236th Technical Committee Meeting

Scott Mandirola, Chair
Presiding
October 8-9, 2024

The meeting will begin at 1:00 P.M. (Eastern) on October 8, 2024.   Below are a few tips to effectively navigate the meeting:

- ***Mute your microphone at all times unless speaking.***
- ***Disable your camera unless you are a Technical Committee member.***
- ***The presenter will prompt participants for verbal questions, or use the Chat feature.***
- ***Detailed instructions and important information can be found in the previously emailed document, "ORSANCO Virtual Technical Committee and Commission Meeting Instructions."***

Chairman's Welcome & Roll Call

Scott Mandirola

Chair, Technical Committee

TEC Member Roll Call

- IL – Scott Twait *
- IN – Gabrielle Ghreichi *
- KY – Katie McKone *
- NY – Damianos Skaros *
- OH – Melinda Harris *
- PA – Kevin Halloran *
- VA – Jeffrey Hurst *
- WV – Scott Mandirola*
- USACE – Erich Emery *
- USCG – LTJG Connor Sullivan*
- USEPA – David Pfeifer *
- USGS – Jeff Frey *
- CIAC – Kathy Beckett
- PIAC – Cheri Budzynski
- PIACO – Betsy Bialosky
- POTW – Reese Johnson (Jim Gibson)
- WOAC – Heather Hulton VanTassel
- WUAC – Chris Bobay (Erica Pauken)
- Chair – Scott Mandirola *
- Executive Director – Richard Harrison *

* Voting member

Agenda Item 1:
Request for action on minutes of the 235th Technical Committee Meeting

Chair Mandirola

Minutes were emailed with the agenda package on September 19, 2024

Agenda Item 2:
Chief Engineer's Report

Executive Director Richard Harrison

Agenda Item 3:
USEPA's New Recommendations for Contaminants to Monitor in Fish and Shellfish

Lisa Larimer, USEPA HQ

Updating Recommended Contaminants to Monitor for Fish and Shellfish Advisories

Lisa Larimer, P.E.

ORSANCO Technical Committee
October 8, 2024

United States Environmental Protection Agency

Office of Water

What will be covered today?

- List of contaminants to monitor in fish and shellfish
  - What it is, process to update it, what's new
- Analysis methods for new additions
- Toxicity values for new additions and how they can be used in advisories
- Results from National Aquatic Resource Surveys

What is the Contaminant List? How is it Used?

- List of contaminants that EPA recommends fish and shellfish advisory programs in states, Tribes, and territories monitor and analyze.
- When contaminants occur in high enough concentrations to potentially affect the health of people eating fish and shellfish, those programs issue consumption advisories for those waterbodies.

Why did EPA update the list?

- Part of larger effort to update fish advisory guidance for states and Tribes (from 2000)
- Adding contaminants found to accumulate in fish at levels that could be problematic for human health
- Part of EPA's PFAS Strategic Roadmap
- Released on July 11; can be found at https://www.epa.gov/choose-fish-and-shellfish-wisely/epa-guidance-developing-fish-advisories

What was the process for updating the list?

1. Searched Literature

Searched databases using specified terms. Removed articles containing non-U.S. species or lab dosing studies.

2. Extracted Data

Compiled concentrations in fish and shellfish from articles and toxicity information from U.S. government sources.

3. Performed Analyses

Calculated if the concentrations in fish or shellfish would exceed thresholds for safely eating 8 oz/week or 5 oz/day.

4. Compiled Lists

Created two lists of contaminants that have been found in fish and shellfish at concentrations that may be of concern for human health.

5. Sent Through Peer Review

Submitted the process and results to independent subject matter experts in toxicology and human health risk assessment.

6. Revised After Peer Review

Made revisions to incorporate peer reviewers' suggestions.

Why are there two lists of contaminants?

1. Contaminants to monitor for advisories (existing list)

- These have measures of oral toxicity in humans (e.g., RfD).
- Recommended for issuing advisories

2. Contaminants to monitor to watch (new list)

- Federal agencies have not released a toxicity measure.
- Recommended for monitoring to see if accumulating in fish.
- If so, state or Tribe could wait for federal value or determine toxicity value on their own and issue advisory.

Which contaminants were added to "Monitor For Advisories" and "Monitor to Watch" lists?

Contaminant Group	Monitor for Advisories List: Contaminant	Monitor to Watch List: Contaminant	
Cyanotoxins	Microcystins	BMAA DABA	
Flame retardants	BDE-47		
Metals	Lead		
PFAS	PFDA PFHxS PFNA PFOA PFOS	PFDS PFDoA PFHpS PFOSA	PFTeDA PFTrDA PFUnDA
Pharmaceuticals	Amphetamine		

Which EPA methods can be used to analyze the new contaminants?

Contaminant Group	Contaminant			EPA Method
Cyanotoxins	Microcystins BMAA DABA			For MC: method using the 2-methoxy-3-methyl-4- phenylbutyric acid (MMPB) procedure is under development
Flame retardants	BDE-47			EPA Method 1614A
Metals	Lead			EPA Method 200.8, Rev. 5.4, with sample preparation by SW-846 Method 3050B or other suitable strong acid digestion procedure applicable to tissues
PFAS	PFDA PFHxS PFNA PFOA	PFOS PFDS PFDoA PFHpS	PFOSA PFTeDA PFTrDA PFUnDA	EPA Method 1633
Pharmaceuticals	Amphetamine			EPA Method 1694

Which toxicity values is EPA using for PFAS?

PFAS	Non-cancer Toxicity Value (mg/kg BW-day)	Cancer Slope Factor $(mg/kg/day)^{-1}$
PFDA	2E-09	N/A
PFHxS	2E-06 (IRIS draft: 4E-10)	N/A
PFNA	3E-06	N/A
PFOS	1E-07	39.5
PFOA	3E-08	29,300

Which toxicity values is EPA using for the new non-PFAS contaminants?

Contaminant	Non-cancer Toxicity Value (mg/kg BW-day)	Cancer Slope Factor $(mg/kg/day)^{-1}$
Microcystins	5E-5	N/A
BDE-47	1E-4	N/A
Amphetamine	8.3E-06	N/A

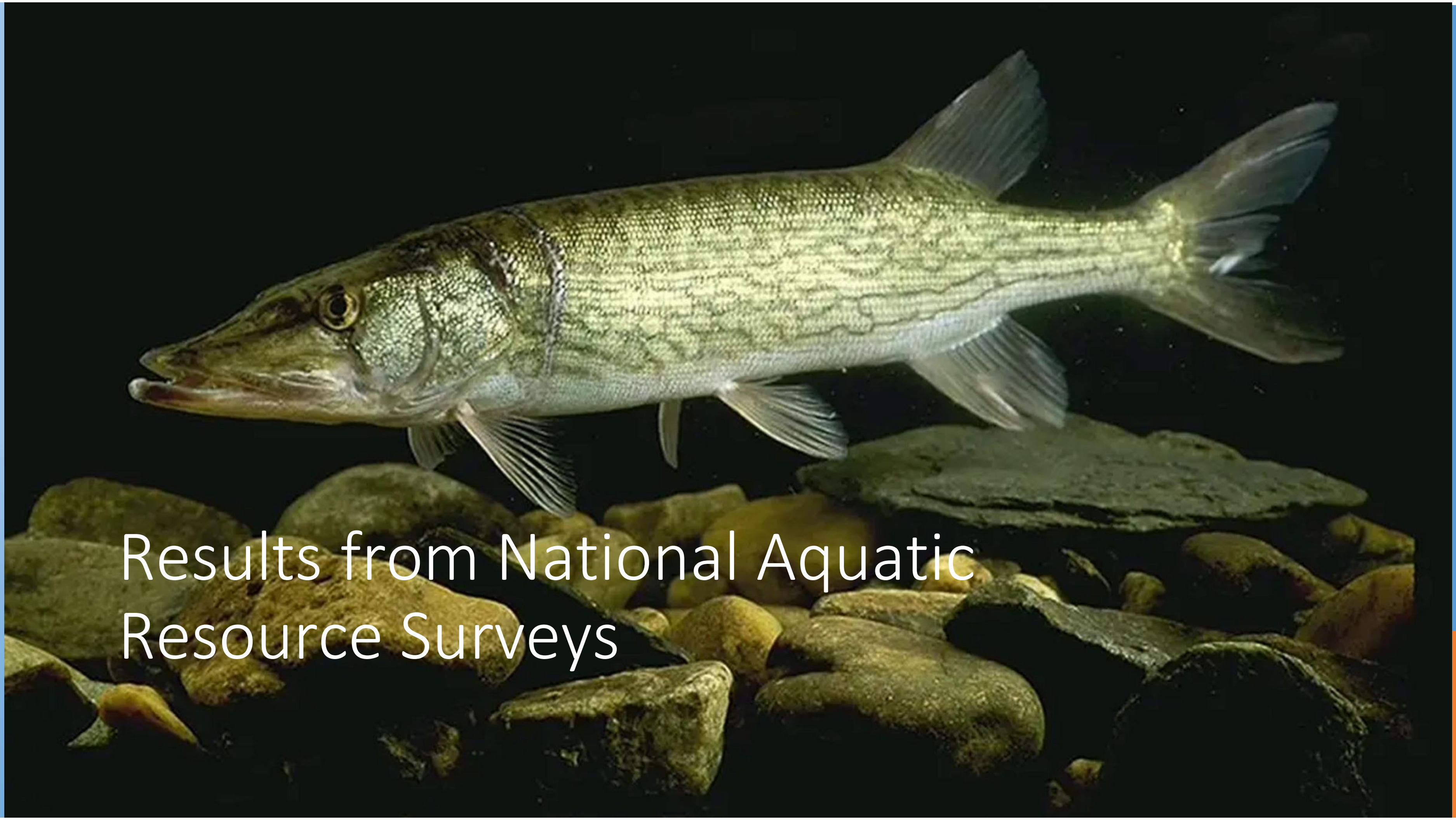
Equations for Calculating Fish Consumption Rates for Advisories (single contaminant)

Carcinogenic effects

$$\mathrm{CR}_{\mathrm{daily}}\left(\frac{kg}{d}\right) = \frac{\text{Cancer Risk Level} \times \text{Body Weight }(kg)}{\text{Cancer Slope Factor }\left(\frac{mg}{kg\text{—}day}\right)^{-1} \times \text{Concentration in fish }\left(\frac{mg}{kg}\right)}$$

Non-carcinogenic effects

$$\mathrm{CR}_{\mathrm{daily}}\left(\frac{kg}{d}\right) = \frac{\text{Reference Dose }\left(\frac{mg}{kg-d}\right) \times \text{Body Weight }(kg)}{Concentration\ in\ fish\ \left(\frac{mg}{kg}\right)}$$



Results from National Aquatic Resource Surveys

Which fish tissue studies does EPA's Office of Water do?

Part of EPA's National Aquatic Resource Surveys

- Rivers (NRSA)
- Great Lakes (NCCA)
- Lakes (NLA)
- Next year: Estuaries (NCCA)

https://www.epa.gov/choose-fish-and-shellfish-wisely/studies-fish-tissue-contamination

How does EPA monitor contaminants in fish tissue?

Collect composite samples of fish commonly consumed by people

- Up to 5 fish of same species
- Harvestable size
- 75% rule

Analyze skin-on fillet tissue for:

- Mercury (total)
- PCBs (209 congeners)
- PFAS (40 compounds)

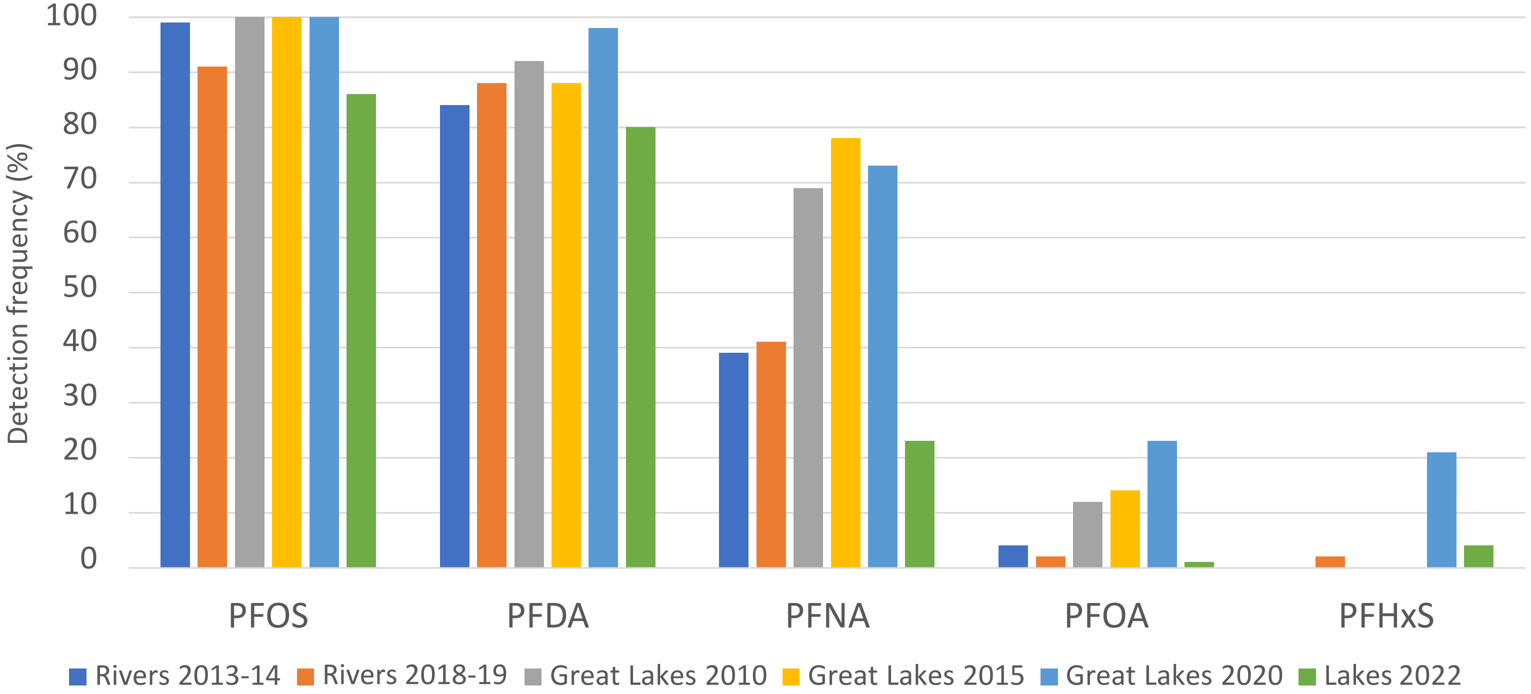
What has EPA been finding?

- Mercury and PCBs have been detected in **100%** of the samples, regardless of waterbody type.
- PFAS has been detected in **86-100%** of the samples, differing slightly by waterbody type.
- Almost all fish that contain PFAS have multiple PFAS compounds.
- The specific PFAS compounds that are found differ by waterbody type.

How often is EPA finding in fish the PFAS on the monitoring lists?

	PFAS	Detection frequency in most recent NARS		
		Lakes (of 413)	Great Lakes (of 165)	Rivers (of 290)
Perfluoroalkyl carboxylic acids	PFOA	1%	23%	2%
	PFNA	23%	73%	41%
	PFDA	80%	98%	88%
	PFUnA	85%	98%	85%
	PFDoA	71%	89%	69%
	PFTrDA	50%	52%	56%
	PFTeDA	40%	62%	36%
Perfluoroalkyl sulfonic acids	PFHxS	4%	21%	2%
	PFHpS	3%	12%	<1%
	PFOS	86%	100%	91%
	PFDS	22%	44%	30%
	PFOSA	2%	28%	24%

How often is EPA detecting in fish the PFAS on the Monitor For Advisories list?



Any questions?

Thank you!

Lisa Larimer

Larimer.Lisa@epa.gov

202-566-1017

United States Environmental Protection Agency

Office of Water

Agenda Item 4:
Identifying Sources of Microplastics in the Aquatic Environment

Amy Bergdale, USEPA Region 3, Wheeling Field Office

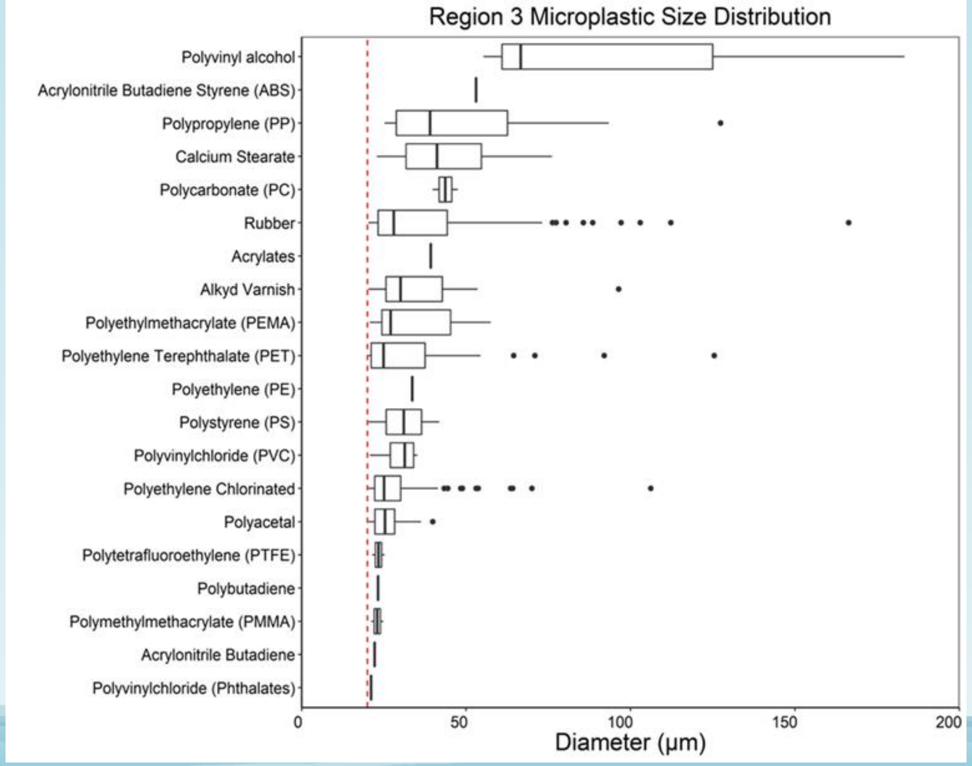
Identifying Sources of Microplastics in the Aquatic Environment

REGIONAL ACTIVITIES TO ADDRESS POLLUTION FROM MICROPLASTICS

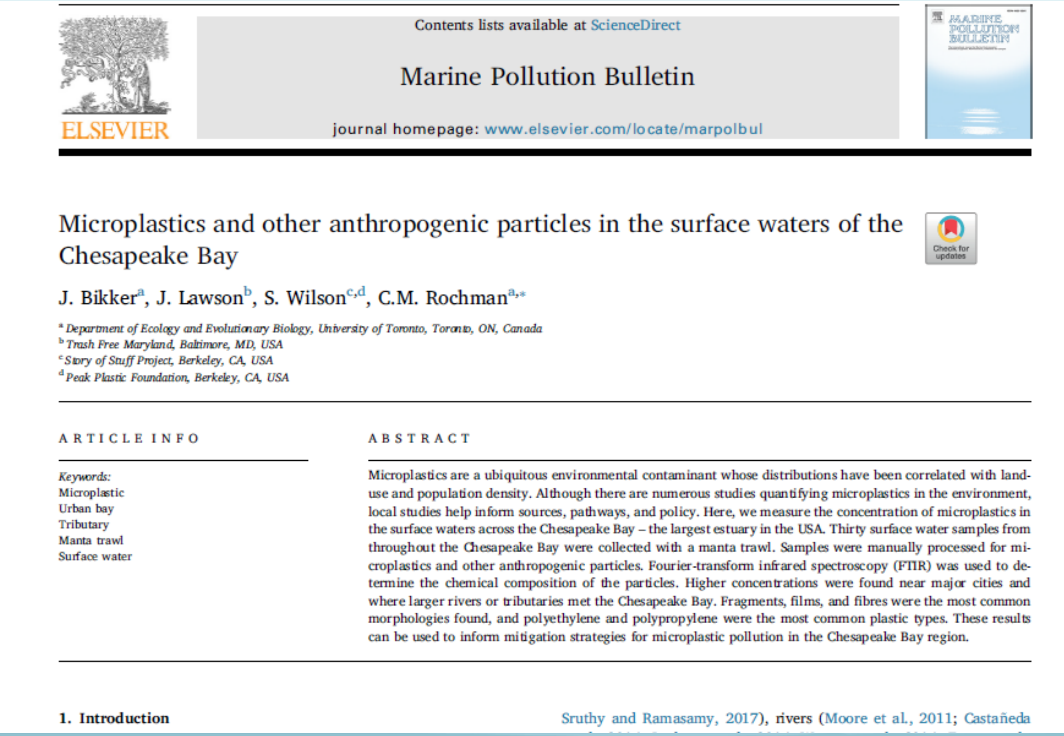
Amy Bergdale, US EPA Region 3 LSASD Field Services Branch
October 2024

Identifying Sources of Microplastics in the Aquatic Environment

- Discuss Chesapeake Bay Microplastic activities
- Regional and ORD Applied Research (ROAR, 2022)
  - Led by Region 7 with Region 3 as a partner



Microplastics are ubiquitous in the Chesapeake Bay



Contents lists available at ScienceDirect

Marine Pollution Bulletin

journal homepage: www.elsevier.com/locate/marpolbul

ELSEVIER

Microplastics and other anthropogenic particles in the surface waters of the Chesapeake Bay

J. Bikker[a], J. Lawson[b], S. Wilson[c,d], C.M. Rochman[a,*]

[a] Department of Ecology and Evolutionary Biology, University of Toronto, Toronto, ON, Canada
[b] Trash Free Maryland, Baltimore, MD, USA
[c] Story of Stuff Project, Berkeley, CA, USA
[d] Peak Plastic Foundation, Berkeley, CA, USA

ARTICLE INFO

Keywords:
Microplastic
Urban bay
Tributary
Manta trawl
Surface water

ABSTRACT

Microplastics are a ubiquitous environmental contaminant whose distributions have been correlated with land-use and population density. Although there are numerous studies quantifying microplastics in the environment, local studies help inform sources, pathways, and policy. Here, we measure the concentration of microplastics in the surface waters across the Chesapeake Bay – the largest estuary in the USA. Thirty surface water samples from throughout the Chesapeake Bay were collected with a manta trawl. Samples were manually processed for microplastics and other anthropogenic particles. Fourier-transform infrared spectroscopy (FTIR) was used to determine the chemical composition of the particles. Higher concentrations were found near major cities and where larger rivers or tributaries met the Chesapeake Bay. Fragments, films, and fibres were the most common morphologies found, and polyethylene and polypropylene were the most common plastic types. These results can be used to inform mitigation strategies for microplastic pollution in the Chesapeake Bay region.

