Cooperative Lakes Monitoring Program

Michigan Lakes– Ours to Protect

2024 Data Report
for
Upper Herring Lake, Benzie County

Site ID: 100247

44.5592°N, 86.1803°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

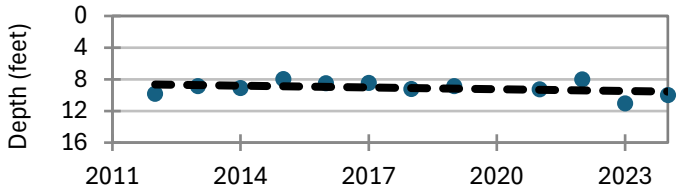
Questions?
If you have questions on this report or believe that the tabulated data for your lake in this report are in error please contact:
Paul Steen (psteen@hrwc.org), CLMP Data Analyst

Site ID: 100247

Upper Herring Lake, Benzie County
2024 CLMP Results

Secchi Disk Transparency (feet)

Year	# Readings	Min	Max	Average	Std. Dev	Carlson TSI
2024	8	7.0	16.0	10.0	3.0	44
2019-2023	36	5.5	19.5	9.3	2.7	45
2012-2018	84	4.0	15.0	8.8	2.7	46
2024 All CLMP Lakes	3348	0.5	85.0	11.7	6.2	43



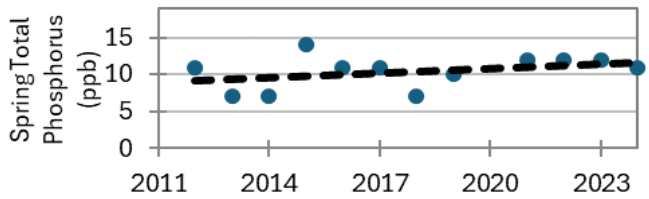
Chlorophyll-a (parts per billion)

Year	# Samples	Min	Max	Median	Std. Dev	Carlson TSI
2021	5	<1.0	6.3	5.7	3.0	48
2024 All CLMP Lakes	708	< 1.0	63.0	2.8	7.3	41

No graph: Not enough data

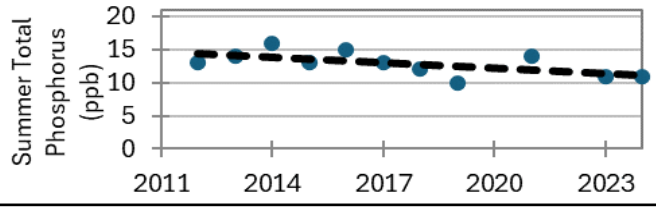
Spring Phosphorus (parts per billion)

Year	# Samples	Min	Max	Average	Std. Dev
2024	1	11.0	11.0	11.0	NA
2019-2023	4	10.0	12.0	11.5	1.0
2012-2018	7	7.0	14.0	9.7	2.8
2024 All CLMP Lakes	259	<= 5	140.0	14.3	39.7

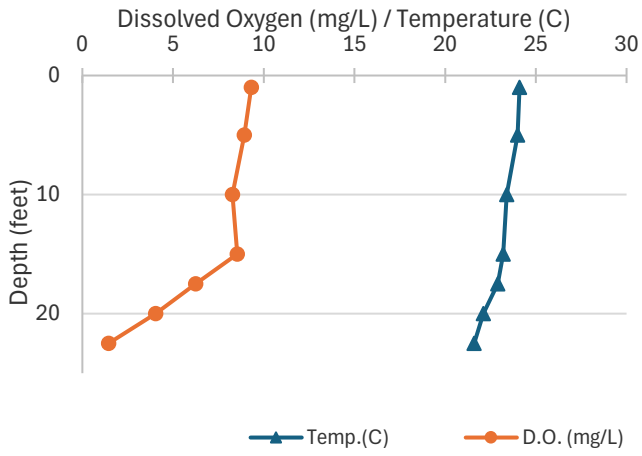


Summer Phosphorus (parts per billion)

Year	# Samples	Min	Max	Average	Std. Dev	Carlson TSI
2024	1	11.0	11.0	11.0	NA	39
2019-2023	3	10.0	14.0	11.7	2.1	39
2012-2018	7	12.0	16.0	13.7	1.4	42
2024 All CLMP Lakes	261	<= 5	140.0	14.6	11.9	43



Dissolved Oxygen and Temperature Profile



8/5/2021

Summary

Average TSI	2024	2019-2023	2012-2018
Upper Herring Lake	41	43	44
All CLMP Lakes	41	42	40

With an average TSI score of 41 based on 2024 Secchi transparency and summer total phosphorus data, this lake is rated as mesotrophic.

This lake displays a normal stratification pattern. The lake maintains some dissolved oxygen in the bottom waters through mid-summer, but by late summer the lake has stratified and the bottom water is mostly devoid of oxygen. Monitoring data indicates that stratification only persists for a short time, however.

While the trends for individual parameters are mixed, monitoring data indicates that overall nutrient levels remain largely unchanged since data collection began.

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

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.

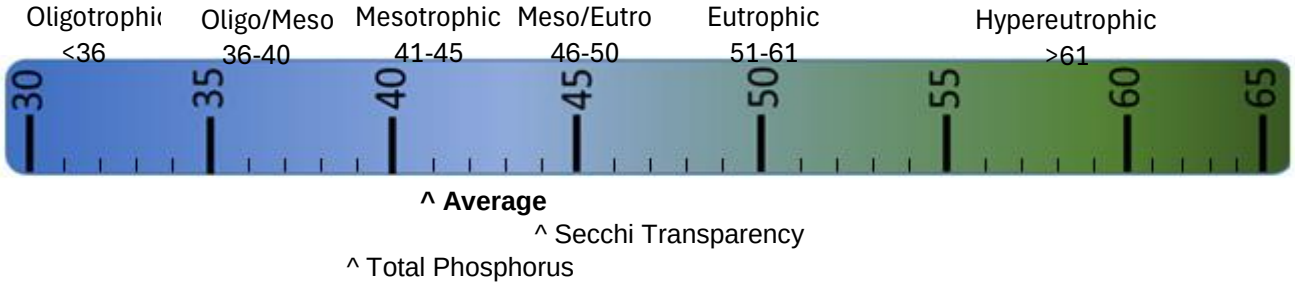
The tables below give the results-to-TSI conversions for the water quality data ranges normally seen in the CLMP. The formulas for this conversion can be found in the CLMP manual (link is on page 2 of this report).

