



2022 Data Report for Upper Woodcock Lake, Benzie County

Site ID: 100277

44.7093°N, 85.8849°W

The CLMP is brought to you by:



EGL MICHIGAN DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY

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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

Upper Woodcock Lake, Benzie County 2022 CLMP Results



Secchi Disk Transparency (feet)

Year	# Readings	Min	Max	Average	Std. Dev	Carlson TSI
2022	8	9.0	22.0	13.8	4.6	39
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	<1.0	3.9	2.0	1.3	37
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	10.0	10.0	10.0	NA
2022 All CLMP Lakes	220	<5	220.0	20.7	21.3

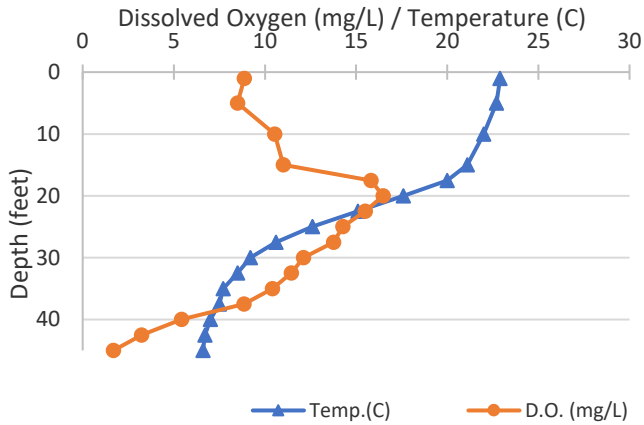
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Summer Phosphorus (parts per billion)

Year	# Samples	Min	Max	Average	Std. Dev	Carlson TSI
2022	1	7.0	7.0	7.0	NA	32
2022 All CLMP Lakes	234	<= 3	150.0	17.4	15.3	45

No graph: Not enough data

Dissolved Oxygen and Temperature Profile 8/19/2022



Summary

Average TSI	2022
Upper Woodcock Lake	36
All CLMP Lakes	44

With an average TSI score of 36 based on 2022 Secchi transparency, chlorophyll-a, and summer total phosphorus data, this lake is rated between the oligotrophic and mesotrophic lake classification. The lake leans slightly more oligotrophic than mesotrophic.

Due to its low nutrient level, the lake is able to maintain dissolved oxygen throughout most of the water column for the entire summer, though dissolved oxygen gets low or anoxic on the very bottom waters.

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.

* = 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.

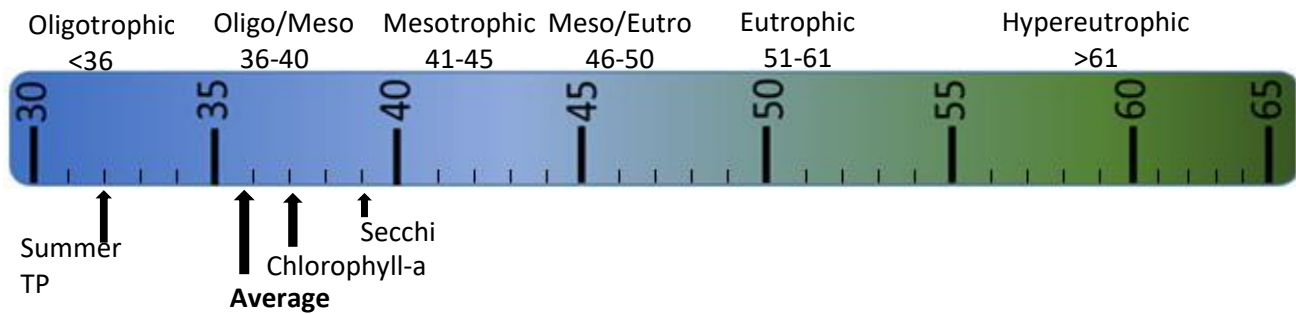
The tables below give the results-to-TSI conversions for the water quality data ranges normally seen in the CLMP. The formulas for this conversion can be found in the CLMP manual (link is on page 2 of this report).

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 Upper Woodcock Lake in 2022	
Average	36
Secchi Disk	39
Summer TP	32
Chlorophyll-a	37



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.

