

Sucker Lake



Shoreline Vegetation Survey 8/25/2020

This document contains data collected on Sucker Lake shoreline vegetation. Details of this report include the methods and findings of a quadrat-transect survey of shoreline vegetation.

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Shoreline Vegetation Survey

August 25, 2020

Background:

Sucker Lake is located in Vadnais Heights, MN near the northern boundary of Ramsey County and in the Vadnais Lake Area Watershed Management Organization (VLAWMO) (Figure 1). The lake has a surface area of approximately 63 acres and a shoreline length of 2.12 miles (MNDNR, 2020). While there is limited data on native plant community classifications along the shoreline of Sucker Lake, the Minnesota Department of Natural Resources (MNDNR) classified the adjacent areas west of Sucker Lake into five categories (Figure 2), which may potentially have an influence on the plant communities of the lake shoreline. Those five categories are Northern Mixed Cattail Marsh (MRn83), Black Ash-Yellow Birch-Red Maple-Alder Swamp (WFn64b), Alder-Maple-Loosestrife Swamp (FPn73a), Tamarack Swamp (FPs63a), and Willow-Dogwood Shrub Swamp (WMn82a) (MNDNR, 2014).

Within the U.S. Fish & Wildlife Service's National Wetland Inventory (Cowardin Classification System), the Sucker Lake shoreline is predominantly classified as PEMF and PUBF (Cowardin et. al, 1979), which correspond to semi-permanently flooded areas of emergent vegetation and unconsolidated bottom. Approximately three-fourths of the shoreline is classified as palustrine-emergent (PEM) (Figure 3). Small sections along the north shore and a section of the southeast shore are classified as palustrine-unconsolidated bottom (PUB). The north shore also includes a section classified as PUBGx, where Gx indicates a human-excavated channel with intermittent exposure of the bottom. A sliver of the east shoreline is classified as palustrine-forested (PFO), further coded with 1C, which indicates a seasonally flooded area of broad-leaved deciduous trees (Cowardin et. al, 1979).

The diverse classifications of native plant communities and wetland types for this urban lakeshore makes Sucker Lake a good candidate for a shoreline survey.

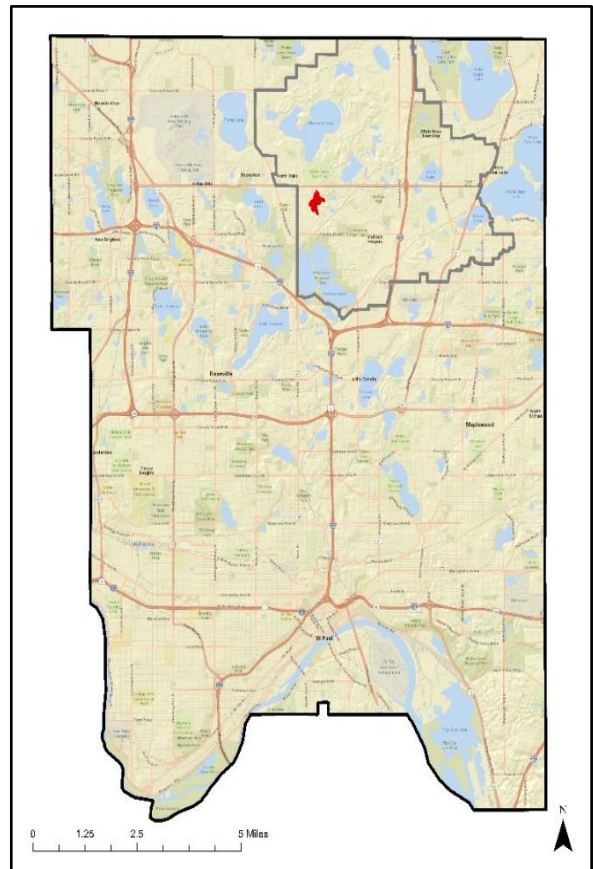


Figure 1. Location of Sucker Lake shown in red within Vadnais Lake Area Water Management Organization and Ramsey County boundaries.

