RMB Environmental Laboratories, Inc.

Little Sand Lake 29-0150-00 HUBBARD COUNTY

Aquatic Vegetation Point-intercept Survey

Survey Date	17 June 2022
Observers	Steve Henry, Emelia Thielman
Date of Report	25 October 2022
Report Author	Steve Henry

Objectives of the Survey

This survey characterizes the aquatic plant community including:

1. Plant taxa observed and the estimated abundance of each taxon
2. Identification of taxa to the level of species when possible
3. Frequency of occurrence of each taxon found
4. Frequency of all aquatic plants found
5. Distribution maps for common species
6. Determination of any invasive aquatic plants

Methods

The aquatic plant survey followed our RMBEL Standard Operating Procedure for Point Intercept Surveys and the methodology described by MN DNR's Point Intercept SOP. The points surveyed previously were projected in the boats GPS system. On the lake the boat was navigated to each previously surveyed point as projected and a new waypoint was established.

A double-headed, weighted garden rake attached to a rope (Figure 2) was used to survey vegetation. Observations were also made visually and with sonar. Vegetation that was found under the surface by use of the double-headed garden rake was assigned a number between 0 and 4; 0 being absent, 1 being rare (≤ 1/3 of the rake head covered), 2 being scattered (>1/3 but ≤ 2/3 of the rake head covered), 3 being common (>2/3 of the rake head covered), and 4 being abundant (plants over top of rake head). Plant identification followed Blickenderfer (2007).

Figure 1: Double-headed, weighted garden rake, attached to a rope used to survey aquatic vegetation.

Little Sand Lake Survey Results

On 17 June 2022, 198 points were observed and sampled for aquatic vegetation. The weather was conducive for the survey with sunny skies. Winds were moderate from the southwest-west .The most abundant native plant species were Chara (Chara spp.), Canada Waterweed (*Elodea canadensis*), and Bulrush (Figures 6, 7, and 8). Given how shallow many of MN DNR's survey points were we began to wonder if they had been wading, many points were in less than 3 feet of water.

Of the 198 sampled locations in Little Sand Lake, 46 had no vegetation present. The average number of plant species per rake sample was 1.7. Sixteen different types of native plants were found in Little Sand Lake (Figures 3 & 4). Seven was the maximum number of species found at a specific point which is exceptional. One unique species encountered in Little Sand Lake was the carnivorous plant Greater Bladderwort, a map is included that shows the distribution.

