Grand Lake

Point-Intercept Survey

August 13, 2017

Cold Spring, MN (Stearns County)

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Preliminary Report

August 29, 2017

Introduction

A point-intercept survey was conducted on Grand Lake in Stearns County on August 13, 2017, by AIS Consulting Services. The purpose of the survey was to characterize the aquatic plant community in the lake, as well as look for new invasive species such Starry Stonewort. Days prior to the survey being performed, Starry Stonewort was discovered and confirmed in Grand Lake. In addition to the point-intercept survey that was conducted, we performed an additional delineation of Starry Stonewort around the public access area where it was found.

Summary

Aquatic plants were abundant in Grand Lake during the survey, occurring at 91% of sites in the littoral zone *(≤ 15 ft.)*. 20 different plant species were observed during the survey, with 16 of those submerged species. Starry Stonewort was recently discovered in the lake, but it appears to be limited in distribution at this time and contained to the public access area. Starry Stonewort was not present at any of the point-intercept sample points, thus it is not being not counted as one of the 20 plant species observed during the point-intercept survey. Chara and Coontail were the most abundant species, occurring at 52% and 38% of littoral sites respectively. Flat Stem Pondweed was the next most abundant plant, occurring at 13.5% of sites. Other common plants that were found between 5-10% of littoral sites include: Sago Pondweed (8.8%), Clasping Leaf Pondweed (8.2%), Narrow-Leaf Pondweed species (7.6%), a native Nitella species (7%), Curlyleaf Pondweed (6.4%), and Bushy Pondweed (5.9%). The remaining 11 species were all found at less than 5% of sample points.

Methods

Point-Intercept Survey

Survey sample points were provided by the MN DNR, who have previously conducted aquatic plant surveys on the lake. The sample points were spaced 75 meters apart across the whole lake, but since plants have not been observed to be growing in depths greater than 20 feet, we uploaded bathymetric contours to the lake from the Minnesota Geospatial Commons into ArcGIS, overlaid it across the sample points, and deleted points that were deeper than the 20 foot contour. These sample points were then uploaded to a GPS unit and used to navigate to each sample point in the field. If points were inaccessible, it was noted and the point was skipped.

At each point, the depth was taken with our sonar unit and recorded. The sample rake was tossed on a designated side of the boat approximately 1 to 2 meters, and dragged on the lake bottom back to the boat before retrieving. A density rating was given to each species on the rake, as well as an overall rating for the entire sample. Density ratings are based on the percent of rake head occupied by the plant sample. Plants that were not collected on the rake but were observed within the sample area were given a density of "0", and were not included in any statistics, but were marked at that location.

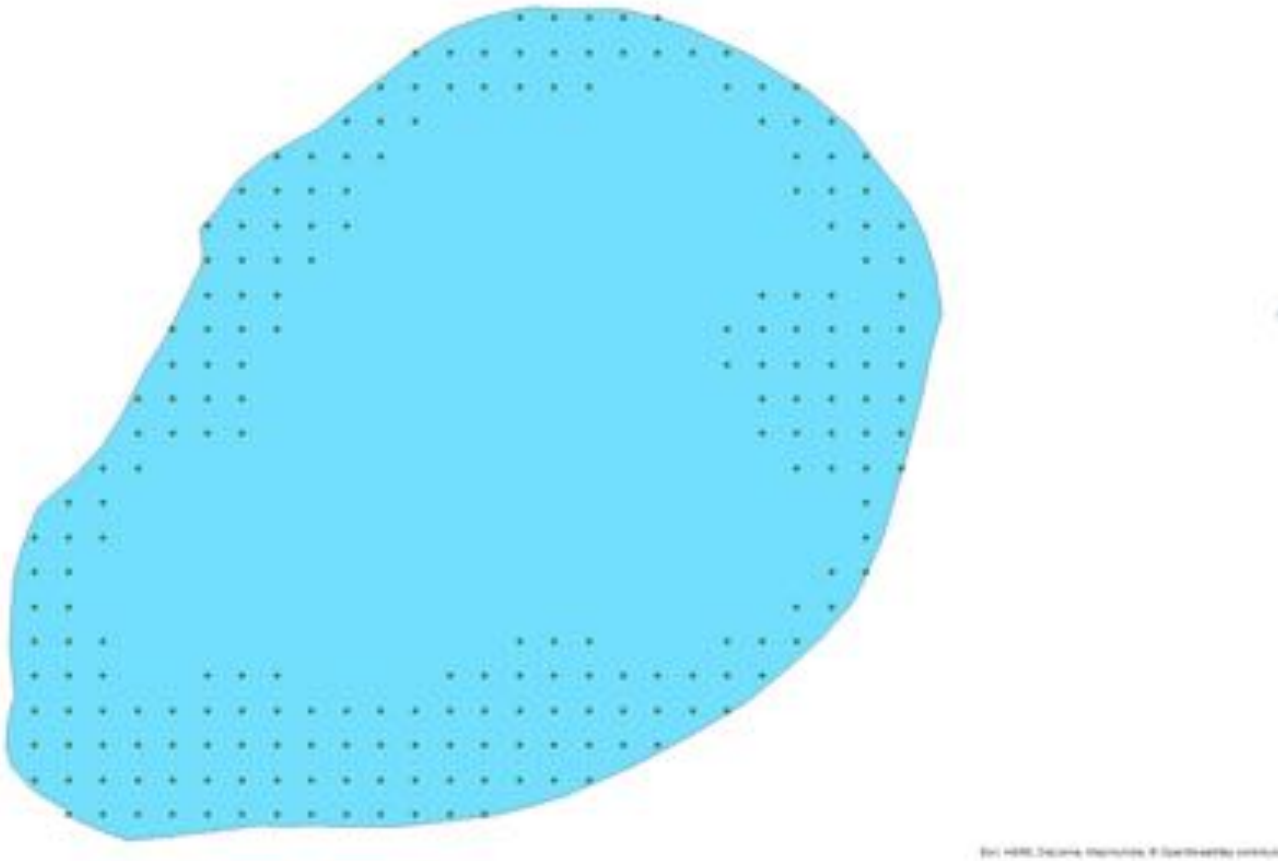
Rake Density Ratings - *estimated coverage of rake head by plant sample*

1 = **Covering up to 1/3 of the rake head** *(plants typically scattered)*

2 = **Covering between 1/3 to 2/3 of rake head** *(plants common)*

3 = **Covered entire rake head** *(dense stands of plants)*

Maps and statistics were created from the data and can be found in the "Results" section of this report.



