Examining temporal water quality in Spokane River tributaries

Madeleine Mathews and Ian Townley
Spokane River Forum
Apr. 22, 2025

The Spokane River watershed

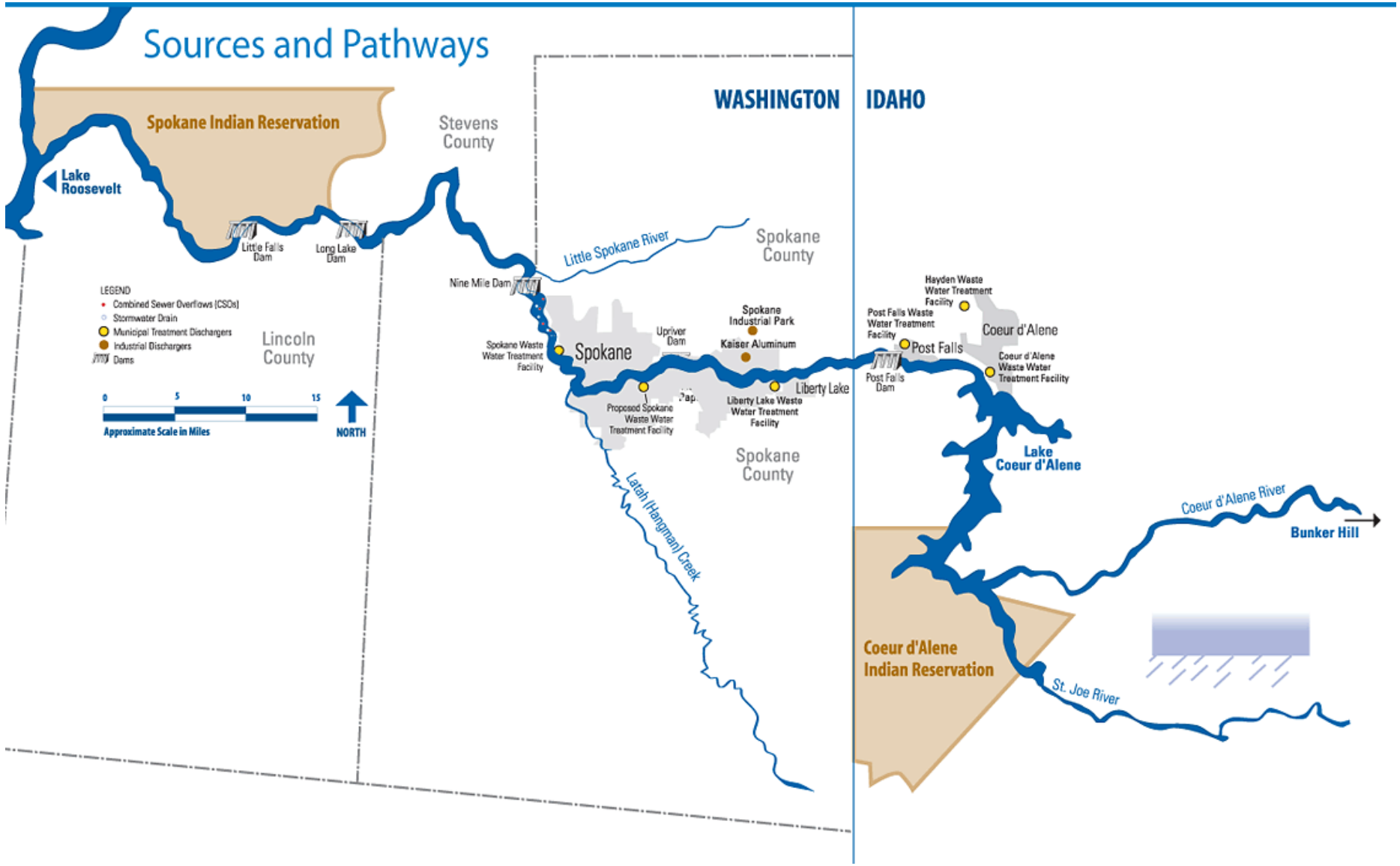
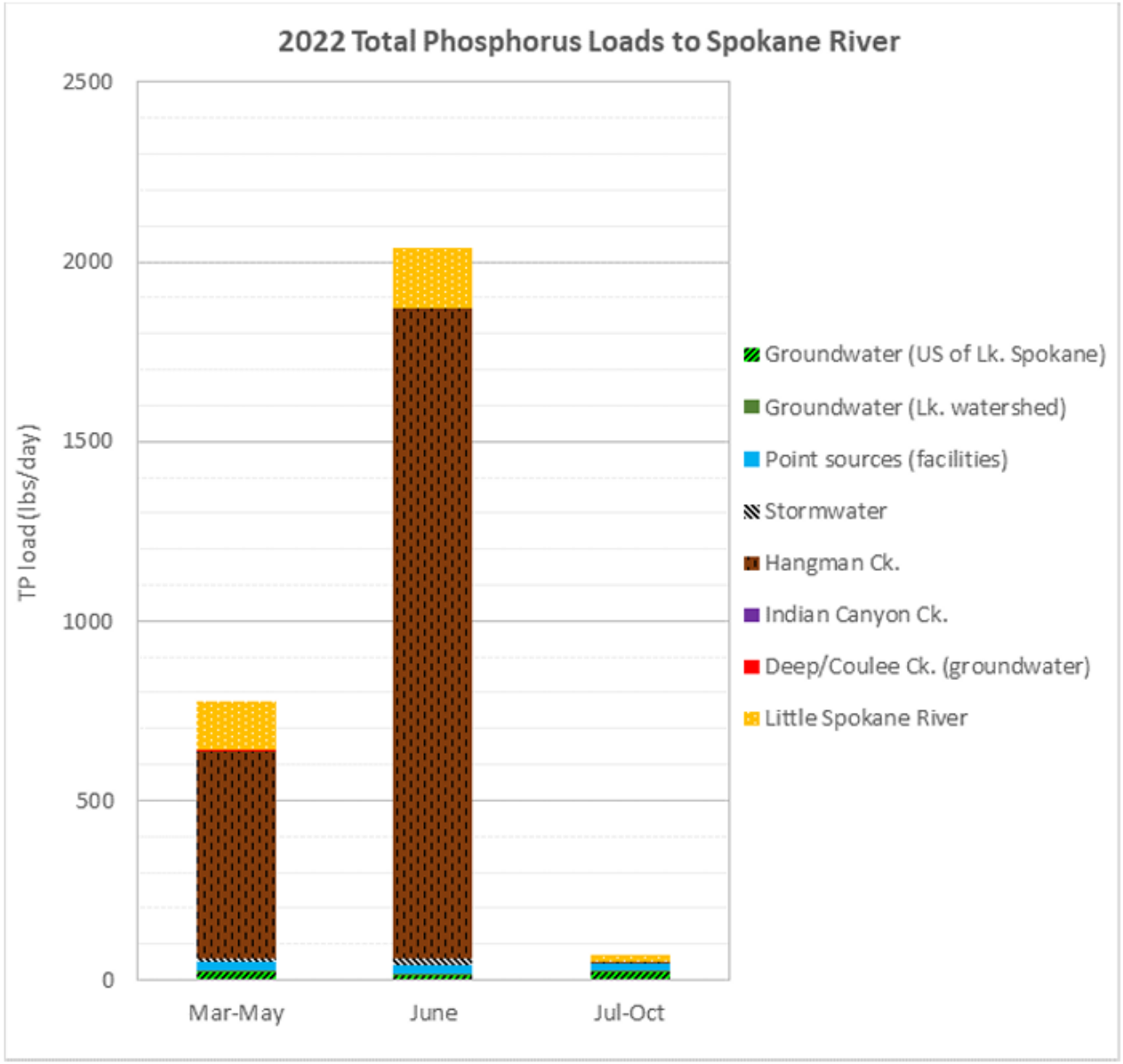


