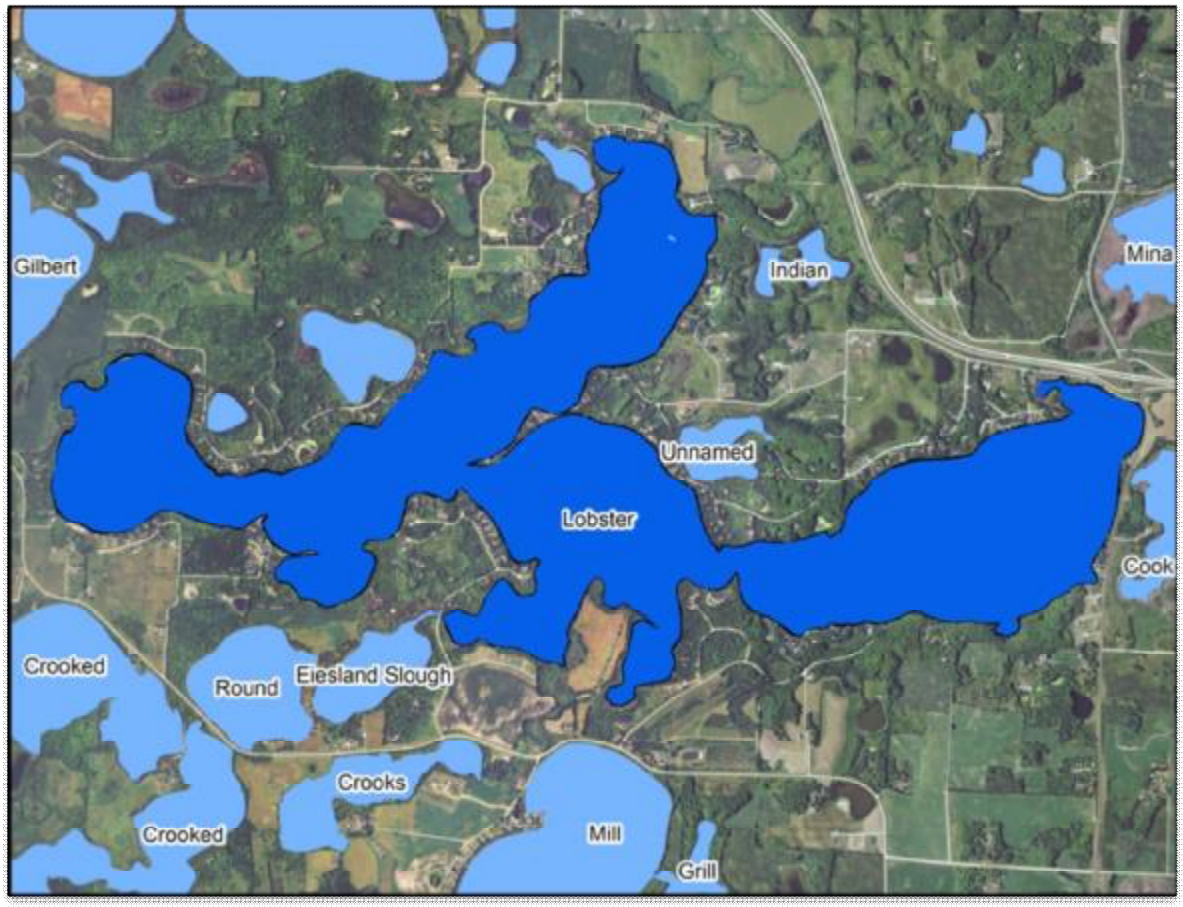
Lobster Lake (21-0144-00)



Aquatic Vegetation Survey

07/26/12
RMB Environmental Laboratories, Inc

Lake: Lobster Lake **DOW Number**: 21-0144-00 **Date of inspection:** July 26, 2012

County: Douglas **Observers**: Tim Randt and Jake Anderson

Authors of report: Tim Randt and Jake Anderson **Date of report**: September 10, 2012

Introduction

Lobster Lake is a large, deep, 1,300 acre lake located in Douglas County near Alexandria, MN. It has a maximum depth of 65 feet and contains a littoral area of fifty percent which means sunlight is permitted to the bottom allowing plant growth.

