49ER WATER
A Full Service Environmental Laboratory

245 New York Ranch Rd, Ste A, Jackson CA 95642 (530)277-2770

Lake of the Pines Monthly report

September 2020 Monitoring Report

49er Water Laboratory contracts with Lake of the Pines, performing monthly monitoring of various analytes at various parks around the lake. Locations are alternated throughout the season and median levels each month are tracked with previous data to track any changes to water quality within the lake.

Lake of the Pines has a more rigorous testing regimen than most lakes in the area. Lake Wildwood does perform weekly e. Coli testing, which is available on their website, during the summer due to high levels of e. Coli in previous years. Lake of the Pines Association performs monthly testing and we have systems in place to take additional tests should we detect elevated levels. However, to date we have not seen alarming spikes in regular e. Coli monitoring. Lake of the Pines Association takes monitoring a step further, performing other water quality tests to ensure algae growth does not exceed normal levels, and water clarity remains as clear as possible during the warm summer months.

We are most focused on spring and summer months, though we perform the same monitoring in January each year to ensure water quality constituents remain low. Spring and summer result in warmer temperatures and extended daylight hours, which play a huge role on water quality in any body of water.

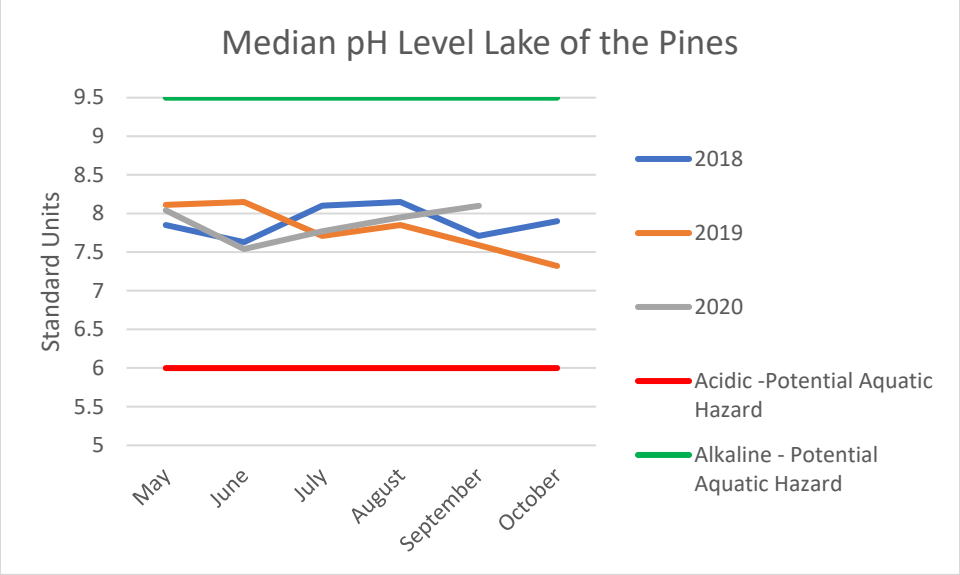
- As water temperatures increase algal growth will also increase. Algae plays a crucial role in a healthy water system. However, an abundance can have adverse effects. During daylight hours algae undergoes photosynthesis creating elevated dissolved oxygen levels which promote aquatic life and facilitate the natural breakdown of organic materials within a lake. During night hours the algae will revert to respiration, consuming that oxygen, producing carbon dioxide that in turn converts to carbonic acid, which will lower the pH in the water. Excess algae can cause large fluctuations in pH and dissolved oxygen, so it is important to keep algae in check as if the fluctuations become too great they can have detrimental effects on aquatic life.
- PTOX or cyanobacteria can also flourish in the warmer weather. At low levels it is not dangerous and is completely natural. Cyanobacteria at high levels will not only kill aquatic life but any wildlife consuming the water. With increased cannabis cultivation in the foothills this has become a major issue with foothill waterways. Runoff from the nutrients provided to cannabis contaminate runoff and provide the nutrients necessary for cyanobacteria to flourish. It is important to

monitor these levels throughout the summer to prevent any out of control blooms from forming.

- E. Coli is a natural bacteria produced from fecal contamination of the wildlife. At higher levels it can become a risk factor for recreational water activities. For this reason Lake of the Pines implemented a Geese reduction plan to alleviate potential increased contamination. The warmer summer months increase water temperature allowing e. Coli to multiply. There are no visible indicators to suggest high e. coli contamination so it is important to test regularly to ensure levels remain below thresholds of concern.

pH~

pH is a measure of acidity or alkalinity in water. It can be useful in ponds and lakes as extreme readings away from a neutral pH of 7 can suggest a number of potential problems. pH will also change throughout the day, depending on algae concentrations so seeing minor variance should not be cause for alarm. It's solely used to track potential problems. Normal pH levels fluctuate between 6.0-9.5, oftentimes depending on time of day.



