Eurasian Water-milfoil (*Myriophyllum spicatum*)
Pre/Post Herbicide and EWM Bed Mapping Surveys
Round Lake – WBIC: 2640100
Burnett County, Wisconsin

Purple loosestrife and Hybrid cattail in the Trade River Inlet (8/29/20)

2020 Final EWM Treatment Areas

Project Initiated by: Round-Trade Lakes Improvement Association Inc., Lake Education and Planning Services, LLC, and the Wisconsin Department of Natural Resources (Grant ACEI21618)

Canopied Eurasian water-milfoil bed at the lake outlet (8/29/20)

Surveys Conducted by and Report Prepared by:

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May 14, June 18, and August 29, 2020

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INTRODUCTION:

Round Lake (WBIC 2640100) is a 208 acre drainage lake in southwest/south-central Burnett County, Wisconsin in the Town of Trade Lake (T37N R18W S27 NE SW). It reaches a maximum depth of 27ft in two spots near the eastern shoreline midlake and has an average depth of approximately 15ft. The lake is eutrophic in nature with summer Secchi disc readings from 1986 to 2020 ranging from 1.7-5.5ft and averaging 3.5ft (WDNR 2020). This very poor clarity produced a littoral zone that extended to approximately 9.0ft in 2020. The bottom substrate is predominately muck in the main basin and in the lake's bays, while the shoreline and midlake bars and humps are dominated by gravel and sand (Sather et al. 1967).

Figure 1: 2020 Final EWM Treatment Areas

BACKGROUND AND STUDY RATIONALE:

In 2003, the Wisconsin Department of Natural Resources (WDNR) confirmed the presence of Eurasian water-milfoil (*Myriophyllum spicatum*) (EWM) in Round Lake. Following the development of a WDNR approved Aquatic Plant Management Plan (APMP) that outlined strategies to control EWM and Curly-leaf pondweed (*Potamogeton crispus*) (CLP), another invasive exotic species that occurs sporadically throughout the lake's spring littoral zone, the Round-Trade Lake Improvement Association, Inc. (RTLIA) began using manual removal and herbicide treatments to control these species.

The RTLIA – under the direction of Dave Blumer (Lake Education and Planning Services, LLC - LEAPS) – applied for and was awarded a WDNR Aquatic Invasive Species control grant (ACEI21618) to help cover the costs associated with management. In 2020, these funds were used to chemically treat six areas totaling 9.70 acres (4.66% of the lake's surface area) for EWM (Figure 1). On May 14th, we conducted a pretreatment survey to gather baseline data from the proposed treatment areas and to allow LEAPS/RTLIA to finalize treatment plans. After the May 22nd herbicide application, we completed a June 18th posttreatment survey to evaluate the effectiveness of the treatment. We also conducted an August 29th EWM bed mapping survey to determine where control might be considered in 2021. This report is the summary analysis of these three field surveys.

METHODS:

Pre/Post Herbicide Surveys:

LEAPS provided treatment shapefiles, and we generated pre/post survey points based on the size and shape of the proposed areas that covered 9.70 acres. The requested 115 point sampling grid approximated to almost 12 pts/acre – well above the minimum of 4-10 pts/acre required by WDNR protocol for pre/post treatment surveys (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). Data was analyzed using the linked statistical summary sheet and the WDNR pre/post analysis worksheet. 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 (UWEX 2010). 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 $p<0.001$.

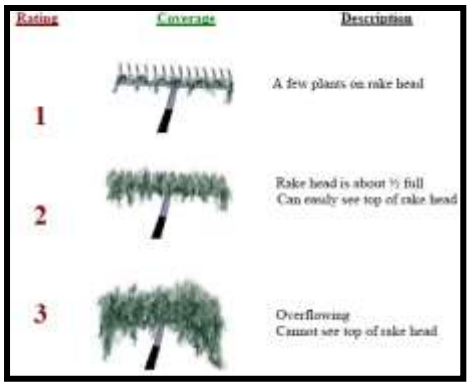


Figure 2: Rake Fullness Ratings

Late Summer Eurasian Water-milfoil Bed Mapping:

During the late summer survey, we searched the visible littoral zone of the lake and mapped all known beds of EWM. A "bed" was determined to be any area where we visually estimated that EWM made up >50% of the area's plants and was generally continuous with clearly defined borders. After we located a bed, we motored around the perimeter of the area, took GPS coordinates at regular intervals, and estimated both the range and mean rake fullness rating of EWM within the bed (Figure 2). Using the WDNR's Forestry Tool's Extension to ArcGIS 9.3.1, we plotted these coordinates to generate bed shapefiles and determine the acreage to the nearest hundredth of an acre. We also took waypoints of EWM plants outside these beds as they were generally few in number.

RESULTS AND DISCUSSION:

Finalization of Treatment Areas:

Initial expectations were to treat six beds – one for Curly-leaf pondweed using liquid Endothall (Aquathol K) and five for Eurasian water-milfoil using liquid 2,4-D (Shredder Amine) (Figure 3) (Appendix I). Following the pretreatment survey, it was decided to maintain the proposed acreage, but to treat all six areas for EWM only (Table 1).

Northern Aquatic Services (Dale Dressel – Dresser, WI) carried out the treatment on May 22nd. The reported water temperature at the time of application was 61°F, the ambient air temperature was 71°F, and winds were out of the southeast at 3-5mph.

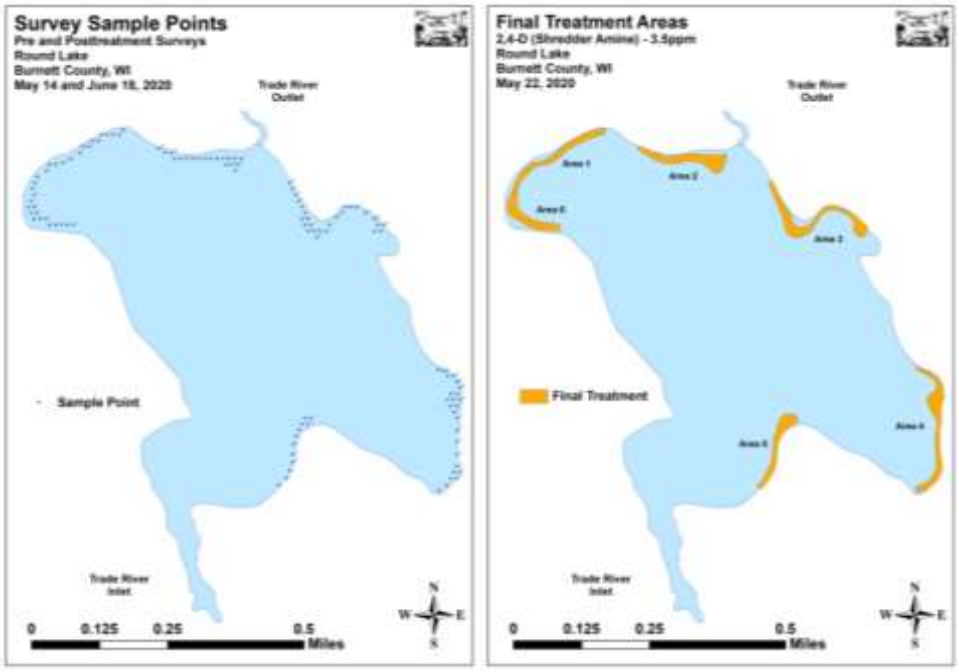


Figure 3: Survey Sample Points and Final Treatment Areas

Table 1: Spring EWM Treatment Summary
Round Lake, Burnett County - May 22, 2020

Treatment Area	Proposed Acreage	Final Acreage	Difference +/-	Chemical (Brand) – Dosage – Total Gallons
1	1.35	1.35	0.00	2,4-D (Shredder Amine) – 3.5ppm – 13.45gal.
2	1.71	1.71	0.00	2,4-D (Shredder Amine) – 3.5ppm – 17.03gal.
3	2.12	2.12	0.00	2,4-D (Shredder Amine) – 3.5ppm – 21.12gal.
4	2.03	2.03	0.00	2,4-D (Shredder Amine) – 3.5ppm – 20.22gal.
5	1.23	1.23	0.00	2,4-D (Shredder Amine) – 3.5ppm – 12.25gal.
6	1.26	1.26	0.00	2,4-D (Shredder Amine) – 3.5ppm – 12.50gal.
Total Acres	**9.70**	**9.70**	**0.00**	

Pre/Post Herbicide Surveys:

All points occurred in areas between 0.5ft and 11.0ft of water. The mean and median depths of plant growth were almost unchanged at 2.9ft/2.5ft respectively pretreatment and 2.8ft/2.5ft posttreatment (Table 2). We found most Eurasian water-milfoil and Curly-leaf pondweed plants were established in a thin layer of muck over sand and rock (Figure 4) (Appendix III).

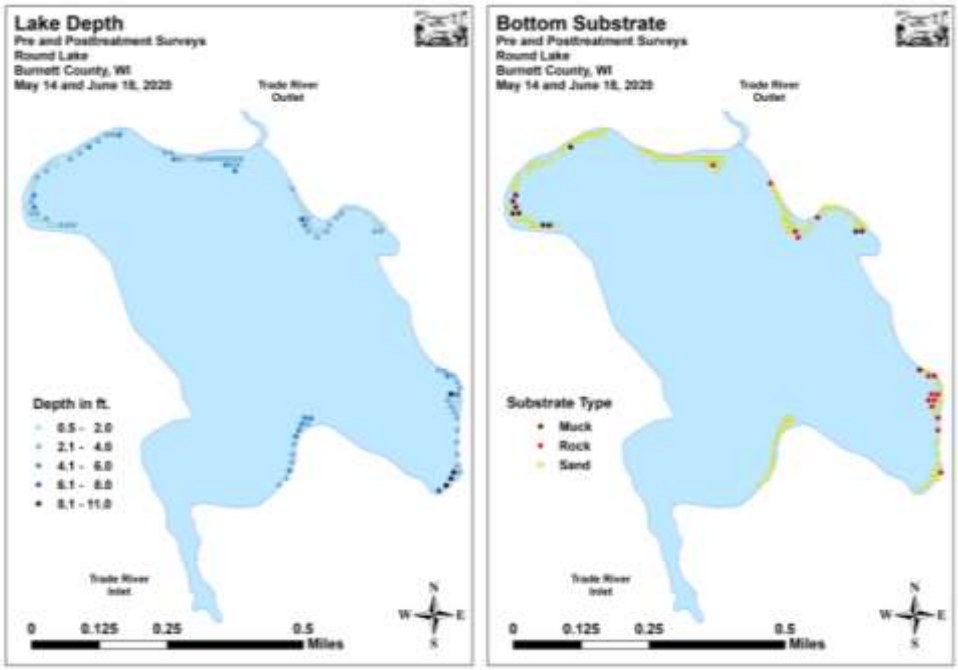


Figure 4: Treatment Area Depths and Bottom Substrate

Table 2: Pre/Post Surveys Summary Statistics
Round Lake, Burnett County
May 14 and June 18, 2020

Summary Statistics:	Pre	Post
Total number of points sampled	115	115
Total number of sites with vegetation	84	87
Total number of sites shallower than the maximum depth of plants	109	114
Freq. of occur. at sites shallower than max. depth of plants (in percent)	77.1	76.3
Simpson Diversity Index	0.68	0.79
Mean Coefficient of Conservatism	4.8	5.8
Floristic Quality Index	11.8	20.8
Maximum depth of plants (ft)	6.0	9.0
Mean depth of plants (ft)	2.9	2.8
Median depth of plants (ft)	2.5	2.5
Average number of all species per site (shallower than max depth)	1.20	1.63
Average number of all species per site (veg. sites only)	1.56	2.14
Average number of native species per site (shallower than max depth)	0.79	1.55
Average number of native species per site (sites with native veg. only)	1.34	2.03
Species richness	7	15
Mean rake fullness (veg. sites only)	1.80	1.79

The littoral zone within the planned treatment areas increased from 6.0ft during the pretreatment survey to 9.0ft during the posttreatment survey. However, the frequency of plant occurrence was almost unchanged at 77.1% pretreatment and 76.3% posttreatment (Figure 5) (Appendix IV). Total richness more than doubled from seven species pretreatment to 15 posttreatment. The Simpson's Diversity Index also rose from a moderate pretreatment value of 0.68 to a moderately high posttreatment value of 0.79. The Floristic Quality Index (another measure of native plant community health) climbed from 11.8 pretreatment to 20.8 posttreatment.

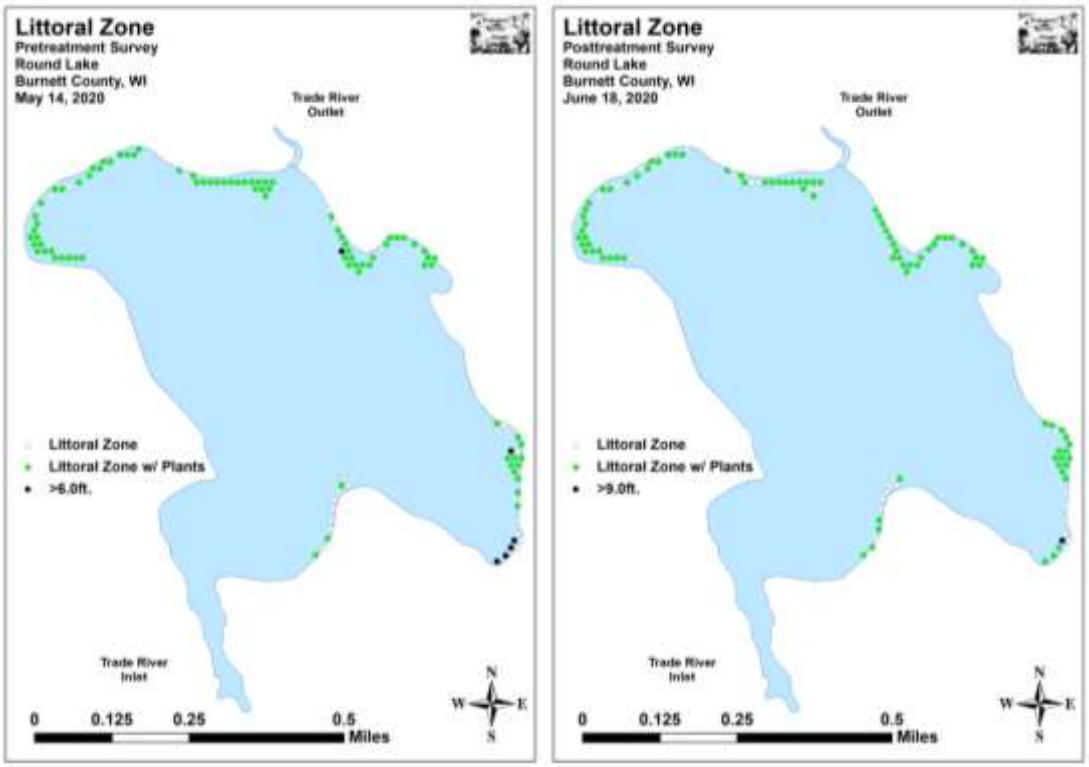


Figure 5: Pre/Post Littoral Zone

Mean native species richness at points with native vegetation experienced a highly significant increase **(p<0.001)** from 1.34 species/point pretreatment to 2.03 species/point posttreatment. Visual analysis of the maps showed these increases occurred in all areas (Figure 6). Total mean rake fullness was almost unchanged from a low/moderate 1.80 pretreatment to 1.79 posttreatment (Figure 7) (Appendix IV).

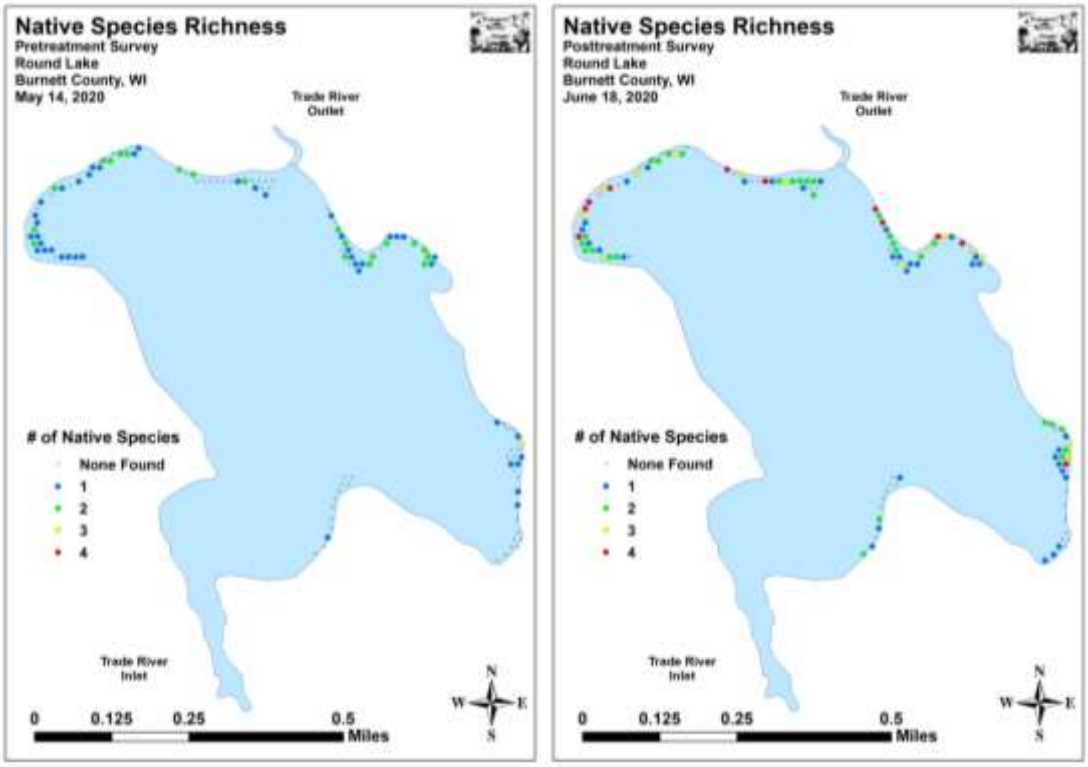


Figure 6: Pre/Post Native Species Richness

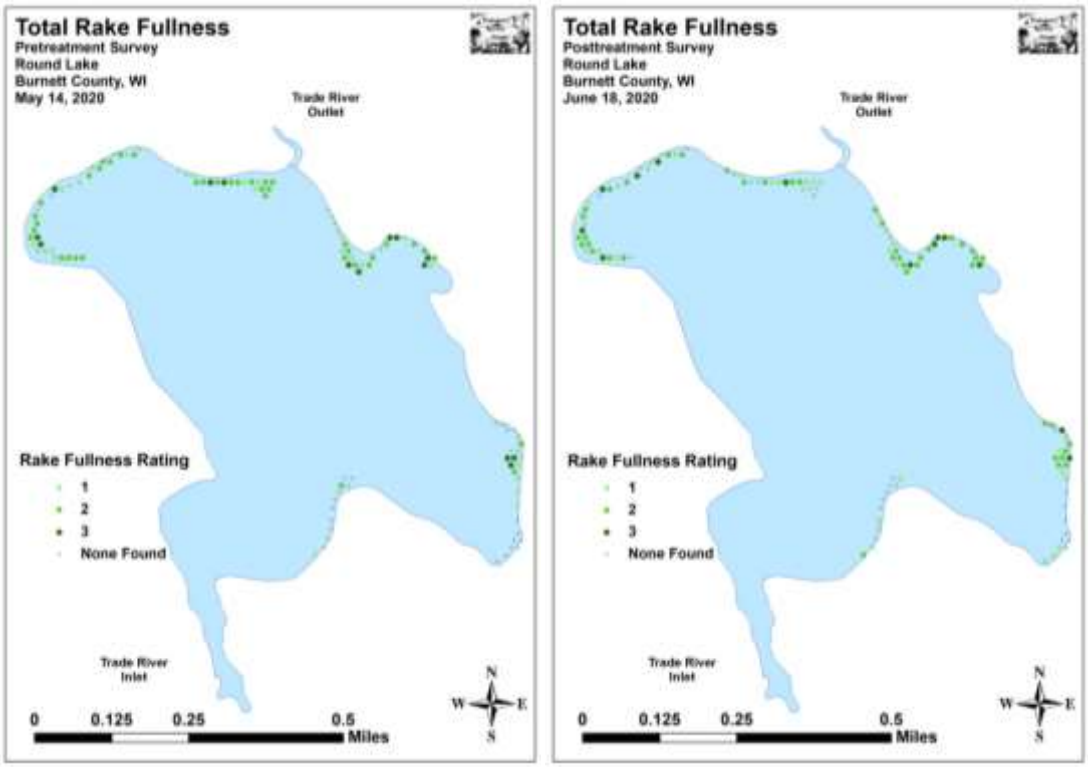


Figure 7: Pre/Post Total Rake Fullness

We didn't find Curly-leaf pondweed at any point during the pretreatment survey, and, consequently, the treatment in Area 6 was cancelled (Figure 8). During the posttreatment survey, CLP was present at eight points (7.0% coverage) all of which rated a 1. We also noted 11 visual sightings. **Our results indicated a moderately significant increase (p=0.004) in total distribution and rake fullness 1; and a highly significant increase (p<0.001) in visual sightings** (Figure 9). Despite these increases, CLP was seldom more than a few canopied plants, and we didn't see any areas where it was bed forming or likely a significant impairment to navigation (Appendix V).

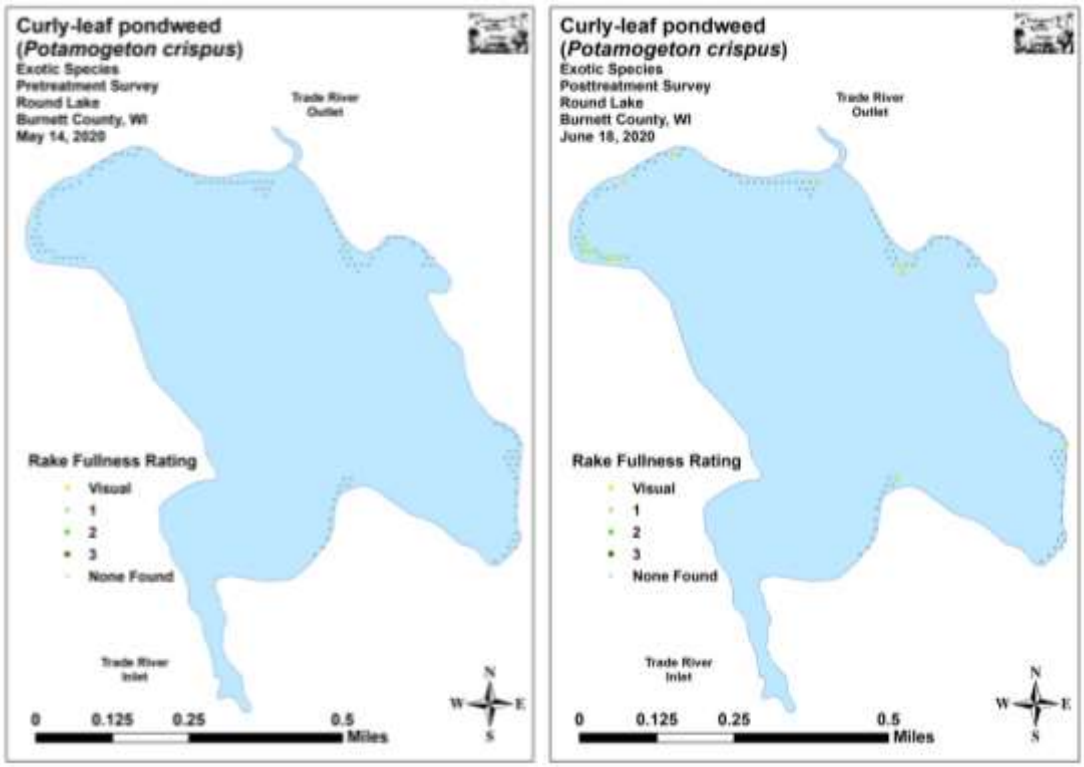
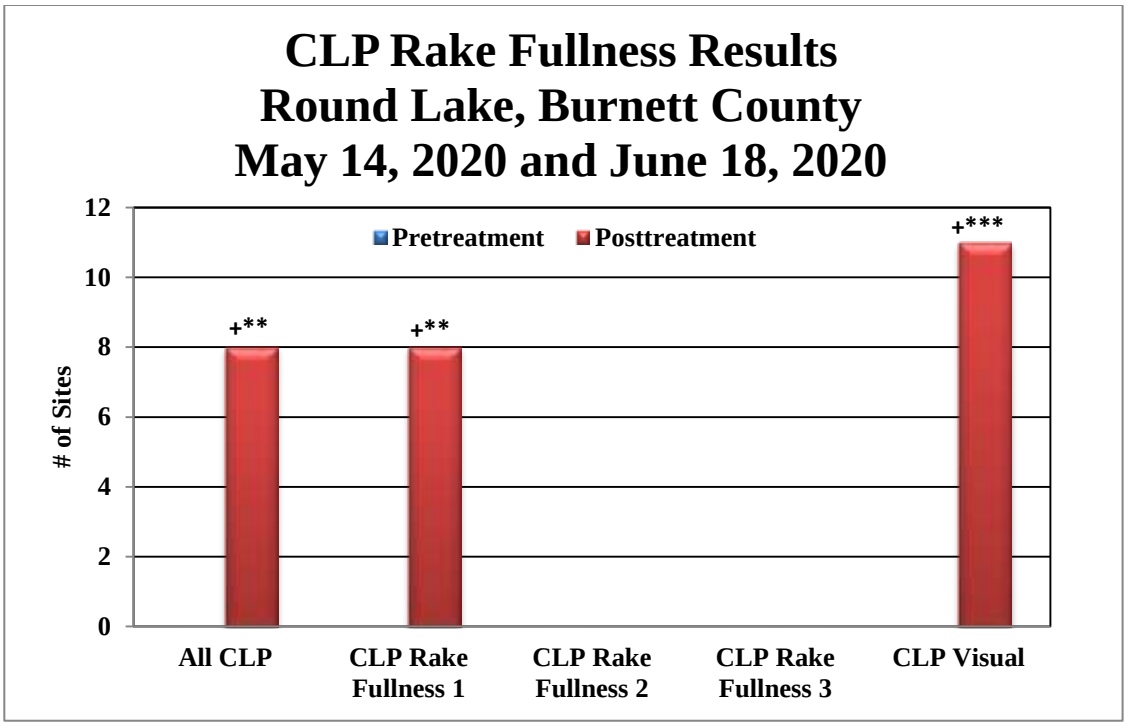


Figure 8: Pre/Post CLP Density and Distribution



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

Figure 9: Pre/Post Changes in CLP Rake Fullness

Eurasian water-milfoil was present at 45 of 115 sites during the pretreatment survey (39.1% coverage) with 21 additional visual sightings (Figure 10) (Appendix V). Of these, seven had a rake fullness rating of 3, 20 rated a 2, and the remaining 18 were a 1. This produced a mean rake fullness of 1.76 and suggested that 23.5% of the treatment areas had a significant EWM infestation (rake fullness 2 and 3).

