MeHg BAF Final Draft Report

Two Additional MeHg BAF Studies Underway

FY'16 Supplemental Plan Tributary THg/MeHg Monitoring

208th Technical Committee Mtg.
Madison, IN
June 16-17, 2015

MeHg BAF Draft Review/Comments

- Reviewers: 2 USGS, 1 USEPA, 1 state agency (IDEM), PIAC, and Axial Corp.
- Report has ~4 additional pages of text needed in response to comments
  - All reviewers will find their comments directly addressed in the final draft
  - Specific comments by Axial, PIAC, and IDEM which did not result in changes are addressed in a separate document (available)

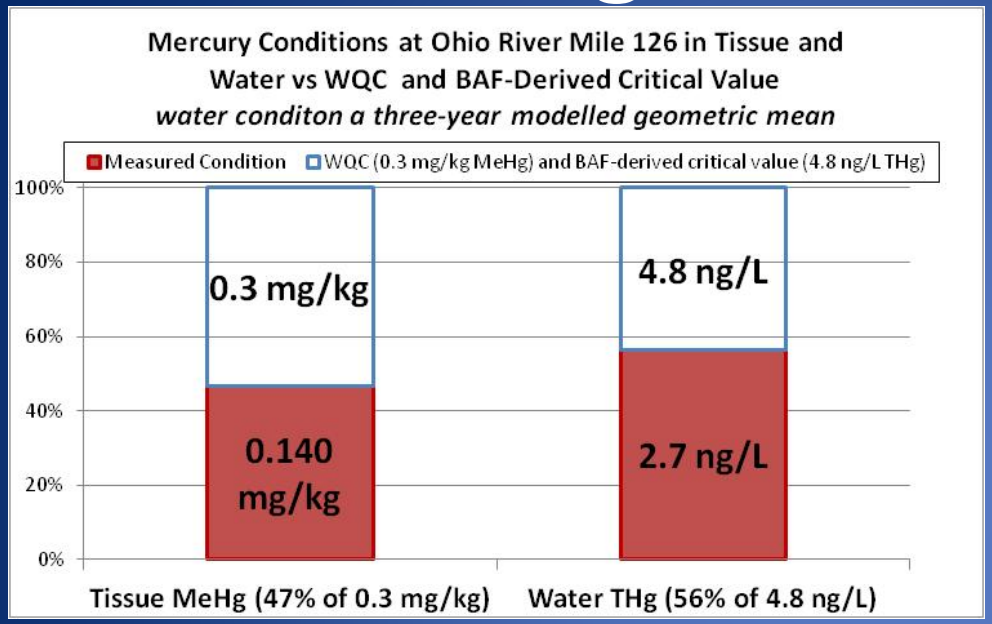
Calculating Protective WQC from BAF

$$BAF = \frac{C_{TMeHg}}{C_{WThg}} \Rightarrow C_{WTHg} = \frac{0.3mg/kg_{TMeHg}}{BAF}$$

BAF	BAF value	Critical Value (ng/L MeHg)	Translator (1.3%x49%)	Critical Value (ng/L THg)
ORSANCO TL3 BAF	7.4E+06	0.04	0.0064	6.3
ORSANCO TL4 BAF	1.3E+07	0.02	0.0064	3.5
Draft Nat. TL3 BAF	6.8E+05	0.44	0.014	31.5
Draft Nat. TL4 BAF	2.7E+06	0.11	0.014	7.9
Draft Nat Average BAF	1.7E+06	0.18	0.014	12.7
ORSANCO Average BAF	1.0E+07	0.03	0.0064	4.5
Consumption Weighted (CW) Average				
Draft Nat CW BAF	1.2E+06	0.25	0.014	17.6
Draft Nat. BAF TL3&4 On	1.5E+06	0.20	0.0140	14.1
ORSANCO CW BAF	9.9E+06	0.03	0.0064	4.8