Figure: https://spokaneriver.net/outreach-resources/spokane-river-public-guide/sources-and-pathways/

Phosphorus in the Spokane River watershed

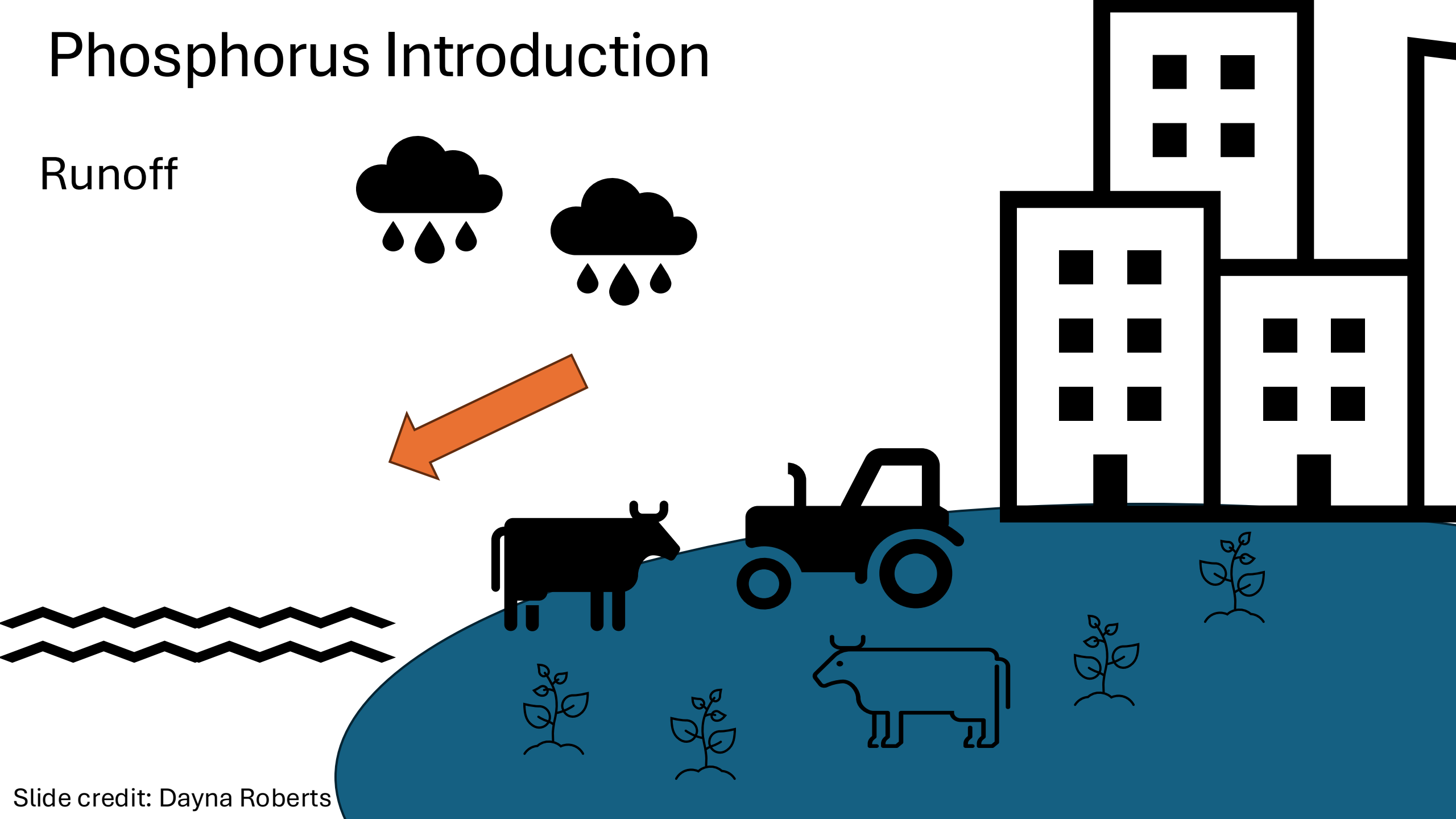


- Tributaries contributed > 90 % TP load during spring months in 2022
- This decreased to ~ 1/3 contribution in the summer months

Figure: Stuart, T. and J. Zimbric, 2025. Spokane River and Lake Spokane dissolved oxygen total maximum daily load 10-year effectiveness study. Washington State Department of Ecology.

