Underwater View of Coontail in Fish Lake, Scott County, July 9, 2020

Curlyleaf Pondweed and Point Intercept Surveys for Fish Lake, Scott Co, MN, 2020

No Open Lake CLP Herbicide Application in 2020

Curlyleaf Pondweed Assessment: June 18, 2020
Point Intercept Plant Survey: July 9, 2020

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Curlyleaf Pondweed and Point Intercept Surveys for Fish Lake, Scott Co, MN, 2020

Summary

Curlyleaf Pondweed Assessment: May 21, 2020

A curlyleaf assessment using a meandered survey was conducted on May 21, 2020. Curlyleaf was found at 35 out of 71 sites mostly along the north and west nearshore areas (Figure S1). Curlyleaf pondweed was growing in water depths of 4-8 feet deep. Heavy curlyleaf growth covered an estimated 0.5 acres in one area on the north side of Fish Lake (Figure S1). No curlyleaf pondweed herbicide treatment was conducted in 2020.

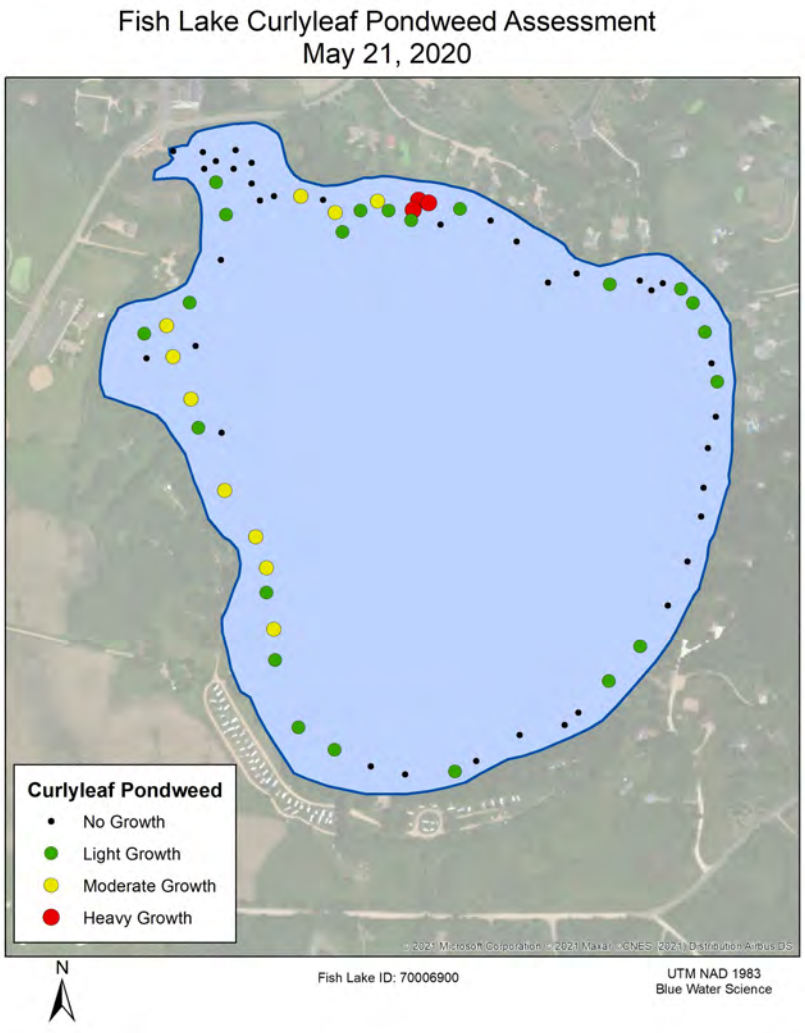


Figure S1. Fish Lake curlyleaf pondweed assessment on May 21, 2020

Fish Lake Point Intercept Survey: July 9, 2020

The Fish Lake point intercept survey consisted of a total of 32 sample sites that were spaced 100 m apart on July 9, 2020. In the July point intercept survey, curlyleaf was found at 3 sample sites with light growth. Coontail was the most common plant and was found at 25 out of 32 sample sites. A total of 8 submerged species were observed (Table S1) and a map of native plant coverage is shown in Figure S2. Plants were observed growing to a depth of 8 feet and covered an estimated 35% of the lake bottom.

Table S1. Fish Lake aquatic plant occurrence and density for the July 9, 2020 survey based on 32 sites in the litoral plant growing zone. Density ratings are 1-3 with 1 being low and 3 being most dense.

