Eurasian water-milfoil (*Myriophyllum spicatum*) and Curly-leaf pondweed (*Potamogeton crispus*)
Pre/Posttreatment Surveys
Lower Vermillion Lake – WBIC: 2098200
Barron County, Wisconsin

2020 EWM/CLP Treatment Areas

Eurasian water-milfoil (Berg 2007)

Project Initiated by:

Vermillion Lakes Association, Wisconsin Department of Natural Resources and Lake Education and Planning Services, LLC (WDNR Grant ACEI20518)

Dead CLP with viable turions and severely burned EWM resprouting from stem 7/2/11

Surveys Conducted by and Report Prepared by:

Endangered Resource Services, LLC
Matthew S. Berg, Research Biologist
St. Croix Falls, Wisconsin
May 18 and July 2, 2020

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INTRODUCTION:

Lower Vermillion Lake (WBIC 2098200) is a 215 acres stratified drainage lake in northwestern Barron County, Wisconsin in the Town of Cumberland (T35N R13W S22 SW NE). It reaches a maximum depth of 55 feet in the central basin and has an average depth of approximately 25ft (Busch et al 1967). The lake is mesotrophic in nature, and, from 2000-2020, water clarity has been fair to good with summer Secchi readings ranging from 6-12ft and averaging 9.1ft (WDNR 2020). This clarity produced a littoral zone that reached approximately 11.5ft in 2020. Bottom substrates along the north, south, and southeastern shorelines are primarily rock and sand, while most of the east bay and main basin are organic muck or sandy muck.

Figure 1: Aerial Photo of 2020 EWM/CLP Treatment Areas

BACKGROUND AND STUDY RATIONALE:

In 2008, the Wisconsin Department of Natural Resources (WDNR) confirmed the presence of Eurasian water-milfoil (EWM) (*Myriophyllum spicatum*) in Lower Vermillion Lake, and the Vermillion Lakes Association (VLA) has been actively working to control this exotic invasive species ever since. Following the 2019 fall EWM bed mapping survey that found scattered patches of EWM throughout the northwest bays near the boat landing and in the east bay, the VLA, under the direction of D. Blumer - Lake Education and Planning Services, LLC (LEAPS) and in accordance with their WDNR approved Aquatic Plant Management Plan, decided to chemically treat three areas totaling approximately 5.13 acres (2.39% of the lake's total surface area) in 2020 (Figure 1). Several of these areas were simultaneously treated for Curly-leaf pondweed (CLP) (*Potamogeton crispus*) – another exotic invasive species that is locally abundant early in the growing season.

On May 18th, we conducted a pretreatment survey to gather baseline data from the scheduled treatment areas and to allow LEAPS and the VLA to finalize treatment plans. Following the herbicide application on June 2nd, we completed a July 2nd posttreatment survey to evaluate the effectiveness of the treatment. This report is the summary analysis of these two field surveys.

METHODS:
Pre/Post Herbicide Surveys:
LEAPS provided treatment area shapefiles, and we generated pre/post survey points based on the size and shape of the proposed treatment areas. The 80 point sampling grid at 16.5m resolution approximated to nearly16 pts/acre. Although this was well above the 4-10 pts/acre required by WDNR protocol for pre/post treatment surveys, the high number of points was requested due to the narrowness of the treatment areas and the difficulty in getting enough points in the target depths (Appendix I).

During the surveys, we located each point using a handheld mapping GPS unit (Garmin 76CSx) and used a rake to sample an approximately 2.5ft section of the bottom. All plants on the rake were assigned a rake fullness value of 1-3 as an estimation of abundance, and a total rake fullness for all species was also recorded (Figure 2). Visual sightings of EWM and CLP were noted if they occurred within 6ft of the point; however, visuals of other species were not recorded as they do not figure into the pre/posttreatment calculation. In addition to plant data, we recorded the lake depth using a metered pole and the substrate (bottom) type when we could see it or reliably determine it with the rake.

We entered all data collected into the standard APM spreadsheet (Appendix II) (UWEX 2010). Data was analyzed using the linked statistical summary sheet and the WDNR pre/post analysis worksheet (UWEX 2010). For pre/post differences of individual plant species as well as count data, we used the Chi-square analysis on the WDNR pre/post survey worksheet. For comparing averages (mean species/point and mean rake fullness/point), we used t-tests. Differences were determined to be significant at $p<0.05$, moderately significant at $p<0.01$ and highly significant at $p<0.001$.

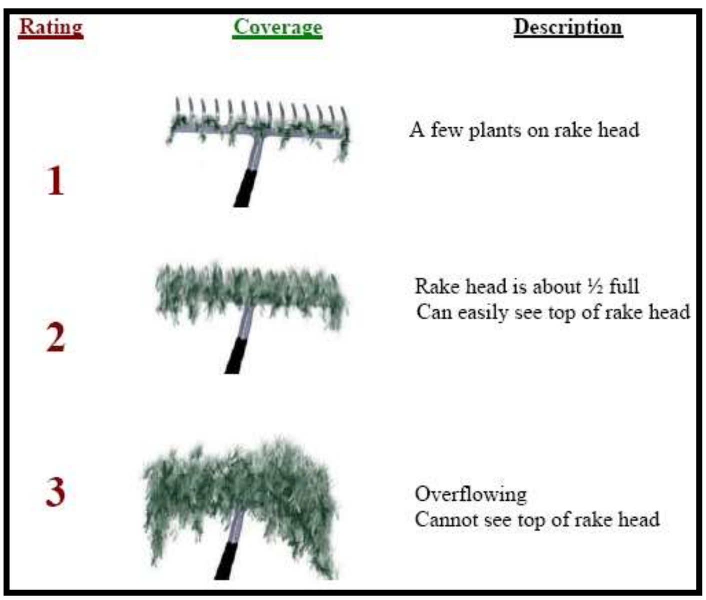


Figure 2: Rake Fullness Ratings

RESULTS AND DISCUSSION:

Finalization of Treatment Areas:

Initial expectations were to treat three areas totaling approximately 5.13 acres (Table 1). Although Eurasian water-milfoil was a visual at a single point during the pretreatment survey, scattered plants were observed inter-point throughout the proposed treatment areas. Similarly, Curly-leaf pondweed was scattered throughout the proposed treatment areas. Because of this, it was decided to continue with the treatment as planned (Figure 3) (Appendix I). The chemical application was conducted by Northern Aquatic Services (Dresser, WI) on June 2nd. The reported water temperature at the time of treatment was 69°F, while the air temp was 75°F. Winds were out of the west at 3-5mph.

Table 1: EWM/CLP Treatment Summary
Lower Vermillion Lake – June 2, 2020

Area	Total Area Acreage	Chemical (Brand), Rate, Total lbs/gal and Coverage
East Bay	1.08	2,4-D (Amine 4) – 4ppm – 24.5 gallons – 1.08 acres
North Shoreline	0.49	Endothall (Aquathol K) – 2ppm – 3.3 gallons – 0.49 acre
Northwest Bay	3.56	2,4-D (Amine 4) – 4ppm – 50.6 gallons – 3.56 acres Endothall (Aquathol K) – 2ppm – 11.7 gallons – 0.65acre/1.12 acres
Total Acres	**5.13**	

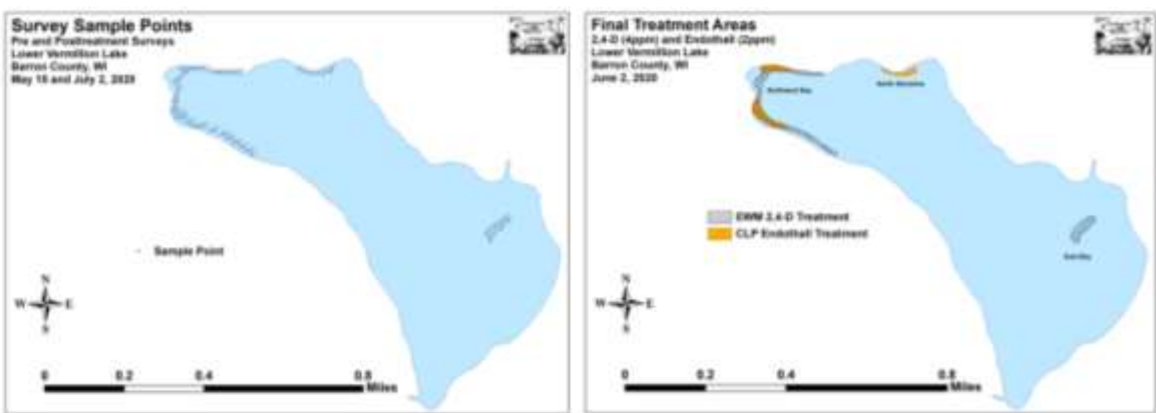


Figure 3: 2020 Survey Sample Points and Final Treatment Areas

Pre/Post Herbicide Surveys:

All points occurred in areas between 1.0ft and 11.0ft of water. The mean depth for all plants was 5.8ft pretreatment before declining to 5.3 posttreatment. The median depth also decline from 5.5ft to 5.0ft (Table 2). Most Eurasian water-milfoil was established over sand and gravel, while Curly-leaf pondweed reached its highest densities over areas with at least some organic muck (Figure 4) (Appendix III).

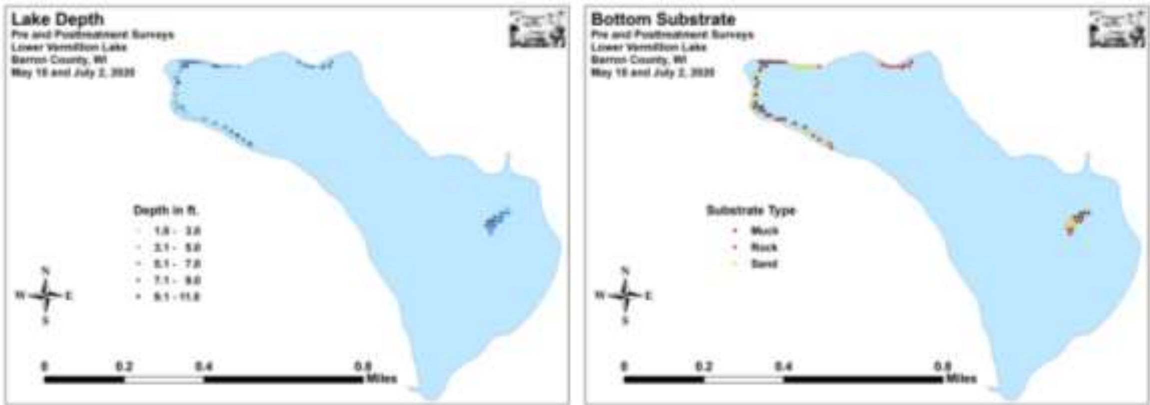


Figure 4: Treatment Area Depths and Bottom Substrate

The littoral zone extended to 11.0ft during both the pretreatment and posttreatment surveys. Within this zone, plants covered 71.3% of point pretreatment before expanding to 95.0% posttreatment (Figure 5) (Appendix IV).

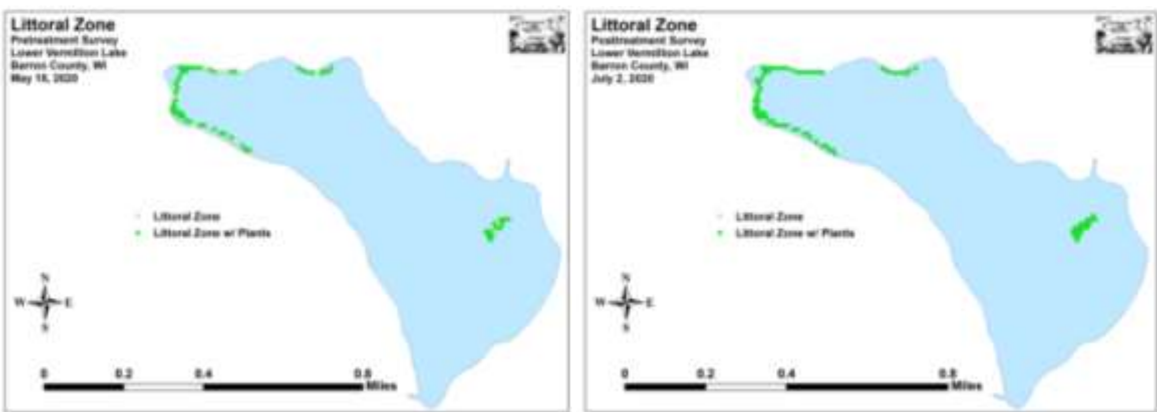


Figure 5: Pre/Posttreatment Littoral Zone

Initial diversity within the beds was moderate with a Simpson Index value of 0.61 pretreatment. This increased to a high 0.84 posttreatment. The Floristic Quality Index, another measure of only native species, also increased sharply from 13.1 pretreatment to 20.2 posttreatment. Total richness nearly doubled from eight species pretreatment to 15 species posttreatment. Similarly, the mean native species richness at sites with native vegetation experienced a highly-significant increase **(p<0.001)** from 1.26 species/site pretreatment to 1.75 species/site posttreatment (Figure 6). Total rake fullness saw a significant increase **(p=0.03)** from a low 1.49 pretreatment to a low/moderate 1.66 posttreatment (Figure 7) (Appendix IV).

Table 2: Pre/Posttreatment Surveys Summary Statistics
Lower Vermillion Lake, Barron County
May 18 and July 2, 2020

Summary Statistics:	Pre	Post
Total number of points sampled	80	80
Total number of sites with vegetation	57	76
Total number of sites shallower than the maximum depth of plants	80	80
Freq. of occur. at sites shallower than max. depth of plants (in percent)	71.3	95.0
Simpson Diversity Index	0.61	0.84
Mean Coefficient of Conservatism	5.3	5.6
Floristic Quality Index	13.1	20.2
Maximum depth of plants (ft)	11.0	11.0
Mean depth of plants (ft)	5.8	5.3
Median depth of plants (ft)	5.5	5.0
Average number of all species per site (shallower than max depth)	0.98	1.78
Average number of all species per site (veg. sites only)	1.37	1.87
Average number of native species per site (shallower than max depth)	0.90	1.60
Average number of native species per site (sites with native veg. only)	1.26	1.75
Species Richness (including visuals)	8	15
Mean Rake Fullness (veg. sites only)	1.49	1.66

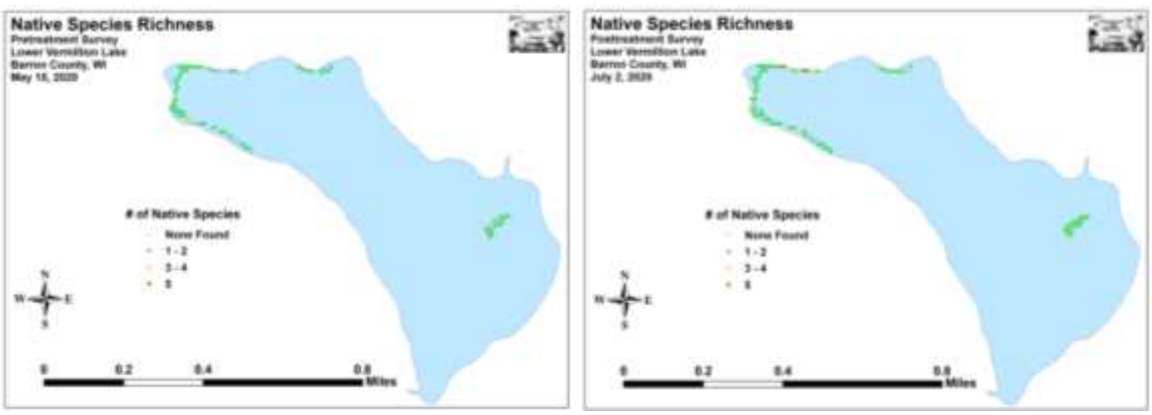


Figure 6: Pre/Posttreatment Native Species Richness

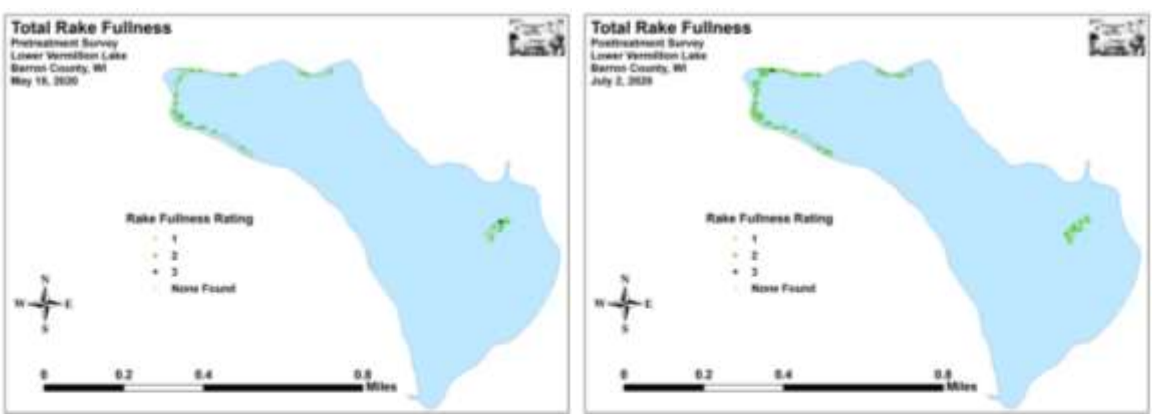


Figure 7: Pre/Posttreatment Total Rake Fullness

We recorded Eurasian water-milfoil as a visual at a single point during the pretreatment survey. Despite this, we did note plants inter-point in the treatment areas. During the posttreatment survey, we located a single severely chemically burned EWM at a point along the south shoreline of the northwest bay (Figure 8) (Appendix V). We also saw a couple of plants inter-point near the southeast border of the treatment area. Each of these was rake removed. Due to the low number of EWM plants found during both surveys, none of our findings demonstrated a statistically significant change (Figure 9).

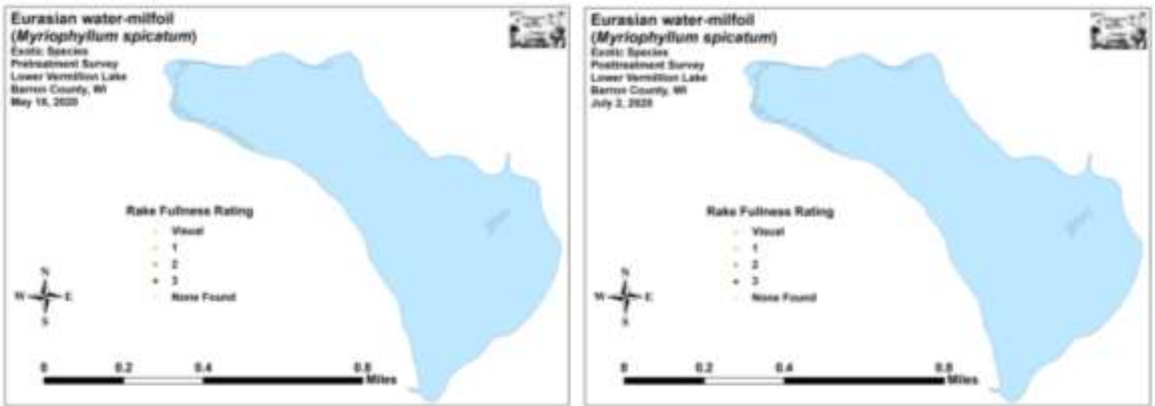
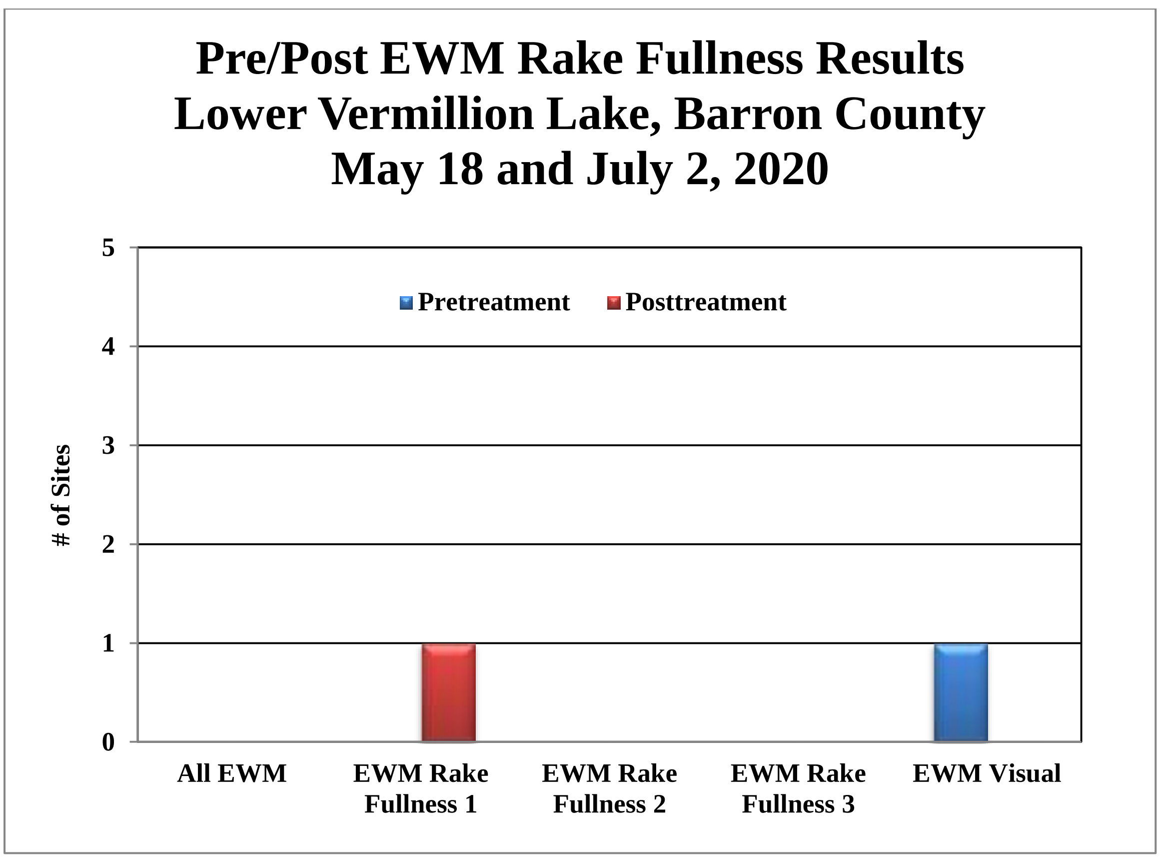


Figure 8: Pre/Posttreatment EWM Density and Distribution



Significant differences = * p<0.05, ** p<0.01, *** p<0.001

Figure 9: Pre/Posttreatment Changes in EWM Rake Fullness

Curly-leaf pondweed was present at six of 80 sites during the pretreatment survey (7.5% coverage) with one additional visual sighting (Figure 10). Of these, none had a rake fullness rating of 3, three rated a 2, and the remaining three were a 1. This produced a mean rake fullness of 1.50 and suggested that 3.8% of the treatment areas had a significant infestation (rake fullness 2 or 3). During the posttreatment survey, we noted that many CLP plant appeared chemically burned, but survived to form viable turions. In these cases, we counted the plants as being alive. In total, we found CLP at 13 points (16.3% coverage) with nine additional visual sightings. None of these samples rated a 3, five were a 2, and eight were a 1 for a mean rake fullness of 1.38 (Appendix V). **Our results demonstrated a moderately significant increase in visual sightings. None of the other increases were significant, although the total increase was nearly significant** (*p*=0.09) (Figure 11).

