BOROUGH OF MOUNTAIN LAKES
MORRIS COUNTY, NJ

2013 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 2013. 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 will be discussed individually regarding aquatic plant and phytoplankton management and water chemistry.

After the 2013 summary discussions, additional topics such as the fecal coliform sampling that occurred at Birchwood and Mountain Lake, water clarity at Mountain Lake, nutrient loading in all of the lakes, and the Lakes Cleaning Program will be discussed. Finally, a summary of the 2013 Lakes Management efforts is included along with specific Lake Management strategies for 2014. Copies of all of the graphs and data utilized in this report are included in the Appendix of this report.

Aquatic Macrophyte Summaries

Scientific Name	Common Name	Observed 2013	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		2011
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	X	
Lythrum salicaria	Purple Loosestrife	X	
Nitella sp.	Stonewort	X	
Fontinalis sp.	Watermoss	X	
Ludwigia peploides	Creeping Water Primrose	X	
Najas minor	Brittle Naiad	X	
Potamogeton pusillus	Small Pondweed	X	
Artemisia vulgaris	Mugwort	X	

The table above depicts a list of aquatic plants observed at Mountain Lakes in 2013 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. 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

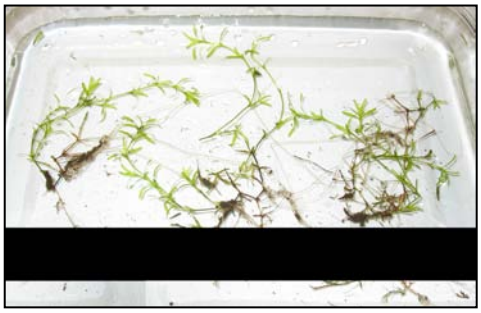
ranging from the size of unicellular protozoans (such as *Euglena*), to mosquito larvae. Prey is slowly digested inside the bladders by enzymes. Common bladderwort produces small yellow flowers that protrude above the water. Stems of common bladderwort provide food and cover for fish.

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

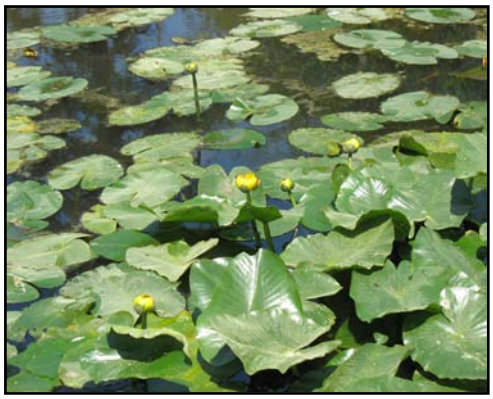
habitats, but usually prefers shallow water. It has a high tolerance for eutrophic conditions, allowing it to even colonize secondary water treatment ponds.



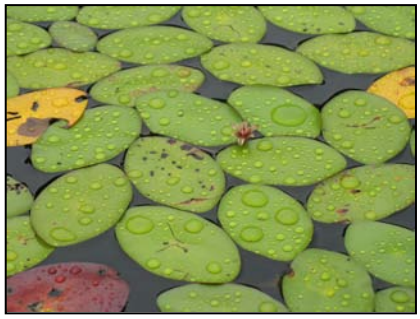
Southern Naiad (*Najas guadalupensis*. Common Names: Southern water nymph, bushy pondweed. **Native**.): Southern naiad is an annual aquatic plant that can form dense stands of rooted vegetation. Its ribbon-like leaves are dark-green to greenish-purple, and are wider and less pointed than slender naiad. 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.

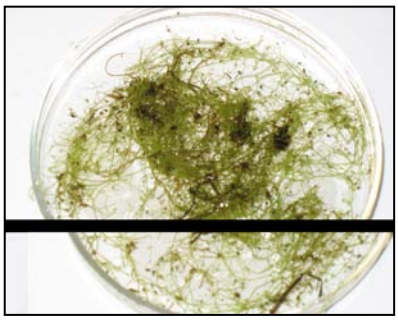
Low Milfoil (*Myriophyllum humile*. Common Name: Lowly water milfoil. **Native**.). Low milfoil is a submersed perennial with delicate stems usually less than one meter long. From these stems are mainly alternate short stalks, with 4 to 8 pairs of capillary-divided leaves. The minute fruit are round-backed 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.

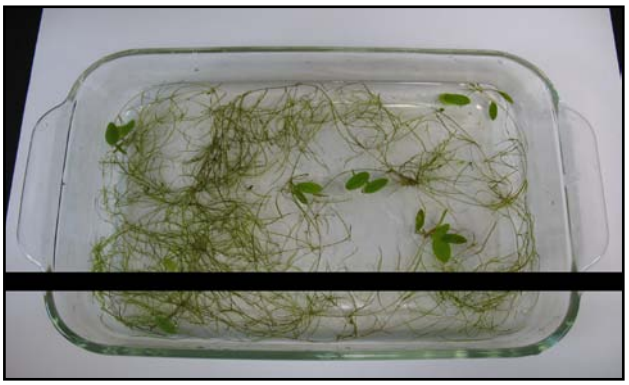


Creeping Bladderwort (*Utricularia gibba*. Common Names: creeping bladderwort, humped bladderwort, cone-spur bladderwort. **Native**.). Creeping bladderwort is a small (usually less than 10 cm long), delicate, free-floating stem. It often forms tangled mats in quiet shallow waters, often associated with 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.



Purple Loosestrife (*Lythrum salicaria*): Purple loosestrife is an **exotic** emergent macrophyte that originated in Europe and Asia. In the United States, the plant is widespread in the northeast and Midwest. It grows in moist soil to shallow water, and can reach a height of 150 cm. It has lance-like opposite leaves, and it produces a flower spike adorned with magenta flowers, giving it a distinct appearance. Purple loosestrife has very little wildlife value as its seeds are low in nutrition and its roots and stems are woody.

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 become 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 three 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.

Mugwort (*Artemisia vulgaris*. Common Names: Chrysanthemum weed, Mother of Herbs, mugwort. **Invasive**.): Mugwort is an emergent perennial weed that inhabits moist soil in disturbed areas. Leaves are 2 to 4 inches long and 1 to 3 inches wide, alternately arranged on the stem. The leaves are deeply lobed, green on the top, but white-gray and wooly on the underside. Stems can reach heights of 5 feet, and become wooly in age. Its primary mode of reproduction is spreading via rhizomes, rendering hand pulling an ineffective control measure. Viable seeds are rarely produced in North America populations. Although the emergent stems do create wildlife habitat, the aggressive spreading nature of this invasive often outweighs its limited benefits.

2013 Aquatic Macrophyte Management

Birchwood Lake			
Date	**Product Applied**	**Acres Treated**	**Target Species**
5/31/13	Clipper	0.175	Water lilies/pondweeds
6/19/13	AquaPro	2.0	Water lilies
7/31/13	AquaNeat	0.025	Mugwort/Purple Loosestrife

At Birchwood Lake in 2013, two herbicide applications were conducted in the basin, and another was conducted to target emergent invasive plants. On May 31st, 0.175 acres around the swim lanes were sprayed via a backpack sprayer. The target plants were water lilies and various pondweeds/submersed plants in and around the swim lanes. This year, we utilized a different product, Clipper (a.i. flumioxazin), which has not been used in this basin. The results were favorable, with excellent control of target plants throughout the season. On June 16th, 2.0 acres of water lilies were targeted for control using AquaPro

applied via a boat mounted spray system. This is a treatment that is conducted every 2-3 years to push back and thin out water lily density in the northern part of the basin. The July 31st terrestrial application of AquaNeat targeted 0.025 acres of mugwort and purple loosestrife along the walking trails and around the aeration compressors.

Crystal Lake

Date	Product Applied	Acres Treated	Target Species
4/8/13	Copper Sulfate	0.5	Filamentous Algae
5/1/13	Sonar AS	20.4	Pondweeds
	Copper Sulfate	2.0	Filamentous Algae
8/28/13	Copper Sulfate	3.0	Filamentous Algae

At Crystal Lake in 2013, three algaecide applications were required, and one herbicide application was required to control nuisance pondweed growth. Due to conditions in 2012, it was decided to take a more aggressive treatment approach in this basin regarding submersed plants. On May 1st, a whole basin Sonar AS (liquid) application was conducted to target pondweeds. Pondweeds included nuisance small pondweed, scattered curly-leaf pondweed and some bass weed. The product was placed in the northern portion of the basin to allow a natural movement to the outlet (southern) end of the basin. Treatment efficacy was excellent as no additional herbicide applications were needed the rest of the season. Copper sulfate was applied on three dates to control nuisance filamentous algae. However, all three applications were limited acreage (0.5 acres to 3.0 acres) targeting accumulating patches only.

Sunset Lake

Date	Product Applied	Acres Treated	Target Species
5/31/13	Sonar Genesis	15.6	Water lilies
	Copper Sulfate	6.0	Filamentous Algae
6/20/13	Sonar Genesis	15.6	Water lilies
7/31/13	AquaNeat	0.025	Creeping Water Primrose
8/15/13	AquaPro	0.25	Creeping Water Primrose

At Sunset Lake in 2013, two herbicide applications were required to control nuisance water lily growth. Based on 2012 water lily abundance and unsuitable control via contact herbicides, a more aggressive approach was taken to control water lilies this season. This included the whole basin application of Sonar Genesis on 5/31/13, when water lilies were at the surface in approximately 30% of the basin. On 6/20/13, a boat inspection of control revealed browned/yellow leaves, but a similar abundance to late May. A bump application of Sonar Genesis was conducted, and soon after the water lilies dropped out of the water column a few weeks later. Heavy rainfall events in late May/June likely created the need for the bump application. A single copper sulfate application was conducted in late May to target 6.0 acres of nuisance filamentous algae. In response to resident complaints, two very limited applications were conducted to target emergent vegetations along the shoreline. The target plants were the invasive creeping water primrose, and AquaPro was utilized on both dates, applied via backpack sprayer.

Olive Lake

Date	Product Applied	Acres Treated	Target Species
4/8/13	SeClear	0.2	Filamentous Algae
8/15/13	Copper Sulfate	0.4	Unicellular Algae

At Olive Lake, no herbicide applications and only two algaecide applications were required in 2013. This represents a significant decrease as compared to 2012. The reduction in herbicide use was likely a result of aggressive management in Sunset Lake (i.e. Sonar use) and heavy rainfall events in May and June. Only two algaecide applications were required to target nuisance algae growth in the basin. In early April, a SeClear application targeting 0.2 acres of filamentous algae was conducted. In mid-August, a 0.4 acre copper sulfate application was required to target unicellular algae, related to the bloom occurring in nearby Shadow Lake. On no dates in 2013 was the dissolved oxygen too low to apply algaecides or herbicides.

Shadow Lake

Date	Product Applied	Acres Treated	Target Species
4/8/13	SeClear	0.2	Filamentous Algae
6/27/13	Copper Sulfate	1.3	Filamentous Algae
7/18/13	Copper Sulfate	1.3	Unicellular Algae
8/6/13	Copper Sulfate	1.3	Unicellular Algae
8/15/13	Copper Sulfate	1.3	Unicellular Algae

In 2013, Shadow Lake required five algaecide applications to maintain suitable conditions. This represents a decrease when compared to 2012 treatment history. The early April application was conducted with SeClear, while subsequent applications in 2013 utilized copper sulfate. Early in the season, the target was filamentous algae mats scattered throughout the basin. But by July, unicellular algae became the target as nuisance blooms of blue-green algae persisted in the basin. Three treatments were required in a four week period to control the bloom. Herbicide use was not required in this basin in 2013, likely due to the aggressive use of Sonar upstream and heavy rainfall events in May and June. In 2013, dissolved oxygen was suitable on all dates, therefore no planned applications needed to be postponed.

Cove Lake

Date	Product Applied	Acres Treated	Target Species
8/6/13	Copper Sulfate	0.45	Unicellular Algae
8/20/13	Copper Sulfate	0.45	Unicellular Algae

At Cove Lake in 2013, two algaecide applications were conducted to target nuisance unicellular algae blooms late (August) in the season. These bloom events were likely related to the blue-green algae bloom event occurring in Shadow Lake, just upstream. On both dates, copper sulfate was utilized to target 0.45 acres of the basin. In 2013, no potential algaecide applications were postponed due to low dissolved oxygen at Cove Lake.

Grunden's Pond

Date	Product Applied	Acres Treated	Target Species
5/22/13	Reward	1.0	Curly-leaf Pondweed/Eurasian Water milfoil
	Copper Sulfate	1.0	Filamentous Algae
7/31/13	AquaNeat	0.00006	Creeping Water Primrose/Purple Loosestrife
8/6/13	Copper Sulfate	0.3	Unicellular Algae
8/6/13	Reward	0.0008	Creeping Water Primrose

At Grunden's Pond, two algaecide and three herbicide applications were performed in 2013. The first herbicide application utilized Reward to target 1.0 acres of curly-leaf pondweed and Eurasian water milfoil growth early in the season. Eurasian water milfoil has not been documented in this basin in several years, and its presence could provide a vector of spread into Mountain Lake. The remaining two herbicide applications targeted creeping water primrose in the basin, and purple loosestrife along the margins. Both applications were extremely limited in scope. A late May algaecide application targeted 1.0 acres of filamentous growth. An early August a copper sulfate application was needed to control unicellular algae growth. This was likely related to the blue-green algae bloom observed at several of the smaller basins around the same time (early August). On no dates in 2013 were any treatments postponed due to low dissolved oxygen in this basin.

Mountain Lake

Date	Product Applied	Acres Treated	Target Species
5/17/13	Reward	38.3	Curly-leaf Pondweed
	Copper Sulfate	10.0	Filamentous Algae
6/5/13	Reward	1.8	Leafy Pondweed
	Copper Sulfate	1.8	Stonewort
6/19/13	Reward	2.5	Leafy Pondweed
	Copper Sulfate	2.5	Filamentous Algae
6/27/13	Reward	2.0	Leafy Pondweed
	SeClear	2.0	Filamentous Algae
7/18/13	Reward	1.0	Bladderwort sp.
	Copper Sulfate	1.0	Filamentous Algae
7/30/13	Reward	2.5	Naiad sp.
	Copper Sulfate	2.5	Filamentous Algae
8/21/13	Reward	0.5	Brittle Naiad
8/28/13	Copper Sulfate	2.0	Filamentous Algae

At Mountain Lake, seven herbicide applications were needed in 2013. Although this is a significant increase from the number of treatments performed in 2012 (four), all of these treatments were limited in acreage. It is typical to use contact herbicides the year after a whole basin Sonar application. In 2013, the seven herbicide application totaled 48.6

acres, whereas the 2012 treatments totaled 159.2 acres. All application in 2013 utilized the contact herbicide Reward. The mid-May application targeted 38.3 acres of scattered curly-leaf pondweed growth, which is typical for this basin. The remaining six applications of limited acres focused on the southern coves (and sailboat cove), the cove north of Island Beach, and in and around Island Beach proper. Seven algaecide applications were also conducted in 2013, on the same dates as herbicide applications. Again, despite the increase in overall treatments this year, fewer acres of algae were targeted in 2013 (21.8 acres) as compared to 2012 (30.5 acres). All targeted algae was filamentous in 2013. Upon review of total phosphorus and water clarity data, Alum was not applied to the lake in 2013. This was the first season since 2009 not to utilize Alum in this basin. Eurasian water milfoil was not observed in Mountain Lake in 2013, but we should expect it to re-colonize parts of the basin in mid to late 2014.

Wildwood Lake

Date	Product Applied	Acres Treated	Target Species
5/17/13	Reward	7.85	Curly-leaf Pondweed
	Copper Sulfate	7.85	Filamentous Algae
6/19/13	Copper Sulfate	4.0	Filamentous Algae
6/28/13	Copper Sulfate	7.0	Filamentous Algae
7/31/13	AquaNeat	0.025	Creeping Water Primrose
8/16/13	Alum	15.7	Nutrient Inactivation

In 2013, Wildwood Lake required three algaecide applications, two herbicide applications and one Alum applications. Reward was applied in mid-May for the control of curly-leaf pondweed, although Eurasian water milfoil was not observed. Filamentous algae was targeted on three dates in 2013, using copper sulfate. In mid-May, 7.85 acres were treated, while in June, two applications (4.0 acres and 7.0 acres) were needed. About this time, the canal cleaning project was on-going, and although algaecide applications were likely needed at this site, a management decision was made to postpone any until the canal cleaning project was complete. Likewise, a typical lake management practice has been the use of Alum early in the season and late in the season at this basin. Due to the canal cleaning project, the early season Alum application was postponed. We did conduct the late-season Alum application, on August 16th, which was delayed about two weeks as compared to previous seasons.

Water Quality Monitoring Program

In 2013, the water quality monitoring program consisted of weekly surveys, phytoplankton analysis, and water chemistry analysis. Phytoplankton samples were examined bi-monthly for Birchwood Lake, Crystal Lake, Sunset Lake, Mountain Lake and Wildwood Lake from June through August. Phytoplankton samples for Olive Pond, Shadow Lake, Cove Pond and Grunden's Pond were examined monthly from June through August. Data sheets for these examinations are in the Appendix of this report. Water chemistry sampling occurred on three dates: June 10, July 8, and August 8. The

water chemistry data 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 2013, and a primer on phytoplankton. Following these descriptions are brief summaries of the 2013 results for each lake in question, including a table of this season's results, and comments regarding the previous season.

Temperature

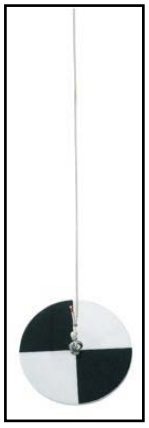
Temperature is measured in degrees Celsius, and is very important to aquatic biota. Several factors affect temperature in a lake system, including air temperature, season, wind, water flow through the system, and shade trees. Turbidity can also increase water temperature as suspended particles absorb 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, 5-6 mg/L is minimally required, but 9.0-10.0 mg/L is an indicator of better overall water quality. A dissolved oxygen reading of below 4.0 mg/L is stressful to most aquatic organisms, especially fish.



Water Clarity

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

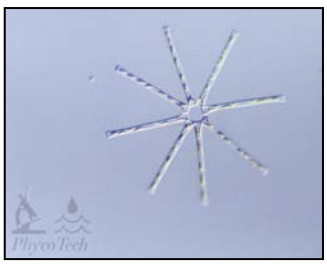
Lakes typically contain three broad categories of phytoplankton (also sometimes referred to as algae). These include filamentous phytoplankton, macroscopic multi-branched phytoplankton (which appear similar to submersed plants), and unicellular phytoplankton. Each category shall be discussed in turn,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

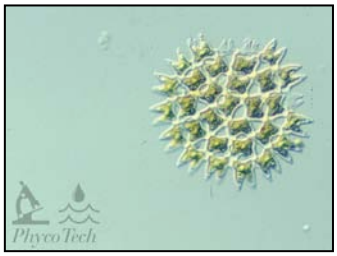
Phytoplankton Group Summary



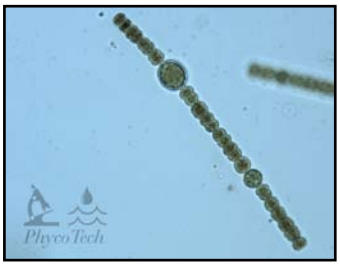
Diatoms are ubiquitous as a group, and often possess a rigid silica shell with ornate cell wall markings or etchings. The silica shells settle to the bottom substrate after they die, and under ideal conditions can become stratified. Limnologists can then study historical (and possibly even ancient) population

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*.

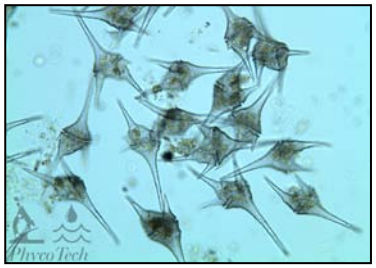


Green Algae are a very diverse group of unicellular phytoplankton. There is tremendous variability in this group which varies from family to family and sometimes even genus to genus. There are flagellated single cells, multi-cell colonies (some motile), filamentous forms and attached forms, typically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

2013 Water Quality Results for Mountain Lakes

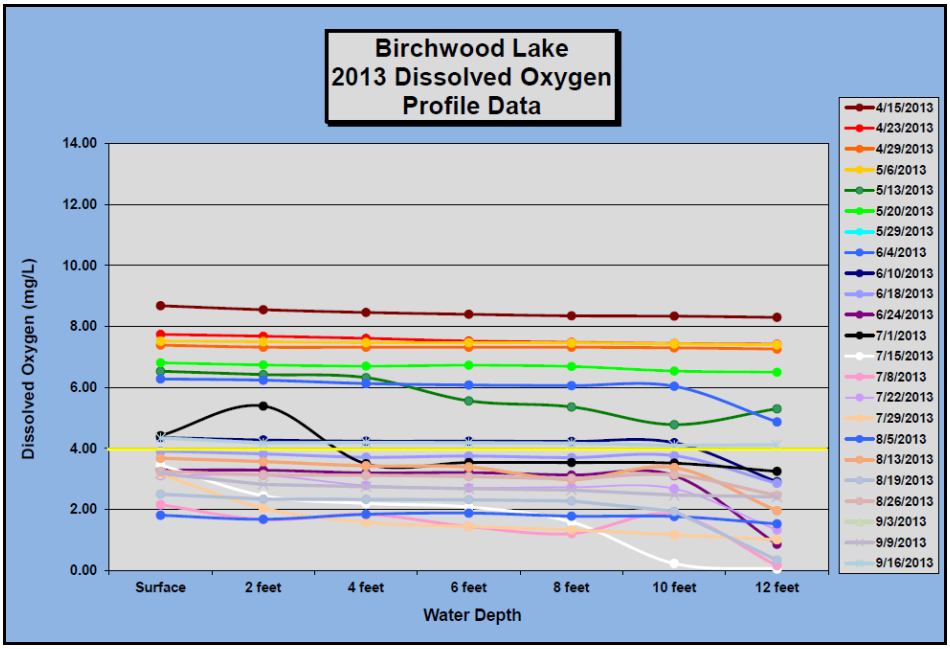
Birchwood Lake

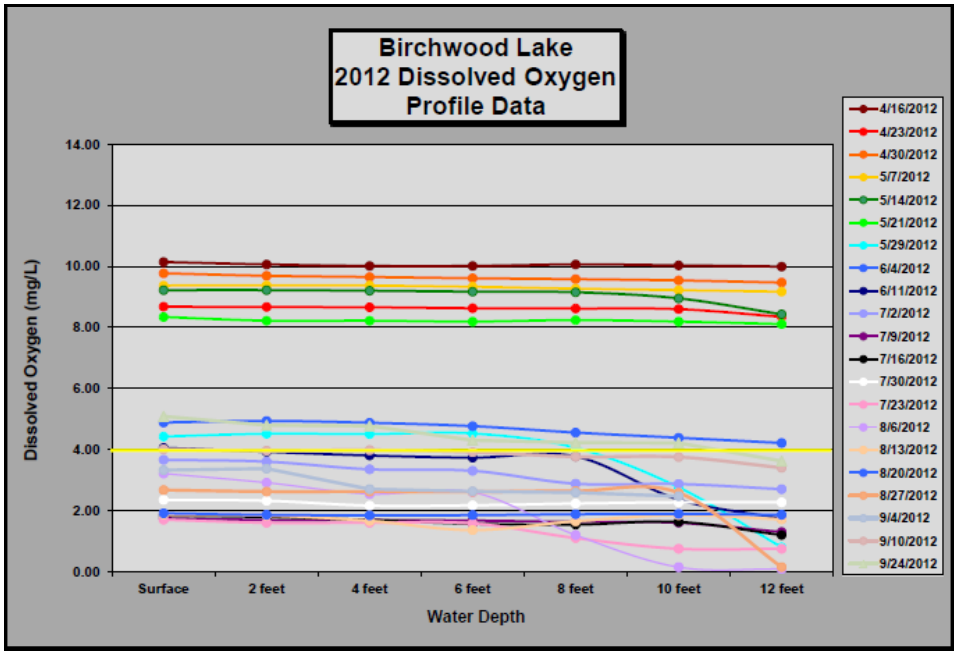
Birchwood Lake	units	6/10/13	7/8/13	8/8/13
Temperature	ºC	20.8	29.2	22.6
Dissolved Oxygen	mg/L	4.36	**3.46**	**3.47**
Alkalinity	mg/L	24	28	40
pH	SU	6.5	6.5	6.0
Nitrate	mg/L	<0.2	<0.2	<0.2
Total Phosphorus	mg/L	0.03	**0.04**	0.03
Turbidity	NTU	1.18	1.30	1.30
Water Clarity	feet	6.0	5.0	5.0

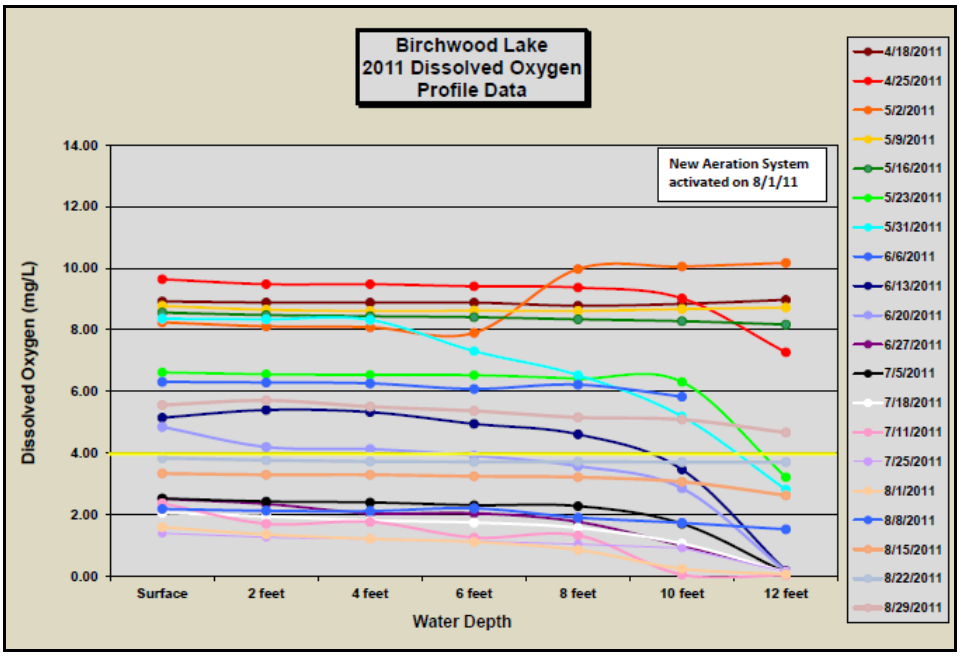
In 2013, water temperature readings were seasonally appropriate in Birchwood Lake, ranging from 20.8°C in June to 29.2 °C in July, and finally 22.6 °C in August. Surface water temperatures were slightly less in June and August when compared to previous data. The elevated temperature in July was a reflection of intense heat in the region. Despite the addition of a second compressor, dissolved oxygen values throughout the water column continue to be depressed, especially on weeks later than early June.

On the next page is a graph depicting all of the profiles conducted at Birchwood Lake in 2013, followed by graphs of the 2008 through 2012 profile data. The 2013 data was similar to data collected in previous years. Early season dissolved oxygen is suitable, then by late May to mid-June, surface dissolved oxygen is about 4.0 mg/L or less, and possibly becomes limiting for aquatic biota. In 2013, this decline set in by mid June. Examining the dissolved oxygen data collected later in the year seems to indicate a slight increase, following the addition of the second compressor. 2012 and 2013 reveals the lowest dissolved oxygen occurring in early August, but then gradually increasing into

September. Furthermore, the minimum dissolved oxygen at most depths (save the deepest) is around 2.0 mg/L following the installation of the second compressor. Prior to this, the minimum dissolved oxygen was often less than 2.0 mg/L, and often decreased towards zero at greater depths. So, a minor improvement on the dissolved oxygen regime is observed.






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
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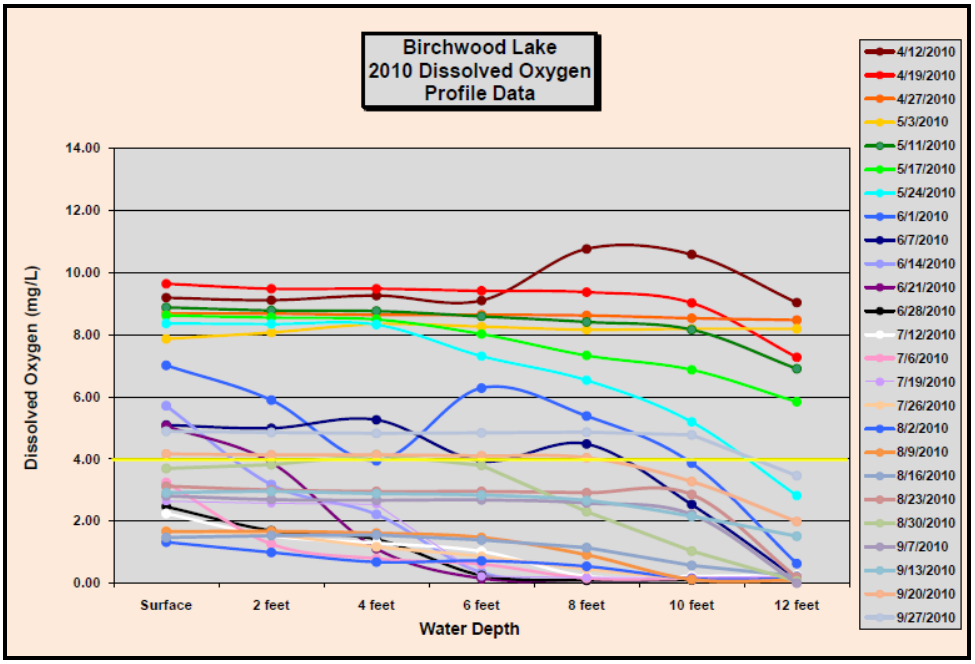
8/22/2011
8/29/2011


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
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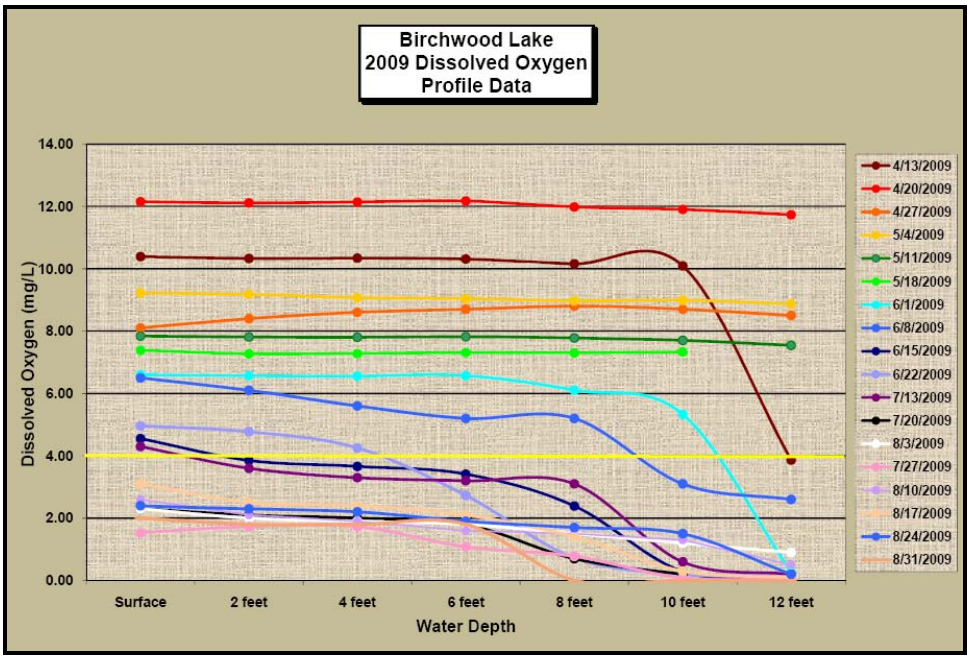
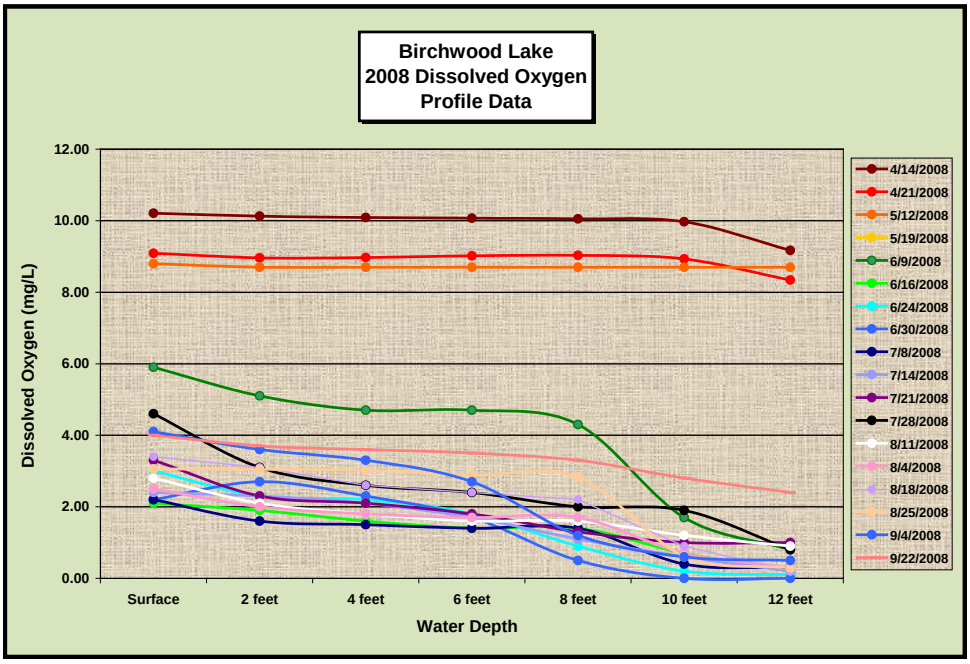




The alkalinity of Birchwood Lake continues to be the lowest in the Mountain Lakes chain. In 2013, it ranged from 24 mg/L to 44 mg/L, which is back to recent historic measurements. Birchwood Lake also traditionally has the lowest pH of all the Mountain Lakes. In 2013, the pH was 6.50 in June and July, and decreased to 6.0 in August. This slightly acidic water is expected, and is equivalent to historical measurements. Nitrate levels were undetected throughout the three sampling events in 2013, continuing a six year trend in this basin. The total phosphorus in Birchwood Lake was favorable throughout most of the season, measuring at the 0.03 mg/L threshold that promotes excessive plant or algal growth in June and August. Total phosphorus was elevated to

0.04 mg/L in July, but this did not equate into increased production that required active management. This slight increase could have been attributed to the die off of water lilies following an application in the northern part of the basin. The turbidity of Birchwood Lake was consistent all season long, ranging from 1.18 NTU to 1.30 NTU, well within acceptable values, which continues to be slightly lower than the previous year. Water clarity ranged from 5.0 feet to 6.0 feet, which is consistent with data collected from previous seasons. As with previous seasons, water clarity experienced a decline as the season progressed.

Birchwood Lake	6/4/13	6/18/13	7/1/13	7/16/13	8/5/13	8/20/13
Diatoms	**36.8%**		18.2%			
Golden Algae	15.8%	33.3%			12.5%	
Green Algae	10.5%	**58.8%**	**54.5%**	**62.5%**	**87.5%**	**75.0%**
Blue-green Algae	**36.8%**	8.3%		37.5%	25.0%	
Protozoa						
Euglenoids						
Dinoflagellates			27.2%			
Total Phytoplankton	190	120	110	80	160	160

In 2013, phytoplankton assemblages at Birchwood Lake were light and favorable on all six sampling dates, a trend observed most previous seasons. On all sampling dates, overall cell counts were less than 200 organisms per mL, which is ideal. It's possible that the low natural pH and depressed water clarity from natural brown colors, inhibits phytoplankton growth in this basin. On the early sampling date, diatoms and blue-green algae (the latter, *Microcystis*) dominated the assemblage. Despite the presence of nuisance blue-green algae, overall phytoplankton abundance was considered non-problematic at the time. By mid-June, green algae abundance increased and now dominated on the rest of the sampling dates, ranging from 54.5% to 87.5% of the total phytoplankton. Blue-green algae abundance decreased, until mid-July, when it accounted for 37.5% of the assemblage. This was likely in response to high regional air temperatures, following a wet late may through June. But again, overall abundance was low (80 organisms per mL) so management was not needed.

Crystal Lake

Crystal Lake	units	6/10/13	7/8/13	8/8/13
Temperature	ºC	22.3	30.9	24.0
Dissolved Oxygen	mg/L	8.12	7.65	7.54
Alkalinity	mg/L	32	28	20
pH	SU	7.0	7.0	7.50
Nitrate	mg/L	<0.2	<0.2	<0.2
Total Phosphorus	mg/L	**0.04**	**0.04**	0.03
Turbidity	NTU	1.74	1.30	2.0
Water Clarity	feet	5.0	10.0 est.	5.5 est.

In 2013, surface water temperature and dissolved oxygen values all fell within acceptable seasonal ranges. The surface water temperature in July exceeded 30.0°C, which could induce increase productivity in a basin, especially following increased rainfall, as seen in 2013. Dissolved oxygen values were ideal on all three dates this season. Alkalinity ranged from 20 mg/L to 32 mg/L, which is somewhat low for this

basin, but equivalent to nearby Birchwood Lake, just upstream. The pH of Crystal Lake ranged from 7.0 (in June and July) and increased to 7.50 (in August). This is suitable to previous year's measurements and the slight increasing trend as the season progresses is typical for this basin. Water clarity was considered fair to good throughout much of the 2013 season. It was estimated at 5.0 feet in June, possibly influenced by recent rainfall events. In July, it was estimated at 10.0 feet, which is excellent for mid-season. In August, it decreased back down to 6.0 feet. Nitrate was undetected on all three sampling dates at Crystal Lake in 2013, similar to the previous three years. Total phosphorus was elevated at 0.04 mg/L in June and July. This is not uncommon for this basin, but no spikes with this nutrient were observed as opposed to last year. In August, total phosphorus levels were suitable. Turbidity values were consistent on all three sampling dates, ranging from 1.30 NTU (July) to 2.00 NTU (August), which are considered to be well within acceptable values, and consistent with data collected in the previous three seasons.

Crystal Lake	6/4/13	6/18/13	7/1/13	7/16/13	8/5/13	8/20/13
Diatoms	11.8%					
Golden Algae	**52.9%**	**71.2%**			5.3%	
Green Algae	5.9%	28.8%	**100.0%**	**78.3%**	**94.7%**	9.4%
Blue-green Algae	17.6%			21.7%		**90.6%**
Protozoa						
Euglenoids	11.8%					
Dinoflagellates						
Total Phytoplankton	170	520	430	690	190	320

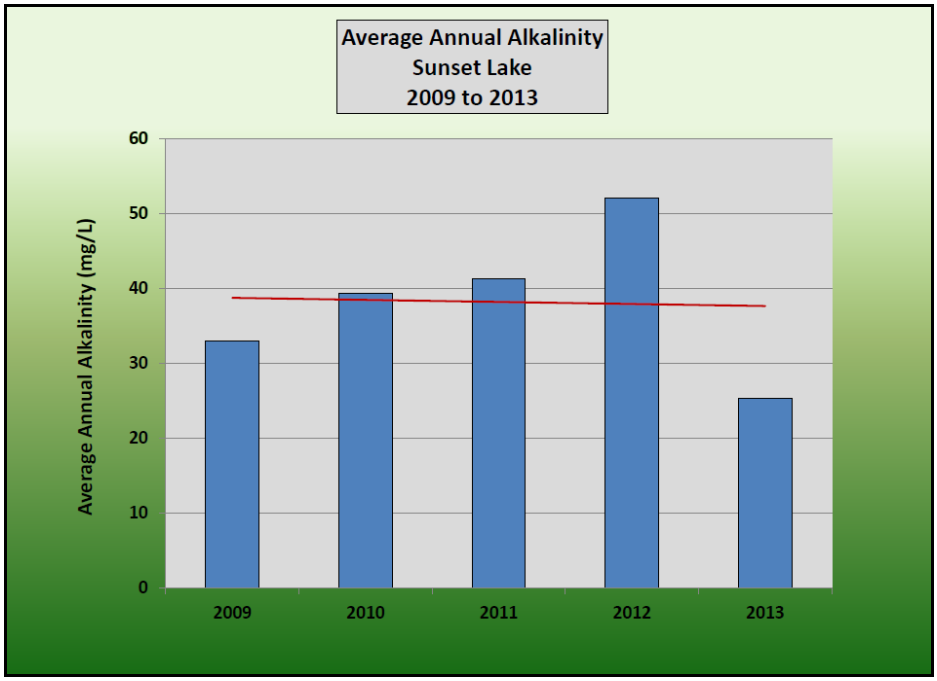
In 2013, phytoplankton abundance at Crystal Lake was considered light and favorable on four of the six sampling dates. The other two dates (mid June and mid-July) had moderate abundance (>700 organisms per mL) of phytoplankton. Early in the season, golden algae dominated the assemblage, mostly accounted for by *Dinobryon*. From early July through early August, green algae dominated the assemblage at 78.3% to 100% of total phytoplankton. Although blue-green algae increased to 21.7% of the assemblage in mid-July, it wasn't until late in August did this nuisance algae dominate the assemblage at 90.6%. However, overall phytoplankton abundance was low on this date, at 320 organisms per mL. Caused a by a minor bloom of *Anabaena*, this late season blue-green algae bloom has been observed in the past, although not recently. An algaecide application was conducted in late August, which likely helped control this manifesting bloom.

Sunset Lake

Sunset Lake	units	6/10/13	7/8/13	8/8/13
Temperature	ºC	22.7	30.6	24.1
Dissolved Oxygen	mg/L	6.28	6.88	6.67
Alkalinity	mg/L	28	28	20
pH	SU	7.0	7.0	7.50
Nitrate	mg/L	<0.2	<0.2	<0.2
Total Phosphorus	mg/L	0.03	**0.06**	**0.05**
Turbidity	NTU	1.70	2.50	5.20
Water Clarity	feet	6.0	3.0	4.5 est.

In 2013, surface water temperature and dissolved oxygen all fell within acceptable seasonal ranges at Sunset Lake. Dissolved oxygen values were suitable on all three dates. Alkalinity results in 2013 ranged from 20 mg/L (in August) to 28 mg/L (in June).

The 2013 average Alkalinity was calculated at 25.3 mg/L, which is less than half the annual average in 2012. This also breaks a four year increasing trend, and represents the lowest annual average in five years. The low 2013 average actually results in a decreasing trend when a trend line (indicated in red) is applied to the data. However, the 2013 data set (which is only based on three sampling dates, after all) could be an aberration. The five year summary is depicted below.



In 2013, the pH ranged from 7.00 (in June and July) to 7.50 (in August). These values are suitable, and similar to data collected in previous seasons. Nitrate was again undetected on all three sampling dates in 2013, a similar trend observed the last few seasons. Total phosphorus was elevated late in the season (at 0.06 mg/L and 0.05 mg/L, respectively), but in June the total phosphorus was measured at 0.03 mg/L, which is right at the threshold to promote nuisance aquatic plant or phytoplankton growth. Turbidity levels were suitable in 2013, displaying an increasing trend from 1.7 NTU in June, to 2.5 NTU in July, and finally to 5.2 NTU in August. Despite this, turbidity values again seem slightly elevated as compared to 2012 data.

Sunset Lake	6/4/13	6/18/13	7/1/13	7/16/13	8/5/13	8/20/13
Diatoms			2.4%	1.9%	2.9%	2.7%
Golden Algae	**38.5%**	36.4%	7.3%		8.8%	
Green Algae	30.8%	**51.5%**	**90.2%**	**94.3%**	**76.5%**	24.3%
Blue-green Algae	30.8%	12.1%		3.8%	2.9%	**73.0%**
Protozoa						
Euglenoids					2.9%	
Dinoflagellates					5.9%	
Total Phytoplankton	130	330	410	530	340	370

Phytoplankton abundance was suitable on all six dates in 2013. On all six dates, the abundance could be considered light to low-moderate, with only one date (mid-July)

exceeding 500 organisms per mL. In early June, golden algae dominated the assemblage at 38.5%. Then, by late June green algae dominance was displayed on all dates save the last. Green algae accounted for between 51.5% and 94.3% of the total phytoplankton on these dates. Nuisance blue-green algae was observed on all sample dates save early July. Despite this, it was usually at trace density, and since the overall counts were low, blue-green algae was considered non-problematic. But by the end of August, blue-green algae dominated the assemblage at 73.0%. A similar minor bloom was observed in Crystal Lake during the same date. The bloom in Sunset Lake did not require active management, however.

Olive Lake

Olive Lake	units	6/10/13	7/8/13	8/8/13
Temperature	ºC	22.3	28.1	23.0
Dissolved Oxygen	mg/L	6.14	4.29	6.13
Alkalinity	mg/L	32	24	40
pH	SU	7.0	7.0	7.0
Nitrate	mg/L	<0.2	<0.2	<0.2
Total Phosphorus	mg/L	**0.04**	**0.13**	**0.08**
Turbidity	NTU	2.26	**10.0**	4.4
Water Clarity	feet	5.0	4.0 est.	4.0 est.

In 2013, surface water temperature measurements fell within acceptable seasonal ranges at Olive Lake. Similar to most other lakes at Mountain Lakes, surface water temperature was elevated in July but lower than average in June and August. Both reflect regional air temperatures. Dissolved oxygen values in Olive Lake were suitable throughout the 2013 season, but again somewhat low. In June, the dissolved oxygen was 6.14 mg/L, which is suitable. In July, the dissolved oxygen was 4.29, which could be stressful to aquatic biota. This depressed value was likely caused by the recent heat wave in the region. In August, dissolved oxygen was again suitable at 6.13 mg/L. No treatments needed to be postponed in this basin due to low dissolved oxygen.

The alkalinity at Olive Lake ranged from 24 mg/L to 40 mg/L, for a 2013 annual average of 32 mg/L. This is about half the annual average alkalinity as compared to 2012 data, and this lower trend was observed in most other basins this year. The pH at Olive Lake was 7.00 on all three dates which is ideal based on data collected in previous seasons, and certainly consistent. Nitrate was undetected throughout the 2013 season, and this marks the sixth consecutive year this parameter has been undetected during the growing season. Similar to previous seasons, the total phosphorus was elevated throughout 2013, however a significant increase was observed in July and August. It ranged from 0.04 mg/L in June, before peaking to 0.13 mg/L in July, or over four times the amount needed to promote excessive phytoplankton or plant growth. 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 ranged from 2.26 NTU in June to 10.0 NTU in July. The July measurement was likely influenced by the increase in phytoplankton in the water column. In August, the turbidity decreased to 4.4 NTU, which is suitable for this basin.

Olive Lake	6/4/13	7/1/13	8/5/13
Diatoms	3.3%	17.6%	27.4%
Golden Algae	30.0%		1.3%
Green Algae	30.0%	**58.9%**	**63.2%**
Blue-green Algae	**33.3%**	21.6%	7.9%
Protozoa			3.9%
Euglenoids			1.3%
Dinoflagellates	3.3%	2.0%	
Total Phytoplankton	300	510	760

In 2013, phytoplankton density was low in June at 300 organisms per mL. Despite this low abundance, blue-green algae dominated the assemblage, but green and golden algae were close behind. In July, overall abundance increased to 510 organisms per mL, but this is still considered moderate. Dominance shifted to green algae on this date (58.9%), but blue-green algae still persisted in the water column. In August, phytoplankton density continued to increase to 760 organisms per mL. Green algae continued to dominate on this date, and actually increased to 63.2%. Although blue-green algae was still present, its abundance decreased. *Microcystis* and *Aphanizomenon* were the most common blue-green algae observed in this basin in 2013.

Shadow Lake

Shadow Lake	units	6/10/13	7/8/13	8/8/13
Temperature	ºC	22.4	29.6	23.2
Dissolved Oxygen	mg/L	5.24	6.97	8.47
Alkalinity	mg/L	36	28	45
pH	SU	7.0	7.50	7.0
Nitrate	mg/L	<0.2	<0.2	<0.2
Total Phosphorus	mg/L	**0.14**	**0.09**	**0.09**
Turbidity	NTU	2.31	2.60	6.30
Water Clarity	feet	5.0	4.0 est.	3.5 est.

In 2013, surface water temperature measurements fell within acceptable seasonal ranges at Shadow Lake, and mimicked the ambient air temperatures, especially the elevated July measurement and the somewhat depressed measurements in June and August. Dissolved oxygen values were consistent throughout the season, and were considered suitable on all three dates. The dissolved oxygen was 5.24 mg/L in June. In July, the surface dissolved oxygen increased to 6.97 mg/L, which is ideal considering the elevated water temperature on this date. In August, the dissolved oxygen was 8.47 mg/L, which is ideal for the late season. Weekly dissolved oxygen measurements at this site revealed only one date that was below 5.0 mg/L. The aeration system installed a few years ago appears to be providing suitable oxygenation to the water column, and should serve as an example to the benefits that can be applied to the other small basins at Mountain Lakes.

Alkalinity was somewhat depressed in 2013 when compared to recent data at this site (and also observed at other basins at Mountain Lakes this year). It ranged from 28 mg/L in July to 45 mg/L in August. The pH at Shadow Lake ranged from 7.0 in June and August to 7.50 in July. These measurements are suitable for this basin, similar in trend from 2011 and 2012. In 2012, nitrate was undetected on all three sampling dates. Total phosphorus levels were elevated once again the entire 2013 season at Shadow Lake, and significantly higher than values observed last year. In June, it was nearly five times the acceptable threshold, and although it decreased to 0.09 in both July and August, this value is still three times the acceptable threshold. These elevated nutrients likely fueled the mid-season blue-green algae bloom observed this season. It is possible that the higher use of SeClear in 2012 actually had a beneficial effect in driving down available

nutrients, and shifting phytoplankton community structure (see below). Turbidity was elevated in 2013, likely influenced by phytoplankton abundance. It ranged from 2.31 NTU to 6.30 NTU and displayed an increasing trend throughout the season.

Shadow Lake	6/4/13	7/1/13	7/16/13	8/5/13
Diatoms	11.7%	2.2%	0.07%	0.3%
Golden Algae	**52.9%**			0.6%
Green Algae	11.7%	43.4%	4.7%	36.0%
Blue-green Algae	17.6%	**54.3%**	**95.1%**	**62.4%**
Protozoa				0.3%
Euglenoids				0.3%
Dinoflagellates	5.9%		0.14%	
Total Phytoplankton	170	460	14,110	3,220

Phytoplankton conditions in 2013 were low on the first two dates. Golden algae dominated the assemblage in June, but gave way to nuisance blue-green algae in early July. This prompted additional phytoplankton sampling on July 16th, which confirmed what was observed in the field: an intense (cell counts exceeding 14,000 organisms per mL) blue green algae bloom in this basin. On this date, blue-green algae accounted for 95.1% of the total phytoplankton. *Aphanizomenon*, a potential toxin producer, was the dominant blue-green algae present that sampling event. This bloom was persistent and required three algaecide applications over the next four weeks to control. Even in August, cell counts exceeded 3,000 organisms per mL, with blue-green algae accounting for 62.4% of the total phytoplankton. As mentioned above, increased nutrients in the water column likely influenced the bloom in this basin (and minor blooms in basins downstream). The increased use of SeClear in 2012, despite increased (though lower than 2013) nutrients in the water column, could have played a role in shifting the phytoplankton community toward more desirable green algae. Of course, heavy rainfall events in late May and early June could have been the driving factor.

