December 22, 2009

Mr. Brian Sullivan, Town Manager
Town of Arlington
730 Mass. Ave.
Arlington, MA 02476

Re: 2009 Year End Report - Aquatic Management Program at Spy Pond – Arlington, MA

In 2009 a non-native plant management program using Reward (diquat) herbicide and AquaPro (glyphosate) herbicide was conducted at Spy Pond to control growth of non-native, invasive Eurasian watermilfoil (*Myriophyllum spicatum*) and common reed (*Phragmites australis*). The Year End Report for the 2009 Aquatic Management Program follows. This report will serve to document the herbicide application process, the post-treatment monitoring of aquatic vegetation in the waterbody and the observed response of the targeted weeds. Attached to this report are several figures and supporting documentation that further help to explain the project and the observed results.

All work performed at Spy Pond in 2009 was conducted in accordance with the Order of Conditions (OOC) issued by the Arlington Conservation Commission and the License to Apply Chemicals issued by the MA DEP – Office of Watershed Management. Management plans were also reviewed by the MA Department of Fisheries and Wildlife and approved with conditions under the Natural Heritage and Endangered Species Program.

A chronology of this past year's management and brief description of events follows.

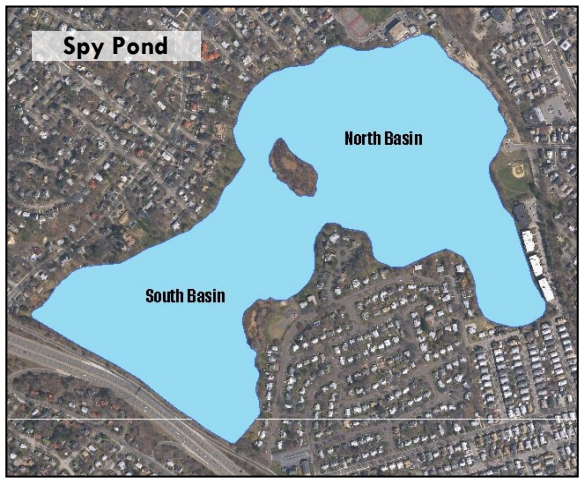
2009 Program Chronology:

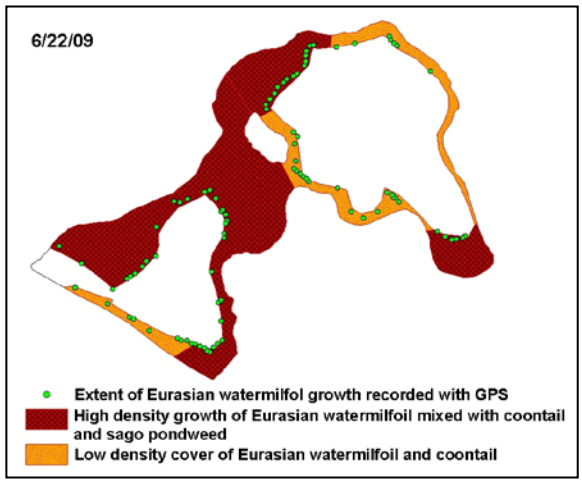
- DEP License to Apply Chemicals Issued (Reward only)..... 6/22/09
- Early Season Vegetation Survey..... 6/22/09
- Diquat Treatment for Milfoil..... 6/30/09
- Post-Treatment Inspections..... 7/15 & 8/20/09
- *Phragmites* Survey..... 7/15/09
- Late Season Surveys..... 9/2/09
- Amended DEP License to Apply Chemicals Issued (AquaPro)..... 9/24/09
- Treatment of *Phragmites*..... 10/6/09

Pre-treatment Survey:

A Pre-Treatment Survey was conducted on June 22nd to document pre-treatment vegetation composition and confirm the extent of the proposed treatment area. During the survey the entire littoral area of the waterbody was toured and the extent of the milfoil infestation was marked with GPS. The presence of other aquatic plant species was also documented and general observations regarding distribution of species type, species density and species location were collected. An AquaVu underwater camera and plant collection with a throw-rake were used to assist in the identification of vegetation and the determination of the milfoil boundary. A temperature/dissolved oxygen profile was also collected along with a Secchi disk clarity measurement (results attached).

- The large littoral area of Spy Pond supported moderate to dense cover (40%-90%) of aquatic plants, primarily Eurasian watermilfoil, coontail (*Ceratophyllum demersum*) and sago pondweed (*Stuckenia pectinatus*).
- Growth of all three species was advanced, growing at, or near the surface in most of the vegetated areas.
- Plant cover was generally greatest at intermediate water depths (4-8 feet) with lesser density growth extended to 10-12 feet.
- The substrate from the immediate shoreline to depths of ~3 feet is generally a mixture of sand and gravel and does not support dense growth of aquatic plant species.
- With the exception of the shallow area to the north of Elizabeth Island and the cove at the southeastern extent of the pond, milfoil cover in the North Basin was generally low density and scattered.
- Dense, more problematic milfoil was growing throughout the South Basin where it spanned the width of the waterbody from Elizabeth Island well into the South Basin, continuing around most of the basin's littoral area. (depicted in red).



