**Week 8: Lab Analysis with the Meridian Wastewater Lab**

Our water and our used water go through many processes. We want to make sure that we have enough water for human uses as well as water for the organisms that rely on the river. Additionally, we need to make sure that the treated water going back into the river (called effluent) from a wastewater treatment facility is going to support the ecosystem and downstream communities rather than pollute them. There are several water quality labs in the Treasure Valley that test many types of water to check water quality. We are going to share with you a few parameters they test for and then ask you to complete some activities based on lab analysis.

Things labs test for in the Boise River and in our reused water:

**E. coli:** E. coli is a type of bacteria that lives in the guts of humans and animals. Most of the time, it is harmless. However, certain strains of the bacteria can make people and animals sick. There is E. coli and other coliforms that are found in the river, but if the numbers are low enough, people are usually safe. E. coli is often measured in Colony Forming Units (CFU) per 100ml of water. Sometimes this number is written as Most Probable Number (MPN) per 100ml of water. In our freshwater, levels of E.coli should be less than 33 CFU/100ml for a 30-day average and between 60-150 CFU/150ml for one sample. The following data is a one day sample collected by volunteers.

**TSS:** TSS stands for Total Suspended Solids. This is a measurement of the actual solid things that can be removed from water by a filter. Once scientists remove these solids, they can weigh them and find out how many suspended solids are in the water. The higher the number, the lower the water quality. The Boise River should be around 10 parts per million (ppm) or mg/L. The following data is a one day sample collected by volunteers.

**TN:** TN stands for Total Nitrogen. This a measure of Nitrogen in the water. Nitrogen is a nutrient that is very abundant on earth. When there is a lot of nitrogen, it leads to excess algal growth and lower water quality. Ideally, TN levels in the Boise River are less than 5 ppm or mg/L.

All TN measurements in August 2020 on the Boise River for Watershed Watch were less than 5 mg/L.

**Dissolved Oxygen (DO):** DO is a measurement of the oxygen in the water. The more oxygen, the more organisms in the water can live healthy lives. In the Boise River, an ideal DO level is 8 mg/L or higher. The following data is a one day sample collected by volunteers.

**pH:** pH is a measurement of how acidic or how alkaline (basic) a liquid is. When measuring pH, scientists are measuring the concentration of hydrogen ions in the water. pH is measured on a scale. This scale goes from 0-14. If a solution has a measurement of 7, it is neutral. If it has a measurement higher than 7 it is alkaline. If it has a pH of less than 7 it is acidic. Ideally, water in the Boise River is close to 7. The following data is a one day sample collected by volunteers.

**TP:** TP is a measurement of the Total Phosphorus in the water. Like TN, TP is a nutrient that leads to plant growth. Usually, the Boise River should have TP measurements less than 50 micrograms per liter (µg/L). The following data is a one day sample collected by volunteers.

**Activities for Week 8**

**Activity 1: How much is 1 ppm or 1 mg/L?**

Ppm and mg/L can be confusing when you hear them, but they are simple! They are both the same measurement so 1 ppm = 1 mg/L. Watch the following video to get an idea of how much a ppm or mg/l is: <https://ed.ted.com/lessons/how-to-visualize-one-part-per-million-kim-preshoff-the-ted-ed-community>

**Activity 2: pH is important!**

pH is something that we measure in solutions. You can find solutions with different pH measurements all around your house. Use online resources to find one solution in your house that is alkaline, one solution that is acidic, and one solution that is neutral. Write them below.

Resources:

<https://www.usgs.gov/media/images/ph-scale-0>

<https://www.sciencenewsforstudents.org/article/scientists-say-ph>

Alkaline Solution: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Acidic Solution: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Neutral Solution: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* Make certain that you are being safe with the different solutions. Ask an adult to help you determine if the solutions are safe for you to touch or smell.

**Activity 3: Look at the data!**

In the informational section of this lesson, we shared with you a lot of data about the Boise River and some of the information we received from the lab. Take a minute to review the data and answer the following question:

How does the Boise River water change as it flows downstream?

**FINAL WATERSHED WATCH ACTIVITY**

This is the last lesson in the Watershed Watch series. By watching the 8 videos and completing activities, you have now gotten a snapshot of the health of the Boise River! So, is the Boise River healthy? Write some of your ideas below based upon what you’ve learned: