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# Little Traverse Lake 2020 Aquatic Plant and Algal Survey Final Report

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## Submergent Plant Survey

Due to the rapidly increasing threat of invasive plants and harmful algae in Leelanau County, associations from the neighboring lakes Lime and Little Traverse conducted lake wide surveys in 2020. Eurasian Watermilfoil (*Myriophyllum spicatum*) was of particular interest due to extensive beds of this invasive plant discovered in neighboring South Lake Leelanau in 2019 and the high cost the Lake Leelanau Lake Association is now incurring to manage it. We are pleased to report that no Eurasian Watermilfoil was found in Little Traverse Lake during our survey. Two different methods were used to survey for aquatic plants.

### Break Line Sampling

#### Methods

We trolled the 12 to 15-foot break line around the perimeter of Little Traverse Lake on 30 July and stopped to sample aquatic plants beds by tossing a double-sided rake in each of the four cardinal directions at each site. The rake was pulled back to the boat and all plants were identified to at least the genus level of classification from our previous knowledge and validation from the “Aquatic Plants of the Upper Midwest” key (Paul M. Skawinski). Relative abundance was recorded (Table 1) as the presence of plants observed with each toss. The number in the box represents the number of rakes that pulled up a plant at a particular site. For example, *Chara contraria* was found on all four rake throws at Site 1 and 2, but only one throw at Site 3. To facilitate repeated surveys in future years, GPS coordinates and approximate depth of sampling for each site were recorded (Table 2). Visual representation of each location can be seen in Figure 1.

#### Results & Conclusions

No invasive species were found at any of the 15 aquatic plant beds. This is good news for the health of Little Traverse Lake. It is recommended that this plant survey be repeated yearly for early detection of invasive species. That way, if a plant like Eurasian Watermilfoil is found, it can be treated and eradicated early before it has a chance to disrupt the ecosystem. Alpine Pondweed, Water Celery, Slender Naiad and Common Stonewort were the most commonly found plants in the survey. Note, Common Stonewort and *Cladophora* are actually macro phytic algae; we included them in this survey because of their size, prevalence, and proximity to vascular plants. Plant growth in Little Traverse Lake appeared to be comparable with other healthy lakes we work on in Northwest Michigan.

Scientific Name	Common Name	Site																
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15*		
<i>Chara contraria</i>	Common stonewort	4	4	2	4	3	4	3	4	3	2	4	3	4	3	4		
<i>Cladophora sp.</i>				1		1												
<i>Ludwigia polycarpa</i>	False Loosestrife	1																
<i>Myriophyllum verticillatum</i>	Whorled watermilfoil		1					1			4							
<i>Najas flexilis</i>	Slender naiad	3	3					1								2	4	
<i>Najas marina</i>	Spiny Naiad																	
<i>Nymphaea odorata</i>	White Water Lily	1																
<i>Potamogeton alpinus</i>	Alpine Pondweed	1						1		2	1		2				4	
<i>Potamogeton foliosus</i>	Leafy Pondweed	1															1	
<i>Potamogeton gramineus</i>	Variable Pondweed	1											2					
<i>Potamogeton natans</i>	Floating Pondweed	2																
<i>Potamogeton sp.</i>	Pondweed													1				
<i>Sagittaria cuneata</i>	Arum-leaved Arrowhead							1									1	
<i>Stuckenia pectinata</i>	Sago Pondweed	1						1	1		1						1	
<i>Vallisneria americana</i>	Water Celery	1	1							1		4			4		3	4

\*Site 15 was monitored during the shoreline survey on 8/13/20

Table 1: Relative abundance of each species of plant found at each site.

Site	Depth	Latitude	Longitude
1	3 ft	44.9242735	-85.8628616
2	10-12 ft	44.9240743	-85.8607099
3	15-17 ft	44.9241102	-85.8534748
4	7-10 ft	44.9251307	-85.8446591
5	9-10 ft	44.926034	-85.8389852
6	6-10 ft	44.9286036	-85.8282373
7	4-6 ft	44.9292984	-85.8274205
8	9-12 ft	44.9230602	-85.831246
9	10-12 ft	44.9212014	-85.8342907
10	7-8 ft	44.9207052	-85.83573
11	10-12 ft	44.9191158	-85.8423856
12	5 ft	44.91871	-85.8507742
13	16 ft	44.9209735	-85.8542208
14	5-6 ft	44.9236732	-85.8613981
15	3-4 ft	44.9188622	-85.832398

Table 2: GPS coordinates and approximate depth for each site in the plant survey.