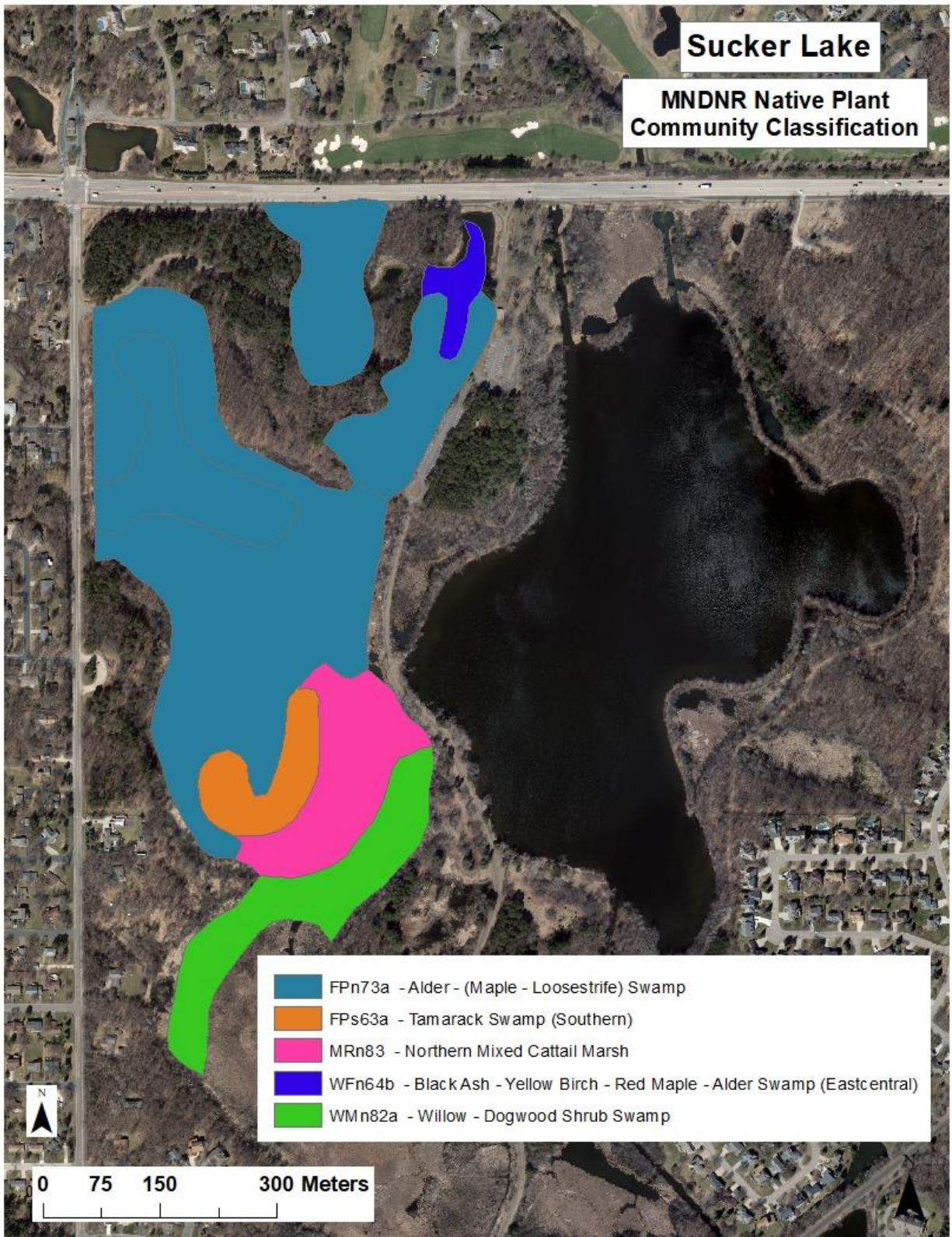


Figure 2. MN Department of Natural Resources native plant community classifications west of Sucker Lake (no data available for immediate shoreline plant communities).