Grand Lake Point-Intercept Survey Grid, 75 meter spacing (219 sample points)

Results

Percent frequency of occurrence for plant species surveyed on Grand Lake (Stearns County), Calculated using all littoral points sampled (≤15ft).

Common Name	Scientific Name	% Occurrence
Submersed Plants		
Muskgrass	*Chara sp.*	52.0%
Coontail	*Ceratophyllum demersum*	38.0%
Flat Stem Pondweed	*Potamogeton zosteriformis*	13.5%
Sago Pondweed	*Stuckenia pectinata*	8.8%
Clasping Leaf Pondweed	*Potamogeton richardsonii*	8.2%
Narrow Leaf Pondweed[1]	*Potamogeton sp.*	7.6%
Nitella	*Nitella sp.*	7.0%
Curlyleaf Pondweed	*Potamogeton crispus*	6.4%
Bushy Pondweed	*Najas flexilis*	5.9%
Variable Pondweed	*Potamogeton gramineus*	4.1%
Northern Watermilfoil	*Myriophyllum sibiricum*	4.1%
White Stem Pondweed	*Potamogeton praelongus*	3.5%
Canada waterweed	*Elodea canadensis*	0.6%
Illinois Pondweed	*Potamogeton illinoensis*	0.6%
Wild celery	*Vallisneria americana*	0.6%
White-water buttercup	*Ranunculus aquatilis*	0.6%
Starry Stonewort[2]	*Nitellopsis obtusa*	Present
Emergent		
Wild Rice	*Zizania palustris*	2.3%
Yellow waterlily	*Nuphar variegata*	1.2%
Bulrush	*Schoenoplectus sp.*	0.6%
Free-floating		
Star Duckweed	*Lemna trisulca*	3.5%

[1]Narrow Leaf Pondweed species were grouped together to remain consistent with a previous survey report from the MN DNR in 2010. This group of species can be difficult to identify from one another. *Potamogeton friessi* was identified, and another species that was potentially *Potamogeton pusillus* .

[2]Starry Stonewort was confirmed in the lake, but it was not found at any point-intercept survey points.

