BOROUGH OF MOUNTAIN LAKES
MORRIS COUNTY, NJ

2015 YEAR-END REPORT
LAKES MANAGEMENT PROGRAM
BOROUGH OF MOUNTAIN LAKES

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Introduction

The following report is submitted to the Borough of Mountain Lakes as a Year End Report summarizing the Aquatic Vegetation Management Program for Mountain Lakes in 2015. As in previous years, the program included weekly surveys of all lakes, biweekly unicellular phytoplankton sampling during June through August, 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 2015 summary discussions, additional topics such as the fecal coliform sampling that occurred at Birchwood and Mountain Lake, water clarity at Mountain Lake, the Lakes Cleaning Program, and nutrient loading in all of the lakes will be discussed. Finally, a 2015 summary is presented as well as specific Lake Management strategies for 2016. 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 2015	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		2012
Najas guadalupensis	Southern Naiad	**X**	
Najas flexilis	Slender Naiad	**X**	
Potamogeton foliosus	Leafy Pondweed	**X**	
Nymphaea odorata	White Water Lily	**X**	
Nuphar variegata	Spatterdock	**X**	
Brasenia schreberi	Watershield	**X**	
Chara sp.	Muskgrass	**X**	
Potamogeton robbinsii	Robbin's Pondweed	**X**	
Myriophyllum humile	Low Water Milfoil		2011
Lemna minor	Small Duckweed	**X**	
Potamogeton amplifolius	Bass Weed	**X**	
Ludwigia sp.	Red Ludwigia	**X**	
Utricularia gibba	Creeping Bladderwort	**X**	
Potamogeton crispus	Curly-leaf Pondweed	**X**	
Riccia fluitans	Slender Riccia	**X**	
Potamogeton diversifolius	Variable-leaf Pondweed		2013
Nitella sp.	Stonewort	**X**	
Fontinalis sp.	Watermoss		2013
Ludwigia peploides	Creeping Water Primrose	**X**	
Najas minor	Brittle Naiad	**X**	
Potamogeton pusillus	Small Pondweed	**X**	

The table above depicts a list of aquatic plants observed at Mountain Lakes in 2015 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. See below for a discussion and list of emergent plants observed in 2015. Following this table are brief descriptions of each aquatic macrophyte and a picture. Red font indicates exotic species.

Eurasian Water Milfoil (*Myriophyllum spicatum*. Common Names: Asian Water milfoil. **Aggressive, Exotic, Invasive**.): Eurasian water milfoil has long (2 meters or more) spaghetti-like stems that grow from submerged rhizomes. The stems often branch repeatedly at the water's surface creating a canopy that can crowd out other vegetation, and obstruct recreation and navigation. The leaves are arranged in whorls of 4 to 5, and spread out along the stem. The leaves are divided like a feather, resembling the bones on a fish spine. Eurasian water milfoil is an exotic originating in Europe and Asia, but its range now includes most of the United States. It's ability to grow in cool water and at low light conditions gives it an early season advantage over other native submersed plants. In addition to reproducing via fruit production, it can also reproduce via fragmentation. Waterfowl graze on Eurasian water milfoil, and its vegetation provides habitat for invertebrates. However, studies have determined mixed beds of pondweeds and wild celery can support more diverse invertebrate populations.

Ribbon-leaf Pondweed (*Potamogeton epihydrus*: Common Name: ribbon-leaf pondweed. **Native**.): Ribbon-leaf pondweed has flattened stems and two types of leaves. The submersed leaves are alternate on the stem, lack a leaf stalk, and are long tape-like in shape. Each leaf has a prominent stripe of pale green hollow cells flanking the midvein. The floating leaves are egg or ellipse-shaped and supported by a leaf stalk about as long as the leaf itself. Fruiting stalks are located at the top of the stem and packed with flattened disk-shaped fruits. It is typically found growing in low alkalinity environments, and a variety of substrates.

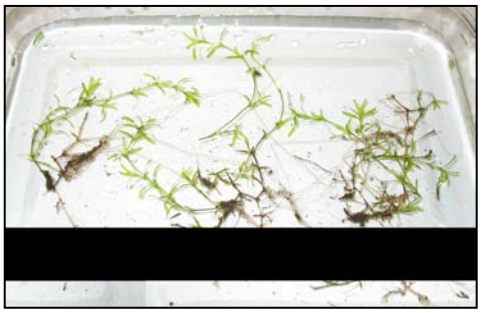
Common Bladderwort (*Utricularia vulgaris*: Common Names: common bladderwort, great bladderwort. **Native.**): Common bladderwort is a free-floating plant that can reach 2-3 meters in length. Since they are free-floating, they can grow in areas with very loose sediment. Along its stem are finely divided leaf-like branches, forked 3-7 times. Scattered about the branches are numerous bladders, used to capture prey ranging from the size of unicellular protozoans (such as *Euglena*), to mosquito larvae. Prey is slowly digested inside the bladders by enzymes.

Common bladderwort produces small yellow flowers that protrude above the water. Stems of common bladderwort provide food and cover for fish.

Spiny Hornwort (*Ceratophyllum echinatum*: Common Names: coontail, hornwort. **Native**.): Spiny hornwort is a type of coontail that inhabits low-pH, soft water lakes. It has long trailing stems that lack true root systems. Its stiff leaves are arranged in whorls. Spiny hornwort leaves are forked 3-4 times and possess small spines. The fruit of spiny hornwort has numerous spines of various lengths around its margin, and a rough surface. Due to its tolerance for cool water, and low-light conditions, plus its ability to reproduce by fragmentation, spiny hornwort can reach nuisance levels. Waterfowl graze on its foliage and fruit, and its leaves host a myriad of aquatic insects.

Coontail (*Ceratophyllum demersum*. Common Names: coontail, hornwort. **Native**.): Coontail has long trailing stems that lack true roots, although it can become loosely anchored to sediment by modified leaves. The leaves are stiff, and arranged in whorls of 5-12 at each node. Each leaf is forked once or twice, and has teeth along the margins. The whorls of leaves are spaced closer at the end of the stem, creating a raccoon tail appearance. Coontail is tolerant of low light conditions, and since it is not rooted, it can drift into different depth zones. Coontail can also tolerate cool water and can over winter as a green plant under the ice. Typically, it reproduces via fragmentation. Bushy stems of coontail provide valuable habitat for invertebrates and fish (especially during winter), and the leaves are grazed on by waterfowl.

Leafy Pondweed (*Potamogeton foliosus*: Common Name: leafy pondweed. **Native**.): Leafy pondweed has freely branched stems that hold slender submersed leaves that become slightly more narrow as they approach the stem. The leaf contains 3-5 veins and often tapers to a point. No floating leaves are produced. It produces early season fruits in tight clusters on short stalks in the leaf axils. These early season fruits are often the first grazed upon by waterfowl during the season. Muskrat, beaver, deer and even moose also graze on the fruit. It inhabits a wide range of habitats, but usually prefers shallow water. It has a high tolerance for eutrophic conditions, allowing it to even colonize secondary water treatment ponds.



Southern Naiad (*Najas guadalupensis*. Common Names: Southern water nymph, bushy pondweed. **Native**.): Southern naiad is an annual aquatic plant that can form dense stands of rooted vegetation. Its ribbon-like leaves are dark-green to greenish-purple, and are wider and less pointed than slender naiad. Flowers occur at the base of the leaves, but are so small; they usually require magnification to detect. Southern naiad is widely distributed, but is less common than slender naiad in northern zones. Southern naiad reproduces by seeds and fragmentation.

Slender Naiad (*Najas flexilis*: Common Names: slender naiad, bushy pondweed. **Native**.): Slender naiad has fine-branched stems that can taper to lengths of one meter, originating from delicate rootstalks. Plant shape varies; sometimes compact and bushy, other times long and slender, depending on growing conditions. The leaves are short (1-4 cm long) and finely serrated, tapering to a point. It is found in a variety of habitats, and can colonize sandy or gravelly substrates. If conditions are ideal, it can reach nuisance densities. It is a true annual, and dies off in the fall, relying on seed dispersal to return the next year. It is an important food source for waterfowl.

White Water Lily (*Nymphaea* sp. Common Name: white water lily, fragrant water lily. **Native**.): White water lily leaf stalks emerge directly from a submerged fleshy rhizome. White water lilies have round floating leaves. Flowering occurs during the summer, and the flowers open during the day, and close during the night. Water lilies typically inhabit quiet water less than two meters deep, such as ponds, shallow lakes and slow-moving streams. The leaves offer shade and protection for fish, and the leaves, stems, and flowers are grazed upon by muskrats, beaver, and sometimes even deer. One subspecies of white water lily (*Nymphaea odorata ssp. tuberosa*) that occurs in New Jersey is listed as a plant species of concern. It carries a state rank of S2 (imperiled with only 6 to 20 occurrences), and is protected by the Highlands Water Protection and Planning Act.

Spatterdock (*Nuphar variegata*. Common Name: yellow pond lily, bullhead pond lily, spatterdock. **Native.**): Yellow water lily leaf stalks emerge directly from a submerged fleshy rhizome. Yellow water lilies have heart-shaped leaves with a prominent notch. Flowering occurs in the summer and, the flowers open during the day and close at night. Water lilies typically inhabit quiet water less than two meters deep, such as ponds, shallow lakes and slow-moving streams. The leaves offer shade and protection for fish, and the leaves, stems, and flowers are grazed upon by muskrats, beaver, and sometimes, even deer.

Watershield (*Brasenia schreberi*. Common Names: common water shield, water target. **Native**.): Watershield is a floating-leaf aquatic plant similar to water lilies. Its stem and leaves are elastic, and are attached to a rooted rhizome that acts as an anchor and source of stored nutrients. The leaf stalks are attached to the middle of the leaf, creating a bull's eye effect, hence its name water target. The leaves are green on the upper surface, and purple underneath. Maroon to purple flowers peak above the water's surface on short, stout stalks. Watershield is usually coated with a clear gelatinous slime on the stem and underside of the leaves. Watershield prefers soft-water lakes and ponds in sediments containing decomposing organic matter. The whole plant is consumed by waterfowl, and the floating leaves provide shade and cover for fish.

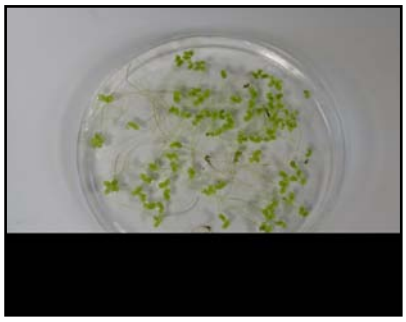
Muskgrass (*Chara* sp. Common Names: muskgrass, stonewort, chara. **Native**.): Chara is actually a multi-branched algae that appears as a higher plant. It is simple in structure and has rhizoids instead of true roots. The branches of chara have ridges that are often encrusted with calcium carbonate. This grants the entire plant a "crusty" feel and appearance. The side branches develop in whorls that look like the spoke in a wheel. Chara is easily identified by a pungent, skunky odor. It prefers softer sediments, and can often be found in deeper water than other plants. As such, it's considered an early pioneer, the first species to colonize a disturbed lakebed.

Benthic and Floating Filamentous Algae: Filamentous algae is a chain or series of similar algae cells arranged in an end to end manner. Benthic filamentous algae is attached to a hard substrate, such as logs, rocks, a lake bottom, or even other aquatic plants. When growing in heavy densities, benthic filamentous algae can appear as brown or green mats of vegetation that can reach the surface. When large pieces break off the bottom substrate they become floating filamentous algae patches. Benthic filamentous algae can comprise an entire range of morphologies, but flagellated taxa are far less common.

Robbins Pondweed (*Potamogeton robbinsii*. Common Name: Fern Pondweed. **Native**.). Robbins pondweed has robust stems that emerge from spreading rhizomes. The leaves are strongly ranked creating a fern-like appearance most clearly seen while still submerged. Its distinct closely-spaced fern-like leaves give it a unique appearance among the pondweeds of our region. Each leaf is firm and linear, with a base that wraps around the stem. At the stem it has ear-like lobes fused with a fibrous stipule. No floating leaves are produced. Robbins pondweed thrives in deeper water, and under some circumstances, it can over winter green. Robbins pondweed creates suitable invertebrate habitat, and cover for lie-in-wait predaceous fish, such as pickerel and pike. Robbin's pondweed is listed as Endangered in New Jersey. It carries a state rank of S2 (imperiled with only 6 to 20 occurrences) and is protected by the Highlands Water Protection and Planning Act, and the Pinelands Commission.

Low Milfoil (*Myriophyllum humile*. Common Name: Lowly water milfoil. **Native**.). Low milfoil is a submersed perennial with delicate stems usually less than one meter long. From these stems are mainly alternate short stalks, with 4 to 8 pairs of capillary-divided leaves. The minute fruit are round-backed and smooth, a distinguishing characteristic of this milfoil. Flowers are produced in axils of submersed and emerged leaves. Low milfoil inhabits shallow ponds and streams, preferring muddy banks after water recedes. The entire low milfoil plant is considered a low grade duck food, and beds of low milfoil provide cover and suitable habitat for small fish and aquatic invertebrates.

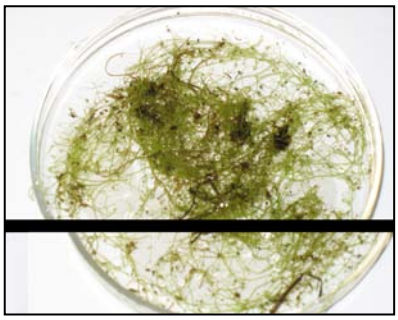
Small Duckweed (*Lemna minor*. Common Names: Small duckweed, water lentil, lesser duckweed. **Native.**). Small duckweed is a free floating plant, with round to oval-shaped leaf bodies typically referred to as fronds. The fronds are small (typically less than 0.5 cm in diameter), and it can occur in large densities that can create a dense mat on the water's surface. Each frond contains three faint nerves, a single root (a characteristic used to distinguish it from other duckweeds), and no stem. Although it can produce flowers, it usually reproduces via budding at a tremendous rate. Its population can double in three to five days. Since it is free floating, it drifts with the wind or water current, and is often found intermixed with other duckweeds. Since it's not attached to the sediment, it derives nutrients directly from the water, and is often associated with eutrophic conditions. It over winters by producing turions late in the season. Small duckweed is extremely nutritious and can provide up to 90% of the dietary needs for waterfowl. It's also consumed by muskrat, beaver and fish, and dense mats of duckweed can actually inhibit mosquito breeding.



Bass Weed (*Potamogeton amplifolius*. Common Names: Large-leaf Pondweed, Bass Weed, Musky Weed. **Native.**): Bass weed has robust stems that originate from black-scaled rhizomes. The submersed leaves of bass weed are among the broadest in the region. The submersed leaves are arched and slightly folded, attached to stems via stalks, and possess many (25-37 veins). Floating leaves are produced on long stalks (8-30 cm). Stipules are large, free and taper to a sharp point. Flowers, and later in the season fruit are densely packed onto a spike. Bass weed prefers soft sediments in water one to 4 meters deep. This plant is sensitive to increased turbidity and also has difficulty recovering from top-cutting, from such devices as boat propellers and aquatic plant harvesters. As its name implies the broad leaves of this submersed plant provides abundant shade, shelter and foraging opportunities for fish. The high number of nutlets produced per plant makes it an excellent waterfowl food source.

Water Primrose (*Ludwigia* sp. Common Name: Red ludwigia, water primrose. **Native.**): Ludwigia is a perennial plant that often grows along lake shorelines or in moist habitats. There is also a submersed form with only the tips exposed. Ludwigia usually is less than 50 cm in total length and has opposite elliptical leaves. It often takes on a reddish to purple hue, and has small green to red flowers. It commonly occurs in shallow waters, such as ditches, ponds streams and freshwater marshes. Submersed ludwigia offers some habitat for juvenile fish and

aquatic invertebrates, but its leaves and fruit provides little nutritional value for grazing waterfowl.



Creeping Bladderwort (*Utricularia gibba*. Common Names: creeping bladderwort, humped bladderwort, cone-spur bladderwort. **Native**.). Creeping bladderwort is a small (usually less than 10 cm long), delicate, free-floating stem. It often forms tangled mats in quiet shallow waters, often associated with bogs, or stranded on soil. It is sometimes mistaken for algae. It has short side braches that fork once or twice, a defining characteristic. Small bladders, used to capture live prey, are situated on these side branches. Small yellow snap-dragon-like flowers are produce on a short stalk. Mats of creeping bladderwort offer limited cover and foraging opportunities for fish.

Curly-leaf Pondweed (*Potamogeton crispus*. Common Name: curly-leaf pondweed. **Invasive.**): Curly-leaf pondweed has spaghetti-like stems that often reach the surface by mid-June. Its submersed leaves are oblong, and attached directly to the stem in an alternate pattern. The margins of the leaves are wavy and finely serrated, hence its name. No floating leaves are produced. Curly-leaf pondweed can tolerate turbid water conditions better than most other macrophytes. In late summer, Curly-leaf pondweed enters its summer dormancy stage. It naturally dies off (often creating a sudden loss of habitat and releasing nutrients into the water to fuel algae growth) and produces vegetative buds called turions. These turions germinate when the water gets cooler in the autumn and give way to a winter growth form that allows it to thrive under ice and snow cover, providing habitat for fish and invertebrates.

Slender Riccia (*Riccia fluitans*. Common Names: Riccia. **Native**.): Slender riccia is a rootless liverwort with forked stems often intertwined like a jigsaw puzzle. Closer examination of the flattened thallus (the forked stem-like body), it appears to be a miniature set of antlers. Since it is rootless, it moves about its habitat based wind and/or water movement much like duckweed. Thus it is not dependant on sediment depth or type, although it requires high water nutrients to sustain its growth. Slender riccia is a non-flowering plant that reproduces via spores. Although it is consumed by waterfowl, it's probably just a byproduct of grazing as the waterfowl target duckweed species intermingled with it. The floating "footloose liverwort" does provide shade and shelter opportunities for fish.

Variable-leaf Pondweed (*Potamogeton diversifolius*. Common Names: Water-thread pondweed, variable-leaf pondweed, snailseed pondweed. **Native**.): Variable-leaf pondweed has freely-branched stems emerging from slender rhizomes. The submersed leaves are narrow and linear with one obvious midvein bordered by a row of hollow cells. The floating leaves are shaped like an ellipse, but are usually less than 4 cm long, Variable-leaf pondweed fruit spikes are produced in two distinct forms. It occurs in lakes, ponds, rivers and streams and prefers soft sediment and water less than 2 meters deep. Waterfowl graze on the fruit, and local fauna often graze on the stems and leaves.

Creeping Water Primrose (*Ludwigia peploides*). Common names: Floating water willow, floating primrose willow. **Invasive.** Creeping water primrose is native to South America, but has become introduced to many locations in the Northeast. The leaves are alternate can vary in shape from long and thin to round or egg-shape. They are dark green with a lighter green midrib. It has fleshy stems that can be emergent on mud flats, or a floating form. Bright yellow flowers with five petals are produced. Its creeping stems and hardy nature classifies it as an aggressive spreader. It typically occurs in slow moving streams, canals, and along the margins of marshes and lakes.

Stonewort (*Nitella* sp. Common Names: stonewort, nitella. **Native**.): Stonewort is actually a multi-branched algae that appears as a higher plant. It lacks conductive tissue and roots, using simple anchoring structures called rhizoids. Stem lengths can reach 0.5 meters, and leaves are arranged in whorls. Although similar in appearance to muskgrass, stonewort has smooth stems and branches, and lacks the distinct musky odor. Nitella inhabits soft sediments in the deeper water of lakes. It can be found as deep as 10 meters. Fish and waterfowl graze on Stonewort.

Water Moss (*Fontinalis* sp. Common Name: water moss. **Native**.): Water mosses are submerged mosses that are attached to rocks, trees, logs, and other hard substrates by false rootlets located at the base of their stems. The stems are dark-green to brown, and about one foot long. The leaves share a similar color as the stems, and are usually ovate with fine-toothed margins. Water moss is utilized by aquatic invertebrates, and as a breeding site for small fish. Water moss rarely reaches nuisance levels.

Brittle Naiad (*Najas minor*. Common Names: brittle water nymph, European naiad. **Exotic, Invasive**): Brittle naiad is a submersed annual that flowers in August to October. It resembles other naiads, except its leaves are highly toothed with 6-15 spinules on each side of the leaf, visible without the aid of magnification. The leaves are opposite, simple, thread-like, and usually lime-green in color, often with a "brittle" feel to them. Brittle naiad fruit are narrow, slightly curved, and marked with 10-18 longitudinal ribs, resembling a ladder. Brittle Naiad has been introduced from Europe in the early 1900's, and can be found in most of the northeastern states. Brittle naiad prefers sandy and gravel substrates, but can tolerate a wide range of bottom types. It's tolerant of turbid and eutrophic conditions. Waterfowl graze on the fruit.

Small Pondweed (*Potamogeton pusillus*. Common Name: Small Pondweed. **Native**.): Small pondweed has slender stems and a slight rhizome that branches repeatedly near the ends. Only submersed leaves are produced, and these are linear, attaching directly to the stem of the plant. The leaves have three veins and the mid-vein is usually bordered by several rows of lacunar (hollow) cells. There is usually a pair of raised glands at the base of the leaf attachment. Membranous stipules are wrapped around the stem in early growth, but as the plant ages, these tend to break down and becoming shredded in appearance and free. Flowers and fruits are produced in 1 to 4 whorls on a slender stalk. The fruit is plump with a smooth back and a short hooked beak. Small pondweed can tolerate turbid environments and inhabits shallow zones to a depth of 3 meters. Small pondweed is grazed upon by waterfowl, muskrat, deer, beaver, and even moose. Locally, it can be a very important link in the ecological balance of a lake system. It also provides suitable grazing opportunities and cover for numerous fish.

2015 Aquatic Macrophyte Management

Birchwood Lake

Date	Product Applied	Acres Treated	Target Species
5/28/15	Clipper	0.5	Pondweeds/lilies

At Birchwood Lake in 2015, one herbicide application was conducted in the basin. The application occurred in the early season (May 28th) targeting nuisance water lilies (white lilies, spatterdock and watershield) and assorted pondweeds in 0.5 acres. We also targeted curly-leaf pondweed among the other pondweeds, and this was the first occurrence of this invasive pondweed in this basin. The target area was in and around the swim lanes and the product was applied via a backpack sprayer. For the third consecutive year, we utilized Clipper (a.i. Flumioxazin), which has once again provided suitable control of target plants throughout the season. It has been several years since the water lilies in the northern reach of this basin have been treated. It is expected that limited water lily treatment will be needed at Birchwood Lake in 2016.

Crystal Lake

Date	Product Applied	Acres Treated	Target Species
4/29/15	Copper Sulfate	3.0	Filamentous Algae
5/19/15	Copper Sulfate	2.0	Filamentous Algae
5/28/15	Sonar AS	20.4	Pondweeds
7/8/15	Copper Sulfate	1.15	Filamentous Algae
9/11/15	Copper Sulfate	2.3	Filamentous Algae

At Crystal Lake in 2015, four algaecide applications were required, and one herbicide application was required to control nuisance pondweed growth. Copper sulfate was the algaecide product of choice and provided suitable control of filamentous algae control throughout this year. Two early algaecide applications (late April and late May) were required in addition to two later season (early July and early September) treatments. However, all algaecide applications were considered partial treatments targeting nuisance beds of algae. These applications ranged from 1.15 acres to 3.0 acres, for a total of 8.45 acres, still less than half the total surface acres of the basin. One herbicide application was also required this season. In late May, a liquid form of Sonar (a.i. Fluridone) was applied to target various pondweed growth, including bassweed, curly-leaf pondweed and small pondweed. This shoreline pondweed growth was quite rampant in late 2014, thus we altered our management strategy to include the aggressive systemic Sonar.

Sunset Lake

Date	Product Applied	Acres Treated	Target Species
7/21/15	Copper Sulfate	7.8	Unicellular Algae
8/13/15	AquaNeat	1.0	Water Lilies

Sunset Lake was hydro-raked in mid-April (see discussion, below). At Sunset Lake in 2015, one herbicide application (limited to 1.0 surface acre) was required to touch-up nuisance water lily growth scattered about the open water. This limited scope application was expected since aggressive water lily control has not been conducted in this basin since 2013. In 2016, a more aggressive water lily treatment program might be required. Also this year, a single algaecide application was required targeting unicellular algae in the open water. The water sample collected (by the outlet) the day before the treatment revealed low unicellular phytoplankton, but an on the water survey revealed the unicellular growth in the open water, in addition to scattered patches of filamentous algae.

Olive Lake

Date	Product Applied	Acres Treated	Target Species
4/22/15	Copper Sulfate	0.4	Filamentous Algae
7/17/15	Copper Sulfate	0.2	Unicellular Algae
9/3/15	Copper Sulfate	0.5	Filamentous Algae

At Olive Lake, no herbicide applications and three algaecide application was required in 2015. The lake did not support nuisance vascular aquatic plant growth this season, hence the lack of herbicide use in this basin. A small patch of water lilies has taken root in this pond and should be encouraged. In late April, 0.4 acres were treated with copper sulfate to target filamentous algae. On July 17th, 0.2 acres were treated with copper sulfate targeting unicellular algae. And on September 3rd, 0.5 acres were treated with copper sulfate targeting filamentous algae. On one date in 2015 the dissolved oxygen was too low to apply an algaecide that was needed, and on July 17th, the application rate was reduced (to 0.2 acres) due to low dissolved oxygen.

Shadow Lake

Date	Product Applied	Acres Treated	Target Species
7/2/15	Clipper	0.125	Duckweed
7/17/15	Copper Sulfate	1.3	Unicellular Algae

In previous seasons, this basin often required numerous algaecide applications to control nuisance algae growth. In 2015, Shadow Lake required one algaecide application to maintain suitable conditions. In mid-July, a copper sulfate application was conducted to control 1.3 acres of unicellular algae. In early July, an algaecide application was needed, but was not conducted due to low dissolved oxygen readings in the basin. Also in 2015, a single herbicide application was conducted targeting a one foot wide strip of duckweed accumulating along some of the shorelines. The results of this treatment were questionable at best, since duckweed was observed at similar abundance the remainder of the season.

On September 3rd, the aeration compressor was serviced by ABI. This included servicing the vanes, gaskets and the air filter. The technician observed that the air stones need to be replaced in 2016.

Cove Lake

Date	Product Applied	Acres Treated	Target Species
No Treatments in 2015	NA	NA	NA

At Cove Lake in 2015, no algaecide or herbicide applications were required to maintain suitable conditions. This is similar to previous seasons. On July 2nd, an on-the-water survey was conducted to confirm our shoreline observations. The survey revealed murky water (clarity 2.0 feet) with trace scattered floating filamentous algae, along with trace duckweed and watermeal. A patch of spatterdock was also observed along the western shoreline. Although dissolved oxygen was depressed on a few dates in 2015 (see discussion, below), no algaecide or herbicide applications were prevented this year.

Grunden's Pond

Date	Product Applied	Acres Treated	Target Species
5/13/15	Reward	1.3	Curly-leaf Pondweed
	Copper Sulfate	1.3	Filamentous Algae
7/2/15	Clipper	0.125	Duckweed
7/30/15	Copper Sulfate	1.3	Filamentous Algae
8/19/15	Diquat SPC 2L	1.0	Pondweeds
	Copper Sulfate	0.5	Filamentous Algae
9/3/15	AquaNeat	0.1	*Ludwigia* sp.
	Copper Sulfate	0.5	Filamentous Algae

At Grunden's Pond, four algaecide and four herbicide applications were performed in 2015. The first herbicide application utilized Reward to target 1.3 acres of curly-leaf pondweed in the early season, which is typical for this basin. The second herbicide application utilized Clipper to target 0.125 acres of duckweed growth. Again, the expected results of this application were questionable due to the fact that duckweed continued to be observed on most survey dates the remainder of the year. In August, 1.0 acre was treated with Diquat SPC 2L targeting sparse to moderate pondweed growth at the western end of the basin. The final herbicide application targeted 0.1 acres of water primrose along the northern shoreline. Four algaecide applications were required this season, all utilizing copper sulfate to target nuisance growth of filamentous algae. Early season applications targeted 1.3 acres each date, while the two late season applications targeted 0.5 acres each.

Mountain Lake

Date	Product Applied	Acres Treated	Target Species
5/4/15	Copper Sulfate	7.5	Filamentous Algae
5/22/15	Reward	10.0	Curly-leaf Pondweed
	Copper Sulfate	10.0	Filamentous Algae

7/1/15	Reward	1.5	Naiad sp.
	Copper Sulfate	2.05	Filamentous Algae
7/22/15	Reward	12.8	Naiad sp.
	Copper Sulfate	5.0	Filamentous Algae

At Mountain Lake, three herbicide applications again were needed in 2015. The benefits of the 2012 Sonar application were again observed in 2015, as only limited acres of applications were needed to control nuisance growth of SAV. Therefore, we decided not to use Sonar to treat the whole basin this season. In 2015, only 24.3 acres of SAV required treatment as compared to 31.0 acres in 2014, 48.3 acres in 2013 and 159.2 acres in 2012. All herbicide applications this year utilized Reward. An early season application targeting 10 acres of curly-leaf pondweed was conducted and on this date, no Eurasian water milfoil was observed. In early July, a limited application of Reward was conducted targeting 1.5 acres of naiad growth restricted to the southern coves. In late July, a second Reward application was needed to target nuisance naiad growth in 12.8 acres, mostly in the northern part of the basin. Four algaecide applications were required at Mountain Lake in 2015. All of these were limited acreage, ranging from 2.05 acres to 10.0 acres in size, and all targeted beds of filamentous algae. Three of them occurred while targeting aquatic plants, but an early season application targeting 7.5 acres of algae growth was also required. Water clarity (see discussion, below) was excellent throughout the entire season in this basin, although it did experience a dip later in the season. Sonar use in this basin in 2016 should be planned for, after confirming Eurasian water milfoil abundance and distribution following early season surveys.

Wildwood Lake

Date	Product Applied	Acres Treated	Target Species
5/5/15	Alum	15.7	Nutrient Inactivation
5/7/15	Copper Sulfate	1.5	Filamentous Algae
5/28/15	Reward	7.85	Leafy Pondweed
	Copper Sulfate	7.85	Filamentous Algae
7/1/15	Copper Sulfate	7.85	Filamentous Algae
7/8/15	Reward	4.0	Naiad sp.
	Copper Sulfate	7.85	Unicellular Algae
7/28/15	Reward	7.85	Naiad sp.
	Copper Sulfate	7.85	Unicellular Algae
8/12/15	Alum	15.7	Nutrient Inactivation
9/3/15	Reward	4.0	Naiad Sp.
	Copper Sulfate	4.0	Filamentous Algae

In 2014, 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. This year required six algaecide applications, four herbicide applications and two Alum applications. Reward was applied in late-May for the control of 7.85 acres of leafy pondweed growth. In mid-July, 4.0 acres of naiad

growth were targeted with Reward. Two more applications were required for naiad growth: 7.85 acres in late July and 4.0 acres of naiad growth in early September.

Filamentous algae was targeted on four dates in 2015, with unicellular algae being the targeted on two dates. All algaecide applications utilized copper sulfate in 2015. Filamentous applications were conducted on May 7, May 28, July 1, and September 3. The unicellular applications were conducted on July 8 and July 28.

A typical lake management practice has been the use of Alum early in the season and late in the season at Wildwood Lake. The early season application is typically conducted in April, but this year was slightly delayed until May 5th. The late season Alum application was conducted on August 12th.

Water Quality Monitoring Program

In 2015, 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 4, July 13, and August 10. 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 2015, and a primer on phytoplankton. Following these descriptions are brief summaries of the 2015 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 2015.

Temperature

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

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

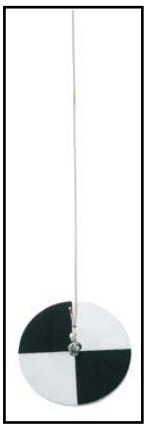
Dissolved Oxygen

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

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

Water Clarity

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



Alkalinity

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

pH

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

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

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

Nitrate

Nitrates are chemical compounds derived from nitrogen and oxygen. Nitrogen is needed by all plants and animals to make proteins needed for growth and reproduction. Nitrates are generated during plant and animal decomposition, from man-made sources, and from livestock and waterfowl sources. Man-made sources of nitrates include septic system leaching, fertilizer runoff, and improperly treated wastewater. Freshwater lake systems can potentially receive large nitrate inputs from waterfowl, specifically large flocks of Canada geese. An increase in nitrate levels can in turn cause an increase in total Phosphorus levels. A nitrate level greater than 0.3 mg/L can promote excessive growth of aquatic plants and algae.

Total Phosphorus

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

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

Turbidity

Turbidity is the measurement of lack of water clarity, and is measured in NTU. Suspended solids in the water column cause an increase in turbidity. Therefore, the lower the turbidity measurement, the clearer the water is. The leading sources of turbidity include soil erosion, waste discharge, urban runoff, flooding, dredging operations, increased flow rates, or algae blooms. An overabundance of bottom feeding fish, such as

carp, can also increase turbidity due to constant grazing and disturbing of fine bottom sediments. A turbidity of 25 NTU or less is desirable for a lake. Ideal trout waters have a turbidity of 10 NTU or less, but most aquatic biota can be sustained in water with a turbidity of 50 NTU or less. Although a turbidity level of 5.0 NTU or greater is generally considered visible to the observer, there is some industry discussion on value of turbidity measurements in relation to aesthetics

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

A Phytoplankton Primer

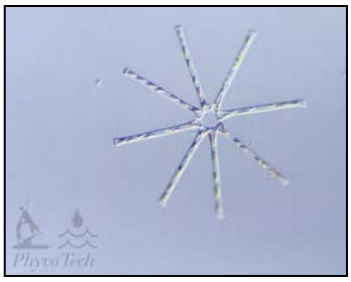
Lakes typically contain three broad categories of phytoplankton (also sometimes referred to as algae). These include filamentous phytoplankton, macroscopic multi-branched phytoplankton (which appear similar to submersed plants), and unicellular phytoplankton. Each category shall be discussed in turn, although the results of the 2013 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.

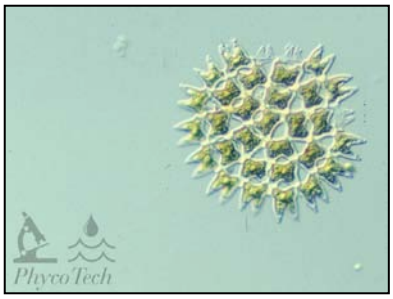
Unicellular phytoplankton are typically microscopic, and consist of individual cells or colonies of cells suspended in the water column. At high enough densities (often called a bloom), they can impart a green or brown (and sometimes, even red) tint to the water column. Unicellular phytoplankton belongs 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*.

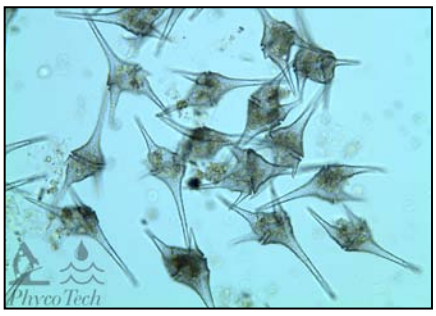


Green Algae are a very diverse group of unicellular phytoplankton. There is tremendous variability in this group which varies from family to family and sometimes even genus to genus. There are flagellated single cells,

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*.

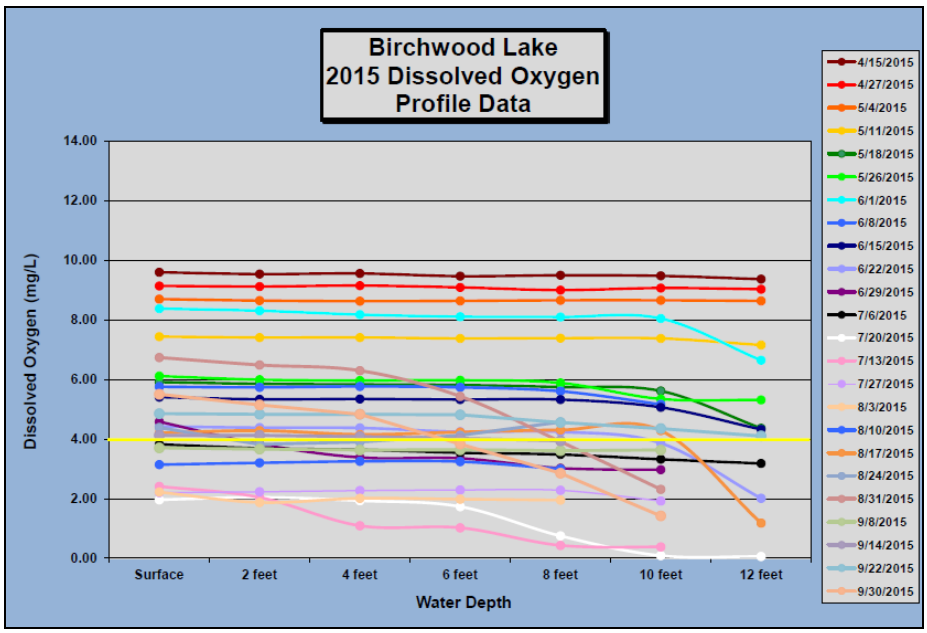
2015 Water Quality Results for Mountain Lakes

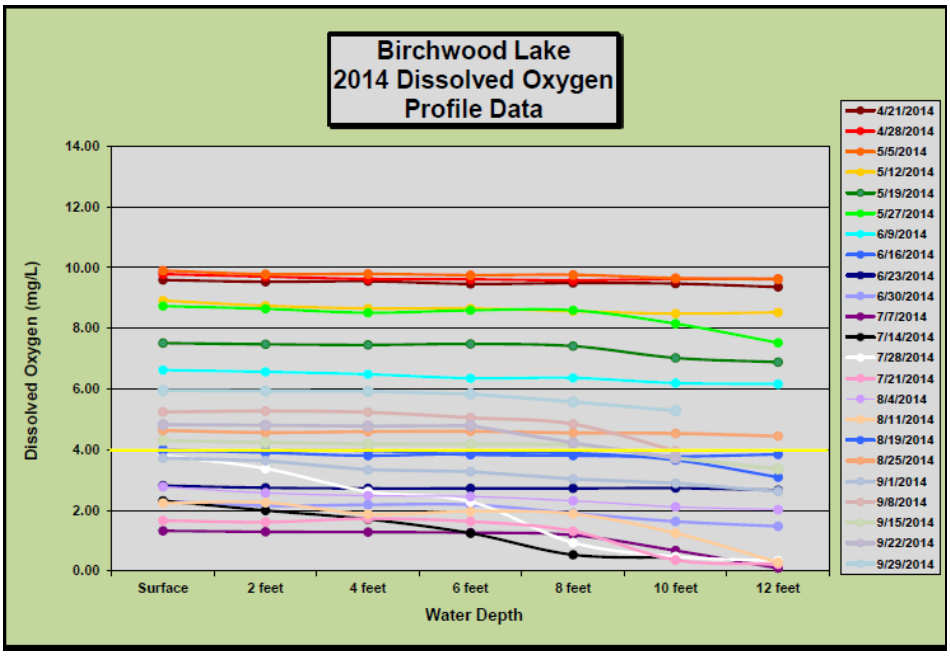
Birchwood Lake

Birchwood Lake	units	6/4/15	7/13/15	8/10/15
Temperature	ºC	19.40	25.17	24.3
Dissolved Oxygen	mg/L	5.46	**2.41**	**3.14**
Alkalinity	mg/L	36	45	52
pH	SU	6.5	6.5	6.5
Nitrate	mg/L	<0.2	<0.2	<0.2
Total Phosphorus	mg/L	0.03	0.03	0.02
Turbidity	NTU	<1.0	1.1	1.2
Water Clarity	feet	10.0	6.5	6.0

In 2015, water temperature readings were seasonally appropriate in Birchwood Lake, ranging from 19.4°C in June to 25.17 °C in July, and finally 24.3 °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. One of the units was not functioning late in the season and required repair. On November 13th, the unit was inspected and it was discovered a snake entered the motor housing and caused damage that required replacement. A new unit has since been ordered and will be installed prior to the 2016 field season. Also on that date, ABI conducted routine compressor maintenance training for the DPW staff.

On the next page is a graph depicting all of the dissolved oxygen profiles conducted at Birchwood Lake in 2015, followed by graphs of the 2008 through 2014 profile data. The 2015 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). Still, the depressed oxygen values have been puzzling to us for several years, and it is possible an aeration specialist needs to be consulted to get to the bottom of this issue.




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
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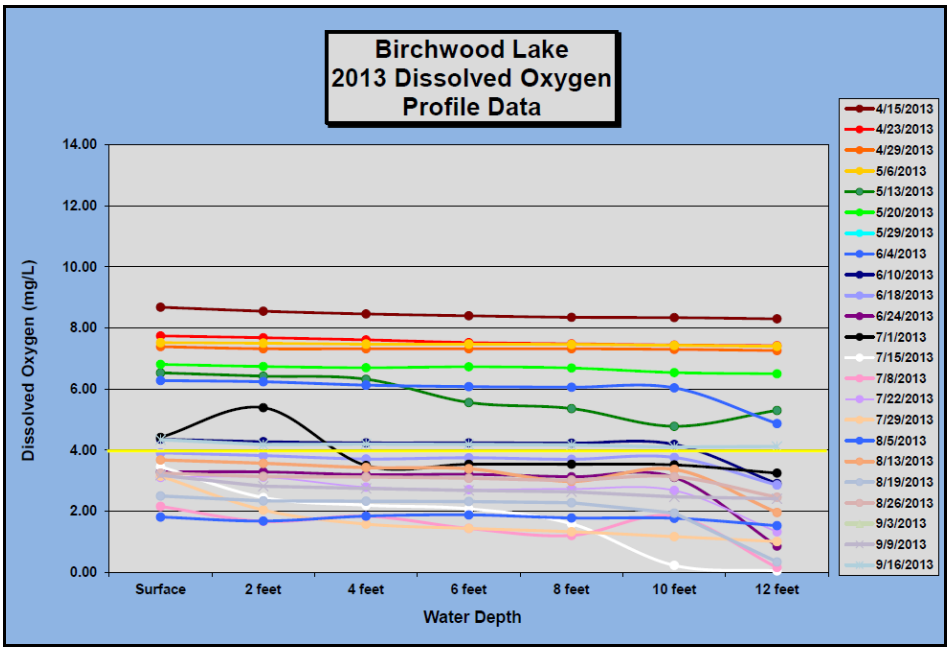
9/15/2014
9/22/2014
9/29/2014


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
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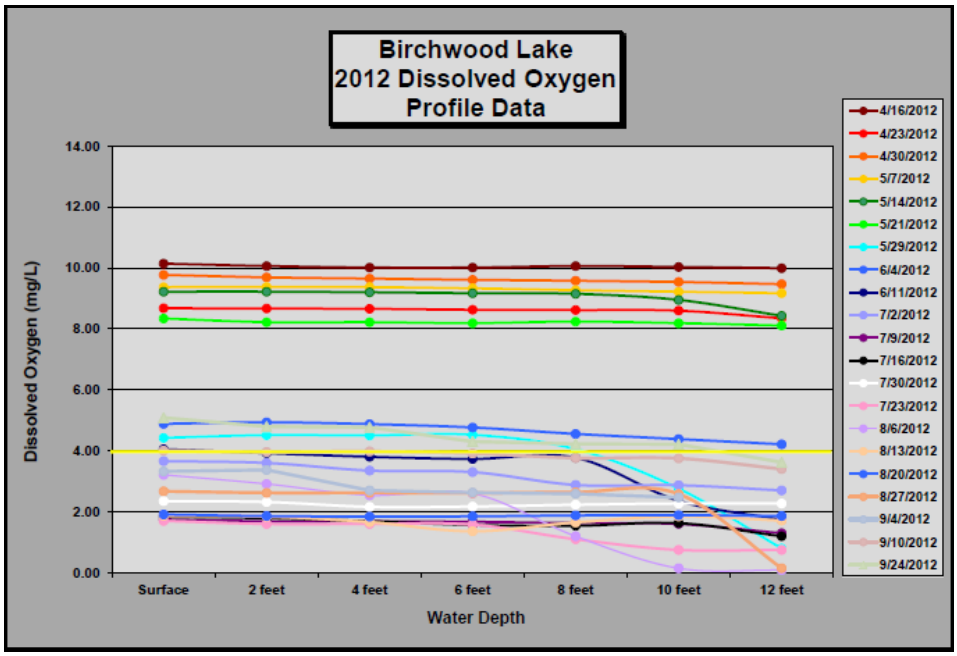
9/9/2013
9/16/2013


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
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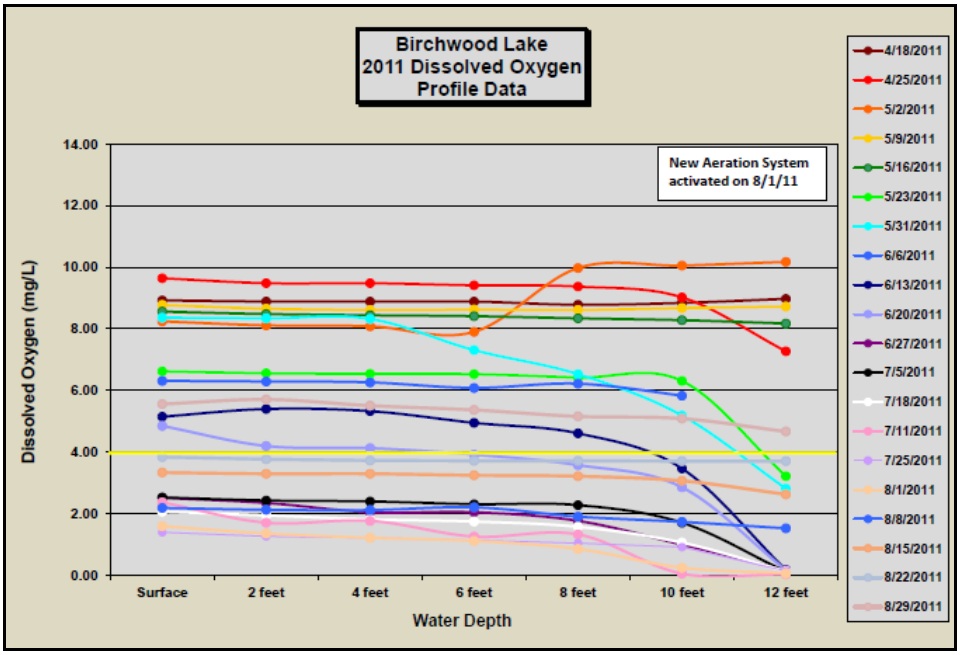
9/10/2012
9/24/2012


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
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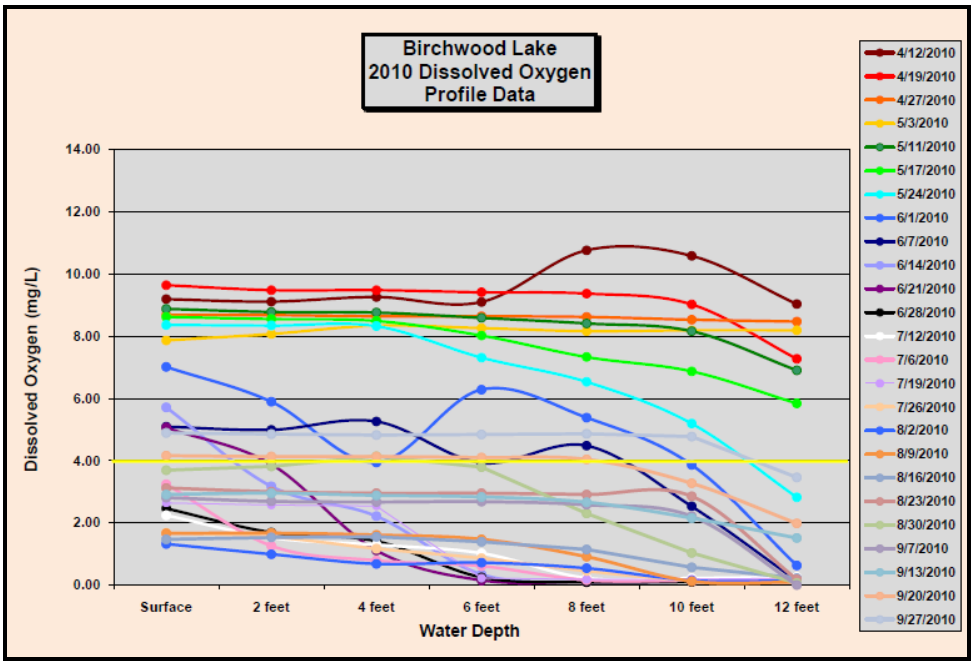
8/22/2011
8/29/2011


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
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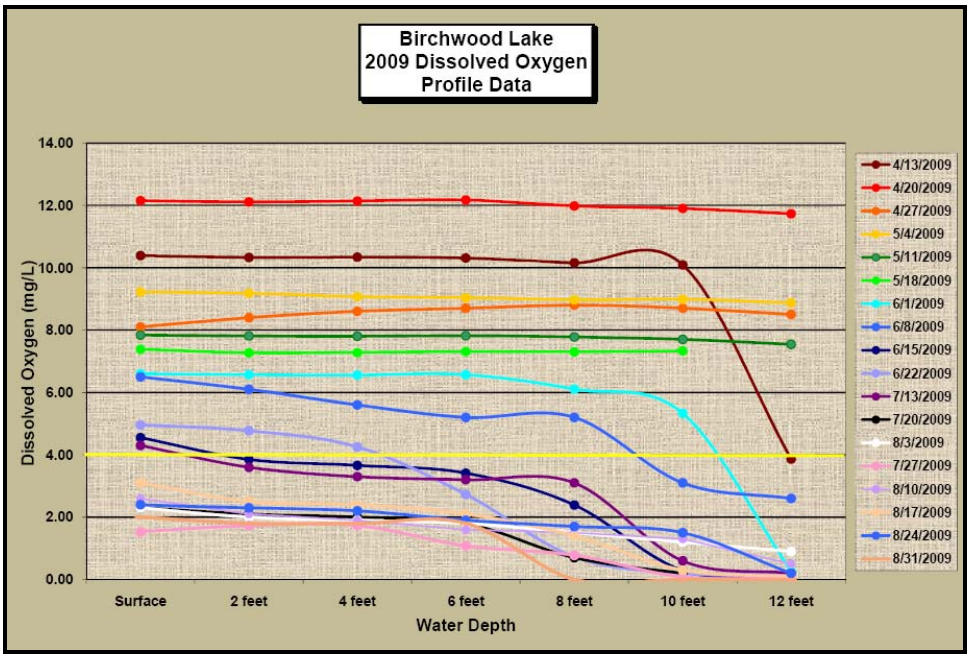
9/20/2010
9/27/2010


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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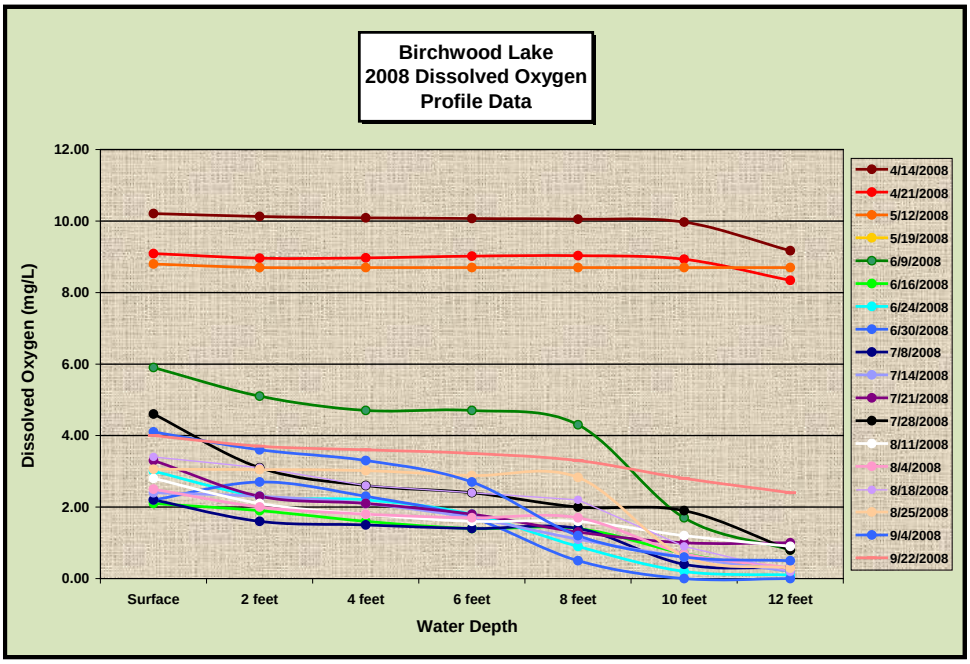
8/24/2009
8/31/2009



The alkalinity of Birchwood Lake continues to be the lowest in the Mountain Lakes chain. In 2015, it ranged from 36 mg/L to 52 mg/L, a slight increase when compared to historic measurements in this basin. The annual average alkalinity was calculated at 44.3 mg/L, slightly higher than the 2014 annual average. Birchwood Lake also traditionally has the lowest pH (slightly acidic) of all the Mountain Lakes. In 2015, the pH was 6.50 on all dates. This is suitable when compared to historical pH values in this basin. Nitrate levels were undetected throughout the three sampling events in 2015, continuing an eight year trend in this basin. The total phosphorus in Birchwood Lake was suitable on all dates, at 0.03 mg/L, in June and July, and then slightly decreasing to 0.02 mg/L in August. The turbidity of Birchwood Lake was consistent all season long, ranging from undetected in June to 1.20 NTU in August, well within acceptable values, and slightly lower than 2014 values. Water clarity ranged from 6.0 feet to 10.0 feet, which is actually better than data collected on similar dates in 2014.

Birchwood Lake	6/4/15	6/22/15	7/6/15	7/20/15	8/3/15	8/17/15
Diatoms	**36.3%**	37.5%		16.7%		
Golden Algae	27.2%	8.3%			3.4%	
Green Algae	9.1%	**54.2%**	**92.3%**	**83.3%**	**96.6%**	**100.0%**
Blue-green Algae			7.7%			
Protozoa						
Euglenoids	9.1%					
Dinoflagellates	18.1%					
Total Phytoplankton	110	240	130	120	290	130

In 2015, phytoplankton assemblages at Birchwood Lake were light and favorable on all four sampling dates. On these four dates, total phytoplankton abundance was less than 290 organisms per mL, typically with green algae dominating (54.2% to 100.0%) on most dates. In early June, diatoms dominated the assemblage, while trace nuisance blue-green

algae (accounting for 7.7% of the total phytoplankton) were observed in July. However, these blue-green algae counts were considered non-problematic at this time and on no other dates in 2015 were blue-green algae observed at this site. From July through August, green algae accounted for greater than 83% of the total phytoplankton with diatoms only observed on one date. This could indicate a shift in phytoplankton community as compared to previous seasons, where diatoms and golden algae tended to dominate.

Crystal Lake

Crystal Lake	units	6/4/15	7/13/15	8/10/15
Temperature	ºC	20.0	27.43	26.5
Dissolved Oxygen	mg/L	7.71	8.73	7.16
Alkalinity	mg/L	40	45	45
pH	SU	7.0	7.5	7.5
Nitrate	mg/L	<0.2	<0.2	<0.2
Total Phosphorus	mg/L	0.03	0.02	0.02
Turbidity	NTU	<1.0	<1.0	1.6
Water Clarity	feet	8.0 est.	7.0 est.	8.0 est.

In 2015, surface water temperature and dissolved oxygen values all fell within acceptable seasonal ranges. Dissolved oxygen values were suitable on all three dates this season, ranging from 7.16 mg/L to 8.73 mg/L. Alkalinity ranged from 40 mg/L to 45 mg/L, which is typical for this basin and similar to last season. The tight range (5.0 mg/L over all three dates) continues to be outstanding. The pH of Crystal Lake ranged from 7.0 (in June) to 7.50 in July and August. This is suitable to previous year's measurements. Water clarity was considered moderate to excellent throughout much of the season this year. It was estimated on all dates. In June it was 8.0 feet, which is very good for early in the summer. In July, it was estimated at 7.0 feet, which is still suitable for mid-season. In August, it increased back up to 8.0 feet. Nitrate was undetected on all three sampling dates at Crystal Lake in 2015, similar to the previous five years. Total phosphorus was suitable on all dates in 2015, ranging from 0.02 mg/L on two dates and 0.03 mg/L on one date (June). Turbidity values were less than data collected in 2014. This year, turbidity was undetected in June and July, and peaked at only 1.6 NTU in August.

Crystal Lake	6/4/15	6/22/15	7/6/15	7/20/15	8/3/15	8/17/15
Diatoms		3.6%		40.0%	8.6%	**43.8%**
Golden Algae		7.1%	12.5%		5.7%	25.0%
Green Algae	**93.3%**	**89.3%**	**87.5%**	**60.0%**	**85.7%**	31.2%
Blue-green Algae						
Protozoa						
Euglenoids						
Dinoflagellates	6.7%					
Total Phytoplankton	150	280	80	250	350	160

In 2015, phytoplankton abundance at Crystal Lake was considered light and favorable on all six sampling dates, an improvement as compared to 2013 and 2014. This year, phytoplankton abundance ranged from 80 organisms per mL to 350 organisms per mL. On most dates overall phytoplankton abundance was less than 200 organisms per mL. On five of the sampling dates, green algae were the dominant group observed, ranging from 60.0% to 93.3%. In late August, diatoms dominated the assemblage at 43.8%, which is

somewhat unusual for a late summer phytoplankton community. Golden algae were observed on four dates, although blue-green algae were not observed on any dates. In the past this basin often hosted a late season blue-green algae bloom that required treatment. Trace dinoflagellates were observed in early June only.

Sunset Lake

Sunset Lake	units	6/4/15	7/13/15	8/10/15
Temperature	ºC	20.4	25.61	27.1
Dissolved Oxygen	mg/L	8.04	7.88	8.22
Alkalinity	mg/L	40	42	40
pH	SU	7.0	7.0	7.5
Nitrate	mg/L	<0.2	<0.2	<0.2
Total Phosphorus	mg/L	0.03	0.03	0.03
Turbidity	NTU	1.5	1.3	2.5
Water Clarity	feet	10.0 est.	5.0 est.	4.5 est.

In 2015, 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 7.88 mg/L to 8.22 mg/L and very little variation between dates. Alkalinity results in 2015 ranged from 40 mg/L (in June and August) to 42 mg/L (in July), with a very tight (2.0 mg/L range). The 2015 average Alkalinity was calculated at 40.6 mg/L, which is slightly higher than the previous season average, but suitable when compared to data collected in 2009 through 2011. In 2015, the pH ranged from 7.0 (in June and July) to 7.5 in August. These values are suitable, and similar to data collected in previous seasons. Nitrate was again undetected on all three sampling dates in 2015, a similar trend observed the last several seasons in this basin. Total phosphorus was consistent on all three dates, measured at 0.03 mg/L, which is right at the threshold to promote nuisance aquatic plant or phytoplankton growth. This is similar to results obtained in the previous season. Turbidity levels in 2015 were less than last year, and returned to more typical values. Turbidity was 1.5 NTU in June, decreased slightly to 1.3 NTU in July and then increased to 2.5 NTU in August. In 2014, the annual average turbidity was 4.1 NTU, while this year the annual average turbidity was 1.8 NTU.

Sunset Lake	6/4/15	6/22/15	7/6/15	7/20/15	8/3/15	8/17/15
Diatoms		**71.4%**	13.3%	22.2%	28.6%	27.7%
Golden Algae	15.3%	14.3%	13.3%	11.1%	14.3%	5.6%
Green Algae	**76.9%**		**73.3%**	**66.7%**	**47.6%**	**66.7%**
Blue-green Algae					9.5%	
Protozoa	7.7%					
Euglenoids						
Dinoflagellates		14.3%				
Total Phytoplankton	130	70	150	90	210	180

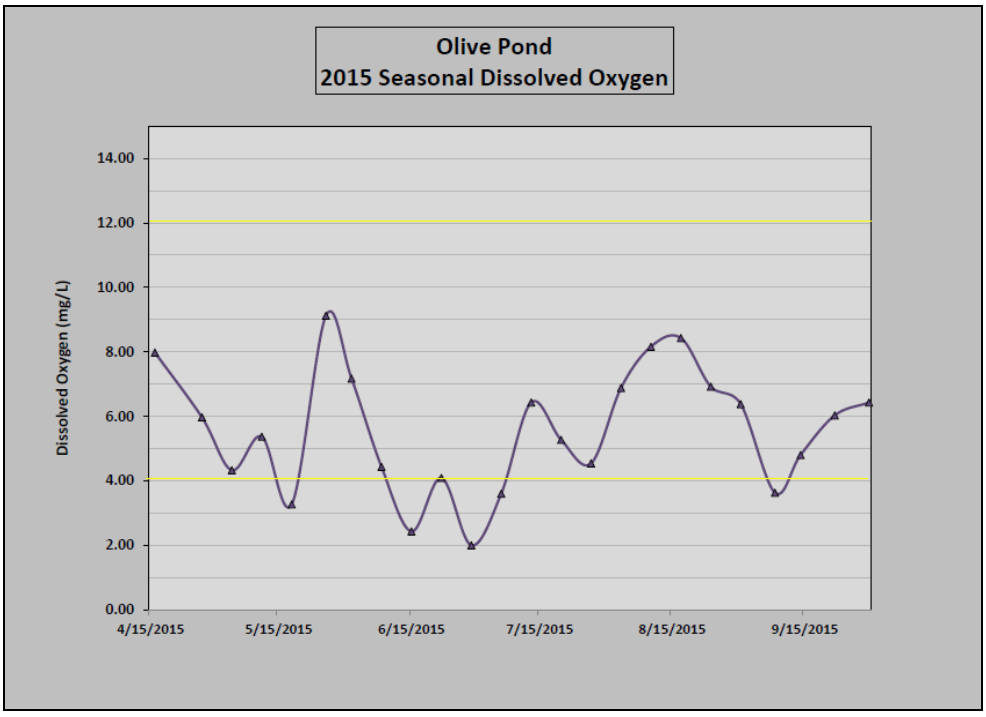
Phytoplankton abundance was suitable on all six of the sampling dates in 2015, similar to results observed in upstream basins. Sunset Lake and Crystal Lake seem to have similar phytoplankton communities for the past few seasons. On all dates, the abundance was considered light with counts less than 220 organisms per mL. As is typical for this site, on most dates this season, green algae were the dominant group in the assemblage, save for the late June event, when diatoms were the most common group observed. In 2014, non-problematic blue-green algae were observed on four different dates. This year, non-

problematic blue-green algae were only observed on one date (early August), and accounted for 9.5% of the total phytoplankton (210 organisms per mL).

Olive Lake

Olive Lake	units	6/4/15	7/13/15	8/10/15
Temperature	ºC	18.9	25.03	25.8
Dissolved Oxygen	mg/L	4.77	6.43	8.16
Alkalinity	mg/L	48	42	62
pH	SU	7.0	7.25	7.5
Nitrate	mg/L	<0.2	<0.2	<0.2
Total Phosphorus	mg/L	**0.120**	**0.06**	**0.09**
Turbidity	NTU	2.0	3.7	2.9
Water Clarity	feet	6.0 est.	4.0 est.	4.0 est.

In 2015, surface water temperature measurements fell within acceptable seasonal ranges at Olive Lake. Dissolved oxygen values in Olive Lake were suitable in July and August in this basin. However, June's dissolved oxygen was less than 5.0 mg/L, which is getting close to the threshold. 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 five dates. This condition, especially if it persists, could be stressful to aquatic biota in the basin, and these depressed values have been occasionally observed at this site in previous seasons. This basin could benefit from the addition of aeration, especially since one treatment was postponed due to low dissolved oxygen this year.



