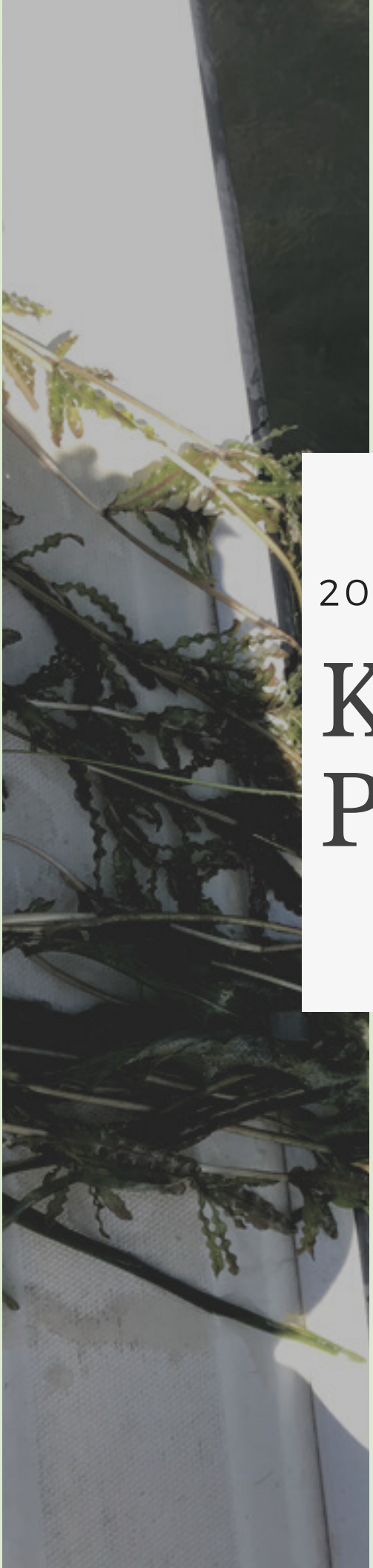

RMB ENVIRONMENTAL LABORATORIES

2021

# Kabekona Lake Plant Survey

PREPARED BY

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KABEKONA

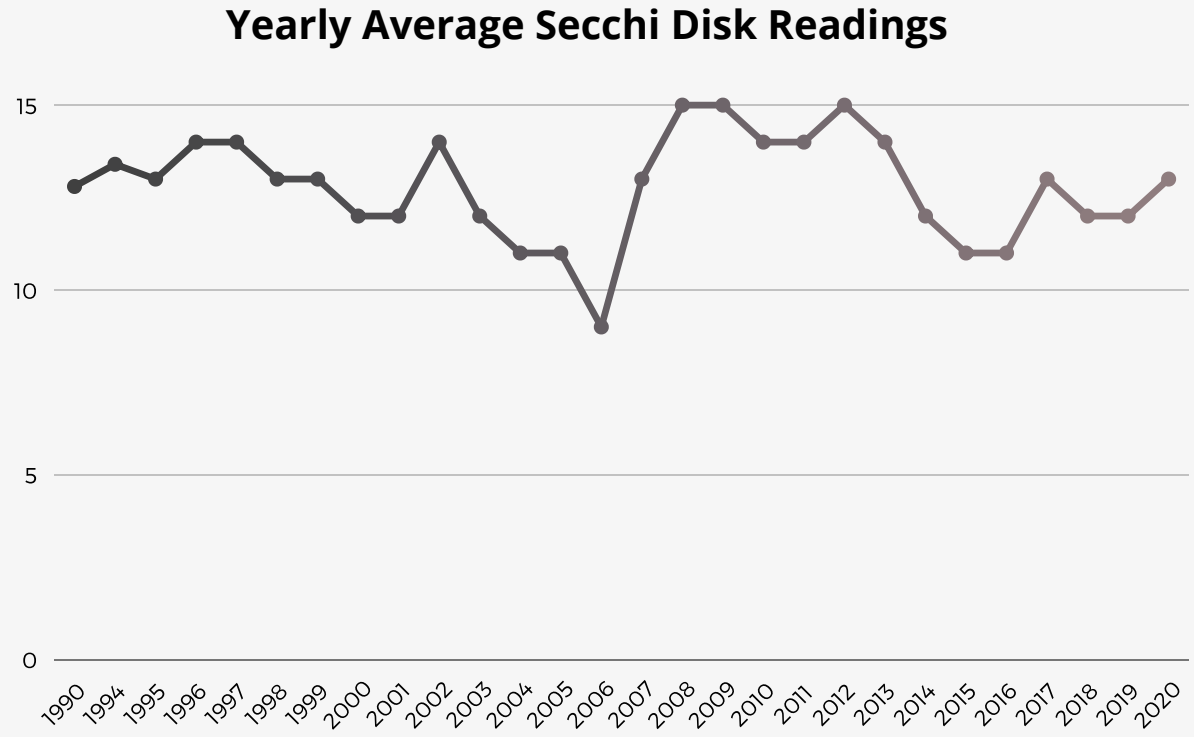
# Lake Summary


Kabekona Lake (DOW 29-0075-00) is a large 2,433-acre lake located near Laporte, Minnesota in Hubbard County. Kabekona Lake has a maximum depth of 133 feet and a mean depth of 54 feet. 532 acres, or 22% of Kabekona Lake is considered littoral zone. The littoral zone is the area of a lake that is less than 15 feet deep. Since the water is shallow in this area, it permits light penetration to the bottom of the lake aiding plant growth.

Kabekona is classified as a mesotrophic lake as measured from 1990-2021 by a mean secchi depth of approximately 13 feet. Continual annual monitoring can help track trends in water quality in the lake.

# Water Quality Statistics

Water quality can impact the speciation and quantity of aquatic plants. Phosphorus is an important nutrient for plant growth. Generally, it is the limiting nutrient in many Minnesota lakes, meaning that the more phosphorus that is available, the more plants and algae will grow. Sunlight also plays a large role in plant growth. Typically in Minnesota lakes, we see the littoral zone ranging up to about 15 feet. The littoral zone is the area of the lake where sunlight penetrates through the water and reaches the bottom of the lake, ultimately aiding plant growth. The average secchi disk reading is about 13 feet on Kabekona Lake. The graph below illustrates the average yearly secchi disk readings recorded for Kabekona Lake at site 205.