1. Introduction

Sruthy and Ramasamy, 2017), rivers (Moore et al., 2011; Castañeda

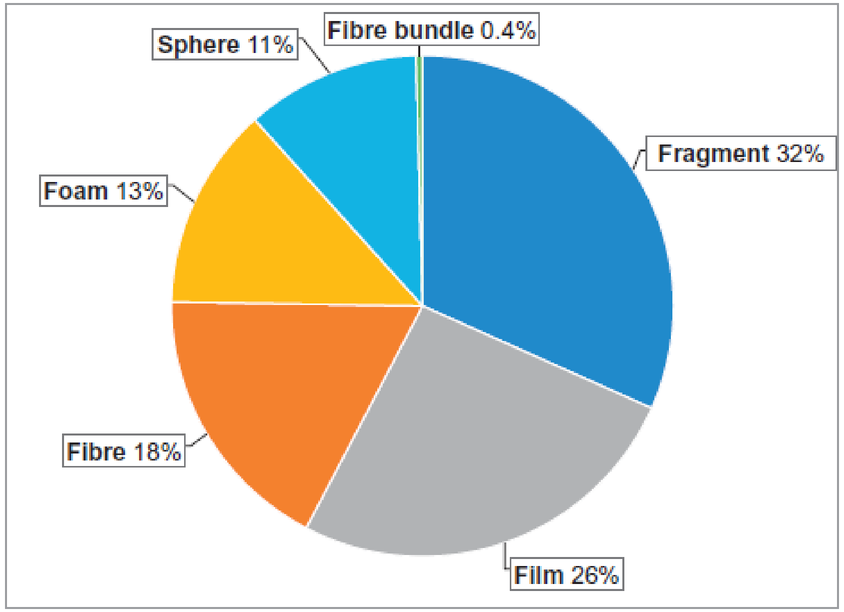


Fig. 3. Morphology of particles from thirty surface water samples (after blank correction) in the Chesapeake Bay.

2019 Microplastics STAC Workshop Recommendations

1. The CBP should create a cross-GIT Plastic Pollution **Action Team** to address the growing threat of plastic pollution to the bay and watershed.

2. The Scientific, Technical Assessment and Reporting Team should incorporate development of ERAs of microplastics into the CBP strategic science and research framework, and the Plastic Pollution Action Team should oversee the **development of the ERAs** focused on assessment of microplastic pollution on multiple living resource endpoints.

3. STAC should undertake a technical review of terminology used in microplastic research, specifically size classification and concentration units, and **recommend uniform terminology** for the CBP partners to utilize in monitoring and studies focused on plastic pollution in the bay and watershed.

4. The CBP should **develop a source reduction strategy** to assess and address plastic pollution emanating from point sources, non-point sources, and human behavior.

5. The CBP should direct the Plastic Pollution Action Team and STAR Team to collaborate on utilizing the existing bay and watershed monitoring networks to monitor for microplastic pollution.

Microplastics in the Chesapeake Bay and its Watershed: State of the Knowledge, Data Gaps, and Relationship to Management Goals

STAC Workshop Report
April 24-25, 2019
Woodbridge, VA

stac

STAC Publication 19-006

First Steps to Addressing Microplastic Pollution

Establish A Plastic Pollution Action Team

The Plastic Pollution Action Team is compromised of various stakeholders from Federal, State, Local, NGO and Academia

The PPAT was given a charge by the CB Management Board

The PPAT is responsible for guiding the various deliverables in this project and providing expertise

Support EPA funded projects

Develop an ecological risk assessment (ERA) conceptual model looking at the effects of microplastics on various ecological endpoints

Compile the best available science to develop a preliminary ERA. Identify data gaps.

Develop uniform size classification and concentration unit terminology.

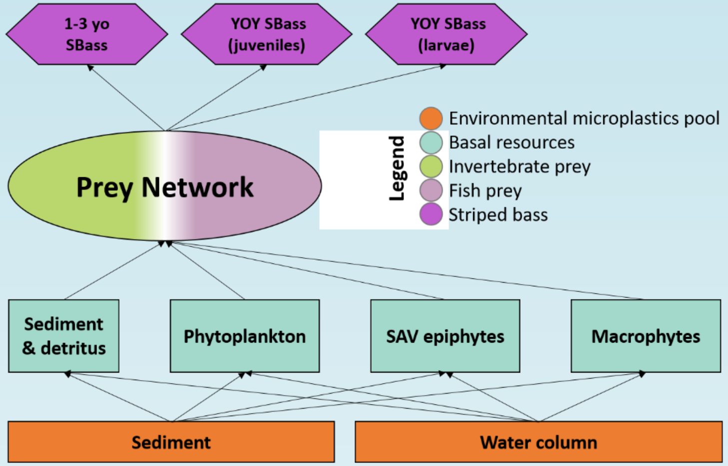
Task 1: Uniform Size Classification and Concentration Unit Terminology

Classification	Size	Rationale
Microplastic	5 mm - 1000 nm (1µm)	--NOAA and GESAMP precedence --Upper size limit is consistent with previous monitoring studies in Chesapeake Bay and tributaries --Use of 333 µm as a lower bound potentially excludes the inclusion of laboratory or monitoring studies that include data below that value -- The lower size limit is consistent with the SI naming convention.
Nanoplastic	1 nm - <1000 nm (1µm)	--The upper limit is consistent with the SI naming convention. --Limit is inclusive of particles <100 nm as defined for non-polymer nanomaterials in the field of engineered nanoparticles -- The lower size limit is consistent with the SI naming convention.

- Setting concentration recommendations for various medias was also a part of this process to support standardized monitoring and broaden the capacity to share and utilize data
- Media Considered
    - Water Column
    - Sediment
    - Organisms
    - Submerged Aquatic Vegetation

Task 2: Develop a Conceptual Preliminary Eco Risk Assessment for MP in the Potomac River

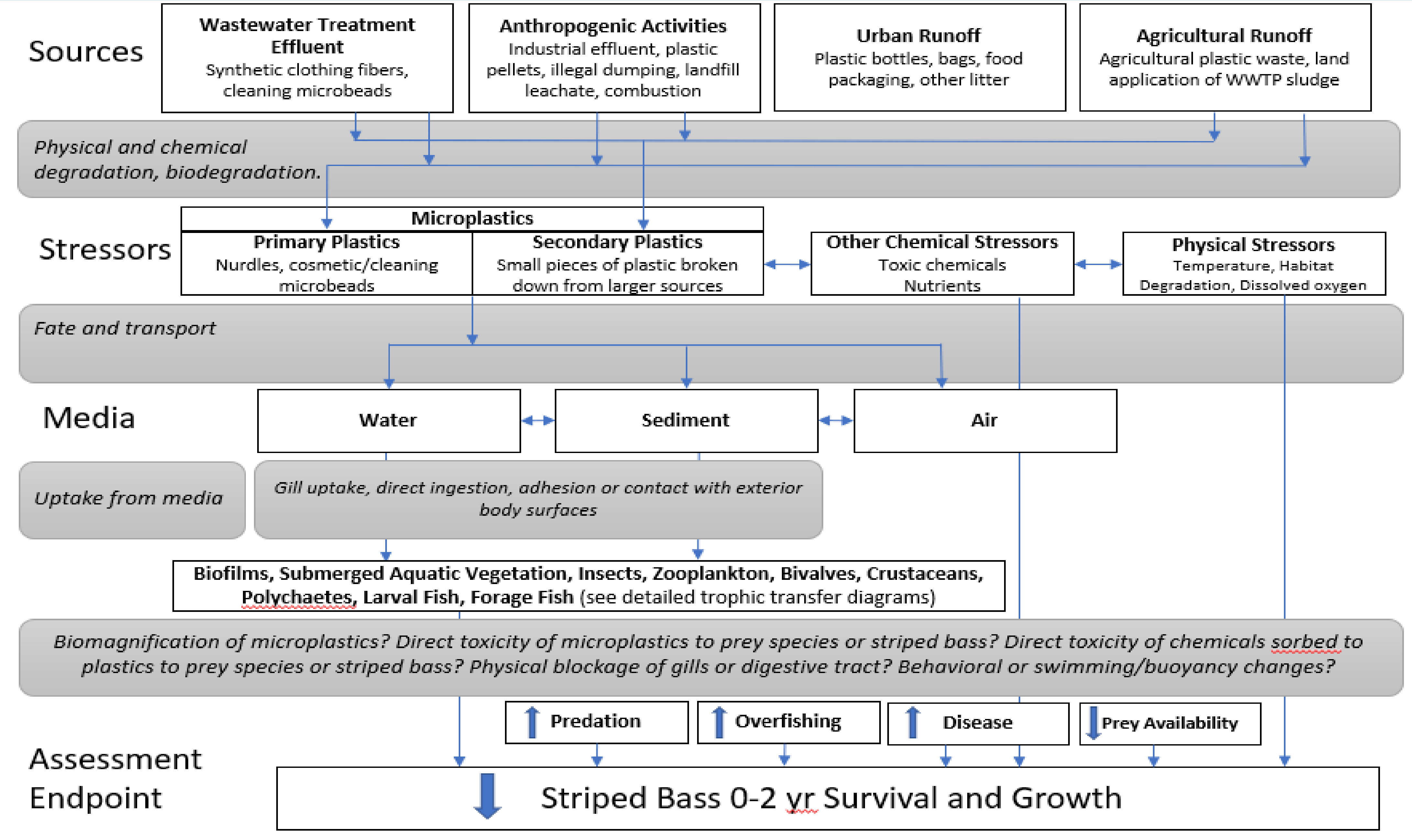
Model Developed by Bob Murphy, Tetra Tech



Potential Assessment Endpoints

Individual Assessment Endpoints
- Growth rates
- Fecundity
- Predator susceptibility
- Direct mortality
- Physiological condition
- Behavior change

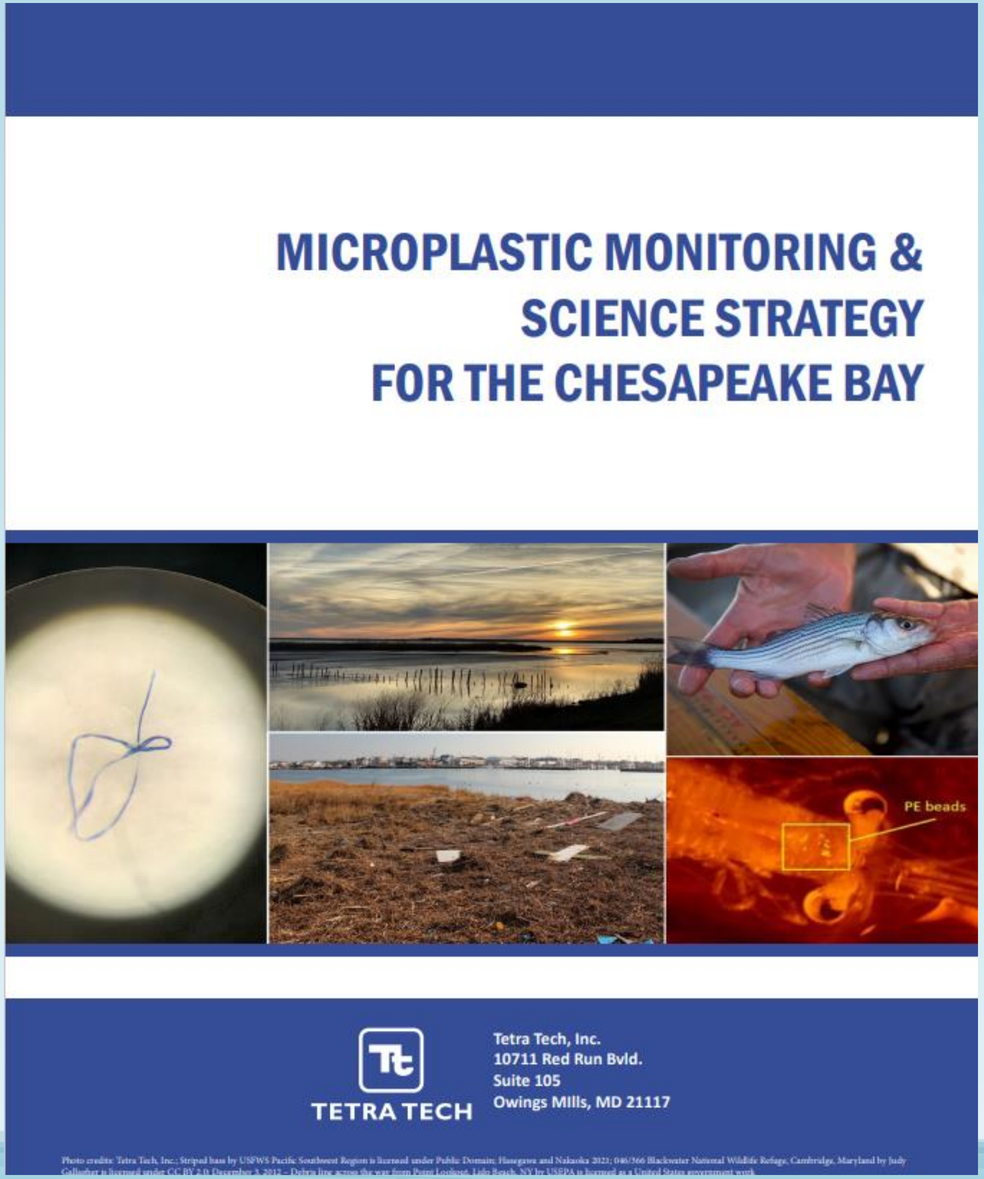
Population Assessment Endpoints
- Catch-per-unit-effort
- Size-at-age
- Age-structure
- Mortality
- Spawning stock biomass



Conceptual Model Developed by Tetra Tech

Task 3: Monitoring and Science Strategy

- Modeled after San Francisco Bay's Microplastic Strategy
- This strategy document provides an overview of management needs regarding implementing policies to reduce plastic pollution, which would result in reduction in microplastics.
- This strategy is intended to be a starting point to develop research priorities, monitoring efforts, and policy development.
- It is expected to be updated in the future as more work and research is completed



Initial Project Summary Conclusions

Identified Data Gaps

- Lack of observational and experimental data on the types, sources, and fates of microplastics in the ecosystem
- Need more understanding on trophic transfer
- Need more direct studies on the prevalence, intensity and efforts of microplastics contamination on focal species, their prey and the environment

Conclusions

- Studies have shown microplastics are ubiquitous throughout the bay and its tributaries. They have been found in both tidal (Yonkos, 2014; Rochman, 2019) and non-tidal waters (Fisher, 2019).
- There is general agreement that plastics represent a widespread, but largely *unquantified*, threat to the Chesapeake Bay ecosystem.
- There is no systematic and organized effort directed at researching plastic pollution.
- The ERA reveals there could be significant impacts on a valuable Chesapeake resource, Striped
- Implementation of the science strategy will put us on a path for understanding the impacts of plastic pollution on ecosystem endpoints

Framework for Monitoring Plastic Pollution in the Chesapeake Bay, July 2024

- This framework makes recommendations on monitoring strategies across various media, such as surface water, sediment, and key living resources, as well as scale, frequency, and locations for broad application throughout the Chesapeake Bay and its watershed.
- The framework focuses on leveraging existing programs to limit the resources required.
- The Framework report includes a Field Sampling Reference Guide and a Laboratory Reference Guide as appendices.

Monitoring Framework Recommendations

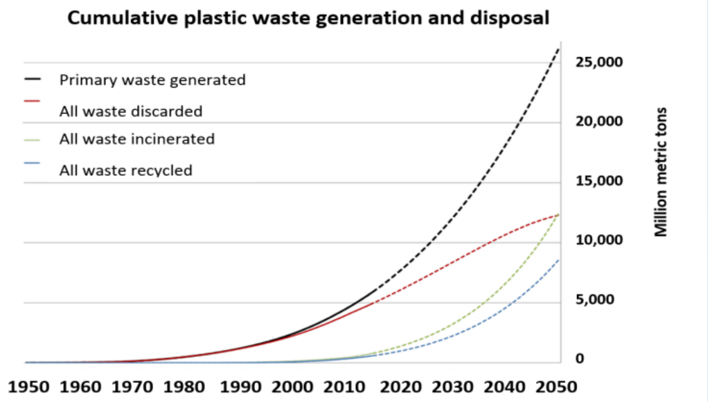
- Consider adding the goal of no net increase in MP pollution to the Bay Agreement
- Institute & implement a monitoring program to measure attainment of goal and support related goals
- Add MP sampling and analysis of water & sediment to existing or new CBP monitoring networks
- Estimate bay loads of MP to Bay tributaries for annual status & trends reporting
- Facilitate incorporation of MP sampling into state & local monitoring programs
- Conduct focused sampling of known MP sources (ie wastewater)
- Monitor plastic type in 20% of samples to understand plastic products and sources
- Determine MP concentrations in select species of ecological and human health importance
- Conduct focused food web studies to better understand trophic pathways
- Undertake scientific studies of the degradation of plastics and their role as a vector of toxicity

Current and Recent Projects

Assessing Biological Effects of Plastic Pollution Exposure on Young of Year Striped Bass (*Morone saxatilis*) in the Chesapeake Bay and its Tributaries	To develop a lab-based study examining biological impacts of microplastics on young of year striped bass fed with microplastic contaminated mysid shrimp coupled with field surveys sampling environmental concentrations of mysid shrimp in the CB watershed
Microplastics Source Tracking in the Chesapeake Bay (CB) Watershed	To source track plastics to understand the major conveyances and compositions of plastics entering the watershed.
Region 7 & 3 ORD Applied Research (ROAR 2022)	Begin to identify, quantify and characterize Microplastics in a large river such as the Ohio river.

Where are the MPs found?

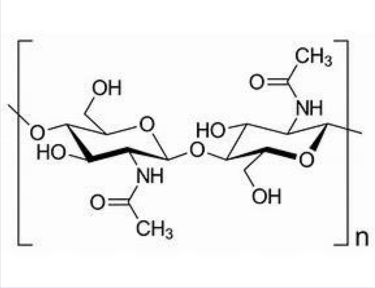
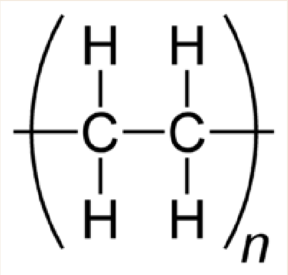
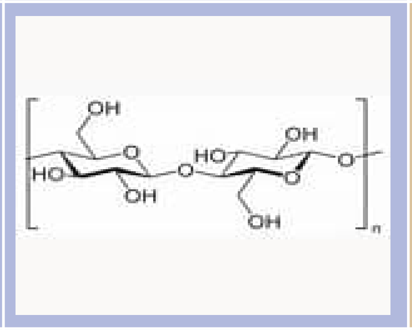
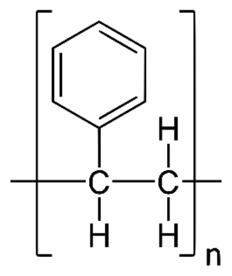
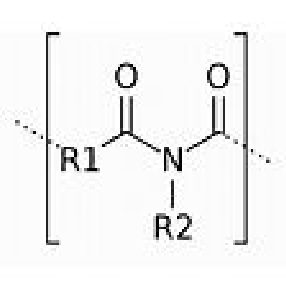
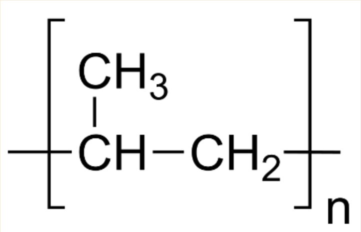
- Microplastics (MPs) are small plastic particles (e.g., fibers, fragments, films, and pellets) < 5 mm across (largest crosswise dimension) and > 100 nm.
- Two categories:
  - *Primary*: Designed to be small. (e.g., PE/PP microbeads in personal care products, glitter, industrial pellets ‘nurdles’)
  - *Secondary*: Breakdown of larger plastic debris, tire wear, nylon/polyester fibers shed from laundry.
- Many MPs sources in urban watersheds
  - Household, food and beverage containers, sewage, solid waste, storm water, WWTPs, industrial effluents, road drainage, landfill leachates and many others
  - WWTPs
    - High removal efficiency but many MPs released due to high discharge volumes
    - MPs trapped in sludge released as agricultural runoff from sludge-treated soils
  - Laundry – major source of microfibers



Source: Cumulative plastic waste generation and disposal, Geyer (2017)

Pollutant: “Dredged spoil, solid waste... sewage, garbage...chemical wastes, biological materials...and industrial, municipal, and agricultural waste discharged into water”(does not include sewage from vessels or injected wastes)

Common Polymers found in Samples

Natural Polymer Identification	Environmental Source	Structure	Anthropogenic Polymer Identification	Source	Structure
Chitin	A component of cell walls in fungi, the exoskeleton of arthropods, and scales of fish		Polyethylene	Packing film, trash & grocery bags, squeeze bottles, toys	
Cellulose/Cellulosic	Component of plant cell walls, bacteria, algae. “Most abundant natural polymer”		Polystyrene	Insulation, protective foam packing material, food packaging	
(Natural) Polyamide	Proteins, collagen, DNA, protein with amide groups		Polypropylene	Packaging, bottles, caps, straws	

Extraction, Separation, & Purification of Plastics from Environmental Media: Chemical

- Effectively removes all organic material while keeping plastic particles intact

Type of Oxidation	Description
H_2O_2 + Heat	Spike 30% H_2O_2 in the sample and heat at 70 °C Typically takes many hours to days to fully oxidize sample (depending on organic matter concentration) Heat can degrade plastics
H_2O_2 + UV light	Like "H_2O_2 + Heat", but with UV light initiating hydroxyl radical formation UV light could degrade plastics
Fenton	Uses 30% H_2O_2 with iron (II) as a catalyst to form hydroxyl radicals Fast reaction and doesn't affect plastics integrity
Ozonation	Bubble ozone in the sample until oxidation is complete

Where to collect samples? Is it a sink or a source?

- Influent and effluent of wastewater treatment plants (sludge would be a plus)
- Creeks and rivers upstream and downstream of industrial areas
- Upstream and downstream of intersection of residential and industrial areas
- Trash collectors, if present upstream and downstream
- Leachate from landfills, streams affected by landfill leachate?

