

Aquatic Plant Surveys of Five Waterbodies in Sibley County, MN



An Interim Data Summary Submitted to the Sibley County Soil and Water Conservation District

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Background

For Minnesota, water is its most important natural resource; and there are many factors that affect the quality of this resource. One such factor is the diversity of aquatic macrophytes, as they can affect water quality, fish and wildlife habitat, recreation, and access to drinking water in some locations. A major threat to the diversity of aquatic macrophytes are non-native plant species. The environmental damages, in addition to the control and management of these invasive plants, can be incredibly expensive. The earlier these invasive species are detected and documented, the more these costs can be mitigated and control efforts can be implemented sooner.

In Sibley County, there are a number of lakes that have environmental and economic value. These lakes are shallow and to date, there have been no quantitative assessments of the macrophyte distribution in these lakes. The objectives of this project are to 1) to survey five of Sibley County's high profile lakes (High Island Lake, Titlow Lake, Schilling Lake, Silver Lake, and Clear Lake) to provide a comprehensive assessment of the abundance and distribution of aquatic macrophytes and 2) assess how the plant community changes over the growing season.

Methods

The aquatic plant communities of High Island Lake, Titlow Lake, Schilling Lake, Silver Lake, and Clear Lake were surveyed between May 23rd and June 28th using the point intercept method. The Early season surveys were conducted using a 150 meter grid; for a total of 766 points sampled across all five lakes (High Island Lake – 249, Titlow Lake – 163, Schilling Lake – 145, Silver Lake – 119, Clear Lake – 90). At each point, the presence of macrophytes was sampled using a plant rake and water depth determined using hydroacoustic equipment. Spatial data were recorded using the FarmWorks Site Mate Software on a Trimble Yuma 2 tablet PC. The software was used to display the survey grid for navigation as well as to collect geospatial data. Data were collected using a database template and pick lists specifically constructed for this project. Secchi disk measurements were also measured at each lake to assess water clarity.

For each species, presence was averaged over all sampled points for a given lake to determine the frequency of occurrence. Species richness was determined both quantitatively at sample points and qualitatively by observation outside of the sample points. Voucher specimens were collected for every species that occurred and total species lists for the early season surveys were constructed for each lake.

Results

High Island Lake

Surveyed on June 1st and June 3rd

Secchi: 149 cm

Average depth: 1.67 m

High Island Lake was the largest lake sampled and had the greatest water clarity. This lake had the greatest diversity of aquatic macrophytes during the early season survey (Table 1). The dominant submerged macrophyte was sago pondweed (*Stuckenia pectinata*) (Figure 1). There were isolated patches of coontail (*Ceratophyllum demersum*) (Figure 2), which seemed to be unique to this lake. There was no curlyleaf pondweed (*Potamogeton crispus*) observed in this lake which was surprising given its proximity to Schilling Lake which was heavily infested. The shoreline of the lake was dominated by cattail (*Typha* spp.) in large patches, but there were also instances of river club-rush (*Bolboschoenus fluviatilis*) and softstem bulrush (*Schoenoplectus tabernaemontani*).

Table 1. The sample frequencies of all macrophyte species observed in High Island Lake, Sibley Co., MN. Species observed but not sampled: *Bolboschoenus fluviatilis*, *Nymphaea odorata*, and *Phragmites australis*.

Plant Species	Common Name	Sample Frequency
<i>Ceratophyllum demersum</i>	coontail	0.020
<i>Lemna minor</i>	lesser duckweed	0.028
<i>Lemna trisulca</i>	star duckweed	0.008
<i>Schoenoplectus tabernaemontani</i>	softstem bulrush	0.004
<i>Stuckenia pectinata</i>	sago pondweed	0.490
<i>Typha</i> spp.	cattail	0.048
<i>Wolffia Columbiana</i>	Columbian watermeal	0.008