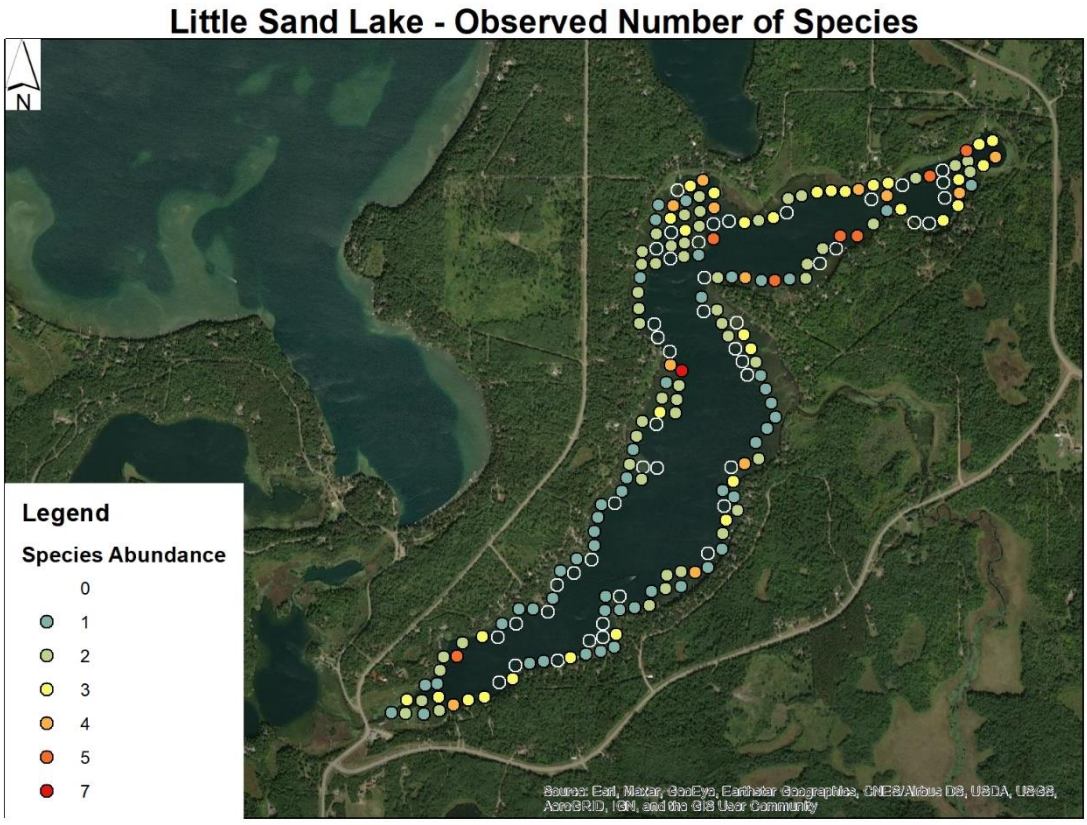


Figure 3: Number of plant species found at the sample points

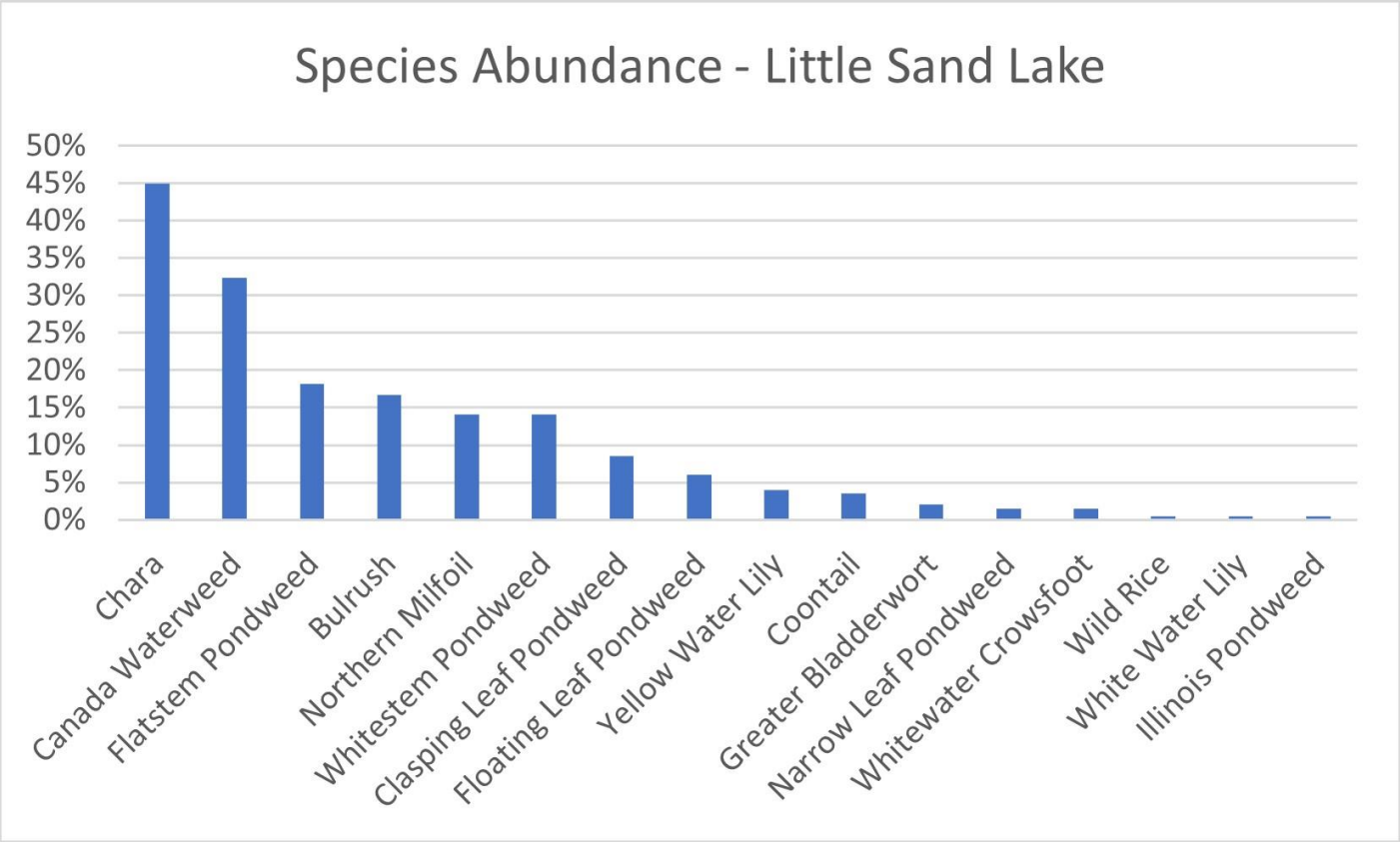


Figure 4: Frequency of aquatic plant species observed.

Table 2. Aquatic plants surveyed in Little Sand Lake, Hubbard County, MN

Life Form	Common Name	Count	Frequency
SUBMERGED – ANCHORED – These plants grow primarily under the water surface. Upper leaves may float near the surface and flowers may extend above the surface. Plants are often rooted or anchored to the lake bottom.	Chara	89	45%
	Canada Waterweed	64	32%
	Flatstem Pondweed	36	18%
	Northern Milfoil	28	14%
	Whitestem Pondweed	28	14%
	Clasping Leaf Pondweed	17	9%
	Coontail	7	4%
	Greater Bladderwort	4	2%
	Narrow Leaf Pondweed	3	2%
	Whitewater Crowsfoot	3	2%
	Illinois Pondweed	1	1%
FLOATING – LEAF – These plant leaves float on water and are anchored to the bottom of the lake.	Floating Leaf Pondweed	12	6%
EMERGENT – These plants extend above the water surface and are found in shallow water.	Bulrush	33	17%
	Yellow Water Lily	8	4%
	White Water Lily	1	1%
	Wild Rice	1	1%
Total number of plants (species diversity for the lake)			16
Total number of plant occurrences			355
Total number of sites			198

