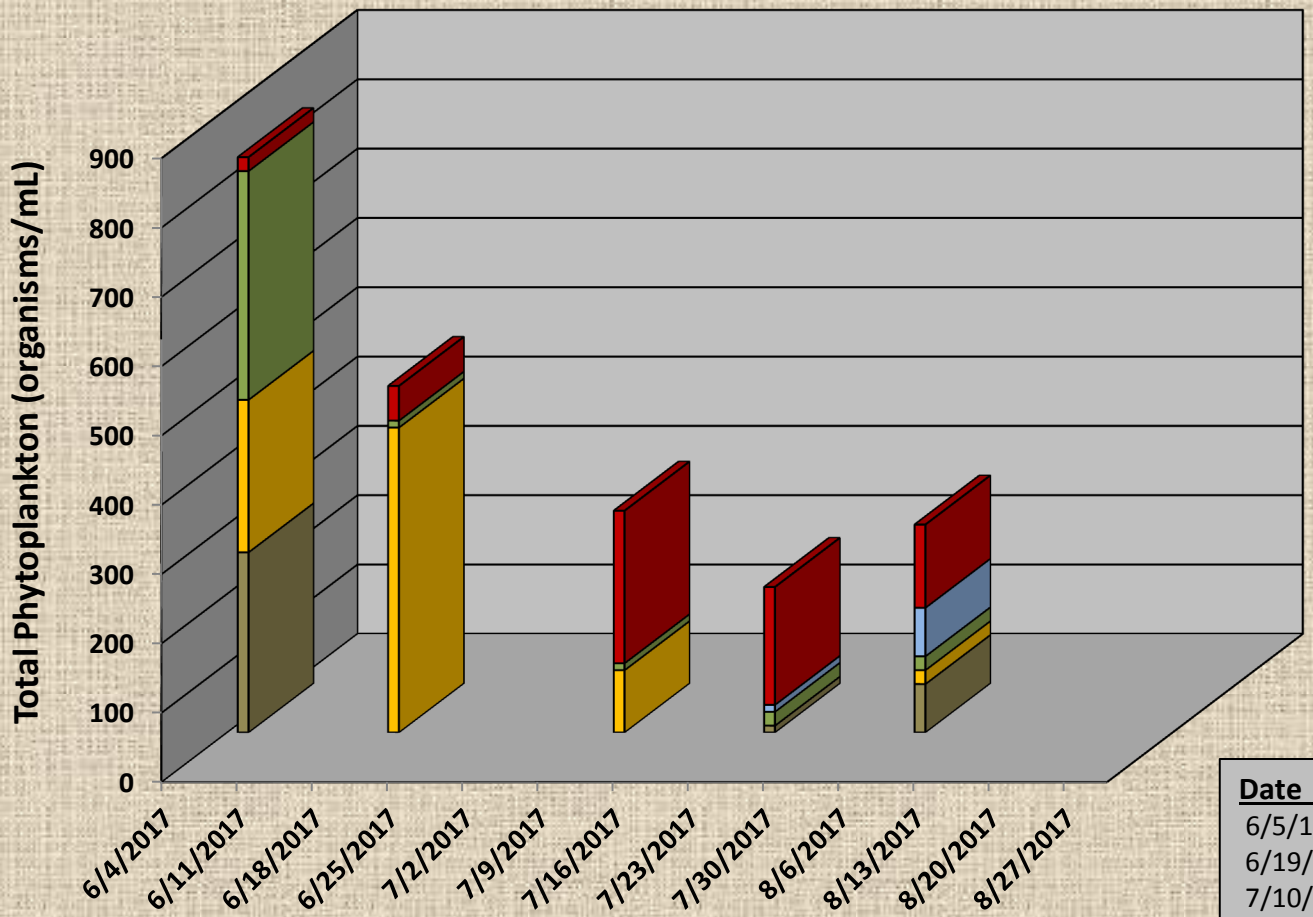
Shadow Lake
2017 Phytoplankton Distribution



Date	Total Phytoplankton
6/5/17	3,670
6/19/17	240
7/10/17	420
7/24/17	1,840
8/7/17	650
8/21/17	120

SOLITUDE LAKE MANAGEMENT

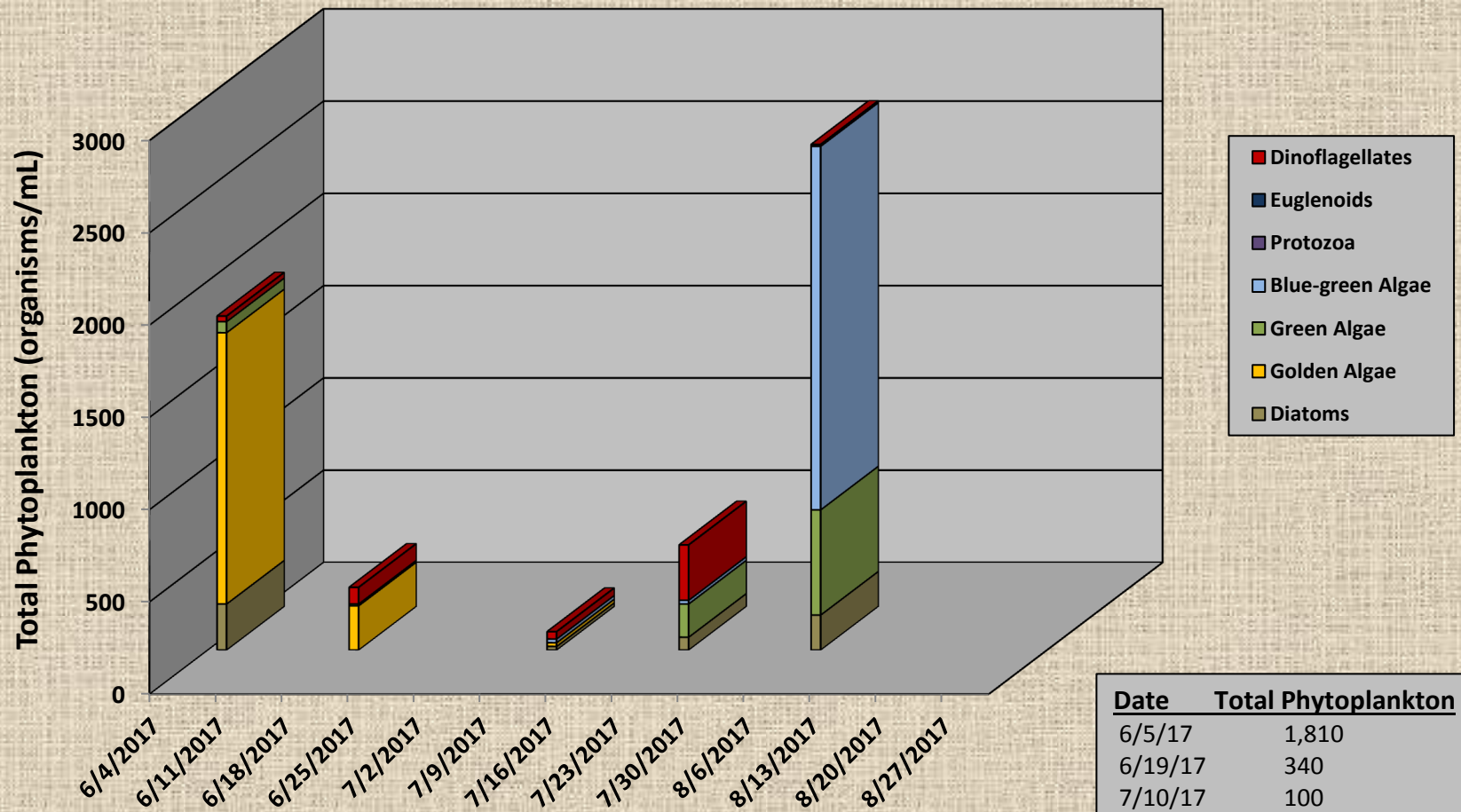
Cove Pond
2017 Phytoplankton Distribution



Date	Total Phytoplankton
6/5/17	830
6/19/17	500
7/10/17	320
7/24/17	210
8/7/17	300

SOLITUDE LAKE MANAGEMENT

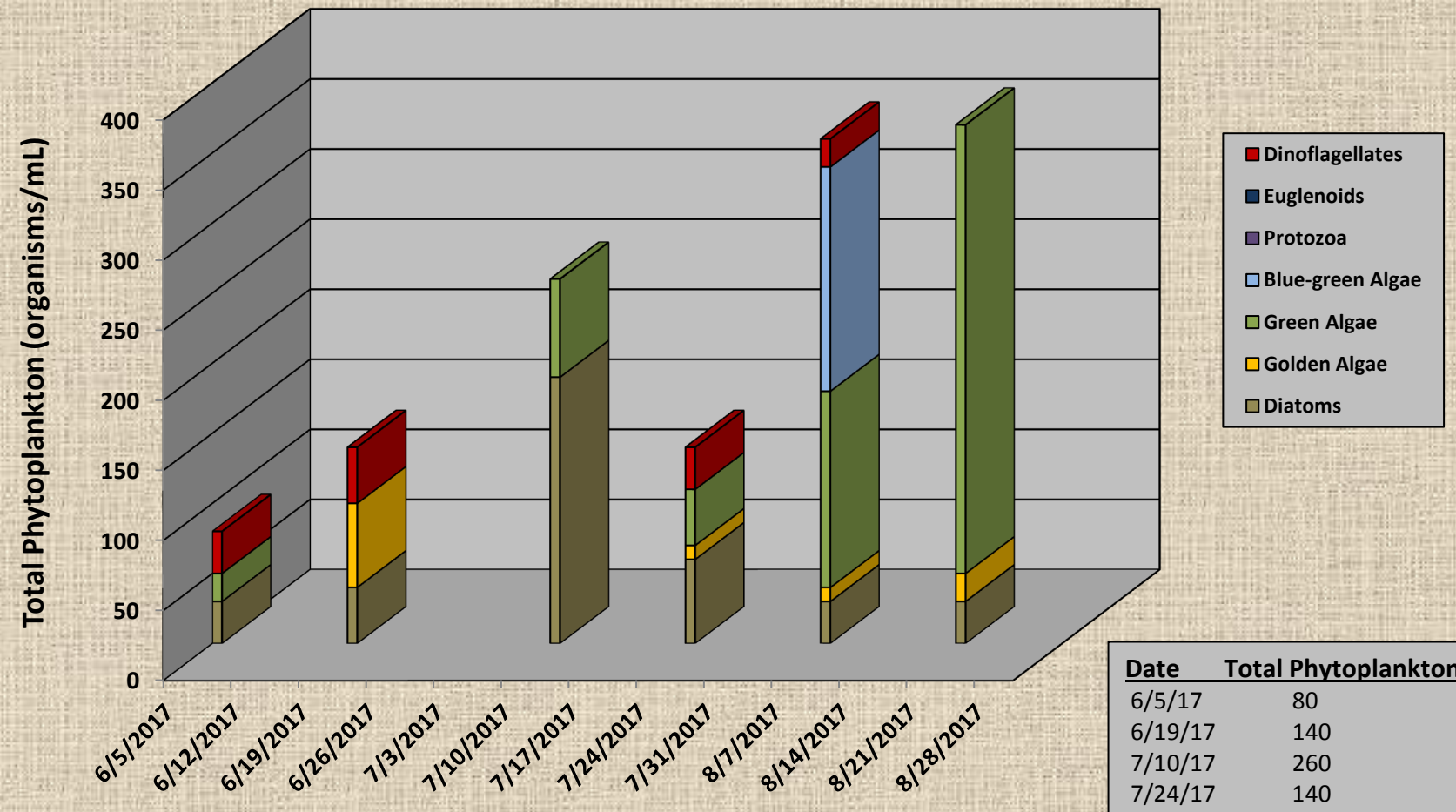
Grunden's Pond
2017 Phytoplankton Distribution



Date	Total Phytoplankton
6/5/17	1,810
6/19/17	340
7/10/17	100
7/24/17	570
8/7/17	2,740

SOLITUDE LAKE MANAGEMENT

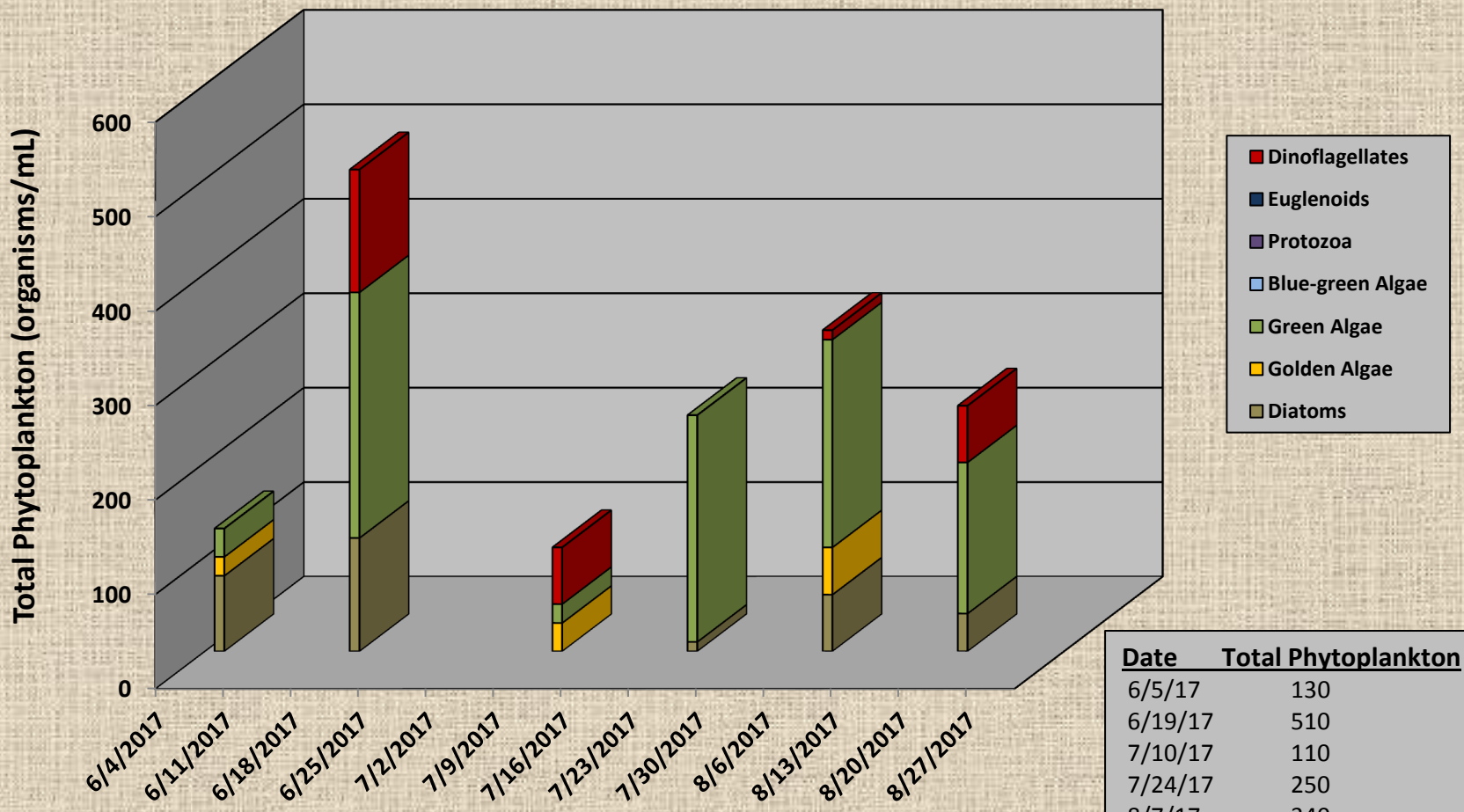
Mountain Lake
2017 Phytoplankton Distribution



Date	Total Phytoplankton
6/5/17	80
6/19/17	140
7/10/17	260
7/24/17	140
8/7/17	360
8/21/17	370

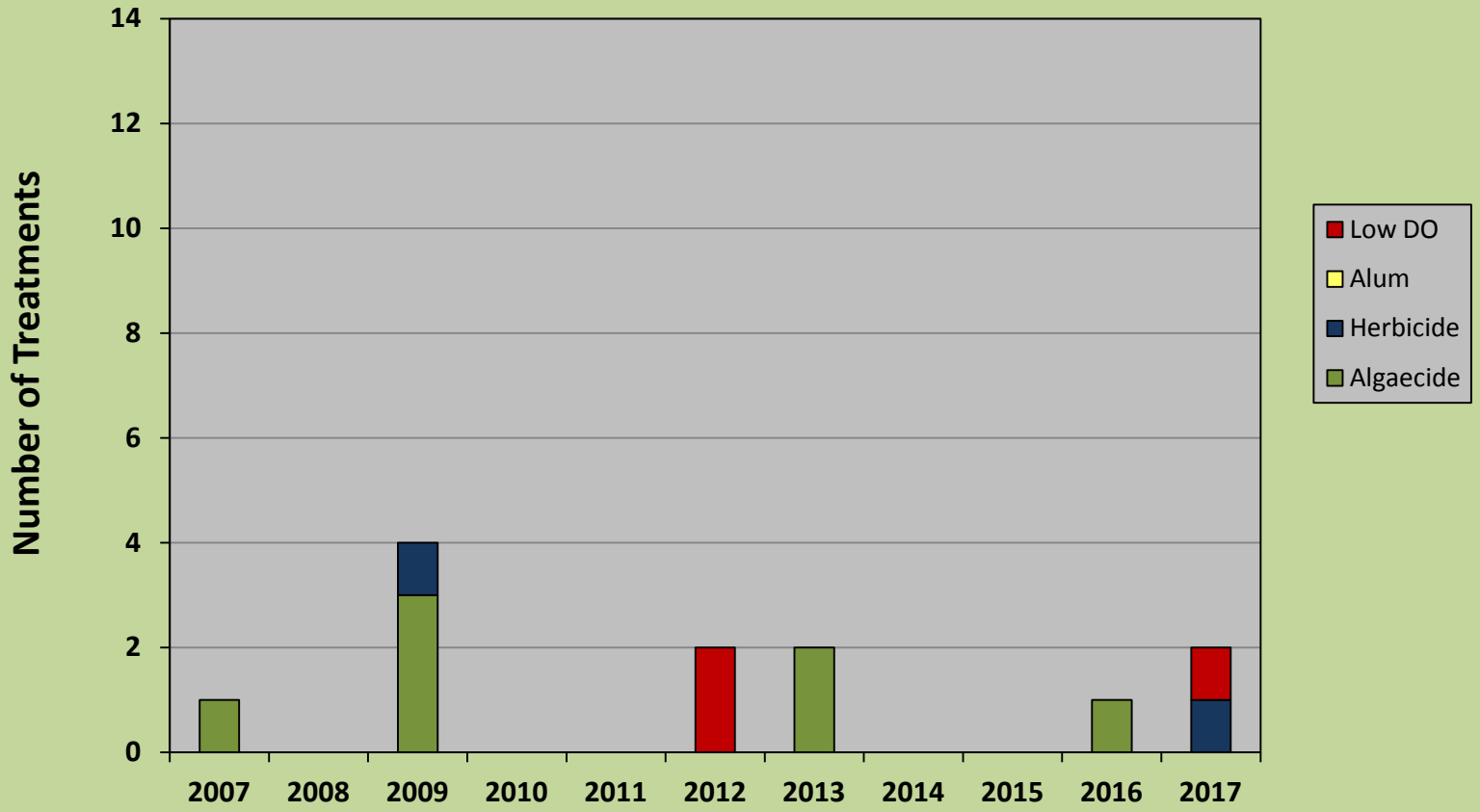
SOLITUDE LAKE MANAGEMENT

Wildwood Lake
2017 Phytoplankton Distribution

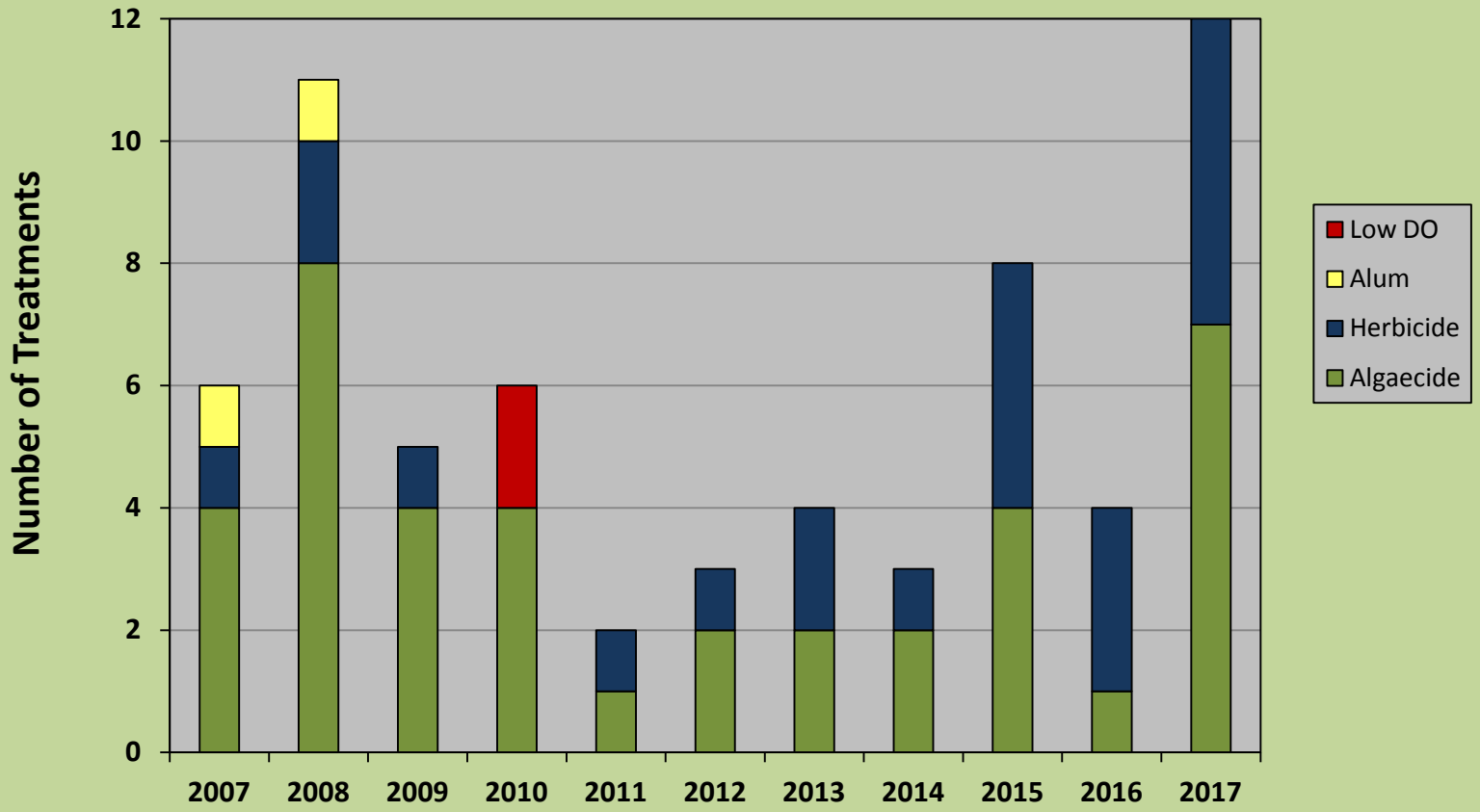


Date	Total Phytoplankton
6/5/17	130
6/19/17	510
7/10/17	110
7/24/17	250
8/7/17	340
8/21/17	260

