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Point Intercept Survey: Silver Lake, Ramsey County - 2012

Inspection by the Invasive Species Program
Division of Ecological & Water Resources
Minnesota Department of Natural Resources

Lake: Silver	DOW Number: 62000100	Dates of inspection: July 20, 2012
County: Ramsey		Observer[s]: A. Doll, K. Lund, R. Roche
Type of inspection: Point intercept survey of aquatic vegetation		Secchi Depth: 2.5 feet
Author[s] of report: Keegan Lund & Rochelle Roche		Date of report: July 23, 2012

Summary – An aquatic vegetation survey of Silver Lake was conducted on July 20, 2012. Silver Lake is a 72-acre lake (littoral area is 71 acres) in Ramsey County with a max depth of 18 feet. Two non-native invasive aquatic plants infest Silver Lake: curly-leaf pondweed (*Potamogeton crispus*) and Eurasian watermilfoil (*Myriophyllum spicatum*). In response to the Eurasian watermilfoil (hereafter EWM) and curly-leaf pondweed (hereafter CLP) infestation, Silver Lake Improvement Association (SLIA) was permitted to chemically treated 6.2 acres of CLP in May 2012 and 3.2 acres of EWM in July 2012. The treatment area covered roughly 13% of the littoral area and Lake Improvement was the herbicide applicator.

The purpose of this point intercept survey was to identify the general abundance and location of native and invasive aquatic plants in Silver Lake. The point intercept surveys provides a general idea as to the overall composition of the aquatic plant community and may help monitor change over time. The MnDNR and partners such as SLIA will utilize this data to evaluate the efficacy of management treatments and thus help shape future decisions regarding lake-wide aquatic invasive plant management

Methods

Aquatic Vegetation Sampling

The point intercept survey method (Madsen 1999) was used for sampling the aquatic vegetation. This method consisted of the following:

- Placed a grid of points (evenly spaced 50 meters apart) across the entire lake.
- Staff navigated to each point using a global positioning system (GPS) where a double-sided rake attached to a rope was tossed from a pre-designated side of the boat and retrieved to obtain a sample of aquatic vegetation (Figure 1).
- Staff identified all species of aquatic vegetation based on Crow and Hellquist (2000) and assigned each species a ranking from 1 to 4 (1 = rare R, 2 = scattered S, 3 = common C, 4 = abundant A) depending on abundance on the double headed rake (R= 1-2 plants on the rake, S = plants cover ½ of the rake, C = plants cover ¾ of the rake, A = plants completely cover the rake).
- Water depth was recorded at each sampling location to the nearest tenth of a foot.



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Frequency of occurrence was calculated for each species as the number of sites in which a species occurred divided by the total number of sites sampled within the littoral zone of the lake. The littoral zone for this survey was defined as any area of the lake of 15.0 feet of depth 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 within the littoral zone.

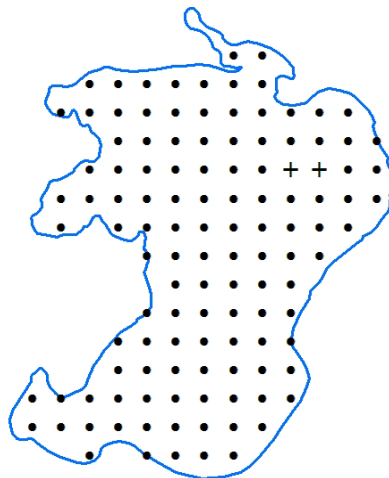
Results:

2012 Point-Intercept Survey

Points for this survey were placed 50 meters apart (Figure 2), totaling 122 possible sample sites. Points that were inaccessible by boat or greater than 15 feet in depth were not included in the following frequencies. As a result, 119 of the possible 122 potential sample sites were located within the littoral zone. In order to determine the greatest depth that plants occurred, many points were sampled deeper than the 15-foot littoral zone. The greatest depth of plants recorded however, was 13 feet. Based on this survey, seven species of native plants were found, compared to nine native plant species collected during the 2011 survey. On average, each point had .41 native submersed plant species. Submersed native plants were also recorded at 38% of the sampled sites within the littoral zone. The secchi depth was 2.5 feet.

Silver Lake is dominated by Eurasian watermilfoil, located at 68% of the sampled sites. The remaining frequencies (Table 1) of submersed native plants in Silver Lake are as follows: Muskgrass (23%), northern watermilfoil (9%), curly-leaf pondweed (8%), Canada waterweed (4%), white water lily (3%), white-stem pondweed (1%), sago pondweed (1%), and leafy pondweed (1%).

