BOROUGH OF MOUNTAIN LAKES
MORRIS COUNTY, NJ

2018 YEAR-END REPORT
LAKES MANAGEMENT PROGRAM
BOROUGH OF MOUNTAIN LAKES

SOLITUDE
LAKE MANAGEMENT

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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 2018. 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 2018 summary discussions, additional topics such as the E. coli sampling that occurred at Birchwood and Mountain Lake, water clarity at Mountain Lake, the Lakes Cleaning Program, and nutrient loading in all of the lakes will be discussed. Finally, a 2018 summary is presented as well as specific Lake Management strategies for 2019. 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 2018	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	X	
Lemna minor	Small Duckweed	X	
Potamogeton amplifolius	Bass Weed	X	
Ludwigia sp.	Red Ludwigia	X	
Utricularia gibba	Creeping Bladderwort	X	
Potamogeton crispus	Curly-leaf Pondweed	X	
Riccia fluitans	Slender Riccia	X	
Potamogeton diversifolius	Variable-leaf Pondweed		2013
Nitella sp.	Stonewort	X	
Fontinalis sp.	Watermoss		2013
Ludwigia peploides	Creeping Water Primrose	X	
Najas minor	Brittle Naiad	X	
Potamogeton pusillus	Small Pondweed	X	
Cabomba caroliniana	Fanwort		2017
Wolffia sp.	Water meal	X	

The table above depicts a list of aquatic plants observed at Mountain Lakes in 2018 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.

2018 Aquatic Macrophyte Management

Birchwood Lake

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

Birchwood Lake

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

The management season at Birchwood Lake began with the hydro raking program in the upper portion of the lake, and this will be discussed in more detail in the Lake Cleaning Portion of this report. Early season plant growth including curly-leaf pondweed and bassweed were managed on May 28th utilizing Schooner within the swimming area. As the season progressed bassweed and white water lilies increased in abundance around the shoreline area primarily outside of the dock area. Through the month of July the plant assemblage increased in diversity to include trace to sparse density bassweed, and trace occurrences of ribbon-leaf pondweed, water shield, spatterdock, low watermilfoil and creeping bladderwort.

On September 7th an application of Rodeo 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. At this time an herbicide application was also conducted along the dam for control of terrestrial vegetation. On September 28th a follow up herbicide application was conducted to provide additional management of increasing cattail growth along the dam area of the lake. Only one herbicide application was required to maintain suitable conditions within the recreational portion of the lake during the 2018 season. Throughout the management season generally acceptable densities of desirable plant species were observed in the recreational area of the lake, and there was no required management efforts within the beach area.

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

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

During 2018, curly-leaf pondweed did not achieve densities that required management that is typical for the early season during most management seasons at this lake. However in 2018, algaecide applications increased in frequency, with filamentous algae requiring three copper sulfate applications for control. Additionally, a copper sulfate application was required on August 30th for control of nuisance densities of planktonic green algae that reduced water clarity and impacted the aesthetics of the lake.

Additionally, bassweed developed at nuisance densities in the northern lake area, and required an application of Aquathol-k on June 11th. Also on this date a localized application of Schooner was performed in the southeast cove for control of water lily growth. This was the only required herbicide application date for submersed aquatic plant control. Further management was conducted as over the past several management seasons the cattail growth has continued to increase along the western shoreline cove, and on September 28th a foliar treatment with backpack sprayer was performed from land to provide management.

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

Sunset Lake			
Date	**Product Applied**	**Acres Treated**	**Target Species**
6/7/18	AquaNeat	2	Water Lilies
6/19/18	Copper Sulfate	7.8	Filamentous Algae

7/18/18	Schooner	0.5	Bassweed
	Copper Sulfate	5	Filamentous algae
	AquaNeat	0.5	Water Lilies
9/7/18	Rodeo/Garlon 3A	Dam	Terrestrial Vegetation
9/21/18	AquaNeat	0.13	Water lilies

Overall management at Sunset Lake increased for 2018, with an emphasis on reducing water lily growth throughout the lake basin. On three occasions from June through September, a foliar herbicide application was performed to provide selective control of water lilies. On July 18th the only herbicide application for management of submersed plant control was conducted to provide management of nuisance bassweed densities adjacent to residential dock areas. Bassweed has been observed to be increasing in density over the past few management seasons, and will need to also be a future focus to ensure suitable control, while allowing desirable densities to persist in areas of the lake where plant densities do not impose nuisance conditions. On September 7th the dam structures of Sunset Lake were targeted for terrestrial plant control.

Algal management at Sunset Lake in 2018 was limited to two applications of copper sulfate for management of filamentous algae. Overall, algal growth was fairly limited in this lake, and may be a result of the increase in the submersed plant community. Although additional submersed plant species did not require management, sparse to moderate densities of naiad and pondweeds were observed throughout the season in the lake.

Olive Lake			
Date	**Product Applied**	**Acres Treated**	**Target Species**
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

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

Overall in 2018 Olive Pond maintained favorable conditions with fair to good water clarity and a clean surface for most of the management season. Although water meal was prevalent during the 2017 management season, this floating aquatic plant was only observed as scattered traces in 2018. The only required management in 2018 was a single application of Earthtec for planktonic algae control. The previous year's hydro raking efforts, as well as consistent flow from rain events also likely aided in the improved water quality conditions during 2018.

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

Shadow Pond also showed a similar improvement in overall water quality and aesthetic as Olive Pond during 2018. Although water meal was a nuisance for a significant part of the 2017 season, only a single localized herbicide application was required on July 5th for management of this nuisance floating aquatic plant. A total of three algaecide applications were conducted at Shadow Lake in 2018, primarily for low density growth of filamentous and unicellular algae control. Two new products were applied to Shadow Lake in 2018, Precise Pond bacterial enhancement, and Earthtec, an alternative copper sulfate formulation.

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

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

Throughout the 2018 management season, Cove Pond maintained favorable aesthetics, although the water had a turbid appearance during most inspections. The pond supported moderate density curly-leaf pondweed in the spring requiring a single herbicide application for control, and only required one algaecide application in early May for filamentous algae management. Water lilies are also established in the lake, but currently at desirable densities.

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	Water meal
8/23/17	Clipper	0.25	Duckweed
9/7/17	Captain	0.5	Filamentous Algae

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

During the 2018 management season, Grunden's Pond experienced repetitive growth of filamentous algae that occupied generally the shoreline edge of the pond, with the heaviest abundance along the Boulevard. This pond also experienced low water levels at short intervals during portions of the year as a result of an unconfirmed leak near the outlet into Mountain Lake. Water levels remained higher in the pond from frequent rain events compared to 2017. Reductions in water level, coupled with nutrient loading, enabled the continued development of nuisance aquatic vegetation growth. Through the season a total of six application dates were required to control nuisance growth. On all six dates, filamentous algae growth was targeted, and on June 8th, management also included targeting pondweeds with Schooner. On a positive note, more consistent outflow and 2017 management in the upper basins prohibited the development of water meal and duckweed in Grundens Pond in 2018, and no herbicide applications for these floating plants were required, as only traces of these plants were observed.

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	

Mountain Lake			
Date	**Product Applied**	**Acres Treated**	**Target Species**
5/21/18	Tribune	11.5	Curly-leaf pondweed
	Copper Sulfate	4.8	Filamentous Algae
6/4/18	Copper Sulfate	16	Filamentous Algae
6/8/18	Captain	0.6	Filamentous Algae
6/21/18	Aquathol-k	4.6	Bassweed
	Copper Sulfate	12	Filamentous algae
7/3/18	Schooner	0.5	Pondweeds
7/10/18	Copper Sulfate	14.4	Filamentous algae
8/31/18	Copper Sulfate	19.2	Unicellular algae
9/7/18	Rodeo/Garlon 3A	Dam	Terrestrial vegetation

Overall, management at Mountain Lake in 2018 was limited in acreage, although numerous site selective surgical applications were conducted. Surveys performed through most of the season indicated favorable lake conditions and usually minor amounts of submersed aquatic plant and algae growth. In late May an application of the herbicide Tribune was performed for management of curly-leaf pondweed in specific areas of the lake. A single application date utilizing Aquathol-k on June 21st was required to manage small localized nuisance infestations of bassweed throughout portions of the lake. There were two larger scale copper sulfate applications required on June 4th and August 31st for filamentous algae and unicellular algae control, respectively.

Through the season a total of five algaecide applications were required to manage nuisance densities of filamentous algae, although the total treatment area was limited to 47.8 acres. The copper sulfate treatment on August 31st was in response to visually decreasing water clarity from increasing densities of green algae. The final herbicide application of the season was the dam vegetation control application on September 7th.

Also, late season surveys indicated widely scattered trace density Eurasian water milfoil in the north end of the lake. This is expected following the third year since the most recent Sonar application, and limited growth is a positive sign that Eurasian milfoil densities may be declining in the lake. Surveys in the early Spring of 2019 will dictate the milfoil management program in the upcoming season.

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

Wildwood Lake

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

In 2018, 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 five dates in 2018. The applications targeted a total of 29.1 acres from late April through the end of the season. Two herbicide applications were required in the main basin in 2018, occurring on June 27th and July 18th for management of nuisance naiad growth. Curly-leaf pondweed and milfoil did not achieve nuisance densities in 2018, and fanwort was not observed in Wildwood Lake or the Canal during this season.

A standard lake management practice has become the use of Alum early in the season and late in the season at Wildwood Lake. The early season application was conducted on April 26th, while the late season alum application was conducted on August 8th in 2018.

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. In 2018, surveys of Wildwood Lake and the Canal did not reveal any growth of fanwort. The canal and Wildwood Lake will require additional survey effort in 2019 to monitor for any re-growth of fanwort to ensure prolonged control and eradication.

Water Quality Monitoring Program

In 2018, 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 6th, July 9th, and August 13th. 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 2018, and a primer on phytoplankton. Following these descriptions are brief summaries of the 2018 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 2019.

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.

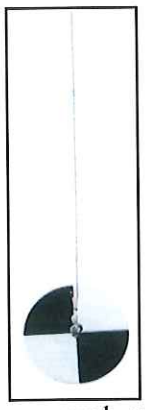
Temperature preferences vary among aquatic biota. Since water temperature typically varies between 5 °C and 30 °C during the season, most aquatic biota can flourish under this wide range of temperatures. Of more concern is thermal shock, which occurs when temperature rapidly changes in a short amount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

Dissolved Oxygen

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

Dissolved oxygen has a wide range, from 0.0 mg/L to 20.0 mg/L. To support diverse aquatic biota, 5.0-6.0 mg/L is minimally required, but 9.0-10.0 mg/L is an indicator of better overall water quality. Dissolved oxygen below 4.0 mg/L is stressful to most aquatic organisms, especially fish.

Water Clarity



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

Alkalinity

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

pH

The measurement of acidity or alkalinity of the water is called pH (the "potential for hydrogen"). Several factors can impact the pH of a lake, including precipitation in a short amount of time, rock and soil composition of the watershed, algal blooms (increase the

pH), and aquatic plant decomposition (decreases the pH). A pH level of 6.5 to 7.5 is considered excellent, but most lake systems fall in the range of 6.0 to 8.5. Aquatic biota can become stressed if the pH drops below 6.0, or increases above 8.5 for an extended amount of time.

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

Conductivity

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

A Phytoplankton Primer

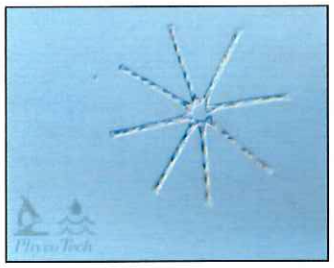
Lakes typically contain three broad categories of phytoplankton (also sometimes referred to as algae). These include filamentous phytoplankton, macroscopic multi-branched phytoplankton (which appear similar to submersed plants), and unicellular phytoplankton. Each category shall be discussed in turn,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

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

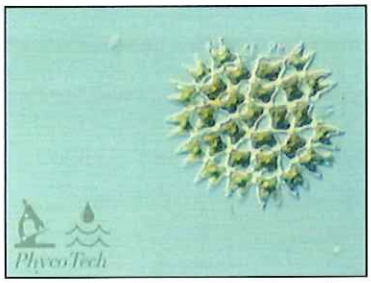
Macroscopic multi-branched phytoplankton appears to be submersed plants, especially when viewed in the water column. Physical examination reveals simple structures, no conductive tissue, and a lack of roots (instead having simplified rhizoids). Although typically only reaching heights of a few inches,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

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

Phytoplankton Group Summary

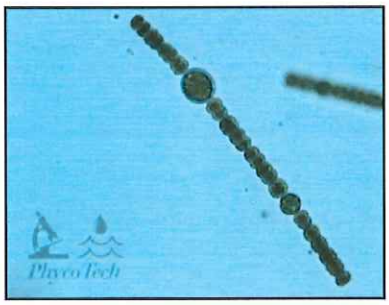


Diatoms are ubiquitous as a group, and often possess a rigid silica shell with ornate cell wall markings or etchings. The silica shells settle to the bottom substrate after they die, and under ideal conditions can become stratified. Limnologists can then study historical (and possibly even ancient) population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



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

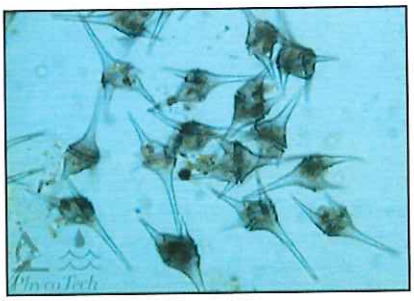
Green Algae are a very diverse group of unicellular phytoplankton. There is tremendous variability in this group which varies from family to family and sometimes even genus to genus. There are flagellated single cells, multi-cell colonies (some motile), filamentous forms and attached forms, typically with distinct cell shapes light green in color. Some prefer acidic waters, and others highly eutrophic (sewage) conditions. A green 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*.

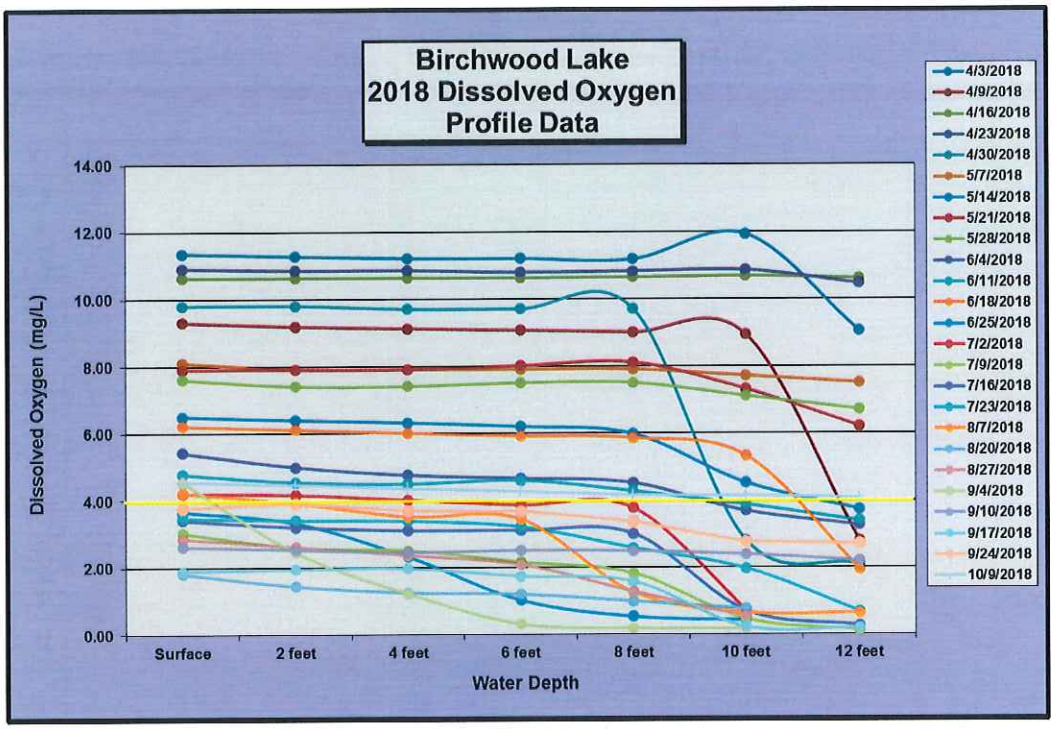
2018 Water Quality Results for Mountain Lakes

Birchwood Lake

Birchwood Lake	units	6/6/2018	7/9/2018	8/13/2018
Temperature	°C	23.0	26.3	25.8
Dissolved Oxygen	mg/L	6.02	**3.03**	**2.50**
Alkalinity	mg/L	40	50	50
pH	SU	7.0	6.75	6.5
Nitrate	mg/L	-	ND	ND
Total Phosphorus	mg/L	0.015	**0.032**	0.021
Conductivity	Umhos/cm	140	-	-
Turbidity	NTU	0.85	1.6	2.1
Water Clarity	feet	6.5	6.25	5.0

In 2018, water temperature readings were seasonally appropriate in Birchwood Lake, ranging from 23.0 °C in June to 26.3 °C in July, and finally 25.8 °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 2018, followed by graphs of the 2008 through 2017 profile data. The 2018 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
2018 Dissolved Oxygen
Profile Data
Dissolved Oxygen (mg/L)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Surface
2 feet
4 feet
6 feet
8 feet
10 feet
12 feet
Water Depth
4/3/2018
4/9/2018
4/16/2018
4/23/2018
4/30/2018
5/7/2018
5/14/2018
5/21/2018
5/28/2018
6/4/2018
6/11/2018
6/18/2018
6/25/2018
7/2/2018
7/9/2018
7/16/2018
7/23/2018
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8/20/2018
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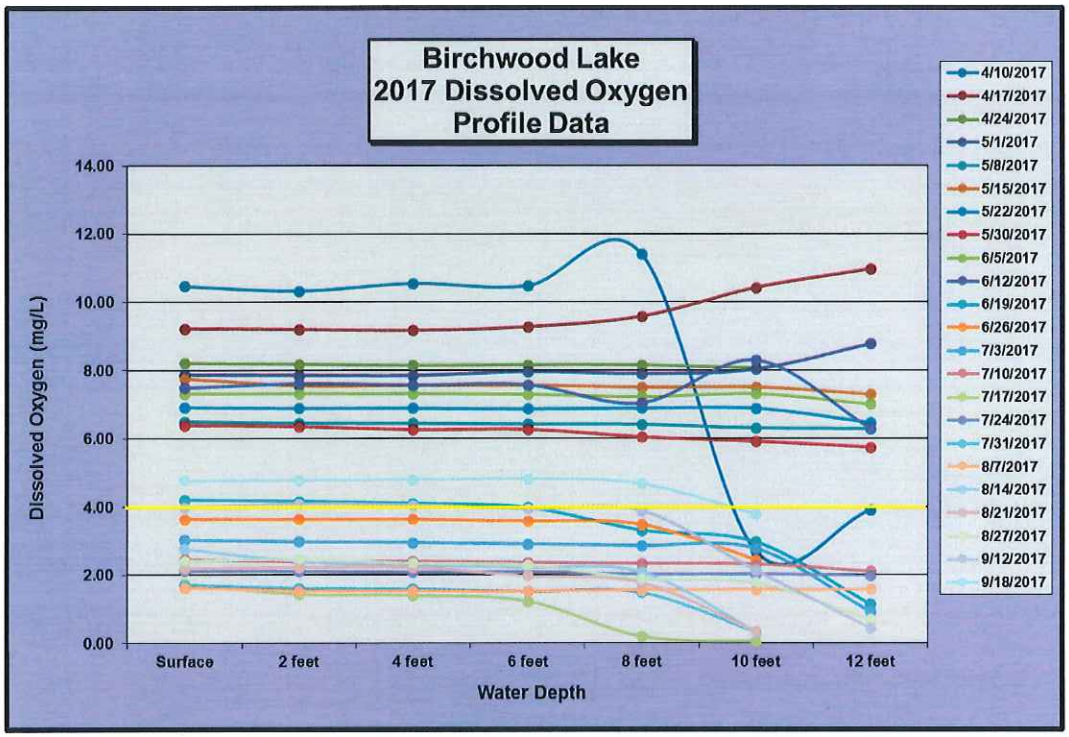
9/4/2018
9/10/2018
9/17/2018
9/24/2018
10/9/2018


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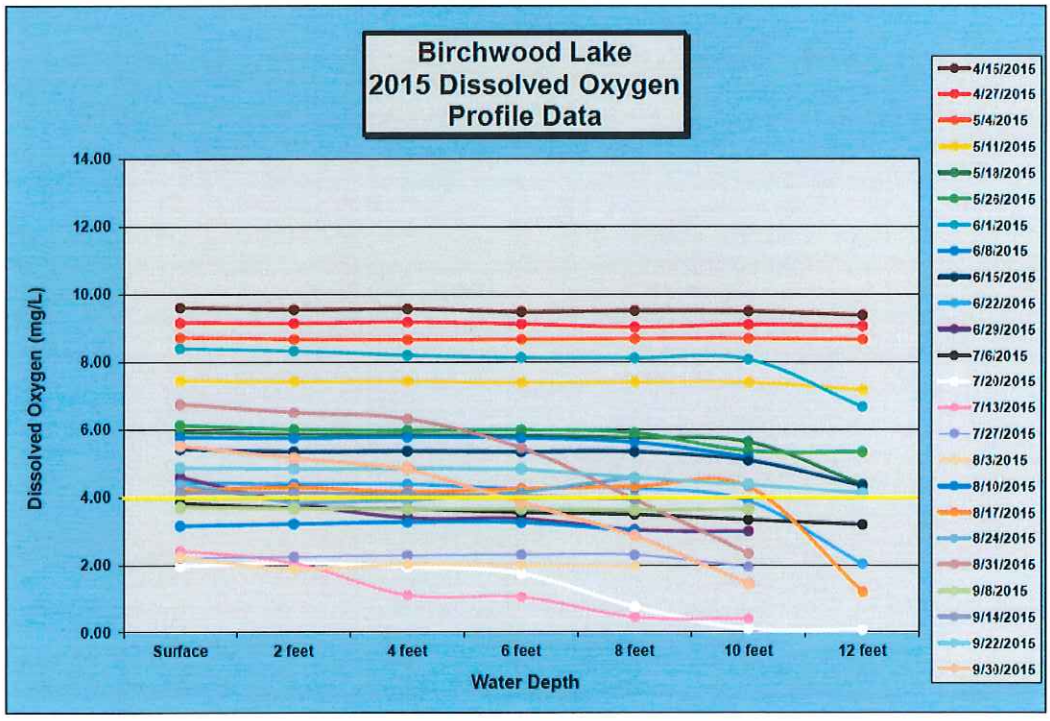
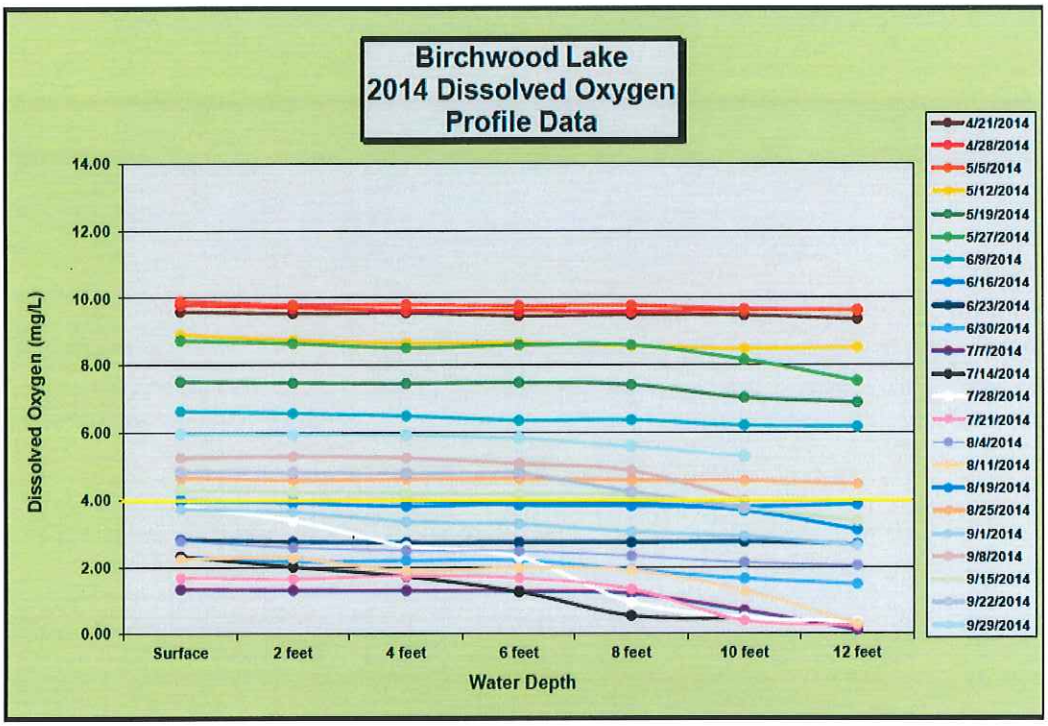
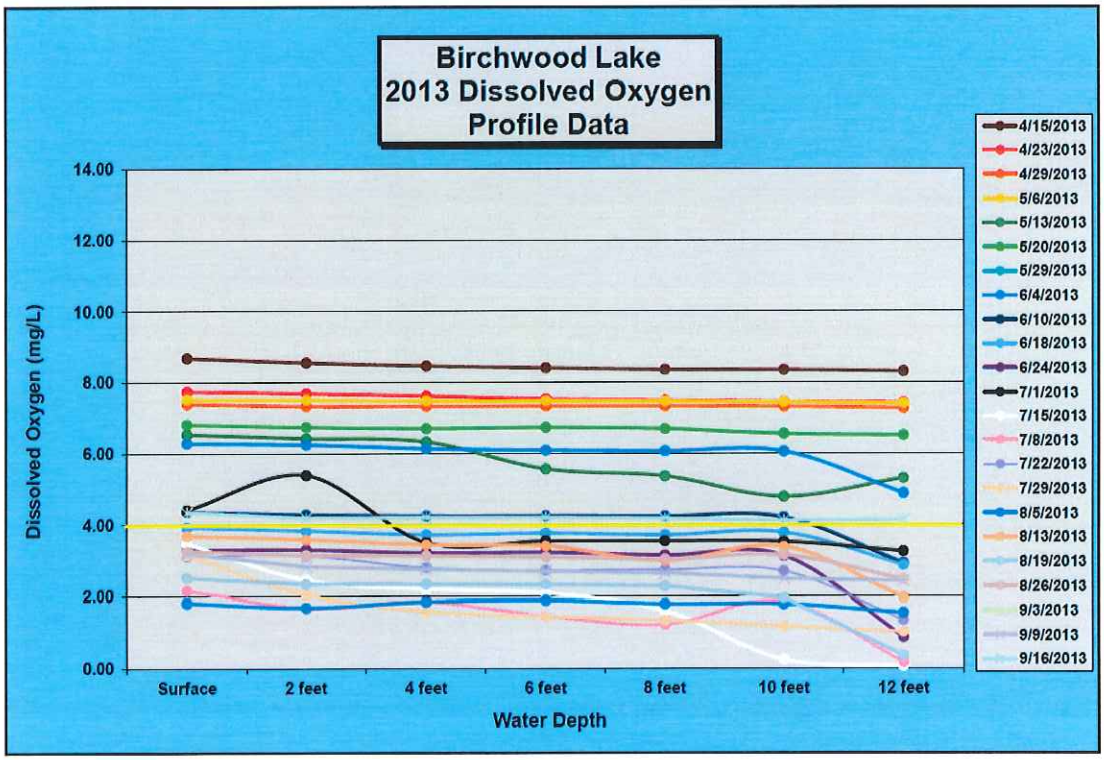
8/27/2017
9/12/2017
9/18/2017


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


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


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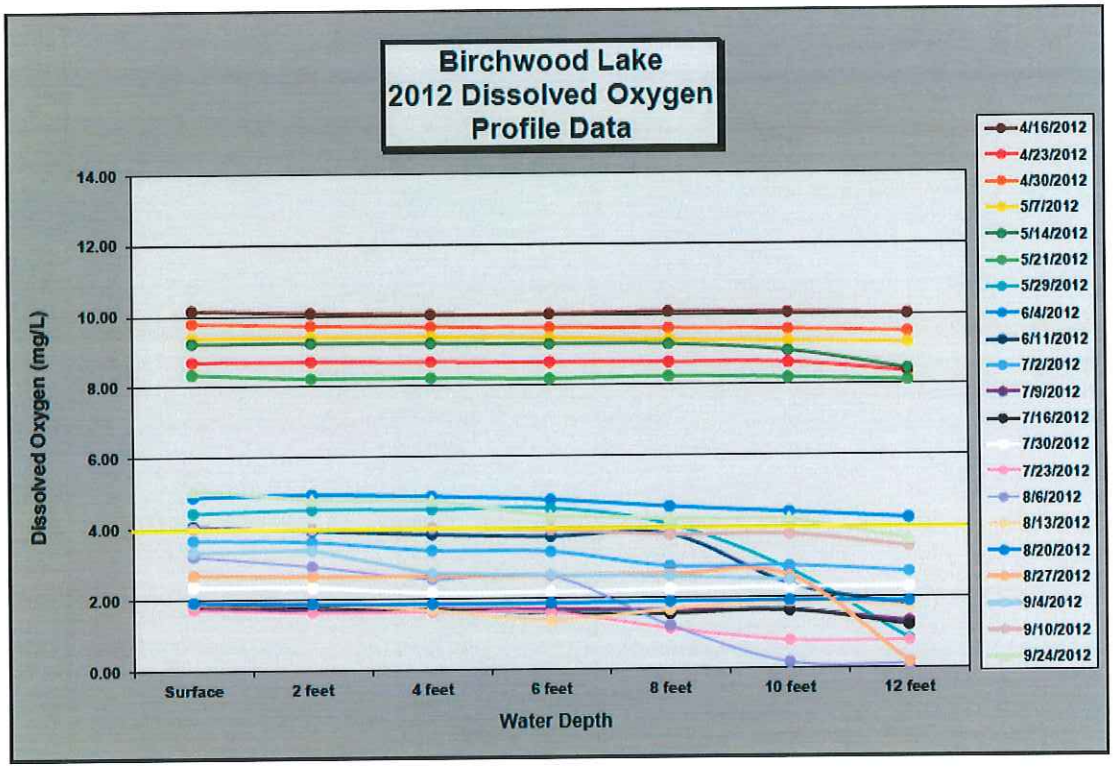
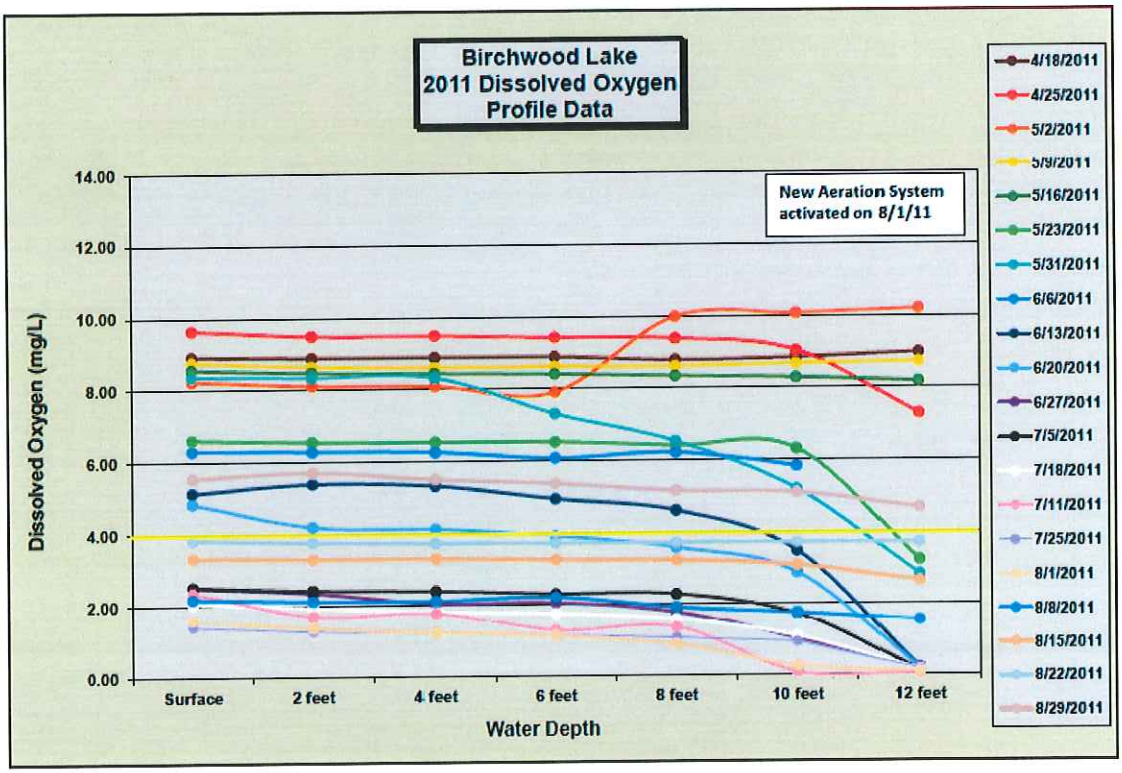
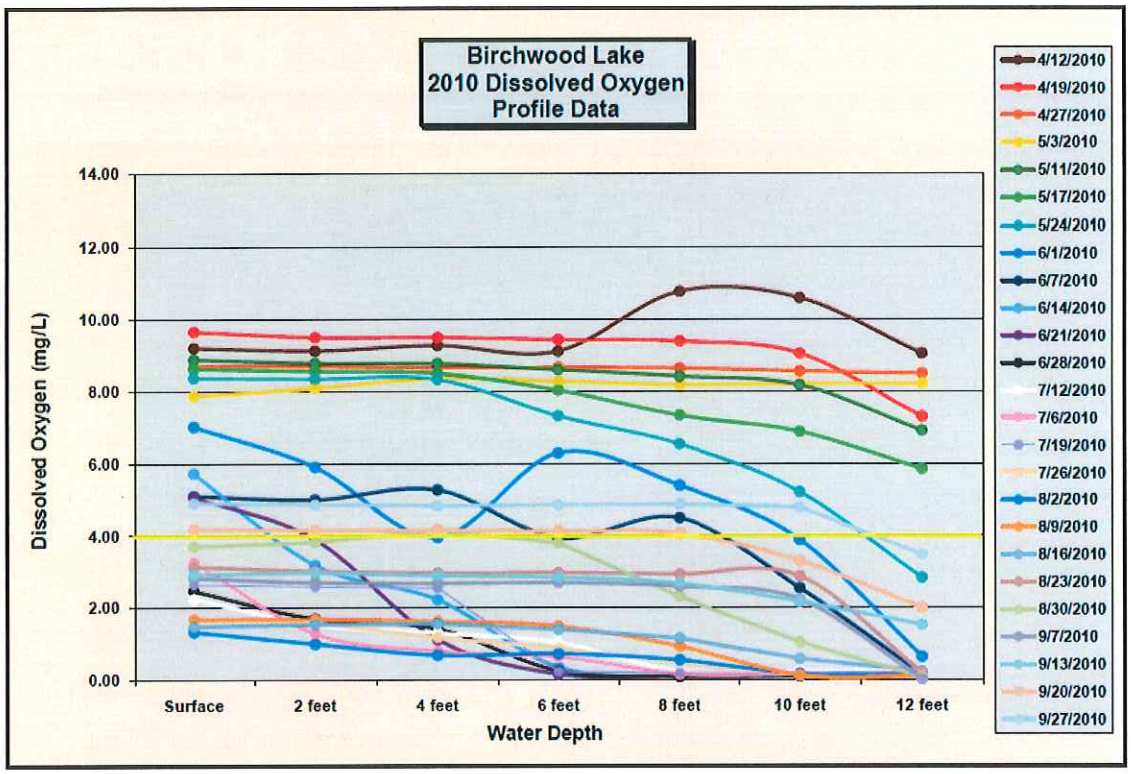
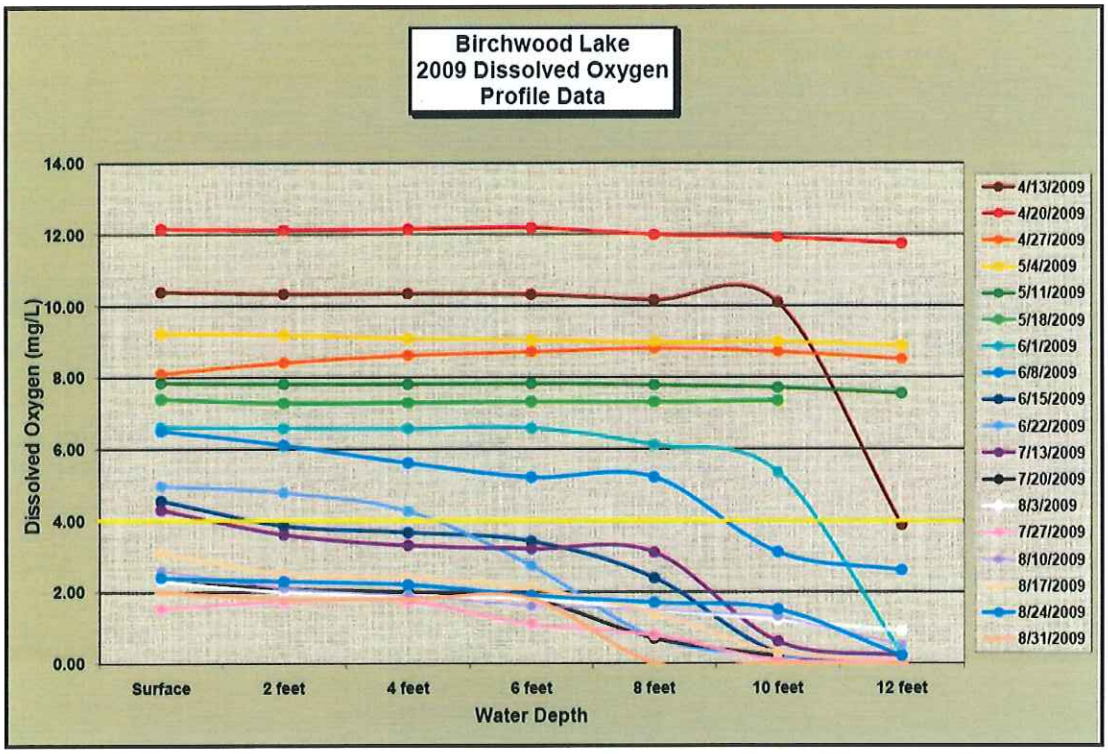
9/3/2013
9/9/2013
9/16/2013


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


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


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


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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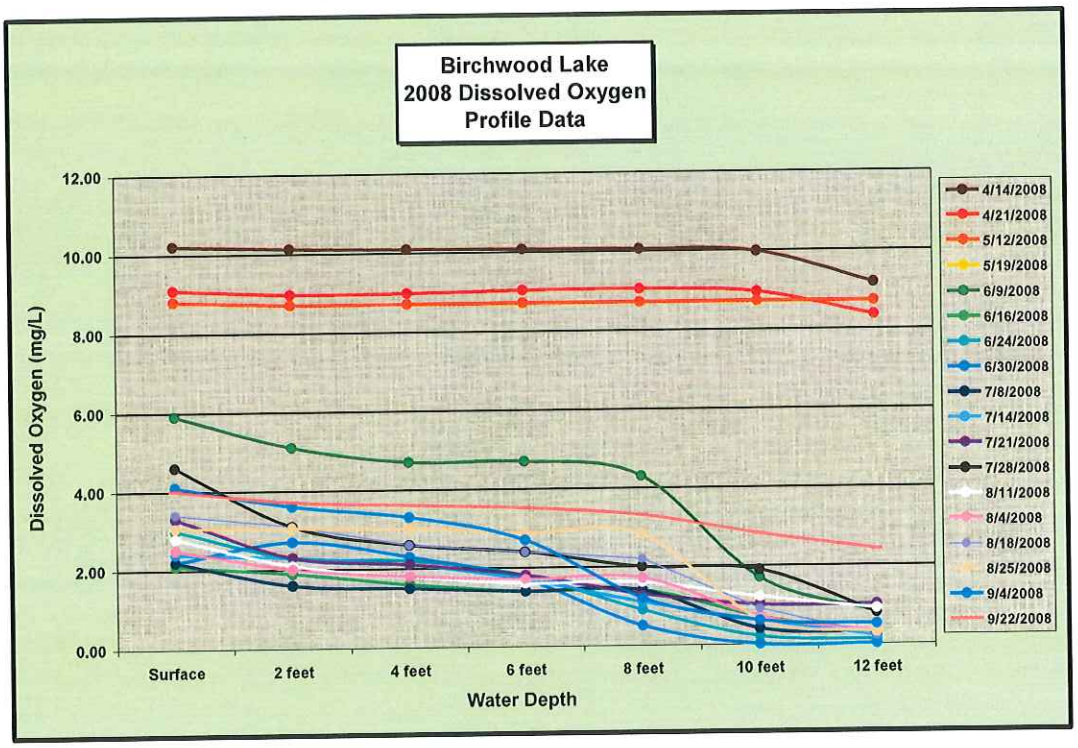
8/17/2009
8/24/2009
8/31/2009



The alkalinity of Birchwood Lake continues to be the lowest in the Mountain Lakes chain. In 2018, it ranged from 40 mg/L to 50 mg/L. Birchwood Lake also traditionally has the lowest pH (slightly acidic) of all the Mountain Lakes. In 2018, the pH was 6.50 to 7.0 on all dates. This is suitable when compared to historical pH values in this basin. Nitrate levels were undetected during two sampling events in 2018. The total phosphorus in Birchwood Lake was suitable during June and August, at 0.015 mg/L and 0.021 mg/L, respectively. The July total phosphorous level was 0.032 mg/L, which is slightly elevated toward 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 0.85 in June to 2.10 NTU in August, well within acceptable values. Water clarity ranged from 5.0 feet to 6.5 feet, which is favorable through the season. Water clarity measurements recorded on additional survey dates were generally even greater. In 2018, conductivity was measured instead of nitrate during the June sampling event to start gaining some background data on this water quality parameter. At Birchwood Lake the conductivity value was 140 umhos/cm, which is within an acceptable range for a lake system.

Birchwood Lake								
Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae (orgs/mL)
6/6/2018	92%					8%		120
6/18/2018	15%	23%	47%	15%				130
7/9/2018	3%		97%					600
7/23/2018	13%	5%	76%	5%			1%	1390
8/6/2018	16%		84%					190
8/20/2018	26%	21%	51%				2%	430

In 2018, phytoplankton assemblages at Birchwood Lake were light and favorable through early July, with the algal community consisting of mostly golden and green algae genera. On July 23rd, the assemblage increased in density with a bloom of *Sphaerocystis*, a green algae genera accounting for most of the assemblage. Overall, the algal community was still favorable. Blue green algae were only observed during a sampling event in June and July, although density was very light.

Crystal Lake

Crystal Lake	units	6/6/18	7/9/18	8/13/18
Temperature	°C	23.8	27.8	26.6
Dissolved Oxygen	mg/L	8.32	6.57	6.00
Alkalinity	mg/L	40	56	40
pH	SU	7.75	7.5	7.25
Nitrate	mg/L	-	ND	ND
Total Phosphorus	mg/L	0.012	0.012	0.02
Conductivity	Umhos/cm	3400	-	-
Turbidity	NTU	0.6	0.99	3.4
Water Clarity	feet	6'	10'+	3'

In 2018, 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 6.0 mg/L to 8.32 mg/L. Alkalinity ranged from 40 mg/L to 56 mg/L, which is typical for this basin and similar to last season. The pH of Crystal Lake ranged from 7.25 (in August) to 7.75 in June. This is suitable to previous year's measurements. Water clarity was considered good to moderate throughout much of the season this year. It was estimated on most dates, although the August 13th reading was accurate, and reduced from a bloom of two genera of green algae. In June it was 6.0 feet, which is good for early in the summer. In July, it was estimated at 10.0 feet +, which is great for mid-season. Most dates through late July indicated water clarity close to this estimated measurement. Nitrate was undetected during the two sampling events. Total phosphorus was below threshold levels for all three sampling dates. In 2018, turbidity ranged from 0.6 NTU in June, and increased to 3.4 NTU in August. In 2018, conductivity was measured instead of nitrate during the June sampling event to start gaining some background data on this water quality parameter. At Crystal Lake the conductivity value was 3400 umhos/cm, which is very high for a lake system. It is difficult to determine the cause of the elevated turbidity since phytoplankton densities

were low, and other nutrient values were also low. Rain events on June 3rd and 4th may be responsible for runoff of conductive material that would elevate the conductivity level, and not impact the turbidity values.

Crystal Lake								
Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae (orgs/mL)
6/6/2018	17%	17%	55%			11%		180
6/18/2018	25%		75%					80
7/9/2018			86%	14%				280
7/23/2018		2%	93%	5%				550
8/6/2018			42%	58%				330
8/20/2018	2%		91%	7%				2,110

In 2018, phytoplankton abundance at Crystal Lake was considered light and favorable on five out the six sampling events. On August 20th the phytoplankton density increased from a bloom of *Coelastrum*, a genera of green algae. An application of copper sulfate was performed on August 30th for the persistent bloom. This year, phytoplankton abundance ranged from 80 organisms per mL on June 18th to 2,110 organisms per mL. Golden algae were observed on two dates, and diatoms were observed during the two sampling events in June, and on August 20th. In the past this basin often hosted a late season blue-green algae bloom that required treatment, although in 2018 blue-green algae did not achieve densities requiring management. Trace euglenoids were observed on June 6th only.

Sunset Lake

Sunset Lake	units	6/6/18	7/9/18	8/13/18
Temperature	°C	23.4	28.1	26.0
Dissolved Oxygen	mg/L	8.66	7.04	5.87
Alkalinity	mg/L	42	48	40
pH	SU	7.75	7.5	7.25
Nitrate	mg/L	-	ND	ND
Total Phosphorus	mg/L	0.028	0.015	0.017
Conductivity	Umhos/cm	180	-	-
Turbidity	NTU	3.9	1.6	1.6
Water Clarity	feet	5.5	8	4

In 2018, 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 5.87 mg/L to 8.66 mg/L. Alkalinity results in 2018 ranged from 40 mg/L in August to 48 mg/L in July. The 2018 average alkalinity was calculated at 43 mg/L, which is similar to previous management seasons average. In 2018, the pH ranged from 7.25 in August to 7.75 in June. These values are suitable, and similar to data collected in previous seasons. Nitrate was undetected during June and July in 2018, a similar trend observed the last several seasons in this basin. Total phosphorus levels were low during each sampling event, ranging from 0.015 mg/L in July to 0.028 mg/L in June. Turbidity was 1.6 NTU in July

and August, and increased to 3.9 NTU in June. Since 2014, average turbidity has declined, although 2018 saw a slight increase with an average of 2.36 NTU. In 2018, conductivity was measured instead of nitrate during the June sampling event to start gaining some background data on this water quality parameter. In 2018, conductivity was measured instead of nitrate during the June sampling event to start gaining some background data on this water quality parameter. At Sunset Lake the conductivity value was 180 umhos/cm, which is within an acceptable range for a lake system.

Sunset Lake

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/6/2018	2%		82%	16%				600
6/18/2018	19%		81%					260
7/9/2018	13%			87%				80
7/23/2018	10%		90%					100
8/6/2018			90%	10%				200
8/20/2018	6%		90%				4%	710

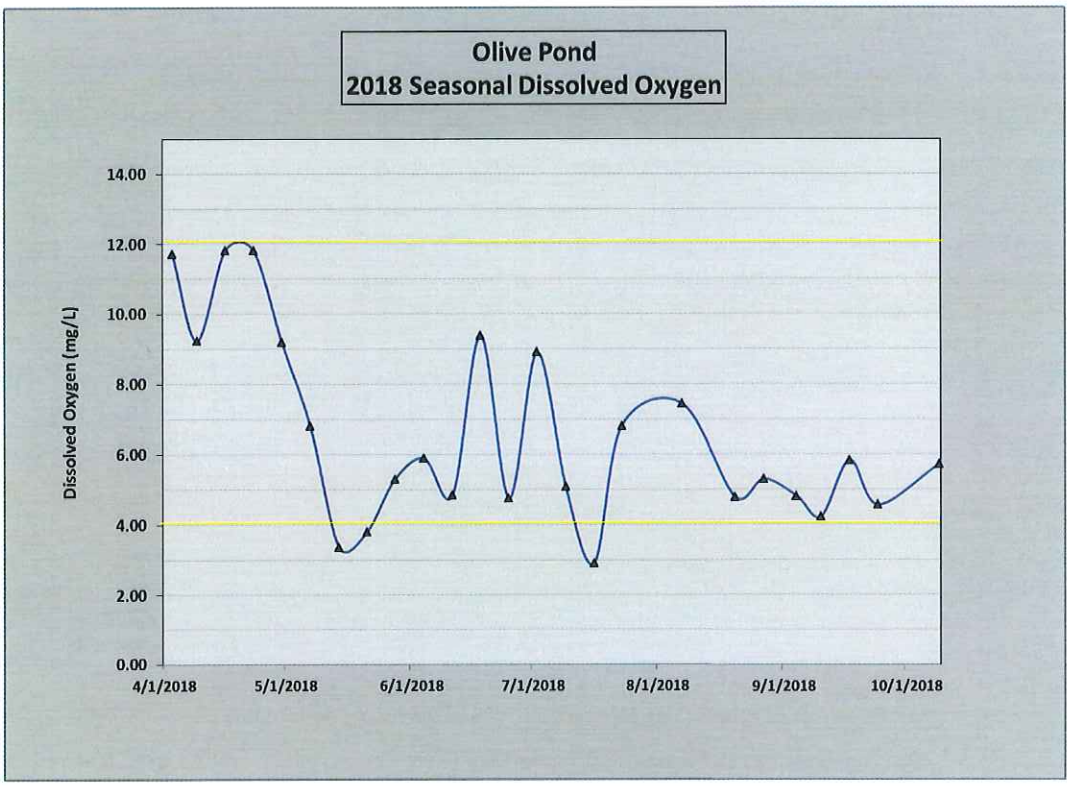
Phytoplankton abundance was suitable on all six of the sampling dates in 2018, supporting lighter densities than the upstream basins, and only traces of blue-green algae on three occasions. On four dates, the abundance was considered light with counts less than 260 organisms per mL. On June 6th density was slightly higher from a light density bloom of *Sphaerocystis*, a genus of green algae. The highest density of the season occurred on August 20th with a density of 710 organisms per mL, and a result of a bloom of *Coelastrum*, a green alga. As is typical for this site, on most dates this season, green and diatoms were the dominant groups in the assemblage. Blue-green algae genera represented 87% of the assemblage on July 9th, but the density was trace density. There were also no golden algae observed during the 2018 season at this basin.

Olive Lake

Olive Lake	units	6/6/18	7/9/18	8/13/18
Temperature	°C	21.4	27.5	26.1
Dissolved Oxygen	mg/L	5.25	5.08	4.52
Alkalinity	mg/L	42	66	60
pH	SU	6.75	7.25	7.0
Nitrate	mg/L	-	ND	ND
Total Phosphorus	mg/L	0.073	0.102	0.034
Conductivity	Umhos/cm	2000	-	-
Turbidity	NTU	3.0	3.5	2.2
Water Clarity	feet	3'	3	2

In 2018, 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 August the dissolved oxygen was less than 5.0 mg/L, which is getting close to the threshold for healthy aquatic habitat. Overall, during other inspections, dissolved oxygen levels were higher than normal for this basin for the season. The dissolved oxygen for this basin is depicted on the graph, below. This depicts that dissolved oxygen was lower than the acceptable threshold (4.0 mg/L) on

three dates. This condition, especially if it persists, could be stressful to aquatic biota in the basin, and these depressed values have been occasionally observed at this site in previous seasons.



The alkalinity at Olive Lake ranged from 42 mg/L to 66 mg/L. This increase in alkalinity is similar to previous data on record. The pH at Olive Lake was suitable on all three dates. In June, the pH was 6.75, and increased to 7.25 in July. Nitrate was undetected throughout the 2018 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 2018, with levels two to three times the threshold to support nuisance aquatic vegetation growth. Total phosphorous ranged from 0.034 mg/L in August, to 0.102 in July. The excess of nutrients are not reflected in plant or algae growth in 2018. Turbidity was suitable for this small basin throughout the season. It ranged from 2.2 NTU in August to 3.5 NTU in July. In 2018, conductivity was measured instead of nitrate during the June sampling event to start gaining some background data on this water quality parameter. At Olive Pond the conductivity value was 2,000 umhos/cm, which is very high for a lake system. It is difficult to determine the cause of the elevated turbidity since phytoplankton densities were low, although total phosphorous was high at this time, and can influence conductivity. Rain events on June 3rd and 4th may be responsible for runoff of conductive material that would elevate the conductivity level, and not impact the turbidity values.

Olive Pond								
Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/6/2018	22%	75%				3%		360
7/9/2018	12%		29%				59%	170
8/6/2018		46%	8%	23%			23%	130

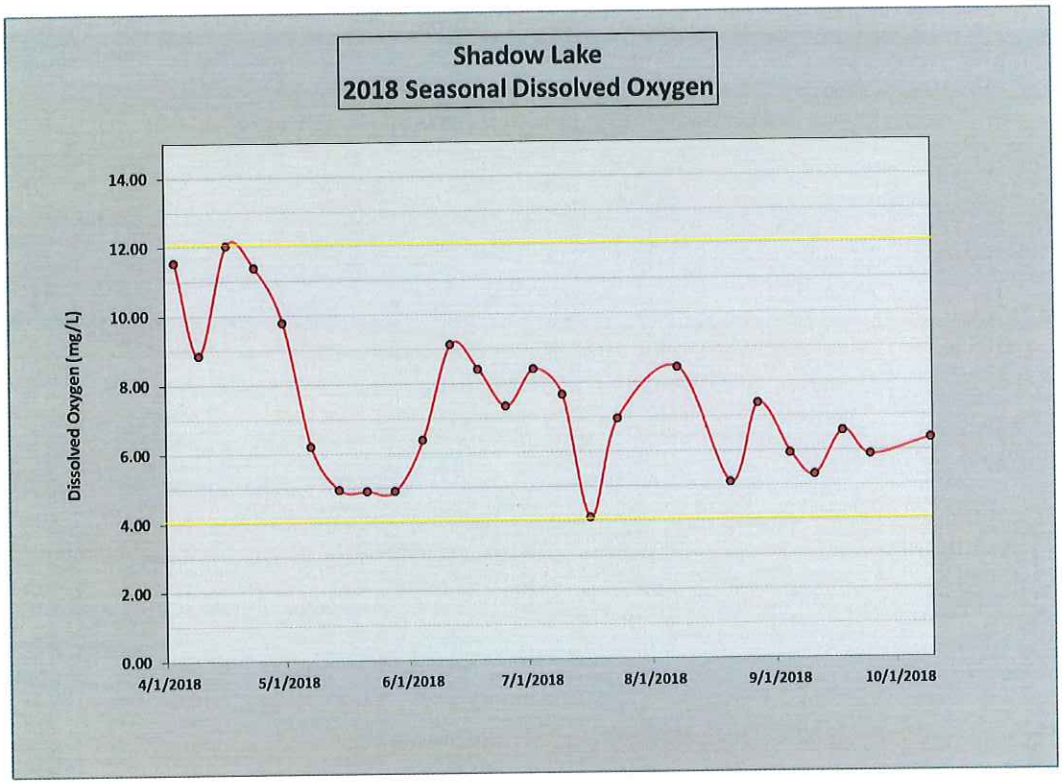
In 2018, phytoplankton density was favorable on all sampling dates, with the highest plankton density occurring on June 6th with 360 organisms per mL. The second two sampling events of the season on July 9th and August 6th were 170 organisms per mL and 130 organisms per mL, respectively. During 2018, plant and algae growth was limited at Olive Pond, despite the elevated total phosphorous levels observed through the season.

Shadow Lake

Shadow Lake	units	6/6/18	7/9/18	8/13/18
Temperature	°C	21.8	26.6	25.2
Dissolved Oxygen	mg/L	7.55	7.66	5.21
Alkalinity	mg/L	42	70	58
pH	SU	6.75	7.5	7.25
Nitrate	mg/L	-	ND	ND
Total Phosphorus	mg/L	0.086	0.118	0.058
Conductivity	Umhos/cm	260	-	-
Turbidity	NTU	3.5	2.8	3.3
Water Clarity	feet	4	3	3

In 2018, surface water temperature measurements fell within acceptable seasonal ranges at Shadow Lake. Dissolved oxygen values were considered suitable throughout the season on each of the water quality monitoring visits. The dissolved oxygen for this basin is depicted on the graph, below, and shows that dissolved oxygen was not lower than the acceptable threshold (4.0 mg/L) on any observed date.

Alkalinity in 2018 represented more typical levels, ranging only from 42 mg/L to 70 mg/L. The pH at Shadow Lake ranged from 6.75 in June to 7.5 in July. These measurements are suitable for this basin. In 2018, nitrate was undetected during July and August. Total phosphorus levels were elevated once again the entire 2018 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 0.086 mg/L, before increasing to 0.118 mg/L in July and then 0.058 mg/L in August. The elevated phosphorous levels in 2018 contributed to filamentous algae growth, although nuisance plant and phytoplankton growth was not a result, except on the last sampling date in August. Turbidity levels were suitable in 2018, ranging from 2.8 NTU in July to 3.5 NTU in June. In 2018, conductivity was measured instead of nitrate during the June sampling event to start gaining some background data on this water quality parameter. At Shadow Lake the conductivity value was 260 umhos/cm, which is within an acceptable range for a lake system. It is interesting that conductivity values on the same date were significantly different between Olive Pond and Shadow, and a determination cannot be made at this time. Only through additional future sampling can valuable data determinations be evaluated.



