



PRESEASON FIELD NOTES

Lake: Lower Straits Lake, Oakland County, MI
Date of Observation: 24 May 2022 Supplemented by Lake Resident Comments
Activity: LakeScan™ Category 700 Pre-Treatment Condition Review

Key Points

- ~ Curly leaf pondweed was clearly the dominant weed and covered many, but not all of the AROS where weed growth is typically observed each year. Weed densities and nuisance conditions were less than conditions observed in previous years.
- ~ Ebrid watermilfoil was observed at surprisingly and uncharacteristically low densities. Scattered plants were observed to grow through the dense curly leaf pondweed mats and appeared to be nearing maturity. It was not observed to form the wide-ranging, dense understory that has been found in previous years when curly leaf pondweed was the first weed to become dominant. Never-the-less, ebrid watermilfoil could still emerge as a significant nuisance later in the growing season or summer.
- ~ Starry stonewort was present in the lake but was mostly found as inconspicuous strands (rhizoids) on the bottom of the lake below a chara understory. It does not appear to be growing in a nuisance producing fashion.
- ~ Native pondweeds were scattered throughout the lake, and it is believed that they will contribute to increased lake health metric values in 2022. These plants help to stabilize the lake ecosystem, compete with weedy species, and support the fishery.
- ~ Waterlilies were only beginning to appear in the lake.
- ~ Water column algae production was evident but appeared to be unremarkable. No blooms were observed, and the water was generally clear even after the previous weekend when boating can stir sediments and make the water more opaque.
- ~ Benthic filamentous algae were observed on the bottom of the lake as would be expected for the time of the year. Photos provided by residents confirmed considerable benthic algae growth, but it did not appear that it would become an imminent nuisance. Waves and water movements could dislodge the algae and it could collect on leeward shores.
- ~ Harvesting operations were being conducted during this survey. Curly leaf pondweed comprised the bulk of the harvested material

Narrative

The day was mostly sunny with only a light breeze. The water clarity was good. The water temperature in most lakes was still in the upper low 60's°s F.

The goal of the Lower Straits Lake management plan is to protect or improve the stability and vitality of the lake ecosystem by supporting high levels of biodiversity including the production of the fishery and other aquatic organisms. These conditions contribute to the support of excellent aesthetic characteristics and provide outstanding recreational opportunities for lake residents and users. Since only three exotic (non-native) invasive species create nuisance conditions and threaten the ecosystem stability of Lower Straits Lake, action or interventions are recommended that will specifically target or suppress the production of these invasive species. Selective plant management will help to preserve the production beneficial plants, algae, and animals in the

lake that are necessary for a sustainable management program and protection of the lake ecosystem.

Historically, the lake management program in Lower Straits has succeeded in protecting and improving lake health and condition metrics by remaining focused on the management of the few species that threaten the lake. Mechanical harvesting was deployed in 2022 to extend the recreational use season by freeing areas of nuisance plant growth prior to the Memorial Day Holiday. The removal of mats of nuisance vegetation can also free more desirable plants, that are only emerging from growth near the bottom of the lake.

Curly leaf pondweed was dominant and present in many of the shallow, plant productive parts of the lake at significant nuisance levels. However, the overall weediness of the lake was considered to be less than what has been observed during the past several years. Ebrid milfoil was conspicuously absent from many of the areas where it has reached extreme nuisance levels in previous years. Where it was observed, it appeared to be growing normally for the time of year of these observations. It did not form the vast areas of understory vegetation that have been observed below curly leaf pondweed mats in the past. The lake has been surveyed and monitored since 1988 and ebrid watermilfoil has not been observed at this low a nuisance level, at this time of year, since the program was begun. It is very possible that it could emerge as a serious nuisance later in the growing season. Ebrid watermilfoil has been very herbicide resistant in Lower Straits Lake for several decades. Control strategies have been developed to successfully over-come this herbicide resistance with little or no impact on desirable plants and animals. Unfortunately, EGLE / ANC herbicide application permit conditions will limit access to proven means to control the watermilfoil in Lower Straits Lake in 2022. Alternate strategies will be used in 2022 to provide effective AND selective control of noxious plant species.

