Clarks Fork Yellowstone Watershed Water Quality Monitoring Project

Abbie Ebert

April 25th, 2024

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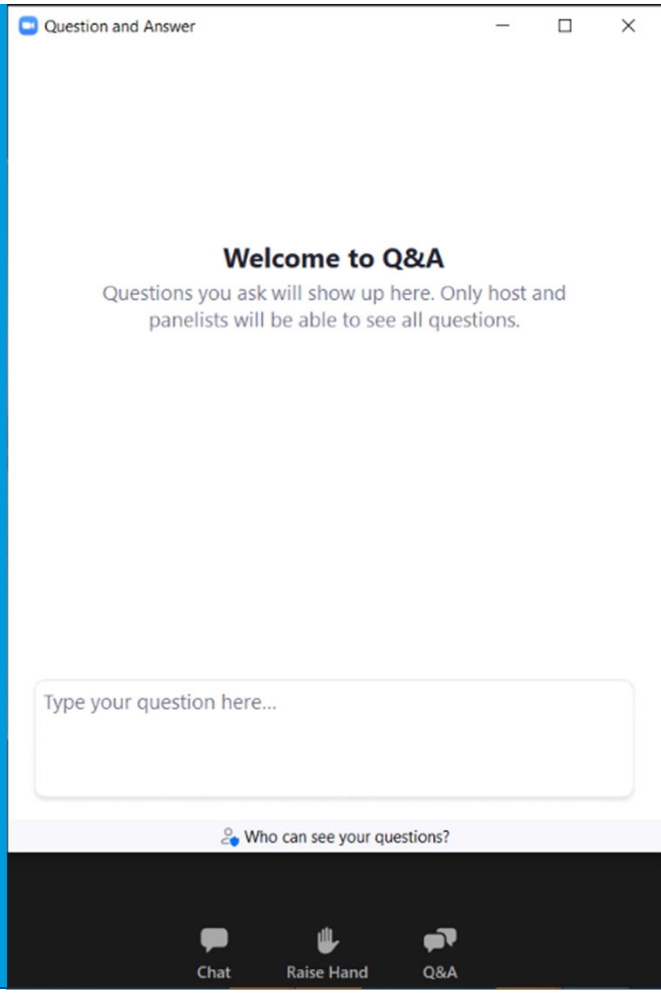
Questions or Comments

- 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



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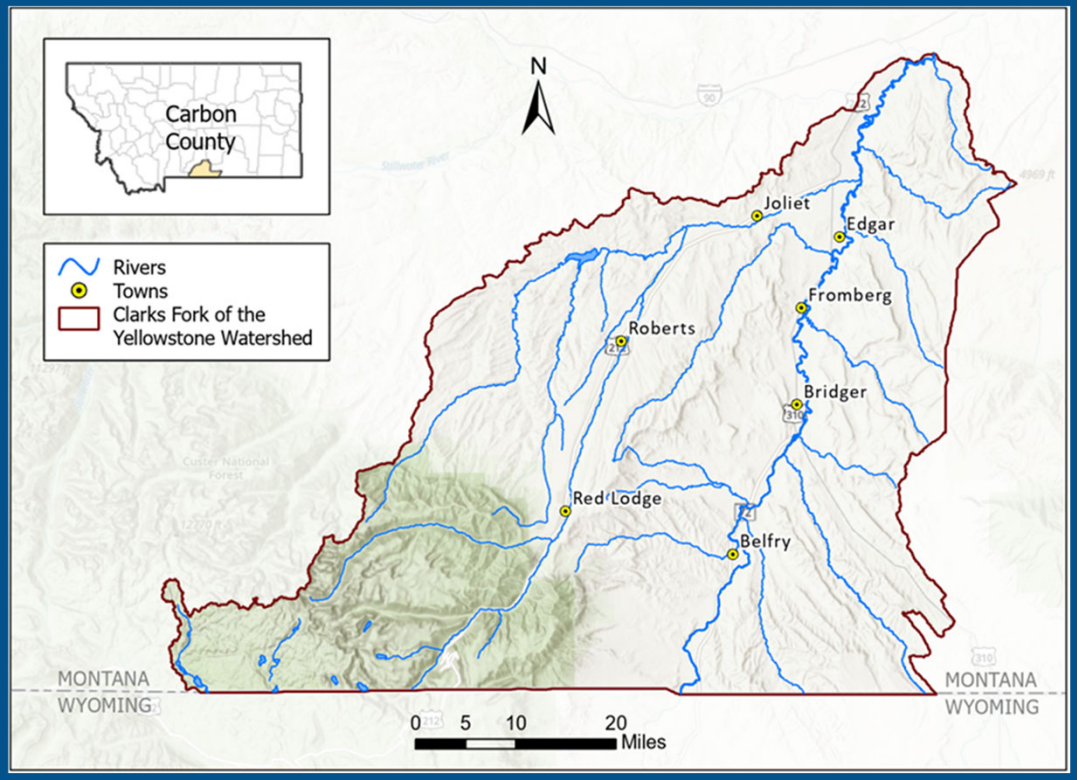
DEQ’s Mission: To champion a healthy environment for a thriving Montana.
Water Quality Division Vision: Clean water from peaks to prairies for all Montanans.

Why are we monitoring here and now?

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



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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)

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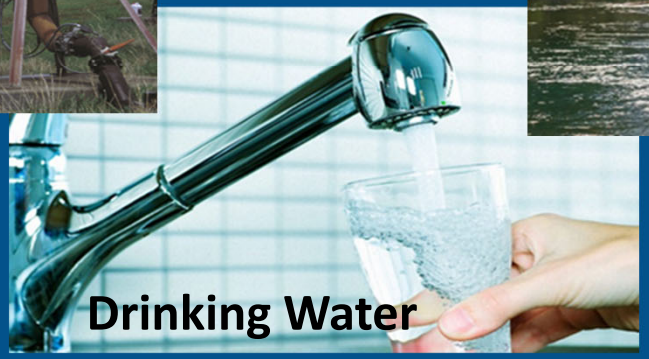
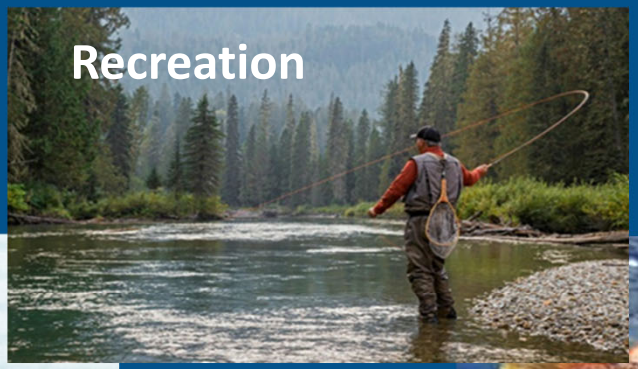
Beneficial Uses

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





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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).

