Clarks Fork Yellowstone Watershed Water Quality Monitoring Project

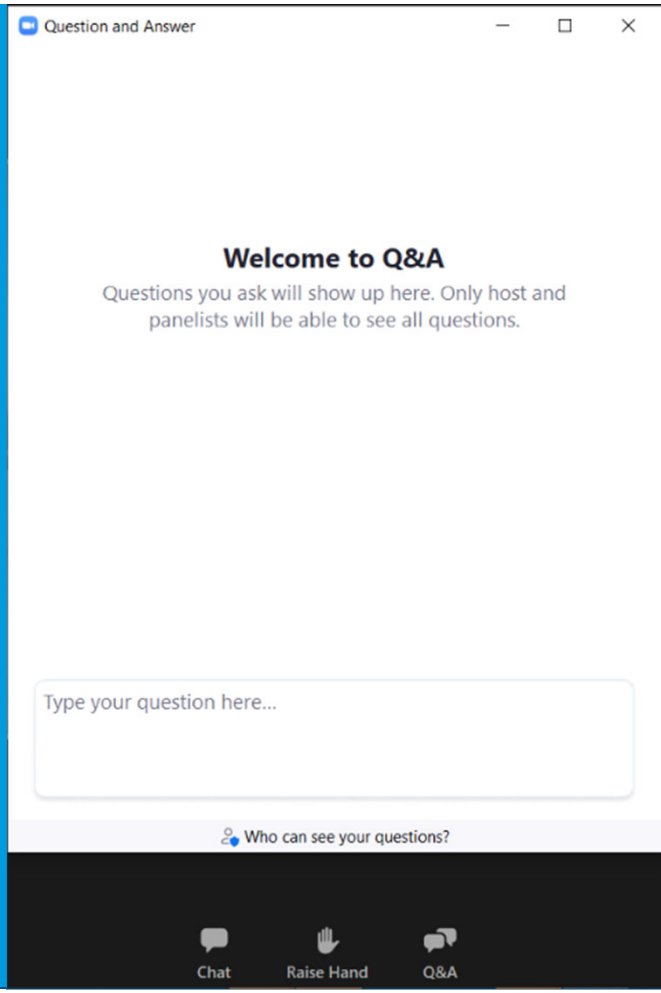
Abbie Ebert

April 24th, 2024

DEQ MONTANA

Questions or Comments

- Raise hand (*9 if on the phone) or type questions into the Q&A
- DEQ will unmute you if you wish to provide your comment orally
- If calling by phone, press*6 to unmute
- State your name and affiliation before providing your comment

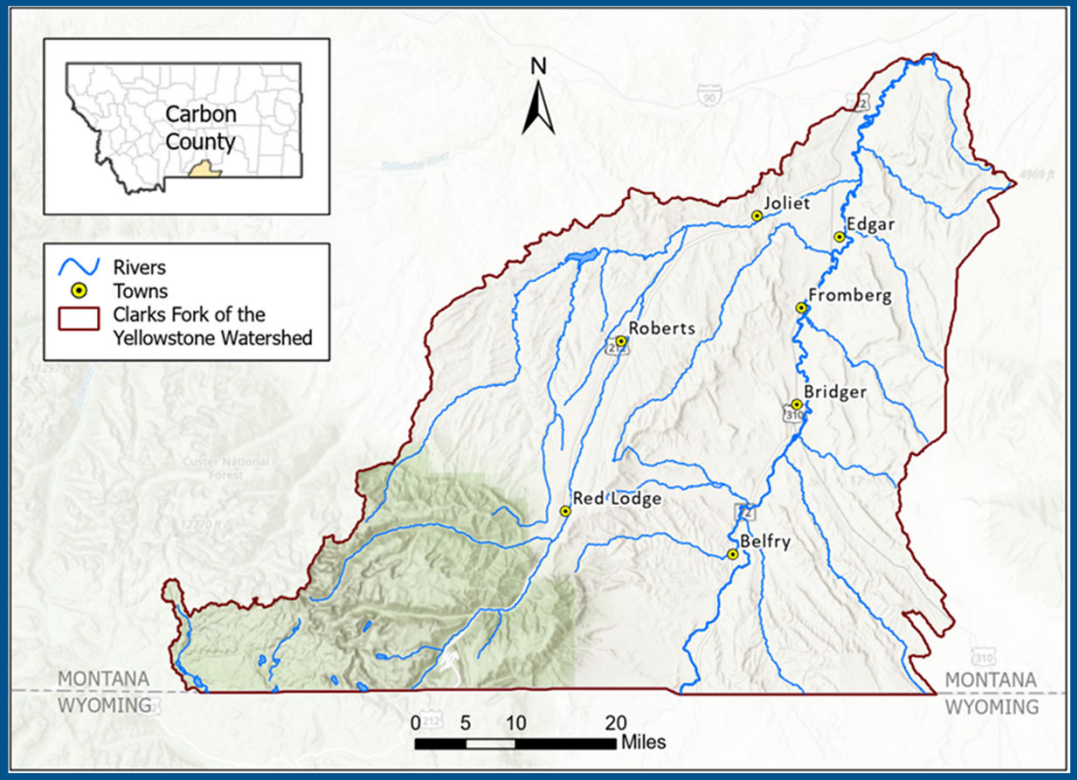


DEQ MONTANA


DEQ’s Mission: To champion a healthy environment for a thriving Montana.
Water Quality Division Vision: Clean water from peaks to prairies for all Montanans.

Why are we monitoring here and now?

- Watershed value and vulnerability
- Local interest
- Time lapse in data



DEQ MONTANA

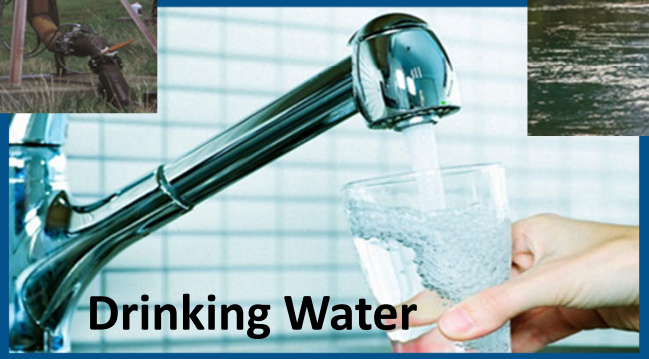
Purpose of Monitoring and Assessing Water Quality

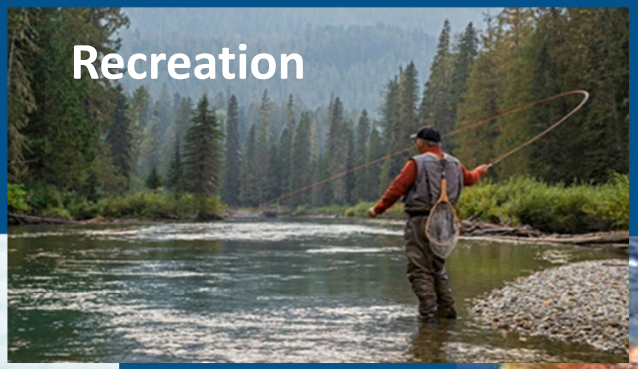
- Update the status of previous water quality issues.
- Determine the overall health of the Clarks Fork Yellowstone watershed.
- Total Maximum Daily Loads (TMDLs)

DEQ MONTANA

Beneficial Uses

Are goals and expectations specified in water quality standards for state surface waters uses.





DEQ MONTANA

Clarks Fork Yellowstone Watershed Beneficial Uses

- Drinking, culinary, and food processing purposes, after conventional treatment;
- Bathing, swimming, and recreation;
- Growth and propagation or marginal propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers;
- Agricultural water supply; and
- Industrial water supply (ARM 17.30.623).

DEQ MONTANA

Water Quality Planning Process

3 - 4 Years

- **Monitor Water Quality**
  - Collect data about water quality.

1 - 2 Years

- **Assess Water Quality**
  - Describe water quality and determine whether waters are “impaired” (do not meet water quality standards and do not fully support beneficial uses).

1 - 3 Years

- **Identify Sources of Pollution and Develop TMDLs**
  - Estimate amount of pollution from identified sources.
  - Determine reductions needed for impaired waters to meet water quality standards and recommend pollution reduction strategies.

