Ohio River Basin Strategic Plan
PAS Project

ORSANCO Roundtable Forum

February 12, 2020

Today’s Agenda

1) Commission Authorization to Enter into USACE Agreement
2) Where is the Ohio River Basin?
3) ORSANCO’s Role in the Project
4) Project Goal Areas
5) Overview of PAS Work to Date
6) Abundant Clean Water Goal
7) Next Steps
8) Discussion

Commission Authorization to Enter into USACE Agreement

- February 14, 2019 ORSANCO Commission Meeting: Commission approved ORSANCO entering into PAS Agreement with the USACE
  - USACE Planning Assistance to States program
  - Collaborative, multi-state effort to create a “blueprint” for the development of a strategic plan for the basin
  - Modeled after the Great Lakes Restoration Initiative
  - Funding includes $200,000 from the USACE, $150,000 from the Kentucky Division of Water and $50,000 in Work-In-Kind funding from ORSANCO

Where is the Ohio River Basin?

Current USEPA Geographic Programs and Line Item Funding

Great Lakes Restoration Initiative	- $300 M
Chesapeake Bay	- $ 73 M
Puget Sound	- $ 28 M
Gulf of Mexico	- $ 12.542 M
Long Island Sound	- $ 12 M
Lake Champlain	- $ 8.399 M
Southern New England Estuaries	- $ 5 M
South Florida	- $ 1.704 M
Lake Pontchartrain	- $ 0.948 M

ORSANCO's Role in the Project

- ORSANCO is the Fiscal Sponsor for the Ohio River Basin Alliance
- ORSANCO is the Non-Federal Sponsor for this USACE PAS Project
- ORSANCO is providing $50,000 of Work-In-Kind funding for the Project
- ORSANCO is performing the PAS Project Financial Administration for the Project
- Dr. Harry Stone is providing valuable assistance by assisting with the Project Management for the PAS Project
- ORSANCO is the lead agency for developing the Plan's Abundant Clean Water Goal

Project Goal Areas

- Nation’s Most Valuable River Transportation and Commerce Corridor
- Healthy, Productive Ecosystems
- Abundant Clean Water
- World Class Nature-based Recreation Opportunities
- Reliable Flood Control and Risk Reduction
- Knowledge and Education to Inform Decisions

Overview of PAS Work to Date

- USACE held a Project Stakeholder Kick-Off Webinar on June 19, 2019
- USACE held a Series of Project Goal Specific Webinars between August 1, 2019 and August 21, 2019 to secure input on the Plan
- ORBA and USACE held a Ohio River Basin Summit between October 2-4, 2019 to secure input on PAS Project Goals
- USACE, ORBA and ORSANCO convened three Workshops in Pittsburgh, Cincinnati and Nashville between January 27-31, 2020
- USACE, ORBA and ORSANCO are working on draft Plan to distribute to Stakeholders for comment

Abundant Clean Water Goal

- This goal focuses on water quality and water quantity
- The term water resources includes water quality and water quantity
- ORSANCO is taking the lead for developing the Objectives and Strategic Actions associated with this Goal
- An objective is a specific, measurable, actionable, realistic, and time-bound condition that must be attained in order to accomplish a particular goal
- A strategic action is a specific action that supports an objective

Abundant Clean Water Goal

Objectives

- Objective 1: Organizations and states, enabled by the Clean Water Act will work collaboratively to demonstrate measurable improvements for the number of water bodies meeting the Clean Water Act's drinkable, swimmable and fishable water quality uses by 2030 as compared to 2020.
- Objective 2 : By 2025, identify and develop strategies to support existing Ohio River Basin Source Water Protection Programs and utilize best practices from these strategies to build collaborative programs to protect Ohio River Basin drinking and industrial, surface and ground water supplies that do not currently have robust, Source Water Protection Programs.
- Objective 3: By 2025, identify priority waters with high incidences of Harmful Algal Blooms (HABs) and convene stakeholders to prepare an Ohio River Basin Wide Strategy to help manage (HABs) in the Basin that will result in measurable reduction in HAB occurrence by 2030 as compared to 2020 priority areas.
- Objective 4: By 2025, develop a Basin-wide inventory of Acid Mine/Rock Drainage sites and Coal Ash Ponds prioritized based upon risk of failure and develop a reclamation strategy to address inventoried, high priority locations.
- Objective 5: By 2025, the Ohio River Valley Water Sanitation Commission (ORSANCO) will convene water quantity managers Basin wide to establish common goals directed at identifying Basin-wide problems affecting water quantity management and recommend strategies to address these goals.
- Objective 6: By 2025, develop an Ohio River Basin strategy to identify and develop strategies to prioritize and address water quality challenges associated with emerging contaminants such as PFAS.
- Objective 7: By 2025, inventory drinking and wastewater system infrastructure needs for the Ohio River Basin and develop a strategy to maintain these systems Basin wide.

Abundant Clean Water Goal
Strategic Actions

- Each objective will have strategic actions that help achieve the objective
- Strategic actions will generally include 3 common actions:
  - Secure additional resources such as funding and personnel to help achieve the objective
  - Utilize the Ohio River Basin GIS Mapping and Data Management Platform to help achieve the objective
    - The mapping system is needed for all PAS Goal Areas
    - The mapping system is envisioned to be developed collaboratively by a federal stakeholders such as USACE, USGS or the USEPA
  - Detail the specific implementation steps needed to help achieve the objective

Next Steps

- Once PAS Draft Plan is completed, the draft will be distributed to stakeholders for comment
  - Distributed to Webinar, Summit and Workshop attendees
  - Distributed to Key Stakeholders that support each goal
- The draft plan will distributed for comment to ORSANCO Stakeholders
  - Commissioners
  - Technical Committee Members
  - Advisory Committees that support ORSANCO

Discussion

Source Water Protection & Emergency Response Update

Informational Item

Technical Committee
February 11-12, 2020

Program Elements

- **Emergency Response**
  - Local & Regional Meetings
  - Spill Response Exercises
- **Source Water Protection Planning**
  - Contaminant Source Inventory Project
  - EPA Region Meetings
- **Organic Detection System (ODS)**
  - System Status Update
- **Harmful Algal Blooms**
  - 2019 HAB
  - HAB Response Plan Update

Emergency Response

- No major spills to report!
- Cincinnati Area Focus Group
  - 2020 Cincinnati Area Plan update
  - GCWW/NKWD Dye Study
- Louisville Sub-Area Team
  - New group - Developing sub-area plan like Cincy
  - Developing spill response data viewer tool
- WV American Water Spill Response Exercise
  - Simulate release to water to improve response
- EPA Regional Response Team 4
  - Maintain relationships with response agencies
  - Educate on downstream impacts to water users

SWP Meetings

- Region 5 – Annual Meeting
  - PFAS
  - HABs
  - Coal Ash Pond Closures
- Water Utility Visits
  - Pittsburgh Water
  - PA/WV American Water (@Hays Mine)
  - Center Township (PA) and PA DEP staff
- Ohio Regional Water Resources Committee
  - Update PA State Water Plan
    - Setting state/watershed priorities

SWP Meetings (cont)

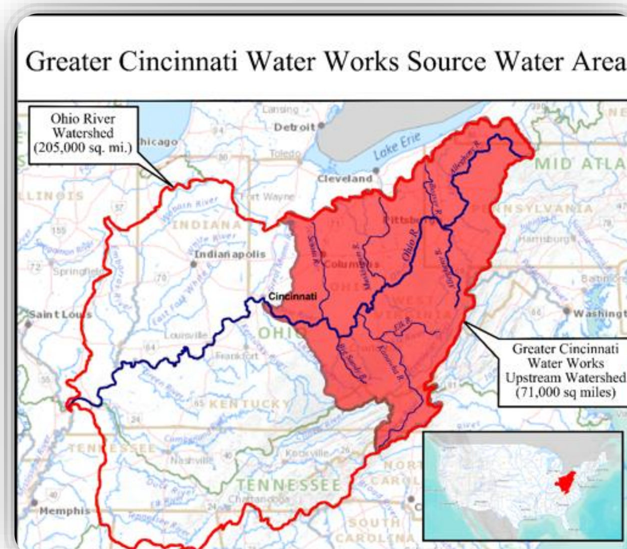
- 2020 Region 5 – Annual Meeting
  - ORSANCO will host meeting in Fall 2020
  - 3-Day meeting (~30 attendees)
  - Location TBD
  - Great opportunity to showcase work in Ohio Basin
    - GCWW/NKWD Source Water Protection plan
    - Dye tracer study (GCWW/NKWD)
    - DNA tracer study (EPA)
    - Contaminant source inventory project (EPA)
    - ODS and spill response (ORSANCO)
    - 2019 HAB
    - HAB Research (EPA)
    - Ohio River PFAS
    - State PFAS efforts

Contaminant Source Inventory Project

- Objective: **Develop GIS database tool to assist water utilities in assessing potential water quality risks.**

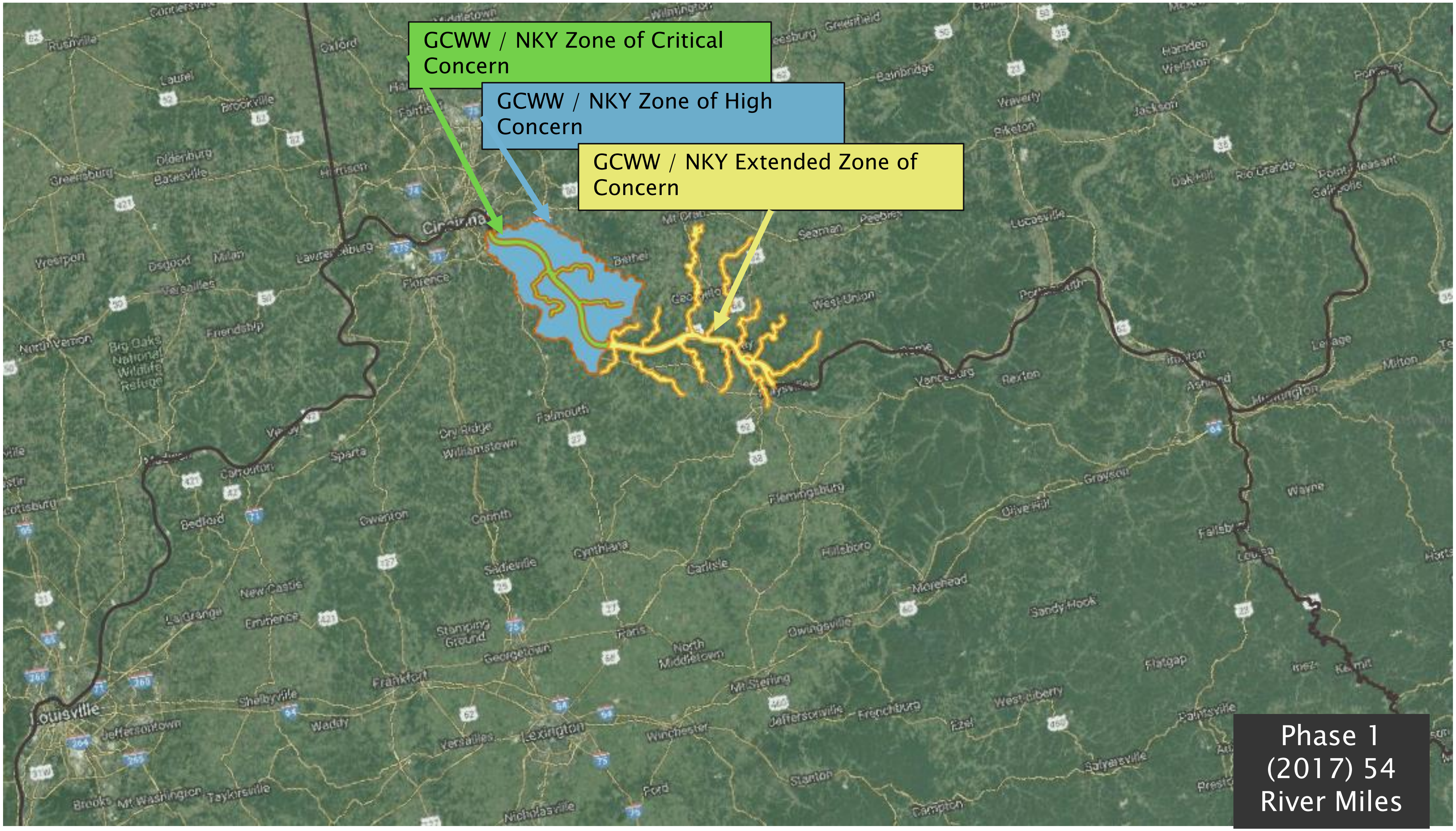
- Utilizes WaterSuite software to map contaminant threats and associated information

- US EPA, Greater Cincinnati Water Works, & Northern Kentucky Water District

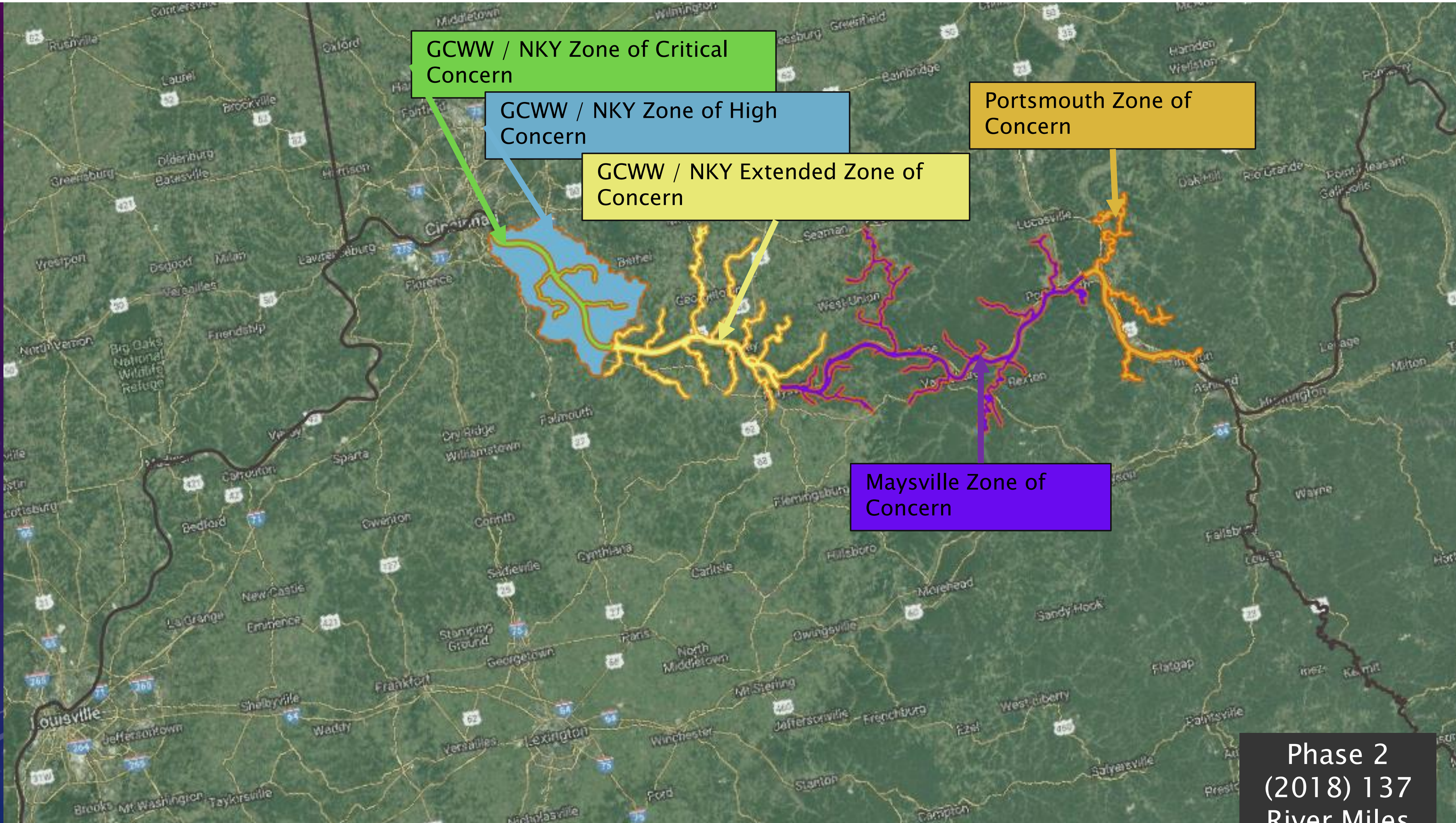


Vision

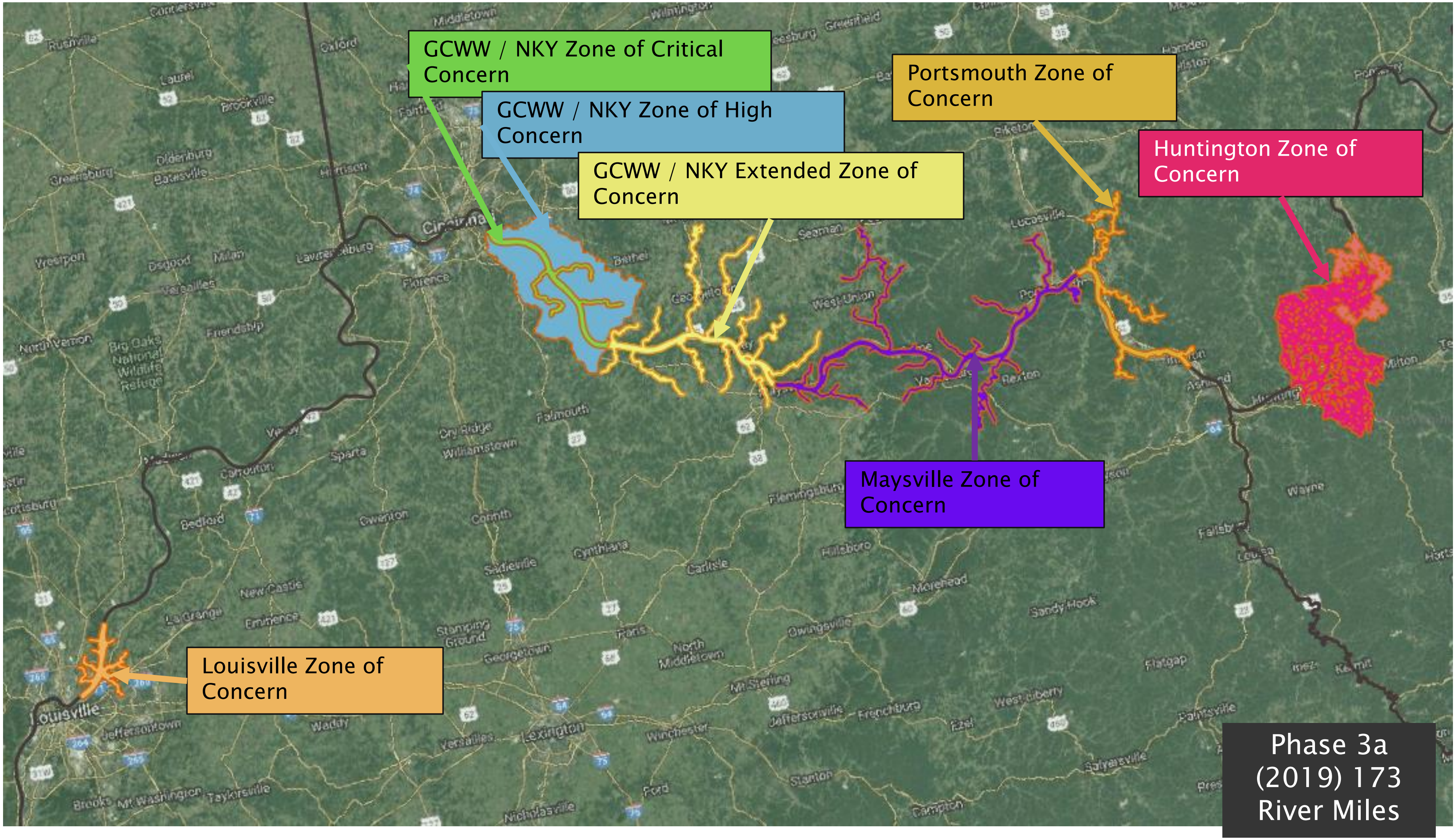
- Regional collaboration of all Ohio River water utilities
- Joint source water protection planning & mitigation efforts
- Develop a source water threat inventory for the entire Ohio River to support regional collaborative planning



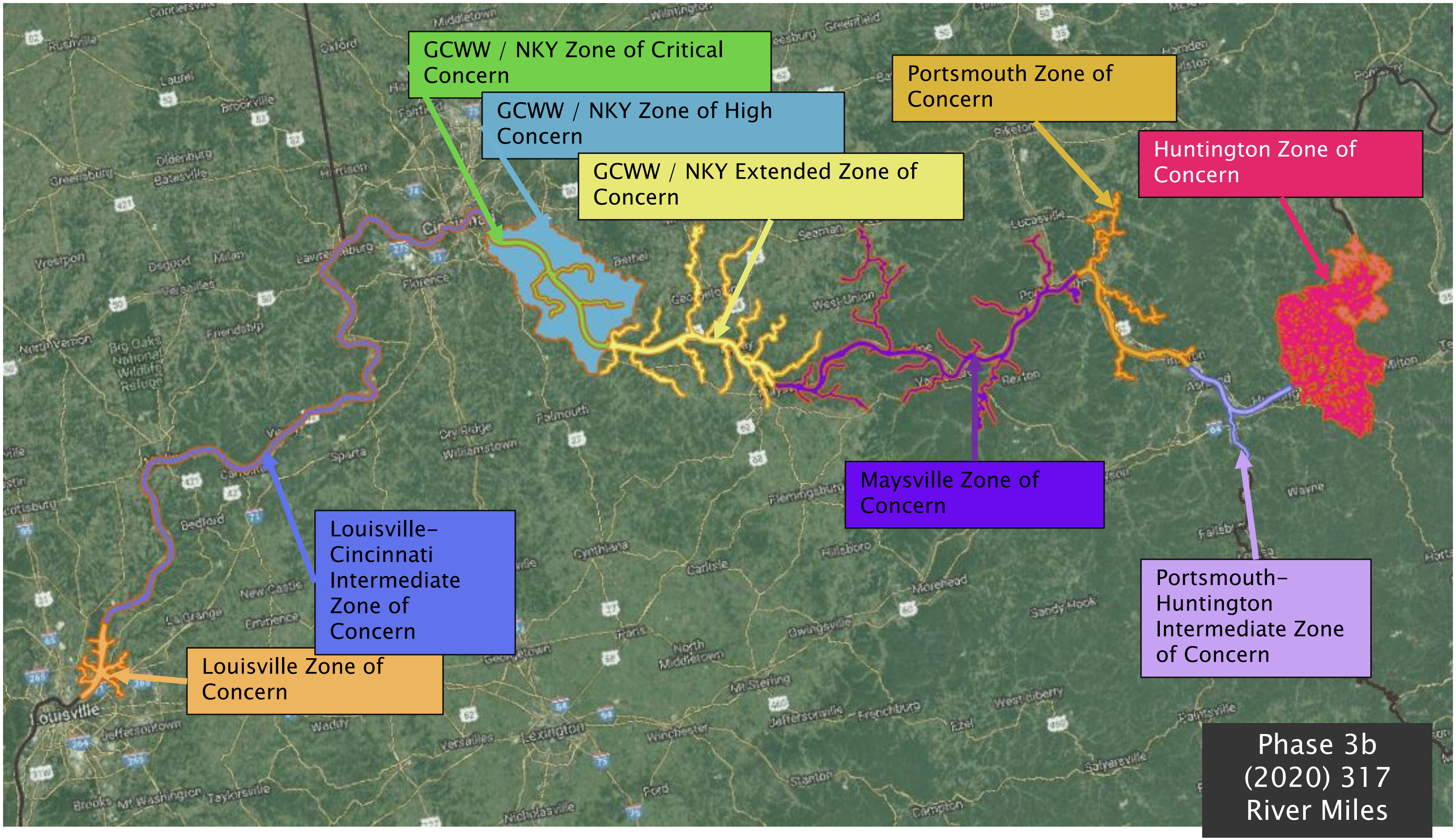
GCWW / NKY Zone of Critical Concern
GCWW / NKY Zone of High Concern
GCWW / NKY Extended Zone of Concern
Phase 1 (2017) 54 River Miles



Phase 2 (2018) 137 River Miles



GCWW / NKY Zone of Critical Concern
GCWW / NKY Zone of High Concern
GCWW / NKY Extended Zone of Concern
Portsmouth Zone of Concern
Huntington Zone of Concern
Maysville Zone of Concern
Louisville Zone of Concern
Phase 3a (2019) 173 River Miles


GCWW / NKY Zone of Critical Concern
GCWW / NKY Zone of High Concern
GCWW / NKY Extended Zone of Concern
Portsmouth Zone of Concern
Huntington Zone of Concern
Maysville Zone of Concern
Louisville-Cincinnati Intermediate Zone of Concern
Louisville Zone of Concern
Portsmouth-Huntington Intermediate Zone of Concern
Phase 3b (2020) 317 River Miles

Datasets

>100 datasets

- EPCRA Tier II Hazardous Chemical Storage
- Toxic Substances Control Act (TSCA)
- Toxics Release Inventory (TRI)
- Risk Management Plan Facilities (RMP)
- Facility Response Plan Facilities (FRP)
- Greater Cincinnati Water Works source water threat inventory database
- Discharges / wastewater treatment
- Other storage tank datasets
- Mining
- Oil and gas extraction
- Landfills
- CAFOs
- Hazardous waste sites & handling
- Contaminated sites
- Pipelines
- Transportation: Road, rail, air
- Locks, dams, ports

Next steps

1. Acquire KY Tier II Hazardous Chemical Storage Data (anticipated in March)
2. Complete Intermediate Zone site creation
3. Finalize travel time and peak concentration estimates for new data
4. Integrate Huntington data
5. Re-run acute spill risk scoring
6. Data gap assessment
7. Transition ownership to ORSANCO
8. Exit workshop
9. Final report

Organics Detection System (ODS)

- Lots of changes!
- Many of these are IT related
  - Adam Scott to provide IT support
- Transition from Windows 7 to Windows 10
- Migrating (slowly) to Chromeleon 7 software
- Transition from TeamViewer to ConnectWise
- Preventative maintenance on schedule
  - Maintenance agreement up for renewal
- Developing two pilot studies
  1. Expand VOC analyte list
  2. Evaluate time/cost of adding semi-volatiles

Questions?

HAB UPDATE

AGENDA ITEM 4

HAB UPDATE

- HABHRCA 2019 REAUTHORIZATION
- 2019 HAB EVENT
- HAB MONITORING, ASSESSMENT AND COMMUNICATION PLAN UPDATE
- USEPA RARE GRANT

HABHRCA 2019 REAUTHORIZATION

- HABS AND HYPOXIA EVENTS OF NATIONAL SIGNIFICANCE
  - AT THE DISCRETION OF APPROPRIATE FEDERAL OFFICIAL OR AT THE REQUEST OF A GOVERNOR
  - MARINE OR COASTAL: NOAA
  - FRESHWATER: EPA
  - EVENT OF NATIONAL SIGNIFICANCE: A HYPOXIA OR HAB EVENT THAT HAS HAD OR WILL LIKELY HAVE A SIGNIFICANT DETRIMENTAL ENVIRONMENTAL, ECONOMIC, SUBSISTENCE USE, OR PUBLIC HEALTH IMPACT ON AN AFFECTED STATE
  - EPA ACCEPTED INPUT ON WHAT THIS MEANS OCTOBER 2019

STATUTORY GUIDANCE FOR MAKING A DETERMINATION

- THE TOXICITY OF THE HAB
- ITS POTENTIAL TO SPREAD
- THE ECONOMIC IMPACT
- THE RELATIVE SIZE IN RELATION TO THE PAST 5 OCCURRENCES OF A HAB THAT OCCUR ON A RECURRENT OR ANNUAL BASIS
- THE GEOGRAPHIC SCOPE

FUNDING AREAS

- ASSESS & MITIGATE
  - ECONOMIC
  - ENVIRONMENTAL
  - SUBSISTENCE USE
  - PUBLIC HEALTH
- FEDERAL SHARE <50%
  - NO FUNDING APPROPRIATED BY CONGRESS
- NOT TO PREVENT FUTURE HABS

HABS OF NATIONAL SIGNIFICANCE TIMELINE

- CURRENTLY WRITING DRAFT POLICY
- PUBLIC COMMENT JUNE 2020
- FINAL POLICY AUGUST/SEPTEMBER 2020

2019 HAB EVENT

- **FIRST REPORTED 9/11/19 AT RUSSELL, KY**
- ***MICROCYSTIS WESENBERGII*** **INITIALLY, LATER *M. AERUGINOSA* AND *M. FLOS-AQUAE***
- **HIGHEST TOXIN CONCENTRATION >5,000 UG/L AT MADISON, IN**
- **CELL COUNTS IN EXCESS OF 1,000,000 CELLS/ML**

COMPARISON TO 2015

2015

2019

ADVISORIES

- BLOOM WAS INTERMITTENT WITH GREATEST CONCENTRATIONS FROM MAYSVILLE, KY (ORM 408) TO LOUISVILLE, KY (ORM 604)
  - VISUAL REPORT AT PT. PLEASANT, WV (ORM 265.7)
  - VISUAL REPORT AT JT MYERS L&D (ORM 846.0)
- RECREATION ADVISORIES POSTED BY OH, KY, IN. GREENUP POOL TO MCALPINE L&D
- LAST ADVISORY LIFTED 11/5/19
- POTENTIAL FINISHED WATER DETECTION IN OWENSBORO, KY
  - FOLLOW-UP FOUND NO DETECTIONS

ANALYTICAL METHODS

- MBIO DIAGNOSTICS
  - ELISA METHOD
  - FIELD PORTABLE
  - SINGLE SAMPLE
  - 8 MICROCYSTIN CONGENERS + CYLINDROSPERMOPSIN
  - MC DETECTION LIMIT 0.4 UG/L
  - RESULTS IN 10 MINUTES
  - $4,000 PER SYSTEM/$20 PER SAMPLE

ANALYTICAL METHODS

- ABRAXIS ELISA
  - SEPARATE KITS FOR MICROCYSTINS, CYLINDROSPERMOPSIN, SAXITOXINS
  - MC DETECTION LIMIT 0.15 UG/L
  - RESULTS IN HOURS
  - 10+SAMPLES AT ONCE
  - DETECTS 11 CONGENERS OF MICROCYSTIN AT VARYING RECOVERY RATES
  - CYANOTOXIN AUTOMATED ASSAY SYSTEM (CAAS) GREATLY INCREASES SPEED AND REDUCES HUMAN ERROR
  - $30,000 WITH CAAS/$500 PER 96 WELL PLATE (10+ SAMPLES)

ANALYTICAL METHODS

- LC MS/MS
  - COST $200,000+
  - SIGNIFICANT STAFF TRAINING
  - METHOD DETECTS 7 CONGENERS AT NEAR 100% RECOVERY
  - MC DETECTION LIMIT 0.25 UG/L
  - NOT FIELD-PORTABLE
  - PREFERRED BY STATE OF KENTUCKY

HAB MONITORING RESPONSE AND COMMUNICATION PLAN

- FIRST FULL UPDATE SINCE 2016
- CHANGES TO STATE AND FEDERAL DRINKING WATER STANDARDS AND RECREATIONAL ADVISORY LEVELS FOR ALGAL TOXINS
- RESPONDED TO A SECOND LARGE HAB EVENT

ORSANCO ROLE AND RESPONSIBILITIES

- ADVISORIES
  - ORSANCO DOES NOT ISSUE ADVISORIES FOR DRINKING WATER OR RECREATION
- MONITORING
  - ORSANCO WORKS WITH STATE AND FEDERAL PARTNERS AS WELL AS DRINKING WATER UTILITIES TO QUICKLY IDENTIFY ALL REPORTED BLOOMS

ORSANCO ROLE AND RESPONSIBILITIES

- RESPONSE
  - ORSANCO COORDINATES WITH STATES/FEDERAL PARTNERS TO ENSURE ADEQUATE COVERAGE OF ONGOING HABS
  - ORSANCO SERVES AS A REPOSITORY FOR DATA AND UPDATES THE DATA WEEKLY
- COMMUNICATIONS
  - ORSANCO COMMUNICATES ALL IDENTIFIED HABS TO WUAC AND GENERAL SPILLS LIST
  - ORSANCO CONVENES WEEKLY CALLS DURING HAB RESPONSE

DRINKING WATER ADVISORY LEVELS

USEPA*, IL, IN, KY

Drinking Water Thresholds	Drinking Water Health Advisory (10-day)	
	Microcystins (ug/L)	Cylindrospermopsin (ug/L)
Bottle-fed infants and pre-school children	0.3	0.7
School-age children and adults	1.6	3.0

*PA has not promulgated any criteria for cyanotoxins or implemented any advisory levels

DRINKING WATER ADVISORY LEVELS

OH, WV

Drinking Water Thresholds	Microcystins (ug/L)	Anatoxin a (ug/L)	Cylindrospermopsin (ug/L)	Saxitoxins (ug/L)
Do Not Drink – children under 6	0.3	20	0.7	0.3
Do Not Drink- children 6 and older and adults	1.6	20	3.0	1.6
Do Not Use	20	300	20	3

RECREATION GUIDELINES

USEPA*, IL, KY

Threshold (ug/L)	Microcystins	Cylindrospermopsin
Human Recreation	8	15

OH, WV

Threshold (µg/L)	Microcystins	Anatoxin-a	Cylindrospermopsin	Saxitoxins
Informational Sign	<6	<80	<5	<0.8
Recreational Public Health Advisory	6	80	5	0.8
Recreational No Contact Advisory	20	300	20	3

*PA has not promulgated any criteria for cyanotoxins or implemented any advisory levels

RECREATION GUIDELINES

INDIANA

Exposure Reference Value ug/L	Microcystins	Cylindrospermopsin	Anatoxin	Saxitoxins
Human Recreation Advisory	8	15	80	0.8
Human Recreation Prohibited	20	20	300	3
Dog Recreation Prohibited	0.8	1	Any detection	Any detection

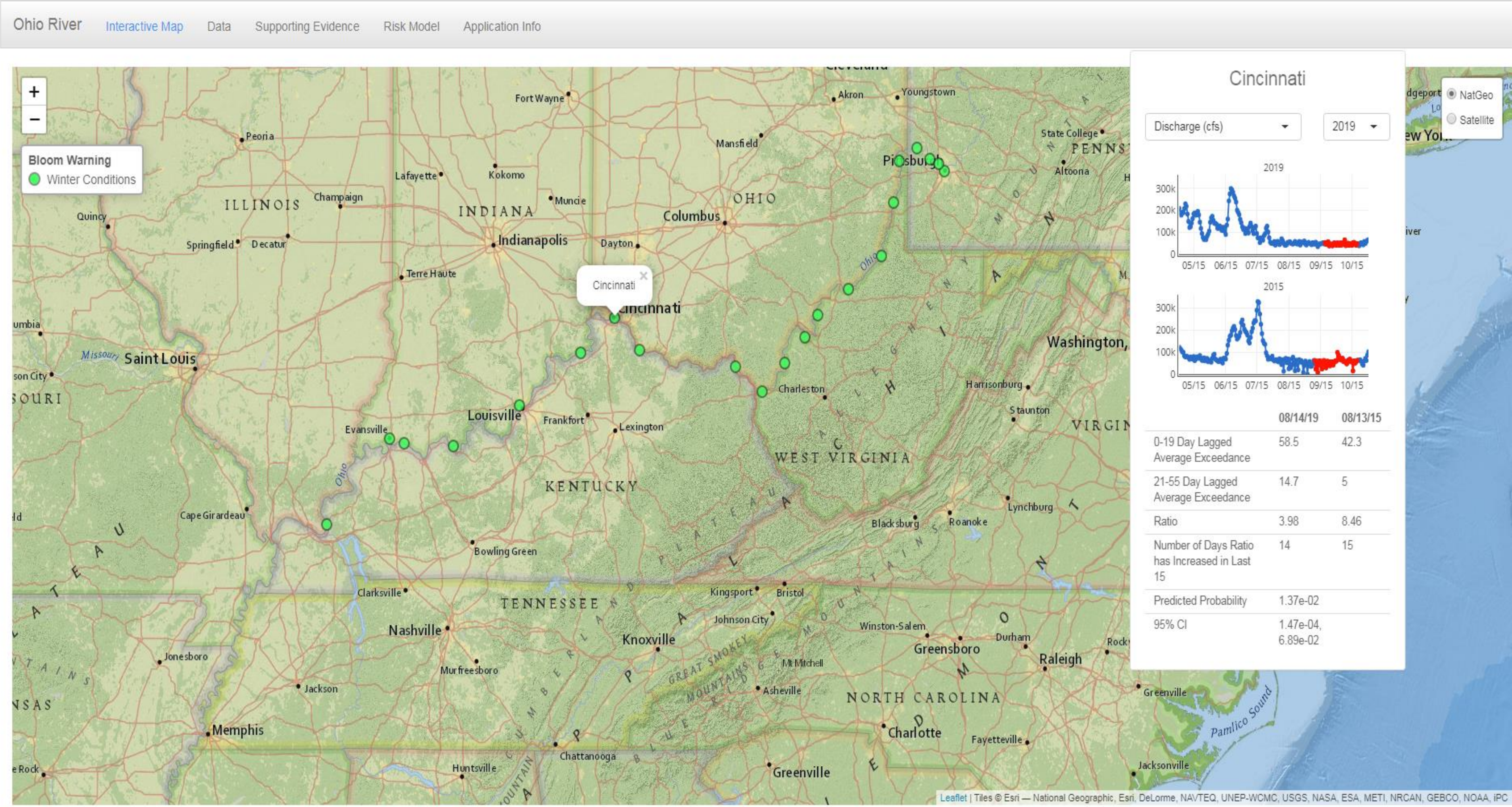
HAB DEFINITION

- A HARMFUL ALGAL BLOOM (HAB) OCCURS WHEN TOXIN-PRODUCING ALGAE GROW EXCESSIVELY IN A BODY OF WATER.

