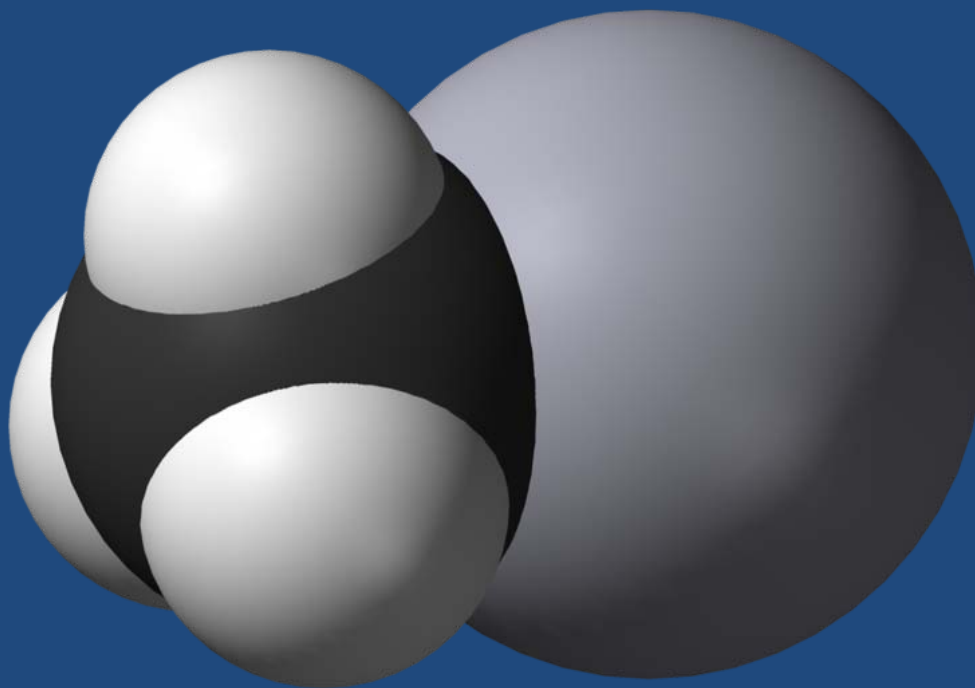


Methylmercury Cooperative Study by the U.S. Geological Survey and ORSANCO



Methylmercury Investigation Goals

Primary Goals

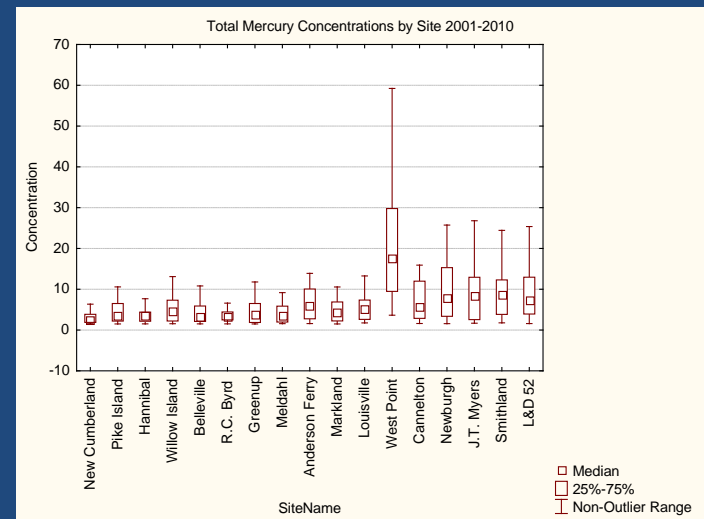
- Characterization of bioavailable methylmercury versus total mercury in water
- Look at relationships between MeHg in water vs. fish tissue
- Evaluate ORSANCO Clean Metals methods/locations for future methylmercury studies

Secondary Goals

- Provide information to assist with potential future variance requests.
- Transfer of knowledge: ORSANCO learns USGS Equal Discharge Increment (EDI) sampling methods