Shadow Lake

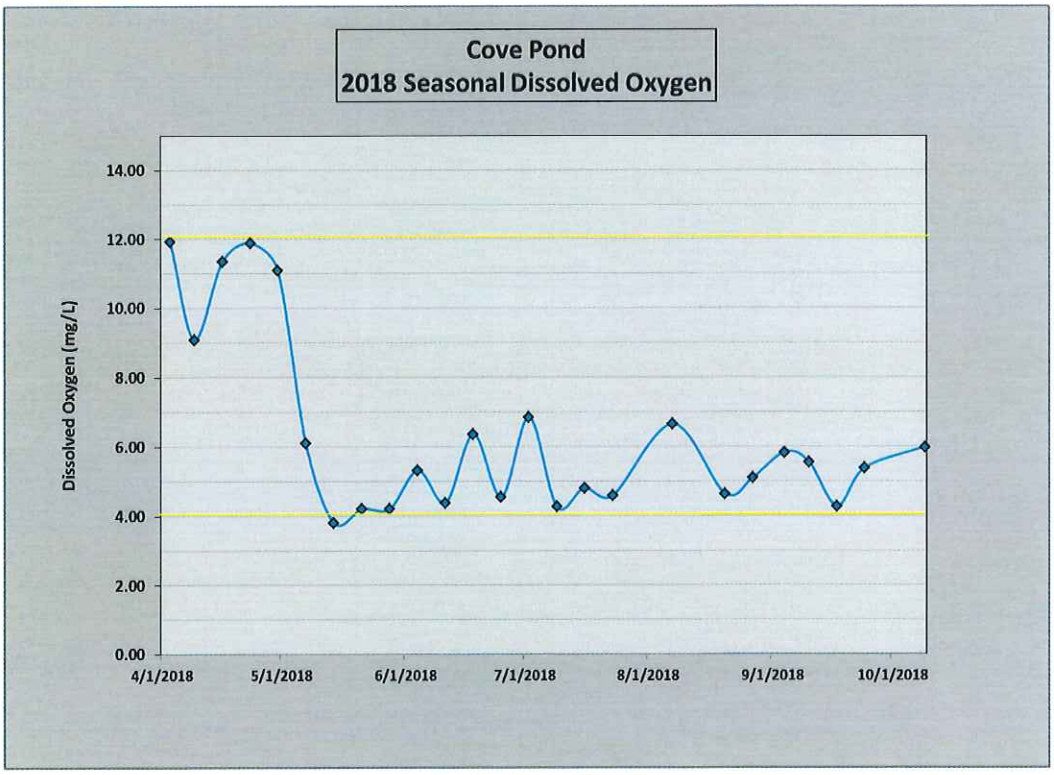
Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/6/2018	24%	76%						**510**
6/18/2018	15%	62%	3%	16%		4%		**680**
7/9/2018			18%	82%				**170**
7/23/2018	44%	8%	16%	21%			11%	**480**
8/6/2018		87%	13%					**300**
8/20/2018	4%	1%	82%	11%		1%	1%	**1,580**

Phytoplankton conditions in 2018 were suitable on five out of six dates. On the final sampling event on August 20th, the total phytoplankton assemblage was 1,580 organisms per mL, but was comprised of mostly green algae, and only light density blue-green algae were present. With the exception of a few occurrences of nuisance filamentous algae growth, overall water quality conditions at Shadow Lake were favorable for the 2018 season.

Cove Pond

Cove Pond	units	6/6/18	7/9/18	8/13/18
Temperature	°C	23.4	24.4	25.0
Dissolved Oxygen	mg/L	7.62	4.26	5.7
Alkalinity	mg/L	40	86	58
pH	SU	6.75	7.0	7.25
Nitrate	mg/L	-	ND	0.04
Total Phosphorus	mg/L	0.059	0.100	0.058
Conductivity	Umhos/cm	290	-	-
Turbidity	NTU	4.1	5.4	2.9
Water Clarity	feet	4	2	1

In 2018, surface water temperature measurements fell within acceptable seasonal ranges at Cove Pond. Dissolved oxygen levels were favorable for most of this season, with all but one observed reading exceeding 4 mg/L. In July, the dissolved oxygen was 4.26 mg/L, which is close to the threshold. Similar values were obtained in August, when dissolved oxygen values increased to 4.78 mg/L. Only one herbicide application was required in this basin, and there were no treatments 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.



In 2018, alkalinity ranged from 40 mg/L to 86 mg/L, for an annual average of 61 mg/L. We continue to see an annual average increase from 2013, when the annual average was 32.0 mg/L. Nitrate level was undetected during the July sampling event, but increased to 0.04 mg/L in August, which is still considered low, and below growth threshold. The total phosphorus at Cove Pond was elevated on all three sampling dates in 2018, similar

to previous seasons. In June, the total phosphorus was 0.059 mg/L, or two times the ideal threshold. In July, the total phosphorus nearly doubled to 0.100 mg/L, and decreased slightly to 0.058 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 2.9 NTU in August, to 5.4 NTU in July. In 2018, conductivity was measured instead of nitrate during the June sampling event to start gaining some background data on this water quality parameter. At Cove Pond the conductivity value was 290 umhos/cm, which is within an acceptable range for a lake system, and similar to Shadow Lake.

Cove Pond

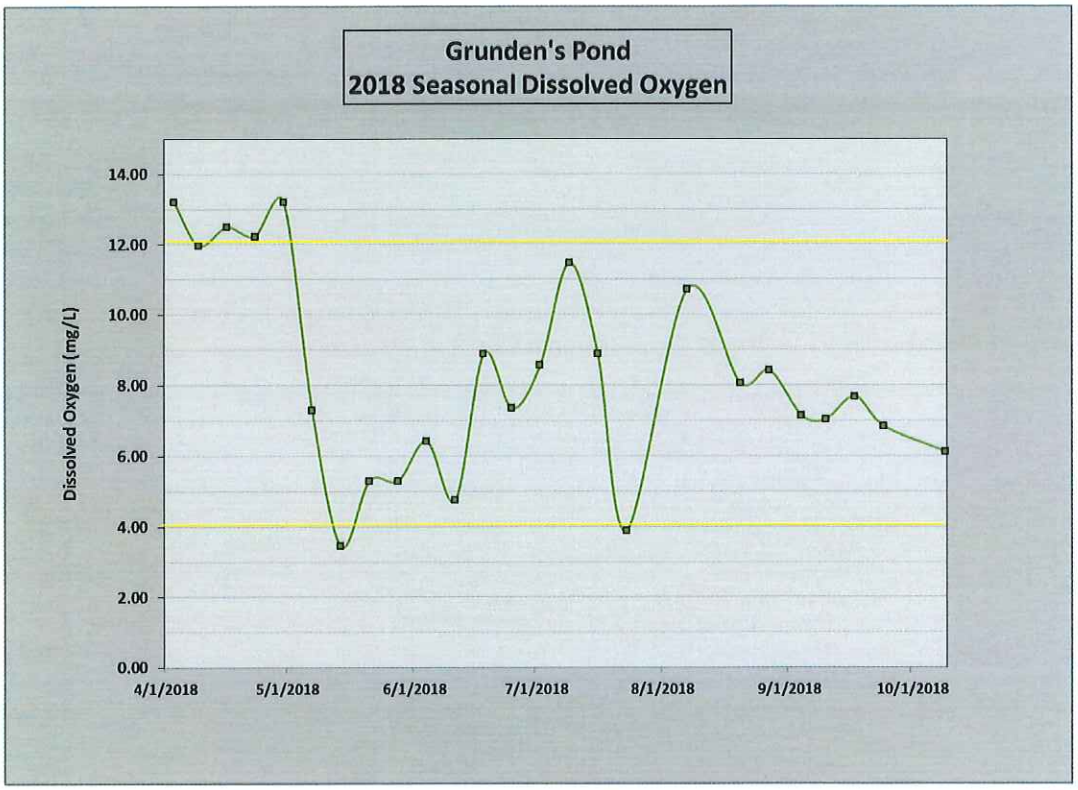
Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/6/2018	22%	74%	4%					**230**
7/9/2018				75%			25%	**160**
8/6/2018				100%				**40**

In 2018, unicellular phytoplankton abundance at Cove Pond was light and favorable throughout the season. On all dates, overall phytoplankton abundance was 230 organisms per mL or less. Through August, overall abundance remained low, but group dominance shifted to blue-green algae on August 6th, although the total density of blue-green algae was only 40 orgs. per mL, which would not cause impairment to water quality?

Grunden's Pond

Grunden's Pond	units	6/6/18	7/9/18	8/13/18
Temperature	°C	23.0	27.1	25.2
Dissolved Oxygen	mg/L	8.64	11.48	6.03
Alkalinity	mg/L	40	92	58
pH	SU	6.75	8.0	7.25
Nitrate	mg/L	-	ND	ND
Total Phosphorus	mg/L	**0.064**	**0.049**	**0.052**
Conductivity	Umhos/cm	**2600**	-	-
Turbidity	NTU	4.3	4.6	4.1
Water Clarity	feet	3	**2**	**2**

In 2018, surface water temperature measurements fell within acceptable seasonal ranges at Grunden's Pond. Weekly dissolved oxygen measurements were collected at this site again in 2018 as depicted on the graph below. Dissolved oxygen was lower than the ideal threshold (4.0 mg/L) on only two dates, but also exceeded the ideal threshold (12.0 mg/L) on four dates, 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 three years as well.



Alkalinity in 2018 at Grunden's Pond ranged from 40 mg/L in June to 92 mg/L in July which is similar to most other basins. The annual average was calculated at 63 mg/L, similar to data prior to 2017 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 July and August in 2018. Total phosphorus was elevated throughout 2018 on all three sampling dates, similar to the previous seasons at this site, and other small basins. In June, it was 0.064 mg/L, with a slight decrease to 0.049 mg/L in July. In August, total phosphorus increased slightly again to 0.052 mg/L. Turbidity was acceptable on all dates this year ranging from 4.1 in August to 4.6 NTU in July. At Grunden's Pond the conductivity value was 2,600 umhos/cm, which is very high for a lake system, and more similar to Olive Pond. It is difficult to determine the cause of the elevated turbidity since phytoplankton densities were low, although total phosphorous was high at this time, and can influence conductivity. Rain events on June 3rd and 4th may be responsible for runoff of conductive material that would elevate the conductivity level, and not impact the turbidity values.

Grunden's Pond

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/6/2018	22%	74%	4%					**890**
7/9/2018				86%			14%	**140**
8/6/2018			40%				60%	**50**

In 2018, total phytoplankton abundance varied throughout the entire season, but early in the season on June 6th it was elevated due to a bloom of golden algae (*Mallamonas*). Overall abundance was low during the July and August sampling dates. The July algal community was dominated by blue-green algae, but at only trace density. Phytoplankton abundance decreased to very low on August 6th. Grunden's Pond seemed to be dominated by filamentous algae in 2018, which required six 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	6/6/18	7/9/18	8/13/18
Temperature	°C	24.3	30.2	25.5
Dissolved Oxygen	mg/L	7.83	9.40	5.72
Alkalinity	mg/L	40	84	50
pH	SU	7.0	8.25	7.25
Nitrate	mg/L	-	ND	0.035
Total Phosphorus	mg/L	0.022	0.024	0.025
Conductivity	Umhos/cm	530	-	-
Turbidity	NTU	1.5	1.5	2.8
Water Clarity	feet	7	10	2

In 2018, 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 2018 season, which is typical for this basin. In June, the dissolved oxygen was 7.83 mg/L, which is equivalent to 93% saturation. In July, the dissolved oxygen experienced an increase to 9.40, but this is equivalent to 125% saturation (due to the increase in water temperature), and likely the result of the plant growth in the lake. By August, dissolved oxygen decreased to 5.72 mg/L, yet this was still equivalent to 70% saturation. See below for a discussion of the water clarity at Mountain Lake in 2018.

Alkalinity at Mountain Lake in 2018 ranged from 40 mg/L in June to 84 mg/L in July. This is slightly higher than data recorded over past several years, but from a historical standpoint is still suitable. In 2018, pH varied throughout the season. In July, it was 8.25, but in June and August the pH was 7.0 and 7.25, respectively. All values were suitable for this basin. The nitrate level was undetectable during July, but increased to 0.025 mg/L in August, which again, is similar to the other basins in the borough. Total phosphorus levels varied minimally throughout the 2018 season at this site. Total phosphorus was 0.022 mg/L in June and increased to 0.024 mg/L in July. This year, in August the total phosphorus increased to 0.025 mg/L. This is elevated compared to previous seasons, and likely a result of nutrient runoff from the excessive rainfall. Each of the total phosphorus levels are below threshold levels, and favorable, especially compared to the small basins in the borough. Turbidity measurements this season were also ideal on all dates, with measurements only ranging from 1.5 NTU in June and July to 2.8 NTU in August. Water clarity was favorable for much of the season, but was observed at only two feet on August 13th, and does not appear to correlate to phytoplankton abundance. In 2018, conductivity was measured instead of nitrate during the June sampling event to start gaining some background data on this water quality parameter. At Mountain Lake the conductivity value was 530 umhos/cm, which is elevated but within an acceptable range

for a lake system. It is likely that rainfall events allowed for the higher value at Mountain Lake for the volume of runoff into this lake.

Mountain Lake

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/6/2018	13%	4%	73%				10%	**480**
6/18/2018	50%		50%					**100**
7/9/2018	23%	8%	69%					**130**
7/23/2018	8%	22%	61%	7%		2%		**590**
8/6/2018	8%	76%	16%					**130**
8/20/2018	2%	2%	75%	2%	15%	2%	2%	**470**

The phytoplankton abundance data was light and favorable throughout the 2018 season, although phytoplankton increased late in August requiring an algaecide application. Total phytoplankton counts ranged from 100 organisms per mL to 590 organisms per mL, very similar to recent seasons. Green algae dominated the phytoplankton community on four dates, and were 50% of the assemblage on June 18th. Also, blue-green algae were at trace density on July 23rd and August 20th, and was not observed on other dates. Since the overall phytoplankton counts were low (less than 590 organisms per mL) on each date, these abundances were considered non-problematic and did not require treatment (until after sampling commenced for season). 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 2018 do not indicate an immediate need for alum in 2019, unless observed water quality through the season displays a shift in water quality.

Wildwood Lake

Wildwood Lake	units	6/6/18	7/9/18	8/13/18
Temperature	°C	24.2	28.3	25.2
Dissolved Oxygen	mg/L	10.37	7.76	7.07
Alkalinity	mg/L	60	68	60
pH	SU	7.5	8.5	7.5
Nitrate	mg/L	-	ND	0.135
Total Phosphorus	mg/L	0.016	0.023	0.029
Conductivity	Umhos/cm	**2800**	-	-
Turbidity	NTU	1.7	1.4	3.4
Water Clarity	feet	5.75	12	3

In 2018, surface water temperature measurements fell within acceptable seasonal ranges at Wildwood Lake. Dissolved oxygen ranged from 7.07 mg/L in August to 10.37 mg/L in June. These values are seasonally ideal for this basin, and similar to results obtained in previous seasons.

Alkalinity levels in 2018 ranged from 60 mg/L to 68 mg/L, for a seasonal average of 62.7 mg/L. This is consistent with data prior to the 2017 season, when alkalinity showed an increase. Wildwood Lake typically has the highest pH of the lakes in the Mountain Lakes chain. In 2018 the pH was recorded at 7.5 in June and August, which is ideal. Although it

did increase to 8.5 in July, this value is still suitable and in balance with the phytoplankton abundances we observed throughout the season. In 2018, nitrate was undetected during the July sampling at this site. During August nitrate level was 0.135, which is still below the critical threshold. Total phosphorus measurements were suitable during each of the sampling dates for the 2018 season at only 0.016 mg/L in June, and increased to a season high 0.029 mg/L in August. Turbidity was also stable this season, ranging from 1.4 NTU in July to 3.4 NTU in August. Despite this increase later in the season, these amounts remain within acceptable measurements. At Wildwood Lake the conductivity value was 2,800 umhos/cm, which is very high for a lake system, and more similar to Birchwood Lake. It is difficult to determine the cause of the elevated turbidity since phytoplankton densities were low. Rain events on June 3rd and 4th may be responsible for runoff of conductive material that would elevate the conductivity level, and not impact the turbidity values

Wildwood Lake

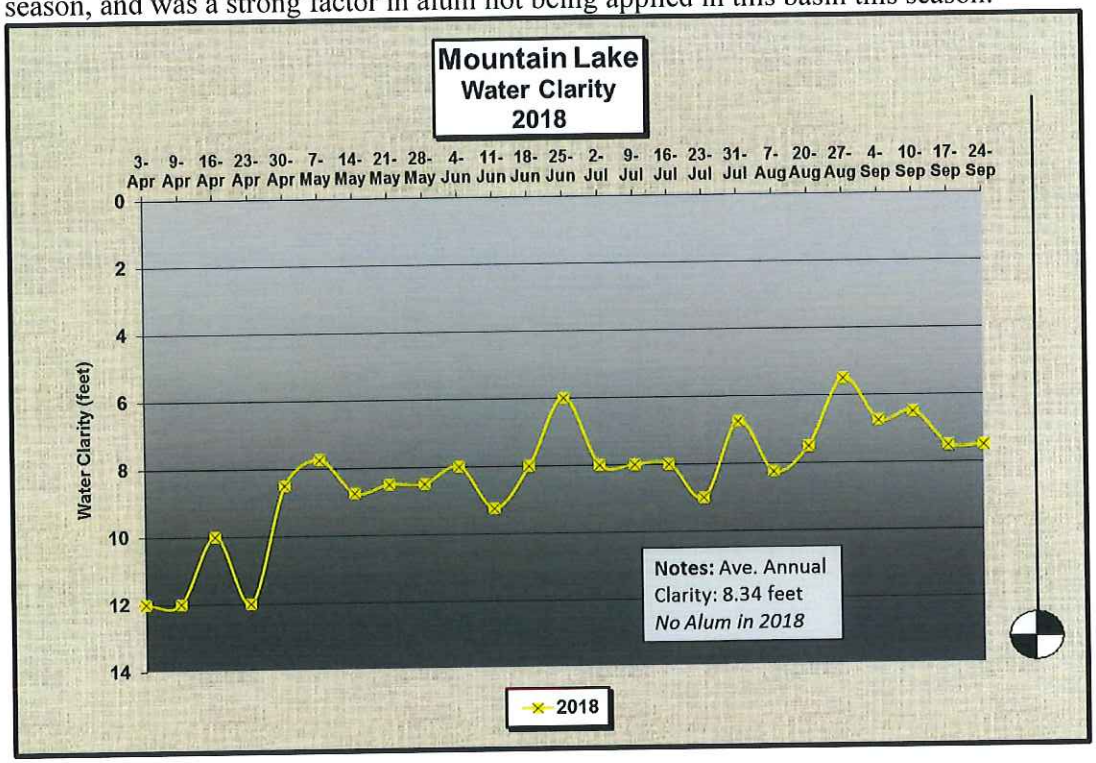
Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/6/2018	64%	9%	18%				9%	**220**
6/18/2018	74%		5%			5%	16%	**390**
7/9/2018	20%		40%	40%				**50**
7/23/2018		25%	50%	12.5%			12.5%	**80**
8/6/2018			100%					**60**
8/20/2018	14%	29%	52%				5%	**210**

In 2018, overall unicellular phytoplankton counts at Wildwood Lake were low on all dates, ranging from 50 organisms per mL to 390 organisms per mL. On two dates, green algae were the dominant group, as expected. These dates were the final two sampling events of the season. Blue-green algae were only present during the two sampling events in July, 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 last sampling event in August, green algae were the only algal group present.

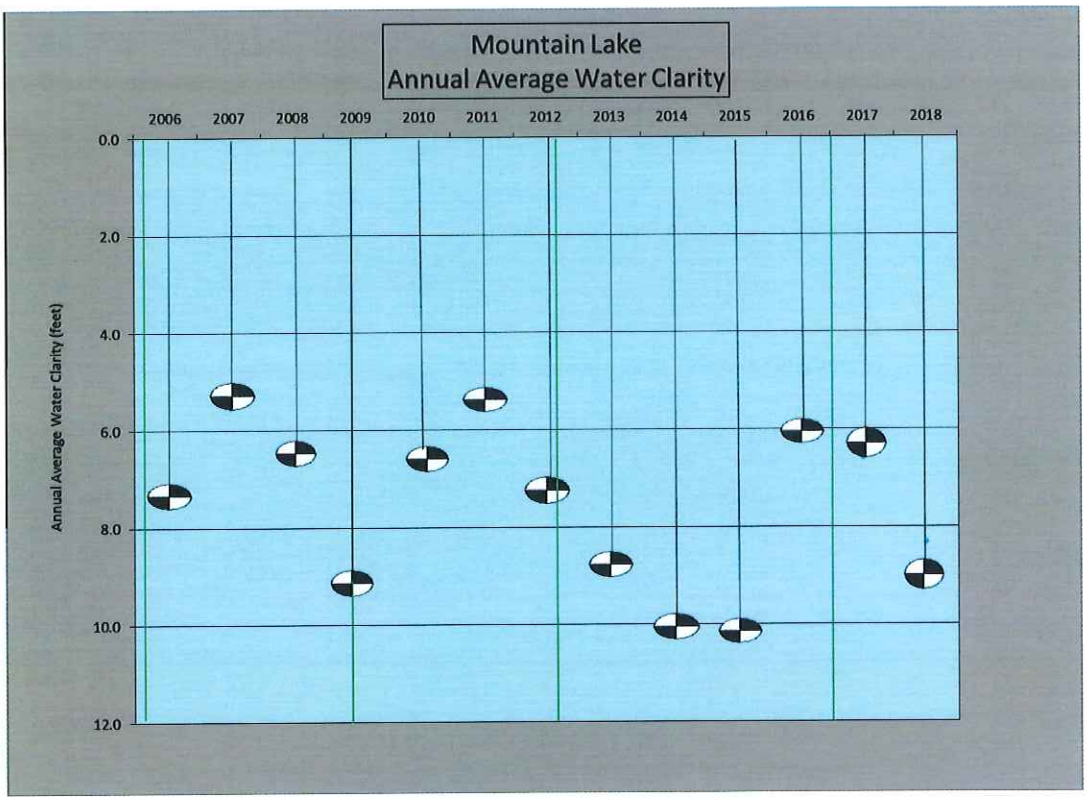
2006 to 2018 Water Clarity at Mountain Lake

Below is a graph that depicts the water clarity at Mountain Lake in 2018. 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 sixth 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 2018 ranged from 5.5 feet to 14.0 feet (estimated) throughout the season. The two foot water clarity measurement did not occur on the values represented, and also does not represent the typical water clarity for the 2018 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 four dates water clarity equaled or exceeded 10 feet, which is considered outstanding for an urban

shallow lake in the Northeast. On all but one observed date the 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 a strong factor in alum not being applied in this basin this season.



In 2018, the annual average water clarity was 8.34 feet, which is higher than the average of the past several seasons, and similar to the values from 2014 and 2015. 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.

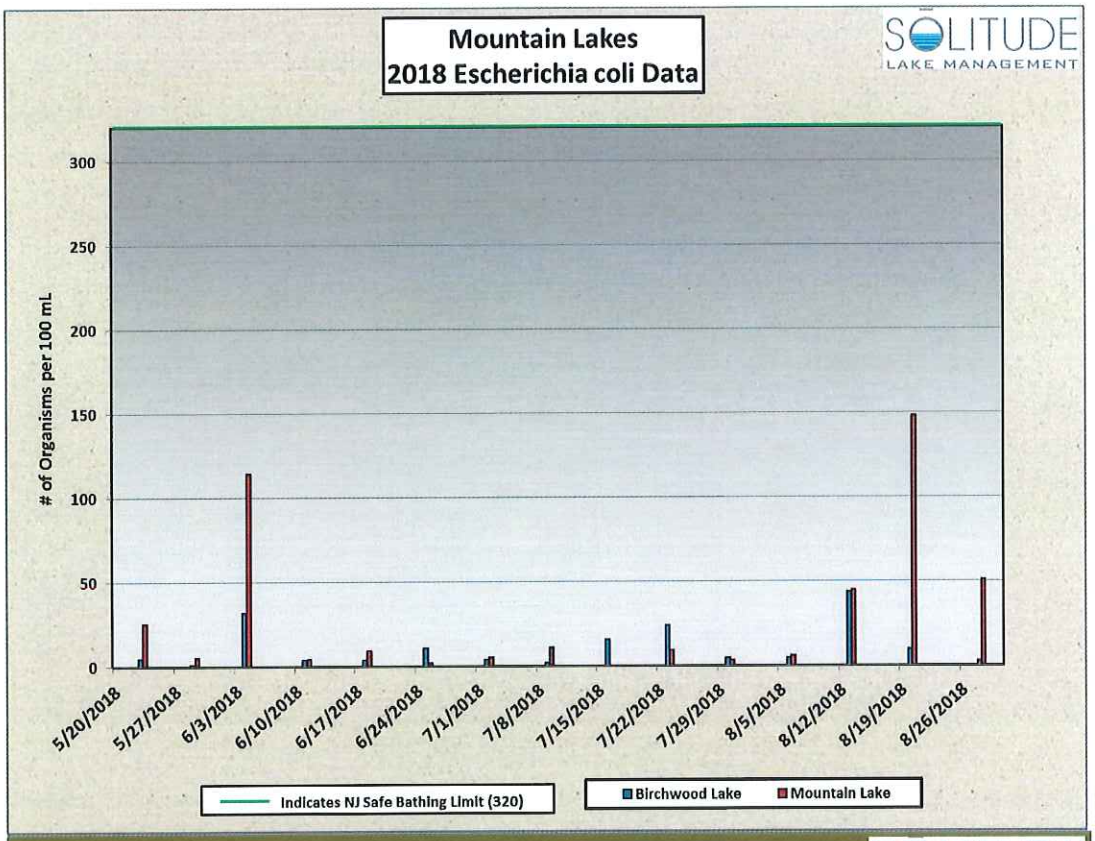


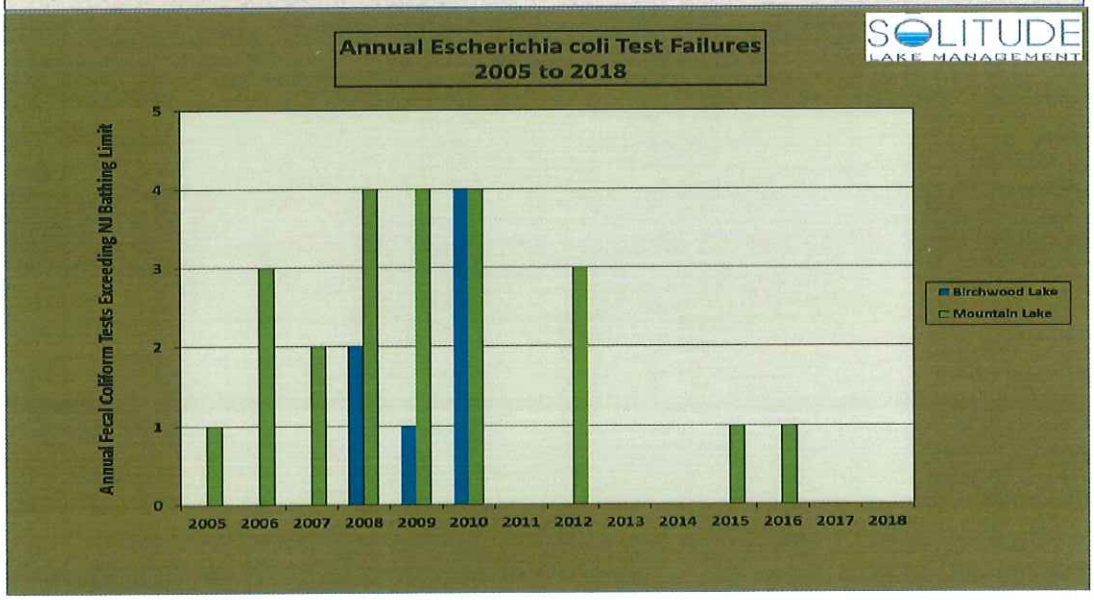
2018 E. coli Testing at Birchwood and Mountain Lake

E. coli sampling was performed at Birchwood Lake's beach and Mountain Lake's Island Beach in 2018. In 2018 New Jersey Department of health imposed revised sampling requirements that dictated a shift from fecal coliform sampling to more specifically E. coli. Sampling occurred weekly during surveys, and was conducted from Memorial Day through August 27th (the week before Labor Day). E coli counts are measured as a number of colony forming units (cfu) per 100 mL sample, and New Jersey has set a safe bathing limit of 320 cfu per 100 mL, depicted by the green line on the graph presented above. Consult the graph for a summary of the fecal coliform counts at both sites for 2018. The Appendix of this report contains a reproduction of this graph, and a table summarizing the 2018 data. On these tables, numbers highlighted in red exceed the NJ bathing limit of 320 cfu per 100 ml. In 2018, 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 2018, no failures were observed at Birchwood Lake, the eighth 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 2018. This graph depicts very different conditions in the first six years of the dataset as compared to the last five years.





2018 Lakes Cleaning Project

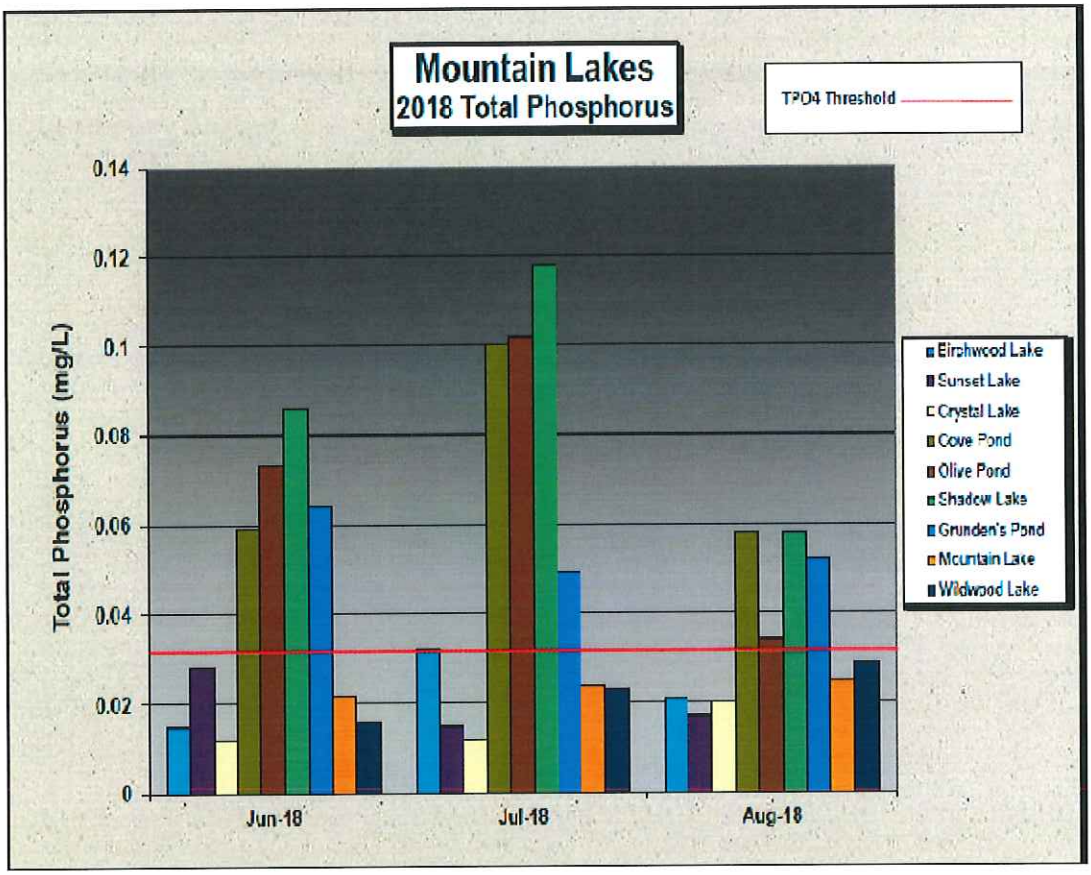
In 2018, the Lakes Cleaning Project was conducted in April, May and October at Birchwood Lake. The table below is a summary of the dates, loads removed, estimated cubic yards of consolidated organic debris removed, and the number of hours raked.

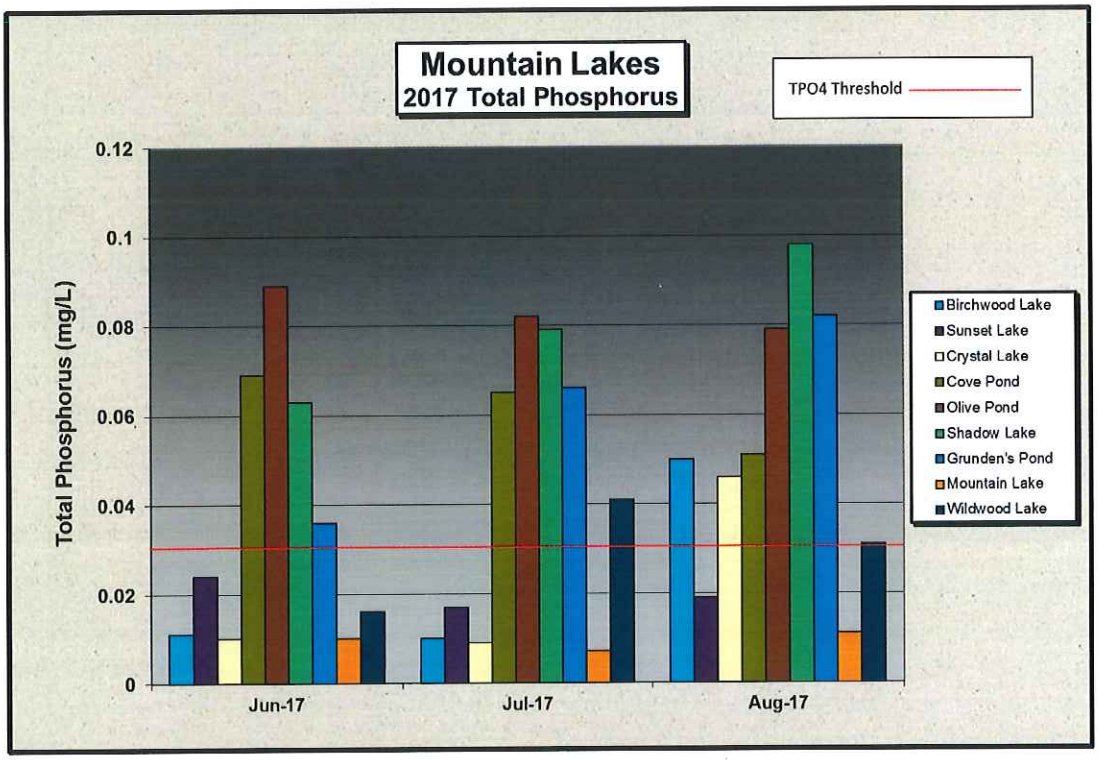
Hydro-raking			
Lake	**Dates**	**Hours**	**Material Removed (yds3)**
Birchwood Lake	April	~40	~100
	May	~40	~100
	October	~80	~500

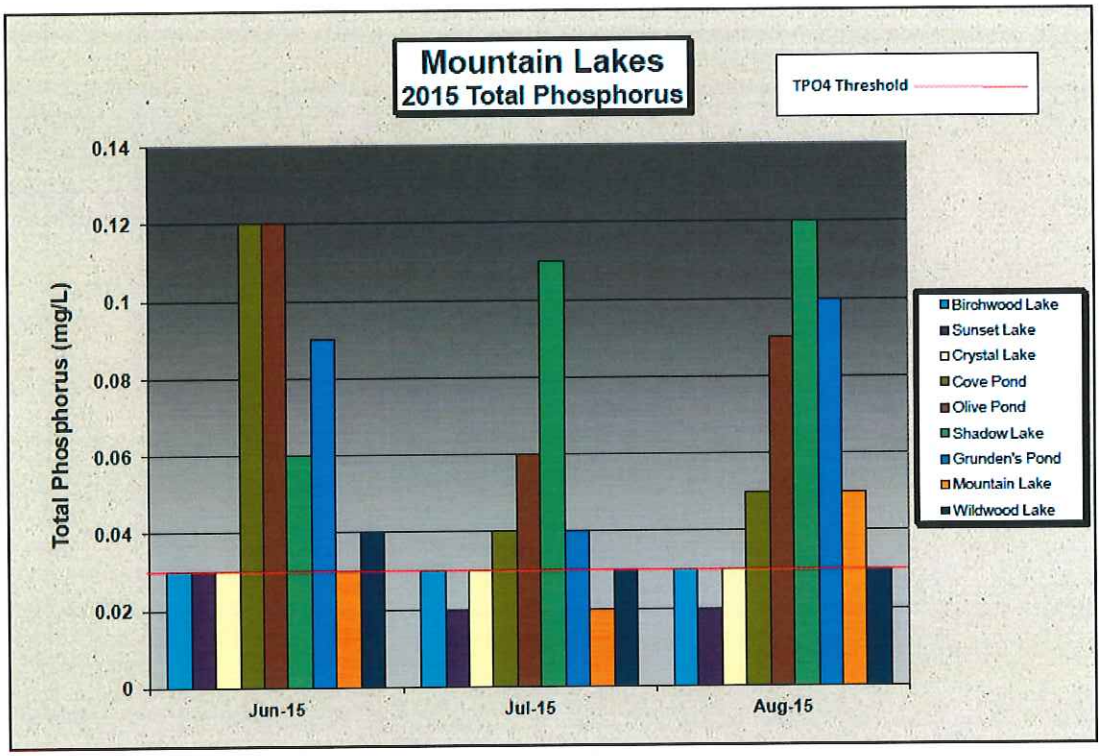
Hydro-raking activities focused on the upper basin area of Birchwood Lake to begin a three to five year restoration program to remove floating debris, as well as accumulated bottom organics. It is anticipated that the program can continue in 2019 without dredging permits, although permits will be required to complete the project as projected and proposed.

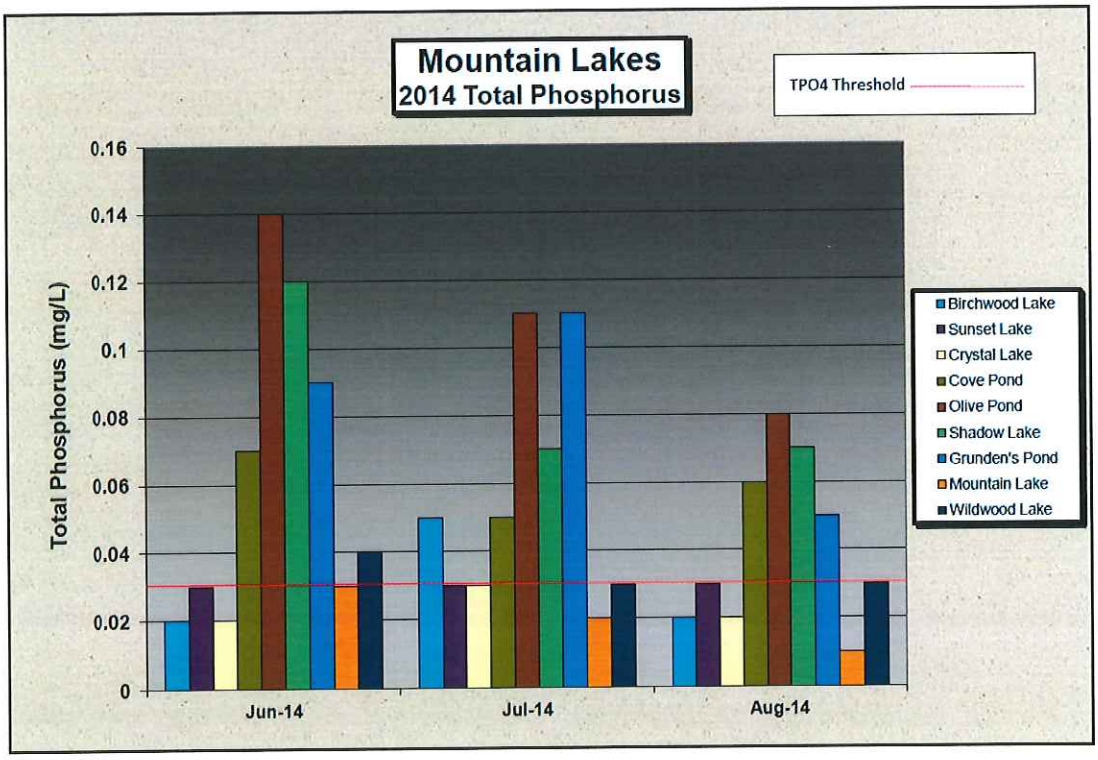
2006 to 2018 Total Phosphorus at Mountain Lakes

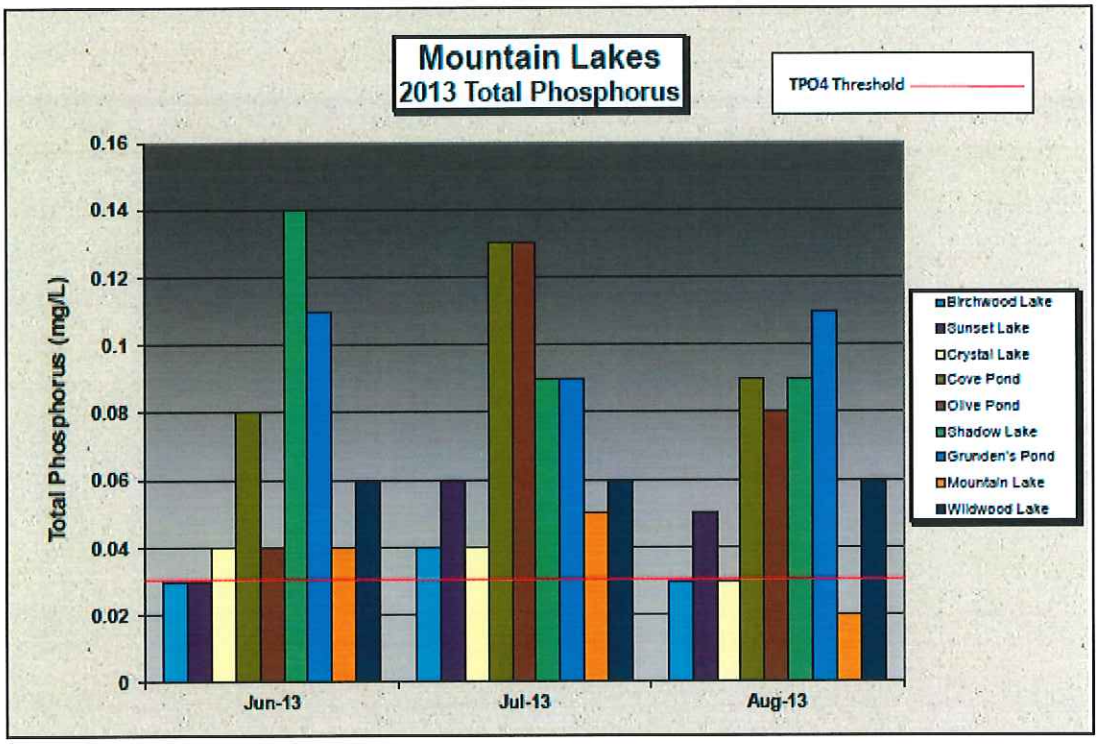
Below are twelve graphs, each representing total phosphorus data collected at all nine lakes for all three seasonal sampling events. Each graph depicts a different year, 2006 through 2018. Total phosphorus in 2018 continues to be elevated at the smaller basins on all three dates. As the season progressed from June to July, total phosphorous levels increased at three locations, although by August total phosphorous at each of the smaller basins decreased significantly. Birchwood Lake, Sunset Lake, Crystal Lake, Mountain Lake and Sunset Lake all maintained total phosphorous levels below the threshold on all three sampling events. This is a significant increase from only Mountain Lake and Wildwood Lake accomplishing that water quality goal in 2017. The acceptable total phosphorus threshold for lakes is 0.03 mg/L, depicted with the red line on the graphs below.

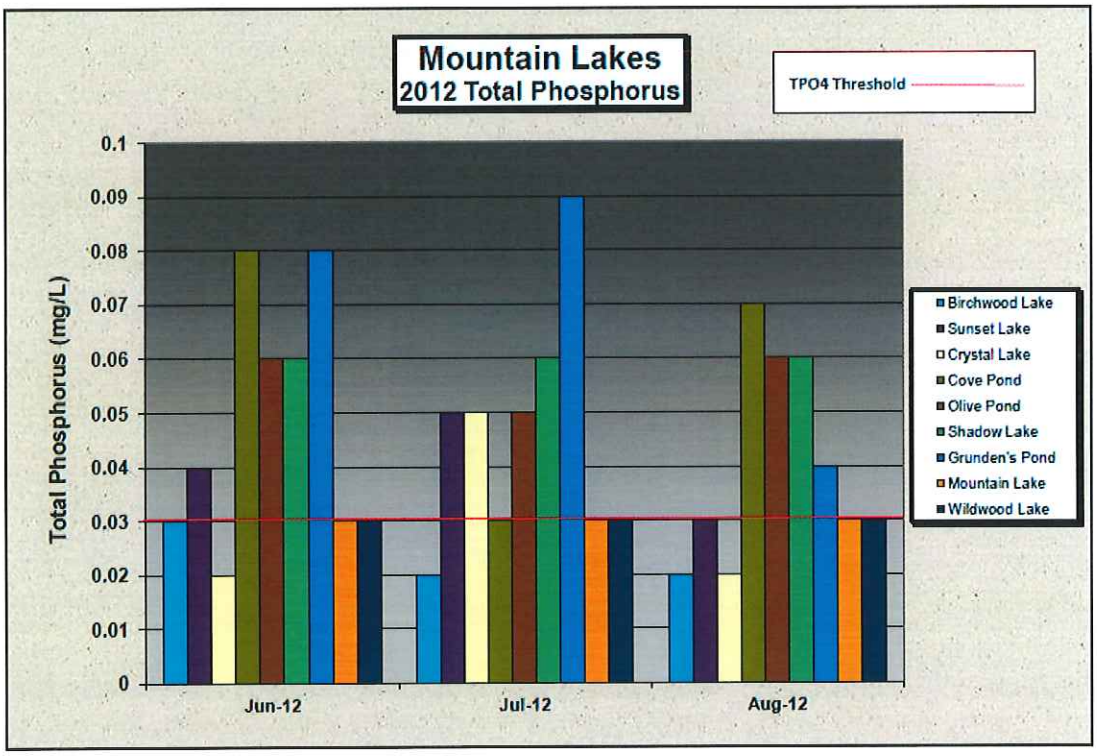

Mountain Lakes
2018 Total Phosphorus
TPO4 Threshold
Total Phosphorus (mg/L)
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
Jun-18
Jul-18
Aug-18
Birchwood Lake
Sunset Lake
Crystal Lake
Cove Pond
Olive Pond
Shadow Lake
Grunden's Pond
Mountain Lake
Wildwood Lake

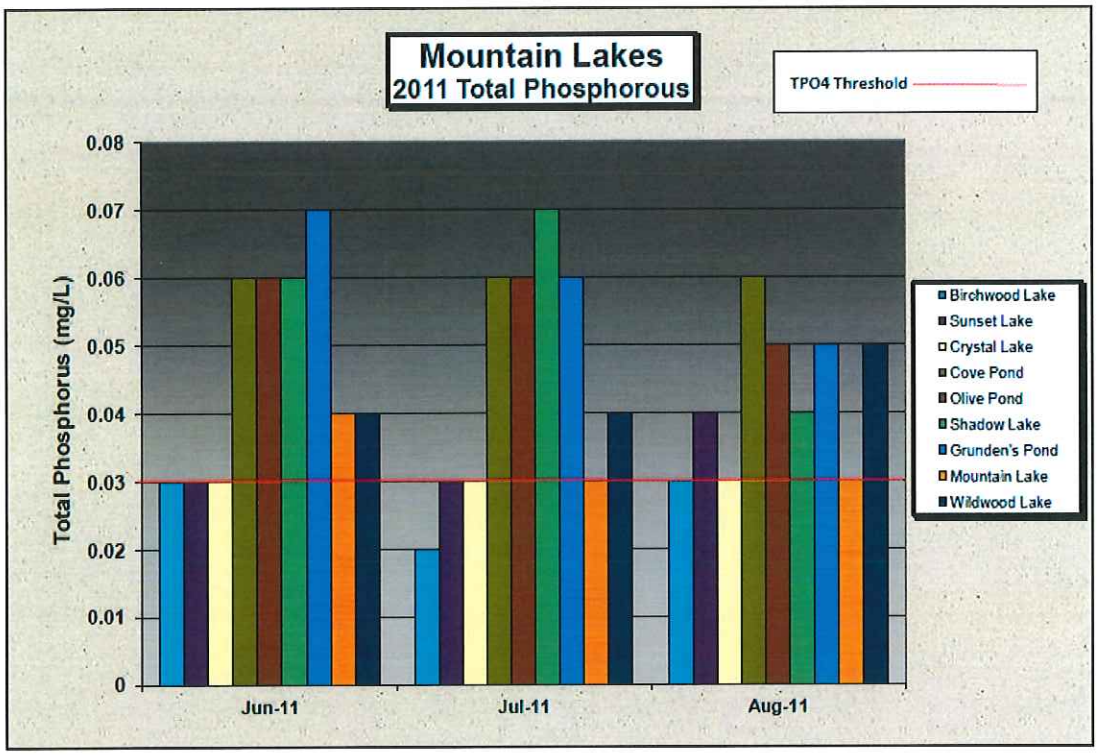

Mountain Lakes
2017 Total Phosphorus
TPO4 Threshold
Total Phosphorus (mg/L)
0.12
0.1
0.08
0.06
0.04
0.02
0
Jun-17
Jul-17
Aug-17
Birchwood Lake
Sunset Lake
Crystal Lake
Cove Pond
Olive Pond
Shadow Lake
Grunden's Pond
Mountain Lake
Wildwood Lake

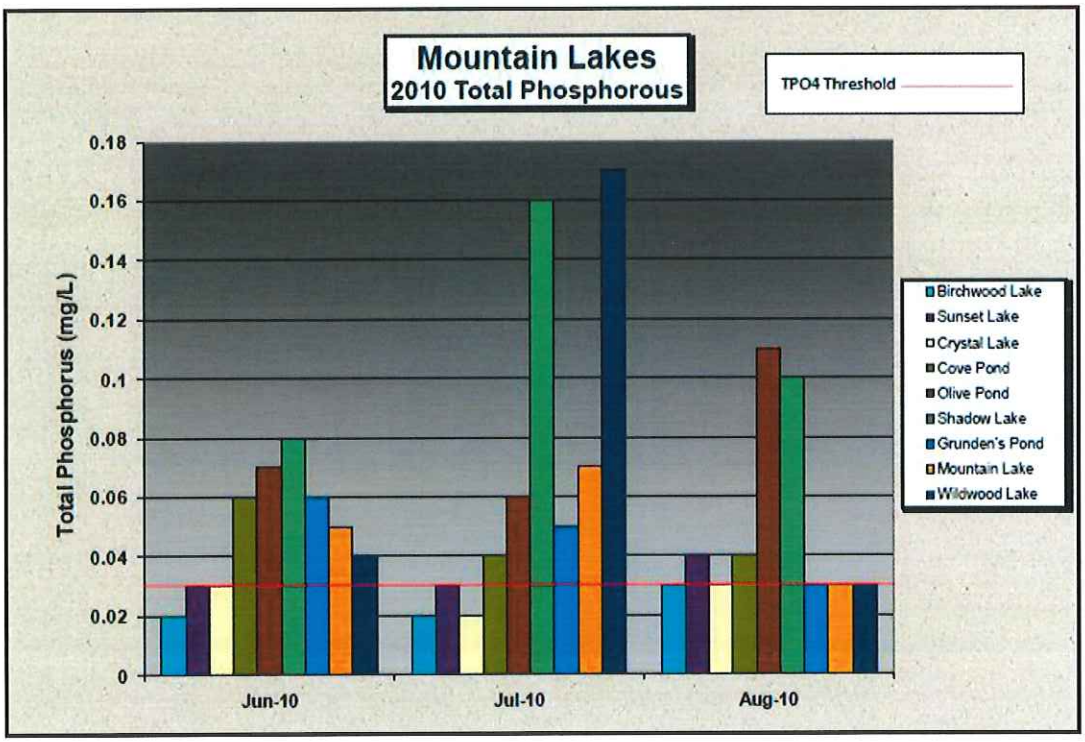

Mountain Lakes
2015 Total Phosphorus
TPO4 Threshold
Total Phosphorus (mg/L)
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
Jun-15
Jul-15
Aug-15
Birchwood Lake
Sunset Lake
Crystal Lake
Cove Pond
Olive Pond
Shadow Lake
Grunden's Pond
Mountain Lake
Wildwood Lake

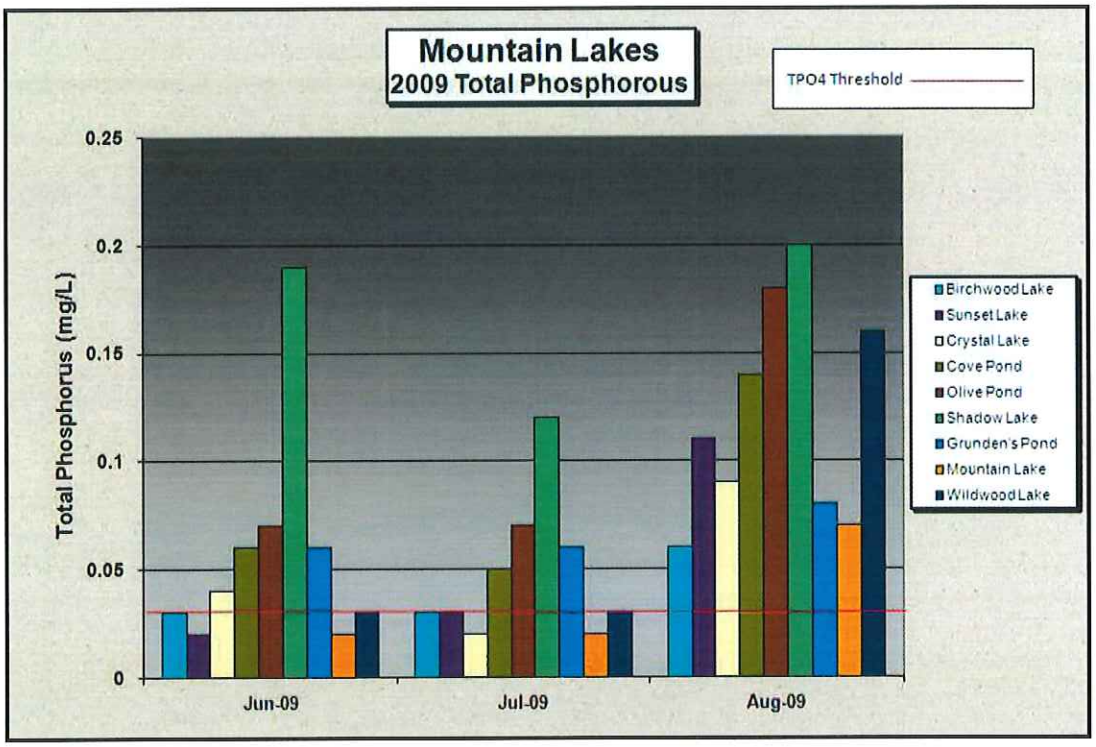

Mountain Lakes
2014 Total Phosphorus
TPO4 Threshold
Total Phosphorus (mg/L)
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
Jun-14
Jul-14
Aug-14
Birchwood Lake
Sunset Lake
Crystal Lake
Cove Pond
Olive Pond
Shadow Lake
Grunden's Pond
Mountain Lake
Wildwood Lake

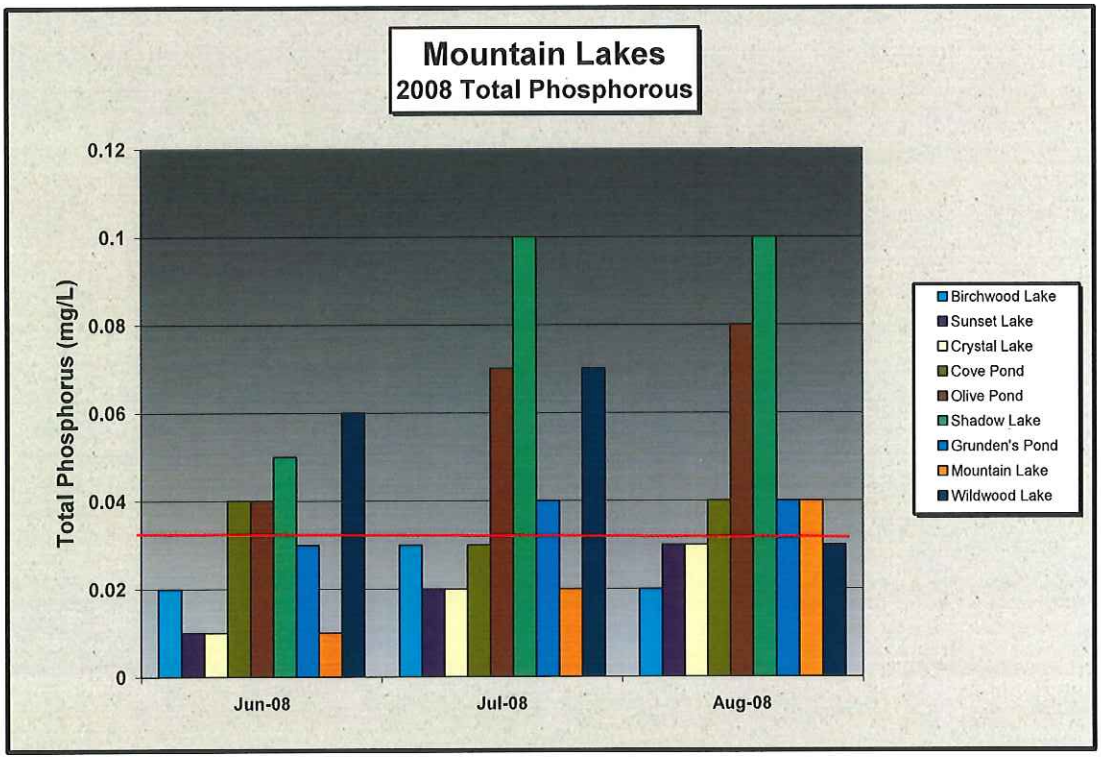

Mountain Lakes
2013 Total Phosphorus
TPO4 Threshold
Total Phosphorus (mg/L)
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
Jun-13
Jul-13
Aug-13
Birchwood Lake
Sunset Lake
Crystal Lake
Cove Pond
Olive Pond
Shadow Lake
Grunden's Pond
Mountain Lake
Wildwood Lake

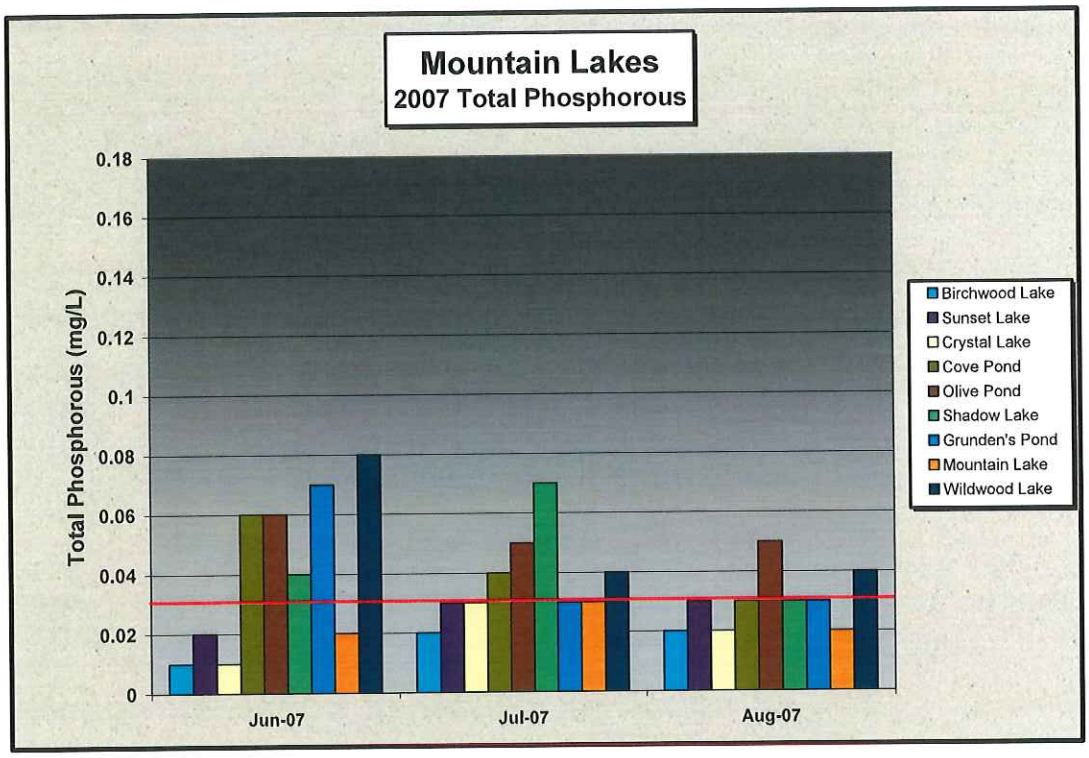

Mountain Lakes
2012 Total Phosphorus
TPO4 Threshold
Total Phosphorus (mg/L)
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
Jun-12
Jul-12
Aug-12
Birchwood Lake
Sunset Lake
Crystal Lake
Cove Pond
Olive Pond
Shadow Lake
Grunden's Pond
Mountain Lake
Wildwood Lake

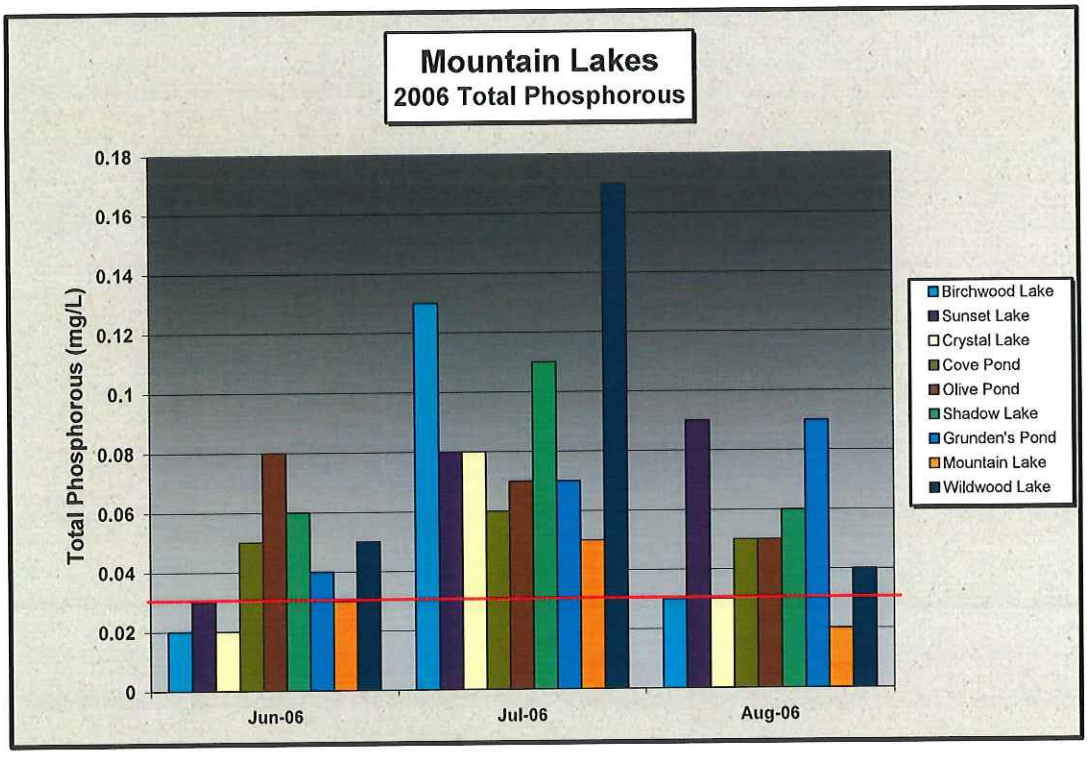

Mountain Lakes
2011 Total Phosphorous
TPO4 Threshold
Total Phosphorus (mg/L)
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
Jun-11
Jul-11
Aug-11
Birchwood Lake
Sunset Lake
Crystal Lake
Cove Pond
Olive Pond
Shadow Lake
Grunden's Pond
Mountain Lake
Wildwood Lake


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


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


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


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


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

2018 Summary of Lake Management Activities

- In 2018, temperature departures were higher than average with the 2nd warmest February, 4th warmest May, 2nd warmest August, and 3rd warmest September. April was three degrees below average, while June, July and October were each only one to two degrees warmer than average.
- For the most part, monthly rainfall averages were significantly exceeded in every month from February through October. The only exception was June which was about three quarters of an inch below average for rainfall.
- Eurasian water milfoil was observed at Mountain Lake and Wildwood Lake in 2018 at very limited abundance and distribution. It was not observed in Mountain Lake until the latter part of the season in the northern end of the lake.
- Schooner was used to control lilies and pondweeds in the swim lanes at Birchwood Lake.
- There was no use of the systemic herbicide Sonar in 2018.
- Each of the four smaller basins showed improvement in overall plant and algae abundance compared to the 2017 season.
- Hydro-raking was conducted in Birchwood Lake in April, May and October.
- Overall, total phosphorus levels were elevated at the smaller basins in 2018, as well as other lakes during various sampling events, most specifically in June and July.
- Overall, unicellular phytoplankton abundance was favorable (low to moderate) at all of the larger basins this season, and on most sampling dates at the smaller basins.
- All E. coli 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 conducted in 2018 at each of dam locations for each lake as appropriate.