Laser Direct Infrared Spectroscopy (LDIR)

- LDIR Chemical Imaging System
- Obtains IR spectra of all particles and identifies the polymer type
    - Uses an IR reference library
- Obtains particle size and shape parameters
    - 10 μm is the detection limit

Sample Preparation for LDIR Analysis

Simple Aliquot

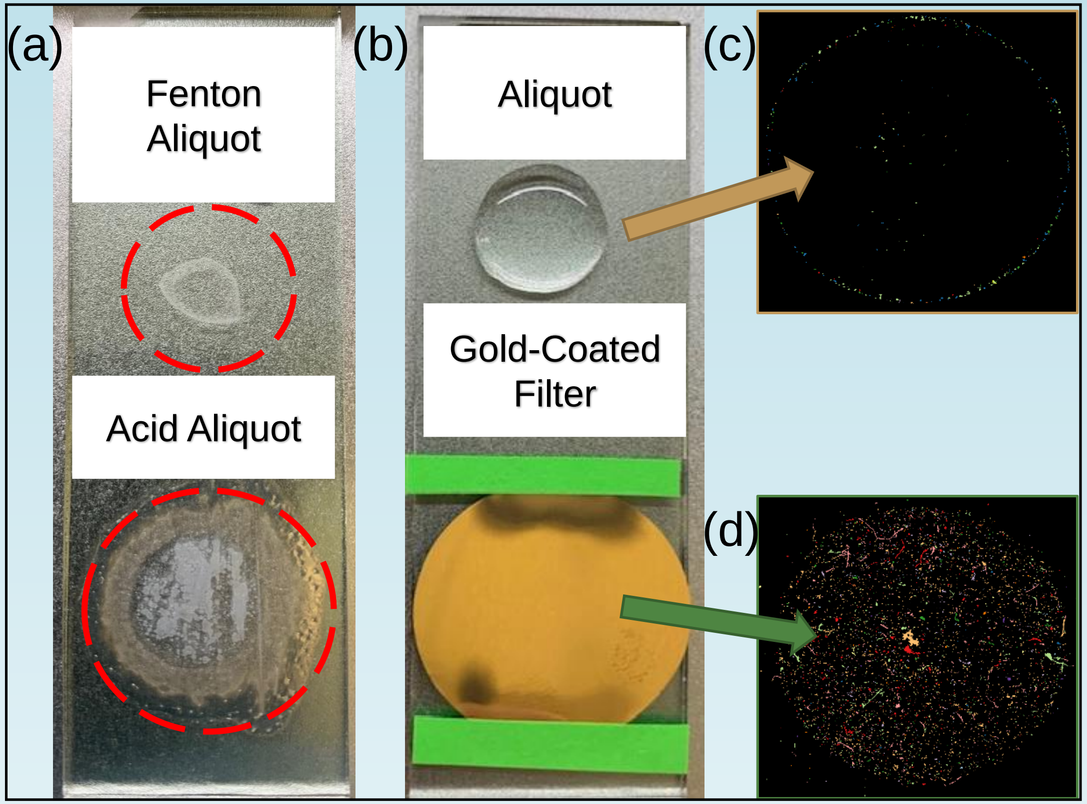
- Tier 1
- Quick & simple
- Lots of organic material
- Not representative

Aliquot After Oxidation

- Tier 2:
- Oxidation with fenton followed by

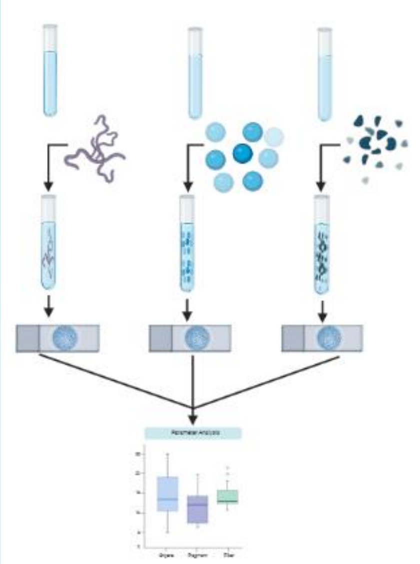
Gold Filters

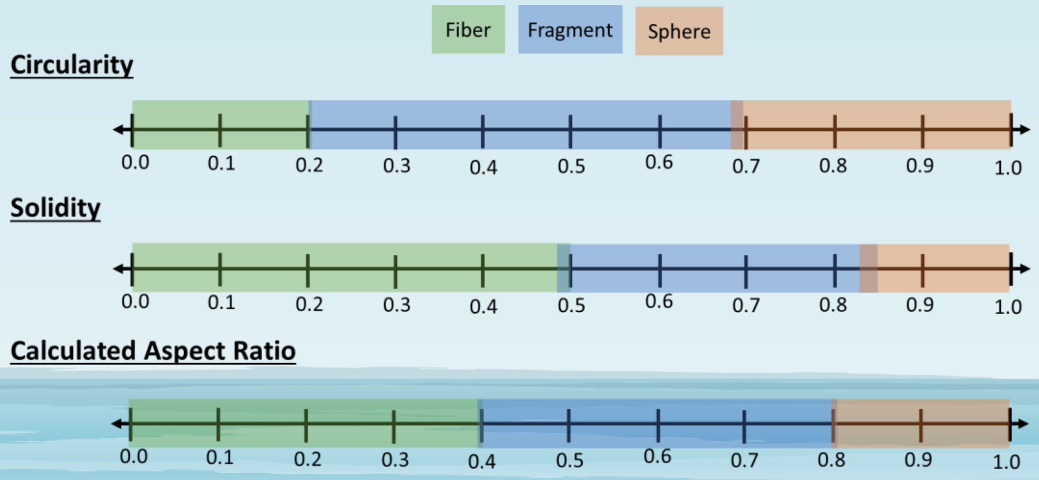
- Filtration



Analysis Parameters

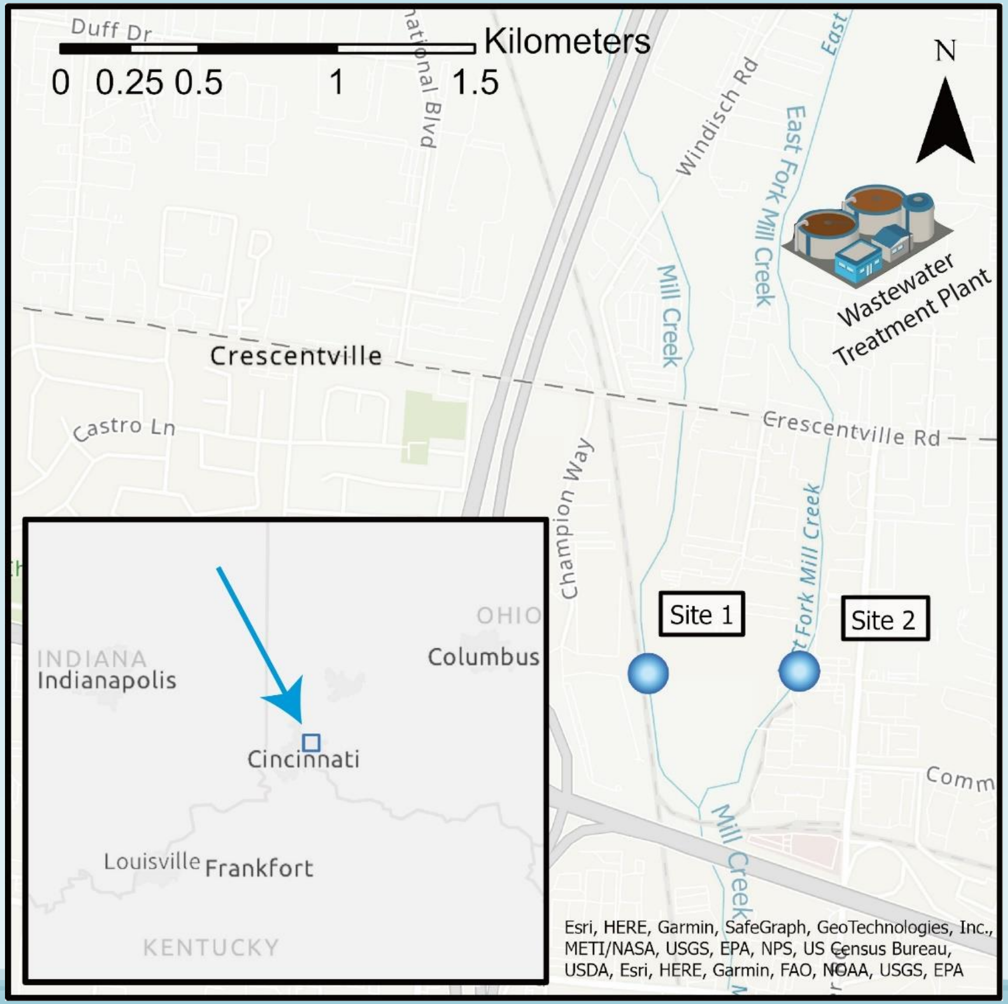
Parameter	Description/unit
#	Particle number
Id	Alphanumeric particle ID
Width	Measurement of latitude (µm)
Height	Measurement of longitude (µm)
Diameter	Assuming a circle shape, back-calculate for diameter (µm)
Aspect Ratio	Ratio of width/height
Area	Width*height (μm^2)
Perimeter	Length of boundary line (µm)
Eccentricity	Characterizes shape, (0-1) a circle has a value of 0 and 1 suggests a high aspect ratio
Circularity	Characterizes shape, (0-1) a perfect circle has a value of 1
Solidity	Ratio of particle area over area of its convex hull (0-1) (see image)
Identification	Polymer identification
Quality	How well the spectra matches the library
Is valid	If the identification is accepted





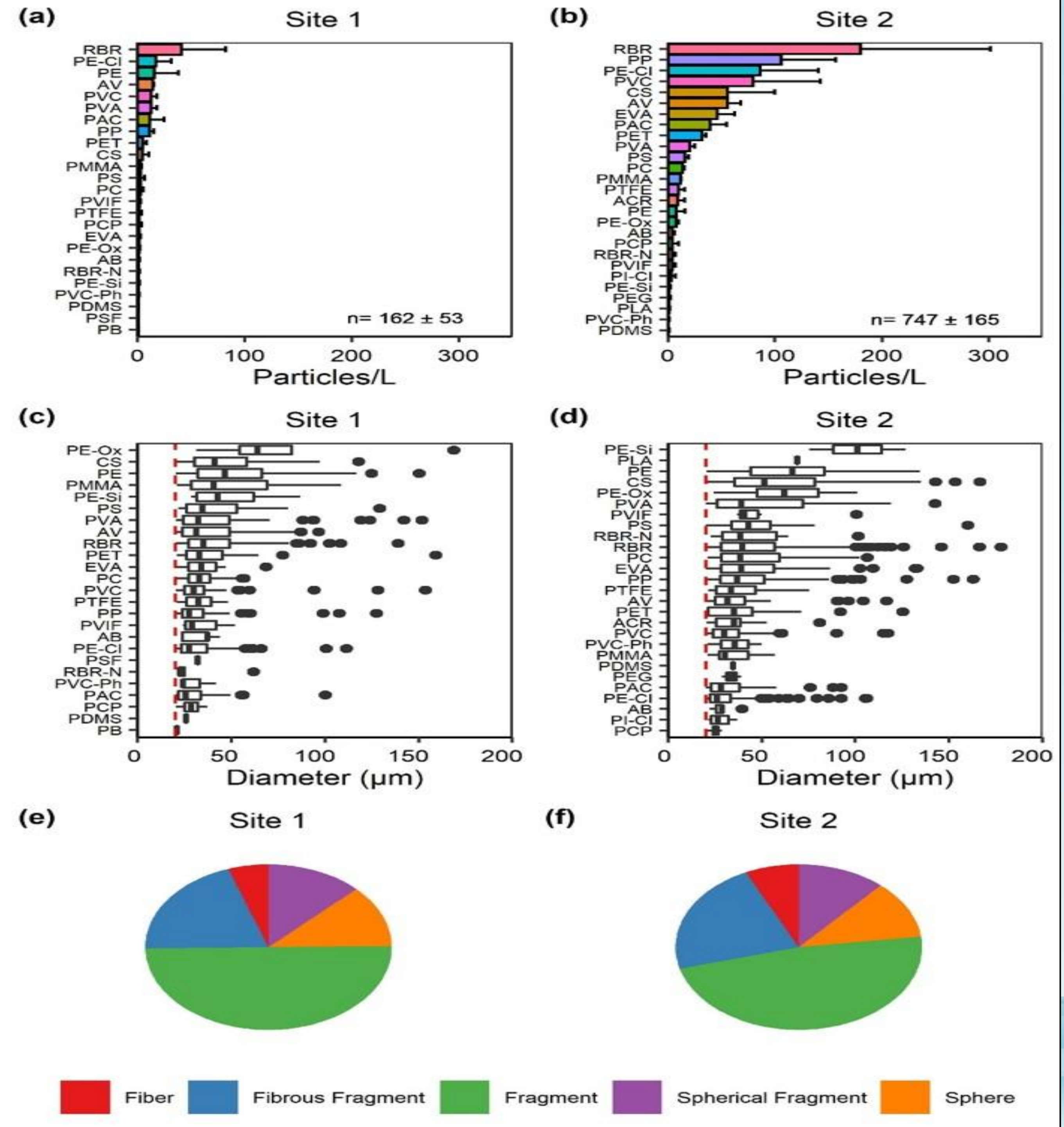
Urban Creek Sample Analysis

- 2 sampling locations
  - Site 2 has WWTP effluent
  - Urbanized area with heavy industry
- Location: Cincinnati, OH, USA

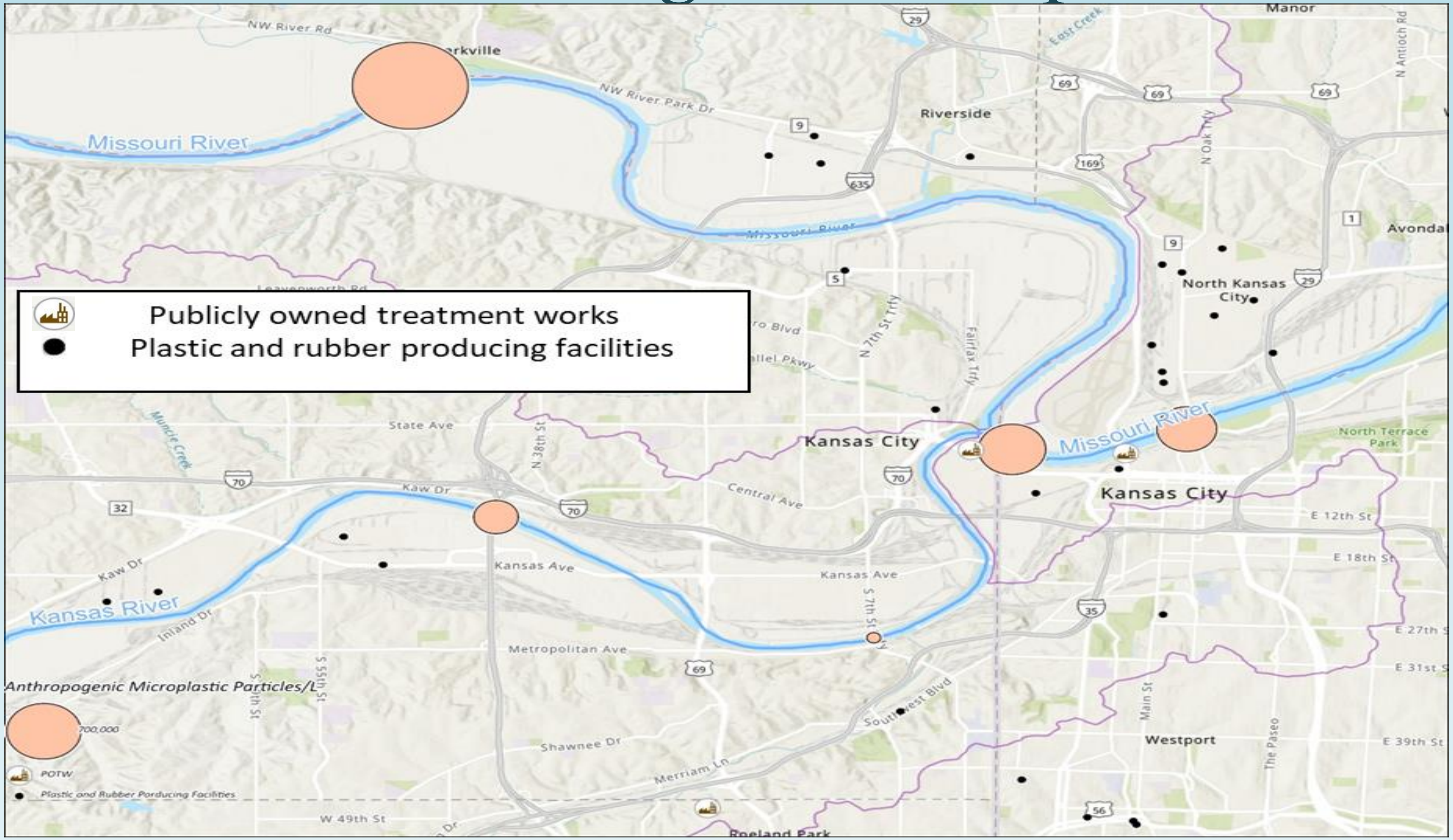


Urban Creek Sample Analysis

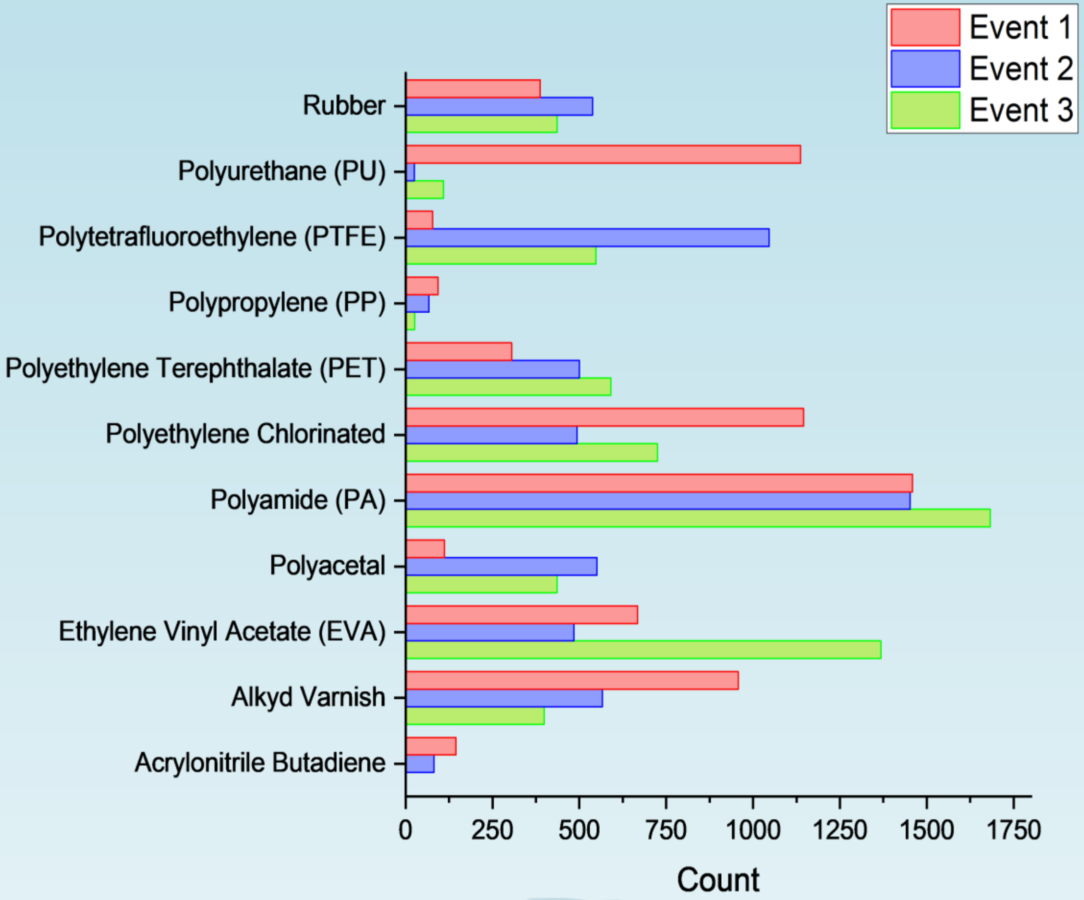
- Spatial variation in MP content
  - Total number of MPs
  - MP identities
  - Higher MPs near WWTP (site 2)
- Shapes and sizes are relatively similar



Kansas river MP loading and transportation



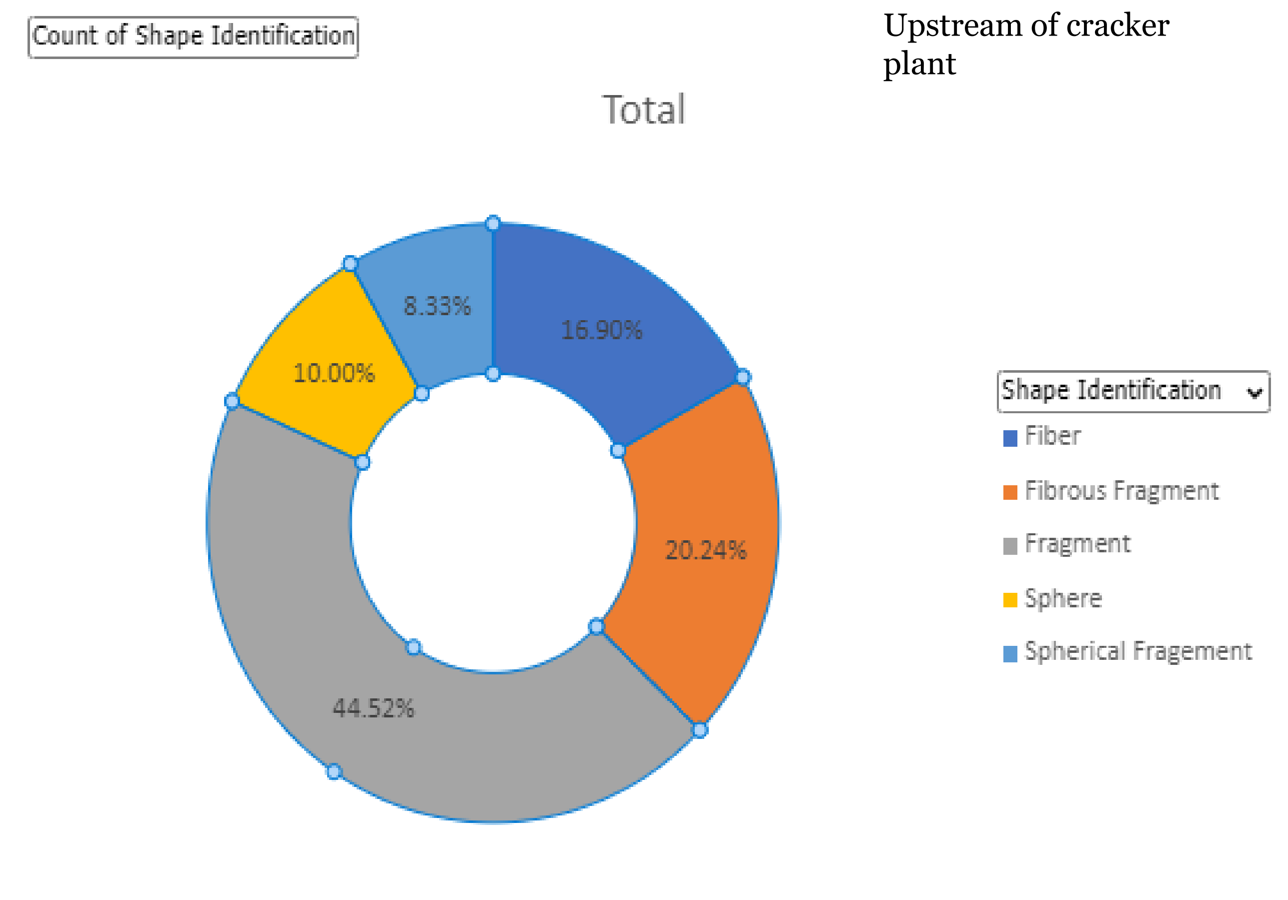
Trends across three flow events



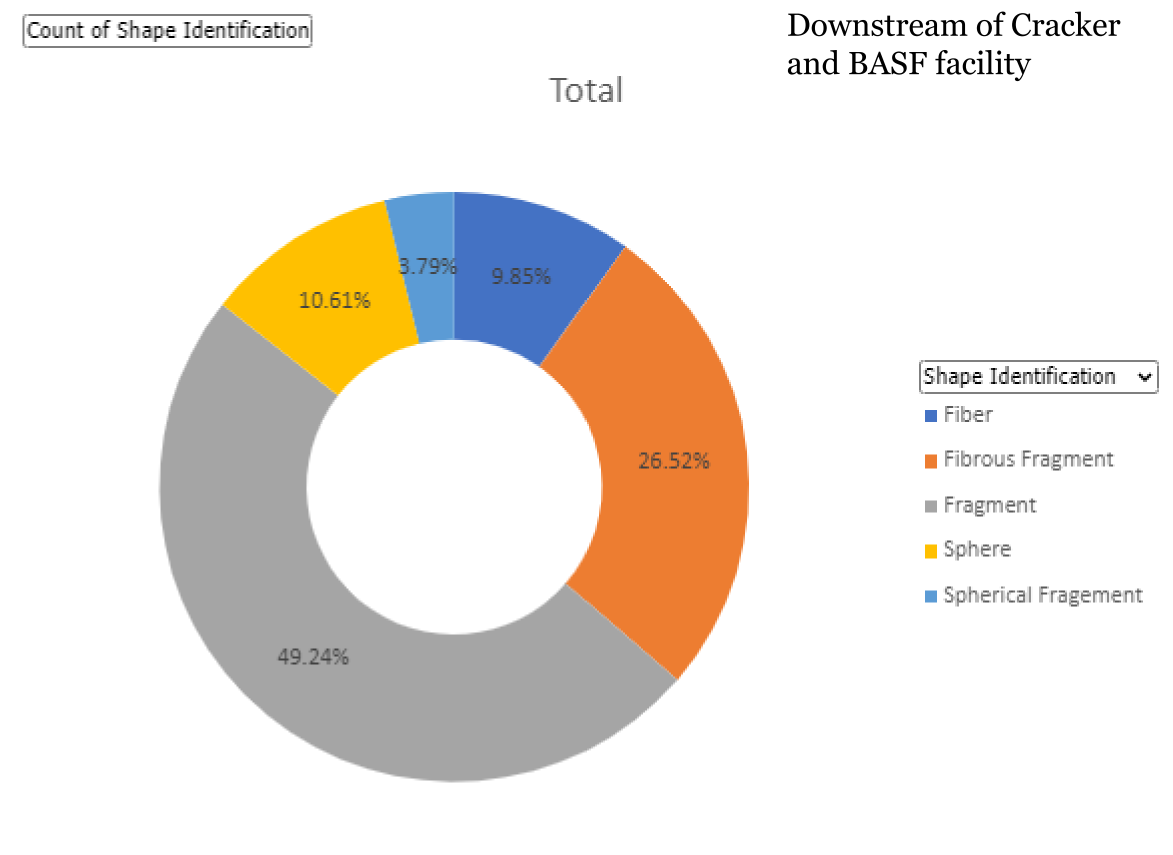
- Event 1: Sep 2022-Base flow of Missouri and Kansas river.
- Event 2: Oct 2022-Run off/High flow (Rain event).
- Event 3: Jan 2023 low flow for both rivers.