	All Stations (n=32)		
	Occur	% Occur	Average Density
Spatterdock (*Nuphar variegata*)	3	9	1.7
White water lilies (*Nymphaea odorata*)	8	25	1.3
Coontail (*Ceratophyllum demersum*)	24	75	1.8
Curlyleaf Pondweed *(Potamogeton crispus)*	3	9	1.0
Northern watermilfoil (*Myriophyllum sibiricum*)	1	3	1.0
Fries' Pondweed *(Potamogeton friesii)*	12	38	1.1
Flatstem pondweed (*Potamogeton zosteriformis*)	5	16	1.0
Sago Pondweed *(Stuckenia pectinata)*	1	3	1.0
Water Stargrass *(Heteranthera dubia)*	1	3	1.0
Water celery (*Vallisneria americana*)	9	28	1.0

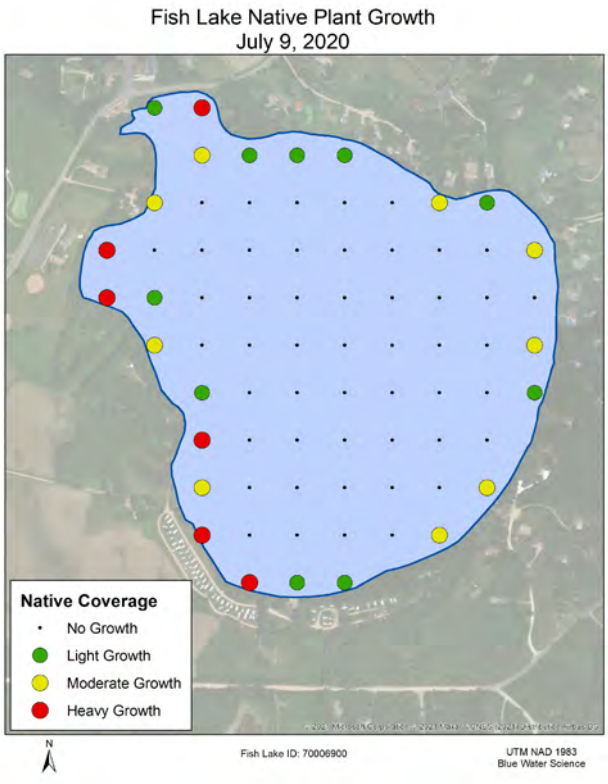


Figure S2. Native aquatic plant coverage map for Fish Lake on July 9, 2020.

Curlyleaf Pondweed and Point Intercept Surveys for Fish Lake, Scott Co, MN, 2020

Fish Lake, Scott County (MnDNR ID: 70006900)
Area: 175.92 acres
Littoral Area: 74 acres
Shore Length: 2.3 miles
Maximum Depth: 28 feet

Introduction

Fish Lake has an area of 176 acres with a littoral area of 74 acres (source: MnDNR). A meandering curlyleaf pondweed assessment was conducted on May 19, 2020. A summer aquatic plant point intercept survey was conducted July 9, 2020 to assess the native plant community in Fish Lake.

Methods

Methods for Assessing Curlyleaf Pondweed Growth and Extent: The assessment survey is conducted using a meandering path around the nearshore area of the entire lake. Curlyleaf is sampled using a fixed 14 tine rakehead on a pole. Curlyleaf stem counts on a rake sampler were used to identify areas that had a potential to produce curlyleaf growth at its June peak. After a short sweep of about 1-foot (which samples about 0.1 m^2), if one or two stems (10-20 stems/m^2) were collected on the rake sweep, it was predicted that this area would produce only future light growth at its peak and was not delineated for treatment. Alternatively, sites where 3 stems (30 stems/m^2) were collected per rake sample future potential growth was considered to be moderate. However if 4 curlyleaf stems (40 stems/m^2) or more per rake sample generally indicated some plants had developed runners and would likely produce heavy growth in the next few weeks and this site would be marked for potential treatment. This survey method used for determining curlyleaf pondweed spot herbicide treatments was similar to the methodology published in a peer reviewed journal (McComas et al, 2015)*.

For a curlyleaf assessment, a meandering survey is used but curlyleaf density is based on a scale of 0 to 3 with 3 being the densest (chart is shown on the next page).

**McComas, S.R., Y.E. Christianson, and U. Singh. 2015. Effects of curlyleaf pondweed control on water quality and coontail abundance in Gleason Lake, Minnesota. Lake and Reservoir Management, 31:109–114. https://doi.org10.1080/10402381.2015.1014583*

Survey Methods for the Point Intercept Survey: An aquatic plant point-intercept survey of Fish Lake was conducted by Blue Water Science on July 9, 2020. A total 74 points were placed on a grid and sample points were spaced 100 meters apart (Figure 1). At each sample point, a sampling rake was lowered into the water and a plant sample was taken. The plant species were recorded and the density of each species was assigned. Densities were based on the coverage on the teeth of the rake. Density ratings ranged from 1 to 3 with 1 being sparse and 3 being heavy growth. Based on these sample sites, a plant distribution map was constructed.