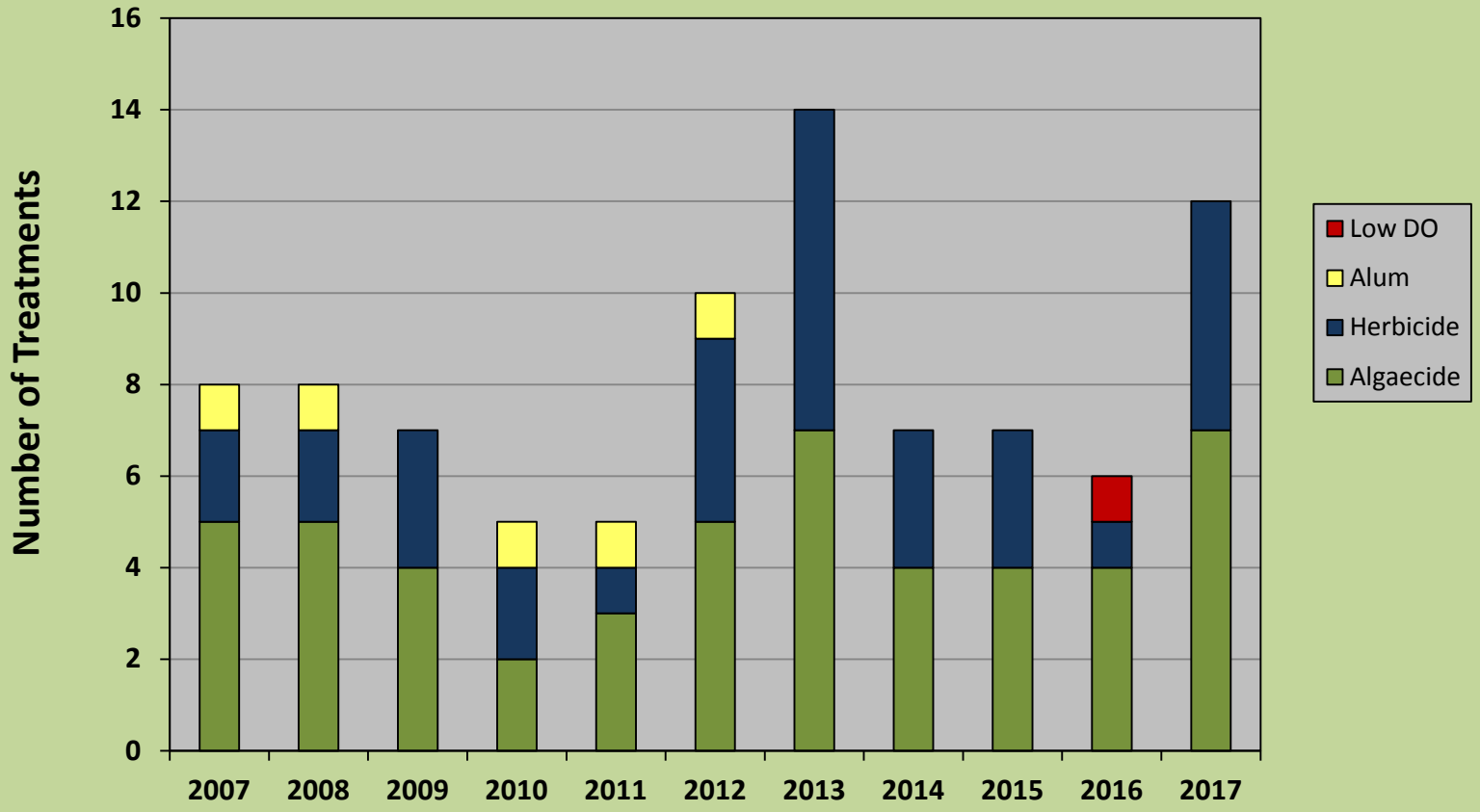
Cove Pond Treatment History 2007 to 2017



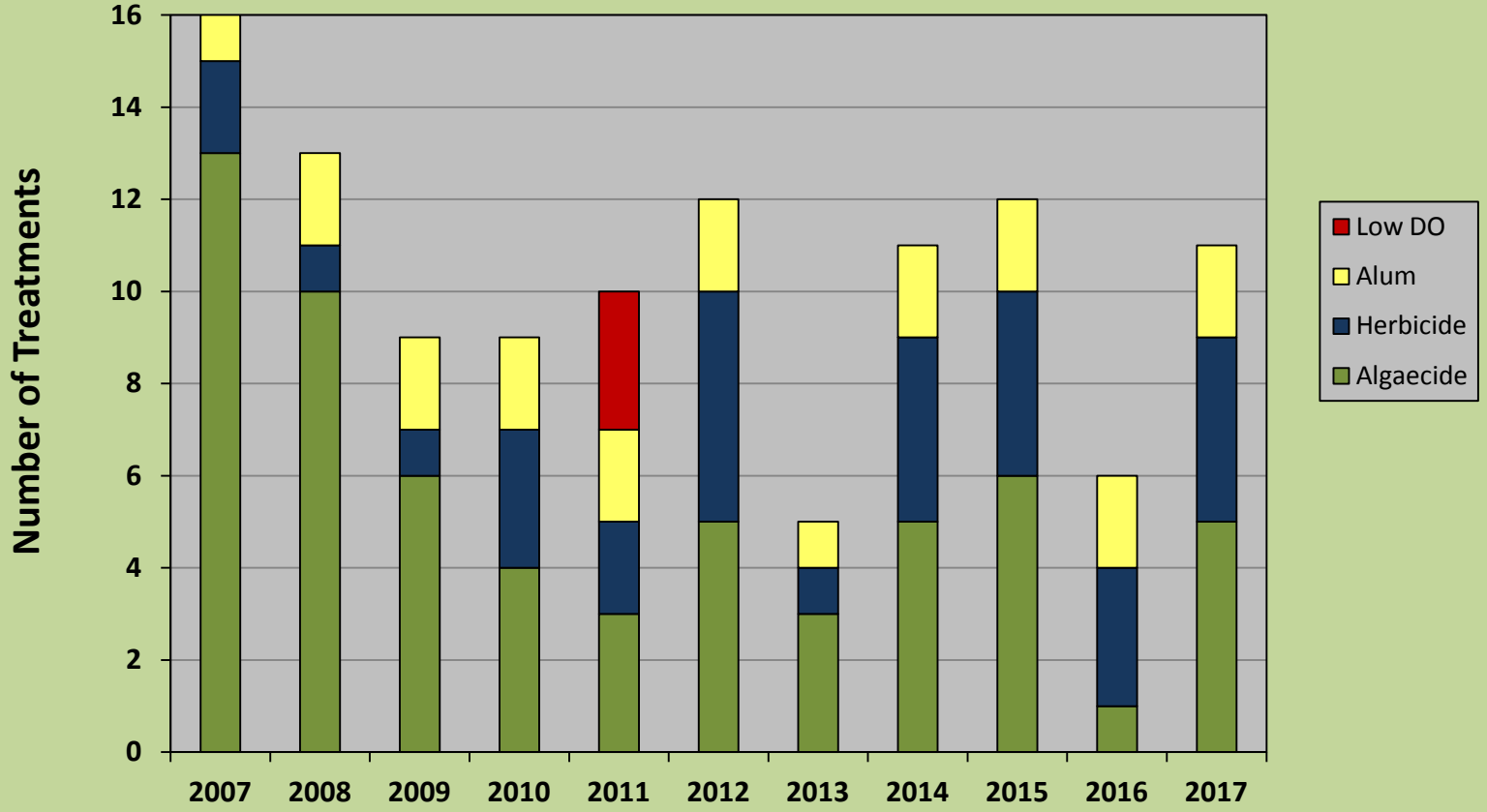
Grunden's Pond Treatment History 2007 to 2017



Mountain Lake Treatment History 2007 to 2017



Wildwood Lake Treatment History 2007 to 2017



Mountain Lakes
2017 Phytoplankton Summary

Birchwood Lake

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/5/2017	10	160	70					**240**
6/19/2017		60	90				30	**180**
7/10/2017			140					**140**
7/24/2017			120				10	**130**
8/7/2017	10	10	280	190		10		**500**
8/21/2017	360	30	370	60		10		**830**

Crystal Lake

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/5/2017		30	130	10			20	**190**
6/19/2017			210				20	**230**
7/10/2017		30	50	10				**90**
7/24/2017		50	130	10				**190**
8/7/2017	70		640	50				**760**
8/21/2017	30	20	410					**460**

Sunset Lake

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/5/2017	60	200	40				10	**310**
6/19/2017	80	10	40	20			20	**170**
7/10/2017	40		40	10				**90**
7/24/2017	80		90					**170**
8/7/2017	40	10	170					**220**
8/21/2017	20	20	30			20		**90**

Olive Pond

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/5/2017	1,690	560	770					**3,020**
6/19/2017	30	560	20	40			50	**700**
7/10/2017	20		30	40			110	**200**
7/24/2017			70	2,340			250	**2,660**
8/7/2017	50		160	1,470			80	**1,760**

Shadow Lake

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/5/2017	2,600	340	730					**3,670**
6/19/2017	10	100	120	10				**240**
7/10/2017		230	100	10			80	**420**
7/24/2017	40		30	1,670			100	**1,840**
8/7/2017	60	250	210	100			30	**650**
8/21/2017	70	20	30					**120**

Cove Pond

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/5/2017	260	220	330				20	**830**
6/19/2017		440	10				50	**500**
7/10/2017		90	10				220	**320**
7/24/2017	10		20	10			170	**210**
8/7/2017	70	20	20	70			120	**300**

Grunden's Pond

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/5/2017	250	1,470	60				30	**1,810**
6/19/2017		240	10				90	**340**
7/10/2017	20	20		20			40	**100**
7/24/2017	70		180	20			300	**570**
8/7/2017	190		570	1,970			10	**2,740**

Mountain Lake

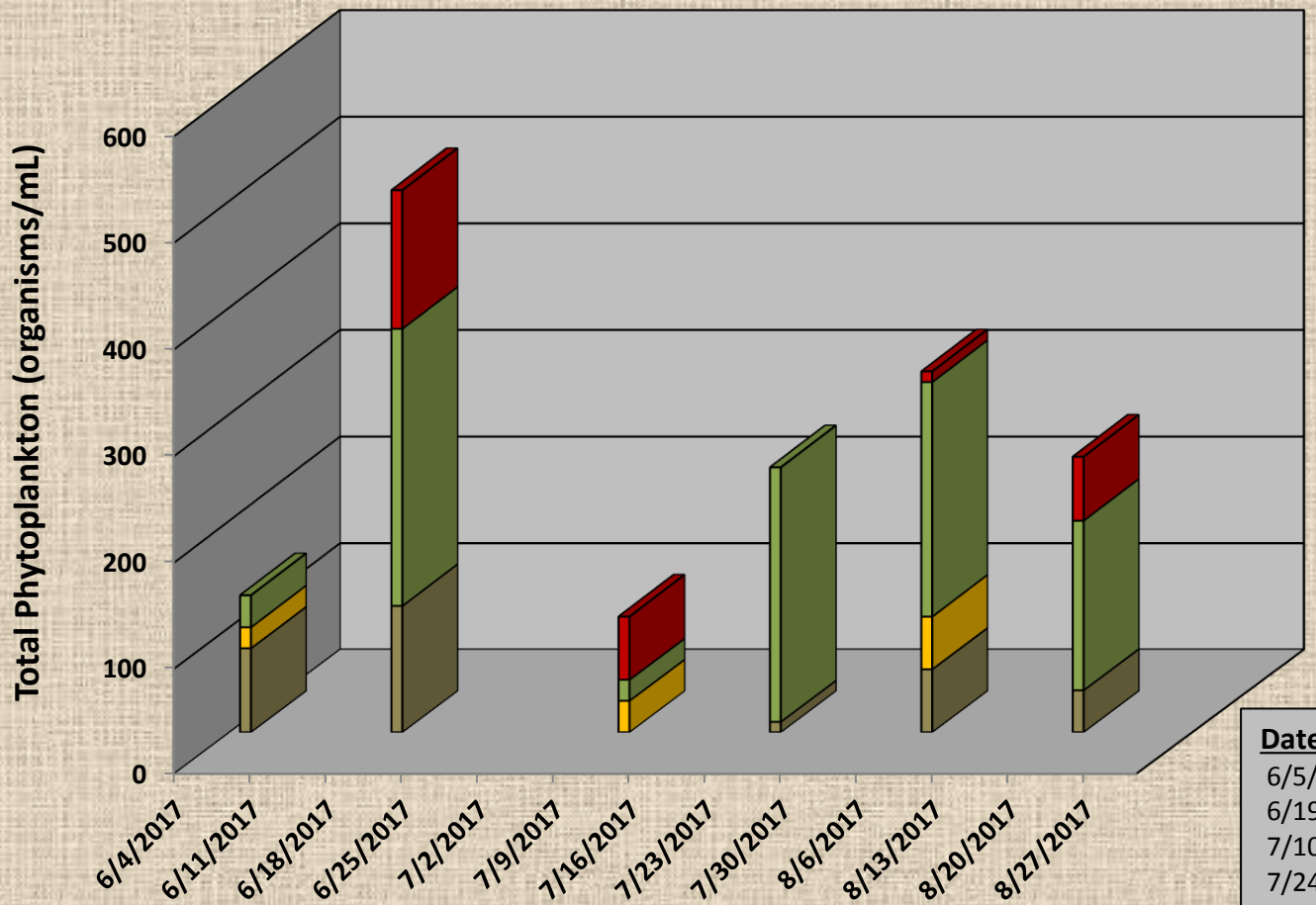
Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/5/2017	30		20				30	**80**
6/19/2017	40	60					40	**140**
7/10/2017	190		70					**260**
7/24/2017	60	10	40				30	**140**
8/7/2017	30	10	140	160			20	**360**
8/21/2017	30	20	320					**370**

Wildwood Lake

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/5/2017	80	20	30					**130**
6/19/2017	120		260				130	**510**
7/10/2017		30	20				60	**110**
7/24/2017	10		240					**250**
8/7/2017	60	50	220				10	**340**
8/21/2017	40		160				60	**260**

SOLITUDE LAKE MANAGEMENT

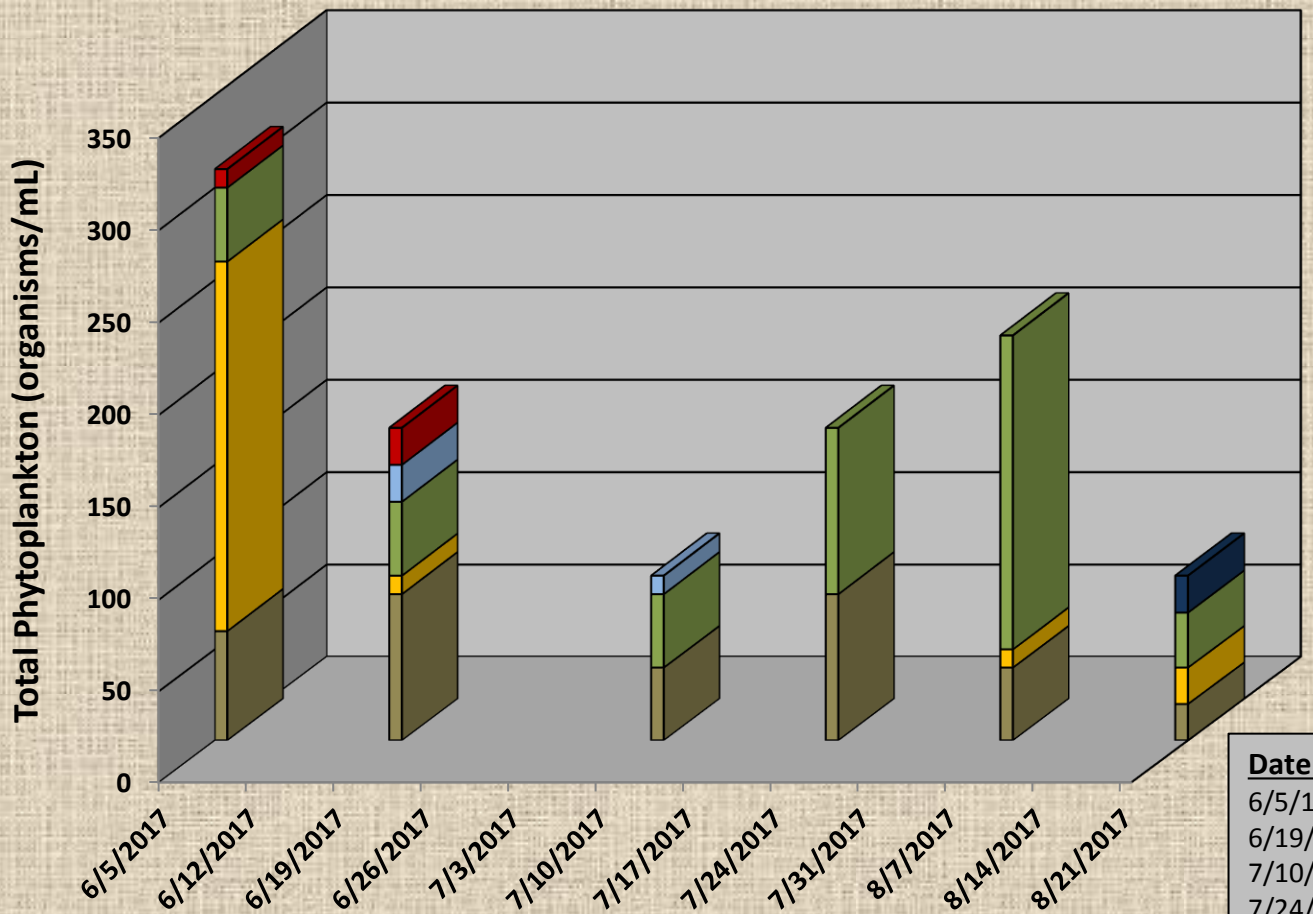
Wildwood Lake
2017 Phytoplankton Distribution



Date	Total Phytoplankton
6/5/17	130
6/19/17	510
7/10/17	110
7/24/17	250
8/7/17	340
8/21/17	260

SOLITUDE LAKE MANAGEMENT

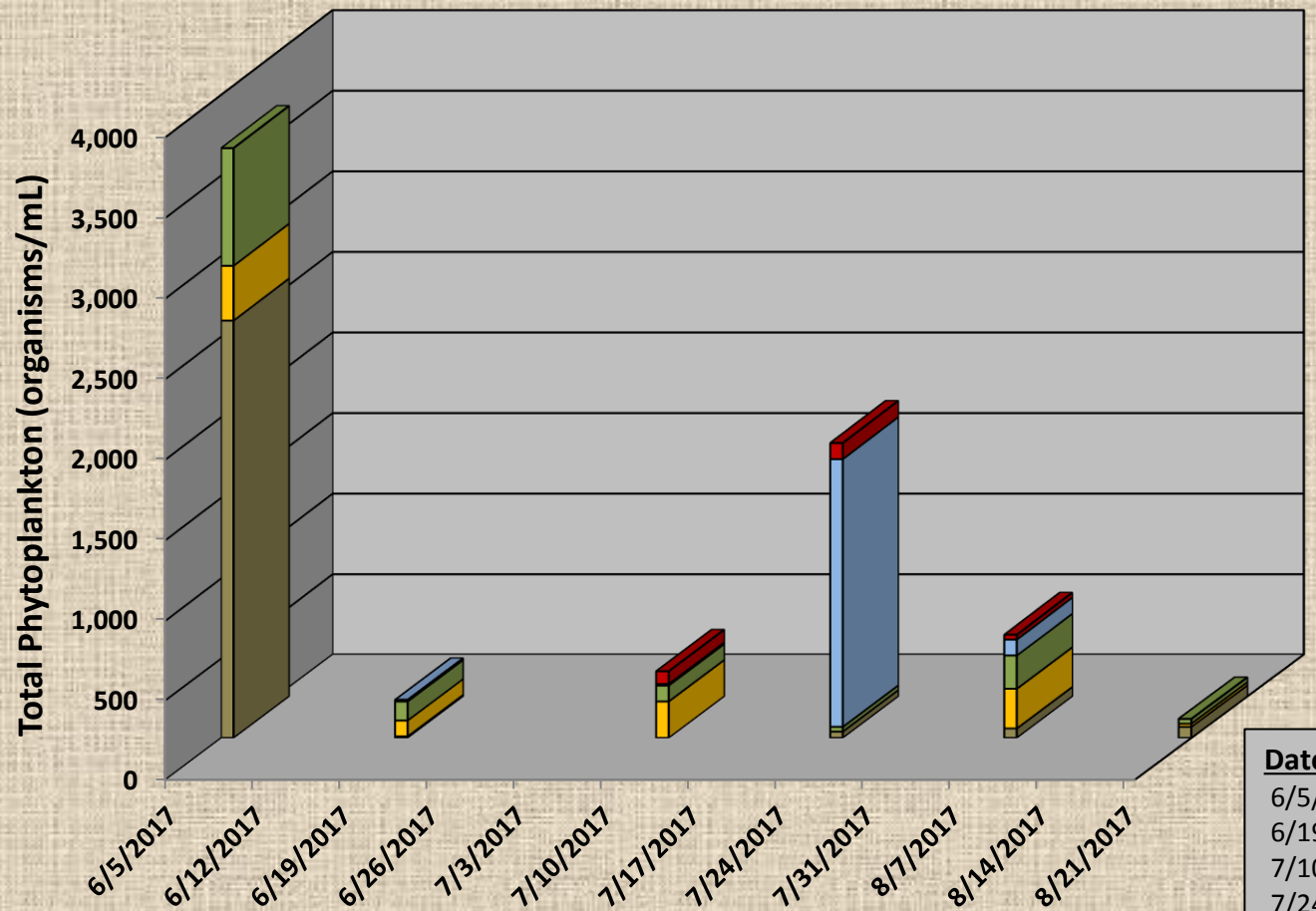
Sunset Lake
2017 Phytoplankton Distribution



Date	Total Phytoplankton
6/5/17	310
6/19/17	170
7/10/17	90
7/24/17	170
8/7/17	220
8/21/17	90

SOLITUDE LAKE MANAGEMENT

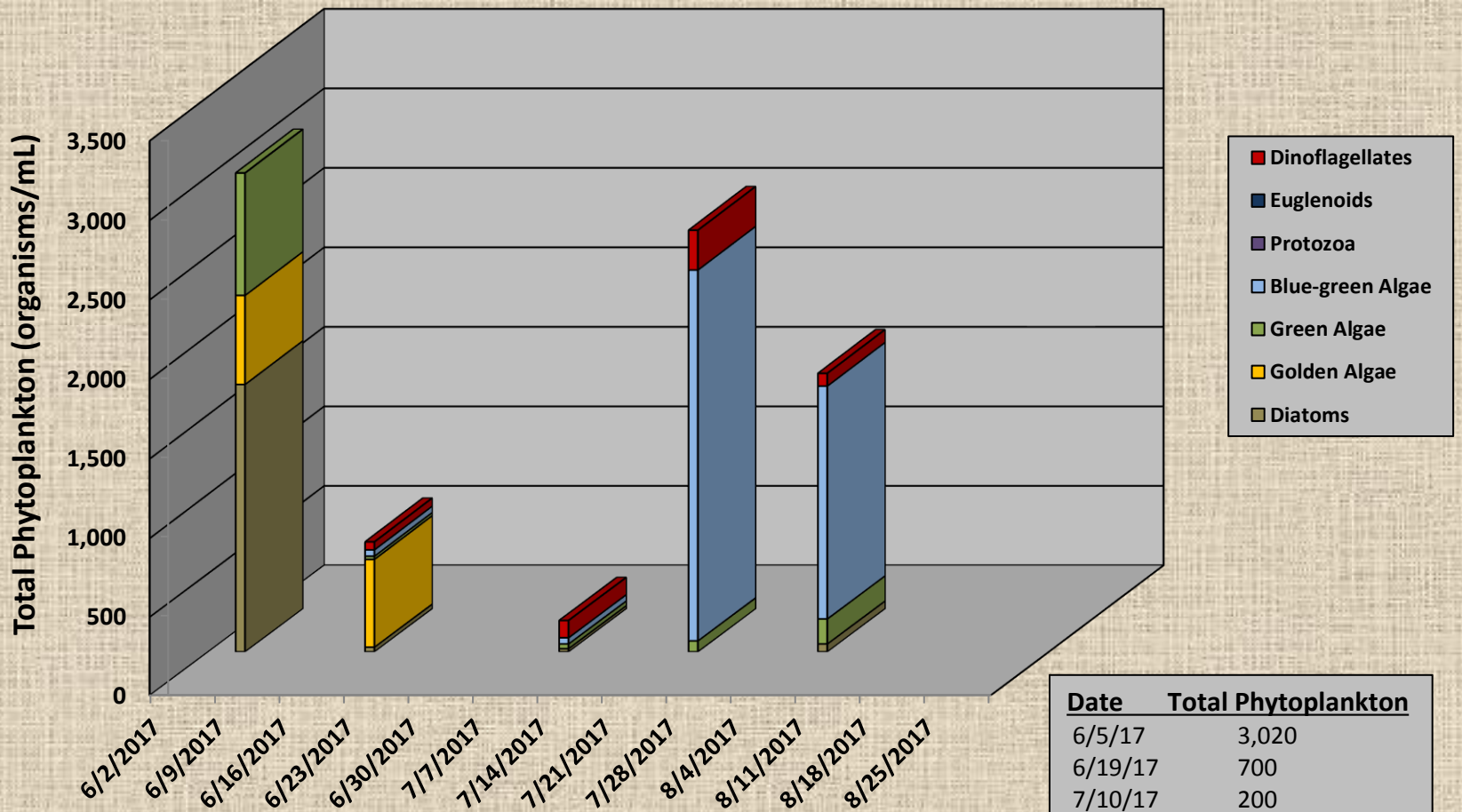
Shadow Lake
2017 Phytoplankton Distribution



Date	Total Phytoplankton
6/5/17	3,670
6/19/17	240
7/10/17	420
7/24/17	1,840
8/7/17	650
8/21/17	120