On Going

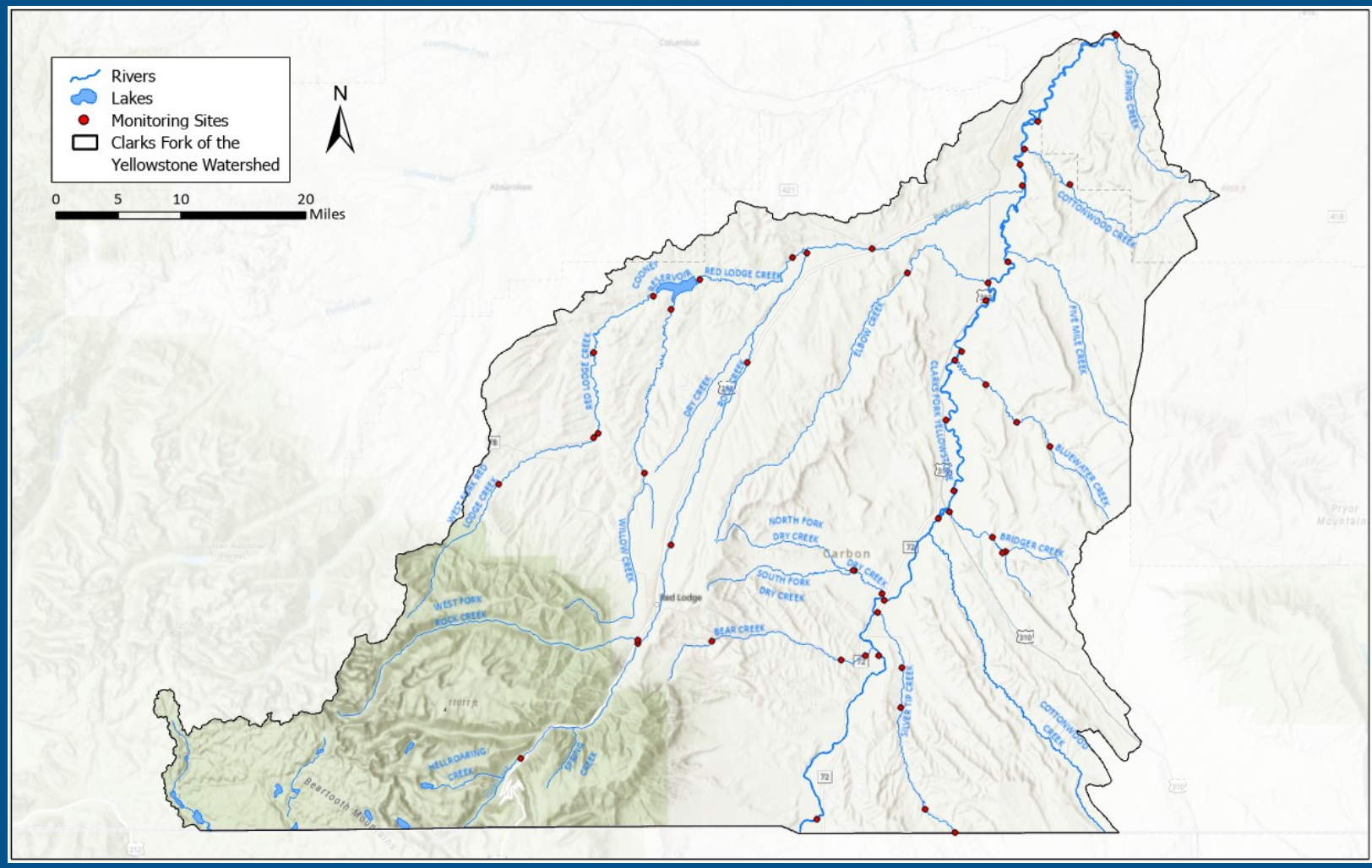
- **Support Water Quality Protection Practices**
- Support efforts to reduce point and nonpoint source pollution and protect and restore water quality.

2023 Monitoring

- Monitored June – Oct.
- 17 Waterbodies
- 51 Monitoring Sites
- Water Quality Parameters
  - Nutrients and Response Variables
  - Metals
  - *E.coli*
  - Oil and Gas Parameters

EA0

2023 Monitoring Sites



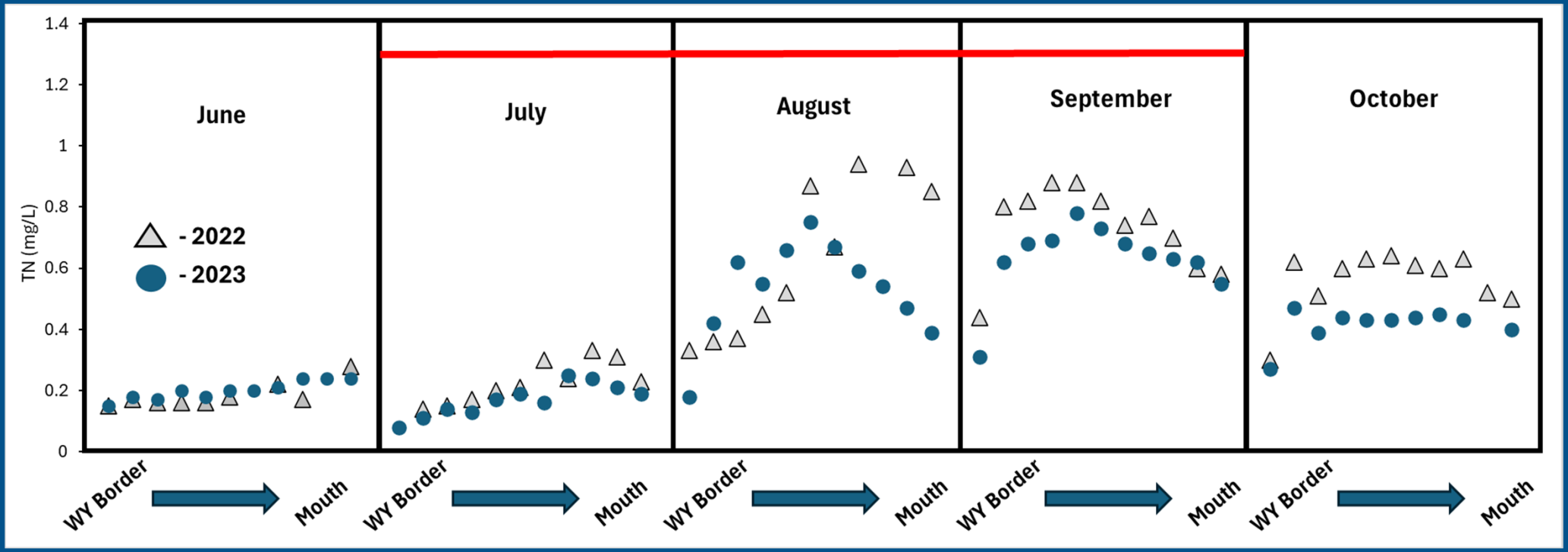
Slide 10

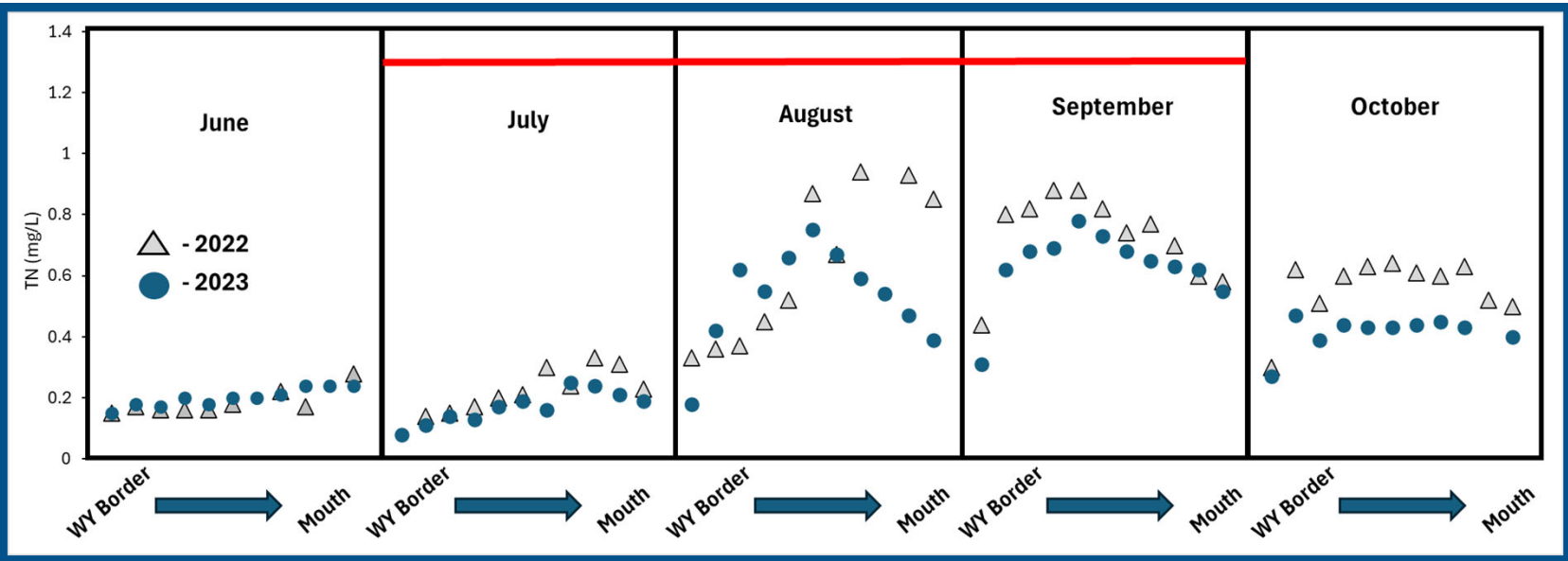
EA0 Need new maps

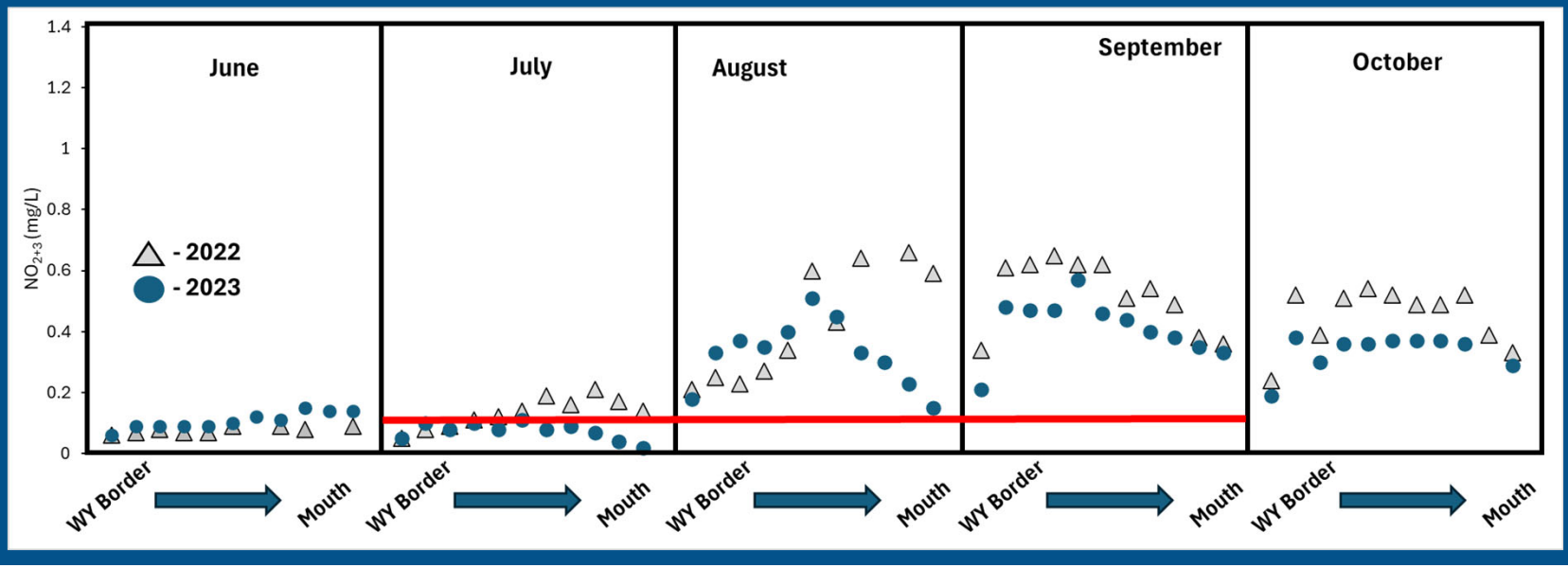
Ebert, Abbie, 2023-02-12T19:50:37.971


Clarks Fork Yellowstone River
Nutrient Results

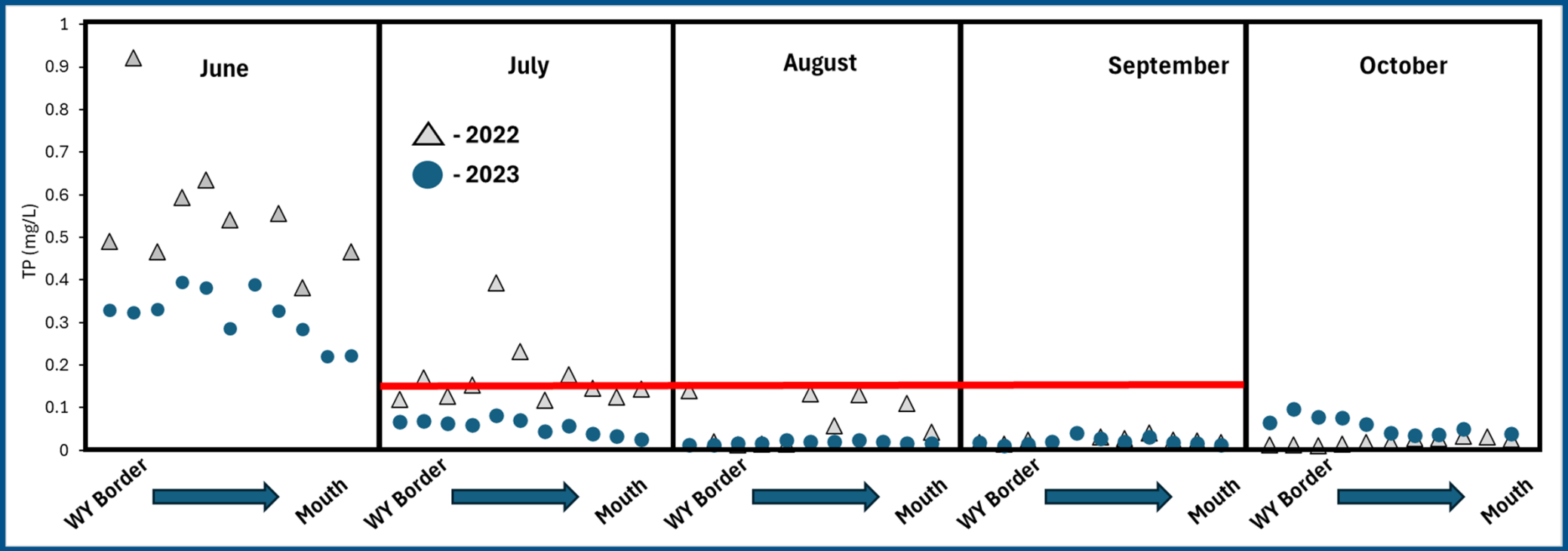
Clarks Fork Yellowstone River: Nitrogen Results