During the posttreatment survey, EWM was present at a single point (2.6% coverage) with a rake fullness of one, and we also documented it as a visual at two points (Figure 10). **Our results demonstrated a highly significant decline ($p<0.001$) in total EWM density, distribution, rake fullness 2 and 1, and visual sightings; and a moderately significant decline ($p=0.007$) in rake fullness 3** (Figure 11).

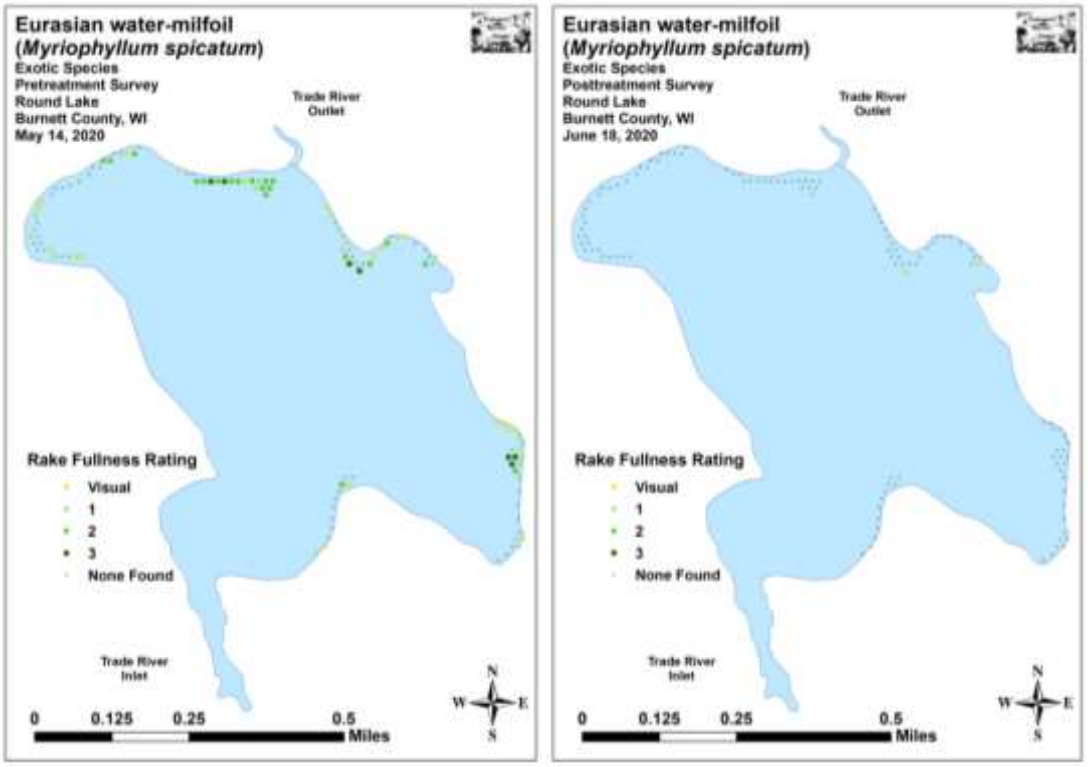
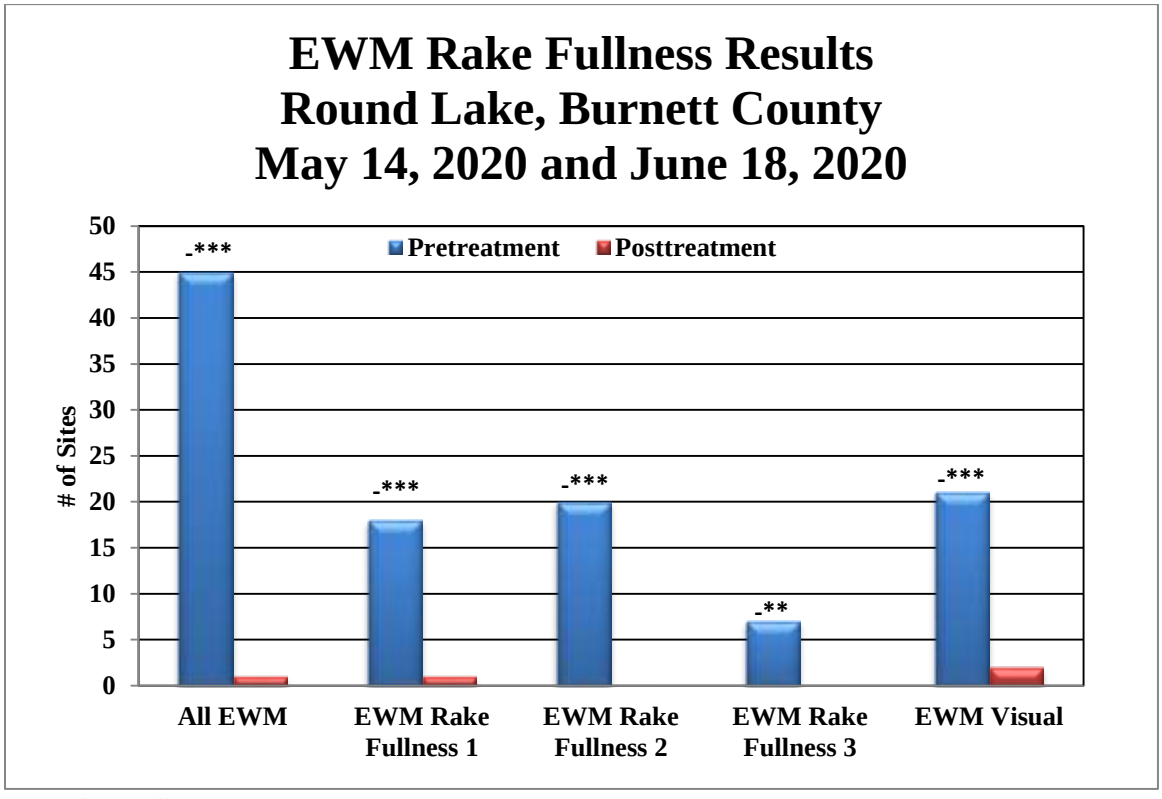


Figure 10: Pre/Post EWM Density and Distribution



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

Figure 11: Pre/Post Changes in EWM Rake Fullness

Coontail (*Ceratophyllum demersum*) (Figure 12) and Common waterweed (*Elodea canadensis*) (Figure 13) were the most common native species during both the pre and posttreatment surveys (Tables 3 and 4). Present at 50 sites with a mean rake fullness of 1.48 during the pretreatment survey, Coontail experienced a significant increase **(*p*=0.02)** in distribution to 67 sites, and a significant increase **(*p*=0.03)** in mean rake fullness to 1.73 posttreatment. Common waterweed (31 sites – mean rake 1.45 pretreatment) also saw a significant increase **(*p*=0.01)** in distribution posttreatment to 49 sites; however, its density was almost unchanged (mean rake fullness to 1.47).

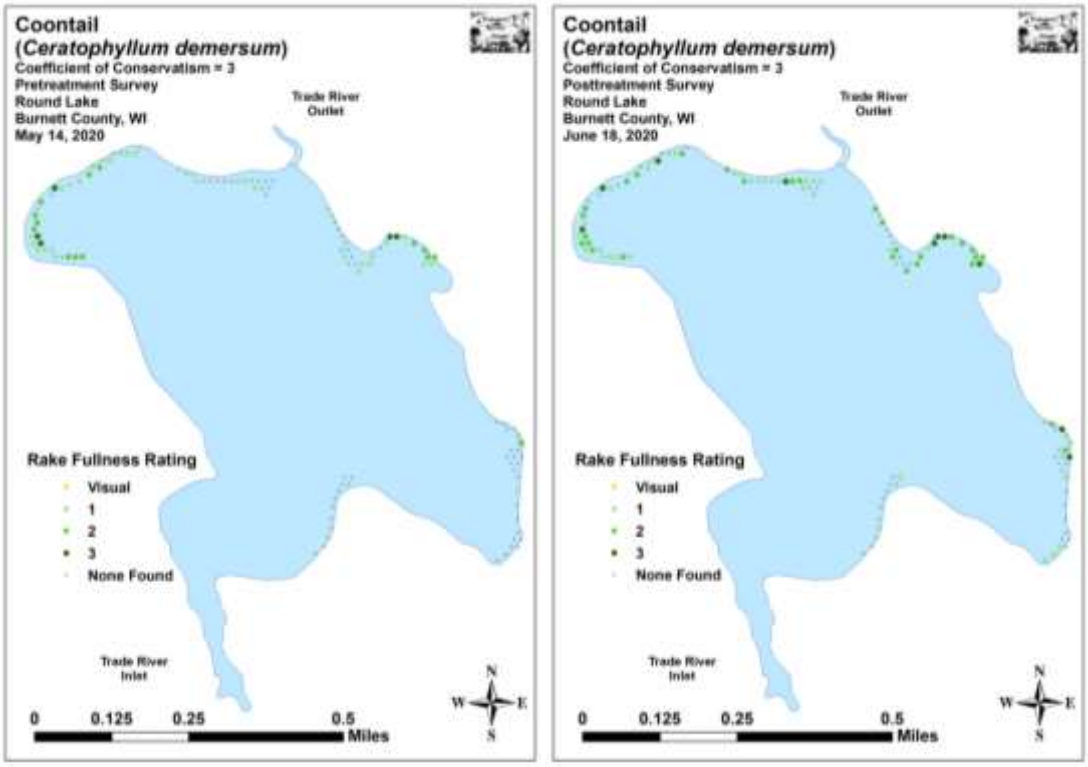


Figure 12: Pre/Post Coontail Density and Distribution

Other than EWM, no species experienced a significant decline posttreatment, but many expanded their range. Specifically, Wild celery (*Vallisneria americana*) enjoyed a highly significant increase; in addition to Curly-leaf pondweed, Clasping-leaf pondweed (*Potamogeton richardsonii*) and Small pondweed (Potamogeton pusillus) saw moderately significant increases; and, along with Coontail and Common waterweed, Long-leaf pondweed (*Potamogeton nodosus*) and Spatterdock (*Nuphar variegata*) saw significant increases (Figure 14) (Maps for all native species from the pre and posttreatment surveys are available in Appendixes VI and VII).

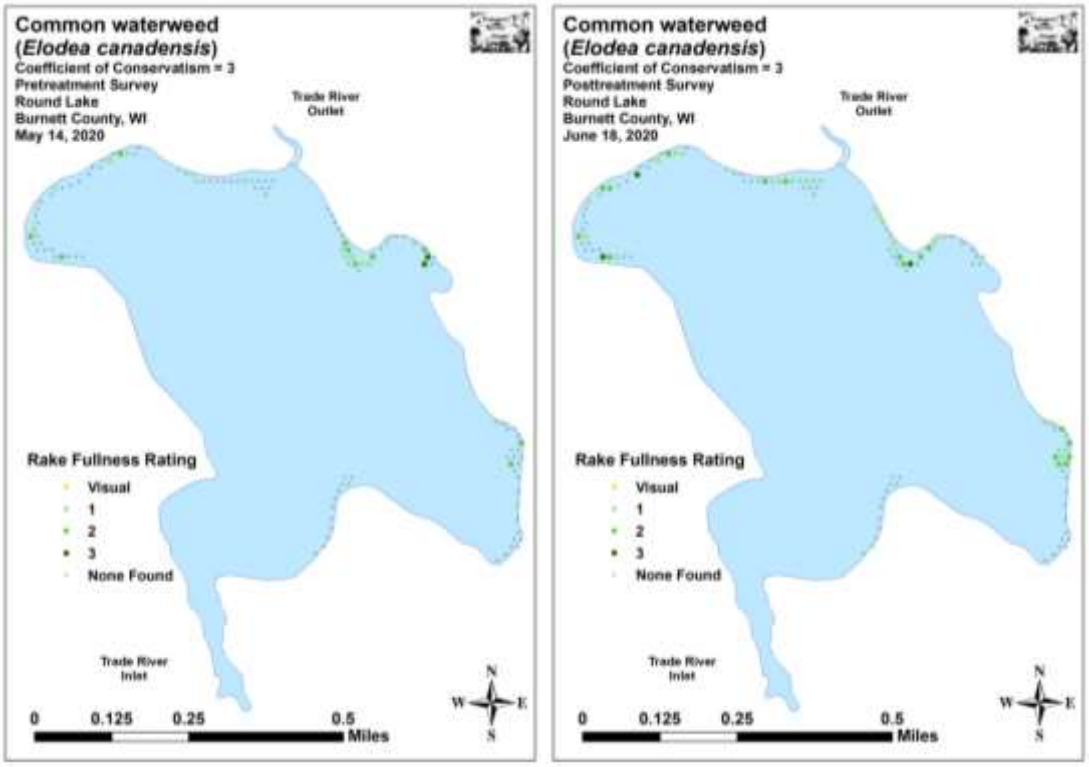


Figure 13: Pre/Post Common Waterweed Density and Distribution

Table 3: Frequencies and Mean Rake Sample of Aquatic Macrophytes
Pretreatment Survey – Round Lake, Burnett County
May 14, 2020

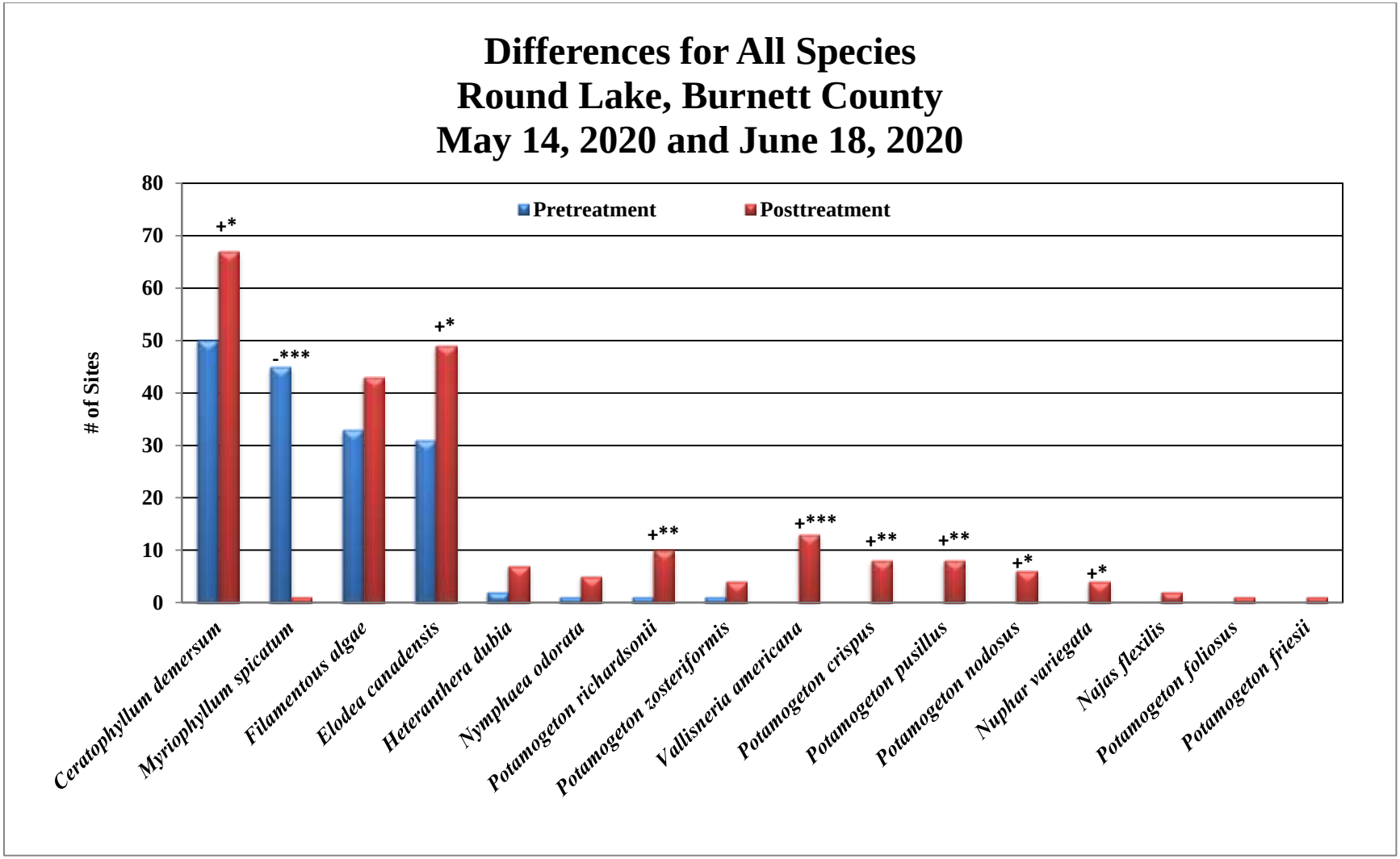
Species	Common Name	Total Sites	Relative Freq.	Freq. in Veg.	Freq. in Lit.	Mean Rake	Visual Sites
Ceratophyllum demersum	Coontail	50	38.17	59.52	45.87	1.48	0
Myriophyllum spicatum	Eurasian water-milfoil	45	34.35	53.57	41.28	1.76	21
	Filamentous algae	33	*	39.29	30.28	1.39	0
Elodea canadensis	Common waterweed	31	23.66	36.90	28.44	1.45	0
Heteranthera dubia	Water star-grass	2	1.53	2.38	1.83	1.00	0
Nymphaea odorata	White water lily	1	0.76	1.19	0.92	1.00	0
Potamogeton richardsonii	Clasping-leaf pondweed	1	0.76	1.19	0.92	1.00	0
Potamogeton zosteriformis	Flat-stem pondweed	1	0.76	1.19	0.92	1.00	0

* Excluded from relative frequency analysis

Table 4: Frequencies and Mean Rake Sample of Aquatic Macrophytes
Posttreatment Survey – Round Lake, Burnett County
June 18, 2020

Species	Common Name	Total Sites	Relative Freq.	Freq. in Veg.	Freq. in Lit.	Mean Rake	Visual Sites
Ceratophyllum demersum	Coontail	67	36.02	77.01	58.77	1.73	0
Elodea canadensis	Common waterweed	49	26.34	56.32	42.98	1.47	0
	Filamentous algae	43	*	49.43	37.72	1.49	0
Vallisneria americana	Wild celery	13	6.99	14.94	11.40	1.08	0
Potamogeton richardsonii	Clasping-leaf pondweed	10	5.38	11.49	8.77	1.30	1
Potamogeton crispus	Curly-leaf pondweed	8	4.30	9.20	7.02	1.00	11
Potamogeton pusillus	Small pondweed	8	4.30	9.20	7.02	1.00	0
Heteranthera dubia	Water star-grass	7	3.76	8.05	6.14	1.14	0
Potamogeton nodosus	Long-leaf pondweed	6	3.23	6.90	5.26	1.17	0
Nymphaea odorata	White water lily	5	2.69	5.75	4.39	1.20	0
Nuphar variegata	Spatterdock	4	2.15	4.60	3.51	1.50	0
Potamogeton zosteriformis	Flat-stem pondweed	4	2.15	4.60	3.51	1.00	0
Najas flexilis	Slender naiad	2	1.08	2.30	1.75	1.00	0
Myriophyllum spicatum	Eurasian water-milfoil	1	0.54	1.15	0.88	1.00	2
Potamogeton foliosus	Leafy pondweed	1	0.54	1.15	0.88	1.00	0
Potamogeton friesii	Fries' pondweed	1	0.54	1.15	0.88	1.00	0

* Excluded from relative frequency analysis



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

Figure 14: Pre/Post Macrophyte Changes

Late Summer Eurasian Water-milfoil Bed Mapping Survey:

During the August survey, we located and mapped 12 areas ranging in size from 0.01 acre (Bed 15A) to 1.67 acres (Bed 3) (Figure 15) (Appendix VIII). Collectively, these beds covered 2.95 acres (1.42% of the lake's surface area) (Table 5). This was a decrease of 1.65 acres (-35.87%) from the 7 areas covering 4.60 acres (2.21% of the lake's surface area) we mapped in 2019, but it was still more than the seven areas totaling 2.18 acres (1.05% coverage) found in 2018 and the 15 beds totaling 2.76 acres (1.28% coverage) in 2017. However, it was lower than the recent high of 7.57 acres (3.64% coverage) mapped in 2016 (Table 6). Outside these beds, EWM was relatively uncommon and scattered as we marked a total of 43 additional plants throughout the rest of the lake.

