An Aquatic Plant Management Update for

Eagle Spring Lake in Waukesha County, Wisconsin

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Prepared by

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Introduction

In order to continue to improve Eagle Spring Lake management an updated report on the aquatic plant management has been compiled. The following contains survey results from the point intercept survey required by the WDNR, a summary of the chemical treatment history and mechanical harvesting history for the past 5 years, and recommendations for future management.

Point Intercept Survey Method

A point intercept survey method was used to complete a vegetation survey on Eagle Spring Lake on July 28th of 2016. A total of 452 points were generated with GPS coordinates, covering the entire water body of Eagle Spring Lake (Fig. 1). The point intercept survey methods included tossing a rake head tied to a rope across each point and recording the data: the species present, species density, overall density, depth, and GPS coordinates. Some points were not sampled due to different conditions including obstructions (i.e. dock, swimmers, and anglers), non-navigable due to dense vegetation, and land (the coordinates were not actually on the lake but on land). Each plant in the sample was given a value of 1 to 3 to record density, one being sparse and 3 being dense (Fig 2).

Figure 1 Eagle Spring Lake Point Intercept Survey

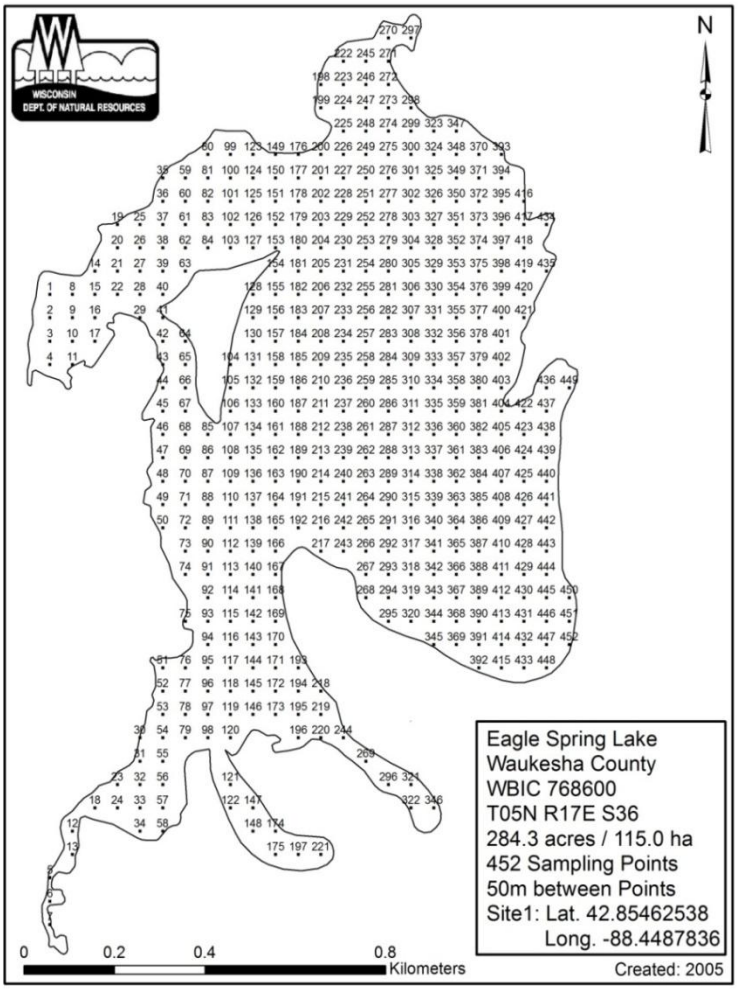
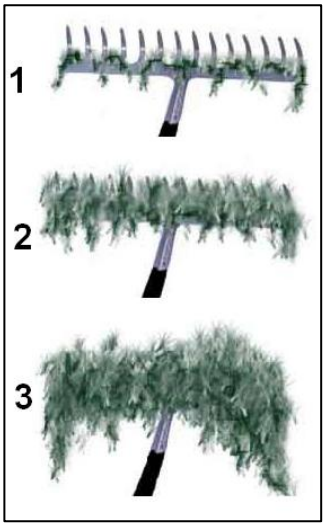


Figure 2 Rake Fullness Scale for Plant Density



Point Intercept Survey Results

Table 1 shows the results of the aquatic plant survey conducted in July 2016. The total number of species of aquatic plants identified

during this survey was 23. The total number of sites sampled was 358, of which 331 contained vegetation. The most dominate species are muskgrass (Chara sp.), wild celery (Vallisneria Americana), slender naiad (Najas flexilis), clasping-leaf pondweed (Potamogeton crispus), and spiny naiad (Najas marina) with relative importance values of .93, .64, .54, .33, and .25. These species are represented in Maps 1, 2, 3, and 8. Eurasian water milfoil (Myriophyllum spicatum) has a relative frequency of occurrence value of .08, and an importance value of .10 (Table 1). Curley-leaf pond weed (Potamogeton crispus) did not occur in any samples but was visually seen at one sight near the north east shore shown in Map 7. Table 2 shows the results of the frequency of occurrence including visual encounters (when a species was visually seen at a survey point but not in the sample or the sample was not possible). Yellow pond lily (Nuphjar advena) and white water lily (Nymphaea odorata) are more accurately represented in Table 2 with a frequency of occurrence including visual of .25 and .26 respectively. The point intercept results for lilies are shown in Map 5. Table 3 shows the results of the previous aquatic plant survey completed in August 2008, which identified 21 aquatic plant species.

Table 1

Aquatic Plant Species Observed in Eagle Spring Lake: July 2016

Common Name	Scientific Name	Number of Sites Found	Overall Frequency of Occurrence	Relative Frequency of Occurrence[a]	Relative Average Density[b]	Importance Value[c]
Coontail	*Ceratophyllum demersum*	5	1.11%	1.51%	1.40	0.02
Muskgrasses	*Chara sp.*	226	50.00%	68.28%	1.36	0.93
Common waterweed	*Elodea canadensis*	12	2.65%	3.63%	1.17	0.04
Filamentous algae		2	0.44%	0.60%	1.00	0.01
Eurasian water-milfoil	*Myriophyllum spicatum*	28	6.19%	8.46%	1.18	0.10
Whorled water-milfoil	*Myriophyllum verticillatum*	56	12.39%	16.92%	1.13	0.19
Slender naiad	*Najas flexilis*	164	36.28%	49.55%	1.09	0.54
Spiny naiad	*Najas marina*	70	15.49%	21.15%	1.19	0.25
Yellow pond lily	*Nuphar advena*	9	1.99%	2.72%	1.00	0.03
White water lily	*Nymphaea odorata*	10	2.21%	3.02%	1.00	0.03
Curly-leaf pondweed	*Potamogeton crispus*	0	0.00%	0.00%	0.00	0.00
Leafy pondweed	*Potamogeton foliosus*	2	0.44%	0.60%	2.00	0.01
Illinois pondweed	*Potamogeton illinoensis*	2	0.44%	0.60%	1.00	0.01
Floating-leaf pondweed	*Potamogeton natans*	2	0.44%	0.60%	1.00	0.01
Clasping-leaf pondweed	*Potamogeton richardsonii*	107	23.67%	32.33%	1.01	0.33
Flat-stem pondweed	*Potamogeton zosteriformis*	3	0.66%	0.91%	1.67	0.02
Water bulrush	*Schoenoplectus subterminalis*	8	1.77%	2.42%	1.00	0.02
Softstem bulrush	*Schoenoplectus tabernaemontani*	0	0.00%	0.00%	0.00	0.00
Small bur-reed	*Sparganium natans*	13	2.88%	3.93%	1.00	0.04
Sago pondweed	*Stuckenia pectinata*	41	9.07%	12.39%	1.05	0.13
Cattail	*Typha sp.*	0	0.00%	0.00%	0.00	0.00
Bladderwort Species	*Utricularia sp.*	26	5.75%	7.85%	1.00	0.08
Wild celery	*Vallisneria americana*	204	45.13%	61.63%	1.04	0.64

NOTE: The survey includes 452 sampling points. The number of samplings with vegetation is 331.

[a]The relative frequency of occurrence is the number sites found divided by the number of samplings with vegetation.

[b]The relative average density is the sum of density ratings for a species divided by the number of sampling points with vegetation, with a maximum density of 3.0.

[c]The importance value is the product of the relative frequency of occurrence and the relative average density.

