

Executive Summary



Wabeek Lake

Oakland County, MI

2014/2015 Annual Report and LakeScan™ Analysis

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MONITORING OBSERVATIONS, 2014

Key Findings

- ~ The annual objectives of the Wabeek Lake aquatic plant community management plan have contributed to the development of a more diverse community and thereby contribute to greater ecosystem stability. Most major LakeScan™ metric values have trended positive since 2011. However, the large plant flora continues to be threatened by several opportunistic, exotic, and invasive species. Fortunately, the annual plant community management strategies that have been applied to Wabeek Lake have successfully suppressed these species and encouraged better lake conditions. These improvements support critical ecosystem functions and enhance recreation and aesthetic qualities of the lake.
- ~ The suspended algae community is very capable of supporting a vibrant fishery. Blue green algae are not conspicuous in the lake.
- ~ High levels of biological and structural diversity (many different plants and animals) are necessary to stabilize the lake ecosystem and minimize the occurrence and collective impact of nuisance plant and animal blooms. The exotic invasive species, ebrid milfoil and starry stonewort are weedy in Wabeek Lake. Although exotic plant species are most commonly identified as invasive and known to extirpate more desirable plants, certain genetic strains of endemic Michigan species can also become similarly invasive in some lakes. Wild celery is very invasive in some Michigan inland lakes and in many of the water resources in the upper Mississippi flyway. There are no known controls for this plant, but if they are developed, every effort should be made to reduce the impact of the unrestricted production of this weed.

Narrative

- ~ Wabeek Lake is the smallest lake included in the 2014 LakeScan™ Michigan inland lakes analysis. It is considered to be in fair condition by all LakeScan™ lake quality measures. Size is important and it should not be surprising that most of the Wabeek Lake LakeScan™ metrics were lower than the average of the lakes included in the 2014 LakeScan™ analysis. Despite these lower metric values, Wabeek Lake is considered to be in good condition.
- ~ Species richness (species number) and biodiversity were considered to be much lower than most lakes but has been trending to toward higher values in Wabeek Lake over the several years. LakeScan™ BioD 60 and MorphoD 26 plant diversity community measures have always been low in Wabeek Lake and higher values are an objective of the annual management objectives that are consistent with the over all management goal. The suppression of invasive species is key to the improvement in the metric values. The LakeScan™ metric values that were recorded for Wabeek Lake in 2014 are considered to be good, even if they are lower than the average SE Michigan inland lake.
- ~ Ebrid milfoil is the name applied to the various Eurasian watermilfoil hybrids that are found throughout the upper Midwest and Great Lakes region of North America. Ebrid milfoil and curly leaf pondweed (an exotic species that invaded NA from Europe) emerge in the early summer in Wabeek Lake and create nuisance conditions. Plants have responded positively to commonly used control efforts that include consideration of aufwuchs community conferred multi-agent herbicide resistance. The management program has helped to reduce the relative dominance of these ebrid milfoil and curly leaf pondweed in the submersed flora of the lake but they remain as the dominant nuisance plant species in the lake.
- ~ Starry stonewort can be a significant nuisance in Wabeek Lake; however, blooms and crashes of this exotic macro-algae have been extremely unpredictable. When present, it has a profound impact on the other plants in the lake and the quality of critical fishery habitat. When it crashes, it also has a profound impact on the plants that are present in the lake at the time of the crash. Starry stonewort is capable of growing from an inconspicuous level to extreme nuisance levels in less than 2 weeks. It is critical that homeowners monitor the growth of this plant to signal when conditions required interventions.
- ~ Wild celery is a late season submersed plant. It has increased in percent occurrence and dominance in the lake AROS's since 2011. It does not reach the same level of biovolume as some of the other common aquatic plant species; however, it can still dominate the flora and create considerable nuisance conditions. It also will "uproot" in late July and early August and create noxious conditions along leeward shorelines where wind causes the flotsam to accumulate. There are currently no known ways to consistently and successfully suppress the nuisance production of this weed. Aquest is engaged in studies related to wild celery management and it is hoped that this research will reveal effective means for wild celery control.
- ~ It is apparent that the current lake management program in Wabeek Lake has not caused any harm to the lake but has reasonably improved conditions. Analysis of lake quality metric values suggest that conditions are generally better in the area where more management effort is expended, relative to parts of the lake where lesser or no management effort is expended.
- ~ LakeScan™ plant community monitoring and analysis is strongly recommended as a means to evaluate the effectiveness of the management program and to provide a measure of success and progress toward meeting management goals outlined in this document.

