



2023 Data Report for

Avery Lake, Montmorency County

Site ID: 600023

44.9356°N, 84.1833°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:

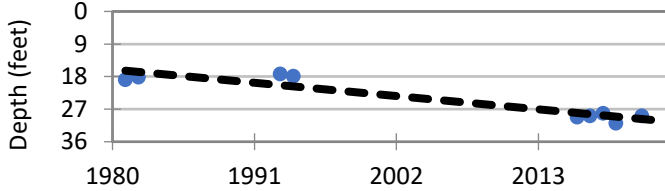
Paul Steen (psteen@hrwc.org), CLMP Data Analyst

Avery Lake, Montmorency County 2023 CLMP Results



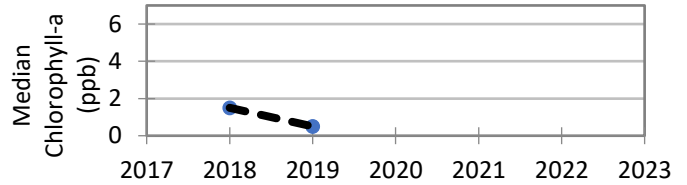
Secchi Disk Transparency (feet)

Year	# Readings	Min	Max	Average	Std. Dev	Carlson TSI
2022	6*	24.0	40.0			
2017-2021	63	19.5	44.0	29.2	6.7	28
1981-2016	81	11.0	41.0	20.3	4.8	34
2023 All CLMP Lakes	2825	0.5	51.0	12.2	2.7	43



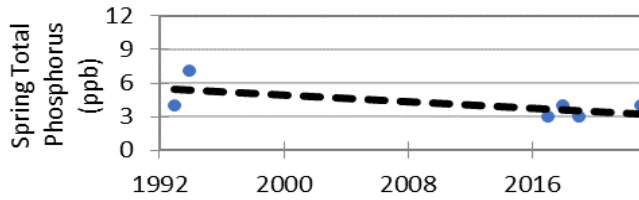
Chlorophyll-a (parts per billion)

Year	# Samples	Min	Max	Median	Std. Dev	Carlson TSI
2023	3*	<1.0	1.6			
2018-2022	5	<1.0	1.6	1.5	0.6	35
2017	2	<1.0	<1.0	1.5		
2023 All CLMP Lakes	687	< 1.0	43.0	3.7	5.3	43



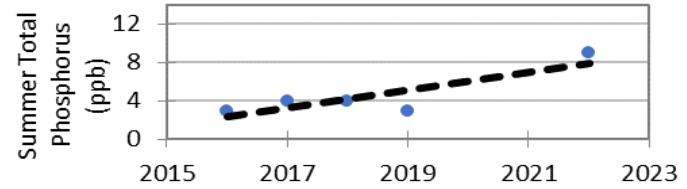
Spring Phosphorus (parts per billion)

Year	# Samples	Min	Max	Average	Std. Dev	Carlson TSI
2023	1	<5 T	<5 T	<5 T	NA	
2018-2022	2	<=3 W	<5 T	3.5	0.7	
1993-2017	3	<=3 W	7.0	4.7	2.1	
2023 All CLMP Lakes	220	<5	220.0	20.7	21.3	

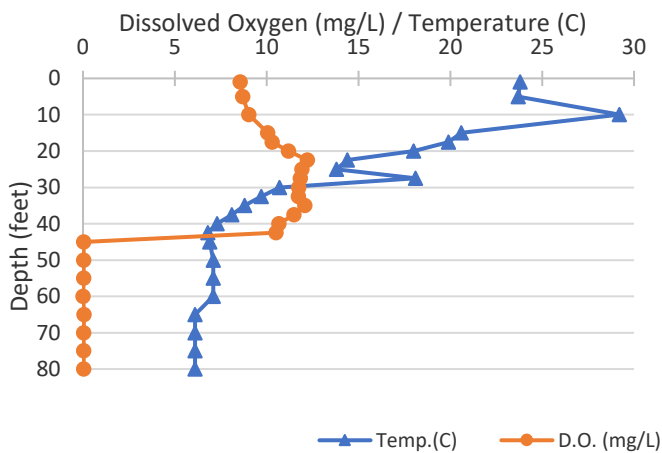


Summer Phosphorus (parts per billion)