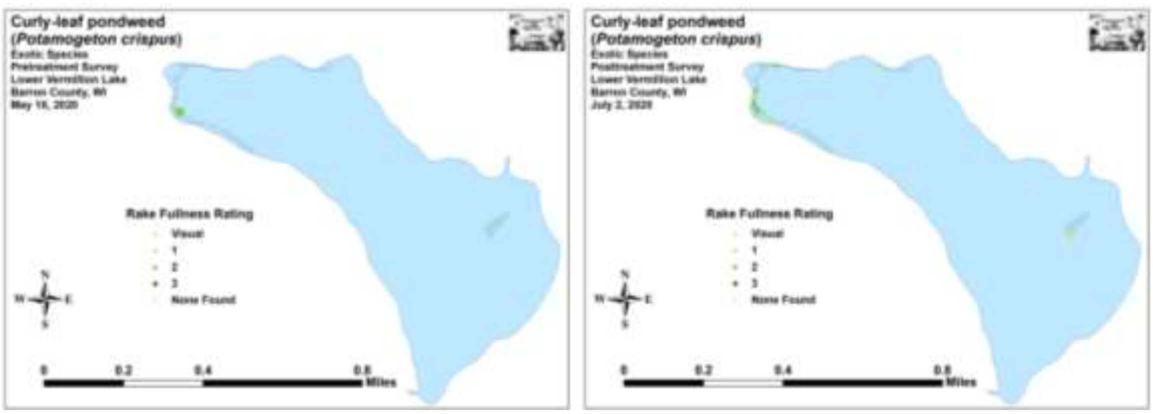
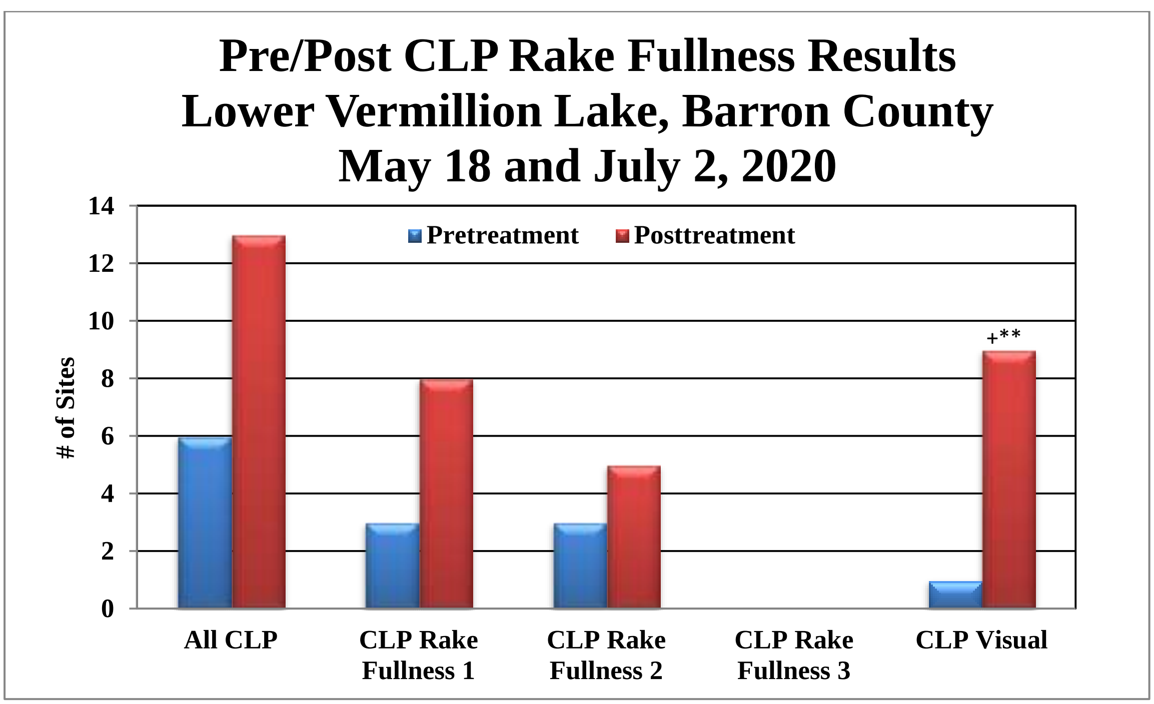


Figure 10: Pre/Posttreatment CLP Density and Distribution



Significant differences = * *p*<0.05, ** *p*<0.01, *** *p*<0.001

Figure 11: Pre/Posttreatment Changes in CLP Rake Fullness

Coontail (*Ceratophyllum demersum*) was the most common native species in both the pre and posttreatment surveys (Tables 3 and 4). Present at 47 sites pretreatment, it experience a non-significant decline (p=0.52) in distribution to 43 sites posttreatment. Its density saw a nearly significant increase (p=0.06) from a mean rake fullness of 1.45 pre to 1.63 post (Figure 12).

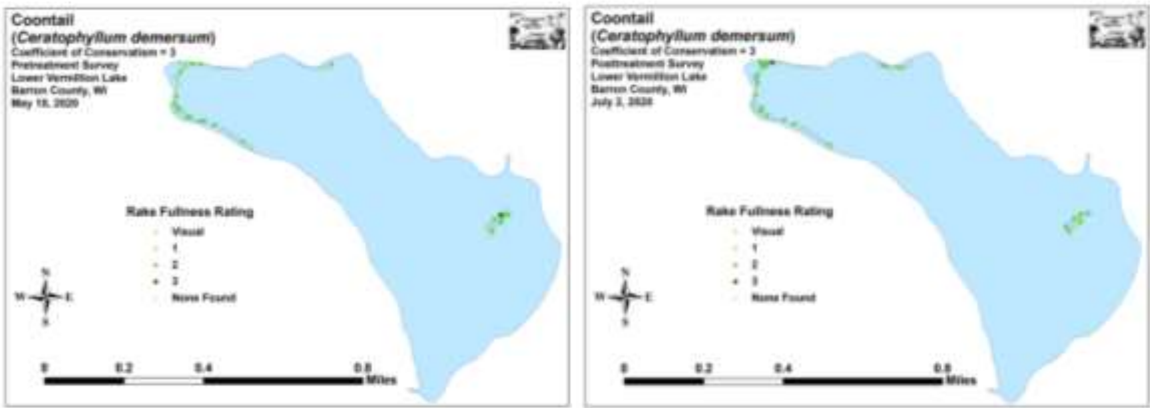


Figure 12: Pre/Post Coontail Density and Distribution

Common waterweed (*Elodea canadensis*) was the second most common pretreatment species (Figure 13). Present at seven points with a mean rake fullness of 1.14, it experienced non-significant increases (p=0.60/p=0.20) in distribution and density to nine sites with a mean rake of 1.33 posttreatment.

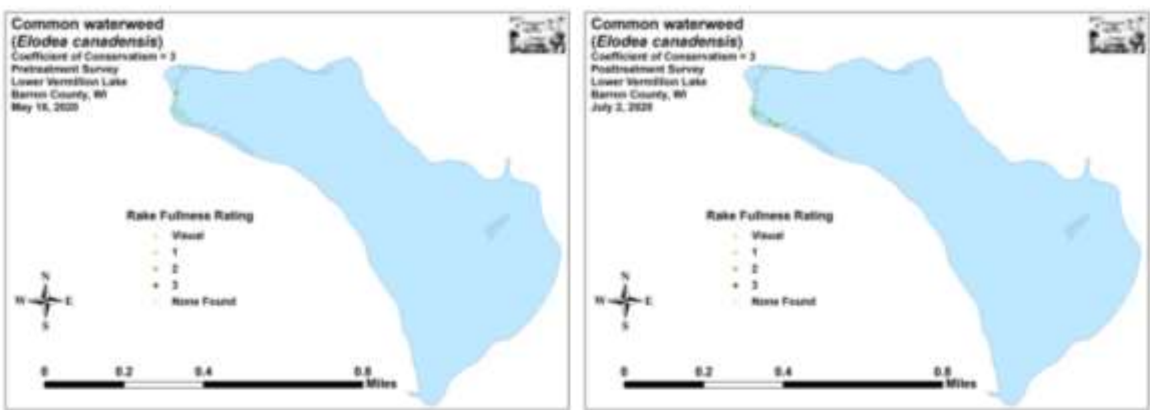


Figure 13: Pre/Post Common Waterweed Density and Distribution

Northern water-milfoil (*Myriophyllum sibiricum*) – which is also sensitive to 2,4-D – was the only native species that suffered a significant decline **(p=0.01)** in distribution posttreatment. Conversely, several late-growing species experienced significant expansions in distribution – Wild celery (*Vallisneria americana*) and Slender naiad (*Najas flexilis*) demonstrated highly significant increases **(p<0.001)**; filamentous algae showed a moderately significant increase **(p=0.004)**; and Water star-grass (*Heteranthera dubia*), Muskgrass (*Chara* sp.), and Sago pondweed (*Stuckenia pectinata*) had significant increases **(p=0.03/p=0.02/p=0.02)** (Figure 14) (Maps for all native species from the pre and posttreatment surveys can be found in Appendixes VI and VII).

Table 3: Frequencies and Mean Rake Sample of Aquatic Macrophytes
Pretreatment Survey Lower Vermillion Lake, Barron County
May 18, 2020

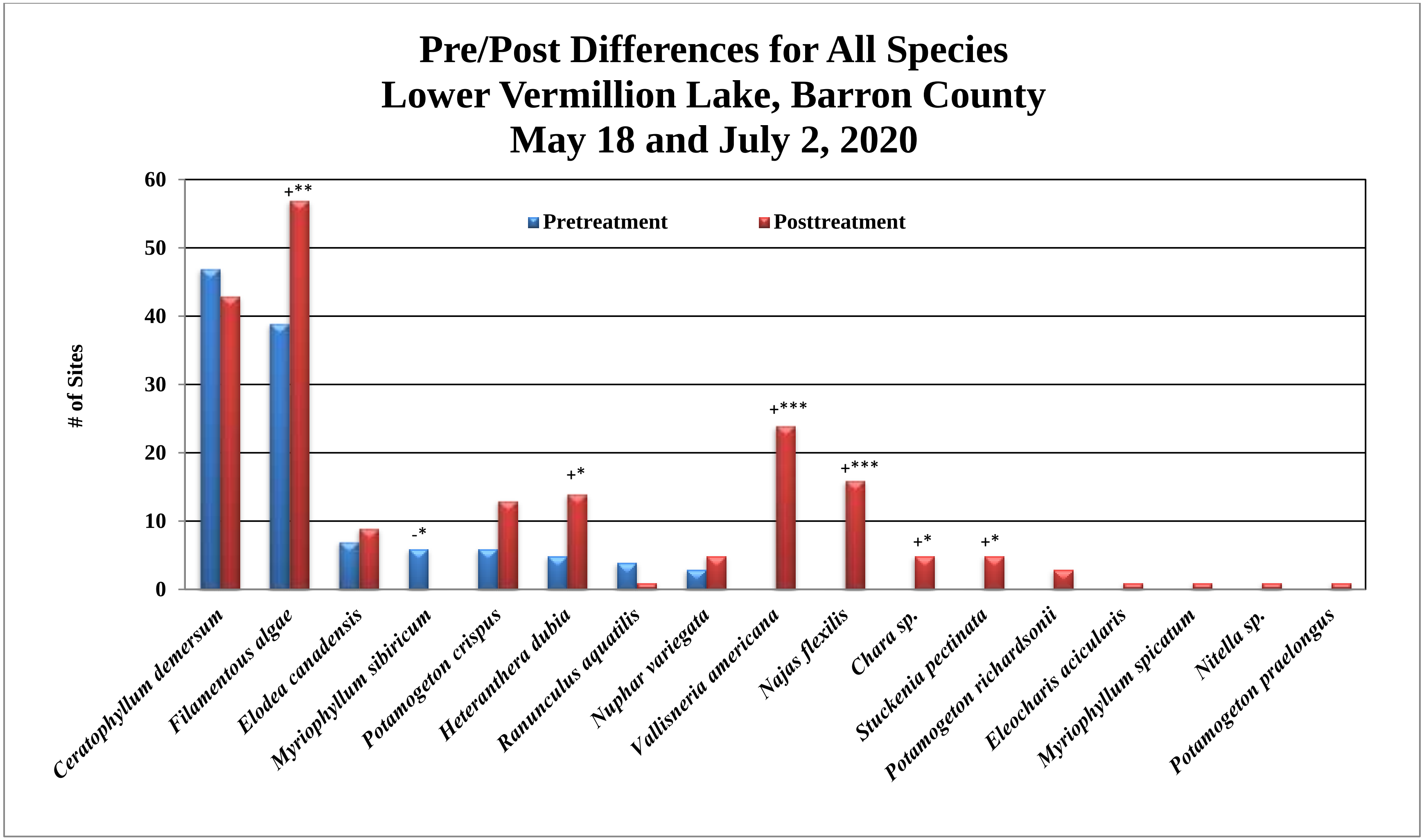
Species	Common Name	Total Sites	Relative Freq.	Freq. in Veg.	Freq. in Lit.	Mean Rake	Visual Sites
Ceratophyllum demersum	Coontail	47	60.26	82.46	58.75	1.45	0
	Filamentous algae	39	*	68.42	48.75	1.33	0
Elodea canadensis	Common waterweed	7	8.97	12.28	8.75	1.14	0
Myriophyllum sibiricum	Northern water-milfoil	6	7.69	10.53	7.50	1.00	0
Potamogeton crispus	**Curly-leaf pondweed**	**6**	**7.69**	**10.53**	**7.50**	**1.50**	**1**
Heteranthera dubia	Water star-grass	5	6.41	8.77	6.25	1.40	0
Ranunculus aquatilis	White water crowfoot	4	5.13	7.02	5.00	1.50	0
Nuphar variegata	Spatterdock	3	3.85	5.26	3.75	1.00	0
Myriophyllum spicatum	**Eurasian water-milfoil**	**	**	**	**	**	**1**

* Excluded from Relative Frequency Analysis ** Visual Only

Table 4: Frequencies and Mean Rake Sample of Aquatic Macrophytes
Posttreatment Survey Lower Vermillion Lake, Barron County
July 2, 2020

Species	Common Name	Total Sites	Relative Freq.	Freq. in Veg.	Freq. in Lit.	Mean Rake	Visual Sites
	Filamentous algae	57	*	75.00	71.25	1.40	0
Ceratophyllum demersum	Coontail	43	30.28	56.58	53.75	1.63	0
Vallisneria americana	Wild celery	24	16.90	31.58	30.00	1.25	0
Najas flexilis	Slender naiad	16	11.27	21.05	20.00	1.31	0
Heteranthera dubia	Water star-grass	14	9.86	18.42	17.50	1.29	0
Potamogeton crispus	**Curly-leaf pondweed**	**13**	**9.15**	**17.11**	**16.25**	**1.38**	**9**
Elodea canadensis	Common waterweed	9	6.34	11.84	11.25	1.33	0
Chara sp.	Muskgrass	5	3.52	6.58	6.25	1.40	0
Nuphar variegata	Spatterdock	5	3.52	6.58	6.25	1.40	0
Stuckenia pectinata	Sago pondweed	5	3.52	6.58	6.25	1.40	0
Potamogeton richardsonii	Clasping-leaf pondweed	3	2.11	3.95	3.75	1.00	0
Eleocharis acicularis	Needle spikerush	1	0.70	1.32	1.25	1.00	0
Myriophyllum spicatum	**Eurasian water-milfoil**	**1**	**0.70**	**1.32**	**1.25**	**1.00**	**0**
Nitella sp.	Nitella	1	0.70	1.32	1.25	1.00	0
Potamogeton praelongus	White-stem pondweed	1	0.70	1.32	1.25	1.00	0
Ranunculus aquatilis	White water crowfoot	1	0.70	1.32	1.25	1.00	0

* Excluded from Relative Frequency Analysis



Significant differences = * *p*<0.05, ** *p*<0.01, * *p*<0.001**

Figure 14: Pre/Posttreatment Macrophyte Changes

LITERATURE CITED

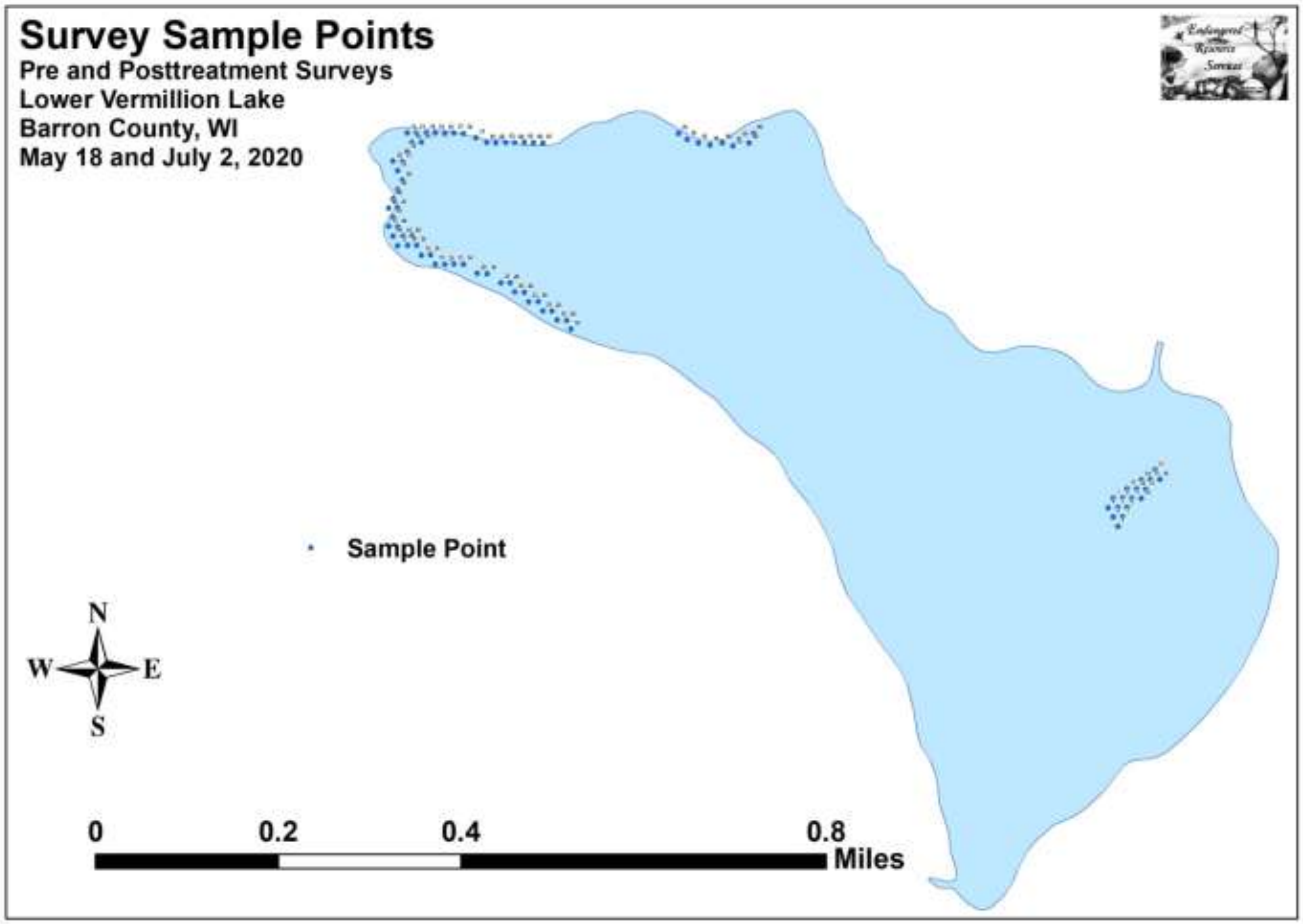
Busch, C, G. Winter, L. Sather, and R. Ripp [online]. 1967. Lower Vermillion Lake Map. Available from http://dnr.wi.gov/lakes/maps/DNR/2098200a.pdf (2020, July).

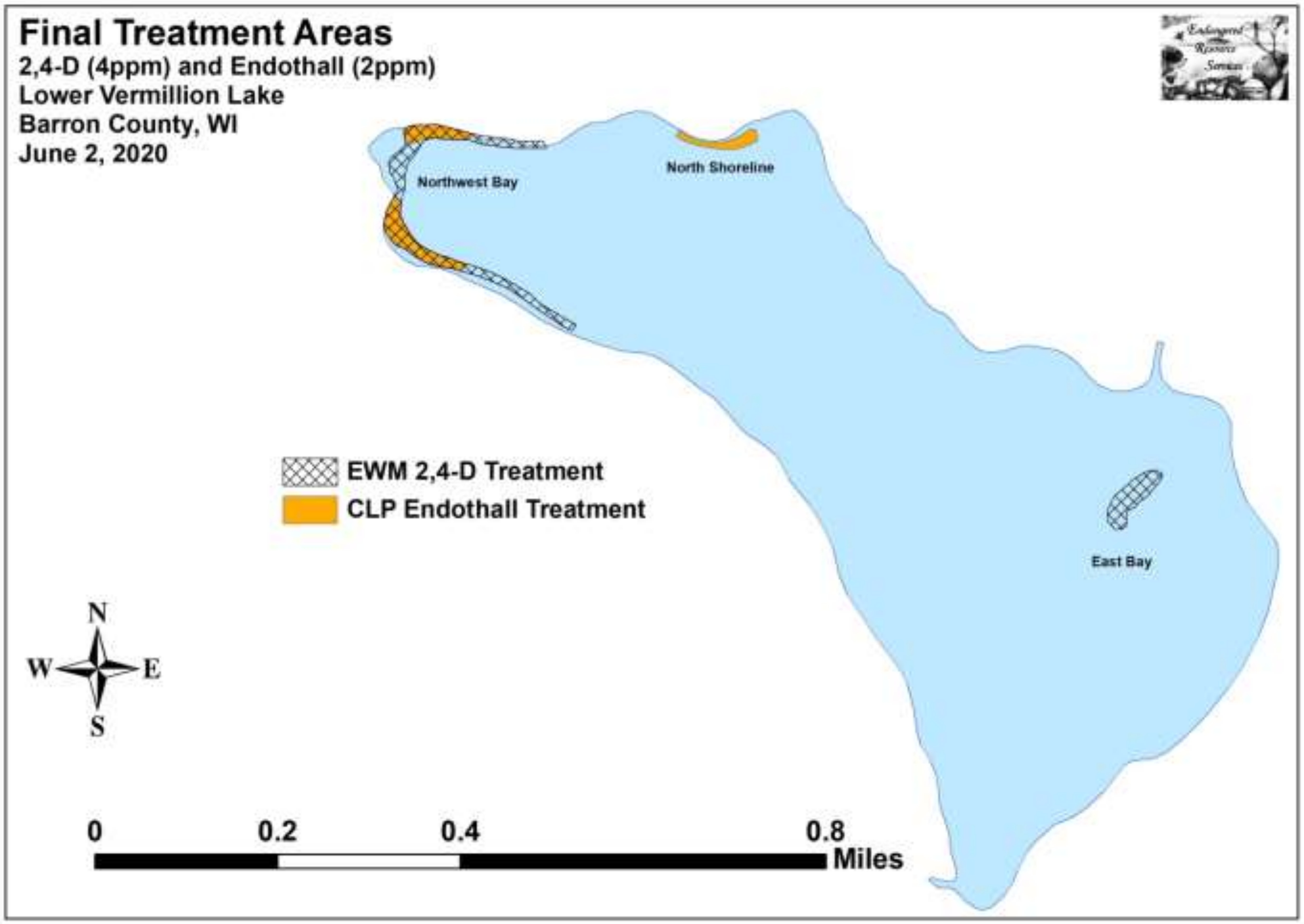
UWEX Lakes Program. [online]. 2010. Aquatic Plant Management in Wisconsin. Available from http://www.uwsp.edu/cnr-ap/UWEXLakes/Pages/ecology/aquaticplants/default.aspx (2020, July).