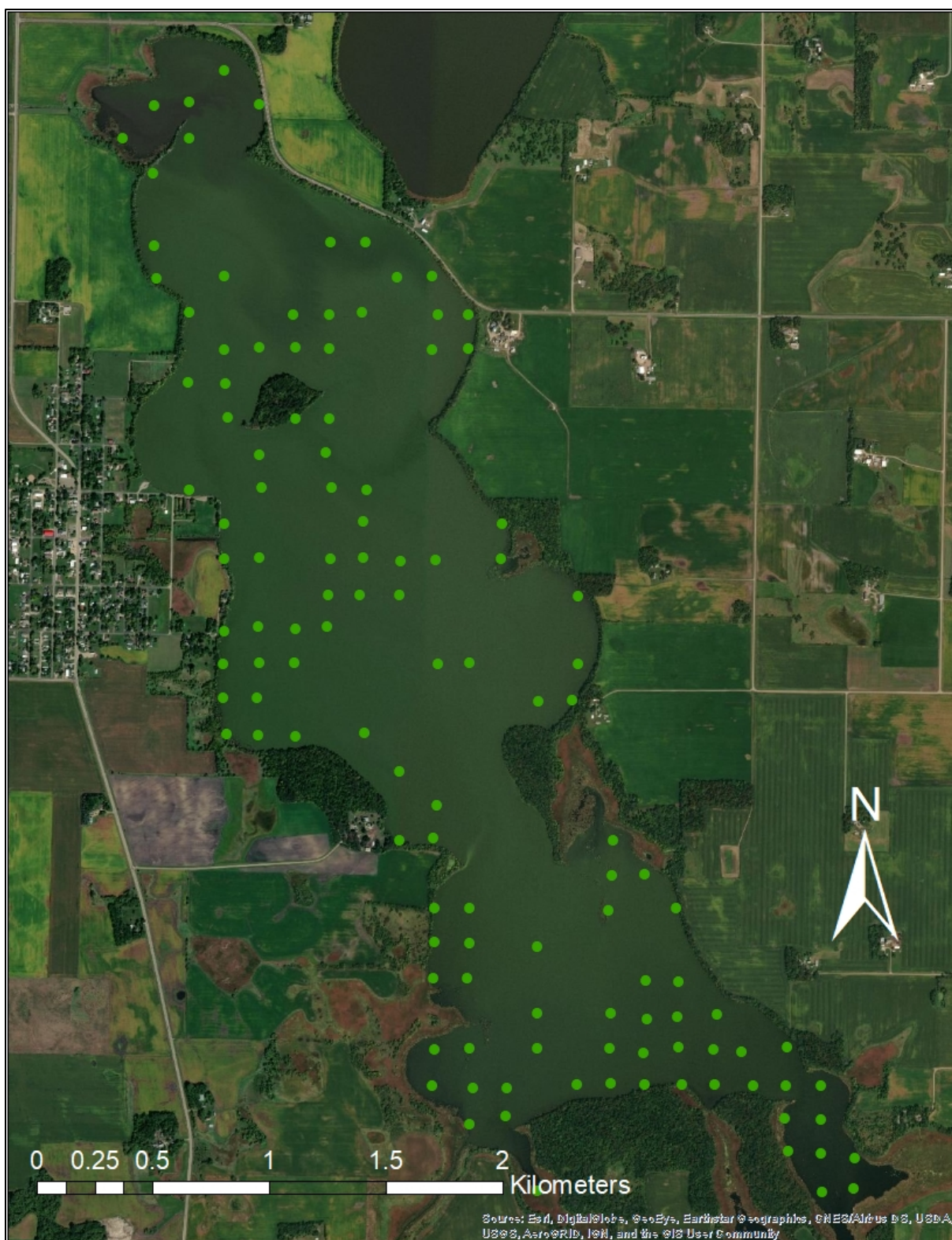


Figure 1. A map of the distribution of sago pondweed (*Stuckenia pectinata*) in High Island Lake, Sibley Co., MN.



Figure 2. A map of the distribution of coontail (*Ceratophyllum demersum*) in High Island Lake, Sibley Co., MN.

Titlow Lake

Surveyed on May 28th and 31st

Secchi: 22 cm

Average depth: 1.52 m

Titlow Lake was the shallowest lake that was surveyed and had low water clarity. Additionally, this lake was one of the least diverse lakes in terms of macrophytes (Table 2). Sago pondweed was the most dominant submerged plant (Figure 3). On the north side of Titlow Lake, the shoreline was dominated by cattail, and by contrast, the southern shoreline had little to no instances of emergent vegetation.