Region 3 Upstream and Downstream of Ethane cracker plant, samples Feb 2023

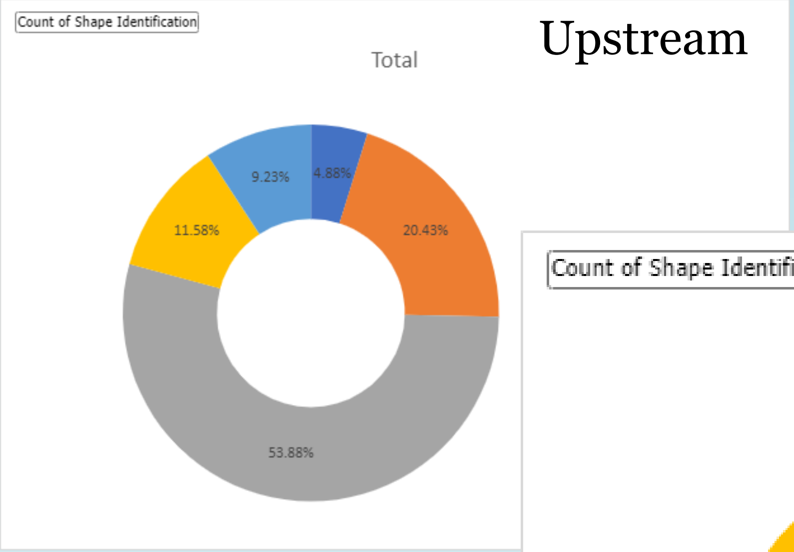
Upstream of cracker plant

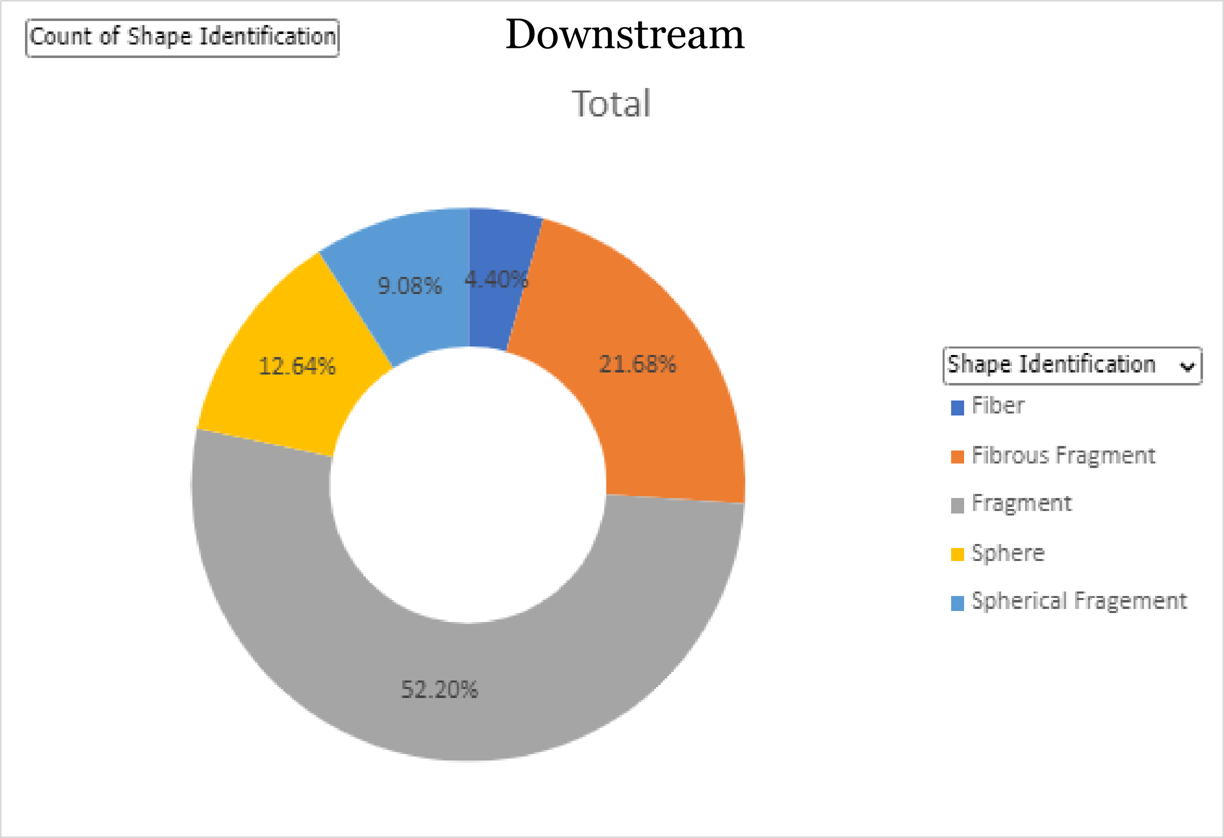


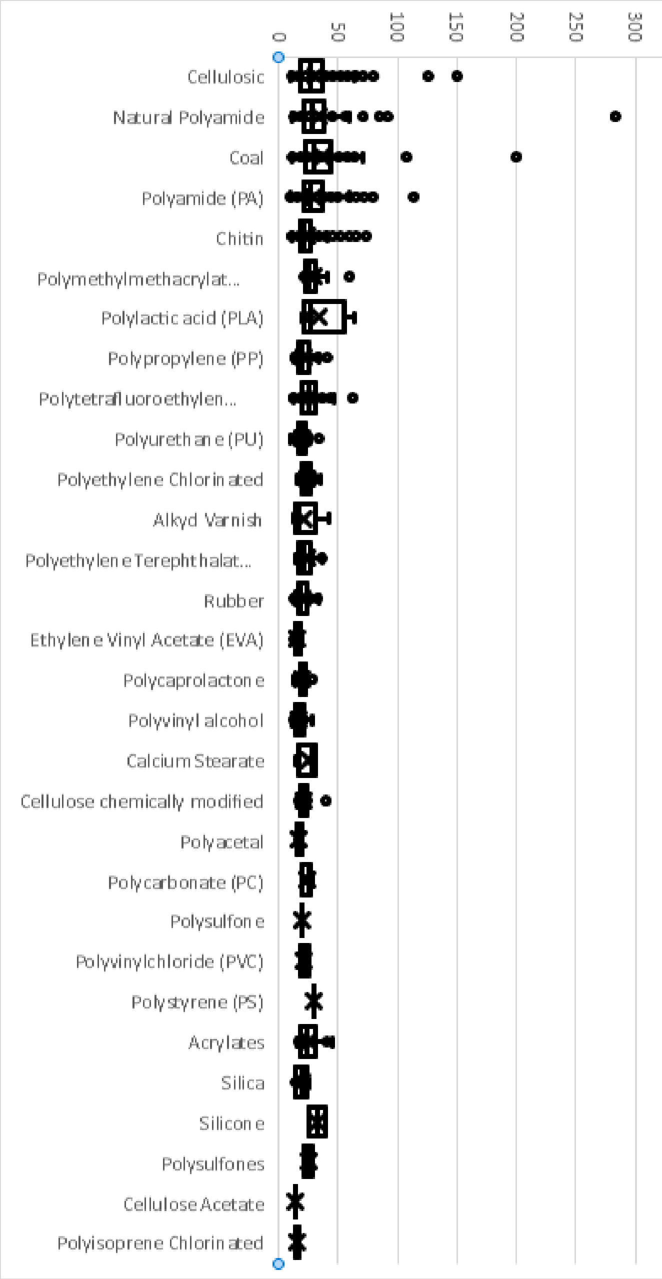
Downstream of Cracker and BASF facility



Penn Plastic in Washington Co, PA







Conclusions to ROAR 2022

- Extraction, separation and analysis of MP reveal various polymer types, sizes, and shapes in urban watershed water.

- Abundance of anthropogenic MPs in urban watershed is contributed to multiple sources and the hydrodynamic in the watershed.

- Distribution of various MPs is source dependent.

Agenda Item 5:
Three Rivers Waterkeeper Plastics Monitoring in the Upper Ohio Basin

Heather Hulton VanTassel, Three Rivers Waterkeeper

THREE RIVERS WATERKEEPER®

Three Rivers Waterkeeper's Programs
and
Plastics Monitoring in the Upper Ohio Basin

Heather Hulton VanTassel, Executive Director
Heather@ThreeRiversWaterKeeper.org
www.ThreeRiversWaterKeeper.org

Photo Credit: Dave DiCello

Three Rivers Waterkeeper

<u>Mission</u>

To protect the water quality of the Monongahela, Allegheny, and Ohio Rivers, and their respective watersheds.

<u>Vision</u>

To have drinkable, fishable, swimmable waters in the Monongahela, Allegheny, and Ohio Rivers.

Member of the Waterkeeper Alliance

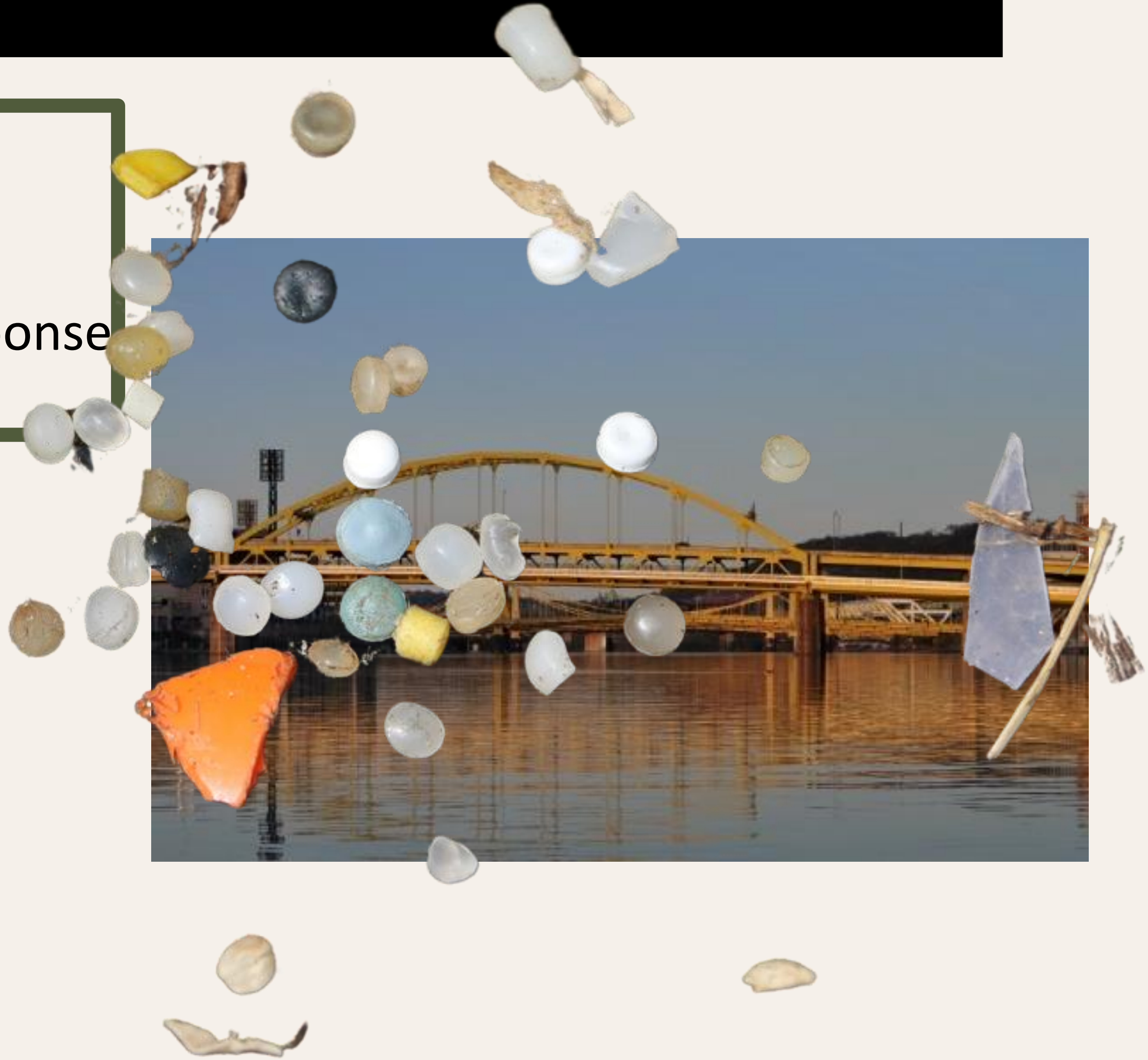
WATERKEEPER® ALLIANCE MEMBER

THREE RIVERS WATERKEEPER®

Three Rivers Waterkeeper

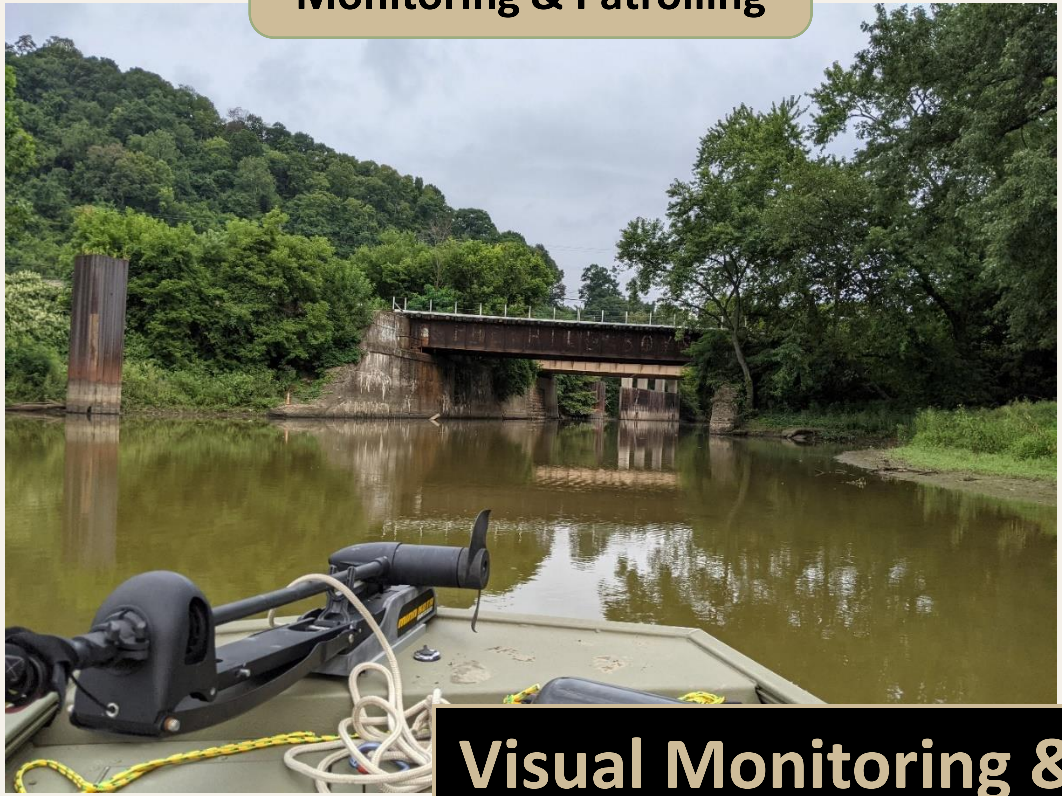
How do we protect our waters?

- On The Water
  - General Monitoring & Patrolling
  - Targeted monitoring & Pollution Response
- In the Community
  - Community Events
  - Education & Outreach
- Through Advocacy
  - Clean Water Laws Enforcement
  - *We hold polluters accountable!*

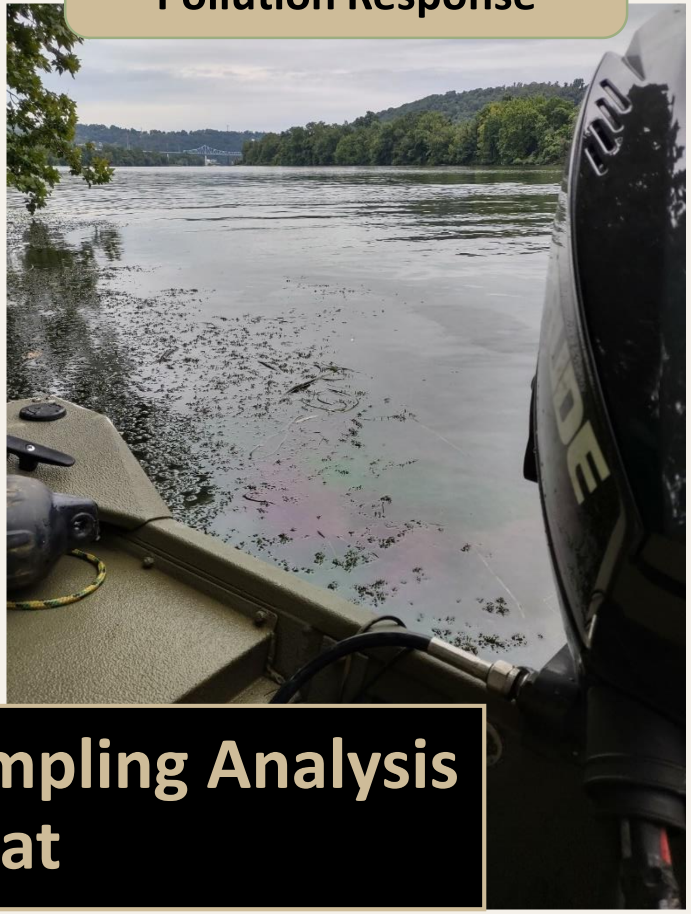


On-the-Water Programs

General Monitoring & Patrolling

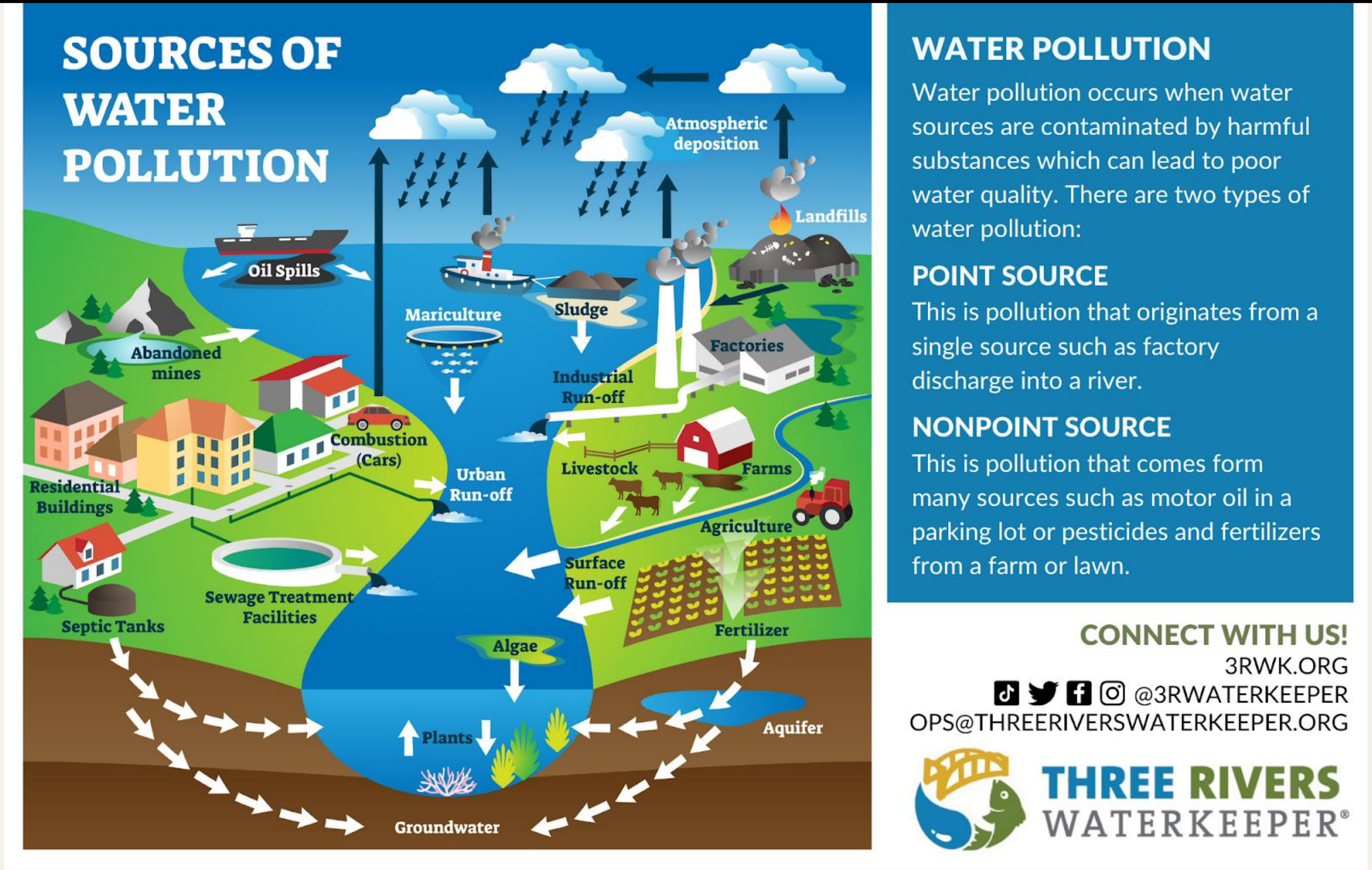


Targeted Monitoring & Pollution Response



Visual Monitoring & Water Sampling Analysis
By foot and by boat

Where does pollution come from?