Table 2
Aquatic Plant Species Encountered including Visual in Eagle Spring Lake: July 2016

Common Name	Scientific Name	Number of Sites Found[a]	Number of Sites Visually Encountered[b]	Relative Frequency of Occurrence Inc. Visual[c]
Coontail	Ceratophyllum demersum	5	0	1.51%
Muskgrasses	Chara sp.	226	0	68.28%
Common waterweed	Elodea canadensis	12	1	3.93%
Filamentous algae		2	0	0.60%
Eurasian water-milfoil	Myriophyllum spicatum	28	8	10.88%
Whorled water-milfoil	Myriophyllum verticillatum	56	46	30.82%
Slender naiad	Najas flexilis	164	3	50.45%
Spiny naiad	Najas marina	70	2	21.75%
Yellow pond lily	Nuphar advena	9	73	24.77%
White water lily	Nymphaea odorata	10	76	25.98%
Curly-leaf pondweed	Potamogeton crispus	0	1	0.30%
Leafy pondweed	Potamogeton foliosus	2	1	0.91%
Illinois pondweed	Potamogeton illinoensis	2	1	0.91%
Floating-leaf pondweed	Potamogeton natans	2	4	1.81%
Clasping-leaf pondweed	Potamogeton richardsonii	107	11	35.65%
Flat-stem pondweed	Potamogeton zosteriformis	3	0	0.91%
Water bulrush	Schoenoplectus subterminalis	8	3	3.32%
Softstem bulrush	Schoenoplectus tabernaemontani	0	1	0.30%
Small bur-reed	Sparganium natans	13	3	4.83%
Sago pondweed	Stuckenia pectinata	41	28	20.85%
Cattail	Typha sp.	0	6	1.81%
Bladderwort Species	Utricularia sp.	26	0	7.85%
Wild celery	Vallisneria americana	204	37	72.81%

NOTE: The survey includes 452 sampling points. The number of samplings with vegetation is 331.

[a]The number of sites found is the number of sites that the species was present in the sample.

[b]The number of sites visually encountered is the sites where the species was not present in the sample was but visible and within 6 feet of sample point.

[c]The relative frequency of occurrence including visual is the sum of the number of sites found and the number of sites visually encountered, divided by the number of samplings with vegetation.

Table 3

Aquatic Plant Species Observed in Eagle Spring Lake: August 2008

Common Name	Scientific Name	Relative Frequency of Occurrence[a]	Relative Average Density[b]	Importance Value[c]
Coontail	*Ceratophyllum demersum*	21%	2.67	0.58
Muskgrasses	*Chara sp.*	58%	2.28	1.32
Needle Spikerush	*Eleocharis acicularis*	13%	2	0.25
Common waterweed	*Elodea canadensis*	15%	1.5	0.23
Eurasian water-milfoil	*Myriophyllum spicatum*	44%	1.79	0.78
Native water-milfoil	*Myriophyllum spp.*	78%	2.67	2.09
Slender naiad	*Najas flexilis*	73%	2.73	1.98
Spiny naiad	*Najas marina*	37%	1.45	0.53
Curly-leaf pondweed	*Potamogeton crispus*	5%	2	0.11
Leafy pondweed	*Potamogeton foliosus*	13%	2.29	0.29
Variable pondweed	*Potamogeton gramineus*	4%	1	0.04
Illinois pondweed	*Potamogeton illinoensis*	2%	2	0.04
Floating-leaf pondweed	*Potamogeton natans*	7%	1.75	0.13
Sago pondweed	*Potamogeton pectinatus*	29%	1.44	0.42
Small Pondweed	*Potamogeton pusillus*	5%	1	0.05
Clasping-leaf pondweed	*Potamogeton richardsonii*	18%	1.1	0.2
Flat-stem pondweed	*Potamogeton zosteriformis*	13%	1.86	0.24
Water crowfoot	*Ranunculus longirostris*	16%	2.11	0.35
Bladderwort Species	*Utricularia sp.*	27%	2.13	0.58
Wild celery	*Vallisneria americana*	49%	2.56	1.25
Water stargrass	*Zosterella dubia*	4%	3.5	0.13

NOTE: The survey includes 55 sampling points.

[a]The relative frequency of occurrence is the number sites found divided by the number of samplings with vegetation.

[b]The relative average density is the sum of density ratings for a species divided by the number of sampling points with vegetation, with a maximum density of 4.0.

[c]The importance value is the product of the relative frequency of occurrence and the relative average density.

Aquatic Plant Community Discussion

Some changes in the aquatic plant community have occurred since the last survey was performed in 2008. Some of the most dominant species continue to be muskgrass, wild celery (aka eel grass), and slender naiad (aka bushy pondweed). However there were a few new species recorded that had not been documented in the 1994 or 2008 surveys. These species included water bulrush (Schoenoplectus subterminalis), softstem bulrush (Schoenoplectus tabernaemontani), and small bur-reed (Stuckenia pectinata). All three species are native to Wisconsin and commonly found in shallow lake habitats such as Eagle Spring Lake. There has been a decline in several species including bladderworts, coontail (Ceratophyllum demersum), and native milfoils such as whorled water milfoil. Although it is also likely that the difference in methods between the previous 2008 survey and the 2016 survey lead to the data showing a decline, these species that have declined utilize the same habitat as Eurasian water milfoil and therefore chemical treatments and mechanical harvesting of Eurasian water milfoil may have affected their population. The 2008 survey method was less extensive, and therefore may not have accurately shown the importance of some species, and data may have shown coontail, bladderwort and native milfoils to have a higher relative frequency than they truly did.

Two aquatic invasive species, curly leaf- pondweed (Potamogeton crispus) and Eurasian water milfoil (Myriophyllum spicatum) have been identified in Chapters NR 40 and NR109 of the Wisconsin Administrative Code as an aquatic invasive plant species. Both of these species were identified in the survey, as they have in the past as well. There has been a decrease from 2008 to 2016 in the relative frequency of occurrence for Eurasian water milfoil from .43 to .08 (Table 1 and Table 3). There is also a decrease from 2008 to 1016 in the relative frequency of occurrence for curly-leaf pondweed from .05 to .00 (Table 1 and Table 3). The only occurrence of curly-leaf pondweed in the survey was a single sprig from a plant that was visually encountered floating along the north east shore of the lake (Map 4, Bottom). This survey was conducted in July, which is generally not part of the growing season for curly-leaf pondweed. More curly-leaf pondweed may be present in the fall and spring. Eurasian water milfoil is present in Pickerel Bay, Mary's Bay and Jack's Bay, as well as moderately dense in the North West bay near the springs and the red pier and raft, where the DASH harvesting experiment occurred (Map 4, Top). The results of the DASH harvesting and future recommendations are elaborated on in the Mechanical Harvesting section to follow.

Table 4
Aquatic Plant Species Recorded in Eagle Spring Lake: July 1994, August 2008, and July 2016

Aquatic Plant Species	1994	2008	2016
Ceratophyllum demersum (coontail)	X	X	X
Chara vulgaris (muskgrass)	X	X	X
Elocharis acicularis (needle spikerush)	–	X	–
Eloda canadensis (waterweed)	X	X	X
Myriophyllum spicatum (Eurasian water milfoil)	X	X	X
Myriophyllum spp. (native milfoil)	X	X	X
Najas flexillis (bushy pondweed or slender naiad)	X	X	X
Najas marina (spiny naiad)	X	X	X
Nuphar spp. (yellow water lily)	–	–	X
Nymphaea tuberosa (white water lily)	–	–	X
Potamogeton crispus (curly-leaf pondweed)	X	X	X
Potamogeton foliosis (leafy pondweed)	–	X	X
Potamogeton gramineus (variable pondweed)	X	X	–
Potamogeton illinoensis (Illinois pondweed)	X	X	X
Potamogeton natans (floating-leaf pondweed)	X	X	X
Potamogeton pectinatus (sago pondweed)	X	X	X
Potamogeton pusillus (small pondweed)	–	X	–
Potamogeton richardsonii (Richardson's pondweed)	–	X	–
Potamogeton zosteriformis (flat-stemmed pondweed)	X	X	X
Ranunculus longisrostris (water crowfoot)	X	X	–
Schoenoplectus subterminalis (water bulrush)	–	–	X
Schoenoplectus tabernaemontani (softstem bulrush)	–	–	X
Sparganium natans (small bur-reed)	–	–	X
Typha spp. (cattail)	–	–	X
Utricularia spp. (bladderwort)	X	X	X
Vallisneria americana (wild celery or eel grass)	X	X	X
Zosterella dubia (water stargrass)	–	X	–