Figure 1. Point-intercept sample sites for Fish Lake in 2020. Sample sites were spaced 100 meters apart.

Chart of Aquatic Plant Density Ratings

Aquatic plant density ratings from 1 to 3.

Results of Curlyleaf Pondweed Assessment, May 21, 2020

A curlyleaf assessment using a meandered survey was conducted on May 21, 2020. Curlyleaf was found at 35 out of 71 sites (Figure 2). Three sites were found with heavy CLP growth, clustered on the north side of Fish Lake, moderate growth (yellow dots) was found at 10 sites, and 22 sites had light growth. Moderate to heavy growth of CLP grew in water depths of 4-8 feet.

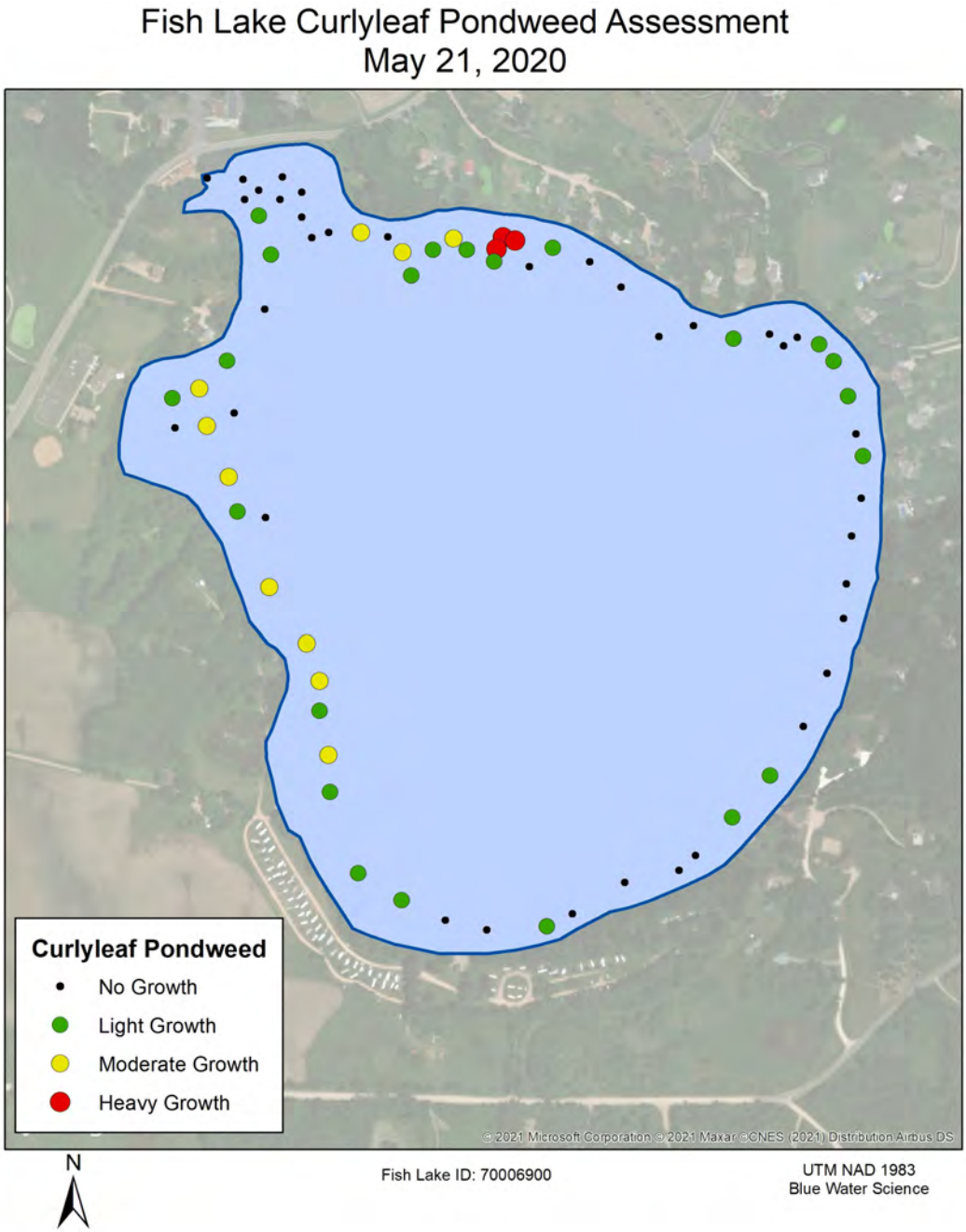


Figure 2. Map of curlyleaf pondweed for May 21, 2020. Key: green = light growth, yellow = moderate growth, red = heavy growth, and black dot = no curlyleaf.