Cove Lake

Cove Lake	units	6/10/13	7/8/13	8/8/13
Temperature	ºC	21.0	28.7	22.5
Dissolved Oxygen	mg/L	6.09	4.76	6.88
Alkalinity	mg/L	28	28	40
pH	SU	6.5	7.0	7.25
Nitrate	mg/L	<0.2	<0.2	<0.2
Total Phosphorus	mg/L	**0.08**	**0.13**	**0.09**
Turbidity	NTU	1.9	2.9	4.0
Water Clarity	feet	4.0	2.0 est.	3.5 est.

In 2013, surface water temperature measurements fell within acceptable seasonal ranges at Cove Lake. As observed with the other basins, increased surface water temperatures were observed in July. Dissolved oxygen levels were somewhat improved this season. In June, the dissolved oxygen was 6.09 mg/L, which is suitable. In July, dissolved oxygen decreased to 4.76 mg/L, which is close to the limiting threshold of 4.0 mg/L. This value was likely the result of elevated water temperatures. But in August, dissolved oxygen values were back at ideal values, measured at 6.88 mg/L. On no dates in 2013 were algaecide applications postponed due to low dissolved oxygen, and the basin did require applications this year.

In 2013, alkalinity ranged from 28 mg/L to 40 mg/L, for an annual average of 32 mg/L. As seen in several other basins this year, alkalinity values have decreased as compared to 2012. Nitrate levels were undetected throughout the entire 2013 season, continuing a six

year trend for this lake. The total phosphorus at Cove Lake was elevated on all three sampling dates this year. In June, the total phosphorus was 0.08 mg/L, or nearly three times the ideal threshold. However, this did not translate into excessive plant of phytoplankton growth early in the season. In July, the total phosphorus spiked to 0.13 mg/L, which is over three times the acceptable value. But in August, it decreased to 0.09 mg/L, which is still elevated. The elevated nutrients in the water column fueled unicellular blue-green algae and filamentous algae growth in the basin which required two algaecide applications in August. Turbidity was similar to 2012, but still suitable on all three dates. It ranged from 1.9 NTU to 4.0 NTU, and displayed an increasing trend throughout the season.

Cove Lake	6/4/13	7/1/13	8/5/13
Diatoms	18.1%	10.0%	
Golden Algae	9.1%	1.7%	8.3%
Green Algae	**36.4%**	33.3%	22.9%
Blue-green Algae	**36.4%**	**51.7%**	**65.6%**
Protozoa			3.1%
Euglenoids		3.3%	
Dinoflagellates			
Total Phytoplankton	110	600	960

In 2013, unicellular phytoplankton densities at Cove Lake were light and favorable in early June with 110 organisms per mL observed. However, the assemblage, even on this early date, was a mixture of green algae and nuisance blue-green algae. In July, the phytoplankton was considered moderate at 600 organisms per mL, but blue-green algae now dominated at 51.7% of the assemblage. Green algae was still common in the water column on this date. By early August, the unicellular algae counts continued to increase (to 960 organisms per mL), and so did the blue-green algae abundance (now at 65.6%). This prompted algaecide use in the basin. The blue-green algae blooms were likely the result of elevated nutrients, and secondarily from the intense bloom in nearby upstream Shadow Lake.

Grunden's Pond

Grunden's Pond	units	6/10/13	7/8/13	8/8/13
Temperature	ºC	21.7	30.1	24.1
Dissolved Oxygen	mg/L	6.28	5.54	7.46
Alkalinity	mg/L	32	22	45
pH	SU	7.0	7.0	7.25
Nitrate	mg/L	**0.5**	<0.2	<0.2
Total Phosphorus	mg/L	**0.11**	**0.09**	**0.11**
Turbidity	NTU	3.42	3.9	7.0
Water Clarity	feet	6.0	4.0 est.	4.5 est.

In 2013, surface water temperature measurements fell within acceptable seasonal ranges at Grunden's Pond. Note the elevated July measurement. Dissolved oxygen concentrations were adequate on all three sampling dates in 2013. Weekly dissolved oxygen measurements were collected at this site again in 2013. On all dates the dissolved oxygen in this basin was above the acceptable threshold of 4.0 mg/L.

Alkalinity in 2013 at Grunden's Pond ranged from 22 mg/L in July to 45 mg/L in August. Although suitable, this data reflects a decrease as compared to data collected in 2012, when alkalinity ranged from 70 to 76 mg/L. This decreasing trend seems to be occurring throughout many of the lower lakes in the Borough in 2013, and could be tied to heavy early season rainfall events. The pH values in 2013 ranged from 7.00 in June to 7.25 in August. Historical data collected at this site indicates that 7.0 to 7.25 is normal, in which

case these results are suitable. For the first time in six year, Nitrate was not undetected throughout the entire 2013 season. In June, the nitrate was measured at 0.5 mg/L, which exceeds the acceptable threshold of 0.3 mg/L. Likely sources of this nutrient could be pondweed die off from a recent herbicide application, and/or heavy rainfall events around the time of the sampling. The only other basin that had detectable nitrate on this (or any) date in 2013 was Wildwood Lake. Total phosphorus was elevated throughout 2013 on all three sampling dates, similar to 2012. In June, it was 0.11 mg/L, with a slight decrease to 0.09 mg/L in July. In August, total phosphorus increased back to 0.11 mg/L. The August algae bloom could be attributed to these increased nutrients levels, but plant and algae growth wasn't problematic all year. Turbidity measurements were elevated this season, ranging from 3.42 NTU in June, and increasing throughout the season to 7.0 NTU in August. For much of the season, decreased water clarity was observed by biologists during weekly surveys at this basin, but no carp or koi were observed during weekly surveys this season.

Grunden's Pond	6/4/13	7/1/13	8/5/13
Diatoms	**28.6%**	3.8%	13.3%
Golden Algae	**28.6%**	1.3%	1.8%
Green Algae	14.3%	**33.3%**	41.2%
Blue-green Algae		24.3%	**42.4%**
Protozoa			
Euglenoids			0.6%
Dinoflagellates	**28.6%**	**37.2%**	0.6%
Total Phytoplankton	140	780	1,650

In 2013, total phytoplankton densities varied throughout the entire season. Phytoplankton abundance was light and favorable early, with diatoms, dinoflagellates and golden algae dominating the assemblage. However, phytoplankton abundance increased to moderate (780 organisms per mL) in July. Although green algae was still the most common group observed, increased blue-green algae were noted. By August, a minor bloom was occurring in the basin. The assemblage this month was a mixture of green algae (41.2%) and nuisance blue-green algae (42.4%). This bloom was likely influenced by the intense upstream bloom (Shadow Lake), and required an algaecide application to control. Conditions were suitable for the remainder of the season, however.

Mountain Lake

Mountain Lake	units	6/10/13	7/8/13	8/8/13
Temperature	ºC	22.9	29.8	25.2
Dissolved Oxygen	mg/L	8.01	7.20	9.55
Alkalinity	mg/L	32	36	40
pH	SU	7.5	7.25	7.80
Nitrate	mg/L	<0.2	<0.2	<0.2
Total Phosphorus	mg/L	**0.04**	**0.05**	0.02
Turbidity	NTU	<1	1.0	1.6
Water Clarity	feet	11.5	15.0 est.	6.0 est.

In 2013, surface water temperature measurements fell within acceptable seasonal ranges at Mountain Lake. Note the elevated July surface water temperature. Dissolved oxygen values were ideal throughout the entire 2013 season. In June, the dissolved oxygen was 8.01 mg/L, which is equivalent to 98% saturation. In July, the dissolved oxygen experienced a decrease to 6.74, but this is equivalent to 90% saturation (due to the increase in water temperature). By August, dissolved oxygen was 7.73 mg/L, yet this was still equivalent to 98% saturation. See below for a discussion of the water clarity at Mountain Lake in 2013.

Alkalinity at Mountain Lake in 2012 ranged from 32 mg/L (in June) to 40 mg/L (in August). As with other alkalinity measurements in 2013, these are lower than previous years. In 2013, pH was consistent throughout the season. In June, it was 7.50, and then it decreased to 7.25 in July. In August, the pH was 7.80. Nitrate levels were undetectable throughout the entire 2012 season, similar to last season. Total phosphorus levels were elevated early in the season at 0.04 mg/L in June and 0.05 mg/L in July. Both of these values are higher than the limiting threshold of 0.03 mg/L, but did not result in increased growth in the basin. However, in August, total phosphorus decreased to 0.02 mg/L, which is ideal, and was a major contributing factor for not conducting Alum at Mountain Lake this year. Turbidity measurements this season were ideal on all dates. In June, turbidity was undetected. In July it was 1.0 NTU, with a slight increase to 1.6 NTU in August.

Mountain Lake	6/4/13	6/18/13	7/1/13	7/16/13	8/5/13	8/20/13
Diatoms	20.0%	28.0%	4.3%		4.5%	
Golden Algae	**40.0%**	8.0%		38.5%	20.5%	22.2%
Green Algae	25.0%	**60.0%**	**91.4%**	**61.5%**	**75.0%**	18.5%
Blue-green Algae	10.0%	4.0%	4.3%			**55.6%**
Protozoa	5.0%					
Euglenoids			4.3%			
Dinoflagellates						3.7%
Total Phytoplankton	200	250	230	260	440	270

Despite elevated nutrients early in the season, and generally a lack of vascular plant growth due to 2012's Sonar application, unicellular phytoplankton densities at Mountain Lake were light and favorable on all dates. This is better than data collected in 2012. Total phytoplankton counts ranged from 220 organisms per mL to 440 organisms per mL. Golden algae dominated the assemblage on the first sampling date, before giving away to green algae dominance throughout the middle of the season. However, trace blue-green algae was observed early in the season. By August, phytoplankton was still low (270 organisms per mL, but blue-green algae dominated the assemblage. Since the overall density was low, it was considered non-problematic at the time, and no algaecide applications were needed.

Wildwood Lake

Wildwood Lake	units	6/10/13	7/8/13	8/8/13
Temperature	ºC	22.8	30.4	25.3
Dissolved Oxygen	mg/L	11.50	8.64	8.26
Alkalinity	mg/L	36	40	60
pH	SU	8.50	7.50	7.50
Nitrate	mg/L	**0.6**	<0.2	<0.2
Total Phosphorus	mg/L	**0.06**	**0.06**	**0.06**
Turbidity	NTU	2.01	2.40	4.70
Water Clarity	feet	10.0	5.0 est.	6.0 est.

In 2013, surface water temperature measurements fell within acceptable seasonal ranges at Wildwood Lake. The July measurement was seasonally high, but the August measurement was equivalent to previous years in this basin. Dissolved oxygen ranged from 8.26 mg/L in August to 11.50 mg/L in June. These values appear suitable for this basin.

Alkalinity levels in 2013 displayed some variation this year, ranging from 36 mg/L in June to 60 mg/L in August. These values are consistent both in season, and when compared to previous season's data. Wildwood Lake typically has the highest pH of the lakes in the Mountain Lakes chain. In 2013, this was the case early in the season with a June pH of 8.50. This elevated pH could have been from nuisance filamentous algae in the basin that required both late May and mid-June treatments. July and August pH values were suitable, both at 7.50. Nitrate is typically undetected on all sampling dates at this site. But in 2013, nitrate was 0.6 mg/L, which is twice the limiting factor to encourage excessive algal or plant growth. This could have been from the recent die off of plants and algae from treatments, or possibly the excessive rain. Total phosphorus was elevated throughout the season, at 0.06 mg/L on each date. This is exactly double the amount measured last year, and (later in the season) could have been attributed to the canal cleaning project and runoff from the disturbed sediments de-watering in the park. Despite these increases, growth conditions were minimally impacted. Turbidity ranged from 2.01 NTU (June) to 4.70 NTU (August). This continues a slightly higher trend from the previous year, and too was likely negatively impacted by the de-watering of canal sediments at the park.

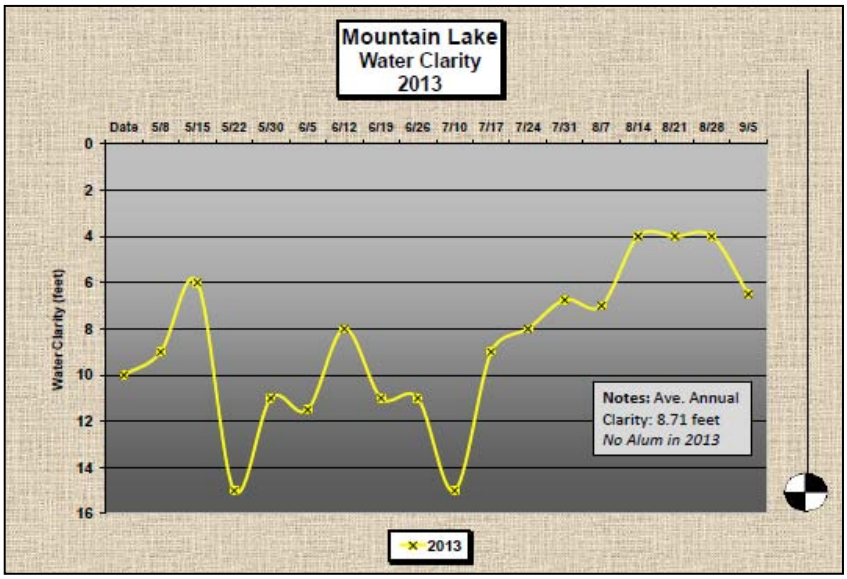
Wildwood Lake	6/4/13	6/18/13	7/1/13	7/16/13	7/30/13	8/5/13	8/20/13
Diatoms	20.0%	**55.5%**	9.5%	18.9%		2.6%	
Golden Algae	16.0%			8.1%	29.2%	7.9%	
Green Algae	**60.0%**	14.8%	**85.7%**	**68.9%**	**70.7%**	**86.8%**	
Blue-green Algae		26.0%		4.1%			**100.0%**
Protozoa							
Euglenoids						2.6%	
Dinoflagellates	4.0%	3.7%	4.8%				
Total Phytoplankton	250	270	210	740	410	380	80

In 2013, overall unicellular phytoplankton counts at Wildwood Lake were low to moderate on all dates. Overall phytoplankton density typically ranged from 80 organisms per mL to 740 organisms per mL. This is a significant reduction in overall abundance as compared to seasons 2011 and before, but is in line with results collected last season. There was an additional sampling date added at the end of July in anticipation of the upcoming Alum application. On five dates, green algae dominated the assemblage. In mid-June, diatoms dominated, which is somewhat unusual for this group to be common this late in the season. Unusually cool and rainy conditions in June could be the factor. Although blue-green algae dominated the late August assemblage, the overall abundance was quite low and did not require an algaecide application.

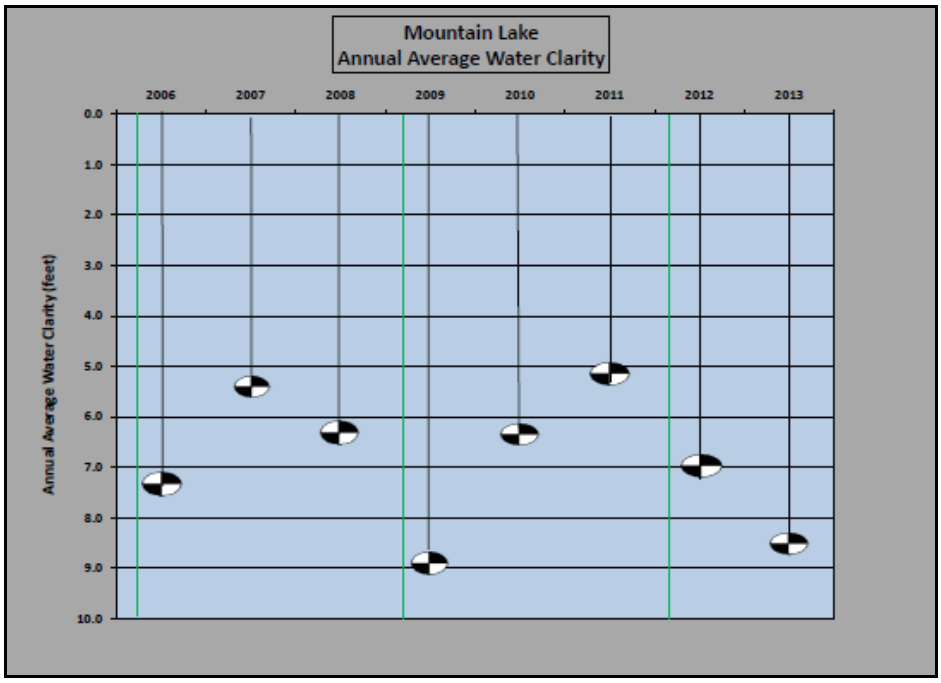
2006 to 2013 Water Clarity at Mountain Lake

Below is a graph that depicts the water clarity at Mountain Lake in 2013. 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 this 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 2013 ranged from 4.0 feet to 15.0 feet (estimated) throughout the season. Water clarity was estimated on several

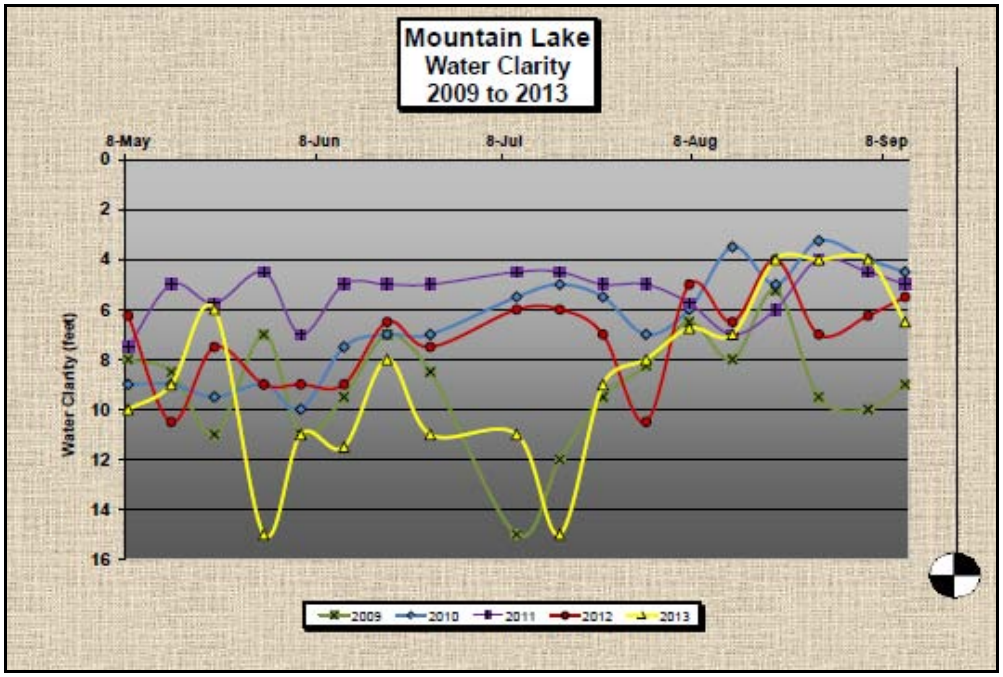
occasions because the clarity exceeded water depth. On seven dates, water clarity equaled or exceeded 10 feet which is considered outstanding for an urban shallow lake in the Northeast. Only on three dates this year was water clarity less than six feet. Water clarity was a critical factor in determining the need for Alum this season, and was the primary reason it was not conducted.



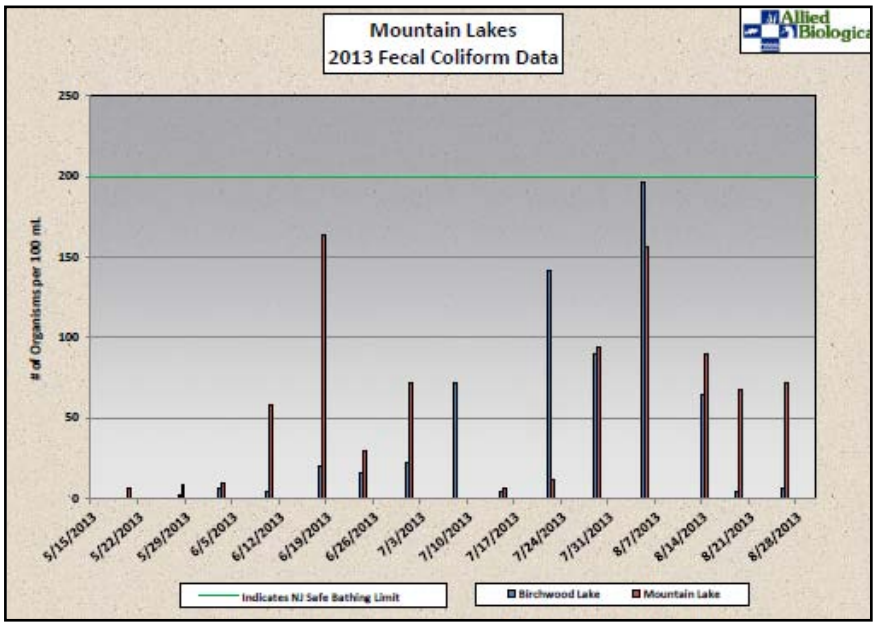
In 2013, the average annual water clarity was 8.71 feet, which is 1.38 feet more than the 2012 annual average of 7.33 feet. Since the water clarity measurements are collected at the same site, using a standard Secchi disc, and on the roughly the same dates from season to season, these values are an accurate 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. Despite the aggressive canal clean-up and potential run-off impacts from this disturbance (and the de-watering sites that were required), this project seems to have minimal impact on the clarity of Mountain Lake. 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.



Below is another graph depicting the annual water clarity for 2009 through 2013. Although the graph is somewhat cluttered by the four data lines, the 2013 data set (yellow) displays outstanding average water clarity early in the season, but then decreases in late season (mid-July to August). Water clarity in August is very similar to data collected in previous seasons, and in 2013, was even worse than last year on several dates.



2013 Fecal Coliform Testing at Birchwood and Mountain Lake

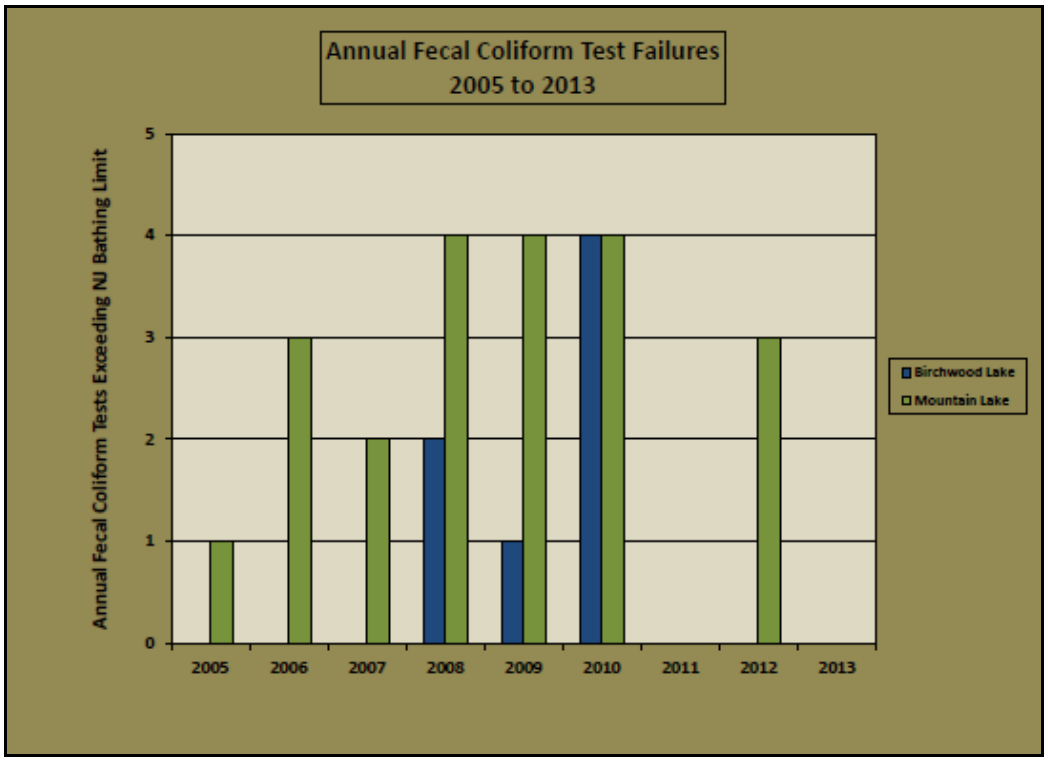


Fecal coliform sampling was performed at Birchwood Lake's beach and Mountain Lake's Island Beach in 2013. Sampling occurred weekly during surveys, and was conducted from Memorial Day through August 28th (the week before Labor Day). Fecal Coliform counts are measured as a number of colony forming units (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 below. Consult the graph for a summary of the fecal coliform counts at both sites for 2013. The Appendix of this report contains a reproduction of this graph, and a table summarizing the 2013 data. On these tables, numbers highlighted in red exceed the NJ bathing limit of 200 cfu per 100 ml. In 2013, 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 2013, no failures were observed at Birchwood Lake, the third consecutive year that no failures occurred at this site. This is despite increased observations of dogs in the water, especially after hours (by residents, and on one occasion, by ABI field technicians). At Mountain Lake, no failures were recorded in 2013 either. This is similar to conditions observed in 2011, but not last year, when three failures occurred. As can be seen by the chart below, two to four failures is typical per year at this basin.

Waterfowl continues to be the likely source of bacteria loading at Island Beach, but the effects of rainfall can't be ignored. The beach staff at both locations should be commended for their clean-up and waterfowl discouraging efforts. Late in the 2013 season, waterfowl were observed roosting on a floating dock off Island Beach. As expected, waterfowl feces were accumulating on the dock, so steps should be taken to discourage this favorite roosting location. In addition to regular feces removal at the beach, this dock should be monitored and cleaned on a regular basis (weekly, or perhaps every other week) as needed. As mentioned during one of the monthly meeting, the dock

should not be rinsed off into the lake, but instead pulled to shore and cleaned away from the shoreline to reduce the chance of creating a source for bacteria loading.



Lakes Cleaning Project

In 2013, the Lakes Cleaning Project focused on the canal between Mountain Lake and Wildwood Lake. In addition, Allied Biological was retained to provide 60 hours of hydro-raking services in the fall of 2013. Sites were determined via preliminary sediment probing with a calibrated pole (conducted in August) by ABI field crews. Maps for the probing studies are including in the Appendix of this report.

Shadow Lake, Olive Lake, Cove Lake and Grunden's Pond were all probed, with five to 10 sites per basin. Shadow Lake had very little accumulated material, with measurements of 0 or 0.5 feet being the most common. One foot of material was determined at three sites, with two being in the northwest corner of the basin. Olive Lake also had very little accumulated material, save for the site near the boat access (2.5 feet deep). Similar results were obtained at Cove Lake, with an increase of material (1.0 foot) in the northern reach of the basin. The cove parallel to Boulevard (the target of raking a few years ago) had no accumulation whatsoever. Grunden's Pond had a few deep spots of accumulated material, despite being the target of hydro-raking a few years ago. Over 1.5 feet of material was observed at half of the 10 sites probed.

In Mountain Lake, three sites were targeted for probing: The cove north of Island Beach, the cove west of Island Beach, and Sailboat Cove. In the first two coves, 1-2 feet of accumulating material was common. In Sailboat Cove, 1 to 2 feet was common in the

northern and western parts of the cove, but in the southeast corner, an increase to four to five feet of material was measured. At Wildwood Lake, two areas of concern were probed. In the northern part of the basin, 1 to 2 feet of material was common, with an increase to 2 to 3 feet in the center, and nearly four feet near the boat access. In the southern part of the basin 0.5 feet to 3.0 feet was measured, with an increase as one moved toward the shore.

Based on these results, Mountain Lake and Wildwood Lake were determined to be the priority sites in 2013. Maps in the Appendix summarize the hydro-raking efforts in both of these basins, which occurred in October. At Mountain Lake, 60 cubic yards of unconsolidated organic material was removed from Sailboat Cove. In addition, 30 cubic yards was removed from the cove west of Island Beach, and six additional cubic yards was removed from the cove north of Island Beach. At Wildwood Lake, 57 cubic yards was removed from the northern part of basin, although large rocks limited productivity in this area. In the southern part of the basin, an additional 12 cubic yards was removed. So for 2013, 58.25 hours of hydro-raking was conducted in October at Mountain Lake and Wildwood Lake. A total of 165 cubic yards of unconsolidated organic material was removed between both basins.

2013 Borough-wide Terrestrial Invasive Plant Management

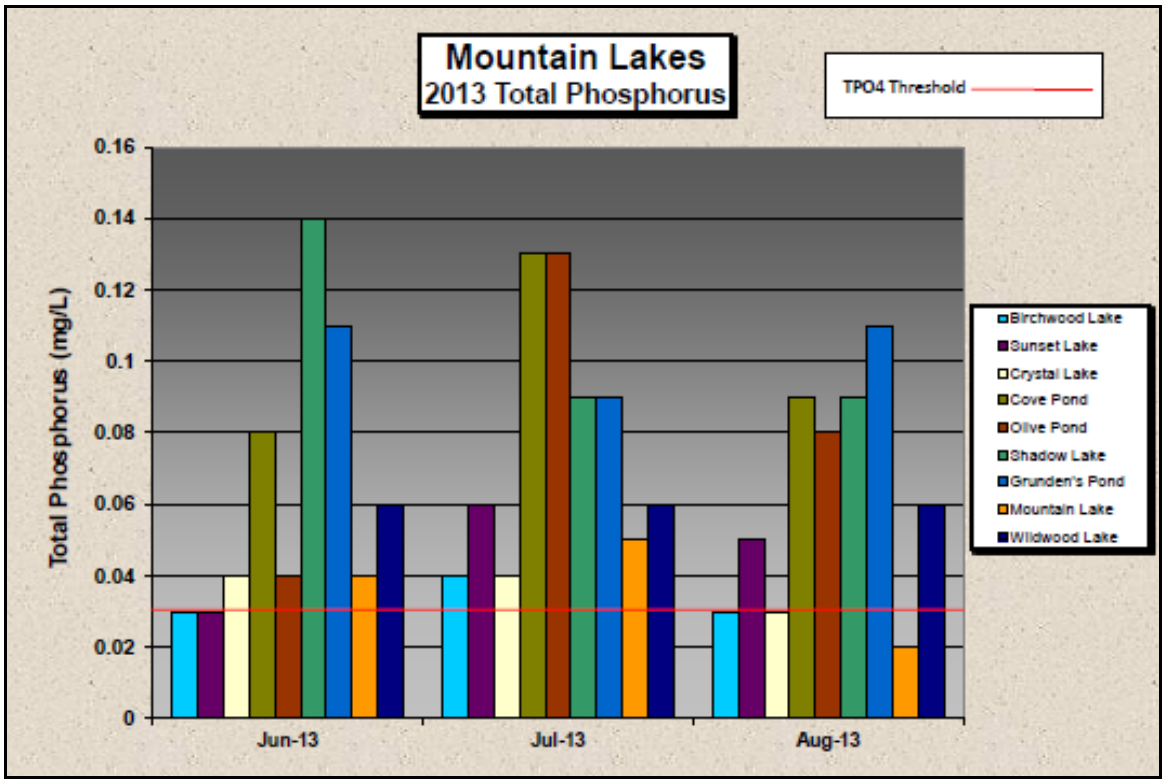
In 2013, it was determined that it would be beneficial to the Borough for Allied Biological to survey the margin of all nine lakes for the presence of emergent invasive plants. Following the identification of invasive infestations, these patches were sprayed with approved herbicides for control efforts. These surveys/applications occurred on July 31 and August 6, and are depicted on a map in the Appendix of this report.

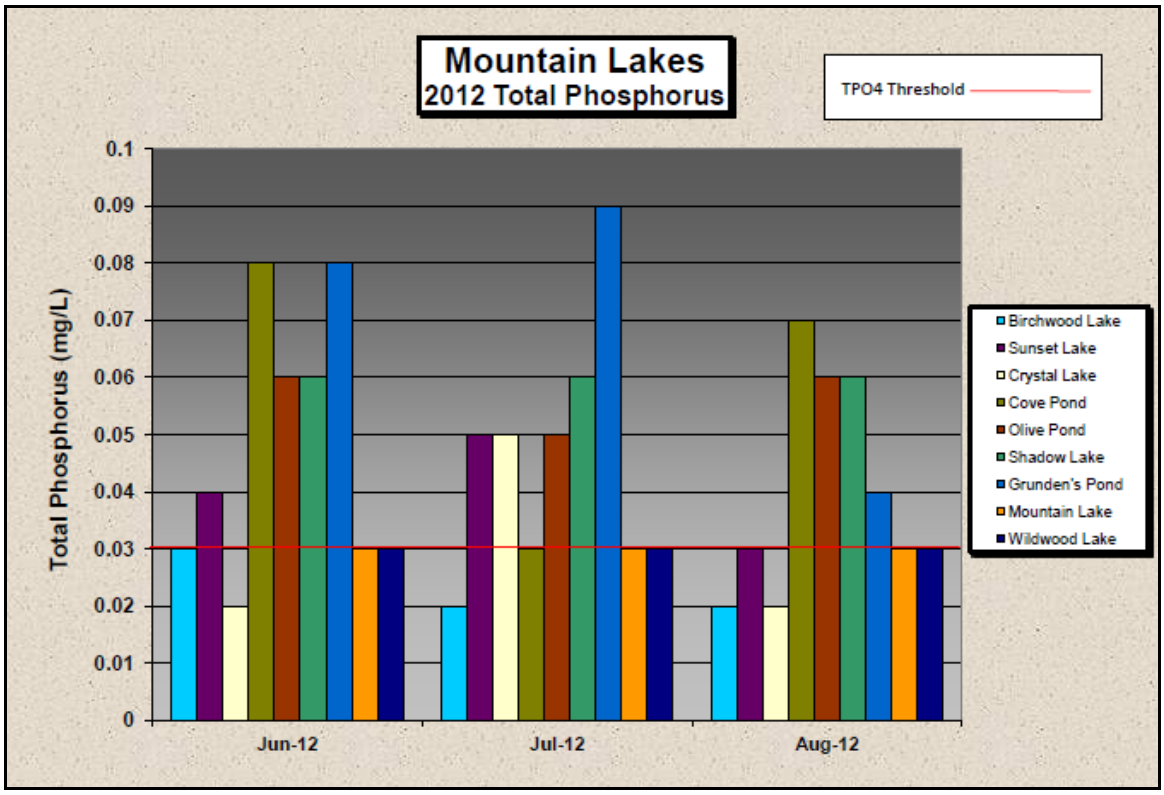
At Birchwood Lake, a 6’ by 20’ patch of mugwort north of the beach was targeted. Purple loosestrife and knotweed was targeted on the Birchwood dam and near the aeration compressors. At Sunset Lake, purple loosestrife along the Crystal Lake dam was targeted, along with a patch of creeping water primrose near the outlet. At Grunden’s Pond, creeping water primrose growing along the stone wall was targeted, along with creeping water primrose and purple loosestrife on the opposite shoreline. At Mountain Lake, the dam was inspected but considered to be free of invasive species. At Sailboat Cove, trace to sparse mugwort and purple loosestrife were colonizing parts of the Centennial Cove Park. At the park area near Island Beach, trace densities of purple loosestrife and mugwort was targeted. Along the canal between Mountain Lake and Wildwood Lake, trace densities of several invasive species were targeted. Special attention needs to be paid to this site in 2014, following the disturbance from the canal clean-up (disturbance favors the colonization of invasive species, especially mugwort). The boat access area of Wildwood Lake was inspected but free of invasive species. Along the Wildwood Lake dam, dense mugwort and trace patches of purple loosestrife and *Phragmites* was targeted.

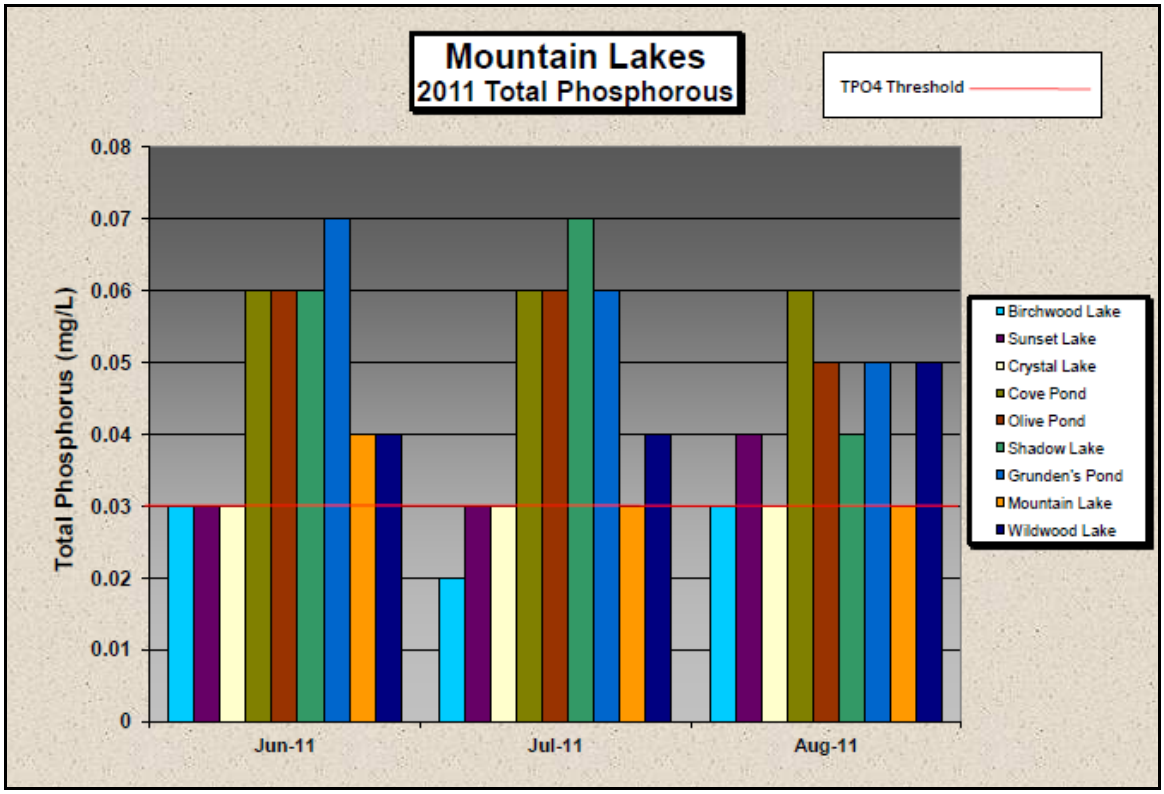
A follow-up survey and possible spraying event should be conducted in 2014 regarding emergent invasive species around the margins of all lakes.

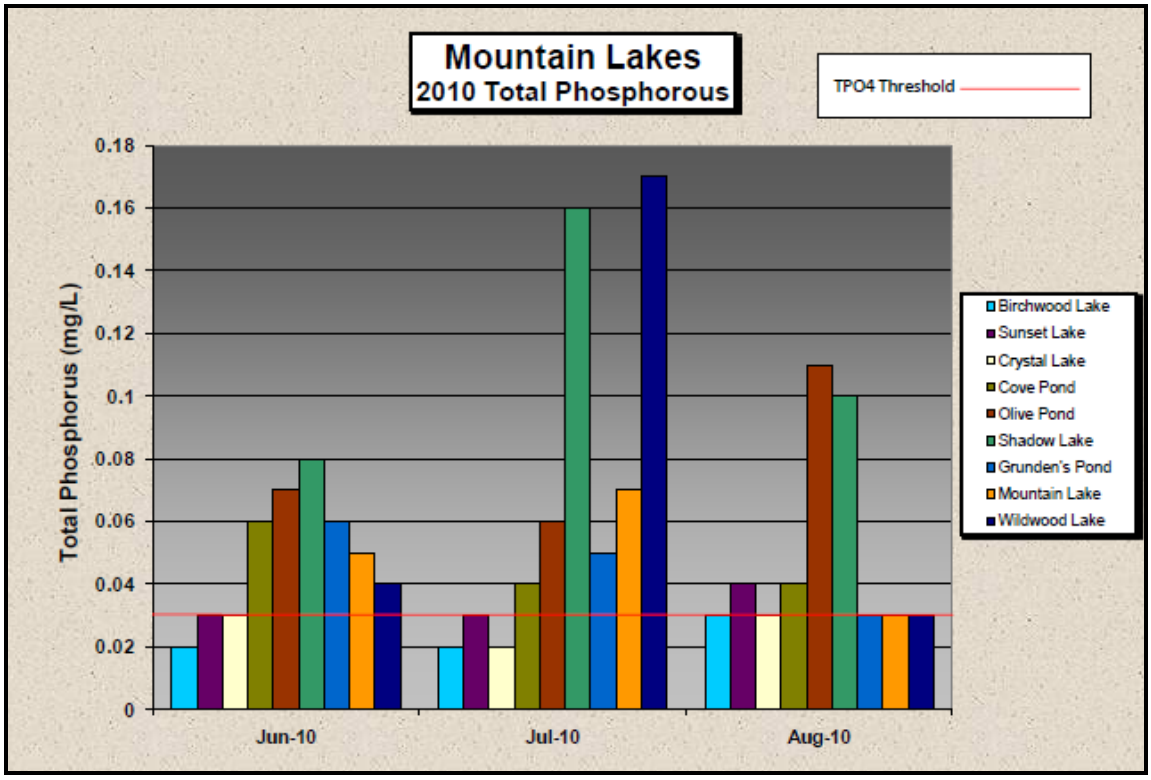
2006 to 2013 Total Phosphorus at Mountain Lakes

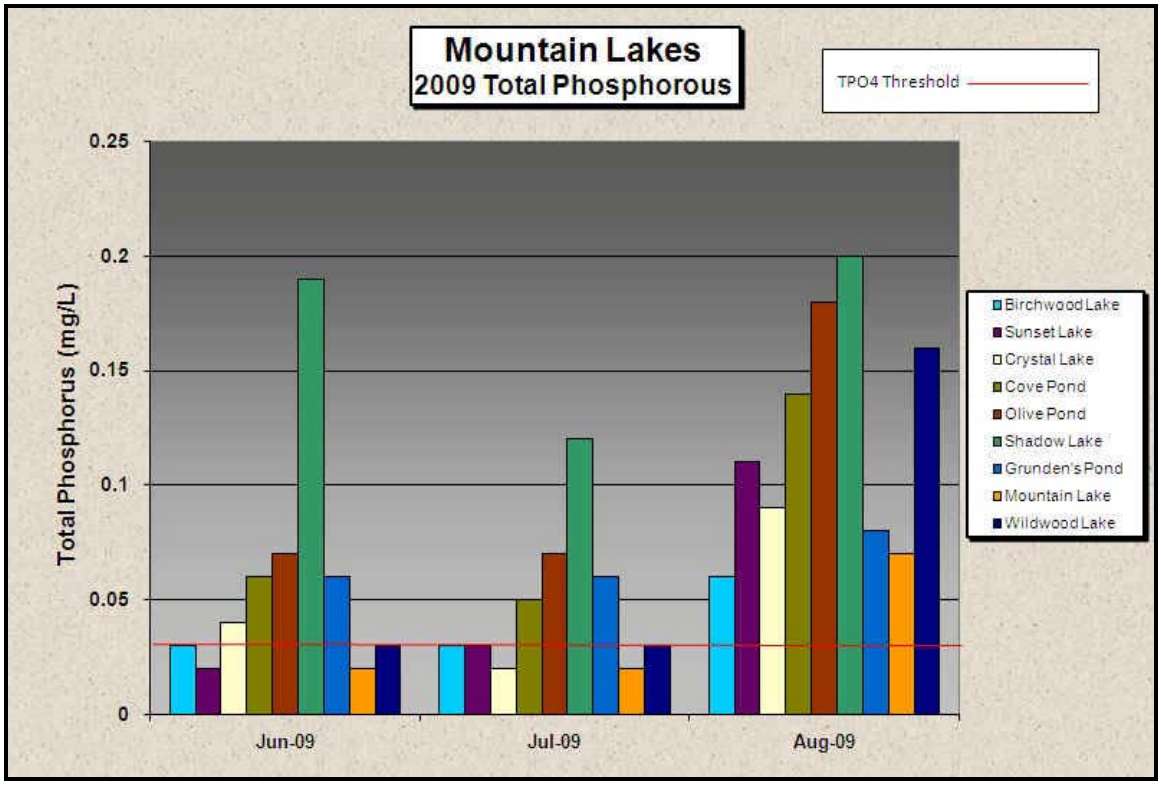
Below are seven graphs, each representing total phosphorus data collected at all nine lakes for all three sampling events. Each graph depicts a different year, 2006 through 2013. Total phosphorus in 2013 was elevated at all sites when compared to 2012 data. On most dates, most basins exceeded the ideal threshold (0.03 mg/L). As usual, the smaller basin all had elevated nutrients on all dates, but even these were higher than 2012. Not since 2006 have we seen such elevated nutrients across the board. It's possible that heavy rainfall events in May and June were the primary source for these increased nutrients. But even Wildwood Lake had elevated nutrients throughout the season. This could have been caused by the canal cleaning project and associated disturbance and de-watering. Despite these results, increased production of algae and plants was not really observed this season, and this was certainly an exception to the rule regarding many of our other clients in the northern part of New Jersey.