Kabekona Lake has been monitoring water quality by analyzing the amount of total phosphorus, chlorophyll a, and measuring transparency through secchi depth readings. Currently there is over 20 years of data for Kabekona Lake at site 205 from 1990-2021. 2021 data was not compiled into this report because the sampling season is not complete at this time.

Kabekona Lake falls in the Northern Lakes and Forest ecoregion according to the *EDA: Guide to typical Minnesota water quality conditions.* The levels of total phosphorus and chlorophyll a concentrations are better than expected ecoregion range established by the Minnesota Pollution Control Agency.

# Methods & Objectives

The point intercept survey followed our RMBEL Standard Operating Procedure (SOP) and the DNR's document, Minnesota Lake Plant Survey Manual (2016). The goals and objectives were discussed with the Lake Association prior to the survey to ensure all goals were met during the survey.

## Goals:

1. Identify if any new invasive species were introduced
2. Native plant taxa observed and the estimated abundance
3. Identification of taxa to the level of species when possible
4. Frequency of occurrence of each taxon found
5. Frequency of all aquatic plants found
6. Estimation of species abundance using MN DNR ranking system
7. Distribution maps for common species
8. Determination of any additional invasive aquatic plants

## Methods:

A double-headed weighted garden rake attached to a rope was used to complete the survey vegetation. The vegetation that was found under the surface was assigned a number between 0 and 3.

**1 =Sparse (<25% of rake covered)**

**2=Common (>25% but <75%)**

**3=Abundant (>75% of rake covered)**

Water depths at each site were recorded in 1-foot increments using an electronic depth finder.

