

2026 SUBMERSED AQUATIC VEGETATION SURVEY REPORT

QUEEN LAKE
PHILLIPSTON,
MASSACHUSETTS



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Phillipston, MA 01331

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The Queen Lake Association hired Pondweed Pursuits to perform an aquatic vegetation survey. The survey was conducted on June 17, 2026. The weather was clear and hot, with winds at 5- 10mph. A 15-foot boat was used to tour the littoral zone. A throw-rake was utilized to collect bottom vegetation to confirm species identification and relative abundance. A hand-held Garmin GPS collected points at random, or where nuisance and/or invasive species were identified. An onboard Lowrance was utilized as a tool to understand the plant biomass below the surface to aid in identifying aquatic vegetation.

Queen Lake is roughly a 150-acre lake. Most of the shoreline is made up of residential houses, with a public beach at the southern end. The lake has a variation of habitats that allows different species of plants to grow according to their habitat preference. In general, the bottom of Queen Lake is made up of erratic piles of boulders in varying sizes, often sitting just below the surface, as well as a mix of organic matter and sand. There are a few small islands, shallow coves, and a large wetland on the north-western shoreline of the lake.

SURVEY RESULTS

During the survey, two (2) non-native, invasive species were identified: Variable watermilfoil (*Myriophyllum heterophyllum*), and fanwort (*Cabomba caroliniana*). Sixteen (16) native species and two macro-alga were also identified at the time of the survey (**Table 1**).

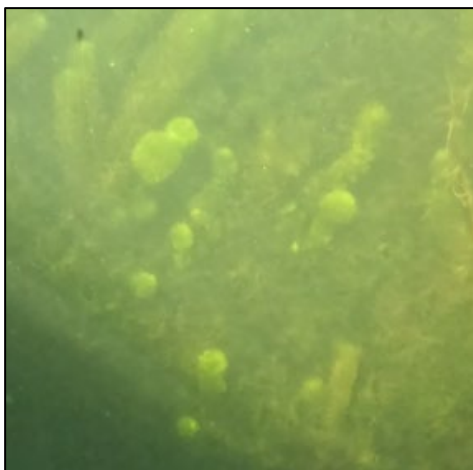
Table 1: Species identified on June 17, 2026

#	COMMON NAME	SCIENTIFIC NAME	
1	Fanwort	<i>Cabomba caroliniana</i>	INVASIVE
2	Variable Watermilfoil	<i>Myriophyllum heterophyllum</i>	
3	Muskgrass	<i>Chara spp.</i>	MACRO-ALGA
4	Stonewort	<i>Nitella spp.</i>	
5	Watershield	<i>Brasenia schreberi</i>	FLOATING-LEAF
6	Yellow Waterlily	<i>Nuphar variegata</i>	
7	White Waterlily	<i>Nymphaea odorata</i>	
8	Little floating-heart	<i>Nymphoides cordata</i>	
9	Spikerush	<i>Eleocharis spp.</i>	SUBMERSED
10	Pipewort	<i>Eriocaulon aquaticum</i>	
11	Low watermilfoil	<i>Myriophyllum humile</i>	
12	Slender Naiad	<i>Najas flexilis</i>	
13	Snail-seed Pondweed	<i>Potamogeton bicupulatus</i>	
14	Ribbon-leaf Pondweed	<i>Potamogeton epihydrus</i>	
15	Robbin's Pondweed	<i>Potamogeton robbinsii</i>	
16	Spiral Pondweed	<i>Potamogeton spirillus</i>	
17	Burreed	<i>Sparganium sp.</i>	
18	Mixed Bladderwort	<i>Utricularia gemniparis</i>	
19	Purple Bladderwort	<i>Utricularia purpurea</i>	
20	Floating Bladderwort	<i>Utricularia radiata</i>	
21	Water-moss	<i>Fontinalis spp.</i>	

Variable watermilfoil populations were observed in three separate areas of the lake (Figure 1, below). Growth was observed just below or at the surface in depths between one (1) and ten (10) feet (photo below). The beach area presented the highest rate of variable watermilfoil, with an extensive patch to the immediate north of the swimming area, extending to the eastern shoreline of the beach area. The second area is the adjacent cove in the southern end of the lake along Samuel Drive. The milfoil in this area is considered sparsely populated. Variable watermilfoil was also sparsely to moderately abundant in Lambs Cove.



