

Tittabawassee River, Saginaw River & Bay Site

# Site-Wide Monitoring

Mary P. Logan – U.S. EPA

CAG Meeting September 18, 2017



# Agenda

- Site-Wide Monitoring Plan
- What is being monitored
  - Post-Response Monitoring
  - Contaminant Uptake Into Biota
  - Sediment and Contaminant Monitoring
- Questions

# Site-Wide Monitoring Plan

The 2010 AOC requires a Site-Wide Monitoring Plan

- The Plan is intended to:
  - Assess and document baseline and ongoing conditions
  - Provide a basis for assessing the effectiveness of response actions
- The Plan consolidates monitoring activities
- The Plan evolves and changes over time to reflect changing data quality objectives (DQOs) and information needs

# Site-Wide Monitoring Plan (cont.)

The Plan includes:

- Post-Response Monitoring
- Contaminant Uptake Into Biota
- Sediment and Contaminant Monitoring

# Implementation

- Dow is conducting the monitoring, and any needed maintenance
- Agencies approve plans, provide oversight, and review results
- Results generally found in the Annual Report

# Post-Response Monitoring

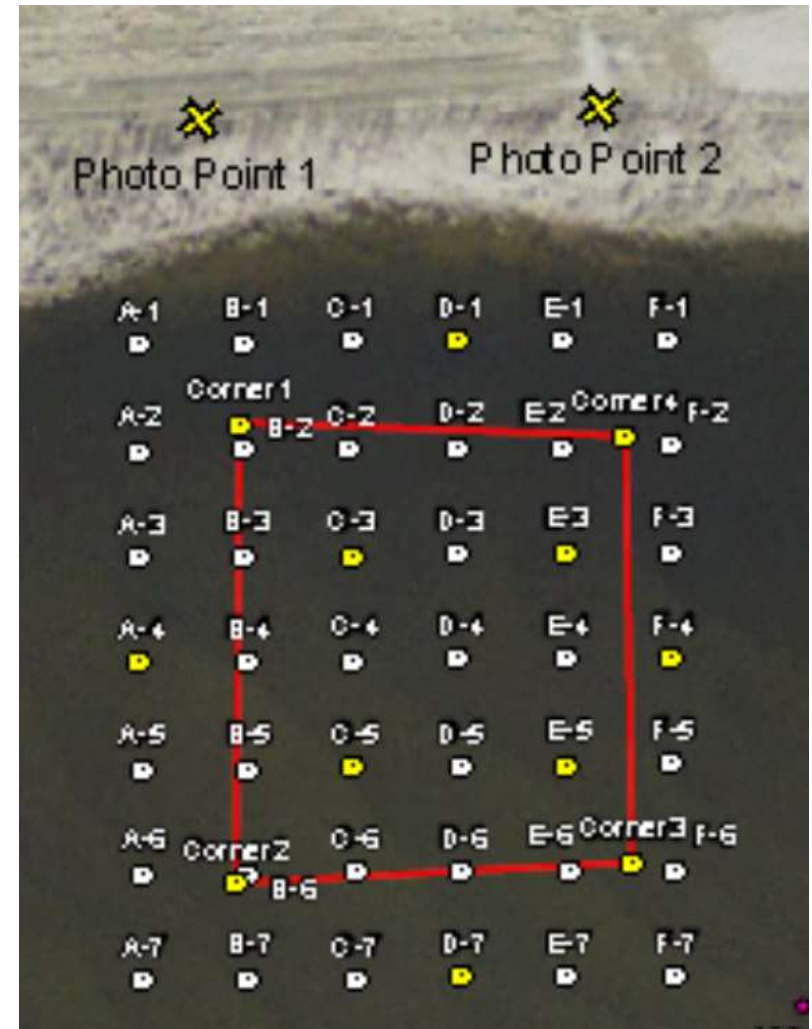
- Response action objectives (RAOs) are established for each cleanup
- The RAOs are either:
  - Short-term RAOs, which are expected to be met shortly after construction; or
  - Long-term RAOs, which may require a longer time until the RAOs are attained and/or that may require response actions in other site areas

# Post-Response Monitoring (cont.)

- Each cleanup has monitoring requirements that get incorporated into the site-wide plan
- Monitoring occurs on a specific schedule and event driven
- Currently monitoring:
  - Stability of sediment caps
  - Integrity of stabilized banks
  - Post-flood conditions at cleaned up properties

