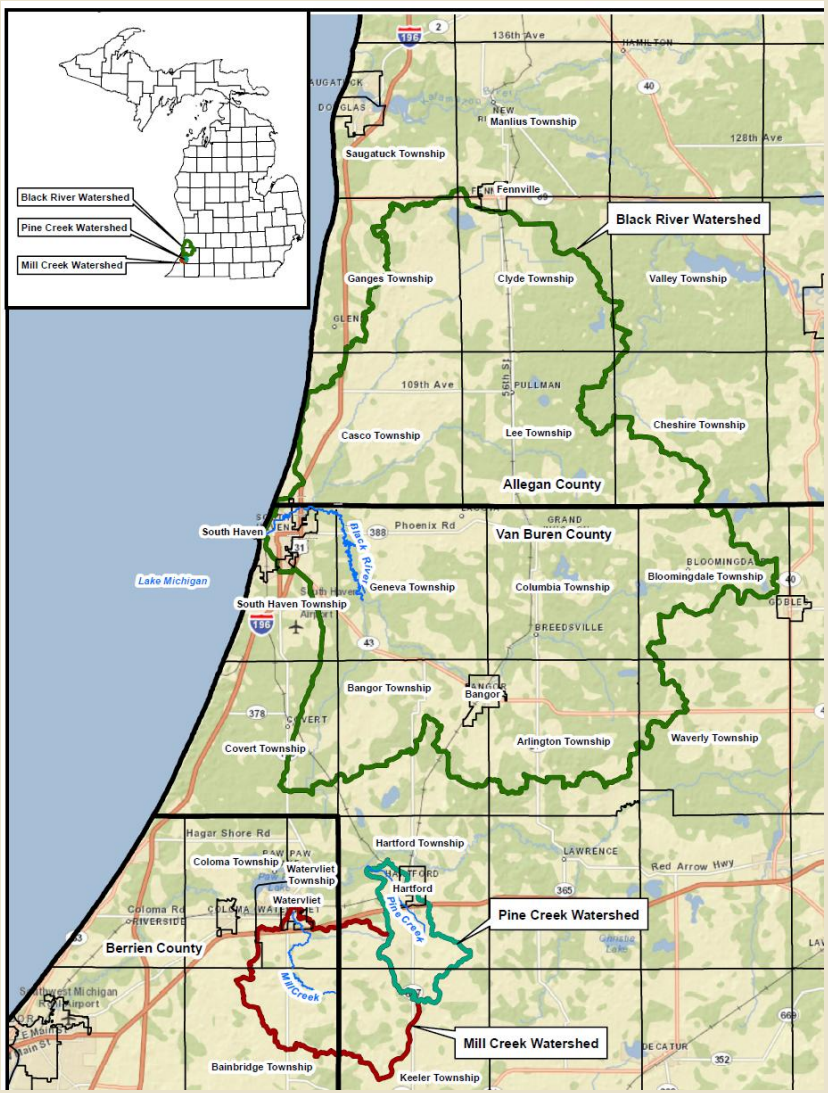
Black and Paw Paw River Watersheds

Pathogen Monitoring Project

Watershed Locations



Project Background

- Black River, Pine Creek, and Mill Creek
  - Water Quality Standard Exceedances for Pathogens
- Southwest Michigan Planning Commission
  - Awarded MDEQ Water Quality Monitoring Grant
- Assembled Project Team
  - Advisory Committee
  - Goals & Objectives of Project