- HAB (HARMFUL ALGAL BLOOM): A VISUALLY IDENTIFIED CONCENTRATION OF CYANOBACTERIA THAT DISCOLORS THE WATER, OR A CELL COUNT GREATER THAN 4,000 CELLS/ML OF CYANOBACTERIA GENERA CAPABLE OF CYANTOXIN PRODUCTION (SHAMBAUGH AND BRINES, 2003) ACCUMULATIONS OF CYANOBACTERIA CELLS MAY BE PRESENT AT THE WATER SURFACE, AT A DEFINED DEPTH, OR THROUGHOUT THE WATER COLUMN.

USEPA RARE GRANT

- TOOL FOR COMPARING CURRENT CONDITIONS TO 2015 CONDITIONS
  - INITIALLY JUST LOOKED AT FLOW DURING 2015 HAB
  - CURRENTLY REVIEWING 2019 HAB TO INCLUDE IN MODEL
- ADDING ADDITIONAL DATA
  - LINK IN DATASONDES
  - POTENTIAL FOR ALERT LEVELS (UC CAPSTONE PROJECT)
  - WATER UTILITIES (WV 604B PROJECT)



Ohio River
Interactive Map
Data
Supporting Evidence
Risk Model
Application Info
Bloom Warning
Winter Conditions
NatGeo
Satellite
Cincinnati
Discharge (cfs)
2019
2019
300k
200k
100k
0
05/15 06/15 07/15 08/15 09/15 10/15
2015
08/14/19
08/13/15
0-19 Day Lagged Average Exceedance 58.5 42.3
21-55 Day Lagged Average Exceedance 14.7 5
Ratio 3.98 8.46
Number of Days Ratio has Increased in Last 15 14 15
Predicted Probability 1.37e-02
95% CI 1.47e-04, 6.89e-02
Leaflet | Tiles © Esri — National Geographic, Esri, DeLorme, NAVTEQ, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, iPC

QUESTIONS?

Ohio River PFAS Study

SURVEY DESIGN

Study Objective

- Characterize ambient conditions relative to PFASs in the Ohio River at 20 locations, for 2 rounds of sampling under two separate seasons.
    - 1 higher flow & 1 lower flow event.
    - Probabilistic-systematic approach used for site selection.
    - Outside of any regulatory mixing zones.
- The survey is not intended to focus on drinking water, but rather develop a ambient baseline conditions for the Ohio River.
- Results may inform states, EPA, utilities & other interested parties on Ohio River ambient water quality conditions. The Commission is developing a communication plan.

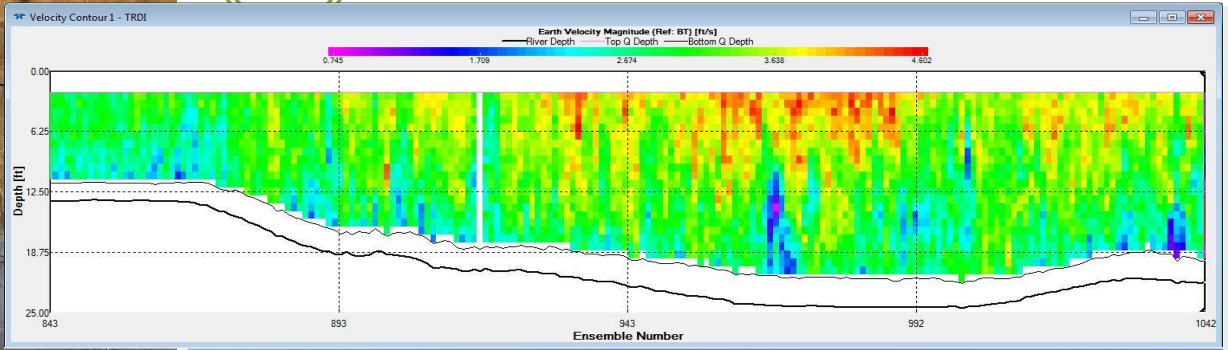
Working with our Federal Partners

- USEPA research lab will analyze water samples for PFASs. They are currently working on new methods
- We continue to work with the USGS on use of the EDI sampling method for PFASs.
- The USGS has completed some extensive QA samples. Results may be available in 3 months.
- Current plan is to begin the survey in 2020. Will hold a meeting of the ORSANCO PFAS workgroup in March.

Sample Collection Methodology

- Preferred Method is EDI-Equal Discharge Increment.
- Collects a flow-weighted cross-sectional composite of the river.
- Needs to be evaluated for suitability for PFAS compounds.

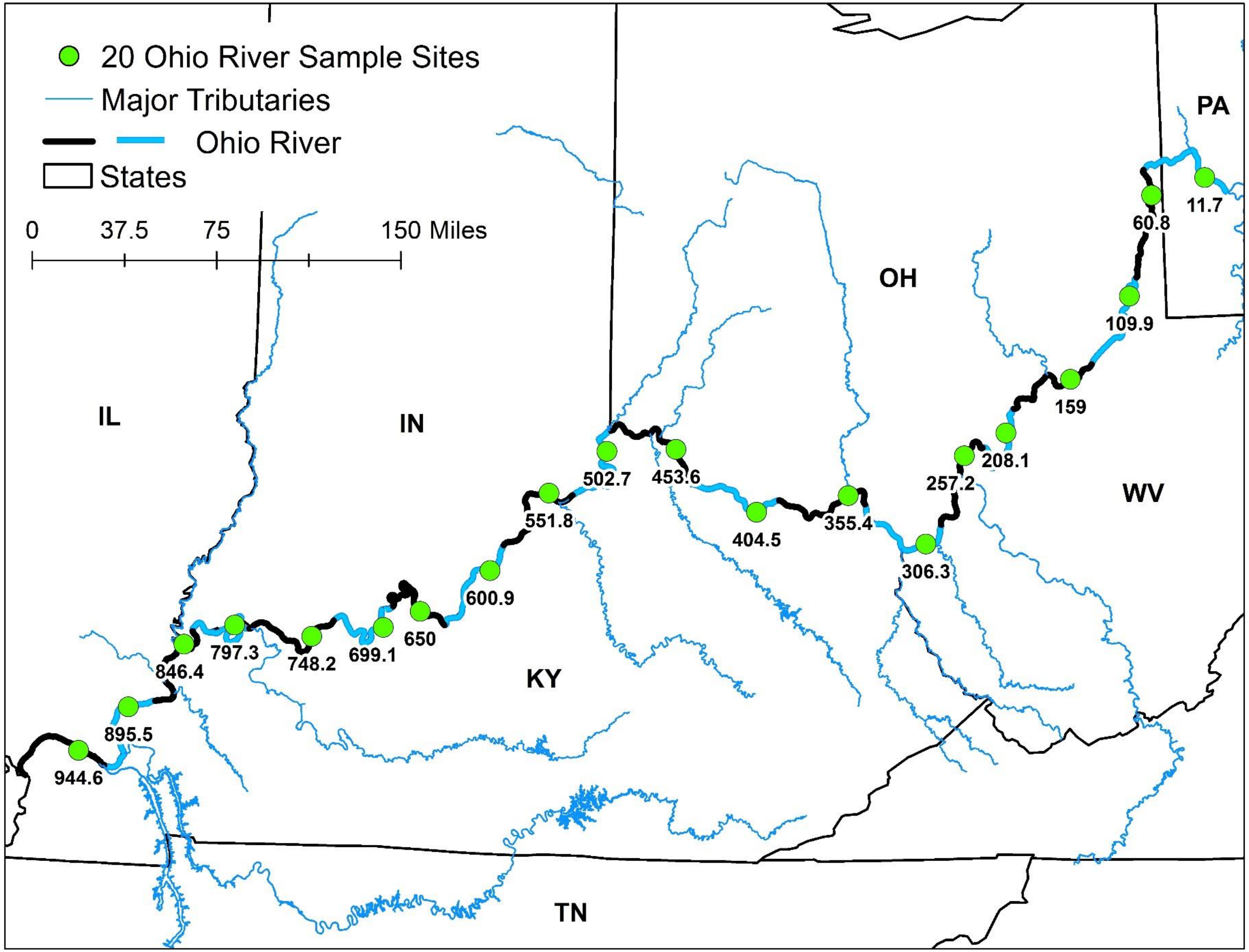
USGS EDI Sampling Equipment



What to Sample

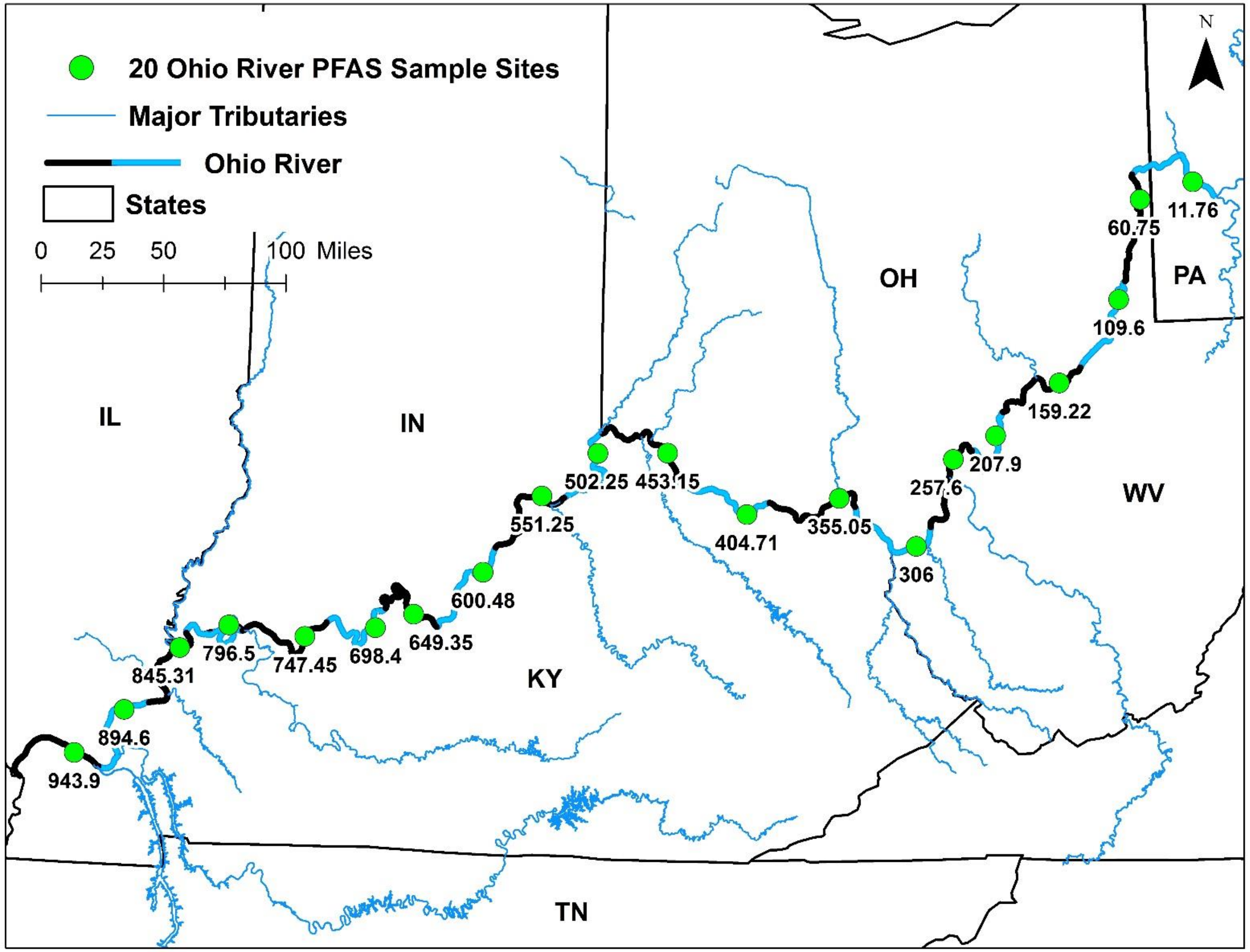
- EPA has a couple of analytical methods – both include 24 PFAS compounds.
- Workgroup asked to see detection levels on both methods.
- Rely heavily on EPA expertise for method selection.
- Workgroup recommends including Gen-X compounds – EPA can do this.
- Flow measurements at every site with ADCP (Acoustic Doppler Current Profiler) instrumentation considers full X-sectional flows.

Systematic-Probabilistic Approach



20 PFAS Sampling sites overview

Original Probabilistic Sites									Alternate Sites									
I.D.	Ohio River Mile Point	Left Descending Bank Y	Left Descending Bank X	Mid-Point Y	Mid-Point X	Right Descending Bank Y	Right Descending Bank X	Issue	Alt. I.D.	Ohio River Mile Point	Alt. Left Descending Bank Y	Alt. Left Descending Bank X	Alt.Mid Point Y	Alt. Mid Point X	Alt. Right Descending Bank Y	Alt. Right Descending Bank X
1	11.70	40.534042	-80.186169	40.532756	-80.187306	40.531569	-80.188344	ADCP flow measurement instrument during sample collection will not work if too close to large metal structures (the bridge)	Alt.1	11.76	40.533628	-80.185131	40.532275	-80.186281	40.530983	-80.187356
2	60.75	40.441808	-80.604633	40.442611	-80.607167	40.443372	-80.60965									
3	109.80	39.854978	-80.802628	39.856433	-80.803547	39.857931	-80.80445	designated barge fleeting area	Alt.3	111.32	39.844158	-80.822678	39.844819	-80.824314	39.845539	-80.826133
								discharges downstream of original. Move point upstream	Revised Alt. 3	109.60	39.856656	-80.799325	39.858006	-80.800511	39.859372	-80.801739
4	158.85	39.378058	-81.2717	39.380636	-81.274233	39.383108	-81.276708	Broadback Island in the middle	Alt.4	159.22	39.3757	-81.27855	39.377575	-81.280039	39.379392	-81.281467
5	207.90	39.075631	-81.780783	39.077333	-81.780783	39.078981	-81.780803									
6	256.95	38.951144	-82.100194	38.952019	-82.102031	38.952822	-82.103728	designated barge fleeting area	Alt.6	257.60	38.943867	-82.103581	38.944531	-82.106594	38.945133	-82.109614
7	306.00	38.435886	-82.404478	38.4382	-82.404522	38.440711	-82.404594									
8	355.05	38.724172	-82.988264	38.725794	-82.987878	38.727403	-82.987489									
9	404.10	38.628406	-83.686358	38.629953	-83.685606	38.631544	-83.684844	designated barge fleeting area	Alt.9	404.71	38.631997	-83.697056	38.633753	-83.695864	38.635556	-83.69465
10	453.15	38.993714	-84.305828	38.994547	-84.3027	38.995397	-84.299519									
11	502.20	38.993969	-84.835522	38.992347	-84.838211	38.990719	-84.840897	Laughery Island in the middle	Alt.11	502.25	38.993358	-84.835086	38.991792	-84.837647	38.99015	-84.840303
12	551.25	38.733742	-85.262956	38.736139	-85.261681	38.738528	-85.260425									
13	600.30	38.283217	-85.697536	38.285414	-85.6993	38.287631	-85.701094	manmade boating docs	Alt.13	600.48	38.281828	-85.700256	38.284083	-85.702078	38.286422	-85.703972
14	649.35	38.026233	-86.223811	38.028136	-86.221511	38.030067	-86.219183									
15	698.40	37.945508	-86.505769	37.944417	-86.508119	37.943331	-86.510464									
16	747.45	37.881214	-87.037739	37.880942	-87.040939	37.880661	-87.044167									
17	796.50	37.9304	-87.614083	37.932656	-87.618878	37.934892	-87.623686									
18	845.55	37.786097	-87.987147	37.789386	-87.98625	37.792667	-87.985344	moving away from dam for safety	Alt.18	845.31	37.785511	-87.983486	37.788361	-87.982083	37.791364	-87.980628
19	894.60	37.4087	-88.382033	37.409914	-88.380736	37.411328	-88.379225									
20	943.65	37.138442	-88.737292	37.141464	-88.735167	37.144553	-88.732992	designated barge fleeting area	Alt.20	944.23	37.142006	-88.746867	37.145586	-88.74435	37.149206	-88.741772
								move site upstream to avoid discharge at mile point 944.	Revised Alt. 20	943.9	37.139739	-88.741142	37.142917	-88.739022	37.14625	-88.736806



20 Ohio River PFAS Sample Sites
Major Tributaries
Ohio River
States
0 25 50 100 Miles
N
IL
IN
OH
PA
WV
KY
TN
11.76
60.75
109.6
159.22
207.9
257.6
306
355.05
404.71
453.15
502.25
551.25
600.48
649.35
698.4
747.45
796.5
845.31
894.6
943.9

1) Mile point 11.70

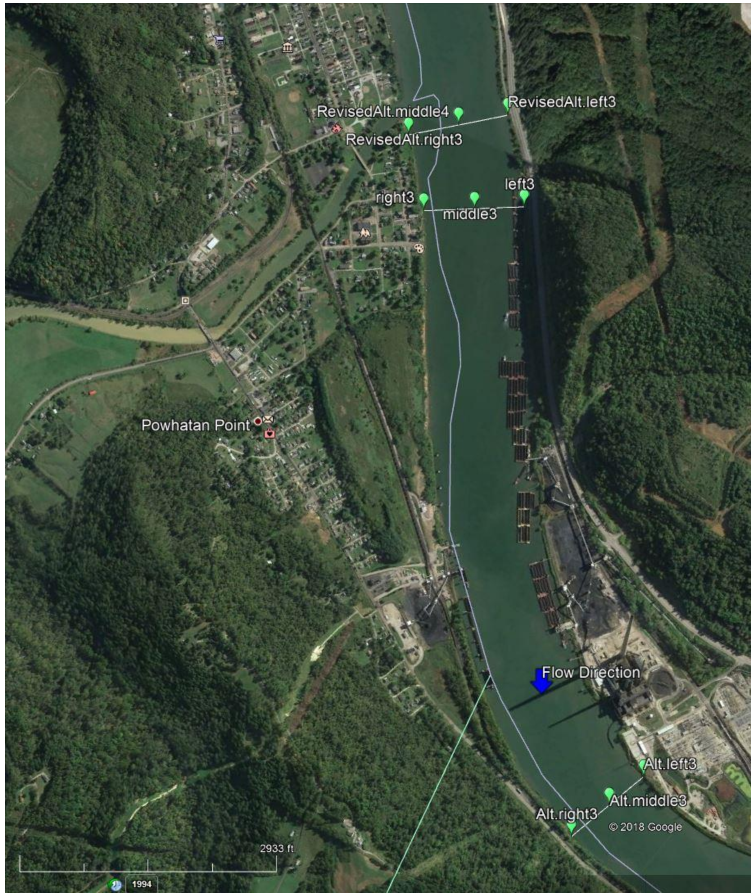
I.D.	Ohio River Mile Point	Left Descending Bank Y	Left Descending Bank X	Mid-Point Y	Mid-Point X	Right Descending Bank Y	Right Descending Bank X
1	11.70	40.534042	-80.186169	40.532756	-80.187306	40.531569	-80.188344
Alt.1	11.76	40.533628	-80.185131	40.532275	-80.186281	40.530983	-80.187356

2) Mile Point 60.75

I. D.	Ohio River Mile Point	Left Descending Bank Y	Left Descending Bank X	Mid-Point Y	Mid-Point X	Right Descending Bank Y	Right Descending Bank X
2	60.75	40.441808	-80.604633	40.442611	-80.607167	40.443372	-80.60965

3) Mile Point 109.80

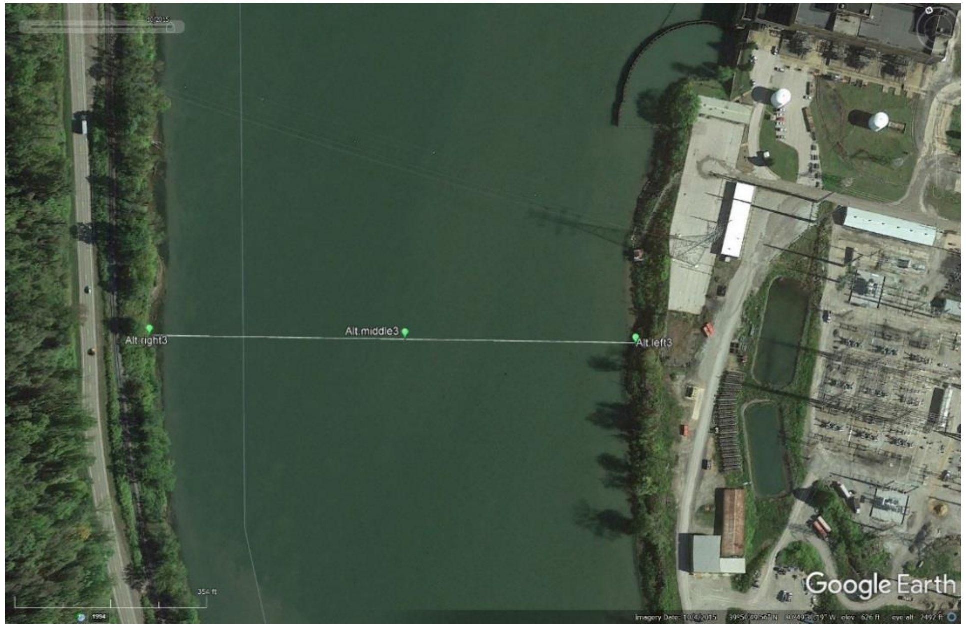
I.D.	Ohio River Mile Point	Left Descending Bank Y	Left Descending Bank X	Mid-Point Y	Mid-Point X	Right Descending Bank Y	Right Descending Bank X
3	109.80	39.854978	-80.802628	39.856433	-80.803547	39.857931	-80.80445
Alt.3	111.32	39.844158	-80.822678	39.844819	-80.824314	39.845539	-80.826133
Revised Alt. 3	109.60	39.856656	-80.799325	39.858006	-80.800511	39.859372	-80.801739



Original #3 proposed sampling site

3) Mile Point Alternatives

Alternative 3) Mile Point 111.32



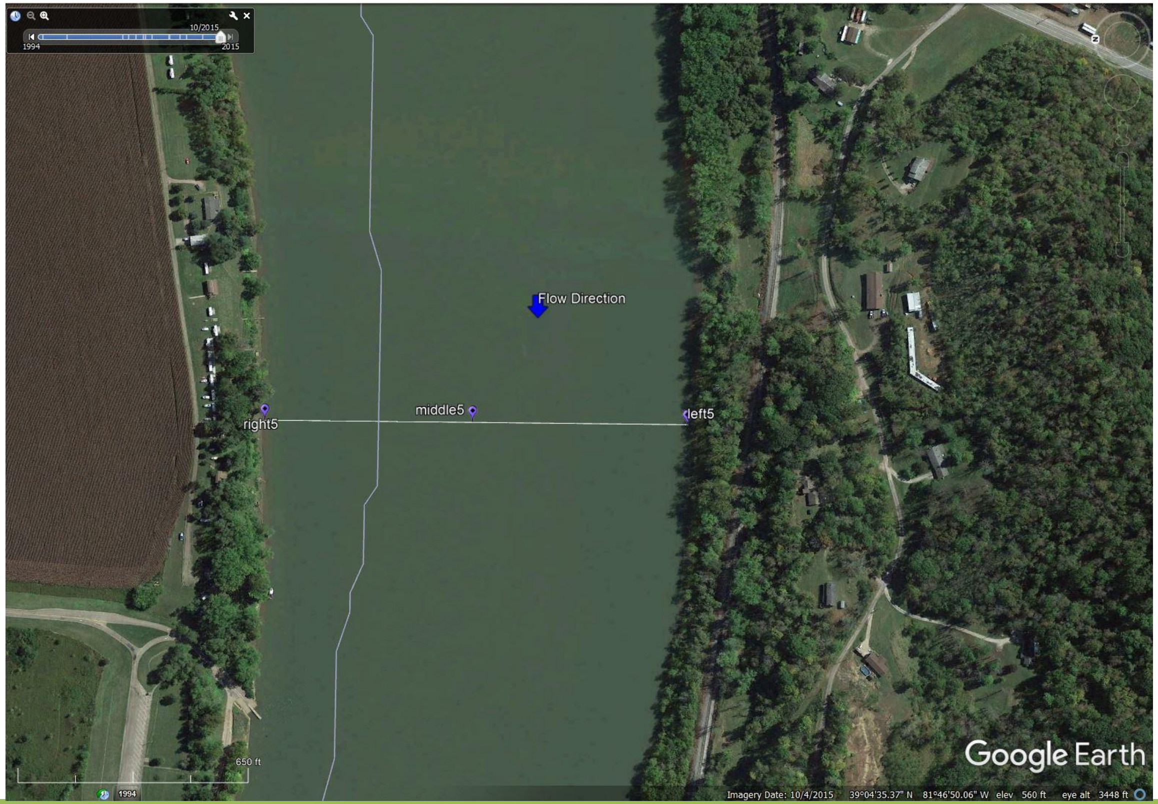
Revised Alternative 3) Mile Point 109.60

4) Mile Point 158.85

I.D.	Ohio River Mile Point	Left Descending Bank Y	Left Descending Bank X	Mid-Point Y	Mid-Point X	Right Descending Bank Y	Right Descending Bank X
4	158.85	39.378058	-81.2717	39.380636	-81.274233	39.383108	-81.276708
Alt.4	159.22	39.3757	-81.27855	39.377575	-81.280039	39.379392	-81.281467

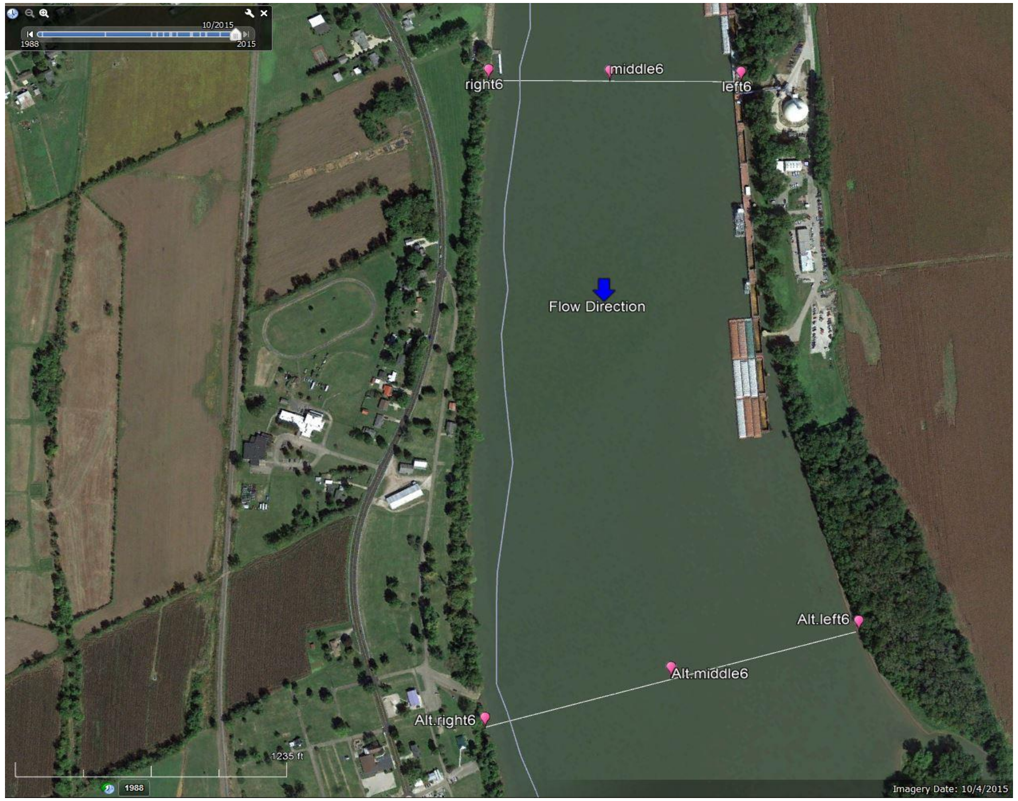
5) Mile Point 207.90

I.D.	Ohio River Mile Point	Left Descending Bank Y	Left Descending Bank X	Mid-Point Y	Mid-Point X	Right Descending Bank Y	Right Descending Bank X
5	207.90	39.075631	-81.780783	39.077333	-81.780783	39.078981	-81.780803



6) Mile point 256.95

I.D.	Ohio River Mile Point	Left Descending Bank Y	Left Descending Bank X	Mid-Point Y	Mid-Point X	Right Descending Bank Y	Right Descending Bank X
6	256.95	38.951144	-82.100194	38.952019	-82.102031	38.952822	-82.103728
Alt.6	257.60	38.943867	-82.103581	38.944531	-82.106594	38.945133	-82.109614

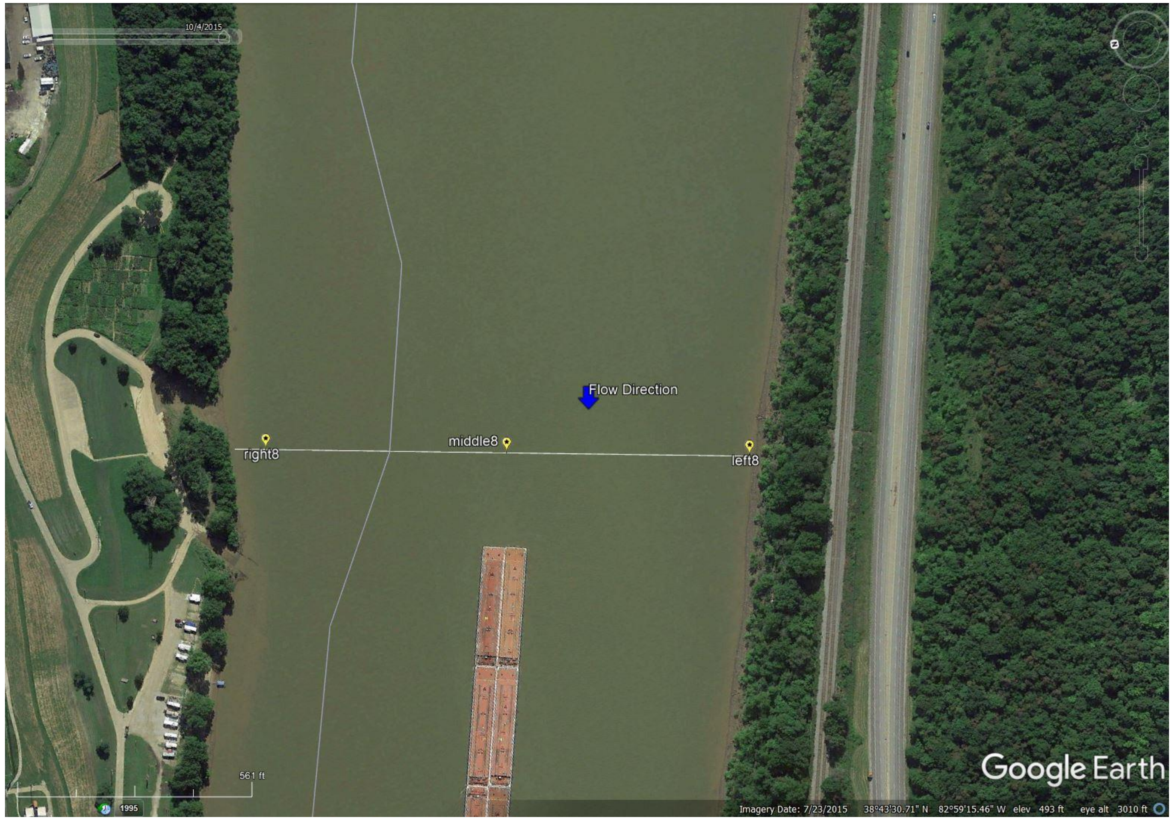


7) Mile Point 306.00

I. D.	Ohio River Mile Point	Left Descending Bank Y	Left Descending Bank X	Mid-Point Y	Mid-Point X	Right Descending Bank Y	Right Descending Bank X
7	306.00	38.435886	-82.404478	38.4382	-82.404522	38.440711	-82.404594

8) Mile point 355.05

I.D.	Ohio River Mile Point	Left Descending Bank Y	Left Descending Bank X	Mid-Point Y	Mid-Point X	Right Descending Bank Y	Right Descending Bank X
8	355.05	38.724172	-82.988264	38.725794	-82.987878	38.727403	-82.987489



9) Mile Point 404.10

I.D.	Ohio River Mile Point	Left Descending Bank Y	Left Descending Bank X	Mid-Point Y	Mid-Point X	Right Descending Bank Y	Right Descending Bank X
9	404.10	38.628406	-83.686358	38.629953	-83.685606	38.631544	-83.684844
Alt. 9	404.71	38.631997	-83.697056	38.633753	-83.695864	38.635556	-83.69465

10) Mile point 453.15

I.D.	Ohio River Mile Point	Left Descending Bank Y	Left Descending Bank X	Mid-Point Y	Mid-Point X	Right Descending Bank Y	Right Descending Bank X
10	453.15	38.993714	-84.305828	38.994547	-84.3027	38.995397	-84.299519

11) Mile point 502.20

I.D.	Ohio River Mile Point	Left Descending Bank Y	Left Descending Bank X	Mid-Point Y	Mid-Point X	Right Descending Bank Y	Right Descending Bank X
11	502.20	38.993969	-84.835522	38.992347	-84.838211	38.990719	-84.840897
Alt.11	502.25	38.993358	-84.835086	38.991792	-84.837647	38.99015	-84.840303

12) Mile point 551.25

I.D.	Ohio River Mile Point	Left Descending Bank Y	Left Descending Bank X	Mid-Point Y	Mid-Point X	Right Descending Bank Y	Right Descending Bank X
12	551.25	38.733742	-85.262956	38.736139	-85.261681	38.738528	-85.260425

13) Mile point 600.30

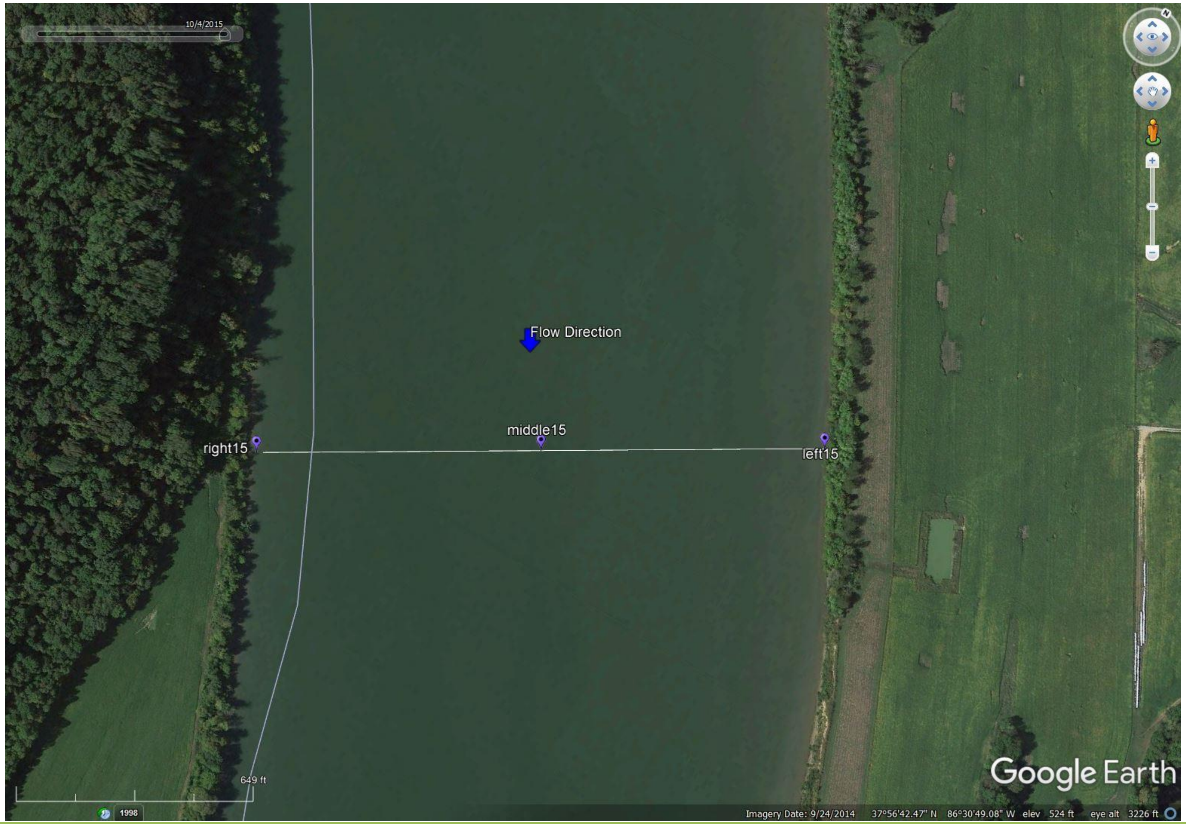
I.D.	Ohio River Mile Point	Left Descending Bank Y	Left Descending Bank X	Mid-Point Y	Mid-Point X	Right Descending Bank Y	Right Descending Bank X
13	600.30	38.283217	-85.697536	38.285414	-85.6993	38.287631	-85.701094
Alt.13	600.48	38.281828	-85.700256	38.284083	-85.702078	38.286422	-85.703972

