2025 Medfield Ponds
Aquatic Vegetation Assessments

October 2025



Prepared for:

Town of Medfield
Conservation Commission

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1. Introduction

On behalf of the Town of Medfield Conservation Commission, Comprehensive Environmental Inc. (CEI) conducted field investigations during the summer of 2025 to assess aquatic vegetation conditions in Kingsbury Pond, Danielson Pond, Flynns Pond, Vine Lake, and Meetinghouse Pond (see Figure 1).

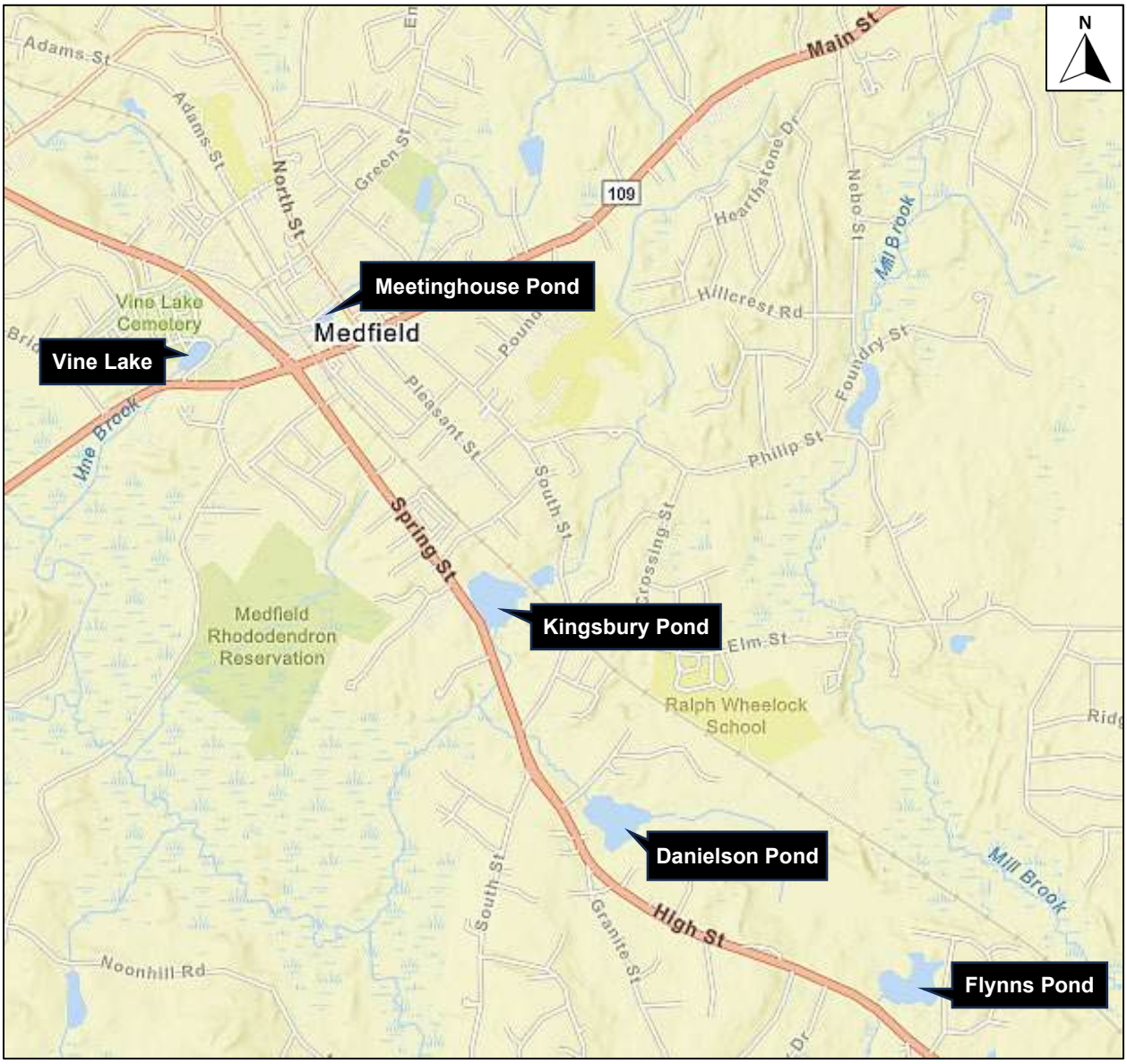


Figure 1. Locus Map for the Medfield Ponds Aquatic Vegetation Assessments

A summary of the field investigations and methods is as follows:

- The field investigations focused on documenting general conditions for each pond with regard to macrophyte abundance, distribution, and dominant species, with special attention given to documenting non-native/invasive species that may require ongoing management.
- Each pond assessment was conducted from a kayak, except for Meetinghouse Pond which was conducted from the shoreline due to the pond's small size and difficulty of boat access.

- Each pond assessment included discrete monitoring stations (see Figures 2-6) to document growth conditions (species presence and dominance, overall growth density) throughout the littoral zone (area of rooted macrophyte growth). Growth density was estimated based on percent aerial cover according to the following categories:

Category	**Growth Density** (% cover)
Sparse	0-25%
Moderate	26-50%
Dense	51-75%
Very Dense	76-100%

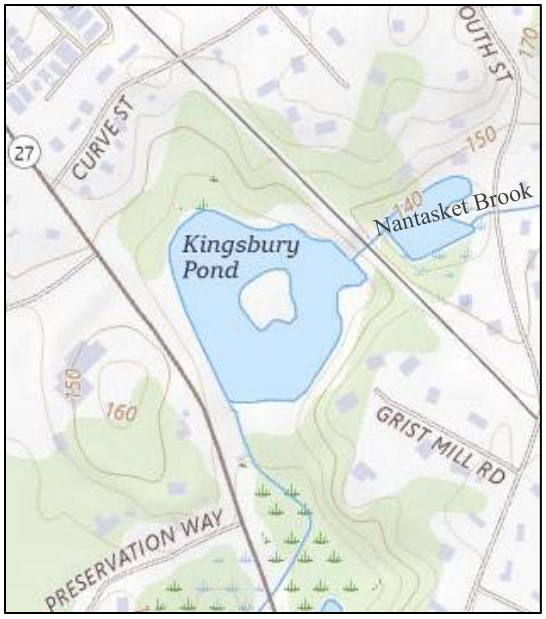
- Aquatic vegetation species at each monitoring location were identified visually and by use of an aquatic vegetation grappling hook to sample submerged vegetation. All identified species were recorded in tabular form on a tally sheet for each pond (see Tables 1-5).

- In addition to recording information from the monitoring stations, a running documentation of major plant assemblages and growth densities was estimated throughout each pond. Figures 2-6 present a generalized representation of major plant growth zones. Localized growth within the depicted growth zones can vary significantly.

