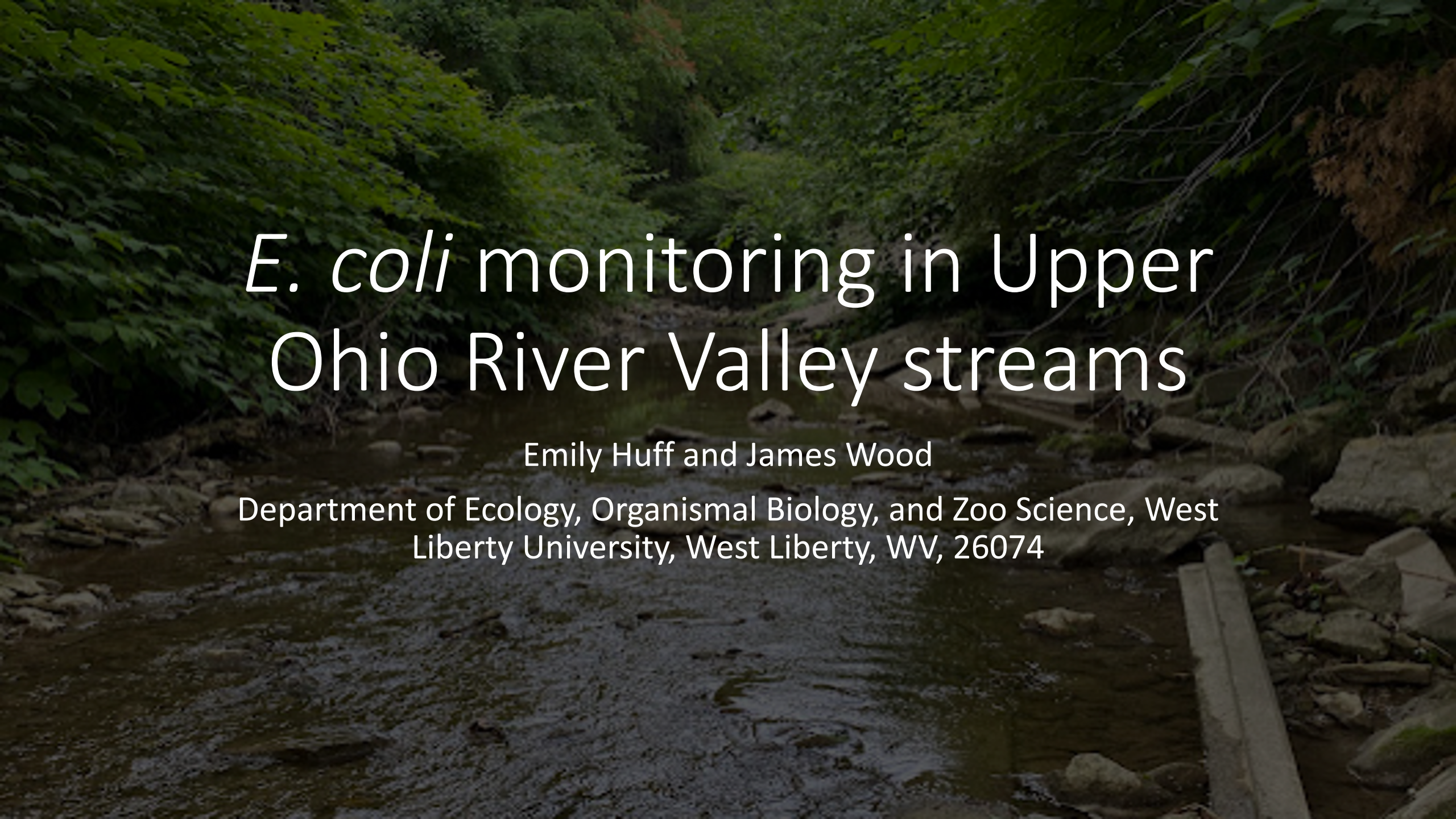

E. coli monitoring in Upper Ohio River Valley streams

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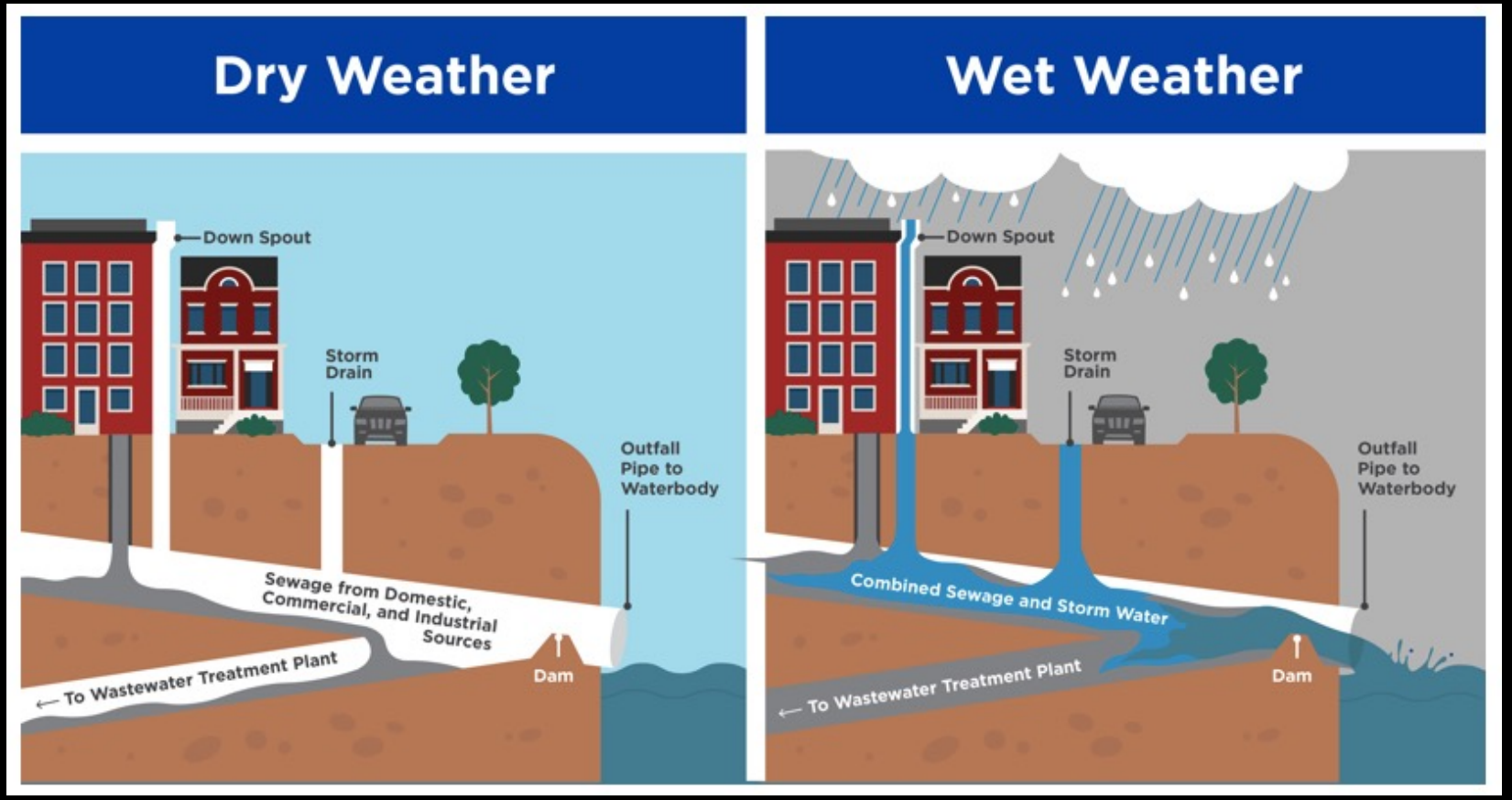
Bacteria surface water contamination

- Sewer systems
  - Combined sewer overflows (CSOs)
- Failing infrastructure
- Wildlife



(RVAH20 2022)

Pathogen contamination

- Number one cause of impairments for Clean Water Act 303(d) listed waters in the USA (Chen and Chang 2014)