UWEX Lakes Program. [online]. 2010. Pre/Post Herbicide Comparison. Available from http://www.uwsp.edu/cnr-ap/UWEXLakes/Documents/ecology/Aquatic%20Plants/Appendix-D.pdf (2020, July).

WDNR. [online]. 2020. Lower Vermillion Citizen Lake Monitoring Water Quality Database. Available from http://dnr.wi.gov/lakes/waterquality/Station.aspx?id=033185 (2020, July).

Appendix I: Survey Sample Points and EWM/CLP Treatment Areas


Survey Sample Points
Pre and Posttreatment Surveys
Lower Vermillion Lake
Barron County, WI
May 18 and July 2, 2020
Sample Point
N
W
E
S
0
0.2
0.4
0.8
Miles


Final Treatment Areas
2,4-D (4ppm) and Endothall (2ppm)
Lower Vermillion Lake
Barron County, WI
June 2, 2020
Northwest Bay
North Shoreline
East Bay
EWM 2,4-D Treatment
CLP Endothall Treatment
N
W
E
S
0
0.2
0.4
0.8
Miles

Appendix II: Vegetative Survey Datasheet

Observers for this lake: names and hours worked by each:																									
Lake:									**WBIC**									**County**						**Date:**	
Site #	**Depth (ft)**	**Muck (M), Sand (S), Rock (R)**	**Rake pole (P) or rake rope (R)**	**Total Rake Fullness**	**EWM**	**CLP**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**
1																									
2																									
3																									
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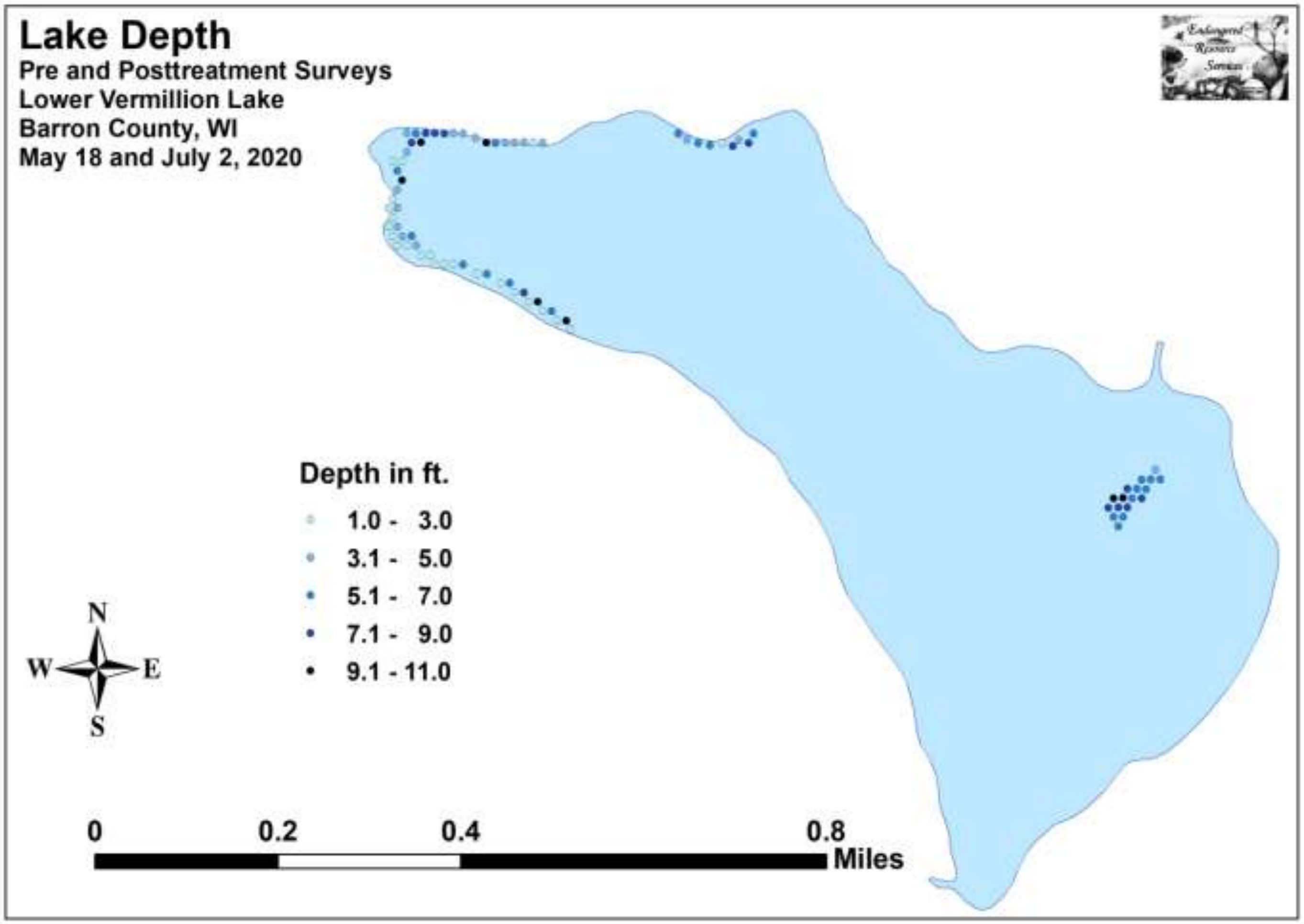
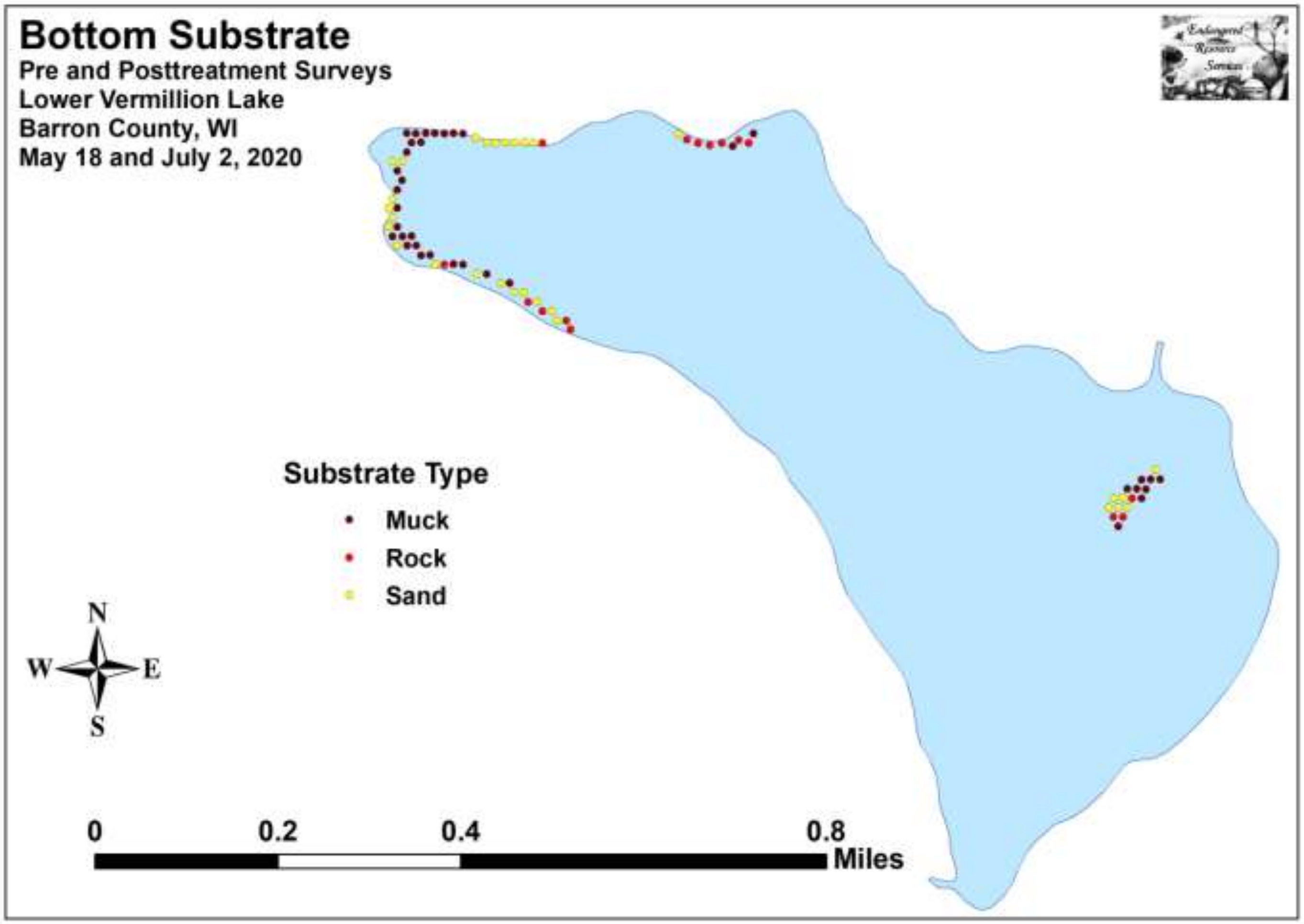
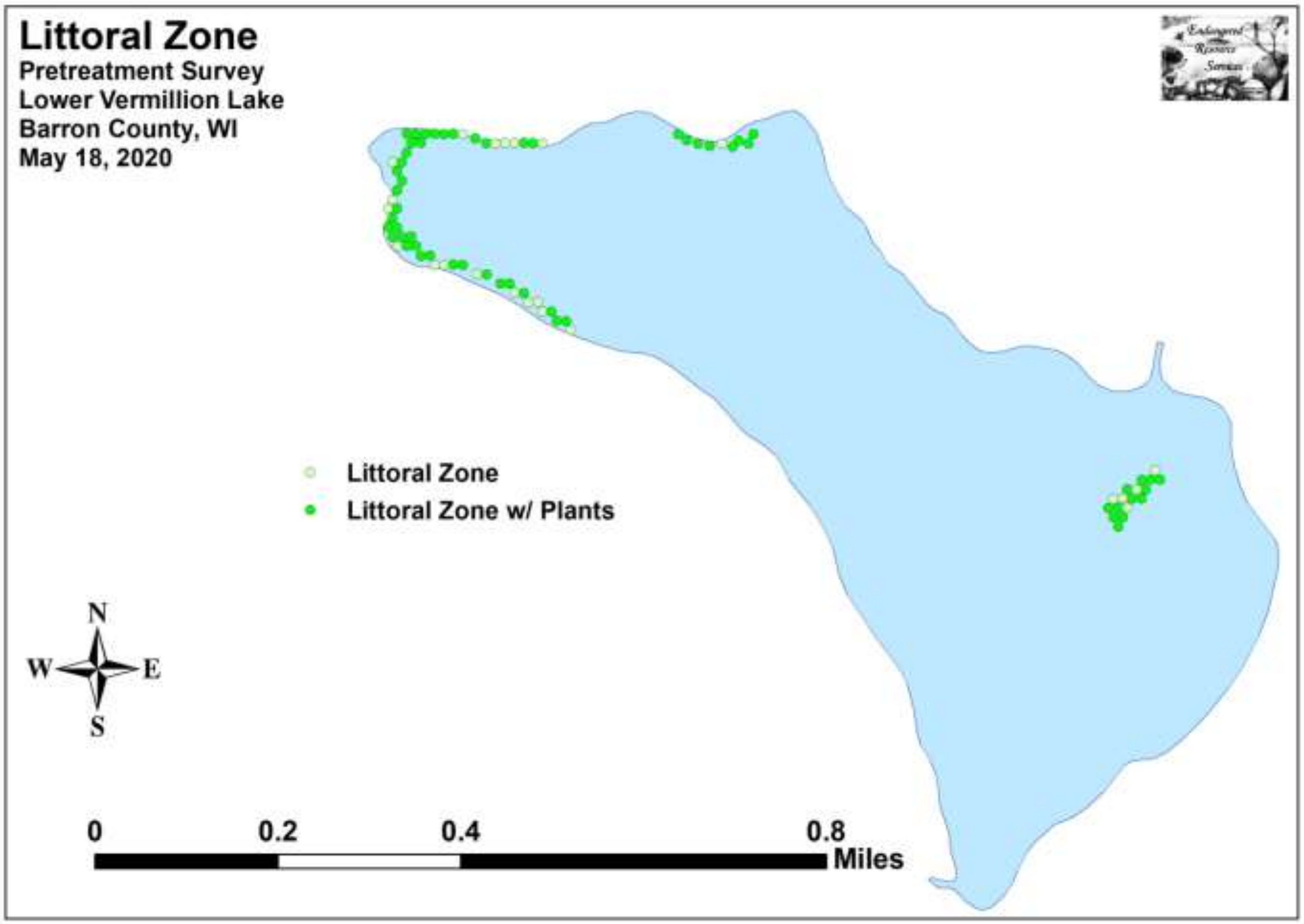
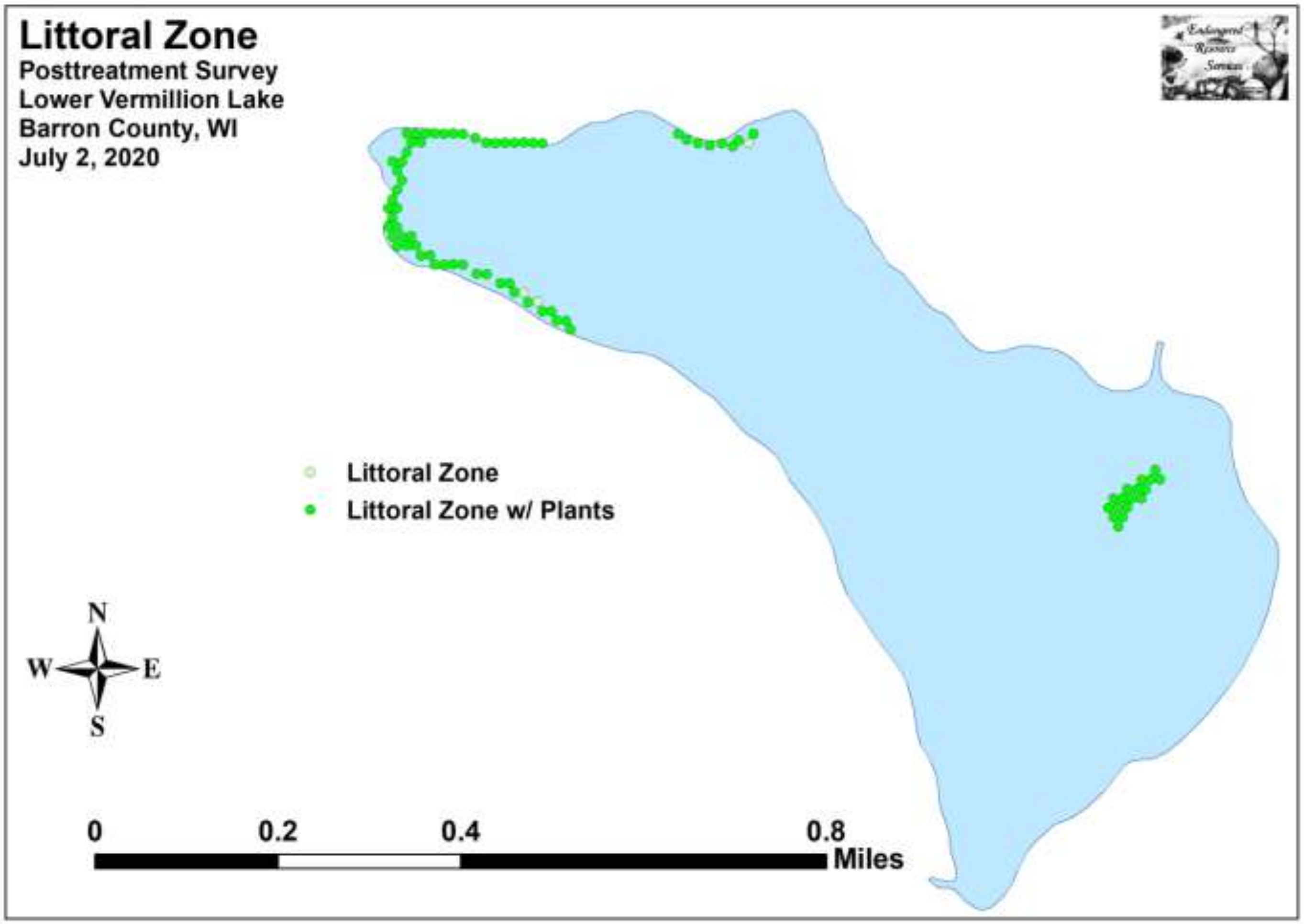
Appendix III: Pre/Post Habitat Variables

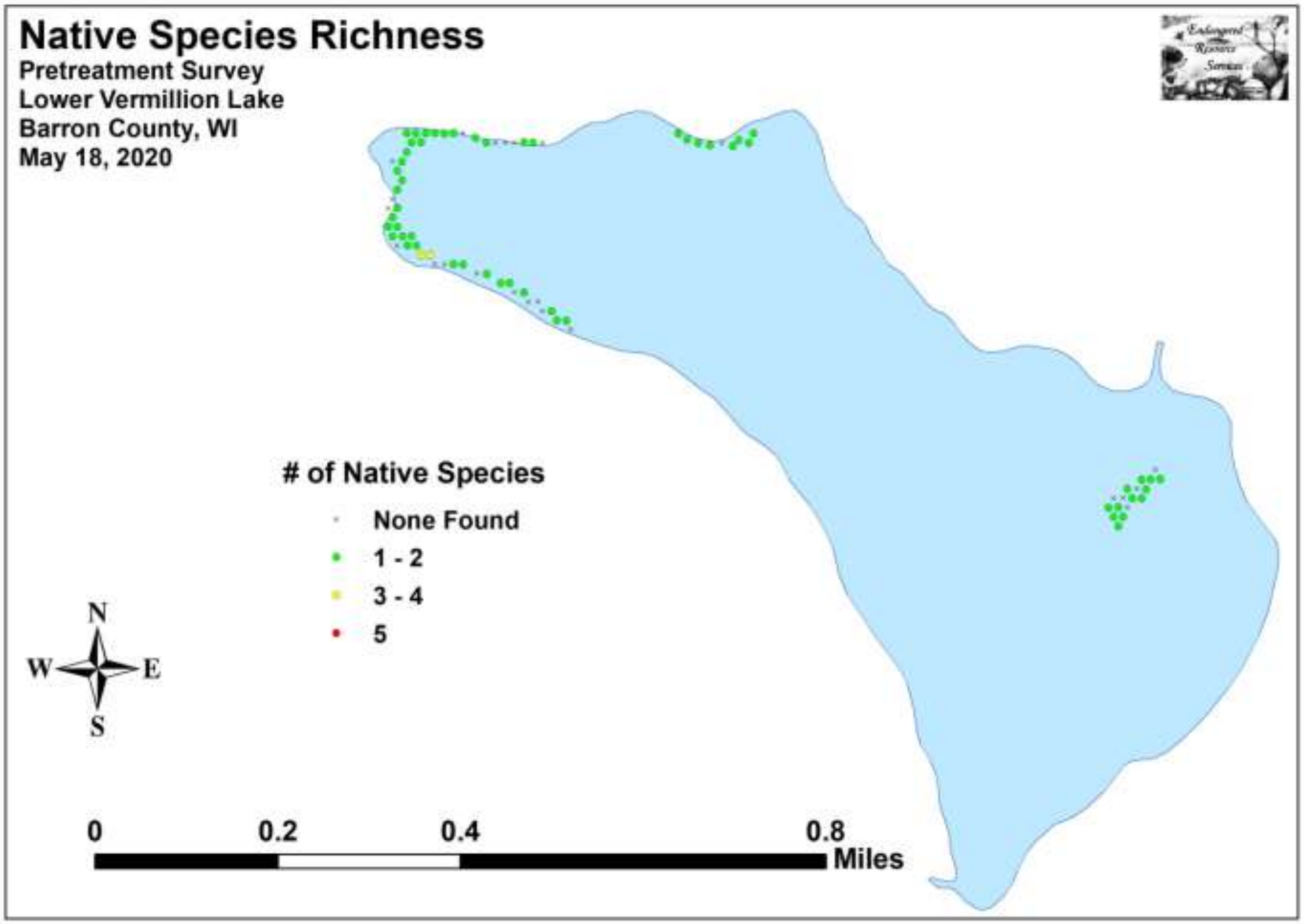

Lake Depth
Pre and Posttreatment Surveys
Lower Vermillion Lake
Barron County, WI
May 18 and July 2, 2020
Depth in ft.
1.0 - 3.0
3.1 - 5.0
5.1 - 7.0
7.1 - 9.0
9.1 - 11.0
N
W
E
S
0
0.2
0.4
0.8
Miles