Sections 2-6 provide the field investigation findings for each pond. When evaluating aquatic vegetation management recommendations for the Medfield ponds (Section 7), CEI considered past and current pond conditions, the lake's vegetation and algae management history (as provided by the Conservation Commission), and recommended long-term goals with regard to maintenance of the pond's ecological and recreational values. These goals include the following:

1. **Prevent and limit nuisance growth of non-native species**, which can out-compete native species and impact aquatic habitat, recreation, and aesthetic values.
2. Maintain conditions that are suitable for to the specific **recreational uses for each pond**, such as paddling, wildlife/bird watching, fishing, etc.
3. Preserve and improve the **ecological values of the Medfield ponds**. A diverse native plant community plays an important role in maintaining a healthy pond ecosystem and its recreational values. For example, the role of rooted aquatic plants in maintaining lake water clarity is well documented, and native plant beds provide critical habitat as forage and protective cover for fish.
4. **Periodic assessment** of conditions, allowing the Town to adapt the management approach for each pond as conditions change (e.g., introduction of a new non-native species to the pond).

2. Kingsbury Pond



Kingsbury Pond is a shallow impoundment of Nantasket Brook with an area of approximately 7.9 acres (not including the island). A 2007 study by Aquatic Control Technology (ACT) reported an average water depth of 3.8 feet and a maximum depth of 7.0 feet.

Kingsbury Pond was created in 1702 with construction of a grist and sawmill. The existing water-driven sawmill was built in 1918 and is historic landmark in Medfield. The pond provides wildlife habitat and is used for fishing, boating, and ice skating. A walking trail also provides public access along the pond's eastern shoreline.

2.1 Vegetation Survey Results

CEI conducted an aquatic vegetation survey at Kingsbury Pond on July 23, 2025, with findings summarized below.

- Growth densities within Kingsbury Pond ranged from moderate (25-50% cover) to very dense (75-100% cover) at the time of the survey, with most areas having very dense growth.
- The 17 aquatic vegetation species observed during the July 2025 survey are listed in Table 1. The observed species included 15 native species and two non-native, invasive species – variable milfoil (*Myriophyllum heterophyllum*) and water chestnut (*Trapa natans*).
    - Variable milfoil was found in relatively small amounts at locations throughout most of the pond, although several pockets of more dense growth were observed in the central and eastern portion of the pond.
    - Water chestnut was observed to have sparse growth scattered throughout Kingsbury Pond, most often found as individual plants or small clusters of several plants growing among water lilies and other floating-leaf vegetation.
- Coontail (*Ceratophyllum demersum*) and horned bladderwort (*Utricularia cornuta*) were the most abundant **submersed species.** Coontail was a dominant plant at 12 out of 16 sampling stations (75%). A 2.8-acrea area in the southern portion of the pond was characterized by open water with dense to very dense growth of submerged species (see Figure 2).
    - The 2007 ACT study noted that Robbins' pondweed (*Potamogeton robbinsii*) was one of the dominant submersed species in the pond. CEI observed this species only in small quantities at several locations.
- White water lily (*Nymphaea odorata)* was the most common **floating-leaf species**, often observed in a floating-leaf assemblage with watershield (*Brasenia schreberi*) and yellow water lily (*Nuphar variegata*). Floating-leaf species were most abundant in the northern portion of the pond, with growth densities ranging from moderate to very dense (see Figure 2).
- The diversity of species observed throughout the pond was high, with an average of 8.38 species observed per monitoring station.

Table 1. Kingsbury Pond Aquatic Vegetation Survey Tally Sheet, 07/23/2025

● species present ● species dominant ● non-native species

scientific name	common name	stations present	stations dominant	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
Ceratophyllum demersum	coontail	16	12	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
Nymphaea odorata	white water lily	14	10	●	●	●	●	●	●	●	●	●	●	●	●			●	●	
Utricularia cornuta	horned bladderwort	13	4	●	●	●	●	●	●	●	●	●	●	●	●				●	
Brasenia schreberi	watershield	13	1	●	●			●	●		●	●	●	●	●	●	●	●	●	
Lemna minor	common duckweed	12	0		●	●			●	●	●	●	●	●	●	●		●	●	
Myriophyllum heterophyllum	variable milfoil	11	1	●	●	●	●	●	●	●					●		●	●	●	
Wolffia spp.	watermeal	11	0	●	●	●				●	●	●	●	●	●			●	●	
Nuphar variegata	yellow pond lily	9	1	●	●			●	●		●	●		●				●	●	
Trapa natans	water chestnut	9	0	●			●	●		●	●	●	●	●			●			
Potamogeton pusillus	small pondweed	8	0	●	●			●	●	●		●		●	●					
Sparganium americanum	American bur-reed	7	0			●	●		●			●	●	●					●	
Potamogeton robbinsii	Robbins' pondweed	4	0		●								●	●	●					
Potamogeton epihydrus	ribbonleaf pondweed	3	0				●						●		●					
Elodea canadensis	Canadian waterweed	1	0											●						
Pontederia cordata	pickerelweed	1	0			●														
Sagittaria latifolia	broadleaf arrowhead	1	0									●								
Vallisneria americana	wild celery	1	0	●																**Avg.**
			Density Rating	2	3	4	4	4	4	4	4	4	3	4	3	4	4	4	4	**3.69**
			# species per station	10	10	8	7	8	9	8	8	11	10	12	10	3	4	7	9	**8.38**

Density Rating (% cover)