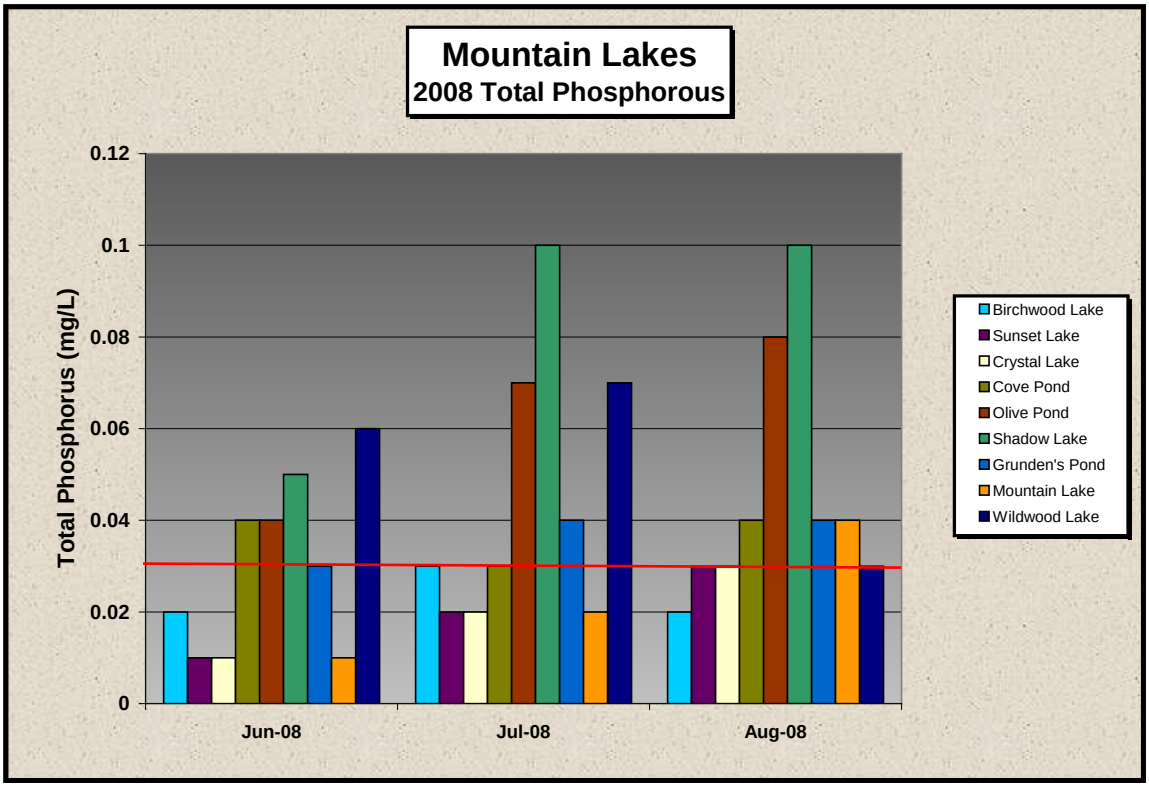


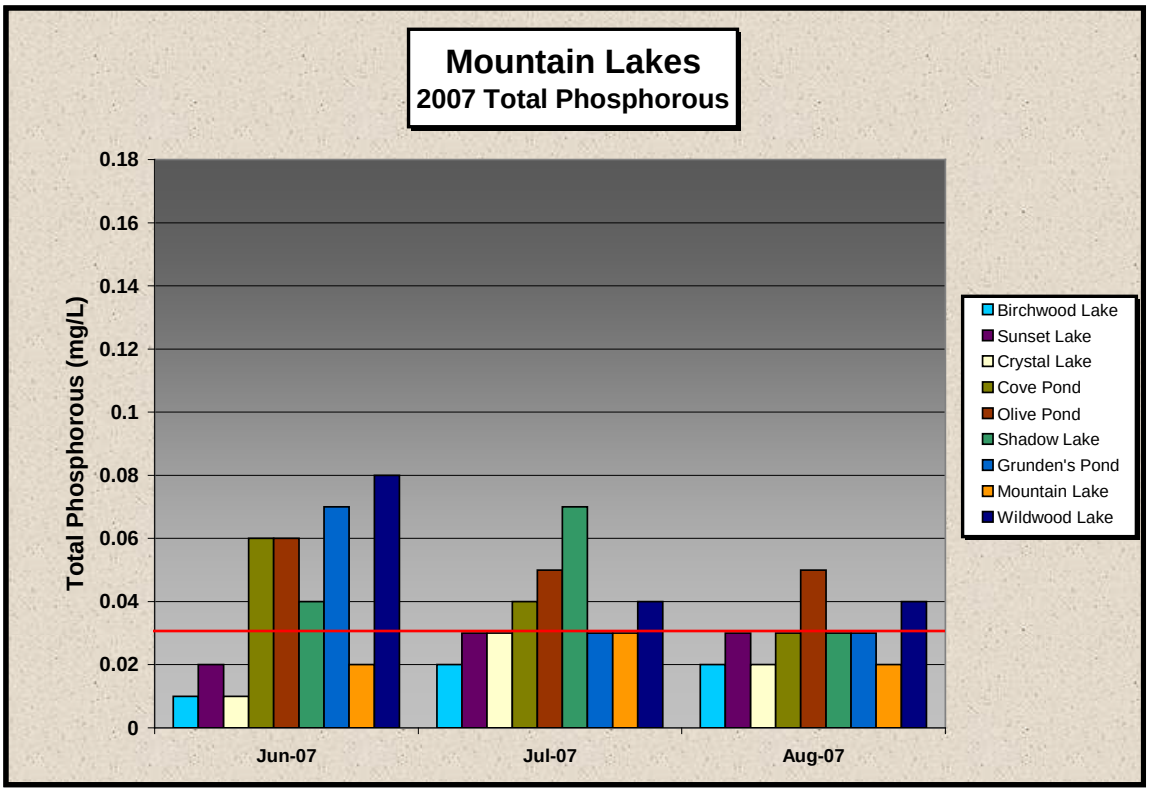

Mountain Lakes
2012 Total Phosphorus
TPO4 Threshold
Total Phosphorus (mg/L)
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
Jun-12
Jul-12
Aug-12
Birchwood Lake
Sunset Lake
Crystal Lake
Cove Pond
Olive Pond
Shadow Lake
Grunden's Pond
Mountain Lake
Wildwood Lake

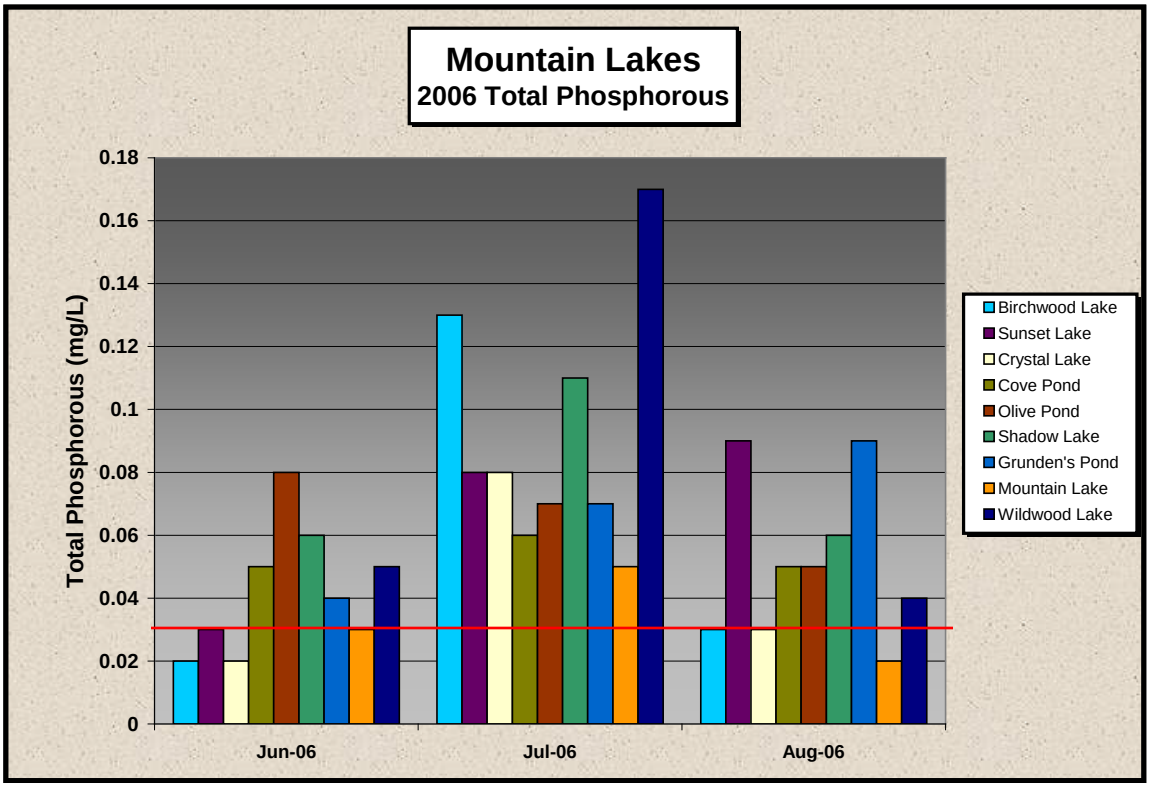

Mountain Lakes
2011 Total Phosphorous
TPO4 Threshold
Total Phosphorus (mg/L)
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
Jun-11
Jul-11
Aug-11
Birchwood Lake
Sunset Lake
Crystal Lake
Cove Pond
Olive Pond
Shadow Lake
Grunden's Pond
Mountain Lake
Wildwood Lake


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

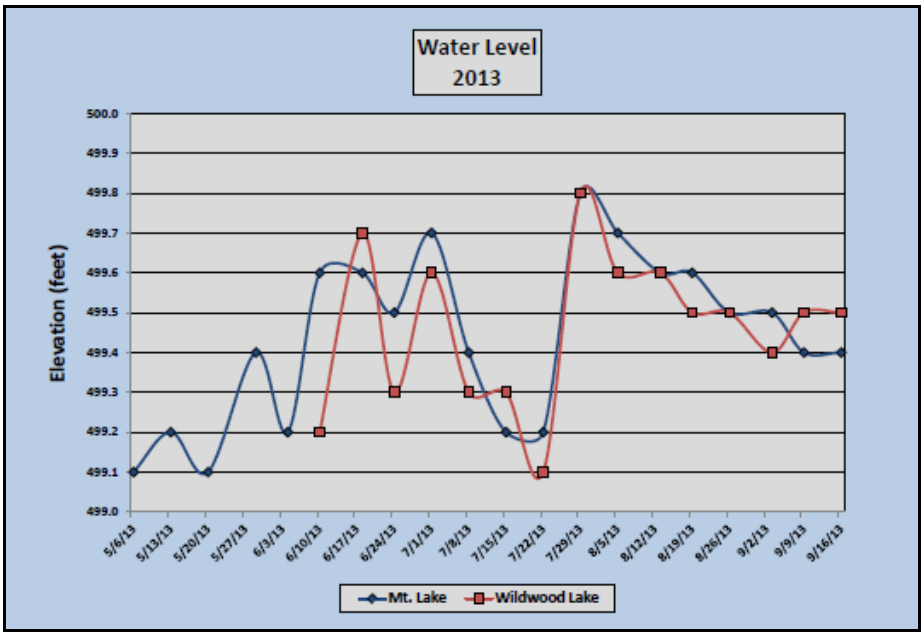

Mountain Lakes
2008 Total Phosphorous
Total Phosphorus (mg/L)
0.12
0.1
0.08
0.06
0.04
0.02
0
Jun-08
Jul-08
Aug-08
Birchwood Lake
Sunset Lake
Crystal Lake
Cove Pond
Olive Pond
Shadow Lake
Grunden's Pond
Mountain Lake
Wildwood Lake


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



2013 Water Levels At Mountain Lake and Wildwood Lakes

Water level at Mountain Lake and Wildwood Lake has been recorded as part of ABI's weekly surveys for several years. Recently, elevations gauges have been installed at both sites to more accurately record and monitor the water level at both basins. At the request of the board, the 2013 water levels for both basins are graphed, below. Mountain Lake is represented in blue and Wildwood Lake is in red. As can be seen, very little variation occurred in 2013, and both sites (connected via the canal) are usually within 0.1 or 0.2 feet of each other on a given date. Water level ranged from elevation 499.1 to 499.8 throughout the season. The greatest weekly variation was observed in late July, and was likely related to the canal cleaning project and/or dam repairs at Wildwood Lake.



2013 Summary of Lake Management

- In 2013, temperature departures were lower in February and March, but elevated from April/May (slightly) to June/July (somewhat higher). July was considered the 5th warmest July since 1895. August and September had lower than average temperatures.
- Rainfall in 2013 was hit or miss throughout the season. March and April were dry, while June was the wettest on record. July and August also had monthly increased rainfall, but September and October were dry.
- Eurasian water milfoil **was not** observed in Mountain Lake in 2013, which is excellent news, following the Sonar application in 2012. Crews were on the water on seven dates throughout the season, with no recorded observations. It appears we will get three (maybe four) years control from the 2012 application.
- Some Eurasian water milfoil was observed in Grunden's Pond (which could be a source of re-infestation into Mountain Lake), but no Eurasian water milfoil was observed at Wildwood Lake.
- Sonar was applied at Sunset Lake for water lily control. Heavy May and June rainfall required a bump application, but late season control was established. Sonar use in this basin will likely not be needed for a few years.
- Sonar use in Crystal Lake was performed for pondweed control early in the season. The application was early enough in the season not to be affected by rainfall events, so a bump application was not needed.
- A new product, Clipper, was used to control lilies and pondweeds in the swim lanes at Birchwood Lake. The results were outstanding for this limited application, and will become routine.
- A topical application of glyphosate was conducted on 2 acres of water lilies at the Northern end of Birchwood Lake. Results were acceptable, and will likely not be repeated for a few years.

- Shadow Lake had an intense bloom of blue-green algae in July that required several algaecides applications to finally control. Less intense blooms also occurred in nearby small basins.
- Allied Biological conducted a survey of all lake margins for the presence of emergent invasive species. Many infestations of limited scope were identified and sprayed in July-August.
- Hydro-raking was conducted at Mountain Lake and Wildwood Lake in October. At total of 58.25 hours was performed, removing 165 cubic yards of unconsolidated organic material.
- Overall, total phosphorus levels were elevated throughout the basins in 2013, and at many sites were significantly higher than data recorded in 2012.
- Overall, unicellular phytoplankton abundance was favorable (low to moderate) at all of the larger basins this season.
- All fecal coliform tests passed at both sites in 2013.
- Due to the canal cleaning, the early season Alum application at Wildwood Lake was postponed. The late season Alum application was conducted following the conclusion of the canal cleaning project.
- Alum **was not** applied at Mountain Lake this season. Although total phosphorus results were elevated early in the season, high water clarity and low unicellular phytoplankton abundance did not justify its use in this basin this year.

2014 Recommendations

The water quality monitoring program continues to be an important priority of the lake management program at Mountain Lakes. The current program seems to be fulfilling the needs of the lakes and providing suitable datasets. In 2014, it is recommended that additional phytoplankton sampling be conducted at Shadow Lake, and possibly the other small basins. In 2013, an intense blue-green algae bloom was observed, and with additional sampling efforts, it could have been detected earlier. Since the efficacy of copper sulfate applications can be dependent on phytoplankton biomass in the water column, timely treatments before a bloom occurs could be more cost effective and utilize less chemicals going into the water column.

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, Clipper was used for the first time in the swim lanes to control nuisance lilies and submersed plants with excellent results. This again will be the product of choice in 2014. At Crystal Lake, control of nuisance pondweeds will be assessed early in the season. Based on observed abundance, either a full lake Sonar application, or spot treatments with Reward, will be conducted. At Sunset Lake, water lily control should be expected in 2014, following the Sonar use this season. The contact herbicide Reward will be used to spot target any nuisance submersed plants or lilies. Since Eurasian water milfoil was not observed at Mountain Lake, we expect to be able to control any nuisance plant growth in this basin with contact herbicides, such as Reward. Copper sulfate will be utilized to control any nuisance algae growth. The same strategy shall be employed at Wildwood Lake in 2014.

Even though we don't have enough data to adequately assess the effects of SeClear at the smaller basins, we still believe this should be the product of choice moving forward in 2014. Since there will be limited upstream Sonar use in 2014, we expect to use contact herbicides to target any nuisance growth of plants in the smaller basins.

The use of Alum at Mountain Lake (mid-season) and Wildwood Lake (early and late season applications) continues to be beneficial to both basins. As the practice has been, examination of water clarity, phytoplankton abundance and total phosphorus will be utilized to make a determination of Alum use at Mountain Lake. It is assumed that two Alum applications shall be conducted at Wildwood Lake, which has become a recent (and effective) practice in this basin.

It is anticipated that the Lakes Cleaning Program will continue in the fall of 2014. Grunden's Pond seems to be a likely basin for targeted organic material removal, but access into this basin is difficult, at best. It is recommended that additional sites in the southern coves of Mountain Lake be probed. It is also recommended that Sunset Lake be probed in select locations to determine which basins should be targeted in 2014.

In 2013, all lake margins were inspected for the presence of invasive emergent plants. In mid-summer, identified patches were sprayed and displayed on a map. It is recommended that follow-up surveys be conducted in 2014 with any new or re-colonizing growth be targeted with appropriate herbicides. Increased surveys are recommended for the canal margin, due to the disturbance from the 2013 cleaning project. Many emergent invasive species favor disturbed areas for spread.

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

2013 Rainfall and Temperature Data
2013 Water Quality Graphs
2013 TPO4 Graph for Mountain Lakes
2013 Water Chemistry Data
2007 to 2013 Treatment History Graphs
2013 Phytoplankton Distribution Graphs
2013 Water Level Graph
2013 Terrestrial Invasive Treatment Map
2013 Sediment Probing Maps
2013 Hydro-raking Summary Maps
2013 APL Water Chemistry Data Sheets
2013 Phytoplankton Data
2013 Fecal Coliform Data
2013 Weekly Surveys

2013 Rainfall Data-Mountain Lakes NJ

Total Monthly Rainfall

Month	2012		2013	
	Inches	Days	Inches	Days
April	3.17	7	1.78	9
May	4.10	14	6.20	12
June	3.36	12	7.12	12
July	2.86	13	4.38	9
August	3.24	12	3.95	13
September	4.86	16	2.54	7

Date	Rainfall
4/1/2013	0.03
4/10/2013	0.51
4/11/2013	0.01
4/12/2013	0.36
4/16/2013	0.03
4/18/2013	0.03
4/19/2013	0.61
4/28/2013	0.06
4/29/2013	0.14

Date	Rainfall
5/7/2013	0.49
5/8/2013	1.39
5/9/2013	0.27
5/10/2013	0.29
5/11/2013	0.32
5/15/2013	0.01
5/18/2013	0.06
5/19/2013	0.12
5/23/2013	2.33
5/24/2013	0.39
5/25/2013	0.02
5/28/2013	0.51

Date	Rainfall
6/2/2013	0.27
6/3/2013	0.03
6/6/2013	0.86
6/7/2013	2.2
6/10/2013	0.67
6/11/2013	0.04
6/12/2013	0.02
6/13/2013	1.26
6/14/2013	0.21
6/17/2013	0.21
6/18/2013	0.82
6/27/2013	0.53

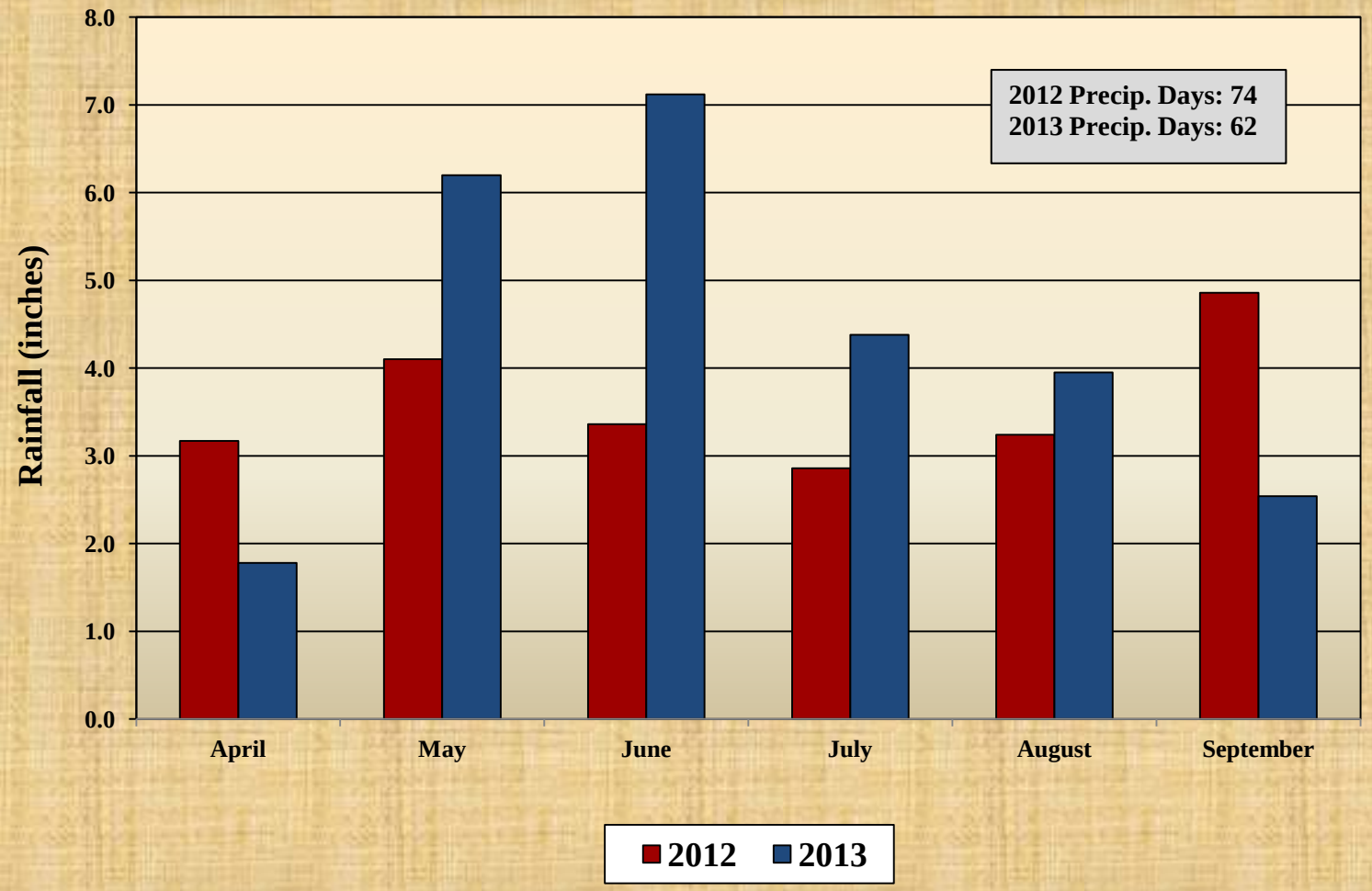
Date	Rainfall
7/1/2013	1.62
7/2/2013	0.07
7/3/2013	0.04
7/7/2013	0.17
7/10/2013	0.23
7/12/2013	0.29
7/13/2013	0.01
7/22/2013	1.35
7/28/2013	0.6

Date	Rainfall
8/1/2013	0.43
8/2/2013	0.02
8/3/2013	0.07
8/7/2013	0.09
8/8/2013	1.05
8/9/2013	0.48
8/11/2013	0.08
8/12/2013	0.04
8/13/2013	0.66
8/22/2013	0.4
8/26/2013	0.07
8/28/2013	0.55
8/29/2013	0.01

Date	Rainfall
9/1/2013	0.01
9/2/2013	0.04
9/9/2013	0.03
9/12/2013	1.05
9/13/2013	0.16
9/15/2013	0.01
9/21/2013	1.24

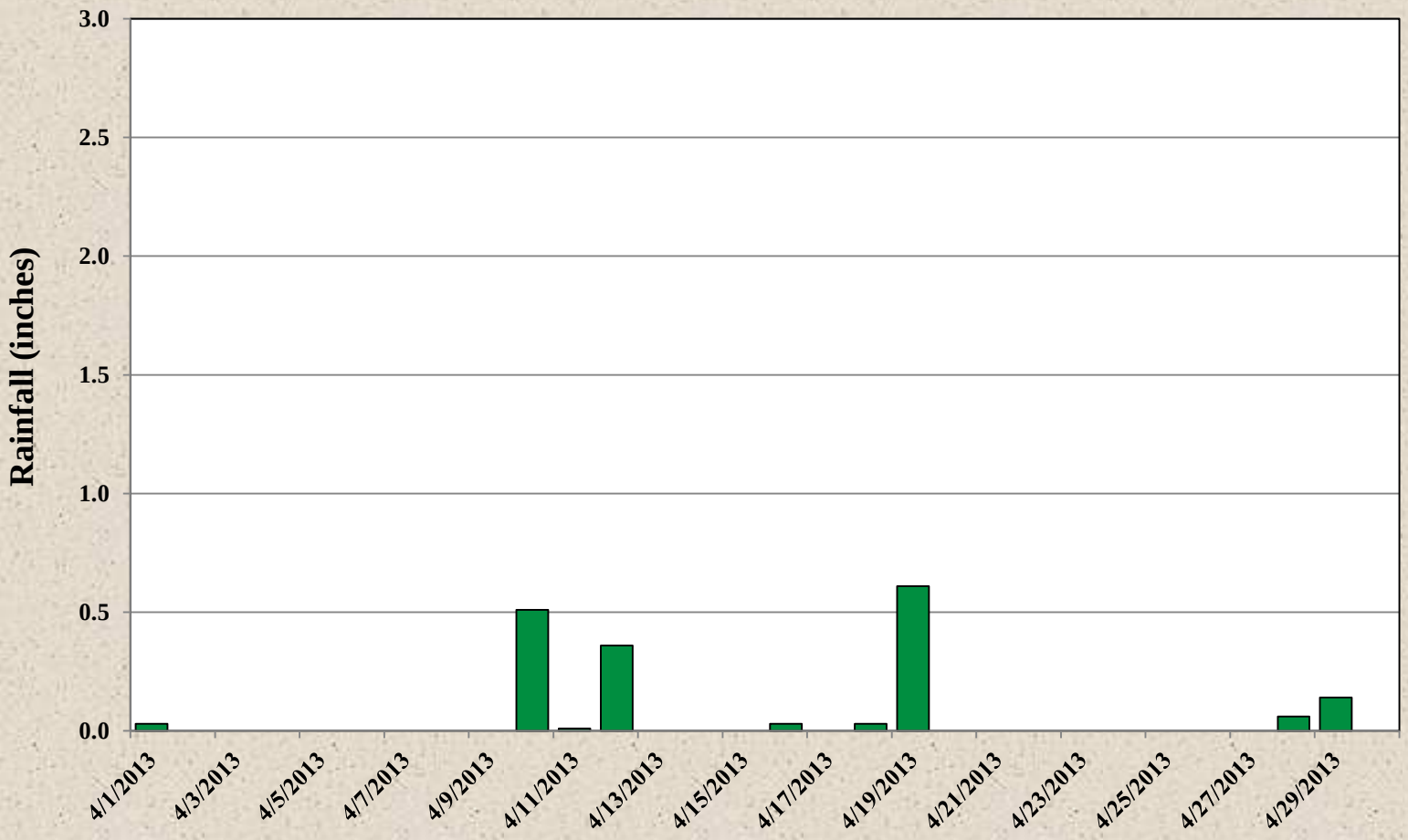
Allied Biological

2012/2013 Monthly Rainfall
Mountain Lakes, NJ



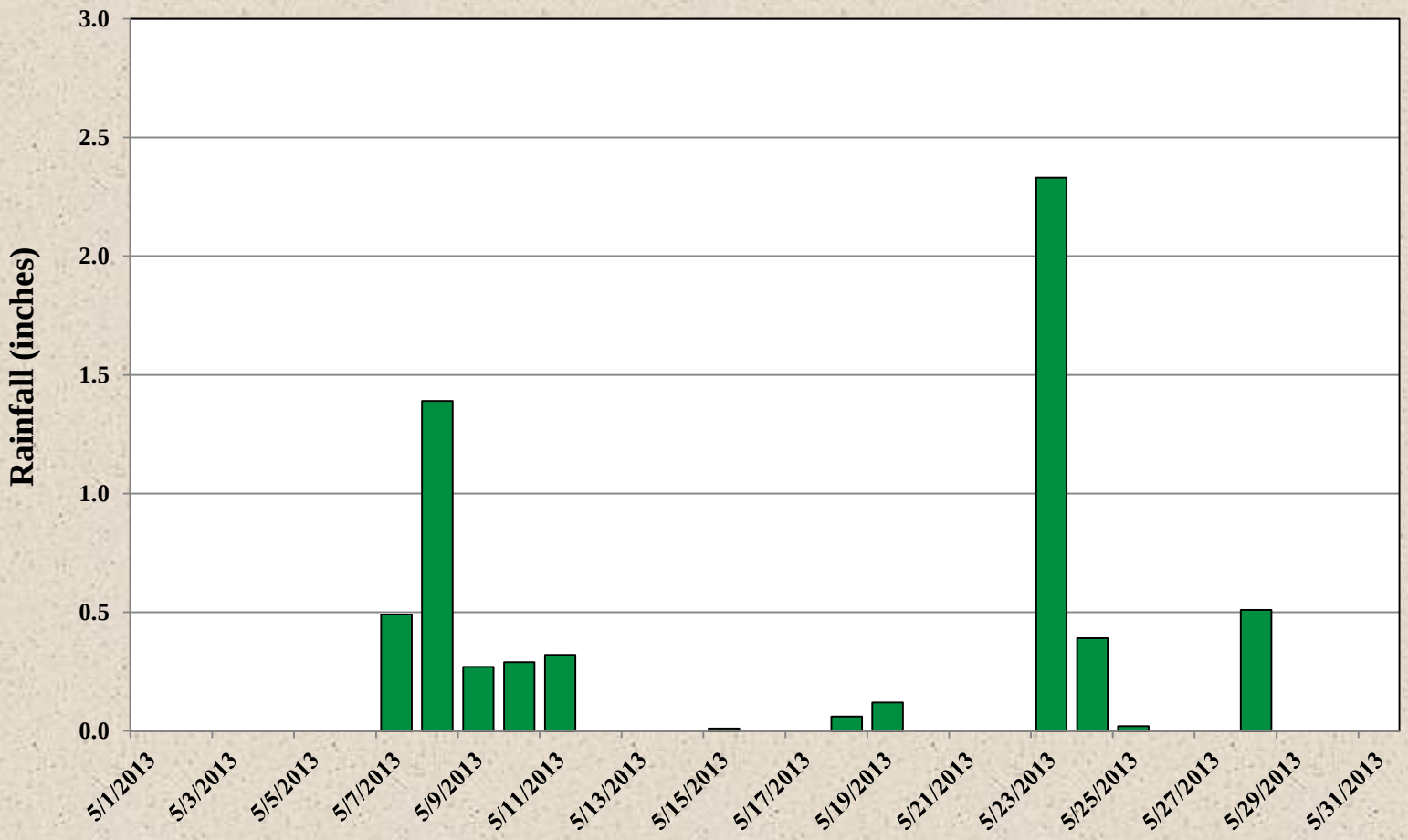
Allied Biological

April 2013 Rainfall
Mountain Lakes, NJ



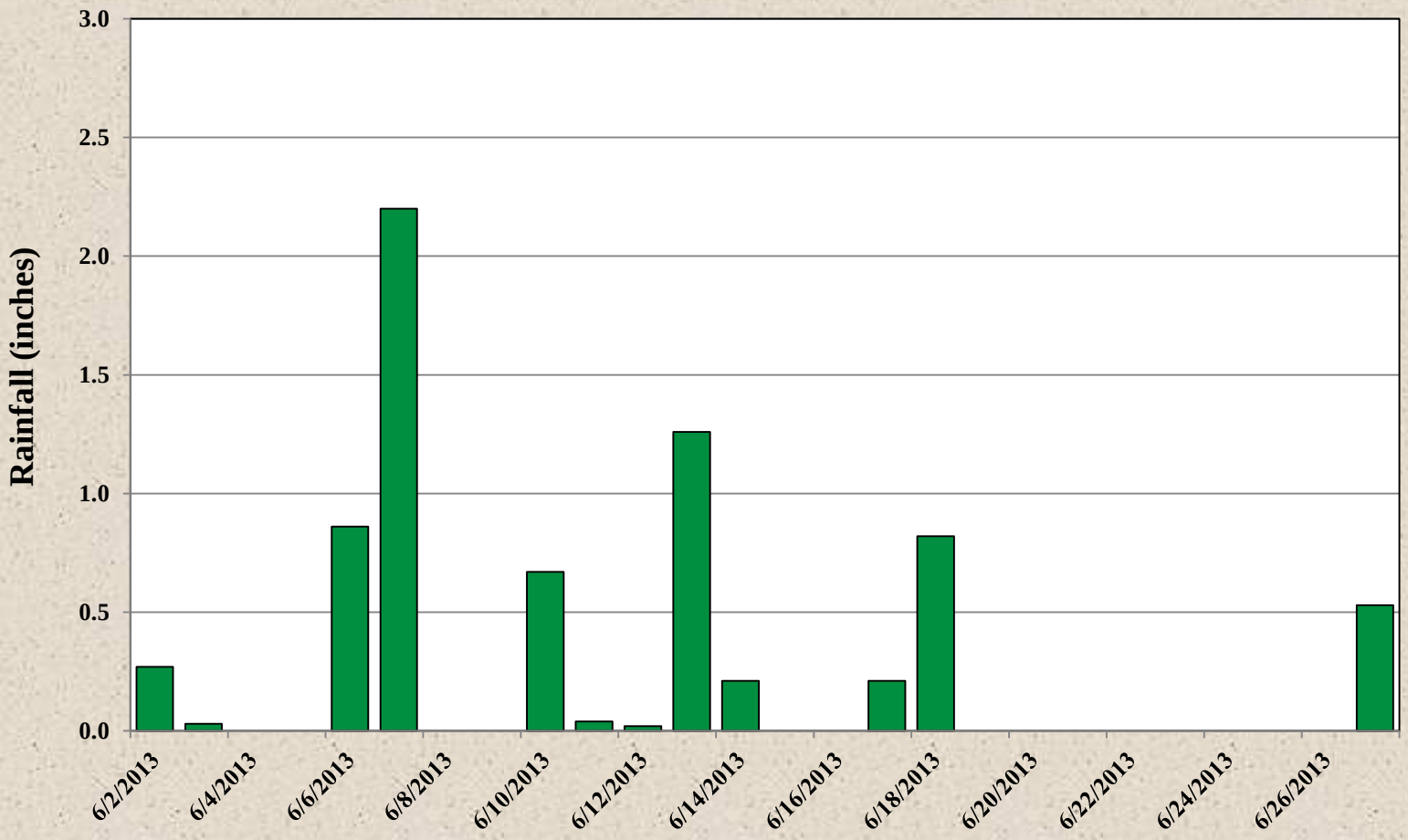
Allied Biological

May 2013 Rainfall
Mountain Lakes, NJ



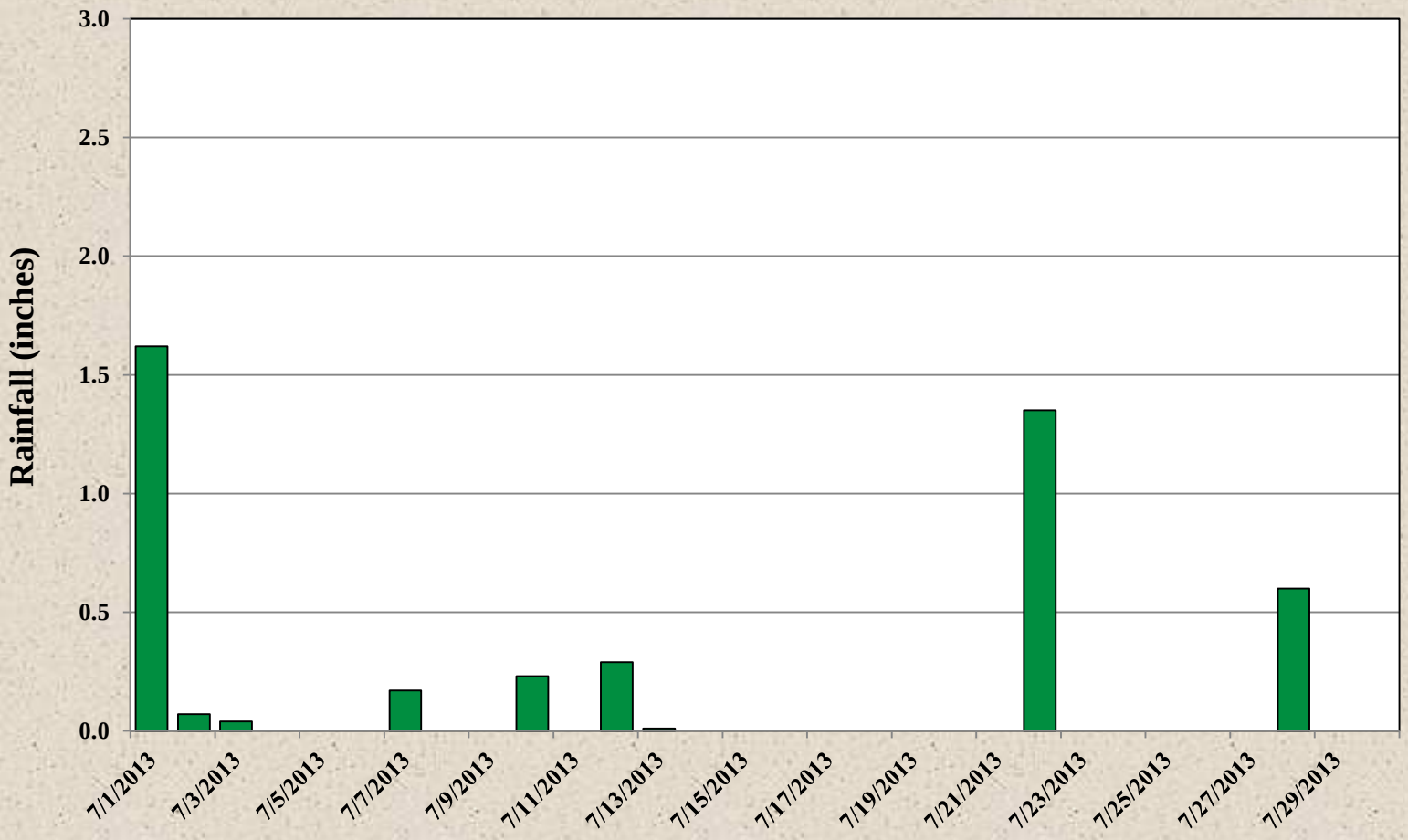
Allied Biological

June 2013 Rainfall
Mountain Lakes, NJ



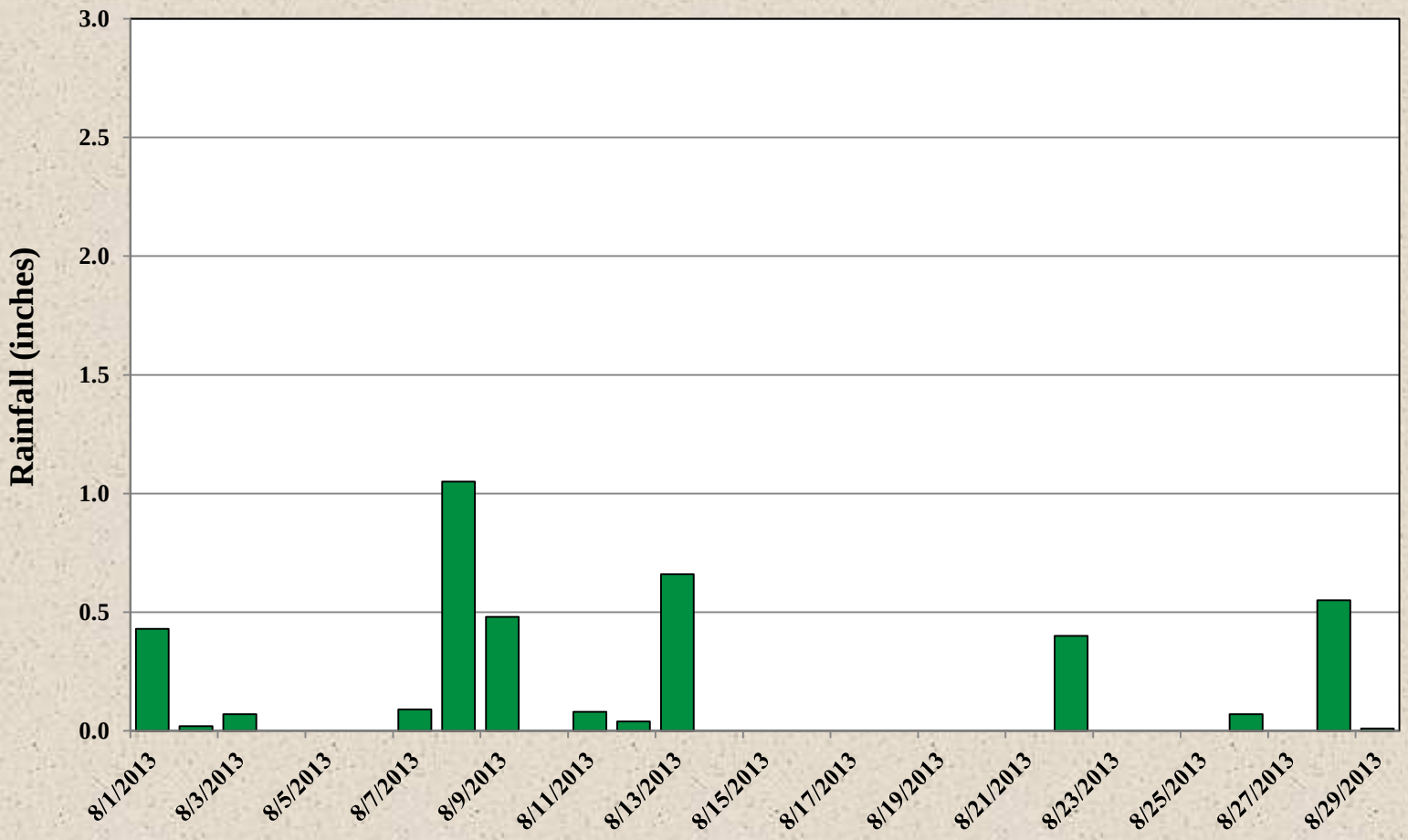
Allied Biological

July 2013 Rainfall
Mountain Lakes, NJ



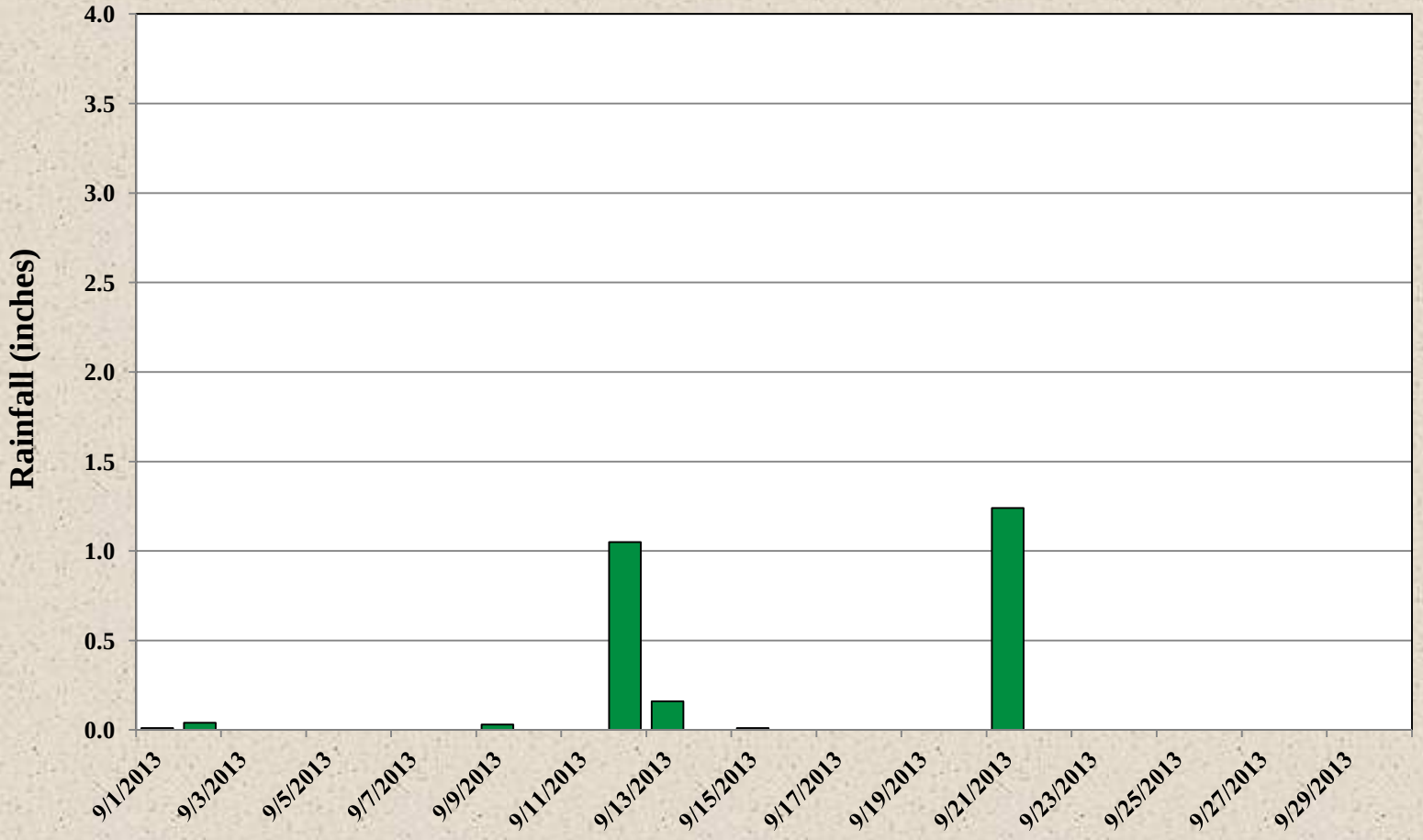
Allied Biological

August 2013 Rainfall
Mountain Lakes, NJ



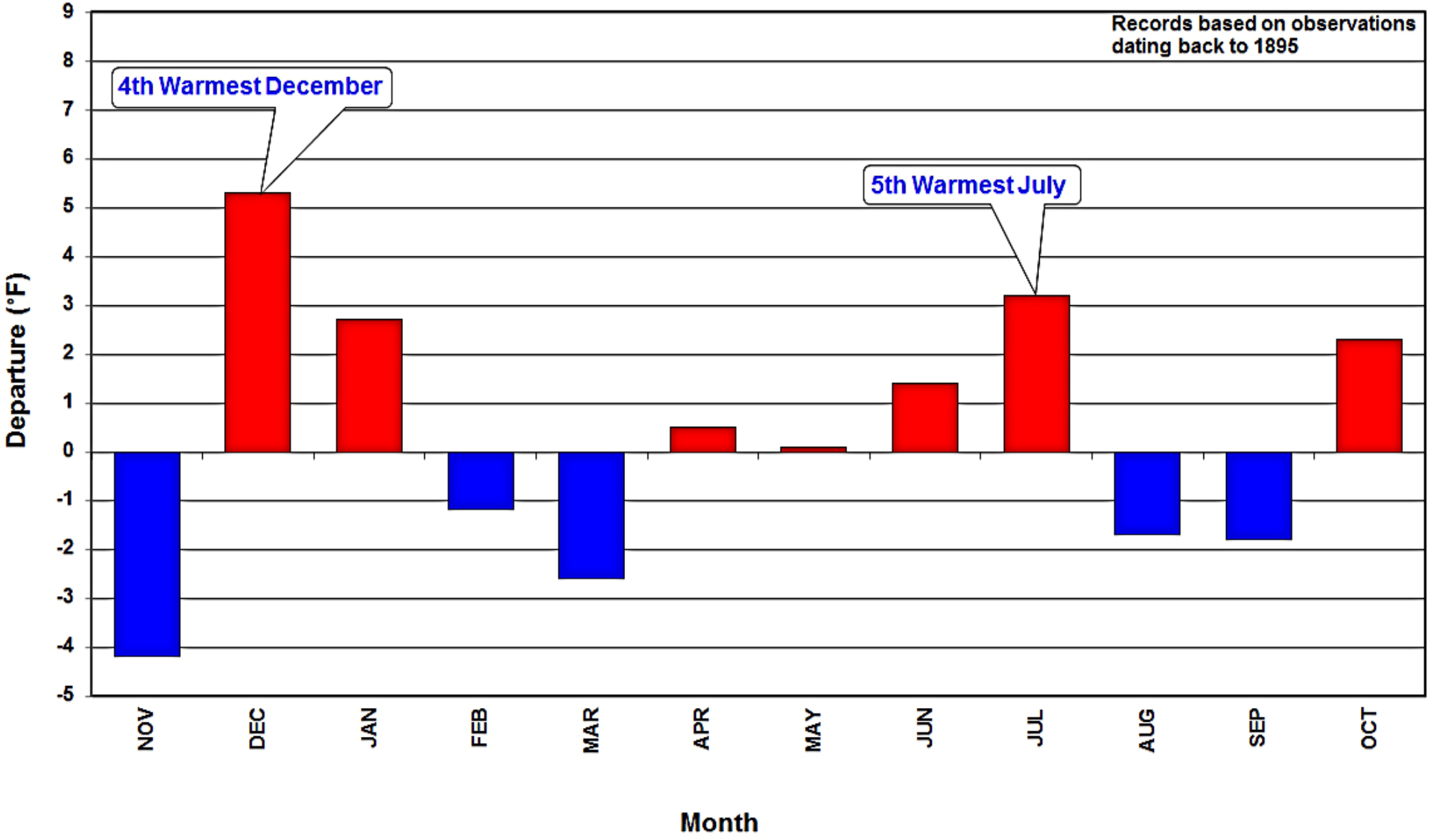
Allied Biological

September 2013 Rainfall
Mountain Lakes, NJ



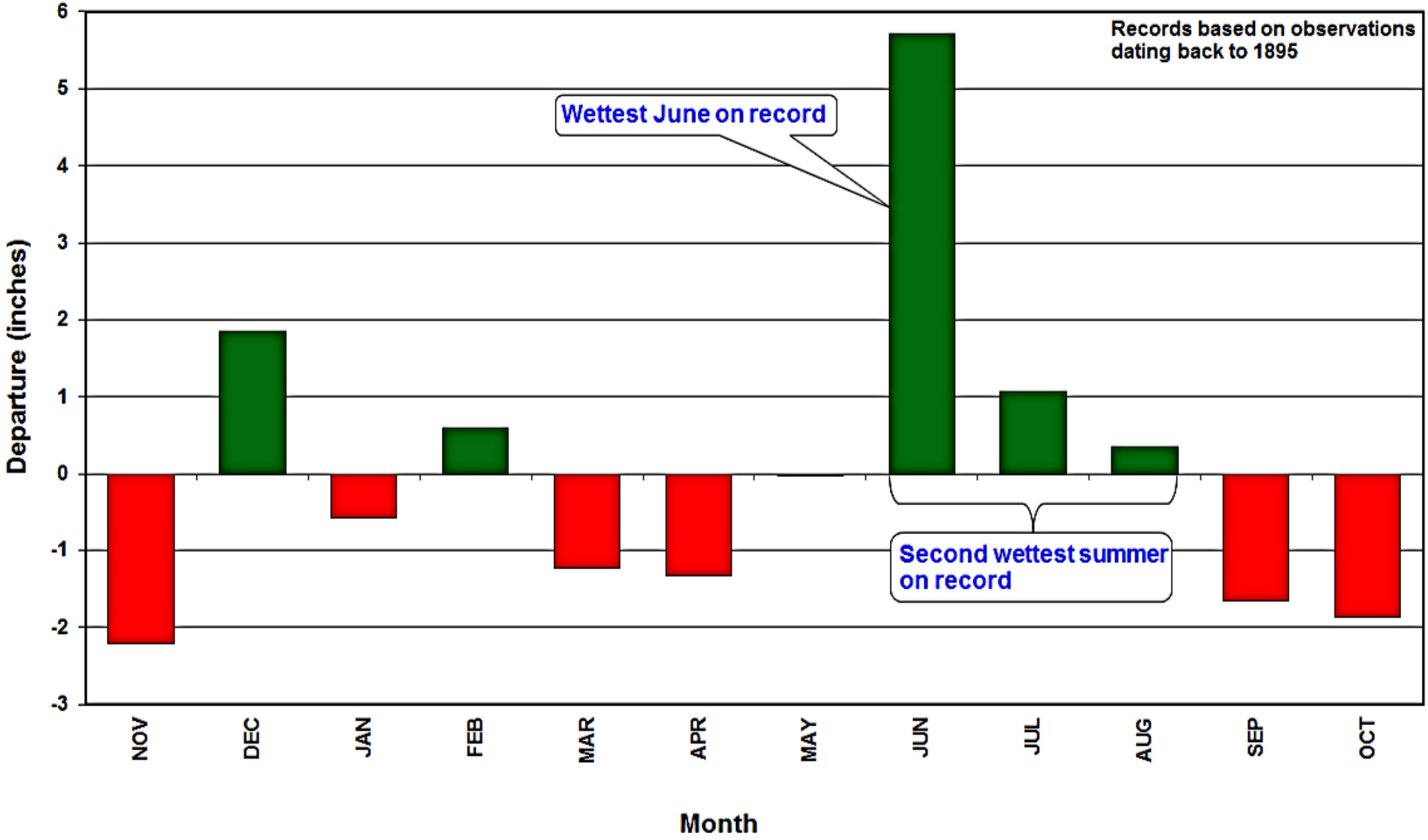
NJ Monthly Temperature Departures (November 2012 - October 2013)

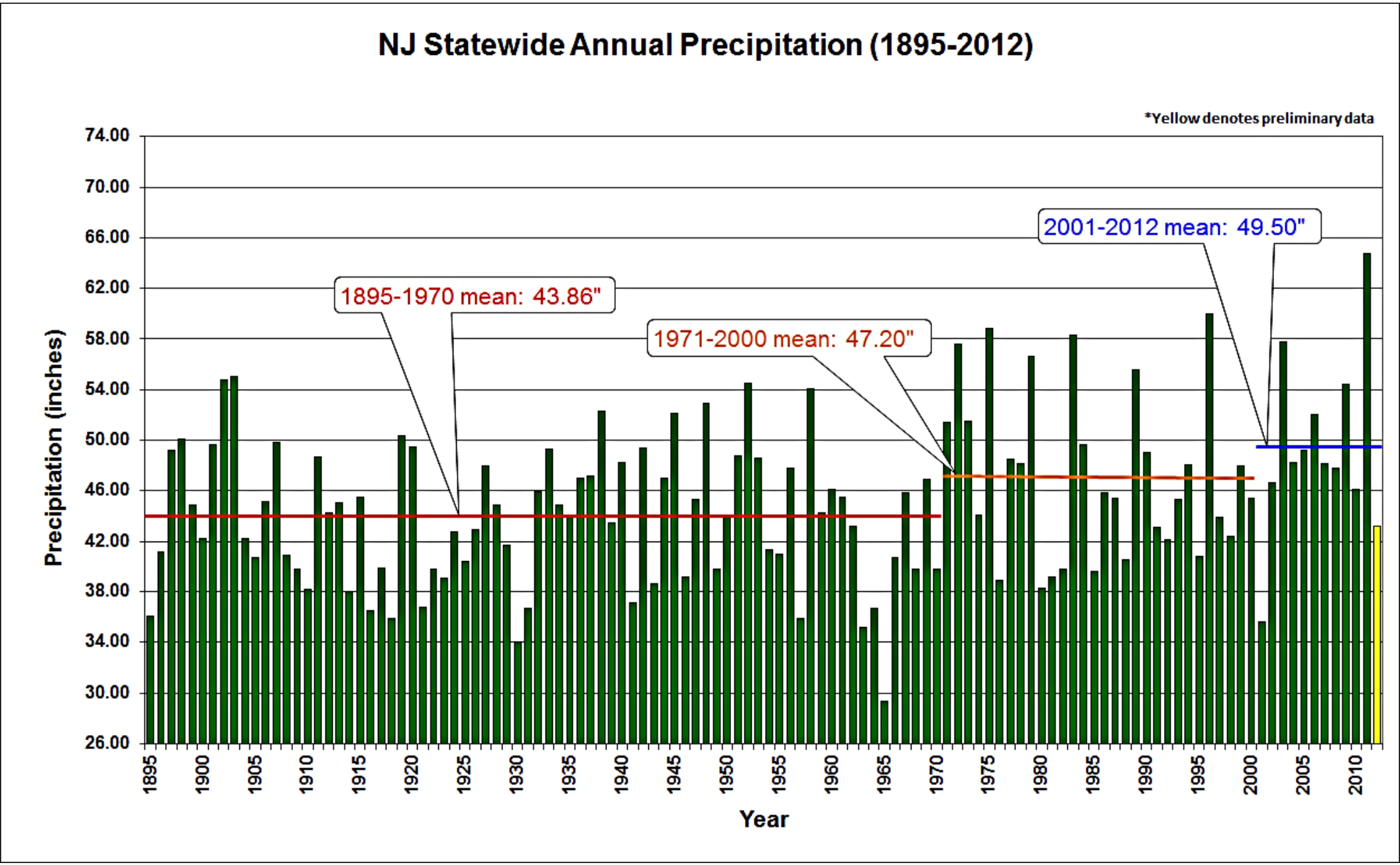
Departures calculated from differences between observed monthly temperatures and 1981-2010 monthly averages