Upper Woodcock Lake, Benzie County 2022 CLMP Aquatic Plant Results



The Aquatic Plant Mapping survey was conducted on Upper Woodcock 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 13 locations (5 transects) in Upper Woodcock Lake in 2022. Below is a list of species reported, in order of relative abundance. Survey conducted July 13. No invasive species reported.

Upper Woodcock Lake, Benzie County 2022 Aquatic Plant Mapping: Species Reported		
<u>Common Name</u>	<u>Latin Name</u>	<u>Average Density*</u>
Stonewort	<i>Chara</i> sp.	3.23
Yellow water lily	<i>Nuphar variegata</i>	1.31
Slender naiad	<i>Najas flexilis</i>	1.23
Sago pondweed	<i>Stuckenia pectinata</i>	1.08
Long-leaf pondweed	<i>Potamogeton nodosus</i>	0.77
Fries Pondweed	<i>Potamogeton friesii</i>	0.62
Northern watermilfoil	<i>Myriophyllum sibiricum</i>	0.62
White water lily	<i>Nymphaea odorata</i>	0.46
Water celery	<i>Vallisneria americana</i>	0.38
Lesser duckweed	<i>Lemna minor</i>	0.31
Variable pondweed	<i>Potamogeton gramineus</i>	0.31
Watercress	<i>Nasturtium officinale</i>	0.31
Leafy pondweed	<i>Potamogeton foliosus</i>	0.23
Waterweed	<i>Elodea canadensis</i>	0.23
Water star grass	<i>Heteranthera dubia</i>	0.15
Bladderwort	<i>Utricularia</i> sp.	0.08
Floating-leaf pondweed	<i>Potamogeton natans</i>	0.08

*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.

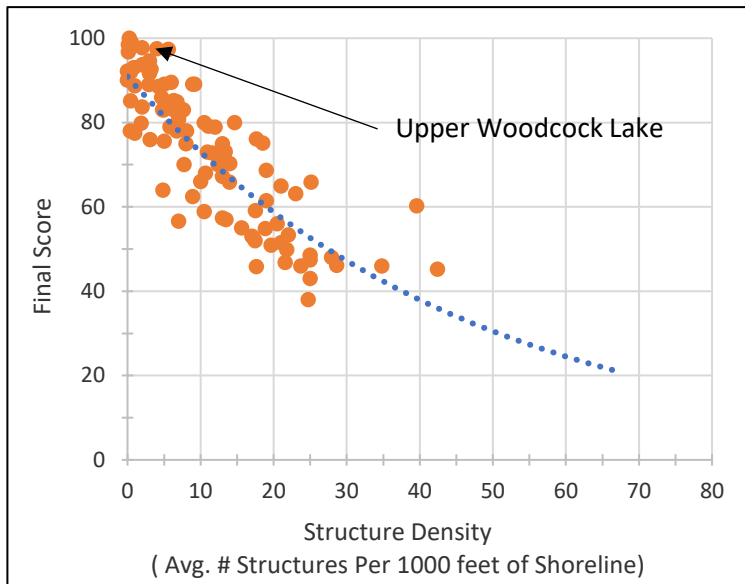
Upper Woodcock Lake, Benzie County 2022 Score the Shore Results



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



Upper Woodcock Lake	
Number of Sections:	5
Number of Structures:	28
Structure Density:	5.6
Final Score:	97

All 97 Participating Lakes from 2015-2022:	
Avg. Number of Sections:	16
Avg. Number of Structures:	228
Avg. Structure Density:	12
Avg. Final Score:	73

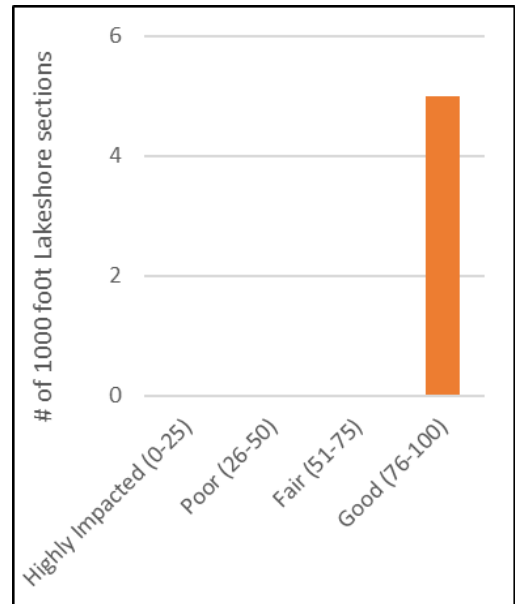
Note about graph to the left: The dotted line sets your average expectation of the score of your lake. If your lake is lower than the dotted line, then your shoreline health is lower than average compared to lakes with similar amount of shoreline development. And vice-versa in regards to a lake above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

