

# Characterization of Dissolved Solids in the Ohio River

Technical Committee Meeting

June 12-13, 2012

# Study Objectives

1. Characterize ambient background levels of TDS.
2. Develop site-specific translators to convert conductivity to TDS.
3. Quantify TDS constituent makeup to document temporal and spatial variability.
4. Provide data to support possible development of an Ohio River bromide stream criterion.

# Sampling Design

- Weekly samples collected at 16 sites
- Collection sites located at water intakes
  - Participants identified through the WUAC and PIAC
- Sampling began in December
- Study will run for one-year

# Analysis

## Dissolved Solids Analytes

- |              |             |
|--------------|-------------|
| 1. Sodium    | 6. Chloride |
| 2. Potassium | 7. Sulfate  |
| 3. Magnesium | 8. Bromide  |
| 4. Calcium   | 9. Fluoride |
| 5. Lithium   |             |

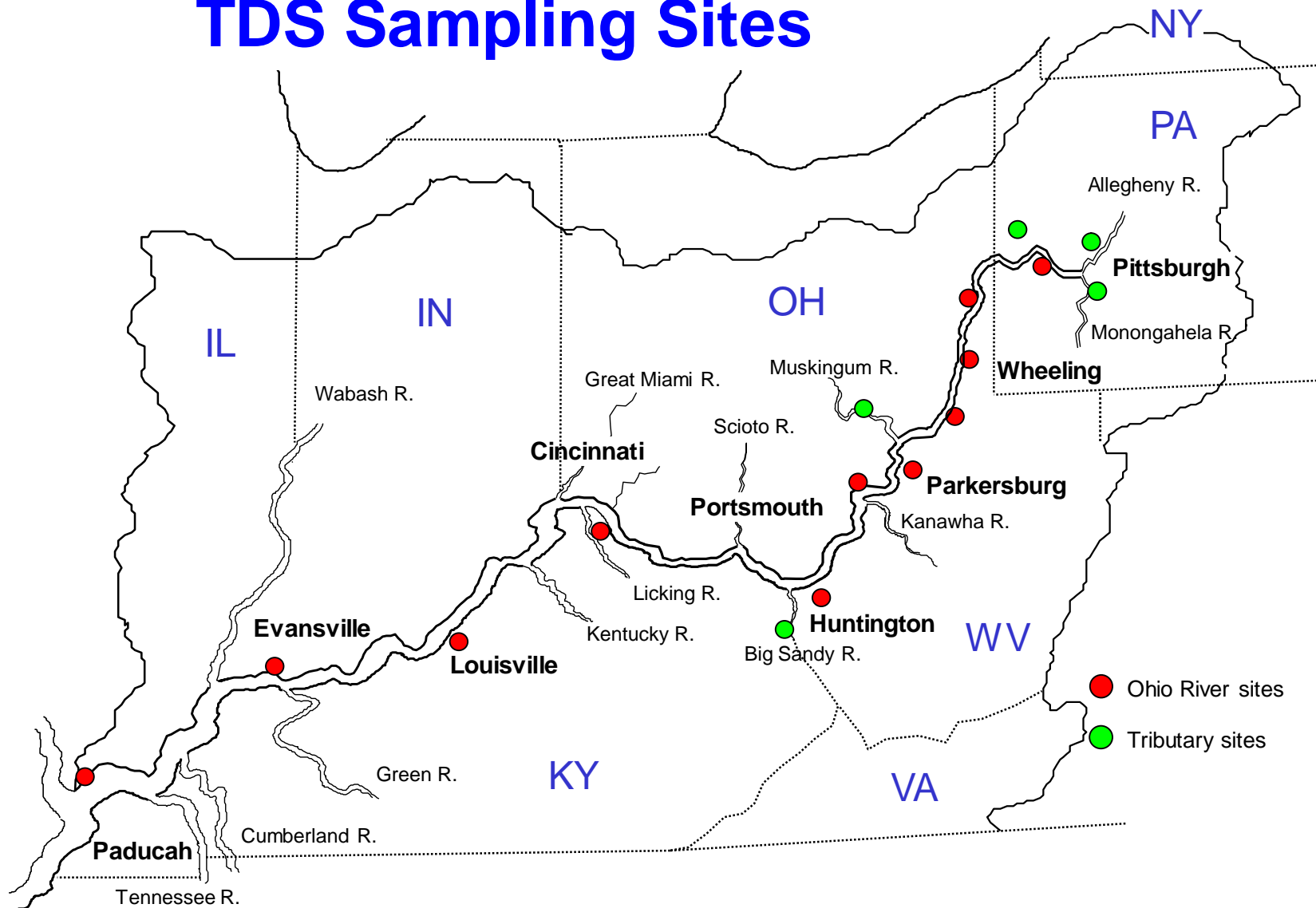
10. Bicarbonate

11. Total Dissolved Solids

## Supplemental Parameters

- pH
- Conductivity
- Temperature
- Stream flow
- Coordinate THM sampling when possible