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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

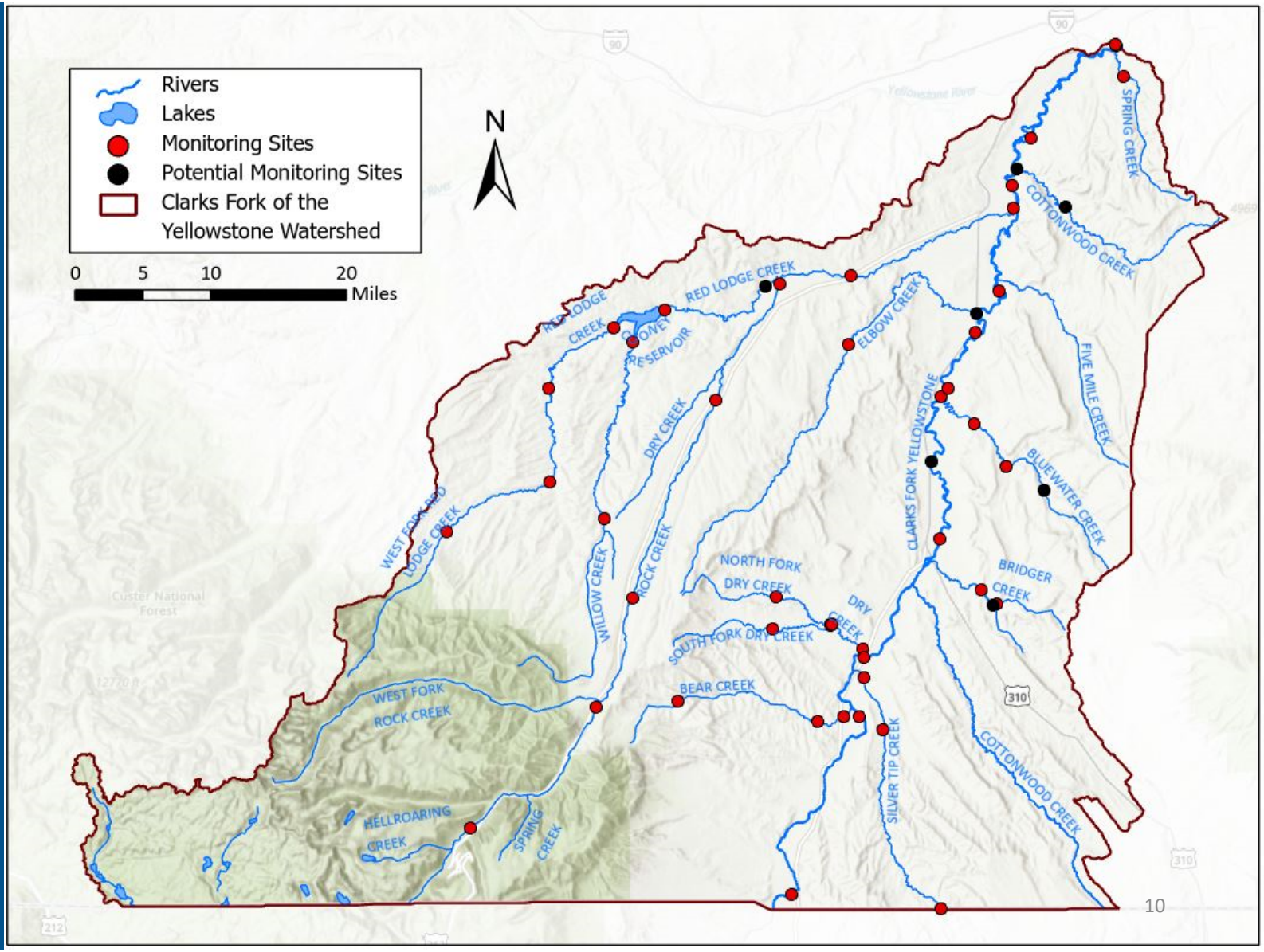
- **Support Water Quality Protection Practices**
- Support efforts to reduce point and nonpoint source pollution and protect and restore water quality.

