



2017-18
South Fork McKenzie
Water Quality Analysis

Created by the 2017-18 Thurston HS
Water Quality Team



Introduction

- The McKenzie watershed provides over 260,000 people with water.
- Having extensive testing ensures safety to wildlife and humans.
- The top ecological concerns with the South Fork McKenzie include problems with campers, bypass roads, invasive plants, and the Cougar Dam.



The South Fork Project

- The two essential projects planned by the FY2012 Cougar Creek Watershed Restoration Action Plan, a part of the Willamette National Forest are to improve habitat conditions, and preserve wildlife and restore a series of side channels.
- This project will take approximately 6-7 years and cost around \$5,000,000 over the span of those years.
- WELL Project's Advanced Water Team Program has a big role in collecting water samples, retrieving data, and doing tests on the water collected.



South Fork Mckenzie Sub Basin Water Quality Map

1

Main Stem Mckenzie Boat Ramp

2

Delta Campground Side Channel

3

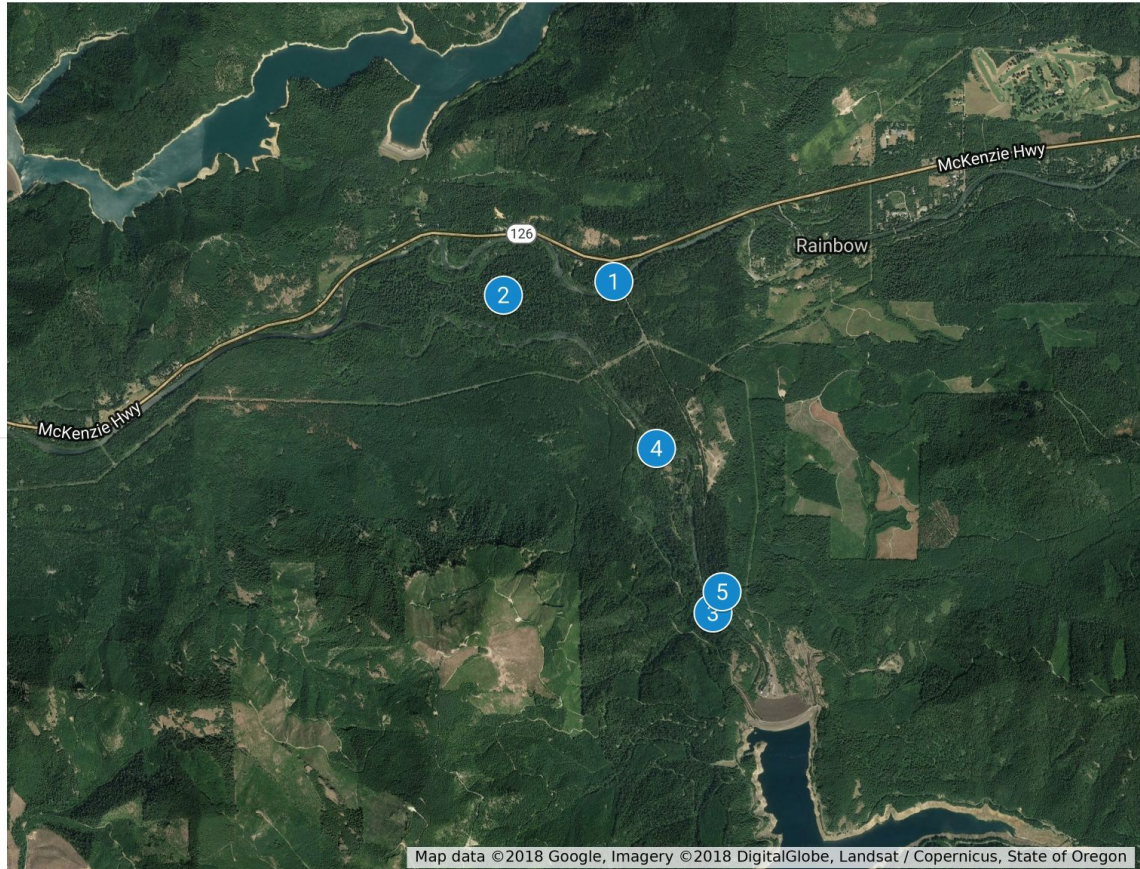
Stream Gauge Station

4

Strube Ponds Side Channel

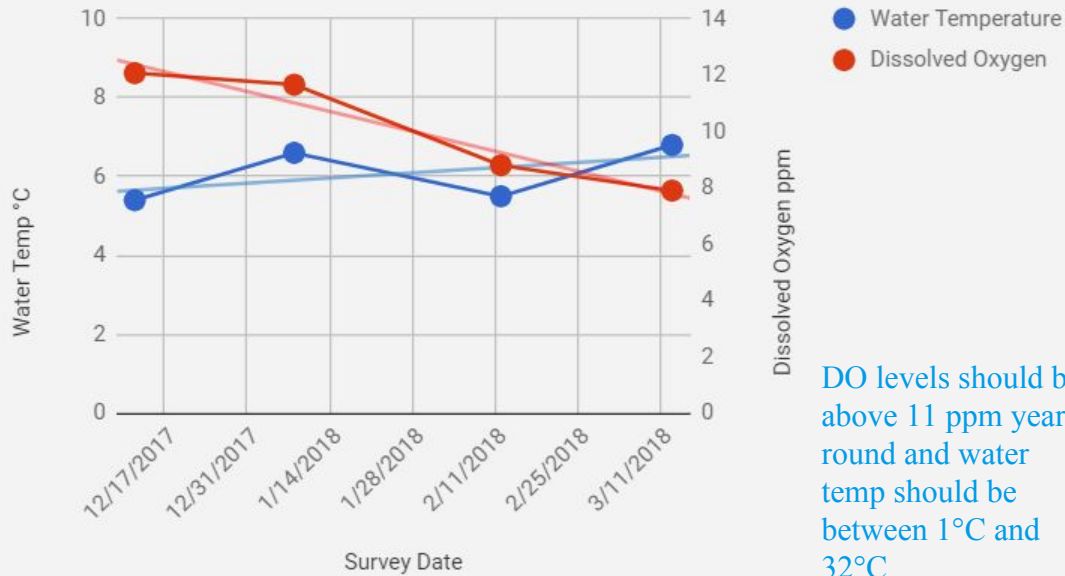
5

Site 5: Cougar Creek at NF-410 Road



Dissolved Oxygen and Water Temp At Cougar Creek

Water Temp and Dissolved Oxygen; Cougar Creek



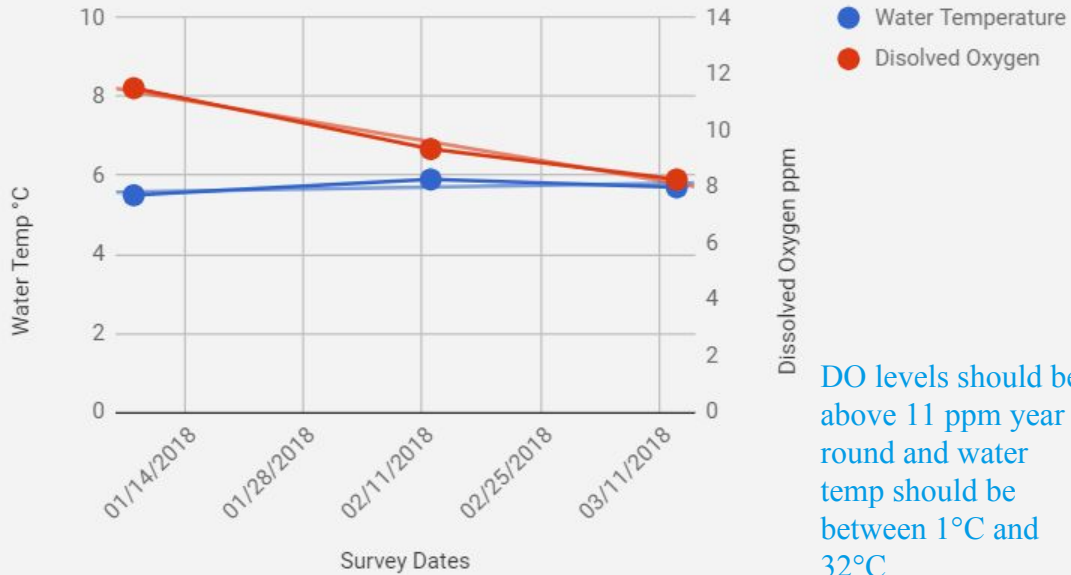
DO levels should be above 11 ppm year round and water temp should be between 1°C and 32°C.