Analysis specific to Upper Woodcock Lake:

With a score of 97%, Upper Woodcock is in the top 3% of lakes ever scored in this program in terms of overall habitat quality.

There is not much room for improvement in the lakeshore habitat (that can at least be determined from this methodology). Maintaining and protecting Upper Woodcock Lake is the most important thing residents or managers can do.

That being said, Section 4 and 5 have Erosion Control scores in the 80s and specifically addressing the reason for those lower scores would probably be the first step in boosting this lake score higher.



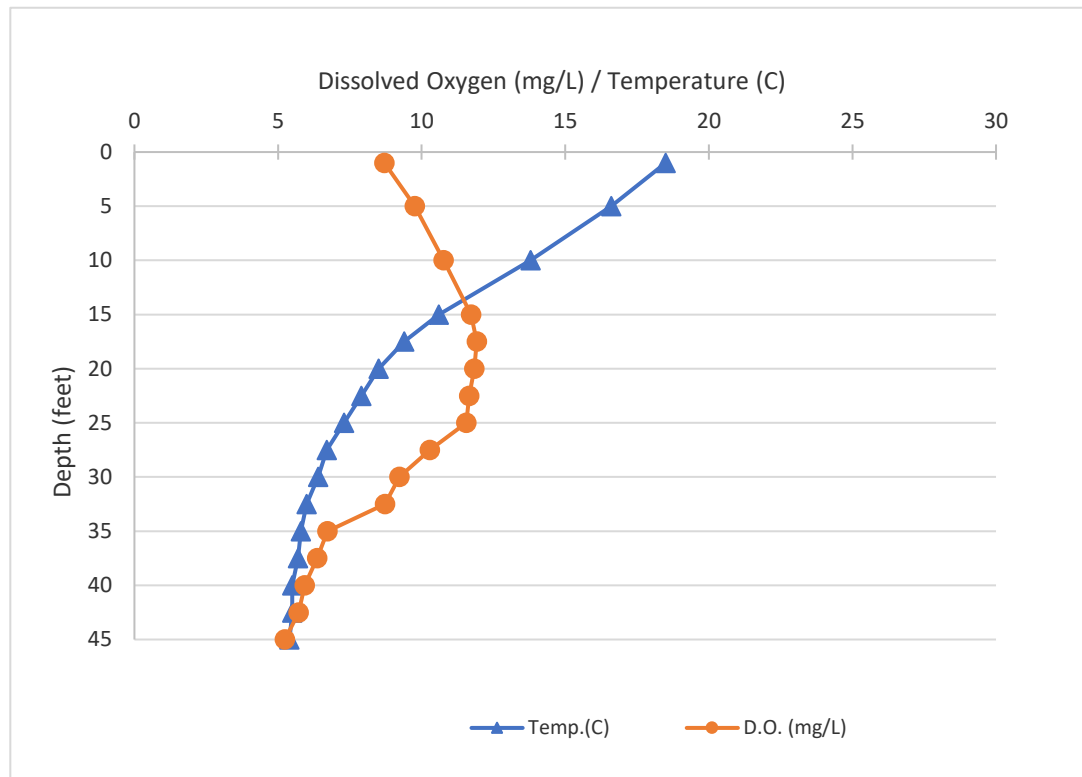
Name: Upper Woodcock Lake
County: Benzie
Site ID: 100277
Date: 5/16/2022

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	18.5	8.7
5	16.6	9.76
10	13.8	10.77
15	10.6	11.72
17.5	9.4	11.92
20	8.5	11.83
22.5	7.9	11.66
25	7.3	11.56
27.5	6.7	10.29
30	6.4	9.23
32.5	6	8.73
35	5.8	6.72
37.5	5.7	6.36
40	5.5	5.93
42.5	5.5	5.72
45	5.4	5.24

Lake: Upper Woodcock Lake (Benzie Co.)