SOLITUDE LAKE MANAGEMENT

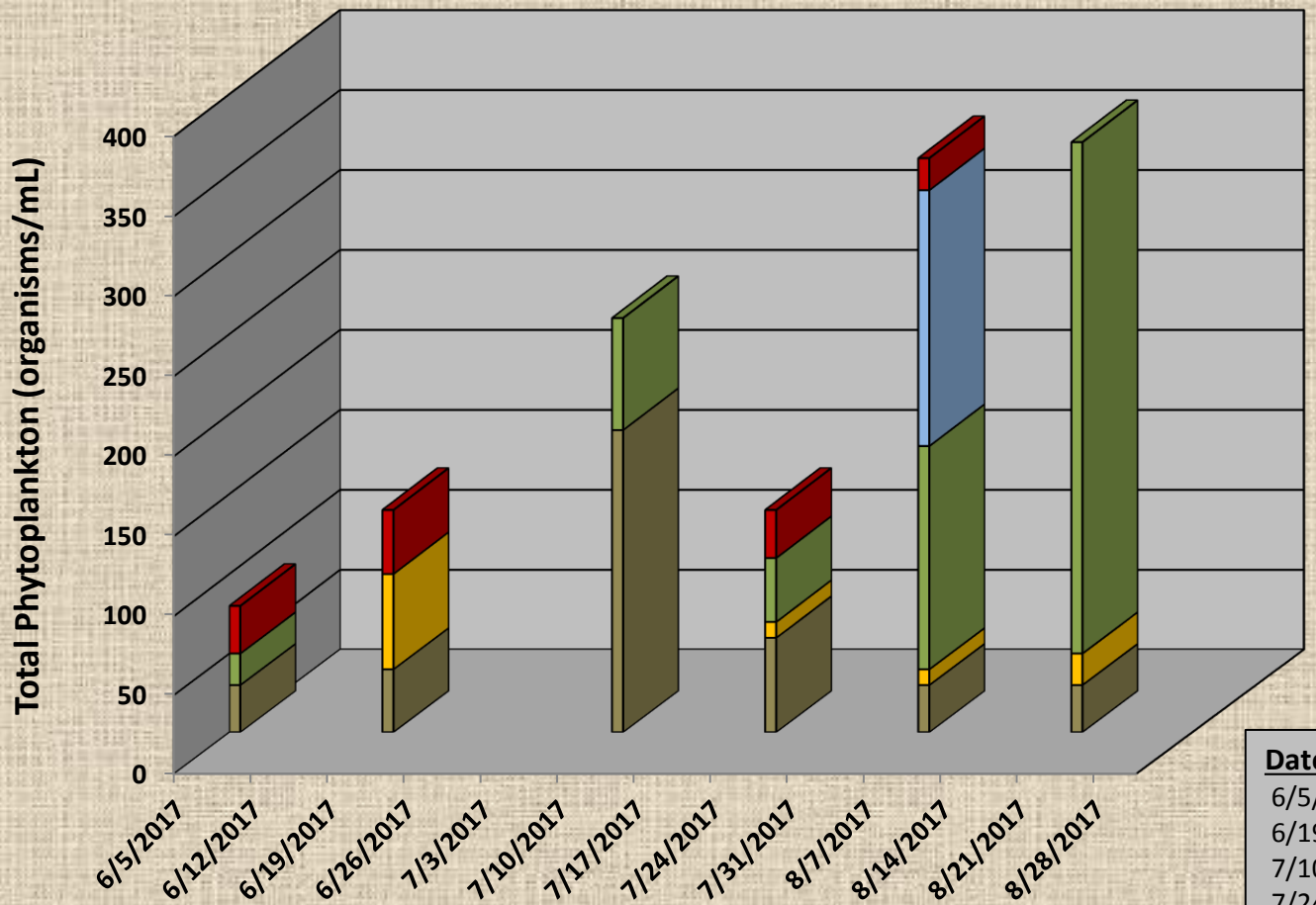
Olive Pond
2017 Phytoplankton Distribution



Date	Total Phytoplankton
6/5/17	3,020
6/19/17	700
7/10/17	200
7/24/17	2,660
8/7/17	1,760

SOLITUDE LAKE MANAGEMENT

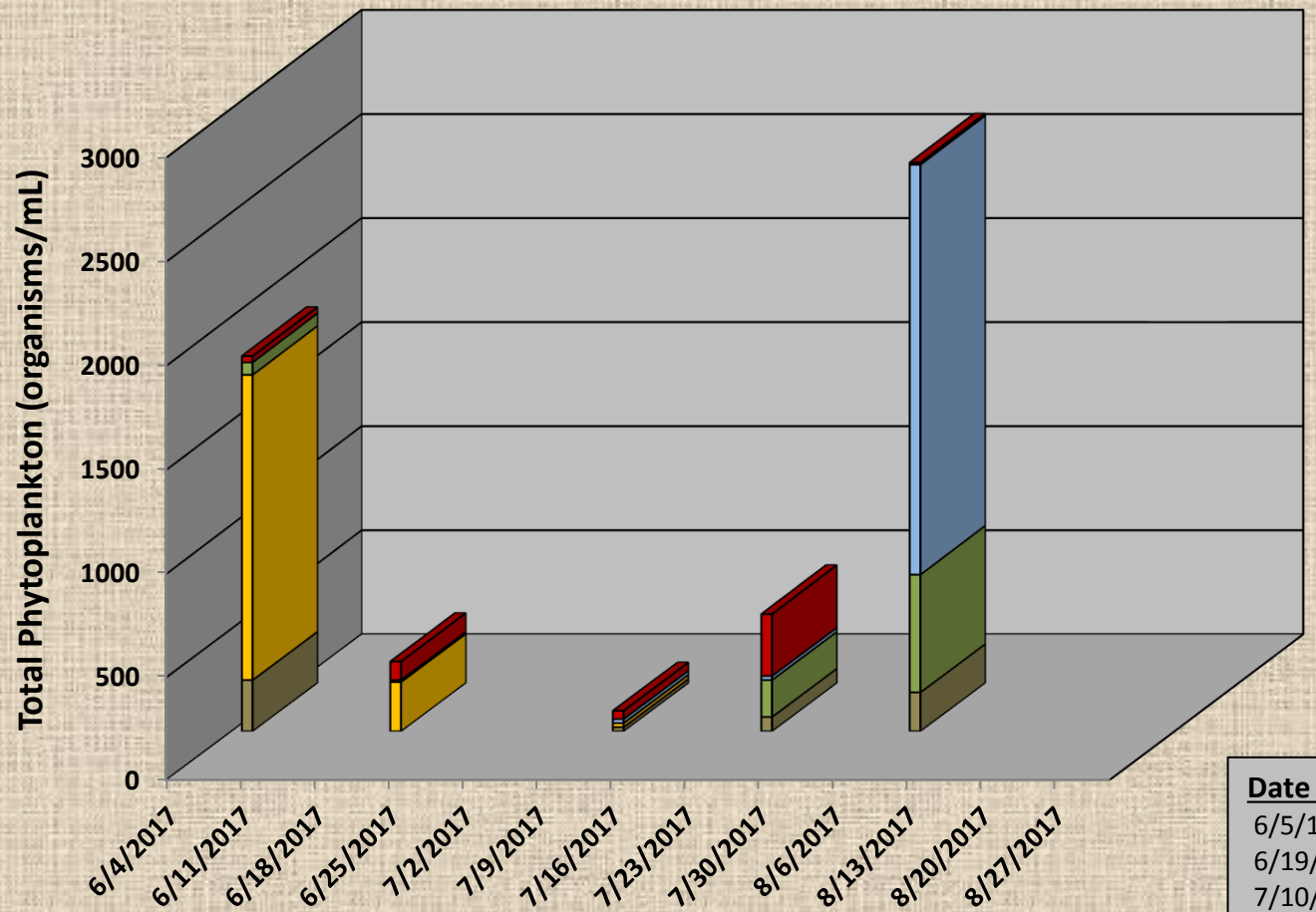
Mountain Lake
2017 Phytoplankton Distribution



Date	Total Phytoplankton
6/5/17	80
6/19/17	140
7/10/17	260
7/24/17	140
8/7/17	360
8/21/17	370

SOLITUDE LAKE MANAGEMENT

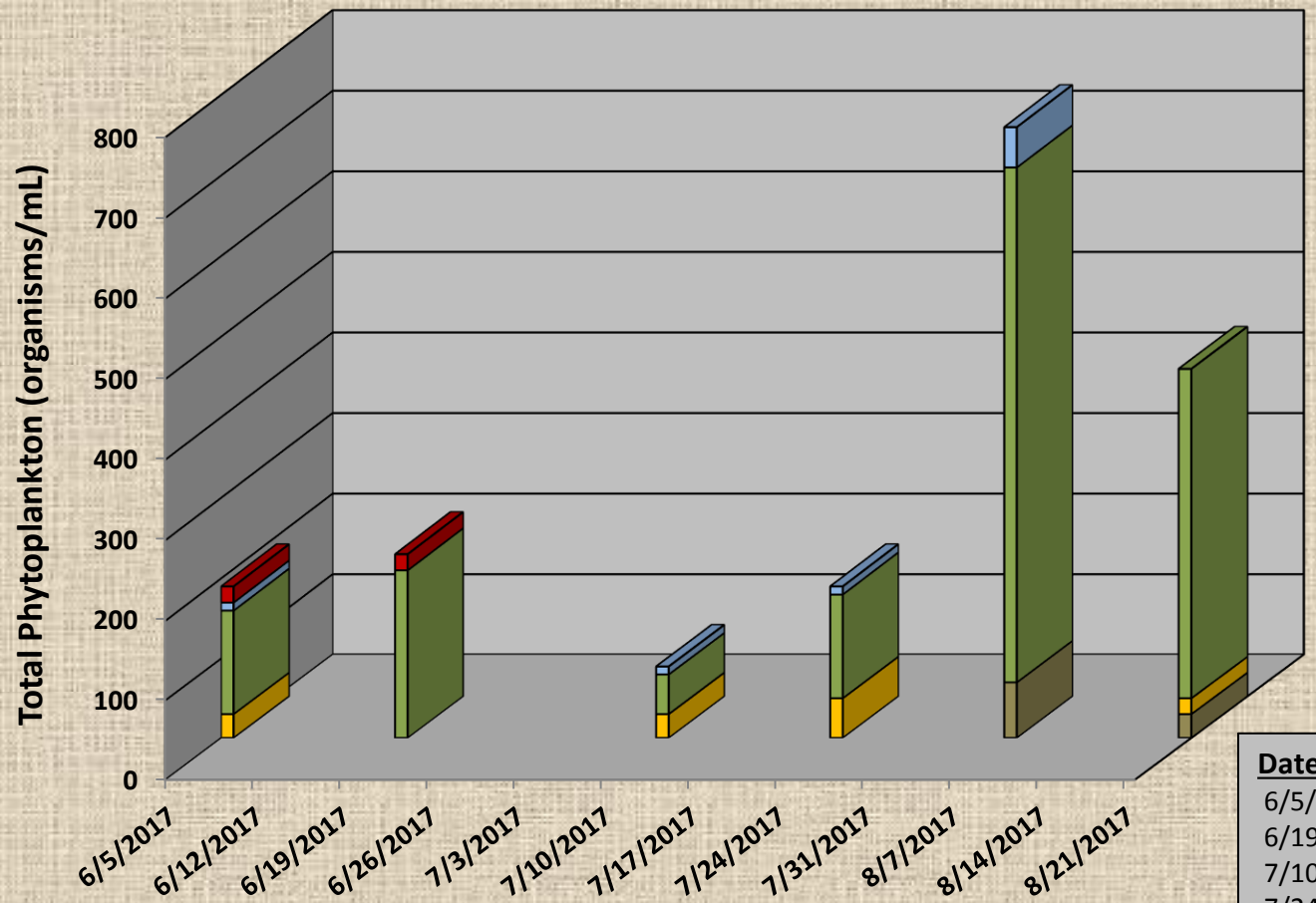
Grunden's Pond
2017 Phytoplankton Distribution



Date	Total Phytoplankton
6/5/17	1,810
6/19/17	340
7/10/17	100
7/24/17	570
8/7/17	2,740

SOLITUDE LAKE MANAGEMENT

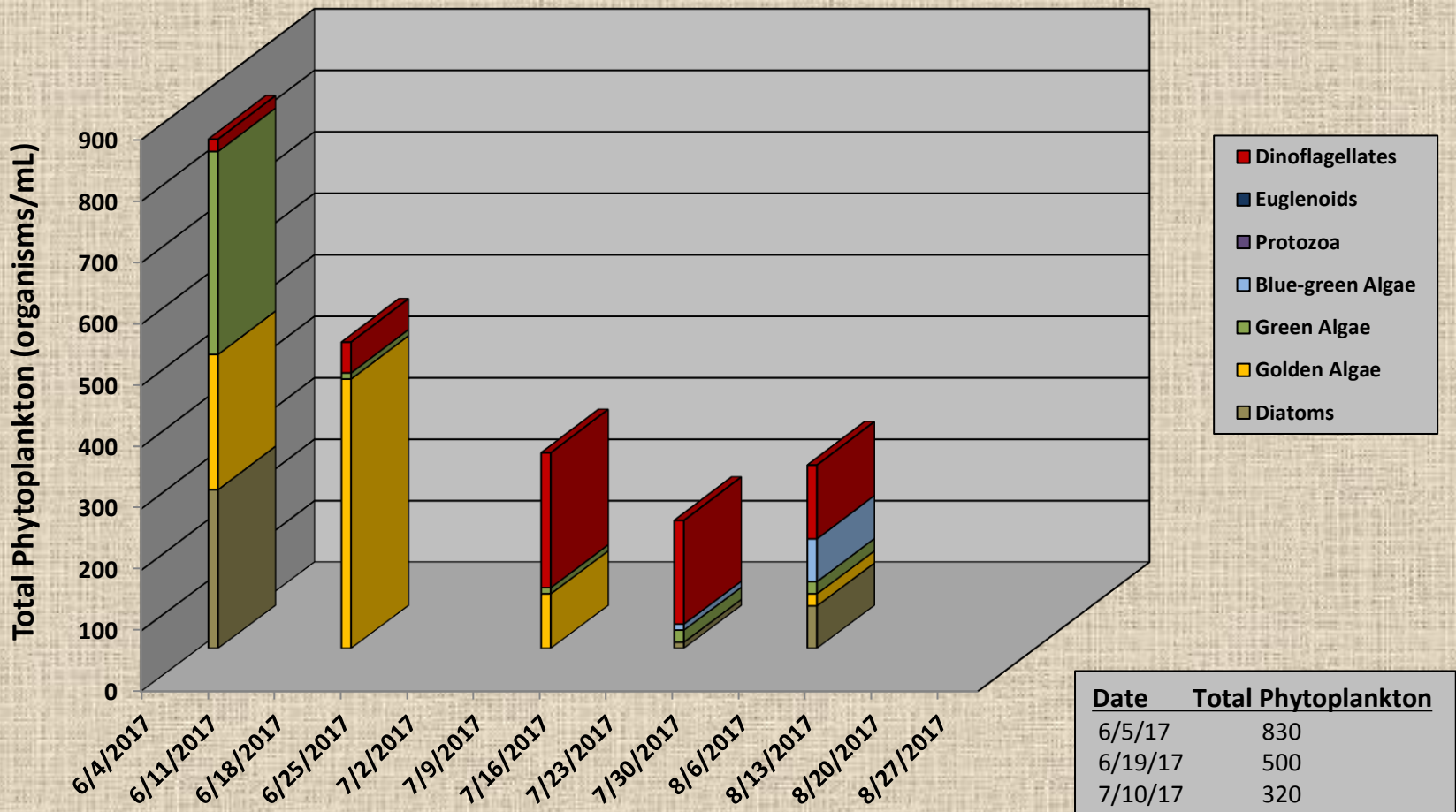
Crystal Lake
2017 Phytoplankton Distribution



Date	Total Phytoplankton
6/5/17	190
6/19/17	230
7/10/17	90
7/24/17	190
8/7/17	790
8/21/17	460

SOLITUDE LAKE MANAGEMENT

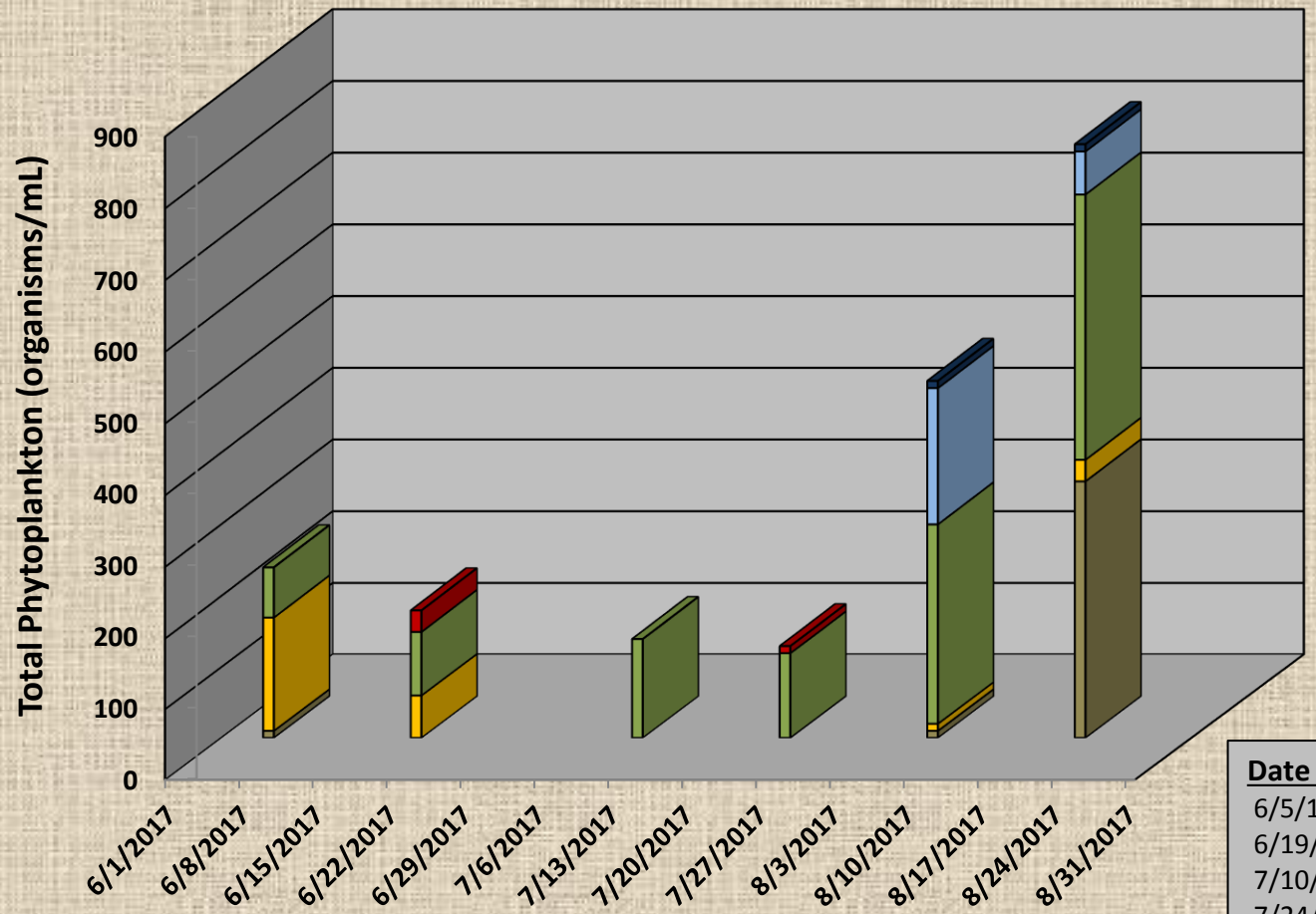
Cove Pond
2017 Phytoplankton Distribution



Date	Total Phytoplankton
6/5/17	830
6/19/17	500
7/10/17	320
7/24/17	210
8/7/17	300

SOLITUDE LAKE MANAGEMENT

Birchwood Lake
2017 Phytoplankton Distribution



Date	Total Phytoplankton
6/5/17	240
6/19/17	180
7/10/17	140
7/24/17	130
8/7/17	500
8/21/17	830

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1728514
Report Date: 08/21/17

SAMPLE RESULTS

Lab ID: L1728514-01
Client ID: BIRCHWOOD LAKE
Sample Location: DENVILLE, NJ
Matrix: Water

Date Collected: 08/14/17 00:00
Date Received: 08/15/17
Field Prep: Not Specified

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	0.06	1	-	08/16/17 02:20	121,2130B	VB
Nitrogen, Nitrate	0.083	J	mg/l	0.100	0.032	1	-	08/16/17 00:47	121,4500NO3-F	CW
Phosphorus, Total	0.050		mg/l	0.020	0.006	2	08/18/17 10:40	08/18/17 15:05	121,4500P-E	SD

Serial_No:08211719:43

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1728514
Report Date: 08/21/17

SAMPLE RESULTS

Lab ID: L1728514-09
Client ID: CRYSTAL LAKE
Sample Location: DENVILLE, NJ
Matrix: Water

Date Collected: 08/14/17 00:00
Date Received: 08/15/17
Field Prep: Not Specified

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	0.06	1	-	08/16/17 02:20	121,2130B	VB
Nitrogen, Nitrate	0.092	J	mg/l	0.100	0.032	1	-	08/16/17 01:01	121,4500NO3-F	CW
Phosphorus, Total	0.046		mg/l	0.010	0.003	1	08/18/17 10:40	08/18/17 15:05	121,4500P-E	SD

Serial_No:08211719:43

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1728514
Report Date: 08/21/17

SAMPLE RESULTS

Lab ID: L1728514-04
Client ID: SUNSET LAKE
Sample Location: DENVILLE, NJ
Matrix: Water

Date Collected: 08/14/17 00:00
Date Received: 08/15/17
Field Prep: Not Specified

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	-	08/16/17 02:20	121,2130B	VB
Nitrogen, Nitrate	0.075	J	mg/l	0.100	0.032	1	-	08/16/17 00:55	121,4500NO3-F	CW
Phosphorus, Total	0.019		mg/l	0.010	0.003	1	08/18/17 10:40	08/18/17 15:05	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1728514
Report Date: 08/21/17

SAMPLE RESULTS

Lab ID: L1728514-08
Client ID: OLIVE LAKE
Sample Location: DENVILLE, NJ
Matrix: Water

Date Collected: 08/14/17 00:00
Date Received: 08/15/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	3.9		NTU	0.20	0.06	1	-	08/16/17 02:20	121,2130B	VB
Nitrogen, Nitrate	ND		mg/l	0.100	0.032	1	-	08/16/17 01:00	121,4500NO3-F	CW
Phosphorus, Total	0.079		mg/l	0.010	0.003	1	08/18/17 10:40	08/18/17 15:05	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1728514
Report Date: 08/21/17

SAMPLE RESULTS

Lab ID: L1728514-07
Client ID: SHADOW LAKE
Sample Location: DENVILLE, NJ
Matrix: Water

Date Collected: 08/14/17 00:00
Date Received: 08/15/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	5.6		NTU	0.20	0.06	1	-	08/16/17 02:20	121,2130B	VB
Nitrogen, Nitrate	0.090	J	mg/l	0.100	0.032	1	-	08/16/17 00:58	121,4500NO3-F	CW
Phosphorus, Total	0.098		mg/l	0.020	0.006	2	08/18/17 10:40	08/18/17 15:05	121,4500P-E	SD

Serial_No:08211719:43

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1728514
Report Date: 08/21/17

SAMPLE RESULTS

Lab ID: L1728514-05
Client ID: COVE POND
Sample Location: DENVILLE, NJ
Matrix: Water

Date Collected: 08/14/17 00:00
Date Received: 08/15/17
Field Prep: Not Specified

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	-	08/16/17 02:20	121,2130B	VB
Nitrogen, Nitrate	0.106		mg/l	0.100	0.032	1	-	08/16/17 00:56	121,4500NO3-F	CW
Phosphorus, Total	0.051		mg/l	0.020	0.006	2	08/18/17 10:40	08/18/17 15:05	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1728514
Report Date: 08/21/17

SAMPLE RESULTS

Lab ID: L1728514-06
Client ID: GRUNDEN'S POND
Sample Location: DENVILLE, NJ
Matrix: Water

Date Collected: 08/14/17 00:00
Date Received: 08/15/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	5.8		NTU	0.20	0.06	1	-	08/16/17 02:20	121,2130B	VB
Nitrogen, Nitrate	0.083	J	mg/l	0.100	0.032	1	-	08/16/17 00:57	121,4500NO3-F	CW
Phosphorus, Total	0.082		mg/l	0.020	0.006	2	08/18/17 10:40	08/18/17 15:05	121,4500P-E	SD

Serial_No:08211719:43

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1728514
Report Date: 08/21/17

SAMPLE RESULTS

Lab ID: L1728514-03
Client ID: MOUNTAIN LAKE
Sample Location: DENVILLE, NJ
Matrix: Water