Baseline Monitoring

- 2021 & 2022 Created a baseline of 25 sites along the three rivers with 4 season sampling with The Pittsburgh Water Collaboratory
  - http://3rwk.org/baseline
- Constantly re-evaluating and **building baseline data via general patrols**
  - Visual & Olfactory Monitoring
  - YSI & handheld meters
  - Water Samples & Lab Analysis


PA 1630 DE
THREE RIVERS WATERKEEPER
cyclopure
CARD™
ECC
ECC
Milwaukee

Pittsbu

Introd

Iron Concentrations

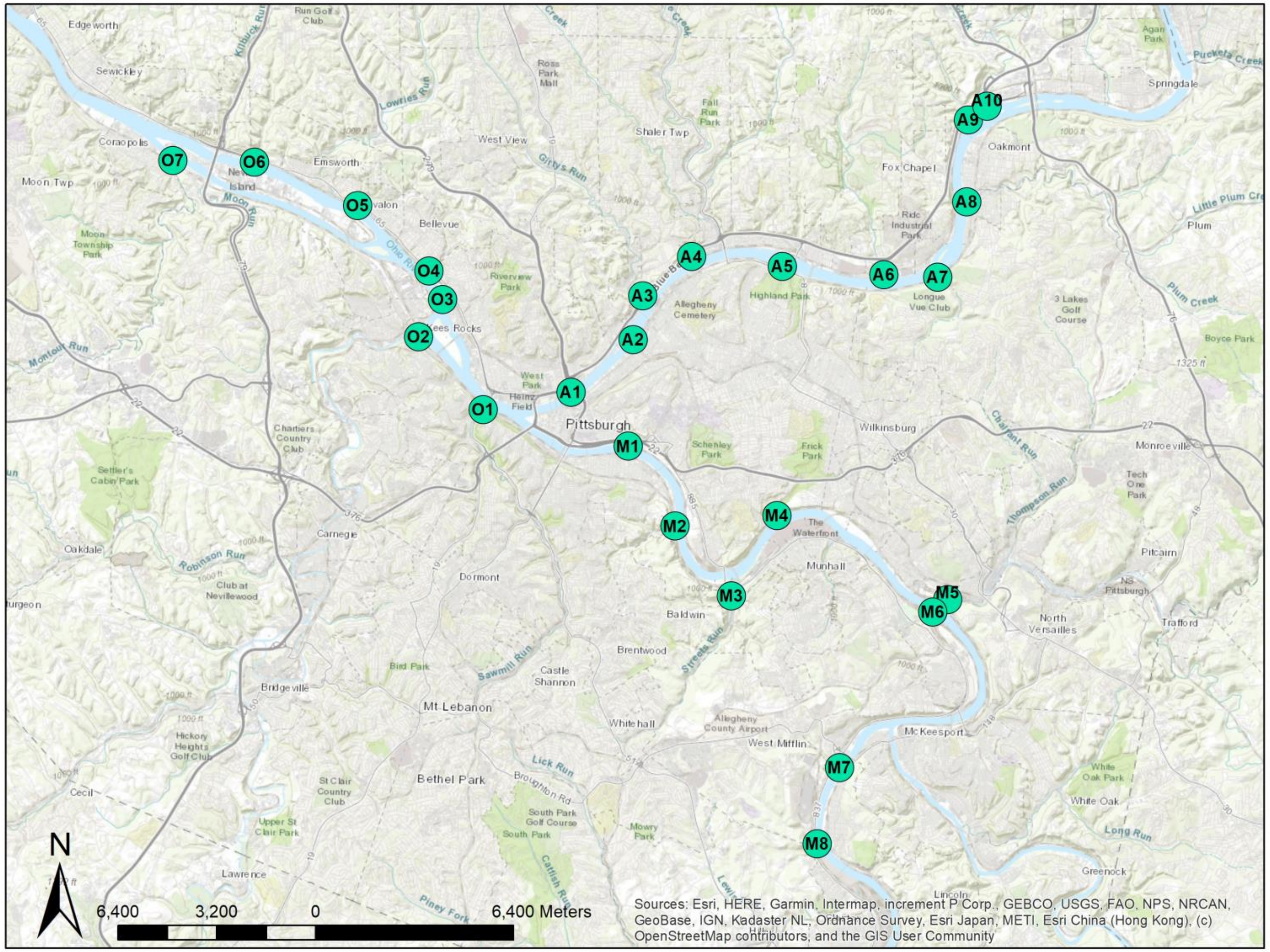
Iron concentrations are consisten
the streams draining to the Mono
Allegheny Rivers.

Quarter 1 (August 202

Quarter 2 (November 20

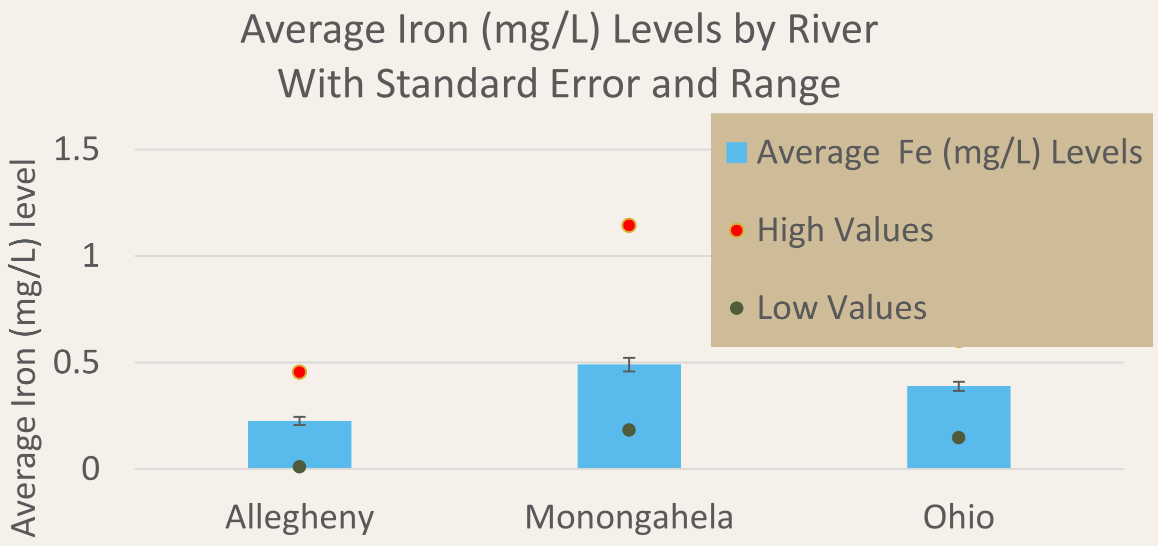
Quarter 3 (February 20

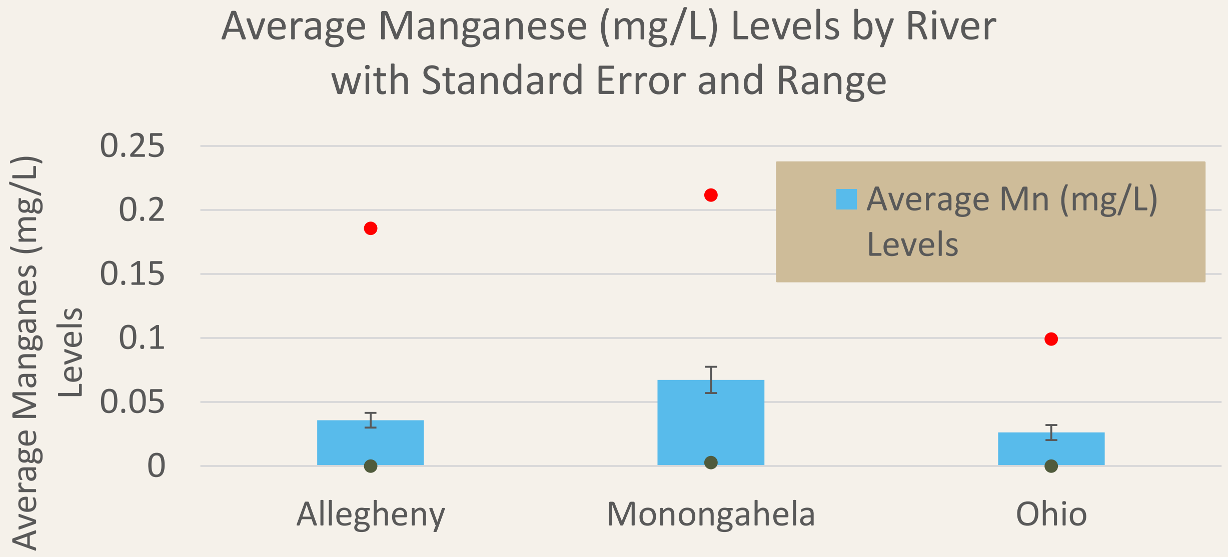
Quarter 4 (May 2022



3rwk.org/baseline

Pittsburgh Collaboratory for WATER
Research, Education, Outreach





3rwk.org/baseline

Pittsburgh Collaboratory for WATER
Research, Education, Outreach

2023 State of the Waters

- Spent over 1000 hours on-the-water, over 230 samples analyzed
  - General Monitoring
  - PFAS
  - Plastic Pellet (nurdles)
  - Industrial Contaminants
  - E coli (swim guide)
  - Emergency or Pollution Response

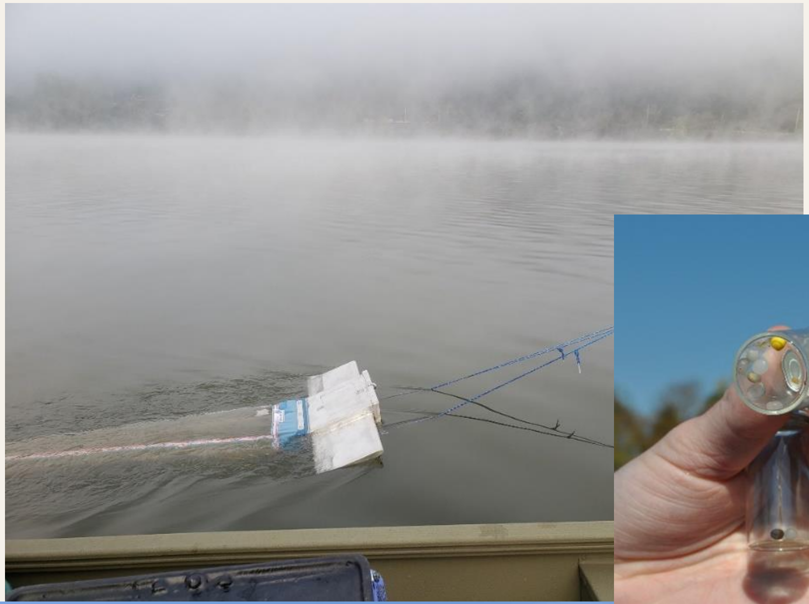
	NUMBER OF TIMES EACH PARAMETER IS EXCEEDED CONCERNED LEVELS		
Parameter	**Allegheny [4]**	**Monongahela [28]**	**Ohio [73]**
Chloride (mg/L) [100]	0	16	33
TDS (mg/L) [1000]	2	0	14
pH [6.9-9.5]	2	0	8
Ammonia (NH3) (mg/L) [17]	0	0	0
Conductivity (µS/cm)[1500]	2	0	9
Salinity (ppm) [1000]	2	0	8
ORP (mV) [300-500]	2	7	20

http://3rwk.org/2023WatersReport

TARGETED Monitoring

- Monitoring Marcellus Shell Cracker Plant in Beaver County

  - Monthly Nurdle Patrols with Mountain Watershed Association
  - Water Quality Sampling with The Water Collaborative, 3Rivers Quest, and other partners
  - Frequent visual monitoring & assessments



Plastics Monitoring

Plastics Monitoring

Plastics Monitoring

Plastics Monitoring

Plastics Monitoring

Plastics Monitoring

Monitor Spills & Major Incidents

Monitor Spills & Major Incidents

How do we protect our waters?

- On The Water
  - General Monitoring & Patrolling
  - Targeted monitoring & Pollution Response
- In the Community
  - Community Events
  - Education & Outreach
- Through Advocacy
  - Clean Water Laws Enforcement
  - *We hold polluters accountable!*

In the Community

Community Education

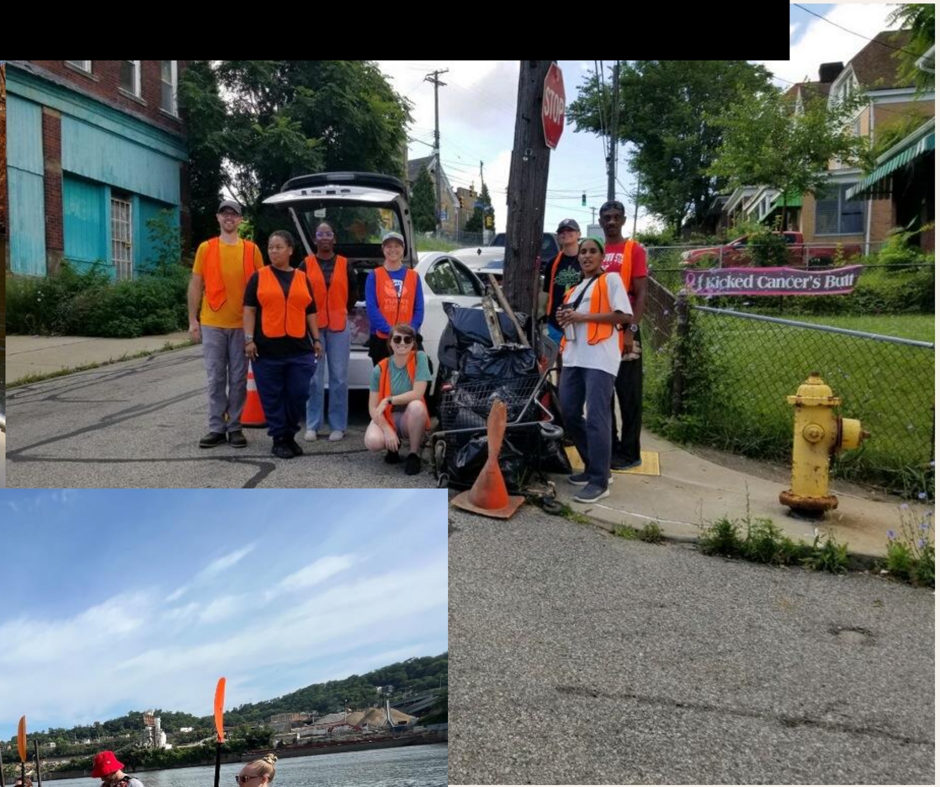
- Connecting land activities to water quality
- Education on pollution issues are prevalent in our rivers
- Amplify our right to clean water
- Stewardship

3 Rivers Ambassador

- 3 Rivers Watch Program
- Water Ecology & Art-based programming
- Stewardship

https://3rwk.org/Events

Sense of Community & Love for our Rivers



Community Nurdle Patrols

Upcoming Events!

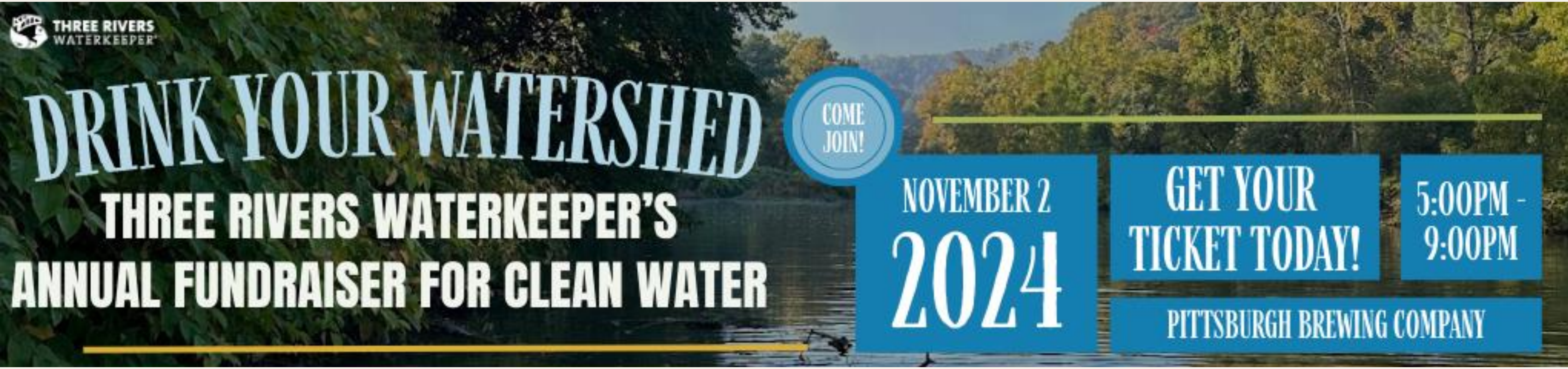
October 13th: Colors of the River at Powdermill Nature Reserve
Time: 1 PM - 2:30 PM
Location: *Powdermill Nature Reserve Visitor Center - 1795 PA-381, Rector, PA 15677*

October 22nd: How to Be A Water Advocate (Brookline)
Time: 5:30 PM - 6:30 PM
Location: *Carnegie Library of Pittsburgh - Beechview, 1910 Broadway Ave, Pittsburgh, PA 15216*

October 26th: Creatures of the Watershed - A Big Sewickley Creek Nature Festival
Time: 11 AM - 4 PM
Location: *Big Sewickley Creek Fire Hall: 1850 Big Sewickley Creek Rd, Sewickley, PA 15143*

http://3rwk.org/EVENTS

Upcoming Events!



http://3rwk.org/water

How do we protect our waters?

- On The Water
  - General Monitoring & Patrolling
  - Targeted monitoring & Pollution Response
- In the Community
  - Community Events
  - Education & Outreach
- Through Advocacy
  - Clean Water Laws Enforcement
  - *We hold polluters accountable!*

Through Advocacy

Finding Evidence of Pollution
On the water programs

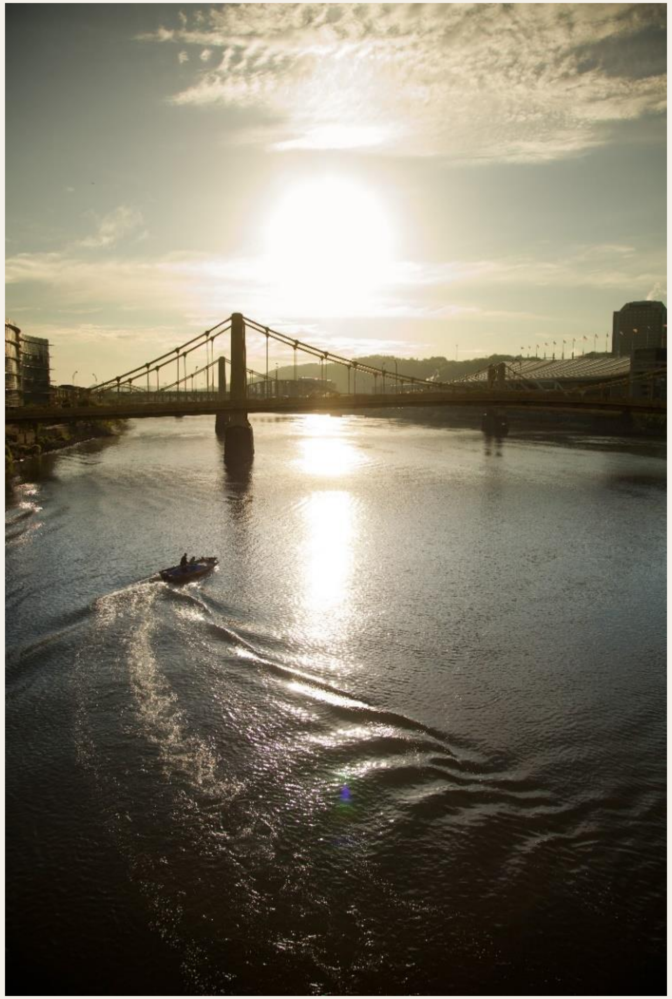
+

Empowering & Educating Communities
In the community programs

=

Holding Polluters Accountable
Through Advocacy

Through Advocacy



Enforcement our Right to Clean Water

Scientific and Legal Advocate for our

<u>CLEAN WATER LAWS</u>

- Clean Water Act
- PA Clean Streams Law
- Safe Drinking Water Act

How we Advocate

Prevent Pollution

- ➢ Rulemaking Comments and Hearings
- ➢ NPDES & Zoning Permit Monitoring

Enforce Current Regulations

- ➢ Rulemaking Comments and Hearings
- ➢ Legal Research

Decrease Pollution Allowances

- ➢ Rulemaking Comments and Hearings
- ➢ Legal Research

Hold Polluters Accountable

- ➢ Pressure on Regulators
- ➢ Litigation

76 Actions in 2023

60+ Actions in 2024 to-date

Plastics Advocacy

Finding Evidence of Pollution
On the water programs

+

Empowering & Educating Communities
In the community programs

=

Holding Polluters Accountable
Through Advocacy

Current Advocacy

On December 5, 2023, PennEnvironment and Three Rivers Waterkeeper filed a federal lawsuit against BVPV Styrenics LLC and its parent company, Styropek USA, Inc.

Thank you!

@3RWaterkeeper

https://3rwk.org/Newsletter

http://3rwk.org/EVENTS

http://3rwk.org/Harmar

http://3rwk.org/sulphurrun

http://3rwk.org/PFASreport

http://3rwk.org/swim

http://3rwk.org/Annual23

Heather Hulton VanTassel
Heather@ThreeRiversWaterKeeper.org

THREE RIVERS WATERKEEPER®

See Pollution? Report Pollution.

It is always better to overreport than assume what you see is less serious.

CALL

Safety is always the number one priority. Call 911 if you suspect an emergency or call one of the following pollution contacts:

Three Rivers Waterkeeper: **412-589-9411**
Southwest PA DEP hotline: **412-442-4000**
PA Fish and Boat : **855-347-4545**
EPA Region 3: **1-800-424-8802**

DOCUMENT

Take pictures and document the visuals, smells, time and location.

Obtain as much information as possible while remaining safe and following all laws.

