Cooperative Lakes Monitoring Program

Michigan Lakes– Ours to Protect

2022 Data Report for Au Sable Lake, Ogemaw County

Site ID: 650052

44.4293°N, 83.9151°W

The CLMP is brought to you by:

Michigan Clean Water Corps

EGLE Michigan Department of Environment, Great Lakes, and Energy

Michigan State University

Michigan Lakes and Streams Association

Huron River Watershed Council

About this report:

This report is a summary of the data that have been collected through the Cooperative Lakes Monitoring Program. The contents have been customized for your lake. The first page is a summary of the Trophic Status Indicators of your lake (Secchi Disk Transparency, Chlorophyll-a, Spring Total Phosphorus, and Summer Total Phosphorus). Where data are available, they have been summarized for the most recent field season, five years prior to the most recent field season, and since the first year your lake has been enrolled in the program.

If you did not take 8 or more Secchi disk measurements or 4 or more chlorophyll measurements, there will not be summary data calculated for these parameters. These numbers of measurements are required to ensure that the results are indicative of overall summer conditions.

If you enrolled in Dissolved Oxygen/Temperature, the summary page will have a graph of one of the profiles taken during the late summer (typically August or September). If your lake stratifies, we will use a graph showing the earliest time of stratification, because identifying the timing of this condition and the depth at which it occurs is typically the most important use of dissolved oxygen measurements.

The back of the summary page will be an explanation of the Trophic Status Index and where your lake fits on that scale.

The rest of the report will be aquatic plant summaries, Score the Shore results, and larger graphs, including all Dissolved Oxygen/Temperature Profiles that you recorded. For Secchi Disk, Chlorophyll, and Phosphorus parameters, you need to have two years of data for a graph to make logical sense. Therefore if this is the first year you have enrolled in the CLMP, you will not receive a graph for these parameters.

Remember that some lakes see a lot of fluctuation in these parameters from year to year. Until you have eight years worth of data, consider all trends to be preliminary.

To learn more about the CLMP monitoring parameters or get definitions to unknown terms, check out the CLMP Manual, found at: **https://micorps.net/wp-content/uploads/2021/03/CLMP-Manual-2019update2_2021.pdf**

Thank you!

The CLMP leadership team would like to thank you for all of your efforts over the past year. The CLMP would not exist without dedicated and hardworking volunteers!

The CLMP Leadership Team is made of: Jo Latimore, Erick Elgin, Jean Roth, Tamara Lipsey, Mike Gallagher, Melissa DeSimone, and Paul Steen

Questions?

If you have questions on this report or believe that the tabulated data for your lake in this report are in error please contact:

Paul Steen (psteen@hrwc.org), CLMP Data Analyst

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Au Sable Lake, Ogemaw County
2022 CLMP Results

Cooperative Lakes Monitoring Program

Secchi Disk Transparency (feet)

Year	# Readings	Min	Max	Average	Std. Dev	Carlson TSI
2022	7*	9.5	13.0			
2022 All CLMP Lakes	2817	1.0	50.0	12.7	2.9	42

No graph: Not enough data

Chlorophyll-a (parts per billion)

Year	# Samples	Min	Max	Median	Std. Dev	Carlson TSI
2022	5	1.2	3.3	3.2	1.0	42
2022 All CLMP Lakes	687	< 1.0	43.0	3.7	5.3	43

No graph: Not enough data

Spring Phosphorus (parts per billion)

Year	# Samples	Min	Max	Average	Std. Dev
2022	1	16.0	16.0	16.0	NA
2022 All CLMP Lakes	220	<5	220.0	20.7	21.3

No graph: Not enough data

Summer Phosphorus (parts per billion)

Year	# Samples	Min	Max	Average	Std. Dev	Carlson TSI
2022	1	12.0	12.0	12.0	NA	40
2022 All CLMP Lakes	234	<= 3	150.0	17.4	15.3	45

No graph: Not enough data

Dissolved Oxygen and Temperature Profile

This lake does not have recent (within 5 years) dissolved oxygen/water temperature data available. Consider enrolling in this parameter next year. Fish, insects, mollusks, and crustaceans need dissolved oxygen to live in water. By late summer, many lakes stratify, with cold anoxic water on the bottom and warm, oxygen rich water on the surface. Anoxic (oxygen-depleted) water occurring too close to the surface is a sign of nutrient enrichment. Understanding the pattern of dissolved oxygen and water temperature in a lake is important for assessing nutrient problems as well as the health of the biological community.