5/16/2022



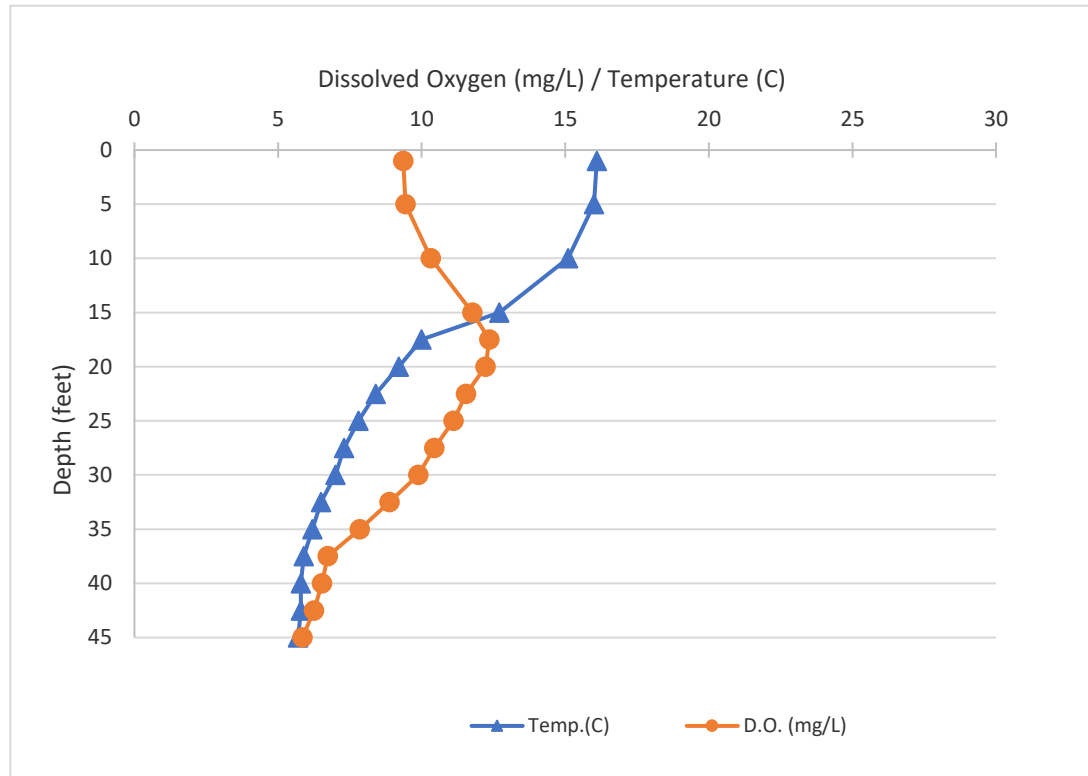
Name: Upper Woodcock Lake
 County: Benzie
 Site ID: 100277
 Date: 5/27/2022

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	16.1	9.36
5	16	9.44
10	15.1	10.32
15	12.7	11.77
17.5	10	12.36
20	9.2	12.23
22.5	8.4	11.54
25	7.8	11.11
27.5	7.3	10.44
30	7	9.89
32.5	6.5	8.88
35	6.2	7.85
37.5	5.9	6.73
40	5.8	6.53
42.5	5.8	6.25
45	5.7	5.85

Lake: Upper Woodcock Lake (Benzie Co.)