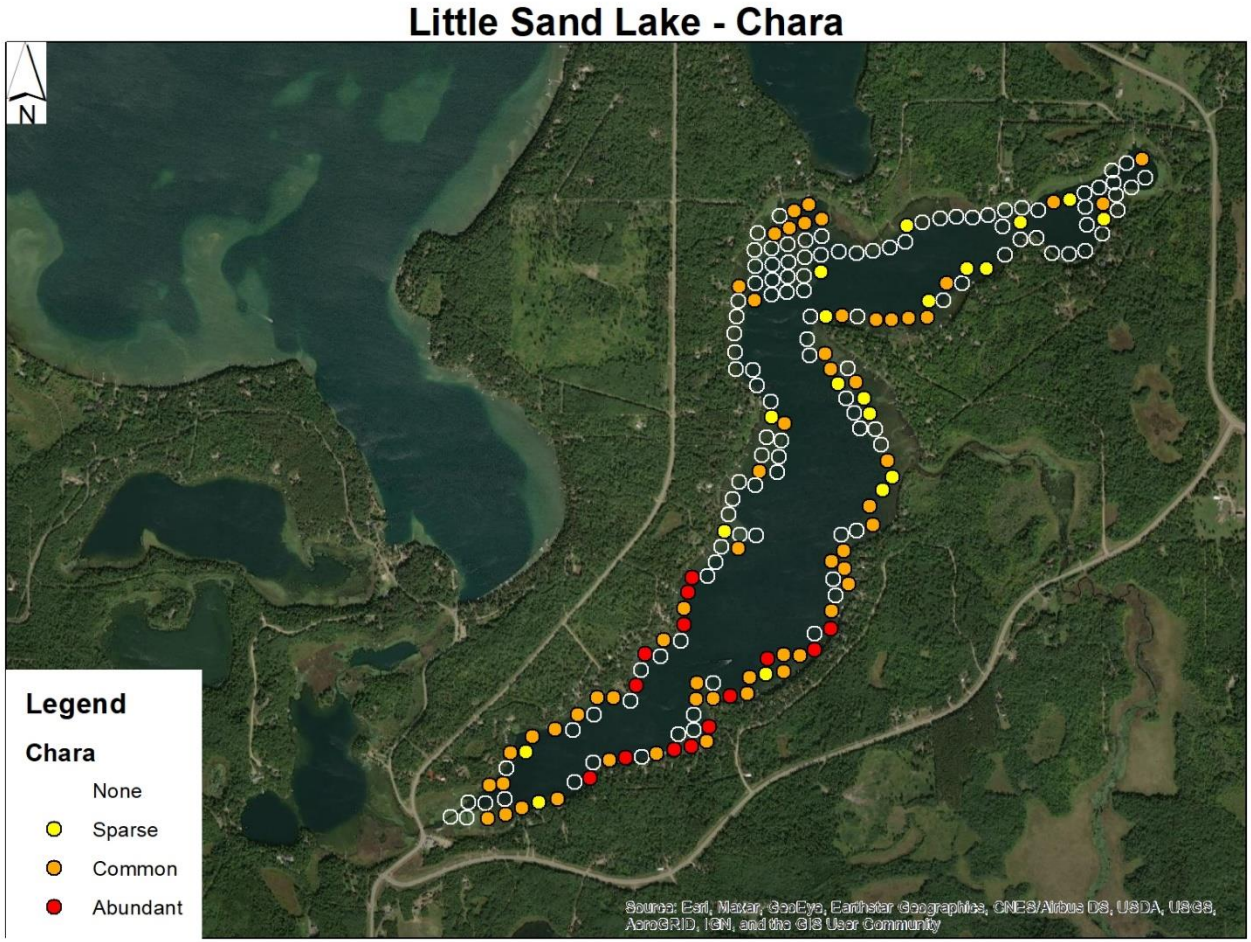


Figure 5: Density of Chara (Chara spp) at survey points.