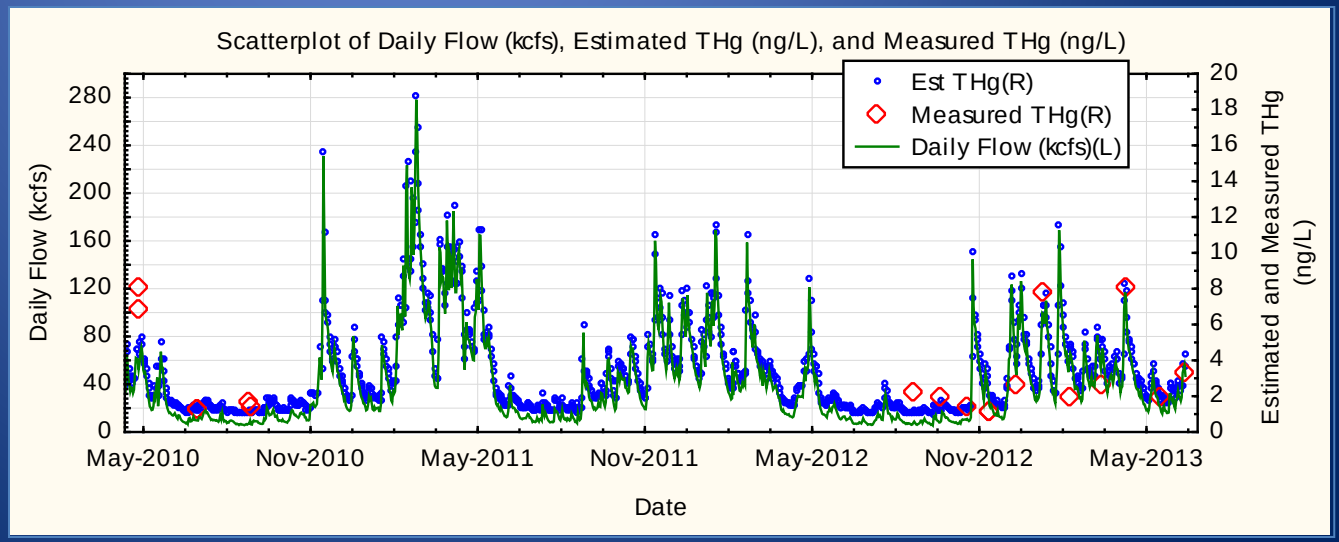
- Consumption weighting of TL3 and TL4 BAFs yields the necessary THg geometric mean (GM) to protect against fish tissue > 0.3mg/kg 4.8 ng/L

Examining Ambient Conditions



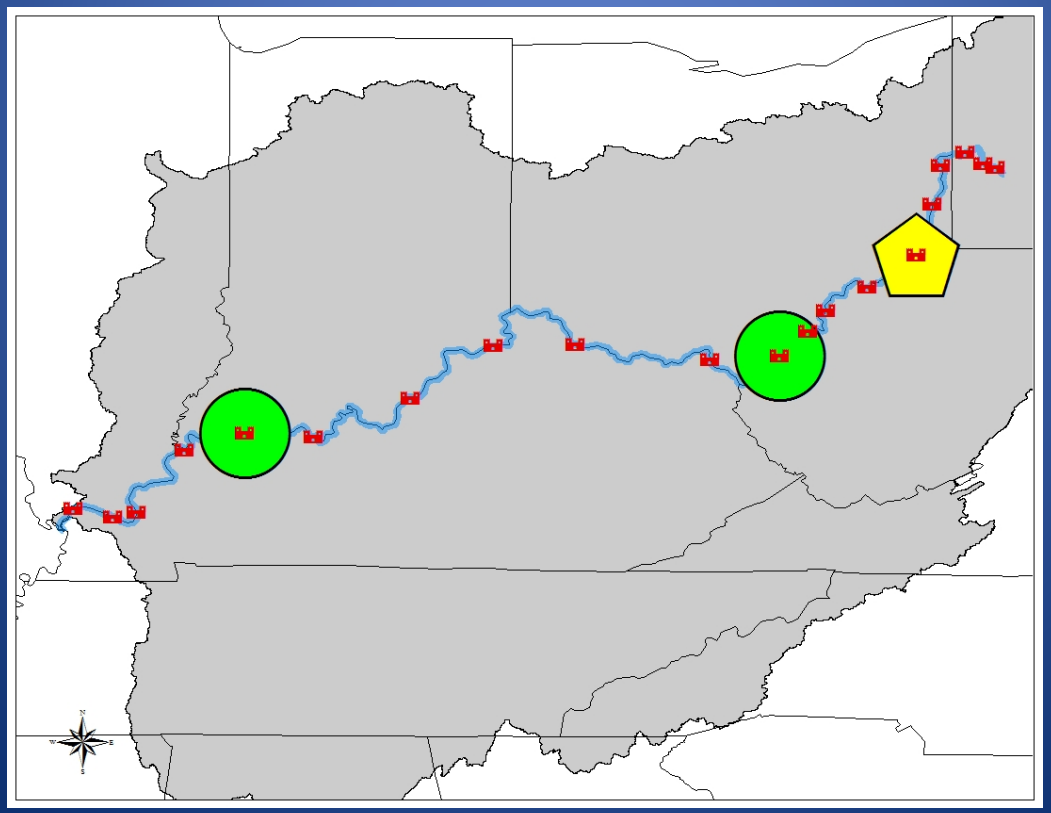
- Tissue average ~50% (0.14/0.3mg/kg) of criterion
- Water average ~50% (2.7/4.8 ng/L) of "critical value"

