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Minerva Lake 2025 Aquatic Macrophyte Survey Report

Submitted November 6, 2025

Report Prepared by Chris Doyle, CLM

Background

Minerva Lake is located in the town of Minerva, NY (Essex County) part of the Adirondack Park. The lake is approximately 79 surface acres and was created by daming the Jones Brook. The lake features a swimming beach (Donnelly Beach), non-motorized (kayak, canoe, paddleboard) boating and fishing.

Eurasian water milfoil became established in the lake around 2007. Since then, it has been managed with annual diver-assisted suction harvesting (DASH). In 2020, the lake was treated with the herbicide ProcellaCOR EC targeting 41 acres of Eurasian water milfoil growth. The treatment was considered a success, with five years of Eurasian water milfoil control, requiring little DASH efforts in years 3-5 to address areas of regrowth. Each year since the treatment, a detailed aquatic macrophyte survey has been conducted to monitor the re-growth of Eurasian water milfoil and determine future managemnet efforts.

Methodology

On September 3, 2025, Ready Scout, LLC. conducted a detailed aquatic macrophyte survey of Minerva Lake. The survey crew included Glenn Sullivan and Brenden Bixby (Ready Scout, LLC) and Chris Doyle (Naiad Consultants). The survey was performed using a 16 foot aluminum boat with a 25 hp motor. The boat was piloted to 82 GPS-referenced sampling locations based on historical surveys conducted at the lake, uploaded to the Lowrance Elite Sonar Fishfinder/Depthfinder prior to the survey. At each survey point, water depth was measured and recorded. One survey location (# 71) could not be accessed due to low water levels during the time of the survey. The average depth of all sample sites was 6.8 feet (2.07 meters). Aquatic plants were observed visually at each location, and if water depths were greater than one meter, a double-sided sample rake on a 40 foot rope was tossed and retrieved to collect plants. Minerva Lake boasts a high richness (n=25) of aquatic macrophytes and this survey focused on submerged and floating macrophytes.

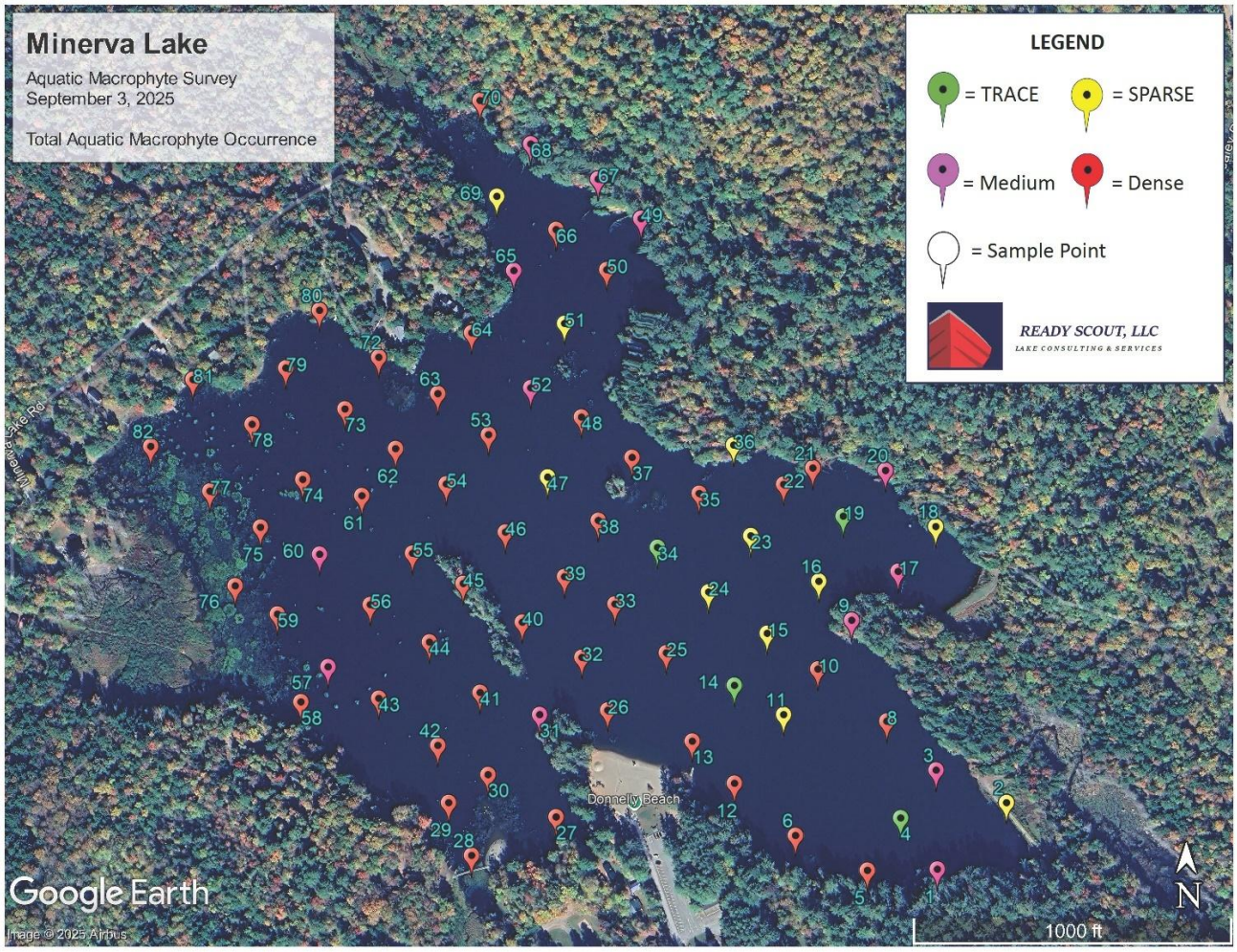
Aquatic macrophytes, both observed and collected were identified to the lowest practical taxa (typically species) using the texts *Through the Looking Glass – A Field Guide to Aquatic Plants*[1] (2001 Edition) and the *Maine Field Guide to Invasive Aquatic Plants* (2007 Edition)[2]. Plant samples were brought onto the boat and assigned an overall density.

In shallow areas, overall density was based on the amount of sediment visible and the volume of vegetative biomass seen in the water column. For retreived samples, the overall abundance was based on the amount of

macrophytes on the rake. Once overall abundance was assigned, then each species was identified in the sample and given its own species abundance using the density categories of Trace, Sparse, Medium (or Moderate), and Dense, as described by other regional aquatic macrophyte surveys:

- **Trace** – 1-2 stems
- **Sparse** – 3-10 stems
- **Moderate** (Medium) – Rakeful, no empty tines
- **Dense** – Rakeful, no visible tines

The density descriptions reflect each plant's specific growth patterns, allowing for smaller species that may be still dense (i.e. slender naiad) to be recorded as such, and to be consistent with plants capable of larger growth (i.e. bassweed). Macrophyte species that were visible and identifiable from the boat but not collected in the rake toss were also assigned an abundance density.



Minerva Lake 2025 Sampling Locations

Results and Analysis

The following pages contain tables identifying the plant species representation and densities, and representative photos of plants from the post-treatment plant survey. Maps of each species found at the sample sites and the raw sampling data are found in the Appendix.

Minerva Lake 2025 Aquatic Macrophyte Summary

Species	Common name	Native/Invasive	Type*
Potamogeton amplifolius	Bassweed	Native	S
Potamogeton obtusifolius	Blunt-leaved pondweed	Native	S
Sparganium sp.	Bur-reed	Native	E
Chara sp. *and Nitella* sp.	Macroalgae	Native	M
Utricularia vulgaris	Common Bladderwort	Native	S
Elodea canadensis	Common Waterweed	Native	S
Utricularia gibba	Creeping Bladderwort	Native	S
Myriophyllum spicatum	Eurasian Water Milfoil	Invasive	S
	Filamentous Algae	Native	S/F
Potamogeton zosteriformis	Flat Stem Pondweed	Native	S
Potamogeton natans	Floating-leaf Pondweed	Native	S/F
Pontederia cordata	Pickerelweed	Native	E
Potamogeton epihydrus	Ribbon-leaf Pondweed	Native	S
Potamogeton robbinsii	Robbin's Pondweed	Native	S
Stuckenia pectinata	Sago Pondweed	Native	S
Najas flexilis	Slender Naiad	Native	S
Utricularia minor	Small Bladderwort	Native	S
Najas guadalupensis	Southern Naiad	Native/Invasive	S
Nuphar variegata	Spatterdock	Native	F
Potamogeton strictifolius	Straight-leaved Pondweed	Native	S
Potamogeton sp.	Thin Leaf pondweed	Native	S
Potamogeton gramineus	Variable Leaf Pondweed	Native	S
Heteranthera dubia	Water Stargrass	Native	S
Brasenia schreberi	Watershield	Native	F
Nymphaea odorata	White Waterlily	Native	F

S= submersed
F=Floating
E= Emergent
M= Macroalgae

Minerva Lake 2025 Aquatic Macrophyte – Percent Abundance

Aquatic Macrophyte	Total		Trace		Sparse		Medium		Dense	
	Sites	%	Sites	%	Sites	%	Sites	%	Sites	%
TOTAL SITES	82									
Overall Abundance	82	100%	4	5%	11	13%	13	16%	52	63%
Southern Naiad	69	84%	3	4%	19	28%	18	26%	29	42%
Common Waterweed	64	78%	11	17%	24	38%	17	27%	12	19%
Bassweed	35	43%	6	17%	21	60%	8	23%	0	0%
Flat Stem Pondweed	31	38%	21	68%	8	26%	2	6%	0	0%
Ribbon-leaf Pondweed	30	37%	16	53%	12	40%	2	7%	0	0%
White Waterlily	29	35%	21	72%	7	24%	1	3%	0	0%
Eurasian Water Milfoil	28	34%	20	71%	8	29%	0	0%	0	0%
Watershield	25	30%	12	48%	9	36%	4	16%	0	0%
Bur-reed spp.	14	17%	11	79%	3	21%	0	0%	0	0%
Slender Naiad	13	16%	5	38%	7	54%	1	8%	0	0%
Chara/Nitella spp.	13	16%	9	69%	3	23%	1	8%	0	0%
Robbin's Pondweed	13	16%	3	23%	2	15%	4	31%	4	31%
Spatterdock	13	16%	9	69%	3	23%	1	8%	0	0%
Straight-leaved Pondweed	12	15%	9	75%	3	25%	0	0%	0	0%
Filamentous algae	10	12%	7	70%	2	20%	1	10%	0	0%
Variable Leaf Pondweed	8	10%	5	63%	3	37%	0	0%	0	0%
Pickerelweed	7	9%	6	85%	1	15%	0	0%	0	0%
Thin-leaf pondweed	6	7%	4	67%	1	17%	1	17%	0	0%
Water Stargrass	4	5%	4	100%	0	0%	0	0%	0	0%
Floating-leaf Pondweed	2	2%	1	50%	0	0%	1	50%	0	0%
Sago Pondweed	1	1%	1	100%	0	0%	0	0%	0	0%
Common Bladderwort	1	1%	0	0%	0	0%	1	100%	0	0%
Blunt-leaved pondweed	1	1%	1	100%	0	0%	0	0%	0	0%
Small Bladderwort	1	1%	0	0%	1	100%	0	0%	0	0%
Creeping Bladderwort	1	1%	1	100%	0	0%	0	0%	0	0%

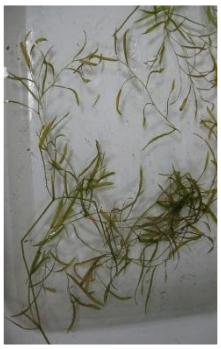
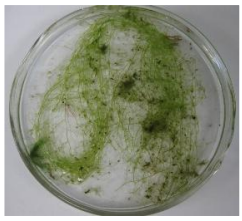
Photo Credits:

Straight-leaved Pondweed, Pickerelweed, bur-reed: www.go-botany.nativetrust.org

Creeping Bladderwort, Common bladderwort, bassweed, flat-stem pondweed, water stargrass, variable-leaf pondweed, sago pondweed, macro-algae, southern naiad, slender naiad: Chris Doyle

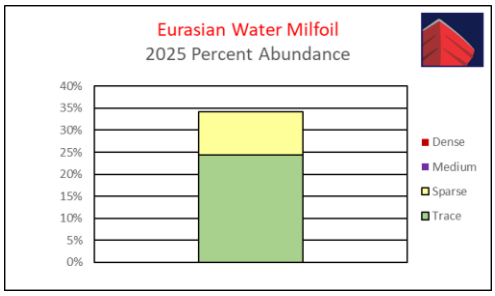
Minerva Lake Aquatic Macrophytes

 Southern Naiad	 Common Waterweed	 Bassweed	 Flat-stem Pondweed	 Ribbon-leaf Pondweed
 White Water Lily	 Eurasian Water Milfoil	 Watershield	 Bur-reed	 Slender Naiad
 Macroalgae	 Robbin's Pondweed	 Spatterdock	 Straight-leaved Pondweed	 Filamentous Algae

 Variable Leaf Pondweed	 Pickerelweed	 Thin-leaf Pondweed	 Water Stargrass	 Floating-leaf Pondweed
 Sago Pondweed	 Common Bladderwort	 Blunt-leaved Pondweed	 Small Bladderwort	 Creeping Bladderwort

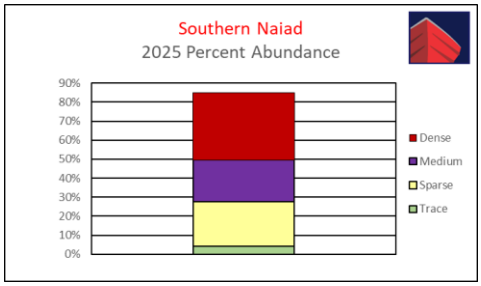
Summary of Findings

Minerva Lake has a healthy abundance of submersed aquatic macrophyte biomass and high diversity (n=25). The diversity we observed in 2025 is consistent with previous reported survey data. Two macrophytes were dominant in the lake, occurring at greater than 75% of the survey locations: southern naiad (84%) and common waterweed (78%). Southern naiad is considered invasive in New York by the New York State Invasive Species Council, although its only considered a moderate threat due to its low growth pattern. We did observed the target macrophyte, Eurasian water milfoil, which occurred at 34% of the sites surveyed. Individual species maps are included in the appendix of this report, and should be refered to during this discussion.



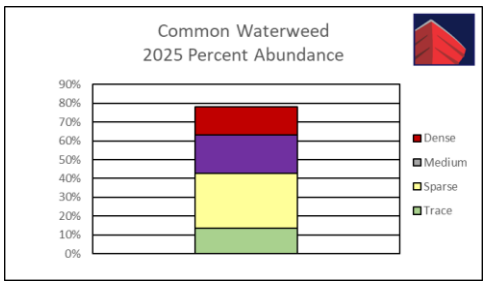
Eurasian Water Milfoil (*Myriophyllum spicatum*)

Eurasian water milfoil is an aggressive invasive submersed macrophyte and was the target species for this 2025 survey. Euarasian water milfoil occurred at 28 (or 34%) of the sample locations surveyed in 2025. Many of these were obsevations of individual plants at the designated survey sites, although we did recover plants on tossed weed rakes. Thus, most of these sites were trace (71%) with the remaining sites being sparse abundance. Eurasian water milfoil occurred throughout the basin, but the sparse locations were mostly found in the southern part of the basin. Overall Eurasian water milfoil preferred the eastern shoreline and the western shoreline.



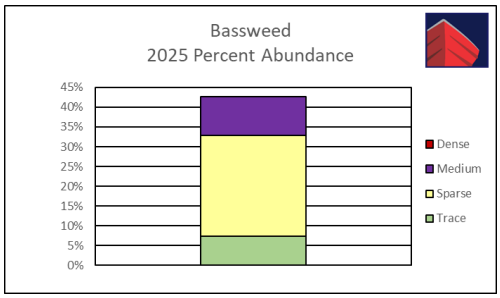
Southern Naiad (*Najas guadalupensis*)

Southern naiad was the most common submersed aquatic macrophyte collected during the 2025 survey. It was collected at 69 (or 84%) of the total sites surveyed, and was one of two naiads collected during the survey. Most of the sites had Medium or greater abundance, accounting for 66% of the sites. Trace (4%) and sparse sites (28%) were much less common. Southern naiad occurred throughout the basin, even at some of the deeper water sites, although abundance was somewhat reduced in these locations. Heavy southern naiad growth occurred along the beach and on the western side of the lake.



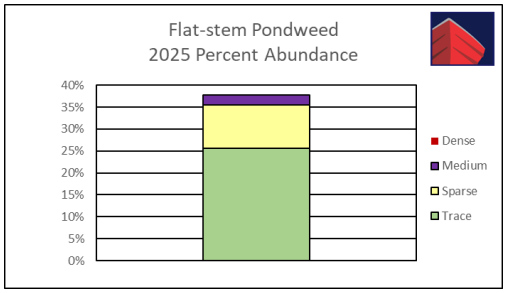
Common Waterweed (*Elodea canadensis*)

Common waterweed was the second most dominant submersed aquatic plant collected in 2025. It occurred at 64 (or 78%) of the sites surveyed in a variety of abundance classes. Trace common waterweed accounted for 17% of the occurrences, while sparse accounted for 38%. Medium sites (27%) and Dense abundance (19%) rounded out the occurrence of the this macrophyte. Established dense beds of common waterweed were found around the island, and in the southeast cove. Lower density abundance was generally located on the eastern half of the basin. It should be noted that regional aquatic macrophyte taxonomy experts are currently debating the prominence and identification of common waterweed (*E. canadensis*) and slender waterweed (*E. nuttallii*) (personal communication, B. Hellquist). During our survey we did not distinguish between the two species and simply called all occurrences *E. canadensis*.