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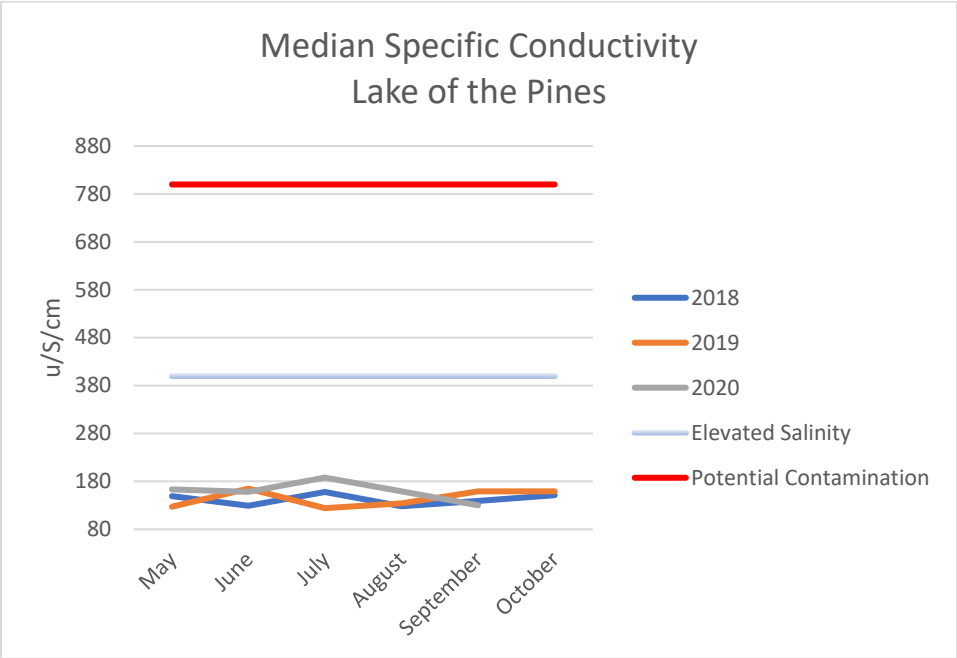
Specific Conductivity~

Specific Conductivity is a measure of salinity in water. Again, it is a useful analyte to monitor over the long-term as it can indicate an increased level of salts in the water over time. It can also be used to locate sources of contamination if there are large variances in certain regions of lake water. Lakes can range anywhere from 100-800 uS/cm depending on many factors and can vary significantly even with nearby lakes, all dependent on the source water feeding the lake.



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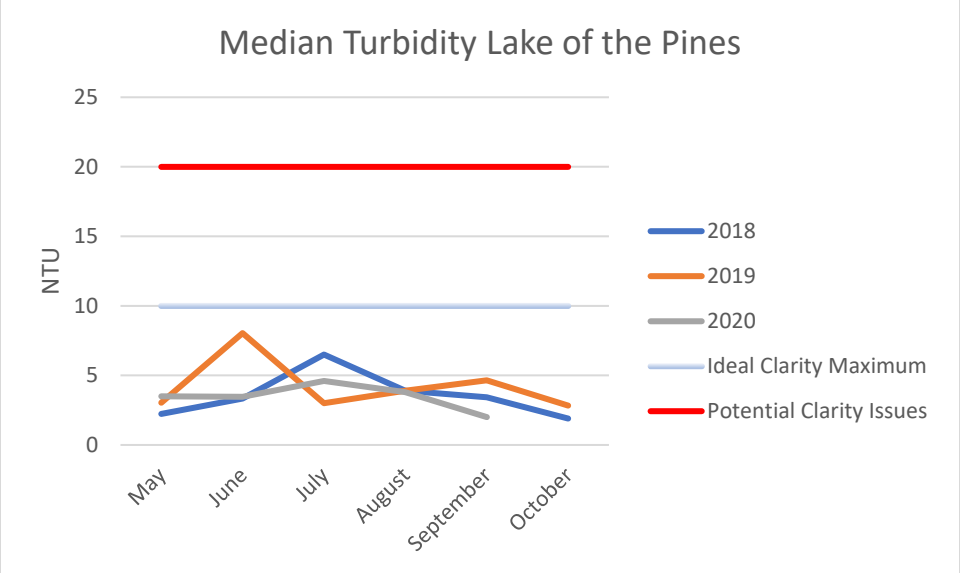
Turbidity~

This is a measure of water clarity. Light is shined through a known volume of water and its intensity is measured through that water to determine clarity. It is completely normal for clarity to worsen during hot summer months as the lake "turns over" (a measure used to describe the time it takes for water at the bottom of the lake to reach the top and return to the bottom) more frequently. Over the long-term we can detect potential worsening water quality if turbidity begins to rise year round. Worsening turbidity can be linked to increased algal growth or increased sediment disturbance or contaminated source water feeding the lake. Turbidity readings of less than 10 NTU indicate a clean body of water, although many lakes can reach up to 20 NTU in the Sierra Nevada Foothills. These values can go into the 100's during rain events as erosion from water runoff runs into a lake.