Fanwort was distributed throughout the lake (Figure 2, below), present in sparse to moderate abundances in the north-western wetland, Lamb's Cove, and Samuel Drive. It was also present in trace abundances in the cove along Pine Point. Fanwort was still relatively low in the water column at this time (photo, below).



Considering native species, the most common and distributed pondweed observed was Robbin's pondweed (*P. robbinsii*) (see Aquatic plant library for description and associated photos). Robbin's Pondweed is not often seen at the surface, unless in very shallow water (<3ft) and typically spreads horizontally along the bottom. A more obvious pondweed present at the surface was ribbon-leaf pondweed. It was scattered nesting along docks, swimming areas, and coves in sparse to moderate patches. If considered a nuisance to residents, it can be hand-pulled very easily or it can be treated with herbicides. The hypolimnion, or bottom zone of the lake, was layered in slender naiad (*N. flexilis*), purple bladderwort (*U. purpurea*), water-moss (*Fontinalis* spp.), and macro-alga. Purple bladderwort and water-moss was extremely common, found throughout the lake in varying depths. Purple bladderwort *can* become a nuisance as it experiences "bloom" years where the population explodes due to successful turion germination rates in a single season. Bladderwort can be managed by herbicide or hand-pulling, if necessary.

SUMMARY

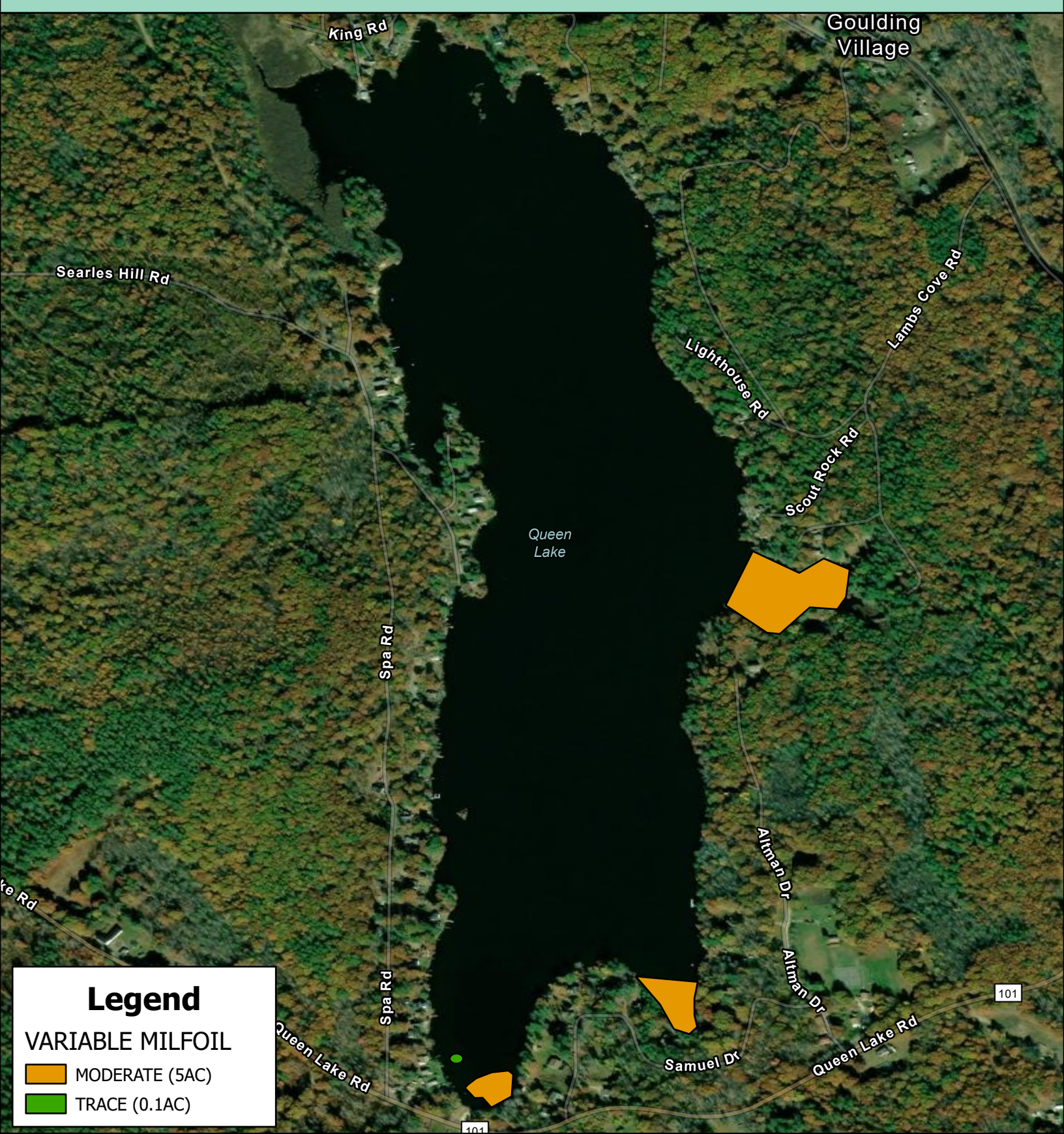
It is recommended to perform an aquatic herbicide application to manage the abundance and distribution of both fanwort and variable watermilfoil. If later in the season, the native species such as ribbon-leaf pondweed and/or bladderwort reach a nuisance level that is frustrating residents, an herbicide application can be performed to take care of the biomass to keep swimming and boating areas free of hazards.

Overall, Queen Lake is a meso-trophic waterbody with stable productivity and a healthy aquatic plant assemblage. Managing aquatic plants is an integral part of a successful lake management program. Being proactive in maintaining native growth while reducing non-native, invasive abundance and distribution is important to sustaining a healthy assemblage and proper productivity, habitat, and food sources for aquatic wildlife.

Thank you for your continuous stewardship in the health and well-being of Queen Lake.

~Amanda Polchlopek, Pondweed Pursuits, LLC.

FIGURE 1: RELATIVE ABUNDANCE OF VARIABLE WATERMILFOIL (M. heterophyllum)



QUEEN LAKE
PHILLIPSTON, MA
42.532515°, -72.114395°

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**FIGURE 2: RELATIVE ABUNDANCE OF FANWORT
(*C. caroliniana*)**