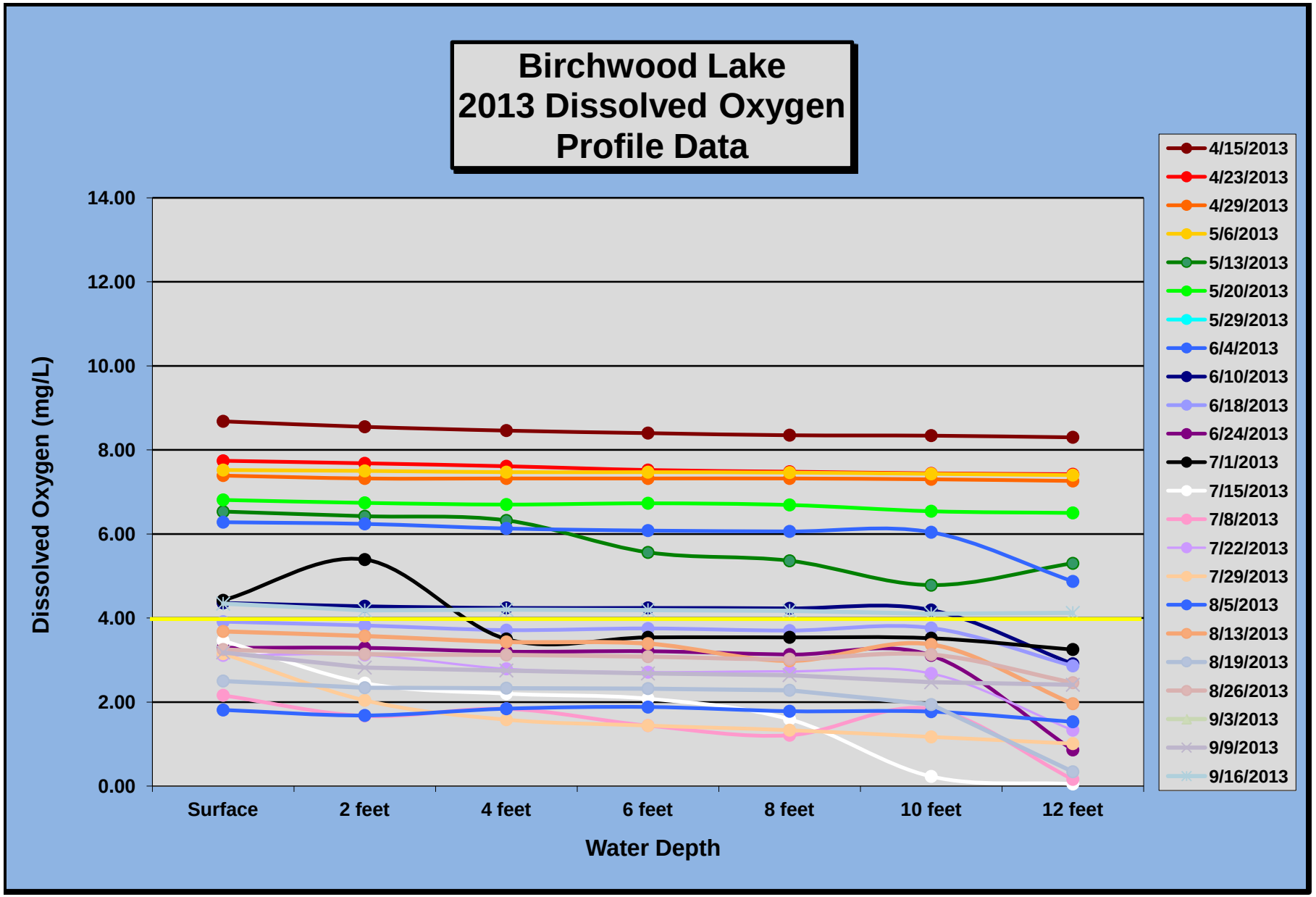


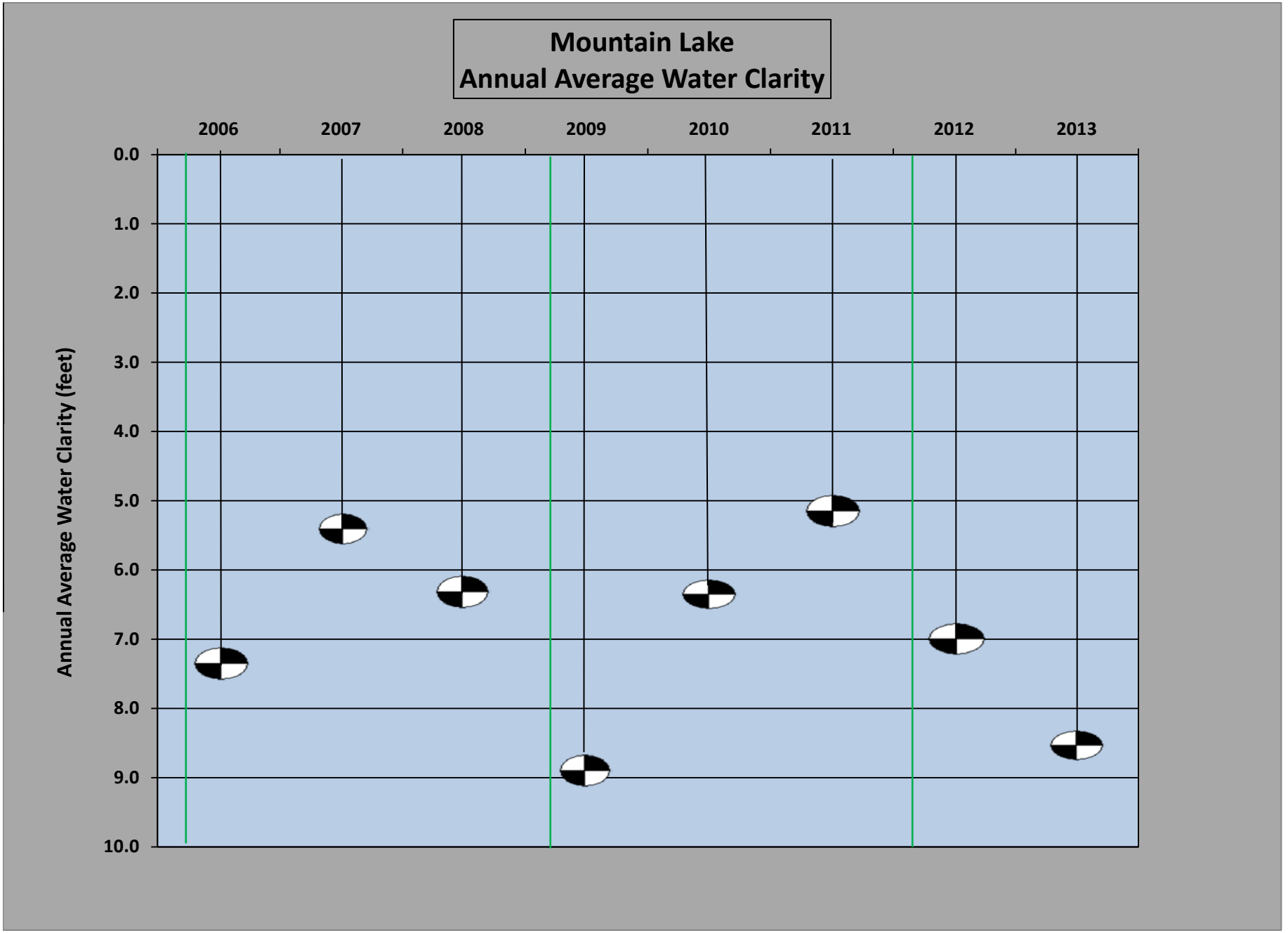
NJ Monthly Precipitation Departures (November 2012 - October 2013)

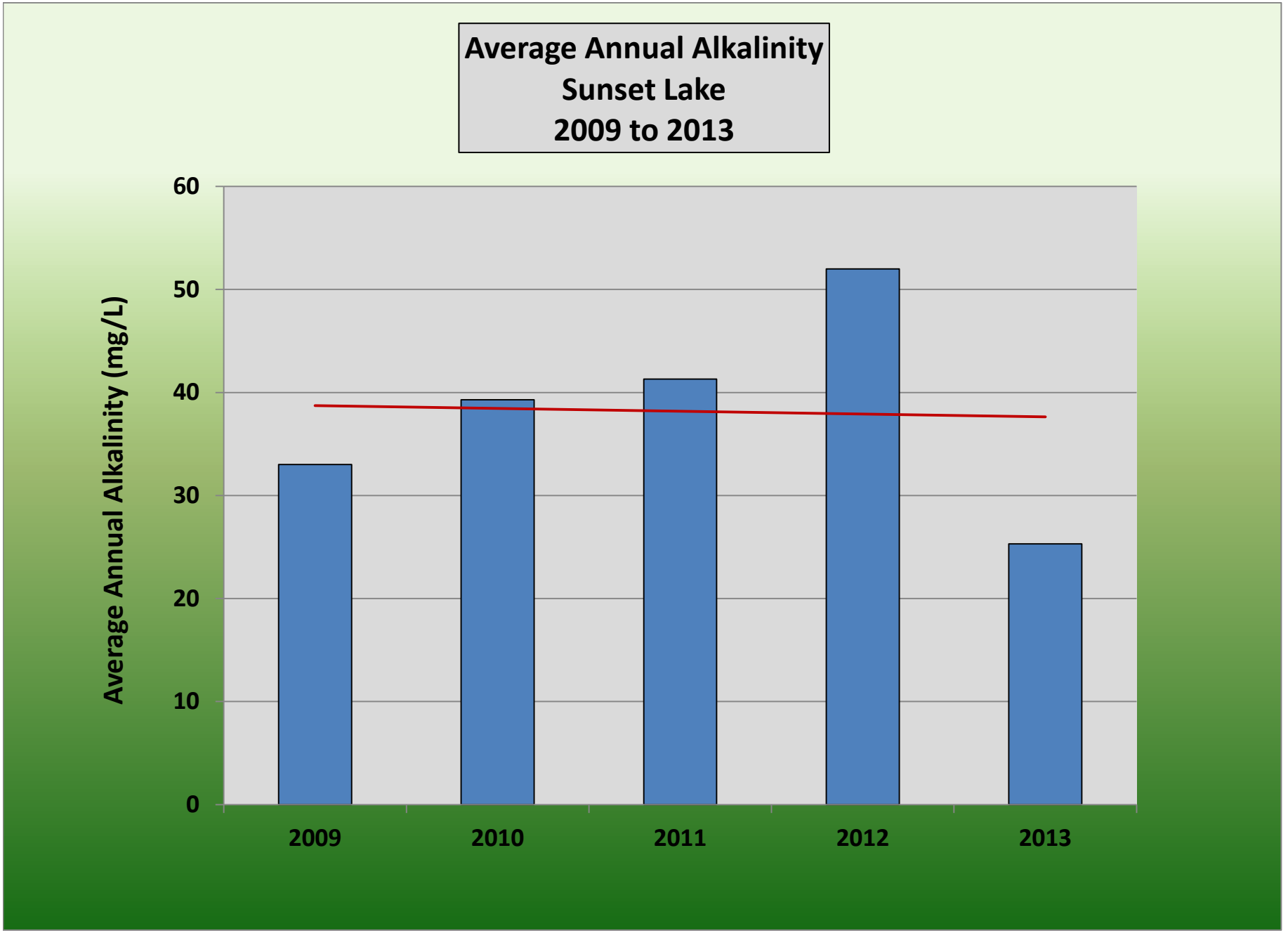
Departures calculated from differences between observed monthly precipitation and 1981-2010 monthly averages

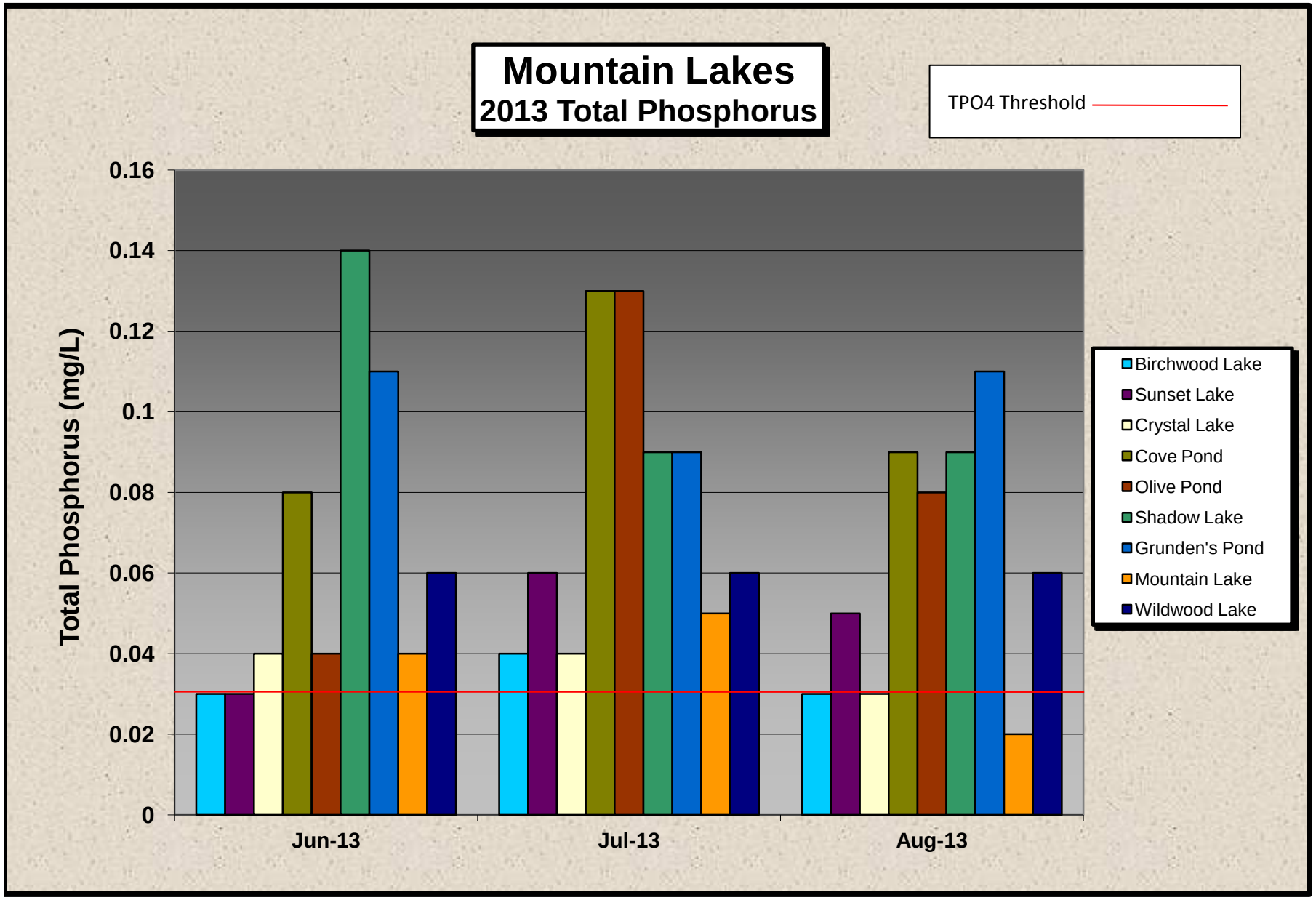


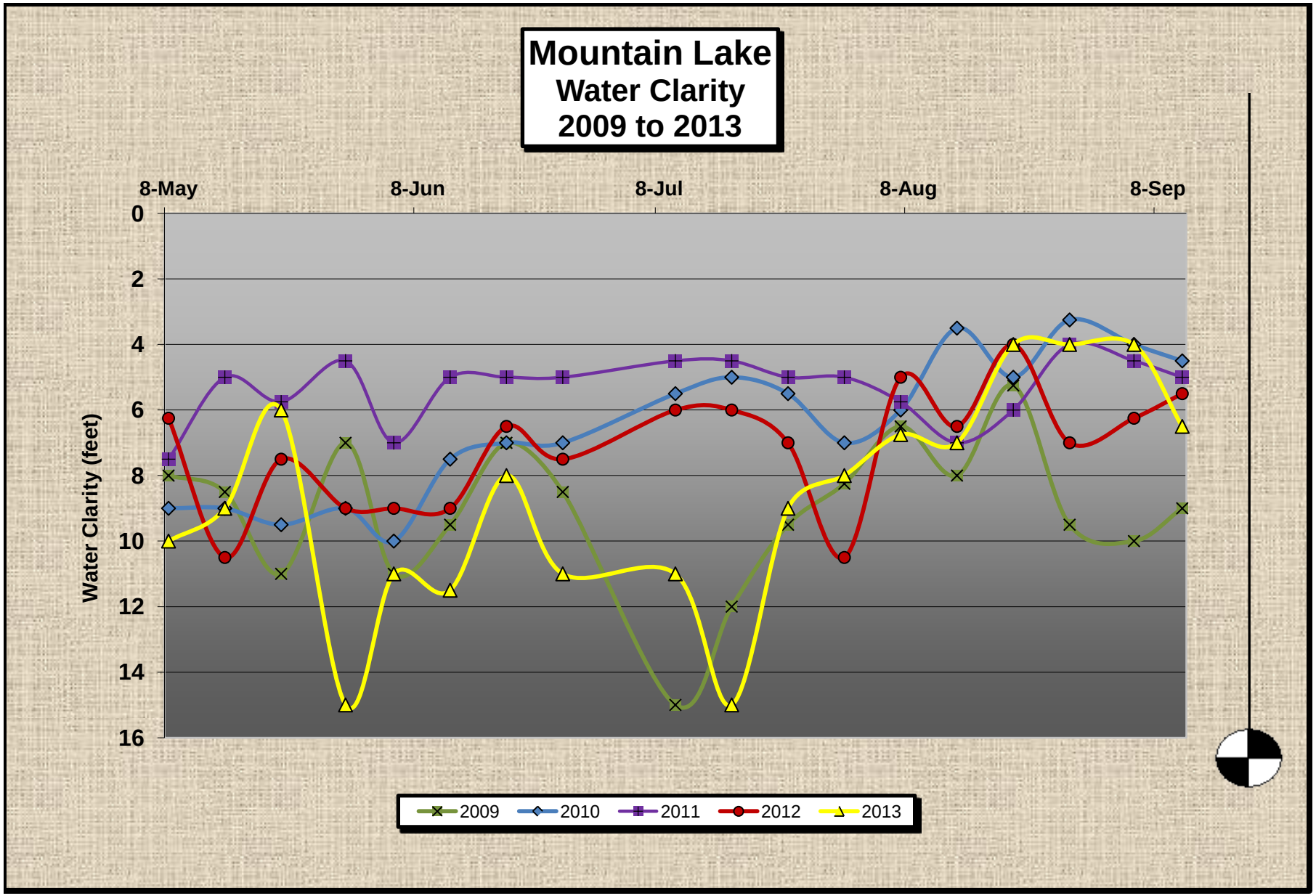

NJ Statewide Annual Precipitation (1895-2012)
*Yellow denotes preliminary data
1895-1970 mean: 43.86"
1971-2000 mean: 47.20"
2001-2012 mean: 49.50"
Precipitation (inches)
74.00
70.00
66.00
62.00
58.00
54.00
50.00
46.00
42.00
38.00
34.00
30.00
26.00
1895
1900
1905
1910
1915
1920
1925
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
Year

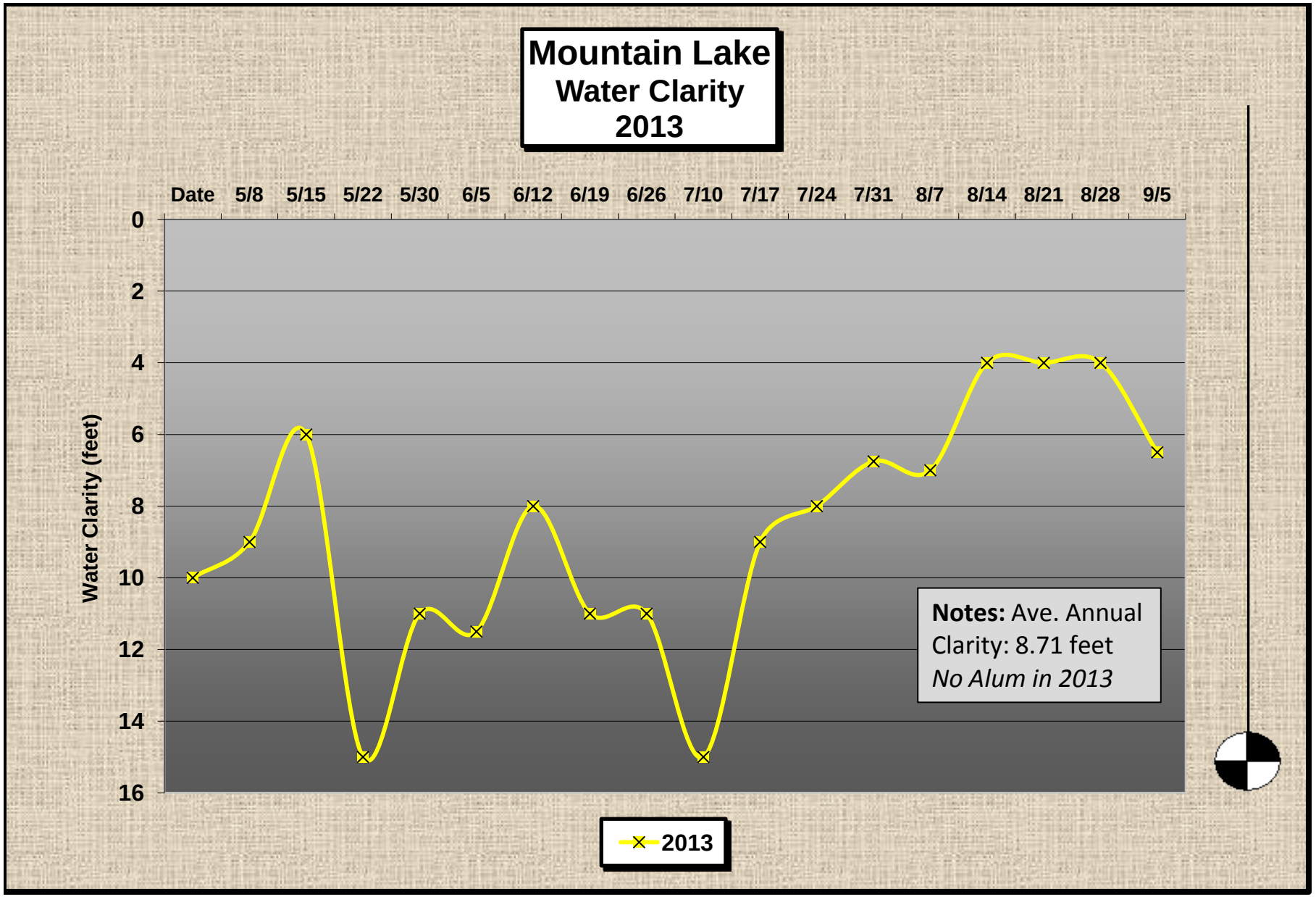

Birchwood Lake
2013 Dissolved Oxygen
Profile Data
Dissolved Oxygen (mg/L)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Surface
2 feet
4 feet
6 feet
8 feet
10 feet
12 feet
Water Depth
4/15/2013
4/23/2013
4/29/2013
5/6/2013
5/13/2013
5/20/2013
5/29/2013
6/4/2013
6/10/2013
6/18/2013
6/24/2013
7/1/2013
7/15/2013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


Mountain Lake
Annual Average Water Clarity
2006
2007
2008
2009
2010
2011
2012
2013
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
Annual Average Water Clarity (feet)


Average Annual Alkalinity
Sunset Lake
2009 to 2013
Average Annual Alkalinity (mg/L)
60
50
40
30
20
10
0
2009
2010
2011
2012
2013


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 Lake
Water Clarity
2009 to 2013
8-May
8-Jun
8-Jul
8-Aug
8-Sep
0
2
4
6
8
10
12
14
16
Water Clarity (feet)
2009
2010
2011
2012
2013


Mountain Lake
Water Clarity
2013
Date
5/8
5/15
5/22
5/30
6/5
6/12
6/19
6/26
7/10
7/17
7/24
7/31
8/7
8/14
8/21
8/28
9/5
Water Clarity (feet)
0
2
4
6
8
10
12
14
16
Notes: Ave. Annual Clarity: 8.71 feet
No Alum in 2013
2013

Order Information

Allied Biological Inc

***APL* Order ID :**	**13060264**
Site Name :	**Mt. Lakes**
Date to Lab :	**6/10/2013 1:12:00 PM**

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.

Samples List

Field ID	Lab ID	Matrix
Birchwood Lake	**13060264-001**	Lake
Mountain Lake	**13060264-002**	Lake
Cove Pond	**13060264-003**	Lake
Wildwood Lake	**13060264-004**	Lake
Grunden's Pond	**13060264-005**	Lake
Shadow Lake	**13060264-006**	Lake
Sunset Lake	**13060264-007**	Lake
Crystal Lake	**13060264-008**	Lake
Olive Pond	**13060264-009**	Lake

Birchwood Lake **13060264-001** 6/10/2013 , 9:15:00 AM Lake

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

Test	Method	Date Posted	MDL	Result	Units	Limit
Phosphorus, Total	SM4500P-E	6/24/2013	0.01	0.03	mg/L	-
Nitrate as N	EPA 300	6/11/2013	0.2	<0.2	mg/L	-
Turbidity (Nephelometric)	SM-18/ 2130-B	6/11/2013	1	1.18	NTU	-
Fecal Coliform	SM#18 9222	6/11/2013	2	4	cfu/100ml	-

Mountain Lake **13060264-002** 6/10/2013 , 11:05:00 AM Lake

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

Test	Method	Date Posted	MDL	Result	Units	Limit
Phosphorus, Total	SM4500P-E	6/24/2013	0.01	0.04	mg/L	-
Nitrate as N	EPA 300	6/11/2013	0.2	<0.2	mg/L	-
Turbidity (Nephelometric)	SM-18/ 2130-B	6/11/2013	1	<1	NTU	-
Fecal Coliform	SM#18 9222	6/11/2013	2	58	cfu/100ml	-

Cove Pond **13060264-003** 6/10/2013 , 10:40:00 AM Lake

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

Test	Method	Date Posted	MDL	Result	Units	Limit
Phosphorus, Total	SM4500P-E	6/24/2013	0.01	0.08	mg/L	-
Nitrate as N	EPA 300	6/11/2013	0.2	<0.2	mg/L	-
Turbidity (Nephelometric)	SM-18/ 2130-B	6/11/2013	1	1.9	NTU	-

Wildwood Lake **13060264-004** 6/10/2013 , 11:20:00 AM Lake

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

Test	Method	Date Posted	MDL	Result	Units	Limit
Phosphorus, Total	SM4500P-E	6/24/2013	0.01	0.06	mg/L	-
Nitrate as N	EPA 300	6/11/2013	0.2	0.6	mg/L	-
Turbidity (Nephelometric)	SM-18/ 2130-B	6/11/2013	1	2.01	NTU	-

Grunden's Pond **13060264-005** 6/10/2013 , 10:50:00 AM Lake

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

Test	Method	Date Posted	MDL	Result	Units	Limit
Phosphorus, Total	SM4500P-E	6/24/2013	0.01	0.11	mg/L	-
Nitrate as N	EPA 300	6/11/2013	0.2	0.5	mg/L	-
Turbidity (Nephelometric)	SM-18/ 2130-B	6/11/2013	1	3.42	NTU	-

Shadow Lake **13060264-006** 6/10/2013 , 10:25:00 AM Lake

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

Test	Method	Date Posted	MDL	Result	Units	Limit
Phosphorus, Total	SM4500P-E	6/24/2013	0.01	0.14	mg/L	-
Nitrate as N	EPA 300	6/11/2013	0.2	<0.2	mg/L	-
Turbidity (Nephelometric)	SM-18/ 2130-B	6/11/2013	1	2.31	NTU	-

Sunset Lake **13060264-007** 6/10/2013 , 9:50:00 AM Lake

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

Test	Method	Date Posted	MDL	Result	Units	Limit
Phosphorus, Total	SM4500P-E	6/24/2013	0.01	0.03	mg/L	-
Nitrate as N	EPA 300	6/11/2013	0.2	<0.2	mg/L	-
Turbidity (Nephelometric)	SM-18/ 2130-B	6/11/2013	1	1.70	NTU	-

Crystal Lake **13060264-008** 6/10/2013 , 10:00:00 AM Lake

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

Test	Method	Date Posted	MDL	Result	Units	Limit
Phosphorus, Total	SM4500P-E	6/24/2013	0.01	0.04	mg/L	-
Nitrate as N	EPA 300	6/11/2013	0.2	<0.2	mg/L	-
Turbidity (Nephelometric)	SM-18/ 2130-B	6/11/2013	1	1.74	NTU	-

Olive Pond **13060264-009** 6/10/2013 , 10:10:00 AM Lake

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

Test	Method	Date Posted	MDL	Result	Units	Limit
Phosphorus, Total	SM4500P-E	6/24/2013	0.01	0.04	mg/L	-
Nitrate as N	EPA 300	6/11/2013	0.2	<0.2	mg/L	-
Turbidity (Nephelometric)	SM-18/ 2130-B	6/11/2013	1	2.26	NTU	-

Report Key:

| *Description*

Result	Units	Limit
x	mg/	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.

Other

PQL- Practical Quantitation Limit

MDL- Method Detection Limit

APL

AQUA PRO-TECH LABORATORIES
Certified Environmental Testing

ACCREDITED IN ACCORDANCE WITH nelac

ANALYTICAL RESULTS

STANDARD DELIVERABLES FORMAT

APL WORK ORDER NUMBER: 3070187

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.

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 Conference
NJDEP #07010 / NYDOH #11634

APL

AQUA PRO-TECH LABORATORIES
Certified Environmental Testing

Analytical Results Summary

Mt. Lakes

Client:	**Allied Biological**	**Contact:**	**Chris Doyle**
APL Order ID:	**3070187**	**Received:**	**7/8/13 13:05**

Sample ID/Analysis	Method	Prepared	Analyzed	Result	Qual	MDL	RL	Units
3070187-01 (Water)		Wildwood Lake			Collected:	7/8/13 11:15		
General Chemistry								
Turbidity	2130 B	7/9/13 11:00	7/9/13 11:00	2.4			1.0	NTU
Phosphorus	4500PE	7/10/13 9:00	7/10/13 9:00	0.0600			0.0100	mg/L
Nitrate	EPA 300	7/9/13 13:11	7/9/13 13:55	ND			0.200	mg/L
3070187-02 (Water)		Mt. Lake			Collected:	7/8/13 11:05		
General Chemistry								
Turbidity	2130 B	7/9/13 11:00	7/9/13 11:00	1.0			1.0	NTU
Phosphorus	4500PE	7/10/13 9:00	7/10/13 9:00	0.0500			0.0100	mg/L
Nitrate	EPA 300	7/9/13 13:11	7/9/13 13:55	ND			0.200	mg/L
3070187-03 (Water)		Grundens Pond			Collected:	7/8/13 10:45		
General Chemistry								
Turbidity	2130 B	7/9/13 11:00	7/9/13 11:00	3.9			1.0	NTU
Phosphorus	4500PE	7/10/13 9:00	7/10/13 9:00	0.0900			0.0100	mg/L
Nitrate	EPA 300	7/9/13 13:11	7/9/13 13:55	ND			0.200	mg/L
3070187-04 (Water)		Cove Pond			Collected:	7/8/13 10:35		
General Chemistry								
Turbidity	2130 B	7/9/13 11:00	7/9/13 11:00	2.9			1.0	NTU
Phosphorus	4500PE	7/10/13 9:00	7/10/13 9:00	0.130			0.0100	mg/L
Nitrate	EPA 300	7/9/13 13:11	7/9/13 13:55	ND			0.200	mg/L
3070187-05 (Water)		Shadow Lake			Collected:	7/8/13 10:28		
General Chemistry								
Turbidity	2130 B	7/9/13 11:00	7/9/13 11:00	2.6			1.0	NTU
Phosphorus	4500PE	7/10/13 9:00	7/10/13 9:00	0.0900			0.0100	mg/L
Nitrate	EPA 300	7/9/13 13:11	7/9/13 13:55	ND			0.200	mg/L

Analytical Results Summary

Mt. Lakes

Client:	**Allied Biological**	**Contact:**	**Chris Doyle**
APL Order ID:	**3070187**	**Received:**	**7/8/13 13:05**

Sample ID/Analysis	Method	Prepared	Analyzed	Result	Qual	MDL	RL	Units
3070187-06 (Water)		Olive Pond			Collected:	7/8/13 10:20		
General Chemistry								
Turbidity	2130 B	7/9/13 11:00	7/9/13 11:00	10			1.0	NTU
Phosphorus	4500PE	7/10/13 9:00	7/10/13 9:00	0.130			0.0100	mg/L
Nitrate	EPA 300	7/9/13 13:11	7/9/13 13:55	ND			0.200	mg/L
3070187-07 (Water)		Crystal Lake			Collected:	7/8/13 10:10		
General Chemistry								
Turbidity	2130 B	7/9/13 11:00	7/9/13 11:00	1.3			1.0	NTU
Phosphorus	4500PE	7/10/13 9:00	7/10/13 9:00	0.0400			0.0100	mg/L
Nitrate	EPA 300	7/9/13 13:11	7/9/13 13:55	ND			0.200	mg/L
3070187-08 (Water)		Sunset Lake			Collected:	7/8/13 9:55		
General Chemistry								
Turbidity	2130 B	7/9/13 11:00	7/9/13 11:00	2.5			1.0	NTU
Phosphorus	4500PE	7/10/13 9:00	7/10/13 9:00	0.0600			0.0100	mg/L
Nitrate	EPA 300	7/9/13 13:11	7/9/13 13:55	ND			0.200	mg/L
3070187-09 (Water)		Birchwood Lake			Collected:	7/8/13 9:30		
General Chemistry								
Turbidity	2130 B	7/9/13 11:00	7/9/13 11:00	1.3			1.0	NTU
Phosphorus	4500PE	7/10/13 9:00	7/10/13 9:00	0.0400			0.0100	mg/L
Nitrate	EPA 300	7/9/13 13:11	7/9/13 13:55	ND			0.200	mg/L

APL

AQUA PRO-TECH LABORATORIES
Certified Environmental Testing

Client: Allied Biological
580 Rockport Road
Hackettstown, NJ 07840

APL Order ID Number: 3080220
Collected : 8/7/13 10:10
Received: 08/07/2013

Contact: Chris Doyle
Report Date: 08/16/2013 14:31

Client Project: Mountain Lakes
Customer Service Rep: Cyndi Babula

Analytical Results Summary

Sample Number / Analyte	Method	Prepared	Analyzed	Result	Qual	MDL	RL	Units
3080220-01 Lake		**Birchwood Lake**						
General Chemistry								
Nitrate	EPA 300	8/8/13 12:56	8/8/13 12:58	ND			0.200	mg/L
Phosphorus	**4500PE**	8/12/13 9:00	8/12/13 9:00	**0.0300**			**0.0100**	**mg/L**
Turbidity	**2130 B**	8/7/13 15:00	8/7/13 15:00	**1.3**			**1.0**	**NTU**
3080220-02 Lake		**Crystal Lake**						
General Chemistry								
Nitrate	EPA 300	8/8/13 12:56	8/8/13 12:58	ND			0.200	mg/L
Phosphorus	**4500PE**	8/12/13 9:00	8/12/13 9:00	**0.0300**			**0.0100**	**mg/L**
Turbidity	**2130 B**	8/7/13 15:00	8/7/13 15:00	**2.0**			**1.0**	**NTU**
3080220-03 Lake		**Sunset Lake**						
General Chemistry								
Nitrate	EPA 300	8/8/13 12:56	8/8/13 12:58	ND			0.200	mg/L
Phosphorus	**4500PE**	8/12/13 9:00	8/12/13 9:00	**0.0500**			**0.0100**	**mg/L**
Turbidity	**2130 B**	8/7/13 15:00	8/7/13 15:00	**5.2**			**1.0**	**NTU**
3080220-04 Lake		**Olive Pond**						

FootNotes

RL - Reporting limit
MDL - Minimum detection limit
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.

Brian Wood
Laboratory Director

1275 BLOOMFIELD AVE, BLDG. 6, FAIRFIELD, NJ 07004 TEL 973 227 0422 FAX 973 227 2813

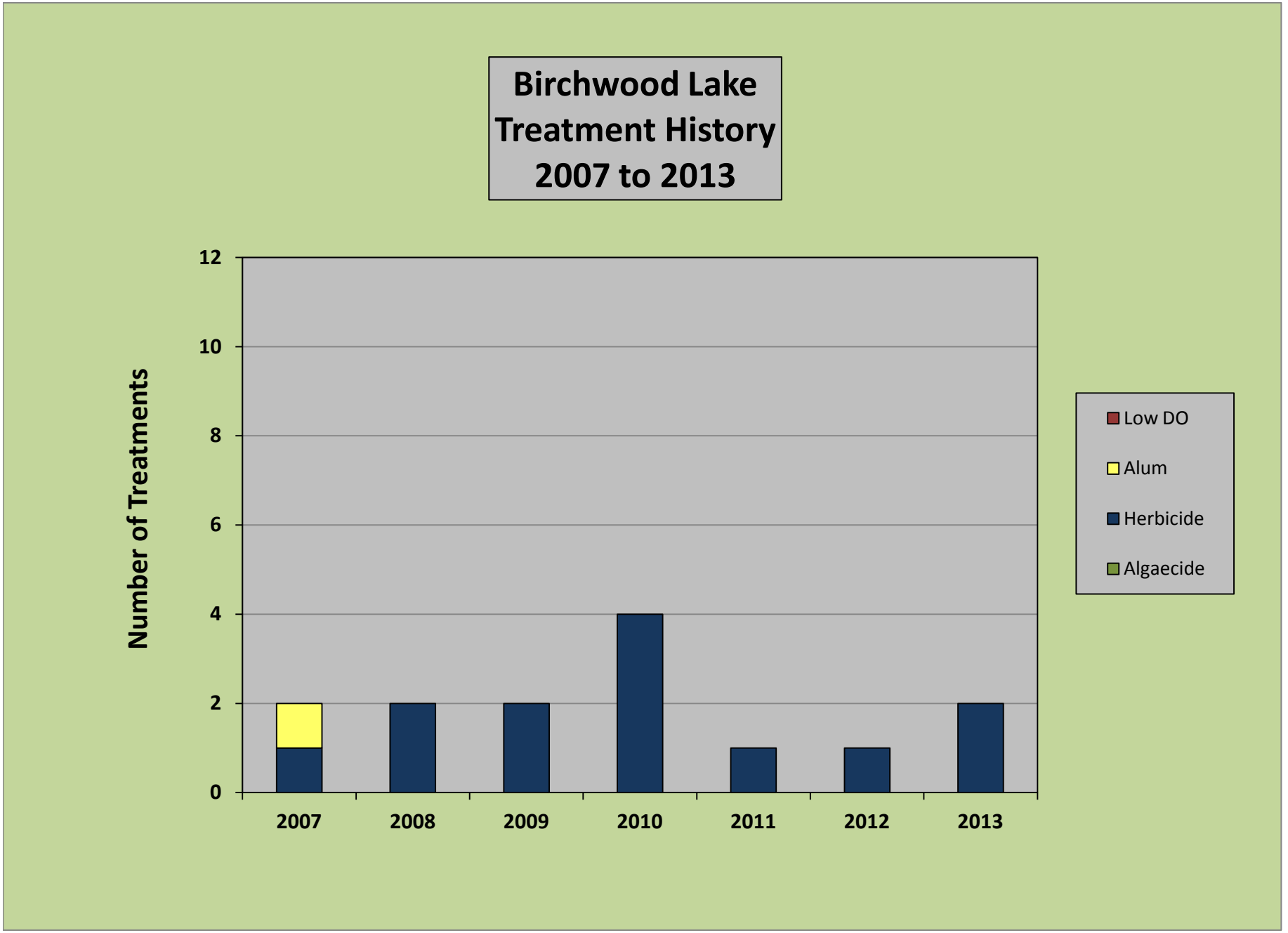
Analytical Results Summary

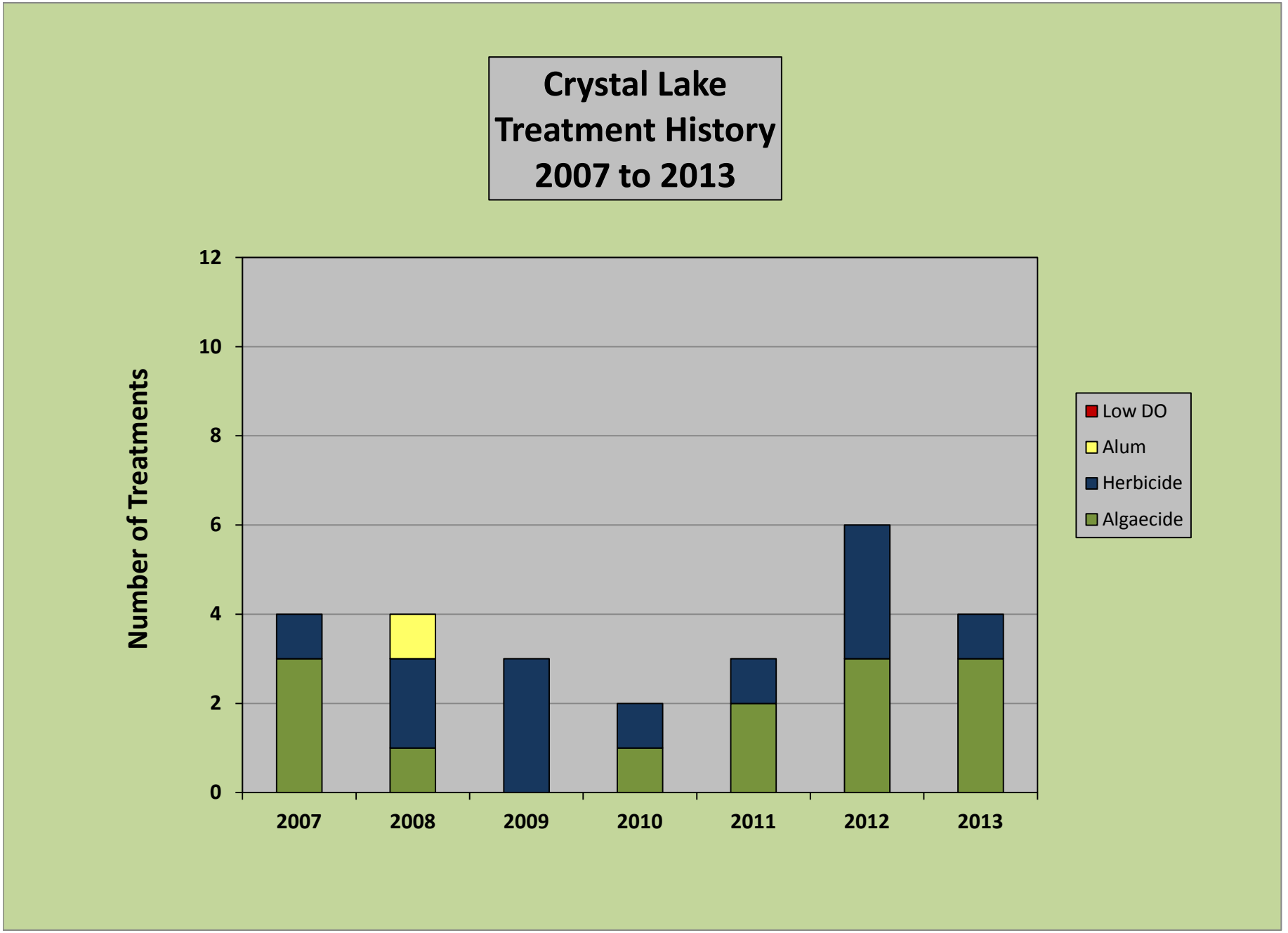
Sample Number / Analyte	Method	Prepared	Analyzed	Result	Qual	MDL	RL	Units
3080220-04 Lake		**Olive Pond**						
General Chemistry								
Nitrate	EPA 300	8/8/13 12:56	8/8/13 12:58	ND			0.200	mg/L
Phosphorus	**4500PE**	8/12/13 9:00	8/12/13 9:00	**0.0800**			**0.0100**	**mg/L**
Turbidity	**2130 B**	8/7/13 15:00	8/7/13 15:00	**4.4**			**1.0**	**NTU**
3080220-05 Lake		**Shadow Lake**						
General Chemistry								
Nitrate	EPA 300	8/8/13 12:56	8/8/13 12:58	ND			0.200	mg/L
Phosphorus	**4500PE**	8/12/13 9:00	8/12/13 9:00	**0.0900**			**0.0100**	**mg/L**
Turbidity	**2130 B**	8/7/13 15:00	8/7/13 15:00	**6.3**			**1.0**	**NTU**
3080220-06 Lake		**Cove Pond**						
General Chemistry								
Nitrate	EPA 300	8/8/13 12:56	8/8/13 12:58	ND			0.200	mg/L
Phosphorus	**4500PE**	8/12/13 9:00	8/12/13 9:00	**0.0900**			**0.0100**	**mg/L**
Turbidity	**2130 B**	8/7/13 15:00	8/7/13 15:00	**4.0**			**1.0**	**NTU**
3080220-07 Lake		**Grunden's Pond**						
General Chemistry								
Nitrate	EPA 300	8/8/13 12:56	8/8/13 12:58	ND			0.200	mg/L
Phosphorus	**4500PE**	8/12/13 9:00	8/12/13 9:00	**0.110**			**0.0100**	**mg/L**
Turbidity	**2130 B**	8/7/13 15:00	8/7/13 15:00	**7.0**			**1.0**	**NTU**
3080220-08 Lake		**Mountain Lake**						
General Chemistry								
Nitrate	EPA 300	8/8/13 12:56	8/8/13 12:58	ND			0.200	mg/L
Phosphorus	**4500PE**	8/12/13 9:00	8/12/13 9:00	**0.0200**			**0.0100**	**mg/L**
Turbidity	**2130 B**	8/7/13 15:00	8/7/13 15:00	**1.6**			**1.0**	**NTU**
3080220-09 Lake		**Wildwood Lake**						
General Chemistry								
Nitrate	EPA 300	8/8/13 12:56	8/8/13 12:58	ND			0.200	mg/L
Phosphorus	**4500PE**	8/12/13 9:00	8/12/13 9:00	**0.0800**			**0.0100**	**mg/L**
Turbidity	**2130 B**	8/7/13 15:00	8/7/13 15:00	**4.7**			**1.0**	**NTU**

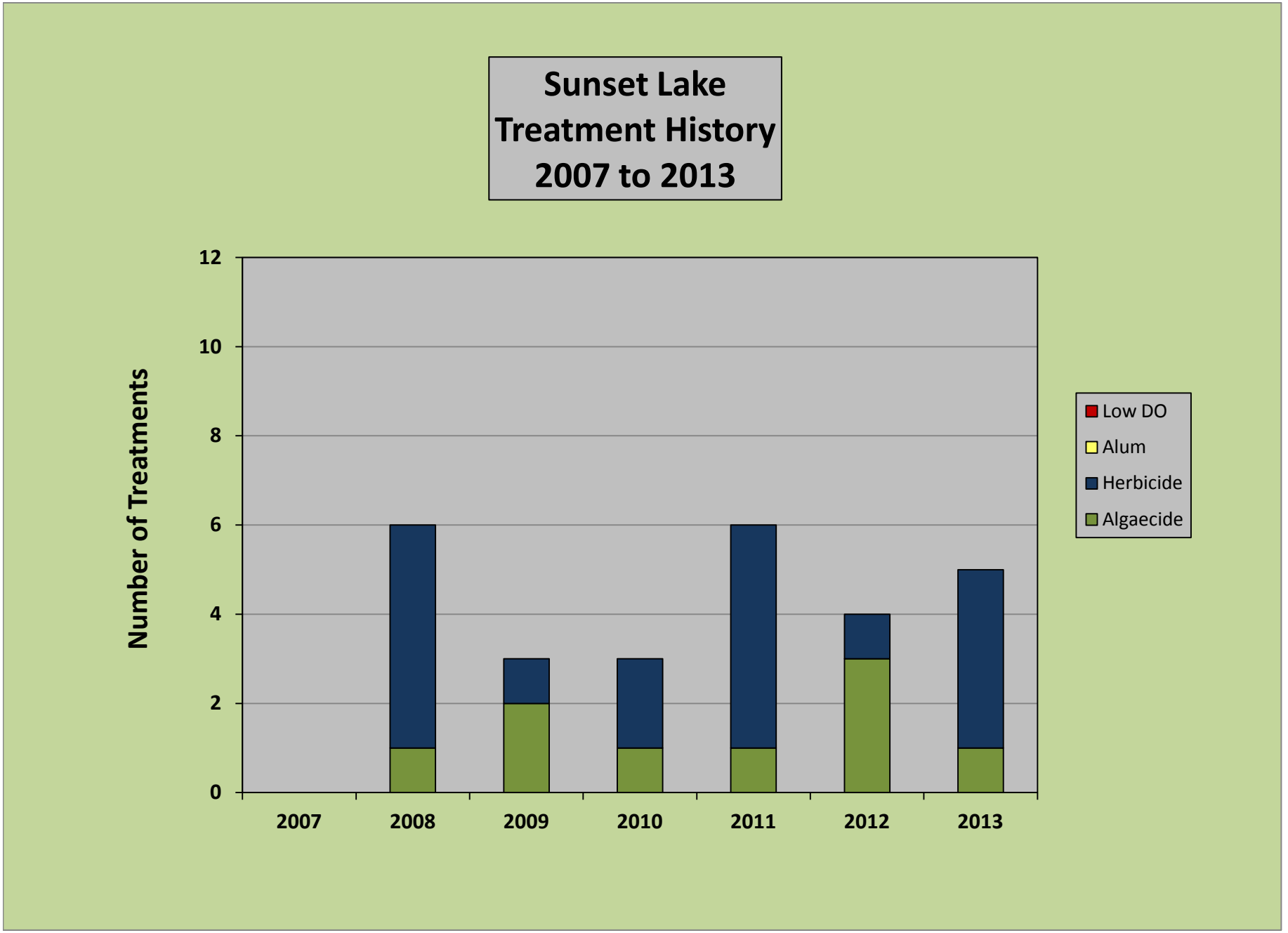
FootNotes

RL - Reporting limit
MDL - Minimum detection limit
ND - Indicates compound analyzed for but not detected
J - Indicates estimated value

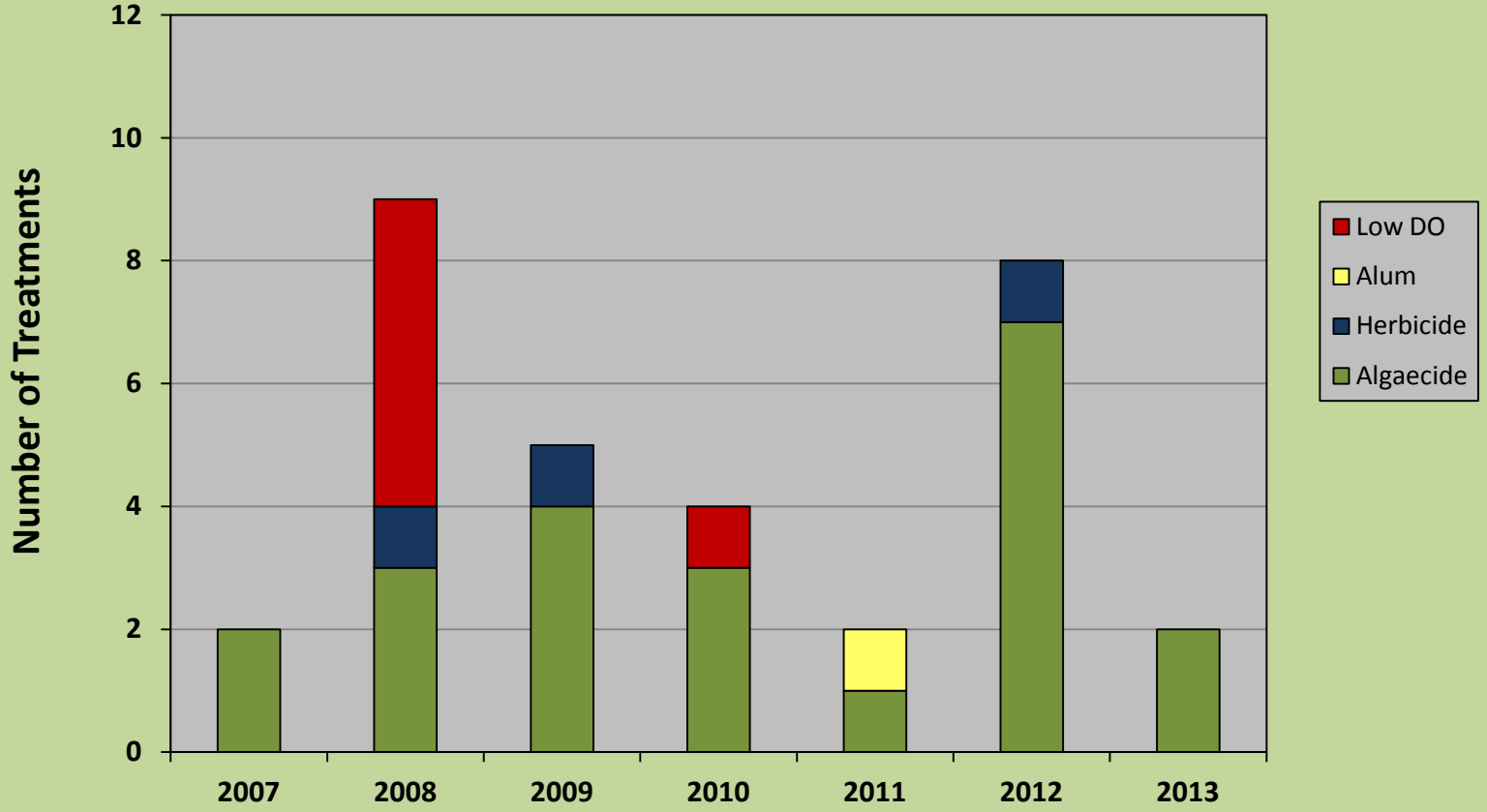
B - Indicates compound found in associated blank
E - Concentration exceeds highest calibration standard
D - Indicates result is based on a dilution
P - Greater than 25% diff. between 2 GC columns.