14) Mile point 649.35

I.D.	Ohio River Mile Point	Left Descending Bank Y	Left Descending Bank X	Mid-Point Y	Mid-Point X	Right Descending Bank Y	Right Descending Bank X
14	649.35	38.026233	-86.223811	38.028136	-86.221511	38.030067	-86.219183

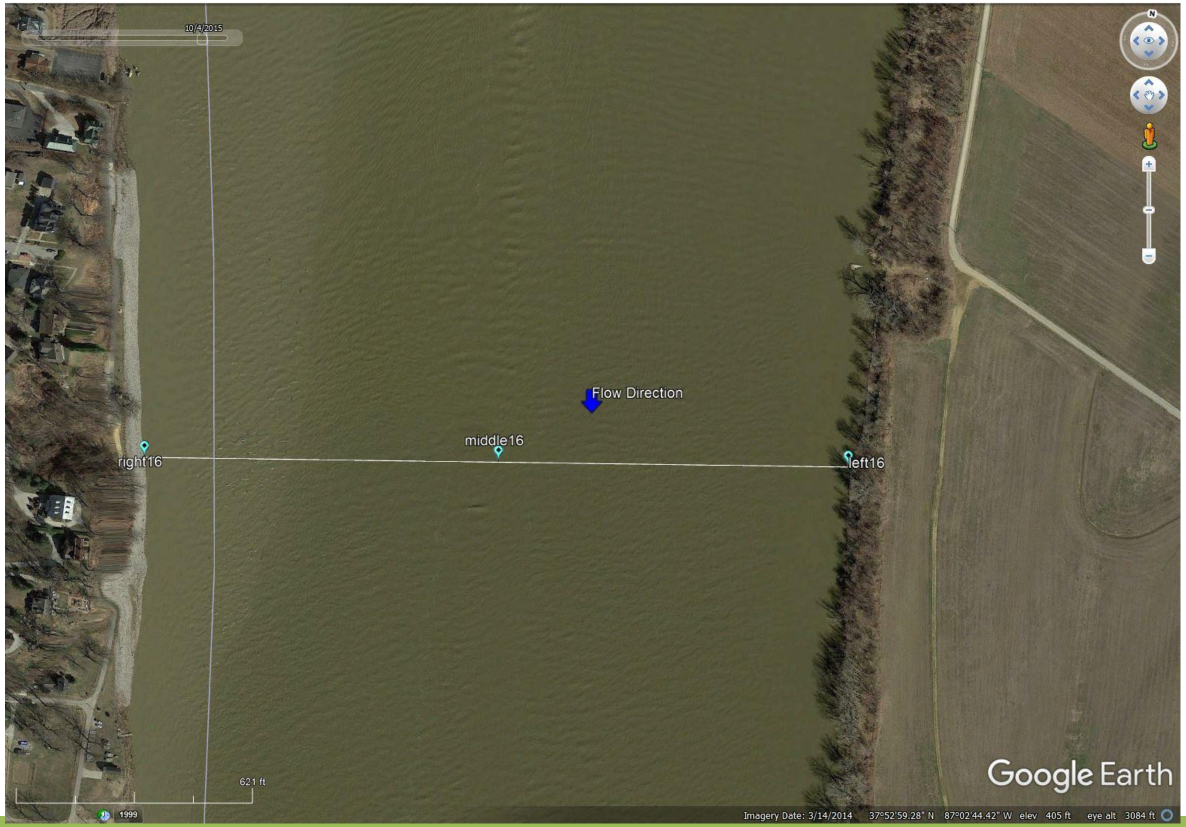
15) Mile point 698.40

I.D.	Ohio River Mile Point	Left Descending Bank Y	Left Descending Bank X	Mid-Point Y	Mid-Point X	Right Descending Bank Y	Right Descending Bank X
15	698.40	37.945508	-86.505769	37.944417	-86.508119	37.943331	-86.510464



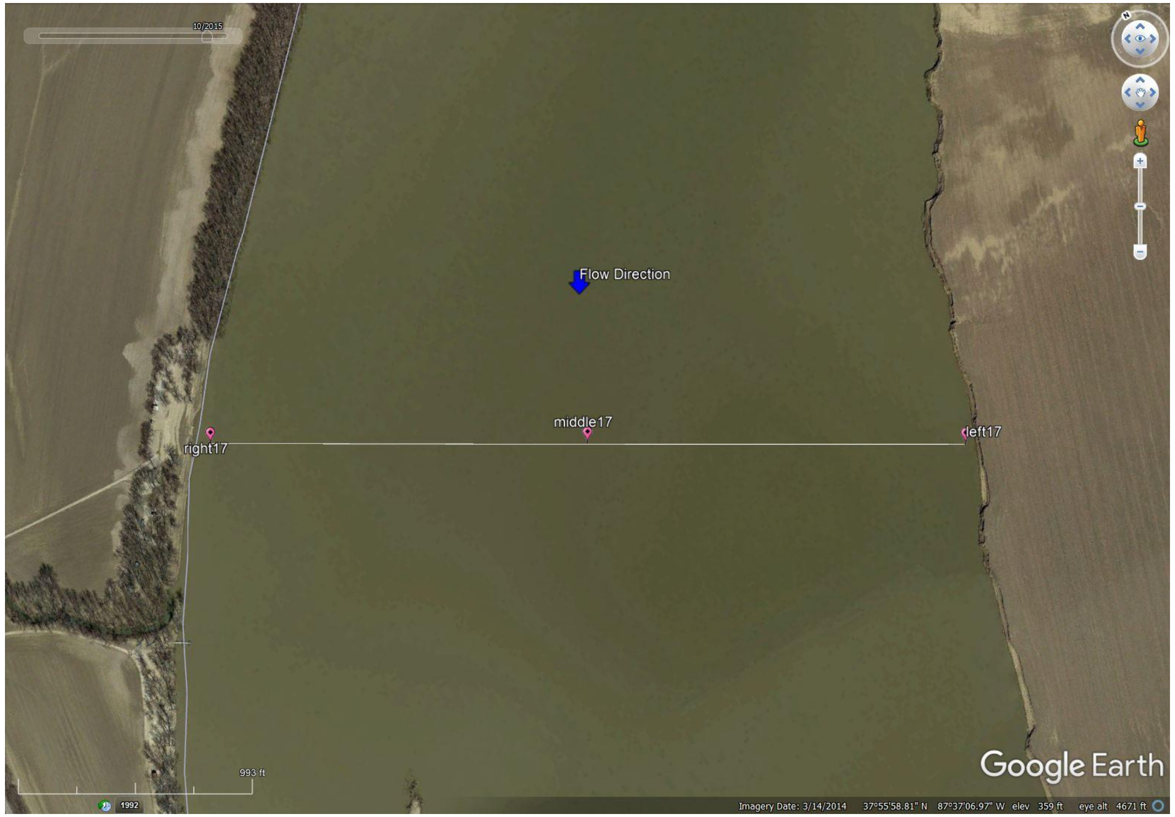
16) Mile point 747.45

I.D.	Ohio River Mile Point	Left Descending Bank Y	Left Descending Bank X	Mid-Point Y	Mid-Point X	Right Descending Bank Y	Right Descending Bank X
16	747.45	37.881214	-87.037739	37.880942	-87.040939	37.880661	-87.044167



17) Mile point 796.50

I.D .	Ohio River Mile Point	Left Descending Bank Y	Left Descending Bank X	Mid-Point Y	Mid-Point X	Right Descending Bank Y	Right Descending Bank X
17	796.50	37.9304	-87.614083	37.932656	-87.618878	37.934892	-87.623686

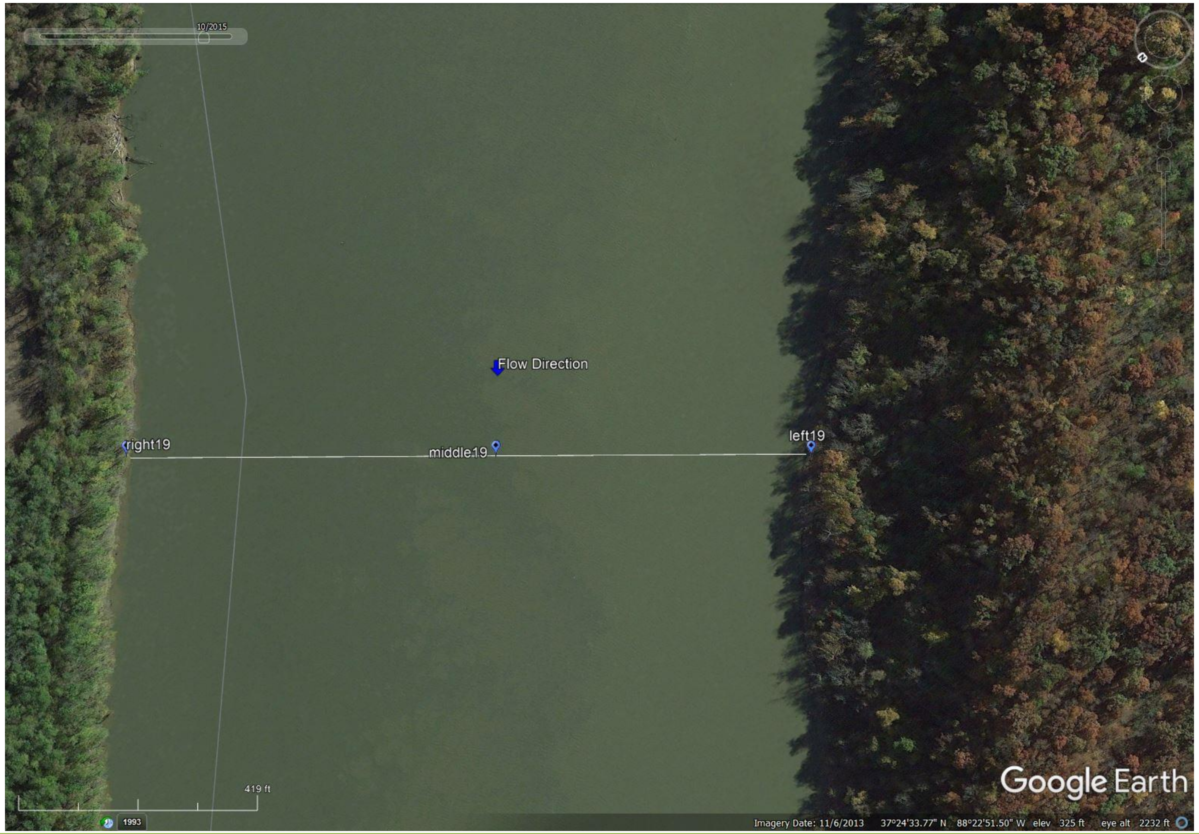


18) Mile point 845.55

I.D.	Ohio River Mile Point	Left Descending Bank Y	Left Descending Bank X	Mid-Point Y	Mid-Point X	Right Descending Bank Y	Right Descending Bank X
18	845.55	37.786097	-87.987147	37.789386	-87.98625	37.792667	-87.985344
Alt.18	845.31	37.785511	-87.983486	37.788361	-87.982083	37.791364	-87.980628

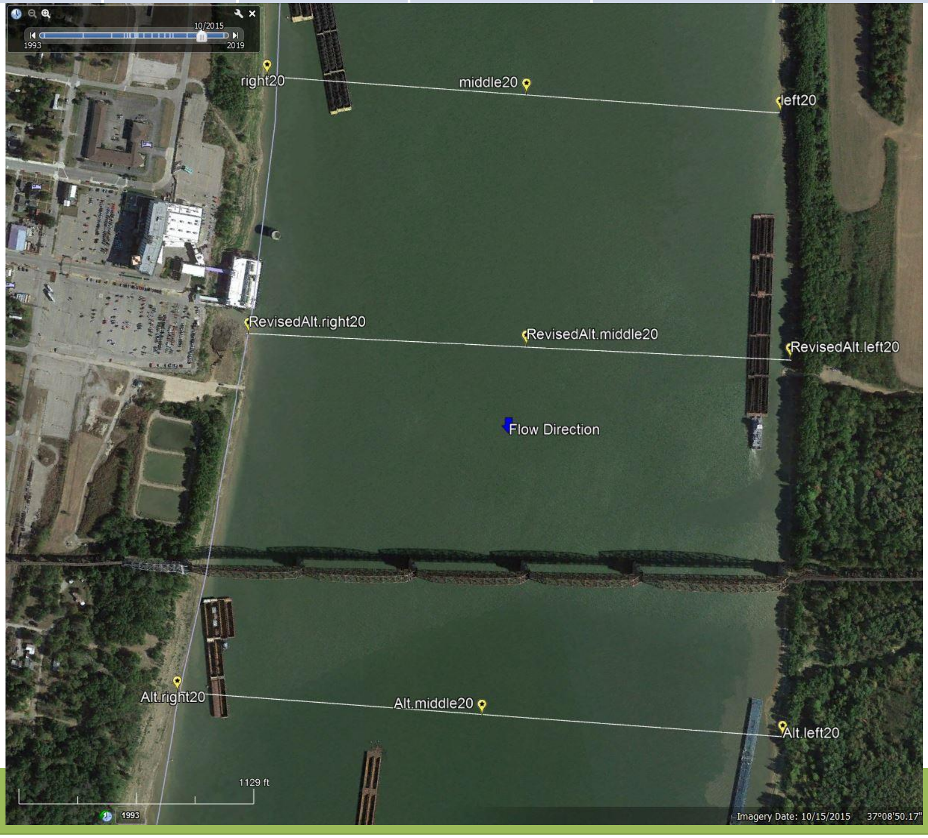
19) Mile point 894.60

I.D.	Ohio River Mile Point	Left Descending Bank Y	Left Descending Bank X	Mid-Point Y	Mid-Point X	Right Descending Bank Y	Right Descending Bank X
19	894.60	37.4087	-88.382033	37.409914	-88.380736	37.411328	-88.379225



20) Mile point 943.65

I.D.	Ohio River Mile Point	Left Descending Bank Y	Left Descending Bank X	Mid-Point Y	Mid-Point X	Right Descending Bank Y	Right Descending Bank X
20	943.65	37.138442	-88.737292	37.141464	-88.735167	37.144553	-88.732992
Alt.20	944.23	37.142006	-88.746867	37.145586	-88.74435	37.149206	-88.741772
Revised Alt. 20	943.9	37.139739	-88.741142	37.142917	-88.739022	37.14625	-88.736806

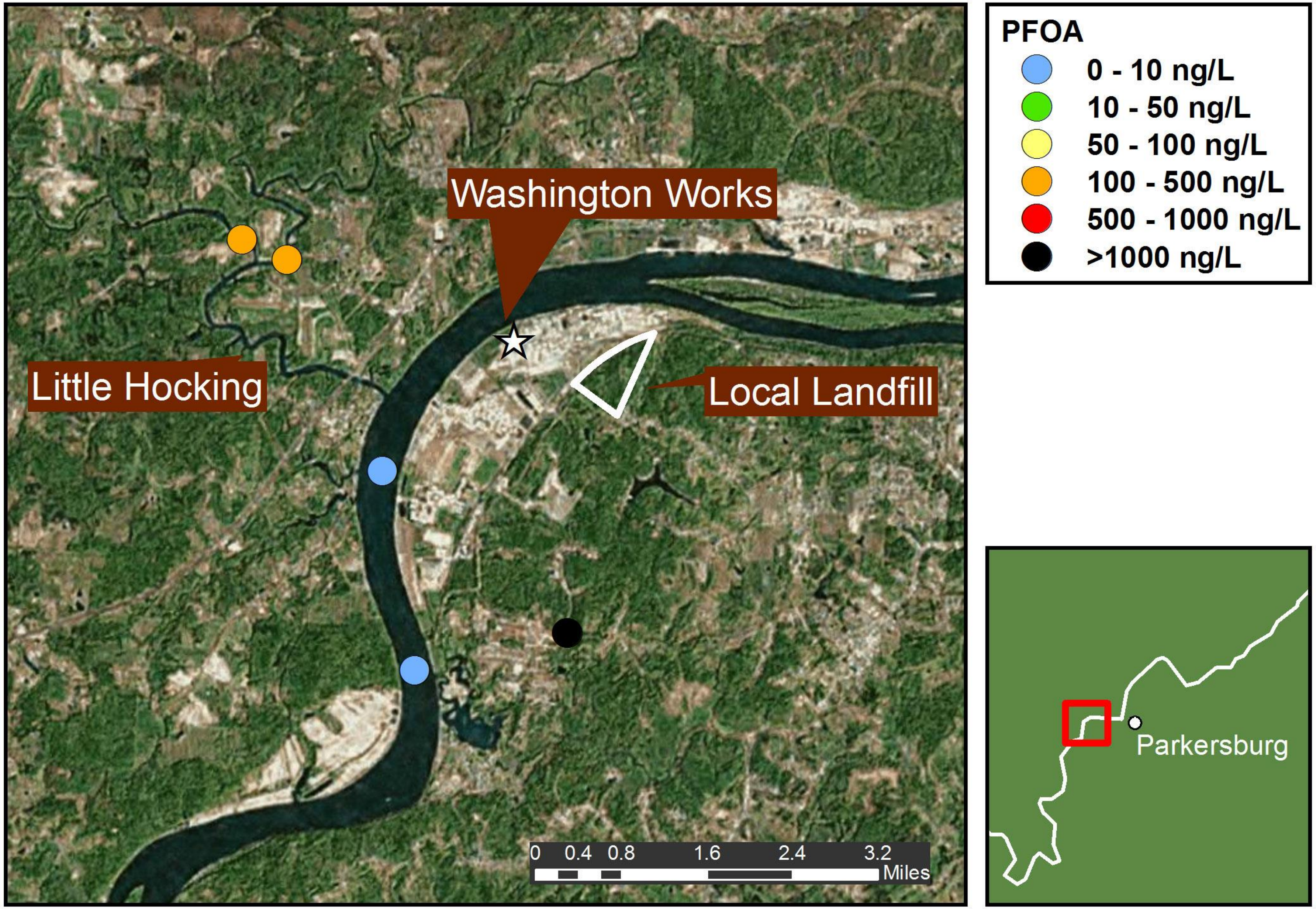


Status

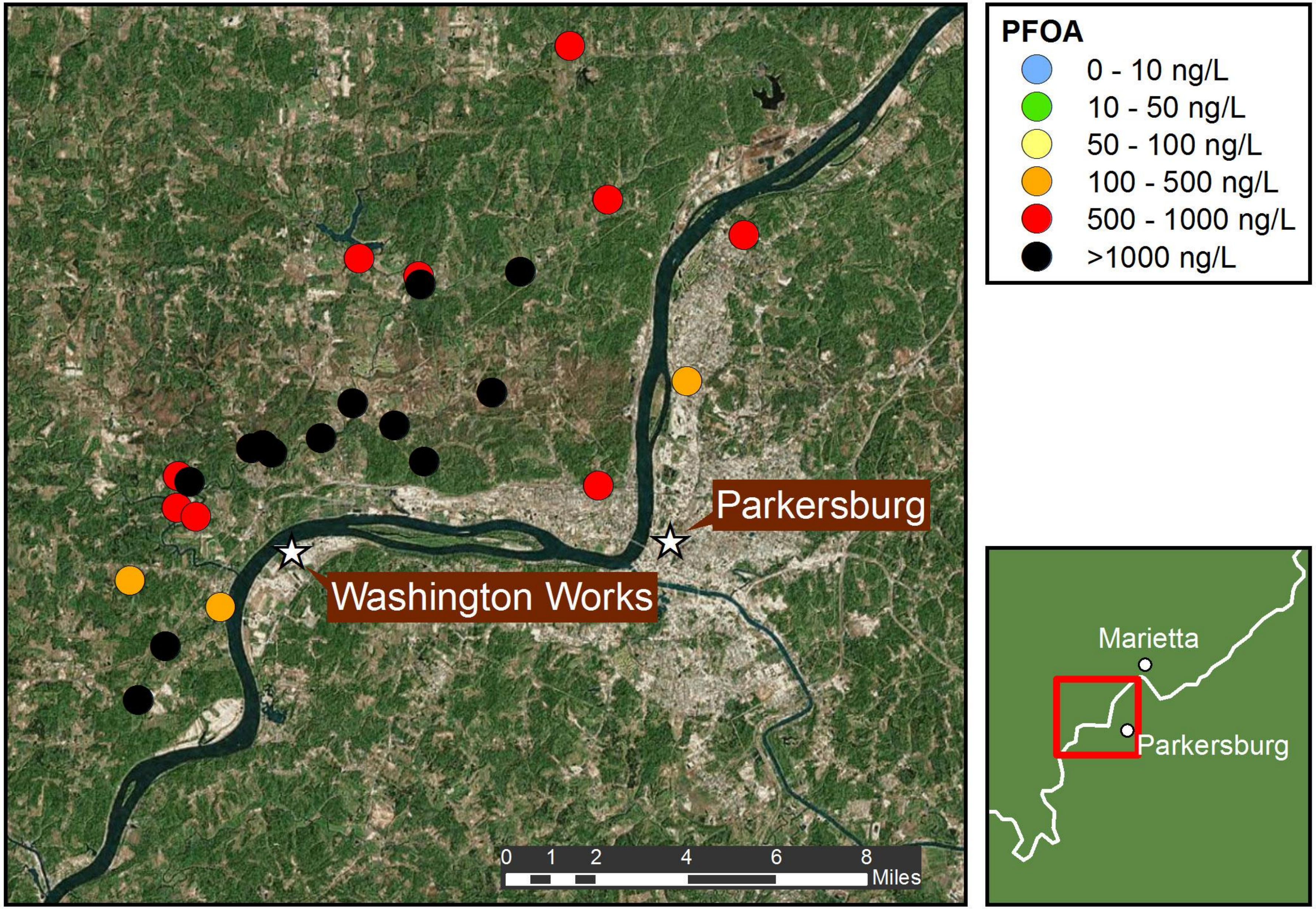
1. We have been communicating with USGS on EDI method.
2. QAPP has been developed to the extent possible. Sample collection and handling methods based on Michigan.
3. Meeting scheduled with EPA Cincinnati regarding analytical services.
4. 20 sites have been selected and sent to states to check alignment with regulatory mixing zones.

Site Selection to Bracket Parkersburg Area

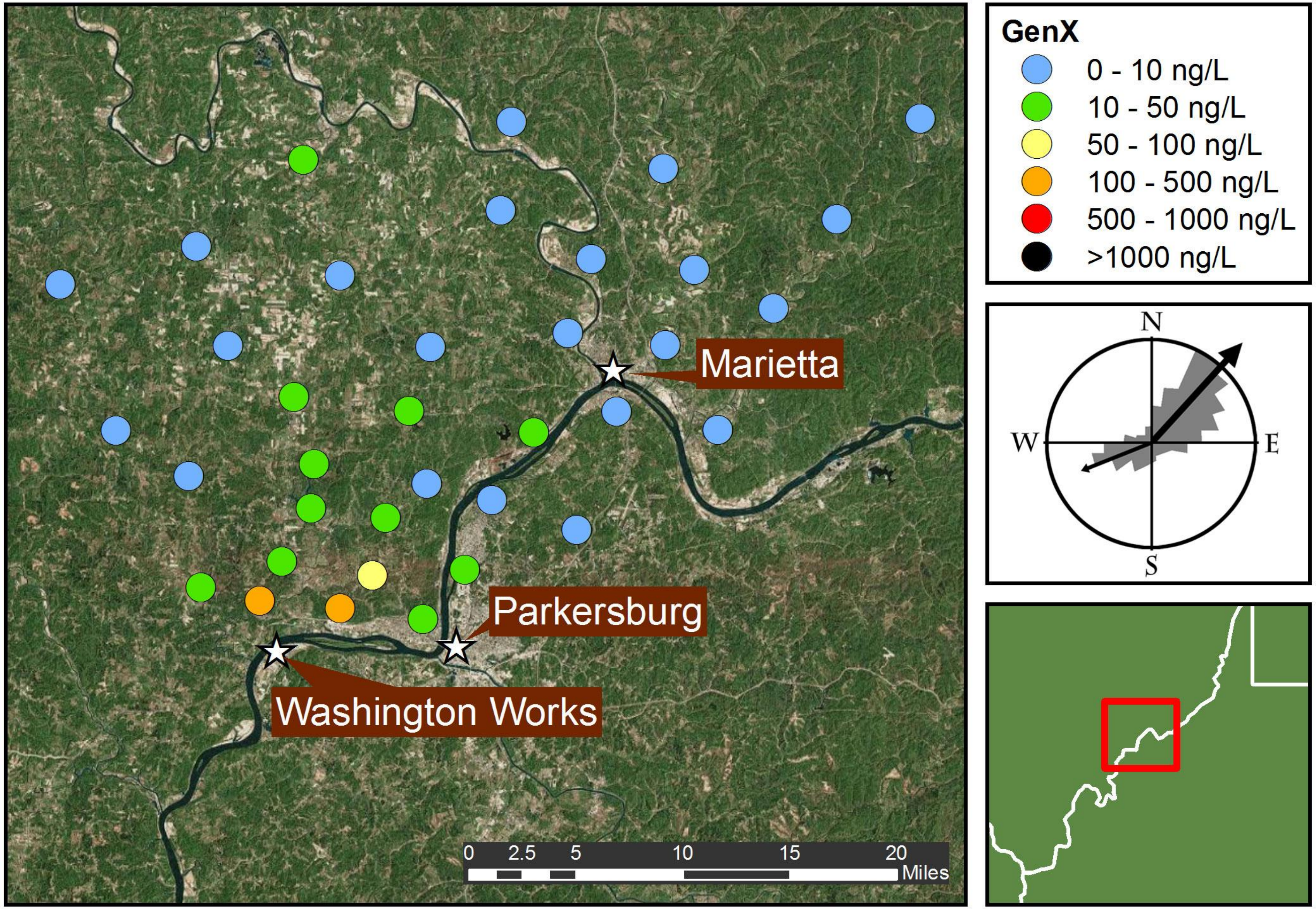
- Two additional sites are to be selected to bracket the Parkersburg area.
- Consider all existing data.
- Initially confer with OEPA & WVDEP, then bring to PFAS workgroup, and TEC in February.



Washington Works
Little Hocking
Local Landfill
0 0.4 0.8 1.6 2.4 3.2
Miles
PFOA
0 - 10 ng/L
10 - 50 ng/L
50 - 100 ng/L
100 - 500 ng/L
500 - 1000 ng/L
>1000 ng/L
Parkersburg



PFOA
0 - 10 ng/L
10 - 50 ng/L
50 - 100 ng/L
100 - 500 ng/L
500 - 1000 ng/L
>1000 ng/L
Parkersburg
Washington Works
0 1 2 4 6 8
Miles
Marietta
Parkersburg


GenX
0 - 10 ng/L
10 - 50 ng/L
50 - 100 ng/L
100 - 500 ng/L
500 - 1000 ng/L
>1000 ng/L
N
W
E
S
Marietta
Parkersburg
Washington Works
0 2.5 5 10 15 20
Miles

Remaining Tasks

1. Secure analytical services.
2. Confirm use of USGS EDI sampling method for PFAS and obtain any needed alternative equipment.
3. Select 2 sites to bracket Parkersburg area of Ohio River.
4. Finalize QAPP, Sampling Plan, and Communication Plan.
5. Confirmation that sites are not within a regulatory mixing zone.

Ohio River PFAS Study

SURVEY DESIGN

Study Objective

- Characterize present ambient concentrations of PFASs in the Ohio River at multiple locations.
- The survey is not intended to focus on drinking water, but rather develop a ambient baseline conditions for the Ohio River.
- Results may inform states, EPA, utilities & other interested parties on Ohio River ambient water quality conditions.

Study Design Elements

1. Project Scope
2. Sampling Site Selection
3. Sample Collection Method
4. Analytical Method
5. Analyte List
6. Quality Assurance Documentation

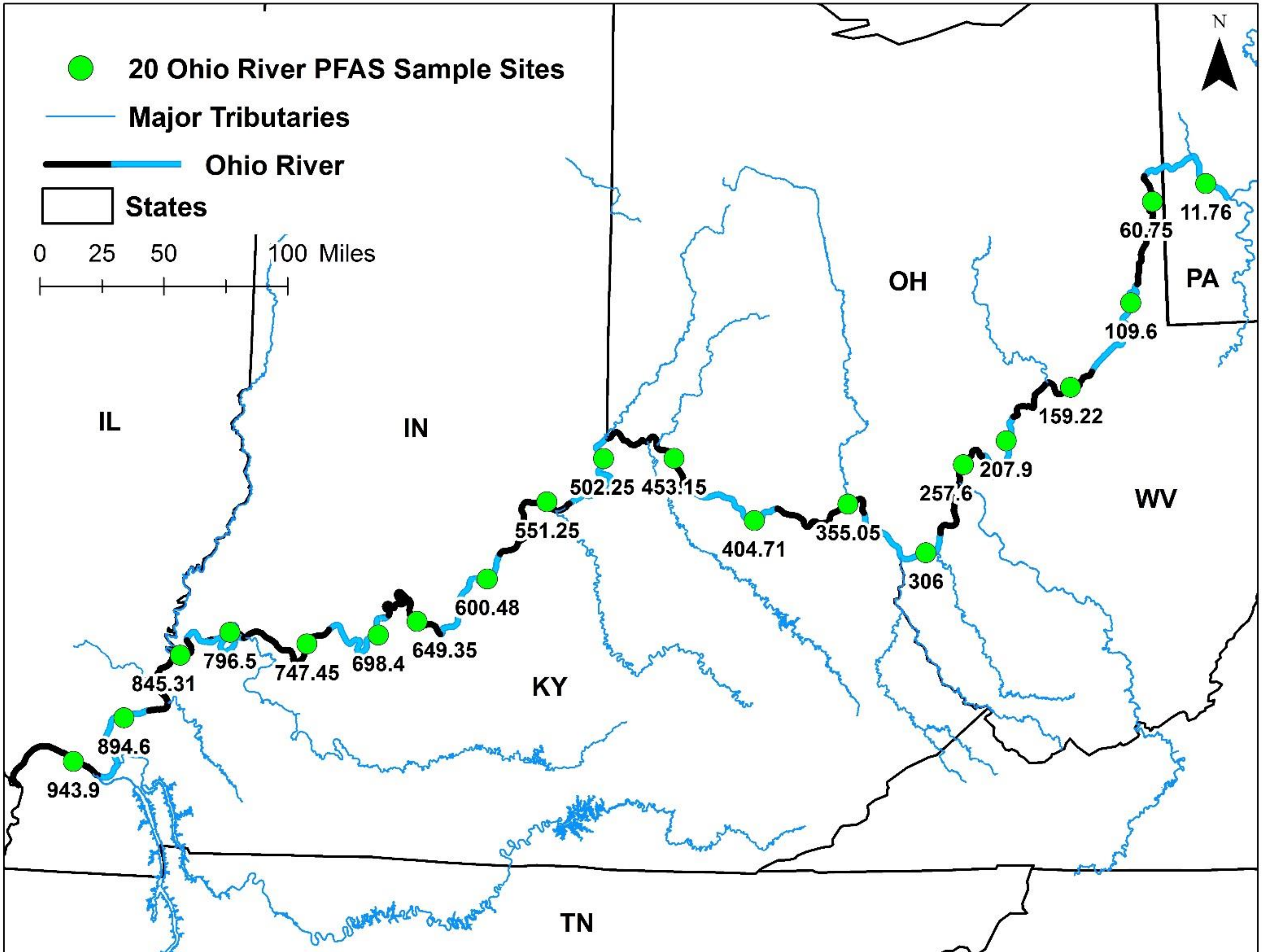
Project Scope

- ORSANCO will collect Ohio River PFAS samples.
- USEPA research lab or EPA contractor will analyze water samples for PFASs.
- Conduct 2 rounds of sampling at 20 sites
- River flow will be measured for each sampling event using Acoustic Doppler Current Profiler (ADCP).

Site Selection

- Selection Objectives
  - Good spatial coverage
  - Use probabilistic approach.
  - Reflect ambient conditions.
  - Exclude regulatory Mixing Zones

- Consulted with Tony Olsen, US EPA Corvalis
  - National expert on probabilistic sampling design
- Provided two site selection options


20 Ohio River PFAS Sample Sites
Major Tributaries
Ohio River
States
0 25 50 100 Miles
N
IL
IN
OH
PA
WV
KY
TN
11.76
60.75
109.6
159.22
207.9
257.6
306
355.05
404.71
453.15
502.25
551.25
600.48
649.35
698.4
747.45
796.5
845.31
894.6
943.9

1) Mile point 11.70

I.D.	Ohio River Mile Point	Left Descending Bank Y	Left Descending Bank X	Mid-Point Y	Mid-Point X	Right Descending Bank Y	Right Descending Bank X
1	11.70	40.534042	-80.186169	40.532756	-80.187306	40.531569	-80.188344
Alt.1	11.76	40.533628	-80.185131	40.532275	-80.186281	40.530983	-80.187356

Sampling Methods

- Method choice depends on a number factors
  - Waterbody Characteristics
  - Available Resources (Time + $$ + Expertise)
  - Data Quality Needs
  - Sampling Objectives

Grab	Depth Integrated
• Low Budget • Smaller streams • Well mixed • Desire to measure analyte at specific depth • Define analyte distribution in water column	• Large streams • Not well mixed • Measure representative concentrations throughout water column (vertical composite) • Calculate loadings

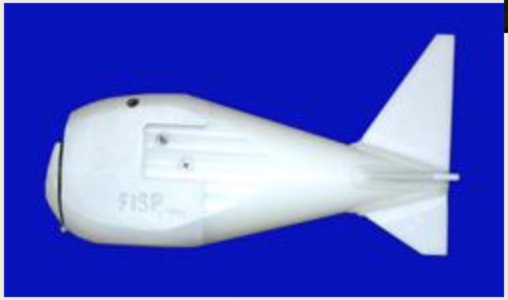
Grab Sampling

- Surface Dip (Bucket or sample bottle)
  - Surface sample collection
  - Quick and easy
  - Results potentially biased (high for PFAS)
- Kemmerer
  - Sub-surface sampling
  - Sample collected at specified depth
  - Single depth may not represent water column
- HydraSleeve
  - Designed for groundwater sampling
  - Collect sample at desired sub-surface depth
  - Single depth may not represent water column
  - May be challenging at depth and in swift water

Depth-Integrated Sampling

- Peristaltic Pump
  - Collects vertical water column composite
  - Pump sample through HDPE tubing
  - Non-isokinetic (water velocity changes)

- Weighted-Bottle Sampler
  - USGS DH-95 Sampler
  - Non-isokinetic
  - Rated for depths up to 15 feet
  - Weighs 29 lbs.