Lobster Lake is classified as a mesotrophic lake with good to fair water clarity as measured by mean secchi depth of approximately 9 feet and ranging between 4.0 - 24.5 feet between 1997-2012. Increased phosphorus levels can contribute to algal abundance associated with a decrease in water clarity throughout the summer. Total phosphorus and chlorophyll-a (a value that provides a measure of the amount of algae in the water) are considered moderately low with mean values 23 and 7.5 ug/L respectively. Surrounding lakes were found to have similar findings with most lakes in the area being mesotrophic with moderate water quality. See Table 1 for water quality data.

Table 1. Water quality means for Lobster, Mary, Andrew and Red Rock Lakes.

Lake	Trophic State	Mean Secchi depth (ft)	Phosphorus (ug/L)	Chlorophyll a (ug/L)
Lobster	Mesotrophic	9.3	23	7.5
Mary	Mesotrophic	6.6	27.4	6.8
Andrew	Mesotrophic	9.4	21.5	6.8
Red Rock	Eutrophic	5.9	115	26.7

Objectives of Survey

This survey describes the aquatic plant community of Lobster Lake including:

1) Estimation of maximum depth of rooted vegetation
2) Record of aquatic plant species that were sampled
3) Estimation of abundance of species sampled
4) Distribution map for common species
5) Determination of any invasive aquatic plants

Methods:

The point-intercept survey followed methodology described by Madsen (1999). Geographic Information System (GIS) software was used to generate sample points across the lake surface in a 400 feet by 400 feet grid, resulting in a total of 287 potential survey points. In the field, few depths greater than 20 feet were sampled since vegetation was not found beyond 20 feet in depth. A Global Positioning System (GPS) unit was used to navigate the boat to each sample point. Water depths at each site were recorded in 1-foot increments using an electronic depth finder.

All plant species found within a one square meter sample site at the pre-designated side of the boat were recorded. A double-headed, weighted garden rake, attached to a rope (Figure 1) was used to survey vegetation not visible from the surface. Aquatic vegetation that was found under the surface by use of the double-headed garden rake was assigned a number between 1 and 4, 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.

Frequency of occurrence was calculated for each species as the number of sites in which a species occurred divided by the total number of sample sites. Frequency was calculated for all sampled locations as well as locations 20 feet or less. The average number of native submersed plants per rake sample was calculated as the total number of plants sampled divided by the number of sample locations.

Sampling points were also grouped by water depth and separated into five depth zones for analysis: 0 to 5 feet, and 6 to 10 feet, 11 to 15 feet, 16 to 20 feet, and 21+ (Figure 6).