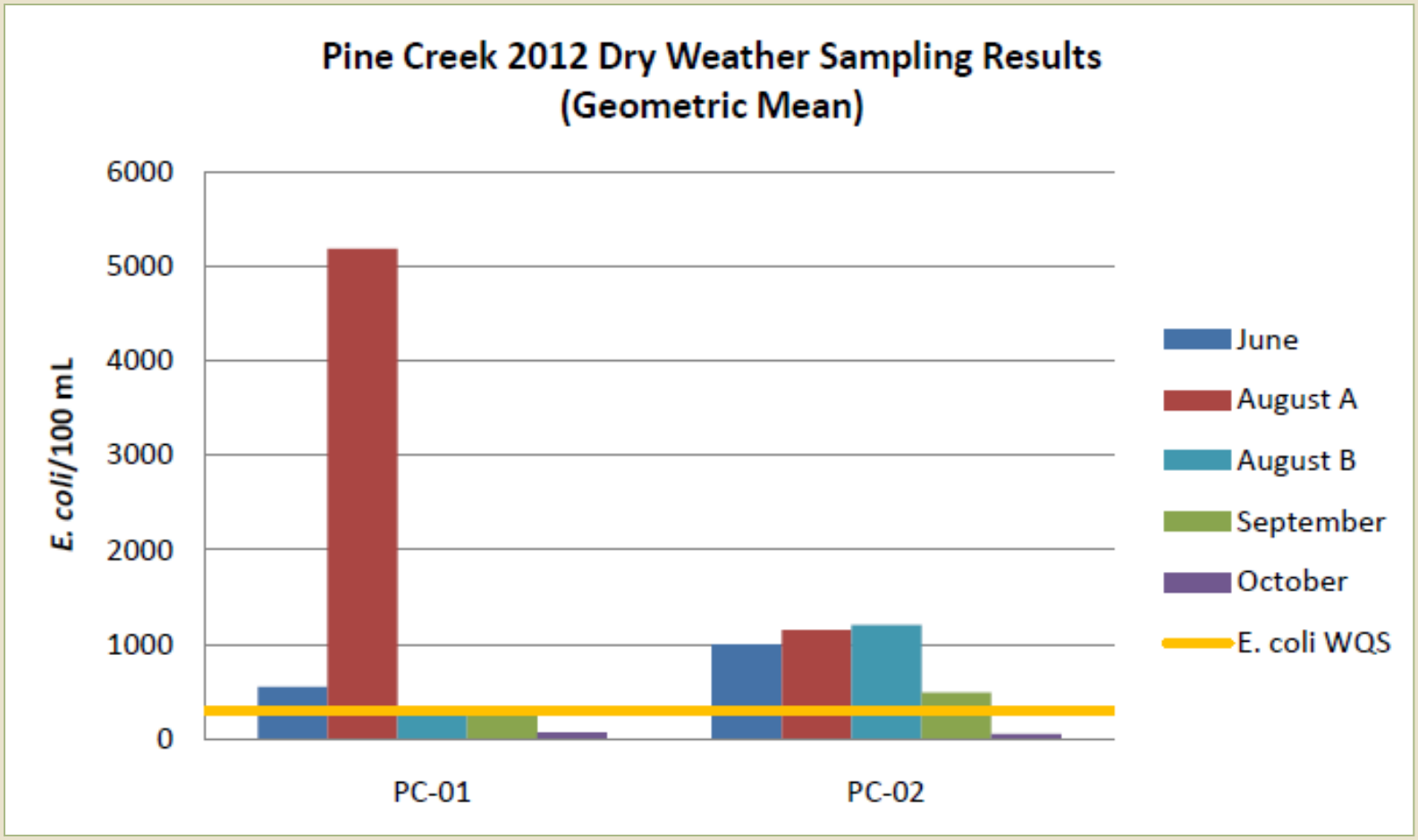
Purpose of Meeting

- Review Data
  - All Sampling Conducted
  - IDEXX Analysis Completed
- Select Sites for MST Analysis
  - Options and Costs
  - Selection Criteria

