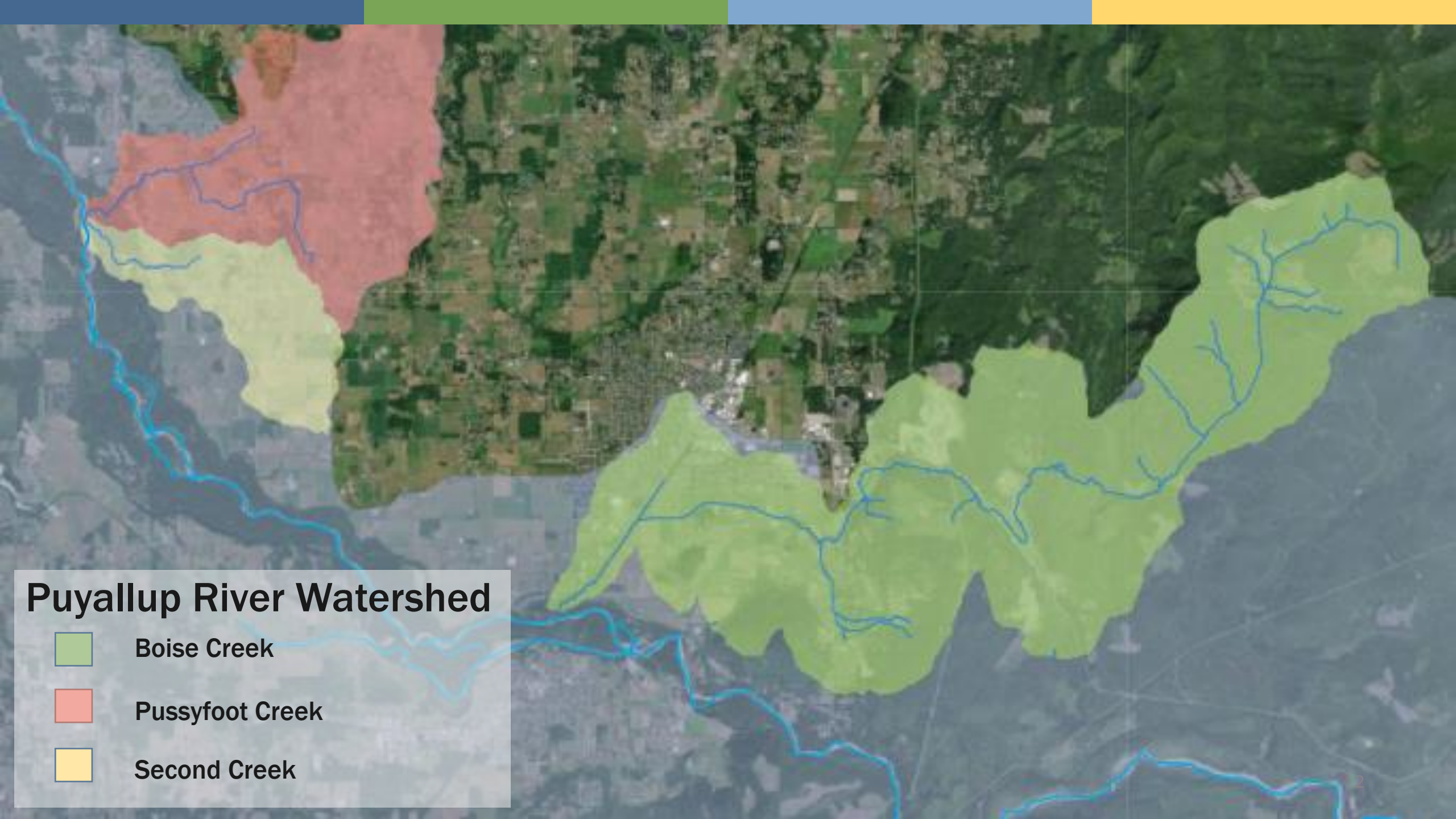
Puyallup River Tributaries Effectiveness Monitoring

Julian Sammons

January 16, 2024


Puyallup River Watershed
Boise Creek
Pussyfoot Creek
Second Creek

Objectives

- Track general water quality trends at each of the tributaries.
- Trace sources of pollution and identify likely causes.
- Provide the information and feedback needed for adaptive management purposes.

Status and Trends

4 sites

Monthly sampling all 10 years

Fecal Coliform + *E.coli*
Ammonia
Nitrate/Nitrite
Total Persulfate Nitrogen
Total Phosphorous
Orthophosphate

Field parameters: Temp, Cond, DO, pH, Turbidity

Implementation

All 26 sites

Bi-Monthly sampling years 1, 5, 10

Fecal Coliform + *E.coli*

Field parameters: Temp, Cond, DO, pH, Turbidity

SOURCE TRACING: Monitoring as needed for tracing sources of pollution and identifying likely causes.

