

# Longitudinal and Tributary Bacteria Surveys to Support a Pathogen TMDL for the Ohio River

---



# Intensive Bacteria Surveys

- Three types of surveys conducted
  - 5-Week Longitudinal surveys
  - Longitudinal “Snapshot” surveys
  - Tributary only surveys



# 5-Week Longitudinal Surveys

- Divided river into 3 reaches
  - Upper, middle, and lower
- Covered entire reach in one week
- Sampled each reach for 5 consecutive weeks
- 3 point cross sections
  - Surface samples only
  - Every 5 miles
  - On all major tribs
  - Downstream of POTWs



# Longitudinal Surveys (cont)

- 3 river-wide surveys completed
  - 222 Ohio River sites
  - 23 tributaries
- Minor tributaries
  - Added 100+ minor tribs to the third and subsequent surveys
  - Sampled from bridges and other land-based access points





# "Snapshot" Surveys

---

- Goal of survey
  - Capture entire river under same conditions
- Cover entire river in 3 weeks
  - Sample Ohio River every 5 to 10 miles
  - Sample 120+ tributaries
- First survey completed Sept/Oct 07
- Second round – May/June 08



# Tributary Only Surveys

---



- Needed additional data for minor tribs
- Sample 120+ tribs over 2 week period
- Two rounds completed in 2007
- One additional round in 2008

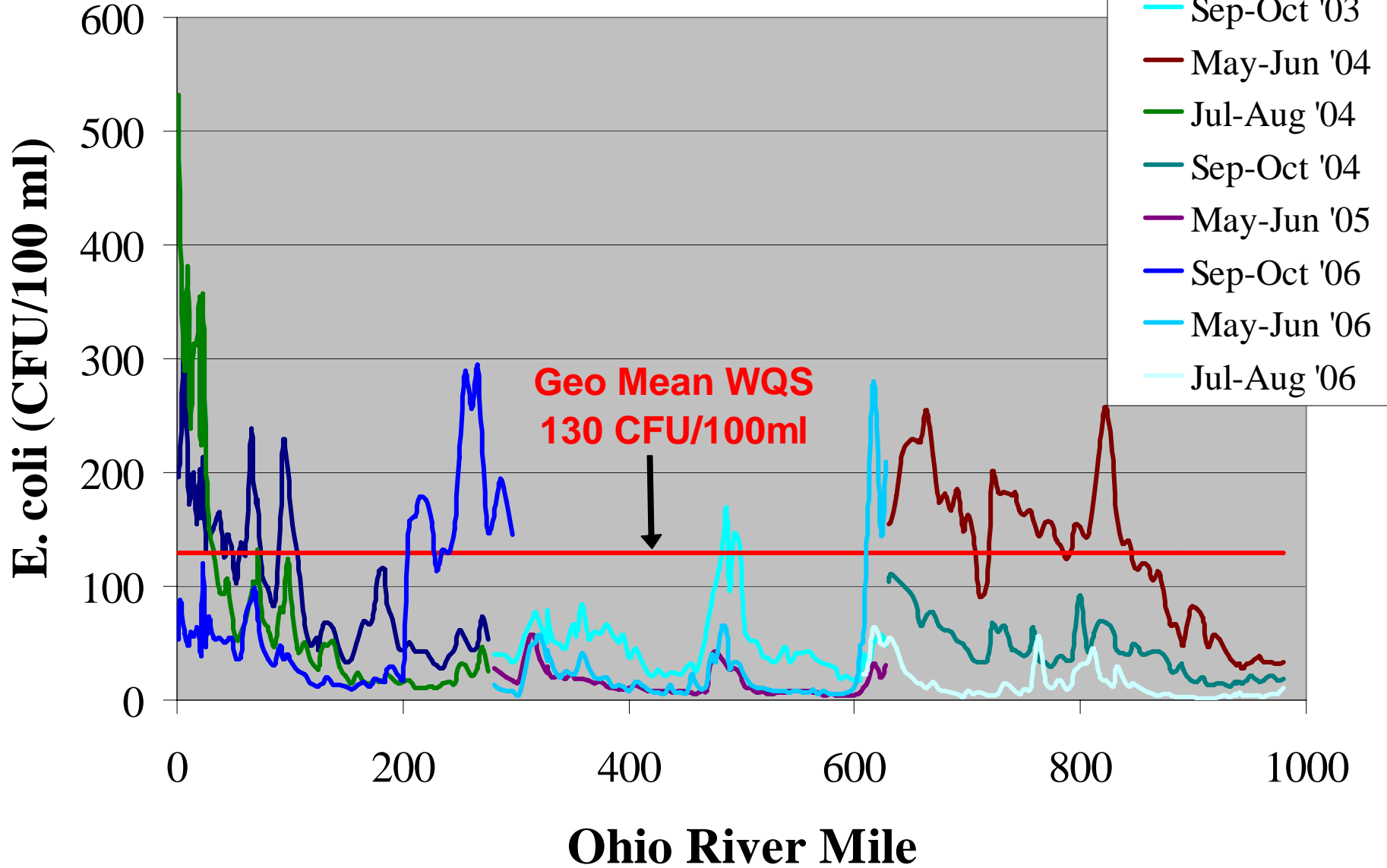
# Sample Analysis

- Colilert<sup>®</sup> method by IDEXX
- Analyze for *E. coli* and total coliforms
- At least two dilutions run for every sample



