AUSABLE LAKE, OGEMAW COUNTY:
2022 AQUATIC VEGETATION REPORT

Lake: AuSable

County: Ogemaw

Lake Surface Area: 271-acres

Littoral Area: 250-acres

Shoreline Length: 29,899 ft

Survey Type: Point-intercept

Date of Survey: 8/15/2022

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Results Summary:

An aquatic vegetation survey of AuSable Lake was completed on August 15, 2022. Submersed plants were present to a maximum depth of 24 ft, and plants were found at 77% of littoral zone points visited. 18 plant species were identified to species level, and three additional species were identified to genus level. The most species rich sampling point contained eight species, and average sampling point richness was 2.7 species. Of note, AuSable Lake has a long herbicide treatment history, primarily to control introduced Eurasian watermilfoil (*Myriophyllum spicatum*), and most recently curly-leaf pondweed (*Potamogeton crispus*) in 2022. While Eurasian watermilfoil and curly-leaf pondweed were not encountered during our survey, invasive starry stonewort (*Nitellopsis obtusa*) was present at 13 locations (18% of all vegetated points) in the Eastern basin only.

Lake Description:

AuSable Lake [44.429822°; -83.919053°] is a 271-acre natural lake in Ogemaw County, Michigan. Lake levels are managed between 897.6 and 898.1 ft by the Michigan DNR. The lake consists of two basins, with the Eastern basin exhibiting more residential shoreline development than the Western basin. Over 80% of the lake is littoral zone (i.e., 0-25 feet), where aquatic plants are likely to be found. Average Secchi depth was 8.5 ft on the date of surveying in 2022. Detailed descriptions of the physical and chemical characteristics, and fish species can be obtained from the Michigan Dept. of Natural Resource Status of the Fishery Resource Report (Cwalinski, 2019) and the Michigan Clean Water Corps.

Management History:

Over the last 25 years, herbicide treatment to control aquatic invasive species has occurred on about 18 occasions at AuSable Lake (Cwalinski, 2019). The most recent treatment efforts were in response to the observation of Eurasian watermilfoil (*Myriophyllum spicatum*) and curly-leaf pondweed (*Potamogeton crispus*).

Survey Objectives:

A point-intercept survey was carried out at AuSable Lake to 1) obtain baseline knowledge of the aquatic plant community, 2) map the distribution of individual plant species, and 3) locate potentially problematic aquatic invasive species and subsequently notify appropriate agencies.

Methods:

We conducted a modified point-intercept survey. 103 equidistant sampling points were established in the littoral zone (i.e., 0 – 25 ft) at AuSable Lake using GIS software (Figure 1). During the field survey, however, ten sampling points were excluded due to especially low water levels (< 1.0 ft) precluding boat access, and some points were located near a Loon nesting area. At each sampling point, a double-sided rake was tossed twice, one toss to the starboard and one to the port side of the research vessel to snag aquatic vegetation. Floating plants (i.e., water lilies) that escaped rake capture, but intersected with the rake rope following a rake throw were marked as being present. Aquatic plant species were identified to the lowest possible taxonomic unit. Small leaf pondweeds (e.g., *Potamogeton foliosus*, *P. pusillus, P. obtusifolius*), however, were lumped into a single category - “small leaf pondweed sp. “, and macroalgae were grouped into three categories: *Chara sp.*, *Nitella sp.*, and *Nitellopsis obtusa*. Environmental variables measured included water depths at each sampling point, and water transparency was sampled using multiple Secchi disk readings from the deepest region of the lake. We also calculated a site level mean coefficient of conservatism score for the AuSable Lake plant community. Useful for floristic quality assessment, plant coefficient of conservatism values (C-values) are a numerical rating system ranging from 0 - 10 and used to describe individual plant species tolerance to disturbance and affinity to natural habitats. Low C-value species include generalists capable of tolerating frequent disturbance. High C-value species are those with low tolerance to disturbance that require specific environmental conditions

often characteristic of late succession undisturbed habitats. Calculation of mean C has become a routine method to indicate ecological condition of plant communities at local, state, and national levels.