Mechanical aquatic weed harvesting can be used to provide quick relief from nuisance conditions created by early season curly leaf pondweed and ebrid watermilfoil production. It is also commonly used in Michigan inland lakes to manage a variety of nuisance native aquatic plants that are not only more herbicide resistant than the exotic invasive species, but that are also much more sensitive to mechanical cutting. Mechanical harvesting is also used to remove exotic invasive species biomass produced by ebrid watermilfoil curly leaf pondweed when conditions are not right for selective control with aquatic herbicides or where herbicide use is prohibited due to flow conditions or other factors. Extreme weedy conditions can occur in some AROS in Lower Straits Lake prior to Memorial Day and mechanical harvesting can be used to provide recreational relief for this critical holiday. Desirable native Michigan species are not as adversely impacted by early season mechanical harvesting since they usually grow more slowly than the exotic invasive species and are still lower in the water column. Unfortunately, curly leaf pondweed and ebrid watermilfoil can recover quickly from harvesting and can reach nuisance levels in two to three weeks. Selective invasive species herbicide treatment is always recommended after harvesting to prevent these particular plants resurging and damaging the lake.

Starry stonewort is a macro alga that resembles highly beneficial, low-growing chara species in Michigan inland lakes. Unlike chara, it can grow to prodigious nuisance levels and has been a perennial nuisance in Lower Straits since it was first detected in 2006. The nuisance level it produces has varied considerably and the time during the when it produces extreme nuisance levels has also varied considerably from year to year. It is highly susceptible to all currently EPA registered copper-based algaecides. However, it is very difficult to treat the dense mats formed by this macro alga since it is difficult to get the algaecide to diffuse deep into the vegetation mass. Special spikes and weighted trailing hoses are used to deliver control agents to proper depths. Fortunately, it was not observed to be growing at levels that would compromise the primary goal of the Lower Straits Lake management plan.

Starry stonewort and late season growth of ebrid watermilfoil can emerge at nuisance level in late July. Species selective treatment is generally recommended. However, mechanical harvesting may also be used to manage nuisance growth that may emerge in late summer. The management plan shall be reconsidered in mid to late July prior to the assignment of any herbicide application or harvesting areas. The use of harvesting is also contingent on contractor availability, cost, and the nuisance species present during late summer.



Figure 1. Lower Straits Lake AROS map.

Management Prescriptives, June 2022

Mechanical harvesting will target nuisance weed growth just prior to the Memorial Day Holiday when conditions are unfavorable to optimum species selective aquatic herbicide use. The near-instantaneous removal of nuisance conditions will extend the recreational use season. The weeds will recover from harvesting, but at a time when conditions are conducive for selective aquatic herbicide applications.