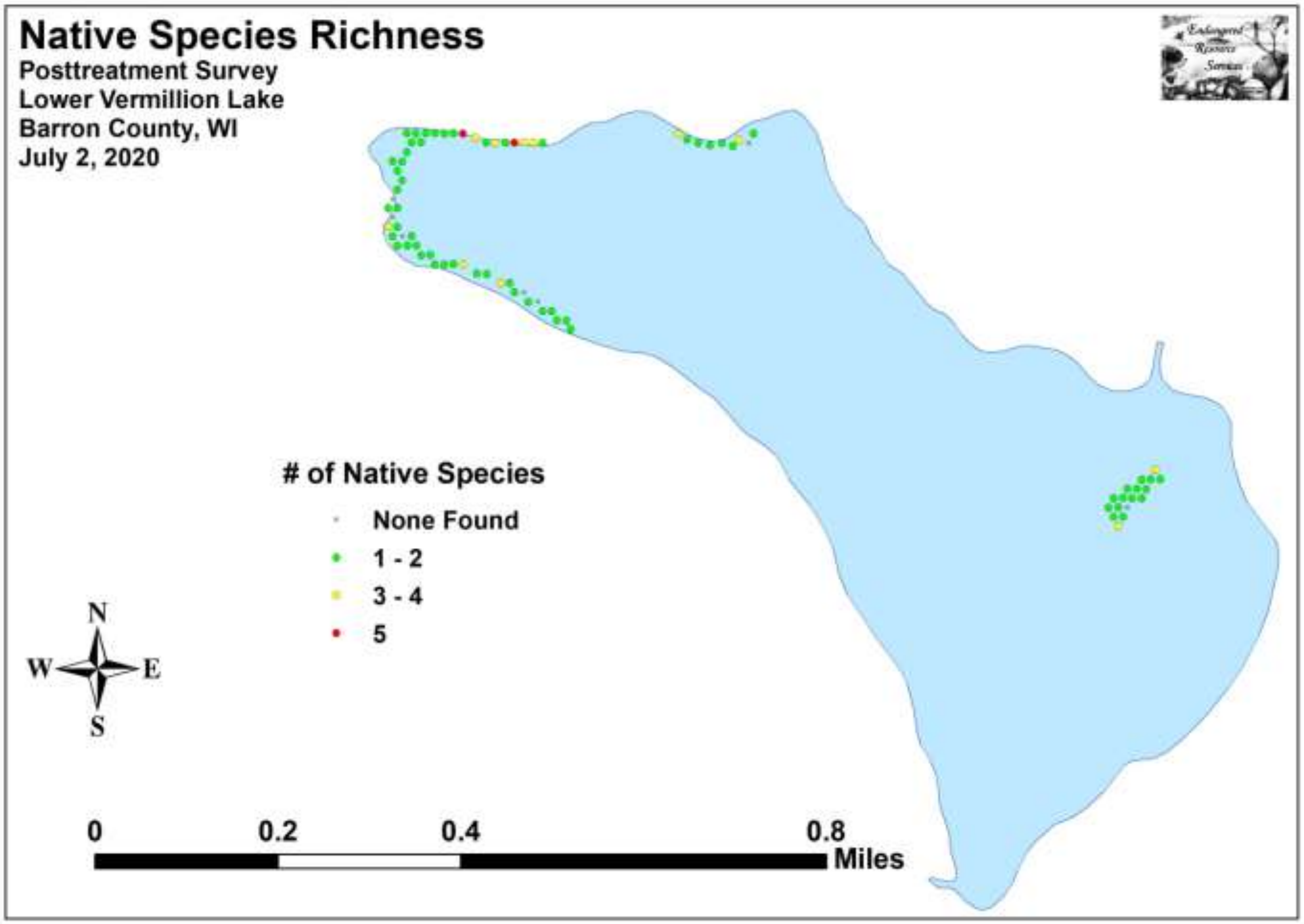

Bottom Substrate
Pre and Posttreatment Surveys
Lower Vermillion Lake
Barron County, WI
May 18 and July 2, 2020
Substrate Type
Muck
Rock
Sand
N
W
E
S
0
0.2
0.4
0.8
Miles

Appendix IV: Pre/Post Littoral Zone, Native Species Richness and Total Rake Fullness


Littoral Zone
Pretreatment Survey
Lower Vermillion Lake
Barron County, WI
May 18, 2020
Littoral Zone
Littoral Zone w/ Plants
N
W
E
S
0
0.2
0.4
0.8
Miles


Littoral Zone
Posttreatment Survey
Lower Vermillion Lake
Barron County, WI
July 2, 2020
Littoral Zone
Littoral Zone w/ Plants
N
W
E
S
0
0.2
0.4
0.8
Miles


Native Species Richness
Pretreatment Survey
Lower Vermillion Lake
Barron County, WI
May 18, 2020
# of Native Species
None Found
1 - 2
3 - 4
5
N
W
E
S
0
0.2
0.4
0.8
Miles



Native Species Richness
Posttreatment Survey
Lower Vermillion Lake
Barron County, WI
July 2, 2020
# of Native Species
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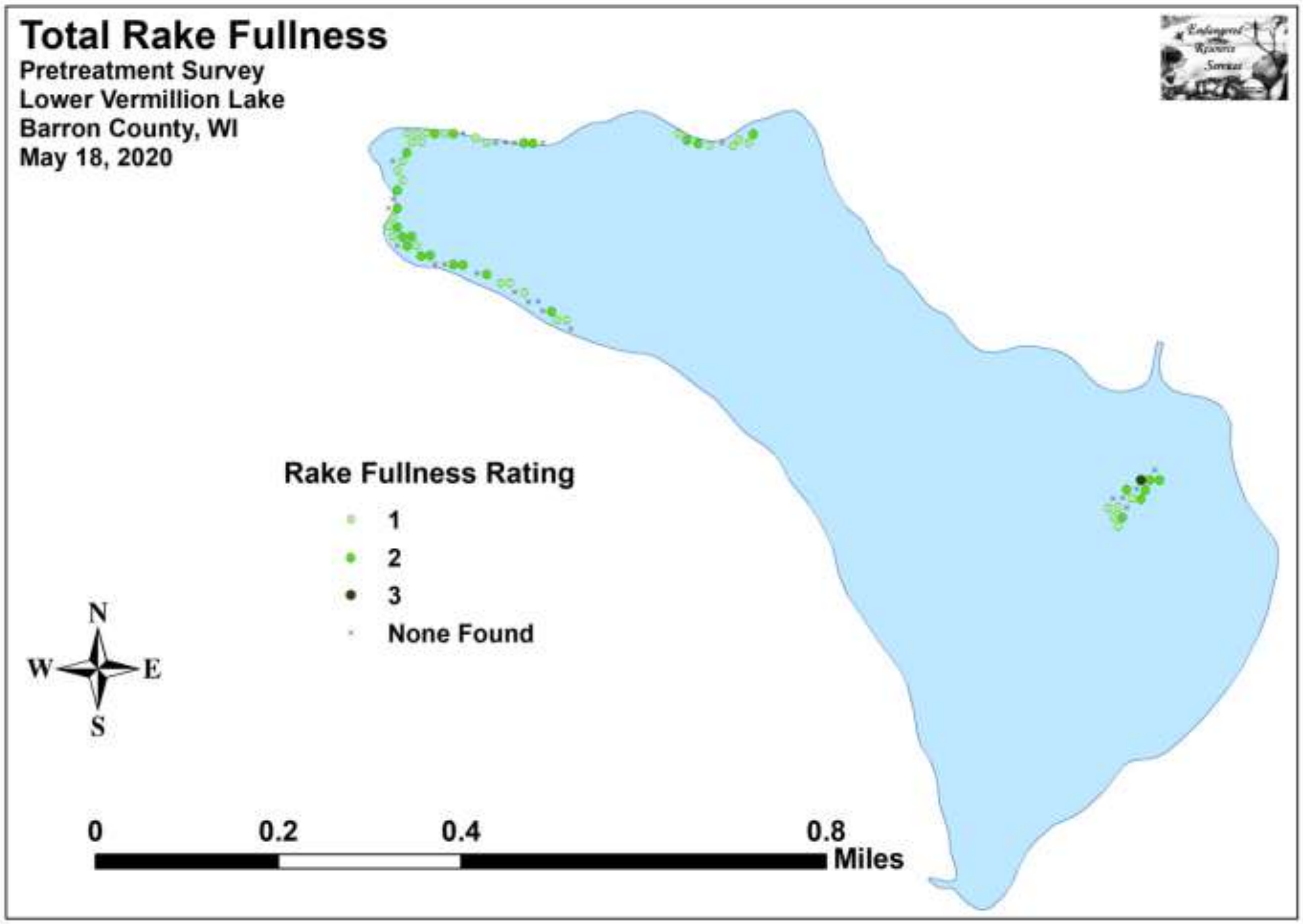
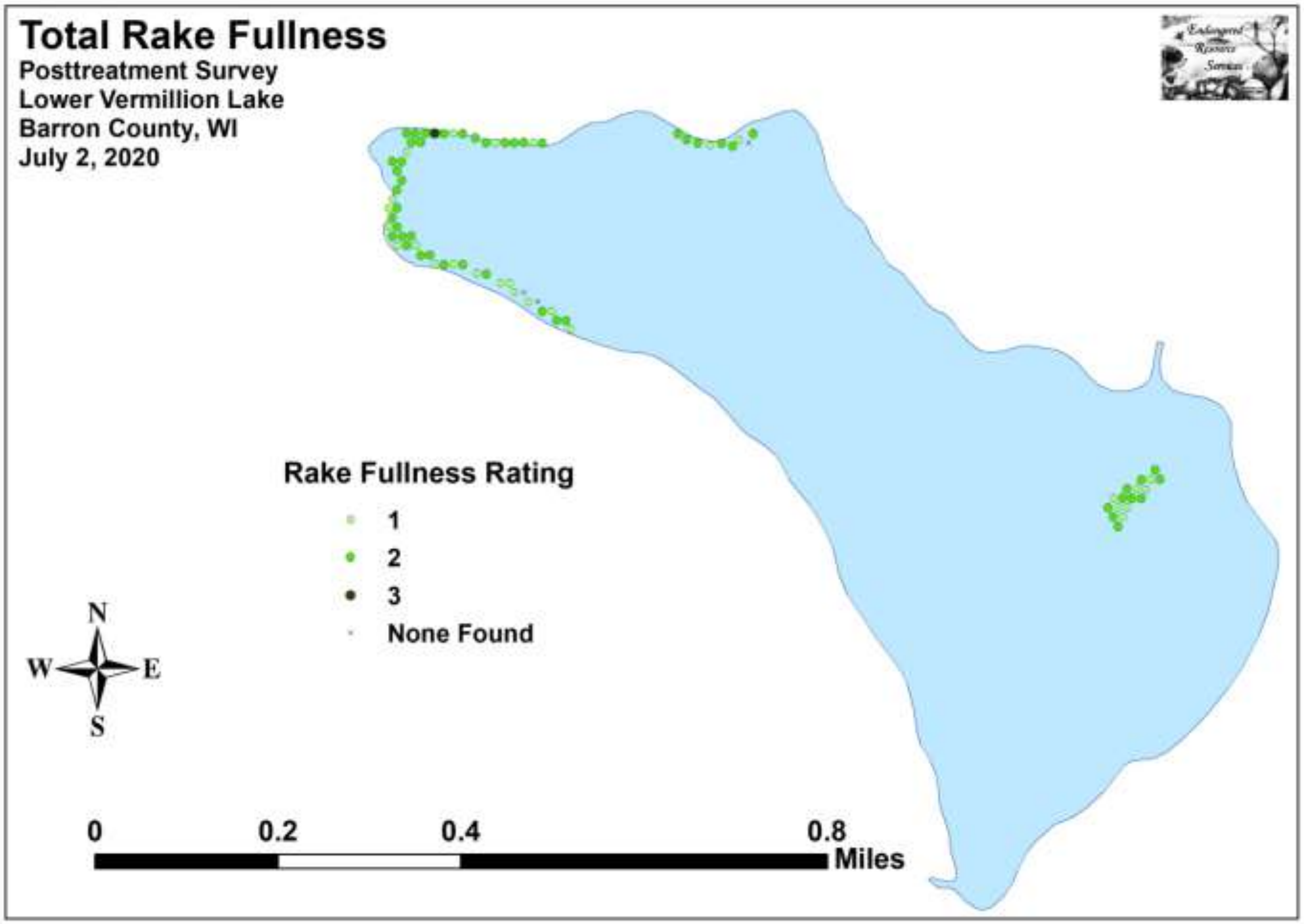
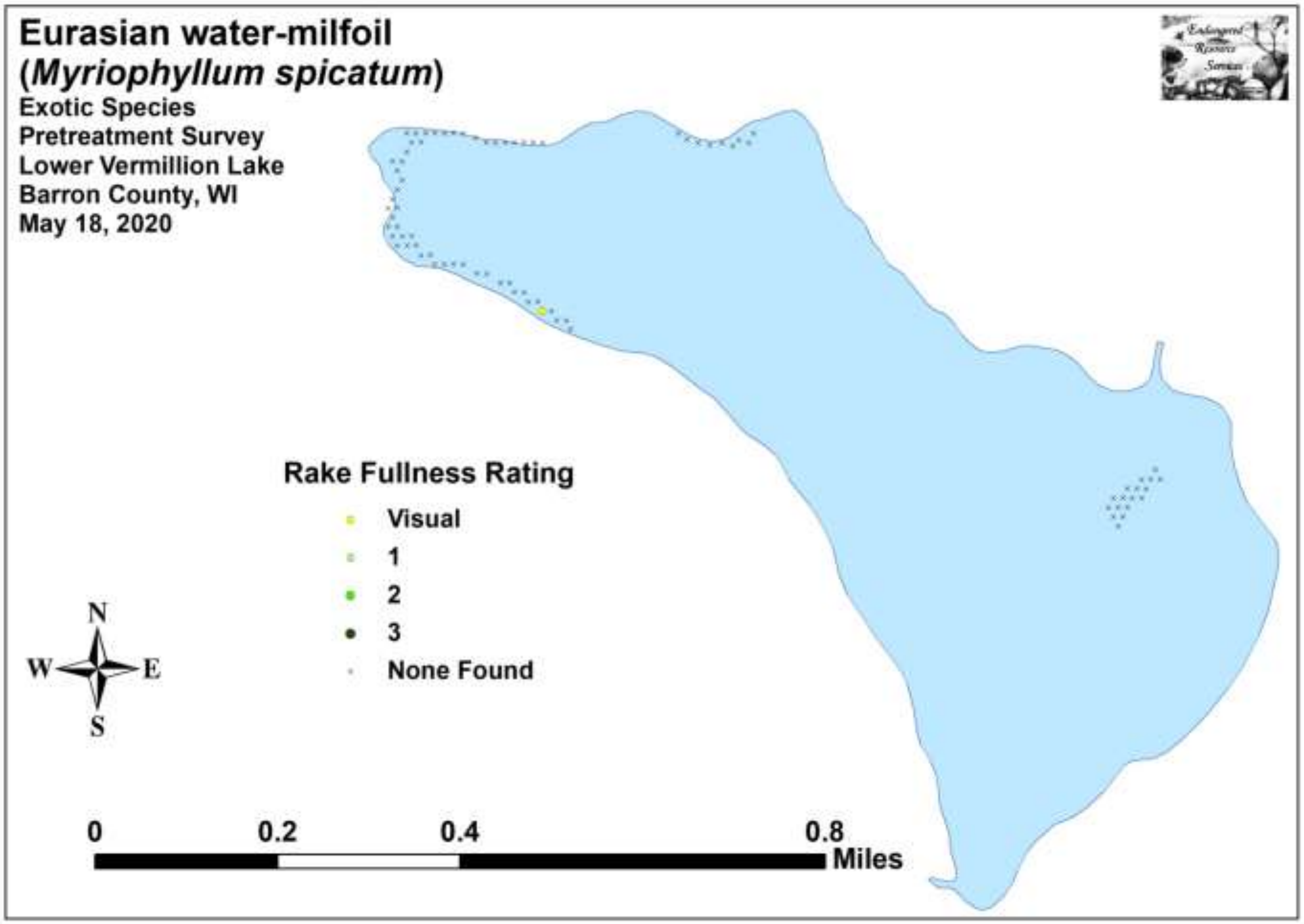
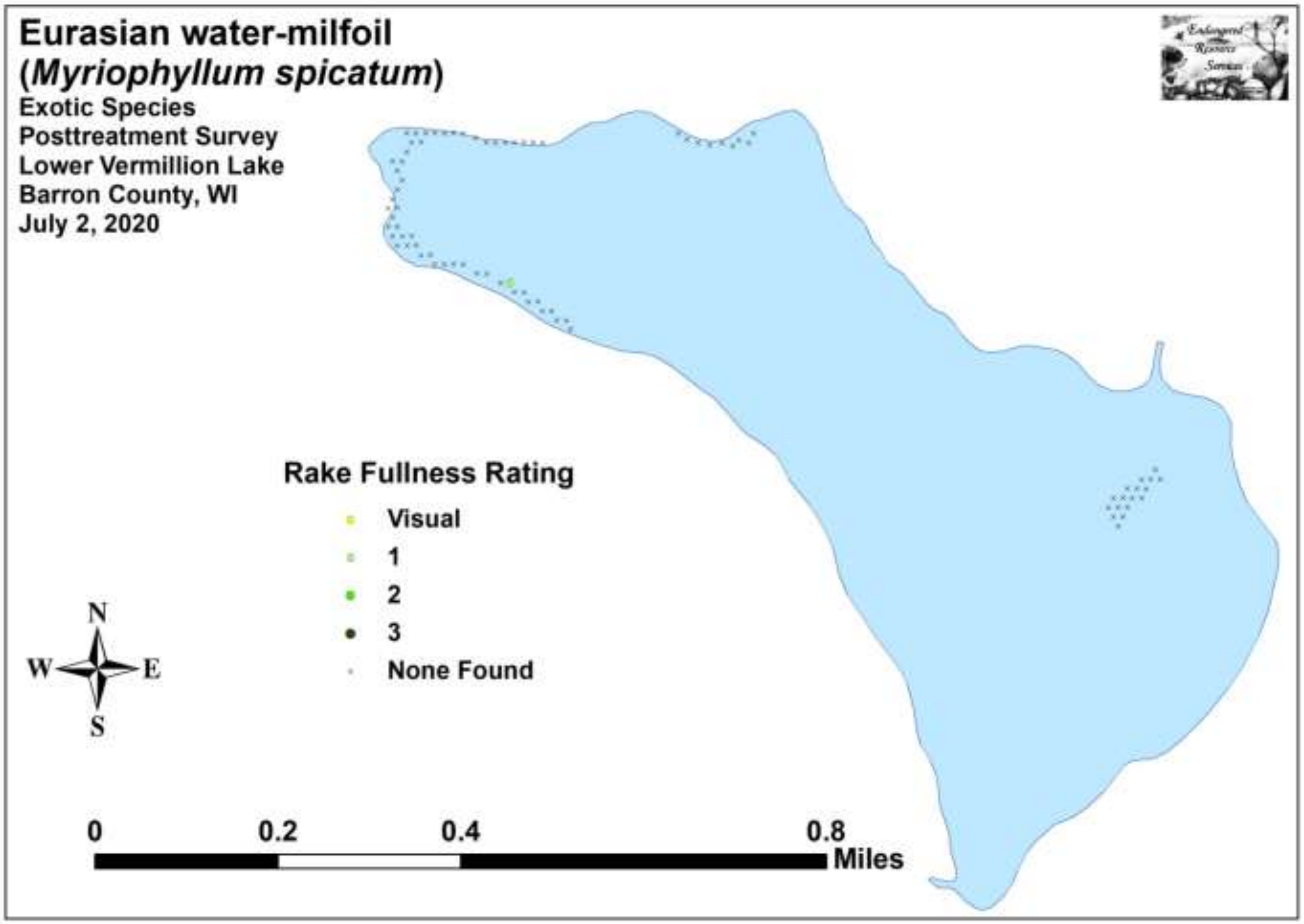
3 - 4
5
N
W
E
S
0
0.2
0.4
0.8
Miles

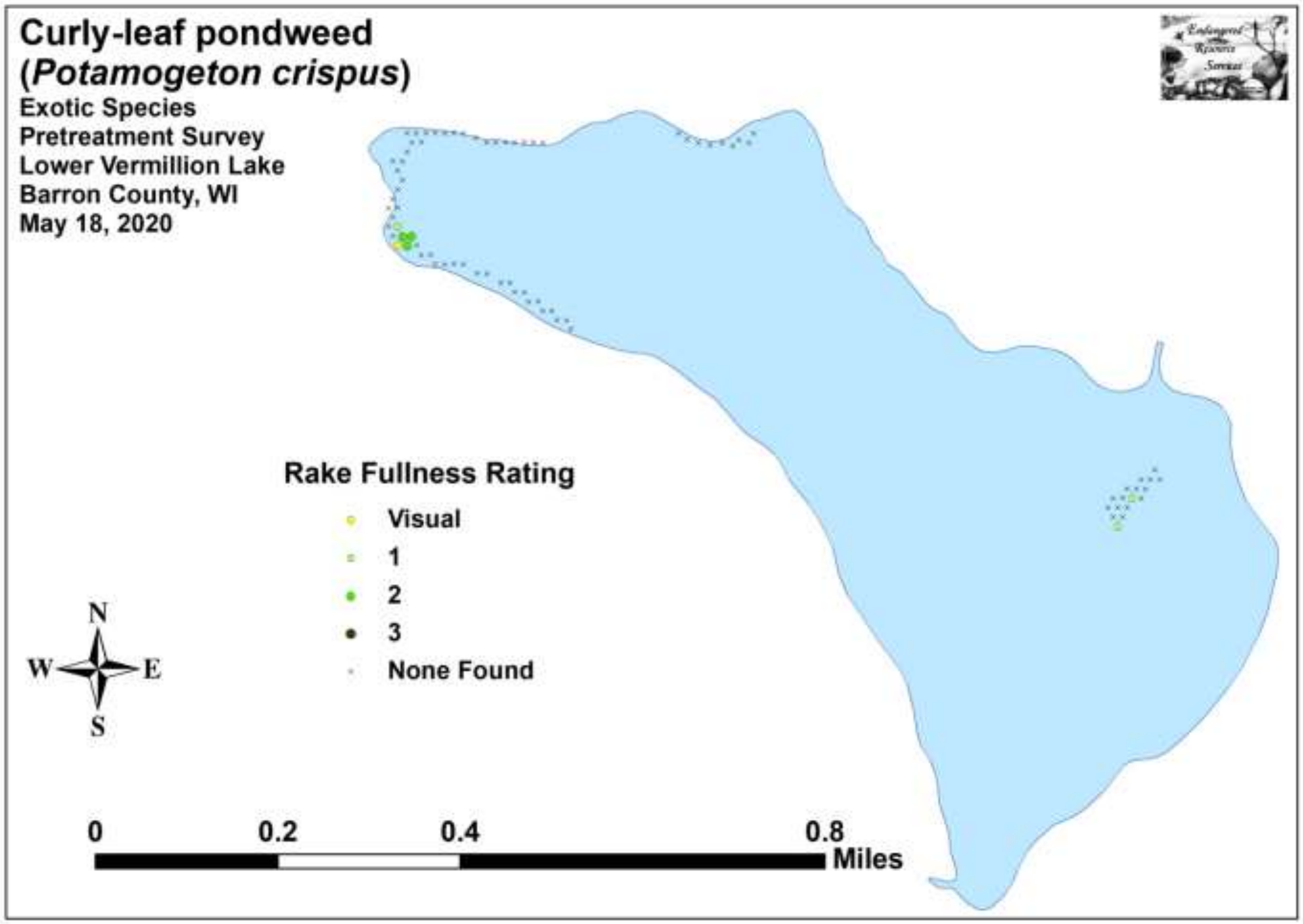

Total Rake Fullness
Pretreatment Survey
Lower Vermillion Lake
Barron County, WI
May 18, 2020
Rake Fullness Rating
1
2
3
None Found
N
W
E
S
0
0.2
0.4
0.8
Miles

