

Field Guide

to the

Aquatic Macrophytes

of

Silver Lake

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Prepared for:
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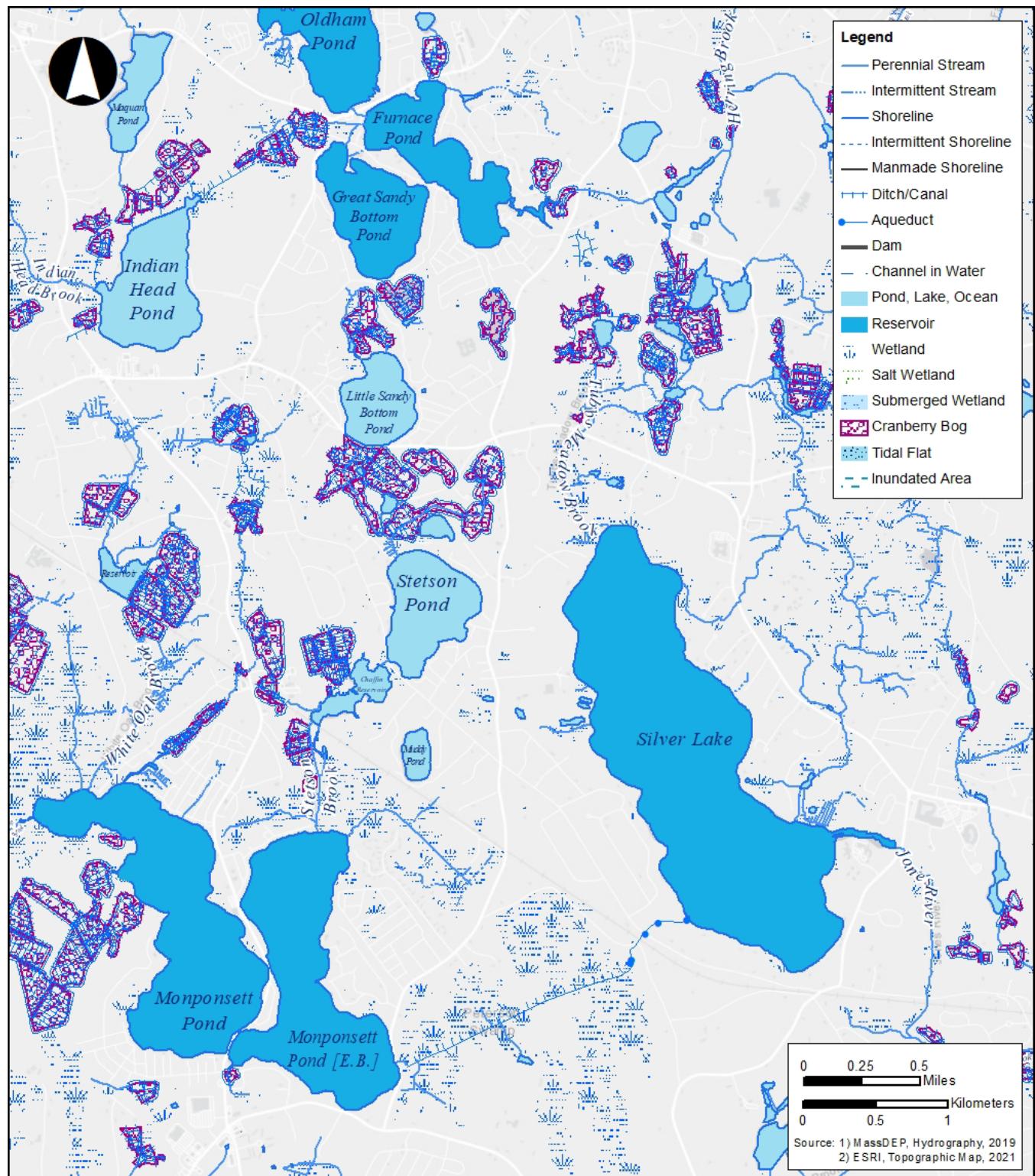
Overview

This field guide includes submerged and floating species observed by ESS Group, LLC during comprehensive surveys of Silver Lake during September and October 2021. Some of the more conspicuous emergent species observed in the reservoir system are also presented. Additionally, this field guide provides information on exotic invasive species that have been observed nearby and may be at higher risk for introduction to the lake system.

Species profiles are presented in alphabetical order by scientific name with key identification features, habitat, and similar species noted. Photos and line drawings, when available, accompany each species account. The distribution of each species within the lake as observed on ESS Surveys is mapped.

All line drawings courtesy of the United States Department of Agriculture USDA-NRCS Plants Database. Photographs are by ESS Group, LLC or in the public domain, unless otherwise noted. The waterbody system map on page 3 was developed by ESS staff with data sources from ESRI and MassDEP.

Silver Lake System Map



Aquatic Plants of Silver Lake



***Cabomba caroliniana* – Fanwort**

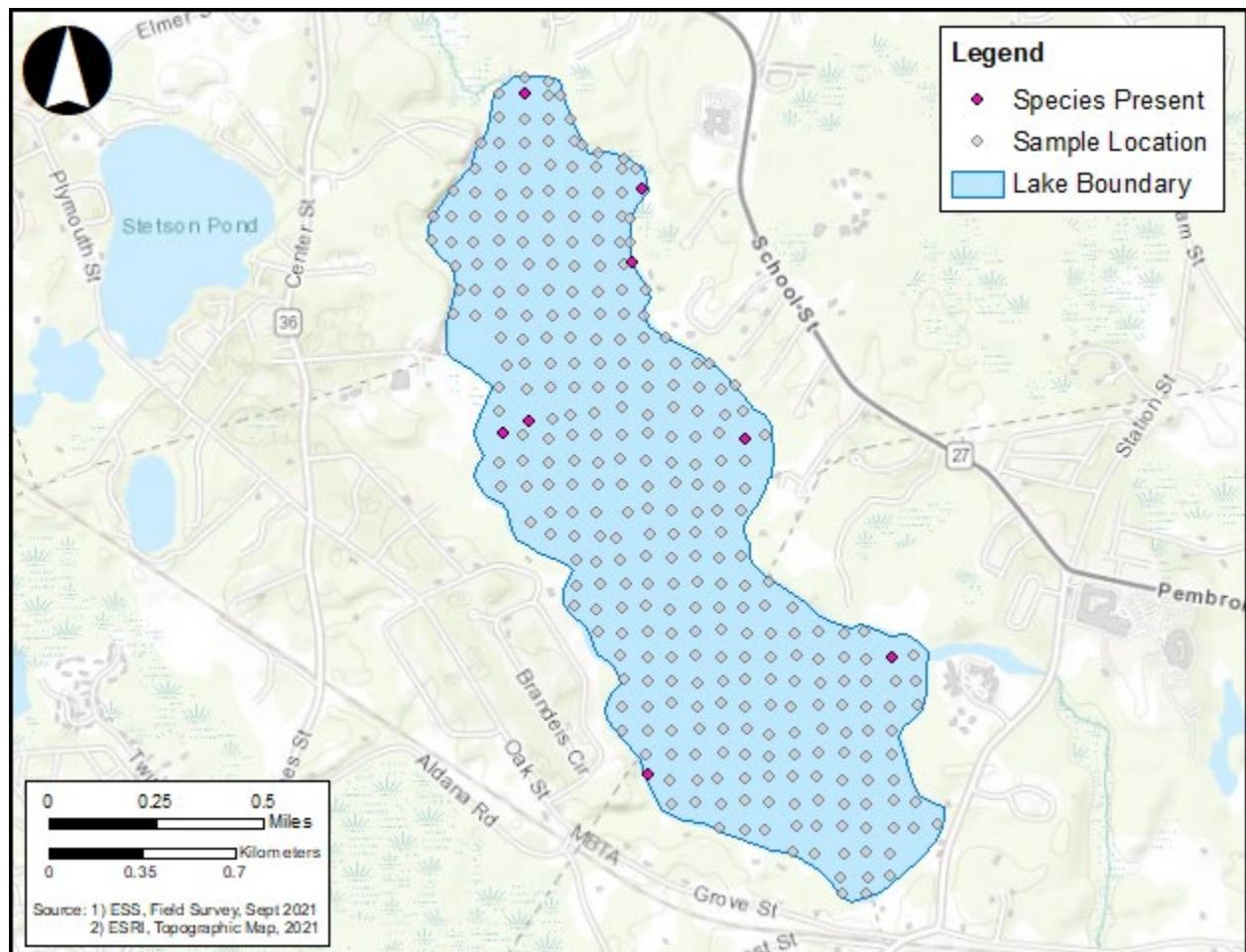
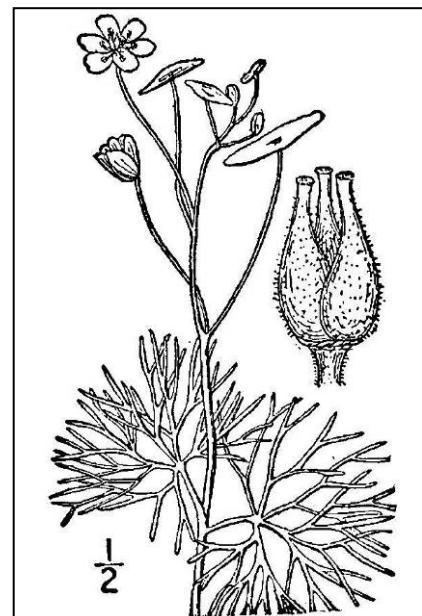
Exotic Invasive

Key Features: Finely dissected, fanlike leaves arranged oppositely on submersed stems. Small, white flowers with small floating leaves emerge in late summer but submersed leaves will remain obvious.

Habitat: Ponds, lakes and other sluggish waters. Can form dense, extensive monocultures.

Growth Type: Submerged

Similar Species: *Ranunculus* spp., *Myriophyllum* spp.



Callitrichia heterophylla – Water Starwort

Native

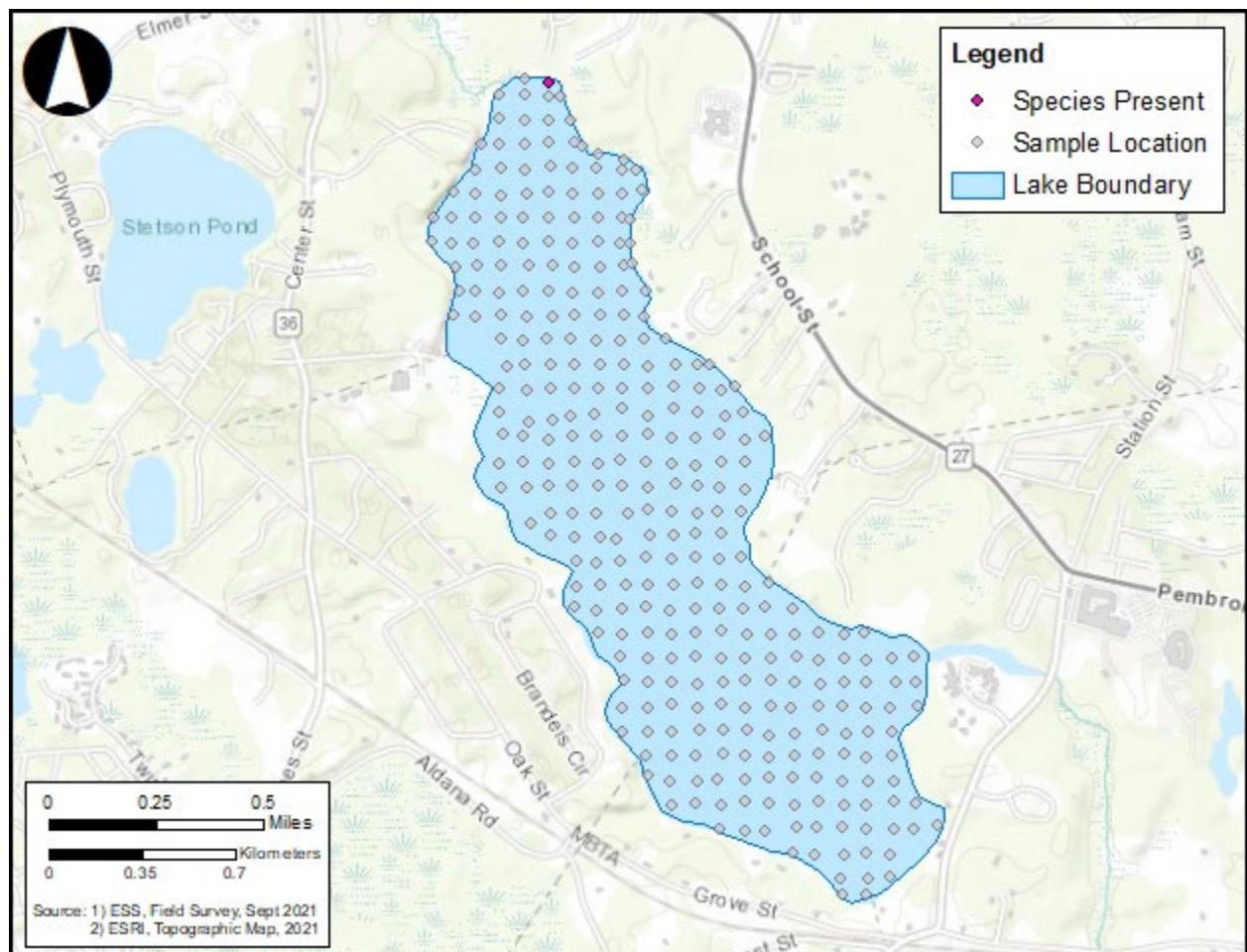
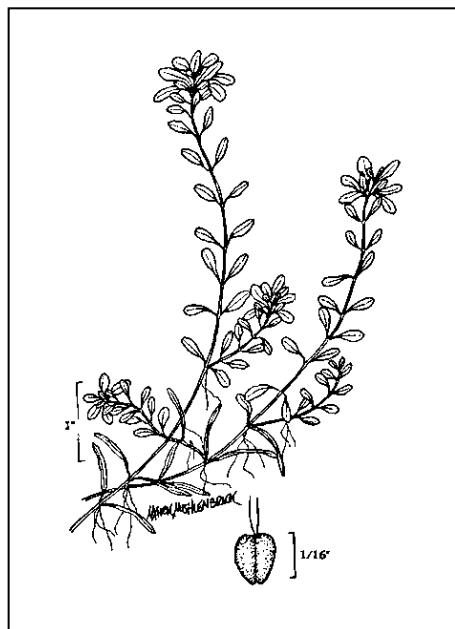
Key Features: Opposite leaves either linear (submersed) or spatulate (floating).

Highly variable.

Habitat: Muddy shores and shallow, protected waters of ponds and lakes.

Growth Type: Submerged (dominant), floating-leaved (secondary)

Similar Species: *Potamogeton* spp., *Najas* spp.



Ceratophyllum demersum – Coontail

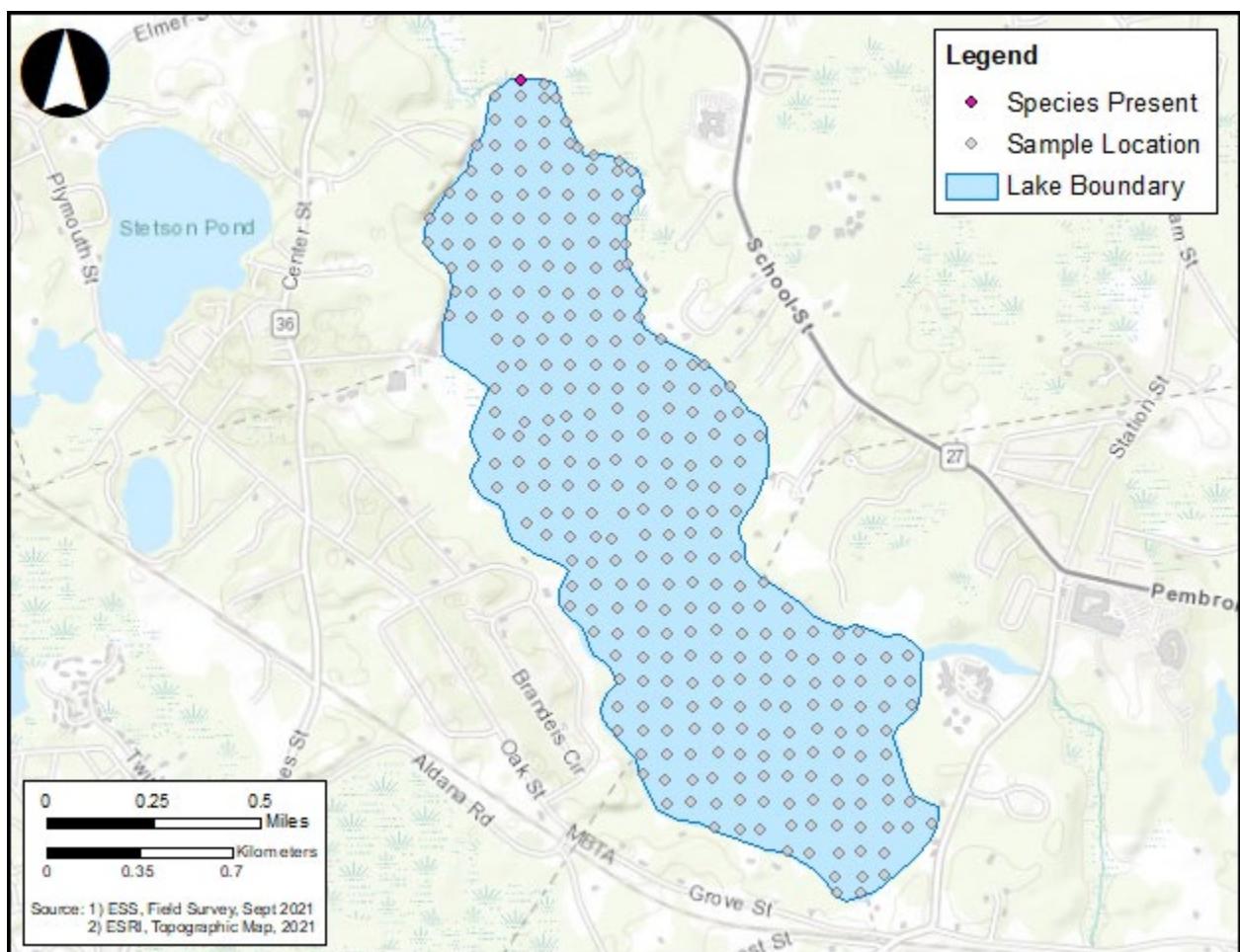
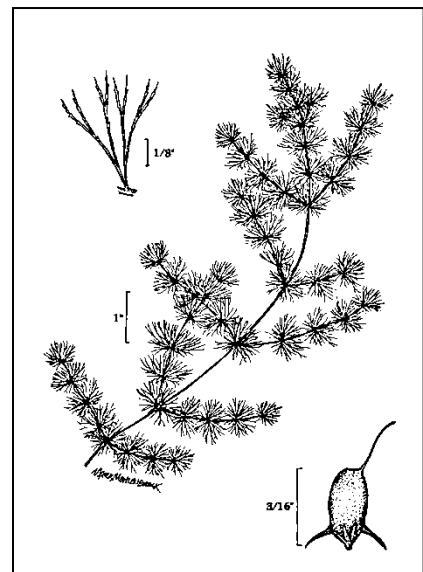
Native

Key Features: Finely dissected, whorled leaves are branched. Leaves often cluster together near the stem tips giving them a look reminiscent of a raccoon tail. Plants are rootless.

