

**Buttonwood Park Pond  
Aquatic Management Program  
2018 Annual Summary Report  
New Bedford, MA**

Prepared for: New Bedford Conservation Commission  
133 William Street #312  
New Bedford, MA 02740  
c/o Cynthia Days (La Gondola, Inc.)

**Introduction**

SOLitude Lake Management was contracted by Cynthia Days (La Gondola, Inc.), to conduct an aquatic vegetation management program at Buttonwood Park Pond in New Bedford, MA. The 2018 program was focused around maintaining a proactive schedule in which a Solitude biologist conducted site visits on a monthly basis from June through September. These site visits included general surveys in order to gain a better understanding of the pond as well as managing nuisance growth of algae and pondweeds, if needed. The frequent surveys allow SOLitude Biologists to observe any issues before they become a larger, more problematic matter as well as accurately time treatments.

This year, the management program included an herbicide/algacide treatment using the USEPA/MA DEP registered aquatic herbicide Reward (active ingredient: diquat) and aquatic algacide Captain XTR (active ingredient: copper ethanolamine complex). A series of water quality sampling was also included in the aquatic management program. An outline of the 2018 program, along with our recommendations for ongoing management follow. All management activities were consistent with the License to Apply Chemicals issued by the MA DEP – Office of Watershed Management (# 18306).

Project Task	Date Performed
File MA DEP pesticide use permit	June 1 <sup>st</sup>
Received approved MA DEP pesticide use permit	June 18 <sup>th</sup>
Performed initial herbicide/algacide treatment	June 18 <sup>th</sup>
Completed final site visit	September 19 <sup>th</sup>

**Pre-treatment Survey**

On June 18<sup>th</sup>, a SOLitude Lake Management biologist performed the initial vegetation survey of Buttonwood Park Pond. The survey was accomplished by navigating around the pond with a jon boat to record visible observations of plant growth. In areas where the submersed vegetation could not be seen (either due to depth or algae surface cover), a specialized throw rake was used. The intent of the inspection was to document dominant vegetation growth during pre-treatment conditions in order to have a baseline by which to evaluate the efficacy of the herbicide treatment, gauge non-target impacts, if any, and assess future management needs and/or necessary program modifications. During this survey, it is noted that there were significant densities of filamentous algae covering 75% of the surface. In areas where there was no algae, pondweeds (*Potamogeton sp.*) and waterlilies (*Nymphaeaceae*) were topped out to the surface. A treatment was deemed necessary after these observations.



### Treatment Program

SOLitude Lake Management conducted an initial herbicide/algaecide treatment to target pondweed sp. and algae growth in Buttonwood Park Pond on June 18<sup>th</sup>. All treatments were conducted by diluting the liquid concentrate with pond water in a 55-gallon mixing tank onboard a treatment vessel. The solution was then evenly applied evenly to the treatment areas as a surface spray. Below is a table illustrating the application schedule and rates.

Herbicide Applied	Application Date	Acreage Treated
Reward	June 18 <sup>th</sup>	~ 4 acres
Captain XTR	June 18 <sup>th</sup>	~ 4 acres

### Post-treatment Surveys

See attached report. This report was sent to the conservation commission in July 2018.

### Water Quality

See attached report. This report was sent to the conservation commission in July 2018.

### Recommendations for 2019

The 2018 aquatic management plan created for Buttonwood Park Pond worked well throughout the entirety of the growing season. This was achieved by implementing a proactive management approach regarding the nuisance vegetation growth. With a more hands-on monitoring schedule, we were able to keep a close watch on increasing plant growth before issues occurred. Although we had a successful year, the following are additional recommendations:

- Maintain balanced waterlily growth through the application of AquaPro (glyphosate). By treating waterlilies every other year, a healthy balance of plants can be achieved. If left unmanaged, waterlilies will encroach on open water habitat further degrading the pond. By treating every other year, we can allow for a healthy distribution of vegetation.
- Consider adding aeration systems. By inducing circulation and efficiently adding dissolved oxygen throughout the lake or pond, many undesirable symptoms of a stagnant and stratified lake or pond are removed. Pond aerator installation will help to "clean" the water of cloudiness and odors. Most importantly, it helps to reduce the overall accumulation of organic sediment on the bottom and reduces the available nutrients in your water column, thereby reducing the likelihood of problematic algae blooms and other water quality problems. It will also aid in the promotion of a healthy habitat for fish and other aquatic life.
- Look into the possibility of amending the DMF treatment date of June 15<sup>th</sup>. As we observed in 2018, by the time June 15<sup>th</sup> arrives, the pond is already choked out and topped out with algae, pondweed sp., and waterlilies. An earlier start date would help tremendously as we will be able to catch all issues before they over take the pond. The smaller the issue within the pond, the less herbicide/algaecide that will be used; instead of treating 4 acres (like in 2018), we would be able to spot treat specific troublesome areas.