Summary

Average TSI	2022
Au Sable Lake	41
All CLMP Lakes	44

Welcome to the CLMP! The longer you stay in the program and the more parameters you monitor, the more interesting this report will become. Once you have eight years of data there will be enough history to analyze the long-term trend.

With an average TSI score of 41 based on 2022 summer total phosphorus and chlorophyll data, this lake is rated as a mesotrophic lake.

Reminder: 8 Secchi measurements are required in order to use the data in graphs and trends.

** = Minimum # samples not met for average/median/TSI value*

<1.0 = Chlorophyll-a. Sample value is less than limit of quantification (<1 ppb).

W= Value is less than the detection limit (<3 ppb) T = Value reported is less than the reporting limit (5 ppb)

Trophic Status Index Explained

In 1977, limnologist Dr. Robert Carlson developed a numerical scale (0-100) where the numbers indicate the level of nutrient enrichment. Using the proper equations, we can convert results from Summer Total Phosphorus, Secchi Depth, and Chlorophyll-a to this Trophic Status Index (TSI). The TSI numbers are furthermore grouped into general categories (oligotrophic, mesotrophic, eutrophic, and hypereutrophic), to quickly give us a way to understand the general nutrient level of any lake.

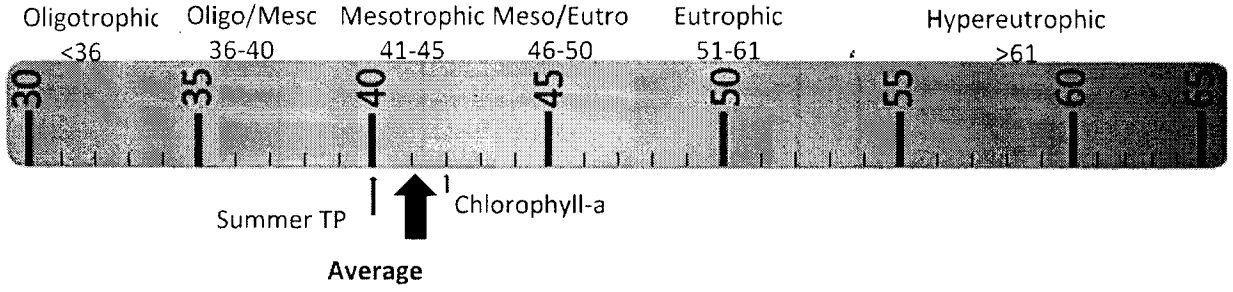
The tables below give the results-to-TSI conversions for the water quality data ranges normally seen in the CLMP. The formulas for this conversion can be found in the CLMP manual (link is on page 2 of this report).

Phosphorus (ppb)	TSI Value
<5	<27
6	30
8	34
10	37
12	40
15	43
18	46
21	48
24	50
32	54
36	56
42	58
48	60
>50	>61

Secchi Depth (ft)	TSI Value
>30	<28
25	31
20	34
15	38
12	42
10	44
7.5	48
6	52
4	57
<3	>61

Chlorophyll-a (ppb)	TSI Value
<1	<31
2	37
3	41
4	44
6	48
8	51
12	55
16	58
22	61
>22	>61

TSI for Au Sable Lake in 2022	
Average	41
Secchi Disk	
Summer TP	40
Chlorophyll-a	42



Oligotrophic: Generally deep and clear lakes with little aquatic plant or algae growth. These lakes maintain sufficient dissolved oxygen in the cool, deep-bottom waters during late summer to support cold water fish, such as trout and whitefish.

Mesotrophic: Lakes that fall between oligotrophic and eutrophic. Mid-ranged amounts of nutrients.

Eutrophic: Highly productive eutrophic lakes are generally shallow, turbid, and support abundant aquatic plant growth. In deep eutrophic lakes, the cool bottom waters usually contain little or no dissolved oxygen. Therefore, these lakes can only support warm water fish, such as bass and pike.

Hypereutrophic: A specialized category of euthrophic lakes. These lakes exhibit extremely high productivity, such as nuisance algae and weed growth.