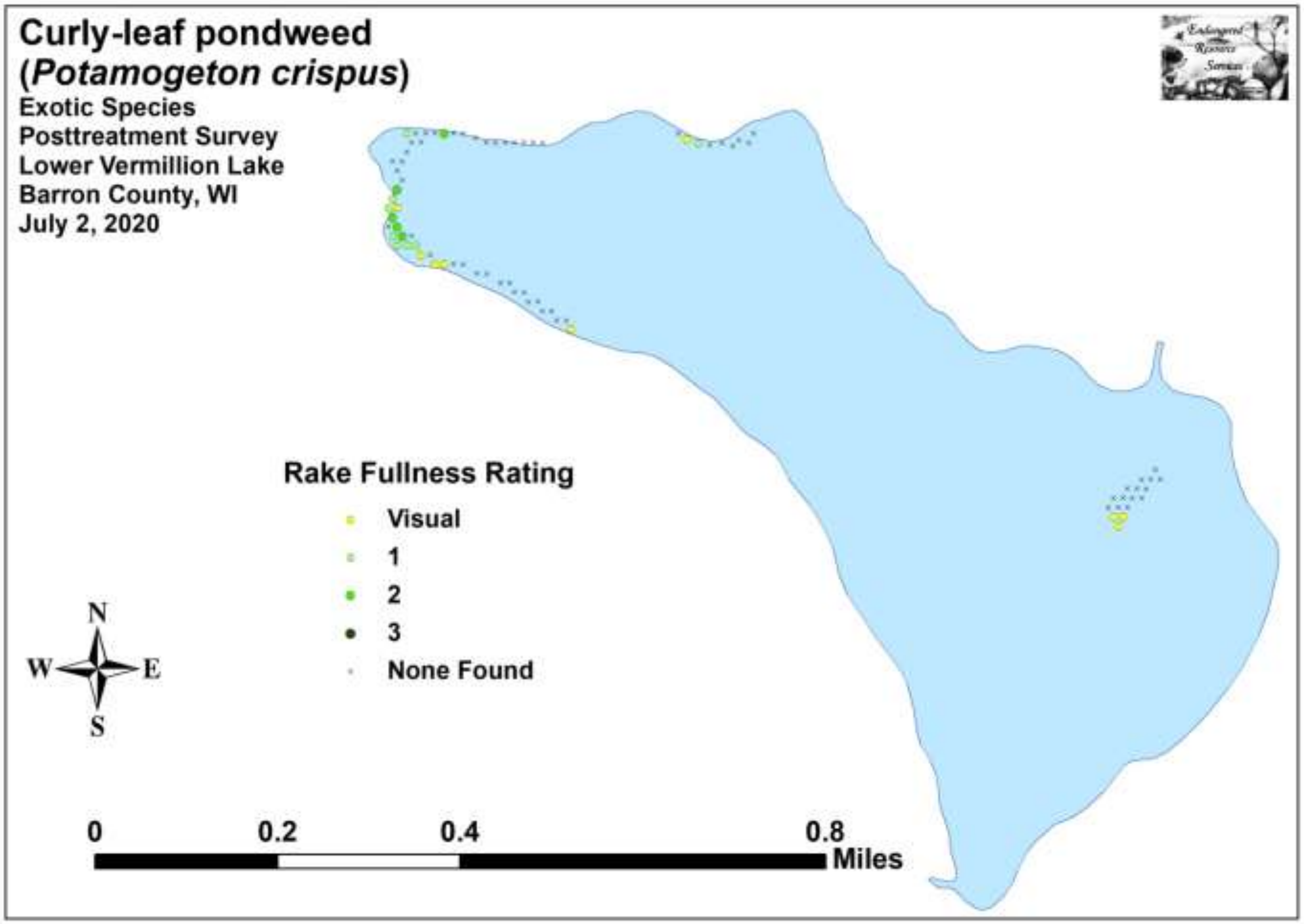

Total Rake Fullness
Posttreatment Survey
Lower Vermillion Lake
Barron County, WI
July 2, 2020
Rake Fullness Rating
1
2
3
None Found
N
W
E
S
0
0.2
0.4
0.8
Miles

Appendix V: EWM and CLP Pre/Post Density and Distribution

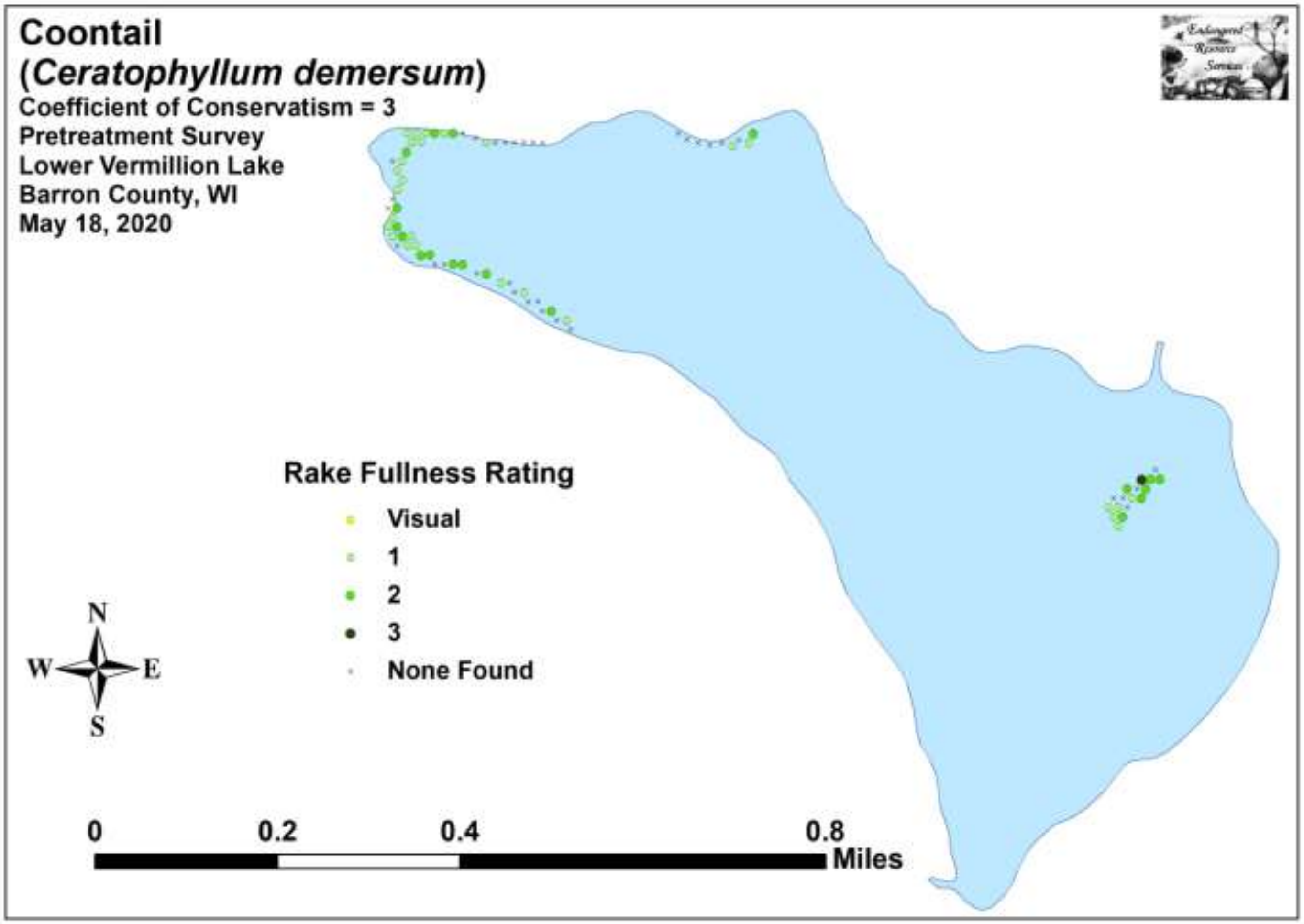

Eurasian water-milfoil
(Myriophyllum spicatum)
Exotic Species
Pretreatment Survey
Lower Vermillion Lake
Barron County, WI
May 18, 2020
Rake Fullness Rating
Visual
1
2
3
None Found
N
W
E
S
0
0.2
0.4
0.8
Miles

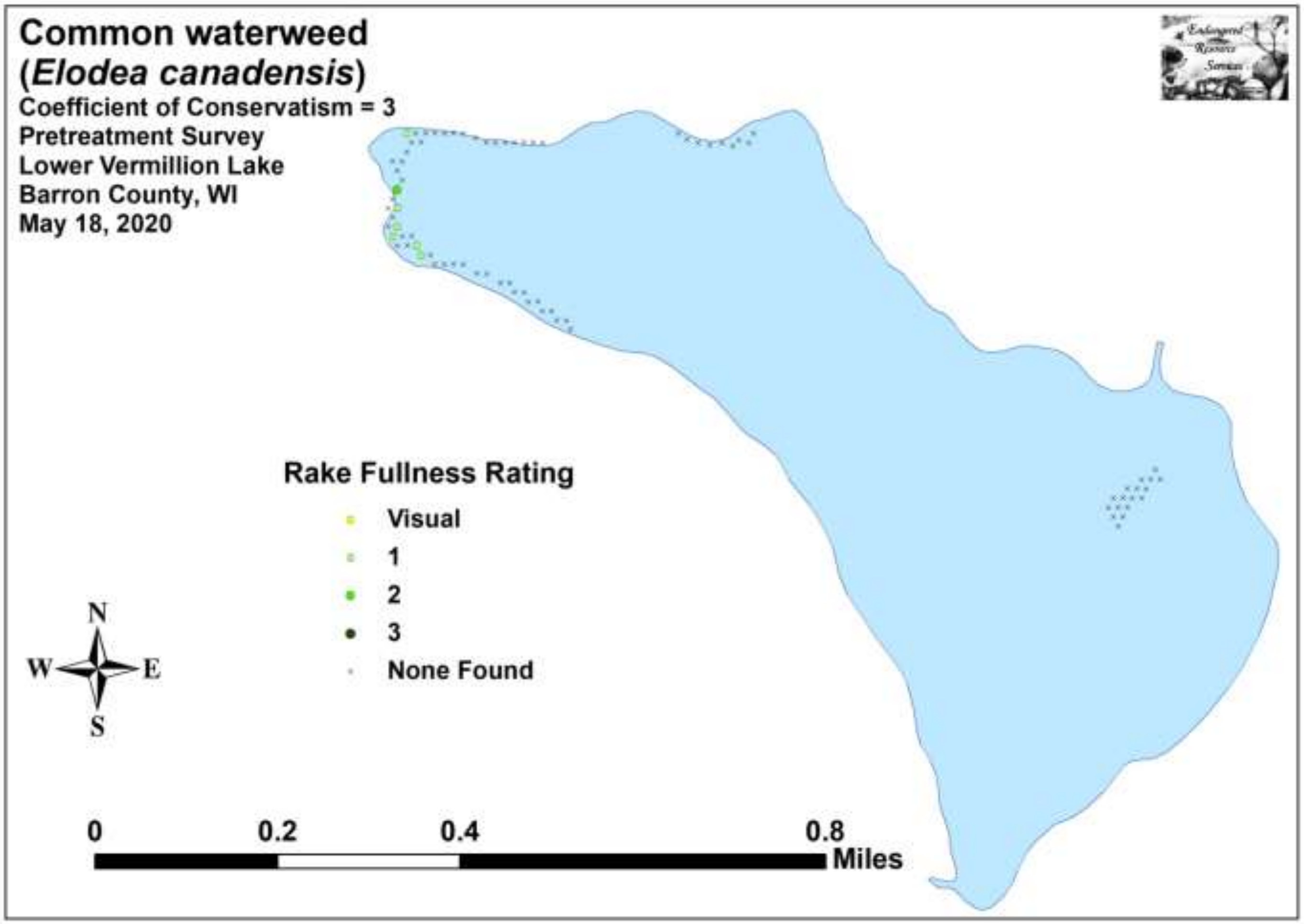

Eurasian water-milfoil
(*Myriophyllum spicatum*)
Exotic Species
Posttreatment Survey
Lower Vermillion Lake
Barron County, WI
July 2, 2020
Rake Fullness Rating
Visual
1
2
3
None Found
N
W
E
S
0
0.2
0.4
0.8
Miles

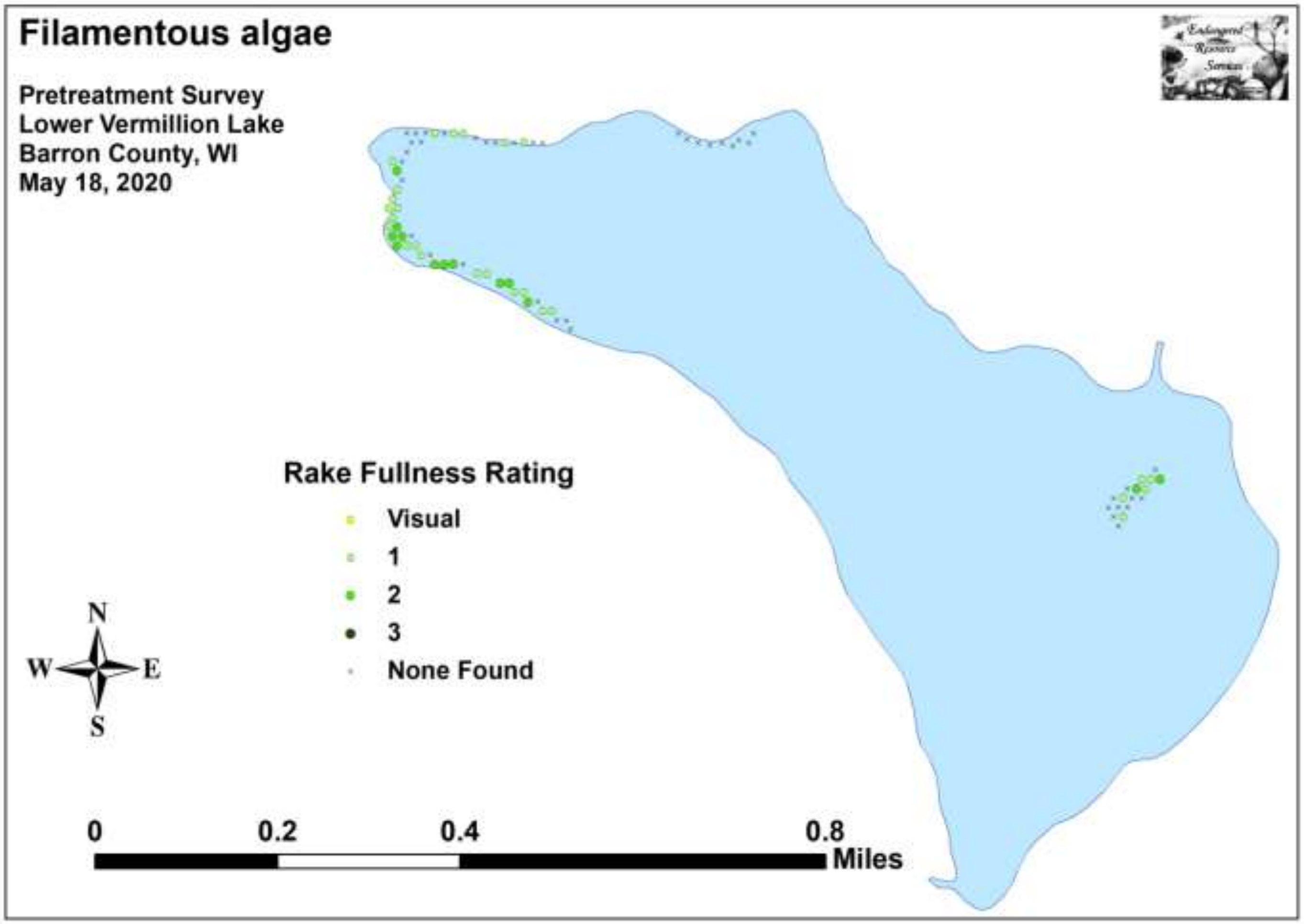

Curly-leaf pondweed
(*Potamogeton crispus*)
Exotic Species
Pretreatment Survey
Lower Vermillion Lake
Barron County, WI
May 18, 2020
Rake Fullness Rating
Visual
1
2
3
None Found
N
W
E
S
0
0.2
0.4
0.8
Miles

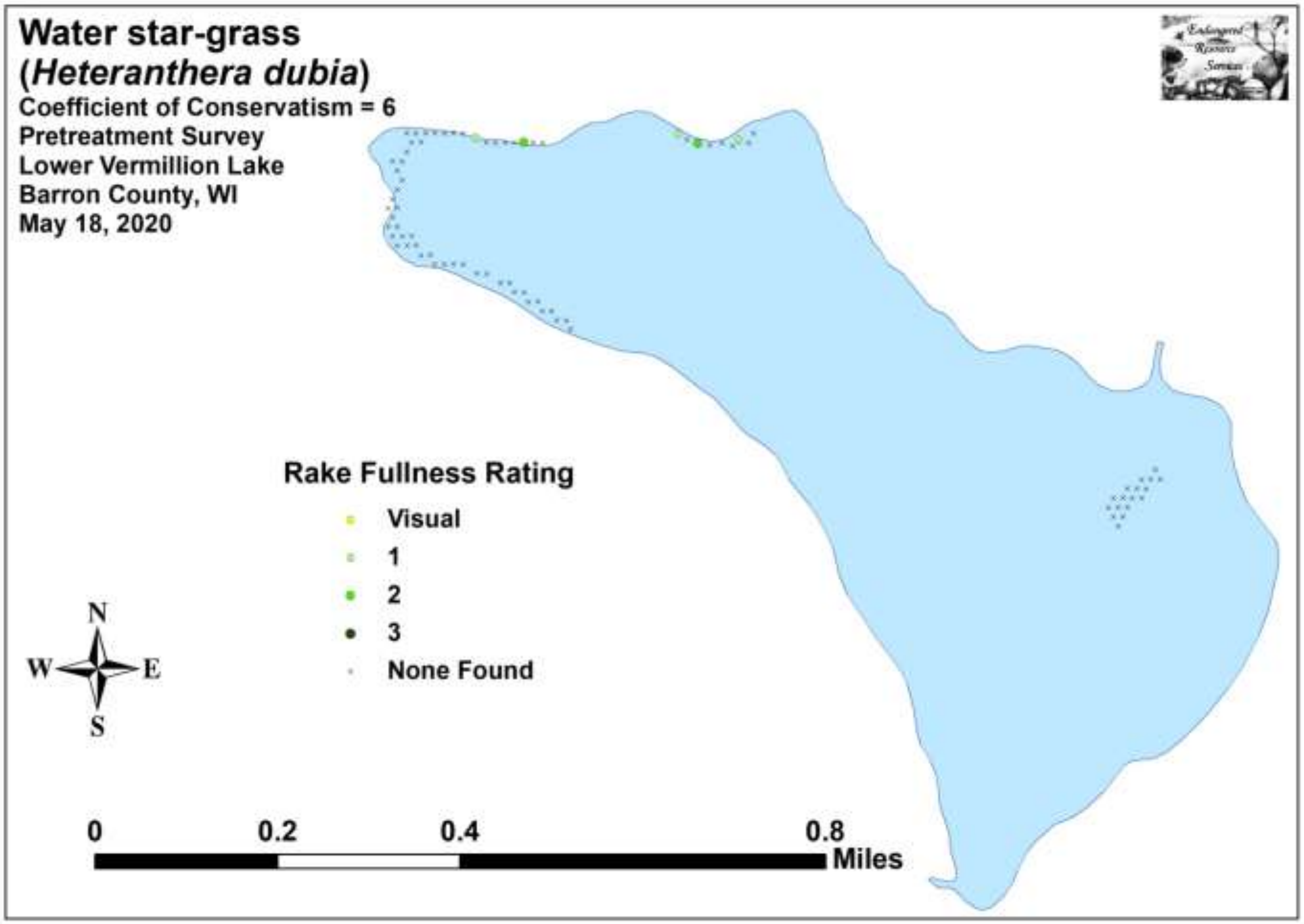

Curly-leaf pondweed
(Potamogeton crispus)
Exotic Species
Posttreatment Survey
Lower Vermillion Lake
Barron County, WI
July 2, 2020
Rake Fullness Rating
Visual
1
2
3
None Found
N
W
E
S
0
0.2
0.4
0.8
Miles