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 Upper Herring Lake in 2024	
Average	41
Secchi Disk	44
Summer TP	39
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 euthrophic lakes. These lakes exhibit extremely high productivity, such as nuisance algae and weed growth.

Site ID: 100247

Upper Herring Lake, Benzie County
2024 Exotic Aquatic Plant Watch Results

The Exotic Aquatic Plant Watch was conducted on Upper Herring Lake in 2024.

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 2024 Exotic Aquatic Plant Watch on Upper Herring Lake.

Upper Herring Lake, Benzie County

2024 Exotic Aquatic Plant Watch Results

Survey Date(s): July 25

Species	Status	Comments
Eurasian watermilfoil	FOUND	Found in 5 of 13 transects surveyed. Some recorded as hybrid watermilfoil. No photos submitted for confirmation.
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.

Site ID: 100247

Upper Herring Lake, Benzie County
2023 Exotic Aquatic Plant Watch Results

The Exotic Aquatic Plant Watch was conducted on Upper Herring Lake in 2023.

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 2023 Exotic Aquatic Plant Watch on Upper Herring Lake.

Upper Herring Lake, Benzie County

2023 Exotic Aquatic Plant Watch Results

Survey Date(s): July 28

Species	Status	Comments
Eurasian watermilfoil	FOUND	Found at 3 of 12 sites surveyed.
Starry stonewort	not found	
Curly-leaf pondweed	not found	
European Frogbit	not found	
Hydrilla	not found	

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Site ID: 100247

Upper Herring Lake, Benzie County
2022 Exotic Aquatic Plant Watch Results

The Exotic Aquatic Plant Watch was conducted on Upper Herring 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 Upper Herring Lake.

Upper Herring Lake, Benzie County

2022 Exotic Aquatic Plant Watch Results

Survey Date(s): July 22

Species	Status	Comments
Eurasian watermilfoil	FOUND	Found in 4 of 12 transects surveyed (1 called hybrid milfoil). No photos to confirm identification.
Starry stonewort	not found	
Curly-leaf pondweed	not found	
European Frogbit	not found	
Hydrilla	not found	

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Site ID: 100247

Upper Herring Lake, Benzie County
2021 CLMP Aquatic Plant Results

The Aquatic Plant Identification and Mapping survey was conducted on Upper Herring Lake in 2021.

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 48 locations (16 transects) in Upper Herring Lake in 2021. Below is a list of species reported in order of relative abundance.

Upper Herring Lake, Benzie County
2021 Aquatic Plant Identification and Mapping: Species Reported

Common Name	Latin name	Average Density*
Water celery	*Vallisneria americana*	1.2
Muskgrass	*Chara* sp.	1.2
Hybrid/Eurasian watermilfoil	*Myriophyllum spicatum x. sibiricum*	0.9
Flat-stem pondweed	*Potamogeton zosteriformis*	0.9
Bulrush	*Scirpus* sp.	0.5
Waterweed	*Elodea canadensis*	0.5
Illinois pondweed	*Potamogeton illinoensis*	0.4
Yellow pond lily	*Nuphar* spp.	0.3
Clasping-leaf pondweed	*Potamogeton richardsonii*	0.2
Northern watermilfoil	*Myriophyllum sibiricum*	0.2
Watermilfoil	*Myriophyllum* sp.	0.1
Globular stonewort	*Chara globularis*	0.1
Variable pondweed	*Potamogeton gramineus*	0.1
Whorled watermilfoil	*Myriophyllum verticillatum*	0.1
White water lily	*Nymphaea odorata*	0.1
Sago pondweed	*Stuckenia pectinata*	0.1
Cattails	*Typha* sp.	0.1
Alpine pondweed	*Potamogeton alpinus*	0.1
Coontail	*Ceratophyllum* sp.	0.1
Bladderwort	*Utricularia* sp.	<0.1
Slender naiad	*Najas flexilis*	<0.1
Eurasian watermilfoil	*Myriophyllum spicatum*	<0.1
Southern naiad	*Najas guadelupensis*	<0.1
White-stem pondweed	*Potamogeton praelongus*	<0.1

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

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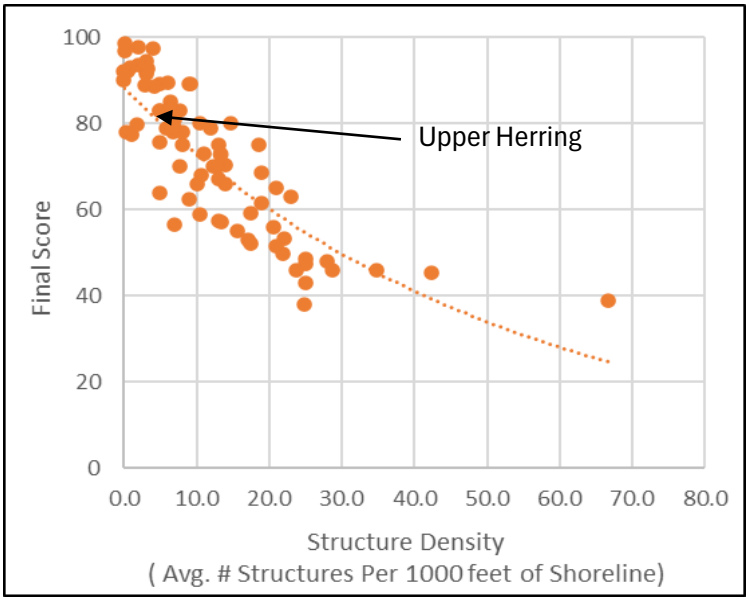
Upper Herring Lake, Benzie County
2021 Score the Shore Results

The Score the Shore Habitat Assessment was conducted on Upper Herring 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?