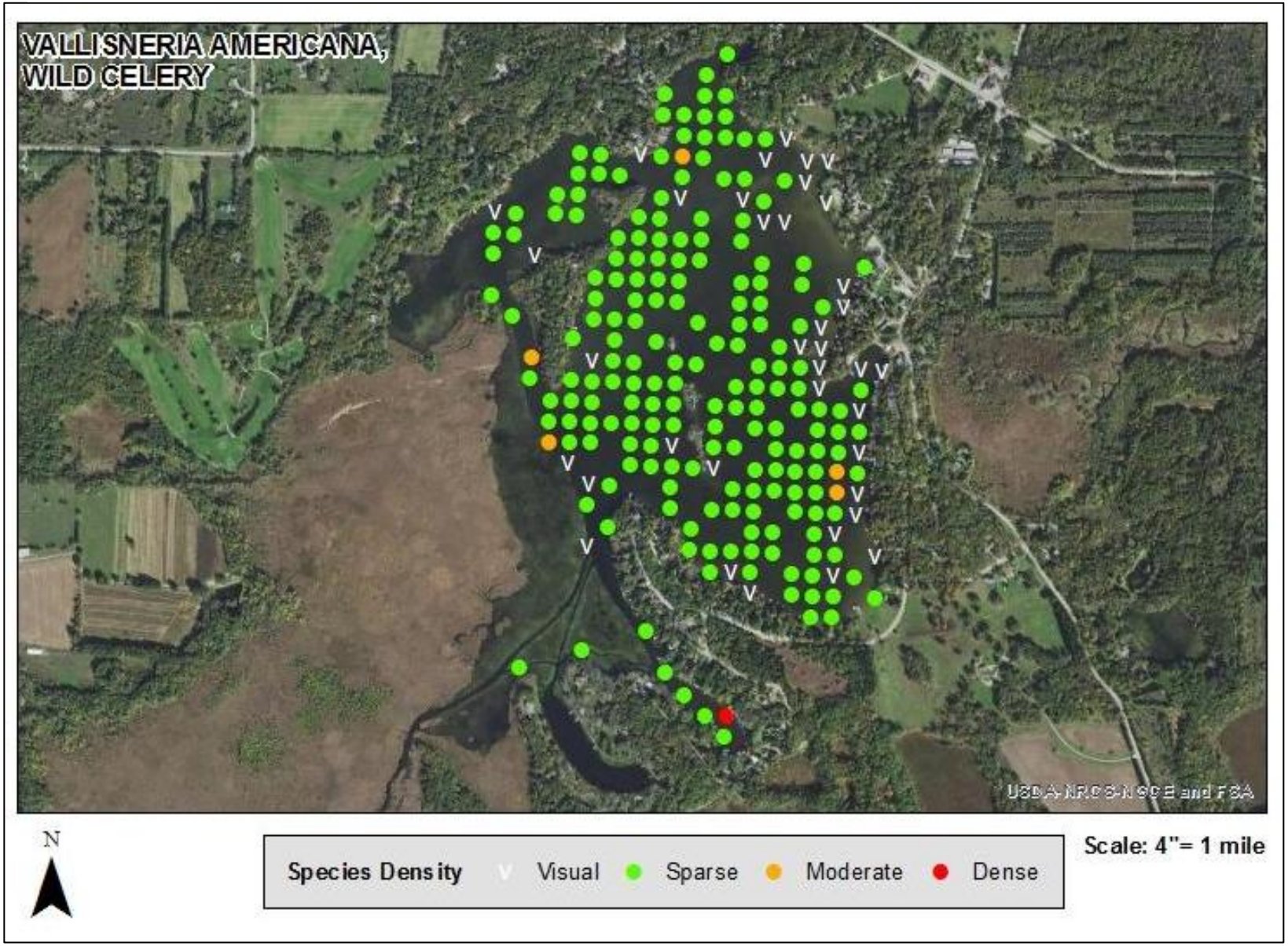
Table 5
Aquatic Plant Species Recorded in Eagle Spring Lake and Their Positive Role In the Lake Community: 1994, 2008, and 2016

Aquatic Plant Species	Ecological Significance
Ceratophyllum demersum (coontail)	Provides good shelter for young fish and supports insects; valuable as food for fish and ducklings
Chara vulgaris (muskgrass)	Excellent producer of fish food, especially for young trout, bluegills and small and largemouth bass; stabilizes bottom sediments; has softening effect on the water by removing lime and carbon dioxide
Elocharis acicularis (needle spikerush)	Food for waterfowl and muskrats
Eloda canadensis (waterweed)	Provides shelter and support for insects which are valuable as fish food
Myriophyllum spicatum (Eurasian water milfoil)	Invasive aquatic species; None known
Myriophyllum spp. (native milfoil)	Provides valuable food and shelter for fish; fruits eaten by many wildfowl
Najas flexillis (bushy pondweed or slender naiad)	Stems, foliage and seeds are important wildfowl food; produces good food and shelter for fish
Najas marina (spiny naiad)	Provides good food and shelter for fish and for waterfowl
Nuphar spp. (yellow water lily)	Leaves, stems and flowers are eaten by deer; roots eaten by beavers and porcupines; seeds eaten by wildfowl; leaves provide harbor to insects, in addition to shade and shelter for fish
Nymphaea tuberosa (white water lily)	Provides shade and shelter for fish; seeds eaten by wildfowl; roots and stalks eaten by muskrats; roots eaten by beaver, deer, moose, and procupine
Potamogeton crispus (curly-leaf pondweed)	Invasive aquatic species; Provides food and shelter for some fish and wildfowl
Potamogeton foliosis (leafy pondweed)	Provides important food for wildfowl and food and shelter for fish
Potamogeton gramineus (variable pondweed)	Provides food important to ducks and food and cover for fish
Potamogeton illinoensis (Illinois pondweed)	Provides some food for ducks and shelter for fish
Potamogeton natans (floating-leaf pondweed)	Provides good food for ducks late in season
Potamogeton pectinatus (sago pondweed)	Most important pondweed for ducks; provides food and shelter for young fish
Potamogeton pusillus (small pondweed)	Provides food important to ducks and food and cover for fish
Potamogeton richardsonii (Richardson's pondweed)	Provides good food and cover for fish and supports insects
Potamogeton zosteriformis (flat-stemmed pondweed)	Provides some food for ducks
Ranunculus longisrostris (water crowfoot)	Provides food important to ducks and food and cover for fish
Schoenoplectus subterminalis (water bulrush)	Provides invertebrate habitat and shelter for fish
Schoenoplectus tabernaemontani (softstem bulrush)	Provides invertebrate habitat and shelter for fish; nutlets provide food for wildfowl; stems and rhizomes eaten by geese and muskrats; provide nesting material and cover for wildfowl
Sparganium natans (small bur-reed)	Helps anchor sediment and stabilize bottom, fruit eaten by waterfowl; provides food for deer and muskrat
Typha spp. (cattail)	Supports insects; stalks and roots are important food for muskrats and beavers; attracts marsh birds, wildfowl, and songbirds in addition to being used as spawning grounds by sunfish and shelter for young fish
Utricularia spp. (bladderwort)	Provides good food and cover for fish
Vallisneria americana (wild celery or eel grass)	Provides good shade and shelter, supports insects, and is valuable fish food
Zosterella dubia (water stargrass)	Provides food important to ducks and food and cover for fish

Information obtained from A Manual of Aquatic Plants *by Norman C. Fassett*, *the* Guide to Wisconsin Aquatic Plants *by the Wisconsin Department of Ntural Resources, and* Through the Looking Glass: A field Guide to Aquatic Plants *by the University of Wisconsin-Extension.*