Figure 2: Sample points for Silver Lake, Ramsey County placed 50 meters apart



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Table 1: Percent Frequencies of occurrence of plants sampled from Silver Lake in 2012

Frequency calculated for littoral zone (shore to 15 feet of depth) Frequency = percent of sites in which species occurred 119 sampled sites				
<u>Life Forms</u>	<u>Common Name</u>	<u>Scientific Name</u>	Frequency in 2011	Frequency in 2012
INVASIVE SPECIES Invasive species are species that are not native to Minnesota <i>and</i> cause economic or environmental harm or harm to human health.	Eurasian watermilfoil	<i>Myriophyllum spicatum</i>	40%	68%
	Curly-leaf pondweed	<i>Potamogeton crispus</i>	5%	8%
SUBMERGED These plants grow primarily under the water surface. Upper leaves may float near the surface and flowers may extend above the surface. Plants are usually rooted or anchored to the lake bottom	Canada waterweed	<i>Elodea Canadensis</i>	12%	4%
	Leafy pondweed	<i>Potamogeton foliosus</i>	9%	1%
	Northern watermilfoil	<i>Myriophyllum sibiricum</i>	3%	9%
	White-stem pondweed	<i>Potamogeton praelongus</i>	2%	1%
	Sago pondweed	<i>Stuckenia pectinatus</i>	2%	1%
FLOATING These plants are rooted in the lake bottom and have leaves that float on the water surface.	White Water Lilly	<i>Nymphaea odorata</i>	6%	3%
ALGAE Algae have no true roots, stems or leaves and range in size from tiny one-celled organisms to large, multi-celled plant like organisms.	Muskgrass	<i>Chara sp.</i>	20%	23%

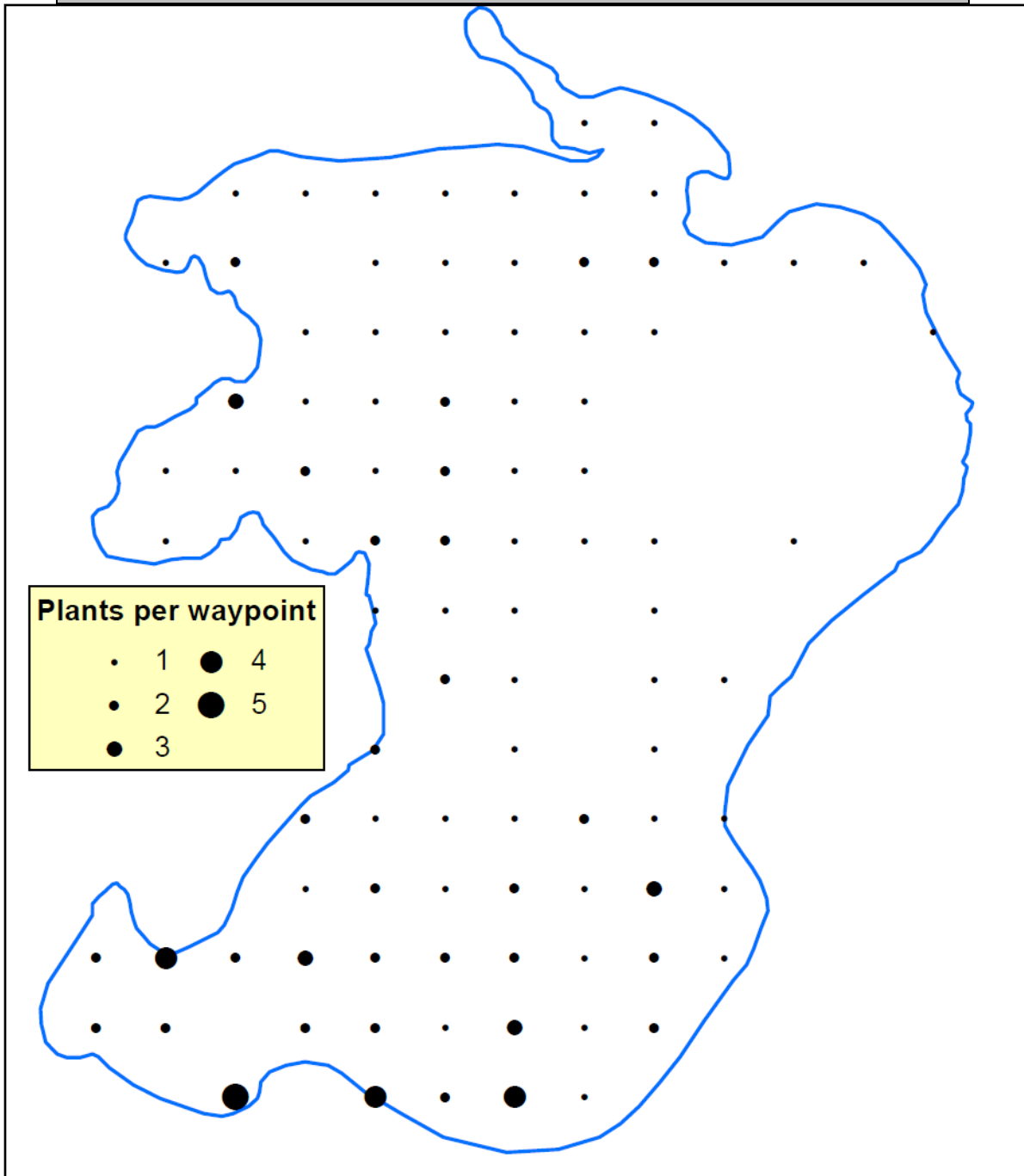
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Photo 2: Abundant Muskgrass (Chara spp.) hooked with a sampling rake in Silver Lake (2012)



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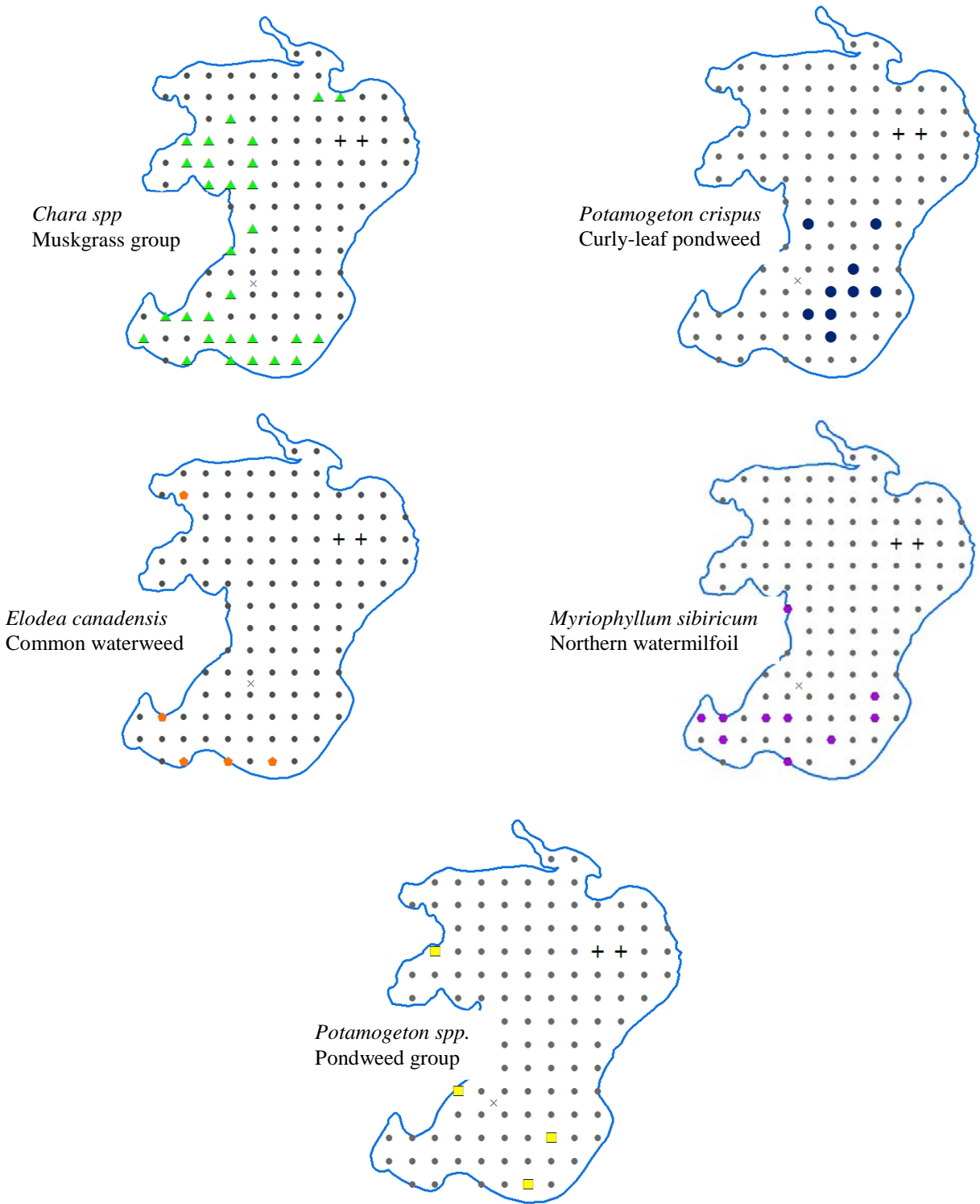
Figure 3: Distribution of submersed aquatic plants in Silver Lake (2012)