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

2022 Monitoring Sites



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EA0 Need new maps

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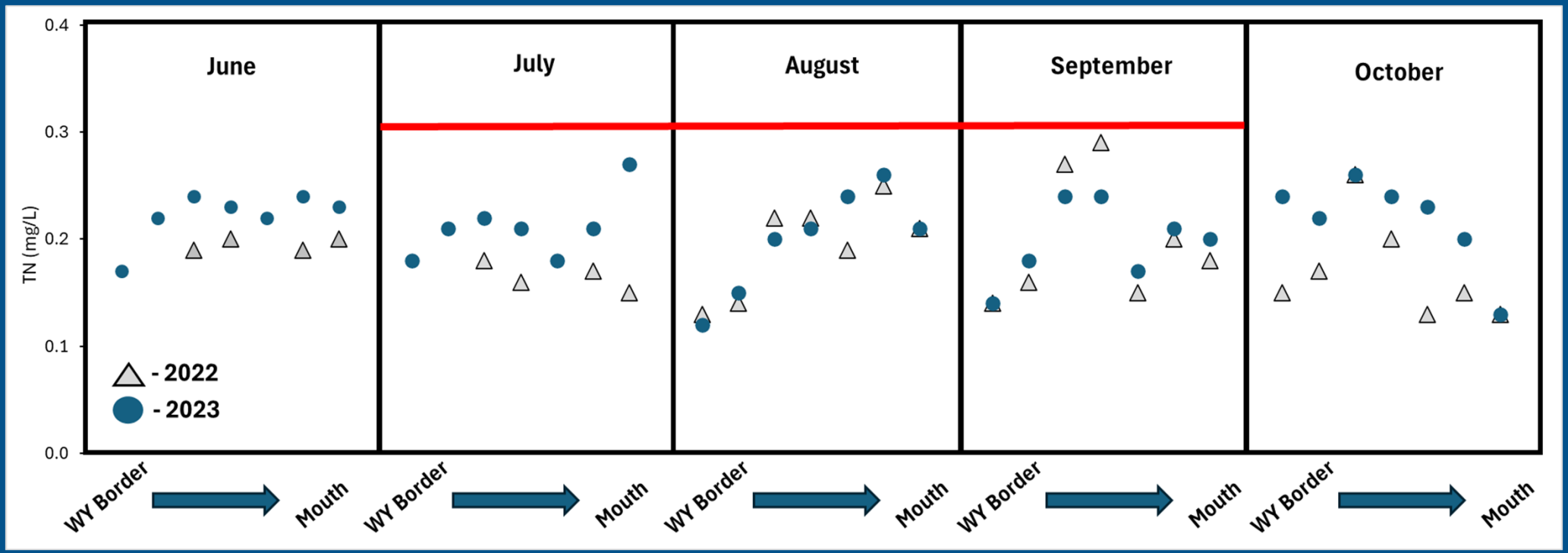
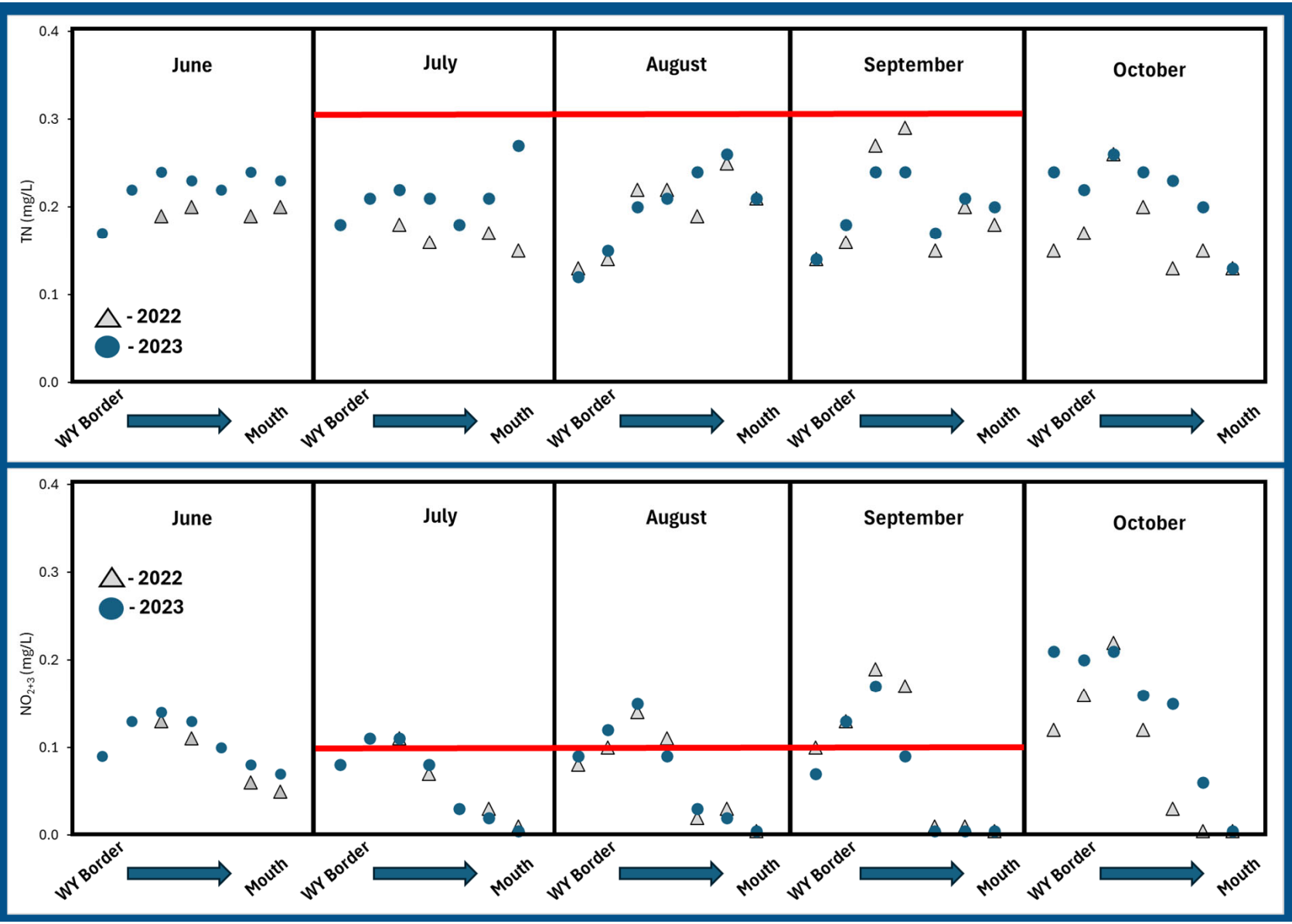
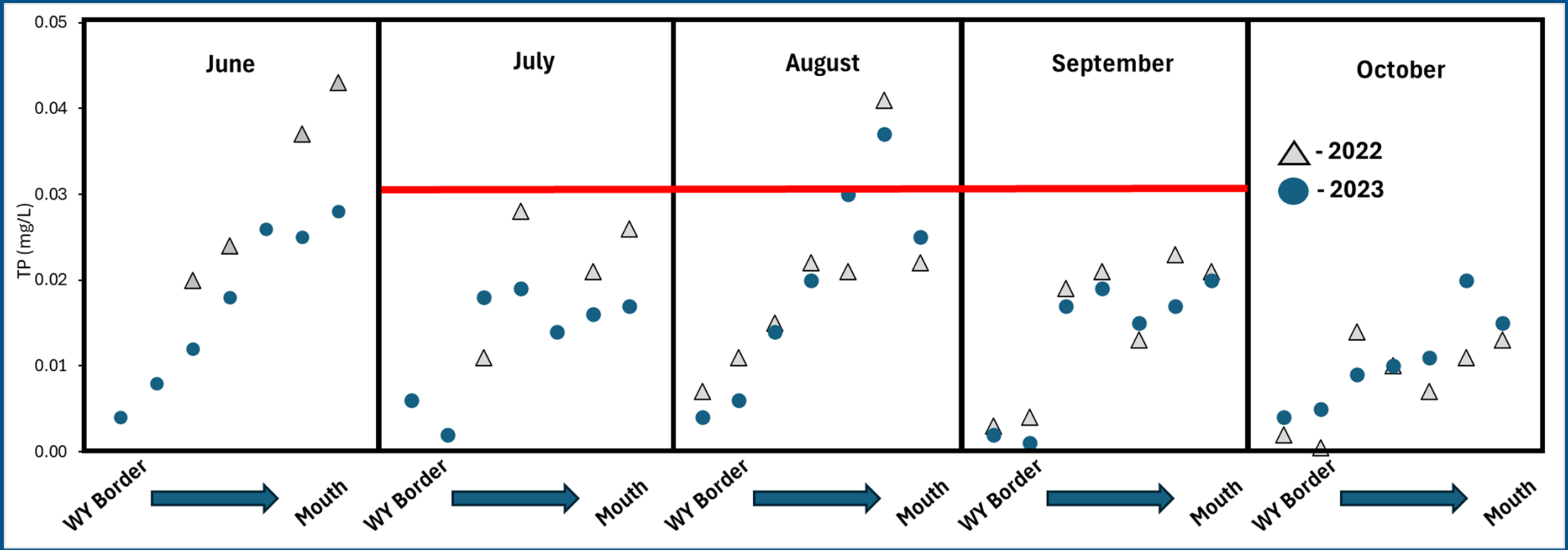
Rock Creek Nutrient Results