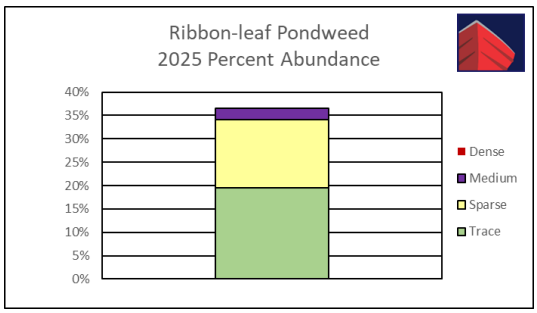
Bassweed (*Potamogeton amplifolius*)

Bassweed is one of eight pondweeds collected in 2025. Minerva Lake boasts a healthy assemblage of desirable pondweeds, and bassweed, with its broad leaves which creates excellent fish habitat, was the most common, occurring at 43% of the sites surveyed. Individual stems of bassweed were also observed in between sampling locations. Most of the sites displayed sparse (60%) bassweed abundance. Trace (17%) and Medium (23%) bassweed growth rounded out the occurrence. Bassweed occurred throughout the basin, with five medium sites occurring along the north shoreline and many sparse sites located to the west of the island.



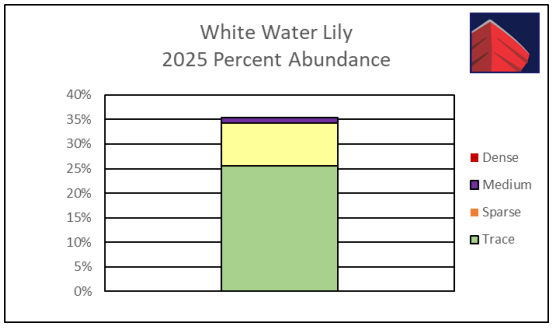
Flat-stem Pondweed (*Potamogeton zosteriformis*)

Another highly desirable native pondweed, flat-stem pondweed occurred at 31 (or 38%) of the locations surveyed in 2025. This pondweed can be distinguished from water stargrass (see below) by the presence of a prominent midvein on the strap-like leaves and the presence of stipules. Flat-stem pondweed was scattered about the basin, mostly at trace (68%) abundance, but there were several sparse sites and two medium sites as well. The medium sites were located at the southern tip of the island, and the farthest location surveyed in the northern cove.



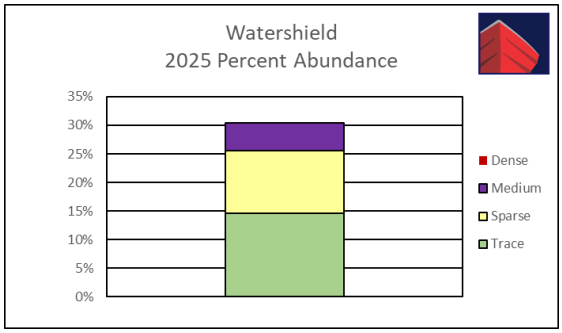
Ribbon-leaf Pondweed (*Potamogeton epihydrus*)

Ribbon-leaf pondweed is another native pondweed that occurs at Minerva Lake. Ribbon-leaf pondweed, with its ability to create dense beds and produce floating leaves, is not as desirable as other pondweeds. That said, the growth observed at Minerva Lake was non-nuisance at this time. Ribbon-leaf pondweed was collected at 30 (or 37%) of the sites surveyed. There is an even distribution between trace (53%) and sparse (40%) abundance sites, with two (or 7%) of the sites considered medium abundance. Ribbon-leaf pondweed occurred almost exclusively on the western half of the basin, with no reported growth along the southeast shoreline or the eastern cove. The medium beds were located off the beach and along the western shoreline.



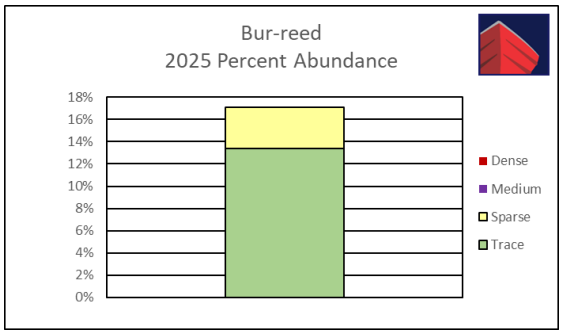
White Water Lily (*Nymphaea odorata*)

White water lily was one of three floating-leaf macrophytes observed during our 2025 survey. It has larger, round pads and produces showy white flowers. It was the most common floating macrophyte, occurring at 29 (or 35%) of the stations. Most of these sites were trace abundance (72%) along with a few sparse (24%) and one (3%) medium site. It was scattered about the basin, but more commonly occurred in the northern cove, in the northwestern cove, and the southwest cove. The medium site was located in the southwest cove, along the shoreline. White water lily is at non-nuisance abundance at Minerva Lake and is suitable wildlife habitat.



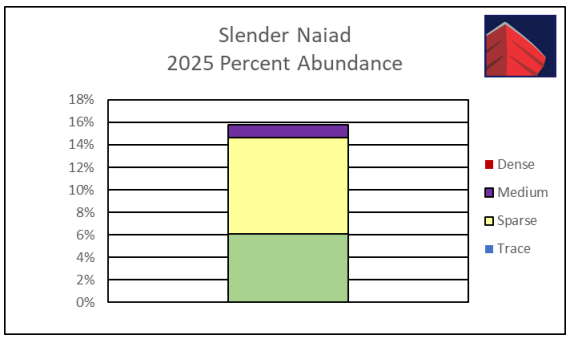
Watershield (*Brasenia schreberi*)

Watershield is the second floating leaf macrophyte collected during the 2025 survey. It has smaller, oval leaves, and the stem is centrally located on the pad. The undersides of the pad and stems are often covered with a gelatinous coating. Watershield occurred at 25 (or 30%) of the sites surveyed. Most of these sites were considered trace or sparse abundance (30% and 48%, respectively) but 4 (or 16%) medium sites were also observed. Looking at the distribution map, watershield was restricted to the western and northern shorelines.



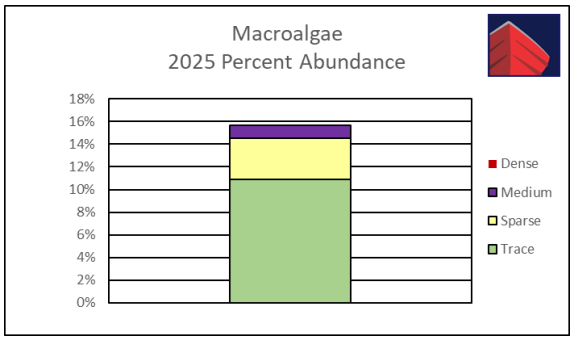
Bur-reed (*Sparganium* sp.)

Bur-reed is a true emergent macrophyte. Its typically restricted to lake margins, although it can colonize into deeper water under favorable conditions. Although not typically collected during a point intercept survey, observations of bur-reed were recorded while conducting the 2025 survey. Bur-reed was observed at 14 (or 17%) of the sites surveyed. Most observations (11 sites, or 78%) were trace abundance, comprising a few scattered stems. The remaining 3 sites were more established beds, and classified as sparse. Bur-reed was scattered about all shorelines on the basin.



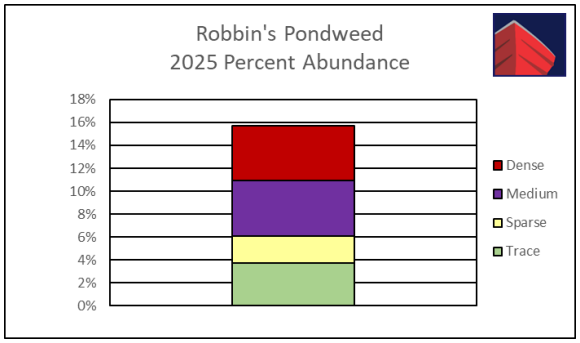
Slender Naiad (*Najas flexilis*)

Slender naiad was the second naiad collected in 2025. It's a diminutive submersed macrophyte that commonly occurs in New York and is desirable. It can be distinguished from southern naiad (and other naiad species) by its seeds, and the fleshy lobes of its leaves at the axil. It occurred at 13 (or 16%) of the sites surveyed, often intermixed with southern naiad. Trace (38%) and sparse (54%) abundance dominated the occurrence, but 1 (8%) medium site was collected as well. Slender naiad was scattered about the basin, although it was absent from the northern cove.



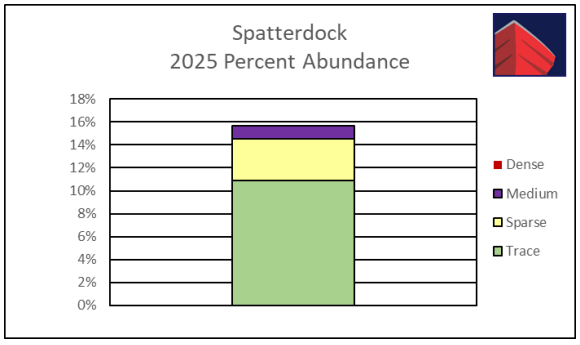
Macroalgae (*Chara* sp. and *Nitella* sp.)

Macroalgae are not true submersed aquatic plants. Yet these macroscopic (visible with the naked eye) serve a similar ecological niche as submersed plants, thus are included on aquatic macrophyte surveys. Previous surveys did not distinguish between muskgrass (*Chara* sp.) and stonewort (*Nitella* sp.), so we continued that practice. During the survey, it did appear that both types of macroalgae were present. Macroalgae was collected at 13 (or 16%) of the sites surveyed in 2025. Most of the macroalgae was at trace (69%) abundance, although a few sparse (3, 23%) and one medium (8%) was collected. Macroalgae was scattered about the basin, with higher abundance typically located along shorelines. Three sites were collected in the northern cove.



Robbin's Pondweed (*Potamogeton robbinsii*)

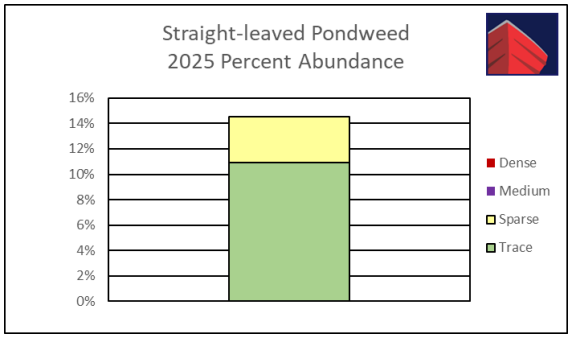
Robbin's pondweed is a highly desirable native pondweed that can establish dense low-growing beds that can inhibit other (even invasive species) growth. It rarely reaches the surface or becomes a nuisance to most lake uses, and is excellent invertebrate habitat. Robbin's pondweed occurred at 13 (or 16%) of the sites surveyed, but in a full range of abundances. It occurred at trace (16%), sparse (23%), medium (15%) and even in some of those dense beds (31%). It occurred in the open water (two medium sites), along the northern shoreline (including three dense and one medium sites), plus isolated locations along the east and west shorelines.



Spatterdock (*Nuphar variegata*)

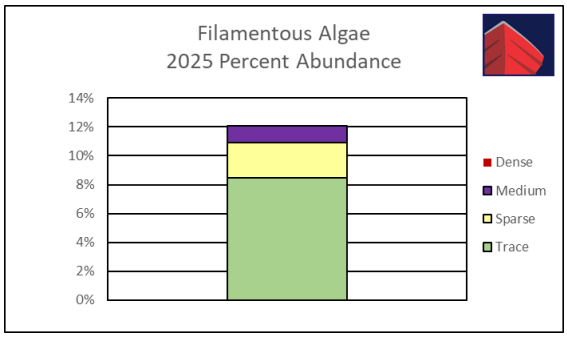
Spatterdock, sometimes called yellow water lily, is another floating leaf macrophyte. Spatterdock has larger, oval leaves with a prominent notch, that produces yellow flowers. Its easy to distinguish spatterdock between white water lily and watershield. Spatterdock occurred at 13 (or 16%) of the sites surveyed. Most were trace abundance (69%), but a few sparse (23%) and one medium (8%) site rounded out the occurrence at

Minerva Lake. Spatterdock was restricted to the northwest part of the basin, although one trace site was located in the northern cove.



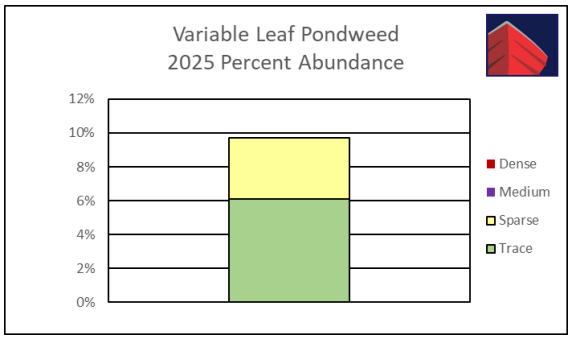
Straight-leaved Pondweed (*Potamogeton strictifolius*)

Straight-leaved pondweed is an uncommonly occurring pondweed, sometimes called strictiform pondweed. It's a delicate pondweed with all submersed linear leaves. Straight-leaved pondweed occurred at 12 (or 15%) of the sites surveyed at Minerva Lake. Most sites (75%) were considered to be trace abundance with the remaining 3 sites being classified as sparse. Straight-leaved pondweed was scattered about the basin, both at shoreline and open-water sites. It commonly occurred in and around the open water at the mouth of the eastern cove.



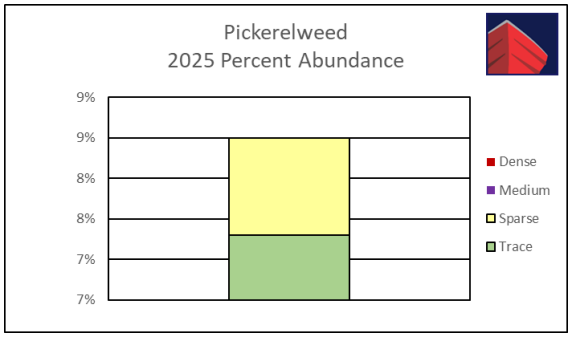
Filamentous Algae

Filamentous algae are clumps or connected strands of algae that are macroscopic (visible to the naked eye). They can be comprised of green algae and/or blue-green algae genera, and under the optimal circumstances can become a nuisance in a basin. At Minerva Lake filamentous algae was rarely forming at the surface, and instead typically was intermixed with the submersed macrophyte community. It was collected at 10 (or 12%) of the sites surveyed in 2025. Most occurrences were trace (70%) with a few sparse (20%) and one medium (10%) site. Filamentous algae was scattered about the basin.



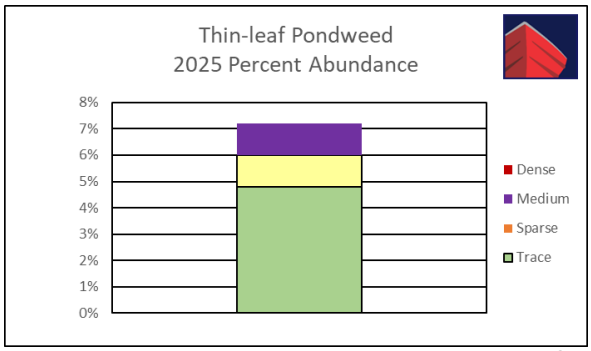
Variable Leaf Pondweed (*Potamogeton gramineus*)

Variable leaf pondweed can be tricky to identify in the field, due to its variable appearance and ability to hybridize with other pondweeds. It occurred at 8 (10%) of the sites surveyed in 2025. Five (63%) of these occurrences were considered trace, while the remaining three were sparse. Variable leaf pondweed occurred at isolated locations throughout the basin.



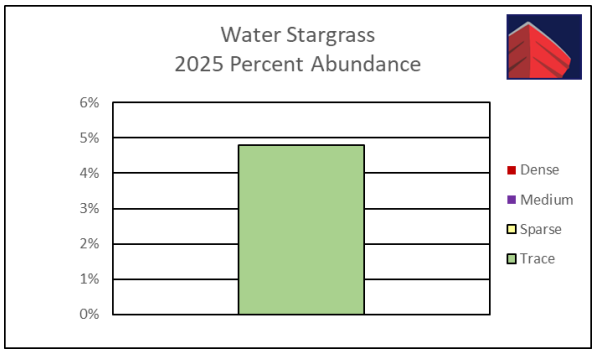
Pickerelweed (*Pontederia cordata*)

Pickerelweed is another emergent macrophyte that is highly desirable and common in the Northeast. It typically occurs along the margins of a lake and has brilliant purple flowers. Pickerelweed plants and established beds were observed during our 2025 survey. It was observed at 7 (or 9%) of the sites surveyed. Most of these (85%) were trace abundance with the last site being considered sparse. Individual beds were located along the southern shore, off the beach and island, along the western shore, and two sites along the north shore.