1: sparse; 0-25%
2: moderate; 26-50%
3: dense: 51-75%
4: very dense: 76-100%

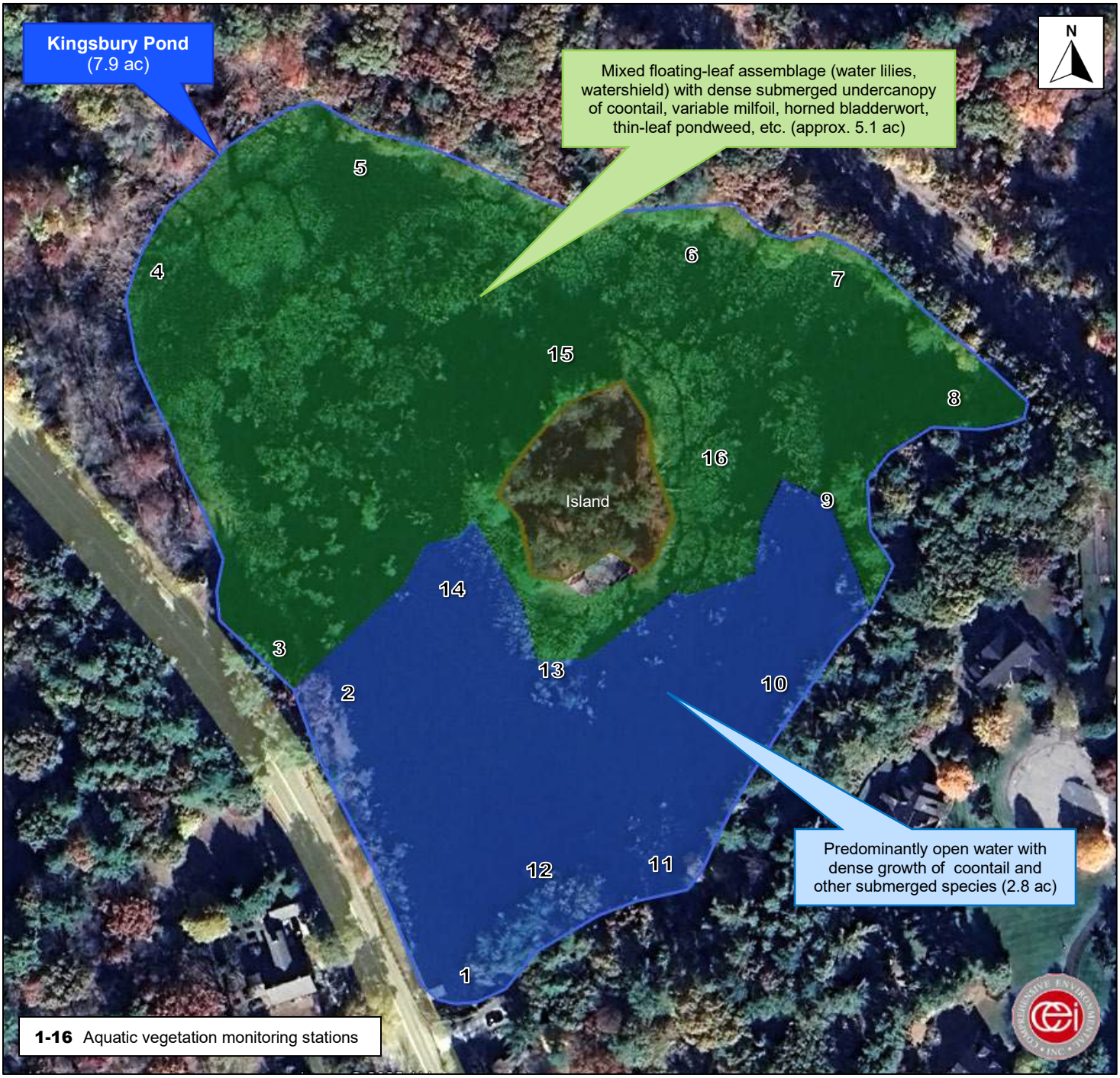


Figure 2. Kingsbury Pond Aquatic Vegetation Map (Survey Date: 7/23/2025)

Kingsbury Pond Photos, July 23, 2025



Photo 1: Invasive water chestnut was found in scattered locations throughout Kingsbury Pond, often intermixed with water lilies.



Photo 2: Pickerelweed and white water lily along the northern edge of Kingsbury Pond.

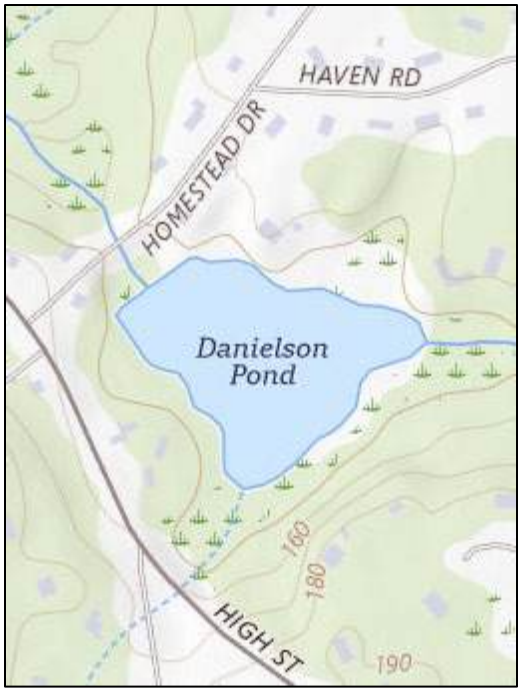


Photo 3: Watershield was a common floating-leaf species found throughout Kingsbury Pond.



Photo 4: Coontail was the most abundant submerged species in Kingsbury Pond, shown here growing near the pond surface in the central portion of the pond.

3. Danielson Pond



Danielson Pond (approx. 6.5 acres) is a shallow impoundment fed by two unnamed streams, located to the east of High Street and south of Homestead Drive. A 2006 ACT study reported that the pond had an average depth of 1.9 feet and a maximum depth of 4.5 feet.

Danielson Pond was likely constructed in the 1880s to provide power for a sawmill and to allow for ice harvesting. Public access is limited to the dam area, which can be accessed from High Street. The pond provides wildlife habitat and is also used for fishing, non-motorized boating, and ice skating.

3.1 Vegetation Survey Results

CEI conducted an aquatic vegetation survey at Danielson Pond on July 23, 2025, with findings as summarized below.

- The 6.5-acre area of Danielson Pond is comprised of three major zones, as shown in Figure 3:
    - Predominantly open water at the surface (approx. 1.3 acres), with an assemblage including submerged species such as coontail (*Ceratophyllum demersum*), Canadian waterweed (*Elodea canadensis*) and thin-leaf pondweed (*Potamogeton pusillus)*. Growth densities ranged from moderate in the northeastern part of this zone (area nearest to the dam) to very dense in most other areas.
    - Areas characterized by very dense growth of floating-leaf vegetation (approx. 3.6 acres), with white water lily (*Nymphaea odorata*) as the heavily dominant species.
    - A transitional perimeter zone dominated by broadleaf cattails (*Typha latifolia*) and other emergent wetland species (approx. 1.5 acres).
- Fourteen species of aquatic vegetation were observed during the survey, all native species.
- Overall growth density was high throughout the pond, with all but one monitoring station in the “very dense” category (75-100% cover). An average of 4.39 species were observed per monitoring station.

Table 2. Danielson Pond Aquatic Vegetation Tally Sheet, 07/23/2025

● species present ● species dominant ● non-native species

scientific name	common name	stations present	stations dominant	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
Nymphaea odorata	white water lily	15	14		●	●	●	●	●	●	●	●	●	●	●		●	●	●		●	
Ceratophyllum demersum	coontail	11	3		●					●	●	●	●	●		●	●	●	●	●		
Pontederia cordata	pickerelweed	10	0	●	●	●	●		●		●		●				●	●	●			
Typha latifolia	broadleaf cattail	8	6			●	●	●	●	●			●		●		●					
Elodea canadensis	Canadian waterweed	7	2		●							●		●		●			●	●	●	
Potamogeton pusillus	small pondweed	7	2								●	●	●	●				●		●	●	
Eleocharis sp.	spike rush	7	1		●	●	●	●	●		●						●					
Spirodela polyrhiza	big duckweed	3	0										●	●	●							
Nuphar variegata	yellow pond lily	2	0												●	●						
Polygonum amphibium	water smartweed	2	0												●	●						
Lemna minor	lesser duckweed	2	0							●					●							
Potamogeton epihydrus	ribbonleaf pondweed	1	0					●														
Iris versicolor	blue flag iris	1	0	●																		
Brasenia schreberi	watershield	1	0																		●	Avg.
Density Rating				1	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	**3.83**
# species per station				2	5	4	4	4	4	4	5	4	6	5	6	6	5	4	4	3	4	**4.39**