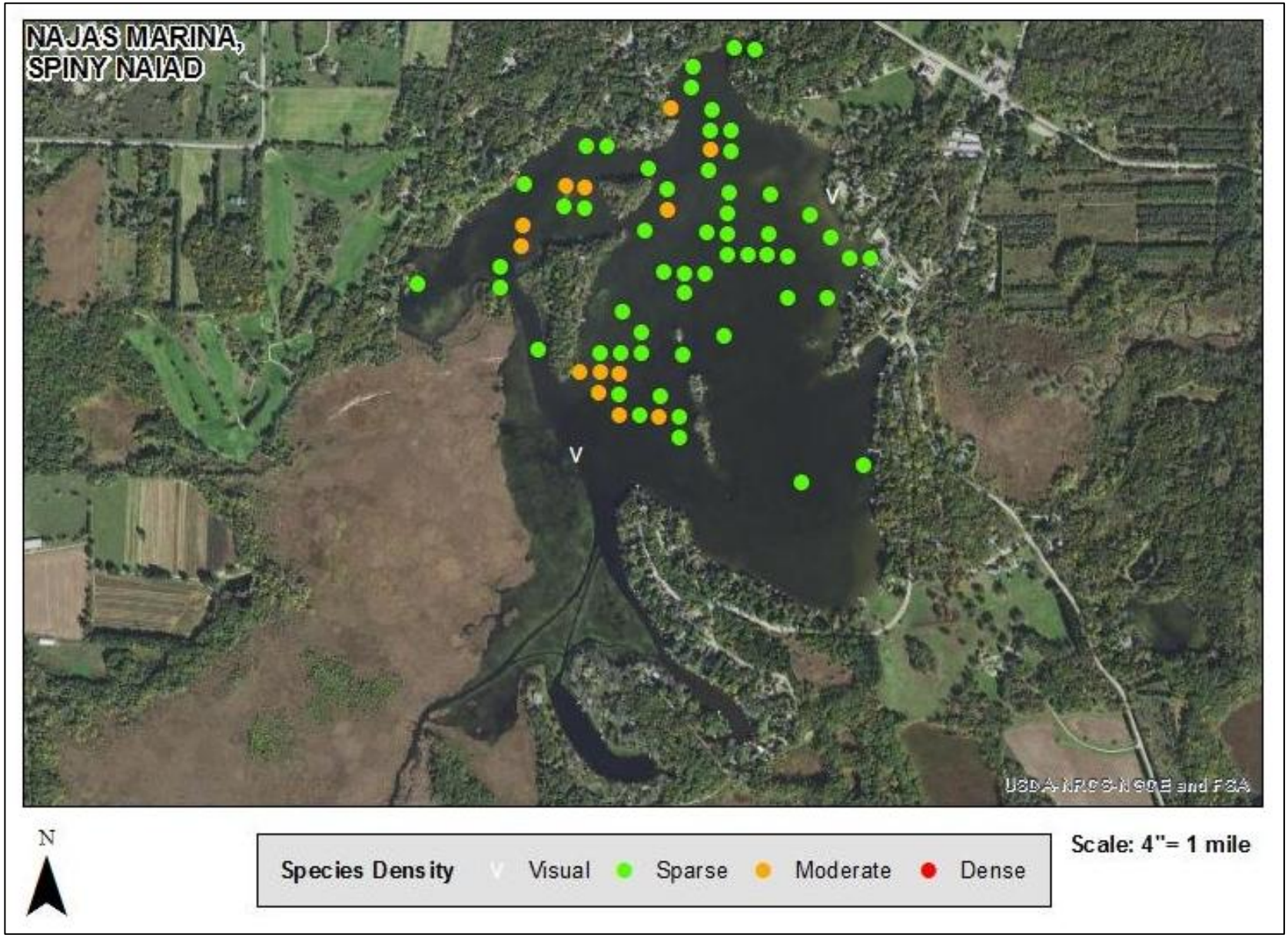
Map 1[1]

Point Intercept Shown for *Vallinsneria Americana* on Eagle Spring Lake 2008



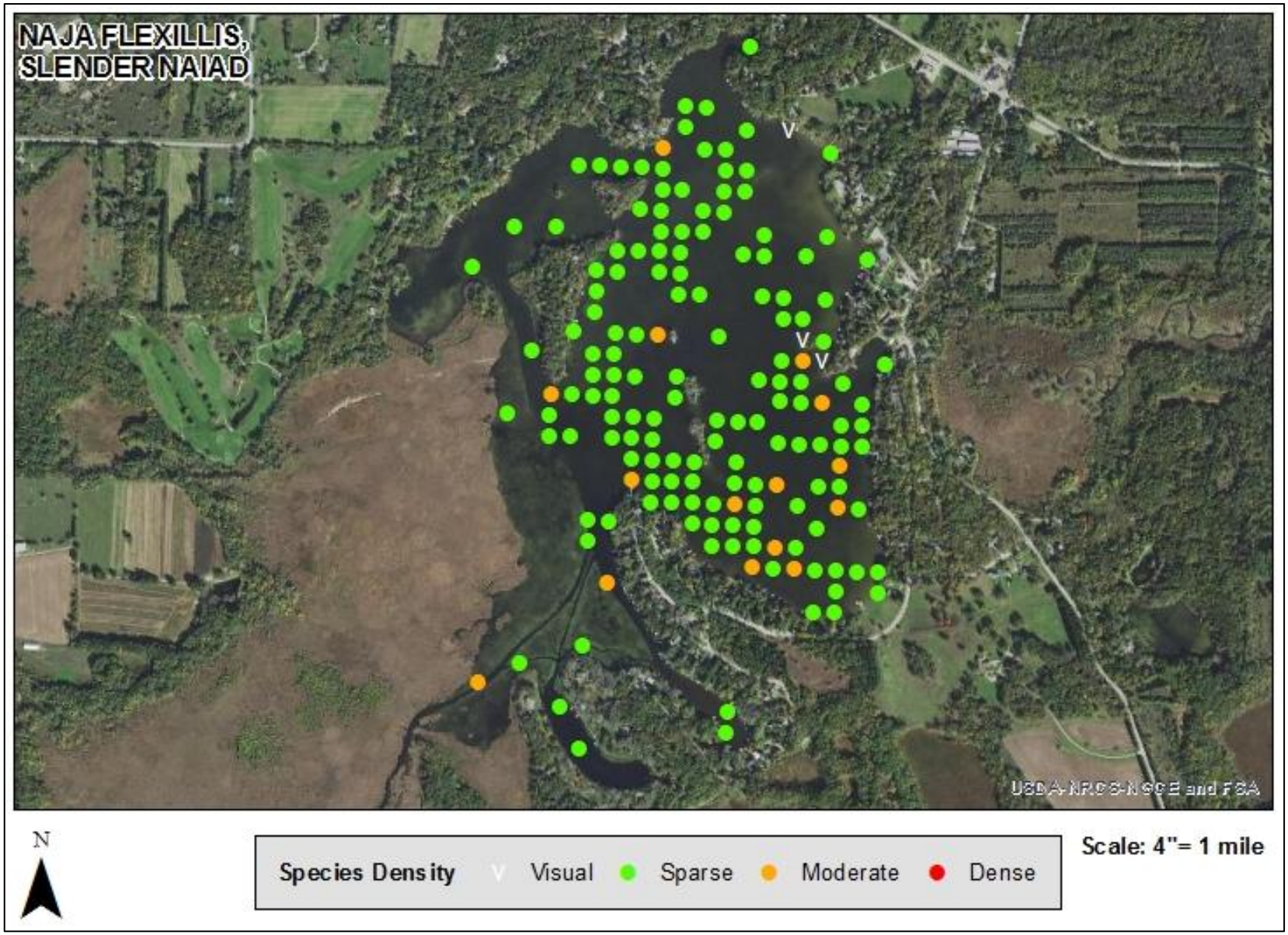
Map 2[1]