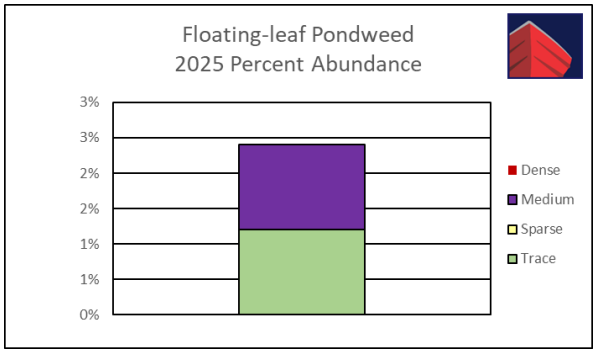
Thin-leaf Pondweed (*Potamogeton* sp.)

When a thin-leaf pondweed lacks distinguishing characteristics, such as seeds or floating leaves, we assign it to thin-leaf pondweed. The specimens were probably small pondweed (*P. pusillus*), a muddled grouping of thin-leaf pondweeds, or Berchtold's pondweed (*P. berchtoldii*) both of which have been collect at this site in the past. Thin-leaf pondweed occurred at 6 (or 7%) of the sites surveyed. Most were trace abundance (67%) but single sites of sparse and medium abundance also were collected. It was scattered throughout the basin, with the medium site being located in the southwest cove.



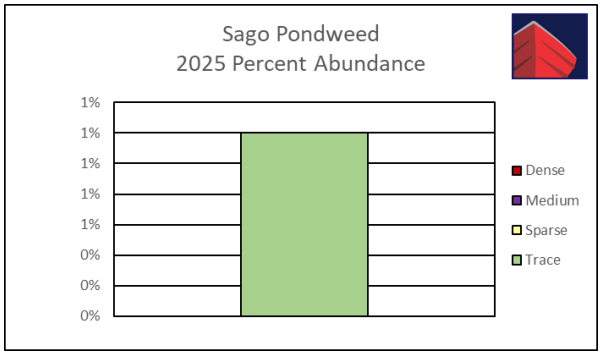
Water Stargrass (*Heteranthera dubia*)

Water stargrass can be easily confused with pondweeds, especial flat-stem pondweed. It lacks a distinct mid-vein, has limp leaves (typically pale green in color) and lacks stipules. Water stargrass is common in New York, and is generally a desirable native submersed macrophyte. At Minerva Lake it occurred at four locations, all of them considered to be trace abundance. These locations were scattered about the basin. One was along the southern shoreline (point #1), one was located in the eastern cove, another north of the island, and the final location was off the western shore.



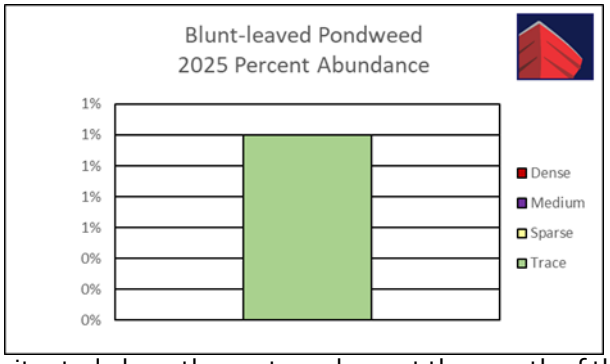
Floating-leaf Pondweed (*Potamogeton natans*)

Floating-leaf pondweed is an uncommon pondweed with reduced (or none) submersed leaves. Instead, it produces oval floating leaves and is often intermixed with other floating leaf macrophytes (such as lilies and watershield). Floating-leaf pondweed was collected at two locations during the 2025 survey. One station was trace abundance (located in the northern cove) and the other was medium abundance (located in the southwestern cove. Since we could not access station #71 in the northern cove (due to water level and macrophyte growth at the surface), it stands to reason that more floating-leaf pondweed is found at and around that location.



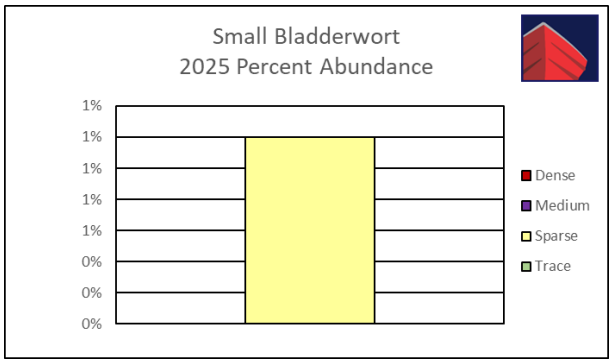
Sago Pondweed (*Stuckenia pectinata*)

Sago pondweed was another pondweed collected during the 2025 survey. It produces pine-needle-like submersed leaves in a fan-like array. It occurred at one station, at trace abundance, although we did observe some floating stems of sago pondweed while piloting between sampling locations in the southwest cove. The established bed occurred in the southwest cove.

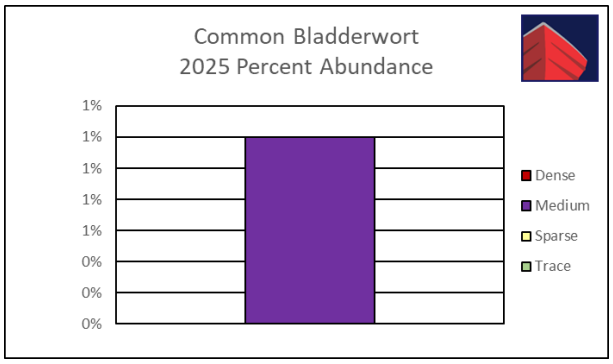


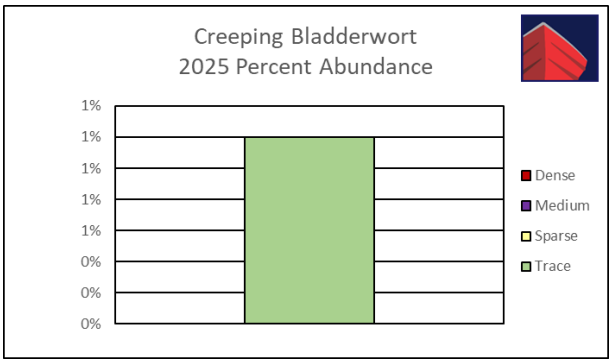
Blunt-leaved Pondweed (*Potamogeton obtusifolius*)

Blunt-leaved pondweed was the final pondweed collected during 2025. This is another thin-leaf pondweed, but it has blunt (or rounded) leaf tips. The specimens collected had seeds, so we were able to identify it to species. Blunt-leaved pondweed is very similar to Berchtold's pondweed (*P. berchtoldii*). Blunt-leaved pondweed was collected at one trace abundance location. It was located at point #36, situated along the eastern shore at the mouth of the eastern cove.



Three bladderworts were collected during the 2025 survey at Minerva Lake. Each bladderwort was identified to species, and occurred at one location, but in a variety of abundances. Small bladderwort (*Utricularia minor*) was a single sparse site along the western shoreline. Common bladderwort (*Utricularia vulgaris*) was a single medium site in the northwest corner of the basin (point #82). Creeping bladderwort (*Utricularia gibba*) was a single trace site in the northwest corner of the basin (point #82).





Recommendations

Minerva Lake boasts a healthy abundant aquatic macrophyte assemblage, with 25 different species collected or observed. Despite the high abundance, most of the species present are desirable natives, or low-growing, thus negative impacts to lake uses are minimal. Eurasian water milfoil, an aggressive invasive submersed macrophyte has returned to the lake, following suitable control from a 2020 herbicide application. It occurred at 34% of the 82 sampling locations surveyed late in 2025. Eurasian water milfoil has the potential to aggressively spread throughout the entire littoral zone of the lake, creating nuisance surface mats, altering water chemistry, and crowding out desirable native aquatic macrophytes.

In 2026, we recommend applying a herbicide to the lake for the control of Eurasian water milfoil. Lake managers typically initiate control of an invasive aquatic macrophyte when it reaches 30% occurrence in a lake. Based on the 34% occurrence at Minerva Lake, in addition to its presence throughout much of the basin, warrant control, especially considering the presence of numerous desirable native macrophytes. We suggest applying ProcellaCOR EC, the same product utilized in 2020. Using this product, we would expect at least similar control, while enjoying limited negative effects on the numerous desirable native aquatic macrophytes.

Despite the extensive, and often medium or dense abundance, occurrence of southern naiad throughout most of Minerva Lake, at this time we don't recommend control. While southern naiad can certainly reach niusance growth in shallow water lakes, the shorter growing season as well as the abundant pondweed and other native submersed growth limits the negative impacts of southern naiad. However, future southern naiad abundance and occurence should be monitored.

A crucial part of any aquatic macrophyte control program is an annual late season aquatic macrophyte survey. This survey is important to assess the success of any control methods employed for the control of target species (such as Eurasian water milfoil). Its also important to assess any impacts on non-target species, such as the native pondweeds. Furthermore, an annual detailed survey could be crucial to detect any new invasive species that colonize the waterbody, and (if necessary) determine what control methods would be needed. We recommend continuing the point intercept survey, utilizing the same GPS-referenced 82 sampling locations used since 2020.

References

1 *Through the Looking Glass: A Field Guide to Aquatic Plants*. Susan Borman, Robert Korth, Jo Temte. 1997

2 *Maine Field Guide to Invasive Aquatic Plants and Their Common Look Alikes.* Roberta Hill and Scott Williams. 2018.

3 *Aquatic Plants of Massachusetts*. Donald J. Padgett. 2021.