Upper Herring Lake:	
Number of Sections:	20
Number of Structures:	127
Structure Density:	6.3
Final Score:	83

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

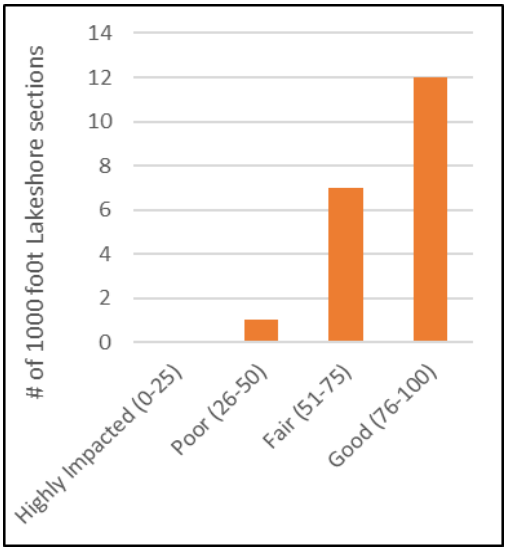
Note about graph to the left: The dotted line sets your average expectation of the score of your lake. If your lake is lower than the dotted line, then your shoreline health is lower than average compared to *lakes with similar amount of shoreline development*. And vice-versa in regards to a lake above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

Analysis specific to Upper Herring Lake:

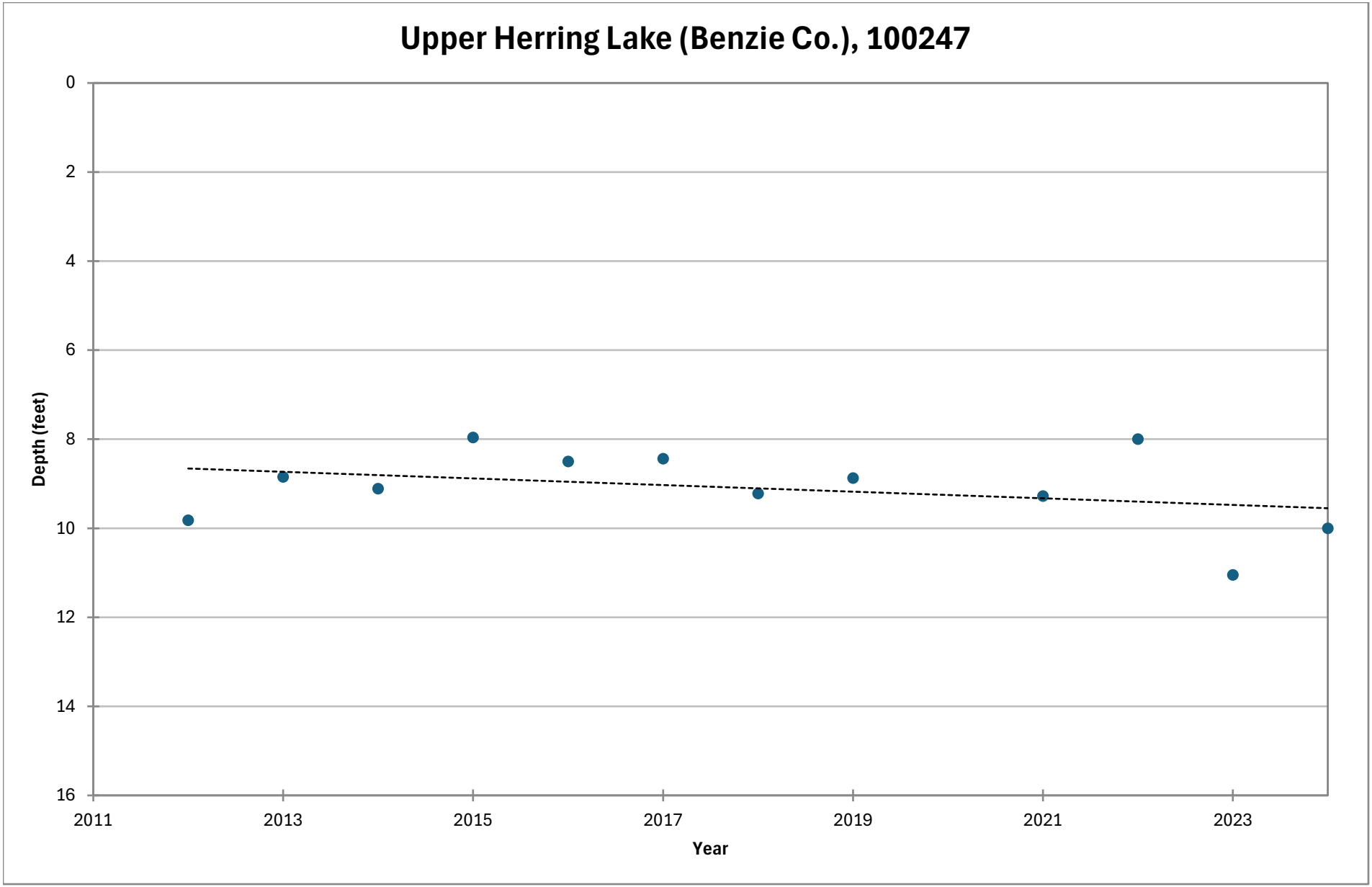
Overall, the lakeshore habitat of Upper Herring Lake is doing well and scored higher than average when compared to other lakes in the program. The breakdown of the sections is 12 Good, 7 Fair, and 1 Poor.

All three of the scoring categories came out approximately the same on Upper Herring Lake (Average scores: Littoral 85, Riparian 81, Erosion Control 82) This means that there is no particular weakness to the habitat on the whole.