# Stability of Sediment Caps

- Elevation surveys
  - Point based
  - Bathymetric
- Visual inspections
- Fill depth at cellular containment system (CCS) caps





# TR Sediment Caps

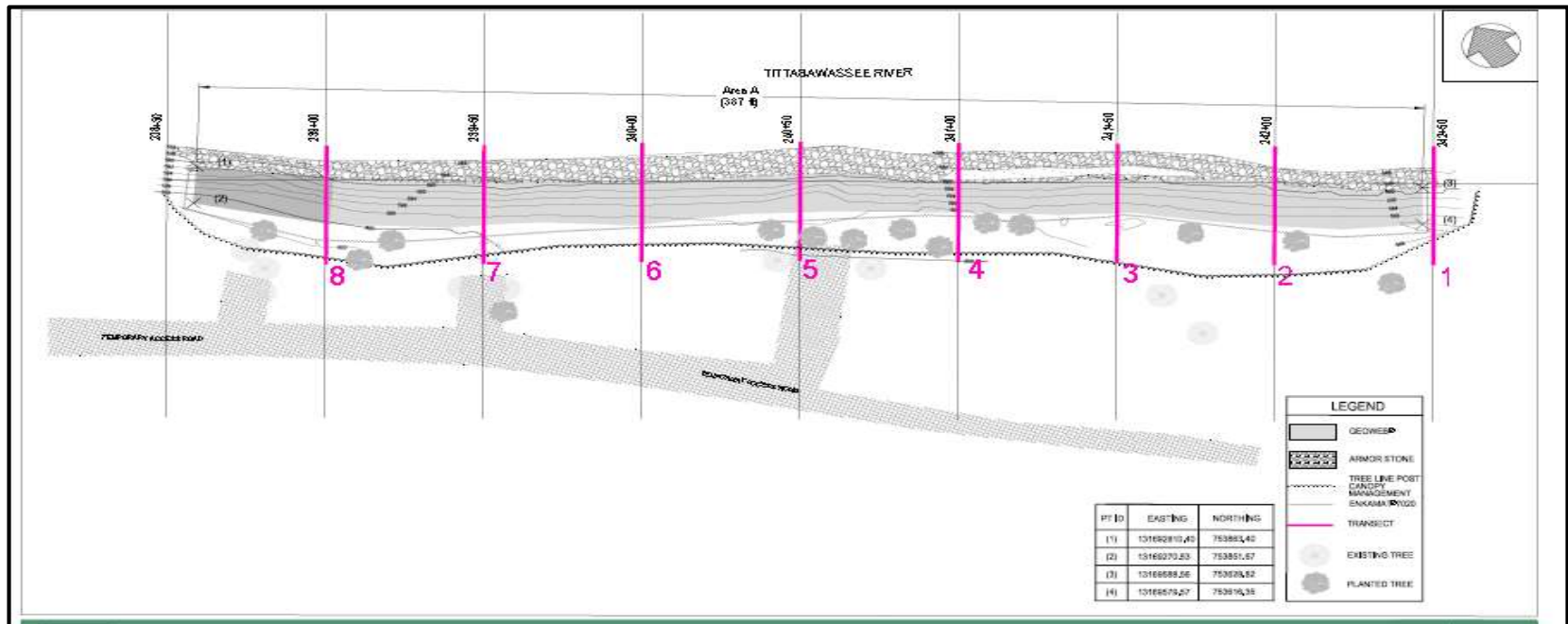
- 14 areas capped from 2008 – 2016
  - 2 armor stone
  - 5 CCS
  - 3 GCL & armor stone
  - 4 caps combined with sediment removal
- 7 caps are in Segment 1 and for non-D/F chemicals
- Size range 0.1 – 1.4 acres; ~ 6.4 acres total

# Integrity of Stabilized Banks

- Initial spring inspection
- Monitor 2X/year – leaf off/leaf on
  - Undercutting
  - Exposed roots
  - Presence of at risk trees
  - Vegetation cover
  - Installed stability features
  - Local scour
  - Light availability
- Also monitor currently stable banks with high TEQ

# Integrity of Stabilized Banks (cont.)

- SBMAs 2-1 thru 2-8; 3-1 thru 3-6; and 3-8 thru 3-10
- Thru 2016, about 2.6 miles of stabilized banks
- Monitoring on transects 50 feet apart



