



**2023 Data Report  
for  
Lime Lake, Benzie County**

Site ID: 100279

44.7547°N, 85.9323°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](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**

# Lime Lake, Benzie County 2023 CLMP Results



## Secchi Disk Transparency (feet)

Year	# Readings	Min	Max	Average	Std. Dev	Carlson TSI
2023	9	12.0	23.0	18.8	3.4	35
2023 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	Med	Std. Dev	Carlson TSI
2023	5	<1.0	3.7	1.2	1.2	32
2023 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
2023	1	11.0	11.0	11.0	NA
2023 All CLMP Lakes	220	<5	220.0	20.7	21.3

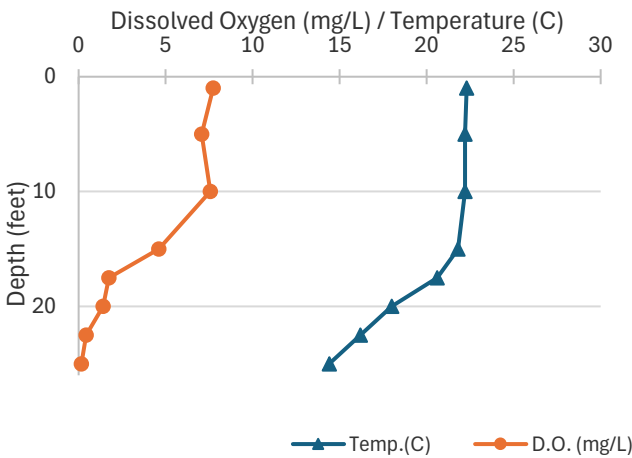
No graph: Not enough data

## Summer Phosphorus (parts per billion)

Year	# Samples	Min	Max	Avg	Std. Dev	Carlson TSI
2023	1	5.0	5.0	5.0	NA	27
2023 All CLMP Lakes	234	<= 3	150.0	17.4	15.3	45

No graph: Not enough data

## Dissolved Oxygen and Temperature Profile 8/24/23



## Summary

Average TSI	2023
Lime Lake	32
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. 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.

Based on your 2023 monitoring of Secchi transparency, chlorophyll-a and summer phosphorus, this lake is rated as oligotrophic, with a TSI score of 32.

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

\* = 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.

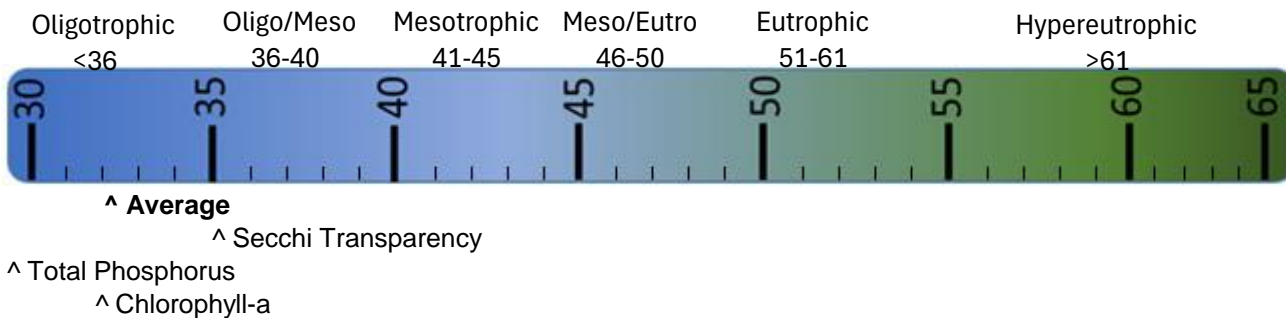
The tables below give the results-to-TSI conversions for the water quality data ranges normally seen in the CLMP. The formulas for this conversion can be found in the CLMP manual (link is on page 2 of this report).

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 Lime Lake in 2023	
Average	32
Secchi Disk	35
Summer TP	27
Chlorophyll-a	32



**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.

# Lime Lake, Benzie County 2023 CLMP Aquatic Plant Results



The Aquatic Plant Mapping survey was conducted on Lime Lake in 2023.

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 18 locations (6 transects) in Lime Lake in 2023. Below is a list of species reported, in order of relative abundance. Survey conducted July 7.