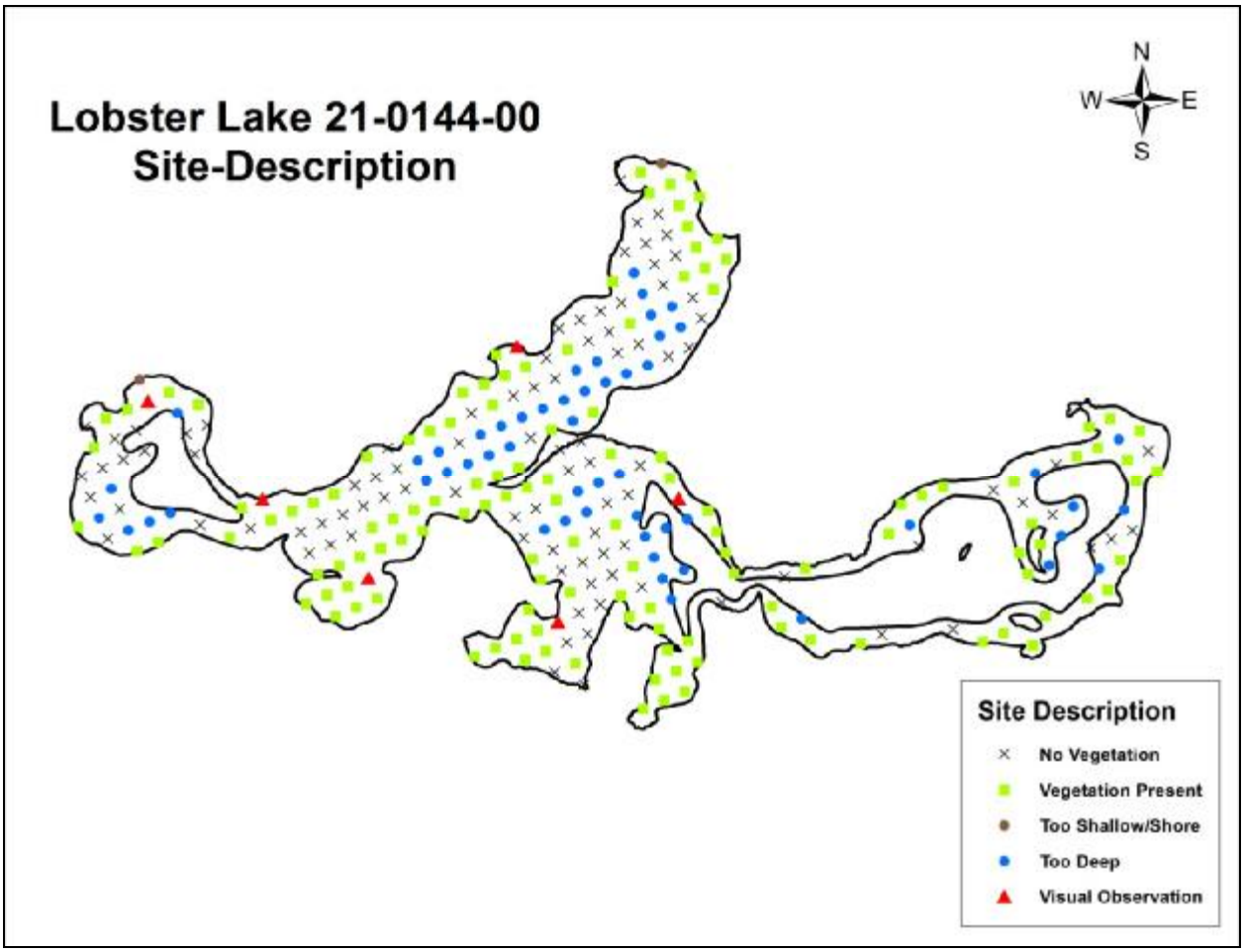


Figure 2. Lobster Lake Point-Intercept Survey with site description, July 26, 2012.

Summary

On July 26, 2012, 287 locations were observed of which 231 locations were sampled for a point-intercept survey of aquatic vegetation (Figure 2). Seventeen different types of native plants were found while sampling. The weather was fair for the survey with partly cloudy skies and mild northeast wind.

Three submersed native species made up the majority of plants sampled in depths of 20 feet or less. Coontail (*Ceratophyllum demersum*) was sampled at 25% of locations, Northern Water Milfoil (*Myriophyllum sibiricum*) at 16% and Muskgrass (*Chara vulgaris*) at 20%. (Figure 4 and Table 3).

Sampling occurred to a maximum depth of 39 feet. However, no plants were found to be growing beyond 18 feet. Plant abundance was greatest in the first 10 feet of water. As depths increased beyond 10 feet the presences of vegetation decreased and became less dense (Figure 5). Of 287 potential sampling locations, 231 were sampled, and 134 were in 10 feet or less.

The average number of native plants per rake sample was 1.16 for depths of 20 feet or less and 1.11 for all locations sampled. Five was the maximum number of species sampled at one location while values of 1, 2, and 3 species were sampled regularly (Figure 6).

Other native plants sampled included: Bladderwart (*Ultricularia vulgaris*), Bushy pondweed (*Najas gracillima*), Clasping leaf pondweed (*Potamogeton richardsonii*), flat-stem pondweed (*Potamogeton zoseriformis*), Illinois pondweed (*Potamogeton illinoensis*), Narrowleaf pondweed (*Potamogeton sp*.), Naiads (*Najas spp.),* other pondweed (*Potamogeton spp*.) Sago pondweed (*Potamogeton pectinatus*), White water lily (*Nymphaea odorata*), Wild celery (*Vallisneria americana*), softstem bulrush (*S. validus*), cattail (*Typha*), and floating leaf pondweed (*Potamogeton natans*).

Discussion

In comparing the early season survey (May 30, 2012) with the late season survey (July 26, 2012), the results are very similar (Table 2). Curly-leaf pondweed was found in the May survey, but that plant dies off in late June, so it was not found in the July survey. In both surveys, Coontail was the most abundant plant. In addition, plants were found at the same depths in both surveys.