July 2021

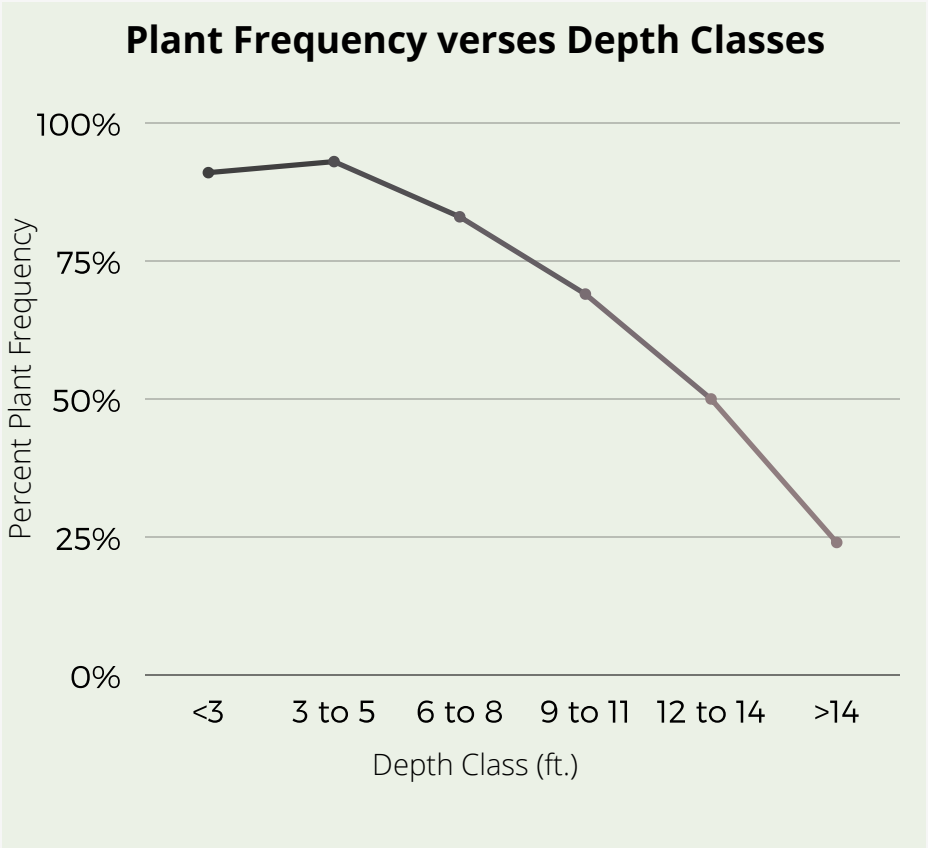
# Survey Results

The weather was conducive for the survey with partly cloudy skies, temperatures reaching 75 degrees and little wind with some scattered showers. Water temperatures were in the mid-low 70s.

Plant abundance was greatest between three to five feet of water. As depths increased beyond that range, the presence of vegetation decreased and became less dense.