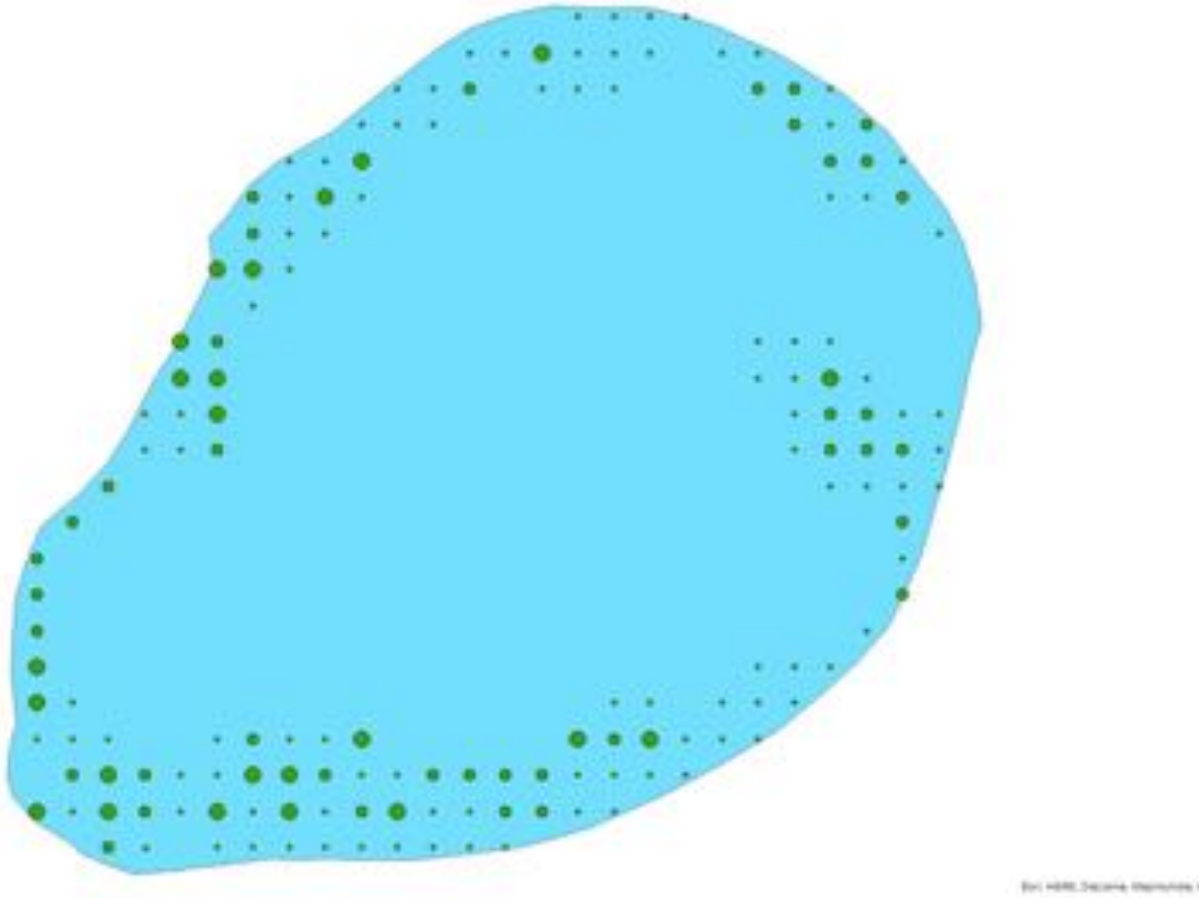
Results

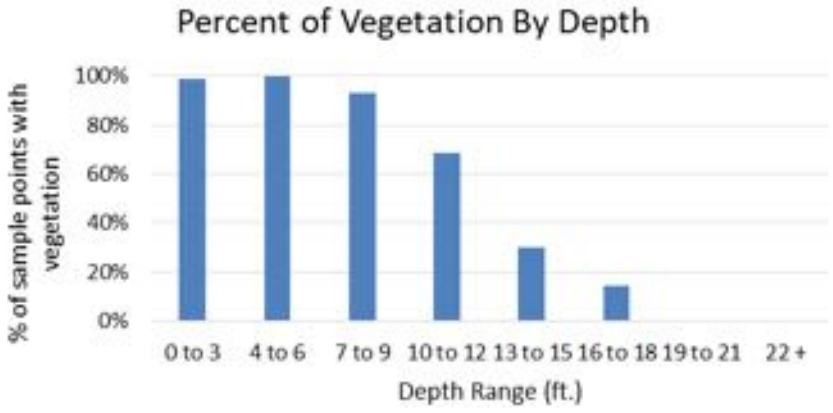
Surface Area (acres)	650.54
Maximum Depth (ft.)	34
Max. Depth of Plant Growth (ft.)	16.5
Points Sampled	213
% of Points Vegetated	74.2%
Littoral Area (≤ 15 ft.) (acres)	235
Littoral Points Sampled (≤ 15 ft.) (ft.)	171
% Littoral Points Vegetated	91.2%
Species Richness (all species)	20
Species Richness (submerged plants)	16
Mean Number of Native Species/Littoral Point	1.6
Mean Number of Invasive Species/Littoral Point	0.1
Mean number of Species/Littoral Point	1.7

Starry Stonewort

The distribution of Starry Stonewort around the public access area where it was discovered was further delineated by AIS Consulting Services on August 13, 2017. Dense emergent vegetation can be found on each side of the public access, leaving an open channel out to the main lake. This open channel is roughly 0.5 acres. Within this half-acre area, a rake was tossed 38 times throughout this location to assess the distribution of the invasive plant. It was found in four locations, all near each other and just out from the public access dock. The population appears to be contained to this area, as no further plants were found during the point-intercept survey, however, no searching by us was conducted in the dense emergent vegetation found on each side of the public access channel. The map below shows areas where vegetation was sampled, and the areas where Starry Stonewort was confirmed to be present.