Table 2. Comparison of May survey to July survey.

Comparison	**May 30, 2012 Survey**	**July 26, 2012 Survey**
Number of plant species found	18	17
Most abundant plant species	Coontail, 31%	Coontail, 25%
Second most abundant species	Northern watermilfoil, 19%	Muskgrass, 20%
Third most abundant species	Muskgrass, 19%	Northern watermilfoil, 16%
Aquatic invasive species	Curly-leaf pondweed	None
Average number of plants per rake sample	1.1	1.16
Depth at which plants were most abundant	10 feet	10 feet

Lobster Lake was found to be a typical deep lake for central Minnesota with a healthy native plant population and fair water clarity. It is important to maintain this aquatic plant community 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. Aquatic plants produce oxygen throughout the water column as a byproduct of photosynthesis. 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.

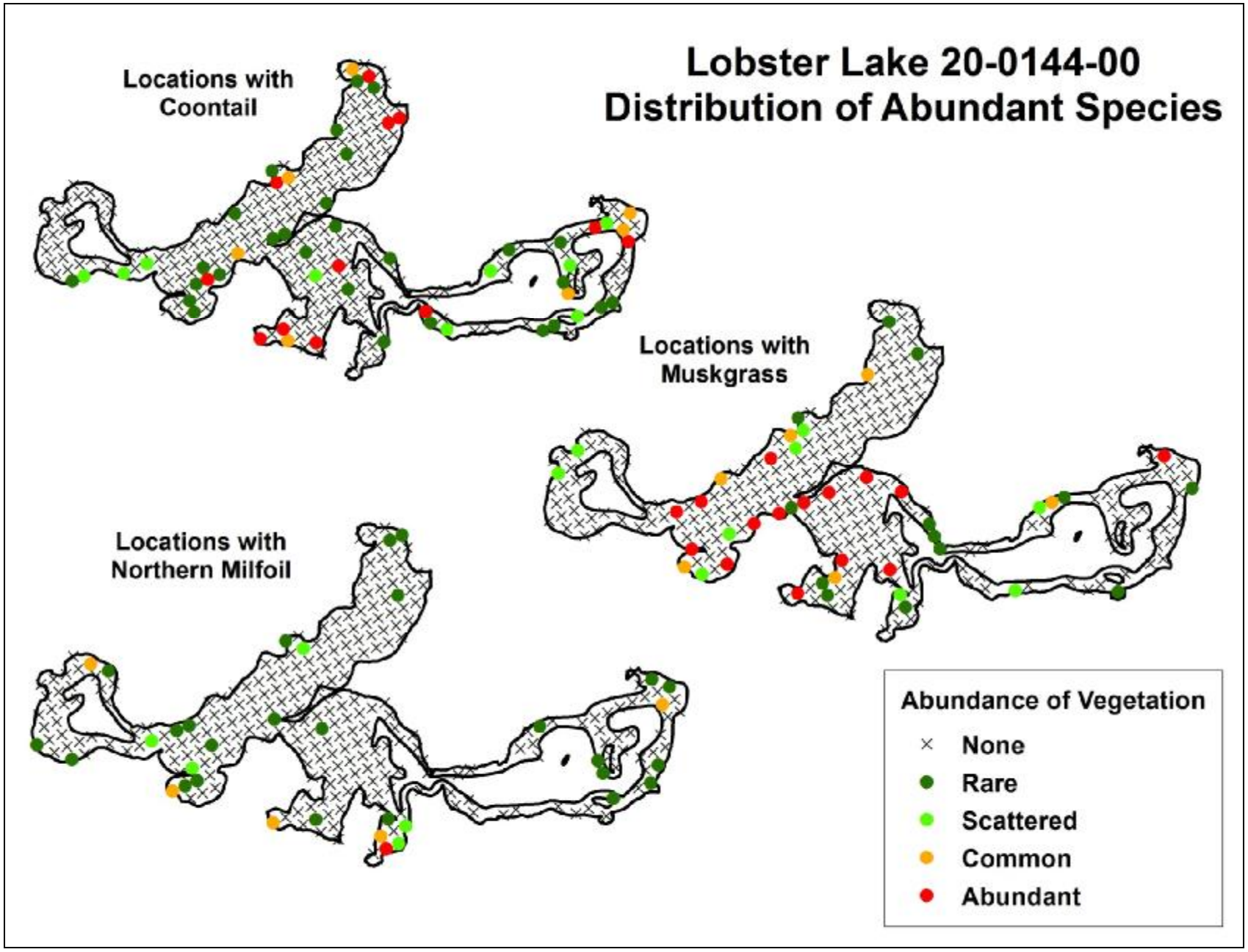


Figure 3. Distribution of common native aquatic plant species in Lobster Lake, July 26, 2012.

