FIELD NOTES

Lake:	**Lower Straits Lake, Oakland County, MI**
Date of Observation:	**01 June 2021**
Activity:	**LakeScan™ Category 700 Pre-Treatment Condition Review**
Participants:	**Township officials, lake residents representing neighborhood associations, lake management consultant, and herbicide application contractor.**

Key Points

- **Partly cloudy, very light breeze. The water clarity was good.**
- **Ebrid milfoil and curly leaf pondweed were co-dominant and covered nearly all areas of the lake shallows except for sand bars. Densities and nuisance conditions were similar to conditions observed in previous years. Most weeds had not yet broached the water surface.**
- **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.**
- **Native pondweeds were scattered throughout the lake, and it is believed that they will contribute to increased lake health metric values in 2021. 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.**
- **There was no evidence of algae blooms and the water was generally clear.**
- **The algae treatment of the north canal was considered to have been very successful; however, milfoil was beginning to proliferate in that area and will require some treatment.**

Narrative

The day was mostly sunny with only a light breeze. The water clarity was good. The water temperature near the water surface was reported to be in the low 70'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 to support the fishery and other aquatic organisms and to provide excellent conditions for the aesthetic and recreational enjoyment of the lake. Since only three exotic (non-native) invasive species create nuisance conditions and threaten the stability of the lake ecosystem, action is recommended that will suppress the production of these invasive species. Selective plant management will help to preserve the production positive plants, algae, and animals in the lake that are necessary for a sustainable management program and protection of the lake ecosystem.

The current lake management program in Lower Straits has succeeded in protecting or improving lake health and condition metrics by remaining focused on the management of the few species that threaten the lake. Details are provided in an annual LakeScan™ management report.

Ebrid watermilfoil and curly leaf pondweed are exotic, notoriously invasive weed species that were present in most of the shallow, plant productive parts of the lake at significant nuisance levels. The weediness in the lake is considered to be greater than what has been observed during the past several years. Ebrid milfoil 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 2021. Alternate strategies will be used in 2021 to provide effective AND selective control of noxious plant species.

Mechanical harvesting is commonly used in Michigan inland lakes to manage a variety of nuisance aquatic plants. It is a particularly effective tool for the control of nuisance native Michigan species. Most native species are relatively tolerant of most EPA registered aquatic herbicides and nuisance native plant treatment outcomes may fail to meet expectations. Native plant growth is usually protected and strictly regulated by MI EGLE but it is reasonable to employ Mechanical harvesting to manage native nuisance species in well-defined or targeted areas of inland lakes. 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. Although extremely weedy conditions did not appear in Lower Straits Lake in 2021 until after the Memorial Day holiday, extremely weedy conditions can occur prior to the holiday and mechanical harvesting can be used to provide relief for this critical holiday. Desirable native Michigan species are not as adversely impacted by early season mechanical harvesting. Invasive species often recover quickly from harvesting and can reach nuisance levels in two to three weeks, depending upon the plant growth stage. 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 mat. Special spikes and weighted trailing hoses are used to deliver control agents to proper depths.

Approximately 85 acres will be treated with herbicides as soon as allowed by weather and scheduling. Recent MI EGLE restrictions on the use of copper which is used in conjunction with herbicides to enhance target plant uptake, may compromise the effectiveness of treatment in some areas in the central and western basins. Treatment outcomes are always better for treatment areas that are greater than two acres, but smaller treatment areas will also be treated. Despite the regulatory impediments to better weed treatment the outcome of the first 2021 treatment is expected to be excellent and relatively swift. Conditions will improve dramatically less than 21 days post treatment.

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 2021

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. Treatments have been consistently better with the addition of copper algaecides or other adjuvants to the treatment mixtures that assist with uptake. However, recent MI EGLE rule changes have restricted use of copper to fewer acres, 53, than are needed in 2021. Areas of the north part of the central basin and areas in the western basin shall be treated with an alternate herbicide / adjuvant combination and there is a reasonable expectation of positive outcome. An area near the south shore of the central basin will be treated with a relatively new, but highly effective control for milfoil known as ProcellaCOR. This control agent is a systemic herbicide that is known to be very effective for the control of various watermilfoil and hybrids. It is also known for having an outstanding toxicity package and irrigation restriction profile. Unfortunately, it is very expensive, so it will be evaluated in only a 7-acre area in 2021. Should watermilfoil control extend into 2022, the use of this agent will be considered for broader use in the lake.