2019-2020
Status and Trend
Implementation

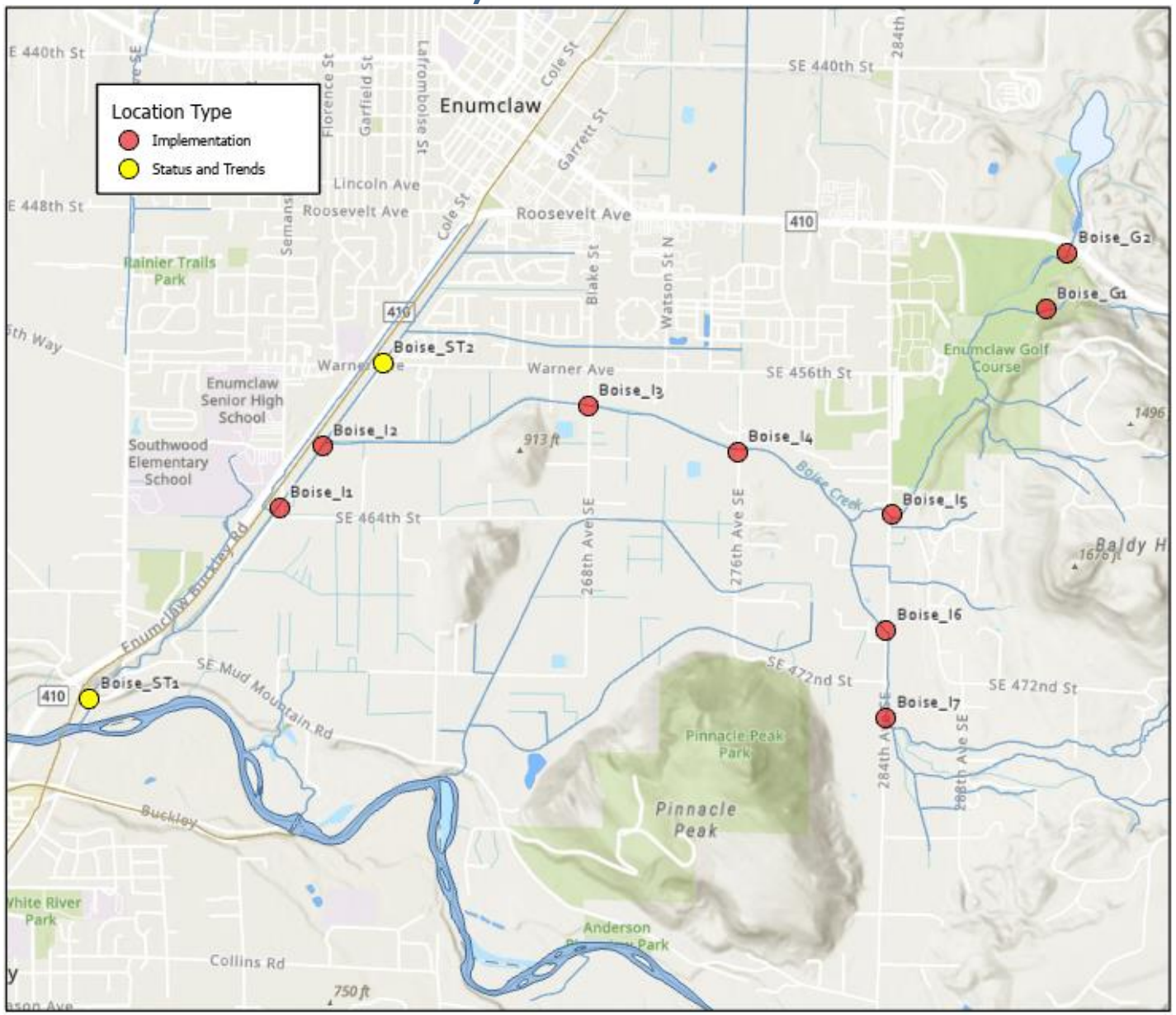
2020-2023
Status and Trend

2023-2024
Status and Trend
Implementation

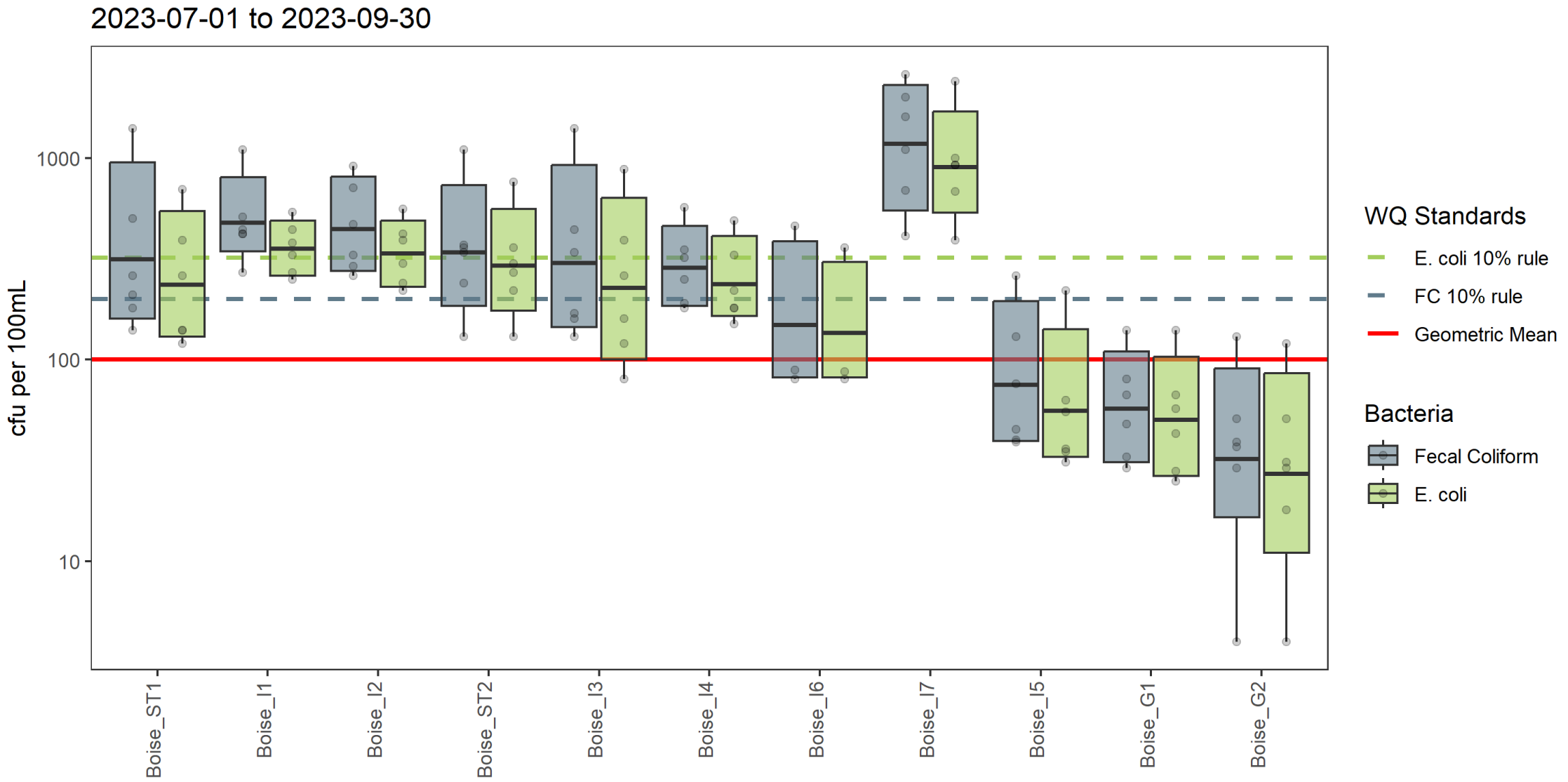
2024-2028
Status and Trend