The alkalinity at Olive Lake ranged from 42 mg/L to 62 mg/L, for a 2014 annual average of 50.7 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 7.0, and increased to 7.25 in July. In August, the pH increased again to 7.50. Nitrate was undetected throughout the 2015 season, and this marks the eighth consecutive year this parameter has been

undetected during the growing season. Similar to previous seasons, the total phosphorus was elevated throughout 2015, although slightly reduced in June and July as compared to previous seasons. It ranged from 0.12 mg/L in June, and then decreased throughout the season. In July it was at 0.06 mg/L, and in August it increased to 0.09 mg/L. Despite this excess of nutrients available during the peak of the growing season, only a slight increase in phytoplankton productivity was observed in this basin. Turbidity was suitable for this small basin throughout the season. It ranged from 2.0 NTU in June to 3.7 NTU in July. Turbidity in August was 2.9 NTU.

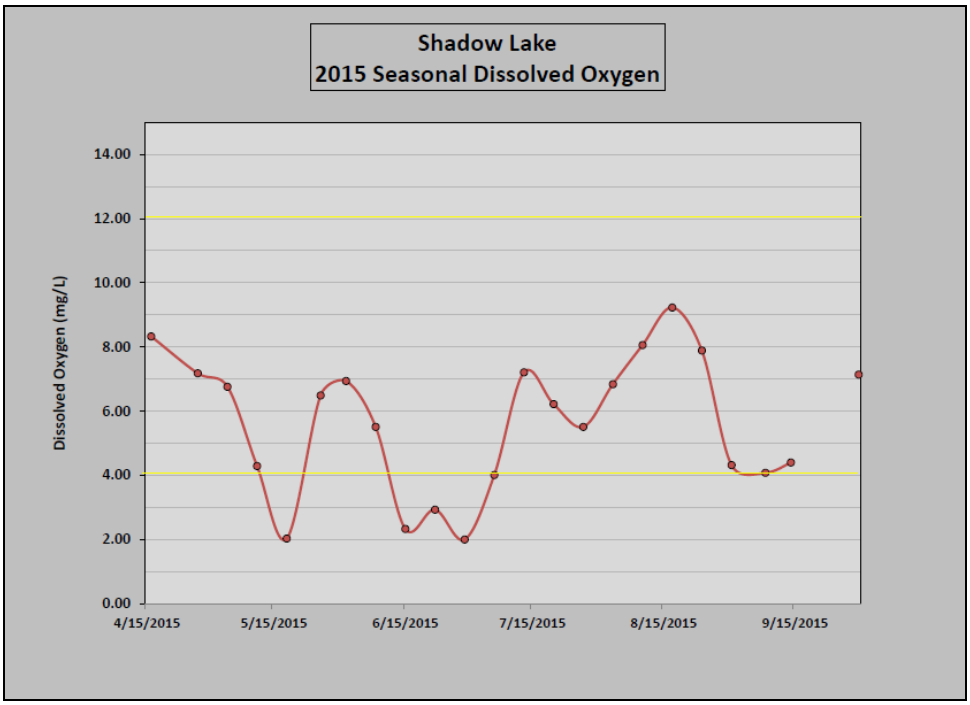
Olive Lake	6/4/15	7/6/15	8/3/15
Diatoms	8.3%	3.6%	8.5%
Golden Algae	8.3%		8.5%
Green Algae	**75.0%**	1.8%	**62.9%**
Blue-green Algae		**94.5%**	5.7%
Protozoa			
Euglenoids			
Dinoflagellates	8.3%		14.3%
Total Phytoplankton	120	550	350

In 2015, phytoplankton density was suitable for most dates, typically occurring at less than 350 organisms per mL. In June, the phytoplankton community was dominated by green algae at 75%. In July, the overall phytoplankton abundance increased to 550 organisms per mL (which is considered low-moderate), with nuisance blue green algae accounting for 94.5% of the assemblage. This triggered an algaecide application to control. In early August, overall phytoplankton abundance decreased to 350 organisms per mL. The assemblage on this date was dominated by green algae (62.9%), although trace blue-green algae was observed.

Shadow Lake

Shadow Lake	units	6/4/15	7/13/15	8/10/15
Temperature	ºC	18.6	27.06	25.7
Dissolved Oxygen	mg/L	5.17	7.21	8.06
Alkalinity	mg/L	44	42	64
pH	SU	7.5	7.25	7.5
Nitrate	mg/L	<0.2	<0.2	<0.2
Total Phosphorus	mg/L	**0.06**	**0.11**	**0.12**
Turbidity	NTU	1.4	1.0	3.3
Water Clarity	feet	6.0 est.	4.5 est.	4.0 est.

In 2015, surface water temperature measurements fell within acceptable seasonal ranges at Shadow Lake, and mimicked the ambient air temperatures. Dissolved oxygen values were considered suitable throughout the season, although slightly depressed in June at 5.17 mg/L. On numerous occasions during our routine surveys at this site, we observed poor or uneven bubbler action via the submersed diffusers. In September, this unit was finally serviced by ABI, although replacing the air stones should be an additional priority in early 2016. The dissolved oxygen for this basin is depicted on the graph, below. This depicts that dissolved oxygen was lower than the acceptable threshold (4.0 mg/L) on four dates and close to the threshold on three additional dates, despite a submersed aeration system.



Alkalinity in 2015 returned to more typical levels, ranging from 44 mg/L to 64 mg/L. The 2015 annual average was calculated at 50.0 mg/L, slightly higher than the previous year. The pH at Shadow Lake ranged from 7.25 in July to 7.5 in June and August. These measurements are suitable for this basin, when compared to the typical previous season. In 2015, nitrate was undetected on all three sampling dates. Total phosphorus levels were elevated once again the entire 2015 season at Shadow Lake, but unlike previous seasons, we observed an increase in total phosphorus as the season progressed. In June it was 0.06 mg/L, before increasing to 0.11 mg/L in July and then 0.12 mg/L in August. Yet again, these increased nutrient values did not translate into additional needed treatments for nuisance algae or weeds. Turbidity levels returned to more suitable levels in 2015. The turbidity ranged from 1.0 NTU (in July) to 1.4 NTU in June, and finally peaking at 3.3 NTU in August. Despite this late season increase, these values are still suitable, and we confirmed they are not tied solely to phytoplankton abundance as the peak of unicellular growth this season corresponded with the lowest turbidity.

Shadow Lake	6/4/15	6/22/15	7/6/15	7/20/15	8/3/15	8/17/15
Diatoms	**75.0%**		2.3%	4.2%	5.6%	
Golden Algae	12.5%			16.7%	2.8%	0.3%
Green Algae		**100.0%**	1.1%	**79.2%**	**80.3%**	**99.7%**
Blue-green Algae			**96.6%**		7.0%	
Protozoa						
Euglenoids						
Dinoflagellates	12.5%				4.2%	
Total Phytoplankton	80	320	880	240	710	3,280

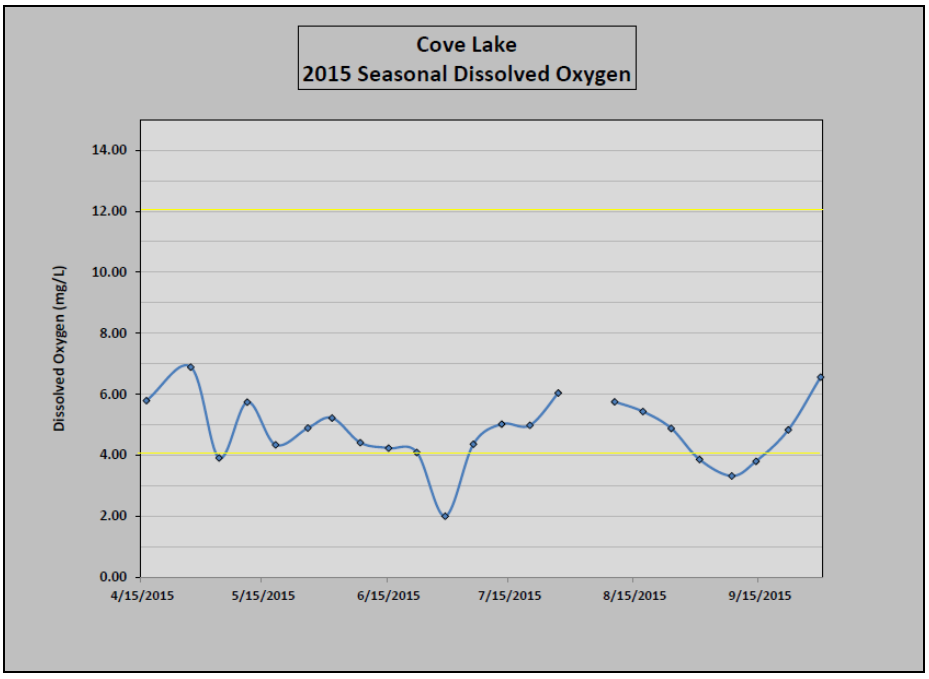
Phytoplankton conditions in 2015 were suitable on most dates. On three of the dates, the total phytoplankton was less than 320 organisms per mL. These dates occurred in early and mid-June and late July. In early July, the overall phytoplankton was moderate (880 organisms per mL) and dominated by nuisance blue-green algae. Proactively, we treated the water column shortly after to

prevent a more intense bloom. Results were suitable as on the following date both overall phytoplankton abundance was reduced and blue-green algae were absent from the assemblage. Overall abundance increased in August to moderate and then high abundance, but desirable green algae (specifically filaments of *Oedogonium*) dominated these phytoplankton communities, and did not require algaecide use.

Cove Lake

Cove Lake	units	6/4/15	7/13/15	8/10/15
Temperature	ºC	18.3	27.23	24.2
Dissolved Oxygen	mg/L	**3.92**	5.02	5.75
Alkalinity	mg/L	44	45	62
pH	SU	7.0	7.25	7.25
Nitrate	mg/L	<0.2	<0.2	<0.2
Total Phosphorus	mg/L	**0.120**	**0.04**	**0.05**
Turbidity	NTU	2.3	1.5	3.0
Water Clarity	feet	5.0 est.	**2.5 est.**	4.0 est.

In 2015, surface water temperature measurements fell within acceptable seasonal ranges at Cove Lake. Dissolved oxygen levels were somewhat depressed for most of this season. In June, the dissolved oxygen was 3.92 mg/L, which is below the 4.0 mg/L threshold and if it persists could negatively impact aquatic biota. In July, dissolved oxygen increased to 5.01 mg/L, which is suitable, but yet not ideal. Similar values were obtained in August, when dissolved oxygen values increased to 5.75 mg/L. These measurements are similar to data recorded in 2014. Since no treatments were required in this basin, none were postponed due to low dissolved oxygen. But it's likely that if algaecides or herbicides were needed, low dissolved oxygen could have been a deterrent. The dissolved oxygen for this basin is depicted on the graph, below. This depicts that dissolved oxygen was lower than the acceptable threshold (4.0 mg/L) on five dates and just above the threshold on four additional dates.



In 2015, alkalinity ranged from 44 mg/L to 62 mg/L, for an annual average of 50.3 mg/L. We continue to see an annual average has increase from 2013, when the annual average was 32.0 mg/L. Nitrate levels were undetected throughout the entire 2015 season, continuing an eight year trend for this basin. The total phosphorus at Cove Lake was elevated on all three sampling dates in 2015, similar to previous seasons. In June, the total phosphorus was 0.12 mg/L, or four times the ideal threshold. In July, the total phosphorus decreased to 0.04 mg/L, which was the lowest concentration observed this year, and for this basin could be considered suitable. In August, it increased slightly to 0.05 mg/L. However, these elevated phosphorus measurements did not translate into excessive aquatic plant or phytoplankton growth during the season. The July and August measurements were similar to data collected in 2014, but the June measurement was clearly an outlier. Turbidity was similar to data collected in 2012-2014, and was considered suitable on all three dates. It ranged from 1.5 NTU to 3.0 NTU this season, which is slightly elevated.

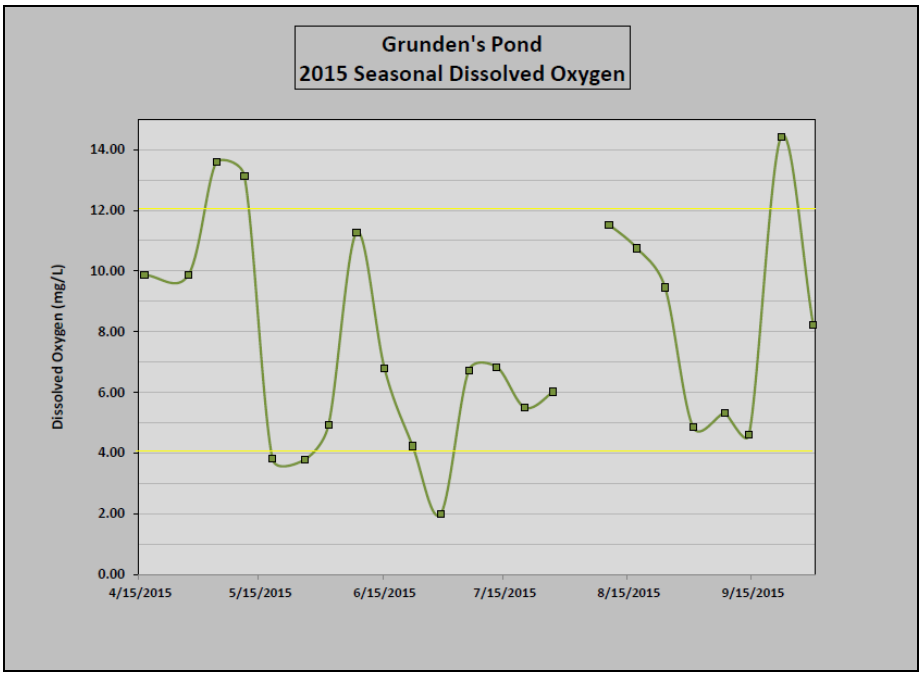
Cove Lake	6/4/15	7/6/15	8/3/15
Diatoms	7.1%	25.0%	**81.3%**
Golden Algae	**78.6%**		
Green Algae	14.3%	8.3%	15.6%
Blue-green Algae		16.7%	
Protozoa			
Euglenoids			
Dinoflagellates		**50.0%**	3.1%
Total Phytoplankton	140	120	320

In 2015, unicellular phytoplankton abundance at Cove Lake was light and favorable throughout the season. On all dates, overall phytoplankton abundance was less than 320 organisms per mL. In June, the overall phytoplankton was low, with golden algae dominating the phytoplankton community. In July, overall abundance remained low, but group dominance shifted to dinoflagellates (*Peridinium*). In early August, the group dominance again shifted, this time to diatoms at 81.3%. This basin was the only site that did not have green algae dominance on at least one date.

Grunden's Pond

Grunden's Pond	units	6/4/15	7/13/15	8/10/15
Temperature	ºC	19.6	27.23	26.8
Dissolved Oxygen	mg/L	7.11	6.84	**11.53**
Alkalinity	mg/L	40	45	60
pH	SU	7.0	7.0	**9.0**
Nitrate	mg/L	<0.2	<0.2	<0.2
Total Phosphorus	mg/L	**0.09**	**0.04**	**0.10**
Turbidity	NTU	2.1	<1.0	2.7
Water Clarity	feet	3.0 est.	5.5 est.	4.5 est.

In 2015, surface water temperature measurements fell within acceptable seasonal ranges at Grunden's Pond. Weekly dissolved oxygen measurements were collected at this site again in 2015 as depicted on the graph below. Dissolved oxygen was lower than the ideal threshold (4.0 mg/L) on three dates, but also exceeded the ideal threshold (12.0 mg/L) on three 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 last year as well.



Alkalinity in 2015 at Grunden's Pond ranged from 40 mg/L to 60 mg/L this year, which was similar in 2014. The annual average was calculated at 48.3 mg/L, representing a very slight decrease as compared to the previous season. The pH values in 2015 were suitable early in the season at 7.0 in June and July. But in August, the pH in this basin was elevated at 9.0, which exceeds the acceptable threshold (8.5) by 0.5 SU. Rampant filamentous algae growth, which required two late season treatments, could have contributed to the increase in pH. Nitrate was undetected on all three dates in 2015. Total phosphorus was elevated throughout 2015 on all three sampling dates, similar to the previous two seasons at this site. In June, it was 0.09 mg/L, with a decrease to 0.04 mg/L in July. In August, total phosphorus peaked at 0.10 mg/L. Despite many visual observations to the contrary in the basin, the turbidity was suitable on all dates this year ranging from undetected in July to 2.1 NTU in June and 2.7 NTU in August.

Grunden's Pond	6/4/15	7/6/15	8/3/15
Diatoms	**66.7%**	12.5%	37.0%
Golden Algae	9.5%	25.0%	**40.2%**
Green Algae	23.8%	**37.5%**	10.2%
Blue-green Algae		12.5%	
Protozoa		12.5%	0.8%
Euglenoids			0.8%
Dinoflagellates			11.0%
Total Phytoplankton	210	80	1,270

In 2015, total phytoplankton abundance varied throughout the entire season, but early in the season it was light and favorable. Overall abundance was low in June, with diatom dominance which is typical. Phytoplankton abundance decreased to very low in July, and the group dominance shifted to green algae, yet five different groups were represented, including trace amounts of non-problematic blue-green algae. In August the phytoplankton peaked at this site to 1,270 organisms per mL, which is considered moderate-high. The assemblage was dominated by golden algae (specifically *Mallomonas*) on this date. Also on this date, six different algal groups (all except blue-green algae) were observed. Grunden's Pond seemed to be dominated by filamentous algae in 2015, which required four algaecide applications this season.

Mountain Lake

Mountain Lake	units	6/4/15	7/13/15	8/10/15
Temperature	ºC	20.6	28.18	26.6
Dissolved Oxygen	mg/L	7.87	8.48	7.43
Alkalinity	mg/L	36	42	60
pH	SU	7.5	8.0	7.5
Nitrate	mg/L	<0.2	<0.2	<0.2
Total Phosphorus	mg/L	0.03	0.02	**0.05**
Turbidity	NTU	<1.0	<1.0	<1.0
Water Clarity	feet	15.0 est.	12.0 est.	9.0 est.

In 2015, surface water temperature measurements fell within acceptable seasonal ranges at Mountain Lake. In general (similar to the other basins at Mountain Lakes) surface water temperatures were slightly lower this season. 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 2015 season, which is typical for this basin. In June, the dissolved oxygen was 7.87 mg/L, which is equivalent to 90% saturation. In July, the dissolved oxygen experienced an increase to 8.48, but this is equivalent to 105% saturation (due to the increase in water temperature). By August, dissolved oxygen decreased to 7.43 mg/L, yet this was still equivalent to 90% saturation. See below for a discussion of the water clarity at Mountain Lake in 2015.

Alkalinity at Mountain Lake in 2015 ranged from 36 mg/L (in June) to 60 mg/L (in August), for an annual average of 46.0 mg/L. This is slightly higher than data recorded in 2014, but from a historical standpoint is still suitable. In 2015, pH varied throughout the season. In July, it was 8.0, but in June and August the pH was 7.5. All values were suitable for this basin. Nitrate levels were undetectable throughout the entire 2015 season, similar to last season. Total phosphorus levels varied throughout the 2015 season at this site. Total phosphorus was 0.03 mg/L in June and decreased to 0.02 mg/L in July. This is exactly the same trend observed in 2014. However, this year, in August the total phosphorus actually increased to 0.05 mg/L which exceeds the ideal threshold of 0.03 mg/L. This could explain an increase in naiad growth observed in late July that required a treatment. Turbidity measurements this season were also ideal on all dates this season. Turbidity was undetected on all dates.

Mountain Lake	6/4/15	6/22/15	7/6/15	7/20/15	8/3/15	8/17/15
Diatoms				11.1%	40.0%	
Golden Algae		16.7%		5.6%	2.9%	6.3%
Green Algae	**96.3%**	**75.0%**	7.1%	27.8%	**48.6%**	43.8%
Blue-green Algae		8.3%	**85.7%**	**55.5%**	5.7%	**50.0%**
Protozoa						
Euglenoids					2.9%	
Dinoflagellates	3.7%		7.1%			
Total Phytoplankton	270	120	140	180	350	160

The phytoplankton abundance data was light and favorable throughout the 2015 season. Total phytoplankton counts ranged from 120 organisms per mL to 350 organisms per mL, very similar to 2014. Green algae dominated the phytoplankton community on three dates (both in June) and early August. However, nuisance blue-green algae dominated the assemblage on the remaining three dates (two in July and one in mid-August. Since the

overall phytoplankton counts were low (less than 160 organisms per mL) on each date, these abundances were considered non-problematic and did not require treatment. However, it is possible that the water chemistry in the basin is shifting to favor this nuisance algal growth, and might require additional management in 2016. For example, it has been a few years since Alum has been utilized in this basin.

Wildwood Lake

Wildwood Lake	units	6/4/15	7/13/15	8/10/15
Temperature	ºC	20.5	28.2	26.9
Dissolved Oxygen	mg/L	7.36	7.33	7.91
Alkalinity	mg/L	40	40	60
pH	SU	7.5	7.5	8.0
Nitrate	mg/L	<0.2	<0.2	<0.2
Total Phosphorus	mg/L	**0.04**	0.03	0.03
Turbidity	NTU	<1.0	<1.0	1.7
Water Clarity	feet	12.0 est.	7.0 est.	7.0 est.

In 2015, surface water temperature measurements fell within acceptable seasonal ranges at Wildwood Lake. Dissolved oxygen ranged from 7.33 mg/L in July to 7.91 mg/L in August. These values are slightly depressed in June, but otherwise are seasonally ideal for this basin, and similar to results obtained in previous seasons.

Alkalinity levels in 2015 ranged from 40 mg/L to 60 mg/L, for a seasonal average of 46.7 mg/L. This is very similar to data collected in 2014, and the same annual average. Wildwood Lake typically has the highest pH of the lakes in the Mountain Lakes chain. In 2015 the pH was recorded at 7.5 in June and July, which is ideal. Although it did increase to 8.0 in August, this value is still suitable and in balance with the phytoplankton abundances we observed throughout the season. In 2015, nitrate was undetected on all sampling dates at this site, the same as data collected the previous season. Total phosphorus measurements were suitable throughout the 2015 season. In June, the total phosphorus was slightly elevated at 0.04 mg/L, but this is not unusual for this site. In July and August, it decreased to 0.03 mg/L which is right at the acceptable threshold. Turbidity was improved this season, ranging from undetected in June and July, to 1.7 NTU in August. Despite this increase later in the season, these amounts are ideal.

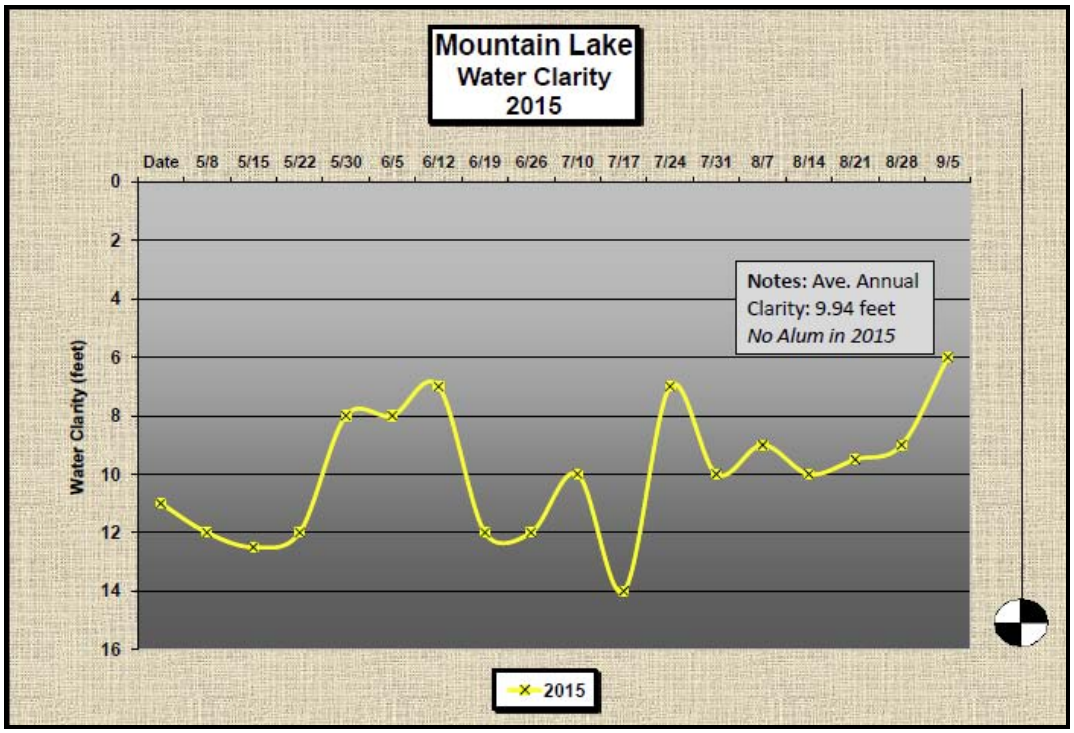
Wildwood Lake	6/4/15	6/22/15	7/6/15	7/20/15	8/3/15	8/17/15
Diatoms	26.3%	6.5%		21.4%	**37.5%**	**46.1%**
Golden Algae	5.3%	**74.2%**			22.9%	7.7%
Green Algae	**47.4%**	16.1%	**92.3%**	**78.6%**	25.0%	**46.1%**
Blue-green Algae			7.6%			
Protozoa						
Euglenoids						
Dinoflagellates	21.0%	3.2%			14.6%	
Total Phytoplankton	190	310	130	280	480	130

In 2015, overall unicellular phytoplankton counts at Wildwood Lake were low on all dates, ranging from 130 organisms per mL to 480 organisms per mL. On four dates, green algae were the dominant group, as expected. These dates were scattered about, with one in June, two in July and the last in August. In early July, trace amounts of blue-green algae were observed in the sample, but these were non-problematic, and this was the only

date this nuisance group was observed. In late June, golden algae were the dominant group. In early August, diatoms were the dominant group, and by mid-August the assemblage was dominated by a mixture of diatoms and green algae.

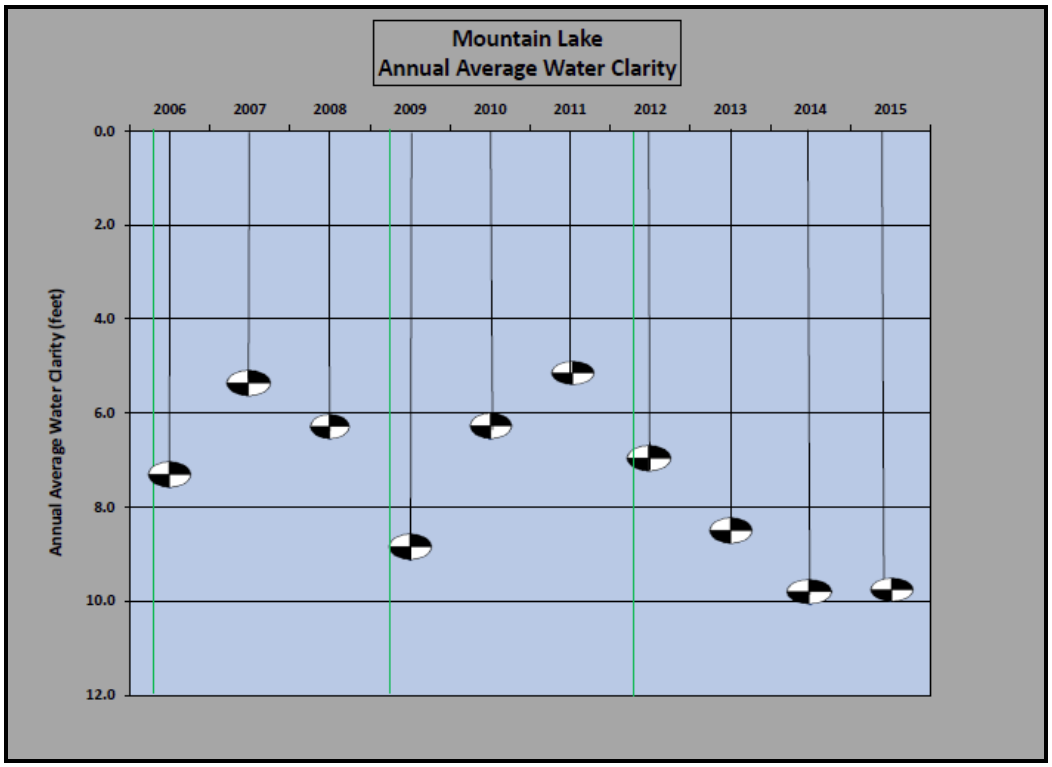
2006 to 2015 Water Clarity at Mountain Lake

Below is a graph that depicts the water clarity at Mountain Lake in 2015. 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 third 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 2015 ranged from 6.0 feet to 14.0 feet (estimated) throughout the season. Water clarity was estimated on most sampling dates because the clarity exceeded water depth at the standardized sampling location (the end of the dock at the Midvale launch). On nine dates water clarity equaled or exceeded 10 feet, which is considered outstanding for an urban shallow lake in the Northeast. On most dates, water clarity was at or exceeded 8.0 feet. Water clarity was a critical factor in determining the use of Alum this season, and was one reason Alum was not applied in this basin this season.

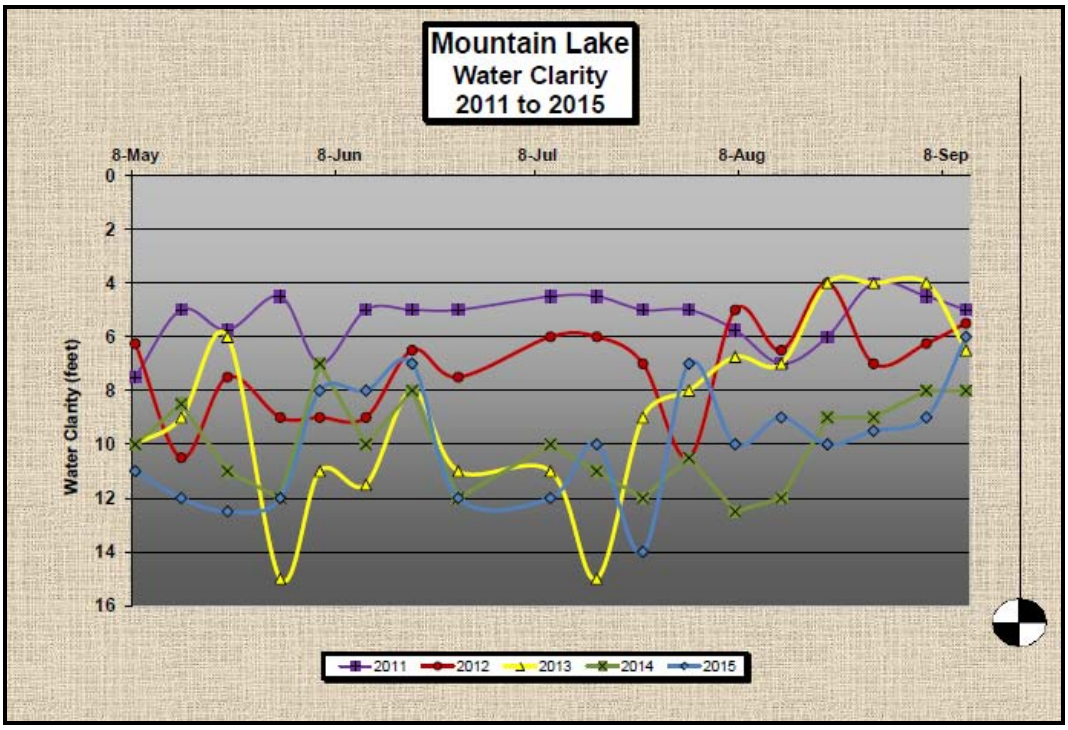


In 2015, the annual average water clarity was 9.94 feet, which was very similar to the 2014 annual average of 10.03 feet. Since the water clarity measurements are collected at the same site, using a standard Secchi disc, and on the roughly the same dates from season to season, these values are an accurate 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

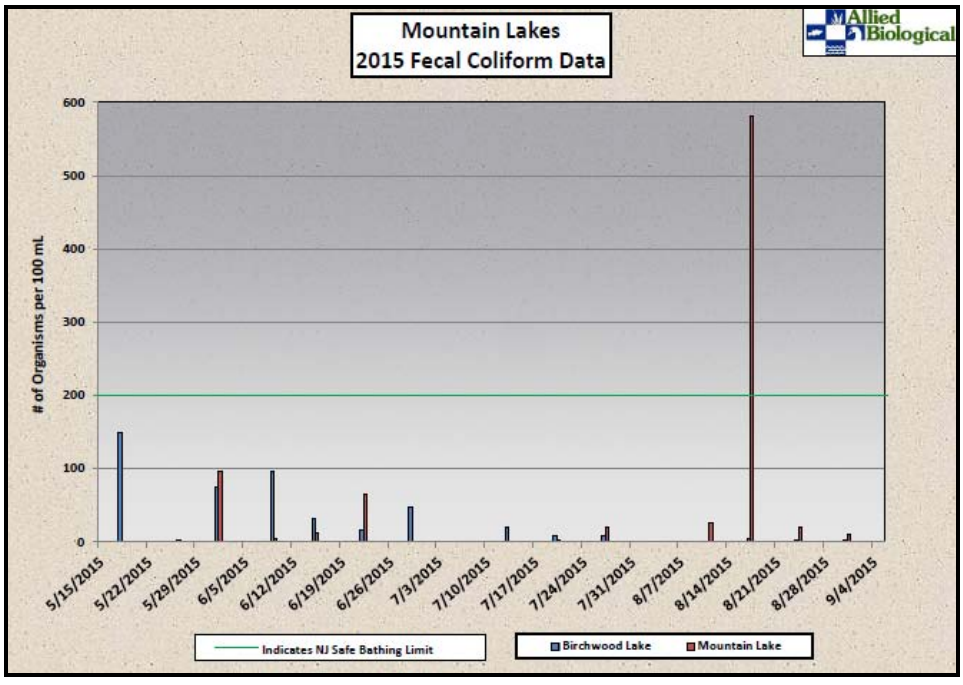
favorable in this basin this year, although we did observe non-problematic blue-green algae on several dates. Submersed plant abundance also plays a major role in the water clarity of a lake. Despite reduced plant density observed throughout the season, the lack of established plant beds did not seem 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.



Below is another graph depicting the annual water clarity for 2011 through 2015. Although the graph is somewhat cluttered by the five data lines, the 2015 data set (blue) displays reasonable average water clarity early in the season, with an increase in July. But then water clarity decreases somewhat in late season (August), and then maintains that level through September. This late-season clarity is several feet more than observed in previous seasons, and stands out on the below graph. The end result was an average annual water clarity very similar to data collected in 2014, which is promising.



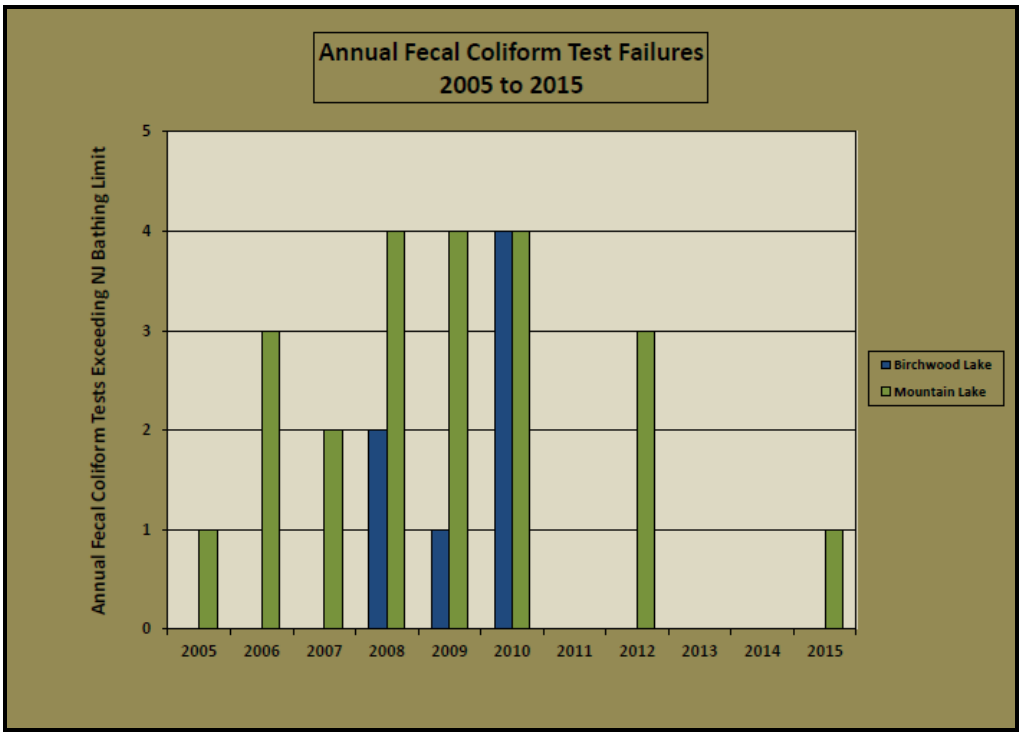
2015 Fecal Coliform Testing at Birchwood and Mountain Lake



Fecal coliform sampling was performed at Birchwood Lake's beach and Mountain Lake's Island Beach in 2015. Sampling occurred weekly during surveys, and was conducted from Memorial Day through August 25th (the week before Labor Day). Fecal Coliform counts are measured as a number of colony forming units (cfu) per 100 mL sample, and New Jersey has set a safe bathing limit of 200 cfu per 100 mL, depicted by

the green line on the graph presented above. Consult the graph for a summary of the fecal coliform counts at both sites for 2015. The Appendix of this report contains a reproduction of this graph, and a table summarizing the 2015 data. On these tables, numbers highlighted in red exceed the NJ bathing limit of 200 cfu per 100 ml. In 2015, 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 2015, no failures were observed at Birchwood Lake, the fifth consecutive year that no failures occurred at this site. This is a promising trend. At Mountain Lake, one failure occurred in 2015, in mid-August with a measurement of nearly 600 cfu per 100 ml. This site was re-sampled the following day and the re-test passed at 32 cfu per 100 ml. The last failures at this site occurred in 2012, with three elevated fecal counts. 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 2015. This graph depicts very different conditions in the first six years of the dataset as compared to the last five years.



2015 Lakes Cleaning Project

In 2015, the Lakes Cleaning Project was conducted in April at Sunset Lake. No hydro-raking was conducted in the fall of 2015. The decision to target Sunset Lake was made following examination of sediment probing data collected at this site in 2014. This map is

included in the Appendix of this report. 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.

Date	Loads Removed	Cubic Yards	Hours Raked
4/13/15	6	24	4
4/14/15	5	20	5
4/15/15	15	60	7
4/16/15	11	44	7
4/21/15	4	16	4
4/22/15	4	16	3
Totals	**45**	**180**	**30**

Hydro-raking activities began at the northwest corner of the basin, and worked along the western shoreline to the southern shoreline and finally the northeastern corner of the basin. The north shoreline was largely not raked due to the large submerged rocks located in this area. The variable amount of material removed and efficiency of the raking is largely dependent on the amount of material to be removed and the distance to the offload site. The highlight of this year's project included the recovery of an intact trolley car wheel and axel, rusted but still in good shape.

2015 Borough-wide Terrestrial Invasive Plant Management

In 2013, it was determined that it would be beneficial to the borough for Allied Biological to survey the margin of all nine lakes for the presence of emergent invasive plants. Following the identification of invasive infestations, these patches were sprayed with approved herbicides for control efforts. 2015 represents a continuation of this program, and with the appearance of the invasive creeping water primrose in the canal, it's likely to become a standard practice to protect the native integrity of the emergent species throughout the borough. The Appendix of this report includes a map of the areas surveyed on July 8th, and depicts the sites surveyed, the species of exotic or nuisance terrestrial plants, and estimated abundance. The table below summarizes the species observed, with red indicated exotic invasive species and black indicating native yet nuisance species.

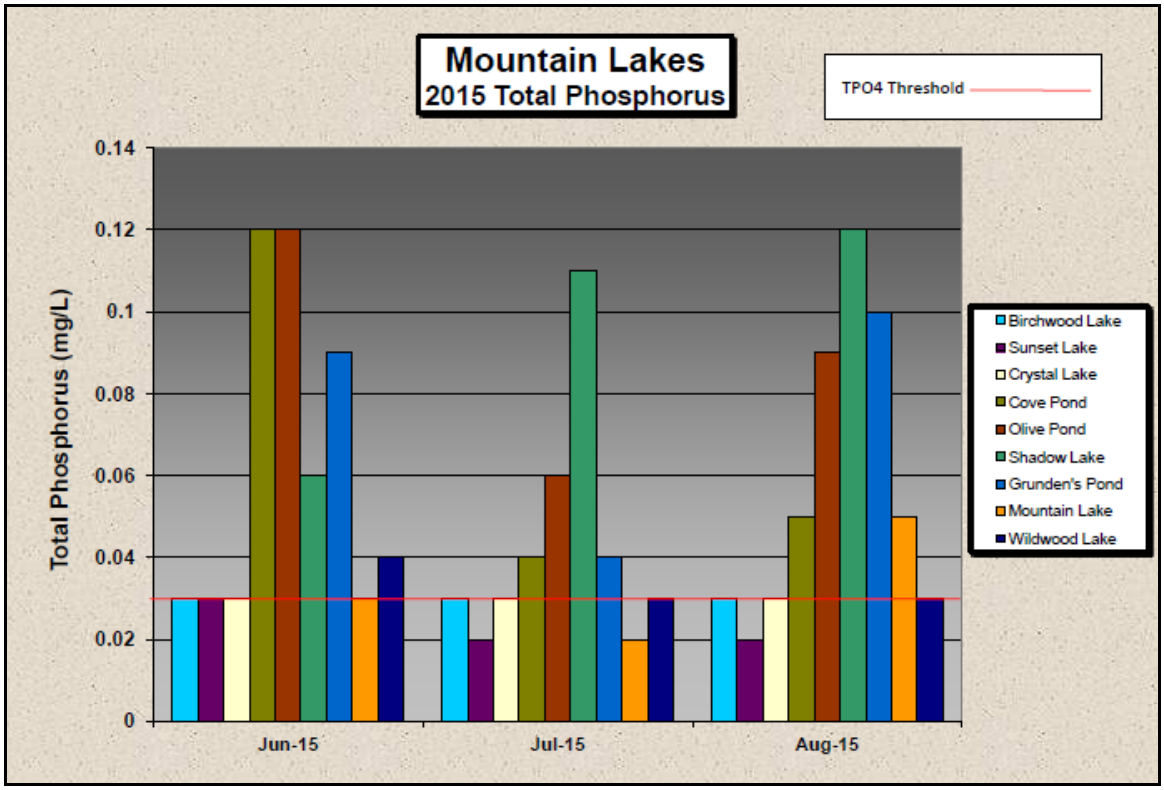
Scientific Name	Common Name	Observed 2015
Typha sp.	Cattail	**X**
Phragmites australis	Common Reed	**X**
Artemisia vulgaris	Mugwort	**X**
Phytolacca americana	Pokeberry	**X**
Celastrus orbiculatus	Oriental Bittersweet	**X**
Elaeagnus umbellata	Autumn Olive	**X**
Menispermum sp.	Wild Grape	**X**
Parthenocissus quinquefolia	Virginia Creeper	**X**
Fallopia japonica	Japanese Knotweed	**X**
Berberis thunbergi	Japanese Barberry	**X**
Rosa multiflora	Multiflora Rose	**X**
Smilax sp.	Greenbriar	**X**

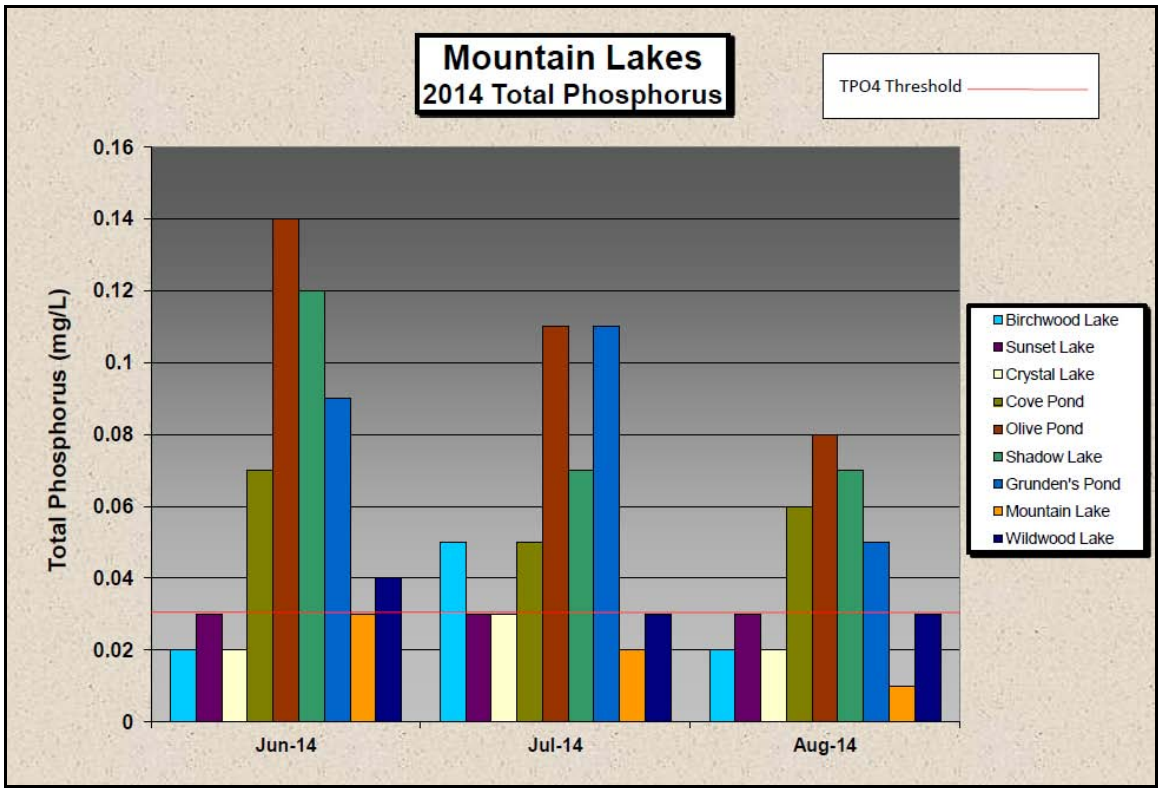
On July 10th terrestrial spraying at this sites was conducted, specifically the dams at Birchwood Lake, Crystal Lake, Mountain Lake, Sunset Lake and Wildwood Lake. Two products were applied on this date: Garlon 3A and AquaNeat depending on species targeted. All applications were conducted via backpack sprayers. On August 12th, a touch-up spraying of purple loosestrife was conducted at the Birchwood dam. On August 13th, a ClearCast application was conducted in the canal to target creeping water primrose.

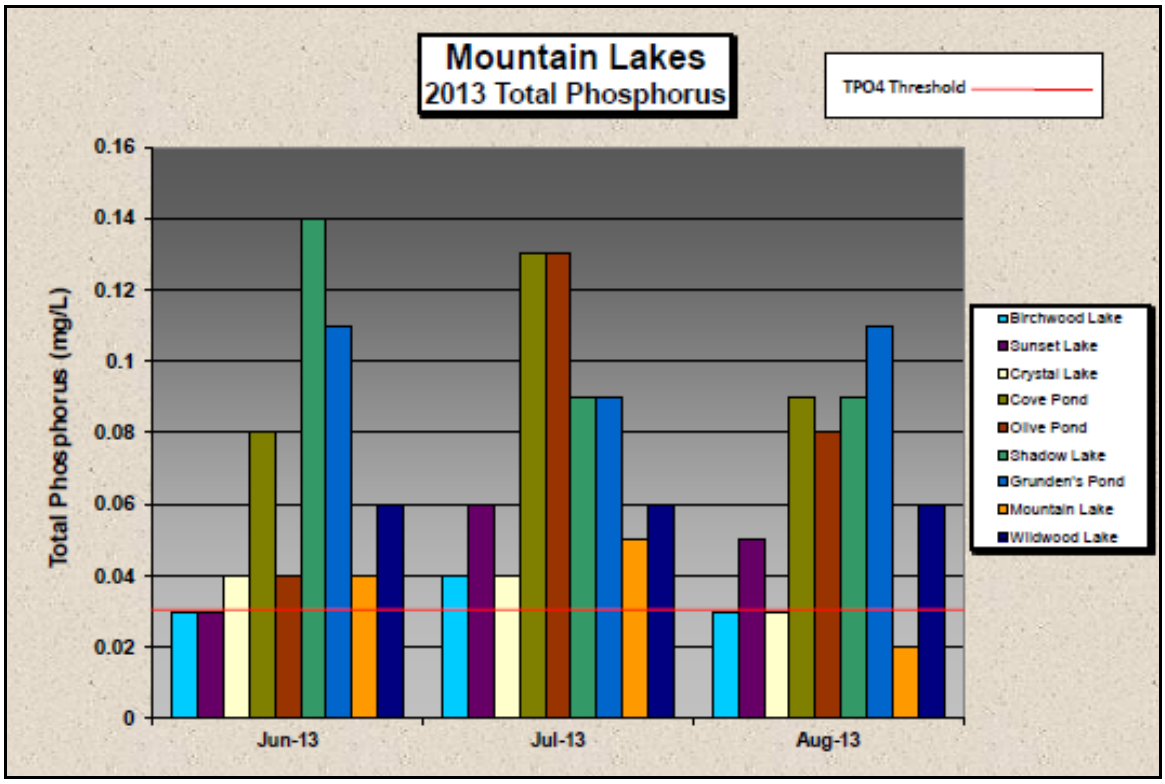
It is highly recommended that this program be continued in 2016. All the sites sprayed in 2015 should be top priorities for follow-up surveys in 2016.

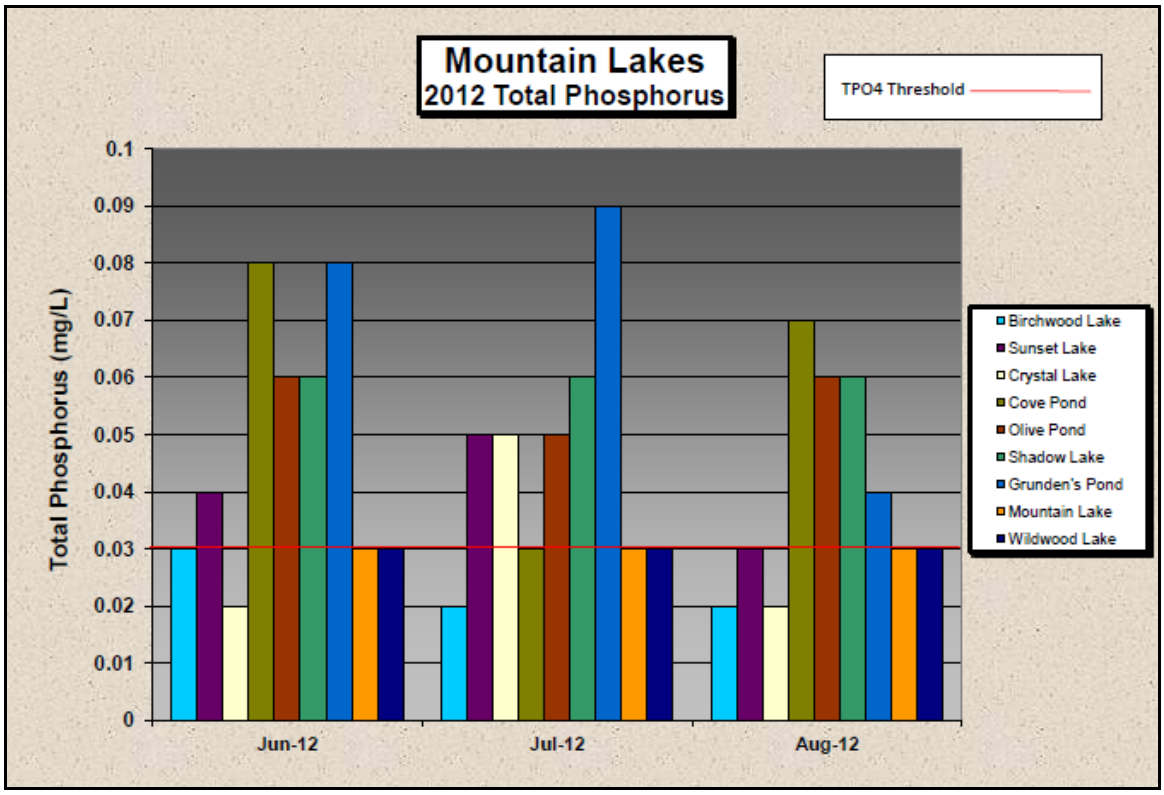
2006 to 2015 Total Phosphorus at Mountain Lakes

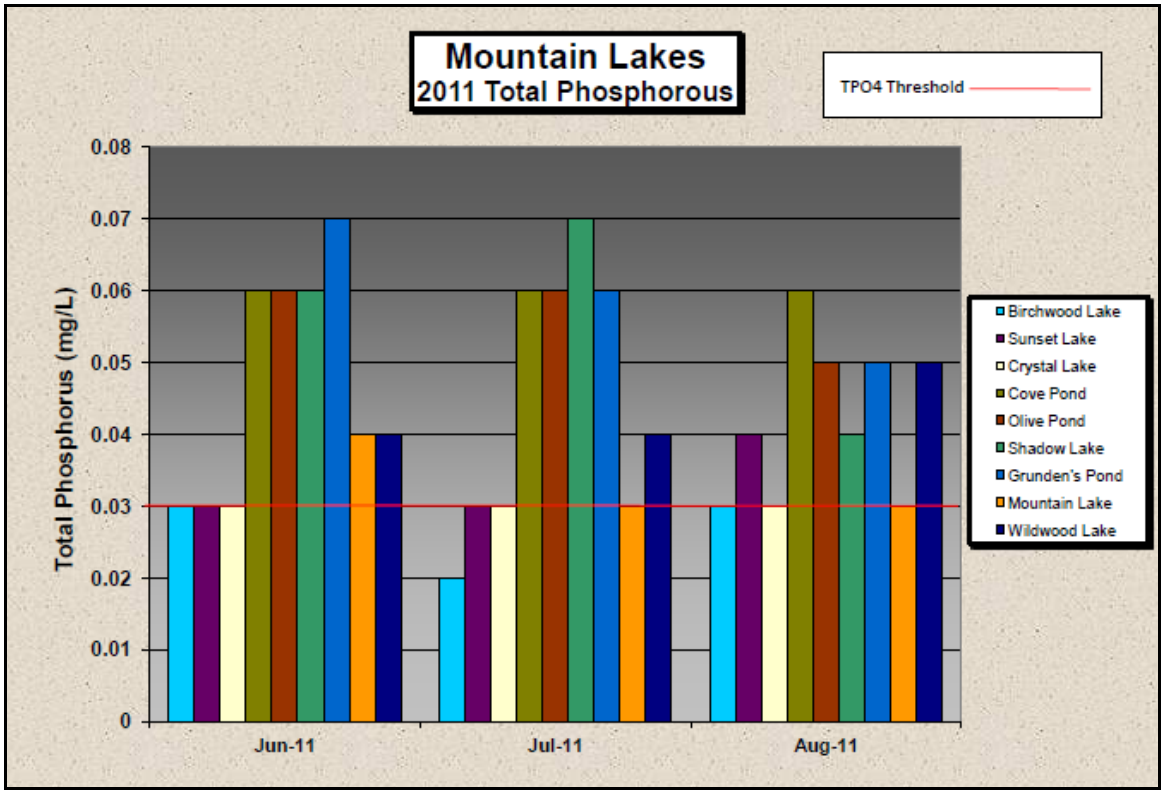
Below are nine graphs, each representing total phosphorus data collected at all nine lakes for all three seasonal sampling events. Each graph depicts a different year, 2006 through 2015. Total phosphorus in 2015 continues to be elevated at the smaller basins on all three dates. We did see some decreased total phosphorus measurements at these smaller basins, especially Cove Pond later in the season and Grunden's Pond in mid-season. Meanwhile, the larger basins all had suitable total phosphorus levels on nearly all of the dates. The exception was Mountain Lake in August, with total phosphorus of 0.05 mg/L. Wildwood Lake was another exception with 0.04 mg/L recorded in June, which was similar to 2014 data collected at this site. The acceptable total phosphorus threshold for lakes is 0.03 mg/L, depicted with the red line on the graphs below.