Table 2. The sample frequencies of all observed macrophyte species in Titlow Lake, Sibley Co., MN. *Carex spp.* was observed, but not sampled.

Plant Species	Common Name	Sample Frequency
<i>Phragmites australis</i>	common reed	0.006
<i>Stuckenia pectinata</i>	sago pondweed	0.148
<i>Typha</i> spp.	cattail	0.006
<i>Lemna minor</i>	lesser duckweed	0.006

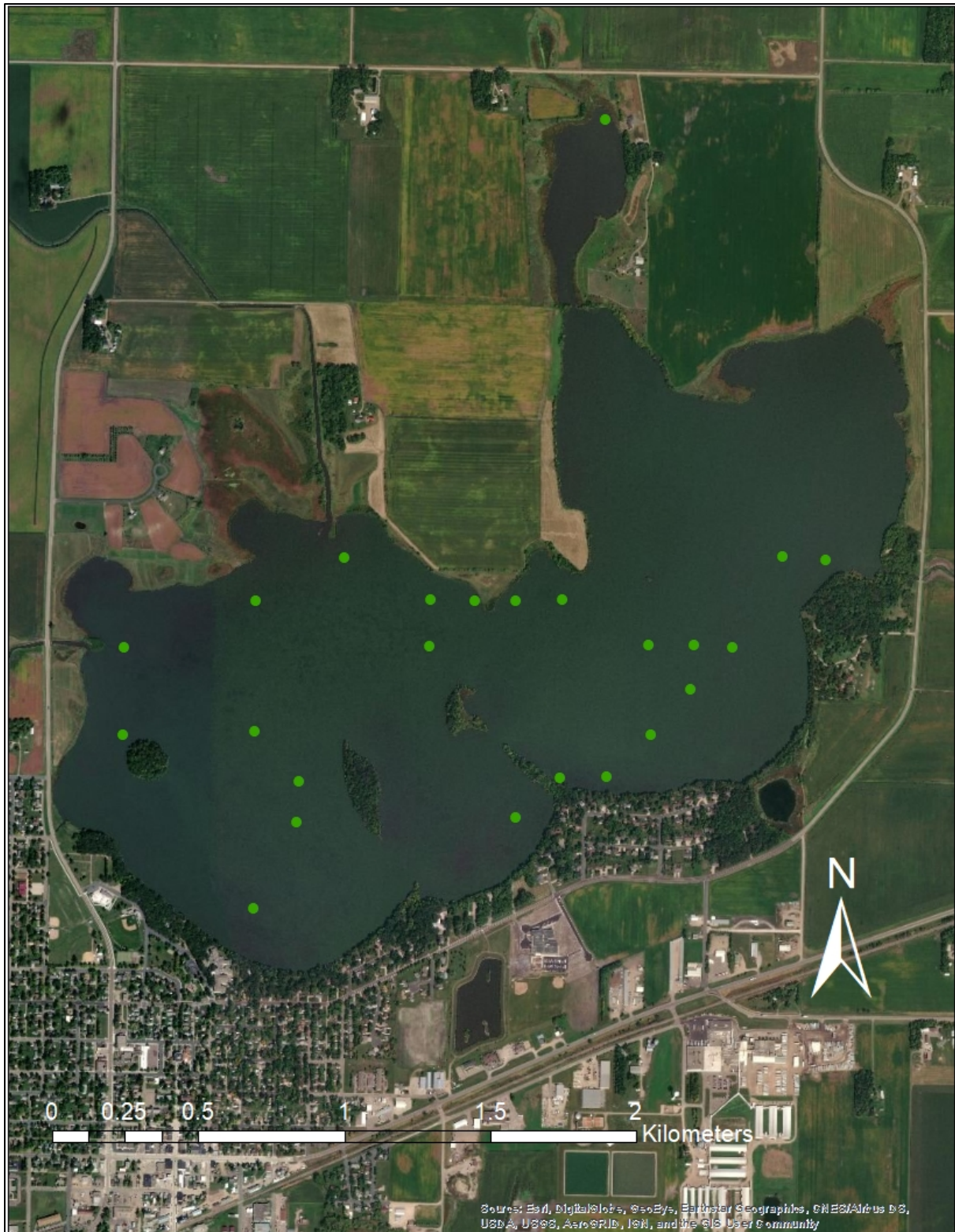


Figure 3. A map of the distribution of sago pondweed (*Stuckenia pectinata*) in Titlow Lake, Sibley Co., MN.