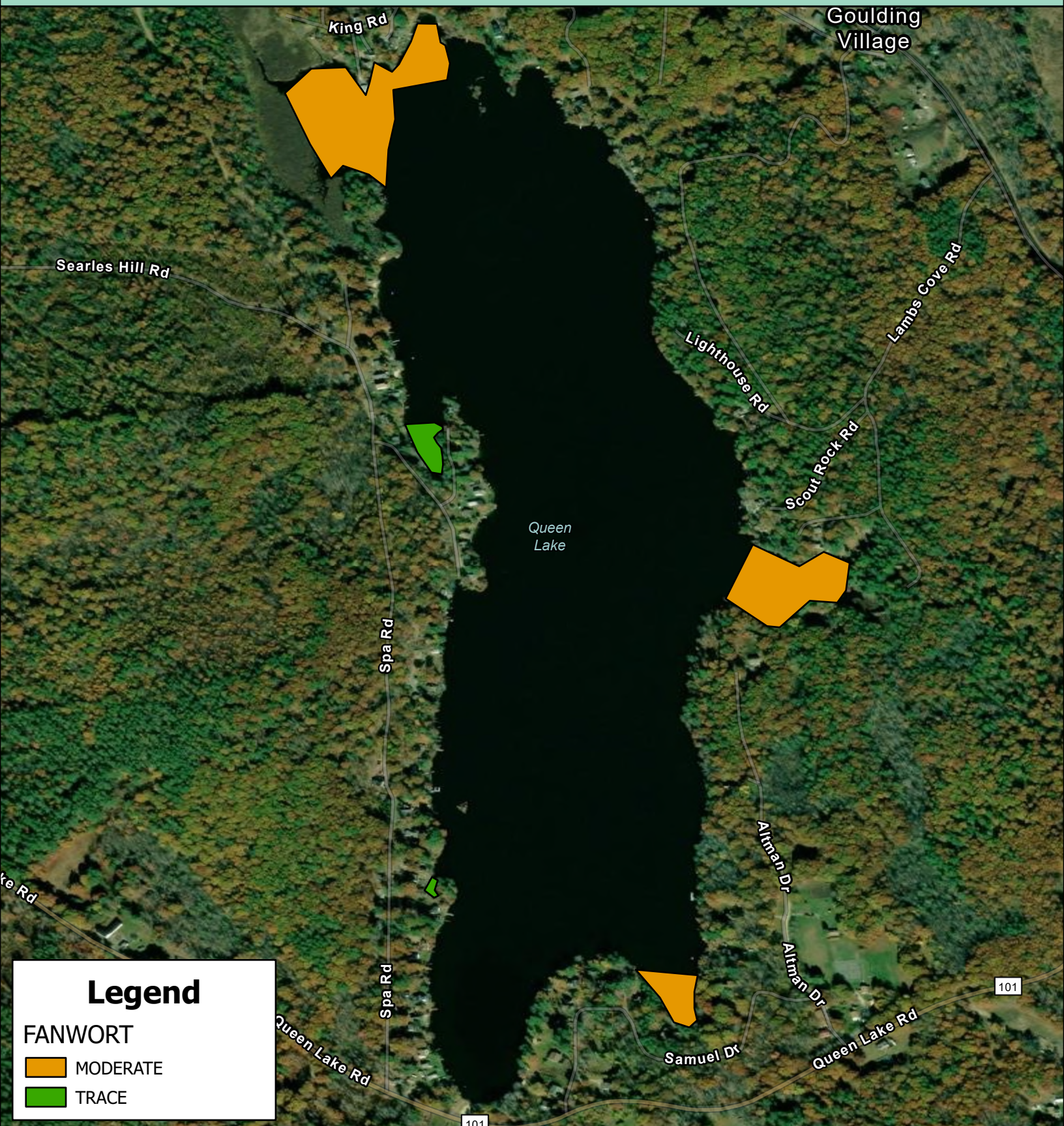
