2019

Webster Lake Aquatic Vegetation Management Plan Update

Webster Lakes Conservation Association

PO Box 454

North Webster, In 46555

Prepared by

1900 S. 11th St. Unit
Niles, Michigan

www.clarke.com

Table of Contents

Acknowledgements 3
Executive Summary 4
Problem Statement 4
Goals and Objectives 5
Plant Management History 5
Aquatic Plant Community Characterization 9
Methods 9
Tier 2 Sampling Results 10
Plant Sampling Discussion 16
Plant Management Discussion and Action Plan 19
Public Involvement 19
Literature Cited 21
Appendix 23

List of Tables

Table 1. Webster Lake Treatment History 1988-2019. 6
Table 2. Eurasian watermilfoil Treatment Summary, May 30, 2019. 7
Table 3. Webster Lake 2019 Tier 2 Sampling Results. 14
Table 4. Webster Lake Tier 2 Data from 2004-2019. 17
Table 5. Proposed WLCA plant management budget for 2020. 19
Table 6. 2019 Public Survey Results. 19

List of Figures

Figure 1. Webster Lake Treatment Areas May 30, 2019. 8
Figure 2. Webster Lake 2019 Shoreline Treatment Areas on June 5, June 27, July 31, and August 15, 2019. 9
Figure 4. Webster Lake EWM Distribution August 14, 2019. 11
Figure 5. Webster Lake CLP Distribution August 14, 2019. 12
Figure 6. Webster Lake SSW Distribution August 14, 2019. 13

Acknowledgements

Clarke Aquatic Services would like to thank the Indiana Department of Natural Resources Division of Fish and Wildlife's LARE Program for providing the funding and guidance on this project. Clarke Aquatic Services passion is to make communities around the world more livable, safe and comfortable. Our goal is to help preserve and enhance lakes and ponds in an environmentally-friendly manner so lake property owners and lake communities can enjoy the recreational and aesthetic value of their waterways to the fullest. We would be remiss if we didn't include a special thank you to Mike Wyrick and the Webster Lake Conservation Association, along with Rod Edgell of the LARE program.

Thank you!

Executive Summary

Webster Lake is located in Kosciusko County with 653 surface acres and has a mean depth of 12 feet. The lake is known as the premier muskie lake in the state of Indiana. This is due to the intense stocking effort conducted by the Department of Natural Resources since 1978. In summer months Webster Lake is a very popular fishing, boating, swimming, and water-skiing resource, and a public beach is located on the western side of Webster Lake. Much of the open water is deep enough on Webster Lake to accommodate boats, but in recent years, dense beds of Eurasian watermilfoil (*Myriophyllum spicatum*) have interrupted the popular summer activity.

Clarke Aquatic Services (CAS) was contracted by the Webster Lake Conservation Association (WLCA) to complete aquatic vegetation sampling, herbicide treatments, and to update the Webster Lake Aquatic Vegetation Management Plan (AVMP) in 2018, and again for the 2019 season. The primary invasive species within Webster Lake is Eurasian watermilfoil (EWM). Other invasive species present in the lake include curly-leaf pondweed (*Potamogeton crispus*) and Starry stonewort (*Nitellopsis obtusa*). A common native species of submerged aquatic vegetation present in Webster Lake that can reach nuisance levels is Coontail (*Ceratophyllum demersum*). Because of extensive shallow areas within the lake, the lake can become heavily infested with dense growth of these nuisance species. Over 100 acres of Eurasian watermilfoil had been documented annually since 2014. In 2018, there was a spike in the growth of Eurasian watermilfoil with 175 acres treated. In 2019, a significant reduction in Eurasian watermilfoil was observed documenting only 88.49 acres compared to the 2018 season.

WLCA was awarded a $34,180 grant from the Lake and River Enhancement (LARE) program for selective Eurasian watermilfoil treatments, sampling, and plan update in 2019. An invasive survey was completed on May 23, 2019. The survey documented 88.49 acres of Eurasian watermilfoil. These areas were treated on June 5, 2019 with 2.0 ppm of 2, 4-D liquid. A Tier 2 survey completed on August 14, 2019, found only 3 sites containing Eurasian watermilfoil. Starry stonewort (SSW) was collected at 2 sites during the 2019 season.

Vegetation controls in 2019 met the LARE objectives and goals of this update by limiting nuisance plant issues in high use areas and maintaining overall plant coverage throughout the lake, however the native plant coverage objective was not met. A similar strategy for the 2020 season is recommended.

Problem Statement

Aquatic vegetation is an important component of lakes in Indiana. However, as a result of many factors, this vegetation can develop to a nuisance level. Nuisance aquatic vegetation, as used in this plan,

describes plant growth that negatively impacts the present uses of the lake including fishing, boating, swimming, aesthetic, and lakefront property values. The primary invasive species within Webster Lake are Eurasian watermilfoil and curly-leaf pondweed (CLP). Other native species at nuisance levels in both 2018 and 2019 were coontail and duckweed.

Goals and Objectives

The vegetation management goals of the Webster Lake Aquatic Vegetation Management Plan are:

- Maintain a stable, diverse aquatic plant community that supports a good balance of predator and prey fish and wildlife species, good water quality, and is resistant to minor habitat disturbances and invasive species
- Direct efforts to preventing and controlling the negative impacts of aquatic invasive species
- Provide reasonable public recreational access while minimizing the negative impacts on plant and fish and wildlife resources

Specific management objectives had been developed for Webster Lake in past plans. Below are the plant management objectives for Webster Lake:

- Keep Eurasian watermilfoil below 10% occurrence in summer Tier 2 surveys
- Keep curly-leaf pondweed below 10% occurrence in spring Tier 2 surveys
- Keep starry stonewort below 10% occurrence in summer Tier 2 surveys
- Maintain native plant coverage at 80% of sample sites in summer Tier 2 Survey.

Plant Management History

The morphology of Webster Lake includes extensive shallow areas, accordingly a large percentage of the lake can become infested with heavy growth of invasive and nuisance species that negatively impact boating, fishing, swimming, and property value. Whole lake fluridone treatments were completed in 1999, 2002, and 2010. After the 2010 Sonar treatment, Eurasian watermilfoil was greatly reduced, but native vegetation was also adversely impacted. In the years following the Sonar treatment, IDNR limited treatments due to a concern of fish cover lacking throughout the lake (Aquatic Control 2017). Traditional non-selective shoreline treatments were allowed, but offshore Eurasian watermilfoil treatments were limited. In 2011, Eurasian watermilfoil was not detected which resulted in a year without treatment. In 2012, 45 acres of Eurasian watermilfoil were treated with 2,4-D herbicide, 53 acres in 2013, 26 acres in 2014, and 26 acres in 2015 (Aquatic Control 2017). These treatments are outlined in Table 1. Over 100 acres of Eurasian watermilfoil were documented in 2014 and 2015. Data from the 2015 Tier 2 survey depicted a large increase in overall plant coverage and native abundance, therefore IDNR lifted treatment restrictions in 2016. In addition to invasive Eurasian watermilfoil treatments, starry stonewort, an invasive macroalgae, was treated in a 4.5 acre area in 2015 and 2016. In the spring of 2016, invasive mapping revealed 155.4 acres of Eurasian watermilfoil. All Eurasian watermilfoil areas were treated with 2.0 ppm of 2, 4-D, which led to a decrease in abundance. The spring 2017 survey documented 59.4 acres of Eurasian watermilfoil and 71.4 acres of curly-leaf pondweed. Eurasian watermilfoil areas were treated with 2.0ppm 2, 4-D, and 16 acres of curly-leaf pondweed were treated with Aquathol K at 1.0ppm (Aquatic Control 2018). The summer of 2017 Tier 2 survey revealed that invasive frequency and overall native plant coverage met the management plan objective. In 2018, 175 acres of Eurasian watermilfoil using 2,4-D, was treated and native plant coverage exceeded the objective

at 94%, which met above and beyond the 80% outlined in the goals section. For 2019, a significant decline in EWM growth was expected in the spring. All objectives were met for 2019, except for native plant coverage which was recorded at 70.0%.

Table 1. Webster Lake Treatment History 1988-2019.