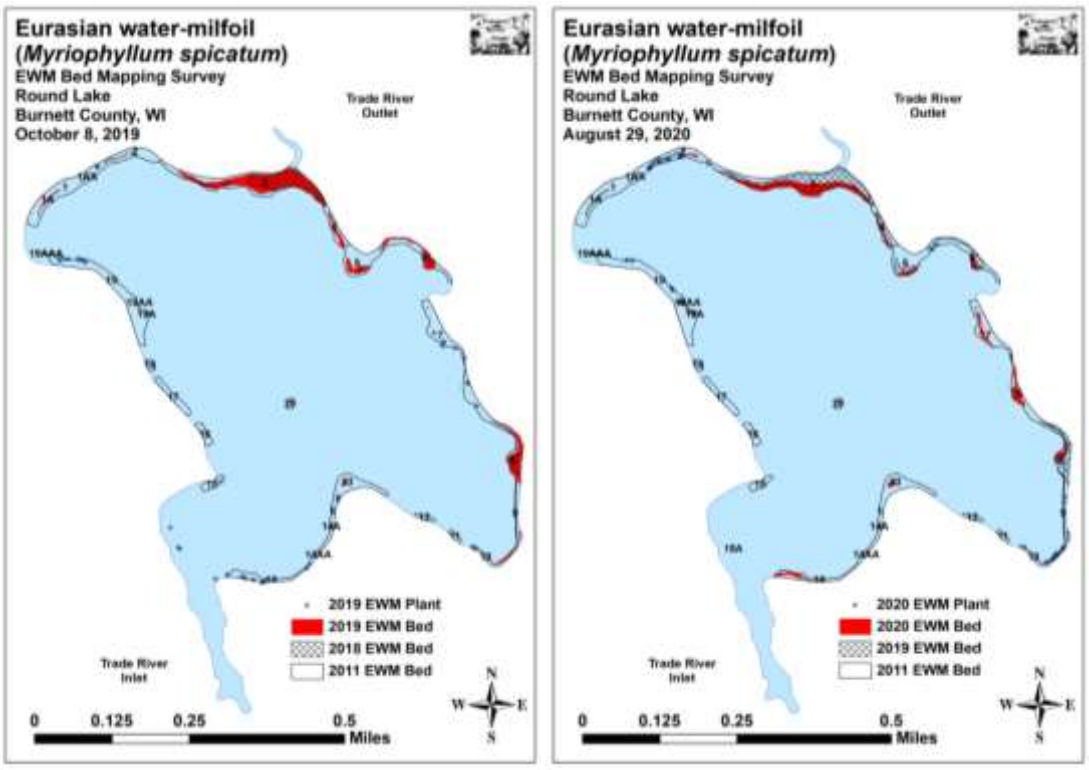


Figure 15: Fall 2019 and Late Summer 2020 EWM Bed Maps

Table 5: Late Summer Eurasian Water-milfoil Bed Mapping Summary
Round Lake, Burnett County
August 29, 2020

Bed Number	2020 Area in Acres	2019 Area in Acres	2020 Change in Acreage	Rake Range; Mean Rake Fullness	Depth Range and Mean Depth	Navigation Impairment	2020 Field Notes
Merged 1-6	2.06	3.68	-1.62	-	-	-	-----
1 and 1A/AA	0	0.10	-0.10	<<<1-1	-	-	8 EWM plants
2	0.04	0.06	-0.02	<<<1-2; <1	2-4; 3	-	More of a HDA – 7 additional plants in area
3 and 3A/AA	1.67	2.66	-0.99	<1-3; 2	2-6; 4	Moderate	Canopied mat near outlet – less dense on periphery
4	0.13	0.19	-0.06	1-3; 2	3-5; 4	Minor	Narrow ribbon along shore
5	0.12	0.26	-0.14	1-3; 3	3-5; 4	Moderate	Canopied mat – too narrow to be severe
6	0.10	0.41	-0.31	<<1-1; 1	3-5; 4	Minor	Open bed mixed with Coontail
7 and 7A	0.46	<0.01	0.46	<<<1-2; <1	2-6; 4	Minor	Open beds along shoreline – nearly monotypic
8	0.16	0.71	-0.55	<<1-2; 2	2-6; 4	Moderate	Canopied mat at core – fragmented on edge
9	0	0.02	-0.02	<<<1	2-6; 4	None	2 EWM plants
10	0	0.08	-0.08	<<<1	2-6; 4	None	9 EWM plants
11	0	0	0	-	-	-	No EWM seen
12	0	0	0	-	-	-	No EWM seen
13	0.06	0.05	0.01	<<1-2; 1	4-6; 5	Minor	Open bed on point
14 and 14A/AA	0.17	0.02	0.15	<<1-3; 2	3-5; 4	Moderate	Bed cut in half by boat traffic at landing
15A	0.01	0	0.01	<1-1; 1	3-5; 4	None	Microbed in the river inlet
15	0	0	0	-	-	-	No EWM seen
16	0	0	0	-	-	-	No EWM seen
17	0	0	0	-	-	-	No EWM seen
18	0	0	0	-	-	-	No EWM seen
19A/AA/AAA	0.04	0.04	0	1-2; 1	5-6; 5	Minor	Low density open bed – some plants prop-clipped
20	0	0	0	-	-	-	No EWM seen
Total Acres	**2.95**	**4.60**	**-1.65**				

Table 6: Historical Late Summer/Fall Eurasian Water-milfoil Bed Mapping Summary
Round Lake, Burnett County
2011-2020

Bed Number	2020 Area in Acres	2019 Area in Acres	2018 Area in Acres	2017 Area in Acres	2016 Area in Acres	2015 Area in Acres	2014 Area in Acres	2013 Area in Acres	2012 Area in Acres	2011 Area in Acres
Merged 1-6	2.06	3.68	1.93	1.24	5.66	2.16	-	-	-	-
1 and 1A/AA	0	0.10	0	0.17	Merged	0	0	0	0.52	1.91
2	0.04	0.06	0	0.14	Merged	0	0.16	0.10	0.47	0.74
3 and 3A/AA	1.67	2.66	1.82	0.59	Merged	1.55	1.81	1.00	2.58	3.57
4	0.13	0.19	Merg. w/3	Merg. w/3	Merged	Merg. w/ 3	Merg. w/ 3	0.11	0.68	0.63
5	0.12	0.26	0.02	0.06	Merged	0.49	0.26	0	0.46	1.21
6	0.10	0.41	0.09	0.28	Merged	0.11	0.06	0	0.43	0.61
7 and 7A	0.46	<0.01	0	0.28	0.78	0.65	0.05	0	0.80	1.73
8	0.16	0.71	0.25	0.52	0.57	0.43	0.23	0	0.19	0.55
9	0	0.02	0	0.06	0	0	0	0	0.20	0.26
10	0	0.08	0	0	0	0	0	0	0.06	0.11
11	0	0	0	0	0	0	0	0	0.06	0.11
12	0	0	0	0	0	0	0	0	0	0.13
13	0.06	0.05	0	0.25	0.08	0.28	0	0	0.44	1.04
14 and 14A/AA	0.17	0.02	0	0.39	0.19	0.06	0.07	0	0.39	0.92
15A	0.01	0	0	0	0.01	0.04	0	0	0	0
15	0	0	0	0	0	0	0	0	0.12	0.27
16	0	0	0	0	0	0	0	0	0.09	0.26
17	0	0	0	0	0	0	0.10	0	0.15	0.46
18	0	0	0	0	0	0	0	0	0	0.13
19A/AA/AAA	0.04	0.04	<0.01	0.03	0.27	0.03	0.46	0.19	1.15	2.27
20	0	0	0	0	0	0	0	0.01	0.05	0.10
Total Acres	**2.95**	**4.60**	**2.18**	**2.76**	**7.57**	**3.65**	**3.20**	**1.41**	**8.84**	**17.01**

Descriptions of Current and Former Eurasian Water-milfoil Beds:

Beds 1A, 1AA, and 2 – The treatment in these beds was fairly effective. Most surviving plants occurred just outside of the herbicide area on the eastern half of Bed 2.

Bed 3 – Treatment on the western end of the bed was effective, but it appeared to have had little impact near the outlet as this was again the worst area on the lake. A solid canopied mat at its core, the bed ended abruptly at the deep water edge. Away from the outlet, densities gradually declined in each direction before the bed fragmented and, ultimately, disappeared.

Beds 4 and 5 – Similar to Bed 2, the surviving plants in these beds occurred on the deep water edge outside the treatment areas.

Bed 6 – Treatment in the northeast bay was either not particularly successful, or, and perhaps more likely, prevailing winds throughout the summer blow fragments to this area allowing for rapid reestablishment.

Beds 7 and 7A – The scattered clusters we documented in 2019 had merged into two low density beds. Both areas were nearly monotypic with few natives present.

Bed 8 – The south end of the flat was almost entirely free of EWM, but the core area on the north end next to the deep water edge survived the treatment. This area was already moderately dense and appeared to be rapidly reestablishing up and down the shoreline.

Beds 9 and 10 – Treatment was mostly effective in these narrow beds as we only found a few widely-scattered towers near the campground docks.

Beds 11 and 12 – We didn't see any EWM in these former beds.

Bed 13, 14A, and 14AA – Treatment along the shoreline bed was effective, but deepwater plants in Bed 13 survived.

Bed 14 – The shoreline in front of the public boat landing is now dominated by a moderately dense EWM bed. Most plants were prop-clipped, and anyone leaving the lake is at risk of bringing plants with them making this a priority for future managment.

Bed 15A – This microbed encompassed a few clusters of plants along an uninhabited shoreline near the river inlet.

Beds 15-18 – We saw no evidence of EWM in these areas along the western midlake shoreline.

Beds 19A, 19AA, and 19AAA – On the southeast end of the area, Beds 19A and 19AA merged into a single low density bed. Treated areas in 19AAA and 19 were almost completely free of EWM.

Bed 20 – We again found no EWM plants on the midlake rock bars.

LITERATURE CITED

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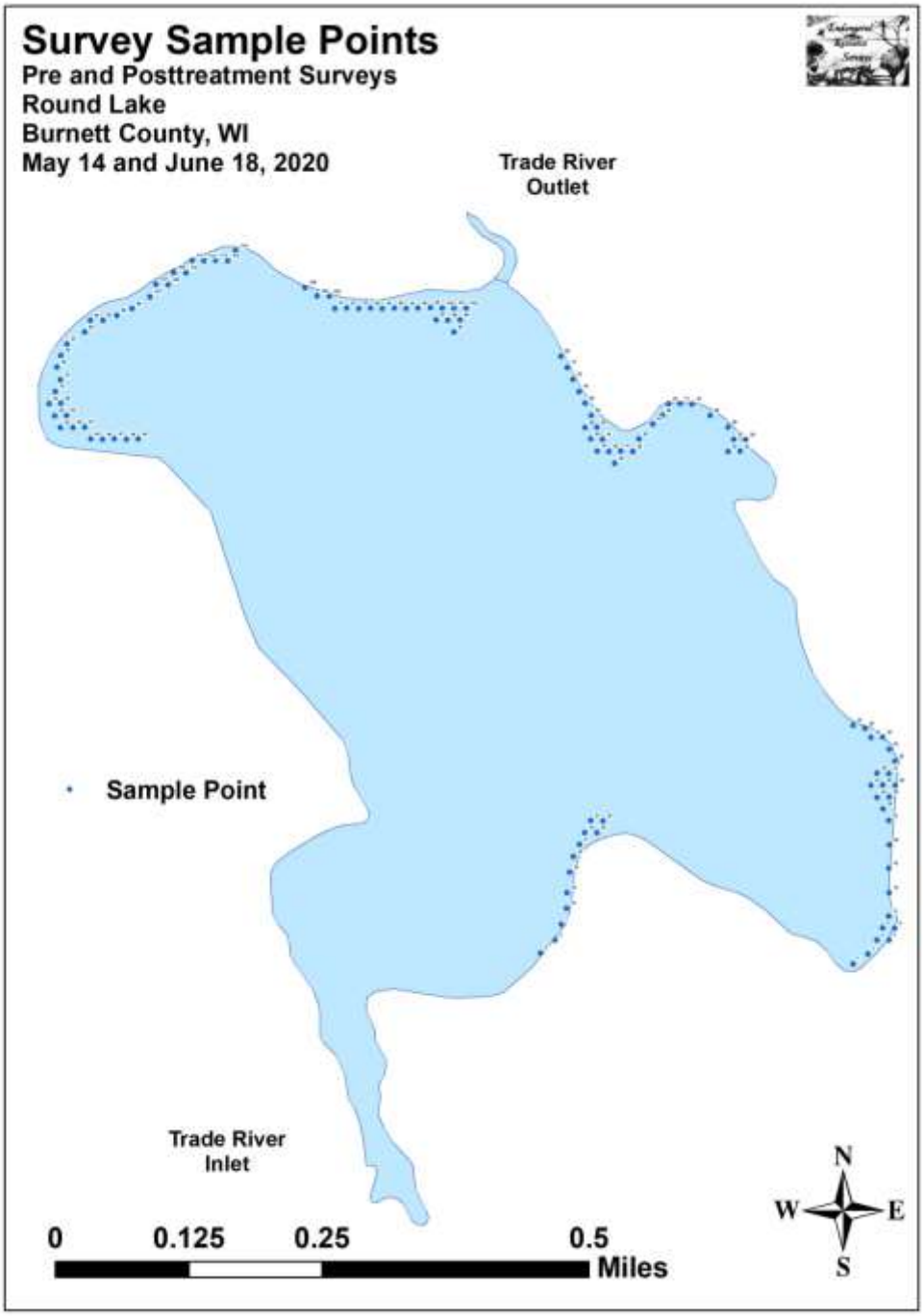
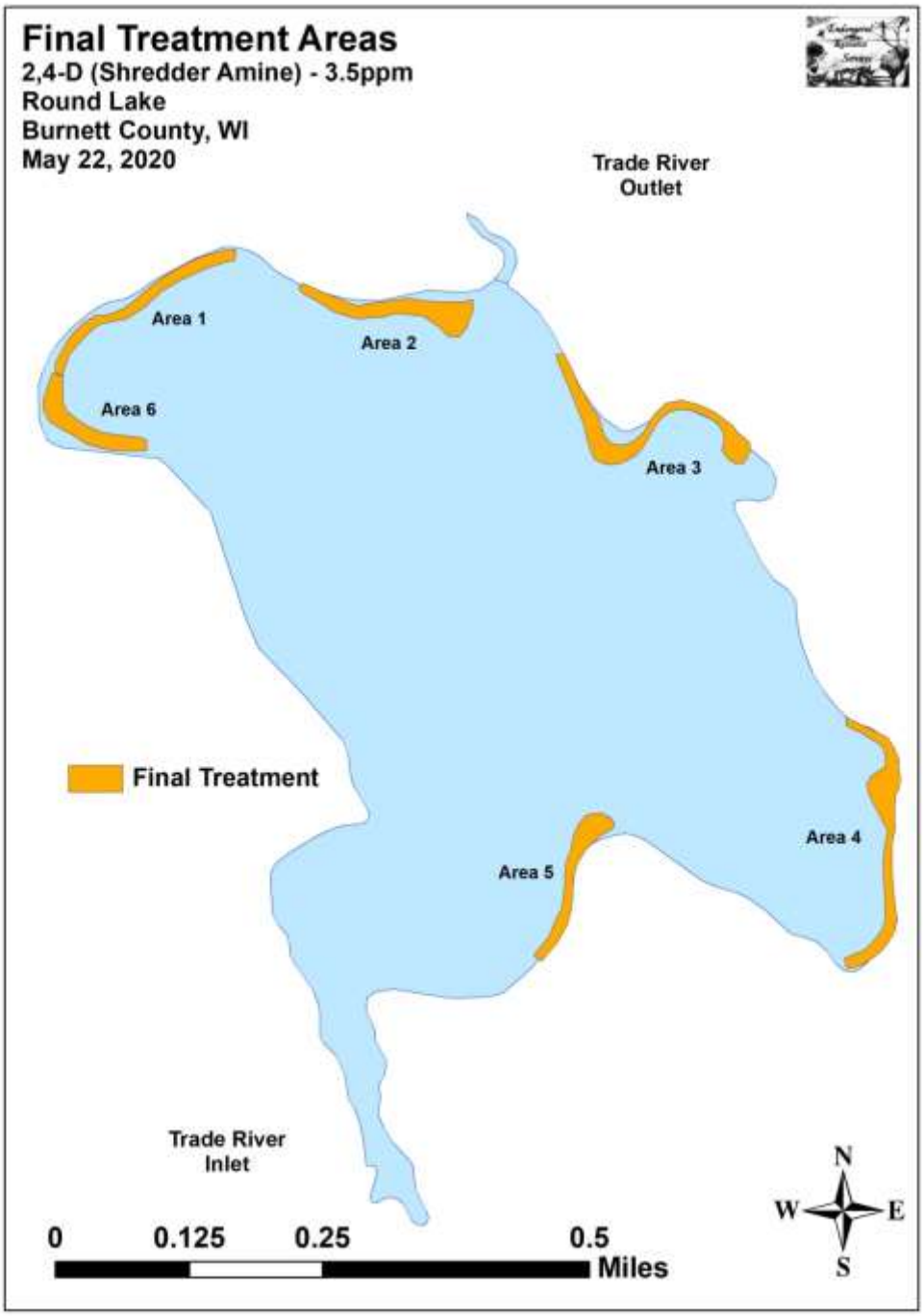
UWEX Lakes Program. [online]. 2010. Aquatic Plant Management in Wisconsin. Available from http://www.uwsp.edu/cnr-ap/UWEXLakes/Pages/ecology/aquaticplants/default.aspx (2020, November).

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, November).

WDNR. [online]. 2020. Round Lake - Citizen Lake Water Quality Monitoring Database. Available from http://dnr.wi.gov/lakes/waterquality/Station.aspx?id=073039 (2020, November).

Appendix I: Survey Sample Points and Final Treatment Areas

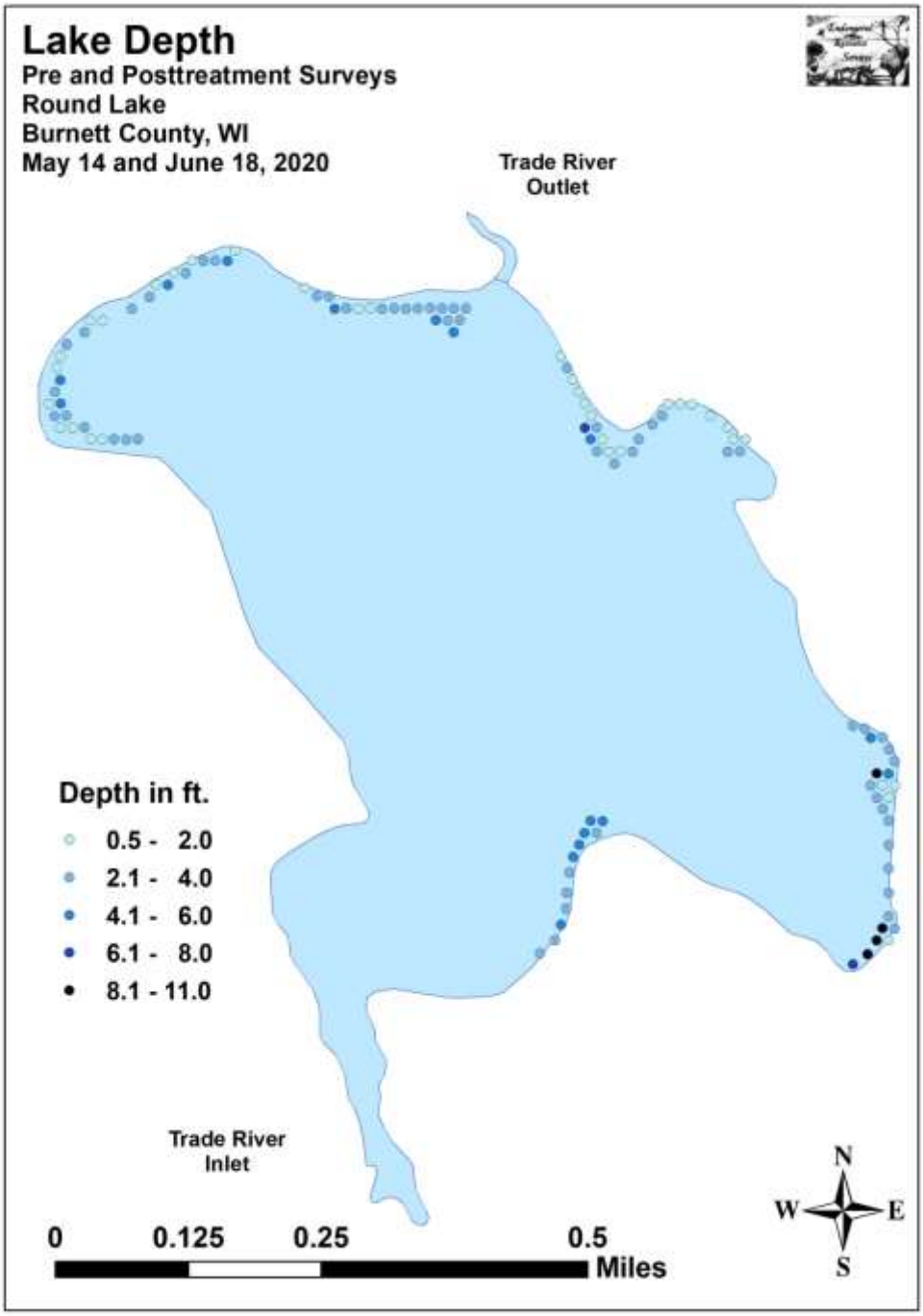

Survey Sample Points
Pre and Posttreatment Surveys
Round Lake
Burnett County, WI
May 14 and June 18, 2020
Trade River
Outlet
Sample Point
Trade River
Inlet
N
W
E
S
0
0.125
0.25
0.5
Miles

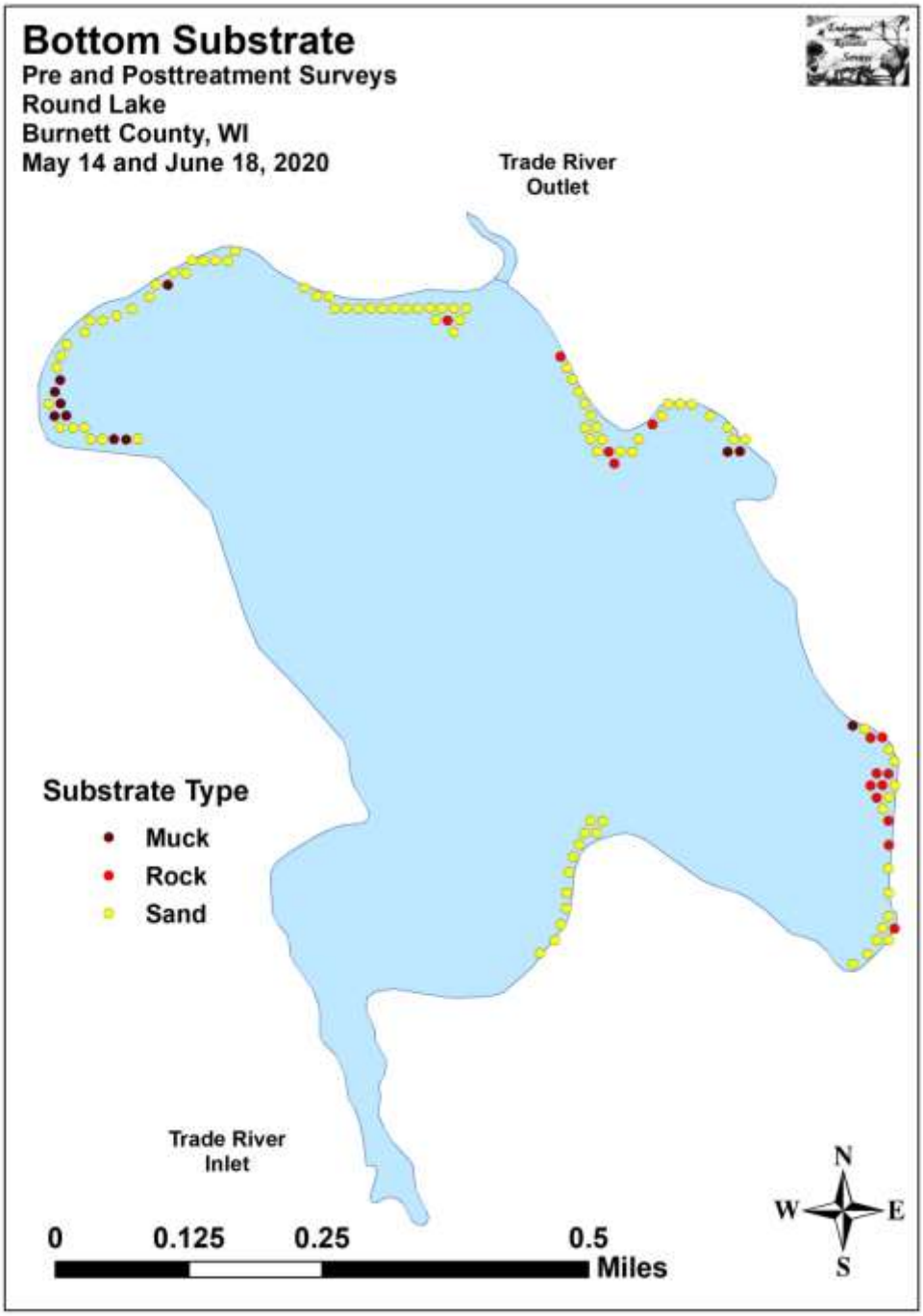

Final Treatment Areas
2,4-D (Shredder Amine) - 3.5ppm
Round Lake
Burnett County, WI
May 22, 2020
Trade River
Outlet
Area 1
Area 2
Area 3
Area 4
Area 5
Area 6
Final Treatment
Trade River
Inlet
N
W
E
S
0
0.125
0.25
0.5
Miles

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																									
4																									
5																									
6																									
7																									
8																									
9																									
10																									
11																									
12																									
13																									
14																									
15																									
16																									
17																									
18																									
19																									
20																									