Point Intercept Summer Survey for Fish Lake

In Fish Lake, a total of 74 sites were placed on a grid and 32 sites out to 15 feet of water depth were surveyed with rake sampling. In the July survey, curlyleaf was found at 3 of the sample sites growing at light growth. Native plants were observed growing at 26 out of 32 sites. Coontail was the most common plant and was found at 24 out of 32 sample sites (Tables 1, 2, and 3). A map of native plant coverage is shown in Figure 3. A total of 8 submerged species were observed (Table 1) and plants grew out to a depth of 8 feet.

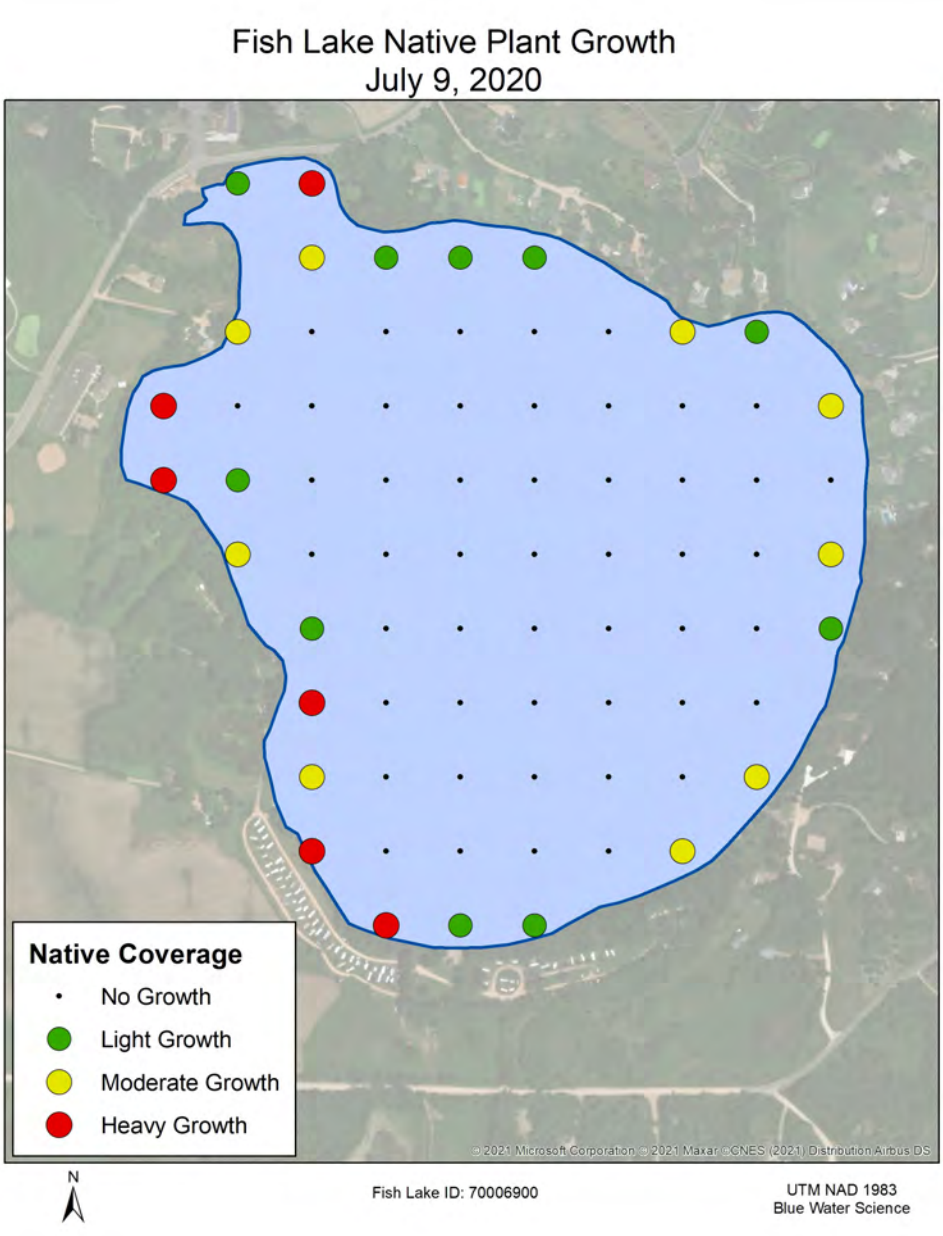


Figure 3. Native aquatic plant distribution and abundance on July 9, 2020.
Key: green = light growth, yellow = moderate growth, red = heavy growth, and black = no growth.