Phosphorus Introduction

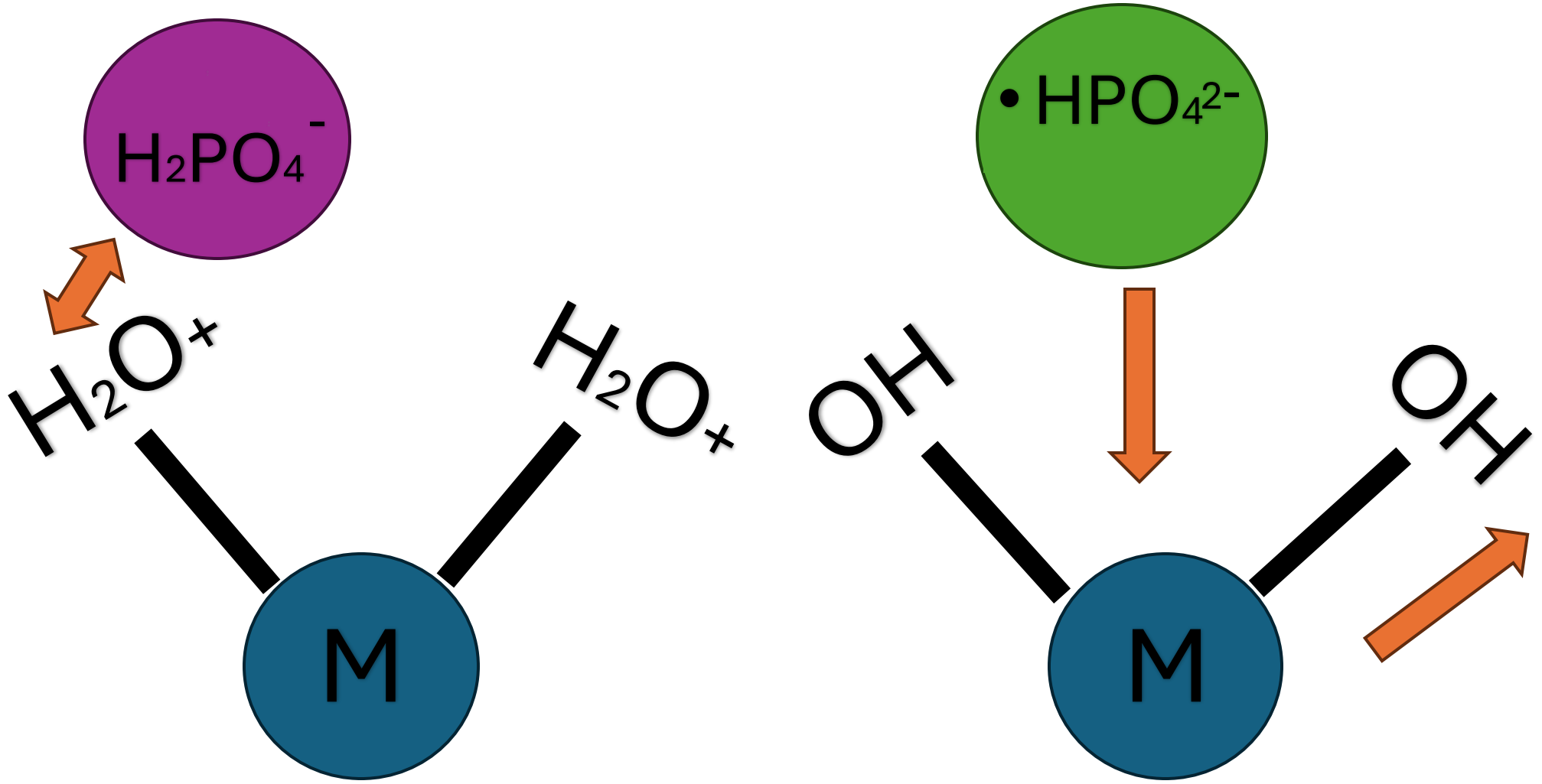
Runoff



Slide credit: Dayna Roberts

Phosphorus Uptake

Interactions with Minerals



Slide credit: Dayna Roberts

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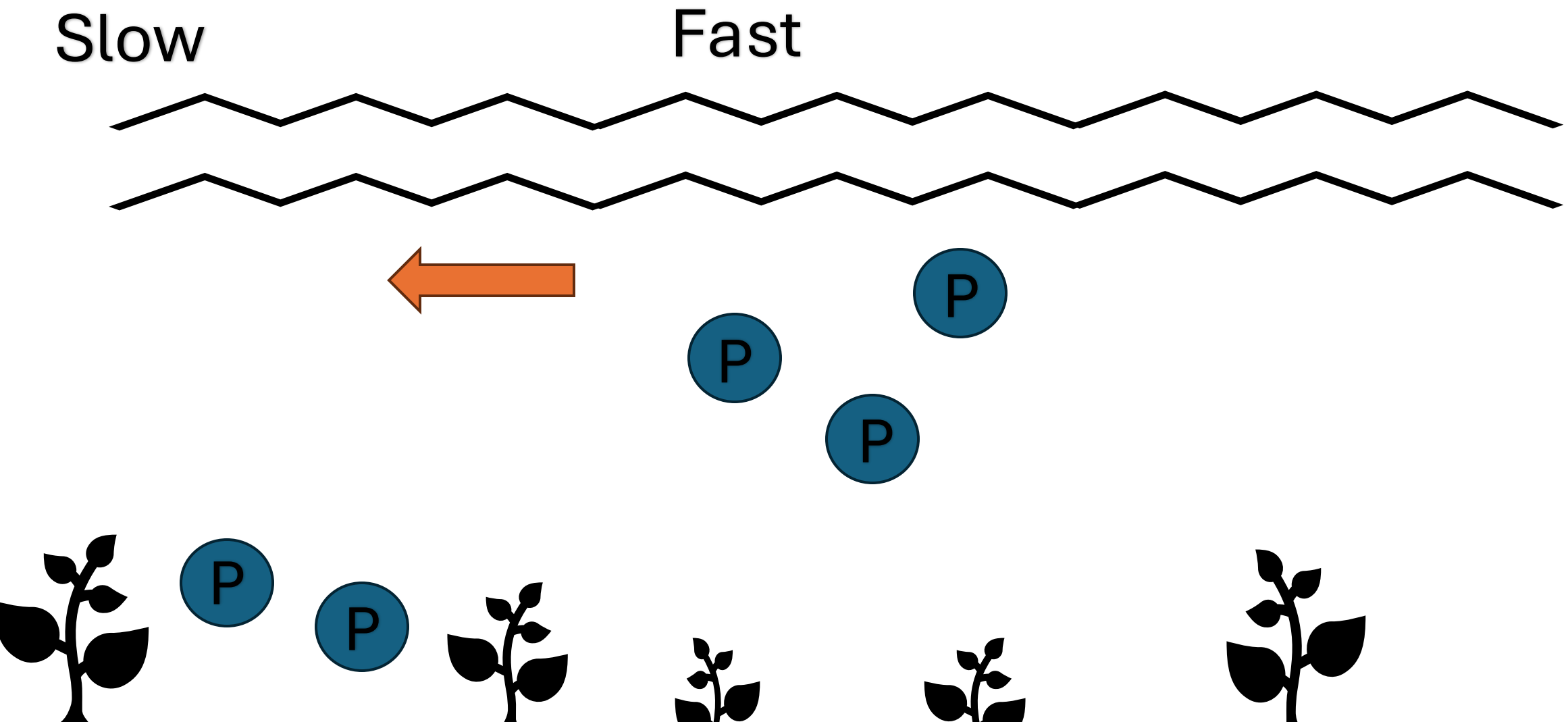
Phosphorus Uptake