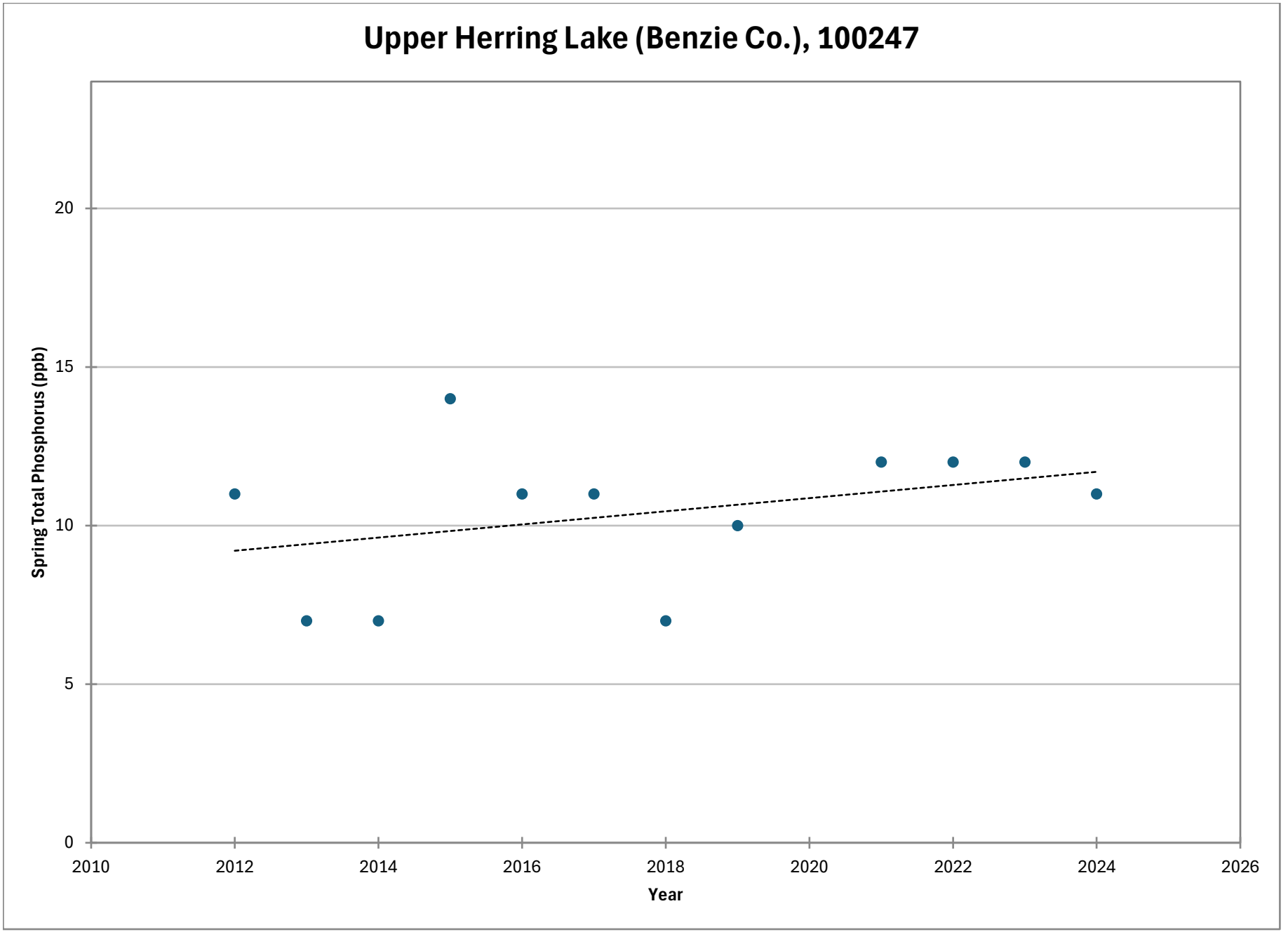
The being said, there is room for improvement on the 1 Poor section and the 7 Fair sections. Looking only at these, they have average scores of 57 for Riparian and 57 for Erosion Control. Reduce the amount of mowed grass and increase the amount of unmowed native vegetation along the lakeshore to boost the Riparian aspect of the shoreline habitat. To improve the Littoral zone score, leave woody debris in place and allow native aquatic vegetation to grow in the shallow waters.You can get plenty of ideas for improving shoreline health from the Michigan Natural Shoreline Partnership (https://www.mishorelinepartnership.org/).