Table 1. Fish Lake aquatic plant occurrence and density for the July 9, 2020 survey based on 74 sites. Statistics are based on 32 sites in Fish Lake for 2020. Density ratings are 1-3 with 1 being low and 3 being most dense.

	All Stations (n=32)		
	Occur	% Occur	Average Density
Spatterdock (*Nuphar variegata*)	3	9	1.7
White water lilies (*Nymphaea odorata*)	8	25	1.3
Coontail (*Ceratophyllum demersum*)	24	75	1.8
Curlyleaf Pondweed *(Potamogeton crispus)*	3	9	1.0
Northern watermilfoil (*Myriophyllum sibiricum*)	1	3	1.0
Fries' Pondweed *(Potamogeton friesii)*	12	38	1.1
Flatstem pondweed (*Potamogeton zosteriformis*)	5	16	1.0
Sago Pondweed *(Stuckenia pectinata)*	1	3	1.0
Water Stargrass *(Heteranthera dubia)*	1	3	1.0
Water celery (*Vallisneria americana*)	9	28	1.0

Table 2. Point intercept survey statistics for samples 0 to 18 feet.

Total # Points Sampled	**32**
Depth Range of Rooted Veg	**3-8 feet**
Maximum Depth of Growth (95%) in feet	**8**
# Points in Max Depth Range	**25**
# Points in Littoral Zone (0-15 feet)	**29**
% Points w/ Native Submersed Taxa	**86**
Mean Native Submersed Taxa/Point	**1.8**
Mean Density of Native Submersed Taxa	**1.1**
# Submersed Native Taxa	7

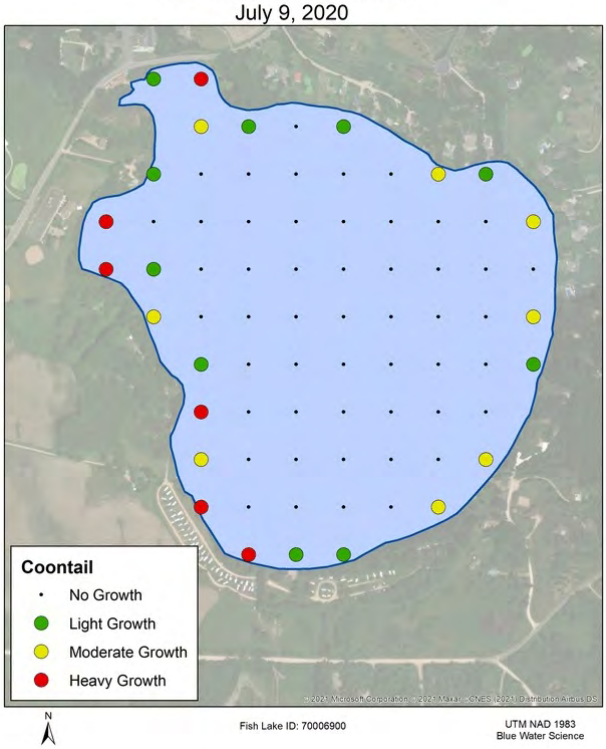
Table 3. Aquatic plants sampled by depth.

Depth Bin (Feet)	# points sampled	% Sampling points with submersed species observed
0		
1		
2		
3	3	100%
4	6	100%
5	4	100%
6	6	100%
7	3	100%
8	3	100%
9	0	

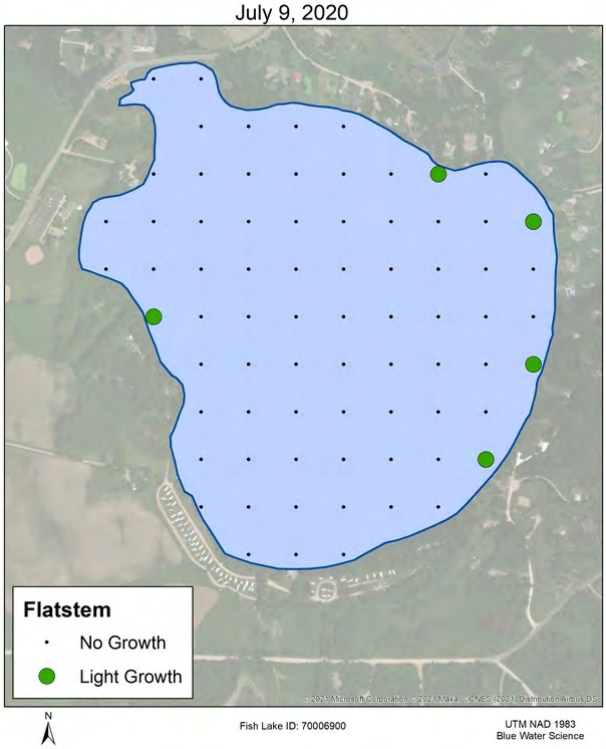
Depth Bin (Feet)	# points sampled	% Sampling points with submersed species observed
10	1	0
11	2	0
12		
13		
14		
15	1	0
16		
17	2	0
18		