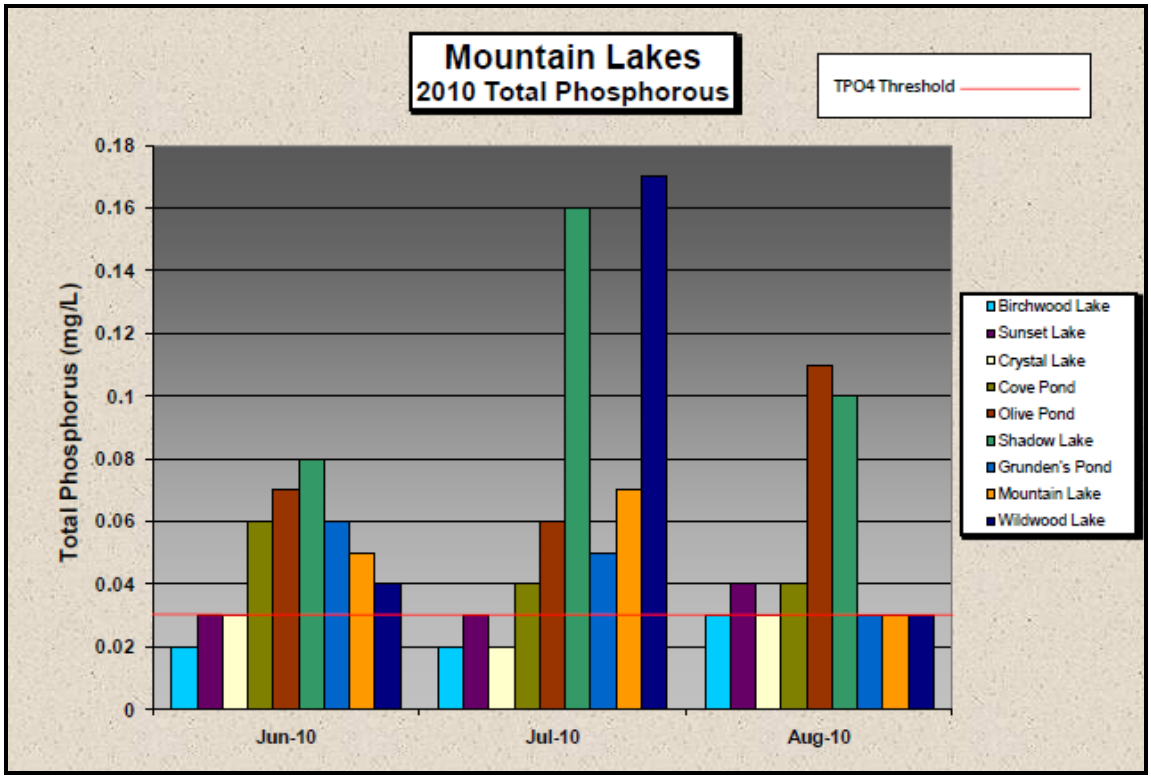


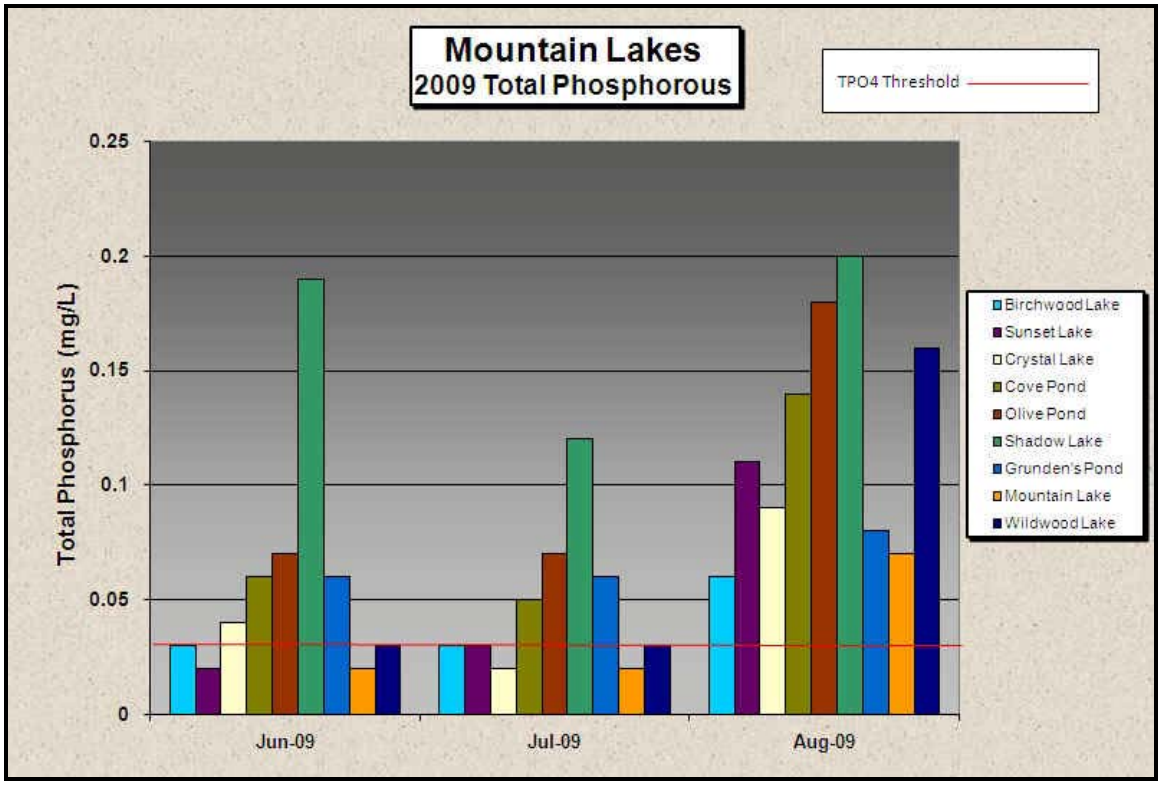

Mountain Lakes
2014 Total Phosphorus
TPO4 Threshold
Total Phosphorus (mg/L)
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
Jun-14
Jul-14
Aug-14
Birchwood Lake
Sunset Lake
Crystal Lake
Cove Pond
Olive Pond
Shadow Lake
Grunden's Pond
Mountain Lake
Wildwood Lake

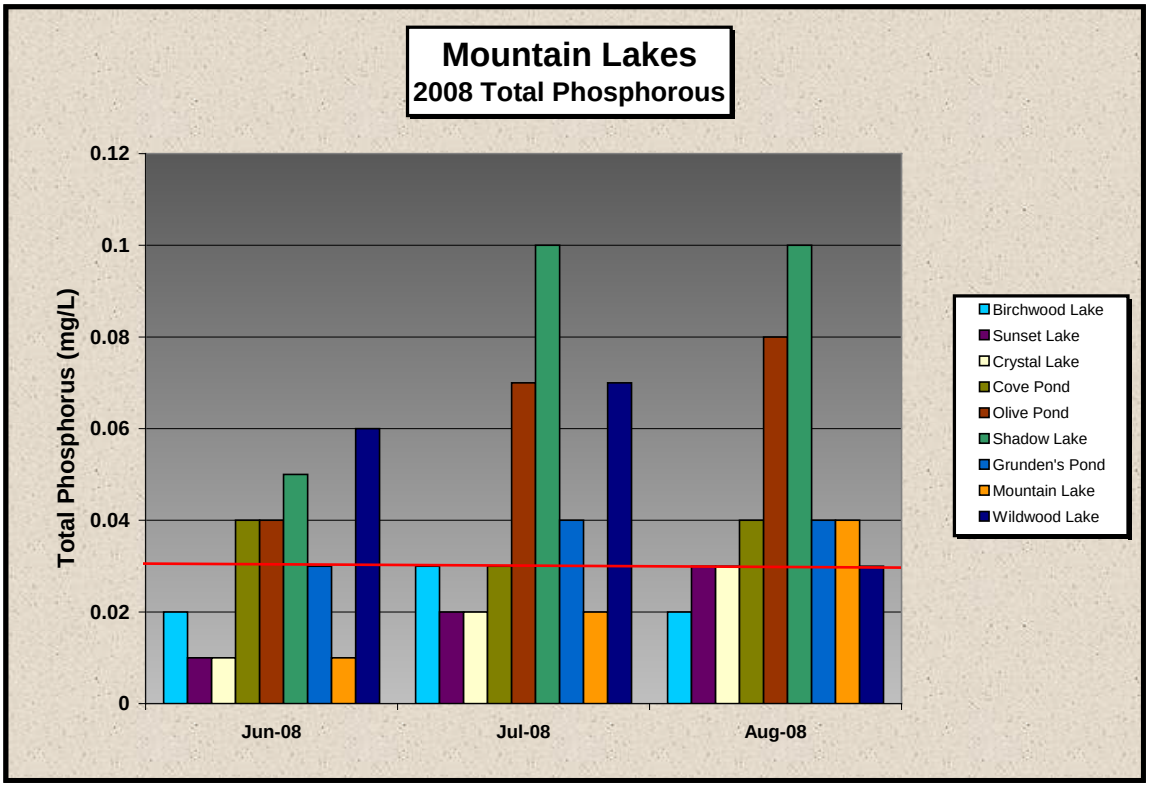

Mountain Lakes
2013 Total Phosphorus
TPO4 Threshold
Total Phosphorus (mg/L)
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
Jun-13
Jul-13
Aug-13
Birchwood Lake
Sunset Lake
Crystal Lake
Cove Pond
Olive Pond
Shadow Lake
Grunden's Pond
Mountain Lake
Wildwood Lake

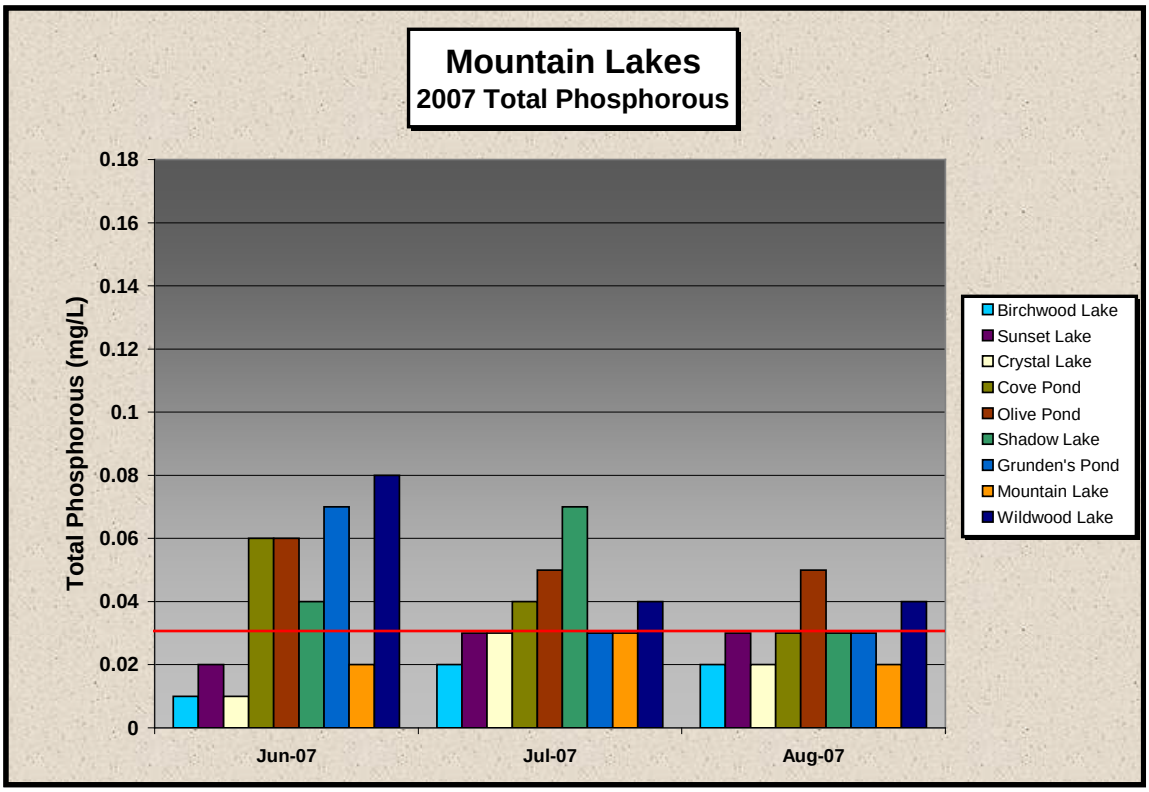

Mountain Lakes
2012 Total Phosphorus
TPO4 Threshold
Total Phosphorus (mg/L)
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
Jun-12
Jul-12
Aug-12
Birchwood Lake
Sunset Lake
Crystal Lake
Cove Pond
Olive Pond
Shadow Lake
Grunden's Pond
Mountain Lake
Wildwood Lake

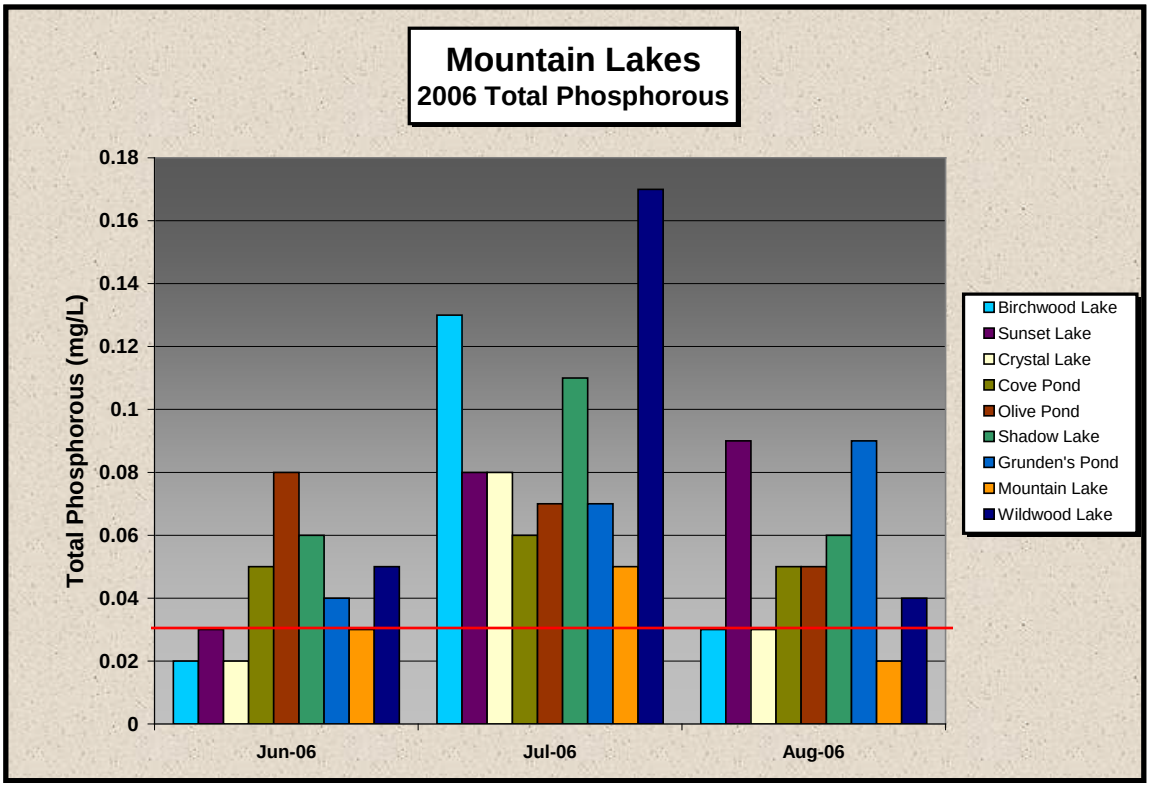

Mountain Lakes
2011 Total Phosphorous
TPO4 Threshold
Total Phosphorus (mg/L)
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
Jun-11
Jul-11
Aug-11
Birchwood Lake
Sunset Lake
Crystal Lake
Cove Pond
Olive Pond
Shadow Lake
Grunden's Pond
Mountain Lake
Wildwood Lake


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



2015 Summary of Lake Management Activities

- In 2015, temperature departures were much lower than average from January through March. But then from April through August, temperatures were slightly higher than the norm. May and September were quite warmer than average.
- For the most part, monthly rainfall averages were below average in 2015, except for June, which was the 4th wettest June on record.
- Eurasian water milfoil was again observed at Mountain Lake in 2015 at very limited abundance and distribution. Although an increase later in the season was observed.
- Clipper was again used to control lilies and pondweeds in the swim lanes at Birchwood Lake. The results were suitable, although in 2016 we might need to treat the abundant water lilies in the northern part of the basin to thin them out.
- Sonar, an aggressive systemic herbicide, was used at Crystal Lake to target nuisance pondweeds.
- Allied Biological conducted a survey of all lake margins for the presence of emergent invasive species in 2015. Many infestation of limited scope were identified and sprayed.
- Hydro-raking was conducted in Sunset Lake in April 2015. An estimated 180 cubic yards of consolidated organic debris were removed as part of this project.
- Overall, total phosphorus levels were elevated at the smaller basins in 2015. For nearly all dates, total phosphorus levels were suitable at the larger basins this season. The exceptions were single dates at Mountain and Wildwood Lake.

- Overall, unicellular phytoplankton abundance was favorable (low to moderate) at all of the larger basins this season. Non-problematic blue-green algae were observed on several dates at Mountain Lake this season, which is unusual.
- All fecal coliform tests passed at Birchwood Lake. However, on one mid-August date at Mountain Lakes, the fecal coliform counts exceeded the safe bathing limits. A re-test the following day revealed suitable fecal coliform counts, so no beach closures were required.
- 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 for the second consecutive season.

2016 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 2015, it is recommended that weekly dissolved oxygen monitoring continue at the smaller basins. For the past several years, dissolved oxygen levels have been depressed on select dates throughout the season, and each of these basins could benefit from the use of aeration. The borough should consider a feasibility study of aeration systems for these small basins in 2016. Dissolved oxygen throughout the water column at Birchwood Lake continues to be depressed as well. Hiring an aeration consultant is an option to investigate this situation before it turns dire. The additional phytoplankton sampling at Shadow Lake will continue in 2016. Once again a mid-season canal survey via kayak shall be conducted, focusing on exotic invasive emergent aquatic plants such as creeping water primrose and potential control efforts.

Herbicide and algaecide use will continue in many of the Mountain Lakes basins to control nuisance densities of aquatic plants and algae. In Birchwood Lake, a limited application of Clipper is planned for the nuisance water lilies and pondweeds around the swimming docks. In addition, Birchwood Lake would also benefit from a limited acreage topical spray of water lilies in the northern reach of the basin this 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. At Sunset Lake, contact herbicides should be suitable for control of SAV and/or water lilies, but depending on the growth of the latter, a systemic product might be a better option in 2016. Since this is the fourth year after treatment (YAT) using Sonar at Mountain Lake, Sonar use or aggressive use of contact products are likely needed in 2016. Conditions shall be confirmed with early season on-water surveys. Contact herbicides will be the products of choice in Wildwood Lake, to control early-season curly-leaf pondweed and later season naiad growth.

In the smaller basins, we expect to continue the use of copper sulfate to control nuisance algae growth. Several of the smaller basins had rampant growth of duckweed species in 2015, which prompted complaints from residents. Therefore, we will aggressively treat nuisance duckweed as needed in 2016 with Clipper.

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 2016. In the past, the use of Alum at Mountain Lake has provided numerous benefits. However conditions (notably water clarity and total phosphorus) have been ideal, and Alum has not been applied in several years. A potential Mountain Lake Alum application will only occur following a review of total phosphorus data, water clarity data and phytoplankton conditions. We did observe a minor total phosphorus spike late in the season, and observed non-problematic blue-green algae later in the season, so Alum could be needed in 2016.

We plan on conducting additional sediment probing studies later in the season to recommend hydro-raking sites in the fall of 2016. We anticipate 1-2 weeks of hydro-raking, which has been the norm.

The increased awareness of invasive emergent vegetation occurring throughout the Borough is proving to be beneficial as several small colonies of invasive emergent plants were observed and treated in 2014 and 2015. 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 2016, previously sprayed locations will be re-surveyed, in addition to surveying most lake margins and dams throughout the borough.

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.

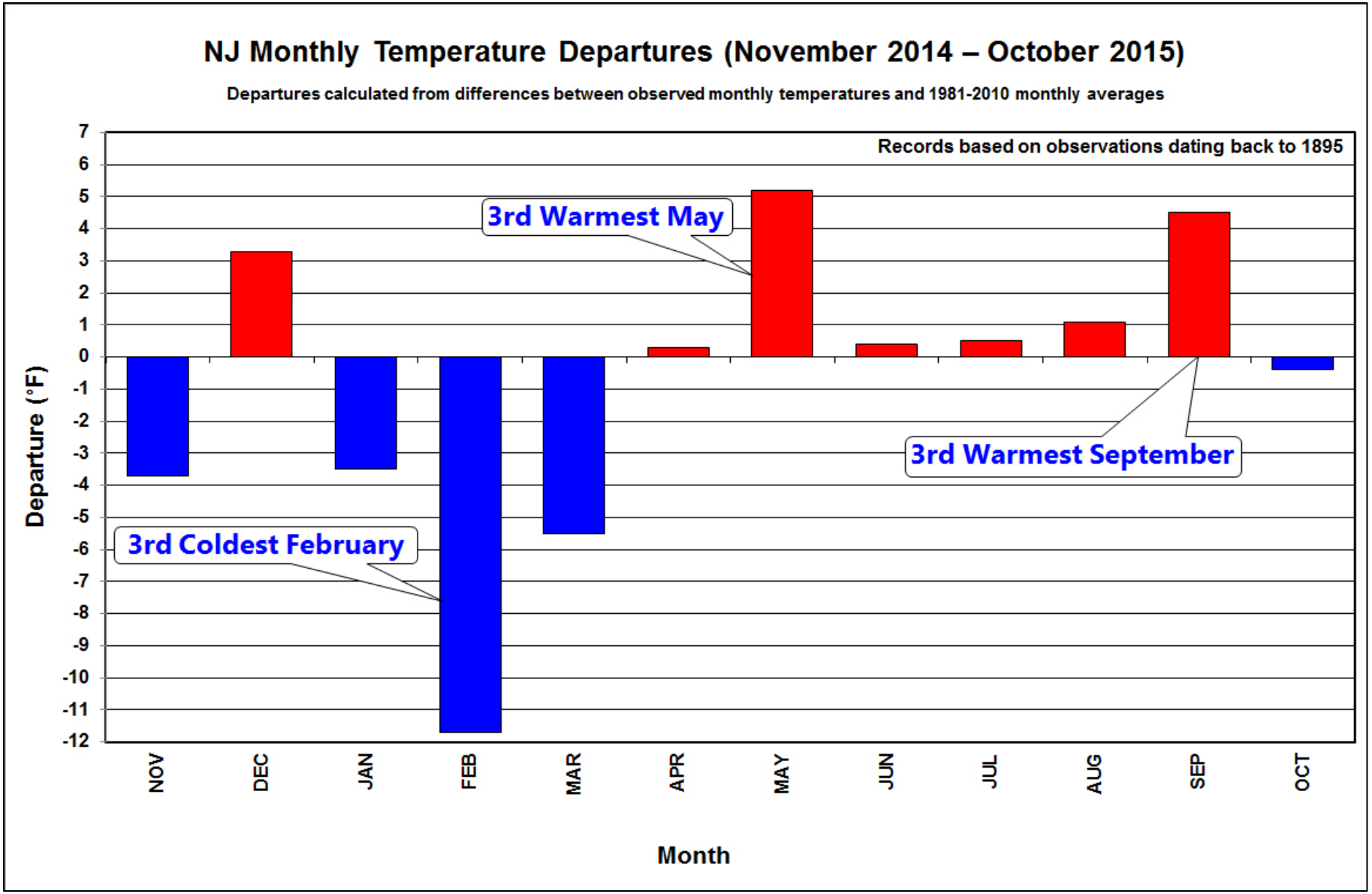
Fassett, Norman C. 1972. *A Manual of Aquatic Plants*. The University of Wisconsin Press, Milwaukee.

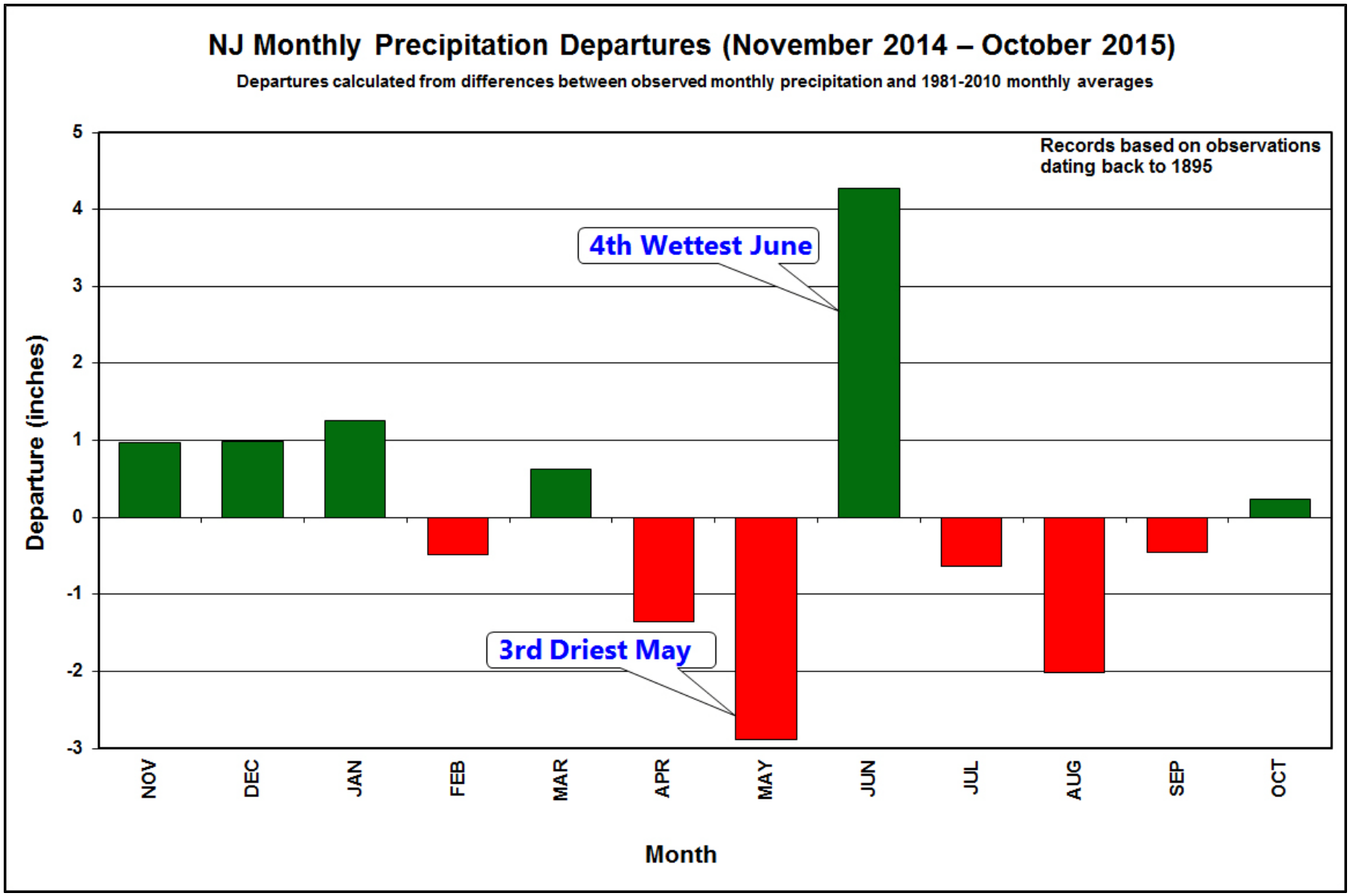
Johnson, Robert L. 2009. *Cazenovia Lake Plant Community Response to the 2009 Application of the Herbicide Triclopyr to Control Eurasian Water Milfoil.* Racine-Johnson Ecologists.

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

2015 Rainfall and Temperature Data
2015 Water Quality Graphs
2015 TPO4 Graph for Mountain Lakes
2014 TPO4 Graph for Mountain Lakes
2013 TPO4 Graph for Mountain Lakes
2012 TPO4 Graph for Mountain Lakes
2011 TPO4 Graph for Mountain Lakes
2010 TPO4 Graph for Mountain Lakes
2009 TPO4 Graph for Mountain Lakes
2008 TPO4 Graph for Mountain Lakes
2007 TPO4 Graph for Mountain Lakes
2006 TPO4 Graph for Mountain Lakes
2015 Water Chemistry Data
2007 to 2015 Treatment History Graphs
2015 Phytoplankton Distribution Graphs
2014 Sediment Probing Map: Sunset Lake
2015 APL Water Chemistry Data Sheets
July 2015 Terrestrial Plant Survey Map
2015 Phytoplankton Data
2015 Fecal Coliform Data
2015 Weekly Surveys


NJ Monthly Temperature Departures (November 2014 – October 2015)
Departures calculated from differences between observed monthly temperatures and 1981-2010 monthly averages
Records based on observations dating back to 1895
3rd Warmest May
3rd Warmest September
3rd Coldest February
Departure (°F)
7
6
5
4
3
2
1
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
-10
-11
-12
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
Month


NJ Monthly Precipitation Departures (November 2014 – October 2015)
Departures calculated from differences between observed monthly precipitation and 1981-2010 monthly averages
Records based on observations dating back to 1895
4th Wettest June
3rd Driest May
Departure (inches)
5
4
3
2
1
0
-1
-2
-3
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
Month

2015 Rainfall Data-Mt Lakes NJ

Date	Rainfall
4/3/2015	0.01
4/4/2015	0.06
4/6/2015	0.01
4/7/2015	0.1
4/10/2015	0.08
4/11/2015	0.01
4/14/2015	0.02
4/15/2015	0.02
4/17/2015	0.09
4/20/2015	0.76
4/21/2015	0.51
4/22/2015	0.01

Date	Rainfall
5/4/2015	0.01
5/6/2015	0.02
5/7/2015	0.02
5/12/2015	0.02
5/16/2015	0.23
5/17/2015	0.19
5/19/2015	0.02
5/23/2015	0.01
5/27/2015	0.04
5/31/2015	0.32

Date	Rainfall
7/1/2015	0.48
7/4/2015	0.18
7/6/2015	0.01
7/8/2015	0.05
7/9/2015	0.42
7/18/2015	0.02
7/21/2015	0.03
7/26/2015	0.02
7/27/2015	0.34
7/30/2015	0.16

Total Monthly Rainfall

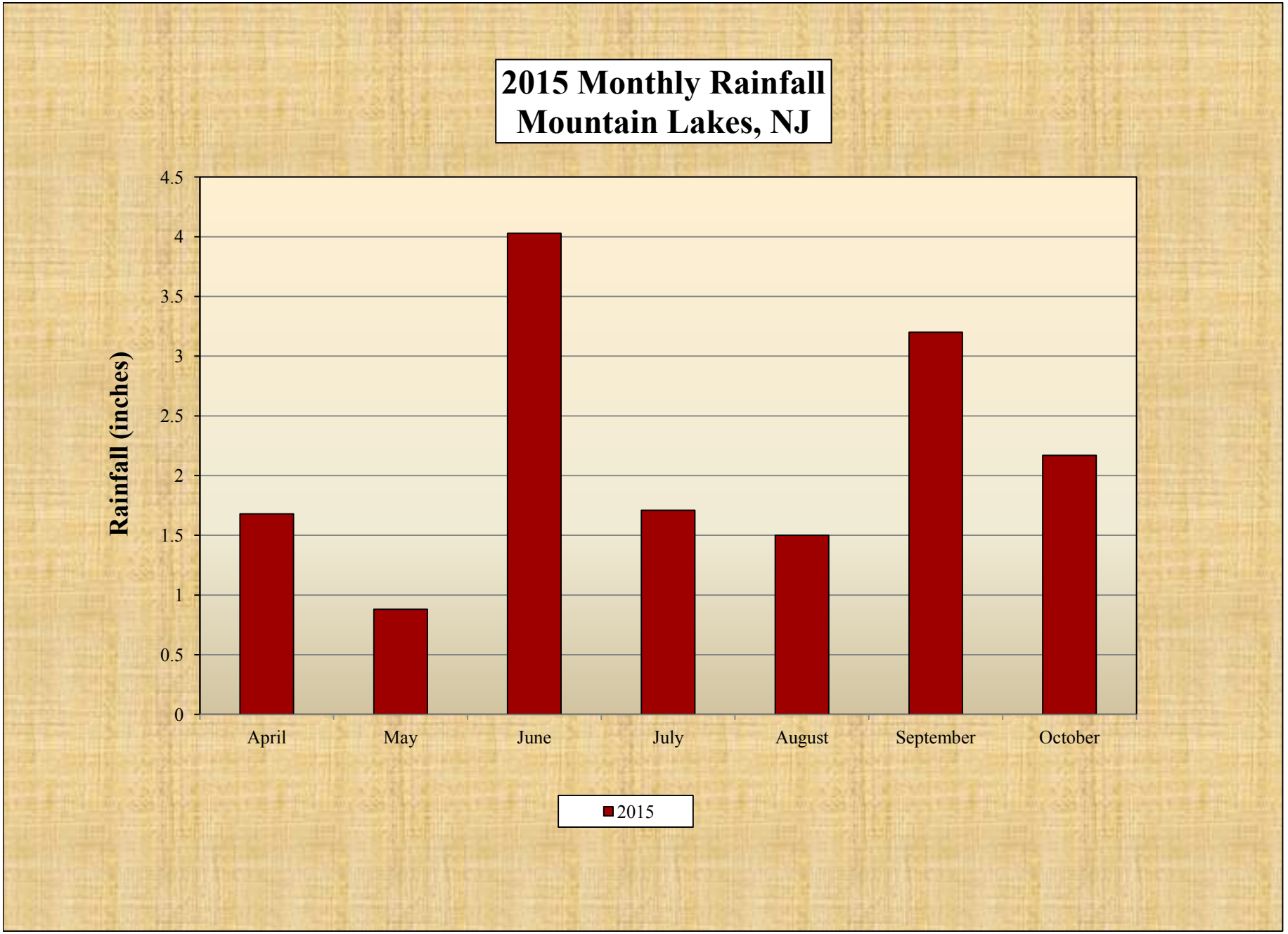
Month	2015	
	Inches	Days
April	1.68	12
May	0.88	10
June	4.03	18
July	1.71	10
August	1.50	9
September	3.2	4
October	2.17	7

Date	Rainfall
6/1/2015	0.82
6/2/2015	0.52
6/5/2015	0.02
6/6/2015	0.16
6/8/2015	0.24
6/9/2015	0.15
6/14/2015	0.23
6/15/2015	0.4
6/16/2015	0.07
6/18/2015	0.02
6/19/2015	0.02
6/21/2015	0.62
6/23/2015	0.03
6/26/2015	0.02
6/27/2015	0.58
6/28/2015	0.11
6/29/2015	0.01
6/30/2015	0.01

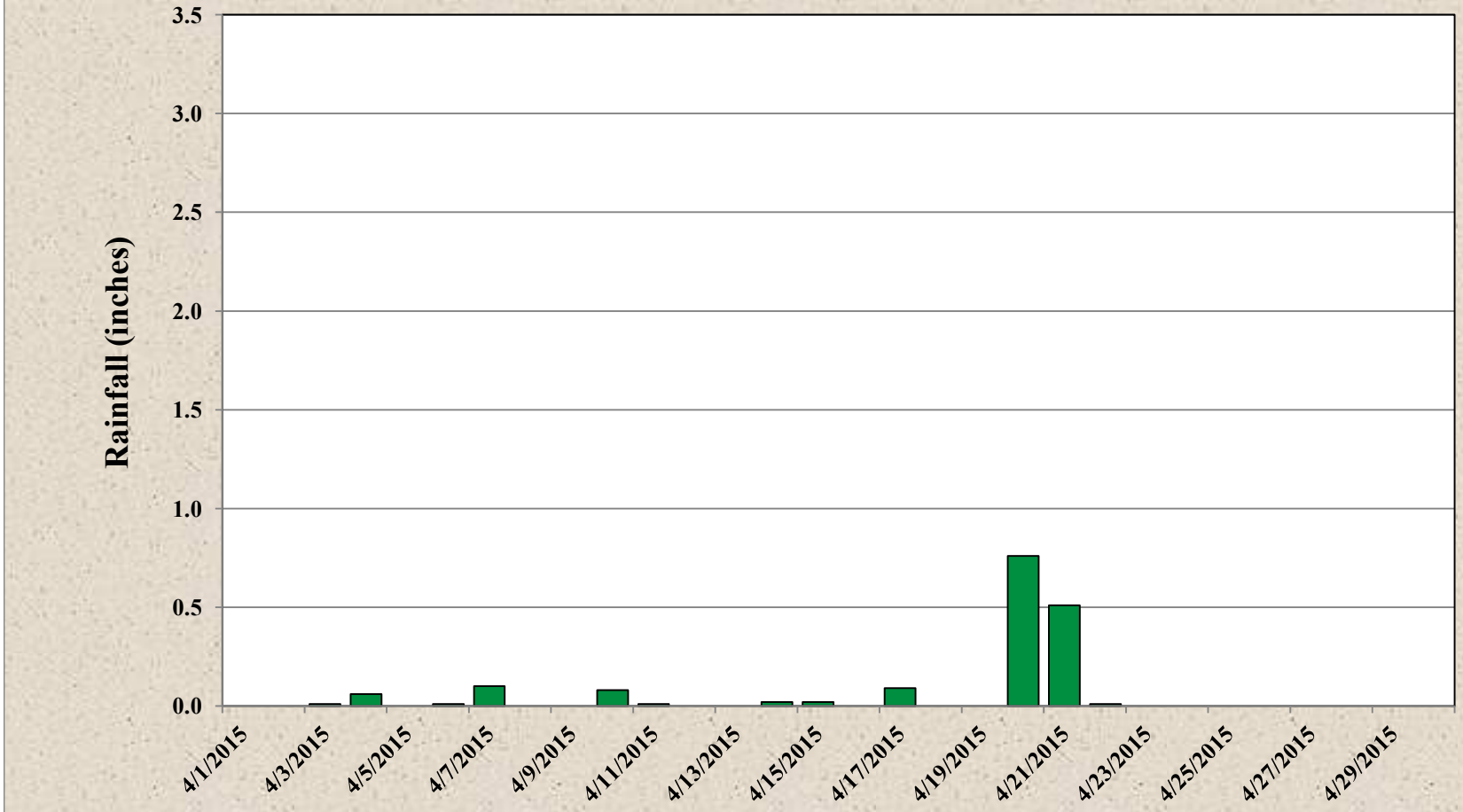
Date	Rainfall
8/4/2015	0.07
8/11/2015	0.7
8/13/2015	0.01
8/17/2015	0.01
8/18/2015	0.04
8/19/2015	0.06
8/20/2015	0.02
8/21/2015	0.58
8/25/2015	0.01

Date	Rainfall
9/10/2015	0.74
9/12/2015	0.24
9/29/2015	0.2
9/30/2015	2.02

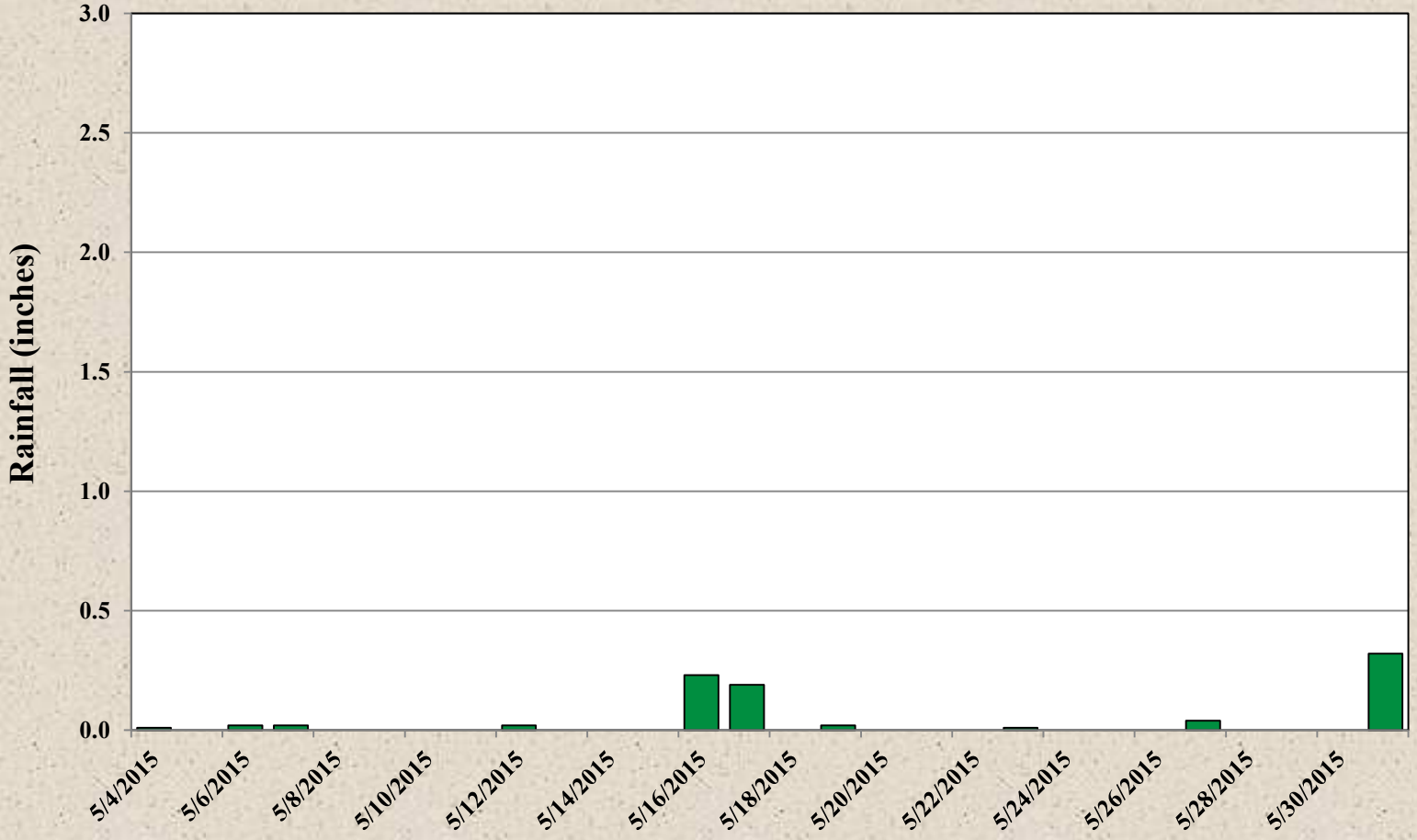
Date	Rainfall
10/1/2015	0.1
10/2/2015	0.49
10/3/2015	0.28
10/9/2015	0.14
10/25/2015	0.05
10/28/2015	0.95
10/29/2015	0.16


2015 Monthly Rainfall
Mountain Lakes, NJ
Rainfall (inches)
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
April
May
June
July
August
September
October
2015

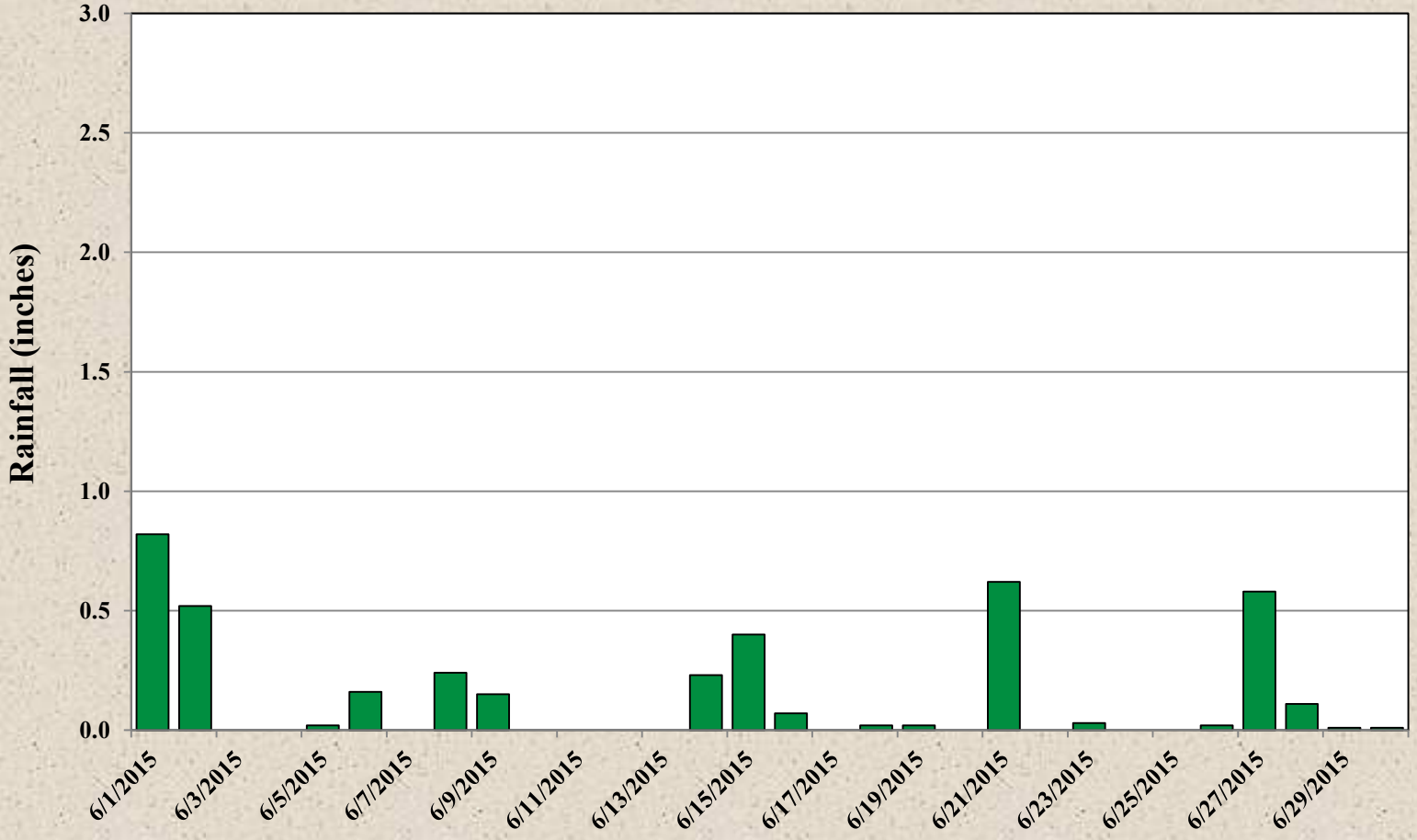
April 2015 Rainfall
Mountain Lakes, NJ



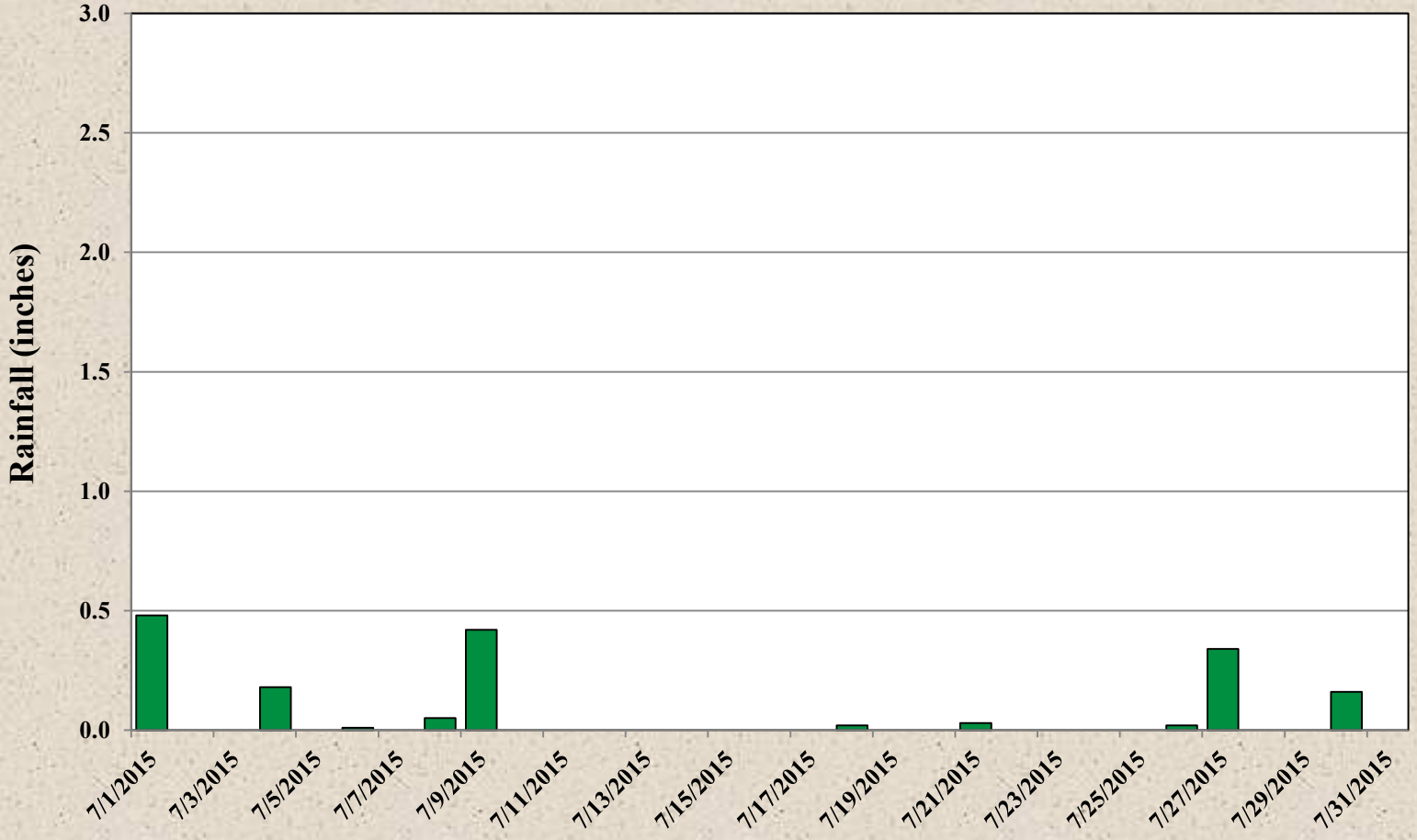
May 2015 Rainfall
Mountain Lakes, NJ



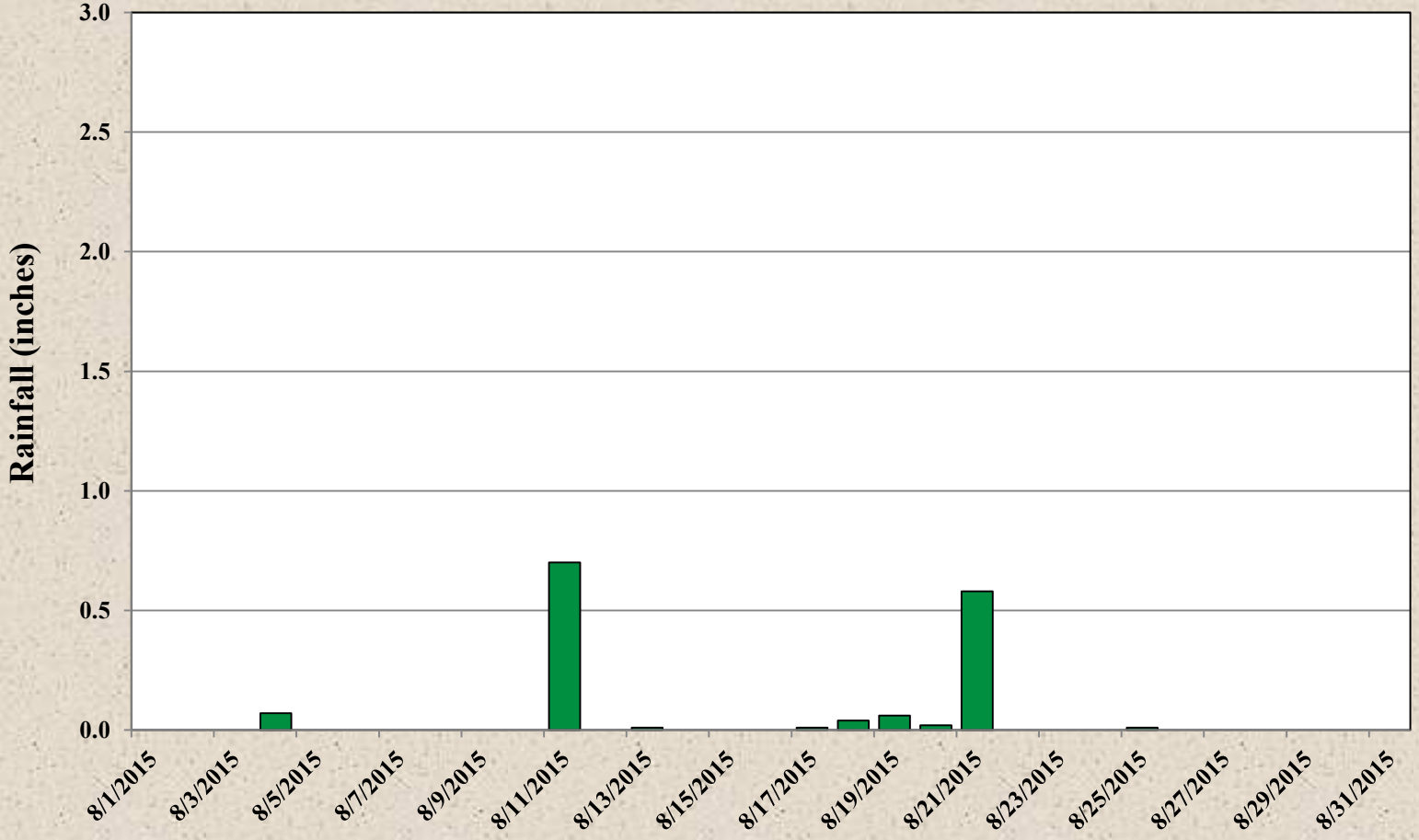
June 2015 Rainfall
Mountain Lakes, NJ



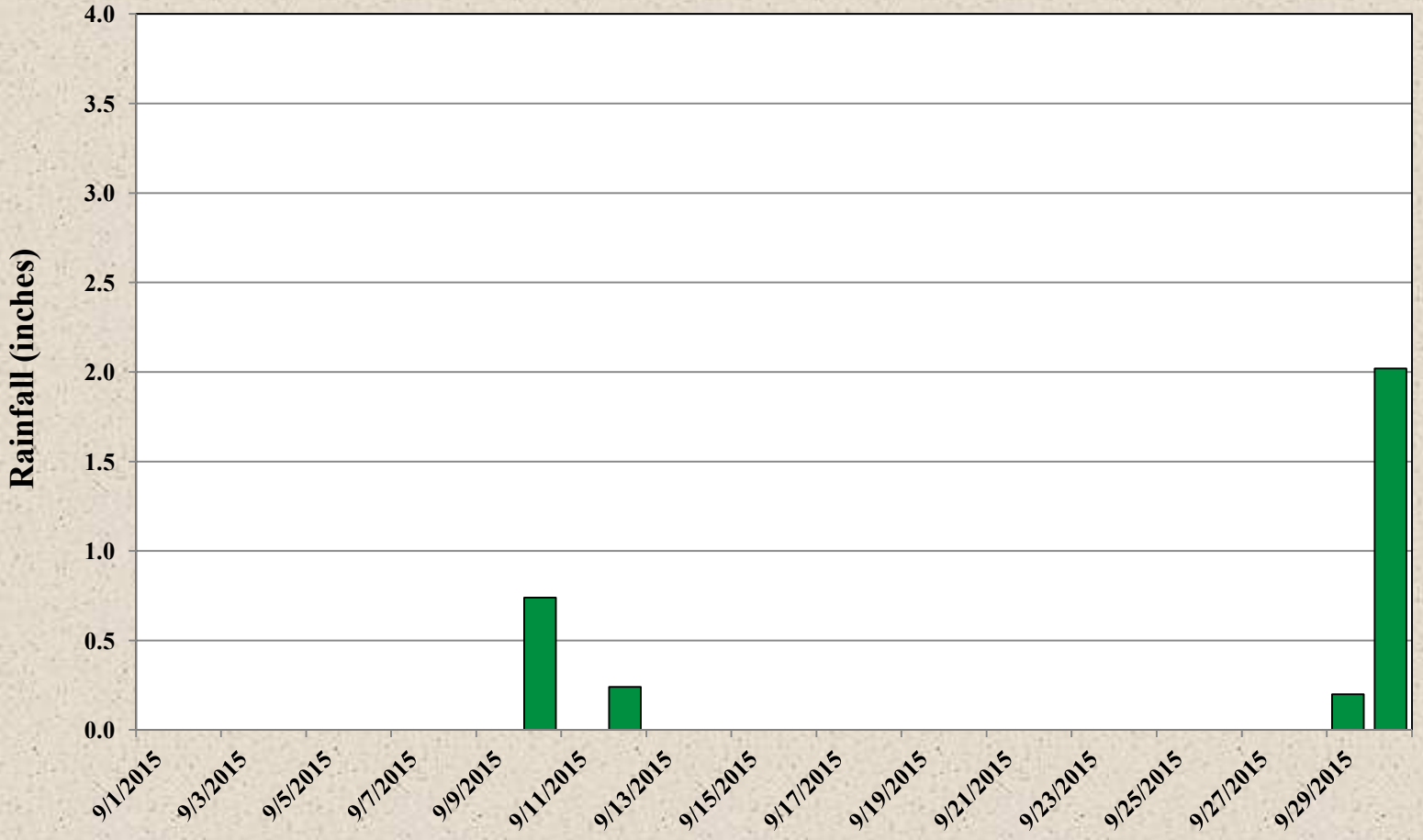
July 2015 Rainfall
Mountain Lakes, NJ



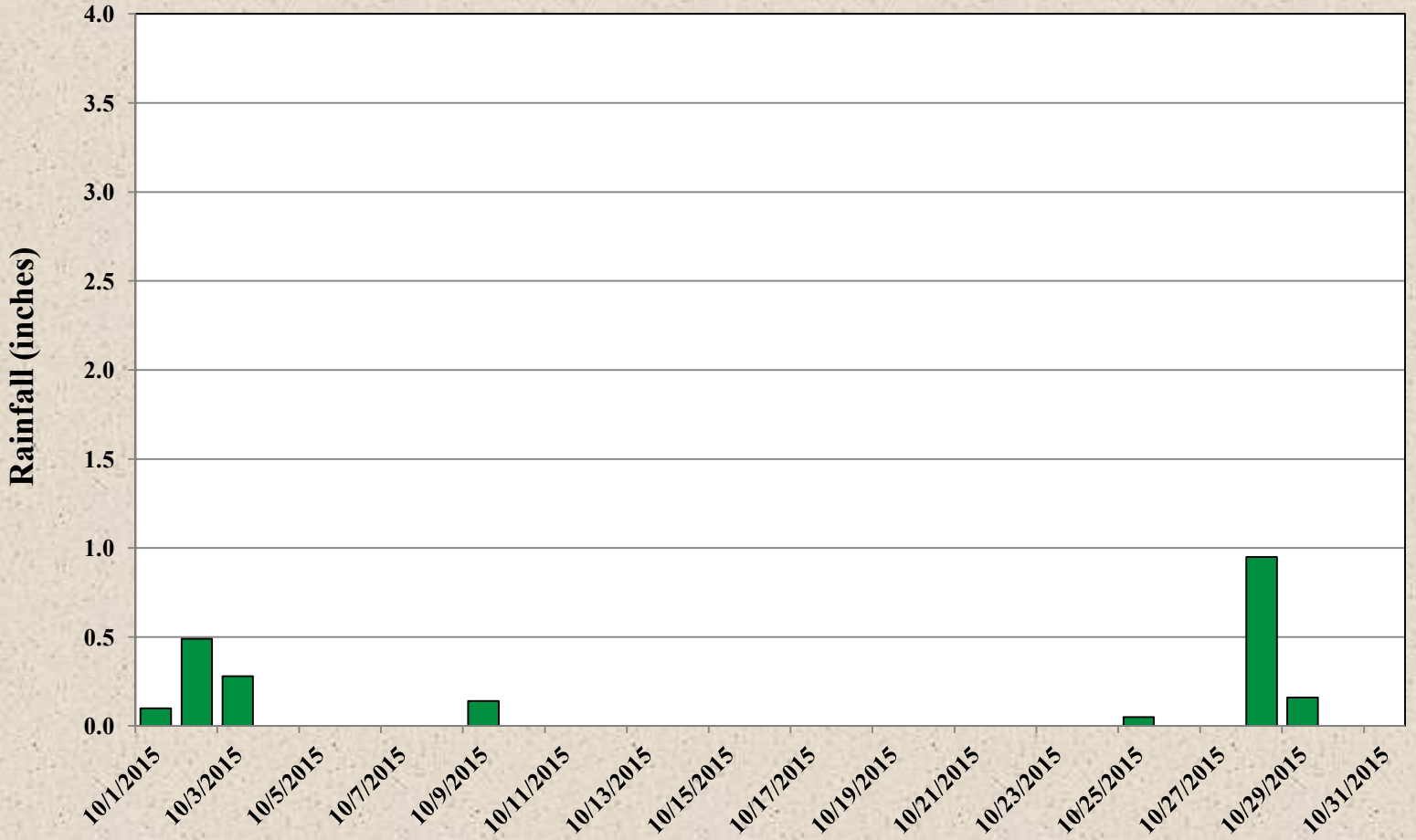
August 2015 Rainfall
Mountain Lakes, NJ

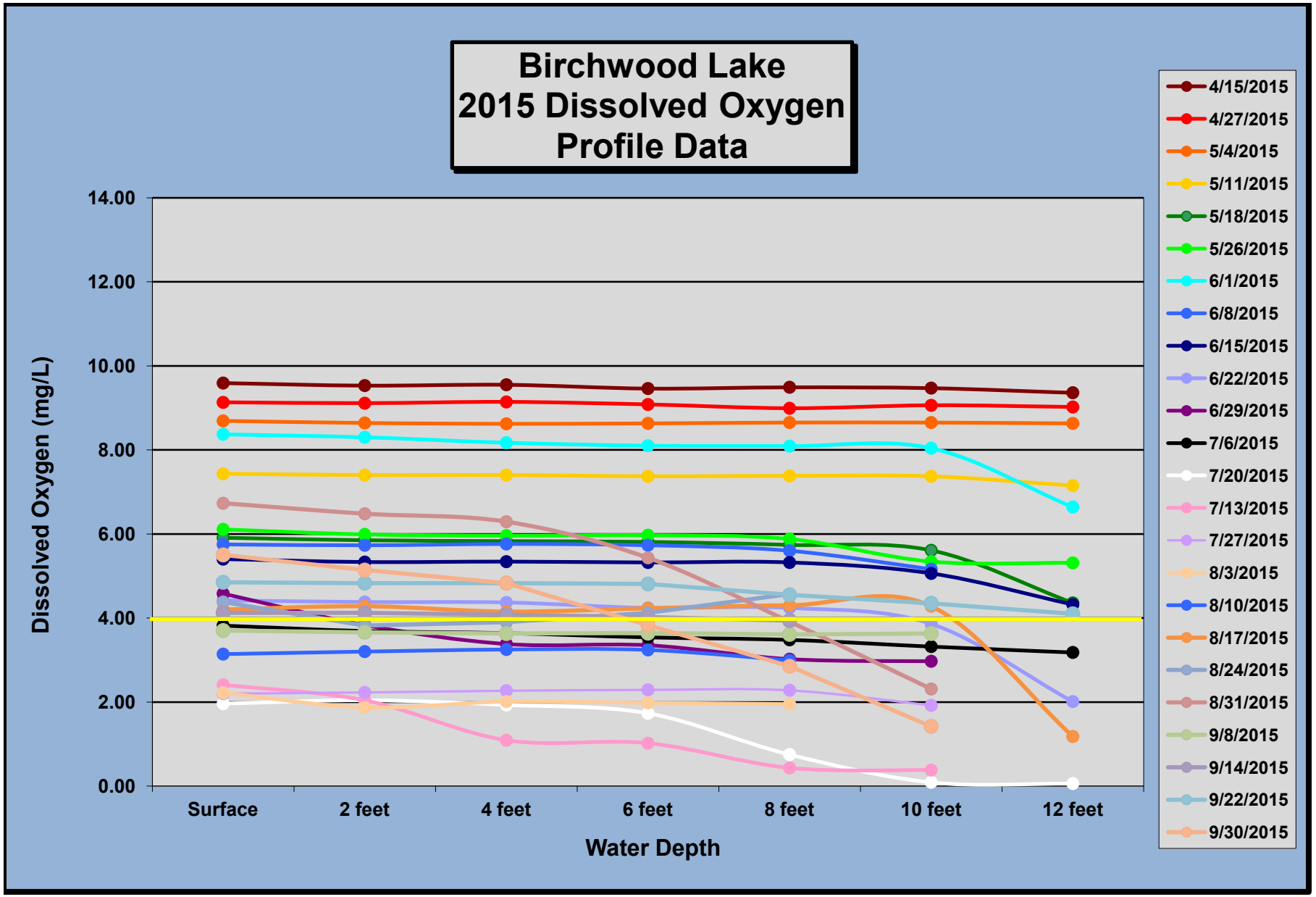


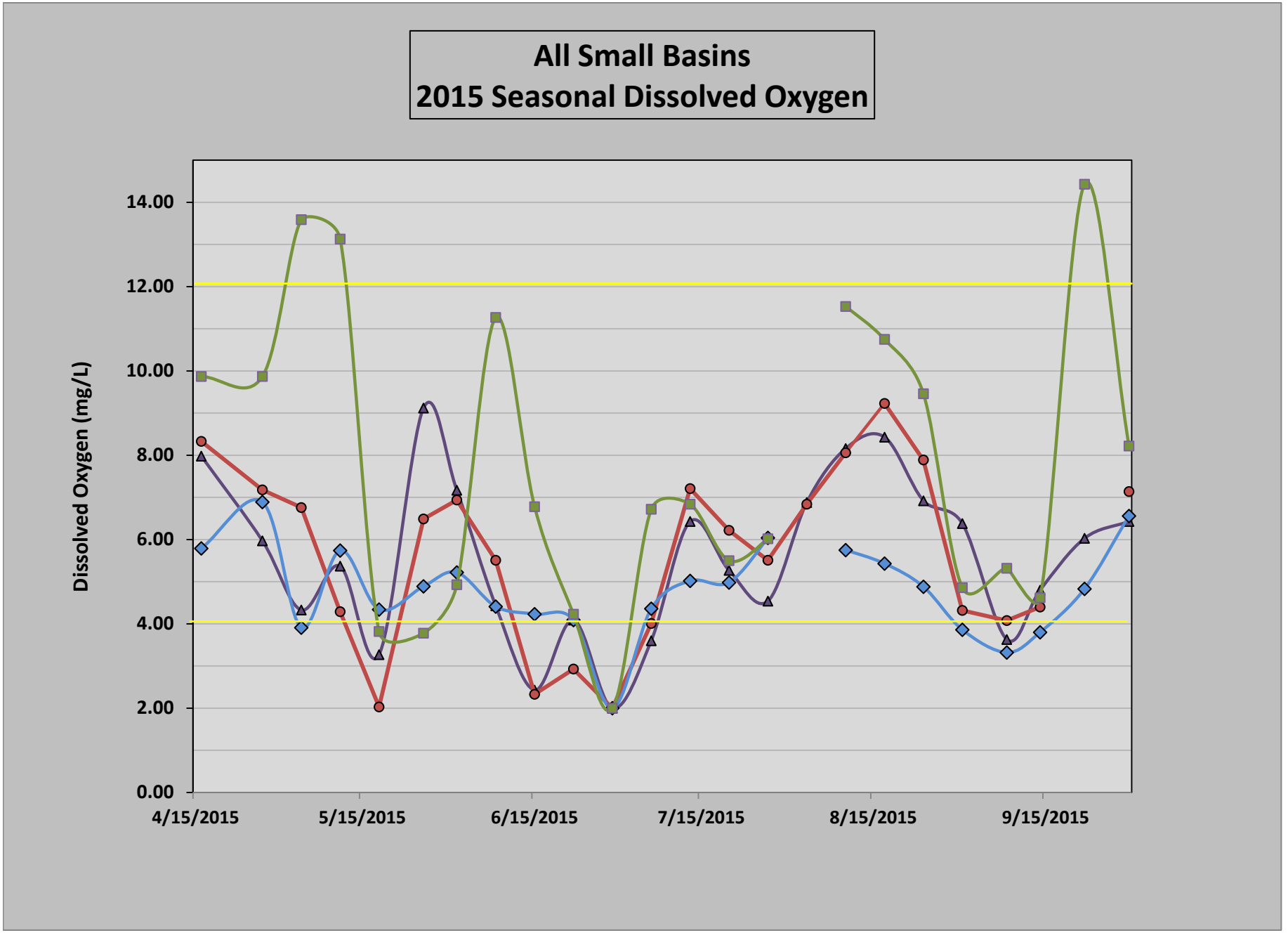
September 2015 Rainfall
Mountain Lakes, NJ