# Post-Flood Conditions

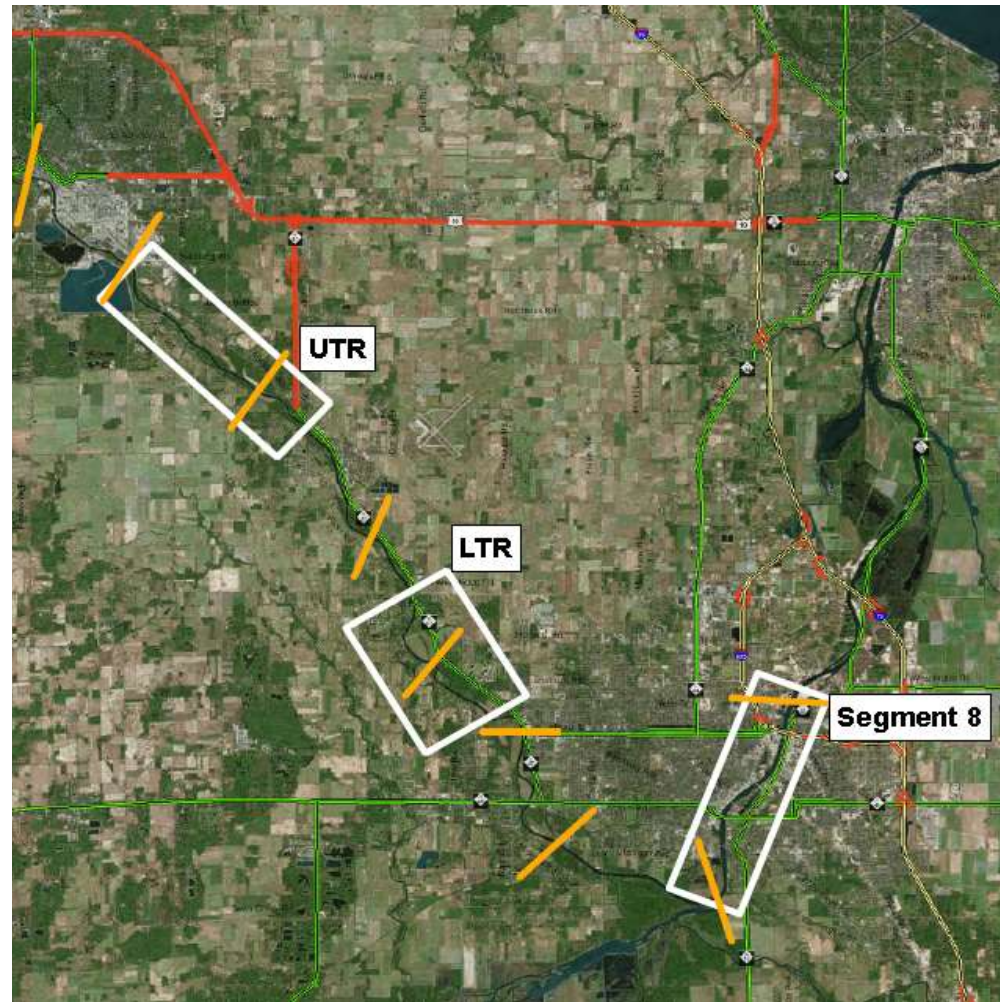
- Monitoring at Riverside and West Michigan Park
- Riverside
  - Constructed 2008
  - 5 sampling events
  - Area average 29 – 142 ppt (2016 was 43 ppt)
- West Michigan Park
  - Constructed 2009
  - 8 sampling events
  - Park average less than 5 – 65 ppt