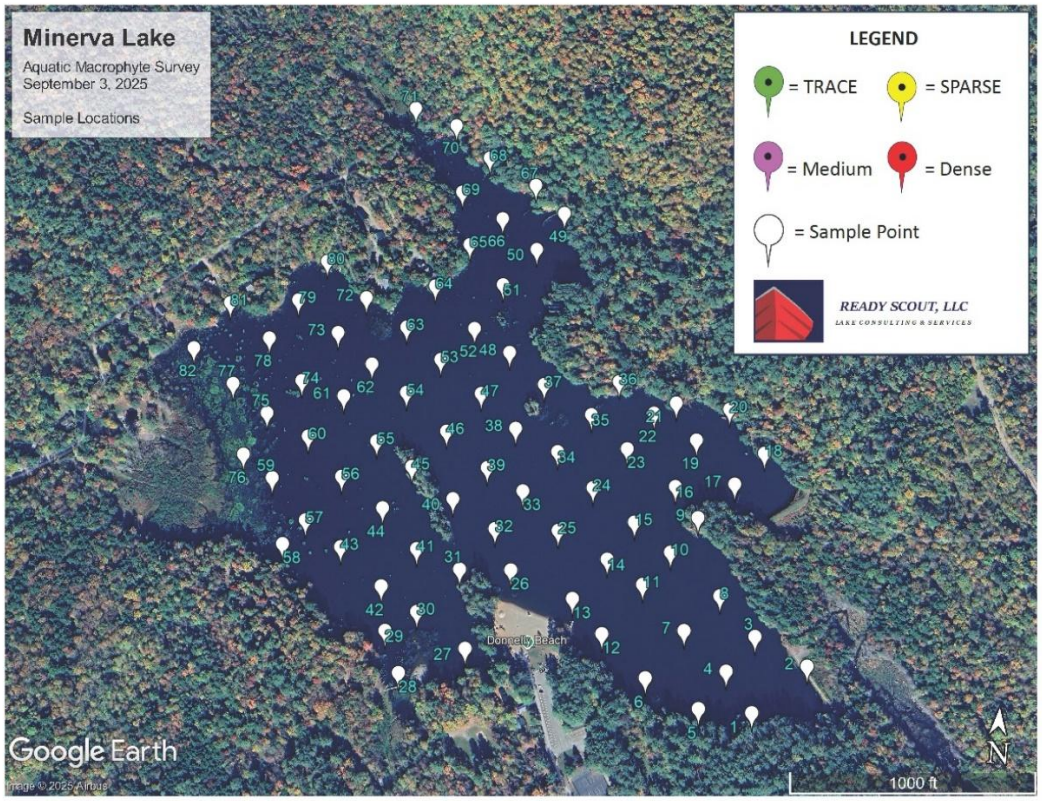
APPENDIX

Plant Species Location and Occurrence Maps

Raw Data

Minerva Lake 2025 Aquatic Macrophyte Abundance Summary

Plant Code	Aquatic Macrophyte	Total Sites	%	Trace Sites	%	Sparse Sites	%	Medium Sites	%	Dense Sites	%
n	**Total Sites Sampled**	82									
	Richness	25									
	Overall Abundance	82	100%	4	5%	11	13%	13	16%	52	63%
NGUAD	Southern Naiad	69	84%	3	4%	19	28%	18	26%	29	42%
ECAN	Common Waterweed	64	78%	11	17%	24	38%	17	27%	12	19%
PAMP	Bassweed	35	43%	6	17%	21	60%	8	23%	0	0%
PZOS	Flat Stem Pondweed	31	38%	21	68%	8	26%	2	6%	0	0%
PEPI	Ribbon-leaf Pondweed	30	37%	16	53%	12	40%	2	7%	0	0%
NODO	White Waterlily	29	35%	21	72%	7	24%	1	3%	0	0%
MSPIC	Eurasian Water Milfoil	28	34%	20	71%	8	29%	0	0%	0	0%
BSCH	Watershield	25	30%	12	48%	9	36%	4	16%	0	0%
SPAR	Bur-reed spp.	14	17%	11	79%	3	21%	0	0%	0	0%
NGRAC	Slender Naiad	13	16%	5	38%	7	54%	1	8%	0	0%
NITE/CHA	Macroalgae	13	16%	9	69%	3	23%	1	8%	0	0%
PROB	Robbin's Pondweed	13	16%	3	23%	2	15%	4	31%	4	31%
NVAR	Spatterdock	13	16%	9	69%	3	23%	1	8%	0	0%
PSTRICT	Straight-leaved Pondweed	12	15%	9	75%	3	25%	0	0%	0	0%
BFA	Filamentous Algae	10	12%	7	70%	2	20%	1	10%	0	0%
PGRAM	Variable Leaf Pondweed	8	10%	5	63%	3	37%	0	0%	0	0%
PCORD	Pickerelweed	7	9%	6	85%	1	15%	0	0%	0	0%
PPUS	Thin-leaf Pondweed	6	7%	4	67%	1	17%	1	17%	0	0%
ZDUB	Water Stargrass	4	5%	4	100%	0	0%	0	0%	0	0%
PNAT	Floating-leaf Pondweed	2	2%	1	50%	0	0%	1	50%	0	0%
SPEC	Sago Pondweed	1	1%	1	100%	0	0%	0	0%	0	0%
UVUL	Common Bladderwort	1	1%	0	0%	0	0%	1	100%	0	0%
POBT	Blunt-leaved Pondweed	1	1%	1	100%	0	0%	0	0%	0	0%
UMINOR	Small Bladderwort	1	1%	0	0%	1	100%	0	0%	0	0%
UGIBBA	Creeping Bladderwort	1	1%	1	100%	0	0%	0	0%	0	0%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Aquatic Macrophyte Survey
September 3, 2025
Sample Locations
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= Medium
= Dense
= Sample Point
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LAKE CONSULTING & SERVICES
Donnelly Beach
Google Earth
1000 ft
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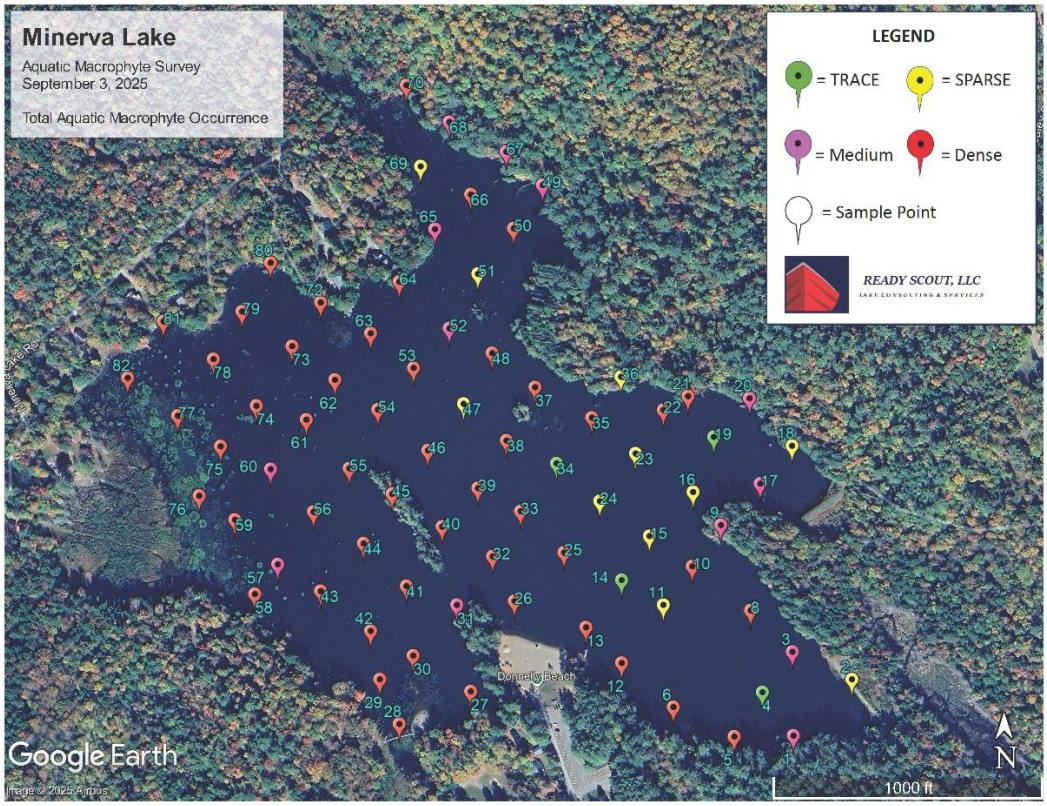
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Aquatic Macrophyte Survey
September 3, 2025
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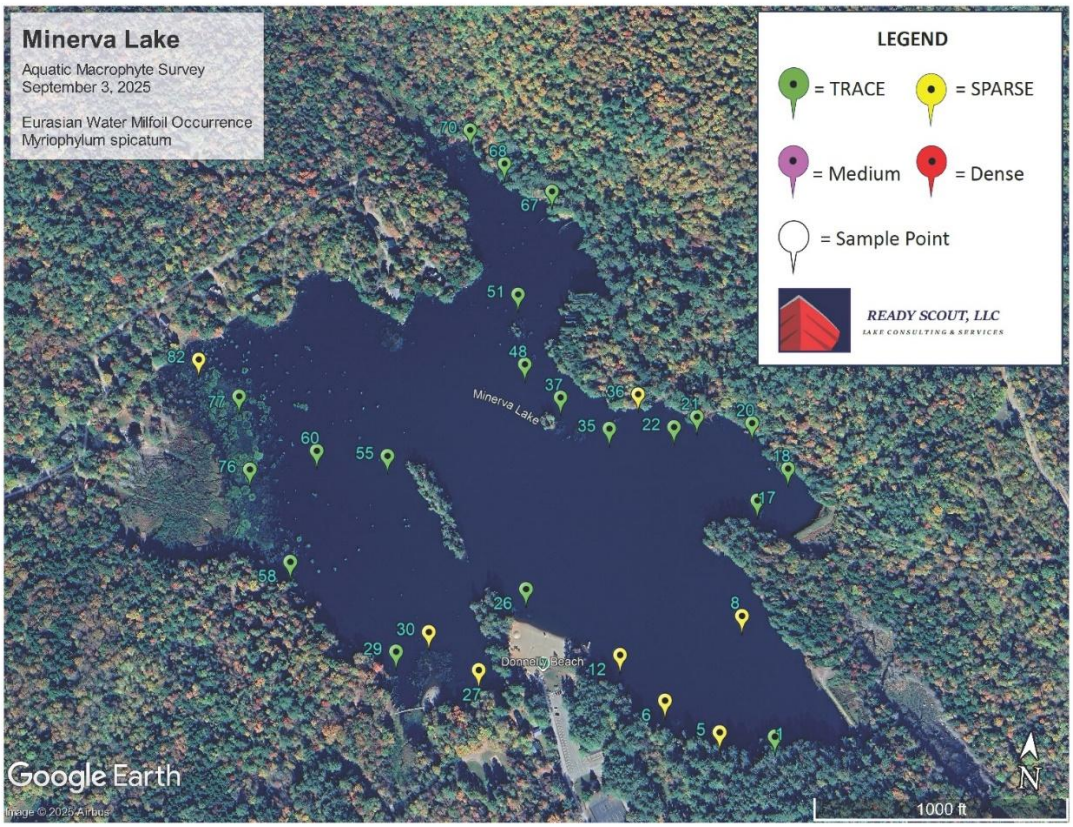
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READY SCOUT, LLC
LAKE CONSULTING & SERVICES
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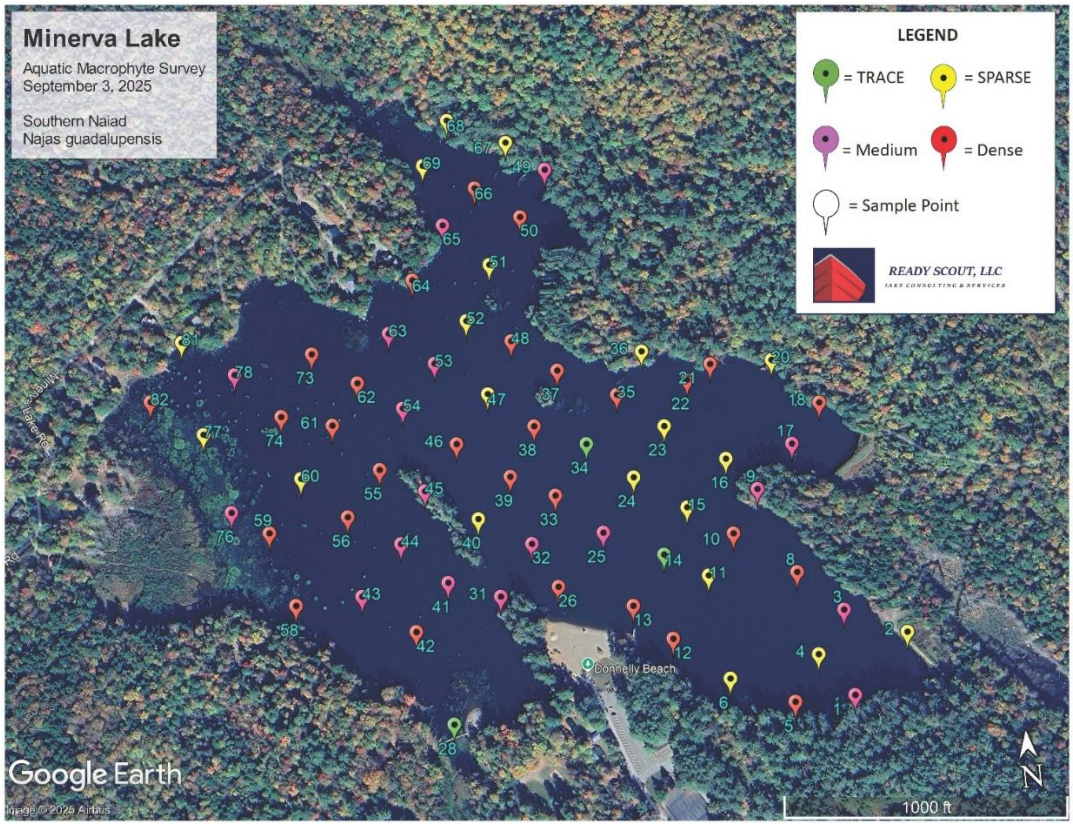
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LAKE CONSULTING & SERVICES
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Google Earth
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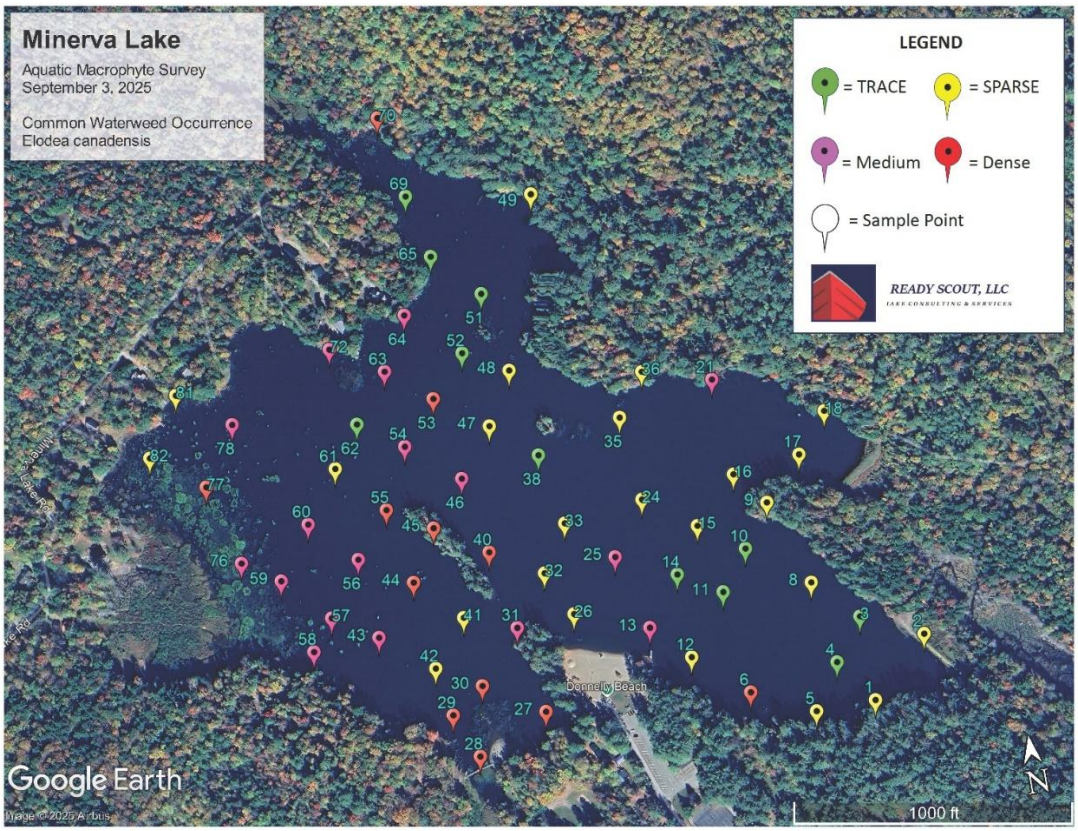
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Common Waterweed Occurrence
Elodea canadensis
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READY SCOUT, LLC
LAKE CONSULTING & SERVICES
Donnelly Beach
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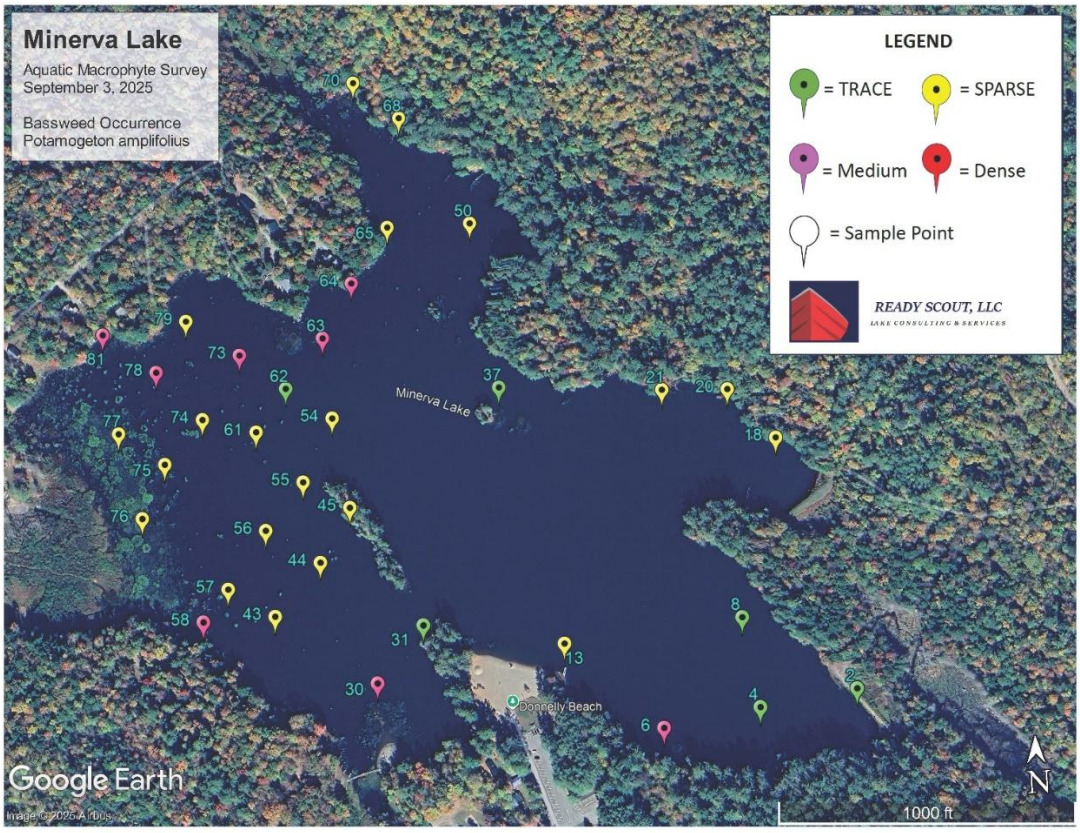
