

Highlights from the SWCA Report on Spy Pond

Brad Barber, Dec. 15, 2021

SWCA Environmental Consultants conducted a survey of Spy Pond on Sept. 23, 2021. During the survey they collected water quality and algae samples. They conducted a plant survey for submerged aquatic vegetation. They made notes and photos of bank stabilization around Spy Pond. They prepared a report of their findings and recommendations.

SWCA presented the report at the Arlington Conservation Commission meeting of Dec 2, 2021. Highlights follow.

The full report is posted at:

<https://www.arlingtonma.gov/home/showpublisheddocument/59156/637753295221670000>

Section 2.0 Plant Community Survey -- On Sept 23, SWCA found no aquatic plants at 28 locations around Spy Pond. Spy Pond was treated with diquat herbicide on September 3. It was applied at label concentrations on 25 acres of Spy Pond. It appears that diquat removed most of the aquatic plants.

Section 3.1 Water Quality Analysis -- Spy Pond water quality is significantly worse than it was in 2012.

a) Turbidity is significantly worse than 2012 for surface measurements and the deep sample from the west basin. The deep sample in the north basin was similar to 2012. Surface turbidity may be due to the algae bloom. West basin turbidity may be due to sediment and silt from the dredging project and Rt. 2 storm drain.

b) Total phosphorus was significantly worse than 2012. Total phosphorus includes phosphorus in algae.

In 2021, Spy Pond was hypereutrophic at the bottom of the north basin (1.075 mg/L) and west basin (0.456 mg/L). Surface samples were eutrophic for both basins (0.025 and 0.31 mg/L).

In 2012, Spy Pond was hypereutrophic at the bottom of the south basin (0.320 mg/L) and eutrophic for the bottom of the north basin (0.090 mg/L). The surface sample was eutrophic for the south basin (0.030 mg/L).

Rainfall was heavier than normal this summer. For example, there was 3" of rain on August 19, before the algae bloom. Algae problems occurred for other water bodies in eastern Massachusetts including the Cambridge reservoirs.

c) Total nitrogen was 1.0 mg/L on the surface and 6.1 mg/L at the bottom of the North basin. The 2012 figures were 0.4 mg/L and 2.1 mg/L respectively. Total nitrogen should be less than 1.

Section 3.2 Algae Sampling Results -- Cyanophyte algae dominated the results. These algae can produce toxins. At the bottom of the west basin, Microcystis was 77,000 cells/mL, above the Dept. of Health's limit of 70,000 cells/mL.

Microcystis was moderate risk to humans and wildlife for both surface samples in the west basin (38,800 and 34,400 cells/mL). At the surface of the north basin, Microcystis and Dolichospermum totaled 10,000 cells/mL.

An algae bloom occurred August 21 in the south and west basins. The health department issued an advisory on August 27 due to conditions in the west basin. SWCA's survey was Sept 23. The advisory was lifted in October after testing by the state health department.

Section 4.0 Bank Stabilization Observations

SWCA surveyed the banks of Spy Pond. Attachment D has a selection of photographs. Multiple properties have manicured lawns up to the pond bank. SWCA observed erosion in some areas. For example, trees growing on banks with undercut roots. In 2019, the shoreline along Spy Pond Park and other areas were restored with coir logs. Most of the coir logs and adjacent banks lack vegetation. "Regular maintenance of coir logs is very important for the long-term efficacy ... of bank restoration."

SWCA approved of some shorelines with a stable emergent shelf, herbaceous and woody hydrophytic vegetation on the landward side, and larger shrubs and small trees near by.

They recommended tall grass and hardy vegetation with shrubs at the top of the bank. Additional soil, seed, and containerized plant material should be added to the coir logs and adjacent areas.

The long-term goal is a stable, emergent shelf with rushes and sedges; a sloping bank with dense roots throughout; and a buffer zone above the bank to slow the velocity of stormwater and trap its nutrients and sediments.

Section 5.0 Summary and Recommendations.

The SWCA report contained multiple near-term and long-term suggestions. In the report and subsequent discussion, SWCA recommended aeration and phosphorus inactivation. Other recommendations follow:

- 1) "The current management protocol is doing more than simply eliminating target plants, it is eliminating all vegetation by the end of the growing season."
- 2) "SWCA proposes working closely with herbicide manufacturers (such as SePRO, who commonly consults on herbicide application strategies) to minimize herbicide applications to the extent possible."

- 3) "[SWCA recommends that] targeted herbicide applications at lower concentrations of herbicides be attempted in the 2022 growing season."
- 4) "As banks degrade, they deposit sediment and vegetation into the pond, furthering nutrient loading, sediment accretion, and eutrophication. Furthermore, a degraded bank will not function to buffer the pond from contaminant and nutrient additions during large storm events. ... Restored banks should be fully vegetated and consist of a gradual incline to upland elevation."
- 5) "New bank restoration projects should be focused on areas of degraded or undercut bank faces and stormwater input areas [e.g., storm drains] ... Installing an emergent shelf and wetland vegetation ... will help reduce the continued input of nutrients in these stormwater inlet areas."
- 6) "Spy Pond experienced persistent HAB [Harmful Algae Blooms from mid-August through September] ... When toxins were not directly tested, it is best to assume toxin-producing algae are actively producing toxins any time they are identified. As-needed spot treatment of algae should be considered along with other nutrient management approaches to ensure the safety of humans and wildlife around the pond."
- 7) "Algaecide application should occur as soon as algae are detected."

Attachment D. Photos

Note the murky green water in all of the pictures. The bottom picture on D-5 was a light green that continued to the adjacent property. It appeared to be a localized algae bloom.

SWCA liked the shoreline shown at the top of D-4. It has emergent plants and a gentle rise to a well vegetated buffer zone.

Note the dark strip at water's edge on D-4 and D-5. There are no leaves or green vegetation. The strip is visible throughout Spy Pond. The strip may be due to the diquat application on September 3. On September 3, Spy Pond was at high water with the Rock Island buoy fully submerged.

Attachment E. Aquatic Vegetation Management Matrix

Attachment E is a two page table of plant management strategies, including estimates of efficacy and cost. Each entry includes useful notes about the strategy.