# Ohio River Bacteria Survey

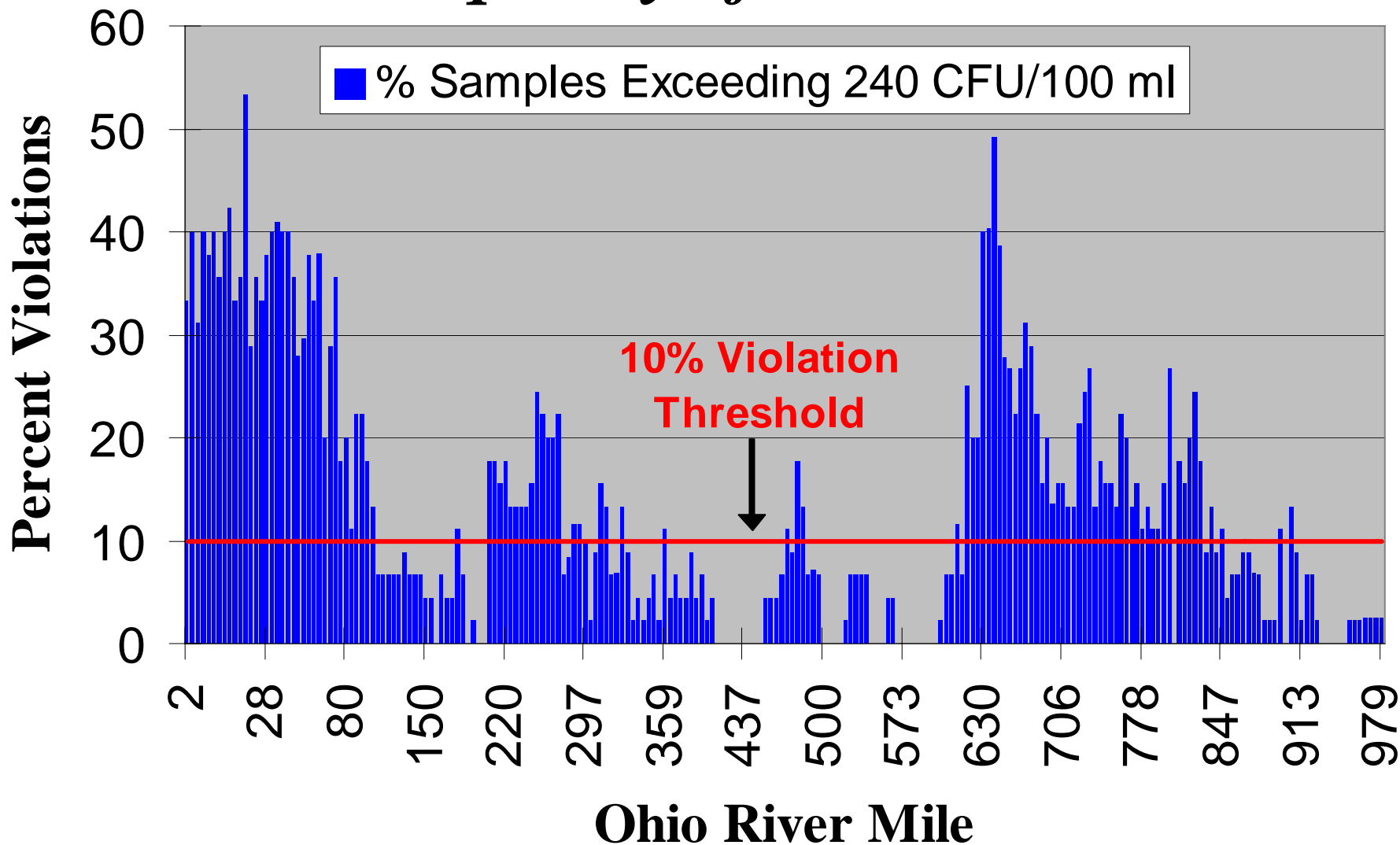
## *Geometric Mean*





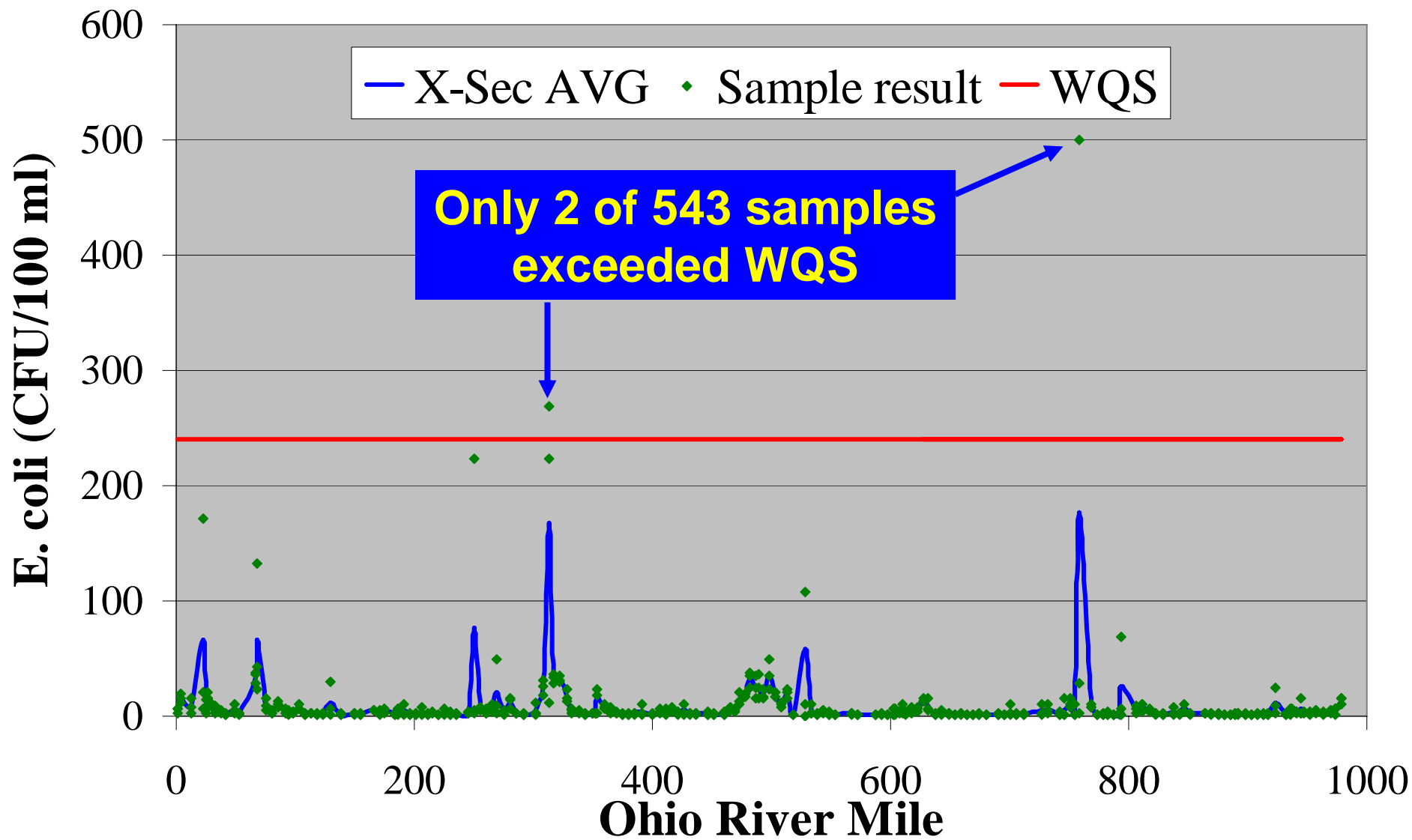
# Ohio River Bacteria Results

## *Frequency of