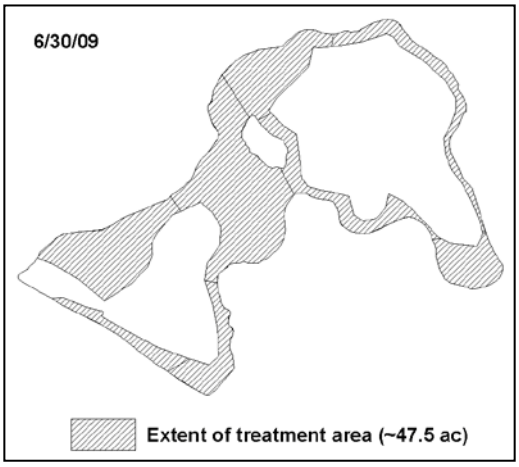


- Coontail and sago pondweed was also extensive in the south basin but was generally secondary in abundance to milfoil.
- While plant density varied depending on location plant cover in the South Basin was generally 60-90% cover.
- Other native plants recorded pre-treatment include: thin-leaf pondweed (*Potamogeton pusillus*), clasping-leaf pondweed (*Potamogeton perfoliatus*) and waterweed (*Elodea canadensis*). Occurrences of these plants were generally scattered and were found mixed with low density cover of milfoil around the perimeter of the North Basin.

Dense cover of Eurasian watermilfoil in southeastern cove – 6/22/09

Eurasian Watermilfoil Management

Based on the advanced stage of milfoil growth observed during the pre-treatment survey, the Reward (diquat) application at Spy Pond was scheduled for June 30th. Ultimately, 47.5 acres around the perimeter of the waterbody were targeted for treatment (roughly 46% of the surface area). Prior to treatment printed signs that warned of the temporary water use restrictions to be imposed following treatment were also posted around the lake prior to treatment. Pre-treatment notifications were also submitted to a local newspaper(s) for publication and to the Arlington Conservation Commission.



An 18 foot airboat equipped with a low pressure pump and calibrated spraying system was used for the treatment. The 47.5 acre treatment area was split into eight sections; each section was treated individually with the calculated dosage of Reward herbicide. Application rates ranged from 0.5-1.0gal/acre; rates were determined by vegetation density and dilution potential in each respective area (see Figure 1 – attached). The liquid Reward herbicide was diluted with pond water in an on-board mixing tank and injected subsurface through weighted hoses to prevent aerial drift of the herbicide. GPS was used during the application to monitor boat speed and ensure a uniform distribution of the herbicide in each treatment area.

Weather during the treatment was optimal with an air temperature of approximately 75°F, little to no wind and 100% cloud cover

The treatment was completed by Aquatic Control's state certified applicators, and was conducted in accordance with the product label directions and the permits issued by MA DEP and the Arlington Conservation Commissions. At no time during the course of this management program did we either observe or receive any reports of negative affect of treatment on fish, other aquatic life or wildlife.

Post-treatment Inspections:

Post-treatment inspections of Spy Pond were performed on July 15h and August 20th to assess the results of the June 30th diquat application. During each inspection the treated area of Spy Pond was toured by boat and vegetation was assessed visually using the help of an underwater camera and plant collection with a throw-rake.

7/15/09

- At the time of the first inspection (7/15) milfoil in the treatment area had fallen out of the water and was laying on the pond bottom.
- With the exception of the coontail, which had been impacted significantly following treatment, native plants in the pond appeared healthy
- As anticipated, coontail had been substantially impacted by treatment and was growing within 1-2 feet of the pond bottom
- Occurrences of clasping-leaf pondweed (pictured right with dead milfoil stems), thin-leaf pondweed and sago pondweed were observed.

- Cover of both sago pondweed and coontail remained widespread throughout the littoral area of the pond
- Sago Pondweed remained erect in the water column; two dense beds were observed to the north and west of Elizabeth Island

8/20/09

- By the time of the second inspection on 8/20 nearly all of the milfoil had decomposed and was gone.
- While large areas of the littoral area were barren with the absence of milfoil most of the native pondweeds appeared healthy.
- Sago Pondweed was the most abundant aquatic plant in the lake and beds to the north and west of Elizabeth Island persisted.
- Where encountered sago pondweed was dense and was growing within 1-2 feet of the surface.
- Coontail growth remained widespread but cover in most areas had been reduced significantly. Most of the coontail observed was still low growing and was well down in the water column where it affords valuable cover for fish and other aquatic life.