- Daily estimated THg concentrations:



Current BAF Projects

- Two additional MeHg BAFs under development
  - Below R.C. Byrd L&D, Ohio River Mile 282
  - Below Newburgh L&D, Ohio River Mile 782



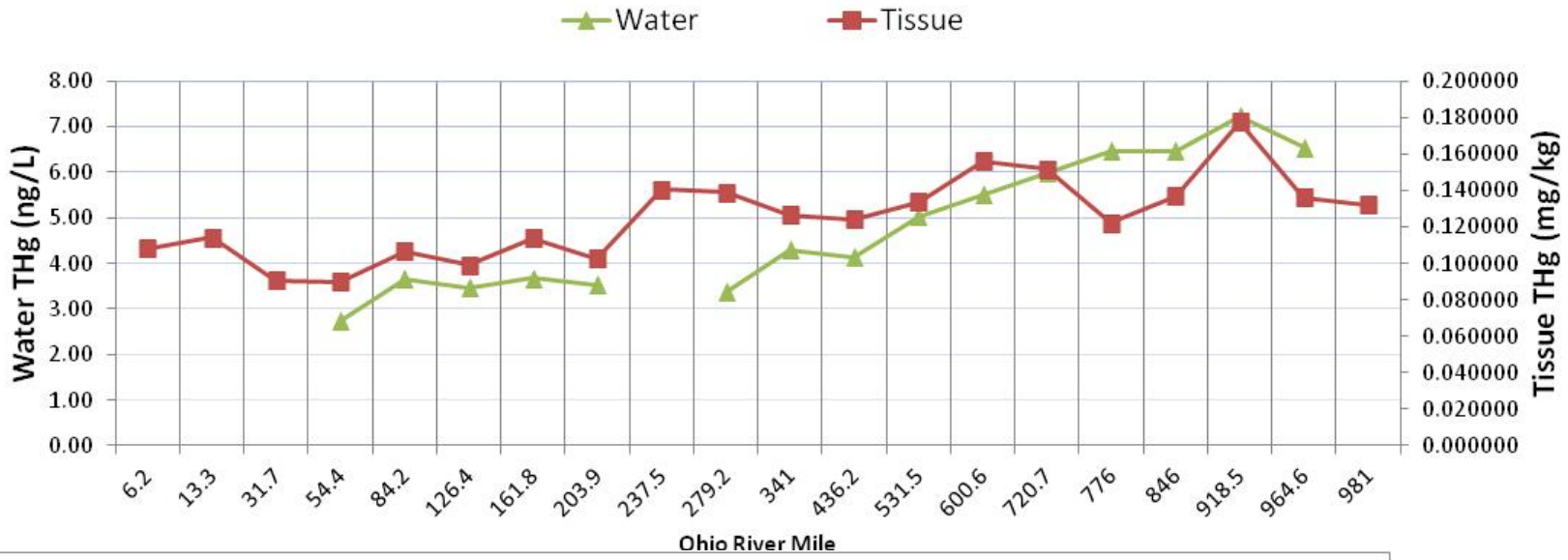
Site Selection Rationale: Expected BAF Results