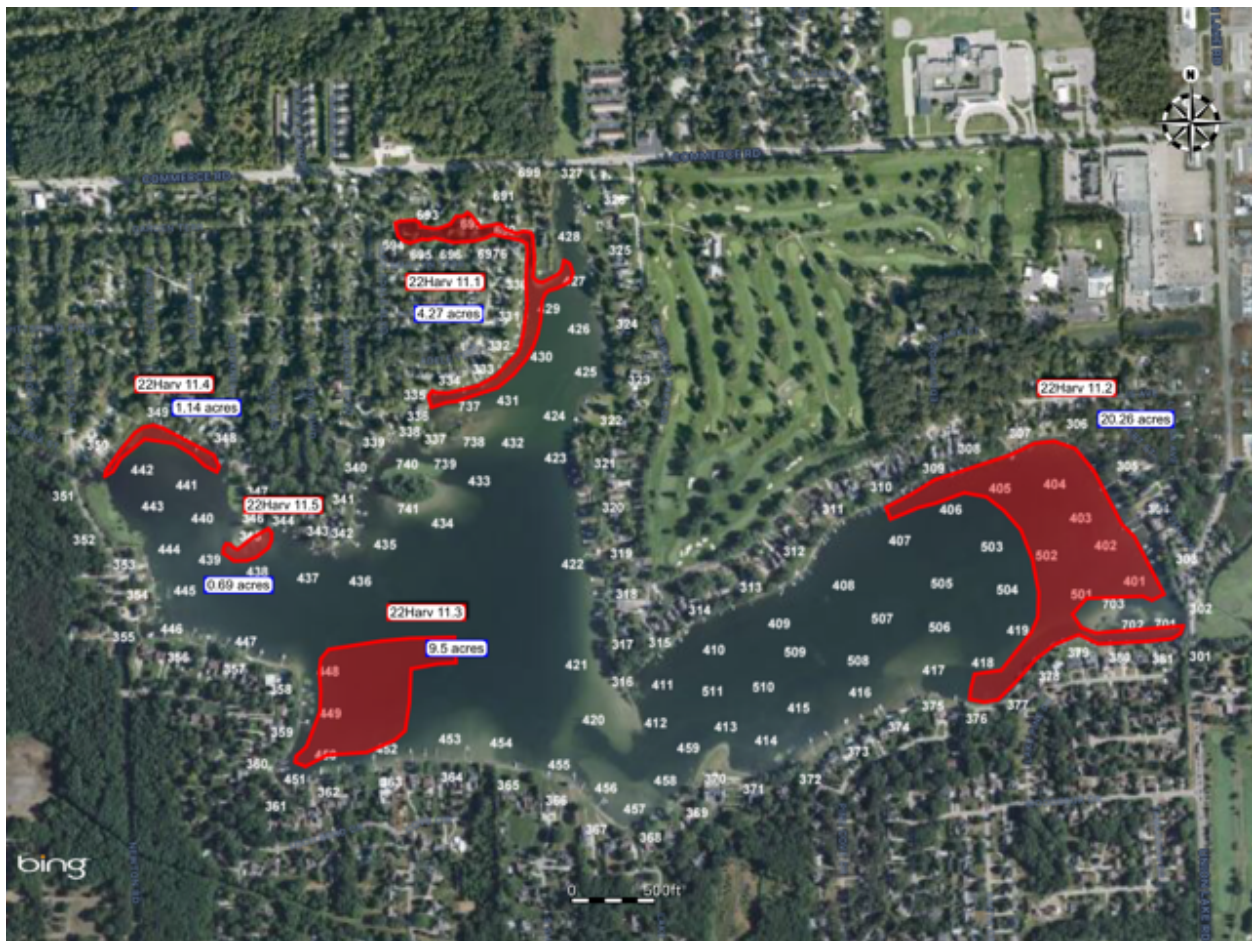


Figure 2 Areas to be mechanically harvested in Lower Straits Lake, May 2022.

Table 1. Lower Straits Lake, May 2022 mechanical harvesting area assignments, acres, and costs.

Location	Acres	TmtZ Zone i.d.	Nearest Shoreline AROS i.d.	Treatment Code	Mechanical Harvesting Acres
East End	20.3	11.2	301 - 310	21	20.26
North End	4.27	11.1	327 - 335	21	4.27
(canal)			690 - 697	21	0.00
Center Basin	9.50	11.3	358 - 363	21	9.50
	0.69	11.5	345	21	0.69
West Side	1.14	11.4	348 - 350	21	1.14
Total Treatment Acres					35.86

Tmt Code	21
Acres	35.86
Estimated Cost Per Acre	\$500
Total Cost of Tmt	\$17,930.00

Selective herbicide combinations shall be used to target nuisance curly leaf pondweed and ebrid watermilfoil when weather and temperature conditions are amenable to achieving good treatment outcomes. The selective control of curly leaf pondweed can be achieved with a variety of chemical agents that have little or no impact on other species. The ebrid watermilfoil in Lower Straits Lake is considered to be relatively resistant to aquatic herbicides. Research conducted by Aquest and the University of Michigan revealed ways to improve treatment outcomes in herbicide tolerant milfoil populations and maintain species selectivity for the improvement of ecosystem stability and plant communities. As a part of the research effort, it was determined that treatments have been consistently better with the addition of copper algaecides or other similar adjuvants to the treatment mixtures that assist with uptake. However, recent MI EGLE rule changes have restricted use of copper to fewer acres than would be considered to be ideal in 2022. Work-a-round strategies have been devised to improve treatment outcomes in spite of permit restrictions and an acceptable treatment outcome is expected this year. The herbicide combination that will be selected will simultaneously control nuisance growth of curly leaf pondweed and ebrid watermilfoil.

