



2023 Data Report for

Au Sable Lake, Ogemaw County

Site ID: 650052

44.4293°N, 83.9151°W

The CLMP is brought to you by:



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:

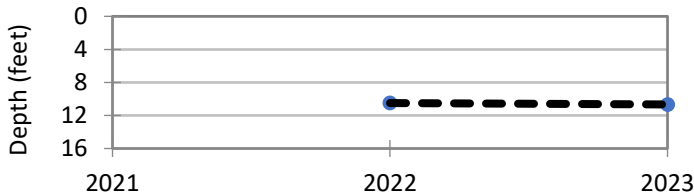
Paul Steen (psteen@hrwc.org), CLMP Data Analyst

Au Sable Lake, Ogemaw County 2023 CLMP Results



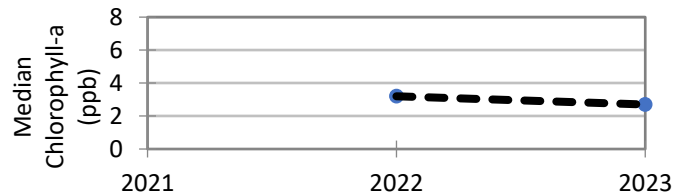
Secchi Disk Transparency (feet)

Year	# Readings	Min	Max	Average	Std. Dev	Carlson TSI
2023	12	8.5	12.0	10.7	1.2	43
2022	8	9.5	13.0	10.5	1.2	43
2023 All CLMP Lakes	2825	0.5	51.0	12.2	2.7	43



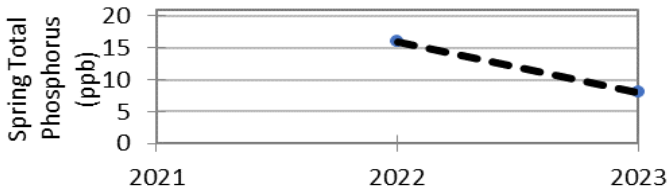
Chlorophyll-a (parts per billion)

Year	# Samples	Min	Max	Median	Std. Dev	Carlson TSI
2023	5	2.0	3.9	2.7	0.8	40
2022	5	1.2	3.3	3.2	1.0	42
2023 All CLMP Lakes	687	< 1.0	43.0	3.7	5.3	43



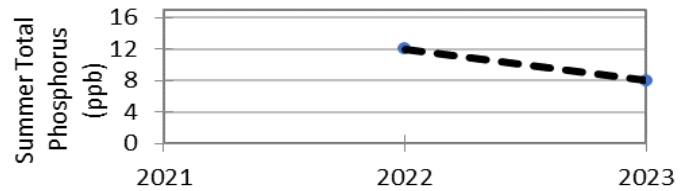
Spring Phosphorus (parts per billion)

Year	# Samples	Min	Max	Average	Std. Dev	Carlson TSI
2023	1	8.0	8.0	8.0	NA	NA
2022	1	16.0	16.0	16.0	NA	NA
2023 All CLMP Lakes	220	<5	220.0	20.7	21.3	NA



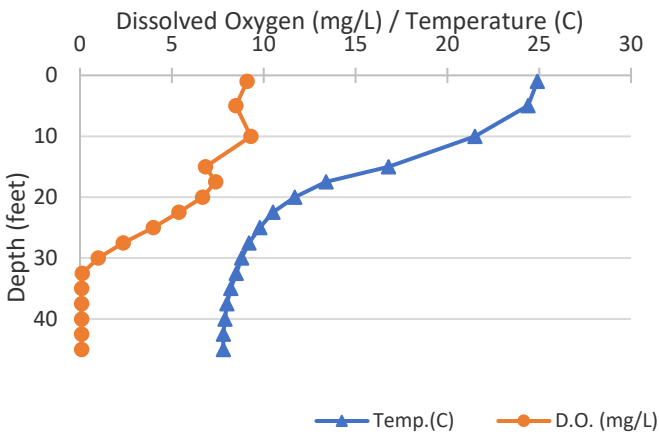
Summer Phosphorus (parts per billion)

Year	# Samples	Min	Max	Average	Std. Dev	Carlson TSI
2023	1	8.0	8.0	8.0	NA	34
2022	1	12.0	12.0	12.0	NA	40
2023 All CLMP Lakes	234	<= 3	150.0	17.4	15.3	45



Dissolved Oxygen and Temperature Profile

6/24/23



Summary

	2023	2022
Average TSI		
Au Sable Lake	39	42
All CLMP Lakes	44	44

With an average TSI score of 39 based on 2023 Secchi transparency, chlorophyll-a, and summer total phosphorus data, this lake is rated between the oligotrophic and mesotrophic classification.

The lake keeps some dissolved oxygen in the bottom waters through spring, but by early summer the lake has stratified and the bottom water is devoid of oxygen.

Welcome back to the CLMP! The longer you stay in the program and the more parameters you monitor, the more interesting this report will become. For now, there is too little data to assess long term trends. CLMP recommends eight years of consistent monitoring in order to develop a strong data baseline.

* = 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.

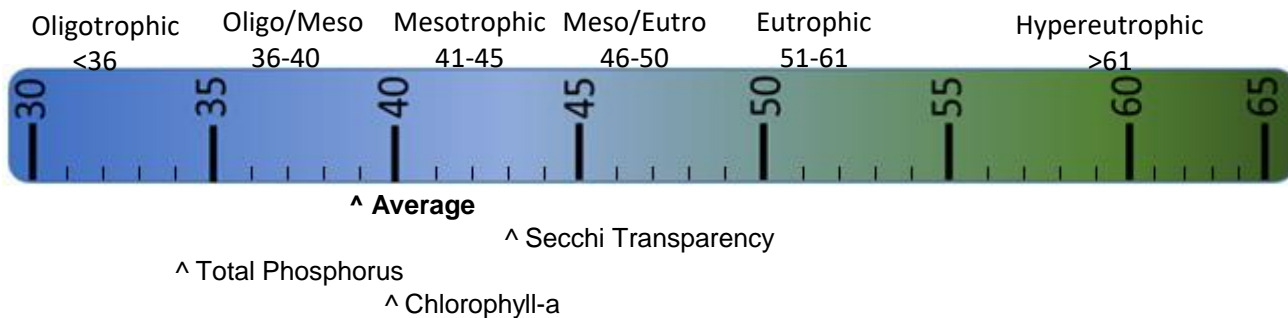
The tables below give the results-to-TSI conversions for the water quality data ranges normally seen in the CLMP. The formulas for this conversion can be found in the CLMP manual (link is on page 2 of this report).