Overall Vegetation Abundance

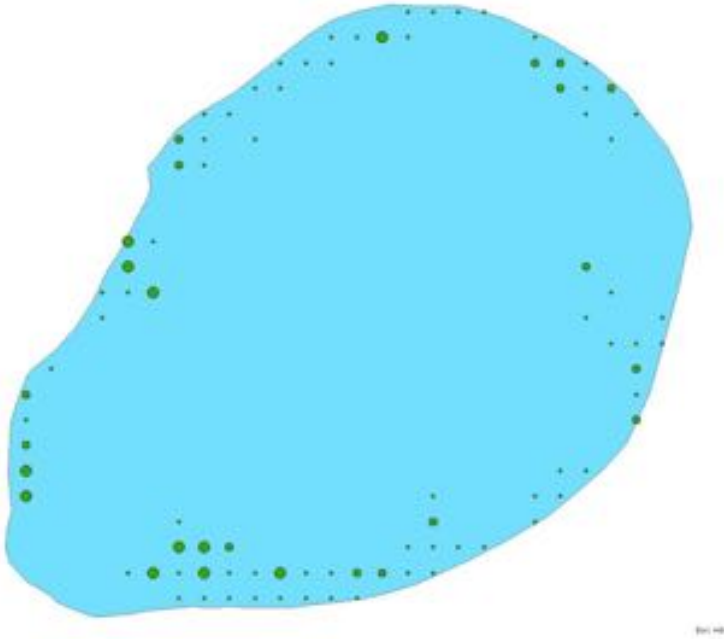




Legend

- Low growth
- Moderate growth
- Heavy growth

Chara



Legend

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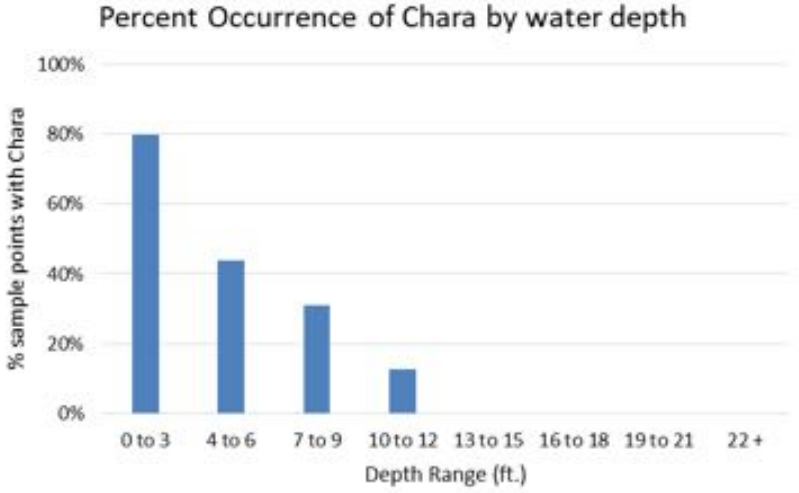
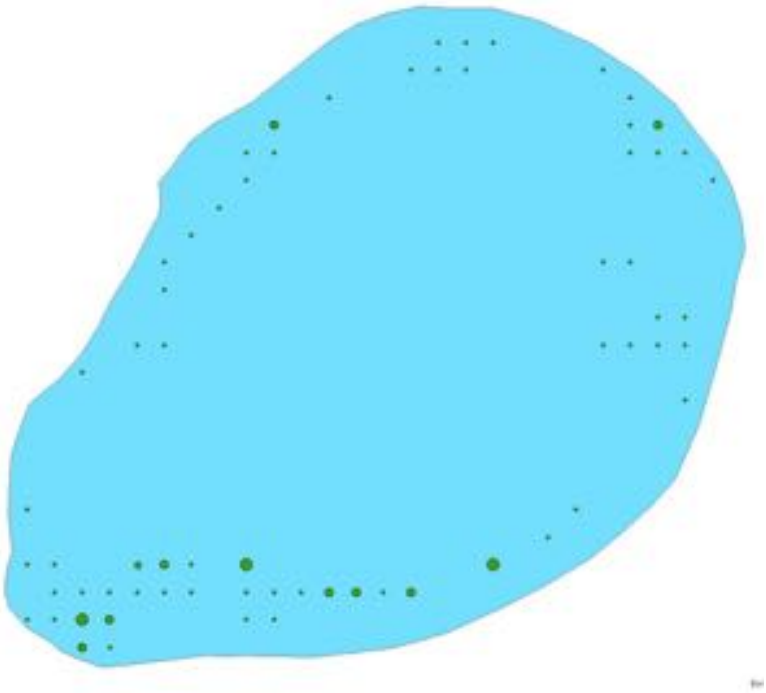
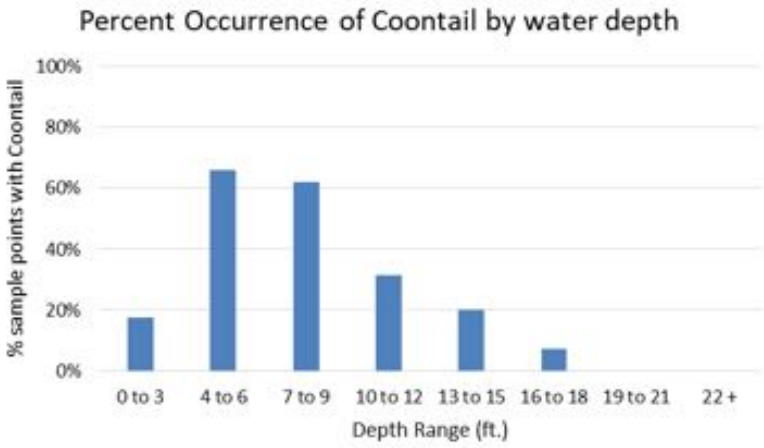
- Heavy growth



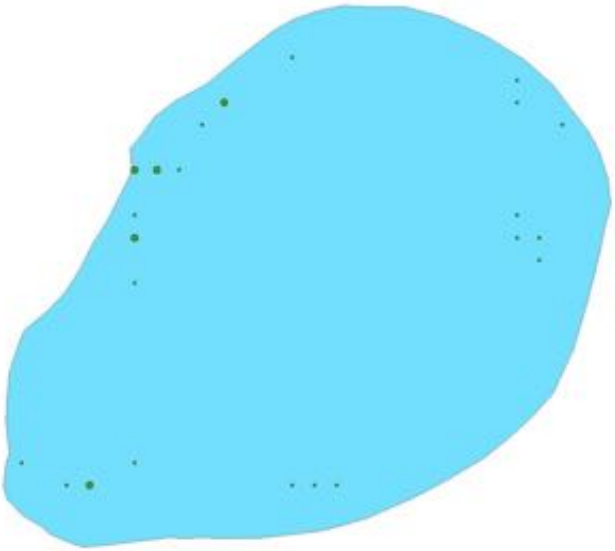
Coontail

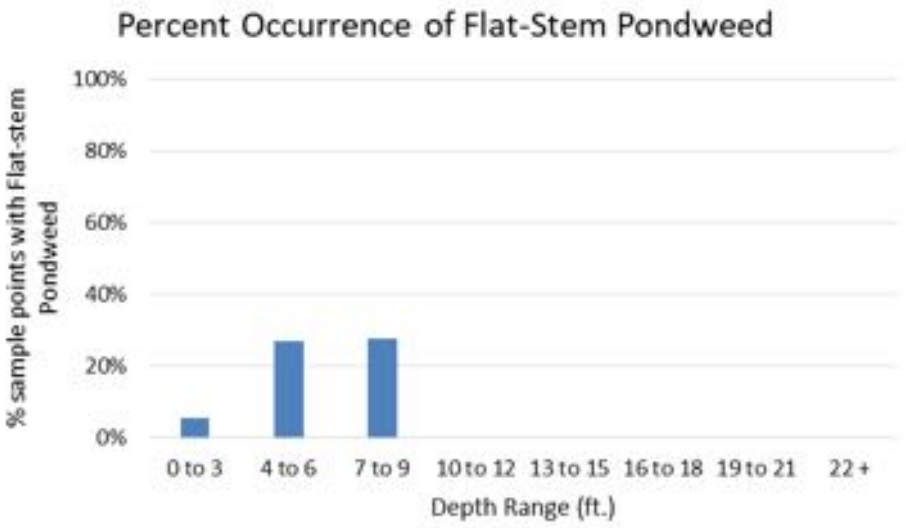



Percent Occurrence of Coontail by water depth
% sample points with Coontail
100%
80%
60%
40%
20%
0%
0 to 3
4 to 6
7 to 9
10 to 12
13 to 15
16 to 18
19 to 21
22 +
Depth Range (ft.)