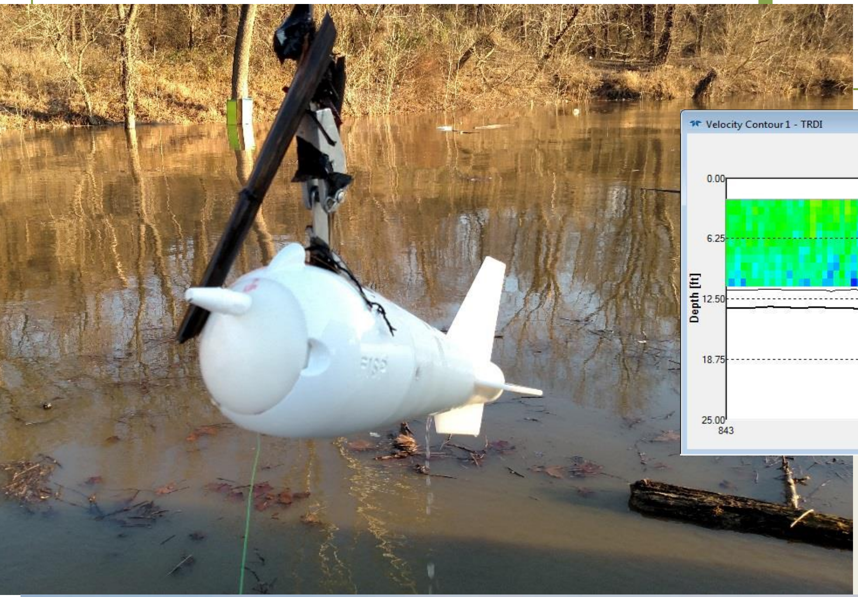


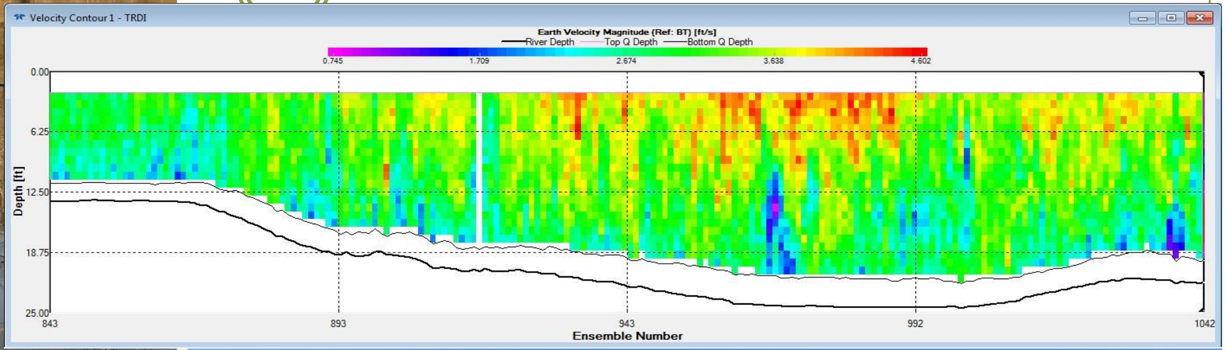
- Equal Discharge Increment (EDI)
  - USGS D-96 Sampler
  - Isokinetic
  - Rated for max depth up to 110 feet
  - Weighs 132 lbs

Method Selection

- Sampling objective:
  - Characterize ambient concentrations of PFAS in the Ohio River at multiple locations.
- Situational Considerations:
  - Large river system
  - Unknown distribution of PFAS in water column
    - Distribution possibly uneven and non-random
  - Objective is to characterize ambient PFAS levels in river
- Propose EDI method (pending QA results from USGS)
  - Best meets method selection considerations
  - Collects isokinetic flow-weighted cross-sectional composite
  - Plan to collect one sample per day
- Proposed alternative method - Peristaltic pump method
  - Not isokinetic; however, allows for full vertically composited sample collection

EDI Sampling Equipment





Analytical Method

- Several lab methods available for PFAS
  - 537 and 537.1 – Developed for finished water (18 analytes)
  - 533 – Released late 2019 (25 analytes)
  - 16XX – Soon to be released (analyte list not finalized)
- Rely heavily on EPA expertise for method selection.
- Workgroup recommends including Gen-X compounds – EPA can do this.
- Analyte list will be dependent on lab method.

Status

1. We have been communicating with USGS on sampling methodology.
2. QAPP has been developed to the extent possible. Sample handling methods based on Michigan.
3. Recent call with US EPA Cincinnati and USGS regarding sampling.
4. 20 sites have been selected and sent to states to check alignment with regulatory mixing zones.
5. Work Group will have a call in March.

Remaining Tasks

1. Awaiting release of sampling methodology and blanking results from USGS for EDI method.
2. Obtain any needed alternative equipment once sampling method established.
3. Finalize analytical services arrangement with US EPA (or contractor)
4. Select 2 sites to bracket Parkersburg area of Ohio River.
5. Finalize QAPP and Sampling Plan
6. Finalize Communication Plan.

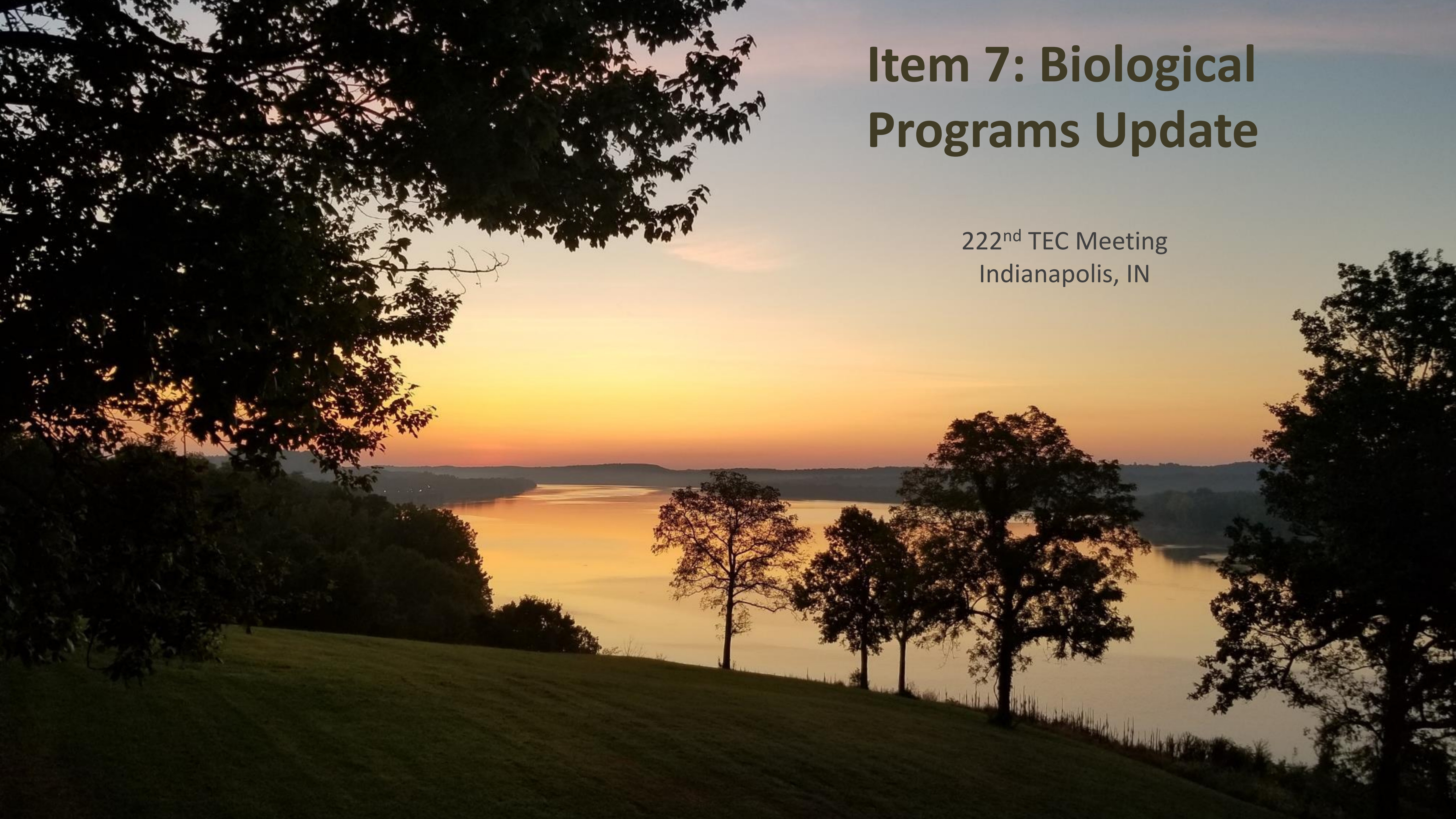
Questions or Comments?

Original Probabilistic Sites / Alternate Sites

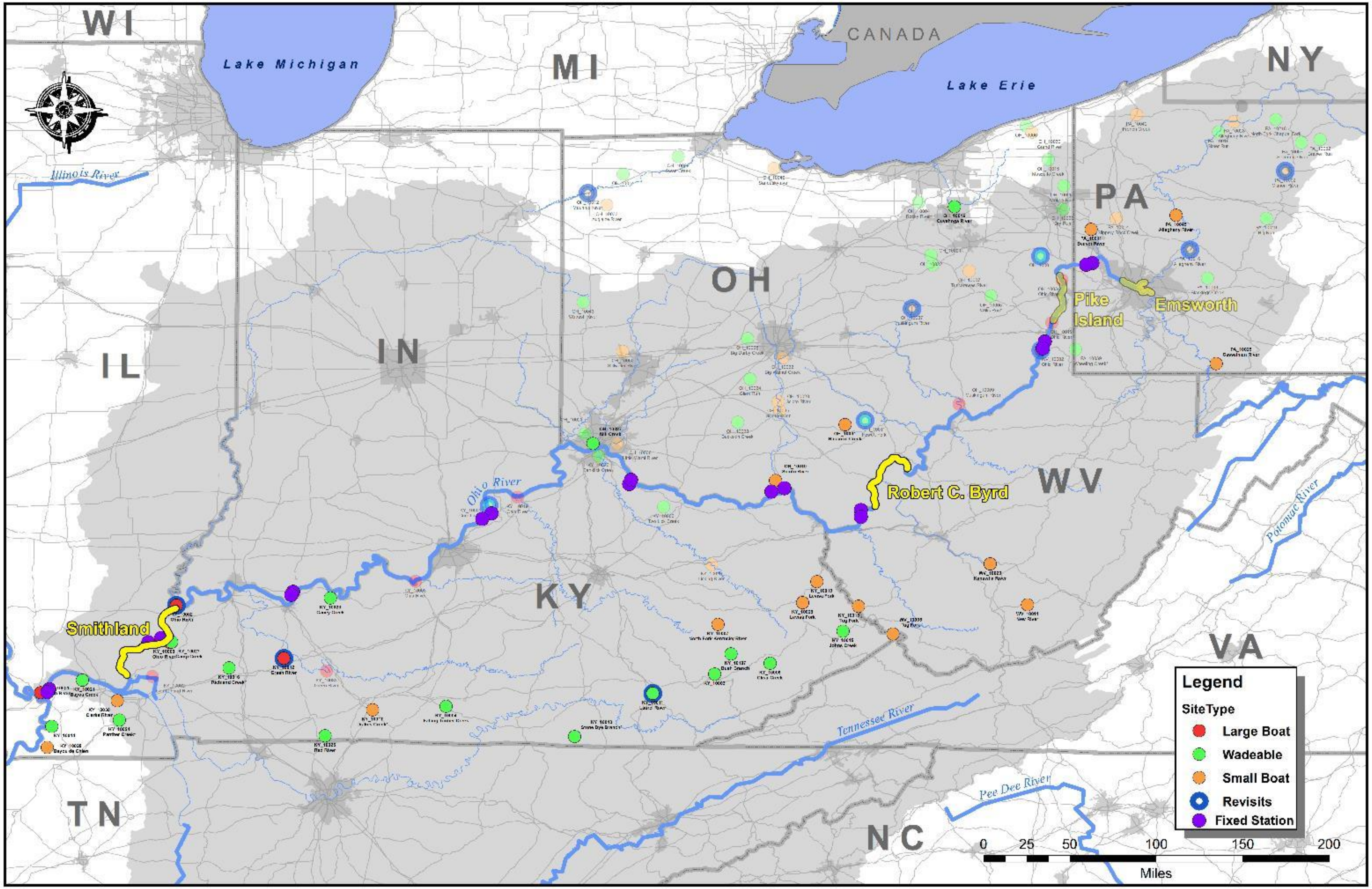
I.D.	Ohio River Mile Point	Left Descending Bank Y	Left Descending Bank X	Mid-Point Y	Mid-Point X	Right Descending Bank Y	Right Descending Bank X	Issue	Alt. I.D.	Ohio River Mile Point	Alt. Left Descending Bank Y	Alt. Left Descending Bank X	Alt.Mid Point Y	Alt. Mid Point X	Alt. Right Descending Bank Y	Alt. Right Descending Bank X
1	11.70	40.534042	-80.186169	40.532756	-80.187306	40.531569	-80.188344	ADCP flow measurement instrument during sample collection will not work if too close to large metal structures (the bridge)	Alt.1	11.76	40.533628	-80.185131	40.532275	-80.186281	40.530983	-80.187356
2	60.75	40.441808	-80.604633	40.442611	-80.607167	40.443372	-80.60965									
3	109.80	39.854978	-80.802628	39.856433	-80.803547	39.857931	-80.80445	designated barge fleeting area	Alt.3	111.32	39.844158	-80.822678	39.844819	-80.824314	39.845539	-80.826133
								discharges downstream of original. Move point upstream	Revised Alt. 3	109.60	39.856656	-80.799325	39.858006	-80.800511	39.859372	-80.801739
4	158.85	39.378058	-81.2717	39.380636	-81.274233	39.383108	-81.276708	Broadback Island in the middle	Alt.4	159.22	39.3757	-81.27855	39.377575	-81.280039	39.379392	-81.281467
5	207.90	39.075631	-81.780783	39.077333	-81.780783	39.078981	-81.780803									
6	256.95	38.951144	-82.100194	38.952019	-82.102031	38.952822	-82.103728	designated barge fleeting area	Alt.6	257.60	38.943867	-82.103581	38.944531	-82.106594	38.945133	-82.109614
7	306.00	38.435886	-82.404478	38.4382	-82.404522	38.440711	-82.404594									
8	355.05	38.724172	-82.988264	38.725794	-82.987878	38.727403	-82.987489									
9	404.10	38.628406	-83.686358	38.629953	-83.685606	38.631544	-83.684844	designated barge fleeting area	Alt.9	404.71	38.631997	-83.697056	38.633753	-83.695864	38.635556	-83.69465
10	453.15	38.993714	-84.305828	38.994547	-84.3027	38.995397	-84.299519									
11	502.20	38.993969	-84.835522	38.992347	-84.838211	38.990719	-84.840897	Laughery Island in the middle	Alt.11	502.25	38.993358	-84.835086	38.991792	-84.837647	38.99015	-84.840303
12	551.25	38.733742	-85.262956	38.736139	-85.261681	38.738528	-85.260425									
13	600.30	38.283217	-85.697536	38.285414	-85.6993	38.287631	-85.701094	manmade boating docs	Alt.13	600.48	38.281828	-85.700256	38.284083	-85.702078	38.286422	-85.703972
14	649.35	38.026233	-86.223811	38.028136	-86.221511	38.030067	-86.219183									
15	698.40	37.945508	-86.505769	37.944417	-86.508119	37.943331	-86.510464									
16	747.45	37.881214	-87.037739	37.880942	-87.040939	37.880661	-87.044167									
17	796.50	37.9304	-87.614083	37.932656	-87.618878	37.934892	-87.623686									
18	845.55	37.786097	-87.987147	37.789386	-87.98625	37.792667	-87.985344	moving away from dam for safety	Alt.18	845.31	37.785511	-87.983486	37.788361	-87.982083	37.791364	-87.980628
19	894.60	37.4087	-88.382033	37.409914	-88.380736	37.411328	-88.379225									
20	943.65	37.138442	-88.737292	37.141464	-88.735167	37.144553	-88.732992	designated barge fleeting area	Alt.20	944.23	37.142006	-88.746867	37.145586	-88.74435	37.149206	-88.741772
								move site upstream to avoid discharge at mile point 944.	Revised Alt. 20	943.9	37.139739	-88.741142	37.142917	-88.739022	37.14625	-88.736806

Item 7: Biological Programs Update

222nd TEC Meeting
Indianapolis, IN

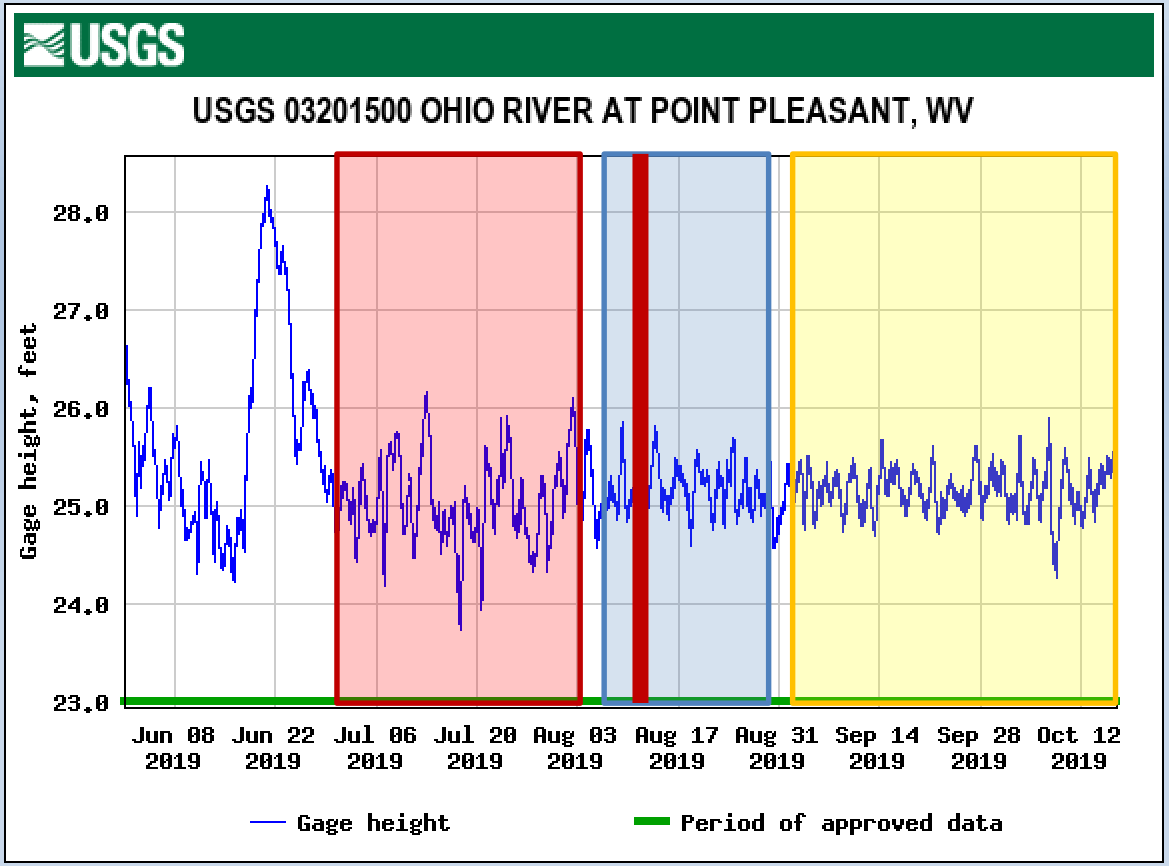


ORSANCO Biological Survey Events (NRSA, Probabilistic, & Fixed Station)

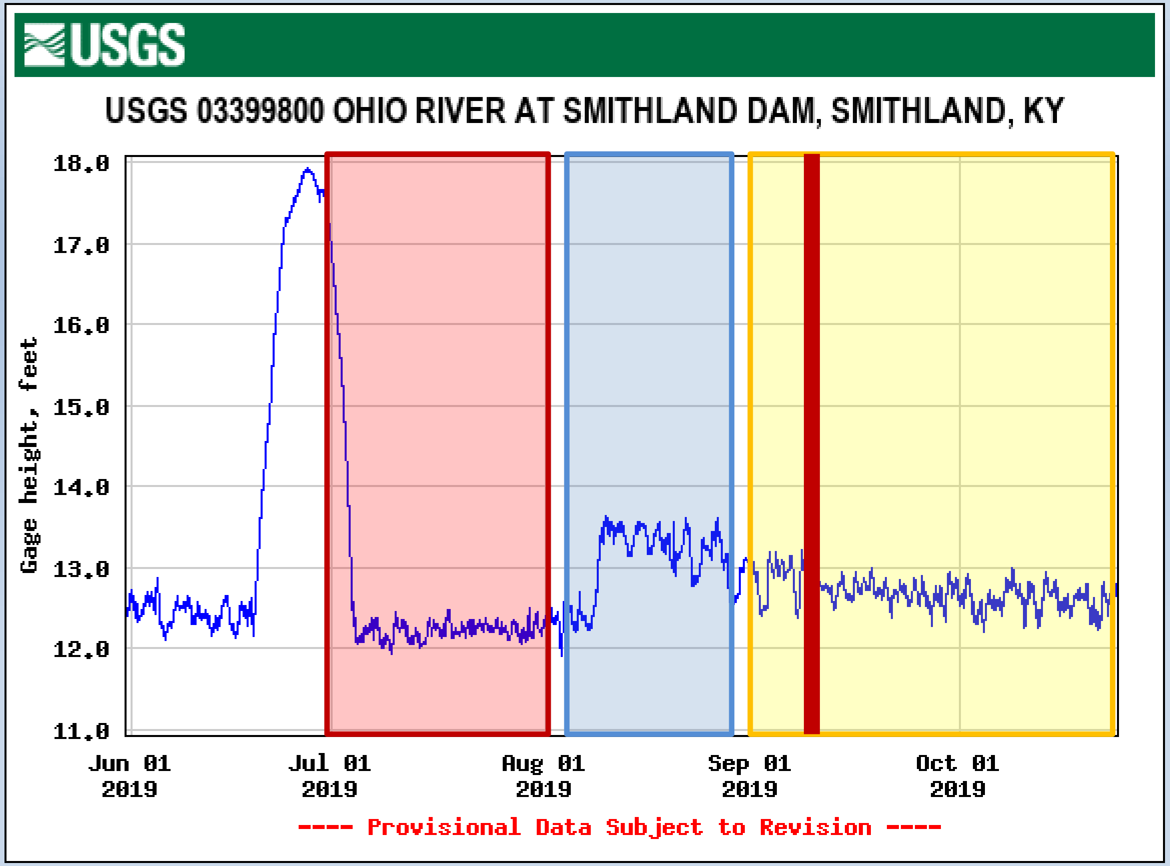


2019 Activities

NRSA-Probabilistic-Fixed Station-Macroinvertebrates/SAV

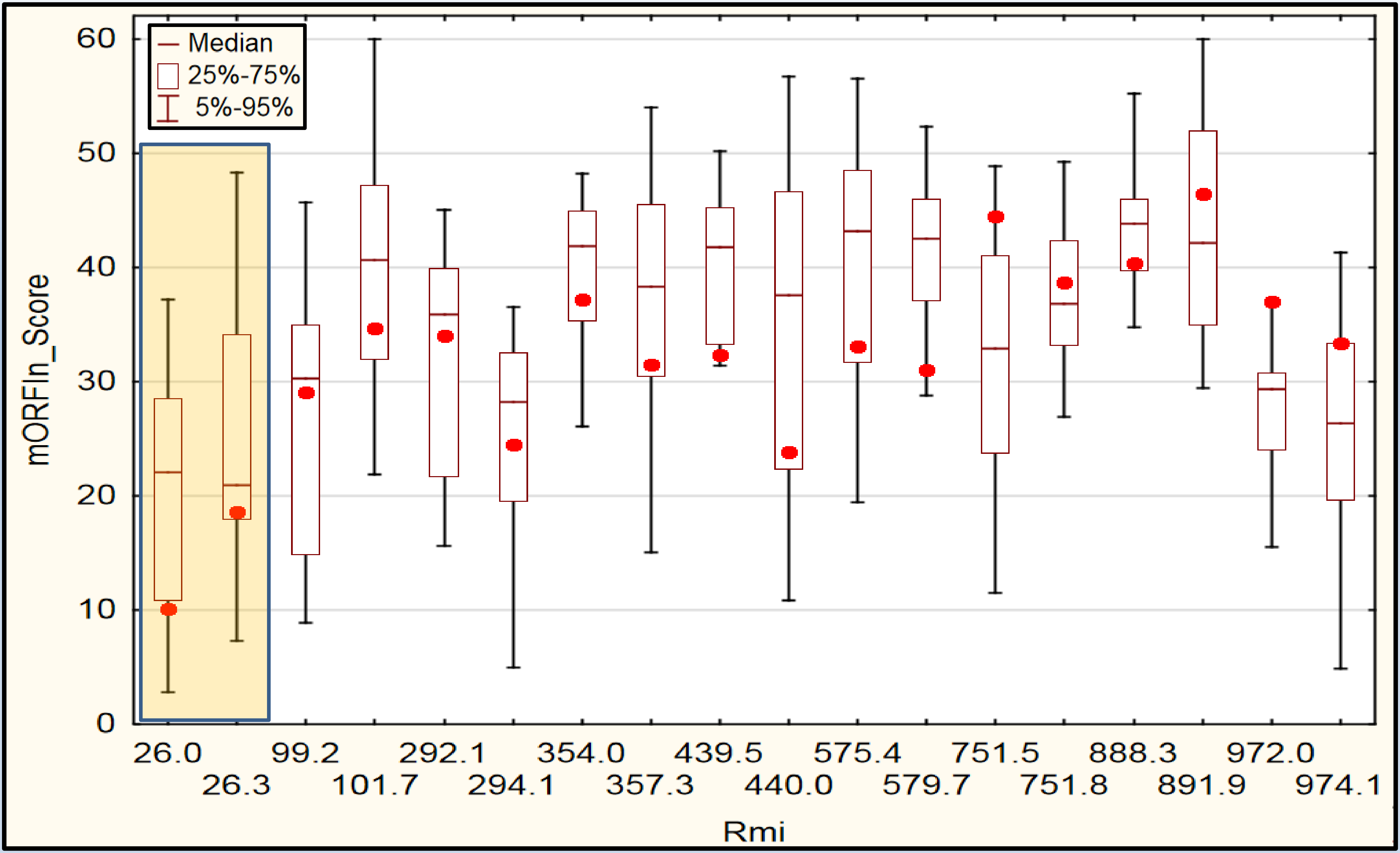


R. C. Byrd



Smithland

Fixed Station *m*ORFIn Performance

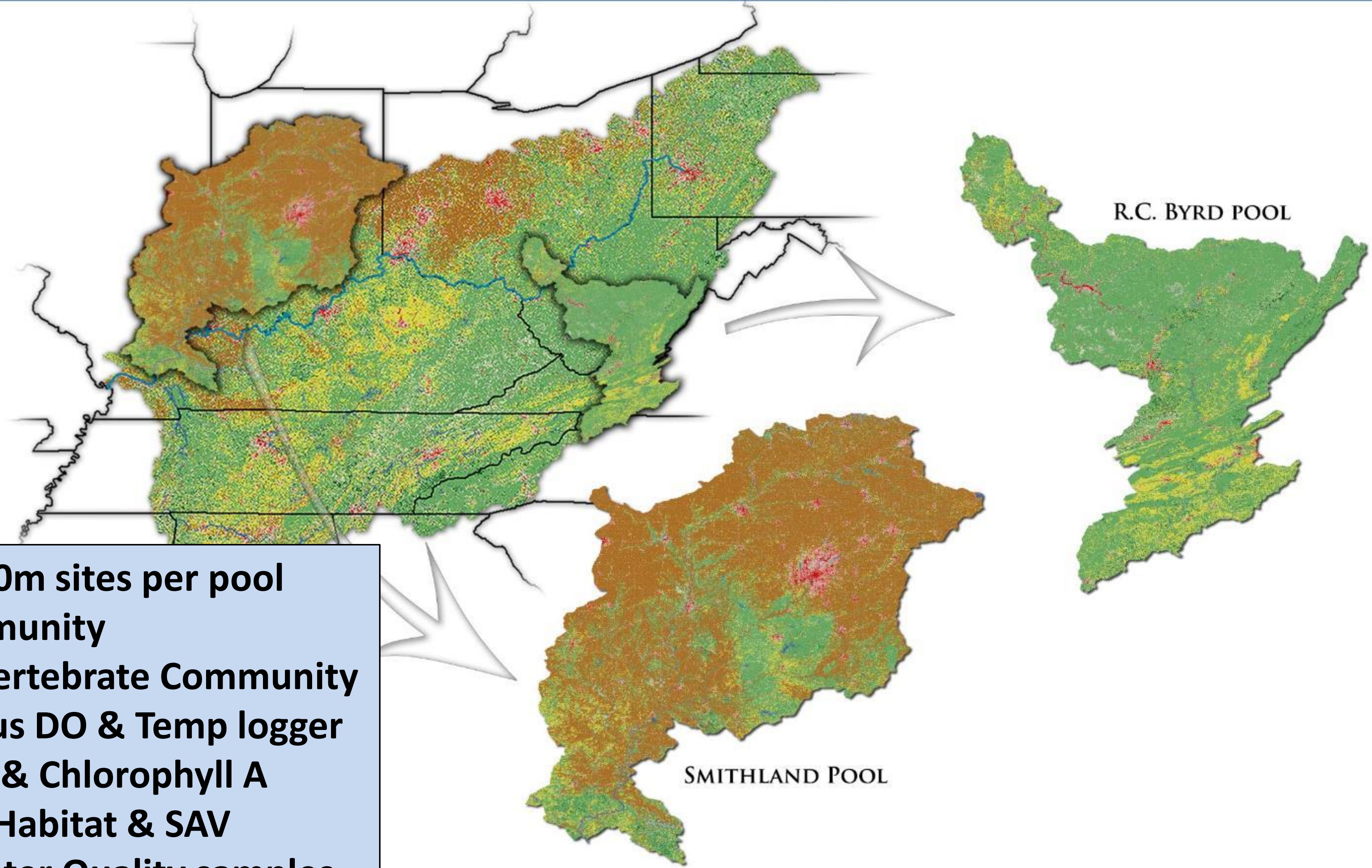


Boxplots: 2004-2018 mORFI*n* Scores

: 2019 mORFI*n* Score

2019 POOL SURVEY RESULTS

The results of the 2019 biological surveys are detailed in the following pages (relative pool locations shown below). Included are brief descriptions of the land use & hydrology, site level mORFIn & ORMIn ratings, summaries of notible catches & instream habitat, and the overall biological condition of each pool.

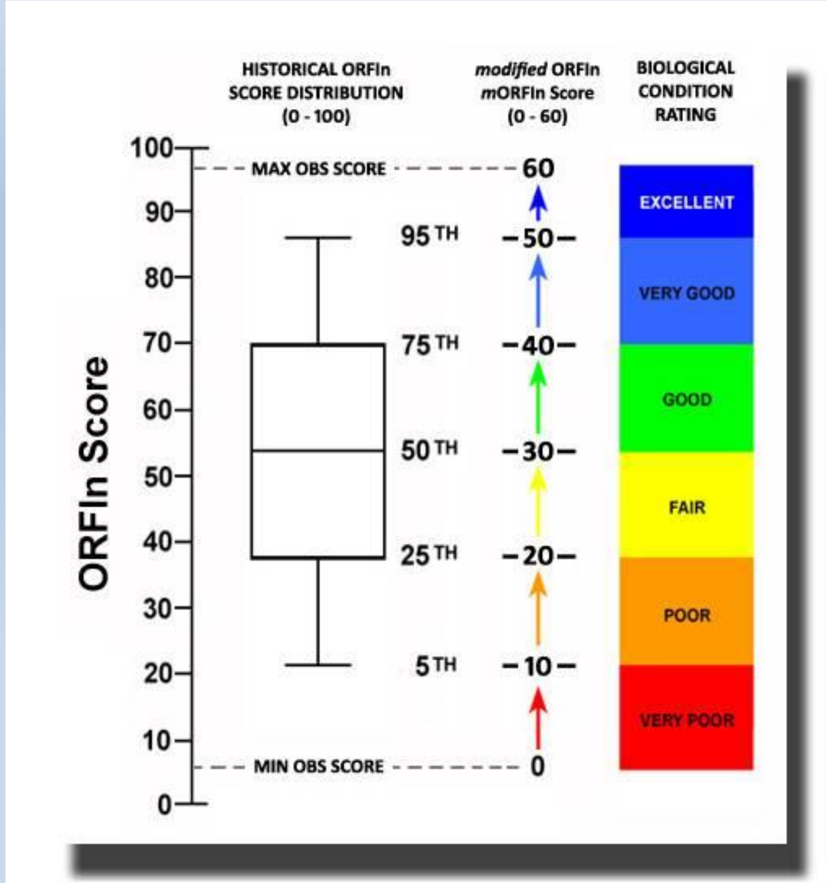


- 15 random 500m sites per pool
    - Fish Community
    - Macroinvertebrate Community
    - Continuous DO & Temp logger
    - Nutrients & Chlorophyll A
    - Instream Habitat & SAV
    - Paired Water Quality samples

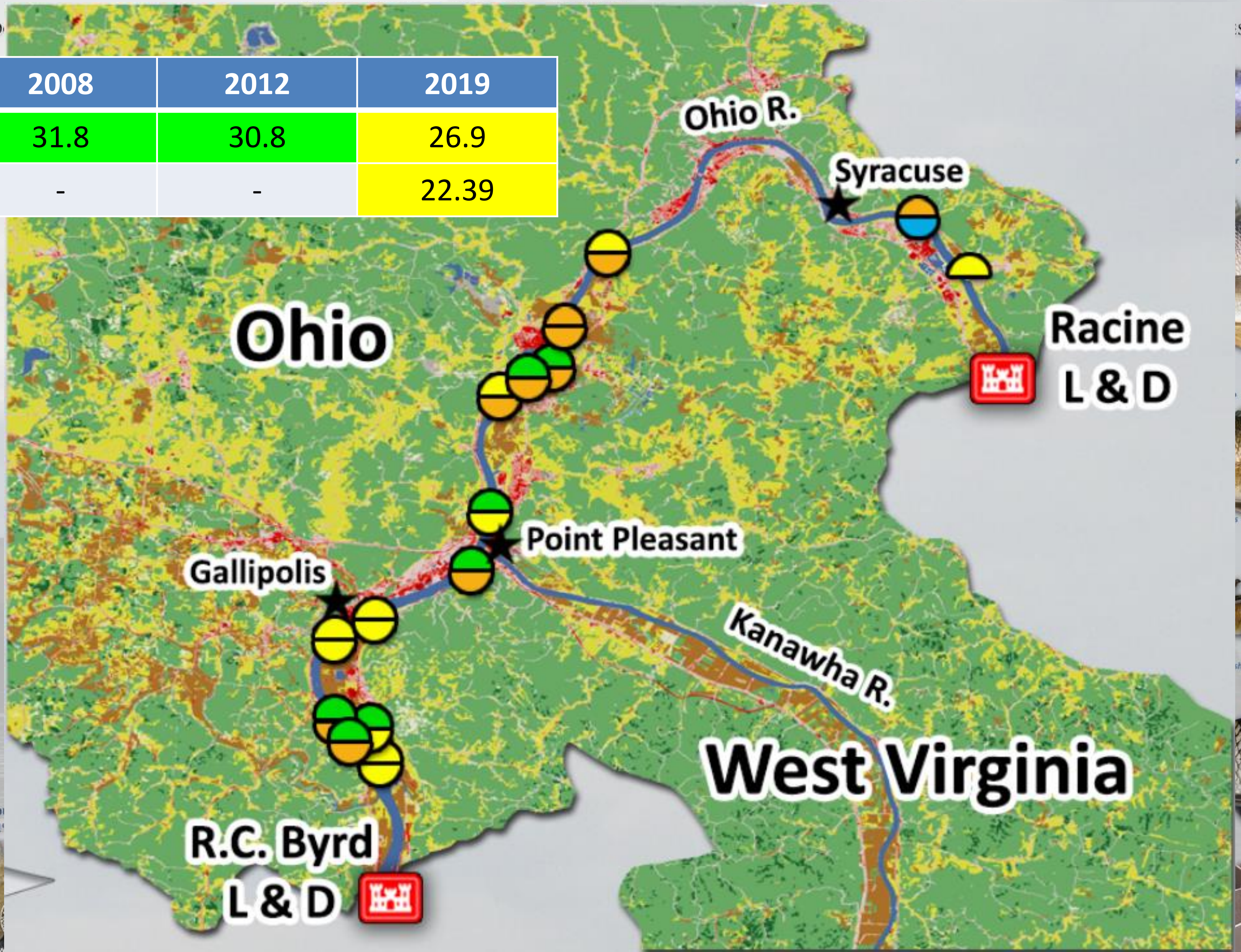
For more detailed catch, metric, and index scores visit www.orsanco.org/programs/biological-programs