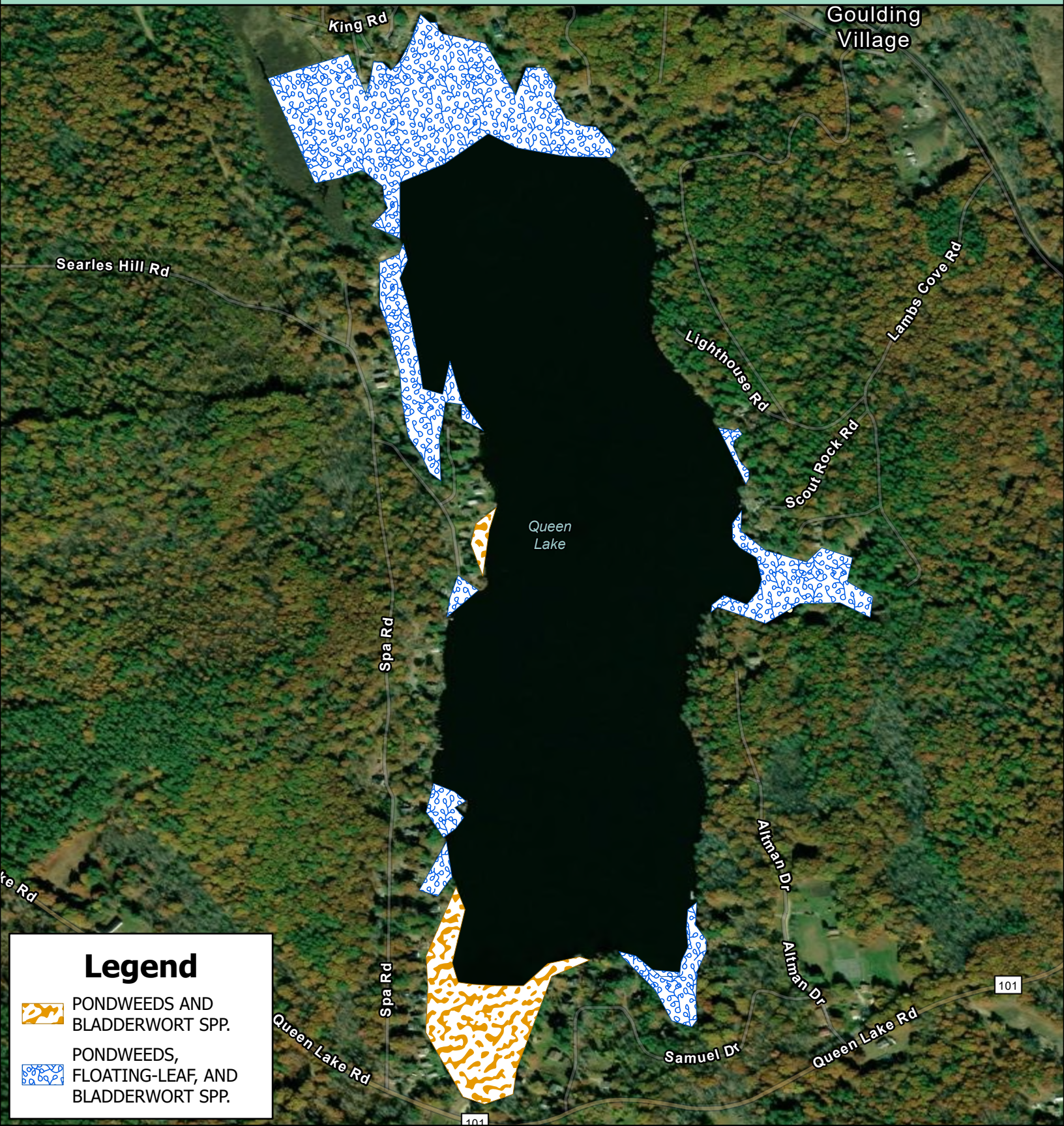