Lime Lake, Benzie County 2023 Aquatic Plant Mapping: Species Reported		
<u>Common Name</u>	<u>Latin Name</u>	<u>Average Density*</u>
Stonewort	<i>Chara</i> sp.	3.44
White-stem pondweed	<i>Potamogeton praelongus</i>	1.06
Water smartweed	<i>Persicaria amphibia</i>	0.72
Floating-leaf pondweed	<i>Potamogeton natans</i>	0.44
White water lily	<i>Nymphaea odorata</i>	0.44
Variable pondweed	<i>Potamogeton gramineus</i>	0.39
Flat-stem pondweed	<i>Potamogeton zosteriformis</i>	0.33
Slender naiad	<i>Najas flexilis</i>	0.33
Bulrush		0.28
Yellow water lily	<i>Nuphar variegata</i>	0.28
Native cattail	<i>Typha latifolia</i>	0.11
Bladderwort	<i>Utricularia</i> sp.	0.06

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

Visit the MiCorps Data Exchange ([www.micorps.net](http://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.

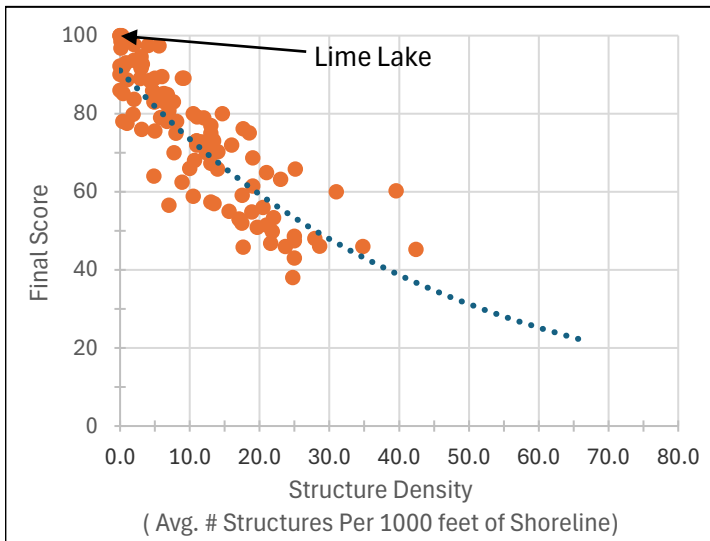
# Lime Lake, Benzie County 2023 Score the Shore Results



The Score the Shore Habitat Assessment was conducted on Lime Lake in 2023.

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 pristine.

### How does your lake compare to others in the program?



Lime Lake	
Number of Sections:	8
Number of Structures:	0
Structure Density:	0
Final Score:	100

All 106 Participating Lakes from 2015-2023:	
Avg. Number of Sections:	16
Avg. Number of Structures:	223
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.

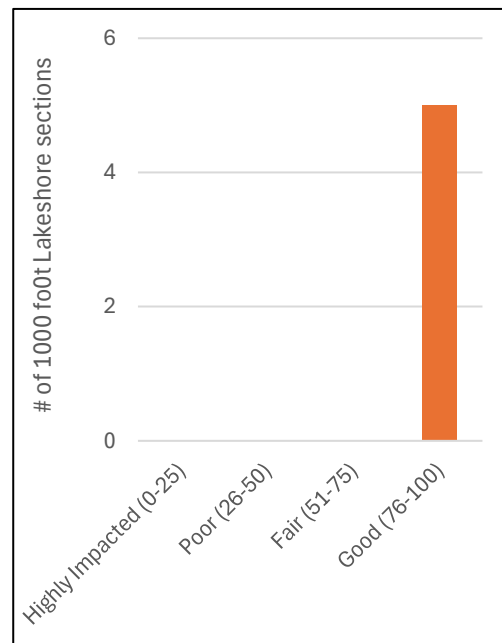
### Analysis specific to Lime Lake:

Lime Lake is a pristine, untouched lake. 100% percent of the lake sections scored a perfect score. It has no buildings or docks in it, and is surrounded by natural areas.

Lime Lake has a littoral zone full of aquatic plants and fallen woody debris, making this an excellent place for fish, birds, turtles, and any other creature that relies on a watery habitat.

There are no notable erosion points on the lake.

Lime Lake is the first lake in the CLMP (along with Ransom Lake, Benzie County) to ever get a perfect score in the Score the Shore analysis.