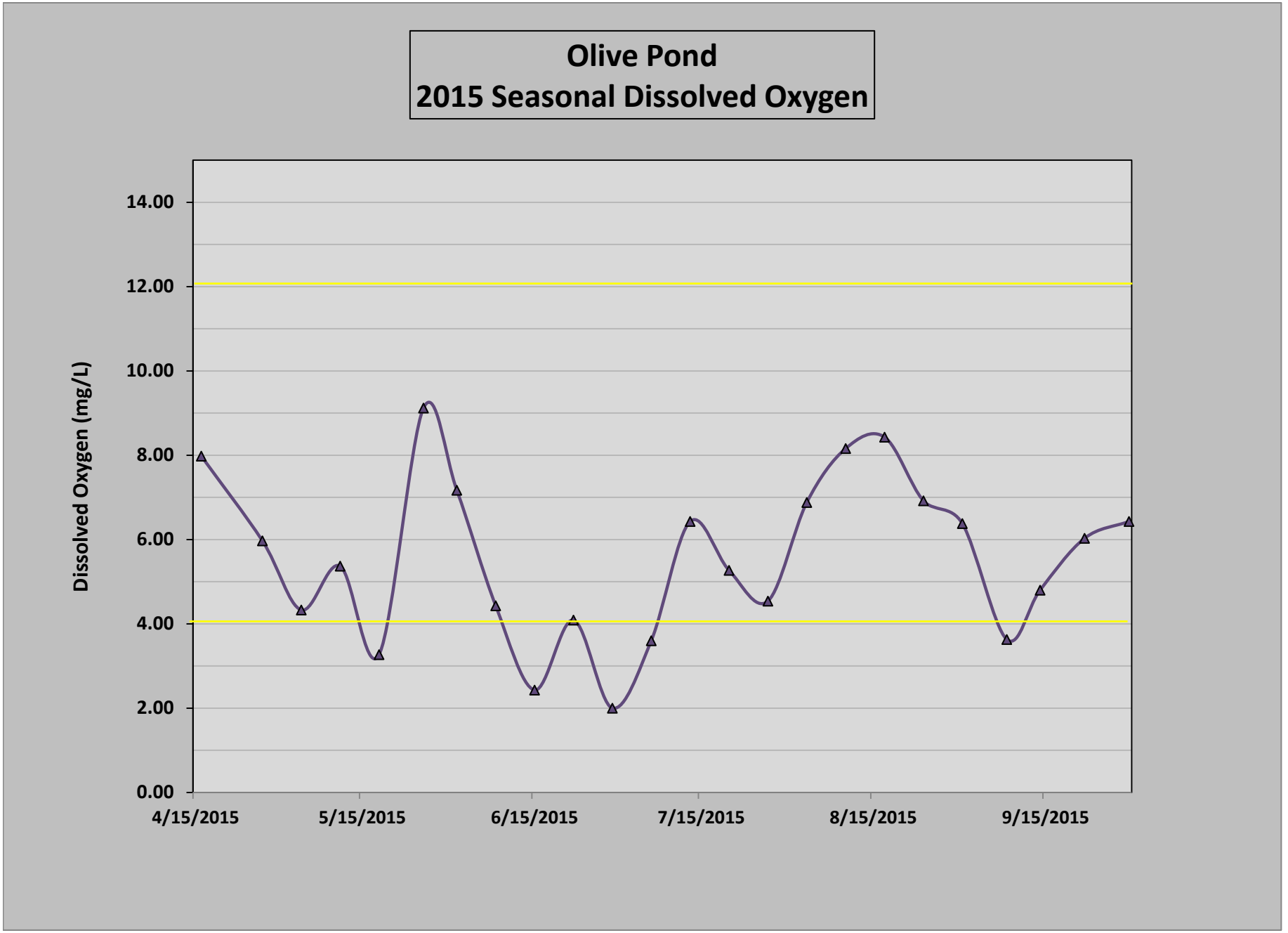


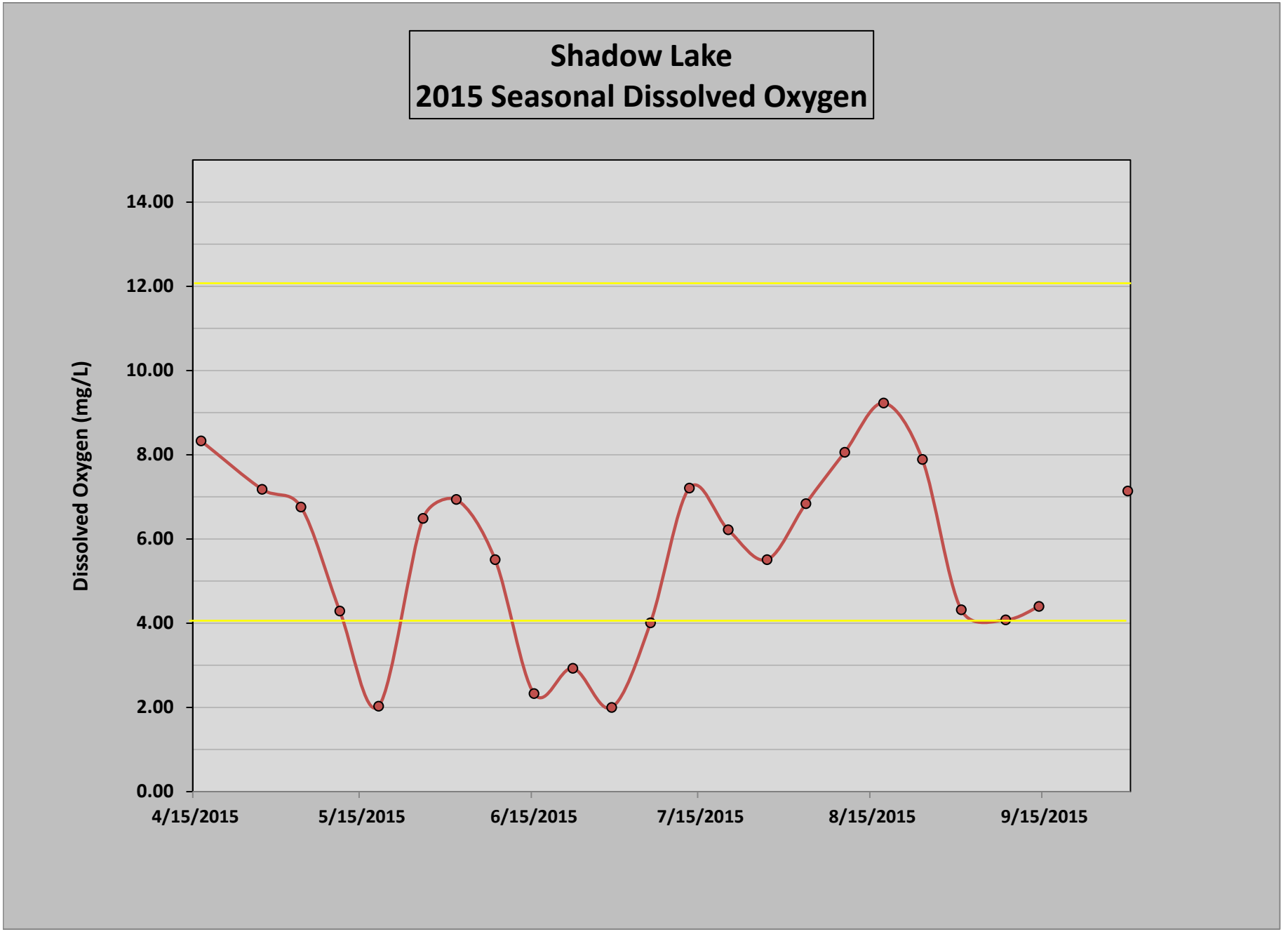
October 2015 Rainfall
Mountain Lakes, NJ

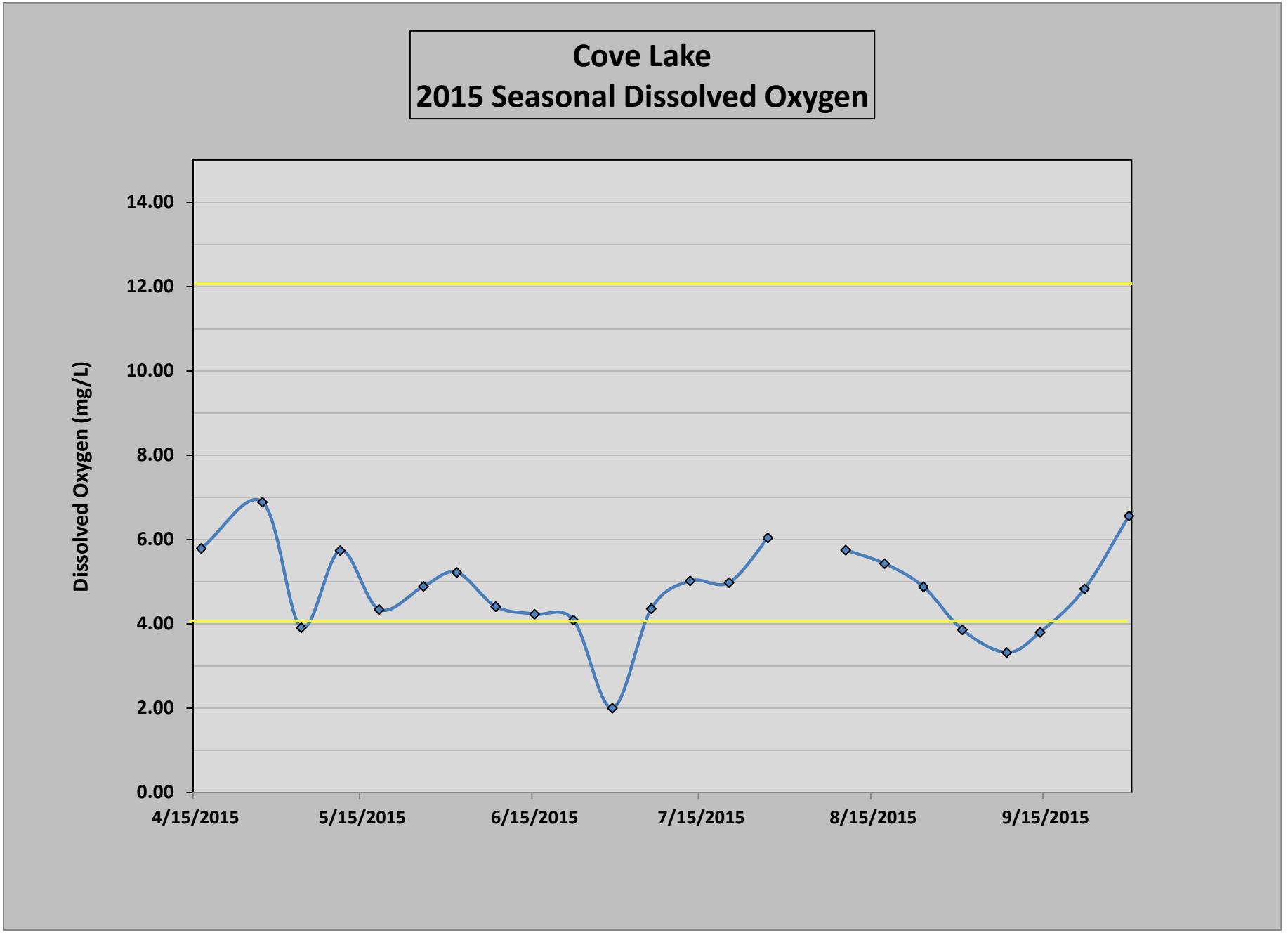


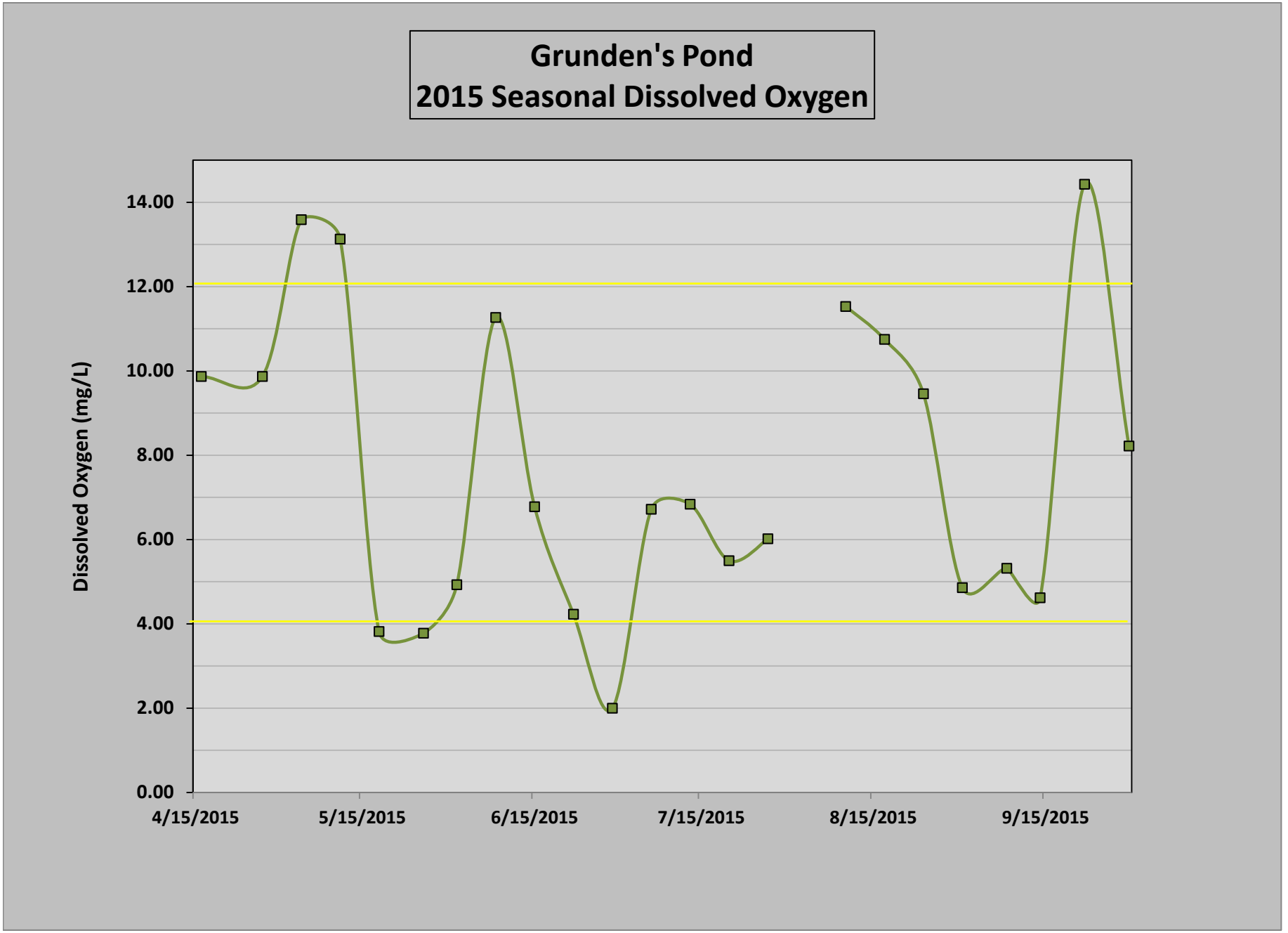

Birchwood Lake
2015 Dissolved Oxygen
Profile Data
Dissolved Oxygen (mg/L)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Surface
2 feet
4 feet
6 feet
8 feet
10 feet
12 feet
Water Depth
4/15/2015
4/27/2015
5/4/2015
5/11/2015
5/18/2015
5/26/2015
6/1/2015
6/8/2015
6/15/2015
6/22/2015
6/29/2015
7/6/2015
7/20/2015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

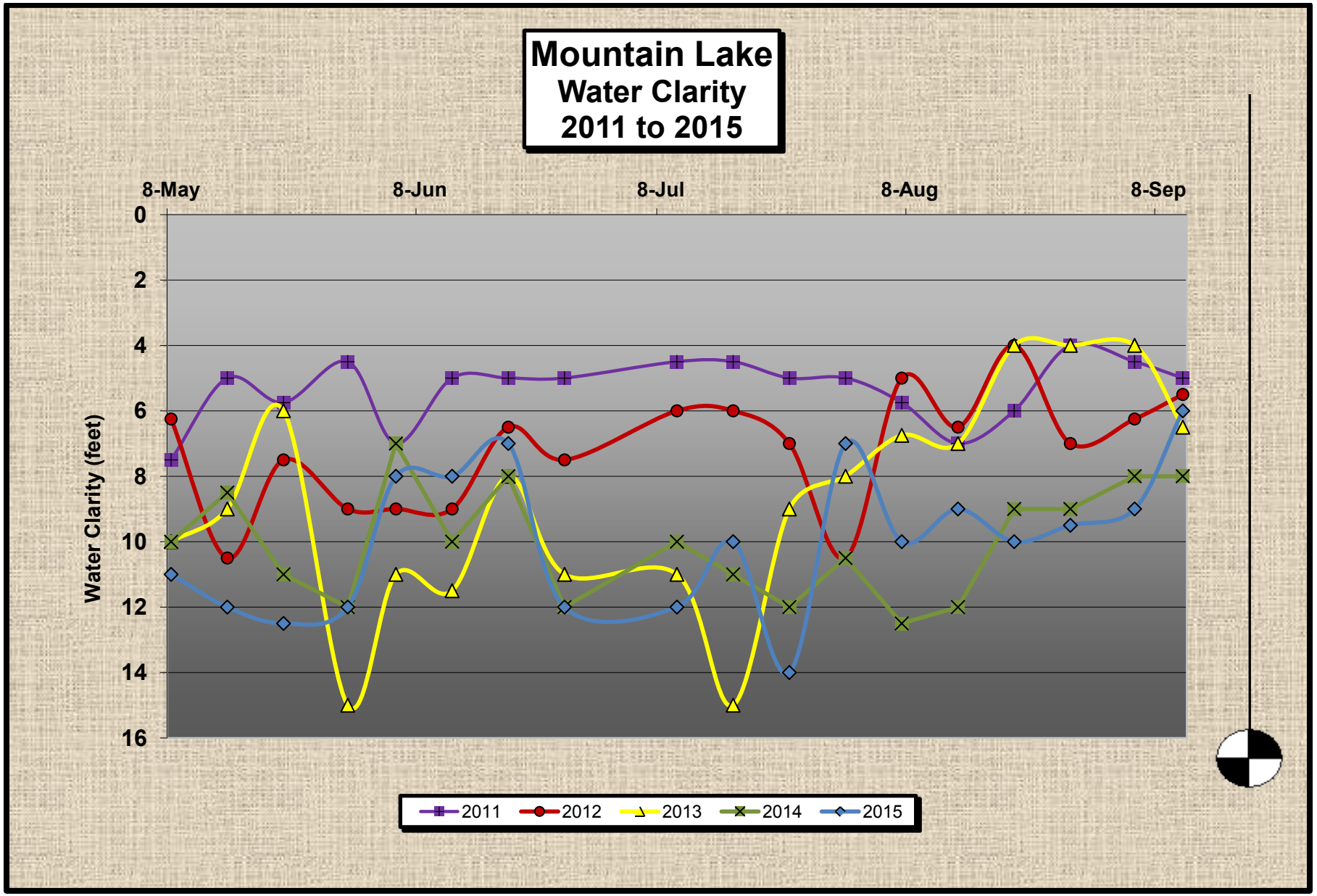

All Small Basins
2015 Seasonal Dissolved Oxygen
Dissolved Oxygen (mg/L)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
4/15/2015
5/15/2015
6/15/2015
7/15/2015
8/15/2015
9/15/2015

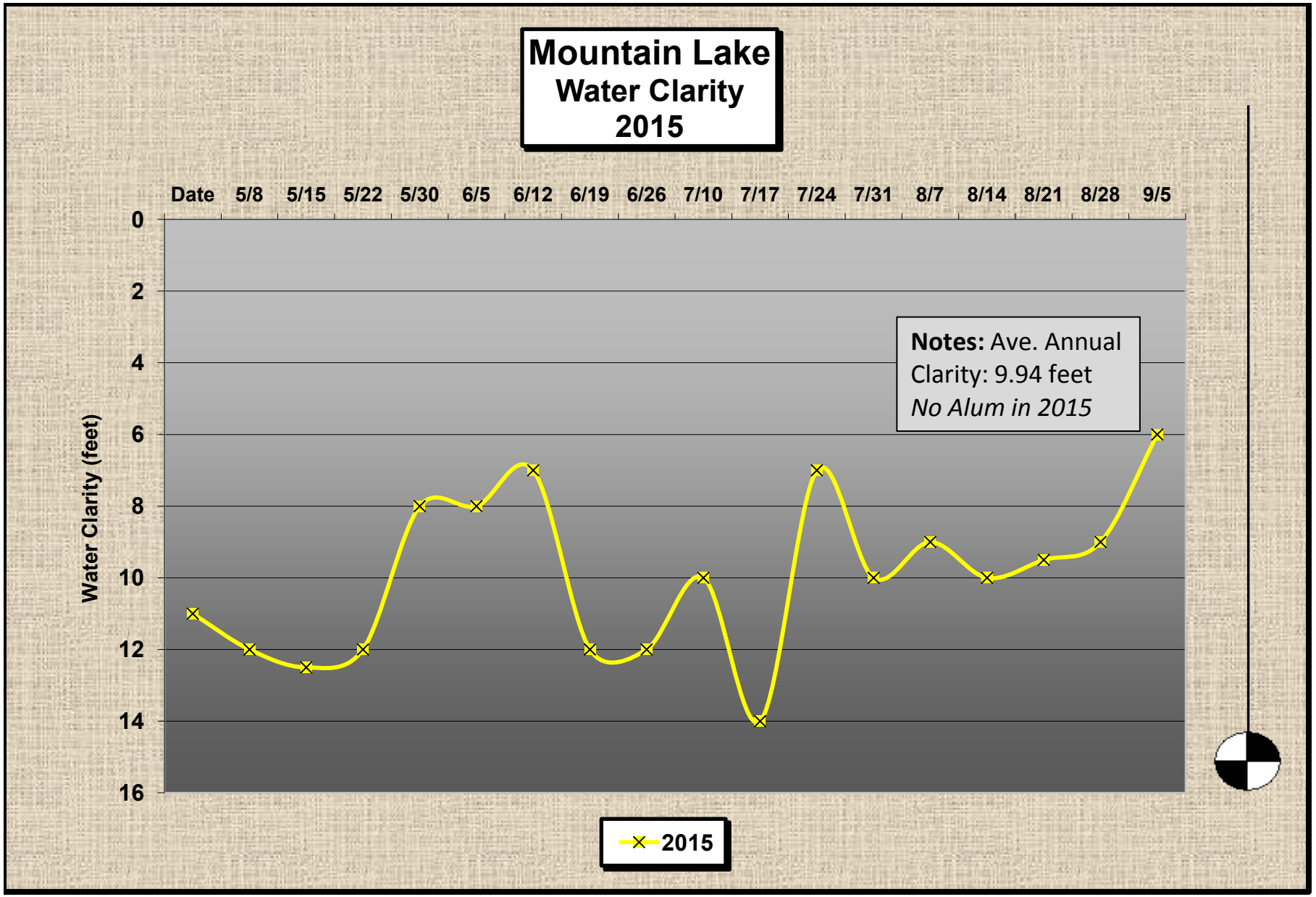

Olive Pond
2015 Seasonal Dissolved Oxygen
Dissolved Oxygen (mg/L)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
4/15/2015
5/15/2015
6/15/2015
7/15/2015
8/15/2015
9/15/2015

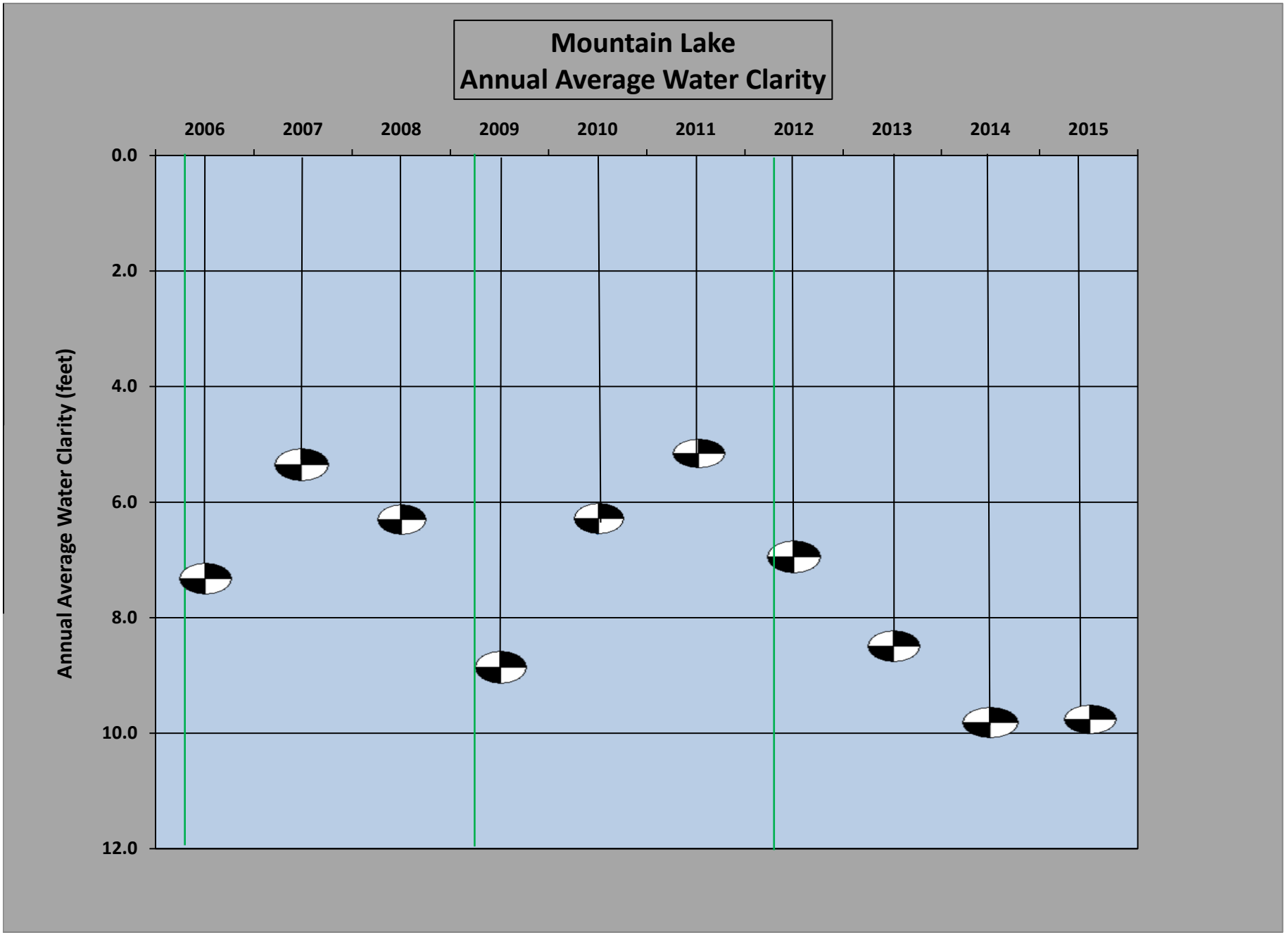

Shadow Lake
2015 Seasonal Dissolved Oxygen
Dissolved Oxygen (mg/L)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
4/15/2015
5/15/2015
6/15/2015
7/15/2015
8/15/2015
9/15/2015

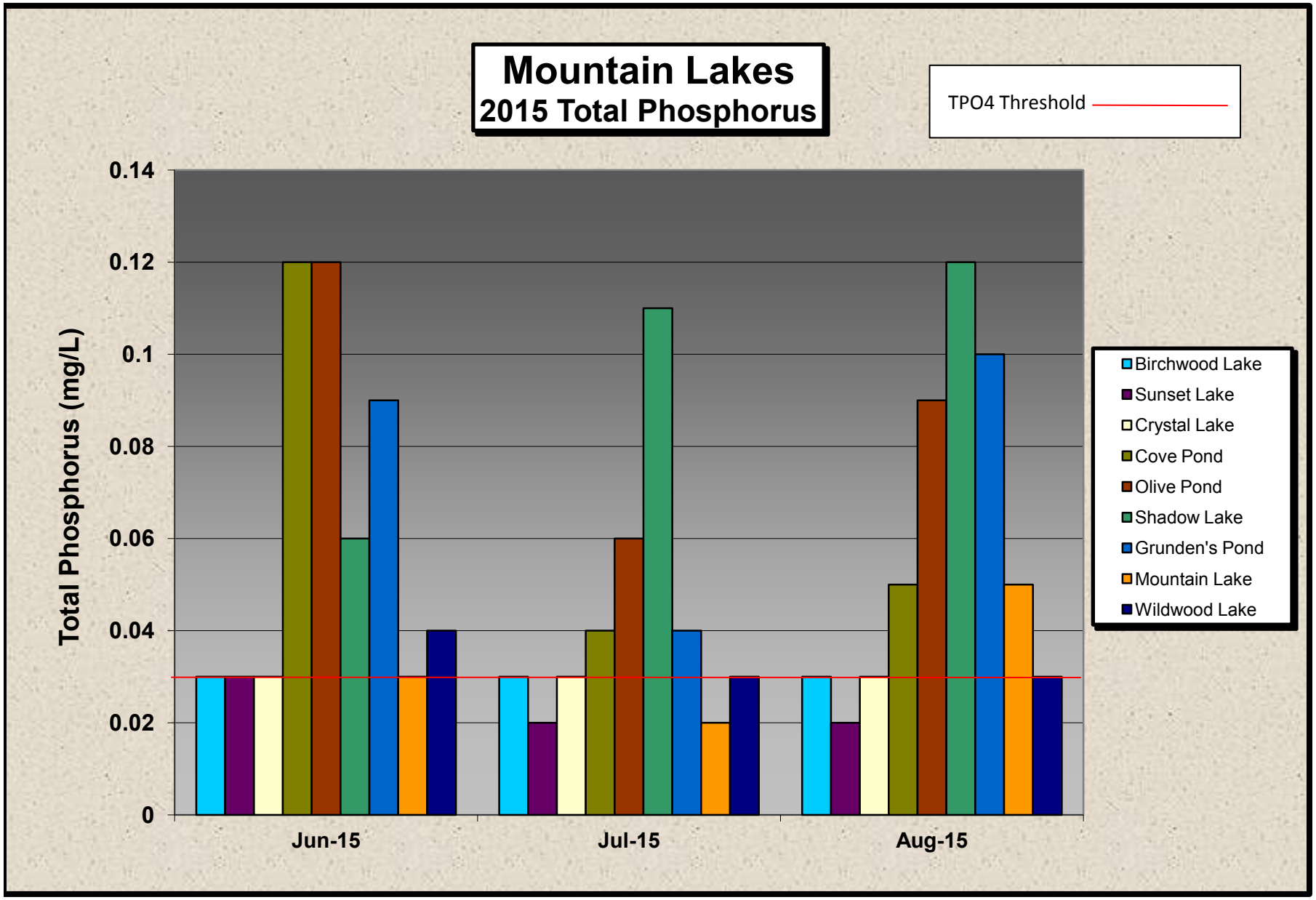

Cove Lake
2015 Seasonal Dissolved Oxygen
Dissolved Oxygen (mg/L)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
4/15/2015
5/15/2015
6/15/2015
7/15/2015
8/15/2015
9/15/2015


Grunden's Pond
2015 Seasonal Dissolved Oxygen
Dissolved Oxygen (mg/L)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
4/15/2015
5/15/2015
6/15/2015
7/15/2015
8/15/2015
9/15/2015


Mountain Lake
Water Clarity
2011 to 2015
8-May
8-Jun
8-Jul
8-Aug
8-Sep
Water Clarity (feet)
0
2
4
6
8
10
12
14
16
2011
2012
2013
2014
2015


Mountain Lake
Water Clarity
2015
Date
5/8
5/15
5/22
5/30
6/5
6/12
6/19
6/26
7/10
7/17
7/24
7/31
8/7
8/14
8/21
8/28
9/5
0
2
4
6
8
10
12
14
16
Water Clarity (feet)
Notes: Ave. Annual Clarity: 9.94 feet
No Alum in 2015
2015


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


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

Allied Biological

Borough of Mountain Lakes

Lake Management as of 12/16/2015

Date	Product Applied or Work Conducted	Acres Treated	Target Species
Mt. Lakes - Birchwood Lake			
5/28/2015	Clipper	0.5	Potamogeton crispus
7/10/2015	Aquaneat	dam spray	Terrestrial plants
7/10/2015	Garlon 3A	dam spray	Terrestrial plants
8/12/2015	Aquaneat	dam spray	Lythrum salicaria
Mt. Lakes - Cove Lake			
3/13/2015	no treatment		
Mt. Lakes - Crystal Lake			
4/29/2015	Copper Sulfate	3	Filamentous Algae
5/19/2015	Copper Sulfate	2.2	Filamentous Algae
5/28/2015	Sonar AS	20.4	Potamogeton amplifolius
7/8/2015	Copper Sulfate	1.15	Filamentous Algae
7/10/2015	Aquaneat	dam spray	Terrestrial plants
7/10/2015	Garlon 3A	dam spray	Terrestrial plants
9/11/2015	Copper Sulfate	2.3	Filamentous Algae

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Allied Biological

Borough of Mountain Lakes

Lake Management as of 12/16/2015

Date	Product Applied or Work Conducted	Acres Treated	Target Species
Mt. Lakes - Grundens Pond			
5/13/2015	Copper Sulfate	1.3	Filamentous Algae
5/13/2015	Reward	1.3	Potamogeton crispus
7/2/2015	Clipper	0.125	Lemna sp.
7/30/2015	Copper Sulfate	1.3	Filamentous Algae
8/19/2015	Diquat SPC 2L	1	Potamogeton sp.
8/19/2015	Copper Sulfate	0.5	Filamentous Algae
9/3/2015	Copper Sulfate	0.5	Filamentous Algae
9/3/2015	Aquaneat	0.1	Ludwigia sp
Mt. Lakes - Mountain Lake			
5/4/2015	Copper Sulfate	7.5	Filamentous Algae
5/22/2015	Reward	10	Potamogeton crispus
5/22/2015	Copper Sulfate	10	Filamentous Algae
7/1/2015	Copper Sulfate	2.05	Filamentous Algae
7/1/2015	Reward	1.5	Najas flexilis
7/10/2015	Garlon 3A	**dam spray**	Terrestrial plants
7/10/2015	Aquaneat	**dam spray**	Terrestrial plants
7/22/2015	Reward	12.8	Najas sp.
7/22/2015	Copper Sulfate	5	Filamentous Algae
Mt. Lakes - Olive Lake			
4/22/2015	Copper Sulfate	0.4	Filamentous Algae
7/17/2015	Copper Sulfate	0.2	Unicellular Algae
9/3/2015	Copper Sulfate	0.5	Filamentous Algae

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Borough of Mountain Lakes

Lake Management as of 12/16/2015

Date	Product Applied or Work Conducted	Acres Treated	Target Species
Mt. Lakes - Shadow Lake			
7/2/2015	Clipper	0.125	Lemna sp.
7/17/2015	Copper Sulfate	1.3	Unicellular Algae
Mt. Lakes - Sunset Lake			
4/23/2015	hydro-raking		
7/10/2015	Aquaneat	dam spray	Terrestrial plants
7/10/2015	Garlon 3A	dam spray	Terrestrial plants
7/21/2015	Copper Sulfate	7.8	Unicellular Algae
8/13/2015	Aquaneat	1	Nymphaea spp.

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Borough of Mountain Lakes

Lake Management as of 12/16/2015

Date	Product Applied or Work Conducted	Acres Treated	Target Species
Mt. Lakes - Wildwood Lake and Canal			
5/5/2015	**Alum**		
5/7/2015	Cutrine Plus Liquid	0.8	Filamentous Algae
5/7/2015	Copper Sulfate	1.5	Filamentous Algae
5/28/2015	Copper Sulfate	7.85	Filamentous Algae
5/28/2015	Reward	7.85	Potamogeton foliosus
7/1/2015	Copper Sulfate	7.85	Filamentous Algae
7/8/2015	Reward	4	Najas flexilis
7/8/2015	Copper Sulfate	7.85	Unicellular Algae
7/10/2015	Aquaneat	**dam spray**	Terrestrial plants
7/10/2015	Garlon 3A	**dam spray**	Terrestrial plants
7/28/2015	Reward	7.85	Najas flexilis
7/28/2015	Copper Sulfate	7.85	Unicellular Algae
8/12/2015	Alum		
8/13/2015	Clearcast	**scattered plants**	Ludwigia sp
9/3/2015	Reward	4	Najas sp.
9/3/2015	Copper Sulfate	4	Filamentous Algae

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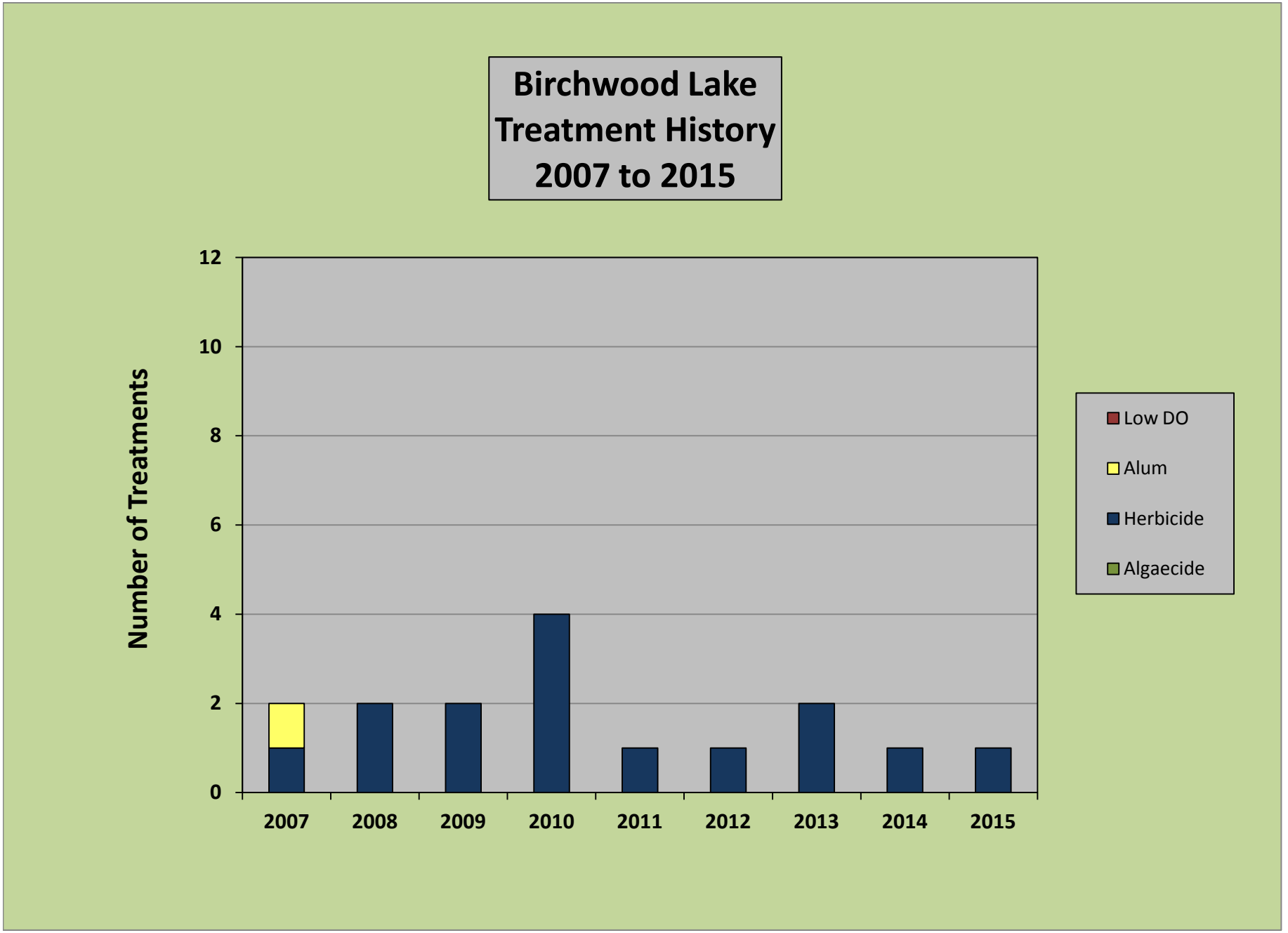
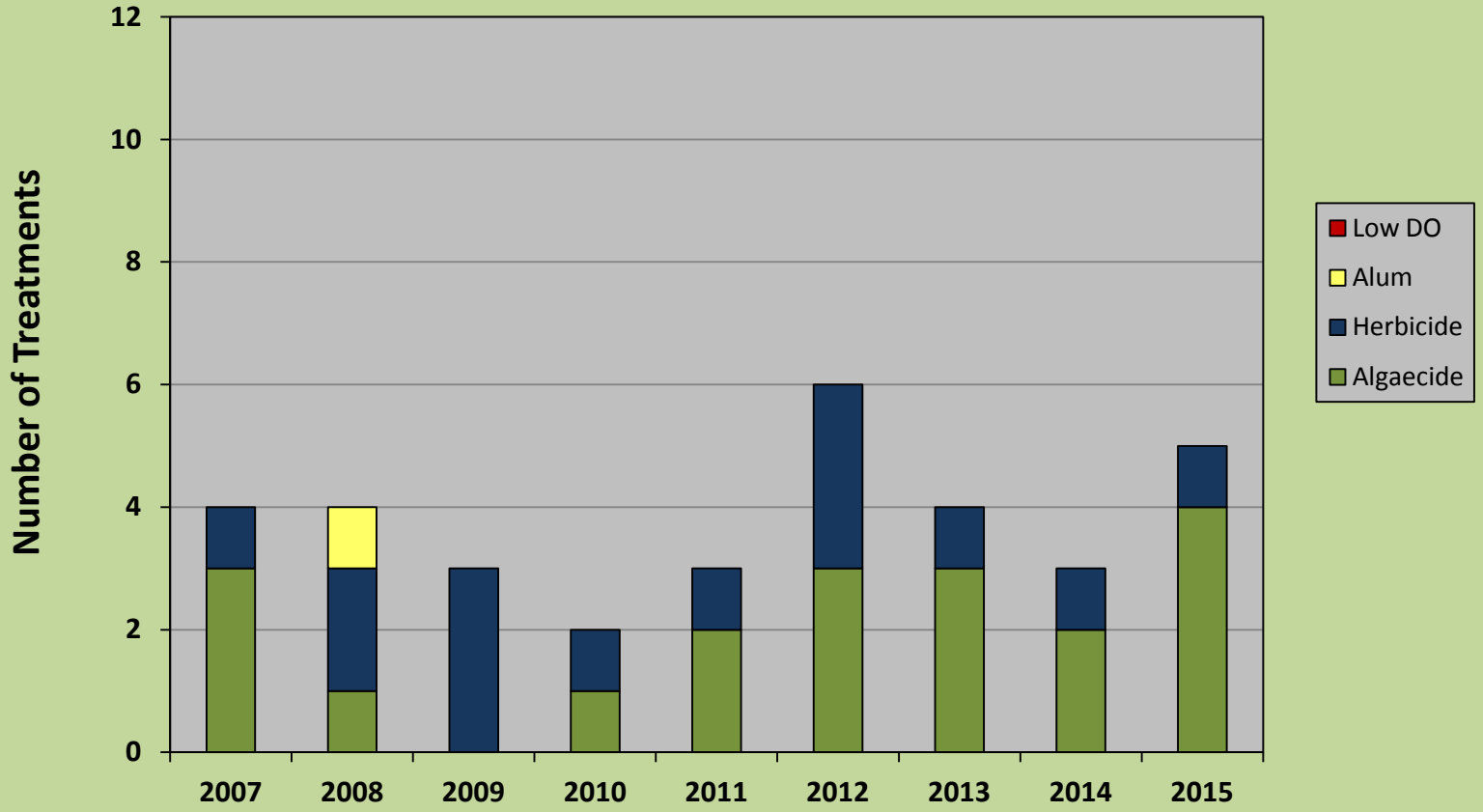
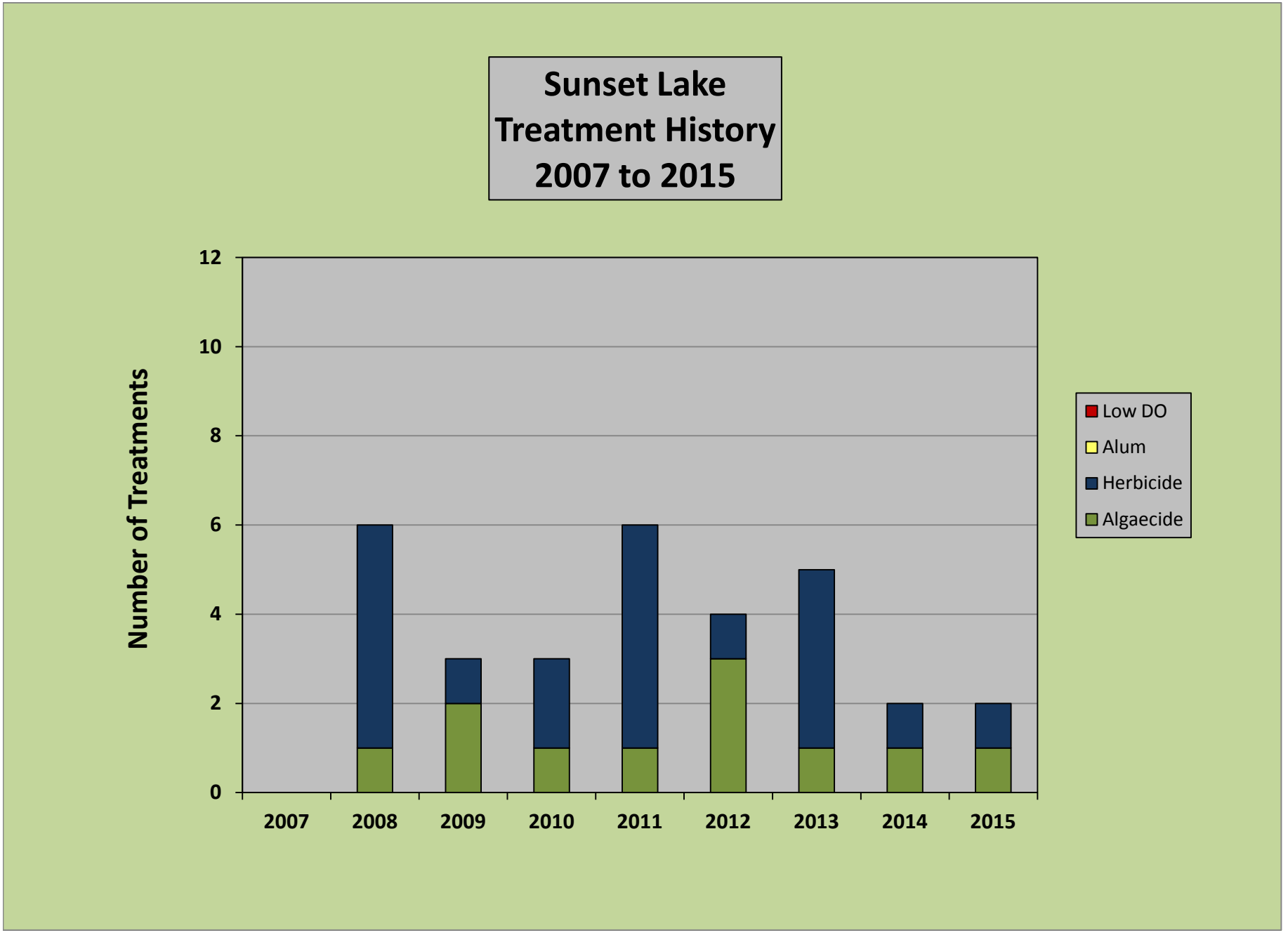
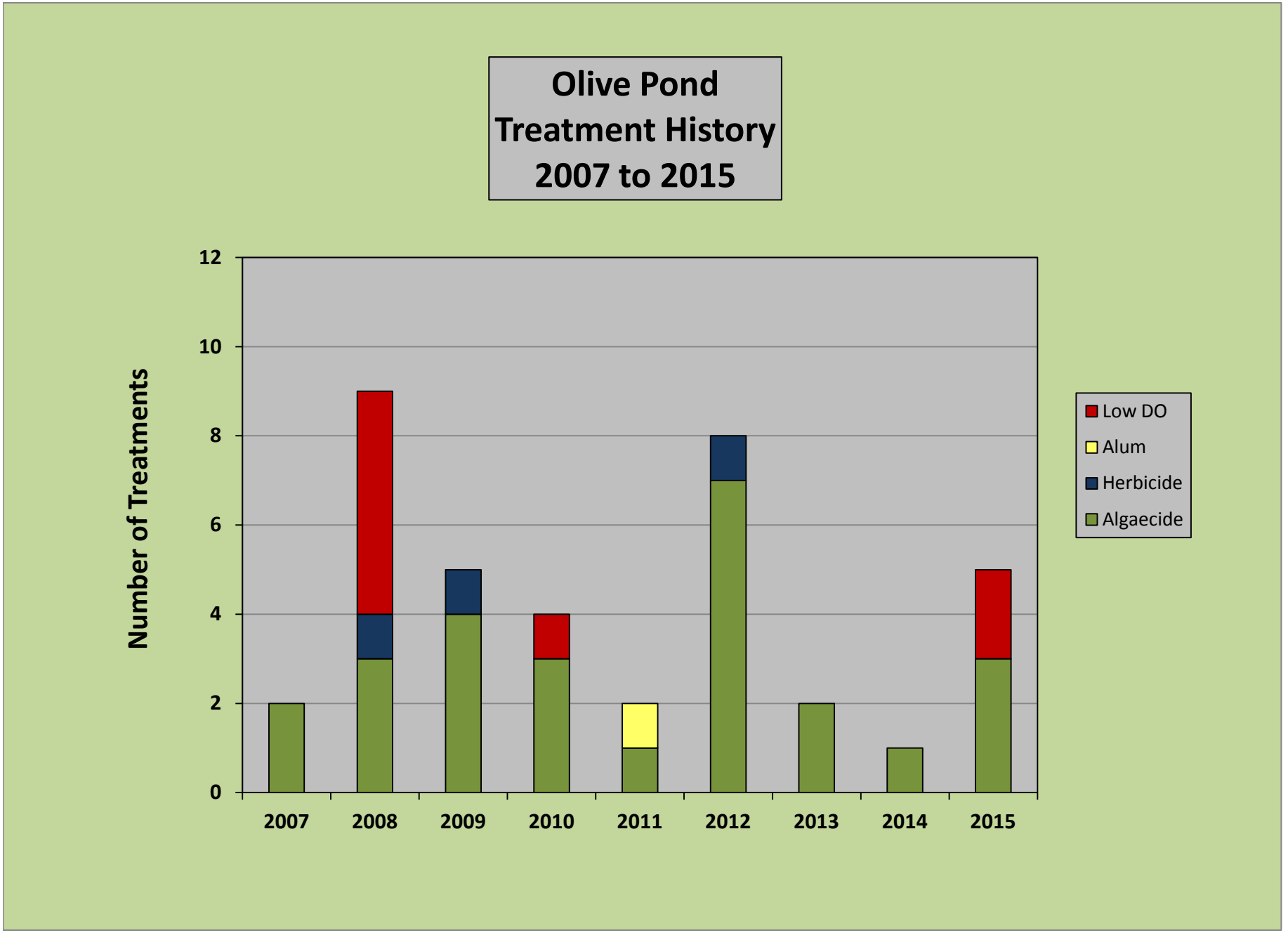

Birchwood Lake
Treatment History
2007 to 2015
Number of Treatments
12
10
8
6
4
2
0
2007
2008
2009
2010
2011
2012
2013
2014
2015
Low DO
Alum
Herbicide
Algaecide

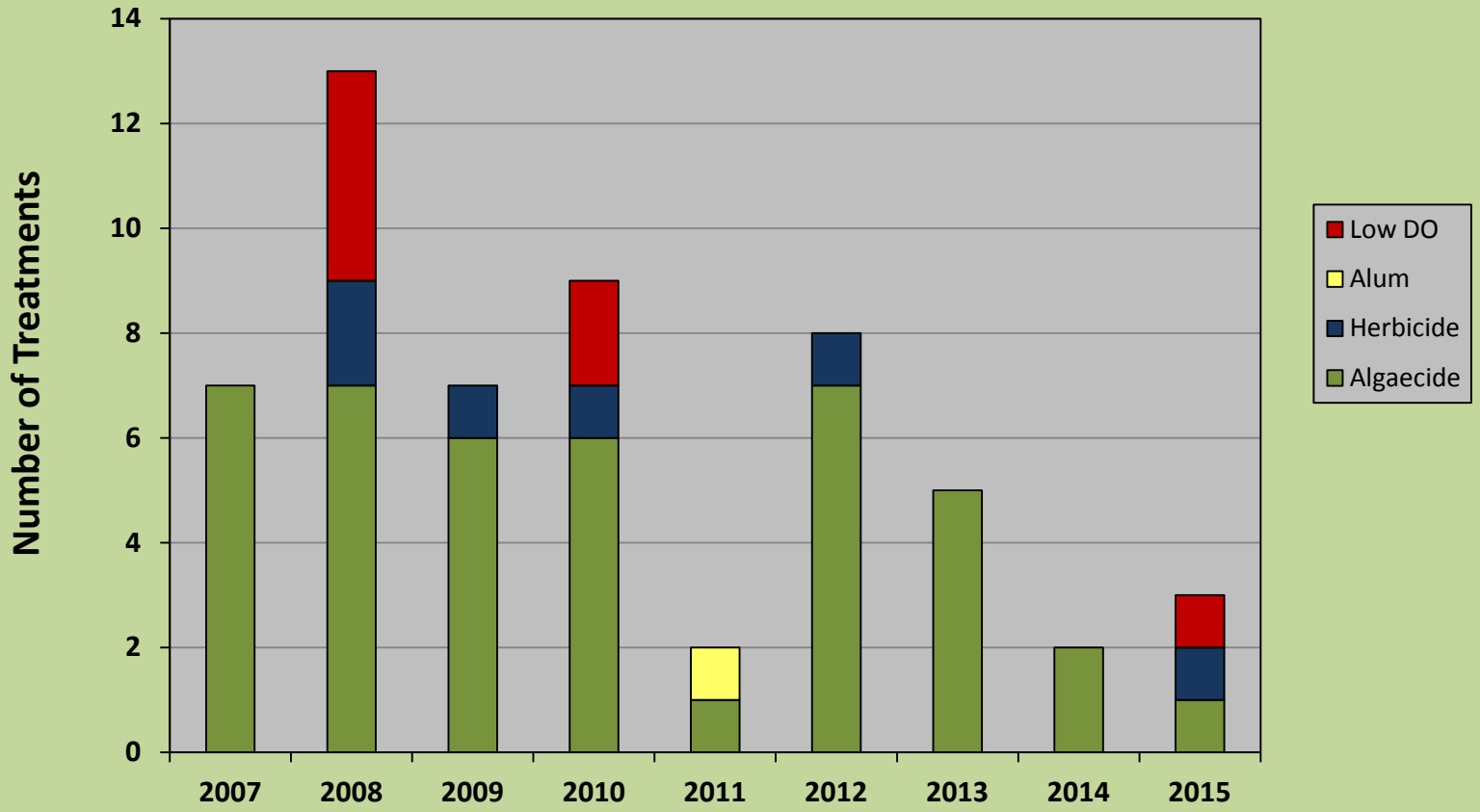
Crystal Lake Treatment History 2007 to 2015

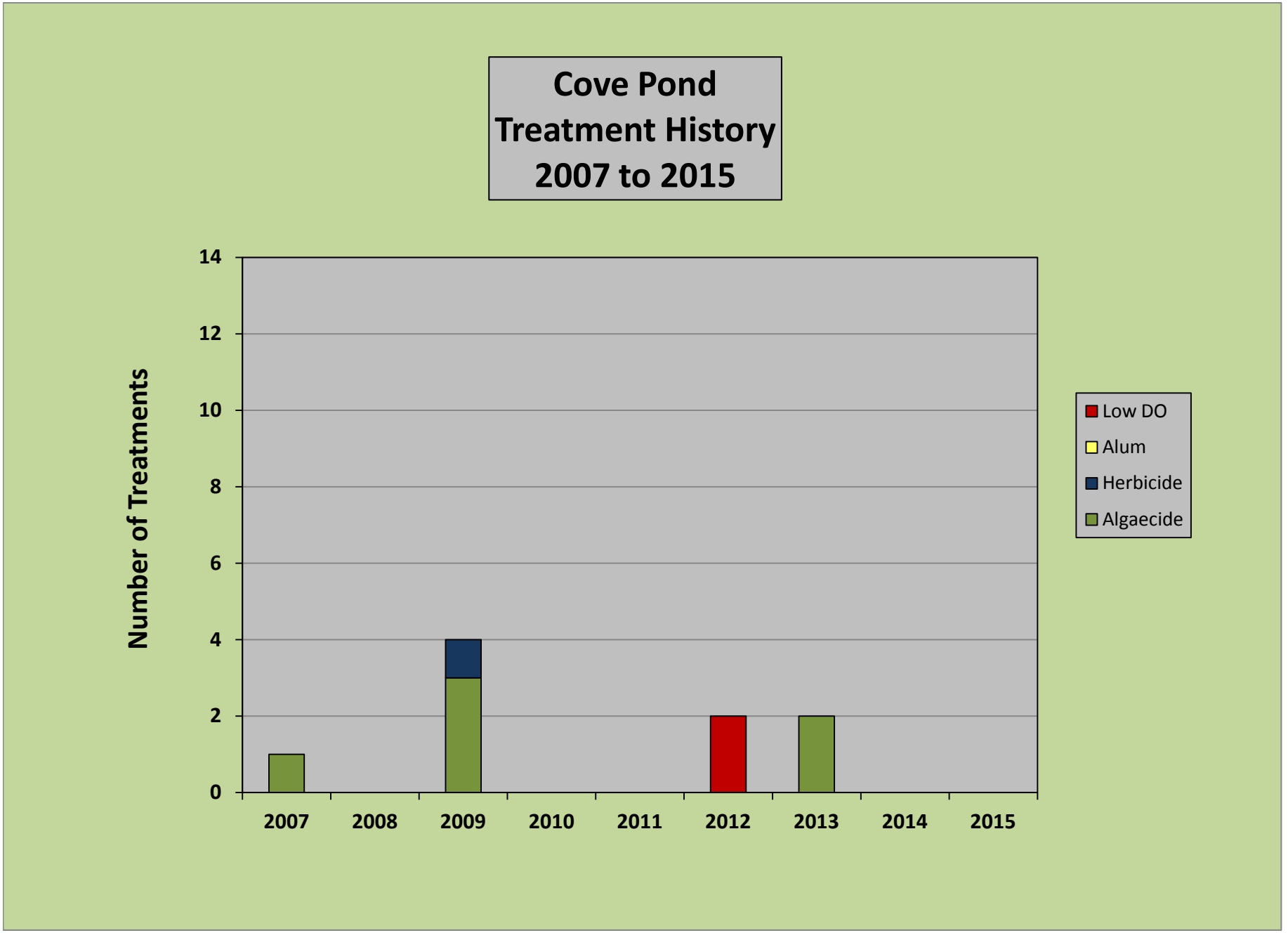



Sunset Lake
Treatment History
2007 to 2015
Number of Treatments
12
10
8
6
4
2
0
2007
2008
2009
2010
2011
2012
2013
2014
2015
Low DO
Alum
Herbicide
Algaecide

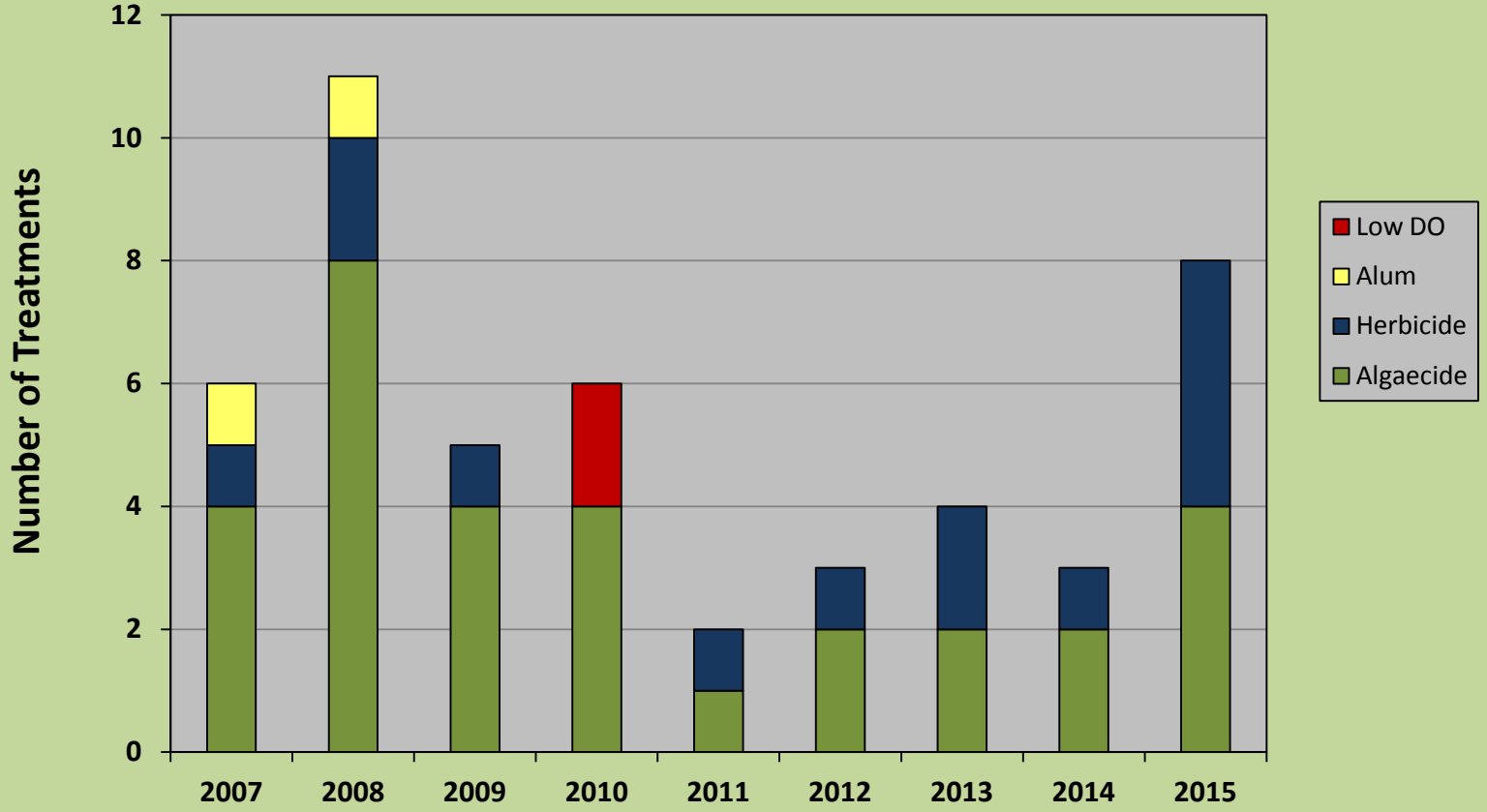

Olive Pond
Treatment History
2007 to 2015
Number of Treatments
12
10
8
6
4
2
0
2007
2008
2009
2010
2011
2012
2013
2014
2015
Low DO
Alum
Herbicide
Algaecide