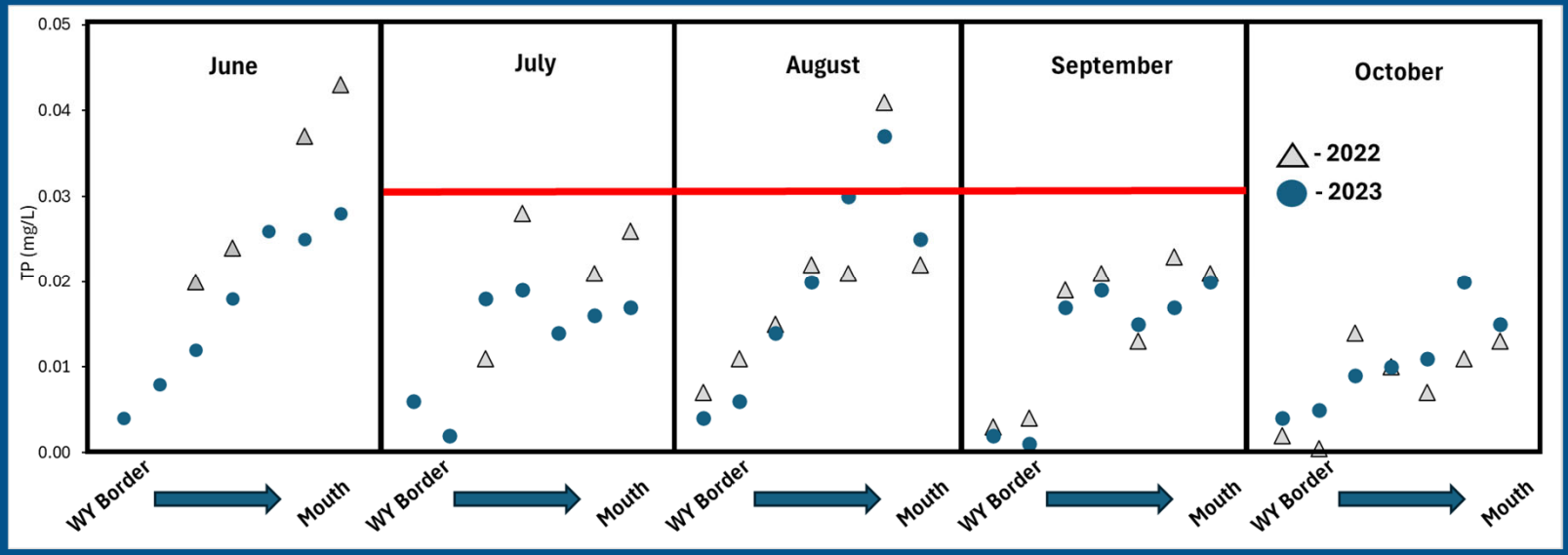
Rock Creek: Nitrogen Results

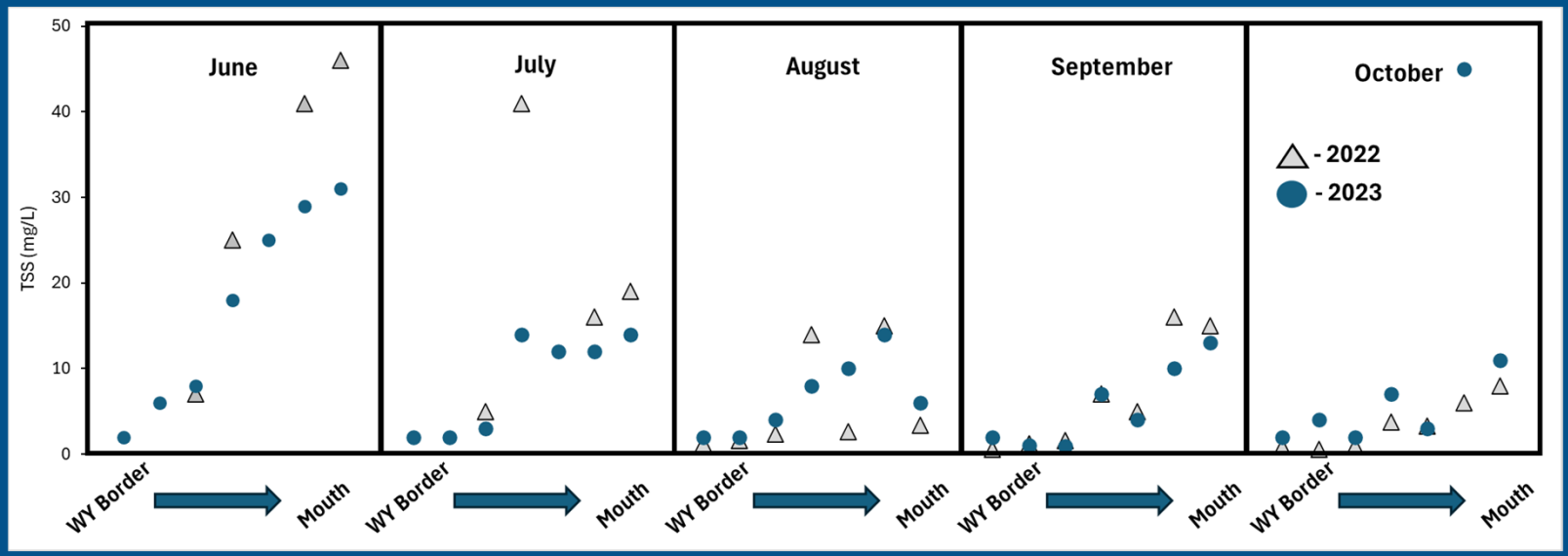



June
July
August
September
October
TN (mg/L)
0.4
0.3
0.2
0.1
0.0
- 2022
- 2023
WY Border
Mouth
NO_{2+3} (mg/L)

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
June
July
August
September
October
- 2022
- 2023
WY Border
Mouth

Willow Creek: Nutrient Results

- Total phosphorus concentrations increase from upstream to downstream.
- Total nitrogen concentrations decrease from upstream to downstream.