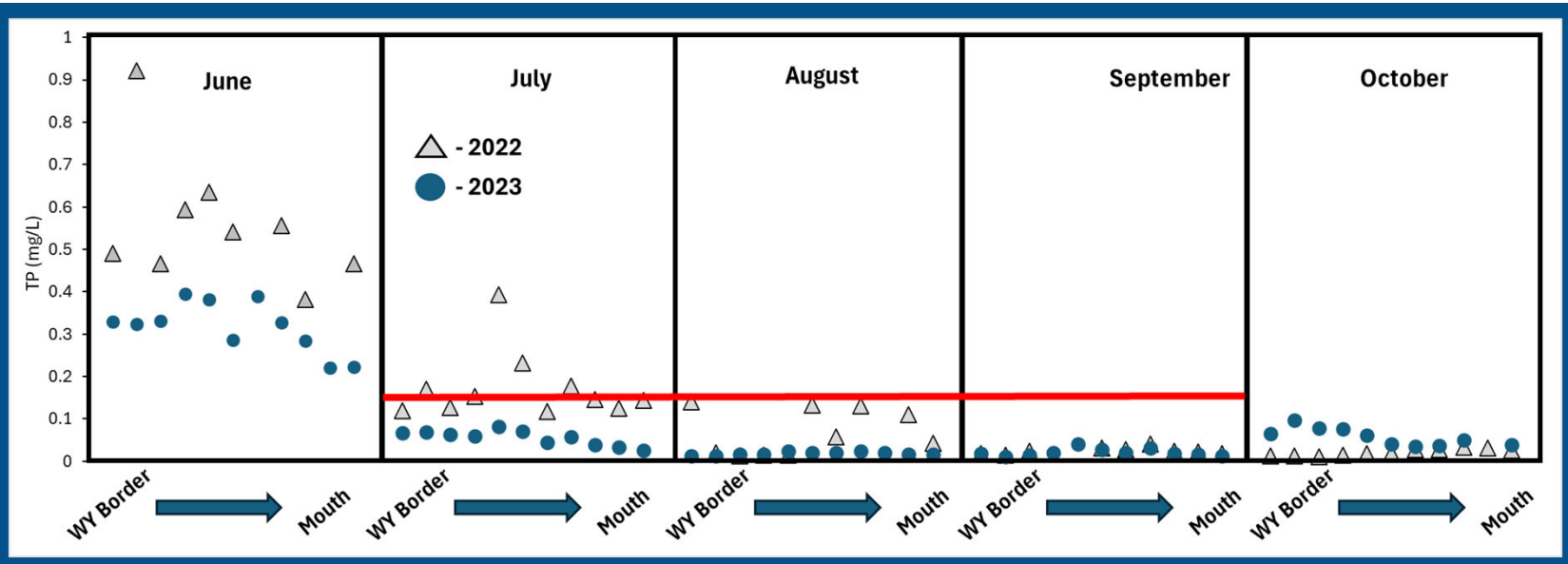


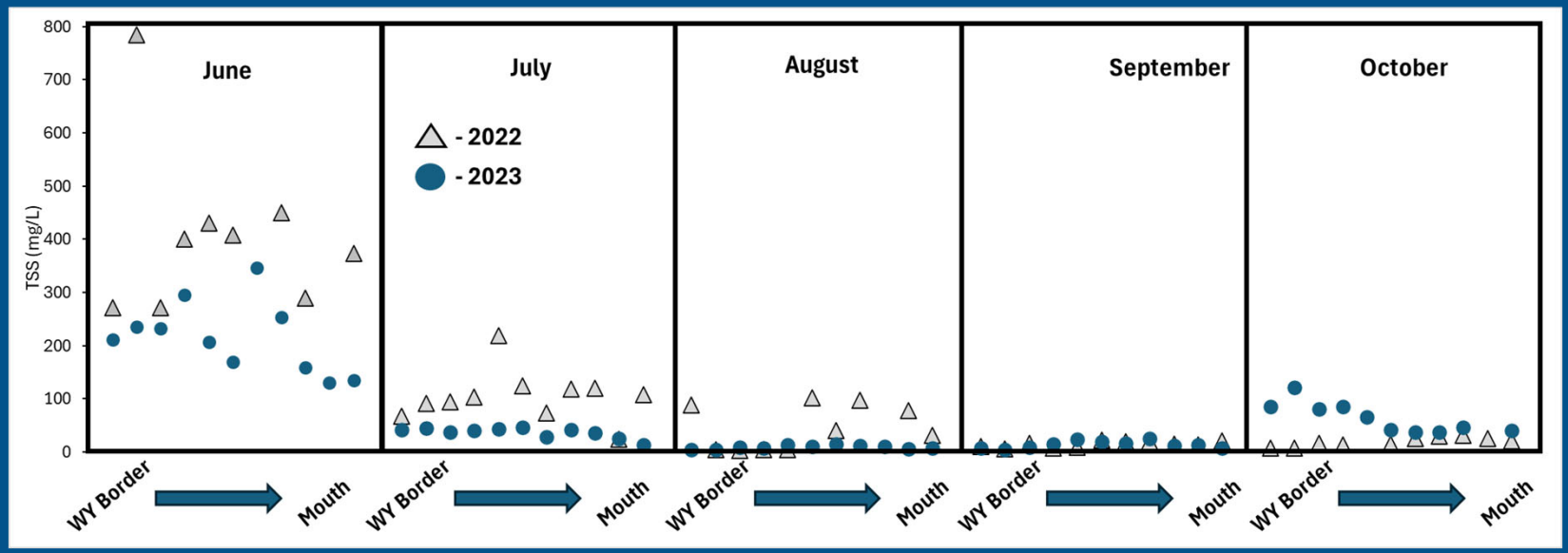

1.4
1.2
1
0.8
0.6
0.4
0.2
0
TN (mg/L)
June
July
August
September
October
- 2022
- 2023
WY Border
Mouth


1.4
1.2
1
0.8
0.6
0.4
0.2
0
NO2+3 (mg/L)
June
July
August
September
October
- 2022
- 2023
WY Border
Mouth

Clarks Fork Yellowstone River: Phosphorus Results




TP (mg/L)
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
June
July
August
September
October
- 2022
- 2023
WY Border
Mouth


TSS (mg/L)
800
700
600
500
400
300
200
100
0
June
July
August
September
October
- 2022
- 2023
WY Border
Mouth

Bear Creek: Nutrient Results

- Total phosphorus and total nitrogen are elevated during spring runoff.
  - Could be due to runoff after the 2021 fire.
- Total nitrogen does not follow a seasonal or upstream to downstream pattern.
- No exceedances of chlorophyll a or ash free dry weight.

DEQ MONTANA

Silvertip Creek: Nutrient Results

- Elevated concentrations of ammonia, total nitrogen, total phosphorus, and soluble reactive phosphorus at the WY border.
- Total nitrogen and total phosphorus decreases from upstream to downstream.

DEQ MONTANA

Dry Creek: Nutrient Results

- Total nitrogen and total phosphorus increase in concentrations from upstream to downstream.

DEQ MONTANA

Bridger Creek: Nutrient Results

- Total nitrogen and total phosphorus increase from upstream to downstream.
- South Fork Bridger Creek provides most of the flow to Bridger Creek.

DEQ MONTANA

Bluewater Creek: Nutrient Results

- Total suspended solids, total phosphorus, total nitrogen, and nitrite + nitrate concentrations increase from upstream to downstream.
- One exceedance of ash free dry weight.