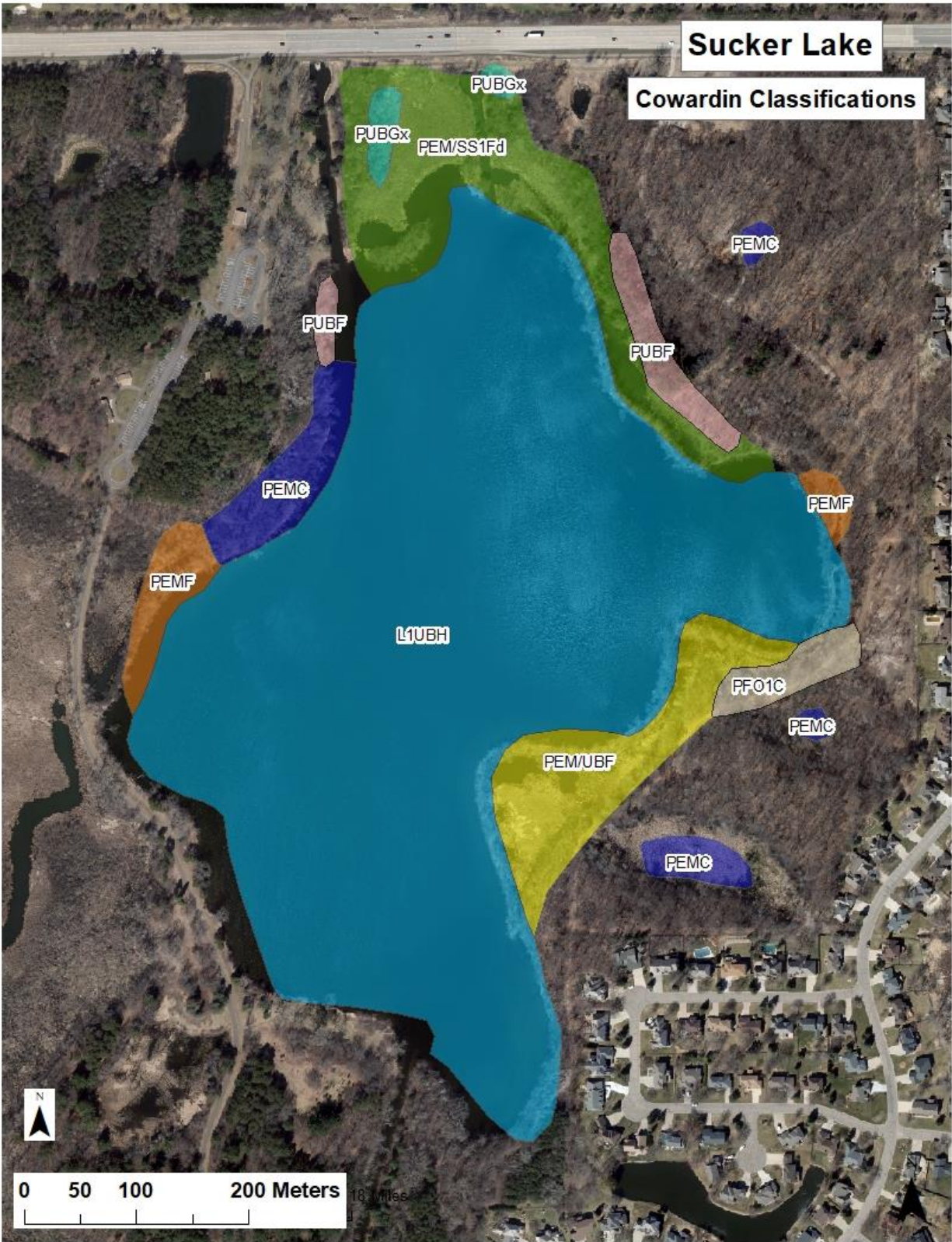


Figure 3. Cowardin classifications of wetlands surrounding Sucker Lake (U.S. Fish & Wildlife Service’s National Wetland Inventory).

Methods:

The sampling method chosen for this shoreline vegetation survey was a quadrat-transect method, as first developed by Curtis and McIntosh (1950). Around the perimeter of Sucker Lake, six transect lines perpendicular to shore were pre-drawn in Google's My Maps with the objective of documenting environmental variations across the areas of study (Figure 4). To best account for vegetation present within dense herbaceous habitats, a one-square-meter quadrat was used in this survey (Goldsmith et al., 1986). Systematic sampling, using defined intervals for transect and quadrat placement, was chosen to best investigate spatial patterns in plant species and abundance along the lakeshore (Barbour et al., 1987).

In the field, individual plants lying within a one-square-meter quadrat (Appendix B) were identified and counted at each of four locations along each transect line: at the interface with the lake (0 m), 5 m from shore, 10 m from shore, and 15 m from shore for a total of 24 quadrat sample sites. A My Maps application with a GPS tracker was used in the field to verify and locate each transect. A tape measure was then used from the lake-shore interface to measure quadrat locations at 0 m, 5 m, 10 m, and 15 m. The number of individual plants of each species per quadrat was recorded in the field (Appendix A). When a total count of 50 or more individual species occurred per quadrat, the count was denoted with an "A" (for Abundant), where a count of 50 was added to each occurrence of A for statistical purposes. The quadrat-transect plant sampling method allowed for the computation of *cover*, *density*, and *frequency* of each species recorded, as calculated using the equations below (Cox, 1990). All vegetation observed and collected along the transects were identified to the lowest taxonomic level possible. Invasive species identification was guided by the status listings on the Minnesota Wildflowers website (MENR, 2006). All survey data were recorded in the field, except for species that were collected, labeled, and brought to the office for further identification.

$$\text{Relative Coverage} = \frac{\text{Total \# of individual species}}{\text{Total \# of all species}}$$

$$\text{Density} = \frac{\text{Total \# of individual species}}{\text{Total \# of quadrats sampled}}$$

$$\text{Relative Density} = \frac{\text{Species density}}{\text{Total density for all species}}$$

$$\text{Frequency} = \frac{\text{\# of quadrats species occurred in}}{\text{Total \# of quadrats}}$$

$$\text{Relative Frequency} = \frac{\text{Species frequency}}{\text{Total frequency of all species}}$$