5/27/2022



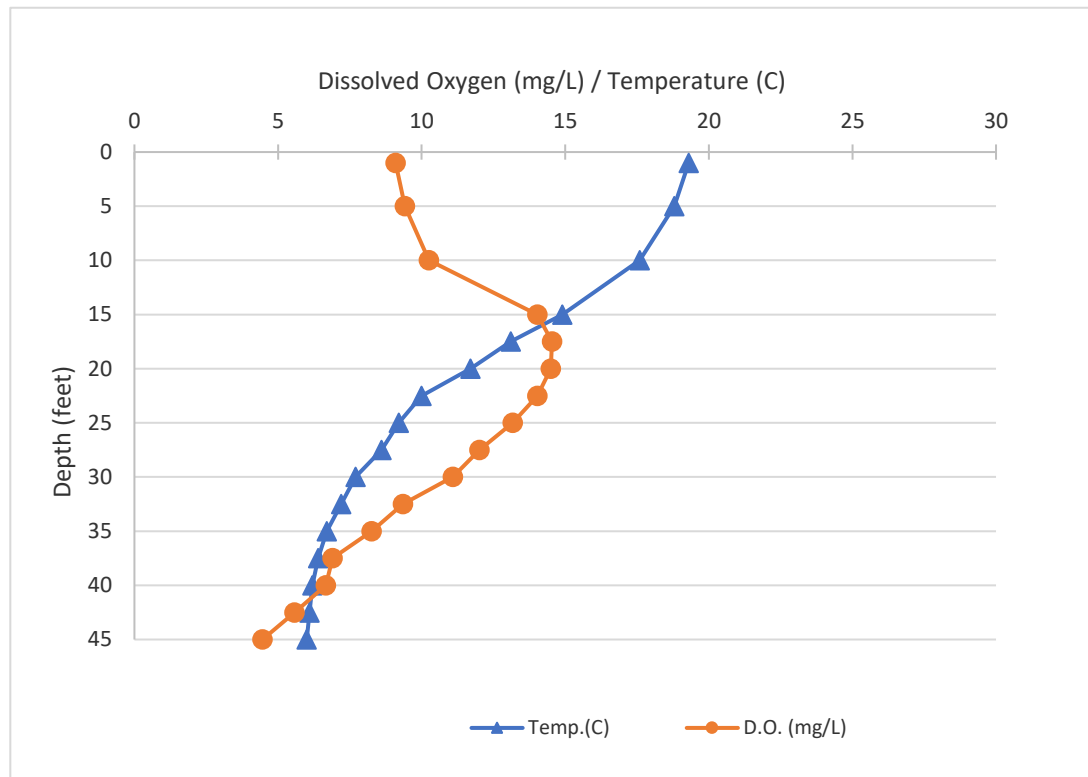
Name: Upper Woodcock Lake
 County: Benzie
 Site ID: 100277
 Date: 6/14/2022

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	19.3	9.09
5	18.8	9.42
10	17.6	10.25
15	14.9	14.03
17.5	13.1	14.54
20	11.7	14.5
22.5	10	14.03
25	9.2	13.17
27.5	8.6	12.01
30	7.7	11.09
32.5	7.2	9.35
35	6.7	8.26
37.5	6.4	6.9
40	6.2	6.67
42.5	6.1	5.57
45	6	4.46

Lake: Upper Woodcock Lake (Benzie Co.)

6/14/2022



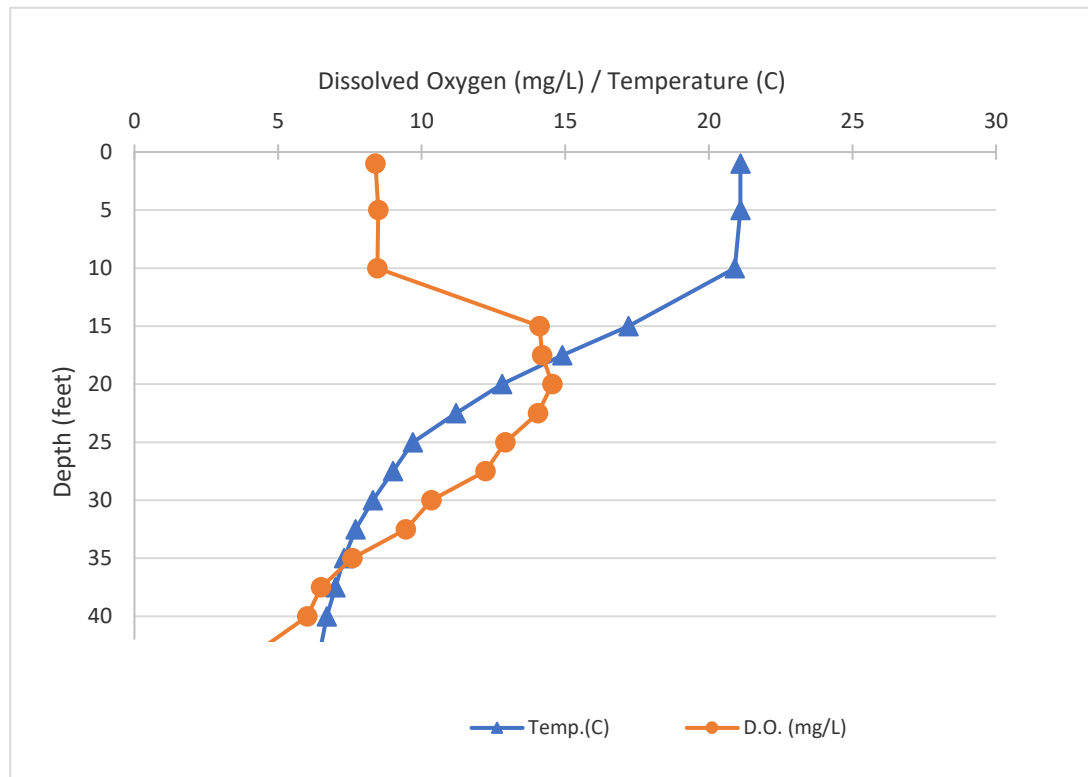
Name: Upper Woodcock Lake
County: Benzie
Site ID: 100277
Date: 6/28/2022