$$BAF = \frac{C_T}{C_W}$$

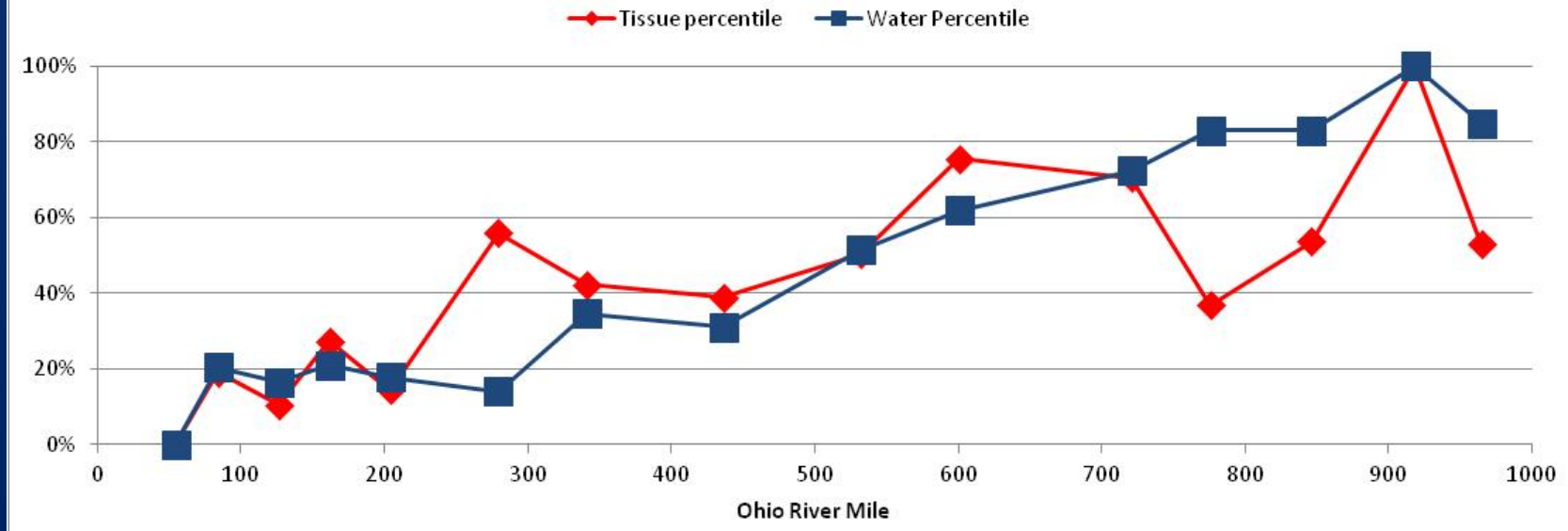
- High Tissue/Low Water Conc. =
  - High BAF/Lower Water "Critical Value"

- The water "Critical Value" is calculated from the BAF to determine background water concentrations that create expected tissue violations