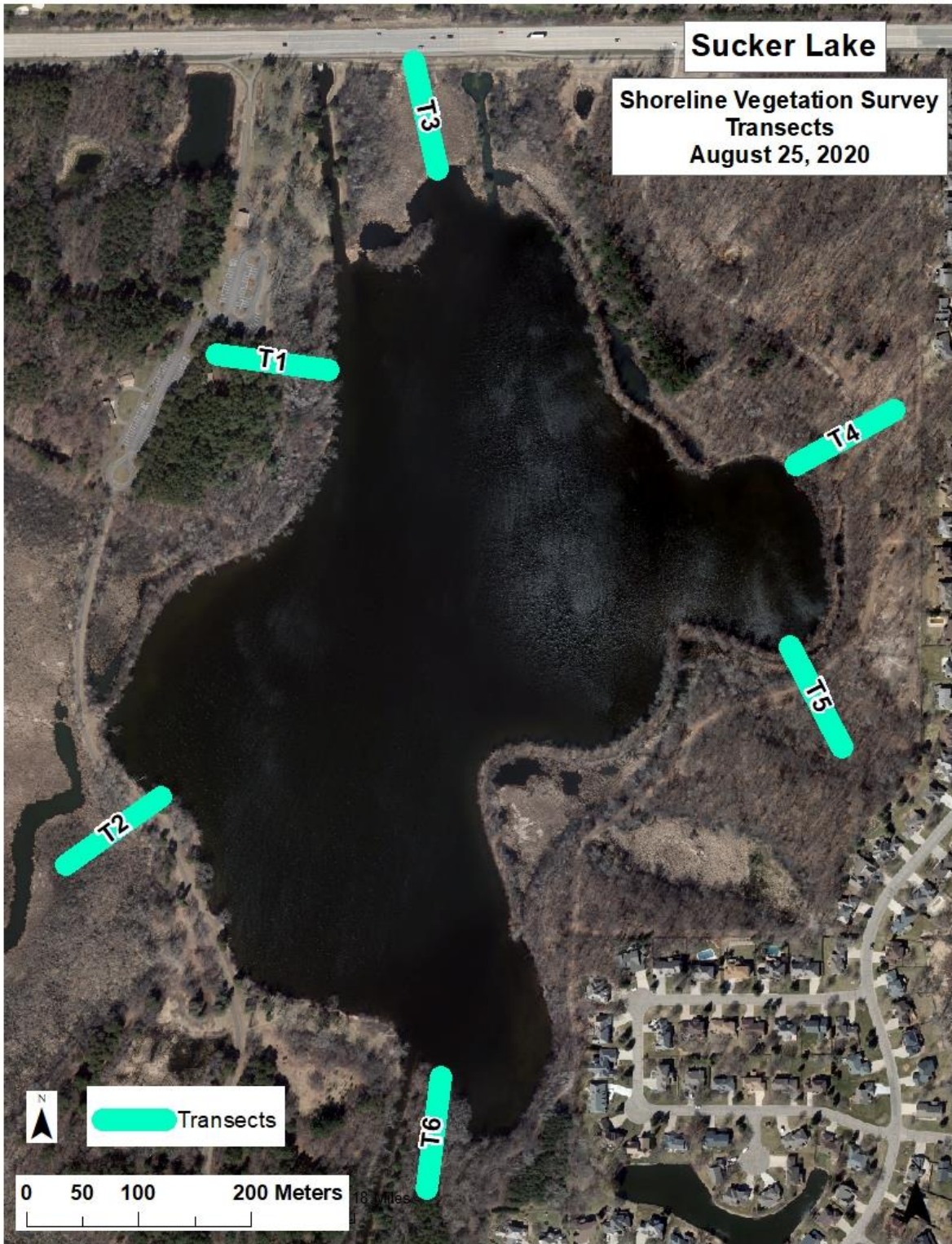


Figure 4. Transects (T) selected for shoreline vegetation survey. Transect locations were selected based on objective of capturing the best plant diversity across the lake shoreline.

Results:

Tables 2 and 3 display shoreline plant species, coverage, density and frequency data as observed within square-meter quadrats (N=24) sampled along six, 15-meter long transects. A total of 62 species was observed (Table 2). The five most abundant species (over 100 total plant count) with highest average densities included Lake Sedge (*Carex lacustris*), Canada Mayflower (*Maianthemum canadense*), Common Buckthorn (*Rhamnus cathartica*), Dwarf Clearweed (*Pilea pumila*), and Glossy Buckthorn (*Frangula alnus*). There were four relatively widespread species across the lake shoreline – found in eight or more quadrats at a frequency of greater than 33% – which included Lake Sedge, Common Buckthorn, Canada Mayflower, and Reed Canary (*Phalaris arundinacea*) (Table 3). The remaining 56 species were found in five or fewer quadrats (less than 25% of the total quadrats sampled) and are listed in Table 3. Species that were concentrated – occurring only in one or two quadrats with a total count of 10 or more individuals – included American Hog Peanut (*Amphicarpaea bracteata*), Groundnut (*Apios americana*), Cinnamon Fern (*Osmundastrum cinnamomeum*), Common Plantain (*Plantago major*), Late Goldenrod (*Solidago altissima*), Northern Bugleweed (*Lycopus uniflorus*), and Canada Bluejoint (*Calamagrostis canadensis*). There was a total of 13 invasive species observed (Table 1). The two most abundant invasive species (exceeding 100 individual plants) were Common Buckthorn and Glossy Buckthorn.

Other observations included a notable presence of the following species in vicinity of the specified locations (outside the surveyed quadrats):

	QUADRAT VICINITY			
	Q0	Q5	Q10	Q15
Transect 1	Early Meadow Rue (<i>Thalictrum dioicum</i>)	Wild Grape (<i>Vitis riparia</i>)		Jack-in-the-Pulpit (<i>Arisaema triphyllum</i>)
Transect 2	Red Pine (<i>Pinus resinosa</i>) Goldenrod (<i>Solidago sp.</i>) Paper Birch (<i>Betula papyrifera</i>)		Common Boneset (<i>Eupatorium perfoliatum</i>)	
Transect 3	Arrow-leaved Tearthumb (<i>Persicaria sagitta</i>) Narrowleaf Cattail (<i>Typha angustifolia</i>) Arrowhead (<i>Sagittaria sp.</i>)	Creeping Charlie (<i>Glechoma hederacea</i>)		
Transect 4	Dwarf Clearweed (<i>Pilea pumila</i>)	Joe-pye Weed (<i>Eutrochium maculatum</i>)		
Transect 5				
Transect 6	Honeysuckle (<i>Lonicera sp.</i>)		Garlic Mustard (<i>Alliaria petiolata</i>) Cinnamon Fern (<i>Osmundastrum cinnamomeum</i>)	

Table 1. *Invasive species (13) that occurred in survey results. Invasiveness was defined as being non-native to Minnesota, an aggressive native, and/or listed as an invasive species on the MN Wildflowers website.*

Common Name	Scientific Name	Total Plant Count (Coverage)
Common Buckthorn	<i>Rhamnus cathartica</i>	112
Glossy Buckthorn	<i>Frangula alnus</i>	104
Narrowleaf Cattail	<i>Typha angustifolia</i>	81
Reed Canary	<i>Phalaris arundinacea</i>	76
Birds-foot Trefoil	<i>Lotus corniculatus</i>	29
Common Plantain	<i>Plantago major</i>	19
Purple Loosestrife	<i>Lythrum salicaria</i>	8
White Sweet Clover	<i>Melilotus alba</i>	4
Common Dandelion	<i>Taraxacum officinale</i>	4
Alsike Clover	<i>Trifolium hybridum</i>	2
Amur Maple	<i>Acer ginnala</i>	1
Leafy Spurge	<i>Euphorbia virgata</i>	1
Curly Dock	<i>Rumex crispus</i>	1