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

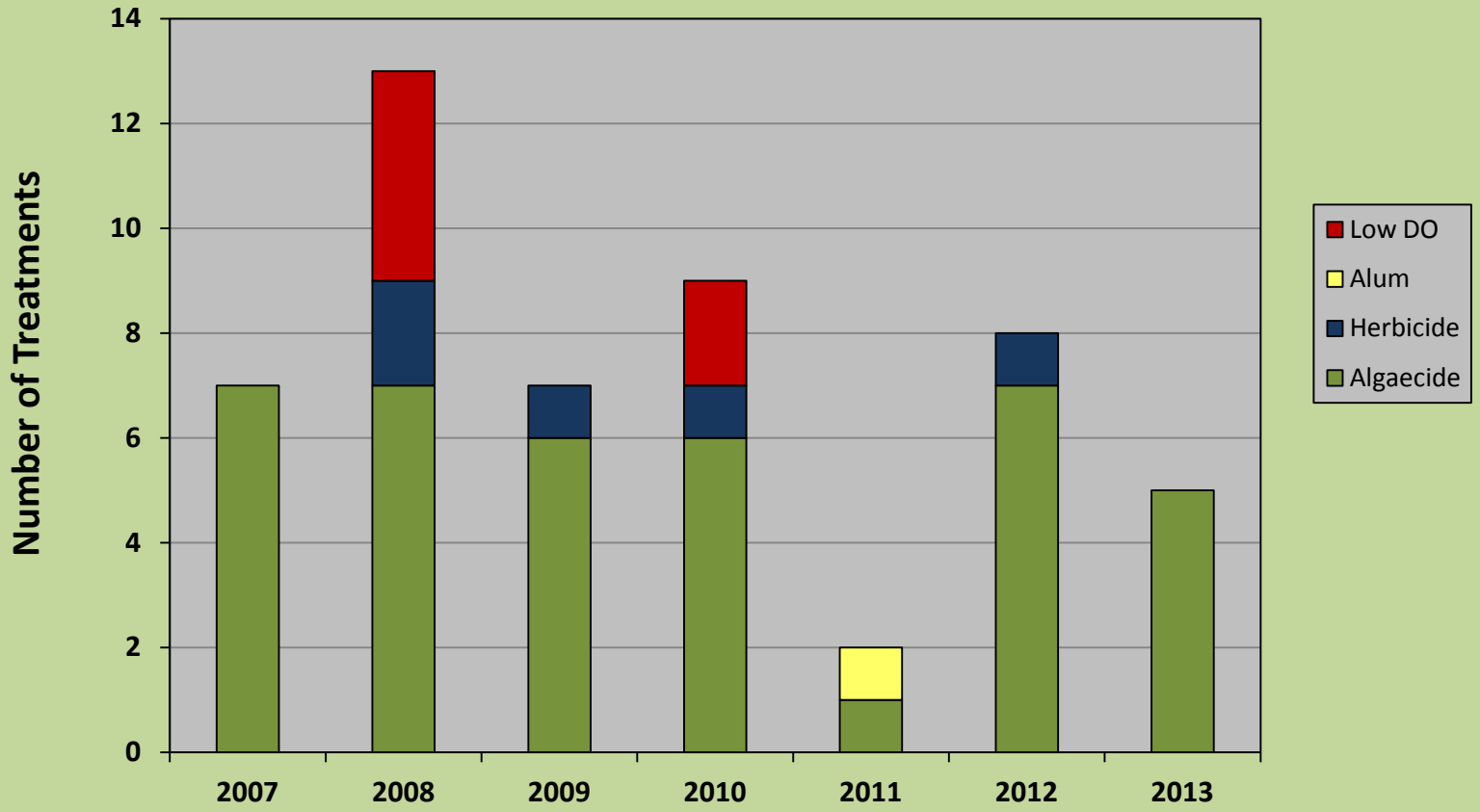

Crystal Lake
Treatment History
2007 to 2013
Number of Treatments
12
10
8
6
4
2
0
2007
2008
2009
2010
2011
2012
2013
Low DO
Alum
Herbicide
Algaecide

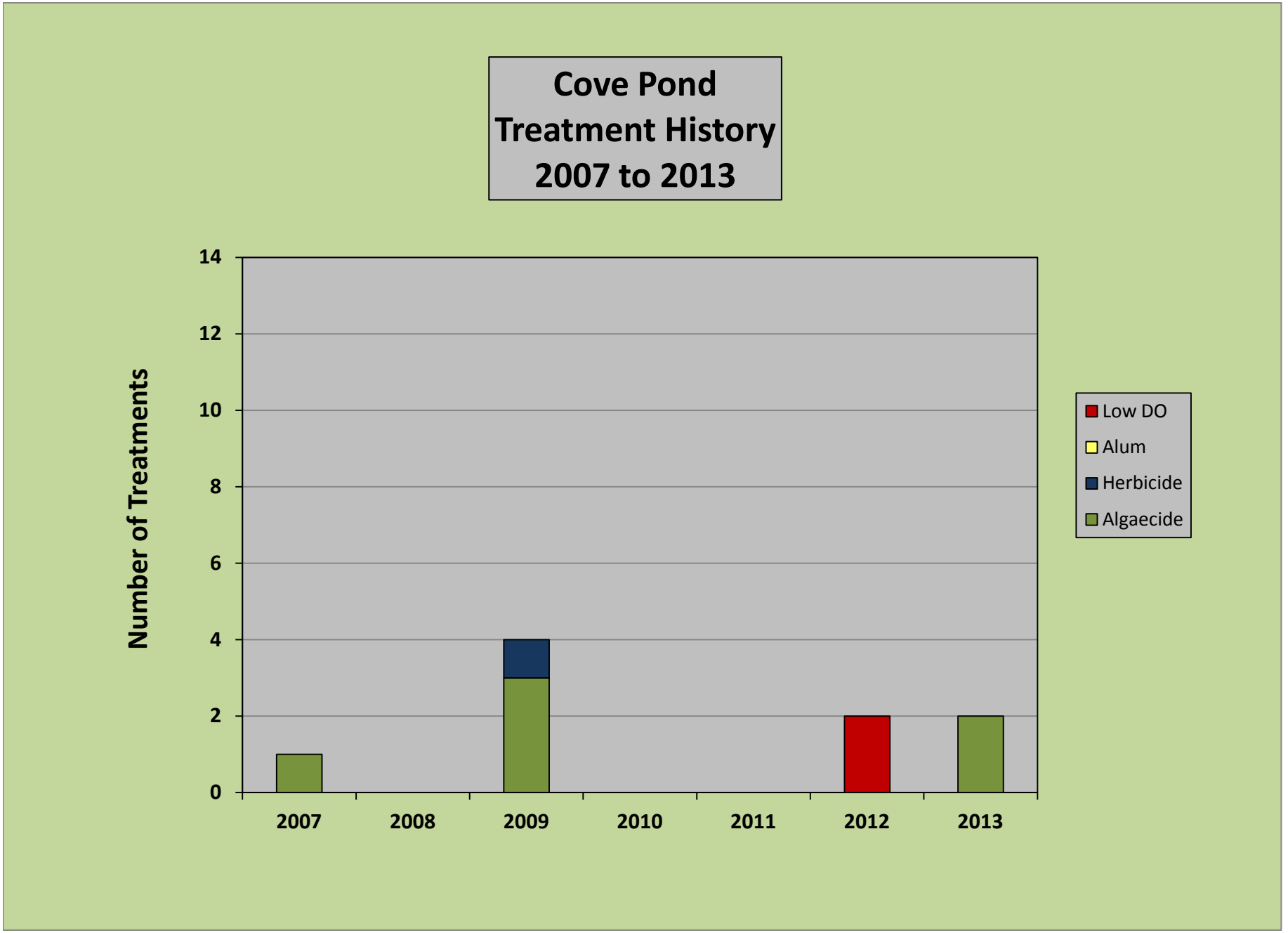

Sunset Lake
Treatment History
2007 to 2013
Number of Treatments
12
10
8
6
4
2
0
2007
2008
2009
2010
2011
2012
2013
Low DO
Alum
Herbicide
Algaecide

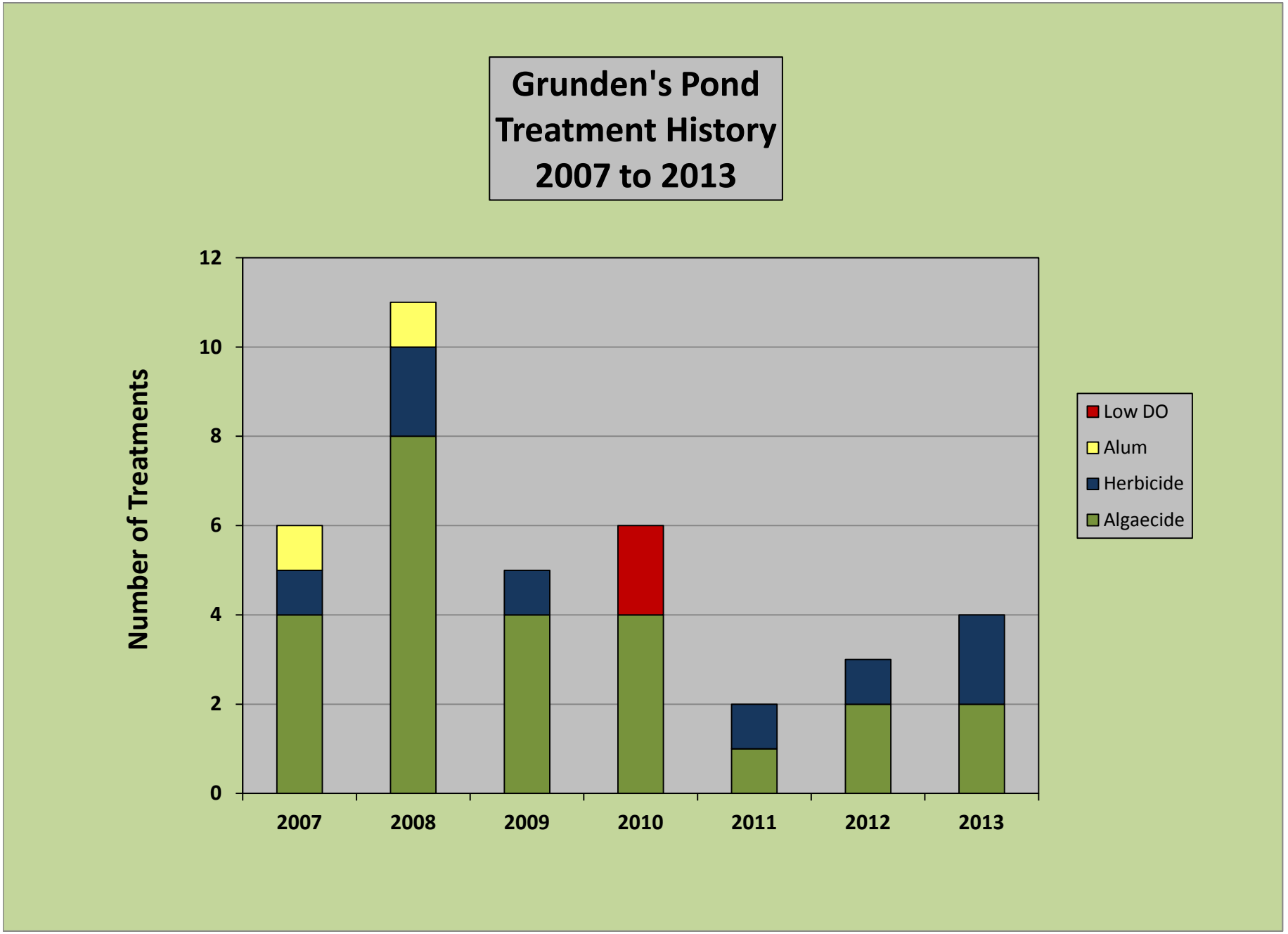
Olive Pond Treatment History 2007 to 2013



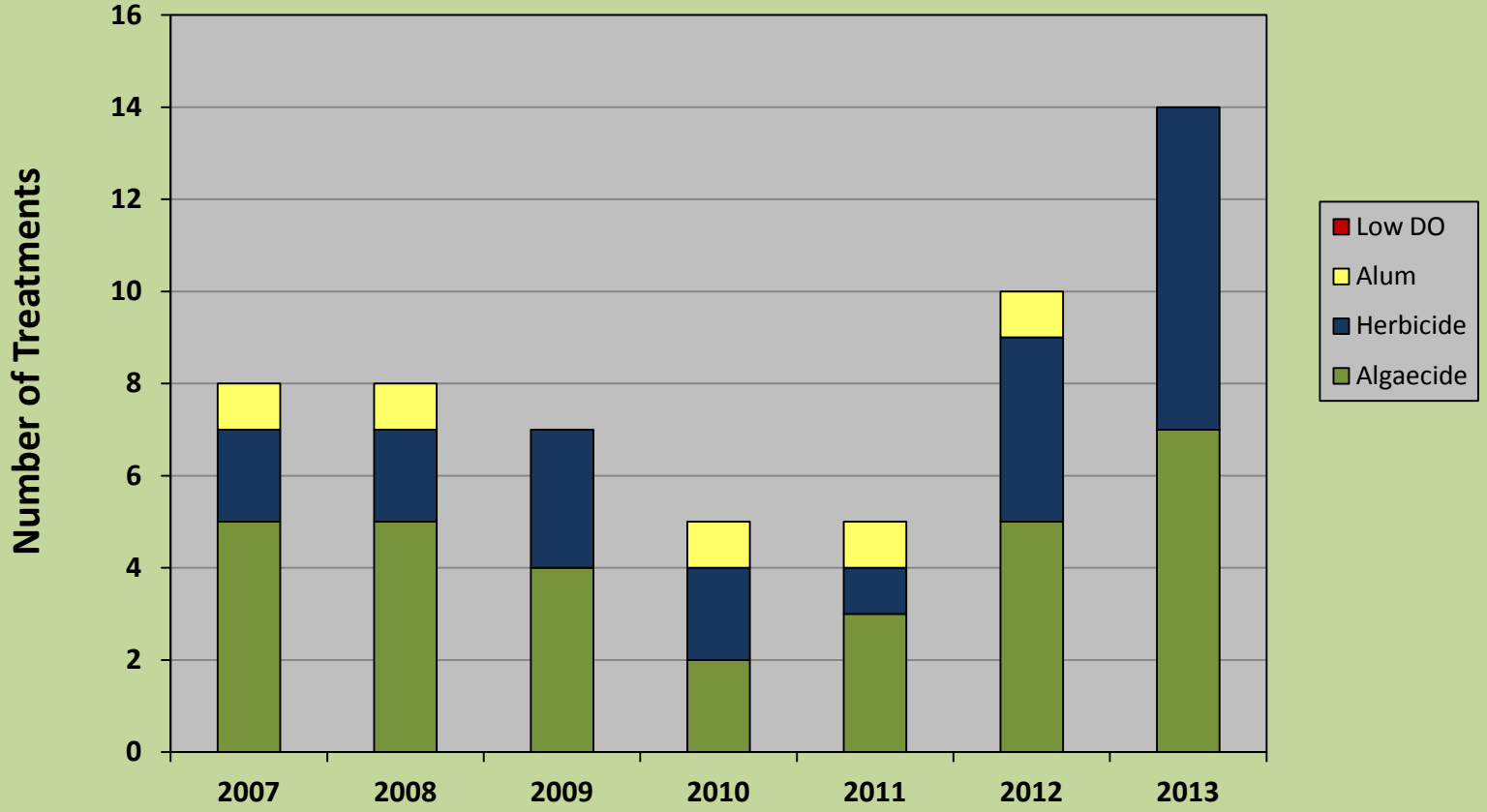
Shadow Lake Treatment History 2007 to 2013



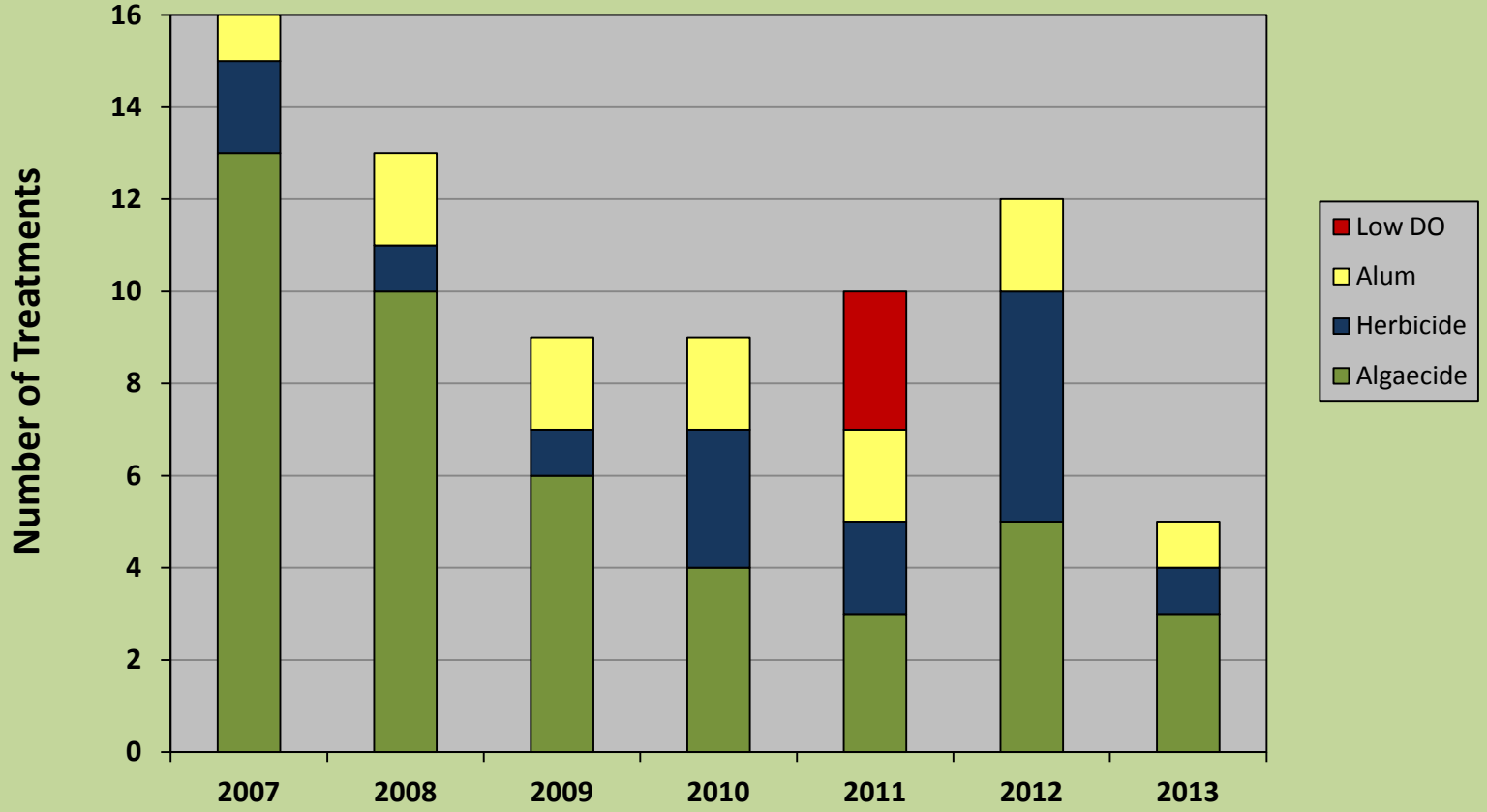

Cove Pond
Treatment History
2007 to 2013
Number of Treatments
14
12
10
8
6
4
2
0
2007
2008
2009
2010
2011
2012
2013
Low DO
Alum
Herbicide
Algaecide


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

Mountain Lake Treatment History 2007 to 2013



Wildwood Lake Treatment History 2007 to 2013



Mountain Lakes
2013 Phytoplankton Summary

Birchwood Lake

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/4/2013	70	30	20	70				190
6/18/2013		40	70	10				120
7/1/2013	20		60				30	110
7/16/2013			50	30				80
8/5/2013		20	140					160
8/20/2013			120	40				160

Crystal Lake

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/4/2013	20	90	10	30		20		170
6/18/2013		370	150					520
7/1/2013			430					430
7/16/2013			540	150				690
8/5/2013		10	180					190
8/20/2013			30	290				320

Sunset Lake

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/4/2013		50	40	40				130
6/18/2013		120	170	40				330
7/1/2013	10	30	370					410
7/16/2013	10		500	20				530
8/5/2013	10	30	260	10		10	20	340
8/20/2013	10		90	270				370

Olive Pond

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/4/2013	10	90	90	100			10	300
7/1/2013	90		300	110			10	510
8/5/2013	170	10	480	60	30	10		760

Shadow Lake

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/4/2013	20	90	20	30			10	170
7/1/2013	10		200	250				460
7/16/2013	10		660	13,420			20	14110
8/5/2013	10	20	1160	2010	10	10		3220

Cove Pond

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/4/2013	20	10	40	40				110
7/1/2013	60	10	200	310		20		600
8/5/2013		80	220	630	30			960

Grunden's Pond

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/4/2013	40	40	20				40	140
7/1/2013	30	10	260	190			290	780
8/5/2013	220	30	680	700		10	10	1650

Mountain Lake

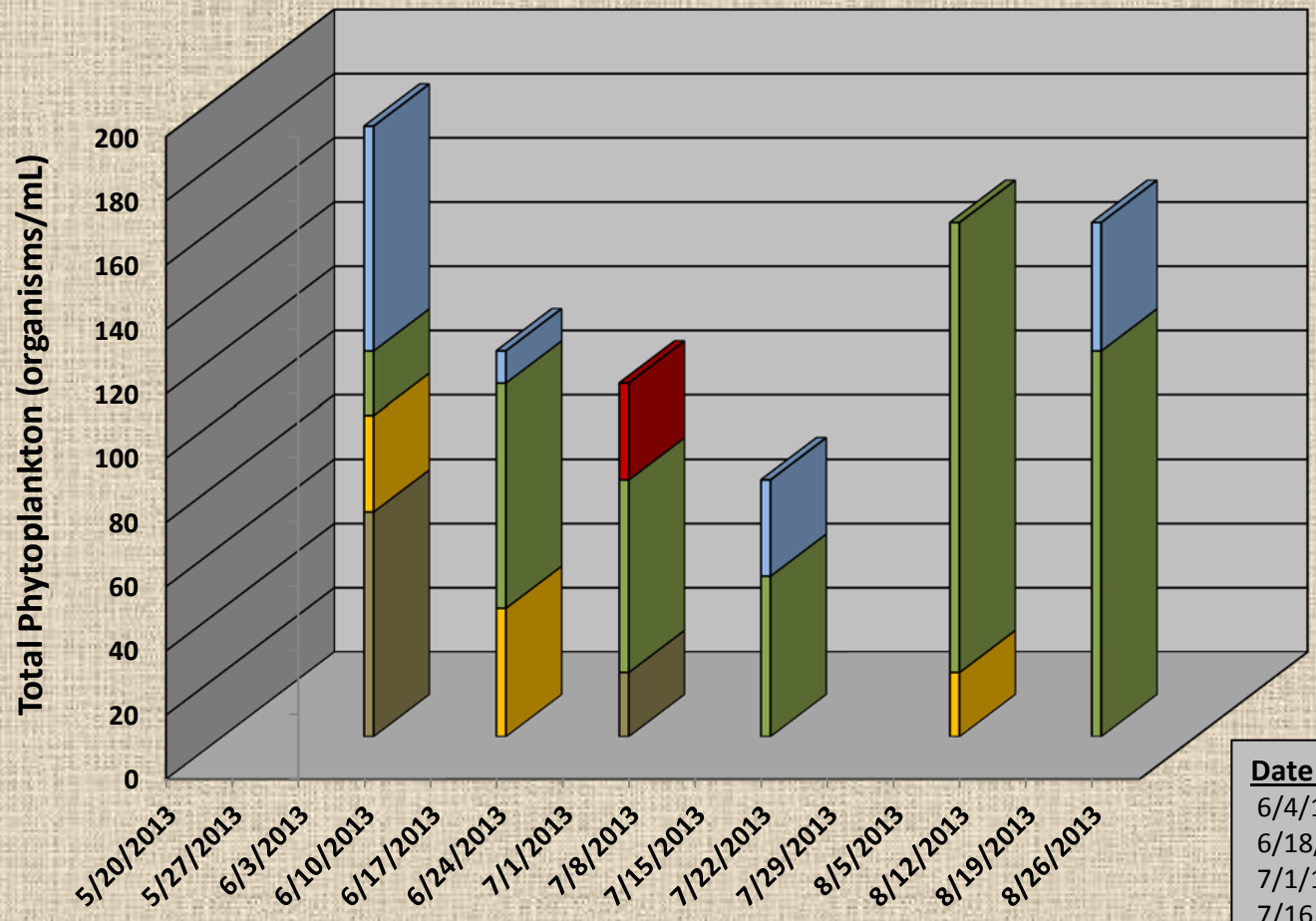
Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/4/2013	70	40	150	10				270
6/18/2013	40	80	50	20	10			200
7/1/2013	10		200	10		10		230
7/16/2013		100	160					260
8/5/2013	20	90	330					440
8/20/2013		60	50	150			10	270

Wildwood Lake

Date	Diatoms	Golden Algae	Green Algae	Blue-green Algae	Protozoa	Euglenoids	Dinoflagellates	Total Algae
6/4/2013	150	20	40	70			10	290
6/18/2013	50	40	150				10	250
7/1/2013	20		180				10	210
7/16/2013	140	60	510	30				740
7/30/2013		120	290					410
8/5/2013	10	30	330			10		380
8/20/2013				30				30

Allied Biological

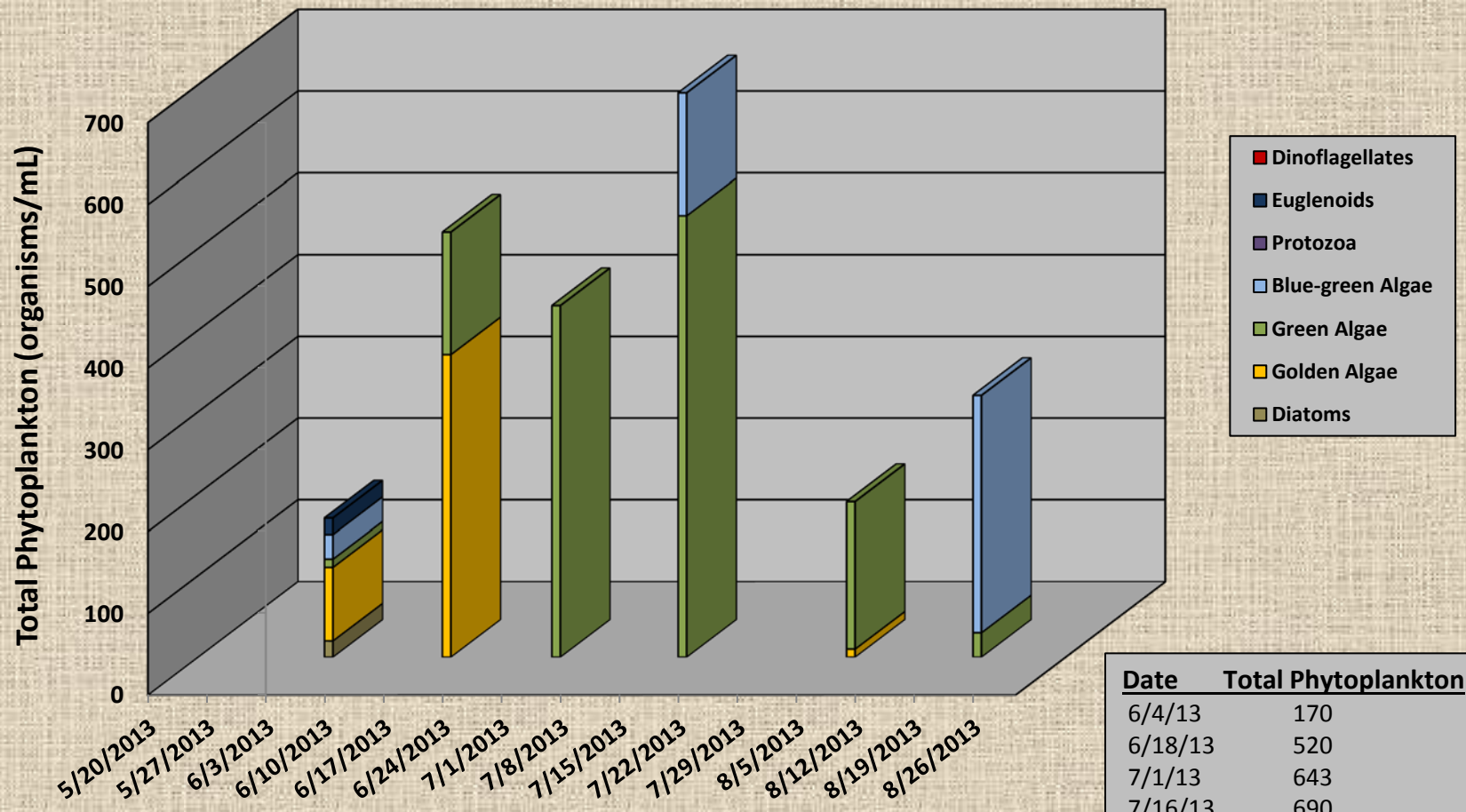
Birchwood Lake
2013 Phytoplankton Distribution



Date	Total Phytoplankton
6/4/13	190
6/18/13	120
7/1/13	110
7/16/13	80
8/5/13	160
8/20/13	160

Allied Biological

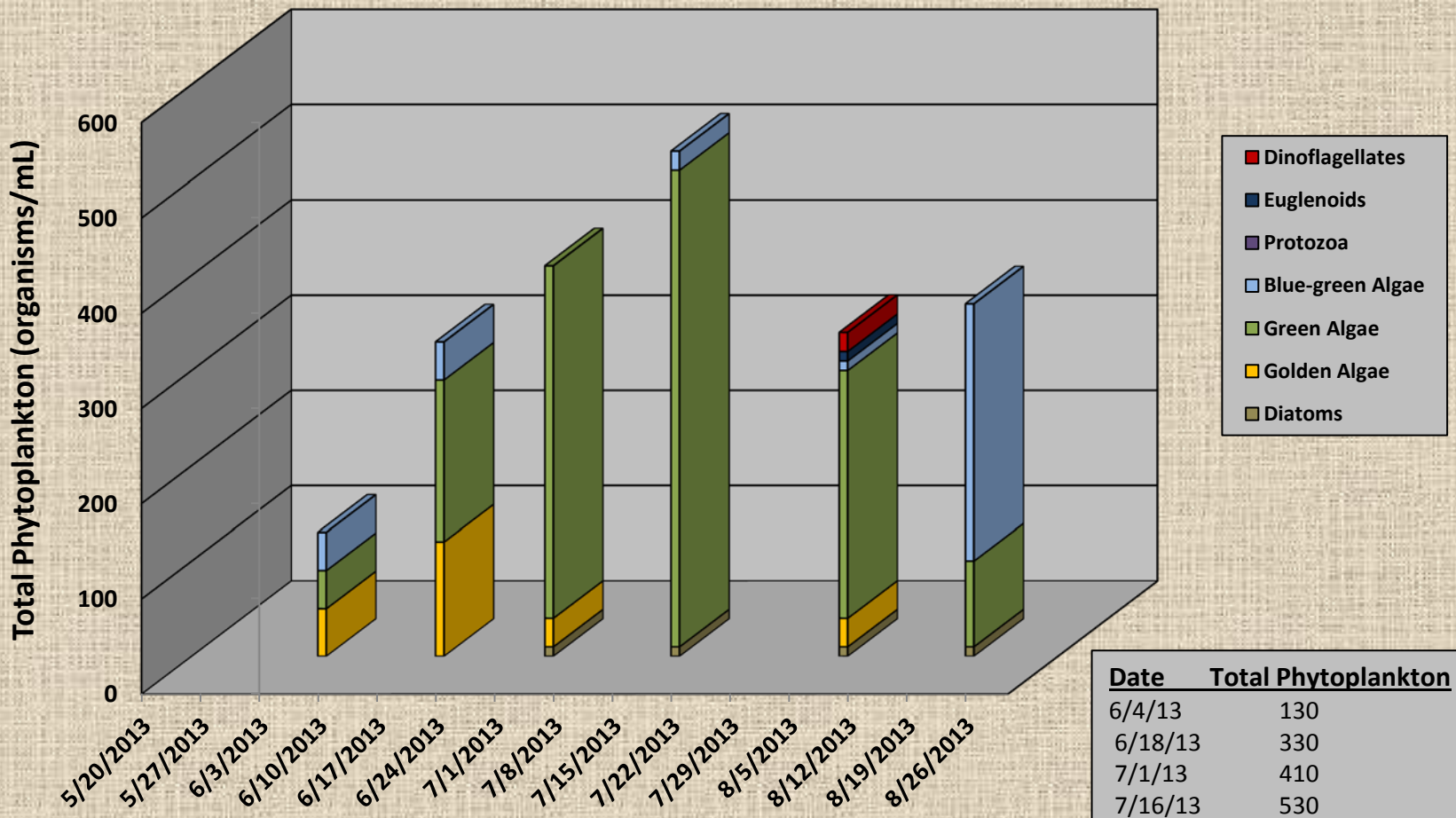
Crystal Lake
2013 Phytoplankton Distribution



Date	Total Phytoplankton
6/4/13	170
6/18/13	520
7/1/13	643
7/16/13	690
8/5/13	190
8/20/13	320

Allied Biological

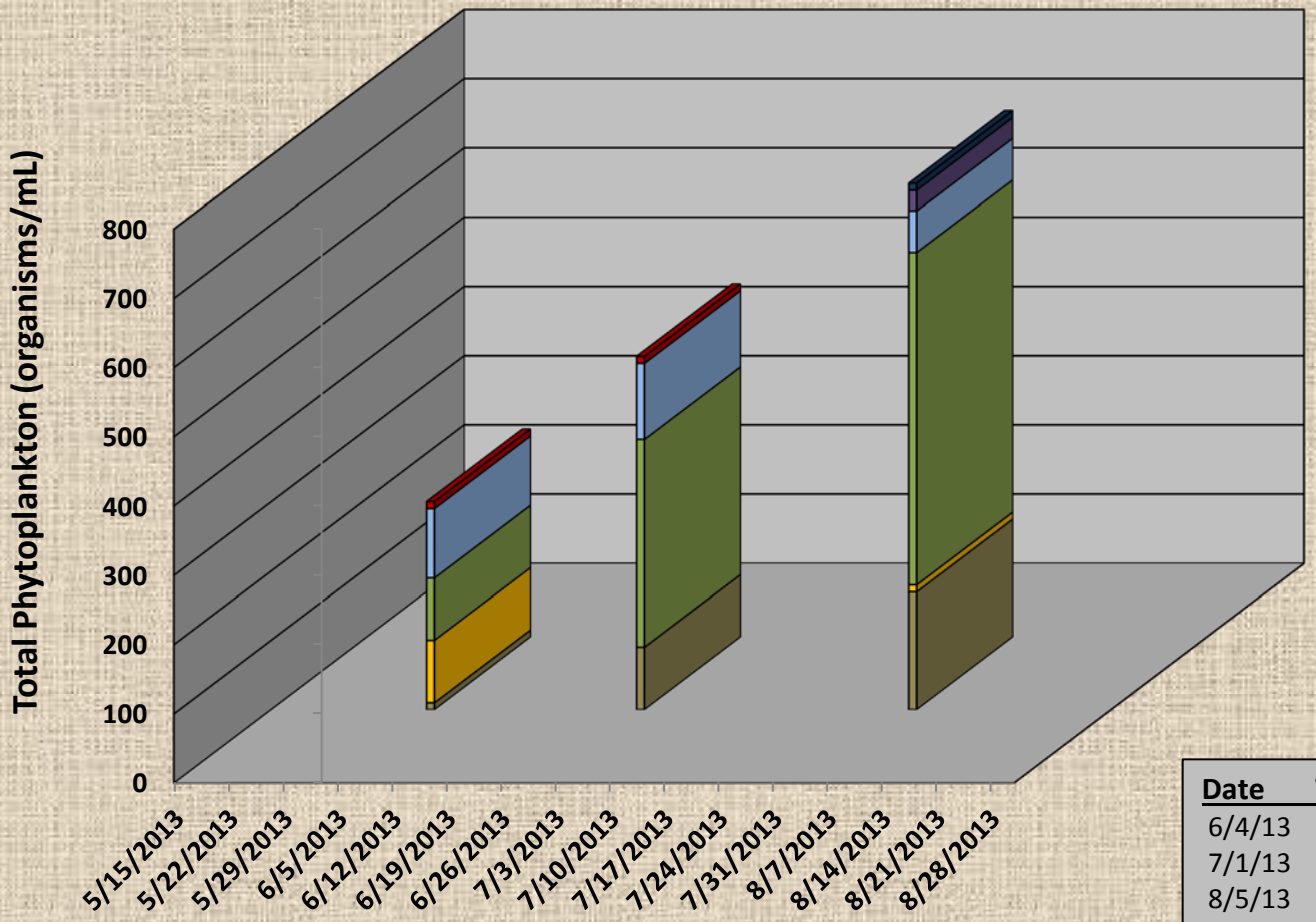
Sunset Lake
2013 Phytoplankton Distribution



Date	Total Phytoplankton
6/4/13	130
6/18/13	330
7/1/13	410
7/16/13	530
8/5/13	340
8/20/13	370

Allied Biological

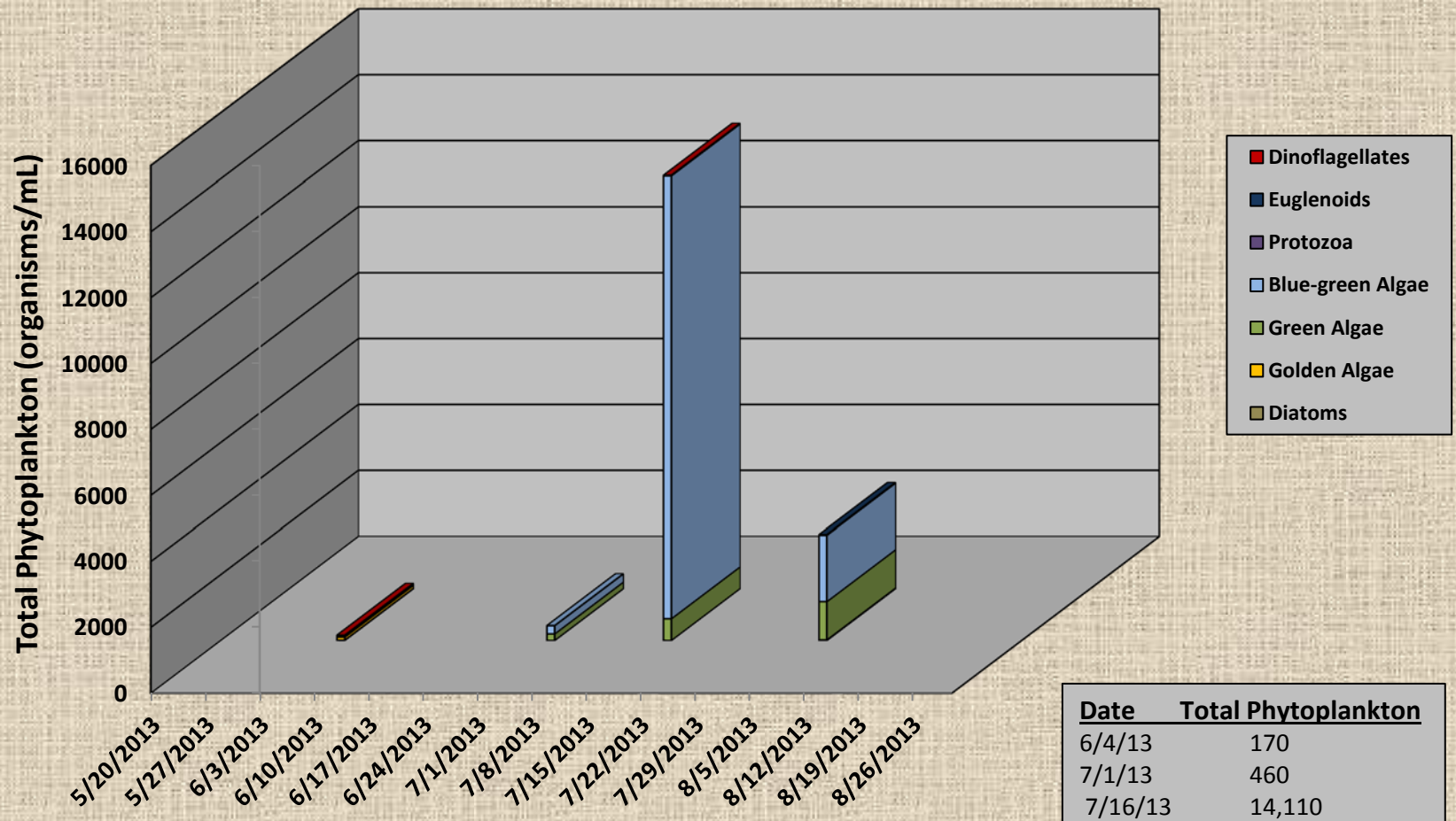
Olive Pond
2013 Phytoplankton Distribution



Date	Total Phytoplankton
6/4/13	300
7/1/13	510
8/5/13	760

Allied Biological

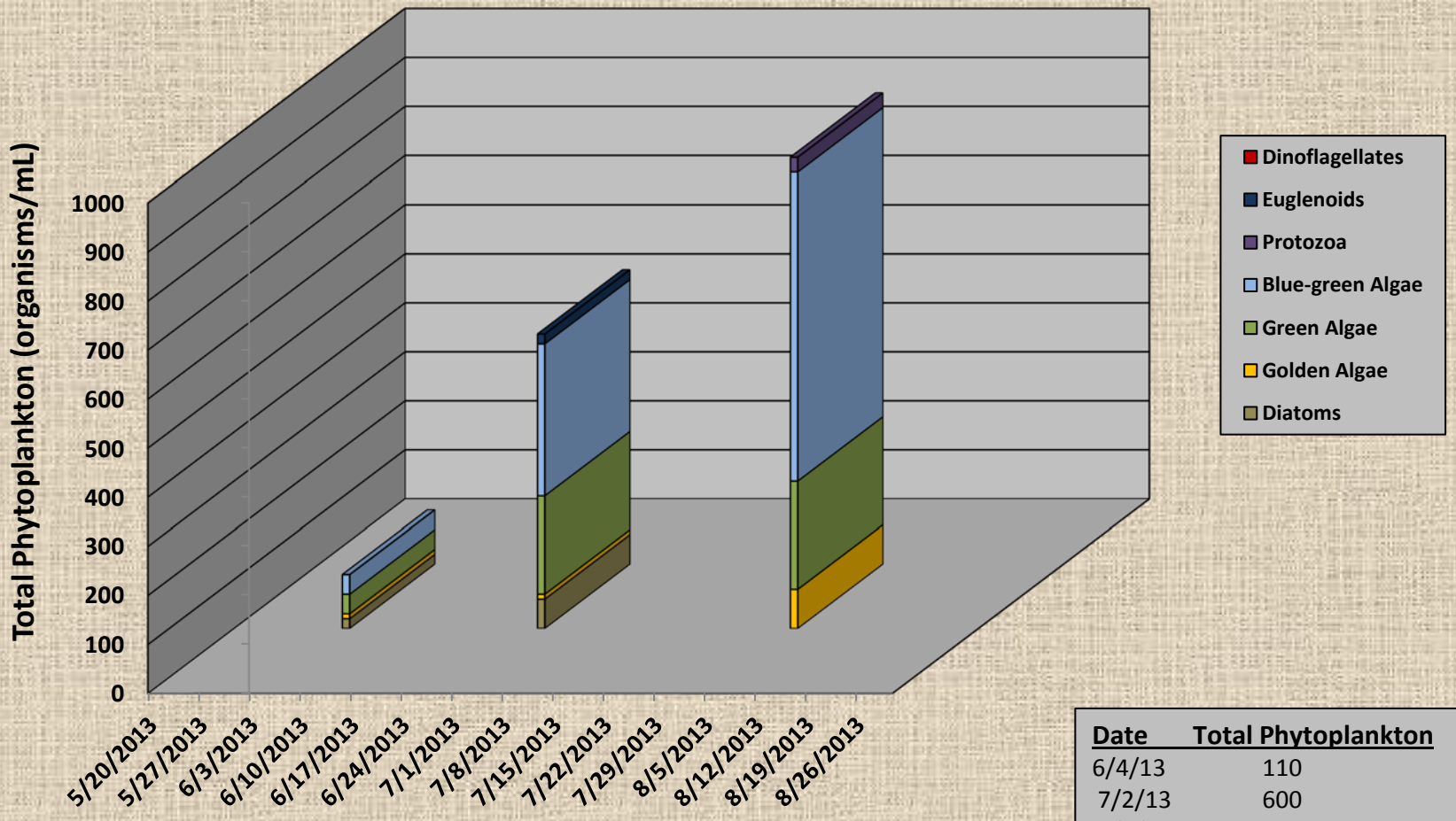
Shadow Lake
2013 Phytoplankton Distribution



Date	Total Phytoplankton
6/4/13	170
7/1/13	460
7/16/13	14,110
8/5/13	3,220

Allied Biological

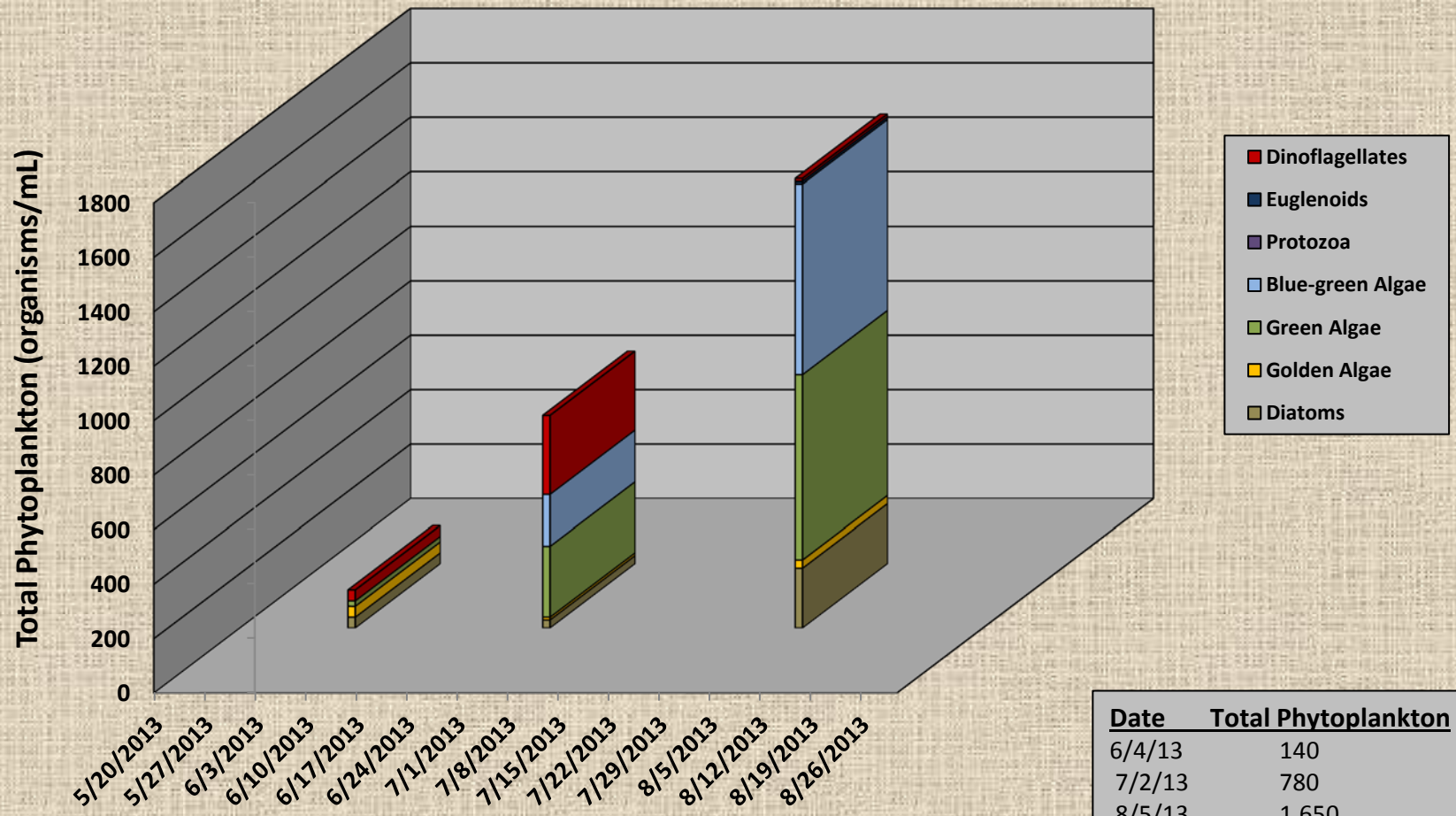
Cove Pond
2013 Phytoplankton Distribution