DEQ MONTANA

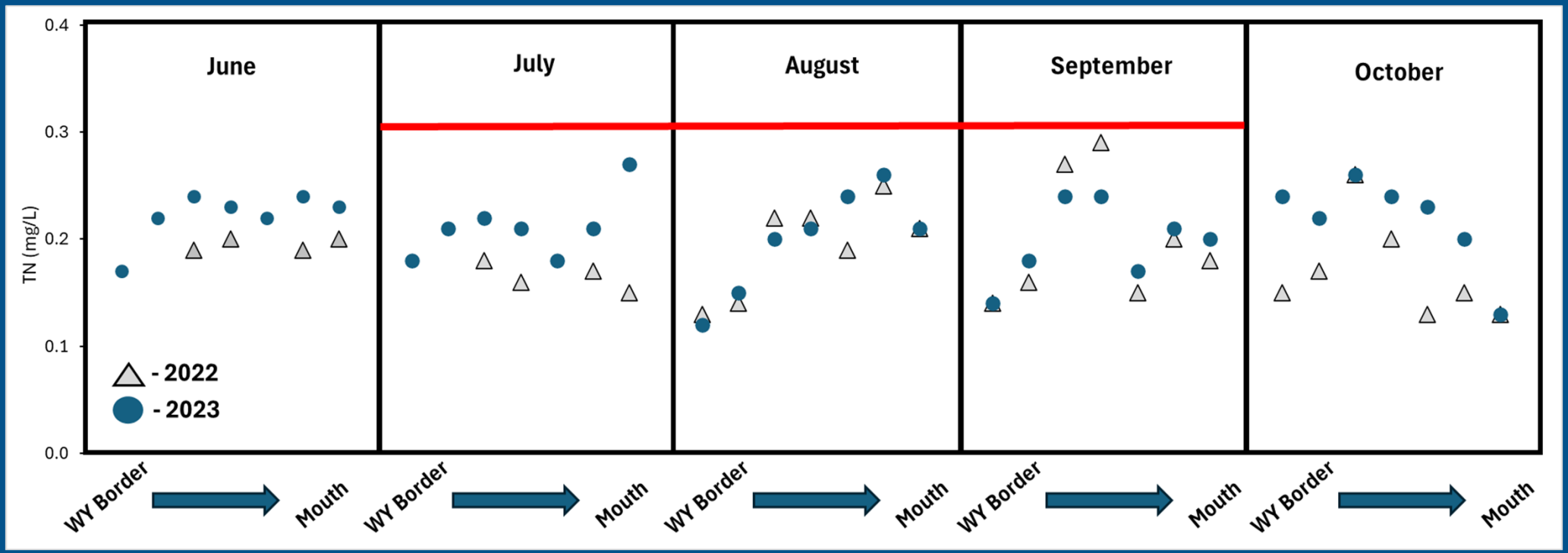
Spring Creek: Nutrient Results

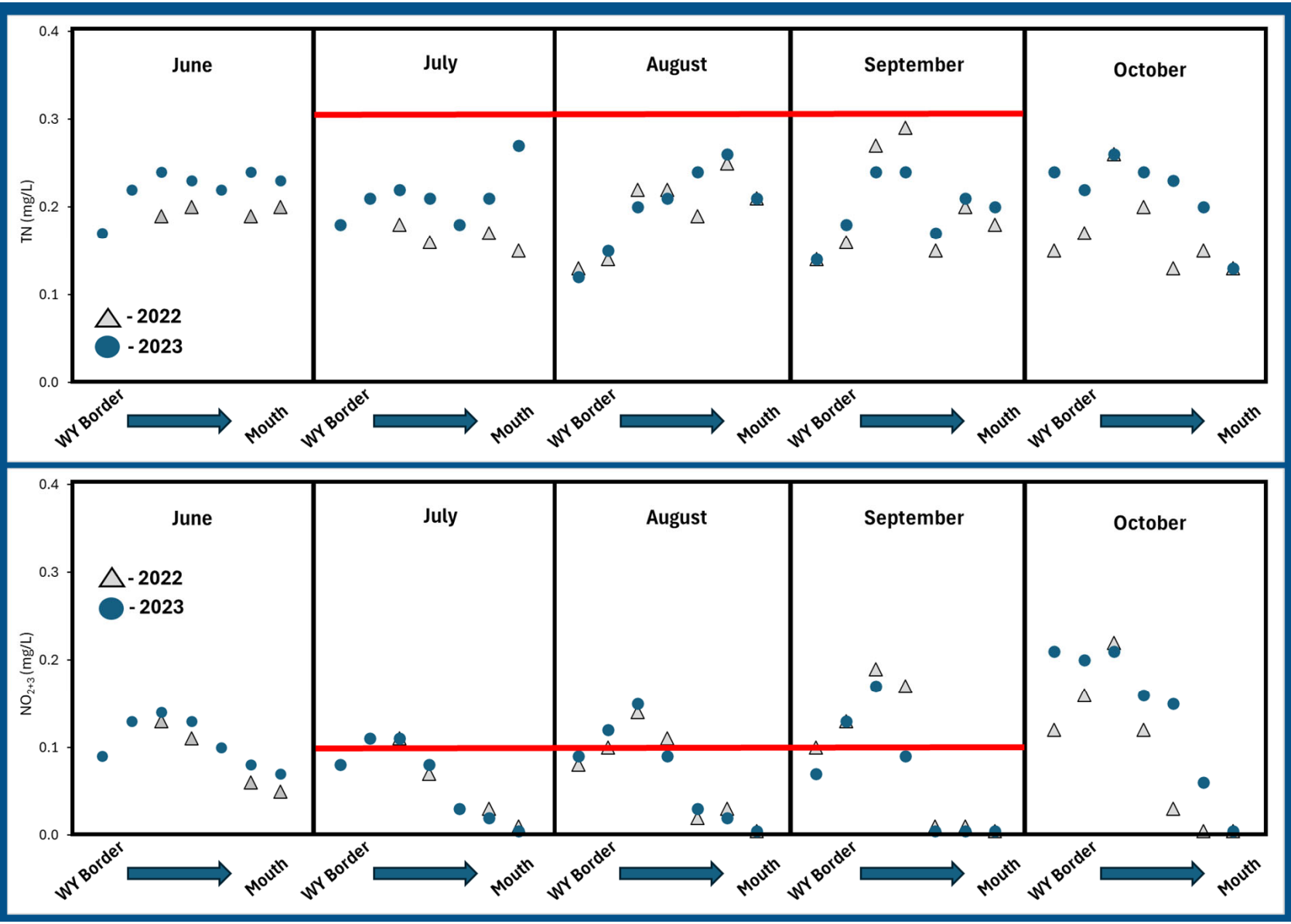
- Total nitrogen and nitrite + nitrate are the highest tributary concentrations in the watershed.
- In 2023, each nitrite + nitrate concentration was above 4.0 mg/L in 2023.