LakeScan™ Plant Data at a Glance

(from: LakeScan™ Report Section 8)

Table ES 1.1 Year to year comparisons of critical LakeScan™ metrics and other data. The historical average is the mean of the values derived from data collected during the years that Wabeek Lake has been part of the LakeScan™ program. The Historical metric range provides the lowest and the highest values from the years that Wabeek Lake has been part of the LakeScan™ monitoring and analysis program.

Year To Year Comparison																
	Species Richness		Morpho- types		Mean C		Whole Lake BioD		BioD T2+		MorphoD		Lake Biovol ft3/acre ft		Weediness	
Wabeek Lake 2014	13		8		3.9		24		14		50		197		5.4	
Historical Average	11		8		4.0		17		11		45		247		5.9	
Historical Metric Range	8 to 13		6 to 10		4 to 5		10 to 24		8 to 14		26 to 61		158 to 316		5.4 to 6.1	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max

Table ES 1.2 Lake to lake comparisons of critical LakeScan™ metrics and other data. Selected Wabeek Lake LakeScan™ metrics and other important data are compared to the average or mean metric values found in 22 Michigan lakes during 2014. The Historical Trend values are derived from the regression slope (or a line) value for individual metric data for each of the 22 lakes considered in this analysis. However, data is only reported for lakes where there is more than 3 years of data. A “+” symbol indicates that the data is trending positively over the years of analysis. The “-“ symbol indicates that the data is trending negatively or toward lesser values during the years of analysis. If there was essentially no change in a metric value over the years of analysis, the “0” value is used to denote “no change”.

Lake To Lake Comparisons and Trend Analysis																					
	Species Richness		Morpho- types		Mean C		Whole Lake BioD		BioD T2+		MorphoD		Lake Biovol ft3/acre ft		Weediness						
<i>Metric Values</i>																					
Wabeek Lake	13		8		3.9		24		14		50		197		5.4						
2014 All Lake Average	16		12		4.8		38		26		75		132		4.8						
2014 All Lake Range	11 to 25		8 to 18		3 to 7		17 to 74		11 to 61		45 to 97		35 to 374		3.1 to 5.8						
<i>Historical Trend Analysis</i>																					
Wabeek Lake	+		+		+		+		+		+		-		-						
2014 All Lake Trend Analysis	+		+		-		+		+		+		-		+						
2014 Trend Analysis	11	0	5	11	0	5	5	0	11	12	0	4	11	0	5	8	0	8	11.0	0.0	5.0
	Pos / Neutral / Neg			Pos / Neutral / Neg			Pos / Neutral / Neg			Pos / Neutral / Neg			Pos / Neutral / Neg			Pos / Neutral / Neg			Pos / Neutral / Neg		