FOR MORE INFORMATION VISIT 3RWK.ORG

REPORT ONLINE

1. Submit a report for free at WaterReporter.org
2. Submit a report to us using this QR Code
3. Follow and tag us on social media

@3RWaterkeeper #3RiversWatch

or email us at ops@threeriverswaterkeeper.org

WATERKEEPER® ALLIANCE MEMBER

Monitor Spills & Major Incidents

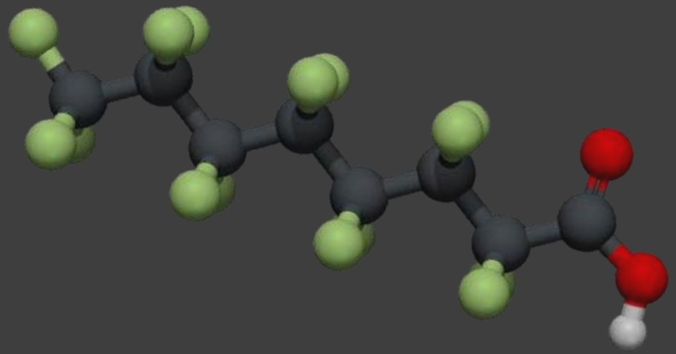
phurrun

Agenda Item 6:

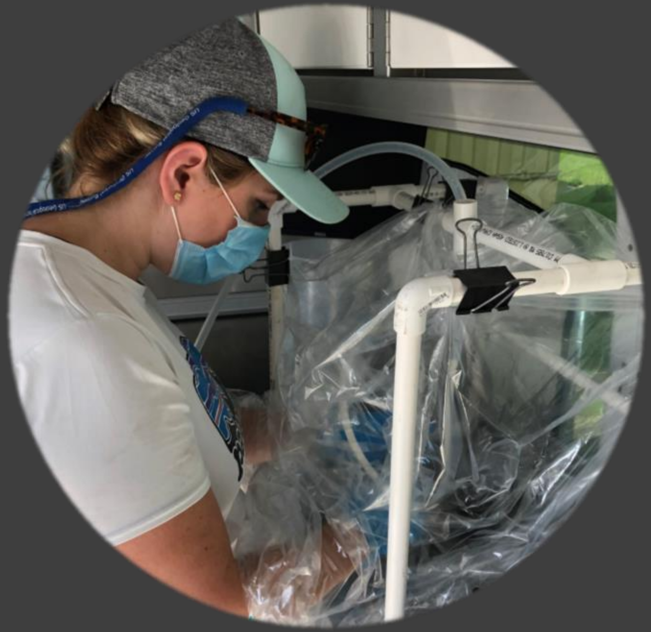
Occurrence of Per- and Polyfluoroalkyl Substances in West Virginia's Public Water Supplies

Mitch McAdoo, USGS, WV Science Center

Occurrence of Per- and Polyfluoroalkyl Substances in West Virginia's Public Water Supplies



Mitch McAdoo, Hydrologist



Outline

- USGS Overview
- Description of PFAS
- Timeline of PFAS studies
- Ohio River Valley Studies
- PFAS in source water
- PFAS in drinking water
- Future PFAS studies in WV

USGS
science for a changing world

USGS

science for a changing world

U.S. DEPARTMENT OF THE INTERIOR · MARCH 3, 1849 ·

USGS serves the Nation by providing reliable scientific information to describe and understand the Earth; minimize loss of life and property from natural disasters; manage water, biological, energy, and mineral resources; and enhance and protect our quality of life.

USGS Virginia & West Virginia Water Science Center

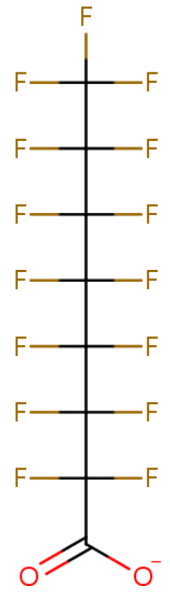
≈ 30 scientists ≈ 40 technicians ≈ 10 management & support

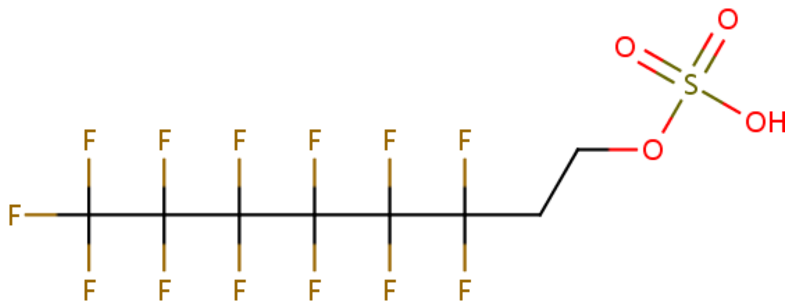
USGS science for a changing world

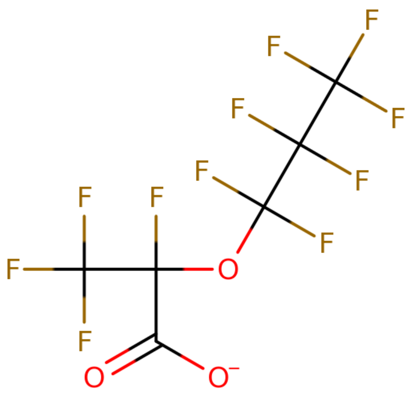
www.usgs.gov/vawv

What are Per- and Polyfluoroalkyl substances (PFAS)?

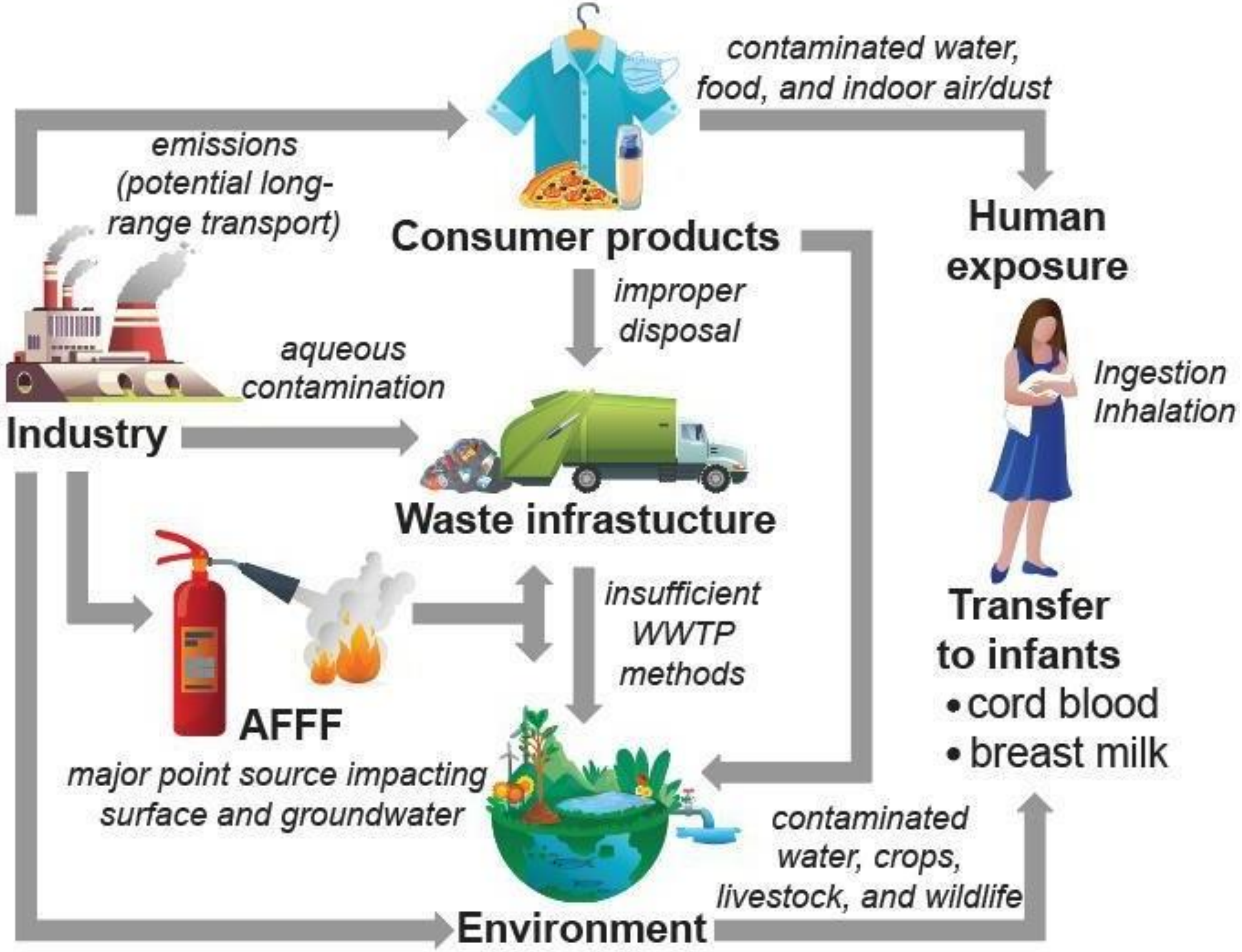
- Family of thousands of synthetic organic compounds
- Used in numerous industrial applications
- Used in numerous consumer products
- Used in aqueous film forming foam (AFFF)
- Persistent in the environment
- The subject of several state and federal regulatory actions



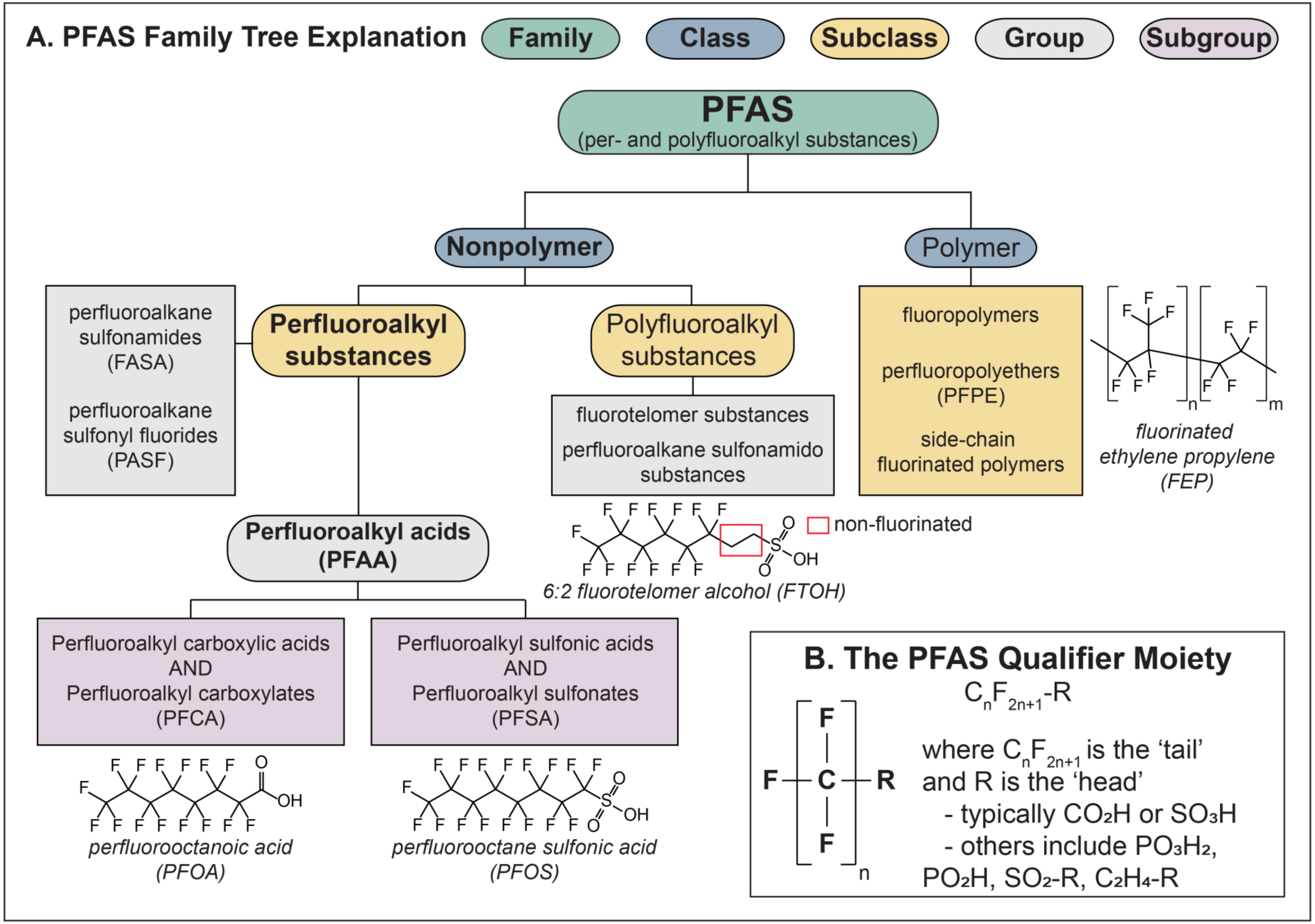




PFAS Sources and Exposure Pathways



After Sunderland and others, 2019



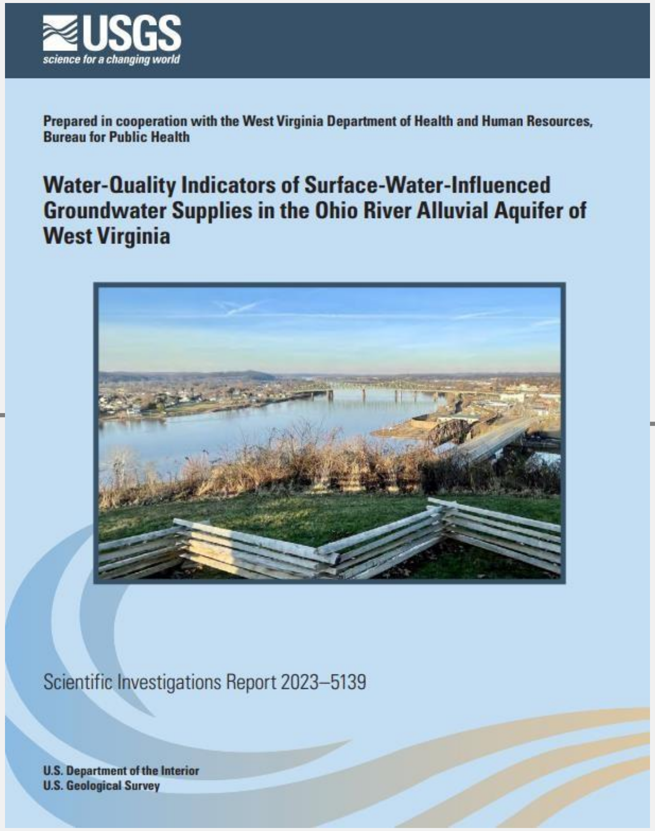
From Mcadoo and others, 2022

Preliminary Information – Subject to Revision. Not for Citation or Distribution.

Timeline of PFAS Projects in WV

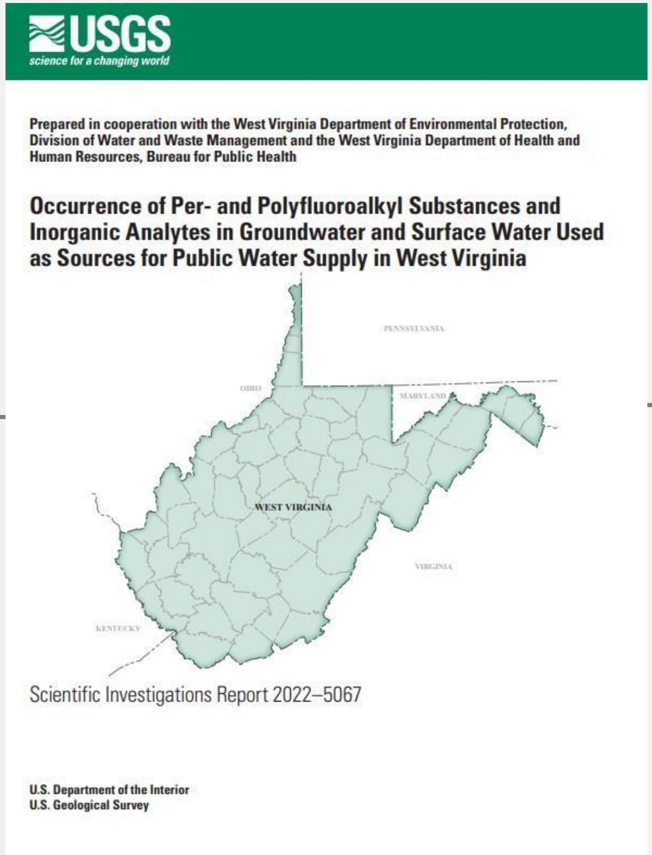
Spring 2019

WVDH OR
Alluvium



WVDEP
Source water

July 2020

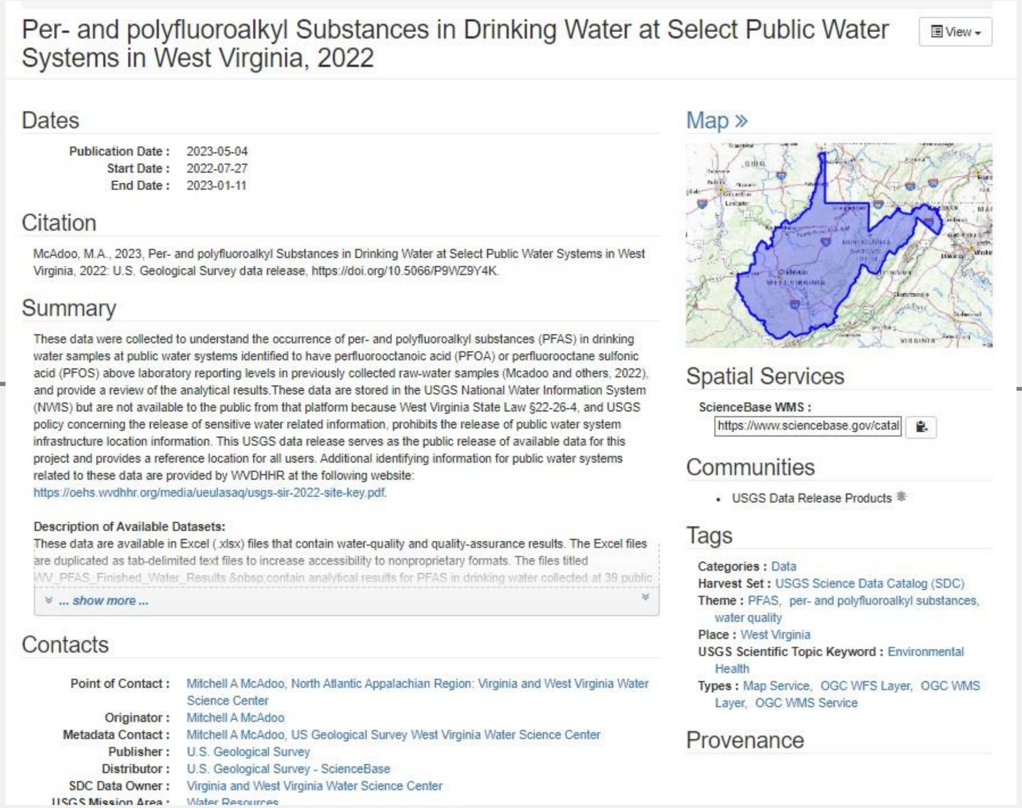


USGS

Timeline of PFAS Projects in WV

Oct 2022

WVDH
Finished Water



Per- and polyfluoroalkyl Substances in Drinking Water at Select Public Water Systems in West Virginia, 2022

View

Dates

Publication Date : 2023-05-04
Start Date : 2022-07-27
End Date : 2023-01-11

Citation

McAdoo, M.A., 2023, Per- and polyfluoroalkyl Substances in Drinking Water at Select Public Water Systems in West Virginia, 2022: U.S. Geological Survey data release, https://doi.org/10.5066/P9WZ9Y4K.

Summary

These data were collected to understand the occurrence of per- and polyfluoroalkyl substances (PFAS) in drinking water samples at public water systems identified to have perfluorooctanoic acid (PFOA) or perfluorooctane sulfonic acid (PFOS) above laboratory reporting levels in previously collected raw-water samples (Mcadoo and others, 2022), and provide a review of the analytical results.These data are stored in the USGS National Water Information System (NWIS) but are not available to the public from that platform because West Virginia State Law §22-26-4, and USGS policy concerning the release of sensitive water related information, prohibits the release of public water system infrastructure location information. This USGS data release serves as the public release of available data for this project and provides a reference location for all users. Additional identifying information for public water systems related to these data are provided by WVDHHR at the following website: https://oehs.wvdhhr.org/media/ueulasaq/usgs-sir-2022-site-key.pdf.

Description of Available Datasets:
These data are available in Excel (.xlsx) files that contain water-quality and quality-assurance results. The Excel files are duplicated as tab-delimited text files to increase accessibility to nonproprietary formats. The files titled WV_PFAS_Finished_Water_Results contain analytical results for PFAS in drinking water collected at 39 public

... show more ...