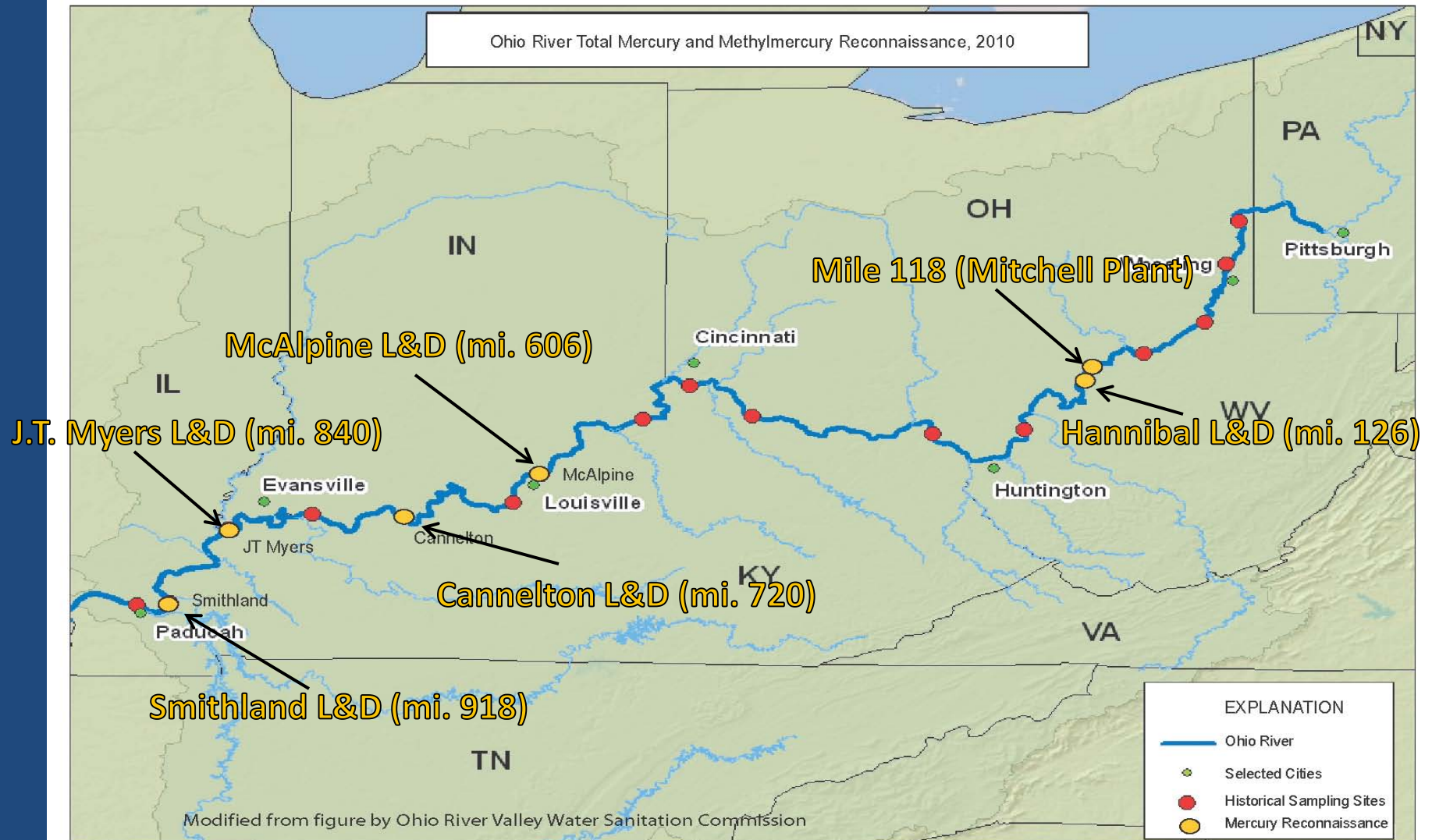
Monitoring Plan

- Six Ohio River Locations
 - Ohio River Mile 118 (AEP Mitchell Plant/PPG Natrium)
 - Mile 126 Hannibal L&D
 - Mile 606 McAlpine L&D
 - Mile 720 Cannelton L&D
 - Mile 840 J.T. Myers L&D
 - Mile 918 Smithland L&D



- 3 Events per site: May, July, and September 2010

Methylmercury Study Locations



Sites at Mile 118 and 126



Analytical Parameters

Mercury

- Dissolved total Hg
- Particulate total Hg
- Dissolved methyl Hg
- Particulate methyl Hg

Supplemental Constituents

- Dissolved sulfate
- Total particulate nitrogen
- Chlorophyll-a
- Suspended sediment
- Dissolved organic carbon
- Total particulate carbon
- Particulate organic carbon
- Particulate inorganic carbon

Sampling Methods

- USGS Equal Discharge Increment (EDI) Isokinetic Sampling



Discrete Depth Sampling

- Photodegradation of methymercury is a concern at the surface
 - standard ORSANCO Bimonthly/Clean Metals grab samples are collected at ~2ft depth
- During July events with turbidity <10 (ntu) ORSANCO grab samples collected in pairs at mid-depth and surface





C.L.A.M. Demonstration

- C.L.A.M. – Continuous Low-Level Aquatic Monitoring device



- Currently developing methods for inorganics
- They will quantify ambient Hg and MeHg for 24-hr sampling periods before and after EDI and ORSANCO Grab samples



Future Events

- ORSANCO will continue to collect grab samples for methylmercury analysis for the remainder of the year at 3 locations.
 - Build dataset of total/methyl ratios
 - Complete a calendar year/different flow conditions

Locations	ORSANCO Bimonthly Sampling Program Event Months					
	May '10	July '10	Sept '10	Nov '10	Jan '11	Mar '11
Mile 118	EDI	EDI	EDI			
Mile 126	EDI, U/F (2)	EDI, U/F, U/F ^{MID} (4)	EDI, U/F (2)	U/F (2)	U/F (2)	U/F (2)
Mile 606	EDI	EDI	EDI			
Mile 720	EDI, U/F (2)	EDI, U/F, U/F ^{MID} (4)	EDI, U/F (2)	U/F (2)	U/F (2)	U/F (2)
Mile 840	EDI, U/F (2)	EDI, U/F (2)	EDI, U/F (2)			
Mile 918	EDI, U/F (2)	EDI, U/F, U/F ^{MID} (4)	EDI, U/F (2)	U/F (2)	U/F (2)	U/F (2)

EDI - Collection of composite sample using USGS Equal Discharge Increment methods
 U/F - 2 MeHg analyses: Unfiltered and Filtered
 U/F^{MID} - 2 MeHg analysis: Mid-depth Unfiltered and Filtered