- Stormwater is a major transporter of pathogens to surface waters (McLellan 2007)

Fecal indicator bacteria

- Presence can indicate contamination
- Limitations
  - Many hosts
  - Unable to distinguish between sources

Escherichia coli

- *Escherichia coli* - recognized as the best indicator of fecal contamination (Price & Wildeboer 2017)

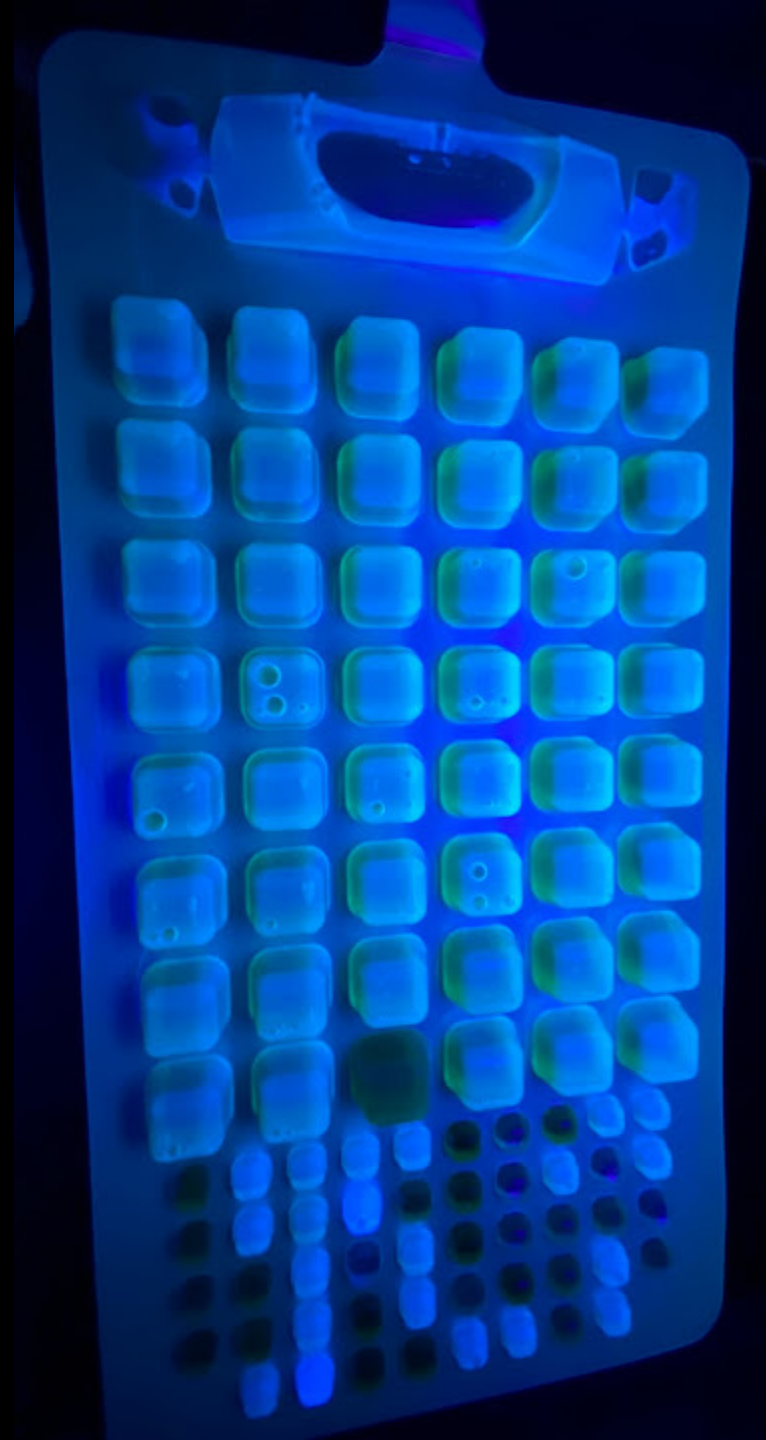
- EPA safe limits
  - 235 CFU/100ml for single sample reading
  - 126 CFU/100ml for geometric mean 30-day period