Year	# Samples	Min	Max	Average	Std. Dev	Carlson TSI
2022	1	9.0	9.0	9.0	NA	36
2017-2021	3	<=3 W	<5 T	3.7	0.6	27
2016-2016	1	<=3 W	<=3 W	<=3 W	NA	27
2023 All CLMP Lakes	234	<= 3	150.0	17.4	15.3	45



Dissolved Oxygen and Temperature Profile 6/26/23



Summary

	2023	2018-2022	1981-2017
Average TSI			
Avery Lake	NA	29	32
All CLMP Lakes	44	41	42

Data collection was largely missing in 2023, so it is not possible to rank the lake this year.

The available monitoring data indicates that this lake is stratified by mid-summer, at which time the bottom waters are devoid of oxygen. More data is required to establish the point at which stratification begins during the monitoring season.

Reminder: 8 Secchi measurements and 4 chlorophyll are required in order to use these parameters 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.

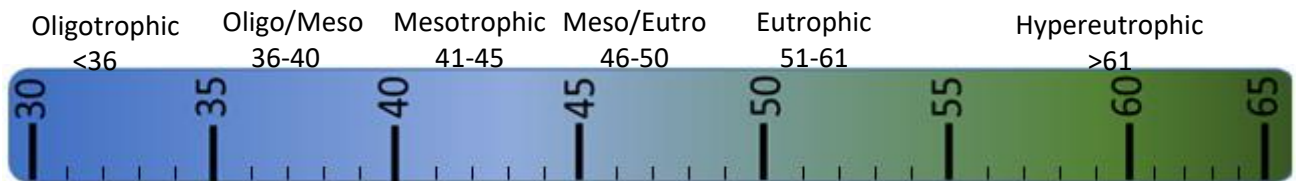
The tables below give the results-to-TSI conversions for the water quality data ranges normally seen in the CLMP. The formulas for this conversion can be found in the CLMP manual (link is on page 2 of this report).

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 Avery Lake in 2023	
Average	NA
Secchi Disk	
Summer TP	
Chlorophyll-a	



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.

Avery Lake, Montmorency County 2022 Exotic Aquatic Plant Watch Results



The Exotic Aquatic Plant Watch was conducted on Avery Lake in 2022.

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 2022 Exotic Aquatic Plant Watch on Avery Lake.

Avery Lake, Montmorency County		
2022 Exotic Aquatic Plant Watch Results		
Survey Date(s): September 5		
<u>Species</u>	<u>Status</u>	<u>Comments</u>
Eurasian watermilfoil	not found	No invasive plants were found in the 5 transects surveyed.
Starry stonewort	not found	
Curly-leaf pondweed	not 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.

Avery Lake, Montmorency County 2021 Exotic Aquatic Plant Watch Results



The Exotic Aquatic Plant Watch was conducted on Avery 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.

Avery Lake, Montmorency County		
2021 Exotic Aquatic Plant Watch Results		
Survey Date: September 5		
<u>Species</u>	<u>Status</u>	<u>Comments</u>
Eurasian watermilfoil	not found	
Starry stonewort	not found	
Curly-leaf pondweed	not 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.