DEQ MONTANA

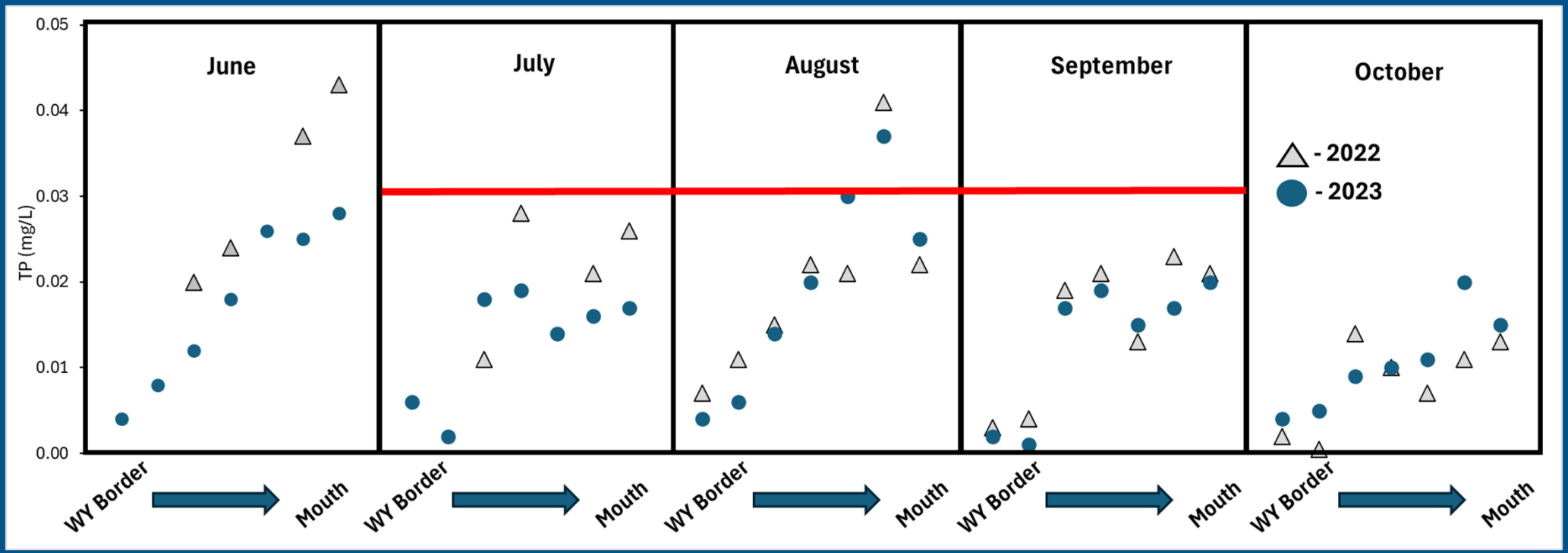
Rock Creek Nutrient Results

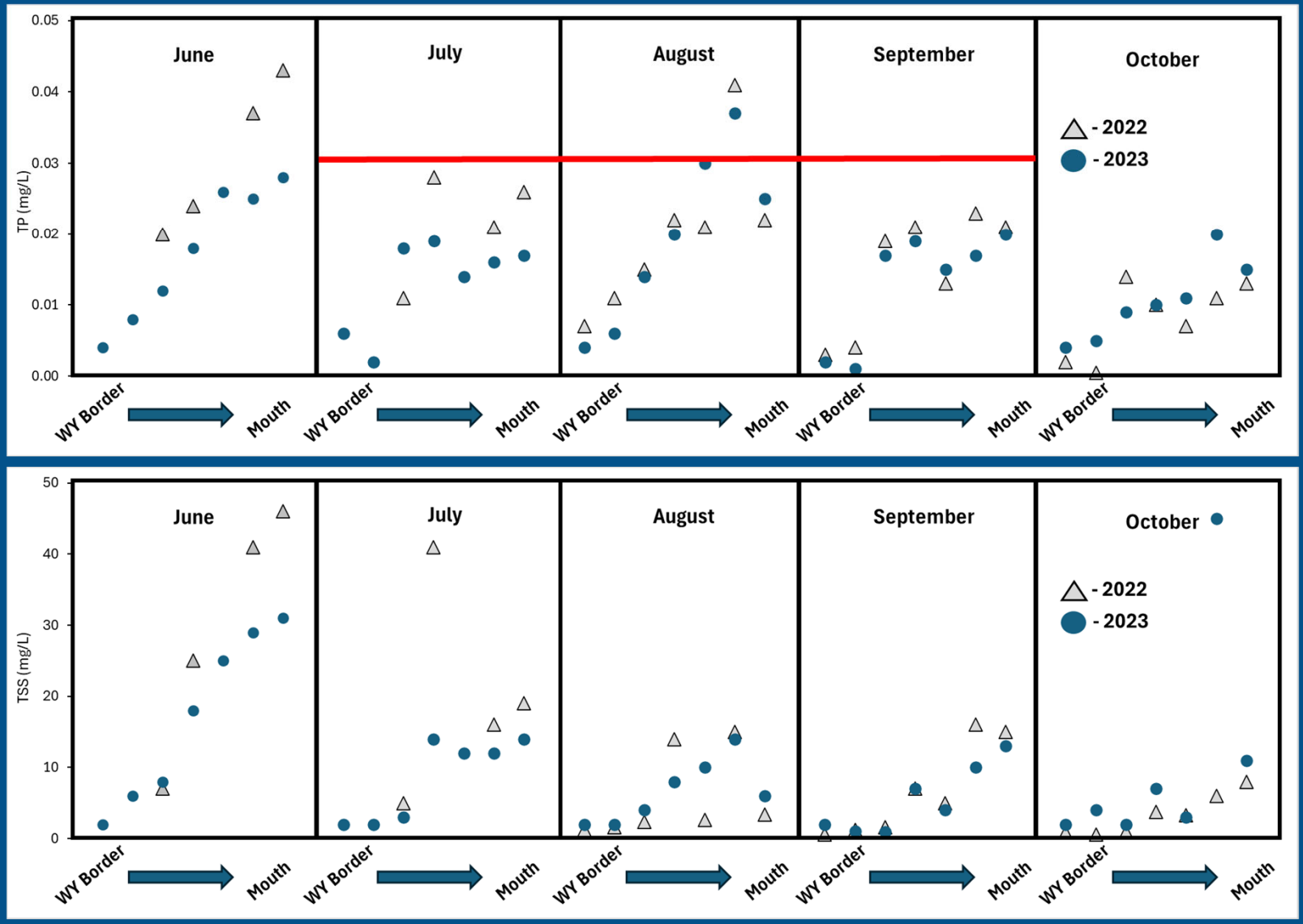
Rock Creek: Nitrogen Results

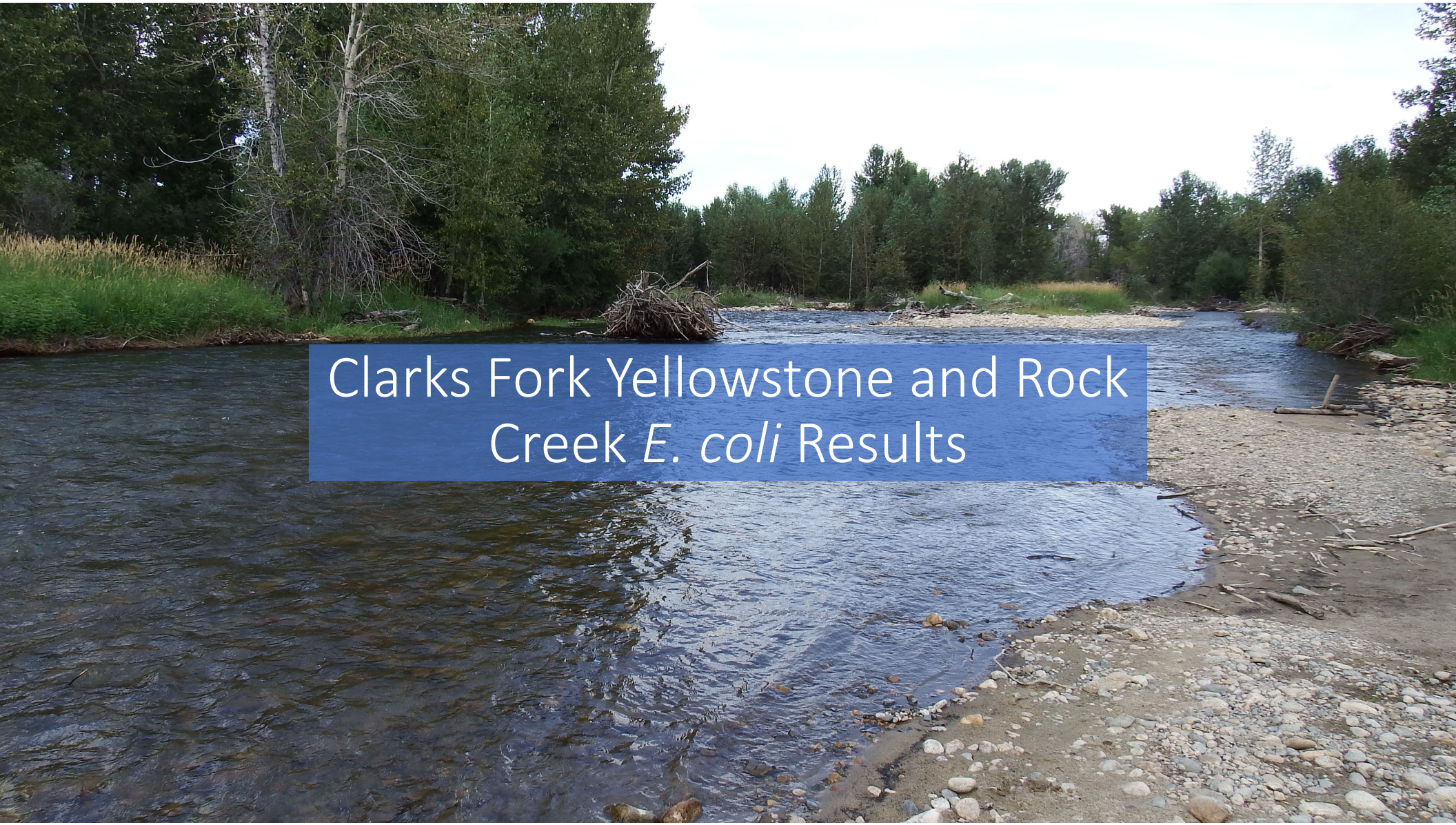



June
July
August
September
October
TN (mg/L)
0.4
0.3
0.2
0.1
0.0
- 2022
- 2023
WY Border
Mouth
NO_{2+3} (mg/L)

