

A Long Term Study of Water Quality in Cedar Creek

Austin Ackerson, Thurston High School

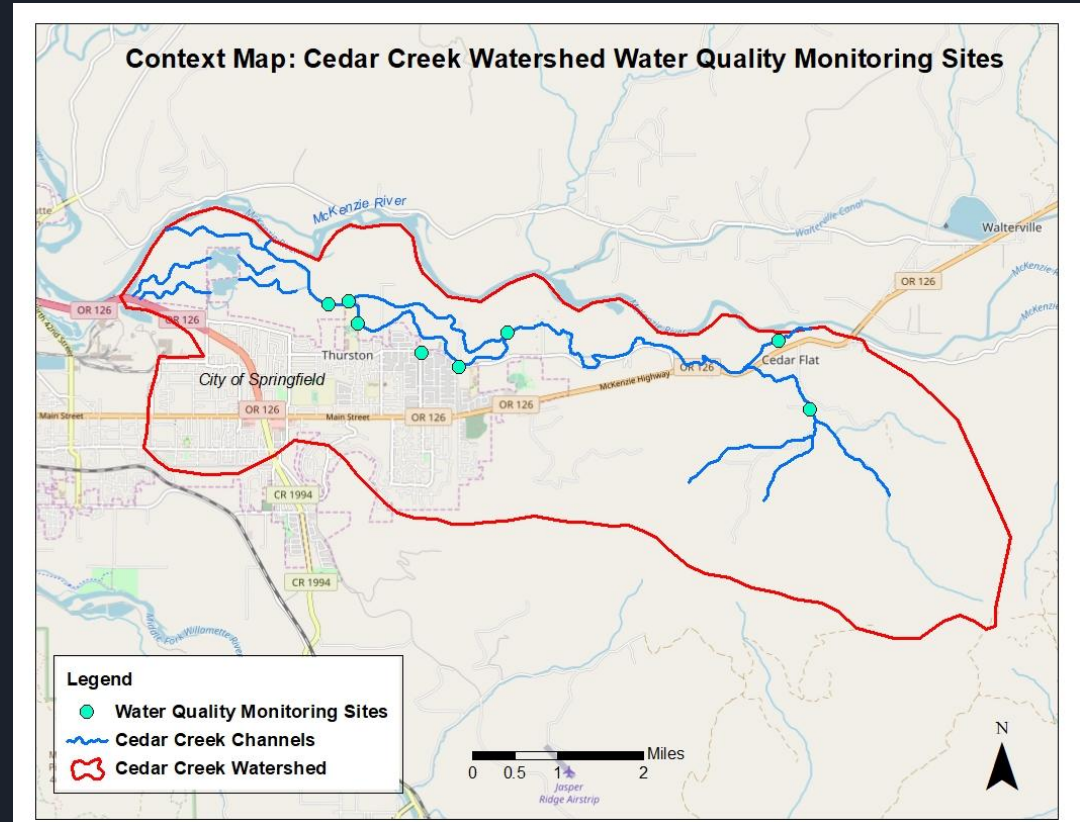
Why Monitor Water Quality in Streams?



- As Nitrates are essential nutrients for wildlife, if they are too low or too high, then it is a good indicator of the watershed's health
- If E.Coli or Coliform bacteria is away from it's typical parameters, it shows that something has gone wrong in the local environment to disrupt the water's ecosystems.
- If bacteria levels are too high, then water will be contaminated, and fish and other local wildlife will start to show signs of disease.

Cedar Creek and its history

- Cedar Creek is a tributary of the McKenzie
- Cedar Creek has many inhabitants including, but not limited to, Trout, Beaver, Great Blue Heron, many other bird species, and a large variety of macroinvertebrates.
- Chinook Salmon spawning ground until the late 1950's, and is used as a release site for the Salmon Trout Enhancement Program(STEP).