2028-2029
Status and Trend
Implementation

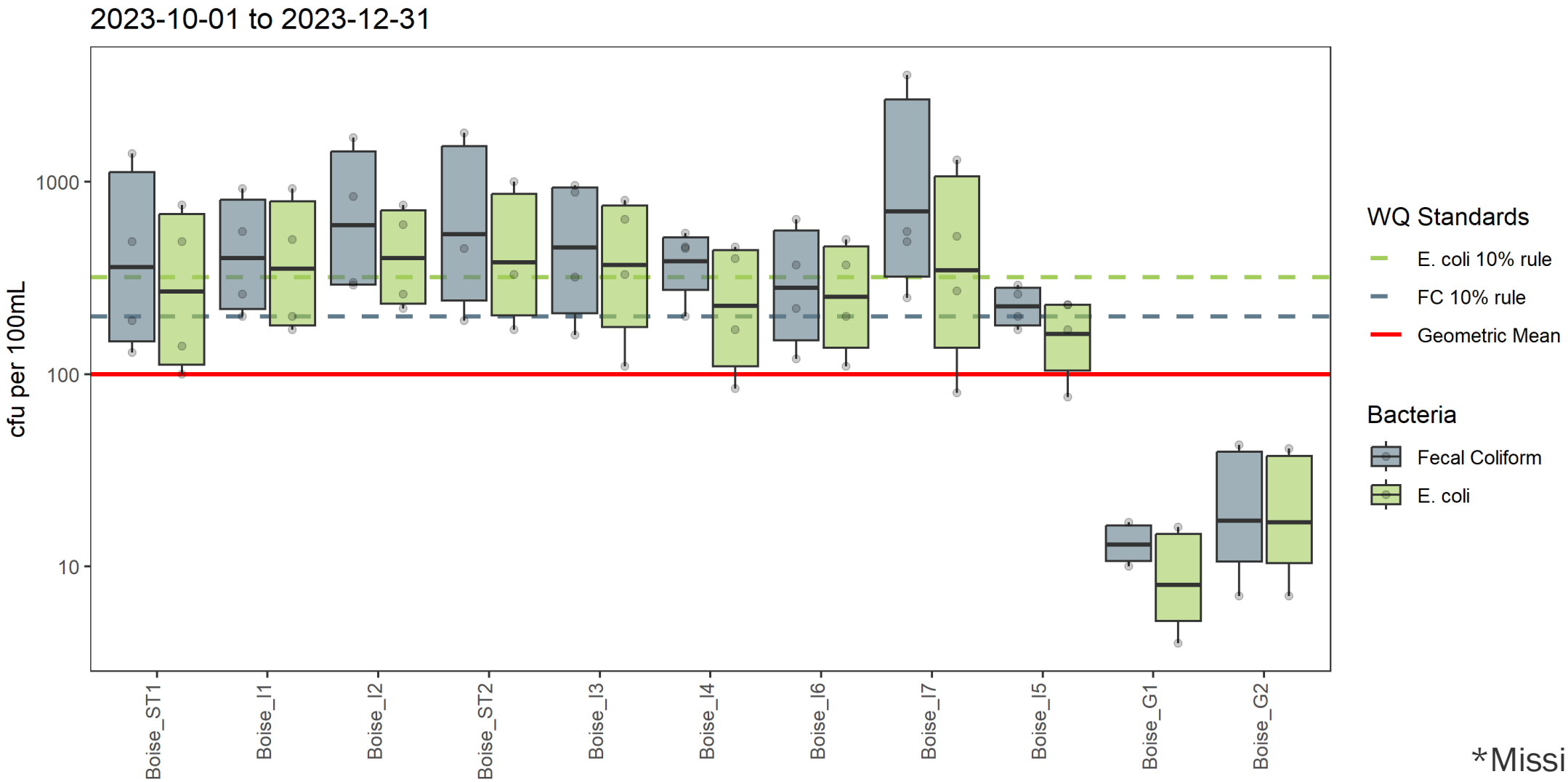
Boise Creek Stations, Year 5



E. Coli - Boise Creek, Summer

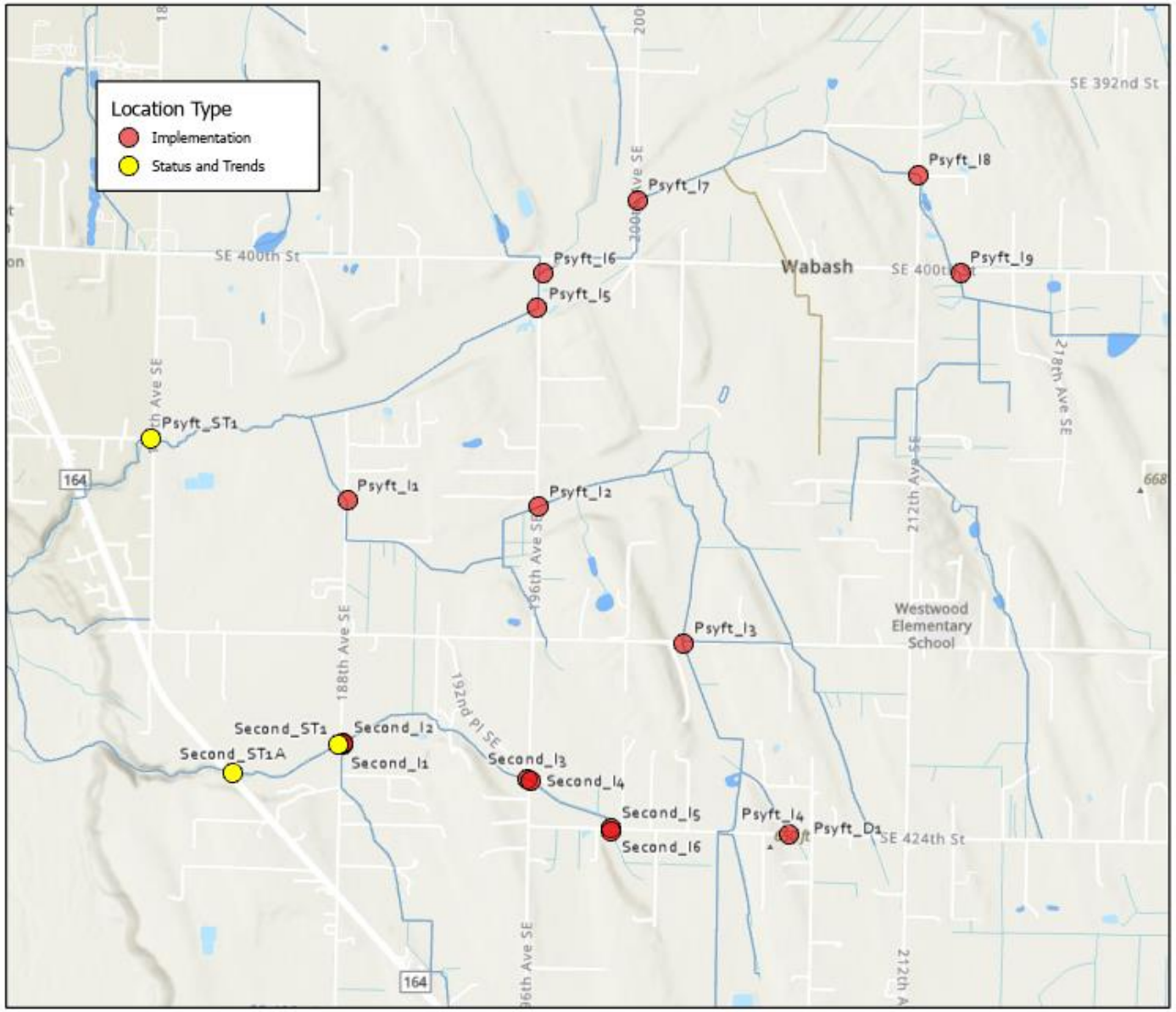


E. Coli - Boise Creek, Fall*