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	21.1	8.39
5	21.1	8.49
10	20.9	8.46
15	17.2	14.11
17.5	14.9	14.2
20	12.8	14.55
22.5	11.2	14.05
25	9.7	12.92
27.5	9	12.22
30	8.3	10.34
32.5	7.7	9.45
35	7.3	7.59
37.5	7	6.5
40	6.7	6.02
42.5	6.5	4.59

Lake: Upper Woodcock Lake (Benzie Co.)

6/28/2022



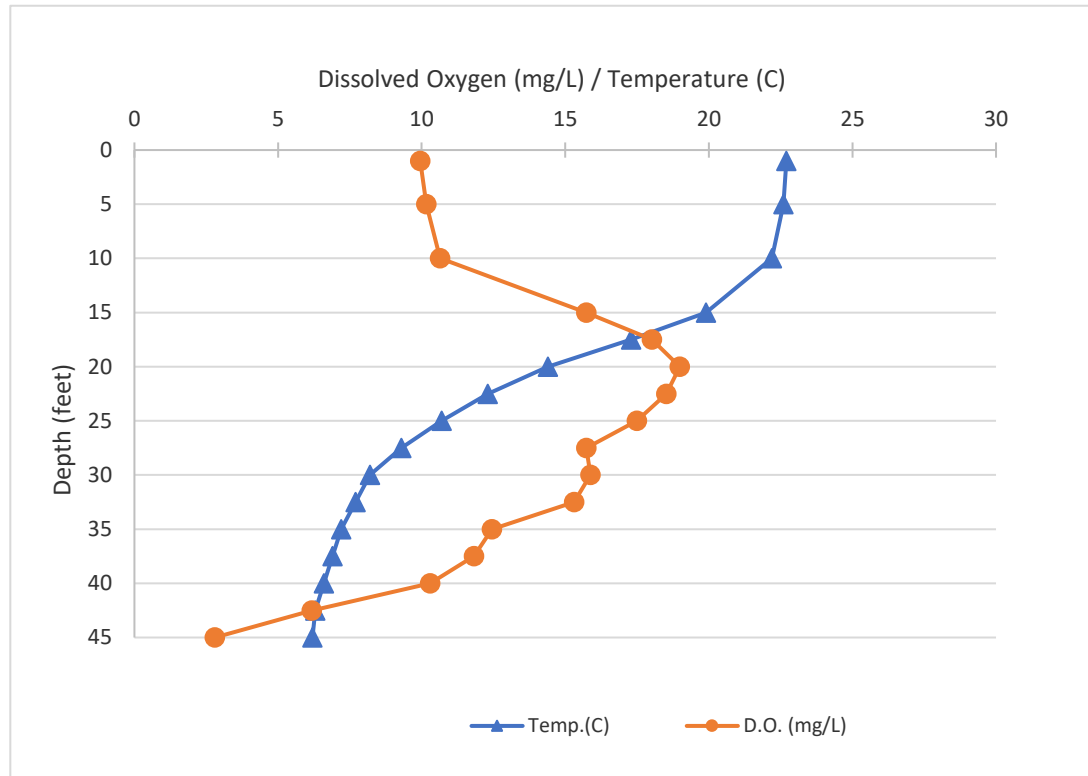
Name: Upper Woodcock Lake
 County: Benzie
 Site ID: 100277
 Date: 7/13/2022