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Bassweed Occurrence
Potamogeton amplifolius
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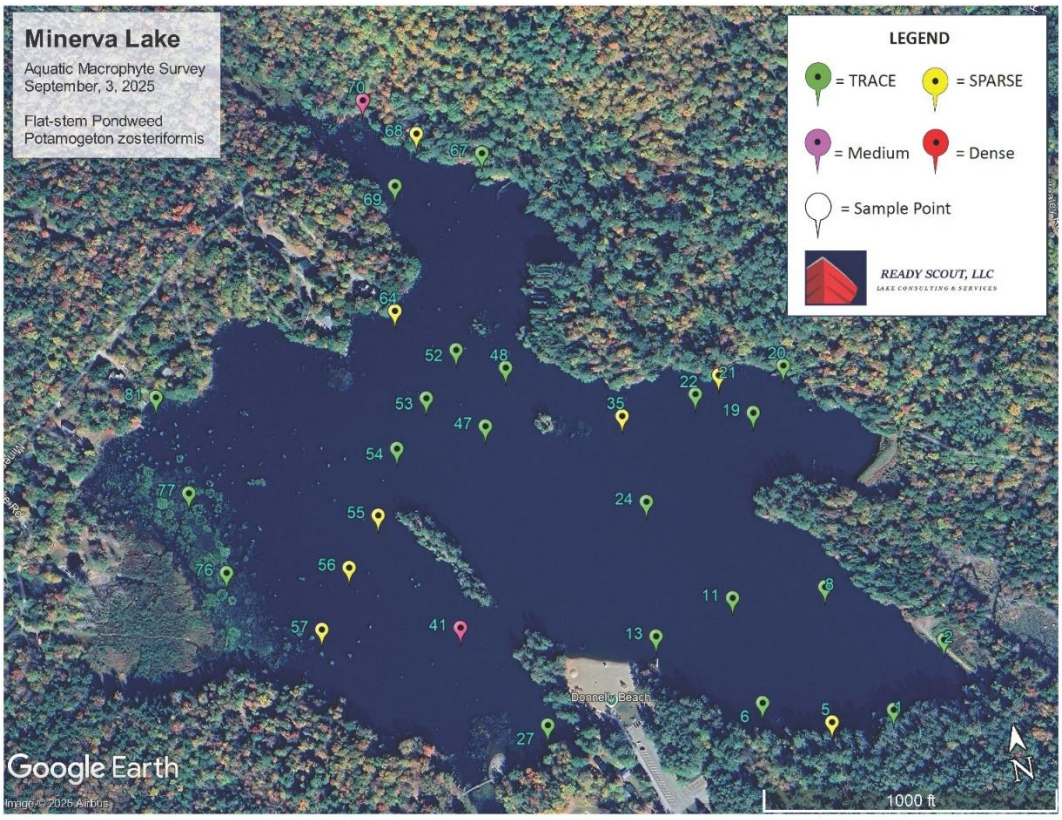
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Flat-stem Pondweed
Potamogeton zosteriformis
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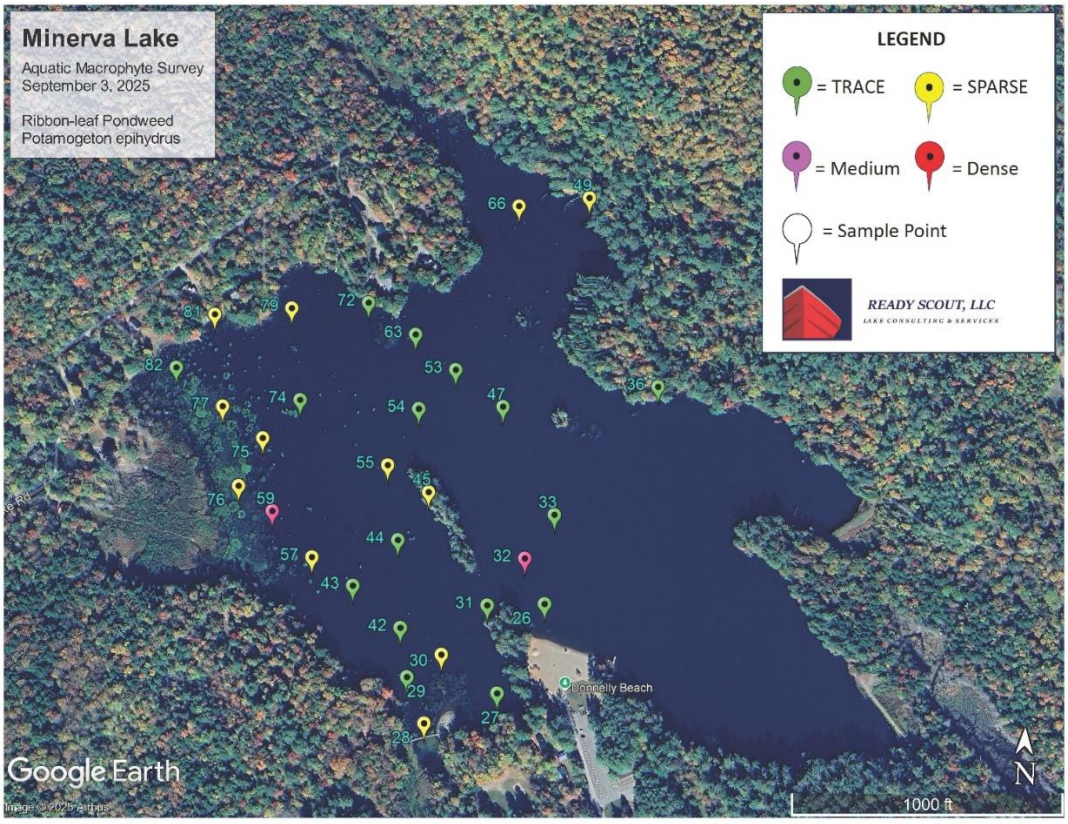
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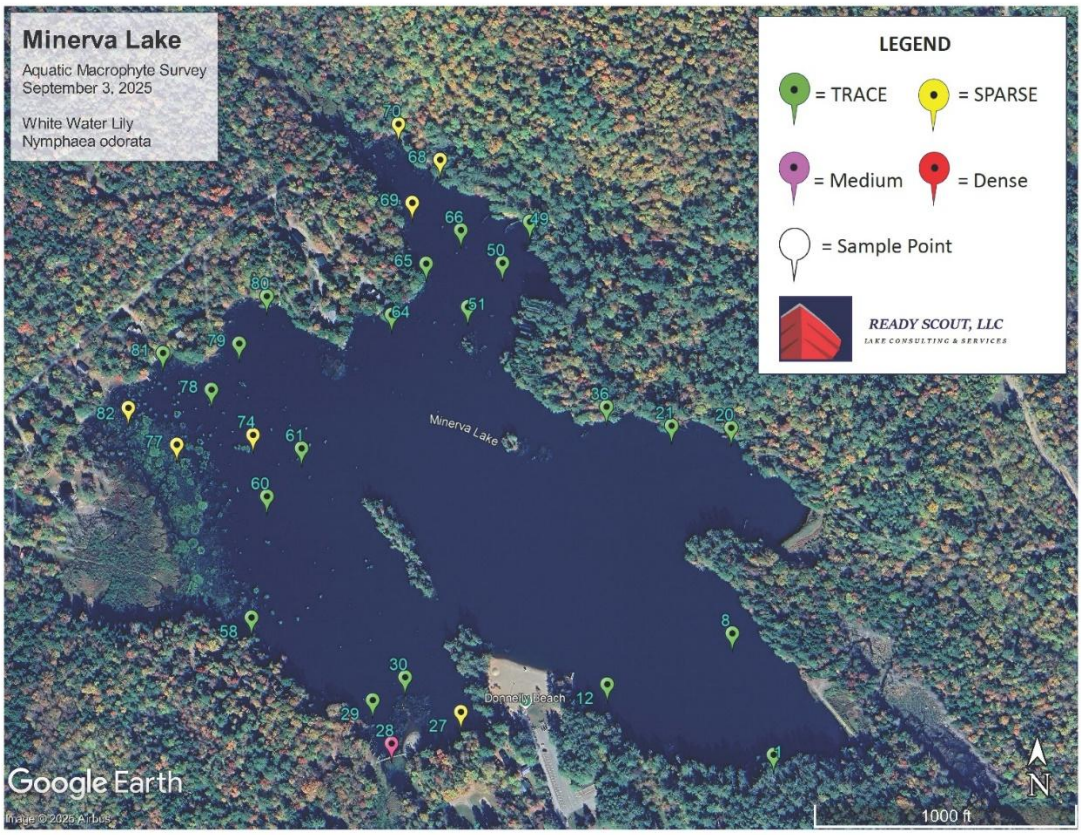
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White Water Lily
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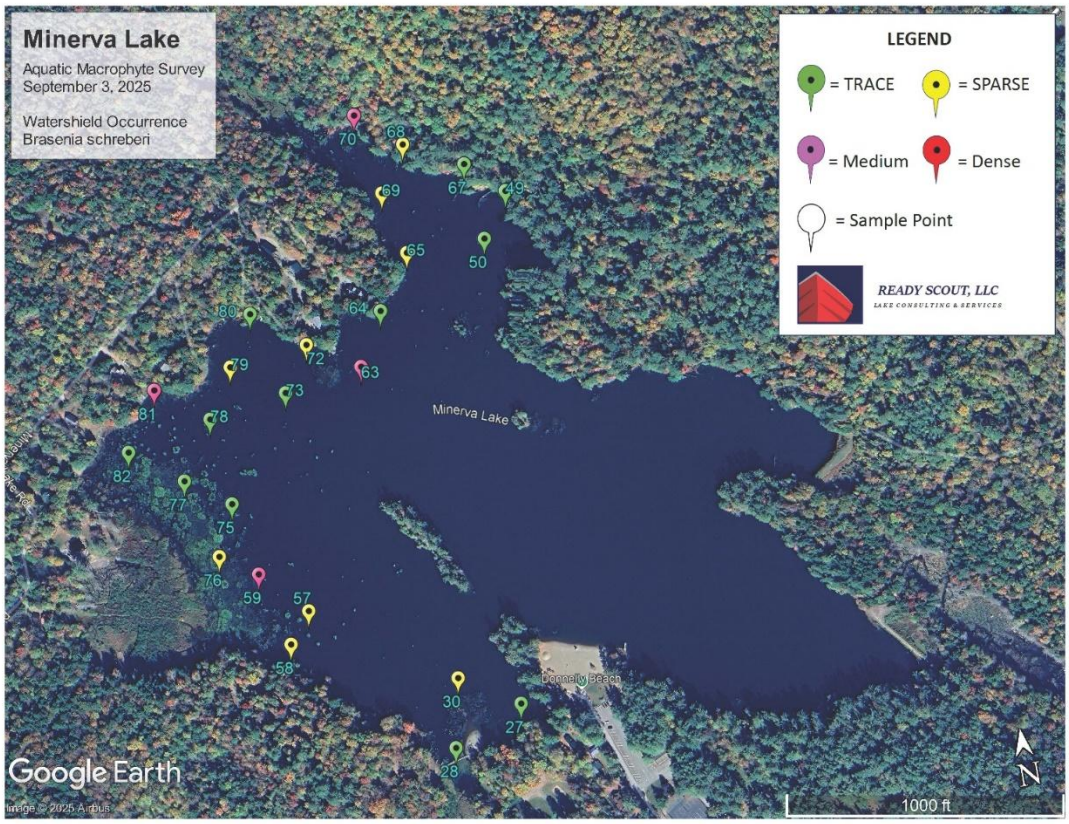
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September 3, 2025
Watershield Occurrence
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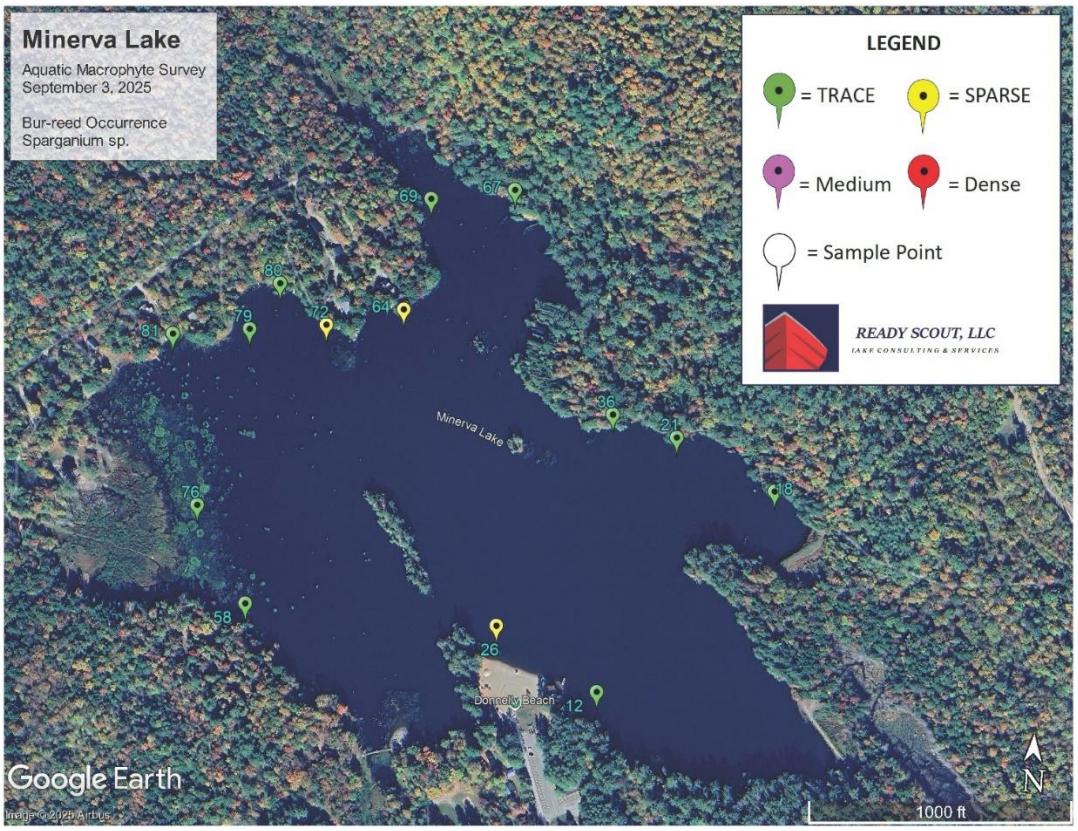
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Bur-reed Occurrence
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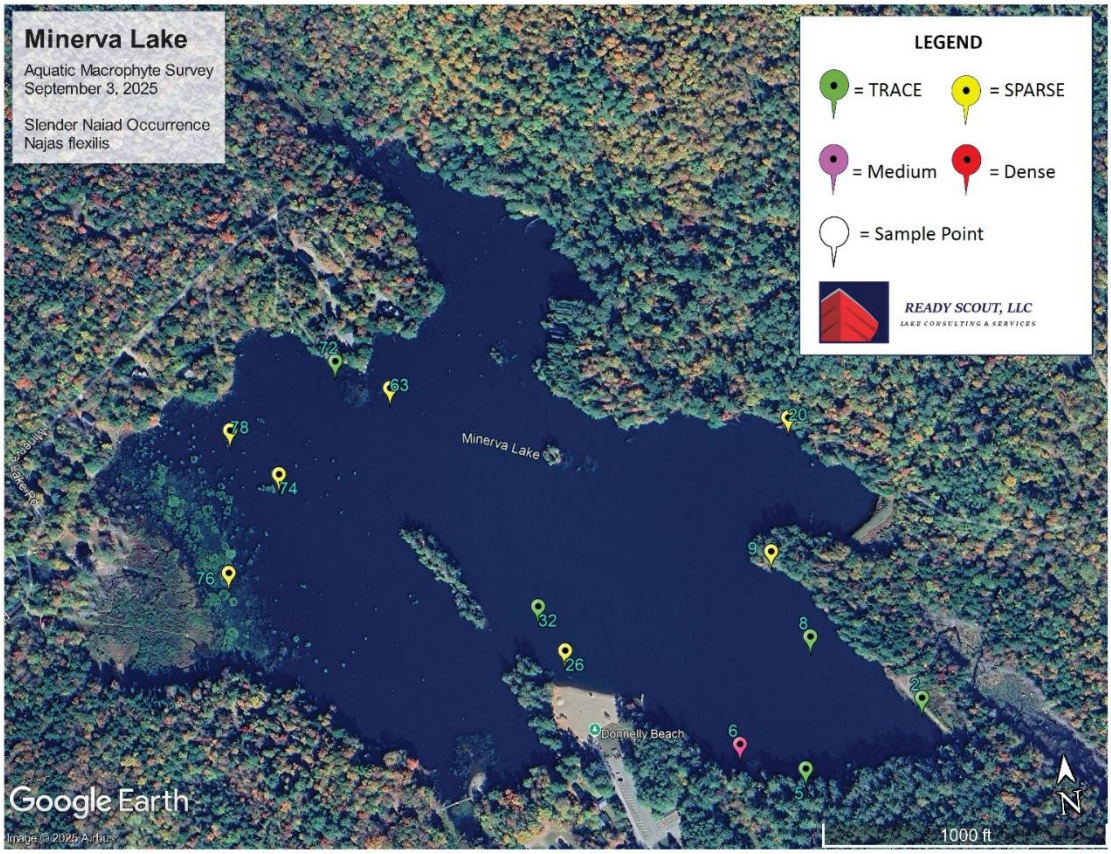
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Slender Naiad Occurrence
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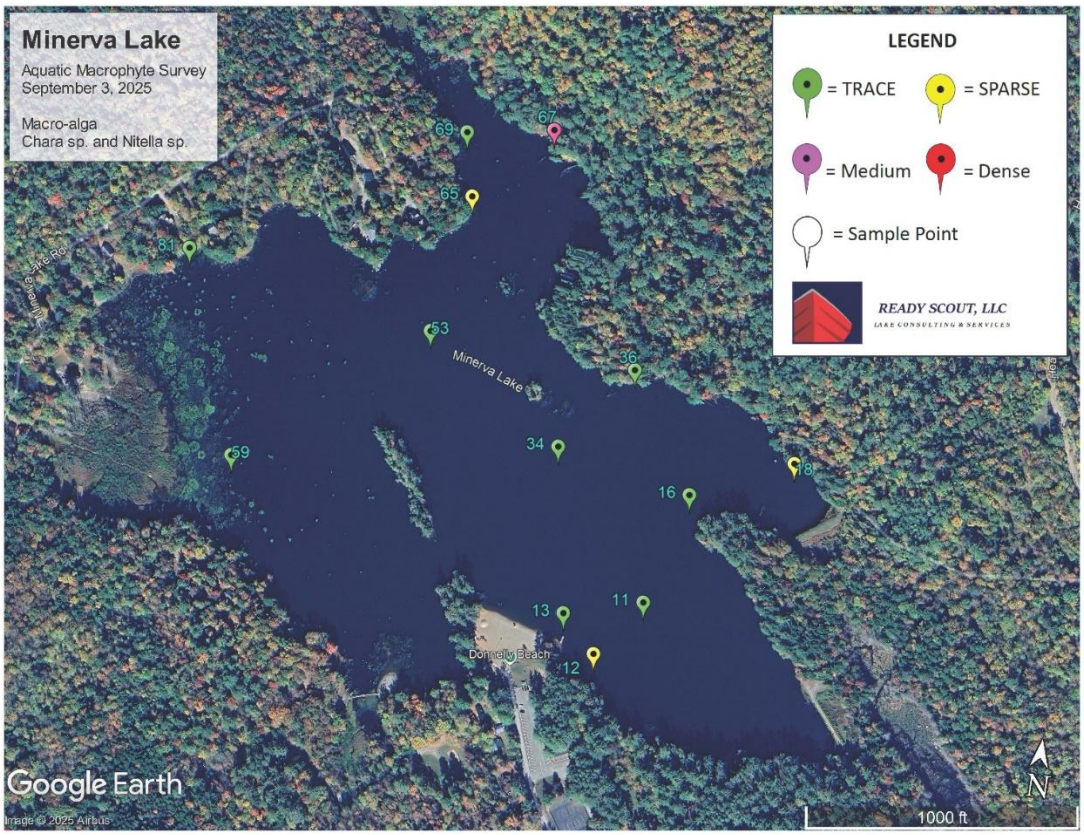
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September 3, 2025
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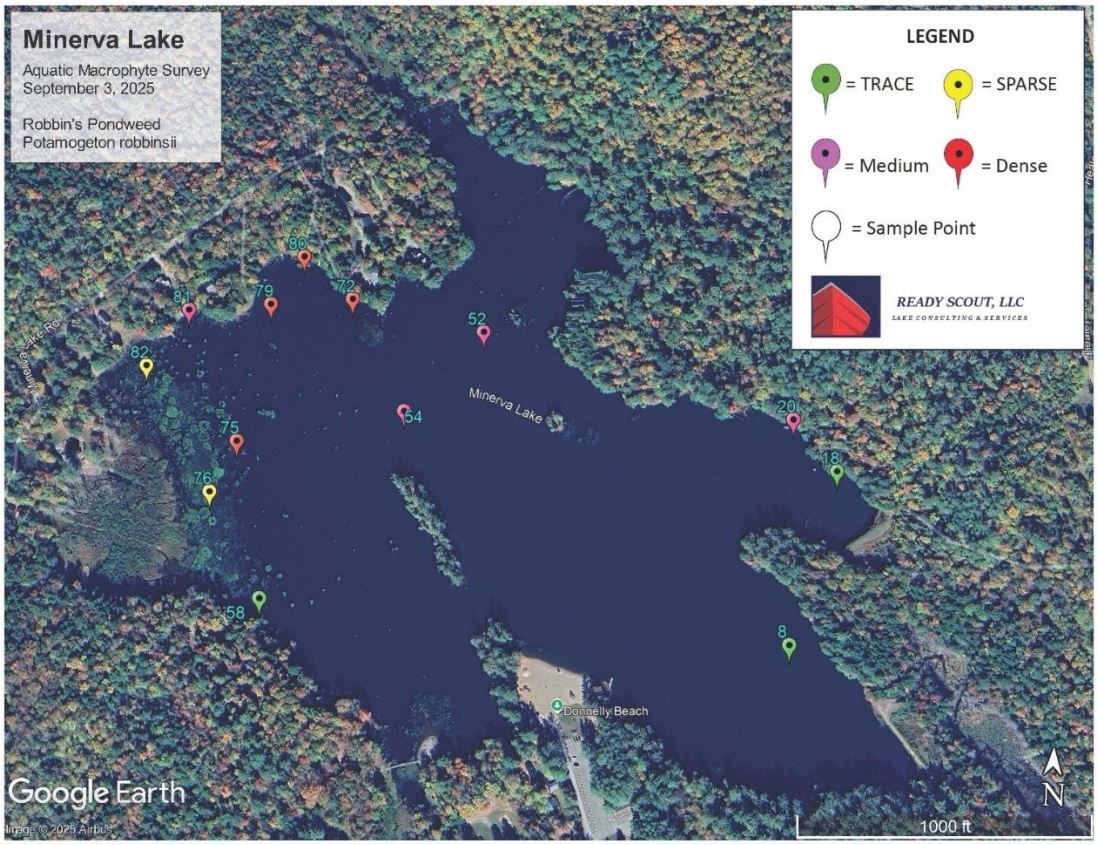
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READY SCOUT, LLC
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Google Earth
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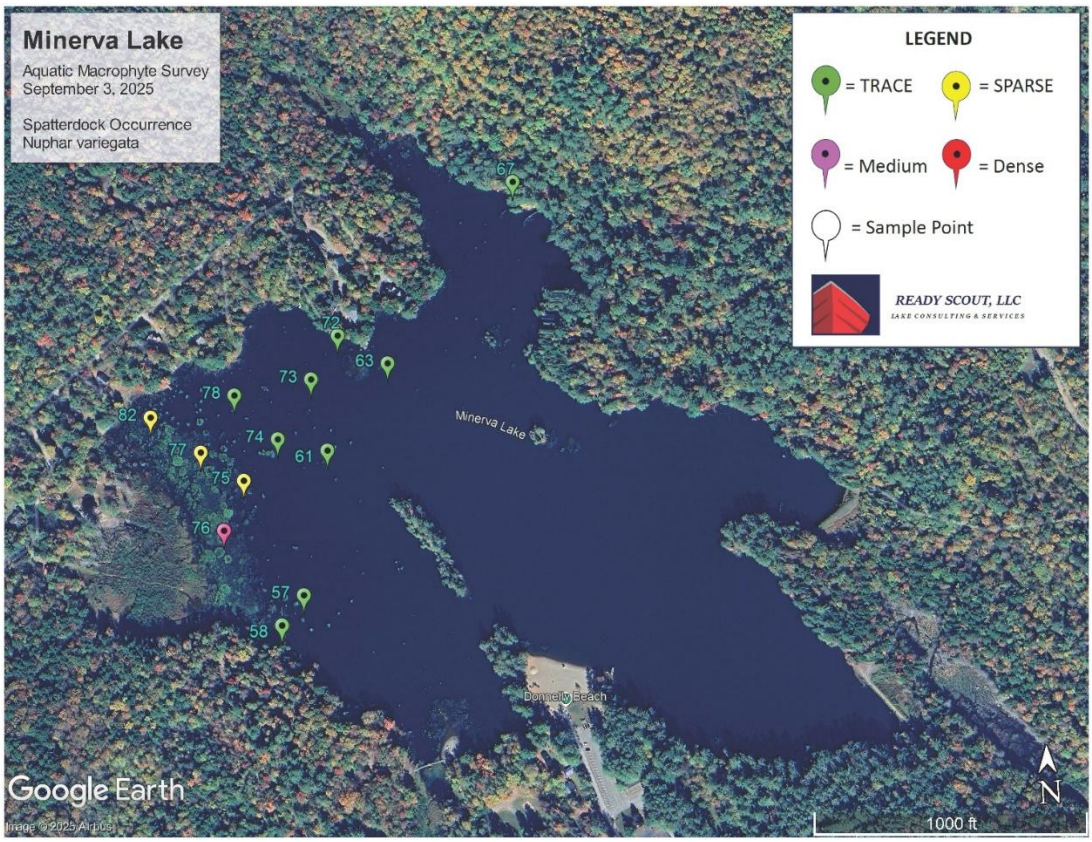
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September 3, 2025
Spatterdock Occurrence
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READY SCOUT, LLC
LAKE CONSULTING & SERVICES
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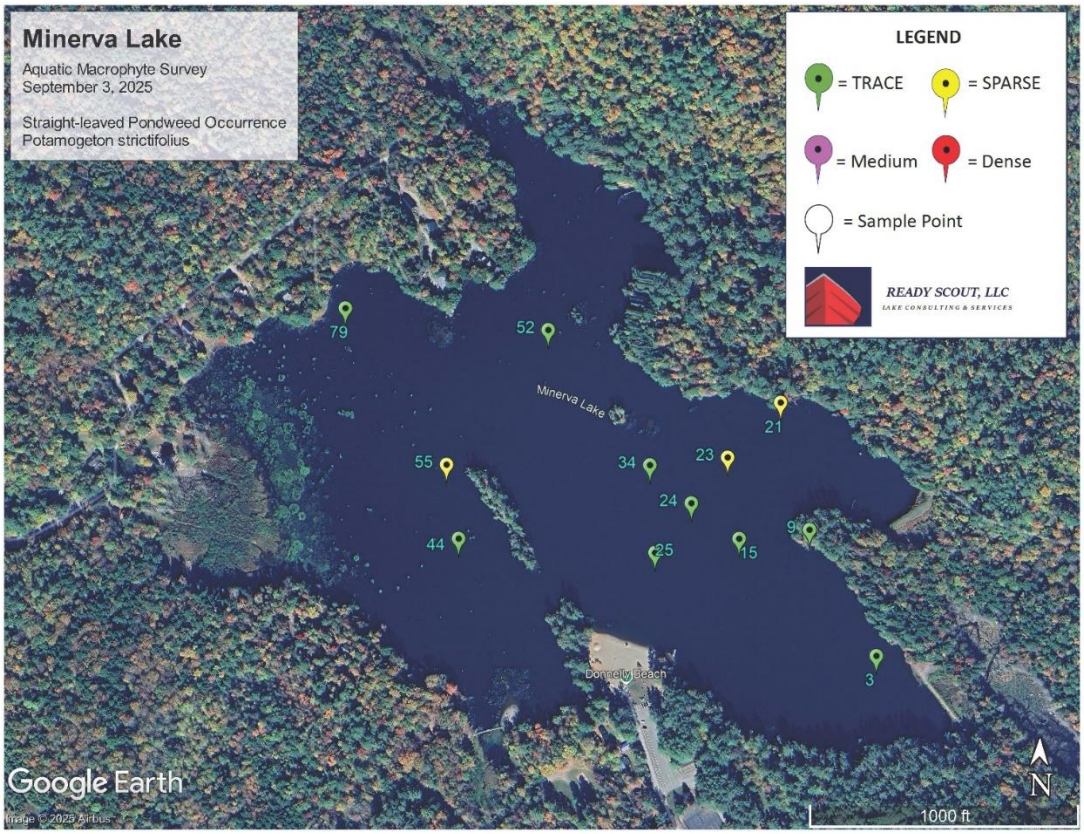
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Aquatic Macrophyte Survey
September 3, 2025
Straight-leaved Pondweed Occurrence
Potamogeton strictifolius
LEGEND
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= Dense
= Sample Point
READY SCOUT, LLC
LAKE CONSULTING & SERVICES
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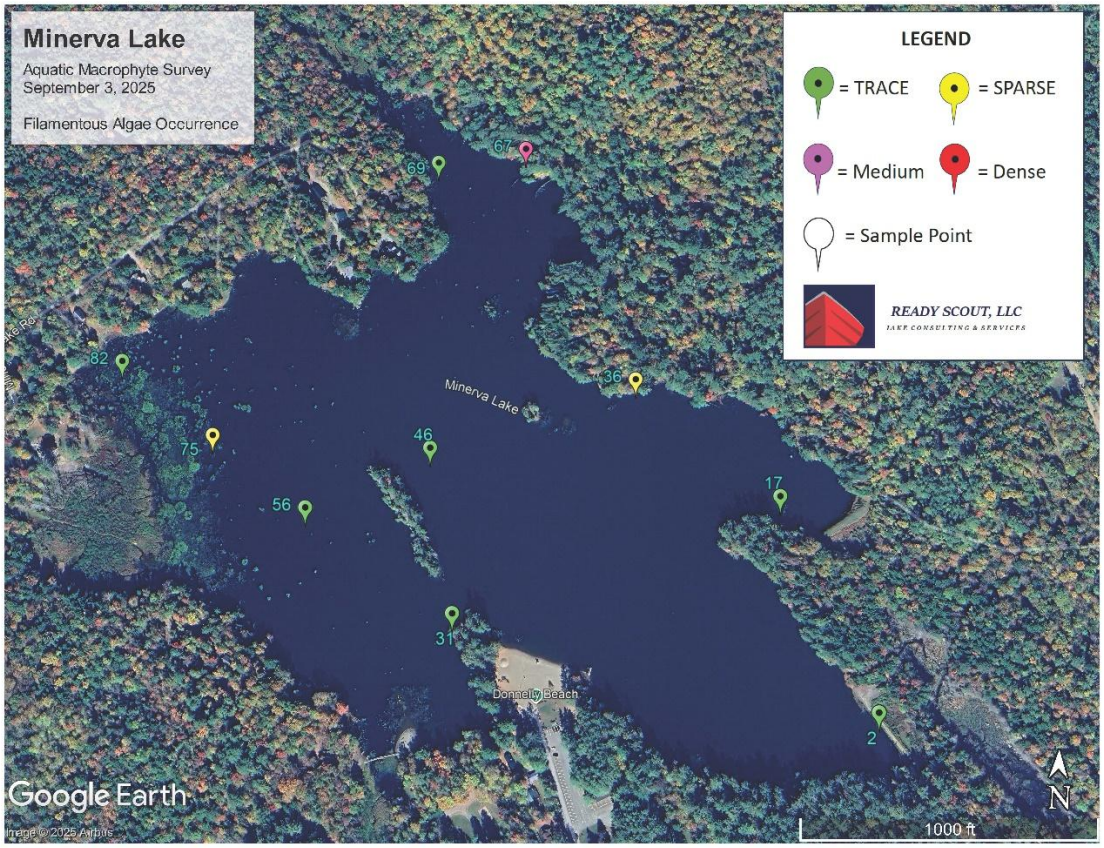
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September 3, 2025
Filamentous Algae Occurrence
LEGEND
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READY SCOUT, LLC
LAKE CONSULTING & SERVICES
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Google Earth
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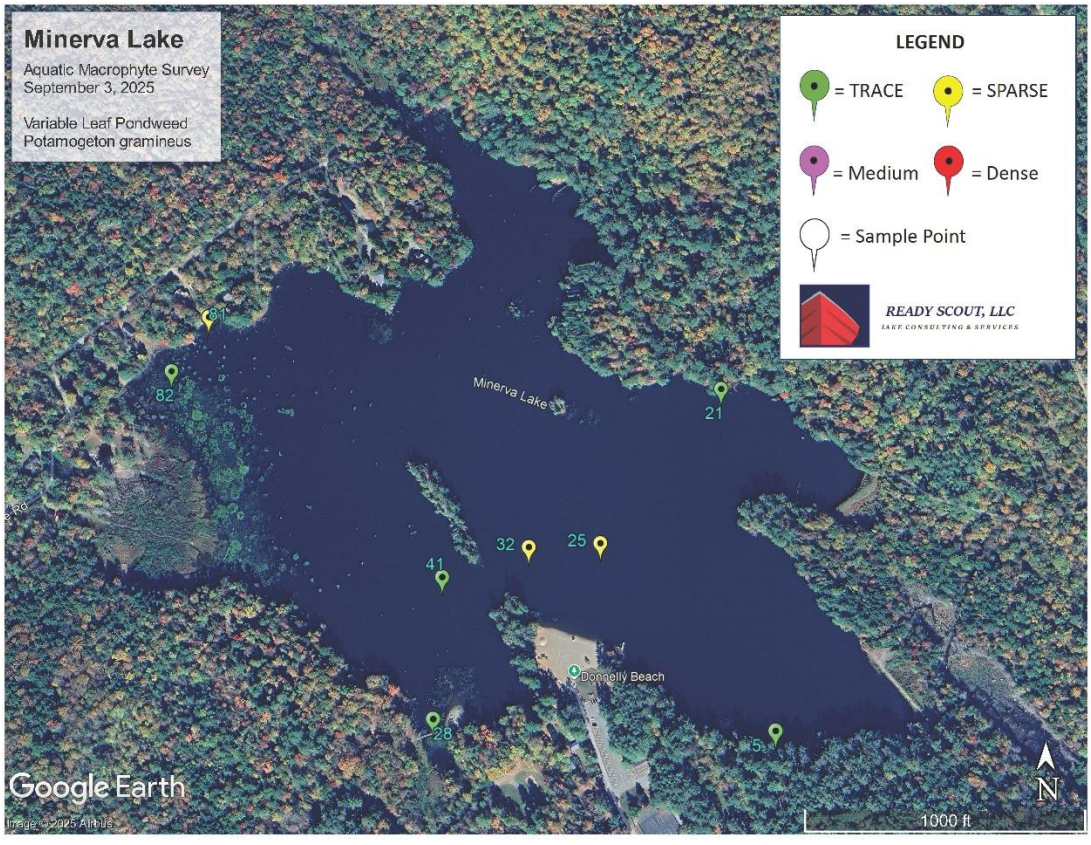
Minerva Lake
Aquatic Macrophyte Survey
September 3, 2025
Variable Leaf Pondweed
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LEGEND
= TRACE
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= Sample Point
READY SCOUT, LLC
LAKE CONSULTING & SERVICES
81
82
Minerva Lake
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Google Earth
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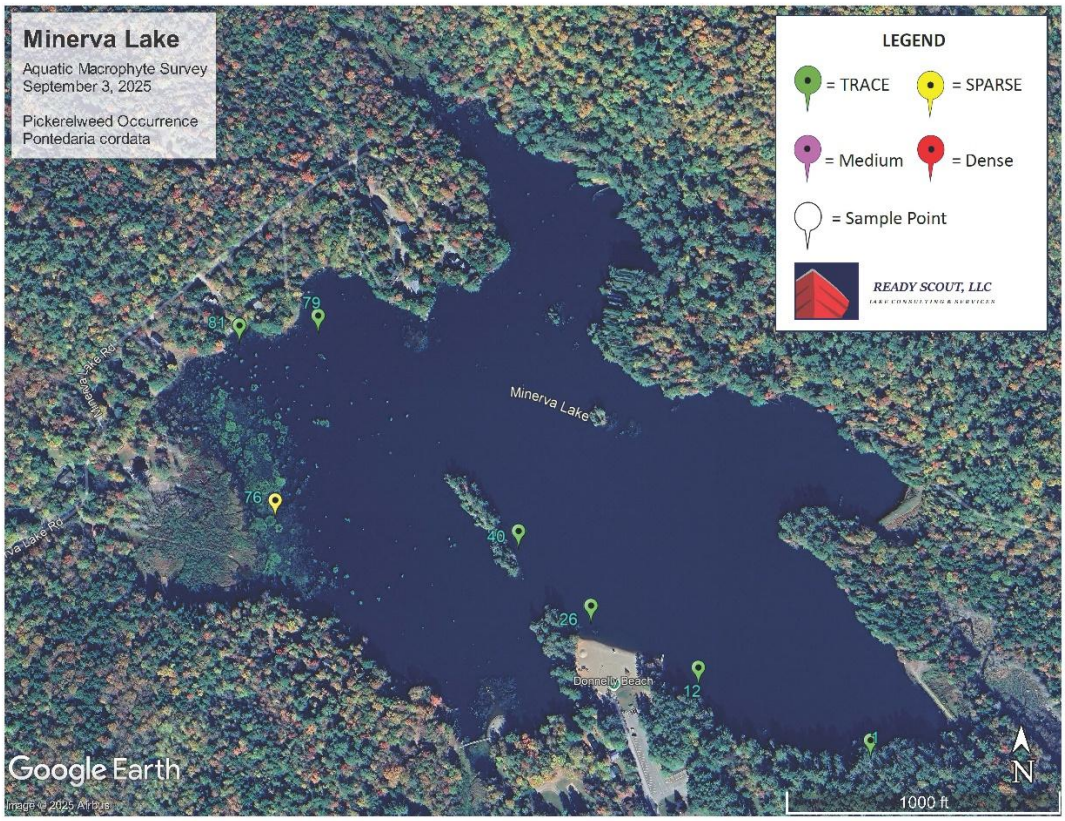
1000 ft