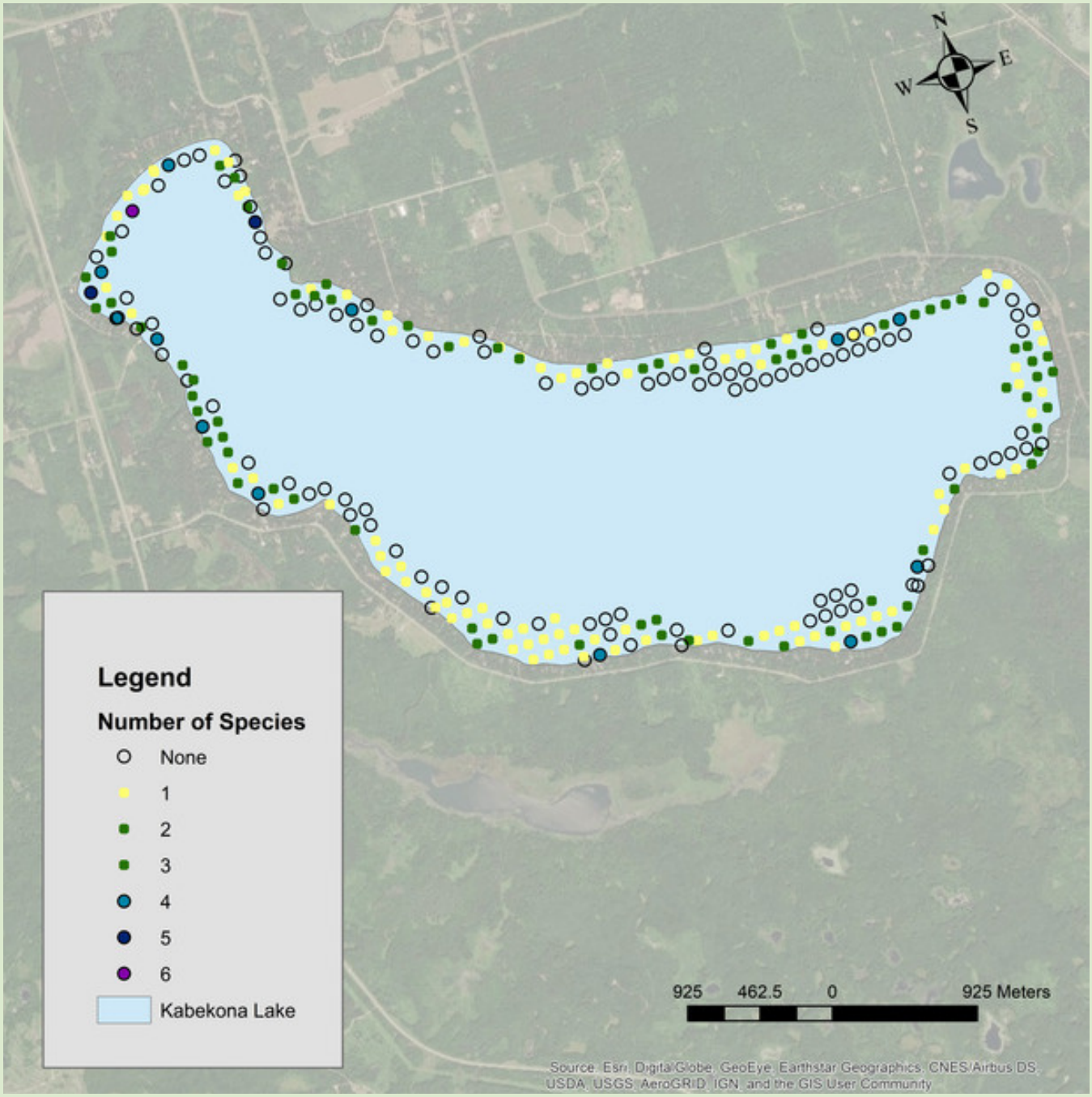
280 points were observed and sampled for aquatic vegetation. Sampling occurred to a maximum depth of 25 feet. No vegetation was found at 75 sites, which is 33% of all sites sampled. The top three most abundant submergent species observed were chara, celery, and busy pondweed. White waterlilies were by far the most frequently observed floating plant and bulrush was the most common emergent plant.