Habitat: Ponds, lakes and other sluggish waters. Can grow to nuisance levels.

Growth Type: Submerged

Similar Species: *Myriophyllum* spp.

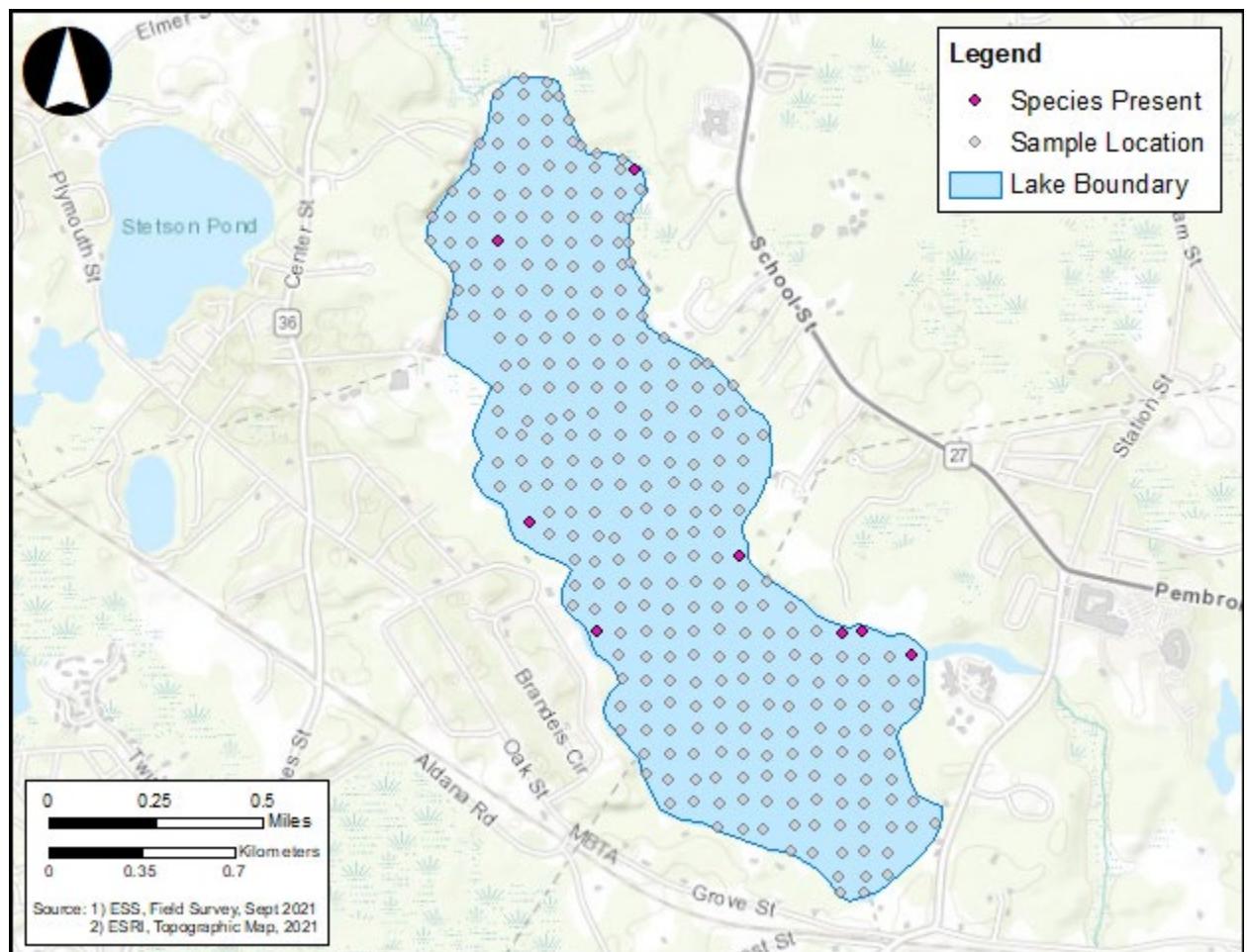
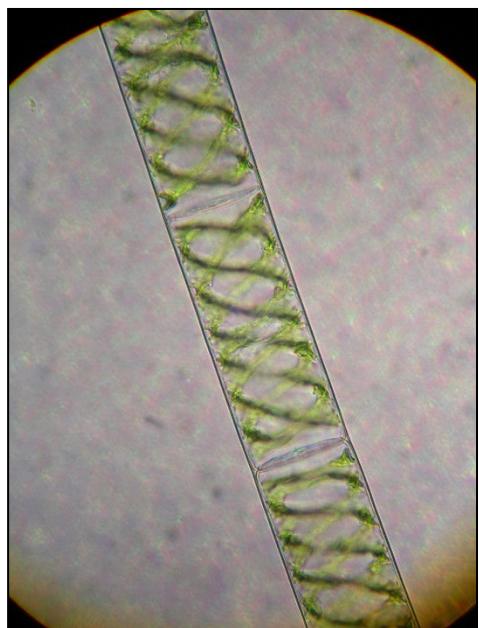


Source: 1) ESS, Field Survey, Sept 2021
2) ESRI, Topographic Map, 2021

Chlorophyceae spp. – Filamentous Green Algae

Native

- Key Features:** Green, cotton-like masses that can either be free-floating or attached to rocks or plants. May feel stringy and/or slimy. The fine green filaments have no flowers, stems, leaves, or roots.
- Habitat:** Deep to shallow lakes and ponds. Can grow to nuisance levels.
- Growth type:** Alga
- Similar Species:** None.



Elatine spp. – Waterwort

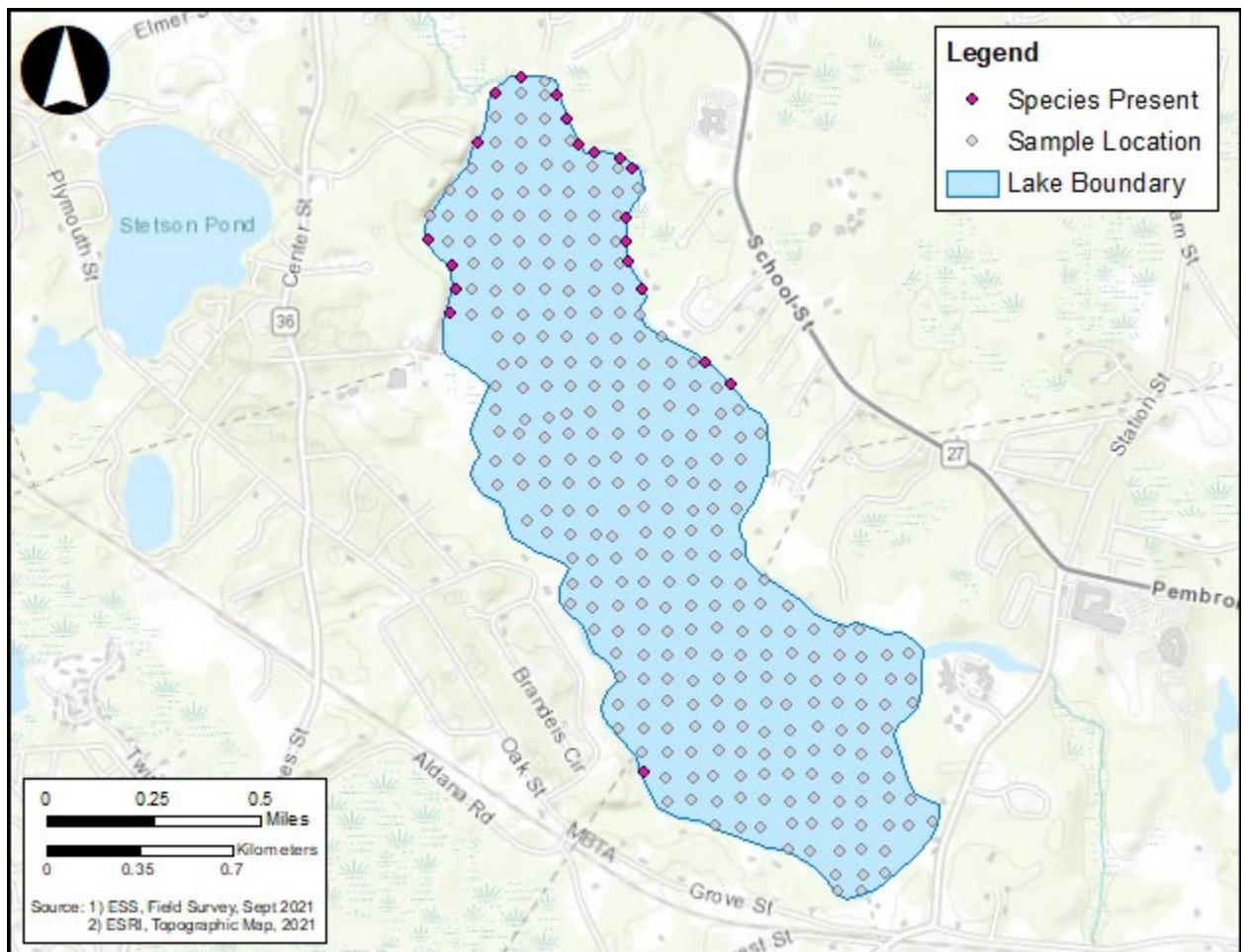
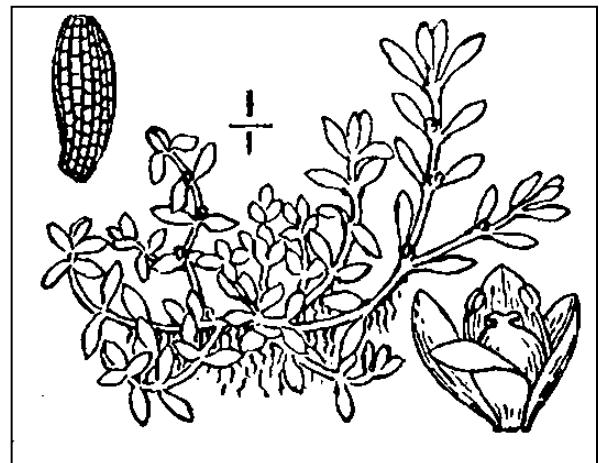
Native

Key Features: Tiny plant. Opposite leaves are small and rounded and each pair is offset from the next by 90 degrees.

Habitat: Often found growing in scattered patches on sand or gravel substrates in the shallow littoral zone.

Growth Type: Submerged (dominant), emergent (secondary)

Similar Species: *Gratiola aurea* (submersed form)



Eleocharis spp./Eleocharis robbinsii – Spikerush/Robbins' Spikerush

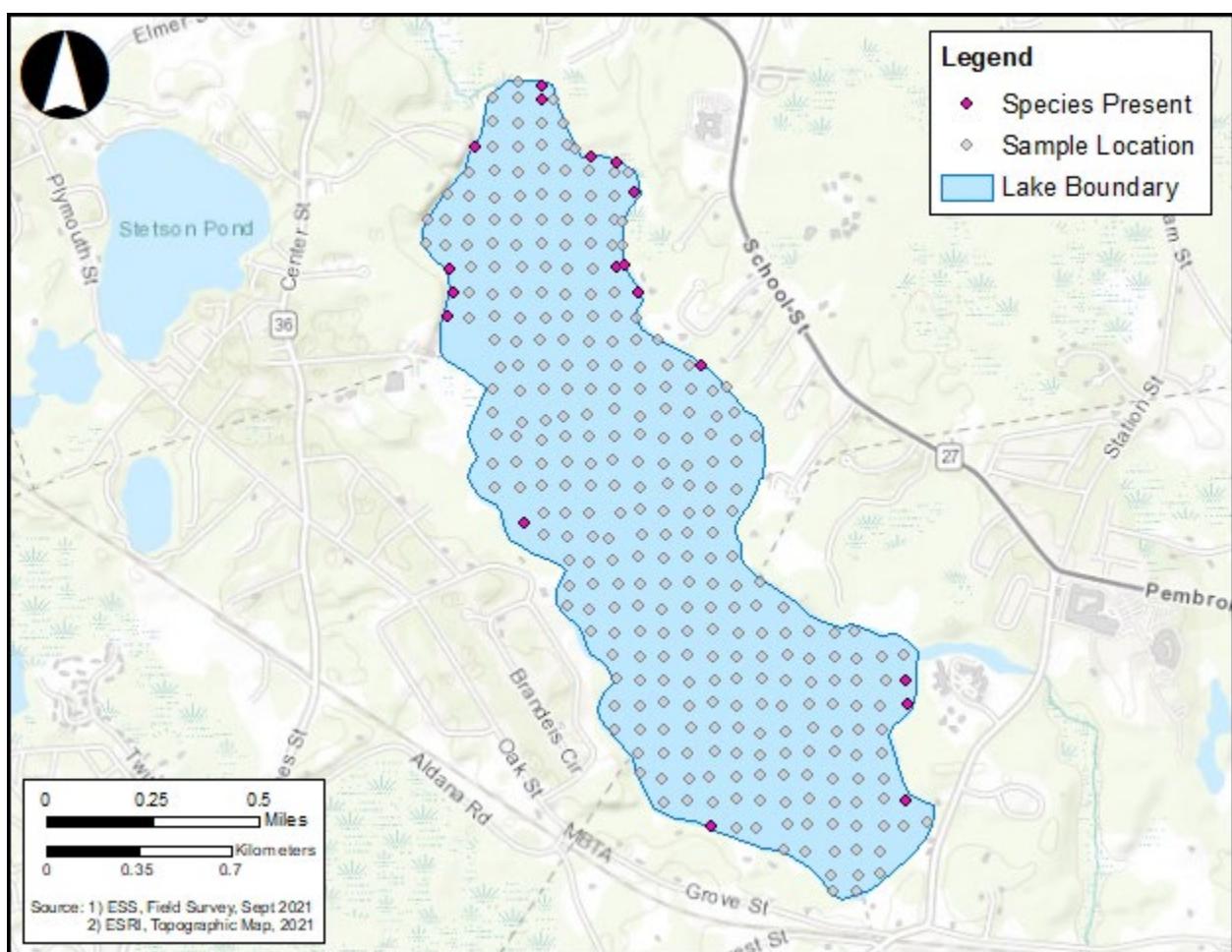
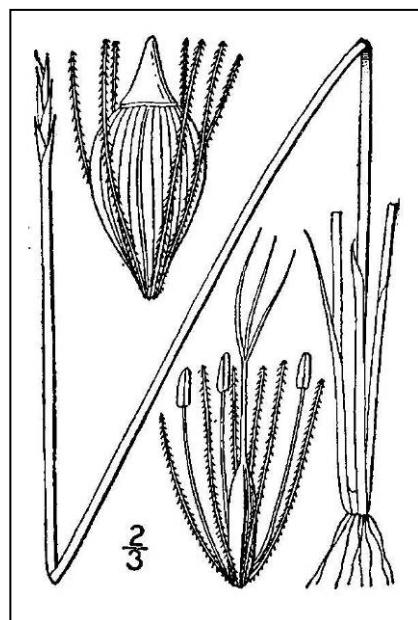
Native

Key Features: Leaves are bladeless sheaths arising from clumps, rhizomes or stolons. Emergent stems may send up a solitary spikelet.

Habitat: Shallow waters and edges of ponds and lakes. Submersed forms may form monoculture or multi-species mats.

Growth Type: Submerged

Similar Species: *Scirpus* spp., *Juncus* spp.



Elodea canadensis – Canadian waterweed

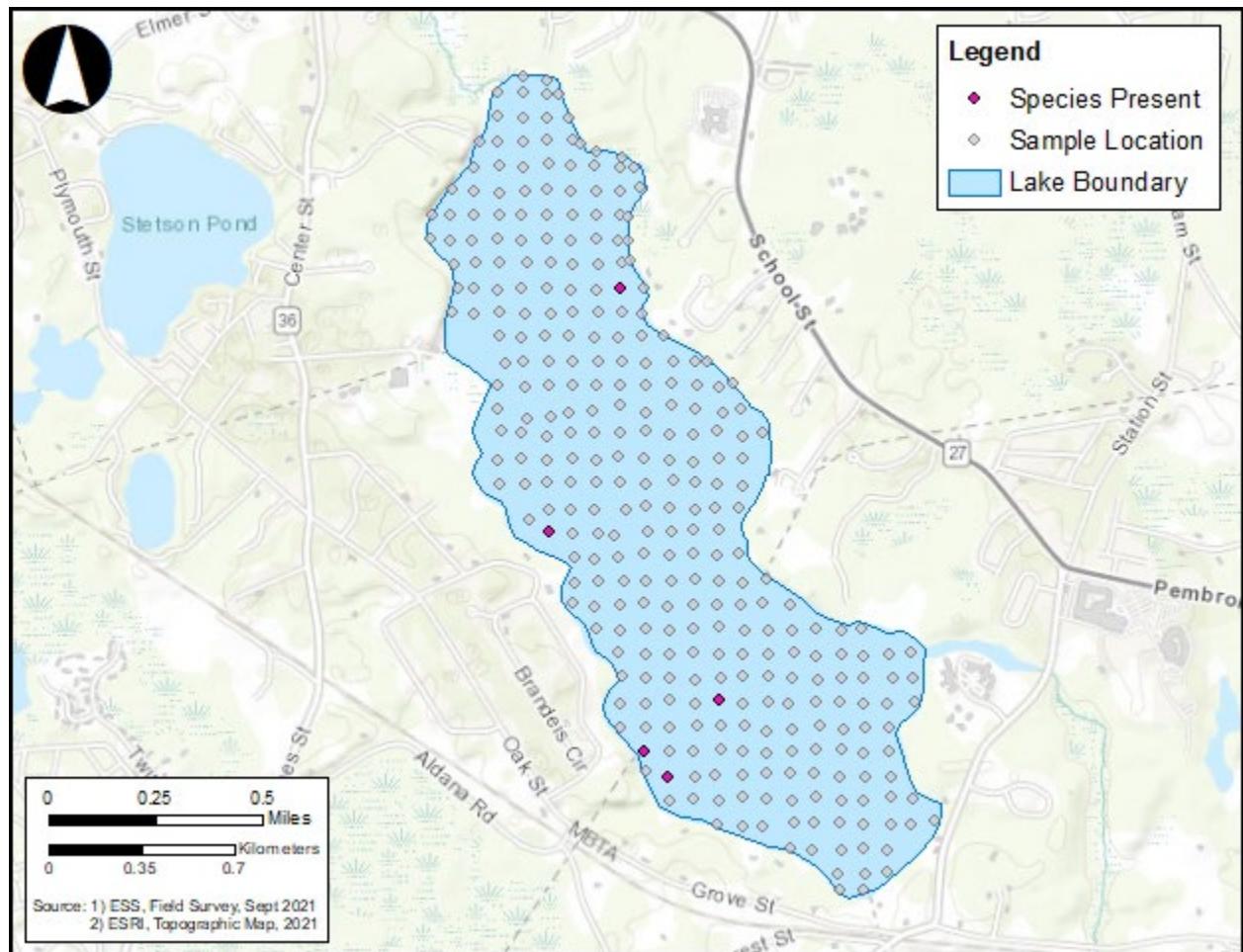
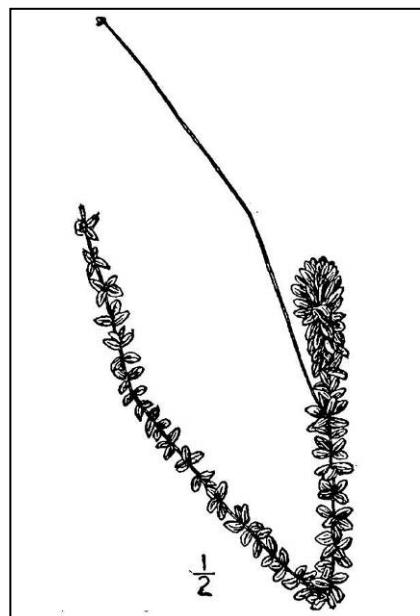
Native

Key Features: Whorls of 3 to 4 leaves with bunching near the stem tips. Leaves are relatively wide and blunt tipped. Small flowers occasionally found arising from long pedicels.