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	22.7	9.95
5	22.6	10.16
10	22.2	10.64
15	19.9	15.74
17.5	17.3	18.02
20	14.4	18.99
22.5	12.3	18.52
25	10.7	17.5
27.5	9.3	15.74
30	8.2	15.88
32.5	7.7	15.31
35	7.2	12.45
37.5	6.9	11.82
40	6.6	10.3
42.5	6.3	6.17
45	6.2	2.8

Lake: Upper Woodcock Lake (Benzie Co.)

7/13/2022



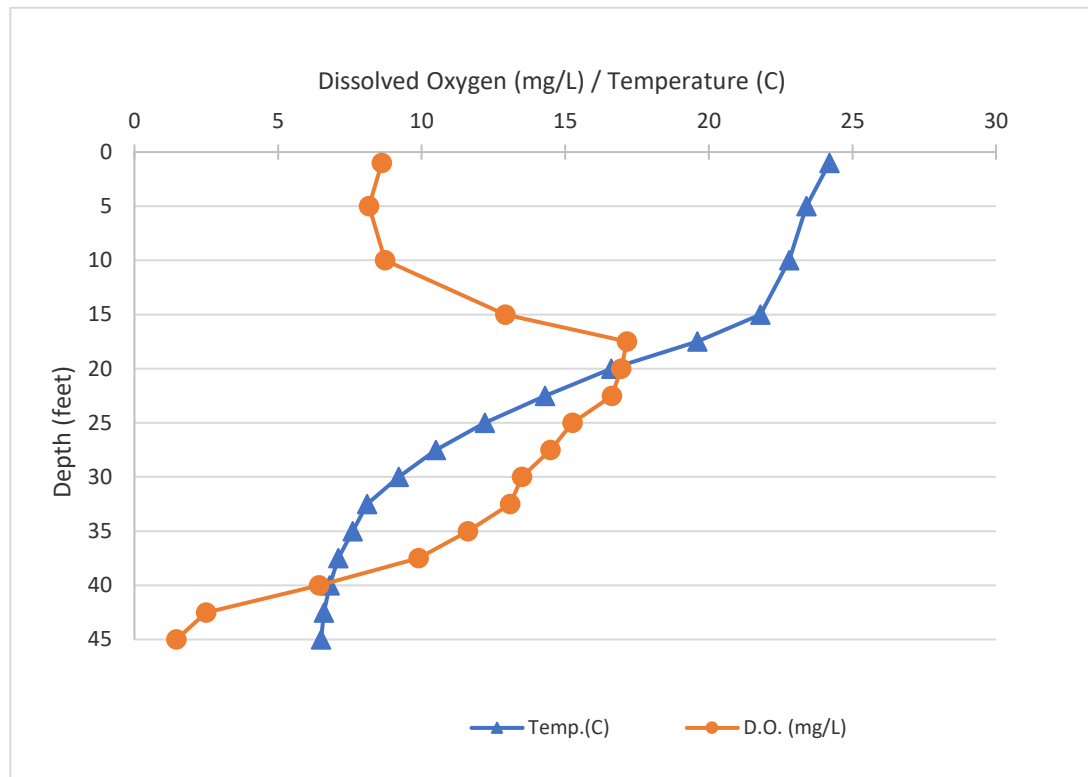
Name: Upper Woodcock Lake
 County: Benzie
 Site ID: 100277
 Date: 8/5/2022

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	24.2	8.62
5	23.4	8.17
10	22.8	8.73
15	21.8	12.92
17.5	19.6	17.15
20	16.6	16.95
22.5	14.3	16.63
25	12.2	15.26
27.5	10.5	14.49
30	9.2	13.5
32.5	8.1	13.08
35	7.6	11.61
37.5	7.1	9.9
40	6.8	6.43
42.5	6.6	2.5
45	6.5	1.46

Lake: Upper Woodcock Lake (Benzie Co.)

