



OXBOW ASSOCIATES, INC.

Wetlands Delineation and Permitting · Wildlife Studies · Herpetology · Vernal Pool Ecology

October 25, 2018

Gregory Meister, Administrator
Town of Sharon Conservation Commission
219 Massapoag Avenue
Sharon, MA 02067

**Professional Botanical Services Summary
Lake Massapoag Invasive Aquatic Plant Control Project (2018)
Sharon, MA**

Dear Mr. Meister:

This letter summarizes the botanical work that Oxbow Associates, Inc. (OA), specifically Amanda Weise, conducted on behalf of the Conservation Commission during 2018 per the requirement of NHESP for protection of state-listed toothcup (*Rotala ramosior*). As documented by Brett Trowbridge from OA in 2014, a single occurrence of the species grows in a small backwater cove on the southwest side of the lakeshore on land owned by Everwood Day Camp. This 2018 herbicide treatment differed from prior treatments in that 1) it was restricted to the “lagoon” area located at the south end of the lake and 2) the treatment would be conducted using a carefully timed application and placement of non-permeable barriers to prevent herbicide from reaching the toothcup population, as opposed to full lake drawn-down.

On July 16, 2018 A. Weise conducted a pre-project site inspection to evaluate lake water level, overall conditions, and placement of protective barriers prior to herbicide application planned for the “lagoon” area. The staff gage read approximately 9.8 ft at the lake outlet (northeast) and up-stream sources to the lagoon were dry. Flow boards installed at the lagoon spillway sufficiently held back flow and a non-permeable plastic barrier was added for additional protection (Fig. 1). In addition, a haybale barrier was been installed around the outer edge of cove where toothcup was previously documented (Fig.2). The bales were covered in long sheets of thick plastic and were staked through the bales into the substrate to anchor the barrier in place. A staff gage was placed inside the cove to monitor interior water levels (Fig. 3a).

Milestones:

July 17, Amanda requested permission from NHESP to commence treatment and was approved by Senior Review Biologist, Misty-Anne Marold.

July 19, the first herbicide application (Sonar) was completed by Solitude.

August 6, Amanda conducted a mid-treatment inspection per agreement with NHESP. The lake level was approximately 9.7 ft and up-stream sources to the lagoon again remained dry. At this time, the fanwort (*Cabomba caroliniana*) within the lagoon showed evidence of decline

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(purple to transparent-colored vegetation) from the herbicide (Fig 4). The cove water level had dropped 3.5 inches from the July 16 inspection, exposing sections of the cove and lake shore (Fig. 2 & 3b). Water around the barrier was hot to the touch (~100°) but appeared to have no effect on the aquatic and emergent vegetation. Several small plants resembling toothcup were observed on the exposed shores; unfortunately, identification could not be verified at the time due to lack of fully developed leaves, flowers/fruits.

October 5, A. Weise returned to the site to complete the final inspection and toothcup survey. At this time the herbicide application was complete and the lagoon spillway was once again open and flowing. The lake level was approximately 9.8 ft and up-stream sources to the lagoon were dry but showed evidence of somewhat recent water flow, likely from heavy rainfall that occurred in mid-September. The water level of the cove had increased, returning to gage level zero (a 3.5-inch increase from Aug. 6) (Fig. 5).

In total 197 toothcup plants were observed in the vicinity of the cove and ranged in height from 1-2 cm to 10 cm (Fig. 6 and Attached Ortho Map). Overall the plants were more abundant than in 2014 when only 50 plants were observed (~300% increase). Plants were observed along the exposed lake shore starting 30 ft. north of the path that provides access to the cove

up to the north-easternmost shore of the cove. Plants were most abundant near the cove mouth and were observed on either side of the haybale barrier. Near the mouth, plants occur on shore as well as in shallow water (3-5 inches deep). Plants primarily occurred in full sun although approximately 7 plants were found inside the cove along the southeast edge near the shaded tree line (Fig. 7). Plants were both single stemmed and multi-stemmed – the latter demonstrating a branched, prostrate form. All plants, regardless of size, possessed capsules with unripe seeds (Fig. 7).