Habitat: Alkaline to circumneutral ponds, lakes and slow streams.

Growth Type: Submerged

Similar Species: *Elodea nuttallii*



Source: 1) ESS, Field Survey, Sept 2021
2) ESRI, Topographic Map, 2021

Gratiola aurea – Golden Hedge-hyssop

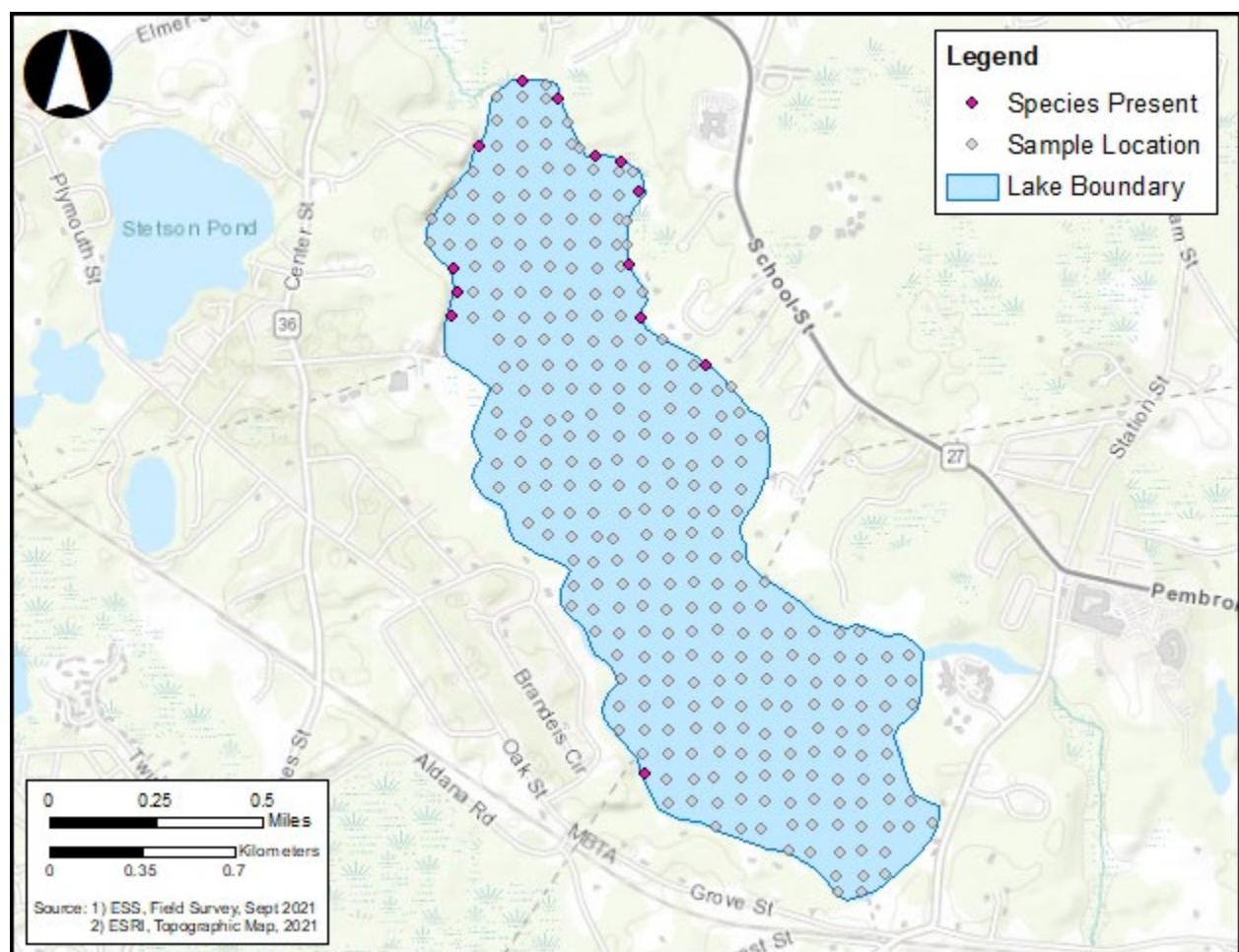
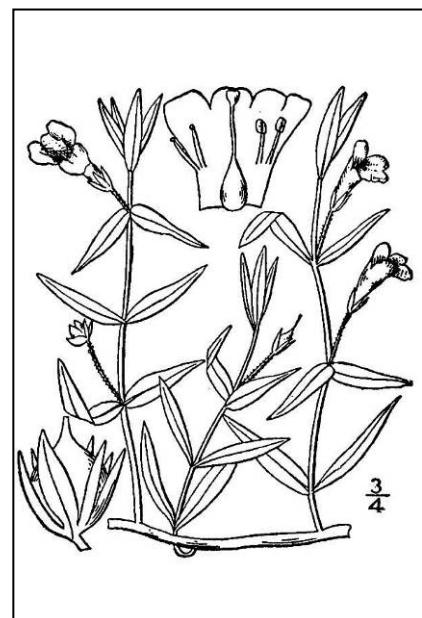
Native

Key Features: Fertile emergent form has opposite, entire leaves without petioles. Flowers produced in July and August are bright yellow. Sterile submersed form (inset below) has small pointed leaves, with each pair offset at 90 degrees from neighboring pairs.

Habitat: Shores and shallow edges of lakes and ponds, most often in sand or gravel other sluggish waters. Often associates with *Eleocharis* sp., *Elatine* sp., and *Isoetes* sp.

Growth Type: Submerged (dominant), emergent (secondary)

Similar Species: *Elatine* spp. (submersed form only)



Source: 1) ESS, Field Survey, Sept 2021
2) ESRI, Topographic Map, 2021

Isoetes sp. – Quillwort

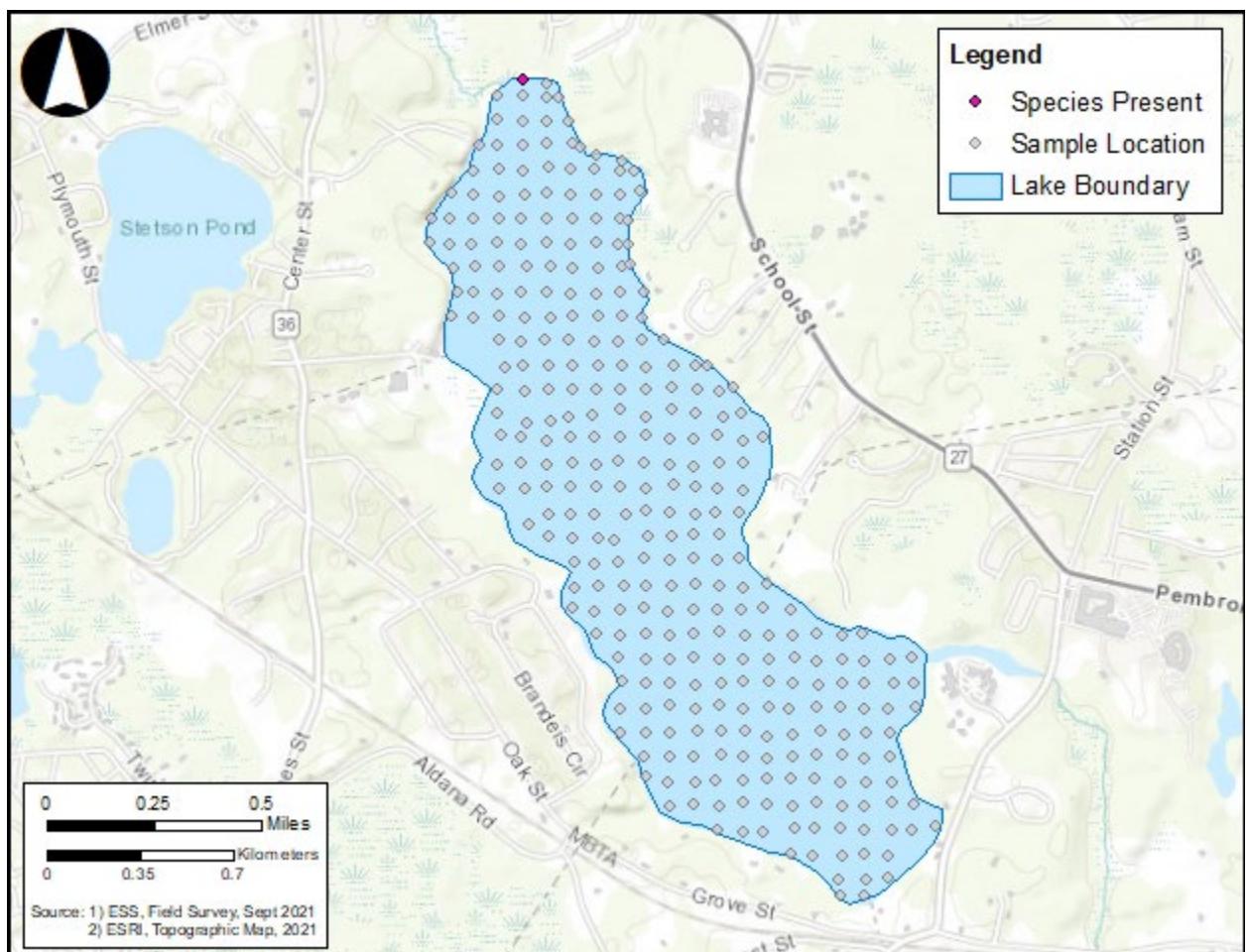
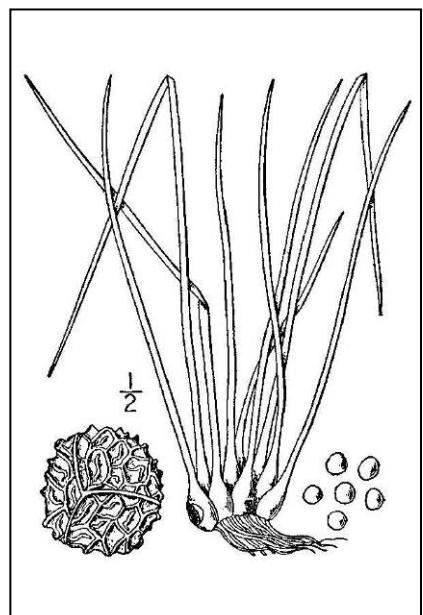
Native

Key Features: Sharply pointed leaves arise from a dense basal clump and are enlarged at the base. Small spores may be found within the enlarged base of the plant. Roots are *not* septate (marked by transverse lines).

Habitat: Shores and shallow edges of lakes and ponds.

Growth Type: Submerged

Similar Species: *Eriocaulon* spp.



Ludwigia palustris – Marsh Seedbox

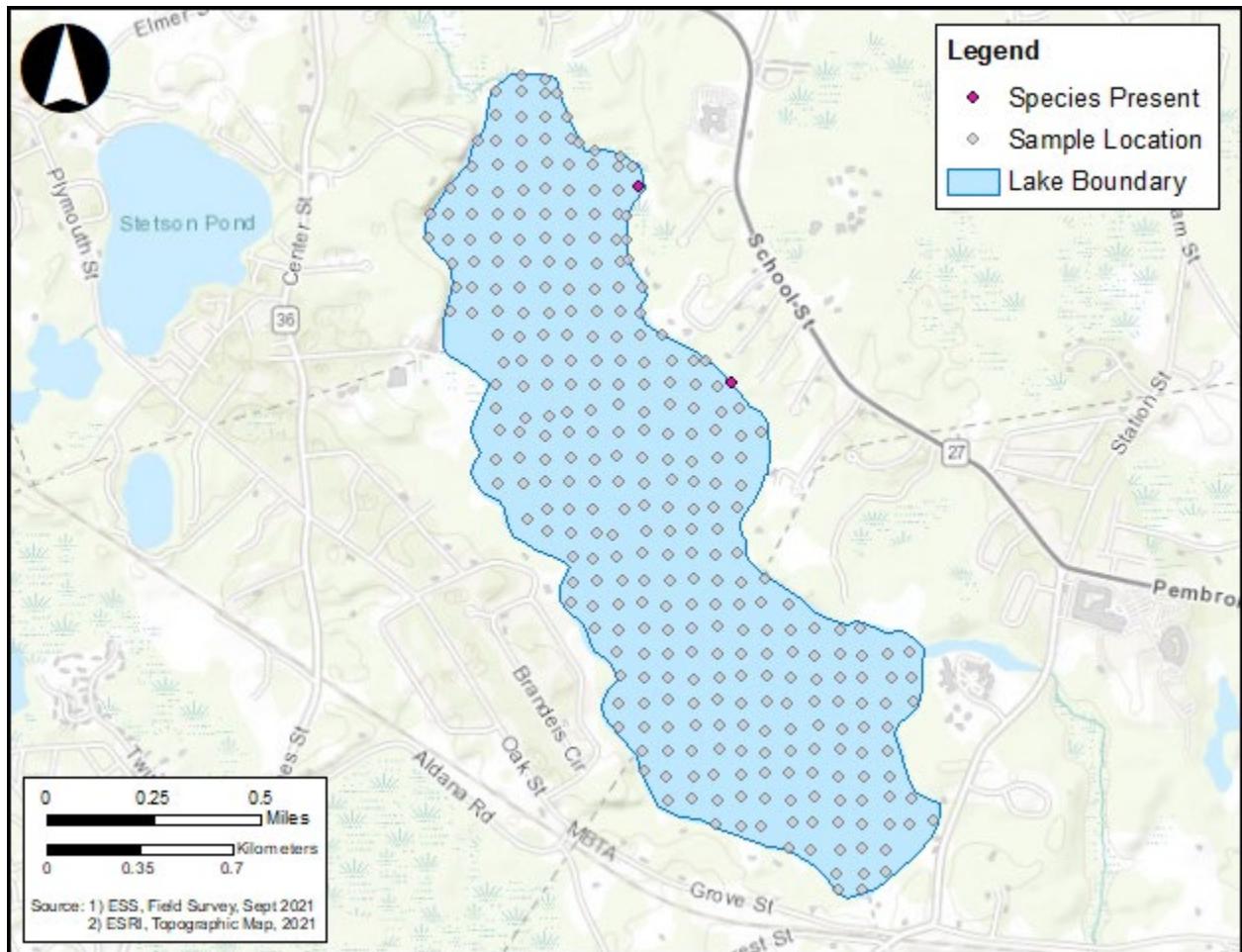
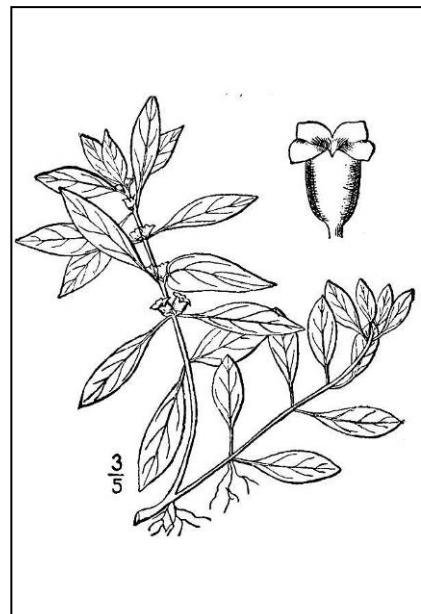
Native

Key Features: Opposite, spatulate leaves. Plant may be entirely submerged or emergent.

Habitat: Pond and lake margins. Often found in small groups or as single plant

Growth Type: Submerged (dominant), emergent (secondary)

Similar Species: None.



Myriophyllum heterophyllum – Variable-leaf Milfoil

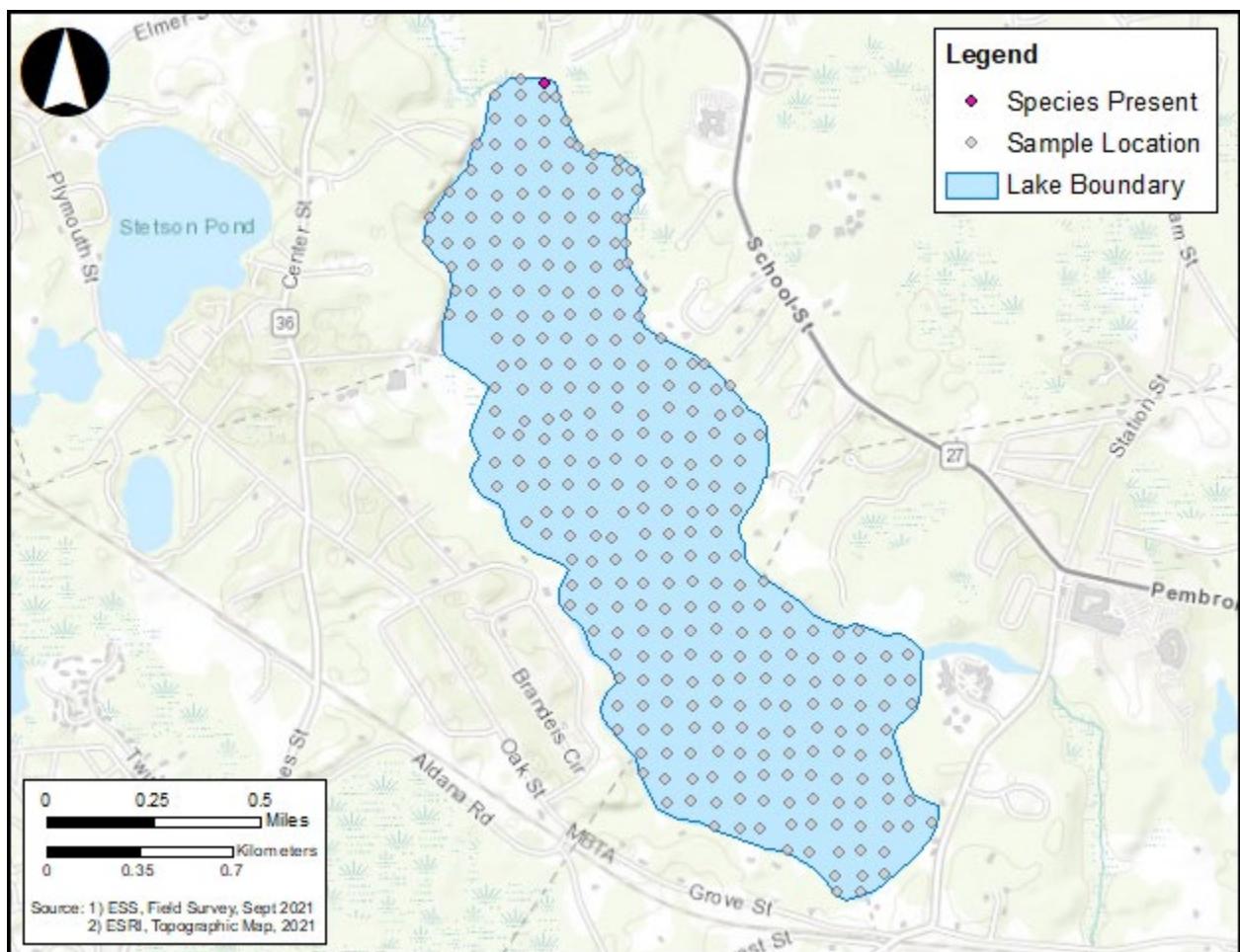
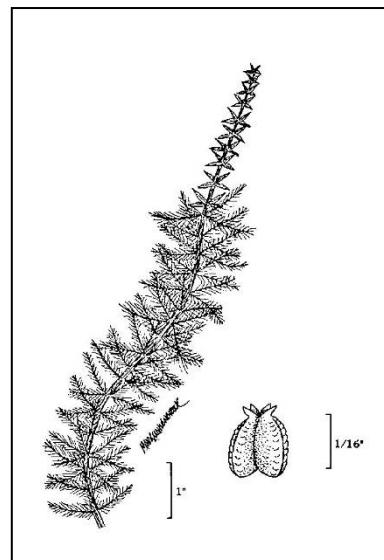
Exotic Invasive

Key Features: Finely dissected, feathery leaves arranged in whorls of 4-6 on submersed stems. Emergent stems form comblike or serrated bracts that are larger than the flowers and look very different from the submersed leaves in August and September. Stems can grow more than 10 feet long.