Table 2. *Sucker Lake Shoreline Vegetation Survey Species List (red = invasive).*

	Common Name	Scientific Name
1	Amur Maple	<i>Acer ginnala</i>
2	Boxelder	<i>Acer negundo</i>
3	Silver Maple	<i>Acer saccharinum</i>
4	Speckled Alder	<i>Alnus incana</i>
5	American Hog Peanut	<i>Amphicarpaea bracteata</i>
6	Canada Anemone	<i>Anemone canadensis</i>
7	Groundnut	<i>Apios americana</i>
8	Dogbane (Indian Hemp)	<i>Apocynum cannabinum</i>
9	Paper Birch	<i>Betula papyrifera</i>
10	Swamp Beggarticks	<i>Bidens connata</i>
11	Canada Bluejoint	<i>Calamagrostis canadensis</i>
12	Bottlebrush Sedge	<i>Carex hystericina</i>
13	Lake Sedge	<i>Carex lacustris</i>
14	Bulblet-bearing Water Hemlock	<i>Cicuta bulbifera</i>
15	Red-osier Dogwood	<i>Cornus sericea</i>
16	Tick Trefoil	<i>Desmodium sp.</i>
17	Smooth Scouring Rush	<i>Equisetum laevigatum</i>
18	Meadow Horsetail	<i>Equisetum pratense</i>
19	Leafy Spurge	<i>Euphorbia virgata</i>
20	Fescue	<i>Festuca sp.</i>
21	Glossy Buckthorn	<i>Frangula alnus</i>
22	Wild Geranium	<i>Geranium maculatum</i>

	Common Name	Scientific Name
23	Jewelweed	<i>Impatiens capensis</i>
24	Jewelweed	<i>Impatiens pallida</i>
25	Marsh Vetchling	<i>Lathyrus palustris</i>
26	Rice Cutgrass	<i>Leersia oryzoides</i>
27	Birds-foot Trefoil	<i>Lotus corniculatus</i>
28	American Water Horehound	<i>Lycopus americanus</i>
29	Northern Bugleweed	<i>Lycopus uniflorus</i>
30	Purple Loosestrife	<i>Lythrum salicaria</i>
31	Canada Mayflower	<i>Maianthemum canadense</i>
32	False Solomon's Seal	<i>Maianthemum racemosum</i>
33	White Sweet Clover	<i>Melilotus alba</i>
34	Sensitive Fern	<i>Onoclea sensibilis</i>
35	Cinnamon Fern	<i>Osmundastrum cinnamomeum</i>
36	Virginia Creeper	<i>Parthenocissus quinquefolia</i>
37	Pennsylvania Smartweed	<i>Persicaria pensylvanica</i>
38	Arrow-leaved Tearthumb	<i>Persicaria sagittata</i>
39	Smartweed	<i>Persicaria sp.</i>
40	Reed Canary	<i>Phalaris arundinacea</i>
41	American Lopseed	<i>Phryma leptostachya</i>
42	Dwarf Clearweed	<i>Pilea pumila</i>
43	Common Plantain	<i>Plantago major</i>
44	White Oak	<i>Quercus alba</i>
45	Swamp White Oak	<i>Quercus bicolor</i>
46	Common Buckthorn	<i>Rhamnus cathartica</i>
47	Raspberry	<i>Rubus sp.</i>
48	Curly Dock	<i>Rumex crispus</i>
49	Arrowhead	<i>Sagittaria sp.</i>
50	Willow	<i>Salix sp.</i>
51	Little Bluestem	<i>Schizachyrium scoparium</i>
52	Mad-dog Skullcap	<i>Scutellaria lateriflora</i>
53	Late Goldenrod	<i>Solidago altissima</i>
54	Goldenrod	<i>Solidago sp.</i>
55	Arrowleaf Aster	<i>Symphotrichum urophyllum</i>
56	Common Dandelion	<i>Taraxacum officinale</i>
57	Marsh Fern	<i>Thelypteris palustris</i>
58	Poison Ivy	<i>Toxicodendron rydbergii</i>
59	Alsike Clover	<i>Trifolium hybridum</i>
60	Narrowleaf Cattail	<i>Typha angustifolia</i>
61	Aster	Unknown Asteraceae
62	Wild Grape	<i>Vitis riparia</i>

Table 3. Species listed by total plant count (coverage), number of quadrats occurred, density, frequency, and relative data for each statistic (*red* = invasive).