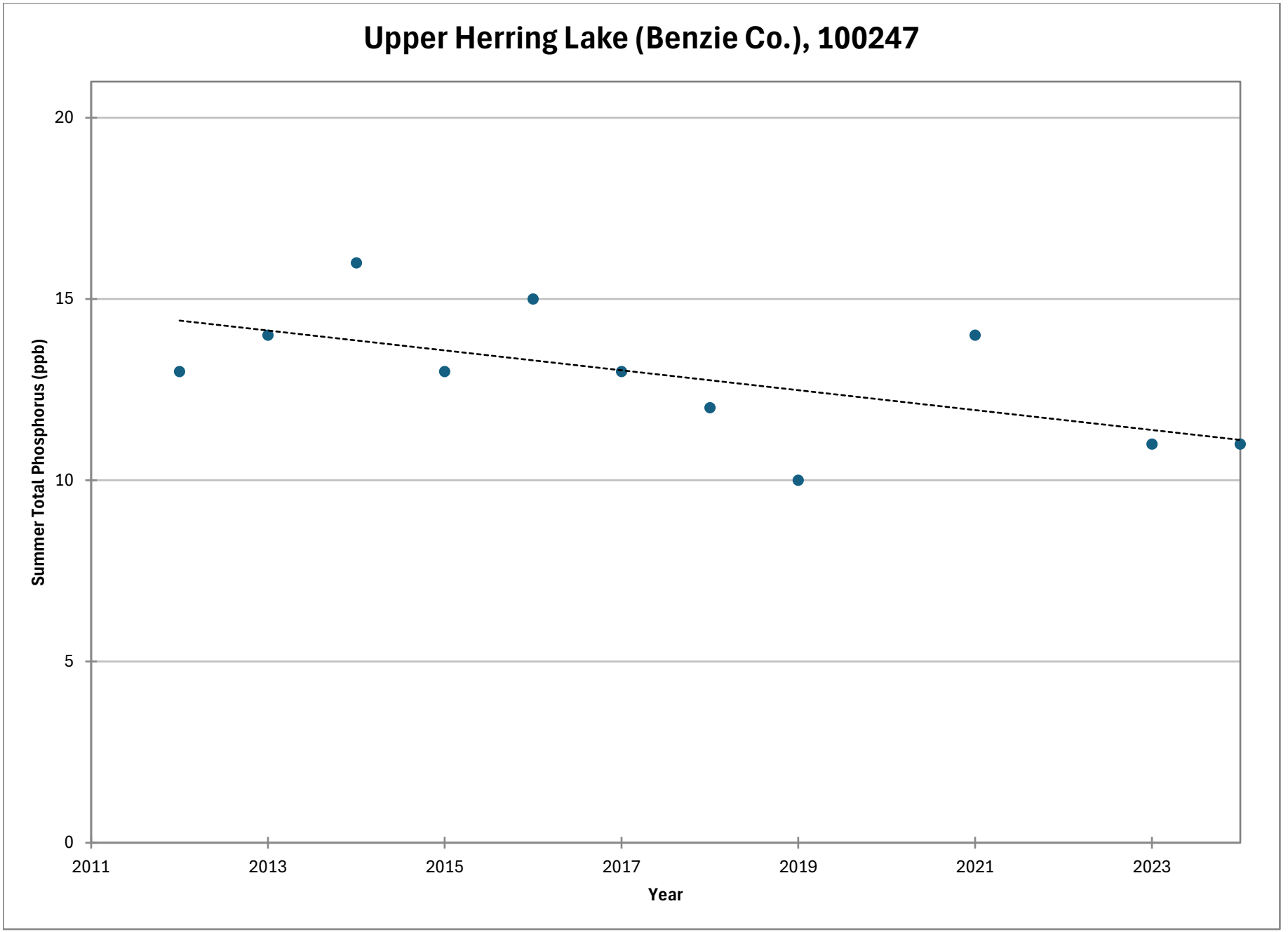
COOPERATIVE LAKES MONITORING PROGRAM
SUMMER MEAN TRANSPARENCY



COOPERATIVE LAKES MONITORING PROGRAM
SPRING TOTAL PHOSPHORUS



COOPERATIVE LAKES MONITORING PROGRAM
SUMMER TOTAL PHOSPHORUS

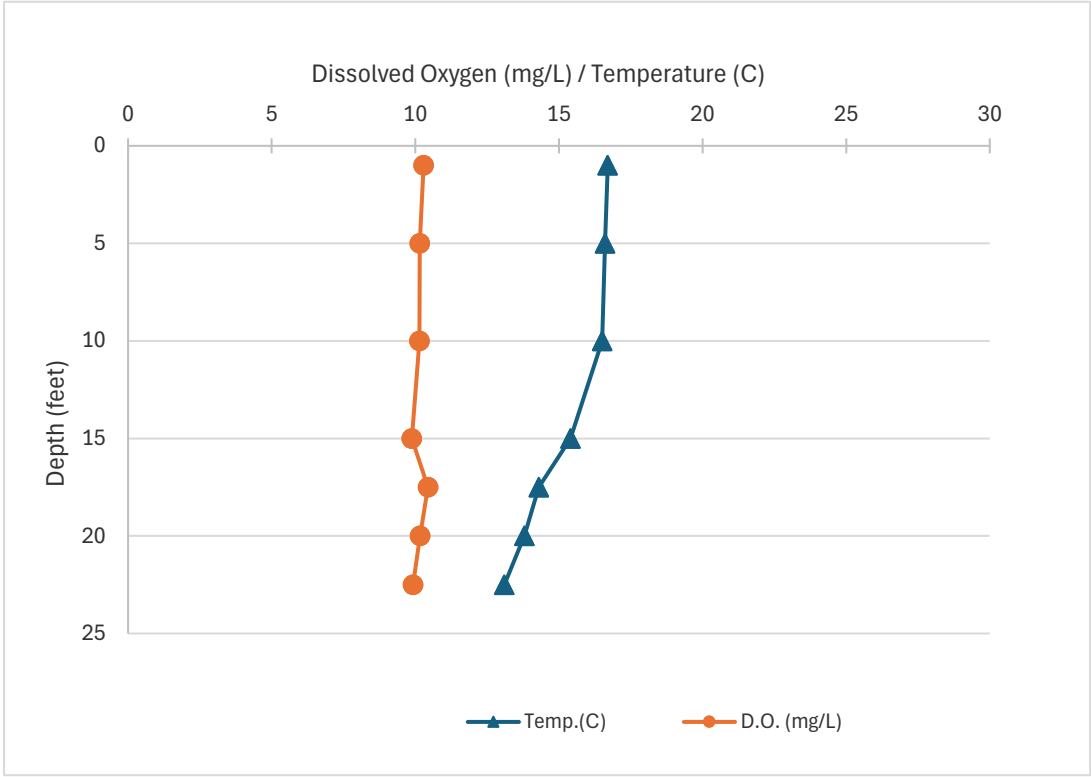


Name: Upper Herring Lake
County: Benzie
Site ID: 100247
Date: 5/20/2021

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	16.7	10.29
1	16.7	10.29
5	16.6	10.16
5	16.6	10.16
10	16.5	10.14
10	16.5	10.14
15	15.4	9.88
15	15.4	9.88
17.5	14.3	10.44
17.5	14.3	10.44
20	13.8	10.17
20	13.8	10.17
22.5	13.1	9.92
22.5	13.1	9.92

Lake: Upper Herring Lake (Benzie Co.) **5/20/2021**

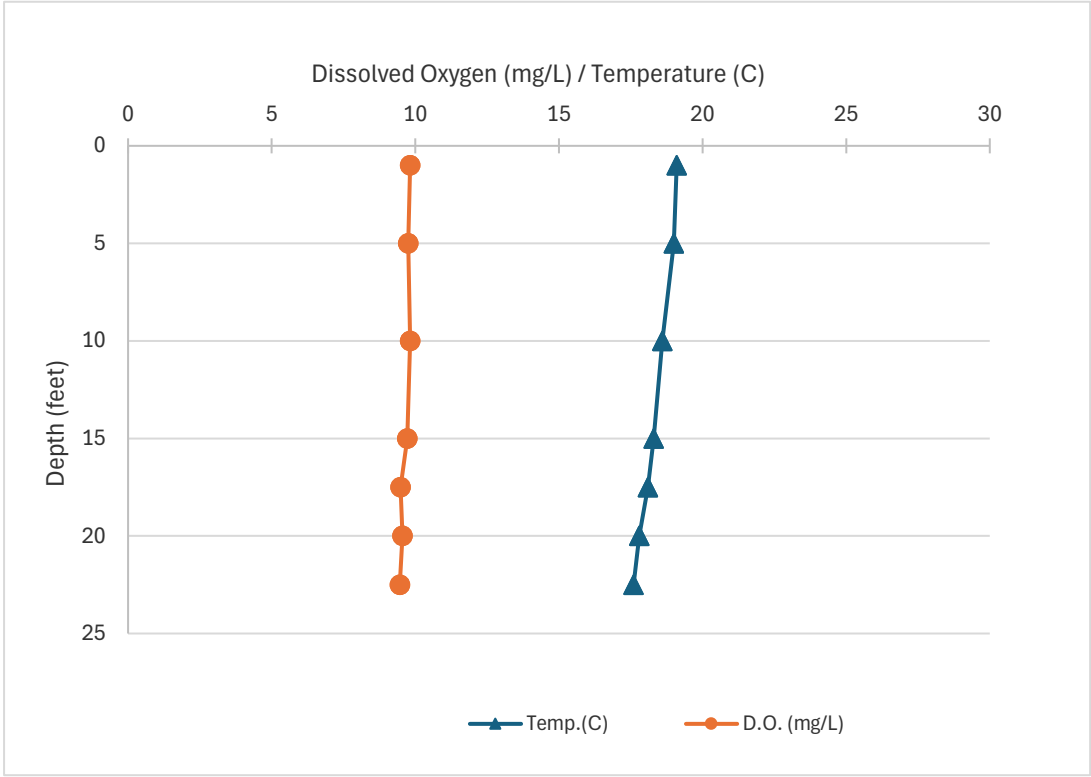


Name: Upper Herring Lake
County: Benzie
Site ID: 100247
Date: 6/2/2021

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	19.1	9.82
1	19.1	9.82
5	19	9.75
5	19	9.75
10	18.6	9.82
10	18.6	9.82
15	18.3	9.72
15	18.3	9.72
17.5	18.1	9.49
17.5	18.1	9.49
20	17.8	9.55
20	17.8	9.55
22.5	17.6	9.46
22.5	17.6	9.46