# TDS Sampling Sites



# Sampling Sites

## Ohio River Locations (Mile)

- Moon Township (12)
- Steubenville (65)
- Wheeling (87)
- Sistersville (137)
- Dupont – Parkersburg (191)
- Cheshire, OH (260)
- Huntington (304)
- Cincinnati (463)
- Louisville (600)
- Evansville (791)
- Cairo (978)

## Tributary Locations (Mile)

- Allegheny (8)
- Monongahela (5)
- Beaver (6)
- Muskingum (30)
- Big Sandy (20)

# Project Budget

- River Users - \$55,000
  - Covers:
    - Shipping
    - Supplies
    - Analysis (TDS and bicarbonate only)
    - Co-op student to assist
    - Staff time
- Source Water Protection (STAG grant)
  - Purchased ion chromatograph



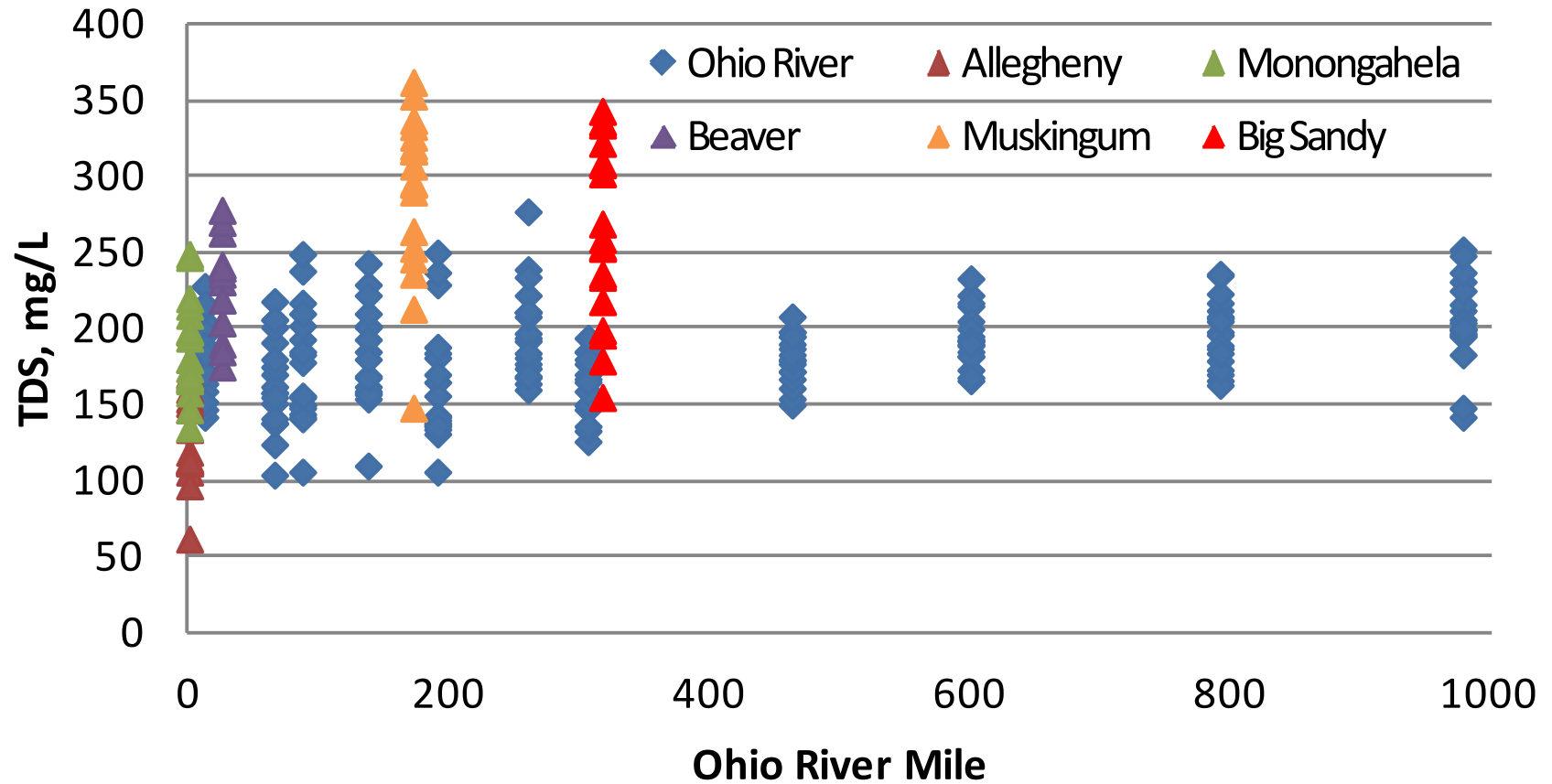
# Summary of TDS Results

- All 16 sites routinely collecting weekly samples
- TDS levels have been fairly low to date
  - Mainstem TDS:
    - Range: 104 – 277 mg/L
    - Mean: 182 mg/L
  - Tributary TDS:
    - Overall Range: 62 – 362 mg/L
    - Tributary means range from 125 mg/L on the Allegheny to 290 mg/L on the Muskingum