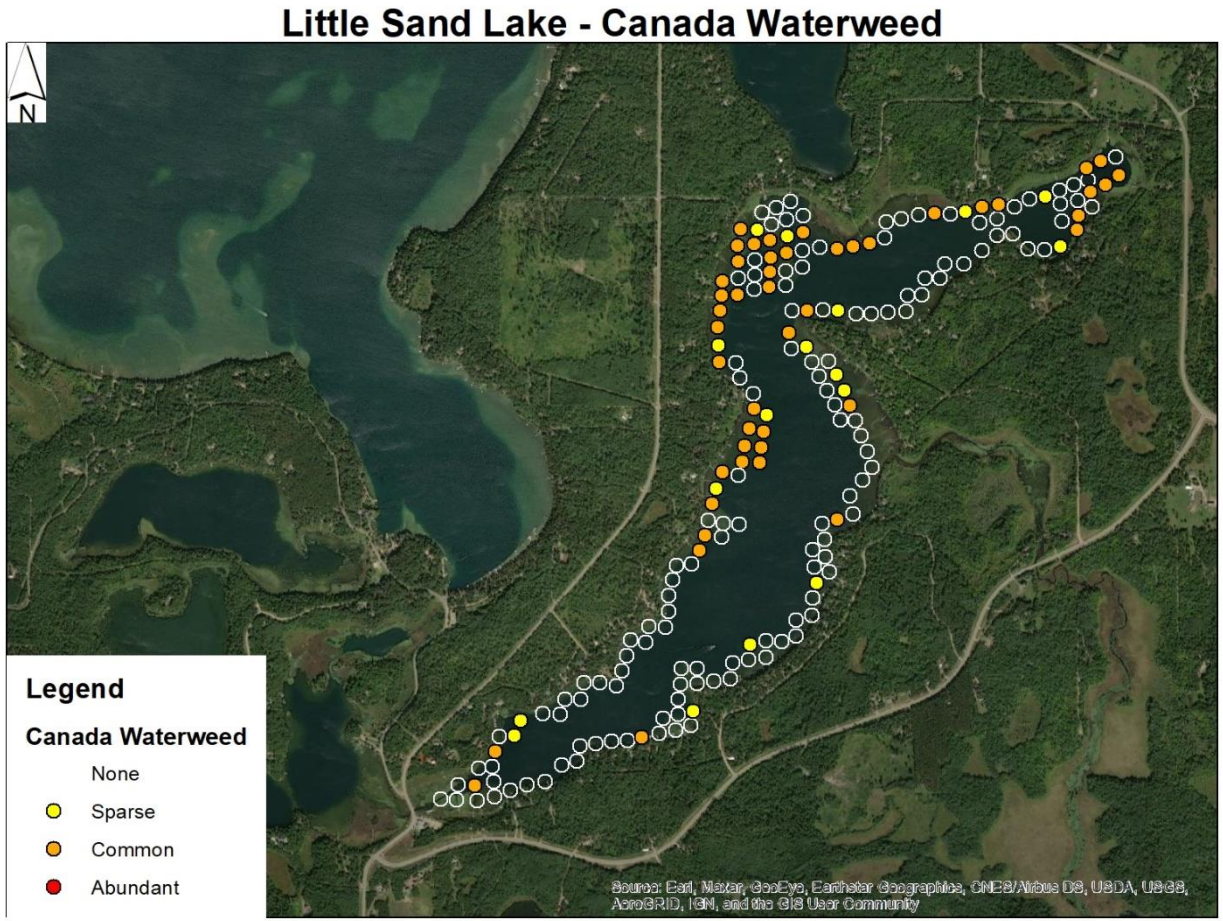


Figure:6: Density of Canada Waterweed (Elodea canadensis) at the survey points.

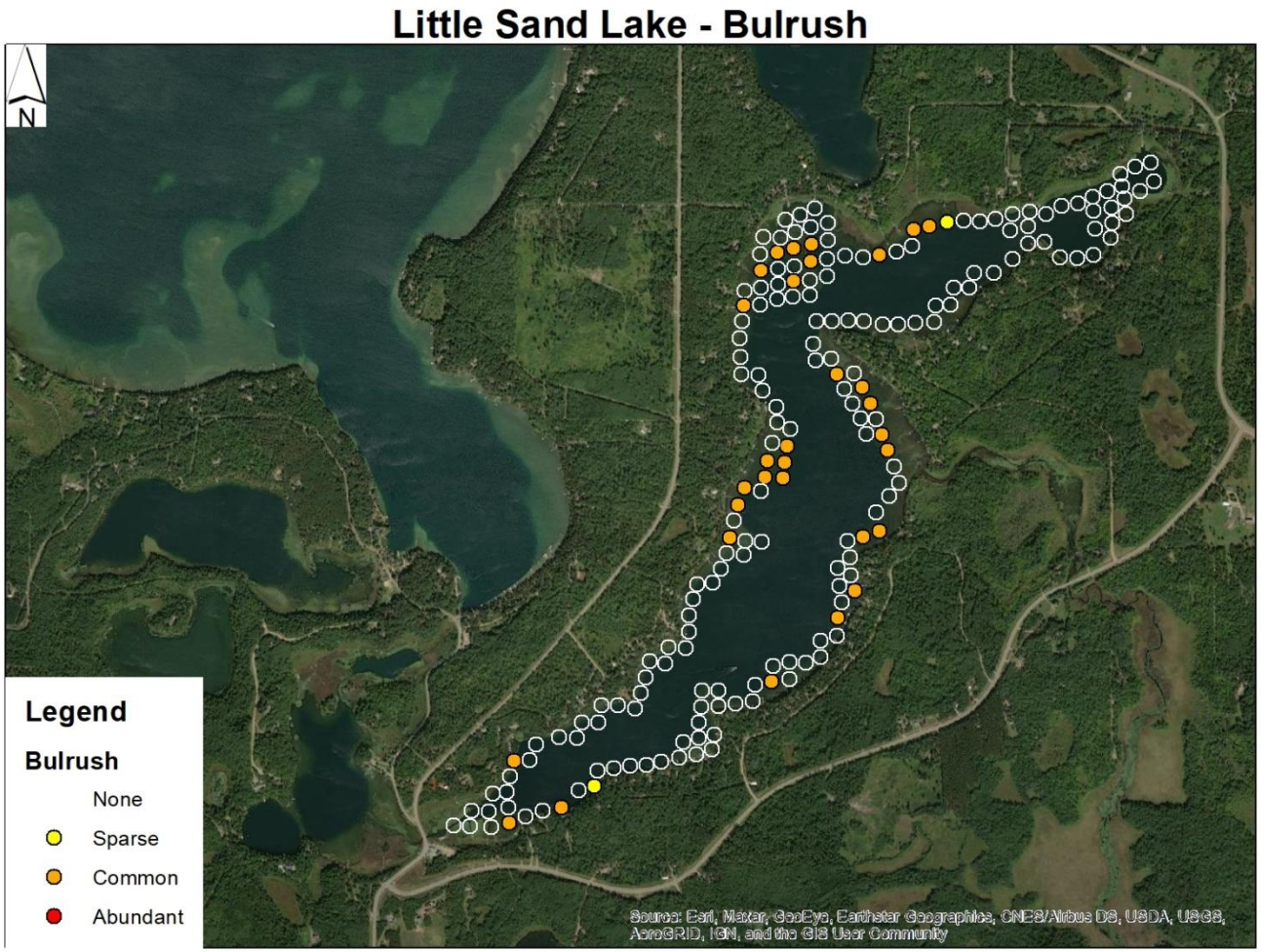


Figure 7: Density of Bulrush (Schoenoplectus acutus) at the survey points.