The average number of plants per rake sample on Kabekona Lake was 2.



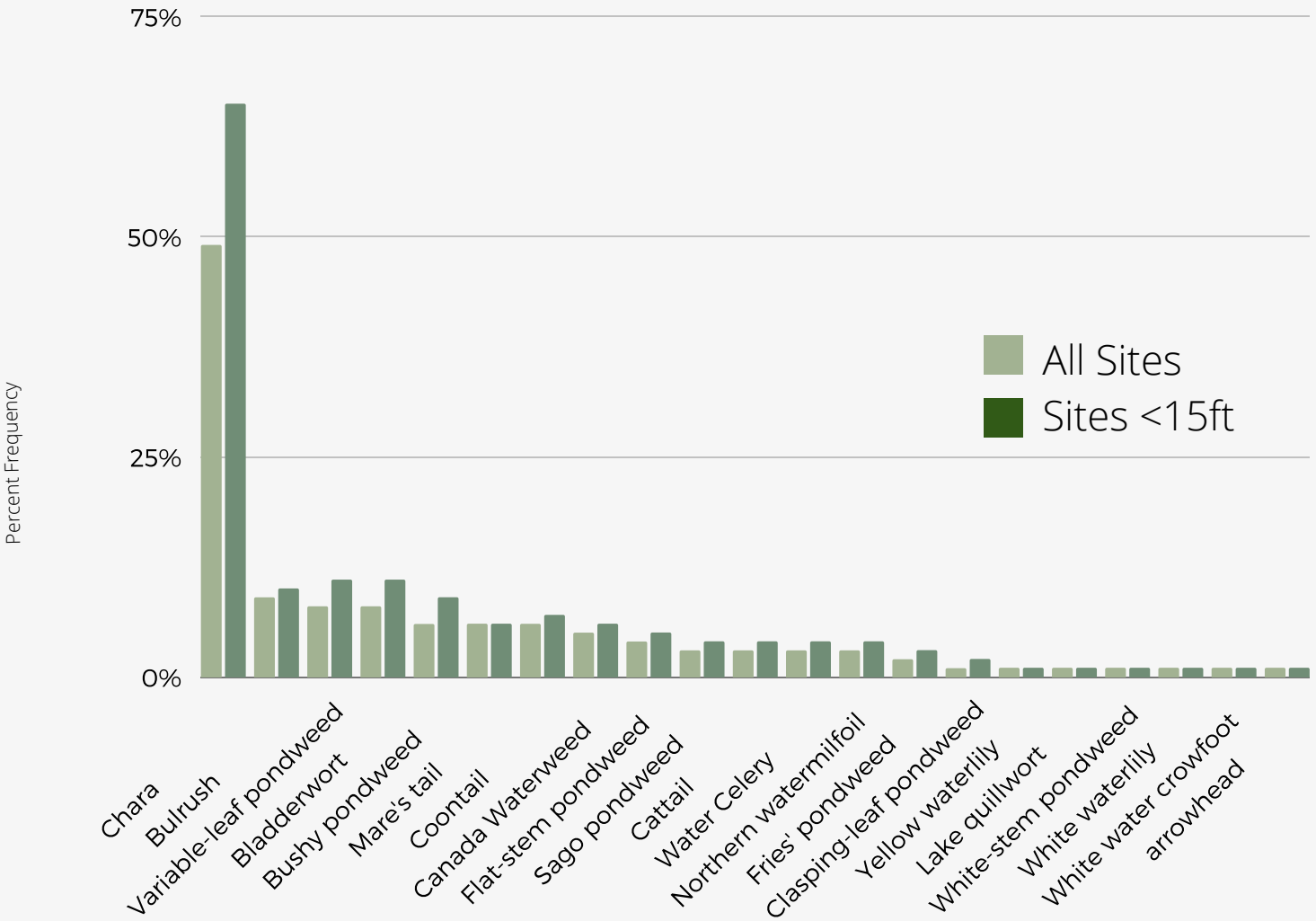
# Aquatic Plant Abundance

21 different types of native plants were found across the sampling area. Six was the maximum number of species found at a specific point.



# Aquatic Plant Frequency

The frequency of plants in a given location depends greatly on the substrate, depth of the water, nutrient supply, and light availability. Due to an early ice out, warm temperatures and low water levels in 2021, we were potentially able to observe a larger variety of native plants.




The most commonly observed plant was:

## Chara

Chara is a native macro algae that typically grows in shallower areas of the lake. It has a strong musty odor.

# Plants Identified

## SUBMERSED

Submersed plants grow primarily under the water's 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.

| Common Name | Scientific Name | Count | Frequency All sites | Frequency <15 ft |
|---|---|---|---|---|
| Chara | Chara spp. | 87 | 38% | 51% |
| Variable pondweed | Potamogeton gramineus | 30 | 13% | 16% |
| Bladderwort | Utricularia macrorohiza | 23 | 10% | 12% |
| Bushy pondweed | Najas flexilis | 21 | 9% | 13% |
| Mare's tail | Hippuris vulgaris | 16 | 7% | 9% |
| Coontail | Ceratophyllum demersum | 15 | 7% | 7% |
| Canada waterweed | Elodea canadensis | 14 | 6% | 7% |
| Flat-stem pondweed | Potamogeton zosteriformis | 7 | 3% | 4% |
| Sago Pondweed | Stuckenia pectinata | 6 | 3% | 4% |
| Water celery | Vallisneria americana | 6 | 3% | 4% |
| Northern watermilfoil | Myriophyllum sibiricum | 5 | 2% | 3% |
| Fries' pondweed | Potamogeton friesii | 3 | 1% | 1% |
| Clasping leaf pondweed | Potamogeton perfoliatus | 3 | 1% | 1% |
| Lake Quillwort | Isoetes lacustris | 3 | 1% | 1% |
| White-stem pondweed | Potamogeton praelongus | 1 | <1% | <1% |
| White water crowfoot | Ranunculus aquatilis | 1 | <1% | <1% |

# Plants Identified

## FLOATING

Floating plants are rooted beneath the surface with leaves that rest on the surface of the water.


| Common Name | Scientific Name | Count | Frequency All sites | Frequency Sites <15ft. |
|---|---|---|---|---|
| Yellow waterlily | Nuphar variegata | 3 | 1% | 2% |
| White water lily | Nymphaea odorata | 1 | <1% | 1% |

# Plants Identified

## EMERGENT

Emergent plants grow above the surface of the water. These plants are typically observed near the shoreline and can help to serve as a natural buffer.

| Common Name | Scientific Name | Count | Frequency | Frequency |
|---|---|---|---|---|
| Bullrush | Scripus acutus | 17 | 9% | 10% |
| Cattail | Typha spp. | 1 | 3% | 4% |
| Arrowhead | Sagittaria latifolia | 1 | <1% | <1% |