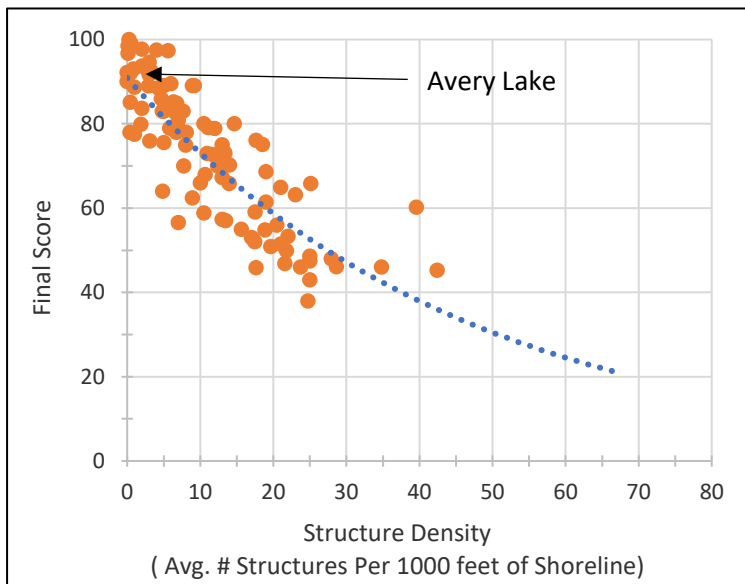
Avery Lake, Montmorency County 2022 Score the Shore Results



The Score the Shore Habitat Assessment was conducted on Avery Lake in 2022.

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?



Avery Lake	
Number of Sections:	20
Number of Structures:	93
Structure Density:	4.65
Final Score:	86

All 97 Participating Lakes from 2015-2023:	
Avg. Number of Sections:	16
Avg. Number of Structures:	228
Avg. Structure Density:	12
Avg. Final Score:	73

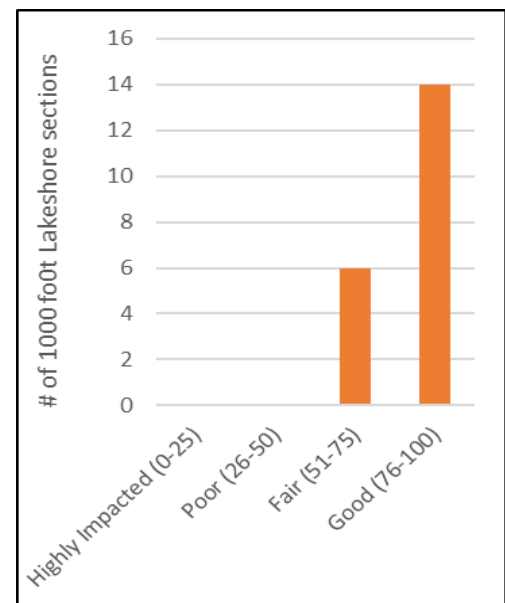
Note about graph to the left: The dotted line sets your average expectation of the score of your lake. If your lake is lower than the dotted line, then your shoreline health is lower than average compared to lakes with similar amount of shoreline development. And vice-versa in regards to a lake above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

Analysis specific to Avery Lake:

Overall, the lakeshore habitat of Avery Lake scored lower than average when compared to other lakes in the program. All of the 1000 foot sections scored either Fair or Good: 6 Fair and 14 Good.