Density Rating (% cover)

1: sparse; 0-25%
2: moderate; 26-50%
3: dense: 51-75%
4: very dense: 76-100%

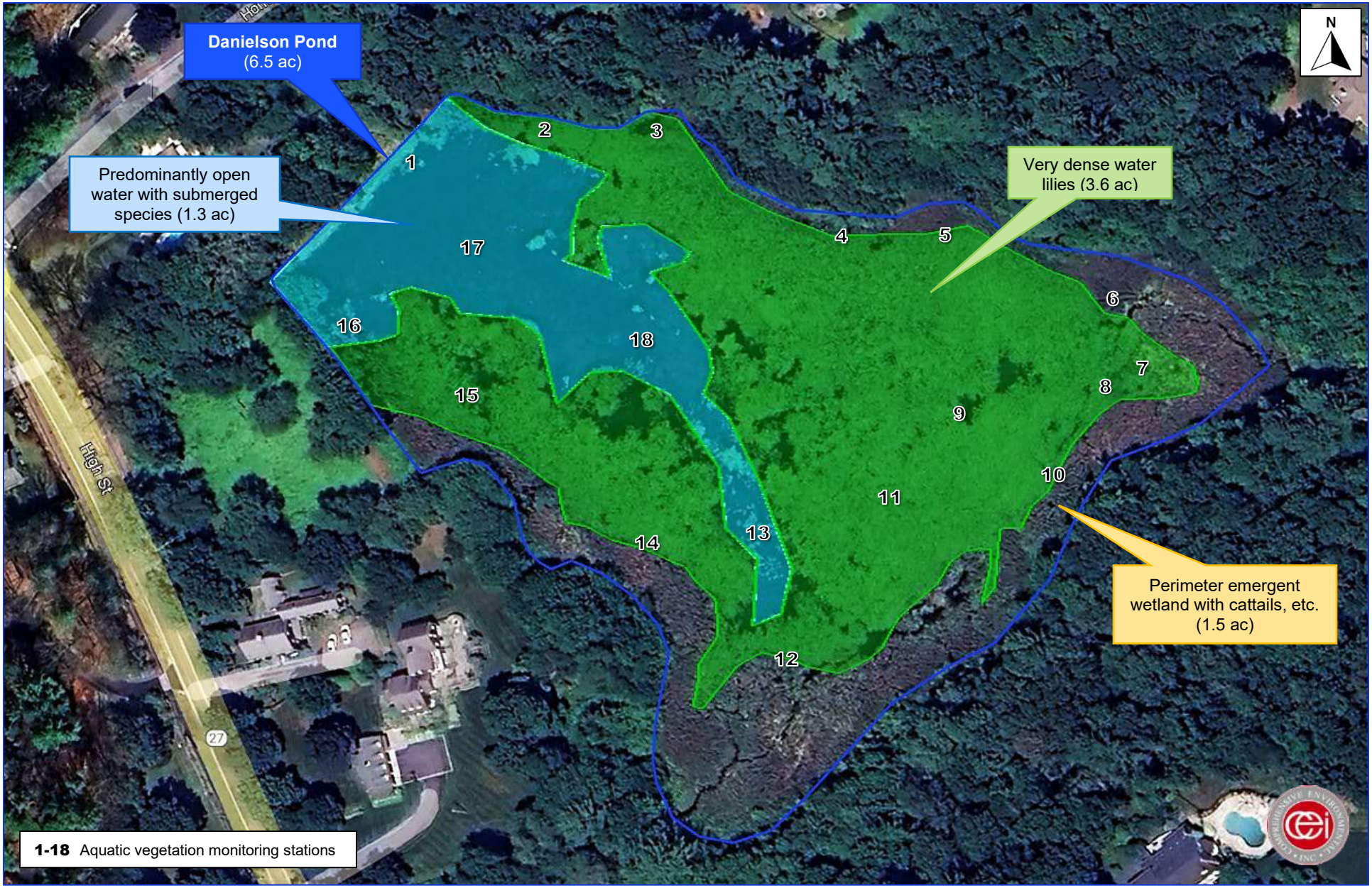


Figure 3. Danielson Pond Aquatic Vegetation Map (Survey Date: 7/23/2025

Danielson Pond Photos, July 23, 2025



Photo 5: View to the east across Danielson Pond. Open water at the pond surface near the earthen dam transitioned to dense floating-leaf vegetation covering in the north and eastern portion of the pond.



Photo 6: Very dense growth of white waterlilies (including many of the pink-flowered variety of this plant) in the northeastern portion of the pond. Cattails can be seen growing along the shallow pond perimeter.

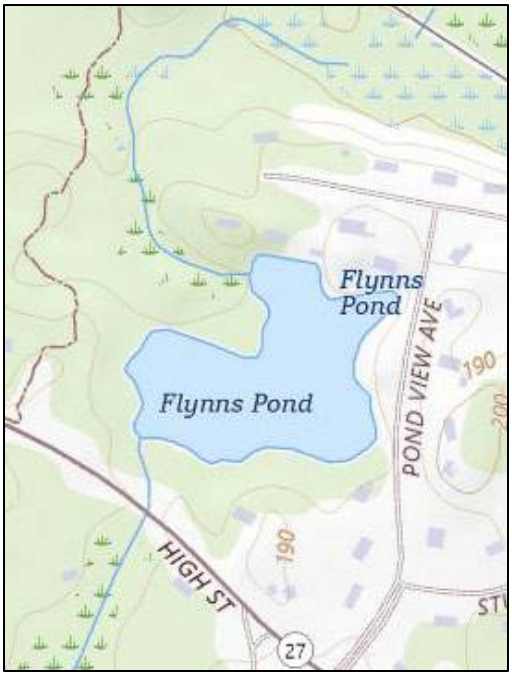


Photo 7: Buttonbush growing in shallow water along the Danielson Pond shoreline.



Photo 8: View northwest towards the Danielson Pond dam.

4. Flynns Pond



Flynns Pond (approx. 7.0 acres) is a shallow pond located to the north of High Street and west of Pond View Avenue. A 2007 study by ACT reported an average depth of 3.3 feet and a maximum depth of 5.0 feet. The pond's primary inlet is an unnamed stream that flows into the southwestern corner of the pond. The pond has a natural outlet at its northwest corner which flows north as an unnamed tributary to Mine Brook.

Flynns Pond and approximately 50% of its shoreline was donated to the Town of Medfield in 1995 as part of the development of Pondview Estates. Public access is provided informally via the Town-owned land between Pond View Avenue and the pond. In addition to the habitat it provides, the pond is used for fishing and non-motorized boating.

4.1 Vegetation Survey Results

CEI conducted an aquatic vegetation survey at Flynns Pond on August 1, 2025, with results as summarized below.