Violations*



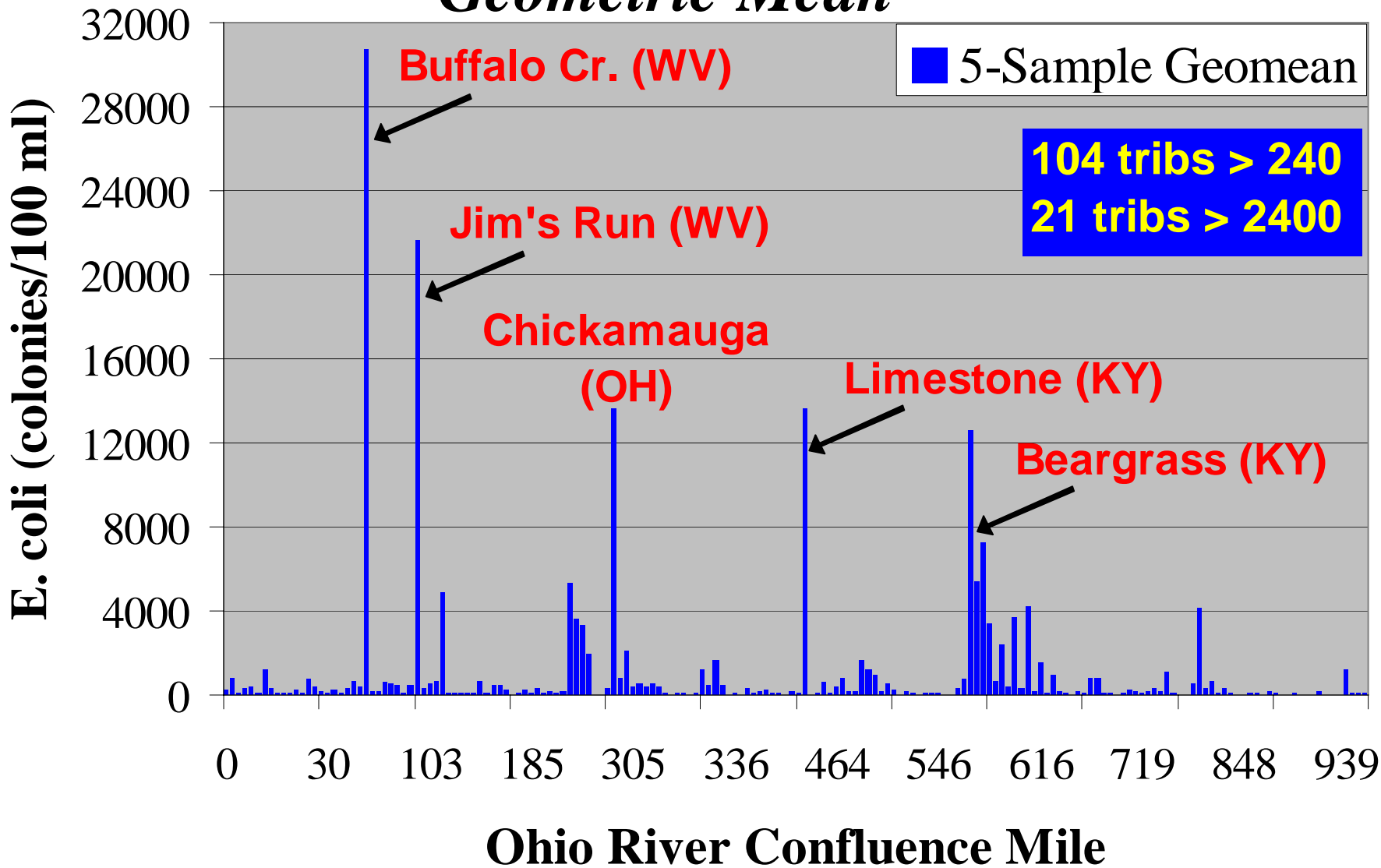
# Ohio River E. coli Snapshot Survey

*Sept 24 - Oct 11, 2007*



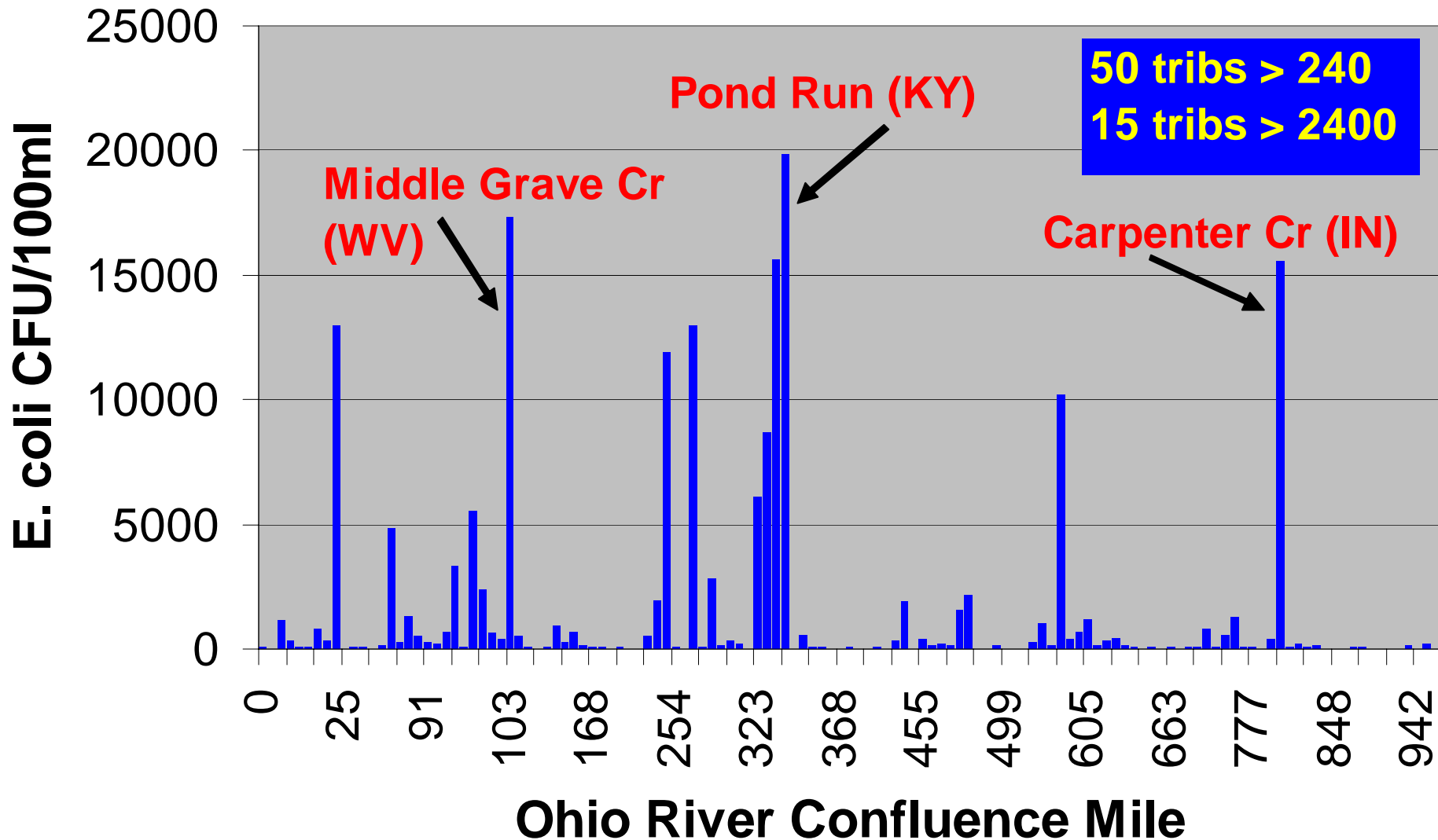
# Tributary E. coli Results (2006)