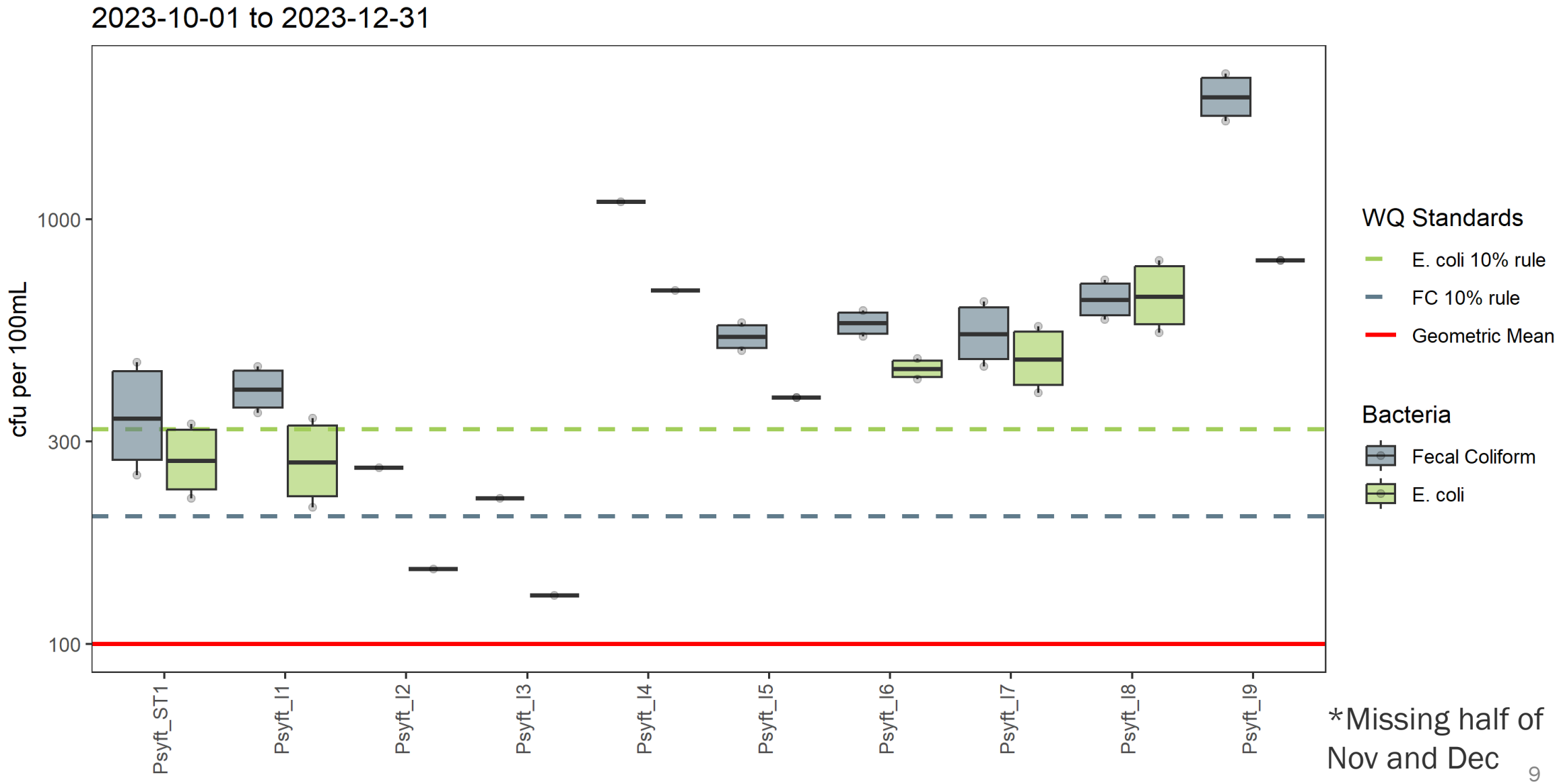


*Missing half of Nov and Dec

Pussyfoot and Second Creek Stations, Year 5

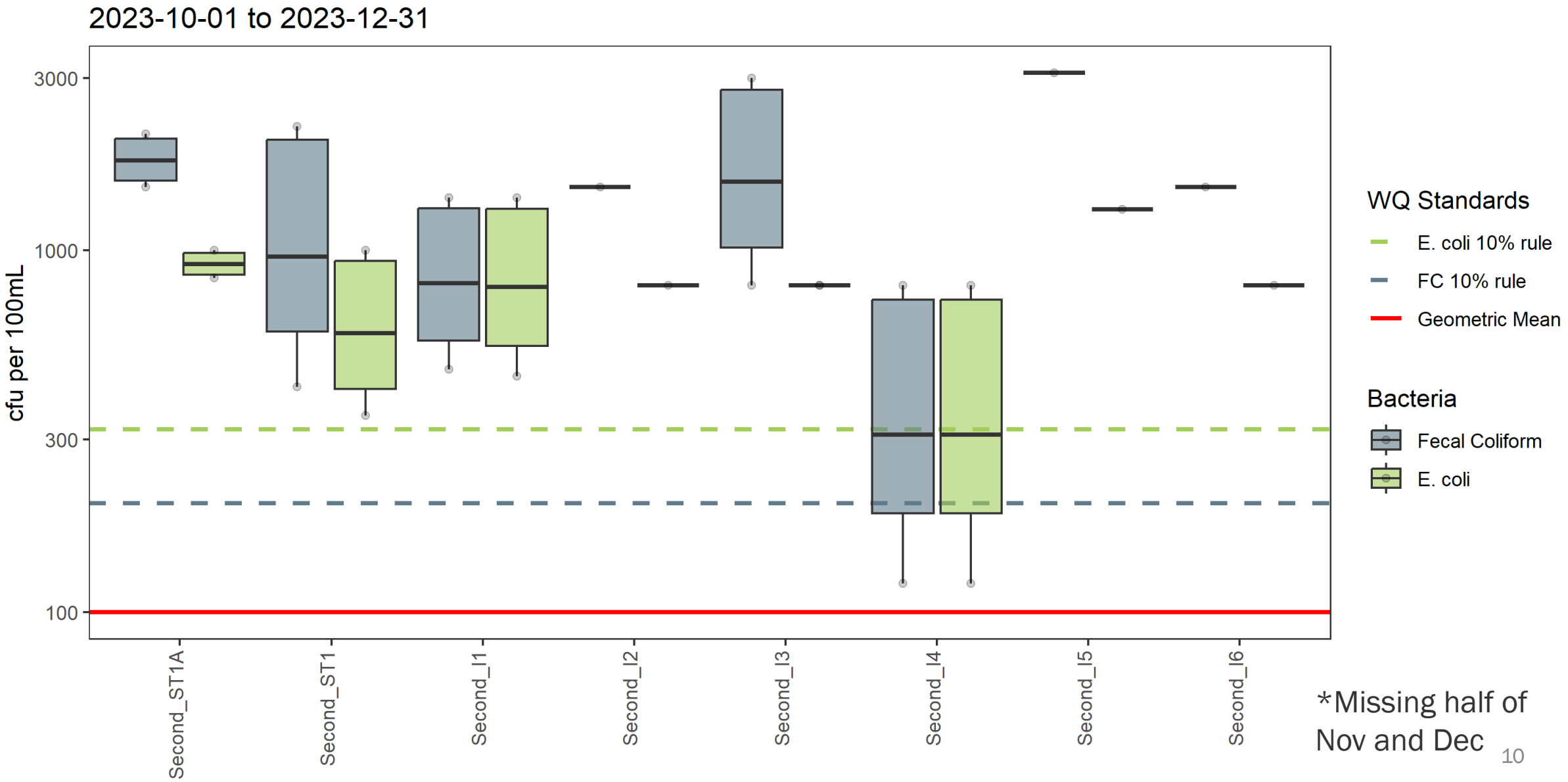


E. Coli - Pussyfoot Creek, Fall*