Rock Creek: Phosphorus Results

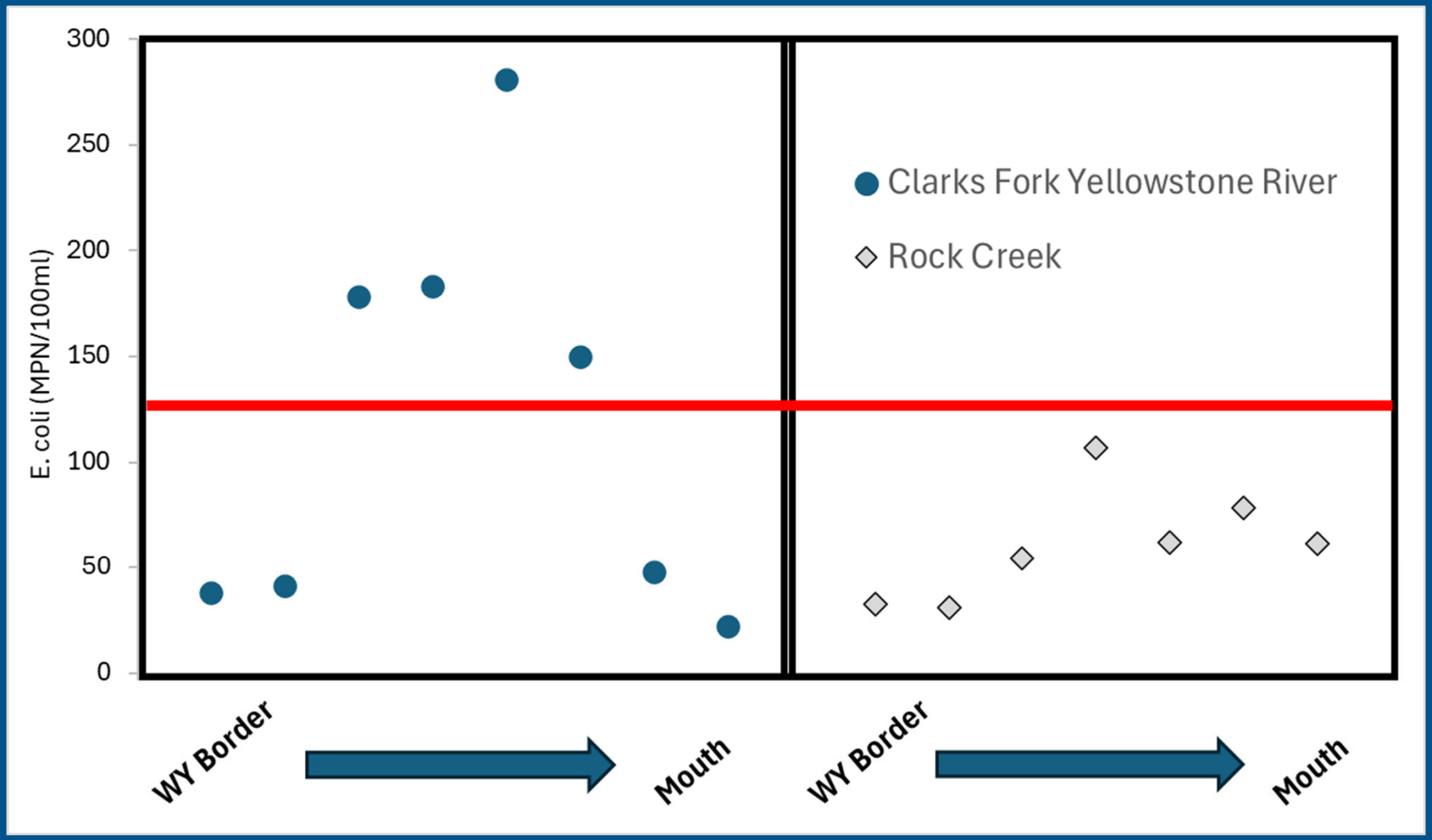



TP (mg/L)
0.05
0.04
0.03
0.02
0.01
0.00
June
July
August
September
October
- 2022
- 2023
WY Border
Mouth
TSS (mg/L)
50
40
30
20
10
0



Clarks Fork Yellowstone and Rock Creek *E. coli* Results

E. Coli Results



Clarks Fork Yellowstone Watershed Metals Results

Definitions: Metals Standards

- Chronic Standard: Long duration at a lower concentration.
- Acute Standard: Short duration at a higher concentration.
- Hardness Dependent Standards: Acute and chronic toxicity is dependent on hardness concentrations.

DEQ MONTANA

Clarks Fork Yellowstone River: Metals Results

- Aluminum (Aquatic Life): 3 chronic exceedances
- Copper (Aquatic Life): 2 acute exceedances and 14 chronic exceedances
- Iron (Aquatic Life): 53 chronic exceedances * Iron concentrations are high
- Lead (Aquatic Life): 15 chronic exceedances

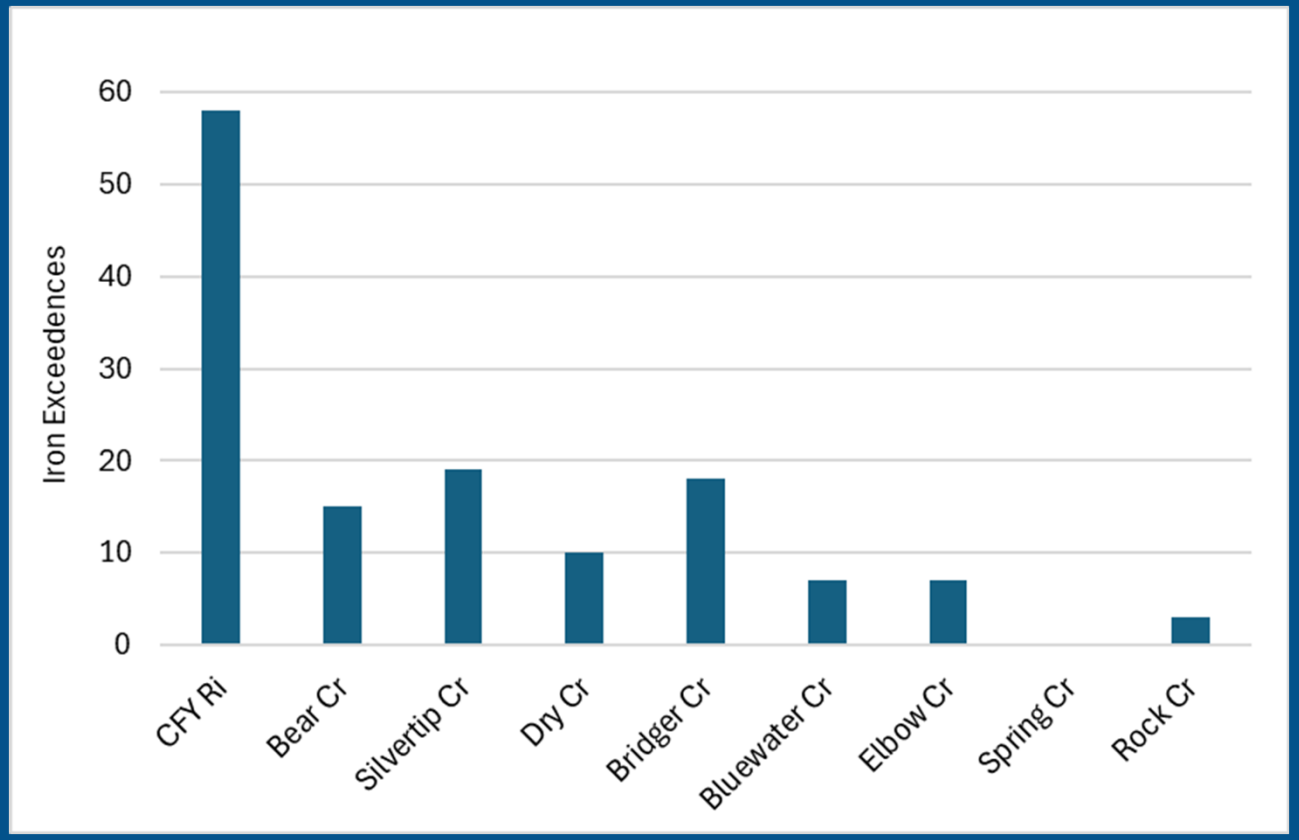
DEQ MONTANA

Silvertip Creek: Metals Results

- Arsenic (Human Health): 17 exceedances
- Chromium (Human Health): 1 exceedances
- Lead (Human Health): 1 acute exceedance
- Copper (Aquatic Life): 1 acute exceedance
- Iron (Aquatic Life): 19 chronic exceedances
- Lead (Aquatic Life): 2 chronic exceedances
- Zinc (Aquatic Life): 1 acute exceedances & 1 chronic exceedances