Contacts

Point of Contact : Mitchell A McAdoo, North Atlantic Appalachian Region: Virginia and West Virginia Water Science Center
Originator : Mitchell A McAdoo
Metadata Contact : Mitchell A McAdoo, US Geological Survey West Virginia Water Science Center
Publisher : U.S. Geological Survey
Distributor : U.S. Geological Survey - ScienceBase
SDC Data Owner : Virginia and West Virginia Water Science Center
USGS Mission Area : Water Resources

Map »

Spatial Services

ScienceBase WMS : https://www.sciencebase.gov/catal

Communities

- USGS Data Release Products

Tags

Categories : Data
Harvest Set : USGS Science Data Catalog (SDC)
Theme : PFAS, per- and polyfluoroalkyl substances, water quality
Place : West Virginia
USGS Scientific Topic Keyword : Environmental Health
Types : Map Service, OGC WFS Layer, OGC WMS Layer, OGC WMS Service

Provenance

WVDEP
Finished Water

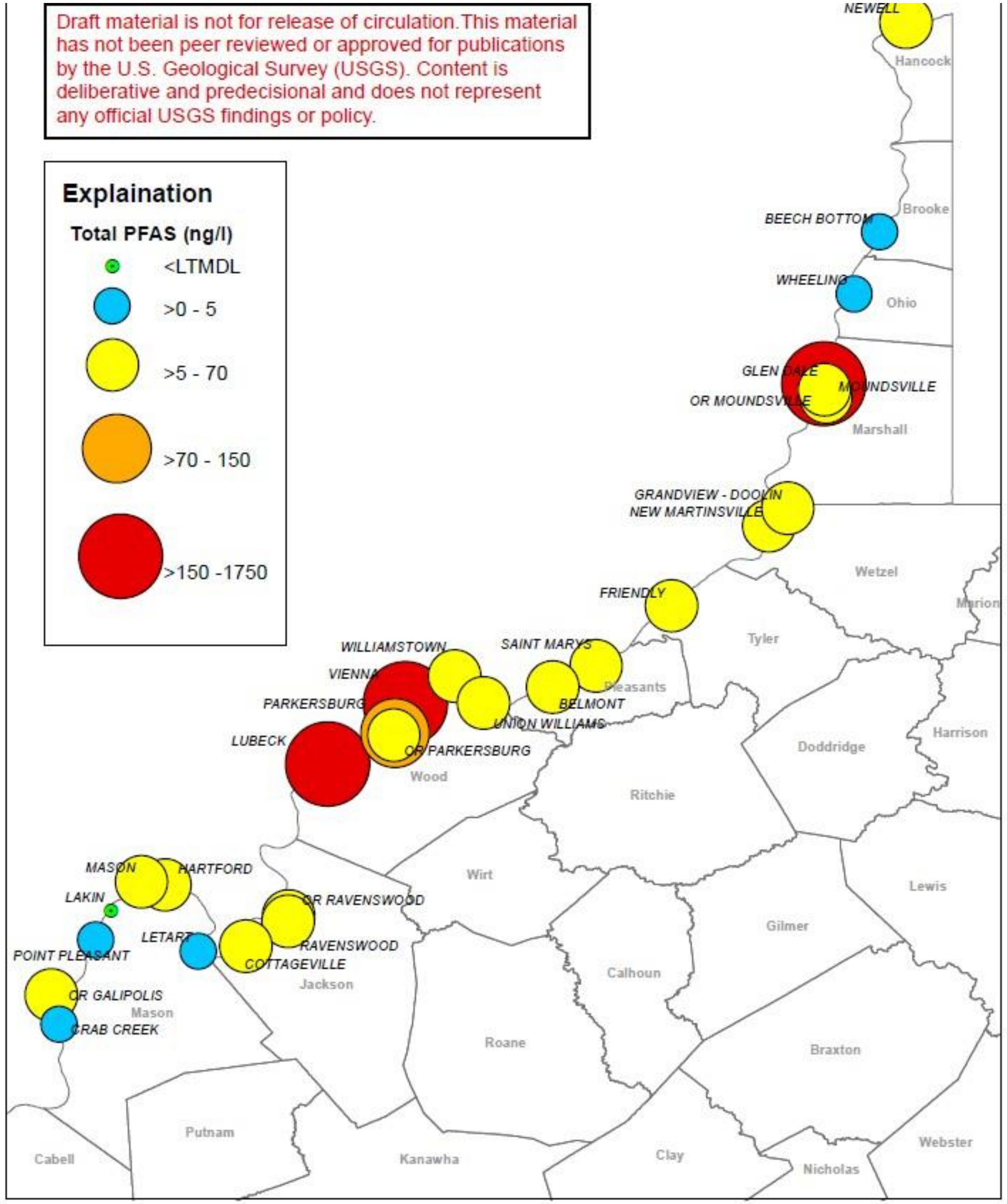
June 2024
In Progress

In Development

WVDEP
Source Tracking

Spring 2019: Ohio River Valley Alluvium Studies

- USGS NAWQA initiated a study to understand water quality in the Ohio River Valley alluvial aquifer (5 sites)
- DHHR funded additional sampling at several public water systems
- PFAS was sampled at all sites but was not the specific objective of the projects
- At this time health advisory for PFAS was 70 ng/L PFOA+PFOS
- PFAS was found at almost all of the sites we sampled



Fall 2019: WV PFAS Work Group

- State regulatory agencies called a meeting to discuss results and establish a PFAS work group consisting of WVDEP, WVDH, and USGS
- The work group concluded that initial results from the Ohio River Valley Alluvium necessitated additional sampling of source water at all public water systems
- WV legislature recognized the need for additional data and passed Senate Concurrent Resolution 46 (SCR46)

Senate Concurrent Resolution 46 of 2020

- First study specifically focused on understanding PFAS occurrence and distribution in WV source water

"Requesting the Department of Environmental Protection and the Department of Health and Human Resources cooperatively propose and initiate a public source-water supply study plan to sample perfluoroalkyl and polyfluoroalkyl substances for all community water systems in West Virginia, including schools and daycares that operate treatment systems regulated by the West Virginia Department of Health and Human Resources."

https://www.wvlegislature.gov/bill_status/bills_text.cfm?billdoc=SCR46%20ORG.htm&yr=2020&sesstype=RS&i=46&houseorig=s&billtype=cr

USGS

Spring 2020: WV Source Water Study

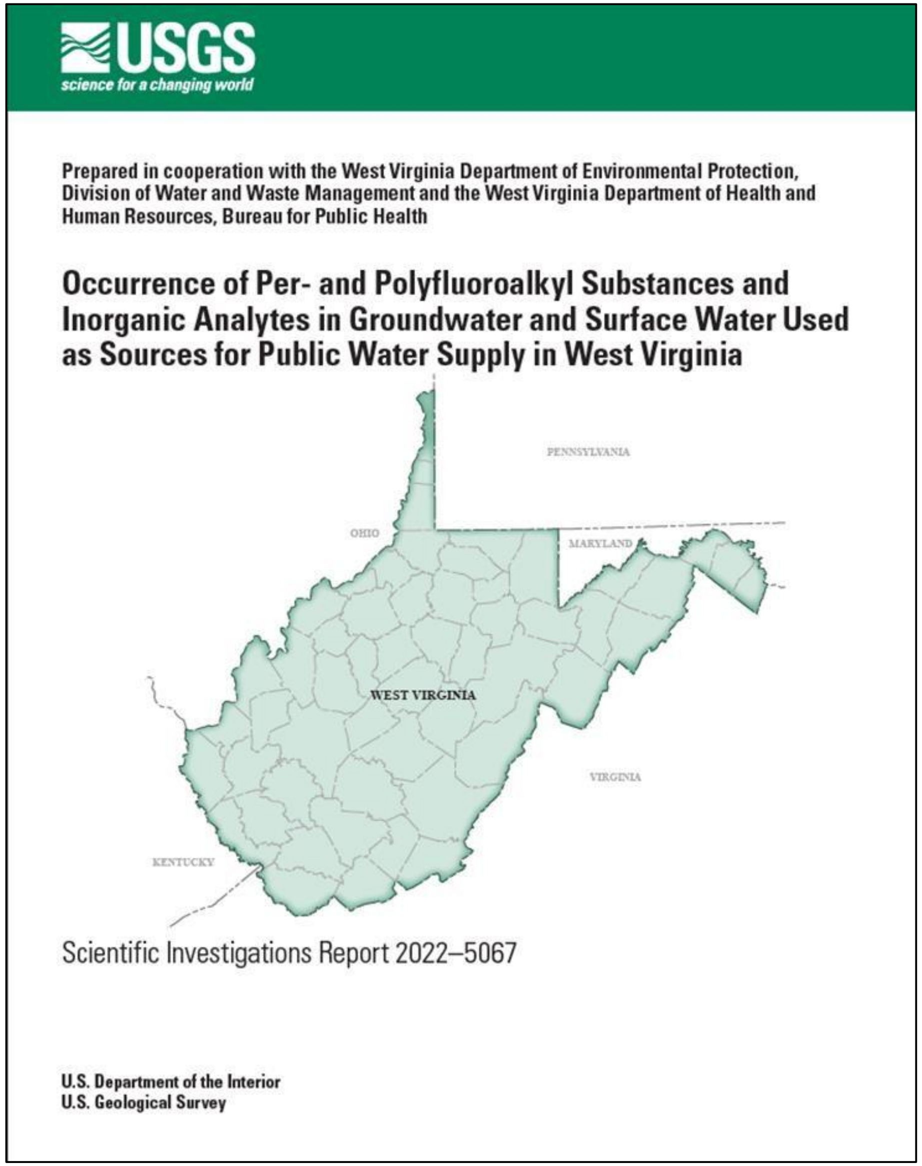
Meet the Requirements of SCR46

1. Identify drinking water sources with measurable amounts of PFAS
2. Determine processes or land use factors affecting PFAS concentrations
3. Inform state agencies of any need for additional PFAS investigation
4. Assist state regulatory agencies in protecting public health by providing information on statewide PFAS distribution in source water

USGS

Source Water Study Results

- 279 sites were sampled between 2019 -2021
- Method 537m, 28 analytes
- USGS Scientific Investigations report published in summer 2022
- 67 (24%) of sites had at least one PFAS detected above the reporting level
- 37 (13%) sites had detections for PFOA or PFOS above the reporting level


USGS
science for a changing world

Prepared in cooperation with the West Virginia Department of Environmental Protection, Division of Water and Waste Management and the West Virginia Department of Health and Human Resources, Bureau for Public Health

Occurrence of Per- and Polyfluoroalkyl Substances and Inorganic Analytes in Groundwater and Surface Water Used as Sources for Public Water Supply in West Virginia

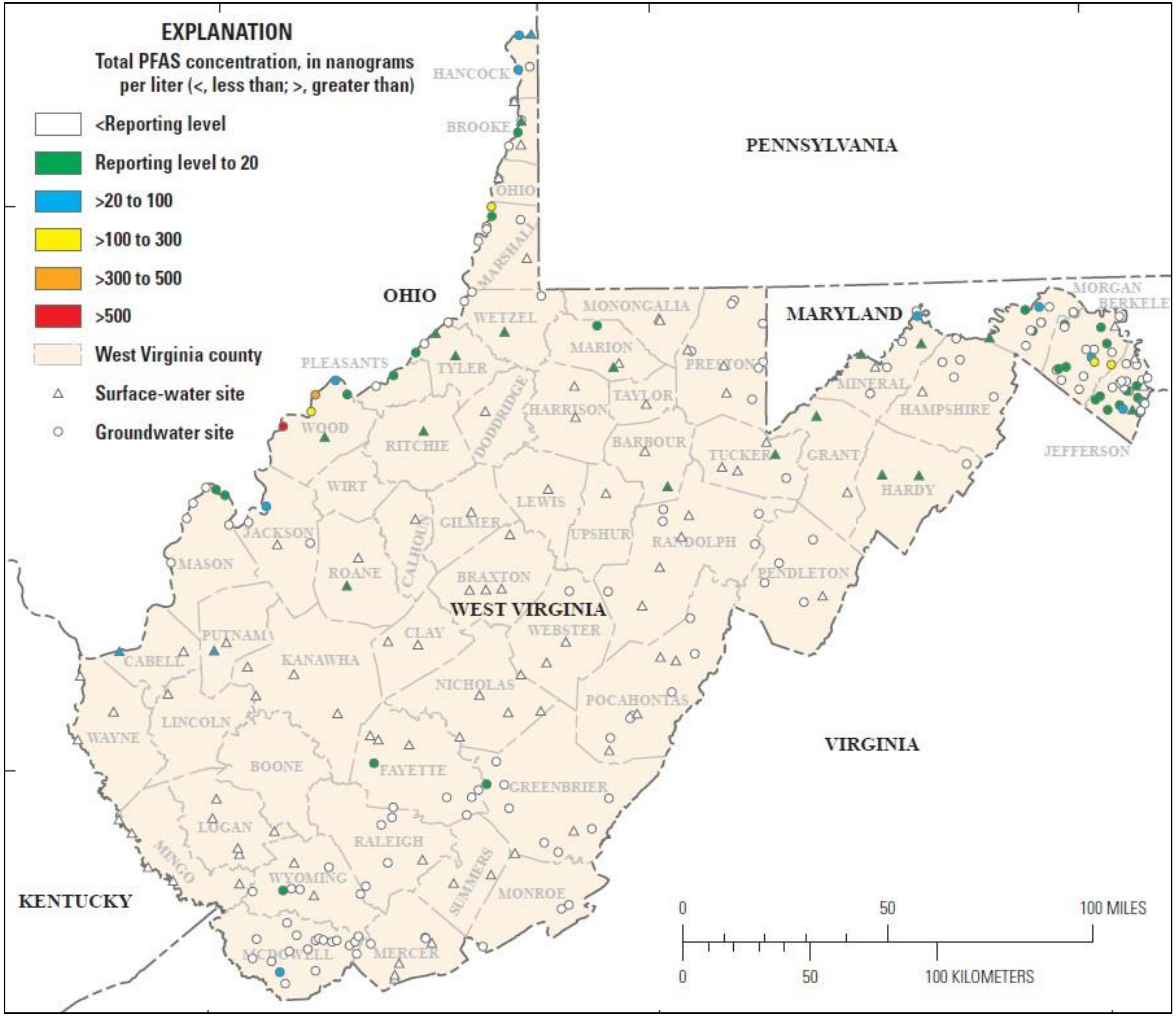
Scientific Investigations Report 2022–5067

U.S. Department of the Interior
U.S. Geological Survey

Source Water Study Results

- Most of the source water in West Virginia is potentially susceptible to PFAS contamination if a source of PFAS exists within the source area
- Ohio River Valley is the most vulnerable region to PFAS contamination in the state of West Virginia for surface water and groundwater
- Three counties of Morgan, Berkely, and Jefferson in the Eastern Panhandle of West Virginia are also highly vulnerable to PFAS contamination

USGS


EXPLANATION
Total PFAS concentration, in nanograms per liter (<, less than; >, greater than)
<Reporting level
Reporting level to 20
>20 to 100
>100 to 300
>300 to 500
>500
West Virginia county
Surface-water site
Groundwater site
PENNSYLVANIA
OHIO
MARYLAND
WEST VIRGINIA
VIRGINIA
KENTUCKY
HANCOCK
BROOKE
OHIO
MARSHALL
WETZEL
MONONGALIA
MARION
PRESTON
TYLER
PLEASANTS
WOOD
RITCHIE
DODDRIDGE
HARRISON
TAYLOR
BARBOUR
TUCKER
MINERAL
HAMPSHIRE
MORGAN
BERKELEY
JEFFERSON
GRANT
HARDY
WIRT
LEWIS
GILMER
UPSHUR
RANDOLPH
PENDLETON
JACKSON
MASON
ROANE
CALHOUN
BRAXTON
WEBSTER
CLAY
PUTNAM
CABELL
KANAWHA
NICHOLAS
POCAHONTAS
WAYNE
LINCOLN
BOONE
FAYETTE
GREENBRIER
LOGAN
MINGO
RALEIGH
WYOMING
SUMMERS
MONROE
MCDOWELL
MERCER
0 50 100 MILES
0 50 100 KILOMETERS
USGS

Questions and Possible Future Investigations

- What is the PFAS concentration in treated finished water at sites that had detections for PFAS?
  - Sample finished water at public-water systems. (in progress)
- What is the distribution of PFAS in domestic wells in areas of contamination or where there is a lack of groundwater data?
  - Sample domestic wells in specified locations.
- What are the major sources and exposure pathways of PFAS in West Virginia?
  - Sample suspected sources contributing PFAS to public-water supplies and understand how those PFAS sources affect drinking water, fish tissue, and other pathways of human exposure.
- What are influences on transformation and change in PFAS concentrations over time in surface water and groundwater?
  - Long-term monitoring for PFAS in groundwater, surface water, sediment, and tissues to understand PFAS fate and transport in areas of known contamination.

Spring 2022: Sample finished water at 37 sites

- 37 sites with detections of PFOA or PFOS over the reporting level

- Drinking water sampled fall 2022

- USGS Data Release Published Spring 2023

- 19 systems exceeded the new proposed EPA MCL's

USGS

EPA Proposed MCL's as of 6/8/2023

<table>
<tr><th>Compound</th><th>Proposed MCLG</th><th>Proposed MCL (enforceable levels)</th></tr>
<tr><td>PFOA</td><td>Zero</td><td>4.0 parts per trillion (also expressed as ng/L)</td></tr>
<tr><td>PFOS</td><td>Zero</td><td>4.0 ppt</td></tr>
<tr><td>PFNA</td><td rowspan="4">1.0 (unitless)
Hazard Index</td><td rowspan="4">1.0 (unitless)
Hazard Index</td></tr>
<tr><td>PFHxS</td></tr>
<tr><td>PFBS</td></tr>
<tr><td>HFPO-DA (commonly referred to as GenX Chemicals)</td></tr>
</table>

$$\text{Hazard Index} = \left(\frac{[\text{GenX}_{\text{water}}]}{[10\ \text{ppt}]}\right) + \left(\frac{[\text{PFBS}_{\text{water}}]}{[2000\ \text{ppt}]}\right) + \left(\frac{[\text{PFNA}_{\text{water}}]}{[10\ \text{ppt}]}\right) + \left(\frac{[\text{PFHxS}_{\text{water}}]}{[9.0\ \text{ppt}]}\right)$$

Spring 2023: WV PFAS Protection Act

- WV Legislature passed the PFAS Protection Act
- Requires WVDEP create PFAS action plans for 37 systems where PFOA, PFOS, HFPO-DA or PFBS was detected above reporting levels in raw water
- Requires WVDEP initiate a plan to sample additional sites with detection of PFOA, PFOS, PFBS, HFPO-DA above minimum detection levels and HA’s (n=100)
- Requires WVDEP create PFAS action plans for any system with detections of PFOA, PFOS, PFBS, or HFPO-DA above health advisory in finished water

USGS

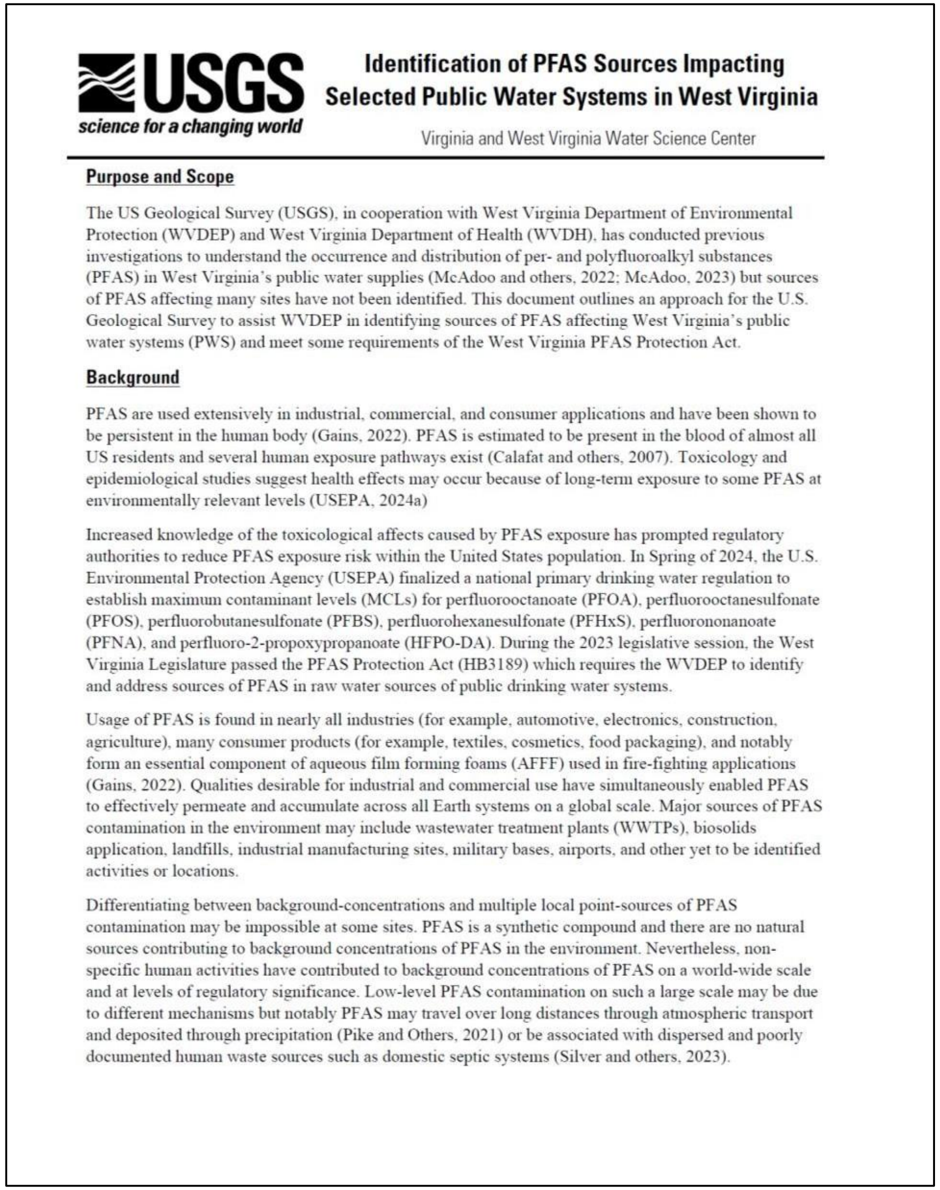
Spring 2024: Finished Water Study

- In progress
- Sample finished water at additional 110 public water systems
- Meet finished drinking water sampling requirements of PFAS protection Act
- All sites have been sampled
- Waiting for results from lab

USGS

In Development: Source Tracking Study

- Proposal in development to assist WVDEP in identifying PFAS sources affecting public water supplies



USGS science for a changing world

Identification of PFAS Sources Impacting Selected Public Water Systems in West Virginia

Virginia and West Virginia Water Science Center

Purpose and Scope

The US Geological Survey (USGS), in cooperation with West Virginia Department of Environmental Protection (WVDEP) and West Virginia Department of Health (WVDH), has conducted previous investigations to understand the occurrence and distribution of per- and polyfluoroalkyl substances (PFAS) in West Virginia's public water supplies (McAdoo and others, 2022; McAdoo, 2023) but sources of PFAS affecting many sites have not been identified. This document outlines an approach for the U.S. Geological Survey to assist WVDEP in identifying sources of PFAS affecting West Virginia's public water systems (PWS) and meet some requirements of the West Virginia PFAS Protection Act.

Background

PFAS are used extensively in industrial, commercial, and consumer applications and have been shown to be persistent in the human body (Gains, 2022). PFAS is estimated to be present in the blood of almost all US residents and several human exposure pathways exist (Calafat and others, 2007). Toxicology and epidemiological studies suggest health effects may occur because of long-term exposure to some PFAS at environmentally relevant levels (USEPA, 2024a)

Increased knowledge of the toxicological affects caused by PFAS exposure has prompted regulatory authorities to reduce PFAS exposure risk within the United States population. In Spring of 2024, the U.S. Environmental Protection Agency (USEPA) finalized a national primary drinking water regulation to establish maximum contaminant levels (MCLs) for perfluorooctanoate (PFOA), perfluorooctanesulfonate (PFOS), perfluorobutanesulfonate (PFBS), perfluorohexanesulfonate (PFHxS), perfluorononanoate (PFNA), and perfluoro-2-propoxypropanoate (HFPO-DA). During the 2023 legislative session, the West Virginia Legislature passed the PFAS Protection Act (HB3189) which requires the WVDEP to identify and address sources of PFAS in raw water sources of public drinking water systems.

Usage of PFAS is found in nearly all industries (for example, automotive, electronics, construction, agriculture), many consumer products (for example, textiles, cosmetics, food packaging), and notably form an essential component of aqueous film forming foams (AFFF) used in fire-fighting applications (Gains, 2022). Qualities desirable for industrial and commercial use have simultaneously enabled PFAS to effectively permeate and accumulate across all Earth systems on a global scale. Major sources of PFAS contamination in the environment may include wastewater treatment plants (WWTPs), biosolids application, landfills, industrial manufacturing sites, military bases, airports, and other yet to be identified activities or locations.

Differentiating between background-concentrations and multiple local point-sources of PFAS contamination may be impossible at some sites. PFAS is a synthetic compound and there are no natural sources contributing to background concentrations of PFAS in the environment. Nevertheless, non-specific human activities have contributed to background concentrations of PFAS on a world-wide scale and at levels of regulatory significance. Low-level PFAS contamination on such a large scale may be due to different mechanisms but notably PFAS may travel over long distances through atmospheric transport and deposited through precipitation (Pike and Others, 2021) or be associated with dispersed and poorly documented human waste sources such as domestic septic systems (Silver and others, 2023).