- Overall growth density was high throughout the pond, with 14 out of 18 monitoring stations in the "very dense" category (75-100% cover). Aquatic vegetation abundance was higher than reported in the 2007 ACT study, which estimated an average 50%-60% cover for Flynns Pond.
- The 13 aquatic vegetation species observed during the August 2025 survey are listed in Table 3. The observed species included 11 native species and two non-native, invasive species – purple loosestrife (*Lythrum salicaria*) and water chestnut (*Trapa natans*).
    - Purple loosestrife was observed in low abundance in several shallow areas in the southern portion of the pond. Purple loosestrife is an emergent wetland species that grows in areas with saturated soils or in very shallow standing water.
    - Water chestnut was observed growing in scattered locations throughout the pond, although most observations of this plant were in the northern portion of the pond where the abundance of floating-leaf plants was low to moderate.
- White water lily (*Nymphaea odorata*) was by far the most common floating-leaf species and the most abundant species in the pond, with lesser amounts of watershield (*Brasenia schreberi*) and yellow water lily (*Nuphar variegata*) also present. Water lilies created a very dense canopy in the southern portion of the pond.
- Small pondweed (*Potamogeton pusillus*) was the most abundant submersed species, most commonly observed in the northern portion of the pond. Horned bladderwort (*Utricularia cornuta*) was another common submersed species found mostly in this area.
- Several "floating islands" with emergent wetland species such as wool grass (*Scirpus cyperinus*) were observed in the very shallow southwestern portion of the pond. Floating islands develop in shallow ponds when the interconnected root systems of aquatic plants become lifted from the pond bottom by buoyant gases produced during decomposition.
- An average of 4.71 species were observed per monitoring station.

Table 3. Flynns Pond Aquatic Vegetation Tally Sheet, 08/01/2025

● species present ● species dominant ● non-native species

scientific name	common name	stations present	stations dominant	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
Nymphaea odorata	white water lily	16	14	●	●	●	●	●	●	●	●	●		●	●	●	●	●	●	●		
Potamogeton pusillus	small pondweed	11	6		●			●			●		●	●	●	●	●	●		●	●	
Brasenia schreberi	watershield	9	1	●								●	●	●	●	●	●	●		●		
Utricularia cornuta	horned bladderwort	9	0	●					●		●		●		●	●	●	●		●		
Nuphar variegata	yellow pond lily	8	1	●			●							●	●		●	●	●	●		
Lemna minor	lesser duckweed	5	0					●			●	●					●	●				
Sparganium americanum	American bur-reed	4	0		●	●	●	●														
Cephalanthus occidentalis	buttonbush	4	0						●	●	●				●							
Trapa natans	water chestnut	4	0										●	●		●	●					
Lythrum salicaria	purple loosestrife	4	0	●		●	●				●											
Persicaria punctata	dotted smartweed	3	0	●	●		●															
Potamogeton pulcher	spotted pondweed	3	0		●							●	●									
Scirpus cyperinus	wool grass	2	0	●		●																**Avg.**
			Density Rating	4	4	4	4	4	4	4	4	3	3	4	4	2	3	4	4	4	4	**3.72**
			# species per station	7	5	4	5	3	3	2	6	4	5	5	6	5	7	6	2	5		**4.71**

Density Rating (% cover)

1: sparse; 0-25%
2: moderate; 26-50%
3: dense: 51-75%
4: very dense: 76-100%



Figure 4. Flynns Pond Aquatic Vegetation Map (Survey Date: 8/1/2025)

Flynns Pond Photos, August 1, 2025



Photo 9: Very dense growth of white water lilies in the northern portion of Flynns Pond.



Photo 10: Invasive water chestnut was found scattered around Flynns Pond in low growth densities.



Photo 11: Several floating islands with emergent wetland species were observed in the shallow southwestern portion of the pond.

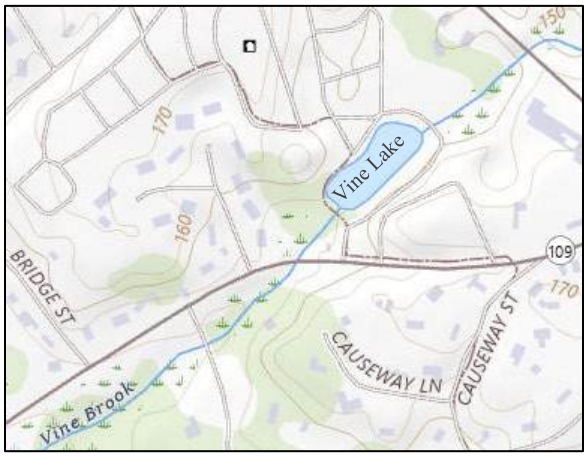


Photo 12: Dense pockets of small pondweed were observed in the northern portion of the pond.



Photo 13: Horned bladderwort, a carnivorous plant that feeds on zooplankton, was in flower during the survey.

5. Vine Lake



Vine Lake (also known as Cemetery Pond) is a small (2.1 acres), shallow impoundment of Vine Brook. Vine Lake is located on the grounds of Vine Lake Cemetery, to the north of Route 109 (Main Street). A 2006 ACT study reported that the pond had an average depth of 4.5 feet and a maximum depth of 6.5 feet.

Vine Lake is a central aesthetic feature within Vine Lake Cemetery, with a walking trail around its entire perimeter. In addition to the wildlife habitat it provides, the pond is used for fishing and ice skating.

5.1 Vegetation Survey Results

CEI conducted an aquatic vegetation survey at Vine Lake on August 1, 2025, with results as summarized below.

- Open water and very sparse vegetation (0-10% cover) characterized much of the southern portion of Vine Lake (approximate 1.3-acre area).
- In the northern portion of the pond, a 0.8-acre area was characterized by pockets of yellow water lily, scant submerged vegetation, and moderate to dense surface matting of filamentous algae intermixed with watermeal (*Wolffia sp.*).
- A total of eight native macrophyte species were observed, with the most common being two very small free-floating species, watermeal and small duckweed. Other observed species are listed in Table 9. All observed species were native species.
- Some of the survey results described above are a notable contrast to the results reported in a 2006 ACT study. Although the ACT study noted abundant filamentous algae (particularly in the northern part of the pond), it also reported that native Canadian waterweed (*Elodea canadensis*) was the dominant plant (estimated 25-50% bottom cover). CEI observed this plant only in small quantities in a few scattered locations. The 2006 study also noted a minor presence of non-native variable milfoil (*Myriophyllum heterophyllum*), which CEI did not observe during the 2025 survey.
- Species diversity was low, with an average of 2.50 species observed per monitoring station.