- The lowest water temp (5.4°C) corresponded with the highest DO (12.07 ppm) and the highest water temperature (6.8 °C) corresponded with the lowest DO (7.9 ppm).
- Overtime, the results fluctuated more than usual, but water temp overall increases while DO decreases.
- There is an inverse correlation between high water temperature and low DO levels.

★ DO = Dissolved Oxygen

Dissolved Oxygen and Water Temp At USGS Stream Gauge

Water Temp and Dissolved Oxygen; Stream Gauge



DO levels should be above 11 ppm year round and water temp should be between 1°C and 32°C.

- The lowest water temp (5.5°C) corresponded with the highest DO (11.5 ppm). Where the highest water temperature (5.9°C) corresponded with the lowest DO (8.26 ppm).
- The water temp was relatively steady, while the DO declined slightly.

★ DO = Dissolved Oxygen

Dissolved Oxygen and Water Temp At Delta Ponds

Water Temperature and Dissolved Oxygen; Delta Ponds

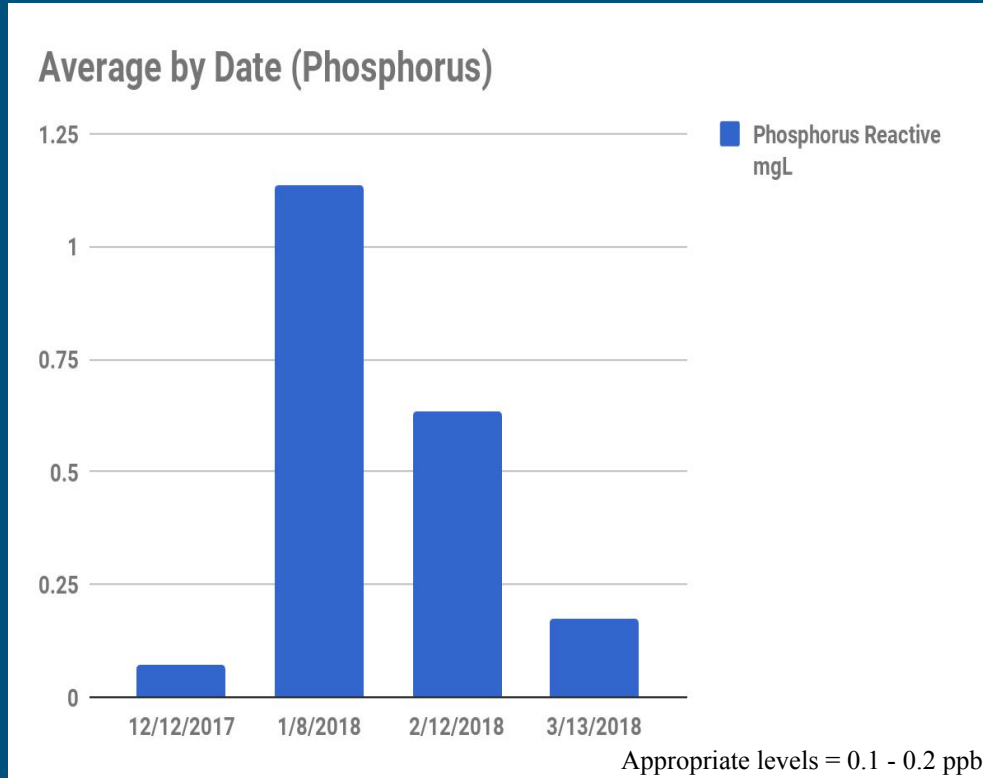


DO levels should be above 11 ppm year round and water temp should be between 1°C and 32°C.

- The lowest water temp (4.6°C) corresponded with the highest DO (11.66 ppm). Where the highest water temperature (5.8°C) corresponded with the lowest DO (8.4 ppm)
- The DO declines, as usual, while the water temp increases