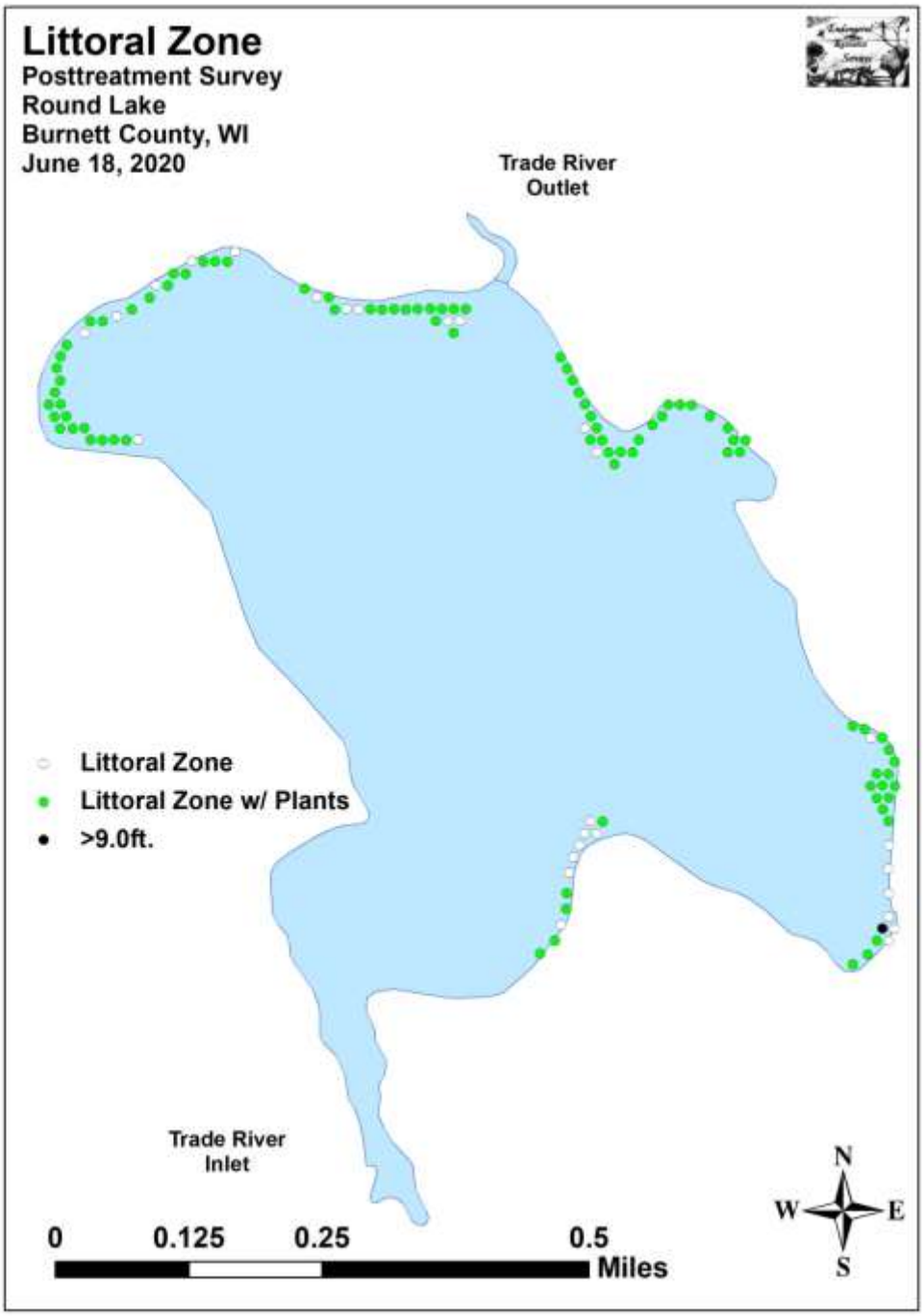
Appendix III: Pre/Post Habitat Variable Maps

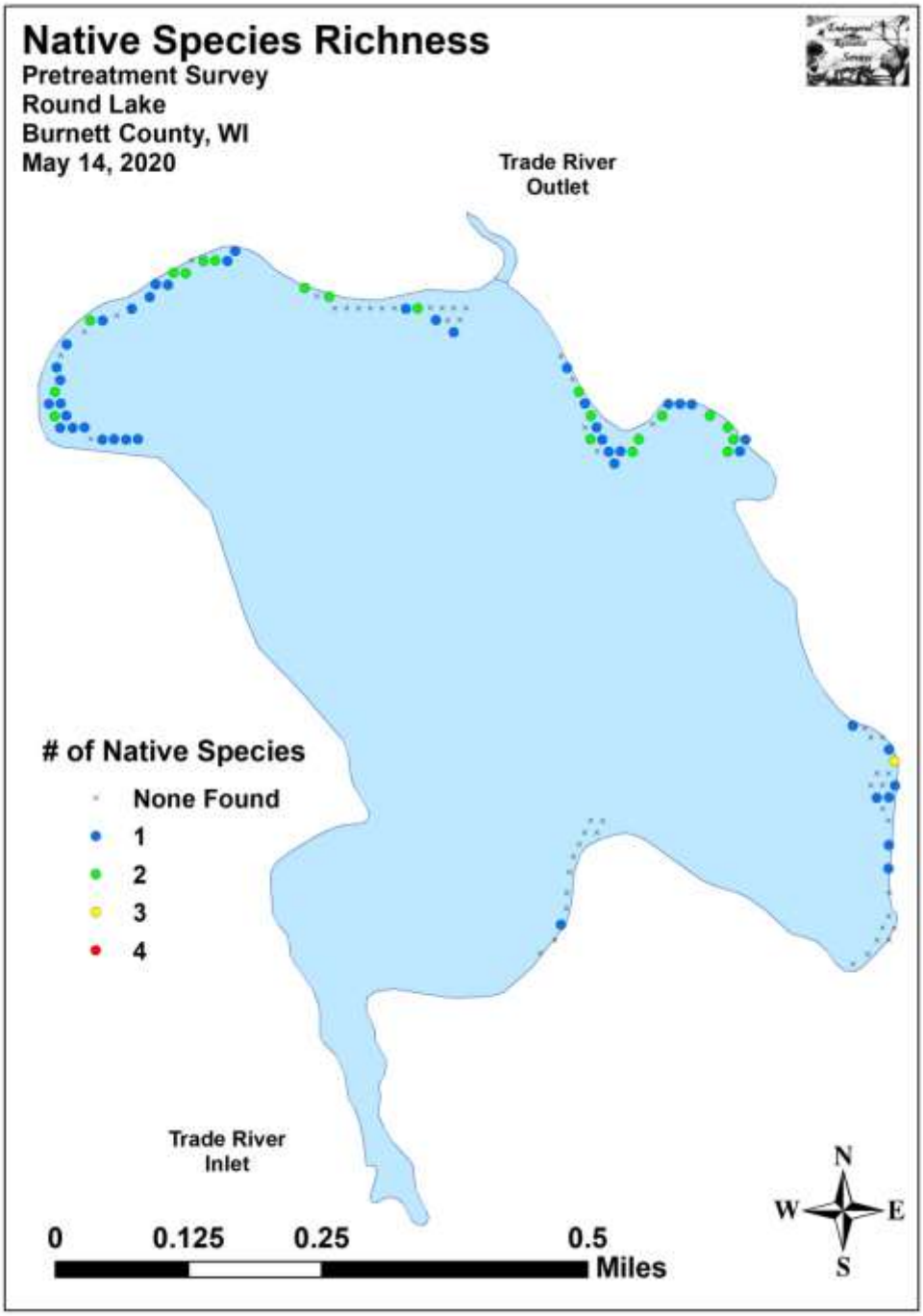

Lake Depth
Pre and Posttreatment Surveys
Round Lake
Burnett County, WI
May 14 and June 18, 2020
Trade River
Outlet
Depth in ft.
0.5 - 2.0
2.1 - 4.0
4.1 - 6.0
6.1 - 8.0
8.1 - 11.0
Trade River
Inlet
0
0.125
0.25
0.5
Miles
N
W
E
S

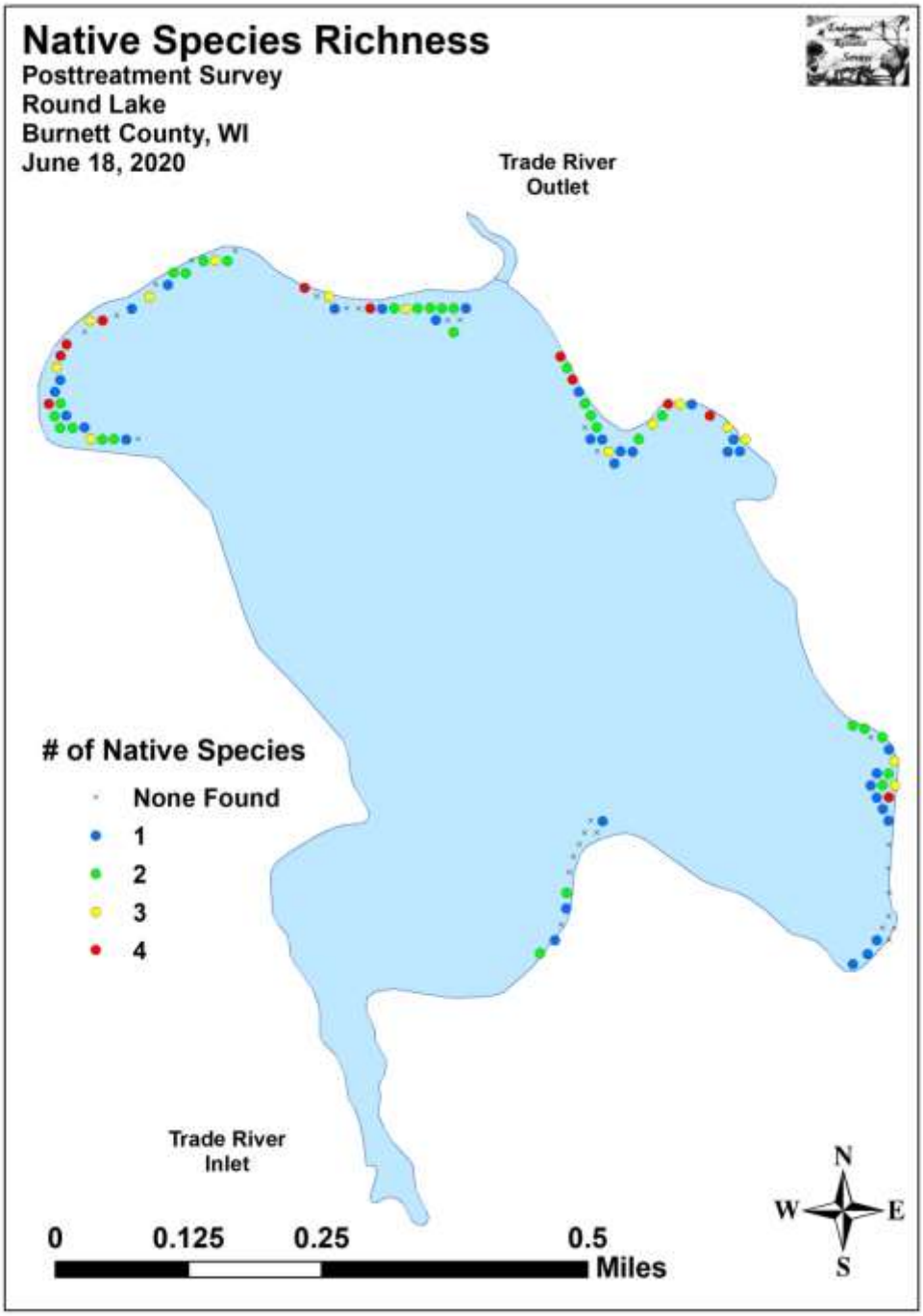

Bottom Substrate
Pre and Posttreatment Surveys
Round Lake
Burnett County, WI
May 14 and June 18, 2020
Trade River
Outlet
Substrate Type
Muck
Rock
Sand
Trade River
Inlet
N
W
E
S
0
0.125
0.25
0.5
Miles

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


Littoral Zone
Pretreatment Survey
Round Lake
Burnett County, WI
May 14, 2020
Trade River
Outlet
Littoral Zone
Littoral Zone w/ Plants
>6.0ft.
Trade River
Inlet
N
W
E
S
0
0.125
0.25
0.5
Miles


Littoral Zone
Posttreatment Survey
Round Lake
Burnett County, WI
June 18, 2020
Trade River
Outlet
Littoral Zone
Littoral Zone w/ Plants
>9.0ft.
Trade River
Inlet
N
W
E
S
0
0.125
0.25
0.5
Miles

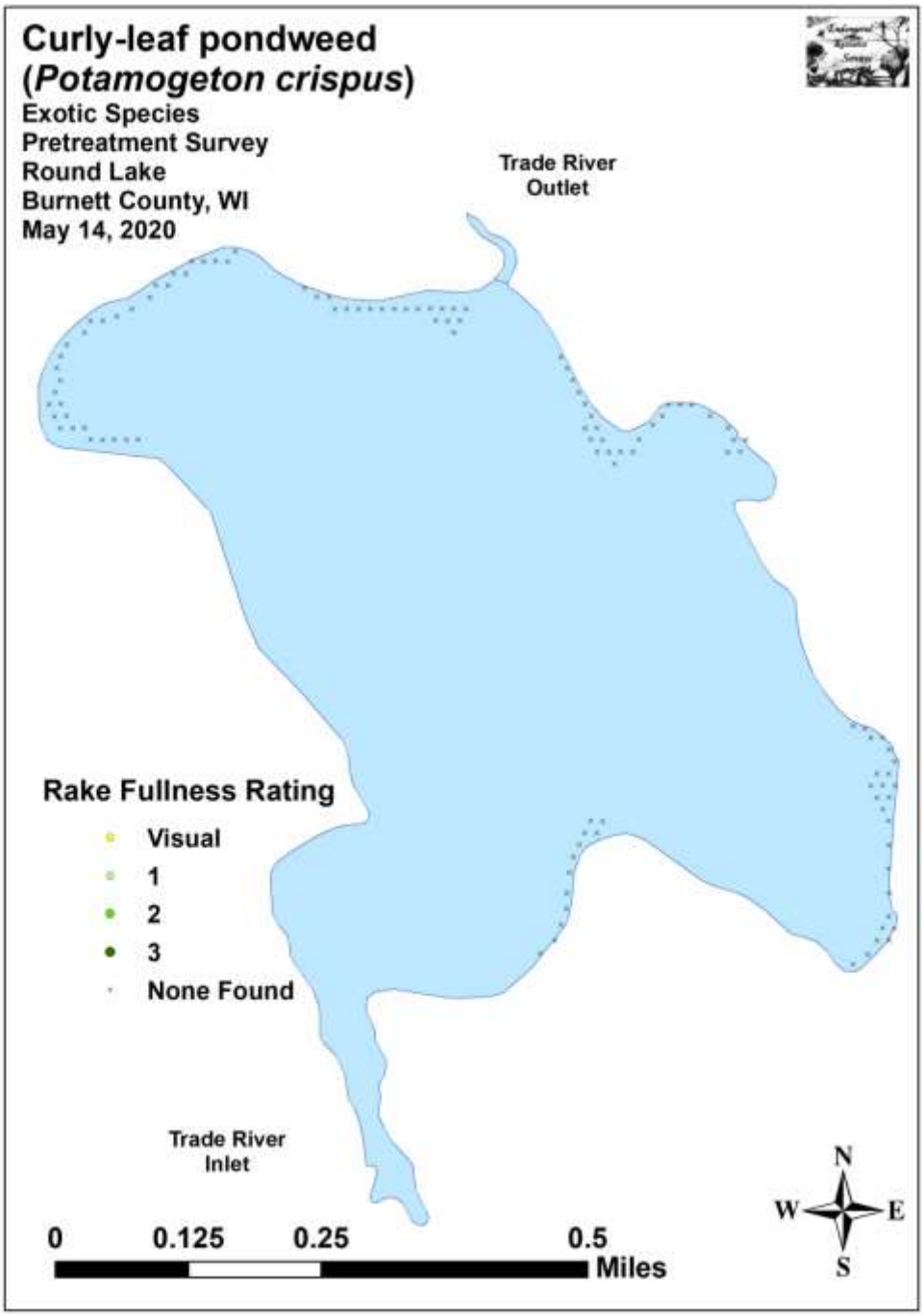

Native Species Richness
Pretreatment Survey
Round Lake
Burnett County, WI
May 14, 2020
Trade River
Outlet
# of Native Species
None Found
1
2
3
4
Trade River
Inlet
N
W
E
S
0
0.125
0.25
0.5
Miles

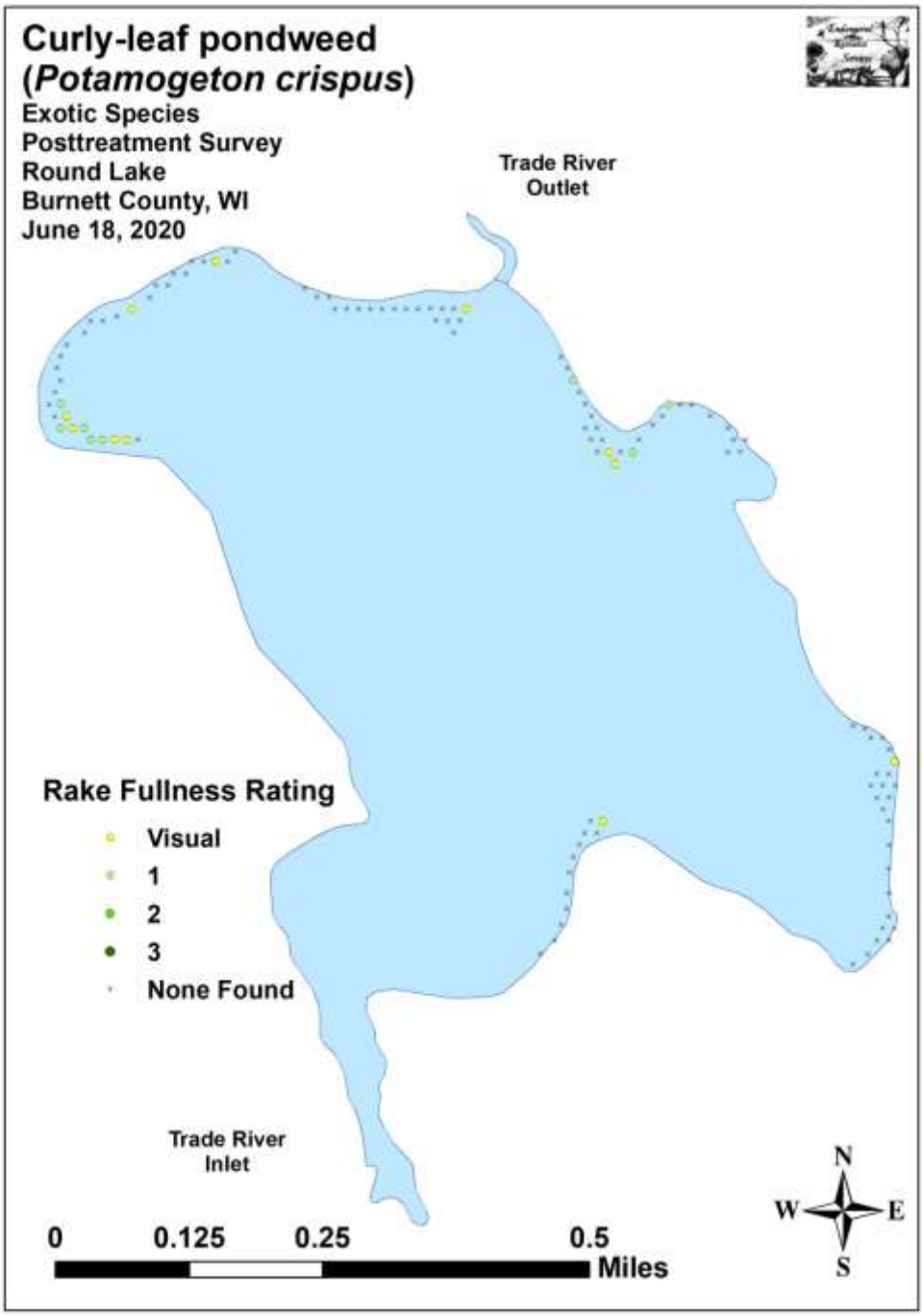

Native Species Richness
Posttreatment Survey
Round Lake
Burnett County, WI
June 18, 2020
Trade River
Outlet
# of Native Species
None Found
1
2
3
4
Trade River
Inlet
N
W
E
S
0
0.125
0.25
0.5
Miles

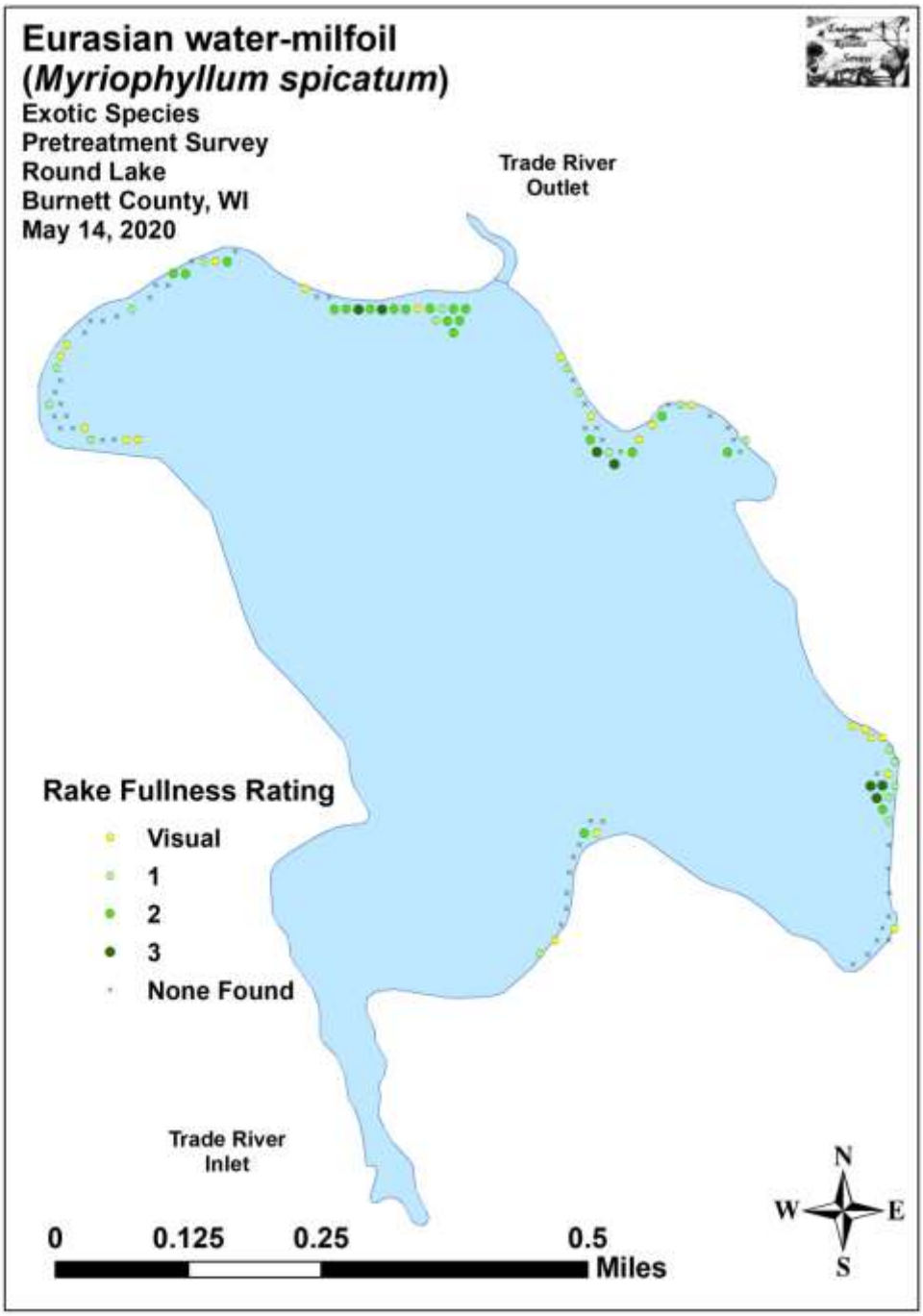

Total Rake Fullness
Pretreatment Survey
Round Lake
Burnett County, WI
May 14, 2020
Trade River
Outlet
Rake Fullness Rating
1
2
3
None Found
Trade River
Inlet
N
W
E
S
0
0.125
0.25
0.5
Miles