Habitat: Shallow edges and quiet waters of protected coves and stream outlets. Can form dense, extensive monocultures.

Growth Type: Submerged

Similar Species: *Myriophyllum* spp.



***Myriophyllum spicatum* – Eurasian Milfoil**

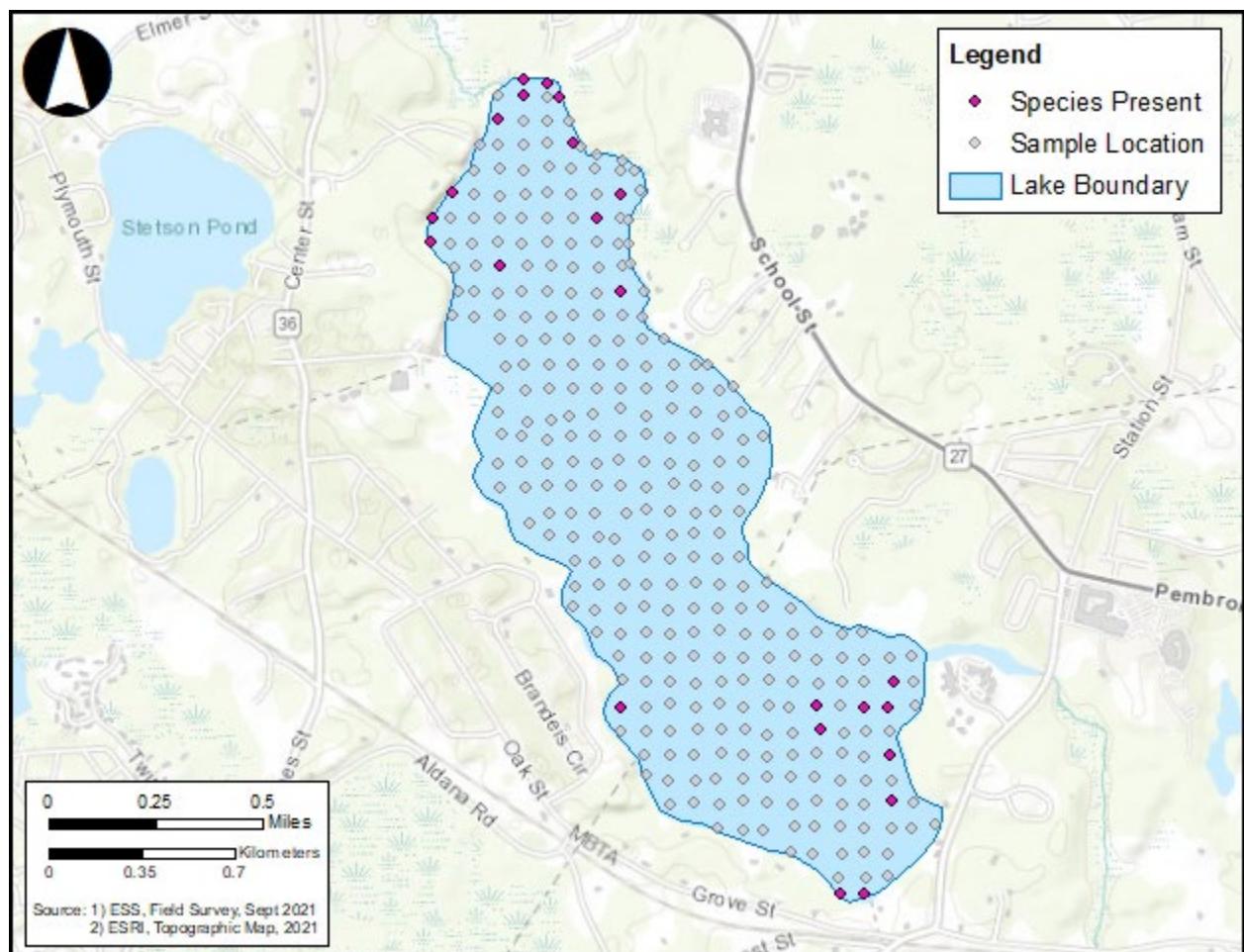
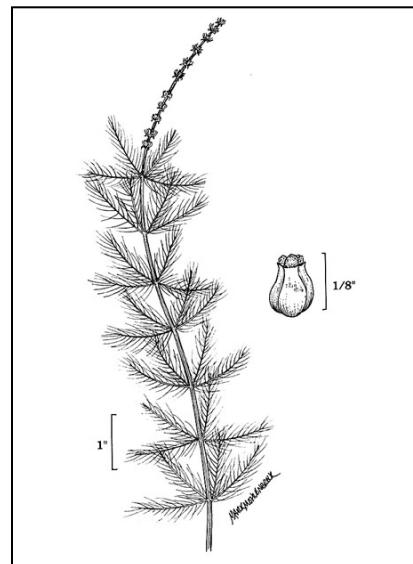
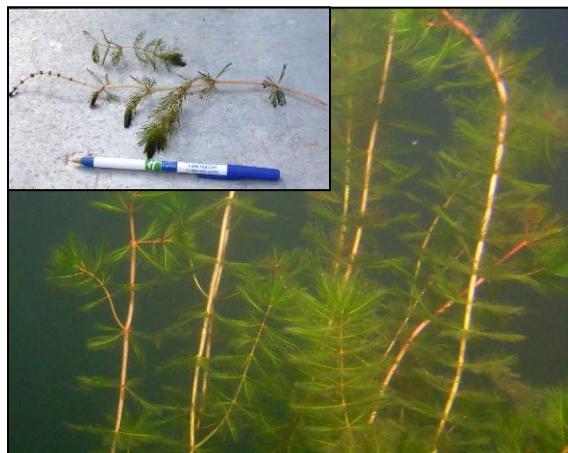
Exotic Invasive

Key Features: Finely dissected leaves arranged in whorls of 3-6 on submersed stems. Leaves appear truncated, as if tips were clipped with scissors. Emergent stems with flowers larger than tiny bracts in August and September (inset below). Stems can grow more than 10 feet long.

Habitat: Ponds, lakes, and other sluggish waters. Can form dense, extensive monocultures.

Growth Type: Submerged

Similar Species: *Myriophyllum* spp.



Nitella spp. – Stonewort

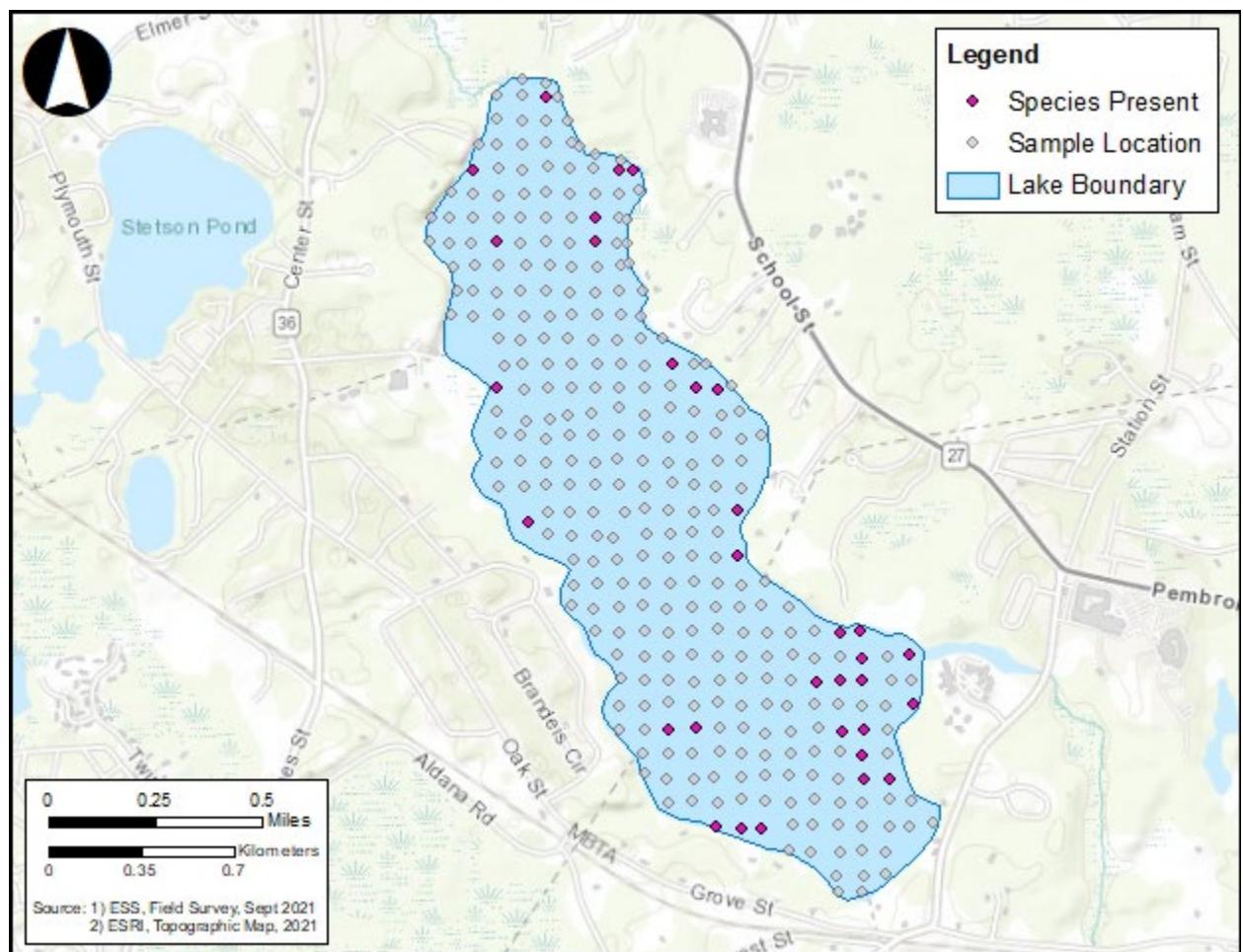
Native

Key Features: Low-growing macroalga with whorled branchlets. Does not releases a pungent odor when crushed.

Habitat: Prefers circumneutral to acid ponds and lakes. Often grows at greater depths than vascular plants but can also be found in shallow water.

Growth Type: Alga

Similar Species: *Chara* spp.



Potamogeton epihydrus – Floating-leaf Pondweed

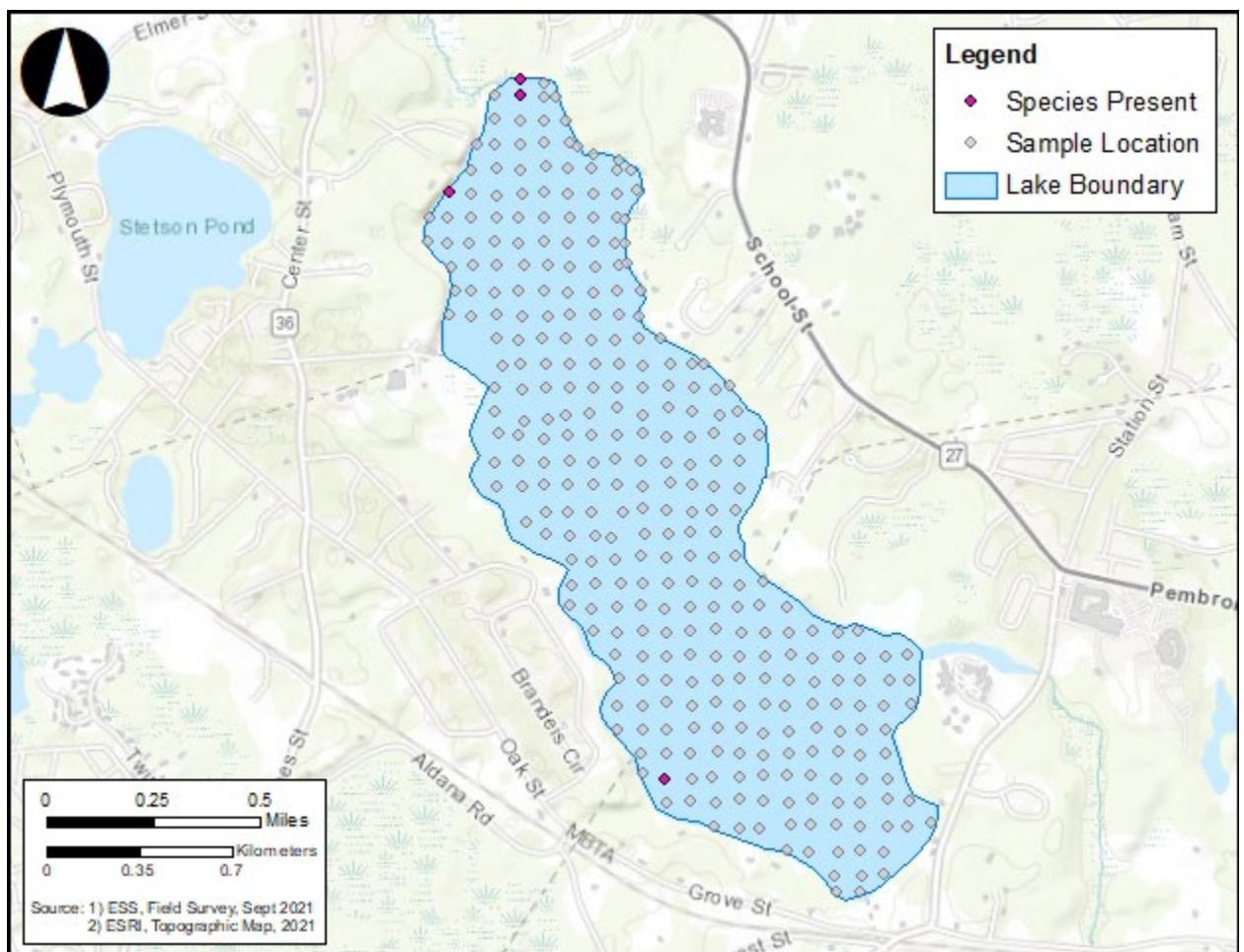
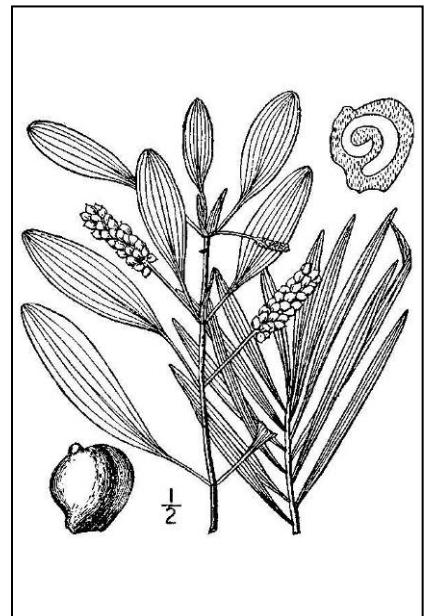
Native

Key Features: Floating leaves up to 3¼" long are oblong, rounded at the tip, and set off from the stem by a long petiole. Submersed leaves are ribbonlike and have wide central strip of lacunae that appears lighter than the leaf edges.

Habitat: Shallow waters of ponds and lakes.