IDEXX Sampling Methods

- Surface grab 100 ml water sample from the middle of the channel
- Store on ice until returning to the lab
  - processed within 6 hours of samples taken
- A field bank is also transported as well to identify any cross contamination

IDEXX Sampling Methods

- IDEXX Colilert is added to 100ml samples and dissolved
- Samples are poured into a 97 well IDEXX tray and sealed
- Samples are incubated at 37°C for 24 hours
  - Yellow wells = fecal coliforms
  - Fluorescing wells = *E. coli*

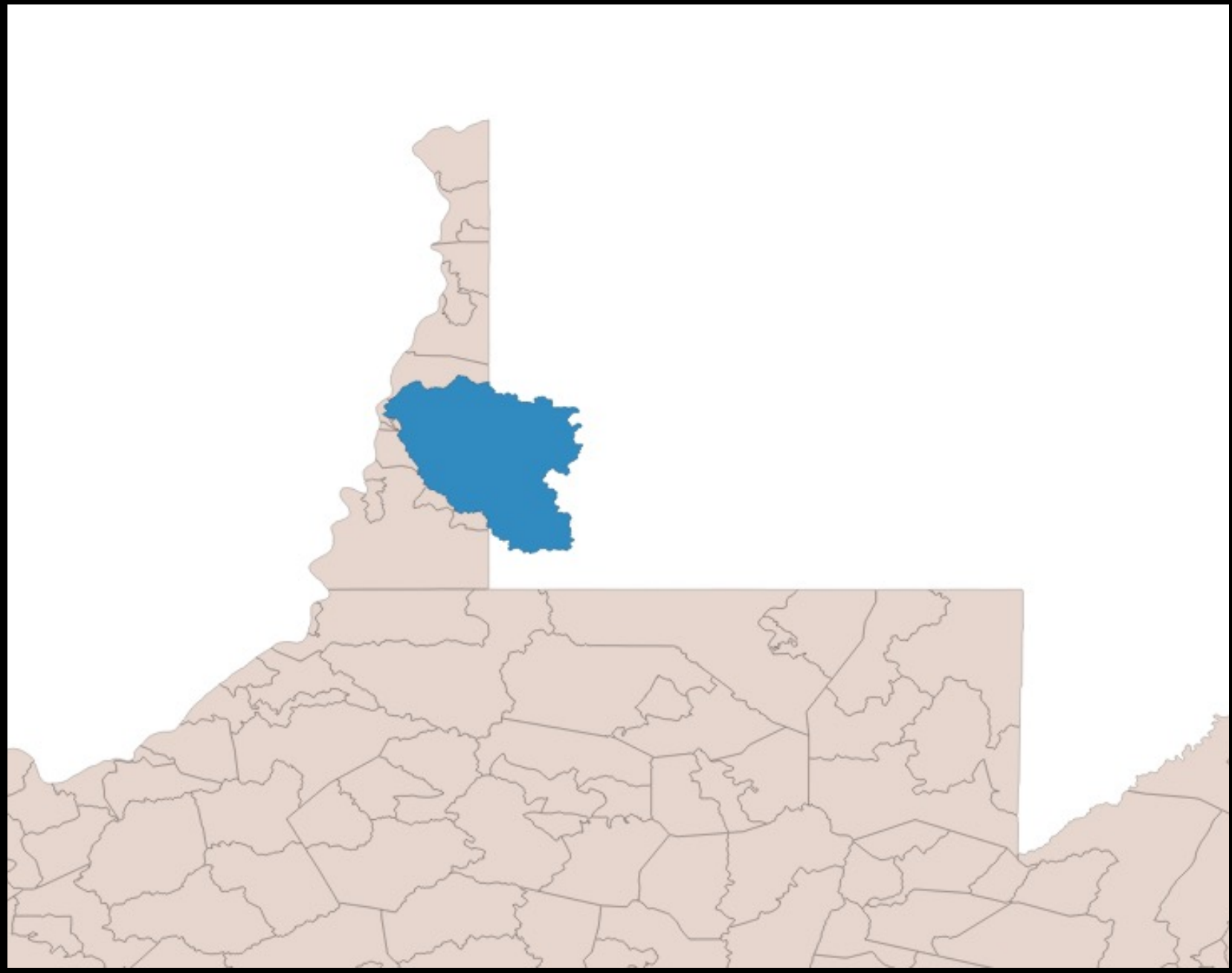


Our Studies

- Started broad
  - Looking at the Wheeling Creek watershed

Wheeling Creek Watershed

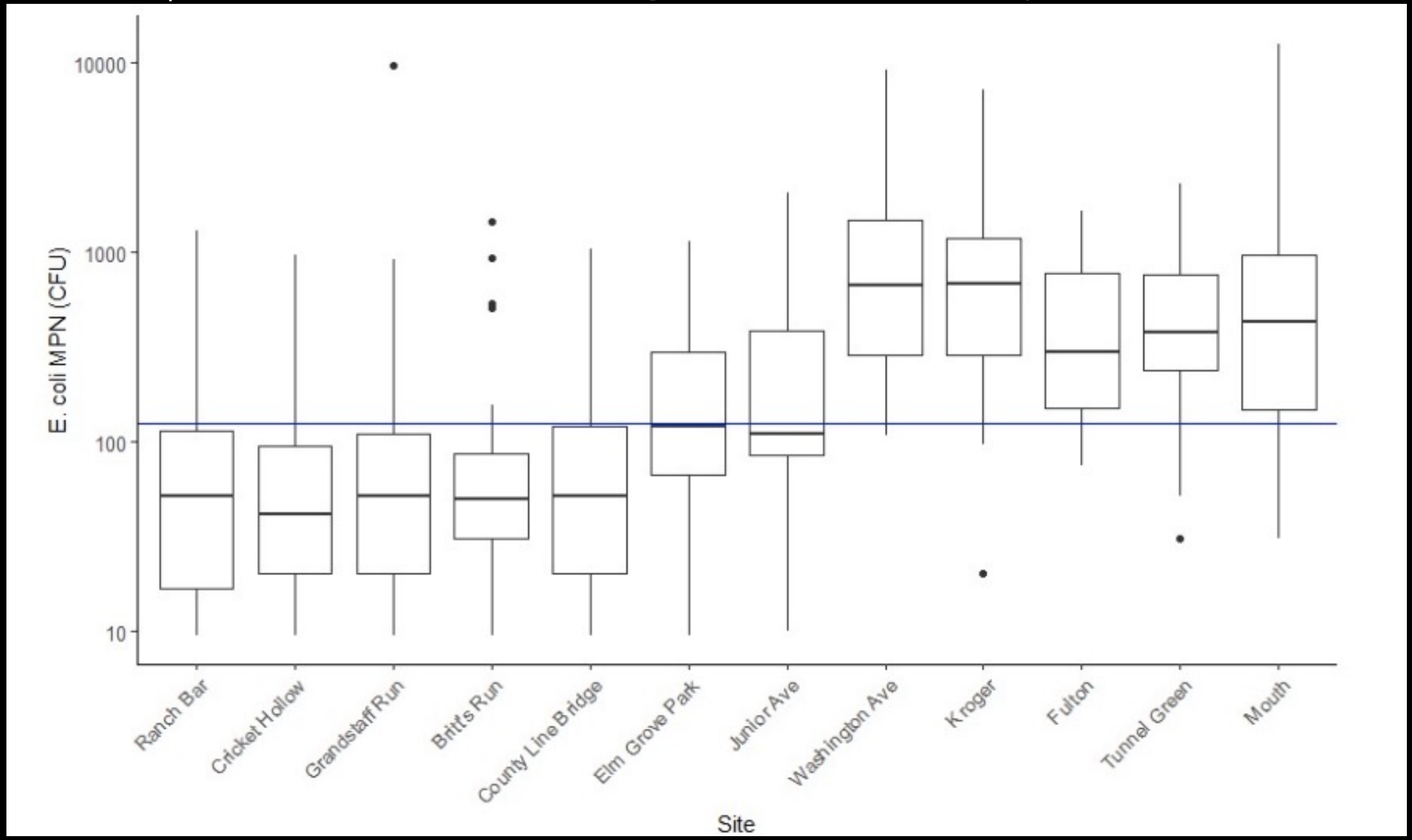
- 5th order stream
- 25 active CSO outfalls
- Old infrastructure, mining, development
- Upper portion affected by agriculture
- Impaired by fecal material inputs