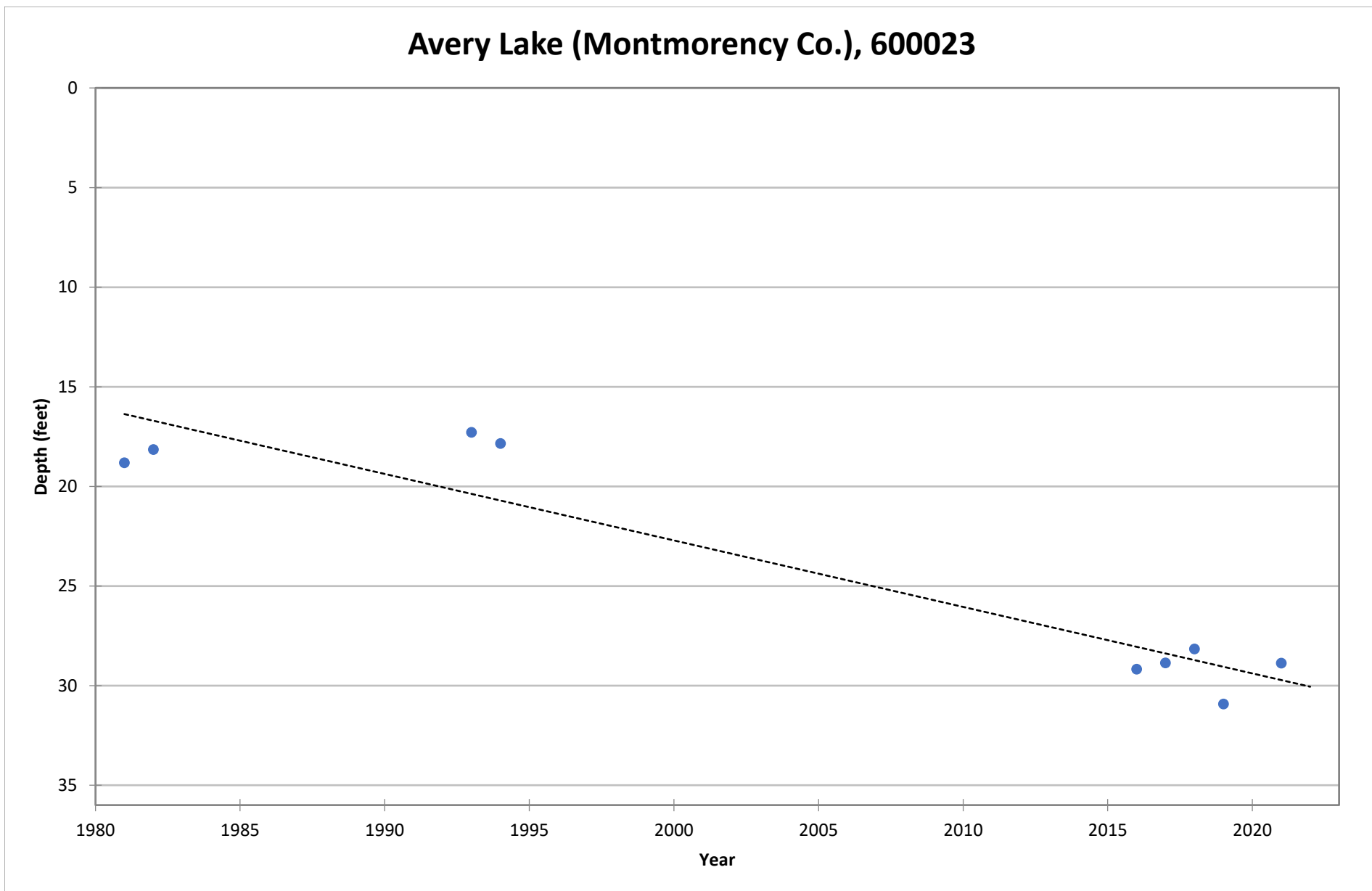
All three of the scoring categories came out approximately the same on Avery Lake (Average scores: Littoral 86, Riparian 81, Erosion Control 90) This means that there is no particular strength to the habitat on Avery Lake; but rather all components of habitat are quite healthy.

So on average, habitat is quite good on Avery. However, there are certain sections that are quite a bit worse than others, in particular for Riparian habitat (sections 11,12, and 15 all scored Poor for Riparian). Reduce the amount of mowed grass and increase the amount of unmowed native vegetation along the lakeshore to boost this aspect of the shoreline habitat. You can get plenty of ideas for improving shoreline health from the Michigan Natural Shoreline Partnership (<https://www.shorelinepartnership.org/>).