FIGURE 3: RELATIVE ABUNDANCE OF NATIVE SPECIES



Legend

-  PONDWEEDS AND BLADDERWORT SPP.
-  PONDWEEDS, FLOATING-LEAF, AND BLADDERWORT SPP.

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AQUATIC PLANT LIBRARY

Watershield (*Brasenia schreberi*) **Native:** Watershield is a floating-leaf aquatic plant similar to water lilies. Its stem and leaves are elastic, and are attached to a rooted rhizome that acts as an anchor and source of stored nutrients. The leaf stalks are attached to the middle of the leaf. The leaves are green on the upper surface, and purple underneath. Maroon to purple flowers peak above the water's surface on short, stout stalks. Watershield is usually coated with a clear gelatinous slime on the stem and underside of the leaves. Watershield prefers soft-water lakes and ponds in sediments containing decomposing organic matter. The whole plant is consumed by waterfowl, and the floating leaves provide shade and cover for fish.



Fanwort (*Cabomba caroliniana*) **Non-native, Invasive:** Fanwort is a submerged rooted herb, native to Southeastern United States, from Virginia to South Florida. A popular aquarium plant, fanwort has since spread to much of the Northeast, and even parts of the Northwest, and is considered a non-native invasive species in these regions. Fanwort prefers sluggish streams, or acidic ponds and lakes. It can reach six feet long, and can colonize water up to ten feet deep. Fanwort has slender stems covered with a thin gelatinous slime, and two types of leaves. Submerged leaves are green and situated in a whorl pattern, similar to a fan. The floating leaves are alternate and linear, about one half to one inch in diameter. Fanwort blooms in the fall, producing small white flowers with a slight pinkish tint. Although it can reproduce via seed germination, it can also reproduce by fragmentation. In late summer, the stems become brittle, and break easily. The loose fragments can then

rapidly move throughout the aquatic system due to natural flow patterns. Unattached plants can even continue to grow, indicating it removes most of its nutrients directly from the water column instead of the sediment. Due to its rapid spreading, it can occur in dense stands, clogging streams or canals, and impairing aquatic systems. Fanwort provides suitable habitat for aquatic invertebrates and fish.

Macroalga Native (*Nitella* sp./*Chara* sp.): Stonewort is a multi-branched algae that appears as a higher plant. It lacks conductive tissue and roots, using simple anchoring structures called rhizoids. Stem lengths can reach 0.5 meters, and leaves are arranged in whorls. Although similar in appearance to muskgrass, stonewort has smooth stems and branches, and lacks the distinct musky odor. *Nitella* inhabits soft sediments in the deeper water of lakes. It can be found as deep as 10 meters. Fish and waterfowl graze on Stonewort. Muskgrass tends to be found in shallower depths with harder water. It is often stiffer than stonewort and produces bright orange spores found along the 'leaflets'. As its name implies, Muskgrass has a distinct odor similar to skunk that makes it easily distinguishable from stonewort when removed from the water. Both species are naturally occurring in freshwater bodies and pose no threat.



Muskgrass



Stonewort

Needle Spikerush (*Eleocharis acicularis*) **Native:** Needle spikerush is a widespread species found throughout New England. It can form dense rooted and floating mats that can be a nuisance in swimming areas. The inflorescence is a seed surrounded by scales and is found at the tip of the plant. This species spreads via rhizome and has one or more storage organs, called tubers, that aid in reproduction success. This plant can be found in lakes, ponds, rivers, streams, meadows, floodplains, and along shorelines.



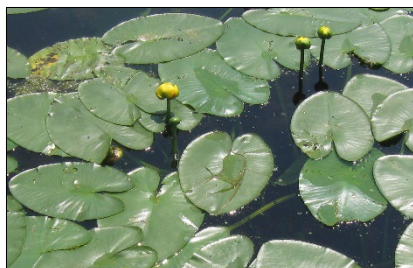
Variable Watermilfoil (*Myriophyllum heterophyllum*) **Non-native:** Variable water milfoil has stems that originate from a robust rootstalk. The leaves are divided like a feather, adorned with 7-12 pairs of thread-like leaflets, and usually arranged in a whorl. These whorls are spaced closely together, usually no more than 10 mm apart. Flowers and seeds are clustered on a spike that sticks out of the water. This spike is adorned with bracts (reduced leaves) that are blade-shaped with a deep, toothy margin. These oddly-shaped bracts give this water milfoil a unique appearance and its name. Flowers are small with a pink to red tint, and seeds are hard, four-part fruit with low ridges on its back and a small, hooked beak. Variable watermilfoil can grow in a wide variety of sediments up to 5 meters deep. It is often found

in large dense stands that can crowd out other desirable submersed plants. It over winters via hardy rootstalks and rhizomes, but can also reproduce via fragmentation during the growing season. The fruit and foliage is grazed upon by waterfowl, and the dense stands of growth provide suitable aquatic invertebrate habitat. Fish also use the dense stands of growth for shelter, shade areas, and foraging.