Year	Targeted Vegetation	Treated Acres	Chemical Approved	Total Cost	Per Acre Cost
1988	Eurasian watermilfoil, Pondweed, Naiad, eel grass, algae	*	Reward, Komeen, Aquathol K, Hydrothol, Sonar AS, CuSO4	$20,527.00	$200.00
1989	Eurasian watermilfoil, pondweeds, chara, algae	*	Reward, Komeen, Aquathol K, Hydrothol, Sonar, CuSO4, and Cidekick	$18,185.00	*
1990	Eurasian watermilfoil, pondweeds, chara, algae	*	Reward, Komeen, Aquathol, and CuSO4	$12,080.00	$200.00
1991	Eurasian watermilfoil, flatstem pw, curlyleaf pw, algae	*	Reward, Aquathol K, Komeen, and CuSO4	$18,000.00	$200.00
1992	Eurasian watermilfoil, mixed pondweeds, chara, and filamentous algae	*	Reward, Komeen, Aquathol K, Sonar, and CuSO4	$18,050.00	*
1993	Eurasian watermilfoil, coontail, pondweeds, and chara	65	Sonar, Aquathol K, Hydrothol, Reward, and CuSO4	$19,400.00	$300.00
1994	Eurasian watermilfoil, coontail, mixed pondweeds, chara, and filamentous algae	32.5	Reward, Komeen, Aquathol K, Hydrothol, and CuSO4	$10,125.00	$312.00
1995	Eurasian watermilfoil, mixed milfoil, coontail, pondweeds, elodea, and chara	*	Reward Komeen, Aquathol K, and CuSO4	$13,230.00	*
1996	Eurasian watermilfoil	60	2,4-D	*	*
1997	Eurasian watermilfoil	60	Reward	*	*
1998	Eurasian watermilfoil	60	Reward	*	*
1999	Eurasian watermilfoil, pondweeds, coontail, and chara	174	Sonar SRP, Nautique, Reward, and CuSO4	$75,367.00	$433.00
2000	Eurasian watermilfoil, curly-leaf pondweed, coontail, chara, and filamentous algae	48	Reward, Nautique, Navigate, Aquathol K, and Copper Sulfate	$19,585.00	$408.00
2001	Eurasian watermilfoil, curly-leaf pondweed, coontail, chara, and filamentous algae	65	Reward, Nautique, Navigate, Aquathol K, and Copper Sulfate	$23,695.00	$364.00
2002	Eurasian watermilfoil, curly-leaf pondweed, coontail, chara, and filamentous algae	653	Sonar SRP, Sonar PR, Sonar AS, Nautique, and Copper Sulfate	$73,390.00	$112.38
2003	Eurasian watermilfoil, curly-leaf pondweed, coontail, chara, and filamentous algae	28	Reward, Nautique, Navigate, Aquathol K, and Copper Sulfate	$6,601.00	$235.75
2004	Eurasian watermilfoil, curly-leaf pondweed, coontail, chara, and filamentous algae	35.75	Reward, Nautique, Navigate, Aquathol K, and Copper Sulfate	$11,575.00	$322.10
2005	Eurasian watermilfoil, curly-leaf pondweed, coontail, chara, and filamentous algae	64 EWM, 80 Shoreline	Reward and Nautique Shoreline & Renovate for EWM	$49,80 0.00**	$345.80
2006	Eurasian watermilfoil, curly-leaf pondweed, coontail, chara, and filamentous algae	121 CLP, 46 EWM, 40 shoreline	Reward & Komeen Shoreline, Renovate EWM, Aquathol early CLP	$51,175.00**	$247.22
2007	Eurasian watermilfoil, curly-leaf pondweed, coontail, chara, and	121 CLP, 40 EWM,	Reward & Komeen Shoreline, Renovate EWM,	$46,144.00**	$231.87

	filamentous algae	38 shoreline	Aquathol early CLP		
2008	Eurasian watermilfoil, curly-leaf pondweed, coontail, chara, and filamentous algae	121 CLP, 46.8 EWM, 38 shoreline	Reward & Komeen Shoreline, Renovate EWM, Aquathol early CLP	$47,406.00**	$230.35
2009	Eurasian watermilfoil, curly-leaf pondweed, coontail, chara, and filamentous algae	31.7 CLP, 38.7 EWM, 38 shoreline	Reward & Komeen Shoreline, Renovate EWM, Aquathol early CLP	$35,201.00**	$324.70
2010	Eurasian watermilfoil	653	SonarONE and Sonar AS	$125,000	$191.42
2011	Eurasian watermilfoil, curly-leaf pondweed, coontail, chara, and filamentous algae	0 (1.75 EWM on backwater)	Renovate Max G	$875.00	$500.00
2012	Eurasian watermilfoil in main lake, algae, coontail, Eurasian watermilfoil in channels only	45.3 EWM (15.3 web), 7.6 native	2,4-D, Reward, Komeen, Aquathol	$18,781.00	$355.00
2013	Eurasian watermilfoil in main lake, algae, coontail, milfoil in channels and select main lake areas	53.0 EWM, 26 native	2,4-D, Reward, Komeen, Aquathol	$24,685***	$312.46
2014	Eurasian watermilfoil in main lake, algae, coontail, milfoil in channels and select main lake areas	26.2 EWM, 69.5 native	2,4-D, Reward, Komeen, Aquathol	$34,530***	$355.25
2015	Eurasian watermilfoil in main lake, algae, starry stonewort, coontail, milfoil in channels and select main lake areas	26.0 EWM, 4.0 SSW, 90.9 native	2,4-D, Reward, Clipper, Komeen, Aquathol	$43,460***	$371.77
2016	Eurasian watermilfoil, algae, coontail, starry stonewort, coontail, pondweed	60.8 native, 4.5 SSW, 158.8 EWM	2,4-D, Reward, Clipper	$62,638****	$285.24
2017	Eurasian watermilfoil, algae, coontail, coontail, pondweed	60.8 native, 138.6 EWM, 15 CLP	2,4-D, Reward, Clipper, Aquathol	$63,050****	$294.08
2018	Eurasian watermilfoil, Misc Species	175 EWM 60.5 natives	2,4-D Captain, Cygnet Plus, Reward	$45,470.45****	$190.08
2019	Eurasian watermilfoil, Misc Species	88.49EWM, 68.59 shore	2,4-D, Clipper, Tribune, Cygnet Plus, Captain	$42,440.49****	$270.18

***insufficient data, **approximately $20,000 funded by LARE, ***approximately $5,000 funded by LARE, ****80% of EWM treatment funded by LARE**

In 2019, an invasive survey was completed on May 23, 2019. The survey documented 88.49 acres of Eurasian watermilfoil. This was a significant decrease from 2018. Treatment for Eurasian watermilfoil was completed on June 5, 2019 with 2.0 ppm, 2, 4-D for control of Eurasian watermilfoil. The treatment is displayed by area in Table 2 and illustrated in Figure 1.

Table 2. Eurasian watermilfoil Treatment Summary, June 5, 2019.

Area	Acres	Average depth (ft)	2,4-D Conc. (ppm)
1	17.96	6	2.0
2	1.08	4	2.0
3	16.65	4	2.0
4	9.06	4	2.0

5	19.04	4	2.0
6	24.70	4	2.0

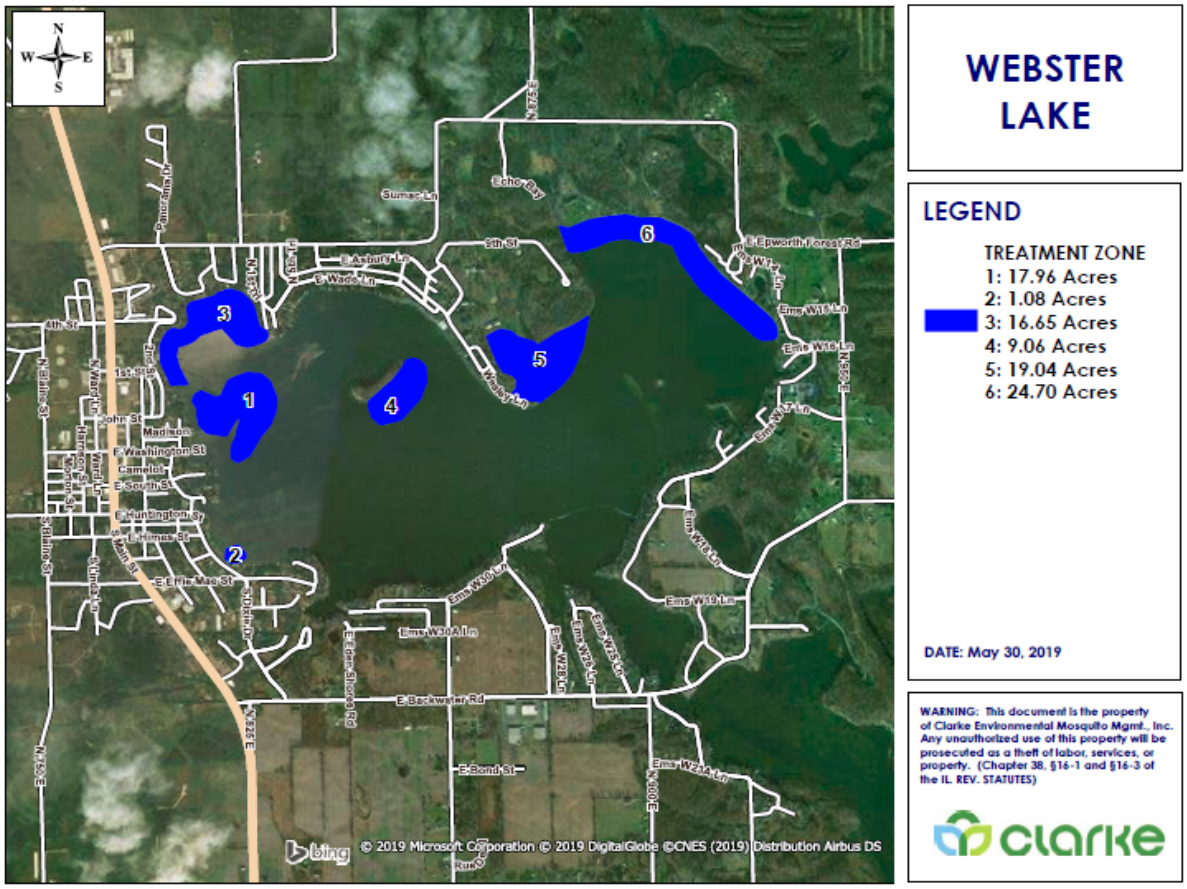

Figure 1. Webster Lake Treatment Areas June 5, 2019.