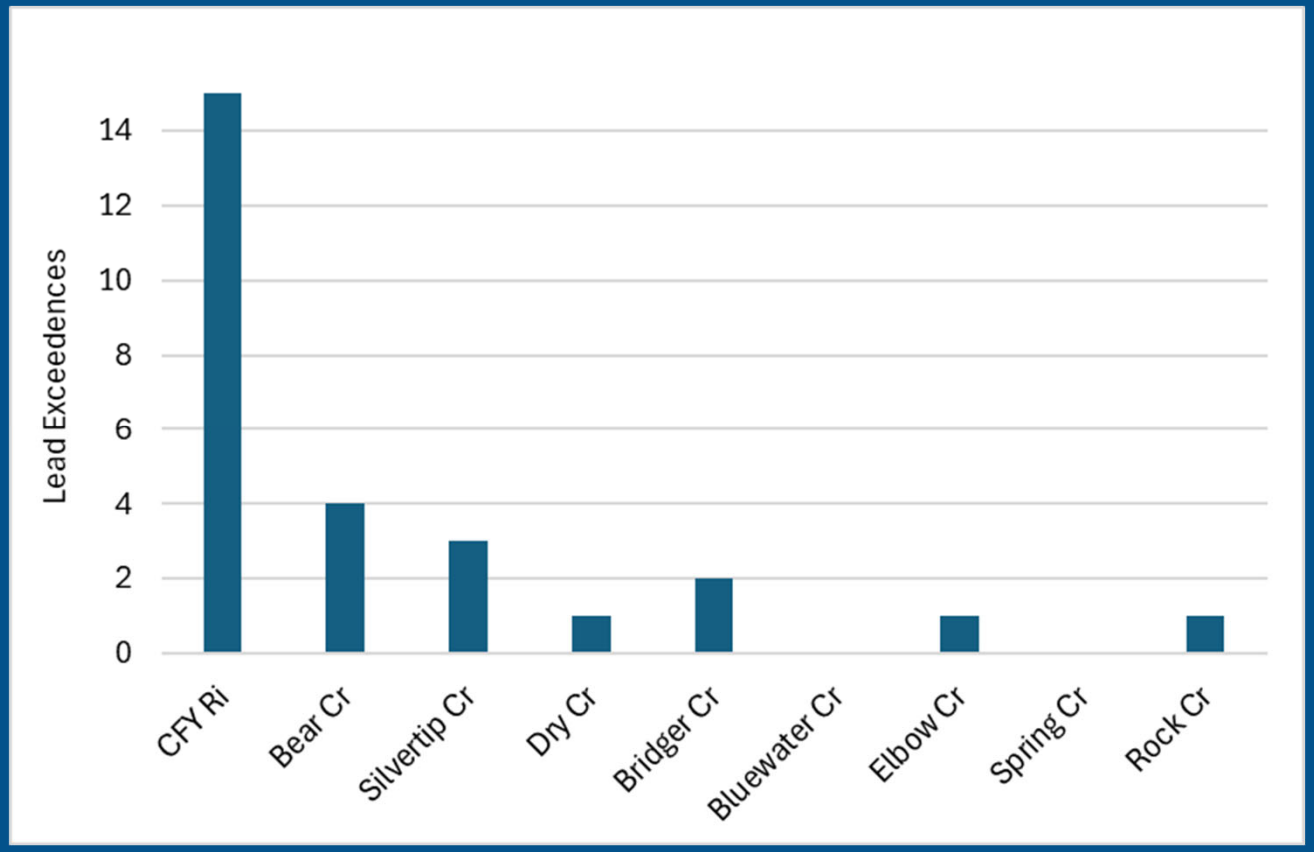
DEQ MONTANA

Clarks Fork Yellowstone Tributaries: Iron Results



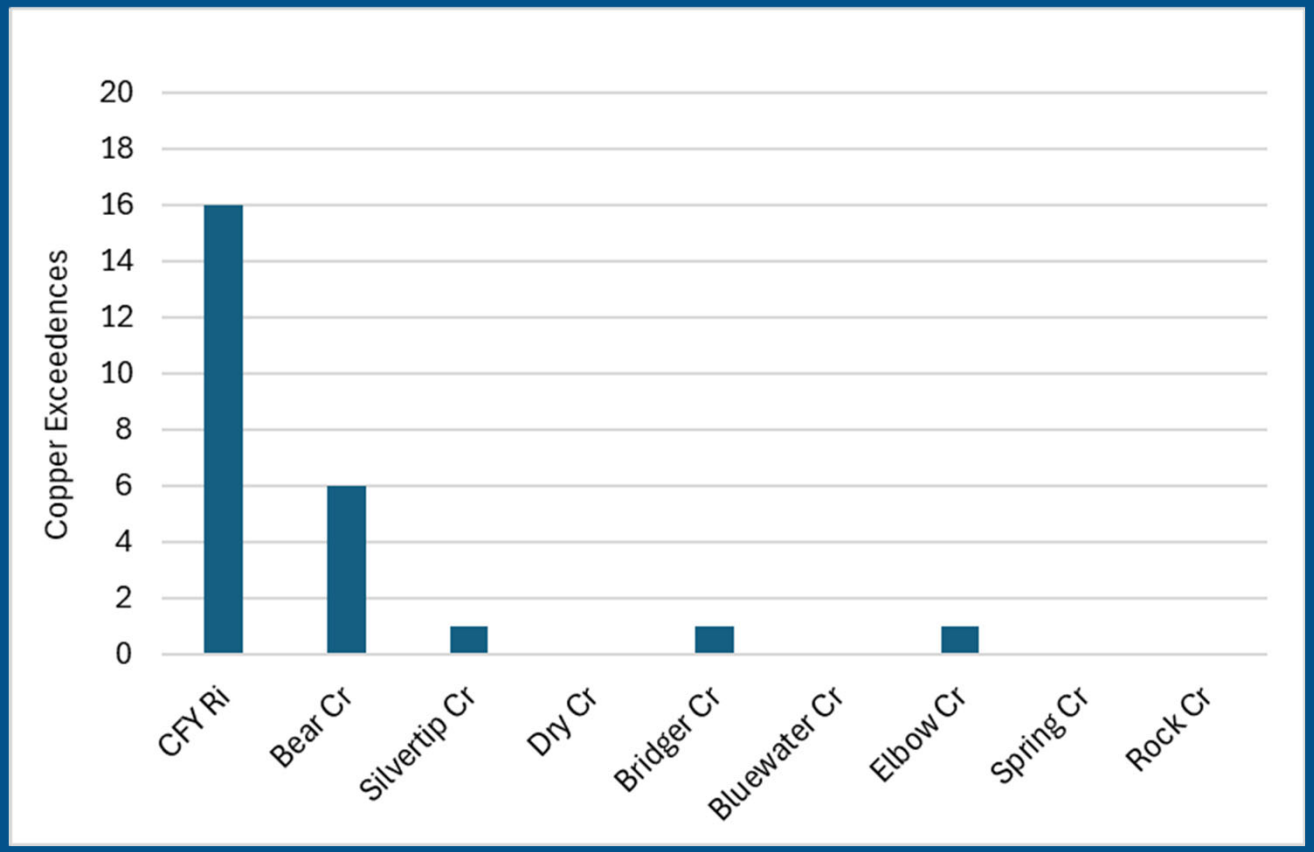
DEQ MONTANA

Clarks Fork Yellowstone Tributaries: Lead Results



DEQ MONTANA

Clarks Fork Yellowstone Tributaries: Copper Results



DEQ MONTANA

2022-2023 Monitoring Key Points

- Elevated metals during runoff.
- High concentrations of iron throughout the Clarks Fork Yellowstone Valley.
- Multiple exceedances of copper and lead.
- Exceedances of nutrient thresholds

DEQ MONTANA

2024 and 2025 Monitoring

2024 Monitoring

- Cooney Reservoir: Nutrients, Algae, Metals, E.coli
- Response variable monitoring: Algae, Dissolved Oxygen, and Macroinvertebrates
- *E.coli* monitoring on CFY and Rock Creek
- Clear Creek monitoring sites
- One Spring Creek site will be added back
- Continue oil and gas parameter monitoring on Silvertip Creek.

2025 Monitoring

- Cooney Reservoir: Nutrients, Algae, Metals, E.coli
- Sediment Monitoring

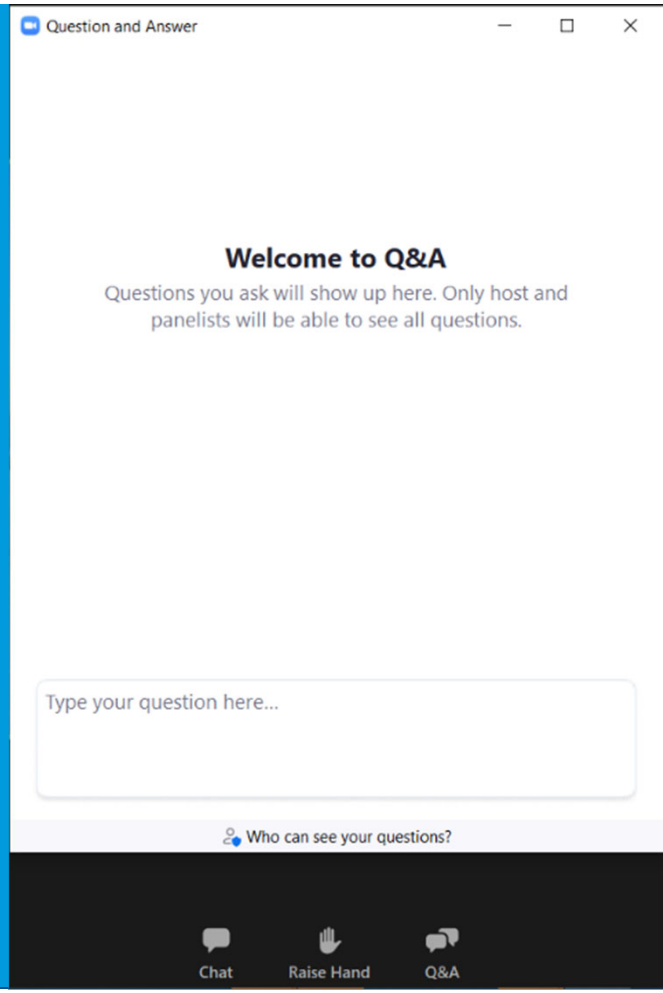
DEQ MONTANA

Special Thank You!

- Landowners
- Clarks Fork Yellowstone Partnership
- Carbon County Resource Council
- Carbon County Conservation District
- NRCS

Questions or Comments

- Raise hand (*9 if on the phone) or type questions into the Q&A
- DEQ will unmute you if you wish to provide your comment orally
- If calling by phone, press*6 to unmute
- State your name and affiliation before providing your comment



DEQ MONTANA