Low Watermilfoil (*Myriophyllum humile*) **Native:** Low milfoil is a submersed perennial with delicate stems usually less than one meter long. From these stems are mainly alternate short stalks, with 4 to 8 pairs of capillary-divided leaves. The minute fruit are round-backed and smooth, a distinguishing characteristic of this milfoil. Flowers are produced in axils of submersed and emerged leaves. Low milfoil inhabits shallow ponds and streams, preferring muddy banks after water recedes. The entire low milfoil plant is considered a low grade duck food, and beds of low milfoil provide cover and suitable habitat for small fish and aquatic invertebrates.

Slender Naiad (*Najas flexilis*) **Native:** Slender naiad has fine-branched stems that can taper to lengths of one meter, originating from delicate rootstalks. Plant shape varies; sometimes compact and bushy, other times long and slender, depending on growing conditions. The leaves are short (1-4 cm long) and finely serrated, tapering to a point. It is found in a variety of habitats, and can colonize sandy or gravelly substrates. If conditions are ideal, it can reach nuisance densities. It is a true annual, and dies off in the fall, relying on seed dispersal to return the next year. It is an important food source for waterfowl.



Yellow Waterlily (*Nuphar variegata*) **Native:** Yellow waterlily leaf stalks emerge directly from a submerged fleshy rhizome. It has heart-shaped leaves with a prominent notch. Depending on the habitat, these leaves can be held aloft via erect stems. A distinguishing characteristic of yellow waterlily is the leaf stalk, which bears a winged margin. Flowering occurs in the summer and, the flowers open during the day and close at night. It typically inhabits quiet water less than two meters deep with a soft substrate, such as ponds, shallow lakes and slow-moving streams. The leaves offer shade and protection for fish, and the leaves, stems, and flowers are grazed upon by muskrats, beaver, and sometimes, even

deer.

Snailseed Pondweed (*Potamogeton bicupulatus*) **Native:** Snailseed pondweed is a thin-leaf pondweed with submersed leaf blades at a width of 0.1-0.4mm and a length between 15-110mm. Snailseed pondweeds do have floating leaves that are elliptic or lanceolate. Flowers are borne on a spike. The plant reproduces by seeds and rhizomes. It can form thick and tall patches but typically does not become problematic.



Ribbon-leaf Pondweed (*Potamogeton epihydrus*) **Native:** Ribbon-leaf pondweed has flattened stems and two types of leaves. The submersed leaves are alternate on the stem, lack a leaf stalk, and are long tape-like in shape. Each leaf, which can reach lengths up to 2 meters long, has a prominent stripe of pale green hollow cells flanking the midvein, and 5 to 13 other veins. Stipules are not fused to the leaf. Floating leaves are egg or ellipse-shaped, and supported by a leaf stalk about as long as the leaf itself. Fruiting stalks are located at the top of the stem and packed with flattened disk-shaped fruits. It is typically found growing in low alkalinity environments, and in a variety of substrates. Seeds are highly sought after by all manner of waterfowl.

Robbins Pondweed (*Potamogeton robbinsii*) **Native:** Robbins pondweed has robust stems that emerge from spreading rhizomes. The leaves are strongly ranked creating a fern-like appearance most clearly seen while still submerged. Its distinct closely spaced fern-like leaves give it a unique appearance among the pondweeds of our region. Each leaf is firm and linear, with a base that wraps around the stem. At the stem it has ear-like lobes fused with a fibrous stipule. No floating leaves are produced. Robbins pondweed thrives in deeper water, and under some circumstances, it can over winter green. Robbins pondweed creates suitable invertebrate habitat, and cover for lie-in-wait predaceous fish, such as pickerel and pike.