2019 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 2019, it is recommended that weekly dissolved oxygen monitoring continue at the smaller basins. For the past several years, dissolved oxygen levels have been depressed on select dates throughout the season, and each of these basins could benefit from the use of aeration. The borough should consider a feasibility study of aeration system for Olive Pond in 2019. Grunden's Pond should be explored following completion of all dam construction and refilling.

Dissolved oxygen throughout the water column at Birchwood Lake continues to be depressed as well. SOLitude Lake Management will examine all of the historical data at Birchwood Lake to develop a more appropriate plan to improve the dissolved oxygen

health of the lake. Also at this lake in 2019, water lilies will be aggressively managed through foliar herbicide application. In Birchwood Lake, a limited application of Clipper is planned for the nuisance water lilies and pondweeds around the swimming docks

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

Surgical management of water lilies in Sunset Lake should 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. A shoreline survey of Sunset Lake will be conducted during June, with an herbicide application to target any growth of Purple Loosestrife in early to mid-July. It is understood that this lake is expected to be drained for dam repair at the end of the 2019 management season.

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. Based on observed algal growth and total phosphorous at Crystal Lake, an aluminum sulfate application at this lake should be strongly considered in 2019. In September of 2018, the cattail growth along the western shoreline was sprayed from the shoreline utilizing backpack sprayer. It is anticipated that the plants that were sprayed may require cutting to remove the dead plant and organic material. Growth of bassweed will be targeted with Aquathol-K as required to ensure only desirable densities are present.

Since this is the third year after treatment (YAT) using Sonar at Mountain Lake, Sonar use or aggressive use of contact products are likely needed in 2019. Solitude will also explore the potential to use a new herbicide formulation ProcellaCor. ProcellaCor is a new systemic herbicide formulation that can be applied as a spot treatment if that is what required for spot control of Eurasian water milfoil. Conditions shall be confirmed with early season on-water surveys. Due to the permitting costs of hydro raking, SOLitude is recommending a more aggressive bacterial enhancement trial program to a cove of the lake, to be determined between the Lake Committee and SLM. The program would include a label recommended prescribed rate on a monthly basis, with visual observation to determine if improvement is occurring. An application of alum in 2019 to Mountain Lake is expected to continue to be more reactive in nature based on observed clarity, phytoplankton density and phosphorous levels.

Contact herbicides will be the products of choice in Wildwood Lake, to control early-season curly-leaf pondweed and later season naiad growth.

In the smaller basins, we expect to continue the use of chelated copper algaecides, or Earthtec, a copper sulfate formulation, to control nuisance algae growth. Solitude will aggressively treat nuisance water meal as needed in 2019 with Schooner or Sonar, or other herbicides that may have a potential fit if necessary. Management at Grunden's

Pond will be determined based on completion of the dam reconstruction. It is recommended that Olive Pond and Shadow Lake be targeted with an early season dose of Phoslock, a phosphorous locking technology to reduce the available phosphorous in these two basins. This program may be expanded to Grunden's Pond if dam reconstruction is complete in the early part of the season. It is also recommended that each of these basins be targeted with monthly bacterial enhancement, similar to what was initiated at Shadow Lake in 2018.

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

The use of Alum at Wildwood Lake (early and late season applications) continues to be beneficial to the basin. Two Wildwood Lake applications will occur as planned in 2019. 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. It is expected that contact herbicides will be utilized for nuisance or invasive submersed aquatic plant growth. Naiad will be aggressively managed, especially along the residential shoreline.

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 2019, previously sprayed locations will be re-surveyed, in addition to surveying most lake margins and dams throughout the borough.

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

References

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

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

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

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

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

APPENDIX

2018 Rainfall and Temperature Data
2018 Water Quality Graphs
2018 Water Chemistry Data
2008 to 2018 Treatment History Graphs
2018 Phytoplankton Distribution Graphs
2018 Phytoplankton Data Sheets
2018 Alpha Water Chemistry Data Sheets
2018 Phytoplankton Data
2018 Fecal Coliform Data
2018 Weekly Surveys

2018 Rainfall Data-Mt Lakes NJ

Date	Rainfall
4/2/2018	0.5
4/3/2018	0.41
4/4/2018	0.04
4/6/2018	0.05
4/15/2018	0.16
4/16/2018	2.55
4/19/2018	0.3
4/25/2018	1.18
4/27/2018	0.08
4/28/2018	0.29
4/30/2018	0.07

Date	Rainfall
5/3/2018	0.12
5/6/2018	0.27
5/10/2018	0.11
5/12/2018	0.31
5/13/2018	0.29
5/15/2018	0.51
5/16/2018	0.43
5/17/2018	0.26
5/19/2018	0.96
5/20/2018	0.09
5/22/2018	0.33
5/23/2018	0.26
5/27/2018	0.34
5/31/2018	0.15

Total Monthly Rainfall

Month	2018	
	Inches	Days
April	5.63	11
May	4.43	14
June	2.75	11
July	6.04	9
August	11.02	12
September	7.12	13
October	3.15	10

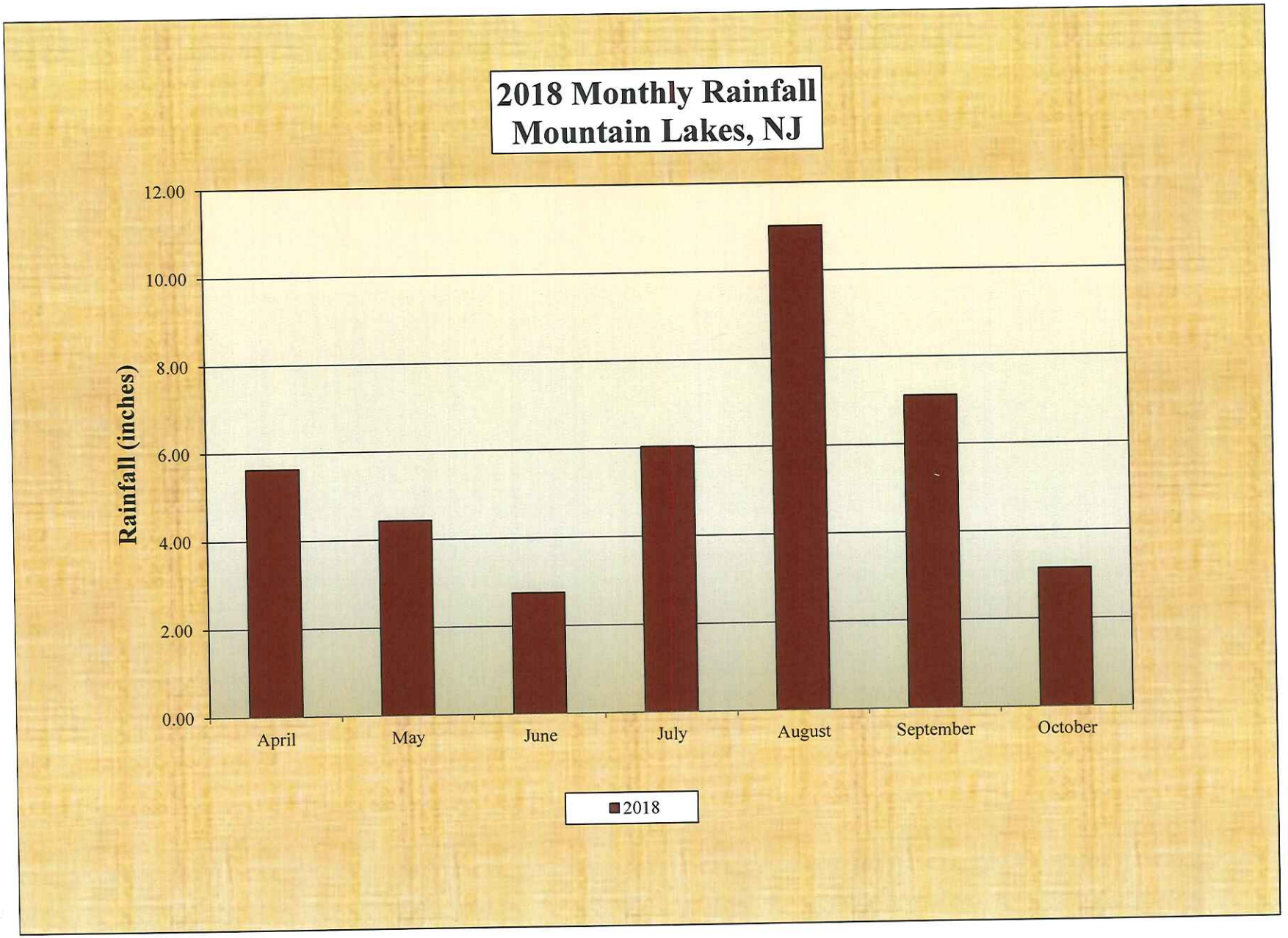
Date	Rainfall
6/1/2018	0.08
6/3/2018	0.64
6/4/2018	0.53
6/10/2018	0.04
6/13/2018	0.05
6/14/2018	0.06
6/18/2018	0.09
6/19/2018	0.05
6/21/2018	0.37
6/24/2018	0.06
6/28/2018	0.78

Date	Rainfall
7/3/2018	0.04
7/4/2018	0.65
7/6/2018	0.21
7/15/2018	0.6
7/17/2018	1.89
7/21/2018	0.4
7/25/2018	1.21
7/26/2018	0.25
7/27/2018	0.79

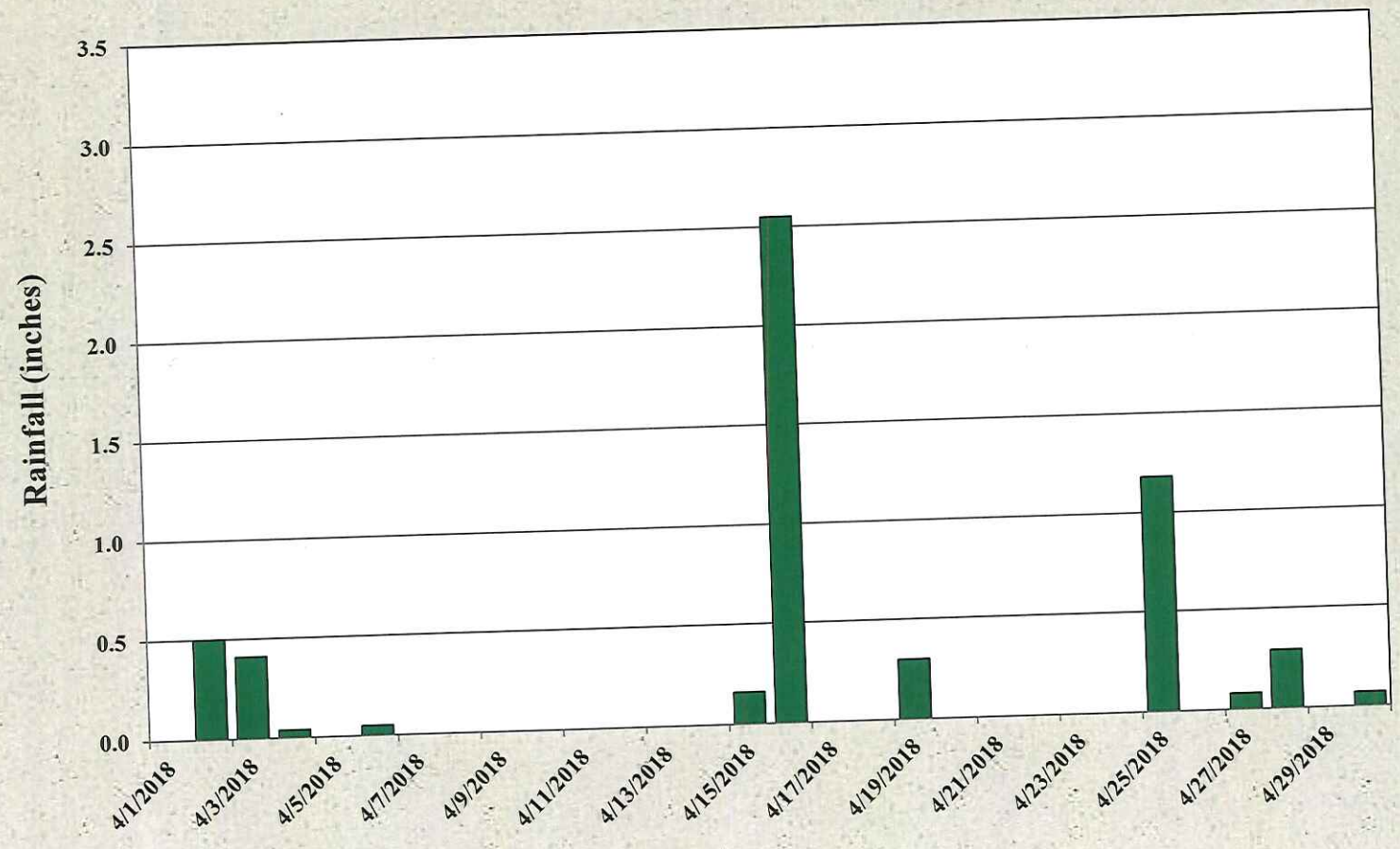
Date	Rainfall
8/1/2018	0.45
8/2/2018	1.46
8/3/2018	0.2
8/4/2018	1.97
8/7/2018	0.63
8/9/2018	0.08
8/11/2018	3.07
8/13/2018	0.39
8/17/2018	0.58
8/18/2018	0.8
8/22/2018	0.72
8/31/2018	0.67

Date	Rainfall
9/6/2018	0.05
9/8/2018	0.05
9/9/2018	0.82
9/10/2018	1.04
9/12/2018	0.34
9/14/2018	0.08
9/17/2018	0.2
9/18/2018	0.73
9/20/2018	0.15
9/25/2018	2.16
9/26/2018	0.25
9/27/2018	0.21
9/28/2018	1.04

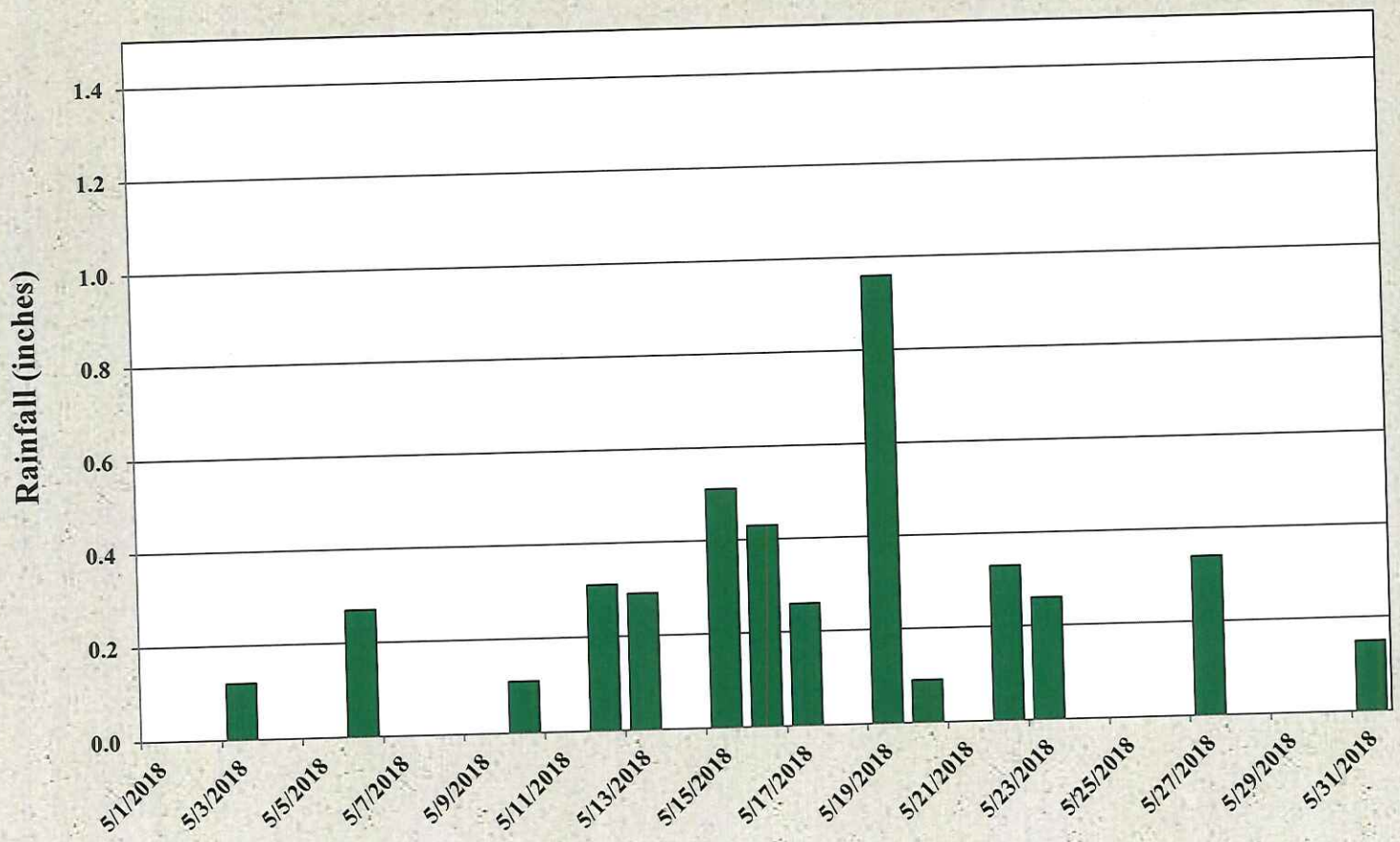
Date	Rainfall
10/2/2018	0.67
10/4/2018	0.05
10/7/2018	0.18
10/8/2018	0.05
10/11/2018	0.85
10/13/2018	0.16
10/15/2018	0.09
10/21/2018	0.03
10/27/2018	0.96
10/29/2018	0.11

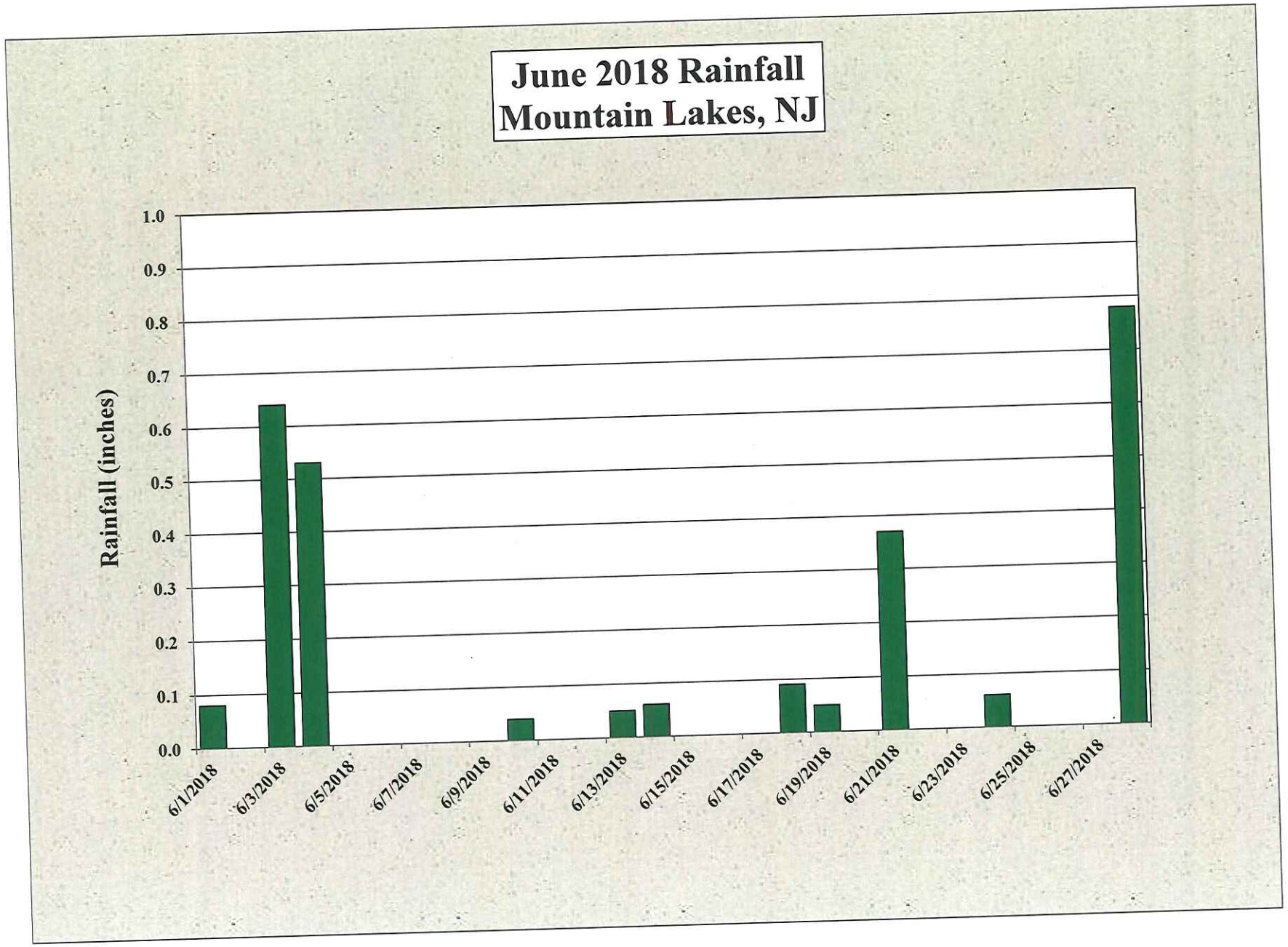

2018 Monthly Rainfall
Mountain Lakes, NJ
Rainfall (inches)
12.00
10.00
8.00
6.00
4.00
2.00
0.00
April
May
June
July
August
September
October
2018

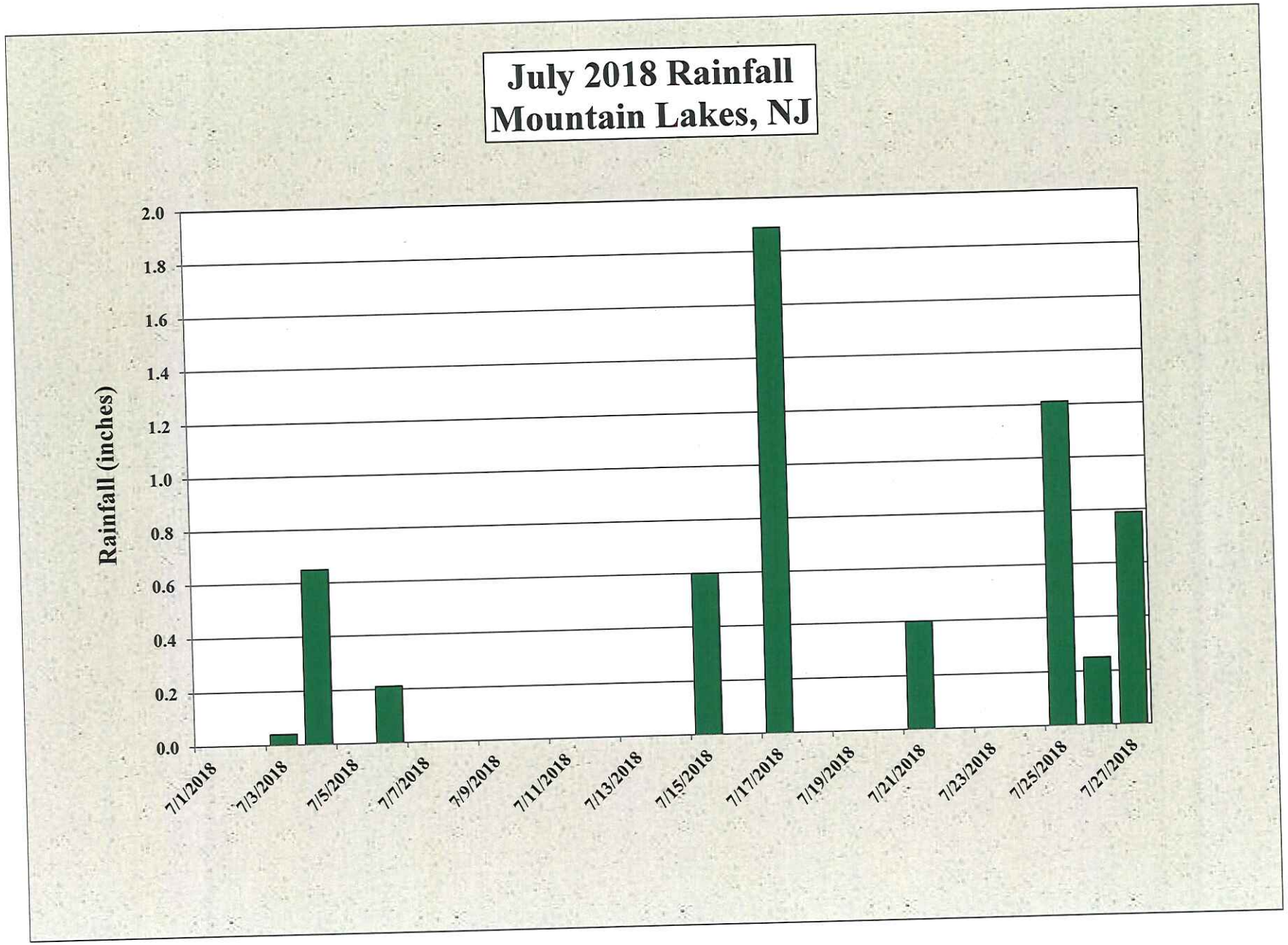
April 2018 Rainfall
Mountain Lakes, NJ

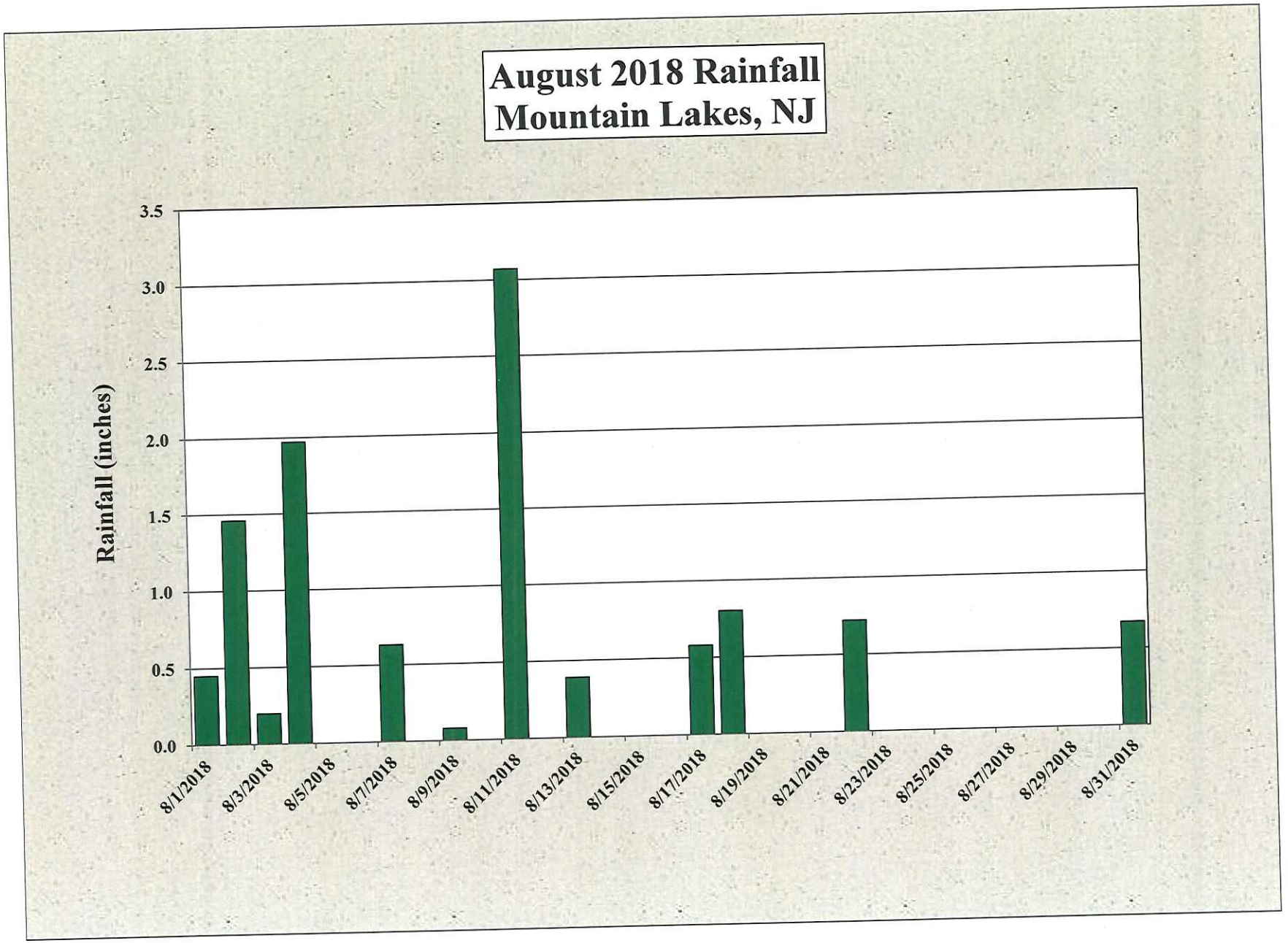


May 2018 Rainfall
Mountain Lakes, NJ




June 2018 Rainfall
Mountain Lakes, NJ
Rainfall (inches)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
6/1/2018
6/3/2018
6/5/2018
6/7/2018
6/9/2018
6/11/2018
6/13/2018
6/15/2018
6/17/2018
6/19/2018
6/21/2018
6/23/2018
6/25/2018
6/27/2018


July 2018 Rainfall
Mountain Lakes, NJ
Rainfall (inches)
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
7/1/2018
7/3/2018
7/5/2018
7/7/2018
7/9/2018
7/11/2018
7/13/2018
7/15/2018
7/17/2018
7/19/2018
7/21/2018
7/23/2018
7/25/2018
7/27/2018


August 2018 Rainfall
Mountain Lakes, NJ
Rainfall (inches)
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
8/1/2018
8/3/2018
8/5/2018
8/7/2018
8/9/2018
8/11/2018
8/13/2018
8/15/2018
8/17/2018
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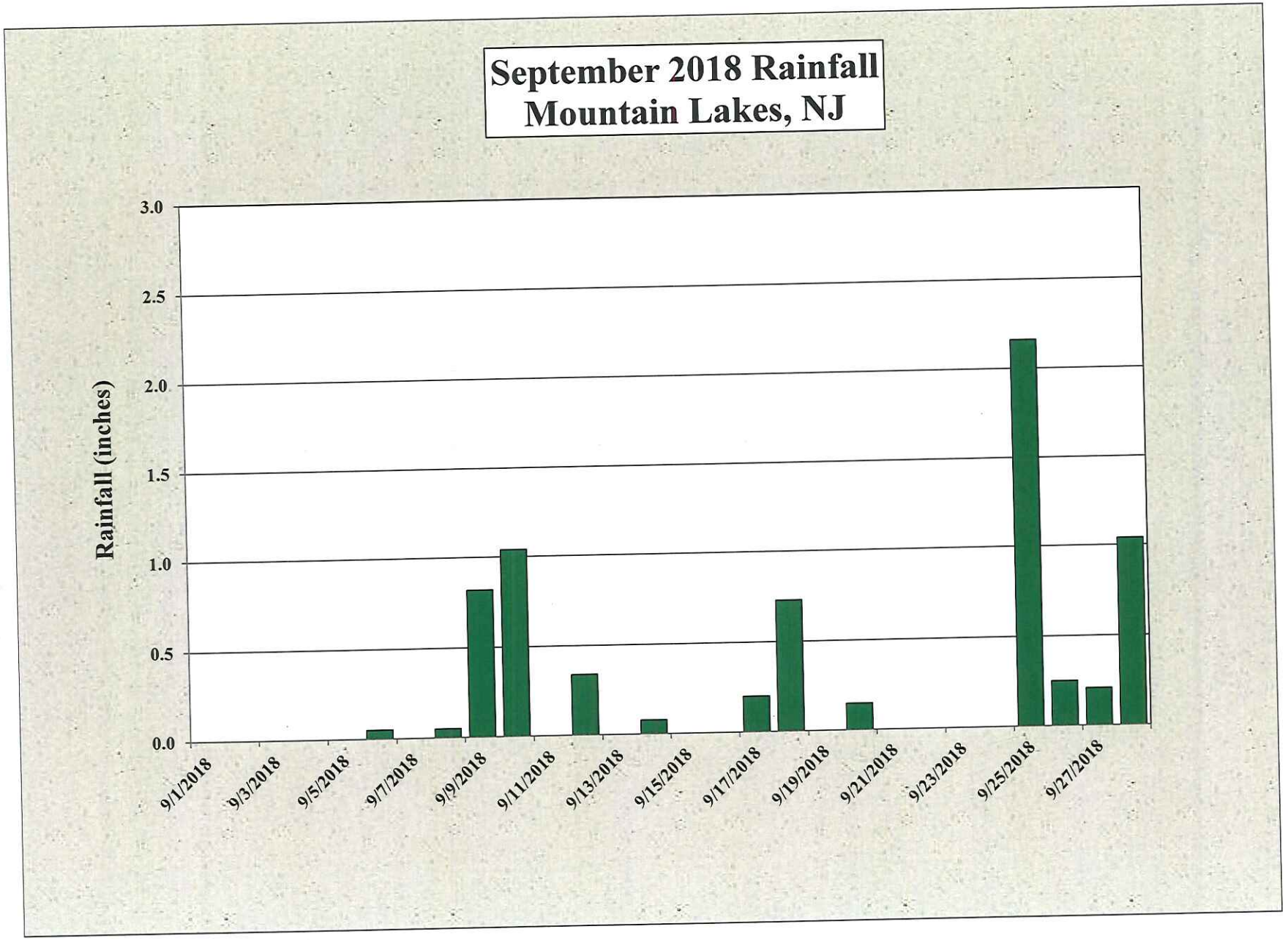
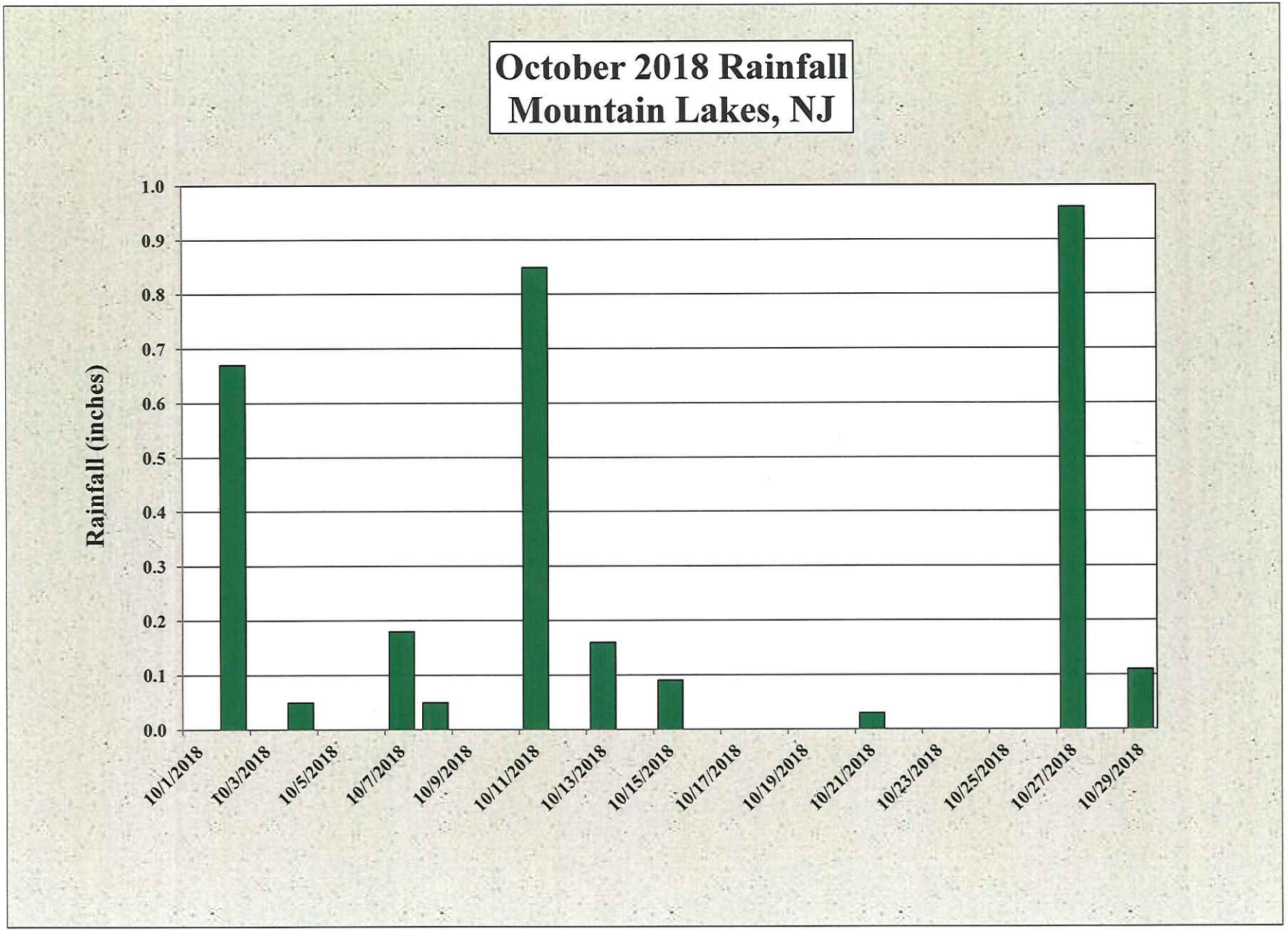
8/29/2018
8/31/2018


September 2018 Rainfall
Mountain Lakes, NJ
Rainfall (inches)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
9/1/2018
9/3/2018
9/5/2018
9/7/2018
9/9/2018
9/11/2018
9/13/2018
9/15/2018
9/17/2018
9/19/2018
9/21/2018
9/23/2018
9/25/2018
9/27/2018


October 2018 Rainfall
Mountain Lakes, NJ
Rainfall (inches)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10/1/2018
10/3/2018
10/5/2018
10/7/2018
10/9/2018
10/11/2018
10/13/2018
10/15/2018
10/17/2018
10/19/2018
10/21/2018
10/23/2018
10/25/2018
10/27/2018
10/29/2018

2018 Rainfall Data-Trenton, NJ

Date	Rainfall
4/2/2018	0.26
4/3/2018	0.09
4/4/2018	0.08
4/6/2018	0.06
4/15/2018	0.43
4/16/2018	1.85
4/19/2018	0.07
4/25/2018	0.28
4/27/2018	0.13
4/28/2018	0.34
4/29/2018	0.18

Date	Rainfall
5/12/2018	1.55
5/13/2018	0.4
5/15/2018	0.35
5/16/2018	0.24
5/17/2018	1.35
5/19/2018	0.56
5/22/2018	0.26
5/27/2018	3.65

Total Monthly Rainfall

Month	2018	
	Inches	Days
April	3.77	11
May	8.36	8
June	3.77	9
July	7.92	10
August	2.86	10
September	8.33	11
October	4.77	9

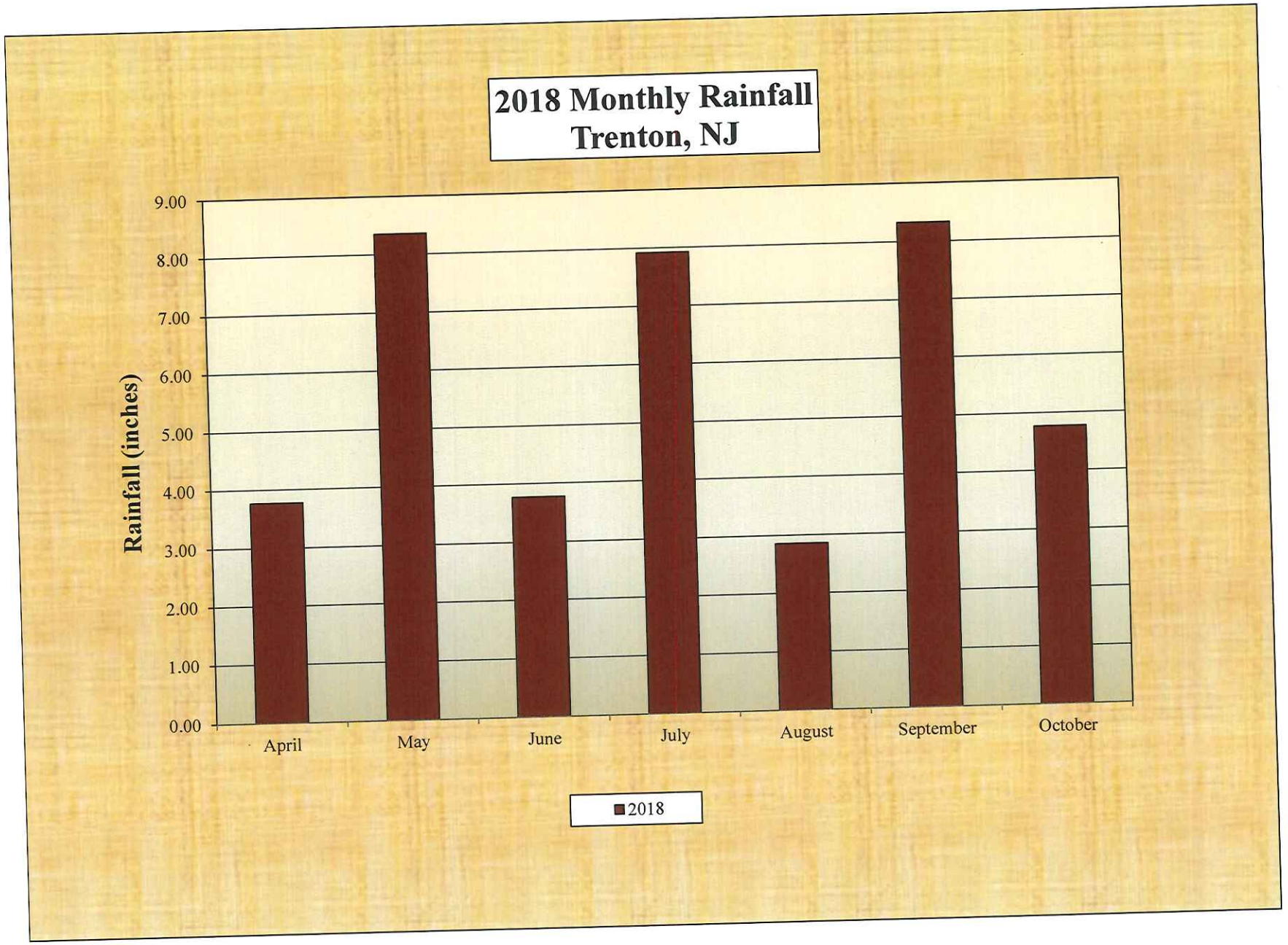
Date	Rainfall
6/1/2018	0.49
6/3/2018	0.61
6/4/2018	0.21
6/5/2018	0.12
6/10/2018	0.6
6/11/2018	0.67
6/18/2018	0.03
6/22/2018	0.16
6/28/2018	0.88

Date	Rainfall
7/3/2018	2.01
7/6/2018	2.47
7/15/2018	0.28
7/17/2018	0.88
7/21/2018	0.87
7/22/2018	0.56
7/23/2018	0.30
7/24/2018	0.15
7/25/2018	0.34
7/27/2018	0.06

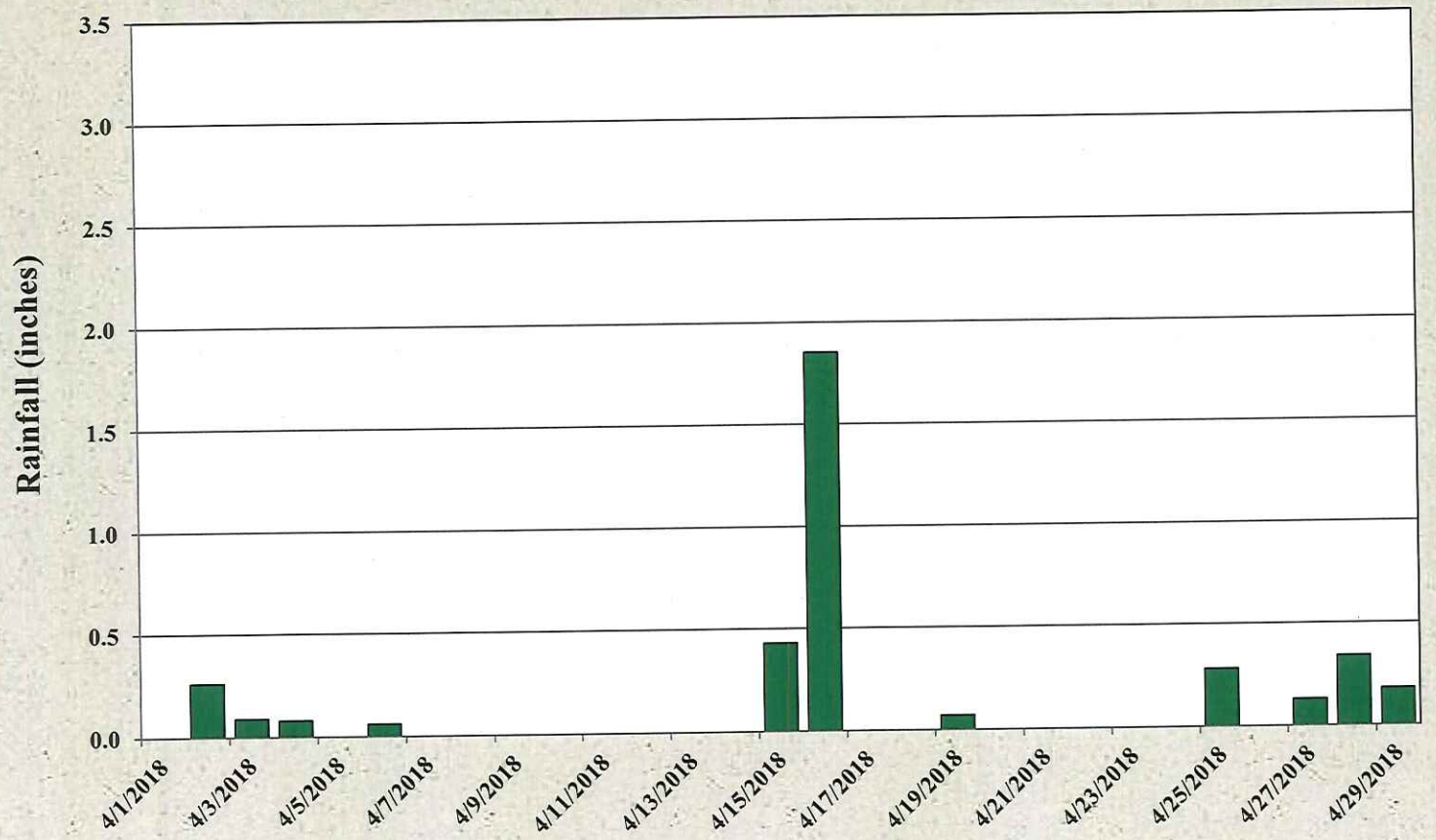
Date	Rainfall
8/1/2018	0.16
8/3/2018	0.34
8/4/2018	0.16
8/8/2018	0.2
8/11/2018	0.32
8/13/2018	0.31
8/14/2018	0.33
8/18/2018	0.12
8/19/2018	0.66
8/21/2018	0.26

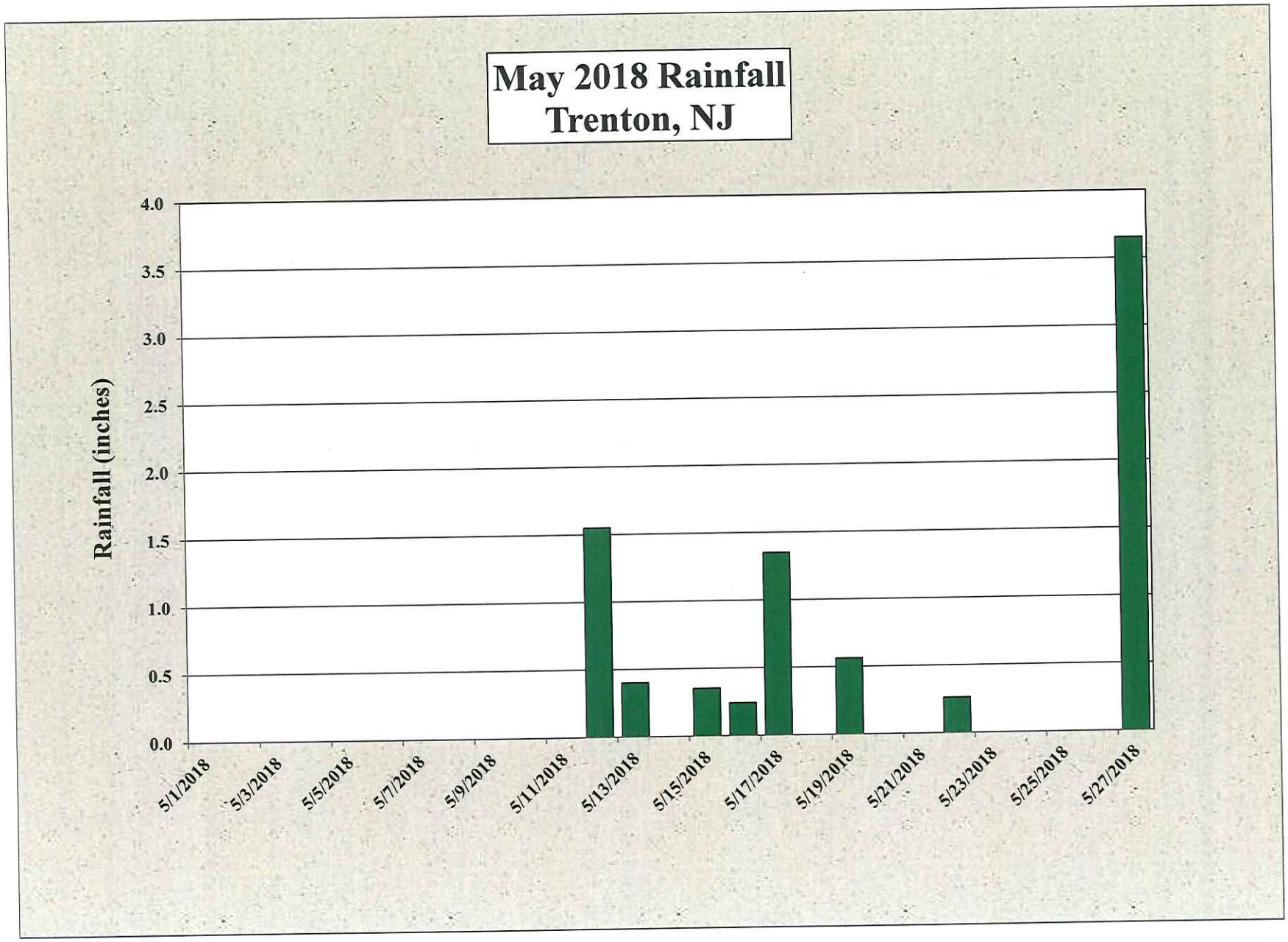
Date	Rainfall
9/6/2018	0.08
9/7/2018	0.11
9/8/2018	0.75
9/9/2018	0.97
9/10/2018	0.46
9/12/2018	0.27
9/18/2018	1.43
9/23/2018	0.27
9/25/2018	2.18
9/26/2018	0.2
9/28/2018	1.61