Late Season Survey:

A Late Season Vegetation Survey was performed on September 2nd. The entire lake was toured and vegetation was identified and spatially referenced. Again an AquaVu underwater camera and plant collection with a throw-rake were used to assist in the identification of vegetation. A map of the late season vegetation composition is attached (Figure 2 – Late Season Vegetation Assemblage).

- Plant distribution was consistent with what was recorded during the spring and was generally confined to depths of less than 10 feet.
- Plant cover was dominated by sago pondweed and coontail although much of the dense sago pondweed growth had fallen out of the water column and had begun to senesce for the winter.
- Scattered re-growth of milfoil was evident throughout the littoral area. Re-growth was most evident in areas where dense milfoil existed prior to treatment.
- Re-growth of milfoil was generally low-density (cover: <5%) and was low growing, in most instances only 6 inches to 1 foot in height.
- Occurrences of thin-leaf pondweed, clasping-leaf pondweed and waterweed were also recorded. Consistent with previous survey, presence of these plants was typically found in the North Basin in some of the lower-density areas.
- A thin layer of filamentous algae cover most of the observed plant cover.

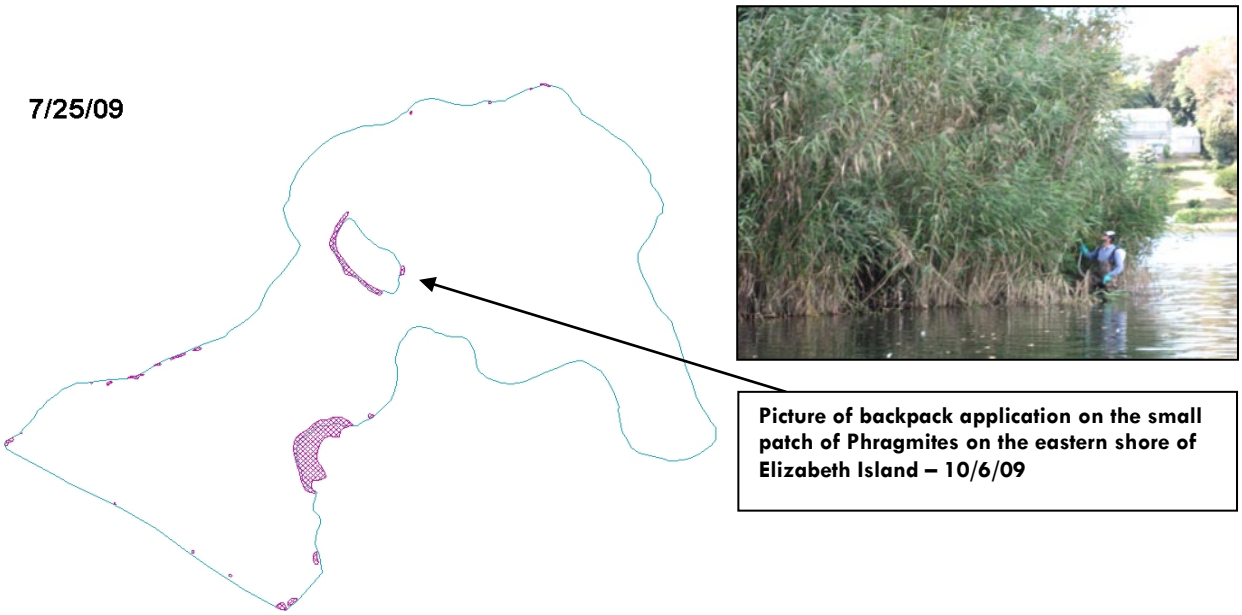
Phragmites Management

During the summer of 2009 approval to treat "in water" *Phragmites* around the shoreline of Spy Pond was granted by the Arlington Conservation Commission as part of a multi-year plan to control growth of this aggressive, non-native plant. While growth of *Phragmites* has been present at Spy Pond for some time, its continued spread both around the shoreline and into the lake prompted an effort to manage its growth and begin to restore the shoreline in favor of more beneficial native plant cover.

In compliance with the Natural Heritage Endangered Species Program a pre-treatment survey of the shoreline, and of the proposed treatment areas, was conducted by Francis Clark of Carex Associates, to identify and mark any growth of Engleman's umbrella sedge (*Cyperus engelmannii*), an endangered shoreline plant know to grow around Spy Pond. The resulting survey report was submitted to the

Department of Fisheries and Wildlife (Natural Heritage for review prior to treatment. Only three occurrences of Engleman's umbrella sedge were recorded. Prior to the glyphosate treatment each plant was covered with a bucket for protection from incidental herbicide drift. Buckets were removed once the treatment was completed.