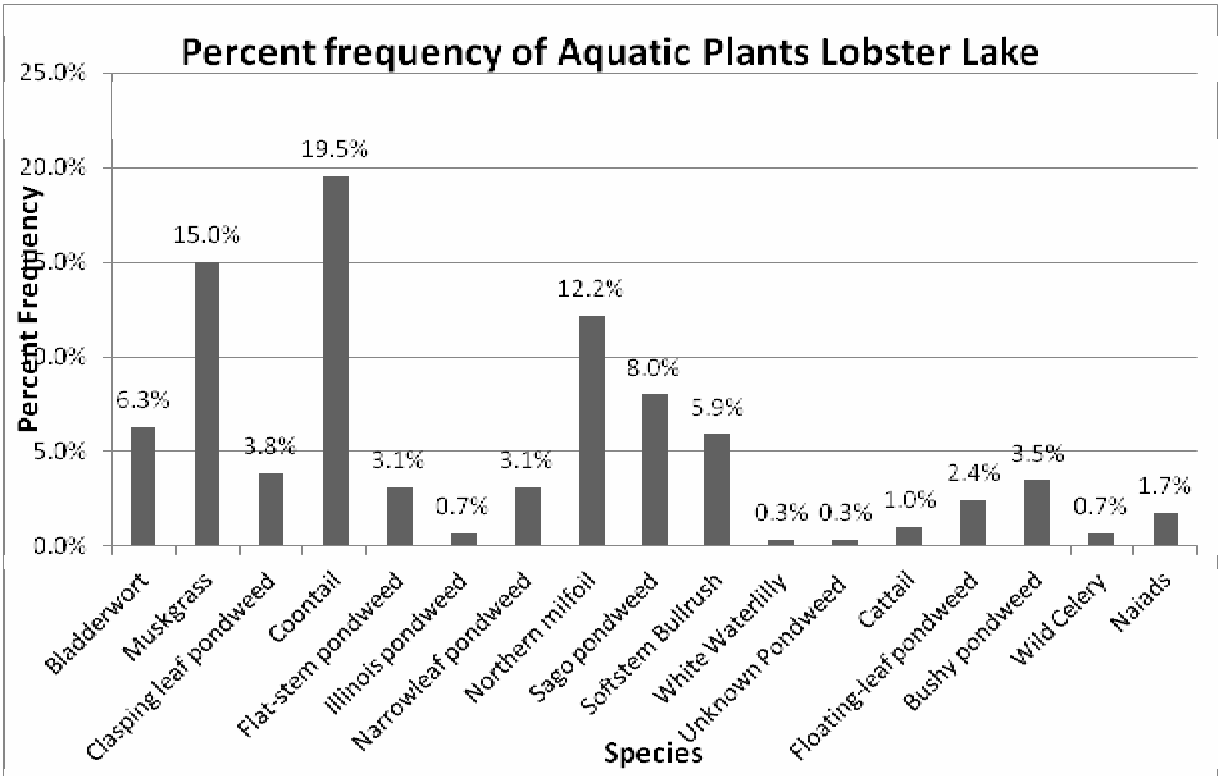


Figure 4. Frequency of occurrence for aquatic plant species in Lobster Lake, Douglas County, MN.