Lake: Upper Herring Lake (Benzie Co.) **6/2/2021**

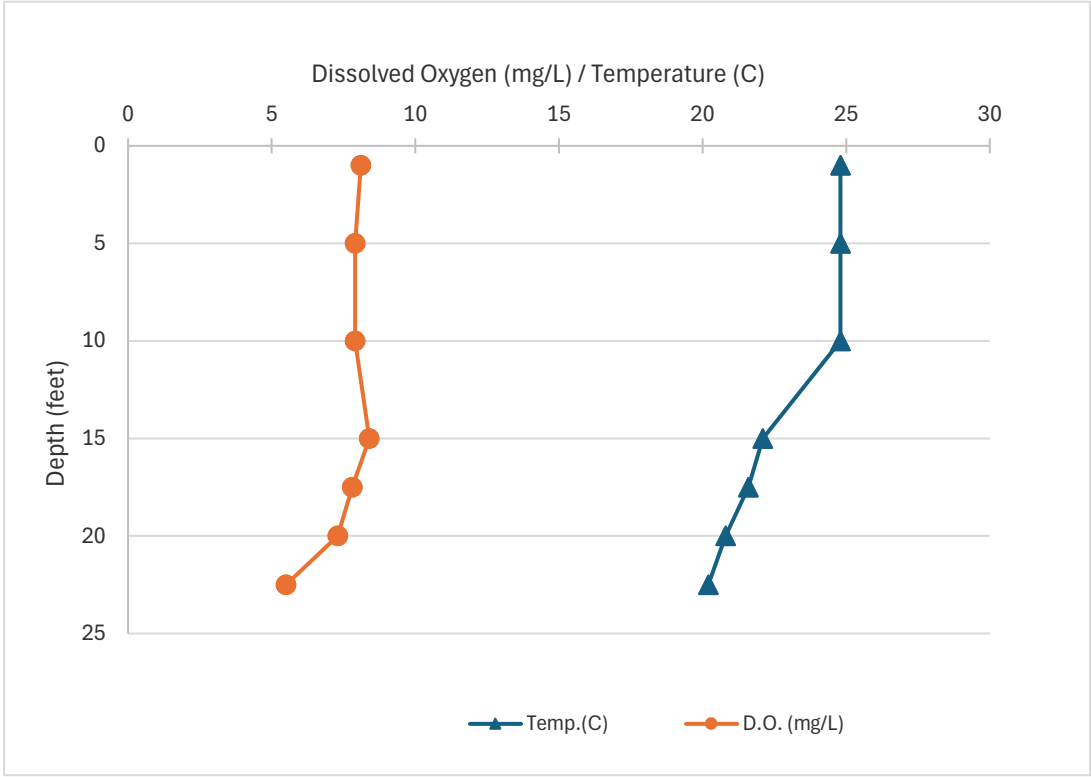


Name: Upper Herring Lake
County: Benzie
Site ID: 100247
Date: 6/15/2021

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	24.8	8.1
1	24.8	8.1
5	24.8	7.9
5	24.8	7.9
10	24.8	7.9
10	24.8	7.9
15	22.1	8.4
15	22.1	8.4
17.5	21.6	7.8
17.5	21.6	7.8
20	20.8	7.3
20	20.8	7.3
22.5	20.2	5.5
22.5	20.2	5.5

Lake: Upper Herring Lake (Benzie Co.) **6/15/2021**

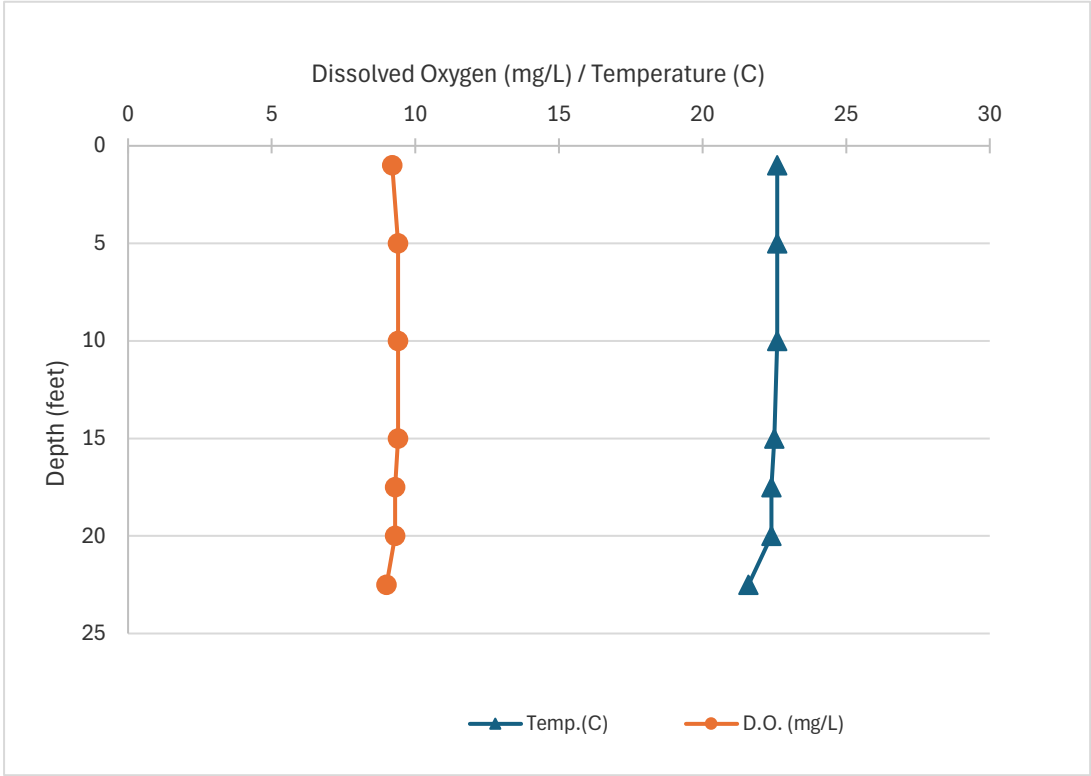


Name: Upper Herring Lake
County: Benzie
Site ID: 100247
Date: 7/1/2021

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	22.6	9.2
5	22.6	9.4
10	22.6	9.4
15	22.5	9.4
17.5	22.4	9.3
20	22.4	9.3
22.5	21.6	9