Schilling Lake

Surveyed on May 23rd and 24th

Secchi: 86 cm

Average depth: 1.67 m

Schilling Lake had a species richness of seven species (Table 3), though the lake was dominated by curlyleaf pondweed (Figure 4). The curlyleaf pondweed grew in very dense mats and was much more abundant on the north end of the lake near the boat landings. The most abundant native, submersed plant was sago pondweed, but it grew in isolated patches (Figure 5). The shoreline of Schilling Lake primarily consisted of cattail with scarce instances of sedges (*Carex* spp.).

Table 3. The sample frequencies of all observed macrophyte species in Schilling Lake, Sibley Co., MN. *Lemna trisulca* was observed, but not sampled.

Plant Species	Common Name	Sample Frequency
<i>Carex</i> spp.	true sedge	0.028
<i>Lemna minor</i>	lesser duckweed	0.021
<i>Phragmites australis</i>	common reed	0.007
<i>Potamogeton crispus</i>	curly pondweed	0.444
<i>Stuckenia pectinata</i>	sago pondweed	0.063
<i>Typha</i> spp.	cattail	0.153

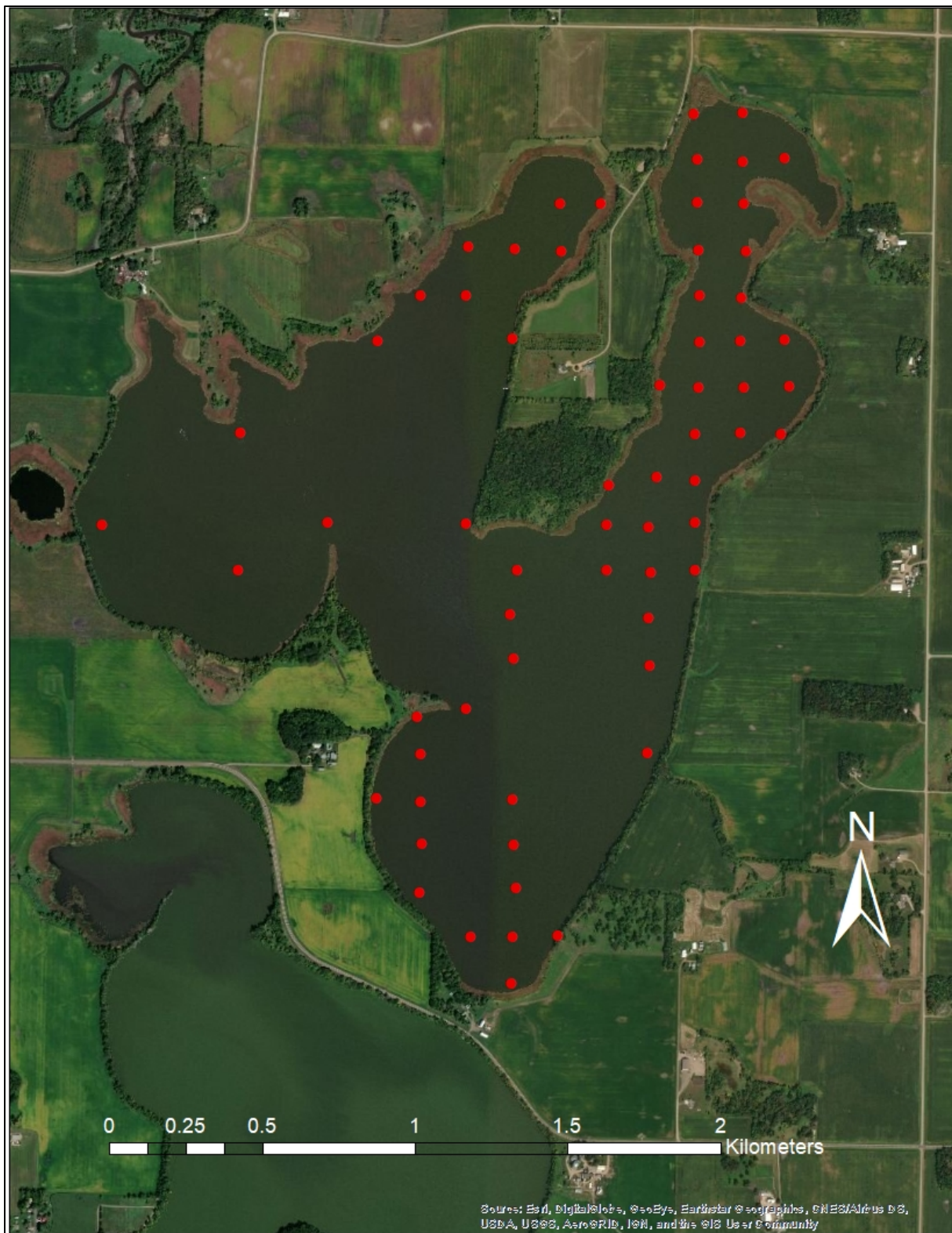


Figure 4. A map of the distribution of curlyleaf pondweed (*Potamogeton crispus*) in Schilling Lake, Sibley Co., MN.



Figure 5. A map of the distribution of sago pondweed (*Stuckenia pectinata*) in Schilling Lake, Sibley Co., MN.

Silver Lake

Surveyed on June 25th

Secchi: 10 cm

Average depth: 1.65 m

Silver Lake had an average depth of 1.65 m and had the lowest water clarity of the lakes surveyed. This very low clarity was likely caused by the prolific algal bloom occurring at the time of survey. Although the macrophyte richness was high, there were no observed instances of submersed macrophytes (Table 4). There were, however, large and dense beds of white water lily (*Nymphaea odorata*) that were relatively frequent and occurred in close proximity to the shoreline (Figure 6). The shoreline vegetation consisted of both narrowleaf cattail (*Typha angustifolia*) and broadleaf cattail (*Typha latifolia*), but also contained some rarer species like bottlebrush sedge (*Carex hystericina*) and broadleaf arrowhead (*Sagittaria latifolia*) in isolated patches.