## *Geometric Mean*



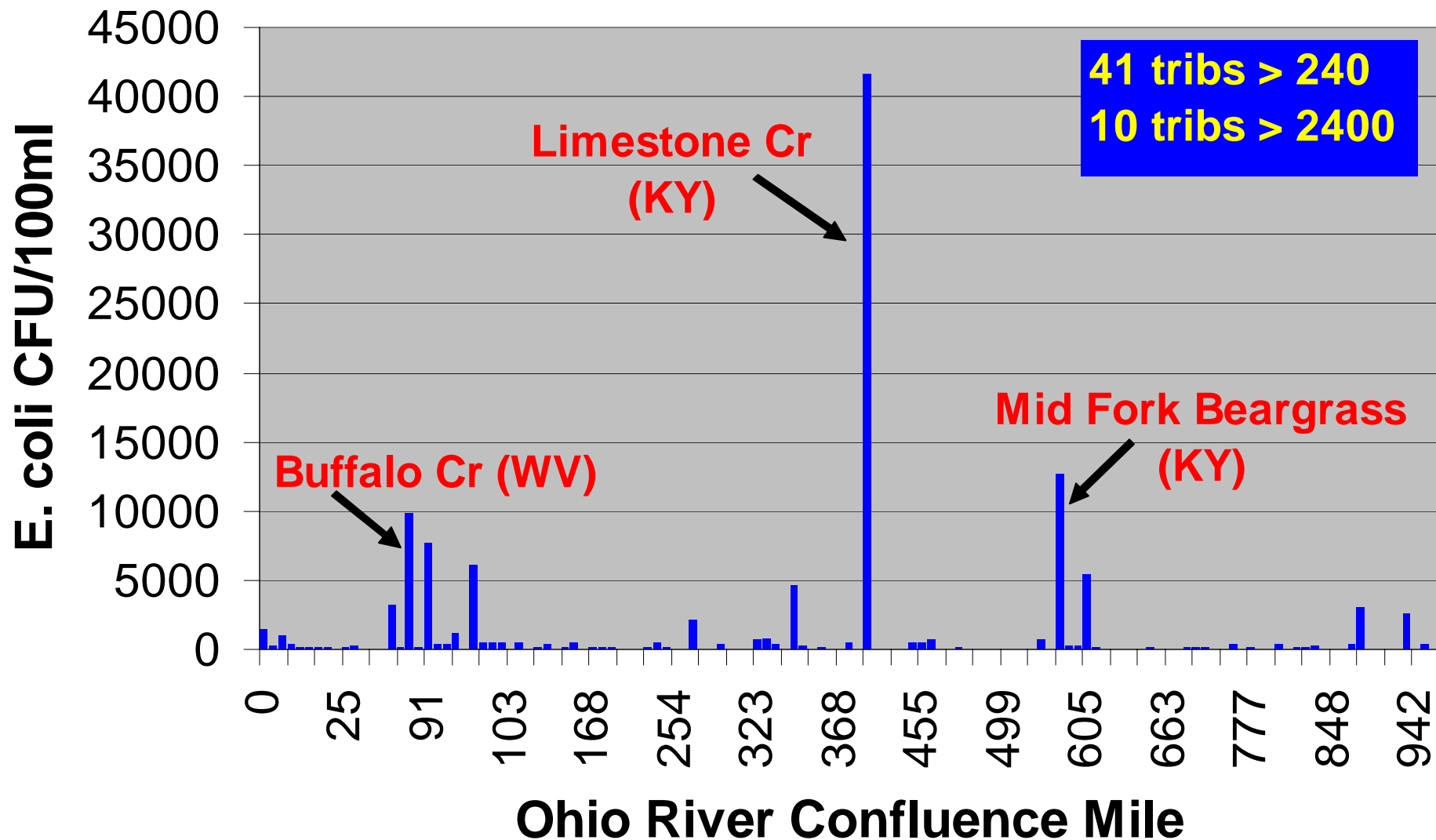
# Tributary E. coli Survey

*July 23 - August 1, 2007*



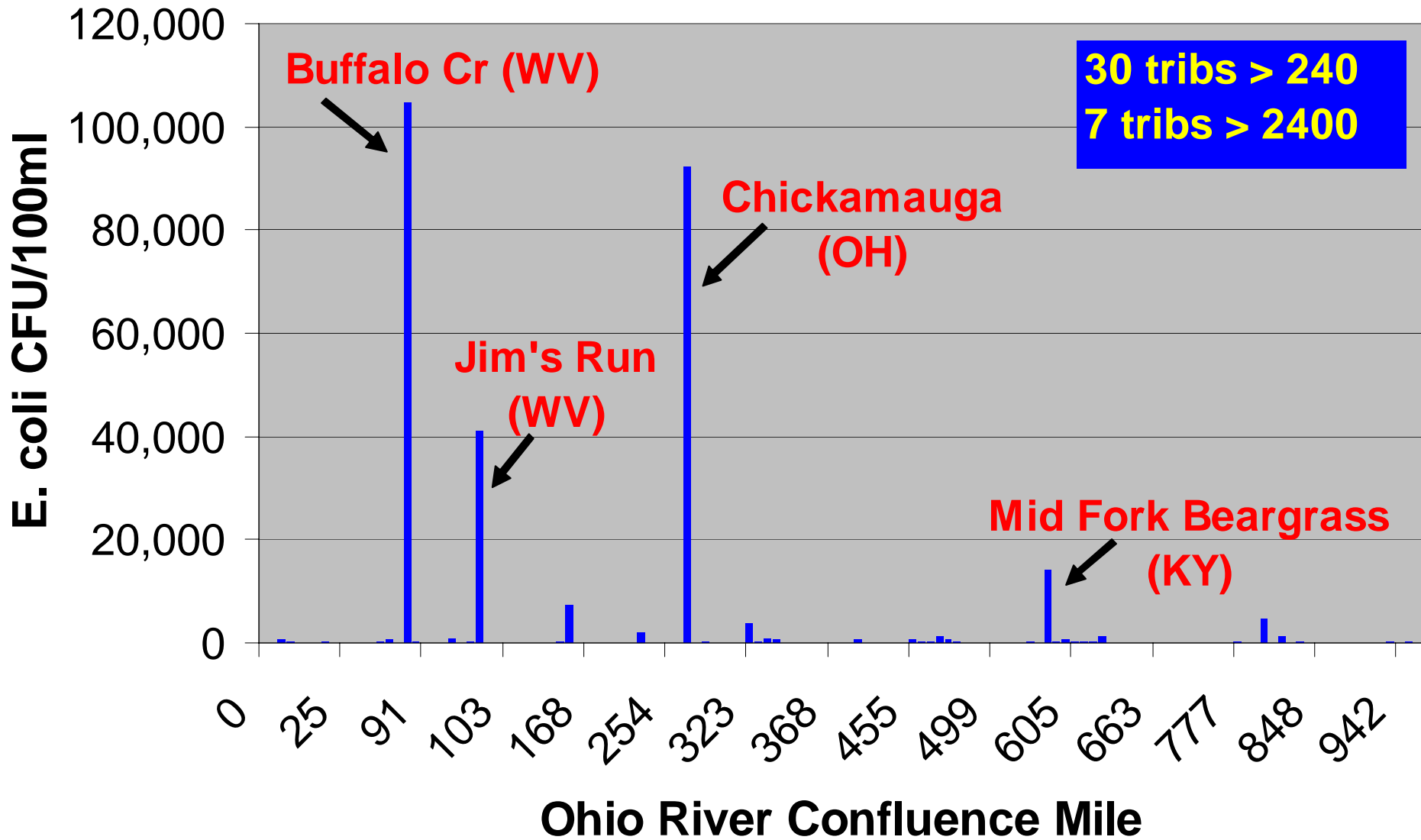
# Tributary E. coli Survey

*August 27 - Sept 6, 2007*



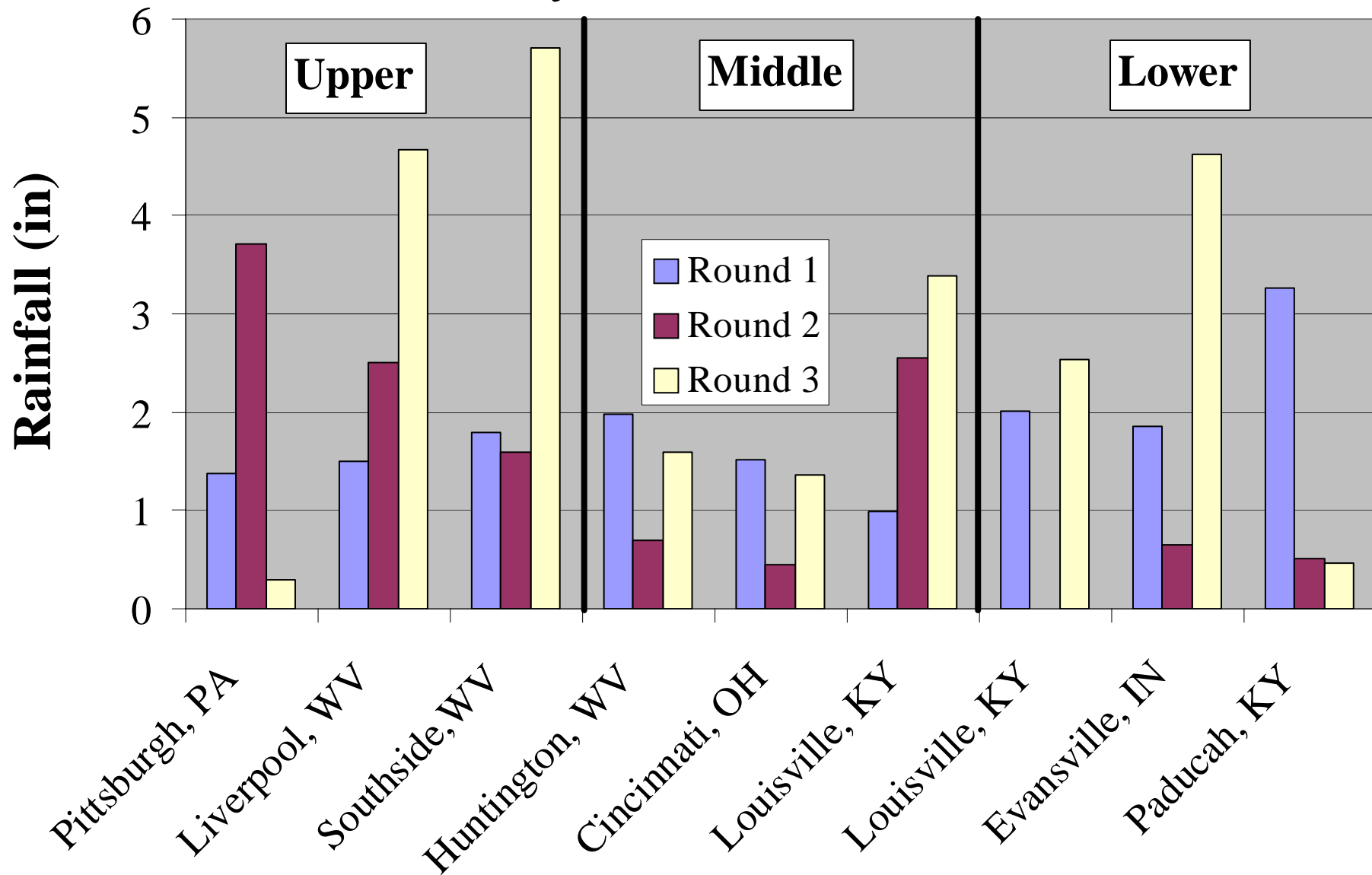