Survey Observations:

From 93 littoral zone sampling points surveyed at AuSable Lake (Figure 1), we encountered 21 aquatic species, 18 of which were identified to species level (Table 1). The highest richness observation was 8 species, and average richness per sampling point was 2.7 species (Figure 2). Over 90% of total site richness was encountered after visiting 80 points (Figure 3), thereby indicating the number of points sampled was sufficient to capture a representative plant community. Mean C of the AuSable Lake native plant community was 5.2. Notable high-quality plant species include Southern naiad (*Najas guadalupensis*; c=7), water celery (*Vallisneria americana*; c=7), creeping bladderwort (*Utricularia gibba*; c=8), and white-stemmed pondweed (*Potamogeton praelongus*; c=8). While Eurasian watermilfoil was observed in previous years, it was not encountered during our 2022 survey. The invasive macroalgae starry stonewort, however, was present at 14% of the sampling points visited (18% of sampling points that contained vegetation) (Figure 5). Of note, starry stonewort was present in the Eastern basin only, and was observed in monoculture at only one location (point 68) (Figures 5-6). The population of starry stonewort at AuSable Lake is the farthest north observation in the state of Michigan.

The most frequently encountered species was native macroalgae in the genus *Chara*, being present at 48 of 93 sampling points visited (Figure 7). Other frequently encountered macrophytes were Southern naiad (21 points), variable pondweed (19 points), whorled watermilfoil (15 points), flat-stem pondweed (12 points), and common waterweed (11 points). Of interest, Southern naiad was distributed primarily in the Eastern basin, whereas slender naiad (5 points) was present in the Western basin only.

Average littoral zone water depth at AuSable Lake was 9 ft and average Secchi depth was 8.5 ft. In general, sampling points exhibiting the highest richness (i.e., richness >4) were found in areas with water depths less than 12 feet (Figure 8). 85% of sampling points with vegetation present exhibited water depths <15, and 99% were present at depths <20 ft. Submersed plants were present to a maximum depth of 24 ft. Of note, invasive starry stonewort was present at water depths ranging from 1.8 – 18 ft, thereby highlighting the broad range of environmental conditions the invasive species can tolerate.

Table 1. 2022 AuSable Lake littoral zone (0-25 ft) aquatic species checklist from 93 points surveyed, coefficient of conservatism values (C-values) for Michigan, and taxa occurrence metrics.

Scientific name	Common name	C-value	Total sites present	Frequency of occurrence (%)*	Relative Proportion (%)*
Muskgrass	*Chara sp.*	--	48	51.6	26.7
Southern naiad	*Najas guadalupensis*	7	21	22.6	11.7
Variable pondweed	*Potamogeton gramineus*	5	19	20.4	10.6
Whorled watermilfoil	*Myriophyllum verticillatum*	6	15	16.1	8.3
Starry Stonewort	*Nitellopsis obtuse (invasive)*	--	13	14.0	7.2
Flat-stem pondweed	*Potamogeton zosteriformis*	5	12	12.9	6.7
Common waterweed	*Elodea canadensis*	1	11	11.8	6.1
Common bladderwort	*Utricularia vulgaris*	6	9	9.7	5.0
Slender naiad	*Najas flexilis*	5	5	5.4	2.8
Soft stem bullrush	*Schoenoplectus tab.*	5	4	4.3	2.2
Coontail	*Ceratophyllum demersum*	1	3	3.2	1.7
Various-leaved watermilfoil	*Myriophyllum heterophyllum*	6	3	3.2	1.7
White water lily	*Nymphea odorata*	6	3	3.2	1.7
Illinois pondweed	*Potamogeton illinoensis*	5	3	3.2	1.7
Water celery	*Vallisneria americana*	7	3	3.2	1.7
Sago pondweed	*Stuckenia pectinata*	3	2	2.2	1.1
Creeping bladderwort	*Utricularia gibba*	8	2	2.2	1.1
White-stem pondweed	*Potamogeton praelongus*	8	1	1.1	0.6
Clasping-leaf pondweed	*Potamogeton richardsonii*	5	1	1.1	0.6
Arrowhead sp.	*Sagittaria sp.*	--	1	1.1	0.6
Bur-reed sp.	*Sparganium sp.*	--	1	1.1	0.6
		Mean C = 5.2			

*Frequency of occurrence (%) based on all sampling points (=93) including those lacking vegetation.
*Relative proportion of taxa based on summed plant species occurrences (=180).