Land uses

- Headwater's are influenced by the forest's surrounding it, along with many rural residential areas
- As it nears the Thurston area, agriculture is common.
- East Springfield's stormwater (may include pesticides, metals, oil, etc.) drains into the South Fork of Cedar Creek.
- The creek provides groundwater to SUBs municipal and residential wells
- Enters the McKenzie just upstream from EWEB's intake, which supplies Eugene's drinking water



Purpose of this study



- This water quality monitoring program began in 1996
- It began in order to collect data on the water quality of Cedar Creek, while providing a way to discover restoration needs and opportunities in the watershed area
- This presentation compares spring and fall data sets across the span of the program with data from three different years for three different parameters: 2005, 2010, and 2016, and the parameters are coliform bacteria, E.Coli, and Nitrates.

Study Question

Has the water quality of cedar creek changed over time?

In this Study:

We will be examining coliform bacteria, E.Coli, and nitrates because if the bacteria levels are too high, fish, surrounding watershed wildlife, and humans alike can suffer from unclean drinking water, leading to the possibility of disease in these animals.



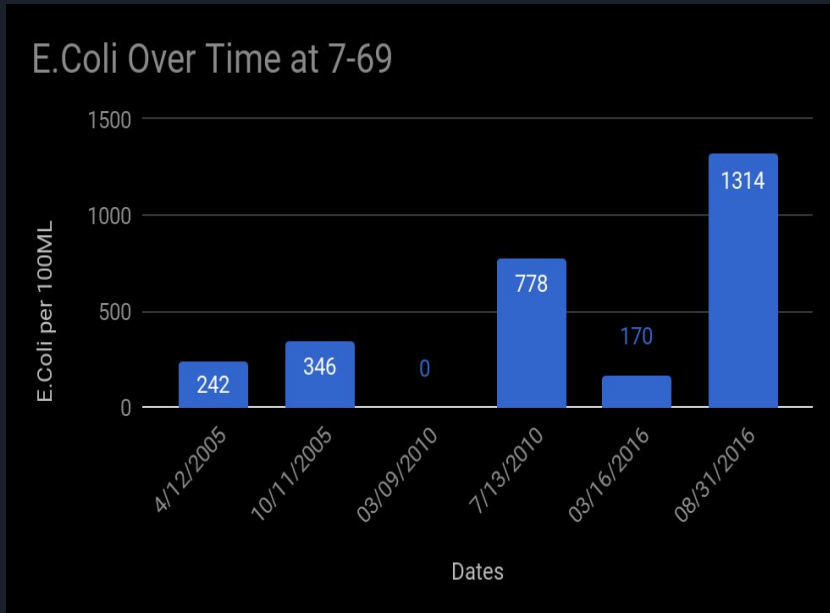
Mean E.Coli over time



- DEQ Standard: 406MPN/100ML
- EPA Standard: 235 MPN/100ML

- Above the DEQ Standard in 2005
- 2010 and 2016 are considered safe values, and meet the standards that have been set
- If this is indicative of trends, the average E.Coli levels are decreasing over time

E.Coli Over Time at 69th Street Storm Drain

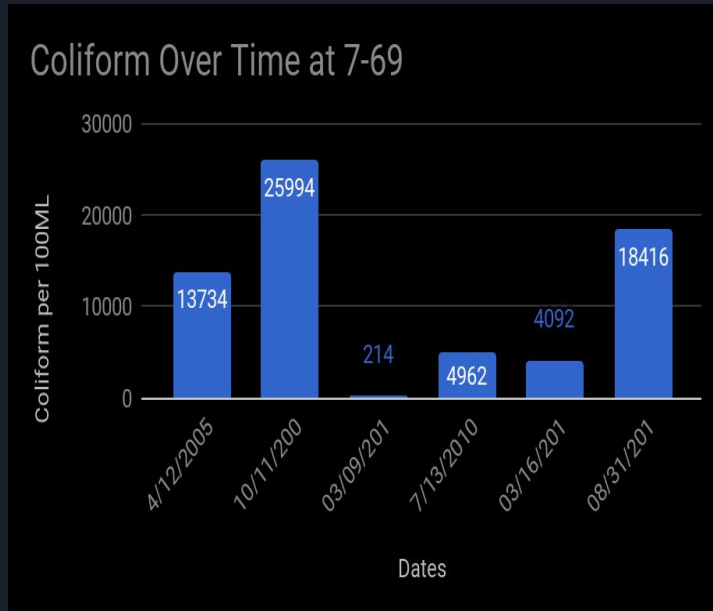


- In 2 of the data sets collected, the levels were considered unsafe by the state standard
- The lowest sets are spring '10 and spring '16, but both '05 sets are considered safe levels
- Levels are consistently higher for E.Coli in the Fall