Point Intercept Shown for *Najas marina* on Eagle Spring Lake 2008



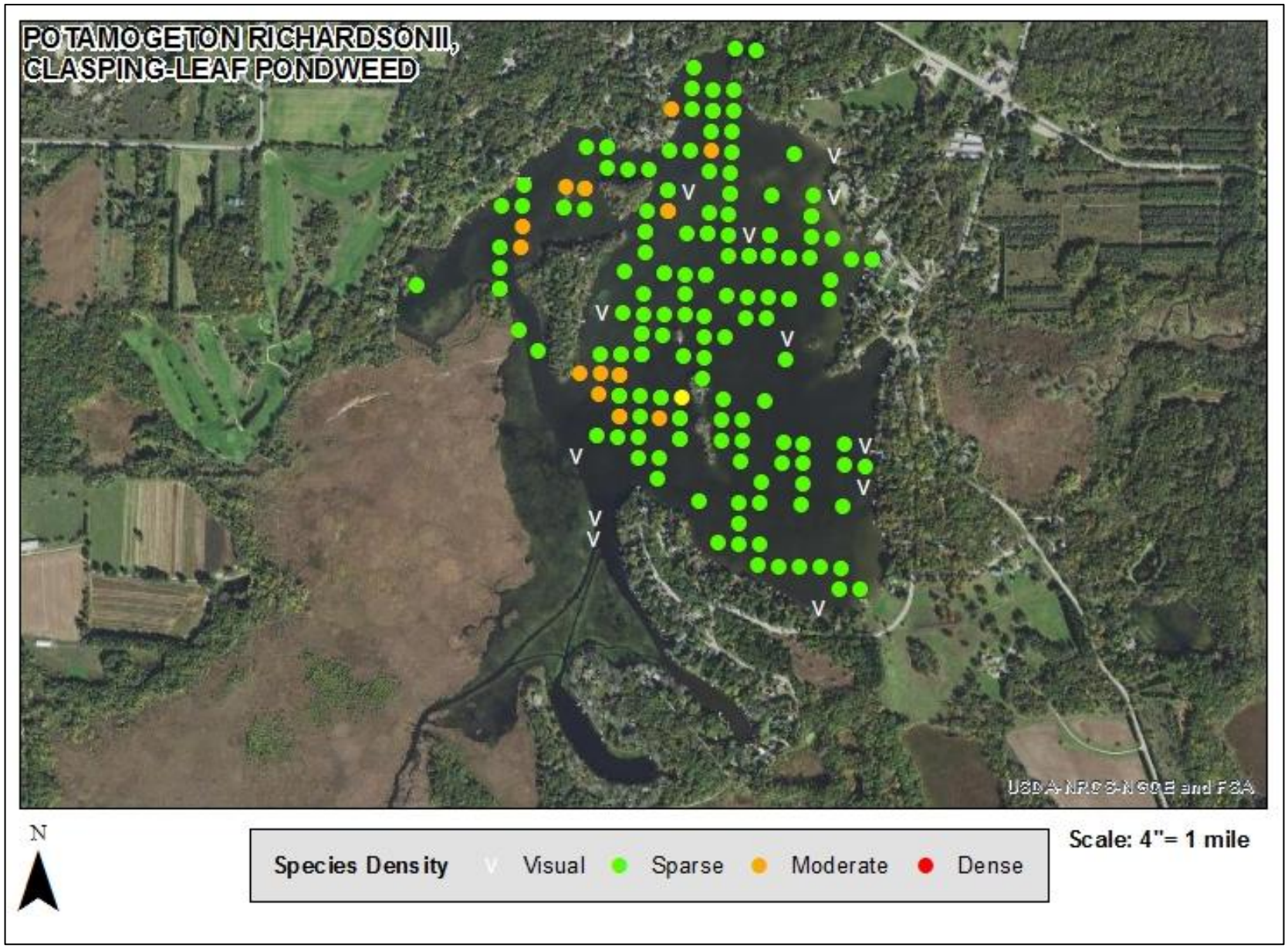
Map 3[1]

Point Intercept Shown for *Najas flexillis* on Eagle Spring Lake 2008



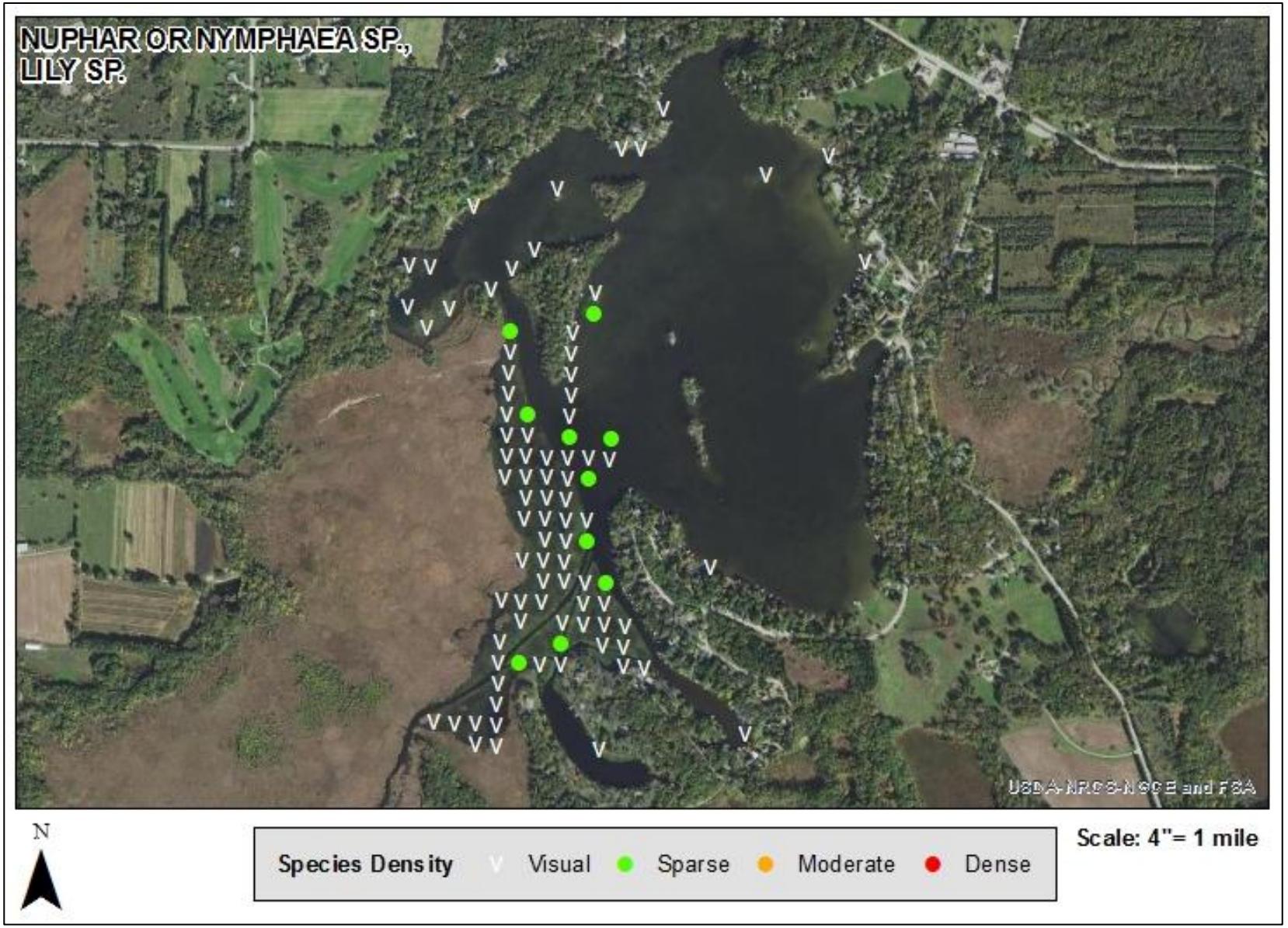
Map 4[1]