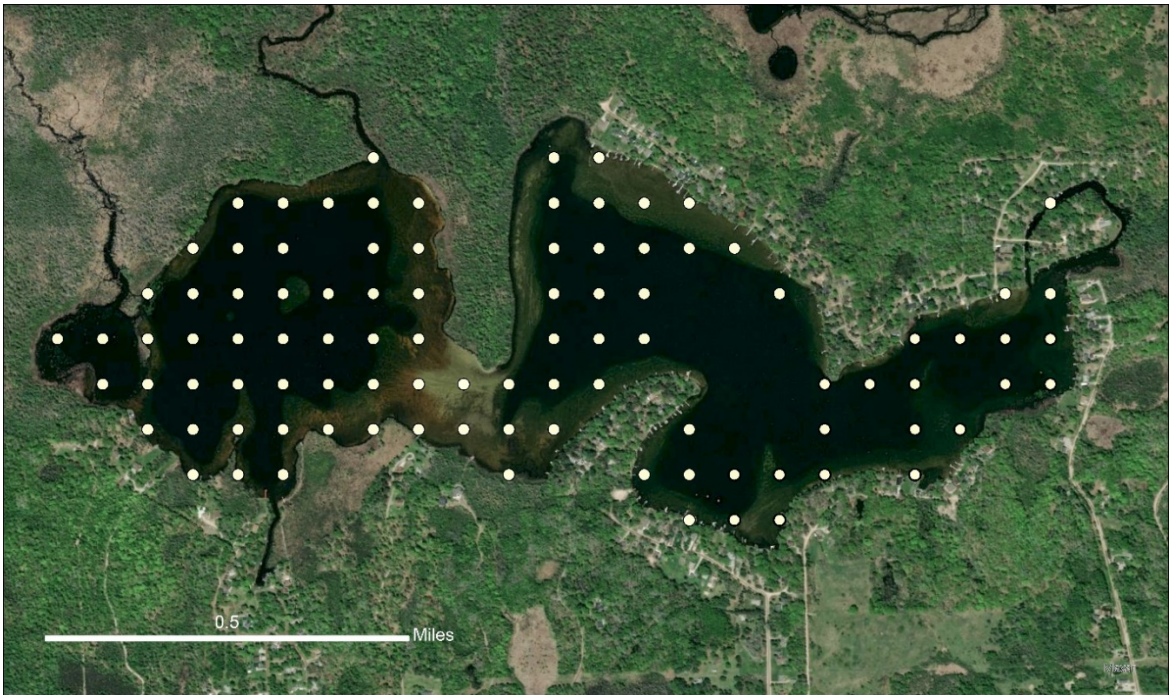

Figure 1. AuSable Lake littoral zone point-intercept sampling point locations (103 points established using GIS, 93 points surveyed).