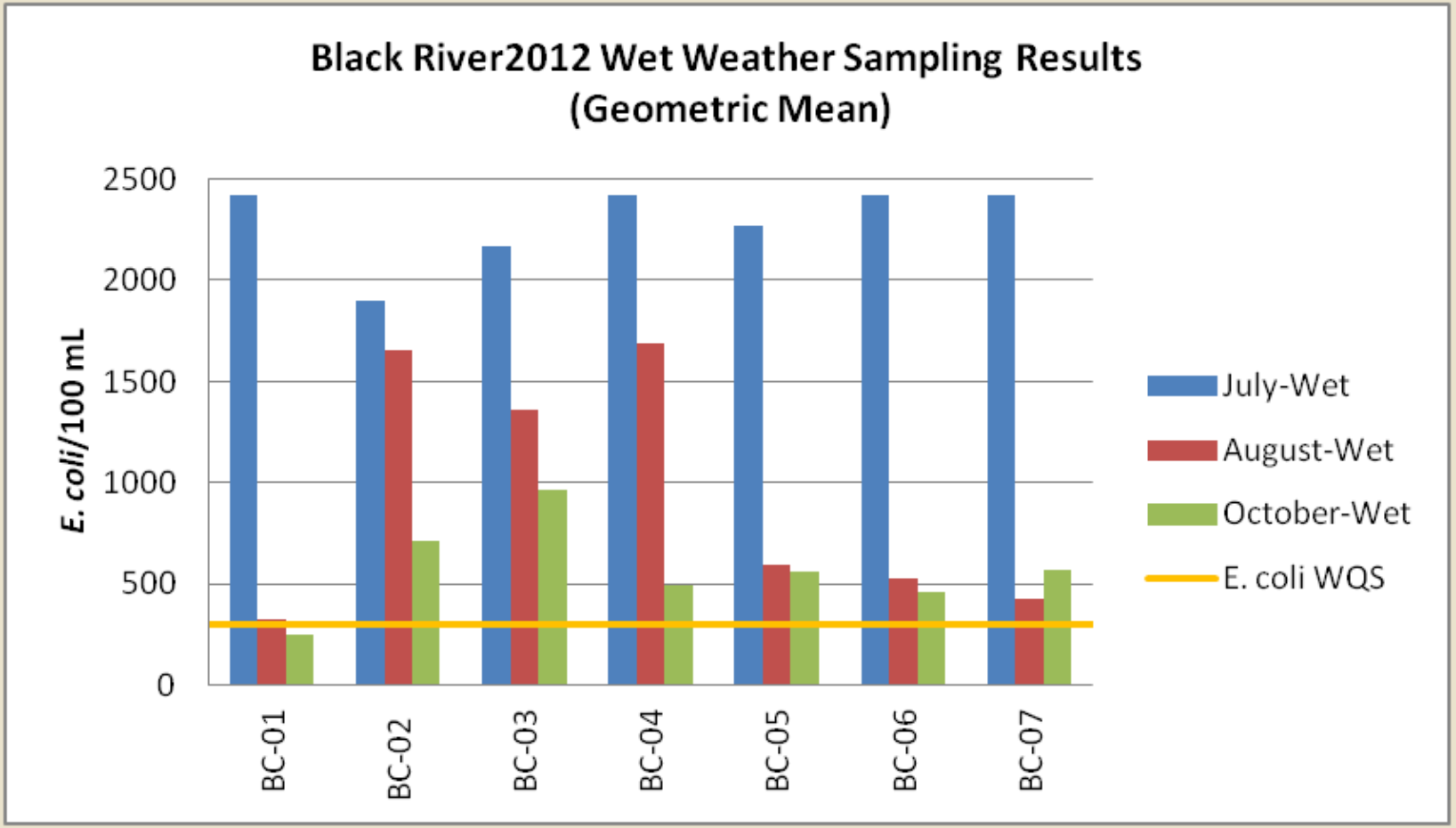
Sampling Strategy and Results

- Dry Weather
  - Pine Creek (2 sites) Pathogens
- Wet Weather
  - Pine Creek (4 sites) - Pathogens
  - Black River (7 sites) - Pathogens
  - Mill Creek (1 site) - Pathogens and Flow