# Contaminant Uptake Into Biota

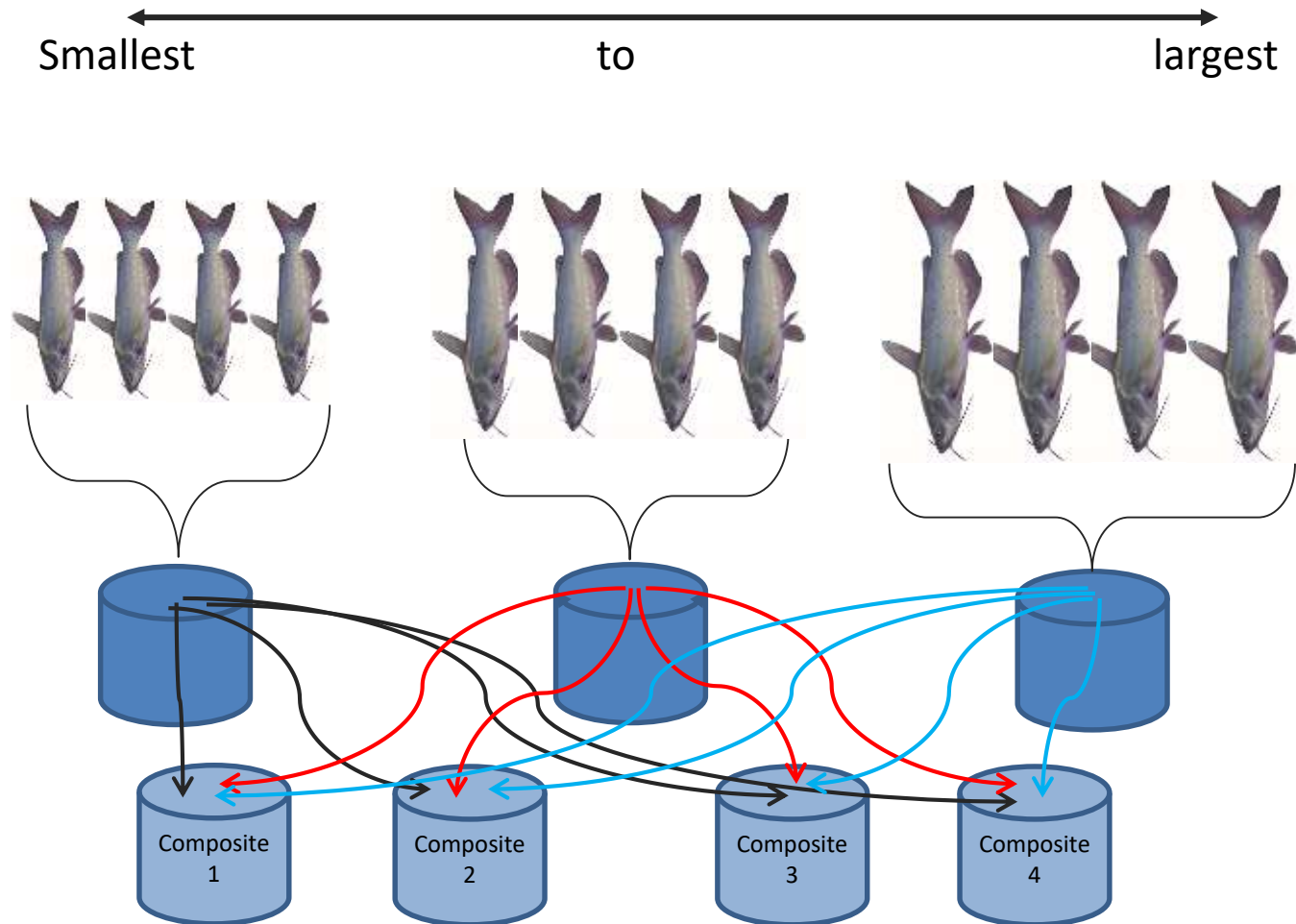
- Currently monitoring fish
  - Three species: channel catfish, smallmouth bass, walleye
- Fish Monitoring Plan (FMP) objectives
  - Measure chemical residues in fish, representing different trophic groups, with consideration of species that anglers preferentially consume;
  - Monitor fish concentrations over time; and
  - Provide for the collection of a manageable amount of data incorporating appropriate sample sizes and intervals

# Fish Monitoring Plan

- Channel catfish
  - Every 2 years
  - Three locations
  - Four composites per location
- Smallmouth bass
  - Every 4 years
  - Two locations
  - Three composites per location
- Walleye
  - Every 4 years
  - One location
  - Three composites