Table 4. The sample frequencies of all observed macrophyte species in Silver Lake, Sibley Co., MN. Species observed, but not sampled: *Carex hystericina*, *Phragmites australis*, and *Schoenoplectus acutus*.

Plant Species	Common Name	Sample Frequency
<i>Carex</i> spp.	true sedge	0.017
<i>Lemna minor</i>	lesser duckweed	0.025
<i>Nymphaea odorata</i>	white water lily	0.101
<i>Sagittaria latifolia</i>	broadleaf arrowhead	0.008
<i>Typha angustifolia</i>	narrowleaf cattail	0.067
<i>Typha latifolia</i>	broadleaf cattail	0.067



Figure 6. A map of the distribution of white water lily (*Nymphaea odorata*) in Silver Lake, Sibley Co., MN.

Clear Lake

Surveyed on June 28th

Secchi: 29 cm

Average depth: 2.29 m

Clear Lake was, the deepest lake surveyed, but similar to other lakes it also had low clarity. Clear Lake had the lowest species richness of the lakes sampled during the early season surveys. The most abundant submersed plant was sago pondweed (Figure 7). Curlyleaf pondweed was also observed in this lake, but it was only found in a very small area on the northwest end of the lake in close proximity to the boat landing, and could be considered an incipient population that should be targeted for management before it spreads. There were very few emergent plants observed along most of the shore of this lake. The southwest arm of the lake did have both narrowleaf cattail and broadleaf cattail growing along the shoreline. Sago pondweed (*Stuckenia pectinate*) was the only species sampled on this lake with a frequency of 0.078. The other species observed but not sampled were common duckweed (*Lemna minor*), curlyleaf pondweed (*Potamogeton crispus*), narrow-leaf cattail (*Typha angustifolia*), and broad-leaf cattail (*Typha latifolia*).



Figure 7. A map of the distribution of sago pondweed (*Stuckenia pectinata*) in Clear Lake, Sibley Co., MN.