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Au Sable Lake, Ogemaw County
2022 CLMP Aquatic Plant Results

The Aquatic Plant Mapping survey was conducted on Au Sable Lake in 2022.

This survey involves intensive sampling at multiple locations and depths around the lake produce a complete map of all aquatic plants present in a lake. A great deal of effort is involved both on the lake and back on shore to identify plants, compile data, and develop a detailed plant map, but the result is an extremely valuable record of the plant community of the lake.

Aquatic plants were sampled from a total of 66 locations (22 transects) in Au Sable Lake in 2022. Below is a list of species reported, in order of relative abundance. Survey conducted June 24-August 27.

Au Sable Lake, Ogemaw County
2022 Aquatic Plant Mapping: Species Reported

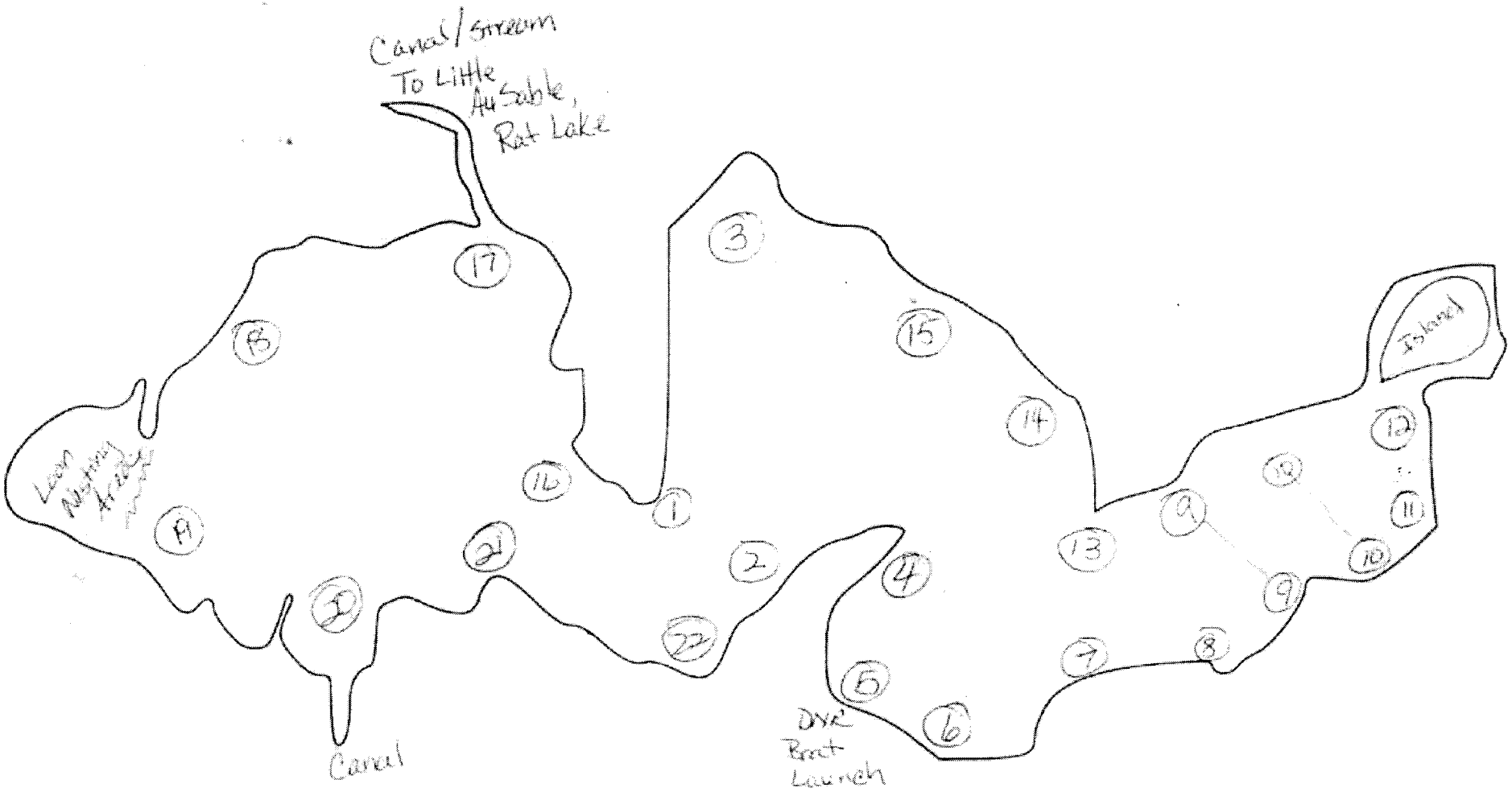
Common Name	Latin Name	Average Density*
Stonewort	*Chara* sp.	2.50
Whorled watermilfoil	*Myriophyllum verticillatum*	1.20
Illinois pondweed	*Potamogeton illinoensis*	1.00
Waterweed	*Elodea canadensis*	0.80
Bushy pondweed	*Najas flexilis*	0.70
Native milfoil	*Myriophyllum* sp.	0.60
Bladderwort	*Utricularia* sp.	0.48
Fries' pondweed	*Potamogeton friesii*	0.40
Starry stonewort^	*Nitellopsis obtusa*	0.40
Sago pondweed	*Stuckenia pectinata*	0.29
Flat-stemmed pondweed	*Potamogeton zosteriformis*	0.18
Curly-leaf pondweed^	*Potamogeton crispus*	0.15
Slender naiad	*Najas flexilis* (also listed above)	0.12
Wild celery	*Vallisneria americana*	0.12
Coontail	*Ceratophyllum demersum*	0.10
Clasping-leaf pondweed	*Potamogeton richardsonii*	0.08
Variable pondweed	*Potamogeton gramineus*	0.08
Nitella	*Nitella* sp.	0.06
Floating-leaf pondweed	*Potamogeton natans*	0.05
Large-leaf pondweed	*Potamogeton amplifolius*	0.05
White water-lily	*Nymphaea odorata*	observed
Yellow water lily	*Nuphar variegata*	observed
Bulrush		observed
filamentous algae		observed
Arrowhead	*Sagittaria* sp.	observed
Pickerelweed	*Pontederia cordata*	observed

^invasive

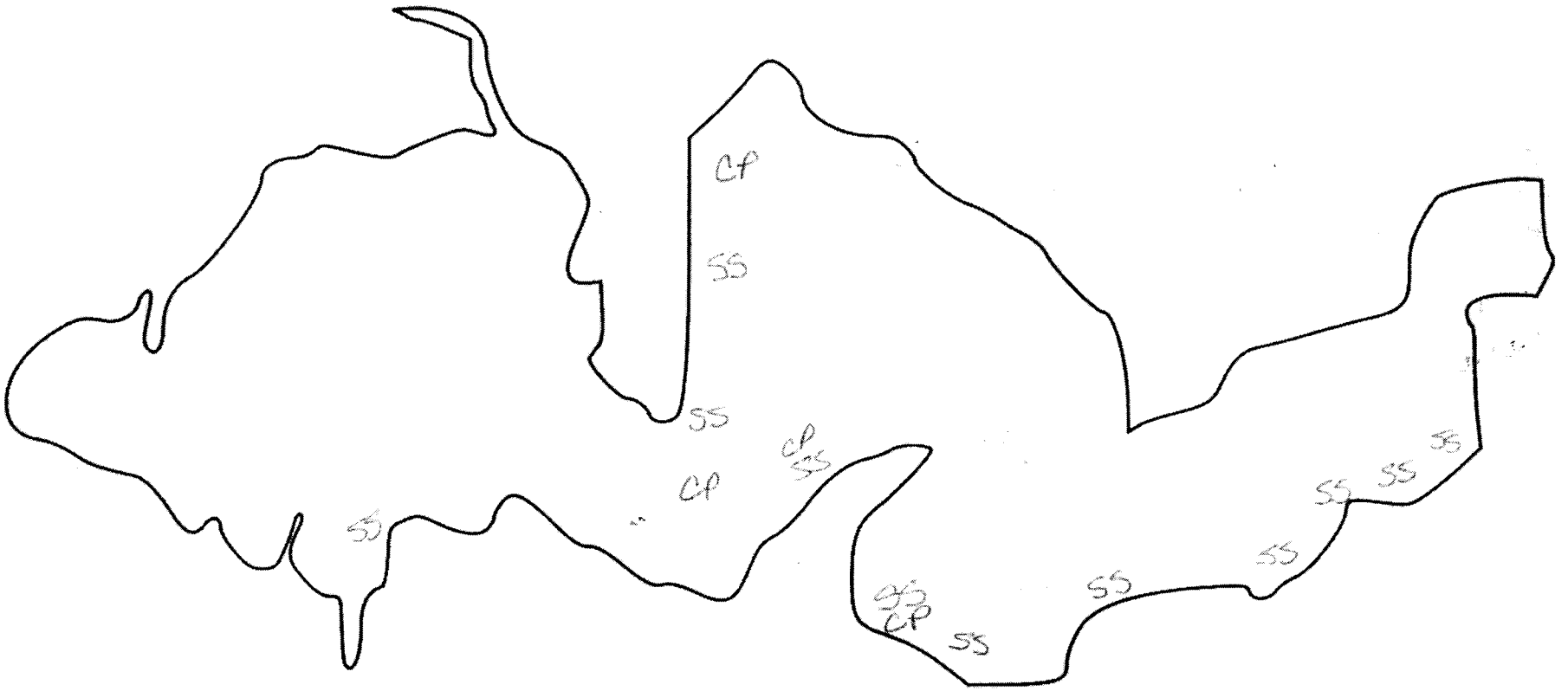
**Lakewide. Scale: 0 (absent) - 5 (dense)*