Table 4. Vine Lake Aquatic Vegetation Tally Sheet, 08/01/2025

● species present ● species dominant ● non-native species

scientific name	common name	stations present	stations dominant	1	2	3	4	5	6	7	8	9	10	11	12	
Wolffia sp.	watermeal	12	5	●	●	●	●	●	●	●	●	●	●	●	●	
Lemna minor	lesser duckweed	6	0	●	●	●	●			●			●			
Nuphar variegata	yellow pond lily	4	3	●						●		●	●			
Sparganium americanum	American bur-reed	3	0			●						●		●		
Elodea canadensis	Canadian waterweed	2	0				●						●			
Potamogeton epihydrus	ribbonleaf pondweed	1	0									●				
Nymphaea odorata	white water lily	1	0			●										
Spirodela polyrhiza	big duckweed	1	0									●				**Avg**.
			Density Rating*	1	1	1	1	1	1	1	4	2	3	3	3	**1.83**
			# species per station	3	2	4	3	1	1	3	1	5	4	2	1	**2.50**

* Filamentous algae observed at the surface in most area, with dense surface matting in the northern portion of Vine Lake. Density rating includes surface matting with filamentous algae.

Density Rating (% cover)

1: sparse; 0-25%
2: moderate; 26-50%
3: dense: 51-75%
4: very dense: 76-100%

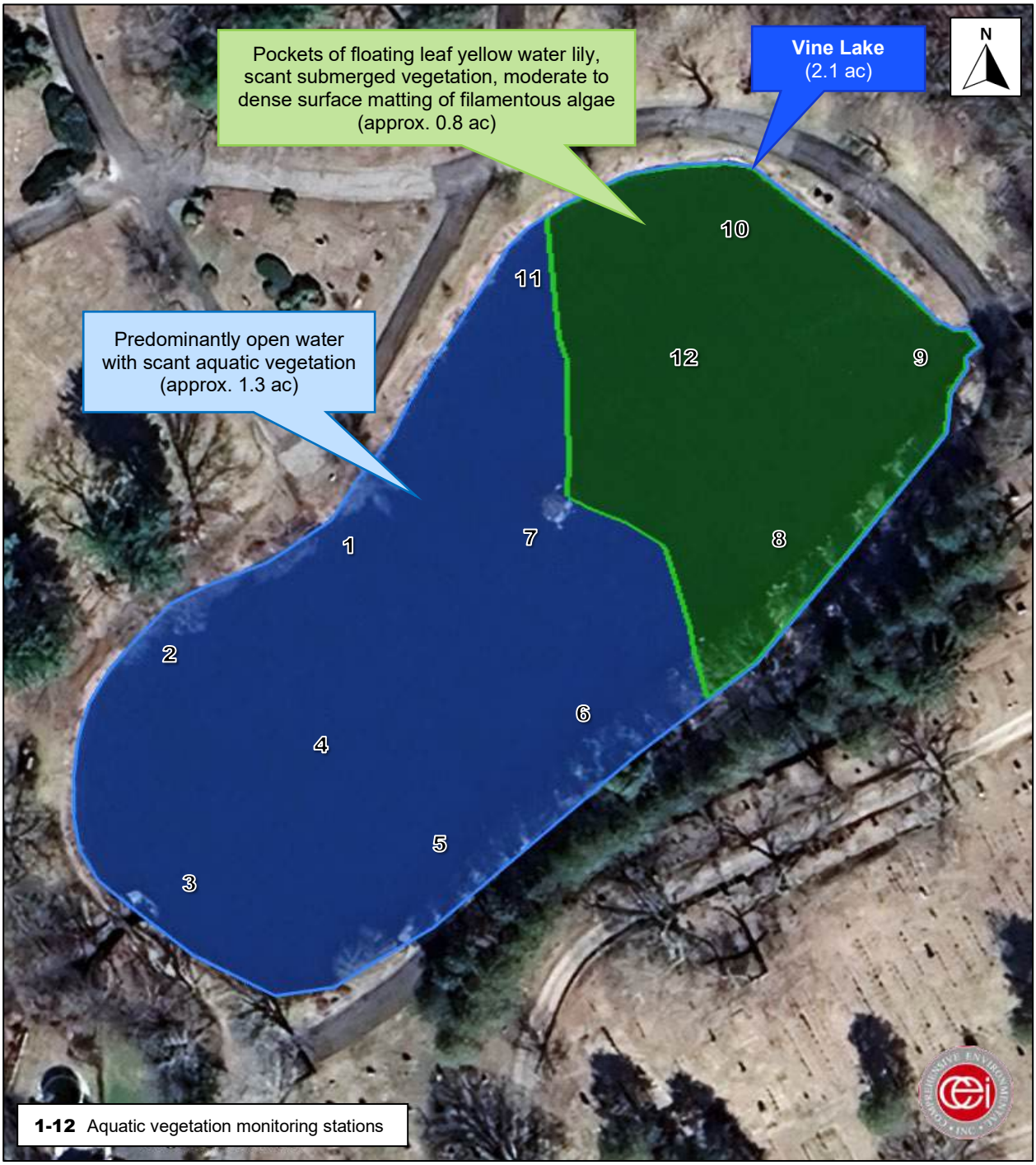


Figure 5. Vine Lake Aquatic Vegetation Map (Survey Date: 8/1/2025)

Vine Lake Photos, August 1, 2025



Photo 14: View of the northeast end of Vine Lake, with filamentous algae floating at the pond surface.



Photo 15: Floating-leaf vegetation in the north portion of Vine Lake was dominated by yellow water lily.

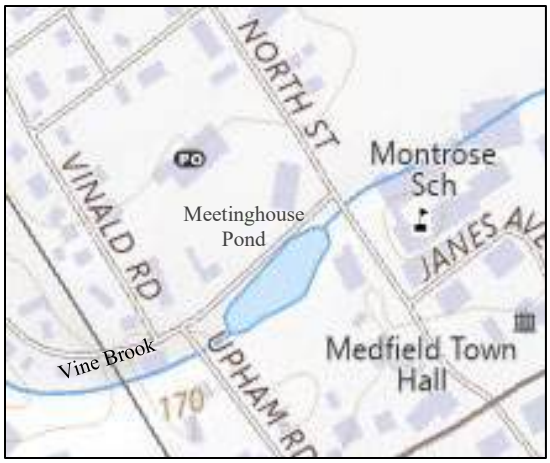


Photo 16: Dense filamentous algae observed matting the surface in the northern portion of Vine Lake.



Photo 17: Open water and sparse vegetation characterized much of the southern portion of Vine Lake.

6. Meetinghouse Pond



Meetinghouse Pond is a small (approx. 0.7 acres), shallow impoundment of Vine Brook. The pond is located to the west of North Street and south of Frairy Street. A 2006 ACT study reported an average water depth of 3.2 feet and a maximum depth of 4.5 feet.

Meetinghouse Pond was created in 1724 with construction of a dam on Vine Brook to power a fulling mill (for cleaning cloth). The pond is entirely bound by retaining walls bordered by mowed grass and has no natural shoreline. The pond provides limited wildlife habitat and serves primarily as an aesthetic amenity for the town center.

6.1 Vegetation Survey Results

CEI conducted an aquatic vegetation survey at Meetinghouse Pond on August 1, 2025, with results as summarized below.