Spiral-fruited Pondweed (*Potamogeton spirillus*) **Native:** Spiral-fruited pondweed has slender stems that originate from a delicate, spreading rhizome. The stems tend to be compact and have numerous branches. Submersed leaves are linear with a curved appearance. Floating leaves are delicate, ellipse-shaped and range from 7 to 35 mm long and two to 13 mm wide. Stipules are fused to the leaf blade for more than half of their length. Nut-like fruits are produced on stalks of varies lengths. The fruit itself is a flatten disc with a sharply-toothed margin. Its smooth sides appear like a tightly coiled embryo, a distinguishing characteristic. Spiral-fruited pondweed prefers shallow water with sandy substrate but can inhabit a wide range of bottom substrates. It serves as an important stabilizer and cover for fish fry and invertebrates.

Burreed (*Sparganium sp.*) **Native:** Burreed is an emergent plant that reaches heights of 1.5 meters. It prefers the moist soil of lake margins, to a depth of one meter. The leaves (6 to 12 mm wide) are spongy with a compressed triangular cross-section. Ribbon-like floating and submersed leaves may also be present. Rhizomes are shallow, intricate networks. The zig-zag flower stalks are covered with gumball-like spherical blooms. The individual fruits mature with outward facing beaks that can be used for positive identification to species. Common bur-reed has two stigmas on each nutlet and a wide flat top. Burreed is a perennial that overwinters with hardy rhizomes. Common bur-reed has many beneficial ecological traits, such as sediment stabilization, providing nesting sites for waterfowl. The whole plant is consumed by deer and muskrat.



Bladderwort species (*Utricularia purpurea*, *Utricularia gemniparis*, *Utricularia radiata*) **Native:** Bladderwort is a free-floating plant that can reach 2-3 meters in length. Since they are free-floating, they can grow in areas with very loose sediment. Along its stem are finely divided leaf-like branches. Scattered about the branches are numerous bladders, used to capture prey ranging from the size of unicellular protozoans (such as *Euglena*), to mosquito larvae. Prey is slowly digested inside the bladders by enzymes. Bladderworts have flowers borne on a flowering stem. *U. vulgaris*, *U. minor*, *U. radiata* all have yellow flowers while *U. purpurea* has purple flowers. Stems of bladderwort provide food and cover for fish.



U. gemniparis

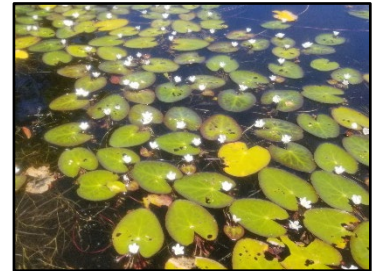


Floating pontoon of *U. radiata*



U. purpurea

Little Floating-heart (*Nymphoides cordata*) **Native:** Little floating-heart is considered a floating-leaf species. It can be mistaken for an immature white water lily or watershield, but the small stature is an identifiable characteristic of this species. The leaves of little floating-heart have scalloped edges that is another unique characteristic. Little floating-heart produces small white flowers in early summer that project above the water surface. Below the leaf, a group of tuberous roots can appear under the floating-leaf which resembles a bushel of bananas; again, another unique characteristic. This charming little floating-leaved species is native to North America and is common throughout New England.



Water Moss **Native** (*Fontinalis* sp. Common Name: water moss.): Water mosses are submerged mosses that are attached to rocks, trees, logs, and other hard substrates by false rootlets located at the base of their stems. The stems are dark-green to brown, and about one foot long. The leaves share a similar color as the stems, and are usually ovate with fine-toothed margins. Water moss is utilized by aquatic invertebrates, and as a breeding site for small fish. Water moss rarely reaches nuisance levels. In Queen Lake, water moss is very abundant, blanketing the bottom sediments and layered along the submerged rocks.