Lake: Upper Herring Lake (Benzie Co.) **7/1/2021**

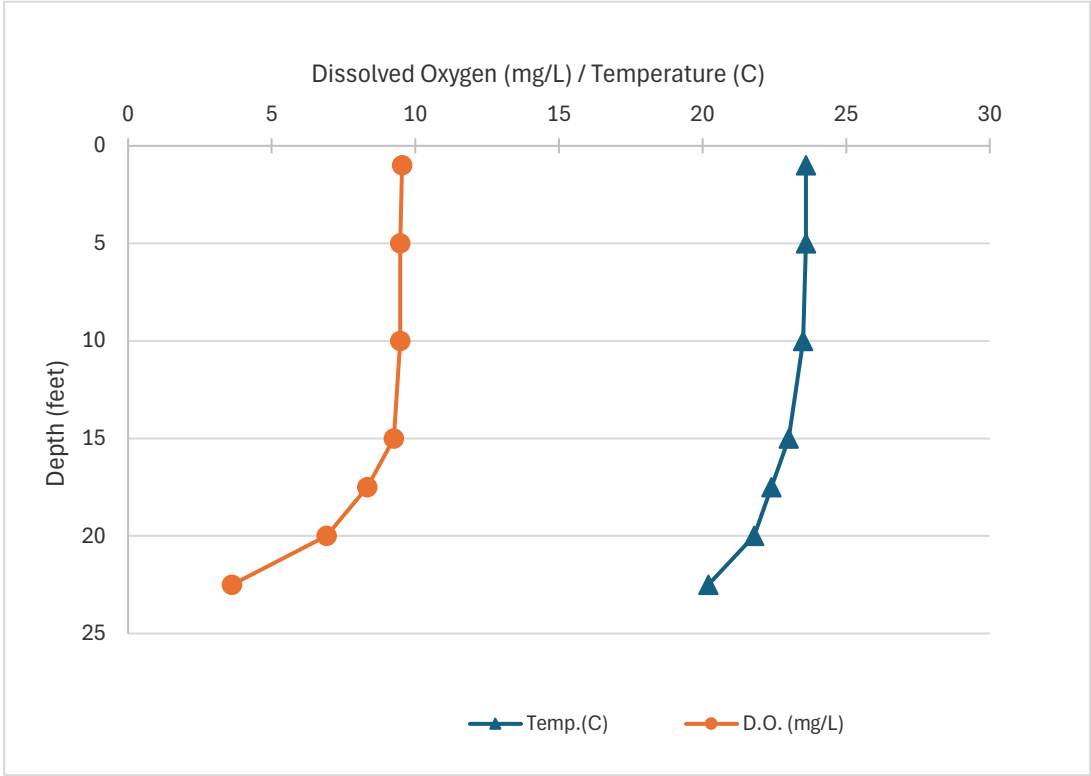


Name: Upper Herring Lake
County: Benzie
Site ID: 100247
Date: 7/13/2021

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	23.6	9.54
5	23.6	9.47
10	23.5	9.47
15	23	9.25
17.5	22.4	8.33
20	21.8	6.91
22.5	20.2	3.62

Lake: Upper Herring Lake (Benzie Co.) **7/13/2021**

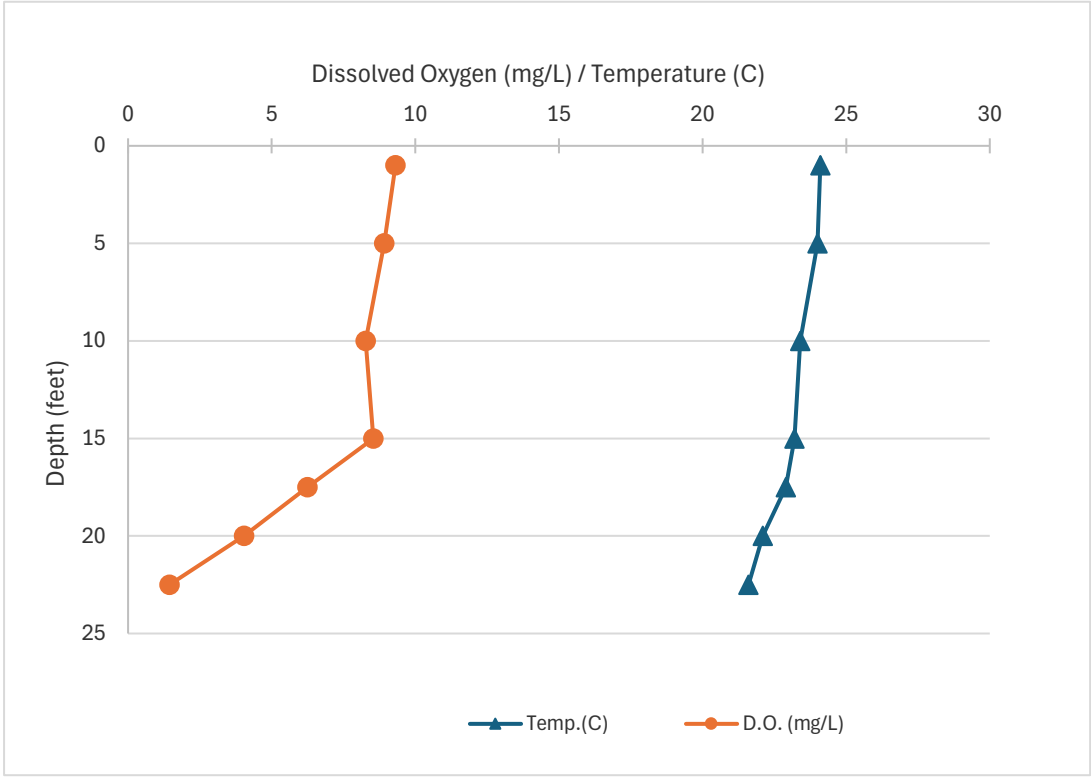


Name: Upper Herring Lake
County: Benzie
Site ID: 100247
Date: 8/5/2021

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	24.1	9.31
5	24	8.92
10	23.4	8.27
15	23.2	8.54
17.5	22.9	6.24
20	22.1	4.04
22.5	21.6	1.44