Growth Type: Floating-leaved (dominant), submerged (secondary)

Similar Species: *Potamogeton nodosus*, *P. robbinsii* (submersed leaves)



Potamogeton perfoliatus – Clasping-Leaf Pondweed

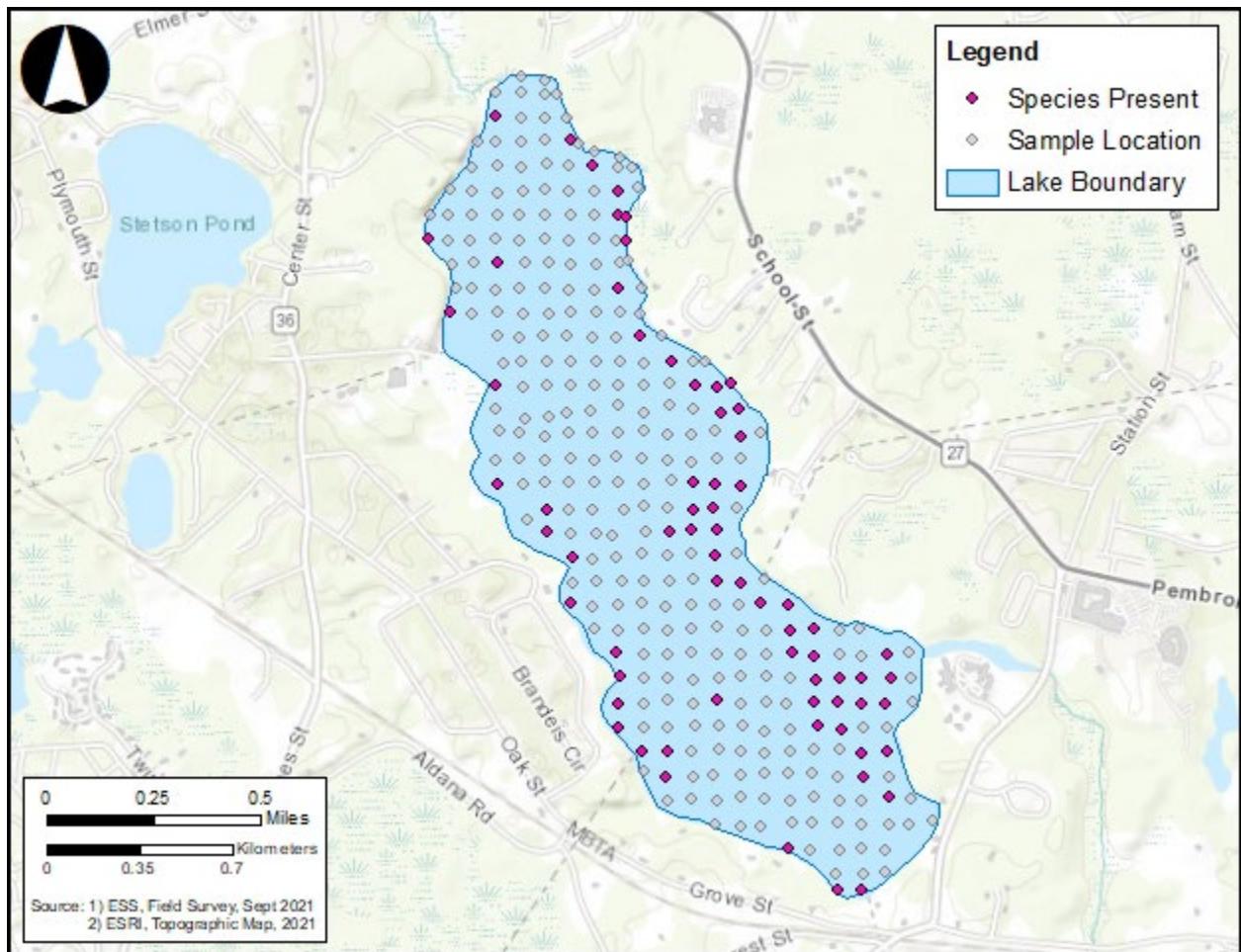
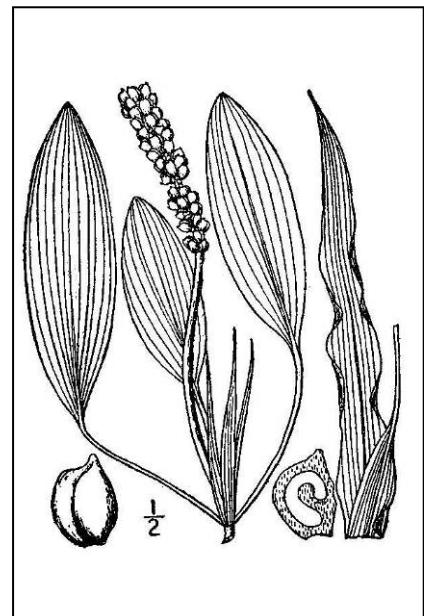
Native

Key Features: Leaves are circular to ovate and clearly clasp the stem. Leaf edges are wavy but entire (not serrated). Floating leaves are absent.

Habitat: Shallow waters of ponds and lakes.

Growth Type: Submerged

Similar Species: *Potamogeton crispus*



Potamogeton pusillus – Thinleaf Pondweed

Native

Key Features: No floating leaves. Submersed leaves are thin.

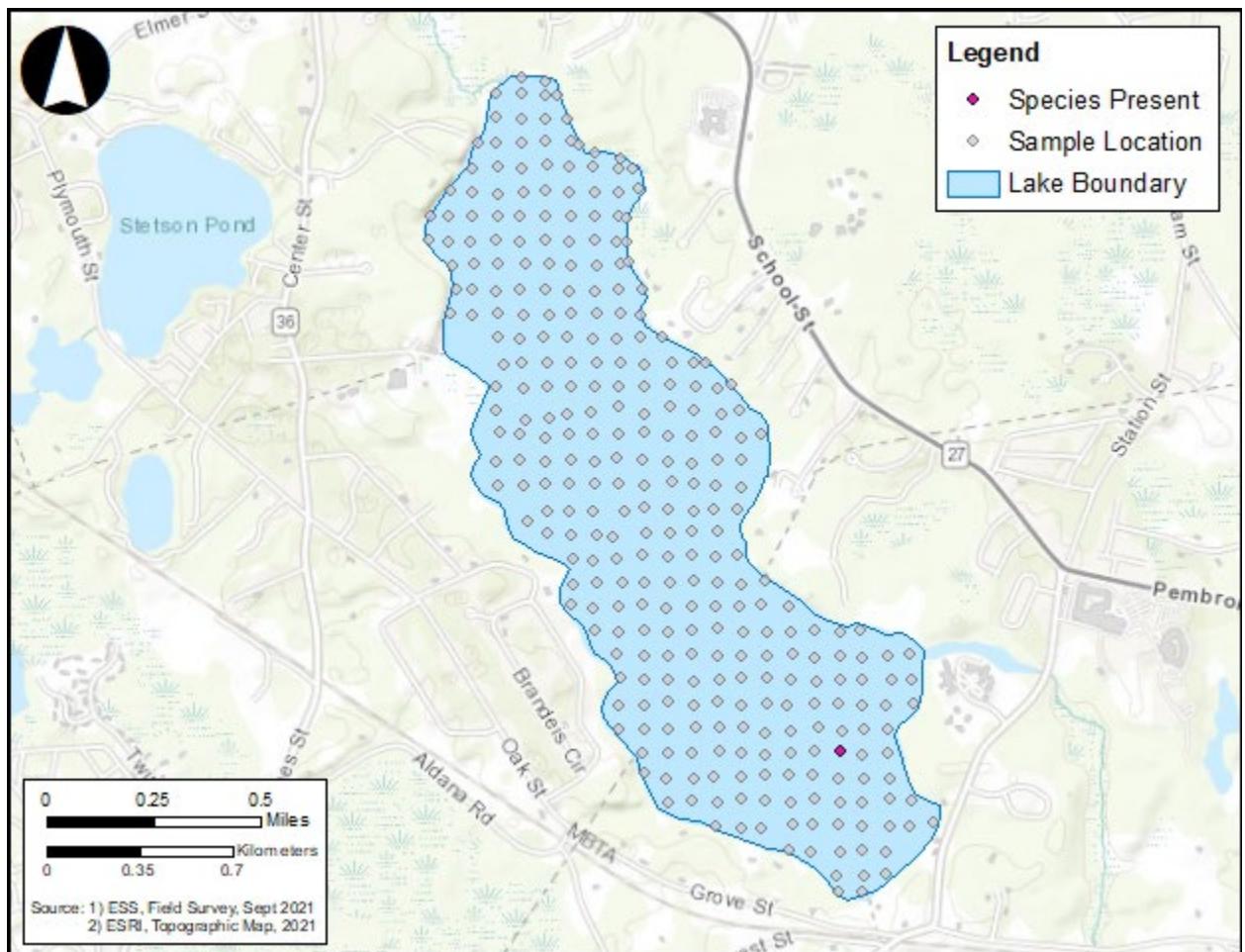
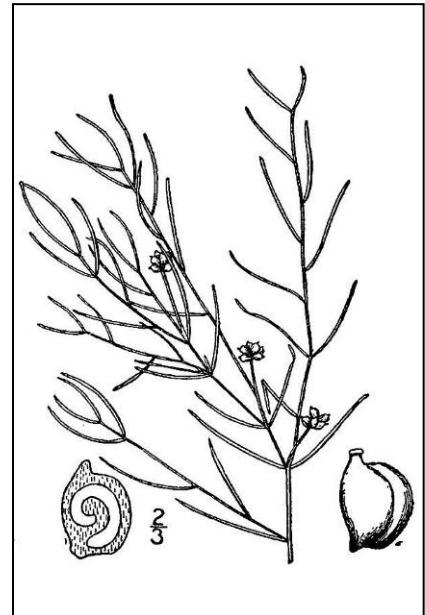
Habitat: Shallow waters of lakes and ponds.

Growth Type: Submerged

Similar Species: *Potamogeton bicupulatus*, *P. spirillus* (submersed leaves)



Source: Christian Fischer



Sagittaria sp. – Arrowhead

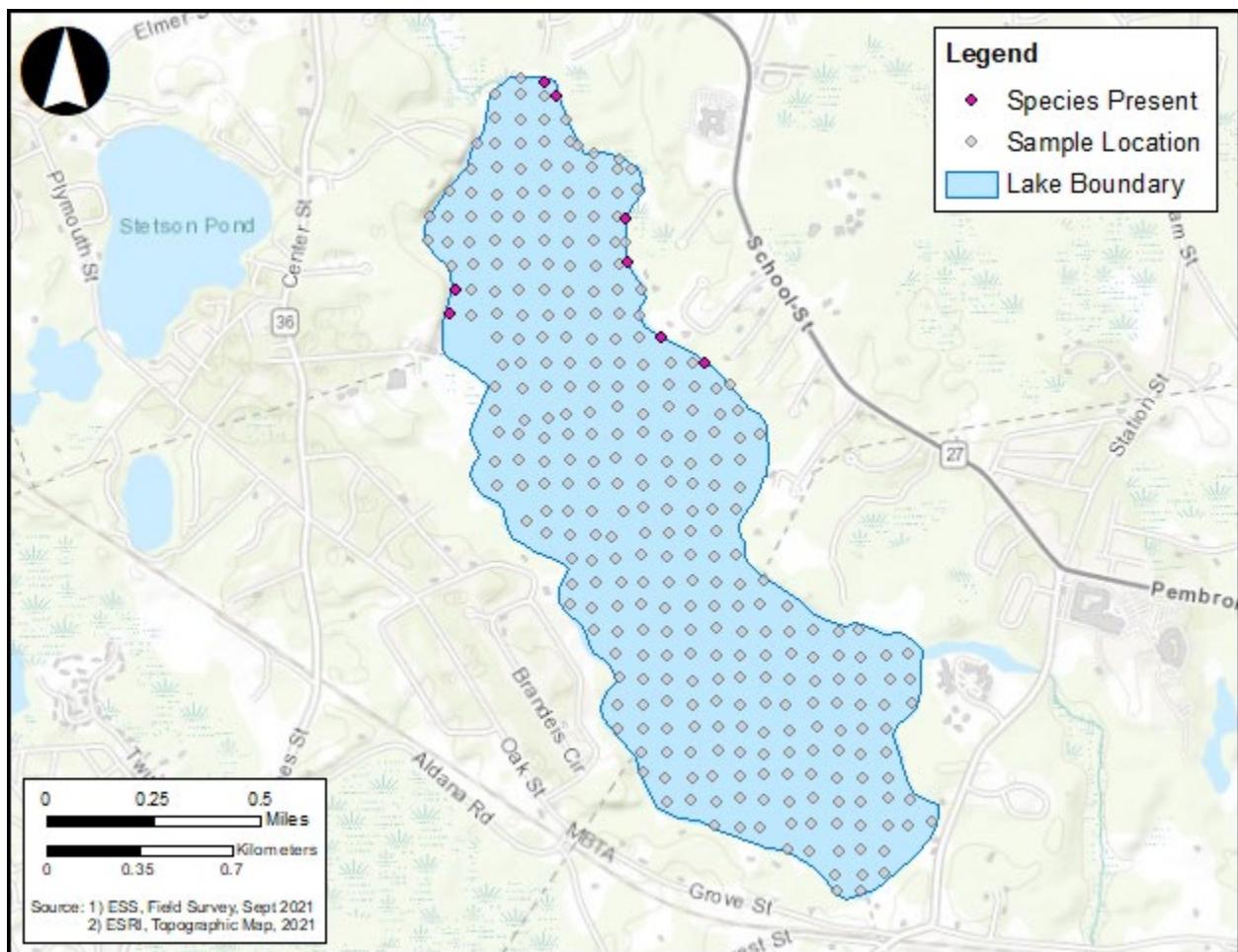
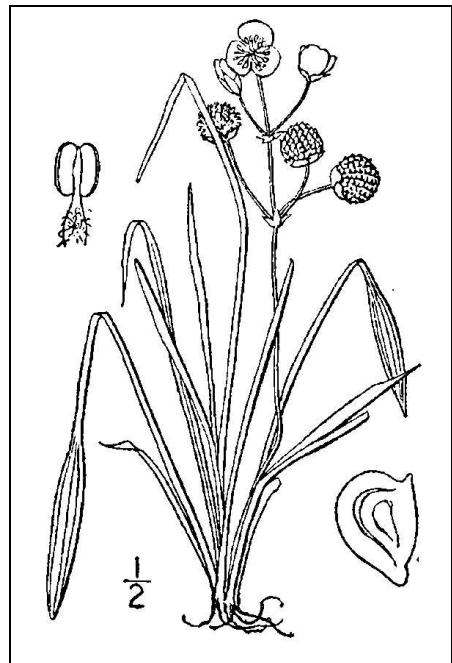
Native

Key Features: Leaf blades can be heart or lance shaped. The fruit is dry, usually 1-seeded, does not split open at maturity. Leaves may be submerged or emergent, depending on the specific species.

Habitat: Shorelines and along shallow areas of lakes, ponds, and rivers

Growth Type: Emergent (primary), submerged (secondary)

Similar Species: *Pontederia cordata*, *Sparganium* ssp.



Utricularia macrorhiza – Common Bladderwort

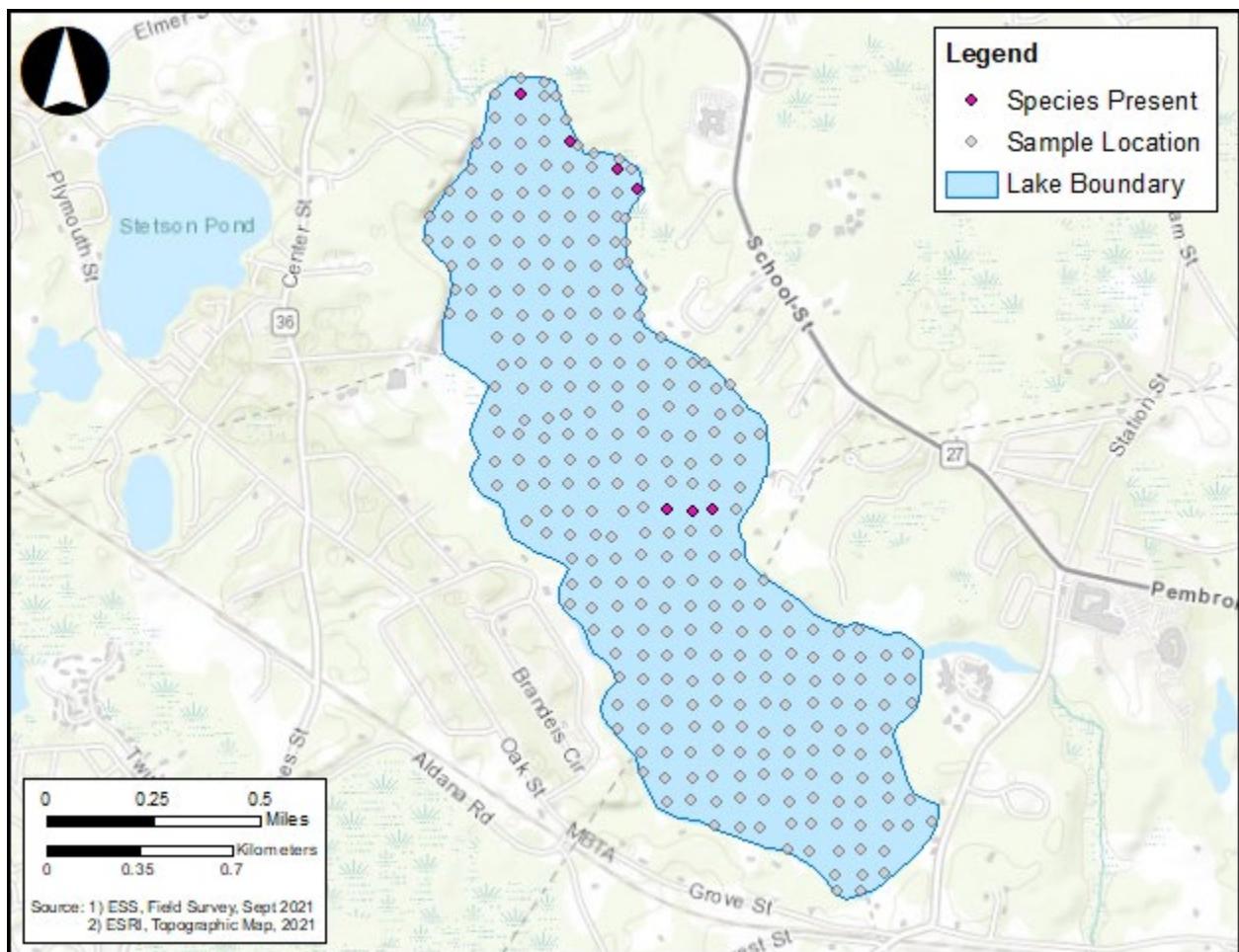
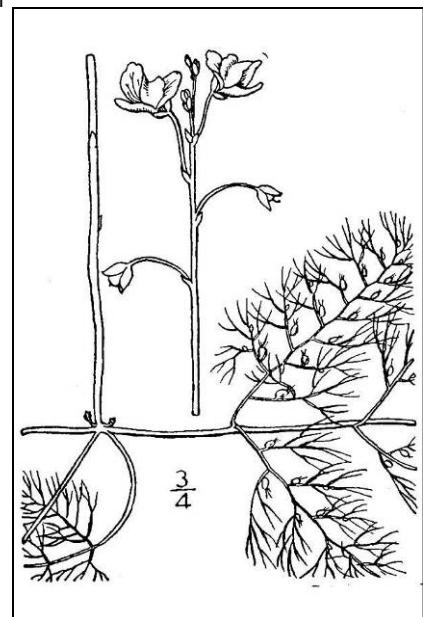
Native

Key Features: Bladders occur with leaves. Leaves are relatively large, finely dissected, and branch 6 or more times. Flowers, when they appear, are bright yellow. Larger than other bladderworts – stems may be several feet long.

Habitat: Shallow waters of ponds, lakes, and sluggish streams.

Growth Type: Submerged

Similar Species: *Utricularia* spp.