Visit the MiCorps Data Exchange (www.micorps.net) or contact the lead volunteer on your lake for more details on the survey, including sampling locations, maps, and abundance information, and for information on past surveys.

Trap set Locations



Invasives



SS = Starry Stonewort

CP = Curly Pondweed

2022

Plant name	Chara			
Density	Number of Observations	x Multiplication Factor	Total Density	Lakewide density rating
Found	14	1	14	
Sparse	5	2	10	
Moderate	6	3	18	2.5
Heavy	1	4	4	
Dense	24	5	120	
Total	50		166	

Plant name	Illinois Pondweed			
Density	Number of Observations	x Multiplication Factor	Total Density	
Found	16	1	16	
Sparse	10	2	20	
Moderate	6	3	18	1
Heavy	3	4	12	
Dense	0	5	0	
Total	35		66	

Plant name	Southern Naiad	Bushy Pondweed		
Density	Number of Observations	x Multiplication Factor	Total Density	
Found	7	1	7	
Sparse	6	2	12	
Moderate	5	3	15	0.7
Heavy	1	4	4	
Dense	2	5	10	
Total	21			

Plant name	Fries' Pondweed			
Density	Number of Observations	x Multiplication Factor	Total Density	
Found	10	1	10	
Sparse	4	2	8	
Moderate	2	3	6	0.4
Heavy	1	4	4	
Dense	0	5	0	
Total	17		28	

Plant name	Elodea			
Density	Number of Observations	x Multiplication Factor	Total Density	Lakewide density rating
Found	13	1	13	
Sparse	15	2	30	
Moderate	2	3	6	
Heavy	0	4	0	0.8
Dense	1	5	5	
Total	31		54	

Plant name	Starry Stonewort			
Density	Number of Observations	x Multiplication Factor	Total Density	Lakewide density rating
Found	4	1	4	
Sparse	7	2	14	
Moderate	0	3	0	0.4
Heavy	0	4	0	
Dense	2	5	10	
Total	13		28	

Plant name	Northern Milfoil			
Density	Number of Observations	x Multiplication Factor	Total Density	Lakewide density rating
Found	11	1	11	
Sparse	5	2	10	
Moderate	3	3	9	0.6
Heavy	0	4	0	
Dense	2	5	10	
Total	21		40	

Plant name	Coontail			
Density	Number of Observations	x Multiplication Factor	Total Density	Lakewide density rating
Found	5	1	5	
Sparse	1	2	2	
Moderate	0	3	0	0.1
Heavy	0	4	0	
Dense	0	5	0	
Total	6		7	

Plant name	Curly-leaf Pondweed

Density	Number of Observations	x Multiplication Factor	Total Density	Lakewide density rating
Found	2	1	2	
Sparse	0	2	0	
Moderate	1	3	3	0.15
Heavy	0	4	0	
Dense	1	5	5	
Total	4		10	

Plant name **Common Bladderwort**

Density	Number of Observations	x Multiplication Factor	Total Density	Lakewide density rating
Found	17	1	17	
Sparse	6	2	12	
Moderate	1	3	3	0.48
Heavy	0	4	0	
Dense	0	5	0	
Total	24		32	