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 2023	
Average	39
Secchi Disk	43
Summer TP	34
Chlorophyll-a	40



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 eutrophic lakes. These lakes exhibit extremely high productivity, such as nuisance algae and weed growth.

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

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

*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.

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



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		
<u>Species</u>	<u>Status</u>	<u>Comments</u>
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.

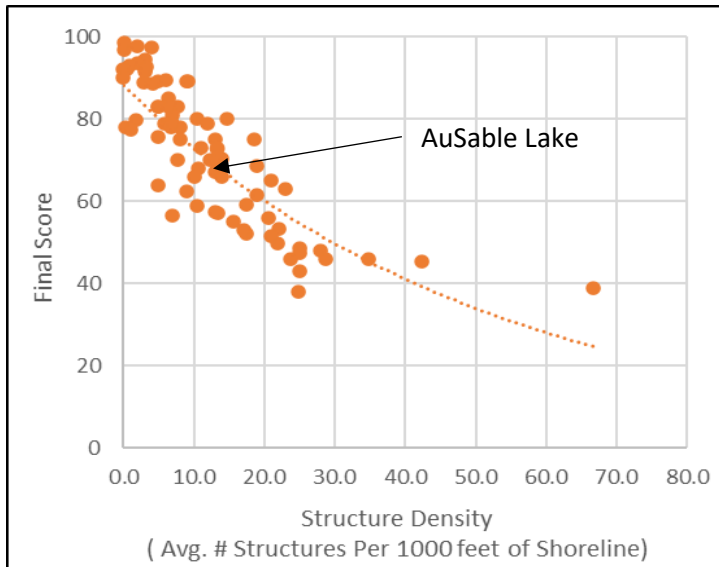
AuSable Lake, Ogemaw County 2021 Score the Shore Results



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

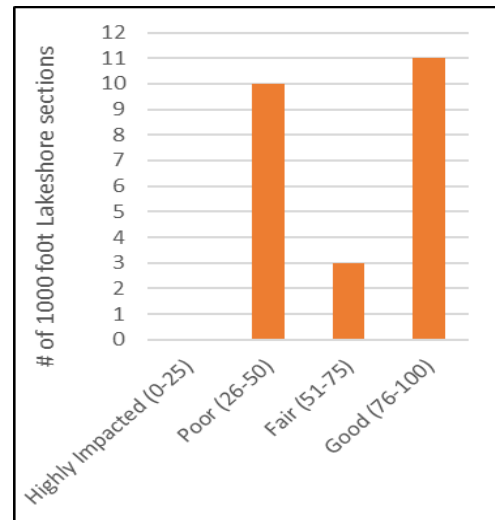
Note about graph to the left: The dotted line sets your average expectation of the score of your lake. If your lake is lower than the dotted line, then your shoreline health is lower than average compared to lakes with similar amount of shoreline development. And vice-versa in regards to a lake above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

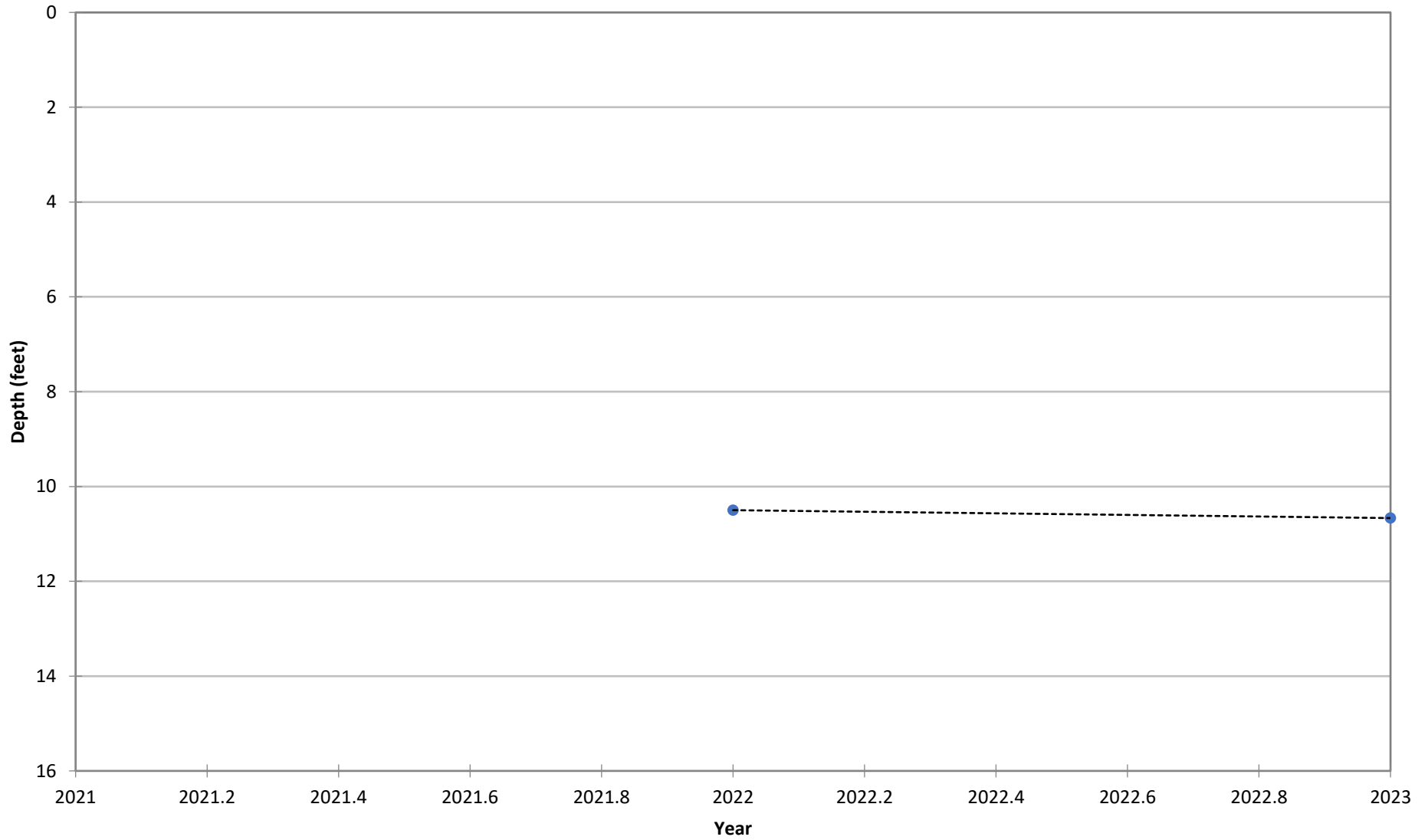
Looking at the Poor rated sections only, we see that the average scores for the three shoreline categories are Littoral Zone: 49, Riparian Zone: 21, Erosion Control: 54. Therefore it is the poor habitat of the Riparian zone that is most contributing to pulling down the habitat of AuSable Lake and reducing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