Minerva Lake
Aquatic Macrophyte Survey
September 3, 2025
Pickerelweed Occurrence
Pontederia cordata
LEGEND
= TRACE
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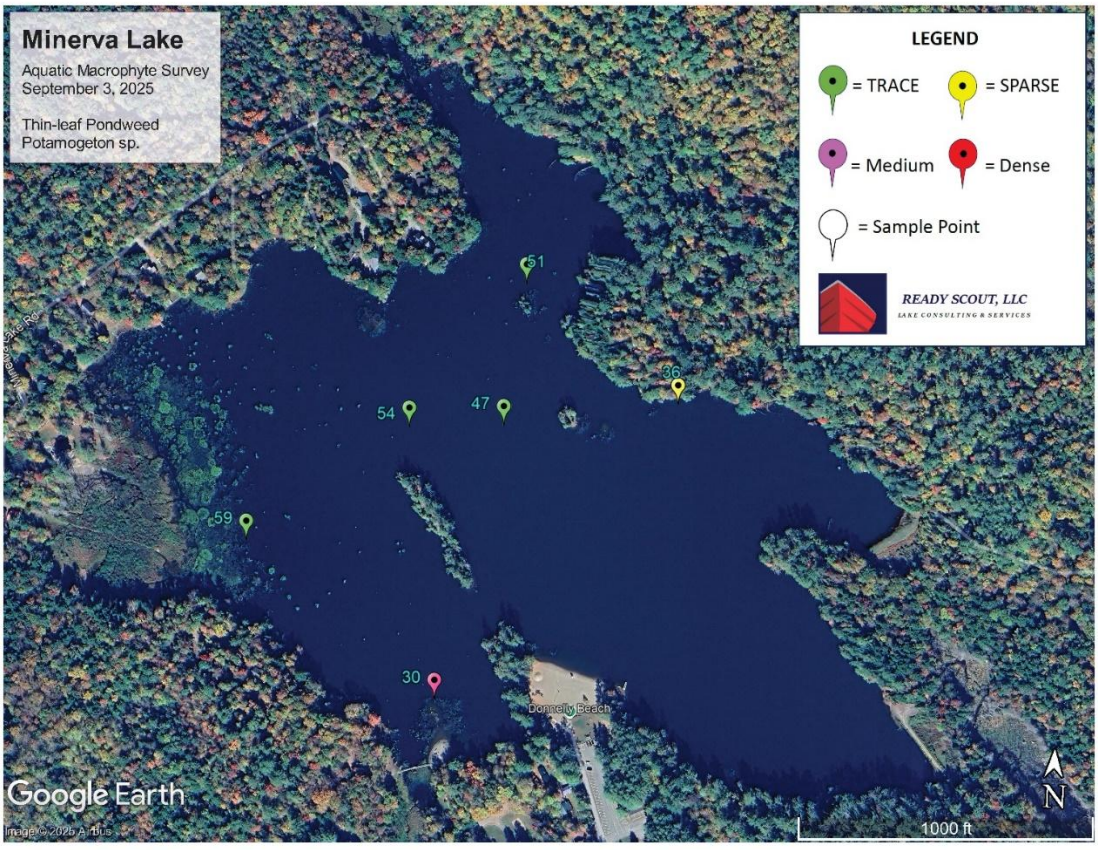
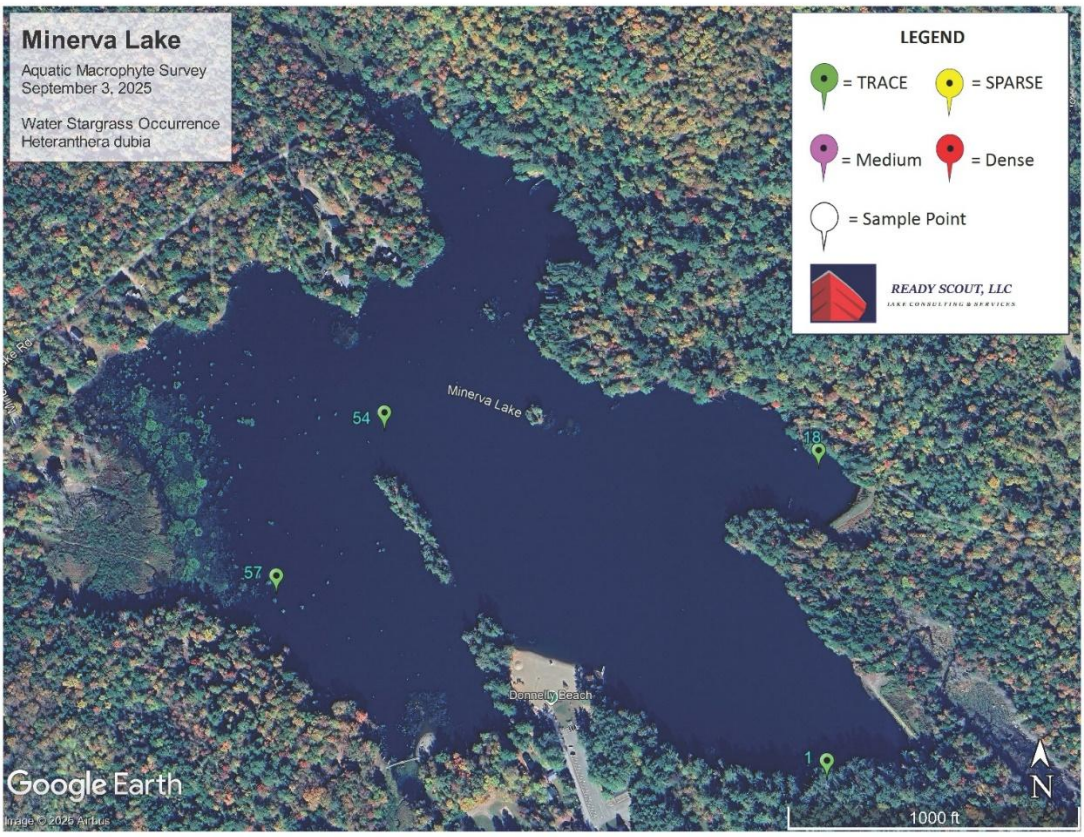
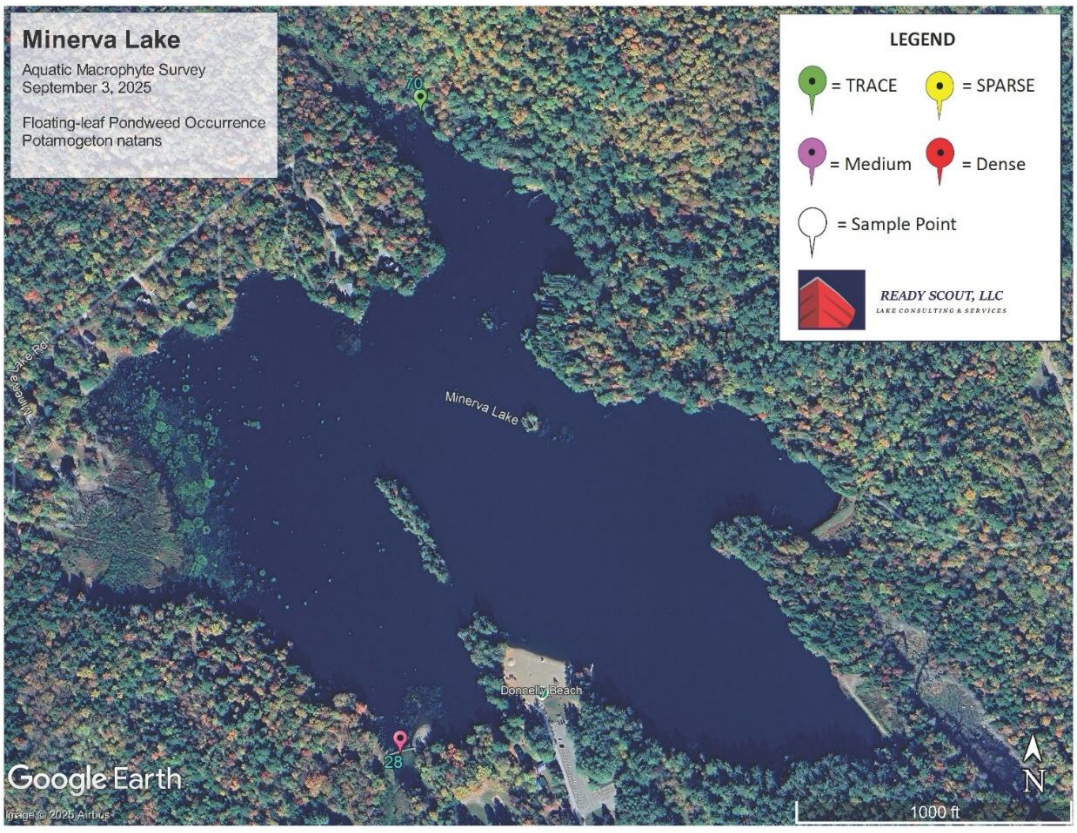
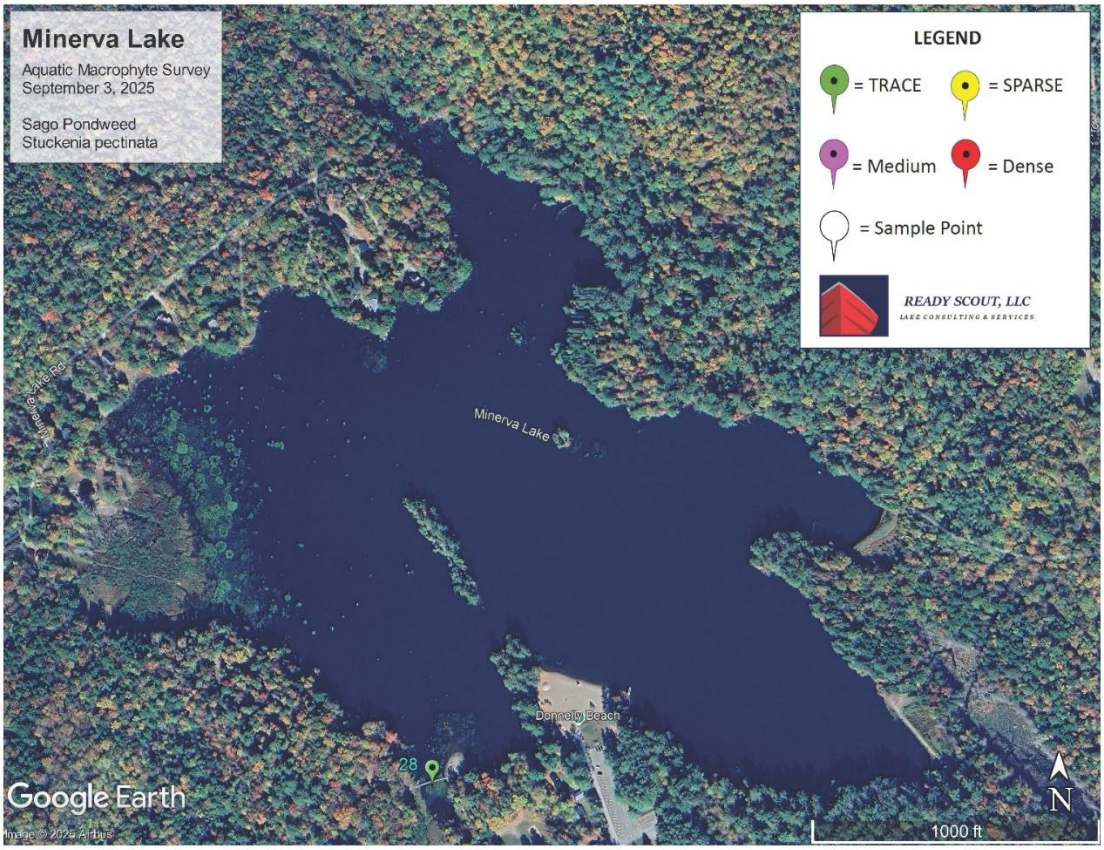
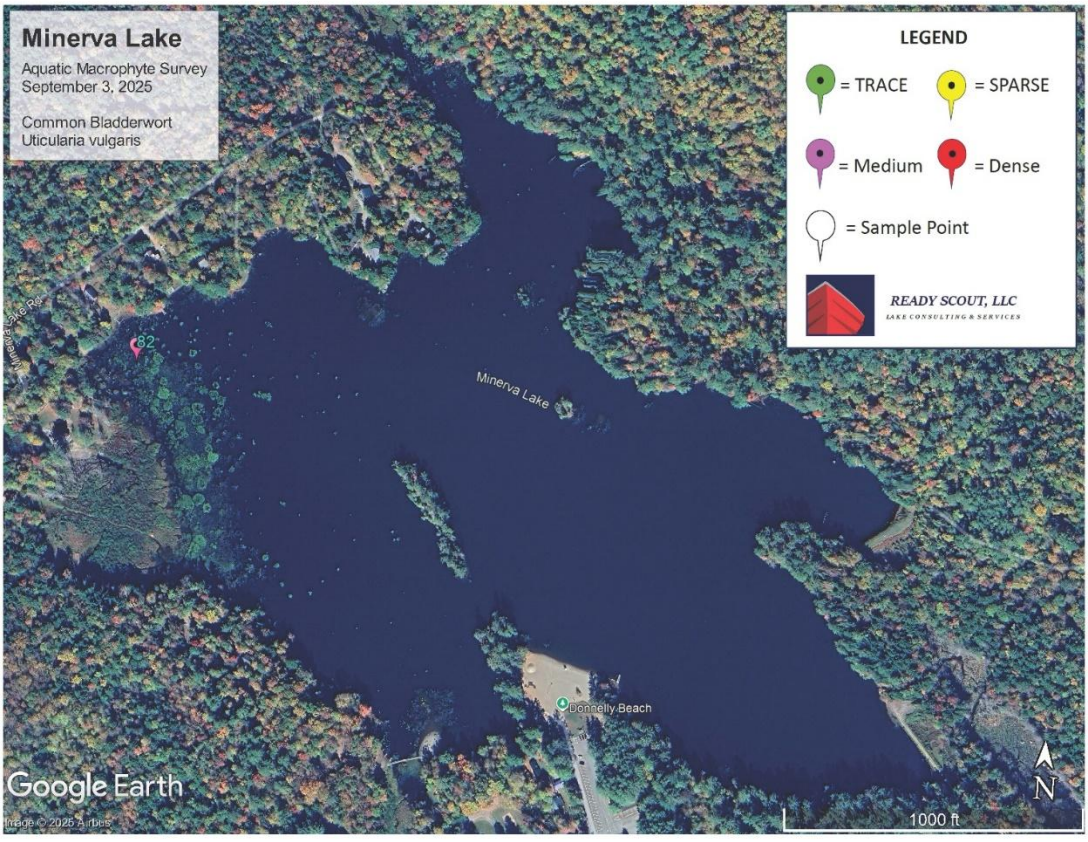
= Dense
= Sample Point
READY SCOUT, LLC
LAKE CONSULTING & SERVICES
81
79
76
40
26
12
Minerva Lake
Donnelly Beach
Google Earth
1000 ft
N