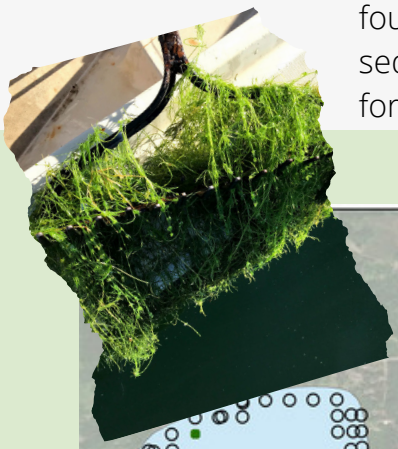
# 2021 Survey Statistics

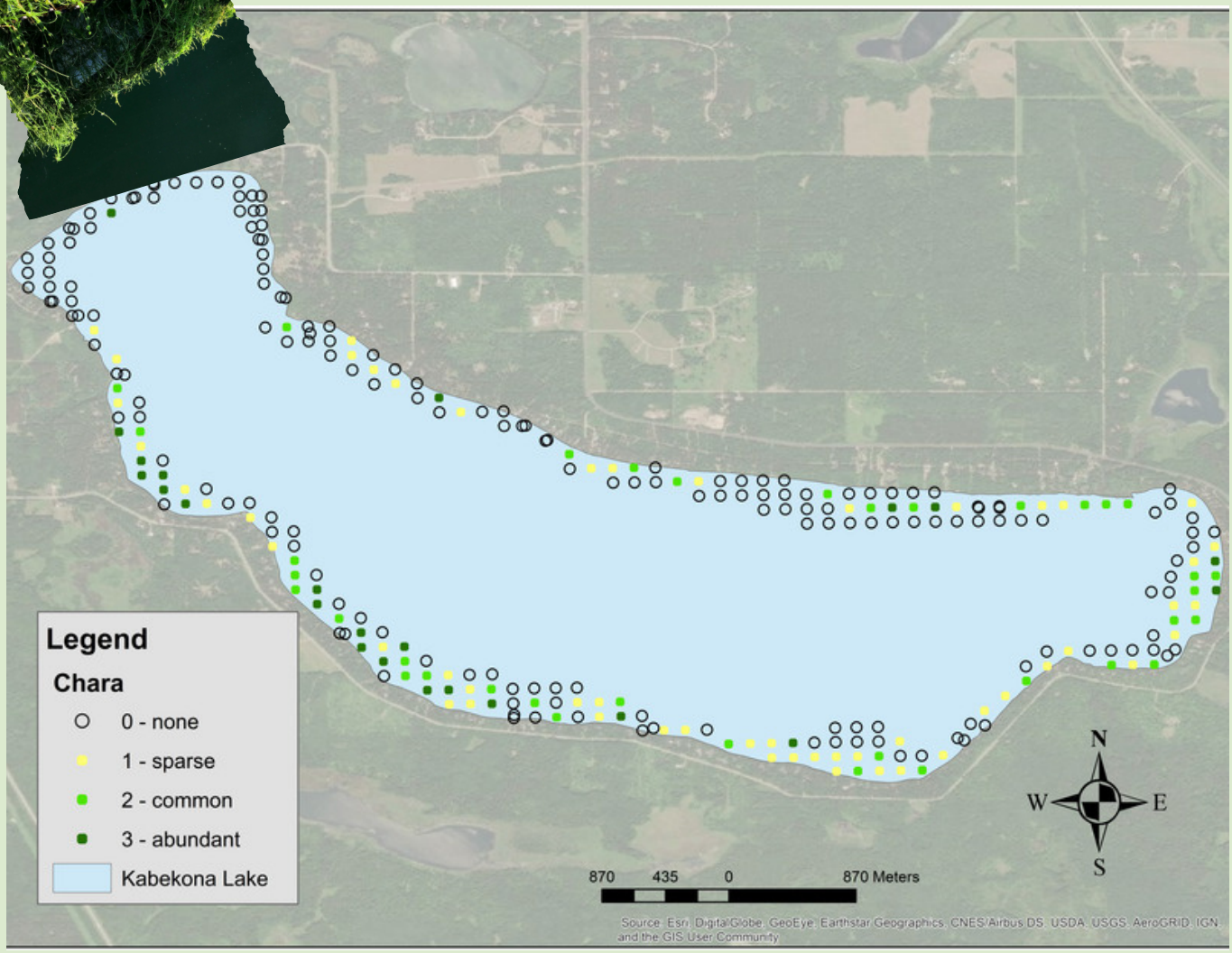
| | |
|---|---|
| **Total number of plants** | 22 species |
| **Total number of plant occurrences** | 204 sites |
| **Total number of sites** | 280 sites |
| **Total number of sites <15 ft.** | 187 sites |