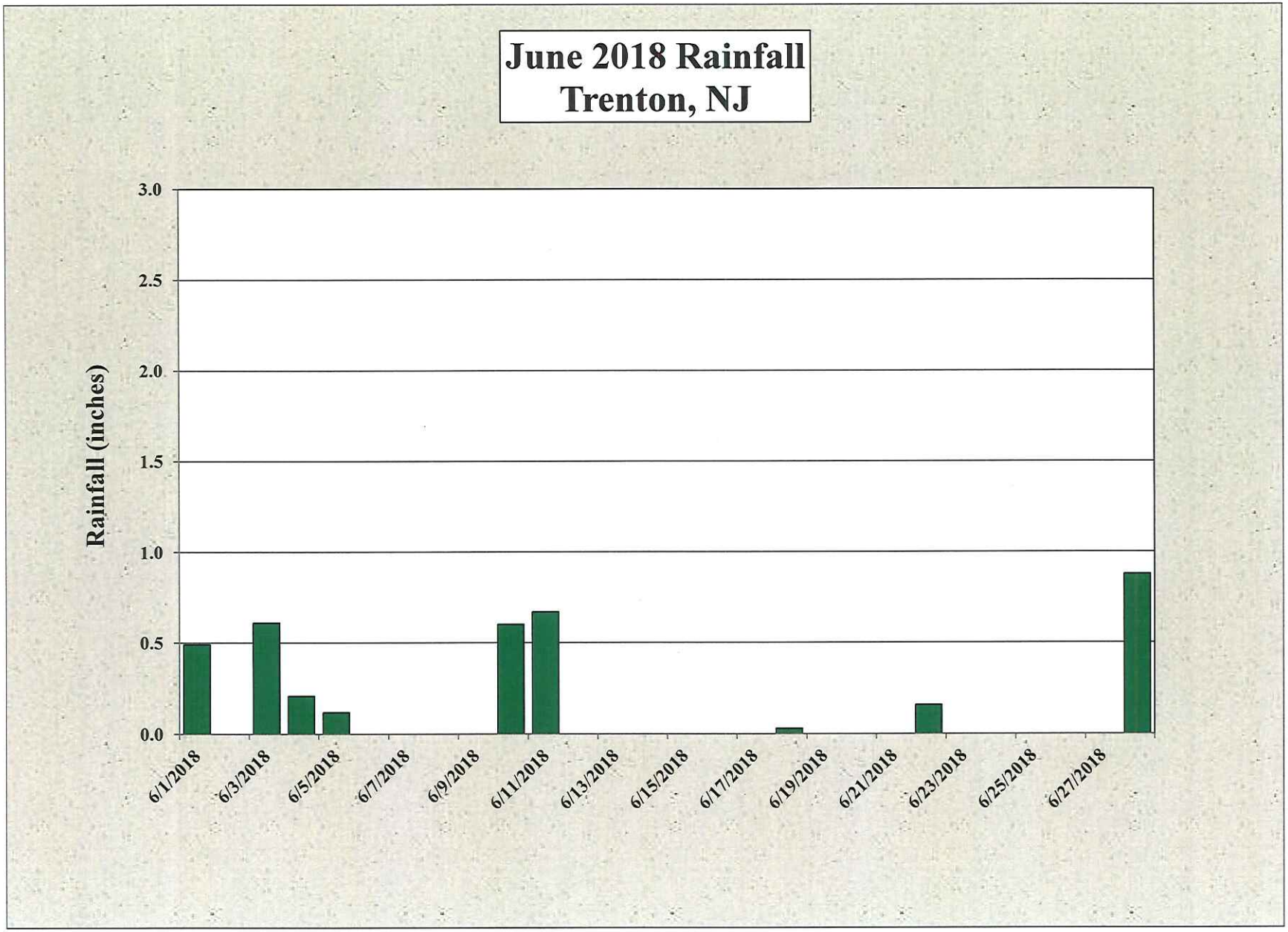
Date	Rainfall
10/2/2018	0.39
10/3/2018	0.4
10/11/2018	1.77
10/12/2018	0.62
10/13/2018	0.1
10/15/2018	0.32
10/20/2018	0.05
10/26/2018	0.06
10/27/2018	1.06

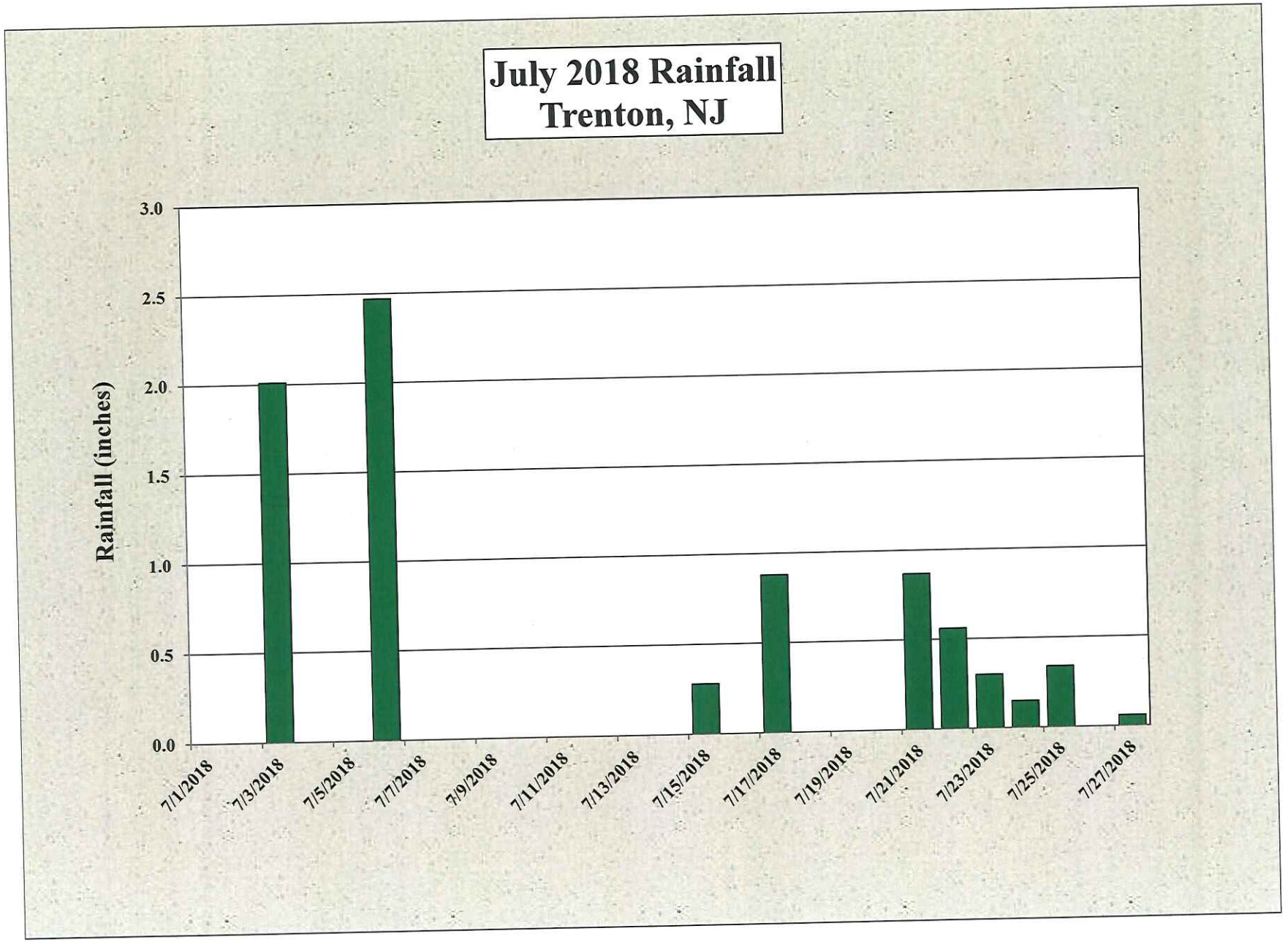

2018 Monthly Rainfall
Trenton, NJ
Rainfall (inches)
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
April
May
June
July
August
September
October
2018

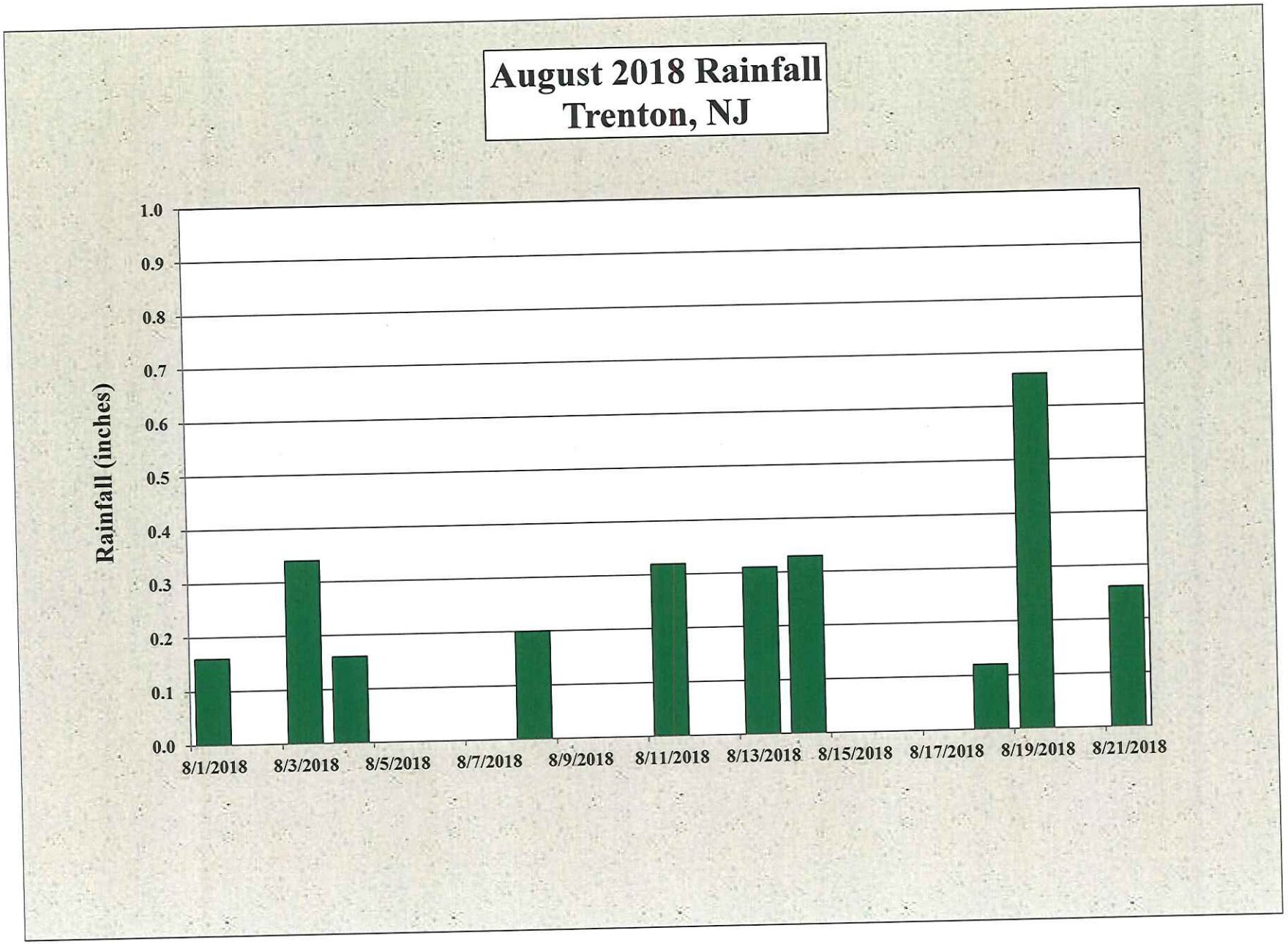
April 2018 Rainfall
Tenton, NJ

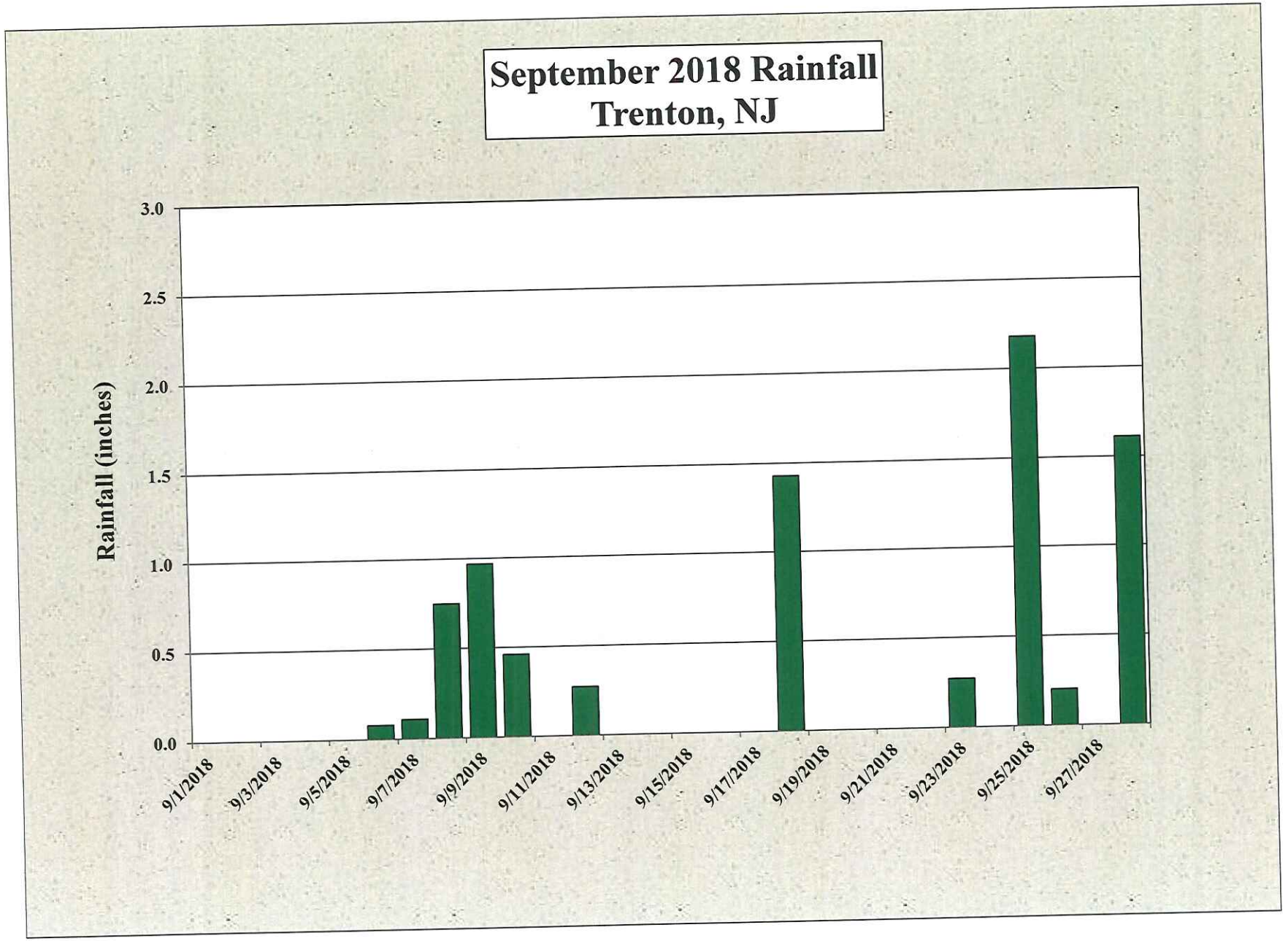


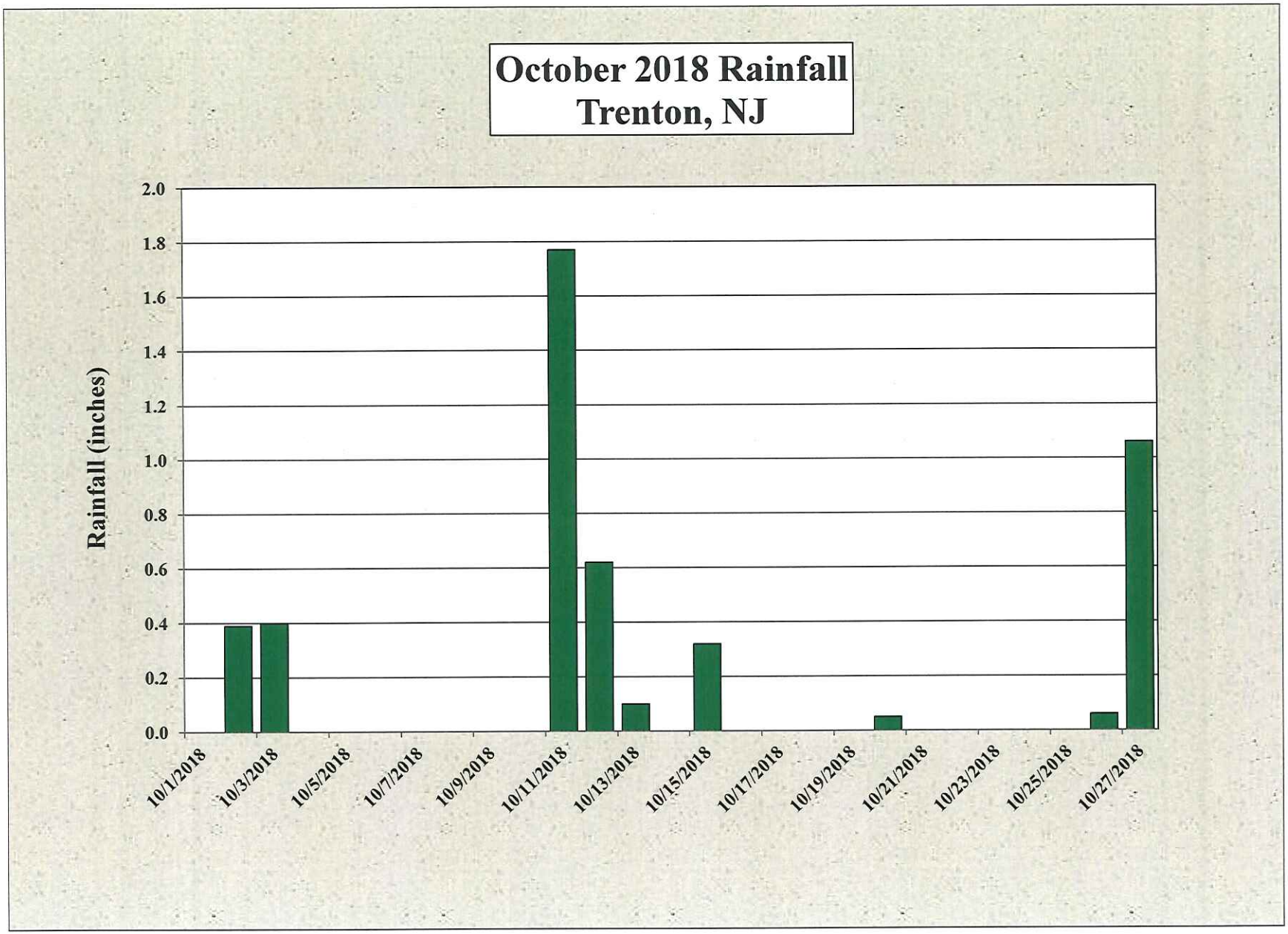

May 2018 Rainfall
Trenton, NJ
Rainfall (inches)
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
5/1/2018
5/3/2018
5/5/2018
5/7/2018
5/9/2018
5/11/2018
5/13/2018
5/15/2018
5/17/2018
5/19/2018
5/21/2018
5/23/2018
5/25/2018
5/27/2018

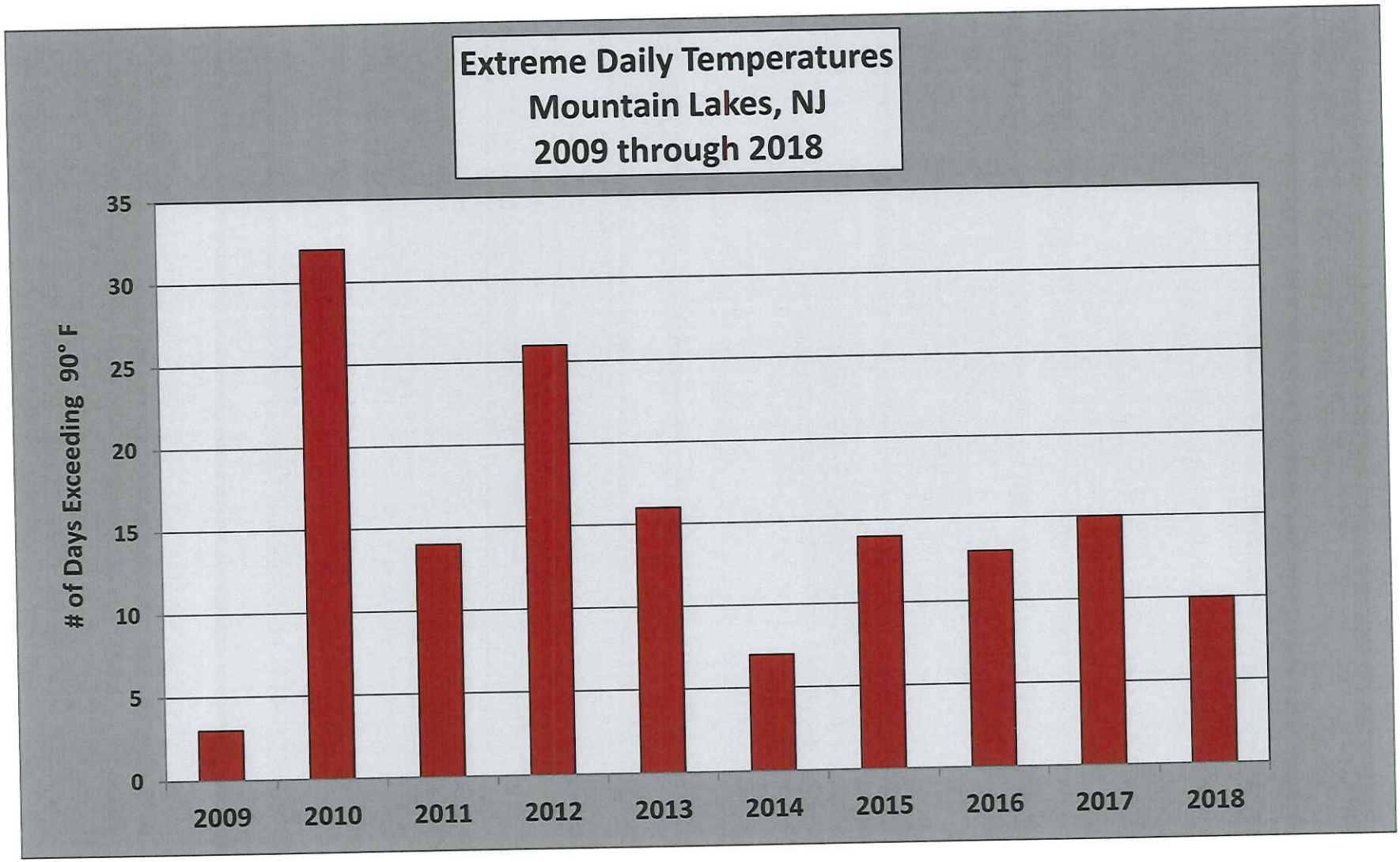

June 2018 Rainfall
Trenton, NJ
Rainfall (inches)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
6/1/2018
6/3/2018
6/5/2018
6/7/2018
6/9/2018
6/11/2018
6/13/2018
6/15/2018
6/17/2018
6/19/2018
6/21/2018
6/23/2018
6/25/2018
6/27/2018

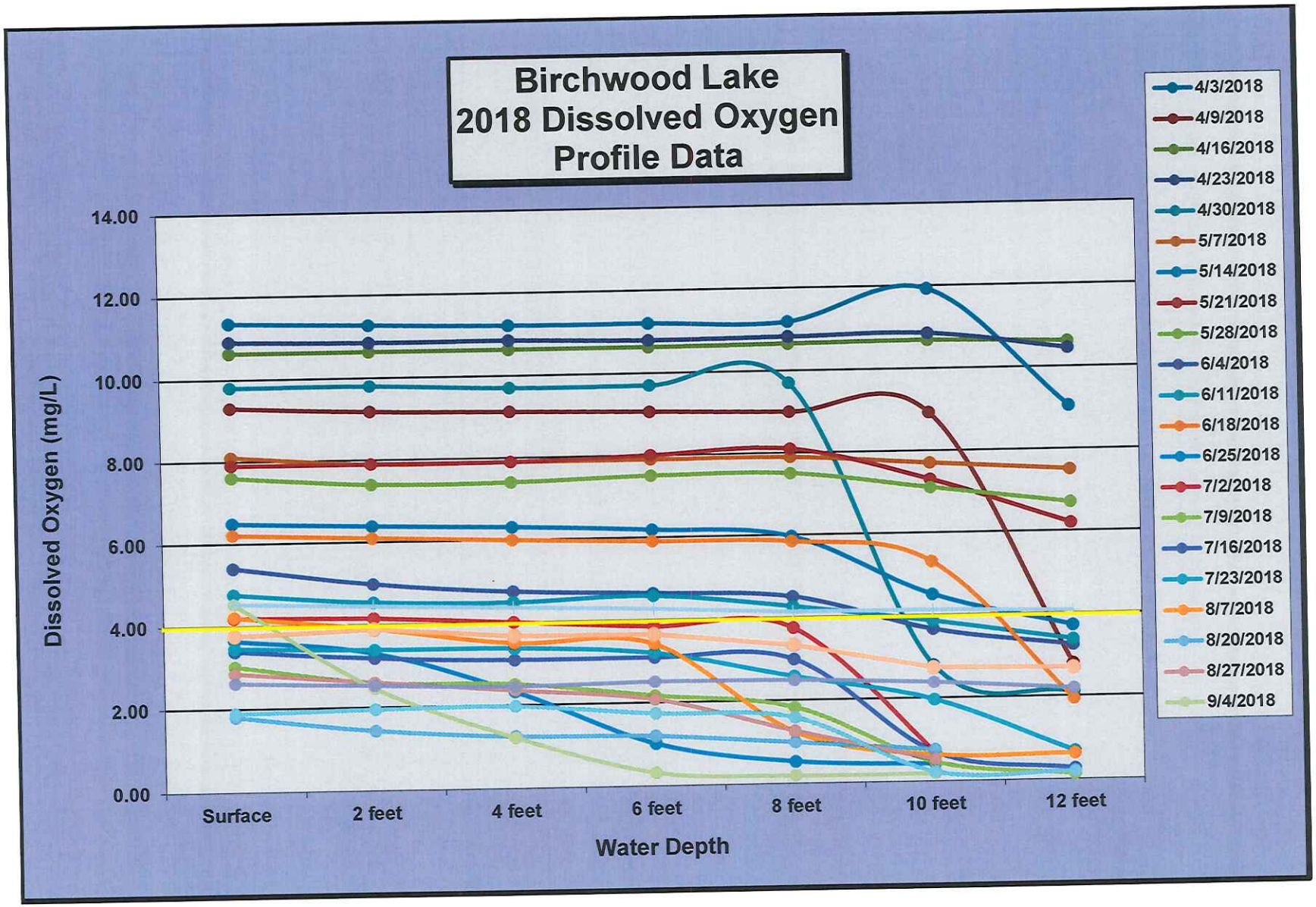

July 2018 Rainfall
Trenton, NJ
Rainfall (inches)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
7/1/2018
7/3/2018
7/5/2018
7/7/2018
7/9/2018
7/11/2018
7/13/2018
7/15/2018
7/17/2018
7/19/2018
7/21/2018
7/23/2018
7/25/2018
7/27/2018

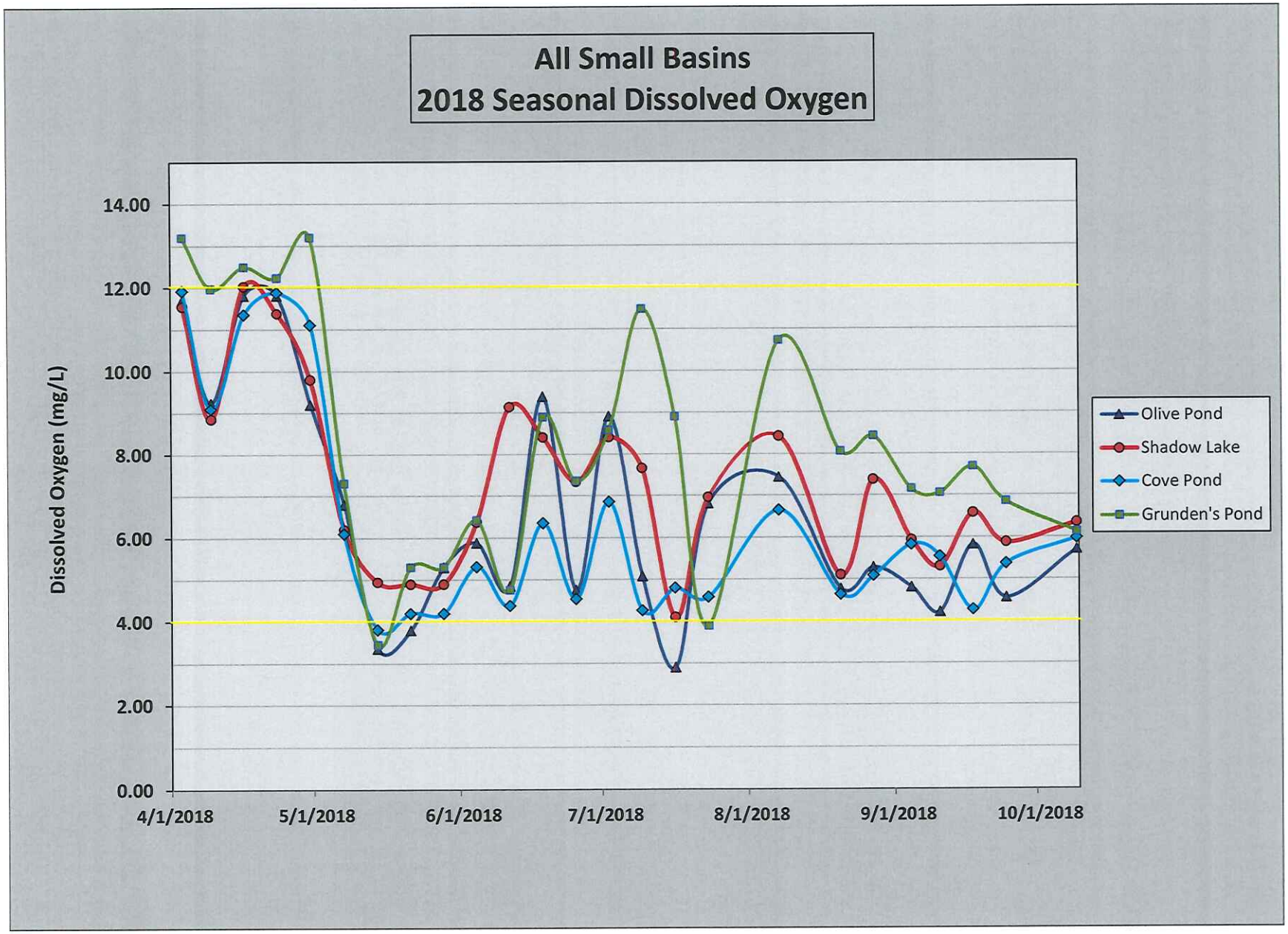

August 2018 Rainfall
Trenton, NJ
Rainfall (inches)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
8/1/2018
8/3/2018
8/5/2018
8/7/2018
8/9/2018
8/11/2018
8/13/2018
8/15/2018
8/17/2018
8/19/2018
8/21/2018

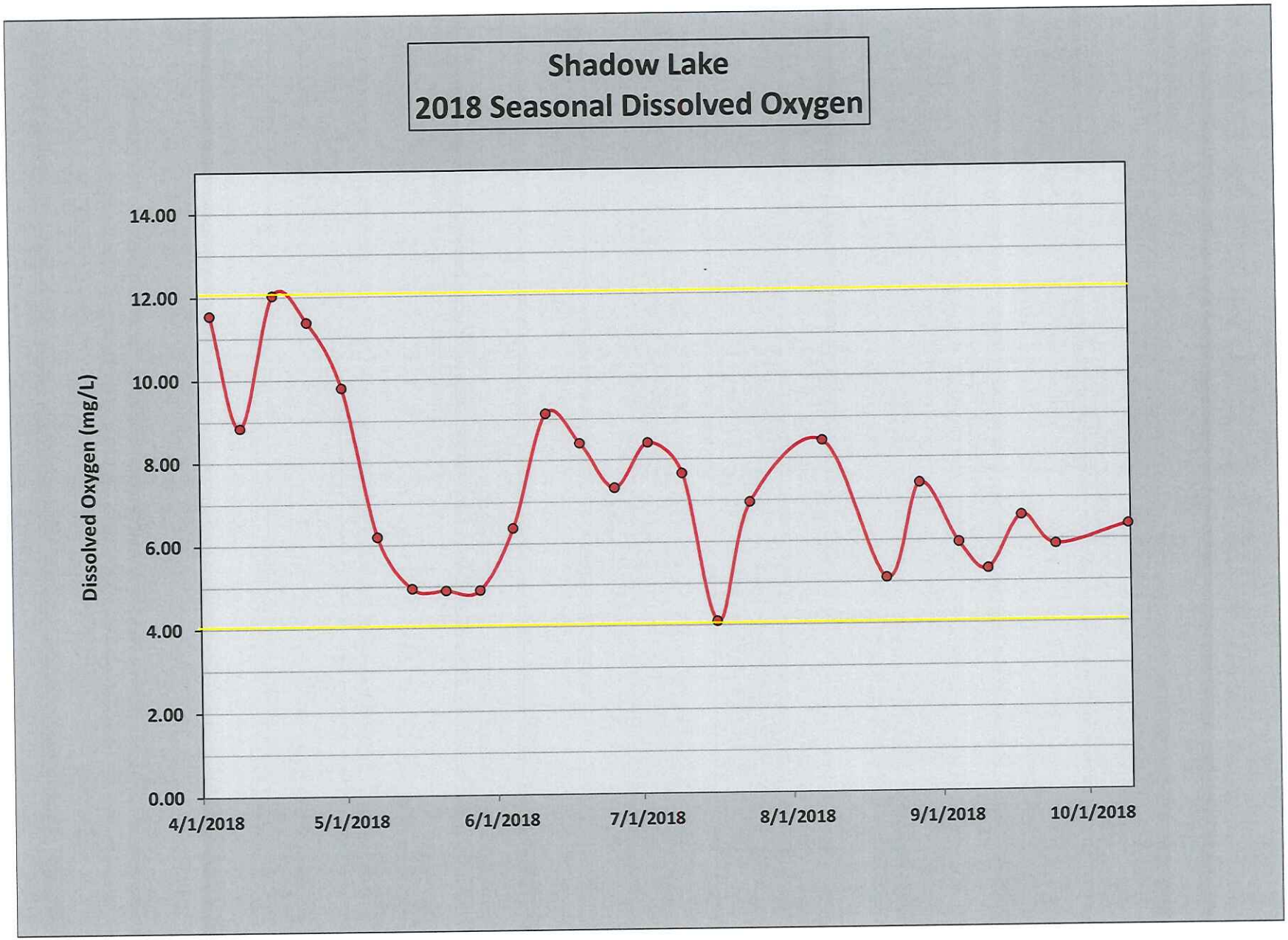

September 2018 Rainfall
Trenton, NJ
Rainfall (inches)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
9/1/2018
9/3/2018
9/5/2018
9/7/2018
9/9/2018
9/11/2018
9/13/2018
9/15/2018
9/17/2018
9/19/2018
9/21/2018
9/23/2018
9/25/2018
9/27/2018

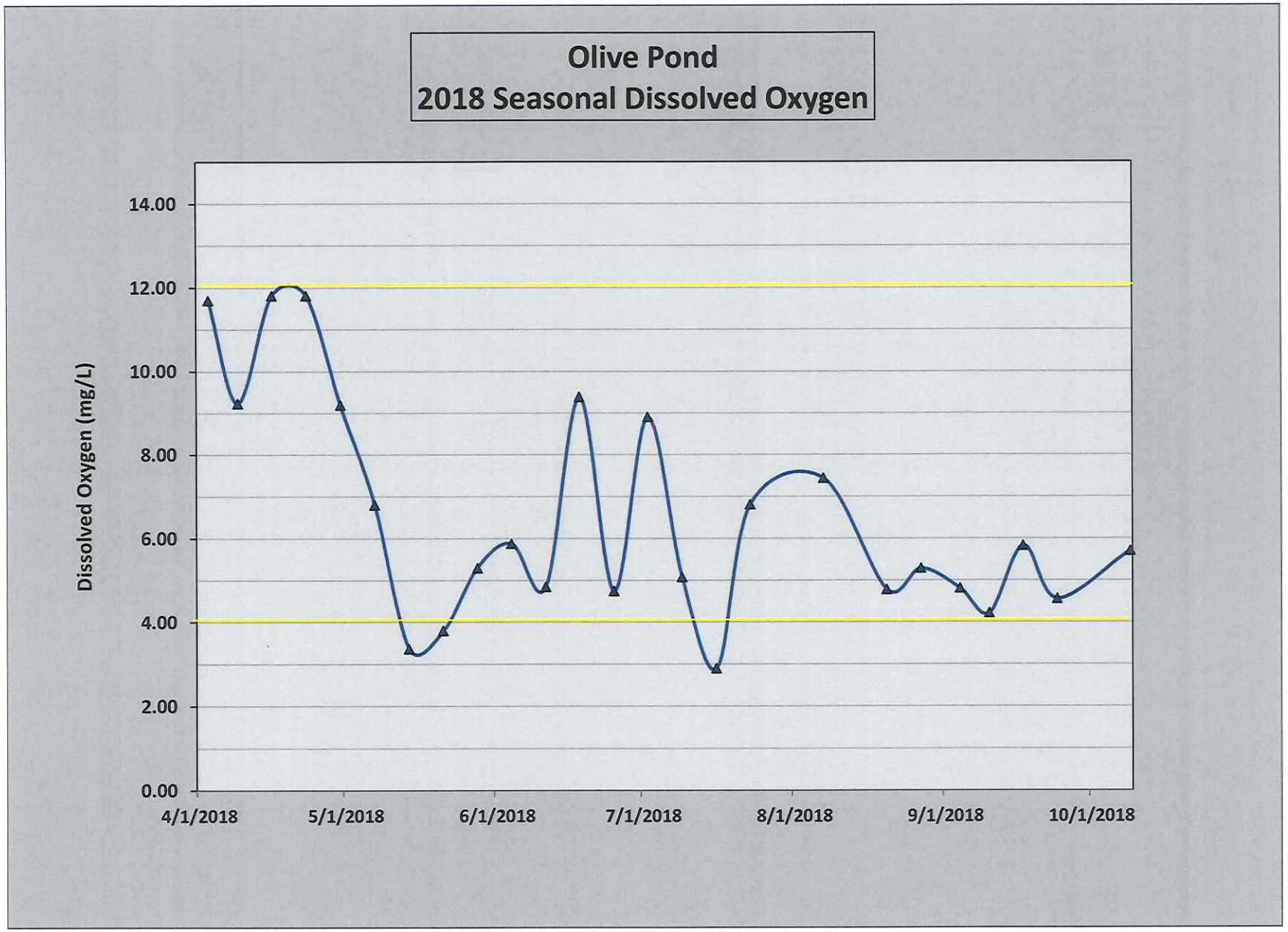

October 2018 Rainfall
Trenton, NJ
Rainfall (inches)
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
10/1/2018
10/3/2018
10/5/2018
10/7/2018
10/9/2018
10/11/2018
10/13/2018
10/15/2018
10/17/2018
10/19/2018
10/21/2018
10/23/2018
10/25/2018
10/27/2018

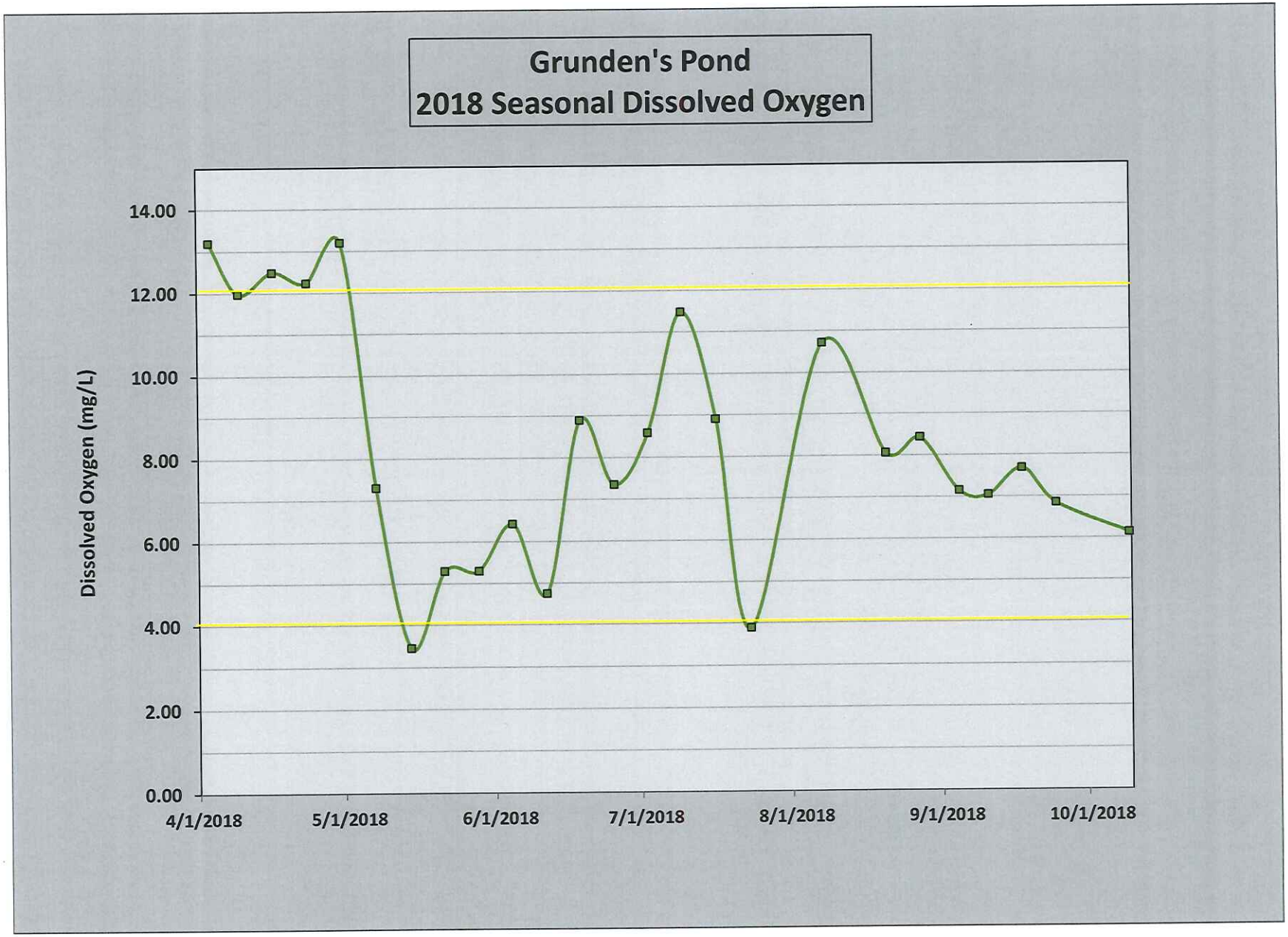

Extreme Daily Temperatures
Mountain Lakes, NJ
2009 through 2018
# of Days Exceeding 90° F
35
30
25
20
15
10
5
0
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018

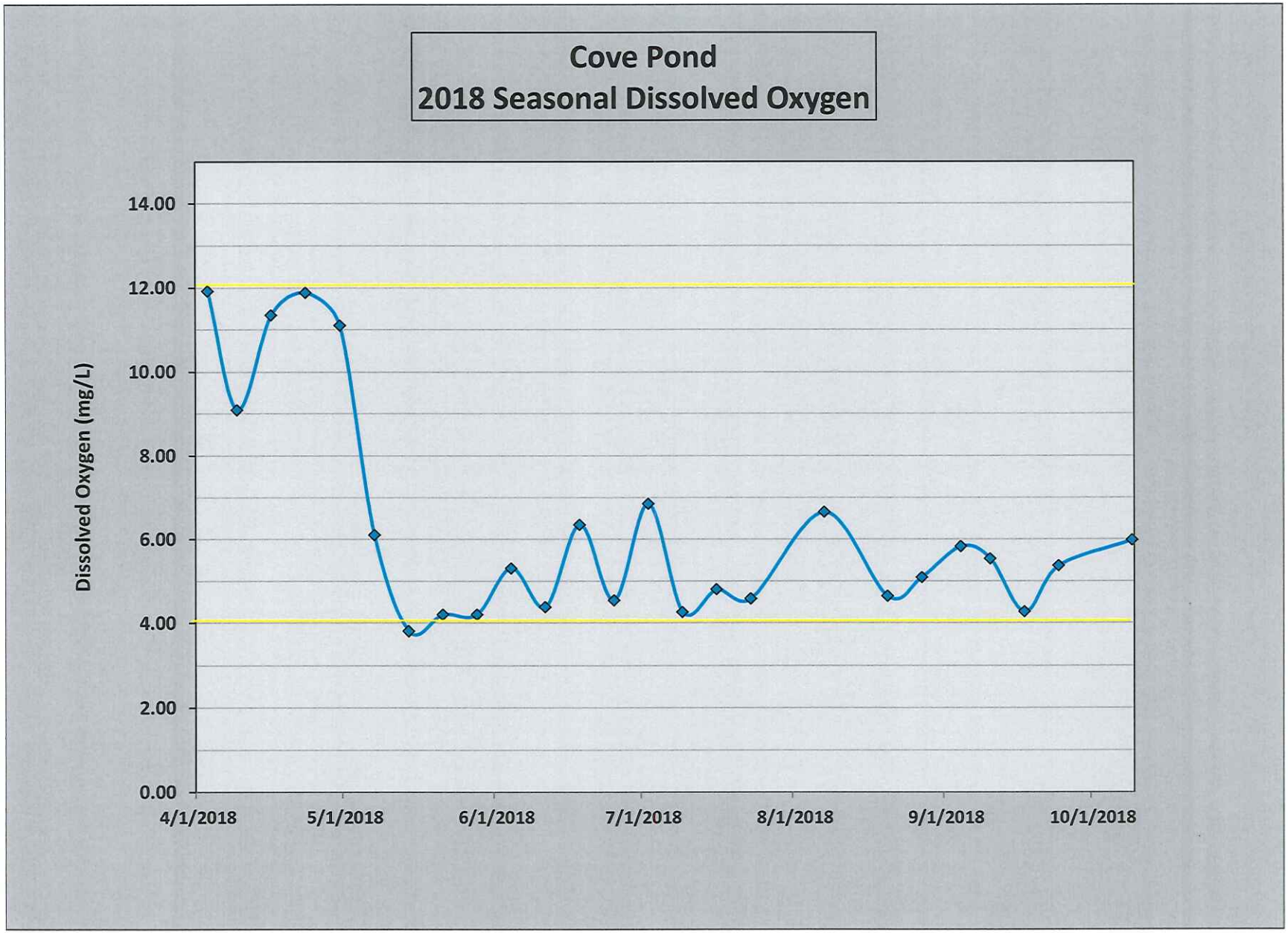

Birchwood Lake
2018 Dissolved Oxygen
Profile Data
Dissolved Oxygen (mg/L)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Surface
2 feet
4 feet
6 feet
8 feet
10 feet
12 feet
Water Depth
4/3/2018
4/9/2018
4/16/2018
4/23/2018
4/30/2018
5/7/2018
5/14/2018
5/21/2018
5/28/2018
6/4/2018
6/11/2018
6/18/2018
6/25/2018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


All Small Basins
2018 Seasonal Dissolved Oxygen
Dissolved Oxygen (mg/L)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
4/1/2018
5/1/2018
6/1/2018
7/1/2018
8/1/2018
9/1/2018
10/1/2018
Olive Pond
Shadow Lake
Cove Pond
Grunden's Pond


Shadow Lake
2018 Seasonal Dissolved Oxygen
Dissolved Oxygen (mg/L)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
4/1/2018
5/1/2018
6/1/2018
7/1/2018
8/1/2018
9/1/2018
10/1/2018


Olive Pond
2018 Seasonal Dissolved Oxygen
Dissolved Oxygen (mg/L)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
4/1/2018
5/1/2018
6/1/2018
7/1/2018
8/1/2018
9/1/2018
10/1/2018


Grunden's Pond
2018 Seasonal Dissolved Oxygen
Dissolved Oxygen (mg/L)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
4/1/2018
5/1/2018
6/1/2018
7/1/2018
8/1/2018
9/1/2018
10/1/2018


Cove Pond
2018 Seasonal Dissolved Oxygen
Dissolved Oxygen (mg/L)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
4/1/2018
5/1/2018
6/1/2018
7/1/2018
8/1/2018
9/1/2018
10/1/2018

Mountain Lakes WQ Data Summary 2018

June 6, 2018

Lake	Temp (°C)	DO (mg/L)	pH	Alkalinity	Secchi (ft)
Birchwood	23.0	6.02	7.00	40	6.5'
Crystal	23.8	8.32	7.75	40	6'est
Sunset	23.4	8.66	7.75	42	5.5'est
Olive	21.4	5.25	6.75	42	3'est
Shadow	21.8	7.55	6.75	42	4'est
Cove	23.4	7.62	6.75	40	4'est
Grunden's	23.0	8.64	6.75	40	3'est
Mountain	24.3	7.83	7.00	40	7'est
Wildwood	24.2	10.37	7.50	60	5.75'

Mountain Lakes WQ Data Summary 2018

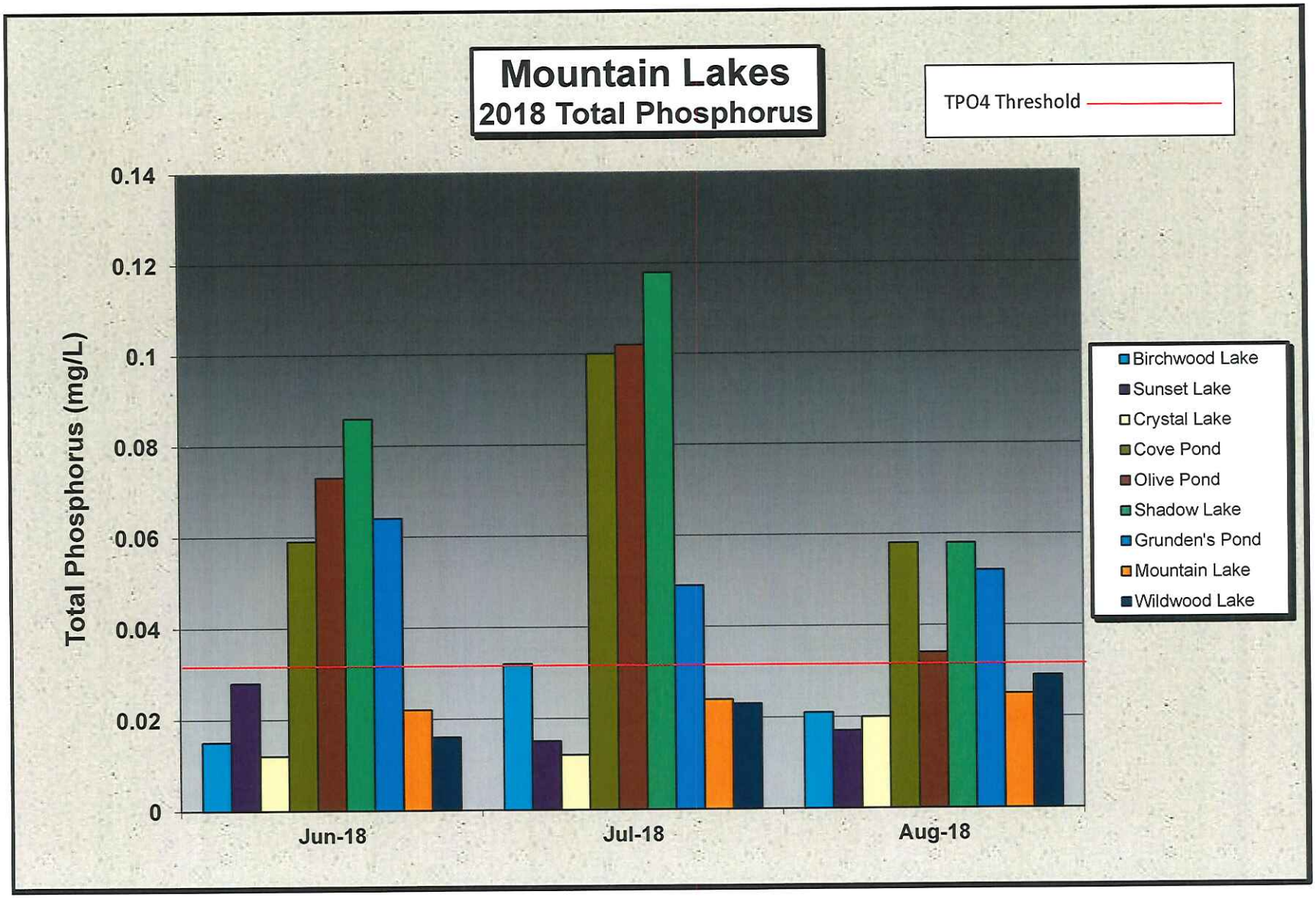
July 9, 2018

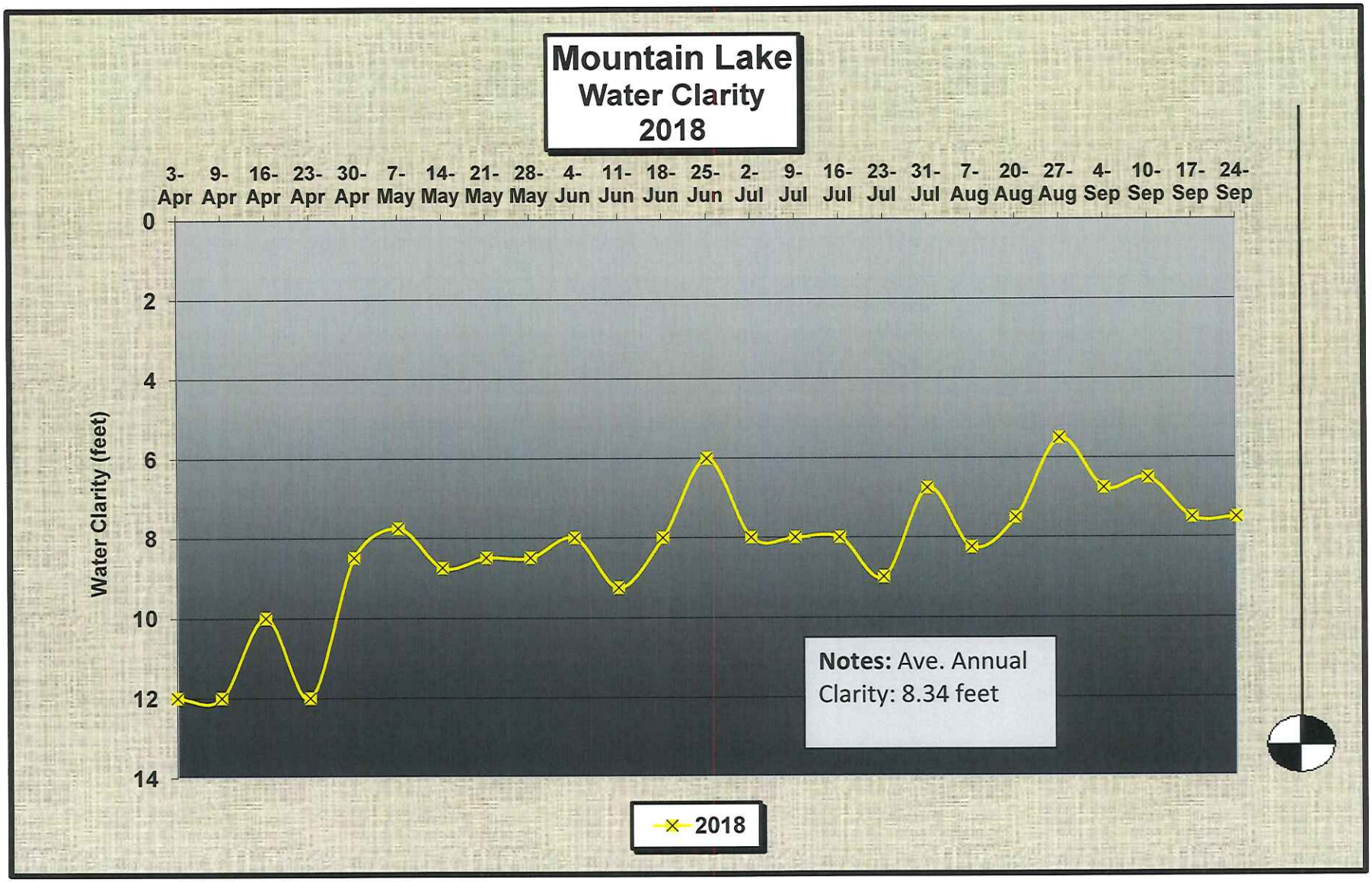
Lake	Temp (°C)	DO (mg/L)	pH	Alkalinity	Secchi (ft)
Birchwood	26.3	3.03	6.75	50	6.25'
Crystal	27.8	6.57	7.5	56	10.0' est
Sunset	28.1	7.04	7.5	48	8.0' est
Olive	27.5	5.08	7.25	66	3.0' est
Shadow	26.6	7.66	7.5	70	3.0' est
Cove	24.4	4.26	7.0	86	2.0' est
Grunden's	27.1	11.48	8.0	92	2.0' est
Mountain	30.2	9.40	8.25	84	10.0' est
Wildwood	28.3	7.76	8.5	68	12.0' est

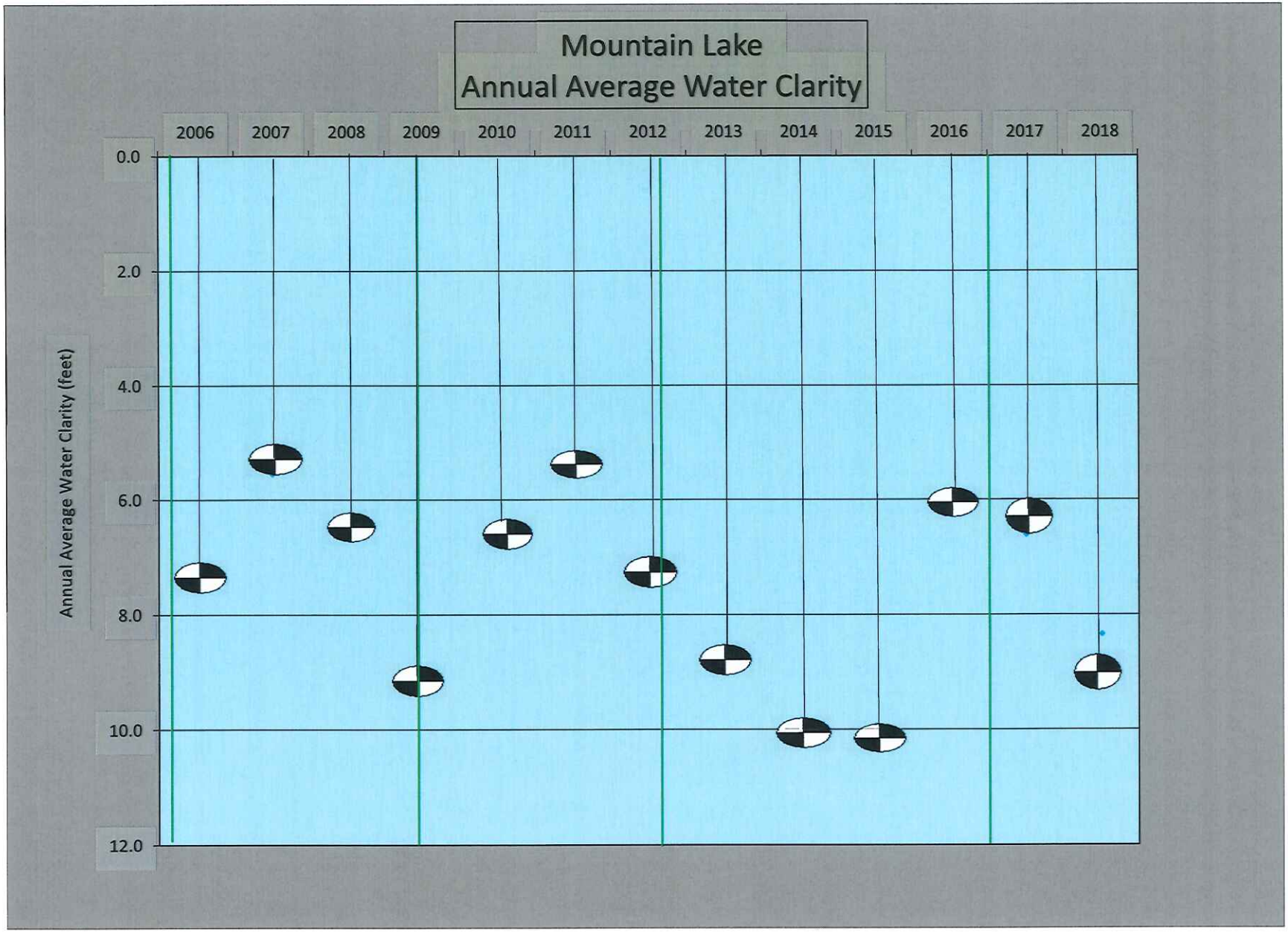
Mountain Lakes WQ Data Summary 2018

August 13, 2018

Lake	Temp (°C)	DO (mg/L)	pH	Alkalinity	Secchi (ft)
Birchwood	25.8	2.50	6.5	50	5.0
Crystal	26.6	6.00	7.25	40	3.0 est
Sunset	26.0	5.87	7.25	40	4.0 est
Olive	26.1	4.52	7.0	60	2.0 est
Shadow	25.2	5.21	7.25	58	3.0 est
Cove	25.0	5.70	7.25	58	1.0 est
Grunden's	25.2	6.03	7.25	58	2.0 est
Mountain	25.5	5.72	7.25	50	2.0 est
Wildwood	25.2	7.07	7.5	60	3.0 est