- No exceedances of chlorophyll a or ash free dry weight.

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West Red Lodge Creek: Nutrient Results

- Total phosphorus and total nitrogen concentrations increase from upstream to downstream.
- No exceedances of chlorophyll a or ash free dry weight.

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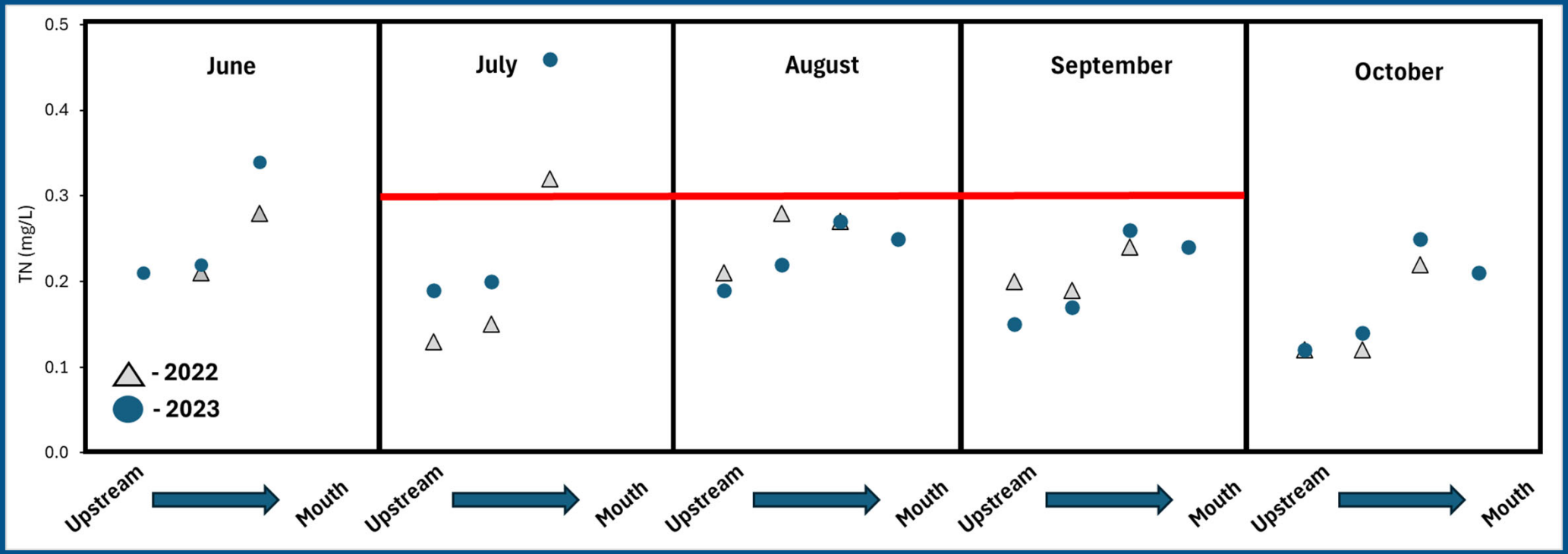
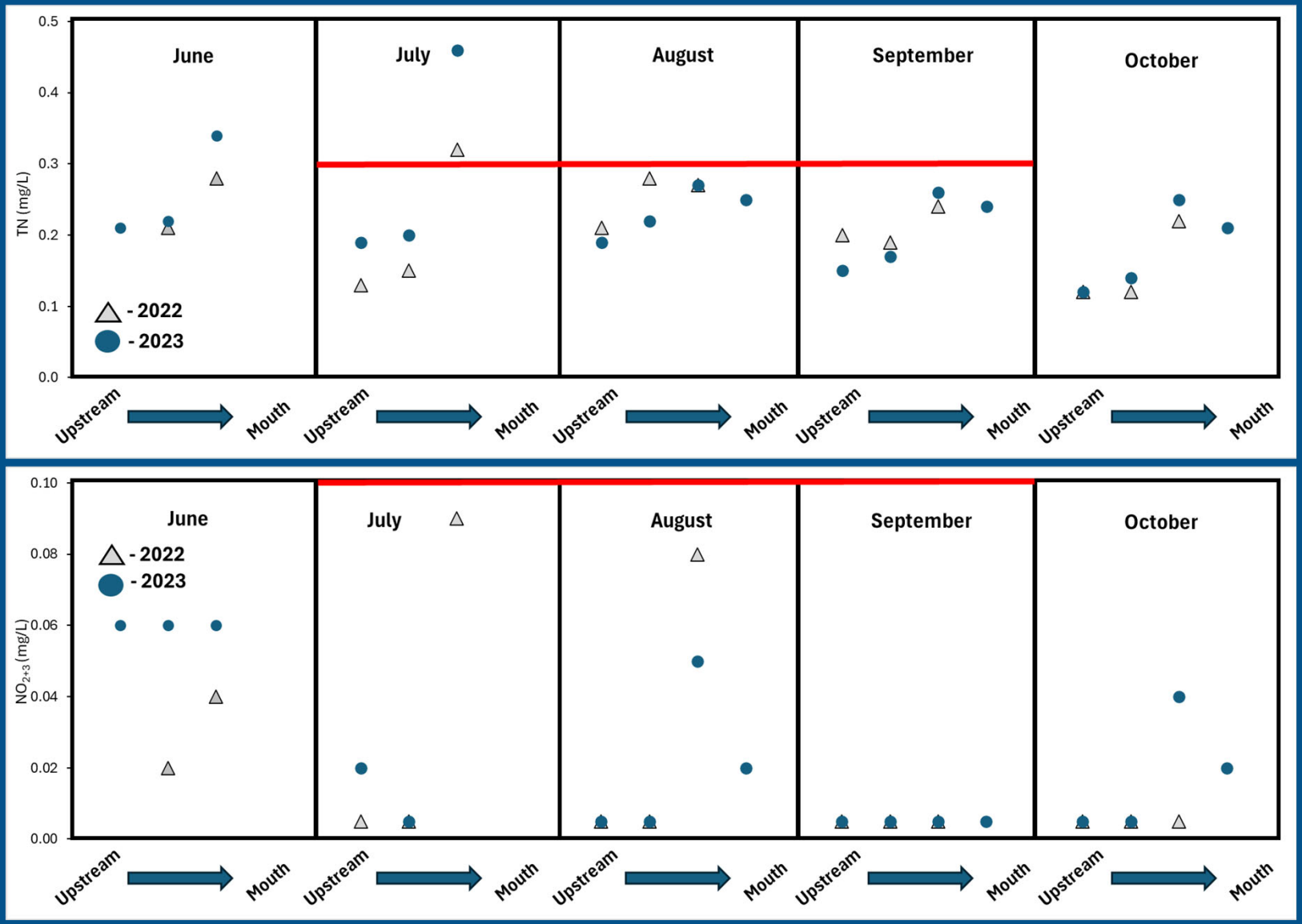
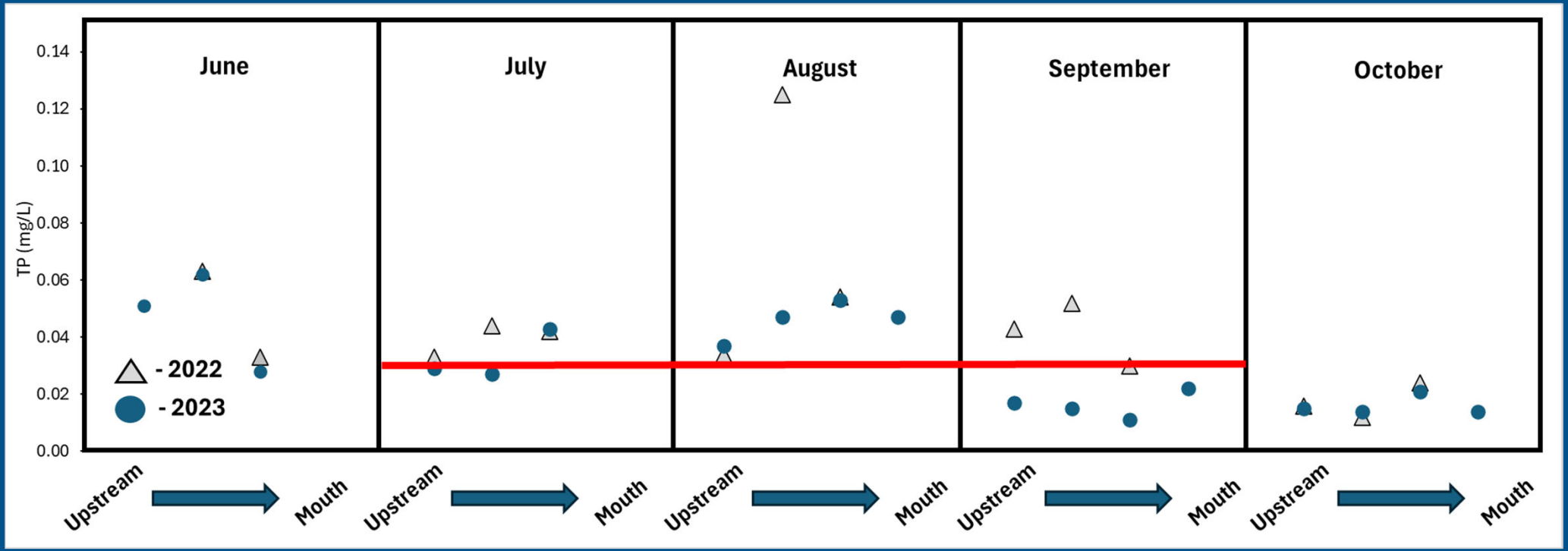
Red Lodge Creek Nutrient Results