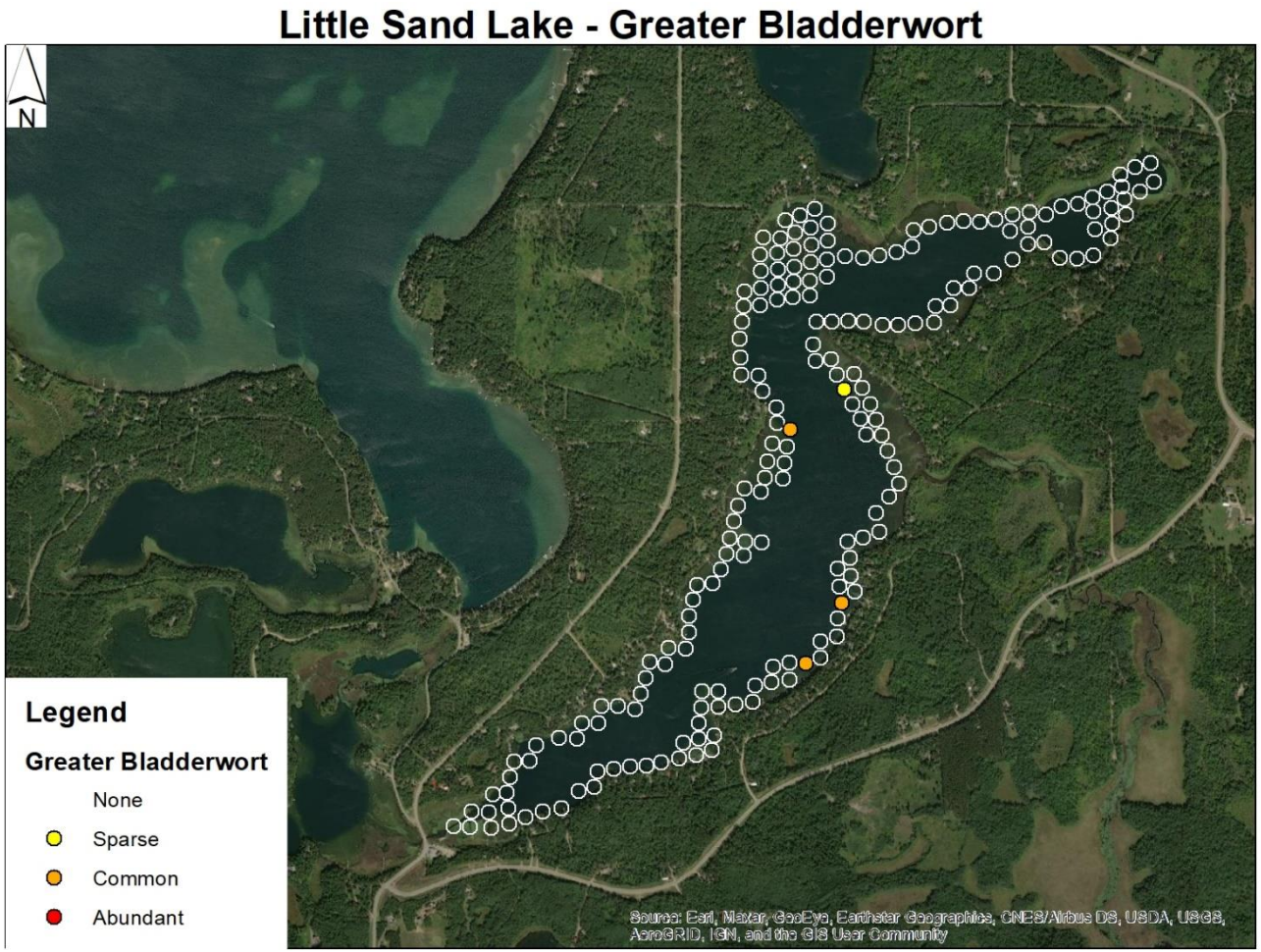


Figure 8: Density of Greater Bladderwort (Utricularia cornuta) at the survey points.

Discussion

The presence of plants and the depth at which one finds them is related to the water clarity. In areas where the sunlight does not reach the lake's bottom, there won't be plants present. The Minnesota DNR lists the littoral area of Little Sand Lake to be approximately 36% of the total surface area, and the findings of this plant survey support these findings. In general, the littoral area is approximated as the area of the lake that is 15 feet deep or less; in this plant survey, no plants were found deeper than 16 feet. While sampling was focused in the littoral area actual depths encountered ranged up to 20 feet.

Aquatic plant communities are important to a body of water because of their ability to maintain water clarity and good fish habitat. Plants in all lakes lock up nutrients in their tissues which limit algae growth keeping lakes clear and healthy. Aquatic plants produce oxygen throughout the water column as a byproduct of photosynthesis, which oxygenates the water column. Plants also help to keep the sediments stable at the bottom of the lake and prevent it from mixing into the water column. Tiny invertebrates called zooplankton eat algae and use plants as a hiding place from predators such as perch, sunfish, and crappies.

Aquatic Plants – Good or Bad?

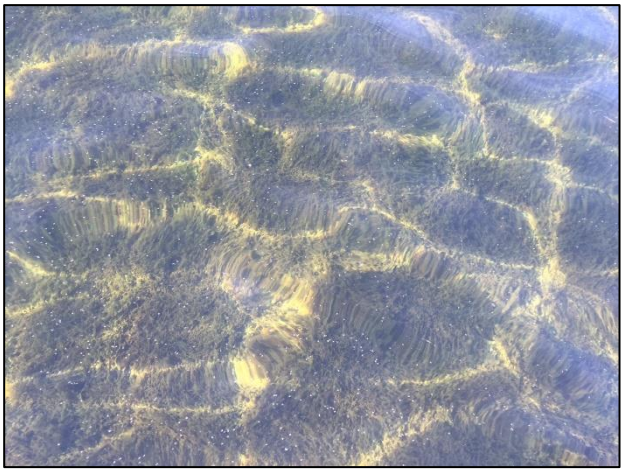
If you've spent any length of time at your favorite Minnesota lake, chances are you're no stranger to aquatic plants. Maybe you've cast into lily pads looking for bass, watched minnows dart to safety in plant beds, pulled in an anchor covered with green vegetation, or waded through a few plants while swimming.