Point Intercept Shown for *Potamogeton richardsonii* on Eagle Spring Lake 2008



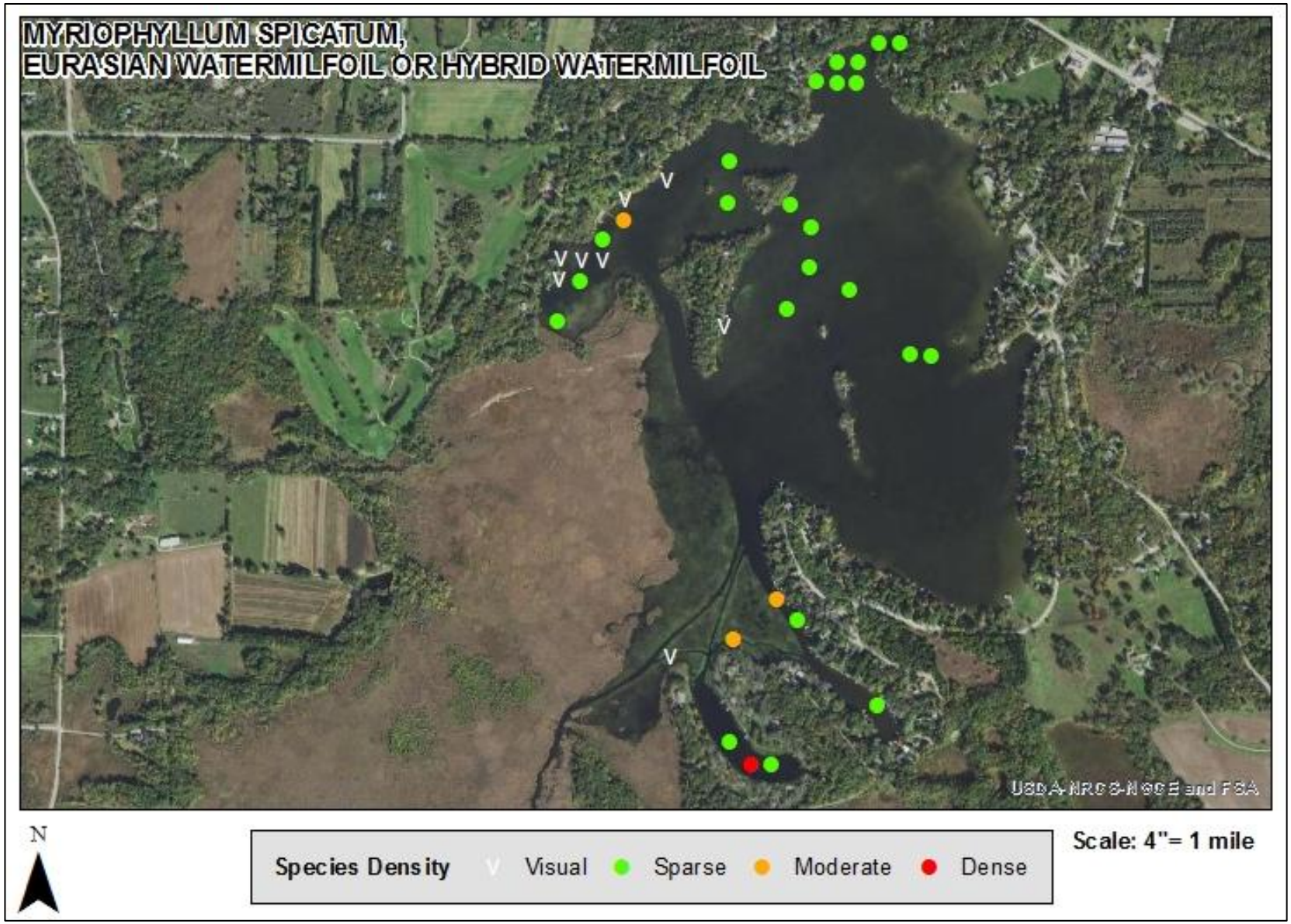
Map 5[1]

Point Intercept Shown for *Nuphar* or *Nymphaea sp.* on Eagle Spring Lake 2008



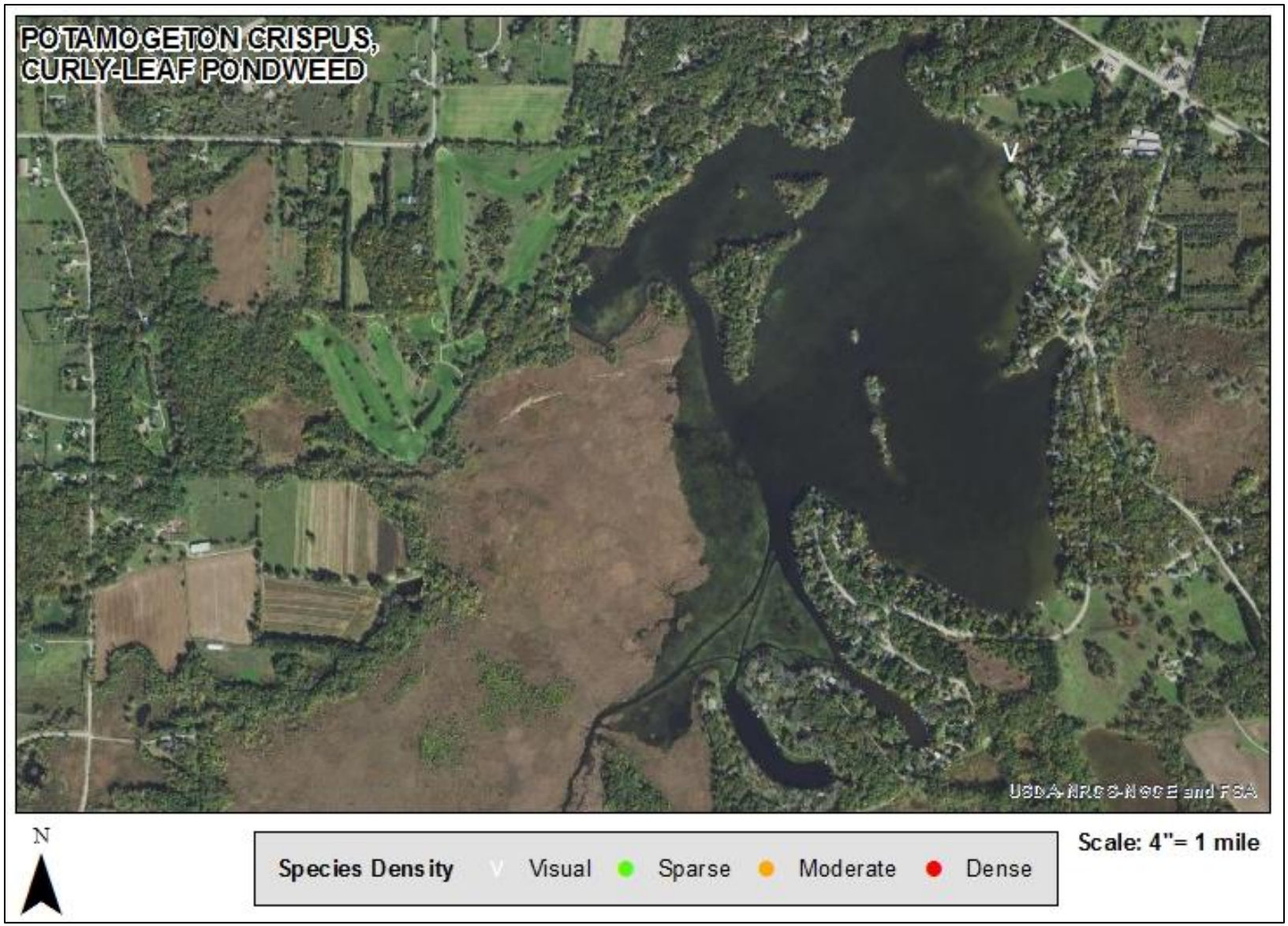
Map 6[1]

Point Intercept Shown for Invasive Aquatic Species *Myriophyllum spcatum* on Eagle Spring Lake 2008