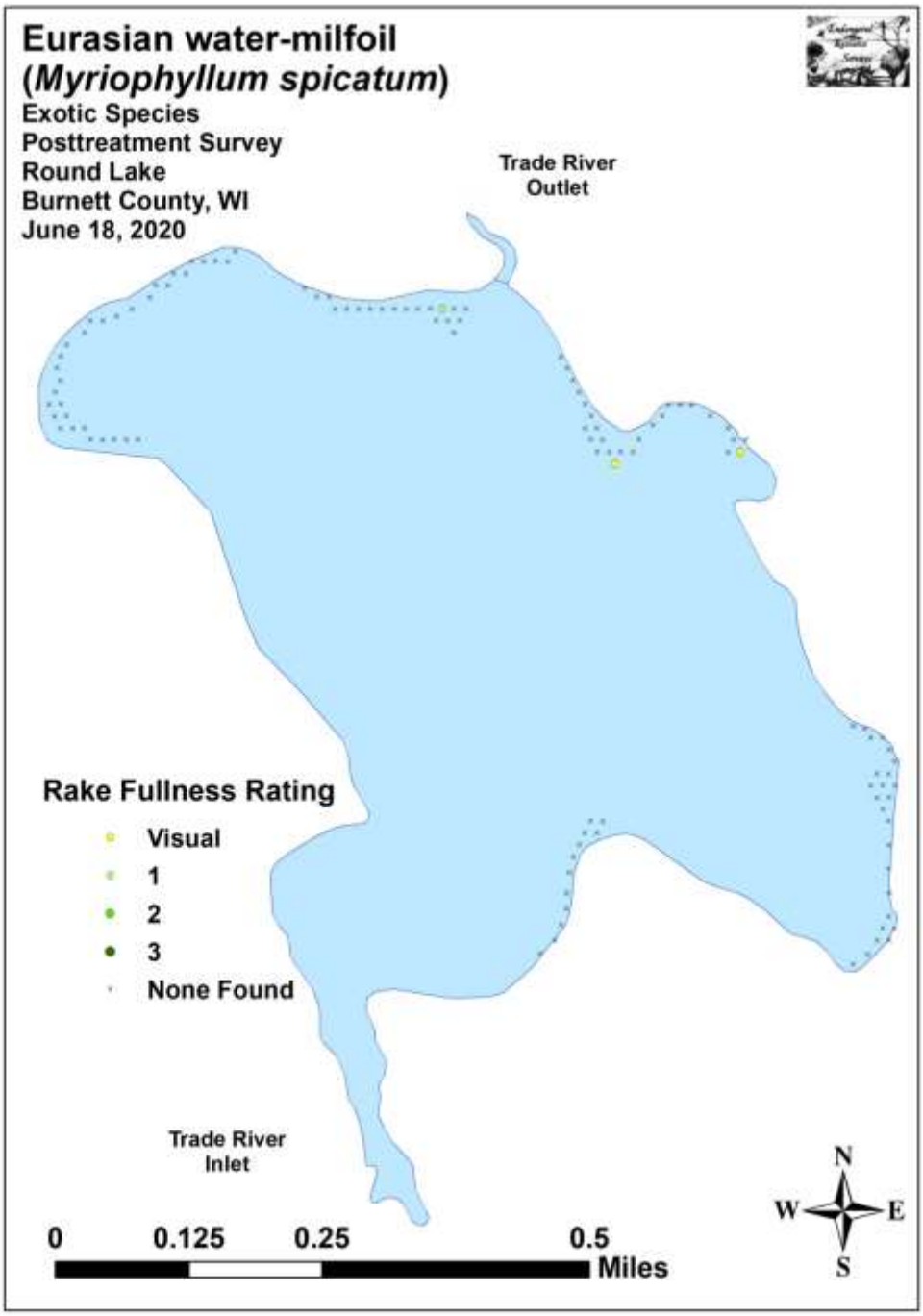

Total Rake Fullness
Posttreatment Survey
Round Lake
Burnett County, WI
June 18, 2020
Trade River
Outlet
Rake Fullness Rating
1
2
3
None Found
Trade River
Inlet
N
W
E
S
0
0.125
0.25
0.5
Miles

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

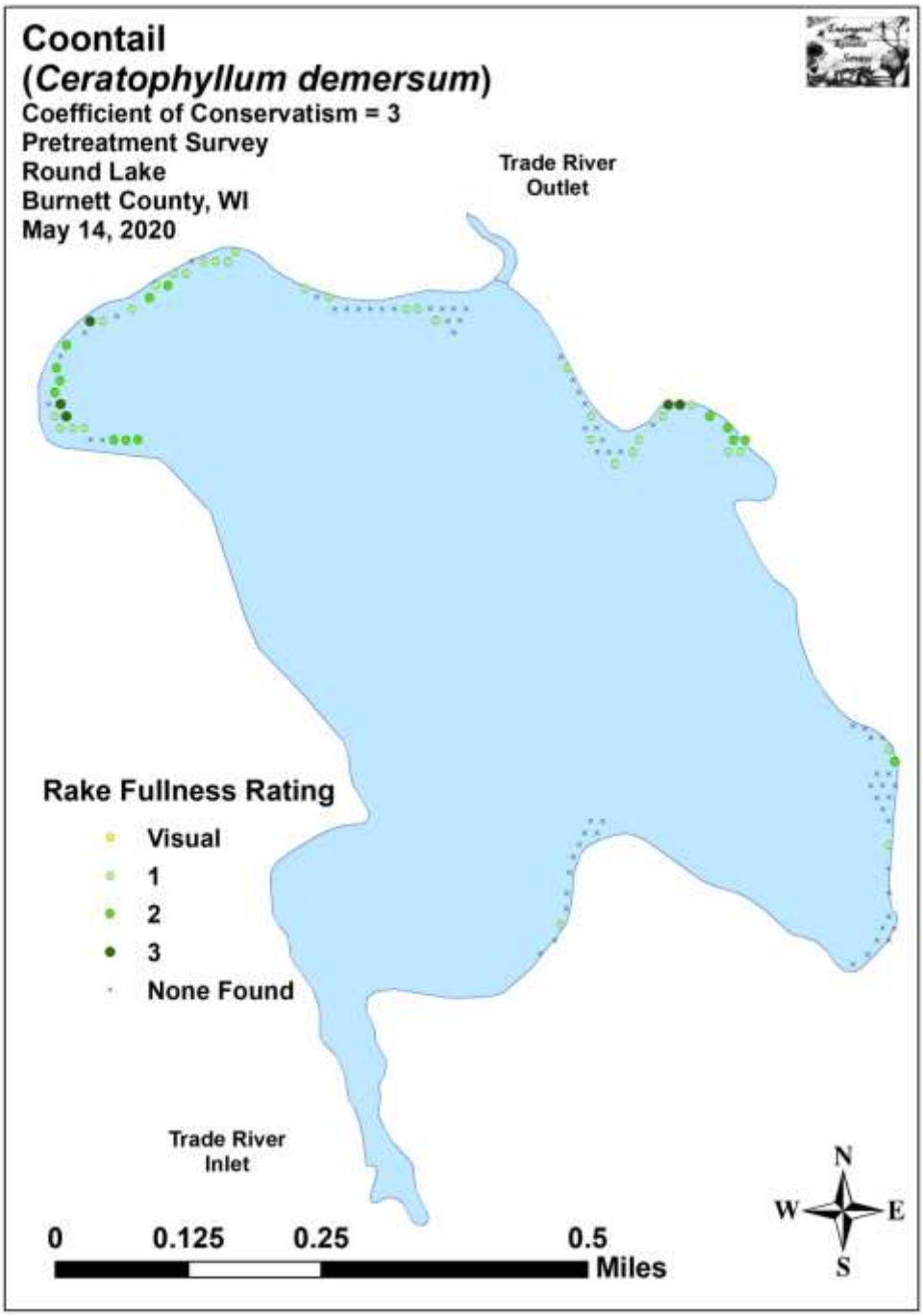

Curly-leaf pondweed
(Potamogeton crispus)
Exotic Species
Pretreatment Survey
Round Lake
Burnett County, WI
May 14, 2020
Trade River
Outlet
Rake Fullness Rating
Visual
1
2
3
None Found
Trade River
Inlet
0
0.125
0.25
0.5
Miles
N
W
E
S

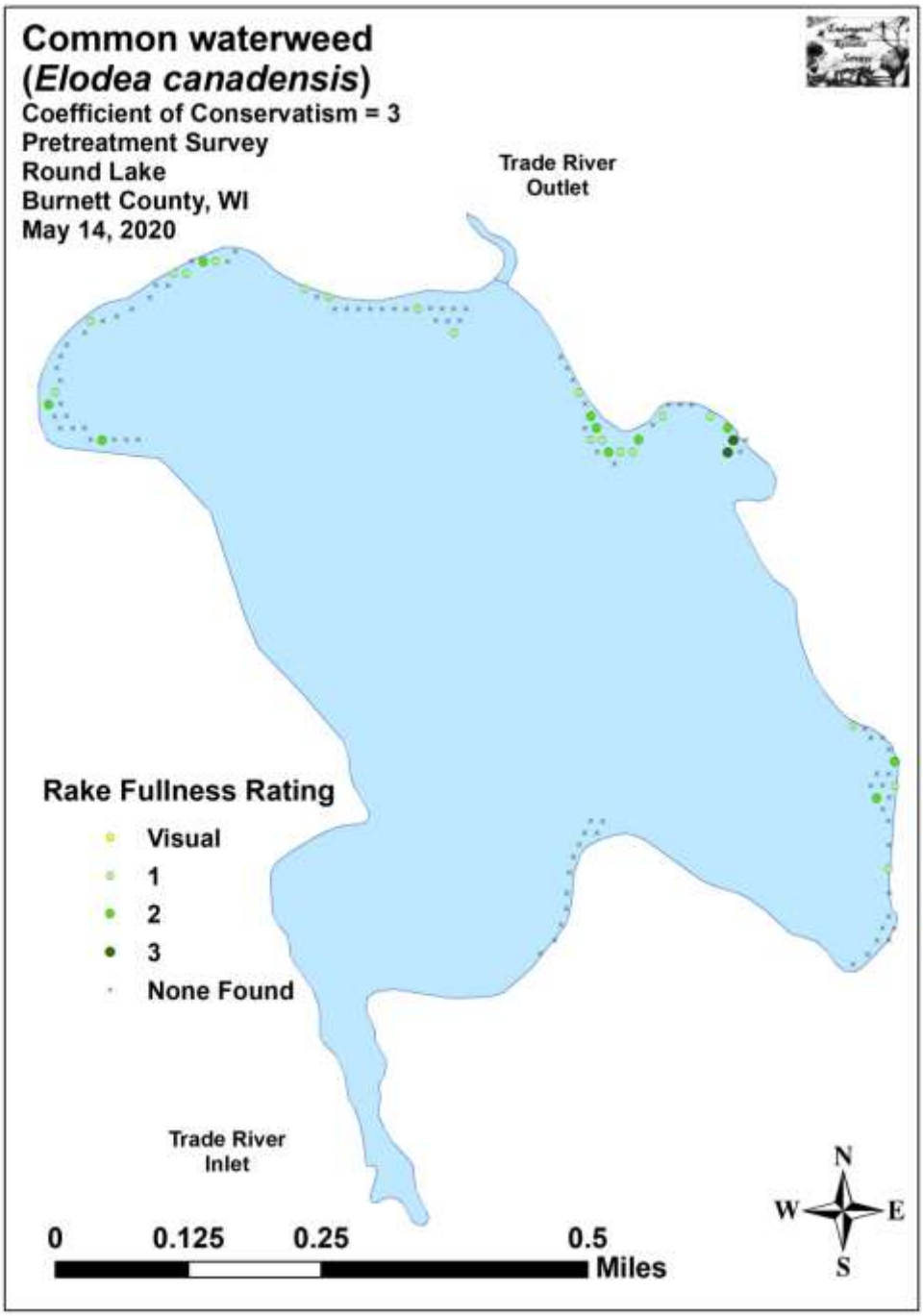

Curly-leaf pondweed
(Potamogeton crispus)
Exotic Species
Posttreatment Survey
Round Lake
Burnett County, WI
June 18, 2020
Trade River
Outlet
Rake Fullness Rating
Visual
1
2
3
None Found
Trade River
Inlet
0
0.125
0.25
0.5
Miles
N
W
E
S

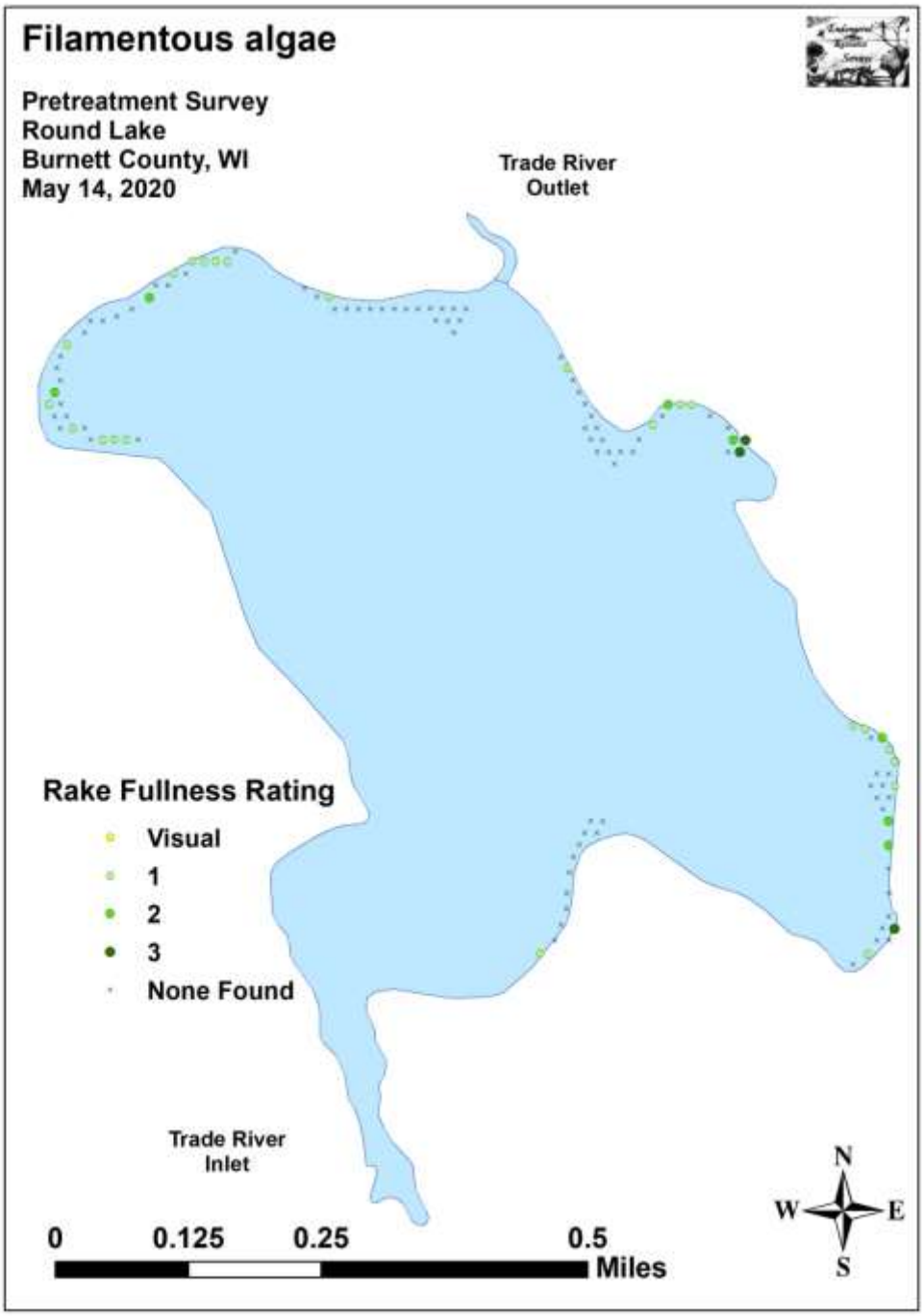

Eurasian water-milfoil
(Myriophyllum spicatum)
Exotic Species
Pretreatment Survey
Round Lake
Burnett County, WI
May 14, 2020
Trade River
Outlet
Rake Fullness Rating
Visual
1
2
3
None Found
Trade River
Inlet
0
0.125
0.25
0.5
Miles
N
W
E
S

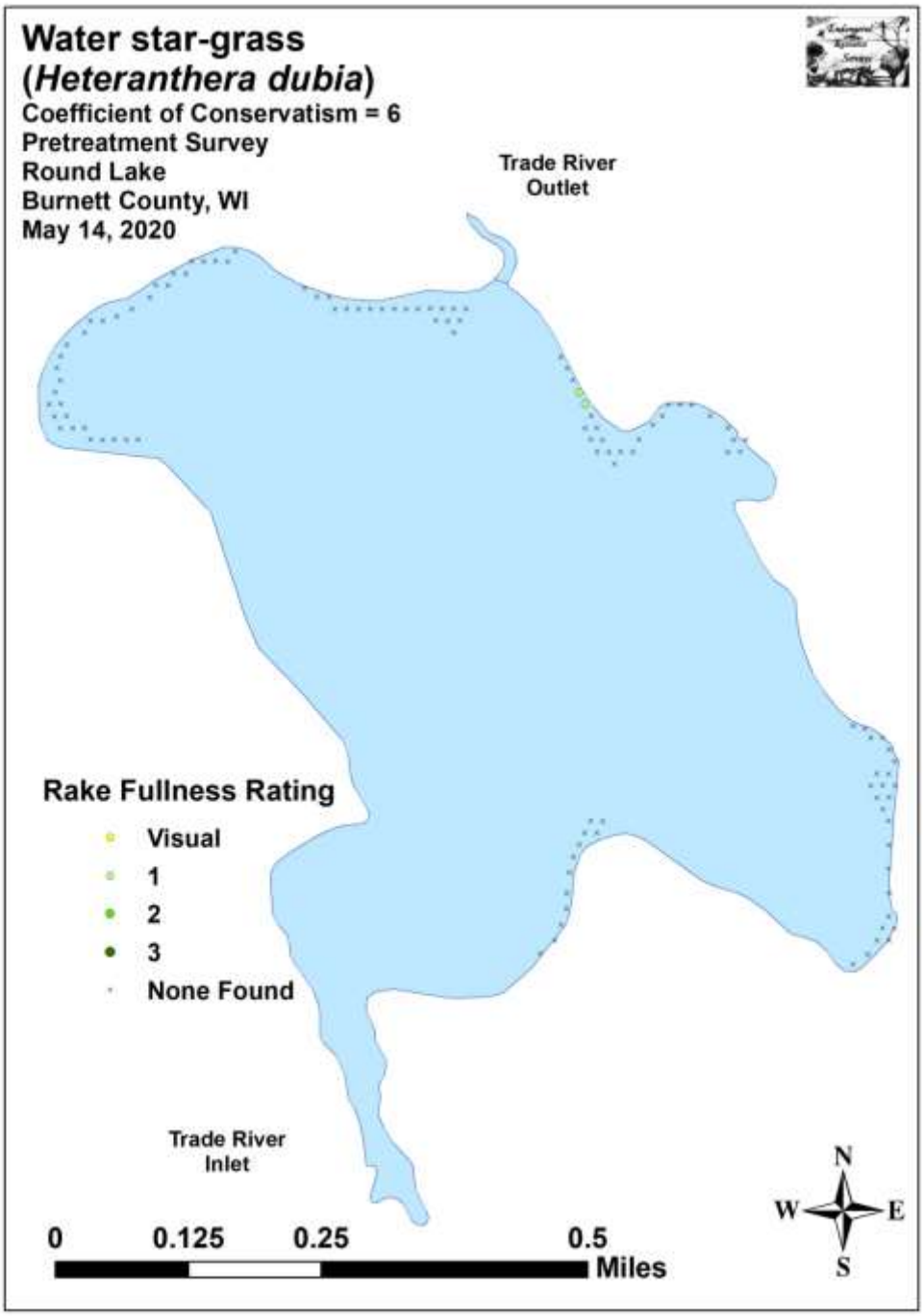

Eurasian water-milfoil
(Myriophyllum spicatum)
Exotic Species
Posttreatment Survey
Round Lake
Burnett County, WI
June 18, 2020
Trade River
Outlet
Rake Fullness Rating
Visual
1
2
3
None Found
Trade River
Inlet
0
0.125
0.25
0.5
Miles
N
W
E
S

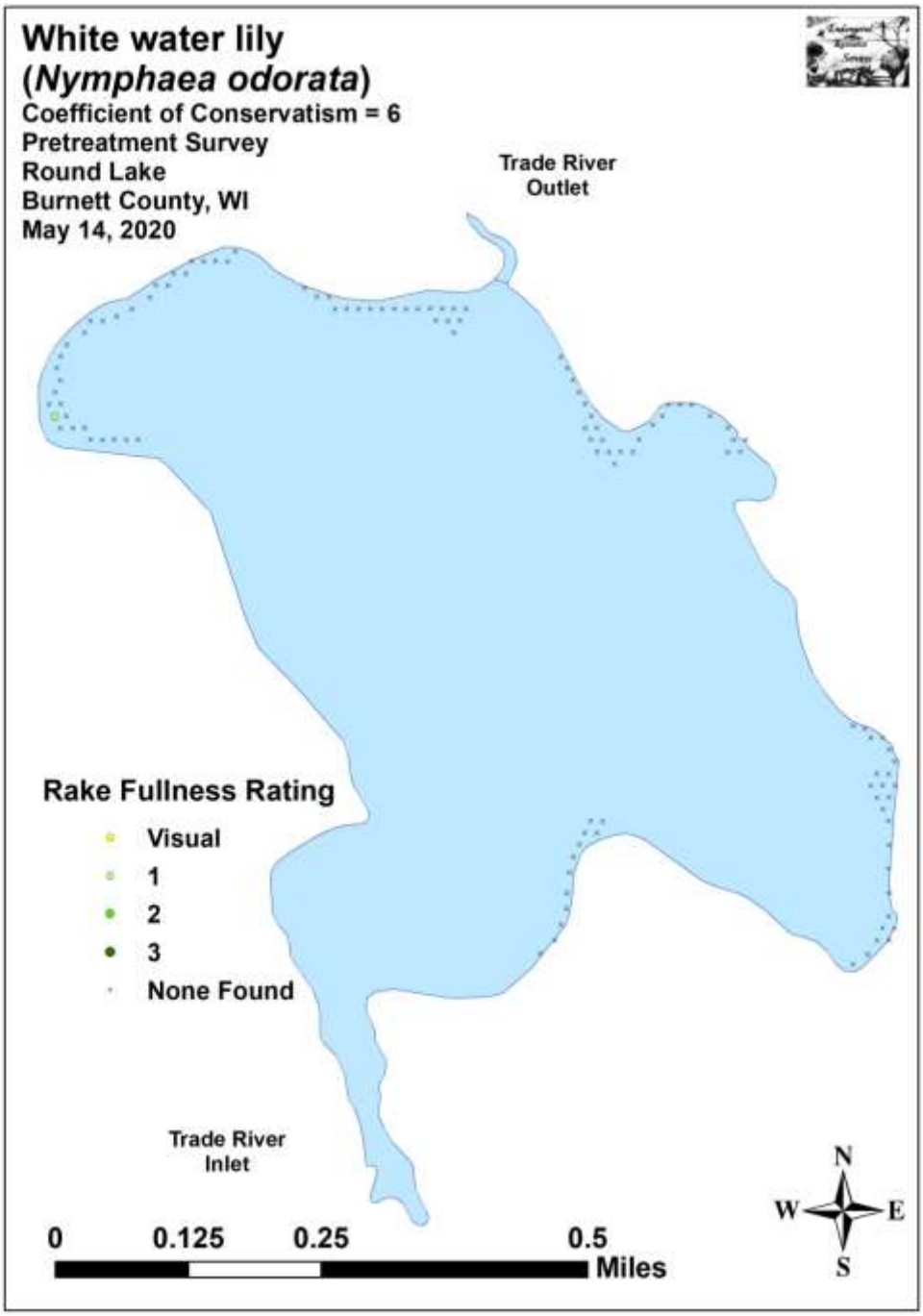
Appendix VI: Pretreatment Native Species Density and Distribution