Wheeling Creek Study

upstream

downstream

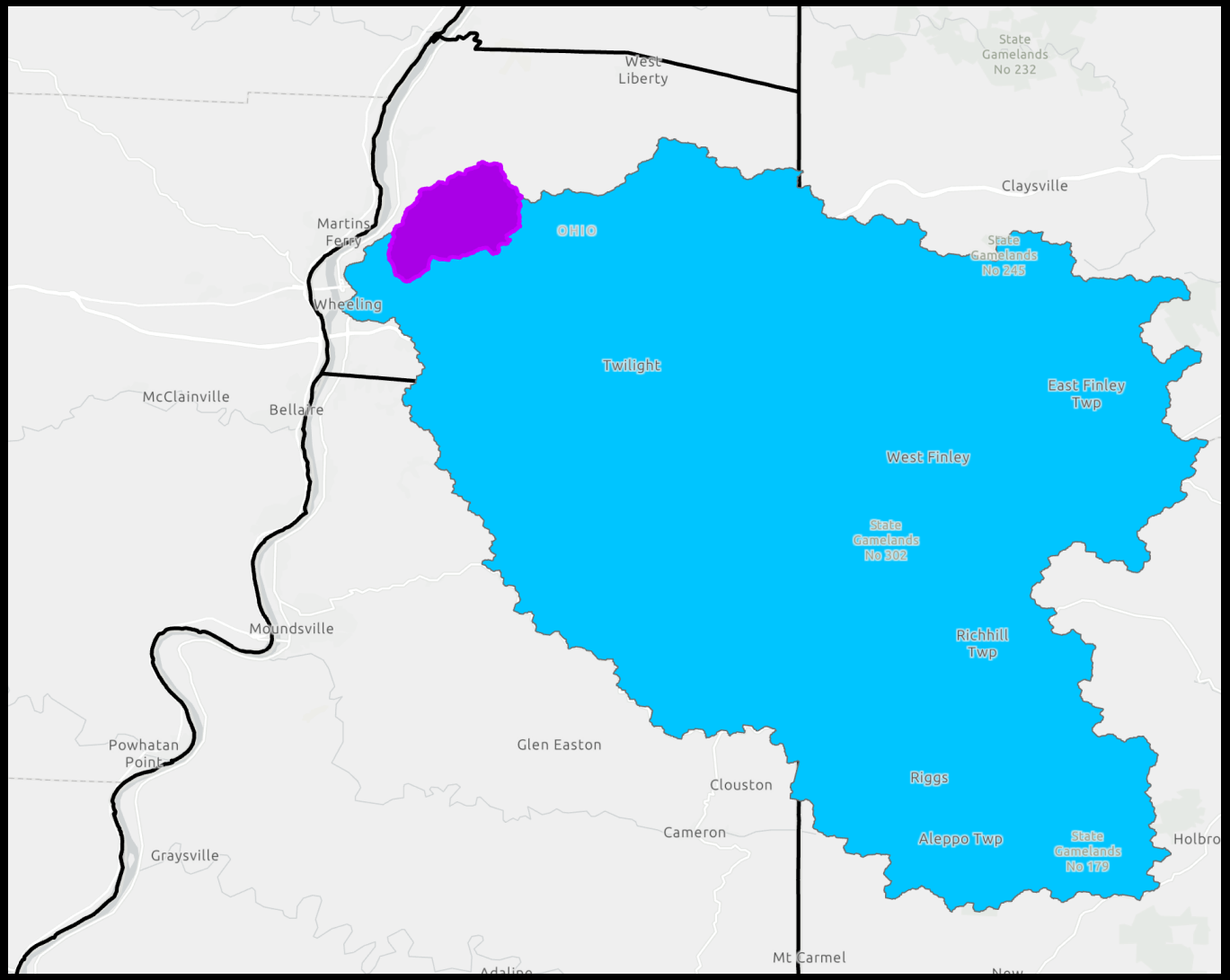


Our Studies

- Started broad
  - Looking at the Wheeling Creek watershed
- Focused in on the Long Run watershed
  - Tributary contributing notable *E. coli* loads