Geometric Mean THg Concentrations in Water '01-'13 and Tissue '95-'13 by Pool

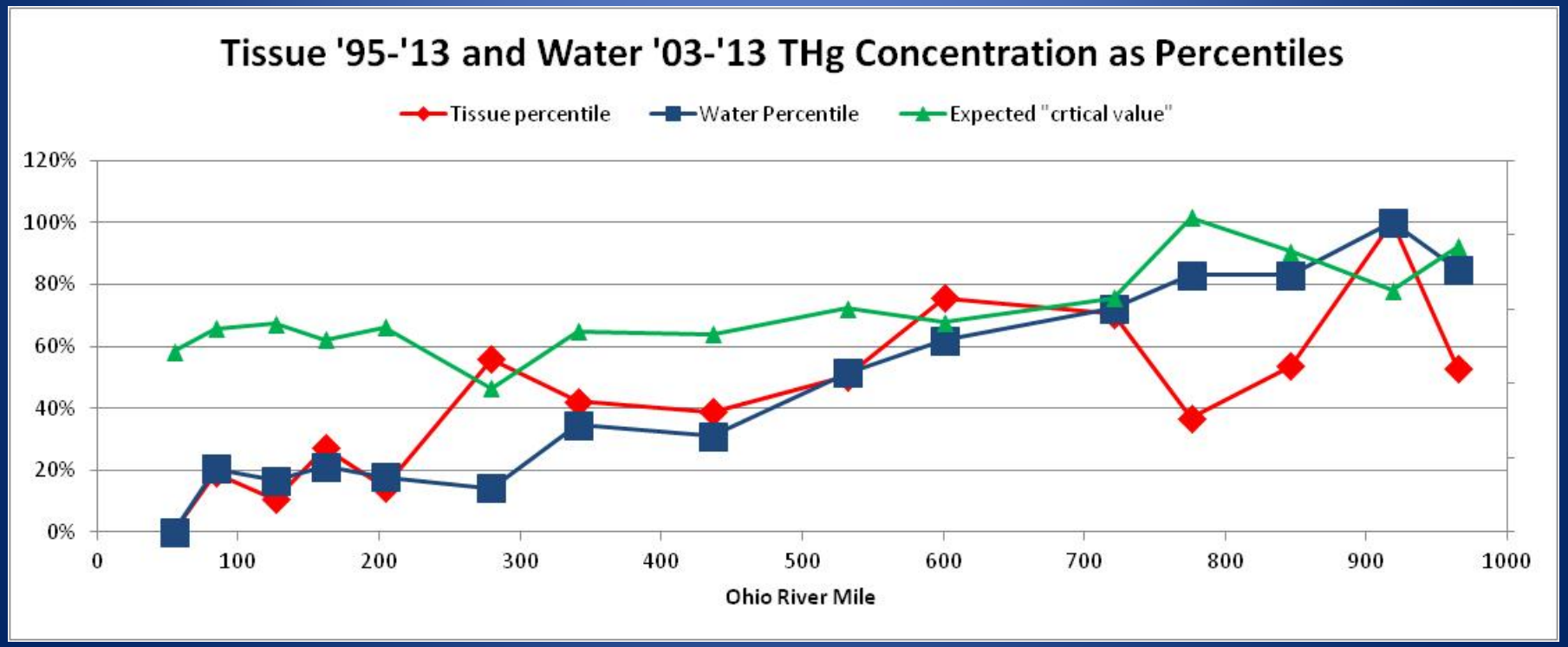


Tissue '95-'13 and Water '03-'13 THg Concentration as Percentiles



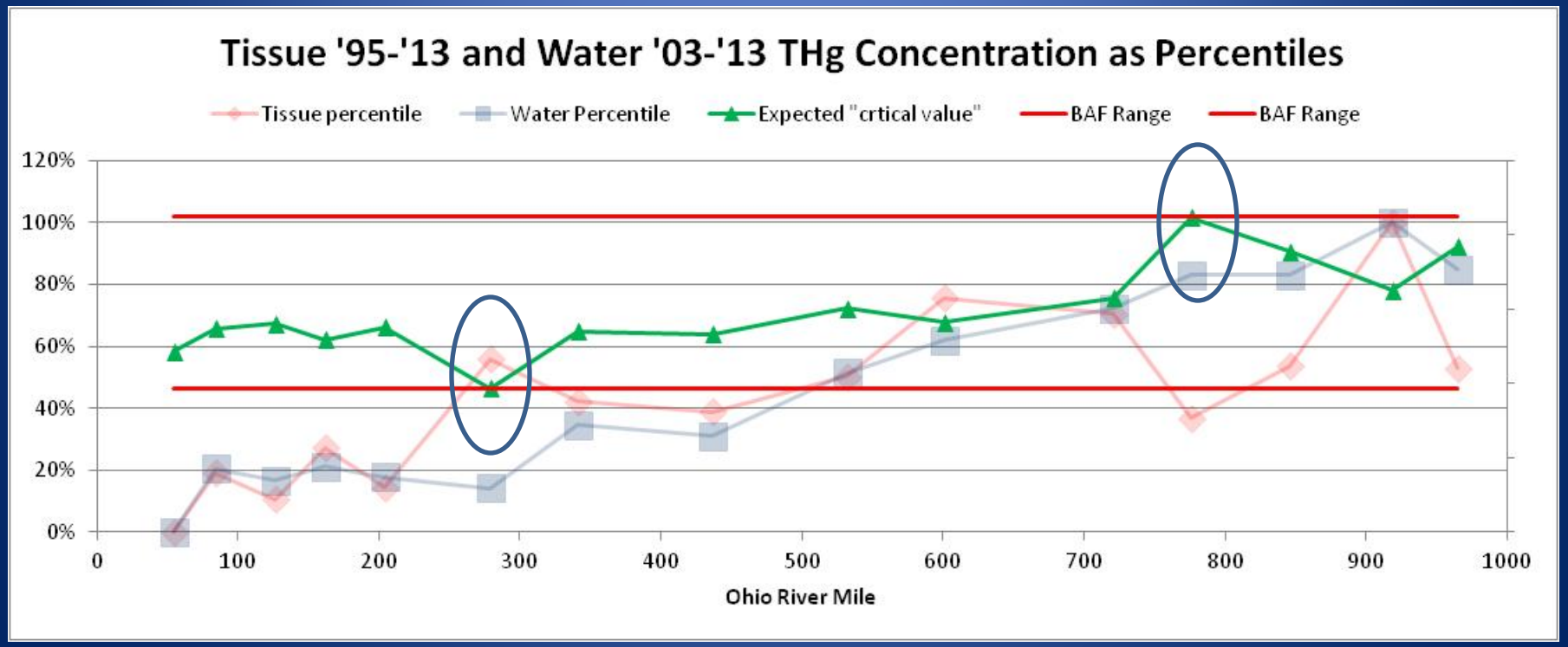
Site Selection Rationale: Plotted Expected BAF/Critical Values