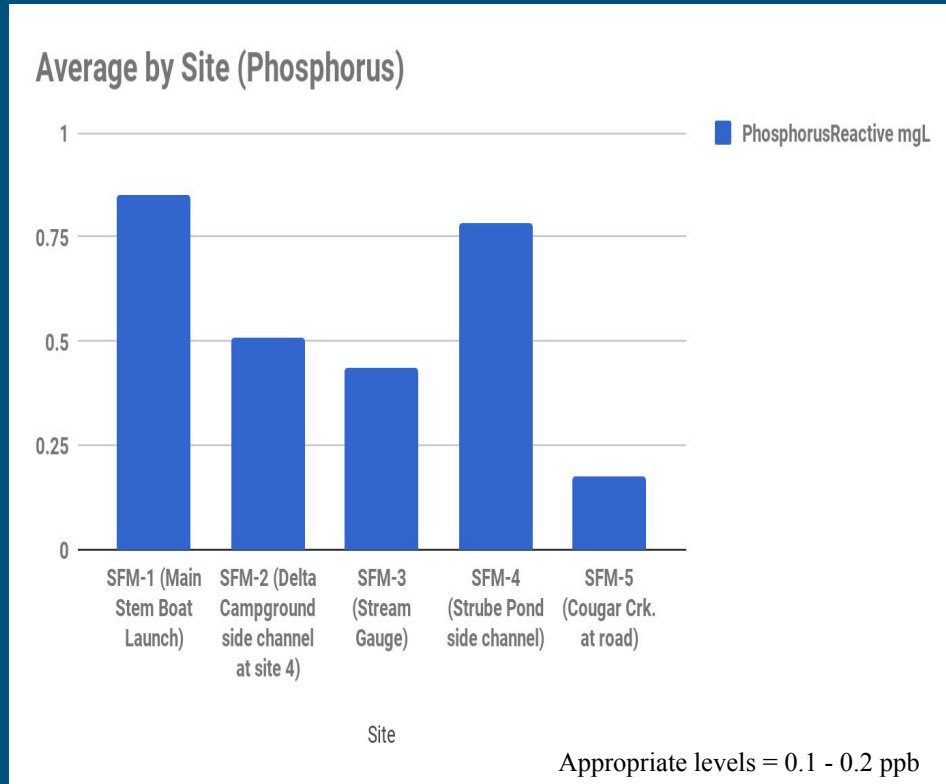
★ DO = Dissolved Oxygen

- Average Phosphates by Date



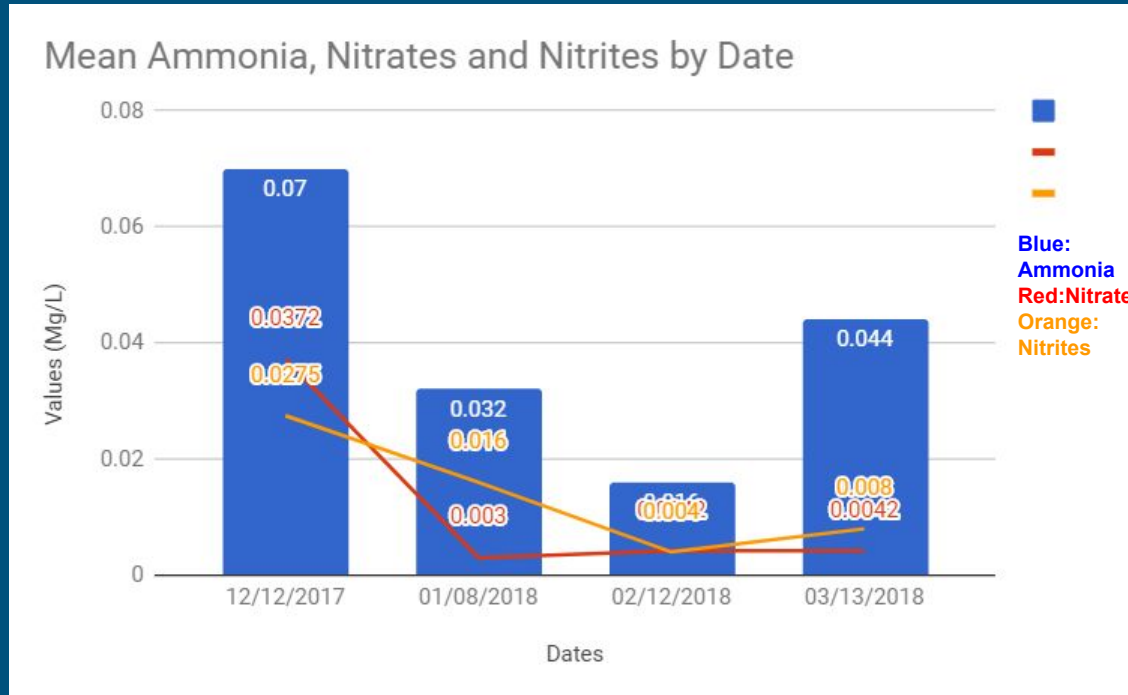
- The highest amounts of phosphorous occurred in the middle of winter and started to decrease in the non-winter months.
- In the winter months in the Pacific Northwest, there is an increase in the amount of precipitation and that may factor into the high phosphate levels during that time.

- Average Phosphates by Site



- Around the mainstream boat launch, the land slopes down around the river. This could have caused the nutrients and phosphates to run off into the river, factoring into the high phosphate levels.
- The Cougar Creek site runs right under the road and is very steep so not a lot of actual foot traffic from life occurs in that area. This could be cause for the low phosphate levels.