Native beneficial aquatic plants.

Unfortunately, most people see aquatic plants as problems. They perceive lakes or lakeshores with lots of so-called "weeds" as messy and in need of cleaning. But what a cabin owner sees as a weedy mess is an essential part of a lake's or river's ecosystem (MN DNR).

Aquatic plant communities are important to a body of water because of their ability to maintain water clarity and good fish habitat. Plants in all lakes lock up nutrients in their tissues which limit algae growth keeping lakes clear and healthy. Aquatic plants produce oxygen throughout the water column as a byproduct of photosynthesis, which oxygenates the water column. Plants also help to keep the sediments stable at the bottom of the lake and prevent it from mixing into the water column. Tiny invertebrates (zooplankton and aquatic insects) eat algae and use plants as a hiding place from predators such as perch, sunfish and crappies.

The presence of plants and the depth at which one finds them is related to the water clarity. In areas where the sunlight does not reach the lake's bottom (usually deep areas), there won't be plants present.



Muskgrass (Chara) meadow in clear water.

Minnesota is home to about 150 species of aquatic plants, most of which are native species. Certain native plants can be water quality indicators. Muskgrass (*Chara*) is found more often in lakes with good water clarity. Though it gives off a 'musky' odor when brought to the surface, it is a great bottom stabilizer and slows the suspension of sediments; therefore, large communities of it can greatly benefit water quality and clarity. This plant is also wonderful habitat for fish and is a favorite food for waterfowl.

Bladderwort is a very interesting native aquatic plant. It is carnivorous and captures small invertebrates with its bladder-like traps. Despite their small size, the traps are extremely sophisticated. The prey brush against trigger hairs connected to the trapdoor. The bladder, when "set", is under negative pressure in relation to its environment so that when the trapdoor is mechanically triggered, the prey, along with the water surrounding it, is sucked into the bladder. Once the bladder is full of water, the door closes again, the whole process taking only ten to fifteen milliseconds.

Bulrush is very important to a lake for many reasons. It provides spawning habitat for crappies, filters the water, and helps to prevent shoreline erosion by acting as a wave break. It is imperative to protect bulrush beds in lakes for these reasons. Larger leave plants, such as the pondweeds, are important spawning and hiding areas for panfish.

Bladderwort, a carnivorous aquatic plant that is common in Minnesota lakes.

Homeowners should be careful not to cut or remove large areas of native plants in the lake. When aquatic plants are uprooted, the lake bottom is disturbed, and the phosphorus in the water column gets used by algae instead of plants. This contributes to "greener" water and more algae blooms. Protecting native aquatic plant beds will ensure a healthy lake and healthy fishery. If a swimming area is necessary in front of people's docks, clear only a small area of plants. Clearing a whole 100-foot frontage is not necessary and can contribute to additional algae blooms.

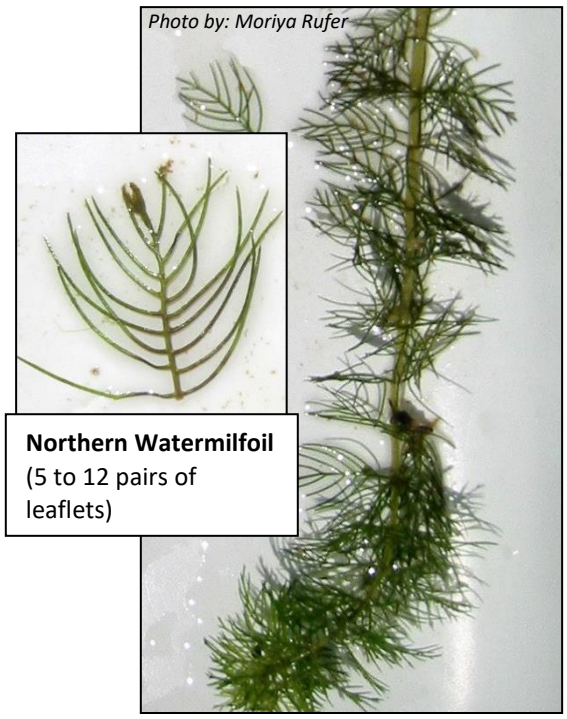
Some aquatic plants in Minnesota are not native and they may cause problems. Control of these species may be done to reduce interference with boating or swimming, to reduce the risk of spread of invasive species to un-infested waterbodies, or in some situations to attempt to produce ecological benefits such as increases in native plant communities. A DNR permit is needed for removal of aquatic plants including aquatic invasive species, and for plant control devices such as weed rollers.