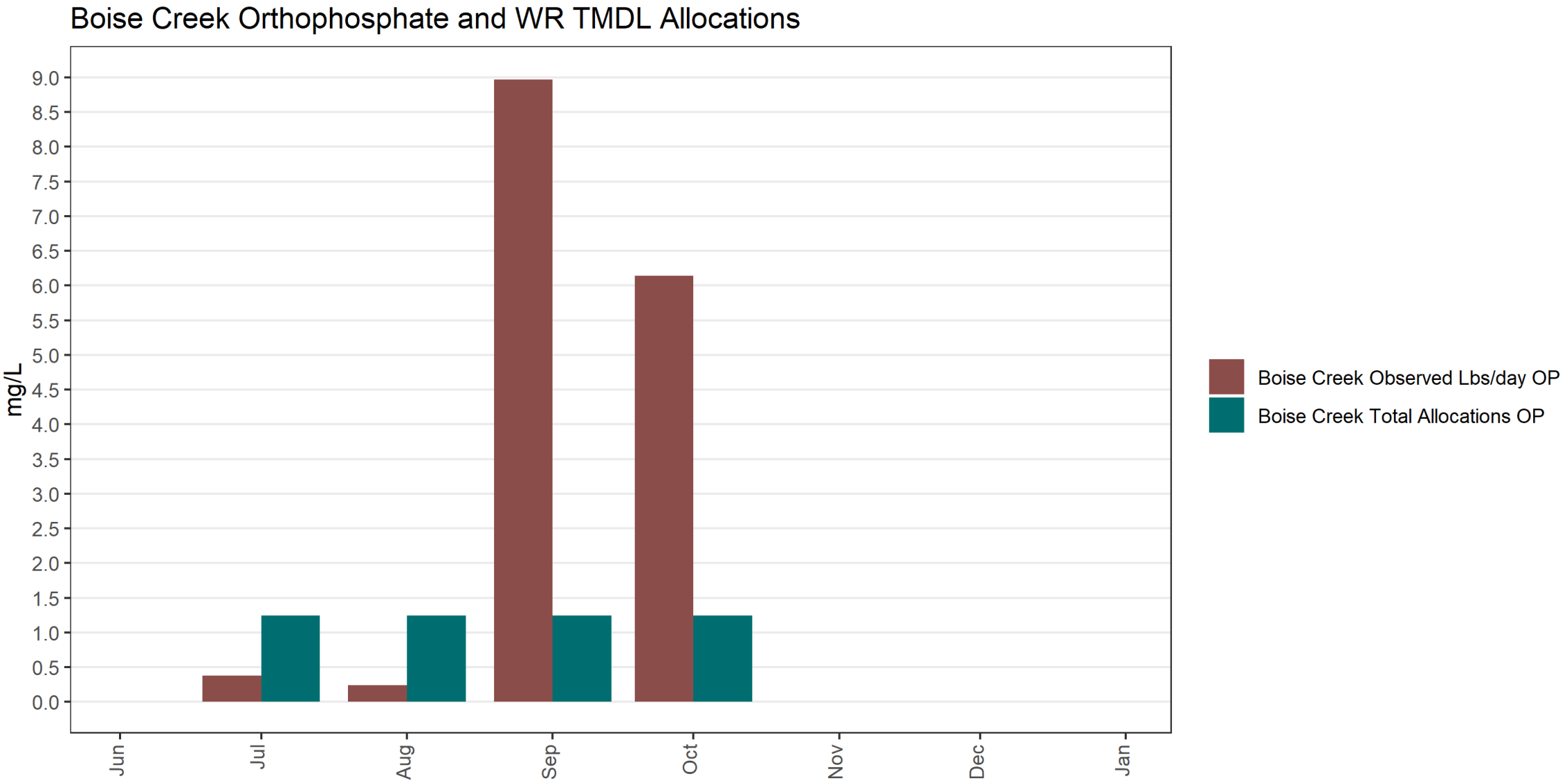
*Missing half of Nov and Dec

E. Coli - Second Creek, Fall*

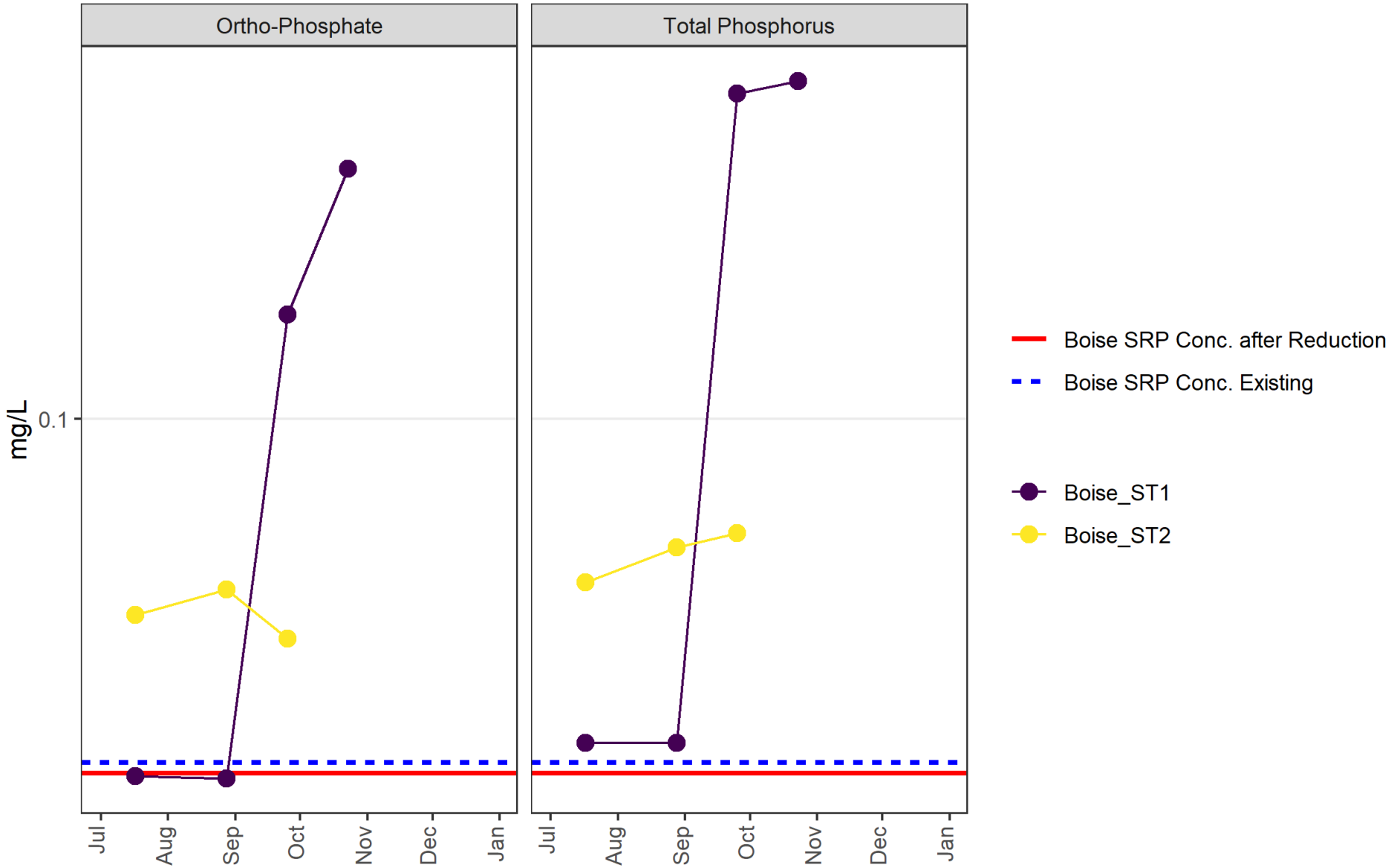


*Missing half of Nov and Dec

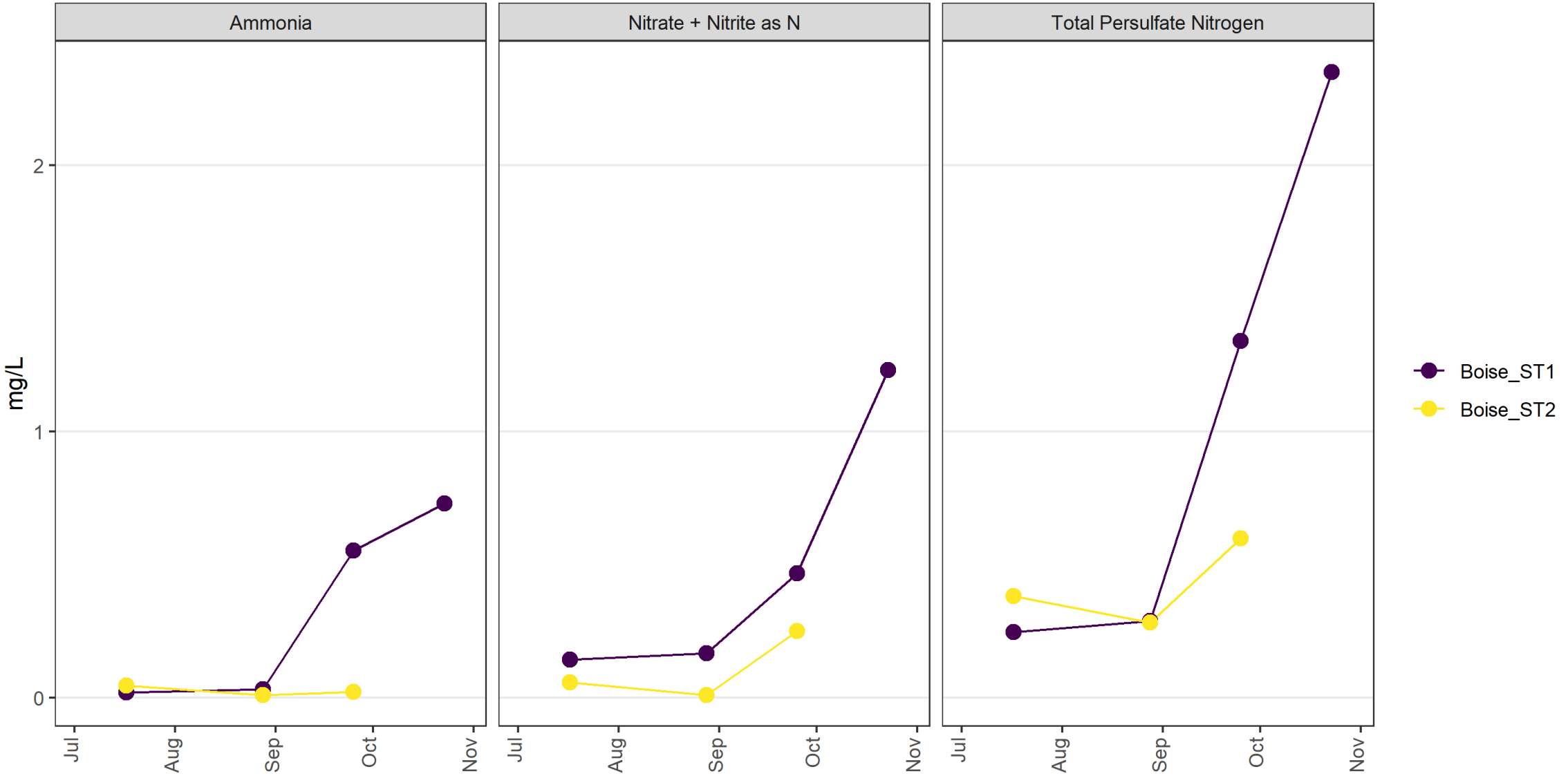
Orthophosphate – Boise Creek