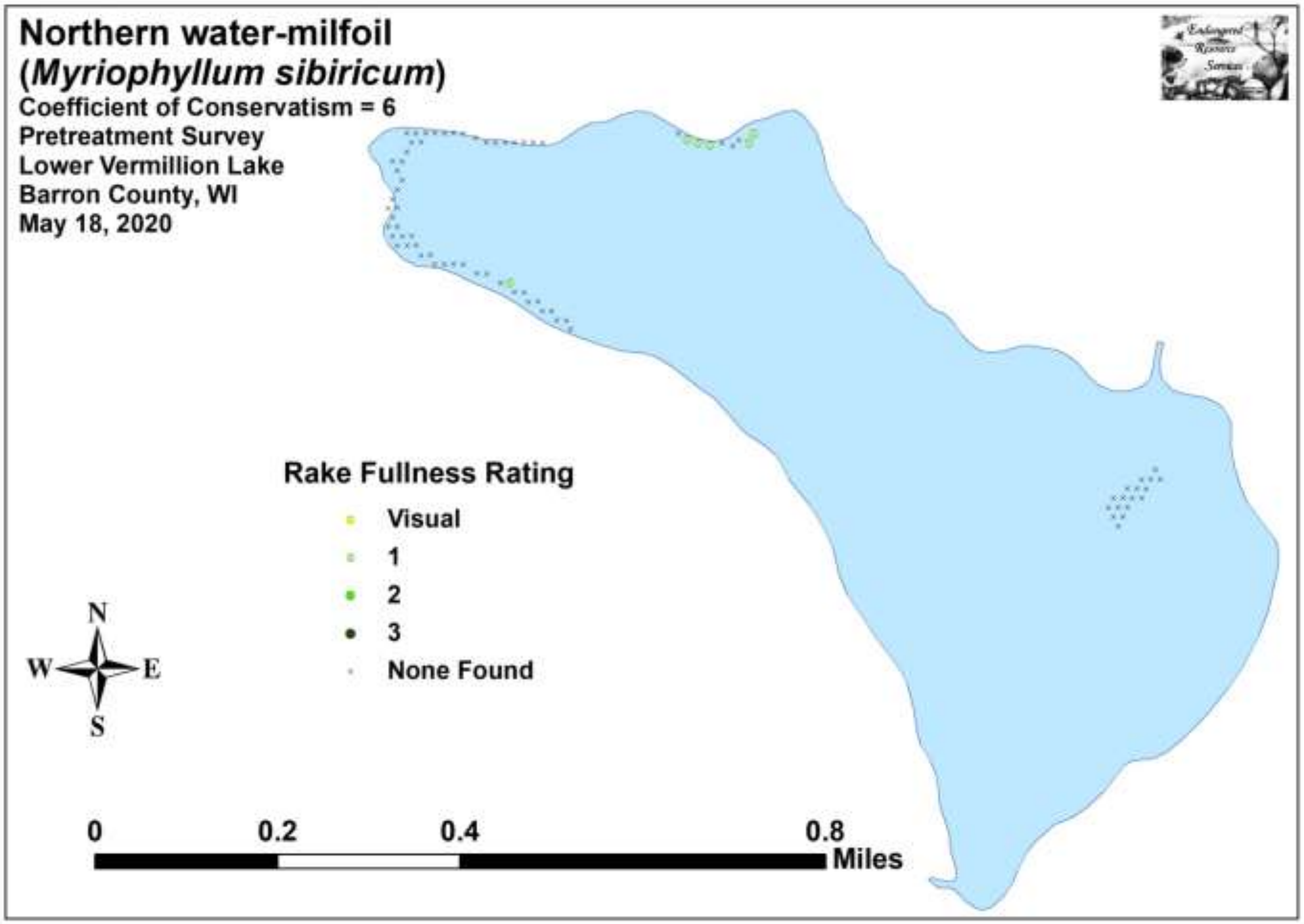
Appendix VI: Pretreatment Native Species Density and Distribution

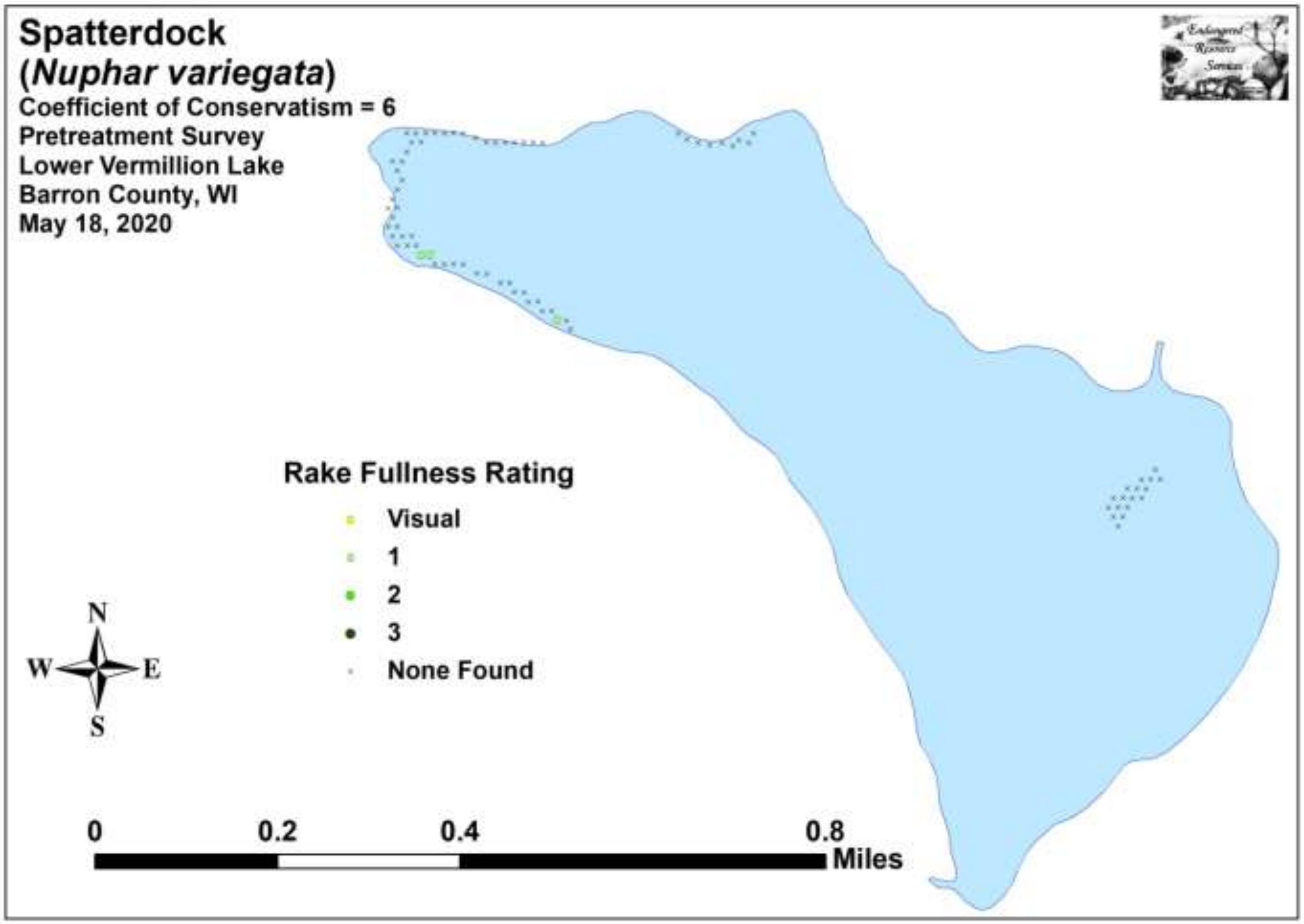

Coontail
(Ceratophyllum demersum)
Coefficient of Conservatism = 3
Pretreatment Survey
Lower Vermillion Lake
Barron County, WI
May 18, 2020
Rake Fullness Rating
Visual
1
2
3
None Found
N
W
E
S
0
0.2
0.4
0.8
Miles


Common waterweed
(*Elodea canadensis*)
Coefficient of Conservatism = 3
Pretreatment Survey
Lower Vermillion Lake
Barron County, WI
May 18, 2020
Rake Fullness Rating
Visual
1
2
3
None Found
N
W
E
S
0
0.2
0.4
0.8
Miles

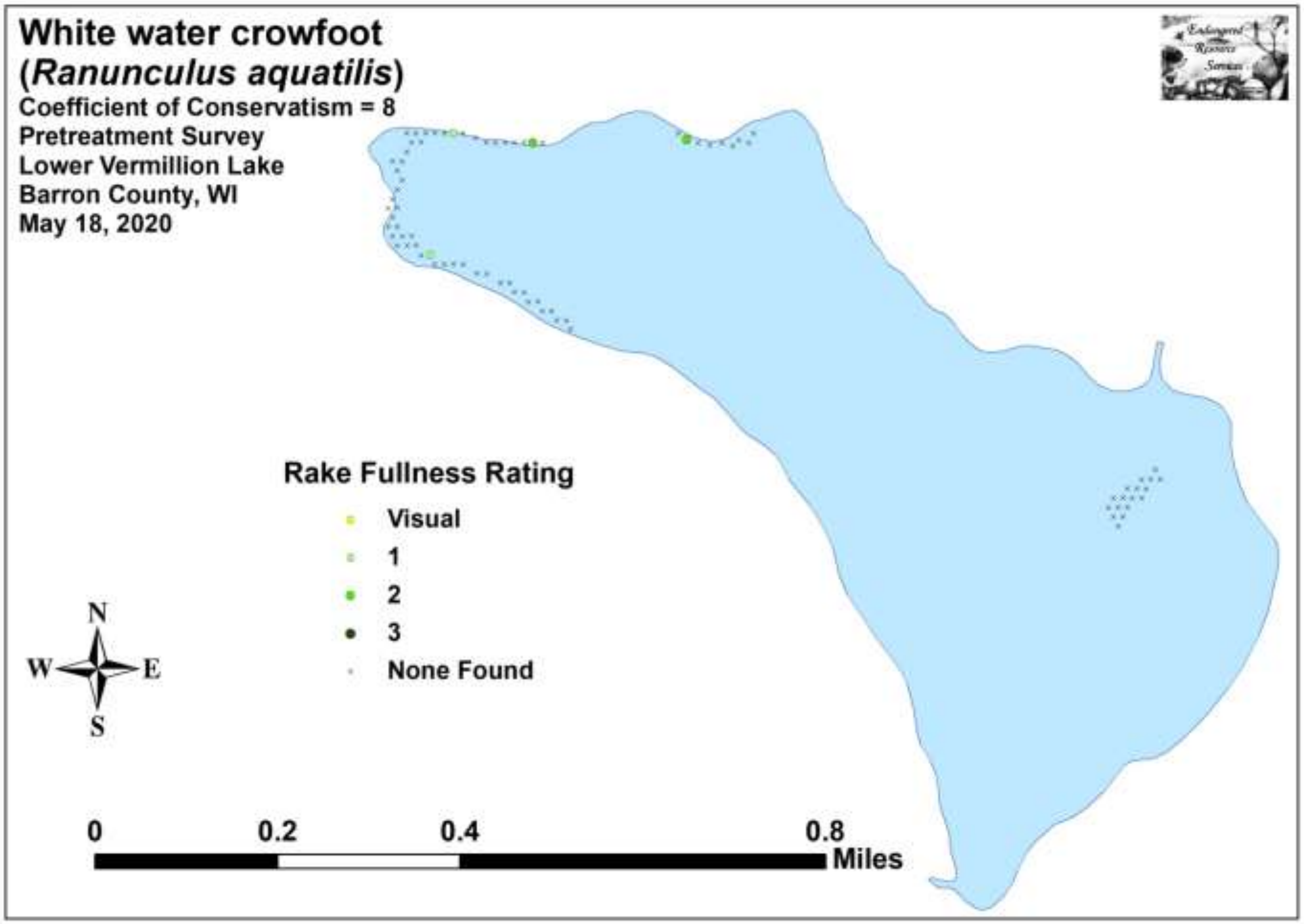

Filamentous algae
Pretreatment Survey
Lower Vermillion Lake
Barron County, WI
May 18, 2020
Rake Fullness Rating
Visual
1
2
3
None Found
N
W
E
S
0
0.2
0.4
0.8
Miles


Water star-grass
(*Heteranthera dubia*)
Coefficient of Conservatism = 6
Pretreatment Survey
Lower Vermillion Lake
Barron County, WI
May 18, 2020
Rake Fullness Rating
Visual
1
2
3
None Found
N
W
E
S
0
0.2
0.4
0.8
Miles


Northern water-milfoil
(*Myriophyllum sibiricum*)
Coefficient of Conservatism = 6
Pretreatment Survey
Lower Vermillion Lake
Barron County, WI
May 18, 2020
Rake Fullness Rating
Visual
1
2
3
None Found
N
W
E
S
0
0.2
0.4
0.8
Miles

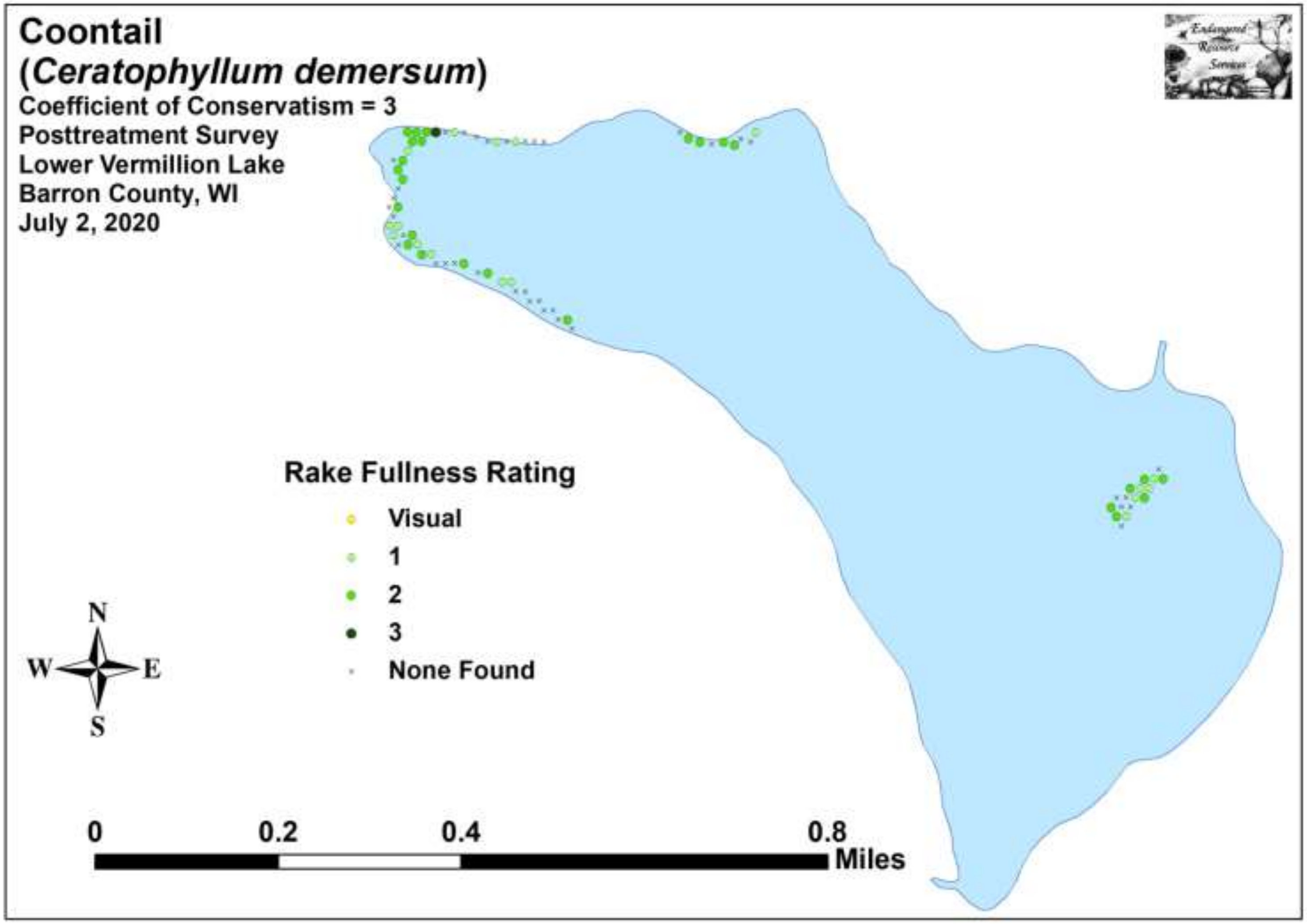


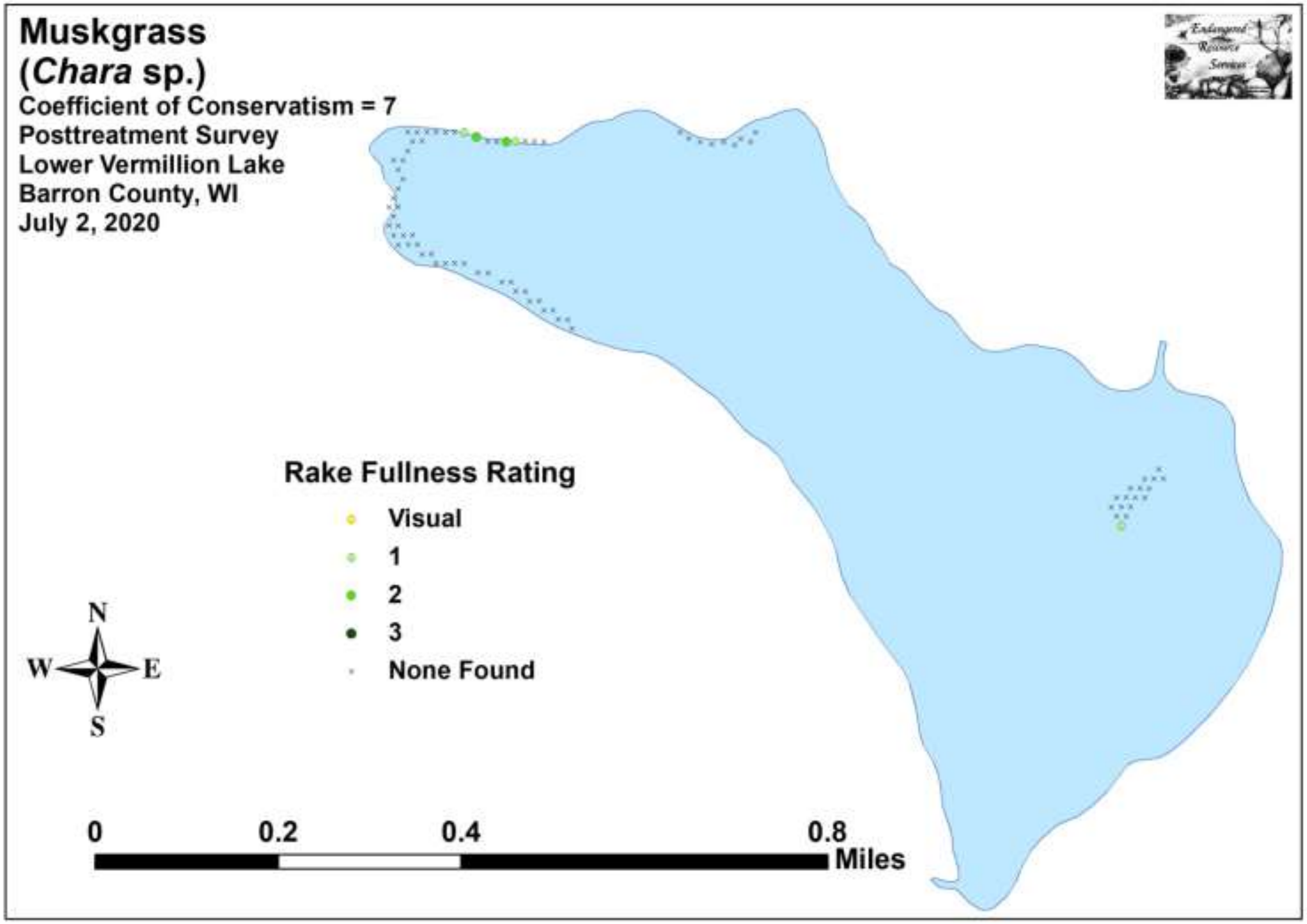
Spatterdock
(Nuphar variegata)
Coefficient of Conservatism = 6
Pretreatment Survey
Lower Vermillion Lake
Barron County, WI
May 18, 2020
Rake Fullness Rating
Visual
1
2
3
None Found
N
W
E
S
0
0.2
0.4
0.8
Miles