Date Collected: 08/14/17 00:00
Date Received: 08/15/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	0.88		NTU	0.20	0.06	1	-	08/16/17 02:20	121,2130B	VB
Nitrogen, Nitrate	0.059	J	mg/l	0.100	0.032	1	-	08/16/17 00:53	121,4500NO3-F	CW
Phosphorus, Total	0.011		mg/l	0.010	0.003	1	08/18/17 10:40	08/18/17 15:05	121,4500P-E	SD

Serial_No:08211719:43

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1728514
Report Date: 08/21/17

SAMPLE RESULTS

Lab ID: L1728514-02
Client ID: WILDWOOD LAKE
Sample Location: DENVILLE, NJ
Matrix: Water

Date Collected: 08/14/17 00:00
Date Received: 08/15/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	3.5		NTU	0.20	0.06	1	-	08/16/17 02:20	121,2130B	VB
Nitrogen, Nitrate	0.091	J	mg/l	0.100	0.032	1	-	08/16/17 00:48	121,4500NO3-F	CW
Phosphorus, Total	0.031		mg/l	0.010	0.003	1	08/18/17 10:40	08/18/17 15:05	121,4500P-E	SD

Serial_No:07171718:17

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1723500
Report Date: 07/17/17

SAMPLE RESULTS

Lab ID: L1723500-01
Client ID: BIRCHWOOD LAKE
Sample Location: DENVILLE, NJ
Matrix: Water

Date Collected: 07/10/17 10:20
Date Received: 07/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	1.0		NTU	0.20	0.06	1	-	07/12/17 00:55	121,2130B	VB
Nitrogen, Nitrate	ND		mg/l	0.100	0.022	1	-	07/13/17 19:51	121,4500NO3-F	MR
Phosphorus, Total	0.010		mg/l	0.010	0.003	1	07/13/17 10:40	07/14/17 09:33	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1723500
Report Date: 07/17/17

SAMPLE RESULTS

Lab ID: L1723500-03
Client ID: CRYSTAL LAKE
Sample Location: DENVILLE, NJ
Matrix: Water

Date Collected: 07/10/17 10:52
Date Received: 07/11/17
Field Prep: Not Specified

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	0.06	1	-	07/12/17 00:55	121,2130B	VB
Nitrogen, Nitrate	ND		mg/l	0.100	0.022	1	-	07/13/17 19:59	121,4500NO3-F	MR
Phosphorus, Total	0.009	J	mg/l	0.010	0.003	1	07/13/17 10:40	07/14/17 09:36	121,4500P-E	SD

Serial_No:07171718:17

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1723500
Report Date: 07/17/17

SAMPLE RESULTS

Lab ID: L1723500-02
Client ID: SUNSET LAKE
Sample Location: DENVILLE, NJ
Matrix: Water

Date Collected: 07/10/17 10:40
Date Received: 07/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	2.2		NTU	0.20	0.06	1	-	07/12/17 00:55	121,2130B	VB
Nitrogen, Nitrate	ND		mg/l	0.100	0.022	1	-	07/13/17 19:55	121,4500NO3-F	MR
Phosphorus, Total	0.017		mg/l	0.010	0.003	1	07/13/17 10:40	07/14/17 09:35	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1723500
Report Date: 07/17/17

SAMPLE RESULTS

Lab ID: L1723500-04
Client ID: OLIVE POND
Sample Location: DENVILLE, NJ
Matrix: Water

Date Collected: 07/10/17 11:05
Date Received: 07/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	2.9		NTU	0.20	0.06	1	-	07/12/17 00:55	121,2130B	VB
Nitrogen, Nitrate	ND		mg/l	0.100	0.022	1	-	07/13/17 20:00	121,4500NO3-F	MR
Phosphorus, Total	0.082		mg/l	0.010	0.003	1	07/13/17 10:40	07/14/17 09:37	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1723500
Report Date: 07/17/17

SAMPLE RESULTS

Lab ID: L1723500-05
Client ID: SHADOW LAKE
Sample Location: DENVILLE, NJ
Matrix: Water

Date Collected: 07/10/17 11:15
Date Received: 07/11/17
Field Prep: Not Specified

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	0.06	1	-	07/12/17 00:55	121,2130B	VB
Nitrogen, Nitrate	ND		mg/l	0.100	0.022	1	-	07/13/17 20:02	121,4500NO3-F	MR
Phosphorus, Total	0.079		mg/l	0.010	0.003	1	07/13/17 12:10	07/14/17 09:57	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1723500
Report Date: 07/17/17

SAMPLE RESULTS

Lab ID: L1723500-06
Client ID: COVE POND
Sample Location: DENVILLE, NJ
Matrix: Water

Date Collected: 07/10/17 11:30
Date Received: 07/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	4.2		NTU	0.20	0.06	1	-	07/12/17 00:55	121,2130B	VB
Nitrogen, Nitrate	ND		mg/l	0.100	0.022	1	-	07/13/17 20:03	121,4500NO3-F	MR
Phosphorus, Total	0.065		mg/l	0.010	0.003	1	07/13/17 12:10	07/14/17 09:58	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1723500
Report Date: 07/17/17

SAMPLE RESULTS

Lab ID: L1723500-07
Client ID: GRUNDEN'S POND
Sample Location: DENVILLE, NJ
Matrix: Water

Date Collected: 07/10/17 11:39
Date Received: 07/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	5.8		NTU	0.20	0.06	1	-	07/12/17 00:55	121,2130B	VB
Nitrogen, Nitrate	ND		mg/l	0.100	0.022	1	-	07/13/17 20:04	121,4500NO3-F	MR
Phosphorus, Total	0.066		mg/l	0.010	0.003	1	07/13/17 12:10	07/14/17 10:00	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1723500
Report Date: 07/17/17

SAMPLE RESULTS

Lab ID: L1723500-08
Client ID: MOUNTAIN LAKE
Sample Location: DENVILLE, NJ
Matrix: Water

Date Collected: 07/10/17 12:10
Date Received: 07/11/17
Field Prep: Not Specified

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	0.06	1	-	07/12/17 00:55	121,2130B	VB
Nitrogen, Nitrate	ND		mg/l	0.100	0.022	1	-	07/13/17 20:06	121,4500NO3-F	MR
Phosphorus, Total	0.007	J	mg/l	0.010	0.003	1	07/13/17 12:10	07/14/17 10:03	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1723500
Report Date: 07/17/17

SAMPLE RESULTS

Lab ID: L1723500-09
Client ID: WILDWOOD LAKE
Sample Location: DENVILLE, NJ
Matrix: Water

Date Collected: 07/10/17 12:35
Date Received: 07/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	4.6		NTU	0.20	0.06	1	-	07/12/17 00:55	121,2130B	VB
Nitrogen, Nitrate	ND		mg/l	0.100	0.022	1	-	07/13/17 20:07	121,4500NO3-F	MR
Phosphorus, Total	0.041		mg/l	0.010	0.003	1	07/13/17 12:10	07/14/17 10:04	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1718706
Report Date: 06/12/17

SAMPLE RESULTS

Lab ID: L1718706-08
Client ID: MOUNTAIN LAKE
Sample Location: MOUNTAIN LAKES, NJ
Matrix: Water

Date Collected: 06/05/17 11:10
Date Received: 06/06/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Calcium, Total	21.1		mg/l	0.100	0.0394	1	06/07/17 14:47	06/09/17 09:59	EPA 3005A	1,6020A	BV

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1718706
Report Date: 06/12/17

SAMPLE RESULTS

Lab ID: L1718706-01
Client ID: BIRCHWOOD LAKE
Sample Location: MOUNTAIN LAKES, NJ
Matrix: Water

Date Collected: 06/05/17 09:05
Date Received: 06/06/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	0.95		NTU	0.20	0.06	1	-	06/07/17 01:41	121,2130B	VB
Nitrogen, Nitrate	ND		mg/l	0.100	0.022	1	-	06/06/17 23:42	121,4500NO3-F	MR
Phosphorus, Total	0.011		mg/l	0.010	0.003	1	06/07/17 12:15	06/08/17 11:36	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1718706
Report Date: 06/12/17

SAMPLE RESULTS

Lab ID: L1718706-02
Client ID: CRYSTAL LAKE
Sample Location: MOUNTAIN LAKES, NJ
Matrix: Water

Date Collected: 06/05/17 09:50
Date Received: 06/06/17
Field Prep: Not Specified

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	0.06	1	-	06/07/17 01:41	121,2130B	VB
Nitrogen, Nitrate	ND		mg/l	0.100	0.022	1	-	06/06/17 23:43	121,4500NO3-F	MR
Phosphorus, Total	0.010		mg/l	0.010	0.003	1	06/07/17 12:15	06/08/17 11:37	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1718706
Report Date: 06/12/17

SAMPLE RESULTS

Lab ID: L1718706-03
Client ID: SUNSET LAKE
Sample Location: MOUNTAIN LAKES, NJ
Matrix: Water

Date Collected: 06/05/17 09:40
Date Received: 06/06/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	2.3		NTU	0.20	0.06	1	-	06/07/17 01:41	121,2130B	VB
Nitrogen, Nitrate	ND		mg/l	0.100	0.022	1	-	06/06/17 23:45	121,4500NO3-F	MR
Phosphorus, Total	0.024		mg/l	0.010	0.003	1	06/07/17 12:15	06/08/17 11:38	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1718706
Report Date: 06/12/17

SAMPLE RESULTS

Lab ID: L1718706-04
Client ID: OLIVE POND
Sample Location: MOUNTAIN LAKES, NJ
Matrix: Water

Date Collected: 06/05/17 10:10
Date Received: 06/06/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	3.9		NTU	0.20	0.06	1	-	06/07/17 01:41	121,2130B	VB
Nitrogen, Nitrate	ND		mg/l	0.100	0.022	1	-	06/06/17 23:46	121,4500NO3-F	MR
Phosphorus, Total	0.089		mg/l	0.010	0.003	1	06/07/17 12:15	06/08/17 11:38	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1718706
Report Date: 06/12/17

SAMPLE RESULTS

Lab ID: L1718706-05
Client ID: SHADOW LAKE
Sample Location: MOUNTAIN LAKES, NJ
Matrix: Water

Date Collected: 06/05/17 10:25
Date Received: 06/06/17
Field Prep: Not Specified

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	-	06/07/17 01:41	121,2130B	VB
Nitrogen, Nitrate	ND		mg/l	0.100	0.022	1	-	06/06/17 23:47	121,4500NO3-F	MR
Phosphorus, Total	0.063		mg/l	0.010	0.003	1	06/07/17 12:15	06/08/17 11:39	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1718706
Report Date: 06/12/17

SAMPLE RESULTS

Lab ID: L1718706-06
Client ID: COVE POND
Sample Location: MOUNTAIN LAKES, NJ
Matrix: Water

Date Collected: 06/05/17 10:40
Date Received: 06/06/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	4.4		NTU	0.20	0.06	1	-	06/07/17 01:41	121,2130B	VB
Nitrogen, Nitrate	ND		mg/l	0.100	0.022	1	-	06/06/17 23:49	121,4500NO3-F	MR
Phosphorus, Total	0.069		mg/l	0.010	0.003	1	06/07/17 12:15	06/08/17 11:40	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1718706
Report Date: 06/12/17

SAMPLE RESULTS

Lab ID: L1718706-07
Client ID: GRANDPA'S POND
Sample Location: MOUNTAIN LAKES, NJ
Matrix: Water

Date Collected: 06/05/17 10:45
Date Received: 06/06/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	5.5		NTU	0.20	0.06	1	-	06/07/17 01:41	121,2130B	VB
Nitrogen, Nitrate	ND		mg/l	0.100	0.022	1	-	06/06/17 23:50	121,4500NO3-F	MR
Phosphorus, Total	0.036		mg/l	0.010	0.003	1	06/07/17 12:15	06/08/17 11:41	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1718706
Report Date: 06/12/17

SAMPLE RESULTS

Lab ID: L1718706-08
Client ID: MOUNTAIN LAKE
Sample Location: MOUNTAIN LAKES, NJ
Matrix: Water

Date Collected: 06/05/17 11:10
Date Received: 06/06/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	0.90		NTU	0.20	0.06	1	-	06/07/17 01:41	121,2130B	VB
Nitrogen, Nitrate	ND		mg/l	0.100	0.022	1	-	06/06/17 23:51	121,4500NO3-F	MR
Phosphorus, Total	0.010		mg/l	0.010	0.003	1	06/07/17 12:15	06/08/17 11:42	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1718706
Report Date: 06/12/17

SAMPLE RESULTS

Lab ID: L1718706-09
Client ID: WILDWOOD LAKE
Sample Location: MOUNTAIN LAKES, NJ
Matrix: Water

Date Collected: 06/05/17 11:20
Date Received: 06/06/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	2.0		NTU	0.20	0.06	1	-	06/07/17 01:41	121,2130B	VB
Nitrogen, Nitrate	0.028	J	mg/l	0.100	0.022	1	-	06/06/17 23:52	121,4500NO3-F	MR
Phosphorus, Total	0.016		mg/l	0.010	0.003	1	06/07/17 12:15	06/08/17 11:43	121,4500P-E	SD

Mountain Lakes

2017 Fecal Coliform Data

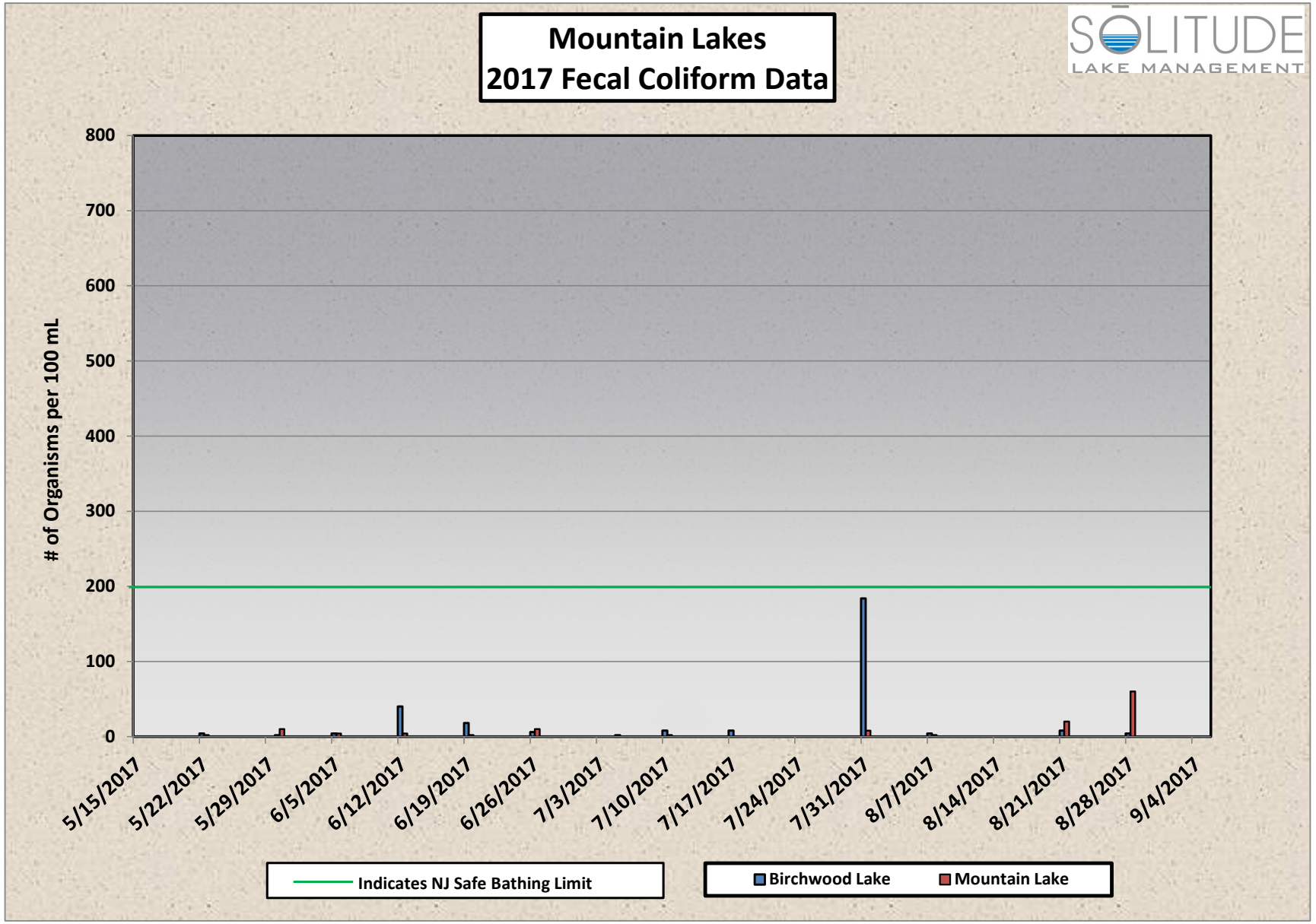
Date	Birchwood Lake	Mountain Lake	New Jersey Health Limit
5/22/2017	4	2	200
5/30/2017	2	10	200
6/5/2017	4	4	200
6/12/2017	40	4	200
6/19/2017	18	2	200
6/26/2017	6	10	200
7/5/2017	2	ND	200
7/10/2017	8	2	200
7/17/2017	8	ND	200
7/31/2017	184	8	200
8/7/2017	4	2	200
8/21/2017	8	20	200
8/28/2017	4	60	200
			200
			200
			200

Retest Results

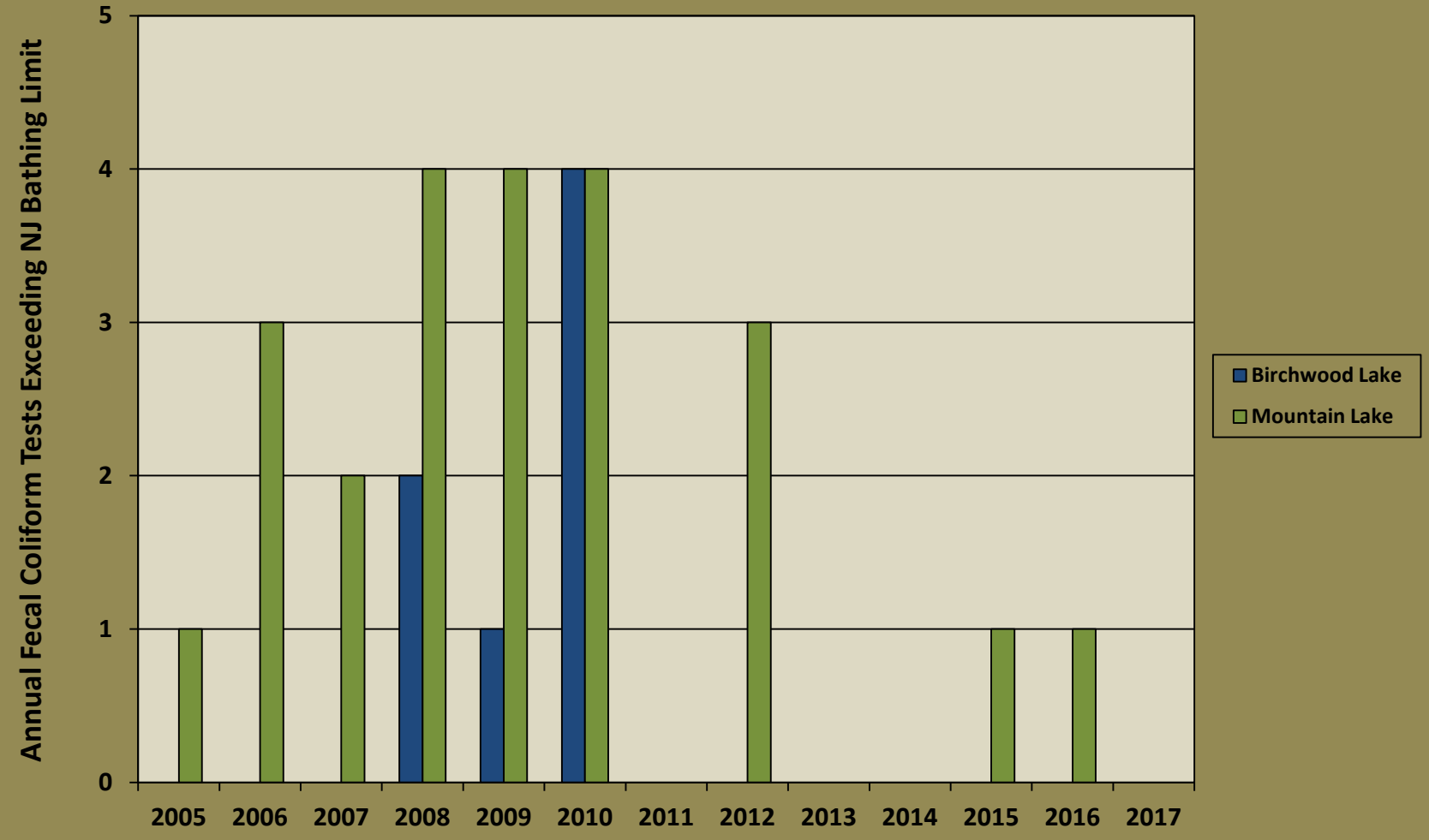
Date	Mountain Lake
NA	NA

Date	Birchwood
NA	NA

Note: All results are in organisms per 100 mL


Mountain Lakes
2017 Fecal Coliform Data
SOLITUDE
LAKE MANAGEMENT
# of Organisms per 100 mL
800
700
600
500
400
300
200
100
0
5/15/2017
5/22/2017
5/29/2017
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
8/28/2017
9/4/2017
Indicates NJ Safe Bathing Limit
Birchwood Lake
Mountain Lake

Annual Fecal Coliform Test Failures 2005 to 2017



BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Solitude Lake Management
DATE: 04/10/17
INSPECTION DATE: 04/10/17

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 9:00 am)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	11.0	10.46
2’	10.9	10.32
4’	10.0	10.54
6’	9.7	10.47
8’	9.6	11.39
10’	9.3	2.68
12’	9.4	3.89
13’		

BIRCHWOOD LAKE	Outlet Cove: Heavy amounts of leaf debris were observed. Traces to sparse amounts of curly leaf pondweed were observed. Traces of benthic filamentous algae were also observed. Trace amounts of leafy pondweed were observed. Water appeared to be turbid.
Secchi: 5’	Inside Swim Lane: Decaying rhizomes were floating at the surface. A dense amount of leaf debris was observed. Otherwise swim lanes were clean and clear.
Aeration: OFF	Outside Swim Lane: A heavy amount of leaf debris was observed. Trace amounts of benthic filamentous algae was observed. Unicellular algae was observed within the water column.
Fecal Sample: NA	Beach: Clean and Clear.
SUNSET LAKE	Launch: Traces of leafy pondweed were observed. Traces of benthic filamentous algae were observed along the shoreline.
Secchi: 6’	Outlet: Trace amounts of benthic filamentous algae were observed along the shoreline. Heavy amounts of leaf debris were observed.
	Sunset Road Cove: 2’ x 2’ patch of floating filamentous algae was observed 5 feet from the shoreline. Trace to sparse

	amounts of benthic filamentous algae was observed along the shoreline.
	Inlet Cove: Clean and clear.
CRYSTAL LAKE	Birchwood Outlet: Moderate to dense amounts of benthic filamentous algae were observed extending 2 feet out from the shoreline. Trace amounts of rooted arrowhead and lilies were observed. Floating stems of curly leaf pondweed and bass weed were also observed along the shoreline.
	Lake Shore Road Shoreline: Trace to sparse amounts of rooted bass weed was observed. Floating stems of curly leaf pondweed were observed along the shorelines. Traces of unicellular algae were observed within the water column. A dense amount of leaf litter was observed.
Secchi: 6’	Crystal Outlet: Traces of benthic filamentous algae was observed on the rocks. One stem of rooted bass weed was observed. Otherwise the area was clean and clear.
OLIVE POND **Dissolved Oxygen: 8.99 mg/L.**	Secchi: 3’est Traces of benthic filamentous algae were observed mixed in with a dense amount of leaf litter along the shorelines. Water was turbid.
SHADOW LAKE Aeration: OFF **Dissolved Oxygen: 9.02 mg/L.**	Secchi: 2.5’est Moderate to dense floating mats of filamentous algae were observed extending 5 feet out from the shorelines. A heavy amount of leaf litter mixed in with moderate amounts of benthic filamentous algae was observed along the shorelines.
COVE POND **Dissolved Oxygen: 8.49 mg/L.**	Secchi: 3’est Water appeared to be turbid. No signs of plant or algae growth were observed.
GRUNDEN’S POND **Dissolved Oxygen: 10.99mg/L.**	Secchi: 2’est Trace to sparse amount of exposed Ludwiga species was observed along the shoreline. Traces benthic filamentous algae were also observed. Traces of rooted curly leaf pondweed were observed.
MOUNTAIN LAKE	Cove End: Heavy leaf litter was observed. Water appeared to be slightly turbid. Trace to sparse amounts of benthic filamentous algae was observed. Right: Clean and clear. Left: Trace amounts of benthic filamentous algae were observed. Otherwise the area was clean and clear.
Secchi: 5.5’est	Sailboat Cove: Traces of benthic filamentous algae were observed. Open water was clean and clear.