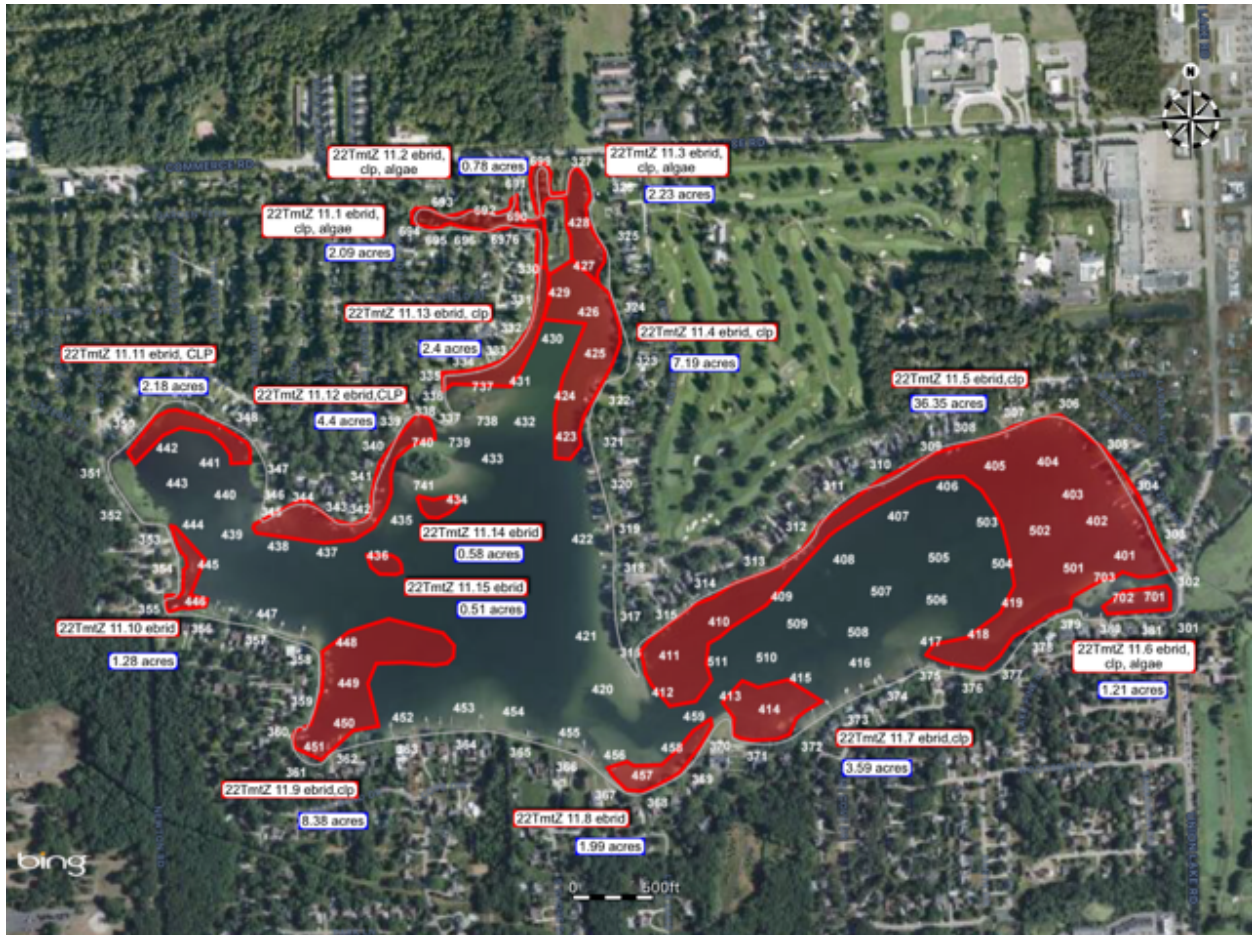


Figure 3 Areas to be considered for treatment for the control of nuisance conditions caused by ebrid watermilfoil and curly leaf pondweed in Lower Straits Lake, June 2022. Red shaded areas shall be treated with a species-specific herbicide combination (TmtZ 11) that will provide simultaneous control of both species.

Table 2. Lower Straits Lake, June 2022 herbicide treatment combination area assignments, acres, and costs.

Tmt Code	11
Acres	75.30
Estimated Cost Per Acre	\$325
Total Cost of Tmt	\$24,472.50

Location	Acres	TmtZ Zone i.d.	Nearest Shoreline AROS i.d.	Treatment Code	Diquat, Endothall, Copper Acres	
East End	36.4	11.5	302 - 316	11	36.40	
	3.6	11.6	380 -381, 301	11	3.60	
	1.2	11.7	371 - 372	11	1.20	
Canal	2.10	11.1	690 - 697	11	2.10	
	0.80	11.2	699	11	0.80	
North End	2.20	11.3	325 - 327	11	2.20	
	7.20	11.4	321 - 234	11	7.20	
Center Basin	2.00	11.8	368 -370	11	2.00	
	8.40	11.9	358 - 362	11	8.40	
	4.40	11.12	337 - 345	11	4.40	
	2.40	11.13	330 - 335	11	2.40	
	(Off Shore)	0.60	11.14	434	11	0.60
	(Off Shore)	0.50	11.15	436	11	0.50
West Side	1.30	11.10	353 - 356	11	1.30	
	2.20	11.11	348 - 350	11	2.20	
Total Treatment Acres					75.30	