

Determining the Water Quality of Lake Norconian

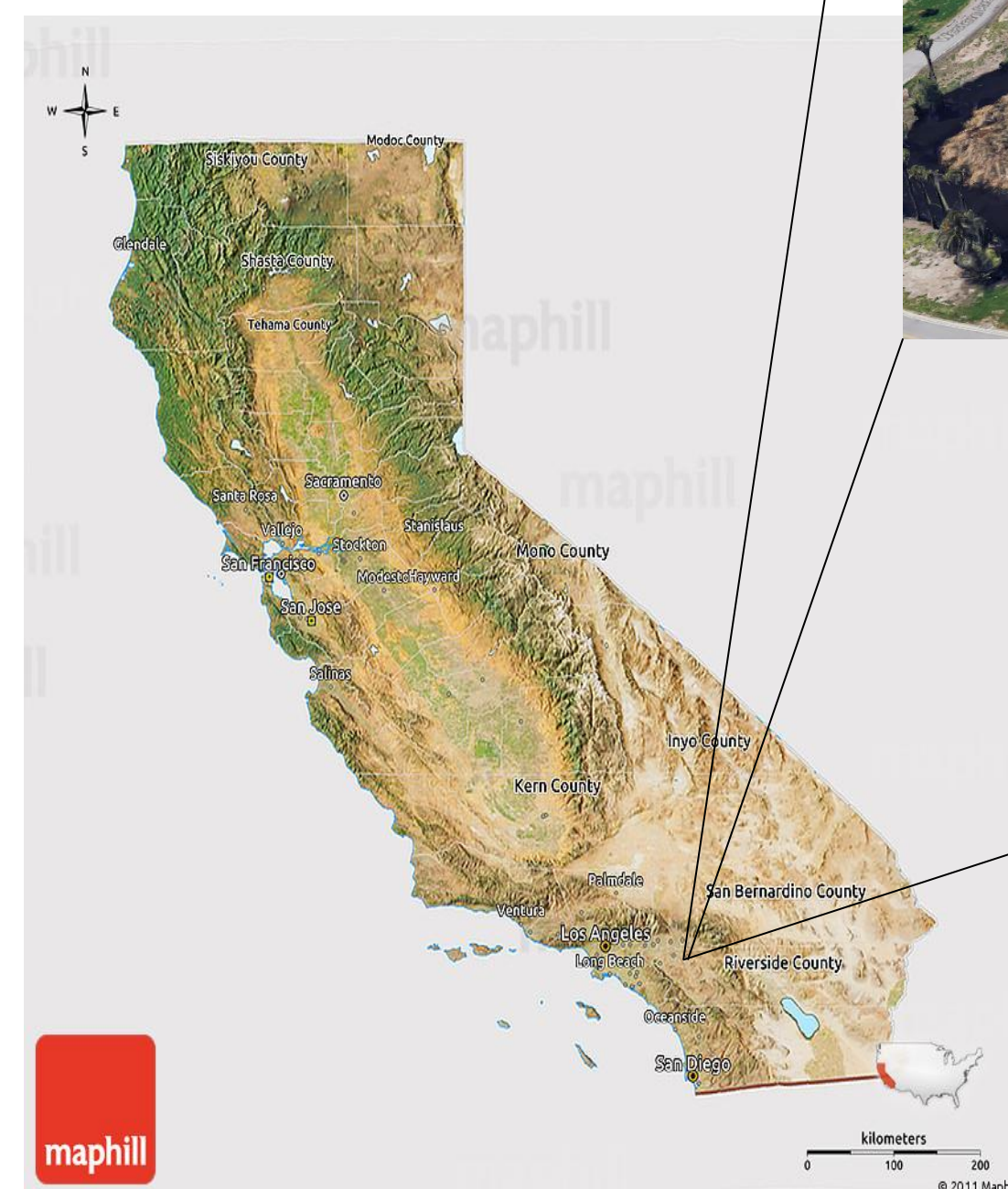
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Introduction

Lake Norconian is a 60-acre artificial lake in the city of Norco in Southern California. It was created in the early 1920s as part of the Norconian Resort. This lake was equipped with a boat house and a pavilion. The resort buildings and the lake were acquired by the U. S. government in 1941, and the lake now sits in federal government land.

A few years back, a few dead fish were observed floating in Lake Norconian, but none has been observed since then. This research project investigated what essential qualities a lake must have in order for fish and wildlife to flourish in Lake Norconian.



Question

What makes the water at Lake Norconian healthy for the fish, ducks, and birds it provides for?

Hypothesis

- Since there have been no dead fish sighted at Lake Norconian recently, and the fish and wildlife are thriving, the hypothesis is that the lake's water temperature, pH levels, and Dissolved Oxygen levels are at appropriate levels in order for fish to survive.