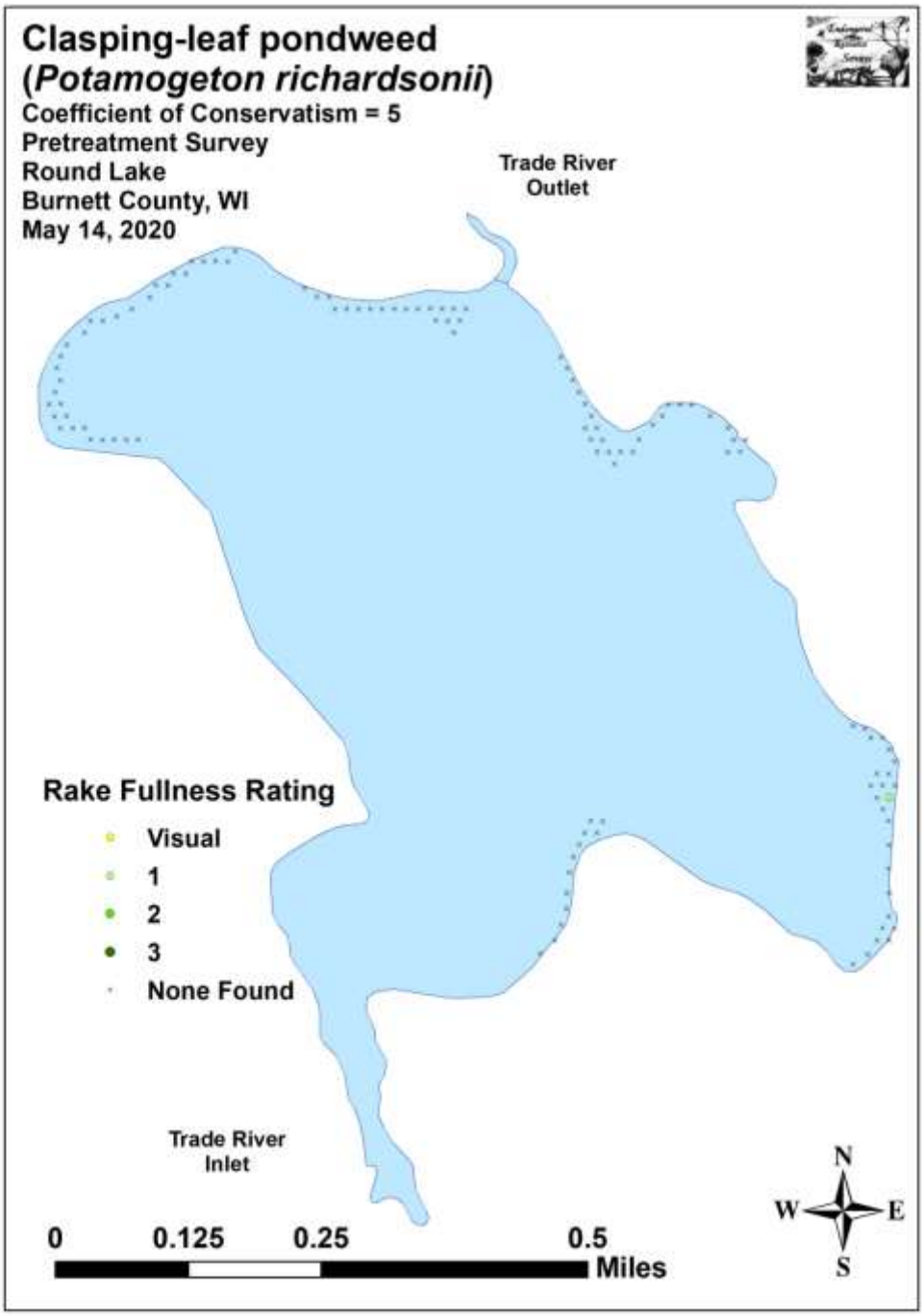

Coontail
(Ceratophyllum demersum)
Coefficient of Conservatism = 3
Pretreatment Survey
Round Lake
Burnett County, WI
May 14, 2020
Trade River
Outlet
Rake Fullness Rating
Visual
1
2
3
None Found
Trade River
Inlet
N
W
E
S
0
0.125
0.25
0.5
Miles

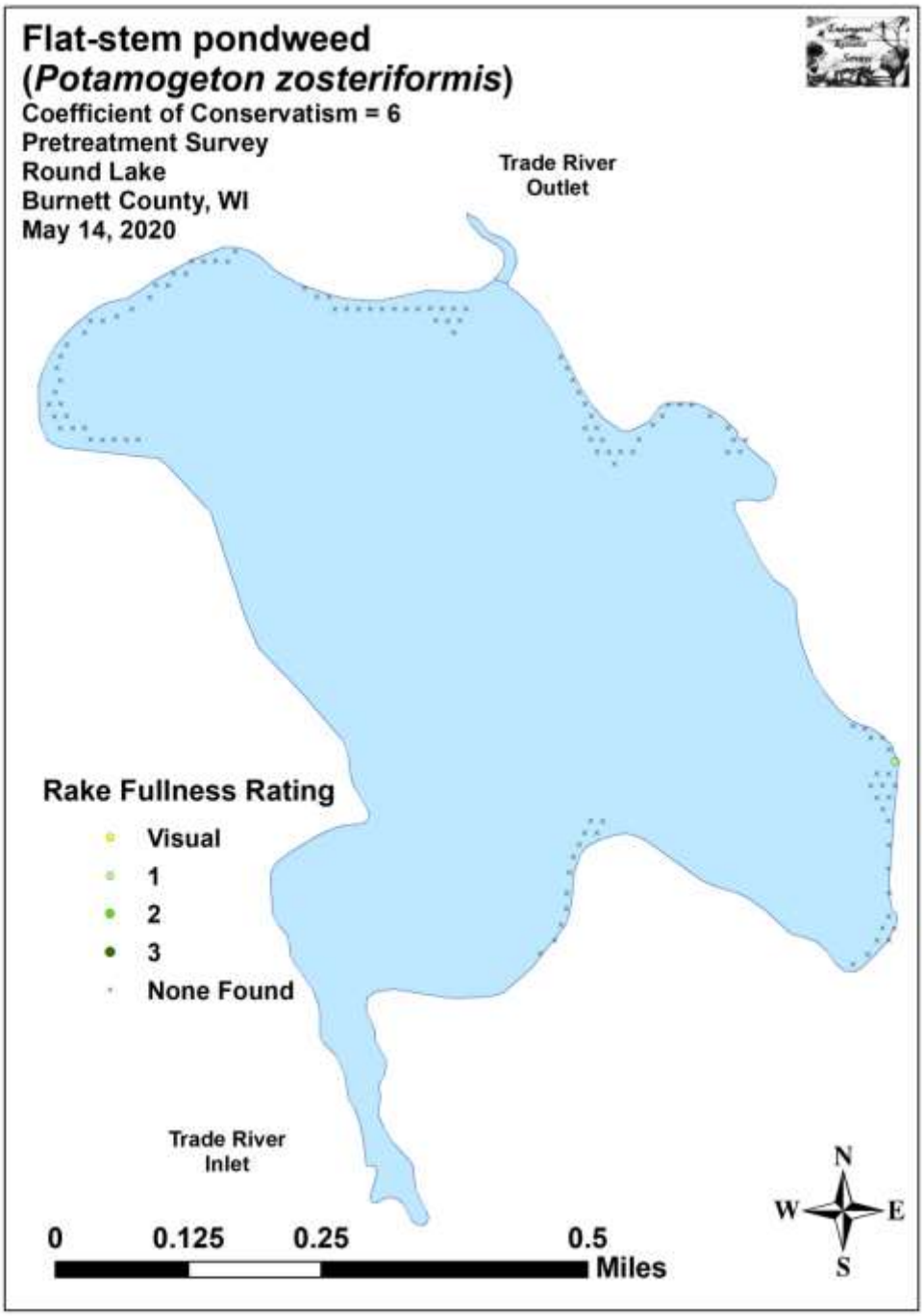

Common waterweed
(Elodea canadensis)
Coefficient of Conservatism = 3
Pretreatment Survey
Round Lake
Burnett County, WI
May 14, 2020
Trade River
Outlet
Rake Fullness Rating
Visual
1
2
3
None Found
Trade River
Inlet
N
W
E
S
0
0.125
0.25
0.5
Miles


Filamentous algae
Pretreatment Survey
Round Lake
Burnett County, WI
May 14, 2020
Trade River
Outlet
Rake Fullness Rating
Visual
1
2
3
None Found
Trade River
Inlet
0
0.125
0.25
0.5
Miles
N
W
E
S

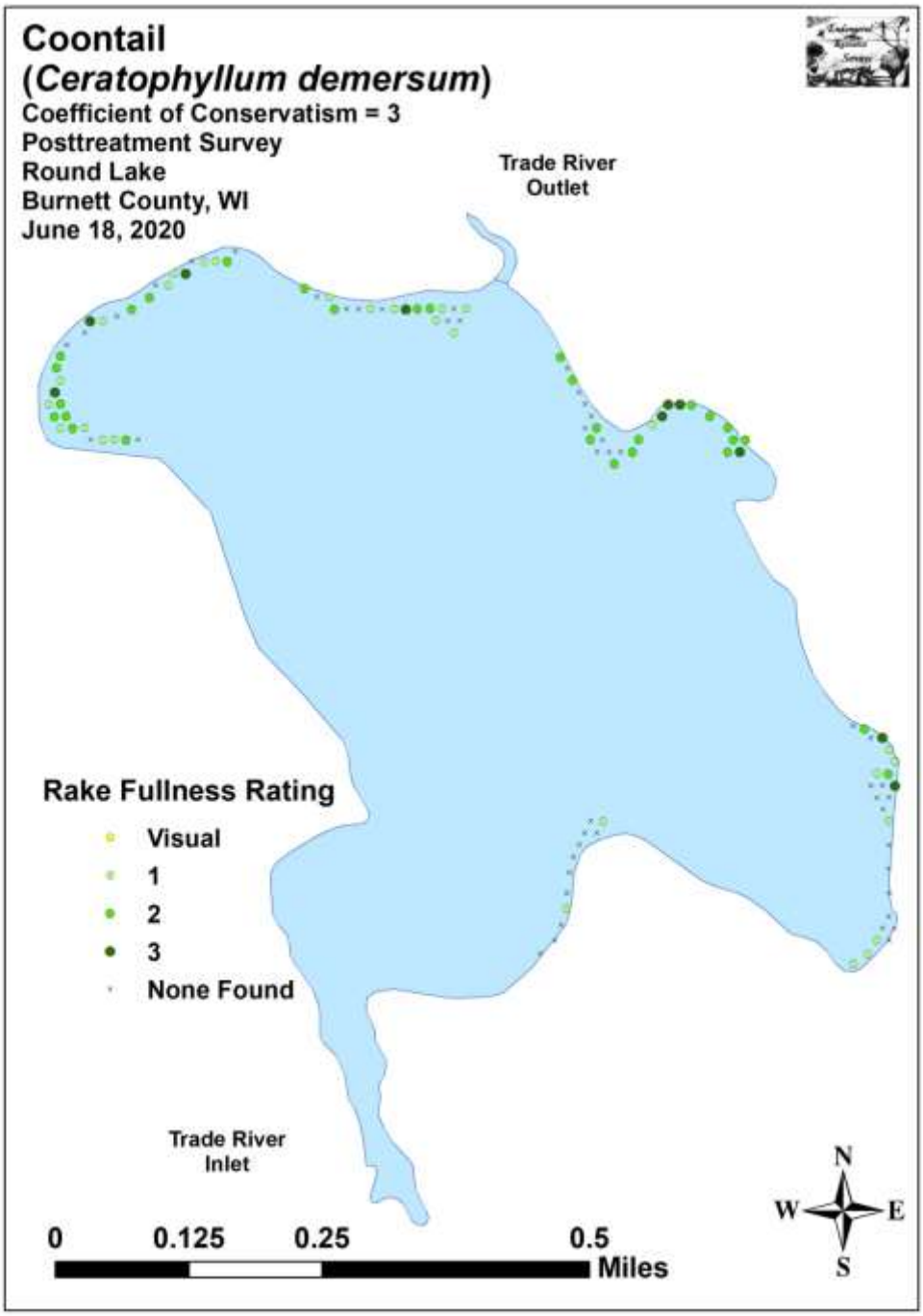

Water star-grass
(Heteranthera dubia)
Coefficient of Conservatism = 6
Pretreatment Survey
Round Lake
Burnett County, WI
May 14, 2020
Trade River
Outlet
Rake Fullness Rating
Visual
1
2
3
None Found
Trade River
Inlet
N
W
E
S
0
0.125
0.25
0.5
Miles

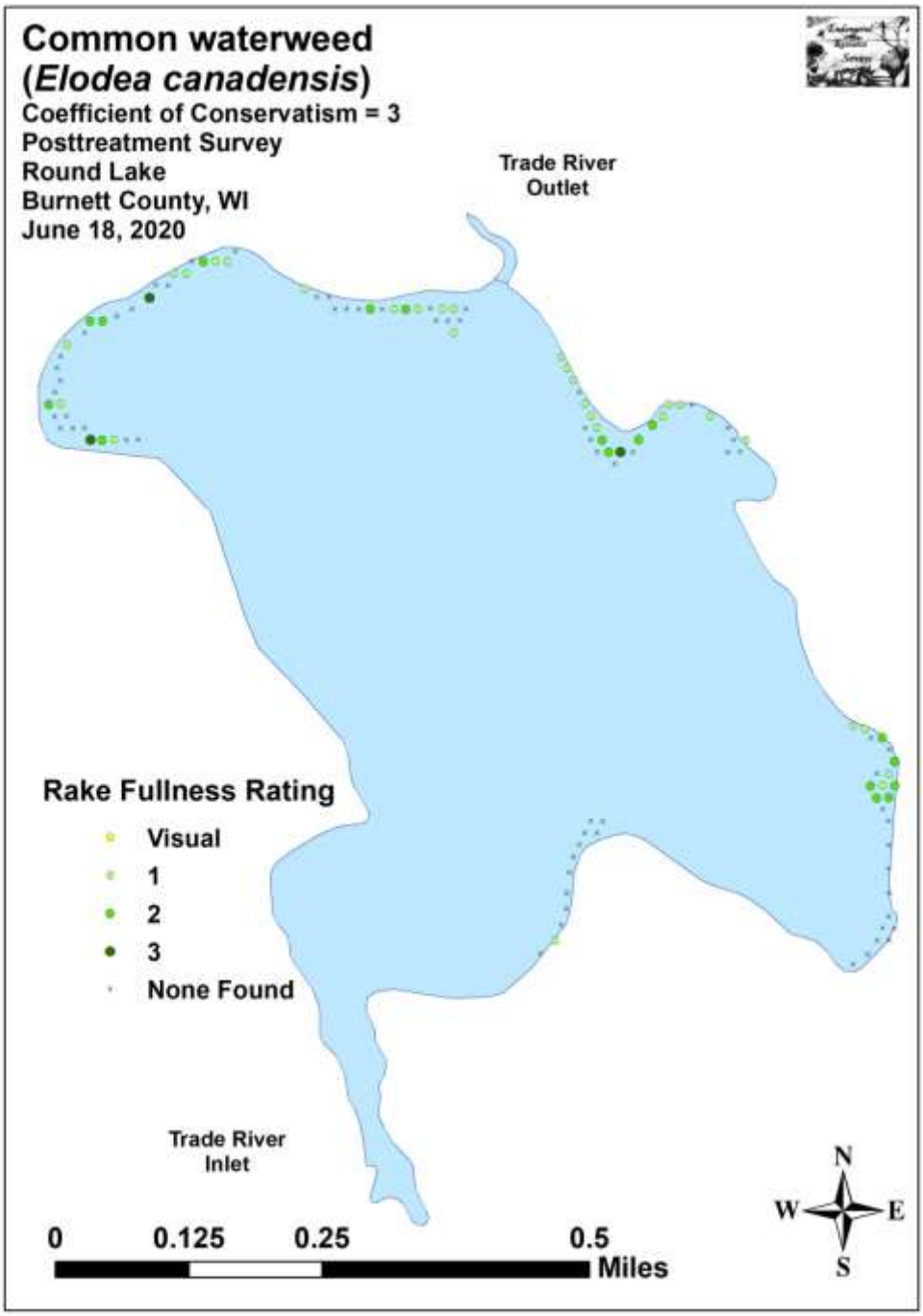

White water lily
(Nymphaea odorata)
Coefficient of Conservatism = 6
Pretreatment Survey
Round Lake
Burnett County, WI
May 14, 2020
Trade River
Outlet
Rake Fullness Rating
Visual
1
2
3
None Found
Trade River
Inlet
N
W
E
S
0
0.125
0.25
0.5
Miles

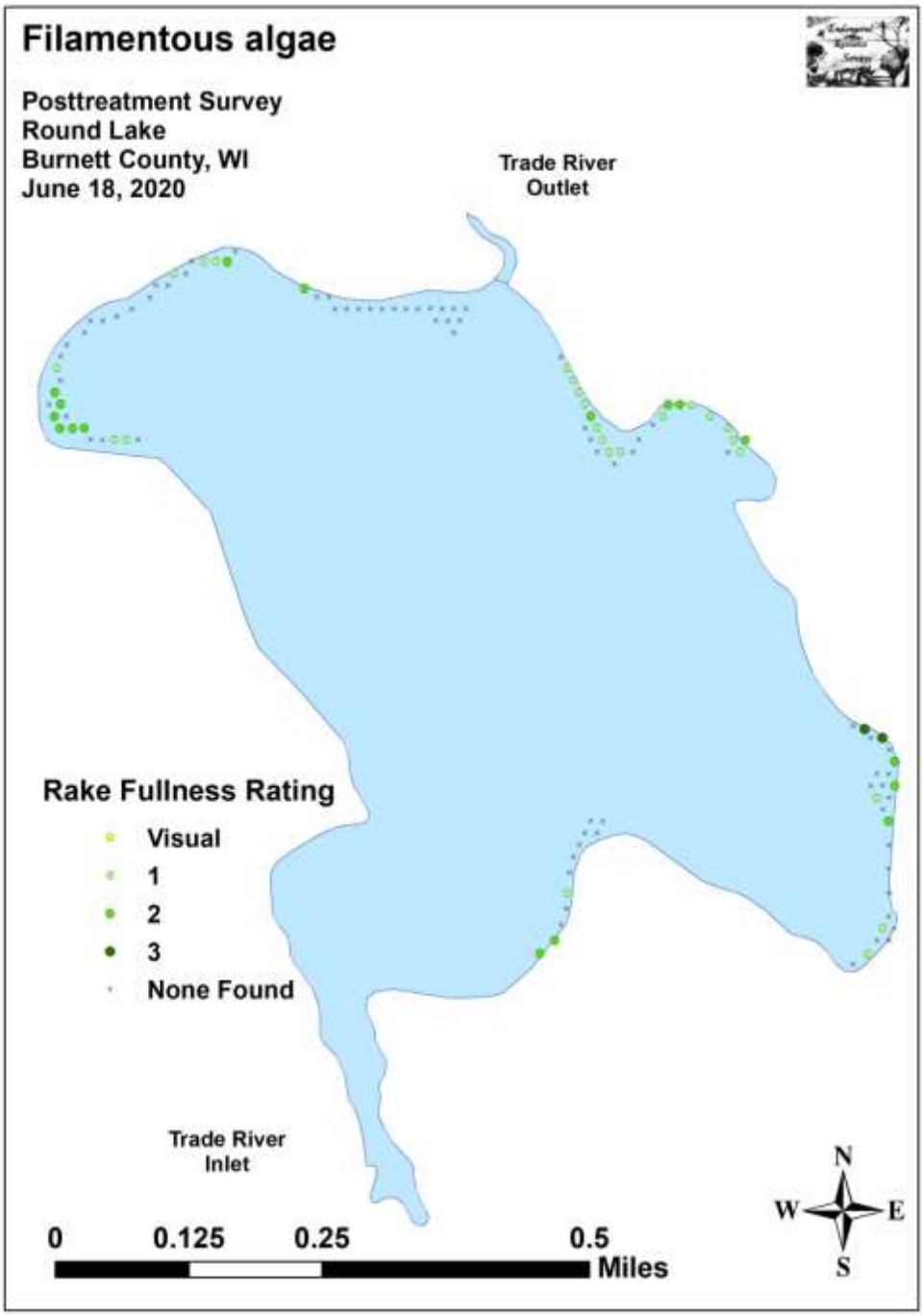

Clasping-leaf pondweed
(Potamogeton richardsonii)
Coefficient of Conservatism = 5
Pretreatment Survey
Round Lake
Burnett County, WI
May 14, 2020
Trade River
Outlet
Rake Fullness Rating
Visual
1
2
3
None Found
Trade River
Inlet
N
W
E
S
0
0.125
0.25
0.5
Miles

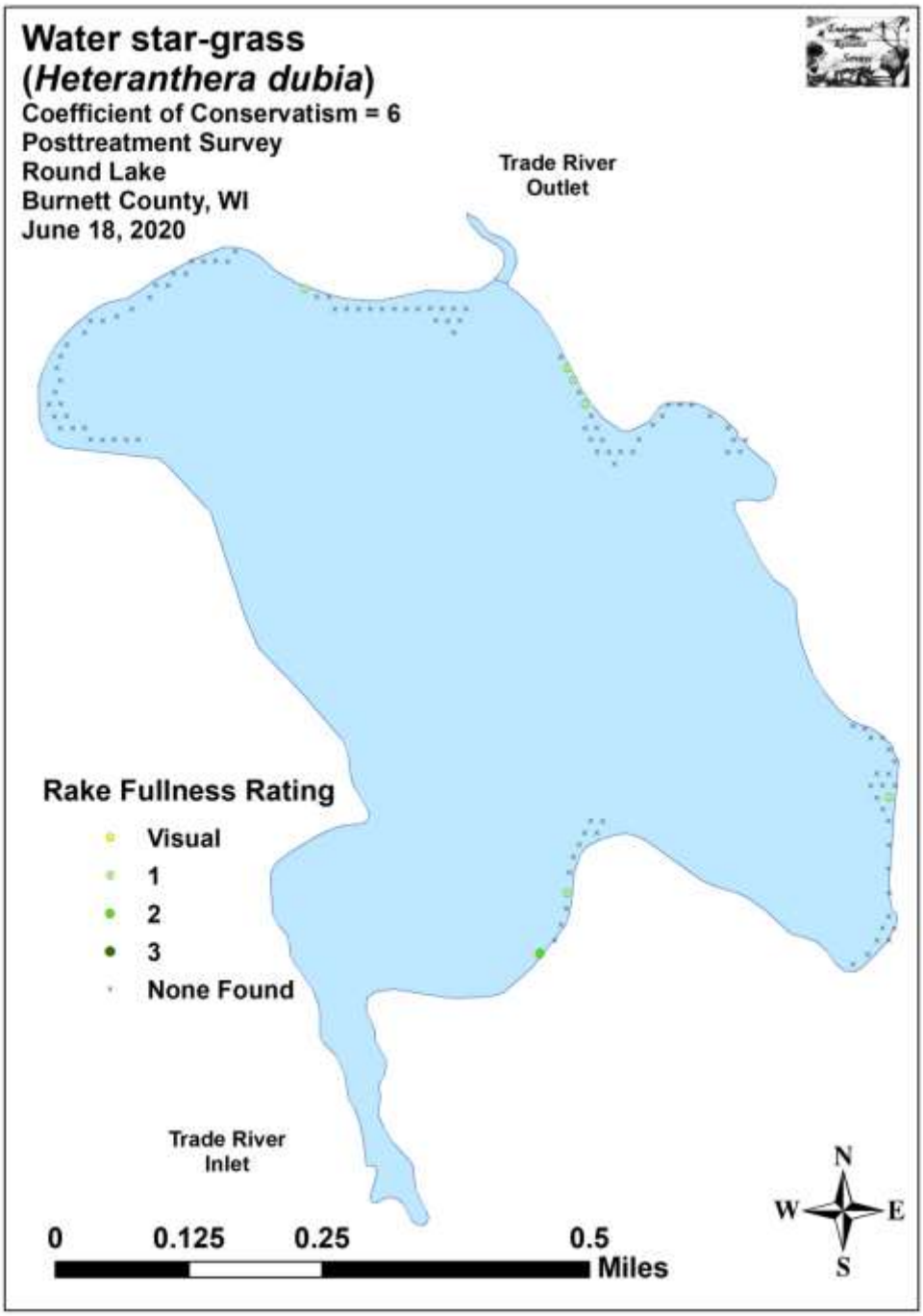

Flat-stem pondweed
(Potamogeton zosteriformis)
Coefficient of Conservatism = 6
Pretreatment Survey
Round Lake
Burnett County, WI
May 14, 2020
Trade River
Outlet
Rake Fullness Rating
Visual
1
2
3
None Found
Trade River
Inlet
N
W
E
S
0
0.125
0.25
0.5
Miles