Water Flow



Slide credit: Dayna Roberts

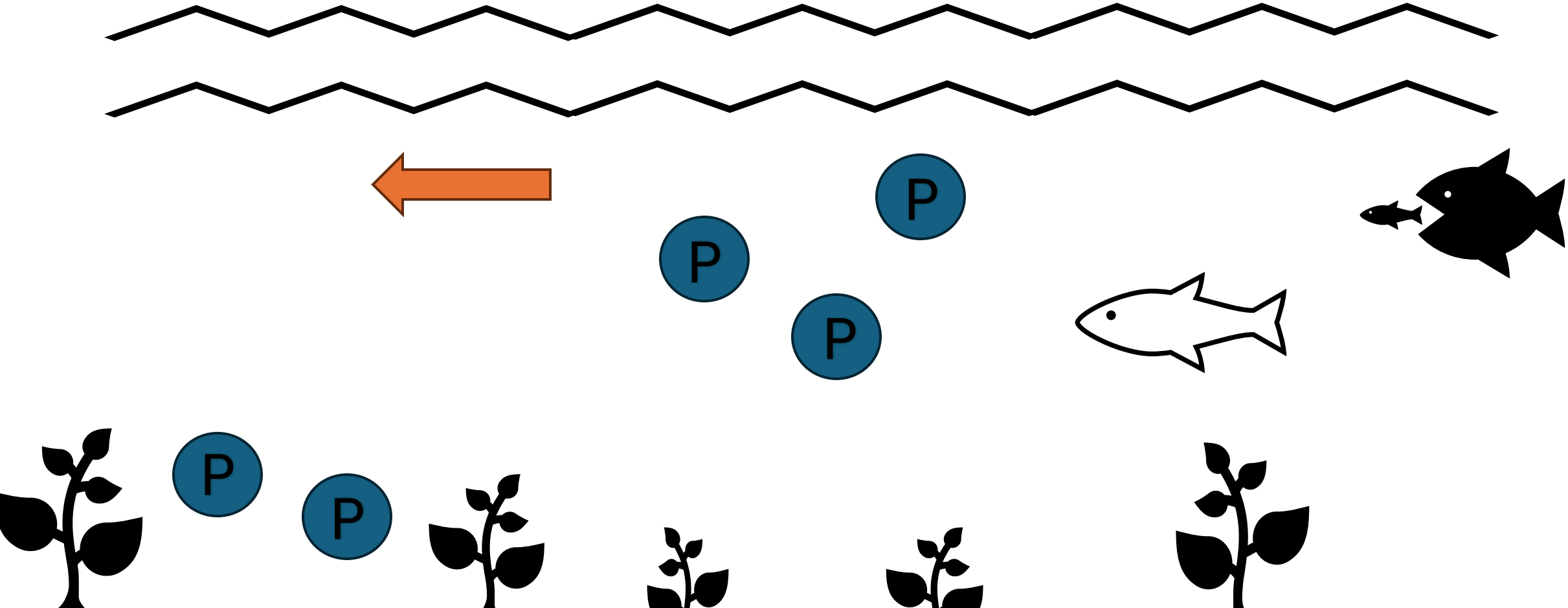
Phosphorus Uptake

Water Flow

Organisms

Slow

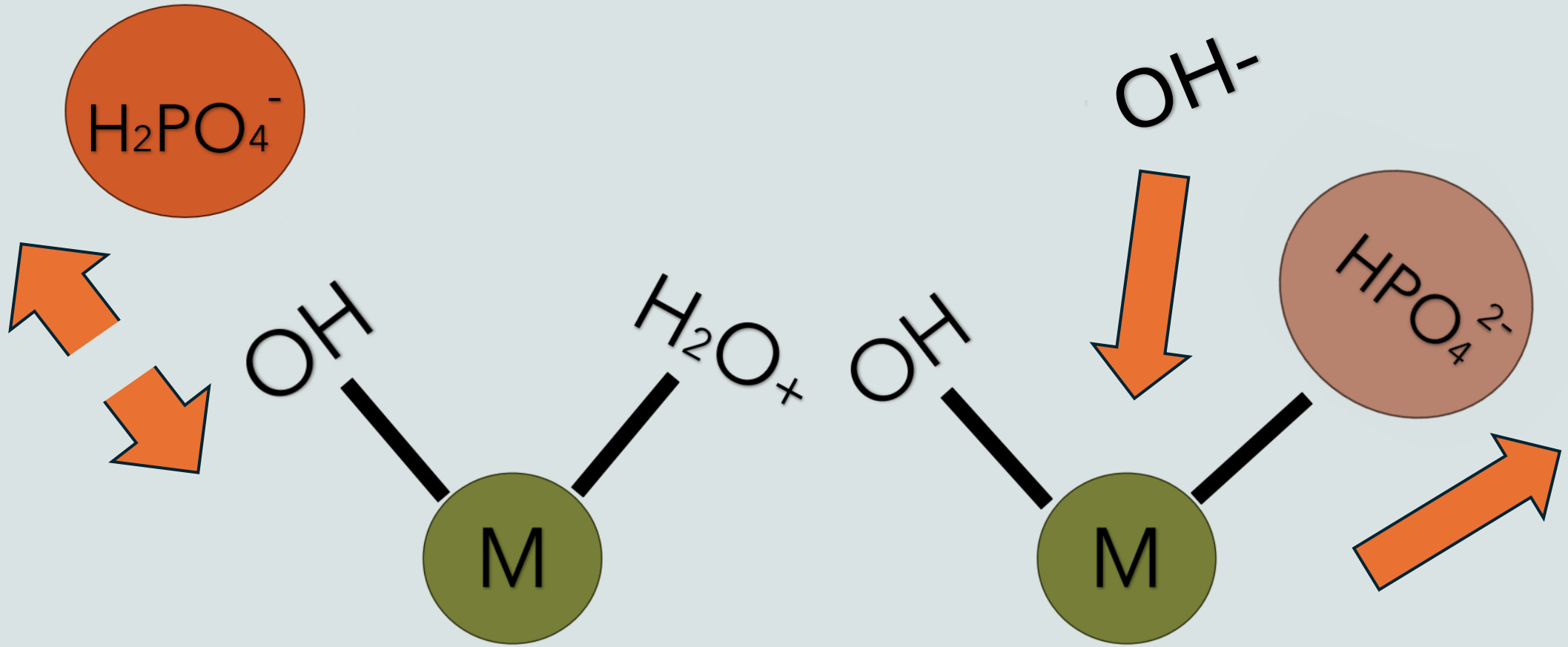
Fast



Slide credit: Dayna Roberts

Phosphorus Release

Metal Oxides and Hydroxides