A total of 68.59 acres of privately funded shoreline treatments (Figure 2) occurred using contact herbicides on June 5 and 27, 2019. Over July 31 and August 15, 2019 three of those treatment areas were re-treated primarily to target coontail and duckweed. These plants had covered the surface and were inhibiting boat navigation and swimming.

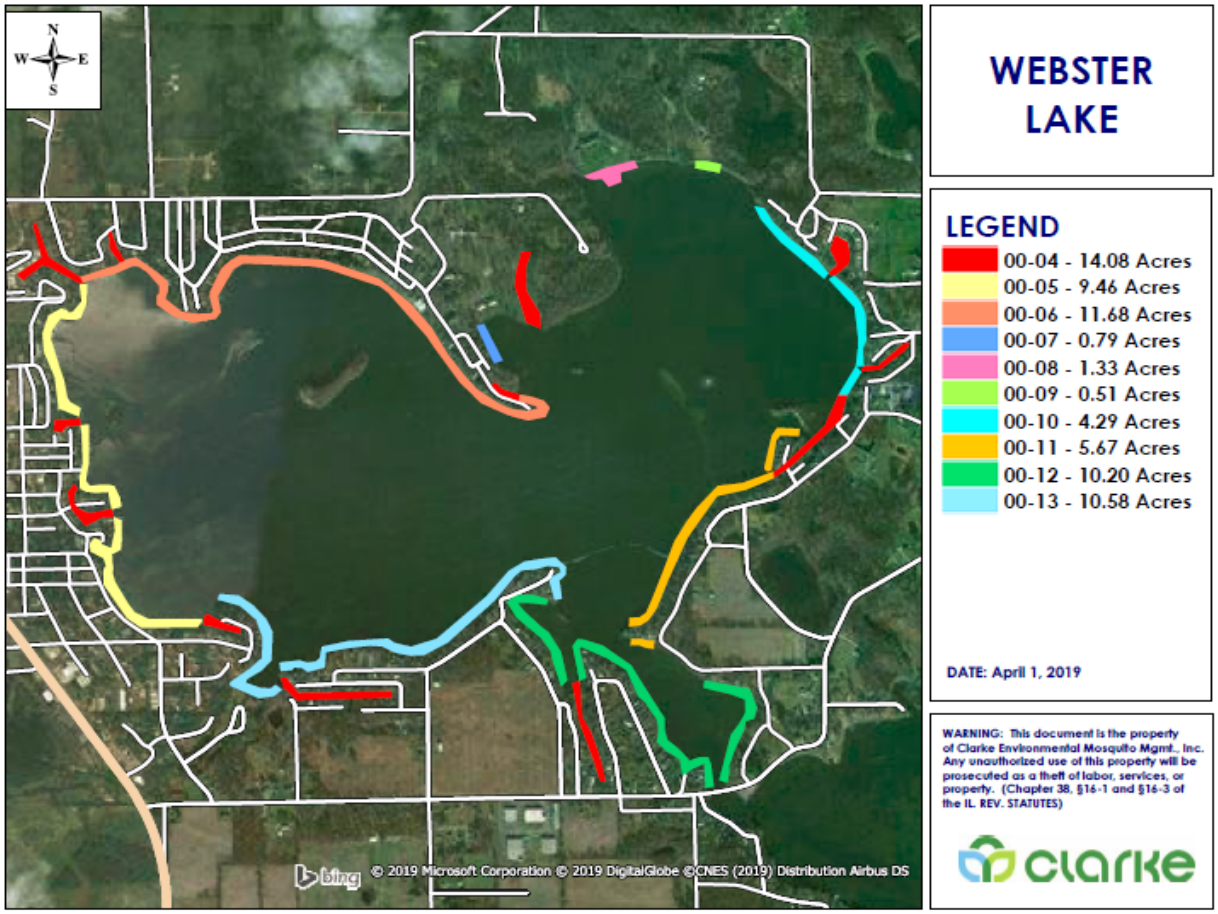

Figure 2. Webster Lake 2019 Shoreline Treatment Areas on June 5, June 27, July 31, and August 15, 2019.

Aquatic Plant Community Characterization

Aquatic vegetation sampling is a must to create an effective aquatic vegetation management plan. Sampling provides useful and important data that allows lake managers to identify and locate areas of nuisance and/or beneficial native submersed vegetation throughout the waterbody. It also allows for annual monitoring to create a proactive plan if any changes occur in the plant community. Monitoring also evaluates the effectiveness of management and treatment techniques from season to season. In 2019, invasive species mapping surveys and Tier 2 surveys were completed on Webster Lake.

Methods

The Tier 2 survey fulfills the following objectives:

1. To document the distribution and abundance of submersed aquatic vegetation
2. To compare present distribution and abundance with past distribution and abundance within select areas and at a lake-wide scale

The Tier 2 survey in 2019 followed new Tier 2 survey protocol issued by the INDR LARE program. Once a site was reached, the boat was slowed to a stop and the coordinates were recorded on a hand-held GPS unit and later downloaded into mapping software. A depth measurement was taken by dropping a two-

headed standard sampling rake that was attached to a rope marked off in 1-foot increments. An additional ten feet of rope was released, and the boat was reversed at minimum operating speed for a distance of ten feet. Once the rake is retrieved the individual species are placed on the rake and the abundance on the rake is scored with either a 0 (no plants retrieved), 1 (1-19% of rake teeth filled), 3 (20-99% of rake teeth filled), or 5 (100% of rake teeth filled) (IDNR 2014).

Tier 2 Sampling Results

A tier 2 survey was completed on August 14th, 2019. Secchi depth was 8.20 ft, a great improvement from 2018 Secchi depth at 2.75 feet. Plants were present at 63 of the 90 sites and 10 species were collected, of which 7 were native (Figure 3). Eurasian watermilfoil (Figure 4), curly-leaf pondweed (Figure 5), and starry stonewort (Figure 6) were the three invasive species collected and found at 6 different sites in Webster Lake. The results of the August 2019 Tier 2 survey for Webster Lake can be found in Table 3.

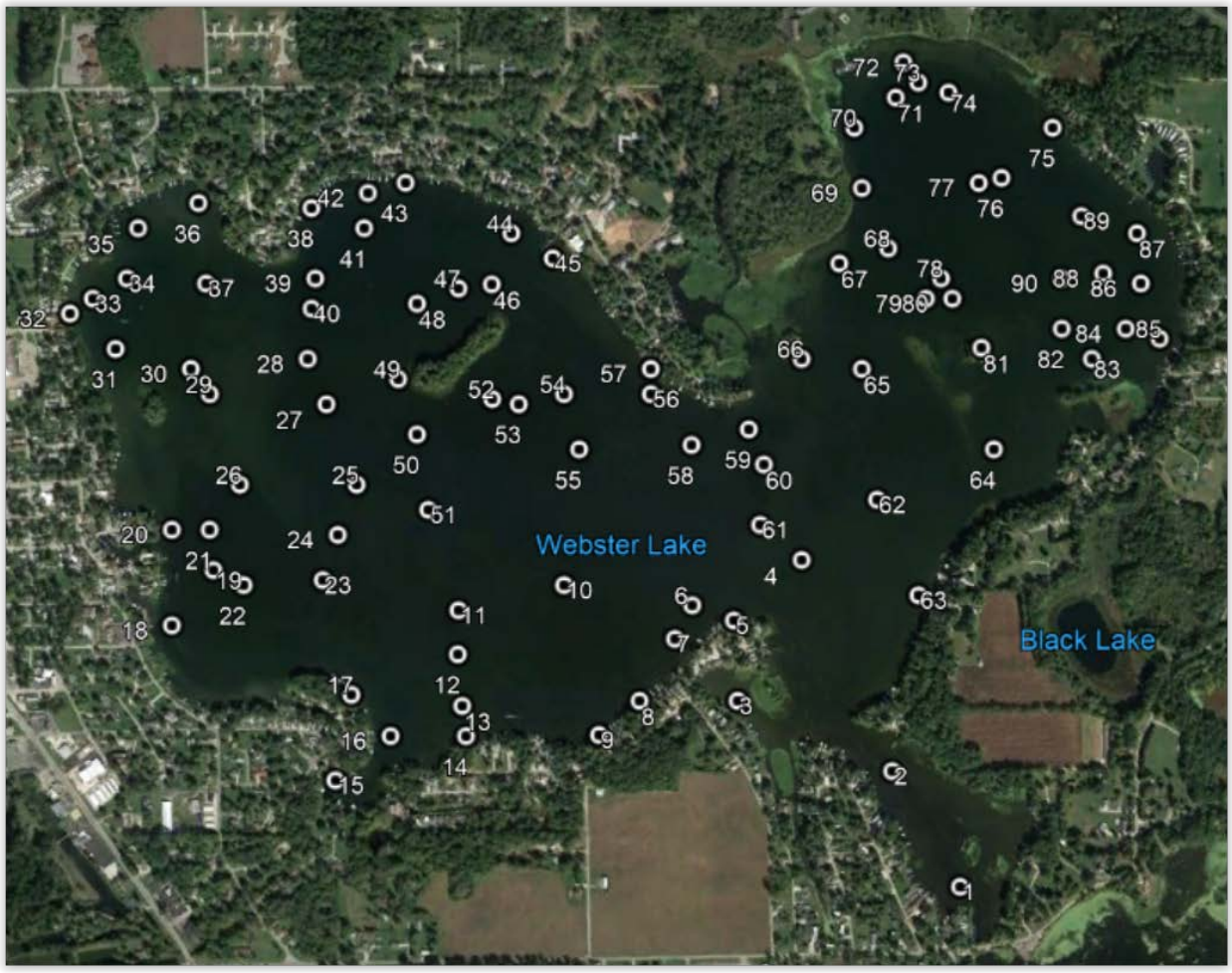

Figure 3. Webster Lake Tier 2 Sampling Locations August 14, 2019.