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


Mountain Lake
Water Clarity
2018
3-Apr
9-Apr
16-Apr
23-Apr
30-Apr
7-May
14-May
21-May
28-May
4-Jun
11-Jun
18-Jun
25-Jun
2-Jul
9-Jul
16-Jul
23-Jul
31-Jul
7-Aug
20-Aug
27-Aug
4-Sep
10-Sep
17-Sep
24-Sep
0
2
4
6
8
10
12
14
Water Clarity (feet)
Notes: Ave. Annual Clarity: 8.34 feet
2018


Mountain Lake
Annual Average Water Clarity
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
0.0
2.0
4.0
6.0
8.0
10.0
12.0
Annual Average Water Clarity (feet)

Mountain Lakes
2018 Phytoplankton Summary

Birchwood Lake

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/6/2018	110					10		120
6/18/2018	20	30	60	20				130
7/9/2018	20		580					600
7/23/2018	190	70	1050	70			10	1390
8/6/2018	30		160					190
8/20/2018	110	90	220				10	430

Crystal Lake

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/6/2018	30	30	100			20		180
6/18/2018	20		60					80
7/9/2018			240	40				280
7/23/2018		10	510	30				550
8/6/2018			140	190				330
8/20/2018	40		1920	150				2110

Sunset Lake

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/6/2018	10		490	100				600
6/18/2018	50		210					260
7/9/2018	10			70				80
7/23/2018	10		90					100
8/6/2018			180	20				200
8/20/2018	40		640				30	710

Olive Pond

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/6/2018	80	270				10		360
7/9/2018	20		50				100	170
8/6/2018		60	10	30			30	130

Shadow Lake

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/6/2018	120	390						510
6/18/2018	100	420	20	110		30		680
7/9/2018			30	140				170
7/23/2018	210	40	80	100			50	480
8/6/2018		260	40					300
8/20/2018	70	20	1300	170		10	10	1580

Cove Pond

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/6/2018	50	170	10					230
7/9/2018				120			40	160
8/6/2018				40				40

Grunden's Pond

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/6/2018	150	690	40				10	890
7/9/2018			40				100	140
8/6/2018			20				30	50

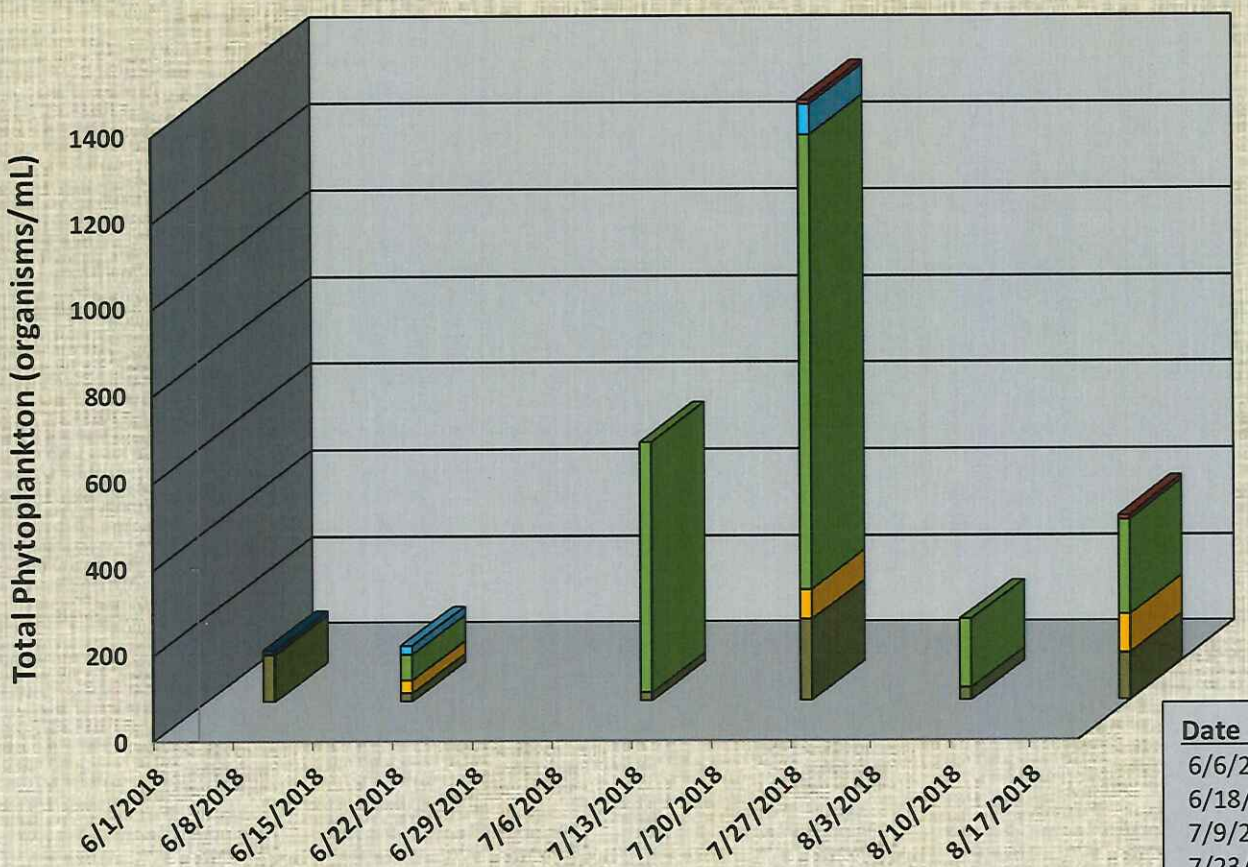
Mountain Lake

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/6/2018	60	20	350				50	480
6/18/2018	50		50					100
7/9/2018	30	10	90					130
7/23/2018	50	130	360	40		10		590
8/6/2018	10	100	20					130
8/20/2018	10	10	350	10	70	10	10	470

Wildwood Lake

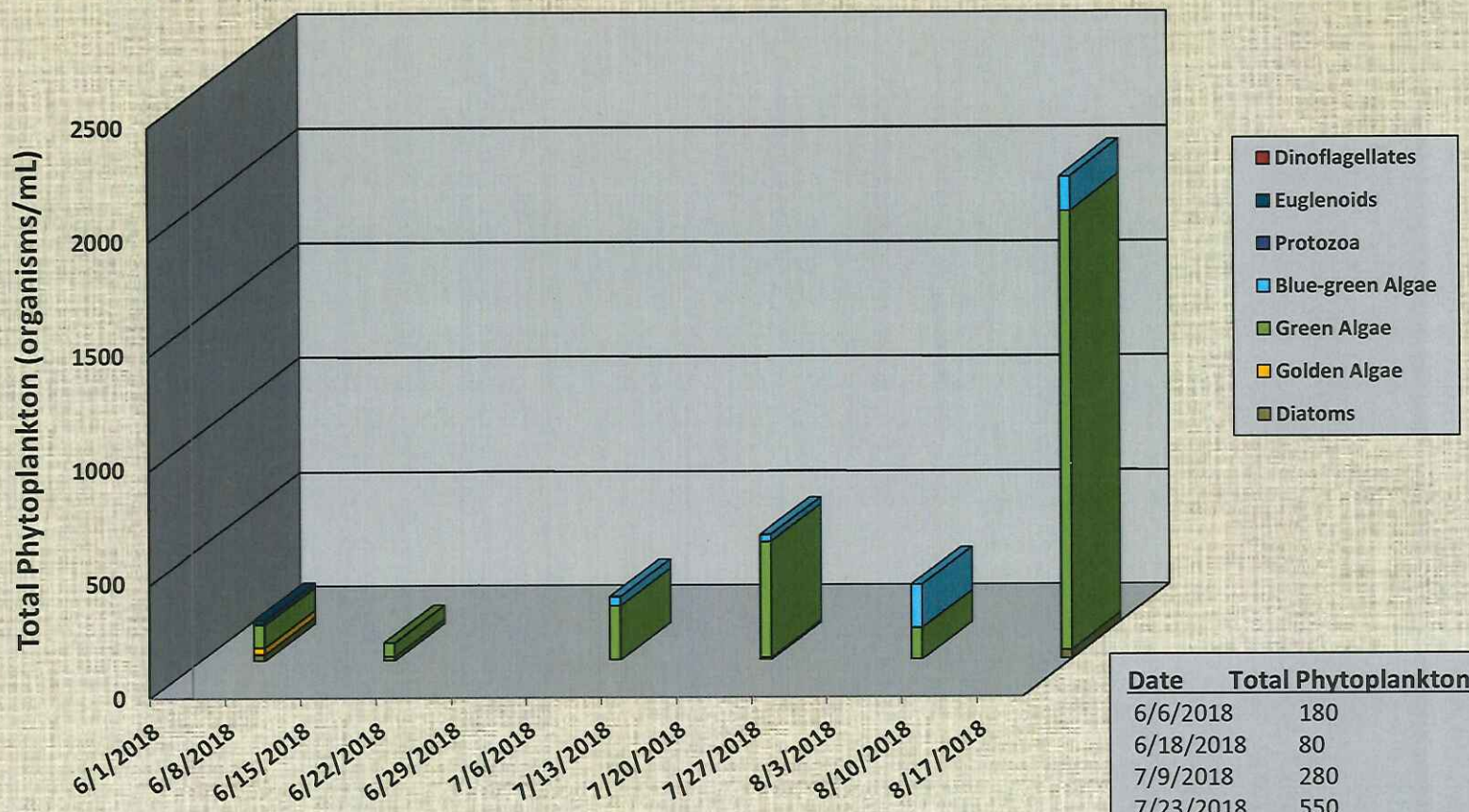
Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/6/2018	140	20	40				20	220
6/18/2018	290		20			20	60	390
7/9/2018	10		20	20				50
7/23/2018		20	40	10			10	80
8/6/2018			60					60
8/20/2018	30	60	110				10	210

Birchwood Lake
2018 Phytoplankton Distribution



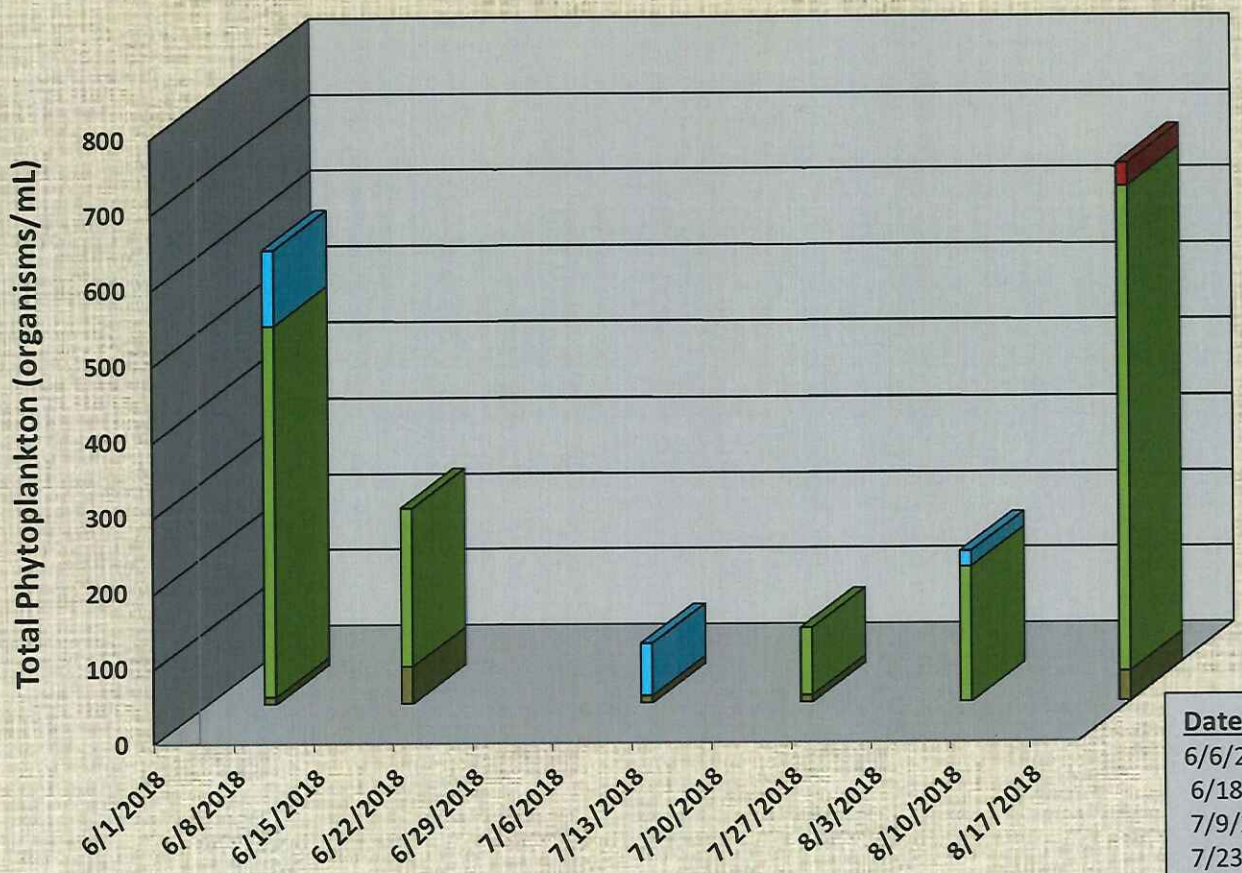
Date	Total Phytoplankton
6/6/2018	120
6/18/2018	130
7/9/2018	600
7/23/2018	1390
8/6/2018	190
8/20/2018	430

Crystal Lake
2018 Phytoplankton Distribution



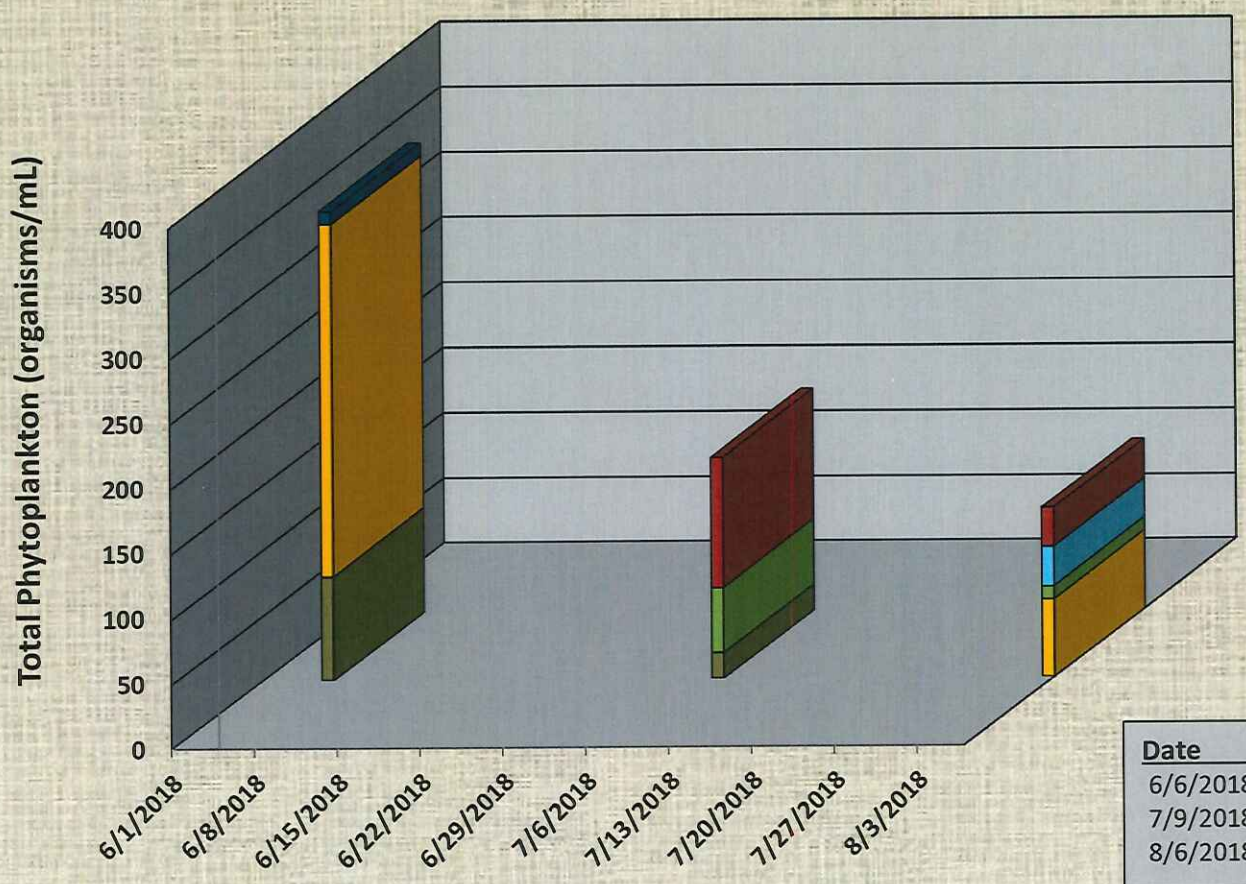
Date	Total Phytoplankton
6/6/2018	180
6/18/2018	80
7/9/2018	280
7/23/2018	550
8/6/2018	330
8/20/2018	2110

Sunset Lake
2018 Phytoplankton Distribution



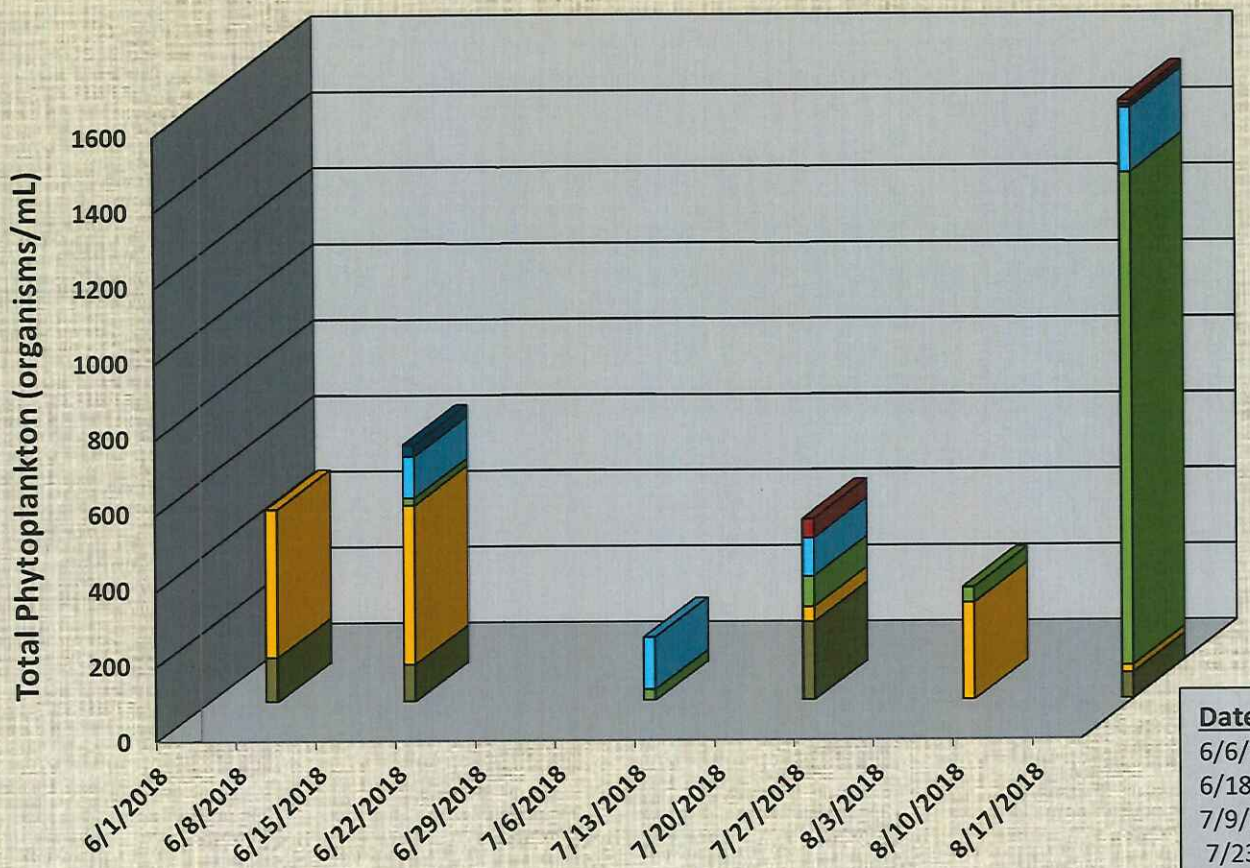
Date	Total Phytoplankton
6/6/2018	600
6/18/2018	260
7/9/2018	80
7/23/2018	100
8/6/2018	200
8/20/2018	710

Olive Pond
2018 Phytoplankton Distribution



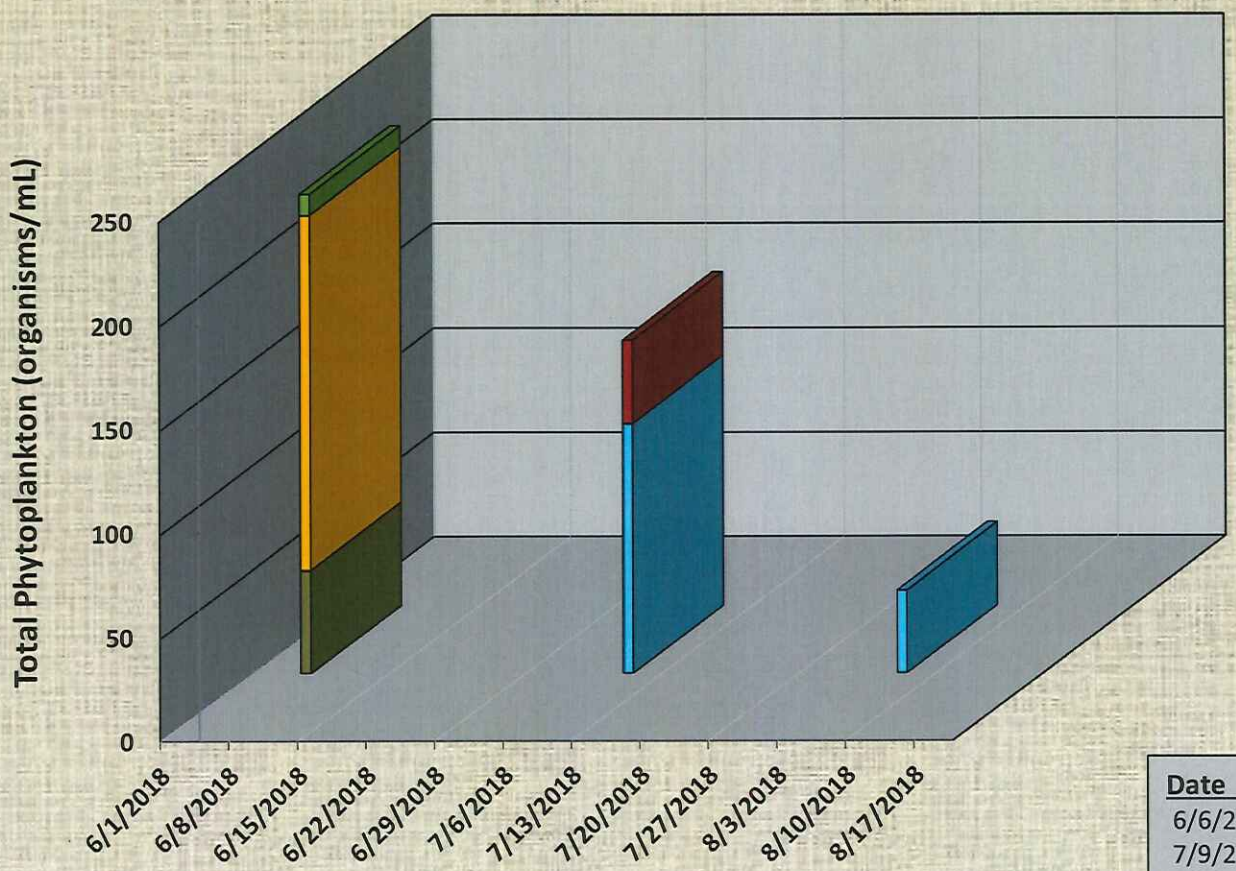
Date	Total Phytoplankton
6/6/2018	360
7/9/2018	170
8/6/2018	130

Shadow Lake
2018 Phytoplankton Distribution



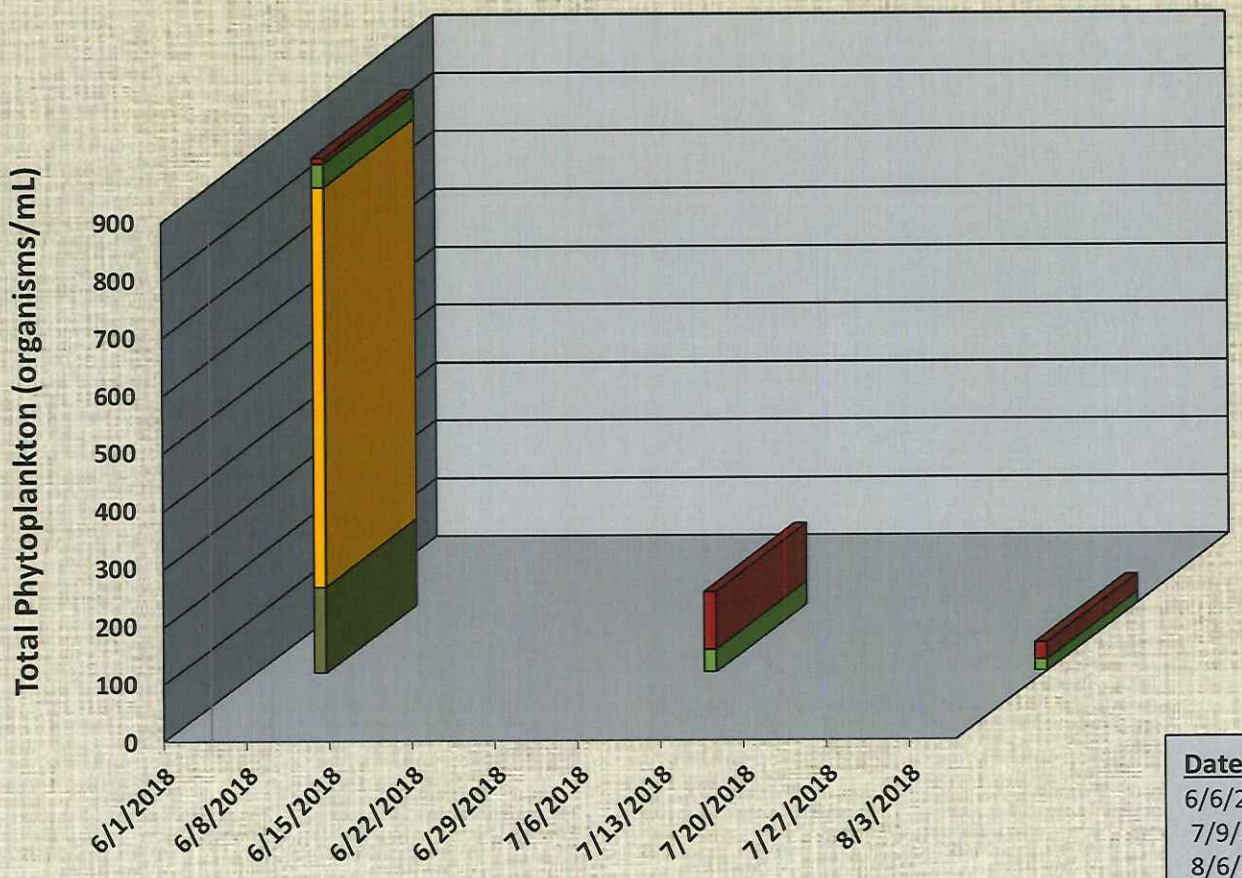
Date	Total Phytoplankton
6/6/2018	510
6/18/2018	680
7/9/2018	170
7/23/2018	480
8/6/2018	300
8/20/2018	1,580

Cove Pond
2018 Phytoplankton Distribution



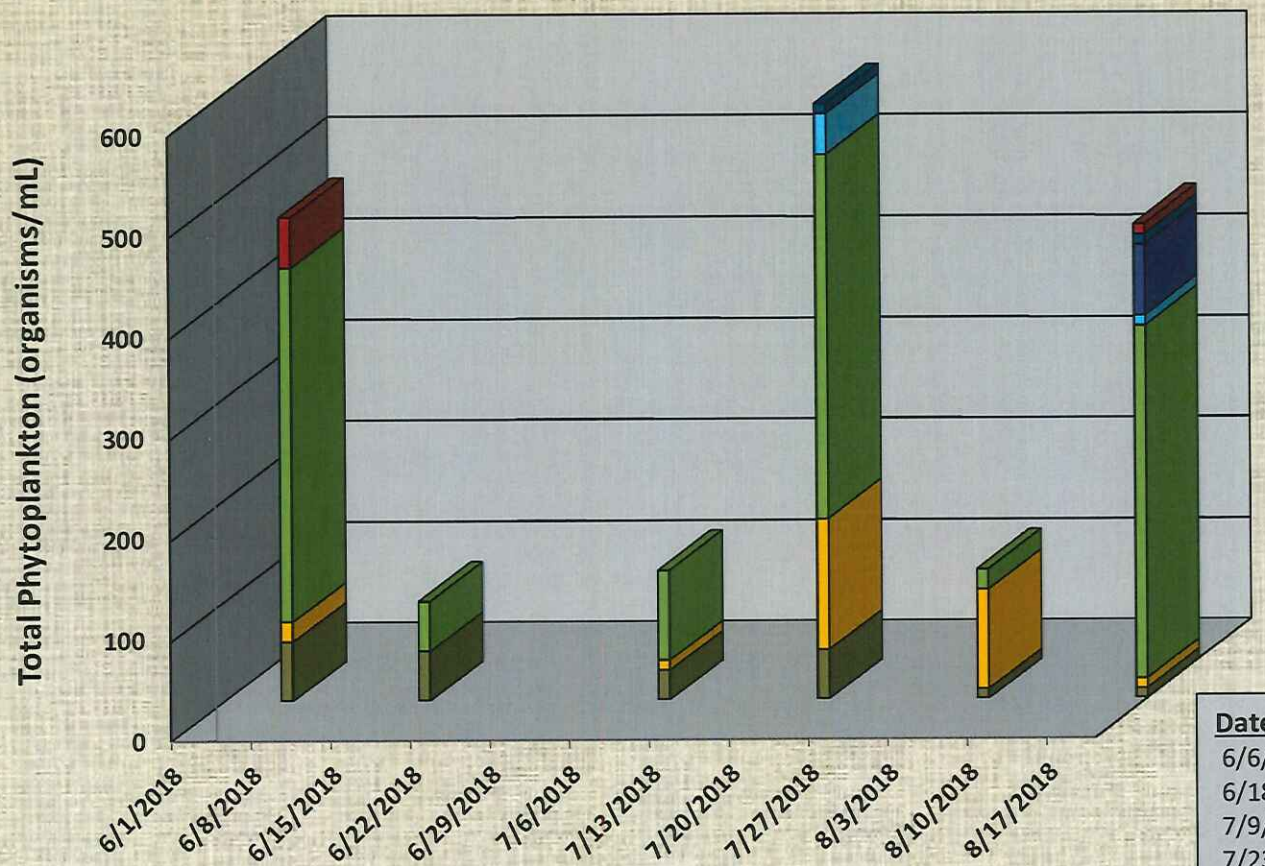
Date	Total Phytoplankton
6/6/2018	230
7/9/2018	160
8/6/2018	40

Grunden's Pond
2018 Phytoplankton Distribution



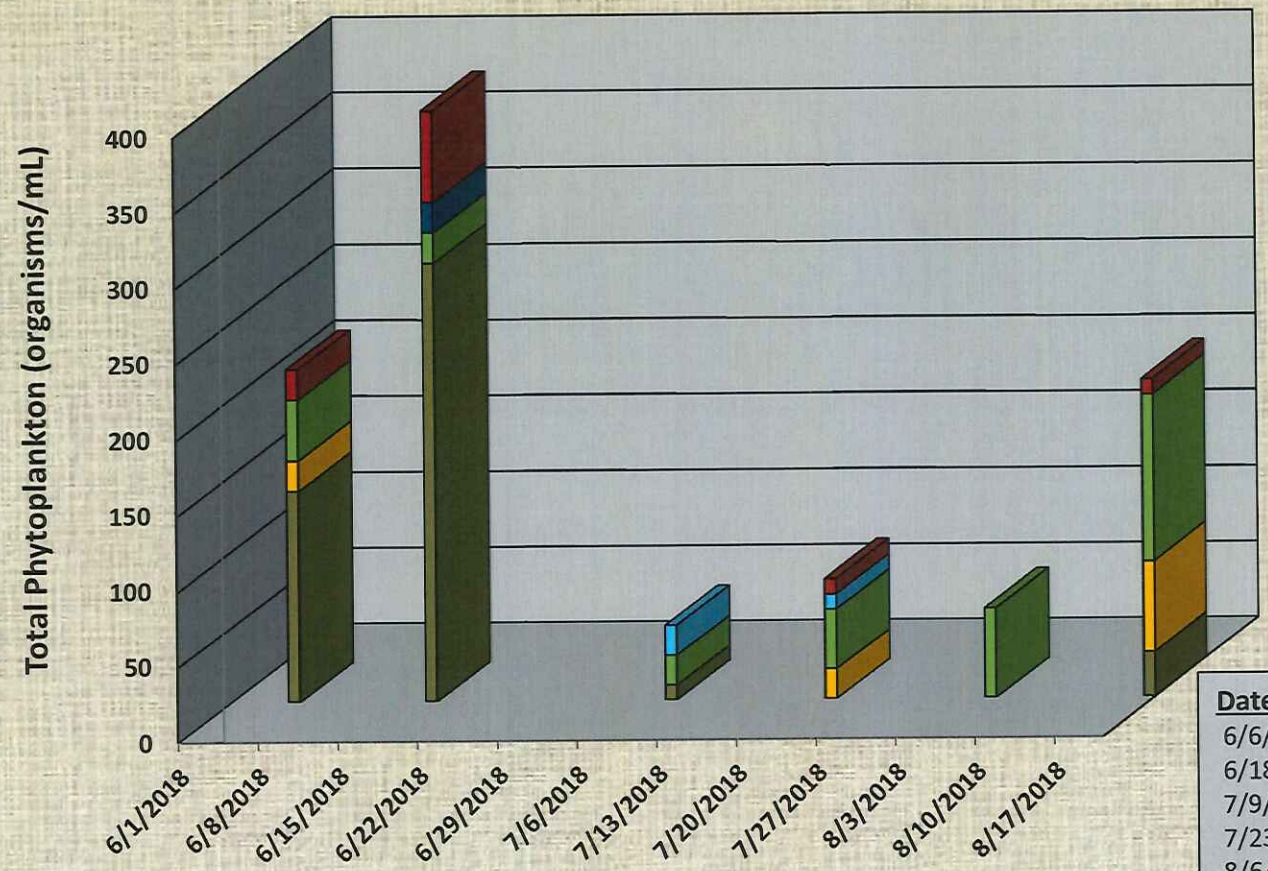
Date	Total Phytoplankton
6/6/2018	890
7/9/2018	140
8/6/2018	50

Mountain Lake
2018 Phytoplankton Distribution

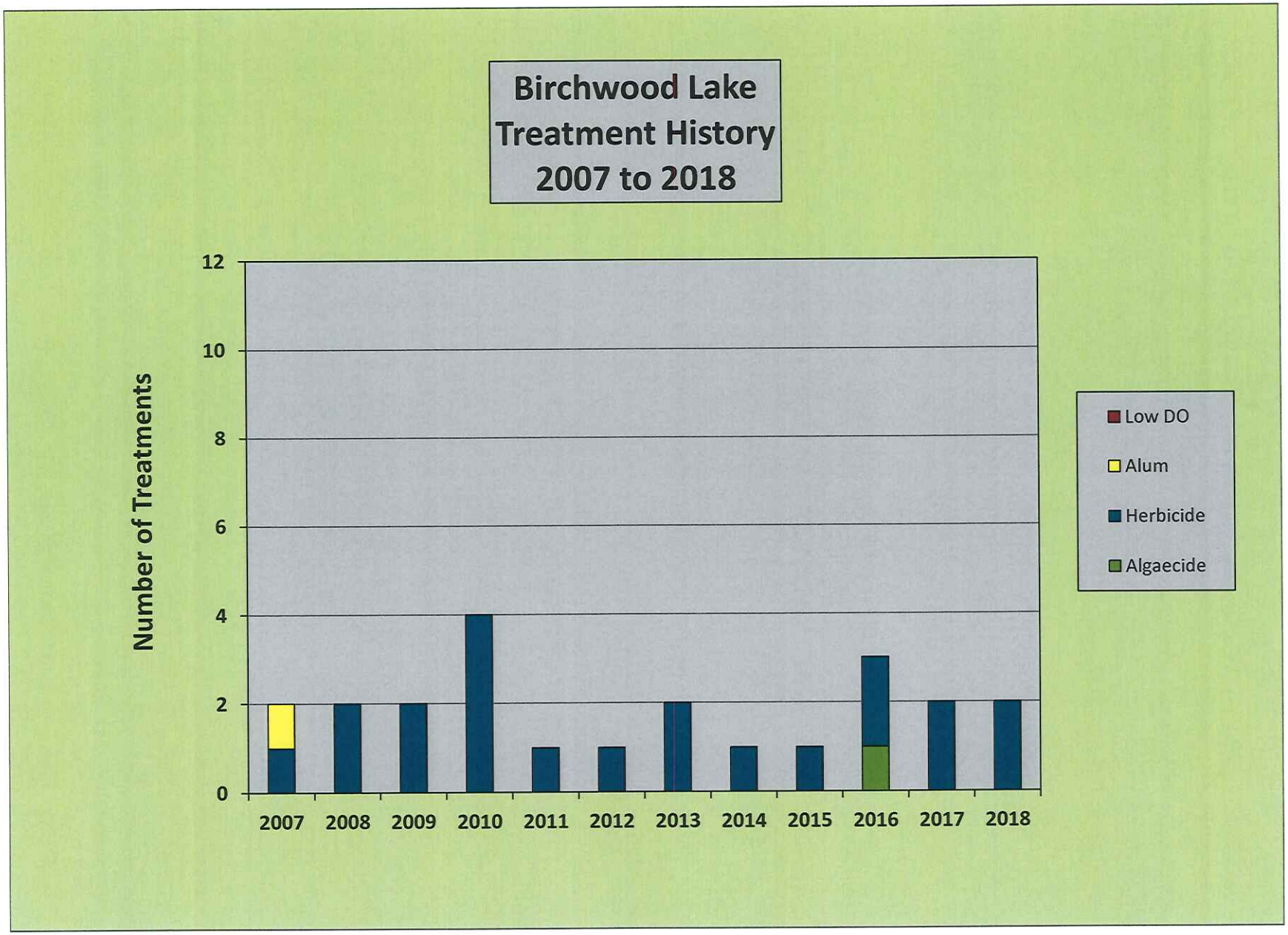


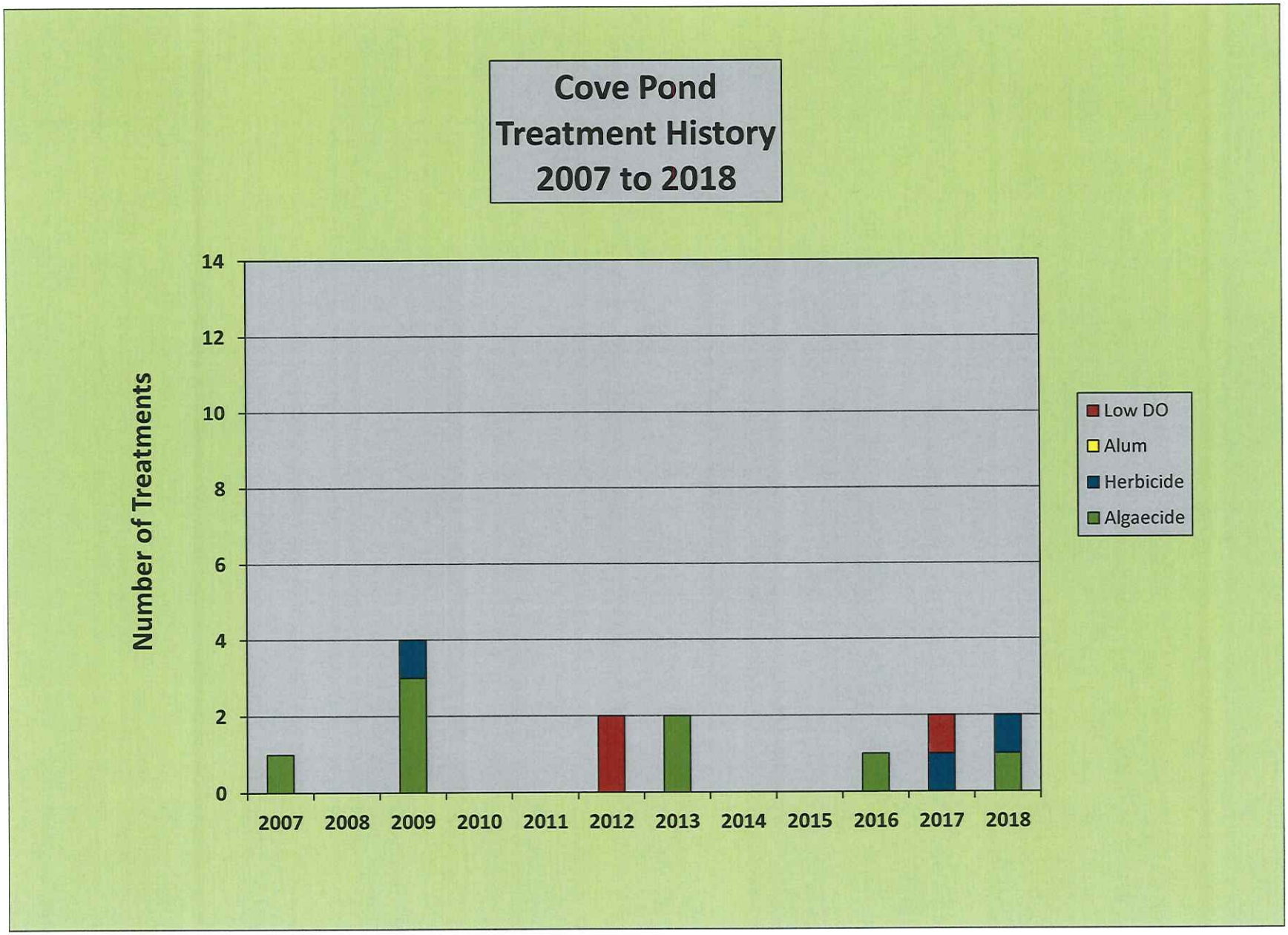
Date	Total Phytoplankton
6/6/2018	480
6/18/2018	100
7/9/2018	130
7/23/2018	590
8/6/2018	130
8/20/2018	470

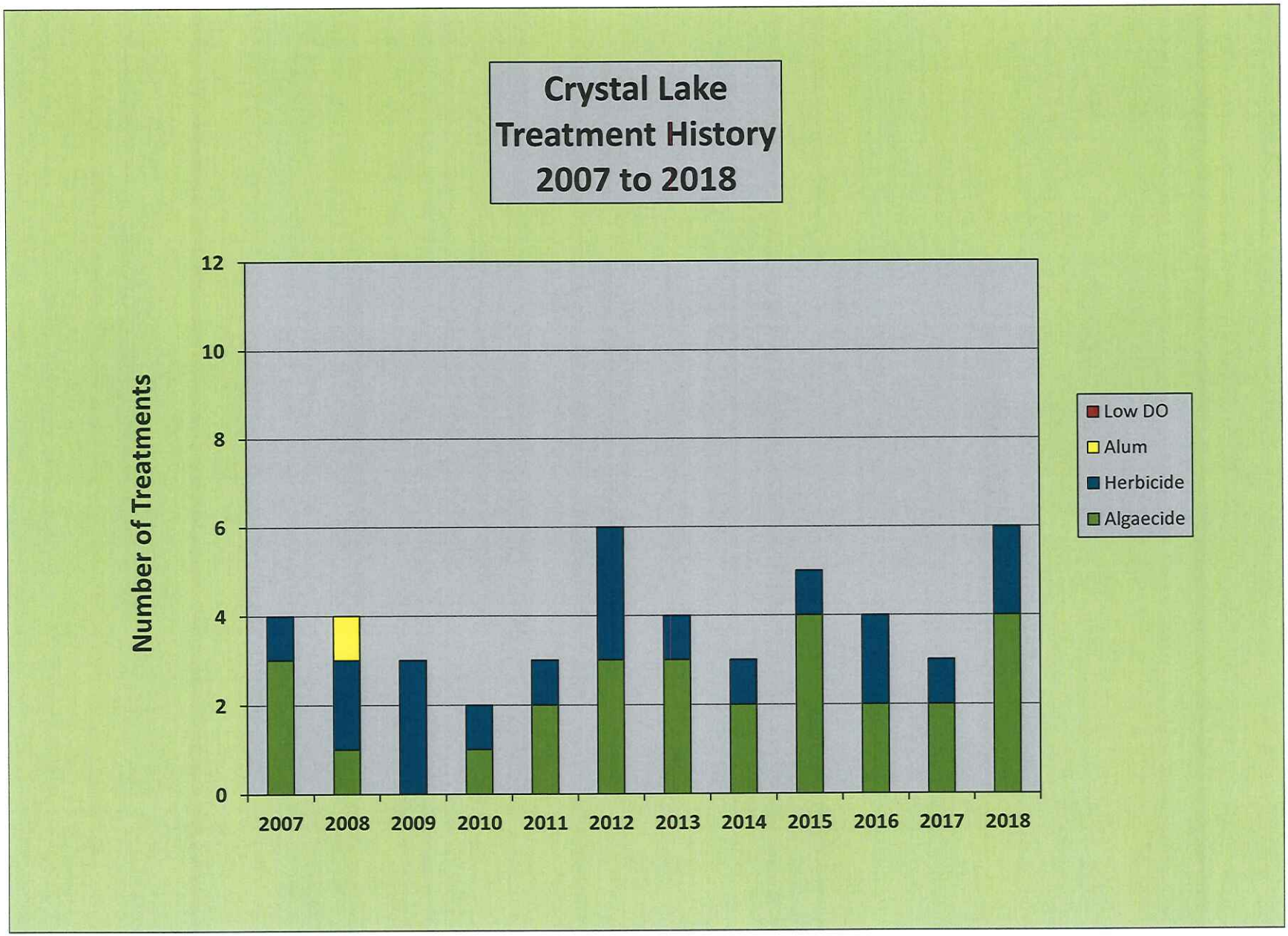
Wildwood Lake
2018 Phytoplankton Distribution

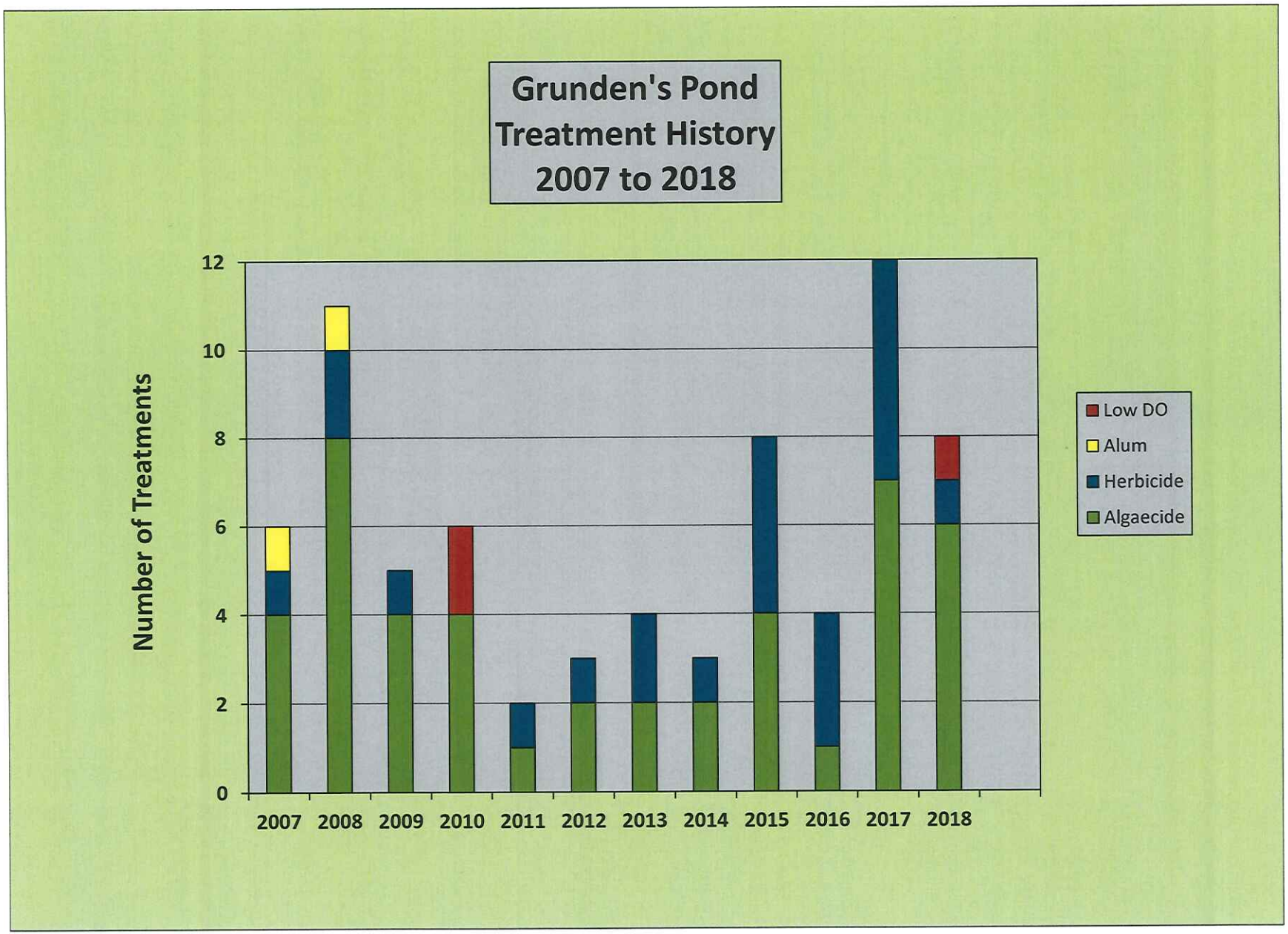


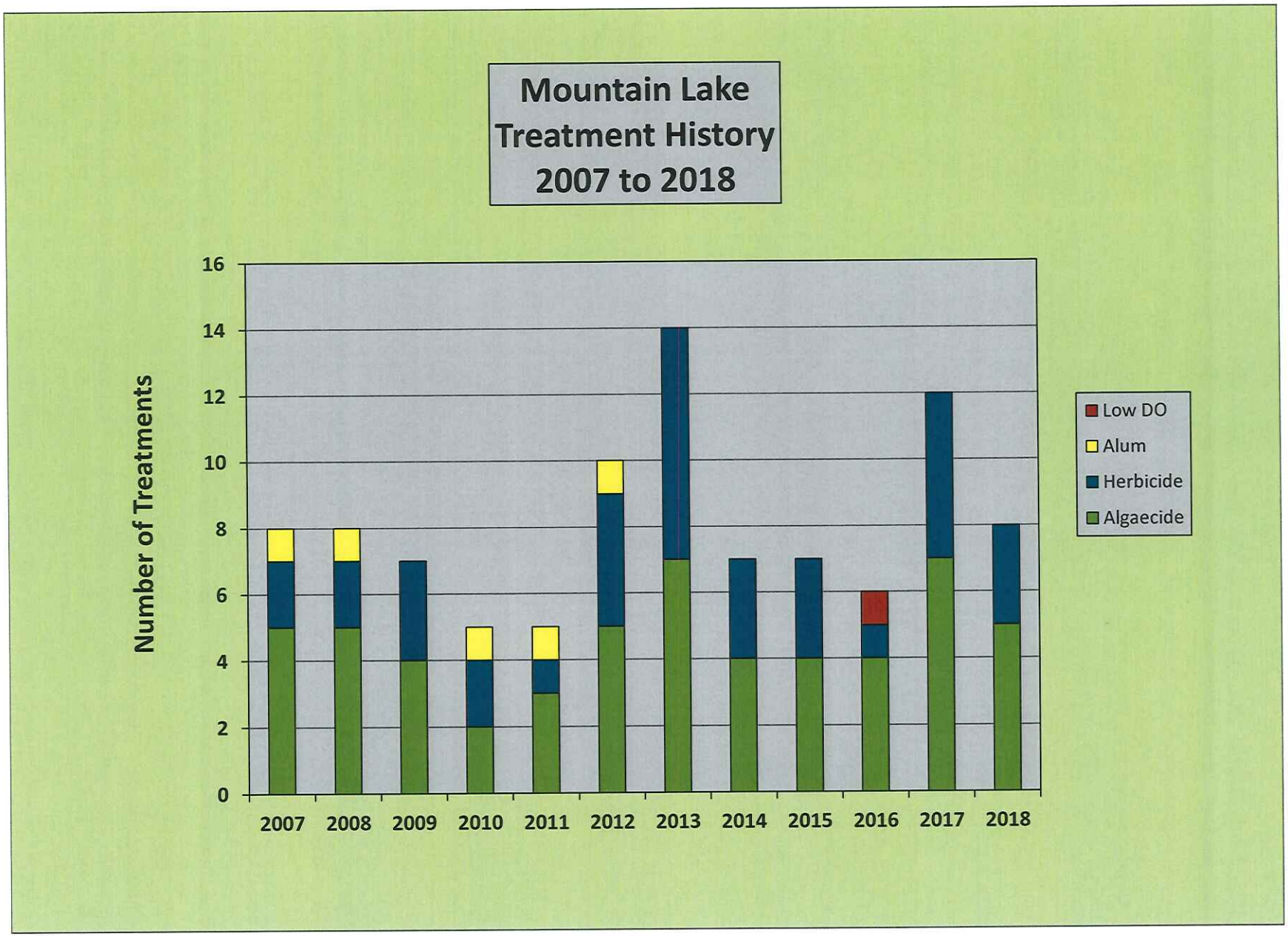
Date	Total Phytoplankton
6/6/2018	220
6/18/2018	390
7/9/2018	50
7/23/2018	80
8/6/2018	60
8/20/2018	210

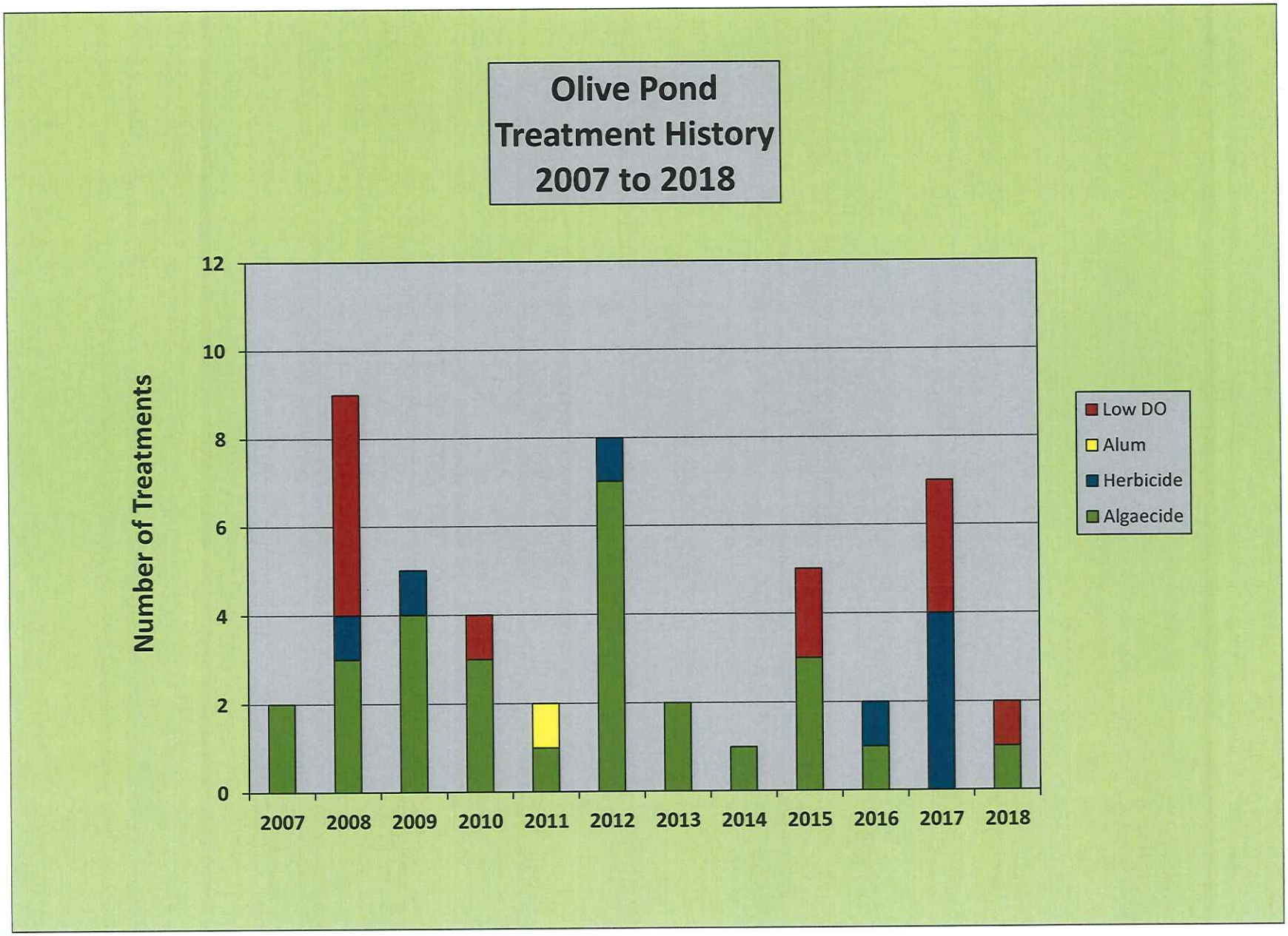

Birchwood Lake
Treatment History
2007 to 2018
Number of Treatments
12
10
8
6
4
2
0
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
Low DO
Alum
Herbicide
Algaecide