Assessment Tools

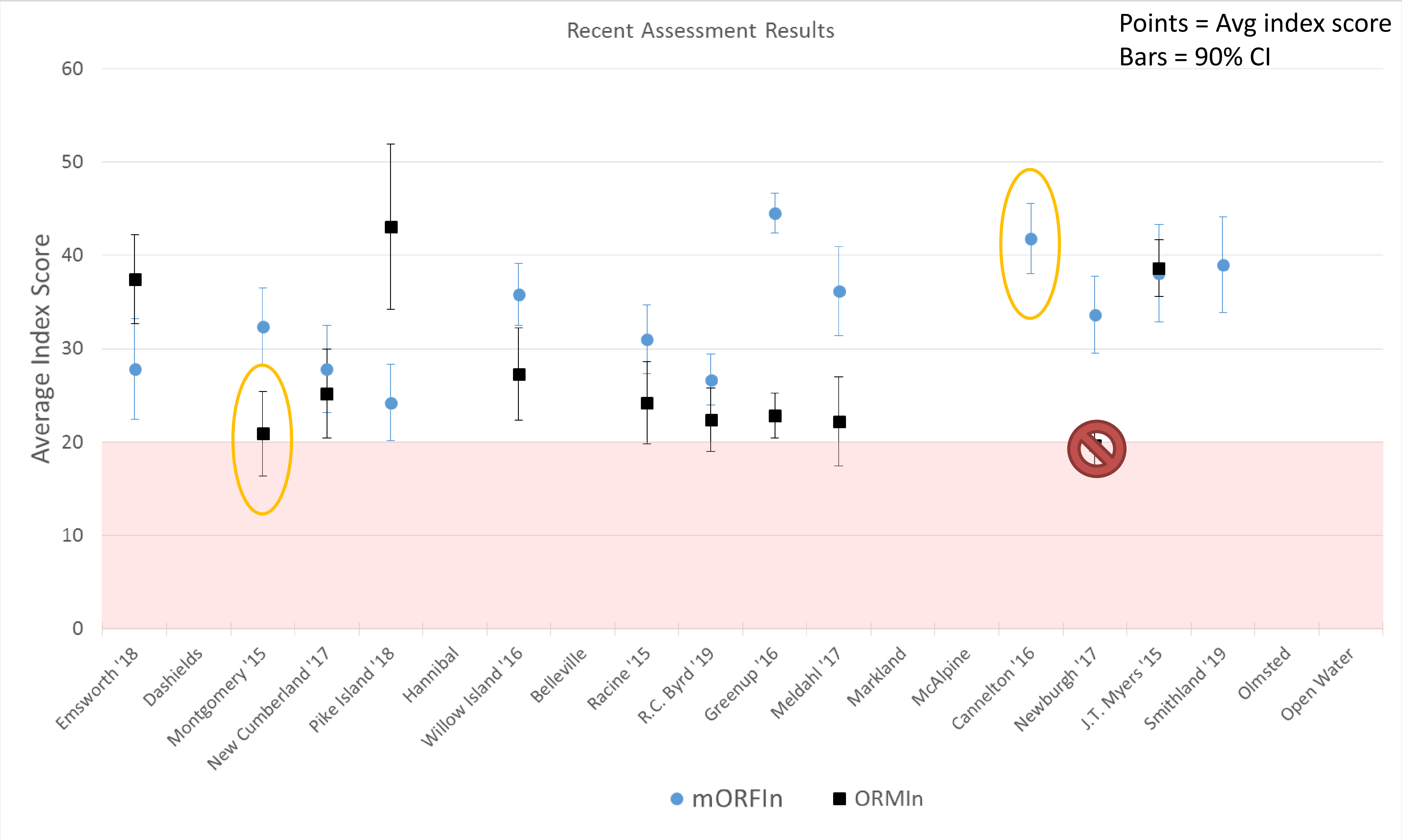
- 2003 - Created a multi-metric Ohio River Fish index (ORFIn)
- 2008 - Modified (*m*ORFIn) to incorporate updated habitat classes and metric scoring methods
- 2012 - Created a multi-metric Ohio River Macro index (ORMIn)
- Fish and Bug metrics
  - Diversity, abundance, feeding/reproductive guilds, pollution tolerance, health, and habits
- Compare observed index score of a site to the past performance of sites with similar habitat
- Biological Condition Ratings (colors) are based on this relative performance
- Support > 20 average index score, 'Fair' rating or better



	2008	2012	2019
*m*ORFIn	31.8	30.8	26.9
ORMIn	-	-	22.39

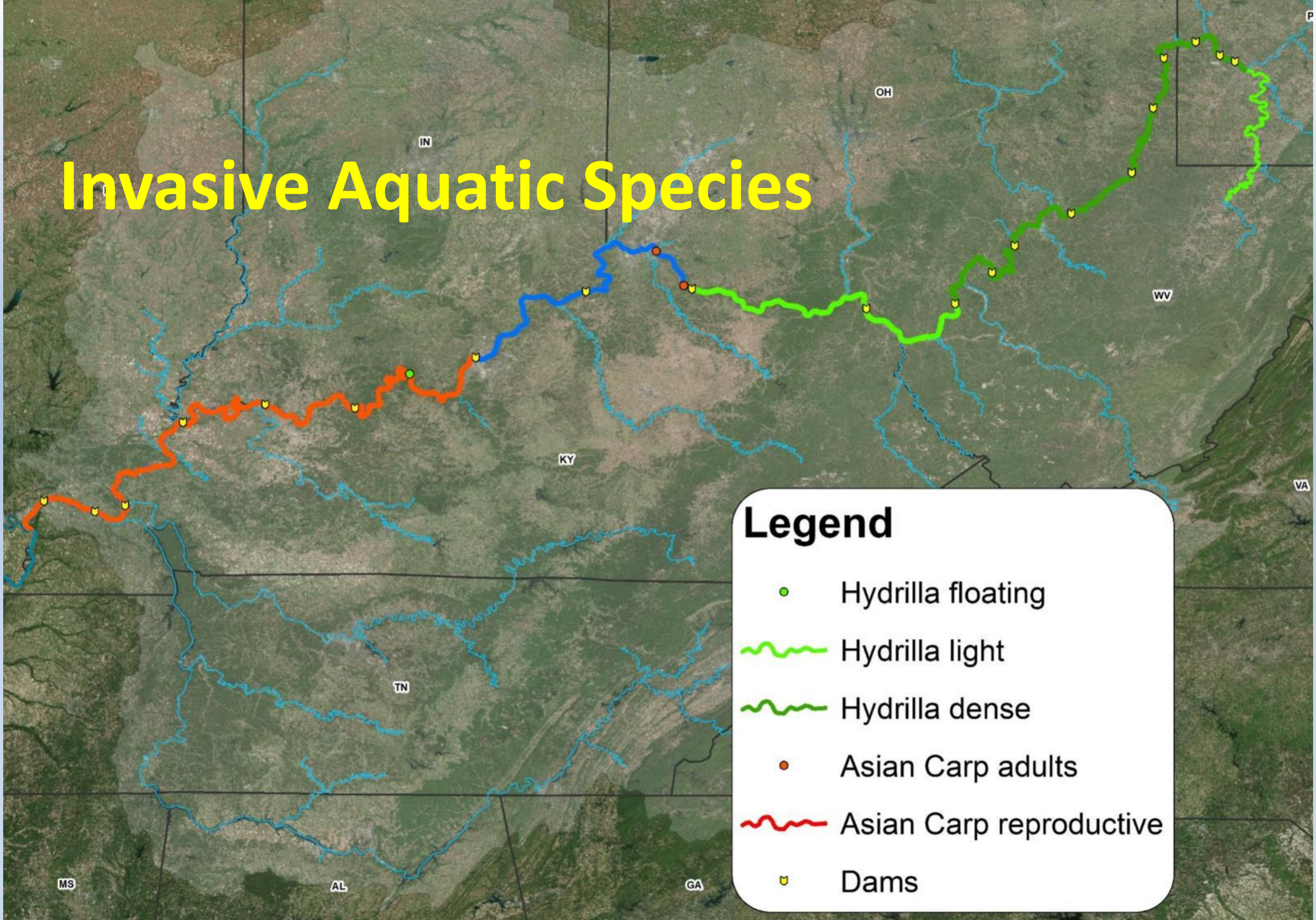


	2008	2012	2019
*m*ORFIn	33.6	31.2	39.2
ORMIn	-	-	*Pending*

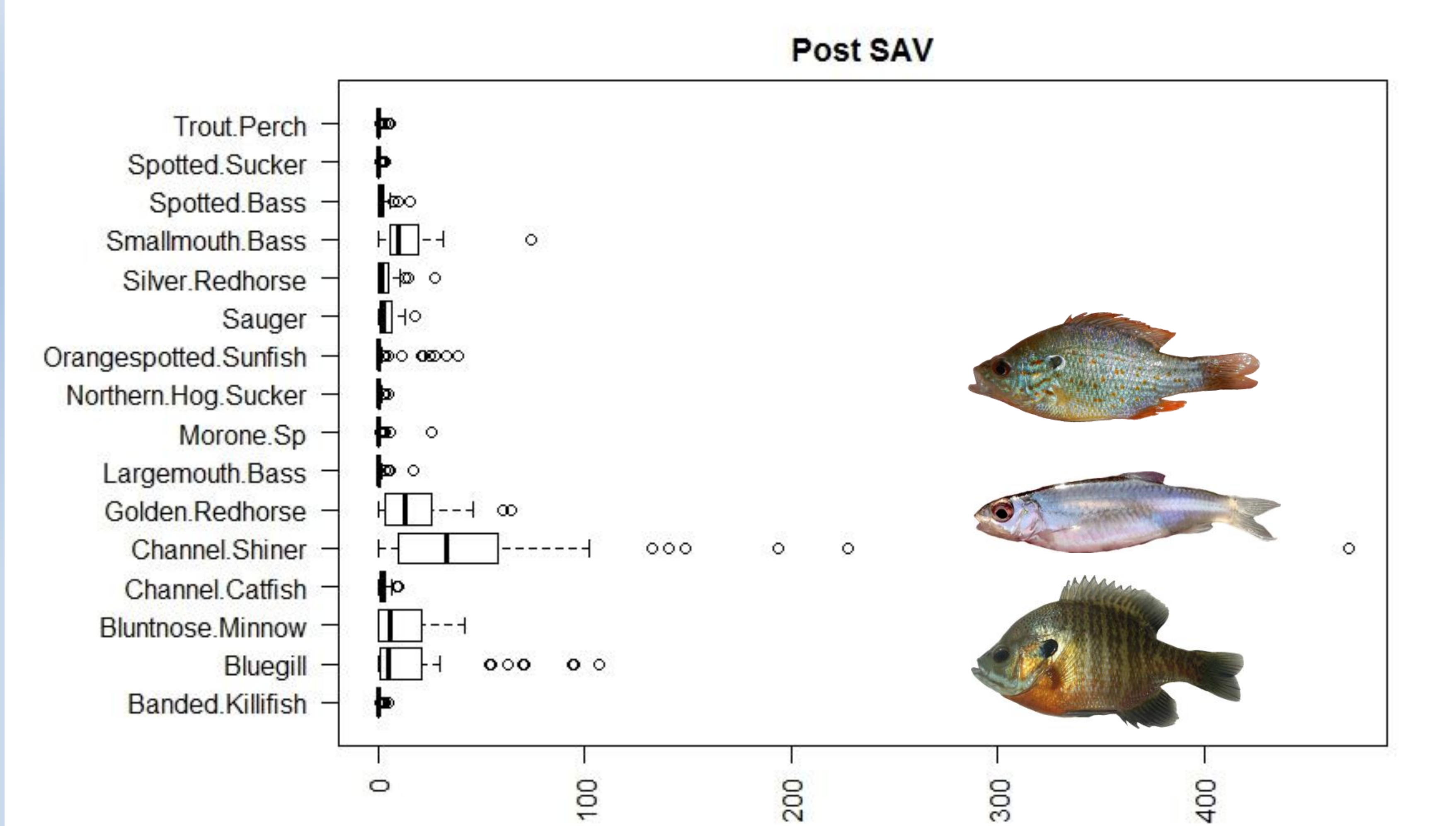


Recent Assessment Results
Points = Avg index score
Bars = 90% CI
Average Index Score
60
50
40
30
20
10
0
Emsworth '18
Dashields
Montgomery '15
New Cumberland '17
Pike Island '18
Hannibal
Willow Island '16
Belleville
Racine '15
R.C. Byrd '19
Greenup '16
Meldahl '17
Markland
McAlpine
Cannelton '16
Newburgh '17
J.T. Myers '15
Smithland '19
Olmsted
Open Water
mORFIn
ORMIn

Invasive Aquatic Species

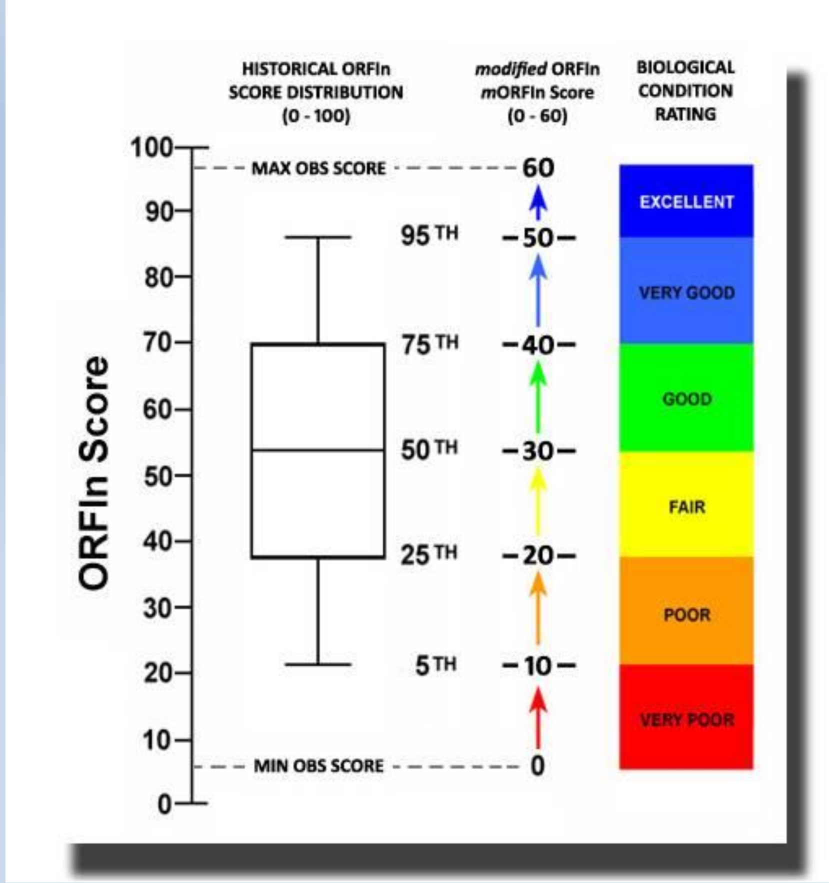


Fish Species Shifts



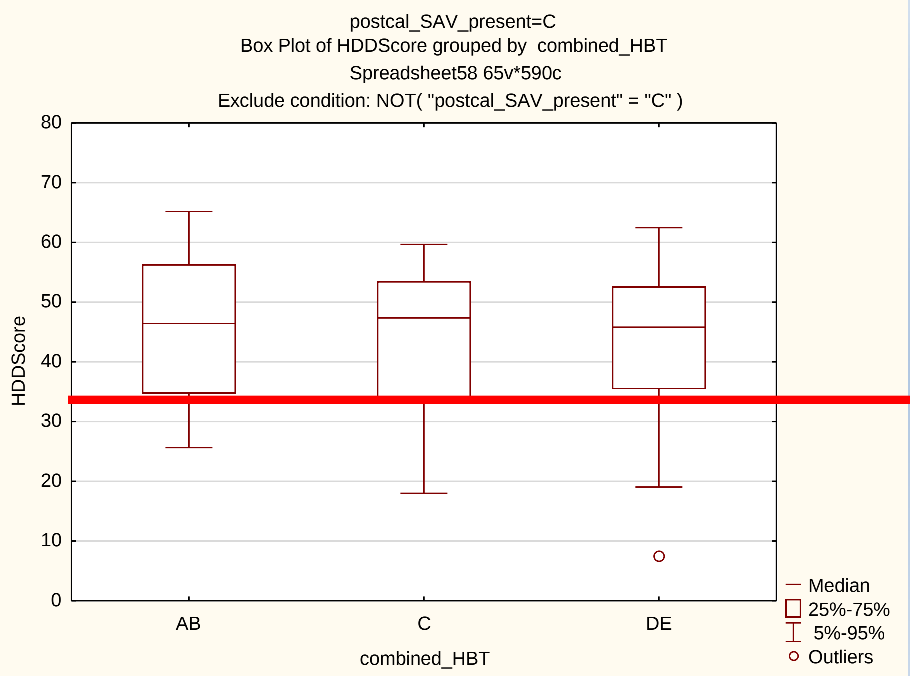
Index Expectation Changes in the Presence of Submerged Aquatic Vegetation (SAV)

- The ORMIn and mORFIn do not account for the presence of SAV
- We investigated the need to create a separate index calculator to deal with sites containing SAV
  - Using Presence/Absence data

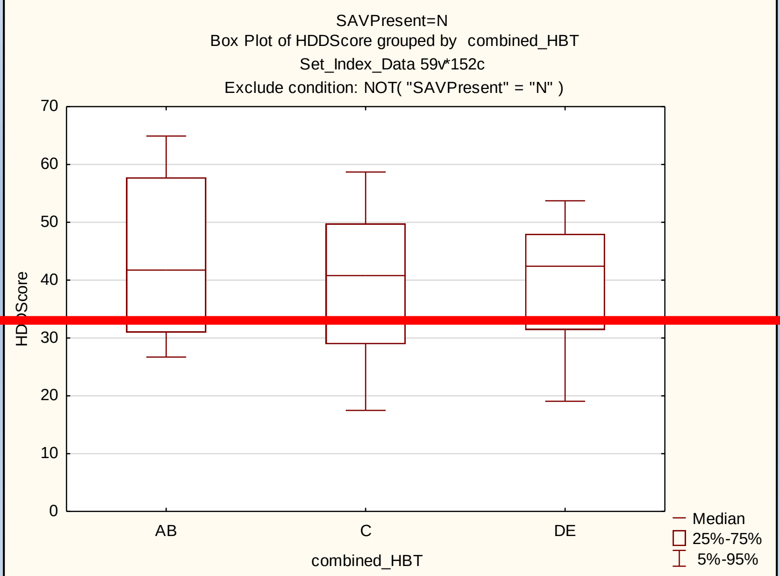


HDD Scores (2007-2018)

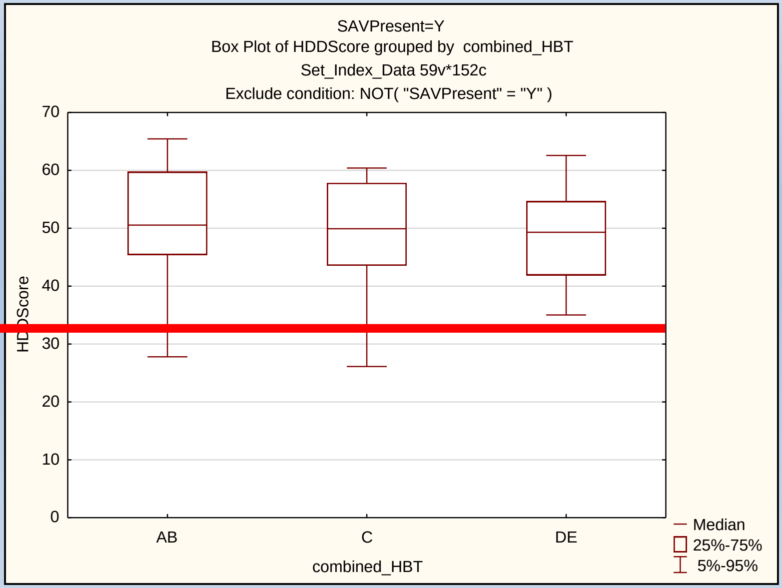
Calibration Data Set



SAV Absent



SAV Present



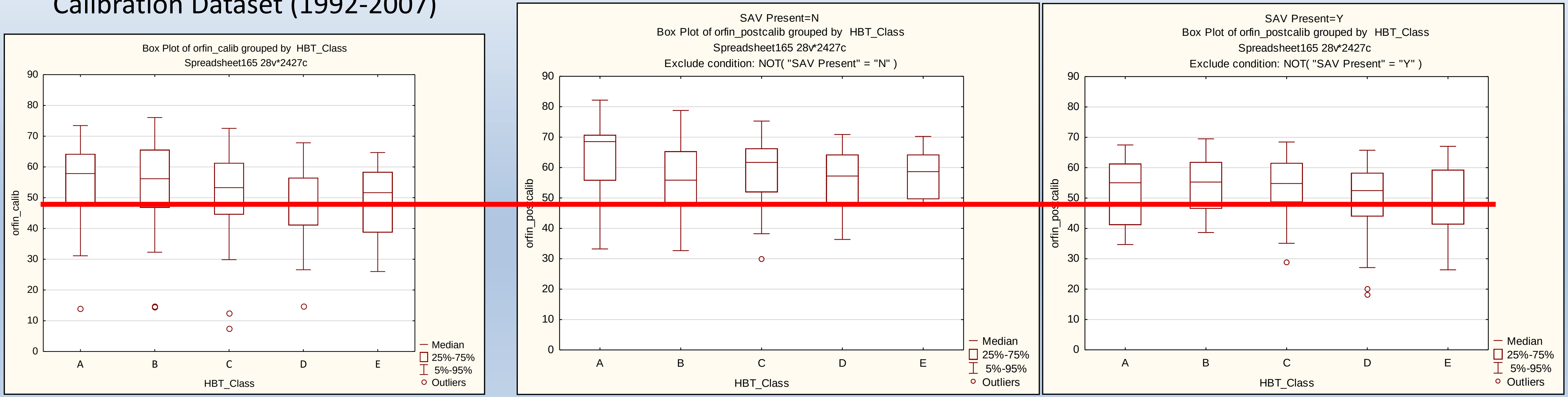
HDD Score	P-value	Valid N SAV Absent	Valid N SAV Present
All Groups	2.1863 x 10-7	240	215
AB	0.2726	51	60
C	0.000199	71	87
DE	0.000204	118	68

ORFIn Scores

Calibration Dataset (1992-2007)

2008-2019 SAV Absent

2008-2019 SAV Present

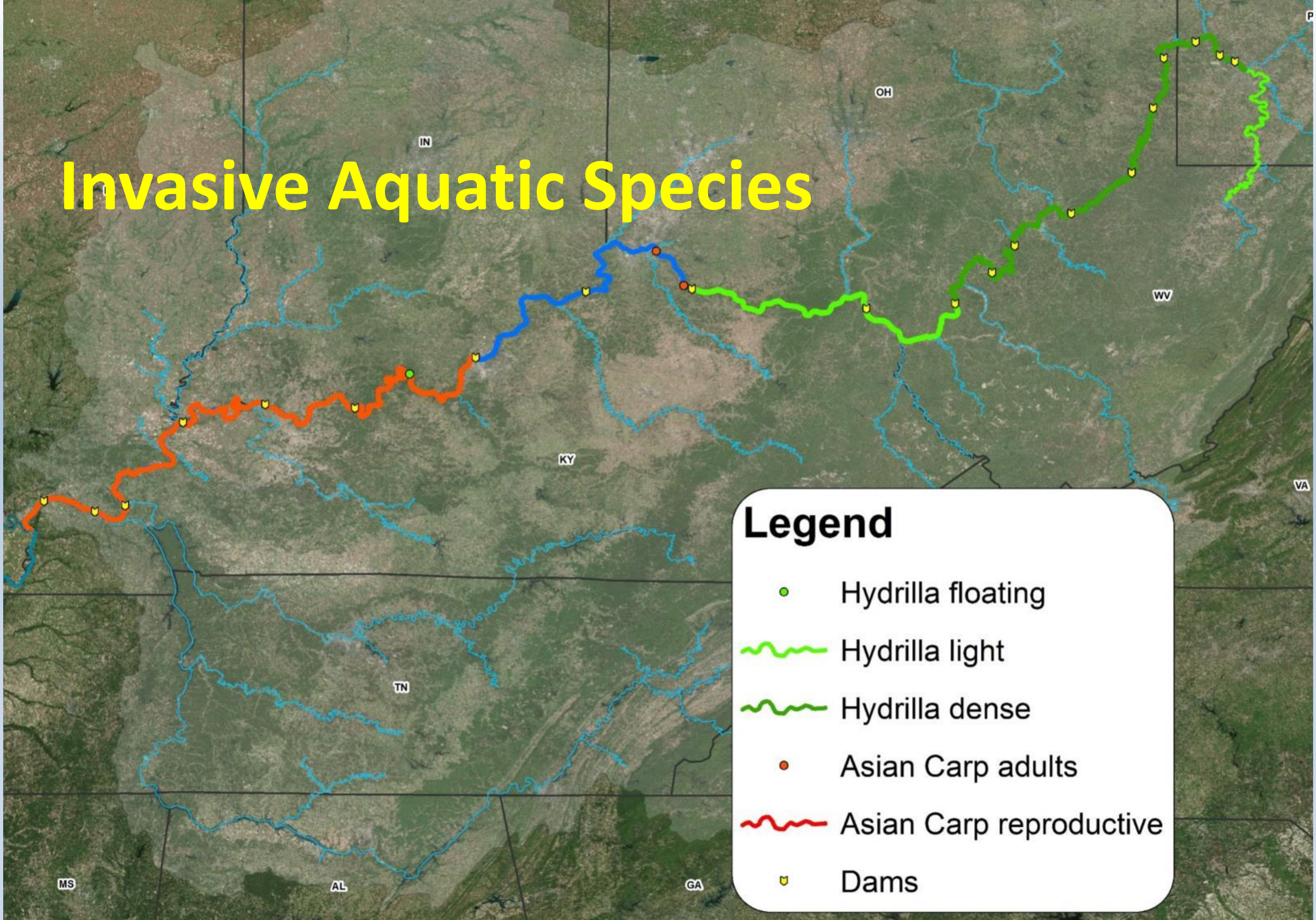


Observed HDD Score (Calibration Set vs Post Cal SAV Absent)	P- value Post Cal SAV Absent	Valid N Post Cal SAV Absent
All groups	7.2148×10^{-10}	267
A	0.064777	8
B	0.841701	44
C	0.000057	77
D	3.9263×10^{-9}	115
E	0.002046	23

Observed ORFIN Score (SAV Present vs SAV Absent)	P- value	Valid N
All groups	0.000007	241
A	0.042980	11
B	0.580914	56
C	0.001884	96
D	0.002574	63
E	0.007187	15

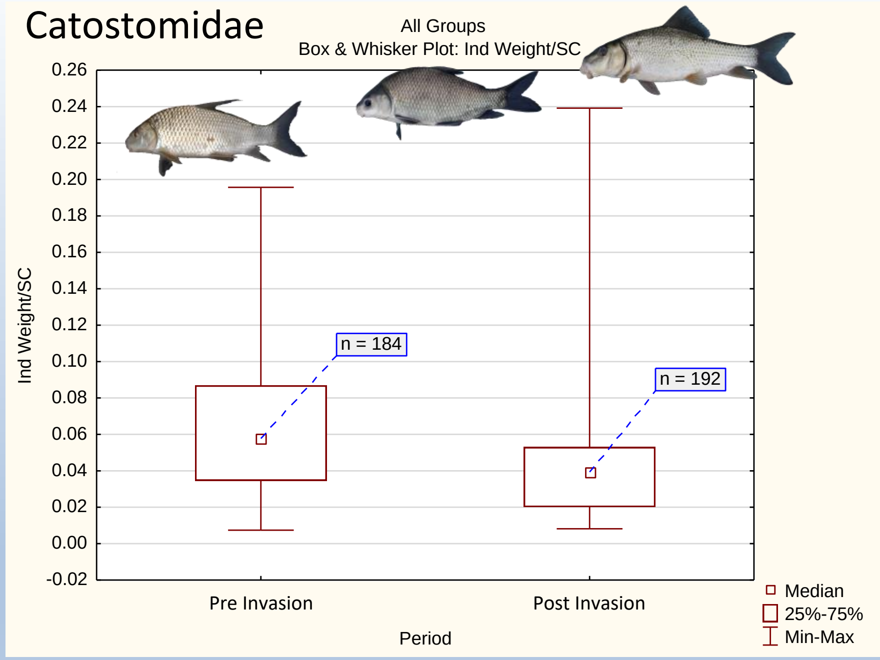
Submerged Aquatic Vegetation (SAV) - Index adjustments

Invasive Aquatic Species

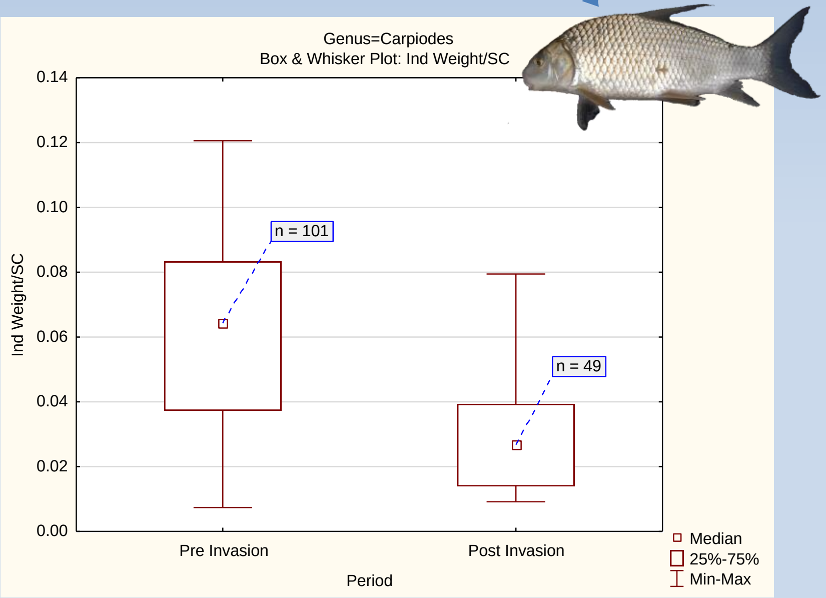


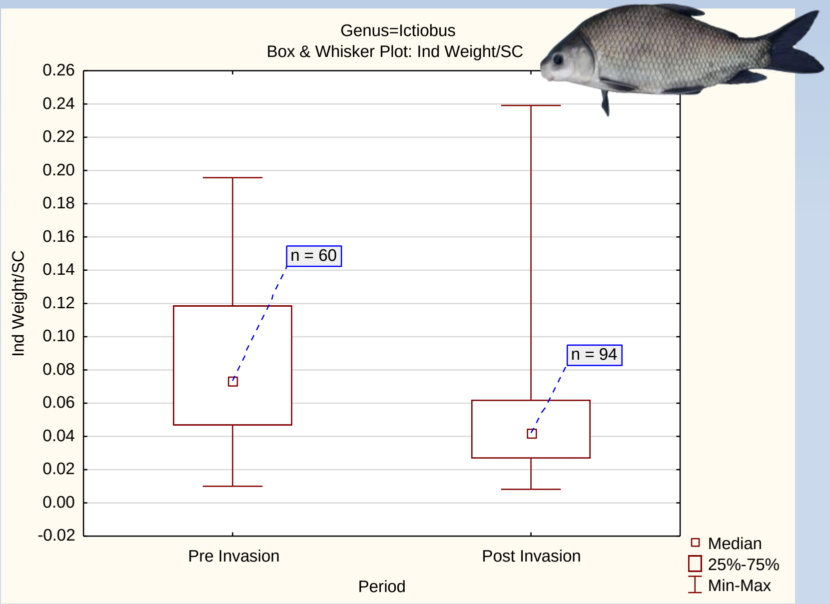
- Collection and compilation of a larger data set (native fish, lower Ohio River, lengths and weights, prior to 1997 and after 2010) to compare with current and ongoing length and weight data to determine if this is a trend.

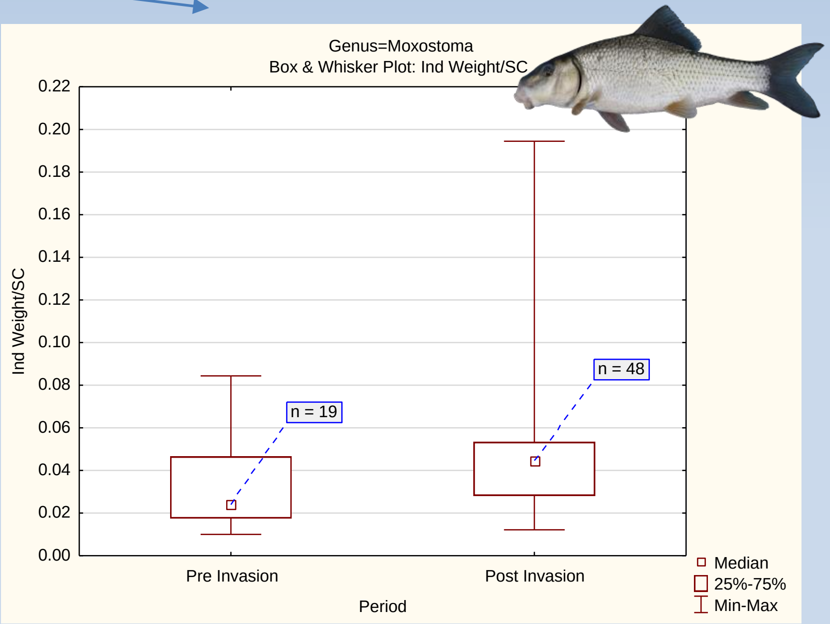
- What families/species are showing the greatest change?



- Is this trend isolated to pools where silver carp are present?