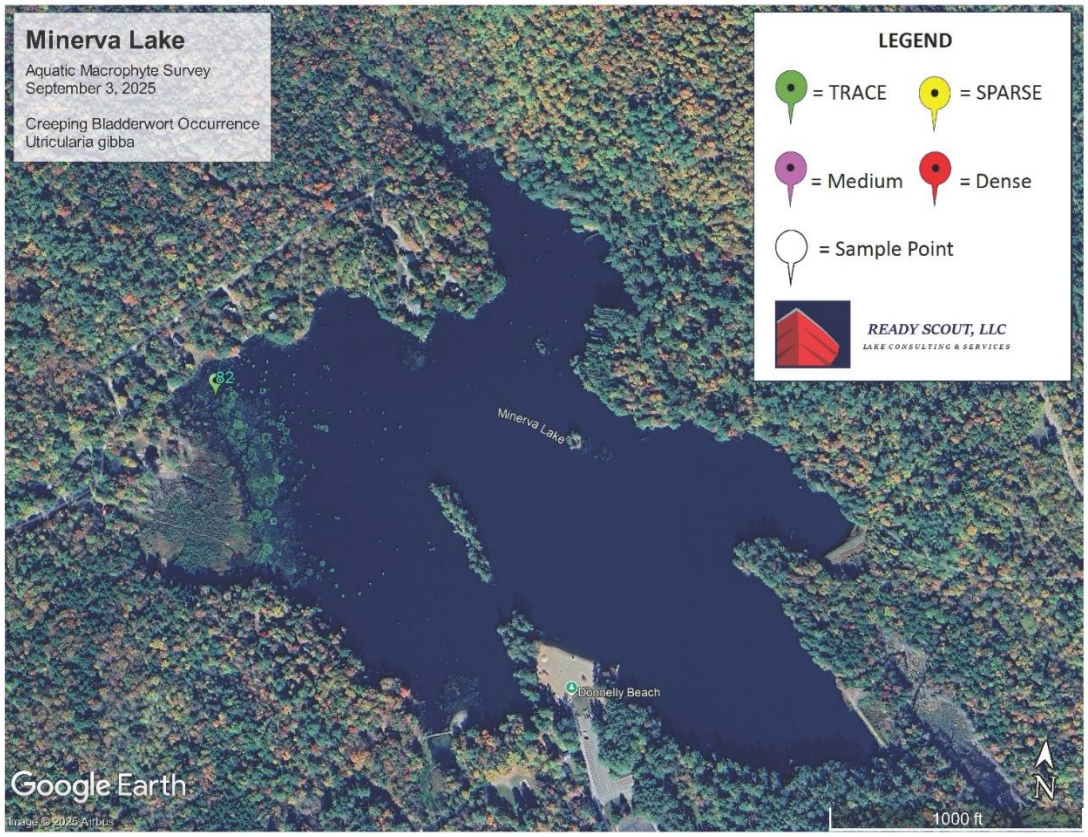

Minerva Lake
Aquatic Macrophyte Survey
September 3, 2025
Thin-leaf Pondweed
Potamogeton sp.
LEGEND
= TRACE
= SPARSE
= Medium
= Dense
= Sample Point
READY SCOUT, LLC
LAKE CONSULTING & SERVICES
51
36
54
47
59
30
Donnelly Beach
Google Earth
1000 ft
N