# Abundant Species

## Chara (Chara spp.)

Chara is a macro algae that feels crunchy and has a distinct musty order. Sometimes chara is referred to as a muskgrass and it is often found in shallower areas of the lake. Chara helps to stabilize the sediment on the bottom of the lake as well as provides food and habitat for many aquatic animals.





# Abundant Species

## Variable-leaf pondweed

### (Potamogeton gramineus

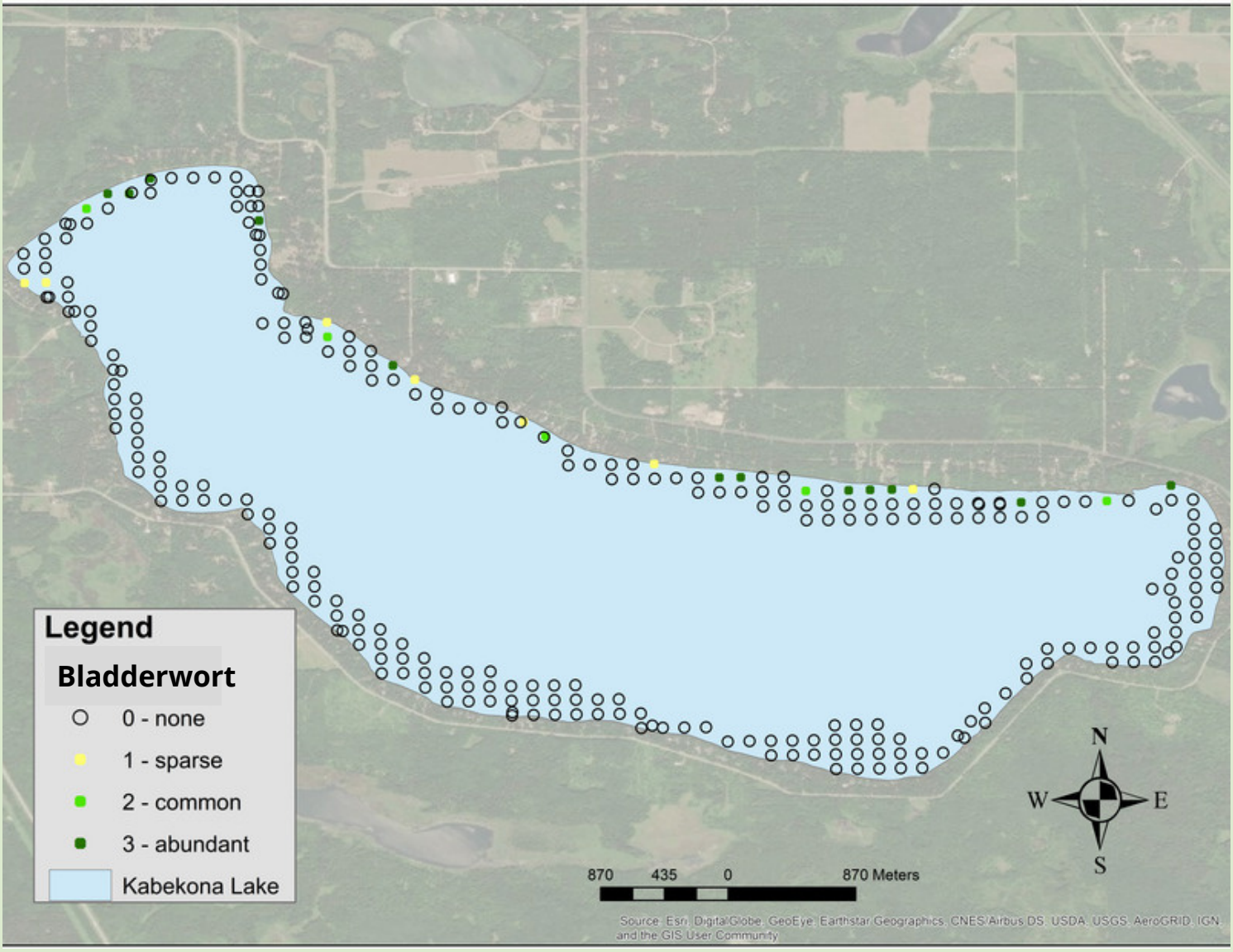
Variable-leaf pondweed is a common native aquatic plant that does well in both shallow and deep water. It is often heavily branched and can have both submergent and floating leaves.