Figure 1. Break line plant survey sample sites.

## Emergent Plant Survey

### Shoreline Sampling

#### Methods

We conducted a shoreline survey on 10 August by slow trolling around the entire perimeter of Little Traverse Lake at dock end or closer from the shoreline. We documented emergent aquatic plants (rushes, sedges, cattails), and invasive species (both terrestrial and aquatic). Findings were drawn on a field map and later transferred to an electronic map. GPS coordinates were not recorded while drawing the maps; all locations are approximate.

#### Results & Conclusions

One unknown plant species was found near the mouth of Shetland Creek (Site 15). It was not included in our key, nor could we identify it with any website searches. Because of this, we do not think it is an invasive species, since most invasive species are well documented in literature.

We did confirm the presence of several patches of purple loosestrife along the SW and NW shoreline. It was first spotted on the south shore (44.9166232, -85.8467076) and its presence continued to the west end of the lake and back to near the public boat launch. It would be our recommendation to remove this species with landowner permission. Mechanical methods can still be used this season if begun soon. Sporadic Narrow Leaf Cattail (*Typha angustifolia*) was spotted, which is another invasive plant. We were not initially looking for it, but have since learned of its invasive behavior. It can be difficult to identify because it often hybridizes with

broadleaf cattail (*Typha latifolia*). Our recommendation would be to monitor its growth in subsequent years and seek professional guidance on the importance or necessity of removal.

We discovered one patch of what appeared to be the invasive Yellow Iris (*Iris pseudacorus*). No Phragmites (*Phragmites australis*) were spotted along in near shore areas. We did not survey for Coltsfoot (*Tussilago farfara*), an increasingly common invasive plant in this area, because it was not blooming and would have required a walking survey along shore. A visual map of our findings can be found in Figure 2.

During our shoreline survey, we noted prevalent golden algae, especially on the north side of the lake. Golden algae is actually a community of microscopic diatoms and is not known to cause significant harm to lakes. Although it can be considered unsightly, there is currently no removal or management process. It may ultimately be healthy for the lake ecosystem. There was also a patch of heavy *Spirogyra sp.* algae growing on the south west side of the lake. This alga is also a natural part of the lake ecosystem. Its presence can indicate high nutrients in the water, but does not necessarily directly correlate to nutrients. It could just be a natural bloom of algae; more water chemistry analyses are required to correlate nutrient loading.