DEQ Standard: <406MPN/100ML

EPA Standard 235MPN/100ML

Coliform Over Time at 69th street Storm Drain

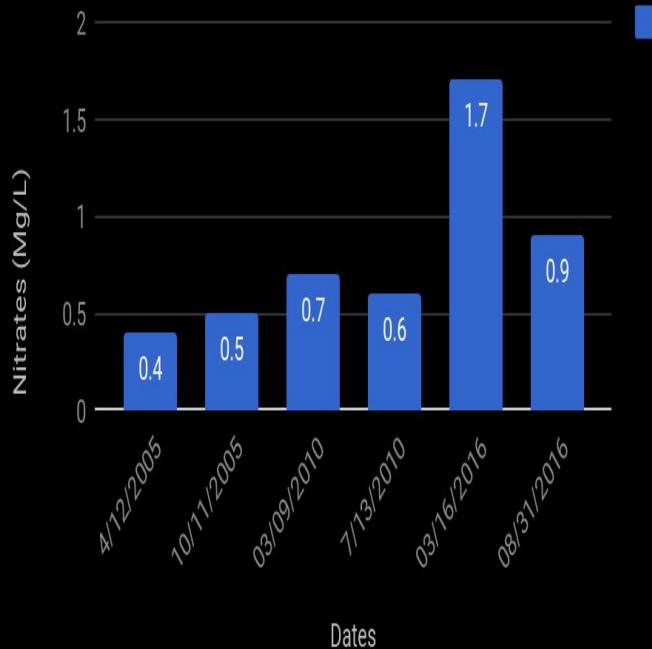


- Coliform comes from the fecal matter in animals and humans
- Levels started out higher, but declined greatly in 2010 with a spike in the fall of 2016
- Levels higher in the fall than in the spring, as are the other parameters

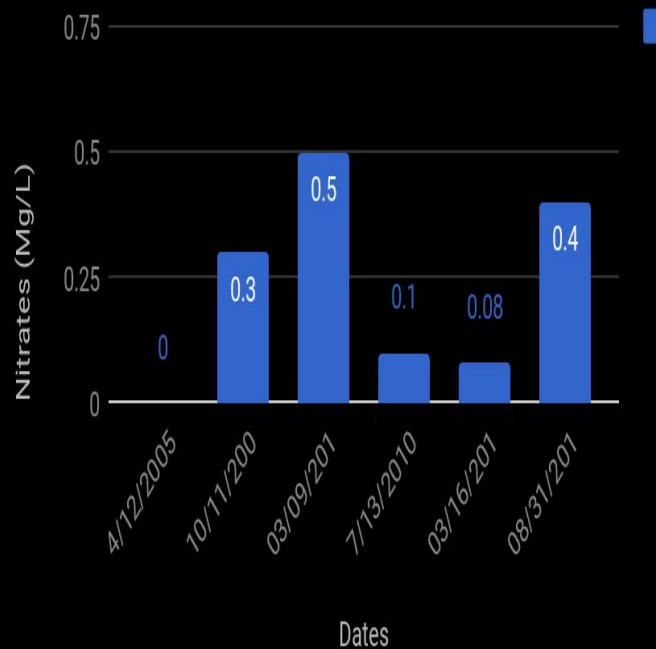
No set limit, may be a strong indicator of other bacteria levels if the levels are too high or too low, greatly varies over time depending on wildlife surrounding the watershed area