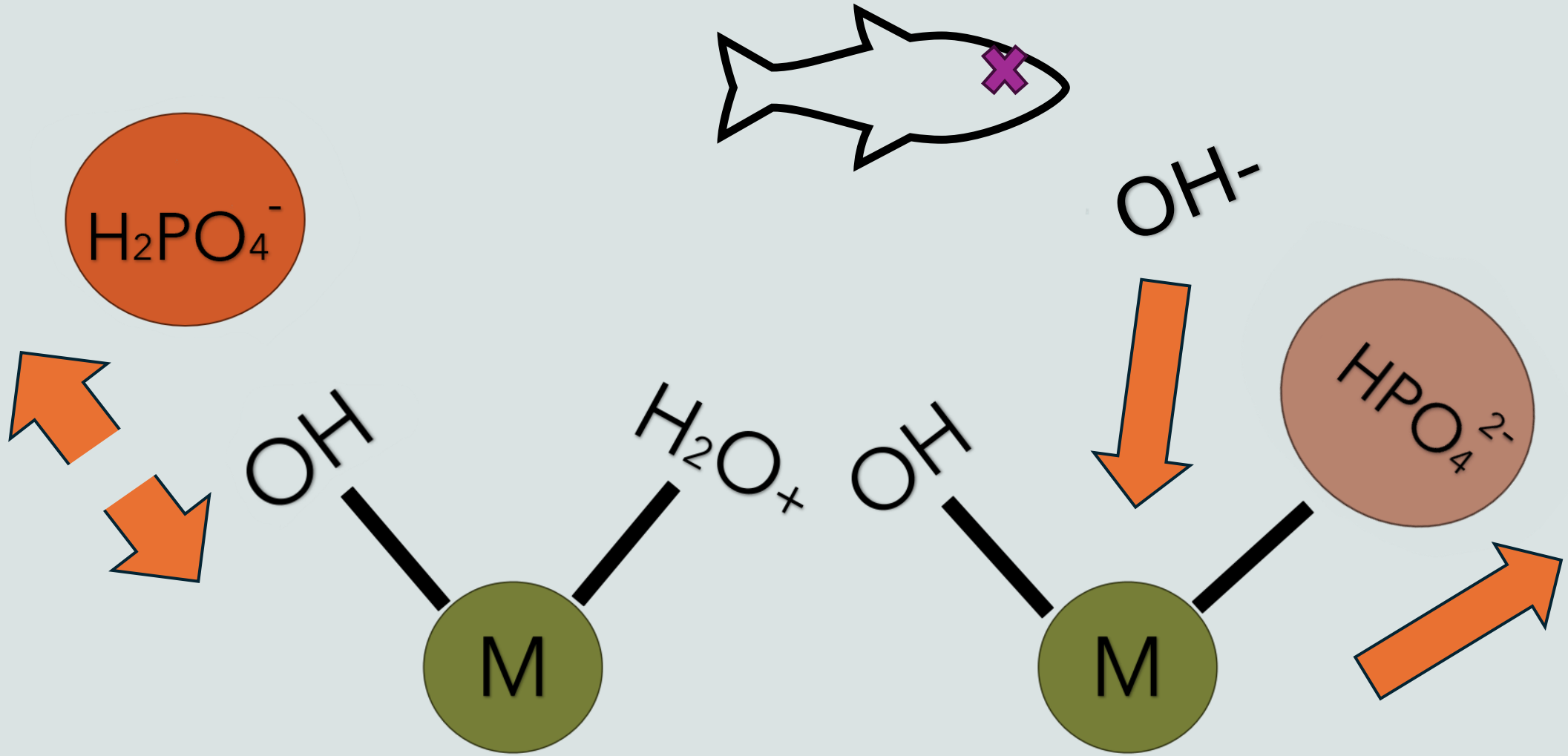


Slide credit: Dayna Roberts

Phosphorus Release

Metal Oxides and Hydroxides

Organisms



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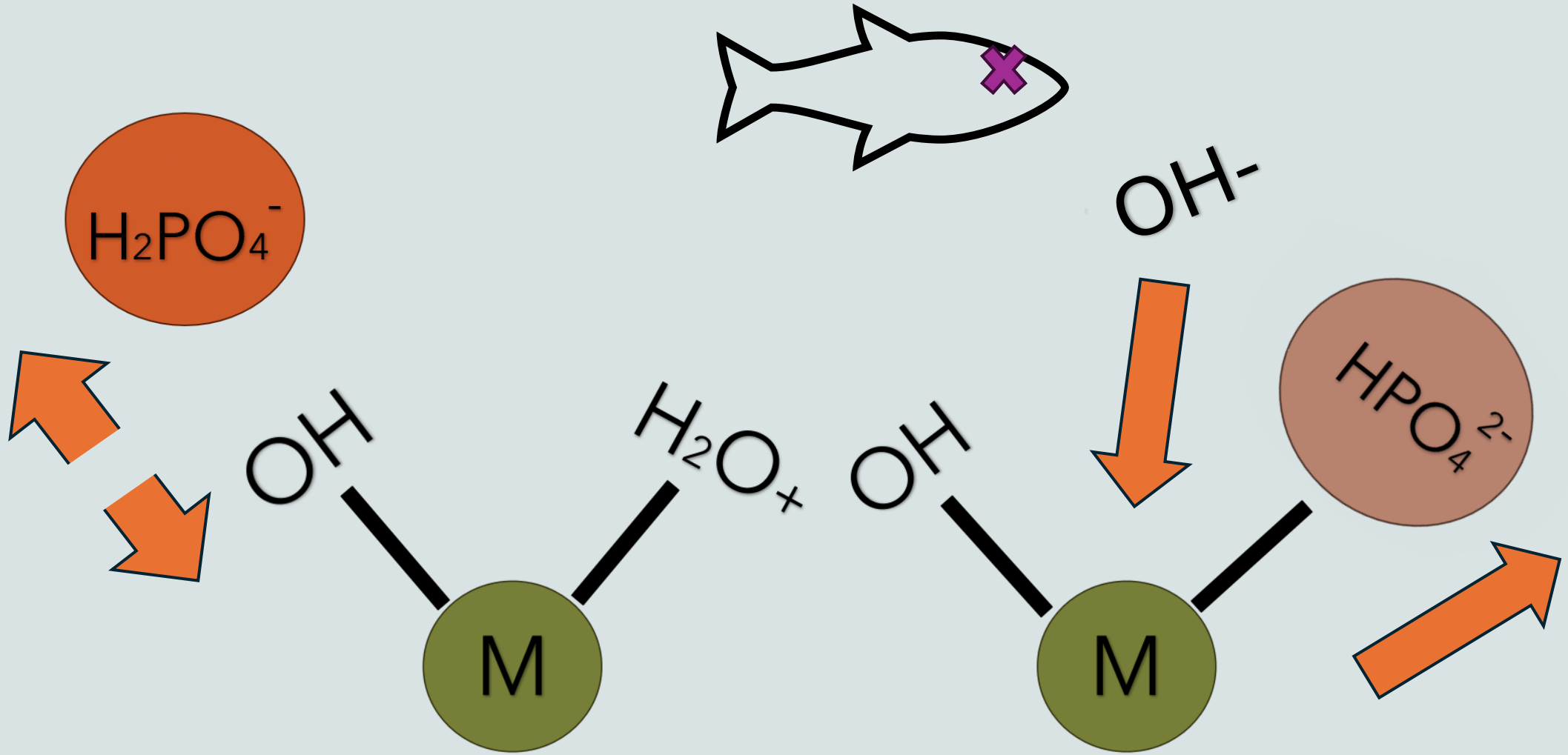
Phosphorus Release

Metal Oxides and Hydroxides

Organisms

Erosion



Eutrophication

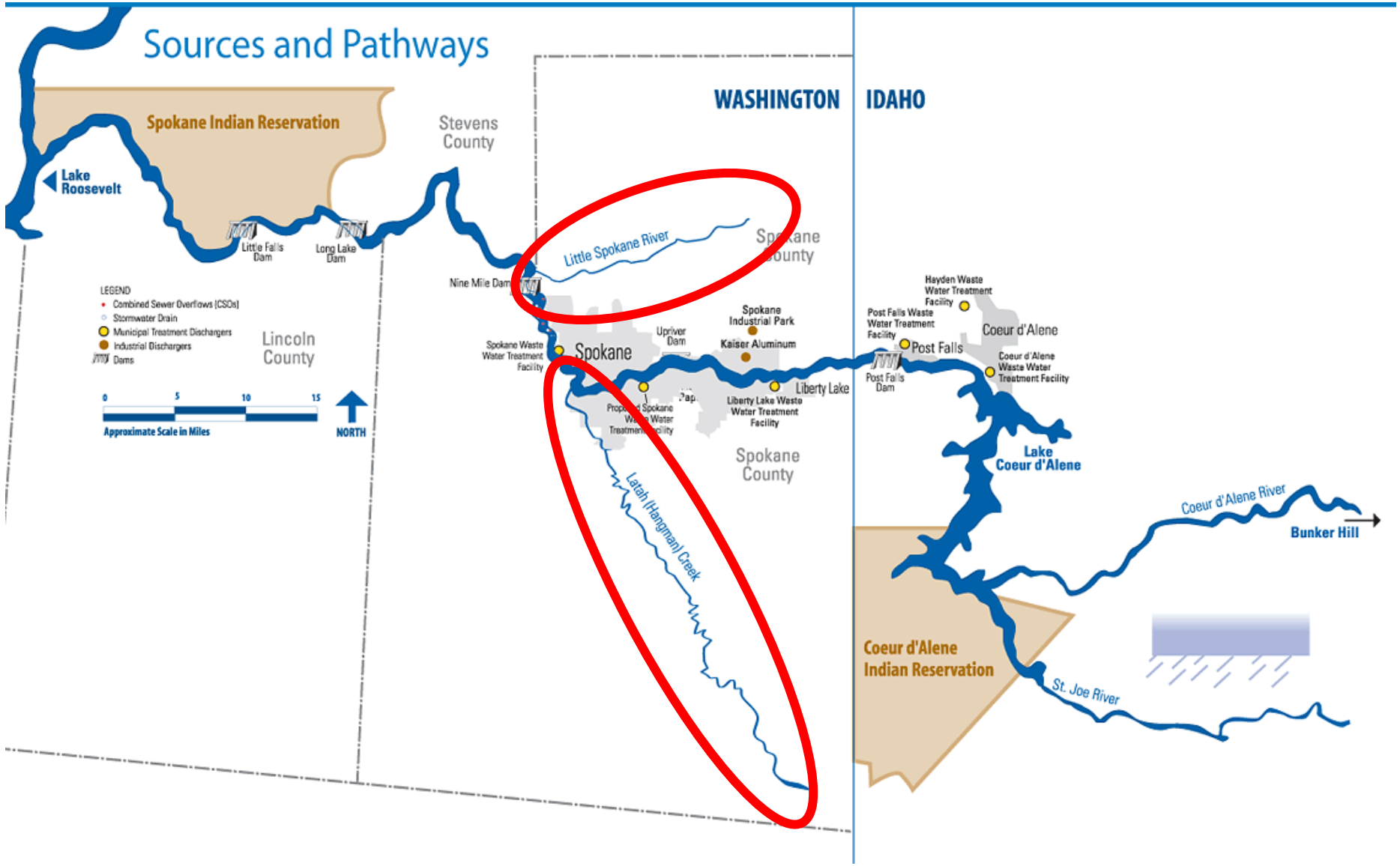
Why do we care?

Slide credit: Dayna Roberts

Phosphorus-sediment interactions

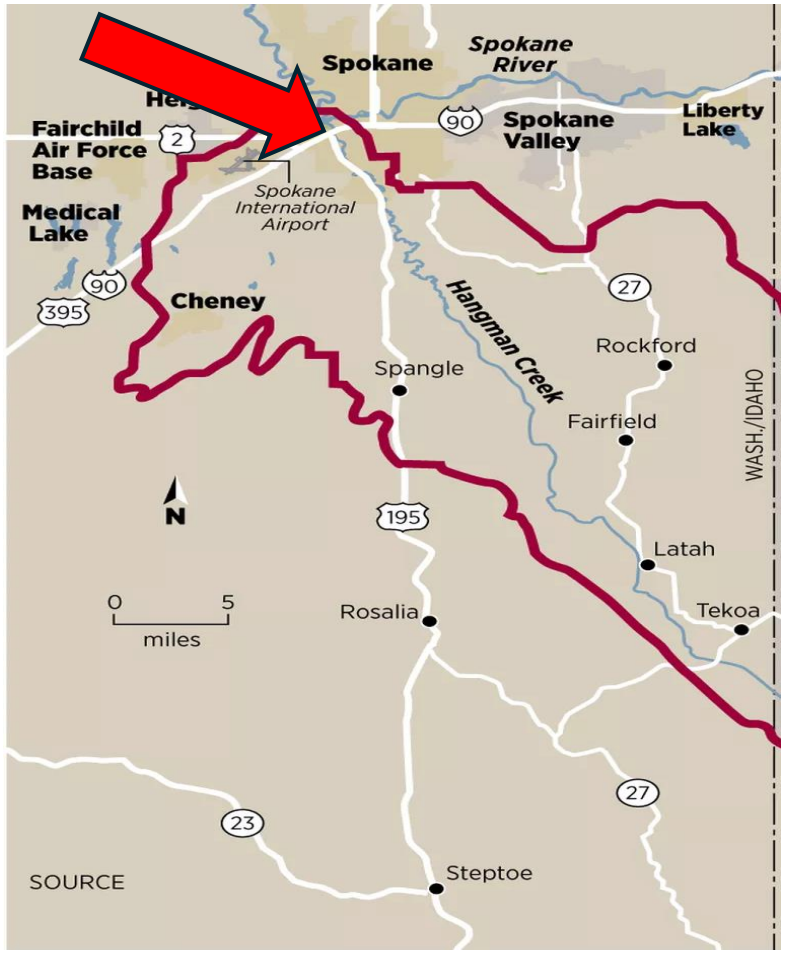
Goal: Examine phosphorus-sediment interactions in the major tributaries to the Spokane River - the Little Spokane River and Hangman Creek.

The Spokane River watershed

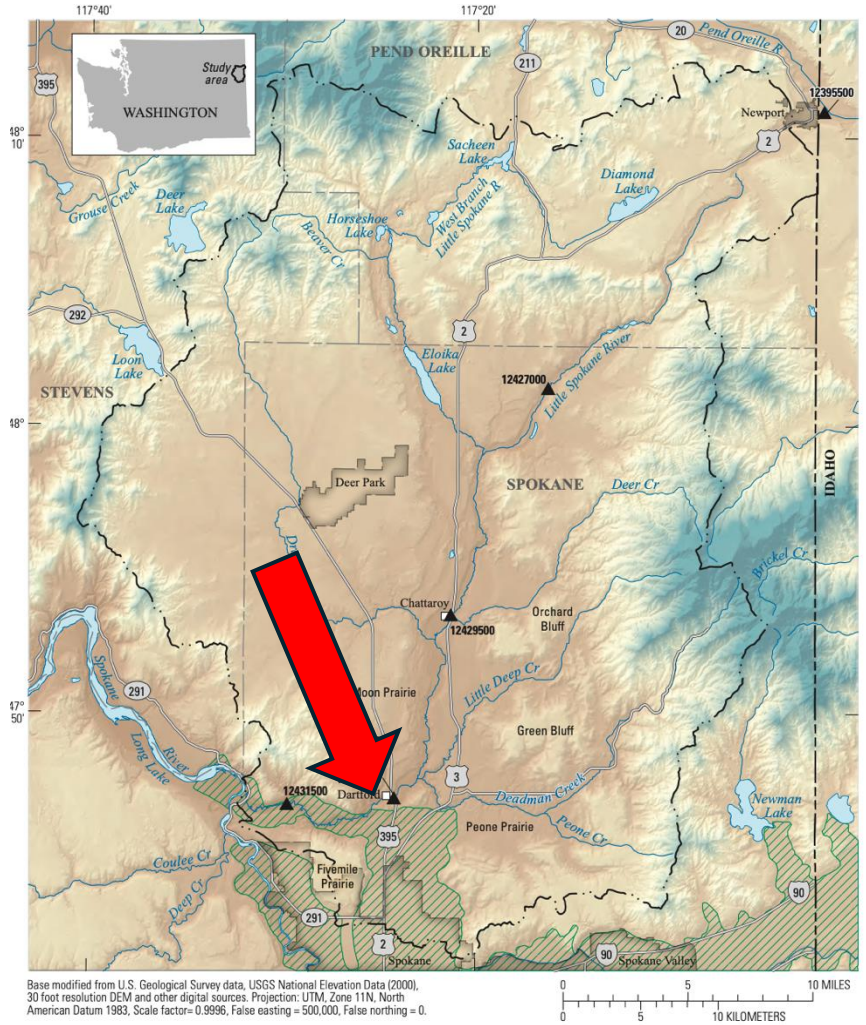


https://spokaneriver.net/outreach-resources/spokane-river-public-guide/sources-and-pathways/