Shadow Lake Treatment History 2007 to 2015

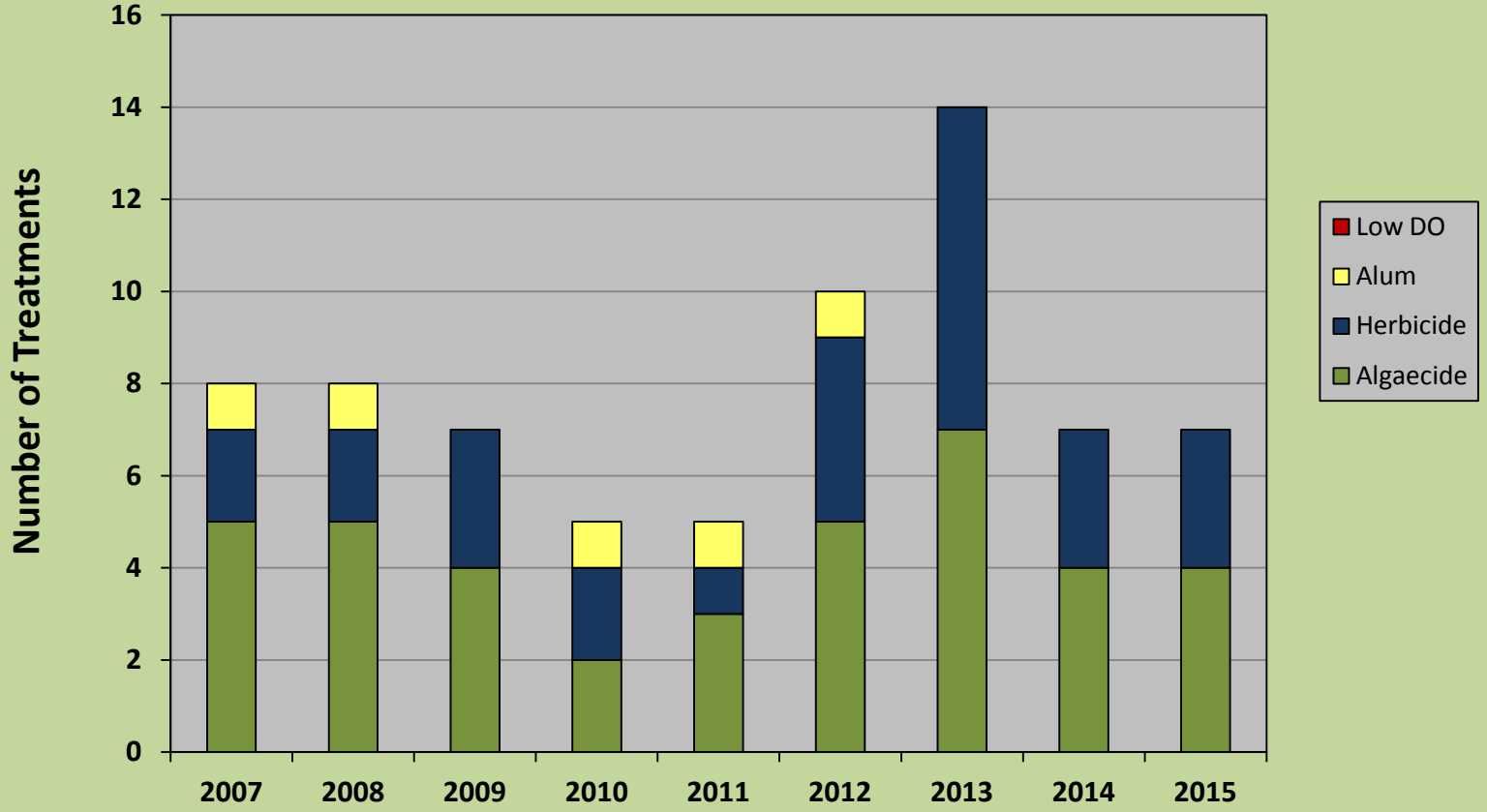


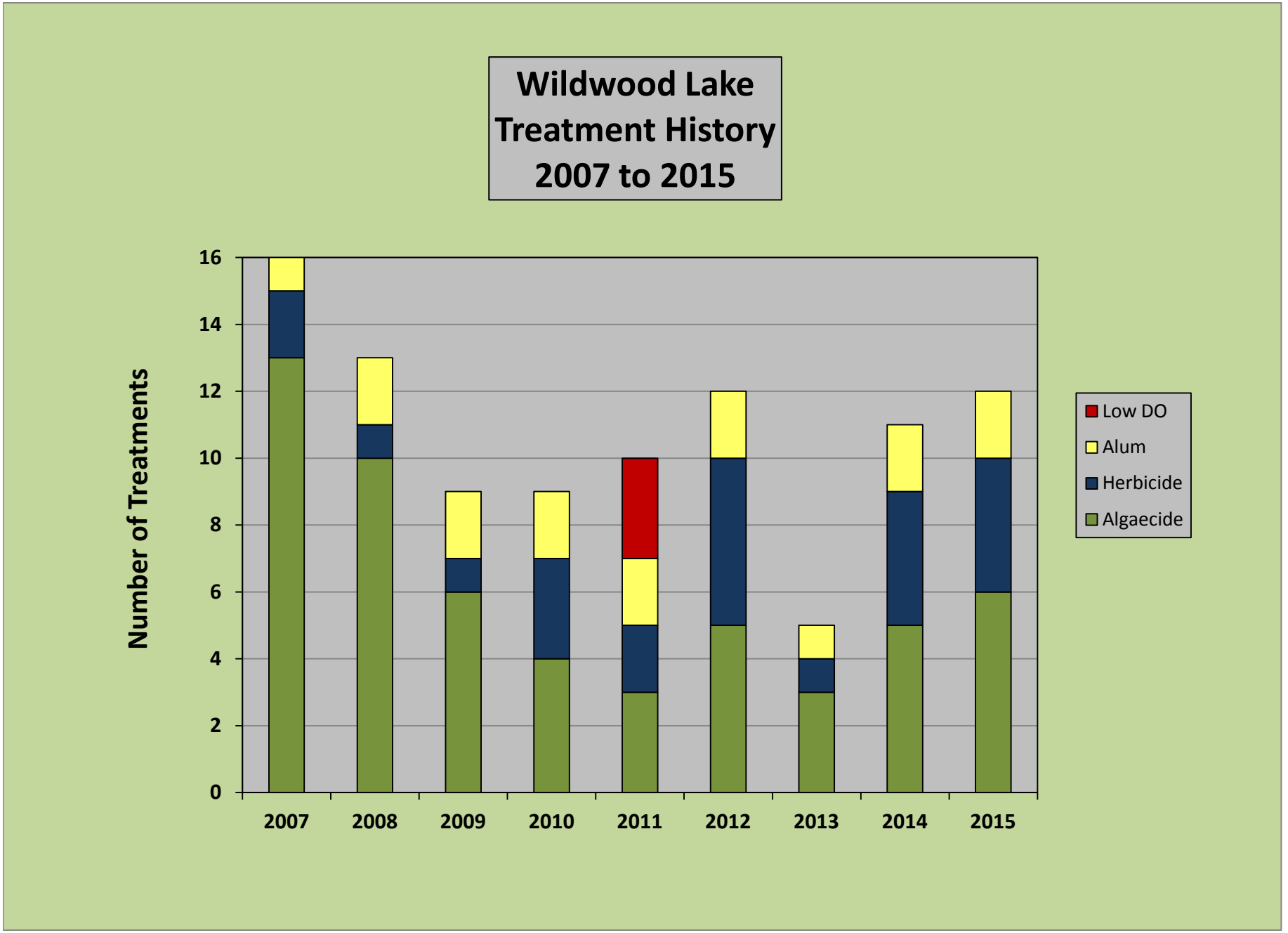

Cove Pond
Treatment History
2007 to 2015
Number of Treatments
14
12
10
8
6
4
2
0
2007
2008
2009
2010
2011
2012
2013
2014
2015
Low DO
Alum
Herbicide
Algaecide

Grunden's Pond Treatment History 2007 to 2015



Mountain Lake Treatment History 2007 to 2015




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

Mountain Lakes
2015 Phytoplankton Summary

Birchwood Lake

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/4/2015	40	30	10			10	20	110
6/22/2015	90	20	130					240
7/6/2015			120	10				130
7/20/2015	20		100					120
8/3/2015		10	280					290
8/17/2015			130					130

Crystal Lake

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/4/2015			140				10	150
6/22/2015	10	20	250					280
7/6/2015		10	70					80
7/20/2015	100		150					250
8/3/2015	30	20	300					350
8/17/2015	70	40	50					160

Sunset Lake

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/4/2015		20	100		10			130
6/22/2015	50		10				10	70
7/6/2015	20	20	110					150
7/20/2015	20	10	60					90
8/3/2015	60	30	100	20				210
8/17/2015	50	10	120					180

Olive Pond

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/4/2015	10	10	90				10	120
7/6/2015	20		10	520				550
8/3/2015	30	30	220	20			50	350

Shadow Lake

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/4/2015		60	10				10	80
6/22/2015			320					320
7/6/2015	20		10	850				880
7/20/2015	10	40	190					240
8/3/2015	40	20	570	50			30	710
8/17/2015		10	3270					3280

Cove Pond

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/4/2015	10	110	20					140
7/6/2015	30		10	20			60	120
8/3/2015	260		50				10	320

Grunden's Pond

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/4/2015	140	20	50					210
7/6/2015	10	20	30	10	10			80
8/3/2015	470	510	130		10	10	140	1270

Mountain Lake

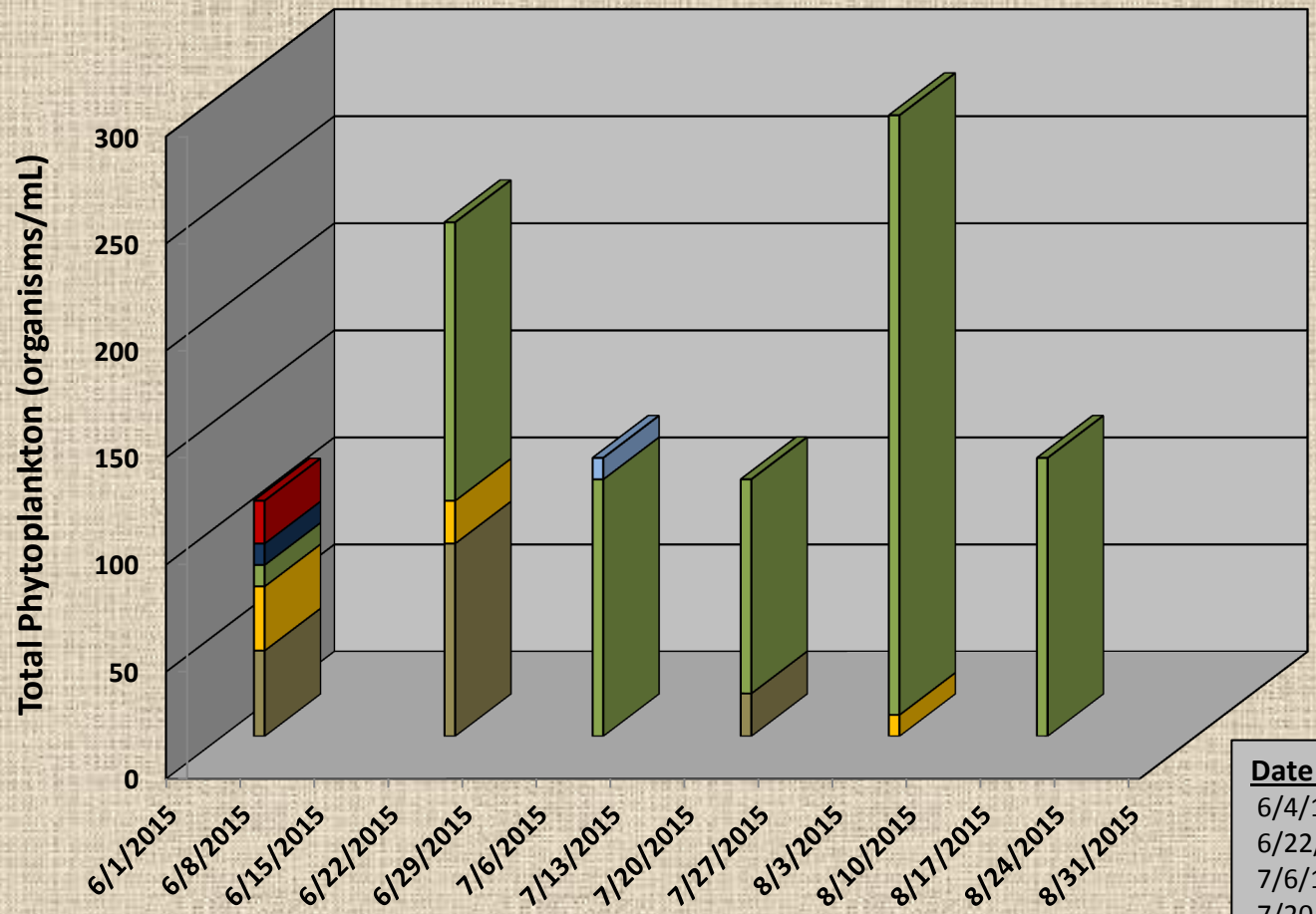
Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/4/2015			260				10	270
6/22/2015		20	90	10				120
7/6/2015			10	120			10	140
7/20/2015	20	10	50	100				180
8/3/2015	140	10	170	20		10		350
8/17/2015		10	70	80				160

Wildwood Lake

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/4/2015	50	10	90				40	190
6/22/2015	20	230	50				10	310
7/6/2015			120	10				130
7/20/2015	60		220					280
8/3/2015	180	110	120				70	480
8/17/2015	60	10	60					130

Allied Biological

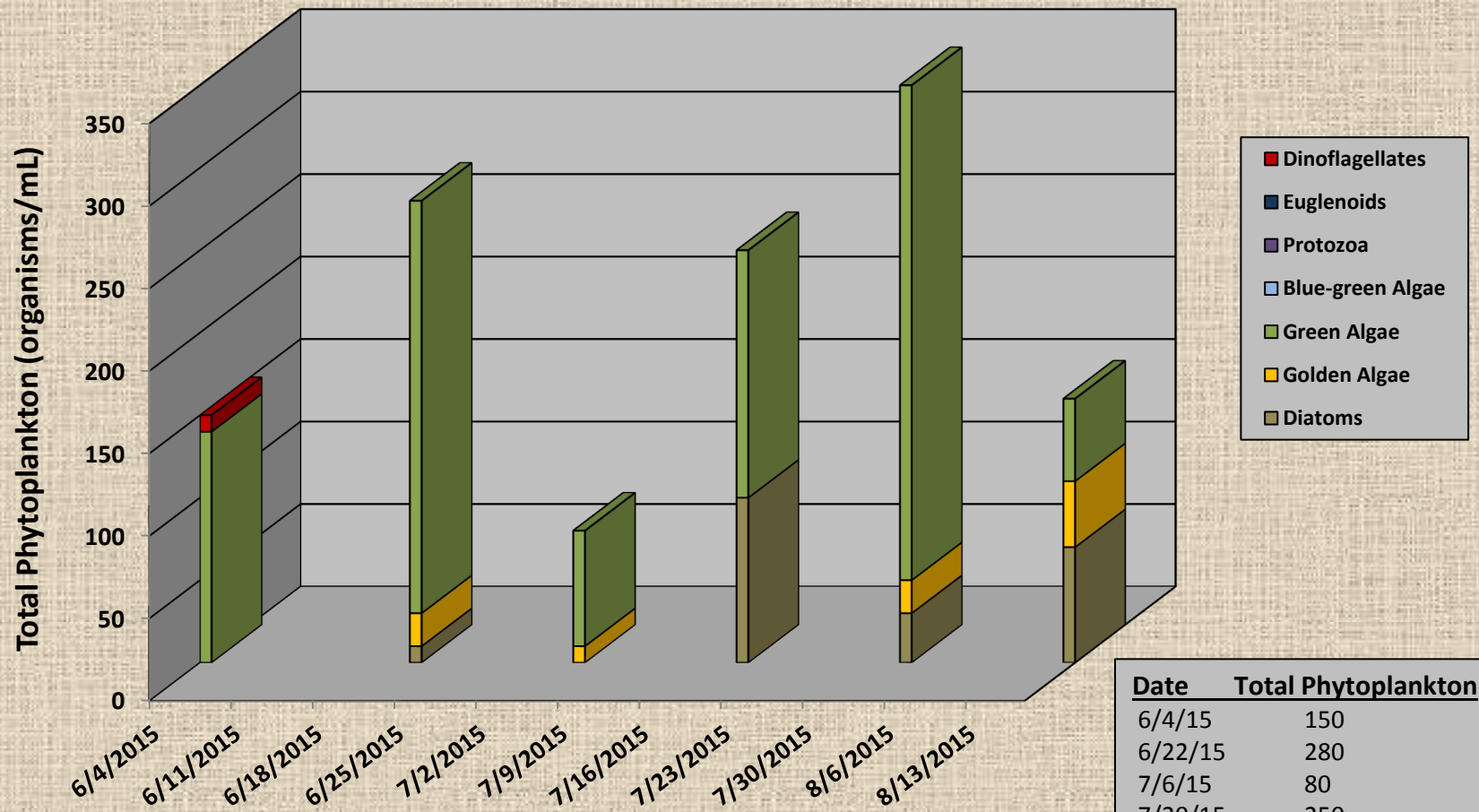
Birchwood Lake
2015 Phytoplankton Distribution



Date	Total Phytoplankton
6/4/15	110
6/22/15	240
7/6/15	130
7/20/15	120
8/3/15	290
8/17/15	130

Allied Biological

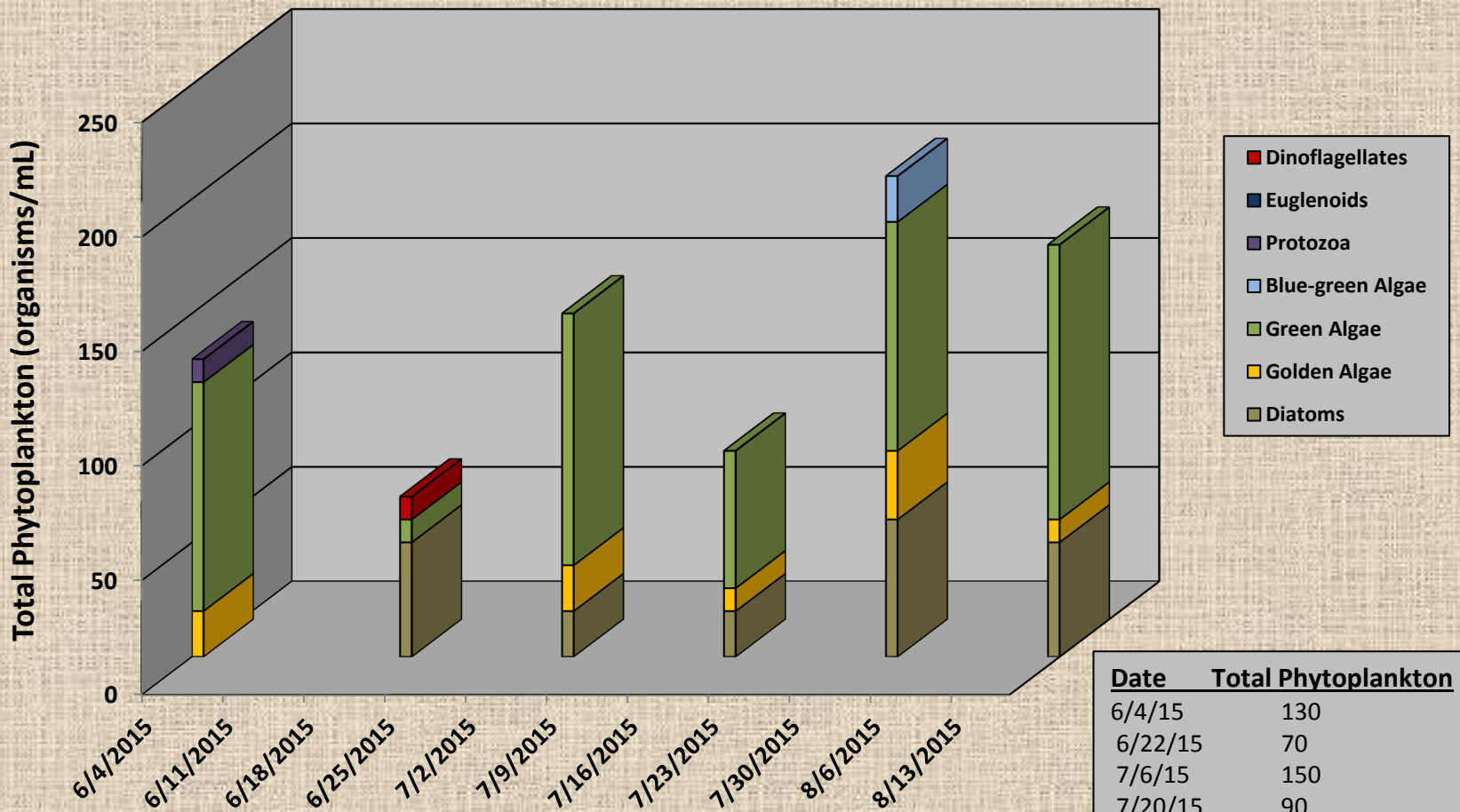
Crystal Lake
2015 Phytoplankton Distribution



Date	Total Phytoplankton
6/4/15	150
6/22/15	280
7/6/15	80
7/20/15	250
8/3/15	350
8/17/15	160

Allied Biological

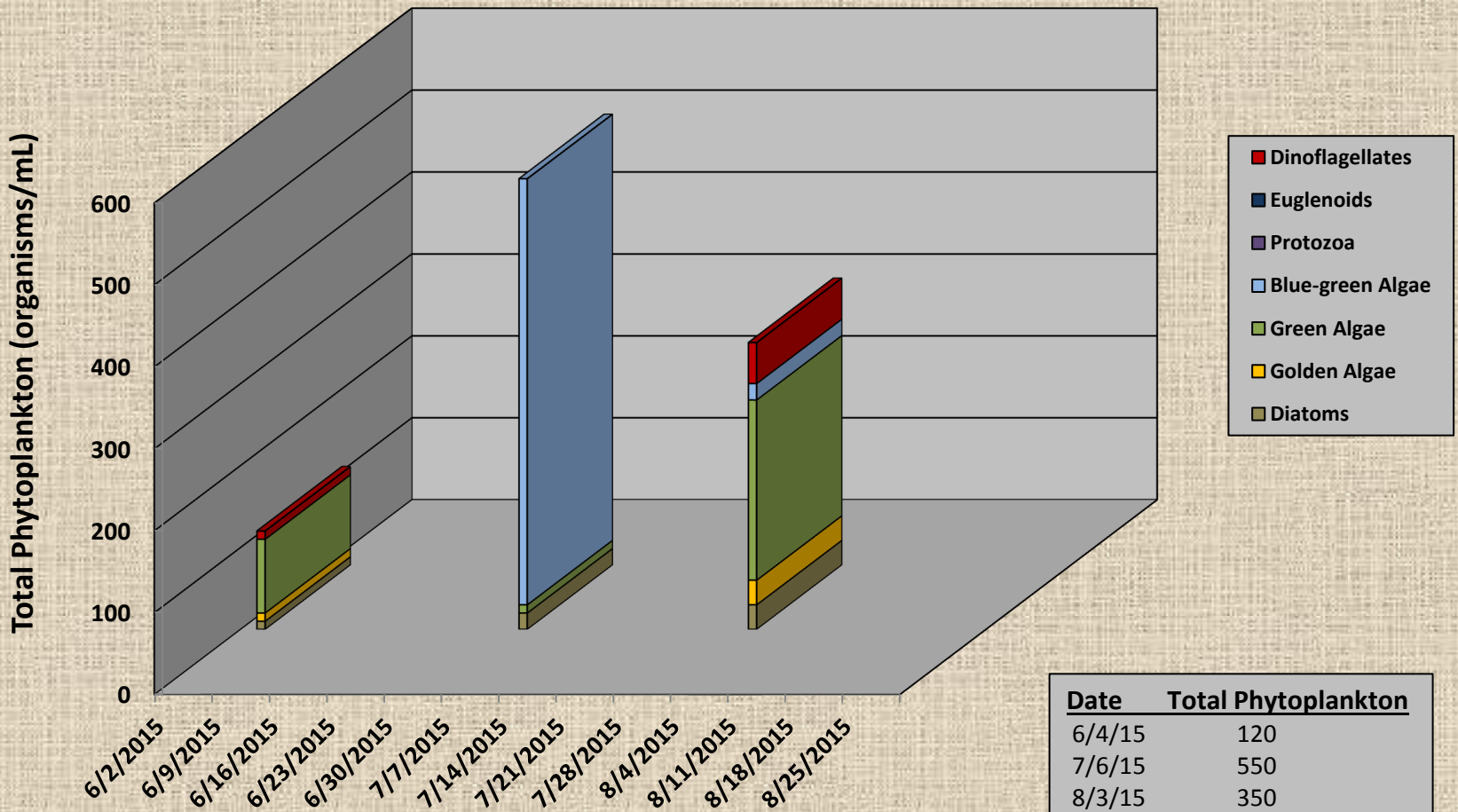
Sunset Lake
2015 Phytoplankton Distribution



Date	Total Phytoplankton
6/4/15	130
6/22/15	70
7/6/15	150
7/20/15	90
8/3/15	210
8/17/15	180

Allied Biological

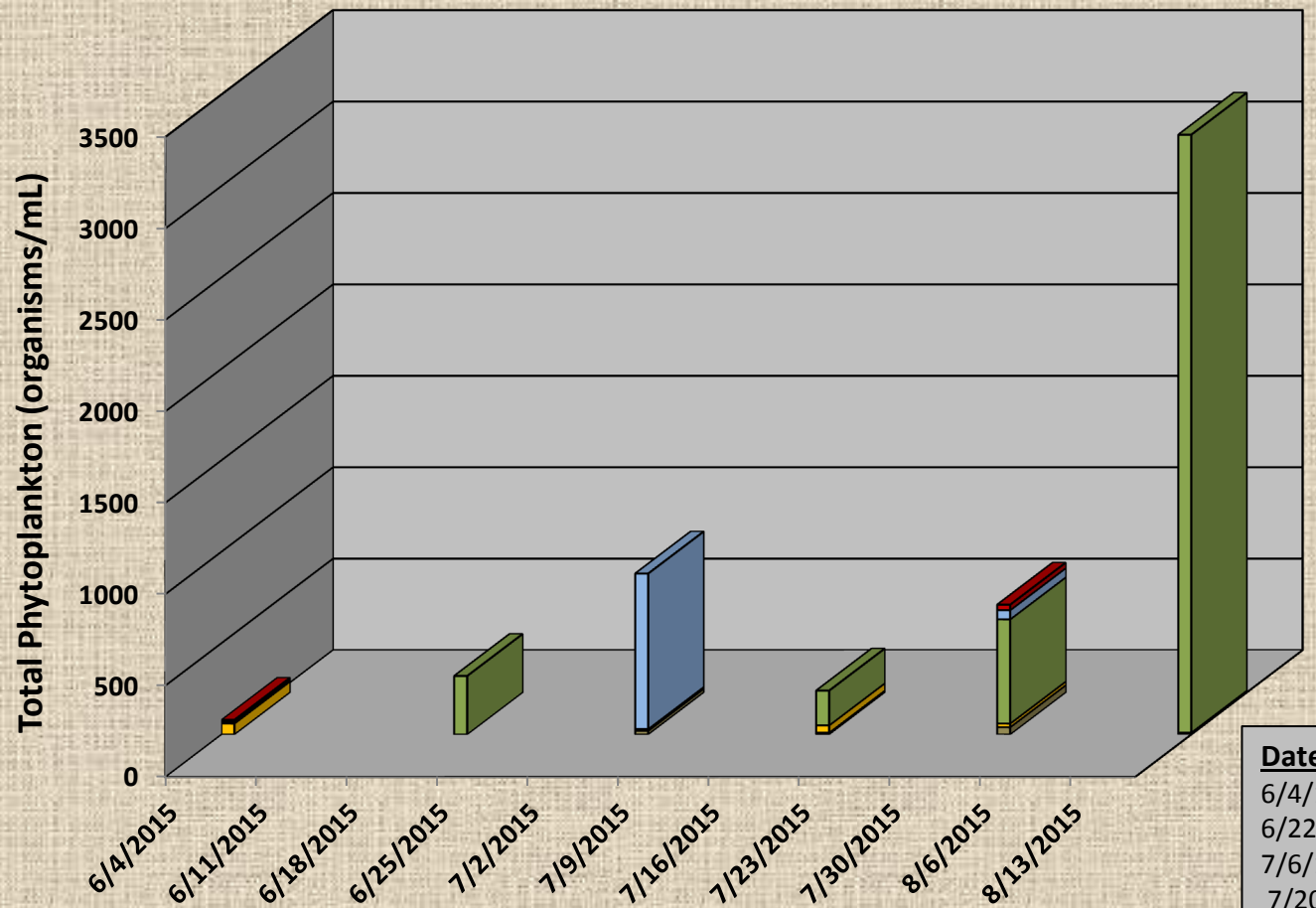
Olive Pond
2015 Phytoplankton Distribution



Date	Total Phytoplankton
6/4/15	120
7/6/15	550
8/3/15	350

Allied Biological

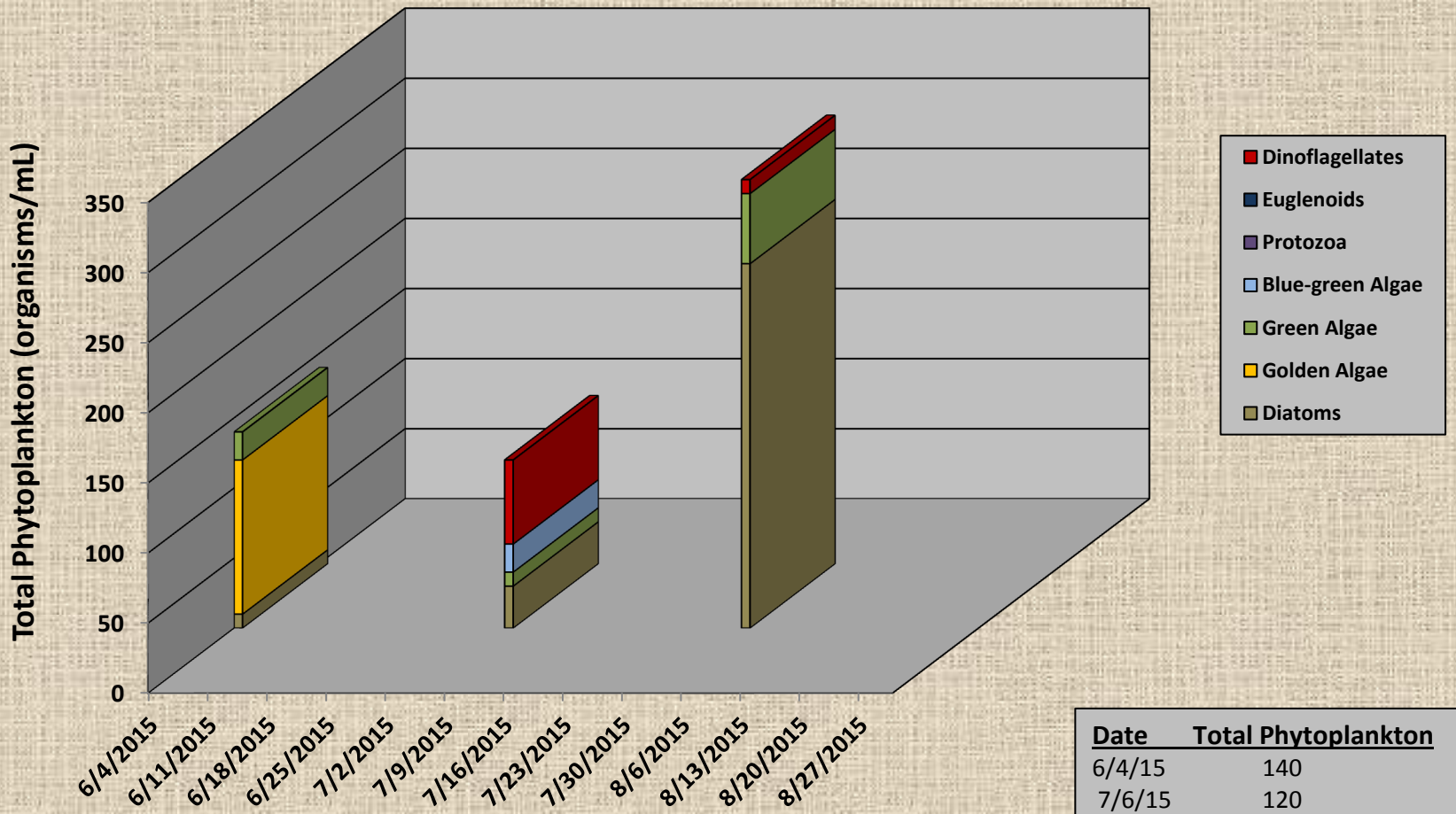
Shadow Lake
2015 Phytoplankton Distribution



Date	Total Phytoplankton
6/4/15	80
6/22/15	320
7/6/15	880
7/20/15	240
8/3/15	710
8/17/15	3,280

Allied Biological

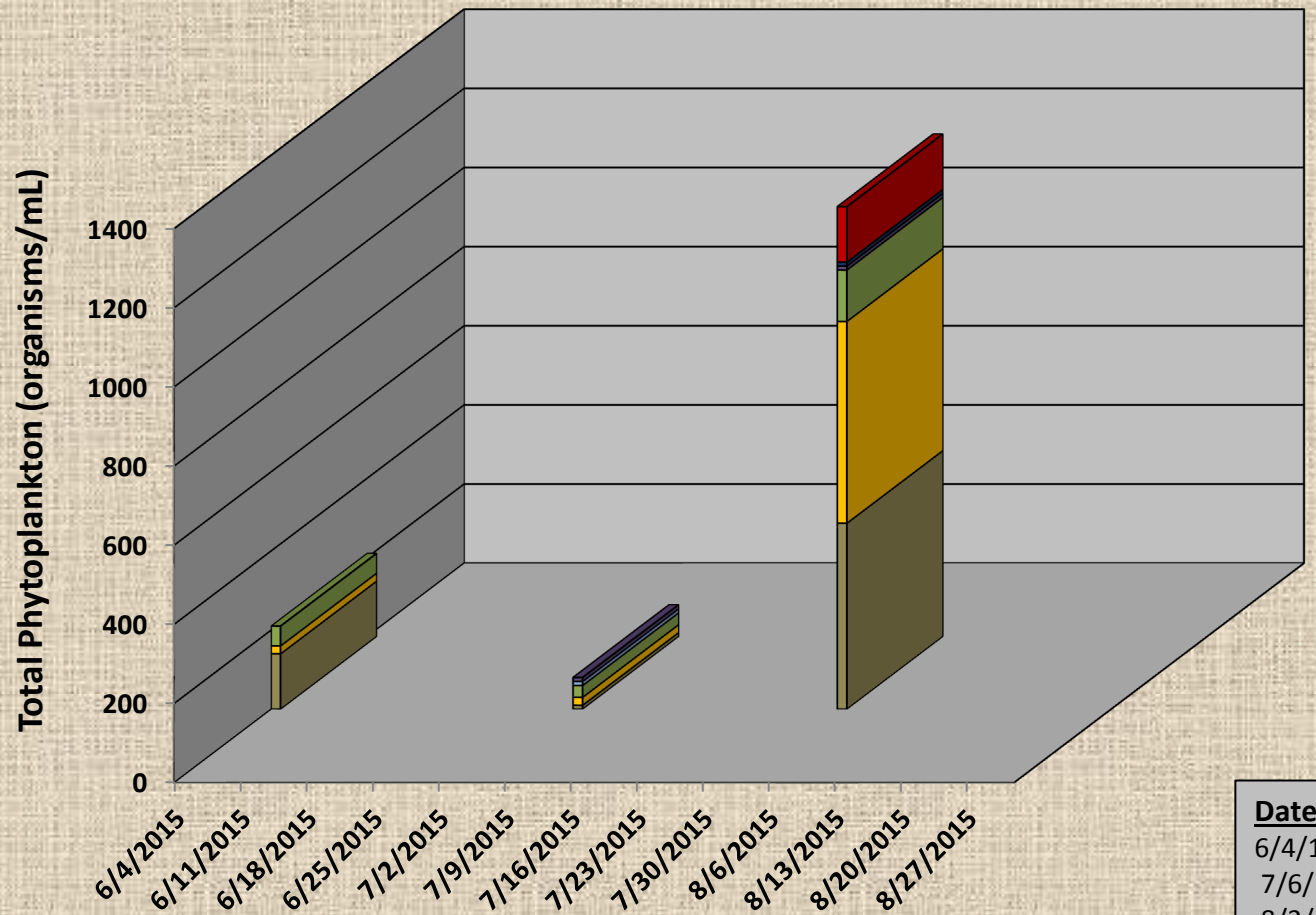
Cove Pond
2015 Phytoplankton Distribution



Date	Total Phytoplankton
6/4/15	140
7/6/15	120
8/3/15	320

Allied Biological

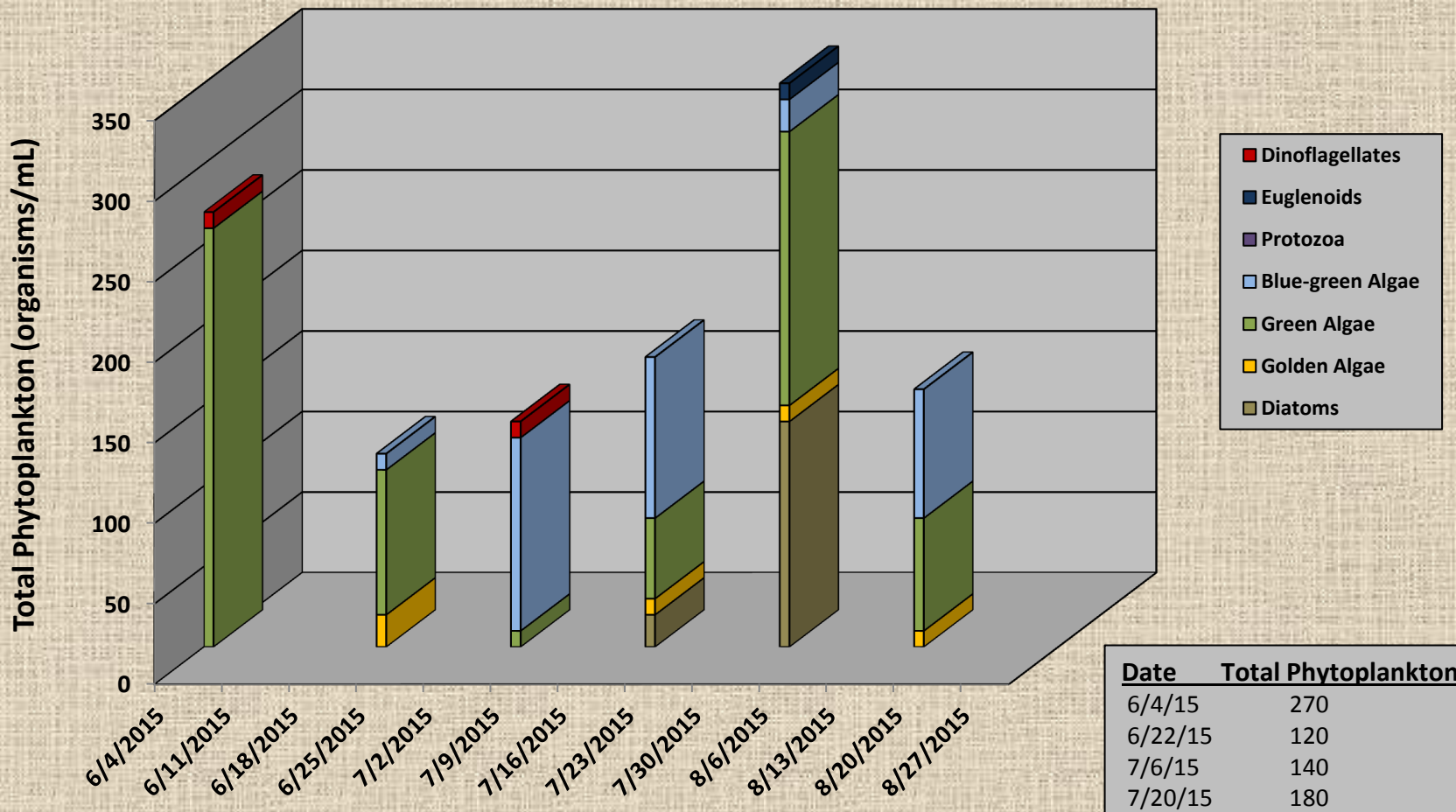
Grunden's Pond
2015 Phytoplankton Distribution



Date	Total Phytoplankton
6/4/15	210
7/6/15	80
8/3/15	1,270

Allied Biological

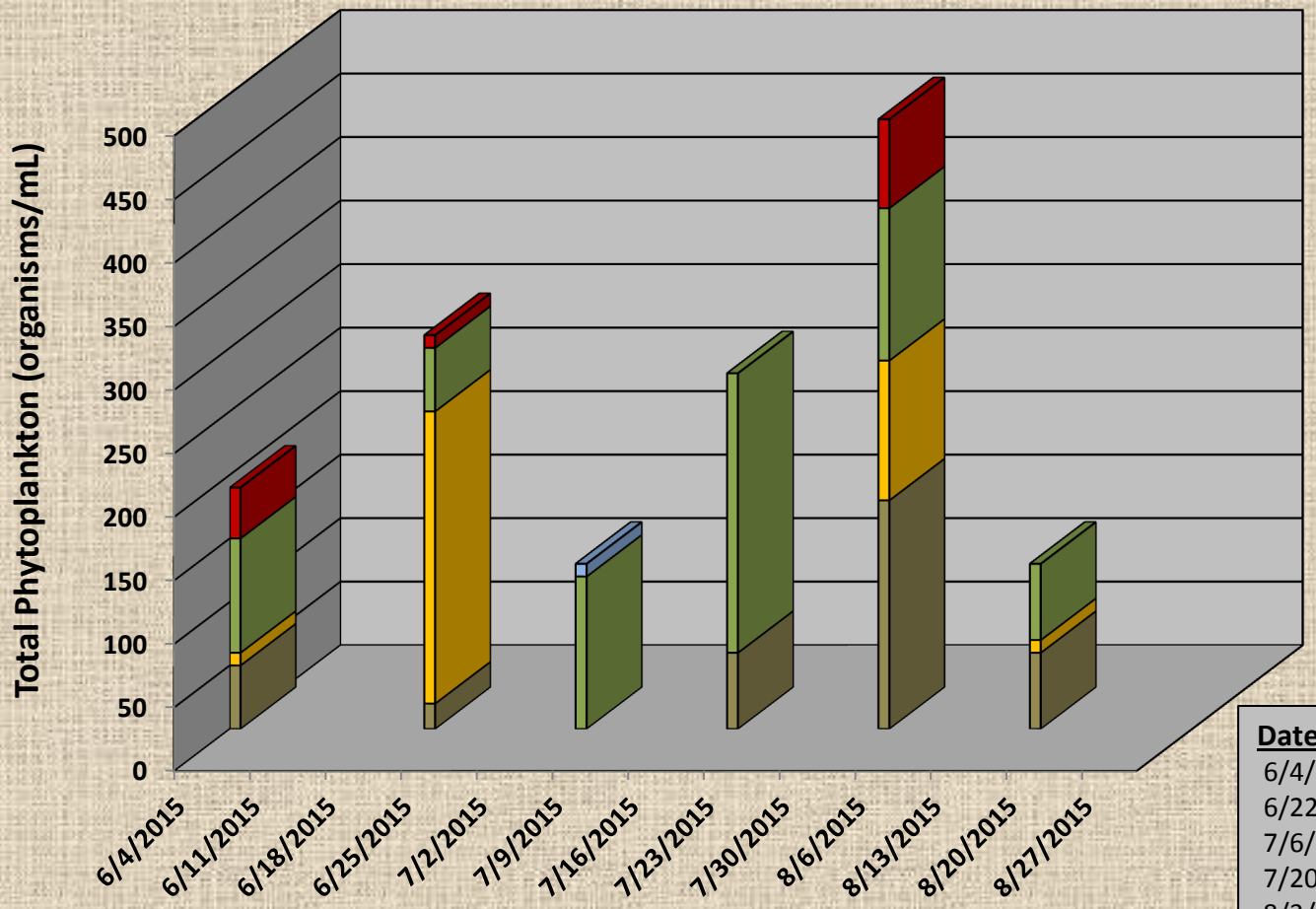
Mountain Lake
2015 Phytoplankton Distribution



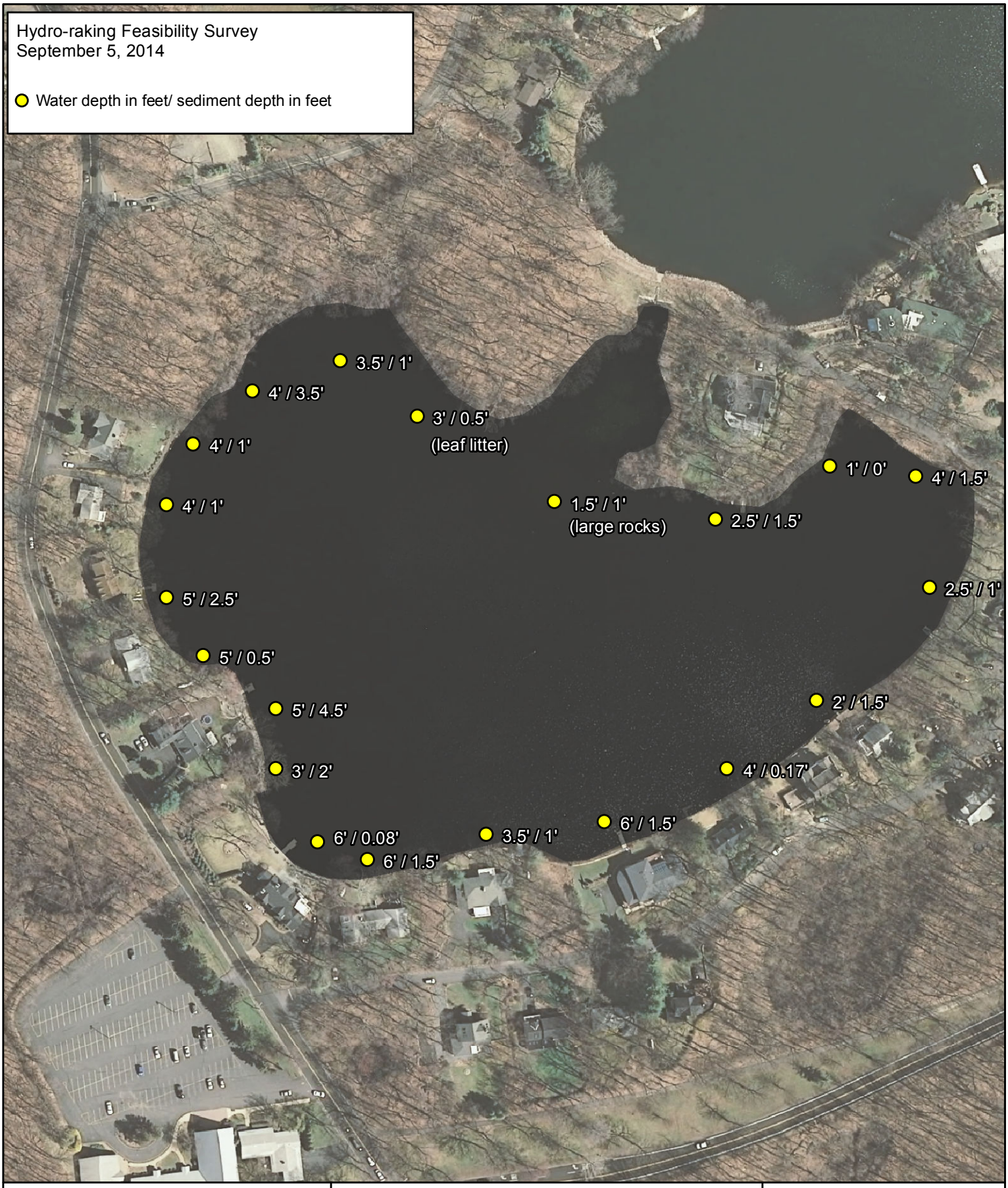
Date	Total Phytoplankton
6/4/15	270
6/22/15	120
7/6/15	140
7/20/15	180
8/3/15	350
8/17/15	160

Allied Biological

Wildwood Lake
2015 Phytoplankton Distribution



Date	Total Phytoplankton
6/4/15	190
6/22/15	310
7/6/15	130
7/20/15	280
8/3/15	480
8/17/15	130



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Northern NY Office: 984 County Highway 53, Maryland, NY 12116

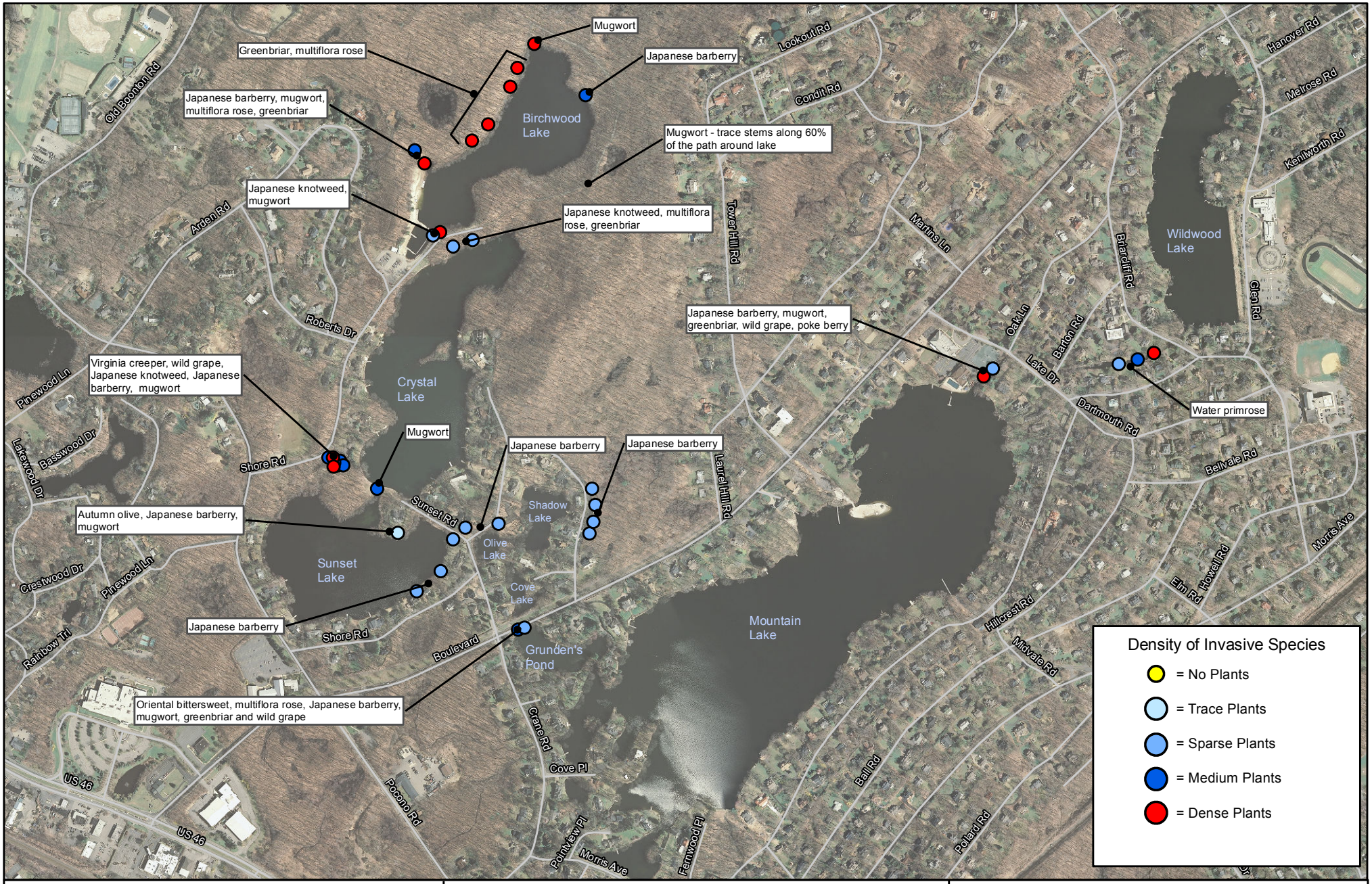
1-800-245-2932 www.alliedbiological.com

SUNSET LAKE
Mountain Lakes Borough, New Jersey

Hydro-raking Feasibility Survey

0 130 260 Feet

Date: 9/8/14
File: MtLakes_SunsetPost_HydroMapFeasibility_2014.mxd



Allied Biological

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Northern NY Office: 338 Mather Road, Suite 1, Oneonta, NY 13820

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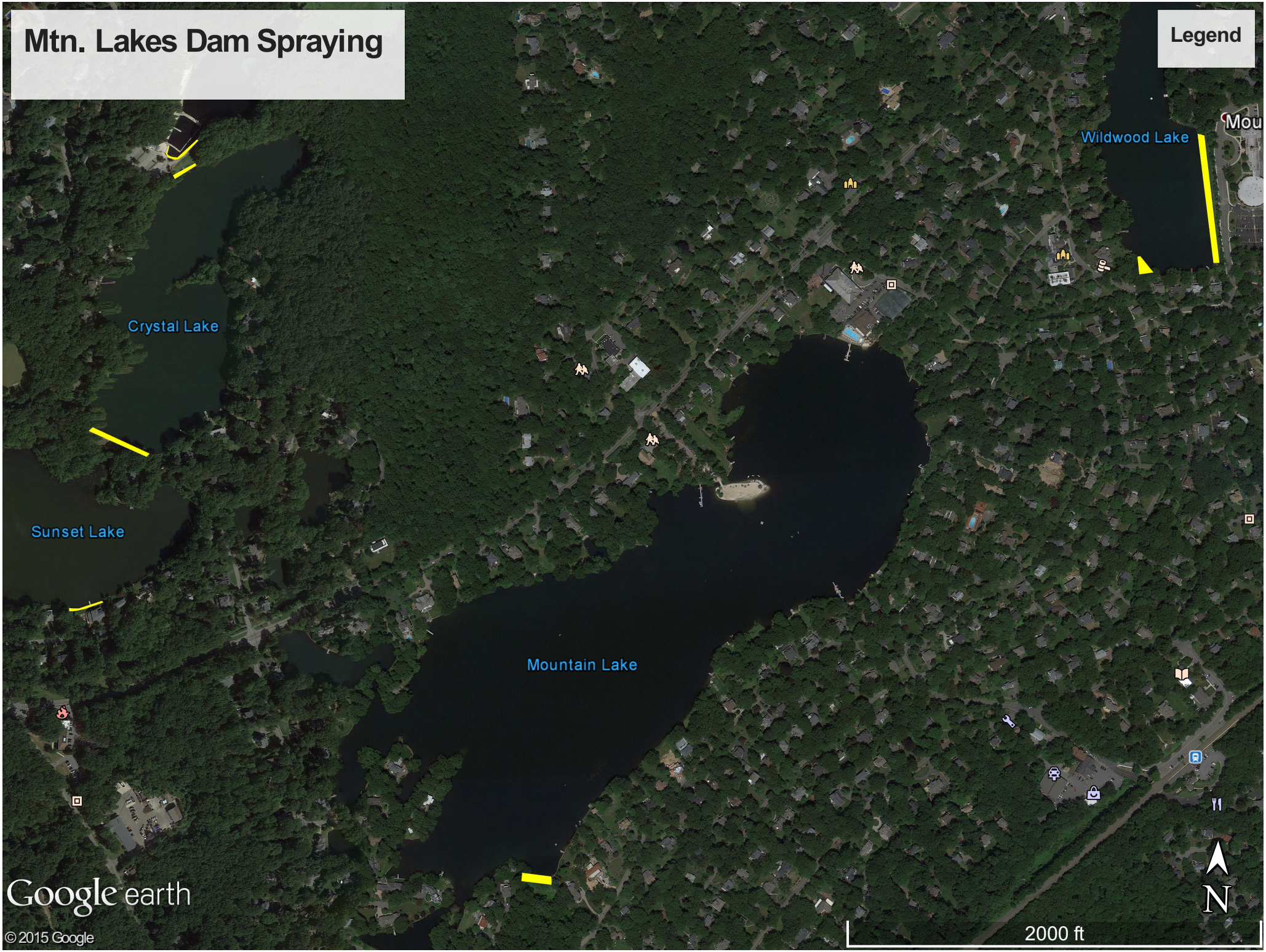
MOUNTAIN LAKES BOROUGH

Terrestrial Invasive Survey
7/8/15

740 370 0 740 Feet


Mtn. Lakes Dam Spraying
Legend
Wildwood Lake
Crystal Lake
Sunset Lake
Mountain Lake
Google earth
© 2015 Google
N
2000 ft

MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 6/4/15	Examination Date: 6/5/15	Amount Examined: 200 ml.
Site A: Birchwood Lake	Site B: Crystal Lake	Site C: Sunset Lake

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

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

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

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

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

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

SITE	**A**	**B**	**C**
TOTAL GENERA:	5	6	5
TRANSPARENCY:	10'	8'est	10'est
ORGANISMS PER MILLILITER:	**110**	**150**	**130**

NOTES: This is the first sampling event of 2015. Algal density is considered light and favorable at all sites. Algal diversity is considered low at sites A and C, while site B is moderate. Sites B and C are dominated by a mixture of green algae. While site A is a mixture of several groups. Traces of golden algae (sites A and C) and dinoflagellates (sites A and B) were observed. Traces of euglenoids were observed at site A only. Site C contained traces of protozoa. Water clarity is considered excellent at all sites.

Allied Biological, Inc.
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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 6/4/15	Examination Date: 6/5/15	Amount Examined: 200 ml.
Site A: Olive Pond	Site B: Shadow Lake	Site C: Cove Pond

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

CHRYSOPHYTA (Golden Algae)	**A**	**B**	**C**
Dinobryon	10		70
Mallomonas		60	40
Synura			
Tribonema			
Uroglenopsis			

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

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

SITE	**A**	**B**	**C**
TOTAL GENERA:	6	3	5
TRANSPARENCY:	6'est	6'est	5'est
ORGANISMS PER MILLILITER:	**120**	**80**	**140**

NOTES: Algal density is considered light and favorable at all three sites. Algal diversity is considered low at sites B and C, while site A is moderate. The assemblage is dominated by a mixture of golden algae and green algae. Traces of diatoms (sites A and C) and dinoflagellates (sites A and B) were also observed. Water clarity is considered good at sites A and B, while site C is fair.

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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 6/4/15	Examination Date: 6/5/14	Amount Examined: 200 ml.
Site A: Grunden's Pond	Site B: Mountain Lake	Site C: Wildwood Lake

BACILLARIOPHYTA (Diatoms)	**A**	**B**	**C**
Asterionella	10		
Cyclotella	10		
Cymbella			
Diatoma			
Fragilaria	10		
Melosira			
Navicula			
Nitzschia			
Pinnularia			10
Urosolenia			
Stephanodiscus			
Stauroneis			
Synedra	110		40
Tabellaria			
Surriella			

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

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			50
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium	20		10
Coelastrum		240	
Eudorina			
Mougeotia			
Oedogonium	30		10
Oocystis			
Pandorina			
Pediastrum		10	10
Phytoconis			
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum			
Sphaerocystis			
Ulothrix			
Scenedesmus			
Zygnema			
Gloeocystis		10	
Cosmarium			10
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	40
Peridinium			

SITE	**A**	**B**	**C**
TOTAL GENERA:	7	4	9
TRANSPARENCY:	3'est	15'est	12'est
ORGANISMS PER MILLILITER:	**210**	**270**	**190**

NOTES: This is the first algal sampling event of 2015. Algal density is considered light and favorable at all sites. Algal diversity is considered moderate at site A, low at site B and moderate-high at site C. A mixture of green algae dominates sites B and C. Site A is dominated by diatoms. Traces of golden algae (sites A and C) and dinoflagellates (sites B and C) were also observed. Water clarity is considered excellent at sites B and C, while site A is considered poor.

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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 6/22/15	Examination Date: 6/22/15	Amount Examined: 200 ml.
Site A: Shadow Lake	Site B: Mountain Lake	Site C: Wildwood Lake

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

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

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			
Coelastrum	310		30
Eudorina			
Mougeotia			
Oedogonium		20	10
Oocystis			
Pandorina			
Pediastrum			
Phytoconis			
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum	10	30	10
Gloeocystis		30	
Ocanthium		10	
Scenedesmus			
Zygnema			
Gloeocystis			
Cosmarium			
Quadriguia			
Tetraspora			

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

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

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

SITE	**A**	**B**	**C**
TOTAL GENERA:	2	8	7
TRANSPARENCY:	4' est	7'	6'
ORGANISMS PER MILLILITER:	**320**	**120**	**310**

NOTES: Algal diversity is considered low at site A and moderate at sites B and C. Algal density decreased at sites B and C, but increased at site A since two weeks ago. Algal density continues to be low at each site. Sites A and B are dominated by green algae, while site C is dominated by golden algae. Other golden algae and diatoms were observed. Traces of blue green algae (site B only) and dinoflagellates (site C only) were also observed. Water clarity decreased at all sites in comparison to the last sampling event. Water clarity is now considered good at sites B and c, but only fair at site A..

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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 6/22/15	Examination Date: 6/22/15	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	10		20
Melosira			
Navicula			
Nitzschia			
Pinnularia	40	10	10
Urosolenia			
Stephanodiscus			
Stauroneis			
Synedra	30		
Tabellaria			

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

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			
Coelastrum	110	230	
Eudorina			
Mougeotia			
Oedogonium			
Oocystis			
Pandorina			
Pediastrum		10	
Phytoconis			
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum	20	10	
Sphaerocystis			
Ulothrix			
Volvox			
Zygnema			
Gloeocystis			
Sphareocystis			
Cosmarium			10
Tetraedron			
Dictyosphaerium			

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

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

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

SITE	**A**	**B**	**C**
TOTAL GENERA:	7	5	5
TRANSPARENCY:	5.5'est	6'	6'
ORGANISMS PER MILLILITER:	**240**	**280**	**70**

NOTES: Algal density increased at sites A and B, while site C decreased since the previous sampling date. Algal density continues to be low at all sites. Algal diversity is now considered low at sites B and C, while site A is moderate. Both sites A and B are dominated by the green algae *Coelastrum*. Site C is dominated by a mixture of diatoms. Traces of golden algae (sites A and B) and dinoflagellates (site C only) was observed. Water clarity decreased at all sites and is now considered good at sites B and C, while site A is fair.

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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 7/6/15	Examination Date: 7/8/15	Amount Examined: 200 ml.
Site A: Birchwood Lake	Site B: Crystal Lake	Site C: Sunset Lake

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

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

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus	10		
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			10
Coelastrum	30	10	
Eudorina			
Mougeotia			
Oedogonium		10	
Oocystis			
Pandorina			
Pediastrum			
Phytoconis			
Rhizoclonium			
Scenedesmus			10
Spirogyra			
Staurastrum	10		80
Gloeocystis	70	50	
Ulothrix			
Volvox			
Zygnema			
Ocanthium			10
Sphareocystis			
Cosmarium			
Tetraedron			
Dictyosphaerium			

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

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

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

SITE	**A**	**B**	**C**
TOTAL GENERA:	5	4	7
TRANSPARENCY:	9'	10'est	5'est
ORGANISMS PER MILLILITER:	**130**	**80**	**150**

NOTES: Algal density decreased at sites A and B while site C increased. Alga density continues to be low at all sites. Algal diversity is considered low at sites A and B while site C is moderate. The assemblage is dominated by a mixture of green algae this week which is typical for the summer. Trace amounts of golden algae were observed at sites B and C only. Diatoms were observed at site C only. Traces of blue green algae were observed at site A only. Water clarity increased at sites A and B while site C decreased. Water clarity is now considered excellent at sites A and B whereas site C is fair.

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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 7/6/15	Examination Date: 7/8/15	Amount Examined: 200 ml.
Site A: Olive Pond	Site B: Shadow Lake	Site C: Cove Pond

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

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

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

CYANOPHYTA (Blue-green Algae)	**A**	**B**	**C**
Anabaena	230	190	
Anacystis			
Aphanizomenon	290	660	20
Coelosphaerium			
Gomphosphseria			
Lyngbya			
Microcystis			
Oscillatoria			
Pseudoanabaena			
Synechocystis			
Agmenellum			
PROTOZOA			
Actinophyrs			

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

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

SITE	**A**	**B**	**C**
TOTAL GENERA:	5	5	4
TRANSPARENCY:	2'est	4'est	4'est
ORGANISMS PER MILLILITER:	**550**	**880**	**120**

NOTES: Algal diversity is considered low at all sites. Algal density increased at sites A and B while site C decreased. Algal density is now considered moderate at sites A and B and low at site C. Sites A and B are dominated by the nuisance blue green algae *Aphanizomenon*. Sites A and B might require an algaecide application soon. While site C is dominated by the dinoflagellate *Peridinium*. Diatoms and green algae were also observed this week. Water clarity decreased at sites A and C while site B remained the same. Water clarity is now considered poor at site A and fair at sites B and C.

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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 7/6/15	Examination Date: 7/8/15	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			
Mallomonas	20		
Synura			
Tribonema			
Uroglenopsis			

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

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

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

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

SITE	**A**	**B**	**C**
TOTAL GENERA:	5	4	4
TRANSPARENCY:	2'est	12'est	10'
ORGANISMS PER MILLILITER:	**80**	**140**	**100**

NOTES: Algal density decreased since last sampling event at all sites and is now considered low at all sites. Algal diversity decreased and is now considered to be low at all sites. The assemblage is dominated by a mixture of green algae and blue green algae. Trace amounts of diatoms, protozoa and golden algae were observed at site A only. Traces of dinoflagellates were also observed at site B only. Water clarity decreased at all three sites. However, the water clarity continues to be excellent at sites B and C, while site A is considered to be poor.