Water Level: 499.5	Outlet Cove: A heavy amount of tree debris was observed. Area was clean and clear.
	Midvale Launch: Unicellular algae was observed within the water column. A dense amount of leaf litter was observed along the shorelines.
Fecal Sample: NA	Island Beach: Traces of benthic filamentous algae was observed around the dock area. Island Beach was clean and clear.
WILDWOOD LAKE	Park: Water appeared to be slightly turbid. Area was clean and clear.
Secchi: 5.25’	Dam: Moderate amounts of benthic filamentous algae were observed. Unicellular algae was observed within the water column.
Water Level: 499.5	Launch: Traces of benthic filamentous algae was observed along the shorelines. Otherwise the area was clean and clear.

NOTES:

1. **Canal: A visual survey was conducted, resulting in trace to sparse amounts of benthic filamentous algae was observed throughout the canal. No signs of plant growth were observed.**
2. **Hydro-raking is currently ongoing within Mountain Lakes.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Solitude Lake Management
DATE: 4/17/17
INSPECTION DATE: 4/17/17

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 10:15 am)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	16.0	9.22
2’	16.0	9.19
4’	15.9	9.16
6’	15.6	9.26
8’	15.2	9.57
10’	13.2	10.41
12’	11.6	10.96
13’	11.4	1.63

BIRCHWOOD LAKE	Outlet Cove: Trace to sparse amounts of curly leaf pondweed. Trace to sparse amounts of benthic filamentous algae was observed. Dense amount of leaf debris was observed within the outlet cove. Trace amounts of lily pads were observed emerging to the surface.
Secchi: 6’	Inside Swim Lane: Floating fragments of curly leaf pondweed were observed. A light amount of tree pollen was observed on the surface. Otherwise swim lanes were clean and clear.
Aeration: ON	Outside Swim Lane: Traces of rooted curly leaf pondweed were observed. Traces of benthic filamentous algae were observed. Heavy amount of leaf debris was observed.
Fecal Sample: NA	Beach: Clean and clear.
SUNSET LAKE	Launch: Traces of benthic filamentous algae and floating filamentous algae were both observed along the main shoreline. Heavy amount of leaf debris was also observed. The open water looked clean and clear.
Secchi: 6’est	Outlet: Traces of floating curly leaf pondweed were observed along the shoreline. Sparse amounts of benthic filamentous algae were observed. Traces of filamentous algae were also observed along the shoreline.

	Sunset Road Cove: A 2'x 2' sized patch of floating filamentous algae was observed, in addition to another patch (7'x7') extending out from the shoreline. Sparse to moderate amounts of benthic filamentous algae were observed.
	Inlet Cove: Moderate amounts of floating filamentous algae were observed. The open water was clean and clear.
CRYSTAL LAKE	Birchwood Outlet: Sparse to moderate amounts of benthic filamentous algae were observed. A 1'x1' sized patch of floating filamentous algae was observed. Sparse to moderate amounts of lily pads were observed. Trace to sparse amounts of bass weed was observed.
	Lake Shore Road Shoreline: Traces of floating Curly-Leaf pondweed were observed. Trace amounts of Bass weed and Ludwiga species were also observed. Heavy amount of leaf debris was observed.
Secchi: 6'est	Crystal Outlet: Trace amounts of benthic filamentous algae were observed on the rocks. Traces of rooted bass weed were also observed. The open water looked clean and clear.
OLIVE POND **Dissolved Oxygen: 6.09 mg/L.**	Secchi: 2'est Water appeared to be very turbid with a dense amount of leaf litter along the shorelines.
SHADOW LAKE Aeration: OFF **Dissolved Oxygen: 8.25 mg/L.**	Secchi: 3'est A 7'x7' sized patch of floating filamentous algae was observed extending out from the main shoreline. Other smaller patches (2'x2') were also observed along the shorelines. Traces of Watermeal were also observed mixed in with the filamentous algae. Floating fragments of curly leaf pondweed were observed.
COVE POND **Dissolved Oxygen: 9.97 mg/L.**	Secchi: 5'est Traces of rooted and floating fragments of curly leaf pondweed were observed. Trace amounts of watermeal were observed along the shorelines. Traces of floating filamentous algae were also observed.
GRUNDEN'S POND **Dissolved Oxygen: 10.64 mg/L.**	Secchi: 4'est Sparse amounts of benthic filamentous algae were observed on the Ludwiga species. Floating fragments of curly leaf pondweed were observed along the shoreline. Sparse amounts of rooted curly leaf pondweed were observed in the open water.
MOUNTAIN LAKE	Cove End: Traces of benthic filamentous algae were

	observed along the shoreline. A 2'x2' sized patch of benthic filamentous algae topping out at the surface was observed in the open water. Heavy leaf debris was also observed. Right: Traces of curly leaf pondweed were observed. Traces of benthic filamentous algae were also observed. Dense amounts of leaf debris were observed. Left: Moderate amounts of benthic filamentous algae was observed.
Secchi: 6'est	Sailboat Cove: Trace amounts of benthic filamentous algae were observed. Floating fragments of curly leaf pondweed was observed along the shorelines.
Water Level: 499.5	Outlet Cove: Heavy amount of tree debris was observed. Otherwise the area was clean and clear.
	Midvale Launch: Water appeared to be turbid. An abundance of leaf debris was observed.
Fecal Sample: NA	Island Beach: Area surrounding the dock contained trace amounts of benthic filamentous algae. Trace amounts of rooted curly leaf pondweed were also observed. Island Beach looked clean and clear.
WILDWOOD LAKE	Park: Trace to sparse amounts of benthic filamentous algae was observed.
Secchi: 5'est	Dam: Sparse to moderate amounts of benthic filamentous algae was observed.
Water Level: 499.5	Launch: Traces of benthic filamentous algae were also observed. Water appeared to be slightly turbid.

NOTES:

1. **A Copper Sulfate treatment was conducted today (4/17/17) at Wildwood Lake. An Alum treatment is scheduled for Wildwood Lake on 4/18/17.**
2. **Hydro-raking is currently ongoing within Mountain Lakes.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Solitude Lake Management
DATE: 4/24/17
INSPECTION DATE: 4/24/17

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 10:09 AM)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	14.2	8.21
2’	14.2	8.18
4’	14.2	8.14
6’	14.2	8.16
8’	14.1	8.15
10’	13.3	8.06
12’		
13’		

BIRCHWOOD LAKE	Outlet Cove: Trace amounts of rooted and floating fragments of curly-leaf pondweed were observed.
Secchi: 10 feet	Inside Swim Lane: Trace amounts floating of curly-leaf pondweed was observed.
Aeration: ON	Outside Swim Lane: Trace amounts of lilies and floating fragments of curly-leaf pondweed were observed.
Fecal Sample: NA	Beach: Traces of floating curly-leaf pondweed were observed.
SUNSET LAKE	Launch: Trace amounts of floating curly-leaf pondweed was observed, and a biofilm was visible on the surface.
Secchi: 7’ est.	Outlet: A biofilm was present on the surface, with traces of floating curly-leaf pondweed fragments were observed along the shorelines.
	Sunset Road Cove: Trace amounts of floating filamentous algae was observed near the shoreline.
	Inlet Cove: Sparse to moderate amounts of floating filamentous algae was observed in the immediate inlet area.
CRYSTAL LAKE	Birchwood Outlet: Trace amounts of floating filamentous

	algae and fragments of curly-leaf pondweed were observed on the surface. Sparse amounts of benthic filamentous algae and bass weed were observed near the shoreline.
	Lake Shore Road Shoreline: Trace amounts of floating and benthic filamentous algae were observed near the shoreline. Traces of bass weed was observed near the dock.
Secchi: 6' est.	Crystal Outlet: A trace amount of benthic filamentous algae was observed on the rocks near the shoreline.
OLIVE POND **Dissolved Oxygen: 5.70 mg/L.**	Secchi: 4' est. A biofilm was observed on the surface.
SHADOW LAKE Aeration: OFF **Dissolved Oxygen: 6.48mg/L.**	Secchi: 4' est. Trace amounts of floating and benthic filamentous algae were observed near the shoreline.
COVE POND ***Dissolved Oxygen: 8.58 mg/L.***	Secchi: 4' est. Trace amounts of benthic filamentous algae and curly-leaf pondweed fragments were observed near the shoreline.
GRUNDEN'S POND **Dissolved Oxygen: 10.64 mg/L.**	Secchi: 4' est. Sparse to moderate benthic algae was observed along the shoreline and by the dock. Sparse patches of floating filamentous algae were present throughout the pond. Sparse to moderate amounts of curly-leaf pondweed were present near the dock and in the center of the basin.
MOUNTAIN LAKE	Cove End: No plant or algae growth was observed.
Secchi: 8' to bottom 12' est.	Sailboat Cove: Trace amounts of floating and benthic filamentous algae were observed.
Water Level: NA	Outlet Cove: Road closed, could not get access to inspect area.
	Midvale Launch: Trace amounts of floating filamentous algae and fragments of curly-leaf pondweed were observed near the shoreline and washed up on the shoreline.
Fecal Sample: n/a	Island Beach: Trace amounts of benthic filamentous algae was observed. Trace amounts of floating fragments of curly-leaf pondweed was observed around the beach and dock. Sparse patches of rooted curly-leaf pondweed were found near the dock.
WILDWOOD LAKE	Park: A trace amount of floating fragments of curly-leaf

	pondweed was observed on the surface.
Secchi: 15’ est.	Dam: No plant or algae growth was observed.
Water Level: 499.4	Launch: Trace to sparse amounts of benthic filamentous algae was observed near the shoreline. Trace amounts of floating filamentous algae was seen on the surface, with sparse amounts of curly-leaf pondweed fragments were also observed. Inlet to basin had a dense mat of floating filamentous algae present.

NOTES:

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Solitude Lake Management
DATE: 05/01/17
INSPECTION DATE: 05/01/17

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 10:00am)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	16.7	7.87
2’	16.8	7.85
4’	16.8	7.84
6’	16.5	7.95
8’	16.7	7.89
10’	16.4	8.02
12’	15.0	8.76
13’	14.5	8.01

BIRCHWOOD LAKE	Outlet Cove: Sparse to moderate amounts of curly leaf pondweed were observed. Heavy amounts of tree pollen and debris was observed on the surface. Dense leaf litter was observed on the bottom.
Secchi: 5’	Inside Swim Lane: Trace amounts of tree pollen were observed on the surface. Floating fragments of curly leaf pondweed were observed.
Aeration: ON	Outside Swim Lane: Sparse amounts of rooted curly leaf pondweed were observed. Trace amounts of lilies were observed. Heavy amounts of leaf litter were observed.
Fecal Sample: NA	Beach: A light amount of tree pollen was observed on the surface. Otherwise area was clean and clear.
SUNSET LAKE	Launch: Trace amounts of tree pollen and oil sheen were observed on the surface. Open water looked clean and clear.
Secchi: 4.5’est	Outlet: Traces of floating filamentous algae was observed along the main shoreline. Floating fragments of curly leaf pondweed were observed.
	Sunset Road Cove: Traces of filamentous algae was observed along the eastern shoreline. A light amount of pollen was observed on the surface.

	Inlet Cove: Sparse amounts of filamentous algae was scattered along the shoreline and was observed within the open water. Traces of tree pollen were also observed.
CRYSTAL LAKE	Birchwood Outlet: Trace to sparse amounts of bass weed was observed. Trace to sparse amounts of benthic filamentous algae was observed. A trace sized patch of lilies was observed.
	Lake Shore Road Shoreline: Floating fragments of curly leaf pondweed were observed along the shorelines. Trace amounts of bass weed were observed. Dense amounts of tree debris were observed on the bottom.
Secchi: 6’	Crystal Outlet: A light amount of tree pollen was observed on the surface. Otherwise area was clean and clear.
OLIVE POND **Dissolved Oxygen: 5.77 mg/L.**	Secchi: 4.25’est Trace amounts of tree pollen was observed on the surface. Open water looked clean and clear.
SHADOW LAKE Aeration: NO **Dissolved Oxygen: 5.25 mg/L.**	Secchi: 3.25’est Scattered patches of tree pollen mixed in with tree debris was observed throughout the lake. Traces of filamentous algae were observed along the shoreline. A dense amount of leaf litter was observed on the bottom.
COVE POND **Dissolved Oxygen: 5.67 mg/L.**	Secchi: 4.25’est Trace amounts of curly leaf pondweed was observed. Trace sized patches of tree pollen mixed in with debris was observed.
GRUNDEN’S POND **Dissolved Oxygen: 8.87 mg/L.**	Secchi: 3’est Sparse to moderate sized patches of filamentous algae was observed in the open water. Traces of leafy pondweed were observed. Sparse to moderate amounts of Ludwiga species was observed along the main shoreline. Trace to sparse amounts of rooted curly leaf pondweed was observed in the open water.
MOUNTAIN LAKE	Cove End: Trace sized patches of filamentous algae mixed in with tree pollen was observed in the open water. Right of bridge: Traces of curly leaf pondweed was observed. Traces of bass weed were also observed. Dense accumulation of tree pollen was observed along the eastern shoreline. Left of the bridge: Clean and clear.
Secchi: 6’	Sailboat Cove: Clean and clear.
Water Level: 499.6	Outlet Cove: Heavy amounts of tree debris was observed.

	Clean and clear.
	Midvale Launch: Floating fragments of curly leaf pondweed were observed.
Fecal Sample: NA	Island Beach: Dock Area: Trace to sparse amounts of rooted curly leaf pondweed was observed. Trace amounts of benthic filamentous algae was also observed. Island Beach contained floating fragments of curly leaf pondweed. Otherwise the area was clean and clear.
WILDWOOD LAKE	Park: Water was slightly turbid. Area was clear of plant and algae growth.
Secchi: 5'est	Dam: Traces of filamentous algae were observed along the main shoreline. Traces of benthic filamentous algae were also observed.
Water Level: 499.5	Launch: Trace amounts of filamentous algae was observed. A light amount of tree pollen was observed on the surface.

NOTES:

1. **Canal: A visual survey was conducted, resulting in sparse to moderate amounts of benthic filamentous algae was observed throughout the canal. An oil sheen was observed on the surface. No signs of plant growth was observed.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Solitude Lake Management
DATE: 5/8/17
INSPECTION DATE: 5/8/17

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 10:00 am)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	15.5	6.50
2’	15.5	6.45
4’	15.5	6.44
6’	15.5	6.42
8’	15.5	6.41
10’	15.4	6.30
12’	15.4	6.28
13’	15.4	3.80

BIRCHWOOD LAKE	Outlet Cove: Water was heavily turbid due to DPW conducting dock maintenance. Trace amounts of tree pollen was observed on the surface. Traces of floating curly leaf pondweed were observed.
Secchi: 1.5’	Inside Swim Lane: Heavily turbid due to DPW conducting dock maintenance. Traces of tree pollen were observed on the surface. Traces of floating curly leaf pondweed were observed.
Aeration: ON	Outside Swim Lane: Trace amounts of lilies were observed along the shoreline. Water was heavily turbid.
Fecal Sample: NA	Beach: Water was heavily turbid. No plants or algae growth was observed.
SUNSET LAKE	Launch: Trace to sparse amounts of floating curly leaf pondweed was observed. Trace to sparse amounts of leafy pondweed was observed along the shoreline. Traces of small duckweed were present along the shoreline. A light amount of tree pollen was observed on the surface. Trace amounts of leaf litter was observed along the shoreline.
Secchi: 4’est	Outlet: Sparse to moderate amounts of benthic filamentous algae was observed. Sparse amounts of curly leaf pondweed were observed along the shoreline. Water appeared to be

	slightly turbid. Traces of leafy pondweed and small duckweed were observed along the shoreline.
	Sunset Road Cove: Trace to sparse amounts of leafy pondweed were observed. Trace amounts of leaf litter were also observed.
	Inlet Cove: Sparse amounts of filamentous algae was observed. Sparse sized patches of spatterdock were observed near the island.
CRYSTAL LAKE	Birchwood Outlet: Traces of floating fragments of curly leaf pondweed were observed along the shoreline. Trace to sparse amounts of rooted bass weed was observed. Trace to sparse amounts of benthic filamentous algae was observed. Sparse sized patches of lilies were observed near the outlet.
	Lake Shore Road Shoreline: A light amount of tree pollen was observed on the surface. Trace amounts of bass weed was observed. A heavy amount of leaf litter was also observed.
Secchi: 4.5'est	Crystal Outlet: Sparse to moderate amounts of benthic filamentous algae was observed.
OLIVE POND **Dissolved Oxygen: 3.88 mg/L.**	Secchi: 4.5'est Water appeared to be slightly turbid. Otherwise area was clean and clear.
SHADOW LAKE Aeration: ON **Dissolved Oxygen: 4.74 mg/L.**	Secchi: 5'est Sparse to moderate amounts of floating curly leaf pondweed were observed. Trace amounts of rooted curly leaf pondweed was observed near the shoreline. A heavy amount of tree pollen was observed along the northern and western shorelines.
COVE POND **Dissolved Oxygen: 4.63 mg/L.**	Secchi: 3'est Water appeared to be turbid. Traces of rooted curly leaf pondweed were observed. A heavy amount of tree pollen was observed along the northeastern shoreline.
GRUNDEN'S POND **Dissolved Oxygen: 5.37 mg/L.**	Secchi: Sparse to moderate amounts of benthic filamentous algae was observed along the shoreline. Moderate amounts of Ludwiga species was observed along the main shoreline. Traces of curly leaf pondweed were also observed. Trace to sparse amounts of leafy pondweed was observed.
MOUNTAIN LAKE	Cove End: Trace amounts of benthic filamentous algae was observed. A heavy amount of leaf litter was observed along the main shoreline. Right side of bridge: Traces of benthic

	filamentous algae was observed. A light amount pollen was observed on the surface. Otherwise area was clean and clear. Left side of the bridge: Traces of benthic filamentous algae was observed. Traces of curly leaf pondweed were also observed.
Secchi: 6’	Sailboat Cove: Traces of benthic filamentous was observed. Traces of rooted and floating fragments of curly leaf pondweed were observed.
Water Level: 499.6	Outlet Cove: A heavy amount of tree debris was observed. Otherwise area looked clean and clear.
	Midvale Launch: Clean and clear.
Fecal Sample: NA	Island Beach: Dock area: Trace amounts of rooted curly leaf pondweed was observed. Beach area looked clean and clear.
WILDWOOD LAKE	Park: Traces of benthic filamentous algae was observed along the shoreline. Traces of leaf litter were also observed.
Secchi: 5.5’	Dam: Trace amounts of benthic filamentous algae was observed along the shoreline.
Water Level: 499.5	Launch: Traces of benthic filamentous algae was observed.

NOTES:

1.

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Solitude Lake Management
DATE: 5/15/17
INSPECTION DATE: 5/15/17

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 10:00 AM)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	15.2	7.75
2’	15.2	7.54
4’	15.2	7.55
6’	15.2	7.55
8’	15.1	7.49
10’	15.1	7.49
12’	15.1	7.28
13’	15.0	3.90

BIRCHWOOD LAKE	Outlet Cove: Heavy amount of tree debris was observed. Dense amount of tree pollen was observed on the surface.
Secchi: 5.5’	Inside Swim Lane: Tree pollen was observed accumulating along the shoreline. Open water was clean and clear.
Aeration: ON	Outside Swim Lane: Trace amounts of bass weed were observed along the shoreline. Trace to sparse amounts of tree debris was observed.
Fecal Sample: NA	Beach: Clean and clear.
SUNSET LAKE	Launch: Water appears to be turbid. A heavy amount of tree pollen was observed on the surface. Sparse amounts of leaf litter were observed along the shoreline. Water appeared to be turbid.
Secchi: 3’est	Outlet: Trace to sparse amounts of floating curly-leaf pondweed was observed accumulating along the shoreline. Water appeared to be turbid.
	Sunset Road Cove: Trace to sparse patches of tree debris mixed in with tree pollen was observed in the open water. Otherwise area was clean and clear
	Inlet Cove: Trace to sparse sized patches of tree debris mixed in with tree pollen observed on the surface. 2’ x 2’

	sized patches of spatterdock were observed near the island.
CRYSTAL LAKE	Birchwood Outlet: Sparse amounts of filamentous algae were observed along the shoreline. Traces of rooted bass weed were observed. Moderate amounts of benthic filamentous was observed starting to top out at the surface in 2 feet out from the shoreline.
	Lake Shore Road Shoreline: Heavy amounts of tree pollen were observed was observed extending 2 feet out from the shoreline. Sparse amounts of benthic filamentous algae were observed. A dense amount of leaf litter was also observed.
Secchi: 4.5'est	Crystal Outlet: Sparse to moderate amounts of benthic filamentous algae was observed directly in front of the outlet. Open water looked clean and clear.
OLIVE POND **Dissolved Oxygen: 5.83 mg/L.**	Secchi: 3'est A light amount of tree pollen was observed on the surface along the shorelines. Water appeared to be turbid. Otherwise area was clean and clear.
SHADOW LAKE Aeration: ON **Dissolved Oxygen: 5.67 mg/L.**	Secchi: 5' A light amount of tree pollen was observed on the surface and along the shorelines. Traces of rooted and floating curly leaf were observed. Area was clean and clear.
COVE POND **Dissolved Oxygen: 7.18 mg/L.**	Secchi: 4'est Heavy amount of tree pollen was observed along the western shoreline. Water was slightly turbid.
GRUNDEN'S POND **Dissolved Oxygen: 11.05 mg/L.**	Secchi: 4'est Six sparse sized patches of filamentous algae were observed in the open water. Sparse to moderate amounts of filamentous algae were observed accumulating along the eastern shoreline. Sparse to moderate amounts of benthic filamentous algae was observed extending 2 feet out from the shoreline. Sparse amounts of Ludwiga species was observed along the main shoreline.
MOUNTAIN LAKE	Cove End: Sparse amounts of benthic filamentous algae were observed along the western shoreline. A heavy amount of tree pollen was observed along the eastern shoreline. Right side of bridge: Traces of benthic filamentous algae were observed was observed topping out at the surface along the shoreline. A light amount of tree pollen was observed. Left side of bridge: Sparse amounts of benthic filamentous algae were observed along the western shoreline. Traces of benthic filamentous algae were located along the eastern shoreline. A light amount of tree pollen was observed on the surface.
Secchi: 6'	Sailboat Cove: Clean and clear.

Water Level: 499.6	Outlet Cove: 4’ x 2’ patch of benthic filamentous algae was observed in the open water, near the western shoreline. Otherwise the area was clean and clear.
	Midvale Launch: A heavy amount of leaf litter was observed. Area was clean and clear.
Fecal Sample: NA	Island Beach: Trace to sparse amounts of benthic filamentous algae was observed along the dock area. Island Beach was clean and clear.
WILDWOOD LAKE	Park: Sparse amounts of benthic filamentous algae were observed. No signs of plant growth were observed.
Secchi: 4.5’est	Dam: Trace to sparse amounts of benthic filamentous algae was observed along the shoreline. Water appeared to be turbid.
Water Level: 499.6	Launch: Sparse amounts of filamentous algae were observed along the main shoreline. Traces of benthic filamentous algae were also observed.