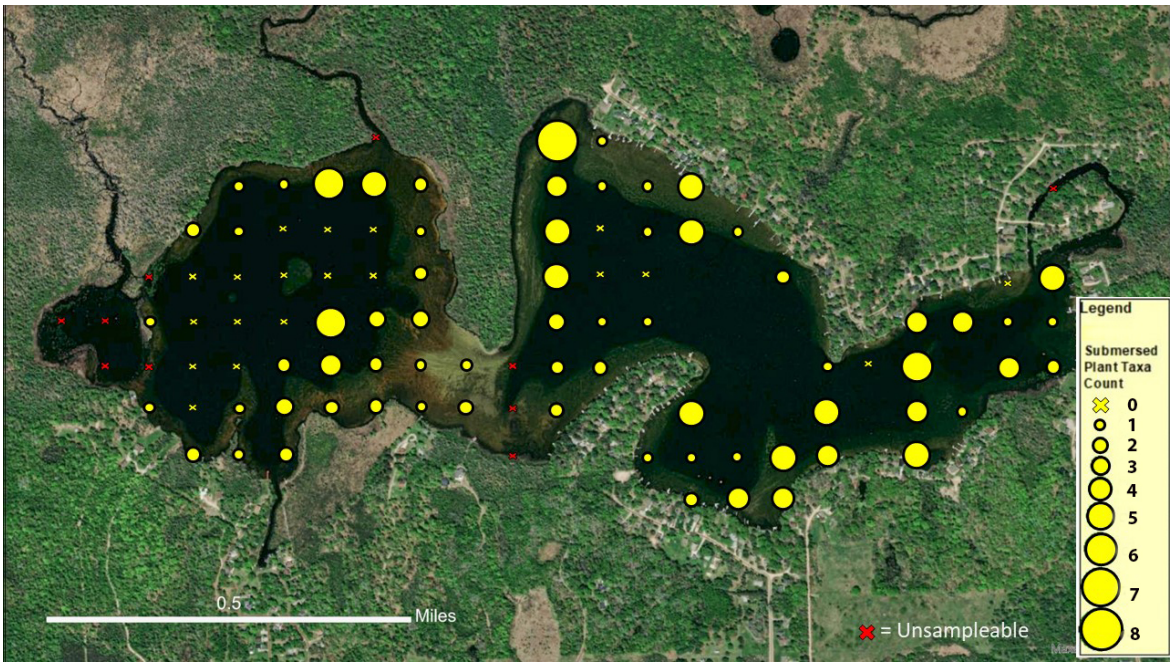

Figure 2. AuSable Lake species richness distribution map (total number of aquatic species per point). Red "x" symbols indicate littoral zone points unable to be sampled. Points on the western side of the lake were in a loon nesting area. Other unsampleable points were in especially shallow areas exhibiting water depths <1.0 ft. In total, 72 points out of 93 surveyed contained vegetation (77% of points).