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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 7/20/15	Examination Date: 7/20/15	Amount Examined: 200 ml.
Site A: Birchwood Lake	Site B: Crystal Lake	Site C: Sunset Lake

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

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus		30	
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium	10		
Coelastrum	50	10	
Eudorina			
Mougeotia			
Oedogonium		10	10
Oocystis			
Pandorina			
Pediastrum	30	10	
Phytoconis			
Rhizoclonium			
Scenedesmus		40	
Spirogyra			
Staurastrum			
Gloeocystis	10	40	50
Ulothrix			
Volvox			
Zygnema			
Ocanthium			
Sphareocystis			
Cosmarium		10	
Tetraedron			
Dictyosphaerium			

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

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

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

SITE	**A**	**B**	**C**
TOTAL GENERA:	6	11	5
TRANSPARENCY:	5'	10' est	3'
ORGANISMS PER MILLILITER:	**120**	**250**	**90**

NOTES: Algal density remained about the same at Birchwood while increasing at Crystal and decreasing slightly at Sunset Lake (since previous sampling event). Algal density continues to be considered low at all sites. Algal diversity increased significantly at Crystal Lake while remaining about the same at the other two sites. Diversity is high at Crystal and moderate at Birchwood and Sunset. The assemblage at all three sites was dominated by a mix of green algae. Diatoms were also noted at all sites. No blue-green algae were observed. Water clarity decreased at Birchwood and Sunset Lakes and is considered fair. Water clarity at Crystal Lake remains excellent.

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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 7/20/15	Examination Date: 7/20/15	Amount Examined: 200 ml.
Site A: Olive Pond	Site B: Shadow Lake	Site C: Cove Pond

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

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

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus		10	
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium		70	
Coelastrum			
Eudorina			
Mougeotia			
Oedogonium			
Oocystis			
Pandorina			
Pediastrum		10	
Phytoconis			
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum		10	
Sphaerocystis			
Ulothrix			
Volvox			
Zygnema			
Quadrigula			
Gloeocystis		90	
Cosmarium			
Treubaria			

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

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

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

SITE	**A**	**B**	**C**
TOTAL GENERA:		7	
TRANSPARENCY:		6' est	
ORGANISMS PER MILLILITER:		**240**	

NOTES: Algal density decreased significantly at Shadow Lake following last week's treatment and is now considered light and favorable. Diversity increased slightly and is considered moderate. The assemblage was dominated by a seasonal mix of green algae. Golden algae and a trace of diatoms were also noted. No blue-green algae were observed in this sample. Water clarity increased and is now considered fair to good.

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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 7/20/15	Examination Date: 7/20/15	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			10
Nitzschia			
Pinnularia			
Urosolenia			
Stephanodiscus			
Stauroneis			
Synedra		20	50
Tabellaria			
Surriella			

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

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			30
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium		10	
Coelastrum		10	30
Eudorina			
Mougeotia			
Oedogonium			10
Oocystis			
Pandorina		10	
Pediastrum			10
Phytoconis			
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum		10	
Sphaerocystis			
Ulothrix			
Scenedesmus			20
Zygnema			
Gloeocystis		10	120
Cosmarium			
Quadriguia			
Tetraspora			

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

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

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

SITE	**A**	**B**	**C**
TOTAL GENERA:		8	8
TRANSPARENCY:		15' est	12' est
ORGANISMS PER MILLILITER:		**180**	**280**

NOTES: Algal density increased at both Wildwood and Mountain Lakes this week but is still considered low. Algal diversity doubled at both sites and is considered moderate. The assemblage at Mt. Lake is dominated by the blue-green algae, *Aphanizomenon,* but levels are non- problematic at this time. The assemblage at Wildwood is dominated by a seasonal mix of green algae. Trace diatoms were noted at both sites. Water clarity decreased at all three sites. Water clarity continues to be excellent at both sites.

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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 8/3/15	Examination Date: 8/3/15	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	60
Tabellaria			

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

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			30
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium	20	10	
Coelastrum	220	240	
Eudorina			
Mougeotia			
Oedogonium		20	
Oocystis			
Pandorina			
Pediastrum		10	
Phytoconis			
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum		20	70
Gloeocystis	40		
Ulothrix			
Volvox			
Zygnema			
Gloeocystis			
Sphareocystis			
Cosmarium			
Tetraedron			
Dictyosphaerium			

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

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

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

SITE	**A**	**B**	**C**
TOTAL GENERA:	4	7	6
TRANSPARENCY:	6'	8'est	4'est
ORGANISMS PER MILLILITER:	**290**	**350**	**210**

NOTES: The algal density increased at all sites but continues to be light and favorable at all three sites. Algal diversity decreased at sites A and B while site C increased. The algal diversity is now considered to be moderate at sites B and C, whereas site A is low. The assemblage is dominated by a mixture of green algae, specifically *Coelastrum* and *Staurastrum*. Golden algae were also observed this week. Trace amounts of diatoms (sites B and C only) and blue green algae (site C only) were observed. Blue-green algae density is non-problematic at this time. Water clarity increased at sites A and C while site B decreased. Clarity is now considered to be excellent at site B, good at site A and fair at site C.

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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 8/3/15	Examination Date: 8/4/15	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	70
Cymbella			
Diatoma			
Fragilaria	250	60	20
Melosira			
Navicula			60
Nitzschia			
Pinnularia	10		
Urosolenia			
Stephanodiscus	10		
Stauroneis	40		
Synedra	160	50	30
Tabellaria			
Surriella			

CHRYSOPHYTA (Golden Algae)	**A**	**B**	**C**
Dinobryon			
Mallomonas	510	10	110
Synura			
Tribonema			
Uroglenopsis			

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium	10	40	20
Coelastrum		100	
Eudorina		10	
Mougeotia			
Oedogonium			
Oocystis			
Pandorina			
Pediastrum			20
Phytoconis			
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum	120	20	40
Sphaerocystis			20
Ulothrix			
Scenedesmus			20
Zygnema			
Gloeocystis			
Cosmarium			
Quadriguia			
Tetraspora			

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

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

PYRRHOPHYTA (Dinoflagellates)	**A**	**B**	**C**
Ceratium			70
Peridinium	140		

SITE	**A**	**B**	**C**
TOTAL GENERA:	10	11	11
TRANSPARENCY:	5'est	10'	6'est
ORGANISMS PER MILLILITER:	**1,130**	**490**	**480**

NOTES: Algal density increased at each site since the last sampling event. The algal density is now considered to be low at sites B and C, whereas site A is moderate-high. Algal diversity increased at all sites and is now considered to be high. A mixture of golden algae, dinoflagellates and diatoms round out the assemblage this week. Green algae and euglenoids were also observed. Trace amounts of blue green algae (site B) and protozoa (site A) were observed. Water clarity decreased at sites B and C, whereas site A increased. Water Clarity is continues to be excellent at site B, and is fair to good at sites A and C.

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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 8/3/15	Examination Date: 8/4/15	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	10	30	110
Melosira			
Navicula			
Nitzschia			
Pinnularia			
Rhizosolenia			
Stephanodiscus			
Stauroneis			
Synedra	20	10	90
Tabellaria			
Cocconeis			

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

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium	40	50	40
Coelastrum	120	280	
Eudorina			
Mougeotia			
Oedogonium	10	170	
Oocystis			
Pandorina			
Pediastrum		10	
Phytoconis			
Rhizoclonium			
Scenedesmus		20	
Spirogyra			
Staurastrum	10	10	10
Gloeocystis	40	30	
Ulothrix			
Volvox			
Zygnema			
Quadrigula			
Gloeocystis			
Cosmarium			
Treubaria			

CYANOPHYTA (Blue-green Algae)	**A**	**B**	**C**
Anabaena			
Anacystis			
Aphanizomenon	20	50	
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	30	10
Peridinium			

SITE	**A**	**B**	**C**
TOTAL GENERA:	11	12	6
TRANSPARENCY:	4'est	3'est	3'est
ORGANISMS PER MILLILITER:	**350**	**710**	**320**

NOTES: Algal diversity increased at all sites since the last sampling event. The algal diversity is now considered to be high at sites A and B while site C is moderate. The algal density decreased at sites A and B whereas site C increased. Algal density is now considered to be low at sites A and C while site B is moderate. Sites A and B are dominated by the green algae *Coelastrum*. Whereas site C is dominated by the diatom *Fragilaria*. Other green algae and dinoflagellates were observed this week. Traces of golden algae and blue green algae were observed at sites A and B only. Blue-green algae is considered non-problematic at this time. Water clarity decreased at sites B and C while site A increased. Clarity is now considered to be poor to fair at all sites, which is typical for these small impoundments.

Allied Biological, Inc.
580 Rockport Road Hackettstown, NJ 07840 Phone (908) 850-0303 Fax (908) 850-4994

MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 8/17/15	Examination Date: 8/17/15	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		20	20
Melosira			
Navicula			10
Nitzschia			
Pinnularia			
Urosolenia			
Stephanodiscus			
Stauroneis			
Synedra		50	20
Tabellaria			

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

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			10
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			
Coelastrum	60	20	10
Eudorina			
Mougeotia			
Oedogonium		10	20
Oocystis			
Pandorina			
Pediastrum			
Phytoconis			
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum		10	80
Gloeocystis	70	10	
Ulothrix			
Volvox			
Zygnema			
Gloeocystis			
Sphareocystis			
Cosmarium			
Tetraedron			
Dictyosphaerium			

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

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

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

SITE	**A**	**B**	**C**
TOTAL GENERA:	2	8	8
TRANSPARENCY:	6'	7'+	5'est
ORGANISMS PER MILLILITER:	**130**	**160**	**180**

NOTES: Algal density decreased at all sites and continues to be low. Algal diversity increased at sites B and C while site A decreased. The algal diversity is now considered to be high at sites B and C whereas site A is low. A mixture of green algae and diatoms dominate the assemblage this week. Water clarity is decreased at site B, increased at site C and remains the same as last week at site A. Clarity is now considered to be good at sites A and B while site C is fair.

Allied Biological, Inc.
580 Rockport Road Hackettstown, NJ 07840 Phone (908) 850-0303 Fax (908) 850-4994

MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 8/17/15	Examination Date: 8/17/15	Amount Examined: 200 ml.
Site A: Shadow Lake	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			50
Tabellaria			
Surriella			

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

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium	20		
Coelastrum		40	10
Eudorina			
Mougeotia			
Oedogonium	3240		20
Oocystis			
Pandorina			
Pediastrum	10	10	10
Phytoconis			
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum			
Gloeocystis		20	20
Ocanthium			
Scenedesmus			
Zygnema			
Gloeocystis			
Cosmarium			
Quadriguia			
Tetraspora			

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

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

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

SITE	**A**	**B**	**C**
TOTAL GENERA:	3	5	7
TRANSPARENCY:	4'est	8'+	8'+
ORGANISMS PER MILLILITER:	**3,240**	**160**	**130**

NOTES: Algal density increased at sites A and B while site C decreased. The algal density is now considered to be low at sites B and C whereas site A is high. The algal diversity is decreased at site B and increased at site C. Algal density is now considered to be low at sites A and B, while site C is moderate. A mixture of green algae, blue green algae and diatoms dominate the assemblage this week. Traces of golden algae were observed at sites B and C only. Water clarity increased at sites B and C while site A remains the same. Clarity is now considered excellent at sites B and C whereas site A is fair.

Allied Biological, Inc.
580 Rockport Road Hackettstown, NJ 07840 Phone (908) 850-0303 Fax (908) 850-4994

Mountain Lakes

2015 Fecal Coliform Data

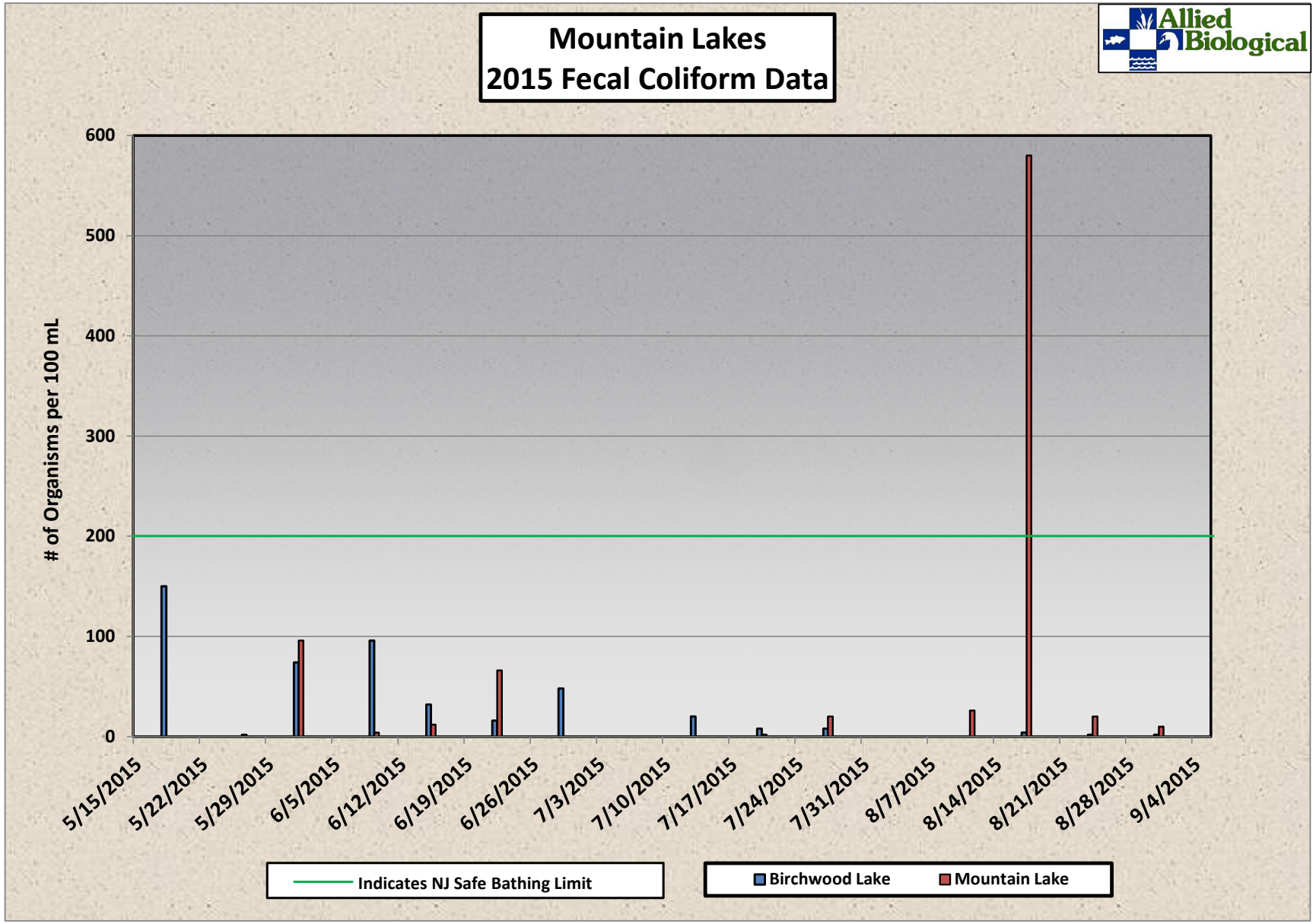
Date	Birchwood Lake	Mountain Lake	New Jersey Health Limit
5/18/2015	150	<1	200
5/26/2015	<1	2	200
6/1/2015	74	96	200
6/9/2015	96	4	200
6/15/2015	32	12	200
6/22/2015	16	66	200
6/29/2015	48	<1	200
7/6/2015	<1	<1	200
7/13/2015	20	<1	200
7/20/2015	8	2	200
7/27/2015	8	20	200
8/3/2015	<1	<1	200
8/11/2015	<1	26	200
8/17/2015	4	580	200
8/24/2015	2	20	200
8/31/2015	2	10	200

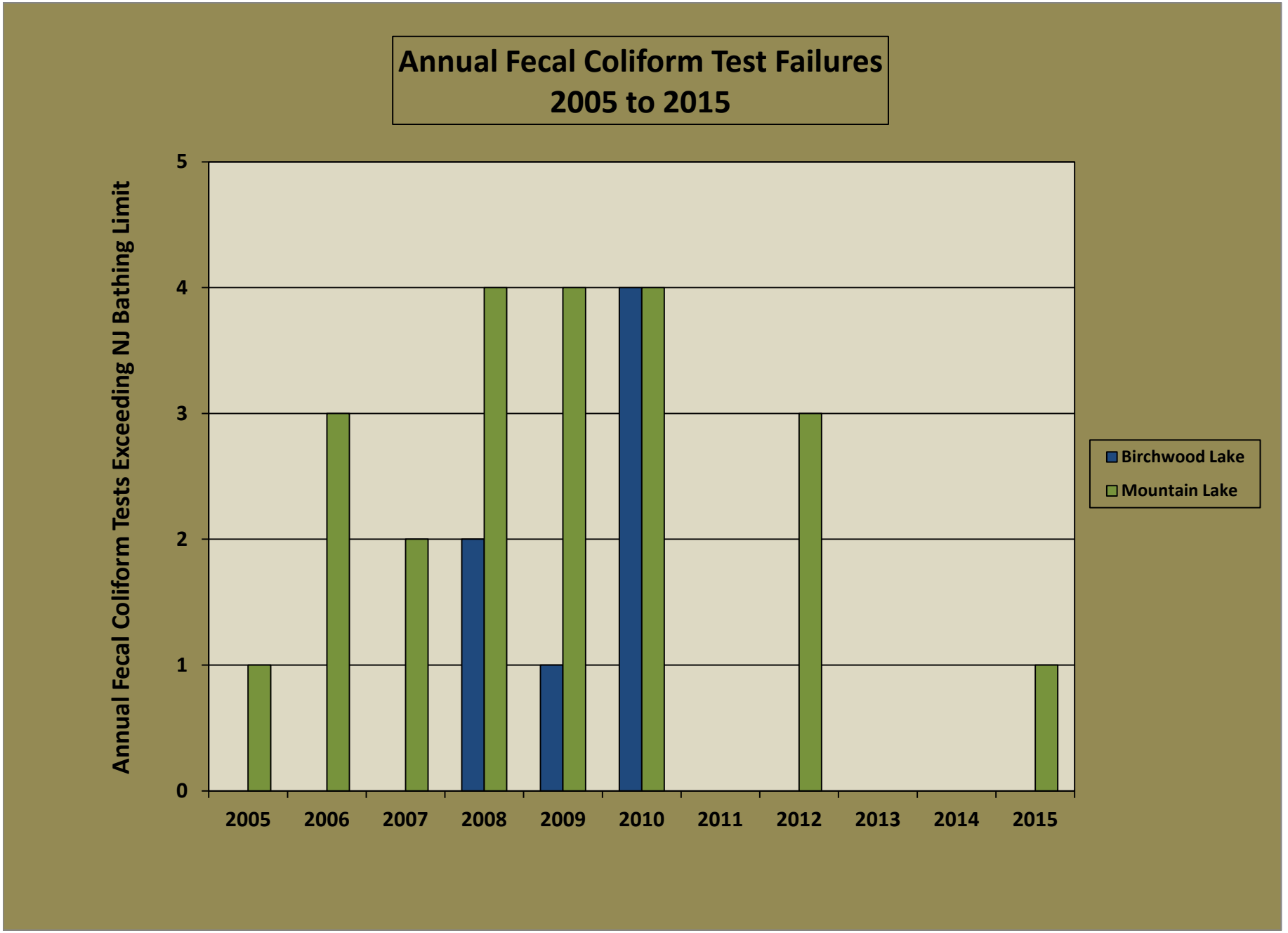
Retest Results

Date	Mountain Lake
8/19/2015	32

Date	Birchwood
NA	NA

Note: All results are in organisms per 100 mL


Mountain Lakes
2015 Fecal Coliform Data
Allied Biological
# of Organisms per 100 mL
600
500
400
300
200
100
0
5/15/2015
5/22/2015
5/29/2015
6/5/2015
6/12/2015
6/19/2015
6/26/2015
7/3/2015
7/10/2015
7/17/2015
7/24/2015
7/31/2015
8/7/2015
8/14/2015
8/21/2015
8/28/2015
9/4/2015
Indicates NJ Safe Bathing Limit
Birchwood Lake
Mountain Lake


Annual Fecal Coliform Test Failures
2005 to 2015
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
Birchwood Lake
Mountain Lake

E-mail Transmission

DATE: 5/26/15

TOTAL NUMBER OF PAGES: 1

TO: Michelle Reilly

E-MAIL: mreilly@mtnlakes.org

FROM: Chris Doyle

RE: Mountain Lakes Fecal Sampling

WEEKLY BEACH SAMPLING

Fecal Coliform Bacteria: results in organisms per 100 mL

Date of Sampling	5/18/15
Birchwood Lake	150
Mountain Lake	ND

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Certified Environmental Testing

ANALYTICAL RESULTS

STANDARD DELIVERABLES FORMAT

APL WORK ORDER NUMBER: 5050487

Allied Biological

Project: MOUNTAIN LAKES

Brian Wood
Laboratory Director

All Results meet the requirements of the National Environmental Laboratory Accreditation Conference and/or State specific certifications as applicable.

1275 Bloomfield Ave., Bldg. 6, Fairfield, New Jersey 07004
(t) 973.227.0422 (f) 973.227.2813 (w) www.aquaprotechlabs.com

NELAC National Environmental Laboratory Accreditation Conferenc
NJDEP #07010 / NYDOH #1163

APL

AQUA PRO-TECH LABORATORIES
Certified Environmental Testing

Analytical Results Summary
MOUNTAIN LAKES

Client:	**Allied Biological**	**Contact:**	**Chris Doyle**
APL Order ID:	**5050487**	**Received:**	**5/18/15 15:10**

Sample ID/Analysis	Method	Prepared	Analyzed	Result	Qual	MDL	RL	Units
5050487-01 (Lake)		BIRCHWOOD LAKE		Collected: 5/18/2015 12:55				
Microbiology								
Fecal Coliform	SM 9222D	5/18/15 15:30	5/18/15 15:30	**150**			**1**	**CFU/100 ml**
5050487-02 (Lake)		MOUNTAIN LAKE		Collected: 5/18/2015 14:35				
Microbiology								
Fecal Coliform	SM 9222D	5/18/15 15:30	5/18/15 15:30	ND			1	CFU/100 ml

ND - Indicates compound analyzed for but not detected
J - Indicates estimated value
B - Indicates compound found in associated blank
E - Concentration exceeds highest calibration standard

D - Indicates result is based on a dilution
P - Greater than 25% diff. between 2 GC columns.
MDL - Minimum detection limit
RL - Reporting limit

APL 5050487

AQUA PRO-TECH LABORATORIES
www.aquaprotechlabs.com
[illegible] AVENUE • BUILDING 6
FAIRFIELD, NEW JERSEY 07004

TEL: 973.227.0422
FAX: 973.227.2813

CHAIN OF CUSTODY

CLIENT: Allied Biological	SEND REPORT TO: Chris Doyle
ADDRESS: 580 Rockport Rd	ADDRESS: 580 Rockport Rd
Hackettstown, NJ 07840	Hackettstown, NJ 07840
PHONE:	PHONE:
E-MAIL: doyle@alliedbiological.com	SEND INVOICE TO: ATTN: DEB
PROJECT NAME: Mountain Lakes	ADDRESS: ↓
PROJECT MGR: Chris Doyle	SAMPLING LOCATION:
PROJECT or PO #:	SAMPLED BY: CD/EM

CONTAMINATION LEVEL
- [x] LOW
- [ ] MEDIUM
- [ ] HIGH

TURN-AROUND TIME
- [x] APL STANDARD 2 weeks
- [ ] RUSH (choose one below, may need lab approval)
  - [ ] 24 hr. date & time required _____
  - [ ] 48 hr. date & time required _____
  - [ ] 72 hr. date & time required _____
  - [ ] 1 week

REPORT/ ELECTRONIC FORMAT
- [x] RESULTS ONLY
- [ ] NJ DEP REDUCED
- [ ] NJ DEP FULL
- [ ] STATE FORMS/E2 REPORTING
- [ ] EMAIL DELIVERY
- [ ] HAZSITE EDD
- [ ] EXCEL

PWSID#_____ SRP#_____

MATRIX ABBREVIATIONS: *D - DRINKING WATER G - GROUNDWATER W - WASTEWATER S - SOIL SL - SLUDGE C - CONCRETE L - LAKE*

APL Lab ID#	Sample Source: Field ID	Date	Time				No. of containers	Preservative	Analysis Requested
5050487-01	Birchwood Lake	5/18/15	12:55	X		L	1	—	Fecal Coliform
-02	Mountain Lake	5/18/15	2:35	X		L	1	—	Fecal Coliform

RELINQUISHED BY	PRINT Chris Doyle	SIGN Chris Doyle	DATE & TIME 5/18/15 1570
RECEIVED BY	PRINT Drew McMahon	SIGN	DATE & TIME 5/18/15 1510
RELINQUISHED BY	PRINT	SIGN	DATE & TIME
RECEIVED BY	PRINT	SIGN	DATE & TIME

COMMENTS/SPECIAL INSTRUCTIONS

Cooler Temp. upon receipt at lab 3-5

CERTIFICATIONS: NELAP (National Environmental Laboratory Accreditation Program) NJDEP #07010 PADEP #68-02903 NYDOH #11634

By signing this Chain of Custody Agreement, customer expressly agrees to pay APL for all charges, reasonably incurred in connection with analysis and reporting for these samples

E-mail Transmission

DATE: 5/27/15

TOTAL NUMBER OF PAGES: 1

TO: Michelle Reilly

E-MAIL: mreilly@mtnlakes.org

FROM: Chris Doyle

RE: Mountain Lakes Fecal Sampling

WEEKLY BEACH SAMPLING

Fecal Coliform Bacteria: results in organisms per 100 mL

Date of Sampling	5/26/15
Birchwood Lake	ND
Mountain Lake	2

ND= Non-detected

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Order Information

Allied Biological

***APL* Order ID :** **5050689**

Site Name : **Mountain Lakes**

Date to Lab : **05/26/2015 15:00**

Samples List

Field ID	Lab ID	Matrix
BIRCHWOOD LAKE	5050689-01	Lake
MOUNTAIN LAKE	5050689-02	Lake

Printing Options

Page Breaks Off

Turning **Page Breaks** on prints each sample on a new page.
Turning **Page Breaks** off prints the report on the minimum number of pages.

BIRCHWOOD LAKE 5050689-01 05/26/2015, 12:50 Lake

Click here to request additional or contingent analyses for this Sample ID.

Test	Method	Date Posted	MDL	Result	Units	Limit
Fecal Coliform	SM 9222D	05/26/2015 16:00	1	ND	CFU/100 ml	

MOUNTAIN LAKE 5050689-02 05/26/2015, 12:35 Lake

Click here to request additional or contingent analyses for this Sample ID.

Test	Method	Date Posted	MDL	Result	Units	Limit
Fecal Coliform	SM 9222D	05/26/2015 16:00	1	2	CFU/100 ml	

Report Key:

| *Description*

Result	Units	Limit
x	mg/l	y *

An asterisk and red highlight indicate that the concentration of the analyte exceeded its limit or optimum range. Click the **Limit** column header for that sample's limits, or visit the **Documents** page for a complete listing of limits for all matrices. For Soil and Wastewater the lowest limit is used. For Concrete the Soil Residential Direct Contact Soil Cleanup Criterion (RDCSCC) is used. For Groundwater the higher of the PQL and the Groundwater Quality Criterion is used.

† Wastewater results are now being compared to site permit limits provided to APL by our clients. If site permit limits are not available, Wastewater results are compared to Groundwater limits. Please contact your client service representative to participate in this program.

Qualifiers

U Indicates the compound was analyzed for but not detected.

J Indicates an estimated value. All tentatively identified compounds (TICs) and results below the MDL receive this qualifier.

N Indicates presumptive evidence of a compound. All TICs receive this qualifier.

B Used if the analyte is found in the method blank as well as the sample.

E Used for identification of compounds with concentrations exceeding the GC/MS calibration range.

D Indicates results from a diluted sample.

E-mail Transmission

DATE: 6/2/15

TOTAL NUMBER OF PAGES: 1

TO: Michelle Reilly

E-MAIL: mreilly@mtnlakes.org

FROM: Chris Doyle

RE: Mountain Lakes Fecal Sampling

WEEKLY BEACH SAMPLING

Fecal Coliform Bacteria: results in organisms per 100 mL

Date of Sampling	6/1/15
Birchwood Lake	74
Mountain Lake	96

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Order Information

Allied Biological

***APL* Order ID :** **5060037**

Site Name : **MT LAKES**

Date to Lab : **06/01/2015 17:48**

Samples List

Field ID	Lab ID	Matrix
MT LAKE ISLAND BEACH	5060037-01	Lake
BIRCHWOOD LAKE	5060037-02	Lake

Printing Options

Page Breaks Off

Turning **Page Breaks** on prints each sample on a new page.
Turning **Page Breaks** off prints the report on the minimum number of pages.

MT LAKE ISLAND BEACH 5060037-01 06/01/2015, 13:30 Lake

Click here to request additional or contingent analyses for this Sample ID.

Test	Method	Date Posted	MDL	Result	Units	Limit
Fecal Coliform	SM 9222D	06/01/2015 18:00	1	96	CFU/100 ml	

BIRCHWOOD LAKE 5060037-02 06/01/2015, 15:10 Lake

Click here to request additional or contingent analyses for this Sample ID.

Test	Method	Date Posted	MDL	Result	Units	Limit
Fecal Coliform	SM 9222D	06/01/2015 18:00	1	74	CFU/100 ml	

Report Key:

| *Description*

Result Units Limit

x mg/l y *

An asterisk and red highlight indicate that the concentration of the analyte exceeded its limit or optimum range. Click the **Limit** column header for that sample's limits, or visit the **Documents** page for a complete listing of limits for all matrices. For Soil and Wastewater the lowest limit is used. For Concrete the Soil Residential Direct Contact Soil Cleanup Criterion (RDCSCC) is used. For Groundwater the higher of the PQL and the Groundwater Quality Criterion is used.

† Wastewater results are now being compared to site permit limits provided to APL by our clients. If site permit limits are not available, Wastewater results are compared to Groundwater limits. Please contact your client service representative to participate in this program.

Qualifiers

U Indicates the compound was analyzed for but not detected.

J Indicates an estimated value. All tentatively identified compounds (TICs) and results below the MDL receive this qualifier.

N Indicates presumptive evidence of a compound. All TICs receive this qualifier.

B Used if the analyte is found in the method blank as well as the sample.

E Used for identification of compounds with concentrations exceeding the GC/MS calibration range.

D Indicates results from a diluted sample.

E-mail Transmission

DATE: 6/9/15

TOTAL NUMBER OF PAGES: 1

TO: Michelle Reilly

E-MAIL: mreilly@mtnlakes.org

FROM: Chris Doyle

RE: Mountain Lakes Fecal Sampling

WEEKLY BEACH SAMPLING

Fecal Coliform Bacteria: results in organisms per 100 mL

Date of Sampling	6/8/15
Birchwood Lake	96
Mountain Lake	4

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RRS Home | Logout | Detailed Report | Allied Biological Tuesday, June 09, 2015

Order Information

Allied Biological

***APL* Order ID :** **5060224**

Site Name : **Mountain Lakes**

Date to Lab : **06/08/2015 14:27**

Samples List

Field ID	Lab ID	Matrix
MOUNTAIN LAKE	5060224-01	Lake
BIRCHWOOD LAKE	5060224-02	Lake

Printing Options

Page Breaks Off

Turning **Page Breaks** on prints each sample on a new page. Turning **Page Breaks** off prints the report on the minimum number of pages.

MOUNTAIN LAKE 5060224-01 06/08/2015, 13:00 Lake

Click here to request additional or contingent analyses for this Sample ID.

Test	Method	Date Posted	MDL	Result	Units	Limit
Fecal Coliform	SM 9222D	06/08/2015 15:00	1	4	CFU/100 ml	

BIRCHWOOD LAKE 5060224-02 06/08/2015, 11:00 Lake

Click here to request additional or contingent analyses for this Sample ID.

Test	Method	Date Posted	MDL	Result	Units	Limit
Fecal Coliform	SM 9222D	06/08/2015 15:00	1	96	CFU/100 ml	

Report Key:

| *Description*

Result	Units	Limit
x	mg/l	y *

An asterisk and red highlight indicate that the concentration of the analyte exceeded its limit or optimum range. Click the **Limit** column header for that sample's limits, or visit the **Documents** page for a complete listing of limits for all matrices. For Soil and Wastewater the lowest limit is used. For Concrete the Soil Residential Direct Contact Soil Cleanup Criterion (RDCSCC) is used. For Groundwater the higher of the PQL and the Groundwater Quality Criterion is used.

† Wastewater results are now being compared to site permit limits provided to APL by our clients. If site permit limits are not available, Wastewater results are compared to Groundwater limits. Please contact your client service representative to participate in this program.

Qualifiers

U Indicates the compound was analyzed for but not detected.

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N Indicates presumptive evidence of a compound. All TICs receive this qualifier.

B Used if the analyte is found in the method blank as well as the sample.

E Used for identification of compounds with concentrations exceeding the GC/MS calibration range.

D Indicates results from a diluted sample.

E-mail Transmission

DATE: 6/16/15

TOTAL NUMBER OF PAGES: 1

TO: Michelle Reilly

E-MAIL: mreilly@mtnlakes.org

FROM: Chris Doyle

RE: Mountain Lakes Fecal Sampling

WEEKLY BEACH SAMPLING

Fecal Coliform Bacteria: results in organisms per 100 mL

Date of Sampling	6/15/15
Birchwood Lake	32
Mountain Lake	12

E-mail Transmission

DATE: 6/23/15 **TOTAL NUMBER OF PAGES: 1**

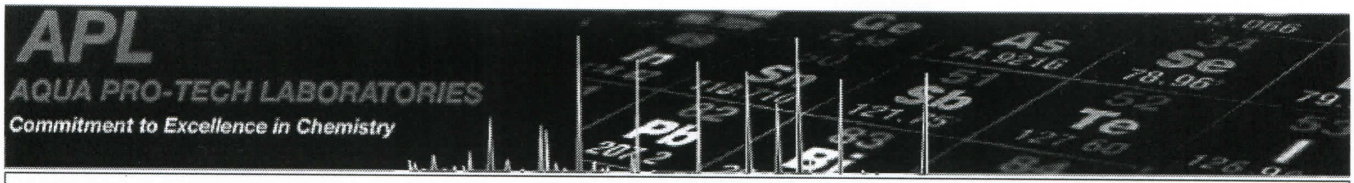
TO: Michelle Reilly **E-MAIL: mreilly@mtnlakes.org**

FROM: Chris Doyle **RE:** Mountain Lakes Fecal Sampling

WEEKLY BEACH SAMPLING

Fecal Coliform Bacteria: results in organisms per 100 mL

Date of Sampling	6/22/15
Birchwood Lake	16
Mountain Lake	66



Order Information

Allied Biological

***APL* Order ID :** **5060655**

Site Name : **Mountain Lakes**

Date to Lab : **06/22/2015 13:30**

Samples List

Field ID	Lab ID	Matrix
Birchwood Lake	5060655-01	Lake
Mountain Lake	5060655-02	Lake

Printing Options

Page Breaks Off

Turning **Page Breaks** on prints each sample on a new page.
Turning **Page Breaks** off prints the report on the minimum number of pages.

Birchwood Lake 5060655-01 06/22/2015, 09:55 Lake

Click here to request additional or contingent analyses for this Sample ID.

Test	Method	Date Posted	MDL	Result	Units	Limit
Fecal Coliform	SM 9222D	06/22/2015 14:00	1	16	CFU/100 ml	

Mountain Lake 5060655-02 06/22/2015, 12:06 Lake

Click here to request additional or contingent analyses for this Sample ID.

Test	Method	Date Posted	MDL	Result	Units	Limit
Fecal Coliform	SM 9222D	06/22/2015 14:00	1	66	CFU/100 ml	

Report Key:

| *Description*

Result	Units	Limit
x	mg/l	y *

An asterisk and red highlight indicate that the concentration of the analyte exceeded its limit or optimum range. Click the **Limit** column header for that sample's limits, or visit the **Documents** page for a complete listing of limits for all matrices. For Soil and Wastewater the lowest limit is used. For Concrete the Soil Residential Direct Contact Soil Cleanup Criterion (RDCSCC) is used. For Groundwater the higher of the PQL and the Groundwater Quality Criterion is used.

† Wastewater results are now being compared to site permit limits provided to APL by our clients. If site permit limits are not available, Wastewater results are compared to Groundwater limits. Please contact your client service representative to participate in this program.

Qualifiers

U Indicates the compound was analyzed for but not detected.

J Indicates an estimated value. All tentatively identified compounds (TICs) and results below the MDL receive this qualifier.

N Indicates presumptive evidence of a compound. All TICs receive this qualifier.

B Used if the analyte is found in the method blank as well as the sample.

E Used for identification of compounds with concentrations exceeding the GC/MS calibration range.

D Indicates results from a diluted sample.

E-mail Transmission

DATE: 6/30/15

TOTAL NUMBER OF PAGES: 1

TO: Michelle Reilly

E-MAIL: mreilly@mtnlakes.org

FROM: Chris Doyle

RE: Mountain Lakes Fecal Sampling

WEEKLY BEACH SAMPLING

Fecal Coliform Bacteria: results in organisms per 100 mL

Date of Sampling	6/29/15
Birchwood Lake	48
Mountain Lake	ND

ND = non-detect

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Order Information

Allied Biological

***APL* Order ID :** **5060869**

Site Name : **Mtn. Lakes Borough**

Date to Lab : **06/29/2015 14:49**

Samples List

Field ID	Lab ID	Matrix
MOUNTAIN LAKE ISLAND BEACH	5060869-01	Lake
BIRCHWOOD LAKE	5060869-02	Lake

Printing Options

Page Breaks Off

Turning **Page Breaks** on prints each sample on a new page. Turning **Page Breaks** off prints the report on the minimum number of pages.

MOUNTAIN LAKE ISLAND BEACH 5060869-01 06/29/2015, 12:55 Lake

Click here to request additional or contingent analyses for this Sample ID.

Test	Method	Date Posted	MDL	Result	Units	Limit
Fecal Coliform	SM 9222D	06/29/2015 15:08	1	ND	CFU/100 ml	

BIRCHWOOD LAKE 5060869-02 06/29/2015, 12:18 Lake

Click here to request additional or contingent analyses for this Sample ID.

Test	Method	Date Posted	MDL	Result	Units	Limit
Fecal Coliform	SM 9222D	06/29/2015 15:08	1	48	CFU/100 ml	

Report Key:

| Description

Result Units Limit

x mg/l y *

An asterisk and red highlight indicate that the concentration of the analyte exceeded its limit or optimum range. Click the **Limit** column header for that sample's limits, or visit the **Documents** page for a complete listing of limits for all matrices. For Soil and Wastewater the lowest limit is used. For Concrete the Soil Residential Direct Contact Soil Cleanup Criterion (RDCSCC) is used. For Groundwater the higher of the PQL and the Groundwater Quality Criterion is used.

† Wastewater results are now being compared to site permit limits provided to APL by our clients. If site permit limits are not available, Wastewater results are compared to Groundwater limits. Please contact your client service representative to participate in this program.

Qualifiers

U Indicates the compound was analyzed for but not detected.

J Indicates an estimated value. All tentatively identified compounds (TICs) and results below the MDL receive this qualifier.

N Indicates presumptive evidence of a compound. All TICs receive this qualifier.

B Used if the analyte is found in the method blank as well as the sample.

E Used for identification of compounds with concentrations exceeding the GC/MS calibration range.

D

E-mail Transmission

DATE: 7/9/15

TOTAL NUMBER OF PAGES: 1

TO: Michelle Reilly

E-MAIL: mreilly@mtnlakes.org

FROM: Chris Doyle

RE: Mountain Lakes Fecal Sampling

WEEKLY BEACH SAMPLING

Fecal Coliform Bacteria: results in organisms per 100 mL

Date of Sampling	7/6/15
Birchwood Lake	ND
Mountain Lake	ND

ND= Non-Detect

APL
AQUA PRO-TECH LABORATORIES
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RRS Home | Logout | Detailed Report | Allied Biological Thursday, July 09, 2015

Order Information

Allied Biological

***APL* Order ID :** **5070149**

Site Name : **Mt. Lakes**

Date to Lab : **07/06/2015 16:40**

Samples List

Field ID	Lab ID	Matrix
Mt. Lake- Island Beach	5070149-01	Lake
Birchwood	5070149-02	Lake

Printing Options

Page Breaks Off

Turning **Page Breaks** on prints each sample on a new page.
Turning **Page Breaks** off prints the report on the minimum number of pages.

Mt. Lake- Island Beach 5070149-01 07/06/2015, 13:05 Lake

Click here to request additional or contingent analyses for this Sample ID.

Test	Method	Date Posted	MDL	Result	Units	Limit
Fecal Coliform	SM 9222D	07/06/2015 17:00	1	ND	CFU/100 ml	

Birchwood 5070149-02 07/06/2015, 12:00 Lake

Click here to request additional or contingent analyses for this Sample ID.

Test	Method	Date Posted	MDL	Result	Units	Limit
Fecal Coliform	SM 9222D	07/06/2015 17:00	1	ND	CFU/100 ml	

Report Key:

| *Description*

Result	Units	Limit
x	mg/l	y *

An asterisk and red highlight indicate that the concentration of the analyte exceeded its limit or optimum range. Click the **Limit** column header for that sample's limits, or visit the **Documents** page for a complete listing of limits for all matrices. For Soil and Wastewater the lowest limit is used. For Concrete the Soil Residential Direct Contact Soil Cleanup Criterion (RDCSCC) is used. For Groundwater the higher of the PQL and the Groundwater Quality Criterion is used.

† Wastewater results are now being compared to site permit limits provided to APL by our clients. If site permit limits are not available, Wastewater results are compared to Groundwater limits. Please contact your client service representative to participate in this program.

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U Indicates the compound was analyzed for but not detected.

J Indicates an estimated value. All tentatively identified compounds (TICs) and results below the MDL receive this qualifier.

N Indicates presumptive evidence of a compound. All TICs receive this qualifier.

B Used if the analyte is found in the method blank as well as the sample.

E Used for identification of compounds with concentrations exceeding the GC/MS calibration range.

D Indicates results from a diluted sample.

E-mail Transmission

DATE: 7/14/15

TOTAL NUMBER OF PAGES: 1

TO: Michelle Reilly

E-MAIL: mreilly@mtnlakes.org

FROM: Chris Doyle

RE: Mountain Lakes Fecal Sampling

WEEKLY BEACH SAMPLING

Fecal Coliform Bacteria: results in organisms per 100 mL

Date of Sampling	7/13/15
Birchwood Lake	20
Mountain Lake	ND

ND= Non-Detect

Turbidity		-	-	Results Not Available	-	-

Mountain Lake- Island Beach 5070353-10 07/13/2015, 13:59 Lake

Click here to request additional or contingent analyses for this Sample ID.

Test	Method	Date Posted	MDL	Result	Units	Limit
Fecal Coliform	SM 9222D	07/13/2015 16:45	1	ND	CFU/100 ml	

Birchwood Lake 5070353-11 07/13/2015, 11:10 Lake

Click here to request additional or contingent analyses for this Sample ID.

Test	Method	Date Posted	MDL	Result	Units	Limit
Fecal Coliform	SM 9222D	07/13/2015 16:45	1	20	CFU/100 ml	

Report Key:

| *Description*

Result	Units	Limit
x	mg/l	y *

An asterisk and red highlight indicate that the concentration of the analyte exceeded its limit or optimum range. Click the **Limit** column header for that sample's limits, or visit the **Documents** page for a complete listing of limits for all matrices. For Soil and Wastewater the lowest limit is used. For Concrete the Soil Residential Direct Contact Soil Cleanup Criterion (RDCSCC) is used. For Groundwater the higher of the PQL and the Groundwater Quality Criterion is used.

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N Indicates presumptive evidence of a compound. All TICs receive this qualifier.

B Used if the analyte is found in the method blank as well as the sample.

E Used for identification of compounds with concentrations exceeding the GC/MS calibration range.

D Indicates results from a diluted sample.

A Indicates an analyte, a target compound included in the calibration.

T Indicates a tentatively identified compound (TIC). A TIC is a non-targeted compound, not included in the calibration, identified by a mass spectral library search.

Results

Dilution Needed Indicates that the compound had an E qualifier and needs a Diluted re-analysis. When completed and made available, this result will be replaced by the Diluted Result.

ND Indicates the compound was analyzed for but not detected.

Other

PQL Practical Quantitation Limit

MDL Method Detection Limit

Terms & Conditions *APL July,2013*

The data on this website is preliminary. It is made available at the earliest possible time in order to better serve our clients. Final deliverable results will be available for download once they are complete.

Questions, Comments, Feedback?

Customer Feedback Survey.

APL Result Retrieval System ©2002-2015 Aqua Pro-Tech Laboratories

E-mail Transmission

DATE: 7/21/15

TOTAL NUMBER OF PAGES: 1

TO: Michelle Reilly

E-MAIL: mreilly@mtnlakes.org

FROM: Chris Doyle

RE: Mountain Lakes Fecal Sampling

WEEKLY BEACH SAMPLING

Fecal Coliform Bacteria: results in organisms per 100 mL

Date of Sampling	7/20/15
Birchwood Lake	8
Mountain Lake	2

ND= Non-Detect

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RRS Home | Logout | Detailed Report | Allied Biological Tuesday, July 21, 2015

Order Information

Allied Biological

***APL* Order ID :** **5070574**

Site Name : **Mountain Lakes**

Date to Lab : **07/20/2015 14:47**

Samples List

Field ID	Lab ID	Matrix
MOUNTAIN LAKE ISLAND BEACH	5070574-01	Lake
BIRCHWOOD LAKE	5070574-02	Lake

Printing Options

Page Breaks Off

Turning **Page Breaks** on prints each sample on a new page.
Turning **Page Breaks** off prints the report on the minimum number of pages.

MOUNTAIN LAKE ISLAND BEACH 5070574-01 07/20/2015, 00:00 Lake

Click here to request additional or contingent analyses for this Sample ID.

Test	Method	Date Posted	MDL	Result	Units	Limit
Fecal Coliform	SM 9222D	07/20/2015 16:00	1	2	CFU/100 ml	

BIRCHWOOD LAKE 5070574-02 07/20/2015, 00:00 Lake

Click here to request additional or contingent analyses for this Sample ID.

Test	Method	Date Posted	MDL	Result	Units	Limit
Fecal Coliform	SM 9222D	07/20/2015 16:00	1	8	CFU/100 ml	

Report Key:

| *Description*

Result	Units	Limit
x	mg/l	y *

An asterisk and red highlight indicate that the concentration of the analyte exceeded its limit or optimum range. Click the **Limit** column header for that sample's limits, or visit the **Documents** page for a complete listing of limits for all matrices. For Soil and Wastewater the lowest limit is used. For Concrete the Soil Residential Direct Contact Soil Cleanup Criterion (RDCSCC) is used. For Groundwater the higher of the PQL and the Groundwater Quality Criterion is used.

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E Used for identification of compounds with concentrations exceeding the GC/MS calibration range.

D

E-mail Transmission

DATE: 7/29/15

TOTAL NUMBER OF PAGES: 1

TO: Michelle Reilly

E-MAIL: mreilly@mtnlakes.org

FROM: Chris Doyle

RE: Mountain Lakes Fecal Sampling

WEEKLY BEACH SAMPLING

Fecal Coliform Bacteria: results in organisms per 100 mL

Date of Sampling	7/27/15
Birchwood Lake	8
Mountain Lake	20

ND= Non-Detect

E-mail Transmission

DATE: 8/4/15

TOTAL NUMBER OF PAGES: 1

TO: Michelle Reilly

E-MAIL: mreilly@mtnlakes.org

FROM: Chris Doyle

RE: Mountain Lakes Fecal Sampling

WEEKLY BEACH SAMPLING

Fecal Coliform Bacteria: results in organisms per 100 mL

Date of Sampling	8/3/15
Birchwood Lake	ND
Mountain Lake	ND

ND= Non-Detect

APL
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RRS Home | Logout | Detailed Report | Allied Biological Tuesday, August 04, 2015

Order Information

Allied Biological

***APL* Order ID :** **5080009**

Site Name : **Mt. Lakes**

Date to Lab : **08/03/2015 14:53**

Samples List

Field ID	Lab ID	Matrix
Birchwood Lake	5080009-01	Lake
Mountain Lake- Island Beach	5080009-02	Lake

Printing Options

Page Breaks Off

Turning **Page Breaks** on prints each sample on a new page.
Turning **Page Breaks** off prints the report on the minimum number of pages.

Birchwood Lake 5080009-01 08/03/2015, 10:58 Lake

Click here to request additional or contingent analyses for this Sample ID.

Test	Method	Date Posted	MDL	Result	Units	Limit
Fecal Coliform	SM 9222D	08/03/2015 15:30	1	ND	CFU/100 ml	

Mountain Lake- Island Beach 5080009-02 08/03/2015, 12:53 Lake

Click here to request additional or contingent analyses for this Sample ID.

Test	Method	Date Posted	MDL	Result	Units	Limit
Fecal Coliform	SM 9222D	08/03/2015 15:30	1	ND	CFU/100 ml	

Report Key:

| *Description*

Result Units Limit

x mg/l y *

An asterisk and red highlight indicate that the concentration of the analyte exceeded its limit or optimum range. Click the **Limit** column header for that sample's limits, or visit the **Documents** page for a complete listing of limits for all matrices. For Soil and Wastewater the lowest limit is used. For Concrete the Soil Residential Direct Contact Soil Cleanup Criterion (RDCSCC) is used. For Groundwater the higher of the PQL and the Groundwater Quality Criterion is used.

† Wastewater results are now being compared to site permit limits provided to APL by our clients. If site permit limits are not available, Wastewater results are compared to Groundwater limits. Please contact your client service representative to participate in this program.

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N Indicates presumptive evidence of a compound. All TICs receive this qualifier.

B Used if the analyte is found in the method blank as well as the sample.

E Used for identification of compounds with concentrations exceeding the GC/MS calibration range.

D

E-mail Transmission

DATE: 8/11/15

TOTAL NUMBER OF PAGES: 1

TO: Michelle Reilly

E-MAIL: mreilly@mtnlakes.org

FROM: Chris Doyle

RE: Mountain Lakes Fecal Sampling

WEEKLY BEACH SAMPLING

Fecal Coliform Bacteria: results in organisms per 100 mL

Date of Sampling	8/10/15
Birchwood Lake	ND
Mountain Lake	26

ND= Non-Detect

APL
AQUA PRO-TECH LABORATORIES
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RRS Home | Logout | Detailed Report | Allied Biological

Tuesday, August 11, 2015

Order Information

Allied Biological

***APL* Order ID :** **5080253**

Site Name : **Mountain Lakes**

Date to Lab : **08/10/2015 14:47**

Samples List

Field ID	Lab ID	Matrix
Mountain Lakes- Island Beach	5080253-01	Lake
Birchwood Lake	5080253-02	Lake
Wildwood Lake	5080253-03	Lake
Cove Pond	5080253-04	Lake

Printing Options

Page Breaks Off

Turning **Page Breaks** on prints each sample on a new page.

Turning **Page Breaks** off prints the report on the minimum number of pages.

Mountain Lakes- Island Beach 5080253-01 08/10/2015, 13:15 Lake

Click here to request additional or contingent analyses for this Sample ID.

Test	Method	Date Posted	MDL	Result	Units	Limit
Fecal Coliform	SM 9222D	08/10/2015 15:45	1	26	CFU/100 ml	

Birchwood Lake 5080253-02 08/10/2015, 11:30 Lake

Click here to request additional or contingent analyses for this Sample ID.

Test	Method	Date Posted	MDL	Result	Units	Limit
Fecal Coliform	SM 9222D	08/10/2015 15:45	1	ND	CFU/100 ml	

Wildwood Lake 5080253-03 08/10/2015, 13:51 Lake

Click here to request additional or contingent analyses for this Sample ID.

Test	Method	Date Posted	MDL	Result	Units	Limit
Nitrate		-	-	Results Not Available	-	-
Phosphorus Total		-	-	Results Not Available	-	-
Turbidity		-	-	Results Not Available	-	-

Cove Pond 5080253-04 08/10/2015, 12:30 Lake

Click here to request additional or contingent analyses for this Sample ID.

Test	Method	Date Posted	MDL	Result	Units	Limit
Nitrate		-	-	Results Not Available	-	-
Phosphorus Total		-	-	Results Not Available	-	-
Turbidity		-	-	Results Not Available	-	-

E-mail Transmission

DATE: 8/18/15

TOTAL NUMBER OF PAGES: 1

TO: Michelle Reilly

E-MAIL: mreilly@mtnlakes.org

FROM: Chris Doyle

RE: Mountain Lakes Fecal Sampling

WEEKLY BEACH SAMPLING

Fecal Coliform Bacteria: results in organisms per 100 mL

Date of Sampling	8/17/15
Birchwood Lake	4
Mountain Lake	580 Failed

ND= Non-Detect

Mountain Lake will be resampled tomorrow morning 8/19/15.

E-mail Transmission

DATE: 8/18/15

TOTAL NUMBER OF PAGES: 1

TO: Michelle Reilly

E-MAIL: mreilly@mtnlakes.org

FROM: Chris Doyle

RE: Mountain Lakes Fecal Sampling

WEEKLY BEACH SAMPLING

Fecal Coliform Bacteria: results in organisms per 100 mL

Date of Sampling	8/17/15
Birchwood Lake	4
Mountain Lake	580 Failed

ND= Non-Detect

Mountain Lake will be resampled tomorrow morning 8/19/15.

Resampling results at 32

E-mail Transmission

DATE: **8/28/15**

TOTAL NUMBER OF PAGES: 1

TO: Michelle Reilly

E-MAIL: mreilly@mtnlakes.org

FROM: Chris Doyle

RE: Mountain Lakes Fecal Sampling

WEEKLY BEACH SAMPLING

Fecal Coliform Bacteria: results in organisms per 100 mL

Date of Sampling	8/24/15
Birchwood Lake	2
Mountain Lake	20

ND= Non-Detect

ANALYTICAL RESULTS

STANDARD DELIVERABLES FORMAT

APL WORK ORDER NUMBER: 5080689

Allied Biological

Project: Mountain Lakes

Brian Wood
Laboratory Director

All Results meet the requirements of the National Environmental Laboratory Accreditation Conference and/or State specific certifications as applicable.

APL

AQUA PRO-TECH LABORATORIES
Certified Environmental Testing

Analytical Results Summary

Mountain Lakes

Client:	**Allied Biological**	**Contact:**	**Chris Doyle**
APL Order ID:	**5080689**	**Received:**	**8/24/15 13:33**

Sample ID/Analysis	Method	Prepared	Analyzed	Result	Qual	MDL	RL	Units
5080689-01 (Lake)		Birchwood Lake		Collected: 8/24/2015 11:05				
Microbiology								
Fecal Coliform	SM 9222D	8/24/15 15:15	8/24/15 15:15	**2**			**1**	**CFU/100 ml**
5080689-02 (Lake)		Mountain Lake Island Beach		Collected: 8/24/2015 12:45				
Microbiology								
Fecal Coliform	SM 9222D	8/24/15 15:15	8/24/15 15:15	**20**			**1**	**CFU/100 ml**

ND - Indicates compound analyzed for but not detected
J - Indicates estimated value
B - Indicates compound found in associated blank
E - Concentration exceeds highest calibration standard
D - Indicates result is based on a dilution
P - Greater than 25% diff. between 2 GC columns.
MDL - Minimum detection limit
RL - Reporting limit

APL 5080689

AQUA PRO-TECH LABORATORIES

www.aquaprotechlabs.com

1275 BLOOMFIELD AVENUE • BUILDING 6
FAIRFIELD, NEW JERSEY 07004

TEL: 973.227.0422
FAX: 973.227.2813

CHAIN OF CUSTODY

PAGE ____ OF ____

CLIENT: Allied Biological	SEND REPORT TO: Chris Doyle
ADDRESS: 580 Rockport Rd. Hackettstown, NJ 07840	ADDRESS: 580 Rockport Rd. Hackettstown, NJ 07840
PHONE: 908-850-0303	PHONE: 908 850-0303
E-MAIL: doyle@alliedbiological.com	FAX:
PROJECT NAME: Mountain Lakes	SEND INVOICE TO: DEB
PROJECT MGR: Chris Doyle	ADDRESS: C
PROJECT or PO #:	SAMPLED BY: EM

CONTAMINATION LEVEL
☐ HIGH ☐ MEDIUM ☒ LOW

TURN-AROUND TIME
- ☒ APL STANDARD 2 weeks
- ☐ RUSH (choose one below)
  - ☐ 24 hr. date & time required ____
  - ☐ 48 hr. date & time required ____
  - ☐ 72 hr. date & time required ____
  - ☐ 1 week

REPORT FORMAT
- ☒ RESULTS ONLY
- ☐ NJ DEP REDUCED
- ☐ NJ DEP FULL
- ☐ STATE FORMS/E2 REPORTING

PWSID# ____

ELECTRONIC FORMAT
- ☐ EMAIL DELIVERY
- ☐ HAZSITE EDD
- ☐ EXCEL

SRP# ____

MATRIX ABBREVIATIONS: D - DRINKING WATER G - GROUNDWATER W - WASTEWATER S - SOIL SL - SLUDGE C - CONCRETE L - LAKE

APL Lab ID#	Sample Source: Field ID	Date	Time	Sample Type: Air	Sample Type: Soil	No. of Bottles	No. of Bottles	Preservative	Analysis Requested
5080689-01	Birchwood Falls	8/24/15	11:05	X		2	1		Fecal Coliform
-02	Mountain Lakes Island Beach	8/24/15	12:45	X		2	1		Fecal Coliform

RELINQUISHED BY (Print) Emily Mayer	DATE 8/24/15	RECEIVED BY (Print) Cassandra Fulcher	
Signature	Time 13:30	*Signature*	
RELINQUISHED BY (Print)	DATE	RECEIVED BY (Print)	
Signature	Time	*Signature*	
RELINQUISHED BY (Print)	DATE	RECEIVED BY (Print)	
Signature	Time	*Signature*	

COMMENTS/SPECIAL INSTRUCTIONS

Cooler Temp. upon receipt at lab 3.2

CERTIFICATIONS: NELAP (National Environmental Laboratory Accredation Program) NJDEP #07010 PADEP #68-02903 NYDOH #11634 CTPH #0233 US ARMY

By signing this Chain of Custody Agreement, customer expressly agrees to pay APL for all charges, reasonably incurred in connection with analysis and reporting for these samples

E-mail Transmission

DATE: **9/2/15**

TOTAL NUMBER OF PAGES: 1

TO: Michelle Reilly

E-MAIL: mreilly@mtnlakes.org

FROM: Chris Doyle

RE: Mountain Lakes Fecal Sampling

WEEKLY BEACH SAMPLING

Fecal Coliform Bacteria: results in organisms per 100 mL

Date of Sampling	8/31/15
Birchwood Lake	2
Mountain Lake	10

ND= Non-Detect

APL
AQUA PRO-TECH LABORATORIES
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Order Information

Allied Biological

***APL* Order ID :** **5080877**

Site Name : **Mountain Lakes**

Date to Lab : **08/31/2015 13:42**

Samples List

Field ID	Lab ID	Matrix
Birchwood Lake	5080877-01	Lake
Mountain Lake- Island Beach	5080877-02	Lake

Printing Options

Page Breaks Off

Turning **Page Breaks** on prints each sample on a new page.
Turning **Page Breaks** off prints the report on the minimum number of pages.

Birchwood Lake 5080877-01 08/31/2015, 10:50 Lake

Click here to request additional or contingent analyses for this Sample ID.

Test	Method	Date Posted	MDL	Result	Units	Limit
Fecal Coliform	SM 9222D	08/31/2015 15:00	1	2	CFU/100 ml	

Mountain Lake- Island Beach 5080877-02 08/31/2015, 12:07 Lake

Click here to request additional or contingent analyses for this Sample ID.

Test	Method	Date Posted	MDL	Result	Units	Limit
Fecal Coliform	SM 9222D	08/31/2015 15:00	1	10	CFU/100 ml	

Report Key:

| *Description*

Result Units Limit

x mg/l y *

An asterisk and red highlight indicate that the concentration of the analyte exceeded its limit or optimum range. Click the **Limit** column header for that sample's limits, or visit the **Documents** page for a complete listing of limits for all matrices. For Soil and Wastewater the lowest limit is used. For Concrete the Soil Residential Direct Contact Soil Cleanup Criterion (RDCSCC) is used. For Groundwater the higher of the PQL and the Groundwater Quality Criterion is used.

† Wastewater results are now being compared to site permit limits provided to APL by our clients. If site permit limits are not available, Wastewater results are compared to Groundwater limits. Please contact your client service representative to participate in this program.

Qualifiers

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N Indicates presumptive evidence of a compound. All TICs receive this qualifier.

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E Used for identification of compounds with concentrations exceeding the GC/MS calibration range.

D

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: 4/16/15
INSPECTION DATE: 4/15/15

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 1:11pm)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	13.9	9.25
2’	13.9	9.22
4’	13.9	9.26
6’	13.8	9.17
8’	13.7	9.11
10’	13.7	9.08
12’	13.7	9.02
13’		

BIRCHWOOD LAKE	Outlet Cove: Trace benthic filamentous algae observed on the bottom.
Secchi: 11.5’	Inside Swim Lane: Trace to sparse benthic filamentous algae observed on the bottom.
Aeration: On by the docks, but open water unit off.	Outside Swim Lane: Trace benthic filamentous algae observed on the bottom.
Fecal Sample: NA	Beach: Clean and clear.
SUNSET LAKE	Launch: Hydro-raking in process. Water turbid. No weeds or algae observed. Clarity reduced from raking.
Secchi: 2.0’	Outlet: Water turbid. No weeds or algae observed.
	Sunset Road Cove: Surface looks good.
	Inlet Cove: Trace benthic filamentous algae observed.
CRYSTAL LAKE	Birchwood Outlet: Trace benthic filamentous algae on

	bottom along the shoreline at base of the dam. Along the north shoreline, floating filamentous algae is accumulating along the shoreline extending 10 to 15 feet out. To the right was a single 20 foot patch of floating filamentous algae. The water looks green (but see comments below).
	Lake Shore Road Shoreline: Trace benthic filamentous algae observed.
Secchi: 10' est.	Crystal Outlet: Trace benthic filamentous algae along rip-rap. The water looks green, but the clarity is excellent. It could be bright green algae on the bottom. Treatment recommended soon.
OLIVE POND **Dissolved Oxygen: 7.98 mg/L.**	Secchi: 3.0' estimated. Floating filamentous algae covers ~15% of the surface of the pond, extending from shorelines to the middle. There appears to be benthic filamentous algae on the bottom.
SHADOW LAKE Aeration: Off **Dissolved Oxygen: 8.33 mg/L.**	Secchi: 3.0'estimated. The surface looks OK. Floating filamentous algae accumulating in the cove to the right, 10 to 15 feet off shoreline. Several small patches of floating filamentous algae also observed. It appears that benthic filamentous algae is covering much of the bottom. Treatment of this basin might be needed next week.
COVE POND ***Dissolved Oxygen: 5.79 mg/L.***	Secchi: 2.0' estimated. Surface looks good. No weeds or algae observed.
GRUNDEN'S POND **Dissolved Oxygen: 9.87 mg/L.**	Secchi: 3.0' estimated. Trace floating filamentous algae accumulating along boulevard shoreline and in the corner. Non-problematic at this time, and the open water looks good.
MOUNTAIN LAKE	Cove End: To the left, clean and clear, although two Canada geese observed. To the right, two small patches of floating filamentous algae (10 foot and 5 foot) observed.
Secchi: 14.0' est.	Sailboat Cove: Clean and clear.
Water Level: 499.6	Outlet Cove: Clean and clear.
	Midvale Launch: Clean and clear. One floating fragment of bassweed observed.
Fecal Sample: NA	Island Beach: Trace benthic filamentous algae observed around the dock. Beach is clean and clear.