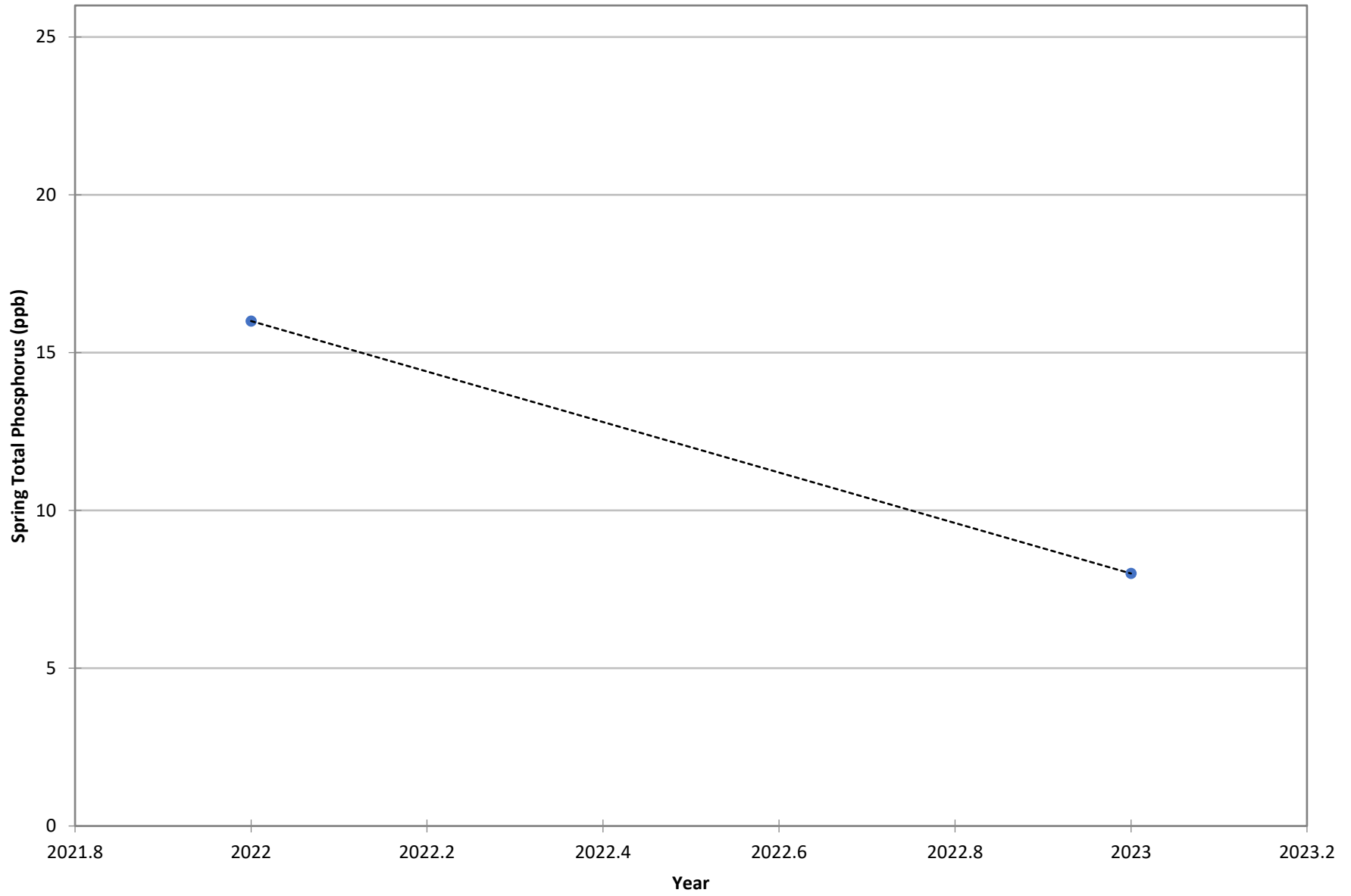
COOPERATIVE LAKES MONITORING PROGRAM
SUMMER MEAN TRANSPARENCY

Au Sable Lake (Ogemaw Co.), 650052



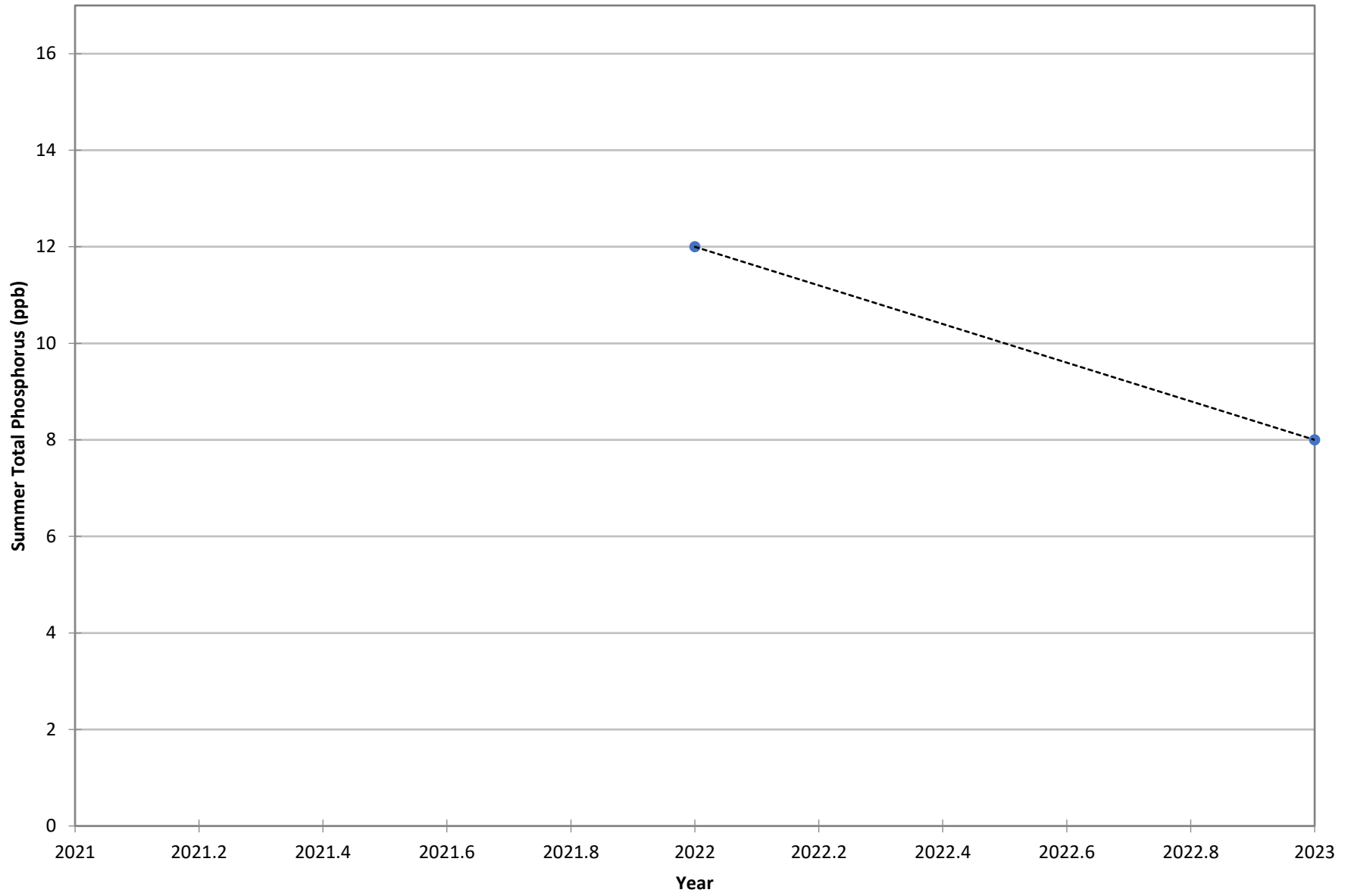
COOPERATIVE LAKES MONITORING PROGRAM
SPRING TOTAL PHOSPHORUS

Au Sable Lake (Ogemaw Co.), 650052



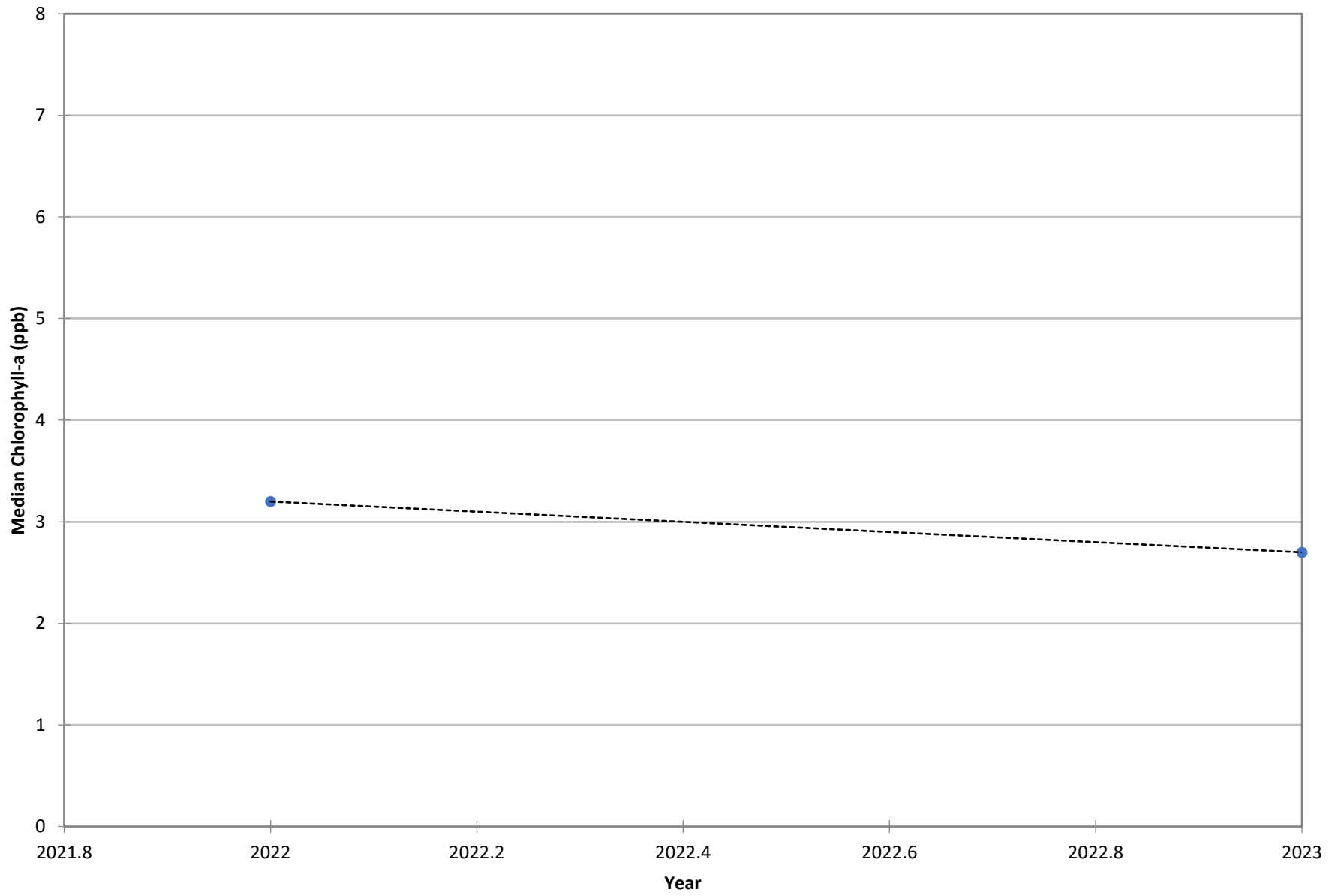
COOPERATIVE LAKES MONITORING PROGRAM