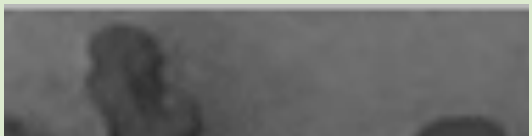
# Abundant Species

## Bladderwort

### (Utricularia macrorhiza)

Bladderwort is a carnivorous aquatic plant, that lacks true roots. Leaves are often heavily dived and bladders are abundant on leaflets.





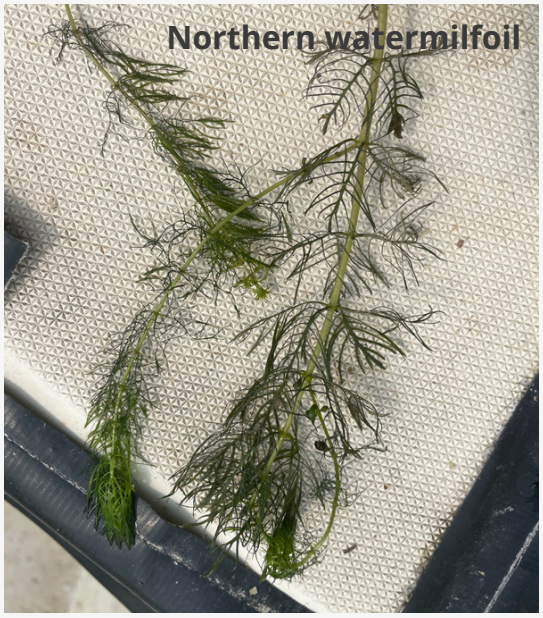
# Discussion

Kabekona Lake is a deep lake located north central Minnesota. 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 most likely, will not be plants present. Kabekona Lake has an average clarity of about 13 feet, and plant abundance was greatest between three to eight feet of water. After nine feet, plant abundance dropped off quickly, and no vegetation was found past 18
feet.

The Minnesota DNR lists the littoral area of Kabekona Lake to be approximately 28% of the total surface area.  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 18 feet.

No invasive aquatic plants were observed during this survey. With starry stonewort recently introduced to the nearby Leech Lake, it will be important to continue monitoring the lake for invasive species. Access checks are a great way to target high traffic areas of the lake.

# More 2021 Survey Photos





# LAKE LEARNING

## BENEFITS OF AQUATIC PLANTS

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.

Unfortunately, most people see aquatic plants as a problem. 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).

# LAKE LEARNING

## THE BENEFITS OF AQUATIC PLANTS

What they do and where they are found?

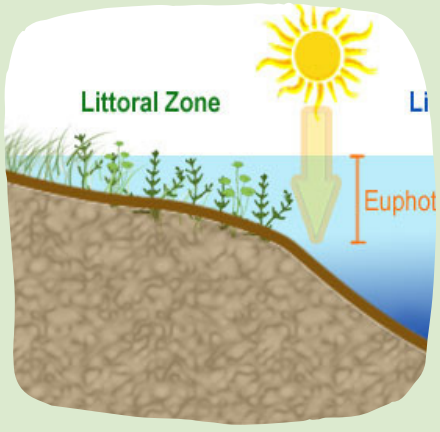
Plants help to maintain water clarity and provide habitat for fish, insects, and water fowl.

Plants reduce nutrient mixing by stabilizing the bottom sediment and can lock up nutrients helping to limit algae growth.



Plants also produce oxygen in the water column, as a biproduct of photosynthesis.

The depth at which one finds plants 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.



# LAKE LEARNING

Protecting native aquatic plant beds will ensure a healthy lake and 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. The natural, healthy state of shallow lakes and bays is to have clear water and abundant native plant growth.

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 can contribute to "greener" water and more 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 spreading 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 also for plant control devices such as weed rollers.

# Resources

**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

EDA: Guide to typical Minnesota water quality conditions: https://www.pca.state.mn.us/quick-links/eda-guide-typical-minnesota-water-quality-conditions

**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