Resources
DNR Guide to Aquatic Plants: https://www.dnr.state.mn.us/shorelandmgmt/apg/index.html
Permits to control aquatic plants: https://www.dnr.state.mn.us/shorelandmgmt/apg/permits.html
DNR AIS Specialists: https://www.dnr.state.mn.us/invasives/ais/contacts.html
AIS permits: https://www.dnr.state.mn.us/invasives/training_permits.html

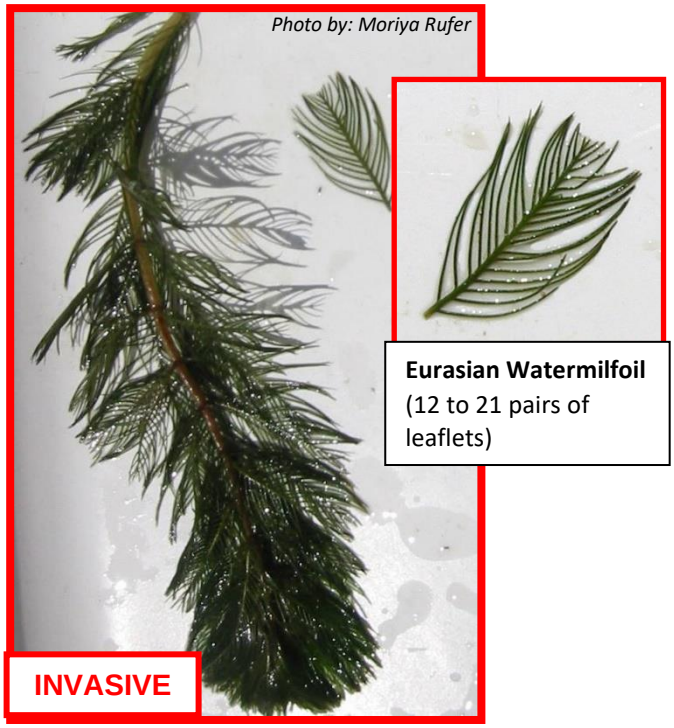
Enjoy the lakes! This article was written and shared by Moriya Rufer at RMB Environmental Laboratories as part of continuing education for their Lakes Monitoring Program (218-846-1465, lakes@rmbel.info). To learn more, visit www.rmbel.info.

Aquatic Plants In Minnesota Lakes

Compiled by Emelia Hauck Jacobs and Moriya Rufer, RMB Environmental Laboratories, Inc, 218-846-1465, rmbel.info

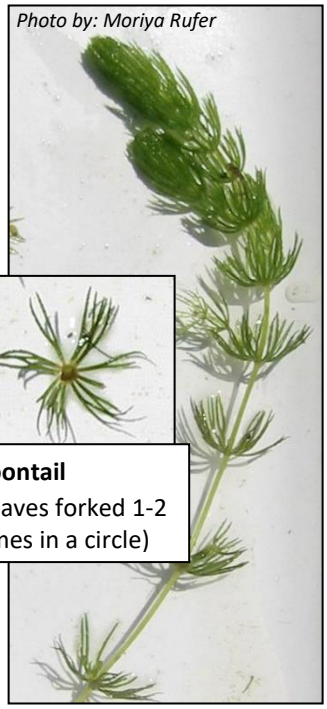


Northern Watermilfoil
(*Myriophyllum sibiricum)*

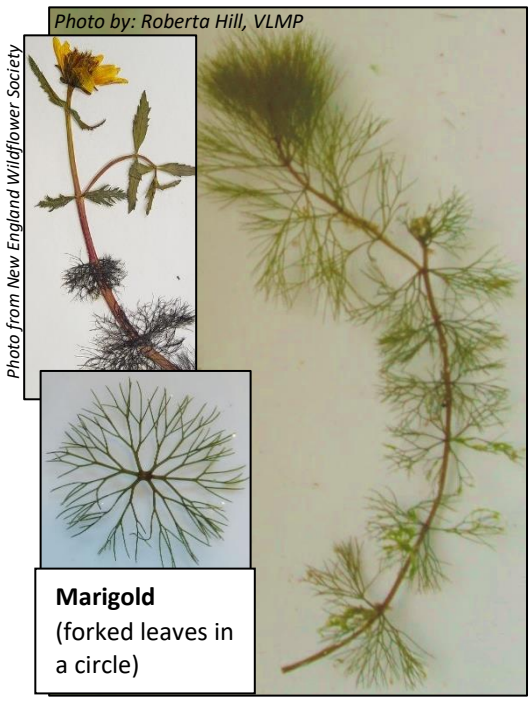


Eurasian Watermilfoil
(*Myriophyllum spicatum*)

Bladderwort
(*Utricularia vulgaris*)



Coontail
(Ceratophyllum demersum)



Water Marigold
(Bidens beckii)

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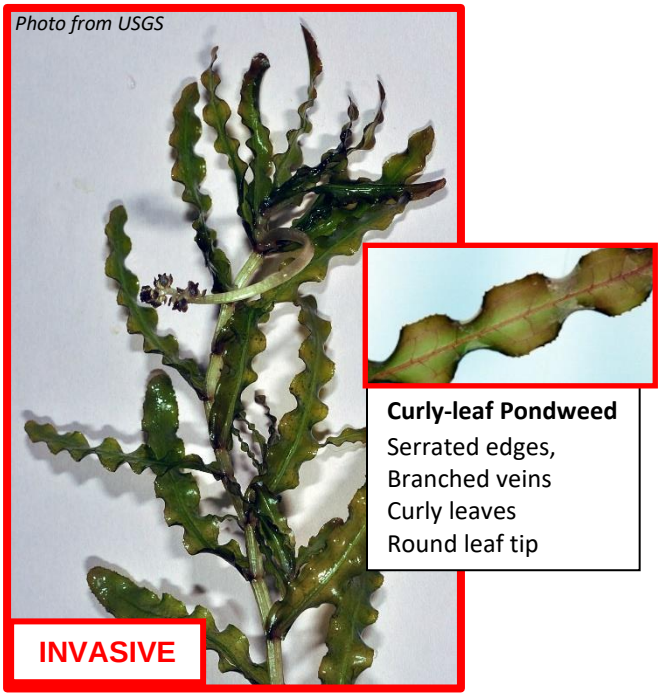
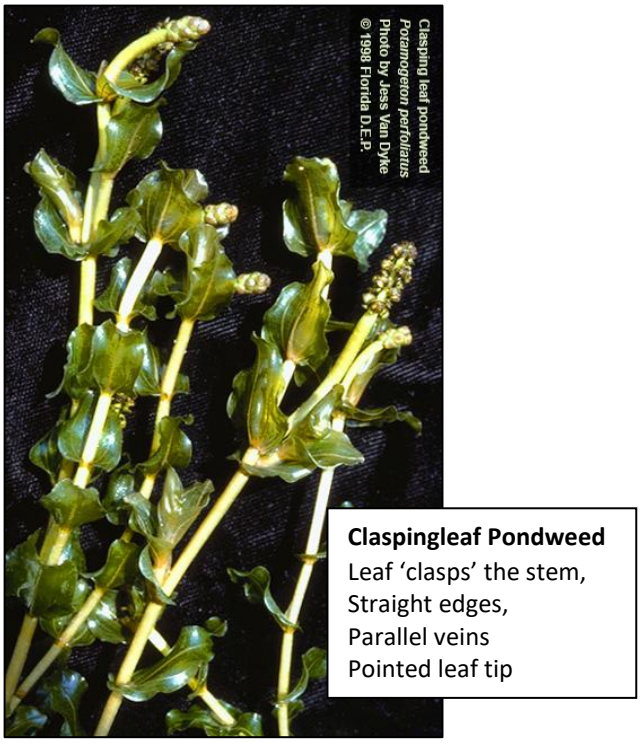