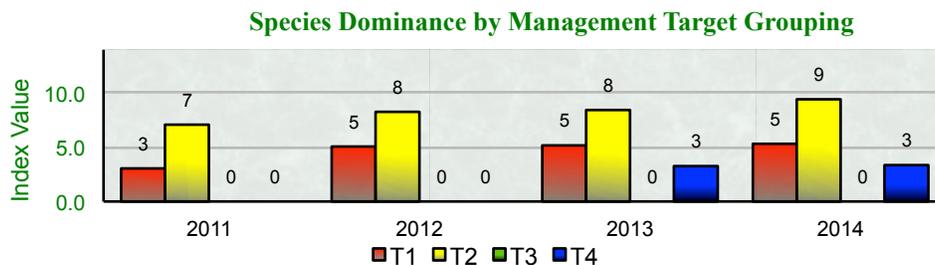


Figure ES 1.1 The quality of the Wabeek Lake plant and weed community considered from the perspective of plant species dominance. T1 species are usually exotic and highly invasive species that are aggressively targeted for control throughout most of the lake. T2 species are targeted for control in many, but not all parts of the lake. They are moderately weedy and are usually considered a significant nuisance in recreational use areas of the lake. T3 species are not usually targeted for complete control. They are typically suppressed for only a part of the growing season near boat docks and developed shorelines. T4 species are the most desirable of the aquatic plants and they are only targeted for control in MZL 4 areas where it is required that all plant growth be removed, such as beach areas.

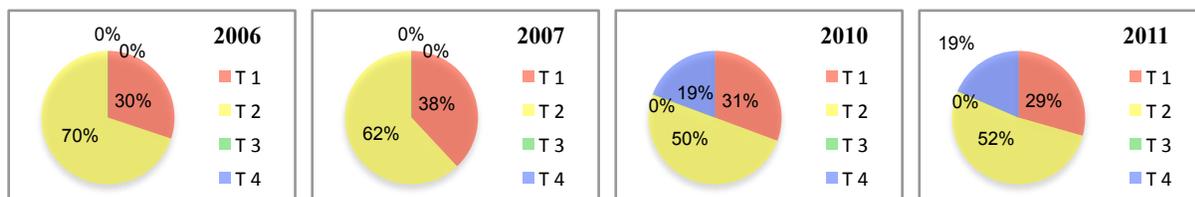


Figure ES 1.2 The quality of the Wabeek Lake plant and weed community considered from the perspective of plant species dominance. This figure is as ES 1.1 except that the dominance values of each target species grouping, T1 – T4 is represented as a percent of the total species present throughout the year of record.

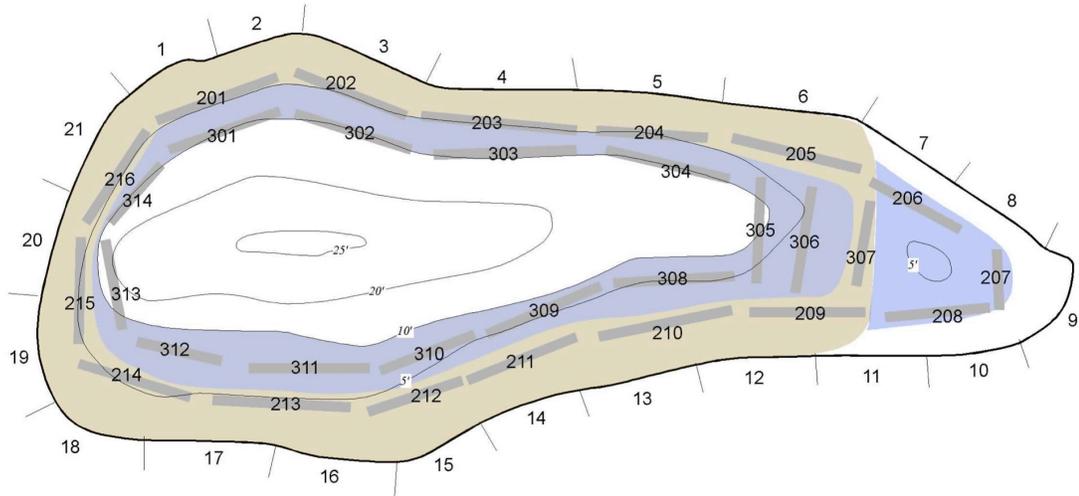


Figure ES 1.3. Wabeek Lake LakeScan™ MZL and Tier map.