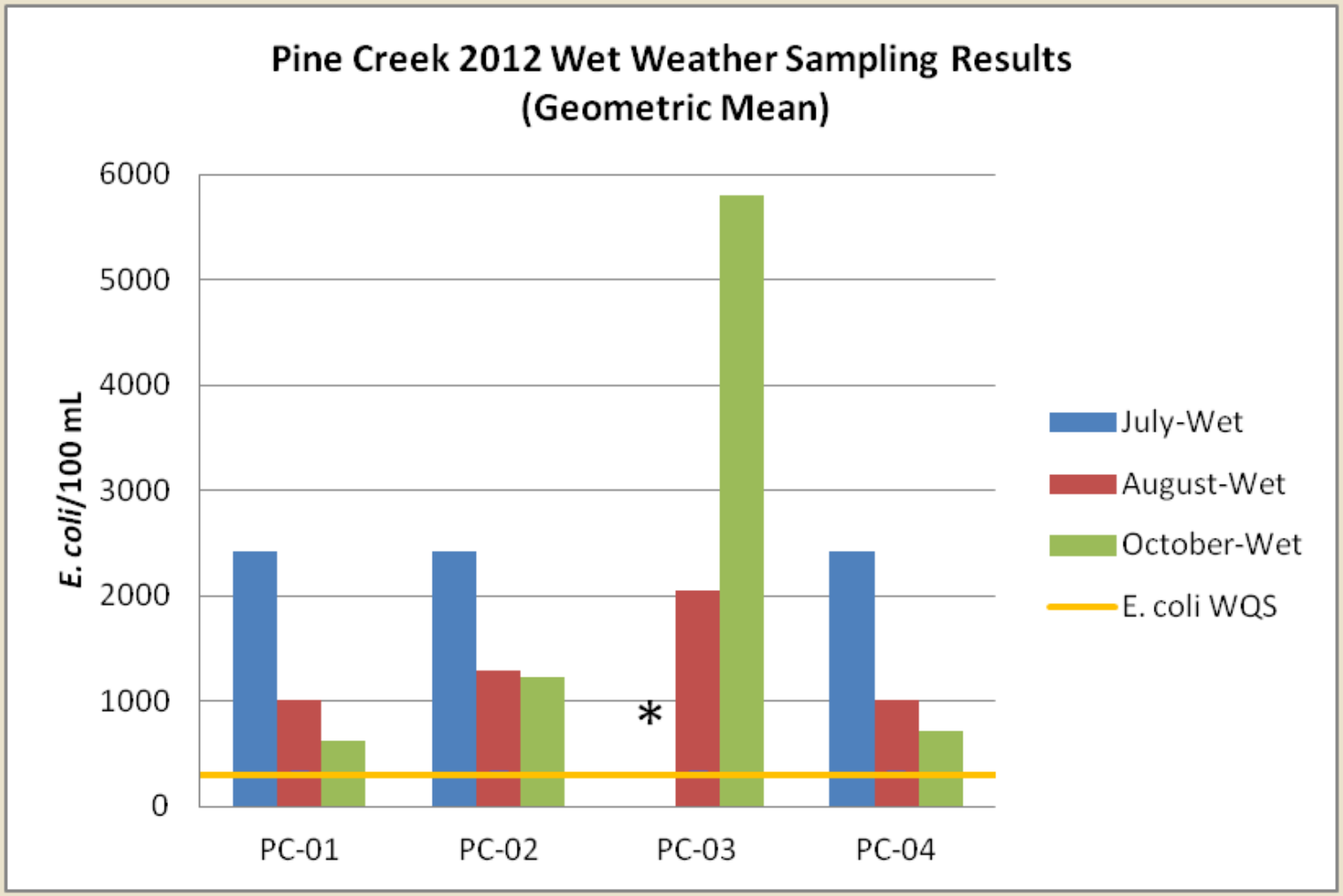
Dry Weather Sampling



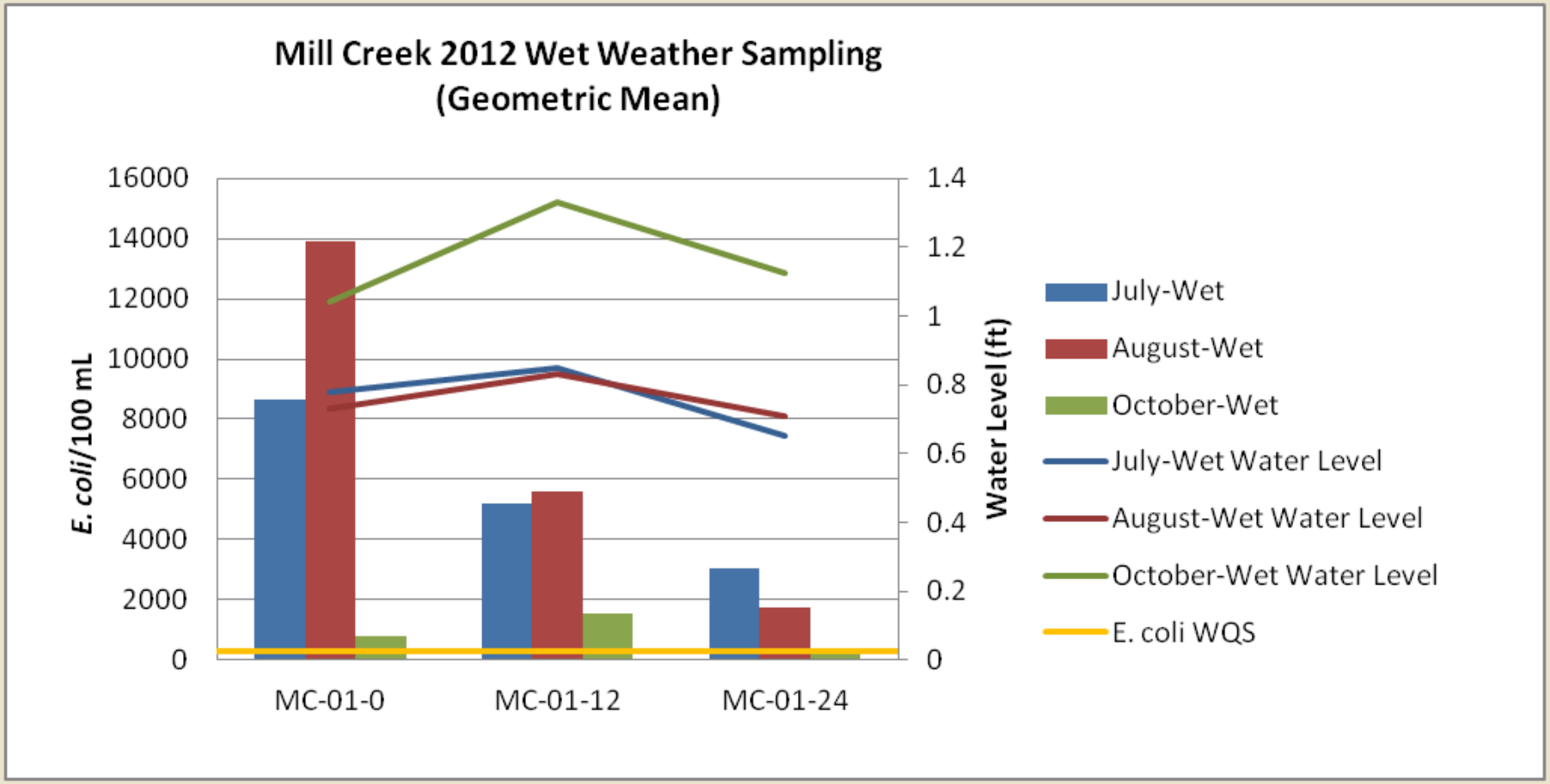
Wet Weather Sampling



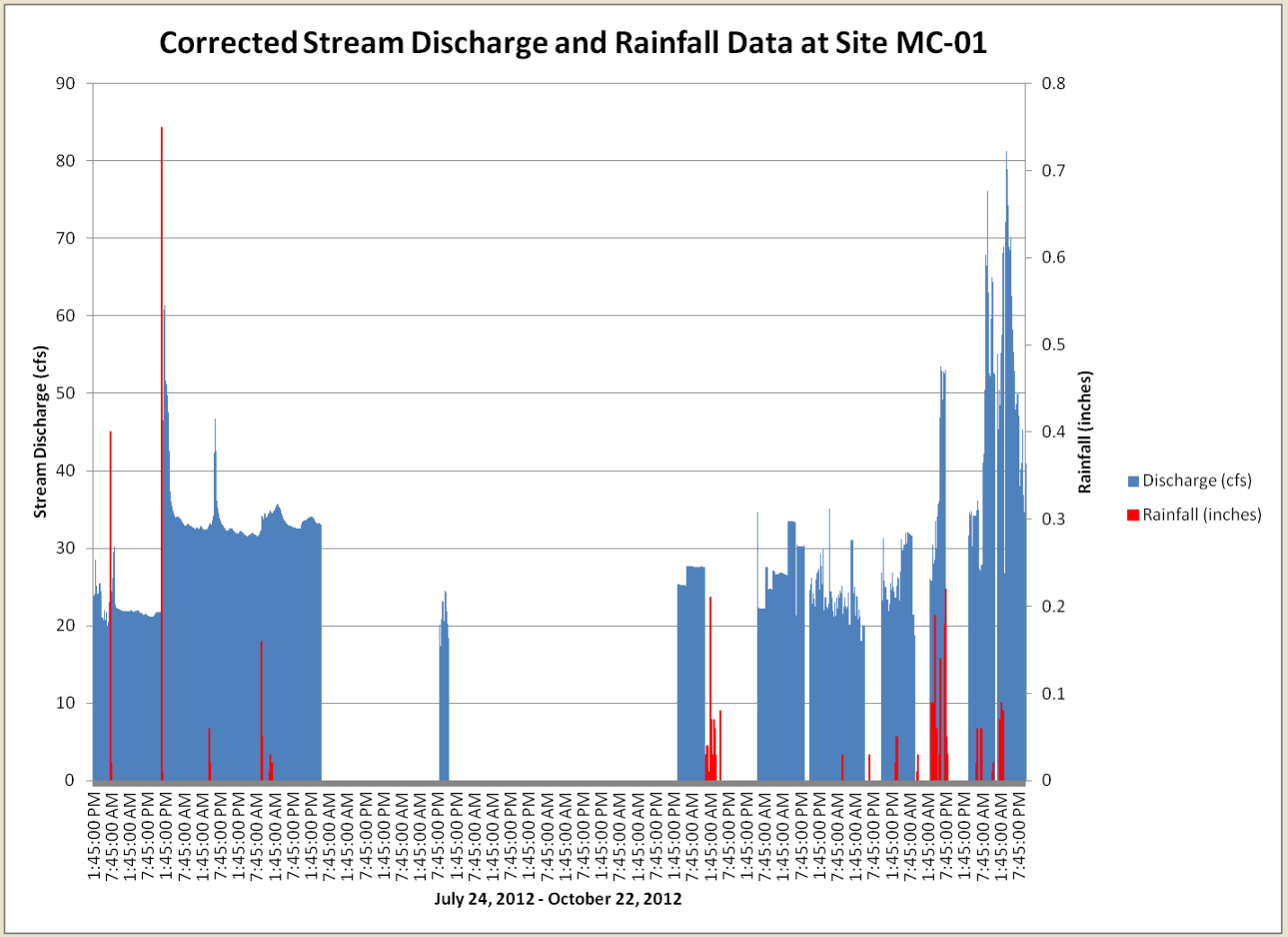
Wet Weather Sampling



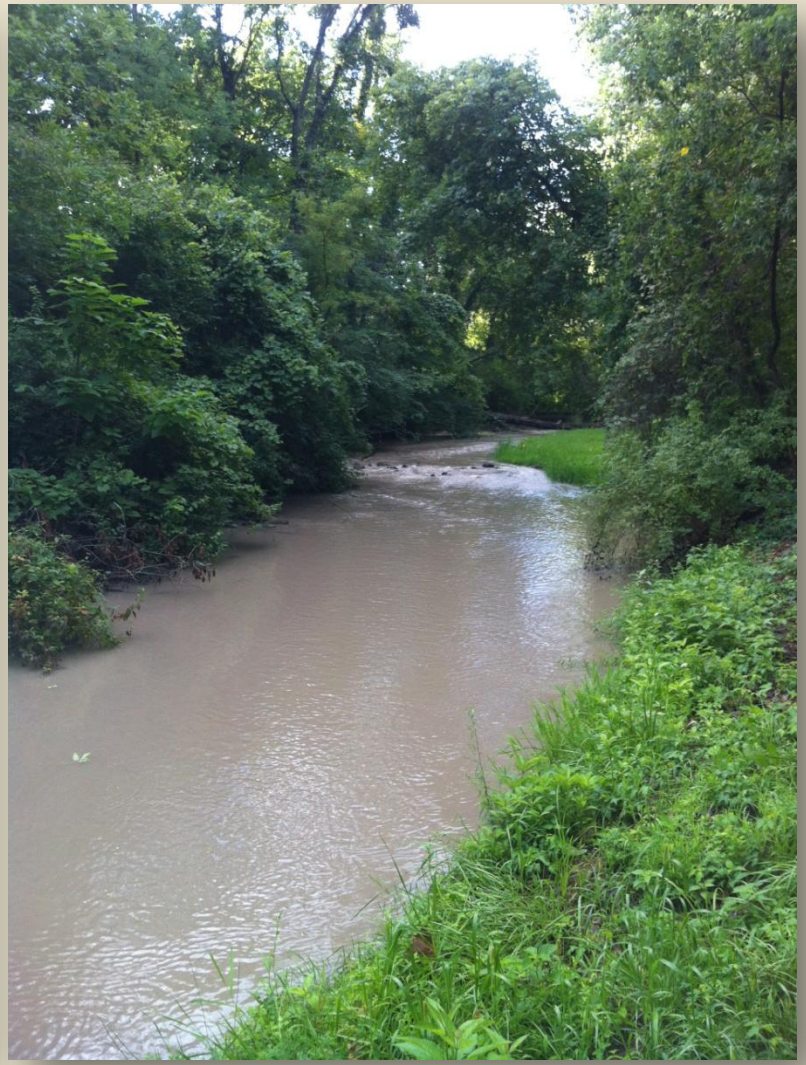
Wet Weather Sampling



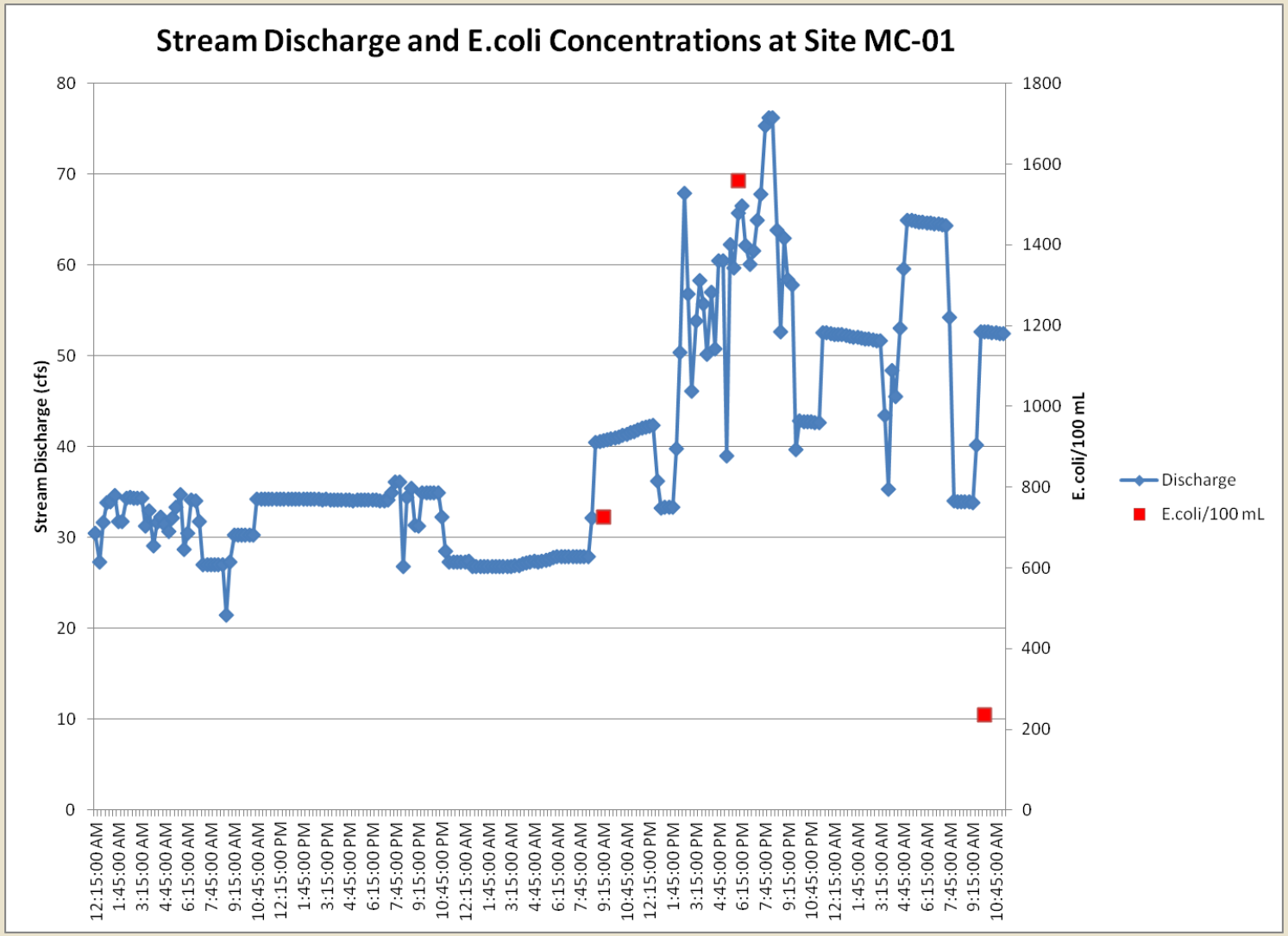
Flow Monitoring at Mill Creek



Flow Monitoring at Mill Creek



Flow Monitoring, Third Storm Event