Predict expected BAF/"critical values" from Routine THg Monitoring and historic tissue



Site Selection Rationale: Plotted Expected BAF/Critical Values

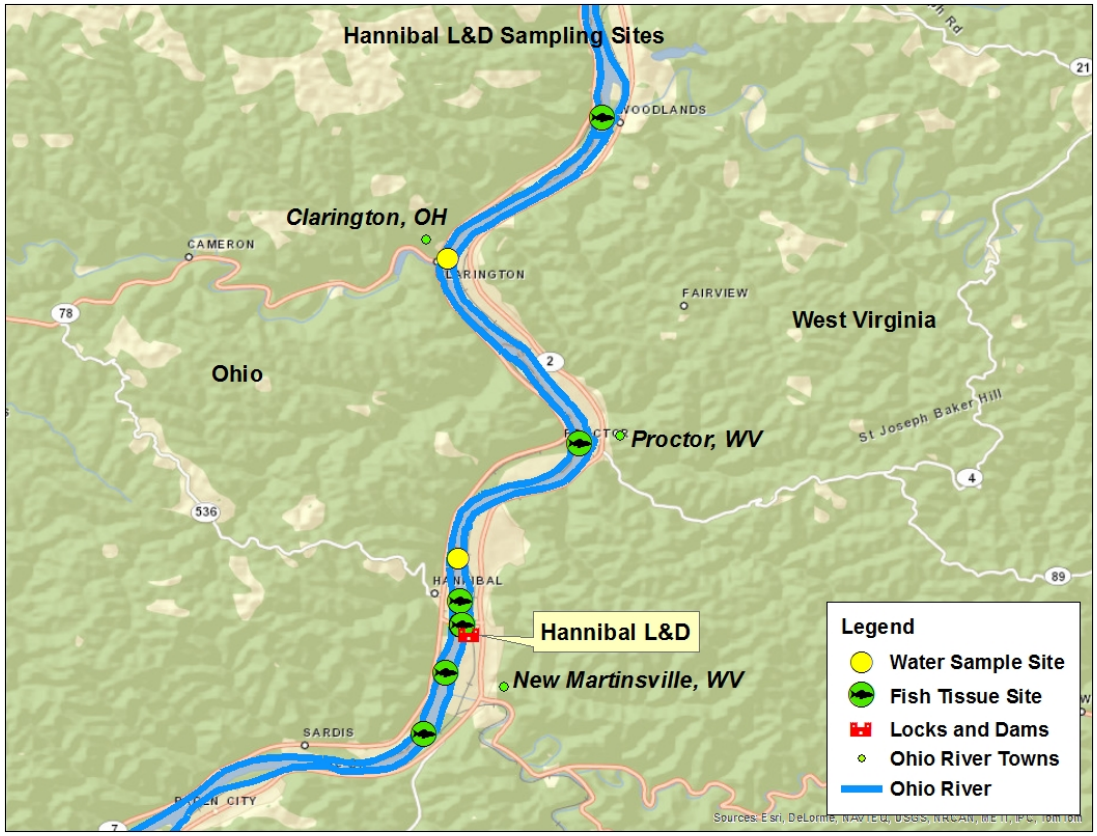
- R.C. Byrd – Lowest expected critical value
- Newburgh – Highest expected critical value