WILDWOOD LAKE	Park: Trace benthic filamentous algae observed. Clarity is excellent and open water looks good.
Secchi: 8.0’ estimated.	Dam: Clean and clear. High winds, so difficult to see in the water column.
Water Level: 499.6	Launch: Trace benthic filamentous algae.

NOTES:

1. **Aeration unit at the Birchwood Swim lanes (4 diffusers) was on. The open water diffusers were off. These should be activated by DPW for 6, 8, 12 hours per day and then left on for 24 hours soon.**
2. **Likewise, aeration system at Shadow Lake should be activated soon.**
3. **Rain in the forecast for Friday, so potential treatment work at Crystal and Olive to occur next week.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: 4/28/15
INSPECTION DATE: 4/27/15

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 119 pm)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	13.3	9.13
2’	13.5	9.11
4’	13.5	9.14
6’	13.6	9.08
8’	13.6	8.99
10’	13.6	9.06
12’	13.6	9.02
13’		

BIRCHWOOD LAKE	Outlet Cove: Bottom is clear. Surface is covered with tree debris, pollen (?) and other debris. An organic odor was detected.
Secchi: 10.5’	Inside Swim Lane: Trace to sparse benthic filamentous algae observed.
Aeration: All on.	Outside Swim Lane: One spatterdock stem observed nearing the surface. In the corner, ribbon-leaf pondweed is just emerging from the lake bottom. Trace benthic filamentous algae.
Fecal Sample: NA	Beach: Clean and clear.
SUNSET LAKE	Launch: Clean and clear.
Secchi: 7.0’ est.	Outlet: Trace floating stems of curly-leaf pondweed observed.
	Sunset Road Cove: Clean and clear.
	Inlet Cove: Clean and Clear.
CRYSTAL LAKE	Birchwood Outlet: Trace to sparse benthic filamentous algae

	observed on the bottom at the base of the hill. Some white lilies are already at the surface here. The floating filamentous algae at the north end of the lake has increased and is now 20 to 30 feet off the shoreline. A resident hiking the trails at Birchwood complained about the algae. To the right, several small (5-10') patches of floating filamentous algae was observed along the shoreline.
	Lake Shore Road Shoreline: Trace to sparse benthic filamentous algae.
Secchi: 6.0' estimated.	Crystal Outlet: Trace benthic filamentous algae on the rocks. Difficult to see the bottom due to cloudy skies and wind.
OLIVE POND **Dissolved Oxygen: 5.97 mg/L.**	Secchi: 2.5 feet. Water is turbid but surface looks much improved. A few scattered dead/dying small patches of floating filamentous algae observed.
SHADOW LAKE Aeration: On **Dissolved Oxygen: 7.18 mg/L.**	Secchi: 3.0' estimated. To the right, trace to sparse patches of floating filamentous observed in the cove. Trace benthic filamentous algae on the bottom in the shallow water.
COVE POND ***Dissolved Oxygen: 6.89 mg/L.***	Secchi: Surface looks clean and clear.
GRUNDEN'S POND **Dissolved Oxygen: 9.87 mg/L.**	Secchi: 3.0' estimated. The surface looks good, but sparse benthic filamentous algae observed on the bottom in the shallow water along the rock wall shoreline.
MOUNTAIN LAKE	Cove End: To the left, the surface looks good. To the right, the surface looks good with trace floating and benthic filamentous algae observed. Observed two large "frisky" snapping turtles at the surface. Took pictures for the Year-End Report ☺.
Secchi: 12.5' est.	Sailboat Cove: Clean and clear.
Water Level: 499.6	Outlet Cove: Clean and clear
	Midvale Launch: DPW was installing new canoe racks. Clean and clear.
Fecal Sample: NA	Island Beach: By the dock, sparse to moderate benthic filamentous algae, just reaching the surface in locations. One stem of curly-leaf pondweed observed in the algae. Trace to sparse algae extending to the bridge and decreasing to trace around the boat mooring area. The beach was clean and clear.
WILDWOOD LAKE	Park: Trace benthic filamentous algae observed. Took pictures of the cattails to the left (see below).
Secchi: 6.5' est.	Dam: Water looks good. Trace benthic filamentous algae

	observed.
Water Level: 499.7	Launch: Trace benthic filamentous algae observed.

NOTES:

1. **Last week, Ms. Stephanie Menack (49 Briarcliff) contacted our office regarding the cattails along her water front on Wildwood Lake. I surveyed the patch, which is to the left of the dock at the park (when standing on the dock, looking toward the dam). The patch is about 50 feet long and 40 feet deep (estimated). A few new growth cattails were just poking above the water on the date of the survey. The resident would like to have the cattails controlled. The resident's phone number is (973) 402-8800. We will advise the borough on the best method to control this patch.**
2. **In the canal, near Wildwood Lake and the bridge, floating filamentous algae covered most of the surface. Algae appeared present down toward the church, but decreased in coverage.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: 5/4/15
INSPECTION DATE: 5/4/15

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time:10:30)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	17.0	8.69
2’	17.0	8.64
4’	16.9	8.62
6’	16.9	8.63
8’	16.9	8.65
10’	16.8	8.65
12’	16.4	8.63
13’	16.2	7.56

BIRCHWOOD LAKE	Outlet Cove: Sparse amounts of emerging Robbins Pondweed mixed with a trace amount of bassweed were observed. Pollen and tree debris noted on the surface.
Secchi: 11’	Inside Swim Lane: Trace amounts of white lily and benthic filamentous algae were observed along the beach wall.
Aeration: All on in the swim lanes. Aeration in main basin OFF.	Outside Swim Lane: Trace amounts of Robbins pondweed, spatterdock, white lily and benthic filamentous algae were all noted in this area.
Fecal Sample: NO	Beach: Clean and clear
SUNSET LAKE	Launch: Water column was clean with pollen and tree debris on the surface.
Secchi: 6’ est	Outlet: Clean and clear
	Sunset Road Cove: Clean and clear
	Inlet Cove: Trace amounts of spatterdock beginning to emerge in the cove with trace benthic and floating filamentous algae noted at the base of the hill.

CRYSTAL LAKE	Birchwood Outlet: Sparse amounts of white lily mixed with trace amounts of emerging bassweed were noted at the base of the hill. Moderate to dense mats of floating filamentous algae noted in far north end of cove with smaller mats along the shoreline throughout.
	Lake Shore Road Shoreline: Trace floating and benthic filamentous algae along the shoreline areas.
Secchi: 10' est	Crystal Outlet: Trace to sparse benthic filamentous algae observed along rocks.
OLIVE POND **Dissolved Oxygen: 4.33** **Temperature: 23.7**	Secchi: 5' est. Tree pollen with detritus on pond surface. The water column was mostly clear with a trace of floating filamentous algae along the shoreline. NOTE: Leaf dumping has been noted along the Sunset Ln. shoreline area. This leaf litter will wash into the lake basin where it will add nutrients to the system.
SHADOW LAKE Aeration: ON **Dissolved Oxygen: 6.76** **Temperature: 20.9**	Secchi: 5'est. Sparse patches of floating filamentous algae mixed with tree pollen and debris along the shoreline areas. Coverage ~ 25%.
COVE POND ***Dissolved Oxygen:*** **3.91** **Temperature: 18.3**	Secchi: 6' est. Water clear overall but some tree pollen and detritus present on the surface.
GRUNDEN'S POND **Dissolved Oxygen: 13.59** **Temperature: 19.8**	Secchi: 3' est. Water turbid throughout the basin. Sparse to moderate benthic filamentous algae, with some rising to the surface, was noted. Trace patches of curly leaf pondweed at or near the surface was also observed.
MOUNTAIN LAKE	Cove End: Right - Trace mats of floating filamentous algae were observed throughout basin. Left – Trace amounts of floating filamentous algae along the shoreline areas.
Secchi: 10' est.	Sailboat Cove: Clean and clear
Water Level: 499.5	Outlet Cove: Trace amounts of benthic filamentous algae observed.
	Midvale Launch: Trace amounts of benthic filamentous algae observed.

Fecal Sample: NO	Island Beach: Launch/dock area – Dense mats of benthic filamentous algae with sparse patches of floating filamentous algae observed. Sailboat cove – Moderate to dense benthic filamentous algae. Beach – Trace benthic filamentous algae. NOTE: Mountain Lakes received an algaecide application this morning.
WILDWOOD LAKE	Park: Scattered patches of benthic and floating filamentous algae throughout basin.
Secchi: 6' est	Dam: Sparse patches floating filamentous algae collecting at spillway. Benthic filamentous algae observed along rocks.
Water Level: 499.5	Launch: Sparse benthic filamentous algae noted in cove end. NOTE: Wildwood scheduled for Alum treatment on 5/5/15.

NOTES: 1 Canada goose noted on Crystal Lake.
2 Canada geese noted on Crystal Lake
1 Double crested Cormorant noted on Mountain Lake.

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: 5/11/15
INSPECTION DATE: 5/11/15

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 1100hrs)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	21.4	7.43
2’	21.4	7.40
4’	21.4	7.40
6’	21.4	7.37
8’	21.4	7.38
10’	21.4	7.37
12’	20.0	7.15
13’		

BIRCHWOOD LAKE	Outlet Cove: Sparse pondweed sp. and trace bassweed, white lilies and curly-leaf pondweed observed.
Secchi: 8.0’	Inside Swim Lane: Trace white lily observed.
Aeration: All on	Outside Swim Lane: Trace pondweed, white lily, spatterdock and watershield all observed between the dock and shoreline.
Fecal Sample: NA	Beach: Clean and clear.
SUNSET LAKE	Launch: Clean and clear.
Secchi: 8.0’ est.	Outlet: Trace floating filamentous algae with tree pollen mixed in observed along the shoreline.
	Sunset Road Cove: Trace white lily observed in the cove.
	Inlet Cove: Trace floating filamentous algae and spatterdock observed in the cove.
CRYSTAL LAKE	Birchwood Outlet: A moderate patch of white lilies observed

	at the base of the hill, with increasing bassweed (sparse) mixed in. The floating mats of algae responded well to recent treatment.
	Lake Shore Road Shoreline: Tree pollen on the surface but otherwise clean and clear.
Secchi: 10.0' est.	Crystal Outlet: Trace floating filamentous algae observed.
OLIVE POND **Dissolved Oxygen: 5.37 mg/L.**	Secchi: 6.0' estimated. Trace mats of floating filamentous algae along the shoreline.
SHADOW LAKE Aeration: On **Dissolved Oxygen: 4.29 mg/L.**	Secchi: 4.0'. Dense tree pollen on the surface with sparse mats of floating filamentous algae mixed in.
COVE POND ***Dissolved Oxygen:*** **5.74 mg/L.**	Secchi: 6.0' estimated. Clean and clear.
GRUNDEN'S POND **Dissolved Oxygen: 13.13 mg/L.**	Secchi: 3.0' estimated. Dense tree pollen on surface. Moderate curly-leaf at or near the surface throughout the central part of the basin. Trace floating filamentous algae mixed in, and dense benthic filamentous algae observed throughout. Treatment needed.
MOUNTAIN LAKE	Cove End: On both sides, moderate tree pollen on surface with trace floating filamentous algae mixed in.
Secchi: 11.0' est.	Sailboat Cove: Clean and clear with some pollen on the surface.
Water Level: 499.3	Outlet Cove: Sparse benthic filamentous algae along the dam.
	Midvale Launch: Clean and clear.
Fecal Sample: NA	Island Beach: Trace benthic and floating filamentous algae near the launch. This area responded well to last week's treatment. All other areas were clean and clear.
WILDWOOD LAKE	Park: Trace small patches (3-5") of filamentous algae observed scattered about the basin. Some pollen observed. Water clarity is excellent following last week's alum application.
Secchi: 15.0' est.	Dam: Trace small patches of floating filamentous algae observed.
Water Level:	Launch: Clean and clear.

NOTES:

1. **At Birchwood beach: unleashed dogs observed in the water.**
2. **Grunden's Pond on schedule for treatment later this week.**
3. **In the canal, trace small patches (3-5" diameter) floating filamentous algae near the inlet to Wildwood Lake. Similar conditions in the canal proper, but heavy pollen on the surface.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: 5/19/15
INSPECTION DATE: **5/18/15**

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time:)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	21.6	5.91
2’	21.6	5.85
4’	21.6	5.83
6’	21.6	5.81
8’	21.5	5.74
10’	21.4	5.61
12’	20.4	4.36

BIRCHWOOD LAKE	Outlet Cove: Pollen and tree debris were observed at the surface. Trace White Lilies and Watershield at the surface. Sparse to moderate densities of Ribbon Leaf Pondweed and Bassweed were observed. Trace amounts of Benthic Filamentous Algae were also observed.
Secchi: 9’ft.	Inside Swim Lane: Trace to sparse densities of White lilies and Creeping Bladderwort were observed. Trace amounts of Curly Leaf Pondweed were observed near the dock. Trace amounts of Ribbon Leaf Pondweed were also observed.
Aeration: On (In swimming lanes, off in the open water)	Outside Swim Lane: Heavy amounts of tree debris and pollen were observed on the surface. Sparse densities of White Lilies were observed. Sparse to moderate amounts of Ribbon Leaf Pondweed were also observed. Trace densities of Curly Leaf Pondweed, Watershield, Spatterdock, and Filamentous Algae were observed.
Fecal Sample: 12:55pm	Beach: Clean and clear. North of beach contained trace densities of White Lilies and Ribbon Leaf Pondweed. Sparse amounts of Watershield were also observed.
SUNSET LAKE	Launch: Two dead yellow perch were observed at the

	launch. Trace densities of Curly Leaf Pondweed (floating stems) and White Lilies were observed on the right side of the launch.
Secchi: 7'est	Outlet: One small patch of White Lilies were observed. Trace amounts of floating stems of Curly Leaf Pondweed were also observed.
	Sunset Road Cove: Increased amount of tree debris and pollen were present at the surface. Trace amount of White Lilies were observed.
	Inlet Cove: Water Lilies were observed at the mouth of the cove, coming in along the left hand side.
CRYSTAL LAKE	Birchwood Outlet: Trace to sparse densities of White Lilies and Watershield were observed in scattered patches. Trace densities of Bassweed and Curly Leaf Pondweed were observed. Algae mats were forming around the island and shorelines. Northern part of basin looks clear.
	Lake Shore Road Shoreline: Dense amount of tree debris was observed. Trace amounts of Filamentous Algae were also observed.
Secchi:	Crystal Outlet: Filamentous Algae was observed along property fronts, docks, and shorelines to the right. Large patches along shorelines across from the Sunset Inlet were also observed. Trace amount of Bassweed was observed. Treatment recommended.
OLIVE POND **Dissolved Oxygen: 3.27**	Secchi: 3.0' estimated. Dense tree debris and pollen were present at the surface. Oil sheen was also observed. Trace amounts of Filamentous Algae were observed at the Inlet only.
SHADOW LAKE Aeration: On (Low pressure) **Dissolved Oxygen: 2.03**	Secchi: 4.0' estimated. Dense tree debris and pollen covered half of the lake near survey location. Along the shorelines trace to sparse densities of Small Duckweed were observed. Oil sheen was also observed on the surface.
COVE POND ***Dissolved Oxygen:*** **4.34**	Secchi: 2.5' estimated. Water appeared to be slightly turbid. Tree debris and pollen were also observed. Trace amounts of Small Duckweed were observed.
GRUNDEN'S POND	Secchi: 3.0' estimated. Dense tree debris and pollen were

Dissolved Oxygen: 3.82	observed along Boulevard. Water appears to be turbid. Ludwigia was observed along the shoreline and trace amounts of Benthic Filamentous Algae were also observed.
MOUNTAIN LAKE	Cove End: Two geese were observed on a lawn near the site. Left Side: Dense amount of tree debris and pollen were observed. Right Side: Trace amount of pollen was observed but otherwise site was was clean and clear.
Secchi: 12'est	Sailboat Cove: Dense amount of tree debris and trace amounts of pollen were present at the surface. Trace densities of Benthic Filamentous Algae were observed. Trace to sparse densities of naiad species were also observed.
Water Level: 499.45	Outlet Cove: Moderate densities of Benthic Filamentous Algae were observed.
	Midvale Launch: Curly Leaf Pondweed was rooted in about 8 feet of water down the right side of the dock. Trace densities of Curly Leaf Pondweed and Benthic Filamentous Algae were also observed.
Fecal Sample: 2:35pm	Island Beach: Area by bridge was clean and clear, with only a trace amount of algae present. Trace densities of Filamentous Algae were observed around the dock area. Traces of rooted stems of Eurasian water milfoil were observed. Sparse amount of stonewort was observed near the dock. Some goose droppings observed on the dock. Sparse to Moderate amounts of Curly Leaf Pondweed with seeds were rooted long the dock, increasing in density at the end of the dock. No goose droppings were observed at the beach. Beach area was clean and clear.
WILDWOOD LAKE	Park: Goose droppings were observed on the dock. Lake was clean and clear. Pieces of floating Curly Leaf Pondweed were observed along the shorelines.
Secchi: 10'est	Dam: Trace densities of Curly Leaf Pondweed were observed. Area was clean and clear.
Water Level: 499.4	Launch: Trace densities of Curly Leaf Pondweed, Ludwigia, and pollen were observed.

NOTES:

1. **Crystal Lake is on the schedule Tuesday for treatment.**
2. **Later this week, an on-the-water survey of Mountain Lake will be conducted along with a possible treatment for nuisance curly-leaf pondweed.**
3. **The aeration system at Birchwood Lake (open water system) was not on. This needs to be on 24 hours.**
4. **The air pressure of the Shadow Lake diffusers is low. The airstones might need to be cleaned or replaced, and the system balanced. The dissolved oxygen was low.**
5. **Fecal samples collected today. Results to follow.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: 5/26/15
INSPECTION DATE: 5/26/15

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 1230)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	20.9	6.11
2’	20.9	5.99
4’	20.9	5.96
6’	20.8	5.97
8’	20.8	5.88
10’	20.8	5.34
12’	20.8	5.31
13’		

BIRCHWOOD LAKE	Outlet Cove: Sparse white lily and watershield at the surface. Sparse to moderate ribbon-leaf pondweed observed at the surface with floating leaves. Trace benthic filamentous algae on the bottom. Scattered patches of curly-leaf pondweed, some at the surface, and trace stems of bassweed also present.
Secchi: 8.5’	Inside Swim Lane: Trace curly-leaf pondweed, white lily and watershield observed. Trace ribbon-leaf pondweed and benthic filamentous algae present on the bottom. Sparse to moderate (but non-nuisance) creeping bladderwort on the bottom as well.
Aeration: On at the swim lanes; off in the open water	Outside Swim Lane: Two small patches of spatterdock observed. Trace to sparse amounts of white lily and ribbon-leaf pondweed (some reaching the surface) observed. One patch of curly-leaf pondweed observed.
Fecal Sample: 1250 hrs	Beach: Clean and clear.
SUNSET LAKE	Launch: Clean and clear with only a trace patch of white lilies observed to the right. Open water looks good.

Secchi: 7.0’ est.	Outlet: Trace benthic filamentous algae, trace curly-leaf pondweed stems (floating) and pollen along the dam shoreline.
	Sunset Road Cove: Trace white lily patch to the right. At the far right, very heavy pollen accumulating in the corner. To the left, several patches of SAV (submersed aquatic vegetation) or benthic filamentous algae nearing the surface along the shore. Might require treatment soon.
	Inlet Cove: Heavy pollen accumulating in the interior of the cove. Further out in the mouth, white lilies and a few patches of spatterdock coming in, especially along the left hand side.
CRYSTAL LAKE	Birchwood Outlet: In the open water, 10 scattered patches (~10 feet) of SAV and/or algae observed. Also in the open water, SAV observed nearing the surface in other locations. At the base of the hill, floating filamentous algae, white lily and watershield observed at the surface, with bassweed and curly-leaf pondweed at the bottom.
	Lake Shore Road Shoreline: Trace benthic filamentous algae observed.
Secchi: 7.0’ estimated.	Crystal Outlet: Still a few persistent patches of floating filamentous algae along the dam shoreline, but around the docks looks much better. Trace benthic filamentous algae on the rocks. Open water looks good, with a typical patch of lilies at the tip of the island.
OLIVE POND **Dissolved Oxygen: 9.12 mg/L.**	Secchi: 3.0’ estimated. Heavy pollen on surface. A few scattered patches of floating filamentous algae, mostly limited to the access point and inlet. Benthic filamentous algae observed on the bottom. Treatment might be required here in another week.
SHADOW LAKE Aeration: On. **Dissolved Oxygen: 6.49 mg/L.**	Secchi: 2.5’ estimated. Very heavy pollen on surface, especially to the left. Difficult to see into the water column. Trace to sparse small duckweed along the shoreline.
COVE POND ***Dissolved Oxygen: 4.89 mg/L.***	Secchi: 2.5’ estimated. Moderate pollen on surface, but otherwise OK. Trace small duckweed observed along shoreline.
GRUNDEN’S POND **Dissolved Oxygen: 3.78 mg/L.**	Secchi: 3.0’ estimated. Heavy pollen on surface. Trace benthic filamentous algae and Ludwigia sp. occurring along the rock wall shoreline.
MOUNTAIN LAKE	Cove End: To the left: trace floating filamentous algae and moderate pollen observed. To the right: Clean and clear.
Secchi: 12.5’ estimated.	Sailboat Cove: Trace floating patches (~1 foot) of floating

	filamentous algae scattered about the cove. Trace to sparse benthic filamentous algae on the bottom, with scattered patches of naiad sp. mixed in.
Water Level: 499.35	Outlet Cove: No flow. Trace benthic filamentous algae observed.
	Midvale Launch: Trace pollen on surface. Pondweed sp. floating stems accumulating at launch. Trace floating and rooted stems of curly-leaf pondweed observed.
Fecal Sample: 1235 hrs.	Island Beach: Floating stems of curly-leaf pondweed and pondweed sp. around the dock. Some floating and some rooted here. Two small patches of Eurasian water milfoil observed as approaching the bridge. These should be hand pulled if they persist. A few scattered floating stems of pondweed sp. around the boat moorings. One dead black crappie (~10") observed.
WILDWOOD LAKE	Park: The shore and area around the dock are clean and clear. In the open water, a 20' patch of SAV and/or algae observed nearing the surface
Secchi: 10' estimated.	Dam: Several large (20'+) patches of SAV and/or algae scattered about the open water nearing the surface.
Water Level: 499.4	Launch: Trace benthic filamentous algae.

NOTES:

1. **Fecal samples collected; results to follow.**
2. **Crystal Lake is ready for a weed treatment.**
3. **Wildwood Lake could use a weed treatment.**
4. **The swim lanes at Birchwood will be treated soon.**
5. **The canal had pollen on the surface, but otherwise looked good.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: 6/2/15
INSPECTION DATE: 6/1/15

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time:1:30)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	22.5	8.37
2’	22.5	8.30
4’	22.6	8.17
6’	22.6	8.10
8’	22.6	8.09
10’	22.6	8.04
12’	22.1	6.64
13’		

BIRCHWOOD LAKE	Outlet Cove: Moderate Robbin’s pondweed observed with trace amounts of bassweed, white lily and floating filamentous algae. Both the bassweed and the lilies were showing signs of dying back.
Secchi: 10’	Inside Swim Lane: Trace amounts of white lily all showing signs of dying back.
Aeration: On inside swim lane / off outside swim lane	Outside Swim Lane: Sparse to moderate amounts of Robbin’s pondweed mixed with trace amounts of white lily, spatterdock and bassweed. Lilies and bassweed showing signs of dying back.
Fecal Sample: Yes	Beach: Clean and clear
SUNSET LAKE	Launch: Trace amounts of floating filamentous algae.
Secchi: 6’ est.	Outlet: Trace amounts of floating filamentous algae and floating stems of dying curly leaf pondweed were observed along the shoreline.
	Sunset Road Cove: Trace amounts of white lilies.
	Inlet Cove: Sparse white lilies and spatterdock and trace amounts of floating filamentous algae were noted.

CRYSTAL LAKE	Birchwood Outlet: Moderate amounts of white lily mixed with trace amounts of watershield and a moderate patch of bassweed all noted at the base of the hill. A moderate patch of floating filamentous algae was also noted at the base of the hill.
	Lake Shore Road Shoreline: Sparse bassweed emerging along the shoreline. Trace amounts of floating stems of leafy pondweed but no rooted stems observed. Moderate density, small patch (3' x 3') observed between dock and canoe.
Secchi: 10' est	Crystal Outlet: Trace amounts of benthic filamentous algae observed along rocks.
OLIVE POND **Dissolved Oxygen: 7.17** **Temp: 19.2**	Secchi: 6' est. Trace amounts of floating filamentous algae noted along shoreline areas.
SHADOW LAKE Aeration: On but not working well. **Dissolved Oxygen: 6.94** **Temp: 19.7**	Secchi: 5' est. Trace amounts of floating filamentous algae and riccia noted along the shoreline area.
COVE POND ***Dissolved Oxygen: 20.3*** ***Temp:*****20.3**	Secchi: 6' est. Trace amounts of duckweed along Boulevard shoreline.
GRUNDEN'S POND **Dissolved Oxygen: 4.93** **Temp; 22.0**	Secchi: 4' est. Trace to sparse duckweed throughout pond. Trace in central basin and sparse along the shoreline. Sparse benthic and floating filamentous algae along the shoreline also noted.
MOUNTAIN LAKE	Cove End: Clean and clear on both sides
Secchi: 12' est.	Sailboat Cove: Trace amounts of floating filamentous algae along roadside shoreline.
Water Level: 499.6	Outlet Cove: Trace amounts of small duckweed.
	Midvale Launch: Trace amounts of leafy pondweed to the left of the boat dock along the shoreline.
Fecal Sample: yes	Island Beach: Trace patches of leafy pondweed mixed with Eurasian water milfoil along the boat dock. All other areas were clean and clear.
WILDWOOD LAKE	Park: Clean and clear.
Secchi: 15' est.	Dam: Clean and clear.
Water Level: 499.5	Launch: Trace floating tree pollen and debris.

NOTES:

1. Waterfowl Observed: Mountain Lake: 3 Canada geese and 2 mallard ducks
   Wildwood Lake: 5 Canada geese and 1 double crested cormorant
2. **The aeration system in the open water at Birchwood is still off.**
3. **The aeration system at Shadow Lake needs to be re-balnced/cleaned.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: 6/9/15
INSPECTION DATE: 6/8/15

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time:)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	19.9	5.75
2’	19.9	5.73
4’	19.9	5.76
6’	19.8	5.73
8’	19.8	5.60
10’	19.9	5.16
12’		
13’		

BIRCHWOOD LAKE	Outlet Cove: Moderate amount of Robbin’s pondweed with trace amounts of white lilies were observed. Trace to moderate amounts of bassweed were mixed in with the Robbin’s pondweed. Floating pieces of curly-leaf pondweed and wild celery were observed.
Secchi: 6’	Inside Swim Lane: Lanes were clean and clear. Floating pieces of plant debris were observed.
Aeration: on	Outside Swim Lane: Trace amounts of Spatterdock were observed. One patch of spatterdock was decaying
Fecal Sample: 11:00am	Beach: Clean and clear.
SUNSET LAKE	Launch: Numerous small clumps of benthic filamentous algae were observed.
Secchi: 5’est	Outlet: Trace amounts of pollen were observed on the surface. Clean and Clear.
	Sunset Road Cove: Clean and clear. Trace amounts of pollen were observed on the surface.

	Inlet Cove: Trace amounts of pollen were observed.
CRYSTAL LAKE	Birchwood Outlet: Filamentous algae patch forming at the mouth of the outlet. Moderate patches of watershield mixed in with two moderate sized patches of white lilies. Trace amounts of bassweed were observed.
	Lake Shore Road Shoreline: Trace patch of white lilies located on the right side. Clean and clear.
Secchi: 6’	Crystal Outlet: Large patch of filamentous algae observed at the opening of the outlet. Trace amounts of bassweed were observed. Trace amounts of benthic filamentous algae forming on rocks.
OLIVE POND **Dissolved Oxygen: 4.43**	Secchi: 3’est Water looks turbid with dense amount of tree debris observed.
SHADOW LAKE Aeration: On **Dissolved Oxygen: 5.51**	Secchi: 4’est Heavy amount of tree debris was observed. Moderate amounts of small duckweed along the shoreline was observed. Trace amounts of naiad were observed.
COVE POND ***Dissolved Oxygen:*** **4.41**	Secchi: 3’est Heavy amount of tree debris was observed. Two large swans were nesting near sampling site. Water appeared to be very turbid with traces of large duckweed. Trace amounts of oil slick was observed, as well.
GRUNDEN’S POND **Dissolved Oxygen:11.27**	Secchi: 3’est Trace amounts of small duckweed were observed along the shoreline. A moderate amount of Ludwigia was observed along the shoreline. Benthic filamentous algae appears to forming on the bottom of the pond.
MOUNTAIN LAKE	Cove End: Right: Appears to be clean and clear. Left: Trace amounts of filamentous algae formed into clumps. Water appears to be turbid.
Secchi: 6’+	Sailboat Cove: Trace to moderate amounts of leaf debris were observed. Other than that the cove is clean and clear.
Water Level: 499.7	Outlet Cove: Trace amounts of benthic filamentous algae were forming near the cattails. A moderate amount of leaf debris was also observed.

	Midvale Launch: The launch appears to be clean and clear, with moderate amount of leaf debris observed.
Fecal Sample: 1:00pm	Island Beach: Traces of rooted Eurasian Water Milfoil were observed around the dock area. Beach was clean and clear.
WILDWOOD LAKE	Park: An abundance of sunfish were observed around the dock. Water appeared slightly turbid with a moderate amount of tree debris.
Secchi: 5'+	Dam: Pollen was observed on the surface of the water. Water appeared to be slightly turbid. Clean and clear.
Water Level: 499.6	Launch: Dense amount of tree debris observed. Clean and clear.

NOTES:

1. **Fecal samples pulled. Results to follow.**
2. **No treatment required at this time.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: 6/15/15
INSPECTION DATE: **6/15/15**

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time:)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	24.8	5.40
2’	24.7	5.33
4’	24.8	5.34
6’	24.8	5.32
8’	23.6	5.32
10’	23.7	5.06
12’	23.2	4.32
13’		

BIRCHWOOD LAKE	Outlet Cove: Moderate amounts of Robbin’s pondweed and Bassweed were mixed in together. Trace amounts of white lilies were observed. Floating pieces of naiad species were also observed.
Secchi: 6’	Inside Swim Lane: Most of the swim lanes appear to be clean and clear. However, two swim lanes closest to the beach area, contained a dense amount of benthic filamentous algae that was appearing at the surface.
Aeration: On	Outside Swim Lane: Trace amounts of Spatterdock were observed. Clean and clear.
Fecal Sample: 11:00am	Beach: Clean and clear.
SUNSET LAKE	Launch: Clean and clear.
Secchi: 6’	Outlet: Dam area contained moderate amounts of benthic filamentous algae forming. Otherwise it appeared to be clean and clear.
	Sunset Road Cove: Trace amounts of white lilies were

	observed.
	Inlet Cove: Heavy amount of tree pollen was observed on the surface. Otherwise this area appeared to be clean and clear.
CRYSTAL LAKE	Birchwood Outlet: Area cleared up from last week. A moderate sized patch of white lilies and watershield were observed. Moderate to dense sized patches of Bassweed were observed.
	Lake Shore Road Shoreline: Trace amounts of benthic filamentous algae were observed around dock area. Moderate amount of Bassweed observed around dock area. Trace amounts of Ludwigia were observed along the shoreline.
Secchi: 7'est	Crystal Outlet: Trace to moderate amounts of benthic filamentous algae were observed forming on the rocks near the outlet. Otherwise area appeared to be clean and clear.
OLIVE POND **Dissolved Oxygen: 2.43**	Secchi: 3' Moderate sized patch of filamentous algae (~5 feet) close to sampling site. Heavy amount of tree debris and pollen was observed.
SHADOW LAKE Aeration: On **Dissolved Oxygen: 2.33**	Secchi: 4' Dense amount of small and large duckweed was observed along the shoreline. Pollen was observed on the surface of the water. Heavy amount of tree debris observed.
COVE POND ***Dissolved Oxygen:*** **4.23**	Secchi: 4'est Heavy amount of tree debris observed. Trace amounts of Creeping Bladderwort were also observed.
GRUNDEN'S POND **Dissolved Oxygen:6.78**	Secchi: 5.5' A moderate amount of Ludwigia was observed along the shoreline. Moderate amount of tree debris was also observed. Trace amounts of duckweed were observed along the shoreline. Water appeared to be green and turbid.
MOUNTAIN LAKE	Cove End: Right: Clean and clear. Left: Trace amounts of benthic filamentous algae appeared to be coming to the surface. Trace amounts of smaller patches of benthic filamentous algae were observed.

Secchi: 8'+	Sailboat Cove: Moderate sized patch of filamentous forming to the right. Trace to moderate amounts of benthic filamentous algae is forming at the bottom. This area might require treatment soon.
Water Level: 499.6	Outlet Cove: A small patch of filamentous algae appeared to be 30 feet away from the outlet. Trace amounts of benthic filamentous algae were observed on the bottom of the lake.
	Midvale Launch: Heavy amount of tree debris was observed. Trace amounts of Eurasian water milfoil were observed around dock area. Trace amounts of floating pieces of naiad species.
Fecal Sample: 1:27pm	Island Beach: Trace amounts of Eurasian water milfoil were observed 10 feet away from dock area. A small patch of filamentous algae was observed near dock. Beach appeared to be clean and clear.
WILDWOOD LAKE	Park: Trace amounts of filamentous algae (small patch) on left side of dock. A moderate amount of tree debris was observed on the bottom of the lake. Otherwise area appeared to be clean and clear.
Secchi: 6'est	Dam: Clean and clear.
Water Level: 499.5	Launch: Dense amount of filamentous algae patches were observed along the shoreline. Heavy amount of pollen was also observed on the surface. Smaller patches of filamentous were observed in the distance forming around lilies. This area might require treatment soon.

NOTES:

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: 6/22/15
INSPECTION DATE: 6/22/15

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time:)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	23.1	4.42
2’	23.1	4.38
4’	23.1	4.37
6’	23.1	4.24
8’	23.1	4.24
10’	22.8	3.86
12’	22.7	2.01
13’		

BIRCHWOOD LAKE	Outlet Cove: Water appears to be turbid. Trace amounts of white lilies were observed. Trace amounts of wild celery and Robbin’s pondweed were observed. Moderate amounts of Bassweed was also observed.
Secchi: 5.5’est	Inside Swim Lane: Dense amount of tree pollen was observed on the surface. Otherwise lanes looked clean and clear.
Aeration: On	Outside Swim Lane: Trace amounts of Spatterdock were observed.
Fecal Sample: 9:55am	Beach: Beach appeared to be clean and clear.
SUNSET LAKE	Launch: Trace amounts of decaying pondweeds were observed along the shoreline. Two small patches of white lilies were observed to the right. Moderate amounts of pollen was observed at the surface.
Secchi: 6’	Outlet: Trace amounts of filamentous algae were observed. Otherwise area appeared to be clean and clear.

	Sunset Road Cove: Heavy amount of tree pollen was observed at the surface. Trace amounts of filamentous algae were observed. Trace amounts of decaying plant matter along the shoreline. Water appears to be turbid.
	Inlet Cove: Moderate amounts of benthic filamentous algae was observed. Trace amounts of decaying pondweeds observed along the shoreline. A small patch of white lilies were observed.
CRYSTAL LAKE	Birchwood Outlet: A small patch of filamentous algae observed to the left of the outlet. Dense area of Bassweed appearing at the surface was observed approximately eight feet away from outlet. Two moderate sized patches of white lilies were observed.
	Lake Shore Road Shoreline: Trace amounts of filamentous algae was mixed in with emergent vegetation. Tree pollen also surrounded the emergent vegetation as well. One dead fish was observed. Moderate amounts of Bassweed was observed around the dock area. Moderate amounts of tree debris was also observed.
Secchi: 6’	Crystal Outlet: Moderate amounts of tree debris were observed. Trace amounts of benthic filamentous algae were observed forming on the rocks near the outlet.
OLIVE POND **Dissolved Oxygen: 4.09**	Secchi: 3’est Trace amounts of filamentous algae were observed scattered throughout the pond. Dense amount of tree debris was observed at the bottom. Moderate amounts of benthic filamentous algae was also observed on the bottom.
SHADOW LAKE Aeration: On (weak) **Dissolved Oxygen: 2.93**	Secchi: 4’est Moderate amounts of small and large duckweed was observed along the shorelines. Traces of filamentous algae were observed along the shorelines. Tree pollen was observed at the surface. Heavy amount of tree debris was observed at the bottom.
COVE POND ***Dissolved Oxygen:*** **4.09**	Secchi: 3’est Heavy amounts of tree debris were observed. Water appears to be turbid. Trace amounts of duckweed were also observed along the shorelines.
GRUNDEN’S POND **Dissolved Oxygen: 4.23**	Secchi: Traces of tree debris were observed. Water appears to be very turbid. Moderate amounts of Ludwigia were observed along the shorelines. Trace to moderate amounts of duckweed were also observed along the shorelines.

MOUNTAIN LAKE	Cove End: Left: Dense amount of tree debris observed on the bottom. Moderate amounts of benthic filamentous algae were observed along the shoreline. A small patch of filamentous algae was observed along the shoreline. Trace amounts of tree pollen was observed at the surface. Right: Clean and clear.
Secchi: 7’	Sailboat Cove: Clean and clear.
Water Level: 499.7	Outlet Cove: Trace amounts of benthic filamentous algae were observed. Moderate amount of tree debris was observed at the bottom. Otherwise area appeared to be clean and clear.
	Midvale Launch: Clean and clear.
Fecal Sample: 12:06pm	Island Beach: Trace amounts of rooted Eurasian water milfoil growth around dock area. Otherwise area appeared to be clean and clear.
WILDWOOD LAKE	Park: Trace amounts of filamentous algae were observed along the shoreline
Secchi: 6’	Dam: Water appears to be very turbid. Otherwise area looks clean and clear.
Water Level: 499.6	Launch: Moderate amounts of filamentous algae was observed along the shoreline.

NOTES:

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: 6/30/15
INSPECTION DATE: 6/29/15

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time:)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	22.91	4.58
2’	22.21	3.83
4’	21.97	3.38
6’	21.93	3.35
8’	21.71	3.02
10’		
12’		
13’		

BIRCHWOOD LAKE	Outlet Cove: Trace lilies observed. Sparse density ribbon-leaf pondweed, trace wild celery, and a moderate patch of bassweed observed.
Secchi: 4.75’	Inside Swim Lane: Trace lilies observed.
Aeration:	Outside Swim Lane: Trace lilies and spatterdock observed.
Fecal Sample: 1218 pm	Beach: Clean and clear.
SUNSET LAKE	Launch: Scattered patches of lilies observed.
Secchi: 6.0 est.	Outlet: Scattered patches of lilies observed.
	Sunset Road Cove: Scattered patches of lilies observed.
	Inlet Cove: Moderate density lilies observed, but free of any algae.
CRYSTAL LAKE	Birchwood Outlet: Trace surface algae along the rip-rap. Trace lilies that are dying back from Sonar application.

	Lake Shore Road Shoreline: Only trace lilies observed. No other submersed plants or algae.
Secchi: 8.0’ est.	Crystal Outlet: Only trace lilies observed. No other submersed plants or algae.
OLIVE POND **Dissolved Oxygen: 2.0 mg/L.**	Secchi: 3.5’ estimated. Water is turbid. Trace surface algae along shorelines. One small patch of lilies observed along with trace small duckweed along most of shorelines.
SHADOW LAKE Aeration: On (2) **Dissolved Oxygen: 2.0 mg/L.**	Secchi: 3.5’ est. Moderate density small duckweed windblown against northern shoreline. Spatterdock/lilies observed. Water is turbid.
COVE POND ***Dissolved Oxygen: 2.0 mg/L.***	Secchi: 2.0’ est. Water is turbid. Patches of lilies/spatterdock present. Sparse to moderate small duckweed along most of shoreline.
GRUNDEN’S POND **Dissolved Oxygen: 2.0 mg/L.**	Secchi: 2.0’ est. Sparse small duckweed along most of the shoreline. Moderate benthic filamentous algae in the shallows along Boulevard. Trace curly-leaf pondweed observed.
MOUNTAIN LAKE	Cove End: Sparse surface algae and naiad sp. observed.
Secchi: 12.0’ est.	Sailboat Cove: Moderate density pondweed growth throughout the cove with most growth within one foot of the surface. Moderate benthic filamentous algae also observed.
Water Level: 499.6	Outlet Cove: No plant or algae growth observed.
	Midvale Launch: Trace floating stems of pondweed, otherwise clean and clear.
Fecal Sample: 1253 pm	Island Beach: Trace benthic filamentous algae observed.
WILDWOOD LAKE	Park: Trace benthic filamentous algae and naiad sp. observed.
Secchi: 6.0’ est.	Dam: Trace to sparse surface algae along the dam extending up to 3 feet out.
Water Level: 499.6	Launch: Sparse surface algae observed along a significant portion of the shoreline.

NOTES:

1. **Wildwood Lake scheduled for algaecide treatment Wed. 7/1.**
2. **Mountain Lake scheduled for survey and Sailboat Cove treatment this week.**
3. **Olive, Shadow Lake, Grunden's and Cove should be treated soon for duckweed growth. Tentatively on schedule for Thursday, but only if dissolved oxygen is suitable for treatment.**
4. **Aeration diffusers need to be serviced at Shadow Lake.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: 7/7/15
INSPECTION DATE: 7/6/15

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 11:00)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	24.02	3.82
2’	23.68	3.69
4’	23.52	3.64
6’	23.45	3.54
8’	23.42	3.48
10’	23.35	3.32
12’	23.24	3.18
13’		

BIRCHWOOD LAKE	Outlet Cove: Trace amounts of white lily and ribbon leaf pondweed were observed.
Secchi: 9’	Inside Swim Lane: Trace amounts of white lily noted.
Aeration: all on	Outside Swim Lane: Trace to sparse amounts of ribbon leaf pondweed as well as sparse amounts of white lily and trace amounts of spatterdock were all observed.
Fecal Sample: yes	Beach: Clean and clear
SUNSET LAKE	Launch: Trace amounts of floating filamentous algae at the shoreline were noted. Trace to sparse small patches of white lily scattered throughout the basin. Trace to sparse amounts of leafy pondweed also noted along the shoreline edge.
Secchi: 5’ est	Outlet: Trace amounts of floating filamentous algae mixed with the emergent vegetation at the shore line were observed. Trace amounts of leafy pondweed stems floating along the shoreline, no rooted plants noted at this site.
	Sunset Road Cove: Trace small patch of white lily.
	Inlet Cove: Sparse to moderate mixed white lily and spatterdock in large patch in central area of cove. Sparse to moderate patches of floating filamentous algae at the base of the inlet.

CRYSTAL LAKE	Birchwood Outlet: Moderate to dense floating filamentous algae in mats at the base of hill, 20' x 40' patch, and mixed in with cattail stand. Sparse lilies in central basin and trace bass weed with signs of dying back.
	Lake Shore Road Shoreline: Sparse to moderate floating filamentous algae and benthic filamentous algae. Dense mats of floating filamentous algae mixed in the cat tail stand.
Secchi: 10' est	Crystal Outlet: Sparse to moderate benthic filamentous algae on rocks at dam. Sparse patches of floating filamentous algae also noted.
OLIVE POND **Dissolved Oxygen: 3.60** **Temperature: 27.44**	Secchi: 2' est. water turbid. Moderate benthic filamentous algae throughout basin. Trace duckweed noted at shoreline edges. Small mats of floating filamentous algae also noted throughout basin.
SHADOW LAKE Aeration: On **Dissolved Oxygen: 4.01** **Temperature: 28.12**	Secchi: 4' est. Water slightly turbid. Watermeal and duckweed in sparse amounts along the shoreline areas showing signs of dying back.
COVE POND ***Dissolved Oxygen:* 4.36** **Temperature: 28.94**	Secchi: 4' est. Water slightly turbid. Trace benthic filamentous algae.
GRUNDEN'S POND **Dissolved Oxygen: 6.72** **Temperature: 28.94**	Secchi: 2' est. Water turbid. Trace small duckweed along the shoreline areas. Sparse amounts of leafy pondweed in central basin observed in small patches at the surface.
MOUNTAIN LAKE	Cove End: Left: Clean and clear Right: Trace small clumps of floating filamentous algae observed at the shoreline.
Secchi: 12' est	Sailboat Cove: Sparse clumps of floating filamentous algae along the west end of the area. Moderate benthic filamentous algae, attached to the dying plant stems throughout.
Water Level: 499.5	Outlet Cove: Trace floating filamentous algae at outlet.
	Midvale Launch: Clean and clear
Fecal Sample: yes	Island Beach: Trace to sparse quantities of naiad and benthic filamentous algae either side of boat dock. Trace (2 stems) of Eurasian watermilfoil also observed. Beach area was clean and clear. Sailboat cove supported sparse amounts of naiad.

WILDWOOD LAKE	Park: Moderate density patch (20x50) of naiad at shoreline of park, 50% of plants at water surface.
Secchi: 10 ft.	Dam: Trace benthic filamentous algae and stems of naiad observed. No rooted plants at this area.
Water Level: 499.6	Launch: Trace benthic filamentous algae and floating filamentous algae noted along the shoreline.

NOTES:

1. **Treatment recommended for the following sites: Wildwood (naiad sp.), Crystal (algae), Olive (algae), and Mt Lake (algae-Sailboat Cove).**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: 7/14/15
INSPECTION DATE: 7/13/15

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time:)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	25.17	2.41
2’	25.17	2.04
4’	26.12	1.09
6’	24.13	1.02
8’	24.08	0.43
10’	23.32	0.38
12’		
13’		

BIRCHWOOD LAKE	Outlet Cove: Heavy amount of tree debris observed on the bottom. Moderate amounts of ribbon leaf pondweed mixed in with traces of wild celery. Trace patch of white lilies were observed in the corner.
Secchi: 6.5’est	Inside Swim Lane: Light amount of tree pollen was observed on the surface. Otherwise it appeared to be clean and clear
Aeration: on	Outside Swim Lane: Trace patches of spatterdock were observed with light amounts of tree pollen on the surface.
Fecal Sample:	Beach: Clean and clear.
SUNSET LAKE	Launch: Water appeared to be turbid. Trace to moderate patches of white lilies were observed in the distance in the middle of the lake.
Secchi: 5’est	Outlet: Benthic filamentous algae appeared to be topping out at the surface. Moderate amounts of filamentous algae surrounded white lilies. Trace to moderate sized patches of lilies were observed.
	Sunset Road Cove: Water appeared to be turbid. Trace small

	patch of white lilies.
	Inlet Cove: Trace amounts of benthic filamentous algae were observed topping out at the surface. Moderate amounts of white lilies were observed in the distance.
CRYSTAL LAKE	Birchwood Outlet: Trace to moderate amounts of filamentous algae were observed along the shorelines. Decaying white lilies were observed in the distance. Traces of dying Bassweed patches were observed.
	Lake Shore Road Shoreline: Sunfish were observed around dock area. Dense amount of tree debris was observed on the bottom. Moderate amount of bassweed was observed near dock area. Trace amounts of benthic filamentous algae were also observed.
Secchi: 7'est	Crystal Outlet: Traces of floating stems of Bassweed were observed at the mouth of the outlet. Traces of benthic filamentous algae were observed forming on the rocks of the outlet. A light amount of tree pollen was observed on the surface and accumulating along the shorelines. Otherwise area appeared to be clean and clear.
OLIVE POND **Dissolved Oxygen: 6.43**	Secchi:4'est Dense amount of tree pollen was observed on the surface. Traces of benthic filamentous algae and small duckweed were observed accumulating along the shoreline. Trace amounts of oil sheen were observed on the surface.
SHADOW LAKE Aeration: On **Dissolved Oxygen: 7.21**	Secchi: 4.5'est Moderate amount of tree pollen was observed at the surface. Traces of filamentous algae and small duckweed were observed along the shoreline. Traces of oil sheen were observed on the surface near the shoreline.
COVE POND ***Dissolved Oxygen: 5.02***	Secchi: 3'est Water appears to be turbid. Trace to moderate amounts of benthic filamentous algae were observed near the shoreline area. A heavy amount of tree debris was observed on the bottom.
GRUNDEN'S POND **Dissolved Oxygen: 6.84**	Secchi: 5.5'est Traces of filamentous algae and benthic filamentous algae were observed accumulating along the shoreline. Small and large duckweed was also mixed in along the shoreline. Trace patch of white lilies were observed in the corner.

MOUNTAIN LAKE	Cove End: Right: Trace amounts of tree pollen were observed at the surface. Otherwise appears to be clean and clear. Left: Trace amounts of filamentous algae were observed scattered throughout the cove.
Secchi: 8'+	Sailboat Cove: Moderate patches of naiad were observed to be emerging to the surface. Traces of filamentous algae were observed accumulating around the naiads. Otherwise area appeared to be clean and clear.
Water Level: 499.5	Outlet Cove: Traces of filamentous algae mixed in with decaying plants were observed forming at the mouth of the outlet. Trace amounts of benthic filamentous algae were observed at the bottom. Dense amount of tree debris were also observed at the bottom.
	Midvale Launch: Left area of shoreline contains floating traces of Eurasian Watermilfoil. Dense amount of rooted naiads were observed on both sides of dock.
Fecal Sample: 1:59 pm	Island Beach: Appeared to be clean and clear.
WILDWOOD LAKE	Park: Moderate amounts of rooted naiads were observed around the dock area. Traces of floating pieces of naiads were accumulating along the shoreline.
Secchi: 7'+	Dam: Appeared to be clean and clear.
Water Level: 499.4	Launch: Appeared to clean and clear. Trace to moderate sized patch of white lilies was observed. Otherwise area appeared to be clean and clear.

NOTES:

1. **Sailboat cove was treated on 7/1 for weed growth.**
2.

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: 7/20/15
INSPECTION DATE: 7/20/15

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time:9:30)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	25.0	1.96
2’	25.3	2.04
4’	25.2	1.93
6’	25.0	1.73
8’	24.7	0.75
10’	24.3	0.09
12’	23.7	0.06
13’		

BIRCHWOOD LAKE	Outlet Cove: Sparse amounts of bassweed, ribbon-leaf pondweed, and white lily were observed in the cove with trace amounts of Robbin’s pondweed and creeping bladderwort mixed in.
Secchi:5’	Inside Swim Lane: Trace amounts of white lily, watershield, ribbon-leaf pondweed and creeping bladderwort were all noted along the beach wall. The swim lanes were clear.
Aeration: On inside the swim lanes but not in the main basin	Outside Swim Lane: Moderate amounts of white lily were present mixed with trace patches of spatterdock and watershield. A trace of ribbon-leaf pondweed was also noted.
Fecal Sample: yes	Beach: Clean and clear
SUNSET LAKE	Launch: Sparse to moderate patches of floating filamentous algae were observed along the shoreline areas. Sparse small patches of white lily continue to be scattered throughout the basin.
Secchi: 3’ est.	Outlet: Water appears turbid throughout basin. Sparse to moderate large patches of floating filamentous algae and benthic filamentous algae present along the shoreline areas. Trace amounts of brittle naiad and leafy pondweed also

	noted at the shoreline.
	Sunset Road Cove: Trace amounts of floating filamentous algae and one small trace patch of lilies noted.
	Inlet Cove: Sparse to moderate mixed white lilies and spatterdock in central cove area. Nearer to the base of the inlet a large moderate mat of floating filamentous algae is present.
CRYSTAL LAKE	Birchwood Outlet: Trace patches of floating filamentous algae along the shore line mixed with trace amounts of dying bassweed.
	Lake Shore Road Shoreline: Trace to sparse amounts of benthic filamentous algae nearing the surface in some areas. One sparse density patch of bassweed noted to the right of the dock.
Secchi: 10' est.	Crystal Outlet: Trace small patches of floating filamentous algae noted along the rocks. One stem rooted bassweed also noted.
OLIVE POND **Dissolved Oxygen: 5.27** **Temperature: 28.5**	Secchi: 5' est. Trace small patch of white lily and trace amounts of duck weed observed on the pond.
SHADOW LAKE Aeration: On **Dissolved Oxygen: 6.22** **Temperature: 28.2**	Secchi: 6' est. Aeration only working nominally. Trace amounts of floating filamentous algae noted close to the shoreline. Trace amounts of small duckweed and watermeal floating throughout basin.
COVE POND ***Dissolved Oxygen:* 4.98** **Temperature: 28.7**	Secchi: 4' est. Water slightly turbid. Trace amounts of floating filamentous algae and small duckweed noted along the Boulevard shoreline.
GRUNDEN'S POND **Dissolved Oxygen: 5.50** **Temperature: 29.5**	Secchi: 8' est. Trace amounts of small duckweed along the shoreline. Sparse patches of benthic filamentous algae mixed with leafy pondweed at the Boulevard end of the basin.
MOUNTAIN LAKE	Cove End: Right – Trace small patches of floating filamentous algae noted. Left – Trace patches of floating filamentous algae and a small trace patch of bassweed observed. Cove at end of cul-de-sac – A large dense mat of floating filamentous algae spreading across most of the cove was observed.
Secchi: 15' est.	Sailboat Cove: Sparse to moderate topped out southern naiad present at both ends of the cove mixed with trace amounts of leafy pondweed.
Water Level: 499.4	Outlet Cove: Trace amounts of small duck weed, floating filamentous algae, and floating stems of leafy pondweed noted along the dam.

	Midvale Launch: Sparse leafy pondweed in patches along the shoreline and out along the boat dock. Medium to dense large patch of naiad to the left of the boat dock mixed with trace stems of Eurasian watermilfoil. One large dense mat of floating filamentous algae noted along the shoreline to the right of the launch area.
Fecal Sample: Yes	Island Beach: Boat dock area – trace stems of Eurasian watermilfoil noted on both sides of the boat dock. Large dense patch of naiad between the dock and the bridge area mixed with trace patches of leafy pondweed also noted. Beach area- Clean and clear. Sail boat cove area – Large patch of topped out naiad at moderate density in sailboat area. Residence behind sailboat area supporting a medium patch of dense floating filamentous algae.
WILDWOOD LAKE	Park: Large patch of moderate density topped out naiad to the left of the dock was observed. Trace small patches of naiad also noted to the right of the dock.
Secchi: 12' est.	Dam: Trace floating filamentous algae along the rip-rap.
Water Level: 499.4	Launch: Trace stems of naiad noted.

NOTES:

1. One double crested cormorant noted near the launch at Island beach.
2. Mountain Lake and Sunset Lake will be on the schedule for treatment this week.
3. Algae samples collected at larger basins (plus Shadow); results to follow.
4. Please note the aeration observations at both sites.

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: 7/27/15
INSPECTION DATE: **7/27/15**

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time:)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	24.85	2.20
2’	24.85	2.23
4’	24.82	2.27
6’	24.80	2.29
8’	24.77	2.28
10’	24.71	1.92
12’		
13’		

BIRCHWOOD LAKE	Outlet Cove: Moderate amounts of Robbin’s pondweed and bassweed were mixed in together. Trace amounts of creeping bladderwort were observed at the surface. Oil sheen was also observed at surface. Small patches of white lilies were observed in the cove.
Secchi: 5’	Inside Swim Lane: Traces of floating stems of Robbin’s pondweed and creeping bladderwort were observed. All swim lanes appeared to be clean and clear. Traces of scattered white lilies were observed to the left of swim lane 1.
Aeration: On	Outside Swim Lane: Two small patches of spatterdock were observed. Three moderate sized patches of white lilies also were observed. Traces of Robbin’s pondweed were observed.
Fecal Sample: 11:00am	Beach: Clean and clear.
SUNSET LAKE	Launch: Water appears to be turbid. Two trace sized patches of white lilies were observed on the right side of the launch. Otherwise area looked clean and clear.
Secchi: 5’est	Outlet: Traces of filamentous algae were observed along the

	shoreline. Two small patches of white lilies were observed.
	Sunset Road Cove: Three trace sized patches of white lilies were observed to the right side of the cove. Water appeared to be turbid.
	Inlet Cove: Moderate amounts of benthic filamentous algae were observed forming around the mouth of the inlet and topping out at the surface. Approximately 15 feet away from the inlet, moderate to dense patches of white lilies were observed. Water appeared to be turbid.
CRYSTAL LAKE	Birchwood Outlet: Trace amounts of scattered white lilies were observed. Moderate to dense patches of bassweed were observed at the surface 20 feet away from the outlet. Floating stems of viable bassweed were also observed at the surface. Trace amounts of filamentous algae were observed along the shoreline.
	Lake Shore Road Shoreline: Water appears to be turbid. Trace amounts of tree debris and decaying bassweed were observed at the bottom. A light amount of pollen was observed at the surface. Otherwise areas looked clear.
Secchi: 6’	Crystal Outlet: Traces of benthic filamentous algae were observed forming on rocks. Trace sized patch of benthic filamentous algae was observed in the open water. Area appeared to clean and clear.
OLIVE POND **Dissolved Oxygen: 4.54 mg/L**	Secchi: 4’est Water is looking green with a light amount of tree pollen on the surface. Moderate amount of tree debris was observed at the bottom and along the shorelines. Traces of watermeal and duckweed were observed along the shorelines.
SHADOW LAKE Aeration: On **Dissolved Oxygen: 5.51 mg/L**	Secchi: 3’est Heavy amounts of tree debris were observed at the bottom and along the shorelines. Traces of filamentous algae were observed along the main shoreline. Traces of duckweed were also mixed in with the filamentous algae.
COVE POND ***Dissolved Oxygen:*** **6.04 mg/L**	Secchi: 3’est Water appears to be heavily turbid. Dense amount of tree debris were observed. Light amount of tree pollen were observed at the surface.
GRUNDEN’S POND **Dissolved Oxygen: 6.02 mg/L.**	Secchi: 5’est Moderate amounts of benthic filamentous algae was topping out at the surface, covering approximately 25% of the pond near the bridge. Small patch of white lilies were observed

	Water appeared to be slightly turbid.
MOUNTAIN LAKE	Cove End: Right: A light amount of tree pollen was observed at the surface. Area appeared to be clean and clear. Left: Water appears to be slightly green. Otherwise area is clear of filamentous algae and plants.
Secchi: 7’	Sailboat Cove: Moderate amounts of naiad were observed at the bottom. This cove was recently treated for naiad growth, which is still dropping out.
Water Level: 499.0	Outlet Cove: Moderate amounts of tree debris were observed at the bottom. A light amount of pollen was observed at the surface. Clean and clear.
	Midvale Launch: Dense patch of rooted naiad was observed forming on the left side of the dock area. Traces of floating Eurasian watermilfoil were observed along the shoreline. Open water appeared to be clean and clear.
Fecal Sample: 1:00pm	Island Beach: Dock area contains dense amount of rooted naiads. Beach area looks clean and clear.
WILDWOOD LAKE	Park: Dense patches of brittle naiad were observed on the left side of dock area. Traces of tree debris were observed at the bottom. Otherwise area was clean and clear.
Secchi: 6’est	Dam: Clean and clear.
Water Level: 499.1	Launch: Trace amounts of naiad and creeping bladderwort were observed along the shoreline. 20 feet away from shoreline in the open water, a dense amount of plants were observed at the surface.

NOTES:

1. **Wildwood Lake is on the schedule for a Tuesday herbicide application prior to an upcoming Alum application.**
2. **Grunden’s Pond is scheduled for treatment later in the week.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: 8/4/15
INSPECTION DATE: 8/3/15

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time:)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	25.5	2.22
2’	25.4	1.87
4’	25.3	2.01
6’	25.1	1.98
8’	24.0	1.95
10’		
12’		
13’		

BIRCHWOOD LAKE	Outlet Cove: Medium to dense ribbon-leaf pondweed with surface leaves beginning to top out. Probably trace amounts of Robbin’s pondweed mixed in.
Secchi: 6.0’	Inside Swim Lane: Clean and clear.
Aeration: Off.	Outside Swim Lane: Light pollen on surface. One trace patch of watershield observed. Scattered patches of white lilies observed.
Fecal Sample: 10:58	Beach: Clean and clear.
SUNSET LAKE	Launch: Clear of plants and algae at the launch. Water is turbid. A trace patch of white lilies observed further out.
Secchi: 4.0’est.	Outlet: Water appears turbid. Trace creeping bladderwort along the shoreline, along with accumulating decaying plant material.
	Sunset Road Cove: Water appears turbid. Trace scattered white lilies observed.

	Inlet Cove: Dense floating filamentous algae at the mouth of the inlet. Water lilies observed, increasing in density further out in the cove.
CRYSTAL LAKE	Birchwood Outlet: Along the shoreline, trace pollen and floating stems of bassweed observed, with floating filamentous algae mixed in. Moderate to dense plant matter in open water, appears to be decaying. Can't identify from the shoreline, but it could be bassweed.
	Lake Shore Road Shoreline: Heavy tree debris on the bottom. Moderate amount of pollen on the surface. Trace scattered patches of floating filamentous algae. Floating fragments of bassweed observed.
Secchi: 9.0' est.	Crystal Outlet: Clean and clear with only trace benthic filamentous algae on the rocks.
OLIVE POND **Dissolved Oxygen: 6.88 mg/L.**	Secchi: 4.0' estimated. Water is very turbid. Light pollen on surface. Trace creeping bladderwort observed. Moderate tree debris on bottom.
SHADOW LAKE Aeration: Off **Dissolved Oxygen: 6.84 mg/L.**	Secchi: 3.0' estimated. Water very turbid. Light pollen on surface. Floating filamentous algae accumulating along the shoreline.
COVE POND ***Dissolved Oxygen: NA***	Secchi: 3.0' est. Water is very turbid. Heavy tree debris observed on bottom. Trace small duckweed observed.
GRUNDEN'S POND **Dissolved Oxygen: NA**	Secchi: 5.0' est. A reduction in filamentous algae observed (down to 5-10%), along the road. One trace patch of white lilies observed, and trace of small duckweed along the shoreline.
MOUNTAIN LAKE	Cove End: To the right: clean and clear. To the left: Trace of benthic filamentous algae observed along the western shoreline.
Secchi: 10.0' est.	Sailboat Cove: Moderate amounts of naiad growth observed, still dropping out of the water column. We will confirm the efficacy of recent treatment at this site.
Water Level: 499.2	Outlet Cove: Water slightly turbid but otherwise clean and clear.
	Midvale Launch: Dense naiad growth on both sides of the dock nearing the surface.
Fecal Sample: 12:53 pm	Island Beach: Dock area is surrounded by moderate to dense naiad growth. The remaining sites are clean and clear.

WILDWOOD LAKE	Park: Dense naiad to the left side of the dock observed.
Secchi: 6.0’ estimated.	Dam: Increased turbidity observed with moderate pollen observed.
Water Level: 499.2	Launch: Trace floating stems of naiad observed along shore and in open water.