8/5/2022



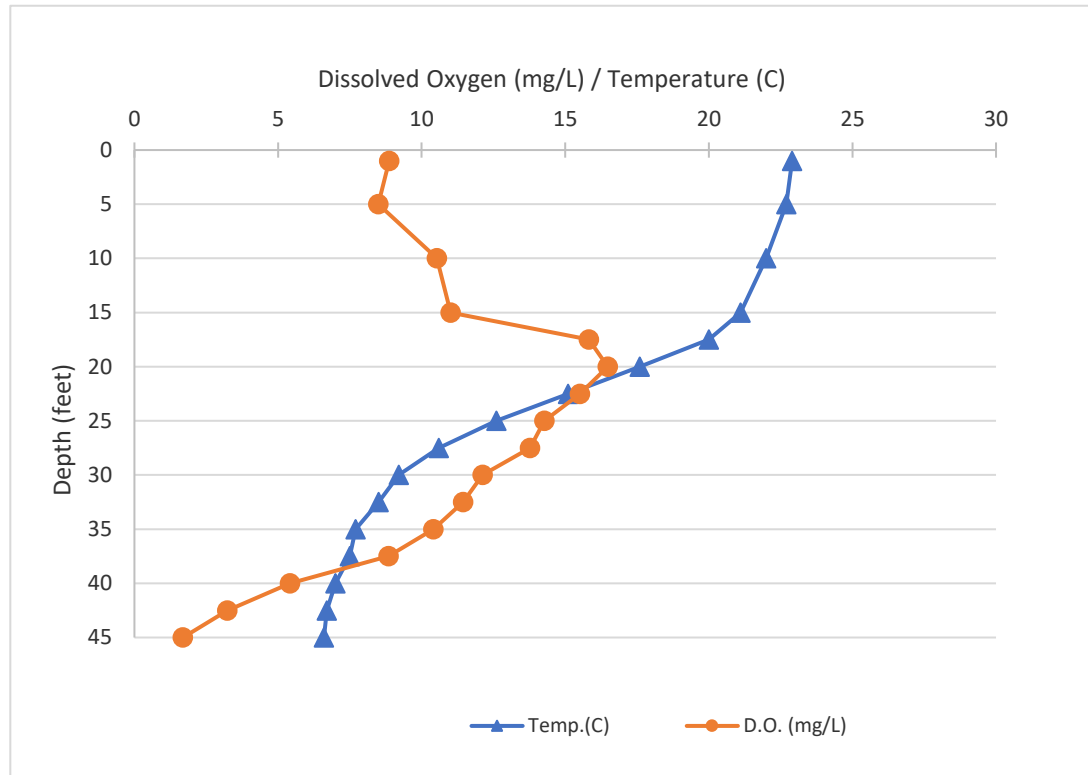
Name: Upper Woodcock Lake
 County: Benzie
 Site ID: 100277
 Date: 8/19/2022

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	22.9	8.87
5	22.7	8.49
10	22	10.53
15	21.1	11.01
17.5	20	15.82
20	17.6	16.48
22.5	15.1	15.51
25	12.6	14.27
27.5	10.6	13.77
30	9.2	12.12
32.5	8.5	11.45
35	7.7	10.41
37.5	7.5	8.85
40	7	5.42
42.5	6.7	3.23
45	6.6	1.69

Lake: Upper Woodcock Lake (Benzie Co.)

8/19/2022



Name: Upper Woodcock Lake
 County: Benzie
 Site ID: 100277
 Date: 9/9/2022

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	21.6	9.31
5	21.6	9.03
10	21.4	9.75
15	20.8	10.17
17.5	20	12.43
20	18	16.32
22.5	15.7	15.97
25	13.1	14.39
27.5	11	13.5
30	9.8	12.47
32.5	8.8	12.83
35	7.8	10.77
37.5	7.5	6.92
40	7.1	3.86
42.5	6.8	1.11
45	6.5	0.9

Lake: Upper Woodcock Lake (Benzie Co.)

9/9/2022