Date	Total Phytoplankton
6/4/13	110
7/2/13	600
8/5/13	960

Allied Biological

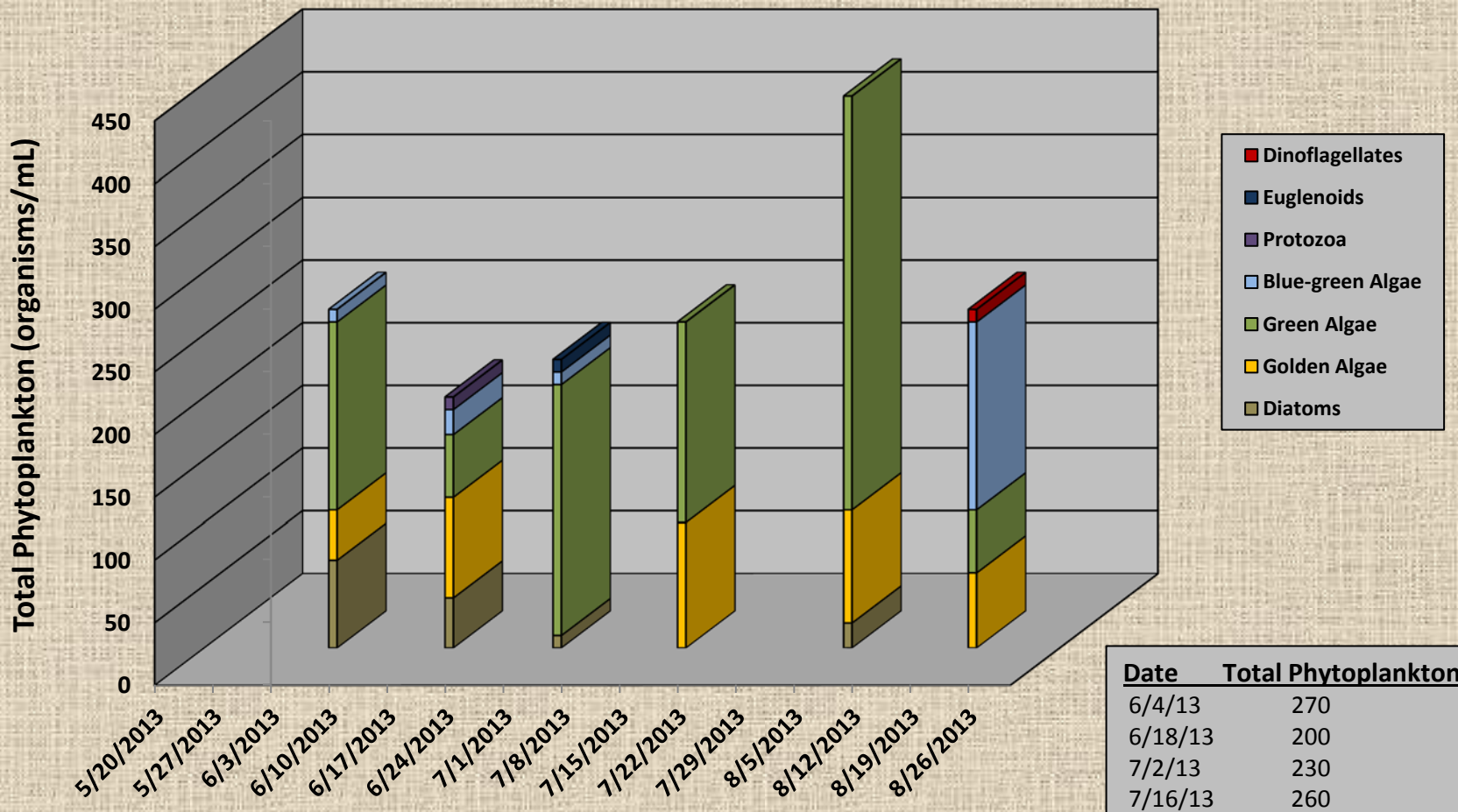
Grunden's Pond
2013 Phytoplankton Distribution



Date	Total Phytoplankton
6/4/13	140
7/2/13	780
8/5/13	1,650

Allied Biological

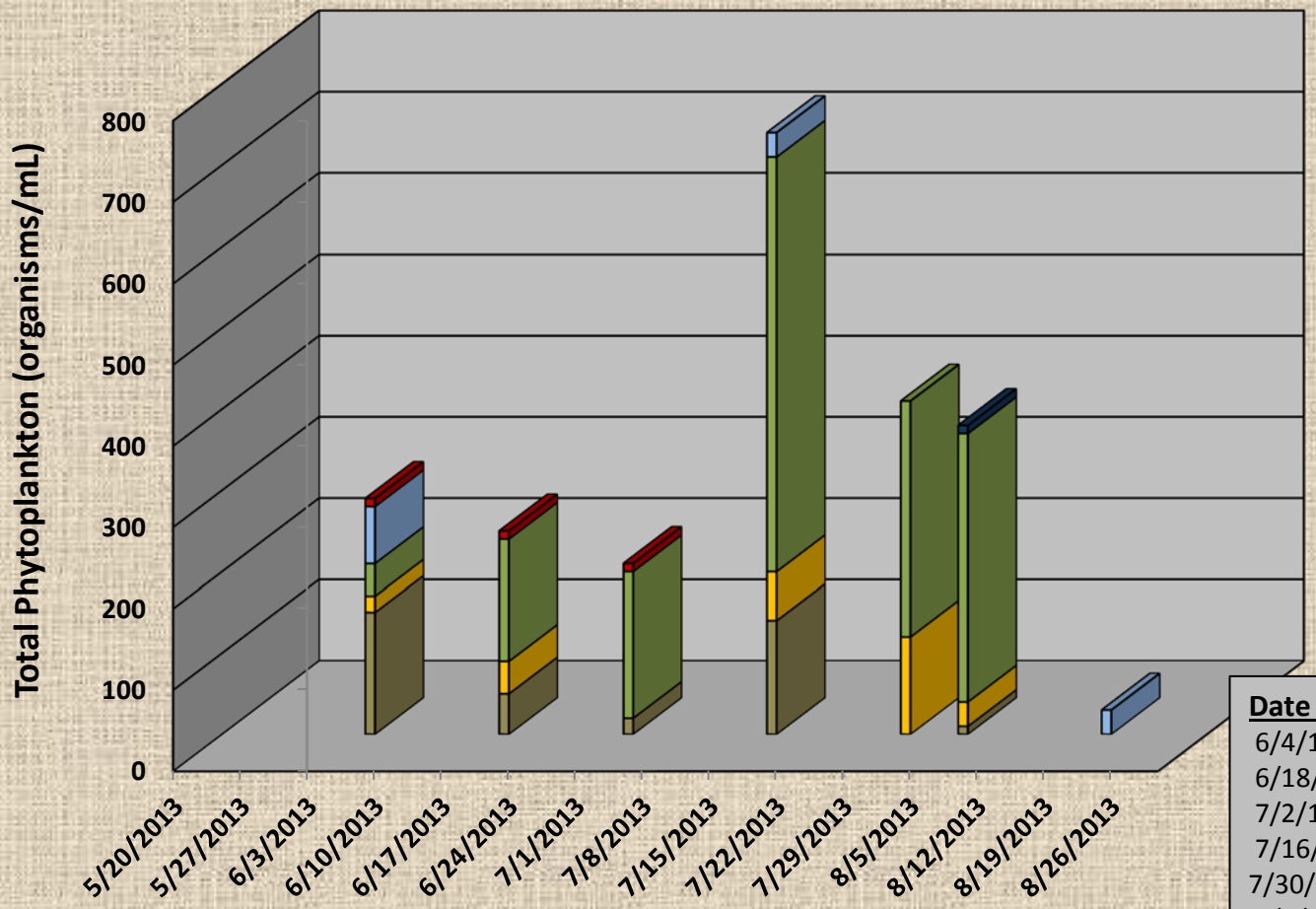
Mountain Lake
2013 Phytoplankton Distribution



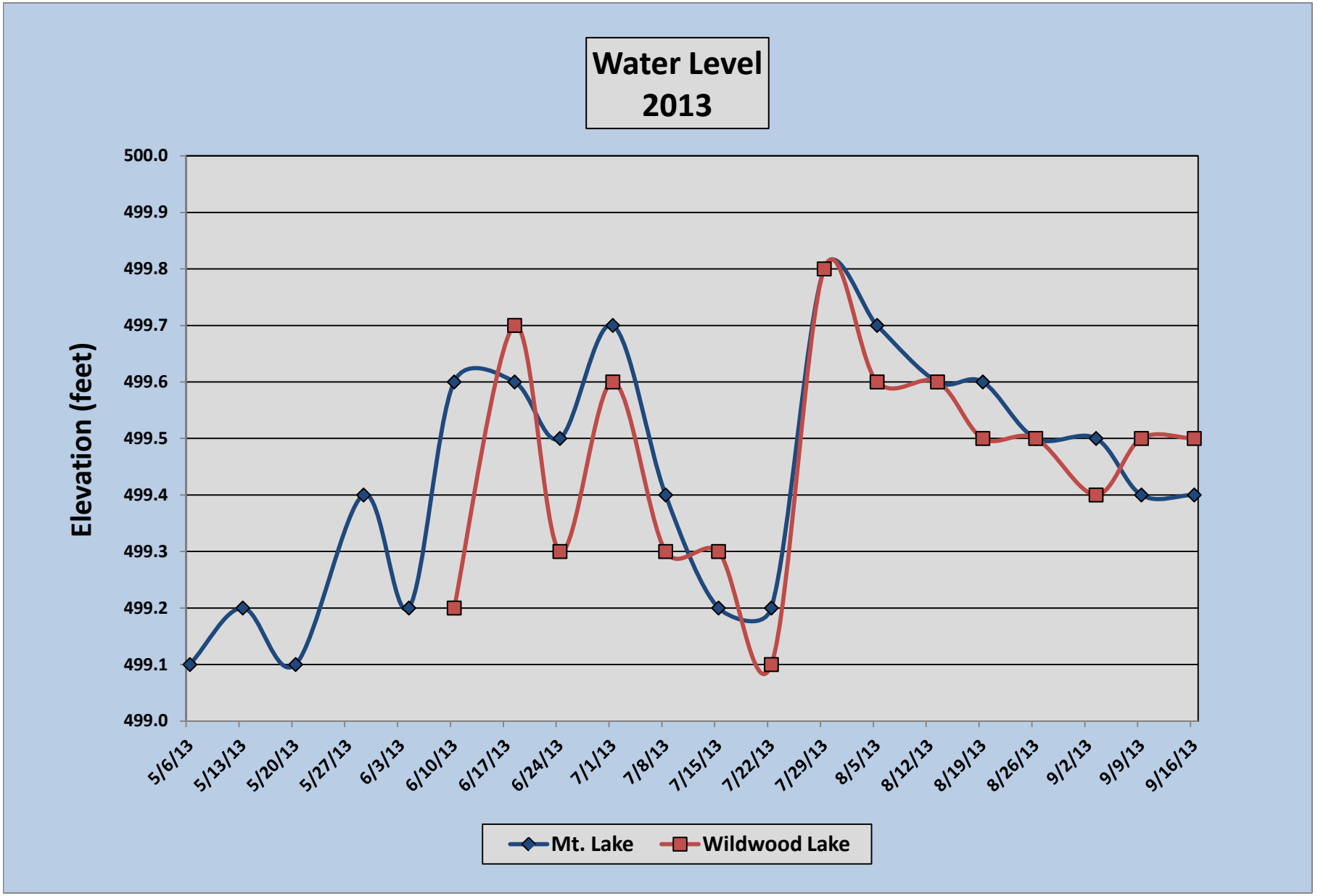
Date	Total Phytoplankton
6/4/13	270
6/18/13	200
7/2/13	230
7/16/13	260
8/5/13	440
8/20/13	270

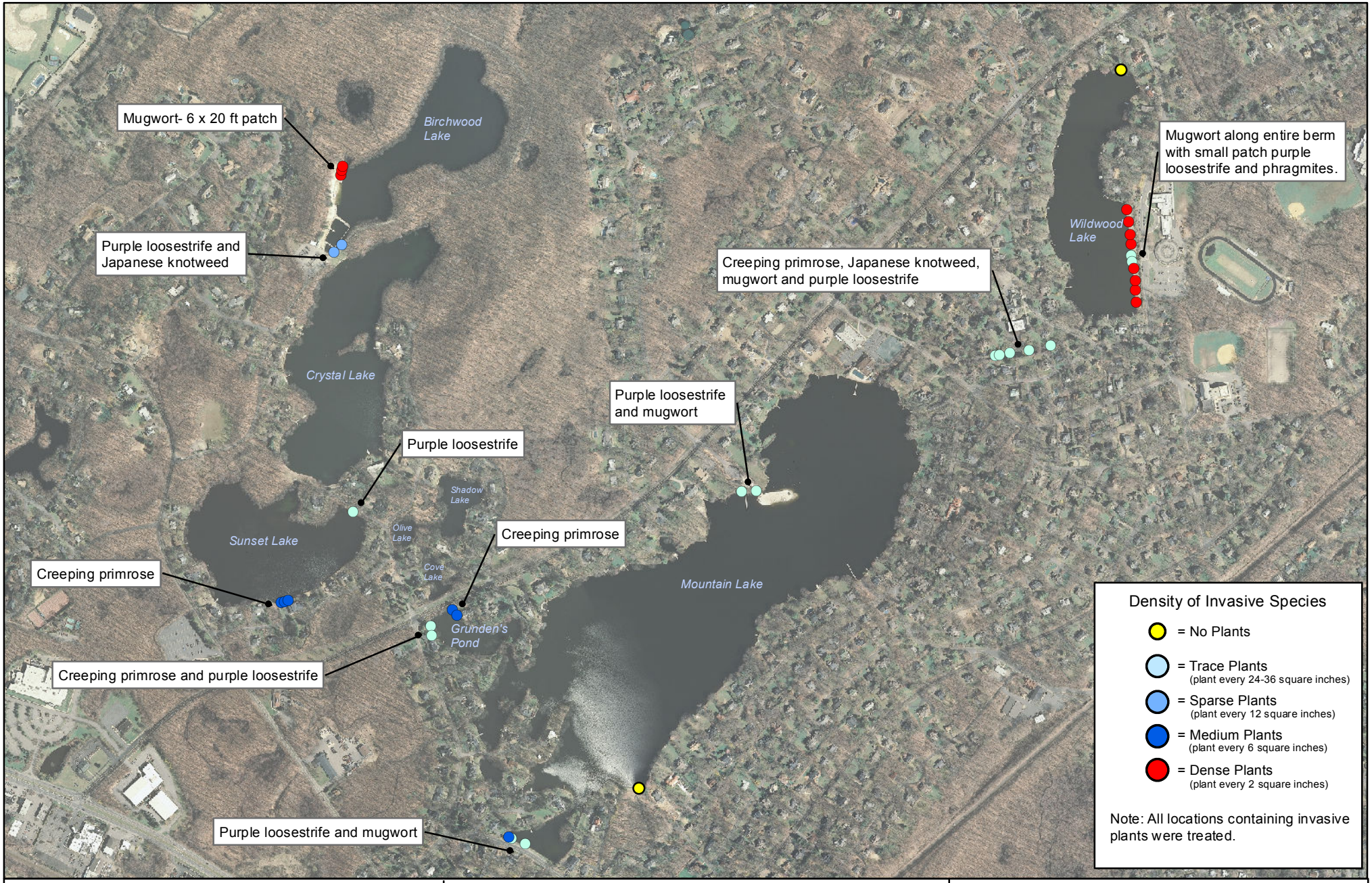
Allied Biological

Wildwood Lake
2013 Phytoplankton Distribution



Date	Total Phytoplankton
6/4/13	290
6/18/13	250
7/2/13	210
7/16/13	740
7/30/13	410
8/5/13	380
8/20/13	30


Water Level
2013
Elevation (feet)
500.0
499.9
499.8
499.7
499.6
499.5
499.4
499.3
499.2
499.1
499.0
5/6/13
5/13/13
5/20/13
5/27/13
6/3/13
6/10/13
6/17/13
6/24/13
7/1/13
7/8/13
7/15/13
7/22/13
7/29/13
8/5/13
8/12/13
8/19/13
8/26/13
9/2/13
9/9/13
9/16/13
Mt. Lake
Wildwood Lake



Allied Biological

Corporate Office: 580 Rockport Road, Hackettstown, NJ 07840
Northern NY Office: 338 Mather Road, Suite 1, Oneonta, NY 13820

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

MOUNTAIN LAKES BOROUGH

Terrestrial Invasive Treatments
7/31/13 and 8/6/13

760 380 0 760 Feet

Olive, Shadow, Cove and Grunden's Lakes
Mountain Lakes Borough, New Jersey

Allied Biological

Corporate Office: 580 Rockport Road, Hackettstown, NJ 07840
Northern NY Office: 338 Mather Road, Suite 1, Oneonta, NY 13820

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

Hydro-Raking Feasibility Study
August 2013

Sediment depth in feet

0 50 100 200 Feet

Date: 8/30/13
File: CoveShadOlive_SedDepth_Aug2013.mxd

Mountain Lake
Mountain Lakes Borough, New Jersey

Allied Biological

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

Hydro-Raking Feasibility Study
August 2013

Sediment depth in feet

0 125 250 500 Feet

Date: 8/30/13
File: MountainLk_SedDepth_Aug2013.mxd

Wildwood Lake
Mountain Lakes Borough, New Jersey

Allied Biological

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Hydro-Raking Feasibility Study
August 2013

Sediment depth in feet

0 65 130 260 Feet

Date: 8/30/13
File: Wildwood_SedDepth_Aug2013.mxd

Mountain Lake
Mountain Lakes Borough, New Jersey

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Hydro-Raking October 2013

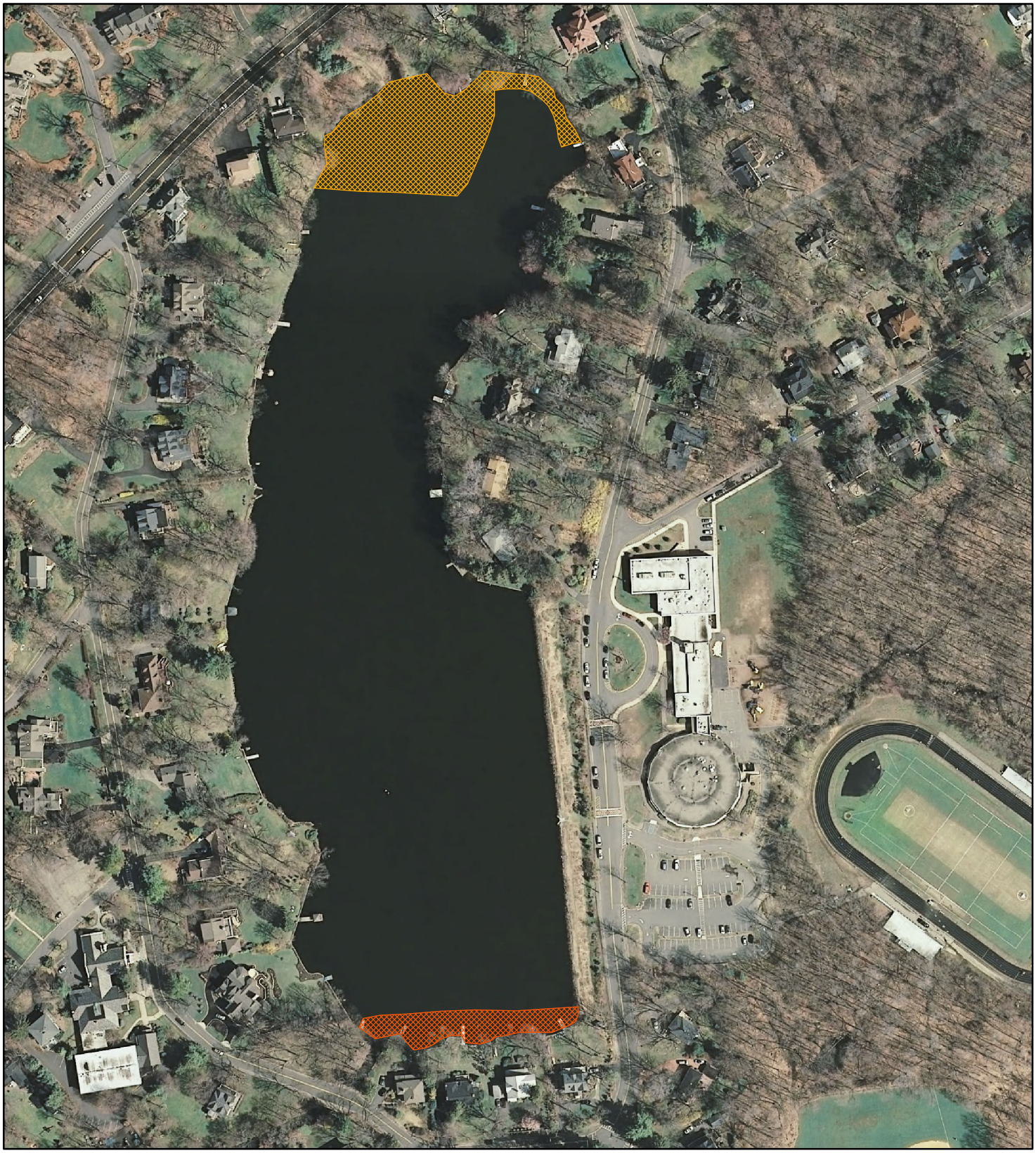
- Sailboat Cove: 60 cubic yards
- Cove West of Island Beach: 30 cubic yards
- Cove North of Island Beach: 6 cubic yards

N

0 125 250 500 Feet

Date: 8/30/13
File: MountainLk_Hydrorake_2013.mxd

Wildwood Lake
Mountain Lakes Borough, New Jersey



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

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Hydro-Raking October 2013

- Wildwood North: 57 cubic yards
- Wildwood Canal: 12 cubic yards

N

0 65 130 260 Feet

Date: 11/04/2013
File: Wildwood_Hydrorake_2013.mxd

MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 6/03/13	Examination Date: 6/4/13	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	20	10	
Nitzschia			
Pinnularia	30		
Urosolenia			
Stephanodiscus			
Stauroneis			
Synedra	20		
Tabellaria		10	

CHRYSOPHYTA (Golden Algae)	**A**	**B**	**C**
Dinobryon	10	50	30
Mallomonas	10	40	10
Synura			
Tribonema	10		10
Uroglenopsis			

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

CYANOPHYTA (Blue-green Algae)	**A**	**B**	**C**
Anabaena			
Anacystis			
Aphanizomenon			
Coelosphaerium			
Gomphosphseria			
Lyngbya			
Microcystis	70	10	40
Oscillatoria			
Pseudoanabaena			
Synechocystis			
Agmenellum			
PROTOZOA			
Actinophyrs		20	

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

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

SITE	**A**	**B**	**C**
TOTAL GENERA:	8	7	6
TRANSPARENCY:	7’	10’est	8’est
ORGANISMS PER MILLILITER:	**190**	**150**	**130**

NOTES: This is the first sampling event of the 2013 season at these sites. Algal density is low at all sites, while diversity at all sites is moderate. Sites A and C are dominated by the blue green algae *Microcystis* but overall density is non-problematic at this time. Meanwhile, site B is dominated by golden algae. Diatoms, golden algae, and green algae were observed at all three sites. Traces of protozoa were observed this week at site B only. Water clarity is good to excellent at all three sites.

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: 6/03/13	Examination Date: 6/4/13	Amount Examined: 200 ml.
Site A: Olive Pond	Site B: Shadow Lake	Site C: Cove Pond

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

CHRYSOPHYTA (Golden Algae)	**A**	**B**	**C**
Dinobryon	70	80	
Mallomonas	20	10	
Synura			
Tribonema			10
Uroglenopsis			

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

CYANOPHYTA (Blue-green Algae)	**A**	**B**	**C**
Anabaena			
Anacystis			
Aphanizomenon		10	
Coelosphaerium			
Gomphosphseria			
Lyngbya			
Microcystis	100	20	40
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:	11	8	6
TRANSPARENCY:	5'est	4'est	2'est
ORGANISMS PER MILLILITER:	**300**	**170**	**110**

NOTES: This is the first sampling event of the 2013 season at these sites. Algal density is low at all three sites. Diversity at sites B and C is moderate, while at site A it is high. The assemblage at sites A is dominated by blue green algae, but overall density is non-problematic at this time. Site B is dominated by the golden algae *Dinobryon*, while site C is a mixture of algal groups. Other diatoms, green algae, golden algae, and blue green algae were observed this week. Traces of dinoflagellates were also observed at sites A and B only. Water clarity is fair at sites A and B. Water clarity at site C is considered poor.

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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 6/03/13	Examination Date: 6/4/13	Amount Examined: 200 ml.
Site A: Grunden's Pond	Site B: Mountain Lake	Site C: Wildwood Lake

BACILLARIOPHYTA (Diatoms)	**A**	**B**	**C**
Asterionella	20	10	
Cyclotella			
Cymbella			
Diatoma			
Fragilaria			
Melosira			
Navicula	20	20	60
Nitzschia			
Pinnularia			
Urosolenia			
Stephanodiscus			
Stauroneis			
Synedra		40	90
Tabellaria			
Surriella			

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

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

CYANOPHYTA (Blue-green Algae)	**A**	**B**	**C**
Anabaena			
Anacystis		10	
Aphanizomenon			
Coelosphaerium			
Gomphosphseria			
Lyngbya			
Microcystis			30
Oscillatoria			
Pseudoanabaena			
Synechocystis			
Scytonema			40
PROTOZOA			
Actinophyrs			

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

PYRRHOPHYTA (Dinoflagellates)	**A**	**B**	**C**
Ceratium	40		10
Peridinium			

SITE	**A**	**B**	**C**
TOTAL GENERA:	5	6	7
TRANSPARENCY:	5'est	11'	5'est
ORGANISMS PER MILLILITER:	**140**	**240**	**270**

NOTES: This is the first sampling event of the 2013 season at these sites. Algal density is low at all three sites. Algal diversity at all three sites is moderate. The assemblage at site B is dominated by the green algae *Ankistrodesmus.* Site C is dominated by the diatom *Synedra.* Trace amounts of golden algae, green algae, and blue green algae were observed this week. Traces of dinoflagellates were also observed at sites A and C only. Water clarity is fair at sites A and C, while water clarity at site B is excellent.

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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 6/18/13	Examination Date: 6/19/13	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			
Tabellaria			

CHRYSOPHYTA (Golden Algae)	**A**	**B**	**C**
Dinobryon	40	330	100
Mallomonas		40	10
Synura			
Tribonema			10
Uroglenopsis			

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			
Coelastrum		100	70
Eudorina			
Mougeotia			
Oedogonium	10	40	
Oocystis			
Pandorina			
Pediastrum			
Phytoconis			
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum		10	10
Sphaerocystis			
Ulothrix			
Volvox			
Zygnema			
Gloeocystis	50		90
Quadrigula			
Cosmarium			
Tetraedron			
Spondylosium	10		

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

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

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

SITE	**A**	**B**	**C**
TOTAL GENERA:	4	6	9
TRANSPARENCY:	8.5’	7’est	7’est
ORGANISMS PER MILLILITER:	**110**	**500**	**330**

NOTES: Algal density continues to be low at all three sites. Algal density increased at sites B and C but decreased at site A since two weeks ago. Diversity at sites B and C remains to be moderate, while site A is low. Site A and site C is dominated by green algae while site B is dominated by the golden algae *Dinobryon*. Golden algae and green algae were observed at all three sites. Trace blue green algae was observed only at sites A and C. Trace of dinoflagellates were observed at site A only. Water clarity continues to be good at all three sites, with a slight decrease at sites B and C since two weeks ago.

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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 6/18/13	Examination Date: 6/19/13	Amount Examined: 200 ml.
Site A: No Sample Collected	Site B: Mountain Lake	Site C: Wildwood Lake

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

CHRYSOPHYTA (Golden Algae)	**A**	**B**	**C**
Dinobryon		60	
Mallomonas		20	40
Synura			
Tribonema			
Uroglenopsis			

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			
Coelastrum			80
Eudorina			
Mougeotia			
Oedogonium		10	
Oocystis			
Pandorina			
Pediastrum			
Phytoconis			
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum		10	
Sphaerocystis			
Ulothrix			
Scenedesmus		10	20
Zygnema			
Gloeocystis		20	30
Cosmarium			
Quadriguia			
Tetraspora			20

CYANOPHYTA (Blue-green Algae)	**A**	**B**	**C**
Anabaena			
Anacystis			
Aphanizomenon			
Coelosphaerium			
Gomphosphseria			
Lyngbya			
Microcystis		20	
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:	NA	11	8
TRANSPARENCY:	NA	8’	4’est
ORGANISMS PER MILLILITER:	**NA**	**200**	**250**

NOTES: Algal density continues to be low at both sites. Diversity is moderate at site C, while site B is high. A seasonal mix of diatoms, golden algae, and green algae were observed this week at both sites. Site B was dominated by golden algae. Site C was dominated by green algae. Trace of blue green algae and protozoa were observed at site B only. Trace dinoflagellates observed at site C only. Water clarity is good at site B, but only poor to fair at site C. Site C (Wildwood Lake) clarity is impacted by the canal cleaning project.

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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 7/1/13	Examination Date: 7/1/13	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	10		10
Nitzschia			
Pinnularia			
Urosolenia			
Stephanodiscus			
Stauroneis			
Synedra	10		
Tabellaria			

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

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			
Coelastrum		390	110
Eudorina			
Mougeotia			
Oedogonium	10		
Oocystis			
Pandorina			
Pediastrum			
Phytoconis			
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum			10
Sphaerocystis			
Ulothrix			
Volvox			
Zygnema			
Gloeocystis	30	30	250
Quadrigula			
Cosmarium			
Treubaria	20		
Volvox		10	

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	30		
Peridinium			

SITE	**A**	**B**	**C**
TOTAL GENERA:	6	3	5
TRANSPARENCY:	8'est	10'est	5'est
ORGANISMS PER MILLILITER:	**110**	**430**	**410**

NOTES: Algal density continues to be low at all three sites. Since two weeks ago, algal density at site C increased, while site B slightly decreased and site A remained the same. The assemblage at all three sites is dominated by green algae. A minor bloom of *Coelastrum* was occurring at Crystal Lake this week. Trace amounts of golden algae (site C) and dinoflagellates (site A) were also observed. No nuisance blue-green algae observed at any sites. Water clarity continues to be good at sites A and B, while site C is considered fair.

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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 7/1/13	Examination Date: 7/2/13	Amount Examined: 200 ml.
Site A: Olive Pond	Site B: Shadow Lake	Site C: Cove Pond

BACILLARIOPHYTA (Diatoms)	**A**	**B**	**C**
Asterionella			
Cyclotella			
Cymbella			
Diatoma			
Fragilaria	10		
Melosira			
Navicula	80		40
Nitzschia			
Pinnularia			
Rhizosolenia			
Stephanodiscus			
Stauroneis			
Synedra		10	20
Tabellaria			
Cocconeis			

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

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium	10		
Coelastrum	150	70	90
Eudorina			
Mougeotia			
Oedogonium			
Oocystis			
Pandorina			
Pediastrum		10	
Phytoconis			
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum	10		20
Sphaerocystis			
Ulothrix			
Volvox			
Zygnema			
Quadrigula			
Gloeocystis	120	120	80
Cosmarium			
Treubaria	10		10

CYANOPHYTA (Blue-green Algae)	**A**	**B**	**C**
Anabaena			
Anacystis			
Aphanizomenon	80	250	290
Coelosphaerium			
Gomphosphseria			
Nodularia	10		
Microcystis	20		10
Oscillatoria			
Pseudoanabaena			
Synechocystis			
Agmenellum			
PROTOZOA			
Actinophyrs			10

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

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

SITE	**A**	**B**	**C**
TOTAL GENERA:	11	5	11
TRANSPARENCY:	5'est	4'	3'
ORGANISMS PER MILLILITER:	**510**	**460**	**600**

NOTES: Algal diversity is high at sites A and C, while site B is considered moderate. Algal density has increased at all three sites since the previous sampling event. Algal density is low at sites A and B, and is considered moderate at site C. The assemblage at site A is dominated by green algae, while sites B and C are both dominated by the nuisance blue green algae *Aphanizomenon.* Some blue-green algae were observed at site A as well. Blue-green algae counts are non-problematic at this time, but will be closely monitored in the upcoming weeks. Trace densities of golden algae, protozoa, and euglenoids were observed at site C only. Water clarity is considered fair at sites A and B, while site C is considered poor.

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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 7/1/13	Examination Date: 7/2/13	Amount Examined: 200 ml.
Site A: Grunden's Pond	Site B: Mountain Lake	Site C: Wildwood Lake

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

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

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			
Coelastrum	80	80	20
Eudorina			
Mougeotia			
Oedogonium		10	
Oocystis			
Pandorina			
Pediastrum	10		10
Phytoconis			
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum	40	10	10
Sphaerocystis	10		
Ulothrix			
Scenedesmus	20		40
Zygnema			
Gloeocystis	90	100	60
Quadrigula			10
Treubaria	10		20
Cosmarium			10

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

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

PYRRHOPHYTA (Dinoflagellates)	**A**	**B**	**C**
Ceratium	290		10
Peridinium			

SITE	**A**	**B**	**C**
TOTAL GENERA:	13	7	11
TRANSPARENCY:	3'est	10'est	6'est
ORGANISMS PER MILLILITER:	**780**	**230**	**210**

NOTES: Algal diversity is high at sites A and C, while site B is considered moderate. Algal density at sites B and C is low, while site A is considered moderate. The assemblage at site A is mixture of blue-green algae, dinoflagellates and green algae, while sites B and C are dominated by green algae only. Diatoms were observed at all three sites. Trace densities of golden algae (site A), euglenoids (site B), and dinoflagellates (sites A and C) were also observed. Water clarity has decreased at sites A and B, while site C has increased. Clarity is considered poor at site A, and good at site C, and excellent at site B, especially for early July.

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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date:7/15/13	Examination Date: 7/16/13	Amount Examined: 200 ml.
Site A: Birchwood Lake	Site B: Crystal Lake	Site C: Sunset Lake

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

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

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium	10		50
Coelastrum		330	270
Eudorina			
Mougeotia			
Oedogonium			
Oocystis			20
Pandorina			
Pediastrum			
Phytoconis			
Rhizoclonium			
Scenedesmus			10
Spirogyra			
Staurastrum			40
Sphaerocystis		20	30
Ulothrix			
Volvox			
Zygnema			
Gloeocystis	20	180	80
Quadrigula		10	
Cosmarium			
Tetraspora	20		
Dictyosphaerium			

CYANOPHYTA (Blue-green Algae)	**A**	**B**	**C**
Anabaena			
Anacystis			
Aphanizomenon		150	20
Coelosphaerium			
Gomphosphseria			
Lyngbya			
Microcystis	30		
Oscillatoria			
Pseudoanabaena			
Synechocystis			
Agmenellum			
PROTOZOA			
Actinophyrs			

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

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

SITE	**A**	**B**	**C**
TOTAL GENERA:	4	5	9
TRANSPARENCY:	5’	10’est	3’
ORGANISMS PER MILLILITER:	**80**	**690**	**610**

NOTES: Algal density remains low at site A, while the other two sites have increased to moderate. Algal diversity is considered low at sites A and B, whereas site C is moderate. The assemblage at all three sites continues to be dominated by green algae. Trace amounts of blue green algae (all three sites) and diatoms (site C) were observed this week. Crystal Lake had higher blue-green counts, which should be monitored. Water clarity increased at sites B and C, while slightly decreasing at site A. Clarity is considered fair at sites A and B, whereas site C is considered excellent.

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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 7/15/13	Examination Date: 7/16/13	Amount Examined: 200 ml.
Site A:	Site B: Mountain Lake	Site C: Wildwood Lake

BACILLARIOPHYTA (Diatoms)	**A**	**B**	**C**
Asterionella			
Cyclotella			
Cymbella			
Diatoma			
Fragilaria			10
Melosira			
Navicula			
Nitzschia			
Pinnularia			30
Urosolenia			
Stephanodiscus			
Stauroneis			
Synedra			100
Tabellaria			
Surriella			

CHRYSOPHYTA (Golden Algae)	**A**	**B**	**C**
Dinobryon		10	10
Mallomonas		90	50
Synura			
Tribonema			
Uroglenopsis			

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium		10	10
Coelastrum		30	270
Eudorina		50	
Mougeotia			
Oedogonium		10	
Oocystis			
Pandorina			
Pediastrum			10
Phytoconis			
Rhizoclonium			
Scenedesmus			20
Spirogyra			
Staurastrum			40
Sphaerocystis			30
Ulothrix			
Scenedesmus			
Zygnema			
Gloeocystis		60	90
Cosmarium			30
Quadriguia			
Octacanthium			10

CYANOPHYTA (Blue-green Algae)	**A**	**B**	**C**
Anabaena			
Anacystis			
Aphanizomenon			10
Coelosphaerium			
Gomphosphseria			
Lyngbya			
Microcystis			20
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:		7	17
TRANSPARENCY:		15'est	5'est
ORGANISMS PER MILLILITER:		**260**	**740**

NOTES: Algal diversity at site C is considered high, while site B is considered moderate. Density is low at site B, whereas site C is considered moderate. Mountain Lake was dominated by the golden algae *Mallomonas.* Wildwood lake was dominated by a mixture of green algae. Trace densities of diatoms and blue green algae were observed at site C only. Water clarity increased at site B and slightly decreased at site C. Clarity remains excellent at site B, while site C is considered fair.

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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 8/5/13	Examination Date: 8/5/13	Amount Examined: 200 ml.
Site A: Birchwood Lake	Site B: Crystal Lake	Site C: Sunset Lake

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

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

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			50
Coelastrum	70	50	80
Eudorina			
Mougeotia			
Oedogonium			
Oocystis			
Pandorina			
Pediastrum		10	
Phytoconis			
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum			40
Sphaerocystis			
Ulothrix			
Volvox			
Zygnema			
Gloeocystis	70	120	80
Quadrigula			
Cosmarium			10
Tetraedron			
Dictyosphaerium			

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

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

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

SITE	**A**	**B**	**C**
TOTAL GENERA:	3	4	10
TRANSPARENCY:	5.5’	8’est	4’est
ORGANISMS PER MILLILITER:	**160**	**190**	**340**

NOTES: Algal diversity is considered low at sites A and B, while site C is moderate. Since the previous sampling event, algal density decreased at sites B and C, while site A increased. All sites are considered to have low density. The assemblage is dominated by green algae at all sites. Trace golden algae were observed at all sites this week. Trace densities of blue green algae, euglenoids, dinoflagellates, and diatoms were observed at site C only. Water clarity slightly increased at sites A and C, while site B decreased. Clarity is considered fair at sites A and C, while site B remains good.

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: 8/5/13	Examination Date: 8/5/13	Amount Examined: 200 ml.
Site A: Olive Pond	Site B: Shadow Lake	Site C: Cove Pond

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

CHRYSOPHYTA (Golden Algae)	**A**	**B**	**C**
Dinobryon			
Mallomonas	10	20	80
Synura			
Tribonema			
Uroglenopsis			

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium	10	10	10
Coelastrum	270	920	110
Eudorina			
Mougeotia			
Oedogonium	30		
Oocystis			
Pandorina			
Pediastrum		20	
Phytoconis			
Rhizoclonium			
Scenedesmus	10	40	10
Spirogyra			
Staurastrum	40	70	30
Sphaerocystis	10		
Ulothrix			
Volvox			
Tetraspora	10		
Quadrigula		10	
Gloeocystis	100	80	50
Cosmarium			
Treubaria		10	10

CYANOPHYTA (Blue-green Algae)	**A**	**B**	**C**
Anabaena			
Anacystis			
Aphanizomenon	50	2010	630
Coelosphaerium			
Gomphosphseria			
Lyngbya			
Microcystis	10		
Oscillatoria			
Pseudoanabaena			
Synechocystis			
Agmenellum			
PROTOZOA			
Actinophyrs	30	10	30

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

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

SITE	**A**	**B**	**C**
TOTAL GENERA:	15	12	9
TRANSPARENCY:	3'est	4'est	3'est
ORGANISMS PER MILLILITER:	**760**	**3210**	**960**

NOTES: Since the last sampling event, algal density increased at all three sites. Algal density at site B is considered high, while site A and C is moderate. Algal diversity is considered high at sites A and B, and moderate at site C. The assemblage at site A is dominated green algae. Sites B and C are dominated by the nuisance blue green algae *Aphanizomenon.* Other green algae and diatoms were observed. Trace densities of golden algae, protozoa and euglenoids (site A) were observed this week. Water clarity decreased at site A, while sites B and C remain similar to previous measurements. Clarity is considered poor at sites A and C, while site B 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: 8/5/13	Examination Date: 8/5/13	Amount Examined: 200 ml.
Site A: Grunden's Pond	Site B: Mountain Lake	Site C: Wildwood Lake

BACILLARIOPHYTA (Diatoms)	**A**	**B**	**C**
Asterionella			
Cyclotella			
Cymbella			
Diatoma			
Fragilaria			10
Melosira			
Navicula	20		
Nitzschia			
Pinnularia			
Urosolenia			
Stephanodiscus			
Stauroneis			
Synedra	200	20	
Tabellaria			
Surriella			

CHRYSOPHYTA (Golden Algae)	**A**	**B**	**C**
Dinobryon			
Mallomonas	30	90	30
Synura			
Tribonema			
Uroglenopsis			

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium	60	10	10
Coelastrum	10	100	110
Eudorina			
Mougeotia			
Oedogonium	340		
Oocystis			
Pandorina			
Pediastrum	30	20	30
Phytoconis			
Rhizoclonium			
Scenedesmus			60
Spirogyra			
Staurastrum	10	40	20
Sphaerocystis			
Ulothrix			
Scenedesmus	10		
Zygnema			
Gloeocystis	120	150	100
Cosmarium			
Quadriguia	20	10	
Trebularia	80		

CYANOPHYTA (Blue-green Algae)	**A**	**B**	**C**
Anabaena			
Anacystis			
Aphanizomenon	700		
Coelosphaerium			
Gomphosphseria			
Lyngbya			
Microcystis			
Oscillatoria			
Pseudoanabaena			
Synechocystis			
Scytonema			
PROTOZOA			
Actinophyrs			

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

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

SITE	**A**	**B**	**C**
TOTAL GENERA:	16	7	10
TRANSPARENCY:	4'est	6.75'	3.5'est
ORGANISMS PER MILLILITER:	**1650**	**420**	**400**

NOTES: Algal density increased at all sites since the previous sampling event. Algal density is now considered low at sites B and C, while site A is high. The assemblage at site A is dominated by the nuisance blue green algae *Aphanizomenon*. Sites B and C are dominated by green algae only. Other green algae, diatoms and golden algae were observed this week. Trace densities of euglenoids (sites A and C) and dinoflagellates (site A) were observed. Water clarity has decreased at sites B and C, while site A increased. Water clarity is considered poor to fair at sites A and C, while site B is good.

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

MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 8/19/13	Examination Date: 8/20/13	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			
Tabellaria			

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

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			
Coelastrum			
Eudorina			
Mougeotia			
Oedogonium			
Oocystis			
Pandorina			
Pediastrum			
Phytoconis			
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum		10	80
Sphaerocystis			
Ulothrix			
Chlorella	120		
Tetraspora		20	
Gloeocystis			10
Quadrigula			
Cosmarium			
Tetraedron			
Dictyosphaerium			

CYANOPHYTA (Blue-green Algae)	**A**	**B**	**C**
Anabaena		290	
Anacystis			
Aphanizomenon			
Coelosphaerium			270
Gomphosphseria			
Lyngbya			
Microcystis	40		
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	3	4
TRANSPARENCY:	8’	8’est	4’
ORGANISMS PER MILLILITER:	**160**	**320**	**370**

NOTES: Algal density increased at sites B and C, while site A remained the same as last sampling event. Algal densities at all sites are considered low. Algal diversity is low at all sites. Sites B and C are dominated by blue green algae, while site A is dominated by the green algae *Chlorella*. The blue-green alage counts are considered non-problematic at this time. Other blue green algae and green algae were observed this week. Site B had clumps of blue green algae, not necessarily reflected in the counts. Trace amounts of golden algae, specifically *Mallomonas*, were observed at site C only. Water clarity increased at site A only, while sites B and C remained similar. Water clarity at sites A and B are considered good, while site C remains fair.

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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 8/19/13	Examination Date: 8/20/13	Amount Examined: 200 ml.
Site A:	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			
Tabellaria			
Surriella			

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

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

CYANOPHYTA (Blue-green Algae)	**A**	**B**	**C**
Anabaena		150	10
Anacystis			
Aphanizomenon			
Coelosphaerium			
Gomphosphseria			
Lyngbya			
Microcystis			20
Oscillatoria			
Pseudoanabaena			
Synechocystis			
Scytonema			
PROTOZOA			
Actinophyrs			

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

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

SITE	**A**	**B**	**C**
TOTAL GENERA:		6	2
TRANSPARENCY:		4’	15’est
ORGANISMS PER MILLILITER:		**270**	**30**

NOTES: No sample was taken at Grunden’s Pond on this date. Algal diversity is considered moderate at site B, while site C is low. Algal density is considered low at both sites. Both sites are dominated by blue green algae, but overall counts are non-problematic at this time. Green algae were also observed this week at Mountain Lake. Trace densities of golden algae and dinoflagellates were observed at site B only. Water clarity decreased at site B, while site C increased. Clarity at site B is considered poor to fair, while site C is excellent, the direct result of the recent Alum application in this basin.

Allied Biological, Inc.
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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 7/15/13	Examination Date: 7/16/13	Amount Examined: 200 ml.
Site A: Shadow Lake	Site B:	Site C:

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

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

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			
Coelastrum	280		
Eudorina			
Mougeotia			
Oedogonium			
Oocystis	10		
Pandorina			
Pediastrum	10		
Phytoconis			
Rhizoclonium			
Scenedesmus	40		
Spirogyra			
Staurastrum	20		
Sphaerocystis	40		
Ulothrix			
Volvox			
Zygnema			
Quadrigula	30		
Gloeocystis	200		
Cosmarium	30		
Treubaria			

CYANOPHYTA (Blue-green Algae)	**A**	**B**	**C**
Anabaena	690		
Anacystis			
Aphanizomenon	12,730		
Coelosphaerium			
Gomphosphseria			
Lyngbya			
Microcystis			
Oscillatoria			
Pseudoanabaena			
Synechocystis			
Agmenellum			
PROTOZOA			
Actinophyrs			

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

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

SITE	**A**	**B**	**C**
TOTAL GENERA:	14		
TRANSPARENCY:	4'est		
ORGANISMS PER MILLILITER:	**14,110**		

NOTES: Sample collected at this site due to unicellular algae bloom observed in the field (and confirmed with the counts). The algal density is very high with high diversity. The assemblage is dominated by a bloom of nuisance blue-green algae, specifically Aphanizomenon. The algal density has significantly increased since the last sampling event. Water clarity is fair. An algaecide application is scheduled for later this week.

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MICROSCOPIC EXAMINATION OF WATER

Sample from: Mountain Lakes

Collection Date: 7/29/13	Examination Date: 7/30/13	Amount Examined: 200 ml.
Site A:	Site B:	Site C: Wildwood Lake

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

CHRYSOPHYTA (Golden Algae)	**A**	**B**	**C**
Dinobryon			
Mallomonas			120
Synura			
Tribonema			
Uroglenopsis			

CHLOROPHYTA (Green Algae)	**A**	**B**	**C**
Ankistrodesmus			
Chlamydomonas			
Chlorella			
Chlorococcum			
Closterium			20
Coelastrum			40
Eudorina			
Mougeotia			
Oedogonium			20
Oocystis			10
Pandorina			
Pediastrum			10
Phytoconis			
Rhizoclonium			
Scenedesmus			
Spirogyra			
Staurastrum			30
Sphaerocystis			
Ulothrix			
Scenedesmus			70
Zygnema			
Gloeocystis			50
Cosmarium			10
Quadriguia			30
Octacanthium			

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			
Peridinium			

SITE	**A**	**B**	**C**
TOTAL GENERA:			11
TRANSPARENCY:			4'est
ORGANISMS PER MILLILITER:			**410**

NOTES: No other samples were taken except for Wildwood Lake. Sample collected in anticipation of upcoming Alum application. Since the last sampling event, algal density decreased to low. Algal diversity decreased, but is still considered high. The assemblage is dominated by a mixture of non-problematic green algae. Golden algae were also observed. No blue green algae were observed this week. Water clarity has decreased, however is still considered fair.