SUMMER TOTAL PHOSPHORUS

Au Sable Lake (Ogemaw Co.), 650052



COOPERATIVE LAKES MONITORING PROGRAM
SUMMER MEDIAN CHLOROPHYLL-A

Au Sable Lake (Ogemaw Co.), 650052



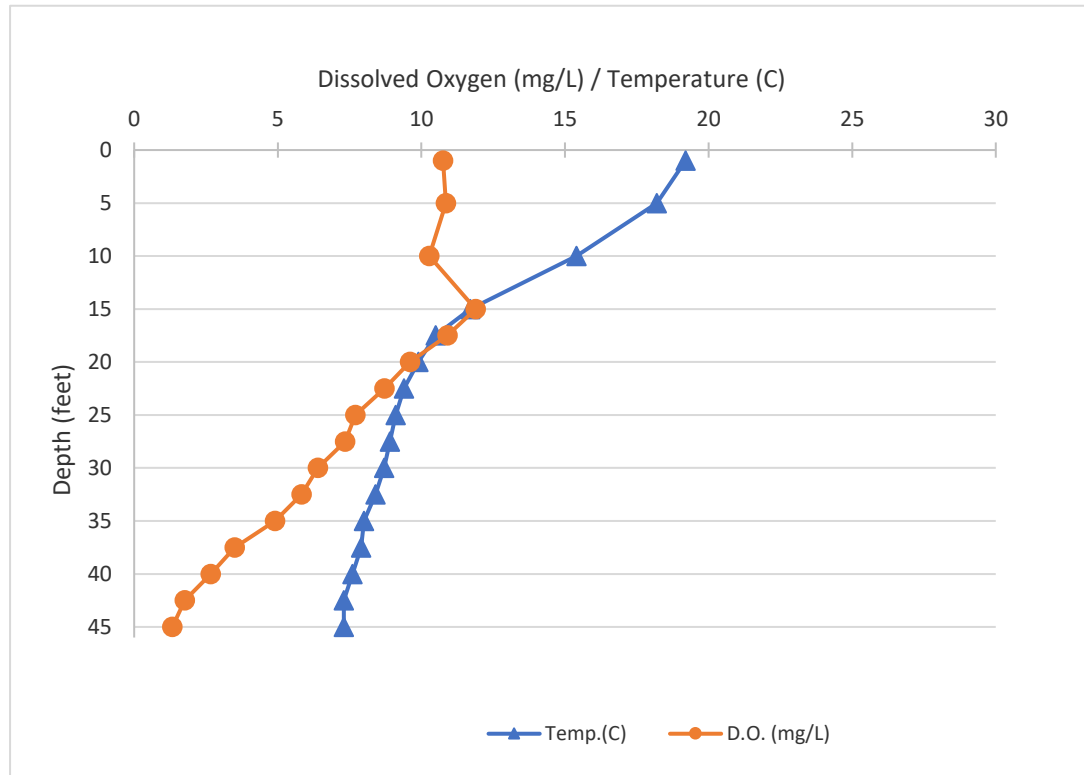
Name: Au Sable Lake
 County: Ogemaw
 Site ID: 650052
 Date: 5/23/2023

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	19.2	10.75