NOTES:

1. **A survey of the canal was performed resulting in no signs of plant growth. Sparse to moderate amounts of benthic filamentous algae were observed. Trace amounts of filamentous algae was observed along the shorelines. A light amount of tree pollen was observed on the surface.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Solitude Lake Management
DATE: 5/22/17
INSPECTION DATE: 5/22/17

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 9:40AM)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	19.9	6.91
2’	19.9	6.88
4’	19.9	6.88
6’	19.9	6.86
8’	19.9	6.88
10’	19.9	6.87
12’	19.9	6.45
13’	19.8	1.91

BIRCHWOOD LAKE	Outlet Cove: Sparse amounts of bass weed were observed. A heavy amount of leaf litter was observed along the main shoreline. Otherwise area was clean and clear.
Secchi: 6’	Inside Swim Lane: Clean and clear.
Aeration: ON	Outside Swim Lane: Trace amounts of curly-leaf pondweed and bass weed were observed. A dense amount of leaf litter was also observed.
Fecal Sample: 10:08 am	Beach: Floating fragments of curly-leaf pondweed was observed. Traces of benthic filamentous algae were observed. Otherwise area was clean and clear.
SUNSET LAKE	Launch: Trace to sparse amounts of leafy pondweed was washed up along the main shoreline. Traces of benthic filamentous algae were observed.
Secchi: 5’	Outlet: Sparse amounts of benthic filamentous algae starting to top out at the surface. Traces of rooted and floating curly-leaf pondweed were observed. Trace amounts of leafy pondweed was observed along the shoreline. Open water looked clean and clear.
	Sunset Road Cove: Floating stems of curly-leaf pondweed and leafy pondweed was observed. Heavy leaf litter was also

	observed along the shorelines. A trace sized patch of lilies were observed along the eastern shoreline. Otherwise the area is clean and clear.
	Inlet Cove: Sparse to moderate amounts of floating filamentous algae was observed near the island. Sparse amounts of filamentous algae were also observed along the shorelines.
CRYSTAL LAKE	Birchwood Outlet: Filamentous algae was observed extending 1 foot out from the shoreline Traces of the benthic filamentous algae was observed. Trace to sparse amounts of bass weed was also observed. Two 1'x1' patches of lilies were observed.
	Lake Shore Road Shoreline: Sparse amounts of benthic filamentous algae were observed. Traces of rooted bass weed were observed. A heavy amount of leaf litter was observed along the main shoreline.
Secchi: 5.5'	Crystal Outlet: Sparse to moderate amounts of benthic filamentous algae starting to top out at the surface. One patch of filamentous algae (1'x1') was observed along the eastern shoreline.
OLIVE POND **Dissolved Oxygen: 3.95 mg/L.**	Secchi: 4'est Water appeared to be turbid. A light amount of pollen was observed on the surface. A sparse amount of leaf litter was observed along the shoreline. Otherwise area was clean and clear.
SHADOW LAKE Aeration: ON **Dissolved Oxygen: 2.95 mg/L.**	Secchi: 5'est Clean and clear.
COVE POND **Dissolved Oxygen: 5.57 mg/L.**	Secchi: 4'est Water appears to be slightly turbid. A 4'x4' sized patch of lilies were observed along the western shoreline. Otherwise area was clean and clear.
GRUNDEN'S POND **Dissolved Oxygen: 6.85 mg/L.**	Secchi: 4'est A small patch, approximately 1'x1' in size, was observed along the northern shoreline. Sparse amounts of exposed Ludwiga species was observed along the main shoreline. Area looks clean and clear.
MOUNTAIN LAKE	Cove End: Filamentous algae was observed accumulating along the main shorelines. Small patches (2'x2') of filamentous algae were observed in the open water. Right side of bridge: Sparse amounts of filamentous algae were

	observed extending 1 foot out from the eastern shoreline. Two to three small patches of floating filamentous algae was observed in the open water. Left side of bridge: Traces of benthic filamentous algae was starting to top out at the surface. Sparse amounts of filamentous algae were observed along the main shorelines. Traces of rooted bass weed were also observed.
Secchi: 6’	Sailboat Cove: Traces of benthic filamentous algae was observed. Area was clean and clear.
Water Level: 499.3	Outlet Cove: Sparse to moderate amounts of benthic filamentous algae were located along the western shoreline.
	Midvale Launch: Sparse amounts of leaf litter were observed along the shorelines. Area was clean and clear.
Fecal Sample: 11:52 am	Island Beach: Dock area: Trace to sparse amounts of benthic filamentous was observed. Island beach was clean and clear.
WILDWOOD LAKE	Park: Floating filamentous algae was observed extending 2 to 4 feet out from the western shoreline. Sparse amounts of benthic filamentous algae were observed along the main shoreline.
Secchi: 6’	Dam: Sparse amounts of filamentous algae were observed along the main shoreline.
Water Level: 499.3	Launch: Moderate sized patches of filamentous algae were observed accumulating along the western shoreline. Small scattered patches of filamentous algae were observed within the open water.

NOTES:

1. **Fecal coliform samples were collected today. Results to follow.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Solitude Lake Management
DATE: 5/30/17
INSPECTION DATE: 5/30/17

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 10:30 AM)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	18.6	6.39
2’	18.6	6.34
4’	18.6	6.25
6’	18.6	6.25
8’	18.5	6.03
10’	18.5	5.90
12’	18.5	5.73
13’	18.4	1.74

BIRCHWOOD LAKE	Outlet Cove: Moderate amounts of leaf litter were observed along the shorelines. Trace sized patches of white water lilies were observed. Otherwise area was clean and clear.
Secchi: 6.5’	Inside Swim Lane: Clean and clear.
Aeration: ON	Outside Swim Lane: Trace amounts of white water lilies were observed along the shoreline. Trace to sparse amounts of rooted bass weed was observed. A heavy amount of leaf litter was also observed.
Fecal Sample: 10:43am	Beach: Clean and clear.
SUNSET LAKE	Launch: Trace to sparse amounts of floating pondweed species was observed along the main shoreline. Small scattered patches of white lilies were observed in the open water. A light amount of tree pollen was observed on the surface. Trace amounts of duckweed were also observed along the main shoreline.
Secchi: 5’est	Outlet: Trace amounts of filamentous algae were concentrated along the shoreline. Traces of creeping bladderwort and pondweed species were also observed.
	Sunset Road Cove: A moderate sized patch of white lilies was observed along the eastern shoreline. Tree pollen was

	observed on the surface.
	Inlet Cove: Tree pollen was observed to be accumulating along the shorelines of the inlet. Scattered sparse sized patches of filamentous algae were observed around the island.
CRYSTAL LAKE	Birchwood Outlet: Filamentous algae was observed extending 2 to 4 feet out from the shoreline. Moderate to dense amounts of benthic filamentous algae was observed along the main shoreline. A 4 x 4 foot patch of white lilies was observed. Sparse amounts of rooted bass weed were also observed.
	Lake Shore Road Shoreline: Moderate amounts of benthic filamentous algae were observed along the shorelines. A heavy amount of tree debris was observed along the shorelines. Traces of floating pondweed species and bass weed were also observed.
Secchi: 6’	Crystal Outlet: Moderate amounts of benthic filamentous algae were observed. A 5’x 5’ patch of filamentous algae was observed in the open water. A 4’ x 4’ patch of filamentous algae was observed along the main shoreline.
OLIVE POND **Dissolved Oxygen: 5.36 mg/L.**	Secchi: 3’est Water appeared to be turbid with a light amount of pollen on surface. Otherwise area was clean and clear.
SHADOW LAKE Aeration: ON **Dissolved Oxygen: 5.03 mg/L.**	Secchi: 4’est A light amount of tree pollen was observed on the surface. Area was clean and clear.
COVE POND **Dissolved Oxygen: 4.00 mg/L.**	Secchi: 4’est Water appeared to be turbid with a light amount of pollen on surface. A 4’ x 4’ patch of exposed white lilies were observed along the western shoreline.
GRUNDEN’S POND **Dissolved Oxygen: 6.88 mg/L.**	Secchi: 3’est Trace to sparse amounts of benthic filamentous algae was observed. Water appeared to be turbid with a light amount of pollen on surface. Exposed Ludwiga species was observed along the main shoreline.
MOUNTAIN LAKE	Cove End: A light amount of tree pollen was observed on the surface. A 7’x7’ patch of filamentous algae was observed in the open water. Right side of the bridge: Sparse amounts of filamentous algae were observed extending approximately 1 to 2 feet out from the eastern shoreline. Left side of the bridge: Trace amounts of benthic filamentous algae was observed along the shoreline with heavy amounts of leaf

	litter.
Secchi: 6’est	Sailboat Cove: Traces of benthic filamentous algae was observed. Otherwise area was clean and clear.
Water Level: 499.5	Outlet Cove: Sparse amounts of benthic filamentous algae were observed along the western shoreline. A heavy amount of leaf litter was also observed.
	Midvale Launch: A heavy amount of tree debris was observed along the main shorelines. Traces of bass weed were observed. Area was clean and clear.
Fecal Sample: 12:32 pm	Island Beach: Clean and clear.
WILDWOOD LAKE	Park: Area appeared to be very turbid. A light amount of pollen was observed on the surface. Otherwise area was clear of algae and plant growth.
Secchi: 3.5’est	Dam: Water appeared to be turbid. Area was clear of algae and plant growth.
Water Level: 499.3	Launch: Water was heavily turbid at the launch. Area was clear of algae and plant growth.

NOTES:

1. **A visual survey of the canal was conducted from the shoreline, results indicated no plant growth was observed. Another survey of the canal (via kayak) will be conducted next week.**
2. **Fecal coliform samples were collected today. Results to follow.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Solitude Lake Management
DATE: 6/5/17
INSPECTION DATE: 6/5/17

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 9:05AM)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	19.1	7.32
2’	19.1	7.32
4’	19.1	7.31
6’	19.1	7.29
8’	19.1	7.22
10’	19.0	7.30
12’	19.0	6.99
13’		

BIRCHWOOD LAKE	Outlet Cove: Trace plants (Ribbon-leaf pondweed, white lily, watershield, bassweed, spatterdock) and benthic filamentous (mostly covering other plants) observed. Cattails observed at the corner.
Secchi: 8.5’	Inside Swim Lane: Sparse benthic filamentous algae observed along with trace white lilies.
Aeration: Swim lanes On, Open Water Off	Outside Swim Lane: Trace bassweed, ribbon-leaf pondweed, white lily, spatterdock, creeping bladderwort, and watershield observed.
Fecal Sample: 09:05 am	Beach: Trace to sparse benthic filamentous algae observed on bottom. Water lilies opposite of beach are ready for treatment.
SUNSET LAKE	Launch: Trace to sparse benthic filamentous algae observed. Scattered trace patches of white lilies observed in the open water. Possible filamentous algae coming in? Might require treatment soon.
Secchi: 5.0’ est.	Outlet: Trace to sparse benthic filamentous algae observed. Trace small duckweed and creeping bladderwort observed.
	Sunset Road Cove: Trace benthic filamentous algae observed. Trace scattered patches of white lily.

	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: Two patches of white lilies along shoreline. One 20' patch of lilies in open water and developed bed of lilies at the tip of island. Sparse benthic filamentous algae and bassweed along shoreline.
	Lake Shore Road Shoreline: Trace to sparse benthic filamentous algae observed. Trace bassweed observed.
Secchi: 6.0' est.	Crystal Outlet: Three patches (~20') of floating filamentous algae to the left, in and around the docks. Two patches (smaller) of floating filamentous algae along shoreline. Trace to sparse benthic filamentous algae observed. Treatment needed.
OLIVE POND **Dissolved Oxygen: 7.44 mg/L.**	Secchi: 4.0' est. Tree debris on surface, but otherwise pond looks good.
SHADOW LAKE Aeration: On **Dissolved Oxygen: 8.91 mg/L.**	Secchi: 3.5' est. Trace benthic filamentous algae, but otherwise the surface looks good. Trace small duckweed observed. Tree debris observed.
COVE POND **Dissolved Oxygen: 3.75 mg/L.**	Secchi: 3.5' est. Trace benthic filamentous algae observed. Trace curly-leaf pondweed observed. Established bed of water lilies on opposite shoreline.
GRUNDEN'S POND **Dissolved Oxygen: 12.33 mg/L.**	Secchi: 3.5' est. Benthic filamentous algae covers the bottom. Scattered patches of floating filamentous algae observed throughout the basin, but more common at the Boulevard end of the lake. Creeping water primrose is becoming a nuisance, and needs treatment. Algae treatment needed as well.
MOUNTAIN LAKE	Cove End: Scattered floating filamentous algae to the right. To the left, more established benthic and floating filamentous algae observed. Requires treatment.
Secchi: 10.5' est.	Sailboat Cove: Cove is 30 to 40% covered with floating mats of filamentous algae, which is accumulating to the right. Trace to sparse benthic filamentous algae observed. Treatment required.
Water Level: 499.4	Outlet Cove: Trace to sparse benthic filamentous algae observed.
	Midvale Launch: Trace to sparse benthic filamentous algae observed. Trace bassweed observed.
Fecal Sample: 11:33 am	Island Beach: Trace to sparse benthic filamentous algae observed in and around the dock. Boat moorings and beach

	are clean. Waterfowl fecal matter in the water at the beach (but the beach is clear). Could be from pair of swans at bridge? Flock of Canada geese (~12-15) observed on lawn to right of launch.
WILDWOOD LAKE	Park: Trace benthic filamentous algae observed. Trace Eurasian water milfoil observed. Surface looks good.
Secchi: 4.5' est.	Dam: Trace to sparse benthic filamentous algae observed. Surface looks good, but water is turbid.
Water Level: 499.4	Launch: Trace to sparse benthic filamentous algae observed.

NOTES:

1. **Open water Aeration at Birchwood is off and needs to be turned on ASAP.**
2. **Water Lilies opposite beach ready for treatment.**
3. **Crystal Lake needs an algae treatment.**
4. **Grunden's Pond needs an algae treatment and creeping water primrose treatment.**
5. **Sail boat Cove and Cove end of Mountain Lake needs algaecide treatment.**
6. **Canal water is turbid, but no vascular plant growth observed.**
7. **Water Chemistry Samples collected at all 9 lakes (Calcium at Mt Lake).**
8. **Algae samples collected at all 9 lakes. Results to follow.**
9. **Fecal Results to follow as well.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Solitude Lake Management
DATE: 6/12/17
INSPECTION DATE: 6/12/17

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 10:38am)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	22.9	7.48
2’	21.5	7.60
4’	21.4	7.56
6’	21.5	7.56
8’	20.4	7.03
10’	19.0	8.28
12’	18.7	6.27
13’		

BIRCHWOOD LAKE	Outlet Cove: Trace sized patches of white lilies were observed. Trace amounts of tree debris was observed along the shoreline.
Secchi: 11’	Inside Swim Lane: Trace amounts of tree debris observed within the swim lanes.
Aeration: ON	Outside Swim Lane: Small patches of spatterdock, white lilies and benthic filamentous algae were observed along the shoreline.
Fecal Sample: 2:17pm	Beach: Traces of benthic filamentous algae was observed.
SUNSET LAKE	Launch: Traces of benthic filamentous algae was observed.. Traces of filamentous algae and white lilies were observed along the shoreline.
Secchi: 5.0’ est.	Outlet: Traces of benthic filamentous algae were observed. Traces of floating filamentous algae were observed along shoreline. Small patches of white lilies were observed in the center of the lake.
	Sunset Road Cove: Traces of benthic filamentous algae were observed along the shoreline. Trace sized patches of white lilies were observed along the main shoreline.

	Inlet Cove: Small patches of spatterdock and white lilies were observed. Traces of benthic filamentous algae and floating filamentous algae observed along the shoreline.
CRYSTAL LAKE	Birchwood Outlet: Sparse amounts of benthic filamentous algae was observed topping out at the surface along the main shoreline. Sparse amounts of bass weed was observed along the shoreline. Trace amounts of white lilies were also observed.
	Lake Shore Road Shoreline: Trace amounts of benthic filamentous algae and floating filamentous algae were observed along the shoreline. Trace sized patches of white lilies were observed in the center of the lake.
Secchi: 5.0'est.	Crystal Outlet: Traces of benthic filamentous algae were observed along the main shoreline. Tree debris was also observed along the shoreline.
OLIVE POND **Dissolved Oxygen:** 7.80 **mg/L.**	Secchi: 3'est A heavy amount of tree debris was observed along the main shoreline. Water appeared to be turbid.
SHADOW LAKE Aeration: ON **Dissolved Oxygen:** 7.58 **mg/L.**	Secchi: 3'est Heavy amount of leaf litter was observed along the shorelines. Trace amounts of floating filamentous algae was also observed along the main shorelines. Water looked turbid.
COVE POND **Dissolved Oxygen:** 7.34 **mg/L.**	Secchi: 3'est Trace amounts of duckweed was observed along the main shoreline. Trace sized patches of white lilies were observed along the shorelines. A heavy amount of leaf litter was observed along main shoreline and center of the pond. Water looked turbid.
GRUNDEN'S POND **Dissolved Oxygen:** 7.10 **mg/L.**	Secchi: 3'est Traces of benthic filamentous algae and floating filamentous algae were observed along the shoreline. Water appeared to be turbid.
MOUNTAIN LAKE	Cove End: Trace amounts of benthic filamentous algae, floating filamentous algae and bass weed were observed along the shoreline. Right side of bridge: Traces of filamentous algae were observed along the main shoreline. Left side of bridge: Sparse amounts of filamentous algae were observed along the main shoreline.
Secchi: 4.0' est.	Sailboat Cove: Trace amounts of benthic filamentous algae and leafy pondweed were observed along the shoreline. Leaf litter was observed floating on the surface along the shoreline.

Water Level: 499.4	Outlet Cove: Trace benthic filamentous algae observed along shoreline.
	Midvale Launch: Traces of floating filamentous algae were observed along the main shoreline.
Fecal Sample: 01:38 pm	Island Beach: Trace amounts of benthic filamentous algae were observed along the shoreline. Traces floating filamentous algae observed near the bridge leading to the beach.
WILDWOOD LAKE	Park: Traces of benthic filamentous algae and floating filamentous algae were observed along the main shoreline.
Secchi: 6.0' est.	Dam: Traces of benthic filamentous algae and floating filamentous algae were observed along the shoreline.
Water Level: 499.3	Launch: Sparse amounts of benthic filamentous algae was observed along the main shoreline and topping out at the surface in some areas.

NOTES:

1. **Fecal coliform samples were collected today. Results to follow.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Solitude Lake Management
DATE: 06/19/17
INSPECTION DATE: 06/19/17

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 8:00 am)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	22.8	4.20
2’	22.8	4.16
4’	22.8	4.09
6’	22.8	3.97
8’	22.5	3.30
10’	22.5	2.95
12’	21.8	1.12
13’		

BIRCHWOOD LAKE	Outlet Cove: Small patches of white lilies were observed. Traces of creeping bladderwort were observed. Sparse amounts of bass weed were observed along the shoreline. Trace amounts of tree debris was observed.
Secchi: 6.5’	Inside Swim Lane: A light amount of tree pollen was observed on the surface. Otherwise area was clean and clear.
Aeration: ON	Outside Swim Lane: Traces of curly-leaf pondweed were observed. Trace sized patches of white lilies and watershield were observed along the shoreline.
Fecal Sample: 8:15 am	Beach: Clean and clear.
SUNSET LAKE	Launch: Sparse to moderate amounts of creeping bladderwort were observed along the main shoreline. Trace to sparse amounts of benthic filamentous algae was observed topping out at the surface. Scattered patches, approximately six inches in diameter, of filamentous algae was observed throughout the open water.
Secchi: 5.5’est	Outlet: Sparse amounts of filamentous algae were observed along the shoreline. Trace to sparse amounts of leafy pondweed and creeping bladderwort were observed accumulating along the main shoreline. Water was slightly turbid.

	Sunset Road Cove: Traces of benthic filamentous algae was observed. 2 x 2’ sized patches of white lilies were observed.
	Inlet Cove: Dense amounts of white lilies were observed. Sparse amounts of filamentous algae were observed along the shoreline. Water was turbid.
CRYSTAL LAKE	Birchwood Outlet: Trace to sparse amounts of filamentous algae was observed along the shoreline. Sparse amounts of bass weed were observed extending three feet out from the shoreline. Two patches, approximately 5 x 2’ of white lilies were observed. Open water looked clean and clear.
	Lake Shore Road Shoreline: Sparse amounts of bass weed were observed. A light amount of tree pollen was observed on the surface. A heavy amount of tree debris was observed along the shorelines.
Secchi: 6’	Crystal Outlet: Traces of floating bass weed were observed this week. Otherwise area was clean and clear.
OLIVE POND **Dissolved Oxygen: 5.34 mg/L.**	Secchi: 3.5’est Traces of watermeal and small duckweed were observed along the main shoreline. Trace amounts of tree pollen were observed on the surface. Water appeared to be turbid.
SHADOW LAKE Aeration: ON **Dissolved Oxygen: 5.43 mg/L.**	Secchi: 4’est A light amount of tree pollen was observed on the surface. Trace amounts of watermeal were observed accumulating along the shoreline. A mixture of both tree pollen and watermeal were observed accumulating along the northern shoreline.
COVE POND **Dissolved Oxygen: 6.09 mg/L.**	Secchi: 2’est Water was very turbid. Traces of watermeal and tree pollen were observed along the shoreline. A moderate sized patch of white lilies were observed along the western shoreline.
GRUNDEN’S POND **Dissolved Oxygen: 5.45 mg/L.**	Secchi: 2’est Sparse amounts of leafy pondweed were observed along the shoreline. Moderate amounts of exposed Ludwiga species were observed along the main shoreline. Sparse to moderate sized patches of leafy pondweed and benthic filamentous algae was observed in the center of the pond.
MOUNTAIN LAKE	Cove End: Traces of creeping bladderwort were observed along the main shoreline. Open water looked clean and clear. Right side of bridge: Traces of rooted bass weed were observed. Dense amounts of leaf litter were also observed. Left side of bridge: Traces of rooted bass weed were

	observed. Trace to sparse amounts of benthic filamentous algae was observed topping out at the surface along the eastern shoreline.
Secchi: 6’	Sailboat Cove: Clean and clear.
Water Level: 499.4	Outlet Cove: A 10 x 10’ patch of benthic filamentous algae was observed topping out at the surface. A heavy amount of leaf litter was also observed.
	Midvale Launch: A small patch of bass weed was observed 30 feet away from the launch. Otherwise area was clean and clear.
Fecal Sample: 9:54 am	Island Beach: Clean and clear.
WILDWOOD LAKE	Park: Scattered sparse sized patches of filamentous algae were observed throughout the open water and along the main shoreline.
Secchi: 4’est	Dam: Trace to sparse amounts of filamentous algae was observed along the shoreline.
Water Level: 499.3	Launch: Trace to sparse amounts of filamentous algae was observed along the main shoreline. Moderate amounts of filamentous algae were observed accumulating along the western shoreline.

NOTES:

1. **Fecal coliform samples were collect today. Results to follow.**
2. **A survey of the canal was performed via kayak. Traces of both rooted and floating spiny hornwort was observed. Traces of floating bass weed were also observed. Various densities (moderate to dense) of benthic filamentous algae and floating filamentous algae was observed throughout the canal. Water was very turbid.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Solitude Lake Management
DATE: 6/26/17
INSPECTION DATE: 6/26/17

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time 9:42)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	24.3	3.63
2’	24.3	3.61
4’	24.3	3.61
6’	24.2	3.56
8’	24.2	3.46
10’	24.1	2.42
12’		
13’		

BIRCHWOOD LAKE	Outlet Cove: Trace amounts of bassweed and trace to sparse amounts of lilies were observed. A biofilm was present on the surface.
Secchi: 5.75’	Inside Swim Lane: A trace amount of lilies was observed near the shoreline. A biofilm was present on the surface.
Aeration: ON	Outside Swim Lane: A trace amount of lilies was observed along dock and shorelines. A biofilm was present on the surface.
Fecal Sample: Collected, 11:18	Beach: No plants or algae were observed at this time. A biofilm was present on the surface.
SUNSET LAKE	Launch: A trace to sparse amount of lilies was seen in patches across the entire lake.
Secchi: 5’ est.	Outlet: A trace to sparse amount of lilies was observed in patches.
	Sunset Road Cove: A trace to sparse amount of lilies was observed in patches near the shoreline.
	Inlet Cove: A sparse to moderate amount of lilies was observed.

CRYSTAL LAKE	Birchwood Outlet: A trace amount of floating filamentous algae was observed near the shoreline. Sparse amounts of lilies and bassweed were also observed growing near the shoreline.
	Lake Shore Road Shoreline: A trace amount of floating filamentous algae was present near the shoreline. Trace to sparse amounts of bassweed were observed around the dock. Sparse to moderate patch of lilies observed near the island.
Secchi: 6' est.	Crystal Outlet: No plants or algae were observed at this time. A biofilm was present on the surface.
OLIVE POND **Dissolved Oxygen: 3.90 mg/L.**	Secchi: 4' est. No plants or algae were observed at this time. A biofilm and tree debris were present on the surface.
SHADOW LAKE Aeration: ON **Dissolved Oxygen: 4.98 mg/L.**	Secchi: 4' est. Sparse to moderate amounts of watermeal were observed being windblown into the far shoreline.
COVE POND **Dissolved Oxygen: 4.47 mg/L.**	Secchi: 3' est. A trace to sparse amount of watermeal was seen collecting in shoreline areas. A sparse to moderate amount of lilies was observed on the far shoreline.
GRUNDEN'S POND **Dissolved Oxygen: 7.61 mg/L.**	Secchi: 3' est. A sparse amount of floating filamentous algae was observed in the Cove Pond half of the basin. The algae was likely holding onto dying plant stems.
MOUNTAIN LAKE	Cove End: Left- A trace amount of floating filamentous algae was observed near the shoreline. Right- Trace amounts of bassweed and floating filamentous algae were observed near the shoreline.
Secchi: 6.5'	Sailboat Cove: A trace to sparse amount of pondweed was seen throughout the cove, some patches nearing surface. A trace amount of bassweed was also present in the cove, mostly near the shoreline.
Water Level: 499.4	Outlet Cove: A trace amount of benthic filamentous algae was observed near the shoreline.
	Midvale Launch: A sparse amount of bassweed was observed in patches along the shoreline of the lake. Patches were 5-8 feet in diameter and were about 10 feet from shore.

Fecal Sample: Collected, 11:08	Island Beach: Trace amounts of bassweed and benthic filamentous algae were observed arounf the dock area. A trace to sparse amount of pondweed was also observed around the dock, with some patches nearing the surface.
WILDWOOD LAKE	Park: A trace amount of benthic filamentous algae was observed near the shoreline.
Secchi: 4' est.	Dam: No plants or algae were observed at this time.
Water Level: 499.5	Launch: No plants or algae were observed at this time. The water looked turbid.