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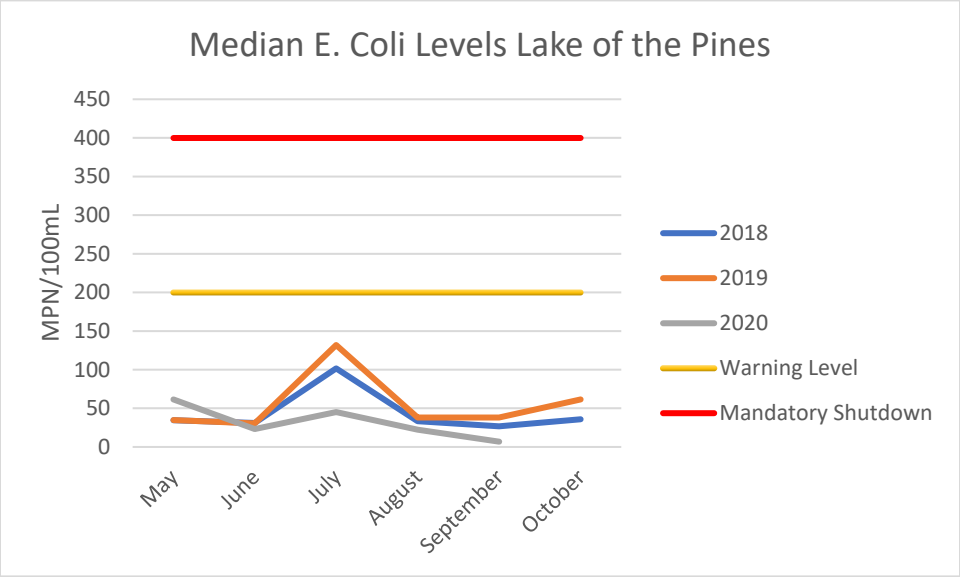
E. Coli~

E. Coli is a measure of a specific fecal coliform bacteria and can be used to monitor overall safety of lake water. All bodies of water are expected to have some E. Coli. State Health rules state that a level of 200 MPN/100ml should be a warning level that it may be unsafe for recreational purposes. A level of 400 MPN/100ml institutes a shut down of all recreational water activity.



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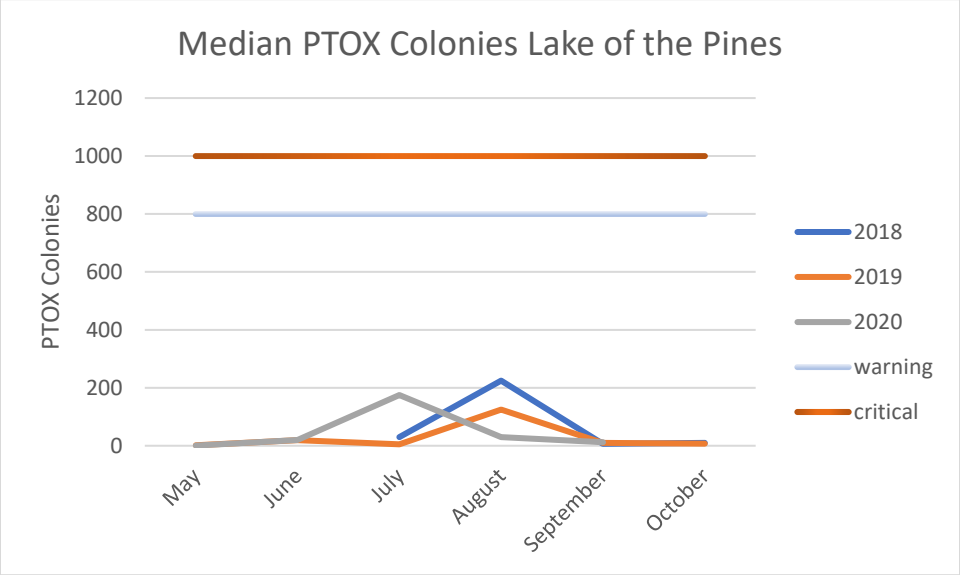
PTOX~

These are an entire subgroup of algae, linked to Cyanobacteria which can be deadly for aquatic life and land animals. It is not uncommon to have low levels of this algae. However, long-term monitoring can play a crucial role in recognizing an increased level of bloom early in the season which can lead to an out of control bloom in late summer. These out of control blooms are what is particularly dangerous to animals and aquatic life. There is no known value which indicates a bloom is eminent. However, if this value reaches 800-1000 cells it is a strong indicator that a serious problem is developing.



Biological Oxygen Demand~

This is a test to determine oxygen demand of all biological activity and its oxygen demand in a water sample. High oxygen demand can suggest risk of a body of water going "septic," essentially dead for aquatic life. While we monitor this regularly, the level is consistently very low level or zero, so do not include it in a graphical format for

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monitoring. If we ever do notice an uptick in the oxygen demand, we will immediately notify Lake of the Pines for further action to address the situation.

Monthly Conclusions

As we have seen in the past, temperatures in September begin to decrease and we see a large reduction in detection of analytes we are monitoring. We saw this reduction to an extent the last week of August (last sampling event) due to fires in the area. The smoke brought cooler weather, beginning the reduction in detections. In September we saw median E. Coli levels drop to the lowest level we have seen since 2018 monitoring. Turbidity levels also fell to levels we have not seen since October 2018.

Shane Burr
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Managing Partner