Spokane River – Major tributaries



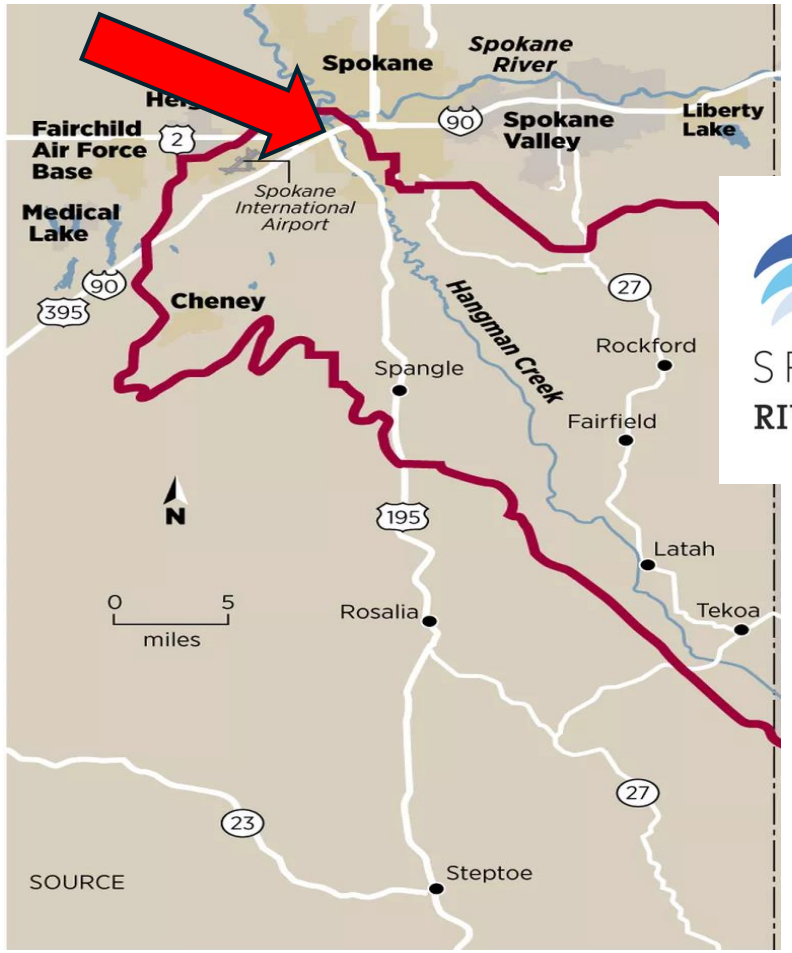
Hangman Creek Watershed



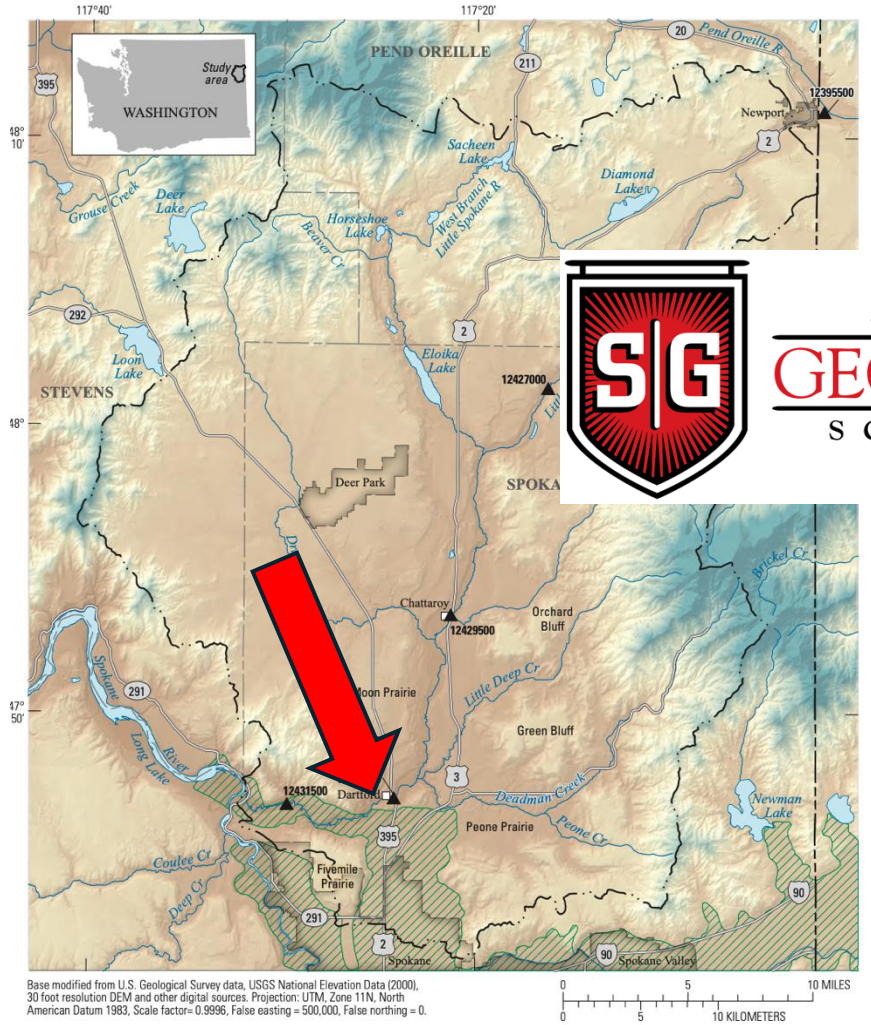
Little Spokane Watershed

https://spokaneriver.net/outreach-resources/spokane-river-public-guide/sources-and-pathways/

Community partnerships in sampling!