Common Name	Scientific Name	Total Plant Count (Coverage)	Relative Coverage	Quadrats Occurred	Density	Relative Density	Frequency	Relative Frequency
Lake Sedge	<i>Carex lacustris</i>	120	9.66%	13	5.00	9.66%	54.17%	8.02%
Canada Mayflower	<i>Maianthemum canadense</i>	112	9.02%	8	4.67	9.02%	33.33%	4.94%
Common Buckthorn	<i>Rhamnus cathartica</i>	112	9.02%	11	4.67	9.02%	45.83%	6.79%
Dwarf Clearweed	<i>Pilea pumila</i>	106	8.53%	5	4.42	8.53%	20.83%	3.09%
Glossy Buckthorn	<i>Frangula alnus</i>	104	8.37%	4	4.33	8.37%	16.67%	2.47%
Narrowleaf Cattail	<i>Typha angustifolia</i>	81	6.52%	5	3.38	6.52%	20.83%	3.09%
Reed Canary	<i>Phalaris arundinacea</i>	76	6.12%	8	3.17	6.12%	33.33%	4.94%
Sensitive Fern	<i>Onoclea sensibilis</i>	46	3.70%	3	1.92	3.70%	12.50%	1.85%
Speckled Alder	<i>Alnus incana</i>	43	3.46%	3	1.79	3.46%	12.50%	1.85%
Meadow Horsetail	<i>Equisetum pratense</i>	40	3.22%	5	1.67	3.22%	20.83%	3.09%
American Hog Peanut	<i>Amphicarpaea bracteata</i>	37	2.98%	2	1.54	2.98%	8.33%	1.23%
Groundnut	<i>Apios americana</i>	37	2.98%	2	1.54	2.98%	8.33%	1.23%
Birds-foot Trefoil	<i>Lotus corniculatus</i>	29	2.33%	3	1.21	2.33%	12.50%	1.85%
Canada Bluejoint	<i>Calamagrostis canadensis</i>	23	1.85%	1	0.96	1.85%	4.17%	0.62%
Raspberry	<i>Rubus sp.</i>	22	1.77%	3	0.92	1.77%	12.50%	1.85%
Swamp Beggarticks	<i>Bidens connata</i>	20	1.61%	4	0.83	1.61%	16.67%	2.47%
Cinnamon Fern	<i>Osmundastrum cinnamomeum</i>	19	1.53%	2	0.79	1.53%	8.33%	1.23%
Common Plantain	<i>Plantago major</i>	19	1.53%	2	0.79	1.53%	8.33%	1.23%
Arrow-leaved Tearthumb	<i>Persicaria sagittata</i>	16	1.29%	3	0.67	1.29%	12.50%	1.85%
Late Goldenrod	<i>Solidago altissima</i>	16	1.29%	2	0.67	1.29%	8.33%	1.23%
Smooth Scouring Rush	<i>Equisetum laevigatum</i>	14	1.13%	3	0.58	1.13%	12.50%	1.85%
Rice Cutgrass	<i>Leersia oryzoides</i>	13	1.05%	3	0.54	1.05%	12.50%	1.85%
Northern Bugleweed	<i>Lycopus uniflorus</i>	13	1.05%	2	0.54	1.05%	8.33%	1.23%
Bottlebrush Sedge	<i>Carex hystericina</i>	8	0.64%	3	0.33	0.64%	12.50%	1.85%
Wild Geranium	<i>Geranium maculatum</i>	8	0.64%	1	0.33	0.64%	4.17%	0.62%
Purple Loosestrife	<i>Lythrum salicaria</i>	8	0.64%	3	0.33	0.64%	12.50%	1.85%
Virginia Creeper	<i>Parthenocissus quinquefolia</i>	8	0.64%	4	0.33	0.64%	16.67%	2.47%
Mad-dog Skullcap	<i>Scutellaria lateriflora</i>	8	0.64%	3	0.33	0.64%	12.50%	1.85%
Red-osier Dogwood	<i>Cornus sericea</i>	6	0.48%	2	0.25	0.48%	8.33%	1.23%
Fescue	<i>Festuca sp.</i>	6	0.48%	5	0.25	0.48%	20.83%	3.09%
Poison Ivy	<i>Toxicodendron rydbergii</i>	6	0.48%	3	0.25	0.48%	12.50%	1.85%
Willow	<i>Salix sp.</i>	5	0.40%	3	0.21	0.40%	12.50%	1.85%
Marsh Vetchling	<i>Lathyrus palustris</i>	4	0.32%	2	0.17	0.32%	8.33%	1.23%
False Solomon's Seal	<i>Maianthemum racemosum</i>	4	0.32%	2	0.17	0.32%	8.33%	1.23%