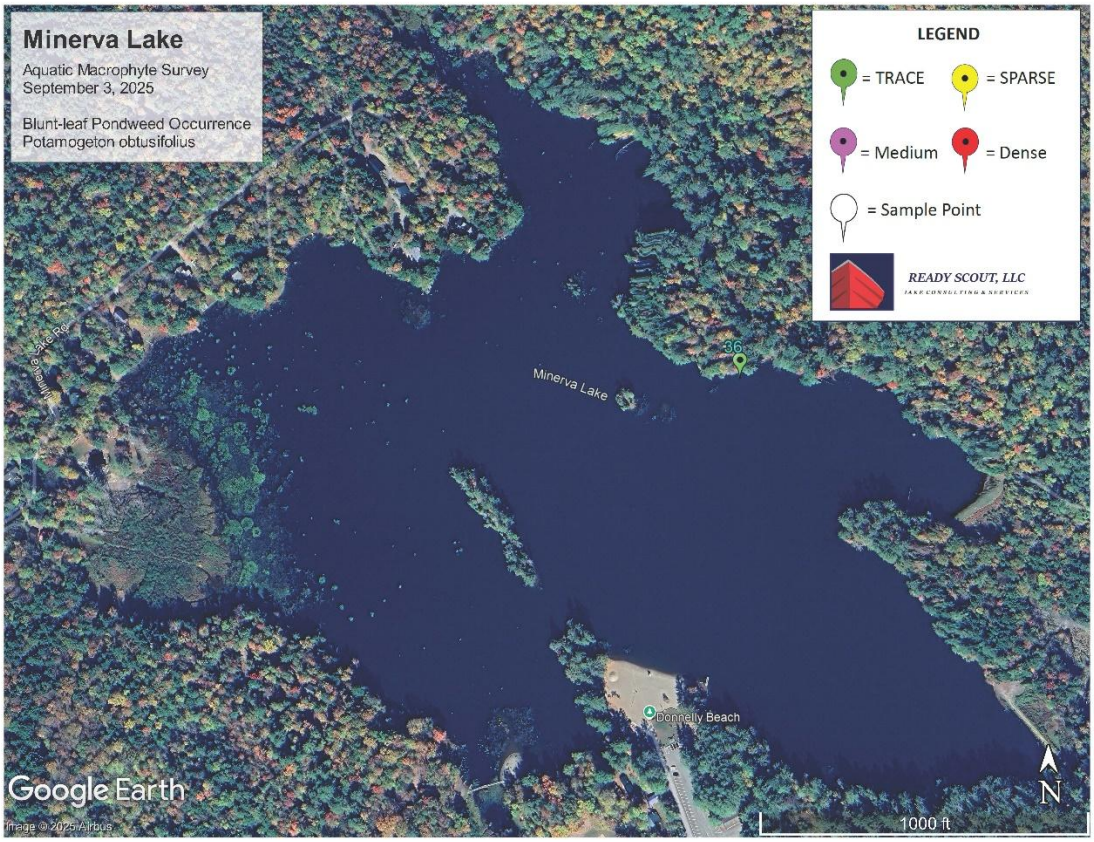

Minerva Lake
Aquatic Macrophyte Survey
September 3, 2025
Water Stargrass Occurrence
Heteranthera dubia
LEGEND
= TRACE
= SPARSE
= Medium
= Dense
= Sample Point
READY SCOUT, LLC
LAKE CONSULTING & SERVICES
Minerva Lake
54
18
57
1
Donnelly Beach
Google Earth
1000 ft
N

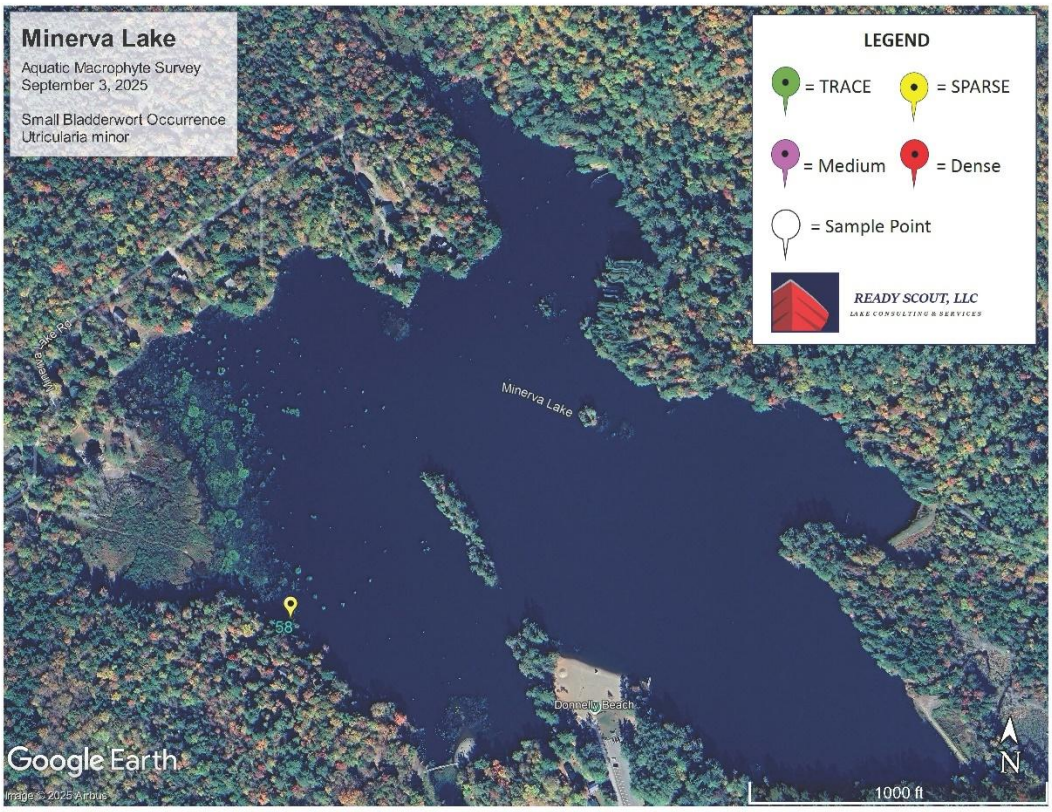

Minerva Lake
Aquatic Macrophyte Survey
September 3, 2025
Floating-leaf Pondweed Occurrence
Potamogeton natans
LEGEND
= TRACE
= SPARSE
= Medium
= Dense
= Sample Point
READY SCOUT, LLC
LAKE CONSULTING & SERVICES
Minerva Lake
70
28
Donnelly Beach
Google Earth
1000 ft
N


Minerva Lake
Aquatic Macrophyte Survey
September 3, 2025
Sago Pondweed
Stuckenia pectinata
LEGEND
= TRACE
= SPARSE
= Medium
= Dense
= Sample Point
READY SCOUT, LLC
LAKE CONSULTING & SERVICES
Minerva Lake
Donnelly Beach
28
Google Earth
N
1000 ft


Minerva Lake
Aquatic Macrophyte Survey
September 3, 2025
Common Bladderwort
Utricularia vulgaris
LEGEND
= TRACE
= SPARSE
= Medium
= Dense
= Sample Point
READY SCOUT, LLC
LAKE CONSULTING & SERVICES
82
Minerva Lake
Donnelly Beach
Google Earth
N
1000 ft


Minerva Lake
Aquatic Macrophyte Survey
September 3, 2025
Creeping Bladderwort Occurrence
Utricularia gibba
LEGEND
= TRACE
= SPARSE
= Medium
= Dense
= Sample Point
READY SCOUT, LLC
LAKE CONSULTING & SERVICES
82
Minerva Lake
Donnelly Beach
Google Earth
Image © 2025 Airbus
1000 ft
N


Minerva Lake
Aquatic Macrophyte Survey
September 3, 2025
Blunt-leaf Pondweed Occurrence
Potamogeton obtusifolius
LEGEND
= TRACE
= SPARSE
= Medium
= Dense
= Sample Point
READY SCOUT, LLC
LAKE CONSULTING & SERVICES
36
Minerva Lake
Donnelly Beach
Google Earth
Image © 2025 Airbus
1000 ft
N


Minerva Lake
Aquatic Macrophyte Survey
September 3, 2025
Small Bladderwort Occurrence
Utricularia minor
LEGEND
= TRACE
= SPARSE
= Medium
= Dense
= Sample Point
READY SCOUT, LLC
LAKE CONSULTING & SERVICES
Minerva Lake
58
Donnelly Beach
Google Earth
N
1000 ft

Raw Data

September 3, 2025

Sample Point	Water Depth (feet)	Latitude (NAD83)	Longitude (NAD 83)	Overall Abun	WATERSHIELD	EURASIAN WATERMILFOIL	WATERWEED	FLAT-STEMMED PONDWEED	SLENDER NAIAD	MACRO-ALGA	BASSWEED	WHITE WATERLILY	VARIABLE-LEAF PONDWEED	SOUTHERN NAIAD	RIBBON-LEAF PONDWEED	ROBBINS PONDWEED	SAGO PONDWEED	COMMON BLADDERWORT	THIN-LEAF PONDWEED	YELLOW WATERLILY	FLOATING-LEAF PONDWEED	WATER STARGRASS	FILAMENTOUS ALGAE	OBTUSE PONDWEED	BURREED	PICKERELWEED	STRAIGHT LEAVED PONDWEED	SMALL BLADDERWORT	CREEPING BLADDERWORT
1	8.0	43.7908	-73.97	M		T	S	T				T		M												T			
2	3.0	43.7913	-73.969	S			S	T	T		T			S									T						
3	10.0	43.7915	-73.97	M			T							M													T		
4	11.0	43.7911	-73.97	T			T				T			S															
5	5.0	43.7907	-73.971	D		S	S	S	T				T	D															
6	4.0	43.7909	-73.972	D		S	D	T	M		M			S															
7	12.0	43.7914	-73.971																										
8	12.0	43.7918	-73.971	D		S	S	T	T		T	T		D		T													
9	3.0	43.7927	-73.971	M			S		S					M													T		
10	12.0	43.7923	-73.971	D			T							D															
11	12.0	43.7919	-73.972	S			T	T		T				S															
12	5.0	43.7913	-73.972	D		S	S			S		T		D											T	T			
13	6.0	43.7916	-73.973	D			M	T		T	S			D															
14	12.0	43.7921	-73.972	T			T							T															
15	11.0	43.7926	-73.972	S			S							S													T		
16	11.0	43.793	-73.971	S			S			T				S															
17	14.0	43.7932	-73.97	M		T	S							M										T					
18	8.0	43.7936	-73.97	S		T	S			S	S			D		T						T			T				
19	10.0	43.7936	-73.971	T				T																					
20	4.0	43.7938	-73.971	M		T		T	S		S	T		S		M													
21	9.0	43.7941	-73.971	D		T	M	S			S	T	T	D											T		S		
22	11.0	43.7938	-73.972	D		T		T						D															
23	12.0	43.7934	-73.972	S										S													S		
24	13.0	43.7929	-73.973	S			S	T						S													T		
25	11.0	43.7924	-73.973	D			M						S	M													T		
26	6.0	43.7919	-73.974	D		T	S		S					D	T										S	T			
27	4.0	43.791	-73.974	D	T	S	D	T				S			T														
28	4.0	43.7907	-73.976	D	T		D					M	T	T	S		T					M							
29	4.0	43.7909	-73.976	D		T	D					T			T														
30	3.0	43.7913	-73.975	D	S	S	D				M	T			S				M										
31	3.0	43.7919	-73.975	M			M				T			M	T									T					
32	9.0	43.7924	-73.974	D			S		T				S	M	M														
33	11.0	43.7928	-73.974	D			S							D	T														
34	12.0	43.7933	-73.973	T						T				T													T		
35	9.0	43.7938	-73.973	D		T	S	S						D															
36	8.0	43.7942	-73.972	S		S	S			T		T		S	T				S					S	T	T			
37	3.0	43.794	-73.974	D		T					T			D															
38	9.0	43.7935	-73.974	D			T							D															
39	9.0	43.793	-73.974	D										D															
40	4.0	43.7927	-73.975	D			D							S												T			
41	6.0	43.792	-73.975	D			S	M					T	M															
42	6.0	43.7916	-73.976	D			S							D	T														
43	6.0	43.792	-73.977	D			M				S			M	T														
44	6.0	43.7925	-73.976	D			D				S			M	T												T		
45	5.0	43.793	-73.976	D			D				S			M	S														
46	10.0	43.7934	-73.975	D			M							D															
47	9.0	43.7939	-73.975	S			S	T						S	T					T				T					
48	7.0	43.7944	-73.974	D		T	S	T						D															
49	4.0	43.796	-73.973	M	T		S					T		M	S														
50	6.0	43.7957	-73.974	D	T						S	T		D															
51	7.0	43.7952	-73.974	S		T	T					T		S					T										
52	9.0	43.7946	-73.975	M			T	T						S		M											T		
53	8.0	43.7943	-73.975	D			D	T		T				M	T														
54	9.0	43.7938	-73.976	D			M	T			S			M	T	M			T			T							
55	6.0	43.7932	-73.976	D		T	D	S			S			D	S												S		
56	4.0	43.7928	-73.977	D			M	S			S			D										T					
57	4.0	43.7923	-73.977	M	S		M	S			S				S					T		T							
58	4.0	43.792	-73.978	D	S	S	M				M	T		D		T				T					T			S	
59	4.0	43.7927	-73.978	D	M		M			T				D	M				T										
60	5.0	43.7932	-73.977	M		T	M					T		S															
61	5.0	43.7937	-73.977	D			S				S	T		D						T									
62	6.0	43.7941	-73.976	D			T				T			D															
63	7.0	43.7946	-73.976	D	M		M		S		M			M	T					T									
64	6.0	43.7951	-73.976	D	T		M	S			M	T		D											S				
65	4.0	43.7956	-73.975	M	S		T			S	S	T		M															
66	7.0	43.796	-73.974	D								T		D	S														
67	6.0	43.7964	-73.974	M	T	T		T		M				S						T				M		T			
68	6.0	43.7967	-73.975	M	S	T		S			S	S		S															
69	5.0	43.7963	-73.975	S	S		T	T		T		S		S										T		T			
70	4.0	43.7971	-73.975	D	M	T	D	M			S	S										T							
71	3.0	43.7973	-73.976																										
72	3.0	43.7949	-73.977	D	S		M		T						T	D				T					S				
73	6.0	43.7945	-73.977	D	T						M			D						T									
74	4.0	43.7939	-73.976	D					S		S	S		D	T					T									
75	4.0	43.7935	-73.978	D	T						S				S	D				S				S					
76	2.0	43.793	-73.978	D	S	T	M	T	S		S			M	S	S				M					T	S			
77	2.0	43.7938	-73.979	D	T	T	D	T			S	S		S	S					S									
78	5.0	43.7943	-73.978	D	T		M		S		M	T		M						T									
79	5.0	43.7948	-73.978	D	S						S	T			S	D									T	T	T		
80	5.0	43.7953	-73.977	D	T							T				D									T				
81	4.0	43.7947	-73.979	D	M		S	T		T	M	T	S	S	S	M									T	T			
82	3.0	43.7942	-73.979	D	T	S	S					S	T	D	T	S		M		S				T					T