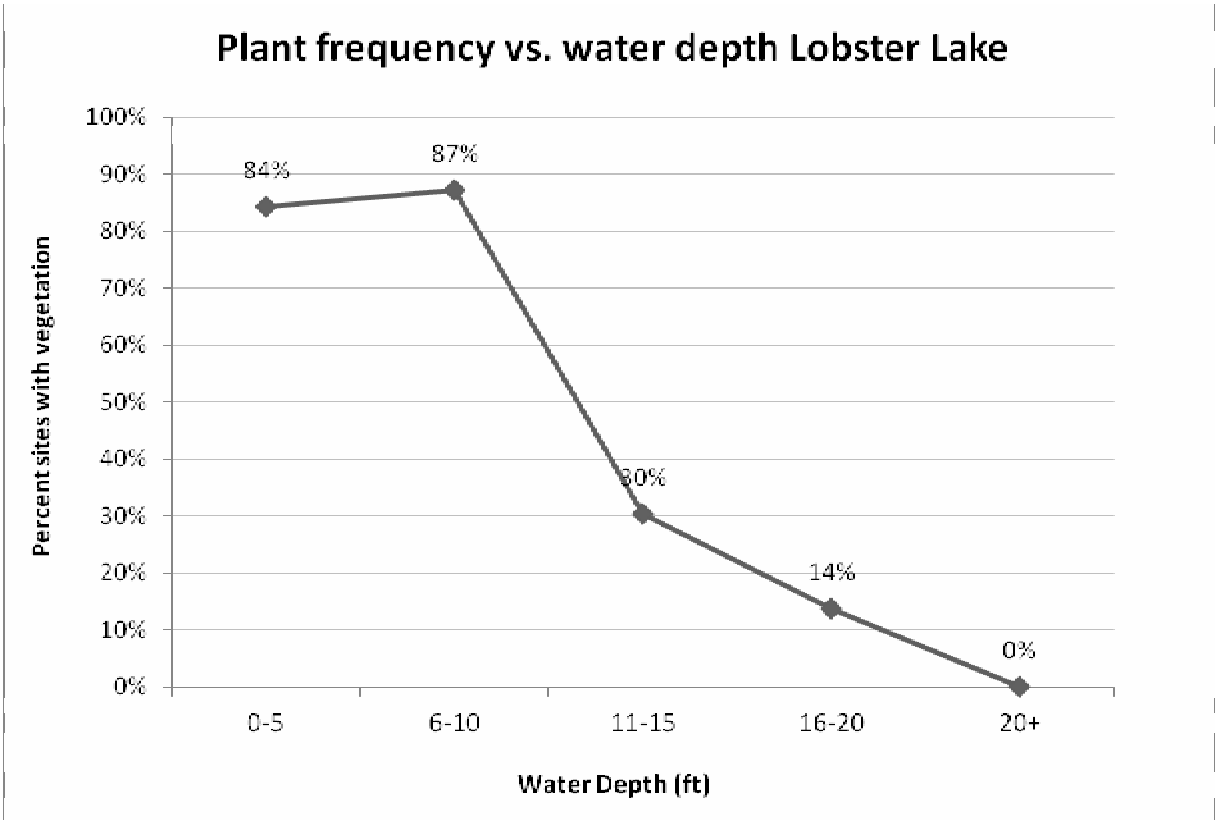


Figure 5. Frequency of vegetation vs. water depth, Lobster Lake, Douglas County, MN.