Methods

- Water was sampled at Lake Norconian almost every week from August 2019 to March 2020.
- Water samples were analyzed for Temperature, pH levels, and Dissolved Oxygen levels using the GLOBE protocols.
- For water temperature, five thermometers were calibrated by using an ice bath and by following the procedures from the GLOBE protocol. Three of the thermometers failed calibration since they were more than 2°C off when reading 0°C. The two thermometers that passed calibration read 0.5°C and 0°C while in an ice bath. The one that read 0°C while in the ice bath was the most accurate, and was the thermometer that was used throughout this research project.
- pH paper was used to measure the lake's pH level.
- A Dissolved Oxygen (DO) test kit was used to measure the lake's DO level.

Results

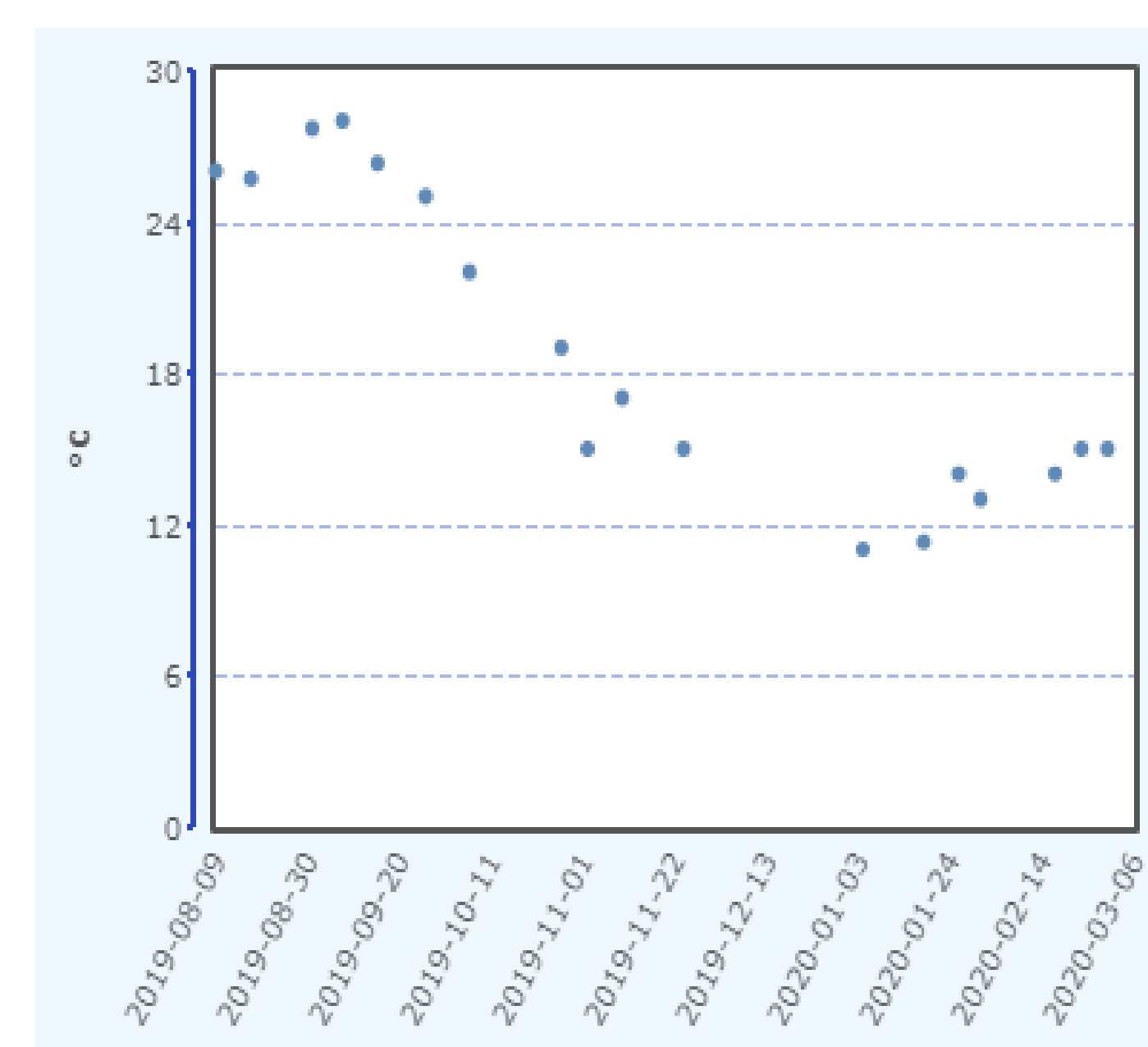


Figure 1. Water temperature data taken at Lake Norconian from August 2019 to March 2020.