Common Name	Scientific Name	Total Plant Count (Coverage)	Relative Coverage	Quadrats Occurred	Density	Relative Density	Frequency	Relative Frequency
White Sweet Clover	<i>Melilotus alba</i>	4	0.32%	2	0.17	0.32%	8.33%	1.23%
Common Dandelion	<i>Taraxacum officinale</i>	4	0.32%	2	0.17	0.32%	8.33%	1.23%
Canada Anemone	<i>Anemone canadensis</i>	3	0.24%	1	0.13	0.24%	4.17%	0.62%
Paper Birch	<i>Betula papyrifera</i>	3	0.24%	2	0.13	0.24%	8.33%	1.23%
Tick Trefoil	<i>Desmodium sp.</i>	3	0.24%	1	0.13	0.24%	4.17%	0.62%
Arrowhead	<i>Sagittaria sp.</i>	3	0.24%	1	0.13	0.24%	4.17%	0.62%
Marsh Fern	<i>Thelypteris palustris</i>	3	0.24%	2	0.13	0.24%	8.33%	1.23%
Boxelder	<i>Acer negundo</i>	2	0.16%	2	0.08	0.16%	8.33%	1.23%
Silver Maple	<i>Acer saccharinum</i>	2	0.16%	1	0.08	0.16%	4.17%	0.62%
Dogbane (Indian Hemp)	<i>Apocynum cannabinum</i>	2	0.16%	1	0.08	0.16%	4.17%	0.62%
Bulblet-bearing Water Hemlock	<i>Cicuta bulbifera</i>	2	0.16%	1	0.08	0.16%	4.17%	0.62%
Jewelweed	<i>Impatiens pallida</i>	2	0.16%	1	0.08	0.16%	4.17%	0.62%
American Water Horehound	<i>Lycopus americanus</i>	2	0.16%	1	0.08	0.16%	4.17%	0.62%
American Lopseed	<i>Phryma leptostachya</i>	2	0.16%	1	0.08	0.16%	4.17%	0.62%
Alsike Clover	<i>Trifolium hybridum</i>	2	0.16%	1	0.08	0.16%	4.17%	0.62%
Wild Grape	<i>Vitis riparia</i>	2	0.16%	2	0.08	0.16%	8.33%	1.23%
Amur Maple	<i>Acer ginnala</i>	1	0.08%	1	0.04	0.08%	4.17%	0.62%
Leafy Spurge	<i>Euphorbia virgata</i>	1	0.08%	1	0.04	0.08%	4.17%	0.62%
Jewelweed	<i>Impatiens capensis</i>	1	0.08%	1	0.04	0.08%	4.17%	0.62%
Pennsylvania Smartweed	<i>Persicaria pensylvanica</i>	1	0.08%	1	0.04	0.08%	4.17%	0.62%
Smartweed	<i>Persicaria sp.</i>	1	0.08%	1	0.04	0.08%	4.17%	0.62%
White Oak	<i>Quercus alba</i>	1	0.08%	1	0.04	0.08%	4.17%	0.62%
Swamp White Oak	<i>Quercus bicolor</i>	1	0.08%	1	0.04	0.08%	4.17%	0.62%
Curly Dock	<i>Rumex crispus</i>	1	0.08%	1	0.04	0.08%	4.17%	0.62%
Little Bluestem	<i>Schizachyrium scoparium</i>	1	0.08%	1	0.04	0.08%	4.17%	0.62%
Goldenrod	<i>Solidago sp.</i>	1	0.08%	1	0.04	0.08%	4.17%	0.62%
Arrowleaf Aster	<i>Symphotrichum urophyllum</i>	1	0.08%	1	0.04	0.08%	4.17%	0.62%
Aster	<i>Unknown Asteraceae</i>	1	0.08%	1	0.04	0.08%	4.17%	0.62%
	Total	1242	100%	162	51.75	100%	675%	100%

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Appendix A: Field Data Results by Quadrat

Sucker Lake Shoreline Survey Field Data

8/25/2020

Red = Invasive, **A** = 50+ individuals

Transect 1						
	Common Name	Scientific Name	Q0	Q5	Q10	Q15
1	Virginia Creeper	<i>Parthenocissus quinquefolia</i>	4	2		1
2	Red-osier Dogwood	<i>Cornus sericea</i>	1			
3	Marsh Vetchling	<i>Lathyrus palustris</i>	2			
4	Canada Mayflower	<i>Maianthemum canadense</i>	5	2		
5	Raspberry	<i>Rubus sp.</i>	1			
6	Jewelweed	<i>Impatiens capensis</i>	1			
7	Common Buckthorn	<i>Rhamnus cathartica</i>	19	30	20	10
8	Wild Grape	<i>Vitis riparia</i>				
9	Willow	<i>Salix sp.</i>		1	1	
10	False Solomon's Seal	<i>Maianthemum racemosum</i>		1		
11	Silver Maple	<i>Acer saccharinum</i>			2	
	% Invasive Species	9%	33	36	23	11

Transect 2						
	Common Name	Scientific Name	Q0	Q5	Q10	Q15
1	Tick Trefoil	<i>Desmodium sp.</i>	3			
2	Common Buckthorn	<i>Rhamnus cathartica</i>	3		6	5
3	Lake Sedge	<i>Carex lacustris</i>	10			
4	American Hog Peanut	<i>Amphicarpaea bracteata</i>	21			16
5	Meadow Horsetail	<i>Equisetum pratense</i>	10	14	13	
6	Birds-foot Trefoil	<i>Lotus corniculatus</i>	1	21	7	
7	Common Dandelion	<i>Taraxacum officinale</i>	1			3
8	American Water Horehound	<i>Lycopus americanus</i>	2			
9	Reed Canary	<i>Phalaris arundinacea</i>	2			
10	Speckled Alder	<i>Alnus incana</i>	37			
11	Late Goldenrod	<i>Solidago altissima</i>		10	6	
12	White Oak	<i>Quercus alba</i>		1		
13	White Sweet Clover	<i>Melilotus alba</i>		3		1
14	Smooth Scouring Rush	<i>Equisetum laevigatum</i>		1	12	
15	Little Bluestem	<i>Schizachyrium scoparium</i>		1		
16	Fescue	<i>Festuca sp.</i>		A	A	A
17	Alsike Clover	<i>Trifolium hybridum</i>		2		
18	Red-osier Dogwood	<i>Cornus sericea</i>			5	
19	Amur Maple	<i>Acer ginnala</i>			1	
20	Paper Birch	<i>Betula papyrifera</i>			1	2
21	Common Plantain	<i>Plantago major</i>			2	17
22	Dogbane (Indian Hemp)	<i>Apocynum cannabinum</i>				2
23	Wild Geranium	<i>Geranium maculatum</i>				8

24	Canada Anemone	<i>Anemone canadensis</i>				3	
25	American Lopseed	<i>Phryma leptostachya</i>				2	
% Invasive Species			32%	90	103	103	109