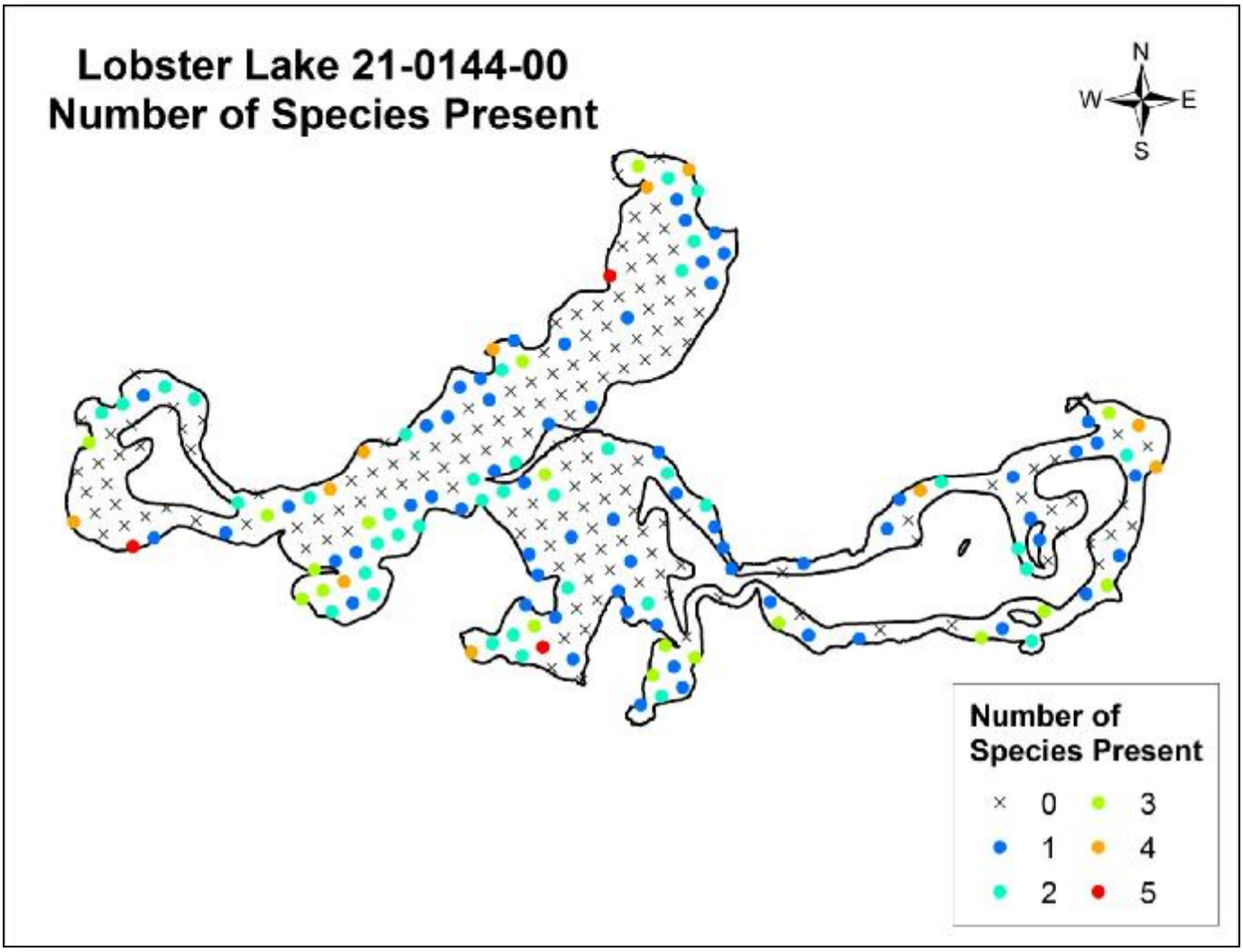


Figure 6. Number of species present per site, Lobster Lake, Douglas County M

Table 3. Aquatic Plants surveyed from Lobster Lake, Douglas County MN.

Life Form	Common Name	Scientific Name	Count	All Sites Freq. (%)	20 Feet or Less Freq. (%)
SUMBMERGED - 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.	Bladderwort	*Utricularia vulgaris*	18	6.3%	8.1%
	Muskgrass	*Chara vulgaris*	43	15.0%	19.5%
	Clasping-leaf pondweeed	*Potamogeton richardsonii*	11	3.8%	5.0%
	Coontail	*Ceratophyllum demersum*	56	19.5%	25.3%
	Flat-stem pondweed	*Potamogeton zosteriformis*	9	3.1%	4.1%
	Illinois pondweed	*Potamogeton ilnoensis*	2	0.7%	0.9%
	Northern Water Milfoil	*Myriophyllum exalbesvens*	35	12.2%	15.8%
	Sago pondweed	*Potamogeton pectinatus*	23	8.0%	10.4%
	Unknown pondweed	*potamogeton sp.*	3	1.0%	1.4%
	Narrowleaf pondweed	*Potamogeton sp.*	9	3.1%	4.1%
	Wild Celery	*Vallisneria americana*	2	0.7%	0.9%
	Naiad	*Najas spp.*	5	1.7%	2.3%
	Bushy pondweed	*Najas gracillima*	10	3.5%	4.5%
FLOATING - LEAF -These plant leaves float on water and are anchored to the bottom of the lake.	White water lily	*Nymphaea odorata*	1	0.3%	0.5%
	Floating leaf pondweed	*Potamogeton natans*	7	2.4%	3.2%
EMERGENT - These plants extend well above the water surface and are usually found in shallow water, near shore.	Softstem Bulrush	*schpus sp.*	17	5.9%	7.7%
	Cattail	*Typha sp.*	3	1.0%	1.4%
All sites			287		
Total number of Plants			541		
Total number of sampled sites			231		
Total number of sampled sites less than 20 feet			221		
52 sites not sampled (Too Deep)					
96 Sites found no vegitation					

Literature Cited

Blickenderfer, Mary. 2007. A Field Guide to Identification of Minnesota Aquatic Plants. University of Minnesota Extension.

