



Northeast Aquatic Research &



Coventry Lake Hydrilla Management Program 2022 Treatment Report

**Prepared for the Connecticut Department of Energy and
Environmental Protection & the Town of Coventry, CT**



November 2022

Northeast Aquatic Research, LLC ∴ 74 Higgins Highway, Mansfield, CT 06250

Introduction

2022 marks the seventh year of *Hydrilla verticillata* (Hydrilla) management in Coventry Lake. A thorough discussion of the prior six years of management can be found in the 2020 and 2021 treatment reports.

In 2022, SOLitude Lake Management (SOLitude) conducted the herbicide treatment, while Northeast Aquatic Research (NEAR) conducted the pre-treatment and post-treatment aquatic plant surveys.

2022 Management Approach

The 2022 management approach was the same as the prior four years. A 4-ppb dose of Sonar One (Fluridone) was applied to the 178-acre littoral zone on July 21st. The first booster treatment was administered on August 22nd, using a lake-wide dose of 2-ppb applied to the littoral zone. A second booster treatment was administered on September 20th, using the same 2-ppb lake-wide dose.

Prior to each herbicide application, signs were posted around the shoreline of the lake warning of the temporary water use restrictions. Swimming was restricted for the full day on the days of treatment. Restrictions on certain types of irrigation were imposed for 30-days after each treatment.

To monitor fluridone concentrations, water samples were collected from the surface and 1-foot off the bottom from six different locations in the lake, as shown in **Map 1**. Samples were collected multiple times over the course of the project. Results are displayed in **Table 1**.

Map 1. Coventry Lake 2022 Treatment Area.

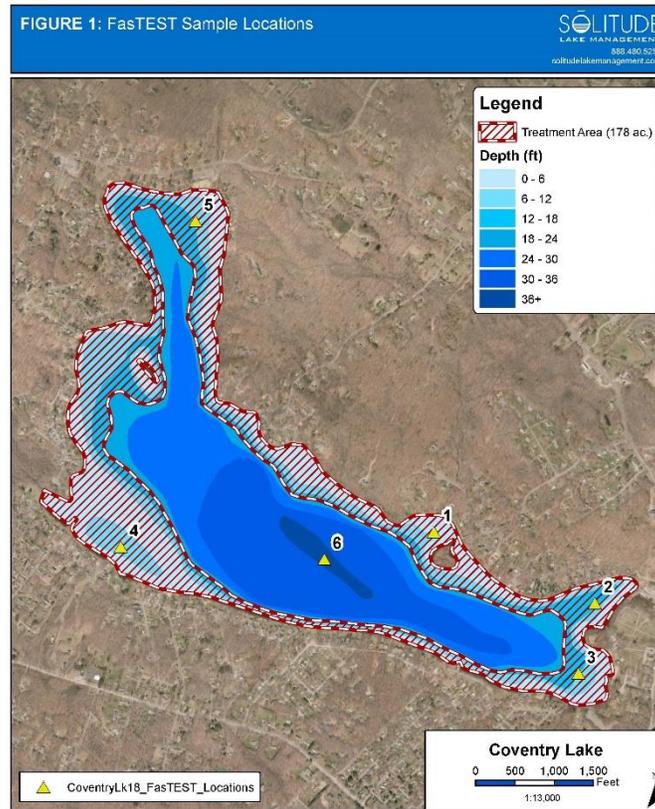


Table 1. 2022 FastTEST data (results in ppb).

Date	Results (ppb)											
	Station ("a" is surface sample, "b" is bottom sample)											
	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b	6a	6b
Water Depth	8'		10'		12'		9'		12'		32'	
7/29/2022	2.6	2.3	1.8	3.2	2.0	2.4	1.9	1.8	1.7	1.7	1.4	1.7
8/14/2022	2.5	2.1	2.1	1.9	2.5	2.1	2.2	2.4	2.3	3.1	2.0	1.1
9/2/2022	3.2	3.5	3.1	3.1	3.4	3.2	3.0	3.1	1.9	3.0	3.4	3.3
10/4/2022	2.9	2.8	1.5	2.4	1.3	3.1	3.4	2.9	3.2	3.3	2.8	1.0
11/2/2022	2.4	2.6	3.2	2.7	3	2.7	2.9	2.3	2.6	2.6	2.7	2.5