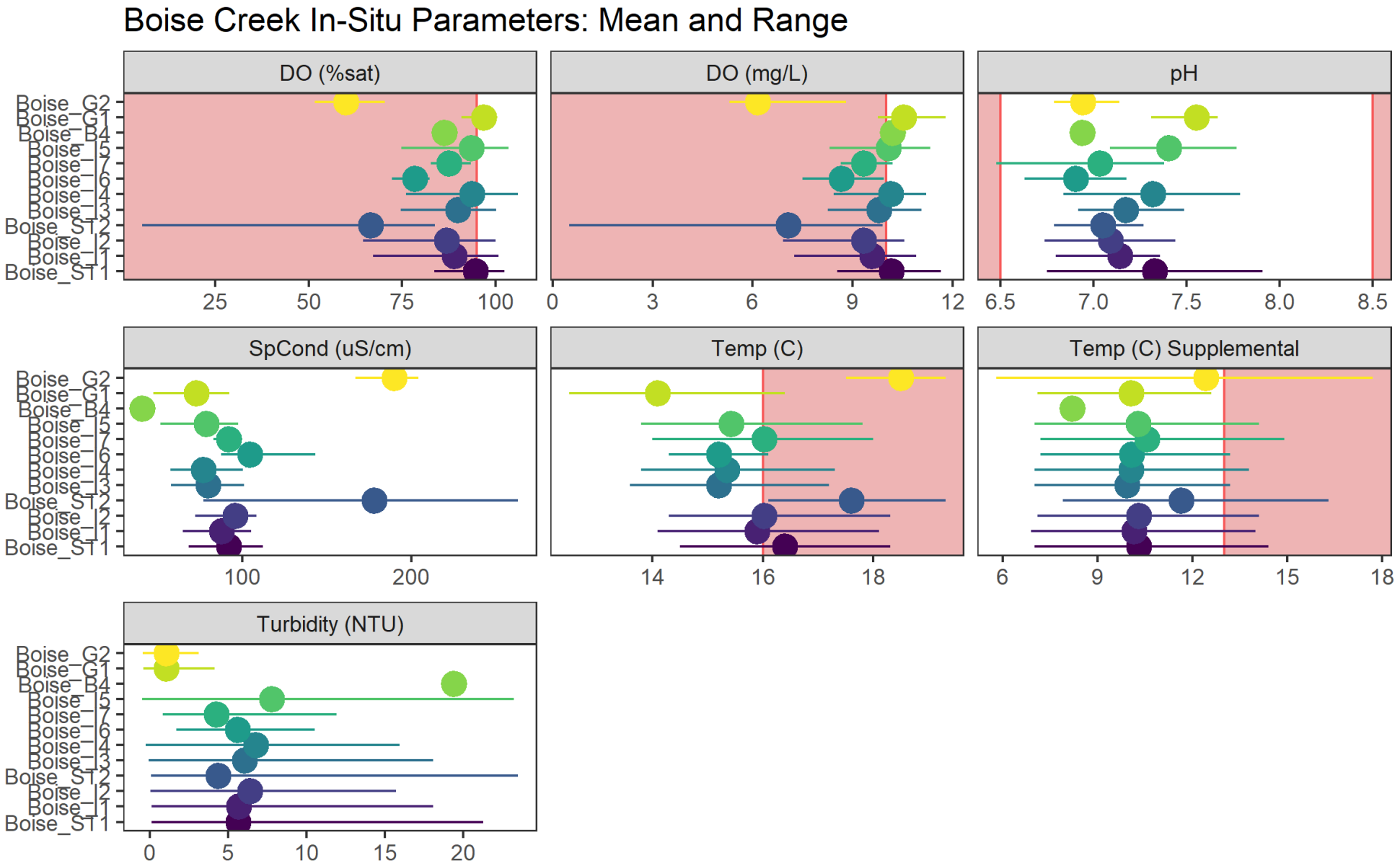
Time Series of Phosphorous – Boise Creek



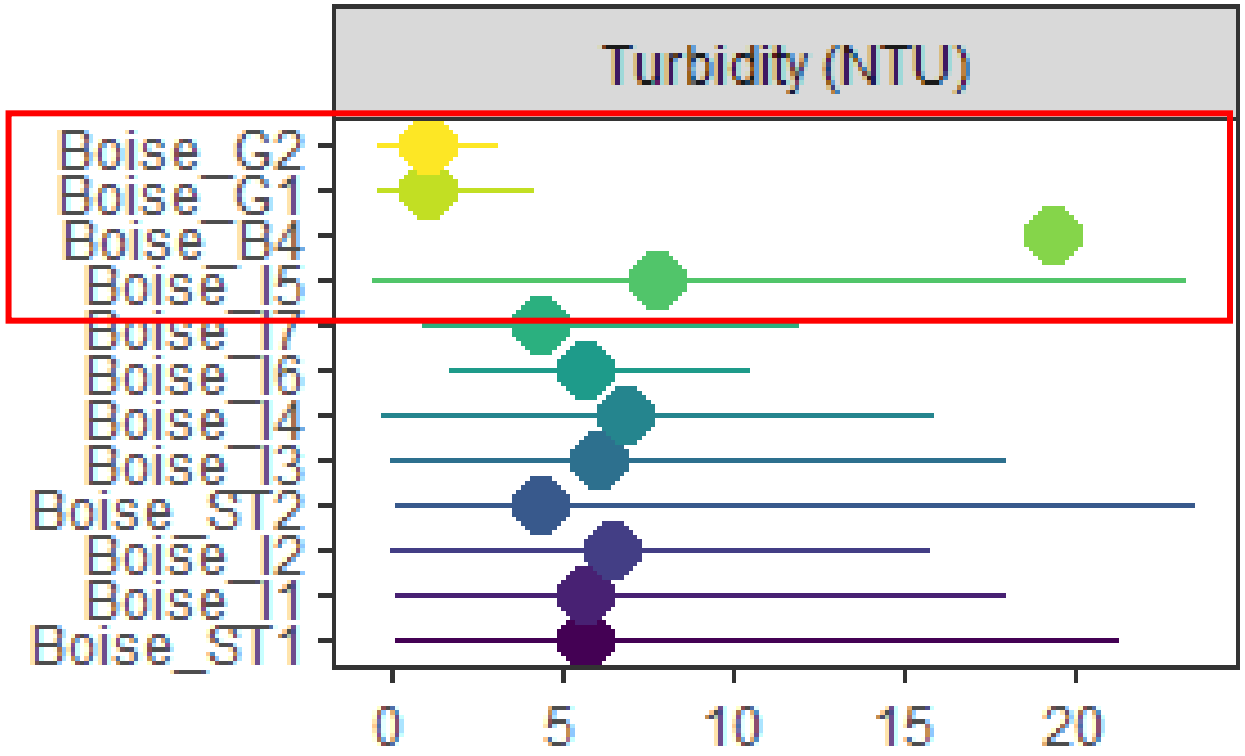
Time Series of Nitrogen – Boise Creek



Field Measurements – Boise Creek (Q1-Q2)