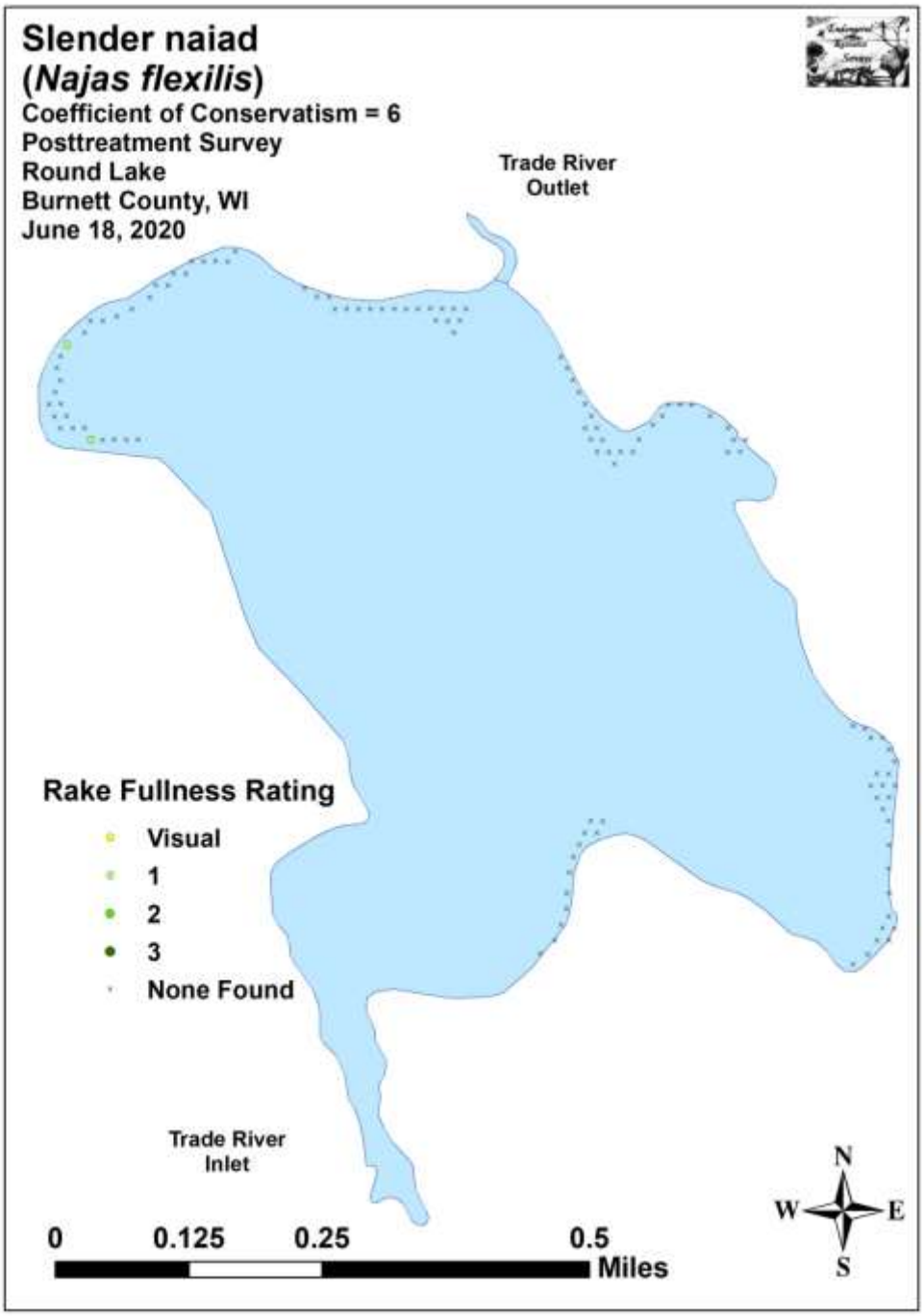
Appendix VII: Posttreatment Native Species Density and Distribution

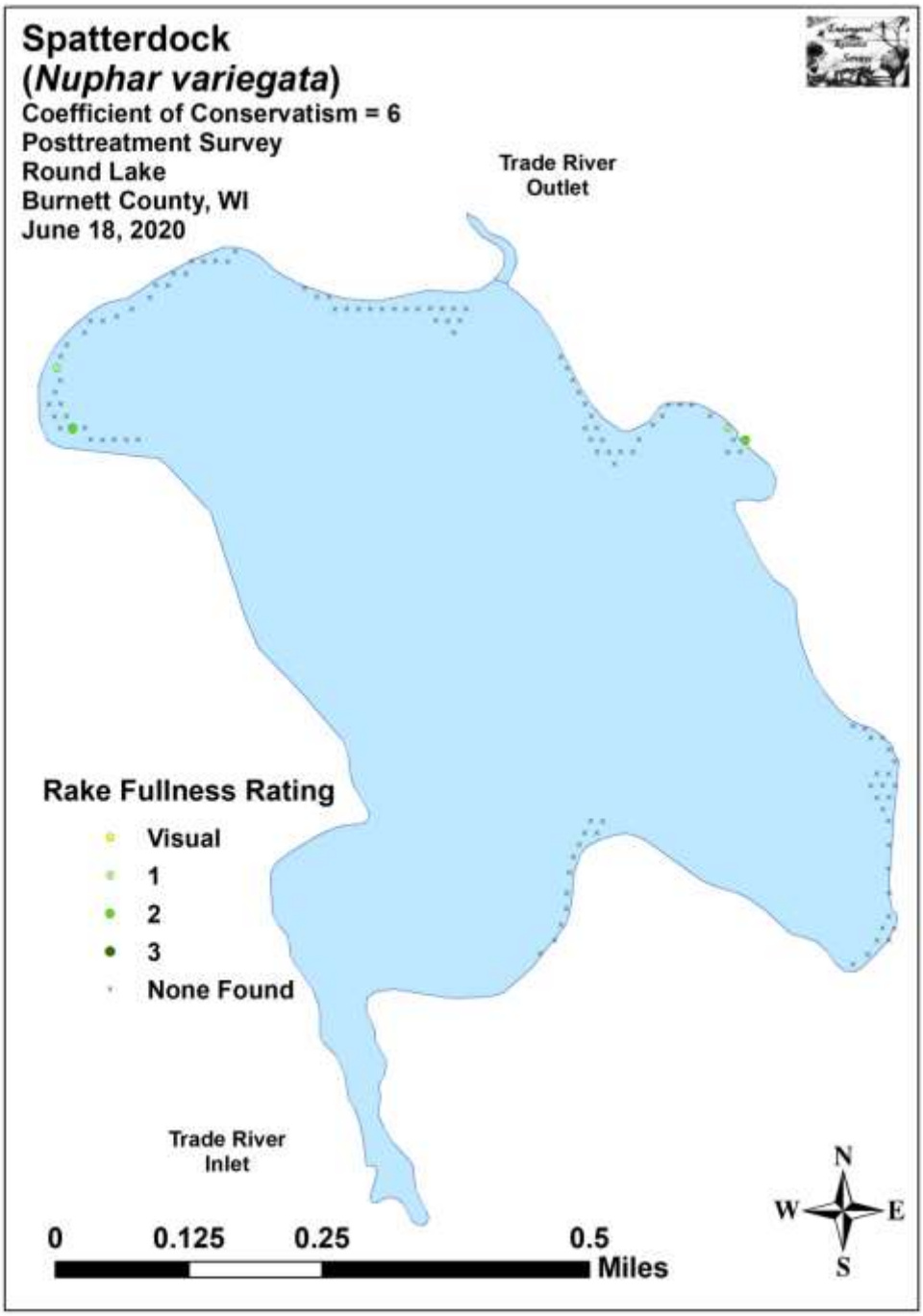

Coontail
(Ceratophyllum demersum)
Coefficient of Conservatism = 3
Posttreatment Survey
Round Lake
Burnett County, WI
June 18, 2020
Trade River
Outlet
Rake Fullness Rating
Visual
1
2
3
None Found
Trade River
Inlet
N
W
E
S
0
0.125
0.25
0.5
Miles

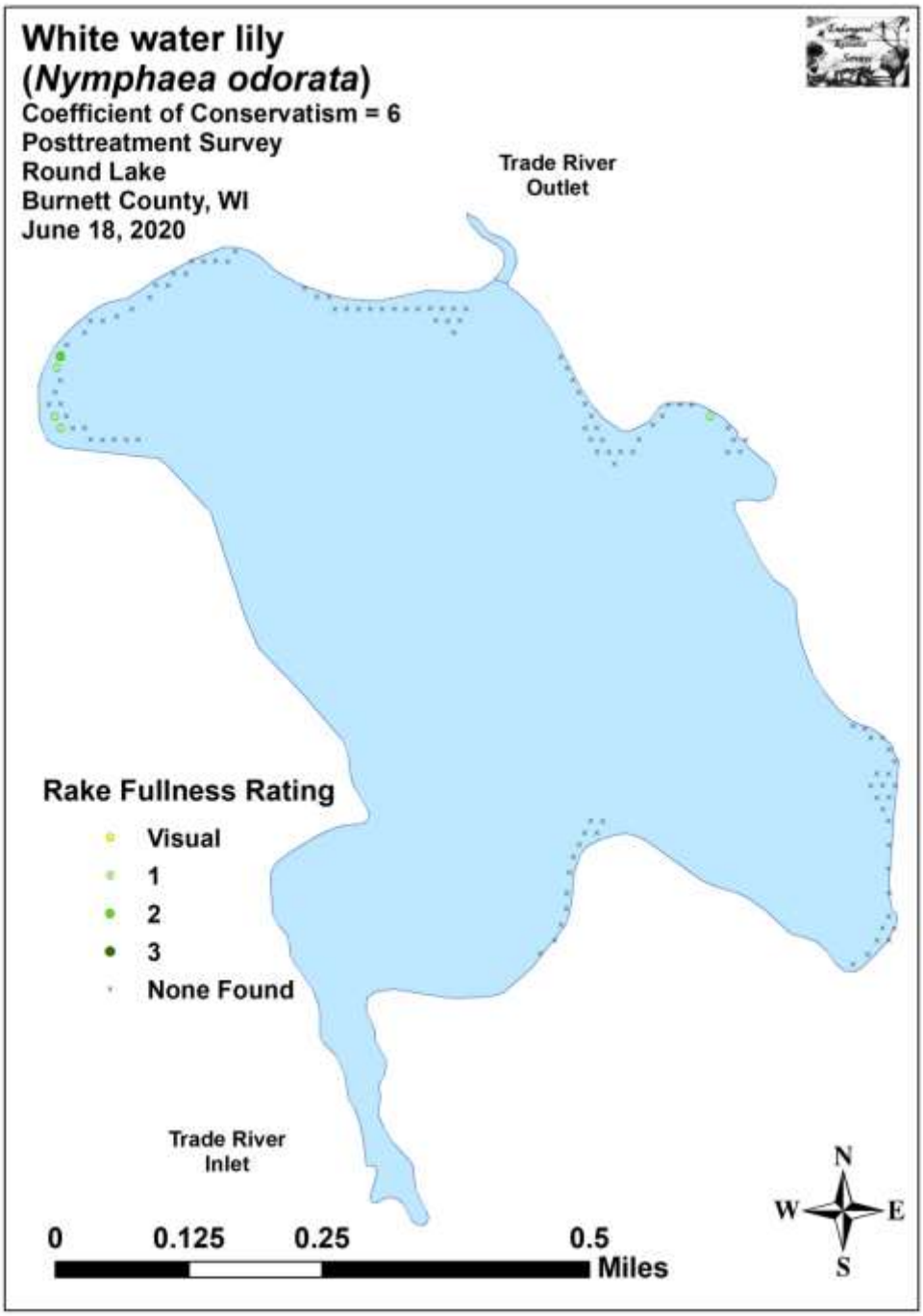

Common waterweed
(Elodea canadensis)
Coefficient of Conservatism = 3
Posttreatment Survey
Round Lake
Burnett County, WI
June 18, 2020
Trade River
Outlet
Rake Fullness Rating
Visual
1
2
3
None Found
Trade River
Inlet
N
W
E
S
0
0.125
0.25
0.5
Miles

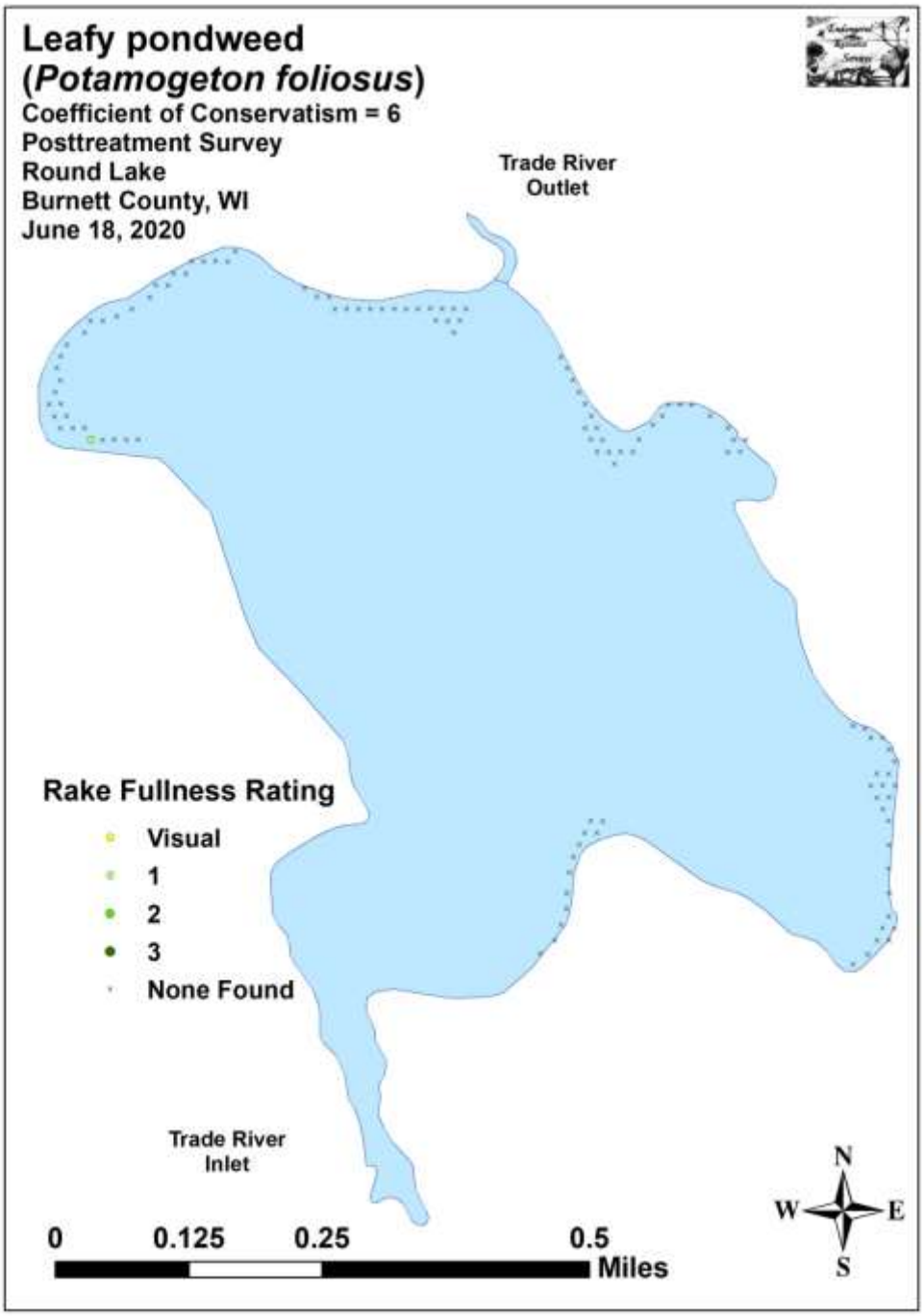

Filamentous algae
Posttreatment Survey
Round Lake
Burnett County, WI
June 18, 2020
Trade River
Outlet
Rake Fullness Rating
Visual
1
2
3
None Found
Trade River
Inlet
0
0.125
0.25
0.5
Miles
N
W
E
S

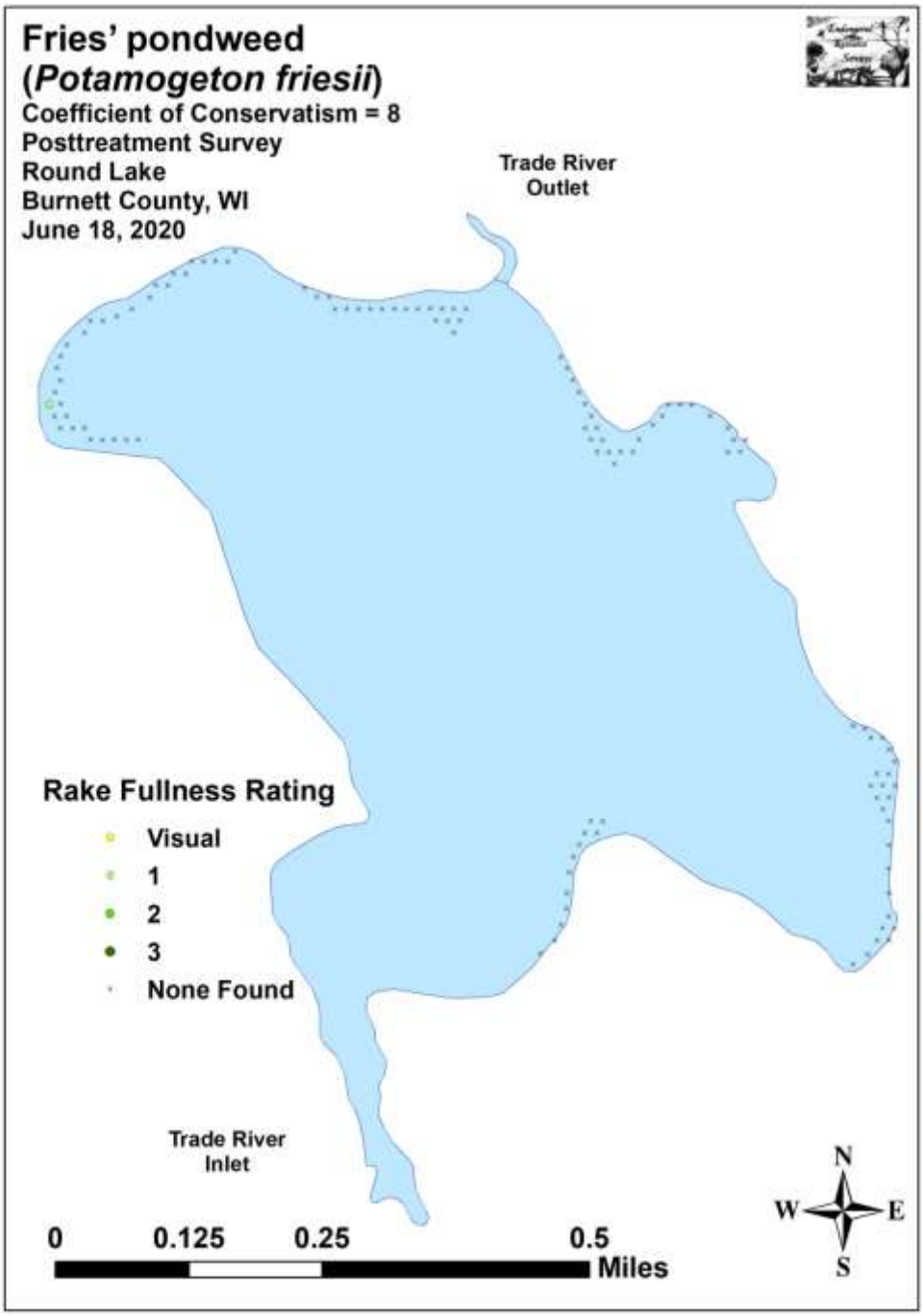

Water star-grass
(Heteranthera dubia)
Coefficient of Conservatism = 6
Posttreatment Survey
Round Lake
Burnett County, WI
June 18, 2020
Trade River
Outlet
Rake Fullness Rating
Visual
1
2
3
None Found
Trade River
Inlet
N
W
E
S
0
0.125
0.25
0.5
Miles

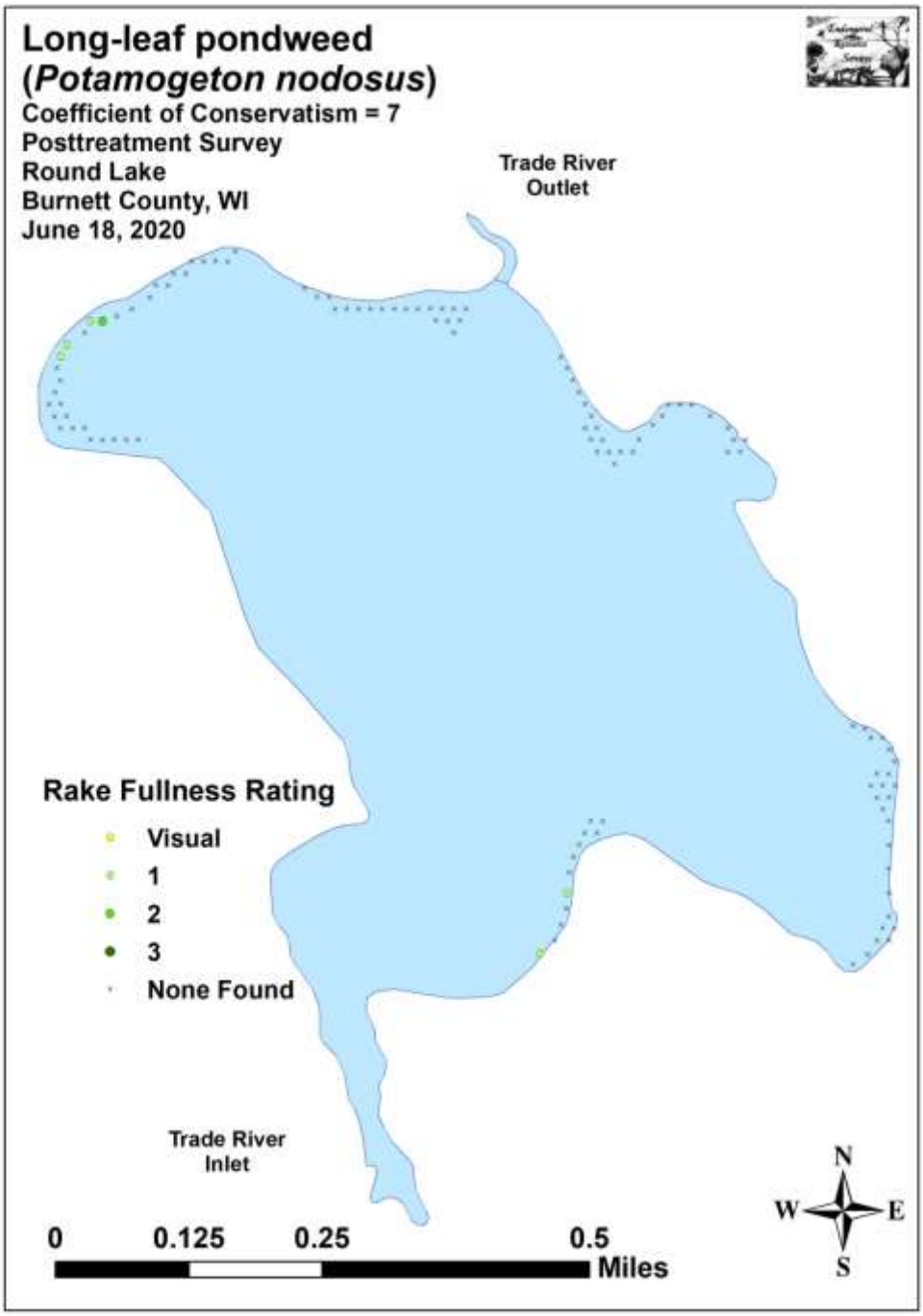

Slender naiad
(Najas flexilis)
Coefficient of Conservatism = 6
Posttreatment Survey
Round Lake
Burnett County, WI
June 18, 2020
Trade River
Outlet
Rake Fullness Rating
Visual
1
2
3
None Found
Trade River
Inlet
0
0.125
0.25
0.5
Miles
N
W
E
S