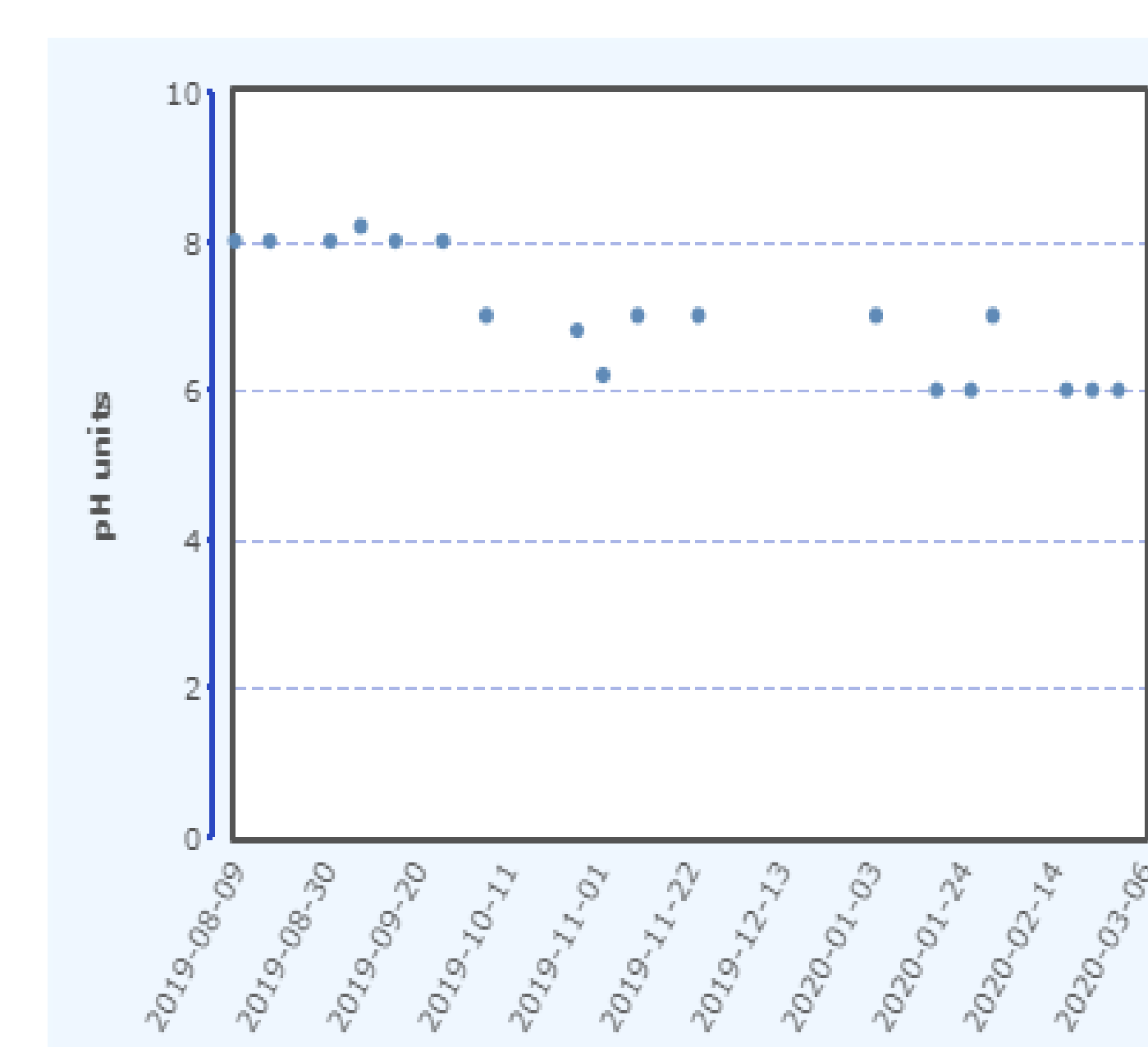


Figure 2. pH level data taken at Lake Norconian from August 2019 to March 2020.