# Tributary E. coli Survey

Sept 24 - Oct 11, 2007



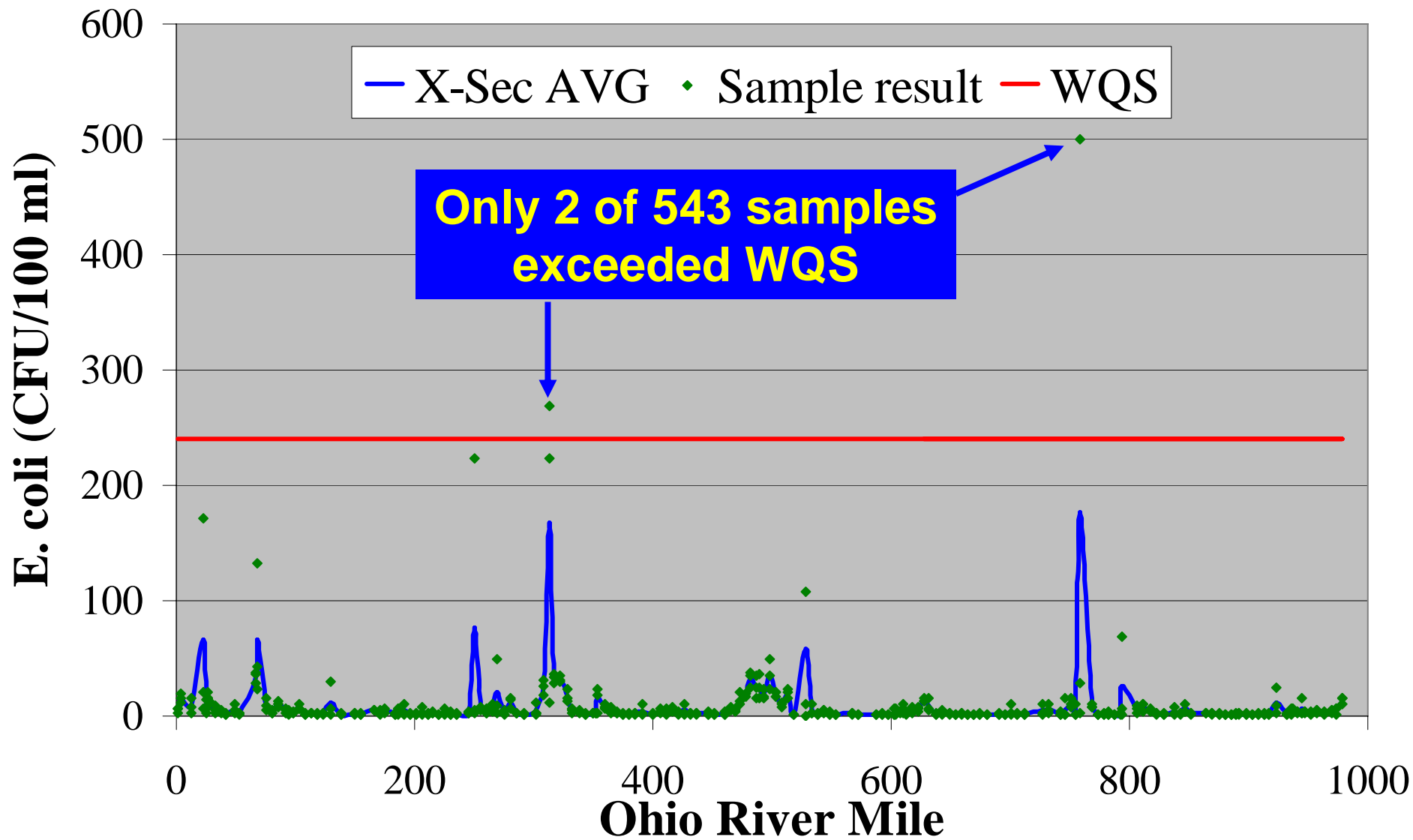
# Precipitation During Bacteria Surveys

*3-Day X 5 Weeks Total*



# Ohio River E. coli Snapshot Survey

*Sept 24 - Oct 11, 2007*

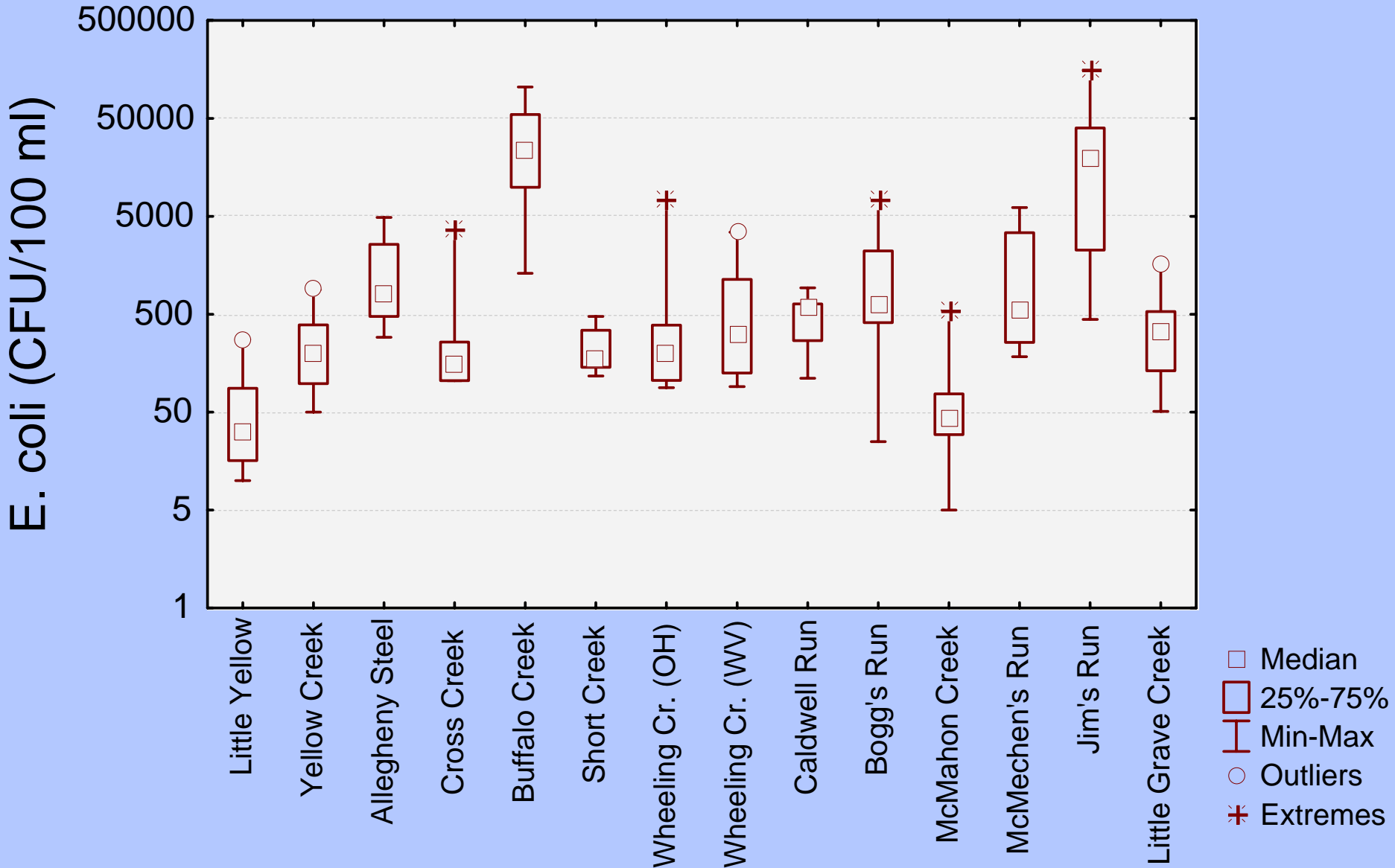