Coontail
Ceratophyllum demersum
Photo by V. Berry
Copyright 2002 Univ. Florida

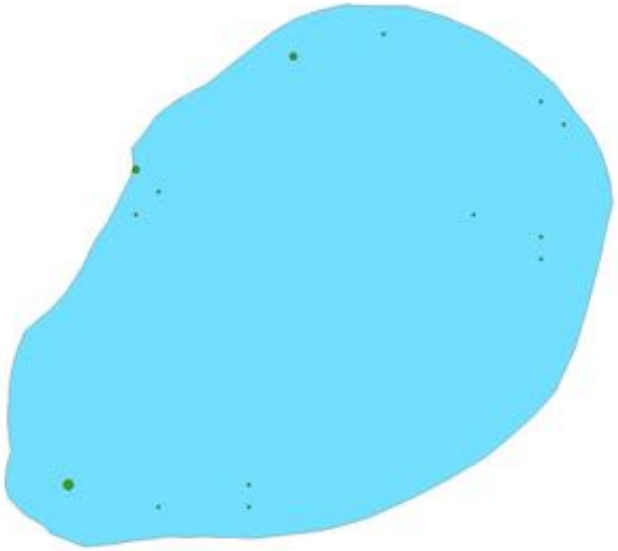
Flat Stem Pondweed



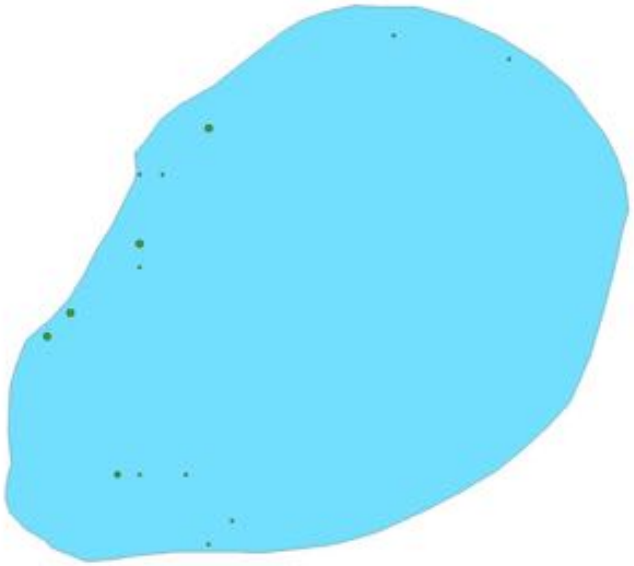


Maps of Additional Aquatic Plant Species Found During Survey

Sago Pondweed



Clasping Leaf Pondweed



Legend

- Low growth
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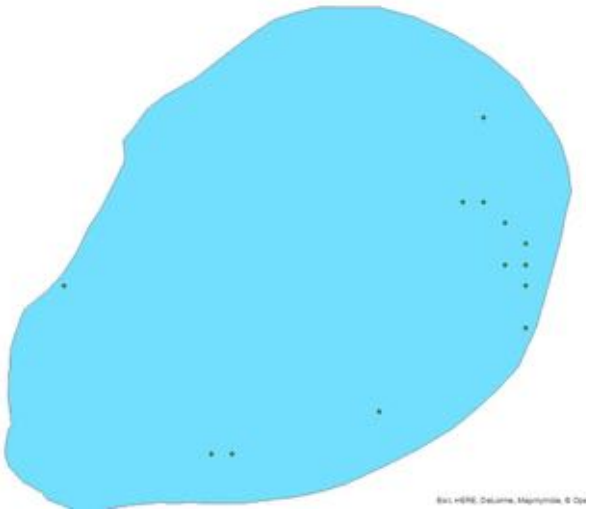
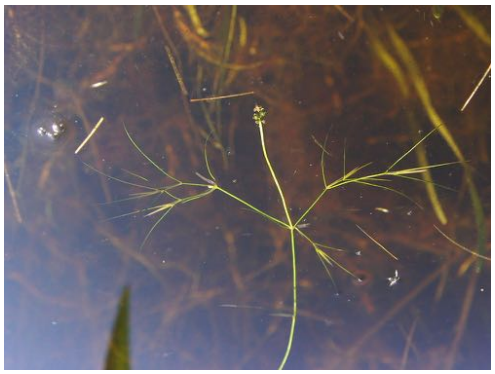
- Heavy growth

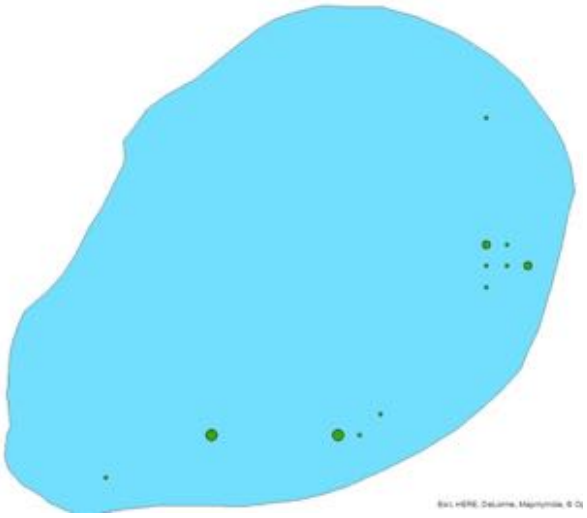
Maps of Additional Aquatic Plant Species Found During Survey

Narrow Leaf Pondweed





Nitella sp.