2020 Fish Tissue Needs

Fish Tissue used for consumption advisories and 305(b) assessments

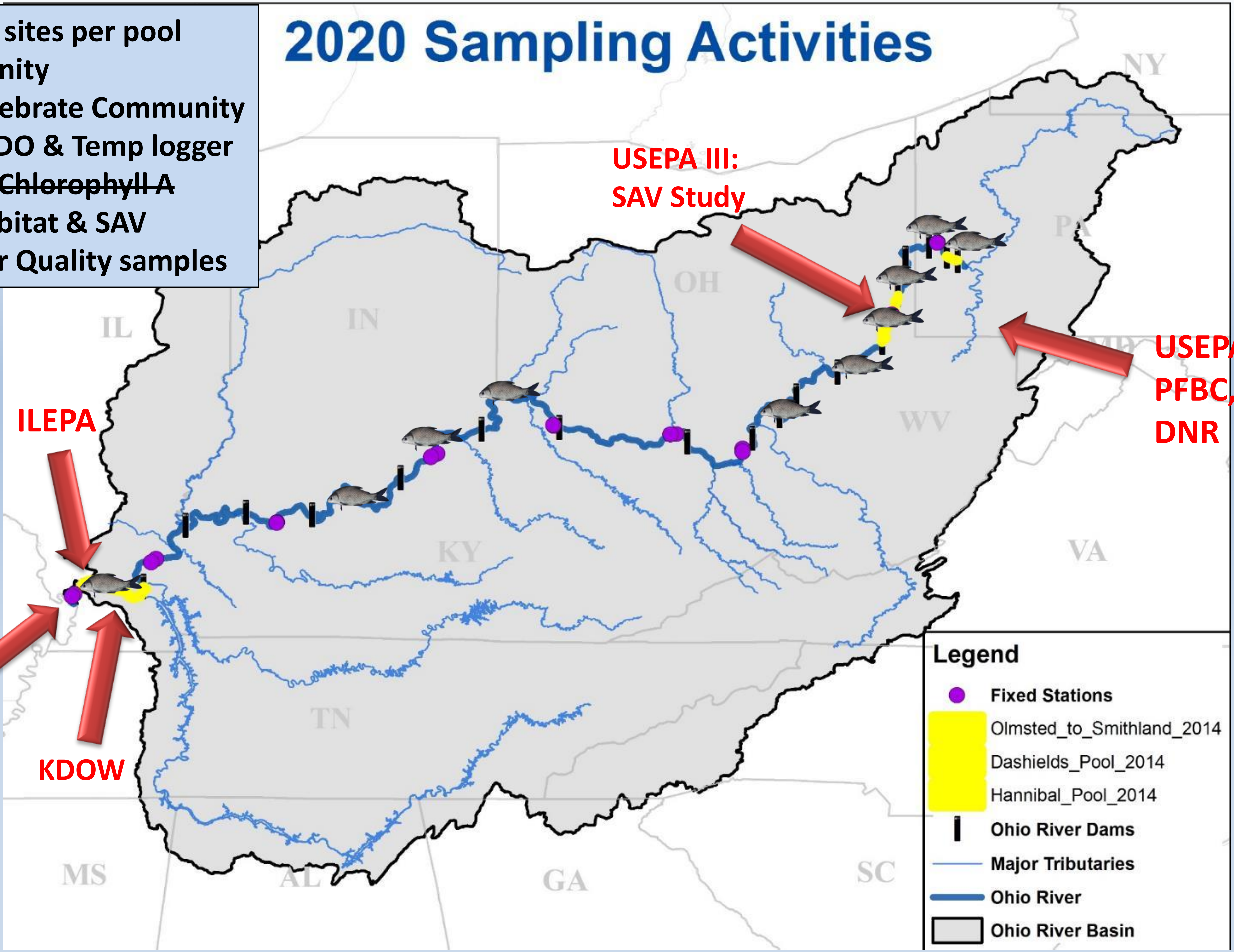
Pool	# TL3	# TL4	Notes	Scheduled opportunities
Dashields	minimum 2	minimum 2	had 0 for 2018, will have 0 for 2020 305(b)	will survey in 2020
Montgomery	minimum 2			FS
Pike Island	1			
Hannibal	1			will survey in 2020, FS
Belleville	minimum 2	minimum 2	will have 0 for 2020 305(b)	WVDNR
Racine	minimum 2	minimum 2	will have 0 for 2020 305(b)	WVDNR
Markland	minimum 2			FS
McAlpine	1			FS
Cannelton	minimum 2	minimum 2	had 0 for 2018, will have 0 for 2020 305(b)	
Olmsted	minimum 2	minimum 2	will have 0 for 2020 305(b)	will survey in 2020

2020 Pool Assessment Schedule

Pool	Times Assessed	Yrs Since last Assmnt	Cycle 1					Cycle 2					Cycle 3							Cycle 4						
			2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Emsworth	3	2			X					X						X							X			
Dashields	3	7				X					X							X						X		
Montgomery	3	5		X				X					X							X						
New Cumberland	3	3	X						X						X							X				
Pike Island	3	2			X					X						X							X			
Hannibal	2	7				X					X							X						X		
Willow Island	3	4		X					X					X							X					
Belleville	2	6					X					X							X						X	
Racine	3	5	X					X					X							X						
RC Byrd	3	1				X					X						X							X		
Greenup	3	4		X					X					X							X					
Meldahl	3	3			X					X					X							X				
Markland	3	6	X				X					X							X						X	
McAlpine	2	6					X					X							X						X	
Cannelton	3	4		Xa	Xb				X					X							X					
Newburgh	3	3			X					X					X							X				
JT Myers	3	5	X					X					X							X						
Smithland	3	1				X					X						X						X			
Olmsted	2	6					X					X						X					X	or----- ---->		X
Open Water	2	6					X					X						X					X	or----- ---->		X

Everything past the double yellow line is hypothetical

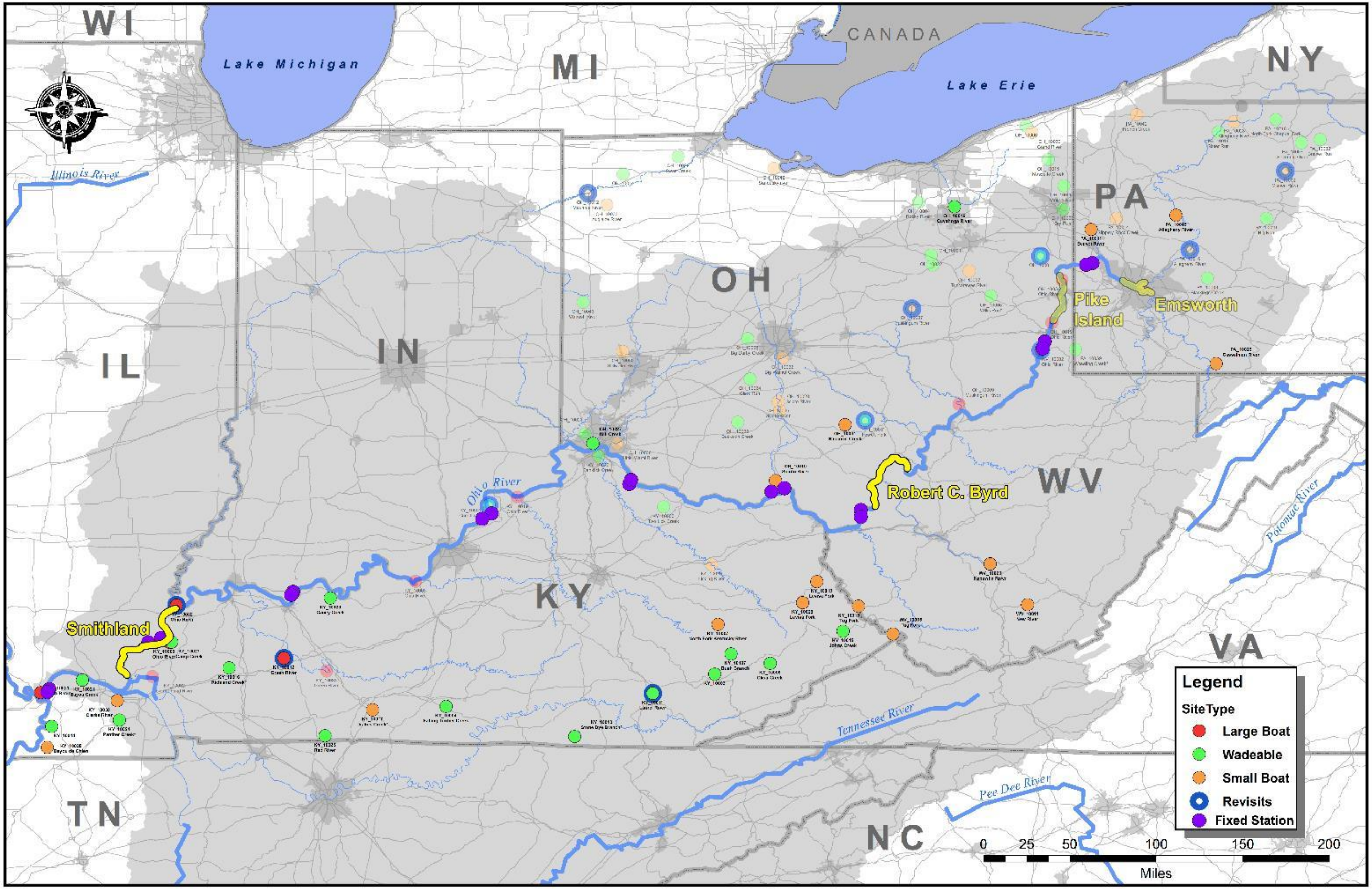
- 15 random 500m sites per pool
  - Fish Community
  - Macroinvertebrate Community
  - Continuous DO & Temp logger
  - ~~Nutrients & Chlorophyll A~~
  - Instream Habitat & SAV
  - Paired Water Quality samples



2019 Summary of BWQSC Recommendations

1. **Accept the biological results of the 2019 Probabilistic Surveys**
   - R.C. Byrd Pool (fish and macros) and Smithland Pool (fish only)
   - Review Smithland macro results with the BWQSC members once data are available (Spring 2020)
2. **For the 2020 Field Season, return to survey efforts prior to NRSA involvement**
   a) Conduct three probabilistic pool surveys (Dashields, Hannibal, Olmsted pools)
   b) Collect Paired Water Quality Samples at Probabilistic and Fixed Stations
3. **As resources allow, focus remaining sampling effort towards**
   a) Conduct targeted sampling within probabilistic pools as directed by relevant state and federal agencies
   b) Sampling six targeted sites within the un-impounded section below Olmsted dam (fish and macros)
   c) Fish tissue collections to fill current data gaps in regards to fish consumption and use attainment assessments
4. **Finalize the updated decision tool for use by committee in acceptance of future biological results**
   - Incorporate agreed additions and allow for members to review prior to full acceptance prior to the next BWQSC meeting
5. **Reincorporate data collections to assist with tracking the effects of invasive species**
   - Collect length and weight measurements from all species in pools with established silver carp populations
6. **Continue investigating the effects of abiotic factors on both biological indices (*m*ORFIn and ORMIn)**

ORSANCO Biological Survey Events (NRSA, Probabilistic, & Fixed Station)




HONDA

- Over 150 kilometers of rivers and streams sampled and over 600 hours spent on site!
- One crew performed the electrofishing survey and fish tissue collection.
- The other crew collected/evaluated macroinvertebrates, periphyton, water quality, and physical habitat characteristics.

- 156 species of fish identified and over 30 thousand individuals processed!

- Fish tissue samples were taken at every site.

- Fish data was recorded on paper, put through a rigorous QA process, and then imported into the ORSANCO fish database.
- Many vouchers retained for ORSANCO's collection.

NRSA 2.0

Current Cycle

Method	2022	2023	2024	2025	2026
Lakes	50				
Rivr&Strms		32	32		
Coastal				11	
Wetlands					26

Proposed Cycle

Method	2022	2023	2024	2025	2026
Lakes	10	10	10	10	10
Rivr&Strms	13	13	13	13	13
Coastal	2	2	2	2	3
Wetlands	5	5	5	5	6

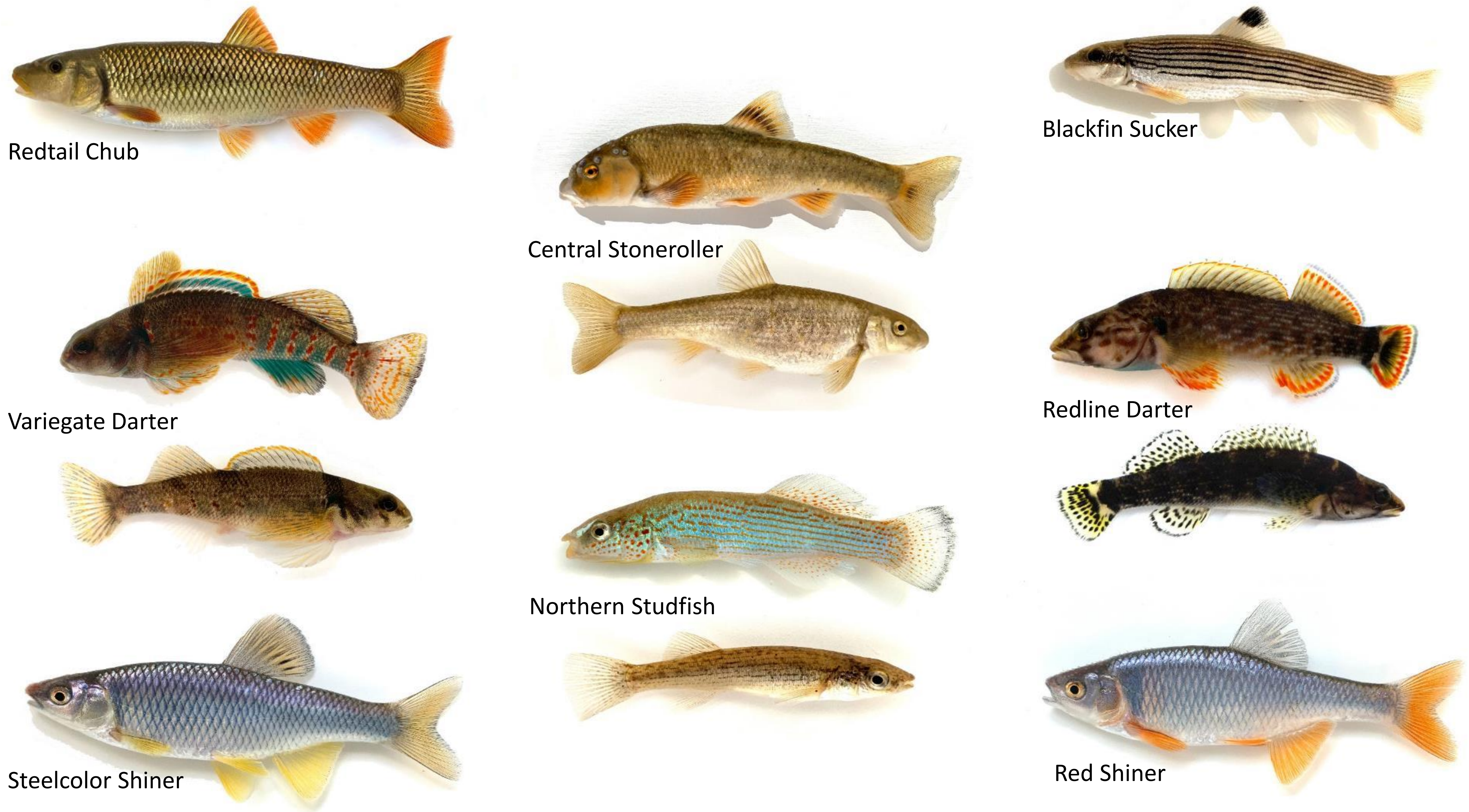
Pros:

- Spreads funding out across years
- Lighter work load per year
- More potential for tracking trends

Cons:

- Is it feasible to train every person, for every method, every year?


Redtail Chub
Variegate Darter
Steelcolor Shiner
Red Shiner


Redtail Chub
Central Stoneroller
Blackfin Sucker
Variegate Darter
Redline Darter
Northern Studfish
Steelcolor Shiner
Red Shiner

Agenda Item 9:

Draft 2020 Ohio River 305b Assessments (2014-2018)

222nd TEC Meeting

Indianapolis, IN

Weight of Evidence Approach (WOE)

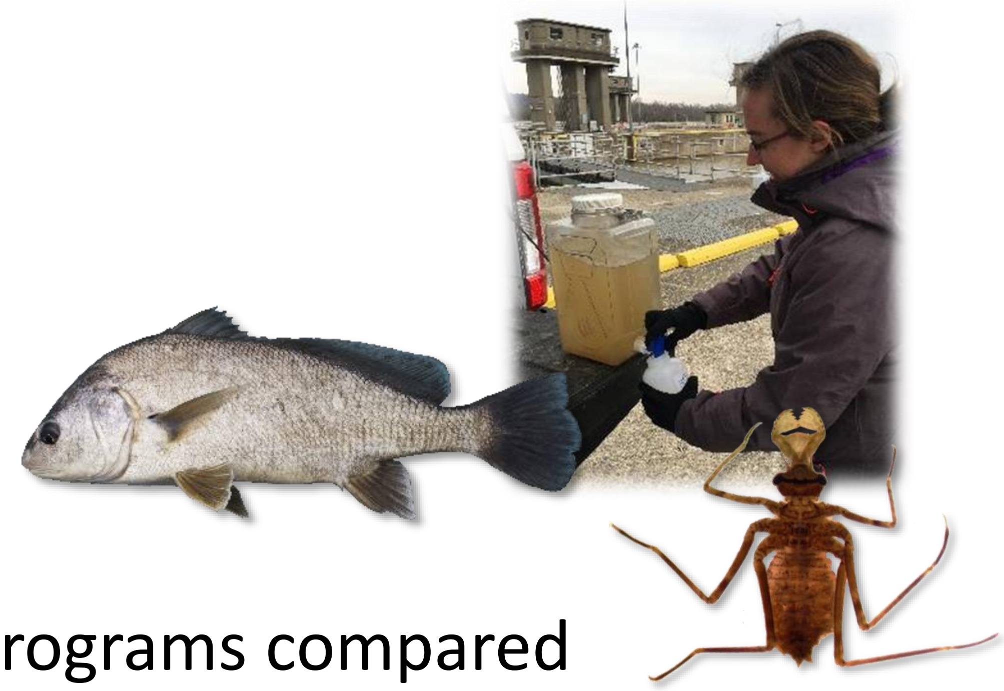
- Recommended by the Technical Committee and approved by the Commission, October 2011

- WOE applied in the following 2020 assessments
  - aquatic life use
  - public water supply
  - mercury fish consumption

2012-2016 Assessment Summary

		Number Miles Use is Impaired				
	States	Aquatic Life	Contact Recreation	Public Water Supply	Fish Consumption for PCBs & Dioxin	Fish Consumption for Mercury
PA	0.0-40.2	0	40.2	0	40.2	0
OH-WV	40.2-317.1	0	242.2	0	276.9	0
OH-KY	317.1-491.3	0	65.0	0	174.2	0
IN-KY	491.3-848.0	0	243.6	0	356.7	0
IL-KY	848.0-981.0	0	40.6	0	133.0	0
TOTAL	981.0	0	631.6	0	981.0	0

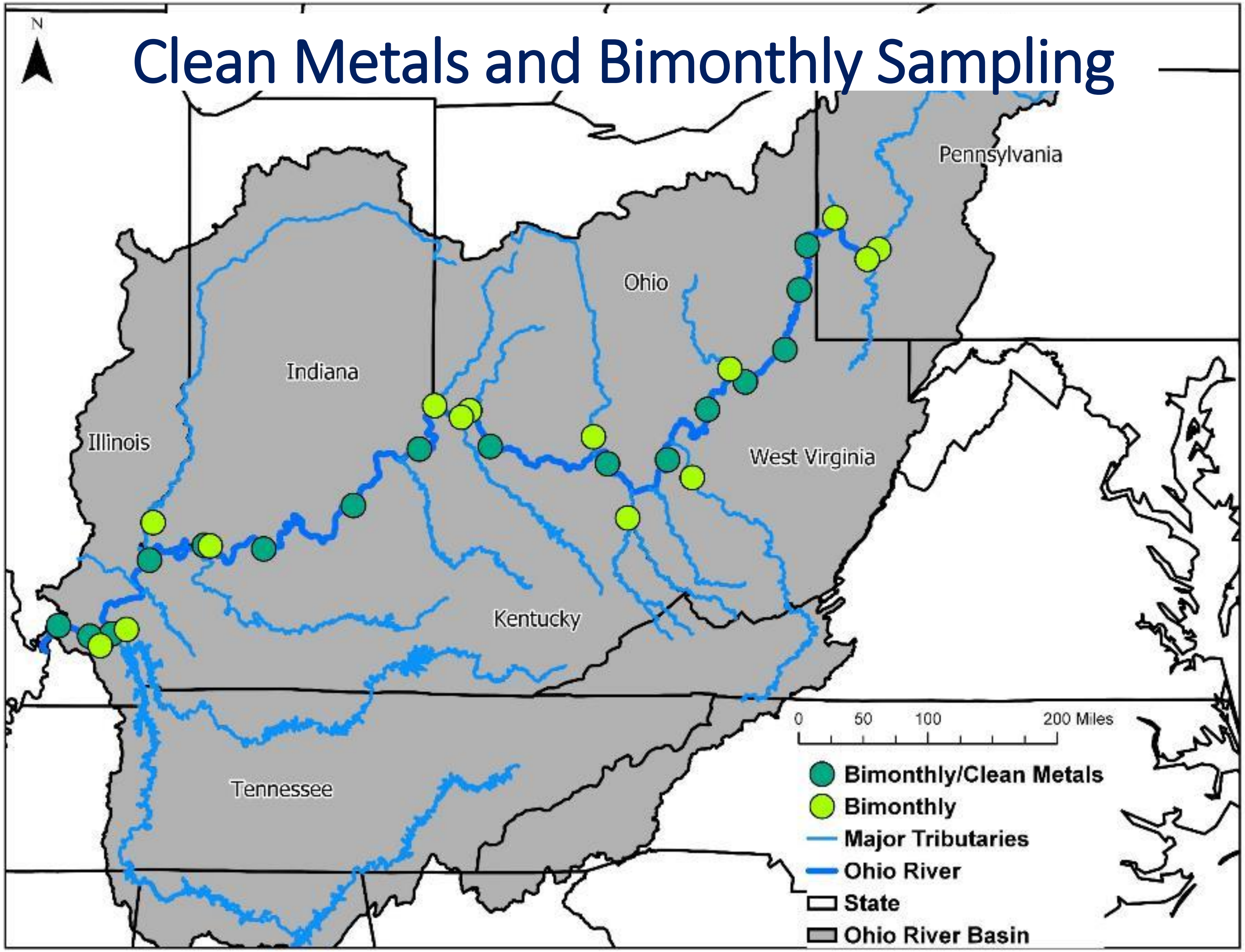
Aquatic Life Use Assessment



Non-Support >10% water criteria exceedance
and/or
Biological Indices <20 average index score

- Bimonthly/Clean metals monitoring programs compared to applicable ALU criteria
- Fish and Macroinvertebrate Probabilistic Surveys Assess Assemblage condition of each pool
- WOE – the direct measures *m*ORFIn and ORMIn are most effective in aquatic life use attainment

Clean Metals and Bimonthly Sampling



ALU Criteria Exceedances – **Fe (ug/L)**

January 2014 – December 2018

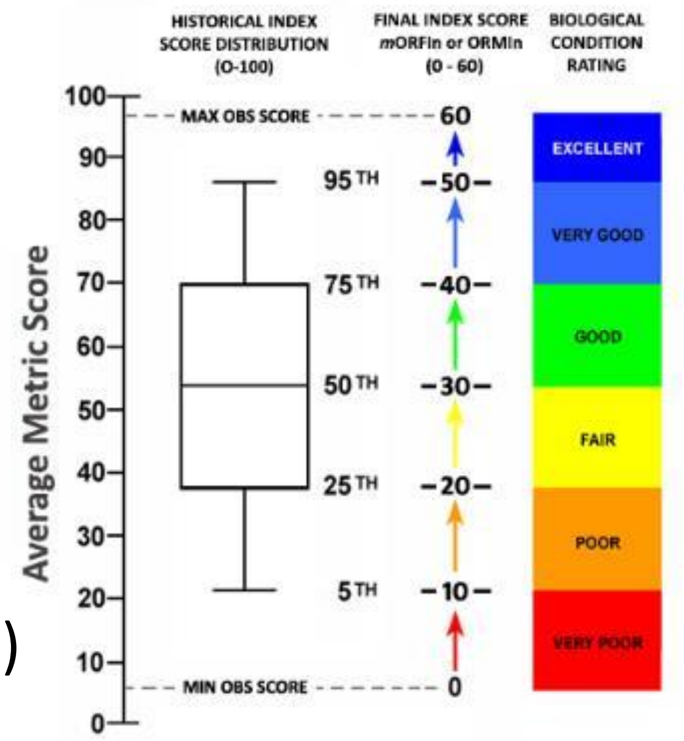
River Mile	Site Name	Criteria (µg/L)	Max Result (µg/L)	WQC Exceedances	Total Samples	% Exceedances
54.4	New Cumberland	WV (1500)	2110	2	30	**7%**
84.2	Pike Island	WV (1500)	2240	4	30	**13%**
126.4	Hannibal	WV (1500)	3030	4	30	**13%**
161.8	Willow Island	WV (1500)	4690	8	30	**27%**
203.9	Belleville	WV (1500)	4410	6	29	**21%**
279.2	R.C. Byrd	WV (1500)	11200	6	30	**20%**
341	Greenup	KY (3500)	6060	4	30	**13%**
436.2	Meldahl	KY (3500)	6230	6	30	**20%**
531.5	Markland	KY (3500)	5290	6	30	**20%**
606.8	McAlpine	KY (1000)	4870	16	30	**53%**
720.7	Cannelton	KY (3500)	11400	9	30	**30%**
776	Newburgh	KY (1000)	5700	17	29	**59%**
846	J.T. Myers	KY (1000)	9720	18	30	**60%**
918.5	Smithland	KY (1000)	6140	16	30	**53%**
938.9	L&D 52	KY (3500)	11200	6	29	**21%**
964.6	Olmsted	KY (3500)	2270	0	1	**0%**

305(b) ALU Bioassessment Approach

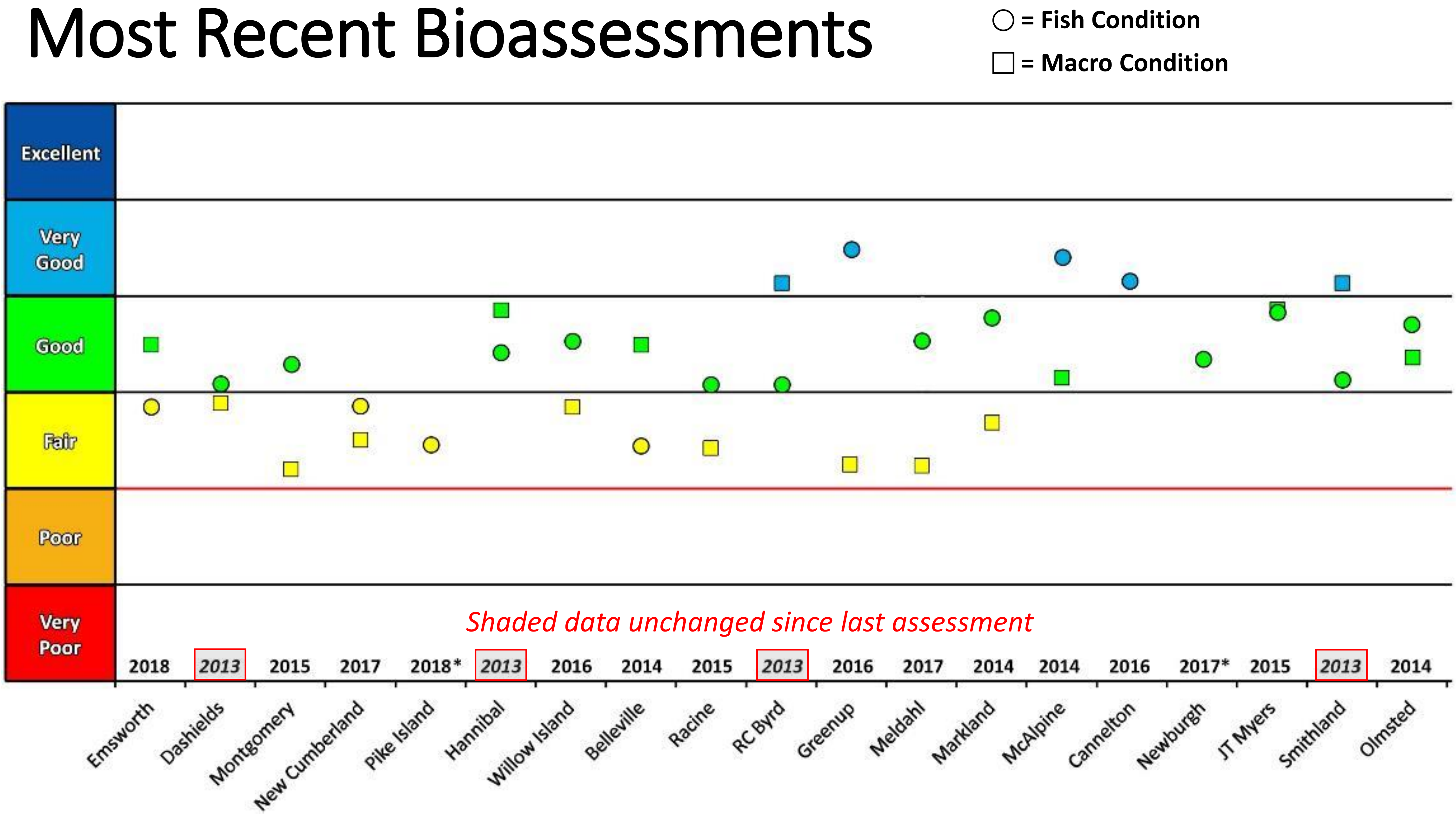
- **<u>full support</u>**
  - *m*ORFIn and ORMIn scores are greater than or equal to 20.0
    - (i.e. a condition rating of 'Fair', 'Good', 'Very Good', or 'Excellent')

- **<u>partial support</u>**
  - one of the indices scores 'Fair' or better (>20.0)
  - the other index scores 'Poor' (10.0 - 19.9)

- **<u>not supporting</u>**
  - pool in which both indices score 'Poor' (<20.0)
  - or in which either or both indices score 'Very Poor' (<10.0)



Most Recent Bioassessments



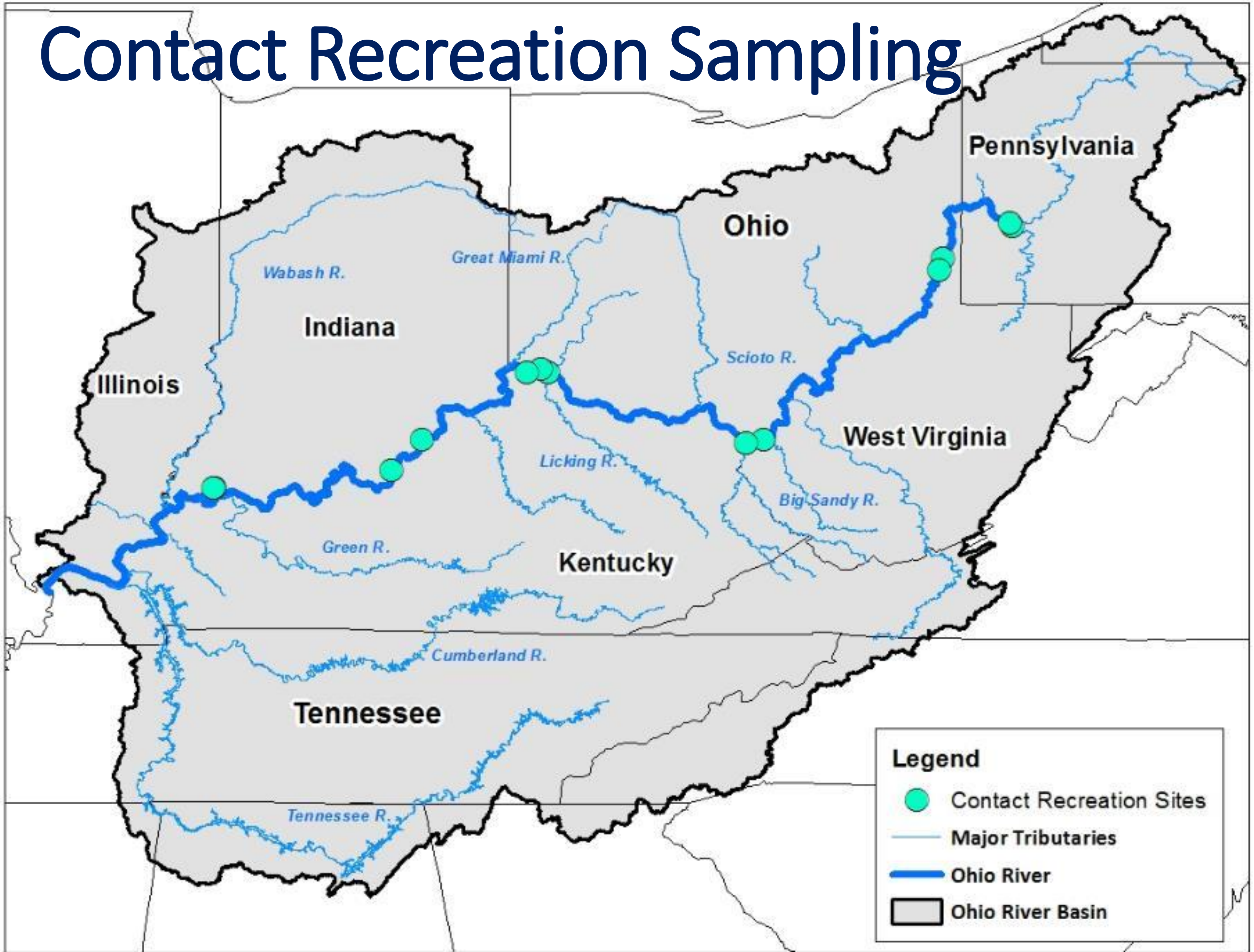
Using WOE, entire river Full Support for ALU based on biological indicator results

Contact Recreation Use Assessment

Partial Support >10% criteria exceedance
Not Supporting >25% criteria exceedance

- States' criteria used for assessment
- Vast majority of river is assessed based on historical E. coli longitudinal surveys
  - 15 historical river-wide longitudinal surveys
  - Data collected 2003-2008
  - Criteria assessed as percentage of *individual samples*
- Contact recreation data from the past 5 years collected Apr-Oct in the 6 largest CSO communities –
  - Criteria assessed as percentage of *monthly geo mean*

Contact Recreation Sampling



Contact Rec. Assessment - 2020 Changes

Site	Assessment 2018 (2012-2016)	Assessment 2018 (2014-2018)	Affected River miles
86.8	Partial support	Not Supporting	85.6-86.8 = 1.2 miles
305.1	Full Support	Partial Support	303.5-306.4 = 2.9 miles
314.8	Partial support	Not Supporting	314.1-316.0 = 1.9 miles
462.6	Full support	Partial Support	461.3-463.2 = 2.1 miles
470	Partial support	Not Supporting	470.0-472.7 = 2.7 miles
594	Partial support	Not Supporting	593.1-595.5 = 2.4 miles

Approximately $^2/_3$ of river Not Supporting contact recreation use
Consistent with past assessments

Public Water Supply Use Assessment

Non-Support >10% water criteria exceedance

- Impairment based on finished water MCL exceedances caused by Ohio River water quality
- Accessed USEPA data base of MCL exceedances and water utility surveys
- Largely attributed to treatment issues, not Ohio River water quality.
  - Treatment was only stopped or altered as a result of HAB presence or spill occurrence

Using WOE, entire river assessed as Fully Supporting public water supply use

Other Criteria Exceedances– **Phenols (5ug/L)**

January 2014 – December 2018

Rmi	SiteName	Max Result (ug/L)	Count of Exceedances	# of Events	% Exceedances
54.4	New Cumberland	12	4	30	**13%**
84.2	Pike Island	16	4	30	**13%**
126.4	Hannibal	103	1	30	**3%**
161.8	Willow Island	34	3	30	**10%**
203.9	Belleville	138	1	30	**3%**
279.2	R.C. Byrd	66	3	29	**10%**
341.0	Greenup	40	2	30	**7%**
436.2	Meldahl	17	2	30	**7%**
531.5	Markland	29	3	30	**10%**
606.8	McAlpine	60	3	30	**10%**
720.7	Cannelton	23	3	30	**10%**
776.0	Newburgh	274	3	30	**10%**
846.0	J.T. Myers	20.3	2	30	**7%**
918.5	Smithland	125	5	30	**17%**
938.9	L&D 52	102	2	29	**7%**
964.8	Olmsted	15.8	1	1	**100%**

UNDER REVIEW & Criteria for Taste & Odor

Fish Consumption Use Assessment

Not Supporting >10% Total Hg water criteria (12ng/L) exceedance

and/or

Not Supporting if the consumption-weighted MeHg conc. for a pool > 0.3 mg/kg

PCBs & Dioxins

- The entire Ohio River is designated as partially supporting for PCBs and dioxin.
  - Data collected between 1997-2004 (support for updating this dataset)
  - 2+ magnitudes > than criteria

Mercury (Total Hg and/or MeHg)

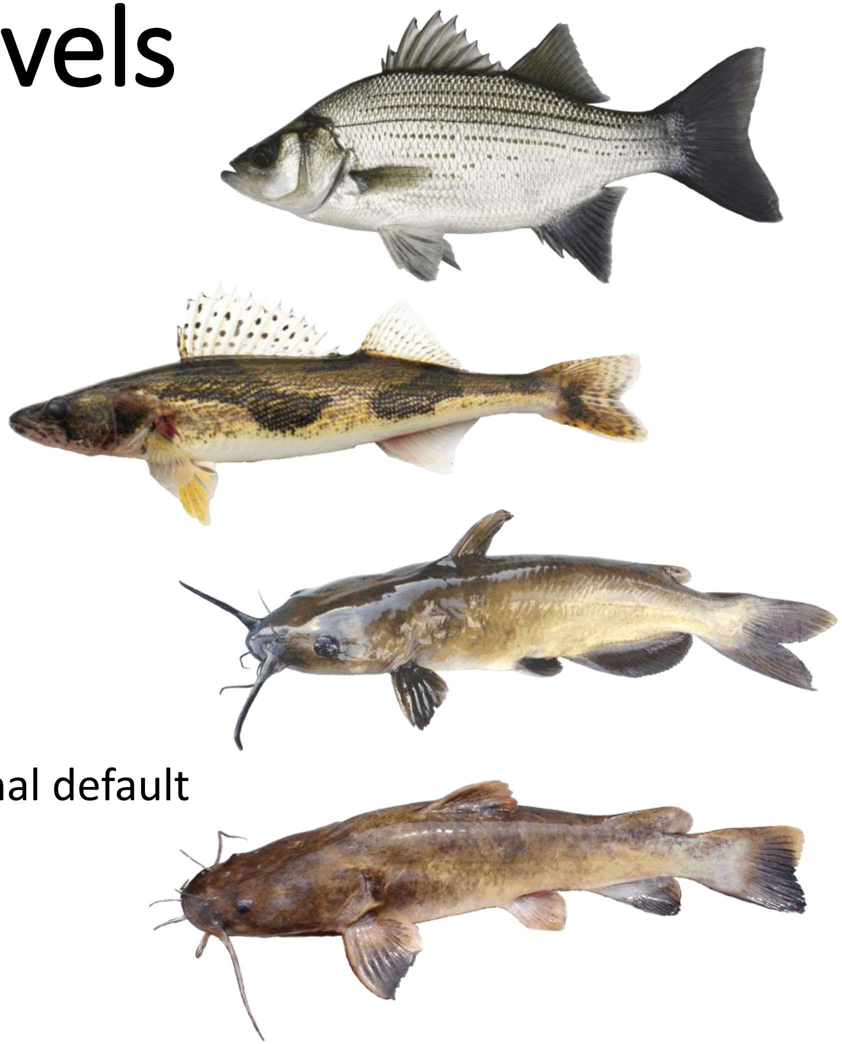
- Total Hg from Clean metals monitoring programs
- ORSANCO directed by TEC to use USEPA's approach for determining impairment based on methylmercury fish tissue data
  - Collected data necessary to use EPA's methodology.