- Explore options concerning the waterfowl population. The waterfowl population is extremely large for a small pond such as Buttonwood Park Pond. This also includes spreading knowledge to the public regarding feeding the waterfowl. This could include:
  - Install fencing around the pond's shoreline
  - Create large, colorful signage for the entirety of the shoreline explaining to the public why not to feed waterfowl (I know there are signs there now, but they are small and can easily seem hidden while looking around the park)
  - Adding strobe lights to deter sleeping patterns
  - Fake dogs or coyotes
  - Use goose repellent

We would look to keep the proactive monitoring schedule for the upcoming management plans in 2019. This would include an initial herbicide/algaecide (Reward and Captain XTR) treatment followed by monitoring for the remainder of the season. A second treatment would be performed in August/September in order to manage specific waterlily populations – this treatment would include using AquaPro. If necessary, algae treatments will be performed throughout the season as algae growth becomes present. We feel that our additional recommendations will help continue to enhance the lake's aesthetic, ecological and recreational value. We truly appreciate your business and look forward to working with you again next season in 2019. Please feel free to call the office with any questions or concerns!

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Date: July 5<sup>th</sup>, 2018  
To: Sarah Porter, New Bedford Conservation Agent  
From: James Lacasse, Environmental Scientist  
Re: Buttonwood Pond Post-Management Water Quality Monitoring Data

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Per your request, the following provides a brief overview of the Buttonwood Pond management program to date.

Following multiple inspections, an aquatic herbicide/algaecide treatment was conducted on June 18, 2018 to reduce unbalanced densities of submersed vegetation and algae. The dominant plant species, which included duckweed, elodea and thin-leaf pondweed were growing at moderate to dense levels throughout most of the pond. To minimize Biological Oxygen Demand (BOD) following management, less than half of the pond was targeted for treatment. As a result, the USEPA and MA DAR registered products Reward (diquat) and Captain (elemental copper) were applied as a surface spray to the southernmost 4 acres of the pond. The treatment was conducted without incident by SOLitude's MA licensed pesticide applicators. During the time of treatment, there was no observable inflow or outflow from the pond, in fact, the water level was approximately 5 inches below the crest of the spillway. The average depth within the treatment area was roughly 3 feet. Benthic and surface mats of filamentous algae were most abundant within the treatment area followed by thin-leaf pondweed and elodea. Duckweed was observed within the pond but the majority of the growth was located in the northern emergent/floating leaf plant dominated zone.

In compliance with the valid Order of Conditions and the Division of Marine Fisheries (DMF) determination letter, a series of post-management water quality monitoring visits were conducted at 1 day before treatment, 1 DAT, 3 DAT, and 5 DAT. Water quality tests were collected from three separate site locations per the DMF determination letter. Sites 1 & 2 were located within the treatment area and Site 3 was located at the north end of the pond outside of the treated area. See the map attached for the specific site locations. Below are the water quality results to date.

**1 Day Before Treatment – June 17, 2018**

Location	Depth (ft)	Temperature (°C)	Dissolved Oxygen (mg/l)
Site 1	Surface	25.2	5.56
	1	24.8	5.52
	2	24.5	3.72
	3	24.3	3.81
Site 2	Surface	25.4	5.61
	1	25.2	5.58
	2	24.8	4.11
	3	24.7	3.76
Site 3	Surface	24.9	5.48
	1	24.7	5.55
	2	24.5	5.28
	3	24.7	4.26
	4	24.3	4.23

**1 DAT – June 19, 2018**

Location	Depth (ft)	Temperature (°C)	Dissolved Oxygen (mg/l)	pH (SU)	Turbidity (NTU)
Site 1	Surface	24.9	2.01	10.2	1.8
	1	24.7	1.97		
	2	24.7	1.76		
	3	27.8	0.84		
Site 2	Surface	25.2	2.14	10.0	2.3
	1	25.2	2.02		
	2	25.1	1.54		
	3	24.7	1.10		
Site 3	Surface	25.3	2.18	10.1	1.6
	1	25.1	1.96		
	2	24.8	1.83		
	3	24.7	1.56		
	4	24.7	0.74		

**3 DAT – June 21, 2018**

Location	Depth (ft)	Temperature (°C)	Dissolved Oxygen (mg/l)	pH (SU)	Turbidity (NTU)
Site 1	Surface	25.4	1.15	6.6	2.6
	1	25.1	0.52		
	2	25.0	0.33		
	3	24.5	0.31		
Site 2	Surface	25.2	1.18	6.6	2.9
	1	25.5	1.08		
	2	24.9	0.60		
	3	25.0	0.40		
Site 3	Surface	26.0	1.01	6.5	3.2
	1	25.5	0.83		
	2	25.2	0.90		
	3	25.1	0.80		