5	18.2	10.85
10	15.4	10.27
15	11.7	11.89
17.5	10.5	10.91
20	9.9	9.61
22.5	9.4	8.72
25	9.1	7.7
27.5	8.9	7.35
30	8.7	6.4
32.5	8.4	5.83
35	8	4.9
37.5	7.9	3.5
40	7.6	2.66
42.5	7.3	1.76
45	7.3	1.33

Lake: Au Sable Lake (Ogemaw Co.)

5/23/2023



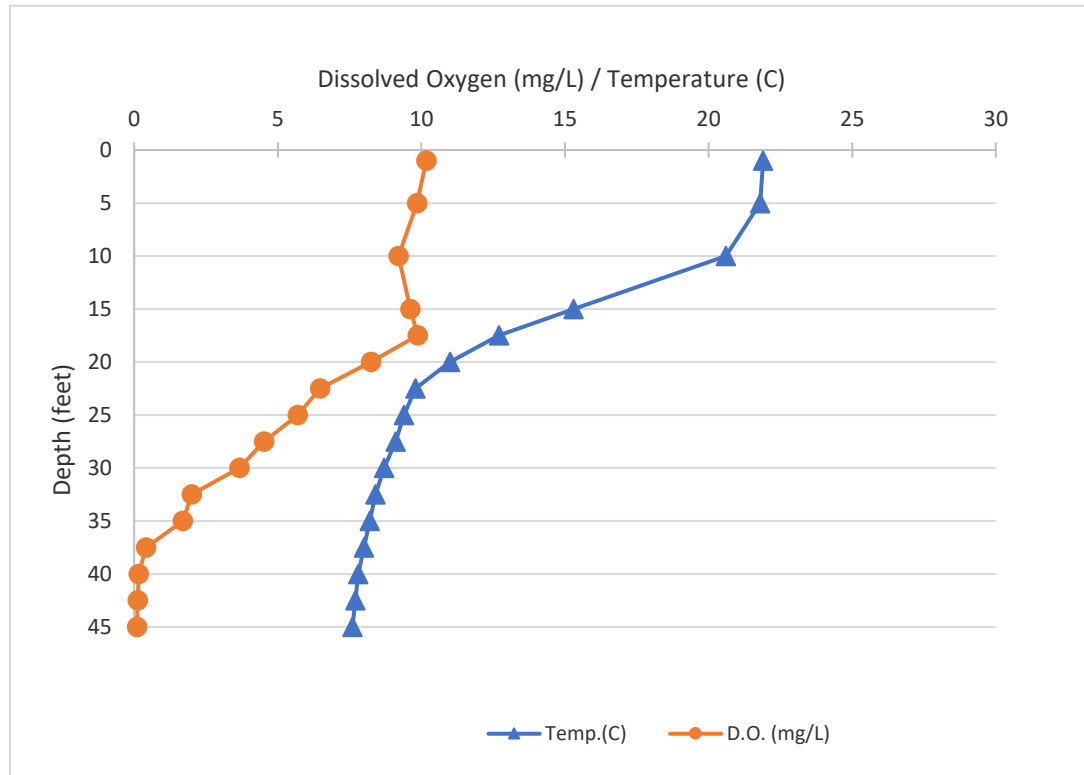
Name: Au Sable Lake
 County: Ogemaw
 Site ID: 650052
 Date: 6/10/2023