# Catfish Compositing Approach



Randomly select and place in each bucket

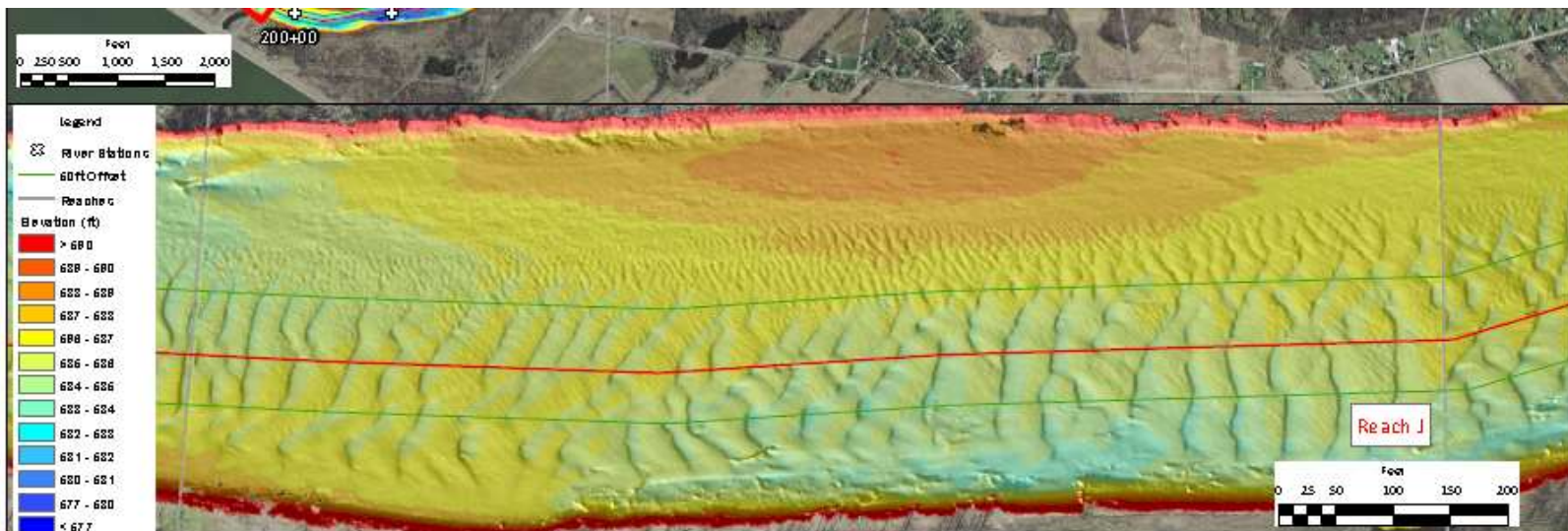
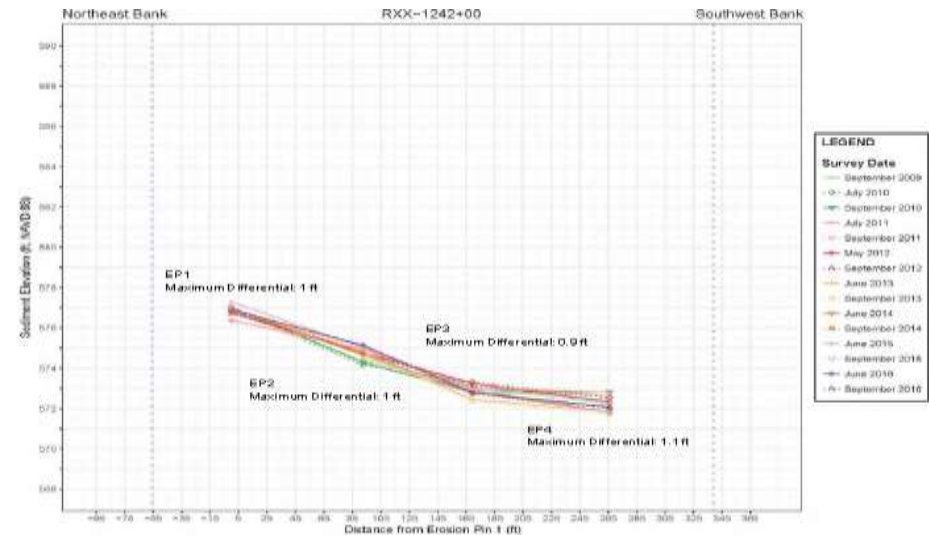
# Fish Tissue Results

- The results will be compared to a robust data set from 2007 – 2010
- FMP data
  - Channel catfish
    - 2014 → 11 samples ranging 14.4 – 28.2; 1 outlier sample at 136 ppt D/F TEQ
    - 2016 → 12 samples ranging 5.5 – 17.3 ppt D/F TEQ
  - Smallmouth bass
    - 2014 → 6 samples ranging 1.5 – 3.6 ppt D/F TEQ
  - Walleye
    - 2014 → 3 samples ranging 2.0 – 2.8 ppt D/F TEQ