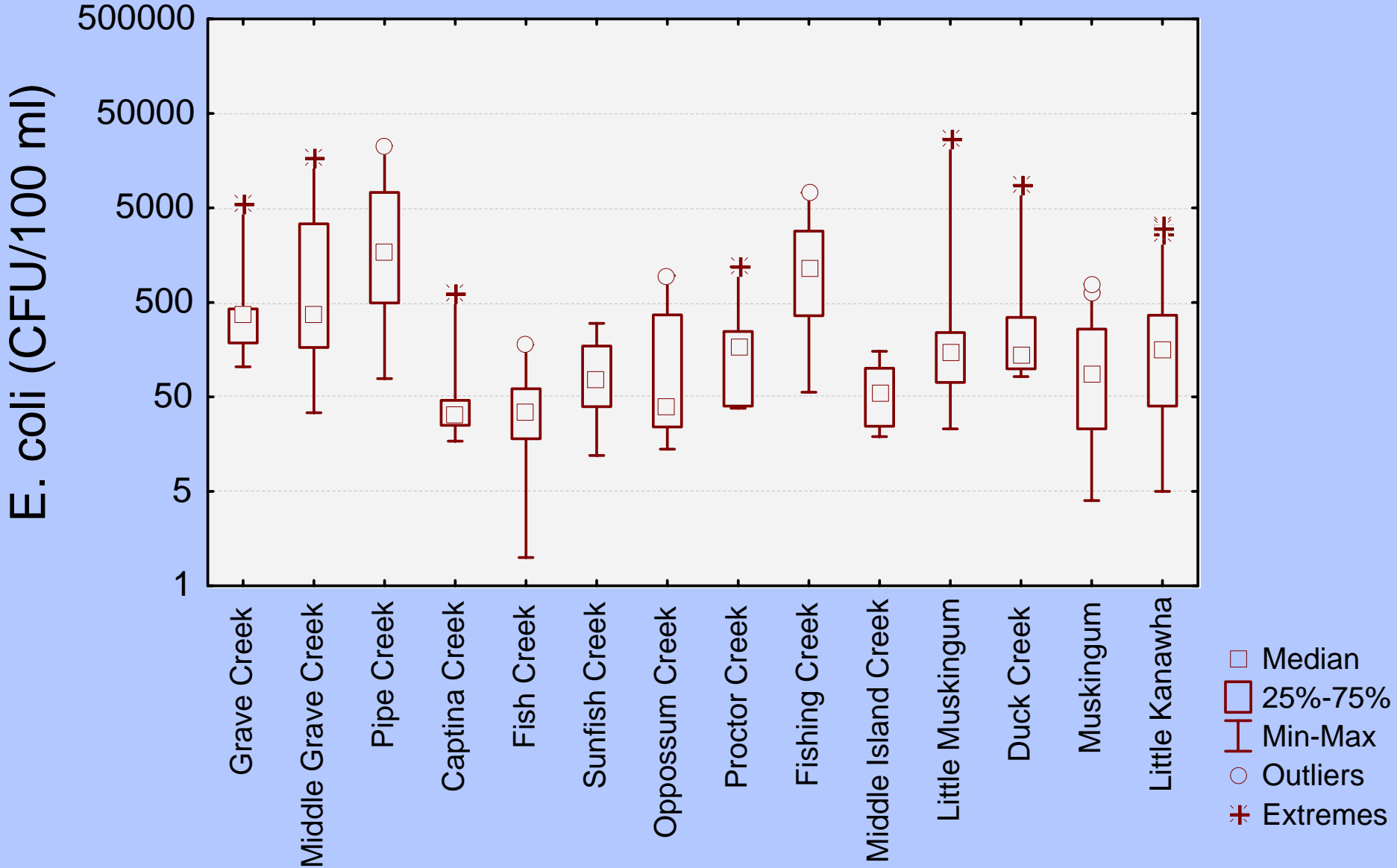
# Tributary E. coli Box Plot

*OH/WV Tribs (ORM 40 - 102)*



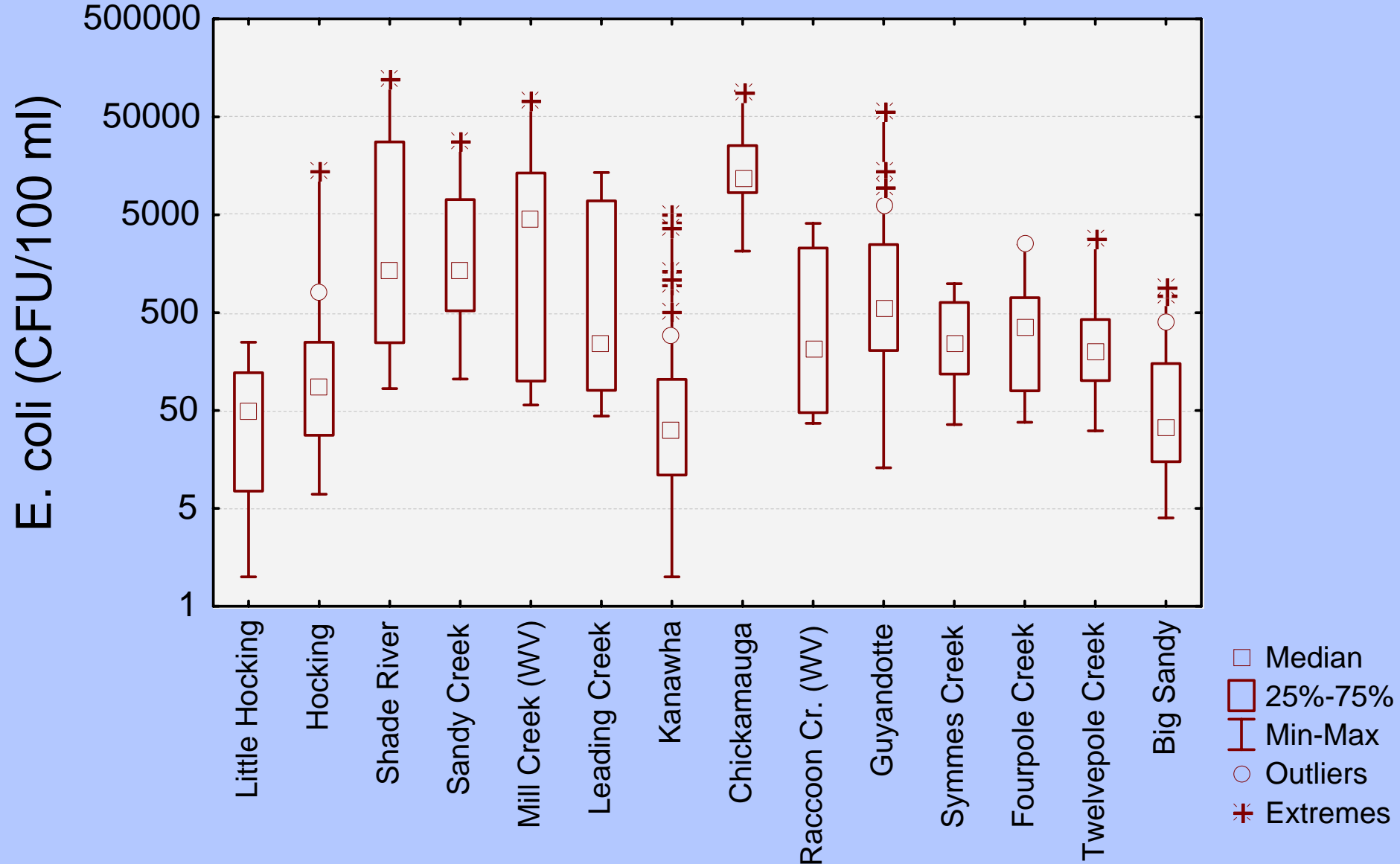
# Tributary E. coli Box Plot

*OH/WV Tribs (ORM 102 - 185)*



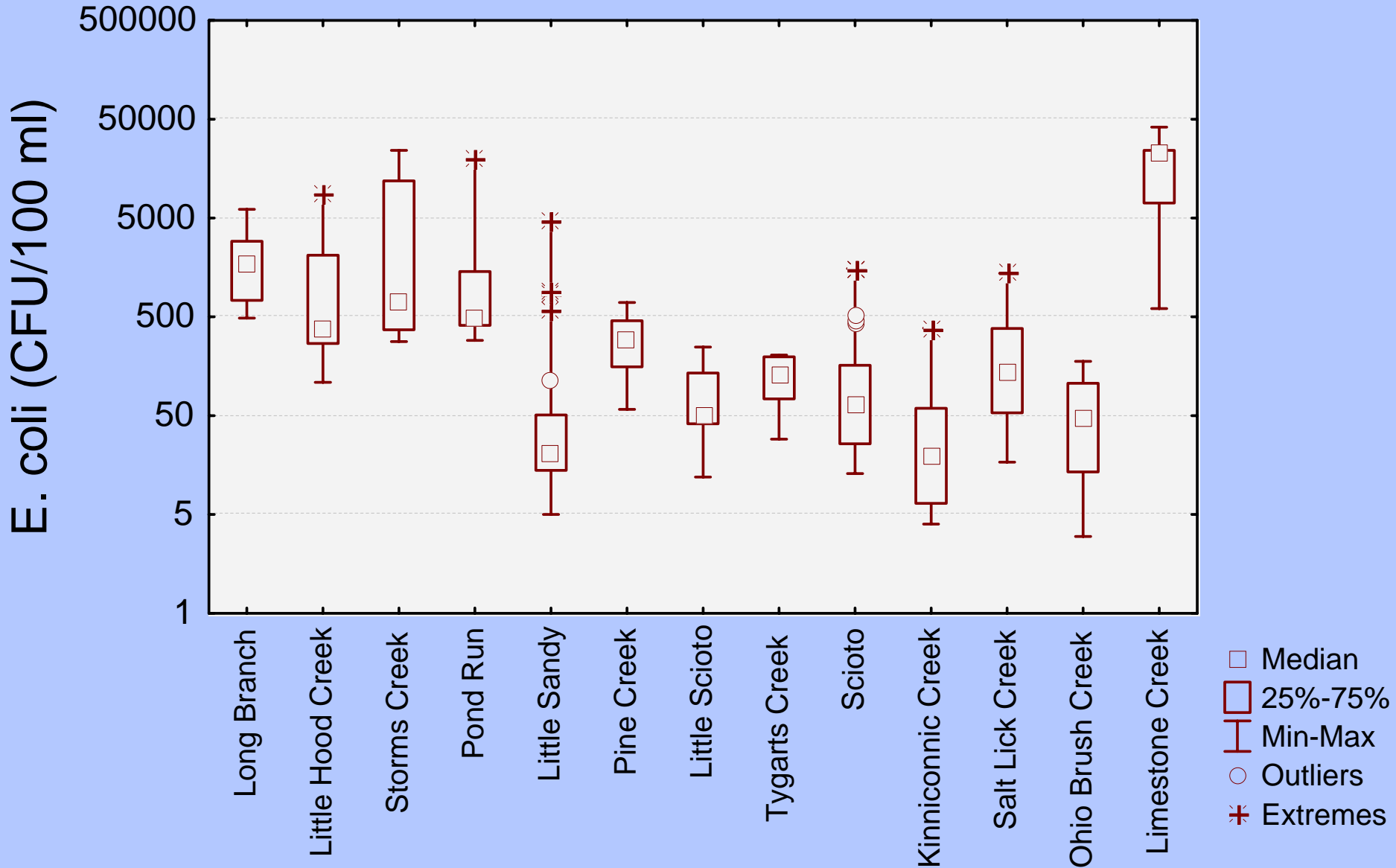
# Tributary E. coli Box Plot

*OH/WV Tribs (ORM 185 - 317)*