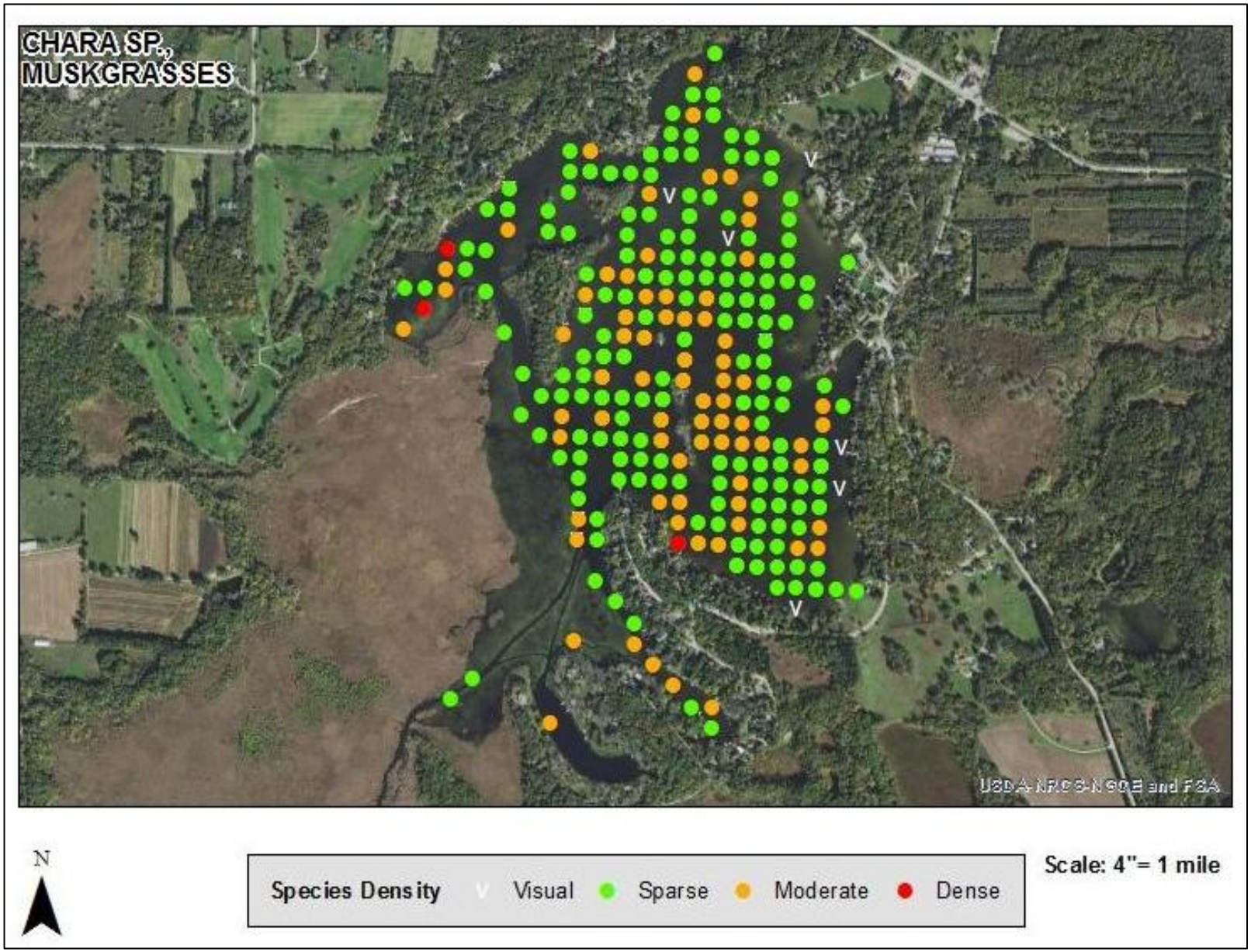
Map 7 [1]

Point Intercept Shown for Invasive Aquatic Species *Potamogeton crispus* on Eagle Spring Lake 2008



Map 8[1]

Point Intercept Shown for *Chara* on Eagle Spring Lake 2008



Chemical Treatment

Eagle Spring Lake is continually treated annually for Eurasian water milfoil. The treatment areas for the past 5 years, 2011, 2012, 2013, 2014 and 2015, are shown in Map 9 and Map 10. Historically the lake was treated with Navigate, a granular herbicide. In 2013 the applicator began using DMA4-IVM which is a liquid herbicide to treat Eurasian water milfoil. Treatment has historically taken place in May and September. Late fall treatments have been shown to be effective in reducing the populations of Eurasian water milfoil for the following year, therefore in areas where there are dense populations of Eurasian water milfoil a fall treatment may be appropriate.

Map 9

Chemically Treated Areas for Eurasian Water Milfoil in 2011 and 2012

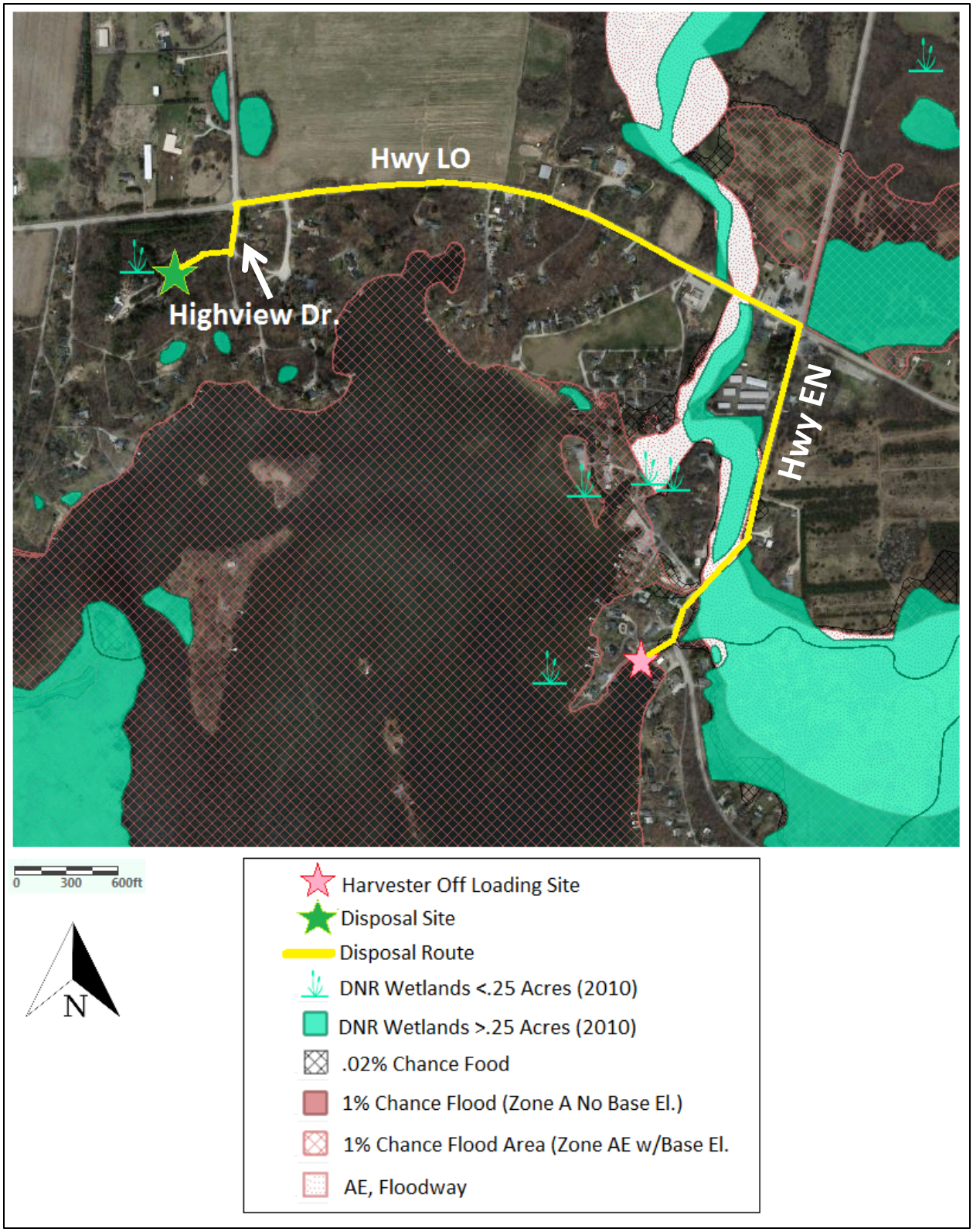
Map 10
Chemically Treated Areas for Eurasian Water Milfoil in 2013, 2014, and 2015

Map 11[2]