Human Health Criteria Exceedances– **Total Hg (12 ng/L)**

January 2014 – December 2018

River Mile	Site Name	Max Result (ng/L)	WQC Exceedances	Total Samples	% Exceedances
54.4	New Cumberland	8.2	0	30	0%
84.2	Pike Island	12.5	1	30	3%
126.4	Hannibal	10.7	0	30	0%
161.8	Willow Island	19.1	2	30	7%
203.9	Belleville	11.6	0	29	0%
279.2	R.C. Byrd	35.7	2	30	7%
341	Greenup	22.6	5	30	17%
436.2	Meldahl	13.9	2	30	7%
531.5	Markland	13.6	1	30	3%
606.8	McAlpine	13.7	1	30	3%
720.7	Cannelton	19	4	30	13%
776	Newburgh	23.1	5	29	17%
846	J.T. Myers	33.3	7	30	23%
918.5	Smithland	19	5	30	17%
938.9	L&D 52	33.1	5	29	17%
964.6	Olmsted	6.4	0	1	0%

Averaging Data Across Trophic Levels



$$C_{avg} = \frac{8.0 * C_3 + 5.7 * C_4}{(8.0 + 5.7)}$$

Where:

C_3 = average mercury concentration for trophic level 3
C_4 = average mercury concentration for trophic level 4

**Calculation is based on apportioning the 13.7 grams/day national default consumption rate for freshwater fish by trophic level (TL 3 & TL 4)

5.7 grams/day of TL 4 fish
8.0 grams/day of TL 3 fish

Guidance for Implementing the January 2001 Methylmercury Water Quality Criterion – US EPA

Fish Consumption-Weighted Methylmercury Fish Tissue

Pool	# Samples	Max. MeHg Conc., ppm	N > 0.3 ppm	MeHg Consumption-Weighted Avg. Conc. (ppm)
Emsworth	5	0.248	0	0.085
Dashields	4	0.187	0	0.179
Montgomery	7	0.118	0	0.072
New Cumberland	6	0.299	0	0.136
Pike Island	1	0.023	0	0.009
Hannibal	4	0.262	0	0.052
Willow Island	8	0.308	1	0.158
Belleville	5	0.294	0	0.141
Racine	8	0.252	0	0.150
RC Byrd	6	0.242	0	0.179
Greenup	11	0.436	1	0.176
Meldahl	7	0.262	0	0.031
Markland	20	0.699	5	0.193
McAlpine	12	0.276	0	0.136
Cannelton	2	0.167	0	0.230
Newburgh	8	0.321	1	0.119
JT Myers	23	0.612	3	0.180
Smithland	13	0.595	3	0.208
Olmsted	5	0.28	0	0.202
Open Water	8	0.486	1	0.100

Using WOE, entire river is in Full Support for fish consumption based on methylmercury

Addressing Harmful Algal Blooms (HABs)

- The 2015 HAB was detailed in the previous 305(b) report
  - HAB data were not used to assess any of the uses
  - Thought to be a unique event…then 2019 event occurred
- Workgroup could not decide on any one assessment method
- State methodologies are still in development
- Recommend that staff look into development of an assessment methodology for future consideration

2014-2018 Assessment Summary

		Number Miles Use is Impaired				
	States	Aquatic Life	Contact Recreation	Public Water Supply	Fish Consumption for PCBs & Dioxin	Fish Consumption for Mercury
PA	0.0-40.2	0	40.2	0	40.2	0
OH-WV	40.2-317.1	0	245.1	0	276.9	0
OH-KY	317.1-491.3	0	67.1	0	174.2	0
IN-KY	491.3-848.0	0	243.6	0	356.7	0
IL-KY	848.0-981.0	0	40.6	0	133.0	0
TOTAL	981.0	0	631.6	0	981.0	0

Status of Ohio River Basin Mercury Loading Analysis Project

Report to TEC Committee

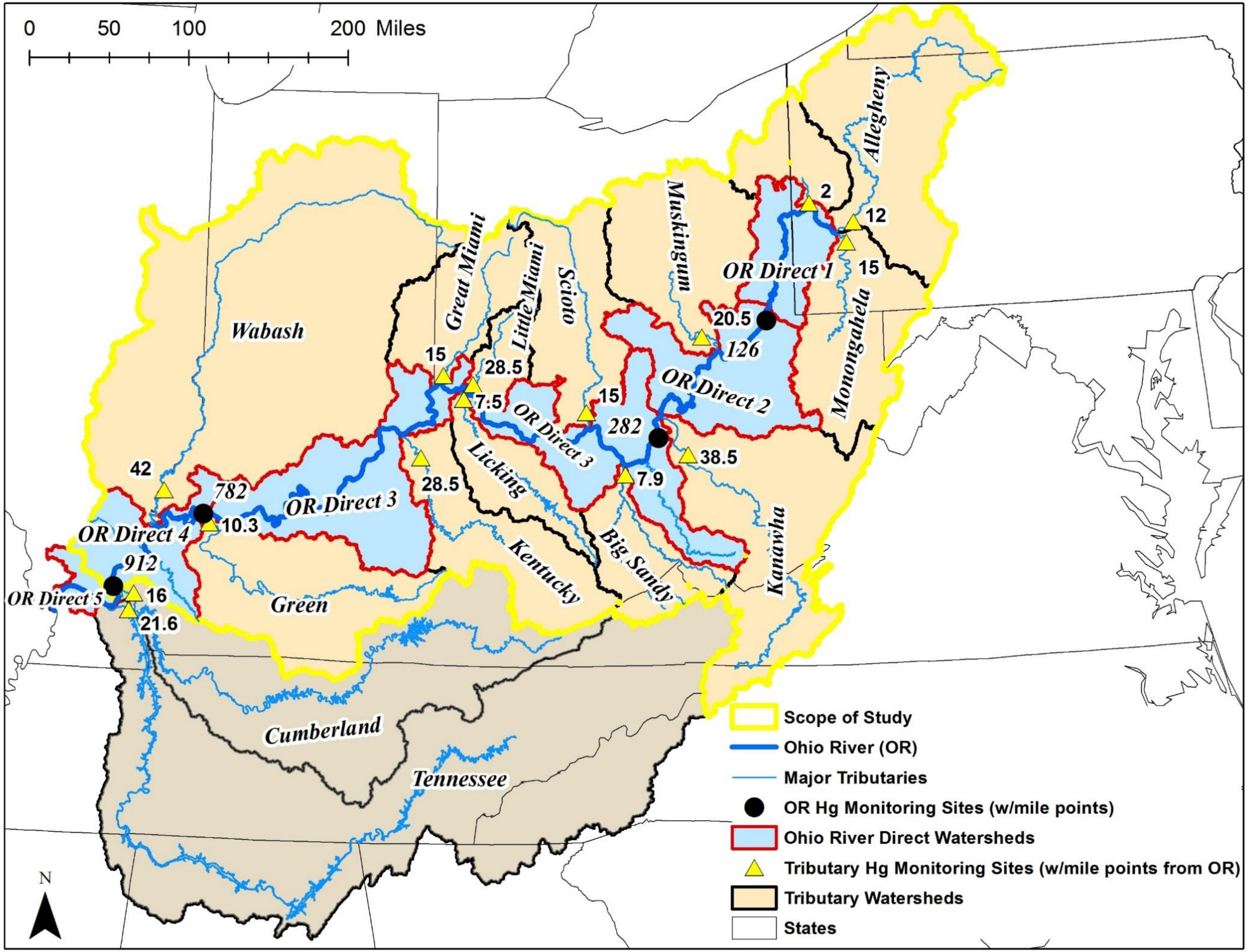
February 11-12, 2020

PROJECT OBJECTIVE

- Complete a mercury loading analysis and source apportionment for the Ohio River Basin.
  - Develop annual instream mercury loads for 15 major watersheds and at 4 Ohio River mainstem stations.
  - Develop annual point source mercury loads for the Ohio River Basin.
  - Develop annual atmospheric deposition mercury loads for the Ohio River Basin.

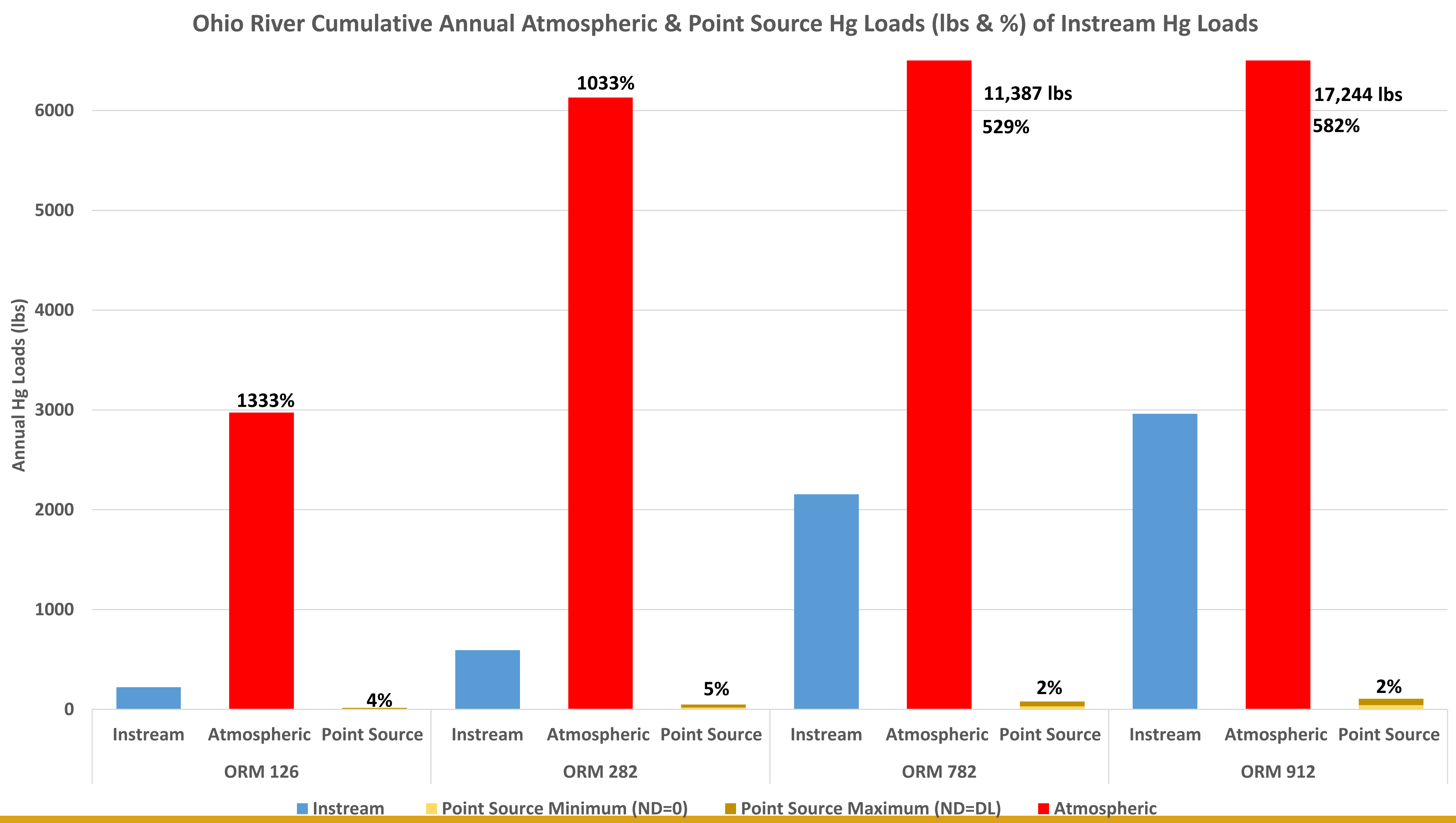
SCOPE

- **All annual loads were calculated for the project period Nov. 2015 through Oct. 2016.**
- **The project period was selected based on ORSANCO's river mercury monitoring data.**
  - **Instream loads developed with ORSANCO stream monitoring data.**
  - **Point source loads developed with Discharge Monitoring Report data.**
  - **Atmospheric deposition loads developed with mercury data from Nat'l Atmospheric Deposition Program.**


0 50 100 200 Miles
Allegheny
Muskingum
Great Miami
Little Miami
Scioto
Wabash
OR Direct 1
OR Direct 2
OR Direct 3
OR Direct 4
OR Direct 5
Monongahela
Licking
Kentucky
Big Sandy
Kanawha
Green
Cumberland
Tennessee
2
12
15
20.5
126
15
28.5
7.5
15
282
38.5
7.9
28.5
42
782
10.3
912
16
21.6
Scope of Study
Ohio River (OR)
Major Tributaries
OR Hg Monitoring Sites (w/mile points)
Ohio River Direct Watersheds
Tributary Hg Monitoring Sites (w/mile points from OR)
Tributary Watersheds
States
N

Main Conclusions

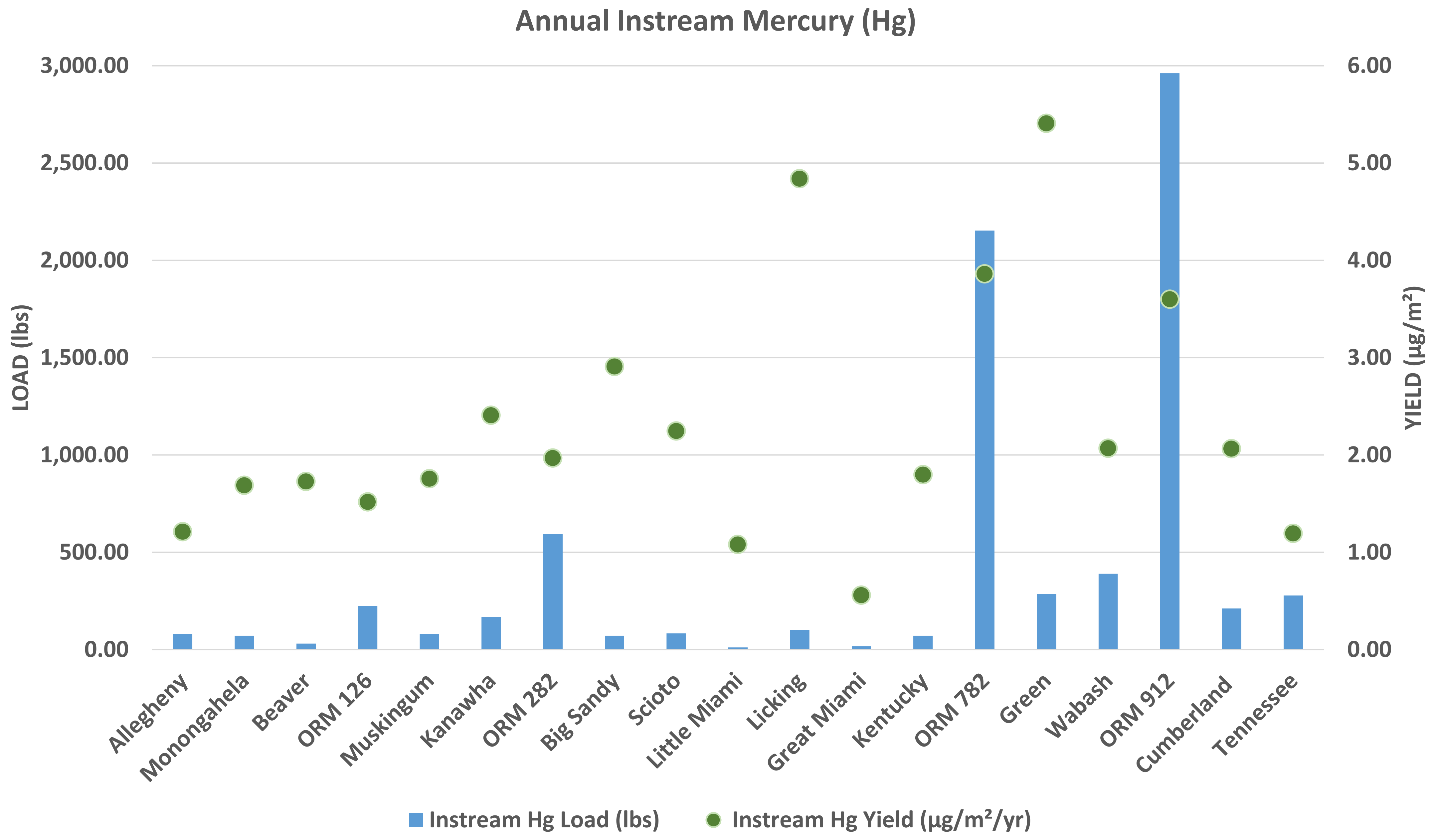
- Point sources account for 2% of the mercury load at ORM912.
- Atmospheric deposition accounts for 582% of the mercury load at ORM912.
- Instream mercury loads and yields are shown for all tribs and mainstem stations.
- Instream tributary loads cumulatively account for half of the mercury load at ORM912.
- Point sources discharging directly to the Ohio River account for 40% of the cumulative point source load.
- Instream sampling results represent typical conditions for the Ohio River relative to mercury.



Ohio River Cumulative Annual Atmospheric & Point Source Hg Loads (lbs & %) of Instream Hg Loads
Annual Hg Loads (lbs)
0
1000
2000
3000
4000
5000
6000
1333%
4%
1033%
5%
11,387 lbs
529%
2%
17,244 lbs
582%
2%
Instream
Atmospheric
Point Source
ORM 126
ORM 282
ORM 782
ORM 912
Instream
Point Source Minimum (ND=0)
Point Source Maximum (ND=DL)
Atmospheric

Main Conclusions

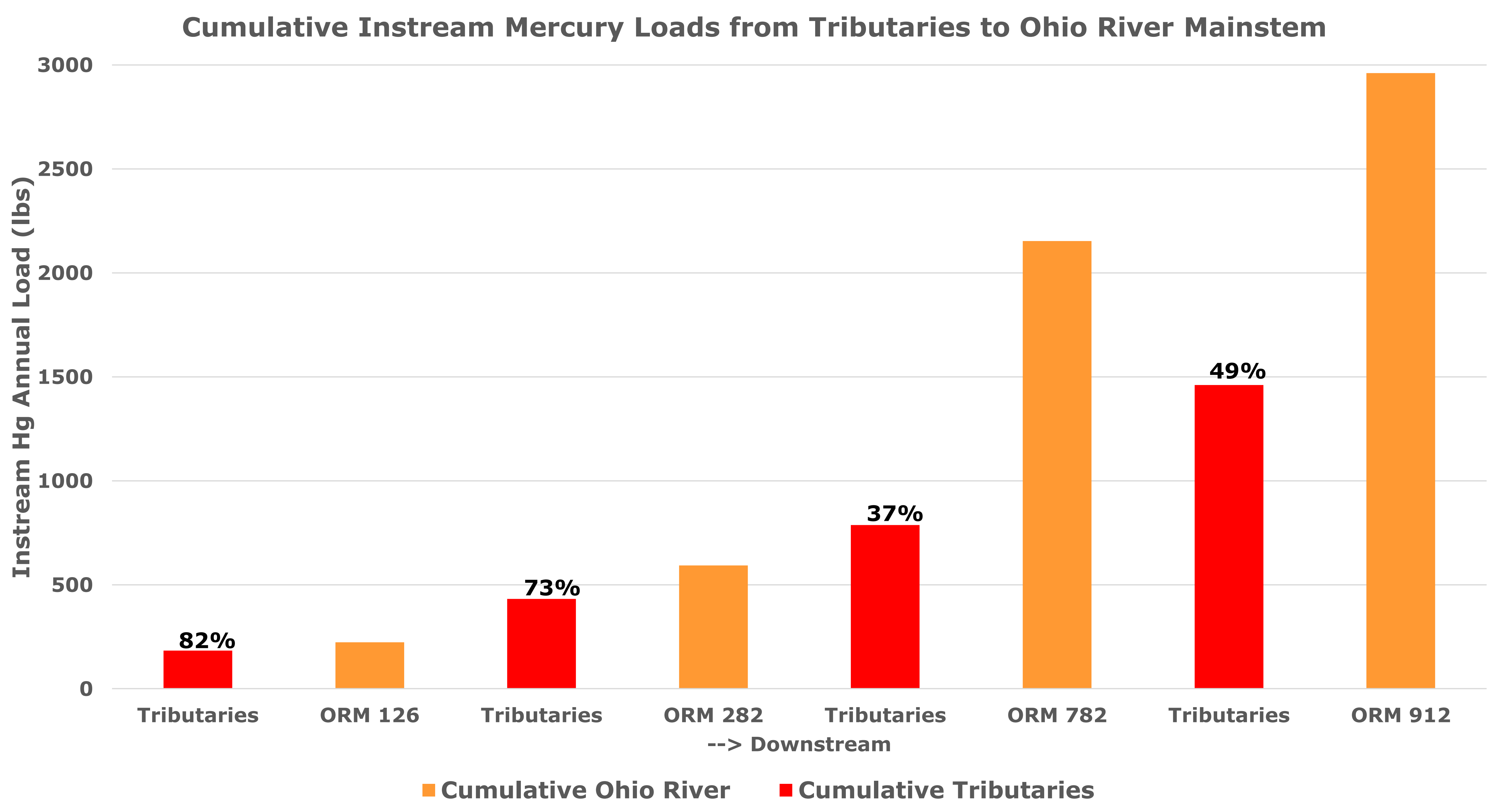
- Point sources account for 2% of the mercury load at ORM912.
- Atmospheric deposition accounts for 582% of the mercury load at ORM912.
- Instream mercury loads and yields are shown for all tribs and mainstem stations.
- Instream tributary loads cumulatively account for half of the mercury load at ORM912.
- Point sources discharging directly to the Ohio River account for 40% of the cumulative point source load.
- Instream sampling results represent typical conditions for the Ohio River relative to mercury.



Annual Instream Mercury (Hg)
3,000.00
2,500.00
2,000.00
1,500.00
1,000.00
500.00
0.00
LOAD (lbs)
6.00
5.00
4.00
3.00
2.00
1.00
0.00
YIELD (µg/m²)
Allegheny
Monongahela
Beaver
ORM 126
Muskingum
Kanawha
ORM 282
Big Sandy
Scioto
Little Miami
Licking
Great Miami
Kentucky
ORM 782
Green
Wabash
ORM 912
Cumberland
Tennessee
Instream Hg Load (lbs)
Instream Hg Yield (µg/m²/yr)

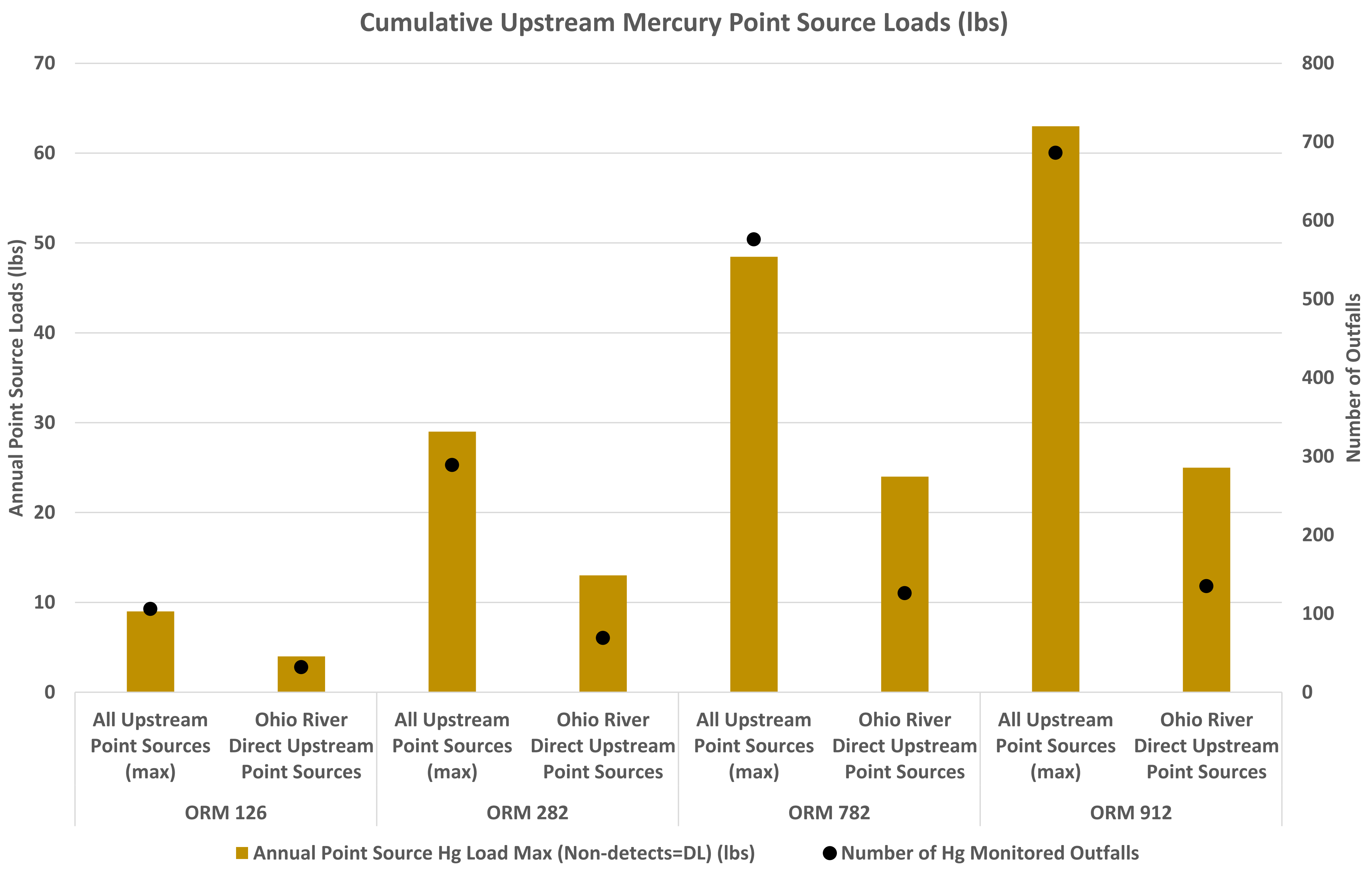
Main Conclusions

- Point sources account for 2% of the mercury load at ORM912.
- Atmospheric deposition accounts for 582% of the mercury load at ORM912.
- Instream mercury loads and yields are shown for all tribs and mainstem stations.
- Instream tributary loads cumulatively account for half of the mercury load at ORM912.
- Point sources discharging directly to the Ohio River account for 40% of the cumulative point source load.
- Instream sampling results represent typical conditions for the Ohio River relative to mercury.


Cumulative Instream Mercury Loads from Tributaries to Ohio River Mainstem
Instream Hg Annual Load (lbs)
3000
2500
2000
1500
1000
500
0
82%
73%
37%
49%
Tributaries
ORM 126
Tributaries
ORM 282
Tributaries
ORM 782
Tributaries
ORM 912
--> Downstream
Cumulative Ohio River
Cumulative Tributaries

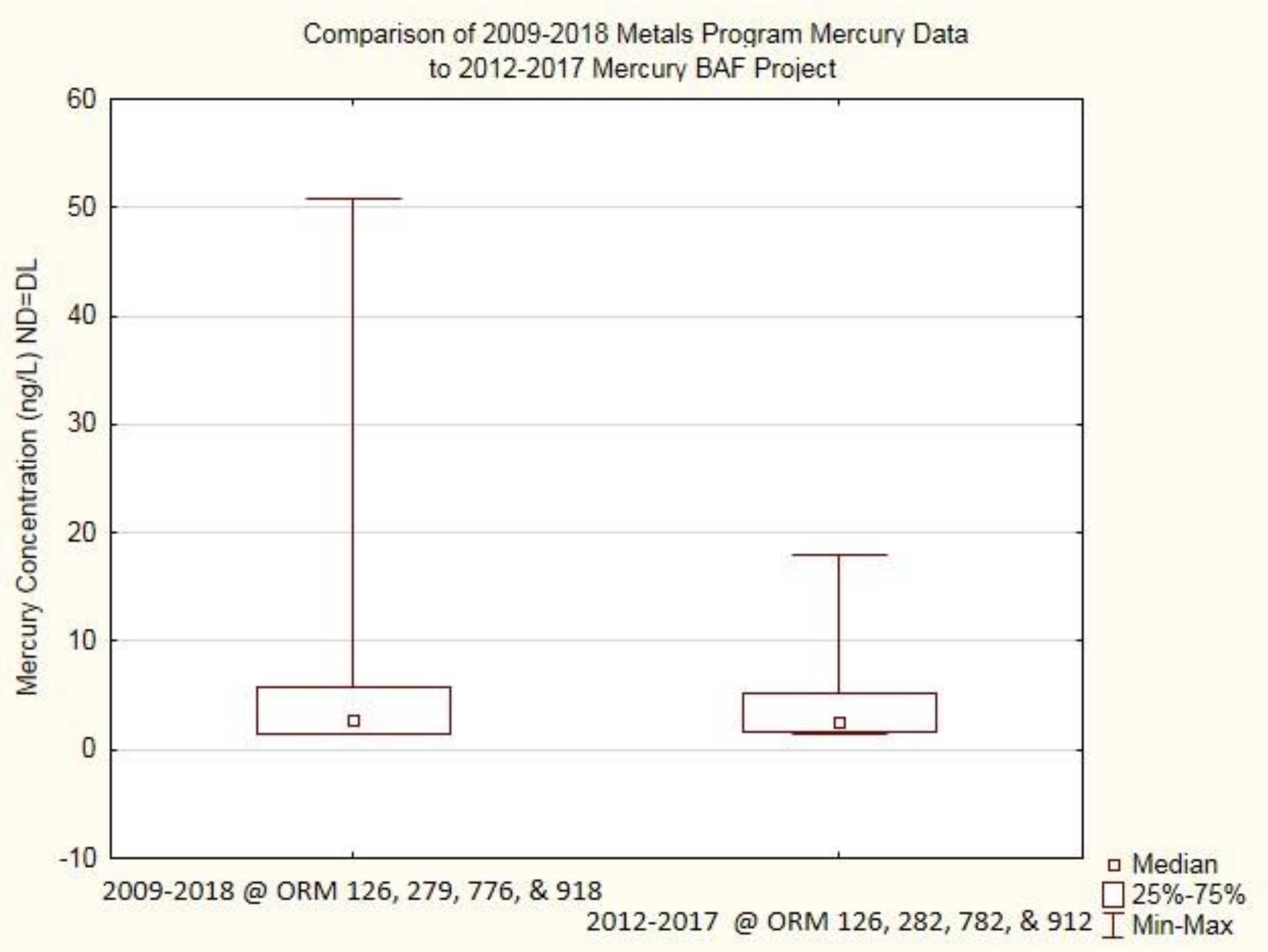
Main Conclusions

- Point sources account for 2% of the mercury load at ORM912.
- Atmospheric deposition accounts for 582% of the mercury load at ORM912.
- Instream mercury loads and yields are shown for all tribs and mainstem stations.
- Instream tributary loads cumulatively account for half of the mercury load at ORM912.
- Point sources discharging directly to the Ohio River account for 40% of the cumulative point source load.
- Instream sampling results represent typical conditions for the Ohio River relative to mercury.


Cumulative Upstream Mercury Point Source Loads (lbs)
Annual Point Source Loads (lbs)
Number of Outfalls
0
10
20
30
40
50
60
70
100
200
300
400
500
600
700
800
All Upstream Point Sources (max)
Ohio River Direct Upstream Point Sources
ORM 126
ORM 282
ORM 782
ORM 912
Annual Point Source Hg Load Max (Non-detects=DL) (lbs)
Number of Hg Monitored Outfalls

Main Conclusions

- Point sources account for 2% of the mercury load at ORM912.
- Atmospheric deposition accounts for 582% of the mercury load at ORM912.
- Instream mercury loads and yields are shown for all tribs and mainstem stations.
- Instream tributary loads cumulatively account for half of the mercury load at ORM912.
- Point sources discharging directly to the Ohio River account for 40% of the cumulative point source load.
- Instream sampling results represent typical conditions for the Ohio River relative to mercury.


Comparison of 2009-2018 Metals Program Mercury Data
to 2012-2017 Mercury BAF Project
Mercury Concentration (ng/L) ND=DL
60
50
40
30
20
10
0
-10
2009-2018 @ ORM 126, 279, 776, & 918
2012-2017 @ ORM 126, 282, 782, & 912
Median
25%-75%
Min-Max

ND=DL

Project Status

- Revised draft distributed to TEC, Commissioners and Ad Hoc Mercury Committee.

- Friday, March 13 deadline for comments.

- Staff will be fine-tuning figures and tables to improve readability.

STATUS OF COMBINED SEWER OVERFLOW ABATEMENT

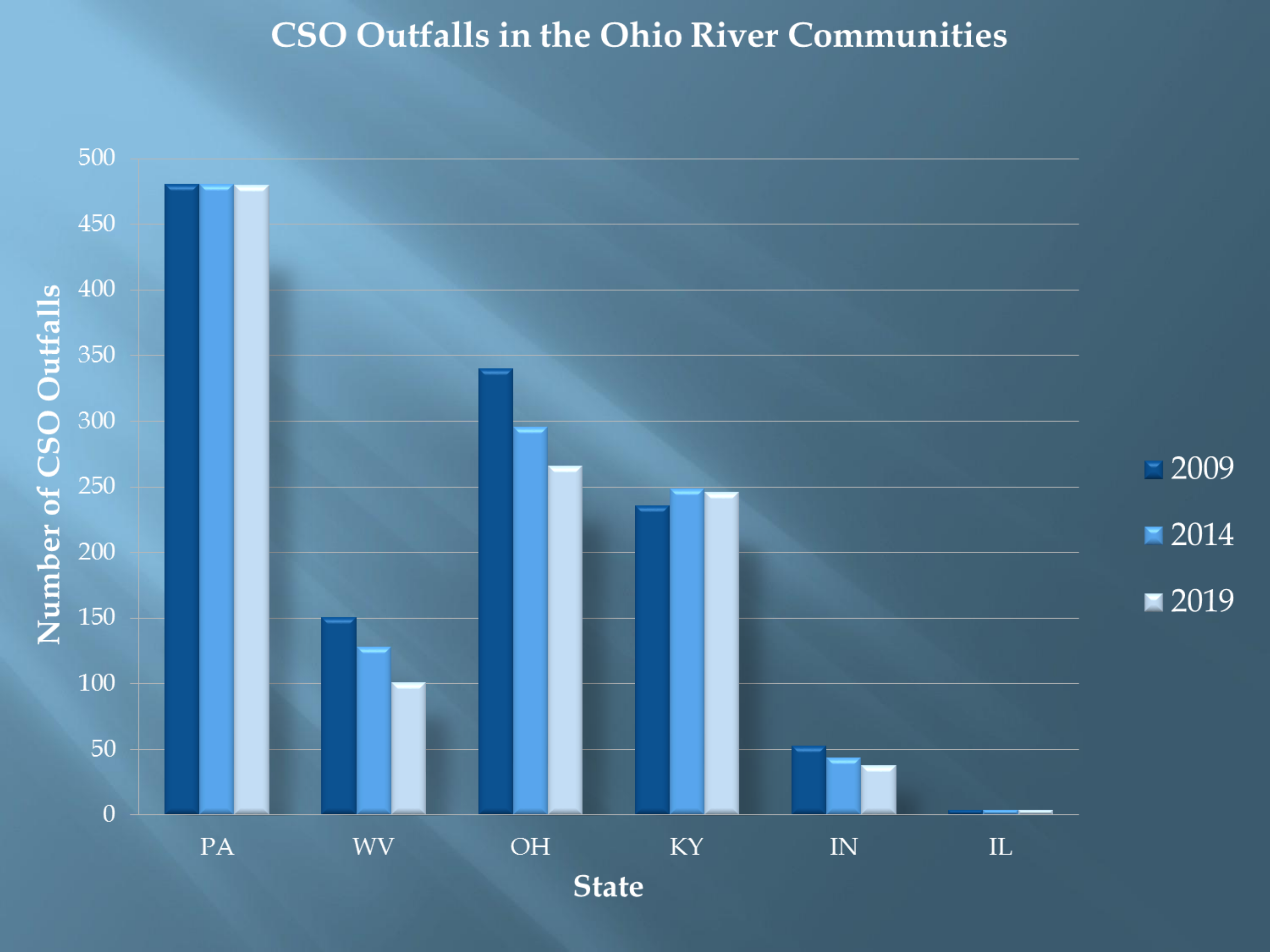
February 11-12, 2020
Agenda Item 11
Informational Item

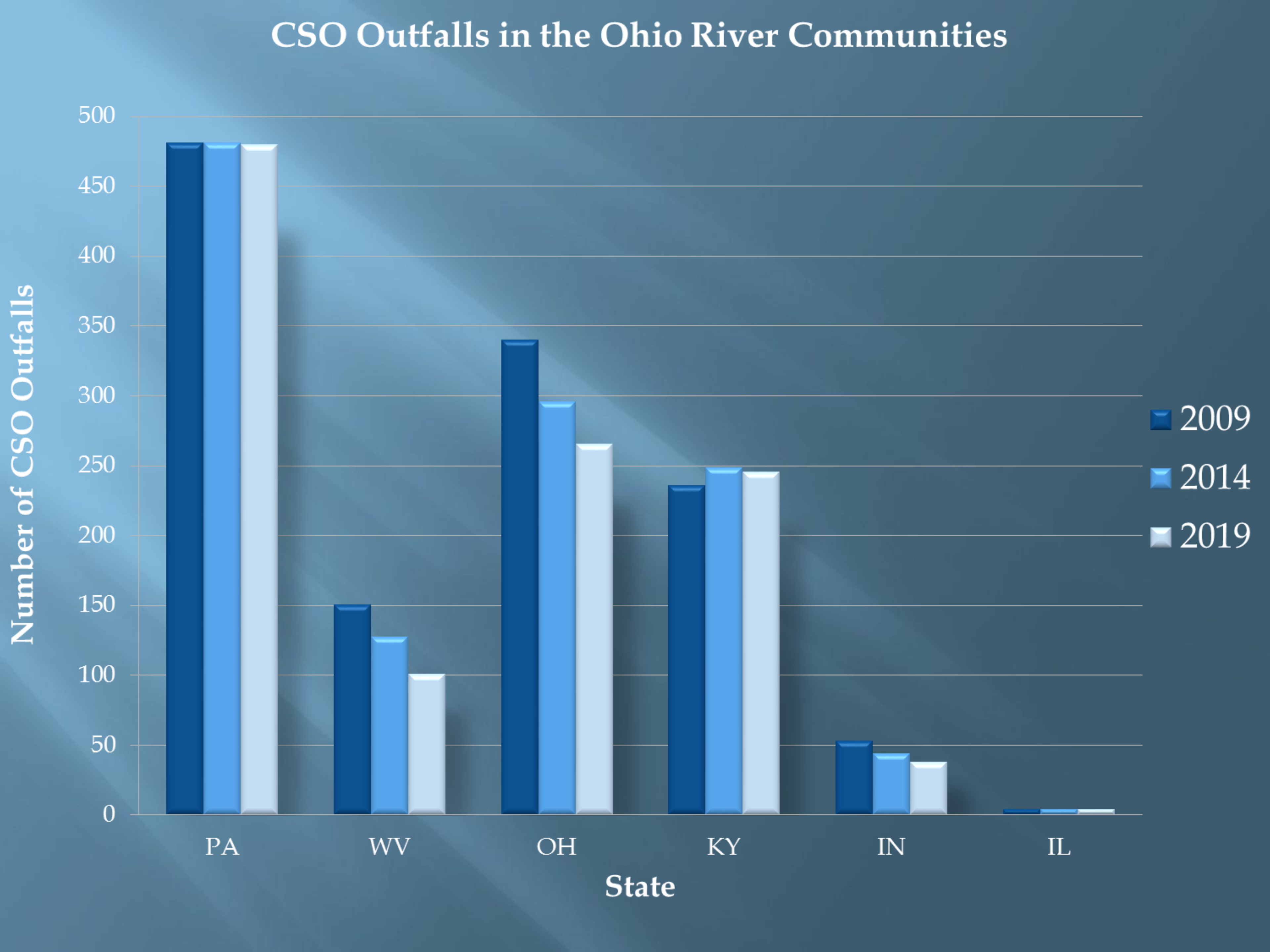
Nine Minimum Controls

- Measures that can reduce CSOs and their effects on receiving water quality.