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	21.9	10.17
5	21.8	9.85
10	20.6	9.2
15	15.3	9.62
17.5	12.7	9.87
20	11	8.25
22.5	9.8	6.48
25	9.4	5.7
27.5	9.1	4.53
30	8.7	3.67
32.5	8.4	2.01
35	8.2	1.7
37.5	8	0.41
40	7.8	0.16
42.5	7.7	0.13
45	7.6	0.1

Lake: Au Sable Lake (Ogemaw Co.)

6/10/2023



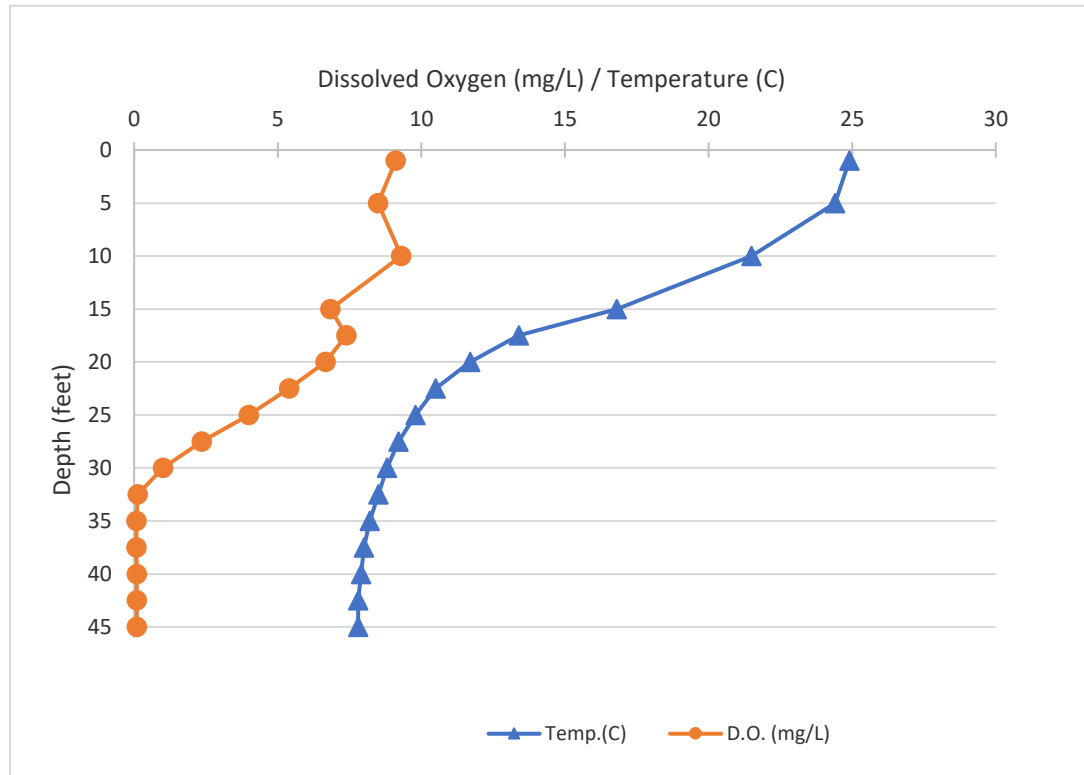
Name: Au Sable Lake
 County: Ogemaw
 Site ID: 650052
 Date: 6/24/2023

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	24.9	9.1
5	24.4	8.49
10	21.5	9.3
15	16.8	6.83
17.5	13.4	7.39
20	11.7	6.67
22.5	10.5	5.39
25	9.8	3.99
27.5	9.2	2.35
30	8.8	1
32.5	8.5	0.12
35	8.2	0.08
37.5	8	0.08
40	7.9	0.09
42.5	7.8	0.09
45	7.8	0.09

Lake: Au Sable Lake (Ogemaw Co.)

6/24/2023



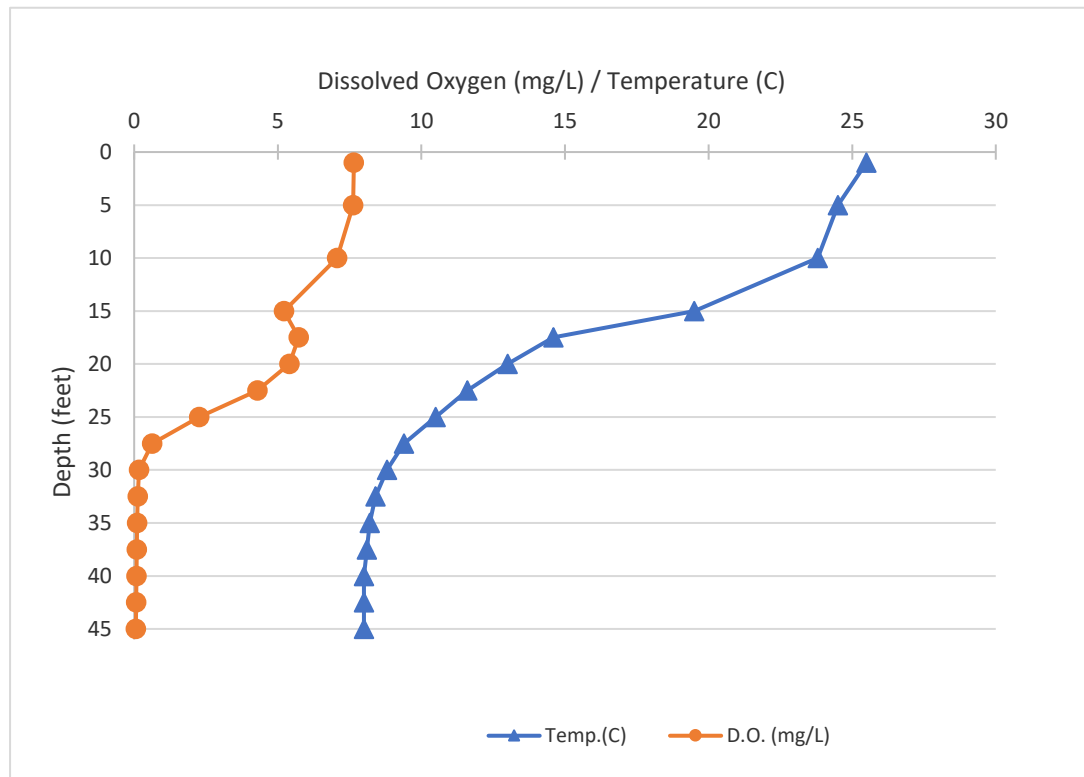
Name: Au Sable Lake
 County: Ogemaw
 Site ID: 650052
 Date: 7/7/2023