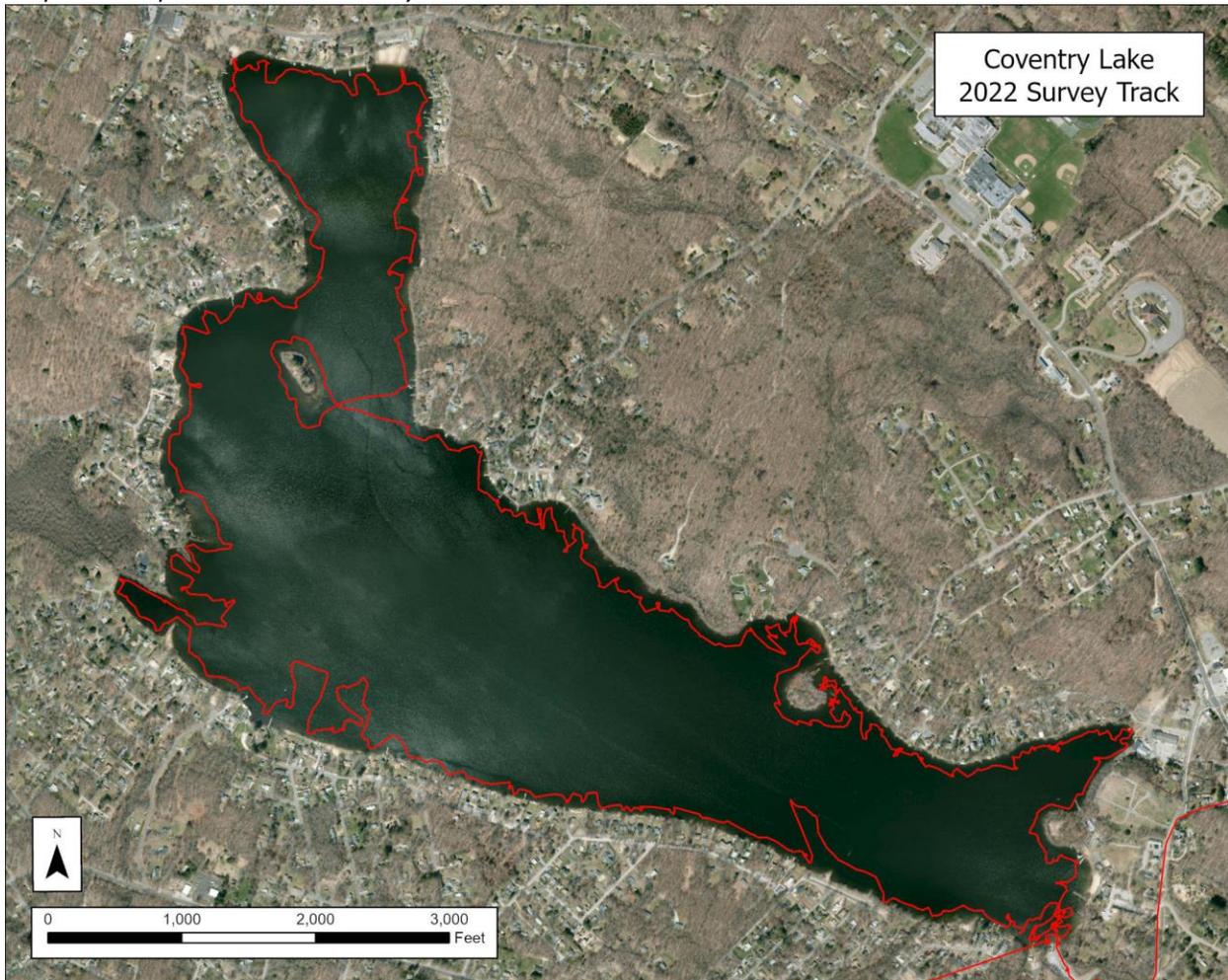
Fluridone was maintained at a desirable concentration for the ~90 days of testing and concentrations were sufficient to provide continued impact after the final FastTEST sampling. Fluridone across the testing dates and stations ranged from a low of 1.0 ppb to a high of 3.5 ppb. The average Fluridone concentration across all dates and stations was 2.5 ppb, which was lower than last year, similar to 2020 and higher than 2018 & 2019. Due to the characteristics of this herbicide, concentrations were likely higher in the water at the lake bottom and in the sediment pore water, which comes in direct contact with the Hydrilla plants.

2022 Aquatic Plant Surveys

NEAR conducted a pre-treatment aquatic plant survey on July 13th. Waypoints were created every ~150 feet throughout the lake's littoral zone and waypoints where Hydrilla had been found in previous years were revisited (**Map 2**). The survey utilized a combination of visual assessments, hand-raking in shallow water, grappling rake tosses, and depth-soundings to view plants growing in deep water.