NOTES:

1. **Aeration Off at both Birchwood and Shadow Lakes during time of inspection.**
2. **Algae samples collected at all nine lakes. Results to follow.**
3. **Alum for Wildwood Lake scheduled for later this week.**
4. **Sediment probing for hydro-rake site selection to occur soon.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: 8/11/15
INSPECTION DATE: 8/10/15

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time:)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	24.3	3.14
2’	24.3	3.20
4’	24.3	3.25
6’	24.3	3.24
8’		
10’		
12’		
13’		

BIRCHWOOD LAKE	Outlet Cove: Dense amount of ribbon-leaf pondweed with floating leaves were observed. Traces of wild celery were also observed.
Secchi: 6’	Inside Swim Lane: Floating plant debris was observed. Along lane 1. Traces scattered white lilies were observed. Dense amount of tree pollen was observed on the surface. Otherwise area appeared to be clean and clear.
Aeration: On	Outside Swim Lane: Moderate patches of white lilies were observed. Trace sized patch of watershield was mixed in with the lilies. Two moderate sized patches of spatterdock were observed. Moderate amounts of ribbon-leaf were observed. Heavy amount of tree pollen was observed on the surface.
Fecal Sample: 11:30 am	Beach: Clean and clear.
SUNSET LAKE	Launch: Two trace sized patches of white lilies were observed to the right of the launch. In the distance, trace amounts of white lilies were observed scattered throughout

	the basin.
Secchi: 4.5'est	Outlet: Decaying plant material was observed along the shorelines. Trace amounts of filamentous algae were also observed.
	Sunset Road Cove: Water appears to be turbid. A light amount of pollen was observed at the surface. Trace scattered white lilies were observed.
	Inlet Cove: Dense amounts of filamentous algae were observed at the mouth of the inlet. Moderate to dense patches of white lilies were observed above the filamentous algae. Trace amounts of watermeal and duckweed were also observed.
CRYSTAL LAKE	Birchwood Outlet: Moderate amounts of bassweed were observed at the surface. Two trace sized patches of white lilies were also observed.
	Lake Shore Road Shoreline: Dense amount of tree debris was observed at the bottom. Trace amounts of floating bassweed were also observed. Otherwise area appeared to be clean and clear.
Secchi: 6'+	Crystal Outlet: Trace amounts of benthic filamentous algae were observed forming on the rocks around the outlet. Area is clean and clear.
OLIVE POND **Dissolved Oxygen: 8.16**	Secchi: 4'est Moderate amount of pollen was observed on the surface, covering half of the pond. Heavy amount of tree debris was observed along the shorelines. Traces of watermeal and duckweed were also observed.
SHADOW LAKE Aeration: Off **Dissolved Oxygen: 8.06**	Secchi: 4'est Traces of watermeal and duckweed were observed along the shorelines. Heavy amounts of tree debris was observed at the bottom along the shorelines. Light amounts of pollen were observed at the surface.
COVE POND ***Dissolved Oxygen: 5.75***	Secchi: 4'est Water appears to be heavily turbid. Traces of benthic filamentous algae were observed scattered throughout the pond. Dense amounts of tree debris were observed. Trace amounts of creeping bladderwort were also observed.

GRUNDEN'S POND **Dissolved Oxygen: 11.53 mg/L.**	Secchi: 4.5'est Dense amounts of water primrose (Ludwigia) along the shorelines. Traces of duckweed were observed along the shoreline. Trace to moderate sized patches of benthic filamentous algae were observed at the bottom. Trace patch of white lilies along the shoreline.
MOUNTAIN LAKE	Cove End: Right: Clean and clear. Left: Light amount of pollen was observed at the surface. Traces of benthic filamentous algae were observed.
Secchi: 7'+	Sailboat Cove: Moderate amounts of naiad were observed.
Water Level: 499.0	Outlet Cove: Heavy amount of tree debris was observed. Clean and clear.
	Midvale Launch: Light amount of pollen was observed at the surface. Area is clean and clear.
Fecal Sample: 1:30pm	Island Beach: Moderate to dense amounts of naiad observed near the dock area and along nearby shorelines. Moderate sized patch of milfoil was observed between bridge to beach and dock area. Beach area appears to be clean and clear.
WILDWOOD LAKE	Park: Clean and clear.
Secchi: 6'+	Dam: Water appears to be heavily turbid. But no weeds or algae were observed.
Water Level: 499.0	Launch: Clean and clear.

NOTES:

1. **Water chemistry sampling conducted at all nine lakes.**
2. **Fecal samples collected: results to follow.**

TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: August 18, 2015
INSPECTION DATE: **August 17, 2015**

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time:)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	24.6	4.20
2’	24.6	4.28
4’	24.5	4.15
6’	24.3	4.23
8’	24.3	4.30
10’	24.3	4.28
12’	24.1	1.18
13’		

BIRCHWOOD LAKE	Outlet Cove: Moderate amounts of Ribbon-leaf Pondweed with floating leaves observed. Moderate patches of White waterlily also observed.
Secchi: 6’	Inside Swim Lane: Two trace sized patches of White waterlily observed near the outlet cove and upper corner near the beach area. Swim lanes appeared clean and clear.
Aeration: On	Outside Swim Lane: Moderate patches of waterlilies and spatterdock observed. Trace sized patch of Watershield observed. Moderate amounts of Ribbon-leaf Pondweed observed under the lilies.
Fecal Sample:	Beach: Clean and clear.
SUNSET LAKE	Launch: Water appears turbid. Traces of Creeping Bladderwort observed along the shoreline.
Secchi: 5’est	Outlet: Moderate amounts of decaying plant matter observed along the shoreline. Trace amount of Creeping Bladderwort observed. Traces of filamentous algae observed along the shoreline and in the distance.
	Sunset Road Cove: Water appears turbid. Patches of White waterlily observed.
	Inlet Cove: Dense amount of filamentous algae observed at the mouth of the inlet. Moderate to dense patches of White waterlily observed above the inlet.

CRYSTAL LAKE	Birchwood Outlet: Dense patches of Bassweed observed towards the center of the lake. Trace sized patches of scattered White waterlily observed. Traces of filamentous algae observed along the shoreline.
	Lake Shore Road Shoreline: Light tree pollen observed on the surface. Traces of benthic filamentous algae observed along the shoreline and scattered throughout the water. Dense amount of tree debris was also observed. Trace amount of floating Bassweed observed.
Secchi: 7'+	Crystal Outlet: Traces of benthic filamentous algae forming on rocks. Otherwise, area looked clean and clear.
OLIVE POND **Dissolved Oxygen: 8.43**	Secchi: 3.5'est Light amount of pollen observed on the surface. Traces of benthic filamentous algae observed along the shoreline. Trace amounts of Watermeal and Duckweed observed along the shoreline. Heavy amounts tree debris observed. Water is very turbid.
SHADOW LAKE Aeration: On **Dissolved Oxygen: 9.23**	Secchi: 4'est Water is very turbid. Traces of benthic filamentous algae observed along the shoreline. Traces of Duckweed observed along the main shoreline.
COVE POND **Dissolved Oxygen: 5.43**	Secchi: 3'est Water is very turbid. Traces of benthic filamentous algae observed at the surface. Heavy amount of tree debris observed along the shoreline.
GRUNDEN'S POND **Dissolved Oxygen: 10.75**	Secchi: 5' Dense amounts of Water Primrose observed along the main shoreline. Trace to moderate amounts of benthic filamentous algae observed along shoreline and scattered throughout the pond near the bridge. One trace sized patch of White waterlily observed.
MOUNTAIN LAKE	Cove End: Right: Sparse amounts of benthic filamentous algae observed at the surface. Otherwise, area was clean and clear. Left: Trace to moderate amounts of benthic filamentous algae observed at the surface along the shoreline.

Secchi: 8'+	Sailboat Cove: Trace to moderate patches of naiad observed along shoreline. Open water looked clean and clear.
Water Level: 499.0	Outlet Cove: Open water looks clean and clear. Light amount of pollen observed along the shoreline. Trace amounts of decaying plant matter observed along the shoreline. Moderate amount of tree debris observed.
	Midvale Launch: Traces of floating naiad observed near dock area. Traces of rooted milfoil observed on the left side of dock. Water appears to be slightly turbid with some unicellular algae observed in the water column.
Fecal Sample: 12:34pm	Island Beach: Dock area contains moderate to dense patches of decaying naiad. Traces of milfoil observed within the patches of naiad. Beach area was clean and clear.
WILDWOOD LAKE	Park: Traces of floating Creeping Bladderwort and naiad observed along the shoreline. Otherwise, lake is clean and clear.
Secchi: 8'+	Dam: Clean and clear.
Water Level: 499.0	Launch: Clean and clear.

NOTES:

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: 8/24/15
INSPECTION DATE: **8/24/15**

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time:)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	24.9	4.38
2’	24.9	3.82
4’	24.9	3.90
6’	24.9	4.12
8’	24.9	4.57
10’		
12’		
13’		

BIRCHWOOD LAKE	Outlet Cove: Moderate to dense amounts of Ribbon-leaf Pondweed with floating leaves were observed. Moderate sized patches of White waterlily also observed.
Secchi: 5’est	Inside Swim Lane: Traces of light tree pollen and plant debris were observed. Swim lanes appeared to be clean and clear.
Aeration: On	Outside Swim Lane: Moderate sized patches of White waterlily were observed. One trace sized patch of Watershield was observed. Moderate amounts of Ribbon-leaf Pondweed were also observed.
Fecal Sample: 11:05 am	Beach: Clean and clear.
SUNSET LAKE	Launch: Water appears to be turbid. Otherwise area looks clean and clear.
Secchi: 5’est	Outlet: Traces of filamentous algae and decaying plant debris observed along the shorelines. A light amount of pollen was observed on the surface.
	Sunset Road Cove: One trace sized patch of White waterlily observed. Traces of filamentous algae observed along the shorelines and in the open water.
	Inlet Cove: Dense amount of filamentous algae observed at the mouth of the inlet. Dense patches of White waterlily observed.

CRYSTAL LAKE	Birchwood Outlet: Dense patches of Bassweed observed in the center of the basin. Trace sized patch of White waterlily observed. Traces of filamentous algae scattered along the shorelines.
	Lake Shore Road Shoreline: Traces of filamentous algae observed along the shorelines. Light tree pollen on the surface. Traces of floating Bassweed were observed along the main shorelines.
Secchi: 7'+	Crystal Outlet: Traces of benthic filamentous algae observed forming on rocks. Otherwise area looked clean and clear.
OLIVE POND **Dissolved Oxygen: 6.92**	Secchi: 4'est Traces of scattered filamentous algae observed throughout the pond and along the shorelines. Trace amount of Duckweed scattered along the main shoreline. Water appears to be slightly turbid. Light tree pollen at the surface.
SHADOW LAKE Aeration: On **Dissolved Oxygen: 7.89**	Secchi: 3'est Moderate amounts of filamentous algae observed along the shoreline. Trace amount of Duckweed observed along the shoreline. Open water appears to be clear of debris and algae.
COVE POND **Dissolved Oxygen: 4.88**	Secchi: 2' Trace amounts of benthic filamentous algae observed at the surface. Heavy amount of tree debris also observed along the shorelines. Water appeared to be heavily turbid.
GRUNDEN'S POND **Dissolved Oxygen: 9.46**	Secchi: 6'est Water appears to be clean and clear. A dense amount Water Primrose observed along the main shoreline. Trace amounts of benthic filamentous algae observed at the bottom.
MOUNTAIN LAKE	Cove End: Right: Water appears to be turbid. Area is clear of algae and plant debris. Left: Water appears to be slightly turbid. Moderate scattered patches of benthic filamentous algae observed along the shorelines.
Secchi: 7'+	Sailboat Cove: Clean and clear.
Water Level: 499.0	Outlet Cove: Heavy amount of tree debris observed along the main shoreline. A light of tree pollen observed on the surface. Traces of floating plant debris were observed.
	Midvale Launch: Traces of rooted Milfoil observed along the left side of the dock area. Otherwise area looks clean and clear.
Fecal Sample:	Island Beach: Beach area was clean and clear.
WILDWOOD LAKE	Park: Heavy amount of tree debris observed along the main shoreline. Clean and clear.
Secchi: 7'+	Dam: Clean and clear.
Water Level: 489.7	Launch: Trace amounts of filamentous algae observed in the open water. Otherwise area looked clean and clear.

NOTES:

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: 09/01/2015
INSPECTION DATE: **8/31/15**

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time:)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	23.8	6.73
2’	23.7	6.48
4’	23.4	6.29
6’	22.5	5.43
8’	22.1	3.91
10’	22.1	2.31
12’		
13’		

BIRCHWOOD LAKE	Outlet Cove: Moderate patch of Ribbon Leaf Pondweed was observed along the shoreline. Moderate sized patches of white lilies also observed.
Secchi: 5.5’est	Inside Swim Lane: Four trace sized patches of White Lilies were observed along lane 1. Traces of Creeping Bladderwort were observed floating on the surface. Trace amounts of decaying plant matter were observed floating on surface. A light amount of tree pollen was observed on the surface.
Aeration: On	Outside Swim Lane: Moderate to dense amounts of Ribbon Leaf Pondweed were observed. Moderate sized patches of Watershield also observed. Moderate to dense amounts of White Lilies observed.
Fecal Sample: 10:50 am	Beach: Clean and clear.
SUNSET LAKE	Launch: Water appears very turbid. Traces of Creeping Bladderwort observed. Trace amounts of rooted Naiad were observed. Traces of floating decaying plant matter observed along the shoreline.
Secchi: 4.5’	Outlet: Traces of floating decaying plant matter observed along the shoreline. Trace amounts of filamentous algae scattered along shoreline. Traces of benthic filamentous algae also observed scattered along the shoreline.

	Sunset Road Cove: Trace amounts of filamentous algae observed along the shorelines. Trace sized patch of White Lilies observed.
	Inlet Cove: Dense amount of filamentous algae observed at the mouth of the inlet. Dense patches of White Lilies also observed surrounding the inlet.
CRYSTAL LAKE	Birchwood Outlet: Dense amount of Bassweed observed two to three feet away from the shoreline. Moderate to dense amounts of filamentous algae were observed at the mouth of the outlet.
	Lake Shore Road Shoreline: Moderate amounts filamentous algae observed along the shoreline and mixed in with the cattails. Traces of benthic filamentous algae scattered throughout.
Secchi: 7'+	Crystal Outlet: Floating pieces of Bassweed observed along the shoreline. Traces of benthic filamentous algae observed to the left of the outlet.
OLIVE POND **Dissolved Oxygen: 6.38**	Secchi: 3'est Trace sized patches of filamentous algae observed in the open water. Traces of Watermeal observed along the shoreline.
SHADOW LAKE Aeration: On **Dissolved Oxygen: 4.32**	Secchi: 4'est A moderate amount of tree pollen was on the surface. Trace amounts of filamentous algae observed along the shorelines. Water appears to be very turbid.
COVE POND ***Dissolved Oxygen:* 3.86**	Secchi: 2'est Water appears to be very turbid. Moderate amounts of benthic filamentous algae observed at the surface.
GRUNDEN'S POND **Dissolved Oxygen: 4.86**	Secchi: 5.5'est Appears to be very clean and clear. Dense Water Primrose observed along the shoreline. Trace sized patches of White Lilies observed.
MOUNTAIN LAKE	Cove End: Right: Area appears to be clean and clear of plant debris. Left: Moderate amounts of benthic filamentous algae scattered throughout the shoreline.
Secchi: 7'+	Sailboat Cove: Clean and clear.
Water Level: 489.3	Outlet Cove: Moderate amounts of unicellular algae building up along the shoreline at the outlet. Open water looks clean and clear.

	Midvale Launch: Moderate unicellular algae observed along the left shoreline of the dock area. Moderate amounts of rooted naiad also observed along the dock area. Traces of rooted milfoil also observed along the dock area. Otherwise area looked clean and clear.
Fecal Sample: 12:07pm	Island Beach: Dense amounts of Naiad observed near the dock area and underneath the bridge to the beach area. The beach looked clean and clear.
WILDWOOD LAKE	Park: Traces of Creeping Bladderwort observed in the open water. Moderate amount of tree debris also observed at the bottom. Clean and clear.
Secchi: 8'+	Dam: Clean and clear.
Water Level: 489.5	Launch: Traces of filamentous algae observed in the open water. Moderate amounts of Naiad were observed.

NOTES:

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE:
INSPECTION DATE: **9/8/15**

LAKE INSPECTION REPORT
Birchwood Lake Profile (Time:)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	24.1	3.70
2’	24.0	3.66
4’	24.0	3.63
6’	24.0	3.64
8’	24.0	3.61
10’	24.0	3.63
12’		
13’		

BIRCHWOOD LAKE	Outlet Cove: Moderate sized patches of White Waterlily observed. Moderate amounts of Ribbon Leaf pondweed observed with floating leaves. Trace to moderate amounts of Bassweed were also observed. Oil sheen was observed on the surface.
Secchi: 5.5’	Inside Swim Lane: A light amount of pollen was observed on the surface. Trace sized patched of white lilies observed along lane 1. Otherwise swimming lanes looked clean and clear.
Aeration: On	Outside Swim Lane: Moderate sized patches of white lilies observed. One trace sized patch of Spatterdock observed. Traces of Watershield observed. Moderate amounts of Ribbon Leaf pondweed were observed.
Fecal Sample: N/A	Beach: Clean and clear.
SUNSET LAKE	Launch: Traces of floating Naiad were observed along the shorelines. Area appeared to be clean and clear.
Secchi: 6’	Outlet: Traces of decaying plant matter were observed along the shorelines. Traces of filamentous algae were also observed along the shorelines.
	Sunset Road Cove: One trace sized patch of white lilies observed. Trace filamentous algae observed surrounding the white lilies. Water appeared to be slightly turbid.

	Inlet Cove: Dense amount of filamentous algae observed at the mouth of the inlet. In the distance, moderate amounts of filamentous algae were observed around patches of white lilies.
CRYSTAL LAKE	Birchwood Outlet: Moderate amounts of filamentous algae observed along the shoreline. Trace sized patches of white lilies also observed. Dense amount of Bassweed observed topping out at the surface, extending 30 feet out into the open water from the shoreline. Trace to moderate amount of floating Bassweed pieces observed along the shoreline.
	Lake Shore Road Shoreline: Moderate amounts of filamentous algae observed along the shoreline. Moderate amount of benthic filamentous algae observed along the shorelines. Trace amount of rooted Bassweed observed. A light amount of pollen observed on the surface.
Secchi: 8'+	Crystal Outlet: Traces of benthic filamentous algae observed accumulating on the rocks near the outlet. Otherwise area was clean and clear.
OLIVE POND **Dissolved Oxygen: 3.63**	Secchi: 4'est Traces of Watermeal and Small Duckweed were observed along the shoreline. A heavy amount of tree debris was also observed. A light amount of tree pollen observed on the surface of the water. Trace amounts of filamentous algae and benthic filamentous algae observed along the shoreline. Trace to moderate amounts of Creeping Bladderwort observed along the shoreline.
SHADOW LAKE Aeration: On **Dissolved Oxygen: 4.08**	Secchi: 4'est Water appears to be turbid. Dense amounts of tree debris observed along the main shoreline. Heavy amounts of tree pollen covered approximately 85 percent of the lake. Traces of Watermeal and Small Duckweed were observed.
COVE POND ***Dissolved Oxygen:*** **3.32**	Secchi: 2.5'est Dense amounts of tree debris observed along the shoreline. Heavy tree pollen also observed. Water appears to be slightly turbid.
GRUNDEN'S POND **Dissolved Oxygen: 5.32**	Secchi: 5'est One trace sized patch of white lilies observed. Moderate amount of Water Primrose was observed along the main shoreline. Traces of benthic filamentous algae were observed scattered throughout the bottom of the pond.

MOUNTAIN LAKE	Cove End: Right: Clean and Clear Left: Moderate amounts of benthic filamentous algae along the shoreline and scattered throughout the cove.
Secchi: 6’	Sailboat Cove: Three geese swimming in the Sailboat Cove. Traces of floating naiad were observed.
Water Level: 498.5	Outlet Cove: Traces of unicellular algae observed building up along the shoreline of the outlet. A light amount of tree pollen blown into the shorelines.
	Midvale Launch: Trace amounts of rooted Naiad were observed along the left side of the dock area. A moderate amount of unicellular algae observed building up along the left side of the dock area against the main shoreline.
Fecal Sample: N/A	Island Beach: Dense amount of Naiad observed along the left side of the dock area. The Beach area contains traces of geese fecal matter. Trace amounts of floating Naiad were also observed.
WILDWOOD LAKE	Park: Heavy tree debris observed along the shoreline. Traces of floating Naiad also observed along the main shoreline. Otherwise area looked clean and clear.
Secchi: 7’+	Dam: Traces of floating Naiad were observed. Area appeared to be clean and clear.
Water Level: 498.5	Launch: Moderate amounts of benthic filamentous algae scattered throughout the center of the lake. Trace amount of Naiad observed along the shoreline.

NOTES:

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: 9/22/15
INSPECTION DATE: **9/14/15**

LAKE INSPECTION REPORT
Birchwood Lake Profile (Time:)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	23.8	4.12
2’	23.8	4.12
4’	23.6	4.08
6’	23.5	4.02
8’	23.2	3.94
10’		
12’		
13’		

BIRCHWOOD LAKE	Outlet Cove: Trace amounts of White waterlilies, pondweed and Ribbon-leaf Pondweed observed.
Secchi: 7.75’	Inside Swim Lane: Trace sized patched of white lilies observed along lane. Otherwise swimming lanes looked clean and clear.
Aeration: On	Outside Swim Lane: Trace amounts of White waterlilies, pondweed and Ribbon-leaf Pondweed observed.
Fecal Sample: N/A	Beach: Clean and clear.
SUNSET LAKE	Launch: Traces of floating Naiad were observed along the shorelines. Area appeared to be clean and clear.
Secchi: 6’	Outlet: Trace amount of lilies and sparse Naiad observed.
	Sunset Road Cove: One trace sized patch of white lilies observed. Trace Naiad scattered throughout.
	Inlet Cove: Scattered lilies and trace amount of algae observed.
CRYSTAL LAKE	Birchwood Outlet: Moderate Bassweed along the dam and within the upper end of the lake. Sparse waterlilies along the dam shoreline. No filamentous algae observed.
	Lake Shore Road Shoreline: No plants or algae observed.
Secchi: 8’+	Crystal Outlet: Area is clean and clear. No plants or algae observed.

OLIVE POND **Dissolved Oxygen: 4.8**	Secchi: 2.75 Sparse benthic algae scattered throughout the pond. Water level down ~ 6”.
SHADOW LAKE Aeration: On **Dissolved Oxygen: 4.4**	Secchi: 2.75 Sparse benthic algae scattered throughout. Duckweed windblown along north and central shorelines. Water level down ~ 6”.
COVE POND ***Dissolved Oxygen:* 3.8**	Secchi: 2’ Water column very turbid. Trace Duckweed observed along shoreline perimeter.
GRUNDEN’S POND **Dissolved Oxygen: 4.62**	Secchi: 3.25’ Water column appears turbid. No plant or algae growth observed.
MOUNTAIN LAKE	Cove End: Trace Naiad scattered along shoreline.
Secchi: 8’ est.	Sailboat Cove: No plant or algae growth observed.
Water Level: 498.5	Outlet Cove: Clean and clear. No plant or algae growth observed.
	Midvale Launch: Trace amount of Naiad observed along shoreline.
Fecal Sample: N/A	Island Beach: Sparse Naiad by the bridge and along the shoreline into adjacent cove areas.
WILDWOOD LAKE	Park: Trace amount of floating Naiad. Otherwise area looked clean and clear.
Secchi: 7’+	Dam: Area appeared clean and clear.
Water Level: 498.5	Launch: Trace amount of surface algae observed.

NOTES:

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: 9/23/15
INSPECTION DATE: **9/22/15**

LAKE INSPECTION REPORT
Birchwood Lake Profile (Time:)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	20.9	4.85
2’	23.8	4.83
4’	20.9	4.83
6’	20.8	4.81
8’	20.6	4.55
10’	20.6	4.35
12’	20.5	4.10
13’		

BIRCHWOOD LAKE	Outlet Cove: Trace amounts of White waterlilies, pondweed and Ribbon-leaf Pondweed scattered along shoreline.
Secchi: 6’	Inside Swim Lane: Trace amounts of lilies, pondweeds and Robins-leaf Pondweed along eastern side.
Aeration: On	Outside Swim Lane: Clean and clear.
Fecal Sample: N/A	Beach: Clean and clear. Waterlilies encroaching in north end.
SUNSET LAKE	Launch: Traces of floating Naiad were observed along the shorelines. Scattered lilies observed.
Secchi: 7’ est.	Outlet: Trace amount of lilies and sparse Brittle Naiad along shoreline. Naiad is 2’ below the surface.
	Sunset Road Cove: One patch of white lilies observed. Moderate density Brittle Naiad along the shoreline, 10-30’ out.
	Inlet Cove: Scattered lilies observed.
CRYSTAL LAKE	Birchwood Outlet: Moderate Bassweed along the dam and within the upper end of the lake. Plants to the surface. Sparse waterlilies along the dam shoreline.
	Lake Shore Road Shoreline: No plants or algae observed.
Secchi: 4’-5’ est.	Crystal Outlet: Area is clean and clear. No plants or algae observed.

OLIVE POND **Dissolved Oxygen: 6.03**	Secchi: 2’ Water level down ~ 6”. Water column is green. Pollen floating on surface. Trace waterlilies and Watermeal observed.
SHADOW LAKE Aeration: On **Dissolved Oxygen: too low to collect**	Secchi: 2’ Benthic and floating filamentous algae scattered along shoreline. Water level down ~ 6”.
COVE POND ***Dissolved Oxygen:4.83***	Secchi: 2’ Water column very green. Small patch of lilies. Water level low.
GRUNDEN’S POND **Dissolved Oxygen: 14.43 off dock**	Secchi: 6’ Slight green tint to water column. Water level low, but clarity was good. Filamentous algae along north shoreline.
MOUNTAIN LAKE	Cove End: Brittle Naiad scattered along shoreline. Heaviest in cove. Filamentous algae colonizing on plants.
Secchi: 6’ est.	Sailboat Cove: Trace amount of pondweed along shoreline. Slight pollen on surface.
Water Level: 498.5	Outlet Cove: Clean and clear. Trace amount of pondweed floating at spillway.
	Midvale Launch: Trace amount of Brittle Naiad observed along shoreline.
Fecal Sample: N/A	Island Beach: Trace amount of floating Naiad and milfoil in shallow areas. Beach area clean and clear. Moderate mix of Chara/Nitella along shore.
WILDWOOD LAKE	Park: Trace amount of Brittle Naiad floating along shoreline.
Secchi: 8’ est.	Dam: Water slightly green. Trace amount of Brittle Naiad observed.
Water Level: 498.5	Launch: Moderate Naiad observed. Filamentous algae colonizing on plants.

NOTES:

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: 10/1/15
INSPECTION DATE: 9/30/15

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 9:45)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	20.9	5.50
2’	20.0	5.14
4’	19.8	4.83
6’	19.5	3.83
8’	18.2	2.85
10’	17.9	1.42
12’	17.5	0.07
13’		

BIRCHWOOD LAKE	Outlet Cove: Surface clear of algae. Some white lilies around the shoreline. Some pondweeds observed as well.
Secchi: 6.5’	Inside Swim Lane: Trace white lilies observed. No algae observed.
Aeration: All On	Outside Swim Lane: Surface clear of algae. 4 white lilies observed.
Fecal Sample: NA	Beach: Clean and clear.
SUNSET LAKE	Launch: No algae observed. Trace white lilies in open water. Sparse naiads observed, but mostly washing up at launch.
Secchi: 6’ est.	Outlet: Water is clear, and no algae observed. Floating stems of naiad observed.
	Sunset Road Cove: Water clear, and no algae observed. Rooted naiads observed on the shoreline and extending into the open water.

	Inlet Cove: No flow and water level is low. White lilies observed in the deeper water.
CRYSTAL LAKE	Birchwood Outlet: Surface mostly clear. Trace white lilies observed.
	Lake Shore Road Shoreline: Surface clear of weeds and algae.
Secchi: 6.5' est.	Crystal Outlet: Water clear; no plants or algae. Dam plants responded well to previous spraying.
OLIVE POND **Dissolved Oxygen: 6.43 mg/L**	Secchi: 4.0' estimated. Trace white lilies, watermeal and duckweeds observed. Good clarity. No algae observed.
SHADOW LAKE Aeration: **Dissolved Oxygen: 7.14 mg/L.**	Secchi: 5.0' estimated. Surface clear of algae and plants.
COVE POND ***Dissolved Oxygen:*** **6.56 mg/L.**	Secchi: 5.0' estimated. Surface clear. Trace benthic filamentous algae near outlet.
GRUNDEN'S POND **Dissolved Oxygen: 8.22 mg/L.**	Secchi: 5.0' estimated. Water level low. Surface clear of plants and algae save for a few non-nuisance white lilies.
MOUNTAIN LAKE	Cove End: Water surface clear of algae. Trace bladderwort and naiad species observed, but are non-problematic.
Secchi: 5.0'	Sailboat Cove: Water surface clear of plants and algae.
Water Level: 1.0' below capacity.	Outlet Cove: Water surface clear of plants and algae. Trace floating stems of naiads.
	Midvale Launch: Water is clear. No algae or plants on surface.
Fecal Sample: NA	Island Beach: Trace stems of milfoil observed near the access point. But the rest of this site looks good with no algae or plants observed.
WILDWOOD LAKE	Park: No plants or algae observed at the park site. Water is clear

Secchi: 8.0’ est.	Dam: Trace amounts of floating naiad stems observed.
Water Level: Below normal.	Launch: Surface is clear of algae and plants. Trace naiad along the shoreline.

NOTES:
This is the final lakes inspection of the 2015 season.

ANALYTICAL RESULTS

STANDARD DELIVERABLES FORMAT

APL WORK ORDER NUMBER: 5060137

Allied Biological

Project: Mt. Lakes

Brian Wood
Laboratory Director

All Results meet the requirements of the National Environmental Laboratory Accreditation Conference and/or State specific certifications as applicable.

REVISED 6/24/15

APL

AQUA PRO-TECH LABORATORIES
Certified Environmental Testing

Analytical Results Summary

Mt. Lakes

Client: Allied Biological **Contact:** Chris Doyle

APL Order ID: 5060137 **Received:** 6/4/15 14:28

Sample ID/Analysis	Method	Prepared	Analyzed	Result	Qual	MDL	RL	Units
5060137-01 (Lake)		Birchwood Lake		Collected: 6/4/2015 10:45				
General Chemistry								
Phosphorus	4500PE	6/22/15 15:00	6/22/15 15:00	**0.0300**			**0.0100**	**mg/L**
Nitrate	EPA 300.0	6/4/15 15:28	6/4/15 15:28	ND			0.200	mg/L
Turbidity	SM 2130 B	6/5/15 10:00	6/5/15 10:00	ND			1.0	NTU
5060137-02 (Lake)		Mountain Lake		Collected: 6/4/2015 12:50				
General Chemistry								
Phosphorus	4500PE	6/22/15 15:00	6/22/15 15:00	**0.0300**			**0.0100**	**mg/L**
Nitrate	EPA 300.0	6/4/15 15:28	6/4/15 15:28	ND			0.200	mg/L
Turbidity	SM 2130 B	6/5/15 10:00	6/5/15 10:00	ND			1.0	NTU
5060137-03 (Lake)		Wildwood Lake		Collected: 6/4/2015 13:00				
General Chemistry								
Phosphorus	4500PE	6/22/15 15:00	6/22/15 15:00	**0.0400**			**0.0100**	**mg/L**
Nitrate	EPA 300.0	6/4/15 15:28	6/4/15 15:28	ND			0.200	mg/L
Turbidity	SM 2130 B	6/5/15 10:00	6/5/15 10:00	ND			1.0	NTU
5060137-04 (Lake)		Crystal Lake		Collected: 6/4/2015 11:40				
General Chemistry								
Phosphorus	4500PE	6/22/15 15:00	6/22/15 15:00	**0.0300**			**0.0100**	**mg/L**
Nitrate	EPA 300.0	6/4/15 15:28	6/4/15 15:28	ND			0.200	mg/L
Turbidity	SM 2130 B	6/5/15 10:00	6/5/15 10:00	ND			1.0	NTU
5060137-05 (Lake)		Sunset Lake		Collected: 6/4/2015 11:05				
General Chemistry								
Phosphorus	4500PE	6/22/15 15:00	6/22/15 15:00	**0.0300**			**0.0100**	**mg/L**
Nitrate	EPA 300.0	6/4/15 15:28	6/4/15 15:28	ND			0.200	mg/L
Turbidity	SM 2130 B	6/5/15 10:00	6/5/15 10:00	**1.5**			**1.0**	**NTU**

Analytical Results Summary

Mt. Lakes

Client: Allied Biological **Contact:** Chris Doyle

APL Order ID: 5060137 **Received:** 6/4/15 14:28

Sample ID/Analysis	Method	Prepared	Analyzed	Result	Qual	MDL	RL	Units
5060137-06 (Lake)	Olive Pond			Collected: 6/4/2015 12:00				
General Chemistry								
Phosphorus	4500PE	6/22/15 15:00	6/22/15 15:00	**0.120**			**0.0100**	**mg/L**
Nitrate	EPA 300.0	6/4/15 15:28	6/4/15 15:28	ND			0.200	mg/L
Turbidity	SM 2130 B	6/5/15 10:00	6/5/15 10:00	**2.0**			**1.0**	**NTU**
5060137-07 (Lake)	Shadow Lake			Collected: 6/4/2015 12:20				
General Chemistry								
Phosphorus	4500PE	6/22/15 15:00	6/22/15 15:00	**0.0600**			**0.0100**	**mg/L**
Nitrate	EPA 300.0	6/4/15 15:28	6/4/15 15:28	ND			0.200	mg/L
Turbidity	SM 2130 B	6/5/15 10:00	6/5/15 10:00	**1.4**			**1.0**	**NTU**
5060137-08 (Lake)	Cove Lake			Collected: 6/4/2015 12:35				
General Chemistry								
Phosphorus	4500PE	6/22/15 15:00	6/22/15 15:00	**0.120**			**0.0100**	**mg/L**
Nitrate	EPA 300.0	6/4/15 15:28	6/4/15 15:28	ND			0.200	mg/L
Turbidity	SM 2130 B	6/5/15 10:00	6/5/15 10:00	**2.3**			**1.0**	**NTU**
5060137-09 (Lake)	Grunden's Pond			Collected: 6/4/2015 12:45				
General Chemistry								
Phosphorus	4500PE	6/22/15 15:00	6/22/15 15:00	**0.0900**			**0.0100**	**mg/L**
Nitrate	EPA 300.0	6/4/15 15:28	6/4/15 15:28	ND			0.200	mg/L
Turbidity	SM 2130 B	6/5/15 10:00	6/5/15 10:00	**2.1**			**1.0**	**NTU**

ND - Indicates compound analyzed for but not detected
J - Indicates estimated value
B - Indicates compound found in associated blank
E - Concentration exceeds highest calibration standard

D - Indicates result is based on a dilution
P - Greater than 25% diff. between 2 GC columns.
MDL - Minimum detection limit
RL - Reporting limit

APL 5060137

AQUA PRO-TECH LABORATORIES

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1275 BLOOMFIELD AVENUE • BUILDING 6
FAIRFIELD, NEW JERSEY 07004

TEL: 973.227.0422
FAX: 973.227.2813

CHAIN OF CUSTODY

PAGE ___ OF ___

CLIENT: Allied Biological	SEND REPORT TO: Chris Dagle
ADDRESS: 580 Rockport Rd	ADDRESS: same
Hackettstown, NJ 07840	
PHONE: 908-850-0303	PHONE:
E-MAIL: dagle@alliedbiological.com	FAX:
PROJECT NAME: Mt. Lakes	SEND INVOICE TO: Attn: Deb
PROJECT MGR: Chris Dagle	ADDRESS:
PROJECT or PO #:	SAMPLED BY: SL

TURN-AROUND TIME

- [X] APL STANDARD 2 weeks
- [ ] RUSH (choose one below)
  - [ ] 24 hr. date & time required ___
  - [ ] 48 hr. date & time required ___
  - [ ] 72 hr. date & time required ___
  - [ ] 1 week

REPORT FORMAT

- [X] RESULTS ONLY
- [ ] NJ DEP REDUCED
- [ ] NJ DEP FULL
- [ ] STATE FORMS/E2 REPORTING

PWSID# ___

ELECTRONIC FORMAT

- [ ] EMAIL DELIVERY
- [ ] HAZSITE EDD
- [ ] EXCEL

SRP# ___

CONTAMINATION LEVEL

[ ] HIGH [ ] MEDIUM [ ] LOW

MATRIX ABBREVIATIONS: D - DRINKING WATER G - GROUNDWATER W - WASTEWATER S - SOIL SL - SLUDGE C - CONCRETE L - LAKE

APL Lab ID#	Sample Source: Field ID	Date	Time	Sample Type GRAB	Sample Type COMP	MATRIX	No. of Bottles	Preservative	Analysis Requested
5060137-01	Birchwood Lake	6/4/15	10:45	X		L	2	H_2SO_4	TPO_4, NO_3, Turb
-02	Mountain Lake		12:50	X		L			" "
-03	Wildwood Lake		1:00						" "
-04	Crystal Lake		11:40						" "
-05	Sunset Lake		11:05						" "
-06	Olive Pond		12:00						" "
-07	Shadow Lake		12:20						" "
-08	Cave Lake		12:35						" "
-09	Grunden's Pond		12:45						" "

RELINQUISHED BY (Print) S. Dagle	DATE 6/4/15	RECEIVED BY (Print) K. Karuck	
Signature	Time 2:20	*Signature*	
RELINQUISHED BY (Print)	DATE	RECEIVED BY (Print)	
Signature	Time	*Signature*	
RELINQUISHED BY (Print)	DATE	RECEIVED BY (Print)	
Signature	Time	*Signature*	

COMMENTS/SPECIAL INSTRUCTIONS

Cooler Temp. upon receipt at lab 4.0

CERTIFICATIONS: NELAP (National Environmental Laboratory Accredation Program) NJDEP #07010 PADEP #68-02903 NYDOH #11634 CTPH #0233 US ARMY

By signing this Chain of Custody Agreement, customer expressly agrees to pay APL for all charges, reasonably incurred in connection with analysis and reporting for these samples

APL
AQUA PRO-TECH LABORATORIES
Certified Environmental Testing

ANALYTICAL RESULTS

STANDARD DELIVERABLES FORMAT

APL WORK ORDER NUMBER: 5070353

Allied Biological

Project: Mountain Lakes

Brian Wood
Laboratory Director

All Results meet the requirements of the National Environmental Laboratory Accreditation Conference and/or State specific certifications as applicable.

1275 Bloomfield Ave., Bldg. 6, Fairfield, New Jersey 07004
(t) 973.227.0422 (f) 973.227.2813 (w) www.aquaprotechlabs.com

APL

AQUA PRO-TECH LABORATORIES
Certified Environmental Testing

Analytical Results Summary

Mountain Lakes

Client: Allied Biological **Contact:** Chris Doyle

APL Order ID: 5070353 **Received:** 7/13/15 15:06

Sample ID/Analysis	Method	Prepared	Analyzed	Result	Qual	MDL	RL	Units
5070353-01 (Lake)	Mountain Lake			Collected: 7/13/2015 13:34				
General Chemistry								
Phosphorus	4500PE	7/27/15 9:00	7/27/15 9:00	**0.0200**			**0.0100**	**mg/L**
Nitrate	EPA 300.0	7/14/15 19:40	7/14/15 19:40	ND			0.200	mg/L
Turbidity	SM 2130 B	7/13/15 16:00	7/14/15 10:00	ND			1.0	NTU
5070353-02 (Lake)	Crystal Lake			Collected: 7/13/2015 11:43				
General Chemistry								
Phosphorus	4500PE	7/27/15 9:00	7/27/15 9:00	**0.0200**			**0.0100**	**mg/L**
Nitrate	EPA 300.0	7/14/15 19:40	7/14/15 19:40	ND			0.200	mg/L
Turbidity	SM 2130 B	7/13/15 16:00	7/14/15 10:00	ND			1.0	NTU
5070353-03 (Lake)	Sunset Lake			Collected: 7/13/2015 11:30				
General Chemistry								
Phosphorus	4500PE	7/27/15 9:00	7/27/15 9:00	**0.0300**			**0.0100**	**mg/L**
Nitrate	EPA 300.0	7/14/15 19:40	7/14/15 19:40	ND			0.200	mg/L
Turbidity	SM 2130 B	7/13/15 16:00	7/14/15 10:00	**1.3**			**1.0**	**NTU**
5070353-04 (Lake)	Wildwood Lake			Collected: 7/13/2015 14:14				
General Chemistry								
Phosphorus	4500PE	7/27/15 9:00	7/27/15 9:00	**0.0300**			**0.0100**	**mg/L**
Nitrate	EPA 300.0	7/14/15 19:40	7/14/15 19:40	ND			0.200	mg/L
Turbidity	SM 2130 B	7/13/15 16:00	7/14/15 10:00	ND			1.0	NTU
5070353-05 (Lake)	Birchwood Lake			Collected: 7/13/2015 11:05				
General Chemistry								
Phosphorus	4500PE	7/27/15 9:00	7/27/15 9:00	**0.0300**			**0.0100**	**mg/L**
Nitrate	EPA 300.0	7/14/15 19:40	7/14/15 19:40	ND			0.200	mg/L
Turbidity	SM 2130 B	7/13/15 16:00	7/14/15 10:00	**1.1**			**1.0**	**NTU**

Analytical Results Summary

Mountain Lakes

Client:	**Allied Biological**	**Contact:**	**Chris Doyle**
APL Order ID:	**5070353**	**Received:**	**7/13/15 15:06**

Sample ID/Analysis	Method	Prepared	Analyzed	Result	Qual	MDL	RL	Units
5070353-06 (Lake)		Shadow Lake		Collected:	7/13/2015 12:38			
General Chemistry								
Phosphorus	4500PE	7/27/15 9:00	7/27/15 9:00	**0.110**			**0.0100**	**mg/L**
Nitrate	EPA 300.0	7/14/15 19:40	7/14/15 19:40	ND			0.200	mg/L
Turbidity	SM 2130 B	7/13/15 16:00	7/14/15 10:00	**1.0**			**1.0**	**NTU**
5070353-07 (Lake)		Cove Pond		Collected:	7/13/2015 12:50			
General Chemistry								
Phosphorus	4500PE	7/27/15 9:00	7/27/15 9:00	**0.0400**			**0.0100**	**mg/L**
Nitrate	EPA 300.0	7/14/15 19:40	7/14/15 19:40	ND			0.200	mg/L
Turbidity	SM 2130 B	7/13/15 16:00	7/14/15 10:00	**1.5**			**1.0**	**NTU**
5070353-08 (Lake)		Olive Pond		Collected:	7/13/2015 12:25			
General Chemistry								
Phosphorus	4500PE	7/27/15 9:00	7/27/15 9:00	**0.0600**			**0.0100**	**mg/L**
Nitrate	EPA 300.0	7/14/15 19:40	7/14/15 19:40	ND			0.200	mg/L
Turbidity	SM 2130 B	7/13/15 16:00	7/14/15 10:00	**3.7**			**1.0**	**NTU**
5070353-09 (Lake)		Grunden's Pond		Collected:	7/13/2015 13:01			
General Chemistry								
Phosphorus	4500PE	7/27/15 9:00	7/27/15 9:00	**0.0400**			**0.0100**	**mg/L**
Nitrate	EPA 300.0	7/14/15 19:40	7/14/15 19:40	ND			0.200	mg/L
Turbidity	SM 2130 B	7/13/15 16:00	7/14/15 10:00	ND			1.0	NTU
5070353-10 (Lake)		Mountain Lake- Island Beach		Collected:	7/13/2015 13:59			
Microbiology								
Fecal Coliform	SM 9222D	7/13/15 16:45	7/13/15 16:45	ND			1	CFU/100 ml
5070353-11 (Lake)		Birchwood Lake		Collected:	7/13/2015 11:10			
Microbiology								
Fecal Coliform	SM 9222D	7/13/15 16:45	7/13/15 16:45	**20**			**1**	**CFU/100 ml**

Analytical Results Summary

Mountain Lakes

Client:	**Allied Biological**	**Contact:**	**Chris Doyle**
APL Order ID:	**5070353**	**Received:**	**7/13/15 15:06**

Sample ID/Analysis	Method	Prepared	Analyzed	Result	Qual	MDL	RL	Units

ND - Indicates compound analyzed for but not detected
J - Indicates estimated value
B - Indicates compound found in associated blank
E - Concentration exceeds highest calibration standard
D - Indicates result is based on a dilution
P - Greater than 25% diff. between 2 GC columns.
MDL - Minimum detection limit
RL - Reporting limit

APL 5070353

AQUA PRO-TECH LABORATORIES

www.aquaprotechlabs.com

1275 BLOOMFIELD AVENUE • BUILDING 6
FAIRFIELD, NEW JERSEY 07004

TEL: 973.227.0422
FAX: 973.227.2813

CHAIN OF CUSTODY

CLIENT: Allied Biological	SEND REPORT TO: Chris Doyle
ADDRESS: 580 Rockport Rd. Hackettstown NJ 07840	ADDRESS: 580 Rockport Rd. Hackettstown, NJ 07840
PHONE: 908-852-0303	PHONE: 908-852-0303
E-MAIL: doyle@alliedbiological.com	FAX:
PROJECT NAME: Mountain Lakes	SEND INVOICE TO: DEB
PROJECT MGR: Chris Doyle	ADDRESS:
PROJECT or PO #:	SAMPLED BY: EM

CONTAMINATION LEVEL
☐ HIGH ☐ MEDIUM ☒ LOW

TURN-AROUND TIME
- ☒ APL STANDARD 2 weeks
- ☐ RUSH (choose one below)
  - ☐ 24 hr. date & time required
  - ☐ 48 hr. date & time required
  - ☐ 72 hr. date & time required
  - ☐ 1 week

REPORT FORMAT
- ☒ RESULTS ONLY
- ☐ NJ DEP REDUCED
- ☐ NJ DEP FULL
- ☐ STATE FORMS/E2 REPORTING

PWSID#

ELECTRONIC FORMAT
- ☐ EMAIL DELIVERY
- ☐ HAZSITE EDD
- ☐ EXCEL

SRP#

MATRIX ABBREVIATIONS: D - DRINKING WATER G - GROUNDWATER W - WASTEWATER S - SOIL SL - SLUDGE C - CONCRETE L - LAKE

APL Lab ID#	Sample Source: Field ID	Date	Time	Sample Type: GRAB	Sample Type: COMP	MATRIX	No. of Bottles	Preservative	Analysis Requested
5070353-01	Mountain Lake	7/13/15	1:34pm	X		L	2	H_2SO_4	TPO_4, NO_3, Turb.
-02	Crystal Lake	7/13/15	11:43am	X		L	2	H_2SO_4	TPO_4, NO_3, Turb.
-03	Sunset Lake	7/13/15	11:30am	X		L	2	H_2SO_4	TPO_4, NO_3, Turb.
-04	Wildwood Lake	7/13/15	2:14pm	X		L	2	H_2SO_4	TPO_4, NO_3, Turb.
-05	Birchwood Lake	7/13/15	11:05am	X		L	2	H_2SO_4	TPO_4, NO_3, Turb.
-06	Shadow Lake	7/13/15	12:38pm	X		L	2	H_2SO_4	TPO_4, NO_3, Turb.
-07	Cove Pond	7/13/15	12:50pm	X		L	2	H_2SO_4	TPO_4, NO_3, Turb.
-08	Olive Pond	7/13/15	12:25pm	X		L	2	H_2SO_4	TPO_4, NO_3, Turb.
-09	Grunden's Pond	7/13/15	1:01pm	X		L	2	H_2SO_4	TPO_4, NO_3, Turb.

RELINQUISHED BY (Print) Emily Mayer	DATE 7/13/15	RECEIVED BY (Print) Cassaundra Falcone	
Signature EM	Time 14:55	Signature CF	
RELINQUISHED BY (Print)	DATE	RECEIVED BY (Print)	
Signature	Time	Signature	
RELINQUISHED BY (Print)	DATE	RECEIVED BY (Print)	
Signature	Time	Signature	

COMMENTS/SPECIAL INSTRUCTIONS

Cooler Temp. upon receipt at lab 3.6

CERTIFICATIONS: NELAP (National Environmental Laboratory Accredation Program) NJDEP #07010 PADEP #68-02903 NYDOH #11634 CTPH #0233 US ARMY

By signing this Chain of Custody Agreement, customer expressly agrees to pay APL for all charges, reasonably incurred in connection with analysis and reporting for these samples

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FAIRFIELD, NEW JERSEY 07004

TEL: 973.227.0422
FAX: 973.227.2813

CHAIN OF CUSTODY

CLIENT: Allied Biological	SEND REPORT TO: Chris Doyle
ADDRESS: 580 Rockport Rd Hackettstown, NJ 07840	ADDRESS: 580 Rockport Rd. Hackettstown, NJ 07840
PHONE: 908-852-0303	PHONE: 908-852-0303
E-MAIL: doyle@alliedbiological.com	FAX:
PROJECT NAME: Mountain Lakes	SEND INVOICE TO: DEB
PROJECT MGR: Chris Doyle	ADDRESS: ↓
PROJECT or PO #:	SAMPLED BY: ET

CONTAMINATION LEVEL
☐ HIGH ☐ MEDIUM ☒ LOW

TURN-AROUND TIME
- ☒ APL STANDARD 2 weeks
- ☐ RUSH (choose one below)
  - ☐ 24 hr. date & time required _____
  - ☐ 48 hr. date & time required _____
  - ☐ 72 hr. date & time required _____
  - ☐ 1 week

REPORT FORMAT
- ☒ RESULTS ONLY
- ☐ NJ DEP REDUCED
- ☐ NJ DEP FULL
- ☐ STATE FORMS/E2 REPORTING

PWSID# _____

ELECTRONIC FORMAT
- ☐ EMAIL DELIVERY
- ☐ HAZSITE EDD
- ☐ EXCEL

SRP# _____

MATRIX ABBREVIATIONS: D - DRINKING WATER G - GROUNDWATER W - WASTEWATER S - SOIL SL - SLUDGE C - CONCRETE L - LAKE

APL Lab ID#	Sample Source: Field ID	Date	Time	Sample Type: GRAB	Sample Type: COMP	MATRIX	No. of Bottles	Preservative	Analysis Requested
353-10	Mountain Lake-Island Beach	7/13/15	1:59pm	X		L	1		Fecal
-11	Birchwood Lake	7/13/15	11:10am	X		L	1		Fecal

RELINQUISHED BY (Print) Emily Mayer	DATE 7/13/15	RECEIVED BY (Print) Cassandra Falcone	
Signature	Time 14:55	Signature	
RELINQUISHED BY (Print)	DATE	RECEIVED BY (Print)	
Signature	Time	Signature	
RELINQUISHED BY (Print)	DATE	RECEIVED BY (Print)	
Signature	Time	Signature	

COMMENTS/SPECIAL INSTRUCTIONS

Cooler Temp. upon receipt at lab 3.6

CERTIFICATIONS: NELAP (National Environmental Laboratory Accredation Program) NJDEP #07010 PADEP #68-02903 NYDOH #11634 CTPH #0233 US ARMY

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ANALYTICAL RESULTS

STANDARD DELIVERABLES FORMAT

APL WORK ORDER NUMBER: 5080253

Allied Biological

Project: Mountain Lakes

Brian Wood
Laboratory Director

All Results meet the requirements of the National Environmental Laboratory Accreditation Conference and/or State specific certifications as applicable.

APL

AQUA PRO-TECH LABORATORIES
Certified Environmental Testing

Analytical Results Summary

Mountain Lakes

Client:	**Allied Biological**	**Contact:**	**Chris Doyle**
APL Order ID:	**5080253**	**Received:**	**8/10/15 14:47**

Sample ID/Analysis	Method	Prepared	Analyzed	Result	Qual	MDL	RL	Units
5080253-01 (Lake)		Mountain Lakes- Island Beach		Collected:	8/10/2015 13:15			
Microbiology								
Fecal Coliform	SM 9222D	8/10/15 15:45	8/10/15 15:45	**26**			**1**	**CFU/100 ml**
5080253-02 (Lake)		Birchwood Lake		Collected:	8/10/2015 11:30			
Microbiology								
Fecal Coliform	SM 9222D	8/10/15 15:45	8/10/15 15:45	ND			1	CFU/100 ml
5080253-03 (Lake)		Wildwood Lake		Collected:	8/10/2015 13:51			
General Chemistry								
Phosphorus	4500PE	8/18/15 10:00	8/18/15 10:00	**0.0300**			**0.0100**	**mg/L**
Nitrate	EPA 300.0	8/11/15 17:00	8/11/15 17:00	ND			0.200	mg/L
Turbidity	SM 2130 B	8/12/15 9:00	8/12/15 9:00	**1.7**			**1.0**	**NTU**
5080253-04 (Lake)		Cove Pond		Collected:	8/10/2015 12:30			
General Chemistry								
Phosphorus	4500PE	8/18/15 10:00	8/18/15 10:00	**0.0500**			**0.0100**	**mg/L**
Nitrate	EPA 300.0	8/11/15 17:00	8/11/15 17:00	ND			0.200	mg/L
Turbidity	SM 2130 B	8/12/15 9:00	8/12/15 9:00	**3.0**			**1.0**	**NTU**

ND - Indicates compound analyzed for but not detected
J - Indicates estimated value
B - Indicates compound found in associated blank
E - Concentration exceeds highest calibration standard

D - Indicates result is based on a dilution
P - Greater than 25% diff. between 2 GC columns.
MDL - Minimum detection limit
RL - Reporting limit

APL 5080253

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FAIRFIELD, NEW JERSEY 07004

TEL: 973.227.0422
FAX: 973.227.2813

CHAIN OF CUSTODY

PAGE 1 OF 1

CLIENT: Allied Biological	SEND REPORT TO: Chris Doyle
ADDRESS: 580 Rockport Rd	ADDRESS: 580 Rockport Rd.
Hackettstown, NJ 07840	Hackettstown, NJ 07840
PHONE: 908-850-6303	PHONE:
E-MAIL: doyle@alliedbiological.com	SEND INVOICE TO: DEP
PROJECT NAME: Mountain Lakes	ADDRESS:
PROJECT MGR: Chris Doyle	SAMPLING LOCATION: NJ
PROJECT or PO #:	SAMPLED BY: EM

CONTAMINATION LEVEL
- [x] LOW
- [ ] MEDIUM
- [ ] HIGH

TURN-AROUND TIME
- [x] APL STANDARD 2 weeks
- [ ] RUSH (choose one below, may need lab approval)
  - [ ] 24 hr. date & time required
  - [ ] 48 hr. date & time required
  - [ ] 72 hr. date & time required
  - [ ] 1 week

REPORT/ ELECTRONIC FORMAT
- [x] RESULTS ONLY
- [ ] NJ DEP REDUCED
- [ ] NJ DEP FULL
- [ ] STATE FORMS/E2 REPORTING
- [ ] EMAIL DELIVERY
- [ ] HAZSITE EDD
- [ ] EXCEL

PWSID# _____ SRP# _____

MATRIX ABBREVIATIONS: *D - DRINKING WATER G - GROUNDWATER W - WASTEWATER S - SOIL SL - SLUDGE C - CONCRETE L - LAKE*

APL Lab ID#	Sample Source: Field ID	Date	Time	Sample Type		Matrix	No. of Bottles	Preservative	Analysis Requested
5080253-01	Mountain Lake - Island beach	8/10/15	1:15pm	X		L	1		Fecal Coliform
-02	Birchwood Lake	8/10/15	11:30AM	X		L	1		Fecal Coliform
-03	Wildwood Lake	8/10/15	1:51	X		L	2	H_2SO_4	NO_3, Turb., TPO_4
-04	Cove Pond	8/10/15	12:30	X		L	2	H_2SO_4	NO_3, Turb. TPO_4

RELINQUISHED BY	PRINT Emily Mayer	SIGN Emily Mayer	DATE & TIME 8/10/15	2:30
RECEIVED BY	PRINT C. Falcone	SIGN C Falcone	DATE & TIME 8/10/15	14:45
RELINQUISHED BY	PRINT	SIGN	DATE & TIME	
RECEIVED BY	PRINT	SIGN	DATE & TIME	

COMMENTS/SPECIAL INSTRUCTIONS

Cooler Temp. upon receipt at lab 3.0

CERTIFICATIONS: NELAP (National Environmental Laboratory Accreditation Program) NJDEP #07010 PADEP #68-02903 NYDOH #11634

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ANALYTICAL RESULTS

STANDARD DELIVERABLES FORMAT

APL WORK ORDER NUMBER: 5080252

Allied Biological

Project: Mountain Lakes

Brian Wood
Laboratory Director

All Results meet the requirements of the National Environmental Laboratory Accreditation Conference and/or State specific certifications as applicable.

1275 Bloomfield Ave., Bldg. 6, Fairfield, New Jersey 07004
(t) 973.227.0422 (f) 973.227.2813 (w) www.aquaprotechlabs.com

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AQUA PRO-TECH LABORATORIES
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Analytical Results Summary

Mountain Lakes

Client: Allied Biological **Contact:** Chris Doyle

APL Order ID: 5080252 **Received:** 8/10/15 14:45

Sample ID/Analysis	Method	Prepared	Analyzed	Result	Qual	MDL	RL	Units
5080252-01 (Lake)		Birchwood Lake		Collected: 8/10/2015 11:30				
General Chemistry								
Phosphorus	4500PE	8/18/15 10:00	8/18/15 10:00	**0.0200**			**0.0100**	**mg/L**
Nitrate	EPA 300.0	8/11/15 17:00	8/11/15 17:00	ND			0.200	mg/L
Turbidity	SM 2130 B	8/12/15 9:00	8/12/15 9:00	**1.2**			**1.0**	**NTU**
5080252-02 (Lake)		Sunset Lake		Collected: 8/10/2015 11:39				
General Chemistry								
Phosphorus	4500PE	8/18/15 10:00	8/18/15 10:00	**0.0300**			**0.0100**	**mg/L**
Nitrate	EPA 300.0	8/11/15 17:00	8/11/15 17:00	ND			0.200	mg/L
Turbidity	SM 2130 B	8/12/15 9:00	8/12/15 9:00	**2.5**			**1.0**	**NTU**
5080252-03 (Lake)		Olive Pond		Collected: 8/10/2015 12:11				
General Chemistry								
Phosphorus	4500PE	8/18/15 10:00	8/18/15 10:00	**0.0900**			**0.0100**	**mg/L**
Nitrate	EPA 300.0	8/11/15 17:00	8/11/15 17:00	ND			0.200	mg/L
Turbidity	SM 2130 B	8/12/15 9:00	8/12/15 9:00	**2.9**			**1.0**	**NTU**
5080252-04 (Lake)		Crystal Lake		Collected: 8/10/2015 11:55				
General Chemistry								
Phosphorus	4500PE	8/18/15 10:00	8/18/15 10:00	**0.0200**			**0.0100**	**mg/L**
Nitrate	EPA 300.0	8/11/15 17:00	8/11/15 17:00	ND			0.200	mg/L
Turbidity	SM 2130 B	8/12/15 9:00	8/12/15 9:00	**1.6**			**1.0**	**NTU**
5080252-05 (Lake)		Shadow Lake		Collected: 8/10/2015 12:30				
General Chemistry								
Phosphorus	4500PE	8/18/15 10:00	8/18/15 10:00	**0.120**			**0.0100**	**mg/L**
Nitrate	EPA 300.0	8/11/15 17:00	8/11/15 17:00	ND			0.200	mg/L
Turbidity	SM 2130 B	8/12/15 9:00	8/12/15 9:00	**3.3**			**1.0**	**NTU**

Analytical Results Summary

Mountain Lakes

Client:	**Allied Biological**	**Contact:**	**Chris Doyle**
APL Order ID:	**5080252**	**Received:**	**8/10/15 14:45**

Sample ID/Analysis	Method	Prepared	Analyzed	Result	Qual	MDL	RL	Units
5080252-06 (Lake)		Mountain Lake		Collected: 8/10/2015 13:16				
General Chemistry								
Phosphorus	4500PE	8/18/15 10:00	8/18/15 10:00	**0.0500**			**0.0100**	**mg/L**
Nitrate	EPA 300.0	8/11/15 17:00	8/11/15 17:00	ND			0.200	mg/L
Turbidity	SM 2130 B	8/12/15 9:00	8/12/15 9:00	ND			1.0	NTU
5080252-07 (Lake)		Grunden's Pond		Collected: 8/10/2015 12:42				
General Chemistry								
Phosphorus	4500PE	8/18/15 10:00	8/18/15 10:00	**0.100**			**0.0100**	**mg/L**
Nitrate	EPA 300.0	8/11/15 17:00	8/11/15 17:00	ND			0.200	mg/L
Turbidity	SM 2130 B	8/12/15 9:00	8/12/15 9:00	**2.7**			**1.0**	**NTU**

ND - Indicates compound analyzed for but not detected
J - Indicates estimated value
B - Indicates compound found in associated blank
E - Concentration exceeds highest calibration standard
D - Indicates result is based on a dilution
P - Greater than 25% diff. between 2 GC columns.
MDL - Minimum detection limit
RL - Reporting limit

APL 5080252

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CHAIN OF CUSTODY

PAGE 1 OF 1

CLIENT: Allied Biological	SEND REPORT TO: Chris Doyle
ADDRESS: 580 Rockport Rd	ADDRESS: 580 Rockport Rd
Hackettstown, NJ 07840	Hackettstown, NJ 07840
PHONE: 908-850-0303	PHONE: 908-850-0303
E-MAIL: doyle@alliedbiological.com	SEND INVOICE TO: DEB
PROJECT NAME: Mountain Lakes	ADDRESS:
PROJECT MGR: Chris Doyle	SAMPLING LOCATION: NJ
PROJECT or PO #:	SAMPLED BY:

CONTAMINATION LEVEL
- [x] LOW
- [ ] MEDIUM
- [ ] HIGH

TURN-AROUND TIME
- [x] APL STANDARD 2 weeks
- [ ] RUSH (choose one below, may need lab approval)
  - [ ] 24 hr. date & time required
  - [ ] 48 hr. date & time required
  - [ ] 72 hr. date & time required
  - [ ] 1 week

REPORT/ ELECTRONIC FORMAT
- [x] RESULTS ONLY
- [ ] NJ DEP REDUCED
- [ ] NJ DEP FULL
- [ ] STATE FORMS/E2 REPORTING
- [ ] EMAIL DELIVERY
- [ ] HAZSITE EDD
- [ ] EXCEL

PWSID# _____ SRP# _____

MATRIX ABBREVIATIONS: *D - DRINKING WATER G - GROUNDWATER W - WASTEWATER S - SOIL SL - SLUDGE C - CONCRETE L - LAKE*

APL Lab ID#	Sample Source: Field ID	Date	Time	Sample Type: GRAB	Sample Type: COMP	MATRIX	No. of Bottles	Preservative	Analysis Requested
5080252-01	Birchwood Lake	8/10/15	11:30 AM	X		L	2	H_2SO_4	TPO_4, NO_3, Turb.
-02	Sunset Lake	8/10/15	11:39 AM	X		L	2	H_2SO_4	TPO_4, NO_3, Turb.
-03	Olive Pond	8/10/15	12:11 PM	X		L	2	H_2SO_4	TPO_4, NO_3, Turb.
-04	Crystal Lake	8/10/15	11:55 AM	X		L	2	H_2SO_4	TPO_4, NO_3, Turb.
-05	Shadow Lake	8/10/15	12:30 PM	X		L	2	H_2SO_4	TPO_4, NO_3, Turb.
-06	Mountain Lake	8/10/15	1:16pm	X		L	2	H_2SO_4	TPO_4, NO_3, Turb.
-07	Grunden's Pond	8/10/15	12:42	X		L	2	H_2SO_4	TPO_4, NO_3, Turb.

RELINQUISHED BY	PRINT Emily Mayer	SIGN	DATE & TIME	8/10/15 2:30
RECEIVED BY	PRINT C. Falcone	SIGN	DATE & TIME	8/10/15 14:45
RELINQUISHED BY	PRINT	SIGN	DATE & TIME	
RECEIVED BY	PRINT	SIGN	DATE & TIME	

COMMENTS/SPECIAL INSTRUCTIONS

Cooler Temp. upon receipt at lab 3.0

CERTIFICATIONS: NELAP (National Environmental Laboratory Accreditation Program) NJDEP #07010 PADEP #68-02903 NYDOH #11634

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