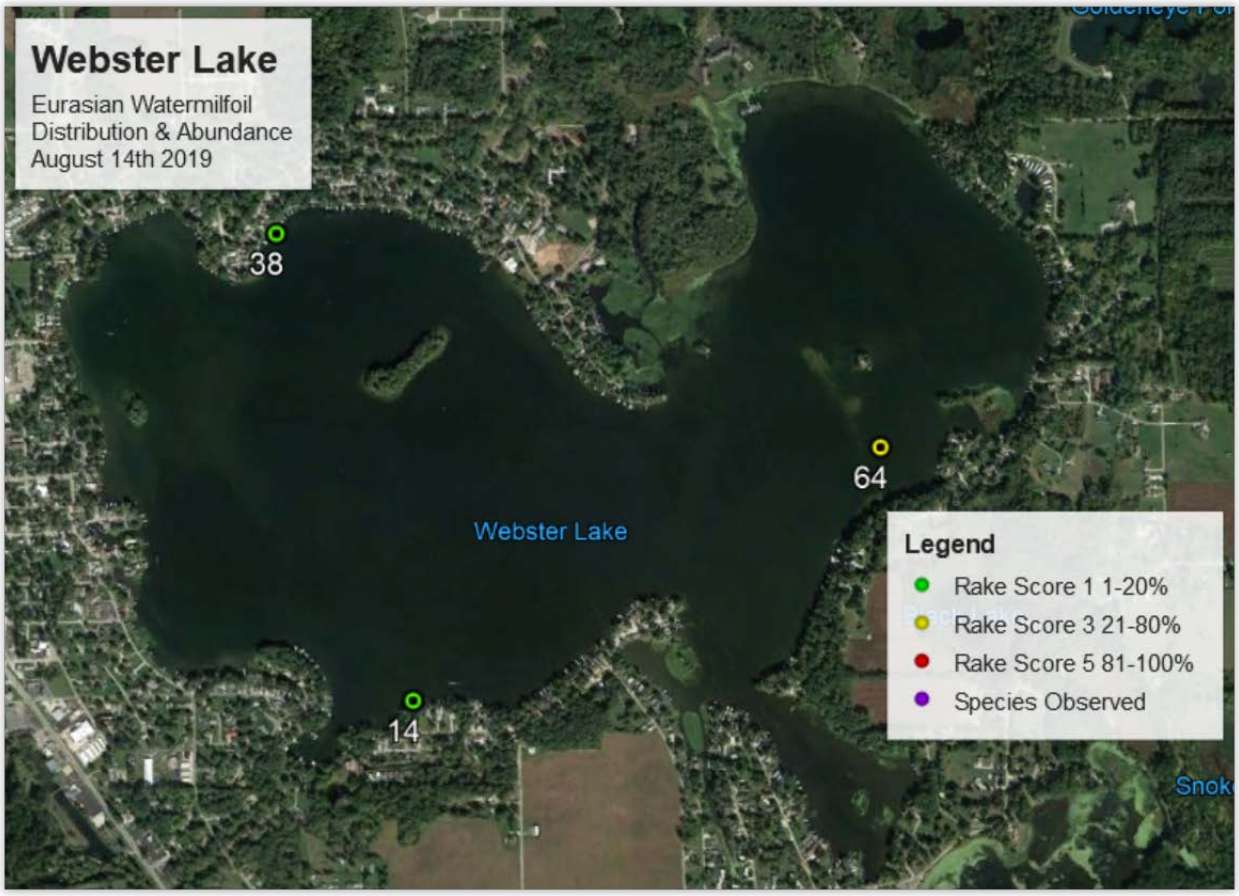

Figure 4. Webster Lake EWM Distribution August 14, 2019.

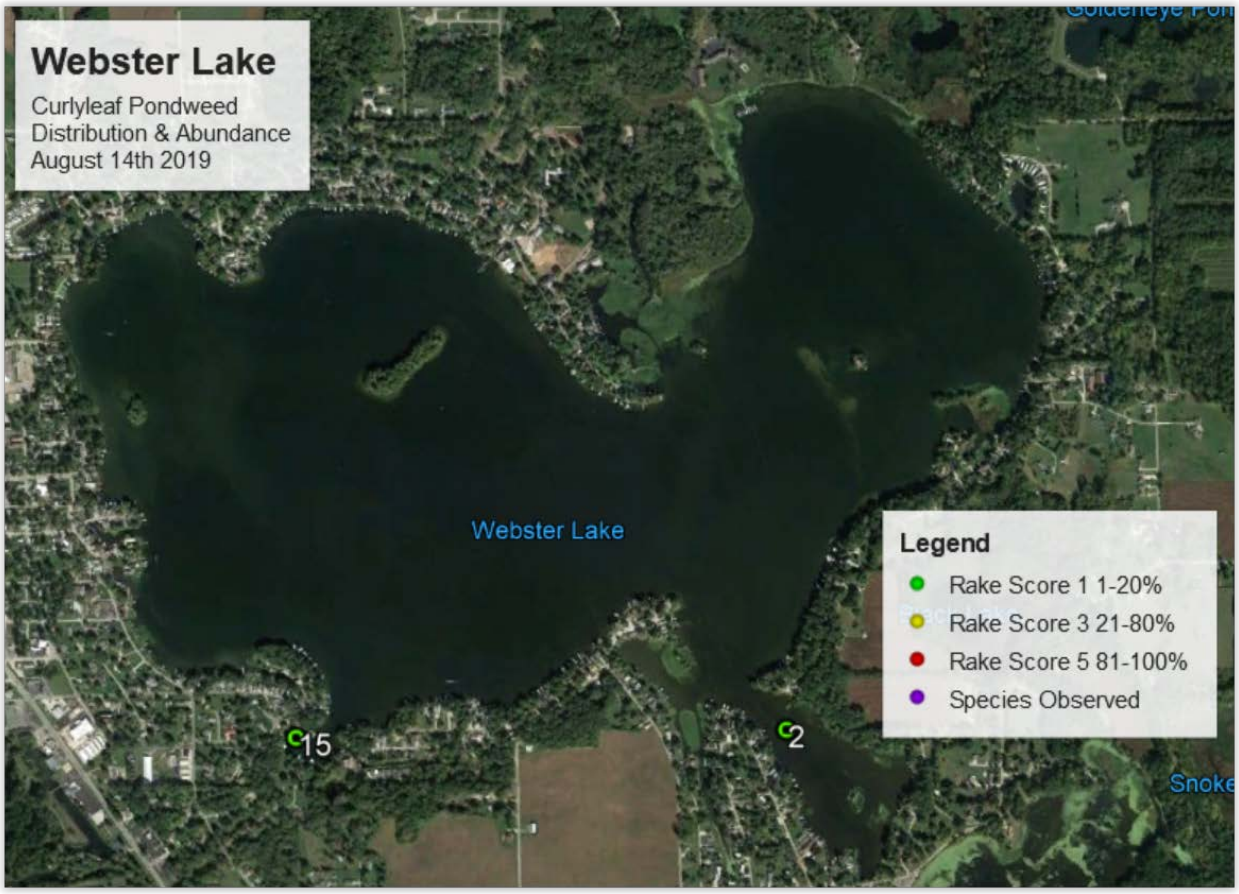

Figure 5. Webster Lake CLP Distribution August 14, 2019.