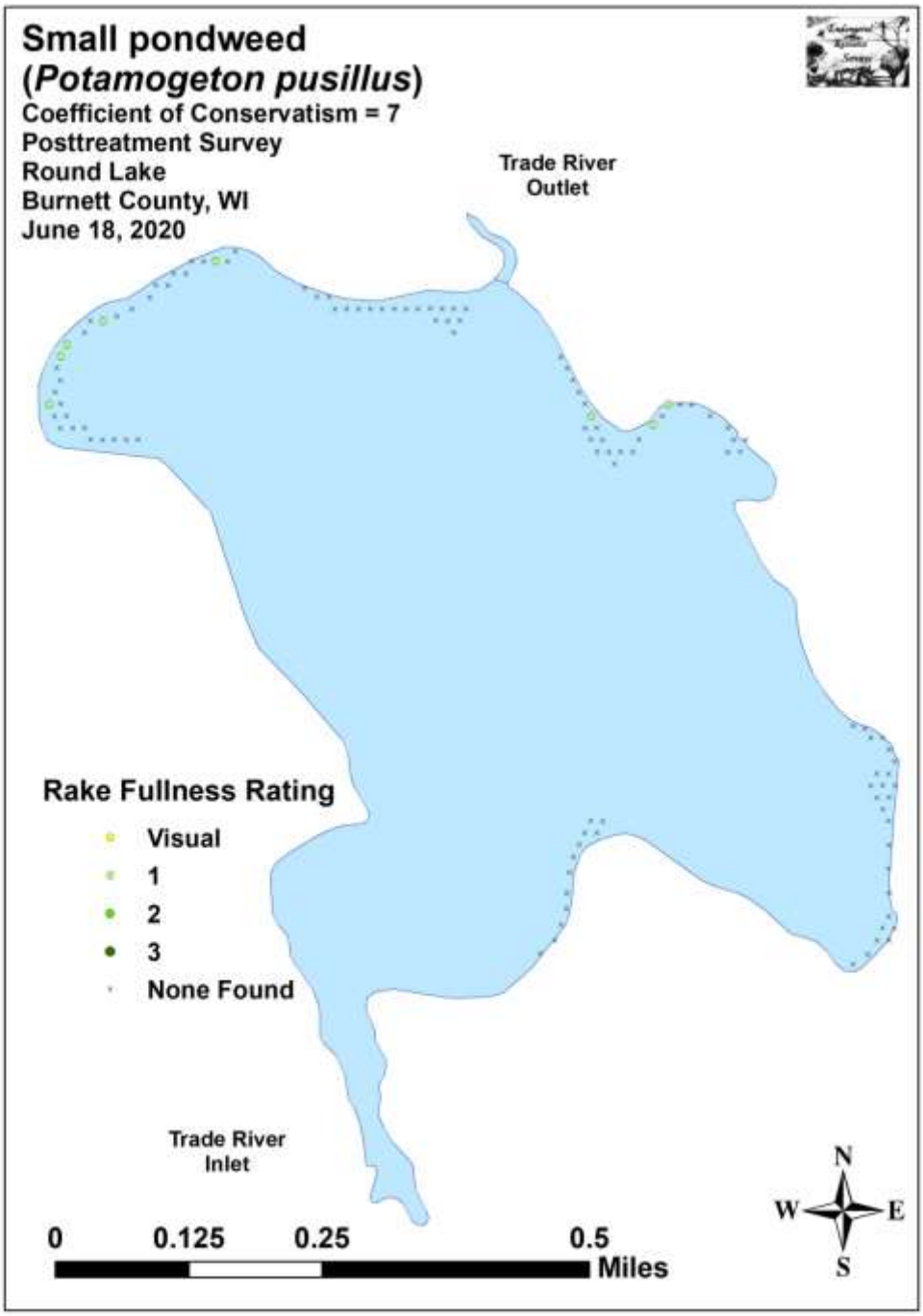

Spatterdock
(Nuphar variegata)
Coefficient of Conservatism = 6
Posttreatment Survey
Round Lake
Burnett County, WI
June 18, 2020
Trade River
Outlet
Rake Fullness Rating
Visual
1
2
3
None Found
Trade River
Inlet
N
W
E
S
0
0.125
0.25
0.5
Miles

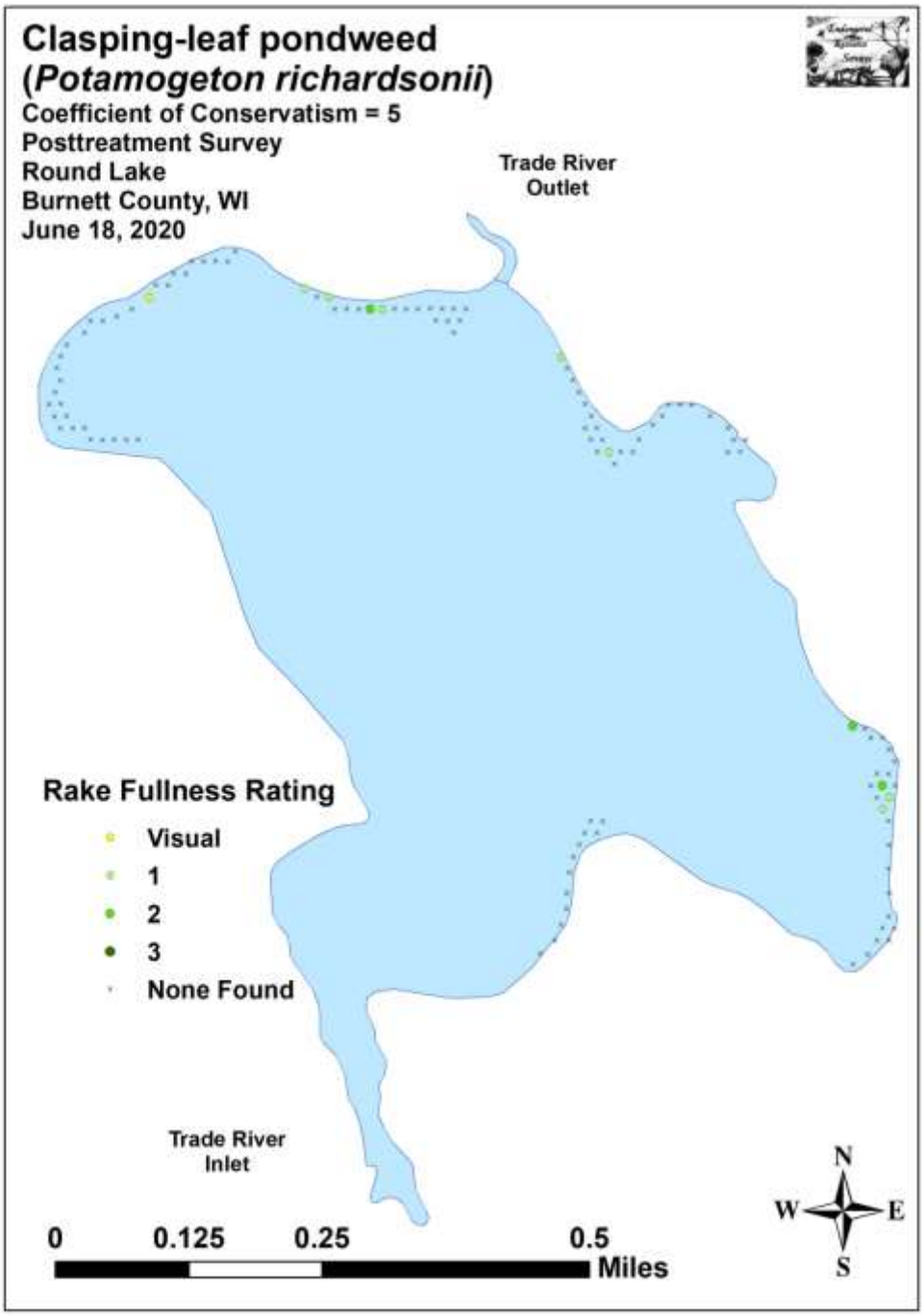

White water lily
(Nymphaea odorata)
Coefficient of Conservatism = 6
Posttreatment Survey
Round Lake
Burnett County, WI
June 18, 2020
Trade River
Outlet
Rake Fullness Rating
Visual
1
2
3
None Found
Trade River
Inlet
0
0.125
0.25
0.5
Miles
N
W
E
S

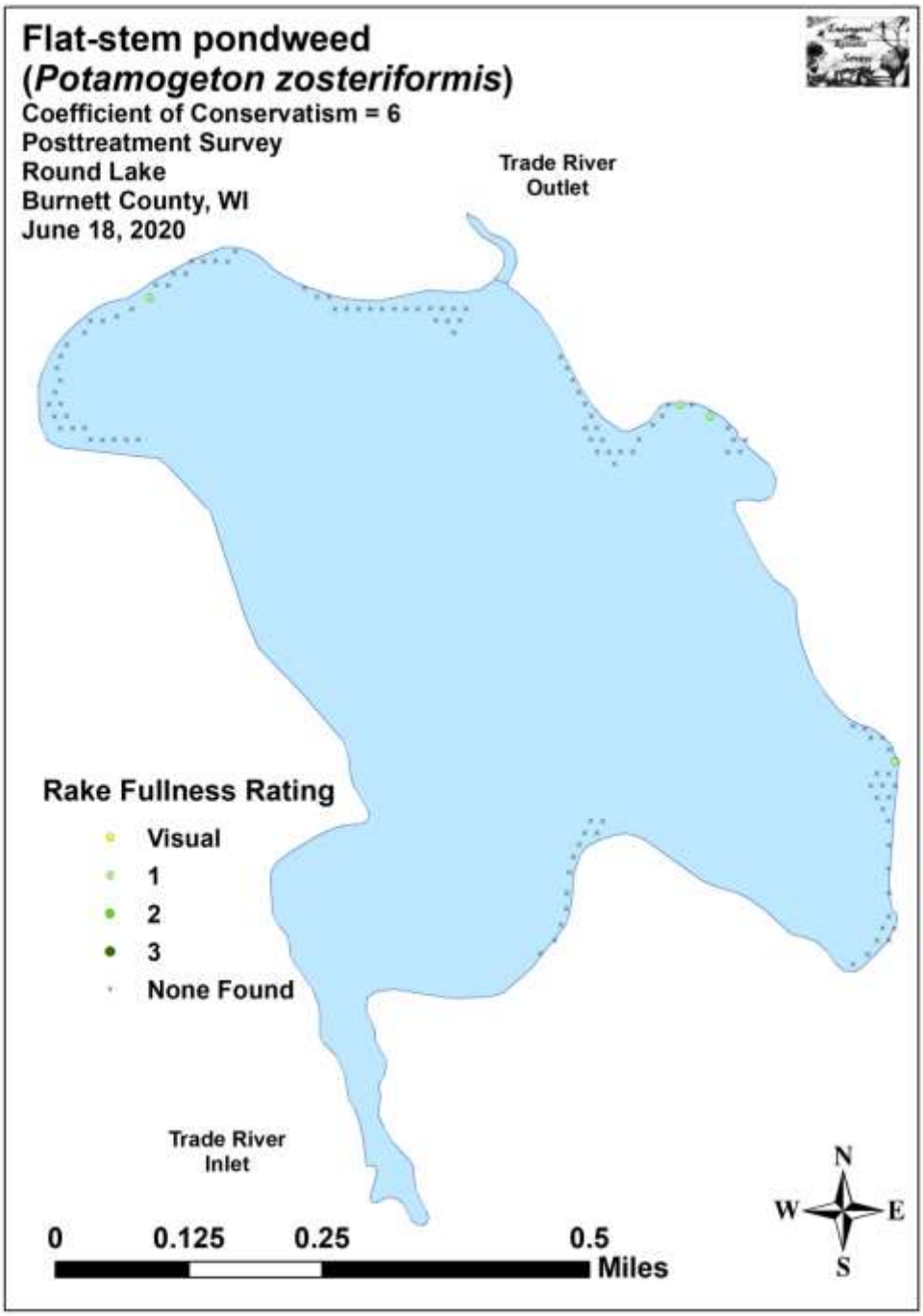

Leafy pondweed
(Potamogeton foliosus)
Coefficient of Conservatism = 6
Posttreatment Survey
Round Lake
Burnett County, WI
June 18, 2020
Trade River
Outlet
Rake Fullness Rating
Visual
1
2
3
None Found
Trade River
Inlet
0
0.125
0.25
0.5
Miles
N
W
E
S

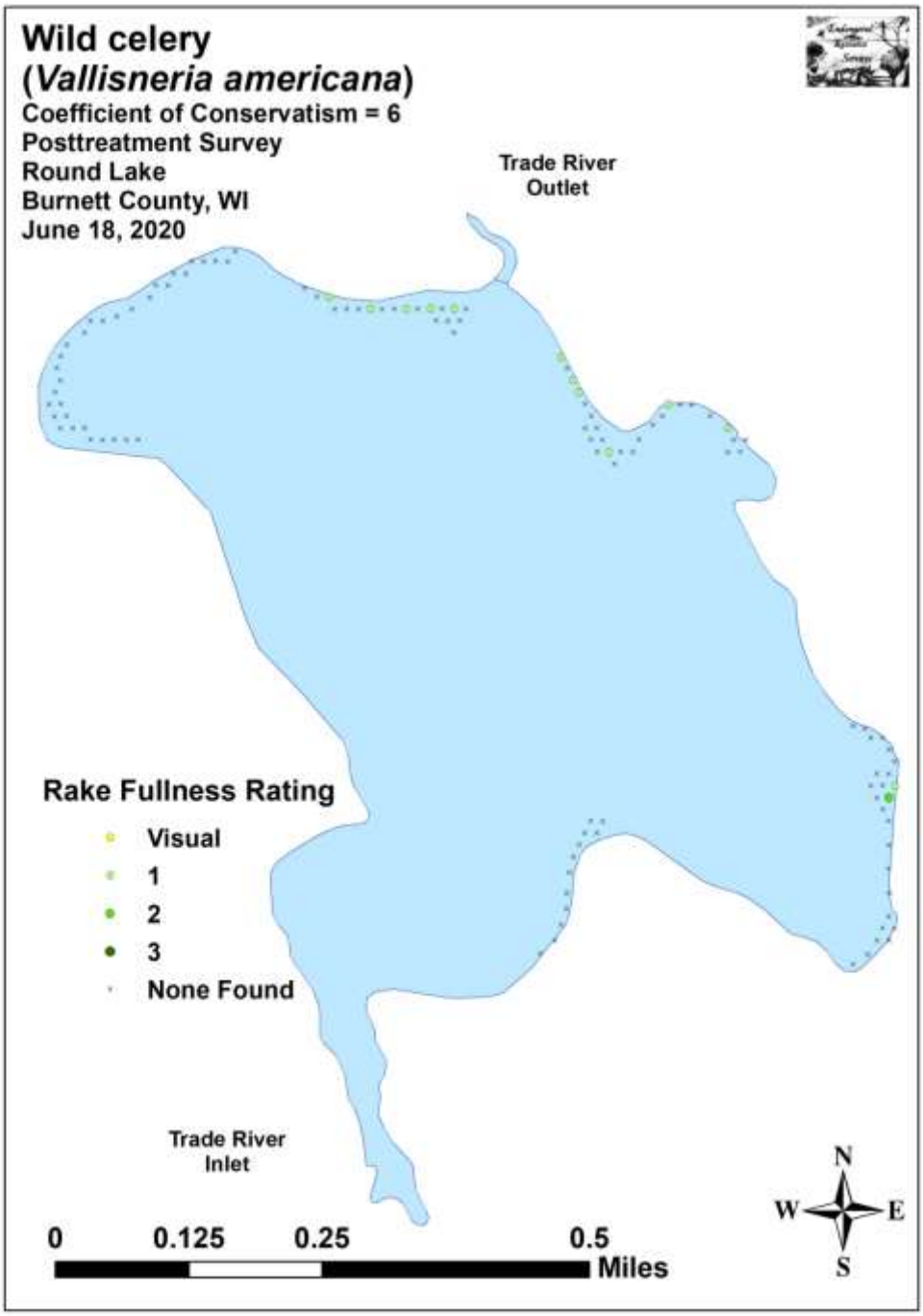

Fries' pondweed
(Potamogeton friesii)
Coefficient of Conservatism = 8
Posttreatment Survey
Round Lake
Burnett County, WI
June 18, 2020
Trade River
Outlet
Rake Fullness Rating
Visual
1
2
3
None Found
Trade River
Inlet
N
W
E
S
0
0.125
0.25
0.5
Miles


Long-leaf pondweed
(Potamogeton nodosus)
Coefficient of Conservatism = 7
Posttreatment Survey
Round Lake
Burnett County, WI
June 18, 2020
Trade River
Outlet
Rake Fullness Rating
Visual
1
2
3
None Found
Trade River
Inlet
0
0.125
0.25
0.5
Miles
N
W
E
S

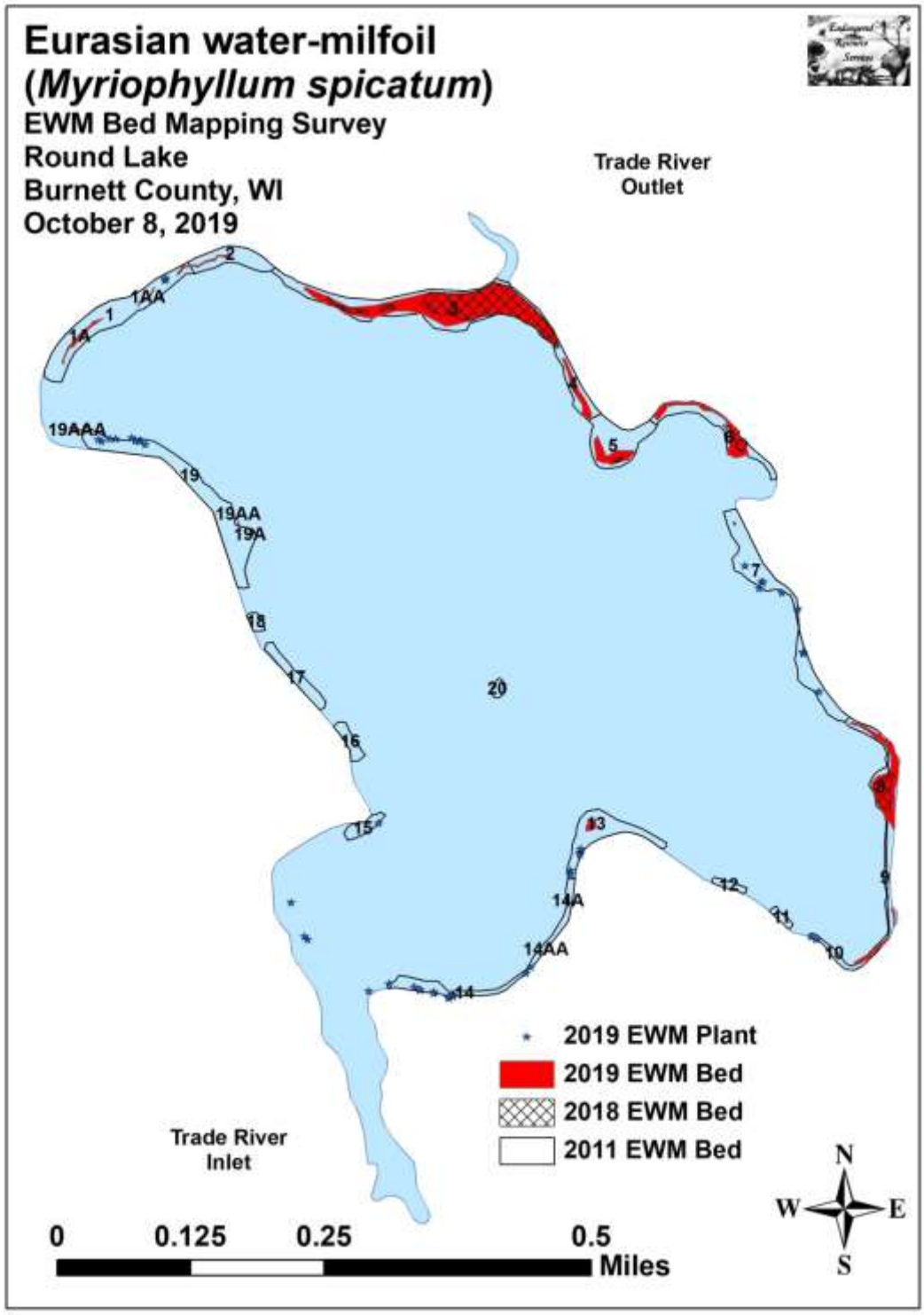

Small pondweed
(Potamogeton pusillus)
Coefficient of Conservatism = 7
Posttreatment Survey
Round Lake
Burnett County, WI
June 18, 2020
Trade River
Outlet
Rake Fullness Rating
Visual
1
2
3
None Found
Trade River
Inlet
0
0.125
0.25
0.5
Miles
N
W
E
S

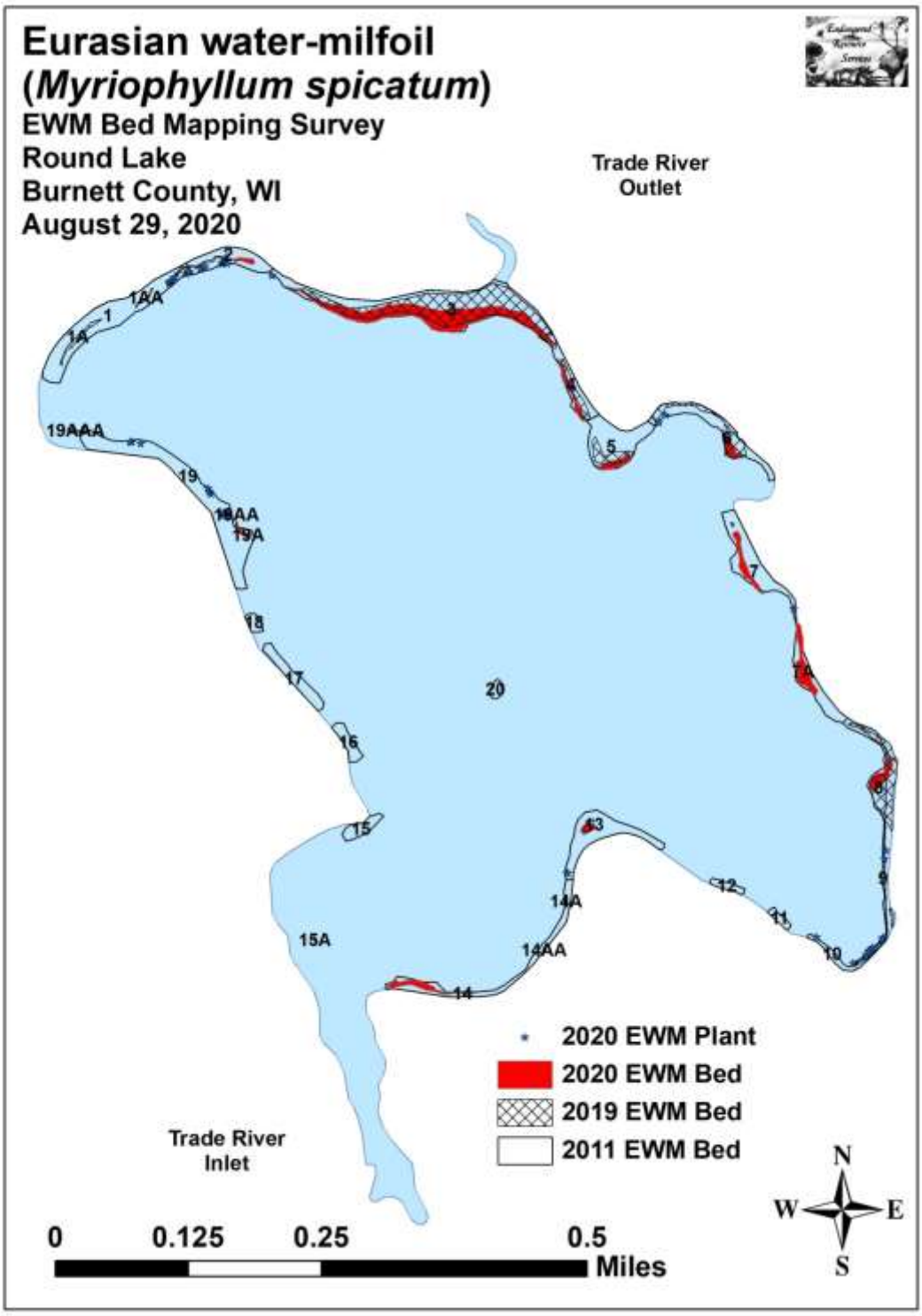

Clasping-leaf pondweed
(Potamogeton richardsonii)
Coefficient of Conservatism = 5
Posttreatment Survey
Round Lake
Burnett County, WI
June 18, 2020
Trade River
Outlet
Rake Fullness Rating
Visual
1
2
3
None Found
Trade River
Inlet
0
0.125
0.25
0.5
Miles
N
W
E
S


Flat-stem pondweed
(Potamogeton zosteriformis)
Coefficient of Conservatism = 6
Posttreatment Survey
Round Lake
Burnett County, WI
June 18, 2020
Trade River
Outlet
Rake Fullness Rating
Visual
1
2
3
None Found
Trade River
Inlet
N
W
E
S
0
0.125
0.25
0.5
Miles


Wild celery
(Vallisneria americana)
Coefficient of Conservatism = 6
Posttreatment Survey
Round Lake
Burnett County, WI
June 18, 2020
Trade River
Outlet
Rake Fullness Rating
Visual
1
2
3
None Found
Trade River
Inlet
N
W
E
S
0
0.125
0.25
0.5
Miles

Appendix VIII: Fall 2019 and Late Summer 2020 EWM Bed Maps


Eurasian water-milfoil
(Myriophyllum spicatum)
EWM Bed Mapping Survey
Round Lake
Burnett County, WI
October 8, 2019
Trade River
Outlet
Trade River
Inlet
2019 EWM Plant
2019 EWM Bed
2018 EWM Bed
2011 EWM Bed
N
W
E
S
0
0.125
0.25
0.5
Miles


Eurasian water-milfoil
(Myriophyllum spicatum)
EWM Bed Mapping Survey
Round Lake
Burnett County, WI
August 29, 2020
Trade River
Outlet
Trade River
Inlet
2020 EWM Plant
2020 EWM Bed
2019 EWM Bed
2011 EWM Bed
0
0.125
0.25
0.5
Miles
N
W
E
S