Cutting Harvesting Area on Eagle Spring Lake 2016 and DASH Harvest Area 2015

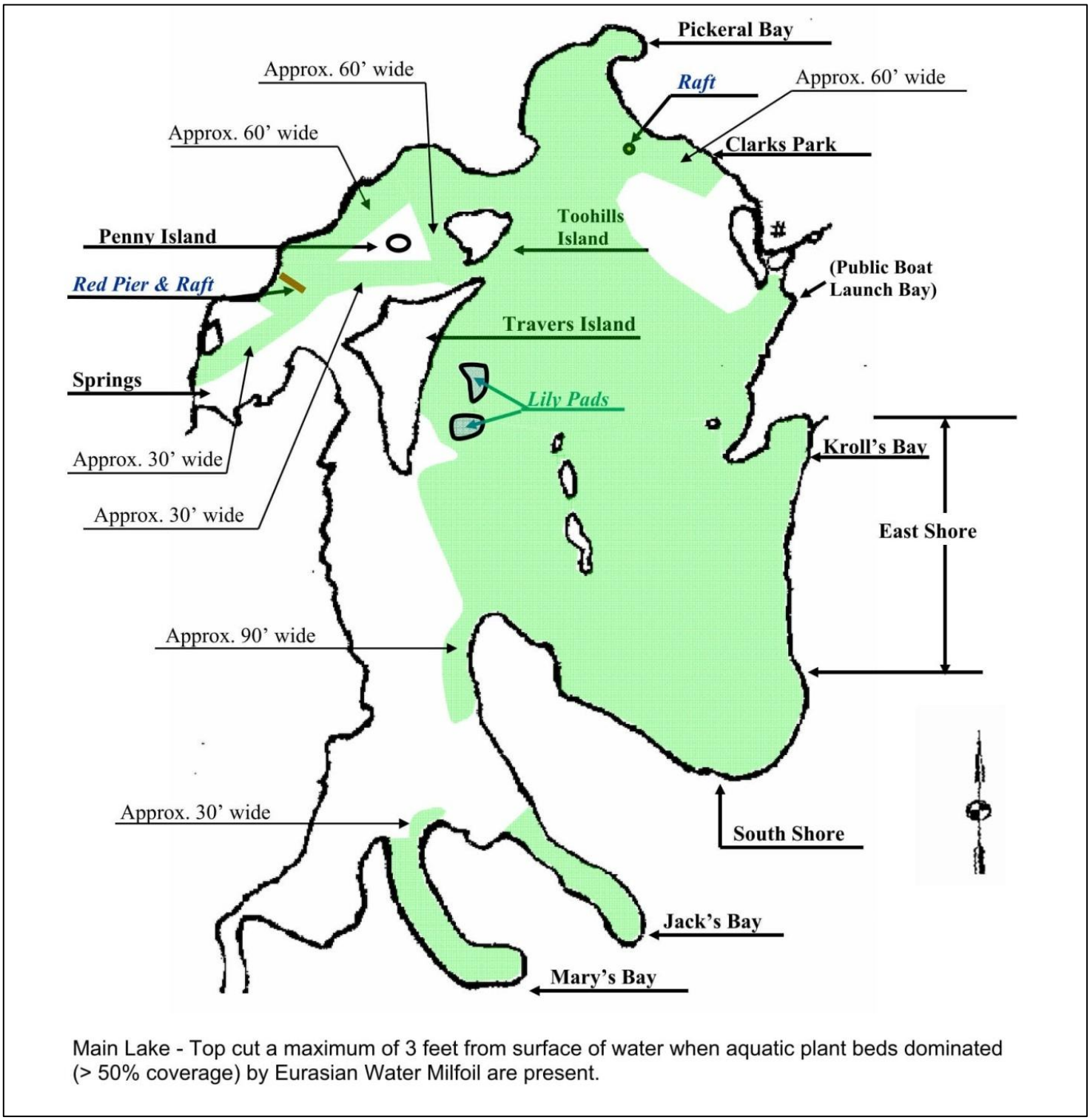
Map 12

Route from Harvester Offload Site to Dump Site



Map 13*

Anticipated Possible Eagle Spring Lake Cutting Paths/Areas



***Map 13** Provided by Gina Krause Bookkeeper/Administrative Assistant Eagle Spring Lake Mgmt. District

Mechanical Harvest

Throughout Eagle Spring Lake mechanical harvesting has been utilized to try to control Eurasian water milfoil, and to keep water areas open and more navigable by boaters for recreational purposes. This is done using specialized equipment that allows aquatic vegetation to be cut at designated depths and then collected to be removed from the water body. Floating and shoreline accumulation of vegetation may also be collected and removed using this method. There are consequences to this method of harvest, including the accidental removal of small fish. Up to four pounds of fish may be removed per ton of plants harvested[3]. WDNR typically recommends harvesting be conducted in areas six feet in depth or greater and that activities not begin before June 15th in order to reduce disturbing fish spawning activates[4]. Mechanical harvesting is recommended to continue, alongside chemical treatments, in order to reduce Eurasian water milfoil. The regrowth of milfoil has been reported to have decreased as harvesting frequency was increased[5]. Mechanical harvesting is recommended to continue to be used as a method for maintaining navigable channels for recreational purposes. The areas harvested in 2016 for both Eurasian water milfoil and to maintain navigable channels are shown in Map 11.

The offload sites for the harvesting will continue to be the same, unless any amendments to the Mechanical Control Permit are approved by the DNR. The current offload site and the route to the disposal site is shown in Map 12. Some of the organic material is then dispersed for composting in Town of Eagle Gardens.

In 2015 Ecowater Way Services used diver assisted suction harvesting (DASH) method to remove Eurasian water milfoil from the area inside the zone shown on Map 11. The area was 70 x 100 feet, .161 acres and approximately three feet deep. While the DASH method has benefits including more specific harvesting of the target species and less bicatch, the results were poor. The area harvested was reported to have repeated growth the same year and the following year that area was shown to have a moderate density of Eurasian water milfoil (Map 6). The method is costly and labor intensive. Because Eagle Spring Lake has over 45 acres that are regularly treated for Eurasian water milfoil, it is not recommended to continue with DASH as a whole lake management method, but, is a recommended option for the individual landowner who would like temporary aquatic plant reduction around their piers.

Fisheries and Wildlife Management

As par WI DNR review, Jason Cotter, Wildlife Biologist, and Ben Heussner, Fisheries Biologist stated the following recommendations:

"The District should continue the practice of not harvesting the west shoreline of Eagle Spring Lake extending from the "springs" area south to the Mukwonago river inlet area (located west of Mary's Bay). This restriction is to protect the foraging and brood rearing habitat for waterfowl and other waterbirds, as well as the breeding, nesting, brood-rearing, foraging and basking habitat for herpetofauna (frogs and turtles). The Department of Natural Resources is limiting the width of harvesting in the area of the lake near Travers and Penny Islands due to the presence of excellent fish habitat. The springs located in this area provide critical cool water northern pike habitat during the warm summer months."

Summary

1.	**Continue with chemical treatments as they have done in the past.** • This option is recommended because the results of the aquatic plant survey shows that long term control of Eurasian water milfoil and curly leaf pondweed have been successful. • The relative density of both the above listed aquatic invasive species has declined since 2008. • The cost of chemical treatments is affordable.
2.	**Continue with mechanical harvesting using a boat harvester.** • This option is recommended because it has kept waterways open and navigable including channels for recreational use. • It is recommended that the harvester continue to be used to harvest Eurasian water milfoil in an effort to reduce the population density. Removing floating aquatic plants will continue to reduce organic matter and excessive nutrients from decaying into the water body, lessening nuisance algae blooms. • Refer to Map 13 for locations and widths of harvesting paths • Harvesting should only take place on the open water portion of Eagle Spring Lake when aquatic plant beds are dominated (> 50% coverage) by Eurasian water milfoil. The depth of the cut may be a maximum of 3 feet from the surface of the water. • Harvesting in the channel extending from Penny island SW to the springs should only take place when aquatic plant beds are dominated (> 50% coverage) by Eurasian water milfoil. The depth of the cut may be a maximum of 2 feet from the surface of the water. The width of the cut is limited to 30 feet.
3.	**Aquatic Invasive Species Prevention** • It is recommended that the Eagle Spring Lake community continue to participate in Clean Boats, Clean Waters program so that volunteer watercraft inspectors can education boaters that visit the boat launch on the lake.
4.	**Discontinue DASH** • The DASH that was performed was not effective. The results were immediate regrowth and the Eurasian water milfoil in the area was still moderately dense the following year. • DASH is expensive and Eagle Spring Lake has over 45 acres of Eurasian water milfoil. • Discontinue DASH for the Eagle Spring Lake Management District • DASH is still an option for individual landowners that would like temporary aquatic plant removal around their piers. An NR 109 permit is required.

[1] *Lauren Manninen, Soil Conservationist, Ekalaka, MT, USDA-NRCS, Provided GIS Mapping For Maps 1-8*

[2]*Thomas A. Day, Cutting Report, October 28, 2016, Attatchment 1A.*

[3]*Wisconsin Department of Natural Resources,* Environmental Assessment Aquatic Nuisance Control (NR107) Program, *3RD Edition, 1990, 213pp.*

[4]*SEWRPC,* A Lake Management Plan for Eagle Spring Lake Waukesha County Wisconsin*, 2nd Edition, 2011, 157pp*

[5]*SEWRPC,* An Aquatic Management Plan for The Lauderdale Lakes, Walworth County, Wisconsin, *July 2010, Appendix D*