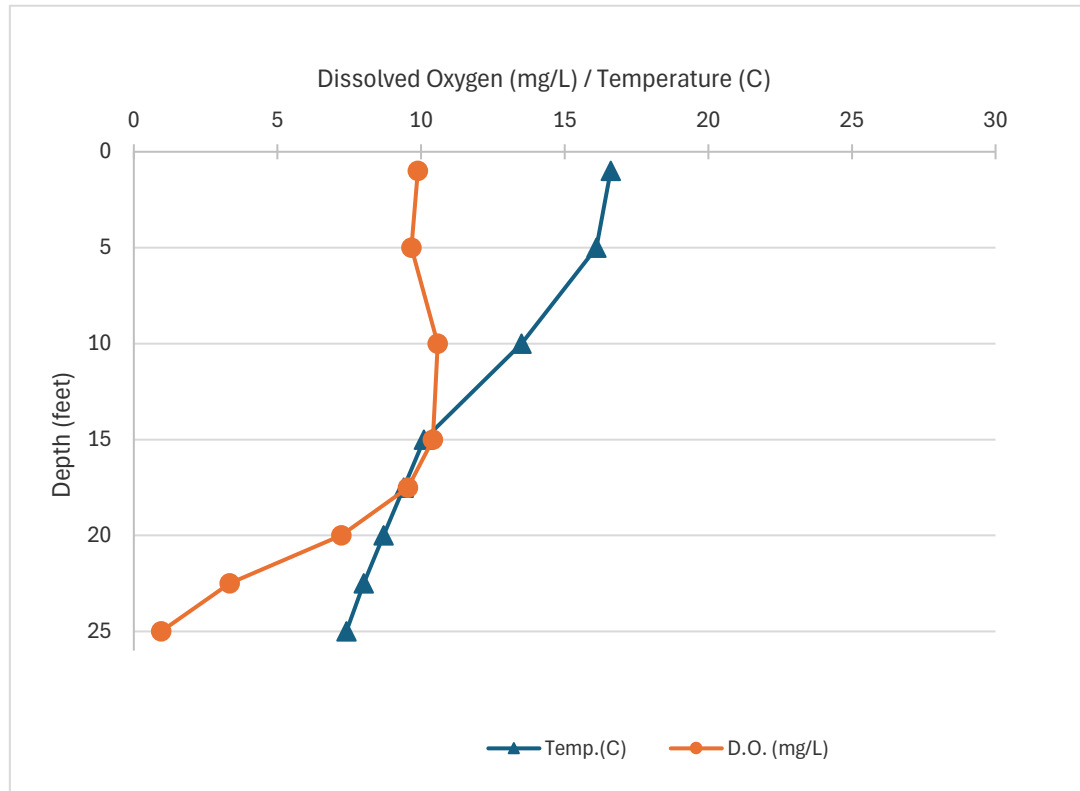
Name: Lime Lake  
County: Benzie  
Site ID: 100279  
Date: 5/18/2023

### Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	16.6	9.89
5	16.1	9.67
10	13.5	10.58
15	10.1	10.41
17.5	9.4	9.54
20	8.7	7.23
22.5	8	3.34
25	7.4	0.95

Lake: Lime Lake (Benzie Co.)

5/18/2023



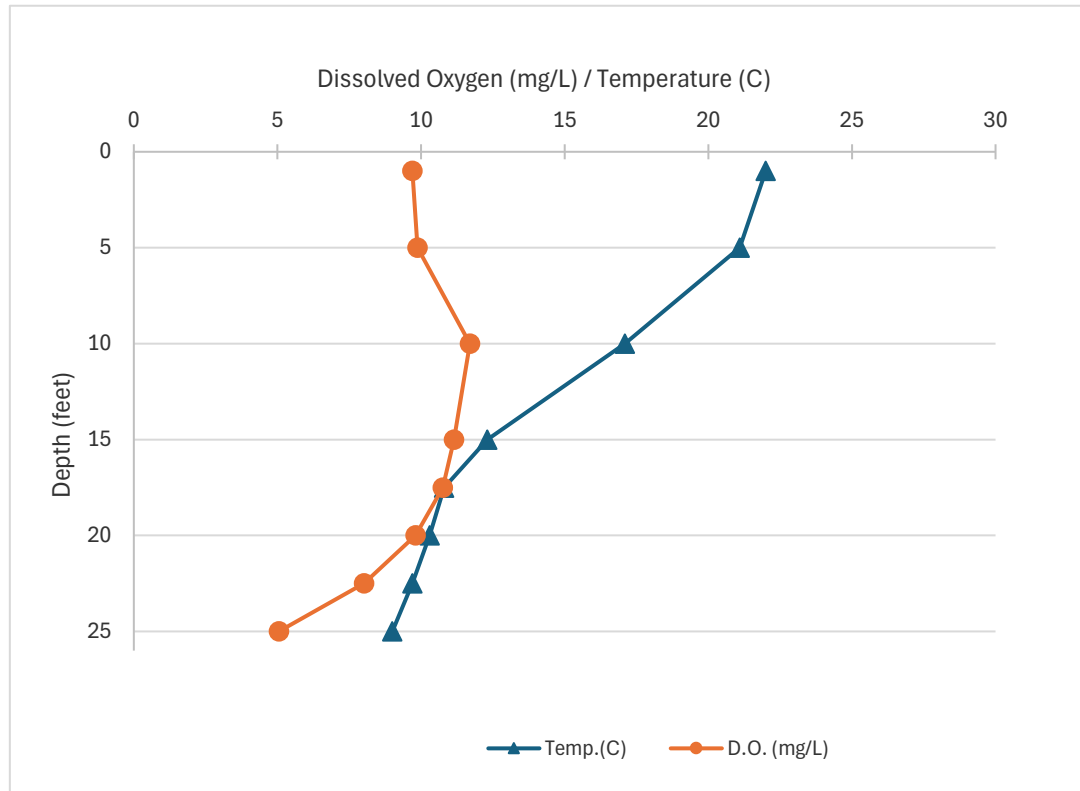
Name: Lime Lake  
County: Benzie  
Site ID: 100279  
Date: 5/30/2023

### Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	22	9.7
5	21.1	9.88
10	17.1	11.7
15	12.3	11.15
17.5	10.8	10.76
20	10.3	9.81
22.5	9.7	8.02
25	9	5.05

Lake: Lime Lake (Benzie Co.)

5/30/2023





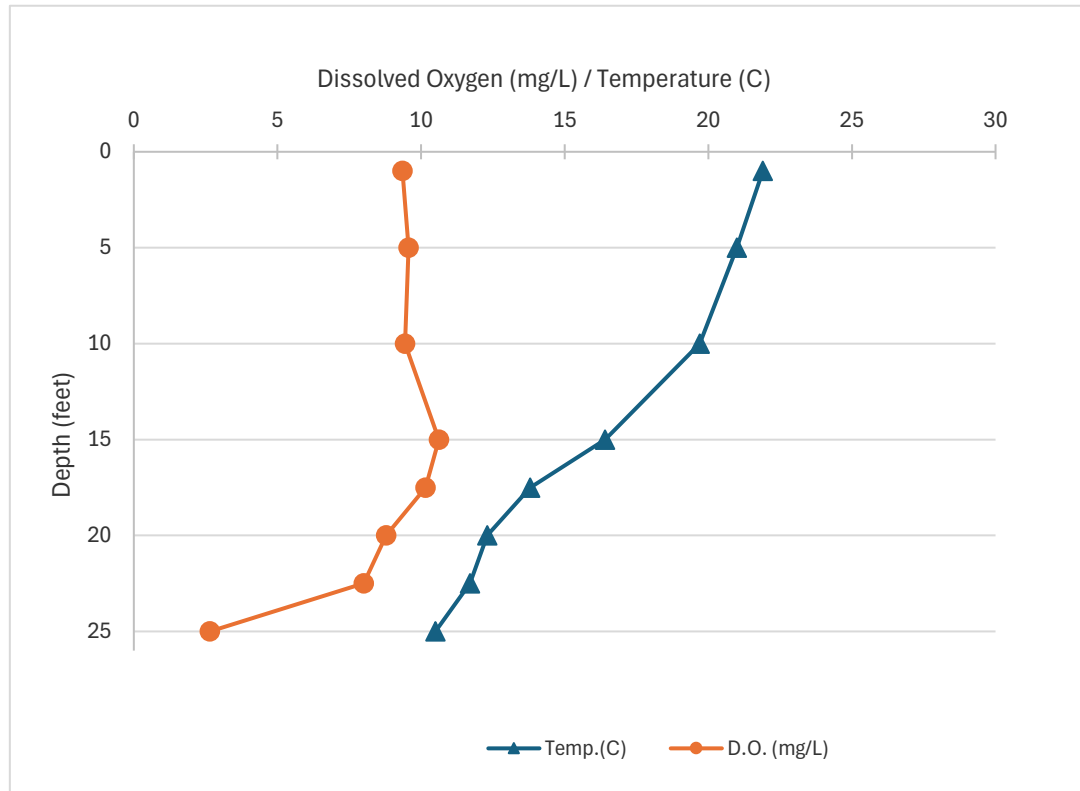
Name: Lime Lake  
County: Benzie  
Site ID: 100279  
Date: 6/20/2023

### Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	21.9	9.35
5	21	9.56
10	19.7	9.44
15	16.4	10.62
17.5	13.8	10.16
20	12.3	8.79
22.5	11.7	8.01
25	10.5	2.65

Lake: Lime Lake (Benzie Co.)