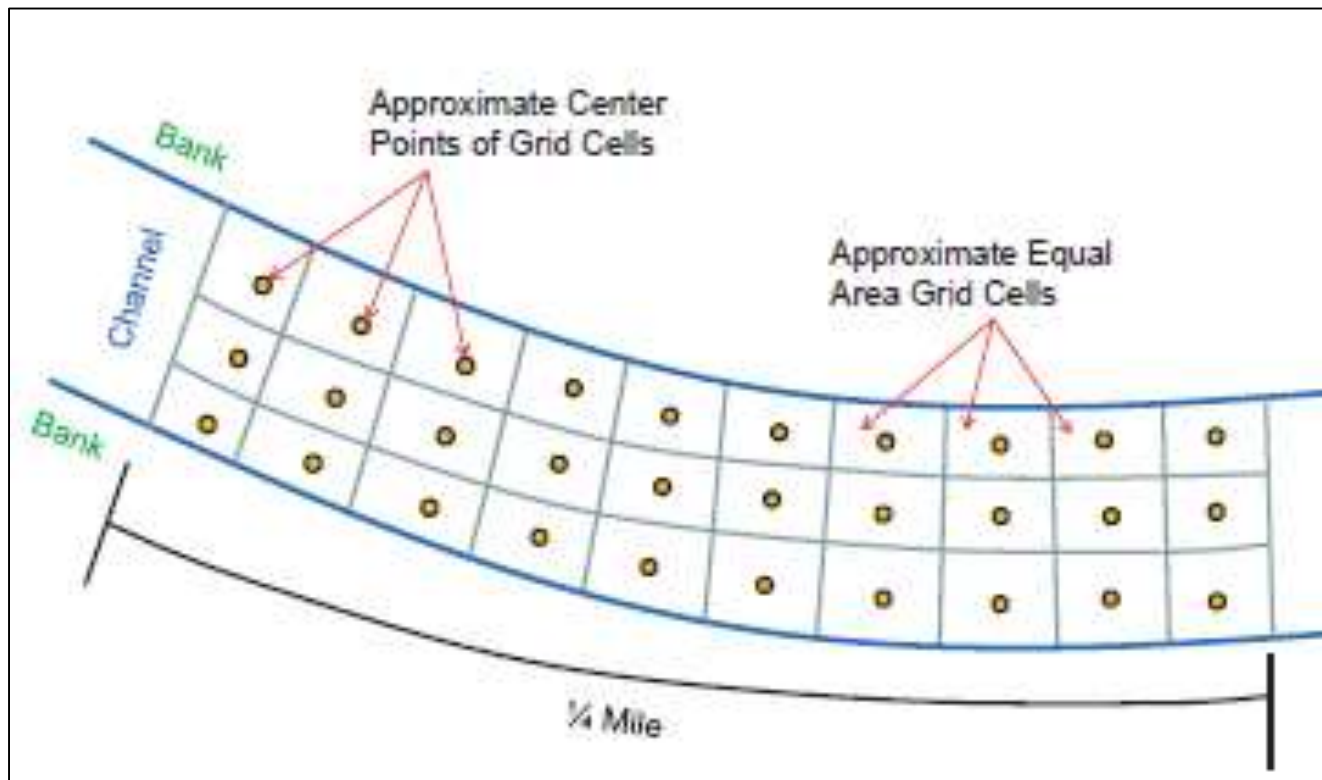
# Sediment and Contaminant Monitoring

- Sediment bed stability
  - Bathymetric surveys
  - Bed pin monitoring
- Bank stability
  - Transects
  - Bank pins



# Sediment and Contaminant Monitoring (cont.)

- Surface sediment concentrations
  - ¼ mile composites; 30 increments per sample
  - Repeated over time



# ¼ Mile Composite Results

Segment	Length	2012/14	2015	Spring 2016	Fall 2016
2	4.1	94	120	49.6	64.6
3	4.2	302	216	251	111
4	3.4	661	266	144	226
5	2.7	386	431	436	123
6	3.0	670	323	300	210
7	3.7	258	209	274	234
Arithmetic average		395	261	242	161

**QUESTIONS?**