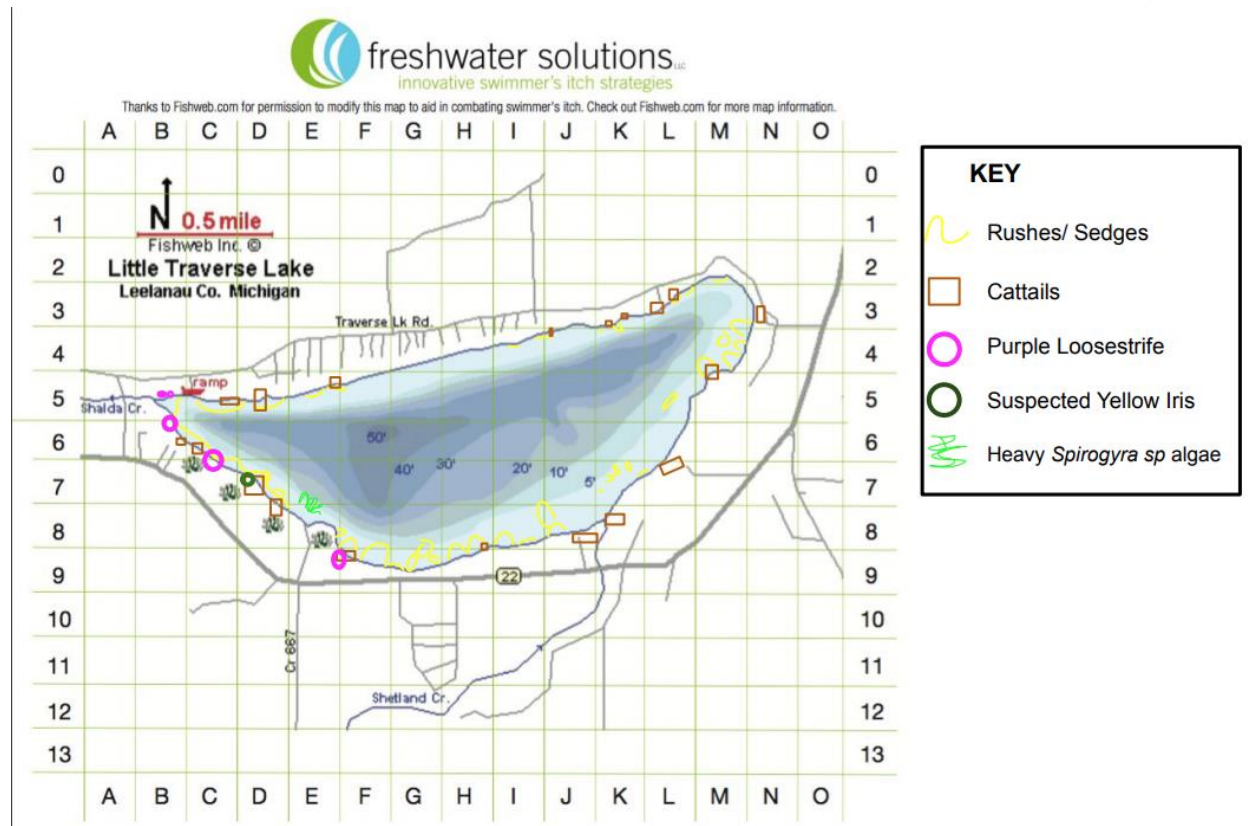


Figure 2: A visual representation of emergent aquatic plants observed during the shoreline survey.

## Algal Survey

Microscopic organisms, including algae, rotifers and arthropods are important organisms in a lake ecosystem. Algae, along with submergent plants and photosynthetic bacteria, are the base of most aquatic food webs and their presence ultimately allows birds, fish and other animals to live in and around the lake.

### Method

A plankton tow (20um) was dragged slowly behind a boat for five minutes, three times on 30 July. Another plankton tow was dropped in a deep part of the lake (44.9229973, -85.8491820) and slowly brought to the surface for vertical collection. All samples were brought back to the lab and examined using a compound microscope. Common species were identified to at least the genus level of classification. Figure 3 shows the areas sampled.

In Appendix I, you will find a visual representation of many species found. All images are taken from a simple google search. Please do not publish this portion of the final report on the lake association website, since image credit is not properly documented.

### Results & Conclusions

There is a vast diversity of microscopic organisms in Little Traverse Lake, as reported in Appendix I. Documenting the current organisms will help to determine if any changes in the lake are occurring, including new chemicals, nutrients, or invasive species. Rob Karner, Glen Lake Watershed Biologist, has conducted a similar survey for a number of years and has been able to show the loss of diversity caused by zebra mussel introduction. From an ecological standpoint, knowing what makes up the base of the aquatic food web is both fascinating and important.

One of the most common algal species present was *Microcystis aeruginosa*, which in extremely high numbers can cause toxic algal blooms. At this time, we have no concerns about the levels of this blue-green algae. During the July 10th sampling date, we also found high numbers of the larval stage of zebra mussels (veliger). If zebra mussels were not already populating the lake, this would be concerning. However, because they are well established, veliger presence was not a surprise. The most common rotifer found in the sampling was *Keratella cochlearis*. This is not surprising either, since it is found in almost all standing bodies of water around the world (1).

During the survey, there was an algal bloom of *Peridinium* occurring. The water was visibly cloudy and had a slight yellow tint to it. *Peridinium* is a non-toxic algal species that has 'safe' blooms throughout the summer. There is no concern raised from this bloom. Interestingly, *Peridinium* has been extensively studied because of the blooms that occur in the Sea of Galilee (2). In every case, the blooms were found to be non-toxic.



Figure 3: Areas sampled during the algal surveys.

## General Recommendations

1. From our surveys, it appears the biggest area of concern is Purple Loosestrife growing along the shores of Little Traverse Lake. We would recommend the removal of this species, possibly with the help of volunteer riparians.
2. We recommend continuing the plant and algal surveys in future years to develop and document trends and to find invasive species in the earliest stages of infestation.
3. Look for flowering Yellow Iris in late spring/ early summer in 2021 and if found, remove immediately.
4. Further investigate the presence and growth of invasive Narrow Leaf Cattail.

## Citations

1. *Zooplankton of the Great Lakes*, Central Michigan University ([people.cst.cmich.edu/mcnau1as/zooplankton%20web/keratella/ker.html](http://people.cst.cmich.edu/mcnau1as/zooplankton%20web/keratella/ker.html))
2. Rogers, Kara. "Peridinium." *Encyclopædia Britannica*, ([www.britannica.com/science/Peridinium](http://www.britannica.com/science/Peridinium))