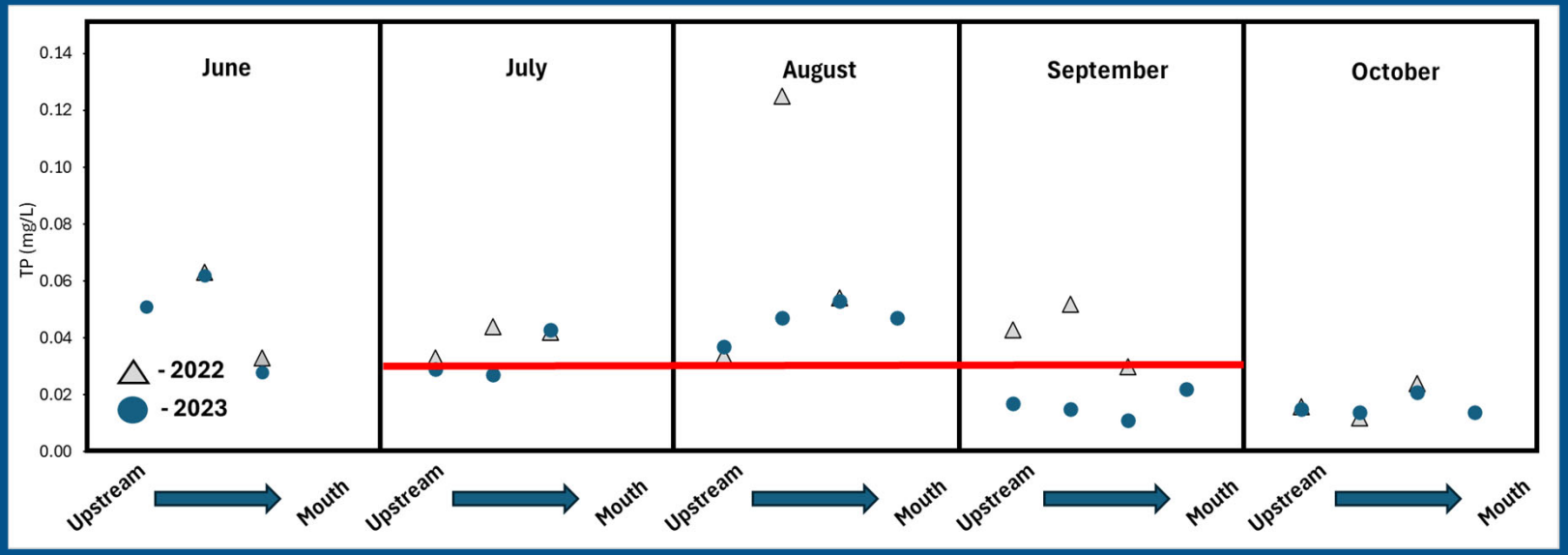
Red Lodge Creek: Nitrogen Results

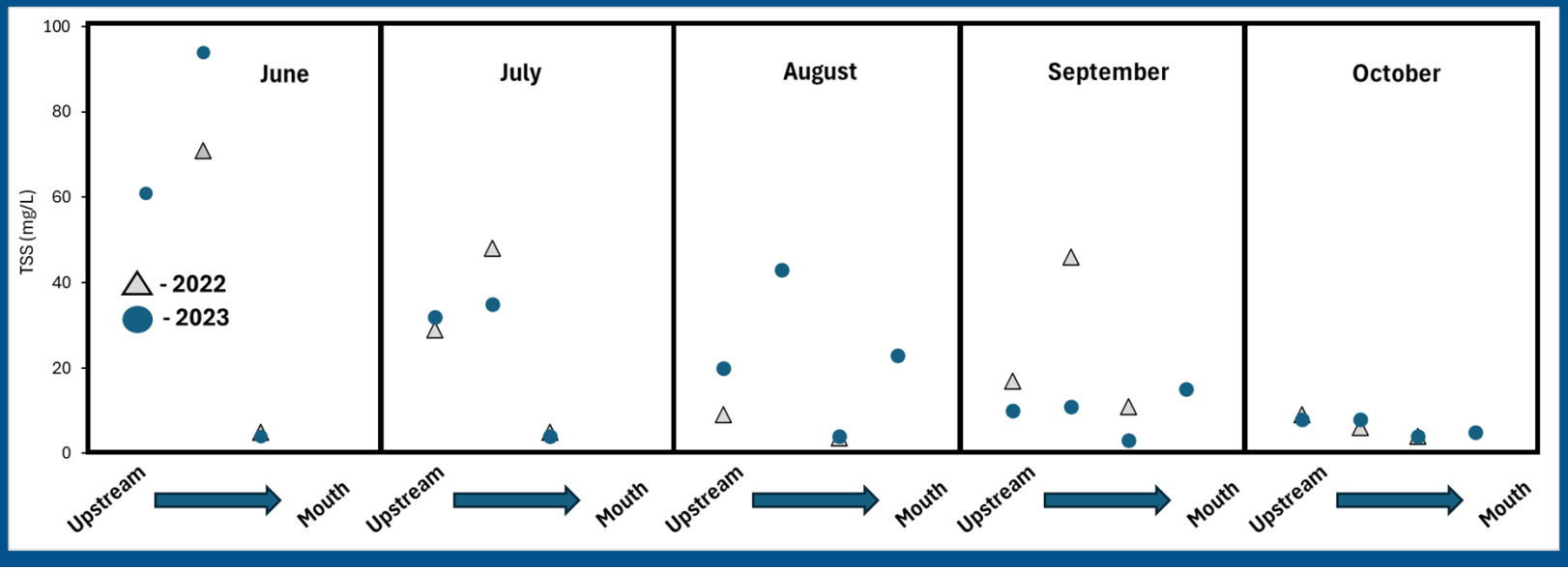



June
July
August
September
October
TN (mg/L)
0.5
0.4
0.3
0.2
0.1
0.0
- 2022
- 2023
Upstream
Mouth
NO_{2+3} (mg/L)
0.10
0.08
0.06
0.04
0.02
0.00

Red Lodge Creek: Phosphorus Results

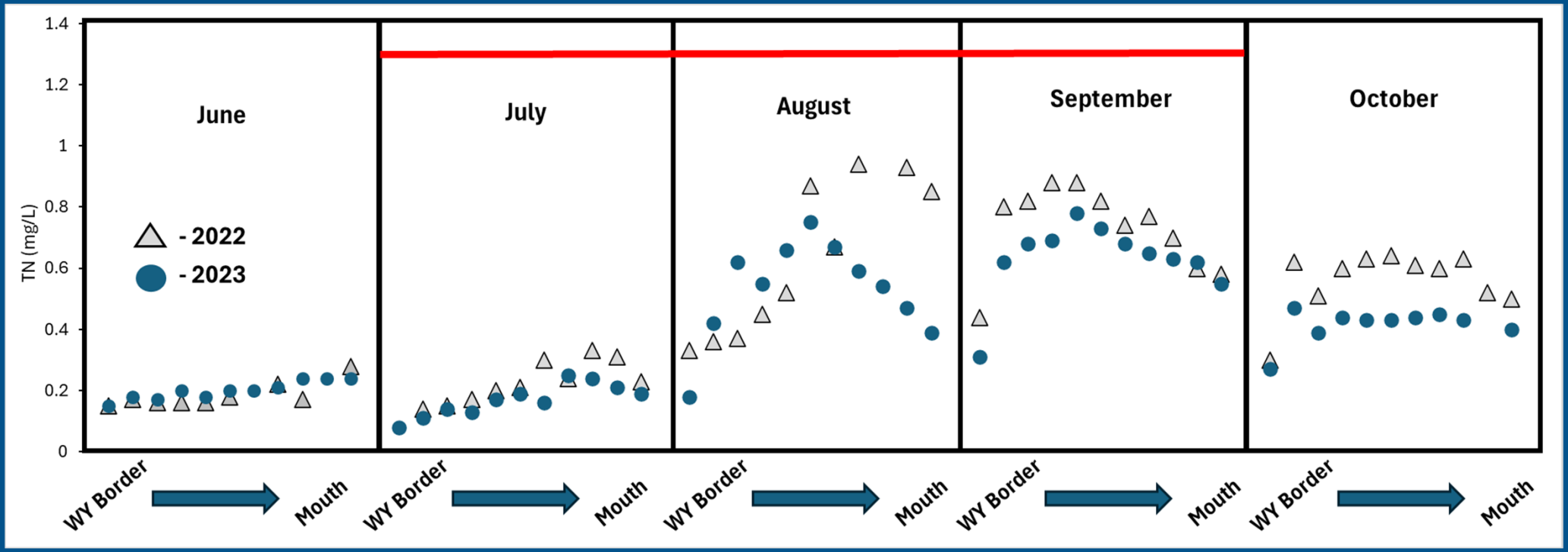


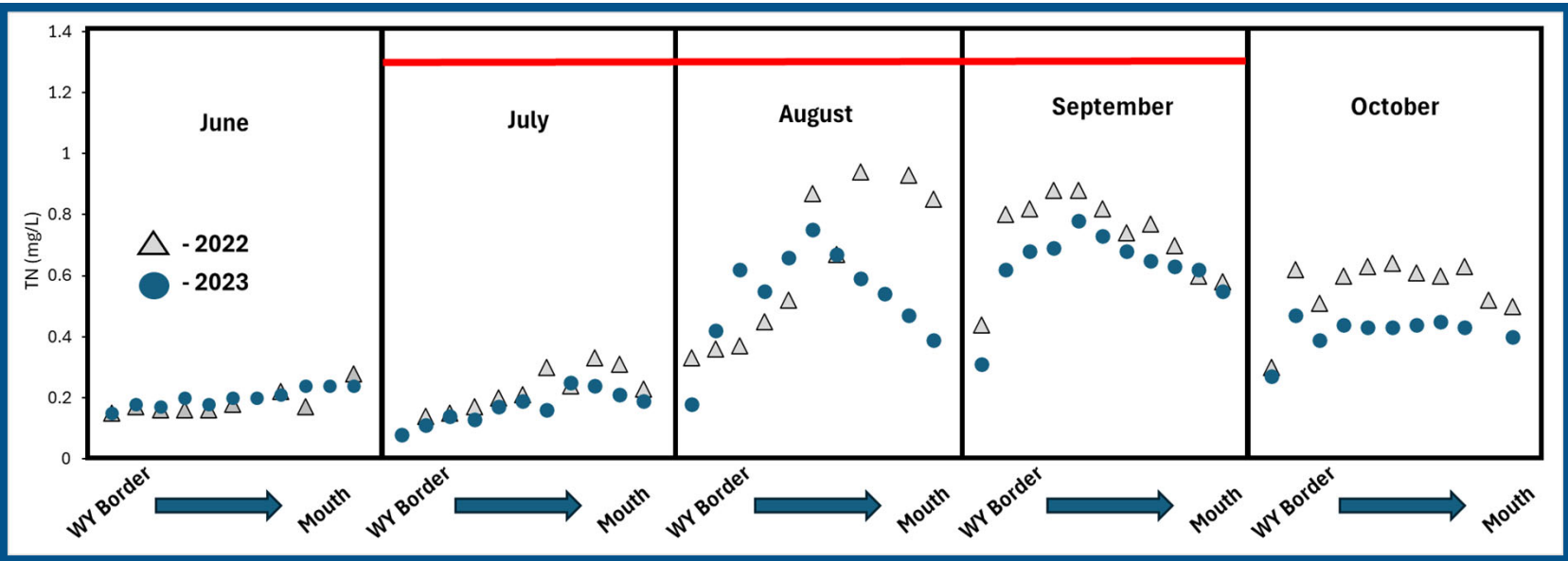

June
July
August
September
October
TP (mg/L)
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
- 2022
- 2023
Upstream
Mouth