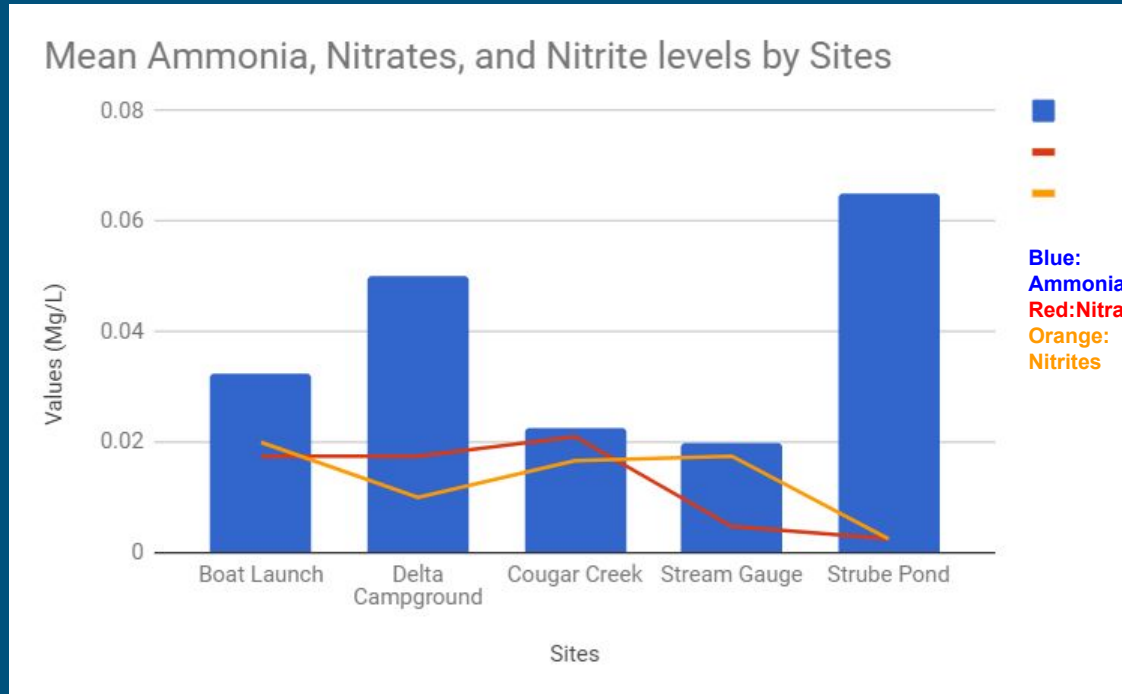
Mean Ammonia, Nitrates, and Nitrites by Date



- The highest point of the data set is December 12th, 2017
- The lowest point was February 12th, 2018

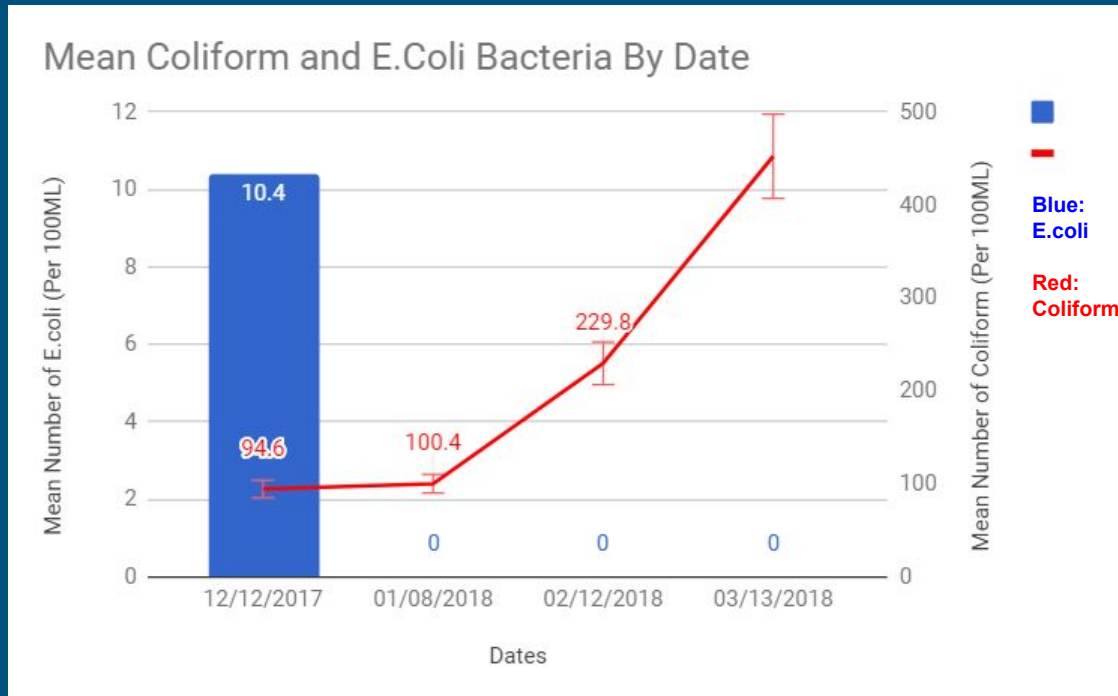
Recommended levels:
Ammonia: 0-.05 Mg/L
Nitrites: 0-.5 Mg/L
Nitrates: 0-10 Mg/L