Transect 3							
	Common Name	Scientific Name	Q0	Q5	Q10	Q15	
1	Curly Dock	<i>Rumex crispus</i>	1				
2	Reed Canary	<i>Phalaris arundinacea</i>	11	5			
3	Mad-dog Skullcap	<i>Scutellaria lateriflora</i>	5			1	
4	Northern Bugleweed	<i>Lycopus uniflorus</i>	10				
5	Lake Sedge	<i>Carex lacustris</i>	34	13	1		
6	Dwarf Clearweed	<i>Pilea pumila</i>	11	43	45	A	
7	Rice Cutgrass	<i>Leersia oryzoides</i>	A				
8	Swamp Beggarticks	<i>Bidens connata</i>	9	1			
9	Smartweed	<i>Persicaria sp.</i>	1				
10	Bottlebrush Sedge	<i>Carex hystericina</i>	3				
11	Narrowleaf Cattail	<i>Typha angustifolia</i>		20	35	19	
12	Arrowhead	<i>Sagittaria sp.</i>		3			
13	Jewelweed	<i>Impatiens pallida</i>			2		
14	Goldenrod	<i>Solidago sp.</i>			1		
15	Arrow-leaved Tearthumb	<i>Persicaria sagittata</i>			2	1	
16	Cinnamon Fern	<i>Osmundastrum cinnamomeum</i>			3		
17	Purple Loosestrife	<i>Lythrum salicaria</i>		1		3	
% Invasive Species			24%	135	86	89	74

Transect 4							
	Common Name	Scientific Name	Q0	Q5	Q10	Q15	
1	Groundnut	<i>Apios americana</i>	9		28		
2	Lake Sedge	<i>Carex lacustris</i>	1	18	1	1	
3	Reed Canary	<i>Phalaris arundinacea</i>	28	18			
4	Cinnamon Fern	<i>Osmundastrum cinnamomeum</i>	16				
5	Common Buckthorn	<i>Rhamnus cathartica</i>	2			A	
6	Sensitive Fern	<i>Onoclea sensibilis</i>		4	30	12	
7	Wild Grape	<i>Vitis riparia</i>		1			
8	Bottlebrush Sedge	<i>Carex hystericina</i>		2			
9	Arrow-leaved Tearthumb	<i>Persicaria sagittata</i>		13			
10	Leafy Spurge	<i>Euphorbia virgata</i>			1		
11	Pennsylvania Smartweed	<i>Persicaria pennsylvanica</i>		1			
12	Mad-dog Skullcap	<i>Scutellaria lateriflora</i>		2			
13	Canada Bluejoint	<i>Calamagrostis canadensis</i>			23		
14	Speckled Alder	<i>Alnus incana</i>			1		
15	Meadow Horsetail	<i>Equisetum pratense</i>			1		
16	Swamp White Oak	<i>Quercus bicolor</i>				1	
17	Poison Ivy	<i>Toxicodendron rydbergii</i>				2	
% Invasive Species			18%	56	59	85	66

Transect 5							
	Common Name	Scientific Name	Q0	Q5	Q10	Q15	
1	Dwarf Clearweed	<i>Pilea pumila</i>			7		
2	Lake Sedge	<i>Carex lacustris</i>	1	2	31	6	
3	Narrowleaf Cattail	<i>Typha angustifolia</i>			6		
4	Bulblet-bearing Water Hemlock	<i>Cicuta bulbifera</i>			2		
5	Swamp Beggarticks	<i>Bidens connata</i>			1	9	
6	Smooth Scouring Rush	<i>Equisetum laevigatum</i>			1		
7	Bottlebrush Sedge	<i>Carex hystericina</i>			3		
8	Reed Canary	<i>Phalaris arundinacea</i>	6		1	5	
9	Canada Mayflower	<i>Maianthemum canadense</i>	1	4			
10	Rice Cutgrass	<i>Leersia oryzoides</i>				12	
11	Groundnut	<i>Apios americana</i>					
12	Common Buckthorn	<i>Rhamnus cathartica</i>	1	16			
13	Willow	<i>Salix sp.</i>				3	
14	Marsh Fern	<i>Thelypteris palustris</i>	1	2			
15	Speckled Alder	<i>Alnus incana</i>	5				
16	Northern Bugleweed	<i>Lycopus uniflorus</i>	3				
% Invasive Species			19%	18	24	52	35

Transect 6							
	Common Name	Scientific Name	Q0	Q5	Q10	Q15	
1	Glossy Buckthorn	<i>Frangula alnus</i>	21	30	30	23	
2	Narrowleaf Cattail	<i>Typha angustifolia</i>	1				
3	Rice Cutgrass	<i>Leersia oryzoides</i>	1				
4	Canada Mayflower	<i>Maianthemum canadense</i>	6	12	34	48	
5	False Solomon's Seal	<i>Maianthemum racemosum</i>	3				
6	Poison Ivy	<i>Toxicodendron rydbergii</i>	3			1	
7	Raspberry	<i>Rubus sp.</i>	3	18			
8	Marsh Vetchling	<i>Lathyrus palustris</i>	2				
9	Lake Sedge	<i>Carex lacustris</i>	1				
10	Boxelder	<i>Acer negundo</i>	1	1			
11	Virginia Creeper	<i>Parthenocissus quinquefolia</i>	1				
12	Meadow Horsetail	<i>Equisetum pratense</i>		2			
13	Wild Grape	<i>Vitis riparia</i>			1		
14	Fescue	<i>Festuca sp.</i>			4	2	
15	Aster	<i>Unknown Asteraceae</i>				1	
16	Purple Loosestrife	<i>Lythrum salicaria</i>				4	
17	Arrowleaf Aster	<i>Symphotrichum urophyllum</i>				1	
% Invasive Species			18%	43	63	69	80

Appendix B: Examples of Plants Lying within a One-square-meter Quadrat