COOPERATIVE LAKES MONITORING PROGRAM
SUMMER MEAN TRANSPARENCY

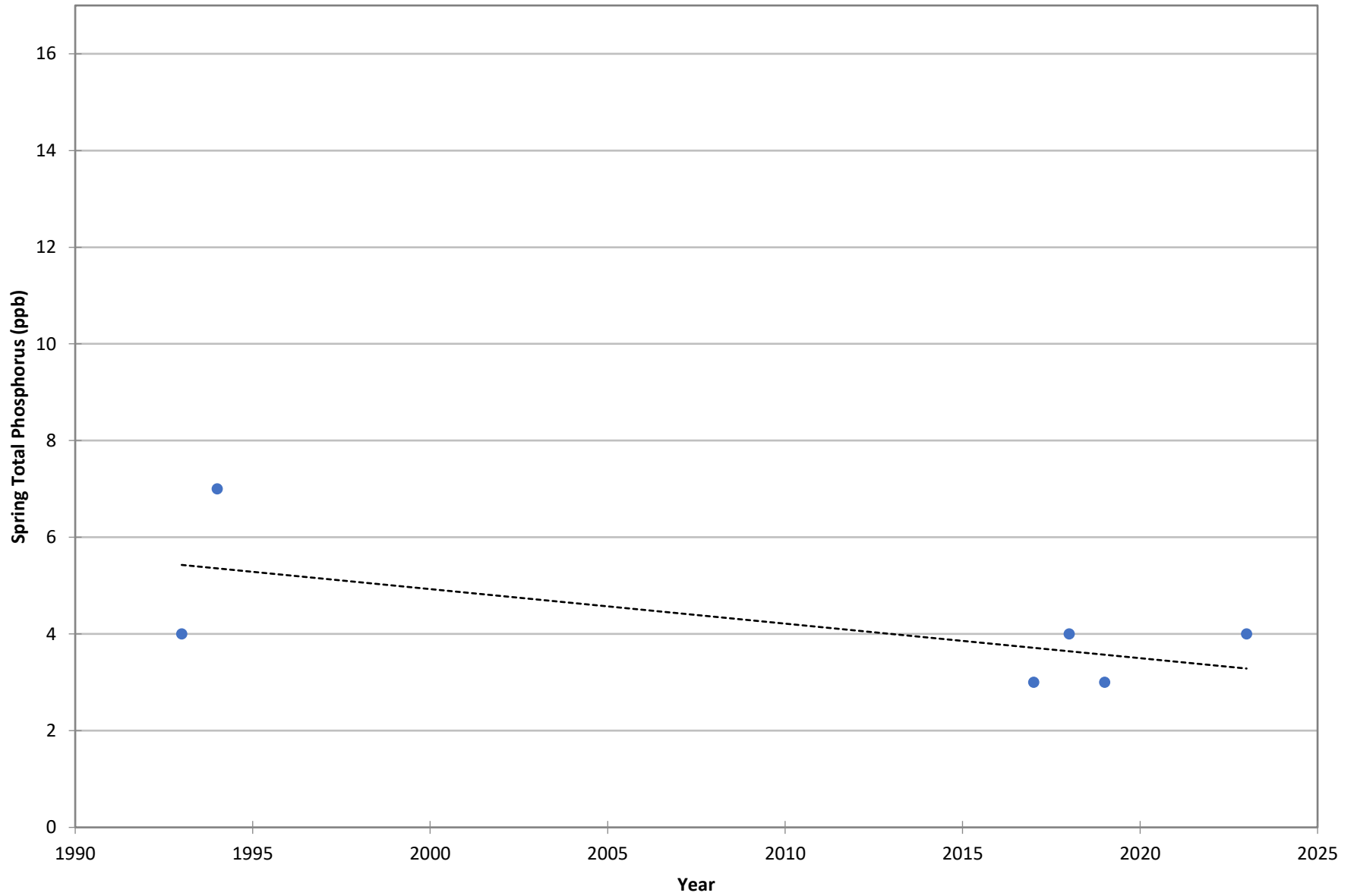
Avery Lake (Montmorency Co.), 600023



Vertical bars indicate standard deviation

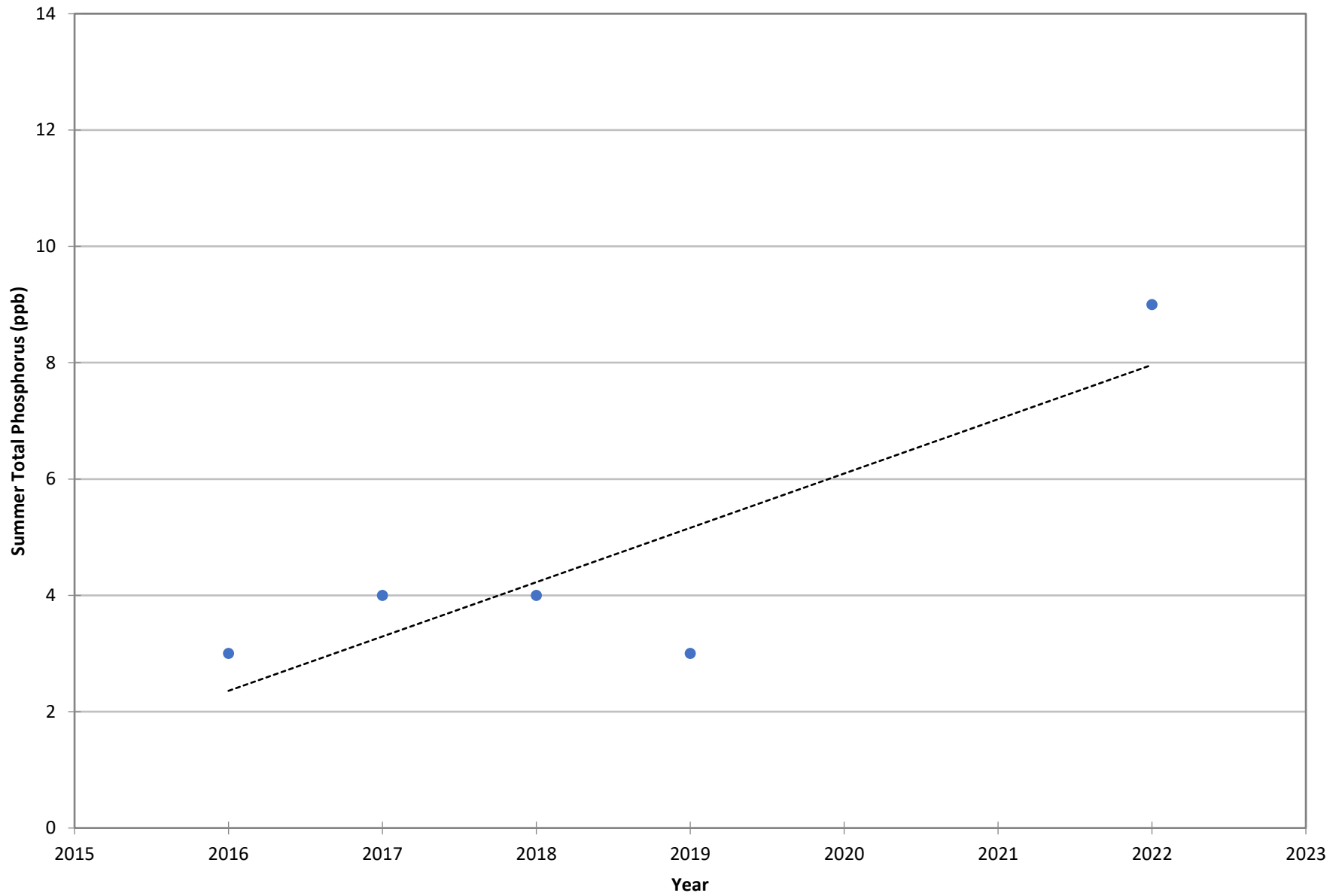
COOPERATIVE LAKES MONITORING PROGRAM
SPRING TOTAL PHOSPHORUS

Avery Lake (Montmorency Co.), 600023



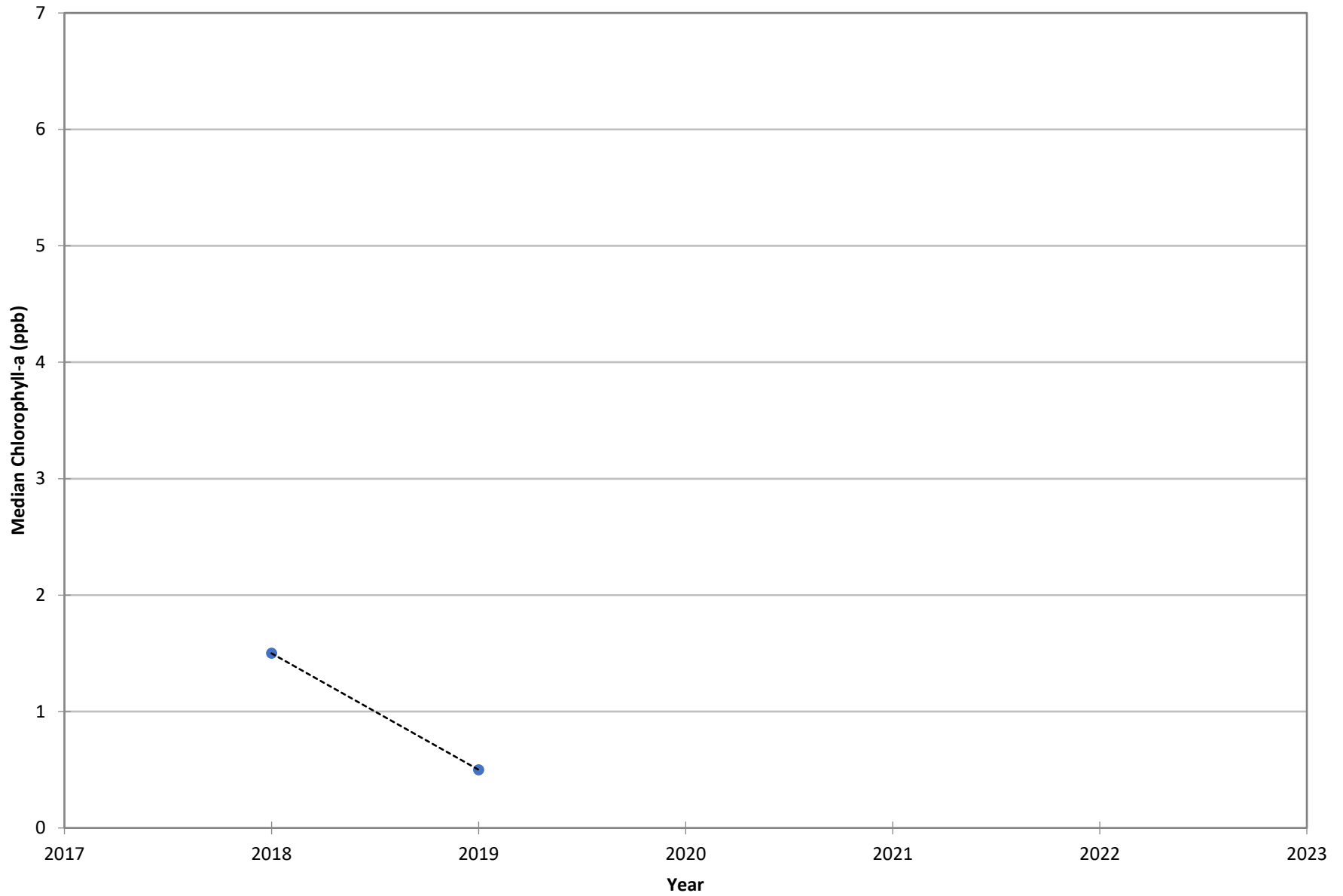
COOPERATIVE LAKES MONITORING PROGRAM