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	25.5	7.65
5	24.5	7.62
10	23.8	7.07
15	19.5	5.22
17.5	14.6	5.73
20	13	5.41
22.5	11.6	4.29
25	10.5	2.26
27.5	9.4	0.63
30	8.8	0.17
32.5	8.4	0.13
35	8.2	0.1
37.5	8.1	0.09
40	8	0.08
42.5	8	0.07
45	8	0.06

Lake: Au Sable Lake (Ogemaw Co.)

7/7/2023



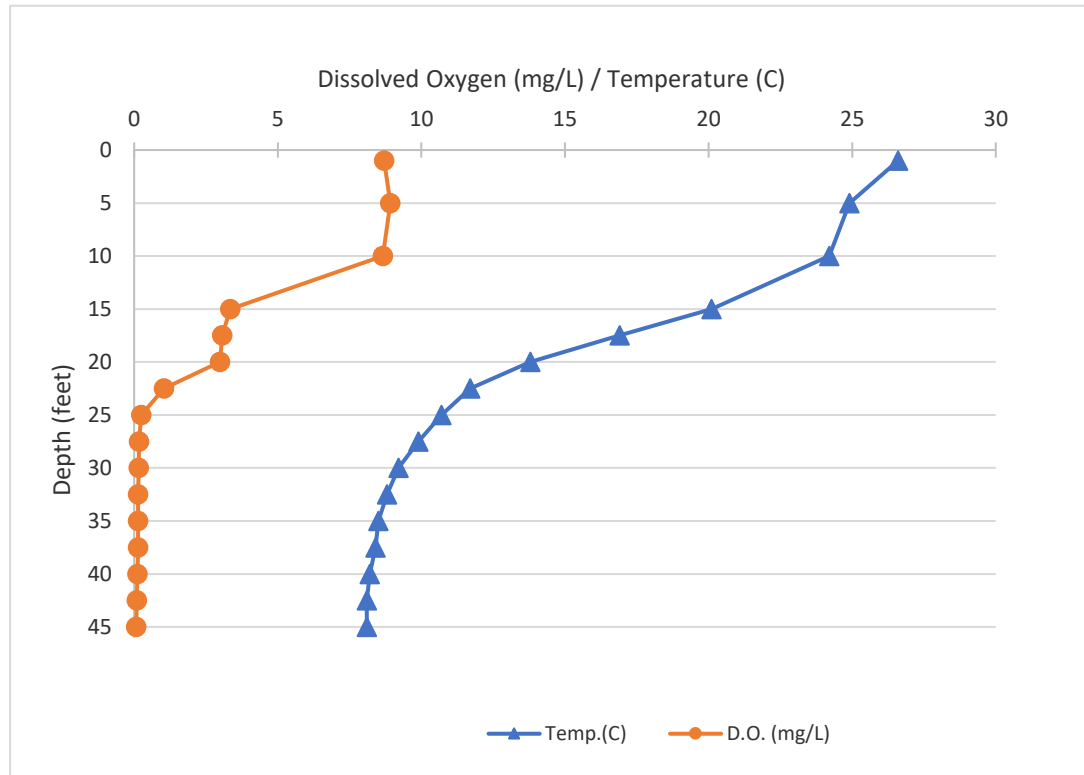
Name: Au Sable Lake
 County: Ogemaw
 Site ID: 650052
 Date: 7/24/2023

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	26.6	8.7
5	24.9	8.92
10	24.2	8.66
15	20.1	3.34
17.5	16.9	3.07
20	13.8	2.99
22.5	11.7	1.04
25	10.7	0.25
27.5	9.9	0.17
30	9.2	0.16
32.5	8.8	0.14
35	8.5	0.14
37.5	8.4	0.14
40	8.2	0.11
42.5	8.1	0.09
45	8.1	0.07

Lake: Au Sable Lake (Ogemaw Co.)