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Mountain Lakes

2013 Fecal Coliform Data

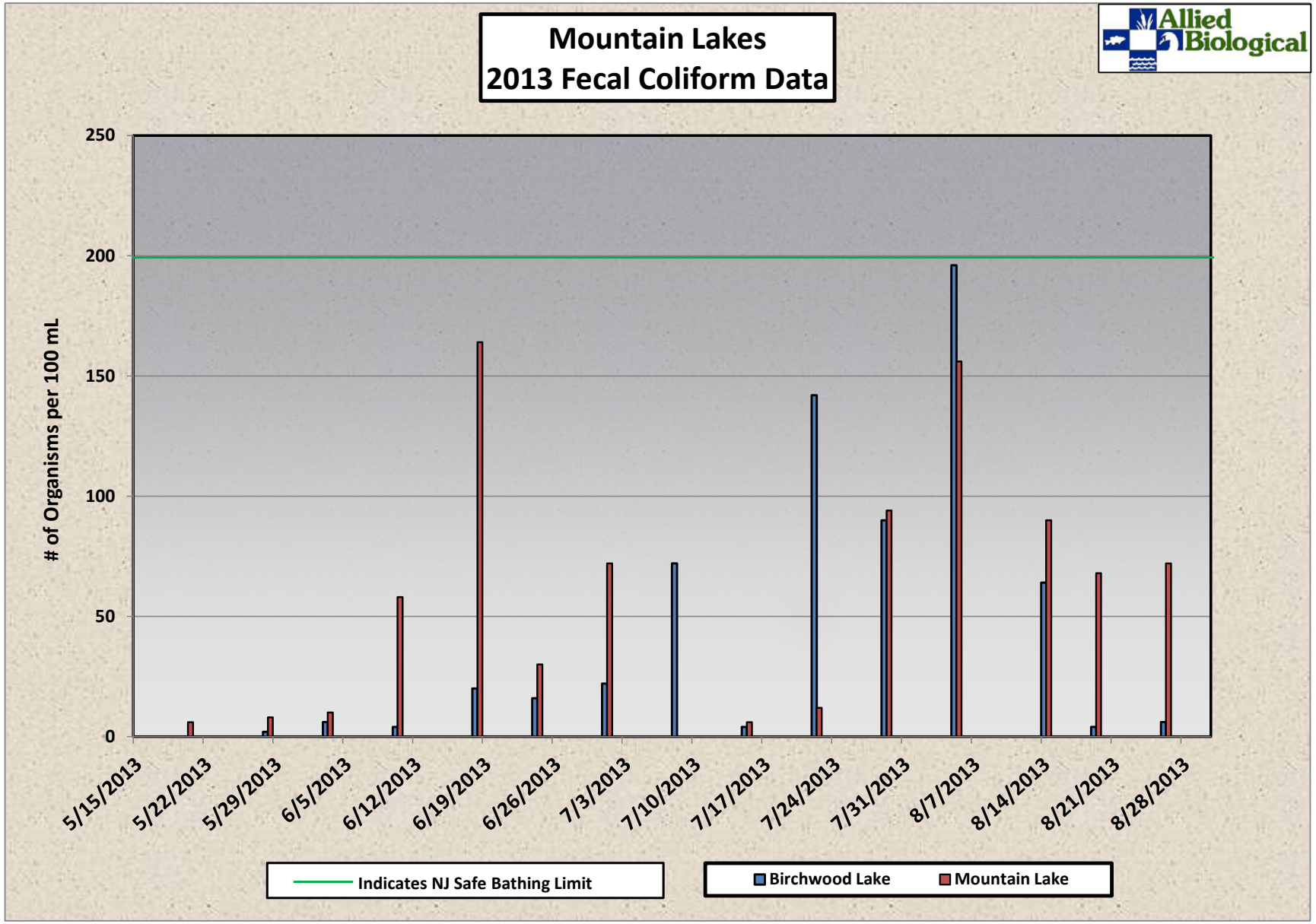
Date	Birchwood Lake	Mountain Lake	New Jersey Health Limit
5/20/2013	<2	6	200
5/28/2013	2	8	200
6/3/2013	6	10	200
6/10/2013	4	58	200
6/18/2013	20	164	200
6/24/2013	16	30	200
7/1/2013	22	72	200
7/8/2013	72	<2	200
7/15/2013	4	6	200
7/22/2013	142	12	200
7/29/2013	90	94	200
8/5/2013	196	156	200
8/14/2013	64	90	200
8/19/2013	4	68	200
8/26/2013	6	72	200

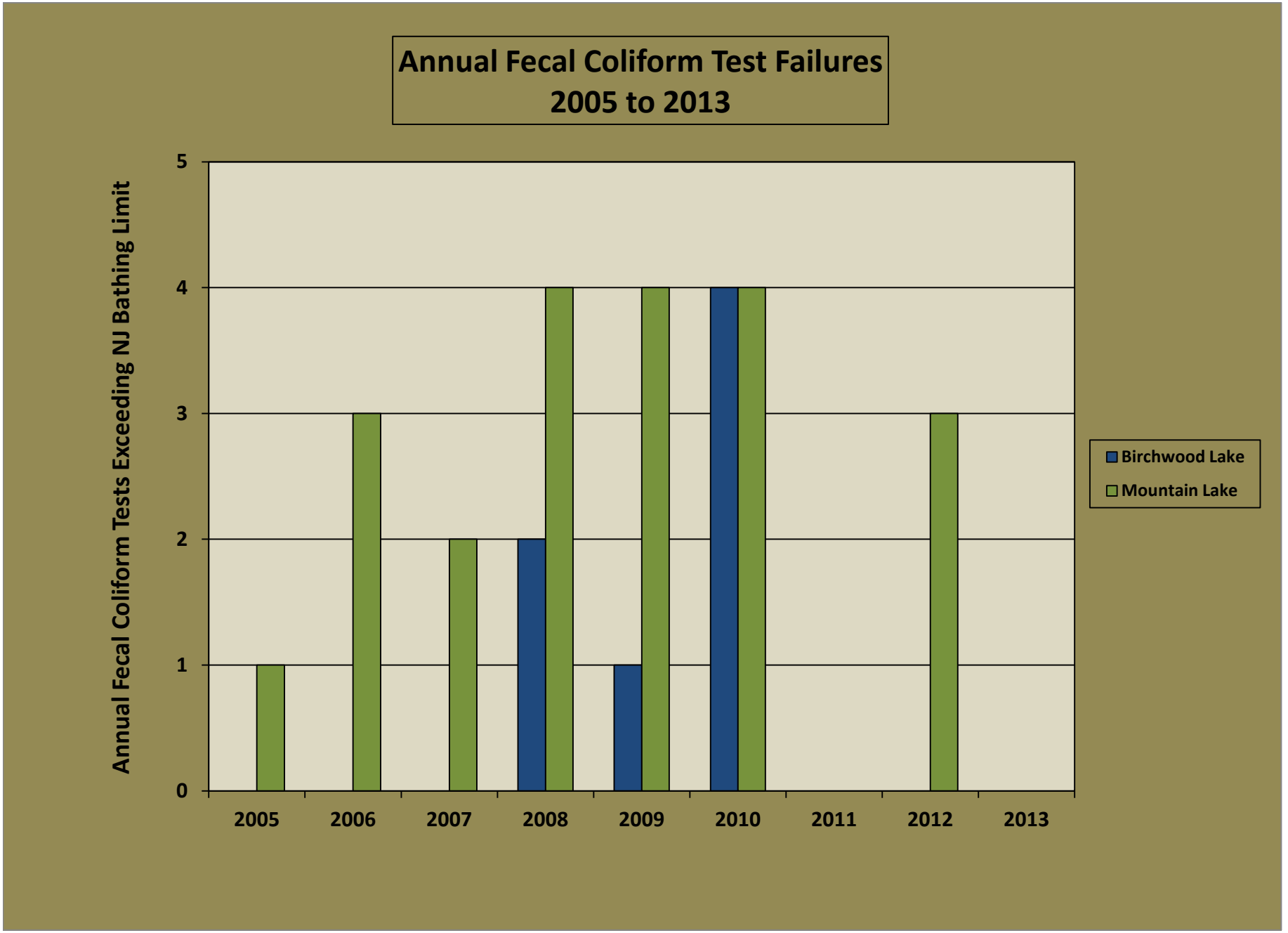
Retest Results

Date	Mountain Lake
NA	NA

Date	Birchwood
NA	NA

Note: All results are in organisms per 100 mL


Mountain Lakes
2013 Fecal Coliform Data
Allied Biological
# of Organisms per 100 mL
250
200
150
100
50
0
5/15/2013
5/22/2013
5/29/2013
6/5/2013
6/12/2013
6/19/2013
6/26/2013
7/3/2013
7/10/2013
7/17/2013
7/24/2013
7/31/2013
8/7/2013
8/14/2013
8/21/2013
8/28/2013
Indicates NJ Safe Bathing Limit
Birchwood Lake
Mountain Lake


Annual Fecal Coliform Test Failures
2005 to 2013
Annual Fecal Coliform Tests Exceeding NJ Bathing Limit
0
1
2
3
4
5
2005
2006
2007
2008
2009
2010
2011
2012
2013
Birchwood Lake
Mountain Lake

E-mail Transmission

DATE: 5/22/13 **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	5/20/13
Birchwood Lake	<2
Mountain Lake	6

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Order Information

Allied Biological Inc

APL Order ID :	13050628
Site Name :	Mt. Lakes
Date to Lab :	5/20/2013 12:40:00 PM

Samples List

Field ID	Lab ID	Matrix
Birchwood Lake	13050628-001	Lake
Mt. Lakes- Island Beach	13050628-002	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 **13050628-001** 5/20/2013 , 11:00:00 AM Lake

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

Test	Method	Date Posted	MDL	Result	Units	Limit
Fecal Coliform	SM#18 9222	5/21/2013	2	<2	cfu/100ml	-

Mt. Lakes- Island Beach **13050628-002** 5/20/2013 , 11:55:00 AM Lake

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

Test	Method	Date Posted	MDL	Result	Units	Limit
Fecal Coliform	SM#18 9222	5/21/2013	2	6	cfu/100ml	-

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.

Other

PQL- Practical Quantitation Limit

MDL- Method Detection Limit

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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?

E-mail Transmission

DATE: 5/29/13

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	5/28/13
Birchwood Lake	2
Mountain Lake	8

E-mail Transmission

DATE: 6/4/13 **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	6/3/13
Birchwood Lake	6
Mountain Lake	10

Order Information

Allied Biological Inc

APL Order ID : 13060017

Site Name : Mt. Lakes

Date to Lab : 6/3/2013 4:14:00 PM

Samples List

Field ID	Lab ID	Matrix
Birchwood Lake	13060017-001	Lake
Mountain Lake	13060017-002	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 **13060017-001** 6/3/2013 , 12:50:00 PM Lake

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

Test	Method	Date Posted	MDL	Result	Units	Limit
Fecal Coliform	SM#18 9222	6/4/2013	2	6	cfu/100ml	-

Mountain Lake **13060017-002** 6/3/2013 , 2:35:00 PM Lake

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

Test	Method	Date Posted	MDL	Result	Units	Limit
Fecal Coliform	SM#18 9222	6/4/2013	2	10	cfu/100ml	-

Report Key:

Result	Units	Limit	Description
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.

Other

PQL- Practical Quantitation Limit

MDL- Method Detection Limit

Terms & Conditions *APL 8/2003*

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?

E-mail Transmission

DATE: 6/11/13 | **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	6/10/13
Birchwood Lake	4
Mountain Lake	58

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RRS Home | Logout | Detailed Report | Allied Biological Inc Tuesday, June 11, 2013

Order Information

Allied Biological Inc

APL Order ID :	13060264
Site Name :	Mt. Lakes
Date to Lab :	6/10/2013 1:12:00 PM

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.

Samples List

Field ID	Lab ID	Matrix
Birchwood Lake	13060264-001	Lake
Mountain Lake	13060264-002	Lake
Cove Pond	13060264-003	Lake
Wildwood Lake	13060264-004	Lake
Grunden's Pond	13060264-005	Lake
Shadow Lake	13060264-006	Lake
Sunset Lake	13060264-007	Lake
Crystal Lake	13060264-008	Lake
Olive Pond	13060264-009	Lake

Birchwood Lake **13060264-001** 6/10/2013 , 9:15:00 AM Lake

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

Test	Method	Date Posted	MDL	Result	Units	Limit
Phosphorus, Total	SM4500P-E		0.01	Results Not Complete.	mg/L	-
Nitrate as N	EPA 300	6/11/2013	0.2	<0.2	mg/L	-
Turbidity (Nephelometric)	SM-18/ 2130-B		1	Results Not Complete.	NTU	-
Fecal Coliform	SM#18 9222	6/11/2013	2	4	cfu/100ml	-

Mountain Lake **13060264-002** 6/10/2013 , 11:05:00 AM Lake

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

Test	Method	Date Posted	MDL	Result	Units	Limit
Phosphorus, Total	SM4500P-E		0.01	Results Not Complete.	mg/L	-
Nitrate as N	EPA 300	6/11/2013	0.2	<0.2	mg/L	-
Turbidity (Nephelometric)	SM-18/ 2130-B		1	Results Not Complete.	NTU	-
Fecal Coliform	SM#18 9222	6/11/2013	2	58	cfu/100ml	-

Cove Pond **13060264-003** 6/10/2013 , 10:40:00 AM Lake

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

Test	Method	Date Posted	MDL	Result	Units	Limit
Phosphorus, Total	SM4500P-E		0.01	Results Not Complete.	mg/L	-
Nitrate as N	EPA 300	6/11/2013	0.2	<0.2	mg/L	-
Turbidity (Nephelometric)	SM-18/ 2130-B		1	Results Not Complete.	NTU	-

Wildwood Lake **13060264-004** 6/10/2013 , 11:20:00 AM Lake

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

Test	Method	Date Posted	MDL	Result	Units	Limit

E-mail Transmission

DATE: 6/19/13 **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	6/18/13
Birchwood Lake	20
Mountain Lake	164

Order Information

Allied Biological Inc

APL Order ID :	13060525
Site Name :	Mountain Lakes
Date to Lab :	6/18/2013 11:48:00 AM

Samples List

Field ID	Lab ID	Matrix
Birchwood Lake	13060525-001	Lake
Mt.Lake-Island Beach	13060525-002	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 **13060525-001** 6/18/2013 , 10:05:00 AM Lake

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

Test	Method	Date Posted	MDL	Result	Units	Limit
Fecal Coliform	SM#18 9222	6/19/2013	2	20	cfu/100ml	-

Mt.Lake-Island Beach **13060525-002** 6/18/2013 , 11:19:00 AM Lake

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

Test	Method	Date Posted	MDL	Result	Units	Limit
Fecal Coliform	SM#18 9222	6/19/2013	2	164	cfu/100ml	-

Report Key:

Result	Units	Limit	*Description*
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.

Other

PQL- Practical Quantitation Limit

MDL- Method Detection Limit

Terms & Conditions *APL 8/2003*

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Questions, Comments, Feedback?

E-mail Transmission

DATE: 6/25/13

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	6/24/13
Birchwood Lake	16
Mountain Lake	30

Order Information

Allied Biological Inc

***APL* Order ID :**	**13060725**
Site Name :	**Mountain Lakes**
Date to Lab :	**6/24/2013 12:37:00 PM**

Samples List

Field ID	Lab ID	Matrix
Birchwood Lake	**13060725-001**	Lake
Island Beach	**13060725-002**	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 **13060725-001** 6/24/2013 , 9:40:00 AM Lake

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

Test	Method	Date Posted	MDL	Result	Units	Limit
Fecal Coliform	SM#18 9222	6/25/2013	2	16	cfu/100ml	-

Island Beach **13060725-002** 6/24/2013 , 11:50:00 AM Lake

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

Test	Method	Date Posted	MDL	Result	Units	Limit
Fecal Coliform	SM#18 9222	6/25/2013	2	30	cfu/100ml	-

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.

Other

PQL- Practical Quantitation Limit

MDL- Method Detection Limit

Terms & Conditions *APL 8/2003*

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Questions, Comments, Feedback?

E-mail Transmission

DATE: 7/3/13 **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	7/1/13
Birchwood Lake	22.0
Mountain Lake	72.0

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ANALYTICAL RESULTS

STANDARD DELIVERABLES FORMAT

APL WORK ORDER NUMBER: 3070003

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 Conference
NJDEP #07010 / NYDOH #11634

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Analytical Results Summary

Island Beach

3070003-01 (Water)

Analyte	Result	Qual	MDL	RL	Units	Dilution	Analyzed	Method
Microbiology								
Fecal Coliform	**72.0**			1.00	CFU/100 ml	1	7/1/13 13:10	SM 9222D

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Analytical Results Summary

Birchwood Lake

3070003-02 (Water)

Analyte	Result	Qual	MDL	RL	Units	Dilution	Analyzed	Method
Microbiology								
Fecal Coliform	**22.0**			1.00	CFU/100 ml	1	7/1/13 13:10	SM 9222D

E-mail Transmission

DATE: 7/10/13

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	7/8/13
Birchwood Lake	72.0
Mountain Lake	ND

ND=Non-detected

Order Information

Allied Biological

***APL* Order ID :** **3070186**

Site Name : **Mt. Lakes**

Date to Lab : **07/08/2013 13:05**

Samples List

Field ID	Lab ID	Matrix
Birchwood Lake	3070186-01	Lake
Mt. Lakes- Island Beach	3070186-02	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 3070186-01 07/08/2013, 09:30 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	07/08/2013 16:00		72.0	CFU/100 ml	-

Mt. Lakes- Island Beach 3070186-02 07/08/2013, 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	07/08/2013 16:00		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.

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.

E-mail Transmission

DATE: 7/17/13 **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	7/15/13
Birchwood Lake	4
Mountain Lake	6

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RRS Home | Logout | Detailed Report | Allied Biological Wednesday, July 17, 2013

Order Information

Allied Biological

***APL* Order ID :** **3070420**

Site Name : **Mountain Lakes**

Date to Lab : **07/15/2013 13:30**

Samples List

Field ID	Lab ID	Matrix
Birchwood Lake	3070420-01	Lake
Mt. Lake	3070420-02	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 3070420-01 07/15/2013, 11:15 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	07/15/2013 15:50		4.00	CFU/100 ml	-

Mt. Lake 3070420-02 07/15/2013, 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	07/15/2013 15:50		6.00	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.

E-mail Transmission

DATE: 7/23/13 **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	7/22/13
Birchwood Lake	142
Mountain Lake	12

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Order Information

Allied Biological

***APL* Order ID :** **3070645**

Site Name : **Mountain Lakes**

Date to Lab : **07/22/2013 14:35**

Samples List

Field ID	Lab ID	Matrix
Birchwood Lake	3070645-01	Lake
Mt. Lakes- Island Beach	3070645-02	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 3070645-01 07/22/2013, 13:40 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	07/22/2013 16:20		142	CFU/100 ml	

Mt. Lakes- Island Beach 3070645-02 07/22/2013, 13:55 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	07/22/2013 16:20		12.0	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: 7/30/13

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	7/29/13
Birchwood Lake	90
Mountain Lake	94

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Order Information

Allied Biological

***APL* Order ID :** **3070913**

Site Name : **Mountain Lakes**

Date to Lab : **07/29/2013 14:20**

Samples List

Field ID	Lab ID	Matrix
Birchwood Lake	3070913-01	Lake
Mt. Lakes- Island Beach	3070913-02	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 3070913-01 07/29/2013, 13:25 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	07/29/2013 15:30		90.0	CFU/100 ml	

Mt. Lakes- Island Beach 3070913-02 07/29/2013, 13:02 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	07/29/2013 15:30		94.0	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: 8/6/13

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	8/5/13
Birchwood Lake	196
Mountain Lake	156

Order Information

Allied Biological

***APL* Order ID :** **3080090**

Site Name : **Mountain Lakes**

Date to Lab : **08/05/2013 10:00**

Samples List

Field ID	Lab ID	Matrix
Birchwood Lake	3080090-01	Lake
Mountain Lake Island Beach	3080090-02	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 3080090-01 08/05/2013, 09:30 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	08/05/2013 11:30		196	CFU/100 ml	

Mountain Lake Island Beach 3080090-02 08/05/2013, 09:15 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	08/05/2013 11:30		156	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: 8/14/13

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	8/12/13
Birchwood Lake	64
Mountain Lake	90

E-mail Transmission

DATE: 8/21/13

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	8/19/13
Birchwood Lake	4
Mountain Lake	68

E-mail Transmission

DATE: 8/28/13

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	8/26/13
Birchwood Lake	6.0
Mountain Lake	72.0

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Order Information

Allied Biological

***APL* Order ID :** **3080859**

Site Name : **Mt Lakes**

Date to Lab : **08/26/2013 12:35**

Samples List

Field ID	Lab ID	Matrix
Island Beach	3080859-01	Lake
Birchwood	3080859-02	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.

Island Beach 3080859-01 08/26/2013, 11:45 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	08/26/2013 14:20		72.0	CFU/100 ml	

Birchwood 3080859-02 08/26/2013, 10:20 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	08/26/2013 14:20		6.00	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.

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: 4/15/13
INSPECTION DATE: 4/15/13

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 09:45)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	13.4	8.68
2’	13.4	8.55
4’	13.3	8.46
6’	13.3	8.40
8’	13.2	8.35
10’	13.2	8.34
12’	13.2	8.30
13’		

BIRCHWOOD LAKE	Outlet Cove: No vegetation growth, slight pollen film on surface of water. Trace benthic filamentous algae along shoreline
Secchi: 9’	Inside Swim Lane: Clean and clear – aeration system not on
Aeration: 3 working in main lake basin only	Outside Swim Lane: Clean and clear
Fecal Sample: N/A	Beach: Clean and clear
SUNSET LAKE	Launch: Trace to sparse patches of benthic algae and trace quantities of floating filamentous algae along rock wall.
Secchi: 10’ est	Outlet: Trace benthic filamentous algae
Temp: 14.3 Dissolved Oxygen: 9.68	Sunset Road Cove: Clean and clear
	Inlet Cove: Sparse benthic and floating filamentous algae at outlet, trace lilies out in cove
CRYSTAL LAKE **Temp: 14.3** Dissolved Oxygen: 9.31	Birchwood Outlet: Trace benthic and filamentous floating algae along shoreline.
Secchi: 9’ est	Crystal Outlet: Sparse benthic filamentous algae on submerged rocks near outlet.

	48 West Shore Rd: Clean and clear
OLIVE POND **Temp:** 14.2 **Dissolved Oxygen: 7.45**	Secchi: 6' est. Clean and clear
SHADOW LAKE Aeration: NO Temp: 14.3 **Dissolved Oxygen: 7.62**	Secchi: 6'est. Trace small duck weed
COVE POND **Temp:** 13.9 **Dissolved Oxygen: 7.11**	Secchi: 4' est. Trace to sparse patches of floating filamentous algae along the Boulevard shoreline
GRUNDEN'S POND **Temp:** 14.3 **Dissolved Oxygen: 9.17**	Secchi: 6' est. Trace floating filamentous algae along shoreline, sparse benthic filamentous algae throughout the basin.
MOUNTAIN LAKE	Cove End: Clean and clear on both sides
Secchi: 7'	Sailboat Cove: Trace benthic filamentous algae along shoreline
Water Level: 499.4	Outlet Cove: Clean and clear
	Midvale Launch: Clean and clear
Fecal Sample: N/A	Island Beach: Clean and clear
WILDWOOD LAKE	Park: Clean and clear
Secchi: 9' est	Dam: Surface clean and clear, trace (one stem) curly leaf pondweed
Water Level: N/A	Launch: Trace benthic filamentous algae and floating filamentous algae along shoreline around littoral plants

NOTES: Waterfowl observed - Mountain Lakes: 3 pairs Bufflehead ducks
1 Common loon
2 swans
3 Canada geese
Crystal Lake : 1 Canada goose
Sunset Lake: 1 Great blue heron
2 Mallard ducks

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: **4/23/13**
INSPECTION DATE: 4/22/13

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 09:45)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	15.4	7.74
2’	15.3	7.68
4’	15.3	7.61
6’	15.2	7.52
8’	15.2	7.48
10’	15.4	7.44
12’	15.0	7.42
13’		

BIRCHWOOD LAKE pH: 7.0	Outlet Cove: Clean and clear surface with a slight trace of benthic filamentous algae around the shore. No aeration.
Secchi:	Inside Swim Lane: Clean and clear – NO aeration
Aeration: 3 units on in outer lake area, none in swim areas	Outside Swim Lane: Trace of white lily starting to show and a trace of benthic filamentous algae
Fecal Sample: N/A	Beach: Clean and clear
SUNSET LAKE	Launch: Sparse benthic filamentous algae with a trace of floating filamentous algae along the shoreline.
Secchi: 8’ est	Outlet: Trace of benthic filamentous algae along shore
Temp: 16.0 DO: 10.60	Sunset Road Cove: Clean and clear
	Inlet Cove: Increase of filamentous algae since last survey. Moderate benthic and sparse floating filamentous algae at outlet. Lilies remain the same.
CRYSTAL LAKE	Birchwood Outlet: Trace benthic filamentous algae
Temp: 15.1 DO: 9.04	48 Lake Shore Road: Trace (one 5” patch) filamentous algae along shoreline.

Secchi: 10’ est.	Crystal Outlet: Sparse benthic filamentous algae along the rocks near the shore
OLIVE POND Temp:15.2 **Dissolved Oxygen: 7.72**	Secchi: 5’ est. Clean and clear
SHADOW LAKE Aeration: NO. Temp: 16.6 **Dissolved Oxygen: 7.94**	Secchi: 5’ est. Trace small duckweed and trace floating filamentous algae. Spoke with gentleman in charge of aeration, he said he would be turning on the aeration system as of 4/22
COVE POND Temp: 14.9 Dissolved Oxygen: 6.78	Secchi: 4’ est. Trace of floating filamentous algae observed along shoreline, trace of lilies starting on opposite shore
GRUNDEN’S POND Temp: 15.5 Dissolved Oxygen:10.47	Secchi: 5’ est. Sparse to moderate small mats of floating filamentous algae from inlet at the Boulevard about 50’ along the shoreline wall. Trace of small duckweed also observed.
MOUNTAIN LAKE	Cove End: Clean and clear on both sides
Secchi: 5’	Sailboat Cove: Surface clean and clear, trace benthic filamentous algae along shoreline rocks.
Water Level: 499.4	Outlet Cove: Clean and clear
Temp: 15.1 DO: 9.5	Midvale Launch: Trace benthic filamentous algae
Fecal Sample: N/A	Island Beach: All areas clean and clear
WILDWOOD LAKE	Park: Clean and clear
Secchi: 8’ est	Dam: Clean and clear
Water Level: N/A	Launch: Trace to sparse patches of benthic filamentous algae.

NOTES: Waterfowl sightings for 4/22/13:

Sunset Lake: 1 Canada goose
2 Mute Swans

Mountain Lake: 2 Double crested Comorants
1 Mallard
3 Mute Swans

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: 4/29/13
INSPECTION DATE: 4/29/13

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 09:45)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	16.3	7.39
2’	16.3	7.32
4’	16.3	7.32
6’	16.3	7.32
8’	16.3	7.32
10’	16.3	7.30
12’	16.2	7.26
13’		

BIRCHWOOD LAKE	Outlet Cove: Trace white lily and spatterdock, increased from last week and a trace of benthic filamentous algae
Secchi: 12’	Inside Swim Lane: Trace white lily and spatterdock along beach wall near the diving dock.
Aeration: on in main lake Off in swim area	Outside Swim Lane: Trace of white lily and spatterdock, increased from last week. Trace of benthic and floating filamentous algae.
Fecal Sample: NA	Beach: Clean and clear
SUNSET LAKE Temp: 17.0 DO: 10.76	Launch: Sparse small patches of floating filamentous algae along shoreline, sparse benthic filamentous algae and white lily
Secchi: 10’ est	Outlet: Sparse floating filamentous algae among cut woody stems near shoreline, trace benthic filamentous algae and white lily
	Sunset Road Cove: Trace white lily and floating filamentous algae.
	Inlet Cove: Dense filamentous algae at base of inlet hill and out 50’ into lake body. Sparse white lily and trace spatterdock, increased from last week.

CRYSTAL LAKE Temp: 15.7 DO: 8.93	Birchwood Outlet: Large patch of floating filamentous algae (20' x 50') in lake center with sparse benthic filamentous algae visible throughout. Second mat of floating filamentous algae observed near shoreline below Birchwood parking area (20'x25'). Sparse to moderate bassweed emerging at the base of the inlet hill with a trace of curly leaf pondweed also observed.
	48 Lake Shore Road: Traces of both benthic and floating filamentous algae observed along shoreline, sparse patch of quillwort emerging on far side of dock area.
Secchi: 10' est.	Crystal Outlet: Continual increase in benthic filamentous algae on the rocks; now considered medium density. Trace water lilies observed as well.
OLIVE POND **Temp:** 13.1 **Dissolved Oxygen:** 5.13	Secchi: 6' est. Trace small patches of floating filamentous algae along shoreline and a trace of small duckweed
SHADOW LAKE Aeration: ON Temp: 15.6 **Dissolved Oxygen:** 7.23	Secchi: 5' est. 15'x20' mat of floating filamentous algae in lake basin close to sample shoreline. Trace of small duckweed and white lily also observed.
COVE POND Temp: 15.7 DO: 5.54	Secchi: 5' est. Trace to sparse patches of floating filamentous algae along shoreline. Trace of small duckweed and white lily also observed.
GRUNDEN'S POND Temp: 16.8 **Dissolved Oxygen:** 11.96	Secchi: 3' est. Visible unicellular bloom in water column. Moderate benthic filamentous algae and trace to sparse floating filamentous algae along walkway wall.
MOUNTAIN LAKE Temp: 16.3 DO: 9.43	Cove End: Trace both floating and benthic filamentous algae observed on both sides.
Secchi: 11'	Sailboat Cove: Trace to sparse benthic filamentous algae with trace patches of floating filamentous algae along rocks.
Water Level: 499.3	Outlet Cove: Trace benthic filamentous algae.
	Midvale Launch: Clean and clear
Fecal Sample: NA	Island Beach: Clean and clear
WILDWOOD LAKE	Park: Trace benthic and floating filamentous algae along shoreline.
Secchi: 10' est	Dam: Trace benthic filamentous algae along shoreline rocks.
Water Level: NA	Launch: Trace floating filamentous algae mixed with emergent vegetation and sparse benthic filamentous algae in cove.

NOTES:

- 4 Mute Swans observed at Mountain Lake
- Treatment scheduled for Crystal Lake on Wed. 5/1/13.

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: 5/6/13
INSPECTION DATE: 5/6/13

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 10:00)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	18.3	7.52
2’	18.2	7.50
4’	18.2	7.47
6’	18.1	7.47
8’	18.1	7.46
10’	18.1	7.43
12’	18.1	7.40
13’		

BIRCHWOOD LAKE	Outlet Cove: Pollen film on water surface. Trace white lily, water shield, spatterdock
Secchi: 10’	Inside Swim Lane: Sparse water shield along wall, trace white lily
Aeration: Off in swim area On in lake basin	Outside Swim Lane: Trace water shield, white lily and spatterdock
Fecal Sample: NA	Beach: Water clear, trace of pollen visible on surface
SUNSET LAKE Temp: 19.0 DO: 10.05	Launch: Trace to sparse white lily throughout the basin, increased from last week. Trace of benthic and floating filamentous algae along shoreline. Pollen on surface
Secchi: 10’est	Outlet: Trace floating filamentous algae, curly leaf pondweed and white lily. Pollen present on lake surface.
	Sunset Road Cove: Trace white lily and floating filamentous algae
	Inlet Cove: Dense floating filamentous algae at base of outlet and out 100’ into cove decreasing to moderate in main basin out a total of 200’. Trace to sparse white lily and spatterdock.

CRYSTAL LAKE	Birchwood Outlet: White lilies and spatterdock observed in central basin in small patches. Bassweed and curly leaf pondweed trace to sparse at base of hill. Water shield and leafy pondweed also observed at base of hill. Filamentous algae decreased from last survey but still present in trace patches along the shoreline. Grass clippings from hill in water at base of hill could add to nuisance level algae in area.
Temp: 18.5 DO: 9.46	48 Lake Shore Road: Trace of ribbon leaf pondweed emerging along shore line. Trace to sparse amounts of leafy pondweed and curly leaf pondweed also observed. Pollen present on surface of water.
Secchi:10' est	Crystal Outlet: Sparse to moderate benthic filamentous algae still present on rocks near outlet.
OLIVE POND Temp: 13.5 **Dissolved Oxygen: 5.27**	Secchi: 6' est. Trace small duck weed and benthic filamentous algae. Heavy pollen and tree debris present on surface
SHADOW LAKE Aeration: on Temp: 18.0 **Dissolved Oxygen: 8.25**	Secchi: 4' est. Dense mats of filamentous algae, 50' diameter present in three spots with many smaller patches observed throughout.
COVE POND Temp: 17.2 DO: 5.29	Secchi: 4' est. Heavy pollen present on lake surface. Trace benthic and floating filamentous algae along shoreline. Sparse white lilies expanding on far shoreline.
GRUNDEN'S POND Temp: 18.7 Dissolved Oxygen:12.73	Secchi: 6' est. Sparse to moderate floating filamentous algae throughout in mats. More dense near the road end of the pond and along the wall. Trace of curly leaf pondweed and ribbon leaf pondweed both observed. Heavy pollen present on lake surface. One dead bluegill observed.
MOUNTAIN LAKE	Cove End: Trace to sparse mats of floating filamentous algae on both sides.
Secchi:10' est Temp: 18.6 DO: 8.73	Sailboat Cove: Trace to sparse mats of floating filamentous algae along shore and in front of houses at either side of cove.
Water Level: 499.1	Outlet Cove: Trace floating filamentous algae along shoreline.
	Midvale Launch: Clean and clear with some pollen present on water surface.
Fecal Sample: NA	Island Beach: Trace amounts of curly leaf pondweed and ribbon leaf pondweed on either side of boat dock. Sparse benthic filamentous algae in canal and under foot bridge. Trace curly leaf pondweed and benthic filamentous algae around sailboats. Trace benthic filamentous algae near beach.

WILDWOOD LAKE Temp: 19.4 DO: 9.64	Park: Trace curly leaf pondweed and ribbon leaf pondweed.
Secchi: 10’ est	Dam: Trace curly leaf pondweed and benthic filamentous algae
Water Level: NA	Launch: Sparse benthic filamentous algae and mats of floating filamentous algae along shore near launch and in cove end.

NOTES: **Grunden’s Pond – Mallards present**
Sunset Lake – Canada geese and Mallards present
Crystal Lake – Canada geese present

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: 5/13/13
INSPECTION DATE: 5/13/13

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 09:45)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	18.9	6.53
2’	19.0	6.42
4’	18.9	6.32
6’	18.9	5.56
8’	18.8	5.36
10’	18.8	4.78
12’	18.7	5.30
13’		

BIRCHWOOD LAKE	Outlet Cove: Light water lilies observed.
Secchi: 10.5’	Inside Swim Lane: Light water lilies up to 10’ off the west dock.
Aeration: Beach yes, lanes no	Outside Swim Lane: Clear
Fecal Sample: NA	Beach: Clear.
SUNSET LAKE	Launch: Clear. Light tree litter along the shoreline.
Secchi:	Outlet: Clear. Light tree litter along the shoreline.
	Sunset Road Cove: Good color, surface clear.
	Inlet Cove: Abundant tree litter and algae in cove, but restricted to this area.
CRYSTAL LAKE	Birchwood Outlet: Water lilies showing Sonar effects. Clear of algae and no signs of submersed plants in mid-lake.
	48 Lake Shore Road: Pollen and tree litter on both sides of the dock (~15’ to either side).
Secchi:	Crystal Outlet: Some benthic filamentous algae observed on the rip-rap. Entire end of lake has clear surface with good color.

OLIVE POND **Dissolved Oxygen:**	Secchi: Small amount of tree litter/algae along the east shore by new landscaping.
SHADOW LAKE Aeration: On **Dissolved Oxygen:**	Secchi: Approx. ¼ of the surface supports tree litter with algae mixed in. Light duckweed observed along shoreline.
COVE POND	Secchi: <15% of pond surface accumulation of tree litter/pollen along shoreline.
GRUNDEN'S POND **Dissolved Oxygen:**	Secchi: Scattered tree litter and floating filamentous algae across the surface (sparse density).
MOUNTAIN LAKE	Cove End: ~1 foot or less of tree litter along the edges with some floating filamentous algae mixed in. Not problematic at this time.
Secchi: 9.0'	Sailboat Cove: Tree litter pushed up in right corner. Scattered small patches of floating filamentous algae (sparse) on left side.
Water Level: 499.15	Outlet Cove: Clear
	Midvale Launch: Surface clear. Occasional curly-leaf pondweed plants visible below surface from the dock.
Fecal Sample: NA	Island Beach: Surface looks good, but curly-leaf pondweed observed just below the surface in >2' of water. No algae.
WILDWOOD LAKE	Park: A few sprigs of curly-leaf pondweed observed below surface, but otherwise clear.
Secchi:	Dam: Water level appears good along the dam. No algae or plants observed. Dam blocks still in place.
Water Level: NA	Launch: 1-2' of tree litter at the launch, but otherwise clear.

NOTES:

1. **Water clarity not measured at most sites due to windy conditions.**
2. **Mountain Lake and Wildwood Lake will be put on the schedule for boat surveys later in the week (submersed weeds).**
3. **Two geese nesting on dock next to Sunset Lake Outlet.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: 5/20/13
INSPECTION DATE: 5/20/13

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 09:45)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	18.0	6.81
2’	17.9	6.74
4’	17.9	6.70
6’	17.9	6.73
8’	17.9	6.69
10’	17.8	6.54
12’	17.8	6.50
13’		

BIRCHWOOD LAKE	Outlet Cove: Sparse to moderate watershield, trace white lily, trace spatterdock, trace ribbon leaf pondweed
Secchi: 9’	Inside Swim Lane: Trace to sparse watershield along wall, trace ribbon leaf also observed.
Aeration: All on	Outside Swim Lane: Moderate watershield, trace white lily and spatterdock. Trace ribbon leaf and benthic filamentous algae.
Fecal Sample: yes	Beach: Clean and clear
SUNSET LAKE	Launch: Trace to sparse white lilies throughout basin. Trace floating filamentous algae along shoreline.
Secchi: 10’ est	Outlet: Trace white lilies and floating filamentous algae.
Temp: 19.9 DO: 8.99	Sunset Road Cove: Trace spatterdock and floating filamentous algae.
	Inlet Cove: Sparse floating filamentous algae, sparse to moderate lilies increasing in density further into cove area.
CRYSTAL LAKE	Birchwood Outlet: Trace curly leaf pondweed with signs of dying back. Trace white lilies and spatterdock along shore with patches throughout basin. Sparse bassweed mixed with a trace of benthic filamentous algae along the shoreline. Sparse watershield mixed with floating filamentous algae

	along shoreline to the left of the outlet along the shoreline.
Temp: 18.7 DO: 7.07	48 Lake Shore Road: Trace benthic filamentous algae and trace quillwort near dock.
Secchi: 12' est	Crystal Outlet: Trace benthic filamentous algae on rocks along shoreline.
OLIVE POND **Temp:** 17.7 **Dissolved Oxygen:** 4.74	Secchi: 6' est. Trace small duckweed along shoreline.
SHADOW LAKE Aeration: ON Temp: 18.3 **Dissolved Oxygen: 5.05**	Secchi: 6' est Trace small duckweed
COVE POND Temp: 18.1 DO: 4.27	Secchi: 3' est. Trace small duckweed and floating filamentous algae along shoreline.
GRUNDEN'S POND **Dissolved Oxygen: NA**	Secchi: 3' est. Water turbid, floating filamentous algae mats covering 25% of central basin. Treatment scheduled for Wed. 5/22.
MOUNTAIN LAKE	Cove End: Left – trace floating filamentous algae Right- Sparse floating filamentous algae along shoreline
Secchi: 6'	Sailboat Cove: Moderate to dense plant growth 50-60% of cove at or near surface, in center. Curly leaf pondweed was treated on 5/17 plants have not dropped out of water column yet.
Water Level: 499.1	Outlet Cove: Trace floating filamentous algae along rocks near outlet.
Temp: 19.2 DO: 8.90	Midvale Launch: Trace curly leaf pondweed at or near surface along both sides of boat dock.
Fecal Sample: yes	Island Beach: sparse to moderate patches of curly leaf pondweed on either side of boat dock at or near surface. Plants were treated 5/17 and should drop out shortly. Visible, localized unicellular algae bloom at launch.
WILDWOOD LAKE	Park: Trace of curly leaf pondweed.
Secchi:8' est	Dam: Trace curly leaf pondweed and benthic filamentous algae along rocks.
Water Level: NA Temp: 19.1 DO: 6.91	Launch: Trace benthic filamentous algae.

NOTES: At Sunset lake three American woodducks and one mute swan were observed.

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: 5/29/13
INSPECTION DATE: 5/28/13

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 10:15)

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

Profile not available, see notes.

BIRCHWOOD LAKE	Outlet Cove: Moderate watershield, trace amounts of spatterdock, white lily, ribbon leaf pondweed, and bladderwort were also observed.
Secchi: 10’ est.	Inside Swim Lane: Trace to sparse watershield along beach wall mixed with trace amounts of bladderwort and ribbon leaf pondweed.
Aeration: All on	Outside Swim Lane: Sparse to moderate watershield with filamentous algae attached. Trace amounts of white lily, bladderwort and ribbon leaf pondweed also.
Fecal Sample: yes	Beach: Clean and clear
SUNSET LAKE	Launch: White lilies continue to increase throughout the basin and are now seen in sparse to moderate patches throughout. Trace amounts of benthic filamentous algae were observed near the shoreline.
Secchi: 10’ est.	Outlet: Trace benthic and floating filamentous algae observed along the shoreline. Lilies throughout the basin.
	Sunset Road Cove: Trace white lilies and spatterdock.
	Inlet Cove: Water turbid at base of inflow, trace amounts of benthic filamentous algae mixed with trace to sparse patches

	of white lilies. Lilies increase out in near cove to moderate/dense quantities.
CRYSTAL LAKE	Birchwood Outlet: Sparse watershield, spatterdock and trace amounts of white lilies all show signs of dying back. Bassweed along shoreline also showing signs of dying back. Sparse patch of floating filamentous algae observed right at base of inlet.
	48 Lake Shore Road: Sparse patches of leafy pondweed, mostly dead stems, along shoreline and near dock.
Secchi: 10' est.	Crystal Outlet: Trace amounts of benthic filamentous algae still remaining on rocks along shore line but significantly decreased from last visit.
OLIVE POND **Dissolved Oxygen: NA**	Secchi: 6' est. Clean and clear (trace amount of floating filamentous algae in down tree near shoreline).
SHADOW LAKE Aeration: On **Dissolved Oxygen: NA**	Secchi: 6' est. Trace small duckweed and benthic filamentous algae.
COVE POND	Secchi: 4' est. Trace small duckweed and floating filamentous algae.
GRUNDEN'S POND **Dissolved Oxygen: NA**	Secchi: 6' est. Trace patches of floating filamentous algae remain (<5% lake surface) mixed with vegetation at surface.
MOUNTAIN LAKE	Cove End: clean and clear on both sides
Secchi:15' est.	Sailboat Cove: Mostly clean and clear, vegetation observed last week has now fallen out of the water column. Trace amounts of benthic filamentous algae remain on the rocks along the shoreline.
Water Level: 499.4	Outlet Cove: Clean and clear
	Midvale Launch: Clean and clear
Fecal Sample: Yes	Island Beach: Trace to sparse benthic filamentous algae out from shoreline around boat dock. Beach and sailboat areas clean and clear.
WILDWOOD LAKE	Park: Clean and clear
Secchi: 12' est.	Dam: Clean and clear
Water Level: NA	Launch: No access due to road work.

NOTES: No temperature or dissolved oxygen available due to meter malfunction.

Waterfowl : Sunset Lake – Mute Swan
Mountain Lake – Double Crested Cormorant

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: 6/4/13
INSPECTION DATE: 6/3/13

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 12:50)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	23.6	6.28
2’	23.8	6.24
4’	23.4	6.13
6’	23.3	6.08
8’	23.2	6.06
10’	23.1	6.04
12’	22.2	4.87
13’		

BIRCHWOOD LAKE	Outlet Cove: Lilies, watershield and spatterdock all show signs of dying back. Trace ribbon leaf pondweed.
Secchi: 7’	Inside Swim Lane: Lilies dying back, sparse amounts of pollen on lake surface.
Aeration: ON	Outside Swim Lane: Trace amounts of bladderwort and ribbon leaf pondweed observed. Lilies dying back.
Fecal Sample: Yes	Beach: Clean and clear
SUNSET LAKE	Launch: Sparse lilies throughout basin showing early signs of dying back.
Secchi: 8’ est	Outlet: Trace benthic filamentous algae along shoreline. Sparse lilies in basin.
Temp: 28.9 DO: 7.34	Sunset Road Cove: Trace white lilies and spatterdock, leaves yellowing.
	Inlet Cove: Less turbid, lilies show signs of dying back, no algae observed.
CRYSTAL LAKE	Birchwood Outlet: Bassweed almost completely dead with most plants having fallen out of water column. Large patch floating filamentous algae (10’x30’) at base of spillway along shoreline.

Temp: 27.1 DO: 8.42	48 Lake Shore Road: Trace to sparse filamentous algae returning along shoreline area.
Secchi: 10' est.	Crystal Outlet: Sparse benthic filamentous algae along rocks near shoreline. Trace patches floating filamentous algae near dam.
OLIVE POND Temp: 27.2 **Dissolved Oxygen:** 5.64	Secchi: 5' est. Trace small duckweed.
SHADOW LAKE Aeration: ON Temp: 27.5 **Dissolved Oxygen: 5.42**	Secchi: 4' est. Trace small duckweed. Trace patches floating filamentous algae along shoreline.
COVE POND Temp: 26.5 DO: 5.73	Secchi: 2' est. Water turbid, trace amounts of small duckweed observed.
GRUNDEN'S POND Temp: 27.5 **Dissolved Oxygen: 7.75**	Secchi: 5' est. Trace amounts of filamentous algae mixed with vegetation in central basin.
MOUNTAIN LAKE	Cove End: Right: moderate to dense benthic and floating filamentous algae.
Secchi: 11'	Sailboat Cove: Sparse to moderate benthic filamentous algae and sparse patches of floating filamentous algae mixed with vegetation in central portion of basin.
Water Level: 499.2	Outlet Cove: Trace floating filamentous algae. Sparse pollen cover on water surface at outlet.
Temp: 27.9 DO: 8.94	Midvale Launch: Clean and clear, pollen visible on surface.
Fecal Sample: YES	Island Beach: Trace floating filamentous algae with sparse to moderate filamentous algae near boat dock, trace filamentous algae near sailboats. Beach area clean and clear.
WILDWOOD LAKE	Park: Not accessible due to construction
Secchi: 5' est.	Dam: Construction continues, and water is turbid.
Water Level: NA	Launch: Water turbid, sparse benthic filamentous algae with patches of floating filamentous algae.

NOTES: Algae samples were collected at all lakes, report to follow.

Wildfowl: Double crested cormorant was observed at Mountain Lake.

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: 6/10/13
INSPECTION DATE: 6/10/13

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 09:45)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	20.8	4.36
2’	20.8	4.28
4’	20.8	4.24
6’	20.8	4.24
8’	20.8	4.23
10’	20.8	4.19
12’	20.1	2,91
13’		

BIRCHWOOD LAKE	Outlet Cove: Trace Ribbon leaf pondweed and trace bass weed observed. Lilies have now fallen out of the water column around the docks. Trace amounts of pollen on the water surface.
Secchi: 6’	Inside Swim Lane: Trace amounts of watershield remain but show signs of dying back.
Aeration: all on	Outside Swim Lane: Trace patches of spatterdock remain but show signs of dying back, trace amounts of ribbon leaf also observed.
Fecal Sample: Yes	Beach: Clean and clear
SUNSET LAKE	Launch: Sparse patches of white lilies all showing signs of dying back following treatment. Trace floating filamentous along the shoreline.
Secchi: 6’ est.	Outlet: Sparse to moderate mixed lilies in central basin, all showing signs of dying back. Trace of floating filamentous algae along the shoreline.
Temp: 22.7 DO: 6.28	Sunset Road Cove: Trace white lilies and spatterdock with sigs of dying back.
	Inlet Cove: Water clear with remaining lilies yellowed and dying back.

CRYSTAL LAKE Temp: 22.3 DO: 8.12	Birchwood Outlet: Trace to sparse patches of bassweed remain, but are stunted and show signs of dying. Trace patches of white lily, watershield and spatterdock throughout lake end. Sparse patches of filamentous algae mixed with the dying watershield remain at the base of the inlet.
	West Shore Road Shoreline: Trace to sparse patches of filamentous algae along rock wall and near boat dock.
Secchi: 5' est.	Crystal Outlet: Visible unicellular algae bloom in water column. Trace to sparse benthic filamentous algae on rocks.
OLIVE POND Temp: 22.3 **Dissolved Oxygen: 6.14**	Secchi: 5' est. Trace small duckweed near shoreline, central basin clean and clear.
SHADOW LAKE Aeration: ON Temp: 22.4 **Dissolved Oxygen:** 5.24	Secchi: 5' est. Trace riccia and floating filamentous algae observed along shoreline. Moderate to dense patches of small duck weed mixed with watermeal in spots along shoreline to the right of water quality site.
COVE POND Temp: 21.0 DO: 6.09	Secchi: 4' est. Trace small duck weed and floating filamentous algae.
GRUNDEN'S POND Temp: 21.7 **Dissolved Oxygen:** 6.28	Secchi: 6' est. Lake basin clean and clear with only a trace of small duckweed along the shoreline.
MOUNTAIN LAKE	Cove End: R- Moderate benthic filamentous algae with sparse to moderate floating filamentous algae. L- Trace floating filamentous algae.
Secchi: 11.5'	Sailboat Cove: Improved from last survey following treatment. Trace patches of naiad mixed with leafy pondweed and filamentous algae remain but show signs of dying back.
Water Level: 499.6	Outlet Cove: Trace floating filamentous algae observed.
Temp: 22.4 DO: 8.01	Midvale Launch: Clean and clear.
Fecal Sample: Yes	Island Beach: Moderate benthic filamentous algae mixed with naiad and leafy pondweed at launch and surrounding boat dock. Sparse patches of floating filamentous algae also observed in that area. Trace amounts of floating filamentous algae observed near the sailboats. Beach – Clean and clear.
WILDWOOD LAKE	Park: N/A – due to construction
Secchi: 10' est. Temp: 22.8 DO: 11.50	Dam: Trace floating filamentous algae, main basin appears clean and clear. Water quality samples collets at Dam site due to construction at Park.

Water Level: 499.2	Launch: Trace to sparse benthic and floating filamentous algae in patches along cove shoreline.

NOTES:

1. **Waterfowl observed: Sunset Lake – Mute swans (2) Canada goose**
2. **Water chemistry samples collected at all nine sites.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: 6/18/2013
INSPECTION DATE: 6/18/2013

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 09:45)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	21.5	3.91
2’	21.3	3.82
4’	20.8	3.71
6’	20.7	3.75
8’	21.3	3.70
10’	21.3	3.76
12’	20.5	2.86
13’		

BIRCHWOOD LAKE	Outlet Cove: Trace pollen on the surface and trace ribbon-leaf pondweed observed, but otherwise clean and clear.
Secchi: 8.5’	Inside Swim Lane: Trace ribbon-leaf pondweed and benthic filamentous algae observed. A few stems of pondweed dying back from recent treatment.
Aeration: All on.	Outside Swim Lane: Trace spatterdock (dying) and trace ribbon-leaf pondweed observed. Trace pollen on the surface.
Fecal Sample: 1005 am	Beach: Clean and clear.
SUNSET LAKE	Launch: Trace creeping bladderwort along launch. In the open basin, scattered patches of lilies showing signs of dying back, yet still at the surface.
Secchi: 7’ estimated	Outlet: High water flow. Unicellular algae appears to be in the water column. Floating stems of dead/dying pondweed accumulating along the shore.
	Sunset Road Cove: Scattered patches of water lilies appear to be dying, but still at the surface.
	Inlet Cove: Heavy pollen and unicellular algae in the left corner. Further out in the cove, medium to dense water lilies still at the surface.