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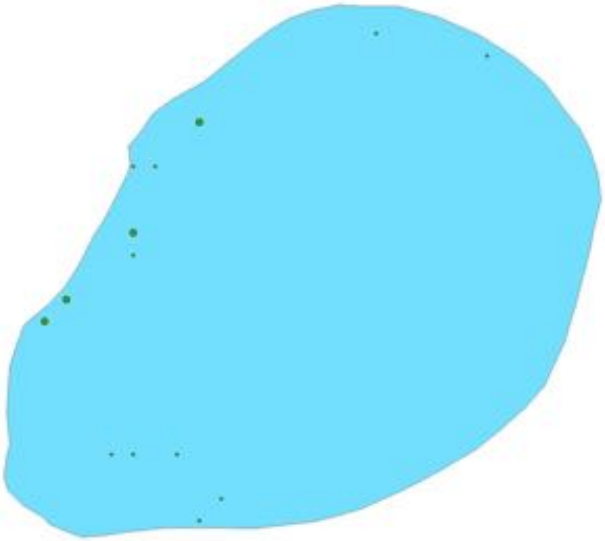
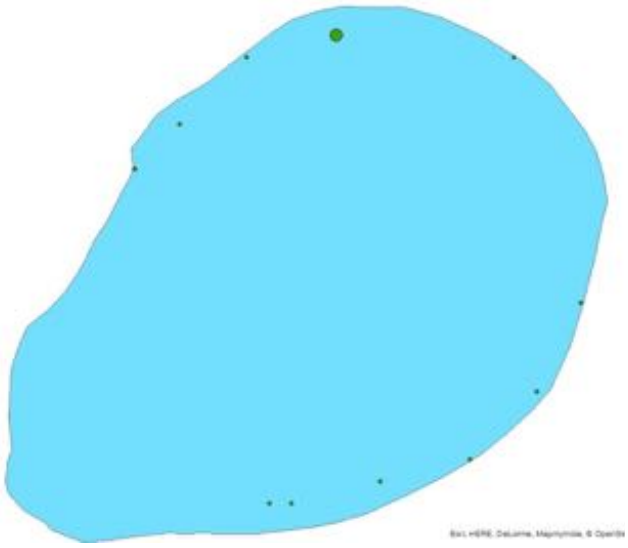
Starry Stonewort (left) and native Nitella (right)

Maps of Additional Aquatic Plant Species Found During Survey

Curlyleaf Pondweed



Bushy Pondweed



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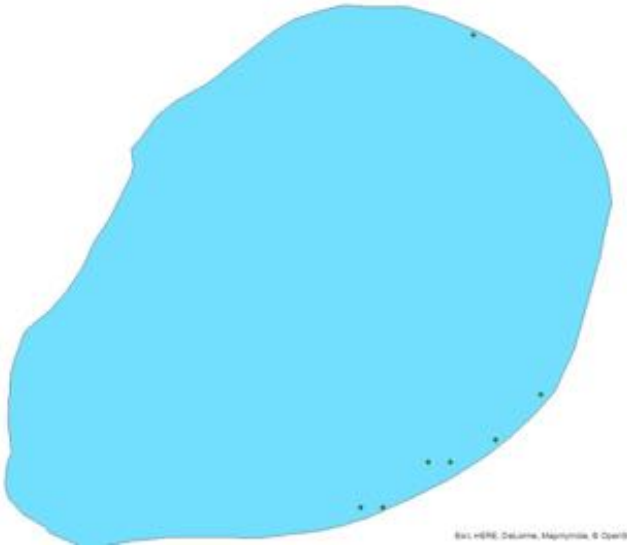
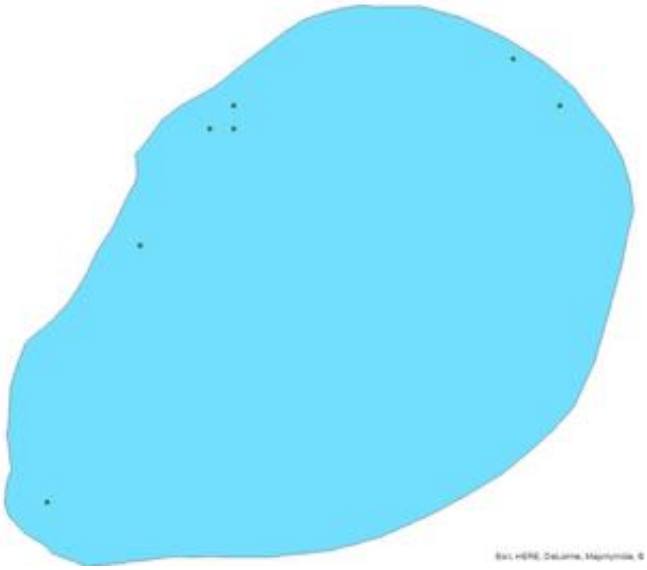
Maps of Additional Aquatic Plant Species Found During Survey