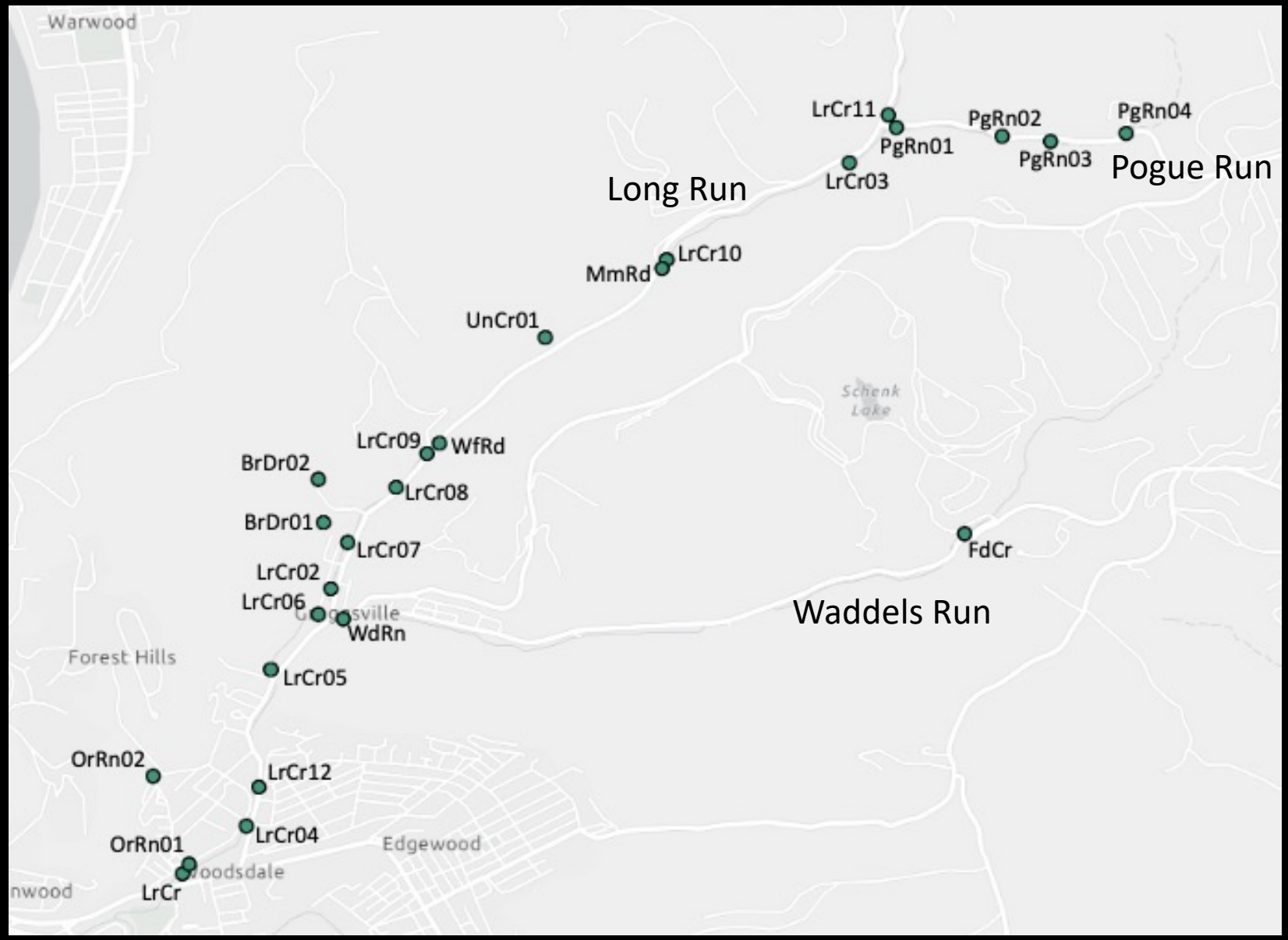
Long Run Watershed

- 1st order stream
- Heavily urbanized
- Extensive deer population
- Impaired by fecal material inputs