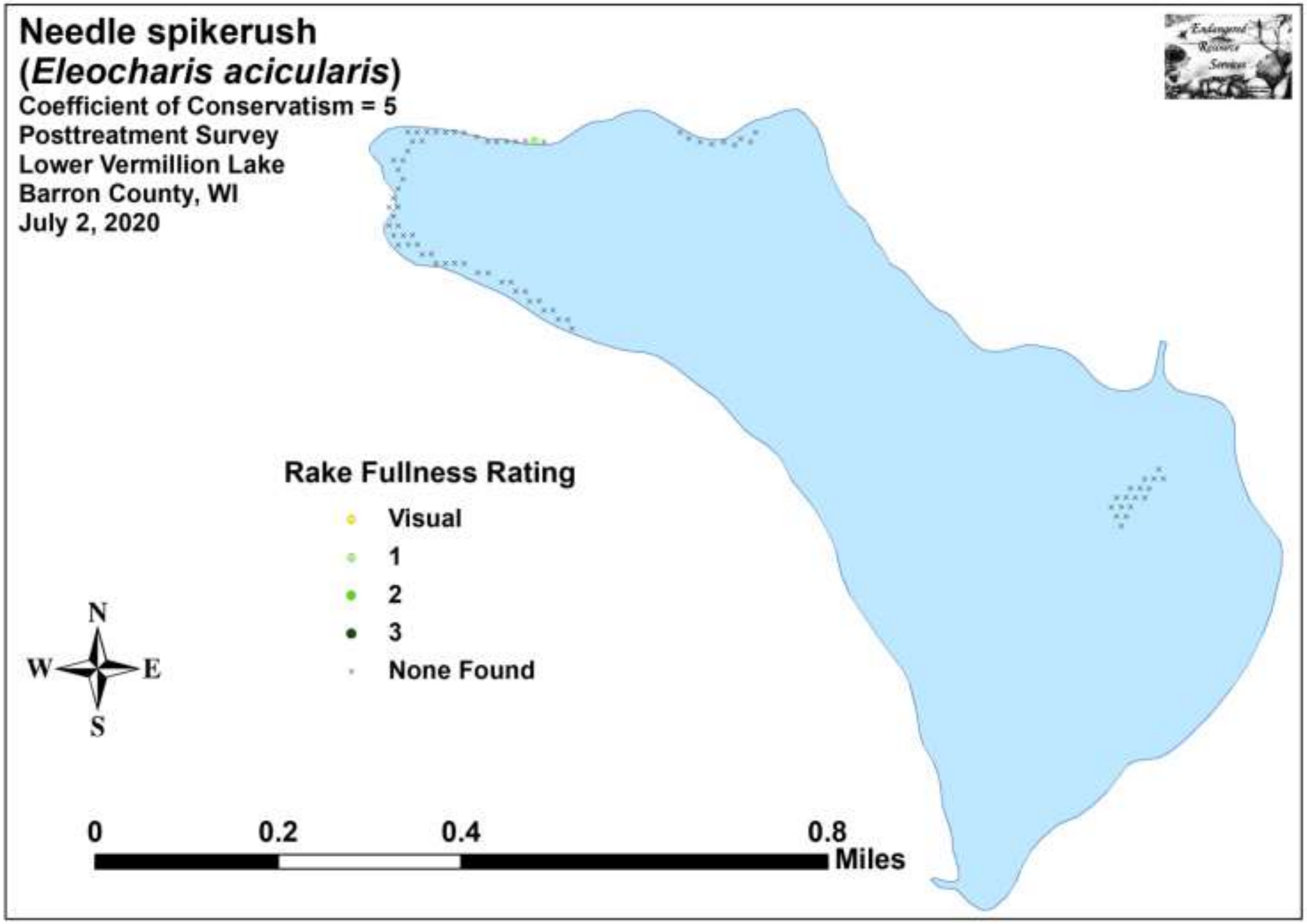


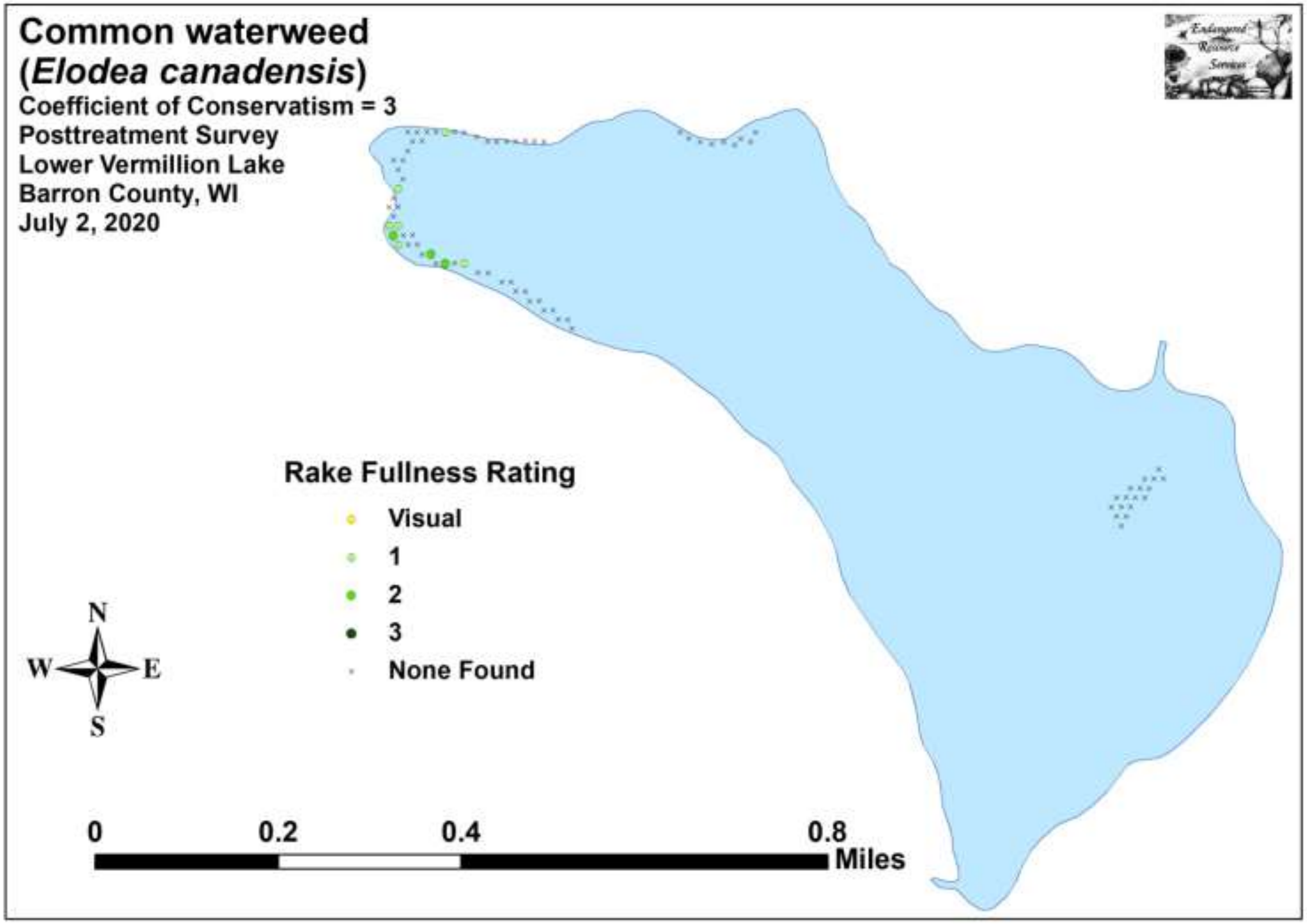
White water crowfoot
(*Ranunculus aquatilis*)
Coefficient of Conservatism = 8
Pretreatment Survey
Lower Vermillion Lake
Barron County, WI
May 18, 2020
Rake Fullness Rating
Visual
1
2
3
None Found
N
W
E
S
0
0.2
0.4
0.8
Miles

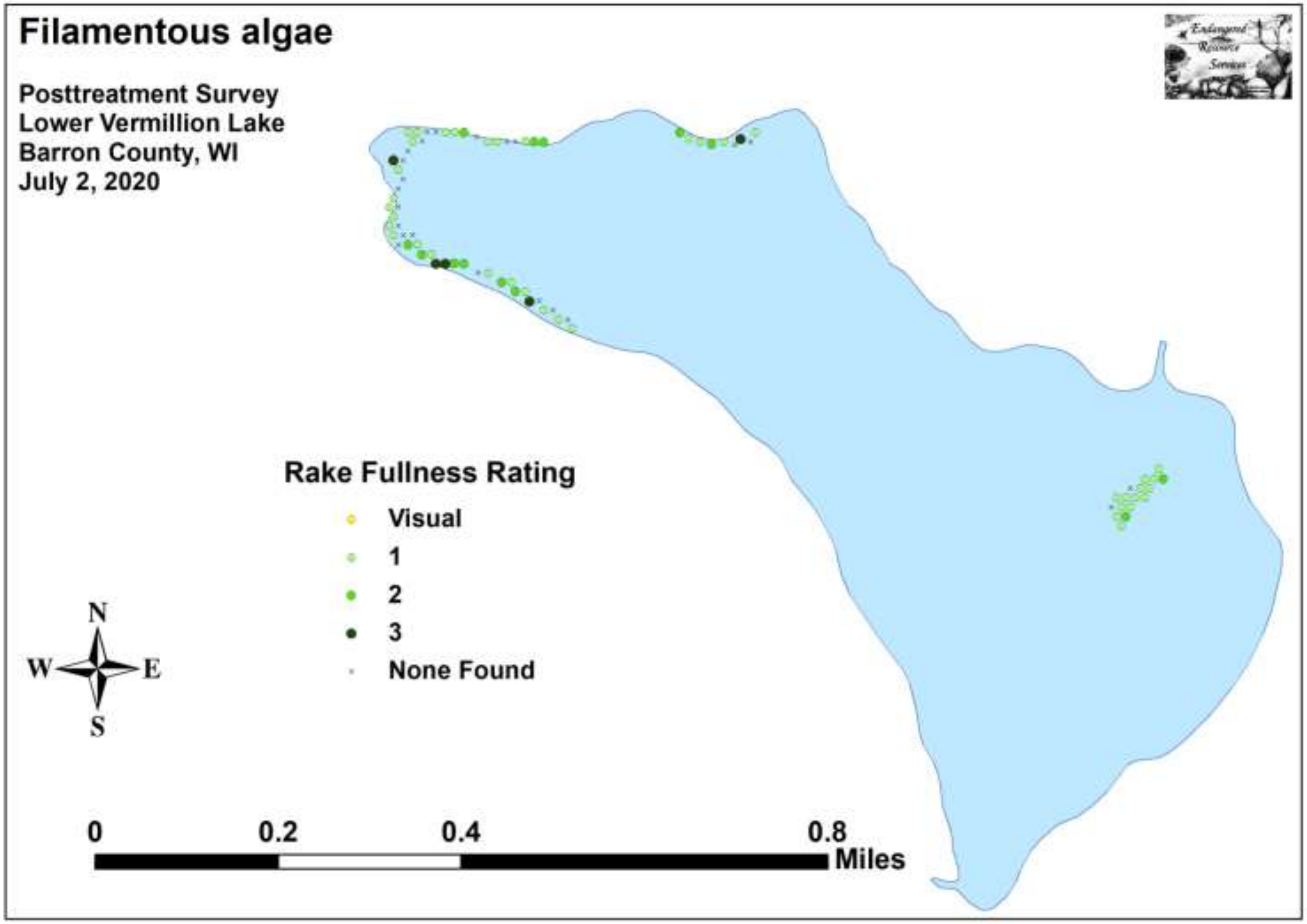
Appendix VII: Posttreatment Native Species Density and Distribution

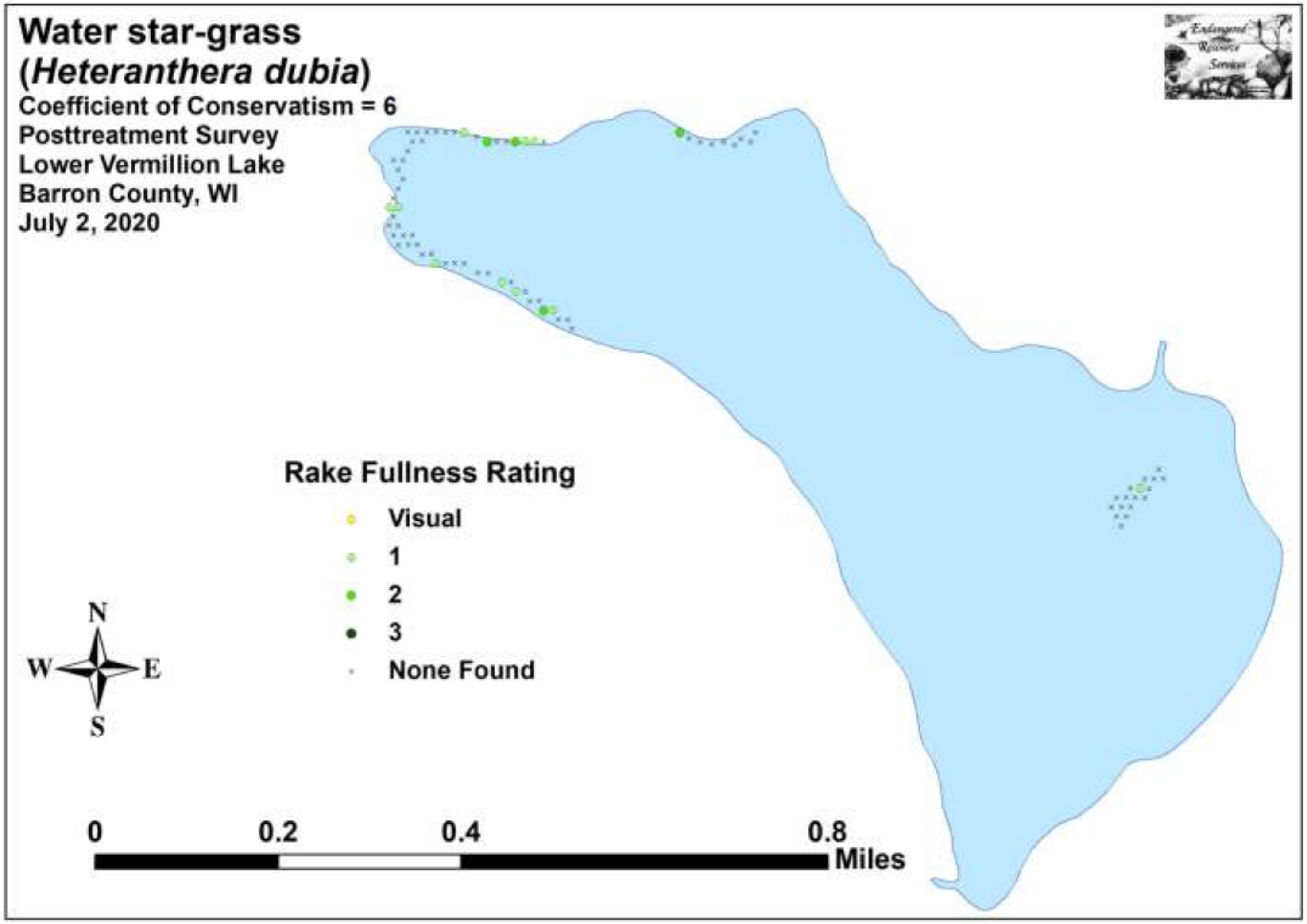

Coontail
(Ceratophyllum demersum)
Coefficient of Conservatism = 3
Posttreatment Survey
Lower Vermillion Lake
Barron County, WI
July 2, 2020
Rake Fullness Rating
Visual
1
2
3
None Found
N
W
E
S
0
0.2
0.4
0.8
Miles

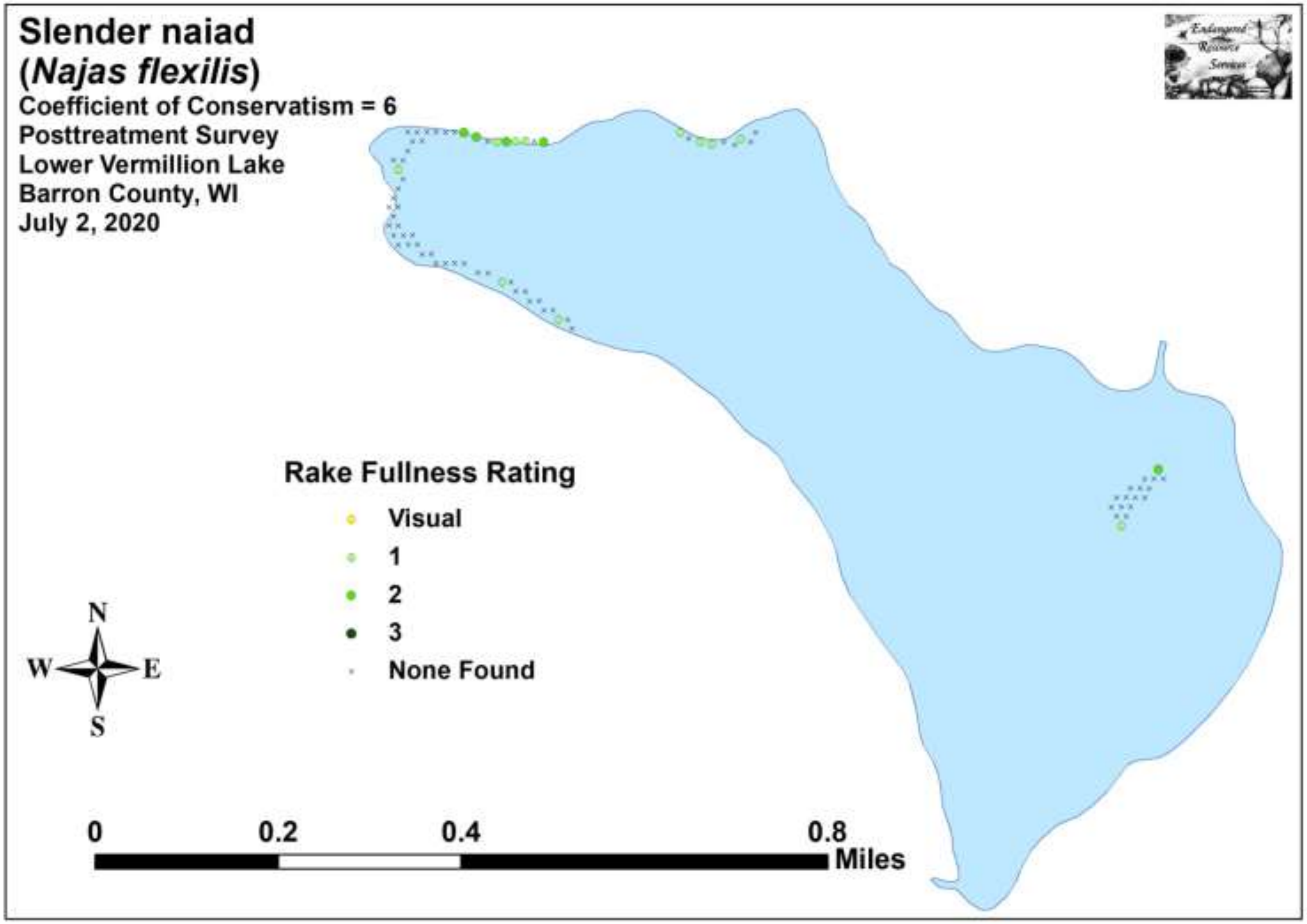

Muskgrass
(*Chara* sp.)
Coefficient of Conservatism = 7
Posttreatment Survey
Lower Vermillion Lake
Barron County, WI
July 2, 2020
Rake Fullness Rating
Visual
1
2
3
None Found
N
W
E
S
0
0.2
0.4
0.8
Miles

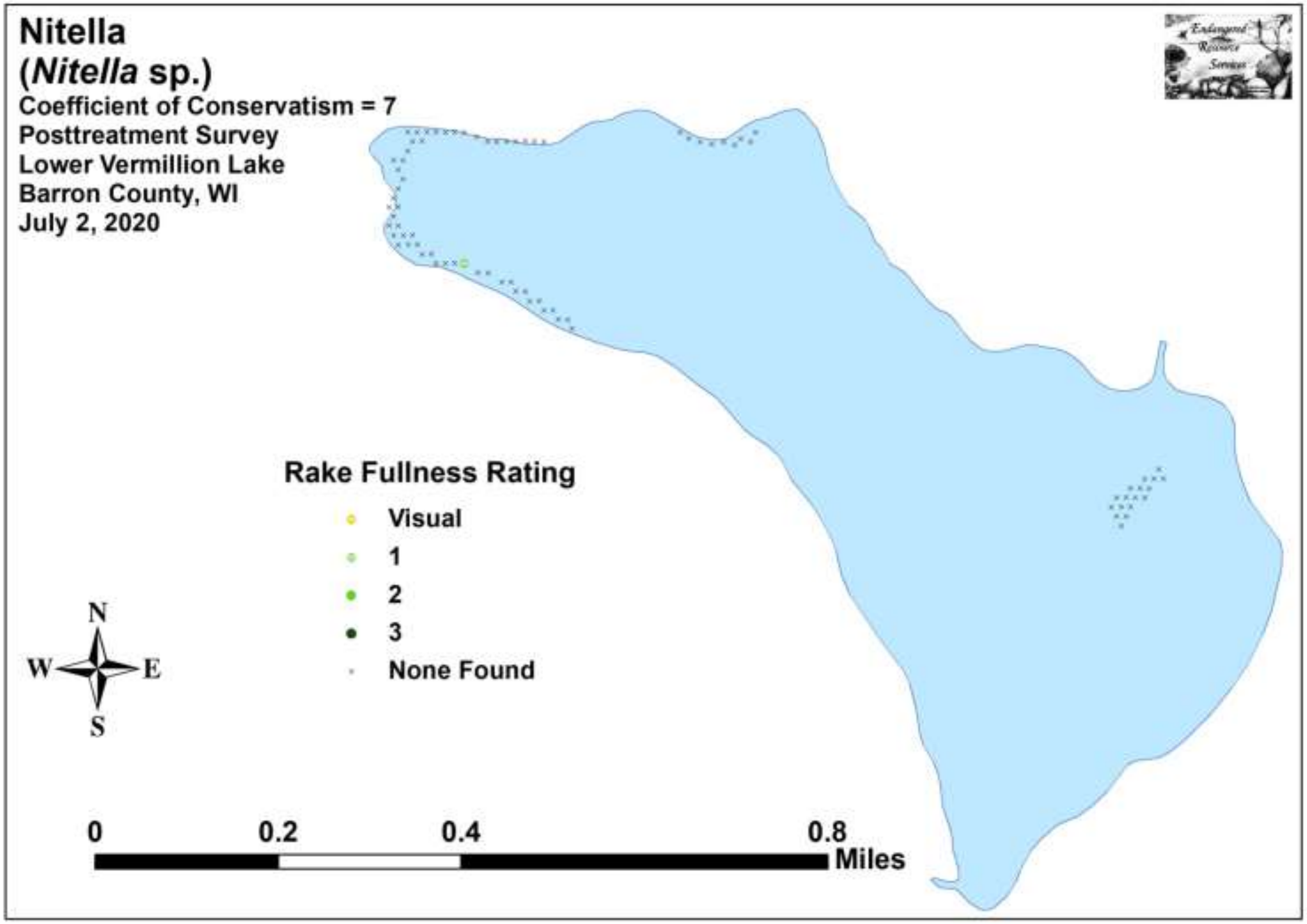

Needle spikerush
(Eleocharis acicularis)
Coefficient of Conservatism = 5
Posttreatment Survey
Lower Vermillion Lake
Barron County, WI
July 2, 2020
Rake Fullness Rating
Visual
1
2
3
None Found
N
W
E
S
0
0.2
0.4
0.8
Miles


Common waterweed
(*Elodea canadensis*)
Coefficient of Conservatism = 3
Posttreatment Survey
Lower Vermillion Lake
Barron County, WI
July 2, 2020
Endangered Resource Services
Rake Fullness Rating
Visual
1
2
3
None Found
N
W
E
S
0
0.2
0.4
0.8
Miles

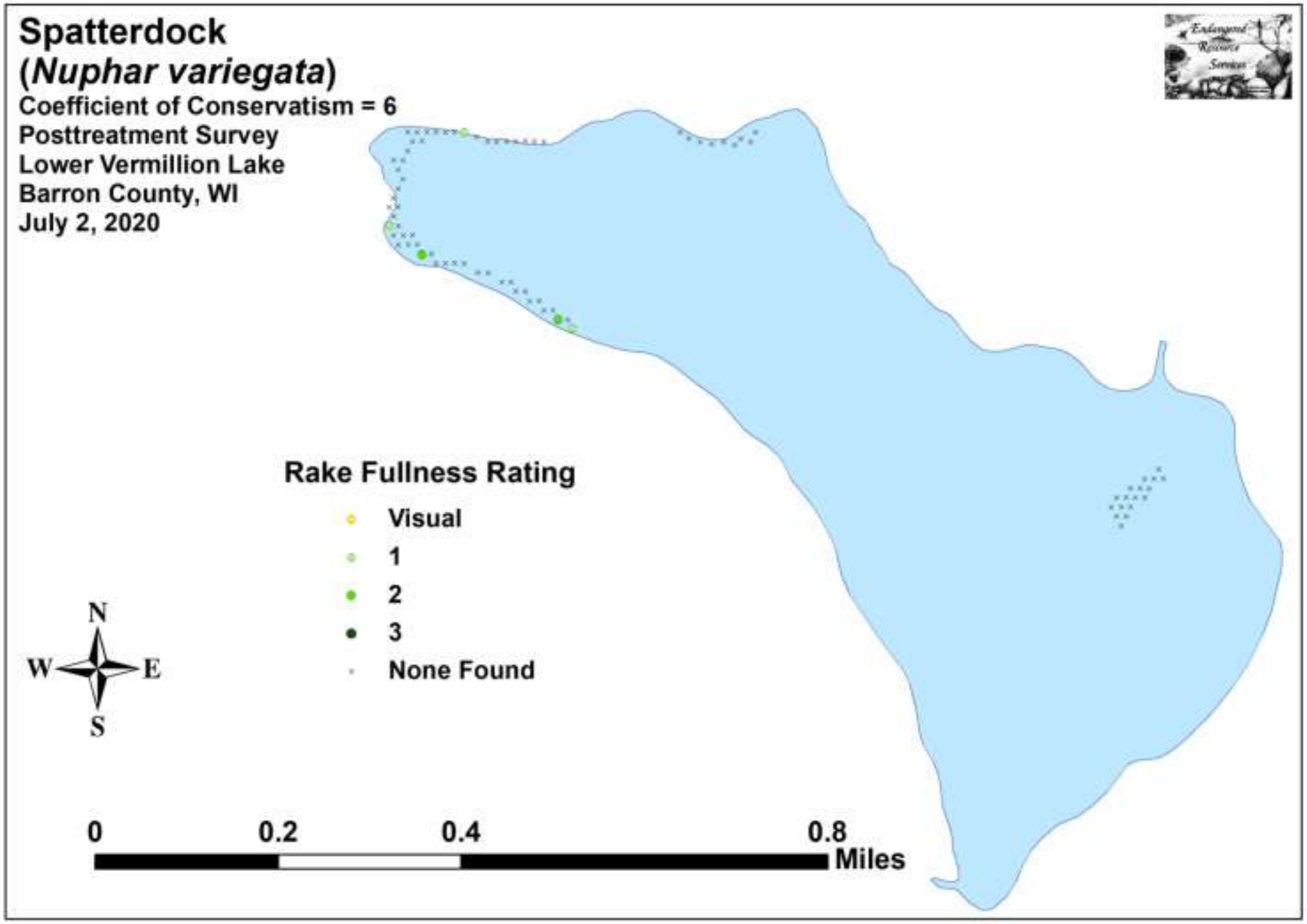

Filamentous algae
Posttreatment Survey
Lower Vermillion Lake
Barron County, WI
July 2, 2020
Rake Fullness Rating
Visual
1
2
3
None Found
N
W
E
S
0
0.2
0.4
0.8
Miles