Variable Pondweed



Northern Watermilfoil



Legend

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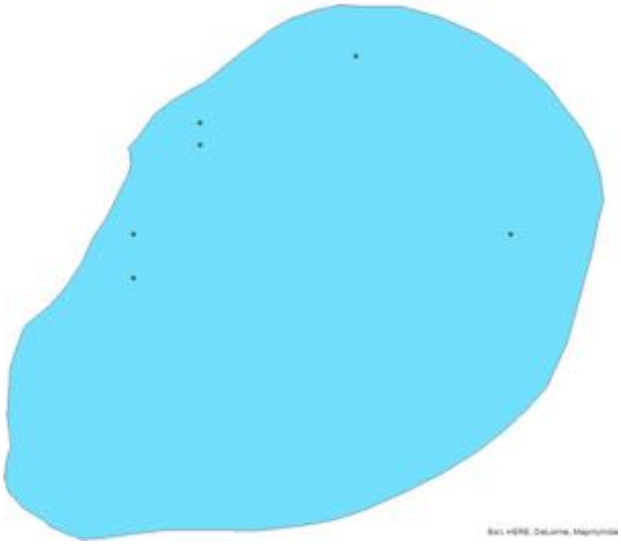
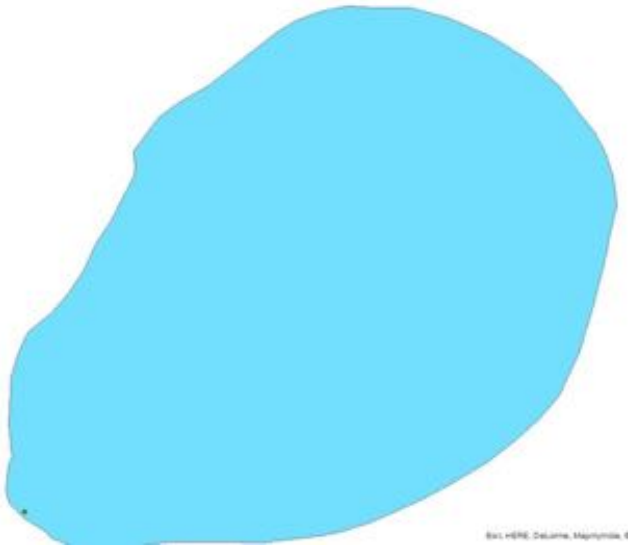
Maps of Additional Aquatic Plant Species Found During Survey

White Stem Pondweed



Canada Waterweed



Legend

- Low growth
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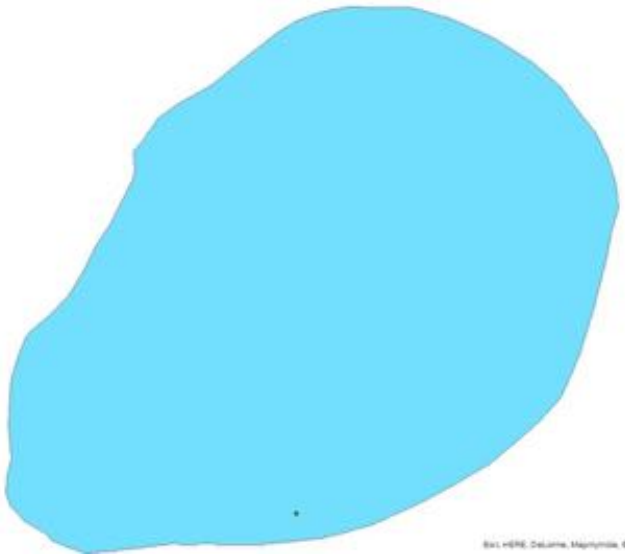
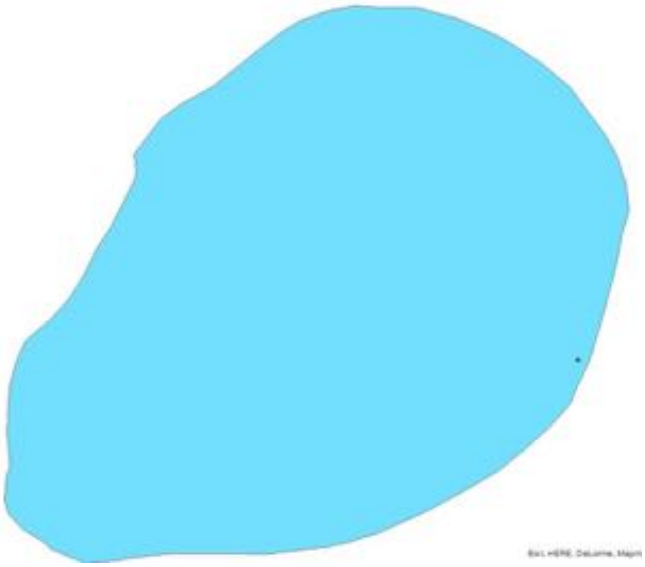
Maps of Additional Aquatic Plant Species Found During Survey

Illinois Pondweed



Wild Celery



Legend

- Low growth
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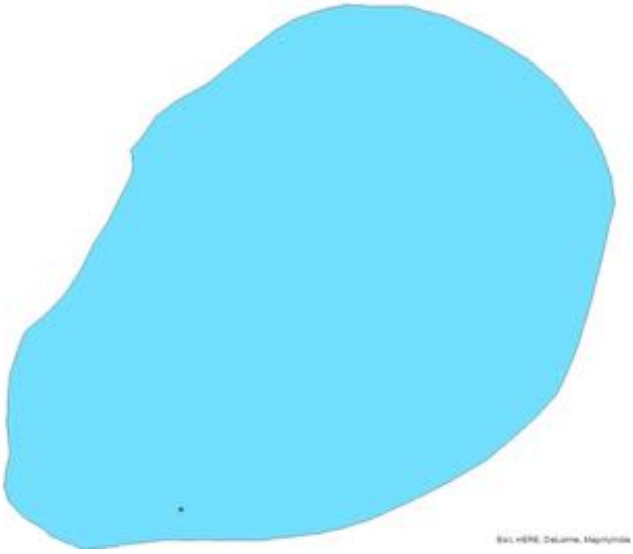
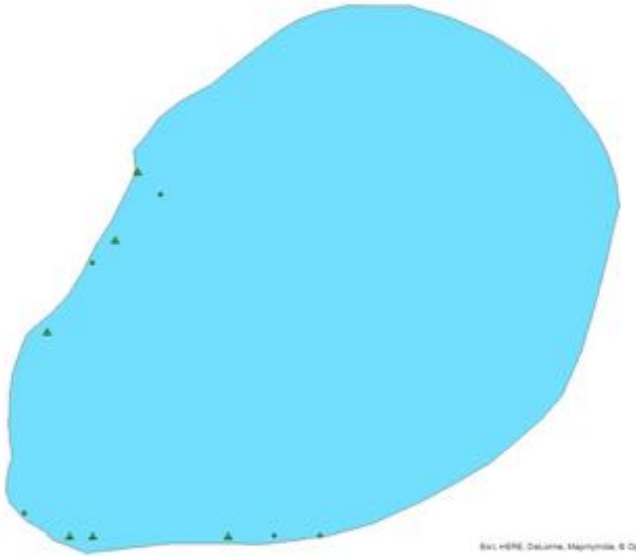
- Heavy growth