NEAR conducted a post-treatment survey on October 6th. Again, the survey covered the entire littoral zone of the lake, with the aim of assessing the impact of the herbicide treatment on both the invasive and native plant populations.

Map 2. 2022 post-treatment survey track.



Hydrilla Results

Hydrilla was not found anywhere in the lake in 2022. All locations where Hydrilla had been found in prior years were thoroughly searched, but no plants were present. Hydrilla plants produce turions (winter buds) that can remain dormant in the sediment at the lake bottom for several years, so while plants were not found this year, it is very possible that plants could sprout from turions in the future. Therefore, it is vital that thorough aquatic plant surveys are conducted every year to search for new Hydrilla plants.

Additional Aquatic Plant Species

A total of 23 aquatic plant species were found in the lake during the pre-treatment survey, along with Filamentous Algae and *Lyngbya* sp. (Cyanomat) (**Table 2**). Of these, the dominant species (those found at greater than 20% frequency) were *Potamogeton perfoliatus* (Clasping-leaf pondweed), *Nitella* sp. (Stonewort), and *Potamogeton amplifolius* (Large-leaf pondweed) (**Map 3, Map 4, Map 5**).

Two small patches of the invasive species *Potamogeton crispus* (Curly-leaf pondweed) were found on the lake's southern shoreline (**Map 6**). A few floating Curly-leaf pondweed fragments were also found along this shoreline.

One patch of the invasive species *Glossostigma cleistanthum* (Mudmat) was found in the cove at the southwest corner of the lake (**Map 7**).

One invasive *Trapa natans* (Water chestnut) plant was found on the lake's northern shoreline (**Map 8**). The plant was immediately pulled and removed from the lake.

The state-listed Threatened species *Potamogeton vaseyi* (Vasey's pondweed) was also found in one location, in approximately 6 feet of water near the southwest corner of the lake (**Map 9**).

During the post-treatment survey, *Potamogeton perfoliatus* was the only dominant species (**Map 10**). Two patches of Mudmat were found in shallow water, one patch on the northern shoreline and one patch on the western shoreline (**Map 11**).

12 aquatic plant species were recorded post-treatment, less than half the number of species found in July. This may be due to reduced water clarity, rather than a true decline in species richness. For most species that were found both pre- and post-treatment, the frequency of occurrence decreased post-treatment, but the density increased. If the decline in species richness was caused by the herbicide, we would expect to see a decrease in density within the plant beds that were found post-treatment.

The invasive species *Myriophyllum spicatum* (Eurasian milfoil) was abundant in the lake when the Hydrilla management program began but has not been found since the second year of Fluridone treatment in 2019.

Table 2. 2022 pre-treatment and post-treatment survey vegetation data.

Scientific Name	% Frequency		Average Density	
	Pre	Post	Pre	Post
<i>Ceratophyllum demersum</i>	11	3	23	27
<i>Chara sp</i>	7	1	13	40
<i>Elatine sp</i>	0	1	NA	5
<i>Eleocharis acicularis</i>	2	0	9	NA
<i>Elodea canadensis</i>	2	0	17	NA
<i>Elodea nuttallii</i>	1	1	20	15
<i>Filamentous algae</i>	5	3	10	51
<i>Glossostigma cleistanthum</i>	<1	1	5	25
<i>Gratiola sp</i>	1	0	13	NA
<i>Ludwigia sp</i>	2	0	18	NA
<i>Lyngbya sp.</i>	1	1	40	80
<i>Myriophyllum tenellum</i>	<1	0	10	NA
<i>Najas flexilis</i>	2	0	15	NA
<i>Nitella sp</i>	23	8	13	37
<i>Potamogeton amplifolius</i>	21	10	22	26
<i>Potamogeton berchtoldii</i>	2	0	22	NA
<i>Potamogeton bicupulatus</i>	1	0	15	NA
<i>Potamogeton crispus</i>	<1	0	8	NA
<i>Potamogeton perfoliatus</i>	26	22	35	47
<i>Potamogeton pusillus</i>	1	2	7	30
<i>Potamogeton vaseyi</i>	<1	0	10	NA
<i>Sagittaria graminea</i>	2	1	14	30
<i>Trapa natans</i>	<1	0	NA	NA
<i>Typha latifolia</i>	1	0	15	NA
<i>Vallisneria americana</i>	3	3	6	24
<i>Zosterella dubia</i>	5	4	5	17

Map 3. Pre-treatment survey locations and densities of *Potamogeton perfoliatus*.