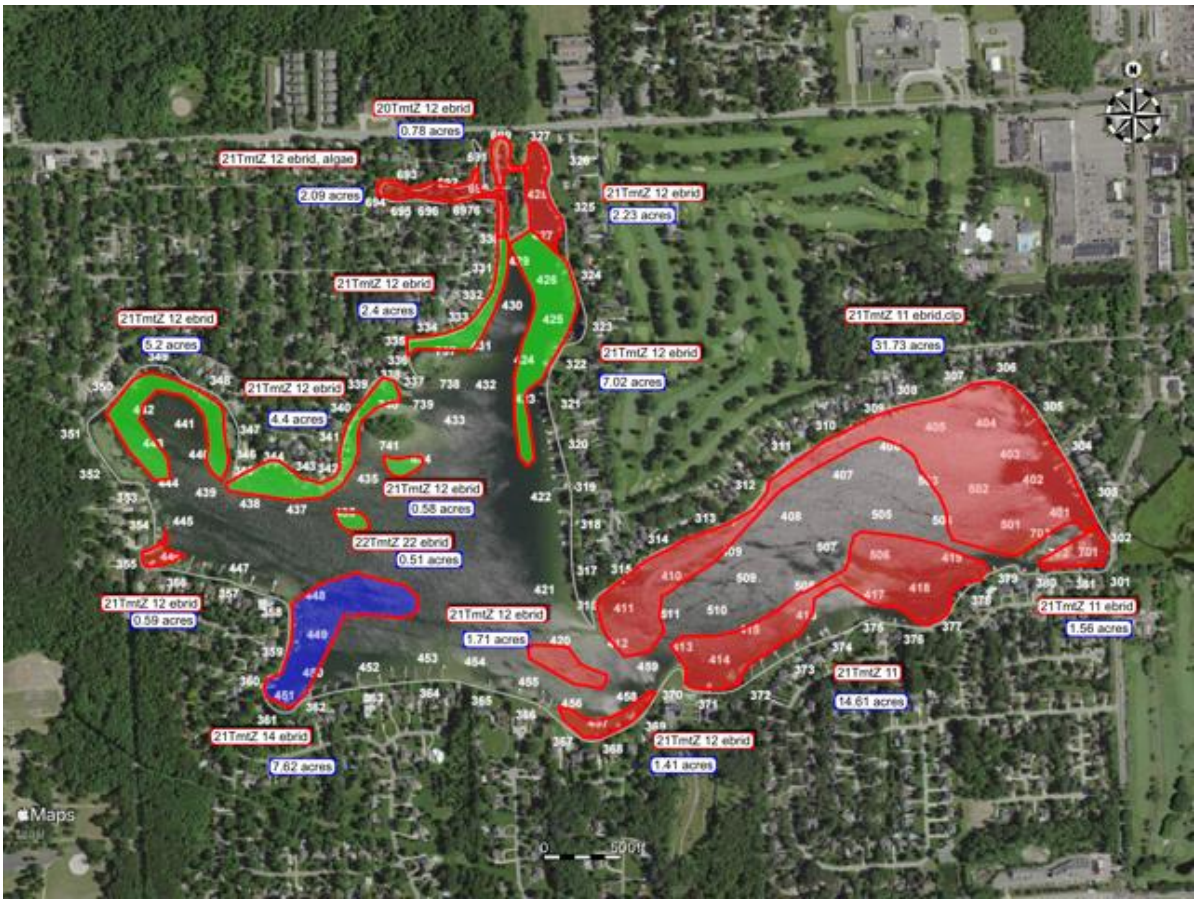

Figure 2 Areas to be considered for treatment for the control of nuisance conditions caused by ebrid watermilfoil and curly leaf pondweed in Lower Straits Lake, June 2021. Red shaded areas shall be treated with a herbicide combination that include chelated copper as an adjuvant (TmtZ 11). Green shaded areas will be treated with a similar herbicide combination that will include a different adjuvant but no chelated copper (TmtZ 12). The blue shaded areas will be treated with a new herbicide known as ProcellaCOR and the treatment outcome shall be monitored in 2021 and 2022 (TmtZ 13).

Table 1. Lower Straits Lake, June 2021 herbicide treatment combinations, area assignments, acres, and costs.

Total Cost with Pondweed Control	$30,204
Total Copper Acres	50.55
Total No Copper Areas	34.10
Total Treatment Acres	84.65

Tmt Code	11	12	13
Acres	50.55	26.48	7.62
Cost Per Acre	$325	$290	$800
Total Cost of Tmt	$16,428.75	$7,679.20	$6,096.00

Location	Acres	AROS i.d.	Treatment Code	11 Diquat, Endothall, Copper Acres	12 Alt. Diquat, Endothall, Adjuvant Acres	13 ProcellaCOR Acres
East End	31.73	404	11	31.73		
1.56	9.01	702	11	9.01		
14.61	1.00	418	11	1.00		
Center Basin	6.37	428	12		6.37	
	7.02	426	12		7.02	
	1.71	420	11	1.71		
	1.41	457	11	1.41		
	7.62	448	13			7.62
	0.51	436	12		0.51	
	0.58	434	12		0.58	
	4.40	437	12		4.40	
	2.40	333	12		2.40	
(North End)	2.23	327	11	2.23		
(canal)	2.09	693	11	2.09		
(canal)	0.78	699	11	0.78		
West Side	5.20	442	12		5.20	
	0.59	355	11	0.59		
Total Treatment Acres		84.65		50.55	26.48	7.62