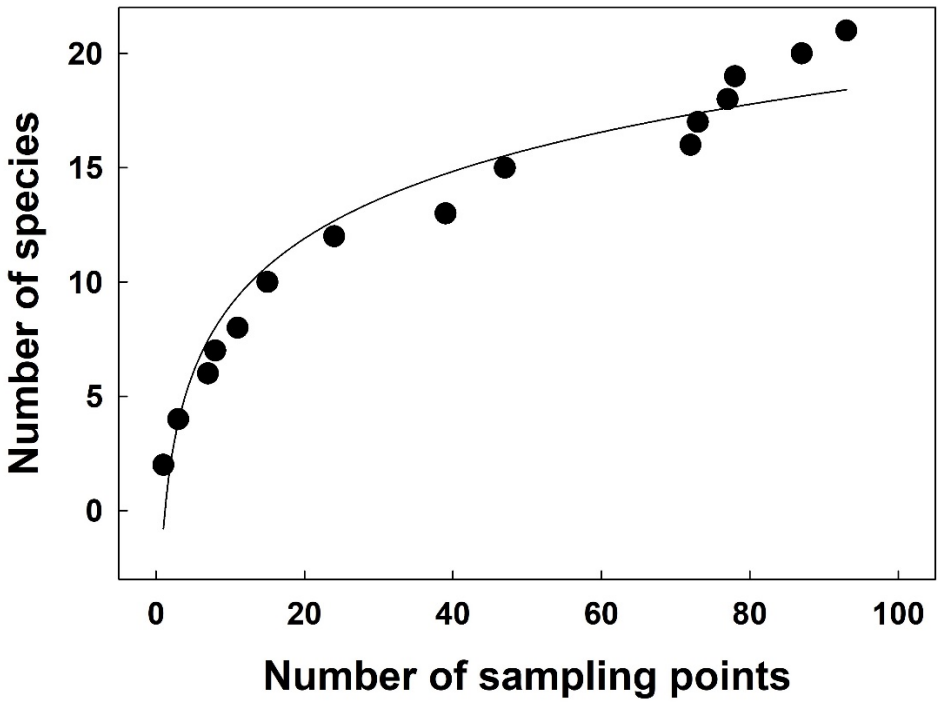

Figure 3. Aquatic species area curve for AuSable Lake, Ogemaw County, Michigan.

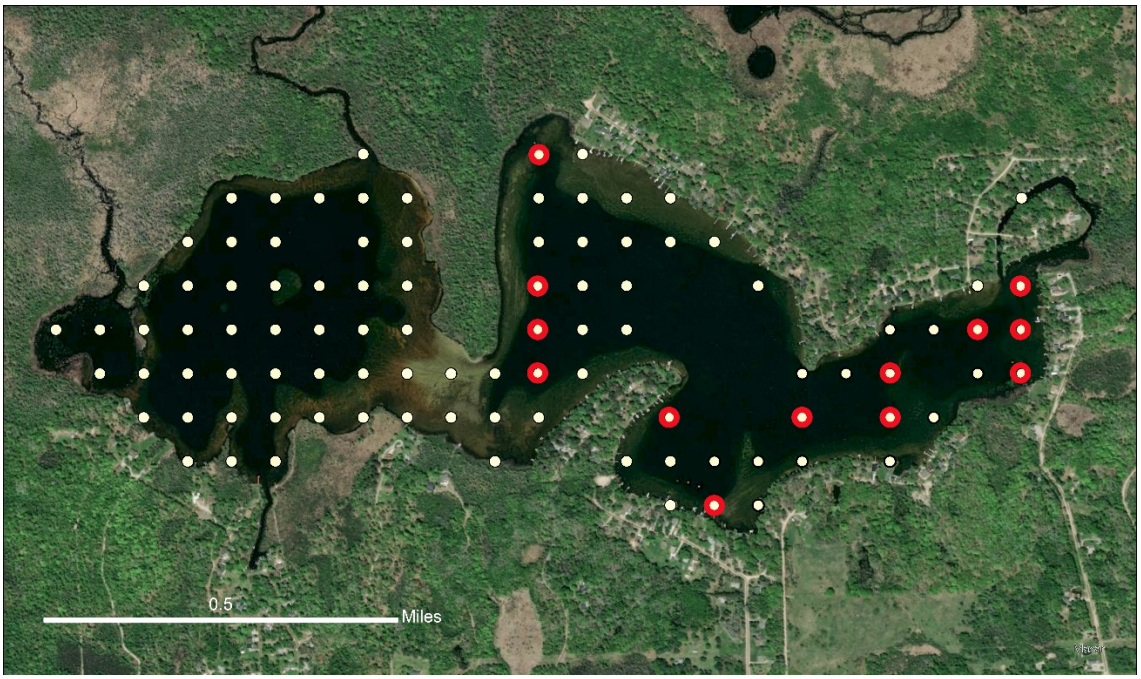

Figure 4. Spatial distribution of *Nitellopsis obtusa* (starry stonewort) at AuSable Lake, Ogemaw County, Michigan. Starry stonewort occurrences (13 total) indicated by red circles. Observations of starry stonewort occurred in the Eastern basin only.

Figure 5. Starry stonewort on a sampling rake at AuSable Lake.