Plant name **Flat-stemmed Pondweed**

Density	Number of Observations	x Multiplication Factor	Total Density	Lakewide density rating
Found	6	1	6	
Sparse	3	2	6	
Moderate	0	3	0	0.18
Heavy	0	4	0	
Dense	0	5	0	
Total	9		12	

Plant name **Sago Pondweed**

Density	Number of Observations	x Multiplication Factor	Total Density	Lakewide density rating
Found	6	1	6	
Sparse	2	2	4	
Moderate	3	3	9	0.29
Heavy	0	4	0	
Dense	0	5	0	
Total	11		19	

Plant name **Whorled Milfoil**

Lakewide

Density	Number of Observations	x Multiplication Factor	Total Density	density rating
Found	13	1	13	
Sparse	8	2	16	
Moderate	7	3	21	1.2
Heavy	7	4	28	
Dense	0	5	0	
Total	35		78	

Plant name **Variable Pondweed**

Density	Number of Observations	x Multiplication Factor	Total Density	Lakewide density rating
Found	3	1	3	
Sparse	1	2	2	
Moderate	0	3	0	0.08
Heavy	0	4	0	
Dense	0	5	0	
Total	5		5	

Plant name **Nitella**

Density	Number of Observations	x Multiplication Factor	Total Density	Lakewide density rating
Found	2	1	2	
Sparse	1	2	2	
Moderate	0	3	0	0.06
Heavy	0	4	0	
Dense	0	5	0	
Total	3		4	

Plant name **Slender Naiad**

Density	Number of Observations	x Multiplication Factor	Total Density	Lakewide density rating
Found	4	1	4	
Sparse	2	2	4	
Moderate	0	3	0	
Heavy	0	4	0	0.12
Dense	0	5	0	
Total	6		8	

Plant name **Clasping Pondweed**

Lakewide

Density	Number of Observations	x Multiplication Factor	Total Density	density rating
Found	3	1	3	
Sparse	1	2	2	
Moderate	0	3		0.08
Heavy	0	4		
Dense	0	5		
Total	4		8	

Plant name **Water Celery**

Density	Number of Observations	x Multiplication Factor	Total Density	Lakewide density rating
Found	3	1	3	
Sparse	1	2	2	
Moderate	1	3	3	0.12
Heavy	0	4	0	
Dense	0	5	0	
Total	5		8	

Plant name **Floating-leaf Spotted PW**

Density	Number of Observations	x Multiplication Factor	Total Density	Lakewide density rating
Found	3	1	3	
Sparse	0	2	0	
Moderate	0	3	0	0.05
Heavy	0	4	0	
Dense	0	5	0	
Total	3		3	

Plant name **Large Leaf Pondweed**

Density	Number of Observations	x Multiplication Factor	Total Density	Lakewide density rating
Found	1	1	1	
Sparse	1	2	2	
Moderate	0	3	0	0.05
Heavy	0	4	0	
Dense	0	5	9	
Total	2		3	

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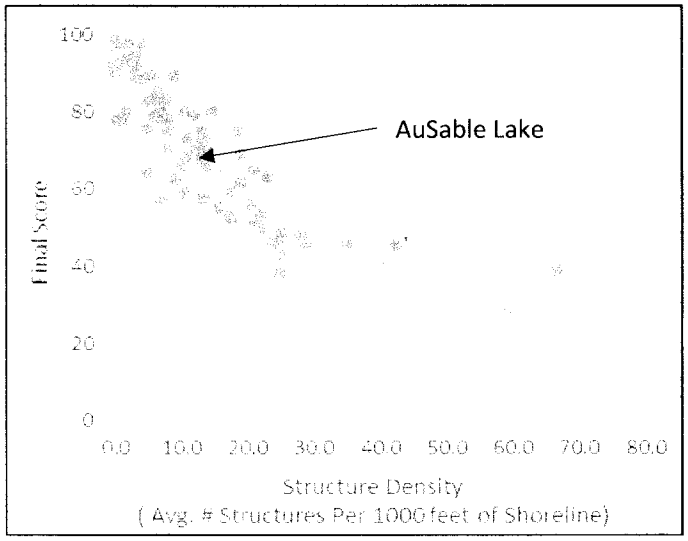
AuSable Lake, Ogemaw County
2021 Score the Shore Results

Cooperative Lakes Monitoring Program

The Score the Shore Habitat Assessment was conducted on AuSable Lake in 2021.