Related Studies

- MDEQ TMDL Report *E. coli* Results
  - Potential Sources
    - Manure runoff, septic systems, illicit connections to storm sewers, wildlife
- South Haven *E. coli* Results
  - MST analysis found no human or bovine markers
- Spreading Schedules
  - MDEQ assistance with coordinating timing

Microbial Source Tracking

- Hope College
  - First qPCR assay determines contamination from **any** fecal sources in water.
  - Second qPCR assay determines contamination from **human** fecal sources in water.
  - Third qPCR assay determines contamination from **cow** fecal sources in water.
  - Fourth qPCR assay determines contamination from **pig** fecal sources in water.

Microbial Source Tracking

- Results Reported
  - Coliform and *E. coli* Levels (cfu/100mL)
  - Relative Contribution of Human, Cow, Pig
    - Sum most likely <100% due to other sources
- Selection Criteria
  - Geometric Means
  - Magnitude of Exceedances
  - Land Use
  - Land Activities

Lessons Learned

- Flow Monitoring
  - Vandalism
  - Leaf Debris
  - Battery Failure
  - Water Level Recordings
- Field Blanks/Error
- Volunteers/Drivers
- Laboratory Dilutions for High Counts
- Unpredictable Weather

Successes

- Additional Data Collected
  - 3 Wet Weather Events
    - All >0.25” in 24 hrs
- Water Depth and Flow Information Useful for Future Comparisons
- Isolating Problem Areas
- Greater Understanding of MST Methods

Next Steps

- Microbial Source Tracking Analysis
- Implementation Report
- Funding Opportunities

Thank You!

- Contact Information

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