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

Appendix I.

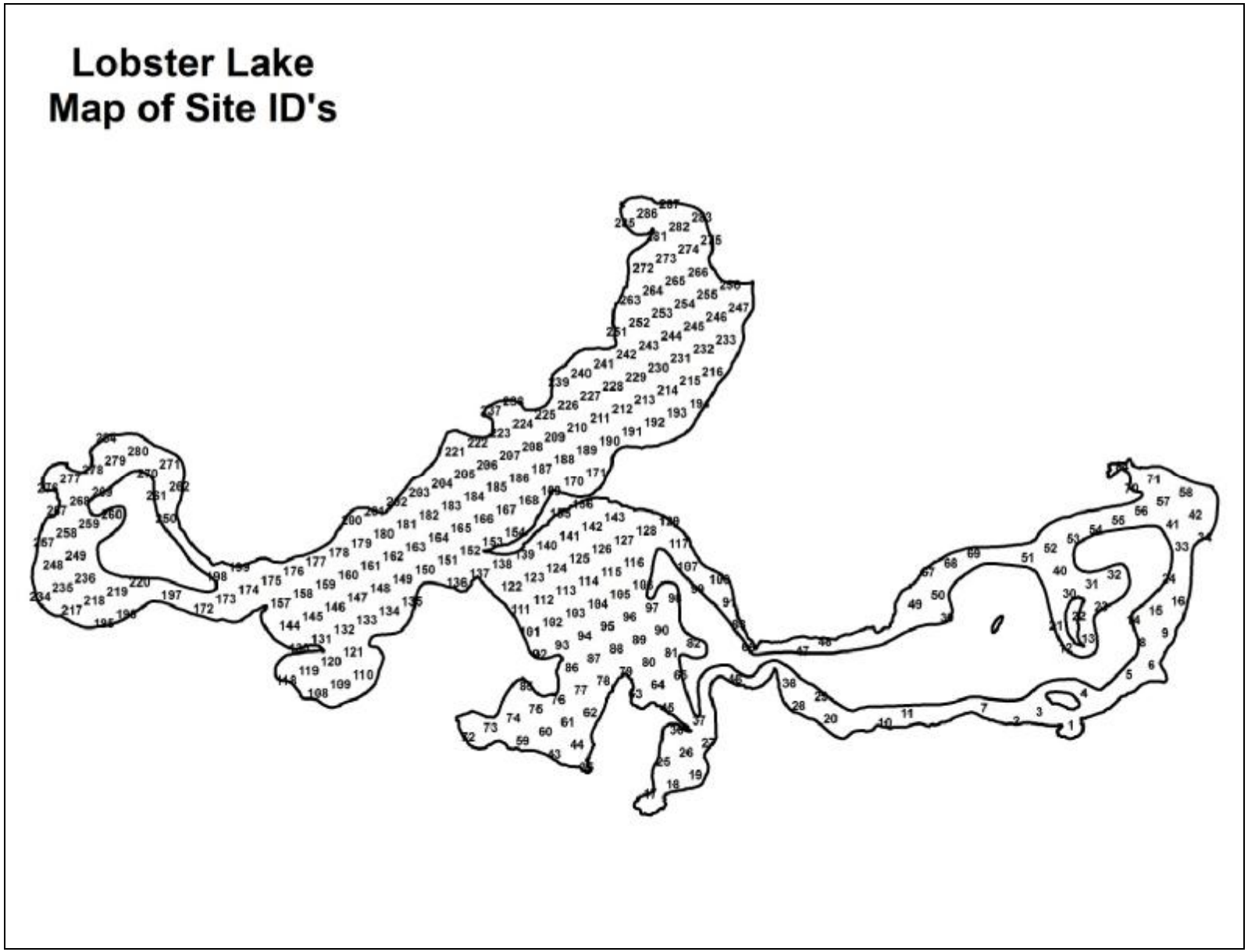


Figure 7. Map of Lobster Lake Site Identification.