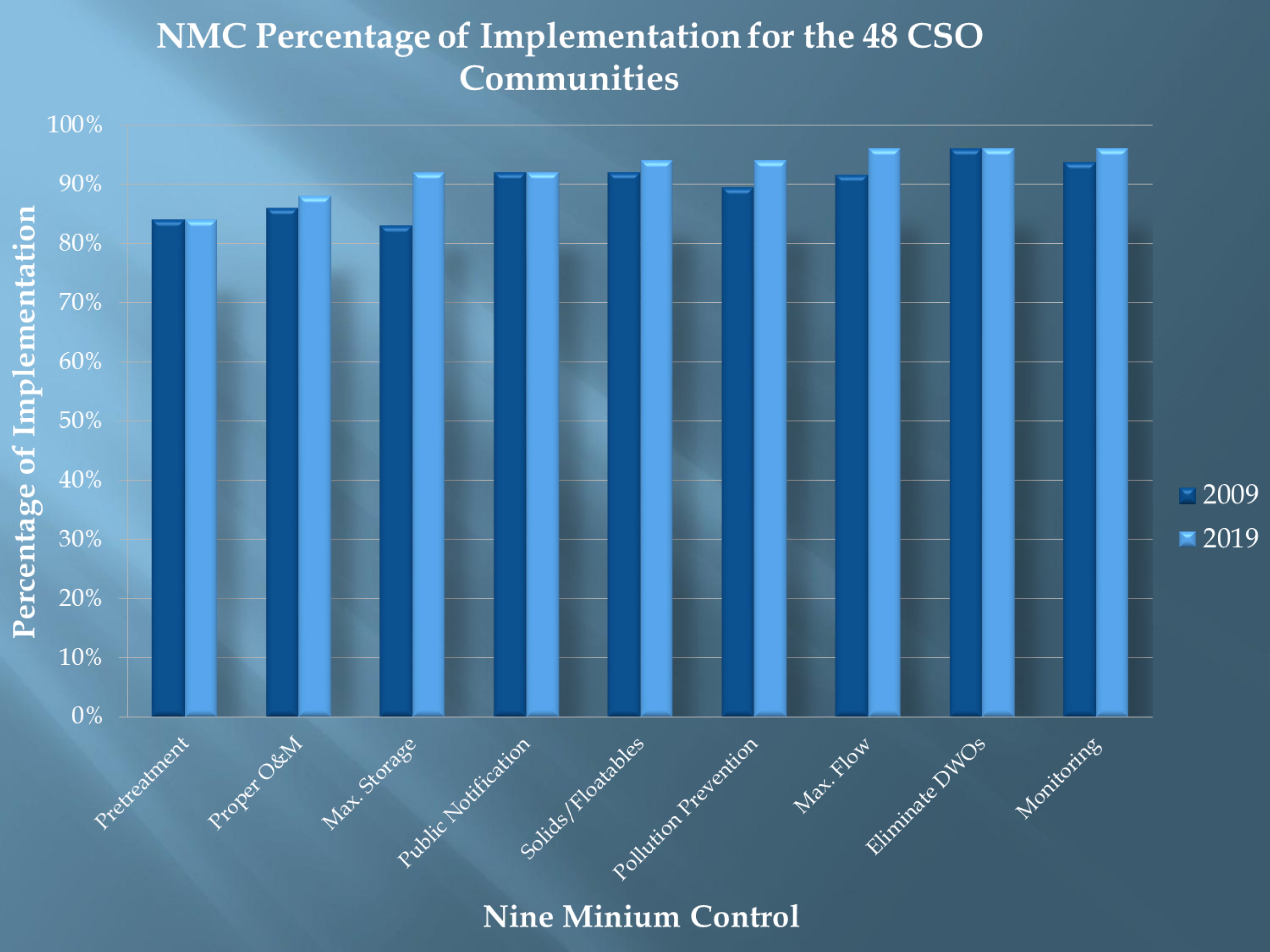
1. Proper Operation & Maintenance
2. Maximize Storage
3. Pretreatment
4. Maximize Flow for Treatment
5. Dry Weather CSO Prohibition
6. Control of Solids and Floatables
7. Pollution Prevention
8. Public Notification
9. Monitoring of CSO Impacts

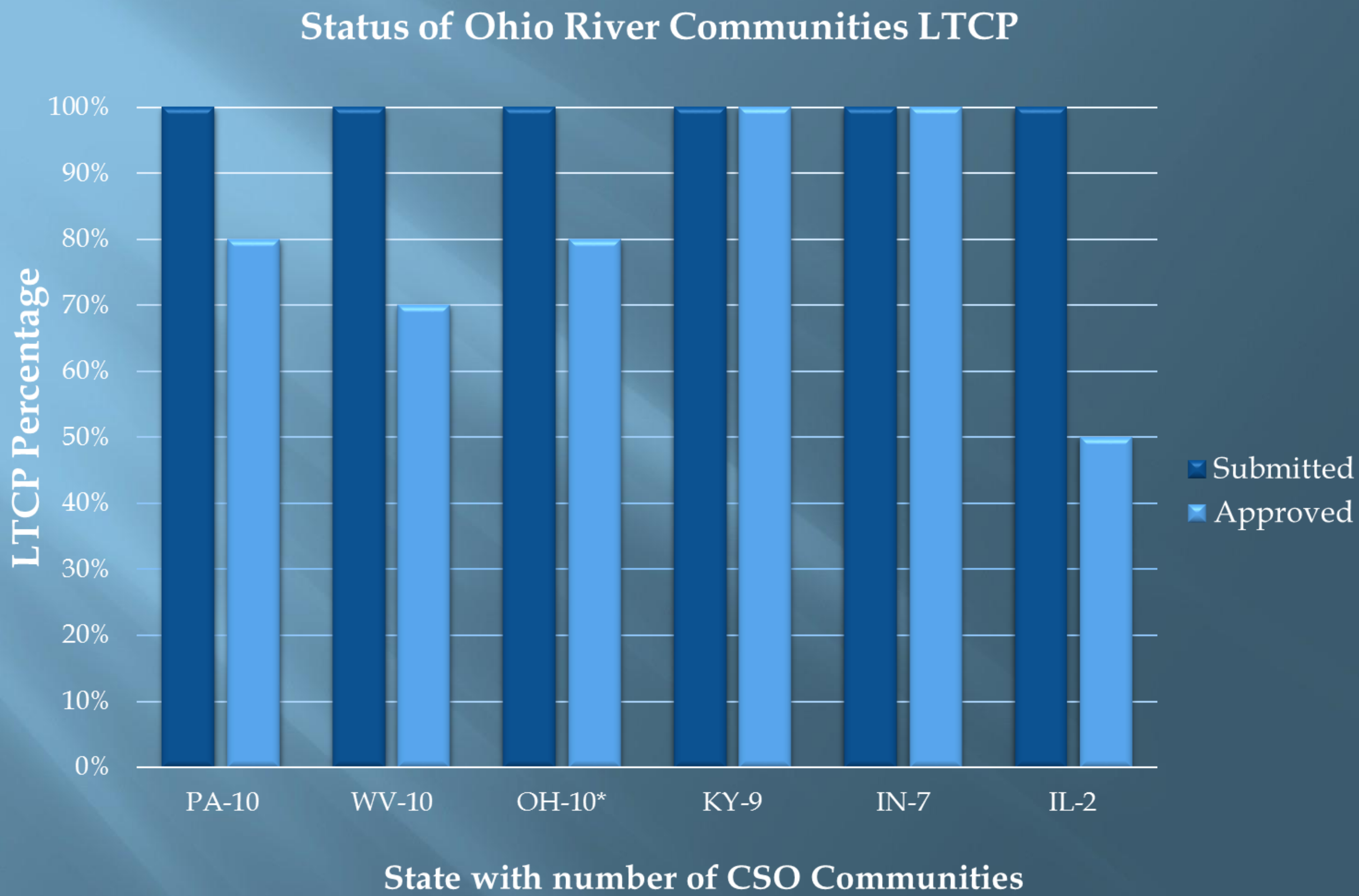
- Pennsylvania – 10 Communities
- West Virginia – 10 Communities
- Ohio – 10 Communities
- Kentucky – 9 Communities
- Indiana – 7 Communities
- Illinois – 2 Communities


CSO Outfalls in the Ohio River Communities
Number of CSO Outfalls
500
450
400
350
300
250
200
150
100
50
0
PA
WV
OH
KY
IN
IL
State
2009
2014
2019



CSO Outfalls in the Ohio River Communities
Number of CSO Outfalls
500
450
400
350
300
250
200
150
100
50
0
PA
WV
OH
KY
IN
IL
State
2009
2014
2019


NMC Percentage of Implementation for the 48 CSO Communities
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percentage of Implementation
Pretreatment
Proper O&M
Max. Storage
Public Notification
Solids/Floatables
Pollution Prevention
Max. Flow
Eliminate DWOs
Monitoring
Nine Minium Control
2009
2019



*New Boston is not required to submit a LTCP.

Long Term Control Plan (LTCP) Status

Pennsylvania

- ALCOSAN Consent Degree has been signed.
- PWSA (Pittsburgh Water and Sewer Authority) are still waiting on EPA enforcement action/negotiations.
- RAJSA (Rochester Area Joint Sewer Authority) are completing their last phase of the LTCP implementation.
- Coraopolis LTCP was approved for the Presumption Approach.

Ohio

- Steubenville and the State are working towards finalizing a Second Amended Consent Order to address the LTCP with a phased concept for projects.
- Mingo Junction has requested a change to the LTCP with plans for new storm sewers.

Long Term Control Plan (LTCP) Status

Indiana

- Madison and Aurora have fully implemented their LTCPs.
- Rockport is in their final phase and scheduled for full implementation May 2026.
- Cannelton is on schedule to fully implement their LTCP in 2029.
- Jeffersonville and Evansville are currently negotiating modifications of their CD/LTCPs with EPA and IDEM.

State Updates

- ALCOSAN and PWSA are both continuing with Green Infrastructure plans/proposals and more information is available on their websites.
- McKees Rocks and Stowe were issued general permits and are proposing compliance with Presumption Approach.
- Midland has submitted their Post Construction Compliance Monitoring Plan (PCCMP) and is waiting approval.
- Sewickley is in discussions to sell/convey its facilities to Leetsdale, but a long way from being settled.
- Toronto completed installations of new storm sewers, thus separating the combined section of the collection system. Five of the seven CSOs have been closed.
- Steubenville is commencing a Flow Study in early 2020 adding 14 flow meters to the existing 19 flow meters to facilitate in the modeling calibration.

State Updates

- Middleport is currently starting Phase 3 of their sewer separation project.
- Madison’s three remaining permitted CSO’s are prohibited from discharging.
- Aurora has not eliminated any CSO’s, but a small CSO storage tank was built to limit overflows.
- Cannelton currently sends it wastewater to Tell City, but there are plans to build its own Wastewater Treatment Plant in the next couple of years.
- Evansville’s next major project is to expand the East Wastewater Treatment Plant and start construction on the wetland adjacent to the Plant. This wetland will drastically reduce the CSO’s into Bee Slough.

NOTICE: CSO 217
Combined Sewer Overflow
Untreated storm water and sewage may discharge during and after rainfall. May contain harmful bacteria.
of greater
CINCINNATI
513-352-4900
www.MSDGC.org
OEPA Permit: 1PX00022

Questions?

Ohio River Basin Water Quality Trading Project

ORSANCO TEC & Commission Meeting

Jessica Fox, EPRI
Jeff Thomas, EPRI

February 12, 2020

ELECTRIC POWER RESEARCH INSTITUTE

USEPA on Water Quality Trading

Wheeler unveils proposal to boost 'market-based' approaches

Philip Athey, E&E News reporter

Published: Thursday, September 5, 2019

News Releases from Headquarters › Water (OW)

EPA Announces New Water Quality Trading Policy Memorandum

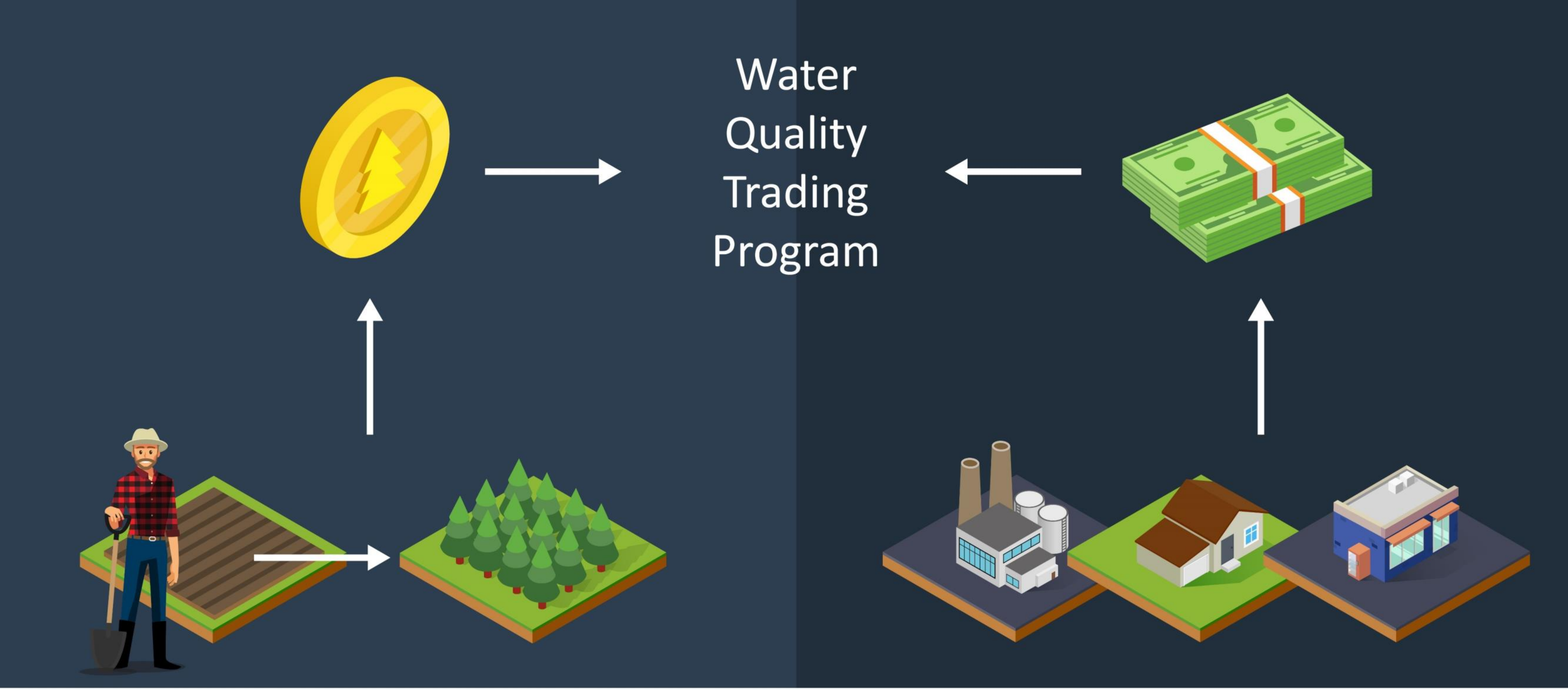
EPA efforts seek to modernize the agency's water quality trading policies to leverage emerging technologies and facilitate broader adoption of market-based programs

02/06/2019

News Releases from Headquarters › Water (OW)

EPA Seeks Comment on New Policy Proposals to Facilitate Market-Based Opportunities to Improve Water Quality

09/05/2019



GRI Empowering Sustainable Decisions

SUSTAINABLE DEVELOPMENT GOALS

CDP DISCLOSURE INSIGHT ACTION

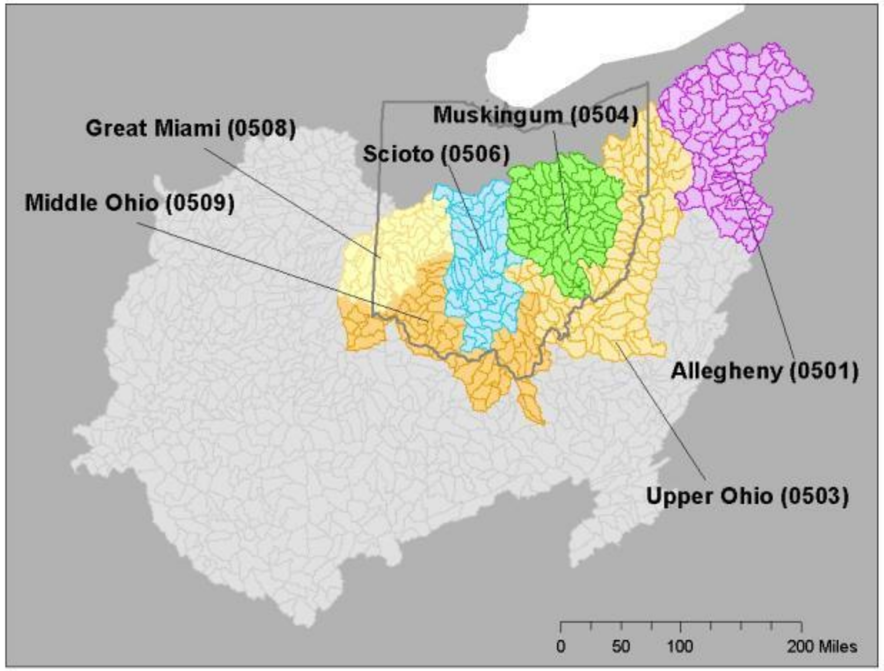
UN GLOBAL COMPACT The CEO Water Mandate

OH, IN, and KY Sign ORB Water Quality Trading Plan!

August 9th, 2012 in Cincinnati Ohio

June 22: A nutrient pollution article in The Economist mentions EPRI's Water Quality Trading Program.

Installed Projects



Before and After

Before
Runoff, erosion, sedimentation.

After
'Heavy Use Protection Area'

Registry

Ohio River Basin Trading Project

ELECTRIC POWER RESEARCH INSTITUTE

Ohio River Basin - Water Quality Trading Project

Clear Search:

Account Holders | Projects | Issuances / Listings | Holdings | Retired Credits | Cancelled Units

Project Name	Account Name	Project Type	Installation Date	State / Province	Watershed (HUC 4)	Sub-Watershed (HUC 10)	BMP	Details
IN-029-2013-106	Dearborn County SWCD	Nitrogen Reduction	04 Sep 2013	IN	Middle Ohio	South Hogan Creek-North Hogan Creek	Feedlot: Waste Management System	View
IN-029-2013-106	Dearborn County SWCD	Phosphorus Reduction	04 Sep 2013	IN	Middle Ohio	South Hogan Creek-North Hogan Creek	Feedlot: Waste Management System	View
IN-115-2013-108	Ohio County SWCD	Nitrogen Reduction	26 Aug 2013	IN	Middle Ohio	South Fork Laughery Creek-Laughery Creek	Feedlot: Waste Management System	View
IN-115-2013-108	Ohio County SWCD	Phosphorus Reduction	26 Aug 2013	IN	Middle Ohio	South Fork Laughery Creek-Laughery Creek	Feedlot: Waste Management System	View
IN-115-2013-109	Ohio County SWCD	Phosphorus Reduction	20 Nov 2013	IN	Middle Ohio	Gunpowder Creek-Ohio River	Feedlot: Waste Management System	View

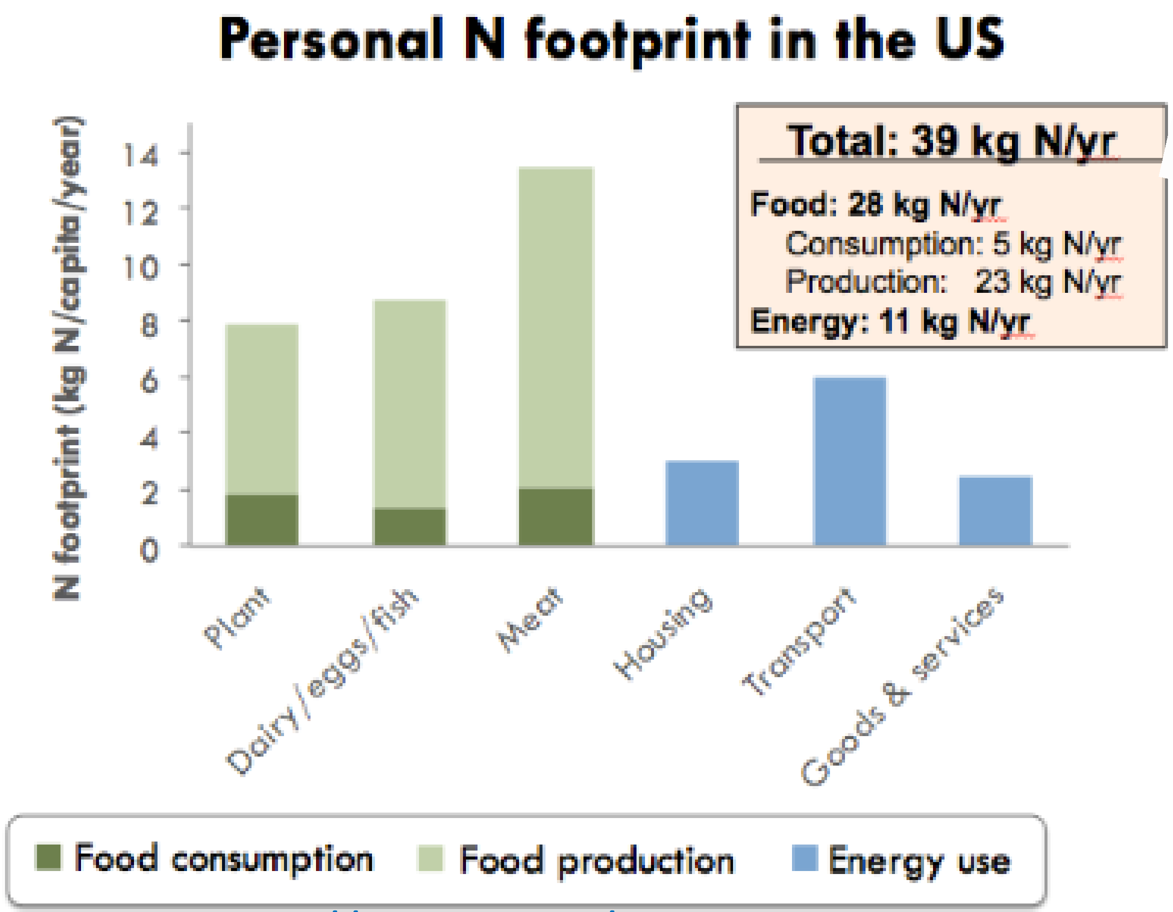
"Protect your dog and the Gulf of Mexico's Dead Zone.....
with a water credit!"

Public Events

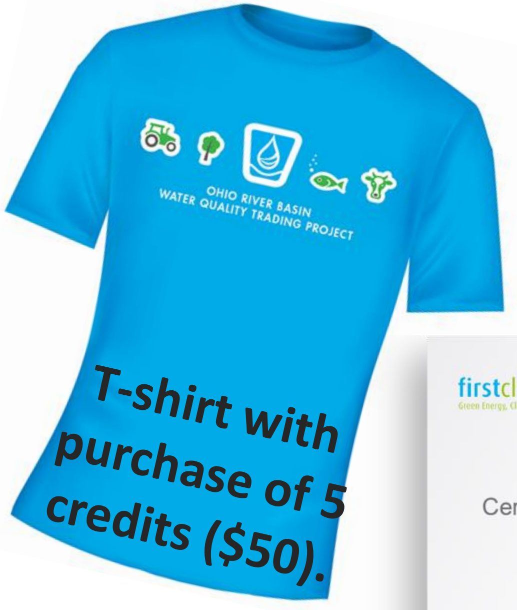
PURCHASE NOW

PayPal

What's YOUR Footprint?



http://n-print.org/



T-shirt with purchase of 5 credits ($50).

International Credit Release: Collaboration First Climate

EPRI | ELECTRIC POWER RESEARCH INSTITUTE   firstclimate   News Release

Contacts:

Clay C. Perry
Senior Media Relations Manager
202-293-6184
clperry@epri.com

Christopher Mahoney
Communications Manager – Energy and Environment
704-595-2653
cmahoney@epri.com

EPRI and First Climate Bring Water Quality Credits to Environmental Stewardship Markets

PALO ALTO, Calif. – (May 29, 2019) – The Electric Power Research Institute (EPRI) and First Climate announced today an agreement that will move credits from EPRI's Ohio River Basin Water Quality Trading Project to international credit trading markets. This is a unique collaborative between a water quality project and an environmental asset credit broker to provide access to some of the world's largest environmental credit buyers.

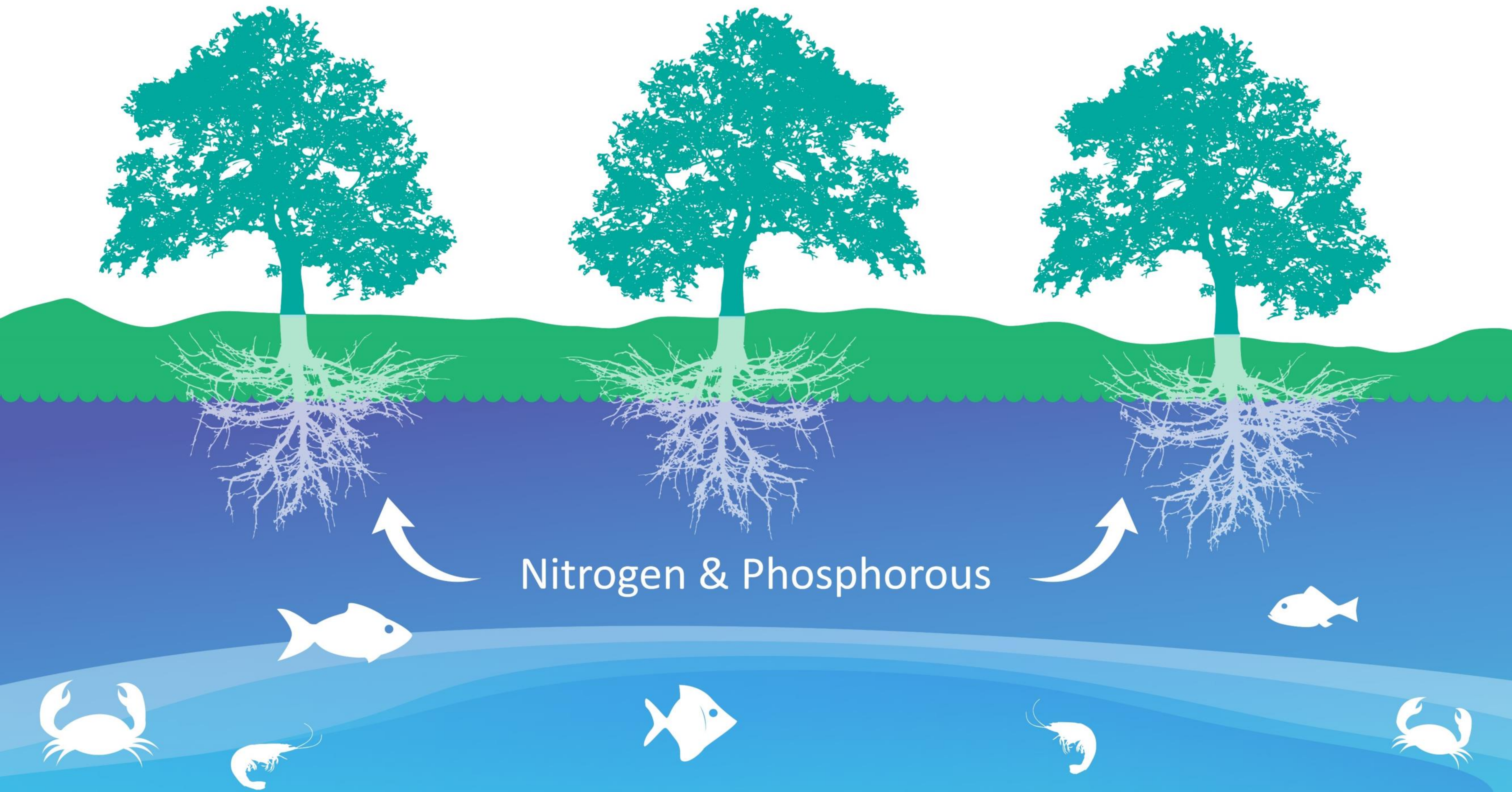
https://www.firstclimate.com/en/water-quality-credits/

Aligning with Sustainability Principles & Disclosures

Food
Milk
Beef
Corn
Soy
Tobacco
Bourbon/Beer

Corporate
Walmart
Eli Lilly
Jim Beam
Wendy's
JP Morgan Chase
Limited Brands
Proctor & Gamble
KFC/Pizza Hut

Purchase Volume	1 – 100 credits	101 – 500 credits	> 500 credits
Unit Price (USD)	$14	$13	$12


Nitrogen & Phosphorous

PLOS | ONE

Keller AA & Fox J (2019)
Giving credit to reforestation for water quality benefits.
PLoS ONE 14(6): e0217756.

https://doi.org/10.1371/journal. pone.0217756

PLOS | ONE

RESEARCH ARTICLE

Giving credit to reforestation for water quality benefits

Arturo A. Keller[1]*, **Jessica Fox**[2]

1 Bren School of Environmental Science & Management, University of California Santa Barbara, Santa Barbara, CA, United States of America, **2** Electric Power Research Institute, Palo Alto, CA, United States of America

* keller@bren.ucsb.edu

Check for updates

OPEN ACCESS

Citation: Keller AA, Fox J (2019) Giving credit to reforestation for water quality benefits. PLoS ONE 14(6): e0217756. https://doi.org/10.1371/journal.pone.0217756

Abstract

While there is a general belief that reforesting marginal, often unprofitable, croplands can result in water quality benefits, to date there have been very few studies that have attempted to quantify the magnitude of the reductions in nutrient (N and P) and sediment export. In order to determine the magnitude of a credit for water quality trading, there is a need to develop quantitative approaches to estimate the benefits from forest planting in terms of load reductions. Here we first evaluate the availability of marginal croplands (i.e. those with low infiltration capacity and high slopes) within a large section of the Ohio River Basin (ORB) to assess the magnitude of the land that could be reforested. Next, we employ the Nutrient Tracking Tool (NTT) to study the reduction in N, P and sediment losses from con-

Overall, there is the potential for avoiding 60 million kg N and 2 million kg P from reaching the streams and rivers of the northern ORB as a result of conversion of marginal farmland to tree planting. This represents a significant fraction of the goal of the USEPA Gulf of Mexico Hypoxia Task Force to reduce TN and TP reaching the dead zone in the Gulf of Mexico.


NATIONAL GEOGRAPHIC

PLOS | ONE

ENVIRONMENT

How to improve the quality of water? By planting (many) trees

American researchers have made the link between reforestation and improved water quality. They call today polluting facilities to reforest their lands.

=250 million

= 60 million kg

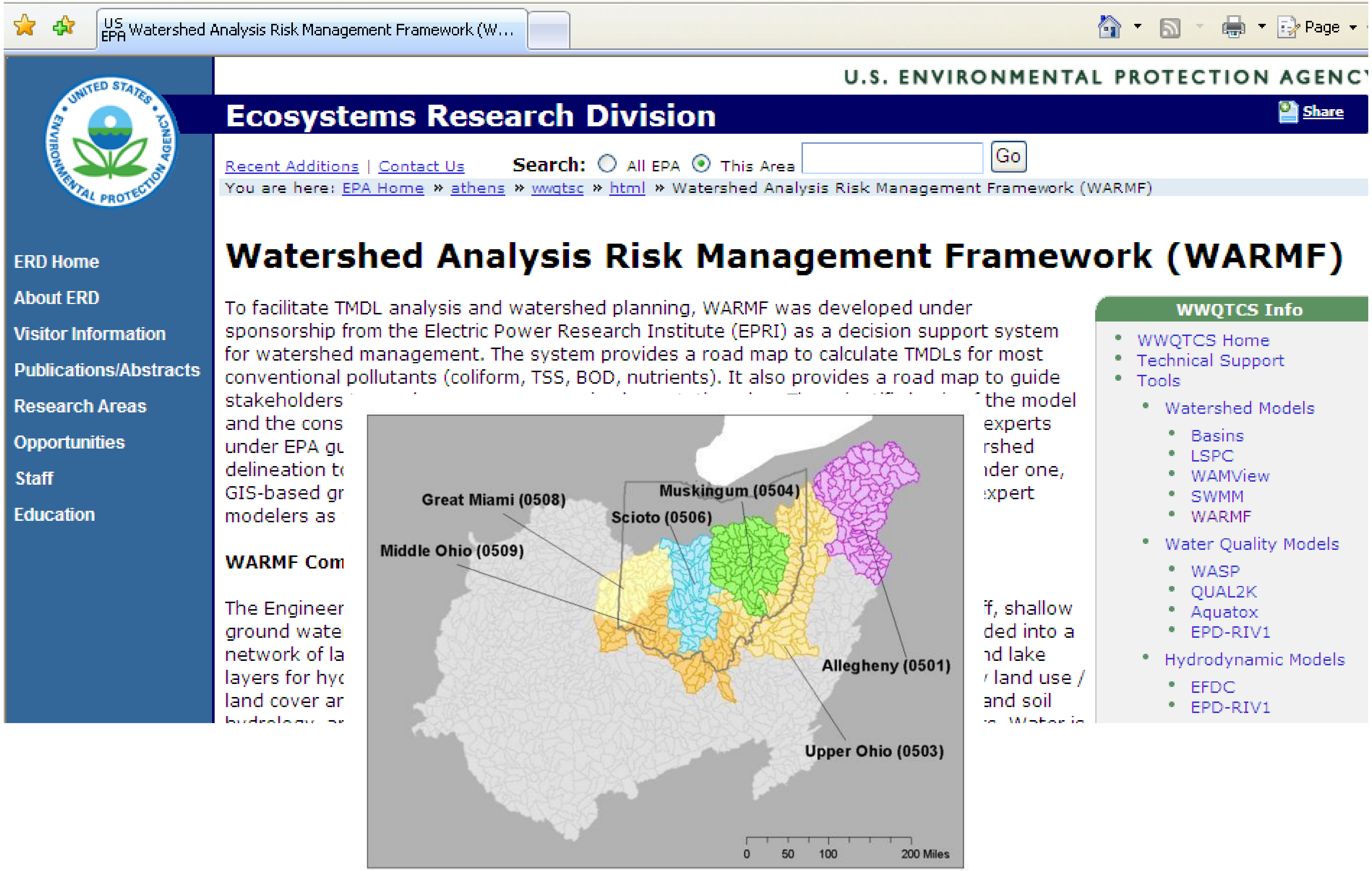
7 N Nitrogen

= 2 million kg

15 P Phosphorus

= 1.54 million

Watershed Model



Summary

- We are having important POSITIVE impacts!
- Funding will end in 2020
- Need additional funding secured by end of 2020

Funding Sources: Credit Sales, Grants, Private Investment

- Stewardship/Sustainability
- Supplemental Environmental Projects (SEPs)
- State/Federal Credit Purchases
  - 319 funds, Gulf of Mexico hypoxia, HABs

OHIO RIVER BASIN
WATER QUALITY TRADING PROJECT


U.S. NEWS

Trading System Tackles Waste

New Plan Pays Farmers to Curb Agricultural Runoff That Pollutes the Gulf of Mexico

WSJ

2018
Environmental Finance
Voluntary Carbon Markets Rankings
WINNER

npr

WaterWorld

US WATER PRIZE

OHIO RIVER BASIN
WATER QUALITY TRADING PROJECT

Do Your Part!

wqt.epri.com