Turbidity – Boise Creek Summer and Fall

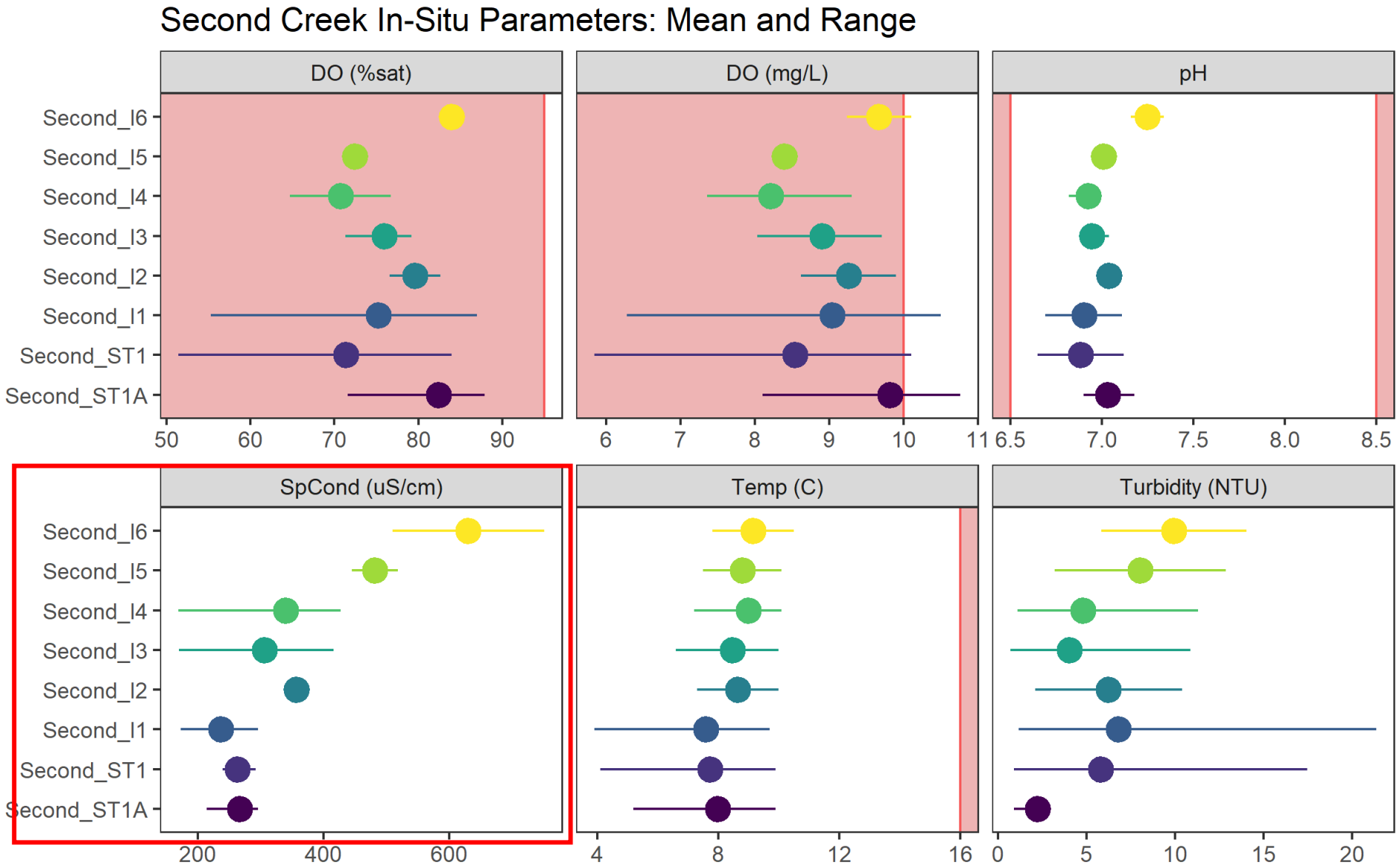


Turbidity – Boise Creek Restoration Site

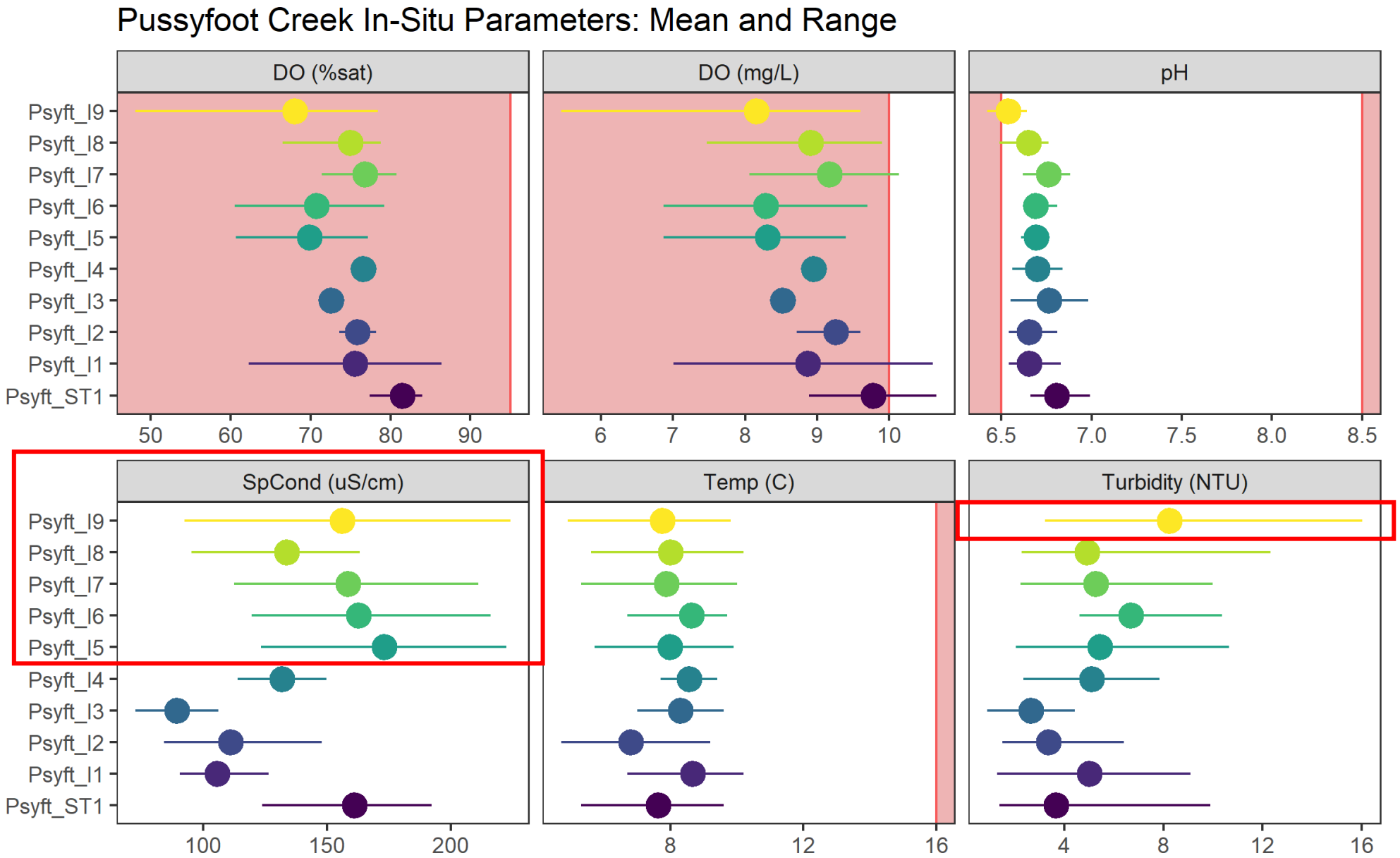
Dec 4, 2023

Jan 8, 2024

Field Measurements – Second Creek (Q1-Q2)



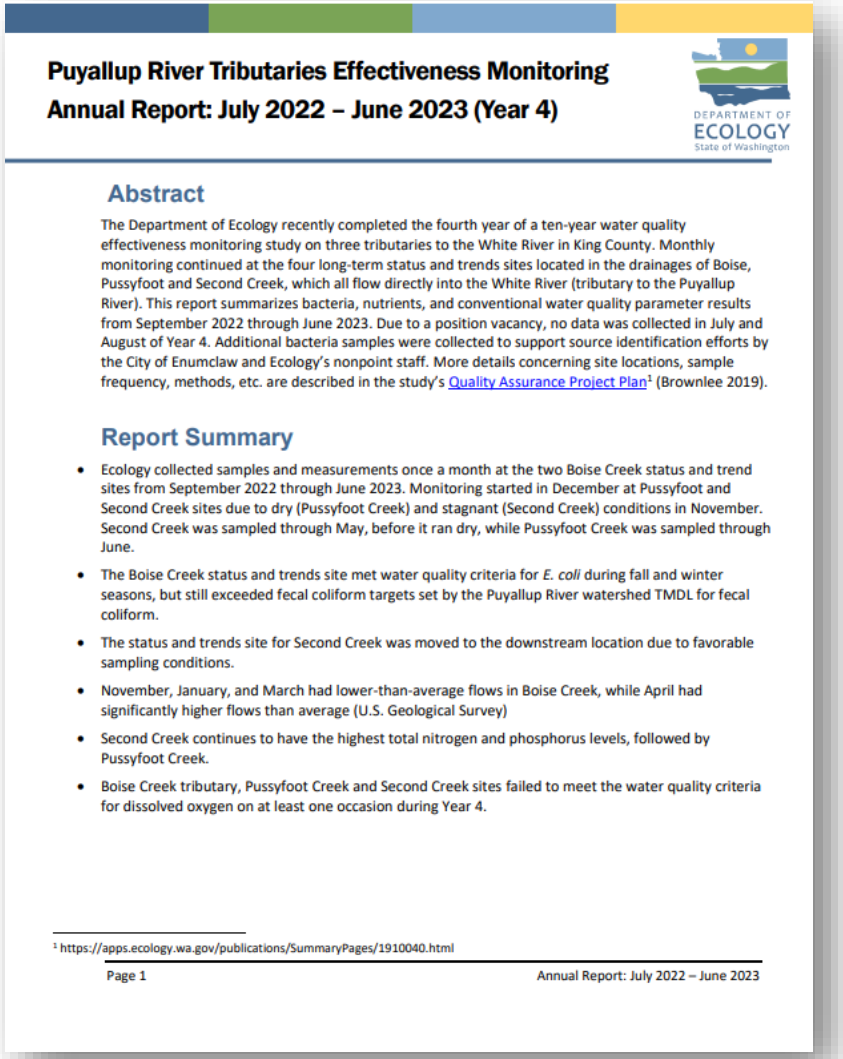
Field Measurements – Pussyfoot Creek (Q1-Q2)