CRYSTAL LAKE	Birchwood Outlet: The bassweed is still dropping out, along with other pondweed (small?). Trace to sparse benthic filamentous algae observed along shoreline.
	Lake Shore Road Shoreline: A few cattails scattered to the right, along the shoreline. Trace to sparse benthic filamentous algae on the bottom, except for active sunfish nest sites (many).
Secchi: 7' estimated.	Crystal Outlet: Benthic filamentous algae covers the rocks in the shallow water (only). Heavy pollen and unicellular algae (?) accumulating in the right corner.
OLIVE POND **Dissolved Oxygen: 7.73 mg/L.**	Secchi: 5' estimated. The basin looks good with suitable water clarity. Trace benthic filamentous algae observed, but surface was clear.
SHADOW LAKE Aeration: On. **Dissolved Oxygen: 9.21 mg/L.**	Secchi: 3' estimated. Water was turbid. Trace small duckweed, slender riccia and creeping bladderwort along the shoreline, typically 3-5 feet wide, but increasing to 10-15 feet wide to the right. A few scattered patches of floating filamentous algae, some accumulating near the dock to the left, was observed in the open water.
COVE POND **Dissolved Oxygen: 6.93 mg/L.**	Secchi: 2' estimated. Water was turbid. Trace duckweed along shoreline, and increased leaf litter observed. The water lilies in front of the yellow house are medium to dense, and extend 10 to 20 feet off shore.
GRUNDEN'S POND **Dissolved Oxygen: 5.18 mg/L.**	Secchi: 3' estimated. The water was turbid, but the surface was clear. Trace benthic filamentous algae on bottom.
MOUNTAIN LAKE	Cove End: To the right, clean and clear. To the left, sparse to moderate filamentous algae observed, with numerous patches reaching the surface (~10% of surface). Trace pondweed (no seeds, so could not identify-perhaps small pondweed) reaching the surface in a few locations in the cove.
Secchi: 8.0'	Sailboat Cove: Shoreline bottom looks great. Further into the cove, in front of the island, vegetation is reaching the surface, but appears to be dying back. It is likely a pondweed/stonewort mixture.
Water Level: 499.6	Outlet Cove: Pollen and unicellular algae (?) accumulating on dam shore.
	Midvale Launch: Heavy pollen and unicellular algae (?) accumulating at the launch. Shallow water is clean and clear, but in the deeper water, stonewort covers the bottom (trace to sparse density).
Fecal Sample: 1119 hrs	Island Beach: By the dock, sparse to moderate density leafy pondweed covered with benthic filamentous algae observed. Stonewort (in scattered patches) observed in the deeper

	water and along the wall. The beach was clean and clear.
WILDWOOD LAKE	Park: Floating filamentous algae accumulating along the right and left shorelines and around the rocks and docks, near the park. Filamentous algae extends out to 30 feet in locations. The open water looks clear.
Secchi: 4' estimated.	Dam: Trace to sparse benthic filamentous algae on the rip-rap.
Water Level: 499.7	Launch: Trace to sparse benthic filamentous algae, but the open water looks good.

NOTES:

1. **One of the diffusers at Shadow Lake was unbalanced (too much output). System probably should be balanced on next on-water visit.**
2. **Algae samples collected at the 5 larger lakes (which all appeared to have unicellular algae in the water column). Results to follow.**
3. **Two dogs observed in the water at Midvale Launch. One dog was observed defecating in the water.**
4. **The canal sediment at the Wildwood Lake park was mostly dry and piled up to the left. However, one hay bale near the lake was moved, and a sediment plume has washed into the lake.**
5. **A large school of juvenile catfish was observed at the Island Beach swim area. To the right were numerous sunfish and at least two lurking largemouth bass.**
6. **Wildwood Lake is on schedule for an algae treatment. The Cove End Basin of Mountain Lake is on schedule for an algae treatment as well.**
7. **Birchwood Lake will be treated for water lilies (upper part of basin) later this week.**
8. **We will plan a Sonar bump treatment for Sunset Lake later in the week.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: 6/24/13
INSPECTION DATE: 6/24/13

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 09:30)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	23.6	3.29
2’	23.7	3.29
4’	23.6	3.20
6’	23.6	3.21
8’	23.6	3.13
10’	23.4	3.11
12’	22.1	0.86
13’		

BIRCHWOOD LAKE	Outlet Cove: Clean and clear
Secchi: 10’	Inside Swim Lane: Clean and clear
Aeration: all on	Outside Swim Lane: Trace of white lily and trace of spatterdock remain.
Fecal Sample: yes	Beach: Clean and clear
SUNSET LAKE	Launch: White lilies continue to die back, sparse patches observed throughout the basin. Trace amount of creeping bladderwort and leafy pondweed also observed.
Secchi: 8’ est	Outlet: Trace of leafy pondweed observed along the shoreline. Trace amount of benthic filamentous algae also observed.
Temp: 28.1 DO: 6.29	Sunset Road Cove: Trace amounts of white lily, spatterdock and floating filamentous algae all observed.
	Inlet Cove: Lilies show signs of dying back in cove center. Water at base of inlet slightly turbid but free of algae.
CRYSTAL LAKE	Birchwood Outlet: Trace of bass weed, white lily and watershield all observed. Sparse amounts of benthic filamentous algae along the shoreline with small patches of floating filamentous algae to the left of the spillway.

	Lake Shore Road Shoreline: Heavy pollen on the surface of the water near the shoreline. Trace amounts of benthic filamentous algae also observed.
Secchi:12' est.	Crystal Outlet: Sparse to moderate benthic filamentous algae on rocks along shoreline. One small mat (3' x 5') of floating filamentous algae near dam.
OLIVE POND **Temp:** 25.1 **Dissolved Oxygen: 4.28**	Secchi: 6' est. Moderate pollen across surface of lake. Trace amount of small duckweed also observed along shoreline.
SHADOW LAKE Aeration: ON **Dissolved Oxygen: 6.68** **Temp: 26.1**	Secchi: 4' est. Moderate patches of small and large duckweed along shoreline. Floating filamentous algae observed throughout basin (30% coverage). Large mats of dense floating filamentous algae accumulating along shoreline. A visible unicellular algae bloom was also noted, a sample was brought back to our lab for analysis. Analysis showed a bloom of the blue-green algae, *Aphanizomenon.*
COVE POND Temp: 25.5 DO: 4.43	Secchi: 4' est. Trace small patches of floating filamentous algae along shoreline. Trace amounts of small duckweed also observed.
GRUNDEN'S POND **Dissolved Oxygen: 5.45** **Temp: 28.7**	Secchi: 3' est. Water slightly turbid in appearance. Trace amounts of small duckweed seen along shoreline. Trace patches of slender naiad mixed with filamentous algae also observed.
MOUNTAIN LAKE	Cove End: Right side – sparse patches of floating filamentous and benthic algae. Moderate patches of pondweed all showing signs of dying back. Left side – trace amount of floating filamentous algae observed.
Secchi: 11'	Sailboat Cove: Two small patches (1' diameter) floating filamentous algae observed along the shoreline. Remainder of cove appeared clean and clear with slightly turbid water.
Water Level: 499.5	Outlet Cove: Clean and clear.
Temp: 27.9 DO: 7.26	Midvale Launch: Clean and clear. A trace patch of floating leafy pondweed was observed washed up near the launch.
Fecal Sample: YES	Island Beach: Moderate leafy pondweed mixed with trace amounts of naiad and stonewort observed on both sides of the boat dock. Moderate amounts of stonewort mixed with trace amounts of benthic filamentous algae in channel and under bridge. Sail boat area and beach both appear clean and clear.
WILDWOOD LAKE	Park: Not accessible.
Secchi: 4' est.	Dam: Dense mats of floating filamentous algae extending out 1' to 2' from dam observed with smaller trace patches observed in basin between park area and dam.

Water Level: 499.3	Launch: Dense mat (3/4 acre) of floating filamentous algae in cove end and along shoreline with trace small patches noted throughout cove.

NOTES:

1. **No waterfowl observed.**
2. **Fecal samples collected. Results to follow.**
3. **Mountain Lake and Shadow Lake on schedule for treatment on Thursday.**
4. **Wildwood Lake on schedule for treatment later this week, but day undetermined as of now.**
5. **Sonar bump treatment conducted at Sunset Lake last week.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: 7/1/13
INSPECTION DATE: 7/1/13

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 09:45)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	21.7	4.42
2’	19.9	5.39
4’	22.6	3.50
6’	25.0	3.54
8’	25.2	3.54
10’	25.1	3.52
12’	24.6	3.25
13’		

BIRCHWOOD LAKE	Outlet Cove: Trace of white lily observed
Secchi: 8’ est.	Inside Swim Lane: Trace of white lily observed a long beach wall
Aeration: All on	Outside Swim Lane: Trace to sparse patches of white lily and a trace of spatterdock.
Fecal Sample: Yes	Beach: Clean and clear.
SUNSET LAKE Temp: 25.7 DO: 6.26	Launch: Trace of floating filamentous algae, creeping bladderwort, and leafy pondweed. Trace patches of white lilies remain but all show signs of dying back and most lilies have now fallen out of the water column.
Secchi: 5’ est.	Outlet: Trace amounts of leafy pondweed, creeping bladderwort and floating filamentous algae observed along the shoreline. Trace patches of lilies also noted.
	Sunset Road Cove: Trace spatterdock, one small patch observed.
	Inlet Cove: Trace to sparse floating and benthic filamentous algae observed at the base of the spillway. White lily and spatterdock remain in the cove but in diminished numbers and many show signs of continuing to die back.

CRYSTAL LAKE	Birchwood Outlet: Trace white lily, watershield and bassweed. Trace to sparse benthic filamentous algae.
Temp: 25.4 DO: 8.98	Lake Shore Road Shoreline: Sparse to moderate benthic filamentous algae concentrated most near dock and wall. Scattered patches (1' to 2' dia) of dense floating filamentous algae throughout area in front to houses.
Secchi: 10' est.	Crystal Outlet: Sparse to moderate benthic filamentous algae along shoreline rocks and to left of spillway.
OLIVE POND Temp: 24.9 **Dissolved Oxygen: 6.53**	Secchi: Trace small duckweed and water meal observed.
SHADOW LAKE Aeration: On Temp: 24.8 **Dissolved Oxygen: 6.42**	Secchi: 4' est. Trace amounts of small duckweed, watermeal and riccia observed near shoreline. Filamentous algae not observed following treatment last week.
COVE POND Temp: 23.8 DO: 7.83	Secchi: 3' est. Trace small duckweed. Water column slightly turbid most likely due to heavy rain.
GRUNDEN'S POND Temp: 24.7 **Dissolved Oxygen: 5.16**	Secchi: 3' est. Trace small duckweed and benthic filamentous algae observed.
MOUNTAIN LAKE	Cove End: Right side – Small patches of pondweed scattered throughout cove. Left side – Trace amounts of floating filamentous algae.
Secchi: 10' est.	Sailboat Cove: Clean and clear
Water Level: 499.7	Outlet Cove: Clean and clear
Temp: 26.2 DO: 8.80	Midvale Launch: Trace amounts of creeping bladderwort and leafy pondweed observed.
Fecal Sample: Yes	Island Beach: Trace to sparse benthic filamentous algae and leafy pondweed remaining in boat dock area. Sailboat area – Trace amounts of bladderwort and slender naiad observed. Beach area – Clean and clear
WILDWOOD LAKE	Park: NA
Secchi: 6'est. Temp: 26.5 DO: 6.82	Dam: Clean and clear
Water Level: 499.6	Launch: Clean and clear

NOTES:

1. **Algae samples collected at all nine lakes. Results to follow.**
2. **All dissolved oxygen measurements suitable for early July.**
3. **Fecal coliform samples collected. Results to follow.**
4. **Algaecide application for Crystal Lake tentatively scheduled for Wed. 7/3. (based on weather conditions).**
5. **Due to the heavy rain, there were no swimmers present at Birchwood Lake, but we did search for the source of the brown film on site. It was difficult to discern in the rain, but it could be pollen, which tends to accumulate in the swim lanes.**
6. **Waterfowl observed: Sunset Lake– Canada goose**
   Crystal Lake – Mute Swan
   Mountain Lake – Mute Swan
   Wildwood Lake – Common Merganser

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: 7/8/13
INSPECTION DATE: 7/8/13

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 09:45)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	27.7	2.16
2’	27.2	1.67
4’	27.1	1.84
6’	27.1	1.44
8’	27.0	1.21
10’	26.9	1.84
12’	25.3	0.16
13’		

BIRCHWOOD LAKE	Outlet Cove: Trace white lily and Ribbon leaf pondweed observed.
Secchi: 4’	Inside Swim Lane: Trace amounts of white lily and watershield were observed along the beach side wall.
Aeration: All on – see note.	Outside Swim Lane: Trace spatterdock and watershield observed. Trace to sparse amounts of white lily also noted.
Fecal Sample: Yes	Beach: Clean and clear.
SUNSET LAKE	Launch: Trace patches of floating filamentous algae along shoreline. Lilies have fallen out of water column in this area.
Secchi: 4’ est.	Outlet: Trace patches of floating filamentous algae along shoreline. No lilies visible in area.
Temp: 28.9 DO: 5.52	Sunset Road Cove: Trace of spatterdock observed but shows signs of dying back.
	Inlet Cove: Water slightly turbid. Sparse floating filamentous algae and benthic filamentous algae observed. Lilies continue to die back out in cove area.
CRYSTAL LAKE	Birchwood Outlet: Trace patches of white lily and watershield along base of hill. Trace patches of spatterdock observed out in central basin. Filamentous algae in patches mixed in near lilies and along shoreline.

Temp: 30.2 DO: 7.73	Lake Shore Road Shoreline: Trace to sparse benthic filamentous and trace patches of floating filamentous algae along wall and in cove area.
Secchi: 10' est.	Crystal Outlet: Trace to sparse benthic filamentous algae on rocks along shoreline. Trace patches of floating filamentous algae also observed.
OLIVE POND Temp: 28.2 **Dissolved Oxygen:** 3.51	Secchi: 4' est. Water slightly turbid. Surface clean and clear.
SHADOW LAKE Aeration: ON Temp: 28.4 **Dissolved Oxygen: 5.13**	Secchi: 3' est. Unicellular bloom visible in water column. Trace small duckweed and riccia.
COVE POND Temp: 27.1 DO: 3.93	Secchi: 3' est. Water slightly turbid, surface clean and clear.
GRUNDEN'S POND Temp: 30.1 **Dissolved Oxygen: 5.22**	Secchi: 3' est. Trace patches of floating filamentous algae. Trace to sparse patches of benthic filamentous algae also observed.
MOUNTAIN LAKE	Cove End: Sparse patches of floating filamentous algae along shoreline on right side. Left side – trace amount of floating filamentous algae.
Secchi: 11' est	Sailboat Cove: Sparse patches of creeping bladderwort mixed with trace amounts of leafy pondweed.
Water Level: 499.4	Outlet Cove: Clean and clear
Temp: 30.3 DO: 6.72	Midvale Launch: Trace patches of creeping bladderwort mixed with trace stems of leafy pondweed. Trace of Nitella also observed.
Fecal Sample: Yes	Island Beach: Dock – trace patches of bladderwort, trace amounts of leafy pondweed and Nitella all noted. Sail boat area – clean and clear. Beach- one small patch of creeping bladderwort at edge of swimming area along ropes.
WILDWOOD LAKE	Park: NA
Secchi: 6' est.	Dam: Clean and clear
Water Level: 499.3 Temp: 30.6 DO: 5.48	Launch: Clean and clear.

NOTES:

1. At Birchwood Lake, diffuser right below diving boards working but not strong. A crew will be scheduled to come out and balance system.

2. No waterfowl observed.
3. With the exception of Mountain Lake (which has excellent clarity for July), the lakes appeared turbid, likely from recent rainfall events.
4. Fecal coliform samples collected; results to follow.
5. Water chemistry samples collected at all nine lakes.

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

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 11:15)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	29.2	3.46
2’	26.9	2.45
4’	26.3	2.20
6’	26.2	2.08
8’	26.0	1.59
10’	25.3	0.23
12’	24.9	0.05
13’		

BIRCHWOOD LAKE	Outlet Cove: Trace white lily and watershield both observed.
Secchi: 5’	Inside Swim Lane: Trace floating filamentous algae and white lily along beach wall.
Aeration: 5 On, aerator below diving board not functioning.	Outside Swim Lane: Sparse white lily and trace amounts of watershield and ribbon leaf observed.
Fecal Sample: Yes	Beach: Clean and clear
SUNSET LAKE	Launch: Trace patches of floating filamentous algae along shore near dock. Water slightly turbid.
Secchi: 3’ est.	Outlet: Trace floating filamentous algae along shoreline in mowed plant stems.
Temp: 30.6 DO: 6.88	Sunset Road Cove: Trace amounts of spatterdock noted.
	Inlet Cove: Water turbid. Sparse to moderate floating filamentous algae mixed with dying lilies throughout cove at base of spillway.
CRYSTAL LAKE Temp: 30.9 DO: 7.65	Birchwood Outlet: Trace watershield mixed with floating filamentous algae at base of hill. Trace amounts of spatterdock out in basin.

	Lake Shore Road Shoreline: One patch of floating filamentous algae observed along boat dock.
Secchi: 10' est.	Crystal Outlet: Trace benthic filamentous algae along rocks.
OLIVE POND Temp: 28.1 **Dissolved Oxygen: 4.29**	Secchi: 4' est. Trace small duckweed.
SHADOW LAKE Aeration: On Temp: 29.6 **Dissolved Oxygen: 6.97**	Secchi: 4' est. Trace riccia along shoreline. Unicellular algae bloom visible in water column. Phytoplankton sample collected, results will follow.
COVE POND Temp: 28.7 DO: 4.76	Secchi: 2' est. Water turbid. Trace patches of floating filamentous algae noted along Boulevard shoreline.
GRUNDEN'S POND Temp: 30.1 **Dissolved Oxygen: 5.54**	Secchi: 4' est. Water turbid. Trace small duckweed along shoreline.
MOUNTAIN LAKE Temp: 29.8 DO: 7.20	Cove End: Right- trace patches of floating filamentous algae. Left – Clean and clear.
Secchi: 15' est.	Sailboat Cove: Sparse to moderate patches of creeping bladderwort at the surface throughout cove. Trace amounts of leafy pondweed also noted.
Water Level: 499.2	Outlet Cove: Clean and clear.
	Midvale Launch: Trace amounts of leafy pondweed near launch area.
Fecal Sample: Yes	Island Beach: Dock- Trace leafy pondweed and creeping bladderwort.
WILDWOOD LAKE	Park: NA
Secchi: 5' est.	Dam: Clean and clear.
Water Level:	Launch: Trace floating filamentous algae along cove shoreline.

NOTES:

1. Algae samples collected a five main lakes and Shadow Lake. Results will follow.
2. No water fowl observed.

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: 7/22/13
INSPECTION DATE: 7/22/13

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 09:45)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	26.9	3.11
2’	26.9	3.12
4’	26.7	2.79
6’	26.6	2.71
8’	26.6	2.73
10’	26.6	2.68
12’	26.6	1.33
13’		

BIRCHWOOD LAKE	Outlet Cove: Trace white lilies and watershield observed at the surface.
Secchi: 6.5’	Inside Swim Lane: Trace white lilies and watershield observed at the surface.
Aeration: On	Outside Swim Lane: Trace white lilies observed along the shoreline.
Fecal Sample: 155pm	Beach: Clean and clear.
SUNSET LAKE	Launch: Water is brown. Trace floating filamentous algae to the right, but non-problematic at this time. No lilies observed at the surface from this vantage point.
Secchi: 4’ est.	Outlet: Trace leafy pondweed and floating filamentous algae observed. No lilies observed at the surface from this vantage point.
	Sunset Road Cove: Surface is clean and clear. Two swans observed.
	Inlet Cove: Very few lilies observed here. The water was stagnant and cloudy with floating filamentous covering ~50% of the cove.
CRYSTAL LAKE	Birchwood Outlet: To the left of the outlet, a large patch of floating filamentous algae was observed (~30-40 feet in

	diameter).
	Lake Shore Road Shoreline: Trace to sparse filamentous algae along the shoreline and around the docks.
Secchi: 9’ est.	Crystal Outlet: Trace benthic filamentous algae on the rocks. To the left, a 15’ patch of floating filamentous algae (bright green) was observed.
OLIVE POND **Dissolved Oxygen: 3.97 mg/L.**	Secchi: 3’ est. Water was turbid. The surface was ~50% covered with tree pollen and/or dying/dead algae.
SHADOW LAKE Aeration: On **Dissolved Oxygen: 7.11 mg/L**	Secchi: 3’ est. Water was turbid. Trace Riccia observed along the shoreline. Heavy pollen and/or dying algae on surface in locations. Trace viable clumps of unicellular algae observed directly on the shoreline. Spoke with the resident and updated on status of algae bloom.
COVE POND ***Dissolved Oxygen:*** **4.13 mg/L.**	Secchi 2’ est. Surface was clean and clear. Heavy lilies still persist along shore opposite the spillway.
GRUNDEN’S POND **Dissolved Oxygen: 5.78 mg/L.**	Secchi: 3’ estimated. Water was turbid, but the surface appears to be clear.
MOUNTAIN LAKE	Cove End: To the left, floating filamentous algae accumulates in patches along the shoreline extending up to 15 feet out. To the right, scattered patches of floating filamentous algae (smaller) occurred around the docks and along the shoreline.
Secchi: 9’ est.	Sailboat Cove: Scattered dead/dying patches of floating filamentous algae (~1 foot) observed. Trace creeping bladderwort occurred on the surface as well. Otherwise, the cove looks good.
Water Level: 499.2	Outlet Cove: Clean and clear.
	Midvale Launch: Trace to sparse floating patches of creeping bladderwort accumulating along the shoreline, but otherwise clean and clear. Water clarity is still excellent in this basin.
Fecal Sample: 140pm	Island Beach: By the dock, trace creeping bladderwort, stonewort and benthic filamentous observed, all at non-problematic densities. As one moves to the bridge, the stonewort abundance increases. The boat moorings were clean and clear at the surface (it helps that the boats are pulled up on the shoreline now). The beach was clean and clear, and no goose feces observed.
WILDWOOD LAKE	Park: The water appeared green/brown (likely unicellular algae bloom), but the surface looks good. Trace patch of creeping bladderwort to the left of the dock. The canal cleaning (and de-watering site) appears done, or nearly so. See picture.

Secchi: 4’ est.	Dam: Water turbid (green/brown); possible unicellular algae bloom). The surface looks good. One small (1’ patch) of floating filamentous algae observed at the spillway.
Water Level: 499.1	Launch: Water is turbid. Trace benthic filamentous algae observed, but in general the cove looks good.

NOTES:

1. **Waterfowl: 2 swans observed at Sunset Lake (cove); Green heron observed at Crystal Lake (on dead tree in water).**
2. **Fecal samples collected: results to follow.**
3. **Since the work at the canal and the Wildwood Dam appear to be completed, we should schedule an algaecide application soon, and then schedule the late season Alum application.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: 7/29/13
INSPECTION DATE: 7/29/13

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 13:45)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	26.8	3.15
2’	25.5	2.04
4’	24.9	1.58
6’	24.6	1.44
8’	24.4	1.33
10’	24.1	1.17
12’	23.9	1.01
13’		

BIRCHWOOD LAKE	Outlet Cove: Trace white lilies, watershield and benthic filamentous algae observed.
Secchi: 6.0’	Inside Swim Lane: Trace white lilies, watershield and benthic filamentous algae observed. The lilies are all small and appear to be new growth since the early season herbicide application.
Aeration: Open water aeration on; swim lanes off for repair.	Outside Swim Lane: Trace white lilies and watershield at the surface observed.
Fecal Sample: 1325 hrs	Beach: Clean and clear.
SUNSET LAKE	Launch: Water is turbid (brown). Trace benthic filamentous algae observed along the shoreline.
Secchi: 3’ est.	Outlet: Water is turbid (brown). No lilies observed on the surface. Trace to sparse benthic filamentous algae accumulating in the emergent vegetation.
	Sunset Road Cove: Water is turbid (brown). No lilies at the surface.
	Inlet Cove: High water flow. The cove looks better regarding water clarity, but floating filamentous algae occupies ~30% of the cove. No lilies observed.

CRYSTAL LAKE	Birchwood Outlet: Water is turbid (green-brown). High flow. Trace white lilies and watershield observed.
	Lake Shore Road Shoreline: Trace to sparse benthic filamentous algae covers the bottom along the shoreline, but well below the surface of the water. Water has a slight green tint. A few dead stems of pondweed observed floating.
Secchi: 6' est.	Crystal Outlet: Water clarity has decreased since last week. Trace benthic filamentous algae along the rip-rap. The patch of floating filamentous algae to the left is now gone.
OLIVE POND **Dissolved Oxygen: 6.55 mg/L**	Secchi: 2' estimated. Water is turbid (brown). No weeds or algae observed on the surface. Light tree debris.
SHADOW LAKE Aeration: On **Dissolved Oxygen: 7.47 mg/L.**	Secchi: 2' estimated. Water is turbid (brown). Surface looks good, but floating filaments (thread-sized) of blue-green algae observed on the surface. Trace slender riccia along the shore. Many large frogs observed.
COVE POND	Secchi: 2' estimated. Water is turbid (brown). Surface remains clear of weeds and algae. The lilies persist on the opposite shoreline.
GRUNDEN'S POND **Dissolved Oxygen: 6.66 mg/L.**	Secchi: 3' estimated. Water is turbid (brown). The surface looks good. Up close, trace creeping bladderwort and fine-leaved pondweed observed. Trace clumps of benthic filamentous algae (fist-sized) present. Plant sample collected (see notes below).
MOUNTAIN LAKE	Cove End: Water is turbid (brown). To the left, it looks much better from recent rain, but floating filamentous algae still accumulating in the corners. To the right, floating filamentous algae still observed along the shoreline, but at reduced abundance. It is likely benthic filamentous algae persists in this area.
Secchi: 8.0'	Sailboat Cove: Scattered patches of creeping bladderwort occupy the cove, some with algae attached. It is starting to become a nuisance. One small patch of southern naiad observed.
Water Level: 499.8	Outlet Cove: The cove looks good, with some accumulating floating leafy pondweed strands near the spillway.
	Midvale Launch: Accumulating creeping bladderwort and leafy pondweed stems (floating) at the launch and near the dock was observed.
Fecal Sample: 1302 hrs.	Island Beach: At the dock, trace to sparse creeping bladderwort is scattered about among rooted leafy pondweed beds and stonewort. As usual, the stonewort abundance increased toward the bridge. Around the boats, accumulating floating stems of leafy pondweed observed. The beach was clean and clear.

WILDWOOD LAKE	Park: Water is turbid (green/brown).Collected algae sample. The surface looks good with no visible algae or weeds.
Secchi: 4’ est.	Dam: Water is turbid (green/brown). The surface looks good with no visible algae or weeds. Trace benthic filamentous algae on the rip-rap.
Water Level: 499.8	Launch: Trace benthic filamentous algae on the bottom.

NOTES:

1. **No waterfowl observed.**
2. **Talked to the resident at 11 North Pocono Road (Sunset Lake; Maria Olide); discussed accumulating leaf debris, algae, and woody debris along her shoreline.**
3. **Collected a plant sample from Grunden’s Pond. It appears to be creeping water primrose (invasive); I will confirm species when I return to lab on Tuesday.**
4. **Region experienced heavy rainfall on previous day. Suitable outflow at all basins.**
5. **An algae sample was collected at Wildwood to check the water column in anticipation of an upcoming alum application. Results to follow.**
6. **The Birchwood swim-lanes compressor has been pulled for service.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: 8/5/13
INSPECTION DATE: 8/5/13

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 07:55)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	22.9	1.81
2’	22.4	1.68
4’	22.6	1.84
6’	22.7	1.88
8’	22.7	1.78
10’	22.7	1.77
12’	22.1	1.53
13’		

BIRCHWOOD LAKE	Outlet Cove: Trace watershield and white lilies observed at the surface. Trace oil sheen observed on the surface.
Secchi: 5.5’	Inside Swim Lane: Trace watershield and white lilies observed at the surface. Trace oil sheen observed on the surface. Trace floating and benthic filamentous algae observed along the rock wall.
Aeration: Swim Lane Unit off for repair; open basin unit on.	Outside Swim Lane: Trace spatterdock, white lily and watershield observed in the swim lanes.
Fecal Sample: 0930 hrs	Beach: Clean and clear.
SUNSET LAKE	Launch: Water turbid. Trace benthic filamentous algae and leafy pondweed observed at the launch area.
Secchi: 4.0’ est.	Outlet: Water turbid. Trace benthic/floating filamentous algae among the emergent plants.
	Sunset Road Cove: Water turbid. Surface in the cove looks clear of weeds and/or algae.
	Inlet Cove: Light flow. Water very turbid. Floating filamentous algae still covers ~40% of the cove, especially to the right and left.
CRYSTAL LAKE	Birchwood Outlet: Trace to sparse benthic filamentous algae

	observed along shoreline. A few stems of diminutive bassweed observed, but most are dead/dying. Trace white lilies and watershield observed on the surface.
	Lake Shore Road Shoreline: Trace to sparse benthic filamentous algae along the shoreline, with scattered floating stems of pondweed observed.
Secchi: 8' est.	Crystal Outlet: The water clarity looks improved vs. last week. Trace filamentous algae on rocks. Several young of the year largemouth bass observed at the outlet.
OLIVE POND **Dissolved Oxygen: 6.22 mg/L.**	Secchi: 3' estimated. Surface is mostly clear, save for trace tree debris. Trace creeping bladderwort observed.
SHADOW LAKE Aeration: On. **Dissolved Oxygen: 7.14 mg/L.**	Secchi: 4' estimated. Surface looks good from a distance, but still observed thread-like filaments of blue-green algae in the water column. Trace creeping bladderwort and slender riccia along the shoreline.
COVE POND **5.17 mg/L.**	Secchi: 3' estimated. Water is turbid. Trace floating filamentous algae observed.
GRUNDEN'S POND **Dissolved Oxygen: 7.01 mg/L.**	Secchi: 4.0' estimated. Surface looks good, but water is turbid. Trace creeping bladderwort, leafy pondweed and small clumps of filamentous algae observed. The patches of creeping water primrose are still present. Need to give the treatment more time to determine efficacy.
MOUNTAIN LAKE	Cove End: This area is much improved following last week's treatment. The surface is free of algae and weeds at this time. Water is turbid, however.
Secchi: 6.75'	Sailboat Cove: Floating patches of creeping bladderwort still observed, most along the shoreline. They still appear viable after last week's treatment, but we still need to give it some more time to judge efficacy. Overall, the cove looks better, but the water is turbid.
Water Level: 499.7'	Outlet Cove: Lighter flow vs. last week. Floating stems of creeping bladderwort and pondweeds accumulating along the dam shoreline.
	Midvale Launch: Water clarity has decreased slightly. Accumulating stems of creeping bladderwort and pondweed at the launch and around the dock.
Fecal Sample: 0915 hrs.	Island Beach: At the dock, trace to sparse creeping bladderwort, pondweed species, and stonewort observed. The stonewort abundance increases to the bridge, but plant community is still non-problematic at this time. Several folks observed fishing in this area. Trace floating stems of pondweed at the beach, but otherwise clean and clear.
WILDWOOD LAKE	Park: Water is turbid. No weeds or algae observed at the surface. The park appears to be cleaned up, with hay

	covering the disturbed sediment.
Secchi: 3.5’ estimated	Dam: Water is turbid (brown). No weeds or algae observed at the surface.
Water Level: 499.6’	Launch: Trace to sparse benthic/floating filamentous algae observed at the launch area, slightly heavier to the left.

NOTES:

1. **Algae samples collected at all nine lakes. Results to follow.**
2. **Fecal samples collected. Results to follow.**
3. **Five dogs (four going in and out of the water) observed at Birchwood Beach during weekly survey and fecal sample collection (~9 am).**
4. **Wildwood Lake Alum treatment to be scheduled soon (disturbance at the park is done).**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: 8/13/13
INSPECTION DATE: 8/12/13

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 09:30)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	23.3	3.68
2’	23.3	3.57
4’	23.3	3.43
6’	23.2	3.39
8’	23.2	2.98
10’	23.0	3.37
12’	22.7	1.96
13’		

BIRCHWOOD LAKE	Outlet Cove: a total 10’x10’ patch of white lilies observed.
Secchi: 6.0	Inside Swim Lane: Trace patches of white lily observed along the wall just reaching the 1st swim lane. Benthic filamentous algae on the lilies, and covering 60% of the bottom.
Aeration: Swim Lane unit still off. Open Water Unit on.	Outside Swim Lane: Trace benthic filamentous algae observed, along with trace spatterdock and watershield.
Fecal Sample: 0930	Beach: Very trace benthic filamentous algae on sandy areas.
SUNSET LAKE	Launch: Very trace (10 pads total) watershield observed, but otherwise clean and clear.
Secchi: 4.0’	Outlet: Benthic and floating filamentous algae collecting among the terrestrial plants.
	Sunset Road Cove: Clean and clear. Two swans observed.
	Inlet Cove: Heavy filamentous algae (30’ x30’ total area) and what appears to be dead water lilies occupies the cove. Tree debris is mixed in.
CRYSTAL LAKE	Birchwood Outlet: Trace bassweed, watershield, white lilies and benthic filamentous algae observed.

	Lake Shore Road Shoreline: Benthic filamentous algae covers about 60% of the bottom. A 10' x 10'mat of floating filamentous algae is along the dock.
Secchi: 4.0' est.	Crystal Outlet: Sparse benthic filamentous algae along the dam rocks. One patch of lilies observed off the point of the island in the open basin.
OLIVE POND **Dissolved Oxygen: 8.38 mg/L.**	Secchi: 3.5' estimated. Water is turbid. Trace to sparse unicellular algae in the water column.
SHADOW LAKE Aeration: On. **Dissolved Oxygen: 8.54 mg/L.**	Secchi: 2.0' estimated. Moderate unicellular algae observed in the water column and on the surface. No visible filamentous algae or weeds observed.
COVE POND	Secchi: 2' estimated. Water is turbid. Sparse unicellular algae observed in the water column. A beaver was observed in the lake with branches.
GRUNDEN'S POND **Dissolved Oxygen: 9.35 mg/L.**	Secchi: 2.5' estimated. Very trace leafy pondweed observed along the shoreline. The patch of creeping water primrose is still present.
MOUNTAIN LAKE	Cove End: To the left is clean and clear. To the right very trace floating filamentous algae on shoreline, with tree debris and lawn clippings mixed in.
Secchi: 7.0'	Sailboat Cove: Patches of creeping bladderwort persist in this area, with heavier abundance to the right.
Water Level: 499.6	Outlet Cove: The left side of the dam is clean and clear. To the right, two floating patches of creeping bladderwort and pondweed species.
	Midvale Launch: Floating stems of pondweed and creeping bladderwort observed.
Fecal Sample: 11:22 am	Island Beach: Trace floating stems of naiad, pondweed and creeping bladderwort observed around the dock. Some of the plants were near the swim area, and there was trace benthic filamentous algae by the bridge.
WILDWOOD LAKE	Park: Clean and clear.
Secchi: 4.0'	Dam: Clean and clear.
Water Level: 499.6	Launch: Clean and clear with trace tree debris observed.

NOTES:

1. **Note a beaver was observed at Cove Pond.**
2. **Treatments scheduled for Shadow Lake and Olive Pond.**
3. **Wildwood Alum scheduled for Friday**
4. **Fecal Results to follow.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: 8/20/13
INSPECTION DATE: 8/19/13

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 09:30)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	22.1	2.50
2’	21.8	2.34
4’	21.7	2.33
6’	21.7	2.32
8’	21.7	2.28
10’	21.6	1.94
12’	21.3	0.34
13’		

BIRCHWOOD LAKE	Outlet Cove: Trace amounts of white lily and floating filamentous algae were observed. A thin film on the water surface was also observed, possibly related to seasonal pollen.
Secchi: 8’	Inside Swim Lane: Trace amounts of white lily, watershield and floating filamentous algae were observed along the beach wall. The film was present at the outlet end of the swim lanes as well.
Aeration: Off all sites	Outside Swim Lane: Sparse white lilies and trace amounts of spatterdock were observed. One purple loosestrife plant was also noted along the path behind the lake.
Fecal Sample: yes	Beach: Clean and clear.
SUNSET LAKE	Launch: Trace amounts of white lily and floating filamentous algae observed.
Secchi: 4’ est.	Outlet: Trace amounts of floating filamentous algae observed along the shoreline.
Temp: 23.8 DO: 4.73	Sunset Road Cove: Trace amounts of floating filamentous algae observed.
	Inlet Cove: Large dense patch of filamentous algae in cove at base of hill.

CRYSTAL LAKE	Birchwood Outlet: Scattered patches of white lily and watershield observed. Trace amounts of benthic filamentous algae on rocks along shoreline also noted.
Temp: 23.5 DO: 6.51	West Shore Road Shoreline: Trace patches of floating filamentous algae along wall and in cattails. Sparse to moderate benthic filamentous algae along wall and near dock and boats.
Secchi:8' est.	Crystal Outlet: Sparse benthic filamentous algae along rocks.
OLIVE POND Temp: 22.9 **Dissolved Oxygen: 3.53**	Secchi: 5' est. Clean and clear.
SHADOW LAKE Aeration: On Temp: 23.2 **Dissolved Oxygen: 4.29**	Secchi: 4' est. Clean and clear.
COVE POND Temp: 20.9 DO: 5.86	Secchi: 3' est. Visible unicellular algae bloom at surface along Boulevard Rd shore.
GRUNDEN'S POND Temp: 23.3 **Dissolved Oxygen: 5.29**	Secchi: 3' est. Trace leafy pondweed observed. Water slightly turbid.
MOUNTAIN LAKE	Cove End: Clean and clear both sides.
Secchi: 4'	Sailboat Cove: Trace to sparse creeping bladderwort with trace patches at the surface.
Water Level: 499.6	Outlet Cove: Trace leafy pondweed stems along shoreline, no rooted plants observed.
Temp: 24.4 DO: 6.72	Midvale Launch: Trace leafy pondweed mixed with creeping bladderwort noted along shoreline near docks.
Fecal Sample: YES	Island Beach: Trace creeping bladderwort along wall near docks. Sail boat area – trace creeping bladderwort noted. Beach – clean and clear.
WILDWOOD LAKE	Park: Clean and clear following alum treatment.
Secchi: 15'est	Dam: Clean and clear.
Water Level: 499.5	Launch: Clean and clear.

NOTES: Two mute swans observed moving from Crystal Lake to Sunset Lake over dam area.

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: 8/26/13
INSPECTION DATE: 8/26/13

LAKE INSPECTION REPORT
Birchwood Lake Profile (Time: 10:15)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	22.2	3.25
2’	22.2	3.14
4’	22.2	3.12
6’	22.2	3.08
8’	22.2	3.02
10’	22.2	3.13
12’	22.1	2.46
13’		

BIRCHWOOD LAKE	Outlet Cove: Trace amounts of white lily were observed. The pollen film noted on last week’s survey was mostly dispersed with only a trace amount visible in the outlet area.
Secchi: 5’	Inside Swim Lane: Trace amounts of white lily and watershield were observed along the beach wall.
Aeration: All on	Outside Swim Lane: Sparse white lily mixed with trace amounts of spatterdock and watershield observed. A trace of Robbins pondweed was also noted. A floating mat of lily rhizomes was also note in this area, most likely due to prior lily treatment.
Fecal Sample: Yes	Beach: Clean and clear.
SUNSET LAKE	Launch: Trace white lily, water turbid.
Secchi: 3’ est.	Outlet: Trace amounts of floating filamentous algae, cut vegetation showed signs of dying back along shoreline.
Temp: 24.0 DO: 6.57	Sunset Road Cove: Trace amounts of floating filamentous algae noted. Vegetation in this area not showing signs of recent treatment yet, but possibly too early for visible signs to appear.
	Inlet Cove: 50% coverage with floating filamentous algae in cove area.

CRYSTAL LAKE	Birchwood Outlet: Trace amounts of benthic and floating filamentous algae along the shoreline observed. Sparse white lily and watershield with trace amounts of white lily and cattail also noted.
Temp: 24.3 DO: 6.82	Lake Shore Road Shoreline: Sparse benthic and floating filamentous algae with a number of mats at the surface along the shoreline and near the dock. Also unicellular algae bloom visible in the water column.
Secchi: 8' est	Crystal Outlet: Trace to sparse benthic filamentous algae along rocks with visible unicellular in the water column.
OLIVE POND Temp: 22.3 **Dissolved Oxygen: 4.59**	Secchi: 2' est. Unicellular bloom visible in the water column. Trace amount of benthic filamentous algae also noted.
SHADOW LAKE Aeration: on Temp: 22.9 **Dissolved Oxygen: 6.98**	Secchi: 2' est. heavy unicellular bloom visible in water. Water noticeably turbid. **Note:** Unicellular bloom will be checked again at the end of the week following the incoming heavy precipitation.
COVE POND Temp: 23.5 DO: 4.97	Secchi: 4' est. Clean and clear
GRUNDEN'S POND Temp: 23.5 **Dissolved Oxygen: 4.95**	Secchi: 3' est. Trace amounts of leafy pondweed and creeping bladderwort observed near the shoreline. Water slightly turbid.
MOUNTAIN LAKE	Cove End: Clean and clear both sides.
Secchi: 4'	Sailboat Cove: Sparse creeping bladderwort with trace patches at the surface noted.
Water Level: 499.5 Temp: 24.4 DO: 6.67	Outlet Cove: Trace amounts of floating stems of leafy pondweed and creeping bladderwort observed, no rooted stems.
	Midvale Launch: Sparse patch of floating leafy pondweed mixed with creeping bladderwort to the left of the boat dock. Trace rooted stems leafy pondweed noted along the boat dock.
Fecal Sample: yes	Island Beach: Boat dock: Trace amounts of floating filamentous algae and creeping bladderwort along shoreline wall and near boat dock. Sail boat area: trace creeping bladderwort and leafy pondweed noted. Beach: Clean and clear.
WILDWOOD LAKE	Park: Clean and clear
Secchi: 12' est	Dam: Clean and clear
Water Level: 499.5	Launch: Clean and clear.

NOTES:

1. Cove at 254 Boulevard – Moderate to dense Nitella (stonewort) mixed with leafy pondweed and floating filamentous algae along the shoreline ranging from 3’ to 25’ out from shore. – Is scheduled for treatment later this week.

2. Crystal Lake will be scheduled for an algae treatment this week also.

3. Two mute swans were observed on Sunset Lake.

4. A small black bear was observed along the wooded shoreline at Birchwood Lake.

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: 9/3/13
INSPECTION DATE: 9/3/13

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 09:45)

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

*DO meter malfunction so no profile conducted.

BIRCHWOOD LAKE	Outlet Cove: Trace white lilies and Robbin’s pondweed observed.
Secchi: 5.0’	Inside Swim Lane: Trace white lily, watershield, Robbin’s pondweed leafy pondweed and creeping bladderwort observed along the rock wall.
Aeration: On	Outside Swim Lane: Sparse white lily, trace spatterdock, watershield and Robbin’s pondweed observed.
Fecal Sample: NA	Beach: Clean and clear
SUNSET LAKE	Launch: Trace floating filamentous algae at launch. Some unicellular visible in the water column.
Secchi: 3.0’ est.	Outlet: Trace floating filamentous algae observed.
	Sunset Road Cove: Clean and clear.
	Inlet Cove: A noticeable decrease in the density of floating filamentous algae (now sparse to moderate) from recent heavy rainfall events.
CRYSTAL LAKE	Birchwood Outlet: Trace patches of white lily, watershield and bassweed observed.
	Lake Shore Road Shoreline: Trace benthic filamentous algae

	observed along the shoreline.
Secchi: 8’ est.	Crystal Outlet: The water appears clean and clear. Some unicellular algae observed in the water column, but only at this location.
OLIVE POND **Dissolved Oxygen: NA**	Secchi: 3’ est. Water turbid, but no weeds or algae visible at the surface.
SHADOW LAKE Aeration: On **Dissolved Oxygen: NA**	Secchi: 3’ est. Trace unicellular algae in the water column.
COVE POND	Secchi: 4’ est. Clean and clear.
GRUNDEN’S POND **Dissolved Oxygen: NA**	Secchi: 4’ est. Water slightly turbid but the surface looked good.
MOUNTAIN LAKE	Cove End: To the right, conditions looked good. To the left, trace floating filamentous algae observed.
Secchi: 4.0’	Sailboat Cove: Sparse patches of creeping bladderwort persist at the surface.
Water Level: 499.5	Outlet Cove: Clean and clear.
	Midvale Launch: Sparse mixture of leafy pondweed and creeping bladderwort to the left of the dock, and along the shoreline. Trace patches of creeping bladderwort along the dock proper.
Fecal Sample: NA	Island Beach: At the beach, trace patches of leafy pondweed mixed with floating filamentous algae. All other areas were clean and clear.
WILDWOOD LAKE	Park: Clean and clear
Secchi: 8.0’ est.	Dam: Clean and Clear.
Water Level: 499.4	Launch: Trace floating filamentous algae accumulating near the launch.

NOTES:

1. **Dogs in the water at the beach on Birchwood Lake.**
2. **Waterfowl observed: I mallard on Birchwood Lake, 2 Swans and 1 comorant at Sunset Lake.**
3. **DO meter malfunction, so no profile or surface DO measurements conducted today.**
4. **At the Boulevard Cove on Mountain Lake: Conditions were much improved with only trace floating filamentous algae mixed in with leafy pondweed.**
5. **Fecal sampling concluded for the season.**

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: 9/10/13
INSPECTION DATE: 9/9/13

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 09:45)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	21.0	3.18
2’	21.1	2.82
4’	21.1	2.75
6’	21.0	2.68
8’	21.0	2.64
10’	20.9	2.47
12’	20.8	2.41
13’		

BIRCHWOOD LAKE	Outlet Cove: Sparse white lilies were observed with trace amounts of Robbins pondweed mixed in near the beach wall.
Secchi: 6’	Inside Swim Lane: Trace amounts of white lily, watershield, Robbins pondweed and leafy pondweed were all observed mostly along the wall adjacent to the beach.
Aeration: on	Outside Swim Lane: Sparse white lily mixed with trace amounts of water shield, spatterdock, creeping bladderwort and Robbins pondweed were all observed.
Fecal Sample: no	Beach: Clean and clear.
SUNSET LAKE	Launch: Trace amounts of benthic and floating filamentous algae were noted along the shoreline and a visible bloom of unicellular algae was noted in the water column.
Secchi: 4’ est	Outlet: A few small patches of floating filamentous algae were observed along the shoreline mixed with the terrestrial vegetation.
Temp: 23.2 DO: 5.14	Sunset Road Cove: Trace amounts of floating filamentous algae were noted.
	Inlet Cove: Floating filamentous algae in large mats covered approximately forty percent of the cove. The water at the base of the inlet was turbid.

CRYSTAL LAKE	Birchwood Outlet: Sparse patches of white lily and trace amounts of watershield and bassweed were observed.
Temp: 23.9 DO: 4.94	Lake Shore Road Shoreline: A trace of benthic filamentous algae was observed along the rock wall.
Secchi: 8' est	Crystal Outlet: Trace amounts of benthic filamentous algae along the rocks were noted.
OLIVE POND Temp: 22.8 **Dissolved Oxygen: 8.94**	Secchi: 4' est. A trace amount of benthic filamentous algae was noted at the inlet.
SHADOW LAKE Aeration: on Temp: 22.3 **Dissolved Oxygen: 8.17**	Secchi: 5' est Trace amounts of riccia and benthic filamentous algae were noted.
COVE POND Temp: 21.0 DO: 7.16	Secchi: 5' est. Trace amounts of benthic and floating filamentous algae were noted along the Boulevard shoreline.
GRUNDEN'S POND Temp: 22.0 **Dissolved Oxygen: 7.19**	Secchi: 5' est. Sparse patches of benthic filamentous algae and a few trace patches of floating filamentous algae were observed.
MOUNTAIN LAKE	Cove End: Clean and clear both sides.
Secchi: 6'	Sailboat Cove: Sparse patches of creeping bladderwort mixed with trace amounts of leafy pondweed were observed in the cove with a few patches at the surface.
Water Level: 499.4	Outlet Cove: Clean and clear.
Temp: 23.4 DO: 6.26	Midvale Launch: A patch of leafy pondweed mixed with trace amounts of creeping bladderwort was noted to the left of the boat dock, along the shoreline.
Fecal Sample: no	Island Beach: Boat dock – Trace patches of benthic and floating filamentous algae were noted along the rock wall between the dock and the bridge a few trace patches of leafy pondweed were also noted. Sail Boat cove – Trace amounts of benthic filamentous algae noted. Beach – Clean and clear.
WILDWOOD LAKE	Park: Clean and clear.
Secchi: 10' est.	Dam: Clean and clear
Water Level: 499.5 Temp: 23.2 DO: 6.84	Launch: A trace amount of floating filamentous algae was observed mixed with the shoreline vegetation.

NOTES: 2 mute swans were observed on Sunset Lake.
12 Canada geese were observed on Mountain Lake.

BY TELEFAX: 973-402-5595
TO: Borough Manager
FROM: Chris Doyle, Allied Biological
DATE: 9/16/13
INSPECTION DATE: 9/16/13

LAKE INSPECTION REPORT

Birchwood Lake Profile (Time: 10:00)

Depth	Temp. (˚C)	D.O. (mg/L)
surface	19.8	4.34
2’	19.7	4.18
4’	19.9	4.20
6’	19.9	4.19
8’	19.9	4.17
10’	19.9	4.10
12’	19.9	4.12
13’		

BIRCHWOOD LAKE	Outlet Cove: Trace amounts of white lily, Robbins pondweed and benthic filamentous algae were observed.
Secchi: 5’	Inside Swim Lane: Trace amounts of white lily, watershield, Robbins pondweed and leafy pondweed were all noted along the stone wall on the beach side.
Aeration: All on	Outside Swim Lane: Spatterdock, white lily, watershield, creeping bladderwort, Robbins pondweed and floating filamentous algae were all observed.
Fecal Sample: NO	Beach: Clean and clear.
SUNSET LAKE	Launch: Trace amounts of floating filamentous algae noted along the shoreline.
Secchi: 5’ est.	Outlet: Trace stems of leafy pondweed and benthic filamentous algae were observed.
Temp: 20.4 DO: 7.42	Sunset Road Cove: Clean and clear.
	Inlet Cove: Water turbid, mats of floating filamentous algae persist over 40% of the cove end. Trace patches of spatterdock also noted.

CRYSTAL LAKE Temp: 20.2 DO: 8.69	Birchwood Outlet: Trace amounts of water shield, white lily and bassweed all noted at the base of Birchwood Lake hill. Trace amounts of benthic and floating filamentous algae also noted.
	Lake Shore Road Shoreline: Clean and clear
Secchi: 10' est.	Crystal Outlet: Trace amounts of benthic filamentous algae were noted along the shoreline.
OLIVE POND Temp: 19.2 **Dissolved Oxygen: 5.36**	Secchi: 4'est. Pond surface is clean and clear with only a trace of benthic filamentous algae near the inlet pipe noted.
SHADOW LAKE Aeration: ON Temp: 18.9 **Dissolved Oxygen: 7.27**	Secchi: 4' est. Trace amounts of benthic and floating filamentous algae noted along the shoreline mixed in with a trace of riccia.
COVE POND Temp: 18.5 DO: 6.49	Secchi: 3' est. Water slightly turbid, trace amounts of benthic filamentous algae along the shoreline.
GRUNDEN'S POND Temp: 19.7 **Dissolved Oxygen: 7.27**	Secchi: 5' est. Trace amounts of benthic filamentous algae with trace stems of leafy pondweed noted along the shoreline wall.
MOUNTAIN LAKE	Cove End: Clean and clear on both sides.
Secchi: 6.5'	Sailboat Cove: Sparse to moderate patches of creeping bladderwort with trace amounts of leafy pondweed mixed. Trace patches reaching the surface at either end of the cove.
Water Level: 499.4	Outlet Cove: Clean and clear.
Temp: 20.8 DO: 7.70	Midvale Launch: Clean and clear.
Fecal Sample: NO	Island Beach: Trace amounts of benthic filamentous algae near the boat launch and the boat dock. Trace amounts of stonewort on either side of the bridge. Sailboat and beach areas clean and clear.
WILDWOOD LAKE	Park: Clean and clear.
Secchi: 10' est.	Dam: Clean and clear.
Water Level: 499.5	Launch: Trace amounts of benthic and floating filamentous algae along shore near launch.

NOTES: Sunset Lake: 2 Mute Swans

Mountain Lake: 1 Mallard duck, 3 Herring gulls were also noted on Island beach.