Aquatic Plant Distribution and Abundance

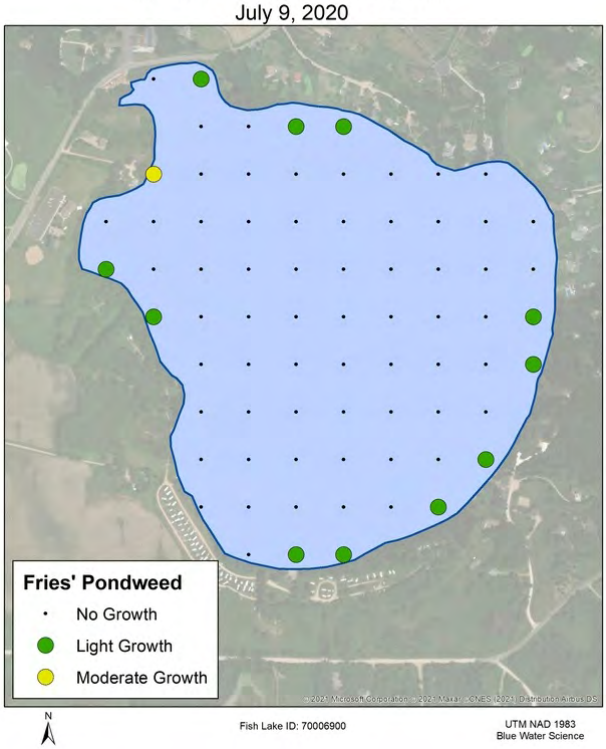
Fish Lake Coontail Growth
July 9, 2020



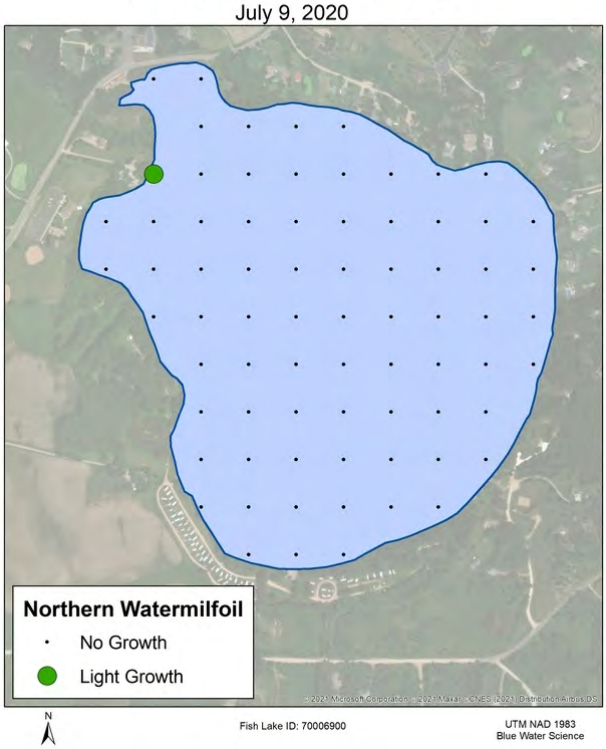
Fish Lake Flatstem Pondweed Growth
July 9, 2020



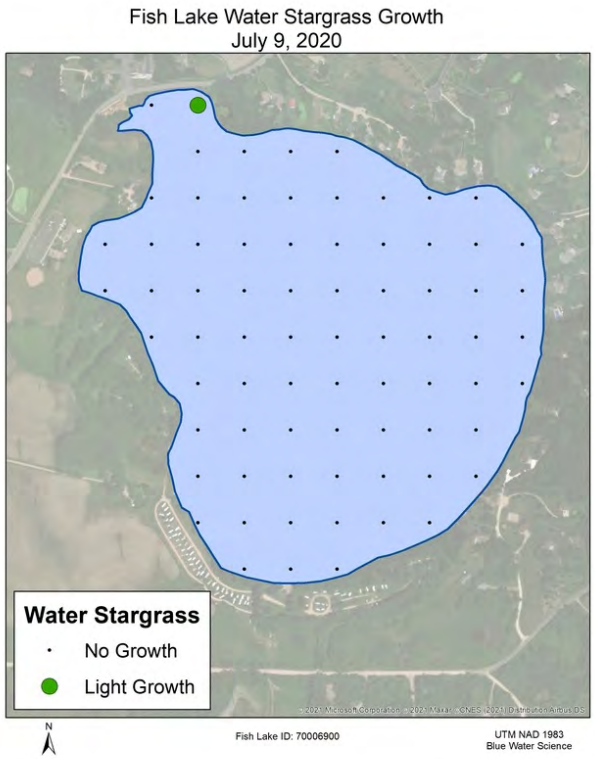
Fish Lake Fries' Pondweed Growth
July 9, 2020