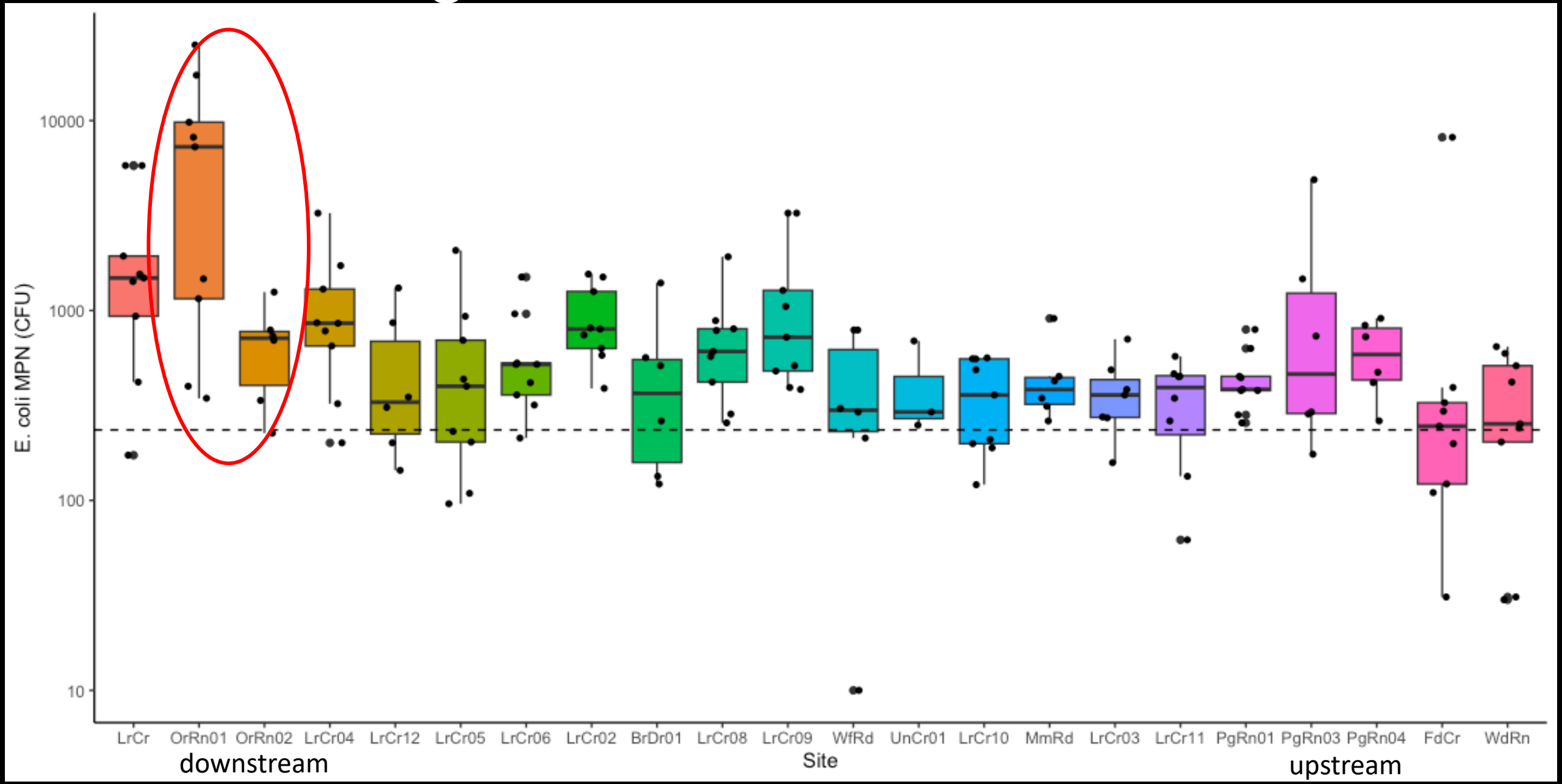


Long Run sites

- 24 sampling sites
- June 2023 – August 2023
- 9 sampling points
- Sampled during dry weather conditions
  - After 72 hours of no rain