SUMMER TOTAL PHOSPHORUS

Avery Lake (Montmorency Co.), 600023



COOPERATIVE LAKES MONITORING PROGRAM
SUMMER MEDIAN CHLOROPHYLL-A

Avery Lake (Montmorency Co.), 600023



Vertical bars indicate standard deviation

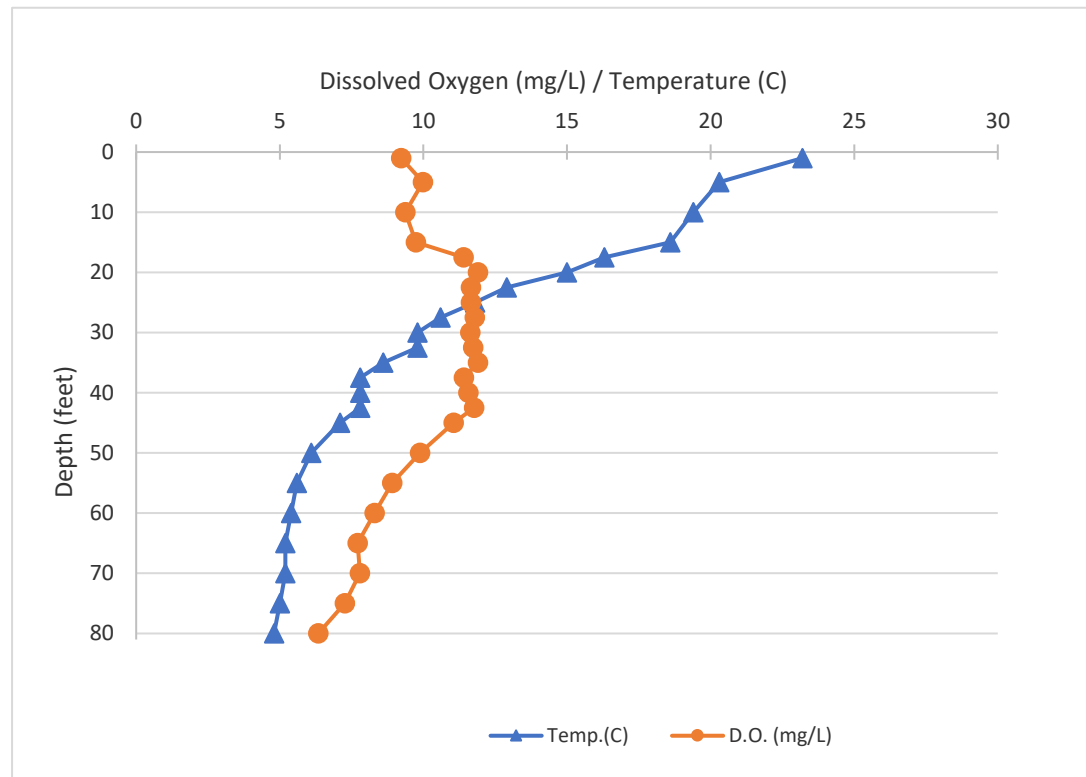
Name: Avery Lake
 County: Montmorency
 Site ID: 600023
 Date: 6/14/2023

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	23.2	9.23
5	20.3	9.99