7/24/2023



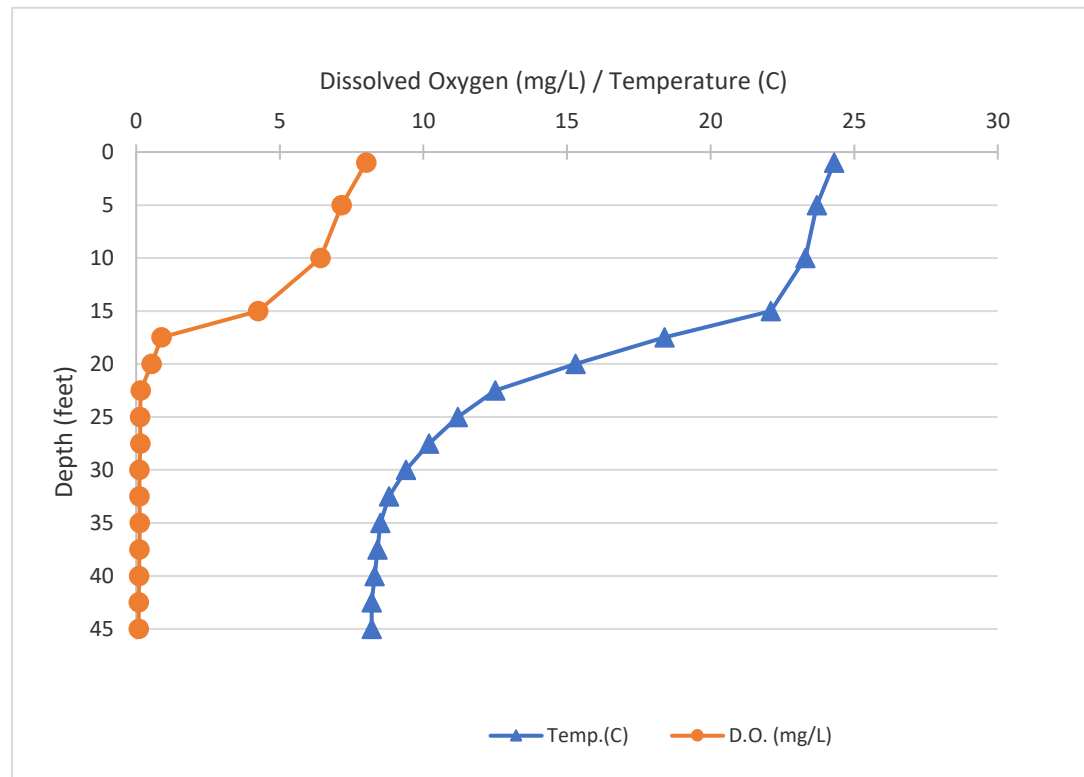
Name: Au Sable Lake
 County: Ogemaw
 Site ID: 650052
 Date: 8/8/2023

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	24.3	8.01
5	23.7	7.15
10	23.3	6.42
15	22.1	4.25
17.5	18.4	0.88
20	15.3	0.54
22.5	12.5	0.16
25	11.2	0.14
27.5	10.2	0.15
30	9.4	0.11
32.5	8.8	0.11
35	8.5	0.12
37.5	8.4	0.11
40	8.3	0.1
42.5	8.2	0.09
45	8.2	0.09

Lake: Au Sable Lake (Ogemaw Co.)

8/8/2023



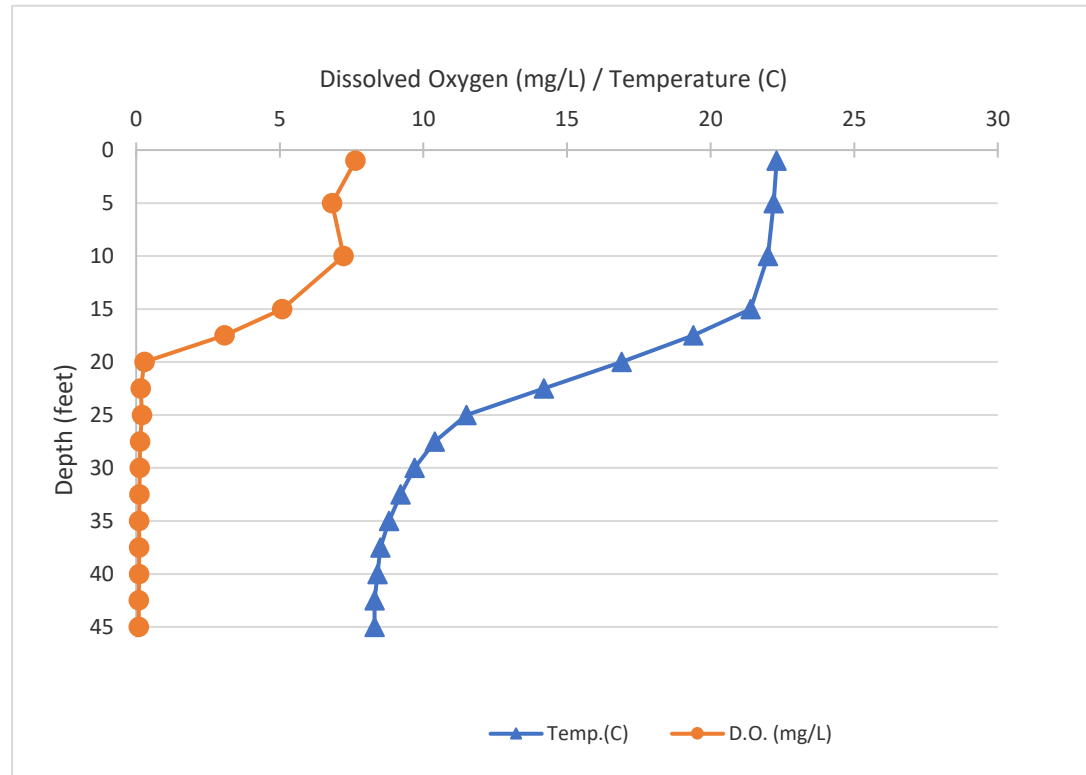
Name: Au Sable Lake
 County: Ogemaw
 Site ID: 650052
 Date: 8/20/2023

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	22.3	7.64
5	22.2	6.82
10	22	7.22
15	21.4	5.08
17.5	19.4	3.08
20	16.9	0.29
22.5	14.2	0.16
25	11.5	0.2
27.5	10.4	0.14
30	9.7	0.12
32.5	9.2	0.11
35	8.8	0.1
37.5	8.5	0.1
40	8.4	0.1
42.5	8.3	0.09
45	8.3	0.09

Lake: Au Sable Lake (Ogemaw Co.)

8/20/2023



Name: Au Sable Lake
County: Ogemaw
Site ID: 650052
Date: 9/9/2023

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	21.4	7.2
5	21.2	7.5
10	20.9	6.76
15	20.5	4.68
17.5	19.4	3.09
20	17.5	0.29
22.5	15.2	0.17
25	12.9	0.15
27.5	11.2	0.13
30	9.9	0.13
32.5	9.2	0.13
35	8.9	0.12
37.5	8.6	0.12
40	8.5	0.11
42.5	8.4	0.15
45	8.3	0.14

Lake: Au Sable Lake (Ogemaw Co.)

9/9/2023