This assessment involves rating 1000 foot sections of shoreline for aquatic vegetation, shoreline vegetation, erosion, and erosion control practices (like sea walls). Each shoreline section is given three scores ranging from 0-100 for the categories of Littoral, Riparian, and Erosion Management. The three scores are averaged to produce a average section score. Then a total score is given to the entire lake by averaging all of the average section scores. A score of 0 indicates a shoreline that has been extremely disturbed by human impacts and no natural shoreline remains. A score of 100 indicates a shoreline that is nearly pristine.

How does your lake compare to others in the program?



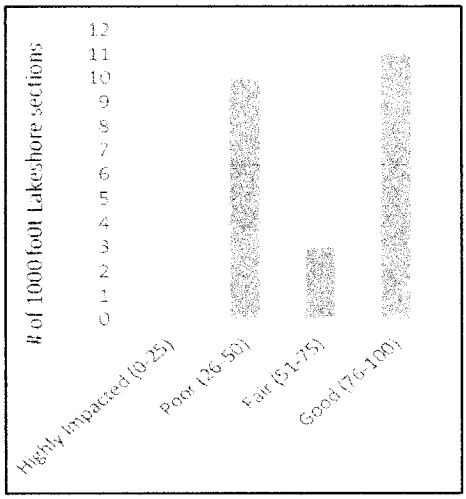
AuSable Lake	
Number of Sections:	24
Number of Structures:	335
Structure Density:	14
Final Score:	66

All 78 Participating Lakes from 2015-2021:	
Avg. Number of Sections:	16
Avg. Number of Structures:	214
Avg. Structure Density:	12.2
Avg. Final Score:	72

Note about graph to the left: The dotted line sets your average expectation of the score of your lake. If your lake is lower than the dotted line, then your shoreline health is lower than average compared to *lakes with similar amount of shoreline development*. And vice-versa in regards to a lake above the dotted line.

Analysis specific to AuSable Lake:

Overall, the lakeshore habitat of AuSable Lake is average when compared to the other lakes in the program. The breakdown of scores is interesting in AuSable Lake because about half of the sections are rated Poor and half are rated Good. (Poor:10, Fair: 1, Good: 11).



Looking at the Poor rated sections only, we see that the average scores for the three shoreline categories are Littoral Zone: 49, Riparian Zone: 21, Erosion Control: 54. Therefore it is the poor habitat of the Riparian zone that is most contributing to pulling down the habitat of AuSable Lake and reducing the overall score.

Reduce the amount of mowed grass and increase the amount of unmowed native vegetation along the lakeshore to boost the Riparian Scores. You can get plenty of ideas for improving shoreline health from the Michigan Natural Shoreline Partnership (https://www.mishorelinepartnership.org/).

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Au Sable Lake, Ogemaw County
2021 Exotic Aquatic Plant Watch Results

Cooperative Lakes Monitoring Program

The Exotic Aquatic Plant Watch was conducted on Au Sable Lake in 2021.

This survey involves sampling at multiple locations around the lake to detect new invaders, and document the extent of known invaders. While notes on other plant species may be recorded during the survey, the effort focuses on five highly invasive species: Eurasian watermilfoil (*Myriophyllum spicatum*), starry stonewort (*Nitellopsis obtusa*), curly-leaf pondweed (*Potamogeton crispus*), European Frogbit (*Hydrocharis morsus-ranae*), and Hydrilla (*Hydrilla verticillata*).

The table below summarizes the results of the 2021 Exotic Aquatic Plant Watch.

Au Sable Lake, Ogemaw County

2021 Exotic Aquatic Plant Watch Results

Survey Date(s): 6/16, 6/18, 6/20, 7/19, 7/29, 8/9, 8/15, 8/29

Species	Status	Comments
Eurasian watermilfoil	FOUND	Possibly found; hybrid milfoil reported but identification uncertain.
Starry stonewort	not found	
Curly-leaf pondweed	FOUND	
European Frogbit	not found	
Hydrilla	not found	

Visit the MiCorps Data Exchange (https://micorps.net) or contact the lead volunteer on your lake for more details on the survey, including sampling locations, maps, and abundance information, and for information on past surveys.