BAF Sampling Design Differences

- Sampling below the dams
  - Most fish are collected in the tail waters

At Newburgh ALCOA and VECTREN are immediately upstream of dam

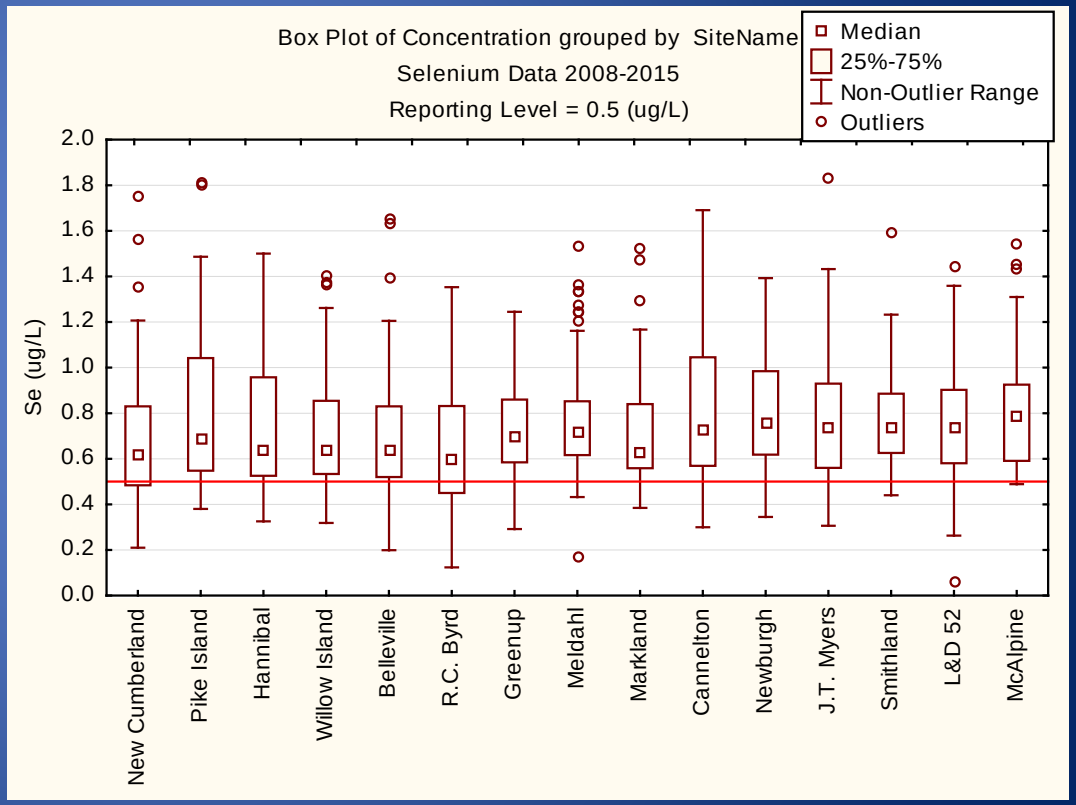


BAF Sampling Design Differences

- BAF QAPP Now Includes:
  - Species selected for the tissue composites are commonly encountered and consumed by recreational fisherman.
  - Sizes of individual fish chosen for the three-fish composite if more than three of the selected species are available will be the three individuals closest to the median size of all the individuals collected but must still vary no more than 25% in length as specified by the SOP for tissue collection.
  - The number of composites of any species collected is 2; and targeted to the species collected in the first of the two collection periods.

Selenium Added

- Additional analysis for Selenium
  - Possible explanation for Newburgh low Hg accumulation
  - Information regarding upcoming USEPA Se tissue criterion



ORSANCO Selenium Data (ug/L) 2008-2015

Continuous Monitoring

- Continuous monitoring with telemetry will be installed at Newburgh
  - Temp, DO, pH, SpCond, Turb, Chlorophyll-A
  - New measurement:

    CDOM – Colored Dissolved Organic Matter

    CDOM has been used to inform models that estimate daily mercury concentrations

Continuous measurements made possible by the close of the Wabash Monitoring Project

BAF Project Schedule

- First water samples collected June 2015, final samples will be collected in May 2016
- Tissue will be collected in the Fall of 2015 and the spring of 2016

FY'16 Supplemental Funds
THg/MeHg Sampling on Major Tributaries

- Total and methyl mercury samples to be collected monthly for one year on 14 major tributaries
  - 14 tributaries of ORSANCO's Bimonthly Sampling Program
  - 81% of total basin, 90% of "major" (>1,000mi^2) trib drainage
- Project Goals
  - Develop flow-based THg/MeHg models to estimate annual loads from the tributaries
  - Estimate percent methyl mercury characteristics of Ohio River tributaries

Tributary Monitoring Sites