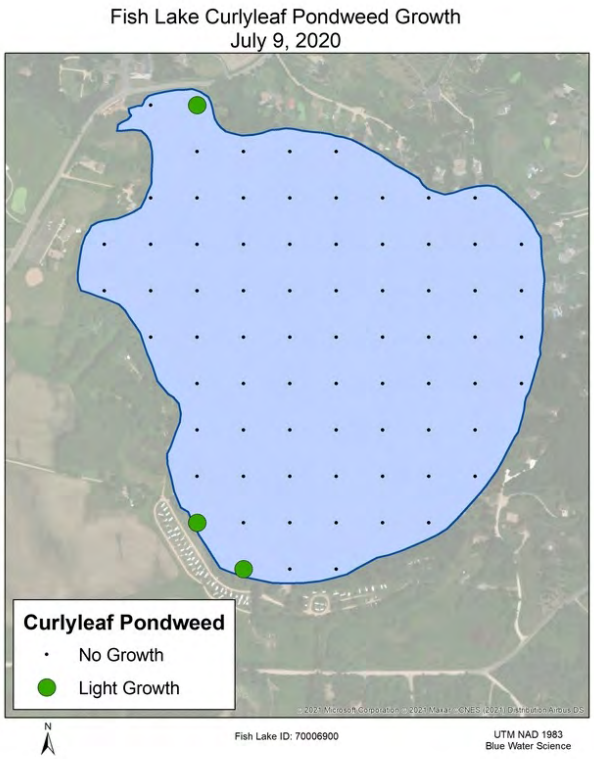


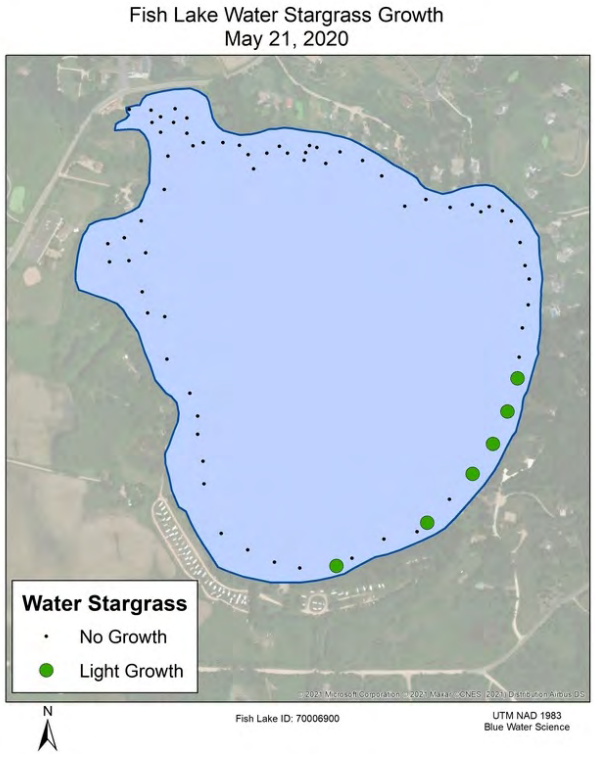
Fish Lake Northern Watermilfoil Growth
July 9, 2020