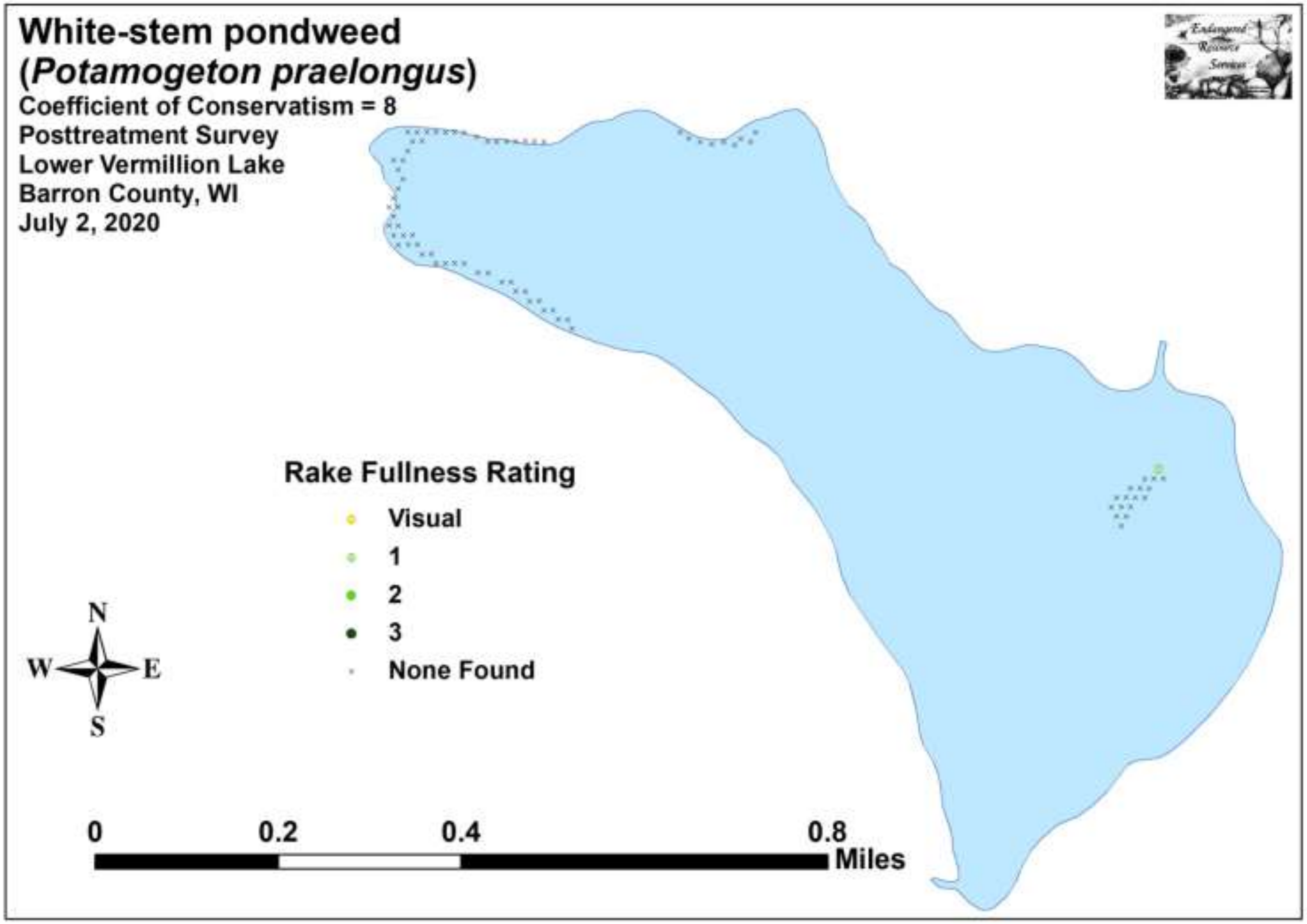

Water star-grass
(Heteranthera dubia)
Coefficient of Conservatism = 6
Posttreatment Survey
Lower Vermillion Lake
Barron County, WI
July 2, 2020
Rake Fullness Rating
Visual
1
2
3
None Found
N
W
E
S
0
0.2
0.4
0.8
Miles

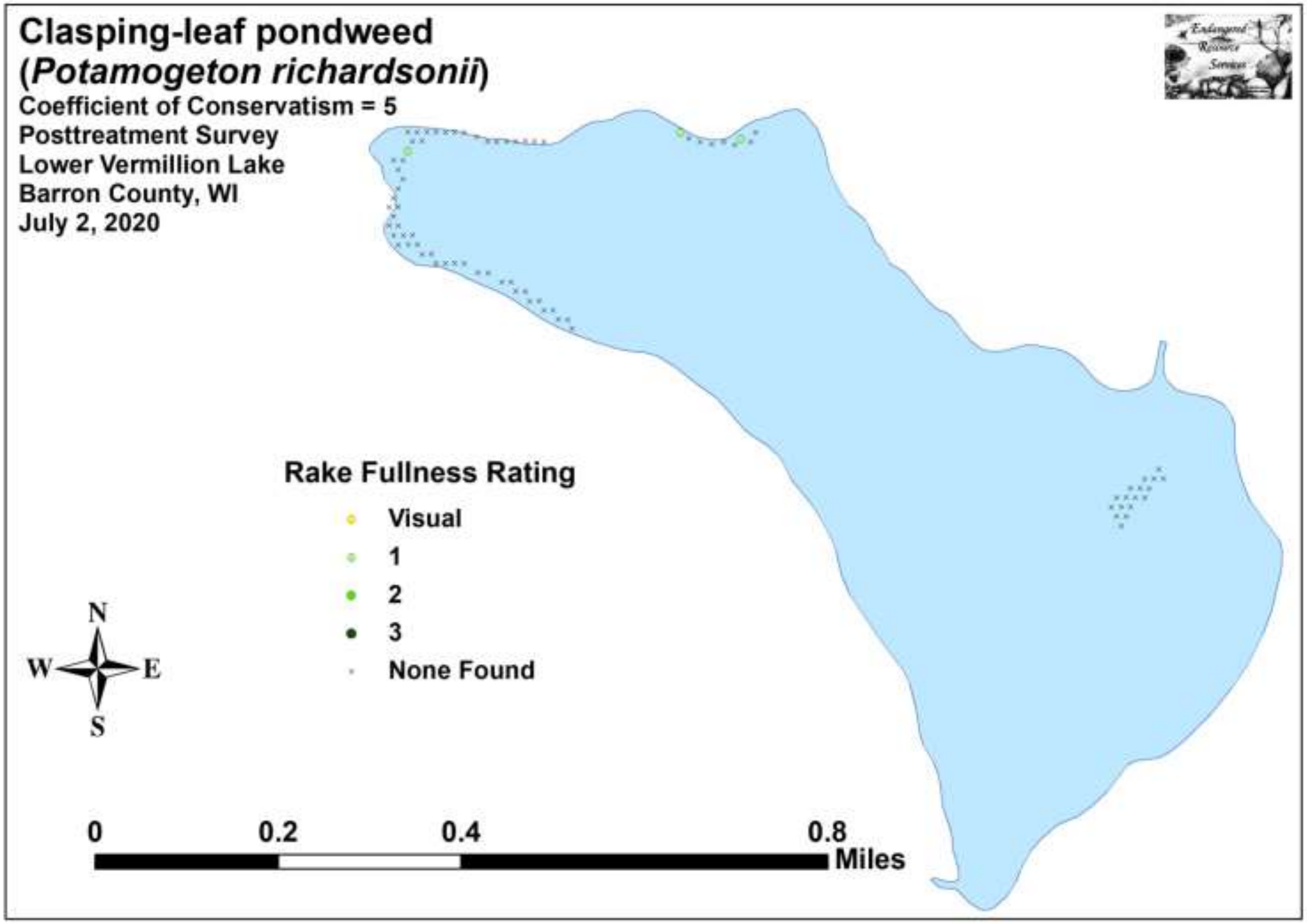

Slender naiad
(Najas flexilis)
Coefficient of Conservatism = 6
Posttreatment Survey
Lower Vermillion Lake
Barron County, WI
July 2, 2020
Rake Fullness Rating
Visual
1
2
3
None Found
N
W
E
S
0
0.2
0.4
0.8
Miles

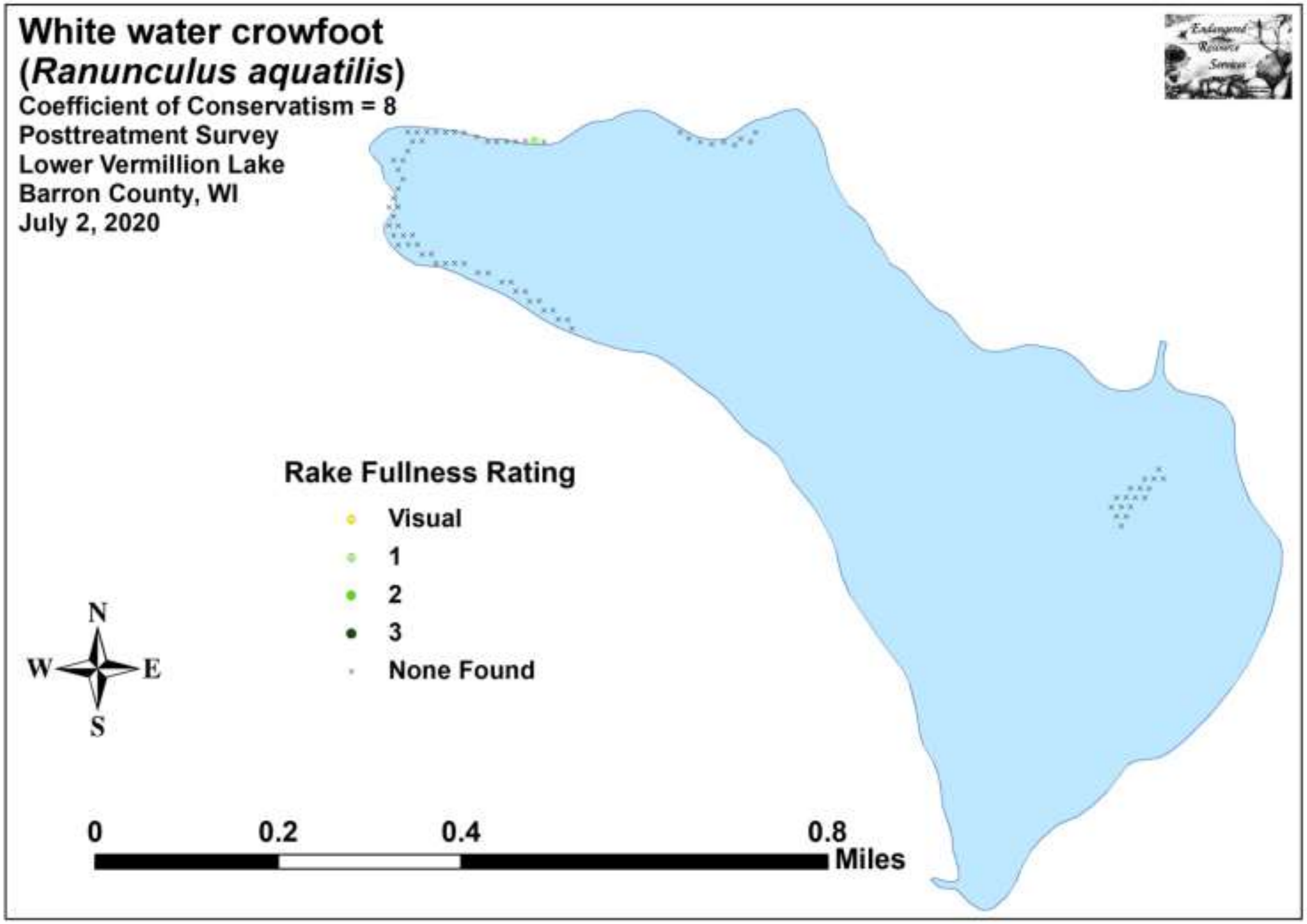


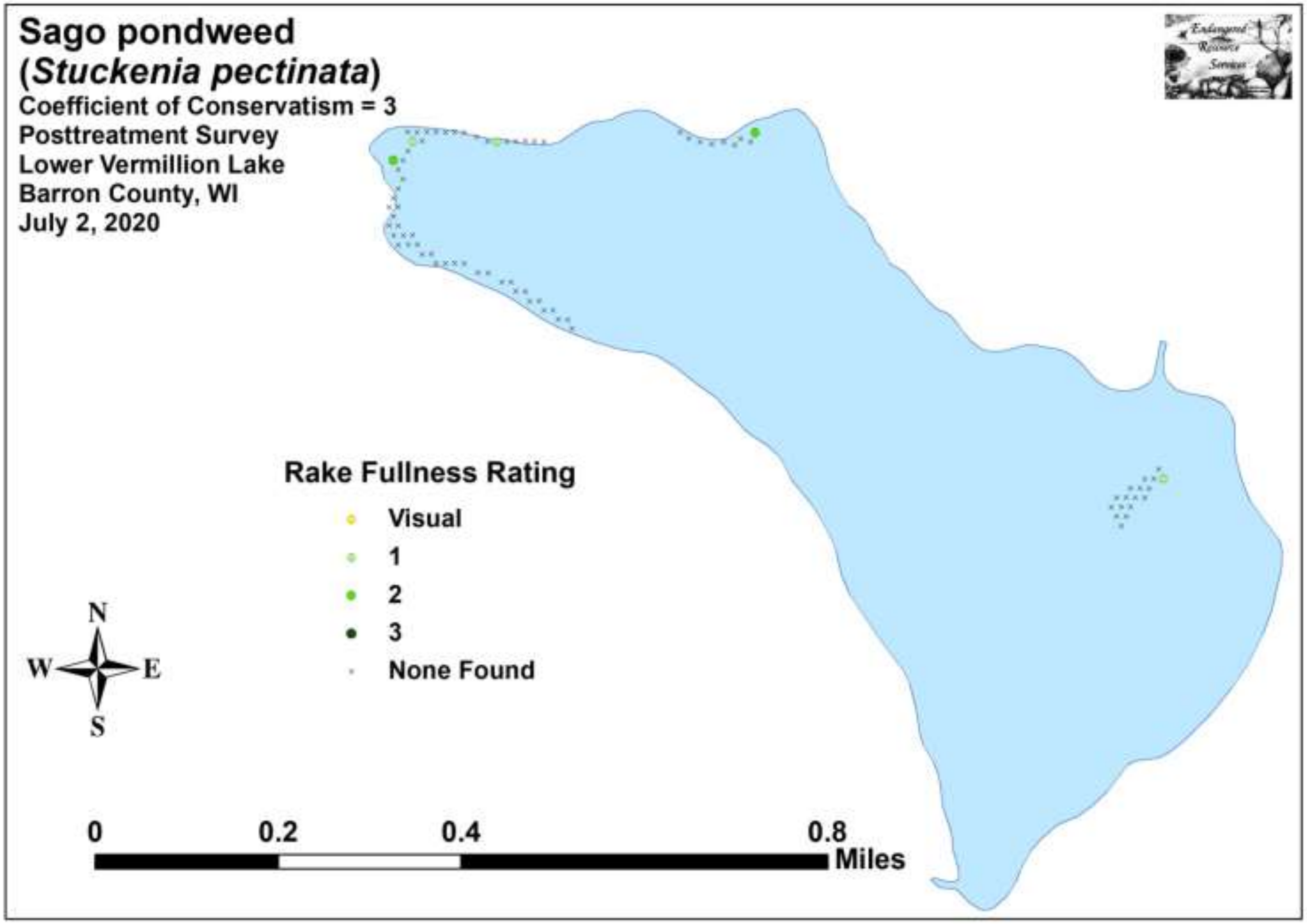
Nitella
(*Nitella* sp.)
Coefficient of Conservatism = 7
Posttreatment Survey
Lower Vermillion Lake
Barron County, WI
July 2, 2020
Rake Fullness Rating
Visual
1
2
3
None Found
N
W
E
S
0
0.2
0.4
0.8
Miles

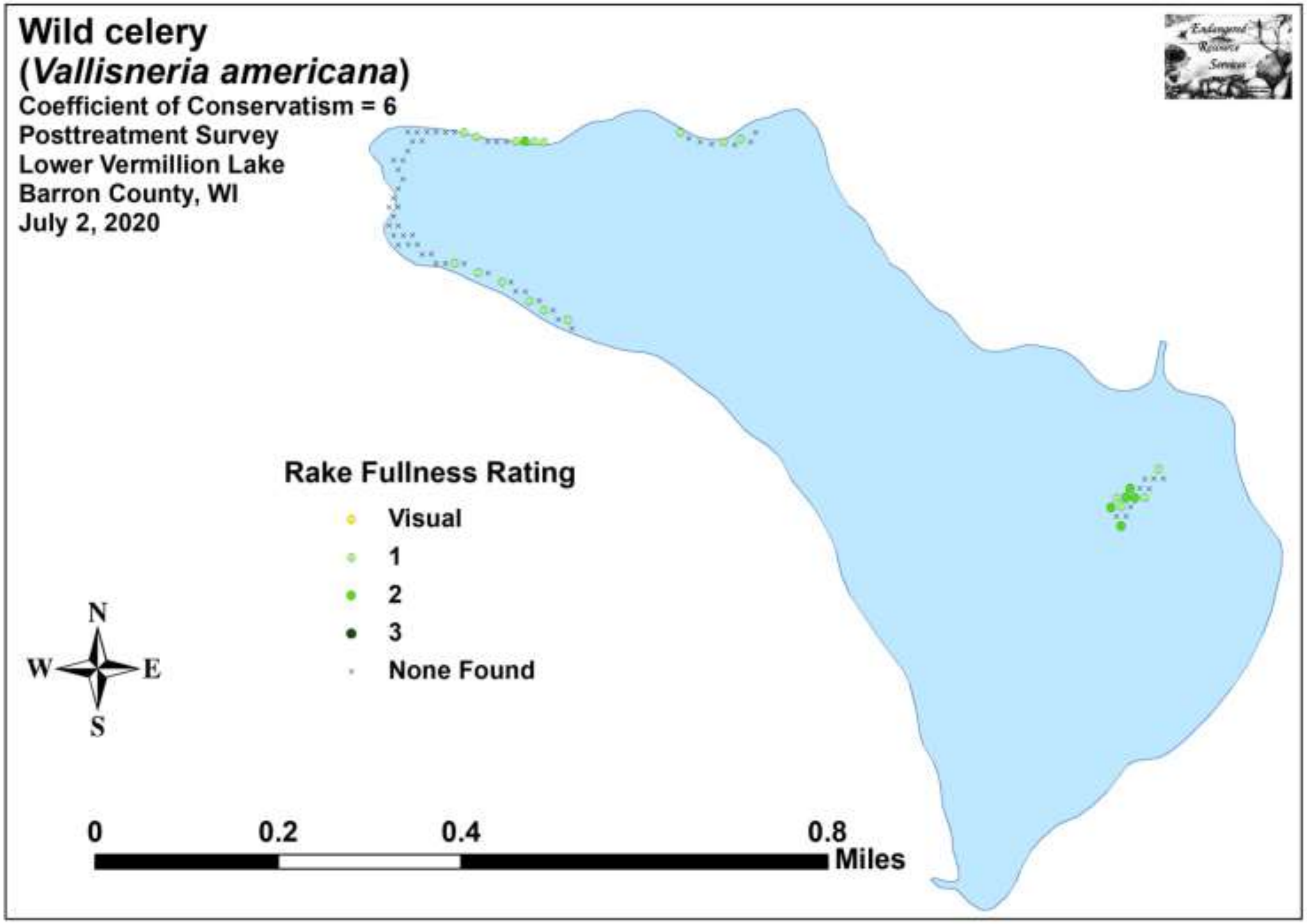

Spatterdock
(*Nuphar variegata*)
Coefficient of Conservatism = 6
Posttreatment Survey
Lower Vermillion Lake
Barron County, WI
July 2, 2020
Rake Fullness Rating
Visual
1
2
3
None Found
N
W
E
S
0
0.2
0.4
0.8
Miles


White-stem pondweed
(*Potamogeton praelongus*)
Coefficient of Conservatism = 8
Posttreatment Survey
Lower Vermillion Lake
Barron County, WI
July 2, 2020
Rake Fullness Rating
Visual
1
2
3
None Found
N
W
E
S
0
0.2
0.4
0.8
Miles


Clasping-leaf pondweed
(*Potamogeton richardsonii*)
Coefficient of Conservatism = 5
Posttreatment Survey
Lower Vermillion Lake
Barron County, WI
July 2, 2020
Rake Fullness Rating
Visual
1
2
3
None Found
N
W
E
S
0
0.2
0.4
0.8
Miles


White water crowfoot
(*Ranunculus aquatilis*)
Coefficient of Conservatism = 8
Posttreatment Survey
Lower Vermillion Lake
Barron County, WI
July 2, 2020
Rake Fullness Rating
Visual
1
2
3
None Found
N
W
E
S
0
0.2
0.4
0.8
Miles


Sago pondweed
(*Stuckenia pectinata*)
Coefficient of Conservatism = 3
Posttreatment Survey
Lower Vermillion Lake
Barron County, WI
July 2, 2020
Rake Fullness Rating
Visual
1
2
3
None Found
N
W
E
S
0
0.2
0.4
0.8
Miles


Wild celery
(Vallisneria americana)
Coefficient of Conservatism = 6
Posttreatment Survey
Lower Vermillion Lake
Barron County, WI
July 2, 2020
Rake Fullness Rating
Visual
1
2
3
None Found
N
W
E
S
0
0.2
0.4
0.8
Miles