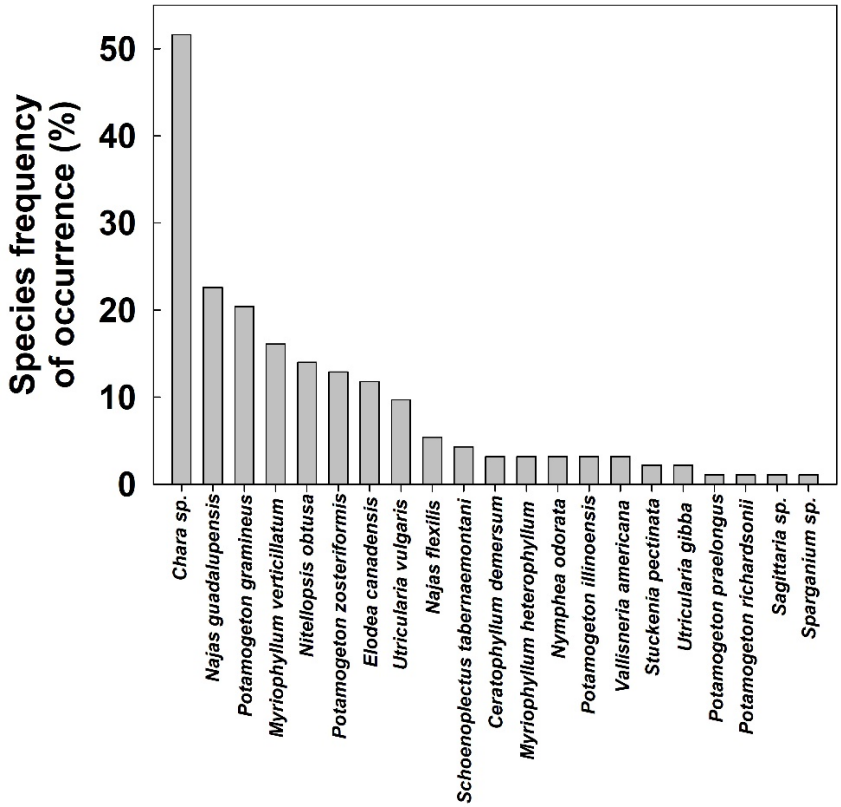

Figure 6. Frequency of occurrence (%) for individual species at AuSable Lake, Ogemaw County, Michigan.

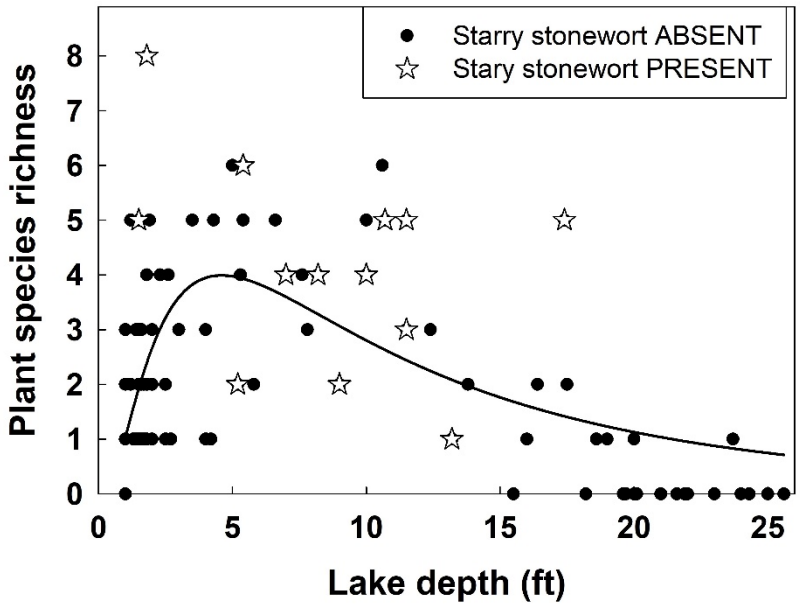

Figure 7. Plant species richness plotted as a function of water depth at AuSable Lake, Ogemaw County, Michigan. Star symbols represent the 13 sampling points (18% of all vegetated sampling points) where invasive starry stonewort was present.

References:

Cwalinski, TA (2019) Au Sable Lake – Michigan Dept. of Natural Resources Status of the Fishery Resource Report.