10	19.4	9.37
15	18.6	9.74
17.5	16.3	11.4
20	15	11.9
22.5	12.9	11.66
25	11.8	11.66
27.5	10.6	11.79
30	9.8	11.64
32.5	9.8	11.74
35	8.6	11.9
37.5	7.8	11.41
40	7.8	11.57
42.5	7.8	11.77
45	7.1	11.05
50	6.1	9.88
55	5.6	8.92
60	5.4	8.3
65	5.2	7.71
70	5.2	7.79
75	5	7.27
80	4.8	6.34

Lake: Avery Lake (Montmorency Co.)

6/14/2023



Name: Avery Lake
 County: Montmorency
 Site ID: 600023
 Date: 6/26/2023

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	23.8	8.56
5	23.7	8.7
10	29.2	9.03
15	20.6	10.05
17.5	19.9	10.3
20	18	11.18
22.5	14.4	12.22
25	13.8	11.92
27.5	18.1	11.83
30	10.7	11.75
32.5	9.7	11.72
35	8.8	12.07
37.5	8.1	11.48
40	7.3	10.67
42.5	6.8	10.51
45	6.9	0.04
50	7.1	0.03
55	7.1	0.03
60	7.1	0.01
65	6.1	0.05
70	6.1	0.04
75	6.1	0.03
80	6.1	0.03

Lake: Avery Lake (Montmorency Co.)

6/26/2023