- Treatment of "in water" *Phragmites* was performed on October 6th, 2009
- Treatment was conducted using AquaPro (glyphosate) herbicide and a non-ionic surfactant (Agri-dex).
- Treatment was performed with a combination of low-pressure/low-volume backpack sprayers and a low pressure pump system.
- Most *Phragmites* stands were sprayed with a backpack sprayer outward from shore to ensure that only growth in standing water was targeted. Growth in deeper water or out-of-reach of the backpack sprayer was sprayed with a backpack from the boat. Permission to spray from shore was approved by most shoreline owners in a signed release form. Locations where landowner permission was not granted were carefully sprayed with a backpack sprayer from our boat
- The low pressure pump system was used to treat only the large *Phragmites* stands on the western shore of Elizabeth Island and abutting Kelwyn Manor Park.
- Both of the large stands were treated from the boat using a ladder and 100 feet of hose. The hose and ladder were both used to help to reach the landward extent of the *Phragmites*. Only *Phragmites* in standing water was targeted. The treatment extent at the Kelwyn Manor site was consistent with the map provided to the Town on 10/1/09 and attached to the end of this report (Figure 3). A low-volume nozzle that sprays large droplets was used with the pump system to minimize potential for aerial herbicide drift.
- Blue "tracker" dye and a third person acting as a spotter were used during treatment at the two larger sites to ensure that only *Phragmites* in standing water was treated.
- A total of 29 individual *Phragmites* stands of varying size (from a few plants to 1/3 acre) totaling approximately 1.0 acres were treated in on 10/6/09.



Picture of backpack application on the small patch of Phragmites on the eastern shore of Elizabeth Island – 10/6/09

Recommendations for Ongoing Management

Treatment with Reward (diquat) herbicide was successful in maintaining season-long control of Eurasian watermilfoil and nuisance growth of coontail, while preserving what remained for native aquatic plant cover in Spy Pond. While it is disappointing to see milfoil re-growth by the end of the season, Reward is a "contact" herbicide so only seasonal control is reasonably attainable, although we have seen longer duration milfoil control at some other waterbodies in the region. While diquat can "thin" annual re-growth of milfoil in some situations, mature root structures often rebound quickly following treatment, requiring further management.

If longer term control of dense milfoil growth is to be achieved in Spy Pond then the use of a systemic herbicide will need to be used. Sonar (fluridone) is very effective at controlling Eurasian watermilfoil as demonstrated by previous whole lake treatments performed at Spy Pond in 2001 and 2005. ACT, Inc. is under contract with the Town to proceed with a whole-lake Sonar treatment in 2010.

Following the whole-lake Sonar treatment at Spy Pond in 2010, it is likely that management will not be needed for a few years following treatment. If milfoil growth does however, begin to return in some of the more historically problematic areas following treatment it may be possible to spot-treat these areas with Renovate OTF (triclopyr) granular herbicide. While Renovate is not currently approved for use at Spy Pond it has been used at a number of waterbodies in the Northeast for selective control of Eurasian watermilfoil and results have been promising. In most situations, effective milfoil control has been maintained of 2-3 years with just one application with little impact to non-target species. Triclopyr is an auxin mimic that targets dicot or broad-leafed plants like milfoil, while having little or no impact on many monocot species, including many of the native pondweed (*Potamogeton*) species found in New England. Similar to fluridone (Sonar), triclopyr is translocated throughout the entire plant killing the stem, foliage and roots, and is expected to provide two or more years of nuisance-level milfoil control.

While Renovate may achieve the desired milfoil control at Spy Pond, its expense is comparable to Sonar without providing any distinct advantage at this time. If, however, a need for more area/site specific milfoil control is need in future years, Renovate may become a useful tool at Spy Pond. Spot treatment with diquat may also be considered for treatment of milfoil re-growth.

Specifically for the 2010 season, we recommend the following invasive aquatic plant management efforts:

1. Early Season Vegetation Survey to access milfoil growth and finalize 2010 treatment scope - early May.
2. Early season whole-lake treatment with Sonar (fluridone) for the control of Eurasian watermilfoil and nuisance coontail growth. Treatment timing will vary depending on the rate of milfoil growth observed but will likely be performed between late May and early June before the milfoil has fully matured. Partial treatment with diquat may also be required to control areas of coontail, which is only moderately susceptible to fluridone.
3. Continued monitoring of vegetation in the lake with both a post-treatment inspection and a late season vegetation survey.

We look forward continuing our work with the Town of Arlington with towards lake management goals. If you have any questions, please do not hesitate to contact us.

Sincerely,

Aquatic Control Technology, Inc.

Gerald N. Smith
President/Aquatic Biologist

Michael Lennon
Biologist