Summary

- Bacteria
  - Boise: Boise_G1/G2 & I5 meeting WQ Criteria in Summer. Only G1/G2 in Fall. All other sites exceeding criteria.
  - Pussyfoot & Second: Too early to calculate, but highly unlikely any site will meet criteria
- Nutrients
  - Sept & Oct exceeded allocations and target concentrations on Boise Creek, during critical period for White River
  - Conductivity trend on Second Creek potential indication of nutrient load in headwaters
- Turbidity
  - Boise Creek restoration project resulted in major turbidity increase
- Dissolved Oxygen
  - All sites failing to meet this criteria at some point
- Temperature
  - Boise Creek likely exceeding. Other streams dry during warm season.
- pH
  - Psyft_I9 & Boise_I7 (Beaver Creek) below 6.5

Reports Available / Questions



Puyallup River Tributaries Effectiveness Monitoring
Annual Report: July 2022 – June 2023 (Year 4)

DEPARTMENT OF ECOLOGY State of Washington

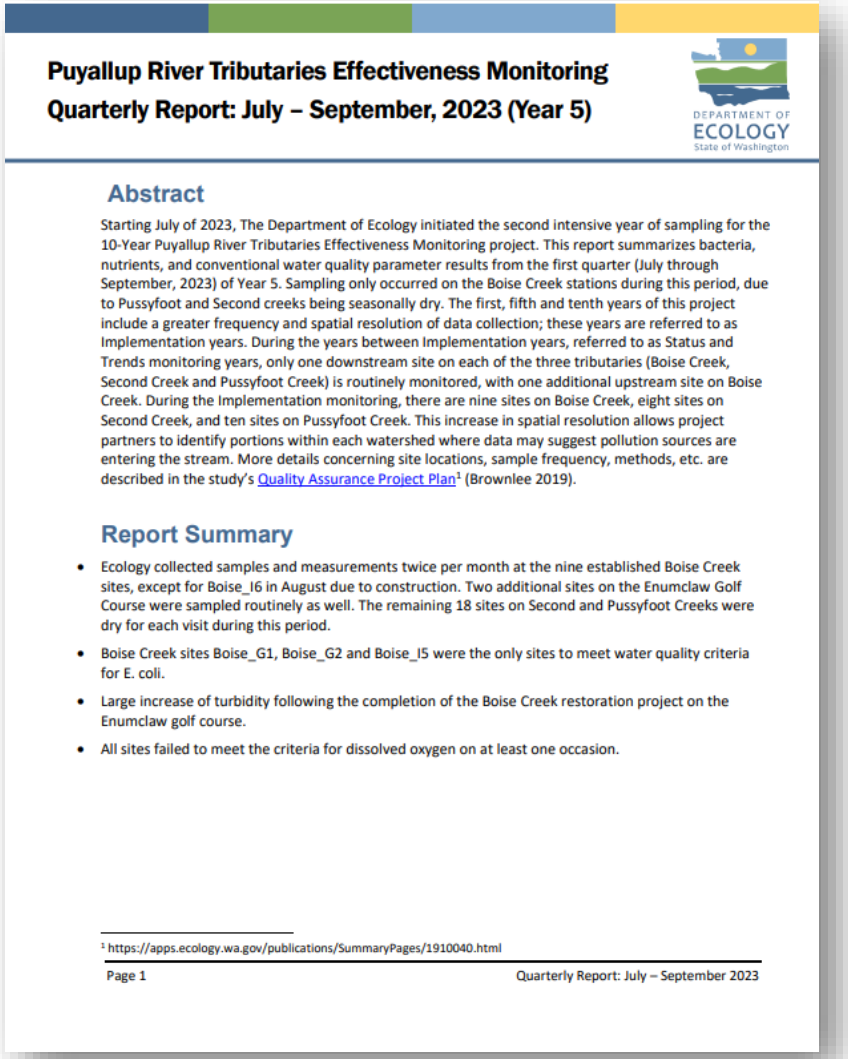
Abstract

The Department of Ecology recently completed the fourth year of a ten-year water quality effectiveness monitoring study on three tributaries to the White River in King County. Monthly monitoring continued at the four long-term status and trends sites located in the drainages of Boise, Pussyfoot and Second Creek, which all flow directly into the White River (tributary to the Puyallup River). This report summarizes bacteria, nutrients, and conventional water quality parameter results from September 2022 through June 2023. Due to a position vacancy, no data was collected in July and August of Year 4. Additional bacteria samples were collected to support source identification efforts by the City of Enumclaw and Ecology's nonpoint staff. More details concerning site locations, sample frequency, methods, etc. are described in the study's Quality Assurance Project Plan[1] (Brownlee 2019).

Report Summary

- Ecology collected samples and measurements once a month at the two Boise Creek status and trend sites from September 2022 through June 2023. Monitoring started in December at Pussyfoot and Second Creek sites due to dry (Pussyfoot Creek) and stagnant (Second Creek) conditions in November. Second Creek was sampled through May, before it ran dry, while Pussyfoot Creek was sampled through June.
- The Boise Creek status and trends site met water quality criteria for *E. coli* during fall and winter seasons, but still exceeded fecal coliform targets set by the Puyallup River watershed TMDL for fecal coliform.
- The status and trends site for Second Creek was moved to the downstream location due to favorable sampling conditions.
- November, January, and March had lower-than-average flows in Boise Creek, while April had significantly higher flows than average (U.S. Geological Survey)
- Second Creek continues to have the highest total nitrogen and phosphorus levels, followed by Pussyfoot Creek.
- Boise Creek tributary, Pussyfoot Creek and Second Creek sites failed to meet the water quality criteria for dissolved oxygen on at least one occasion during Year 4.

[1] https://apps.ecology.wa.gov/publications/SummaryPages/1910040.html



Puyallup River Tributaries Effectiveness Monitoring
Quarterly Report: July – September, 2023 (Year 5)

DEPARTMENT OF ECOLOGY State of Washington

Abstract

Starting July of 2023, The Department of Ecology initiated the second intensive year of sampling for the 10-Year Puyallup River Tributaries Effectiveness Monitoring project. This report summarizes bacteria, nutrients, and conventional water quality parameter results from the first quarter (July through September, 2023) of Year 5. Sampling only occurred on the Boise Creek stations during this period, due to Pussyfoot and Second creeks being seasonally dry. The first, fifth and tenth years of this project include a greater frequency and spatial resolution of data collection; these years are referred to as Implementation years. During the years between Implementation years, referred to as Status and Trends monitoring years, only one downstream site on each of the three tributaries (Boise Creek, Second Creek and Pussyfoot Creek) is routinely monitored, with one additional upstream site on Boise Creek. During the Implementation monitoring, there are nine sites on Boise Creek, eight sites on Second Creek, and ten sites on Pussyfoot Creek. This increase in spatial resolution allows project partners to identify portions within each watershed where data may suggest pollution sources are entering the stream. More details concerning site locations, sample frequency, methods, etc. are described in the study's Quality Assurance Project Plan[1] (Brownlee 2019).

Report Summary

- Ecology collected samples and measurements twice per month at the nine established Boise Creek sites, except for Boise_I6 in August due to construction. Two additional sites on the Enumclaw Golf Course were sampled routinely as well. The remaining 18 sites on Second and Pussyfoot Creeks were dry for each visit during this period.
- Boise Creek sites Boise_G1, Boise_G2 and Boise_I5 were the only sites to meet water quality criteria for E. coli.
- Large increase of turbidity following the completion of the Boise Creek restoration project on the Enumclaw golf course.
- All sites failed to meet the criteria for dissolved oxygen on at least one occasion.

[1] https://apps.ecology.wa.gov/publications/SummaryPages/1910040.html

Thank you