Source: 1) ESS, Field Survey, Sept 2021
2) ESRI, Topographic Map, 2021

Vallisneria americana – Water Celery

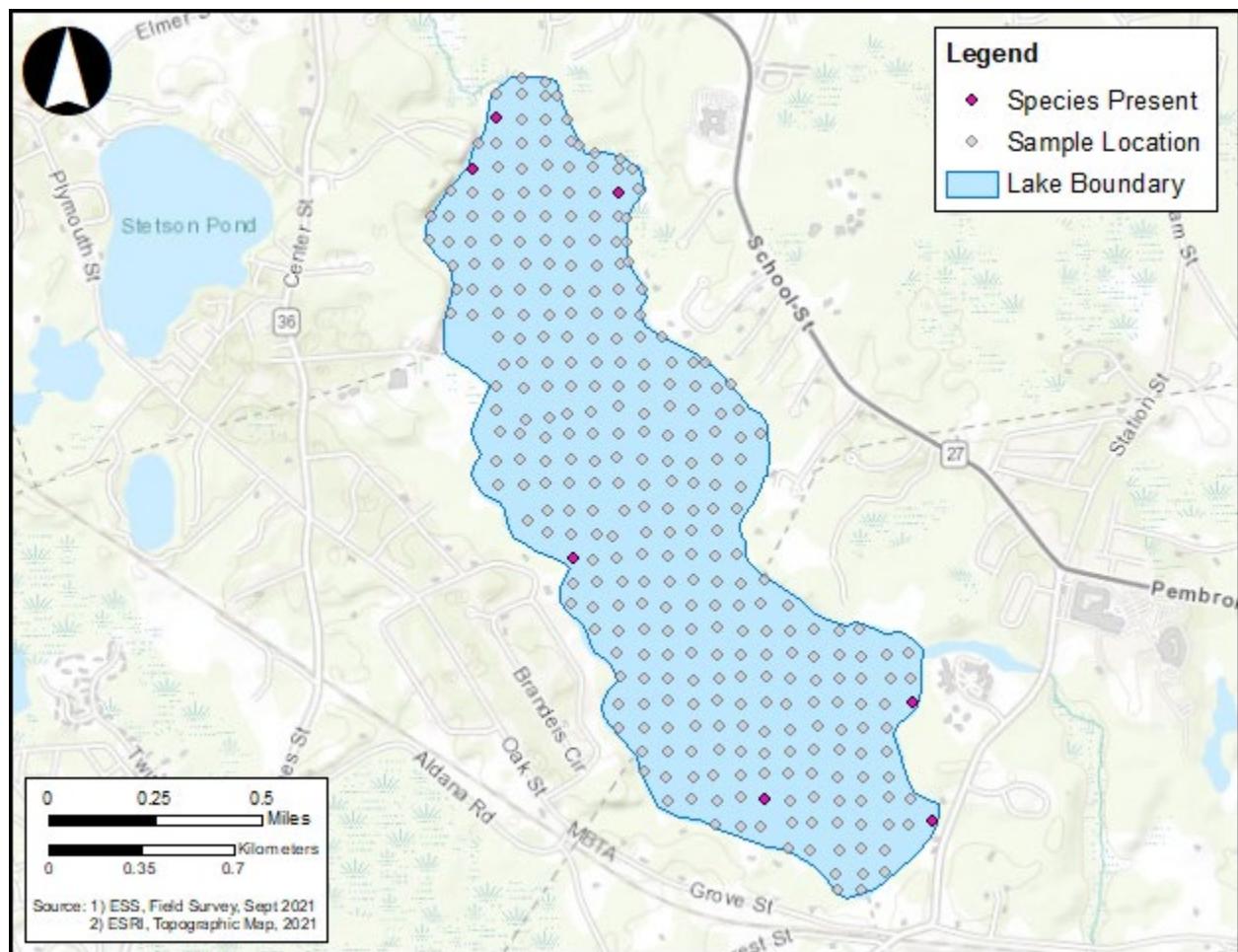
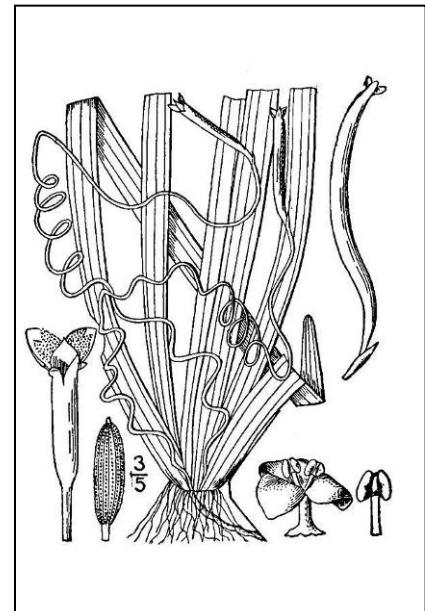
Native

Key Features: Long, flimsy, strap-like basal leaves may be accompanied by coiled fruiting stems reaching to the water surface. When held up to the sunlight, two distinctive venation patterns can be seen on the center and edges of the leaf. In addition to reproduction through seeds, also spreads by rhizomes and turions to form colonies. Leaves are flat (not keeled).

Habitat: Ponds, lakes and sluggish streams, often in large beds.

Growth Type: Submerged

Similar Species: *Sparganium* spp.



Potential Invaders to the Silver Lake System

REPORT IF OBSERVED

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Egeria densa – Brazilian Elodea

Exotic Invasive

Key Features: Trailing stems up to 6 feet long, producing roots at intervals along the stem. Broad, pointed-leaves are whorled in groups of four to eight, with each leaf 1–4 cm long and 2–5 mm across. Flowers are 2–20 mm in diameter, with three broad, rounded, white petals.

Habitat: Grows in lakes and ponds in water up to 16 feet deep. Can form dense, extensive monocultures.

Growth Type: Submerged

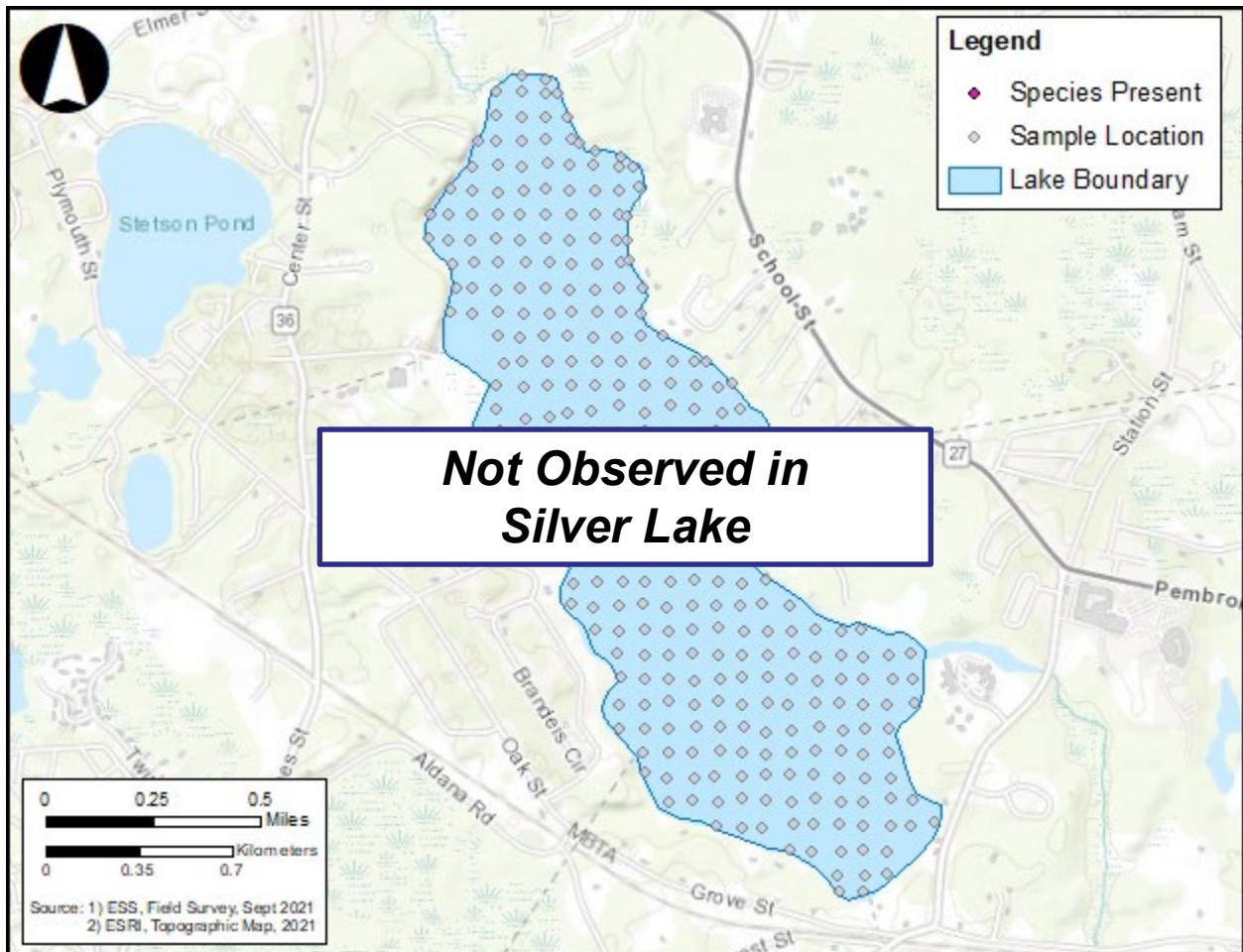
Similar Species: *Elodea nuttallii*, *E. canadensis*.



Source: Kristian Peters
(CC BY-SA 3.0)



Source: Lara Gudmundsdottir
(CC BY-SA 4.0)



Eichhornia crassipes – Water Hyacinth

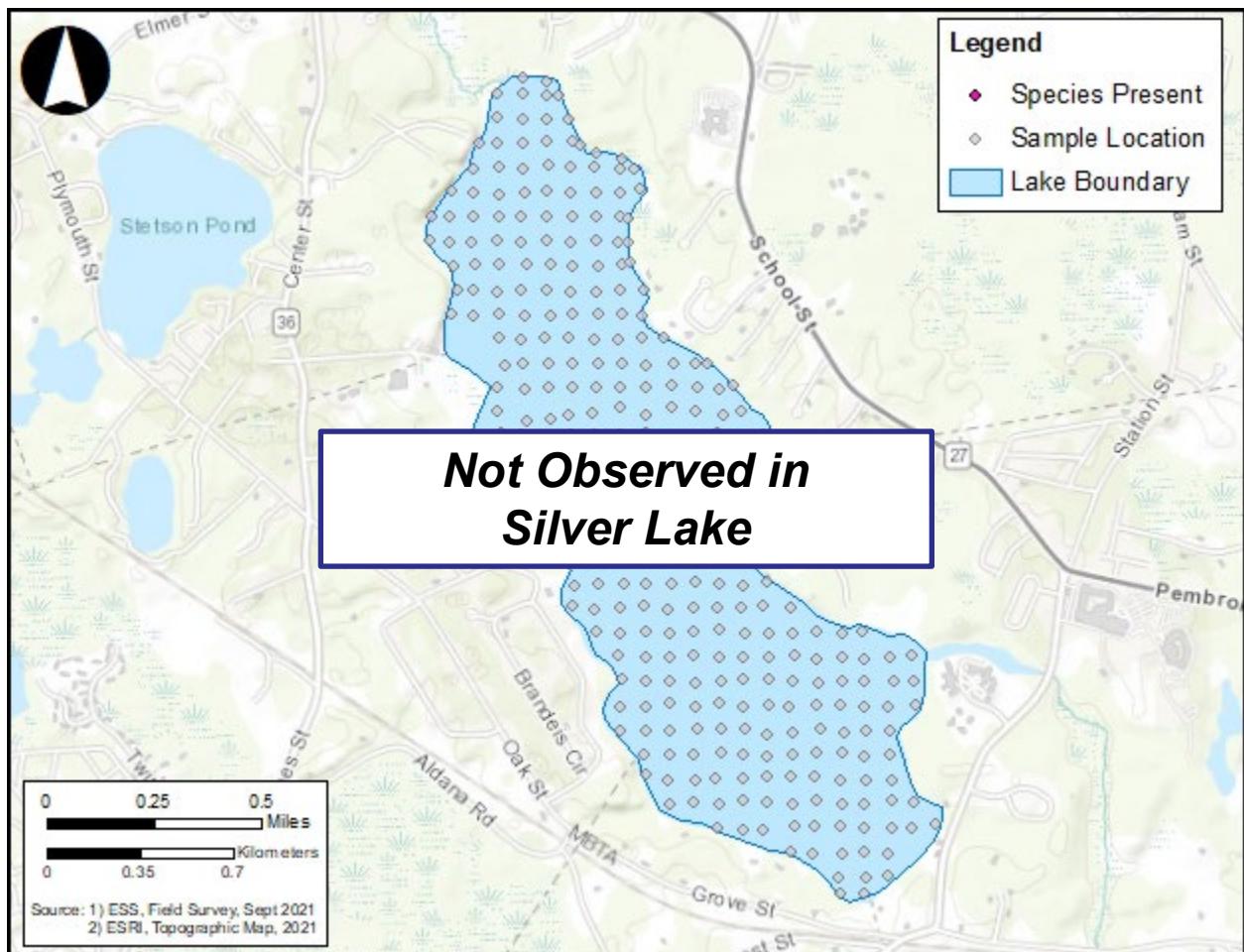
Exotic Invasive

Key Features: Thick, glossy, oval-shaped leaves float above the water surface and range from 10 to 20 cm across. Long, spongy, bulbous stems float on the water and may rise above the surface of the water as much as 3 feet. Feathery, freely hanging roots are purple-black. An erect stalk supports a single spike of 8-15 lavender to pink flowers. Each flower has six petals.

Habitat: Slow-moving waters of lakes and ponds. Can form dense, extensive monocultures.

Growth Type: Floating-leaved

Similar Species: None.



Source: 1) ESS, Field Survey, Sept 2021
2) ESRI, Topographic Map, 2021

Glossostigma cleistanthum – Mud-mat

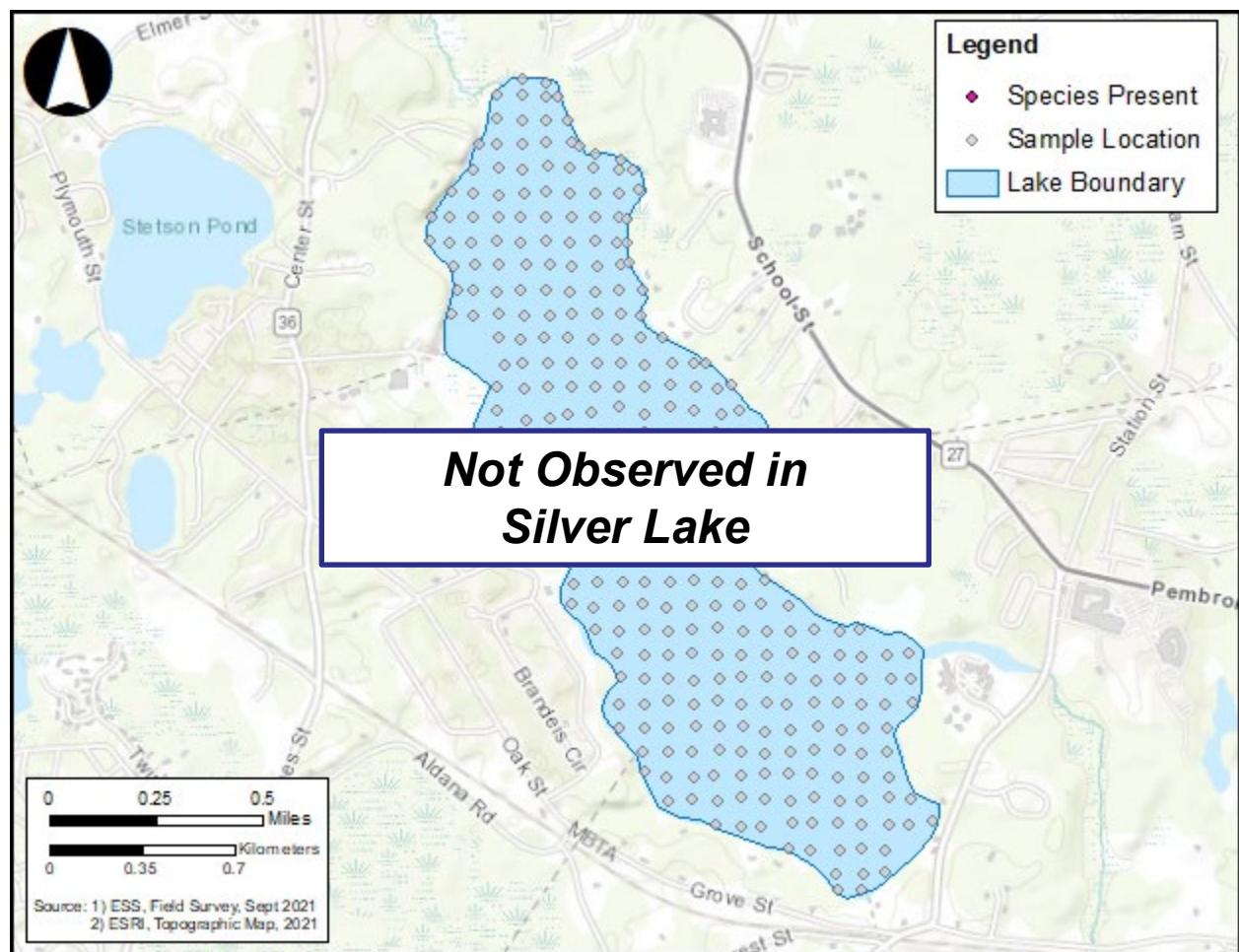
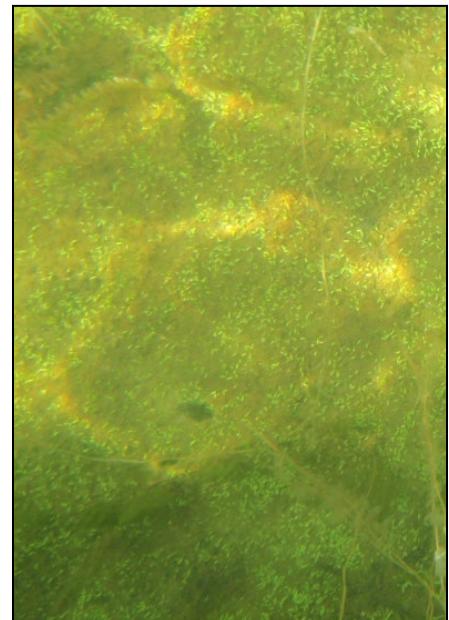
Exotic Invasive

Key Features: Mat-forming plant with small, spatula-shaped leaves. Leaves are opposite, 1-3 cm long, with two leaves per node along the stem. Tiny, pastel, bell shaped flowers arise from the leaf axils. Flowers are produced on emergent and submergent plants. Emergent plants are annual while submergent plants are perennial and will remain green throughout the winter.

Habitat: Shallow shores of rivers, lakes, or ponds.

Growth Type: Submerged (dominant), emergent (secondary)

Similar Species: *Elatine* spp., *Gratiola aurea*.