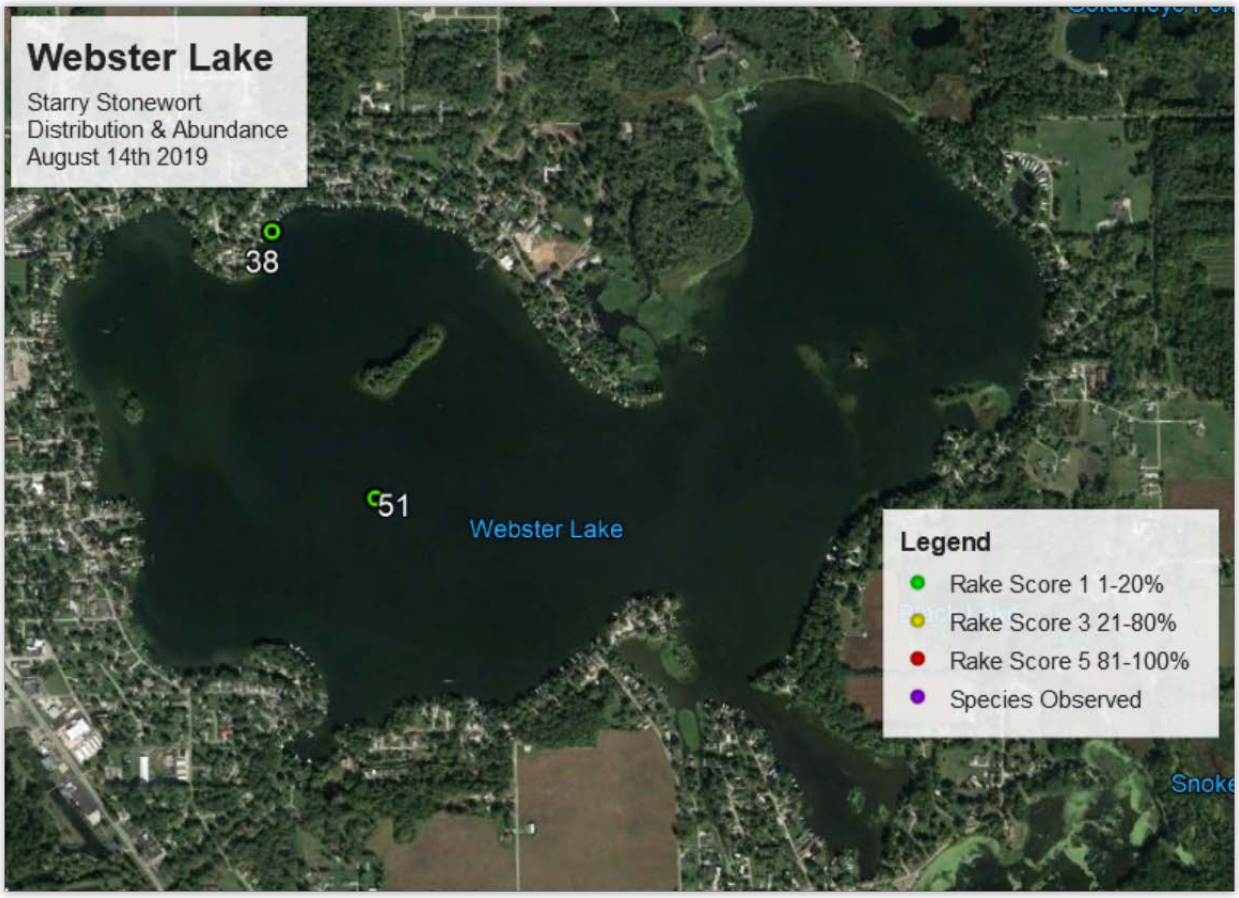

Figure 6. Webster Lake SSW Distribution August 14, 2019.

Table 3. Webster Lake 2019 Tier 2 Sampling Results.

Occurrence and Abundance of Submersed Aquatic Plants in Lake Webster.

County:	Kosciusko	Secchi (ft):	8.2	Mean species/site:	1.13
Date:	8/14/2019	Sites with plants:	63	SE Mean species/site:	0.10
Littoral Depth (ft):	20.0	Sites with native plants:	63	Mean native species/site:	1.06
Littoral Sites:	90	Number of species:	10	SE Mean natives/site:	0.09
Total Sites:	90	Number of native species:	7	Species diversity:	0.62
		Maximum species/site:	4	Native species diversity:	0.56

All Depths	Frequency of	Rake score frequency per species				Plant
Species	Occurrence	0	1	3	5	Dominance
Coontail	66.7	33.3	47.8	17.8	1.1	21.3
Illinois pondweed	18.9	81.1	17.8	1.1	0.0	4.2
Narrow leaved pondweed	8.9	91.1	8.9	0.0	0.0	1.8
Sago pondweed	4.4	95.6	4.4	0.0	0.0	0.9
Eurasian watermilfoil	3.3	96.7	2.2	1.1	0.0	1.1
Small pondweed	3.3	96.7	2.2	1.1	0.0	1.1
Curly-leaf pondweed	2.2	97.8	2.2	0.0	0.0	0.4
Eel grass	2.2	97.8	2.2	0.0	0.0	0.4
Starry stonewort	2.2	97.8	2.2	0.0	0.0	0.4
Large-leaved pondweed	1.1	98.9	1.1	0.0	0.0	0.2

Occurrence and Abundance of Submersed Aquatic Plants in Lake Webster.

County:	Kosciusko	Secchi (ft):	8.2	Mean species/site:	1.59
Date:	8/14/2019	Sites with plants:	24	SE Mean species/site:	0.20
Littoral Depth (ft):	20.0	Sites with native plants:	24	Mean native species/site:	1.38
Littoral Sites:	29	Number of species:	9	SE Mean natives/site:	0.15
Total Sites:	29	Number of native species:	6	Species diversity:	0.69
		Maximum species/site:	4	Native species diversity:	0.60

Depths: 0 to 5 ft	Frequency of	Rake score frequency per species				Plant
Species	Occurrence	0	1	3	5	Dominance
Coontail	79.3	20.7	51.7	24.1	3.4	28.3
Illinois pondweed	34.5	65.5	31.0	3.4	0.0	8.3
Eurasian watermilfoil	10.3	89.7	6.9	3.4	0.0	3.4
Small pondweed	10.3	89.7	6.9	3.4	0.0	3.4
Curly-leaf pondweed	6.9	93.1	6.9	0.0	0.0	1.4
Narrow leaved pondweed	6.9	93.1	6.9	0.0	0.0	1.4
Eel grass	3.4	96.6	3.4	0.0	0.0	0.7
Sago pondweed	3.4	96.6	3.4	0.0	0.0	0.7
Starry stonewort	3.4	96.6	3.4	0.0	0.0	0.7

Occurrence and Abundance of Submersed Aquatic Plants in Lake Webster.

County:	Kosciusko	Secchi (ft):	8.2	Mean species/site:	1.37
Date:	8/14/2019	Sites with plants:	24	SE Mean species/site:	0.14
Littoral Depth (ft):	20.0	Sites with native plants:	24	Mean native species/site:	1.33
Littoral Sites:	27	Number of species:	6	SE Mean natives/site:	0.13
Total Sites:	27	Number of native species:	5	Species diversity:	0.57
		Maximum species/site:	3	Native species diversity:	0.55

Depths: 5 to 10 ft	Frequency of	Rake score frequency per species				Plant
Species	Occurrence	0	1	3	5	Dominance
Coontail	85.2	14.8	63.0	22.2	0.0	25.9
Illinois pondweed	22.2	77.8	22.2	0.0	0.0	4.4
Narrow leaved pondweed	14.8	85.2	14.8	0.0	0.0	3.0
Sago pondweed	7.4	92.6	7.4	0.0	0.0	1.5
Large-leaved pondweed	3.7	96.3	3.7	0.0	0.0	0.7
Starry stonewort	3.7	96.3	3.7	0.0	0.0	0.7

Occurrence and Abundance of Submersed Aquatic Plants in Lake Webster.

County:	Kosciusko	Secchi (ft):	8.2	Mean species/site:	0.67
Date:	8/14/2019	Sites with plants:	12	SE Mean species/site:	0.17
Littoral Depth (ft):	20.0	Sites with native plants:	12	Mean native species/site:	0.67
Littoral Sites:	24	Number of species:	4	SE Mean natives/site:	0.17
Total Sites:	24	Number of native species:	4	Species diversity:	0.41
		Maximum species/site:	3	Native species diversity:	0.41

Depths: 10 to 15 ft	Frequency of	Rake score frequency per species				Plant
Species	Occurrence	0	1	3	5	Dominance
Coontail	50.0	50.0	37.5	12.5	0.0	15.0
Narrow leaved pondweed	8.3	91.7	8.3	0.0	0.0	1.7
Eel grass	4.2	95.8	4.2	0.0	0.0	0.8
Sago pondweed	4.2	95.8	4.2	0.0	0.0	0.8

Occurrence and Abundance of Submersed Aquatic Plants in Lake Webster.

County:	Kosciusko	Secchi (ft):	8.2	Mean species/site:	0.30
Date:	8/14/2019	Sites with plants:	3	SE Mean species/site:	0.15
Littoral Depth (ft):	20.0	Sites with native plants:	3	Mean native species/site:	0.30
Littoral Sites:	10	Number of species:	2	SE Mean natives/site:	0.15
Total Sites:	10	Number of native species:	2	Species diversity:	0.44
		Maximum species/site:	1	Native species diversity:	0.44

Depths: 15 to 20 ft	Frequency of	Rake score frequency per species				Plant
Species	Occurrence	0	1	3	5	Dominance
Coontail	20.0	80.0	20.0	0.0	0.0	4.0
Illinois pondweed	10.0	90.0	10.0	0.0	0.0	2.0

Plant Sampling Discussion

A summer Tier 2 survey was completed on August 14, 2019 and found 3 sites with Eurasian watermilfoil present, 2 sites with curly-leaf pondweed, and 2 sites with starry stonewort. There was an increase in abundance of Coontail. Table 4 compares surveys completed on Webster Lake from 2004 through 2019 for all depths. Depths broken down into 5-foot increments can be found in the Appendix. Eurasian watermilfoil occurrence increased in 2019 to 3.3% during the summer Tier 2 survey. Sites with plants decreased from64 in 2018 to 63 in 2019. The number of native species increased from 5 to 7 between 2018 and 2019. The total number of species also increased from 6 to 10 in the same period. Illinois pondweed was down in frequency of occurrence from the 2018 and was recorded at a 5.6% frequency of occurrence according to the IDNR 2019 Tier 2 survey and recorded at 18.9% by CAS. Coontail also had a high frequency of occurrence in the survey occurring 66.7% of the sites, which is an increase from the 2018 season. Curly-leaf pondweed and starry stonewort were documented in the survey in 2019, compared to previous years surveys, starry stonewort had not been document since 2015 and Curly-leaf since 2016. In 2019, all objectives of the plant management plan were met, except native plant coverage.