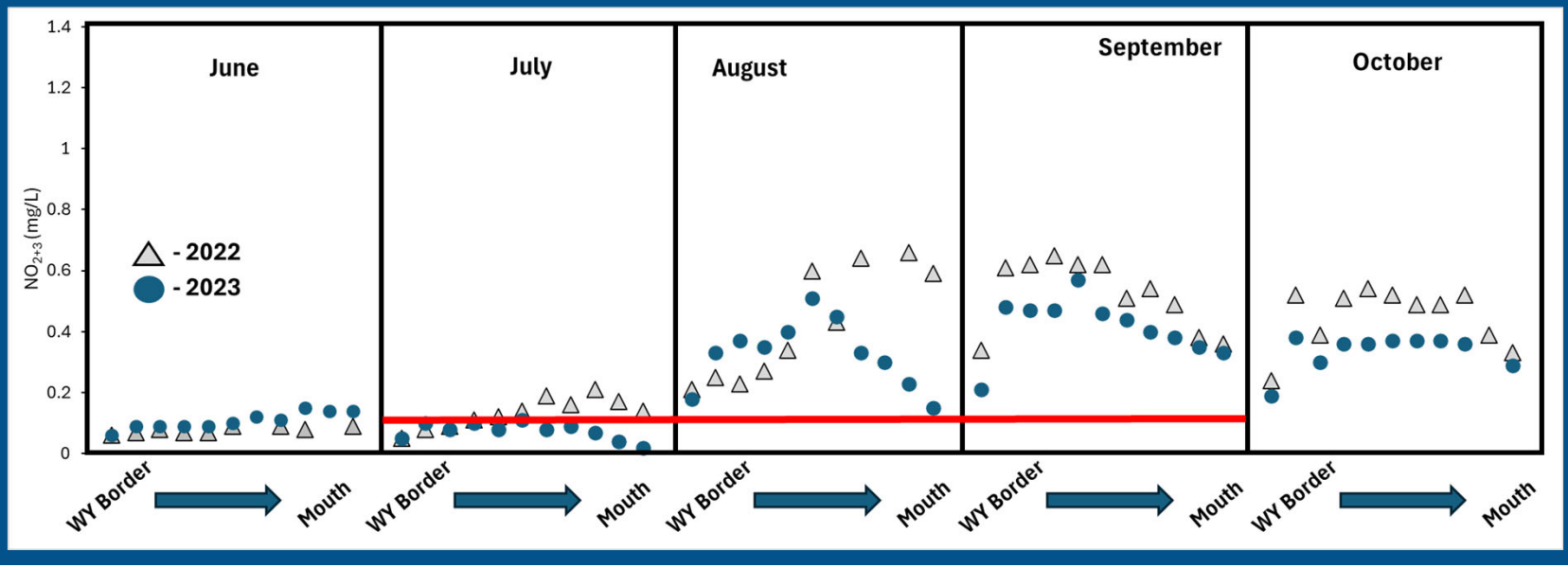

June
July
August
September
October
TSS (mg/L)
100
80
60
40
20
0
- 2022
- 2023
Upstream
Mouth


Clarks Fork Yellowstone River
Nutrient Results

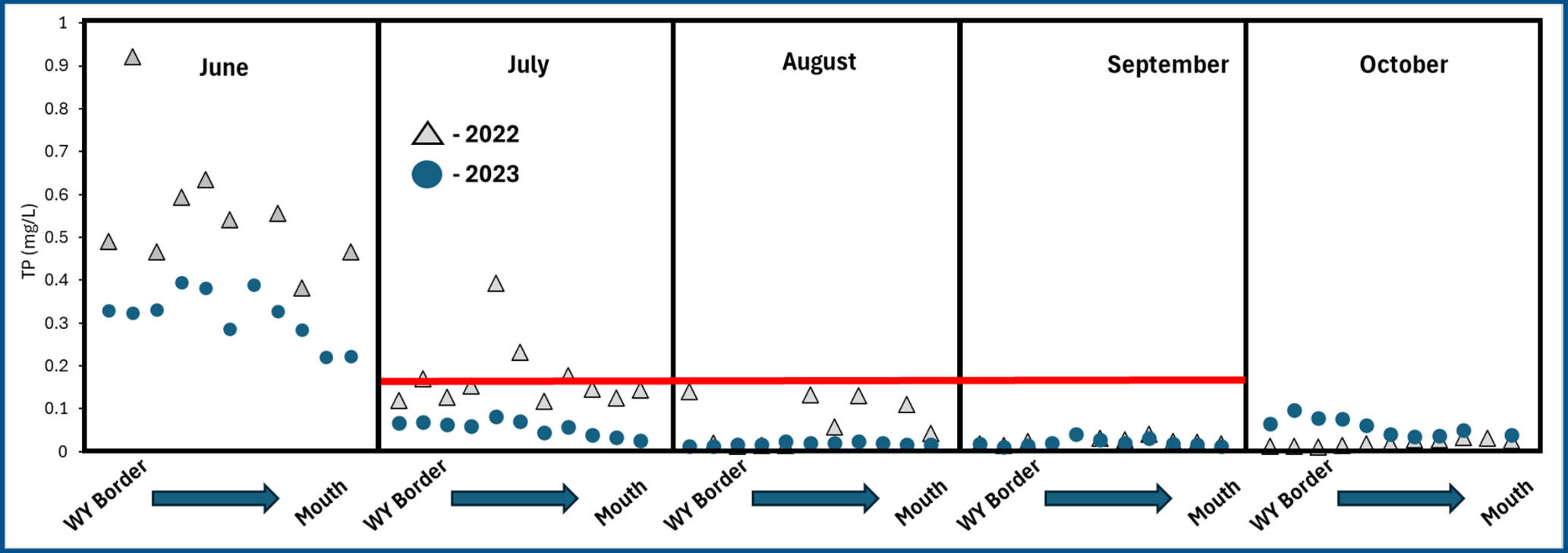
Clarks Fork Yellowstone River: Nitrogen Results