Maps of Additional Aquatic Plant Species Found During Survey

White-water Buttercup



Wild Rice

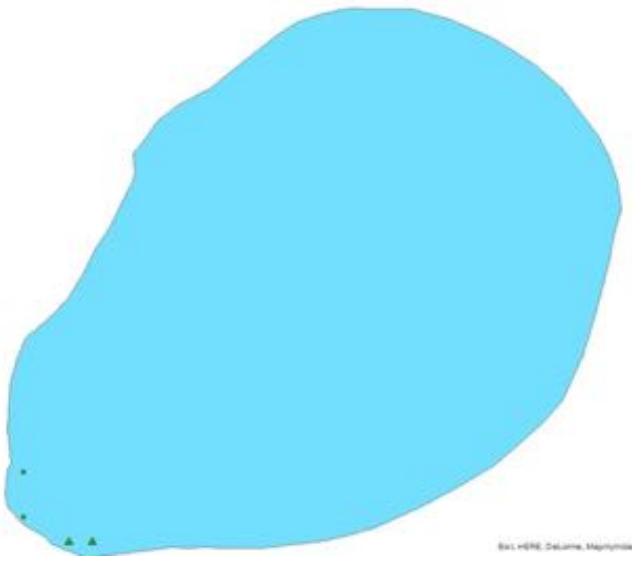


Legend

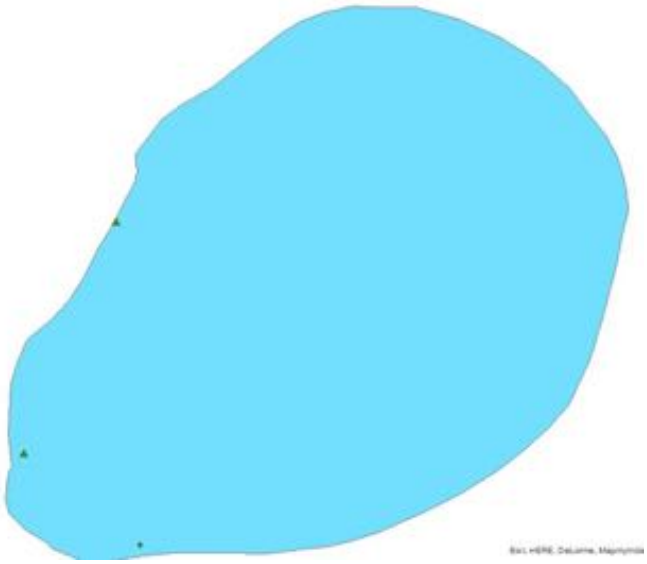
- Low growth
- Moderate growth
- Heavy growth
- Present

Maps of Additional Aquatic Plant Species Found During Survey

Yellow Waterlily



Bulrush

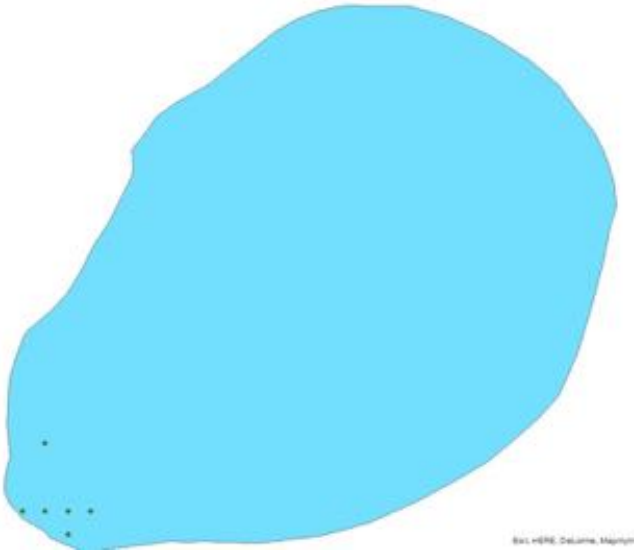


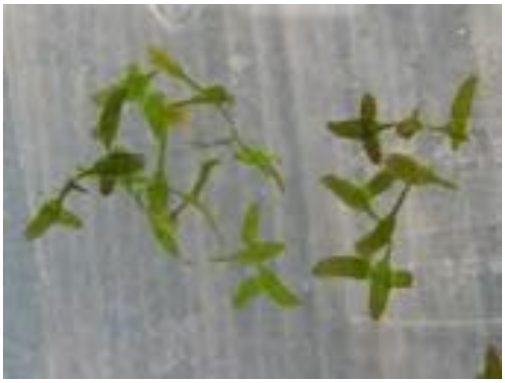
Legend

- Low growth
- Moderate growth
- Heavy growth
- Present

Maps of Additional Aquatic Plant Species Found During Survey

Star Duckweed





Legend

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