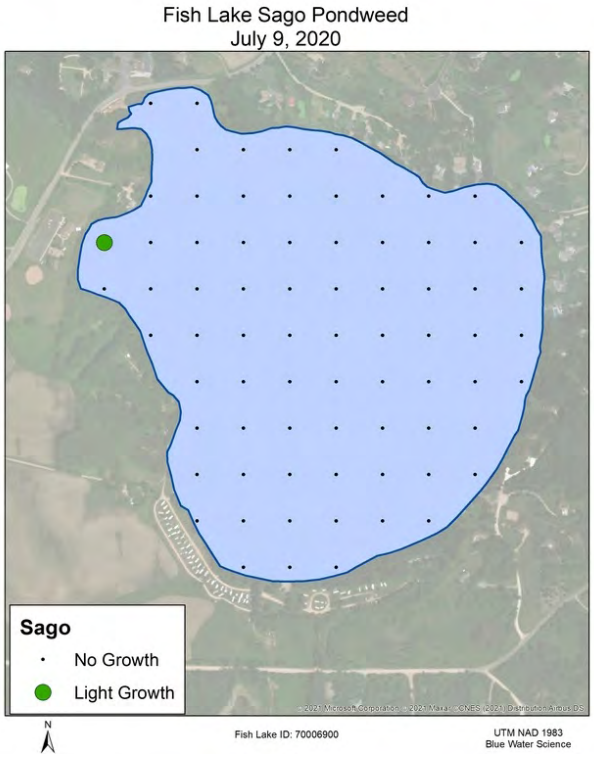


Distribution and Abundance of Aquatic Plants in Fish Lake









Aquatic Plant Results for 2015, 2018, and 2020 Point Intercept Surveys: The aquatic plant community has been fairly stable from 2015 to 2020 (Figure 4 and Table 2).

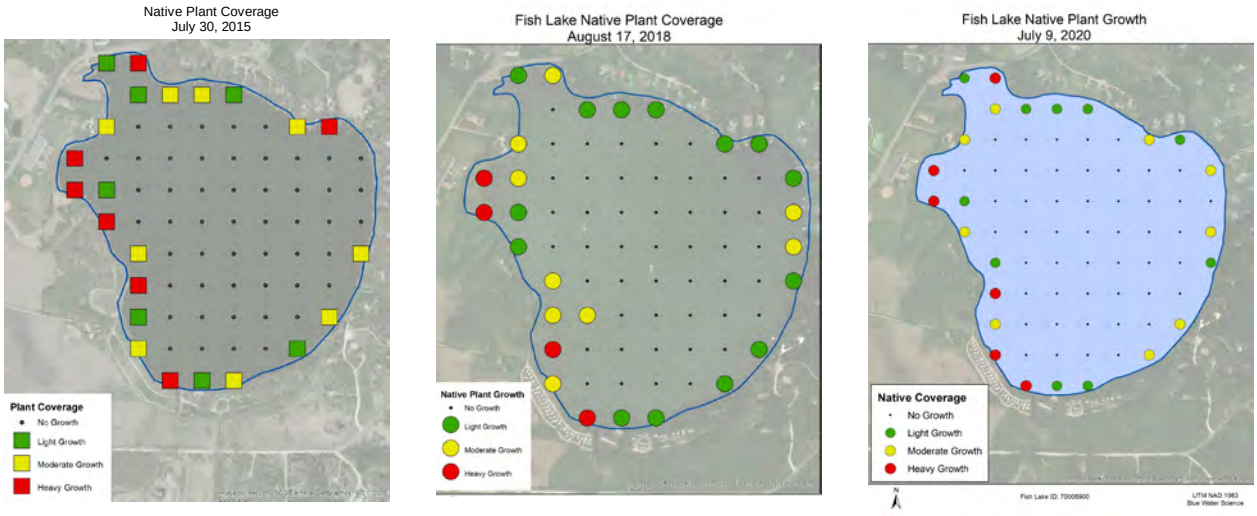


Figure 4. Native aquatic plant distribution and abundance on July 30, 2015 (left), August 17, 2018 (middle) and July 9, 2020 (right). Key: green = light growth, yellow = moderate growth, red = heavy growth, and black = no growth.

Table 4. Fish Lake aquatic plant occurrence and density for the 2015, 2018, and 2020 pont intercept surveys. Density ratings in 2015 are 1-5 with 1 being low and 5 being most dense. In 2018 and 2020, a density scale of 1 to 3 was used.

	July 30, 2015 All Stations (100 meter spacing)		August 17, 2018 All Stations (100 meter spacing)		July 9, 2020 All Stations (100 meter spacing)	
	Occur	Average Density	Occur	Average Density	Occur	Average Density
Spatterdock (*Nuphar variegata*)	4	2.8	2	1.0	3	1.7
White water lilies (*Nymphaea odorata*)	6	2.0	4	2.8	8	1.3
Coontail (*Ceratophyllum demersum*)	21	2.9	25	1.4	24	1.8
Chara (*Chara sp*)	1	1.0				
Northern watermilfoil (*Myriophyllum sibiricum*)	7	1.3	5	1.0	1	1.0
Floatingleaf pondweed (*Potamogeton natans*)	3	1.7				
Flatstem pondweed (*Potamogeton zosteriformis*)			2	1.0	5	1.6
Sago pondweed (*Stuckenia pectinata*)	2	2.0			1	1.0
Water celery (*Vallisneria americana*)	8	1.6	7	1.0	9	1.0
Water stargrass (*Zosterella dubia)*	3	1.3			1	1.0
number of submerged species	7		4		8	