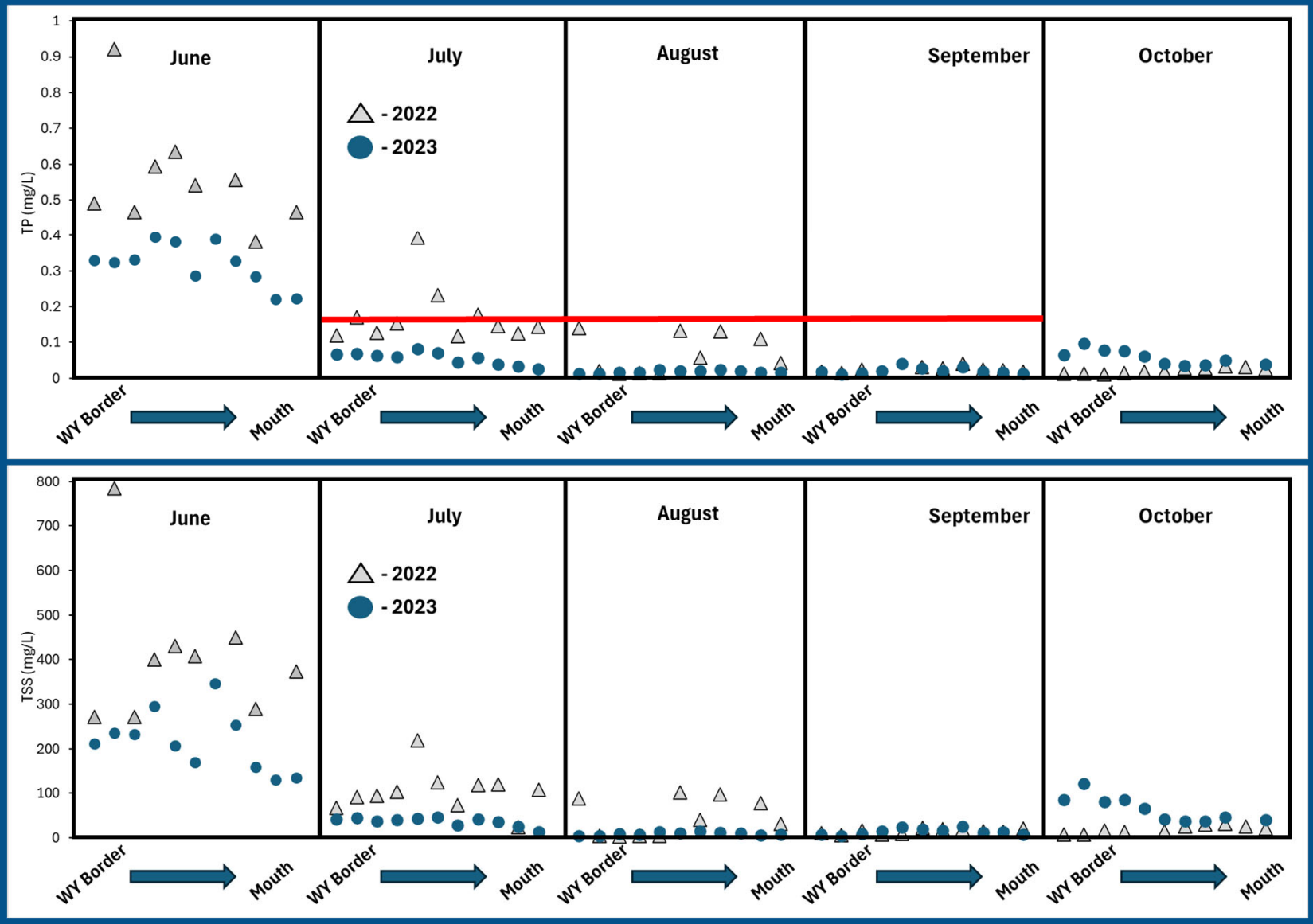



1.4
1.2
1
0.8
0.6
0.4
0.2
0
TN (mg/L)
June
July
August
September
October
- 2022
- 2023
WY Border
Mouth


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

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.

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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

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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

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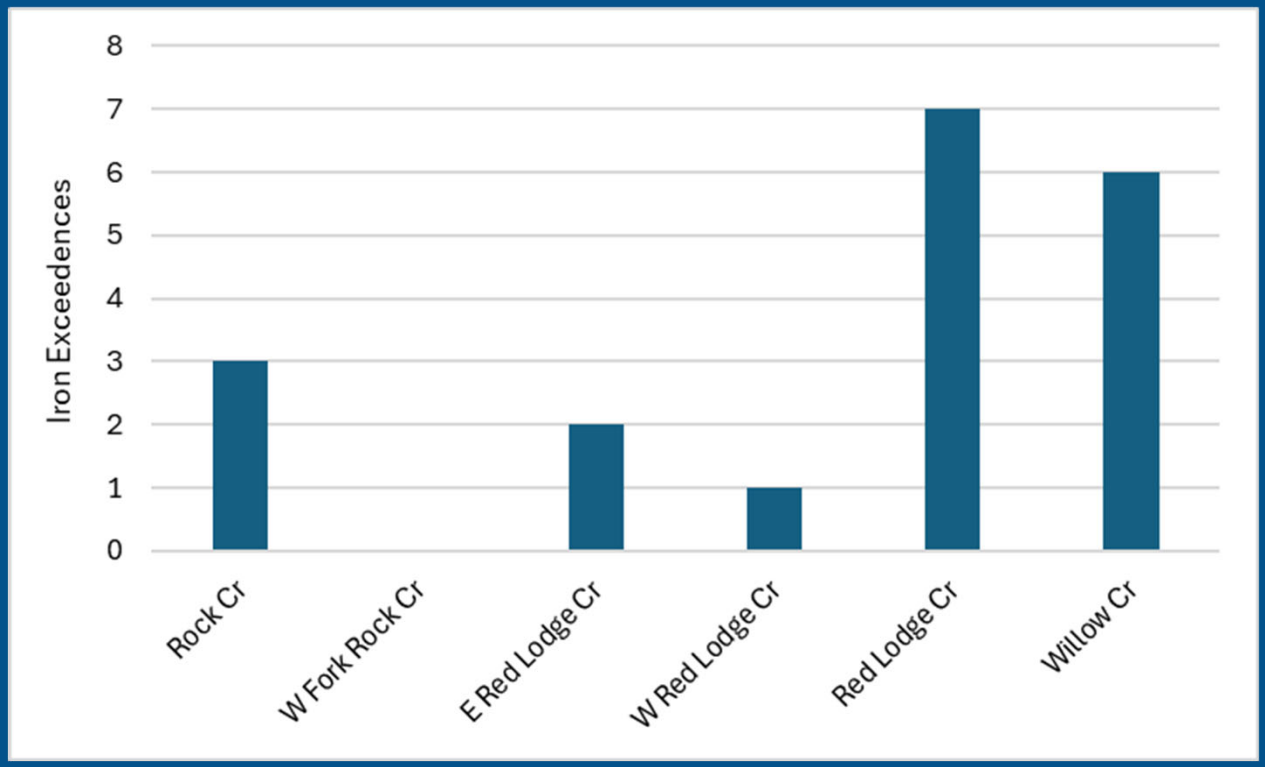
Rock Creek Tributaries: Iron Results



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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

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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

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Special Thank You!

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

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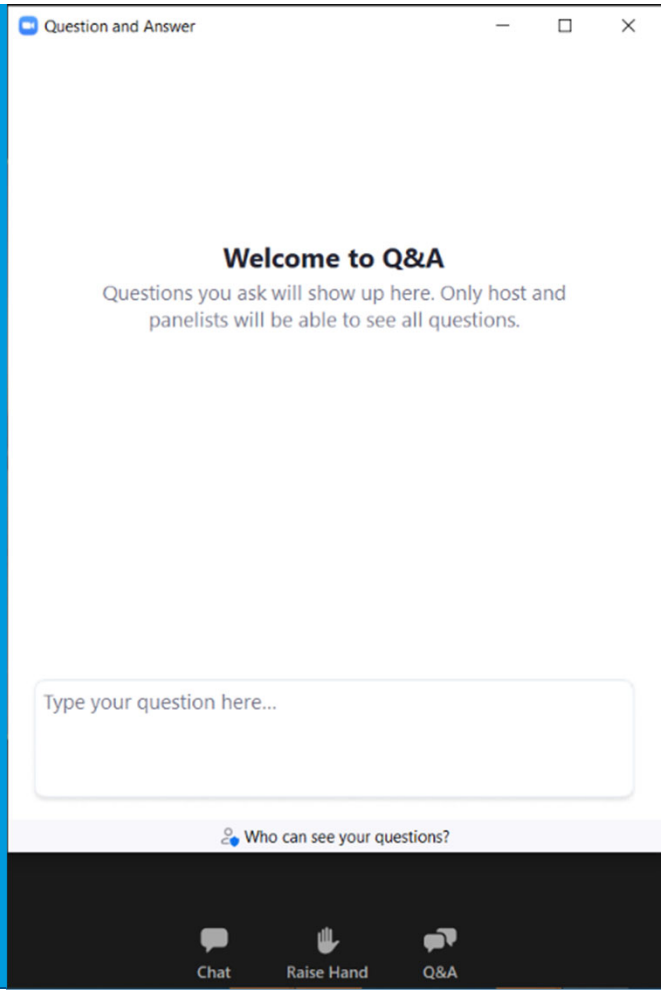

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