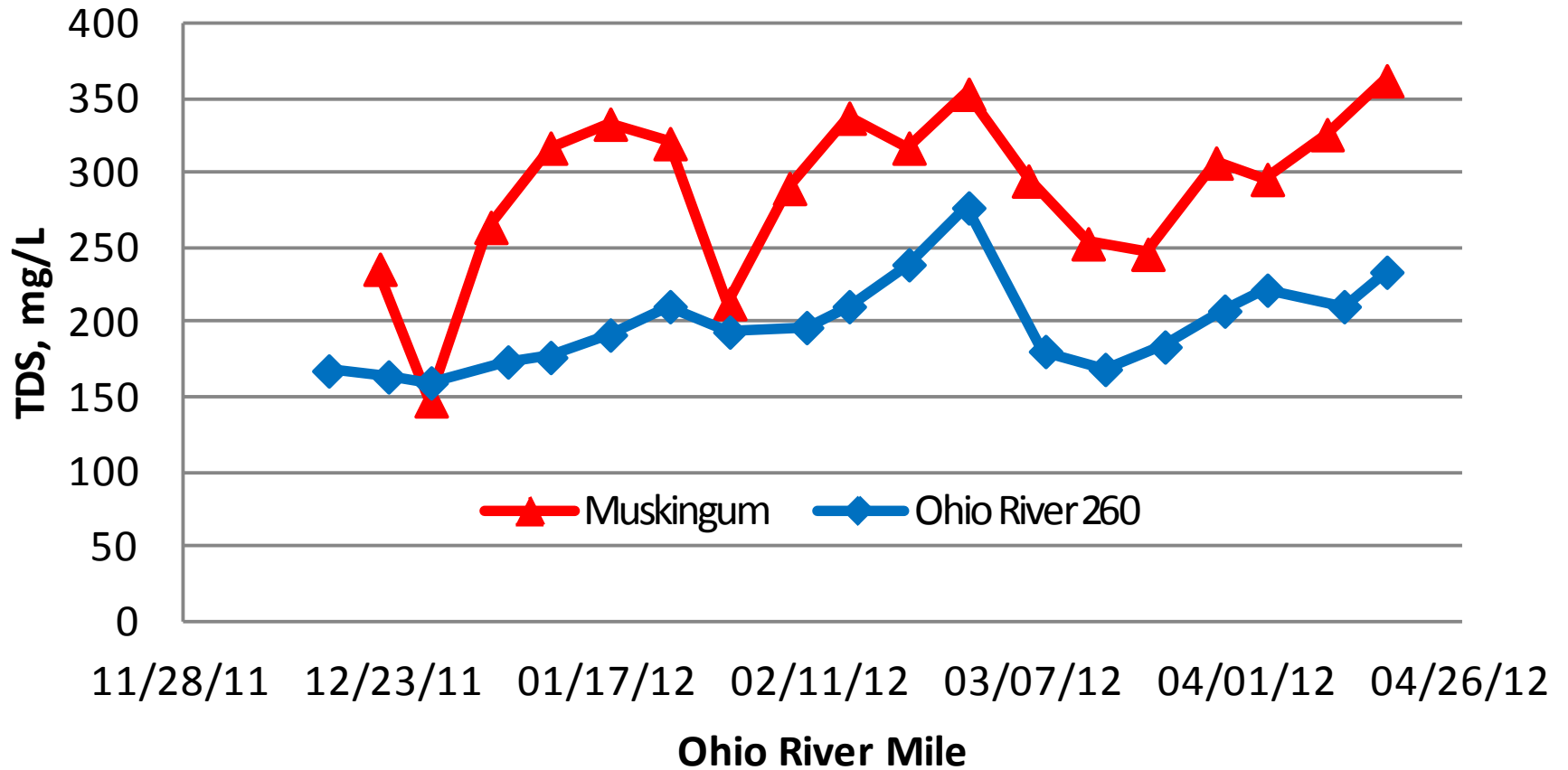


# Total Dissolved Solids

## *Ohio River and Select Tributaries*

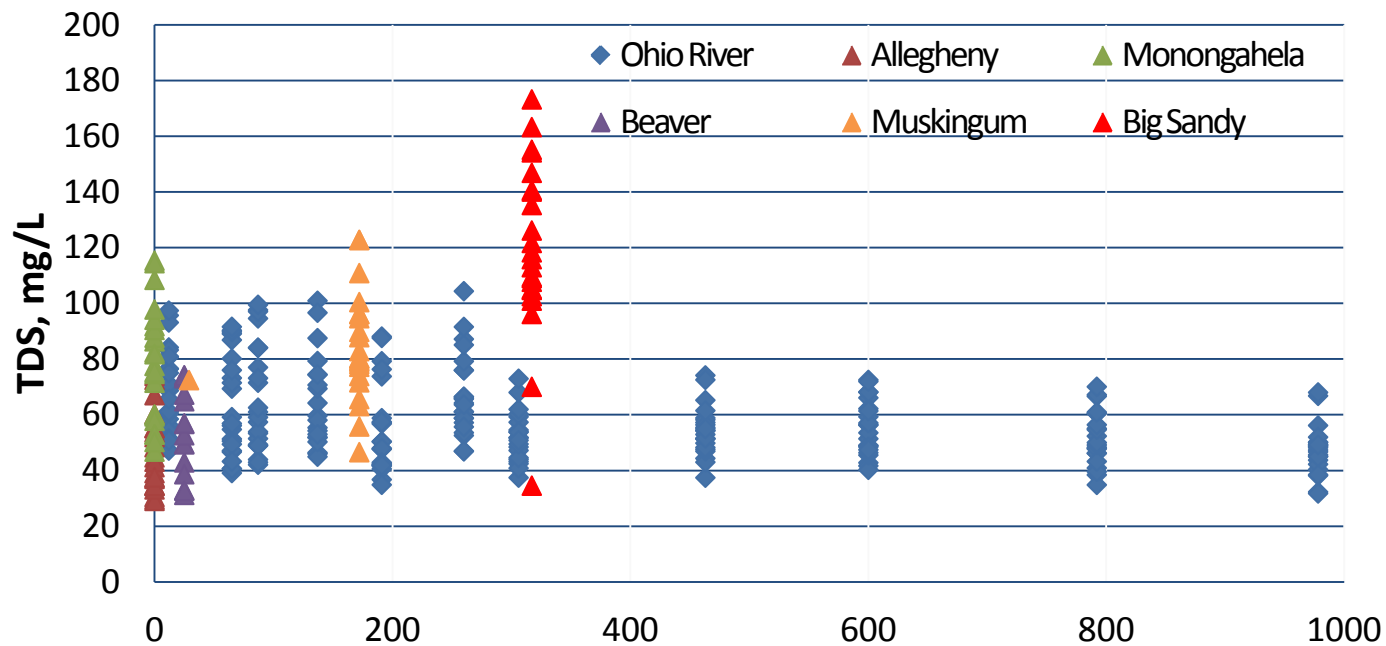


## Total Dissolved Solids *Ohio and Muskingum Rivers*



## Sulfate

### *Ohio River and Select Tributaries*



# Summary of Bromide Results

- Detection limit of 100 ppb at start of project yielded few detections
  - Bromide quantified in only 2 samples over first 11 weeks
- Detection limit improved to 35 ppb
  - Since Week 12 bromide quantified in 68 of 170 samples (40%)
  - Overall median value: Non-detect
  - Median of detections: 81 ppb
  - Mainstem Bromide:
    - Range: <35 – 553 ppb (Ohio River Mile 260)
  - Tributary Bromide:
    - Range: <35 – 1800 ppb (Beaver River)
    - Muskingum River had bromide level of 996 ppb

# Additional Data Collection

- Tributary sampling at 37 locations
- FGD Study – Quarterly samples at four locations

Comments?