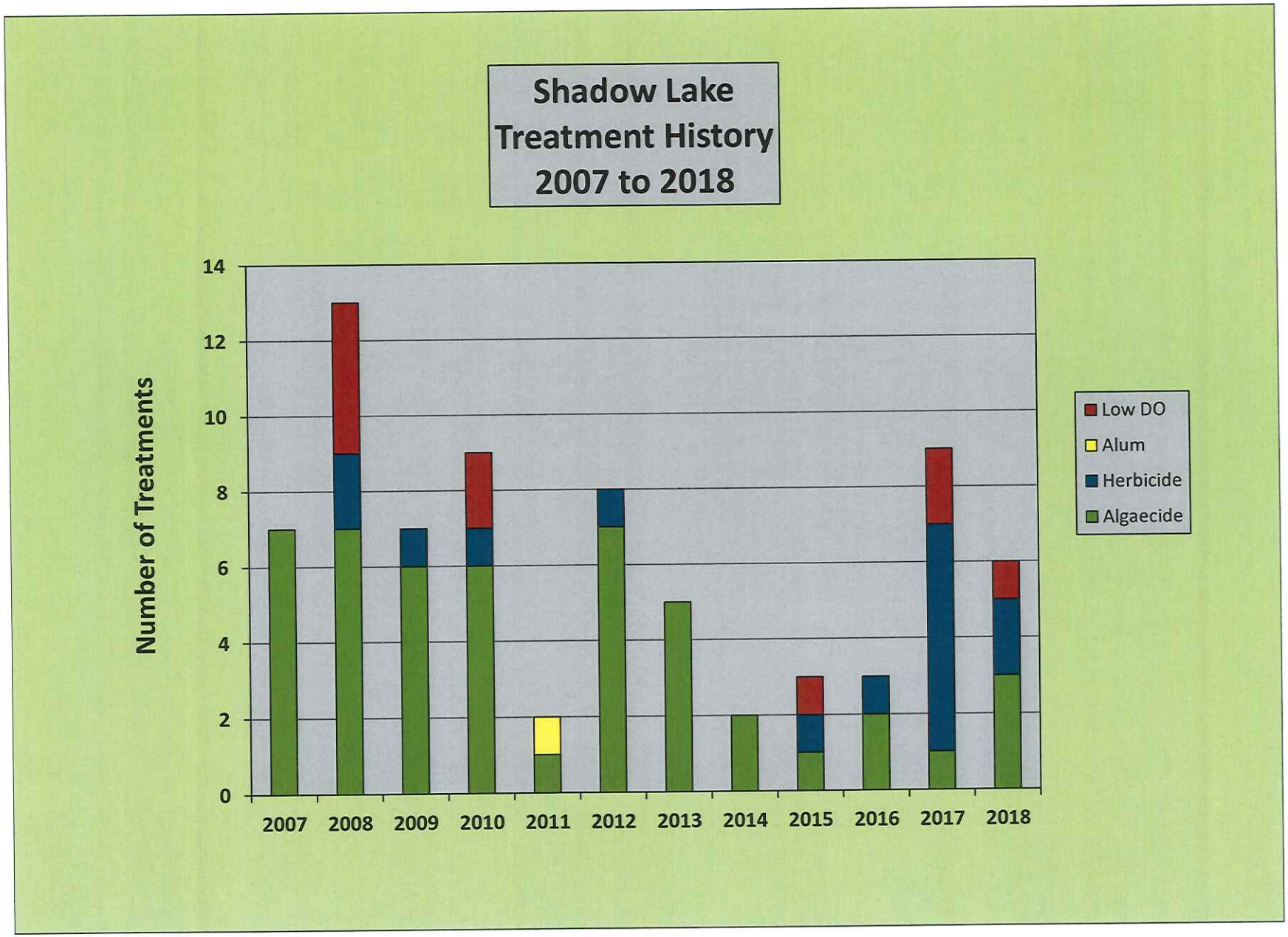

Cove Pond
Treatment History
2007 to 2018
Number of Treatments
14
12
10
8
6
4
2
0
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
Low DO
Alum
Herbicide
Algaecide

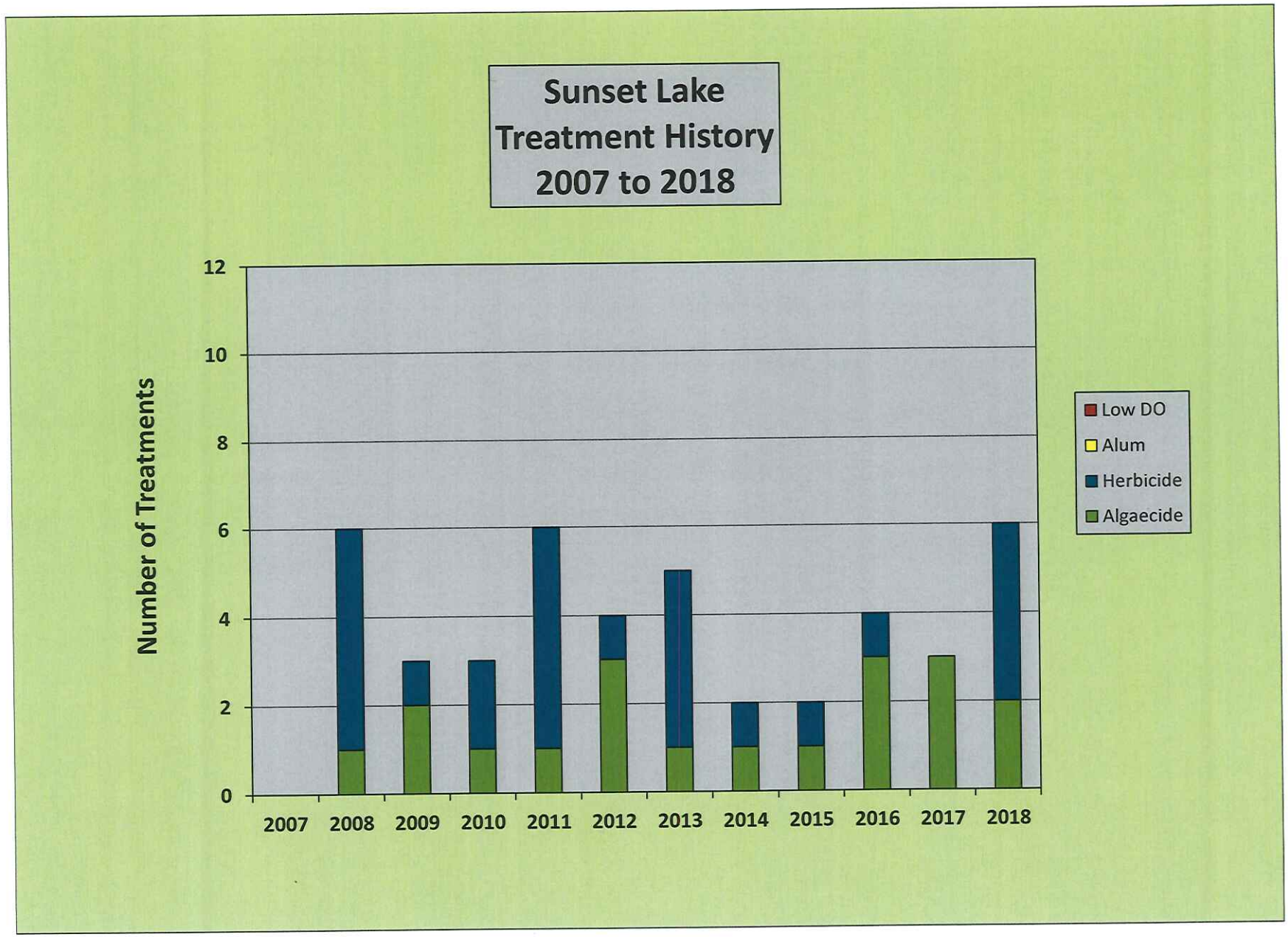

Crystal Lake
Treatment History
2007 to 2018
Number of Treatments
12
10
8
6
4
2
0
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
Low DO
Alum
Herbicide
Algaecide

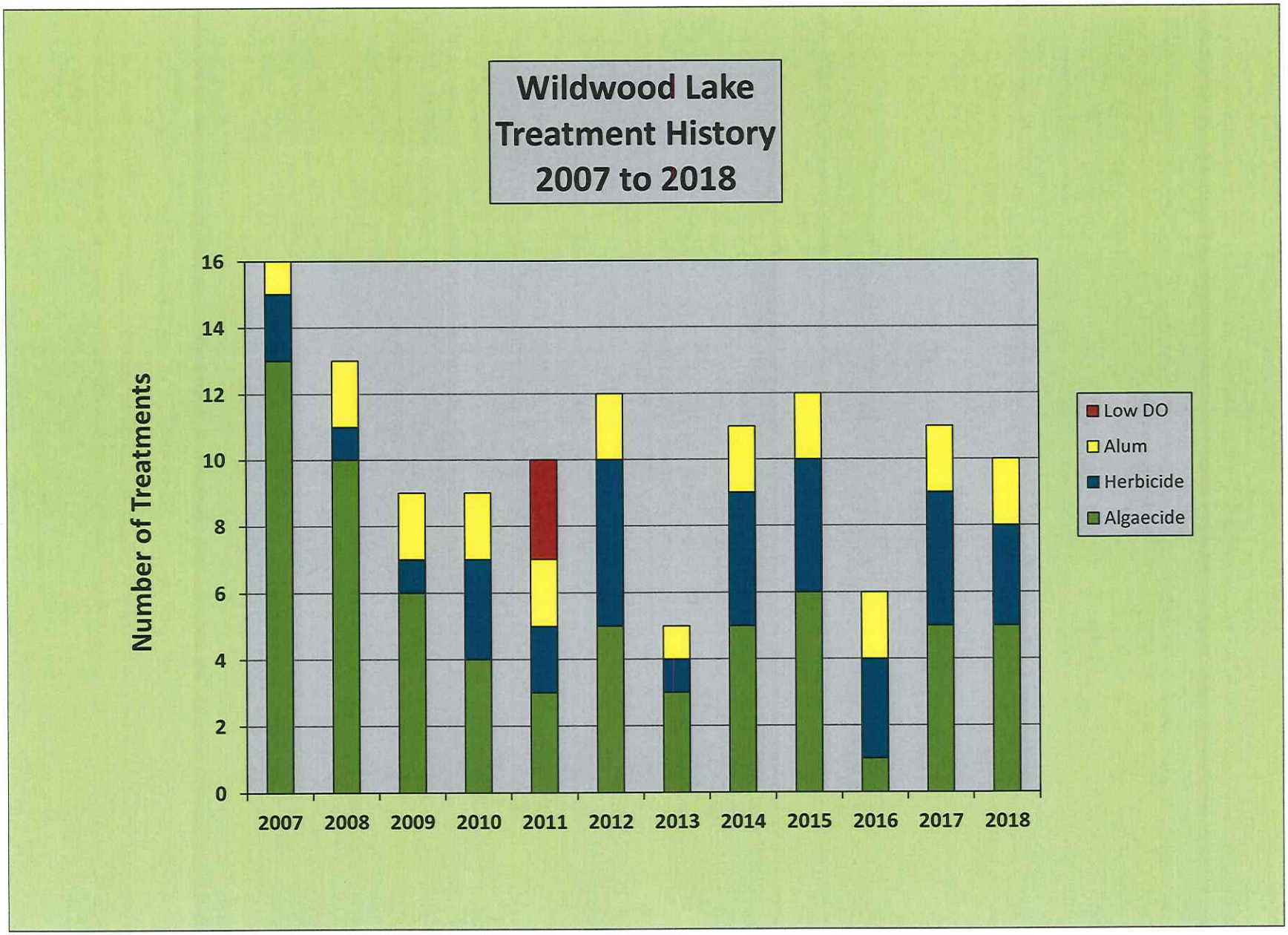

Grunden's Pond
Treatment History
2007 to 2018
Number of Treatments
0
2
4
6
8
10
12
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
Low DO
Alum
Herbicide
Algaecide


Mountain Lake
Treatment History
2007 to 2018
Number of Treatments
16
14
12
10
8
6
4
2
0
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
Low DO
Alum
Herbicide
Algaecide


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


Shadow Lake
Treatment History
2007 to 2018
Number of Treatments
14
12
10
8
6
4
2
0
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
Low DO
Alum
Herbicide
Algaecide


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


Wildwood Lake
Treatment History
2007 to 2018
Number of Treatments
16
14
12
10
8
6
4
2
0
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
Low DO
Alum
Herbicide
Algaecide

Mountain Lakes

2018 E. Coli: Data

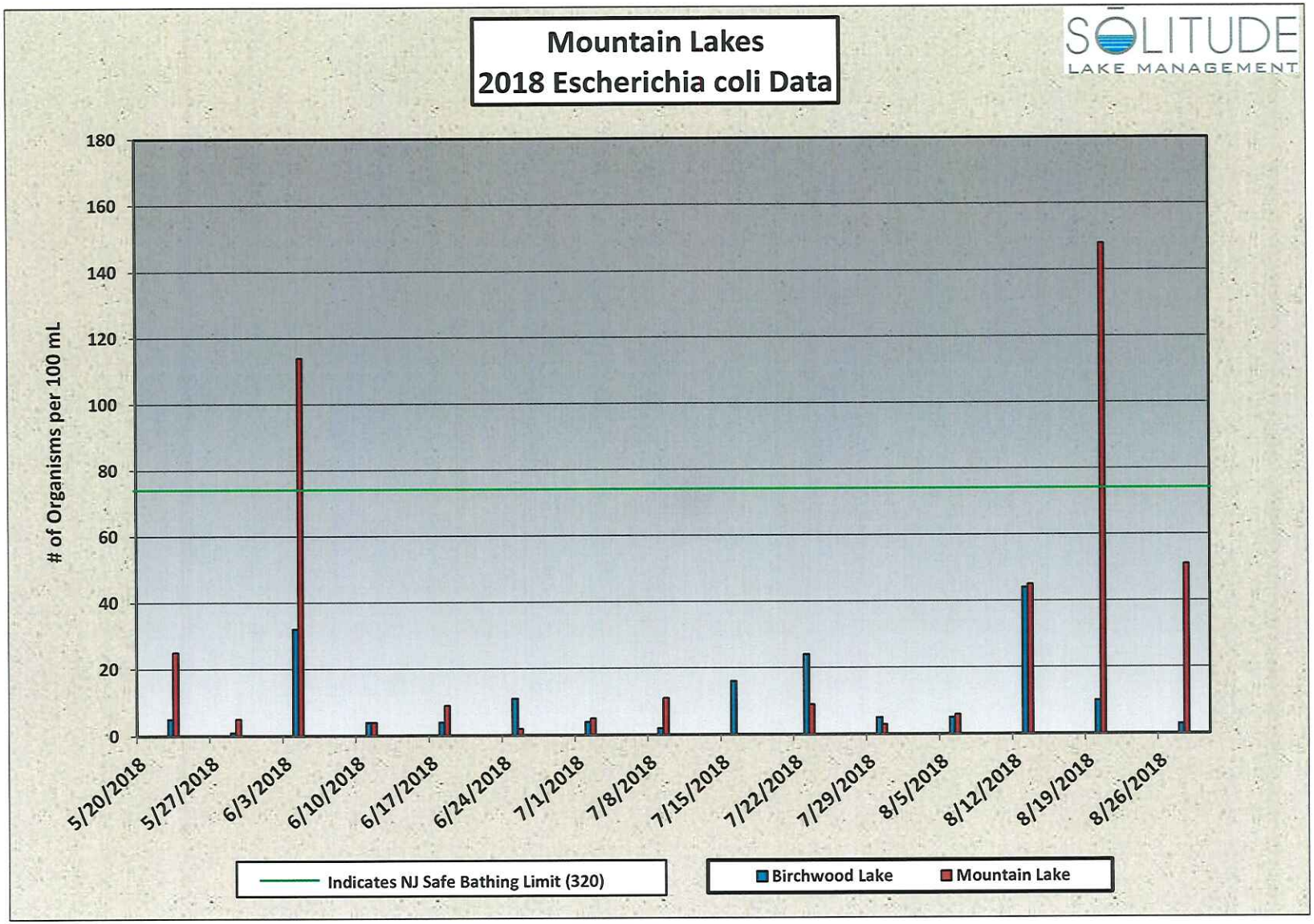
Date	Birchwood Lake	Mountain Lake	New Jersey Health Limit
5/23/2018	5	25	320
5/29/2018	1	5	320
6/4/2018	32	114	320
6/11/2018	4	4	320
6/18/2018	4	9	320
6/25/2018	11	2	320
7/2/2018	4	5	320
7/9/2018	2	11	320
7/16/2018	16	ND	320
7/23/2018	24	9	320
7/30/2018	5	3	320
8/6/2018	5	6	320
8/13/2018	44	45	320
8/20/2018	10	148	320
8/28/2018	3	51	320
			320
			320

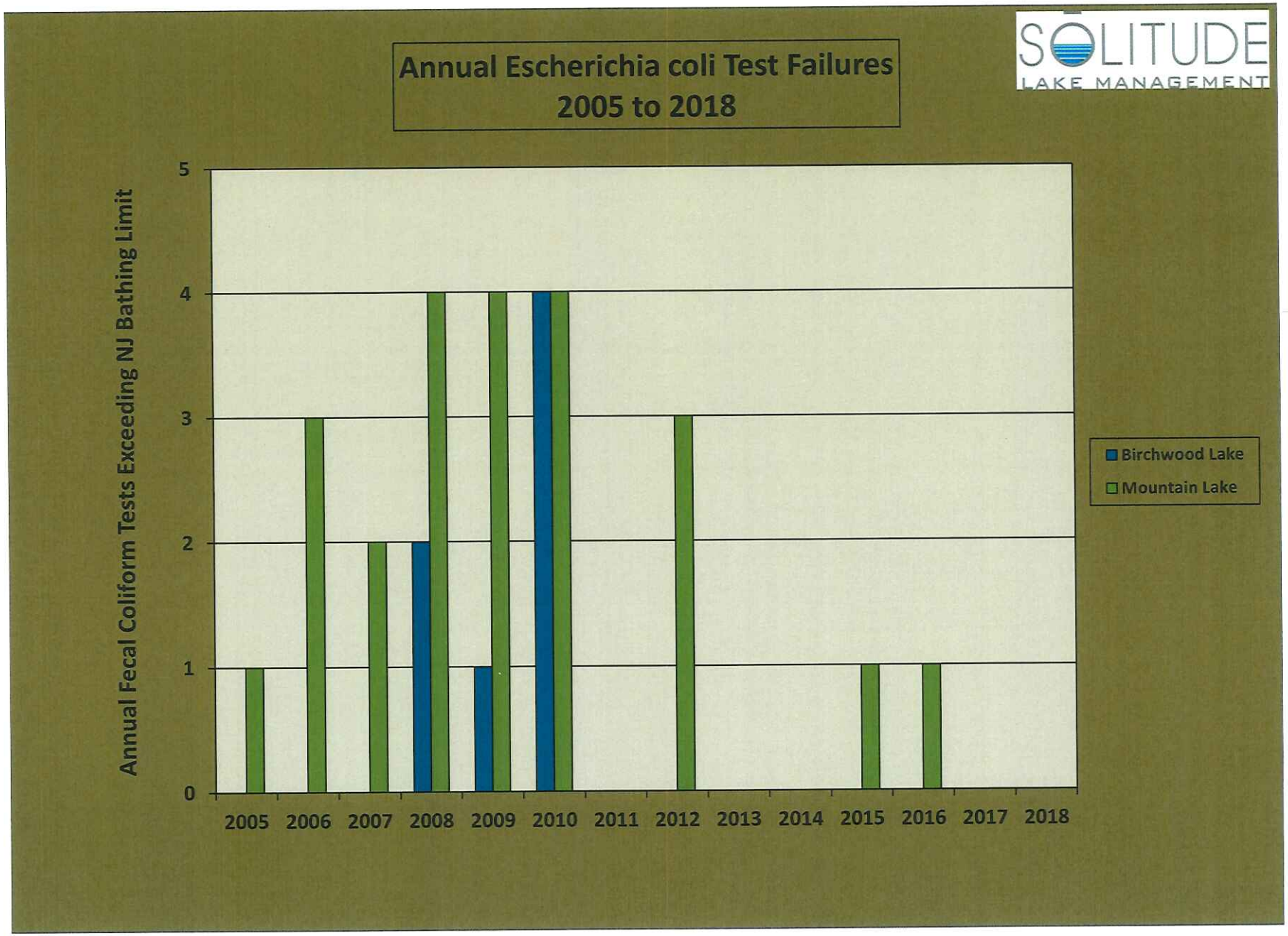
Retest Results

Date	Mountain Lake
NA	NA

Date	Birchwood
NA	NA

Note: All results are in organisms per 100 mL


Mountain Lakes
2018 Escherichia coli Data
SOLITUDE
LAKE MANAGEMENT
# of Organisms per 100 mL
180
160
140
120
100
80
60
40
20
0
5/20/2018
5/27/2018
6/3/2018
6/10/2018
6/17/2018
6/24/2018
7/1/2018
7/8/2018
7/15/2018
7/22/2018
7/29/2018
8/5/2018
8/12/2018
8/19/2018
8/26/2018
Indicates NJ Safe Bathing Limit (320)
Birchwood Lake
Mountain Lake


Annual Escherichia coli Test Failures
2005 to 2018
SOLITUDE
LAKE MANAGEMENT
Annual Fecal Coliform Tests Exceeding NJ Bathing Limit
0
1
2
3
4
5
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
Birchwood Lake
Mountain Lake

MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 6/6/2018	Examination Date: 6/7/2018	Amount Examined: 200 ml.
Site A: Olive Pond	Site B: Shadow Lake	Site C: Cove Pond

BACILLARIOPHYTA (Diatoms)	A	B	C
Asterionella	10	10	10
Cyclotella	10	30	
Cymbella			
Diatoma			
Fragilaria			10
Melosira			
Navicula		10	
Nitzschia			
Pinnularia			
Rhizosolenia			
Stephanodiscus	60	70	30
Stauroneis			
Synedra			
Tabellaria			
Cocconeis			

CHRYSOPHYTA (Golden Algae)	A	B	C
Dinobryon	20	70	30
Mallomonas	250	320	140
Synura			
Tribonema			
Uroglenopsis			

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

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

EUGLENOPHYTA (Euglenoids)	A	B	C
Euglena	10		
Phacus			
Trachelomonas			

PYRRHOPHYTA (Dinoflagellates)	A	B	C
Ceratium			
Peridinium			

SITE	A	B	C
TOTAL GENERA:	6	6	6
TRANSPARENCY:	3.0'	4.0'	3.5'
ORGANISMS PER MILLILITER:	360	510	230

NOTES: This was the first sampling event of 2018. Algal density was observed as low for sites A and C and moderate for site B. Algal diversity is considered moderate for all three sites. The assemblage is dominated by golden algae at all three sites along with smaller amounts of diatoms. There are also trace amounts of green algae at site C and euglenoids at site A. Water clarity for all three sites is considered fair.

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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 6/18/2018	Examination Date: 6/19/2018	Amount Examined: 200 ml.
Site A: Olive Pond	Site B: Shadow Lake	Site C: Cove Pond

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

CHRYSOPHYTA (Golden Algae)	A	B	C
Dinobryon		310	
Mallomonas		110	
Synura			
Tribonema			
Uroglenopsis			

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

CYANOPHYTA (Blue-green Algae)	A	B	C
Anabaena			
Anacystis			
Aphanizomenon			
Coelosphaerium			
Gomphosphseria			
Lyngbya			
Microcystis			
Oscillatoria		110	
Pseudoanabaena			
Synechocystis			
Agmenellum			
PROTOZOA			
Actinophyrs			

EUGLENOPHYTA (Euglenoids)	A	B	C
Euglena		30	
Phacus			
Trachelomonas			

PYRRHOPHYTA (Dinoflagellates)	A	B	C
Ceratium			
Peridinium			

SITE	A	B	C
TOTAL GENERA:		11	
TRANSPARENCY:		3.5'est	
ORGANISMS PER MILLILITER:		680	

NOTES: Algal density increased and is now considered moderate. Algal diversity also increased and is now observed as high. The assemblage is dominated by golden algae this week. Diatoms, dinoflagellates, green algae and blue-green algae were also observed. Water clarity decreased since the last sampling event and continues to be fair.

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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 7/9/2018	Examination Date: 7/10/2018	Amount Examined: 200 ml.
Site A: Olive Pond	Site B: Shadow Lake	Site C: Cove Pond

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

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

CHLOROPHYTA (Green Algae)	A	B	C
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			
Coelastrum	50	30	
Eudorina			
Mougeotia			
Oedogonium			
Oocystis			
Pandorina			
Pediastrum			
Phytoconis			
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum			
Sphaerocystis			
Ulothrix			
Volvox			
Zygnema			
Quadrigula			
Gloeocystis			
Cosmarium			
Treubaria			

CYANOPHYTA (Blue-green Algae)	A	B	C
Anabaena		140	10
Anacystis			
Aphanizomenon			90
Coelosphaerium			
Gomphosphseria			
Lyngbya			
Microcystis			10
Oscillatoria			
Pseudoanabaena			
Synechocystis			
Agmenellum			
Nodularia			10

EUGLENOPHYTA (Euglenoids)	A	B	C
Euglena			
Phacus			
Trachelomonas			

PYRRHOPHYTA (Dinoflagellates)	A	B	C
Ceratium	100		40
Peridinium			

SITE	A	B	C
TOTAL GENERA:	3	2	5
TRANSPARENCY:	3.0' est	3.0' est	2.0' est
ORGANISMS PER MILLILITER:	170	170	160

NOTES: Since the last sampling event, algal density decreased and is now considered low for all three sites. Algal diversity also decreased at all three sites and are all now considered low. The assemblage consists mainly of dinoflagellates, blue-green algae (sites B and C), green algae, and diatoms. Water clarity remained the same at site A but decreased at sites B and C. All three sites are now considered to have poor water clarity.

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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 7/23/2018	Examination Date: 7/25/2018	Amount Examined: 200 ml.
Site A: Olive Pond	Site B: Shadow Lake	Site C: Cove Pond

BACILLARIOPHYTA (Diatoms)	A	B	C
Asterionella			
Cyclotella			
Cymbella			
Diatoma			
Fragilaria			
Melosira			
Navicula			
Nitzschia			
Pinnularia			
Rhizosolenia			
Stephanodiscus		200	
Stauroneis			
Synedra		10	
Tabellaria			
Cocconeis			

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

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

CYANOPHYTA (Blue-green Algae)	A	B	C
Anabaena		20	
Anacystis			
Aphanizomenon		80	
Coelosphaerium			
Gomphosphseria			
Lyngbya			
Microcystis			
Oscillatoria			
Pseudoanabaena			
Synechocystis			
Agmenellum			
PROTOZOA			
Actinophyrs			

EUGLENOPHYTA (Euglenoids)	A	B	C
Euglena			
Phacus			
Trachelomonas			

PYRRHOPHYTA (Dinoflagellates)	A	B	C
Ceratium		50	
Peridinium			

SITE	A	B	C
TOTAL GENERA:		7	
TRANSPARENCY:		3.5'	
ORGANISMS PER MILLILITER:		450	

NOTES: Since the last sampling event, algal density increased but is still considered low. Algal diversity also increased and is now moderate. The assemblage consists of diatoms, golden algae, green algae, blue-green algae, and dinoflagellates. Water clarity increased slightly and is now considered fair.

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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 8/6/2018	Examination Date: 8/7/2018	Amount Examined: 200 ml.
Site A: Olive Pond	Site B: Shadow Lake	Site C: Cove Pond

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

CHRYSOPHYTA (Golden Algae)	**A**	**B**	**C**
Dinobryon	10	20	
Mallomonas	50	240	
Synura			
Tribonema			
Uroglenopsis			

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

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

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

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

SITE	**A**	**B**	**C**
TOTAL GENERA:	5	4	2
TRANSPARENCY:			
ORGANISMS PER MILLILITER:	**130**	**300**	**40**

NOTES: Since the last sampling event, algal density decreased at all three sites and is now low for all. Algal diversity increased at site A but decreased at sites B and C. All three sites now have low diversity. The assemblage consists mainly of green algae, golden algae, dinoflagellates, and blue-green algae. Site C in particular contains only blue-green algae.

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: 8/20/2018	Examination Date: 8/21/2018	Amount Examined: 200 ml.
Site A: Olive Pond	Site B: Shadow Lake	Site C: Cove Pond

BACILLARIOPHYTA (Diatoms)	A	B	C
Asterionella			
Cyclotella		60	
Cymbella			
Diatoma			
Fragilaria			
Melosira			
Navicula		10	
Nitzschia			
Pinnularia			
Rhizosolenia			
Stephanodiscus			
Stauroneis			
Synedra			
Tabellaria			
Cocconeis			

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

CHLOROPHYTA (Green Algae)	A	B	C
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			
Coelastrum		250	
Eudorina			
Mougeotia			
Oedogonium			
Oocystis			
Pandorina			
Pediastrum			
Phytoconis		620	
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum		230	
Sphaerocystis		200	
Ulothrix			
Volvox			
Zygnema			
Quadrigula			
Gloeocystis			
Cosmarium			
Treubaria			

CYANOPHYTA (Blue-green Algae)	A	B	C
Anabaena		100	
Anacystis			
Aphanizomenon		10	
Coelosphaerium			
Gomphosphseria		10	
Lyngbya			
Microcystis		50	
Oscillatoria			
Pseudoanabaena			
Synechocystis			
Agmenellum			
PROTOZOA			
Actinophyrs			

EUGLENOPHYTA (Euglenoids)	A	B	C
Euglena			
Phacus			
Trachelomonas		10	

PYRRHOPHYTA (Dinoflagellates)	A	B	C
Ceratium		10	
Peridinium			

SITE	A	B	C
TOTAL GENERA:		13	
TRANSPARENCY:		3.5' est	
ORGANISMS PER MILLILITER:		1,580	

NOTES: Since the last sampling event, algal density increased and is now considered high for Shadow Lake. Algal diversity also increased and is now high. The assemblage consists mainly of green algae with some lower amounts of blue-green algae, diatoms, golden algae, euglenoids, and dinoflagellates. Water clarity is considered fair for this site.

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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 6/6/2018	Examination Date: 6/7/2018	Amount Examined: 200 ml.
Site A: Grunden's Pond	Site B: Mountain Lake	Site C: Wildwood Lake

BACILLARIOPHYTA (Diatoms)	A	B	C
Asterionella		30	
Cyclotella	30	10	70
Cymbella			
Diatoma			
Fragilaria			10
Melosira			
Navicula			60
Nitzschia			
Pinnularia			
Urosolenia			
Stephanodiscus	120	20	
Stauroneis			
Synedra			
Tabellaria			
Surriella			

CHRYSOPHYTA (Golden Algae)	A	B	C
Dinobryon	80		
Mallomonas	610	20	20
Synura			
Tribonema			
Uroglenopsis			

CHLOROPHYTA (Green Algae)	A	B	C
Ankistrodesmus	20	10	
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			
Coelastrum			
Eudorina			
Mougeotia			
Oedogonium			
Oocystis			
Pandorina			
Pediastrum			
Phytoconis			
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum		20	10
Sphaerocystis	20	320	30
Ulothrix			
Scenedesmus			
Zygnema			
Gloeocystis			
Cosmarium			
Quadriguia			
Tetraspora			

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

EUGLENOPHYTA (Euglenoids)	A	B	C
Euglena			
Phacus			
Trachelomonas			

PYRRHOPHYTA (Dinoflagellates)	A	B	C
Ceratium	10	50	20
Peridinium			

SITE	A	B	C
TOTAL GENERA:	7	8	7
TRANSPARENCY:	3.0'	7.0'est	7.5'
ORGANISMS PER MILLILITER:	890	480	220

NOTES: This is the first sampling event of 2018. Algal density is considered low for sites B and C, while site A is moderate. Algal diversity was found to be moderate for all three sites. The assemblage is primarily made up of golden algae, green algae, and diatoms. Trace amounts of dinoflagellates were also observed. Water clarity for sites B and C are considered to be good, while site A is poor.

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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 6/18/2018	Examination Date: 6/19/2018	Amount Examined: 200 ml.
Site A: Grunden's Pond	Site B: Mountain Lake	Site C: Wildwood Lake

BACILLARIOPHYTA (Diatoms)	A	B	C
Asterionella			
Cyclotella		10	
Cymbella			
Diatoma			
Fragilaria		10	10
Melosira			
Navicula		20	180
Nitzschia			
Pinnularia			10
Urosolenia			
Stephanodiscus			
Stauroneis			
Synedra		10	90
Tabellaria			
Surriella			

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

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

PYRRHOPHYTA (Dinoflagellates)	A	B	C
Ceratium			60
Peridinium			

SITE	A	B	C
TOTAL GENERA:		6	8
TRANSPARENCY:		9.0'	8.5'
ORGANISMS PER MILLILITER:		100	390

NOTES: Since the last sampling event, algal density decreased at site B but increased at site C. Both are considered to have low density. Algal diversity decreased at site B and increased at site C. Both sites now have moderate diversity. The assemblage consists mainly of diatoms and green algae. Trace amounts of euglenoids and dinoflagellates at site C only. Water clarity increased at both sites and is now considered to be good at site C, while site B is good-excellent at site B.

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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 7/9/2018	Examination Date: 7/10/2018	Amount Examined: 200 ml.
Site A: Grunden's Pond	Site B: Mountain Lake	Site C: Wildwood Lake

BACILLARIOPHYTA (Diatoms)	A	B	C
Asterionella			
Cyclotella			
Cymbella			
Diatoma			
Fragilaria		10	
Melosira			
Navicula			
Nitzschia			
Pinnularia			
Urosolenia			
Stephanodiscus			
Stauroneis			
Synedra		20	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			
Eudorina			
Mougeotia			
Oedogonium	10		
Oocystis			
Pandorina			
Pediastrum			
Phytoconis			
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum	10		
Sphaerocystis			
Ulothrix			
Scenedesmus			
Zygnema			
Gloeocystis	20	80	
Cosmarium		10	20
Quadrigula			
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	100		
Peridinium			

SITE	A	B	C
TOTAL GENERA:	4	5	3
TRANSPARENCY:	2.0' est	10.0' est	12.0' est
ORGANISMS PER MILLILITER:	140	130	50

NOTES: Since the last sampling event, algal density decreased at sites A and C but increased slightly at site B. All three sites now have low density. Algal diversity decreased at site A, but increased at sites B and C. All three sites now have low diversity. The assemblage is a mix of diatoms, green algae, and dinoflagellates. There are trace amounts of blue-green algae at site C only. Water clarity increased at sites B and C but decreased slightly at site A. Sites B and C are considered excellent and site A is poor.

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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 7/23/2018	Examination Date: 7/25/2018	Amount Examined: 200 ml.
Site A: Grunden's Pond	Site B: Mountain Lake	Site C: Wildwood Lake

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

CHRYSOPHYTA (Golden Algae)	A	B	C
Dinobryon		130	20
Mallomonas			
Synura			
Tribonema			
Uroglenopsis			

CHLOROPHYTA (Green Algae)	A	B	C
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			
Coelastrum			
Eudorina			
Mougeotia		10	
Oedogonium			
Oocystis			
Pandorina			
Pediastrum			
Phytoconis			
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum		10	
Sphaerocystis		320	40
Ulothrix			
Scenedesmus			
Zygnema			
Gloeocystis			
Cosmarium			
Quadrigula			
Octacanthium		20	

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

EUGLENOPHYTA (Euglenoids)	A	B	C
Euglena			
Phacus		10	
Trachelomonas			

PYRRHOPHYTA (Dinoflagellates)	A	B	C
Ceratium			10
Peridinium			

SITE	A	B	C
TOTAL GENERA:		8	4
TRANSPARENCY:		9.0'	12.0'
ORGANISMS PER MILLILITER:		590	80

NOTES: Since the last sampling event, algal density increased at both sites B and C. Site B is considered moderate while site C is still low. Algal diversity increased at both sites and is now moderate at site B and low at site C. The assemblage consists mainly of green algae, diatoms, golden algae, and blue-green algae. Trace amounts of euglenoids (site B) and dinoflagellates (site C) were also observed. Water clarity decreased slightly at site B and remained the same at site C. Both sites are considered excellent.

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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 8/6/2018	Examination Date: 8/7/2018	Amount Examined: 200 ml.
Site A: Grunden's Pond	Site B: Mountain Lake	Site C: Wildwood Lake

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

CHRYSOPHYTA (Golden Algae)	A	B	C
Dinobryon		90	
Mallomonas		10	
Synura			
Tribonema			
Uroglenopsis			

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

SITE	A	B	C
TOTAL GENERA:	3	5	2
TRANSPARENCY:			
ORGANISMS PER MILLILITER:	50	130	60

NOTES: Since the last sampling event, algal density decreased at all three sites and is now low for all. Algal diversity also decreased at all three sites and is now low. The assemblage consists mainly of green algae and golden algae with trace amounts of diatoms (site B) and dinoflagellates (site A).

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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 8/20/2018	Examination Date: 8/21/2018	Amount Examined: 200 ml.
Site A: Grunden's Pond	Site B: Mountain Lake	Site C: Wildwood Lake

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

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

CHLOROPHYTA (Green Algae)	A	B	C
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			
Coelastrum			20
Eudorina			
Mougeotia			
Oedogonium			
Oocystis			
Pandorina			
Pediastrum			
Phytoconis		170	
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum		40	10
Sphaerocystis			10
Ulothrix			
Scenedesmus			20
Zygnema			
Gloeocystis			
Cosmarium			50
Quadriguia			
Tetraspora			
Dictyosphaerium		140	

CYANOPHYTA (Blue-green Algae)	A	B	C
Anabaena		10	
Anacystis			
Aphanizomenon			
Coelosphaerium			
Gomphosphseria			
Lyngbya			
Microcystis			
Oscillatoria			
Pseudoanabaena			
Synechocystis			
Scytonema			
PROTOZOA			
Actinophyrs		60	
Vorticella		10	

EUGLENOPHYTA (Euglenoids)	A	B	C
Euglena		10	
Phacus			
Trachelomonas			

PYRRHOPHYTA (Dinoflagellates)	A	B	C
Ceratium		10	10
Peridinium			

SITE	A	B	C
TOTAL GENERA:		10	10
TRANSPARENCY:		7.5'	12.0'+ est
ORGANISMS PER MILLILITER:		470	210

NOTES: Since the last sampling event, algal density increased but is still considered low for both sites. Algal diversity also increased and is now moderate at both sites. The assemblage consists mainly of green algae with low amounts of diatoms, golden algae, blue-green algae (site B), protozoa, euglenoids (site B), and dinoflagellates. Water clarity is considered good at site B and excellent at site C.

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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 6/6/2018	Examination Date: 6/7/2018	Amount Examined: 200 ml.
Site A: Birchwood Lake	Site B: Crystal Lake	Site C: Sunset Lake

BACILLARIOPHYTA (Diatoms)	A	B	C
Asterionella	10	20	
Cyclotella			
Cymbella			
Diatoma			
Fragilaria			
Melosira			
Navicula	30		10
Nitzschia			
Pinnularia			
Urosolenia			
Stephanodiscus	70	10	
Stauroneis			
Synedra			
Tabellaria			

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

CHLOROPHYTA (Green Algae)	A	B	C
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			
Coelastrum			
Eudorina			
Mougeotia			
Oedogonium			20
Oocystis			
Pandorina			
Pediastrum			20
Phytoconis			
Rhizoclonium			
Scenedesmus			
Spirogyra			120
Staurastrum		10	
Sphaerocystis			
Ulothrix			
Volvox			
Zygnema			
Gloeocystis			
Sphaerocystis		90	330
Cosmarium			
Tetraedron			
Dictyosphaerium			

CYANOPHYTA (Blue-green Algae)	A	B	C
Anabaena			
Anacystis			
Aphanizomenon			
Coelosphaerium			
Gomphosphseria			
Lyngbya			10
Microcystis			90
Oscillatoria			
Pseudoanabaena			
Synechocystis			
Agmenellum			
PROTOZOA			
Actinophyrs			

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

PYRRHOPHYTA (Dinoflagellates)	A	B	C
Ceratium			
Peridinium			

SITE	A	B	C
TOTAL GENERA:	4	7	7
TRANSPARENCY:	6.5'	6.0'est	5.5'est
ORGANISMS PER MILLILITER:	120	180	600

NOTES: This is the first sampling event of 2018. Algal density is considered low at sites A and B, but moderate at site C. Algal diversity was observed as low for site A whereas sites B and C are considered to be moderate. A mixture of diatoms and green algae dominates the assemblage this week. Trace amounts of golden algae (site B only), blue-green algae (site C only) and euglenoids (sites A and B only) were also observed. Water clarity at sites A and B are considered to be good, while site C is fair.

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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 6/18/2018	Examination Date: 6/19/2018	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	20	
Melosira			
Navicula			40
Nitzschia			
Pinnularia			
Urosolenia			
Stephanodiscus	10		10
Stauroneis			
Synedra			
Tabellaria			

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

CHLOROPHYTA (Green Algae)	A	B	C
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			10
Coelastrum			
Eudorina			
Mougeotia	10		
Oedogonium			
Oocystis			
Pandorina			
Pediastrum			
Phytoconis			
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum			20
Sphaerocystis	50		180
Ulothrix			
Volvox			
Zygnema			
Gloeocystis			
Sphareocystis		50	
Cosmarium			
Tetraedron			
Dictyosphaerium			
Tetraspora		10	

CYANOPHYTA (Blue-green Algae)	A	B	C
Anabaena			
Anacystis			
Aphanizomenon			
Coelosphaerium			
Gomphosphseria			
Lyngbya			
Microcystis	20		
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:	7	3	5
TRANSPARENCY:	8.5'	12.0'+ est	6.0'est
ORGANISMS PER MILLILITER:	130	80	280

NOTES: Algal density increased slightly at site A but decreased at sites B and C. All three sites are considered to have low algal density. Algal diversity increased at site A and decreased at site B and C. Sites B and C have low diversity and site A is moderate. A mixture of green algae and diatoms dominates the assemblage this week. Trace amounts of golden algae and blue-green algae at site A only. Water clarity increased at all three sites since the last sampling event. Clarity at sites A and C are considered to be good, while site B is excellent.

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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 7/9/2018	Examination Date: 7/10/2018	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	20		
Stauroneis			
Synedra			10
Tabellaria			

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

CHLOROPHYTA (Green Algae)	A	B	C
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			
Coelastrum		150	
Eudorina			
Mougeotia			
Oedogonium			
Oocystis			
Pandorina			
Pediastrum			
Phytoconis			
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum		10	
Sphaerocystis			
Ulothrix			
Volvox			
Zygnema			
Gloeocystis	560	70	
Sphareocystis	20		
Cosmarium		10	
Tetraedron			
Dictyosphaerium			

CYANOPHYTA (Blue-green Algae)	A	B	C
Anabaena		30	70
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:	3	6	2
TRANSPARENCY:	6.25'	10.0' est	8.0' est
ORGANISMS PER MILLILITER:	600	280	80

NOTES: Since the last sampling event, algal density increased at sites A and B but decreased at site C. Sites B and C now have low density and site A is moderate. Algal diversity decreased at sites A and C and increased at site B. Sites A and C now have low diversity and site B is moderate. The assemblage consists mainly of green algae. Smaller amounts of blue-green algae and diatoms were also observed. Water clarity decreased at sites A and B and increased at site C. Sites A and B now have good clarity while site B is excellent.

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

MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 7/23/2018	Examination Date: 7/25/2018	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	190		10
Stauroneis			
Synedra			
Tabellaria			

CHRYSOPHYTA (Golden Algae)	A	B	C
Dinobryon	10		
Mallomonas	60		
Synura		10	
Tribonema			
Uroglenopsis			

CHLOROPHYTA (Green Algae)	A	B	C
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium	10		
Coelastrum			
Eudorina			
Mougeotia			
Oedogonium			
Oocystis			
Pandorina			
Pediastrum			
Phytoconis			
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum	20	40	10
Sphaerocystis	1020	460	80
Ulothrix			
Volvox			
Zygnema			
Gloeocystis			
Sphareocystis			
Cosmarium			
Tetraedron			
Octacanthium		10	

CYANOPHYTA (Blue-green Algae)	A	B	C
Anabaena	10	30	
Anacystis			
Aphanizomenon			
Coelosphaerium			
Gomphosphseria	50		
Lyngbya			
Microcystis	10		
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:	10	5	3
TRANSPARENCY:	8.25'	10.0'	7.0'
ORGANISMS PER MILLILITER:	1,390	550	100

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

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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 8/6/2018	Examination Date: 8/7/2018	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	30		
Tabellaria			

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

CHLOROPHYTA (Green Algae)	A	B	C
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			
Coelastrum	10	10	10
Eudorina			
Mougeotia			
Oedogonium			
Oocystis			
Pandorina			
Pediastrum			
Phytoconis			
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum	10		
Sphaerocystis	140	20	170
Ulothrix			
Volvox			
Zygnema			
Gloeocystis		110	
Sphareocystis			
Cosmarium			
Tetraedron			
Dictyosphaerium			

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

EUGLENOPHYTA (Euglenoids)	A	B	C
Euglena			
Phacus			
Trachelomonas			

PYRRHOPHYTA (Dinoflagellates)	A	B	C
Ceratium			
Peridinium			

SITE	A	B	C
TOTAL GENERA:	4	4	3
TRANSPARENCY:			
ORGANISMS PER MILLILITER:	180	330	200

NOTES: Since the last sampling event, algal density decreased at sites A and B but increased at site C. All three sites now have low density. Algal diversity decreased at sites A and B and remained the same at site C. All three sites now have low diversity. The assemblage consists mainly of green algae, blue-green algae, and diatoms.

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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 8/20/2018	Examination Date: 8/21/2018	Amount Examined: 200 ml.
Site A: Birchwood Lake	Site B: Crystal Lake	Site C: Sunset Lake

BACILLARIOPHYTA (Diatoms)	A	B	C
Asterionella			
Cyclotella	100	20	20
Cymbella			
Diatoma			
Fragilaria	10		
Melosira			
Navicula		10	
Nitzschia			
Pinnularia		10	
Urosolenia			
Stephanodiscus			
Stauroneis			
Synedra			20
Tabellaria			

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

CHLOROPHYTA (Green Algae)	A	B	C
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			
Coelastrum	70	820	530
Eudorina		40	
Mougeotia			
Oedogonium			
Oocystis		10	
Pandorina			
Pediastrum			
Phytoconis			
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum		810	
Sphaerocystis	140	240	90
Ulothrix			
Volvox	10		
Zygnema			
Gloeocystis			
Sphareocystis			
Cosmarium			10
Tetraedron			
Euastrum			10

CYANOPHYTA (Blue-green Algae)	A	B	C
Anabaena		140	
Anacystis			
Aphanizomenon		10	
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		30
Peridinium			

SITE	A	B	C
TOTAL GENERA:	7	9	8
TRANSPARENCY:	6.5'	10.0'+ est	8.0' est
ORGANISMS PER MILLILITER:	430	2,110	720

NOTES: Since the last sampling event, algal density increased at all three lakes and is now low at site A, high at site B, and moderate at site C. Algal diversity also increased and is now moderate at all three sites. The assemblage consists mainly of green algae with lower amounts of diatoms. Trace amounts of golden algae (site A), blue-green algae (site B), and dinoflagellates (sites A and C) were also observed. Water clarity is good at sites A and C and excellent at site B.

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ALPHA ANALYTICAL

ANALYTICAL REPORT

Lab Number:	L1821132
Client:	Solitude Lake Management LLC 310 East Washington Ave. Suite C Washington, NJ 07882
ATTN:	Emily Mayer
Phone:	(908) 798-6956
Project Name:	MOUNTAIN LAKES
Project Number:	MOUNTAIN LAKES
Report Date:	06/14/18

Certifications & Approvals: MA (M-MA030), NH NELAP (2062), CT (PH-0141), DoD (L2474), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NJ (MA015), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-17-00150), USFWS (Permit #206964).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1821132
Report Date: 06/14/18

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1821132-01	MOUNTAIN LAKE	WATER	DENVILLE, NJ	06/06/18 00:00	06/07/18
L1821132-02	WILDWOOD LAKE	WATER	DENVILLE, NJ	06/06/18 00:00	06/07/18
L1821132-03	SUNSET LAKE	WATER	DENVILLE, NJ	06/06/18 00:00	06/07/18
L1821132-04	OLIVE POND	WATER	DENVILLE, NJ	06/06/18 00:00	06/07/18
L1821132-05	GRUNDEN'S POND	WATER	DENVILLE, NJ	06/06/18 00:00	06/07/18
L1821132-06	SHADOW LAKE	WATER	DENVILLE, NJ	06/06/18 00:00	06/07/18
L1821132-07	BIRCHWOOD LAKE	WATER	DENVILLE, NJ	06/06/18 00:00	06/07/18
L1821132-08	CRYSTAL LAKE	WATER	DENVILLE, NJ	06/06/18 00:00	06/07/18
L1821132-09	COVE POND	WATER	DENVILLE, NJ	06/06/18 00:00	06/07/18

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1821132
Report Date: 06/14/18

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY
For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1821132
Report Date: 06/14/18

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Turbidity

L1821132-01 through -09 were analyzed with the method required holding time exceeded.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Kelly Stenstrom

Title: Technical Director/Representative

Date: 06/14/18

INORGANICS
&
MISCELLANEOUS

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1821132
Report Date: 06/14/18

SAMPLE RESULTS

Lab ID: L1821132-01
Client ID: MOUNTAIN LAKE
Sample Location: DENVILLE, NJ

Date Collected: 06/06/18 00:00
Date Received: 06/07/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	1.5		NTU	0.20	0.06	1	-	06/08/18 05:00	121,2130B	UN
Specific Conductance @ 25 C	530		umhos/cm	10	10.	1	-	06/08/18 05:33	1,9050A	MA
Phosphorus, Total	0.022		mg/l	0.010	0.003	1	06/08/18 09:40	06/10/18 11:35	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1821132
Report Date: 06/14/18

SAMPLE RESULTS

Lab ID: L1821132-02
Client ID: WILDWOOD LAKE
Sample Location: DENVILLE, NJ

Date Collected: 06/06/18 00:00
Date Received: 06/07/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	1.7		NTU	0.20	0.06	1	-	06/08/18 05:00	121,2130B	UN
Specific Conductance @ 25 C	2800		umhos/cm	10	10.	1	-	06/08/18 05:33	1,9050A	MA
Phosphorus, Total	0.016		mg/l	0.010	0.003	1	06/08/18 09:40	06/10/18 11:39	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1821132
Report Date: 06/14/18

SAMPLE RESULTS

Lab ID: L1821132-03
Client ID: SUNSET LAKE
Sample Location: DENVILLE, NJ

Date Collected: 06/06/18 00:00
Date Received: 06/07/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	3.9		NTU	0.20	0.06	1	-	06/08/18 05:00	121,2130B	UN
Specific Conductance @ 25 C	180		umhos/cm	10	10.	1	-	06/08/18 05:33	1,9050A	MA
Phosphorus, Total	0.028		mg/l	0.010	0.003	1	06/08/18 09:40	06/10/18 11:43	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1821132
Report Date: 06/14/18

SAMPLE RESULTS

Lab ID: L1821132-04
Client ID: OLIVE POND
Sample Location: DENVILLE, NJ

Date Collected: 06/06/18 00:00
Date Received: 06/07/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	3.0		NTU	0.20	0.06	1	-	06/08/18 05:00	121,2130B	UN
Specific Conductance @ 25 C	2000		umhos/cm	10	10.	1	-	06/08/18 05:33	1,9050A	MA
Phosphorus, Total	0.073		mg/l	0.010	0.003	1	06/08/18 09:40	06/10/18 11:45	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1821132
Report Date: 06/14/18

SAMPLE RESULTS

Lab ID: L1821132-05
Client ID: GRUNDEN'S POND
Sample Location: DENVILLE, NJ

Date Collected: 06/06/18 00:00
Date Received: 06/07/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	4.3		NTU	0.20	0.06	1	-	06/08/18 05:00	121,2130B	UN
Specific Conductance @ 25 C	2600		umhos/cm	10	10.	1	-	06/08/18 05:33	1,9050A	MA
Phosphorus, Total	0.064		mg/l	0.010	0.003	1	06/08/18 09:40	06/10/18 11:46	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1821132
Report Date: 06/14/18

SAMPLE RESULTS

Lab ID: L1821132-06
Client ID: SHADOW LAKE
Sample Location: DENVILLE, NJ

Date Collected: 06/06/18 00:00
Date Received: 06/07/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	3.5		NTU	0.20	0.06	1	-	06/08/18 05:00	121,2130B	UN
Specific Conductance @ 25 C	260		umhos/cm	10	10.	1	-	06/08/18 05:33	1,9050A	MA
Phosphorus, Total	0.086		mg/l	0.010	0.003	1	06/08/18 09:40	06/10/18 11:47	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1821132
Report Date: 06/14/18

SAMPLE RESULTS

Lab ID: L1821132-07
Client ID: BIRCHWOOD LAKE
Sample Location: DENVILLE, NJ

Date Collected: 06/06/18 00:00
Date Received: 06/07/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	0.85		NTU	0.20	0.06	1	-	06/08/18 05:00	121,2130B	UN
Specific Conductance @ 25 C	140		umhos/cm	10	10.	1	-	06/08/18 05:33	1,9050A	MA
Phosphorus, Total	0.015		mg/l	0.010	0.003	1	06/08/18 09:40	06/10/18 11:48	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1821132
Report Date: 06/14/18

SAMPLE RESULTS

Lab ID: L1821132-08
Client ID: CRYSTAL LAKE
Sample Location: DENVILLE, NJ

Date Collected: 06/06/18 00:00
Date Received: 06/07/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	0.60		NTU	0.20	0.06	1	-	06/08/18 05:00	121,2130B	UN
Specific Conductance @ 25 C	3400		umhos/cm	10	10.	1	-	06/08/18 05:33	1,9050A	MA
Phosphorus, Total	0.012		mg/l	0.010	0.003	1	06/08/18 09:40	06/10/18 11:50	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1821132
Report Date: 06/14/18

SAMPLE RESULTS

Lab ID: L1821132-09
Client ID: COVE POND
Sample Location: DENVILLE, NJ

Date Collected: 06/06/18 00:00
Date Received: 06/07/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	4.1		NTU	0.20	0.06	1	-	06/08/18 05:00	121,2130B	UN
Specific Conductance @ 25 C	290		umhos/cm	10	10.	1	-	06/08/18 05:33	1,9050A	MA
Phosphorus, Total	0.059		mg/l	0.010	0.003	1	06/08/18 09:40	06/10/18 11:51	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1821132
Report Date: 06/14/18

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 01-09 Batch: WG1123799-1										
Turbidity	0.06	J	NTU	0.20	0.06	1	-	06/08/18 05:00	121,2130B	UN
General Chemistry - Westborough Lab for sample(s): 01-09 Batch: WG1123871-1										
Phosphorus, Total	0.004	J	mg/l	0.010	0.003	1	06/08/18 09:40	06/10/18 11:31	121,4500P-E	SD

Lab Control Sample Analysis
Batch Quality Control

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1821132
Report Date: 06/14/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-09 Batch: WG1123799-2								
Turbidity	102		-		90-110	-		
General Chemistry - Westborough Lab Associated sample(s): 01-09 Batch: WG1123800-1								
Specific Conductance	100		-		99-101	-		
General Chemistry - Westborough Lab Associated sample(s): 01-09 Batch: WG1123871-2								
Phosphorus, Total	96		-		80-120	-		

Matrix Spike Analysis
Batch Quality Control

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1821132
Report Date: 06/14/18

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-09 QC Batch ID: WG1123871-3 QC Sample: L1821132-01 Client ID: MOUNTAIN LAKE												
Phosphorus, Total	0.022	0.5	0.511	98		-	-		75-125	-		20

Lab Duplicate Analysis

Batch Quality Control

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1821132
Report Date: 06/14/18

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-09 QC Batch ID: WG1123799-3 QC Sample: L1821132-01 Client ID: MOUNTAIN LAKE						
Turbidity	1.5	1.4	NTU	7		13
General Chemistry - Westborough Lab Associated sample(s): 01-09 QC Batch ID: WG1123800-2 QC Sample: L1821132-01 Client ID: MOUNTAIN LAKE						
Specific Conductance @ 25 C	530	540	umhos/cm	2		20
General Chemistry - Westborough Lab Associated sample(s): 01-09 QC Batch ID: WG1123871-4 QC Sample: L1821132-01 Client ID: MOUNTAIN LAKE						
Phosphorus, Total	0.022	0.021	mg/l	5		20

Sample Receipt and Container Information

Were project specific reporting limits specified? NO

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1821132-01A	Plastic 250ml unpreserved	A	7	7	4.9	Y	Absent		TURB-2130(2),COND-9050(28)
L1821132-01B	Plastic 250ml H2SO4 preserved	A	<2	<2	4.9	Y	Absent		TPHOS-4500(28)
L1821132-02A	Plastic 250ml unpreserved	A	7	7	4.9	Y	Absent		TURB-2130(2),COND-9050(28)
L1821132-02B	Plastic 250ml H2SO4 preserved	A	<2	<2	4.9	Y	Absent		TPHOS-4500(28)
L1821132-03A	Plastic 250ml unpreserved	A	7	7	4.9	Y	Absent		TURB-2130(2),COND-9050(28)
L1821132-03B	Plastic 250ml H2SO4 preserved	A	<2	<2	4.9	Y	Absent		TPHOS-4500(28)
L1821132-04A	Plastic 250ml unpreserved	A	7	7	4.9	Y	Absent		TURB-2130(2),COND-9050(28)
L1821132-04B	Plastic 250ml H2SO4 preserved	A	<2	<2	4.9	Y	Absent		TPHOS-4500(28)
L1821132-05A	Plastic 250ml unpreserved	A	7	7	4.9	Y	Absent		TURB-2130(2),COND-9050(28)
L1821132-05B	Plastic 250ml H2SO4 preserved	A	<2	<2	4.9	Y	Absent		TPHOS-4500(28)
L1821132-06A	Plastic 250ml unpreserved	A	7	7	4.9	Y	Absent		TURB-2130(2),COND-9050(28)
L1821132-06B	Plastic 250ml H2SO4 preserved	A	<2	<2	4.9	Y	Absent		TPHOS-4500(28)
L1821132-07A	Plastic 250ml unpreserved	A	7	7	4.9	Y	Absent		TURB-2130(2),COND-9050(28)
L1821132-07B	Plastic 250ml H2SO4 preserved	A	<2	<2	4.9	Y	Absent		TPHOS-4500(28)
L1821132-08A	Plastic 250ml unpreserved	A	7	7	4.9	Y	Absent		TURB-2130(2),COND-9050(28)
L1821132-08B	Plastic 250ml H2SO4 preserved	A	<2	<2	4.9	Y	Absent		TPHOS-4500(28)
L1821132-09A	Plastic 250ml unpreserved	A	7	7	4.9	Y	Absent		TURB-2130(2),COND-9050(28)
L1821132-09B	Plastic 250ml H2SO4 preserved	A	<2	<2	4.9	Y	Absent		TPHOS-4500(28)

*Values in parentheses indicate holding time in days

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES
Lab Number: L1821132
Report Date: 06/14/18

GLOSSARY

Acronyms

EDL - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).