6/20/2023



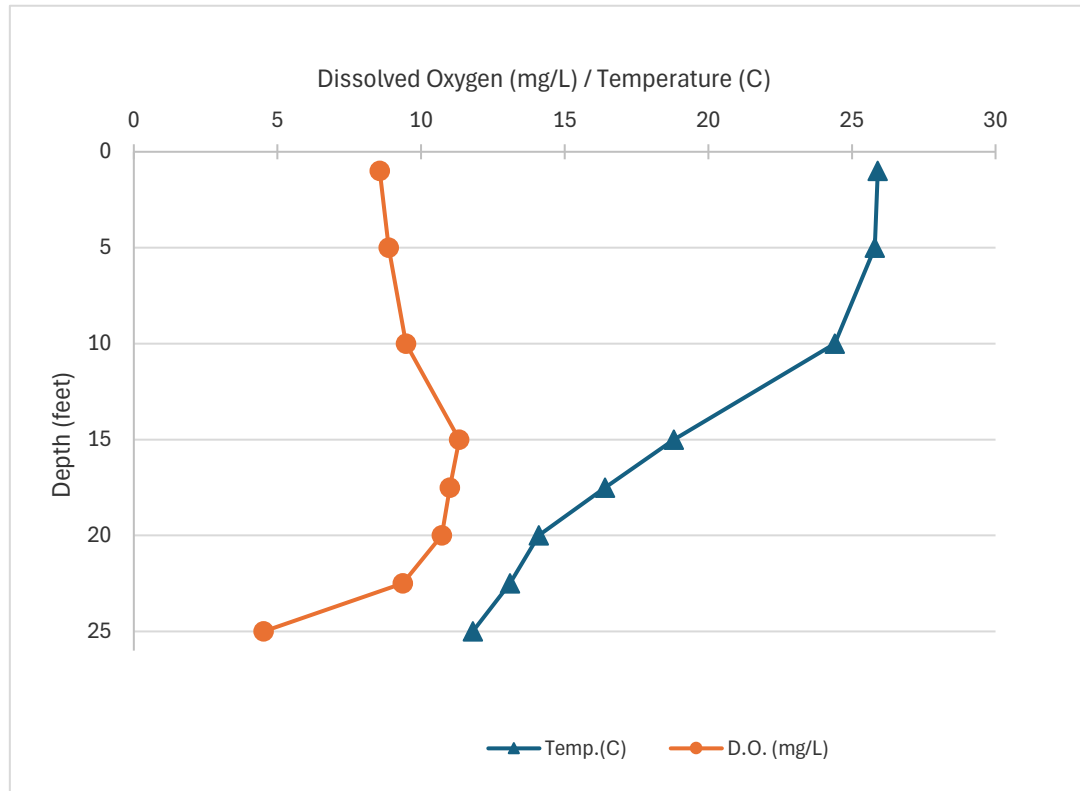
Name: Lime Lake  
County: Benzie  
Site ID: 100279  
Date: 7/7/2023

### Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	25.9	8.56
5	25.8	8.87
10	24.4	9.47
15	18.8	11.33
17.5	16.4	11
20	14.1	10.72
22.5	13.1	9.36
25	11.8	4.52

Lake: Lime Lake (Benzie Co.)

7/7/2023



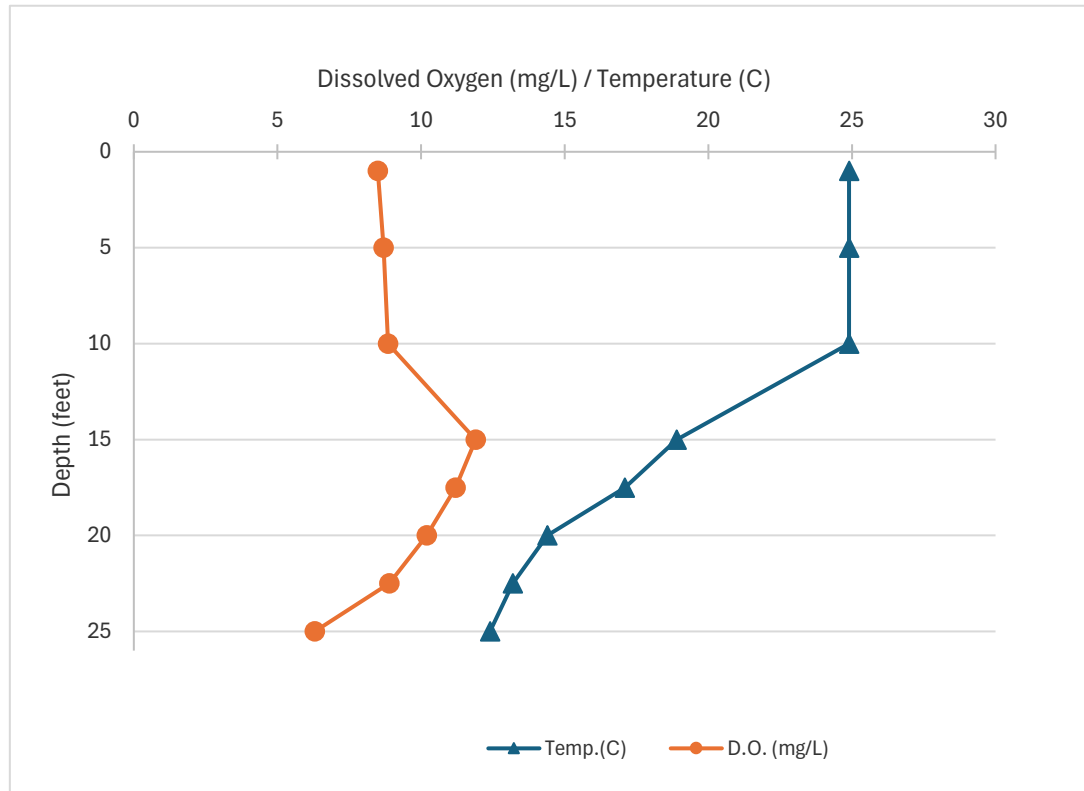
Name: Lime Lake  
County: Benzie  
Site ID: 100279  
Date: 7/11/2023

### Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	24.9	8.5
5	24.9	8.7
10	24.9	8.85
15	18.9	11.9
17.5	17.1	11.2
20	14.4	10.2
22.5	13.2	8.9
25	12.4	6.3

Lake: Lime Lake (Benzie Co.)

7/11/2023



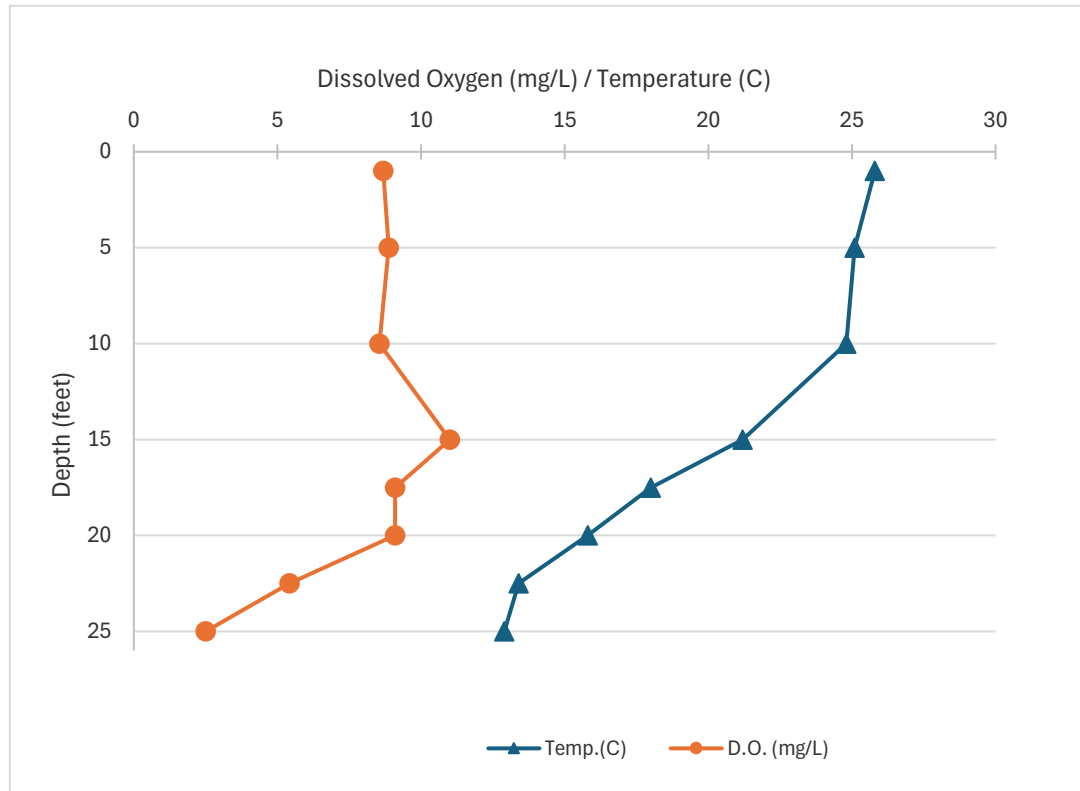
Name: Lime Lake  
County: Benzie  
Site ID: 100279  
Date: 7/24/2023

### Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	25.8	8.69
5	25.1	8.87
10	24.8	8.55
15	21.2	11
17.5	18	9.1
20	15.8	9.1
22.5	13.4	5.42
25	12.9	2.5

Lake: Lime Lake (Benzie Co.)