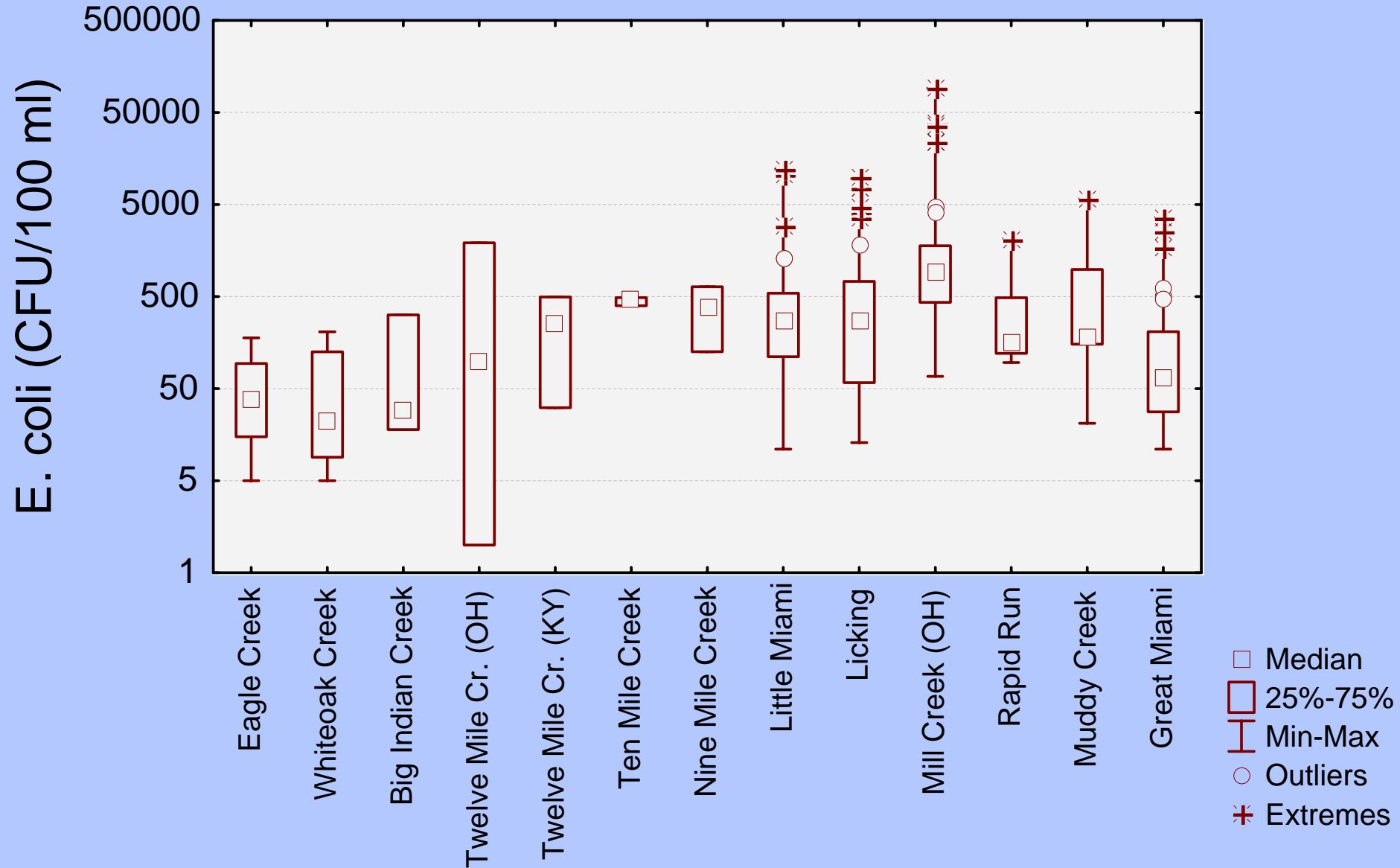
# Tributary E. coli Box Plot

*OH/KY Tribs (ORM 317 - 409)*



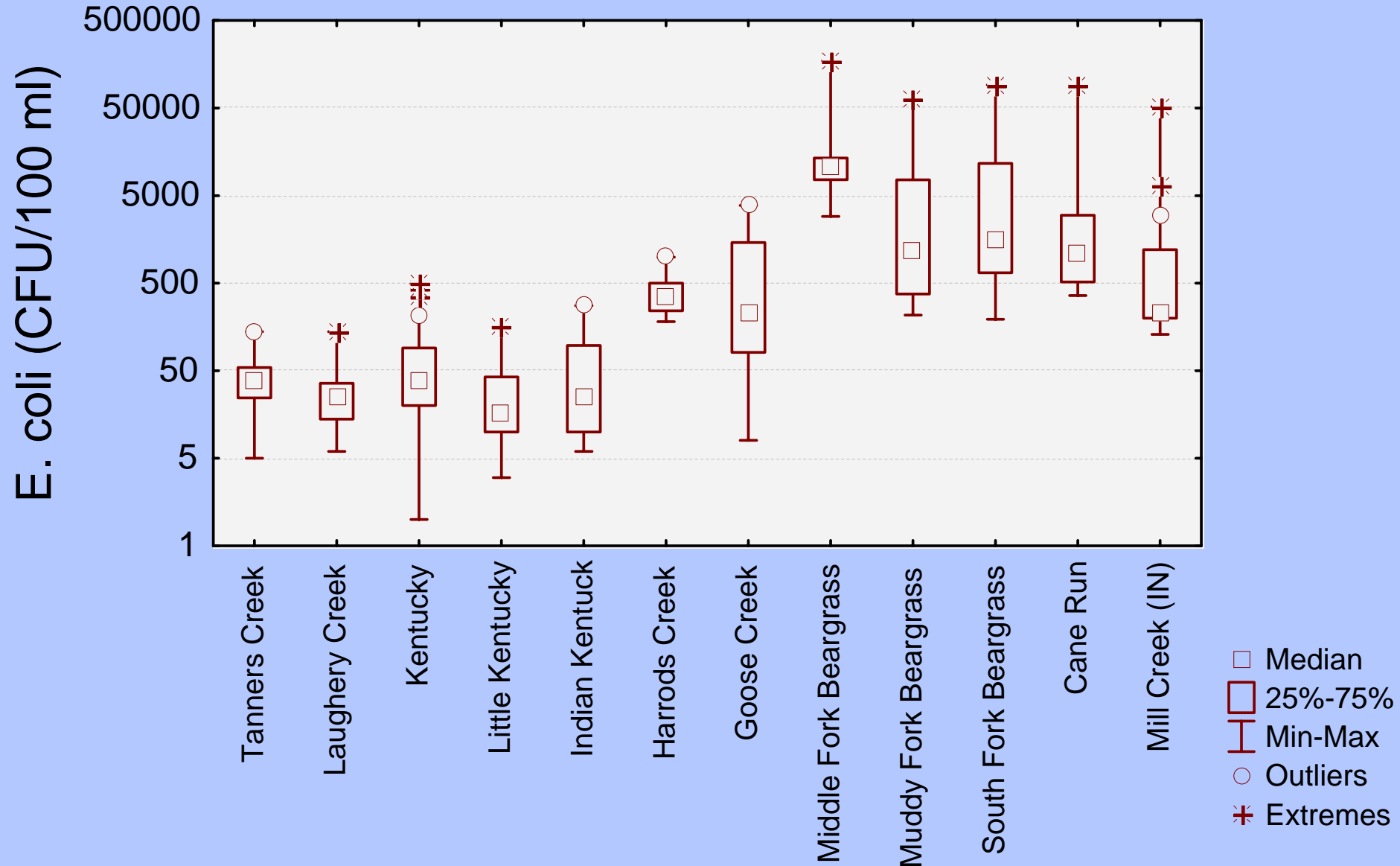
# Tributary E. coli Box Plot

*OH/KY Tribs (ORM 409 - 491)*



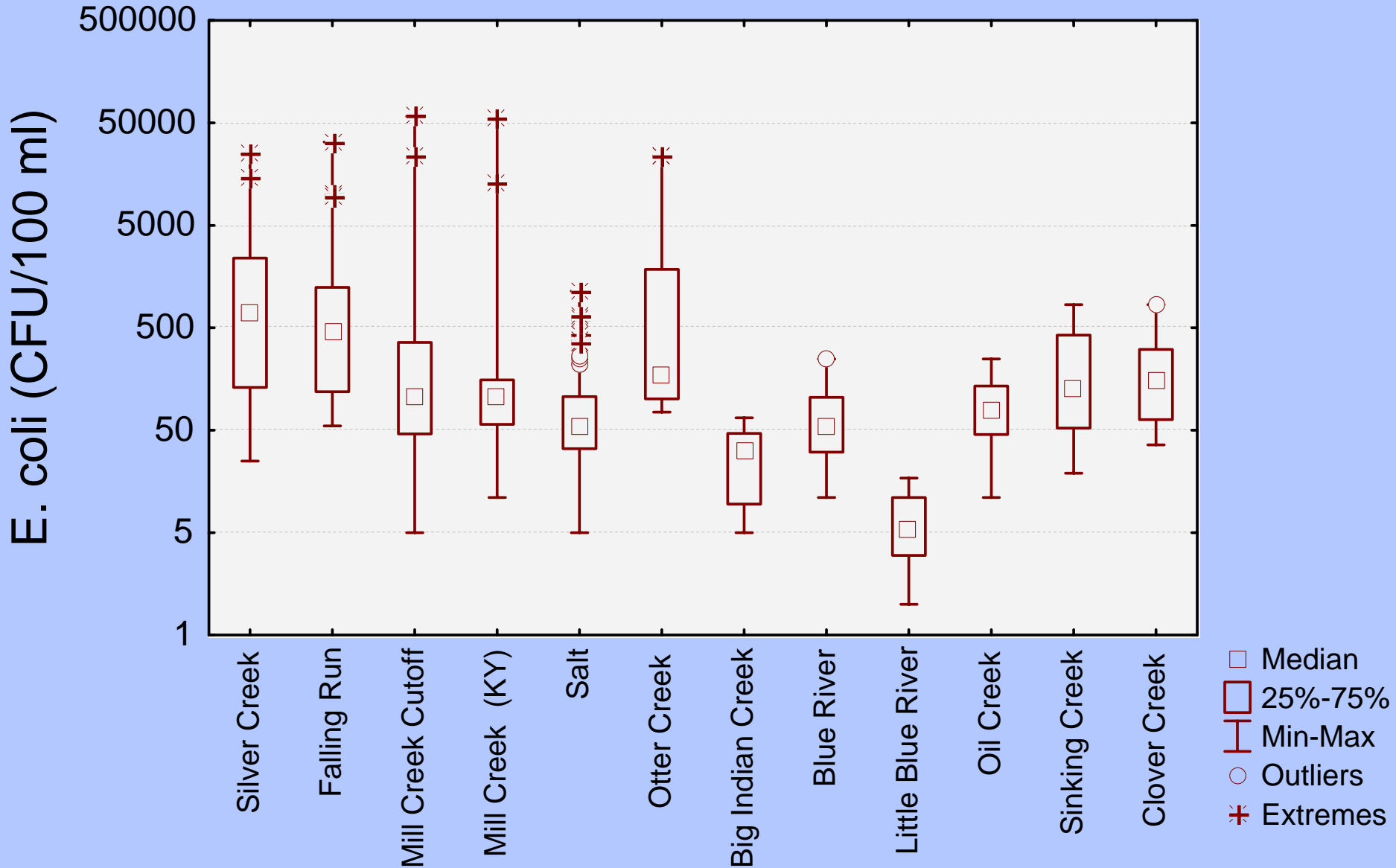