- Keep Eurasian watermilfoil below 10% occurrence in summer Tier 2 surveys – 3.3% in 2019
- Keep curly-leaf pondweed below 10% occurrence in spring Tier 2 surveys – 2.2% in 2019
- Keep starry stonewort below 10% occurrence in summer Tier 2 surveys – 2.2% in 2019
- Maintain native plant coverage at 80% of sample sites in summer Tier 2 Survey – 70% in 2019

Table 4. Webster Lake Tier 2 Data from 2004-2019.

Surveyor	AC	AC	AC	AC	AC	AC	AC	AC	AC	AC	AC	AC	AC	AC	AC	IDNR	Clarke	IDNR	Clarke
Date	8/25/04	8/2/05	8/3/06	8/13/07	8/27/08	7/30/09	9/21/10	8/24/11	8/13/12	8/13/13	8/11/14	8/12/15	4/25/16	8/3/16	8/7/17	8/1/18	8/8/18	8/1/19	8/14/19
Total Sites	160	160	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90
Littoral Sites	159	160	88	87	90	88	65	65	80	86	80	84	89	89	90	90	90	90	90
Sites with Plants	125	146	74	68	78	77	29	41	46	48	56	71	67	72	75	69	64	64	63
% Sites With Plants	78.1%	91.3%	82.2%	75.6%	86.7%	85.6%	32.2%	45.6%	51.1%	53.3%	62.2%	78.9%	74.4%	80.0%	83.3%	76.6%	71.1%	71.1%	70.0%
Sites with Native Plants	113	144	74	68	78	76	29	41	43	35	53	68	46	72	74	69	64	63	63
Percent Littoral Coverage	79%	91%	84%	78%	87%	88%	45%	63%	58%	56%	70%	85%	75%	81%	83%	76.6%	71.0%	71.0%	70%
Maximum Plant Depth	12	14	18	18	20	17	8	9	12	15	15	18	19	19	20	19.5	20	18	20
Secchi (ft)	5	8	7	7	9	5	5	3.5	3	5	8.5	7.5	7	4	8.5	4	2.75	6.0	8.2
Number of Species	13	15	10	8	7	10	6	10	9	10	9	13	9	9	9	6	6	11	10
Number of Native Species	11	13	9	7	6	8	6	9	7	8	7	11	7	8	8	5	5	9	7
Species Diversity	0.85	0.80	0.55	0.40	0.60	0.68	0.71	0.77	0.79	0.78	0.79	0.69	0.68	0.51	0.56	0.44	0.53	0.65	0.62
Native Species Diversity	0.80	0.74	0.55	0.37	0.59	0.58	0.71	0.76	0.73	0.80	0.73	0.57	0.48	0.45	0.53	0.42	0.5	0.62	0.56
Mean Native Species/Site	1.21	1.49	1.10	0.92	1.27	1.31	0.40	0.72	0.71	0.50	0.99	1.11	0.63	1.08	1.16	0.99	0.94	1.03	1.06
Species- All Depths																			
Eurasian Watermilfoil	12.5	6.3	1.1	2.2	1.1	21.1	0.0	0.0	7.8	34.4	40.0	30.0	47.8	6.7	3.3	2.2	2.2	2.2	3.3
Curly-leaf Pondweed	21.3	20.0	0.0	0.0	0.0	3.3	0.0	1.1	3.3	2.2	1.1	0.0	6.7	0.0	0.0	0.0	0.0	1.1	2.2
Starry Stonewort	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	2.2
Coontail	36.9	66.3	70.0	72.2	74.4	74.4	17.8	22.2	28.9	11.1	37.8	71.1	44.4	73.3	76.7	73.3	61.1	60.0	66.7
Sago Pondweed	3.8	7.5	2.2	2.2	5.6	1.1	10.0	25.6	18.9	11.1	0.0	3.3	0.0	1.1	0.0	0.0	0.0	0.0	4.4
Chara Spp.	11.3	13.8	10.0	7.8	10.0	4.4	6.7	5.6	3.3	13.3	18.9	4.4	7.8	5.6	4.4	2.2	5.6	6.7	0.0
Slender Naiad	22.5	28.8	22.2	6.7	30.0	40.0	0.0	3.3	10.0	7.8	25.6	8.9	1.1	0.0	3.3	1.1	1.1	0.0	0.0
Canada Waterweed	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	2.2	0.0	1.1	0.0	0.0	2.2	0.0

Flat-stemmed Pondweed	29.4	9.4	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0
Horned Pondweed	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Common Bladderwort	0.0	0.6	0.0	1.1	0.0	0.0	0.0	1.1	0.0	0.0	1.1	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0
Water Stargrass	5.6	8.8	1.1	1.1	2.2	2.2	2.2	4.4	0.0	2.2	0.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unidentified Pondweed	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Small Pondweed	7.5	3.1	1.1	0.0	0.0	4.4	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3
Nitella	1.3	0.6	1.1	0.0	0.0	0.0	2.2	5.6	0.0	0.0	0.0	3.3	1.1	2.2	2.2	0.0	0.0	2.2	0.0
Illinois Pondweed	0.6	0.0	0.0	0.0	0.0	2.2	1.1	0.0	0.0	0.0	1.1	1.1	4.4	15.6	2.2	15.6	25.6	5.6	18.9
Leafy Pondweed	0.0	0.0	1.1	0.0	4.4	2.2	0.0	2.2	6.7	2.2	12.2	5.6	0.0	1.1	11.1	6.7	0.0	16.7	0.0
Variable Watermilfoil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Spiny Naiad	1.9	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Large-leaved Pondweed	0.0	3.1	1.1	0.0	0.0	0.0	0.0	2.2	2.2	0.0	0.0	8.9	2.2	0.0	14.4	0.0	0.0	0.0	1.1
White-stemmed Pondweed	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0
Northern Watermilfoil	0.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0
Filamentous algae	70.0	0.0	0.0	0.0	0.0	42.2	60.0	52.2	43.3	46.7	54.4	48.9	37.8	56.7	40.0	35.6	0.0	41.1	0.0
Narrow leaved Pondweed	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	8.9

Plant Management Discussion and Action Plan

A reduction in occurrence for EWM was seen in 2019 compared to the 2018 season in which IDNR allowed for 175 acres of EWM to be treated in the lake. In 2019, 100 acres of EWM were anticipated and 88.49 acres of EWM were treated. During the summer season Webster Lake residents saw and noted an increase in Coontail and duckweed presence comparable to 2018. Additional treatments were made for nuisance native vegetation in the 2019 season. Due to the treatments in 2019, it is estimated to treat no more than 100 acres of EWM in 2020. It is also recommended to treat approximately 70 acres of shoreline for nuisance species that are limiting navigation and multiple recreational uses. It is recommended that the association plan on treating all areas of EWM with 2, 4-D for systemic control in April or early May. If late summer issues with Coontail again impede navigation additional treatment would be requested of the DNR at that time.

Two sites of starry stonewort were found in 2019. It is important for this invasive species to be controlled in 2020. There is a potential for LARE maintenance funding for starry stonewort control treatments. A 4.5 acre area along the western shore had been treated with 200 ppb of flumioxazin in 2015 and 2016. It is recommended that WLCA request LARE funding for treatment of the two sites, approximately 1 acre each is size with 200 ppb of flumioxazin and any other potential new areas with similar treatment strategy in 2020.

It is our recommendation that WLCA apply to LARE for $35,000 for the treatment of EWM, $4720 for early season curly-leaf pondweed, $4,950 for the treatment of starry stonewort and $4,600 for an Aquatic Management Plan update (Table 5). A copy of this grant application is in the Appendix.

Table 5. Proposed WLCA plant management budget for 2020.

Plant Management Action Plan	Estimated Cost
Invasive Surveys (3), Tier 2 survey (August) and Plan Update (Nov)	$4,600
Up to 100 acres EWM treatment with 2.0 ppm 2,4-D (April)	$35,000
Two starry stonewort treatments with Clipper up to 2.0 acres	$4,950
Total	$44,550
Total LARE Grant Requested	$34,155

Public Involvement

A public meeting was held for the WLCA on August 10, 2019. This meeting was created to gain public opinion and support. Residents around the lake area were surveyed to gain insight to their history and needs. There were 45 completed questionnaires. The results from the survey are below in Table 6.

Table 6. 2019 Public Survey Results.