Myriophyllum aquaticum – Parrot Feather

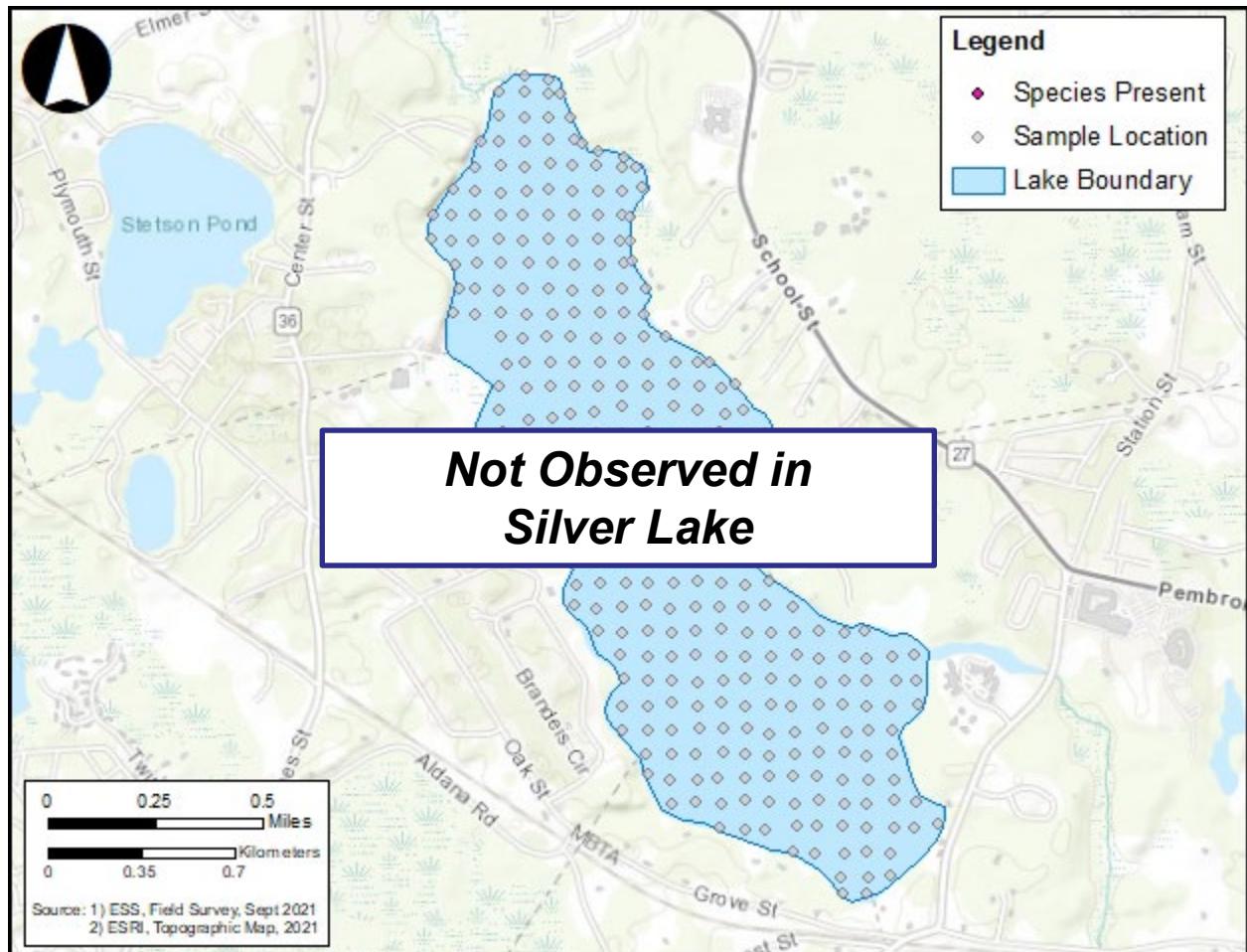
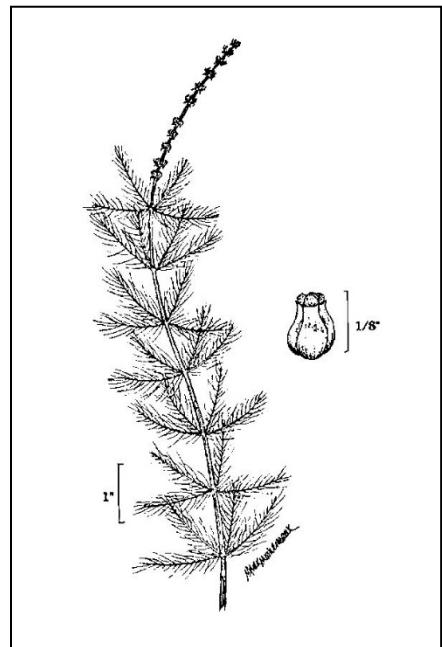
Exotic Invasive

Key Features: Feathery leaves are arranged in whorls of 4-6 on submersed stems. Submerged leaves are 0.5 to 3.5 cm long and have 20 to 30 divisions per leaf. Emergent leaves are 2 to 5 cm long and have 6 to 18 divisions per leaf. Emergent stems and leaves can grow up to one foot above the water surface and resemble small fir trees (leaves darker green than submergent leaves). Small flowers on axis of emergent leaves are pinkish-white.

Habitat: Shallow edges and quiet waters of protected coves and stream outlets. Can form dense, extensive monocultures.

Growth Type: Submerged (dominant), emergent (secondary)

Similar Species: *Myriophyllum* spp.



Najas minor – Brittle Naiad

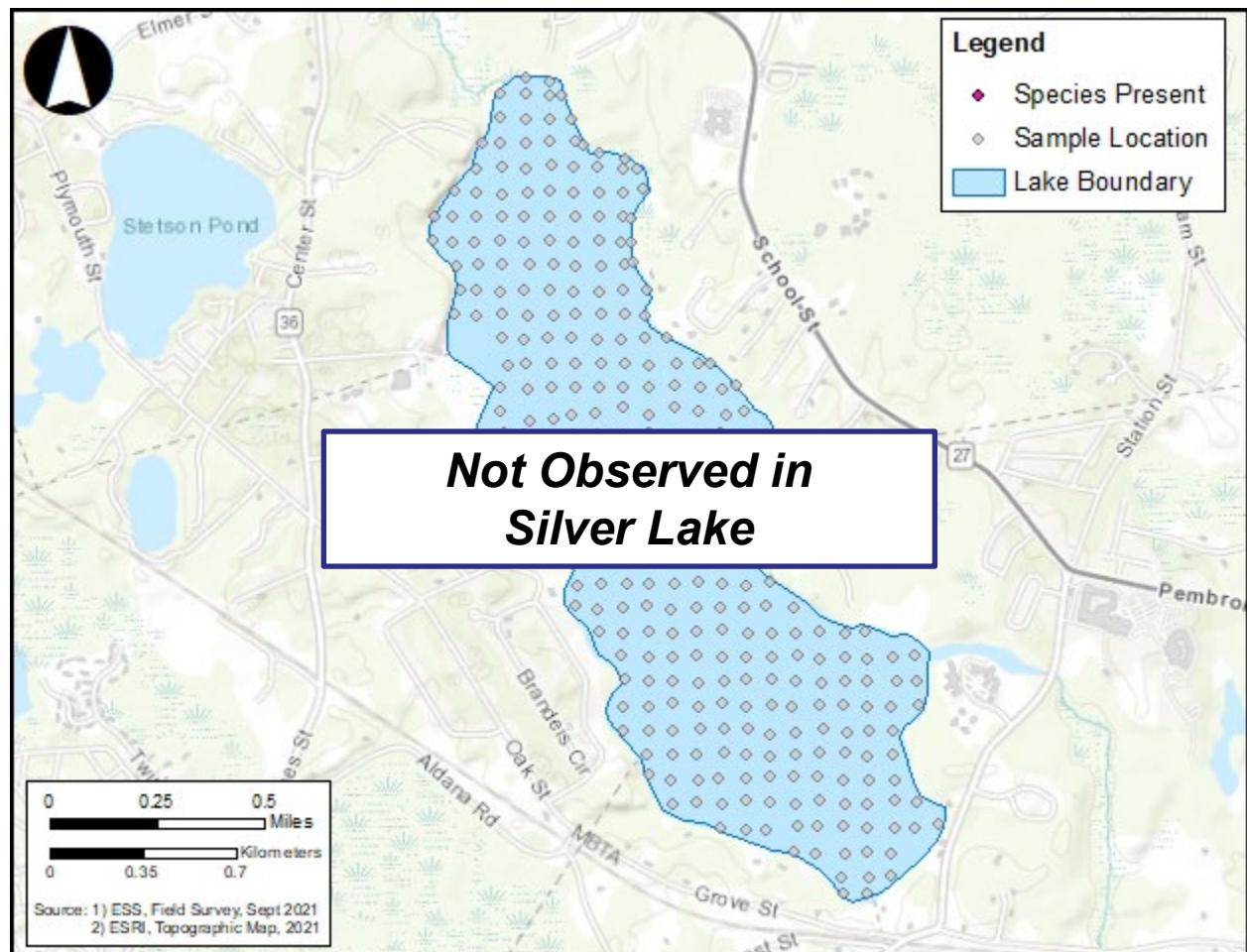
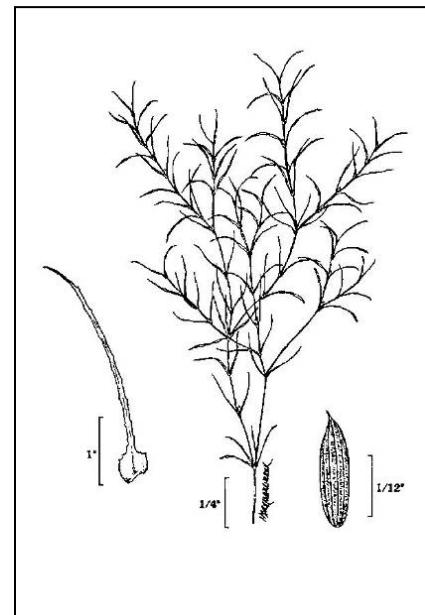
Exotic Invasive

Key Features: Narrow, opposite leaves with prominent spines along each edge. Spines are small but clearly visible with the naked eye, making the leaf margins appear jagged. Stems are extensively branched and fragment easily.

Habitat: Ponds, lakes, and sluggish streams.

Growth Type: Submerged

Similar Species: *Najas* spp.



Nelumbo lutea – American Lotus

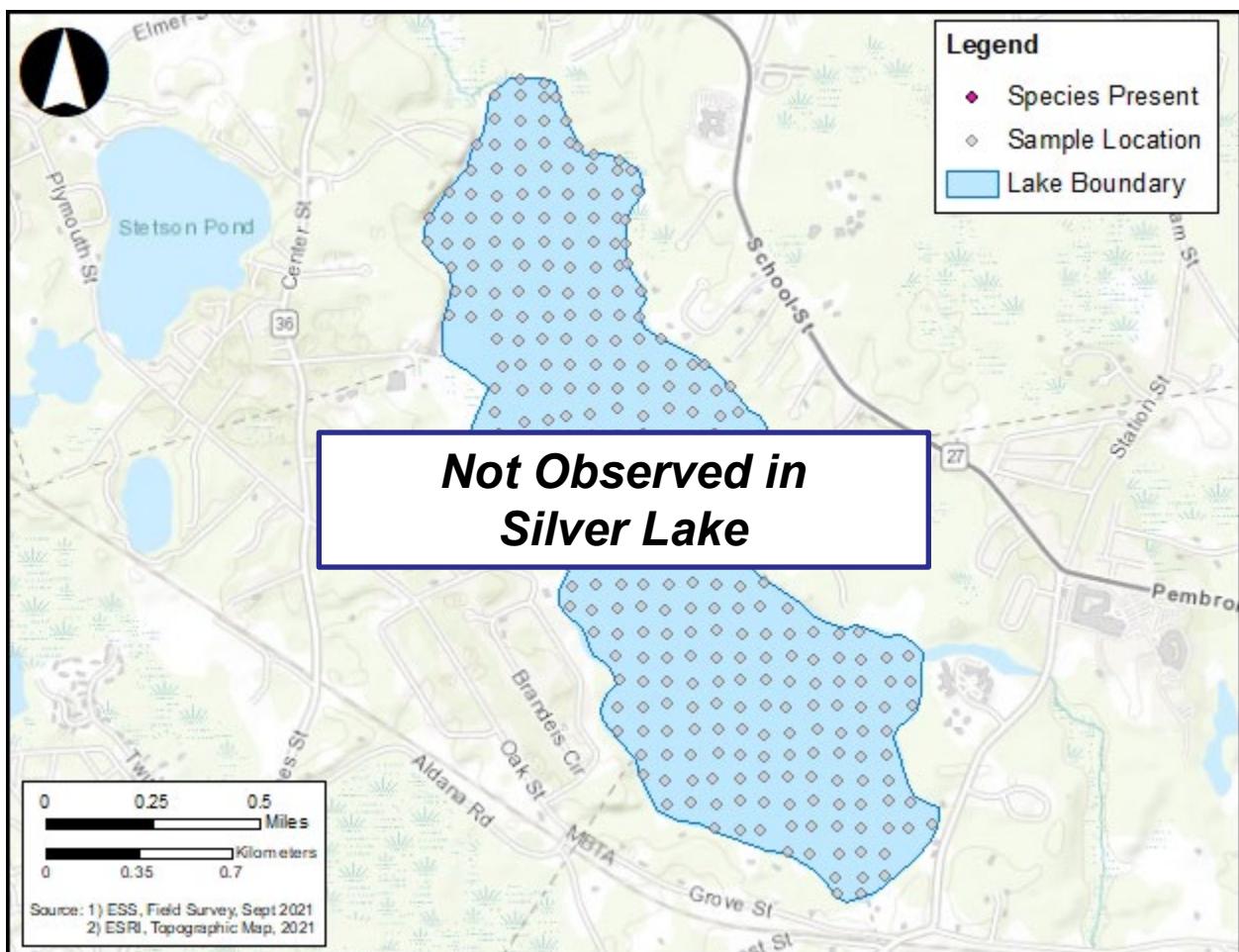
Exotic Invasive

Key Features: Large (6-24") emergent leaves with petiole joining at center of elliptical leaf. Large yellow pale flowers may be present in summer and are followed by distinctive woody seed pods.

Habitat: Shallow waters of ponds, lakes and sluggish streams, especially in organic sediments.

Growth Type: Emergent (primary), floating-leaved (secondary)

Similar Species: *Brasenia schreberi*, *Nymphaea odorata*, *Nuphar lutea variegata*, *Nymphoides peltata*



Nymphoides peltata – Yellow Floating Heart

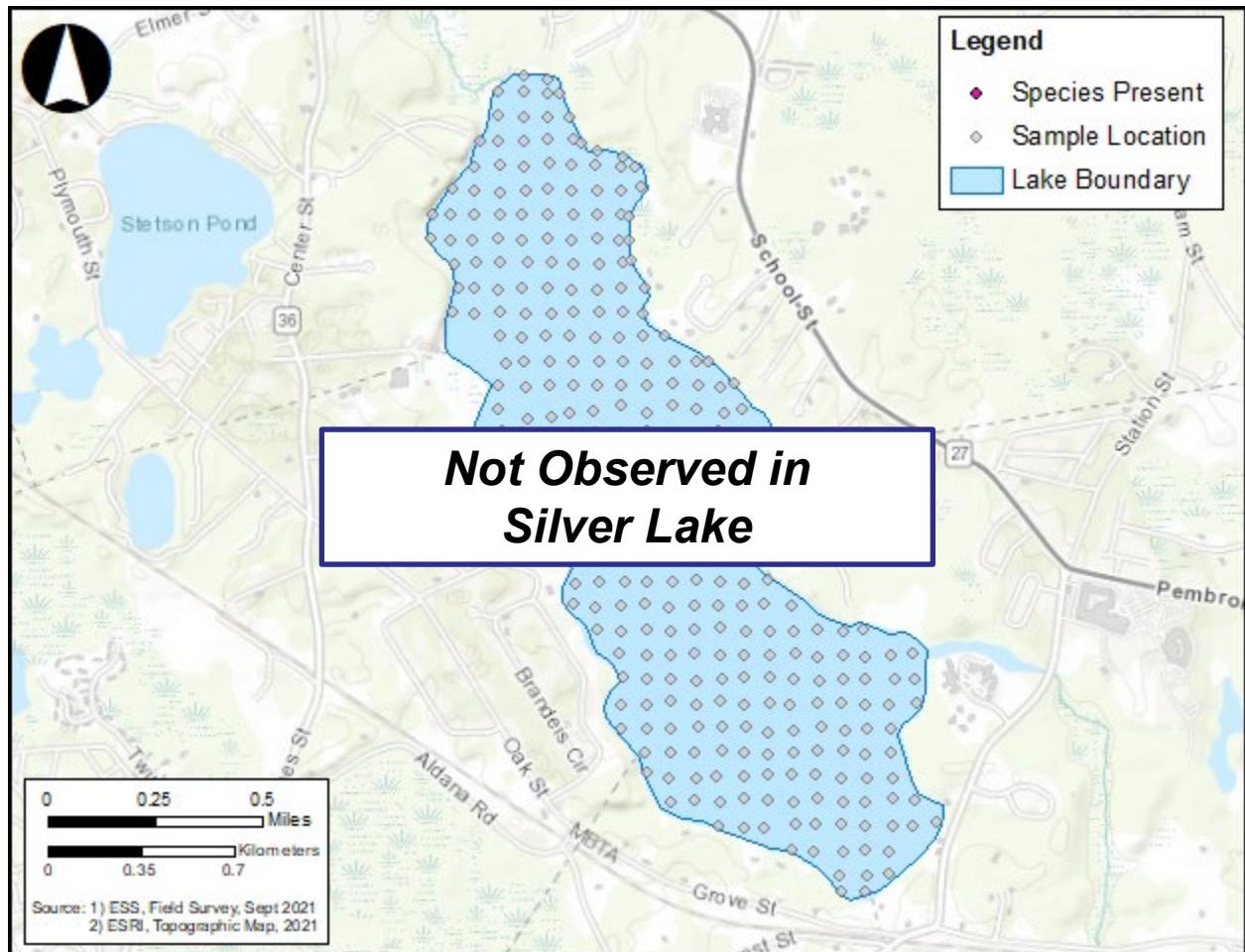
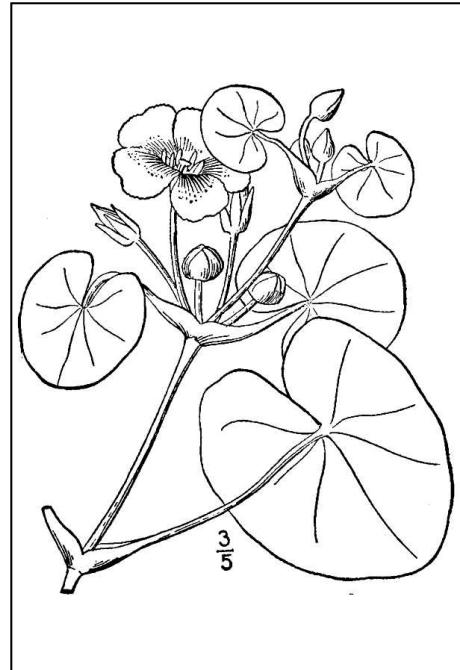
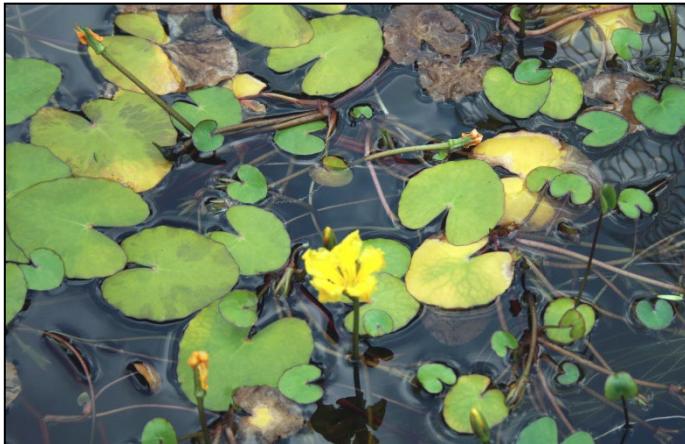
Exotic Invasive

Key Features: Perennial, water lily-like plant that covers water surface with long-stalked heart-shaped leaves. Five-petaled yellow flowers occur on long stalks and rise a few inches above the water.