Potamogeton perfoliatus :: July 13, 2022



Map 4. Pre-treatment survey locations and densities of *Nitella* sp.

Nitella sp. :: July 13, 2022



Map 5. Pre-treatment survey locations and densities of *Potamogeton amplifolius*.

Potamogeton amplifolius :: July 13, 2022



Map 6. Pre-treatment locations and densities of *Potamogeton crispus*.

Potamogeton crispus :: July 13, 2022



Map 7. Pre-treatment locations and densities of *Glossostigma cleistanthum*.

Glossostigma cleistanthum :: July 13, 2022



Species Density

- Very Sparse
- Sparse
- Medium
- Dense
- Very Dense

Map 8. Pre-treatment locations and densities of *Trapa natans*.

Trapa natans :: July 13, 2022



Species Density

- Very Sparse
- Sparse
- Medium
- Dense
- Very Dense

Map 9. Pre-treatment survey locations and densities of *Potamogeton vaseyi*.

Potamogeton vaseyi :: July 13, 2022



Species Density

- Very Sparse
- Sparse
- Medium
- Dense
- Very Dense

Map 10. Post-treatment survey locations and densities of *Potamogeton perfoliatus*.

Potamogeton perfoliatus :: October 3, 2022



Species Density

- Very Sparse
- Sparse
- Medium
- Dense
- Very Dense

Map 11. Post-treatment survey locations and densities of *Glossostigma cleistanthum*.

Glossostigma cleistanthum :: October 3, 2022



Recommendations

No underwater searching was done in 2022 and the relatively poor clarity conditions this year made the aquatic plant survey more challenging than in years past when clarity was better. Therefore, it is impossible to confirm that there is no Hydrilla left in Coventry Lake, but after five years of fluridone treatment, there should be little to no Hydrilla remaining.

As a systemic herbicide, fluridone allows existing Hydrilla tubers to sprout from the sediment each year, and then subsequently kills those plants, while preventing the formation of new tubers. Tuber density studies at other Hydrilla management locations across the country indicate that after six years of fluridone treatment, there should be a 99% reduction in Hydrilla tubers (California and New York). This means that few to no tubers should be present in Coventry Lake, especially because many of the Hydrilla patches had only been present and producing tubers for roughly two years prior to fluridone management.

Fluridone treatments are expensive, and it is likely that Coventry Lake will experience some level of Hydrilla regrowth in the next several years. For that reason, we recommend the Town pause treatment for 2023 and instead focus on intensive searching for Hydrilla plants and tubers. It is most likely that Hydrilla regrowth will take place at the locations of historically larger Hydrilla beds, which presumably produced more tubers than the smaller one-year present patches. If any Hydrilla plants are found, it would be possible to follow-up with a small spot treatment using a contact herbicide product, as early as

possible after plants are found. It would be wise to apply for and maintain a DEEP pesticide permit for multiple different potential products, just in case any Hydrilla is found in 2023.

If Hydrilla is not found in 2023, it will not be necessary to treat the lake. Follow up monitoring in subsequent years can follow a similar approach, where spot treatment may occur if Hydrilla is found in one or two locations. Should Hydrilla be found in multiple locations in 2024-onwards it would be wise to begin a potential regimen of fluridone treatment every three or four years. It is not sustainable or cost effective to continue full-lake fluridone treatments every year. Six years is the typical 'tipping point' for intensive Hydrilla management programs. The Croton River in NY is now in a very similar management position as Coventry Lake and time will tell how both waters experience or do not experience potential Hydrilla regrowth in future years. It is very difficult to project treatment needs into the future. Some California case studies indicate that Hydrilla may experience a considerable resurgence in population if left untreated for several years after previous efforts to diminish tuber density to non-detectable levels¹. However, it is also possible that Coventry Lake, which still has many native plant species, may not experience that similar level of regrowth.

Overall, fluridone has been incredibly effective in managing both invasive Hydrilla and invasive Eurasian milfoil in Coventry Lake over the past five years. Eurasian milfoil regrowth is less likely, as this species does not have hardy tubers to sustain its population.

¹ Kratville, David. *Hydrilla Eradication Challenges, Partnerships and Lessons Learned*. 2017. California Department of Food and Agriculture. www.cal-ipc.org/wp-content/uploads/2017/12/10_Kratville.pdf