2019 Webster Lake Public Use Survey

Are you a lake property owner?	44 -Yes	1 -No
Are you currently a member of your lake association?	41 -Yes	3- N0
How many watercrafts do you currently have registered in Indiana?	0 - 1 1 – 13 2 – 21 3 or more - 10	
Do you have a current Indiana Fishing License?	16 - Yes	22- N0
How many years have you been at the lake?	5 or less – 5 5-10 – 0 Over 10 years –40	
How do you use the lake?	Boating – 44 Swimming – 44 Fishing – 25 Irrigation - 10 Drinking water – 0 Other – 1 (Sailing)	
Do you have aquatic plants at your shoreline in nuisance quantities?	33- yes	9- No
Do you donate funding towards aquatic plant control?	40 -Yes	3 -No
Do aquatic plants interfere with your use or enjoyment of the lake?	37 -Yes	6- No
Do you support efforts to control invasive plants on the lake?	45- Yes	0- No
Are you aware that LARE funds can only be used for controlling invasive plants, not native plants?	37 -Yes	7 -No
Mark any of these you think are problems on your lake:	 Too many aquatic plants Dredging needed Other Lack of speed enforcement Too many watercraft use the lake Fish population problem Not enough aquatic plants Poor water quality Too much fishing	 26 23 1 4 2 7 1 9 5

Please add any additional comments:

Need to be sprayed for weeds every year or we have a problem, Dredge channels
Weed Treatments Help and are appreciated
Duckweed continues to be an issue
I don't like muskies, they kill ducks and turtles
I feel like improving the quality of the lake will promote more people buying property on the water, looking out and seeing the shoreline full of duckweed and weeds is not inviting. N. Webster business thrives on lake owners.
Need more small game fish and fewer muskie. Need low growing weeds. Less, tall stringy, top water weeds.
Duckweed is becoming a big problem as is spring time green algae.
The duck weed has become a problem. Cannot fish in front of the house because it is too thick. Usually, this only lasts a short time, but the past 2 years it lasts most of the summer.

The lake is delightful the weeds being my only serious frustration. Duckweed is the very worst problem. Duckweed blocks cooling to engines and motors.
Too much duckweed. Too much sludge in front of our property.
In spring weeds too heavy in channel- cannot fish or swim in summer. Too much duck weed and weed chop.
Very thick layer in channel. Lack of oxygen in water. Cannot fish or swim. Boat overheats before reaching lake.
Huge problem…DUCKWEED, DUCKWEED, DUCKWEED. Stop it before it comes through the tubes into Webster Lake.
Duckweed abundance.
Duckweed control. No control of inlet of duckweeds.
Problem with duckweed interferes with fishing, affects land value – Real problem. May clog up engines. Our neighbor has not been able to sell his house due to the duckweed. Once the buyers see the duckweed they decline to make an offer. Duckweed is getting worse. Muck is 3 to 4 feet deep in areas along the shore W25-W26.
Need sewers to be completed around the east side of the lake.
Board member for 20 years. TWF Director emeritus. Clean Lakes Program member, Lilly lakes and stream volunteer. Have a water circulator.
Lake associations/Members appreciate the cooperation and assistance provided by the DNR with keeping lakes in good order.
No longer problems only because lake is treated. Happy with lake association.
A lot of OVT, duck weeds the worst.
Duckweed is bad. A lot of cut weeds

Literature Cited

Aquatic Control Inc. 2008. Webster Lake Aquatic Vegetation Management Plan 2007 Update. Prepared for the Webster Lake Conservation Association. North Webster, IN.

Aquatic Control Inc. 2009. Webster Lake Aquatic Vegetation Management Plan 2008 Update. Prepared for the Webster Lake Conservation Association. North Webster, IN.

Aquatic Control Inc. 2010. Webster Lake Aquatic Vegetation Management Plan 2009 Update. Prepared for the Webster Lake Conservation Association. North Webster, IN.

Aquatic Control Inc. 2010. Webster Lake Aquatic Vegetation Management Plan 2010 Update. Prepared for the Webster Lake Conservation Association. North Webster, IN.

Aquatic Control Inc. 2011. Webster Lake Aquatic Vegetation Management Plan 2011 Update. Prepared for the Webster Lake Conservation Association. North Webster, IN.

Aquatic Control Inc. 2012. Webster Lake Aquatic Vegetation Management Plan 2012 Update. Prepared for the Webster Lake Conservation Association. North Webster, IN.

Aquatic Control Inc. 2013. Webster Lake Aquatic Vegetation Management Plan 2013 Update. Prepared for the Webster Lake Conservation Association. North Webster, IN.

Aquatic Control Inc. 2014. Webster Lake Aquatic Vegetation Management Plan 2014 Update. Prepared for the Webster Lake Conservation Association. North Webster, IN.

Aquatic Control Inc. 2015. Webster Lake Aquatic Vegetation Management Plan 2015 Update. Prepared for the Webster Lake Conservation Association. North Webster, IN.

Aquatic Control Inc. 2017. Webster Lake Aquatic Vegetation Management Plan 2016 Update. Prepared for the Webster Lake Conservation Association. North Webster, IN.

IDNR 2018. Aquatic Vegetation Survey Protocol. IN Department of Natural Resources. Division of Fish & Wildlife, Indianapolis, IN

Appendix

Tier 2 Data Sheets

WPT	Latitude	Long	Depth	Eurasian watermilfoil	Curly-leaf pondweed	Starry stonewort	Illinois pondweed	Small pondweed	Coontail	Sago pondweed	Narrow leaved pondweed	Northern watermilfoil	Eelgrass	Large-leaved pondweed
1	41.3177	-85.6717	5					1	1					
2	41.32	-85.6735	5		1				1					
3	41.3214	-85.6776	4						1					
4	41.3242	-85.6759	8						1					
5	41.323	-85.6777	5				1		3					
6	41.3233	-85.6788	13											
7	41.32263	-85.67926	19											
8	41.3214	-85.6802	5				1		5					
9	41.32072	-85.68127	3					3	1					
10	41.3237	-85.6822	8						1	1				
11	41.3232	-85.685	9						1		1			
12	41.32233	-85.68502	20											
13	41.3213	-85.6849	13											
14	41.3207	-85.6848	3	1			1		1					
15	41.31982	-85.68826	5		1				1	1				
16	41.3207	-85.6868	8						1					
17	41.32152	-85.68784	4						3					
18	41.3229	-85.6926	4											
19	41.324	-85.6915	7											
20	41.3248	-85.6926	4											
21	41.3248	-85.6916	20											
22	41.3237	-85.6907	12						1					
23	41.3238	-85.6886	12											
24	41.3247	-85.6882	9						1		1			
25	41.3257	-85.6877	12											
26	41.3257	-85.6908	13						1		1			
27	41.3273	-85.6885	13						1		1		1	
28	41.3282	-85.689	9						1					

29	41.3275	-85.6916	7											
30	41.328	-85.6921	13						3					
31	41.3284	-85.6941	17											
32	41.3291	-85.6953	4						1					
33	41.3294	-85.6947	8						3					
34	41.3298	-85.6938	12											
35	41.3308	-85.6935	5											
36	41.3313	-85.6919	4				1		1					
37	41.3297	-85.6917	7						1					1
38	41.3312	-85.6889	3	1		1	1		3					
39	41.3298	-85.6888	9						1					
40	41.3292	-85.6889	14						1					
41	41.3308	-85.6875	13						1					
42	41.3315	-85.6874	9							1				
43	41.3317	-85.6864	3				1		3					
44	41.3307	-85.6836	10						3					
45	41.3302	-85.6825	3				3		1					
46	41.32969	-85.68412	18											
47	41.3296	-85.685	14											
48	41.3293	-85.6861	10				1		1					
49	41.3278	-85.6866	3					1						
50	41.3267	-85.6861	10				1		3					
51	41.3252	-85.6858	8			1			1		1			
52	41.3274	-85.6841	12											
53	41.3273	-85.6834	19											
54	41.3275	-85.6822	9						1		1			
55	41.3264	-85.6818	11											
56	41.3275	-85.6799	8						3					
57	41.328	-85.6799	3				1		1					
58	41.32649	-85.67882	13											
59	41.3268	-85.6773	9				1		1					
60	41.3261	-85.6769	18											

61	41.3249	-85.677	14											
62	41.3254	-85.6739	8				1		1					
63	41.3235	-85.6728	3						1					
64	41.3264	-85.6708	3	3					1		1			
65	41.328	-85.6743	8						1					
66	41.3282	-85.6759	4						1					
67	41.3301	-85.6749	4				1		1					
68	41.3304	-85.6736	13						3					
69	41.3316	-85.6743	4											
70	41.3328	-85.6745	9						1					
71	41.3334	-85.6734	18				1							
72	41.3341	-85.6732	4						3					
73	41.3337	-85.6728	13											
74	41.3335	-85.672	7						1					
75	41.33279	-85.66925	4											
76	41.3318	-85.6706	7				1		3					
77	41.3317	-85.6712	15						1	1				
78	41.3298	-85.6722	16						1					
79	41.3294	-85.6726	7						3					
80	41.3294	-85.6719	12						3					
81	41.32842	-85.67113	2						3					
82	41.3288	-85.669	14						1					
83	41.3282	-85.6682	7											
84	41.3288	-85.6673	15						1					
85	41.3286	-85.6664	5						3		1			
86	41.3297	-85.6669	15						1					
87	41.3307	-85.667	5				1		1				1	
88	41.3299	-85.6679	20						1					
89	41.33104	-85.66848	8				1		1					
90	41.3298	-85.669	11											