Nitrates Over Time

Nitrate Levels Over Time at 7-69



Nitrate Levels Over Time at Saunder's Bridge

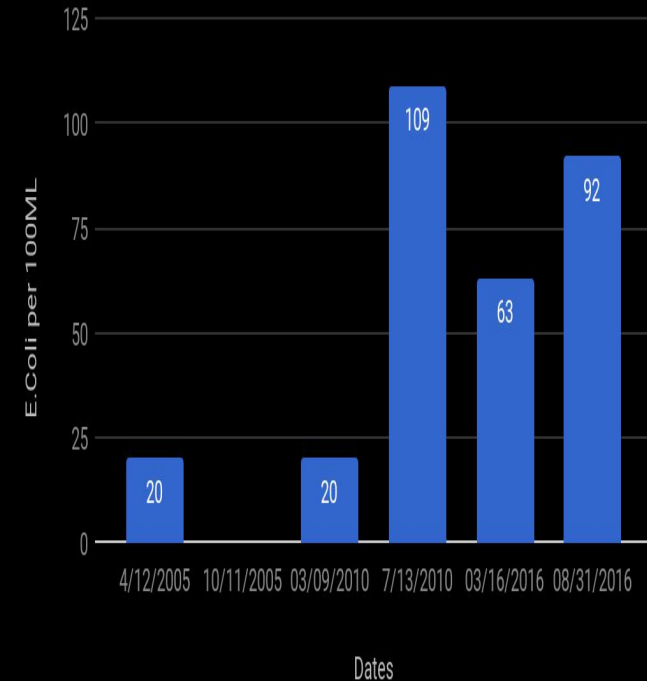


- At 7-69 the trend shows that the Nitrate levels are steadily rising overtime
- Fall data sets are higher at both sites
- Spring sets are generally lower
- Levels are very low, with even the highest less than 20% of the recommended limit

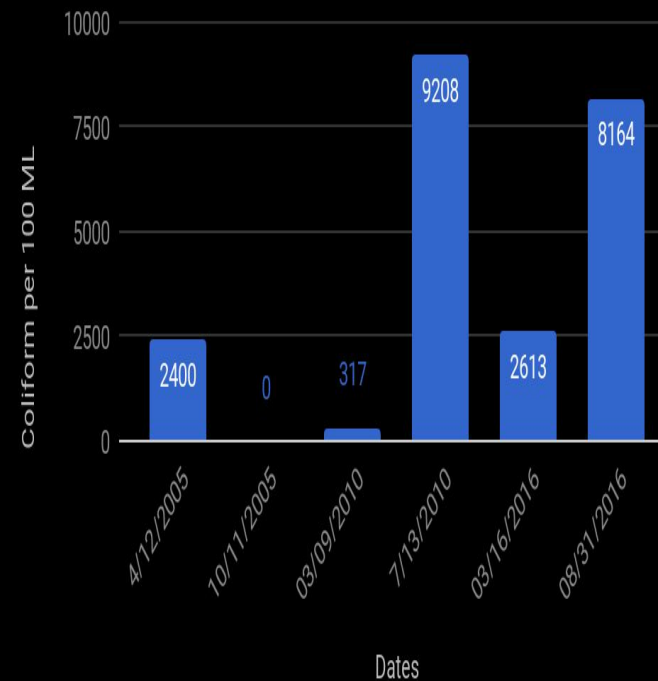
Bacteria Over Time at Saunder's Bridge

- All E.Coli levels considered safe with the highest value as $\frac{1}{4}$ of the recommended level
- Spring values are consistently lower than fall data sets
- E.Coli levels are rising, but are not approaching the standard

E.Coli Over time at Saunder's Bridge



Coliform Over Time at Saunder's Bridge



DEQ E.Coli:406MPN/100ML

EPA E.Coli:235MPN/100ML



Conclusions

- At Saunder's Bridge, the E.Coli and Coliform levels have a rising trend where the values that are seen have gone up
- At 7-69, the Coliform levels have recently spiked, and the E.Coli levels have reached levels more than 3X the safe limit
- Nitrates have remained consistently low over time

These rising levels of bacteria shows that Cedar Creek must continue to be monitored, and local landowners should be consulted and worked with in order to have a healthy watershed are around the Creek so that the health of the watershed is maintained.