0 105 210 420 630 840 Feet

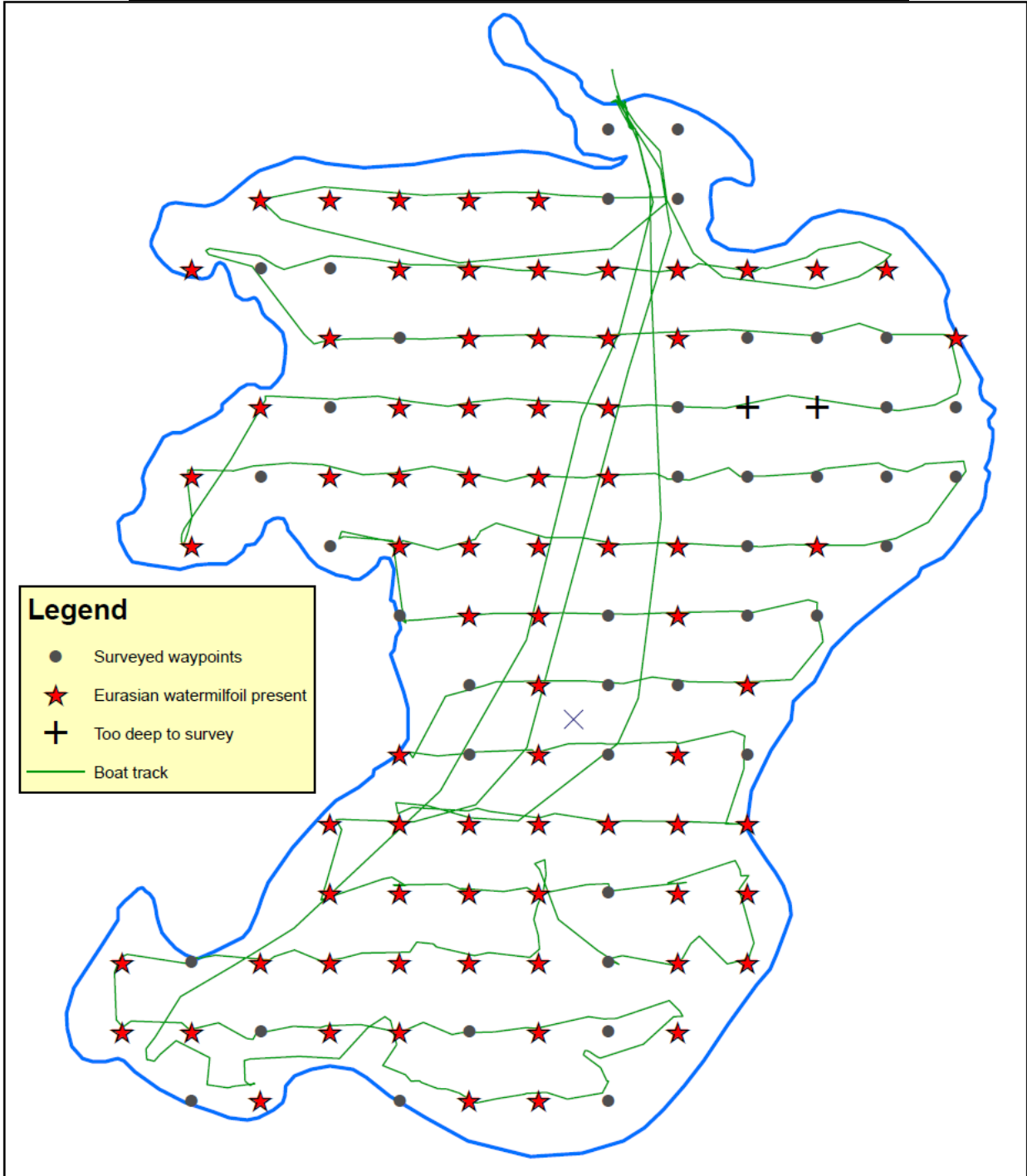
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Figure 4: Distribution of native submerged plants in Silver Lake (2012)



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Figure 5: Distribution of EWM in Silver Lake (2012)



0 105 210 420 630 840 Feet

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References cited

Crow, G.E. and C.B. Hellquist. 2000. Aquatic and wetland plants of Northeastern North America. 2 volumes. The University of Wisconsin Press.

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