Tier Data Comparison for depths 0-5ft, 5-10ft, 10ft-15ft, 15-20ft 2004-2019																			
Surveyor	AC	AC	AC	AC	AC	AC	AC	AC	AC	AC	AC	AC	AC	AC	AC	IDNR	Clarke	IDNR	Clarke
Date	8/25/04	8/2/05	8/3/06	8/13/07	8/27/08	7/30/09	9/21/10	8/24/11	8/13/12	8/13/13	8/11/14	8/12/15	4/25/16	8/3/16	8/7/17	8/1/18	8/8/18	8/8/19	8/14/19
Species Frequency of Occurrence - Depth 0 to 5 ft																			
Eurasian Watermilfoil	18.2	9.6	0.0	3.4	0.0	32.3	0.0	0.0	6.9	37.0	43.9	34.5	55.2	6.9	6.9	0.0	3.4	3.4	10.3
Curly-leaf Pondweed	20.0	19.2	0.0	0.0	0.0	3.2	0.0	0.0	0.0	0.0	0.0	0.0	6.9	0.0	0.0	0.0	0.0	3.4	6.9
Coontail	45.5	63.5	34.8	58.6	69.4	67.7	26.9	30.4	40.5	22.2	61.0	82.8	58.6	69.0	72.4	69.0	62.1	55.2	79.3
Sago Pondweed	0.0	135.5	4.3	3.4	5.6	3.2	7.7	39.1	17.2	3.7	0.0	10.3	0.0	3.4	0.0	0.0	0.0	0.0	3.4
Starry stonewort	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2
Chara Spp.	18.2	23.1	30.4	17.2	22.2	12.9	19.2	21.7	6.9	18.5	26.8	10.3	20.7	13.8	10.3	6.9	6.9	20.7	0.0
Slender Naiad	29.1	26.9	21.7	13.8	41.7	74.2	0.0	4.3	17.2	14.8	0.0	6.9	3.4	0.0	0.0	0.0	0.0	0.0	0.0
Common Naiad	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	0.0	24.1	0.0
Canada Waterweed	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	6.4	6.9	0.0	3.4	0.0	0.0	6.9	0.0
Flat-stemmed Pondweed	23.6	5.8	0.0	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Common Bladderwort	0.0	1.9	0.0	3.4	0.0	0.0	0.0	4.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water Stargrass	3.6	9.6	0.0	0.0	0.0	3.2	0.0	4.3	0.0	3.7	0.0	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unidentified Pondweed	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Small Pondweed	1.8	1.9	4.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.3
Nitella	1.8	1.9	4.3	0.0	0.0	0.0	7.7	8.7	0.0	0.0	0.0	10.3	3.4	6.9	6.9	0.0	0.0	6.9	0.0
Illinois Pondweed	0.0	0.0	0.0	0.0	0.0	6.5	0.0	0.0	0.0	0.0	0.0	3.4	10.3	13.8	0.0	24.1	17.2	6.9	34.5
Leafy Pondweed	0.0	0.0	4.3	0.0	0.0	0.0	0.0	4.3	6.9	3.7	7.3	6.9	0.0	0.0	6.9	10.3	0.0	24.1	0.0
Spiny Naiad	5.5	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Large-leaved Pondweed	0.0	1.9	0.0	0.0	0.0	0.0	0.0	8.7	6.9	0.0	0.0	10.3	0.0	0.0	13.8	0.0	0.0	0.0	0.0
Narrow leaved pondweed	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	0.0	6.9
Northern Watermilfoil	0.0	13.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	0.0	0.0	0.0	0.0	0.0
Filamentous algae	65.5	0.0	0.0	0.0	0.0	58.1	92.3	73.9	75.9	77.8	73.2	69.0	51.7	75.9	55.2	51.7	0.0	58.6	0.0
Species Frequency of Occurrence - Depth 5 to 10 ft																			
Eurasian Watermilfoil	12.2	0.0	2.7	2.3	2.6	20.0	0.0	0.0	9.5	45.5	58.1	36.7	66.7	13.3	3.3	7.4	0.0	3.7	0.0
Curly-leaf Pondweed	26.8	13.6	0.0	0.0	0.0	5.0	0.0	2.1	7.1	4.5	3.2	0.0	11.1	0.0	0.0	0.0	0.0	0.0	0.0
Starry Stonewort	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	0.0	86.7	0.0	0.0	0.0	0.0	3.7
Coontail	36.6	77.3	86.5	88.6	84.2	87.5	19.1	27.1	40.5	9.1	29.0	73.3	55.6	0.0	83.3	74.1	67.6	74.1	85.2
Sago Pondweed	2.4	4.5	2.7	2.3	5.3	0.0	14.9	29.1	28.6	20.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0		7.4
Chara Spp.	2.4	0.0	5.4	4.5	2.6	0.0	2.1	0.0	2.4	13.6	19.4	3.3	0.0	3.3	3.3	0.0	2.9	0.0	0.0

Slender Naiad	14.6	34.1	24.3	4.5	28.9	32.5	0.0	4.2	9.5	4.5	45.2	3.3	0.0	0.0	6.7	0.0	0.0	0.0	0.0
Flat-stemmed Pondweed	29.3	9.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Common Bladderwort	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2	3.3	0.0	3.3	0.0	0.0	0.0	0.0	0.0
Water Stargrass	9.8	18.2	2.7	2.3	5.3	2.5	4.3	6.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Small Pondweed	7.3	0.0	0.0	0.0	0.0	10.0	0.0	0.0	0.0	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nitella	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Illinois Pondweed	2.4	0.0	0.0	0.0	0.0	0.0	2.1	0.0	0.0	0.0	3.2	0.0	3.7	20.0	3.3	14.8	47.1	11.1	22.2
Leafy Pondweed	0.0	0.0	0.0	0.0	7.9	5.0	0.0	2.1	9.5	2.3	25.8	3.3	0.0	0.0	16.7	0.0	0.0	18.5	0.0
Large-leaved Pondweed	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.7	0.0	0.0	13.3	0.0	0.0	0.0	3.7
Northern Watermilfoil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Filamentous algae	80.5	0.0	0.0	0.0	0.0	35.0	57.4	58.3	35.7	36.4	48.4	56.7	48.1	70.0	53.3	51.9	0.0	55.6	0.0

Surveyor	AC	AC	AC	AC	AC	AC	AC	AC	AC	AC	AC	AC	AC	AC	AC	IDNR	Clarke	INDR	Clarke
Date	8/25/04	8/2/05	8/3/06	8/13/2007	8/27/08	7/30/09	9/21/10	8/24/11	8/13/12	8/13/13	8/11/14	8/12/15	4/25/16	8/3/16	8/7/17	8/1/18	8/8/18	8/8/2019	8/14/2019
Species Frequency of Occurrence - Depth 10 to 15 ft																			
Eurasian Watermilfoil	0.0	0.0	0.0	0.0	0.0	7.1	0.0	0.0	7.1	6.7	0.0	28.6	37.5	0.0	0.0	0	5.9	0.0	0.0
Curly-leaf Pondweed	0.0	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0
Coontail	25.0	25.0	100.0	71.4	75.0	64.3	0.0	0.0	7.1	0.0	0.0	71.4	33.3	81.0	90.5	91.7	58.8	66.7	50.0
Chara Spp.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.7	0.0	0.0	4.2	0.0	0.0	0	0.0	0.0	0.0
Slender Naiad	25.0	0.0	22.2	0.0	8.3	0.0	0.0	0.0	0.0	6.7	12.5	19.0	0.0	0.0	4.8	0	0.0	0.0	0.0
Flat-stemmed Pondweed	25.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0
Water Stargrass	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.8	0.0	0.0	0.0	0	0.0	0.0	0.0
Small Pondweed	0.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0

Leafy Pondweed	0.0	0.0	5.6	0.0	8.3	0.0	0.0	0.0	0.0	0.0	0.0	9.5	0.0	4.8	14.3	12.5	0.0	12.5	0.0
Large-leaved Pondweed	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.3	0.0	19.0	0	0.0	0.0	0.0
Illinois Pondweed	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.0	4.8	12.5	5.9	0.0	0.0
Filamentous algae	25.0	0.0	0.0	0.0	0.0	28.6	0.0	0.0	14.3	26.7	25.0	23.8	25.0	23.8	9.5	12.5	0.0	12.5	0.0
Species Frequency of Occurrence - Depth 15 to 20 ft																			
Coontail	0.0	0.0	41.7	40.0	25.0	40.0	0.0	0.0	0.0	0.0	0.0	30.0	0.0	30.0	40.0	40.0	40.0	20.0	20.0
Sago Pondweed	0.0	0.0	0.0	0.0	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Large-leaved Pondweed	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	0.0	0.0	0.0	0.0
Illinois Pondweed	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	0.0	10.0
Slender Naiad	0.0	0.0	16.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chara Spp.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0
Curly-leaf Pondweed	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0
Flat-stemmed pondweed	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	0.0
White-stemmed pondweed	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	0.0
Filamentous algae	0.0	0.0	0.0	0.0	0.0	40.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0	30.0	20.0	0.0	0.0	0.0	0.0

List of Aquatic Plant Names

Common Name	*Scientific Name*
Coontail	*Ceratophyllum demersum*
Illinois pondweed	*Potamogeton illinoensis*
Sago pondweed	*Potamogeton pectinatus*
EURASIAN WATERMILFOIL	*MYRIOPHYLLUM SPICATUM*
Small pondweed	*Potamogeton pusillus*
Narrow-leaved pondweed	*Potamogeton foliosus*
CURLY-LEAF PONDWEED	*POTAMOGETON CRISPUS*
Eel grass sp.	*Vallisneria sp.*
STARRY STONEWORT	*NITELLOPSIS OBTUSA*

Large-leaved pondweed	*Potamogeton amplifolius*

***The scientific and common names of NON-NATIVE species are shown in ALL CAPITAL LETTERS.