EPA - Environmental Protection Agency.

LCS - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LCSD - Laboratory Control Sample Duplicate: Refer to LCS.

LFB - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

MDL - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

MS - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.

MSD - Matrix Spike Sample Duplicate: Refer to MS.

NA - Not Applicable.

NC - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.

NDPA/DPA - N-Nitrosodiphenylamine/Diphenylamine.

NI - Not Ignitable.

NP - Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.

RL - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

RPD - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.

SRM - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

STLP - Semi-dynamic Tank Leaching Procedure per EPA Method 1315.

TIC - Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensation Product".

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related

Report Format: DU Report with 'J' Qualifiers

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1821132
Report Date: 06/14/18

Data Qualifiers

projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

Report Format: DU Report with 'J' Qualifiers

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1821132
Report Date: 06/14/18

REFERENCES

1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IV, 2007.

121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624: m/p-xylene, o-xylene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
EPA 300: DW: Bromide
EPA 6860: SCM: Perchlorate
EPA 9010: NPW and SCM: Amenable Cyanide Distillation
SM4500: NPW: Amenable Cyanide, Dissolved Oxygen; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N, **EPA 351.1, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D.**
EPA 624: Volatile Halocarbons & Aromatics,
EPA 608: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, SM9222D.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Be, Cd, Cr, Cu, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

NEW JERSEY CHAIN OF CUSTODY

ALPHA ANALYTICAL

Westborough, MA 01581
8 Walkup Dr.
TEL: 508-898-9220
FAX: 508-898-9193

Mansfield, MA 02048
320 Forbes Blvd
TEL: 508-822-9300
FAX: 508-822-3288

Service Centers
Mahwah, NJ 07430: 35 Whitney Rd, Suite 5
Albany, NY 12205: 14 Walker Way
Tonawanda, NY 14150: 275 Cooper Ave, Suite 105

Page 1 of 1

Date Rec'd in Lab: 6/7/18

ALPHA Job #: L1821132

Client Information

Client: SLM
Address: 310 E. Washington Ave
Suite C, Washington, NJ 07882
Phone: 908-850-0363
Fax:
Email: EMayer@solitudelake.com

Project Information

Project Name: Mountain Lakes
Project Location: Denville, NJ
Project #:
(Use Project name as Project #): ☒
Project Manager: Emily Mayer
ALPHAQuote #:

Turn-Around Time

Standard ☒
Rush (only if pre approved) ☐
Due Date:
# of Days:

These samples have been previously analyzed by Alpha ☐

Deliverables

☐ NJ Full / Reduced
☐ EQuIS (1 File) ☐ EQuIS (4 File)
☐ Other

Regulatory Requirement

☐ SRS Residential/Non Residential
☐ SRS Impact to Groundwater
☐ NJ Ground Water Quality Standards
☐ NJ IGW SPLP Leachate Criteria
☐ Other

Billing Information

☒ Same as Client Info
PO #

Site Information

Is this site impacted by Petroleum? Yes ☐
Petroleum Product:

For EPH, selection is REQUIRED:
☐ Category 1
☐ Category 2

For VOC, selection is REQUIRED:
☐ 1,4-Dioxane
☐ 8011

Other project specific requirements/comments:
Billing - MID Report results in mg/L.
Please specify Metals or TAL.

ANALYSIS

Sample Filtration
☐ Done
☐ Lab to do
Preservation
☐ Lab to do
(Please Specify below)

Total Bottle

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	Total Phosphorus	Turbidity	Conductivity	Sample Specific Comments
21132-01	Mountain Lake	6/6/18		L	EM	X	X	X	
02	Wildwood Lake	6/6/18				X	X	X	
03	Sunset Lake	6/6/18				X	X	X	
04	Olive Pond	6/6/18				X	X	X	
05	Grunden's Pond	6/6/18				X	X	X	
06	Shadow Lake	6/6/18				X	X	X	
07	Birchwood Lake					X	X	X	
08	Crystal Lake					X	X	X	
09	Cove Pond					X	X	X	

Preservative Code:
A = None
B = HCl
C = HNO_3
D = H_2SO_4
E = NaOH
F = MeOH
G = $NaHSO_4$
H = $Na_2S_2O_3$
K/E = Zn Ac/NaOH
O = Other

Container Code:
P = Plastic
A = Amber Glass
V = Vial
G = Glass
B = Bacteria Cup
C = Cube
O = Other
E = Encore
D = BOD Bottle

Westboro: Certification No: MA935
Mansfield: Certification No: MA015

Container Type	P	P	P						
Preservative	D	A	A						

Relinquished By:	Date/Time	Received By:	Date/Time
Emily Mayer	6/7/18 9:40	Don D AAL	6/7/18 9:40
Don D AAL	6/7/18 1400	D Santos AAL	6/7/18 1330
D Santos AAL	6/7/18 2330		6/7/18 2330

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. BY EXECUTING THIS COC, THE CLIENT HAS READ AND AGREES TO BE BOUND BY ALPHA'S TERMS & CONDITIONS. (See reverse side.)

Form No: 01-14 HC (rev. 30-Sept-2013)

ALPHA ANALYTICAL

ANALYTICAL REPORT

Lab Number:	L1821132
Client:	Solitude Lake Management LLC 310 East Washington Ave. Suite C Washington, NJ 07882
ATTN:	Emily Mayer
Phone:	(908) 798-6956
Project Name:	MOUNTAIN LAKES
Project Number:	MOUNTAIN LAKES
Report Date:	06/14/18

Certifications & Approvals: MA (M-MA030), NH NELAP (2062), CT (PH-0141), DoD (L2474), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NJ (MA015), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-17-00150), USFWS (Permit #206964).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1821132
Report Date: 06/14/18

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1821132-01	MOUNTAIN LAKE	WATER	DENVILLE, NJ	06/06/18 00:00	06/07/18
L1821132-02	WILDWOOD LAKE	WATER	DENVILLE, NJ	06/06/18 00:00	06/07/18
L1821132-03	SUNSET LAKE	WATER	DENVILLE, NJ	06/06/18 00:00	06/07/18
L1821132-04	OLIVE POND	WATER	DENVILLE, NJ	06/06/18 00:00	06/07/18
L1821132-05	GRUNDEN'S POND	WATER	DENVILLE, NJ	06/06/18 00:00	06/07/18
L1821132-06	SHADOW LAKE	WATER	DENVILLE, NJ	06/06/18 00:00	06/07/18
L1821132-07	BIRCHWOOD LAKE	WATER	DENVILLE, NJ	06/06/18 00:00	06/07/18
L1821132-08	CRYSTAL LAKE	WATER	DENVILLE, NJ	06/06/18 00:00	06/07/18
L1821132-09	COVE POND	WATER	DENVILLE, NJ	06/06/18 00:00	06/07/18

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1821132
Report Date: 06/14/18

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY
For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1821132
Report Date: 06/14/18

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Turbidity

L1821132-01 through -09 were analyzed with the method required holding time exceeded.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Kelly Stenstrom

Title: Technical Director/Representative

Date: 06/14/18

INORGANICS
&
MISCELLANEOUS

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1821132
Report Date: 06/14/18

SAMPLE RESULTS

Lab ID: L1821132-01
Client ID: MOUNTAIN LAKE
Sample Location: DENVILLE, NJ

Date Collected: 06/06/18 00:00
Date Received: 06/07/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	1.5		NTU	0.20	0.06	1	-	06/08/18 05:00	121,2130B	UN
Specific Conductance @ 25 C	530		umhos/cm	10	10.	1	-	06/08/18 05:33	1,9050A	MA
Phosphorus, Total	0.022		mg/l	0.010	0.003	1	06/08/18 09:40	06/10/18 11:35	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1821132
Report Date: 06/14/18

SAMPLE RESULTS

Lab ID: L1821132-02
Client ID: WILDWOOD LAKE
Sample Location: DENVILLE, NJ

Date Collected: 06/06/18 00:00
Date Received: 06/07/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	1.7		NTU	0.20	0.06	1	-	06/08/18 05:00	121,2130B	UN
Specific Conductance @ 25 C	2800		umhos/cm	10	10.	1	-	06/08/18 05:33	1,9050A	MA
Phosphorus, Total	0.016		mg/l	0.010	0.003	1	06/08/18 09:40	06/10/18 11:39	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1821132
Report Date: 06/14/18

SAMPLE RESULTS

Lab ID: L1821132-03
Client ID: SUNSET LAKE
Sample Location: DENVILLE, NJ

Date Collected: 06/06/18 00:00
Date Received: 06/07/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	3.9		NTU	0.20	0.06	1	-	06/08/18 05:00	121,2130B	UN
Specific Conductance @ 25 C	180		umhos/cm	10	10.	1	-	06/08/18 05:33	1,9050A	MA
Phosphorus, Total	0.028		mg/l	0.010	0.003	1	06/08/18 09:40	06/10/18 11:43	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1821132
Report Date: 06/14/18

SAMPLE RESULTS

Lab ID: L1821132-04
Client ID: OLIVE POND
Sample Location: DENVILLE, NJ

Date Collected: 06/06/18 00:00
Date Received: 06/07/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	3.0		NTU	0.20	0.06	1	-	06/08/18 05:00	121,2130B	UN
Specific Conductance @ 25 C	2000		umhos/cm	10	10.	1	-	06/08/18 05:33	1,9050A	MA
Phosphorus, Total	0.073		mg/l	0.010	0.003	1	06/08/18 09:40	06/10/18 11:45	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1821132
Report Date: 06/14/18

SAMPLE RESULTS

Lab ID: L1821132-05
Client ID: GRUNDEN'S POND
Sample Location: DENVILLE, NJ

Date Collected: 06/06/18 00:00
Date Received: 06/07/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	4.3		NTU	0.20	0.06	1	-	06/08/18 05:00	121,2130B	UN
Specific Conductance @ 25 C	2600		umhos/cm	10	10.	1	-	06/08/18 05:33	1,9050A	MA
Phosphorus, Total	0.064		mg/l	0.010	0.003	1	06/08/18 09:40	06/10/18 11:46	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1821132
Report Date: 06/14/18

SAMPLE RESULTS

Lab ID: L1821132-06
Client ID: SHADOW LAKE
Sample Location: DENVILLE, NJ

Date Collected: 06/06/18 00:00
Date Received: 06/07/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	3.5		NTU	0.20	0.06	1	-	06/08/18 05:00	121,2130B	UN
Specific Conductance @ 25 C	260		umhos/cm	10	10.	1	-	06/08/18 05:33	1,9050A	MA
Phosphorus, Total	0.086		mg/l	0.010	0.003	1	06/08/18 09:40	06/10/18 11:47	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1821132
Report Date: 06/14/18

SAMPLE RESULTS

Lab ID: L1821132-07
Client ID: BIRCHWOOD LAKE
Sample Location: DENVILLE, NJ

Date Collected: 06/06/18 00:00
Date Received: 06/07/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	0.85		NTU	0.20	0.06	1	-	06/08/18 05:00	121,2130B	UN
Specific Conductance @ 25 C	140		umhos/cm	10	10.	1	-	06/08/18 05:33	1,9050A	MA
Phosphorus, Total	0.015		mg/l	0.010	0.003	1	06/08/18 09:40	06/10/18 11:48	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1821132
Report Date: 06/14/18

SAMPLE RESULTS

Lab ID: L1821132-08
Client ID: CRYSTAL LAKE
Sample Location: DENVILLE, NJ

Date Collected: 06/06/18 00:00
Date Received: 06/07/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	0.60		NTU	0.20	0.06	1	-	06/08/18 05:00	121,2130B	UN
Specific Conductance @ 25 C	3400		umhos/cm	10	10.	1	-	06/08/18 05:33	1,9050A	MA
Phosphorus, Total	0.012		mg/l	0.010	0.003	1	06/08/18 09:40	06/10/18 11:50	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1821132
Report Date: 06/14/18

SAMPLE RESULTS

Lab ID: L1821132-09
Client ID: COVE POND
Sample Location: DENVILLE, NJ

Date Collected: 06/06/18 00:00
Date Received: 06/07/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Turbidity	4.1		NTU	0.20	0.06	1	-	06/08/18 05:00	121,2130B	UN
Specific Conductance @ 25 C	290		umhos/cm	10	10.	1	-	06/08/18 05:33	1,9050A	MA
Phosphorus, Total	0.059		mg/l	0.010	0.003	1	06/08/18 09:40	06/10/18 11:51	121,4500P-E	SD

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1821132
Report Date: 06/14/18

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 01-09 Batch: WG1123799-1										
Turbidity	0.06	J	NTU	0.20	0.06	1	-	06/08/18 05:00	121,2130B	UN
General Chemistry - Westborough Lab for sample(s): 01-09 Batch: WG1123871-1										
Phosphorus, Total	0.004	J	mg/l	0.010	0.003	1	06/08/18 09:40	06/10/18 11:31	121,4500P-E	SD

Lab Control Sample Analysis
Batch Quality Control

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1821132
Report Date: 06/14/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-09 Batch: WG1123799-2								
Turbidity	102		-		90-110	-		
General Chemistry - Westborough Lab Associated sample(s): 01-09 Batch: WG1123800-1								
Specific Conductance	100		-		99-101	-		
General Chemistry - Westborough Lab Associated sample(s): 01-09 Batch: WG1123871-2								
Phosphorus, Total	96		-		80-120	-		

Matrix Spike Analysis
Batch Quality Control

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1821132
Report Date: 06/14/18

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-09 QC Batch ID: WG1123871-3 QC Sample: L1821132-01 Client ID: MOUNTAIN LAKE												
Phosphorus, Total	0.022	0.5	0.511	98		-	-		75-125	-		20

Lab Duplicate Analysis
Batch Quality Control

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1821132
Report Date: 06/14/18

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-09 QC Batch ID: WG1123799-3 QC Sample: L1821132-01 Client ID: MOUNTAIN LAKE						
Turbidity	1.5	1.4	NTU	7		13
General Chemistry - Westborough Lab Associated sample(s): 01-09 QC Batch ID: WG1123800-2 QC Sample: L1821132-01 Client ID: MOUNTAIN LAKE						
Specific Conductance @ 25 C	530	540	umhos/cm	2		20
General Chemistry - Westborough Lab Associated sample(s): 01-09 QC Batch ID: WG1123871-4 QC Sample: L1821132-01 Client ID: MOUNTAIN LAKE						
Phosphorus, Total	0.022	0.021	mg/l	5		20

Serial_No:06141817
Lab Number: L1821132
Report Date: 06/14/18

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Sample Receipt and Container Information

Were project specific reporting limits specified? NO

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1821132-01A	Plastic 250ml unpreserved	A	7	7	4.9	Y	Absent		TURB-2130(2),COND-9050(28)
L1821132-01B	Plastic 250ml H2SO4 preserved	A	<2	<2	4.9	Y	Absent		TPHOS-4500(28)
L1821132-02A	Plastic 250ml unpreserved	A	7	7	4.9	Y	Absent		TURB-2130(2),COND-9050(28)
L1821132-02B	Plastic 250ml H2SO4 preserved	A	<2	<2	4.9	Y	Absent		TPHOS-4500(28)
L1821132-03A	Plastic 250ml unpreserved	A	7	7	4.9	Y	Absent		TURB-2130(2),COND-9050(28)
L1821132-03B	Plastic 250ml H2SO4 preserved	A	<2	<2	4.9	Y	Absent		TPHOS-4500(28)
L1821132-04A	Plastic 250ml unpreserved	A	7	7	4.9	Y	Absent		TURB-2130(2),COND-9050(28)
L1821132-04B	Plastic 250ml H2SO4 preserved	A	<2	<2	4.9	Y	Absent		TPHOS-4500(28)
L1821132-05A	Plastic 250ml unpreserved	A	7	7	4.9	Y	Absent		TURB-2130(2),COND-9050(28)
L1821132-05B	Plastic 250ml H2SO4 preserved	A	<2	<2	4.9	Y	Absent		TPHOS-4500(28)
L1821132-06A	Plastic 250ml unpreserved	A	7	7	4.9	Y	Absent		TURB-2130(2),COND-9050(28)
L1821132-06B	Plastic 250ml H2SO4 preserved	A	<2	<2	4.9	Y	Absent		TPHOS-4500(28)
L1821132-07A	Plastic 250ml unpreserved	A	7	7	4.9	Y	Absent		TURB-2130(2),COND-9050(28)
L1821132-07B	Plastic 250ml H2SO4 preserved	A	<2	<2	4.9	Y	Absent		TPHOS-4500(28)
L1821132-08A	Plastic 250ml unpreserved	A	7	7	4.9	Y	Absent		TURB-2130(2),COND-9050(28)
L1821132-08B	Plastic 250ml H2SO4 preserved	A	<2	<2	4.9	Y	Absent		TPHOS-4500(28)
L1821132-09A	Plastic 250ml unpreserved	A	7	7	4.9	Y	Absent		TURB-2130(2),COND-9050(28)
L1821132-09B	Plastic 250ml H2SO4 preserved	A	<2	<2	4.9	Y	Absent		TPHOS-4500(28)

*Values in parentheses indicate holding time in days

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES
Lab Number: L1821132
Report Date: 06/14/18

GLOSSARY

Acronyms

EDL - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).

EPA - Environmental Protection Agency.

LCS - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LCSD - Laboratory Control Sample Duplicate: Refer to LCS.

LFB - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

MDL - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

MS - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.

MSD - Matrix Spike Sample Duplicate: Refer to MS.

NA - Not Applicable.

NC - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.

NDPA/DPA - N-Nitrosodiphenylamine/Diphenylamine.

NI - Not Ignitable.

NP - Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.

RL - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

RPD - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.

SRM - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

STLP - Semi-dynamic Tank Leaching Procedure per EPA Method 1315.

TIC - Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensation Product".

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related

Report Format: DU Report with 'J' Qualifiers

Project Name: MOUNTAIN LAKES
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Data Qualifiers

projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

Report Format: DU Report with 'J' Qualifiers

Project Name: MOUNTAIN LAKES
Project Number: MOUNTAIN LAKES

Lab Number: L1821132
Report Date: 06/14/18

REFERENCES

1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IV, 2007.

121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624: m/p-xylene, o-xylene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
EPA 300: DW: Bromide
EPA 6860: SCM: Perchlorate
EPA 9010: NPW and SCM: Amenable Cyanide Distillation
SM4500: NPW: Amenable Cyanide, Dissolved Oxygen; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D.**

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N, **EPA 351.1, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D.**
EPA 624: Volatile Halocarbons & Aromatics,
EPA 608: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, SM9222D.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Be, Cd, Cr, Cu, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

NEW JERSEY CHAIN OF CUSTODY

ALPHA ANALYTICAL

Westborough, MA 01581 — 8 Walkup Dr. — TEL: 508-898-9220 — FAX: 508-898-9193

Mansfield, MA 02048 — 320 Forbes Blvd — TEL: 508-822-9300 — FAX: 508-822-3288

Service Centers
Mahwah, NJ 07430: 35 Whitney Rd, Suite 5
Albany, NY 12205: 14 Walker Way
Tonawanda, NY 14150: 275 Cooper Ave, Suite 105

Page 1 of 1

Date Rec'd in Lab: 6/7/18

ALPHA Job #: L1821132

Client Information
Client: SLM
Address: 310 E. Washington Ave Suite C, Washington, NJ 07882
Phone: 908-850-0363
Fax:
Email: EMayer@solitudelake.com

Project Information
Project Name: Mountain Lakes
Project Location: Denville, NJ
Project #:
(Use Project name as Project #) ☒
Project Manager: Emily Mayer
ALPHAQuote #:

Turn-Around Time
Standard ☒ Due Date:
Rush (only if pre approved) ☐ # of Days:

These samples have been previously analyzed by Alpha ☐

Deliverables
☐ NJ Full / Reduced
☐ EQuIS (1 File) ☐ EQuIS (4 File)
☐ Other

Billing Information
☒ Same as Client Info
PO #

Regulatory Requirement
☐ SRS Residential/Non Residential
☐ SRS Impact to Groundwater
☐ NJ Ground Water Quality Standards
☐ NJ IGW SPLP Leachate Criteria
☐ Other

Site Information
Is this site impacted by Petroleum? Yes ☐
Petroleum Product:

For EPH, selection is REQUIRED:
☐ Category 1
☐ Category 2

For VOC, selection is REQUIRED:
☐ 1,4-Dioxane
☐ 8011

Other project specific requirements/comments:
Billing - MID Report results in mg/L.
Please specify Metals or TAL.

ANALYSIS

Sample Filtration
☐ Done
☐ Lab to do
Preservation
☐ Lab to do
(Please Specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	Total Phosphorus	Turbidity	Conductivity	Total Bottle	Sample Specific Comments
21132-01	Mountain Lake	6/6/18		L	EM	X	X	X		
02	Wildwood Lake	6/6/18				X	X	X		
03	Sunset Lake	6/6/18				X	X	X		
04	Olive Pond	6/6/18				X	X	X		
05	Grunden's Pond	6/6/18				X	X	X		
06	Shadow Lake	6/6/18				X	X	X		
07	Birchwood Lake					X	X	X		
08	Crystal Lake					X	X	X		
09	Cove Pond	↓		↓	↓	X	X	X		

Container Type: P P P
Preservative: D A A

Preservative Code:
A = None
B = HCl
C = HNO_3
D = H_2SO_4
E = NaOH
F = MeOH
G = $NaHSO_4$
H = $Na_2S_2O_3$
K/E = Zn Ac/NaOH
O = Other

Container Code
P = Plastic
A = Amber Glass
V = Vial
G = Glass
B = Bacteria Cup
C = Cube
O = Other
E = Encore
D = BOD Bottle

Westboro: Certification No: MA935
Mansfield: Certification No: MA015

Relinquished By:	Date/Time	Received By:	Date/Time
Emily Mayer	6/7/18 9:40	Don D AAL	6/7/18 9:40
Don D AAL	6/7/18 1400	D Santos AAL	6/7/18 1830
D Santos AAL	6/7/18 2330		6/7/18 2330

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. BY EXECUTING THIS COC, THE CLIENT HAS READ AND AGREES TO BE BOUND BY ALPHA'S TERMS & CONDITIONS. (See reverse side.)

Form No: 01-14 HC (rev. 30-Sept-2013)

SOLITUDE LAKE MANAGEMENT

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Bob Schindler, Solitude Lake Management
DATE: 5/7/2018
INSPECTION DATE: 5/7/2018

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 3:45 PM)

Depth	Temp. (°C)	D.O. (mg/L)
surface	20.7	8.1
2'	20.1	7.9
4'	19.1	7.9
6'	18.7	7.9
8'	18.2	7.9
10'	18.1	7.7
12'	17.9	7.5
13'	17.1	6.6

BIRCHWOOD LAKE	Outlet Cove: There was sparse floating cattail debris adjacent to the spillway.
Secchi: 8.25'	Inside Swim Lane: Trace density curly-leaf pondweed is beginning to develop, but overall abundance is the same. One small patch of active growth of water starwort still observed.
Aeration: Yes, swim lanes No, beach	Outside Swim Lane: Growth of bassweed is emerging along the immediate shoreline edge at the southern end of the lake.
Fecal Sample: NA	Beach: There was no plant or algae growth observed at this time.
SUNSET LAKE	Launch: There was no plant or algae growth observed at this time.
Secchi: est. 6'6"	Outlet: Filamentous algae is developing at trace density along small areas of the shoreline edge.
	Sunset Road Cove: Filamentous algae is developing at trace density along small areas of the shoreline edge.
In general, water lilies emerging throughout the lake basin.	Inlet Cove: This area of the lake is supporting sparse growth from the inlet throughout the inlet cove, and along small areas of the shoreline edge adjacent to each side of the inlet.
CRYSTAL LAKE	Birchwood Outlet: Sparse density water lilies and bassweed emerging along the shoreline edge along the base of

	Birchwood Dam and extending along each side of the dam..
	Lake Shore Road Shoreline: There was no plant or algae growth observed at this time.
Secchi: est. 9'+	Crystal Outlet: There was no plant or algae growth observed at this time.
OLIVE POND **Dissolved Oxygen: 6.8 mg/L.**	Secchi: est. 5' There was no plant or algae growth observed at this time. Basin still looks good.
SHADOW LAKE Aeration: Yes **Dissolved Oxygen: 6.2 mg/L.**	Secchi: est. 5' There was no plant observed at this time. Aeration system is operating.
COVE POND **Dissolved Oxygen: 6.1 mg/L.**	Secchi: est. 4' There was no plant or algae growth observed at this time.
GRUNDEN'S POND **Dissolved Oxygen: 7.3 mg/L.**	Secchi: est. 5' There was no submersed plant growth observed. Filamentous algae growth is reduced to scattered traces along the immediate shoreline edge along the BLVD. Water primrose beginning to emerge along the edge of the shoreline onto the water surface.
MOUNTAIN LAKE	Cove End: Traces of benthic and surface filamentous algae were located along small portions of the shoreline edge to the right of the bridge in the small cove. Growth of bassweed is emerging around portions of the island to the left of the bridge.
Secchi: 8.5'+	Sailboat Cove: There was no plant or algae growth observed at this time.
Water Level: 499.6	Outlet Cove: There was no plant or algae growth observed at this time.
	Midvale Launch: There was no plant or algae growth observed at this time. There was traces of curly-leaf pondweed observed at the far north end of the lake. There was also trace density filamentous algae along the immediate shoreline edge scattered around small areas of the lake perimeter. No treatment is needed at this time, but algae growth will need to be closely monitored.
Fecal Sample: NA	Island Beach: Overall area looks good, although a minor amount of benthic algae was growing around the dock area.
WILDWOOD LAKE	Park: Filamentous algae were developing at trace density along the lake bottom and lake surface along the shoreline edge.
Secchi: est. 10'+	Dam: Trace to sparse density filamentous algae growth was scattered along the majority of the dam shoreline.
Water Level: 499.7	Launch: The north end of the lake was supporting usually

	scattered trace density filamentous algae along small portions of the shoreline edge.

NOTES:

1. **Sunset Lake will need an algae treatment soon. The initial herbicide treatment for water lilies will be scheduled for late May.**
2. **Aeration maintenance is scheduled for Friday May 11th.**
3. **Wildwood Lake will need an algae treatment soon.**
4. **Crystal Lake was treated on 5/4 for filamentous algae growth with copper. Bassweed growth will be monitored closely to optimize treatment timing.**
5. **Shadow Lake was treated on 5/2 with schooner for curly-leaf pondweed, cutrine plus for filamentous algae, and bacteria were added to the pond.**
6. **Cove pond was treated on 5/2 with schooner for curly-leaf pondweed growth, and with cutrine plus for filamentous algae growth.**
7. **The swim lanes at Birchwood will be treated during the week of 5/14 for all submersed aquatic plant growth.**
8. **A drone survey was performed today to show the mechanical equipment in action. A supplemental drone survey will be performed following completion of raking.**

SOLITUDE LAKE MANAGEMENT

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Bob Schindler, Solitude Lake Management
DATE: 5/14/2018
INSPECTION DATE: 5/14/2018

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 11:15 AM)

Depth	Temp. (°C)	D.O. (mg/L)
surface	18.2	6.49
2'	18.0	6.39
4'	17.9	6.31
6'	17.9	6.19
8'	17.8	5.97
10'	17.3	4.51
12'	17.4	3.72
13'	17.5	3.21

BIRCHWOOD LAKE	Outlet Cove: In this area sparse cattail growth was emerging near the spillway, and a few stems of water lilies were at the surface.
Secchi: 10.2'	Inside Swim Lane: Trace density curly-leaf pondweed is still present. A sparse amount of ribbon-leaf pondweed was also now growing along the shallow shoreline areas, as well as one small patch of water starwort. A few stems of water lilies have also breached the lake surface.
Aeration: Yes, swim lanes No, beach	Outside Swim Lane: Growth of bassweed is emerging along the immediate shoreline edge at the southern end of the lake.
Fecal Sample: NA	Beach: There was no plant or algae growth observed at this time.
SUNSET LAKE	Launch: There was trace growth of a species of pondweed adjacent to the boat launch.
Secchi: est. 10'+	Outlet: Water lilies are increasing in density in this portion of the lake, with scattered patches of sparse growth.
	Sunset Road Cove: Water lilies are increasing in density in this portion of the lake, with scattered patches of sparse growth.
	Inlet Cove: Water lilies are increasing in density in this portion of the lake, with scattered patches of sparse growth.

CRYSTAL LAKE	Birchwood Outlet: Sparse density water lilies and bassweed emerging along the shoreline edge along the base of Birchwood Dam and extending along each side of the dam.
	Lake Shore Road Shoreline: There was no plant or algae growth observed at this time.
Secchi: est. 10'+	Crystal Outlet: There was no plant or algae growth observed at this time.
OLIVE POND **Dissolved Oxygen: 3.36 mg/L.**	Secchi: est. 4.5' There was no plant or algae growth observed at this time. Basin still looks good.
SHADOW LAKE Aeration: Yes **Dissolved Oxygen: 4.95 mg/L.**	Secchi: est. 5' There was no plant observed at this time. Aeration system is operating.
COVE POND **Dissolved Oxygen: 3.81 mg/L.**	Secchi: est. 4' There was no plant or algae growth observed at this time.
GRUNDEN'S POND **Dissolved Oxygen: 3.45 mg/L.**	Secchi: est. 5' At this time, no filamentous algae growth was observed. Water primrose is growing in small patches in portions of the shoreline edge. The water level has increased at this time, and appears to be near full pool level.
MOUNTAIN LAKE	Cove End: Traces of benthic and surface filamentous algae were located along small portions of the shoreline edge to the right of the bridge in the small cove. Growth of bassweed is emerging around portions of the island to the left of the bridge.
Secchi: 7.75'	Sailboat Cove: There was no plant or algae growth observed at this time.
Water Level: 499.65	Outlet Cove: There was no plant or algae growth observed at this time.
	Midvale Launch: There was no plant or algae growth observed at this time.
Fecal Sample: NA	Island Beach: Overall area looks good, although a minor amount of benthic algae was growing around the dock area.
WILDWOOD LAKE	Park: There was no plant or algae growth observed at this time.
Secchi: est. 10'+	Dam: There was no plant or algae growth observed at this time.
Water Level: 499.6 No outflow at this time.	Launch: There was no plant or algae growth observed at this time.

NOTES:

1. **The dissolved oxygen appears to be depressed from the recent weather.**
2. **Birchwood Lake has no signs of hydro-raking in terms of no floating debris and no observed increase in turbidity.**
3. **Sunset Lake continues to increase in water lily growth, and will be treated once plants are viable for foliar application. There was no algae observed at this time.**
4. **Crystal Lake bassweed appears the same as it has the past few weeks, and treatment is not yet required.**
5. **All of the small basins look good at this time as well as the Canal.**
6. **Birchwood Lake swim area will be treated soon now that plants are more actively growing.**
7. **Wildwood Lake was treated with copper sulfate on May 9th for control of filamentous algae. There was no algae observed on this survey date.**
8. **Aeration maintenance was discussed and individuals from DPW said they were already well trained on maintenance and only needed the kits to complete.**
9. **Will need to order one new kit, as one of the numbers was wrong, as well as two new compressor fans that are needed in two of the compressor boxes. The new parts will be ordered soon.**

SOLITUDE LAKE MANAGEMENT

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Bob Schindler, Solitude Lake Management
DATE: 5/21/2018
INSPECTION DATE: 5/21/2018

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 6:05 PM)

Depth	Temp. (°C)	D.O. (mg/L)
surface	21.7	7.9
2'	19.8	7.9
4'	19.3	7.9
6'	18.9	8.0
8'	18.5	8.1
10'	18.1	7.3
12'	17.5	6.2
13'	17.4	6.1

BIRCHWOOD LAKE	Outlet Cove: In this area, cattail growth is already expanding in area and increasing in density. Bassweed also increasing in density and growth height.
Secchi: 8.5'	Inside Swim Lane: Trace density curly-leaf pondweed is still present. A sparse amount of ribbon-leaf pondweed was still present growing along the shallow shoreline areas, as well as one small patch of water starwort. Water lilies increased slightly in density.
Aeration: Neither running at time of survey	Outside Swim Lane: Growth of bassweed is emerging along the immediate shoreline edge at the southern end of the lake. Bassweed was also emerging in a few small additional areas.
Fecal Sample: NA	Beach: There was no plant or algae growth observed.
SUNSET LAKE	Launch: There was trace growth of a species of pondweed adjacent to the boat launch.
Secchi: est. 7'+	Outlet: Water lilies are increasing in density in this portion of the lake, with scattered patches of sparse growth.
	Sunset Road Cove: Water lilies are increasing in density in this portion of the lake, with scattered patches of sparse growth.
	Inlet Cove: Water lilies are increasing in density in this portion of the lake, with scattered patches of sparse growth.

CRYSTAL LAKE	Birchwood Outlet: Sparse density water lilies and bassweed still present along the shoreline edge along the base of Birchwood Dam and extending along each side of the dam. Growth is relatively consistent, although densities have increased slightly since last survey.
	Lake Shore Road Shoreline: There was no algae growth observed at this time, although bassweed was observed as a few scattered plant stems.
Secchi: est. 12'+	Crystal Outlet: There was no plant or algae growth observed at this time.
OLIVE POND **Dissolved Oxygen: 3.8 mg/L.**	Secchi: est. 4' There was no plant or algae growth observed at this time. Basin still looks good.
SHADOW LAKE Aeration: Yes **Dissolved Oxygen: 4.9 mg/L.**	Secchi: est. 4' There was no plant observed at this time. Significant pollen collecting on the surface.
COVE POND **Dissolved Oxygen: 4.2 mg/L.**	Secchi: est. 4' There was no plant or algae growth observed at this time. Significant pollen was collecting on the surface.
GRUNDEN'S POND **Dissolved Oxygen: 5.3 mg/L.**	Secchi: est. 4' Water primrose is growing in small patches in portions of the shoreline edge. Filamentous algae was present at trace density along the BLVD shoreline. A few stems of curly-leaf pondweed were observed in the center of the basin.
MOUNTAIN LAKE	Cove End: See separate survey report.
Secchi: 8.75'	Sailboat Cove:
Water Level: 499.6	Outlet Cove:
	Midvale Launch:
Fecal Sample: Collected	Island Beach:
WILDWOOD LAKE	Park: At this time, there was a trace amount of filamentous algae adjacent to the dock. No other growth observed in this area.
Secchi: est. 15'+	Dam: There was no plant or algae growth observed at this time.
Water Level: 499.55	Launch: There was no plant or algae growth observed at this time.

NOTES:

1. **The dissolved oxygen in small basins appears to be depressed from the recent weather.**

2. **Sunset Lake continues to increase in water lily growth, and will be treated once plants are viable for foliar application. There was no algae observed at this time.**
3. **Crystal Lake bassweed appears the same as it has the past few weeks, and treatment is not yet required.**
4. **All of the small basins look good at this time as well as the Canal.**
5. **Birchwood Lake profile has improved since last survey visit.**
6. **Order of new compressor fans will be completed this week.**
7. **Still trying to reach NJ Fish and Wildlife Control office to get determination regarding beaver lodge removal.**
8. **Mountain lake survey and treatment summary in separate report.**

SOLITUDE LAKE MANAGEMENT

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Bob Schindler, Solitude Lake Management
DATE: 5/28/2018
INSPECTION DATE: 5/28/2018

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 12:20 PM)

Depth	Temp. (°C)	D.O. (mg/L)
surface	24.6	7.6
2'	21.9	7.4
4'	21.5	7.4
6'	21.3	7.5
8'	21.2	7.5
10'	21.0	7.1
12'	20.8	6.7
13'	19.8	3.6

BIRCHWOOD LAKE	Outlet Cove: In this area, cattail and bassweed growth has remained consistent in density and abundance.
Secchi: 9.25'	Inside Swim Lane: Trace density curly-leaf pondweed is still present. A sparse amount of ribbon-leaf pondweed was still present growing along the shallow shoreline areas, as well as one small patch of water starwort. Water lilies and ribbon-leaf pondweed increased slightly in density.
Aeration: Swim lanes only	Outside Swim Lane: Bassweed and water lilies have increased in density.
Fecal Sample: NA	Beach: There was no plant or algae growth observed.
SUNSET LAKE	Launch: There was trace growth of a species of pondweed adjacent to the boat launch.
Secchi: est. 7'+	Outlet: Water lilies are increasing in density in this portion of the lake, with scattered patches of sparse growth. Trace density filamentous algae was present along the shoreline edge.
	Sunset Road Cove: Water lilies are increasing in density in this portion of the lake, with scattered patches of sparse growth. Filamentous algae were present along portions of the shoreline edge at trace to sparse density.
	Inlet Cove: Water lilies are increasing in density in this

	portion of the lake, and are now at sparse to moderate density. Traces of filamentous algae also present along the immediate shoreline edge.
CRYSTAL LAKE	Birchwood Outlet: Sparse density water lilies and bassweed still present along the shoreline edge along the base of Birchwood Dam and extending along each side of the dam. Growth of water lilies si consistent with previous surveys, however bassweed is increasing in density. Bassweed is also now observed in the central upper portion of the lake.
	Lake Shore Road Shoreline: There was no algae growth observed at this time, although bassweed was observed as a few scattered plant stems.
Secchi: est. 12'+	Crystal Outlet: There was no plant or algae growth observed at this time.
OLIVE POND **Dissolved Oxygen: 5.3 mg/L.**	Secchi: est. 4.5' There was no plant or algae growth observed at this time. Basin still looks good with exception of pollen on surface.
SHADOW LAKE Aeration: Yes **Dissolved Oxygen: 4.9 mg/L.**	Secchi: est. 4' There was no plant observed at this time. Significant pollen collecting on the surface.
COVE POND **Dissolved Oxygen: 4.2 mg/L.**	Secchi: est. 4' There was no plant or algae growth observed at this time. Significant pollen was collecting on the surface.
GRUNDEN'S POND **Dissolved Oxygen: 5.3 mg/L.**	Secchi: est. 4' At this time filamentous algae was present along small portions of the shoreline edge at usually trace density. A few stems of curly-leaf pondweed were observed in the center of the basin.
MOUNTAIN LAKE	Cove End: Heavy pollen on the surface within the cove, and no plant or algae growth observed. To the left of the bridge, a few trace patches of filamentous algae were observed, but overall looks good.
Secchi: 8.5'	Sailboat Cove: Sparse density filamentous algae was present in the corner of the cove in the southeast corner.
Water Level: 499.5	Outlet Cove: There was no aquatic plant or algae growth observed.
	Midvale Launch: Traces of bassweed and filamentous algae were observed in this area.
Fecal Sample: Collected	Island Beach: In this area scattered trace density patches of filamentous algae were observed near the docks and in the channel.
WILDWOOD LAKE	Park: At this time, the lake was supporting sparse to moderate density filamentous algae growth along the majority of the perimeter of the lake. Heaviest algae growth

	was present at the far northern and southern lake areas. A few stems of leafy pondweed and curly-leaf pondweed were observed. Low growth of southern naiad emerging from the lake bottom in the shallow shoreline edge.
Secchi: est. 10.5'	Dam:
Water Level: 499.45	Launch:

NOTES:

1. **The swim lanes and dock area of Birchwood Lake was treated with Schooner on this date for control of nuisance aquatic plant growth.**
2. **Sunset Lake will be treated this week for water lilies and filamentous algae.**
3. **A canoe survey of the canal was performed on this day. Not a single stem of submersed aquatic plant growth was observed. Most of the canal contained sparse filamentous algae growth.**
4. **Shadow Lake will get a supplement of bacterial enhancement on the next survey visit.**
5. **Grundens pond will be treated this week for aquatic plant and algae growth.**
6. **Wildwood Lake was treated on this date for management of filamentous algae with copper sulfate.**
7. **It has been confirmed with NJDFW that the beaver lodges can be removed in the fall. A letter of approval will be secured prior to commencement of fall raking activity.**
8. **Additional aeration maintenance have been dropped off at DPW. We still need to secure one additional compressor fan.**
9. **Bassweed growth in Crystal Lake and Mountain Lake will be completed by Mid-June.**
10. **SOLitude is now approaching end of month two without a signed contract. We need to secure a signed contract to ensure services are not disrupted.**

SOLITUDE
LAKE MANAGEMENT

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Bob Schindler, Solitude Lake Management
DATE: 6/4/2018
INSPECTION DATE: 6/4/2018

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 3:25 PM)

Depth	Temp. (°C)	D.O. (mg/L)
surface	24.5	5.41
2'	23.5	4.99
4'	22.5	4.75
6'	22.2	4.65
8'	21.9	4.51
10'	21.6	3.67
12'	21.4	3.25
13'	21.2	2.81

BIRCHWOOD LAKE	Outlet Cove: At this time cattail growth as remained consistent with the past several inspection dates. The bassweed has dropped out of the water column from the previous herbicide application.
Secchi: 9.5'	Inside Swim Lane: Since the previous inspection date when an application of Schooner was performed, water lilies, curly-leaf pondweed and bassweed were well controlled within the treatment area. Ribbon-leaf pondweed was only displaying minimal impact, and may require an application of Tribune if the plants do not respond prior to the next inspection date.
Aeration: Swim lanes only	Outside Swim Lane: Bassweed and water lilies were also controlled in areas outside of the swim lanes.
E. Coli Sample: Collected	Beach: There was no plant or algae growth observed.
SUNSET LAKE	Launch: There was trace growth of a species of pondweed adjacent to the boat launch. Trace density filamentous algae was developing along portions of the shoreline edge.
Secchi: est. 5.5'+	Outlet: Water lilies are increasing in density in this portion of the lake, with now scattered patches of moderate growth. Trace density filamentous algae was present along the

	shoreline edge as widely scattered individual patches.
	Sunset Road Cove: Water lilies are increasing in density in this portion of the lake, with scattered patches of sparse growth. Filamentous algae were present along portions of the shoreline edge at trace to sparse density.
	Inlet Cove: Water lilies are increasing in density in this portion of the lake, and are now at usually moderate density. Traces of filamentous algae also present along the immediate shoreline edge.
CRYSTAL LAKE	Birchwood Outlet: Sparse density water lilies have now increased to moderate density patches and bassweed still present along the shoreline edge along the base of Birchwood Dam and extending along each side of the dam. Bassweed in the central upper portion of the lake has remained at scattered sparse density.
	Lake Shore Road Shoreline: There was no algae growth observed at this time, although bassweed was observed as a few scattered plant stems.
Secchi: est. 12'+	Crystal Outlet: At this time, traces of filamentous algae growth were observed, and a few stems of curly-leaf pondweed were washed up along the shoreline edge.
OLIVE POND **Dissolved Oxygen: 5.88 mg/L.**	Secchi: est. 4' There was no plant or algae growth observed at this time. Basin still looks good with exception of pollen on surface.
SHADOW LAKE Aeration: Yes **Dissolved Oxygen:6.38 mg/L.**	Secchi: est. 4' There was no plant observed at this time. Light density pollen was scattered on the surface.
COVE POND **Dissolved Oxygen: 5.31 mg/L.**	Secchi: est. 3' There was no plant or algae growth observed at this time. Significant pollen was collecting on the surface, and the basin appeared turbid reducing water clarity.
GRUNDEN'S POND **Dissolved Oxygen: 6.42 mg/L.**	Secchi: est. 5' At this time filamentous algae was present along small portions of the shoreline edge at usually trace density. A few stems of curly-leaf pondweed were observed in the center of the basin.
MOUNTAIN LAKE	Cove End: To the left and right of the bridge a few sparse density patches of filamentous algae were observed.
Secchi: 8'	Sailboat Cove: Sparse density filamentous algae were present in the southeast corner of the cove.
Water Level: 499.6	Outlet Cove: A trace amount of filamentous algae and bassweed were observed.
	Midvale Launch: Traces of bassweed and filamentous algae were observed in this area.

E Coli Sample: Collected	Island Beach: In this area scattered sparse density patches of filamentous algae were observed near the docks and in the channel.
WILDWOOD LAKE	Park: The algaecide treatment performed during the previous inspection was effective, reducing overall algae growth to a minor amount of trace density algae near the park. A few stems of leafy pondweed and curly-leaf pondweed were observed. Low growth of southern naiad emerging from the lake bottom in the shallow shoreline edge.
Secchi: est. 10.5'	Dam: There was no aquatic plant or algae growth observed at this time.
Water Level: 499.55	Launch: At this time, only a trace amount of algae was windblown along the far northern shoreline adjacent to the boat launch and inlet.

NOTES:

1. **Sunset Lake is on schedule for this week, and will be conducted on a day of favorable weather for foliar treatment of water lilies. Rainy weather forced postponement last week on days scheduled.**
2. **An algaecide treatment was performed on this date at Mountain Lake for control of nuisance filamentous algae growth.**
3. **Bacterial enhancement will be performed at Shadow Lake this week.**
4. **An application of the algaecide Earthtec will be applied to both Olive and Shadow Ponds soon to determine if proactive treatment prior to blooms can be effective.**
5. **Grundens pond will be treated this week for aquatic plant and algae growth. Grundens Pond was surveyed on Friday June 1st with treatment anticipated, but depressed dissolved oxygen levels prohibited treatment. The Pond also looked better on this inspection date than last week. The pond will be inspected again later this week and treated appropriately as long as dissolved oxygen levels remain favorable.**
6. **Bassweed growth in Crystal Lake and Mountain Lake will be completed by Mid-June.**
7. **SOLitude is now approaching end of month two without a signed contract. We need to secure a signed contract to ensure services are not disrupted.**
8. **Although the contract references dam vegetation management in August and September, based on observed growth, the initial application will likely be moved up to July.**

SOLITUDE
LAKE MANAGEMENT

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Bob Schindler, Solitude Lake Management
DATE: 6/11/2018
INSPECTION DATE: 6/11/2018

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 3:25 PM)

Depth	Temp. (°C)	D.O. (mg/L)
surface	22.0	4.77
2'	21.9	4.54
4'	21.8	4.49
6'	21.6	4.59
8'	21.6	4.27
10'	21.5	3.86
12'	21.4	3.38
13'	20.7	0.44

BIRCHWOOD LAKE	Outlet Cove: At this time cattail growth as remained consistent with the past several inspection dates. Otherwise this area looks good at this time.
Secchi: 8.25'	Inside Swim Lane: Trace density growth of ribbonleaf pondweed and water starwort remain in the swimming area at this time, and do not appear to have been impacted by the herbicide application.
Aeration: Swim lanes only	Outside Swim Lane: This area looks good at this time.
E. Coli Sample: Collected	Beach: This area looks good at this time.
SUNSET LAKE	Launch: At this time, the previously observed growth of pondweed and algae has dissipated. Area looks good at this time.
Secchi: est. 6.5'	Outlet: Sparse density water lily growth and traces of filamentous algae were observed at this time.
	Sunset Road Cove: Water lilies increased in density in this portion of the lake, with scattered patches of sparse growth. Filamentous algae were present along portions of the shoreline edge at trace density.
	Inlet Cove: Water lilies increased in density in this portion of the lake, and are now at usually moderate density. Traces of

	filamentous algae also present along the immediate shoreline edge.
CRYSTAL LAKE	Birchwood Outlet: See attached survey report.
	Lake Shore Road Shoreline:
Secchi: est. 12'+	Crystal Outlet:
OLIVE POND **Dissolved Oxygen: 4.85 mg/L.**	Secchi: est. 3.5' There was no plant or algae growth observed at this time. Basin still looks good with exception of pollen on surface.
SHADOW LAKE Aeration: Yes **Dissolved Oxygen:9.14 mg/L.**	Secchi: est. 3.5' There was no plant growth observed at this time. Light density pollen was scattered on the surface. Trace to sparse density filamentous algae was present at this time, and will treated this week.
COVE POND **Dissolved Oxygen: 4.38 mg/L.**	Secchi: est. 3' There was no plant or algae growth observed at this time.
GRUNDEN'S POND **Dissolved Oxygen: 4.75 mg/L.**	Secchi: est. 4' There was no algae growth observed at this time following previous algae treatment. A trace amount of decomposing plant growth is floating at the surface in small portions of the central area of the basin.
MOUNTAIN LAKE	Cove End: Within the cove sparse density bassweed was developing, while on the opposite side of the bridge adjacent to the island bassweed was growing at moderate density to the surface.
Secchi: 9.25'	Sailboat Cove: A trace amount of filamentous algae was observed, however the cove looks significantly improved following the previous algaecide treatment.
Water Level: 499.45	Outlet Cove: This area looks clear at this time.
	Midvale Launch: A trace amount of bassweed was observed north of the boat launch.
E Coli Sample: Collected	Island Beach: A sparse density patch of bassweed was present adjacent to the boat dock. Otherwise area looks good.
WILDWOOD LAKE	Park: At this time, filamentous algae was once again developing along portions of the shoreline edge. The park area and adjacent shoreline contained usually sparse density. Sparse density brittle naiad is also developing in the shallow portions of the lake.
Secchi: est. 10.5'	Dam: Filamentous algae was present along the dam at scattered trace density.
Water Level: 499.4	Launch: At this time, sparse amounts were present along this area and adjacent areas of the shoreline edge.

NOTES:

1. **Sunset Lake was treated on June 6th for water lily growth.**
2. **An herbicide application was conducted on this date for management of bassweed along residential area in Crystal Lake.**
3. **Shadow Lake will require an algaecide treatment this week for shoreline filamentous algae.**
4. **Management of bassweed will be performed at Mountain Lake within the next week.**
5. **As discussed in the lake meeting, a foliar application for water lily growth will be scheduled soon.**
6. **Wildwood Lake will scheduled for an algaecide treatment within the next week. Naiad will also be targeted if sufficiently developed.**

SOLITUDE
LAKE MANAGEMENT

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Bob Schindler, Solitude Lake Management
DATE: 6/19/2018
INSPECTION DATE: 6/18/2018

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 10:45 AM)

Depth	Temp. (°C)	D.O. (mg/L)
surface	23.8	6.21
2'	23.8	6.10
4'	23.6	6.00
6'	23.5	5.91
8'	23.4	5.85
10'	22.7	5.31
12'	21.8	1.94
13'	21.2	0.32

BIRCHWOOD LAKE	Outlet Cove: At this time cattail growth as remained consistent with the past several inspection dates. Otherwise this area looks good at this time.
Secchi: 8.5'	Inside Swim Lane: Trace density growth of ribbon-leaf pondweed is present at the corner of the swim area.
Aeration: Swim lanes only	Outside Swim Lane: This area looks good at this time.
E. Coli Sample: Collected	Beach: This area looks good at this time.
SUNSET LAKE	Launch: Trace to sparse density filamentous algae was present along the shoreline edge in this area. Pondweed growth has dropped out of the water column.
Secchi: est. 6'	Outlet: Sparse density water lily growth. Filamentous algae is present as sparse to moderate patches scattered along shoreline and a few patches in the open water area.
	Sunset Road Cove: Filamentous algae is present in usually moderate density throughout this area. Water lily growth is beginning to show impact from the previous herbicide application.
	Inlet Cove: Water lilies showing impact from herbicide application. Sparse density patches of filamentous algae along the shoreline edge.

CRYSTAL LAKE	Birchwood Outlet: Water lilies and bassweed appear at same abundance as previous surveys. Overall the open water of the lake looks good throughout the basin.
	Lake Shore Road Shoreline: Bassweed is showing impact from previous week's herbicide application. A few sparse density patches of water lilies present in the upper end of the lake.
Secchi: est. 12'+	Crystal Outlet: A small patch of bassweed is present along the dam, and was not targeted during the previous herbicide application. Trace amounts of benthic filamentous algae growing on the rocks along the dam.
OLIVE POND **Dissolved Oxygen: 9.39 mg/L.**	Secchi: est. 2.5' There was no plant growth observed at this time. Basin still looks good with exception of pollen on surface. The water was developing a green to brown tint in the water column.
SHADOW LAKE Aeration: Yes **Dissolved Oxygen:8.41 mg/L.**	Secchi: est. 3.5' There was no plant growth observed at this time. Trace to sparse density filamentous and planktonic algae was present at this time, and will treated this week.
COVE POND **Dissolved Oxygen: 6.35 mg/L.**	Secchi: est. 3' There was no plant or algae growth observed at this time.
GRUNDEN'S POND **Dissolved Oxygen: 8.89 mg/L.**	Secchi: est. 4' Trace density filamentous algae was present along the shoreline edge, mostly near the Boulevard. Traces of dead plant stems were also floating along the immediate shoreline edge in portions of the pond.
MOUNTAIN LAKE	Cove End: The cove contained sparse densities of filamentous algae and bassweed, while the area opposite from the bridge contained moderate density bassweed that was up to the surface.
Secchi: 9.0'	Sailboat Cove: Sparse density leafy pondweed and bassweed were present throughout the cove. The lake surface was clear.
Water Level: 499.35	Outlet Cove: This area looks clear at this time, with the exception of a minor amount of benthic filamentous algae.
	Midvale Launch: Sparse density bassweed was up to the surface along the shoreline edge from the boat launch to the canal entrance.
E Coli Sample: Collected	Island Beach: A sparse density patch of bassweed was present adjacent to the boat dock, and a few other trace occurrences in the open water. Trace density benthic algae was growing adjacent to the bridge to the beach.
WILDWOOD LAKE	Park: Overall the area looks good. There were traces of dead floating algae, and sparse density naiad growing along the

	shoreline edge.
Secchi: est. 8.5'	Dam: Trace density decomposing filamentous algae was present along the dam at trace density.
Water Level: 499.35	Launch: This area looks good with minor amounts of dead floating algae, and sparse density naiad growth.

NOTES:

1. **Sunset Lake is on schedule for an algaecide treatment on June 19th.**
2. **Mountain Lake will be treated this week for filamentous algae and spot treatment for nuisance bassweed growth.**
3. **Olive Pond, Shadow Pond, and Grunden's Pond are on schedule for treatment on June 19th.**
4. **Algae sampling was conducted on June 18th at six of the basins.**
5. **Grunden's Pond water level has declined again at this time from lack of rainfall.**
6. **A full survey of Mountain Lake was conducted on June 18th with two members of the board to provide greater insight into the management program.**

SOLITUDE LAKE MANAGEMENT

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Emily Mayer, Solitude Lake Management
DATE: 06/25/18
INSPECTION DATE: 06/25/18

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 9:25 AM)

Depth	Temp. (°C)	D.O. (mg/L)
surface	23.8	3.66
2'	23.8	3.32
4'	23.6	2.32
6'	23.4	1.02
8'	23.1	0.53
10'	21.2	0.42
12'		
13'		

BIRCHWOOD LAKE	Outlet Cove: Sparse amounts of Bassweed was observed. Trace sized patches of Watershield and White-Water lilies were also observed.
Secchi: 6'est	Inside Swim Lane: Traces of tree pollen and floating plant debris was observed. Otherwise swim lanes were clean and clear.
Aeration: ON	Outside Swim Lane: Traces of rooted Bassweed and White-Water lilies were observed.
E. Coli Sample: 9:30 am	Beach: Clean and clear.
SUNSET LAKE	Launch: Traces of decaying pondweed species was observed along the main shoreline. Water appeared to be slightly turbid. A trace sized patch of White-Water lilies was observed.
Secchi: 4.5'est	Outlet: Traces of decaying filamentous algae was observed. Two sparse sized patches of rooted Bassweed were observed to the left of the outlet.
	Sunset Road Cove: Water was very turbid. Sparse patches of White-Water lilies were observed.
	Inlet Cove: Moderate to dense patches of White-Water lilies were observed. Water appeared to be very turbid.
CRYSTAL LAKE	Birchwood Outlet: A mixture of White-Water lilies (sparse

	to moderate) and Watershield (trace) was observed at the outlet. Moderate amounts of Bassweed was observed along the shoreline. Traces of benthic filamentous algae were also observed.
	Lake Shore Road Shoreline: Heavy amounts of leaf litter was observed along the main shoreline. Traces of floating fragments of Bassweed were observed. Open water was clean and clear.
Secchi: 6.5'est	Crystal Outlet: Traces of benthic filamentous algae was observed on the rocks. A sparse sized patch of rooted Bassweed was observed. Open water was clean and clear.
OLIVE POND **Dissolved Oxygen: 4.75 mg/L.**	Secchi: 2.75'est Water appeared to be very turbid. A light film of tree pollen was observed on the surface.
SHADOW LAKE Aeration: ON **Dissolved Oxygen: 7.33 mg/L.**	Secchi: 2.0'est A heavy amount of leaf litter was observed along the main shoreline. Water was very turbid.
COVE POND **Dissolved Oxygen: 4.54 mg/L.**	Secchi: 1.5'est Traces of leaf litter and tree debris was observed throughout the pond. Water was turbid.
GRUNDEN'S POND **Dissolved Oxygen: 7.35 mg/L.**	Secchi: 2.0'est Water was turbid in the open water. Traces of benthic filamentous algae were scattered throughout the pond.
MOUNTAIN LAKE	Cove End: Sparse patches of rooted Bassweed were observed throughout the open water. Water was slightly turbid. Right side of bridge: Moderate sized (4'x 4') patches of rooted Bassweed were observed in the open water. Left side of the bridge: Traces of rooted Bassweed were observed.
Secchi: 6.0'	Sailboat Cove: Traces of rooted Brittle Naiad was observed along the main shoreline. Open water was clean and clear.
Water Level: 499.3	Outlet Cove: Two sparse patches of rooted Bassweed was observed. Water was slightly turbid.
	Midvale Launch: Traces of rooted Chara was observed along the main shoreline.
E. Coli Sample: 11:00 am	Island Beach: Swim area was clean and clear. Dock area: Traces of benthic filamentous algae was observed. Sparse to moderate amounts of Chara and Brittle Naiad was observed. A small patch of rooted Bassweed was observed by the dock.
WILDWOOD LAKE	Park: Trace to sparse scattered patches of southern naiad was observed.