Lake: Upper Herring Lake (Benzie Co.) **8/5/2021**

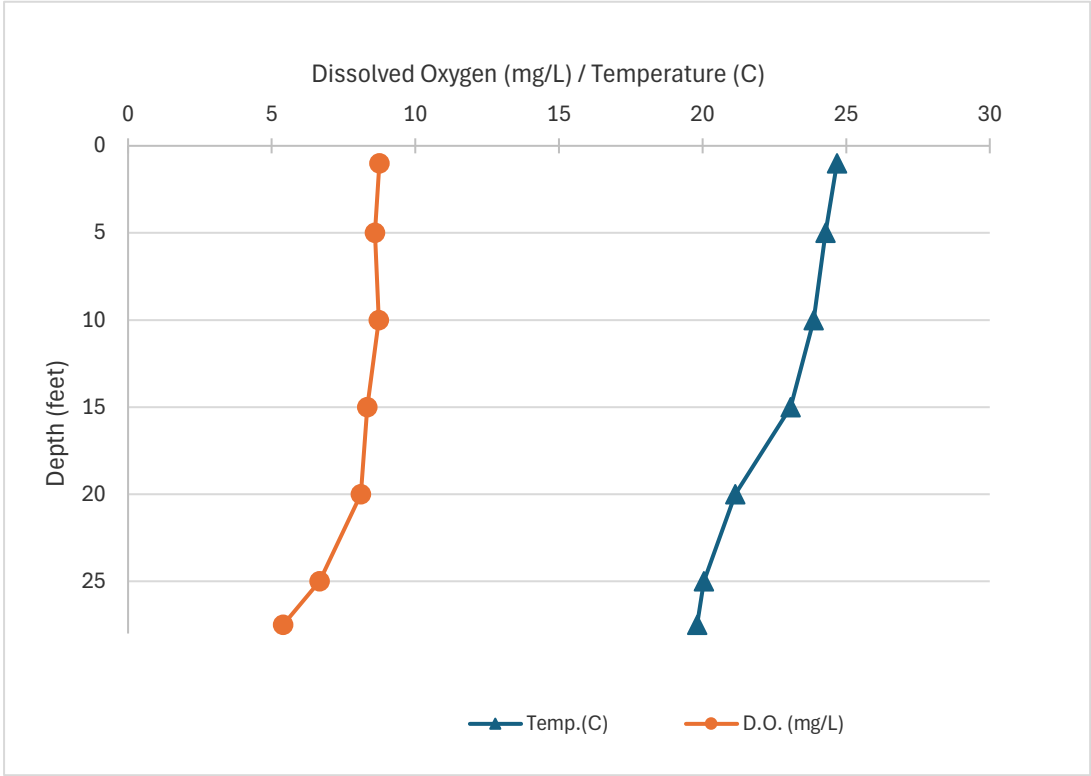


Name: Upper Herring Lake
County: Benzie
Site ID: 100247
Date: 8/10/2021

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	24.68	8.75
5	24.28	8.59
10	23.87	8.73
15	23.07	8.33
20	21.14	8.1
25	20.05	6.67
27.5	19.81	5.4

Lake: Upper Herring Lake (Benzie Co.) **8/10/2021**

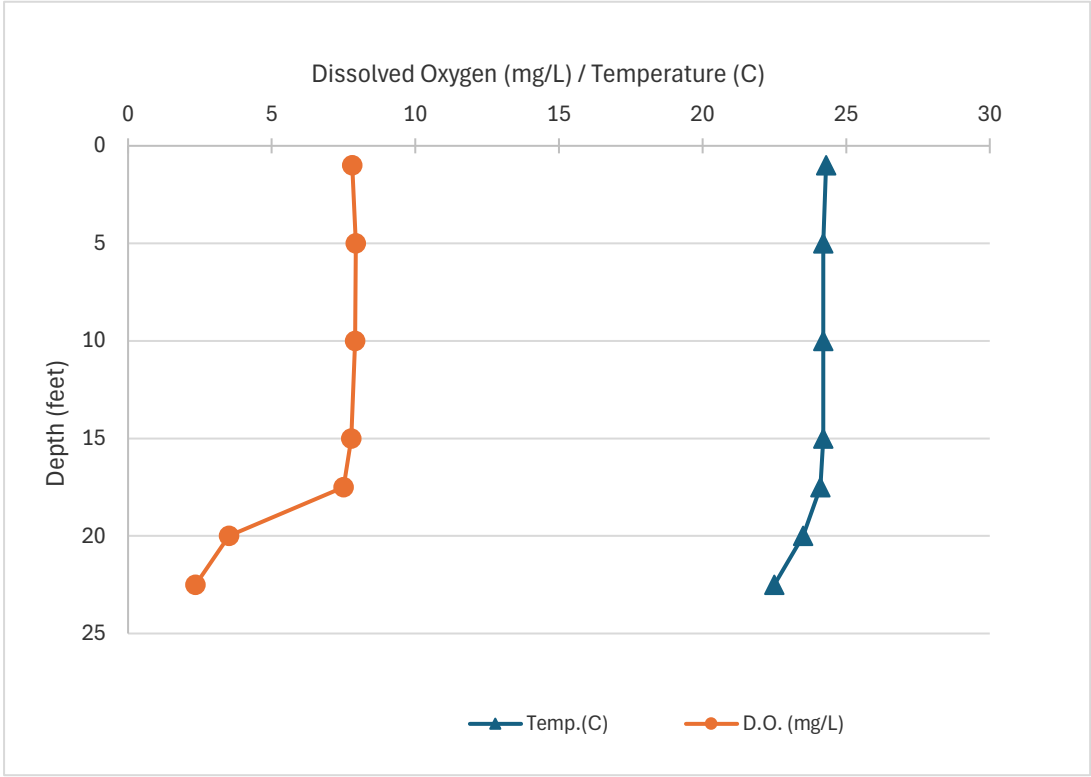


Name: Upper Herring Lake
County: Benzie
Site ID: 100247
Date: 9/1/2021

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	24.3	7.8
5	24.2	7.93
10	24.2	7.91
15	24.2	7.77
17.5	24.1	7.5
20	23.5	3.51
22.5	22.5	2.35

Lake: Upper Herring Lake (Benzie Co.) **9/1/2021**



Name: Upper Herring Lake
County: Benzie
Site ID: 100247
Date: 9/9/2021

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	21.05	7.25
5	20.98	7.06
10	20.98	6.92
15	20.73	6.69
17.5	20.7	6.5
20	20.2	6.54
22.5	20.63	6.33
25	20.4	6.38
27.5	20.23	6.47

Lake: Upper Herring Lake (Benzie Co.) **9/9/2021**