**5 DAT – June 23, 2018**

Location	Depth (ft)	Temperature (°C)	Dissolved Oxygen (mg/l)	pH (SU)	Turbidity (NTU)
Site 1	Surface	25.7	1.51	6.8	4.4
	1	25.8	1.27		
	2	25.7	1.04		
	3	24.3	0.19		
Site 2	Surface	25.9	0.97	6.7	4.7
	1	25.8	0.85		
	2	24.5	0.21		
Site 3	Surface	26.1	1.13	6.7	4.8
	1	24.9	1.06		
	2	25.4	0.47		
	3	25.1	0.27		

**14 DAT – July 2, 2018**

Location	Depth (ft)	Temperature (°C)	Dissolved Oxygen (mg/l)
Site 1	Surface	31.8	2.45
	1	30.5	0.99
	2	27.2	0.20
	3	26.0	0.13
Site 2	Surface	32.0	2.28
	1	31.0	1.25
	2	26.2	0.21
Site 3	Surface	32.0	1.84
	1	31.8	1.70
	2	29.7	0.24

Dissolved oxygen levels were below saturation prior to conducting treatment, which is likely a function of the elevated plant growth, lower water levels, and high water temperatures. Given these conditions, less than half the pond was treated to protect against excessive BOD resulting from decaying vegetation. Despite these efforts, a significant drop in dissolved oxygen was observed post-treatment. Although the dissolved oxygen was low, no fish mortality or dissolved oxygen stress behaviors (gulping, fish at surface, shoreline crowding, etc.) were observed at any time during the monitoring period. In fact, it was not until ten days post-treatment, on Thursday June 28<sup>th</sup>, that fish mortality was reported. Although a SŌLitude biologist did not directly observe the extent of the fish kill it was reported to us by multiple sources as several dozens of fish of various species and size classes. A SŌLitude Biologist did visit the site the morning of June 29<sup>th</sup> and did not observe any additional dead fish. An abundant warm-water fish assemblage was observed at the time of this visit that did not appear overly stressed by low dissolved oxygen levels. No additional fish mortality has been observed or reported since Thursday June 28<sup>th</sup>.

As you are aware, the region experienced a significant rain event on the 28<sup>th</sup>, where in some areas more than an inch of rain fell in less than 24 hours. Given that fish mortality at Buttonwood Pond was confined to the 28<sup>th</sup> during the rain storm, we believe that the detrimental water quality impacts (increased organics, transport of fecal bacteria from resident geese, and other potential watershed based contaminants) resulting from the elevated storm water flow caused an already dissolved oxygen stressed sub-set of the fishery to succumb.

Although these events are unfortunate and require additional preventative measures in the future, we do not feel that this isolated and limited fish kill has negatively affected the overall fishery or the ecology of the system. We have already begun discussing the installation of a submersed aeration system with the swan boats owner to help stabilize naturally fluctuating dissolved oxygen levels and protect against excessive BOD resulting from vegetation control activities.

SŌLitude has collected some additional bacteria samples for analysis and will continue to monitor conditions throughout the remainder of the season. If you have any questions regarding this information, the management program, or next steps please do not hesitate to contact me (cell 774-276-6098) or Keith Gazaille (cell 508-954-8576) directly to discuss further.

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Date: July 9, 2018  
To: Sarah Porter, New Bedford Conservation Agent  
From: James Lacasse, Environmental Scientist  
Re: Buttonwood Pond Post-Management Water Quality Monitoring Data

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As mentioned in our report, SOLitude Lake Management collected water samples in order to test for E. Coli and Fecal Coliform at Buttonwood Park Pond. The following provides follow-up data of the results.

Location of Sampling	E. Coli (MPN/100 ml)	Fecal Coliform (MPN/100 ml)
Site 1	52,000	>1,600
Site 2	8,100	>1,600

The water samples were collected on Friday morning, June 29<sup>th</sup> – about 19 hours after having been notified of the fish kill. The samples were collected from two sites in order to gain a better understanding of the nutrient levels within the entirety of the pond. The sites include: 1) the western shoreline 2) the middle of the pond.

*E. coli (Escherichia coli)* – are the type of fecal coliform associated with fecal material, and some strains cause illness. *E. coli* analysis is used to determine the probability of fecal contamination; it is present in the digestive tract of humans and animals, and therefore is a reliable indicator of fecal inputs. Per EPA regulation, no *E. coli* should be present in drinking water resources. In recreational surface waters (beaches), the EPA set criteria at <126 colonies per 100mL. *Site 1 resulted in 52,000 colonies while Site 2 resulted with 8,100 colonies, extremely far above the concerning threshold.*

Fecal coliforms – are bacteria directly associated with the intestines of warm blooded organisms but can also be naturally found in soil. Typically, the presence of fecal coliforms is indicative of *E. coli (Escherichia coli)* and other waste contamination. *Both sites reached the maximum testing capacity at >1,600 (MPN/100 ml).*

We believe these results have a major contribution with the fish kill that occurred on June 28<sup>th</sup> due to the extremely high bacteria levels. Please do not hesitate to reach out to me via email ([jlacasse@solitudelake.com](mailto:jlacasse@solitudelake.com)) or phone (774-276-6098) if you have any questions or concerns.