Curly-leaf Pondweed
(*Potamogeton crispus*)

Whitestem Pondweed
(*Potamogeton praelongus*)



Claspingleaf Pondweed
(*Potamogeton richardsonii*)

Robbin's Pondweed
(*Potamogeton robinsii)*

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Chara
(*Chara spp.*)

Starry Stonewort
(*Nitellopsis obtuse)*

Sago Pondweed
(*Potamogeton pectinatus)*

Brittle Naiad
(*Najas minor)*

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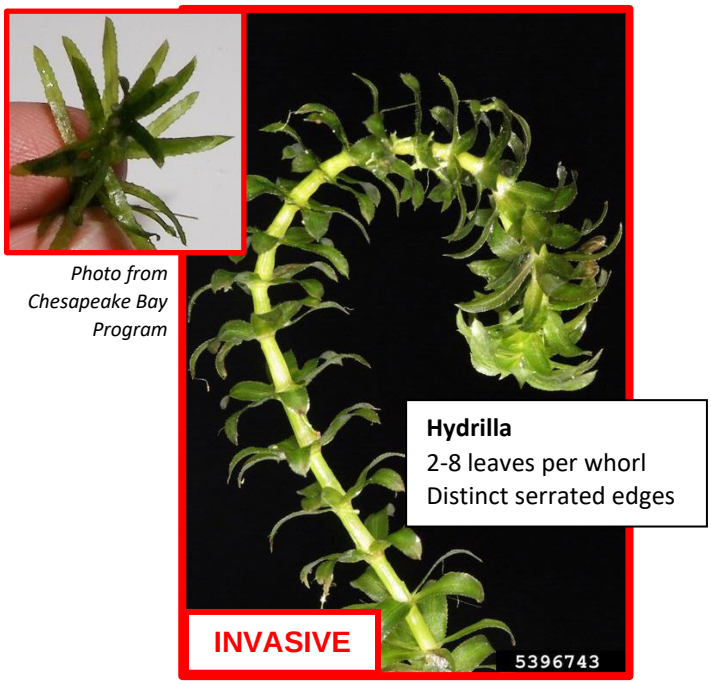
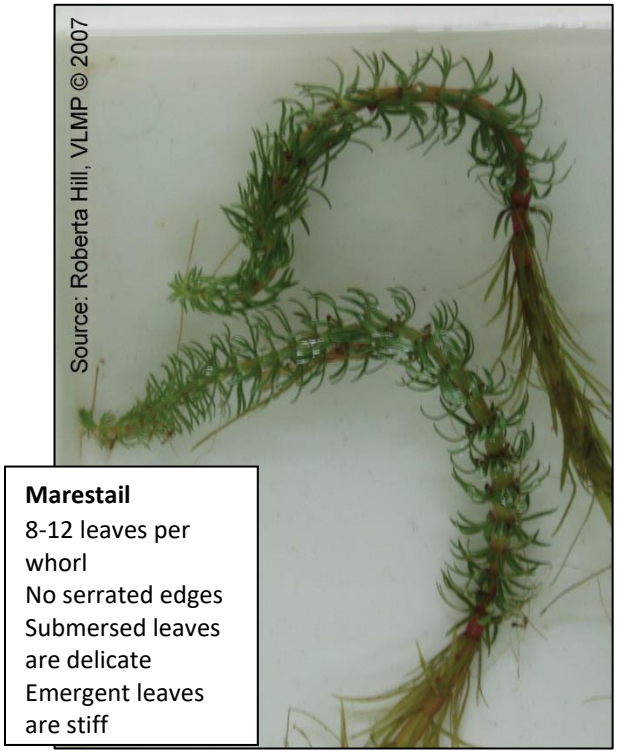
Brazilian Elodea
(Egeria densa)



Hydrilla
(*Hydrilla verticillata*)

Canada Waterweed
(Elodea canadensis)



Marestail
(*Hippuris vulgaris)*

Literature Cited

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Madsen, J. D. 1999. Point intercept and line intercept methods for aquatic plant management. *APCRP Technical Notes Collection* (TN APCRP-M1-02). U.S. Army Engineer Research and Development Center, Vicksburg, MS. www.wes.army.mil/el/aqua