# Tributary E. coli Box Plot

*OH/KY Tribs (ORM 491 - 606)*



# Tributary E. coli Box Plot

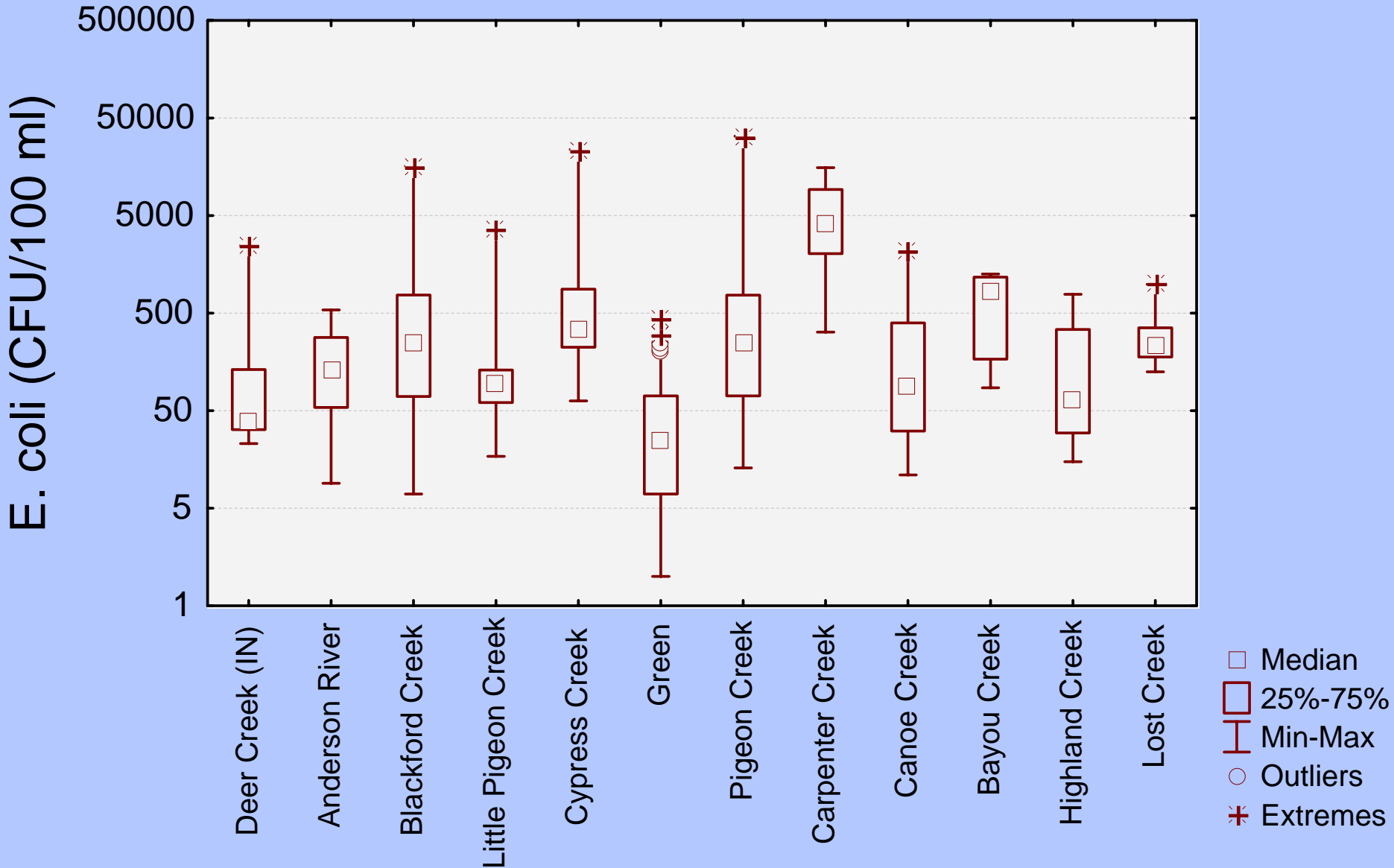
*OH/KY Tribs (ORM 606 - 711)*





# Tributary E. coli Box Plot

*OH/KY Tribs (ORM 711 - 843)*



# Tributary E. coli Box Plot

*OH/KY Tribs (ORM 843 - 981)*