Secchi: 6.5'est	Dam: Traces of floating southern naiad was observed. Open water was clean and clear.
Water Level: 499.3	Launch: Dense mats of filamentous algae was observed along the main shoreline and patches were present in the open water.

NOTES:

1. **E. Coli samples were collected at both beaches, results will be received tomorrow 6/26/18.**
2. **Visual observations were performed from the bridge, with no signs of Fanwort growth. A canal survey should be performed within the next two weeks.**

SOLITUDE
LAKE MANAGEMENT

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Bob Schindler, Solitude Lake Management
DATE: 7/2/2018
INSPECTION DATE: 7/2/2018

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 10:45 AM)

Depth	Temp. (°C)	D.O. (mg/L)
surface	28.4	4.20
2'	27.4	4.16
4'	27.0	4.01
6'	26.6	3.85
8'	26.2	3.76
10'	25.1	0.69
12'	25.0	0.-
13'	24.8	0.-

BIRCHWOOD LAKE	Outlet Cove: At this time cattail growth has remained consistent with the past several inspection dates. Otherwise this area looks good at this time.
Secchi: 7.25'	Inside Swim Lane: Trace density growth of ribbon-leaf pondweed is present at the corner of the swim area.
Aeration: both systems on	Outside Swim Lane: This area looks good at this time.
E. Coli Sample: Collected	Beach: This area looks good at this time.
SUNSET LAKE	Launch: Trace density filamentous algae was present along the shoreline edge in this area.
Secchi: est. 6'	Outlet: Trace density water lily growth remaining from previous water lily treatment. Filamentous algae is present as trace patches scattered along shoreline and a few patches in the open water area.
	Sunset Road Cove: Filamentous algae is present in usually trace to sparse density throughout this area. Water lily growth is significantly reduced from herbicide treatment.
	Inlet Cove: Water lilies reduced to sparse density from herbicide application. Otherwise, this area looks good.
CRYSTAL LAKE	Birchwood Outlet: Water lilies and bassweed appear at same abundance as previous surveys. Overall the open water of

	the lake looks good throughout the basin.
	Lake Shore Road Shoreline: A few sparse density patches of water lilies are present in the upper end of the lake.
Secchi: est. 12'+	Crystal Outlet: A small patch of bassweed is present along the dam. Trace amounts of benthic filamentous algae growing on the rocks along the dam.
OLIVE POND **Dissolved Oxygen: 8.91 mg/L.**	Secchi: est. 2' There was no plant growth observed at this time. The water was developing a green to brown tint in the water column. The surface is still clear at this time.
SHADOW LAKE Aeration: Yes **Dissolved Oxygen:8.41 mg/L.**	Secchi: est. 2' There was no plant growth observed at this time. The water was developing a green to brown tint, and a green film was growing along portions of the surface.
COVE POND **Dissolved Oxygen: 6.85 mg/L.**	Secchi: est. 3' There was no plant or algae growth observed at this time. Basin looks good with limited water clarity.
GRUNDEN'S POND **Dissolved Oxygen: 8.58 mg/L.**	Secchi: est. 3.5' Trace density filamentous algae was present along the shoreline edge, mostly near the Boulevard. Traces of dead plant stems were also floating along the immediate shoreline edge in portions of the pond. The water level of the pond is reduced and most of the algae is growing in an estimated up to three inches of water depth.
MOUNTAIN LAKE	Cove End: The cove looks good at this time, with limited algae growth, and reduced bassweed density. The opposite side of bridge also looks good with no observed algae growth, and bassweed appears to be decomposing.
Secchi: 8.0'	Sailboat Cove: Sparse density leafy pondweed and bassweed were present throughout the cove. There was a minor amount of filamentous algae on the surface.
Water Level: 499.2	Outlet Cove: Bassweed has developed as a small patch in front of spillway. Otherwise area looks good.
	Midvale Launch: Sparse density bassweed was up to the surface along the shoreline edge from the boat launch to the canal entrance. The plants appear to be decomposing from previous herbicide application.
E Coli Sample: Collected	Island Beach: A sparse density patch of bassweed was present adjacent to the boat dock, and a few other trace occurrences in the open water. Trace density benthic algae was growing adjacent to the bridge to the beach.
WILDWOOD LAKE	Park: Overall the area looks good. There were traces of dead floating algae, and sparse density naiad growing along the shoreline edge.
Secchi: est. 8.5'	Dam: The dam face shoreline looked good at this time, as

	well as overall the rest of the open water of the lake.
Water Level: 499.1	Launch: This area looks good with minor amounts of dead floating algae, and sparse density naiad growth.

NOTES:

1. **Birchwood water lily treatment will be schedule this month.**
2. **Mountain Lake sailboat cove was treated on 7/3 for plant and algae growth.**
3. **Olive Pond, Shadow Pond, and Grunden's Pond are on schedule for treatment on July 5th. Grunden's Pond is now about 8 inches low.**
4. **Wildwood Lake looks great following previous weeks treatment, and the July alum treatment will be scheduled.**
5. **The bassweed appears to be decomposing in all areas of management from the previous herbicide application at Mountain Lake.**
6. **Sunset Lake could use a touch up treatment for lilies, and will be scheduled in July.**

SOLITUDE LAKE MANAGEMENT

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Bob Schindler, Solitude Lake Management
DATE: 7/9/2018
INSPECTION DATE: 7/9/2018

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 10:40 AM)

Depth	Temp. (°C)	D.O. (mg/L)
surface	26.3	3.03
2'	25.8	2.60
4'	25.8	2.51
6'	25.5	2.17
8'	25.3	1.83
10'	25.2	0.46
12'	24.9	0.13
13'	24.1	0.-

BIRCHWOOD LAKE	Outlet Cove: Cattail growth has expanded slightly and is encroaching further into the lake toward the dock. Water lily abundance has increased slightly, with trace density growth along the edge of the swim lanes.
Secchi: 6.25'	Inside Swim Lane: Trace density growth of water lilies along edge of the swim lanes.
Aeration: both systems on	Outside Swim Lane: Trace density water lilies developing along the edges of the lake.
E. Coli Sample: Collected	Beach: This area looks good at this time.
SUNSET LAKE	Launch: Trace density filamentous algae and pondweed growth was present along the shoreline edge in this area.
Secchi: est. 8'	Outlet: Trace density water lily growth remaining from previous water lily treatment. Filamentous algae is present as trace patches scattered along shoreline and a few patches in the open water area. A few sparse patches of bassweed have developed in this lake area.
	Sunset Road Cove: Filamentous algae are present in usually trace density along the shoreline edge. Sparse growth of bassweed and water lilies in this area of the lake.
	Inlet Cove: Water lily growth has appeared to increase in

	abundance slightly at this time since previous survey. Trace density filamentous algae was also occupying the area along the immediate shoreline edge.
CRYSTAL LAKE	Birchwood Outlet: Water lilies and bassweed appear at same abundance as previous surveys. Filamentous algae has developed as moderate density patches throughout the upper end of the lake basin.
	Lake Shore Road Shoreline: A few sparse density patches of water lilies are present in the upper end of the lake. Filamentous algae growing across the upper end of the lake basin at generally moderate density.
Secchi: est. 10'+	Crystal Outlet: A small patch of bassweed is present along the dam. Trace amounts of benthic filamentous algae growing on the rocks along the dam.
OLIVE POND **Dissolved Oxygen: 5.08 mg/L.**	Secchi: est. 3' There was no plant growth observed at this time. The water was developing a green to brown tint in the water column, but clarity was visibly improved since last survey. There is a "film" along the surface that is likely early watermeal development.
SHADOW LAKE Aeration: Yes **Dissolved Oxygen: 7.66 mg/L.**	Secchi: est. 3' There was no plant growth observed at this time. The water was maintained a brown turbid appearance. The lake surface was clear at this time.
COVE POND **Dissolved Oxygen: 4.26 mg/L.**	Secchi: est. 2' There was no plant or algae growth observed at this time. Basin appears very turbid. Water level about 5 inches low.
GRUNDEN'S POND **Dissolved Oxygen: 11.48 mg/L.**	Secchi: est. 2' The pond was supporting sparse density decomposing filamentous algae along a significant portion of the shoreline edge. The edge was present primarily in less than 4 inches of water depth. This pond is approximately 10 inches below full pool at this time.
MOUNTAIN LAKE	Cove End: The cove looks good at this time, with limited algae growth, and reduced bassweed density. The opposite side of bridge also looks good with no observed algae growth, and bassweed is continuing to drop out of the water column.
Secchi: 8.0'	Sailboat Cove: The cove looks good at this time, with no growth of filamentous algae or pondweed. Bassweed is now decomposing from previous herbicide treatment.
Water Level: 498.95	Outlet Cove: Bassweed has increased in density slightly in the outlet cove in front of spillway. There was also sparse density benthic algae present.
	Midvale Launch: This area looks good at this time with only

	trace density algae along the shoreline edge.
E Coli Sample: Collected	Island Beach: A sparse density patch of bassweed was present adjacent to the boat dock, and a few other trace occurrences in the open water. Trace density benthic algae was growing adjacent to the bridge to the beach. The cove south of the beach was supporting scattered sparse density filamentous algae patches.
WILDWOOD LAKE	Park: Overall the area looks good. There was no observed algae growth, and decomposing naiad settled to the lake bottom.
Secchi: est. 12'	Dam: The dam face shoreline looked good at this time, as well as overall the rest of the open water of the lake.
Water Level: 498.9	Launch: This area looks good with naiad settled to the bottom of the lake.

NOTES:

1. **Birchwood water lily treatment will be schedule this month. Dissolved oxygen levels have dropped dramatically through the water column at this time.**
2. **Shadow Pond was treated on July 5th, and is showing significant improvement. It also appears the treatment had some impact to Olive Pond, which also had increased clarity compared to previous survey.**
3. **Grundens Pond shoreline algae growth is expanding as water level is declining. An algaecide treatment was performed on 7/5, although the algae cannot settle to bottom to decompose.**
4. **Crystal Lake and Mountain Lake will be treated for nuisance filamentous algae growth this week.**
5. **Wildwood Lake looks great following previous weeks treatment, and the July alum treatment will be scheduled.**
6. **The bassweed appears to be decomposing in all areas of management from the previous herbicide application at Mountain Lake.**
7. **Sunset Lake could use a touch up treatment for lilies, and will be scheduled in July.**
8. **There are new developments with regard to hydro-raking that need to be discussed at this weeks meeting.**

SOLITUDE
LAKE MANAGEMENT

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Bob Schindler, Solitude Lake Management
DATE: 7/16/2018
INSPECTION DATE: 7/16/2018

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 1:40 PM)

Depth	Temp. (°C)	D.O. (mg/L)
surface	27.5	3.4
2'	26.4	3.2
4'	26.1	3.1
6'	25.9	3.1
8'	25.6	3.0
10'	25.2	0.7
12'	25.1	0.26
13'	24.5	0.-

BIRCHWOOD LAKE	Outlet Cove: Cattail and water lily growth has remained consistent in this area, and overall looks good at this time.
Secchi: 7.5'	Inside Swim Lane: Trace density growth of water lilies and low water milfoil along edge of the swim lanes.
Aeration: both systems on	Outside Swim Lane: Trace density water lilies developing along the edges of the lake.
E. Coli Sample: Collected	Beach: This area looks good at this time, although water lilies are encroaching on the north side of the beach.
SUNSET LAKE	Launch: Trace density filamentous algae and pondweed growth was present along the shoreline edge in this area.
Secchi: est. 6'	Outlet: Trace density water lilies and filamentous algae are present scattered along shoreline and a few patches in the open water area. A few sparse patches of bassweed have developed in this lake area, and are adjacent to dock areas.
	Sunset Road Cove: Filamentous algae are present in usually trace density along the shoreline edge. Sparse growth of bassweed and water lilies in this area of the lake.
	Inlet Cove: Sparse density water lily and filamentous algae growth is present at this time.
CRYSTAL LAKE	Birchwood Outlet: Water lilies and bassweed appear at same abundance as previous surveys. Filamentous algae appeared

	well controlled. Shoreline surveys of residential areas did not indicate any nuisance plant or algae growth.
	Lake Shore Road Shoreline: A few sparse density patches of water lilies are present in the upper end of the lake.
Secchi: est. 10'+	Crystal Outlet: A small patch of bassweed is present along the dam.
OLIVE POND **Dissolved Oxygen: 2.9 mg/L.**	Secchi: est. 3.5' There was no plant growth observed at this time. The water column appeared to have improved clarity at this time, and overall basin looks good.
SHADOW LAKE Aeration: Yes **Dissolved Oxygen: 4.1 mg/L.**	Secchi: est. 3.5' There was no plant growth observed at this time. The water has maintained a slight turbid appearance, but clarity has improved slightly since previous survey. The lake surface was clear at this time.
COVE POND **Dissolved Oxygen: 4.8 mg/L.**	Secchi: est. 2' There was no plant or algae growth observed at this time. Basin appears very turbid. Water level about 7 inches low.
GRUNDEN'S POND **Dissolved Oxygen: 8.9 mg/L.**	Secchi: est. 2' The pond was supporting sparse density decomposing filamentous algae along a significant portion of the shoreline edge. The algae was present primarily in less than 4 inches of water depth. This pond is approximately 12 inches below full pool at this time. The conditions of the pond will likely not improve until water level increases.
MOUNTAIN LAKE	Cove End: The cove looks good at this time, with limited algae growth, and reduced bassweed density. The opposite side of bridge also looks good with no observed algae growth.
Secchi: 8.0'	Sailboat Cove: The cove looks good at this time, with no growth of filamentous algae or pondweed observed. Bassweed is still decomposing from previous herbicide treatment.
Water Level: 498.9	Outlet Cove: Bassweed is still present at trace to sparse density in this area, with no algae growth observed at this time.
	Midvale Launch: This area looks good at this time with no observed plant or algae growth.
E Coli Sample: Collected	Island Beach: A sparse density patch of bassweed was present adjacent to the boat dock, and a few other trace occurrences in the open water. All algae was well controlled from previous algaecide application.
WILDWOOD LAKE	Park: Overall the area looks good. There was no observed algae growth, however some growth of naiad was developing in the shallow areas along the shoreline edge.

Secchi: est. 12'	Dam: The dam face shoreline looked good at this time, as well as overall the rest of the open water of the lake.
Water Level: 498.85	Launch: This area looks good with naiad settled to the bottom of the lake.

NOTES:

1. **Birchwood water lily treatment will be schedule this month. Dissolved oxygen levels have increased slightly at this time since last week's assessment.**
2. **Shadow and Olive have continued to improve with clean lake surface and fair water clarity.**
3. **Grunden's Pond shoreline algae growth is expanding as water level is declining. An algaecide treatment was performed on 7/5, although the algae cannot settle to bottom to decompose.**
4. **Crystal Lake and Mountain Lake have significantly improved since last week's algaecide applications.**
5. **Wildwood Lake will be treated this week to touch up naiad growth, and alum treatment will be scheduled soon as well.**
6. **Sunset Lake will be scheduled this week to touch water lily growth, and address submersed plant and algae growth.**
7. **Bob will work on getting a more comprehensive assessment of Birchwood Lake restoration effort.**
8. **Would it be possible to create a launch for an airboat on the edge of the swimming area at Birchwood so we can more effectively perform a water lily application??**

SOLITUDE
LAKE MANAGEMENT

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Bob Schindler, Solitude Lake Management
DATE: 7/23/2018
INSPECTION DATE: 7/23/2018

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 1:40 PM)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	24.6	3.47
2'	24.6	3.40
4'	24.7	3.38
6'	24.6	3.21
8'	24.5	2.58
10'	24.3	1.96
12'	24.0	0.68
13'	23.2	0.-

BIRCHWOOD LAKE	Outlet Cove: Cattail and water lily growth has remained consistent in this area, and overall looks good at this time.
Secchi: 8.25'	Inside Swim Lane: Trace density growth of water lilies and low water milfoil along edge of the swim lanes.
Aeration: both systems on	Outside Swim Lane: Trace density water lilies developing along the edges of the lake.
E. Coli Sample: Collected	Beach: This area looks good at this time, although water lilies are encroaching on the north side of the beach.
SUNSET LAKE	Launch: Trace densities of pondweed and slender naiad growth along the shoreline, and observed scattered around the lake.
Secchi: est. 7'	Outlet: Trace density water lilies are present scattered along shoreline and a few patches in the open water area. A few sparse patches of bassweed have developed in this lake area, and are adjacent to dock areas. Pondweed and naiad at trace to sparse density scattered in this area of the lake as well.
	Sunset Road Cove: Sparse growth of bassweed and water lilies in this area of the lake.
	Inlet Cove: Sparse density water lily growth is present at this time.
CRYSTAL LAKE	Birchwood Outlet: Water lilies and bassweed appear at same

	abundance as previous surveys.
	Lake Shore Road Shoreline: A few sparse density patches of water lilies are present in the upper end of the lake.
Secchi: est. 10'+	Crystal Outlet: This area looks clear of plant and algae growth.
OLIVE POND **Dissolved Oxygen: 6.81 mg/L.**	Secchi: est. 3.5' There was no plant or algae growth observed at this time. The water column appeared to have improved clarity at this time, and overall basin looks good.
SHADOW LAKE Aeration: Yes **Dissolved Oxygen: 6.96 mg/L.**	Secchi: est. 3.5' There was no plant or algae growth observed at this time. The water has continued to improve in clarity and appearance, and does not support the turbid appearance at this time.
COVE POND **Dissolved Oxygen: 4.58 mg/L.**	Secchi: est. 2.5' Water lilies appear to be increasing in density in front of one residential area. This should not be controlled unless requested by the resident. Clarity and turbidity has improved. Basin appears to be at full water level.
GRUNDEN'S POND **Dissolved Oxygen: 3.89 mg/L.**	Secchi: est. 3' The water level has increased significantly from recent rainfall, is now only a few inches below normal full pool level. Shoreline areas of the lake have improved in appearance from increased water level. Sparse density filamentous algae is present in a few areas, and mostly along the Boulevard shoreline edge.
MOUNTAIN LAKE	Cove End: The cove looks good at this time, with limited algae growth, and reduced bassweed density. The opposite side of bridge also looks good with no observed plant or algae growth.
Secchi: 9.0'	Sailboat Cove: This cove overall looks good, but does contain some sparse growth of bassweed and filamentous algae.
Water Level: 499.2	Outlet Cove: Trace patches of bassweed occupy this area, but otherwise lake looks good from this vantage.
	Midvale Launch: This area looks good at this time with no observed plant or algae growth.
E Coli Sample: Collected	Island Beach: Other than presence of bassweed in areas, overall lake looks good from this vantage.
WILDWOOD LAKE	Park: Overall the area looks good. There was no observed algae growth, and naiad appears to be decomposing from previous herbicide application.
Secchi: est. 12'	Dam: The dam face shoreline looked good at this time, as well as overall the rest of the open water of the lake.
Water Level: 499.2	Launch: This area looks good with naiad settled to the

	bottom of the lake.

NOTES:

1. **Birchwood water lily treatment will be schedule this month. Dissolved oxygen levels have increased slightly at this time since last week's assessment.**
2. **Shadow and Olive continue to improve with clean lake surface and fair water clarity. Recent rainfall should also help to increase water levels and provide some water movement.**
3. **Grunden's Pond shoreline algae growth has improved now that the water levels have increased to near normal level.**
4. **Crystal Lake, Mountain Lake, Cove Pond and Wildwood Lake overall look good at this time.**
5. **Sunset Lake was treated on July 18th for supplemental control of water lilies, filamentous algae growth, and spot treatment of bassweed.**

SOLITUDE
LAKE MANAGEMENT

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Bob Schindler, Solitude Lake Management
DATE: 7/31/2018
INSPECTION DATE: 7/31/2018

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 3:10 PM)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	25.1	2.72
2'	25.2	2.84
4'	25.2	2.74
6'	25.0	2.50
8'	24.8	2.06
10'	24.6	1.42
12'	24.4	0.79
13'	24.3	0.-

BIRCHWOOD LAKE	Outlet Cove: Cattail and water lily growth has remained consistent in this area, and overall looks good at this time.
Secchi: 6.75'	Inside Swim Lane: Trace density growth of water lilies and low water milfoil along edge of the swim lanes.
Aeration: both systems on	Outside Swim Lane: Trace density water lilies along the edges of the lake.
E. Coli Sample: Collected on 7/30	Beach: This area looks good at this time, although water lilies are encroaching on the north side of the beach, and will be treated.
SUNSET LAKE	Launch: Trace densities of pondweed and slender naiad growth along the shoreline.
Secchi: est. 7'	Outlet: Trace density water lilies are present scattered along shoreline and a few patches in the open water area. A few sparse patches of bassweed have developed in this lake area, and are adjacent to dock areas.
	Sunset Road Cove: Sparse growth of bassweed and water lilies in this area of the lake.
	Inlet Cove: Sparse density water lily and filamentous algae growth is present at this time.
CRYSTAL LAKE	Birchwood Outlet: Water lilies have increased in density at this time, and water shield is also now present as small areas

	of sparse growth. The bassweed appears to have declined in abundance in this area. Observed densities should still be considered desirable at this time.
	Lake Shore Road Shoreline: A few sparse density patches of water lilies are present in the upper end of the lake.
Secchi: est. 10'+	Crystal Outlet: There was no observed plant growth, although a trace amount of filamentous algae was developing along the rocks of the dam.
OLIVE POND **Dissolved Oxygen: 4.87 mg/L.**	Secchi: est. 2.5' There was no plant or algae growth observed at this time. The water column has a more turbid appearance, and there is a light film across the surface of the pond. Overall appearance is still favorable. There is now a tree that has fallen in the channel between Olive and Shadow.
SHADOW LAKE Aeration: Yes **Dissolved Oxygen: 5.31 mg/L.**	Secchi: est. 3' There was no plant or algae growth observed at this time. This basin has a better appearance than Olive Pond, with better clarity, and a clean surface. Basin also does not present a turbid appearance compared to Olive.
COVE POND **Dissolved Oxygen: 2.55 mg/L.**	Secchi: est. 2' Growth of water lilies appears to be consistent with previous survey. This basin also has turbid appearance comparable to Olive Pond, although the surface in this basin has less of a film developing.
GRUNDEN'S POND **Dissolved Oxygen: 9.45 mg/L.**	Secchi: est. 3.5' The water level remains near full pool, with filamentous algae growing along certain areas of the perimeter of the pond. No plant growth was observed at this time.
MOUNTAIN LAKE	Cove End: The cove looks good at this time, with limited algae growth, and no observed plant growth. The opposite side of bridge also looks good with no observed plant, and only scattered traces of algae growth.
Secchi: 6.75'	Sailboat Cove: The cove contains sparse density patches of both bassweed and filamentous algae. The bass weed should be considered favorable in this area for habitat.
Water Level: 499.4	Outlet Cove: There was no observed growth of bassweed present at this time, and only a trace amount of duckweed was windblown along the dam.
	Midvale Launch: This area looks good at this time with no observed plant growth, and a trace amount of filamentous algae.
E Coli Sample: Collected	Island Beach: Overall this area looks good with only scattered traces of filamentous algae observed.
WILDWOOD LAKE	Park: Overall the area looks good. There was no observed algae growth, and naiad appears to be well controlled

	throughout the area.
Secchi: est. 12'	Dam: The dam face shoreline looked good at this time, as well as overall the rest of the open water of the lake.
Water Level: 499.4	Launch: There was no plant growth observed at this time, with scattered trace density filamentous algae growth along the shoreline edge.

NOTES:

1. **Birchwood water lily treatment has been scheduled, but persistent rain has caused delay. This will be scheduled ASAP.**
2. **Grunden's Pond shoreline algae growth has developed more extensively with viable blooms that will be treated soon.**
3. **Crystal Lake, Cove Pond, Olive Pond, Shadow Lake, Sunset Lake and Wildwood Lake overall look good at this time with no observed nuisance aquatic plant and algae growth.**
4. **Mountain Lake looks good with the exception of filamentous algae growth in Sailboat Cove.**
5. **A greater scope of work has been discussed regarding hydro-raking and can be reviewed at the next Lake Committee meeting.**
6. **A kayak survey of the canal revealed only scattered traces of filamentous algae through the canal, and trace density coontail at the end of the canal near Mountain Lake.**

SOLITUDE
LAKE MANAGEMENT

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Bob Schindler, Solitude Lake Management
DATE: 8/7/2018
INSPECTION DATE: 8/6/2018

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 10:45 AM)

Depth	Temp. (°C)	D.O. (mg/L)
surface	29.3	4.22
2'	26.8	3.91
4'	26.6	3.51
6'	26.3	3.43
8'	25.8	1.24
10'	25.5	0.64
12'	25.1	0.63
13'	25.0	0.-

BIRCHWOOD LAKE	Outlet Cove: Cattail and water lily growth has remained consistent in this area, and overall looks good at this time.
Secchi: 6.5'	Inside Swim Lane: Trace density growth of water lilies and low water milfoil along edge of the swim lanes.
Aeration: beach only on	Outside Swim Lane: Trace density water lilies along the edges of the lake.
E. Coli Sample: Collected on 8/7	Beach: This area looks good at this time, although water lilies are encroaching on the north side of the beach, and will be treated in August.
SUNSET LAKE	Launch: Trace densities of pondweed and slender naiad growth along the shoreline.
Secchi: est. 7'	Outlet: Trace density water lilies are present scattered along shoreline and a few patches in the open water area. Bassweed has developed further in this area, and may need to be more aggressively addressed if there are complaints. Overall looks good.
	Sunset Road Cove: Sparse growth of bassweed and water lilies in this area of the lake.
	Inlet Cove: Sparse density water lily growth. Water lilies have been further reduced in the lake from the previous herbicide treatment.

CRYSTAL LAKE	Birchwood Outlet: Growth of water lilies and water shield similar to the previous survey visit. Overall upper end of the lake looks good at this time.
	Lake Shore Road Shoreline: A few sparse density patches of water lilies are present in the upper end of the lake.
Secchi: est. 10'+	Crystal Outlet: There was no observed plant growth, although a trace amount of filamentous algae was developing along the rocks of the dam.
OLIVE POND **Dissolved Oxygen: 7.44 mg/L.**	Secchi: est. 3' There was no plant or algae growth observed at this time. There was still a light film across the pond surface, but clarity and dissolved oxygen have improved since the previous survey.
SHADOW LAKE Aeration: Yes **Dissolved Oxygen: 8.43 mg/L.**	Secchi: est. 3.5' There was no plant or algae growth observed at this time. Shadow Pond looks good overall, with a clean surface, and fair water clarity. There is some sparse patches of filamentous algae
COVE POND **Dissolved Oxygen: 6.65 mg/L.**	Secchi: est. 2' Growth of water lilies appears to be consistent with previous survey. This basin maintains a turbid appearance, but overall aesthetics are favorable.
GRUNDEN'S POND **Dissolved Oxygen: 10.72 mg/L.**	Secchi: est. 4.5' The water level remains near full pool, with filamentous algae growing along certain areas of the perimeter of the pond. No plant growth was observed at this time. The clarity of the pond has improved since previous survey,
MOUNTAIN LAKE	Cove End: The cove looks good at this time, with limited algae growth, and no observed plant growth. The opposite side of bridge also looks good with no observed plant or algae growth.
Secchi: 8.25'	Sailboat Cove: The cove contains sparse density patches of both bassweed and filamentous algae. The bass weed should be considered favorable in this area for habitat.
Water Level: 499.7	Outlet Cove: There was no observed growth of bassweed present at this time, and there was no observed algae growth.
	Midvale Launch: This area looks good at this time with no observed plant growth, and a trace amount of filamentous algae.
E Coli Sample: Collected	Island Beach: Overall this area looks good with only scattered traces of filamentous algae observed.
WILDWOOD LAKE	Park: Overall the area looks good. There was no observed algae growth, and naiad appears to be well controlled throughout the area.
Secchi: est. 12'+	Dam: The dam face shoreline looked good at this time, as

	well as overall the rest of the open water of the lake.
Water Level: 499.7	Launch: There was no plant growth observed at this time, with scattered trace density filamentous algae growth along the shoreline edge.

NOTES:

1. **In general, rainfall from last week postponed a lot of management activity, but weather for this week looks better.**
2. **Birchwood water lily treatment has been scheduled, but persistent rain has caused delay. This will be scheduled ASAP.**
3. **Grunden's Pond shoreline algae growth has developed more extensively with viable blooms that will be treated this week.**
4. **Crystal Lake, Cove Pond, Olive Pond, Sunset Lake and Wildwood Lake overall look good at this time with no observed nuisance aquatic plant and algae growth.**
5. **Shadow Lake will be treated this week to target patches of filamentous algae growth.**
6. **Mountain Lake looks good at this time.**
7. **Wildwood Lake alum treatment is scheduled for Wednesday August 8th in the morning.**
8. **Algae samples from all lakes were collected this week.**

SOLITUDE
LAKE MANAGEMENT

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Bob Schindler, Solitude Lake Management
DATE: 8/21/2018
INSPECTION DATE: 8/20/2018

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 3:25 PM)

Depth	Temp. (°C)	D.O. (mg/L)
surface	25.2	1.81
2'	25.2	1.44
4'	25.1	1.25
6'	25.1	1.20
8'	25.0	0.99
10'	24.9	0.76
12'	24.7	0.-
13'	24.4	0.-

BIRCHWOOD LAKE	Outlet Cove: Cattail and water lily growth has remained consistent in this area, and overall looks good at this time.
Secchi: 6.5'	Inside Swim Lane: Trace density growth of water lilies and low water milfoil along edge of the swim lanes.
Aeration: beach only	Outside Swim Lane: Trace density water lilies along the edges of the lake.
E. Coli Sample: Collected on 8/20	Beach: This area looks good at this time, although water lilies are encroaching on the north side of the beach.
SUNSET LAKE	Launch: Trace densities of pondweed and slender naiad growth along the shoreline.
Secchi: est. 8'	Outlet: Trace density water lilies are present scattered along shoreline and a few patches in the open water area. A few sparse patches of bassweed have developed in this lake area, and are adjacent to dock areas.
	Sunset Road Cove: Sparse growth of bassweed and water lilies in this area of the lake.
	Inlet Cove: Sparse density water lily and filamentous algae growth is present at this time.
CRYSTAL LAKE	Birchwood Outlet: Water lilies and water shield are present at sparse density in the same growth area as what has been observed recently. A sparse patch of spatterdock has

	emerged in the upper central basin area of the lake.
	Lake Shore Road Shoreline: A few sparse density patches of water lilies are present in the upper end of the lake.
Secchi: est. 10'+	Crystal Outlet: There was no observed plant or algae growth at this time.
OLIVE POND **Dissolved Oxygen: 4.78 mg/L.**	Secchi: est. 3.5' There was no plant or algae growth observed at this time. The water clarity has improved at this time compared to recent survey events, and overall pond looks good. There is now a tree that has fallen in the channel between Olive and Shadow.
SHADOW LAKE Aeration: Yes **Dissolved Oxygen: 5.11 mg/L.**	Secchi: est. 3.5 A trace amount of filamentous algae was observed, and the water clarity was also favorable for the basin.
COVE POND **Dissolved Oxygen: 4.64 mg/L.**	Secchi: est. 3' Growth of water lilies appears to be consistent with previous survey. Clarity in this pond has also improved compared to recent survey visits. Overall looks good at this time.
GRUNDEN'S POND **Dissolved Oxygen: 8.06 mg/L.**	Secchi: est. 4' There was no plant growth observed at this time, and there was a sparse amount of algae growing in small patches. The water level is the highest that has been observed for some time.
MOUNTAIN LAKE	Cove End: The cove looks good at this time, with limited algae growth, and no observed plant growth. The opposite side of bridge also looks good with no observed plant or algae growth.
Secchi: 7.5	Sailboat Cove: The cove contains trace density patches of both bassweed and filamentous algae.
Water Level: 499.8	Outlet Cove: There was no observed plant or algae growth observed, outside of the cattail growth that has been present through season.
	Midvale Launch: This area looks good at this time with no observed plant growth, and a trace amount of filamentous algae.
E Coli Sample: Collected	Island Beach: Overall this area looks good with only scattered traces of brittle naiad and coontail near the docks.
WILDWOOD LAKE	Park: Overall the area looks good. There was no observed algae growth, and naiad appears to be well controlled throughout the area.
Secchi: est. 12'+	Dam: The dam face shoreline looked good at this time, as well as overall the rest of the open water of the lake.
Water Level: 499.8	Launch: There was no plant growth observed at this time, with scattered trace density filamentous algae growth along

	the shoreline edge.

NOTES:

1. **Birchwood water lily treatment has been scheduled, but persistent rain has caused delay. This will be scheduled ASAP.**
2. **Grunden's Pond water level is highest level observed in a long time and overall looks good.**
3. **Crystal Lake, Cove Pond, Olive Pond, Shadow Lake, Sunset Lake and Wildwood Lake overall look good at this time with no observed nuisance aquatic plant and algae growth.**
4. **Mountain Lake looks good with the exception of filamentous algae growth in Sailboat Cove.**
5. **Crystal Lake phytoplankton density is slightly elevated, and will be sampled again next week and monitored closely to see if an algaecide treatment is necessary.**
6. **The dam spraying will be scheduled this week.**

SOLITUDE
LAKE MANAGEMENT

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Emily Mayer, Solitude Lake Management
DATE: 08/27/18
INSPECTION DATE: 08/27/18

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 10:00AM)

Depth	Temp. (°C)	D.O. (mg/L)
surface	24.5	2.86
2'	24.0	2.61
4'	23.8	2.36
6'	23.8	2.08
8'	23.6	1.27
10'	23.3	0.52
12'		
13'		

BIRCHWOOD LAKE	Outlet Cove: Sparse amounts of white lilies were observed along the shoreline. Traces of leafy pondweed, creeping bladderwort, and robbin's pondweed were observed. Sparse amounts of common bladderwort were also observed. Trace to sparse amounts of floating bass weed was observed within the lilies.
Secchi: 6.25'est	Inside Swim Lane: A small patch of white lilies and watershield were observed along the main shoreline. A light film of tree pollen was observed on the surface. Otherwise the rest of the swim lanes were clear of plant and algae growth.
Aeration: OFF	Outside Swim Lane: Moderate amounts of rooted white lilies were observed. Sparse patches of watershield were also observed. Traces of bass weed and creeping bladderwort were present.
E. Coli Sample: 10:05am	Beach: Clean and clear.
SUNSET LAKE	Launch: Small patches of white lilies were observed in the open water. Otherwise the area was clean and clear.
Secchi: 4'est	Outlet: Traces of unicellular algae were observed along the shoreline.

	Sunset Road Cove: Trace sized patches of white lilies were observed and the water was slightly turbid.
	Inlet Cove: Water was tinted blue-green and was very turbid. Dense decaying filamentous algae was observed along with dense patches of white lilies. Traces of benthic filamentous algae were also observed.
CRYSTAL LAKE	Birchwood Outlet: Moderate patches of white lilies were observed. Sparse patches of watershield were also observed.
	Lake Shore Road Shoreline: Sparse amounts of benthic filamentous algae was observed. Benthic filamentous algae appeared to be topping out at the surface.
Secchi: 4'est	Crystal Outlet: Water was very turbid with benthic filamentous algae attached to the rocks.
OLIVE POND **Dissolved Oxygen: 5.29 mg/L.**	Secchi: 3'est Water was turbid. Traces of benthic filamentous algae was also observed.
SHADOW LAKE Aeration: ON **Dissolved Oxygen: 7.38 mg/L.**	Secchi: 2.5'est Sparse to moderate amounts of benthic filamentous algae was observed along the main shoreline. A light amount of tree pollen was observed on the surface.
COVE POND **Dissolved Oxygen: 5.09 mg/L.**	Secchi: 3'est Water was very turbid. Traces of unicellular algae was observed in the water column.
GRUNDEN'S POND **Dissolved Oxygen: 8.43 mg/L.**	Secchi: 3'est The water was slightly turbid with trace to sparse amounts of benthic filamentous algae. Sparse to moderate amounts of decaying and viable filamentous algae were also observed.
MOUNTAIN LAKE	Cove End: Water appeared to be turbid. Right side of bridge: Traces of creeping bladderwort were observed. Open water was clean and clear. Left side of the bridge: Water was very turbid.
Secchi: 5.5'est	Sailboat Cove: Traces of floating milfoil were observed along the shoreline. Unicellular algae were observed within the water column.
Water Level: 499.1	Outlet Cove: Traces of unicellular algae were observed in the water column.
	Midvale Launch: Unicellular algae was present in the water column.
E. Coli Sample: 11:35am	Island Beach: Traces of floating coontail was observed along the shoreline. Otherwise the open water was clean and clear.
WILDWOOD LAKE	Park: Moderate amounts of rooted southern naiad and sparse

	amounts of rooted brittle naiad were observed. Water was slightly turbid.
Secchi: 5'est	Dam: Traces of floating southern naiad and turbidity was observed.
Water Level: 499.6	Launch: Traces of rooted brittle naiad was observed. Sparse to moderate amounts of benthic filamentous algae was observed. Traces of filamentous algae was observed along the western shoreline.

NOTES:

1. **E. Coli samples were collected today at Mountain Lake and Birchwood Lake. Results to follow.**
2. **Visual observations found no Fanwort present in the canal.**

SOLITUDE LAKE MANAGEMENT

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Bob Schindler, Solitude Lake Management
DATE: 09/6/18
INSPECTION DATE: 09/4/18

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 6:50 PM)

Depth	Temp. (°C)	D.O. (mg/L)
surface	28.9	4.54
2'	26.4	2.46
4'	25.2	1.22
6'	24.4	0.32
8'	24.1	0.19
10'	23.8	0.18
12'	23.3	-
13'		

BIRCHWOOD LAKE	Outlet Cove: Sparse amounts of white lilies were observed along the shoreline. Traces of leafy pondweed, creeping bladderwort, and Robbin's pondweed were observed. Sparse amounts of common bladderwort were also observed. Trace to sparse amounts of floating bass weed was observed within the lilies.
Secchi: 6.5'	Inside Swim Lane: A small patch of white lilies and water shield were observed along the main shoreline. White water lilies have increased in this area along the shoreline.
Aeration: OFF	Outside Swim Lane: Moderate amounts of rooted white lilies were observed. Sparse patches of water shield were also observed. Traces of bass weed and creeping bladderwort were present.
E. Coli Sample: NA	Beach: Clean and clear.
SUNSET LAKE	Launch: Small patches of white lilies were observed in the open water. Otherwise the area was clean and clear.
Secchi: 5.5'est	Outlet: Patches of bassweed and pondweed observed off of shoreline, but overall looks good.
	Sunset Road Cove: Trace sized patches of white lilies were observed and the water was slightly turbid.
	Inlet Cove: Trace amounts of filamentous algae, and sparse

	density water lilies. Water clarity improved following treatment of Crystal Lake.
CRYSTAL LAKE	Birchwood Outlet: Moderate patches of white lilies were observed. Sparse patches of water shield were also observed.
	Lake Shore Road Shoreline: Sparse amounts of benthic filamentous algae was observed.
Secchi: 10'+est	Crystal Outlet: Overall lake looks much better compared to last week with no observed filamentous algae and water clarity improved to 10'+.
OLIVE POND **Dissolved Oxygen: 4.81 mg/L.**	Secchi: 3.5'est There was a green film on the surface, appeared to be more of a pollen than algae. Clarity improved since previous treatment, and no filamentous algae observed.
SHADOW LAKE Aeration: ON **Dissolved Oxygen: 5.94 mg/L.**	Secchi: 2.5'est Sparse to moderate amounts of benthic filamentous algae was observed along the main shoreline. A light amount of tree pollen was observed on the surface.
COVE POND **Dissolved Oxygen: 5.83 mg/L.**	Secchi: 3'est Water has a turbid appearance. Clarity appears to have improved from last week's rains.
GRUNDEN'S POND **Dissolved Oxygen: 7.15 mg/L.**	Secchi: 4'est . Sparse amounts of decaying filamentous algae were also observed. The water level has receded again.
MOUNTAIN LAKE	Cove End: Right side of bridge: Traces of creeping bladderwort were observed. Open water was clean and clear. Left side of the bridge: Clarity significantly improved from previous algaecide treatment.
Secchi: 6.75'est	Sailboat Cove: Traces of floating milfoil were observed along the shoreline, and traces of floating decomposing filamentous algae.
Water Level: 499.4	Outlet Cove: This area looks good at this time.
	Midvale Launch: Trace density unicellular algae in water column, although clarity and water color improved from Friday's treatment.
E. Coli Sample: NA	Island Beach: Traces of floating coontail was observed along the shoreline. Sparse density creeping bladderwort and Nitella by the foot bridge. Otherwise the open water was clean and clear.
WILDWOOD LAKE	Park: Moderate amounts of rooted southern naiad and sparse amounts of rooted brittle naiad were observed. A trace

	amount of filamentous algae along the shoreline edge in areas.
Secchi: 9'est	Dam: Traces of floating southern naiad.
Water Level: 499.5	Launch: Traces of rooted brittle naiad was observed. Sparse to moderate amounts of benthic filamentous algae was observed. Traces of filamentous algae was observed along the western shoreline.

NOTES:

1. **Treatments at all of the dam structures has been completed. A Follow up spray will be scheduled for the end of September.**
2. **Mountain Lake was treated with Copper Sulfate on 8/31 for unicellular algae.**
3. **Crystal Lake was treated with Copper Sulfate on 8/30 for unicellular algae.**
4. **Olive pond was treated on 8/28 with earthtec for unicellular algae.**
5. **Grunden's Pond was treated on 8/30 with Cutrine Plus for filamentous algae.**
6. **Water level at Grunden's Pond appeared abnormally low again.**
7. **Cattail spray will be conducted along small portions of shoreline at a few of the lakes.**
8. **A few stems of Eurasian milfoil were observed during the 8/31 algaecide treatment adjacent to the club beach.**
9. **The tree should be removed between Olive and Shadow.**
10. **Sunset Lake will get an additional lily treatment in September.**
11. **We are continuing to follow up on hydro rake permitting and will communicate details to Borough Manager once more information is obtained and permitting requirements are determined.**

SOLITUDE
LAKE MANAGEMENT

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Bob Schindler, Solitude Lake Management
DATE: 09/11/18
INSPECTION DATE: 09/10/18

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 3:45 PM)

Depth	Temp. (°C)	D.O. (mg/L)
surface	20.9	2.62
2'	20.9	2.53
4'	20.9	2.45
6'	20.9	2.51
8'	20.9	2.49
10'	20.8	2.38
12'	20.8	2.19
13'	20.7	1.87

BIRCHWOOD LAKE	Outlet Cove: Sparse amounts of white lilies were observed along the shoreline. Traces of leafy pondweed, creeping bladderwort, and Robbin's pondweed were observed. Sparse amounts of common bladderwort were also observed. Trace to sparse amounts of floating bass weed was observed within the lilies.
Secchi: 6.25'	Inside Swim Lane: A small patch of white lilies and water shield were observed along the main shoreline. White water lilies continue to increase in this area along the shoreline.
Aeration: OFF	Outside Swim Lane: Moderate amounts of rooted white lilies were observed. Sparse patches of water shield were also observed. Traces of bass weed and creeping bladderwort were present.
E. Coli Sample: NA	Beach: Clean and clear.
SUNSET LAKE	Launch: Small patches of white lilies were observed in the open water. Otherwise the area was clean and clear.
Secchi: 6'est	Outlet: Patches of bassweed and pondweed observed off of shoreline, but overall looks good.
	Sunset Road Cove: Trace sized patches of white lilies were observed and the water was slightly turbid.
	Inlet Cove: Sparse density water lilies remain at this time,

	while the filamentous algae has dissipated.
CRYSTAL LAKE	Birchwood Outlet: Moderate patches of white lilies were observed. Sparse patches of water shield were also observed.
	Lake Shore Road Shoreline: Overall area looks good at this time.
Secchi: 10'+est	Crystal Outlet: Area looks good with good clarity and no observed algae growth.
OLIVE POND **Dissolved Oxygen: 4.22 mg/L.**	Secchi: 3.5'est This pond looks good at this time with fair water clarity and no observed algae growth. The water surface is clear at this time.
SHADOW LAKE Aeration: ON **Dissolved Oxygen: 5.31 mg/L.**	Secchi: 3'est Filamentous algae growth was at trace density at this time, and the water surface was overall mostly clear. Water has a slight turbid appearance, but improved over past two survey visits.
COVE POND **Dissolved Oxygen: 5.54 mg/L.**	Secchi: 3'est Water has a turbid appearance, but clarity and water surface look better from recent rain.
GRUNDEN'S POND **Dissolved Oxygen: 7.05 mg/L.**	Secchi: 5'est This pond contained sparse amounts of decaying filamentous algae along the BLVD, and otherwise looks good at this time.
MOUNTAIN LAKE	Cove End: At this time, the areas on both sides of the bridge look good with no observed plant or algae growth.
Secchi: 6.5'	Sailboat Cove: This lake area looks much better compared to most recent surveys, with no observed plant or algae growth.
Water Level: 499.7	Outlet Cove: This area looks good at this time.
	Midvale Launch: A trace amount of unicellular algae is observed in the water column, but density has continued to decline since the most recent algaecide treatment.
E. Coli Sample: NA	Island Beach: Traces of floating coontail was observed along the shoreline. Sparse density creeping bladderwort and Nitella by the foot bridge. Otherwise the open water was clean and clear.
WILDWOOD LAKE	Park: Moderate amounts of rooted southern naiad and sparse amounts of rooted brittle naiad were observed. A trace amount of filamentous algae along the shoreline edge in areas.
Secchi: 9'est	Dam: Traces of floating southern naiad.
Water Level: 499.5	Launch: Traces of rooted brittle naiad was observed. Traces of filamentous algae was observed along the western

	shoreline.

NOTES:

1. **Treatments at all of the dam structures has been completed. A Follow up spray will be scheduled for the end of September.**
2. **Cattail spray will be conducted along small portions of shoreline at a few of the lakes.**
3. **Sunset Lake will get an additional lily treatment in September.**
4. **Birchwood Lake will be treated for water lily growth in the lower lake basin by the swim lanes and beach.**
5. **We are continuing to follow up on hydro rake permitting and will communicate details to Borough Manager once more information is obtained and permitting requirements are determined. The direction at this time is that SLM will be scheduling a meeting with DEP Division of Land Use to discuss hydro-raking in general, and Birchwood Lake specifically.**

SOLITUDE
LAKE MANAGEMENT

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

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 2:30 PM)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	21.6	1.89
2'	21.6	1.95
4'	21.6	1.97
6'	21.6	1.74
8'	21.0	1.58
10'	21.0	0.22
12'	20.2	0.19
13'	20.0	--

BIRCHWOOD LAKE	Outlet Cove: Sparse amounts of white lilies were observed along the shoreline. Traces of leafy pondweed, creeping bladderwort, and Robbin's pondweed were observed. Sparse amounts of common bladderwort were also observed. Trace to sparse amounts of floating bass weed was observed within the lilies.
Secchi: 7.5'	Inside Swim Lane: A small patch of white lilies and water shield were observed along the main shoreline. White water lilies continue to increase in this area along the shoreline.
Aeration: Both systems on	Outside Swim Lane: Moderate amounts of rooted white lilies were observed. Sparse patches of water shield were also observed. Traces of bass weed and creeping bladderwort were present.
E. Coli Sample: NA	Beach: Clean and clear.
SUNSET LAKE	Launch: Small patches of white lilies were observed in the open water. Otherwise the area was clean and clear.
Secchi: 6.5'est	Outlet: Patches of bassweed and pondweed observed off of shoreline, but overall looks good.
	Sunset Road Cove: Trace sized patches of white lilies were observed and the water was slightly turbid.
	Inlet Cove: Sparse density water lilies remain at this time,

	while the filamentous algae has dissipated.
CRYSTAL LAKE	Birchwood Outlet: Moderate patches of white lilies were observed. Sparse patches of water shield were also observed.
	Lake Shore Road Shoreline: Overall area looks good at this time.
Secchi: 10'+est	Crystal Outlet: Area looks good with good clarity and no observed algae growth.
OLIVE POND **Dissolved Oxygen: 5.83 mg/L.**	Secchi: 4'est This pond looks good at this time with good water clarity for this basin and no observed algae growth. Although water clarity has continued to improve, there is a moderate surface covering of what appears to be pollen.
SHADOW LAKE Aeration: ON **Dissolved Oxygen: 6.58 mg/L.**	Secchi: 3'est There was no observed filamentous algae growth at this time. Water clarity remained fair at 3', and this pond also had a moderate surface coverage of pollen.
COVE POND **Dissolved Oxygen: 4.27 mg/L.**	Secchi: 3'est Water has a turbid appearance, and this basin also has pollen across the surface.
GRUNDEN'S POND **Dissolved Oxygen: 7.69 mg/L.**	Secchi: 5'est This pond contained sparse amounts of decaying filamentous algae along the BLVD, and otherwise looks good at this time.
MOUNTAIN LAKE	Cove End: At this time, the areas on both sides of the bridge look good with no observed plant or algae growth. There was a trace amount of pollen on the surface in these areas.
Secchi: 7.5'	Sailboat Cove: This area overall looks good, but there are traces of filamentous algae growth, and a few small trace patches of bassweed.
Water Level: 499.6	Outlet Cove: This area looks good at this time.
	Midvale Launch: There was no unicellular algae observed in the water column at this time. Overall lake looks good from this vantage.
E. Coli Sample: NA	Island Beach: Traces of floating coontail was observed along the shoreline, a few stems of milfoil have also popped up adjacent to the bridge. Sparse density creeping bladderwort and Nitella by the foot bridge. Otherwise the open water was clean and clear.
WILDWOOD LAKE	Park: Moderate amounts of rooted southern naiad and sparse amounts of rooted brittle naiad were observed. A trace amount of filamentous algae along the shoreline edge in areas.

Secchi: 9'est	Dam: Traces of floating southern naiad.
Water Level: 499.55	Launch: Traces of rooted brittle naiad was observed. Traces of filamentous algae was observed along the western shoreline.

NOTES:

1. **A Follow up spray will be scheduled for the end of September.**
2. **Cattail spray will be conducted along small portions of shoreline at a few of the lakes this Friday.**
3. **Sunset Lake will get an additional lily treatment on Friday, as well as the swimming area of Birchwood.**
4. **We are continuing to follow up on hydro rake permitting and will communicate details to Borough Manager once more information is obtained and permitting requirements are determined. The direction at this time is that SLM will be scheduling a meeting with DEP Division of Land Use to discuss hydro-raking in general, and Birchwood Lake specifically. This remains the most recent update, as SLM is waiting for a response from DEP to schedule a meeting to discuss. I have also presented this issue to the attorney for NJ COLA, and this was discussed at this past weekend's NJ COLA meeting. I believe she is working to try and bring NJ DEP to the next meeting on November 10th to openly discuss with the COLA organization. As the attorney who represents a significant number of lake associations in NJ, she was also under the impression that hydro raking was not a permitted activity.**

SOLITUDE
LAKE MANAGEMENT

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Bob Schindler, Solitude Lake Management
DATE: 09/26/18
INSPECTION DATE: 09/24/18

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 4:30 PM)

Depth	Temp. (°C)	D.O. (mg/L)
surface	20.6	3.77
2'	20.6	3.90
4'	20.6	3.68
6'	20.5	3.66
8'	20.4	3.35
10'	20.1	2.74
12'	20.0	2.70
13'	20.0	1.93

BIRCHWOOD LAKE	Outlet Cove: Sparse amounts of white lilies were observed along the shoreline. Traces of leafy pondweed, creeping bladderwort, and Robbin's pondweed were observed. Sparse amounts of common bladderwort were also observed.
Secchi: 6.75'	Inside Swim Lane: A small patch of white lilies and water shield were observed along the main shoreline. White water lilies continue to increase in this area along the shoreline. Ribbon leaf pondweed and low watermilfoil were present at trace densities.
Aeration: Both systems on	Outside Swim Lane: Moderate amounts of rooted white lilies were observed. Sparse patches of water shield were also observed. Traces of bass weed and creeping bladderwort were present.
E. Coli Sample: NA	Beach: Clean and clear.
SUNSET LAKE	Launch: Small patches of white lilies were observed in the open water. Otherwise the area was clean and clear.
Secchi: 6'est	Outlet: Patches of bassweed and pondweed observed off of shoreline, but overall looks good.
	Sunset Road Cove: Trace sized patches of white lilies were observed and the water was slightly turbid.
	Inlet Cove: Sparse density water lilies remain at this time.

CRYSTAL LAKE	Birchwood Outlet: Moderate patches of white lilies were observed. Sparse patches of water shield were also observed.
	Lake Shore Road Shoreline: Overall area looks good at this time.
Secchi: 10'+est	Crystal Outlet: Area looks good with good clarity and no observed algae growth.
OLIVE POND **Dissolved Oxygen: 4.56 mg/L.**	Secchi: 4'est This pond looks good at this time with good water clarity for this basin and no observed algae growth. The surface pollen has declined to only trace amounts across the surface.
SHADOW LAKE Aeration: ON **Dissolved Oxygen: 5.88 mg/L.**	Secchi: 3'est There was no observed filamentous algae growth at this time. Water clarity remained fair at 3', and this pond also had a sparse surface coverage of pollen.
COVE POND **Dissolved Oxygen: 5.37 mg/L.**	Secchi: 3'est Water has a turbid appearance, and this basin also has pollen across the surface.
GRUNDEN'S POND **Dissolved Oxygen: 6.85 mg/L.**	Secchi: 5'est This pond contained sparse amounts of decaying filamentous algae along the BLVD, and otherwise looks good at this time.
MOUNTAIN LAKE	Cove End: At this time, the areas on both sides of the bridge look good with no observed plant or algae growth.
Secchi: 7.5'	Sailboat Cove: This area overall looks good, with a few small trace patches of bassweed.
Water Level: 499.55	Outlet Cove: This area looks good at this time.
	Midvale Launch: There was no unicellular algae observed in the water column at this time. Overall lake looks good from this vantage.
E. Coli Sample: NA	Island Beach: Traces of floating coontail was observed along the shoreline, a few stems of milfoil have also popped up adjacent to the bridge. Sparse density creeping bladderwort and Nitella by the foot bridge. Otherwise the open water was clean and clear.
WILDWOOD LAKE	Park: Moderate amounts of rooted southern naiad and sparse amounts of rooted brittle naiad were observed. A trace amount of filamentous algae along the shoreline edge in areas. Overall the lake contained less filamentous algae as previous survey and looks good at this time.
Secchi: 9'est	Dam: No plant or algae growth observed.
Water Level: 499.5	Launch: Traces of rooted brittle naiad was observed. Traces of filamentous algae was observed along the western

	shoreline.

NOTES:

1. **SOLitude will be meeting with NJ DEP division of Land Use Thursday Sept. 27th to discuss hydro-raking permitting. The state has already received a project summary for Birchwood with maps for their review prior to the meeting.**
2. **Chris will be attending the lakes management meeting on Tuesday October 2nd as Bob will be away for the week on a project. Information will be provided to Chris for the management during the month of September, which was overall minimal, and a summary of the results of the hydro raking meeting.**

SOLITUDE LAKE MANAGEMENT

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Bob Schindler, Solitude Lake Management
DATE: 10/11/18
INSPECTION DATE: 10/9/18

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 3:45 PM)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	19.3	4.54
2'	19.3	4.45
4'	19.3	4.36
6'	19.3	4.27
8'	19.3	4.14
10'	19.2	4.13
12'	19.2	4.07
13'	19.2	2.81

BIRCHWOOD LAKE	Outlet Cove: Traces of leafy pondweed, creeping bladderwort, and Robbin's pondweed were observed. Water lily treatment worked well in this area, and cattails are also starting to show signs of treatment.
Secchi: 6.25'	Inside Swim Lane: A small patch of white lilies and water shield were observed along the main shoreline. White water lilies have mostly settled to the lake bottom following previous treatment. Ribbon leaf pondweed and low watermilfoil were present at trace densities.
Aeration: Both systems on	Outside Swim Lane: Moderate amounts of rooted white lilies were observed. Sparse patches of water shield were also observed. Traces of bass weed and creeping bladderwort were present.
E. Coli Sample: NA	Beach: Clean and clear.
SUNSET LAKE	Launch: Small patches of white lilies were observed in the open water. Otherwise the area was clean and clear.
Secchi: 7'est	Outlet: Water lilies still observed in this area, but submersed plants no longer visible.
	Sunset Road Cove: Trace sized patches of white lilies were observed and the water was slightly turbid.
	Inlet Cove: Sparse density water lilies remain at this time.

CRYSTAL LAKE	Birchwood Outlet: Moderate patches of white lilies were observed. Sparse patches of water shield were also observed. This area will need to be managed in early summer 2019 to reduce surface plant densities.
	Lake Shore Road Shoreline: Overall area looks good at this time.
Secchi: 10'+est	Crystal Outlet: Area looks good with good clarity and no observed algae growth.
OLIVE POND **Dissolved Oxygen: 5.71 mg/L.**	Secchi: 4'est This pond looks good at this time with good water clarity for this basin and no observed algae growth. A trace amount of surface filamentous algae was observed.
SHADOW LAKE Aeration: ON **Dissolved Oxygen: 6.35 mg/L.**	Secchi: 3.5'est There was no observed filamentous algae growth at this time. Overall looks good at this time.
COVE POND **Dissolved Oxygen: 5.98 mg/L.**	Secchi: 3'est Pond maintains a dark appearance in the water column, but overall looks good.
GRUNDEN'S POND **Dissolved Oxygen: 6.13 mg/L.**	Secchi: 5'est This pond contained sparse amounts of decaying filamentous algae in the open water, but is mostly clear.
MOUNTAIN LAKE	Cove End: At this time, the areas on both sides of the bridge look good with no observed plant or algae growth.
Secchi: 6.5'	Sailboat Cove: This area overall looks good, with no observed plant or algae growth.
Water Level: 499.55	Outlet Cove: This area looks good at this time.
	Midvale Launch: There was no unicellular algae observed in the water column at this time. Overall lake looks good from this vantage.
E. Coli Sample: NA	Island Beach: Traces of floating coontail was observed along the shoreline, a few stems of milfoil have also popped up adjacent to the bridge. Sparse density creeping bladderwort and Nitella by the foot bridge. Otherwise the open water was clean and clear.
WILDWOOD LAKE	Park: There was no observed filamentous algae, and the naiad appears to have mostly settled to the lake bottom.
Secchi: 8'est	Dam: No plant or algae growth observed.
Water Level: 499.5	Launch: Traces of rooted brittle naiad was observed. A sparse amount of filamentous algae has developed along portions of the shoreline edge. No treatment can be performed in October for algae control.

NOTES:

1. **The lake management program for monitoring and treatment has come to a close for the 2018 management season.**
2. **A survey will be conducted specific to Sunset Lake for purple loosestrife to document areas for management during the summer of 2019 when herbicide is most effective for this plant species.**
3. **The hydro raking program for Birchwood Lake will continue in October. It has been determined that no permits will be required in 2018 for the work at Birchwood. The beaver lodges and other material associated with the beavers can be physically removed as long as no current beaver activity is observed. Confirmed with USDA office in NJ.**
4. **Permitting for the other lakes and for the future raking at Birchwood is still being assessed to determine what data needs to be collected for the permit application, and determine a per permit cost.**