- Aquatic vegetation at Meetinghouse Pond on July 24, 2025 was generally very sparse (0-10% cover) throughout the pond, with only very limited pockets having slightly more abundant growth.
- The most commonly observed plants were white water lily and American bur-reed, although the presence of these plants was limited to small pockets of growth in the northern portion of the pond. Other observed species are listed in Table 5. All observed species were native species.
- Many areas in the central and southern portion of the pond were observed to be either devoid or nearly devoid of aquatic vegetation.
- The survey results described above are a notable contrast to the results of the 2005 survey conducted by ACT. The 2005 survey estimated 75-100% bottom cover, with invasive variable milfoil (*Myriophyllum heterophyllum*) as over 50% of the total vegetative cover. No variable milfoil or other invasive species were observed by CEI during the 2025 survey.
- Species diversity was very low, with an average of 0.92 species observed per monitoring station.

Table 5. Meetinghouse Pond Aquatic Vegetation Tally Sheet, 08/01/2023

				• species present	• species dominant	• non-native species										
scientific name	**common name**	stations present	stations dominant	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	
Nymphaea odorata	white water lily	4	1							●	●	●	●			
Sparganium americanum	American bur-reed	3	0								●	●	●			
Elodea canadensis	Canadian waterweed	2	0								●	●				
Potamogeton epihydrus	ribbonleaf pondweed	1	0									●				
Ludwigia palustris	marsh seedbox	1	0									●				Avg.
			Density Rating	1	1	1	1	1	1	1	1	1	1	1	1	**1.00**
			# species per station	0	0	0	0	0	0	1	3	5	2	0	0	**0.92**

Density Rating (% cover)

1: sparse; 0-25%
2: moderate; 26-50%
3: dense: 51-75%
4: very dense: 76-100%



Figure 6. Meetinghouse Pond Aquatic Vegetation Map (Survey Date: 8/1/2025)

Meetinghouse Pond Photos, August 1, 2025



Photo 18: View of Meetinghouse Pond to the northeast. Very limited aquatic vegetation was observed in the pond.

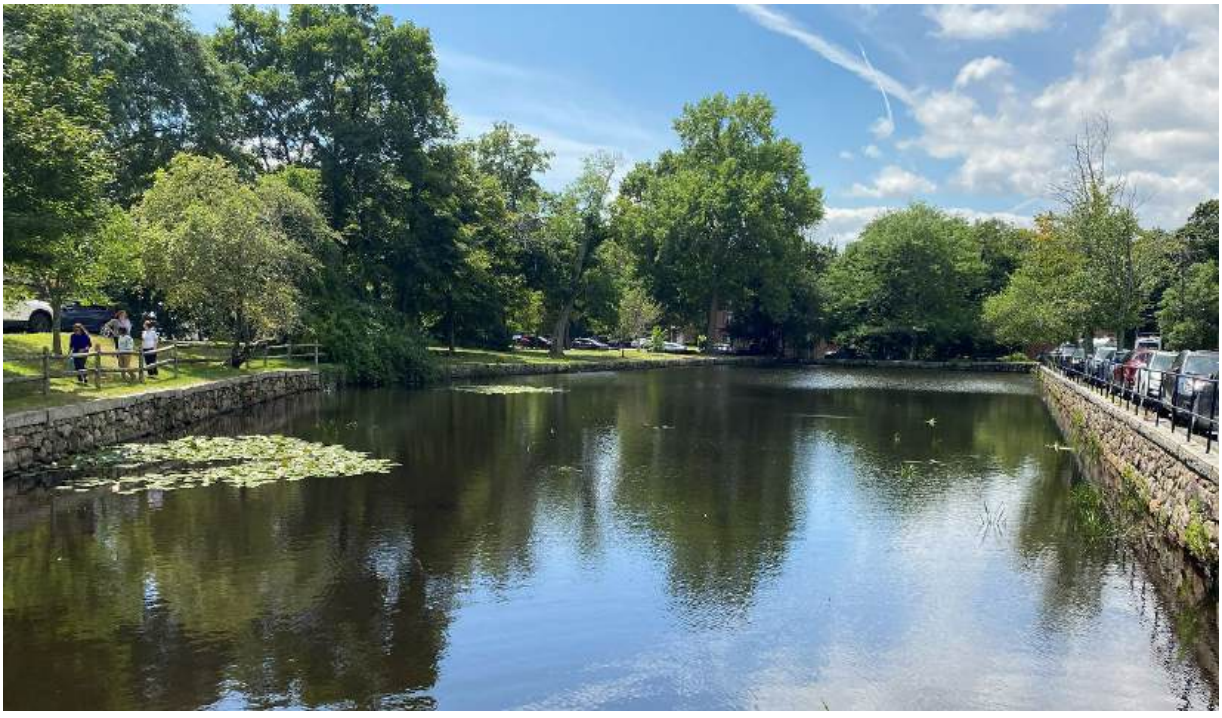


Photo 19: View of Meetinghouse Pond to the southwest, with small patches of white water lily on left side of photo.

7.0 Aquatic Vegetation Management Recommendations

When evaluating an aquatic vegetation strategy for the Medfield Ponds, it is important to consider past and current pond conditions, the pond's management history, and their ecological values and recreational uses. Key considerations include the following:

- A diverse native plant community plays an important role in maintaining a healthy pond ecosystem and its recreational values. For example, the role of rooted aquatic plants in maintaining lake water clarity is well documented, and native plant beds provide critical habitat as forage and protective cover for fish. As described in Sections 2-6, native species comprise the vast majority of aquatic vegetation community for the five ponds included in this assessment.
- Medfield's ponds provides habitat for diverse array of wildlife, including fish, amphibians, mammals, birds, insects, and benthic organisms. This habitat also supports recreational wildlife viewing from trails or from paddling with a kayak or canoe.
- Man-made impoundments tend to fill in with sediment more rapidly than many natural lakes and ponds. Periodic vegetation control (and other lake management actions such as maintenance dredging) should be anticipated to maintain open water for small and shallow impoundments of this type.
- Continued monitoring of pond conditions is recommended, allowing for an adaptive management approach as conditions change (e.g., introduction of a new non-native species to the pond, increased frequency and/or severity of algal blooms, etc.).

The sections below provide a summary of past vegetation management actions and discussion of several in-lake management options, based on the summer 2025 field observations summarized in Section 2-6.

7.1 Summary of Past Management Actions

Pond	Summary of Aquatic Vegetation/Algae History
Kingsbury Pond	• The broad-spectrum herbicide diquat dibromide has been used to control the growth of submerged aquatic vegetation, including native pondweed species and non-native variable milfoil. • The herbicide glyphosate has been used to control growth of native water lilies. • Possible 2015 algae treatment (noted as "treated with aquatic herbicides and/or algaecides")
Danielson Pond	• Hydroraking was used to mechanically remove 3-4 acres of waterlilies in 2008. • Diquat dibromide has been used to control the growth of native submersed aquatic plants.
Flynns Pond	• Diquat dibromide has been used for control of native pondweed species (*Potamogeton* spp.) and bladderwort (*Utricularia* spp.). • Glyphosate has been used for control of native pond lilies.
Vine Lake	• In most years the town has applied copper to Vine Lake for algae control. • Small areas of milfoil have been removed by hand-pulling.
Meetinghouse Pond	• Sediment was removed from the pond by dredging (approximately 1990). • Vertex Air II submersed aeration system installed in 2008 to maintain summer oxygen levels. • Diquat dibromide has been applied to control the growth of variable watermilfoil.