Habitat: Slow moving rivers, lakes, reservoirs, and ponds. Can form dense, extensive monocultures.

Growth Type: Floating-leaved

Similar Species: *Nuphar lutea variegata*, *Nymphaea odorata*, *Nymphoides cordata*.



Potamogeton crispus – Curly-leaf Pondweed

Exotic Invasive

Key Features: Leaves are oblong, rounded at apex and are both wavy and serrated along the edges. Pine cone shaped turions may be present at the leaf axils and are very hard. Leaves do not clasp stem.

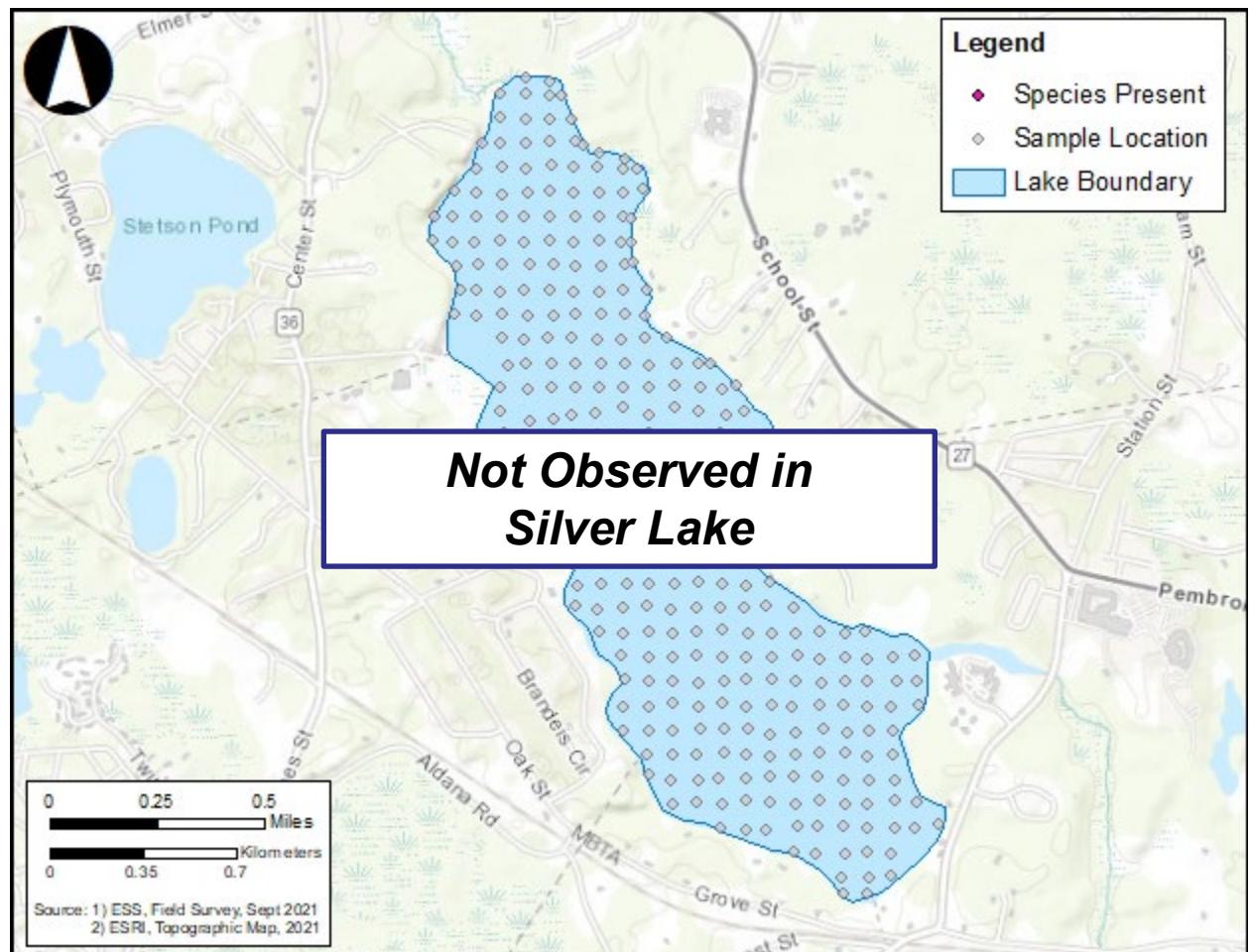
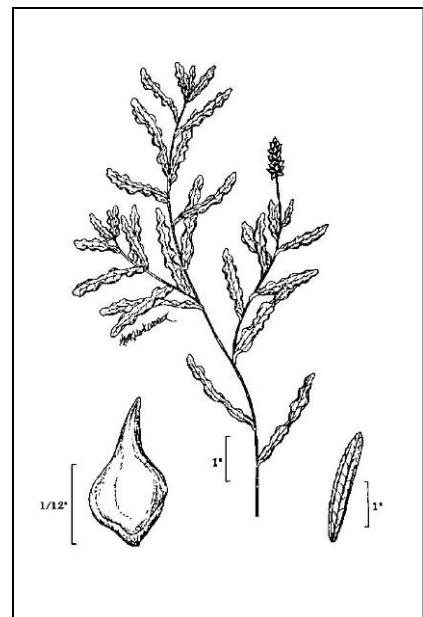
Habitat: Prefers ponds, lakes and streams with some alkalinity. Can form dense, long-stemmed monocultures early in the growing season (May to June).

Growth Type: Submerged

Similar Species: *Potamogeton perfoliatus*



Source: Waterland Management, Ltd



Trapa natans – Water Chestnut

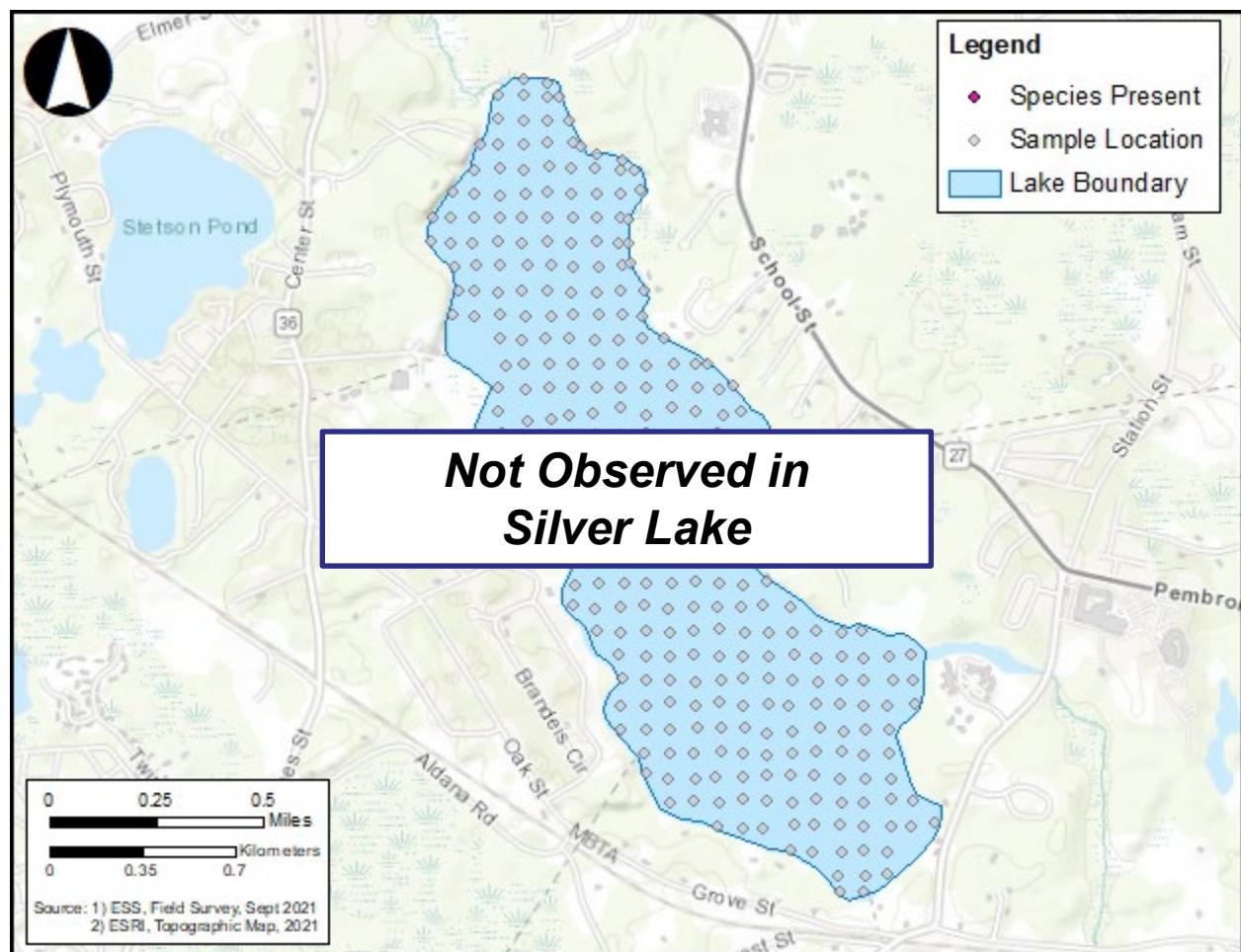
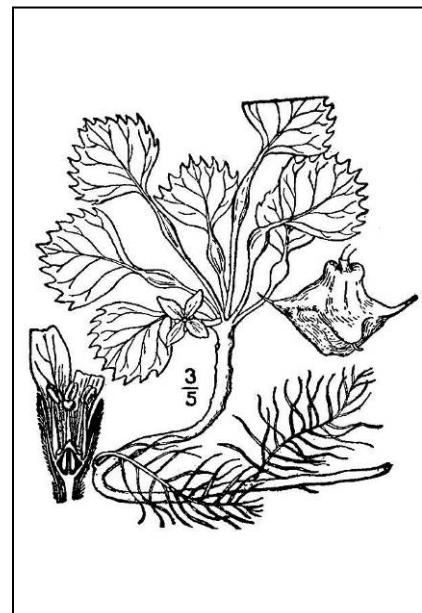
Exotic Invasive

Key Features: Floating leaves characterized by rosettes of shiny toothed leaves with swollen, air-filled petioles. Submersed leaves are finely divided and whorled around the stem. Floating seeds are set in the summer and are four-barbed and large (see inset).

Habitat: Shallow areas of lakes, ponds and sluggish streams. May quickly form dense monoculture beds.

Growth Type: Floating-leaved

Similar Species: None.



Utricularia inflata – Swollen Bladderwort

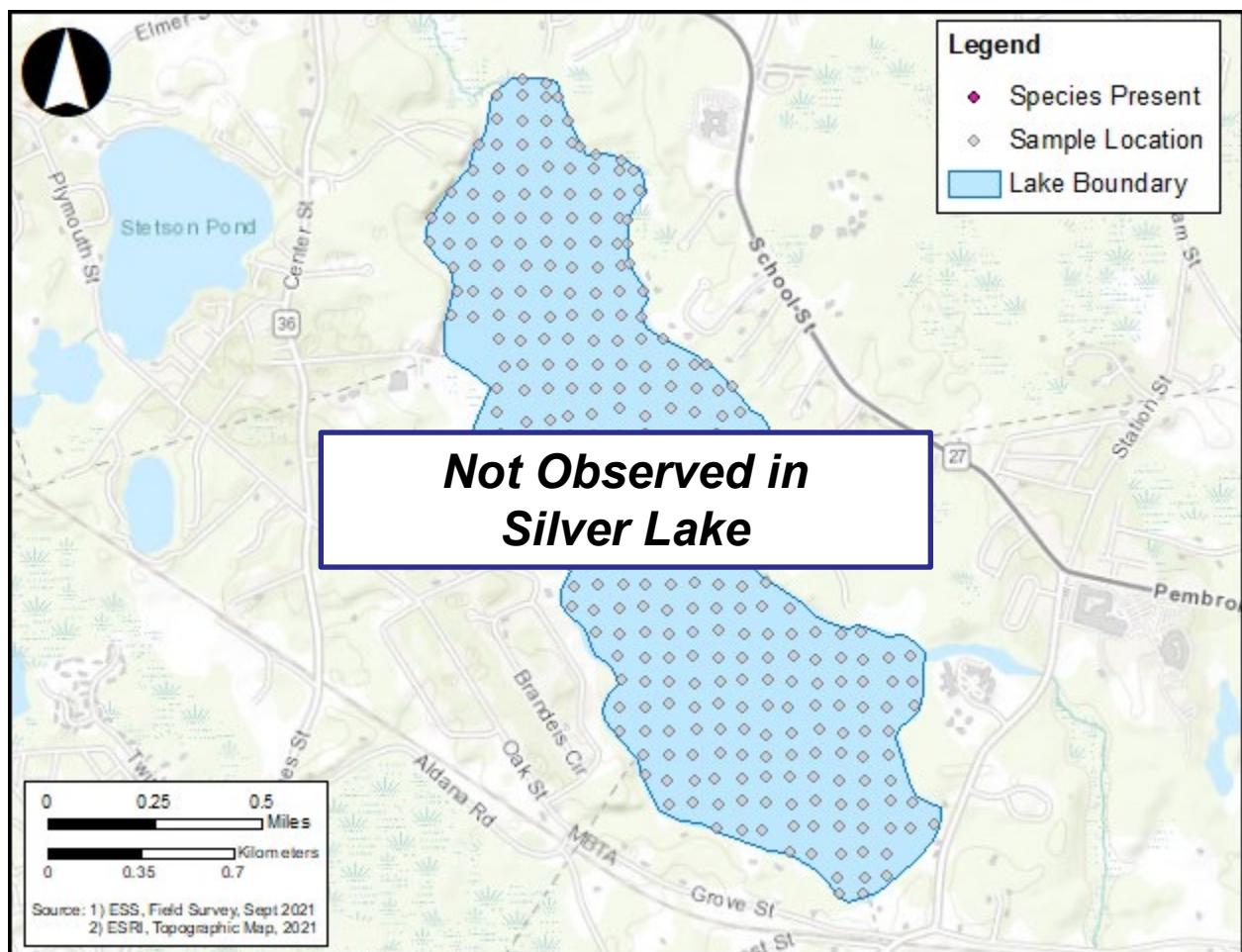
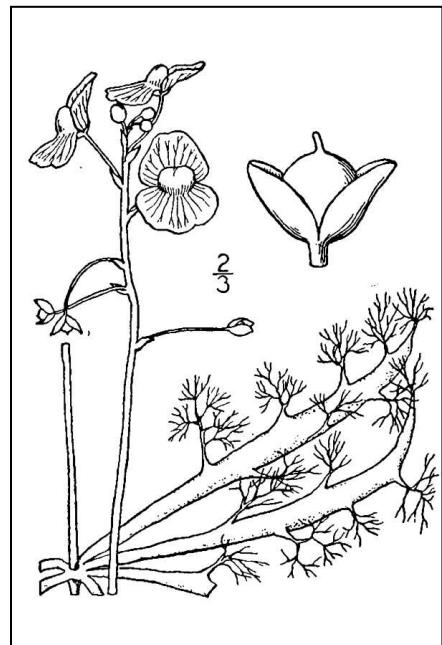
Exotic Invasive

Key Features: Yellow flowers in groups of 3 to 14 with five petals set off by a spoke-like whorl of 4 to 10 wedge-shaped floating leaves, 4 to 9 cm long. Green, highly branched, finely divided underwater leaf-like stems with small seed-like bladders.

Habitat: Shallow waters of ponds and lakes.

Growth Type: Submerged (primary), floating-leaved (secondary)

Similar Species: *Utricularia radiata*.



Aquatic Plant Species Observed in Silver Lake

Common Name	Scientific Name	Dominant Growth Type	Secondary Growth Type	Invasive	Silver Lake
Fanwort	<i>Cabomba caroliniana</i>	Submerged		Exotic Invasive	X
Water Starwort	<i>Callitrichia heterophylla</i>	Submerged	Floating-leaved		X
Coontail	<i>Ceratophyllum demersum</i>	Submerged			X
Filamentous Green Algae	<i>Chlorophyceae sp.</i>	Alga			X
Brazilian Elodea	<i>Egeria densa</i>	Submerged		Exotic Invasive	
Water Hyacinth	<i>Eichhornia crassipes</i>	Floating-leaved		Exotic Invasive	
Waterwort	<i>Elatine sp.</i>	Submerged	Emergent		X
Spikerush/Robbins' Spikerush	<i>Eleocharis sp./Eleocharis robbinsii</i>	Submerged			X
Canadian Waterweed	<i>Elodea canadensis</i>	Submerged			X
Mud-mat	<i>Glossostigma cleistanthum</i>	Submerged	Emergent	Exotic Invasive	
Golden Hedge-hyssop	<i>Gratiola aurea</i>	Submerged	Emergent		X
Quillwort	<i>Isoetes sp.</i>	Submerged			X
Seedbox	<i>Ludwigia palustris</i>	Submerged	Emergent		X
Parrot Feather	<i>Myriophyllum aquaticum</i>	Submerged	Emergent	Exotic Invasive	
Variable-leaf milfoil	<i>Myriophyllum heterophyllum</i>	Submerged		Exotic Invasive	X
Eurasian milfoil	<i>Myriophyllum spicatum</i>	Submerged		Exotic Invasive	X
Brittle Naiad	<i>Najas minor</i>	Submerged		Exotic Invasive	
American Lotus	<i>Nelumbo lutea</i>	Emergent	Floating-leaved	Exotic Invasive	
Stonewort	<i>Nitella sp.</i>	Alga			X
Yellow Floating Heart	<i>Nymphoides peltata</i>	Floating-leaved		Exotic Invasive	
Curly-leaf pondweed	<i>Potamogeton crispus</i>	Submerged		Exotic Invasive	
Floating-leaf Pondweed	<i>Potamogeton epihydrus</i>	Floating-leaved	Submerged		X
Clasping-Leaf Pondweed	<i>Potamogeton perfoliatus</i>	Submerged			X
Thinleaf Pondweed	<i>Potamogeton pusillus</i>	Submerged			X
Arrowhead	<i>Sagittaria sp.</i>	Emergent	Submerged		X
Water Chestnut	<i>Trapa natans</i>	Floating-leaved		Exotic Invasive	
Inflated Bladderwort	<i>Utricularia inflata</i>	Submerged	Floating-leaved	Exotic Invasive	
Common bladderwort	<i>Utricularia macrorhiza</i>	Submerged			X
Water Celery	<i>Vallisneria americana</i>	Submerged			X