Mean Ammonia, Nitrates, and Nitrites by Site



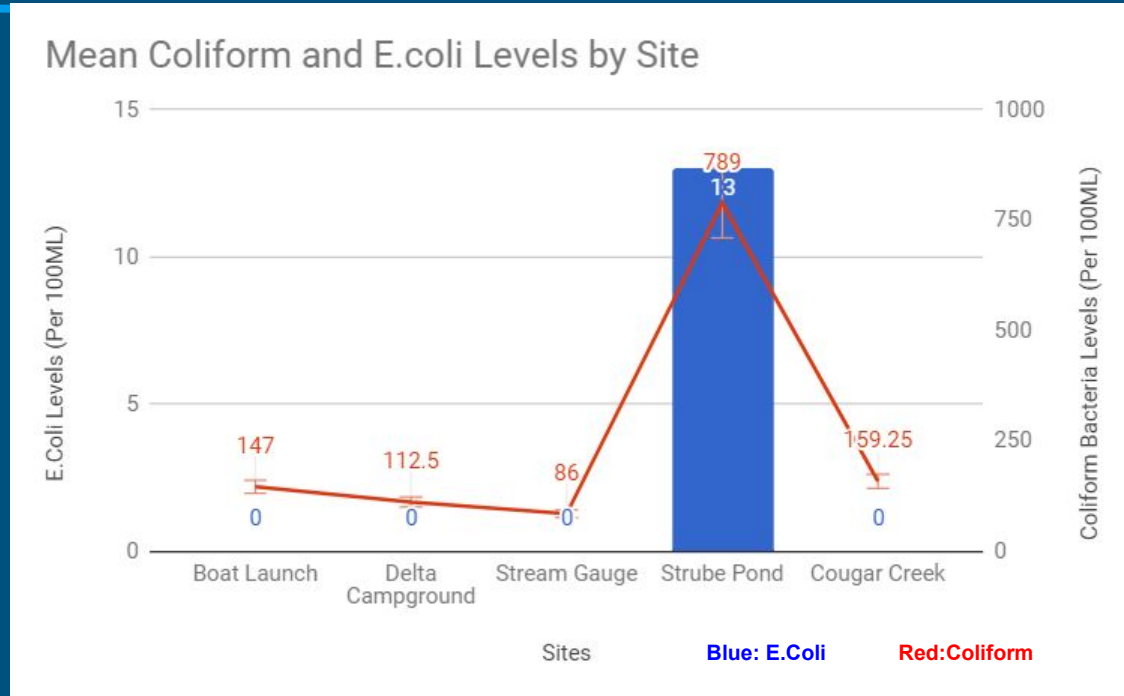
- Highest Ammonia levels were at Strube Pond, with the lowest being at the Stream Gauge site.
- Nitrites were highest at Boat Launch, and lowest at the Strube Pond Site
- Nitrates were highest at the Cougar Creek site, and were lowest at the Strube Pond site.

Mean E.coli and Coliform Bacteria by Date



- On December 12th, 2017 the highest amount of E.coli took place.
- There were no E.coli on January 8th through March 13th, 2018
- Healthy Levels:
E.coli:0-235/100ml
Coliform:0-406/100ml

Mean E.coli and Coliform Bacteria by Site



- The highest amount of E.coli by site is at Strube Pond
- Mostly the amount of E.coli is persistent, and healthy
- The lowest amount of E.coli is located at Stream Gauge

Conclusions

1. Need to collect more data
2. Preliminary data showing excellent to good (overall good)
3. Based on current data trends over the last year, we expect the water quality to stay within the healthy regions, if the current data is indicative of future trends.