SPOKANE RIVERKEEPER®



SAINT GEORGE'S SCHOOL

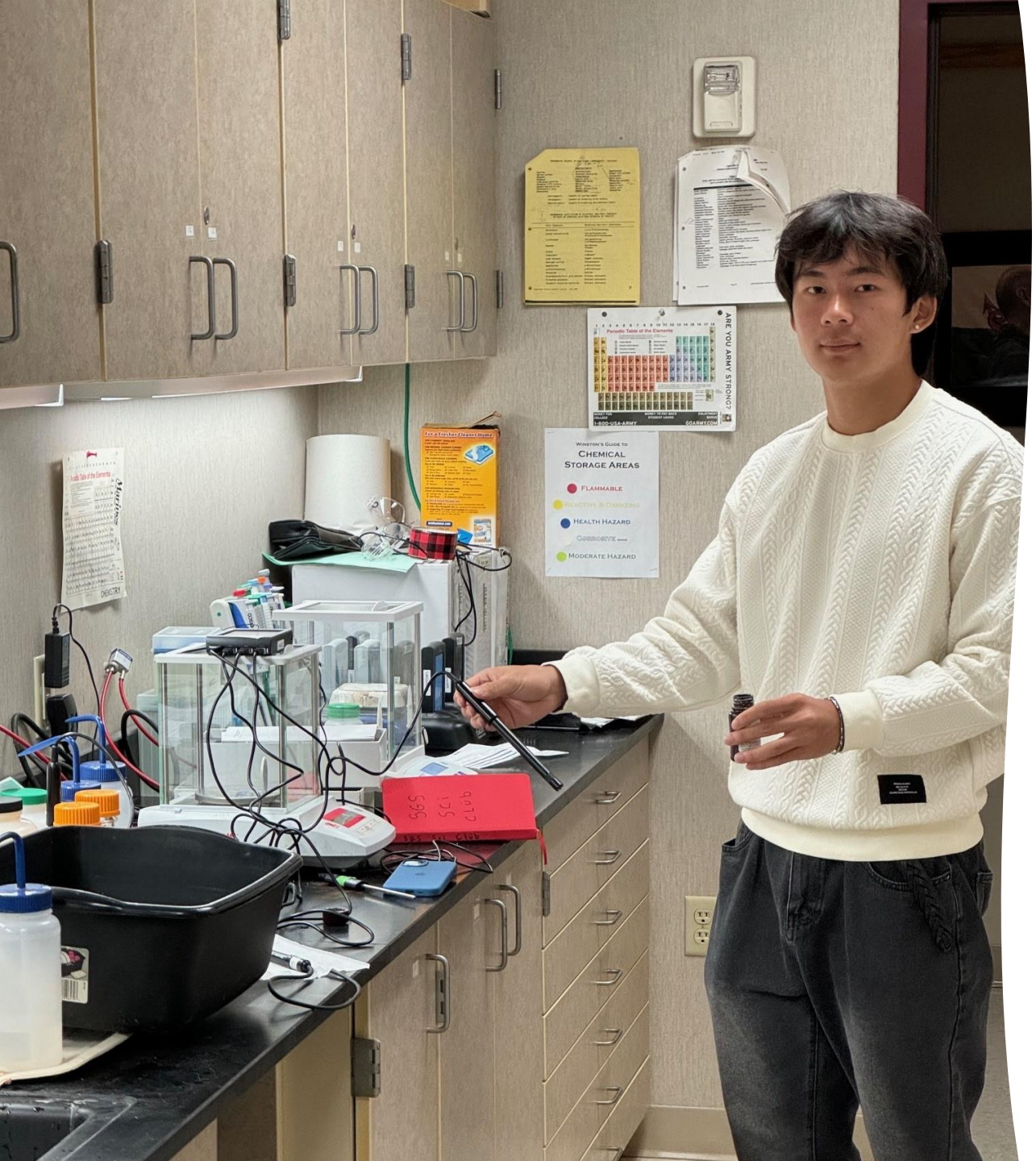
Hangman Creek Watershed

Little Spokane Watershed

https://spokaneriver.net/outreach-resources/spokane-river-public-guide/sources-and-pathways/

SGS Students Collecting Water

- SGS Students collect water from the Little Spokane River.
- Collected almost every week beginning in October.
- Samples are driven to Gonzaga for processing in Dr. Mathews Lab.

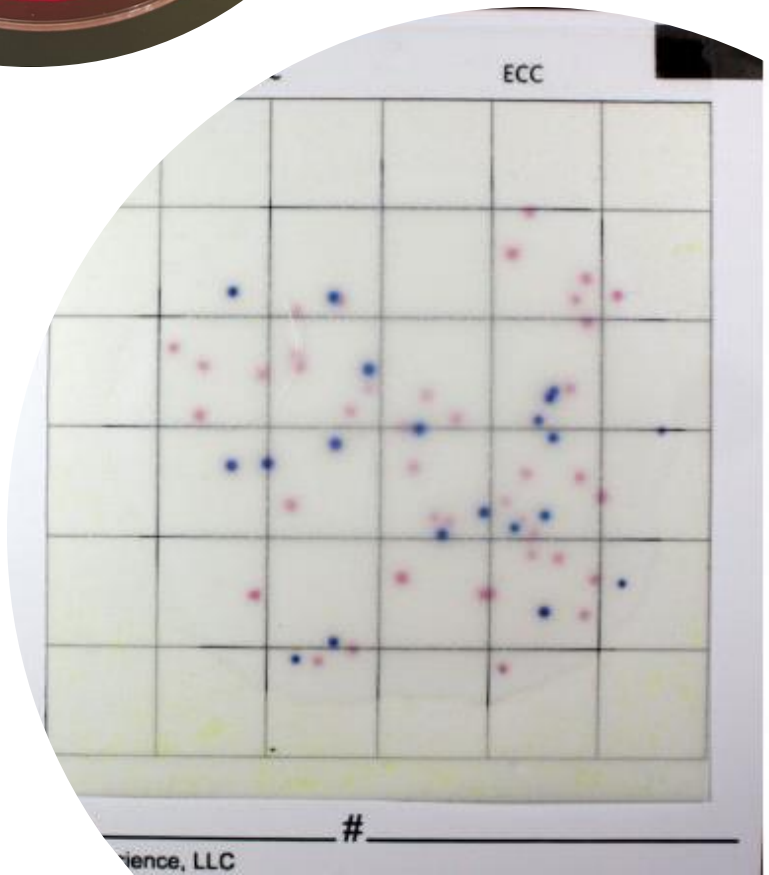


SGS Students Analyzing Water

- Each Week Data is recorded:
  - Weather at time of collection
  - Using Vernier probes
    - pH
    - Conductivity
    - Temp
    - Dissolved Oxygen

SGS Students Screen water samples for pathogenic bacteria

- In collaboration with Dr. Andrade we screen for:
  - *Aeromonous* bacteria
    - Students make GPS (*Pseudomonas Aeromonas* selective) agar plates.
      - We deliver plates to Dr. Andrade's lab each week if we identify positive colonies for genetic barcoding.
  - E.coli
    - Students plate R-Cards (Roth Biosciences, LLC) to get quantitative E.coli counts.
  - Student autoclave all biohazardous material each week.



Goal and Outcomes of SGS Science Club

Goal

The only rule of Science Club is that you must do real science.

Outcomes

Conclusions

- Examining temporal water quality changes provides insight into phosphorus-sediment interactions
- This is not possible without working with awesome community groups!

Acknowledgements

Gonzaga Science Research Program

St. George's School

The Spokane RiverKeeper

Nigel D'Souza and Christy Andrade