Long Run *E. coli* concentrations

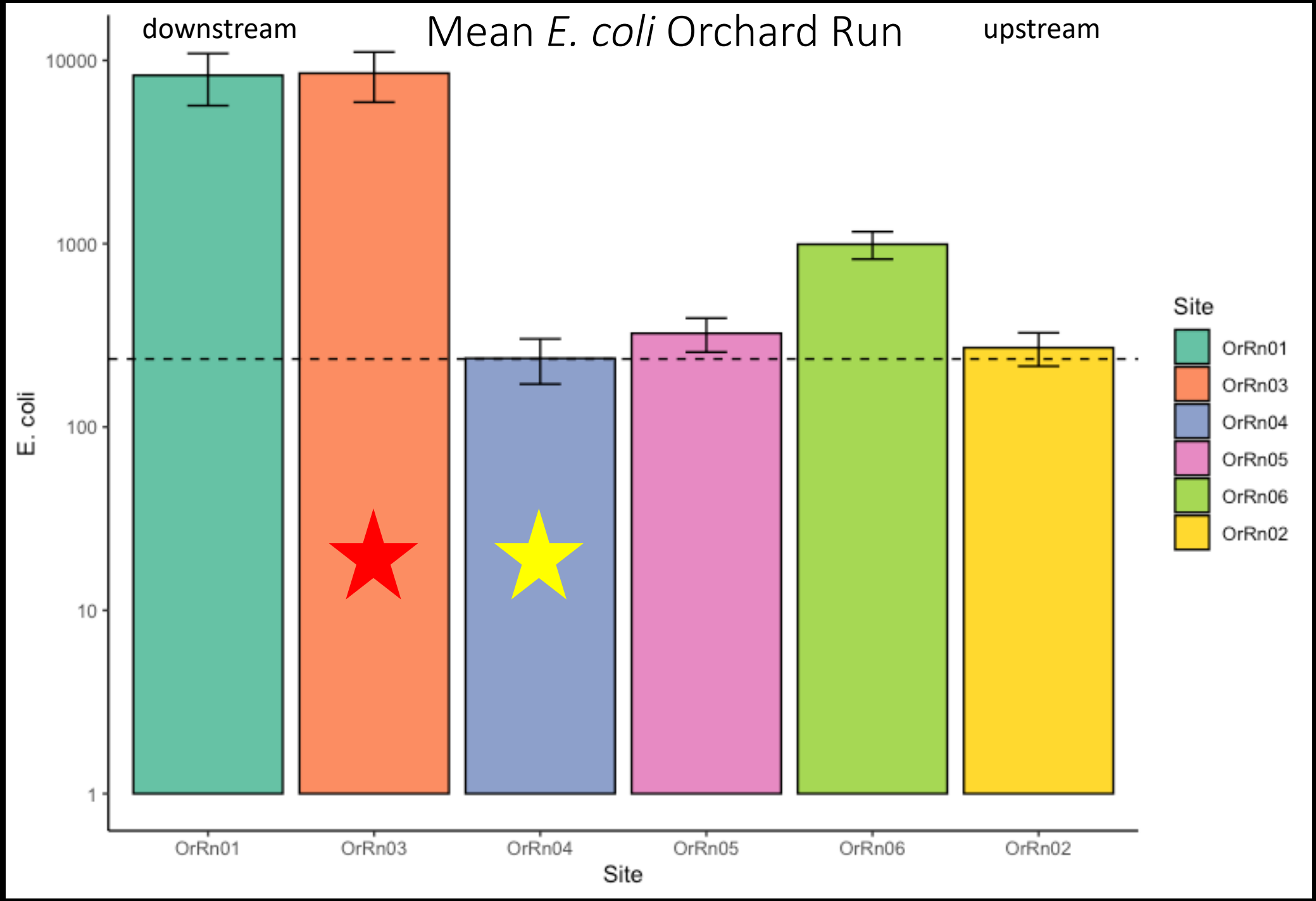


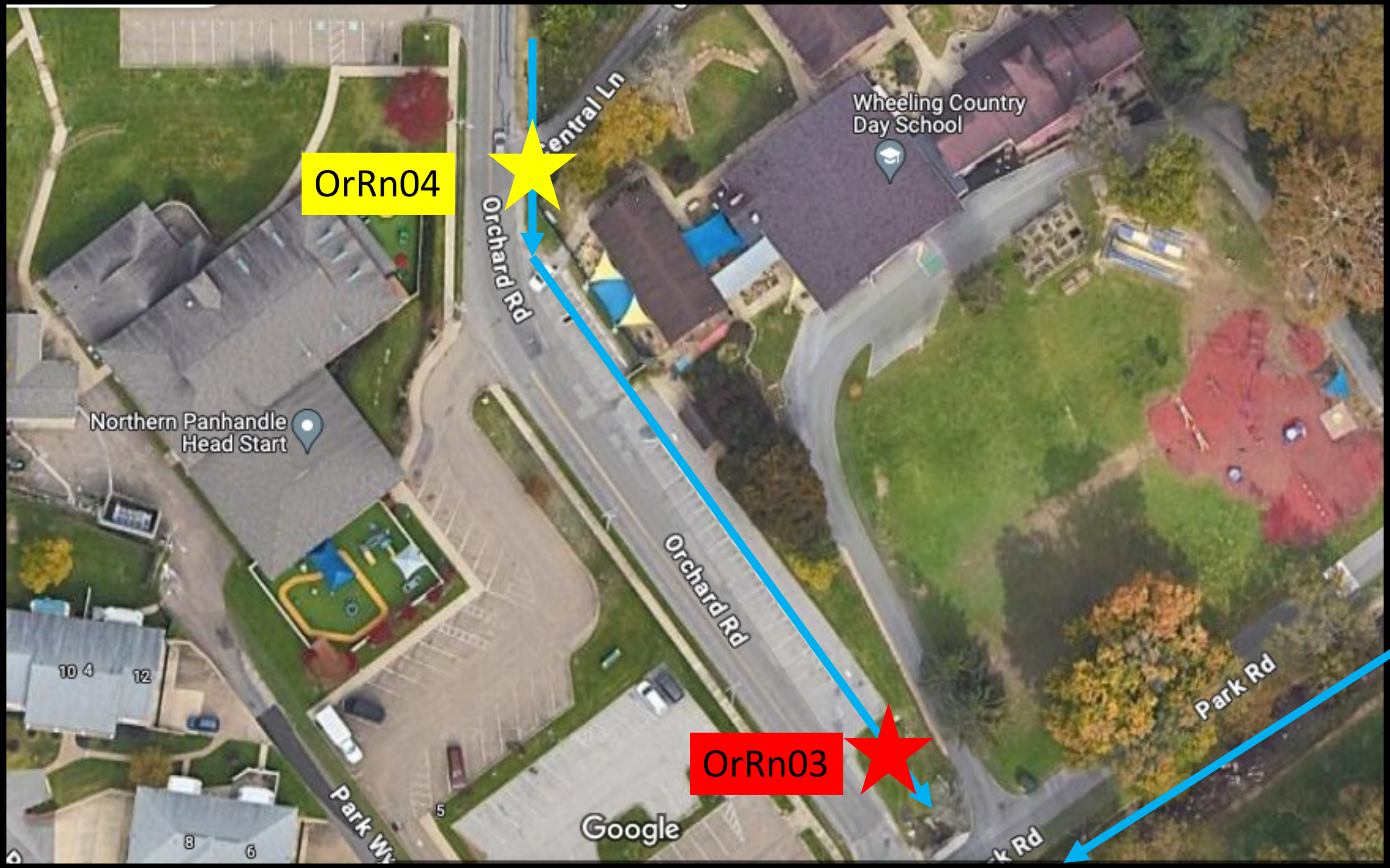
Our Studies

- Started broad
  - Looking at the Wheeling Creek watershed
- Focused in on the Long Run watershed
  - Tributary contributing notable *E. coli* loads
- Finer focus on a smaller geographic area
  - Orchard run stream

Orchard Run sites

- 6 sampling sites
- October 2023 – November 2023
- 6 sampling points
- Sampled during dry weather conditions
  - After 72 hours of no rain


downstream
Mean E. coli Orchard Run
upstream
10000
1000
100
10
1
E. coli
OrRn01
OrRn03
OrRn04
OrRn05
OrRn06
OrRn02
Site
Site
OrRn01
OrRn03
OrRn04
OrRn05
OrRn06
OrRn02


OrRn04
OrRn03
Orchard Rd
Orchard Rd
Wheeling Country Day School
Northern Panhandle Head Start
Park Rd
Park Wy
Google

Moving Forward

- Provided information to the WWPC
- Continue monitoring on other tributaries on Wheeling Creek

Acknowledgments

- Wheeling Water Pollution Control Division
- 3RQ
- Dr. James Wood

Questions