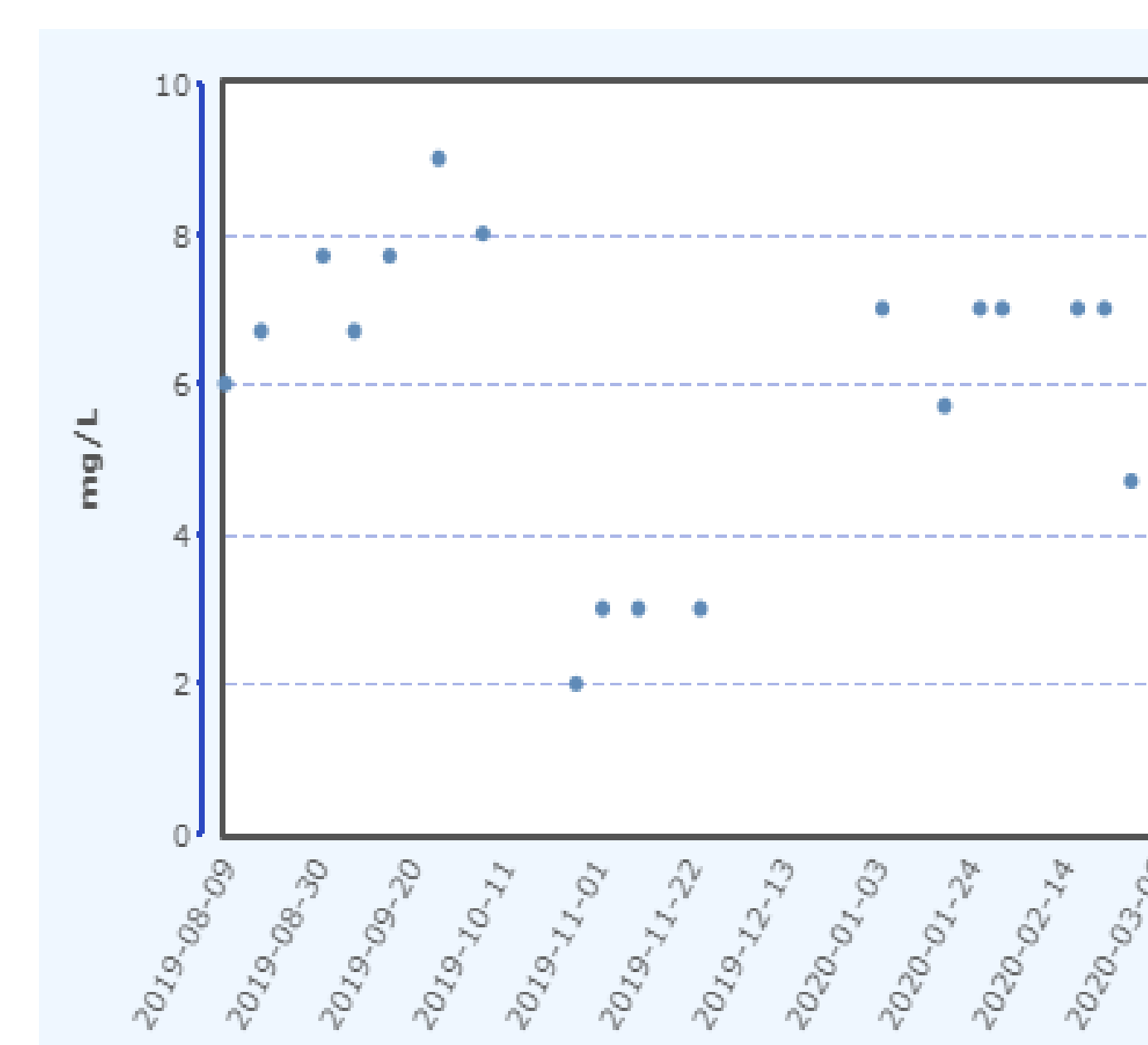


Figure 3. Dissolved oxygen data taken at Lake Norconian from August 2019 to March 2020.

Discussion and Conclusions

As expected, the water temperature of the lake rose and dropped in accordance with the seasons. The lake's water temperature peaked at 28°C in August 2019 and reached a low of 11°C in January 2020.

The lake's pH level were consistently between 6 and 8 pH units from August 2019 to March 2020. Those pH levels are within the optimum levels for fish to survive, according to the Environmental Learning Center website, and is one of the reasons fish are thriving at the lake.

According to the Water Research Center website, the Dissolved Oxygen (DO) level needs to be above 4 mg/L in order for fish to survive. The data shows this reading until November 2019, when the data collected were showing below 4 mg/L. After analyzing the data, it was suggested that there may be a bad batch of ampoules in the DO Kit. After measurements were made with a new batch of ampoules, the DO level readings were back to normal levels.

Other than those outlier data from DO measurements, the hypothesis was proven correct. Lake Norconian's water temperature, pH levels, and DO levels are all at appropriate levels in order for fish to survive. That is why fish and other wildlife are thriving at Lake Norconian.

Next Steps

Since one of the batches in the Dissolved Oxygen (DO) kit that was used gave suspect data, a new DO kit from a different manufacturer will be used in the next round of measurements at the lake. The DO kit that will most likely be used will be from the manufacturer that GLOBE recommends, which is the LaMotte kit.

It is also planned to obtain new equipment in order to measure the lake's Electrical Conductivity (EC) levels. Knowing the lake's EC levels would lead to a better understanding of the water quality of the lake.

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