NOTES:

1. **Grunden's Pond will need an algae treatment this week.**
2. **Shadow Lake will need a watermeal treatment in the near future, but will need the DO concentration to rise.**
3. **Mountain Lake will likely need a shoreline plant treatment soon.**
4. **DO concentrations were low at most of the basins.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Solitude Lake Management
DATE: 07/03/17
INSPECTION DATE: 07/03/17

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 9:30 AM)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	24.7	3.02
2’	24.7	2.97
4’	24.7	2.94
6’	24.6	2.90
8’	24.6	2.85
10’	24.6	2.76
12’	22.7	0.90
13’		

BIRCHWOOD LAKE	Outlet Cove: Trace to sparse amounts of white water lilies were observed along the shorelines. Traces of curly-leaf pondweed was observed mixed in with the bass weed. Sparse amounts of bass weed were observed. Traces of benthic filamentous algae was also observed. Traces of leaf litter were observed.
Secchi: 5.75’	Inside Swim Lane: Traces of creeping bladderwort was observed. Floating fragments of lilies were observed along the main shoreline. A light amount of tree pollen was observed. Otherwise area was clean and clear.
Aeration: ON	Outside Swim Lane: Trace amounts of white water lilies were observed. Water looked turbid.
Fecal Sample: NA	Beach: Clean and clear.
SUNSET LAKE	Launch: Traces of creeping bladderwort was observed along the main shoreline. Open water was clean and clear.
Secchi: 4.25’est	Outlet: Trace to sparse amounts of benthic filamentous algae was observed starting to top out at the surface.
	Sunset Road Cove: Water was turbid. Small patches (1’x 1’) of white water lilies were observed throughout the basin.

	Inlet Cove: Moderate amounts of white lilies was observed. Water appeared to be turbid.
CRYSTAL LAKE	Birchwood Outlet: Sparse amounts of bass weed was observed. Three (6'x 6') patches of white lilies were observed at the outlet.
	Lake Shore Road Shoreline: Traces of rooted bass weed was observed. Heavy amounts of leaf litter was observed along the main shoreline.
Secchi: 5.5'	Crystal Outlet: Clean and clear.
OLIVE POND **Dissolved Oxygen: 6.17 mg/L.**	Secchi: 3.5'est A mixture of watermeal and tree pollen was observed covering half of the pond.
SHADOW LAKE Aeration: ON **Dissolved Oxygen: 6.21 mg/L.**	Secchi: 3'est Watermeal and tree pollen was observed accumulating in the northern half of the lake. Traces of curly-leaf pondweed were also observed. Water was turbid.
COVE POND **Dissolved Oxygen: 6.95 mg/L.**	Secchi: 2.5'est Water was turbid throughout the pond. Traces of small duckweed and watermeal were observed accumulating along the main shoreline.
GRUNDEN'S POND **Dissolved Oxygen: 9.32 mg/L.**	Secchi: 2'est Sparse to moderate amounts of filamentous algae was observed throughout the center of the pond. Moderate amounts of filamentous algae was observed accumulating along the northern shoreline. Traces of benthic filamentous algae was observed. Traces of rooted leafy pondweed were also observed. Water level appeared to be low. Water was turbid.
MOUNTAIN LAKE	Cove End: Sparse amounts of creeping bladderwort was observed along the main shoreline. Trace to sparse amounts of filamentous algae was observed accumulating along the eastern shoreline. Right side of bridge: Moderate amounts of filamentous algae was observed along the eastern shoreline. Traces of bass weed were also observed. Left side of the bridge: Moderate to dense amounts of filamentous algae was observed along the western shoreline, extending into the open water.
Secchi: 6'	Sailboat Cove: Sparse amounts of brittle naiad was observed. Traces of rooted leafy pondweed were also observed. Open water was clear.
Water Level: 499.4	Outlet Cove: Heavy amounts of leaf litter was observed.

	Area was clear of plant growth and algae.
	Midvale Launch: Clean and clear.
Fecal Sample: NA	Island Beach: Dock area: Moderate amounts of brittle naiad was observed. Sparse amounts leafy pondweed was also observed. Beach: Clean and clear.
WILDWOOD LAKE	Park: Trace to sparse amounts of benthic filamentous algae was observed. Traces of brittle naiad was observed. Water was very turbid.
Secchi: 4.25'est	Dam: Clean and clear.
Water Level: 499.4	Launch: Trace to sparse amounts of filamentous algae was observed.

NOTES:

1. **No fecal coliform samples were collected today, due to the holiday. Fecal coliform samples will be collected on Wednesday, July 5th.**
2. **Grunden's Pond, Shadow Lake and Olive Pond are scheduled for treatments to be conducted on Wednesday, dependent upon the dissolved oxygen readings and permit regulations.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Solitude Lake Management
DATE: 07/10/17
INSPECTION DATE: 07/10/17

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 10:00AM)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	24.3	2.45
2’	24.3	2.38
4’	24.3	2.39
6’	24.3	2.35
8’	24.3	2.32
10’	24.3	2.30
12’	24.2	2.09
13’		

BIRCHWOOD LAKE	Outlet Cove: Sparse to moderate amounts of rooted bass weed was observed. Traces of creeping bladderwort was observed. Small patches of white lilies along the shoreline.
Secchi: 6.5’	Inside Swim Lane: Clean and clear.
Aeration: ON	Outside Swim Lane: Traces of scattered white lilies was observed. Traces of watershield and creeping bladderwort were also observed.
Fecal Sample: 10:13 am	Beach: Clean and clear.
SUNSET LAKE	Launch: Traces of leafy pondweed were observed along the shoreline. Water was slightly turbid.
Secchi: 3.5’est	Outlet: Traces of creeping bladderwort and leafy pondweed was observed along the main shoreline. Traces of benthic filamentous algae was observed. Water was very turbid.
	Sunset Road Cove: Small scattered patches of white lilies was observed. Water was turbid.
	Inlet Cove: Sparse amounts of benthic filamentous algae was observed. Sparse to moderate amounts of white lilies were also observed throughout the inlet cove. Water was turbid.
CRYSTAL LAKE	Birchwood Outlet: 6’ x 6’ patches of white lilies was observed at the outlet. Trace to sparse amounts of bass weed and benthic filamentous algae was also observed.

	Lake Shore Road Shoreline: Sparse amounts of rooted bass weed was observed. Heavy leaf litter was observed throughout the shoreline area.
Secchi: 5'est	Crystal Outlet: Water looked slightly turbid. Otherwise area was clean and clear.
OLIVE POND **Dissolved Oxygen: 4.51 mg/L.**	Secchi: 2'est Completely covered in watermeal with traces of pollen mixed in on the surface. Water was also very turbid.
SHADOW LAKE Aeration: ON **Dissolved Oxygen: 6.47 mg/L.**	Secchi: 2.5'est Watermeal covered approximately 80% of the lake. Traces of tree pollen was observed on the surface. Traces of curly-leaf pondweed was observed along the shoreline.
COVE POND **Dissolved Oxygen: 4.68 mg/L.**	Secchi: 2.5'est Water is very turbid. No signs of algae or plant growth was observed.
GRUNDEN'S POND **Dissolved Oxygen: 3.38 mg/L.**	Secchi: 3'est Traces of benthic filamentous algae was observed. Water is slightly turbid. Traces of filamentous algae was observed along the northeastern shoreline.
MOUNTAIN LAKE	Cove End: Trace to sparse amounts of creeping bladderwort and leafy pondweed was observed scattered throughout the area. Right side of bridge: Moderate to dense amounts of filamentous algae was observed accumulating along the western shoreline. Left side of the bridge: Moderate amounts of filamentous algae was observed accumulating along the eastern shoreline. The filamentous algae extends approximately 2 – 3 feet out from the shoreline.
Secchi: 6.5'	Sailboat Cove: Sparse to moderate amounts of rooted brittle naiad was observed.
Water Level: 499.6	Outlet Cove: Sparse amounts of leaf litter was observed. Otherwise area was clean and clear.
	Midvale Launch: A light pollen was observed on the surface. Area was clean and clear.
Fecal Sample: 12:15pm	Island Beach: Clean and clear. Dock area: Sparse to moderate amounts of brittle naiad and muskgrass was observed. Traces of leafy pondweed were also observed.
WILDWOOD LAKE	Park: Trace to sparse amounts of brittle naiad was observed. Water was turbid.
Secchi: 3.5'est	Dam: Water was very tubid. Floating fragments of brittle

	naiad were also observed.
Water Level: 499.6	Launch: Water appeared to be turbid. Traces of brittle naiad was observed along the shoreline.

NOTES:

1. **Fecal coliform samples were collected today. Results to follow.**
2. **No signs of plant growth were observed in the canal from the shoreline. However, the water was very turbid. An on-the-water survey will be conducted next week.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Solitude Lake Management
DATE:7/17/17
INSPECTION DATE:7/17/17

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 10:03AM)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	24.8	1.74
2’	24.6	1.43
4’	24.6	1.39
6’	24.4	1.22
8’	24.2	0.19
10’	23.9	0.05
12’		
13’		

BIRCHWOOD LAKE	Outlet Cove: Trace amounts of rooted bass weed was observed near the shoreline. Trace to sparse amounts of lilies was observed near the shoreline. Traces of floating fragments of bladderwort were observed.
Secchi: 4’	Inside Swim Lane: Fragments of floating bladderwort were observed on the surface.
Aeration: ON	Outside Swim Lane: Floating fragments of bladderwort were observed, and trace to sparse amounts of lilies were present.
Fecal Sample: 11:47	Beach: No plant or algae growth was observed at this time.
SUNSET LAKE	Launch: Trace to sparse amounts of lilies were observed growing in patches across the lake.
Secchi: 4’ est.	Outlet: Trace to sparse amounts of lilies were observed growing in patches across the lake.
	Sunset Road Cove: Trace to sparse amounts of lilies were observed near the shoreline.
	Inlet Cove: Sparse to moderate amounts of lilies was present.
CRYSTAL LAKE	Birchwood Outlet: Sparse amounts of lilies and bass weed were observed near the shoreline. In the open water, bass weed appeared to be topping out at the surface.

	Lake Shore Road Shoreline: Trace to sparse amounts of bass weed was observed near the dock. Sparse amounts of spatterdock were observed near the island.
Secchi: 4' est.	Crystal Outlet: No plant or algae growth was observed at this time.
OLIVE POND **Dissolved Oxygen: 6.47 mg/L.**	Secchi: 3' est. Most of the pond is covered in moderate to dense watermeal.
SHADOW LAKE Aeration: ON **Dissolved Oxygen: 8.21 mg/L.**	Secchi: 3' est. Sparse to moderate amounts of watermeal were observed near the shorelines toward Olive Pond. Trace amounts of unicellular algae was observed blown into the shoreline.
COVE POND **Dissolved Oxygen: 4.22 mg/L.**	Secchi: 3' est. Traces of watermeal was observed in the pond. A biofilm was also present.
GRUNDEN'S POND **Dissolved Oxygen: 4.77 mg/L.**	Secchi: 3' est. Traces of floating filamentous algae was observed near the shoreline, brown in color. The pond looks great otherwise.
MOUNTAIN LAKE	Cove End: *Right side of bridge:* Sparse amounts of filamentous algae was seen near the bridge, and trace to sparse amounts of floating filamentous algae was seen around some of the shoreline areas. *Left side of the bridge:* Trace amounts of floating filamentous algae was observed near the shoreline. Most of it was brown to black in color.
Secchi: 6' to bottom	Sailboat Cove: Sparse amounts of pondweed sp. was observed approximately five feet from the shoreline. The plants are near the surface and are holding bladderwort fragments in place. Trace to sparse amounts of bladderwort fragments were observed near the shoreline. Traces of bass weed was observed growing near the shoreline. Trace to sparse amounts of naiad was also observed near the shoreline. Some of the patches looked bleached, while others still looked green.
Water Level: 499.6	Outlet Cove: No plant or algae growth was observed at this time.
	Midvale Launch: Fragments of bass weed and pondweed were observed floating near the shoreline. Sparse amounts of bass weed were observed growing in patches along the shoreline.
Fecal Sample: 11:30	Island Beach: Trace amounts of floating fragments and rooted plants of bass weed was observed floating near the shoreline. Fragments of pondweed sp. was also observed

	near the shoreline. Trace to sparse amounts of naiad was observed near the dock and in the channel.
WILDWOOD LAKE	Park: Sparse amounts of naiad was observed near the shoreline.
Secchi: 4' est., turbid	Dam: No plant or algae growth was observed at this time.
Water Level: 499.4	Launch: Trace to sparse amounts of naiad was observed around the dock and near the canal.

NOTES:

1. **Olive and Shadow need to be treated for watermeal, however, the dissolved oxygen level is still low at Olive Pond.**
2. **Fecal Coliform samples were collected today. Results to follow.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Solitude Lake Management
DATE: 07/31/17
INSPECTION DATE: 07/31/17

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 9:00AM)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	22.9	1.70
2’	22.9	1.60
4’	22.9	1.58
6’	22.9	1.50
8’	22.8	1.47
10’	22.6	0.31
12’		
13’		

BIRCHWOOD LAKE	Outlet Cove: Sparse to moderate amounts of white lilies were observed. Sparse amounts of creeping bladderwort were also observed along the eastern shoreline. A sparse sized patch of rooter bass weed was observed.
Secchi: 6.5’	Inside Swim Lane: Shoreline along cement wall contains traces of rooted white lilies. All swim lanes are clean and clear.
Aeration: ON	Outside Swim Lane: Sparse amounts of white lilies were observed. Sparse amounts of watershield were also observed. A heavy amount of tree pollen was observed accumulating around the lily pads.
Fecal Sample:11:05 am	Beach: Clean and clear.
SUNSET LAKE	Launch: Small patches of white lilies were observed scattered throughout the basin, Traces of creeping bladderwort and pondweed species was observed along the main shoreline.
Secchi: 4.25’	Outlet: Dense amount of tree pollen was observed accumulating along the shoreline. Open water is clean and clear.
	Sunset Road Cove: Water appears to be turbid. Trace to sparse amounts of white lilies were observed.

	Inlet Cove: Moderate amounts of white lilies were observed. Trace to sparse amounts of benthic filamentous algae was also observed. Water level was low.
CRYSTAL LAKE	Birchwood Outlet: Sparse to moderate amounts of bass weed was observed. Two dense patches of white lilies were observed. Patches (10' x 10') of benthic filamentous algae was observed topping out at the surface, approximately 50 feet from the shoreline.
	Lake Shore Road Shoreline: A heavy amount of leaf litter was observed along the main shoreline. Traces of floating bass weed were also observed. Otherwise area is clean and clear.
Secchi: 5'est	Crystal Outlet: A light amount of pollen was observed on the surface. Water is slightly turbid. Water level is low.
OLIVE POND **Dissolved Oxygen: 5.18 mg/L.**	Secchi: 1.5'est Unicellular algae was observed throughout the pond. Dense amounts of watermeal cover 90% of the surface. Water is very turbid and green.
SHADOW LAKE Aeration: ON **Dissolved Oxygen: 7.99 mg/L.**	Secchi: 1.5'est Unicellular algae was observed within the water column. Moderate amounts of watermeal was observed along the main shoreline and in the open water.
COVE POND **Dissolved Oxygen: 7.07 mg/L.**	Secchi: 3'est Sparse to moderate amounts of unicellular algae was observed accumulating along the eastern shoreline. Water looks turbid.
GRUNDEN'S POND **Dissolved Oxygen: mg/L.**	Secchi: 3'est Sparse amounts of filamentous algae were observed along the eastern shoreline. Traces of benthic filamentous algae were observed scattered along the main shoreline.
MOUNTAIN LAKE	Cove End: Four sparse sized patches of creeping bladderwort was observed in the open water. Right side of bridge: Clean and clear. Left side of the bridge: A sparse sized patch of filamentous algae was observed along the eastern shoreline.
Secchi: 6'	Sailboat Cove: A moderate amount of naiad was observed along the main shoreline.
Water Level: 499.4	Outlet Cove: A heavy amount of leaf litter was observed. Clean and clear.
	Midvale Launch: Clean and clear.
Fecal Sample: 10:43 am	Island Beach: Clean and clear.

	Dock area: Moderate amount of rooted naiad was observed.
WILDWOOD LAKE	Park: Moderate amounts of brittle naiad were observed.
Secchi: 4'est	Dam: Water was very turbid. No signs of plant or algae growth.
Water Level: 499.4	Launch: Traces of filamentous algae was observed along the shoreline. Water was turbid.

NOTES:

1. **Fecal coliform samples were collected today. Results to follow.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Solitude Lake Management
DATE: 08/07/17
INSPECTION DATE: 08/07/17

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 10:15AM)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	23.3	1.62
2’	23.3	1.53
4’	23.3	1.52
6’	23.3	1.51
8’	23.3	1.55
10’	23.3	1.55
12’	23.3	1.56
13’		

BIRCHWOOD LAKE	Outlet Cove: Sparse amounts of white lilies were observed. Sparse amounts of rooted bass weed were observed along the main shoreline. Traces of creeping bladderwort were also observed.
Secchi: 5’	Inside Swim Lane: Clean and clear.
Aeration: ON	Outside Swim Lane: Sparse amounts of white lilies and watershield was observed. Sparse amounts of creeping bladderwort were also observed.
Fecal Sample: 10:00AM	Beach: Clean and clear.
SUNSET LAKE	Launch: Sparse amounts of creeping bladderwort was observed. Small patches of white lilies were observed throughout the open water.
Secchi: 4’est	Outlet: Traces of creeping bladderwort was observed along the shoreline. Open water was clean and clear.
	Sunset Road Cove: Water was turbid. Trace sized patches of white lilies were observed.
	Inlet Cove: Sparse amounts of benthic filamentous algae was observed topping out at the surface. Moderate sized patches of white lilies were observed.
CRYSTAL LAKE	Birchwood Outlet: Sparse amounts of rooted bass weed was observed. Moderate sized patches (8’x 8’) of white lilies was

	observed.
	Lake Shore Road Shoreline: Sparse amounts of bass weed was observed. Heavy amounts of leaf litter were also observed. Open water was clear of plant and algae growth.
Secchi: 4'est	Crystal Outlet: Clean and clear.
OLIVE POND **Dissolved Oxygen: 3.84 mg/L.**	Secchi: 2'est Watermeal covers 100% of the pond. Water is slightly turbid. Traces of unicellular algae was observed within the water column.
SHADOW LAKE Aeration: ON **Dissolved Oxygen: 4.89 mg/L.**	Secchi: 3'est Watermeal covered 50% of the lake. Unicellular algae were observed within the water column.
COVE POND **Dissolved Oxygen: 3.91 mg/L.**	Secchi: 3'est Trace to sparse amounts of filamentous algae was observed. Water was turbid throughout the pond.
GRUNDEN'S POND **Dissolved Oxygen: 4.24 mg/L.**	Secchi: 4'est Water level appears to be low and turbid. Sparse amounts of filamentous algae were observed along the northeastern shoreline.
MOUNTAIN LAKE	Cove End: Sparse to moderate amounts of creeping bladderwort patches was observed. Open water was clean and clear. Right side of bridge: Traces of benthic filamentous algae was observed. Water was turbid. Left side of the bridge: Traces of benthic filamentous algae was observed. Sparse patches of filamentous algae were observed along the eastern shoreline.
Secchi: 6'	Sailboat Cove: Sparse to moderate amounts of naiad was observed. Open water was clean and clear.
Water Level: 499.4	Outlet Cove: A heavy amount of leaf litter was observed. Otherwise the area was clean and clear.
	Midvale Launch: Traces of floating bass weed was observed. Trace to sparse amounts of leaf litter was observed. Area overall was clean and clear.
Fecal Sample: 11:55AM	Island Beach: Clean and clear. Dock area: Sparse amounts of leaf litter was observed.
WILDWOOD LAKE	Park: Moderate amounts of brittle naiad was observed.
Secchi: 4'est	Dam: Water was turbid. No signs of plant or algae growth was observed.
Water Level: 499.4	Launch: Trace to sparse amounts of filamentous algae was observed. Sparse amounts of brittle naiad was observed.

NOTES:

1. **Fecal Coliform samples were collected today. Results to follow.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Solitude Lake Management
DATE: 8/14/17
INSPECTION DATE: 8/14/17

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 11:00AM)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	23.5	2.75
2’	23.4	2.39
4’	23.4	2.27
6’	23.4	2.21
8’	23.3	2.07
10’	22.8	0.31
12’		
13’		

BIRCHWOOD LAKE	Outlet Cove: Sparse to moderate amounts of bass weed was observed along the main shoreline. Sparse sized patches of white lilies.
Secchi: 6.5’	Inside Swim Lane: Small patches of white lilies were observed along the main shoreline and are not interfering with the swim lanes currently. Swim lanes are clean and clear.
Aeration: ON	Outside Swim Lane: Sparse to moderate amounts of white lilies was observed. A sparse sized patch of bass weed was observed among the lilies. Trace to sparse scattered patches of creeping bladderwort was observed. Sparse amounts of robbin’s pondweed was also observed.
Fecal Sample: 11:23am	Beach: Clean and clear.
SUNSET LAKE	Launch: Traces of creeping bladderwort and pondweed species was observed along the main shoreline. Small scattered patches of white lilies were observed throughout the center of the basin.
Secchi: 5’est	Outlet: Traces of pondweed species was observed decaying along the shoreline. Water was slightly turbid.
	Sunset Road Cove: Sparse to moderate amounts of benthic filamentous algae was starting to top out at the surface.

	Small scattered patches of white lilies were observed.
	Inlet Cove: Water was turbid. Unicellular algae was observed in the water column. Moderate to dense patches of white lilies was also observed throughout the inlet area.
CRYSTAL LAKE	Birchwood Outlet: Moderate amounts of bass weed was observed throughout the outlet area. 10' x 10' patches of white lilies was observed.
	Lake Shore Road Shoreline: Sparse amounts of bass weed was observed. A small patch of floating brittle naiad was observed along the shoreline.
Secchi: 6'	Crystal Outlet: Benthic filamentous algae was observed on the rocks. Otherwise area was clean and clear.
OLIVE POND **Dissolved Oxygen: 6.35 mg/L.**	Secchi: 3'est Watermeal continues to cover the surface of the pond. Traces of unicellular algae was observed.
SHADOW LAKE Aeration: ON **Dissolved Oxygen: 7.97 mg/L.**	Secchi: 3'est Watermeal was observed covering 35% of the lake. Traces of benthic filamentous algae was observed.
COVE POND **Dissolved Oxygen: 4.78 mg/L.**	Secchi: 2'est Water was very turbid. Traces of unicellular algae was observed within the water column.
GRUNDEN'S POND **Dissolved Oxygen: 7.26 mg/L.**	Secchi: 4'est Traces of decaying filamentous algae was scattered along the eastern and main shorelines.
MOUNTAIN LAKE	Cove End: Moderate amounts of creeping bladderwort was observed in patches along the main shoreline. Sparse amounts of pondweed species were observed. Open water was clean and clear. Right side of bridge: Sparse to moderate amounts of filamentous algae was observed along both the eastern and western shorelines. Left side of the bridge: Traces of benthic filamentous algae was observed.
Secchi: 6'est	Sailboat Cove: Sparse to moderate amounts of brittle naiad was observed.
Water Level: 499.4	Outlet Cove: Traces of filamentous algae was observed. Heavy amounts of leaf litter were also observed. Open water was clean and clear.
	Midvale Launch: Floating decaying fragments of bass weed was observed along the main shoreline. Heavy amounts of leaf litter were also observed. Otherwise area was clean and clear.
Fecal Sample: 1:32pm	Island Beach: Clean and clear.
WILDWOOD LAKE	Park: Sparse to moderate amounts of both brittle and

	southern naiad was observed at the surface.
Secchi: 6'est	Dam: Water was turbid. Floating fragments of brittle naiad was observed in the open water.
Water Level: 499.4	Launch: Sparse amounts of filamentous algae was observed. Sparse amounts of brittle naiad was observed along the main shoreline.

