Background

- The West Virginia Water Research Institute (WVWRI) founded 3RQ to investigate high TDS levels in the Monongahela River in 2009.
- 3RQ monitors the water quality of the Monongahela River and its major tributaries.
- In addition to 3RQ, several AMD treatment systems have been installed within the
- tributaries.
- 18 sites are monitored monthly in the Monongahela Basin where water quality parameters (temperature, pH, electrical conductivity, and total dissolved solids (TDS)) are quantified (Fig. 1).



Long-term water quality trends in the Monongahela River Basin

Sarah Nelson, Leslie Hopkinson, Rachel Spirnak, Eliza Siefert, Melissa O'Neal Department of Civil and Environmental Engineering, West Virginia University

• WVWRI uses this data to evaluate the impact of coal and oil and gas industries.

Figure 1. 18 testing sites of the Monongahela River Basin.



Objective

Examine data sets obtained from 3RQ for trends in the water quality of the Monongahela River Basin.

Methods

- 3RQ field data was obtained from WVWRI from the years 2009-2023.
- Data was compiled and sorted by date for each site.
- Mann-Kendall and seasonal Kendall tests were performed on the data using R ($\alpha = 0.1$).

Figure 2. Robinson Run (RO) taken on June 15, 2023.

Discussion **Temperature:**

- 1 site increasing
- 1 site decreasing
- 16 sites no change

TDS:

- 0 sites increasing
- 12 sites decreasing
- 6 sites no change

Conclusion and Future Work

Evidence presented through this study supports the continuation of long-term water quality monitoring programs like 3RQ. In the future, this study aims to quantify other streams within Appalachia like Lambert Run and Muddy Creek using the same methods.

References

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pH:

- 10 sites increasing
- 1 site decreasing
- 7 sites no change

Electrical conductivity:

- 1 site increasing
- 7 sites decreasing
- 10 sites no change