7/24/2023



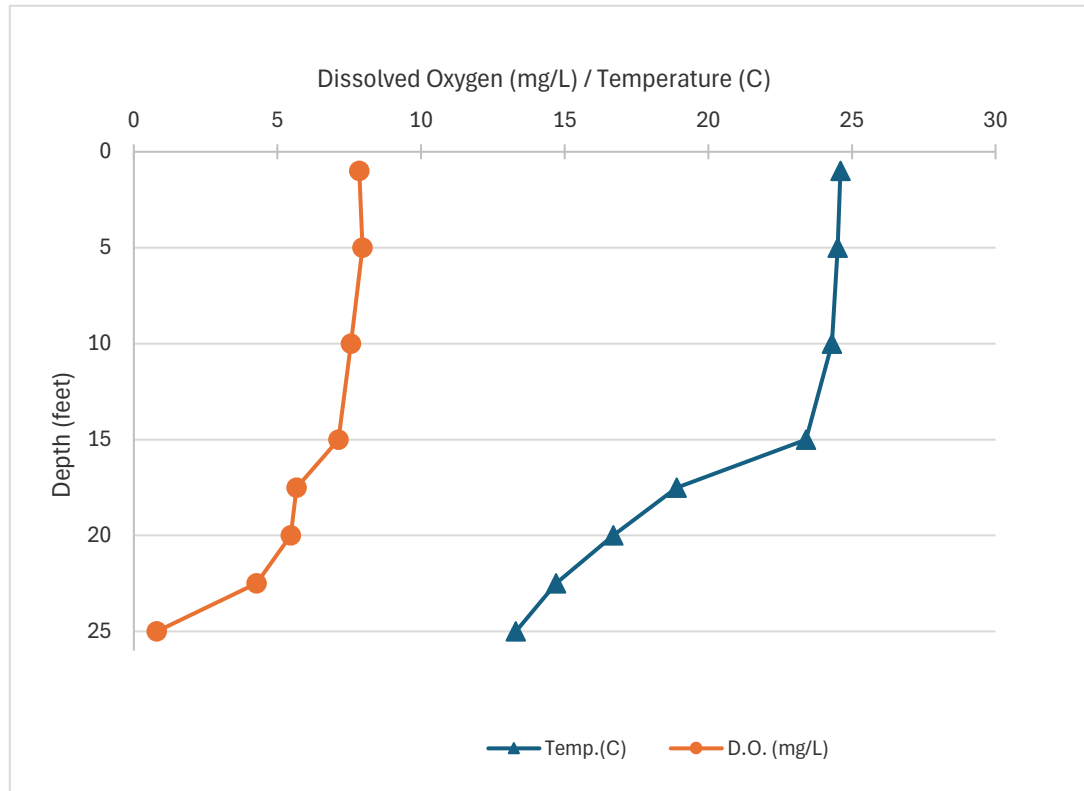
Name: Lime Lake  
County: Benzie  
Site ID: 100279  
Date: 8/9/2023

### Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	24.6	7.85
5	24.5	7.96
10	24.3	7.56
15	23.4	7.13
17.5	18.9	5.67
20	16.7	5.47
22.5	14.7	4.27
25	13.3	0.8

Lake: Lime Lake (Benzie Co.)

8/9/2023



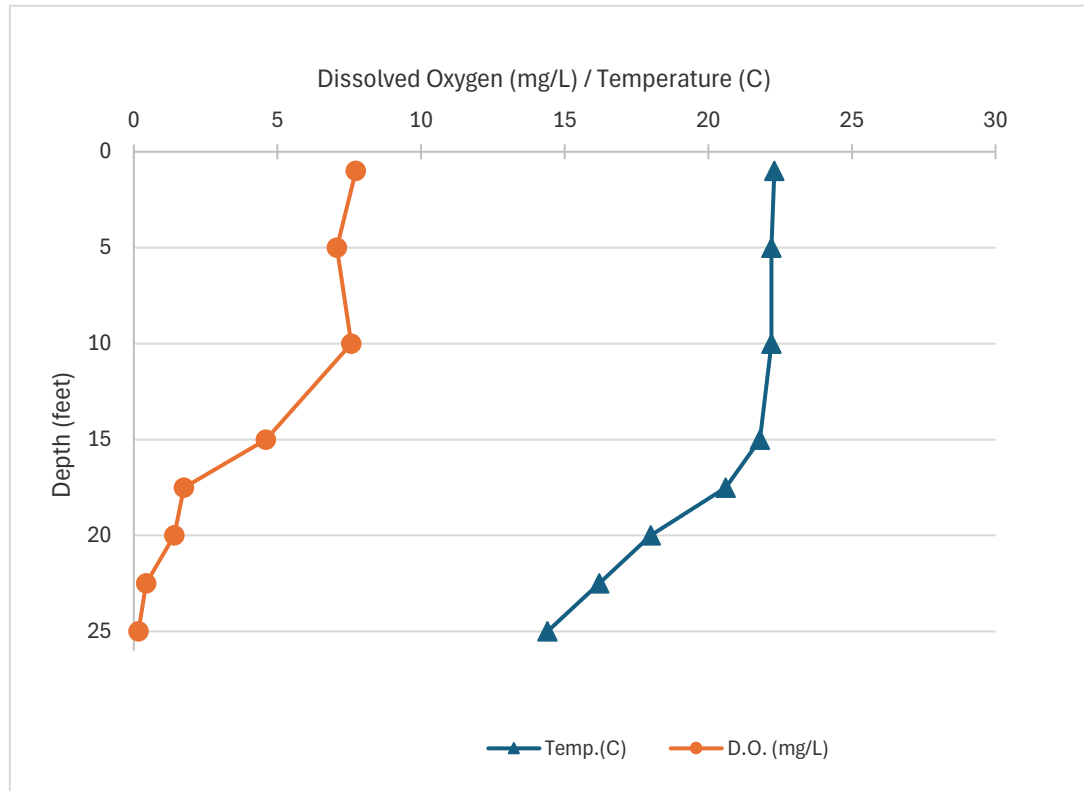
Name: Lime Lake  
County: Benzie  
Site ID: 100279  
Date: 8/24/2023

### Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	22.3	7.73
5	22.2	7.07
10	22.2	7.57
15	21.8	4.6
17.5	20.6	1.74
20	18	1.41
22.5	16.2	0.43
25	14.4	0.16

Lake: Lime Lake (Benzie Co.)

8/24/2023



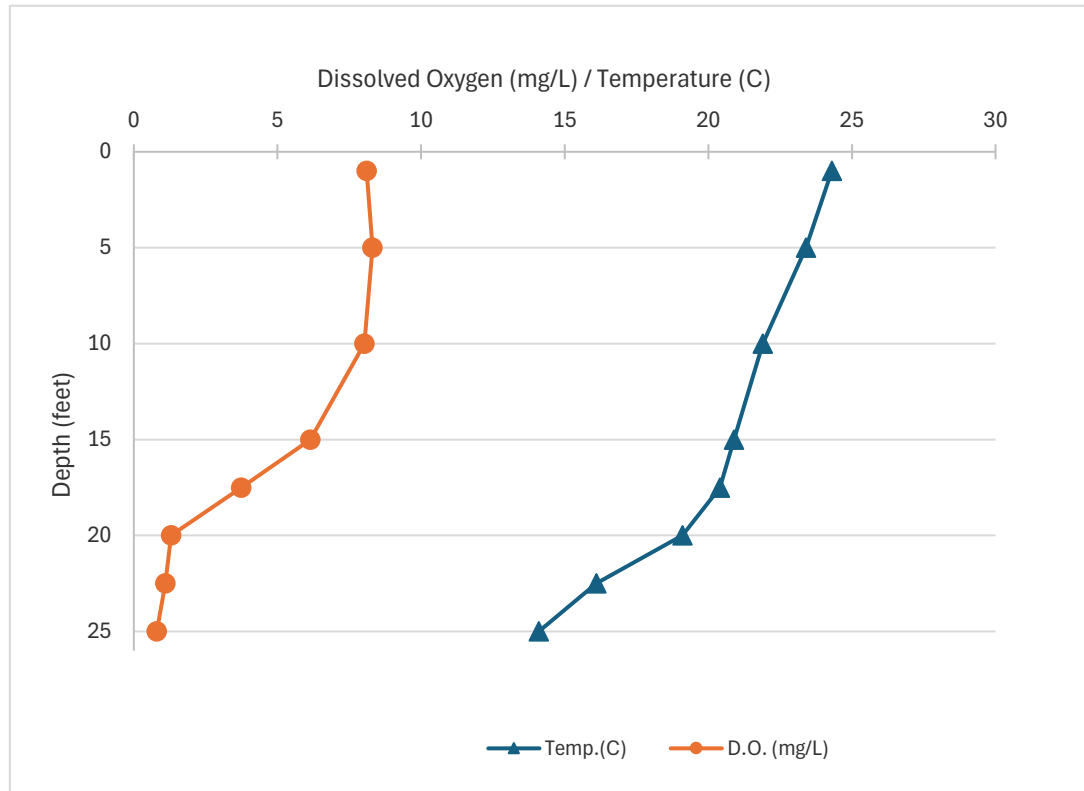
Name: Lime Lake  
County: Benzie  
Site ID: 100279  
Date: 9/6/2023

### Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	24.3	8.1
5	23.4	8.31
10	21.9	8.03
15	20.9	6.14
17.5	20.4	3.74
20	19.1	1.3
22.5	16.1	1.1
25	14.1	0.8

Lake: Lime Lake (Benzie Co.)

9/6/2023



Name: Lime Lake  
County: Benzie  
Site ID: 100279  
Date: 9/22/2023

### Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	21.2	8.59
5	19.9	8.39
10	19.2	8.35
15	18.8	8.37
17.5	18.6	6.24
20	18.2	4.23
22.5	17	1.41

Lake: Lime Lake (Benzie Co.)

9/22/2023