NOTES:

1. **Fecal coliform samples were collected today. Results to follow.**
2. **<u>Canal survey</u>: A survey was performed via kayak on 8/14/17. Sparse amounts of brittle naiad was concentrated along the eastern shoreline throughout majority of the canal. Traces of rooted spiny hornwort and leafy pondweed were also observed. Floating fragments of bass weed were observed. A heavy amount of leaf litter was also observed. No signs or presence of fanwort was observed.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Solitude Lake Management
DATE: 8/21/17
INSPECTION DATE: 8/21/17

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 1:30PM)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	24.3	2.18
2’	24.4	2.21
4’	24.2	2.21
6’	24.0	1.96
8’	23.8	1.75
10’	23.5	0.32
12’		
13’		

BIRCHWOOD LAKE	Outlet Cove: Sparse to moderate amounts of white lilies were observed. Sparse to moderate sized patches of bass weed were observed along the shoreline. Traces of filamentous algae was mixed in with the lilies.
Secchi: 6.5’	Inside Swim Lane: Traces of white lilies were observed along the main shoreline. Swim lanes are clean and clear.
Aeration: ON	Outside Swim Lane: Moderate amounts of white lilies were observed. Trace to sparse amounts of watershield was observed among the lilies. Traces of creeping bladderwort were observed. Traces of rooted curly-leaf were also observed. Sparse amounts of Robbin’s pondweed were observed.
Fecal Sample: 10:40 am	Beach: Clean and clear.
SUNSET LAKE	Launch: Traces of creeping bladderwort was observed. Trace amounts of floating brittle naiad was observed. Trace to sparse amounts of leaf litter was concentrated along the shoreline.
Secchi: 4’est	Outlet: Traces of rooted brittle naiad was observed along the shoreline. Sparse amounts of benthic filamentous algae were observed. Water looked turbid.
	Sunset Road Cove: Trace sized patches of white lilies were

	observed. Water looked turbid.
	Inlet Cove: Moderate amounts of benthic filamentous algae was observed. Dense patches of white lilies were observed throughout the inlet cove.
CRYSTAL LAKE	Birchwood Outlet: Dense patches of white lilies was observed in front of the outlet. Moderate amounts of flowering bass weed were also observed.
	Lake Shore Road Shoreline: Water looked turbid. Floating fragments of bass weed was observed.
Secchi: 5'est	Crystal Outlet: Sparse amounts of benthic filamentous algae was observed. Water was very turbid.
OLIVE POND **Dissolved Oxygen: 3.82 mg/L.**	Secchi: 3'est A mixture of watermeal and unicellular algae was observed. A treatment was performed on 08/02/17.
SHADOW LAKE Aeration: ON **Dissolved Oxygen: 6.48 mg/L.**	Secchi: 3'est A mixture of watermeal and unicellular algae was observed. Sparse amounts of benthic filamentous algae was also observed. A treatment was performed on 08/02/17.
COVE POND **Dissolved Oxygen: 4.32 mg/L.**	Secchi: 1.5'est Cove Pond was very turbid. Heavy amounts of leaf litter was observed.
GRUNDEN'S POND **Dissolved Oxygen: 4.48 mg/L.**	Secchi: 4.5'est Trace to sparse amounts of decaying filamentous algae was observed along the northeastern shoreline. Water level was low.
MOUNTAIN LAKE	Cove End: Sparse patches of creeping bladderwort was observed at the surface. Traces of rooted bass weed was also observed. Right side of bridge: Moderate amounts of filamentous algae was observed along the eastern shoreline. Traces of rooted bass weed were also observed. Left side of the bridge: Clean and clear.
Secchi: 6'	Sailboat Cove: Moderate amounts of brittle naiad was observed. Traces of rooted bass weed was observed. Open water is clean and clear.
Water Level: 499.4	Outlet Cove: A heavy amount of leaf debris was observed. Otherwise area was clean and clear.
	Midvale Launch: Clean and clear.
Fecal Sample: 10:55 am	Island Beach: Clean and clear. Dock Area: Moderate amounts of naiad species was observed.
WILDWOOD LAKE	Park: Sparse amounts of rooted brittle naiad was observed. Sparse patches of brittle naiad was observed at the surface

	approximately 10 to 12 feet from the dock.
Secchi: 4.5’est	Dam: Floating fragments of brittle naiad was observed. Water looked slightly turbid.
Water Level: 499.4	Launch: Trace to sparse amounts of brittle naiad was observed at the surface.

NOTES:

1. **Fecal coliform samples were collected today. Results to follow.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Solitude Lake Management
DATE: 8/27/17
INSPECTION DATE: 8/27/17

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 12:30PM)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	23.2	2.41
2’	23.1	2.44
4’	23.1	2.33
6’	23.0	2.27
8’	22.6	1.88
10’	22.5	1.76
12’	22.5	0.68
13’		

BIRCHWOOD LAKE	Outlet Cove: Moderate to sparse sized patches of white lilies were observed along the main shoreline. Trace to sparse amounts of watershield was mixed in among the lilies. Sparse to moderate amounts of rooted bass weed was observed. Traces of creeping bladderwort was observed along the shoreline.
Secchi: 6.5’	Inside Swim Lane: Traces of white lilies were observed along the main shoreline. Swim lanes were clean and clear.
Aeration: ON	Outside Swim Lane: Moderate amounts of white lilies were observed. Sparse amounts of rooted Robbin’s pondweed and watershield was also observed. Trace to sparse amounts of bass weed was observed.
Fecal Sample: 7:41 AM (08/28/17)	Beach: Clean and clear.
SUNSET LAKE	Launch: Traces of creeping bladderwort and pondweed species was observed along the main shoreline. Traces of brittle naiad were observed.
Secchi: 4.25’est	Outlet: Traces of decaying plant matter was observed along the shoreline. Water was slightly turbid. Scattered patches of white lilies were observed throughout the open water.
	Sunset Road Cove: Sparse amounts benthic filamentous

	algae were observed. Sparse amounts of white lilies were observed. Water was turbid. Traces of decaying plant matter were also observed.
	Inlet Cove: Moderate to dense patches of white lilies were observed throughout the cove. Water was very turbid.
CRYSTAL LAKE	Birchwood Outlet: Dense patches of white lilies were observed. Dense amounts of bass weed were observed along the main shoreline. Traces of watershield were also observed.
	Lake Shore Road Shoreline: Water was turbid. Floating fragments (trace to sparse) of bass weed was observed accumulating along the shoreline. Sparse amounts of rooted bass weed were also observed.
Secchi: 5.5'est	Crystal Outlet: Traces of benthic filamentous algae was observed. Open water was clean and clear.
OLIVE POND **Dissolved Oxygen: 3.15 mg/L.**	Secchi: 2.25'est Watermeal covers 25 to 30 % of the surface. Water appears to be turbid. A treatment was performed on 8/23/17.
SHADOW LAKE Aeration: ON **Dissolved Oxygen: 7.00 mg/L.**	Secchi: 4'est A sparse sized patch of filamentous algae was observed along the eastern shoreline. Trace to sparse amounts of benthic filamentous algae was observed along the main shoreline. Traces of watermeal were also observed.
COVE POND **Dissolved Oxygen: 2.90 mg/L.**	Secchi: 2'est Water was very turbid. Traces of decaying filamentous algae were observed.
GRUNDEN'S POND **Dissolved Oxygen: 6.38 mg/L.**	Secchi: 4'est Sparse amounts of decaying filamentous algae were observed along the northeastern shoreline. Traces of benthic filamentous algae were observed along the shoreline. A light amount of tree pollen was observed on the surface.
MOUNTAIN LAKE	Cove End: Moderate to sparse sized patches of creeping bladderwort was observed. Open water is clean and clear. Right side of bridge: Traces of benthic filamentous algae was observed. Left side of the bridge: Moderate amounts of filamentous algae were observed.
Secchi: 7'est	Sailboat Cove: Sparse amounts of brittle naiad was observed. Open water looked clean and clear.
Water Level: 499.3	Outlet Cove: Clean and clear.
	Midvale Launch: Clean and clear.

Fecal Sample: 8:00am (08/28/17)	Island Beach: Clean and clear. Dock area: Moderate to sparse amounts of naiad was observed. Traces of benthic filamentous algae were also observed.
WILDWOOD LAKE	Park: Traces of rooted brittle naiad and southern naiad were observed.
Secchi: 4'est	Dam: Water appeared to be slightly turbid. Open water was clear of plant and algae growth.
Water Level: 499.3	Launch: Moderate to sparse amounts of decaying filamentous algae was observed. Sparse amounts of brittle naiad was observed along the main shoreline.

NOTES:

1. **Fecal coliform samples were collected today. Results to follow.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Solitude Lake Management
DATE: 09/05/17
INSPECTION DATE: 09/05/17

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time:)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	NA	NA
2’		
4’		
6’		
8’		
10’		
12’		
13’		

BIRCHWOOD LAKE	Outlet Cove: Sparse amounts of white lilies were observed. Traces of watershield were also observed. Sparse amounts of bladderwort species were observed. Trace to sparse amounts of creeping bladderwort and benthic filamentous algae was observed.
Secchi: 6.5’	Inside Swim Lane: Trace to sparse amounts of watershield and white lilies were observed this week. Trace to sparse amounts of creeping bladderwort was observed. Traces of benthic filamentous algae, ribbon-leaf pondweed and leafy pondweed.
Aeration: ON	Outside Swim Lane: Sparse amounts of white lilies and ribbon-leaf pondweed was observed. Traces of watershield were also observed.
Fecal Sample: NA	Beach: Located along the left side of the beach, sparse amounts of creeping bladderwort and traces of benthic filamentous algae was also observed. Traces of watershield and white lilies were observed extending out into the open water.
SUNSET LAKE	Launch: Open water contained 60+ small (5 to 10’) patches of white lilies were observed. Will need aggressive treatment in 2018. Shoreline was clean and clear.

Secchi: 7'est	Outlet: Open water contained scattered patches of white lilies. Traces of benthic filamentous and creeping bladderwort was observed.
	Sunset Road Cove: Several small patches of white lilies were observed. Some benthic filamentous algae and aquatic vegetation was merging to the surface.
	Inlet Cove: No flow was observed. Water was very turbid. Sparse to moderate amounts of benthic filamentous algae and white lilies were observed.
CRYSTAL LAKE	Birchwood Outlet: Well established white lilies and watershield was observed along the shore. One large patch and small patch of white lilies were observed in the cove. Bass weed was observed along the shoreline. A patch of cattails (20') was observed along the main shoreline. Open water is clear, signs of benthic filamentous and aquatic vegetation was observed.
	Lake Shore Road Shoreline: Traces of bass weed and benthic filamentous algae was observed. Traces of pondweed species was also observed.
Secchi: 6'est	Crystal Outlet: Traces of benthic filamentous algae was observed. Surface looks good.
OLIVE POND **Dissolved Oxygen: NA mg/L.**	Secchi: 3'est Water is turbid. Traces of watermeal was observed on the surface, and looks much better.
SHADOW LAKE Aeration: ON **Dissolved Oxygen: NA mg/L.**	Secchi: 3'est Water was turbid. Traces of watermeal and filamentous algae patches was observed accumulating to right of the shoreline. A few scattered filamentous patches were also observed in the open water.
COVE POND **Dissolved Oxygen: NA mg/L.**	Secchi: 2'est Water was brown and cloudy. Surface appears to be clear of plant and algal growth.
GRUNDEN'S POND **Dissolved Oxygen: NA mg/L.**	Secchi: 3'est Filamentous algae were observed accumulating along the bridge near Boulevard Road. Some scattered patches of filamentous algae were observed along the western shoreline. Water level is low.
MOUNTAIN LAKE	Right side of bridge: Clean and clear. Left side of the bridge: A few patches of filamentous algae was observed along the rock wall.
Secchi: 14'est	Sailboat Cove: One small patch of filamentous algae was observed. Otherwise area was clean and clear.
Water Level: 499.3	Outlet Cove: Traces of benthic filamentous algae was

	observed.
	Midvale Launch: Traces of bass weed, nitella, and benthic filamentous algae was observed. Clarity is considered to be excellent.
Fecal Sample: NA	Island Beach: Beach was clean and clear. Dock area: Sparse to moderate amounts of naiad was observed. Trace to sparse amounts of nitella covers the bottom and is considered to be non-problematic at this time.
WILDWOOD LAKE	Park: Looks clean and clear. Trace to sparse amounts of benthic filamentous algae and submerged aquatic vegetation was observed.
Secchi: 10'est	Dam: Water looks clean and clear. Trace to sparse amounts of naiad was observed.
Water Level: 499.2	Launch: Traces of naiad species and benthic filamentous algae was also observed.

NOTES:

1. **Dissolved oxygen readings were not collected.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Solitude Lake Management
DATE: 9/12/17
INSPECTION DATE: 9/12/17

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 1120 am)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	18.7	3.98
2’	18.8	4.08
4’	18.8	4.05
6’	18.8	3.92
8’	18.7	3.87
10’	18.5	2.11
12’	18.5	0.42
13’		

BIRCHWOOD LAKE	Outlet Cove: Sparse bassweed (but below the surface), sparse white lilies, trace watershield and trace creeping bladderwort all observed. Benthic algae covers the bottom.
Secchi: 7.0’	Inside Swim Lane: Sparse to moderate ribbon-leaf pondweed with creeping bladderwort and leafy pondweed mixed in growing right along the edge. Some white lilies occupy this area too. One cattail plant is located inside the swim lanes between the two docks. It will be hand pulled next time we are on site.
Aeration: On in the Swim lanes; **but off in open water**	Outside Swim Lane: Sparse ribbon-leaf pondweed and white lilies observed with trace bassweed, watershield and benthic filamentous algae mixed in.
Fecal Sample: NA	Beach: Clean and clear, although water lilies observed on opposite shore spreading toward the beach and will require control next year.
SUNSET LAKE	Launch: Trace creeping bladderwort and benthic filamentous algae observed. Water clarity improved, and numerous small patches of water lilies observed in the open water.

Secchi: 6.0’ estimated	Outlet: Trace benthic filamentous algae observed.
	Sunset Road Cove: Scattered water lilies throughout cove, with floating filamentous algae mixed in.
	Inlet Cove: No water flow, so the cove is stagnant. The bottom is covered with benthic algae and water lilies abundance increases at the mouth of the cove.
CRYSTAL LAKE	Birchwood Outlet: At the base of the dam, three established patches of water lilies were observed. In the water column here, bassweed and benthic filamentous algae is present. In the open water, one large patch of water lilies observed, and two smaller patches (one in left cove, the other near island) observed. Otherwise, surface looks clear.
	Lake Shore Road Shoreline: Trace to sparse bass weed and trace benthic filamentous algae observed.
Secchi: 6.0’ est.	Crystal Outlet: Trace benthic filamentous algae on rocks.
OLIVE POND **Dissolved Oxygen: 5.03 mg/L**	Secchi: 3.0’ estimated. Water turbid, but surface is clear. Trace watermeal still present on surface however. Bottom looks mostly clear of algae.
SHADOW LAKE **Aeration: off** **Dissolved Oxygen: 7.31 mg/L.**	Secchi: 3.0’ estimated. Floating filamentous algae covers 20-30% of the surface, heaviest in the cove to the right. Trace watermeal still present on surface but non-problematic at this time. Resident complained via e-mail about algae. Treatment required. **Aeration system turned off by resident due to loud noise from compressor. Needs to be serviced ASAP.**
COVE POND **Dissolved Oxygen: 4.97 mg/L.**	Secchi: 2.0’ estimated. Water appears turbid. Surface clear except for two small (1-2’ diameter) patches of algae.
GRUNDEN’S POND **Dissolved Oxygen: 6.93 mg/L.**	Secchi: 5.5’ estimated. The water level is still down with exposed shorelines. The water clarity has improved. A few patches of floating algae persist to the left (near docks) and is accumulating in the Boulevard corner.
MOUNTAIN LAKE	Cove End: To the right: the surface looks good. To the left: The cove looks better, with the previous algae along shore being controlled. There is one patch of benthic algae nearing

	the surface in the open water.
Secchi: 12.0’ estimated	Sailboat Cove: The surface looks good, although a few patches of benthic algae are nearing the surface. This might require treatment soon.
Water Level: 499.2	Outlet Cove: Water clarity is excellent. Cove is clean and clear.
	Midvale Launch: Water clarity is excellent. Launch area is clean and clear, with only trace pondweeds and bass weed observed well below the surface.
Fecal Sample: NA	Island Beach: Around the dock, sparse to moderate naiads and stonewort covers the bottom, but its well below the surface and non-problematic at this time. The beach was clean and clear. 14 Canada Geese observed swimming around the beach and island.
WILDWOOD LAKE	Park: Water clarity continues to be excellent. Naiads and other SAV observed on the bottom, but well below the surface and non-problematic at this time.
Secchi: 10.0’ estimated.	Dam: Water is clean and clear, with a few small patches of floating naiads, likely from previous treatment.
Water Level: 499.2	Launch: Trace benthic filamentous algae observed, along with a few isolated patches of floating naiads (~1’ in diameter).

NOTES:

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Solitude Lake Management
DATE: 09/18/17
INSPECTION DATE: 9/18/17

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 1:00PM)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	21.7	4.76
2’	21.2	4.78
4’	21.2	4.79
6’	21.2	4.82
8’	21.2	4.67
10’	20.9	3.78
12’		
13’		

BIRCHWOOD LAKE	Outlet Cove: Sparse to moderate amounts of bass weed was observed. Moderate to sparse amounts of white lilies were also observed.
Secchi: 5’est	Inside Swim Lane: Located along the main shoreline, a sparse patch of ribbon leaf pondweed was observed. Traces of rooted curly leaf pondweed and leafy pondweed were also observed. A few stems of cattails were also observed. Traces of benthic filamentous algae was also observed.
Aeration: ON	Outside Swim Lane: Sparse amounts of white lilies were also observed. Trace amounts of watershield were observed. Traces of creeping bladderwort were also observed.
Fecal Sample: NA	Beach: Clean and clear.
SUNSET LAKE	Launch: Small scattered patches of white lilies were observed throughout the open water. A heavy amount of leaf litter was also observed. A light amount of tree pollen was observed on the surface.
Secchi: 4.25’est	Outlet: Water is turbid. Traces of decaying pondweed species was observed.
	Sunset Road Cove: Water is turbid. Trace sized patches of white lilies.
	Inlet Cove: Water appeared to be green and turbid. Dense

	amounts of white lilies were also observed.
CRYSTAL LAKE	Birchwood Outlet: Dense to moderate patches of white lilies were observed near the outlet. Moderate amounts of rooted bass weed were observed.
	Lake Shore Road Shoreline: Moderate amounts of rooted bass weed was observed. Traces of floating brittle naiad were also observed.
Secchi: 4.5'est	Crystal Outlet: Sparse amounts of benthic filamentous algae was observed. Water was slightly turbid. A light amount of tree pollen was observed on the surface.
OLIVE POND **Dissolved Oxygen: 7.67 mg/L.**	Secchi: 2.5'est A light amount of watermeal was observed on the surface. Tree pollen was also observed. Traces of filamentous algae was observed along the main shoreline.
SHADOW LAKE Aeration: No **Dissolved Oxygen: 8.40 mg/L.**	Secchi: 3'est Moderate amounts of decaying (brown) filamentous algae was observed extending 6 feet out from the main shoreline. Open water looks clean and clear.
COVE POND **Dissolved Oxygen: 8.98 mg/L.**	Secchi: 2'est Water has a green tint to it and is turbid. No plant growth was observed.
GRUNDEN'S POND **Dissolved Oxygen: 9.15 mg/L.**	Secchi: 4'est Sparse to moderate amounts of decaying filamentous algae was observed along the northeastern shoreline. Leaf litter was observed throughout the pond. Open water looked clean and clear.
MOUNTAIN LAKE	Cove End: Right side of bridge: Sparse to moderate amounts of benthic filamentous algae was observed. Left side of the bridge: Traces of rooted bass weed was observed. Sparse amounts of benthic filamentous algae was observed.
Secchi: 8'	Sailboat Cove: Sparse amounts of decaying naiad was observed.
Water Level: 499.2	Outlet Cove: Heavy leaf litter was observed. Open water was clean and clear.
	Midvale Launch: Heavy amounts of tree debris was observed. Open water was clean and clear.
Fecal Sample: NA	Island Beach: Clean and clear.
WILDWOOD LAKE	Park: Traces of brittle naiad was observed
Secchi: 5.5'est	Dam: Water was slightly turbid.

Water Level: 499.2	Launch: Sparse amounts of rooted brittle naiad was observed. A light amount of leaf litter was observed.

NOTES:

1. **A survey of the canal was performed via kayak, traces of brittle naiad and spiny hornwort were observed. Heavy amounts of leaf litter was observed. No fanwort was observed.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Solitude Lake Management
DATE: 9/25/17
INSPECTION DATE: 9/25/17

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 830 am)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	22.1	4.17
2’	22.2	4.14
4’	22.2	4.20
6’	22.2	4.14
8’	22.3	4.11
10’	22.3	4.10
12’	22.2	4.07
13’		

BIRCHWOOD LAKE	Outlet Cove: This area supports a diverse array of aquatic plants in various densities. Sparse bass weed, sparse white lily and watershield, trace benthic filamentous algae, trace ribbon-leaf and leafy pondweed along with trace creeping bladderwort all were present.
Secchi: 9.0’	Inside Swim Lane: A dense patch of ribbon-leaf pondweed (at the surface with floating leaves) was observed at the corner. It should naturally die back in a few weeks. Trace to sparse benthic algae, trace leafy pondweed and white lilies also observed. The one cattail still needs to be hand pulled.
Aeration: All on.	Outside Swim Lane: Sparse white lily with trace spatterdock and watershield mixed in. Creeping bladderwort was among the lilies. Trace bassweed, ribbon-leaf and benthic algae observed on the bottom.
Fecal Sample: NA	Beach: Clean and clear.
SUNSET LAKE	Launch: Tree debris on surface. Scattered patches of lilies in open water, with perhaps floating filamentous algae accumulating among the lilies. Requires on water survey to

	confirm and possibly treat.
Secchi: 7.0’ est.	Outlet: Tree debris and leaves on surface. Trace to sparse creeping bladderwort and benthic algae observed. In open water, it appears there is algae accumulating among the lilies.
	Sunset Road Cove: Scattered patches of lilies (becoming a nuisance, but too late to treat this year) along with accumulating algae observed.
	Inlet Cove: No flow, so water is stagnant and cloudy (white-brown). The cove is full of benthic algae and lilies.
CRYSTAL LAKE	Birchwood Outlet: Established white lilies on dam shore, along with moderate to dense bass weed nearing the surface. Water appears clear and can see bottom in open water, which appears to be covered with benthic algae or SAV. Needs a boat survey to confirm
	Lake Shore Road Shoreline: Trace to sparse bass weed with accumulating fragments along with trace benthic algae.
Secchi: 6.0’ est.	Crystal Outlet: No flow. Sparse benthic algae on rocks.
OLIVE POND **Dissolved Oxygen: 6.78 mg/L.**	Secchi: 5.0’ estimated. Water clarity improved. Watermeal does not appear present. Surface is covered with tree debris, especially to the right. A few patches of floating algae are present to the right. Treatment recommended.
SHADOW LAKE **Aeration: OFF** **Dissolved Oxygen: 7.33 mg/L.**	Secchi: 4.0’ estimated. Clarity improved, but aeration unit still off. Increased tree debris. Significant surface algae along the shoreline, to the right (in cove) and possibly on opposite shore. Sparse watermeal mixed in. Requires treatment.
COVE POND **Dissolved Oxygen: 4.07 mg/L.**	Secchi: 2.0’ estimated. Water is turbid. Tree debris and film on surface but no weeds or algae observed.
GRUNDEN’S POND **Dissolved Oxygen: 3.17 mg/L.**	Secchi: 4.0’ estimated. Water clarity improved, and most of the lake looks good. Water level still down. Leaf debris in corner, and a few floating algae patches are near the docks to left. Bottom supports benthic algae. Corner of Boulevard supports some floating algae too.
MOUNTAIN LAKE	Cove End: On both sides, the surface looks good. Benthic algae observed.

Secchi: 10.' estimated	Sailboat Cove: Excellent water clarity. 3 small patches of floating algae observed. Trace naiads and creeping bladderwort observed on bottom. All are non-nuisance.
Water Level: 499.1	Outlet Cove: Trace benthic algae observed. Fragments of naiad and bass weed observed.
	Midvale Launch: Water clarity reduced, but still excellent. Trace bass weed to the left, and a few floating naiad fragments accumulating at shore.
Fecal Sample: NA	Island Beach: Sparse to moderate naiad observed near dock, with trace spikerush at shore, and trace to sparse stonewort mixed in. All plants well below surface. Stonewort abundance increases to bridge. 10 geese observed in water near dock; one more off beach. Beach is clean and clear.
WILDWOOD LAKE	Park: Water still clear, with naiad observed at bottom. Two fanwort plants observed in canal near mouth of Wildwood. Will treat or hand pull as appropriate. Suggest an on-water survey to examine for more fanwort in canal and lake and treat if needed.
Secchi: 7.0' estimated	Dam: Trace benthic algae.
Water Level: 499.0	Launch: Trace benthic algae.

NOTES:

1. **On the water surveys (and possible treatment) recommended for Sunset and Crystal Lakes this week.**
2. **Olive and Shadow Lakes to be treated for algae this week.**
3. **Since two plants of fanwort were found at the canal near Wildwood, we suggest an on-the-water survey of this basin this week and treat if needed.**
4. **The one cattail at Birchwood still needs to be pulled.**
5. **Aeration at Shadow Lake is still off and needs to be serviced ASAP.**
6. **On water survey (by Committee) of Birchwood Lake scheduled for Tuesday Oct 2nd at 530 pm.**