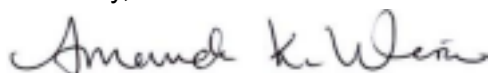
Given that these plants are annuals and can variably occur year to year, the protective barrier was positioned based on the 2014 study and expected available habitat (Fig. 8). Unfortunately, it did not fully enclose the entire extent of the 2018 population. There was no loss of herbicide from the lagoon during treatment and the temporary placement of the barrier does not appear to have caused measurable impact to the population (the footprint of the barrier is approximately 20 ft²; the total population area is 5,555 ft²). In the future the barrier will need to be installed further into the lake and extend the full length of the cove to provide protection to newly utilized habitat areas (Fig. 8).

During the survey, adjacent areas with suitable habitat were also visited but no additional plants were observed (figure). A detailed observation report was submitted to NHESP on October 13, 2018 using their VPRS website.

Removal of the barrier will take place, and is planned for November or December, 2018 after hard frost and the plants have been able to set seed. During removal, all foot and wheel barrel traffic will be restricted to the existing footprint of the barrier, with removal starting as the southern edge, and advancing north. All loose hay will be gathered using a spring rake and removed from the site.

Thank you for the opportunity to provide professional botanical services for this project again this season. Please feel free to contact me at any time if you have questions.

Sincerely,



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CC: Misty-Anne Marold, NHESP
Joe Onorato, Solitude Lake
Noah Siegel, Lake Association
Rob McGrath, Lake Association
Steve Weiss, Lake Association

Appendices

Appendix A. *Rotala ramosior* Population, Lake Massapoag, Sharon, MA (10/5/2018 Ortho Map)

Document References and Resources

March 13, 2015 Report by Brett Trowbridge, Oxbow Associates, Inc.

NHESP VPRS *Rotala ramosior* observation form (3/10/15 by Brett Trowbridge)

Mattrick, C. 2001. *Rotala ramosior* (L.) Koehne (Toothcup) Conservation and Research Plan. New England Wild Flower Society, Framingham, Massachusetts, USA.

Figures – *Begin on the Following Page*



Figure 1. The non-permeable barrier in place at the lagoon spillway (08/05/18).



Figure 2. Protective haybale barrier, note the degree of exposed shore area (08/05/18).



Figure 3(a) water level gage set to “zero” the day the barrier on 07/16/2018; (b). water level roughly 3.5 inches below the previously level on 08/05/18.

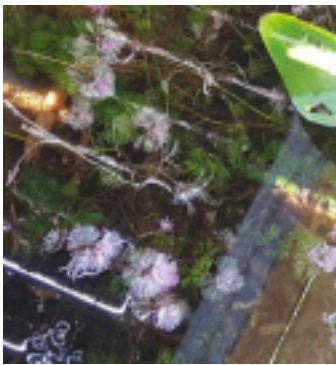




Figure 4. (a) Dense fanwort in the lagoon area showing signs of stress from herbicide absorption with close up of purple-colored vegetation (b).

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Figure 5. water level in the cove on 10/5/18; note the lack of exposed shore.



Figure 6. (a) Individual toothcup plants varying in size from 10+ cm with multiple prostrate, branching stems to just barely (b) 2 cm and single stemmed (10/05/18).

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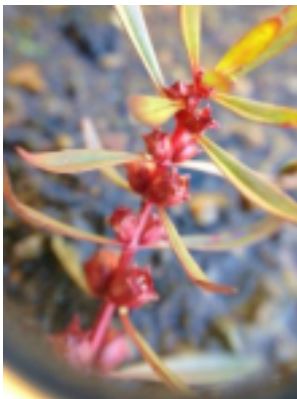




Figure 7. (a) An individual toothcup plant in a shaded back-area of the cove with (b) a closeup of the maturing seed capsules (10/05/18).

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Figure 8. Detailed sketch of *Rotala ramosior* population as observed on 10/5/18, 2018 barrier location, and recommendation for future barrier placement.

Appendix A.

Rotalamosior Assessment Lake Massapoag, Sharon, MA 10/5/2018

Rotalamosior Population

Survey Area

1:3,000

1 inch = 250 feet

F

0125250500 Feet

USGS, MassGIS