7.1 Recommendations for Meetinghouse Pond and Vine Lake

- Based on conditions observed during the 2025 survey, CEI recommends that Meetinghouse Pond and Vine Lake should not be scheduled for further herbicide applications until future conditions support the need for aquatic vegetation control. Meetinghouse Pond and Vine Lake were both observed to have entirely native aquatic plant assemblages, with low diversity and low abundance.
- Aeration with a bottom-diffused aeration system is highly recommended for long-term prevention of nuisance growth of algae at Vine Lake (including filamentous algae). The estimated installed cost for a high-quality aeration system is $8,000 to 10,000.
- Based on the dense surface matting of filamentous algae observed at Vine Lake, the use of copper-based algaecides should also be considered as an option for short-term control on an as-needed basis.
    - The duration of effectiveness for copper-based algaecides typically varies from several days to several weeks, depending on factors such as hydraulic residence time (how long water stays in the pond before being replaced by inflowing water), pond water chemistry, and algae type. Due to its small size, shallow depth, and the size of its watershed (approximately 1.3 square miles), Vine Lake has a very short average hydraulic residence time (2.3 days). As such, the duration of effectiveness for algaecide treatments should be expected to be very short, likely lasting only a few days.

7.2 Recommendations for Kingsbury Pond, Danielson Pond and Flynns Pond

a. Continue Hand-pulling of Water Chestnut (Kingsbury Pond, Flynns Pond)

As discussed in Sections 2 and 4, new infestations of water chestnut were documented in Kingsbury Pond and Flynns Pond. In both ponds, the abundance was low, with scattered growth observed in low densities.



Water chestnut floating rosette

Water chestnut is an annual plant that disperses seed prolifically, allowing it the expand rapidly from year to year. For small infestations, hand pulling can be an effective means of control for water chestnut. Because water chestnut is an annual plant, any observed plants should be pulled prior to seed dispersal in August.

The Medfield Conservation Commission was alerted to the water chestnut observations on the day of the surveys (7/23/25 for Kingsbury Pond; 8/1/2025 for Flynns Pond), so that removal could be performed as soon as possible. In both cases, members of Conservation Commission performed hand pulling within several days from kayaks, with plants bagged and removed from the area for upland disposal.



Water chestnut nuts

When removing water chestnut plants by hand, it is important to pull out the entire stem, root structure, and any attached nuts. The nuts range in color from green to black and are easily identified by their sharply pointed spikes as shown in the photo to the right. The plants should be removed using a very slow and steady pulling motion, taking care not to snap the stem and leave behind the nut, which can produce new plants

for up to 12 years. Although the nuts are typically the primary means of propagation for water chestnut, this plant can also spread by vegetative reproduction. The plant produces ramets (separate plant units that derive from a single seed via vegetative growth) that can break off and move away from the rest of the clone and survive to produce seeds. This attribute allows for rapid clonal expansion.

Continued annual monitoring and removal of any observed plants in late June/July each year is recommended as a **high priority**.

b. Hydro-raking

This approach uses a floating backhoe with a York rake attachment to rake the upper sediment layer, breaking up and collecting plants, roots, and attached sediments to a depth of ten feet (depth varies depending on machine size). Hydro-raking is effective for targeted control of plants with a well-defined root system (such as water lilies) and can provide multiple years of control.

This technique could be beneficial for targeted control in sections of Kingsbury Pond, Danielson Pond and Flynns Pond that are dominated by dense growth of water lilies and other floating-leaf species. If this technique is used, it should be approached with the goal of maintaining a perimeter band of vegetation near the shoreline and a balance between floating-leaf vegetation and open water zones. Rapid, broad-scale removal of aquatic vegetation communities may have unintended consequences, such as creating new growth zones for invasive species or shifting the lake towards greater abundance of algae and cyanobacteria.

For very densely vegetated areas, hydro-raking typically takes up to 7 days per acre at a cost of $2,000 per day (plus mobilization/de-mobilization costs). This cost assumes that the removed material could be disposed of nearby on Town land (no trucking or disposal costs assumed).

As noted below, hydro-raking could be implemented either independently or as part of an integrated strategy in combination with herbicide treatments.

Permitting Notes:

- MassDEP categorizes hydro-raking as a type of dredging project.
- 401 Water Quality Certification is required for dredging over 100 cubic yards.
- The Massachusetts threshold for major dredge project certification is 5,000 cubic yards or more.



A hydro-rake removing water lilies and attached sediment.

c. Mechanical Harvesting

Mechanical harvesting machines have a cutter which “mows” vegetation to a depth several feet below the water surface. This technique will typically have a short duration of effective control, as rooted plants will continue to grow immediatey after cutting. Harvesting can encourage the spread of some invasive species, such as variable milfoil, which have the ability to propagate from numerous plant fragments created during the cutting operation.

Mechanical harvesting is **not recommended** for the Medfield ponds at this time due to the greater longevity of effectiveness provided by hydro-raking for the water lilies which dominate a large portion of Kingsbury Pond, Danielson Pond and Flynns Pond.



A mechanical harvester collecting cut submersed vegetation for upland disposal.

d. Herbicides

Floating-leaf species: Herbicide application could be used to target floating-leaf species (water lilies, watershield) with a goal of maintaining open water access “corridors” for paddling, fishing, etc.

- For control of water lilies, the recommended herbicide is glyphosate, a broad-spectrum herbicide that is typically effective for 1-2 years.
- If glyphosate is used, a split treatment (2 applications in growing season) is recommended.
- As an example for budgeting purposes, if a 3-acre area was treated as described above (split treatment), the estimated cost would be $3,000 - $4,500.
- Glyphosate could be used either as primary control method or as a more targeted “follow-up” to prevent re-emergence of waterlilies following control with hydro-raking.

Submersed species (bladderworts, etc.): Control of native submersed species with herbicides is **not recommended** for the Medfield ponds at this time.

e. Benthic Barriers

Benthic barriers are mats that are secured to the pond bottom to prevent plant growth. They work by both blocking sunlight and acting as a physical barrier to plant growth. Benthic barriers are not suitable for large areas, but can be effective in small areas that are key to recreational water use, such as around docks, boat launches, beaches, etc. They can also be used for small areas where a new population of invasive species has been found. Benthic barriers are most commonly made from materials such as polypropylene, nylon, and fiberglass.



Benthic barrier installation

Benthic barriers are not currently recommended for use in any of the ponds, but are included in this report as an option that could potentially be useful in the future for maintaining open water access in a limited area near canoe/kayak access areas (such as the Kingsbury Pond boat launch area).