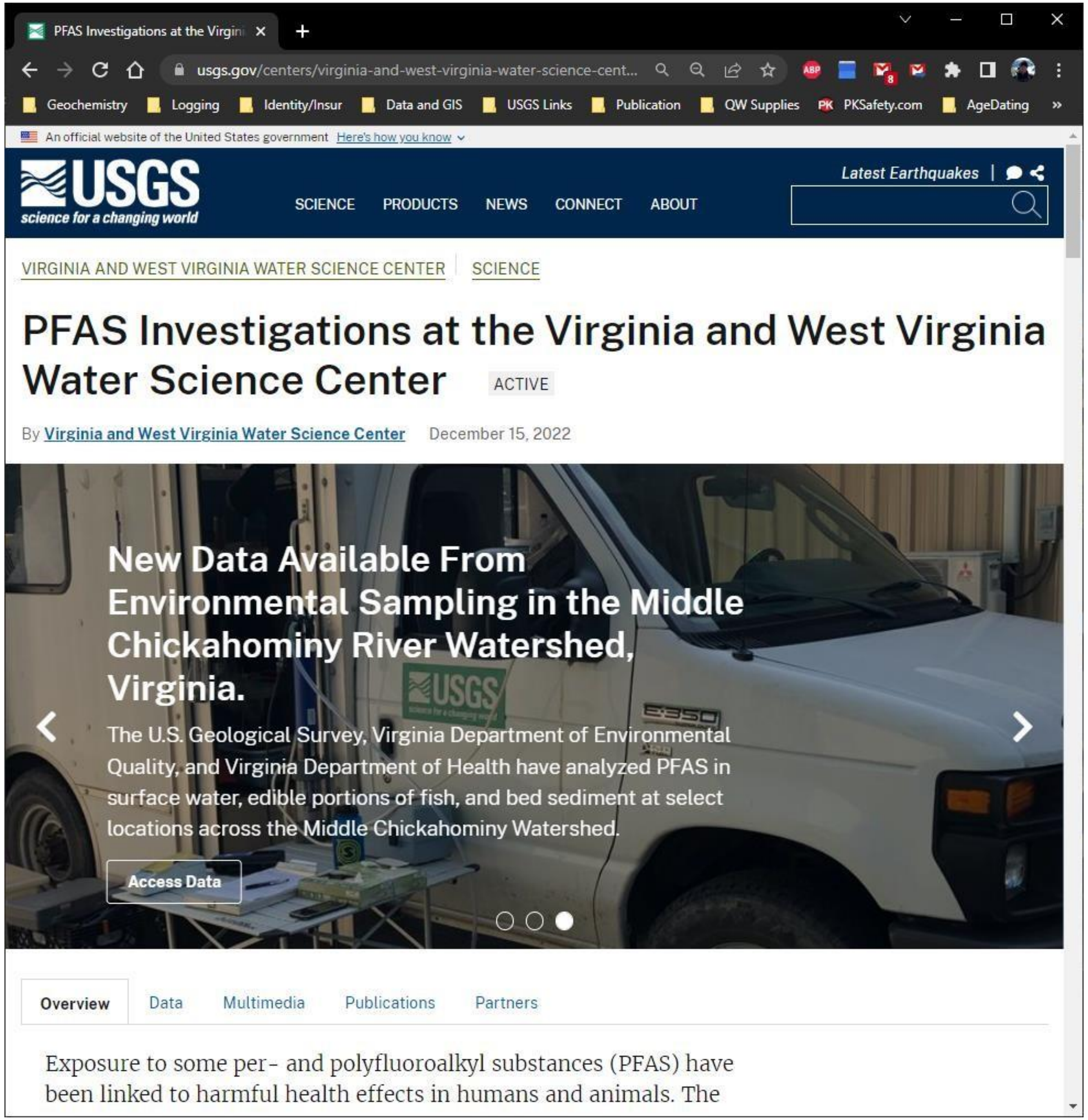
USGS

For More Information:

USGS VA/WV PFAS Web Site

- Highlights all the PFAS projects in VA/WV
- Capabilities
- Interactive Site Mapper
- Background on PFAS
- USGS PFAS Strategic Vision

https://www.usgs.gov/centers/virginia-and-west-virginia-water-science-center/science/pfas-investigations-virginia-and



USGS

Questions?

Mitch McAdoo

mmcadoo@usgs.gov

USGS

science for a changing world

References

ITRC, 2020. Fact Sheet: Naming Conventions for Per- and Polyfluoroalkyl Substances (PFAS). https://pfas-1.itrcweb.org/wp-content/uploads/2020/10/naming_conventions_508_2020Aug_Final.pdf

McAdoo, M.A., Connock, G.T., and Messinger, T., 2022, Occurrence of per- and polyfluoroalkyl substances and inorganic analytes in groundwater and surface water used as sources for public water supply in West Virginia: U.S. Geological Survey Scientific Investigations Report 2022–5067, 37 p., https://doi.org/10.3133/sir20225067

Sunderland, E.M., Hu, X.C., Dassuncao, C. et al, 2019, A review of the pathways of human exposure to poly- and perfluoroalkyl substances (PFASs) and present understanding of health effects. J Expo Sci Environ Epidemiol 29, 131–147. https://doi.org/10.1038/s41370-018-0094-1

Agenda Item 7:
Summary of Stream Gages and Monitoring in the Ohio River Basin

Jeff Frey, USGS, IN-KY-OH Science Center

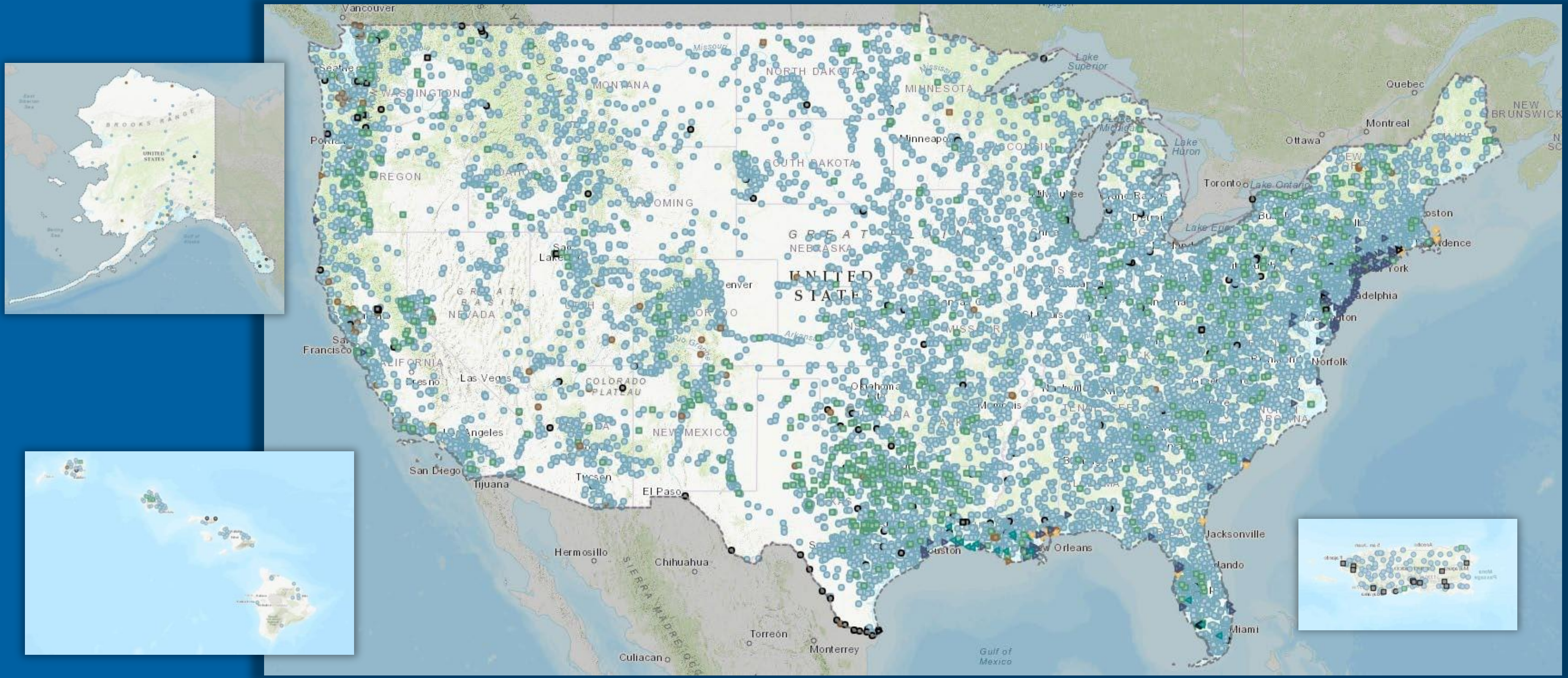
Ohio-Kentucky-Indiana
Water Science Center (OKI WSC)

Summary of streamgages and monitoring in the Ohio River Basin and USGS Tools and Resources for Water Data

Jeff Frey and Jeff Woods

U.S. Department of the Interior
U.S. Geological Survey

Nationwide ~11,600 sites in the USGS Streamgage Network



Standardized approach regardless of location

National techniques and methods

Provide hourly data real-time even in disasters

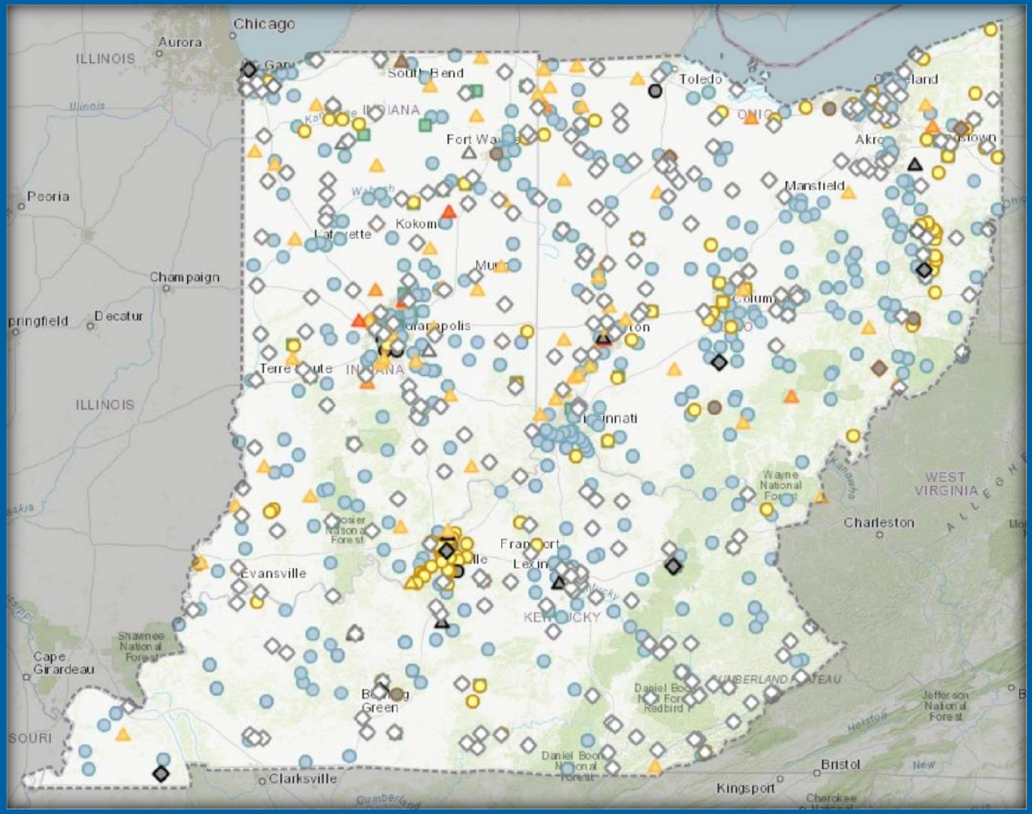
USGS Streamgage have multiple uses

- Flood forecasting
- Water Use
- Ecological monitoring
  - Industry effluence temperatures at low flows
  - Endangered species – Ecoflows
  - Nutrient loads related to Gulf hypoxia, Lake Erie
- Operation of dams, locks, and reservoirs
- Navigation
- Emergency management
- Infrastructure design and monitoring

Streamgage uses

OKI Monitoring Network

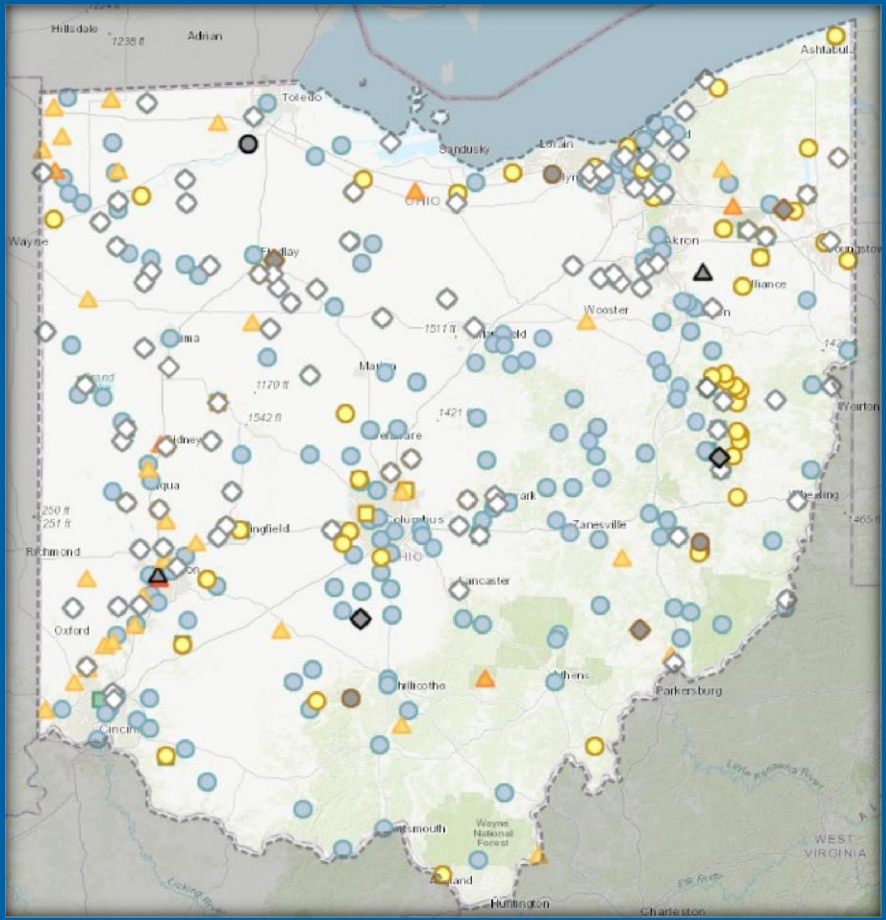
- 808 Surface Water Gages
- 265 Precipitation Gages
- 166 Continuous Water Quality sites
- 94 Continuous Groundwater Wells



USGS

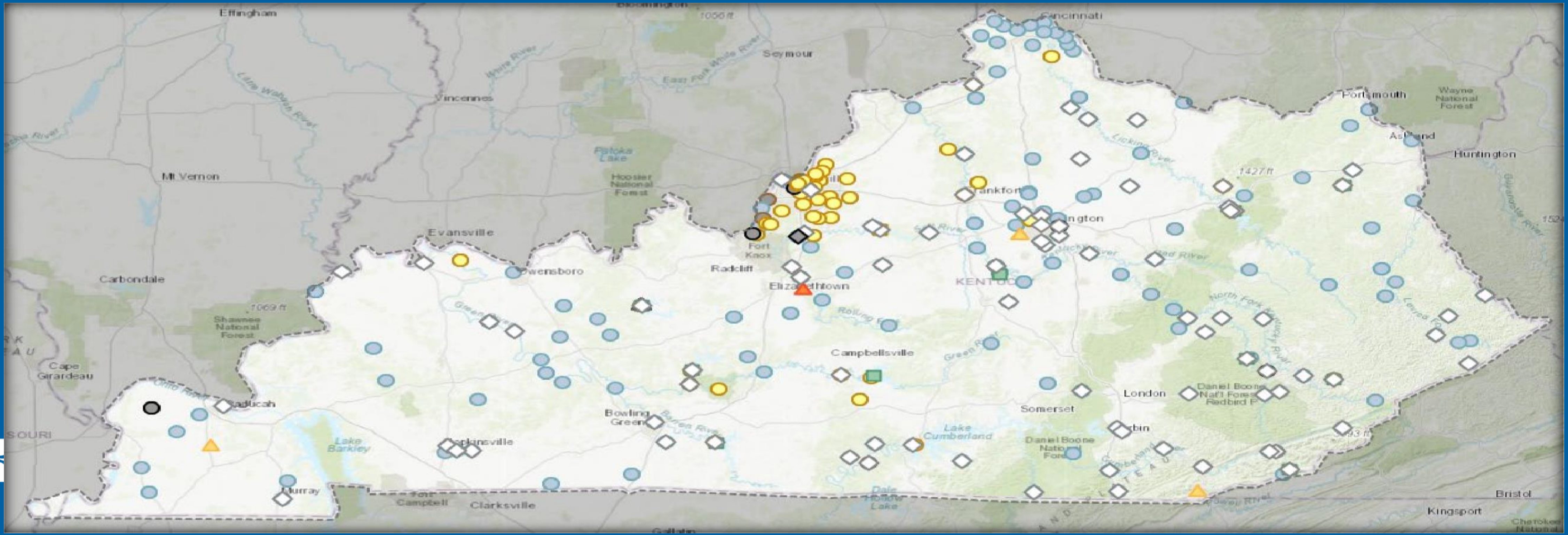
OKI - Ohio Monitoring Network

- 332 Surface Water Gages
- 65 Continuous Water Quality Sites
- 97 Precipitation Gages
- 38 Continuous Groundwater Wells



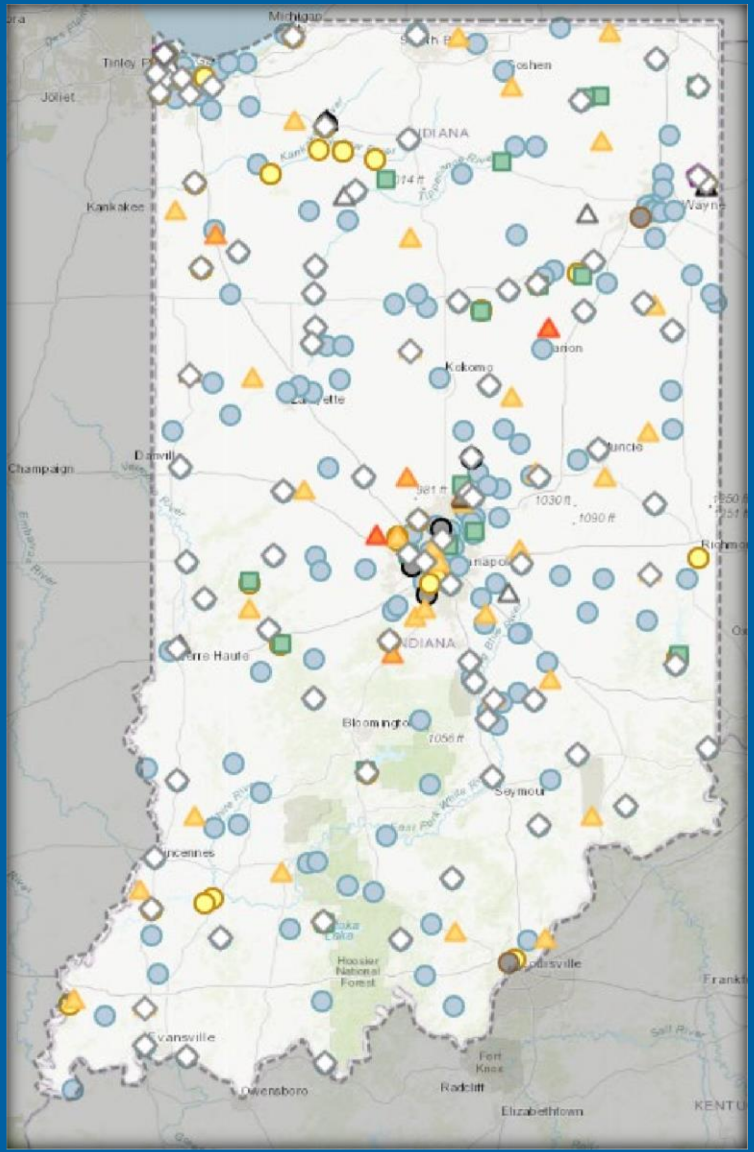
OKI - Kentucky Monitoring Network

- 216 Surface Water Gages
- 53 Continuous Water Quality Locations
- 83 Precipitation Gages
- 4 Continuous GW Wells



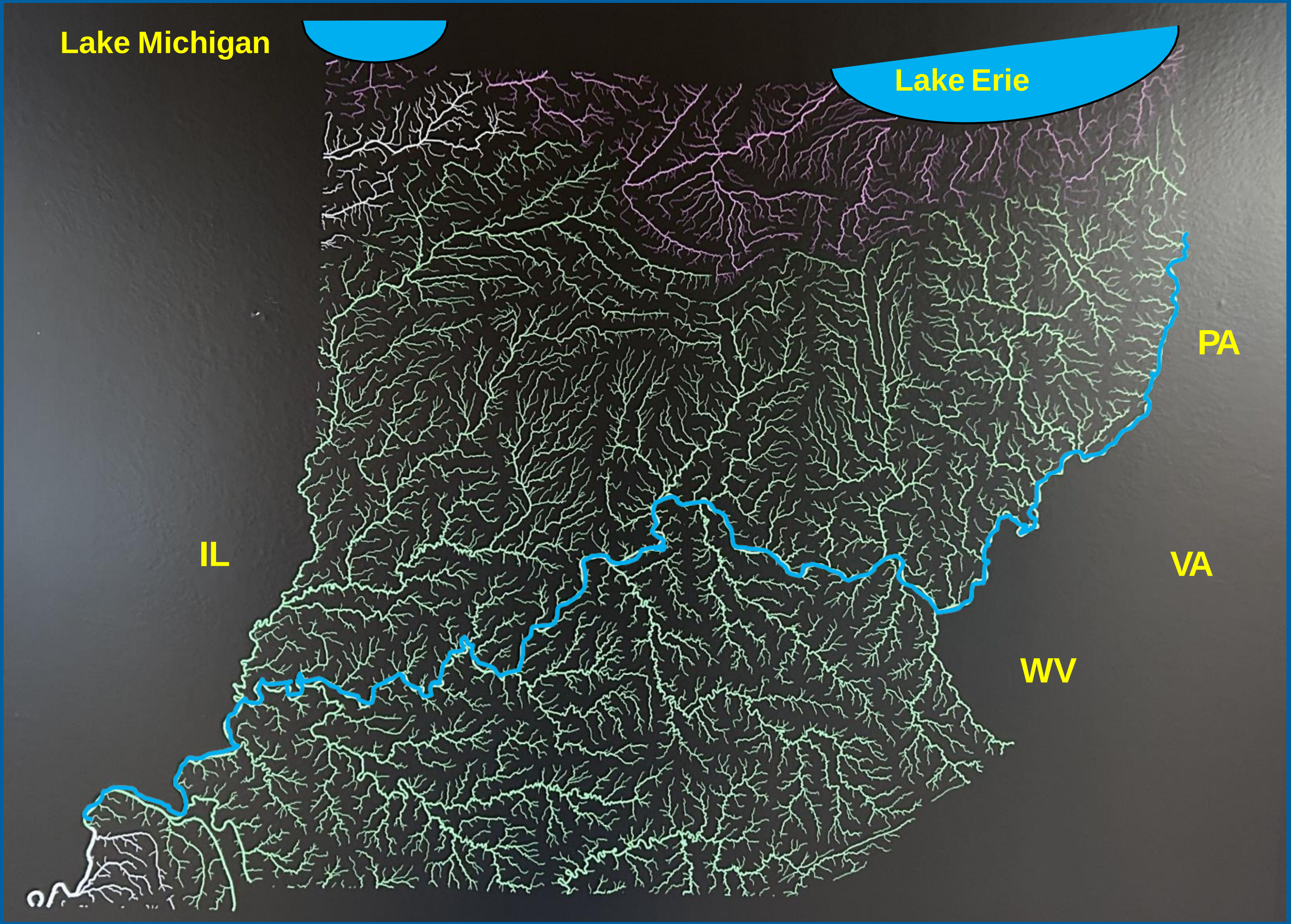
OKI - Indiana Monitoring Network

- 260 Surface Water Gages
- 48 Continuous Water Quality Locations
- 85 Precipitation Gages
- 52 Continuous Groundwater Wells



USGS

The Ohio River Basin dominates OKI



USGS OKI Streamgage Network

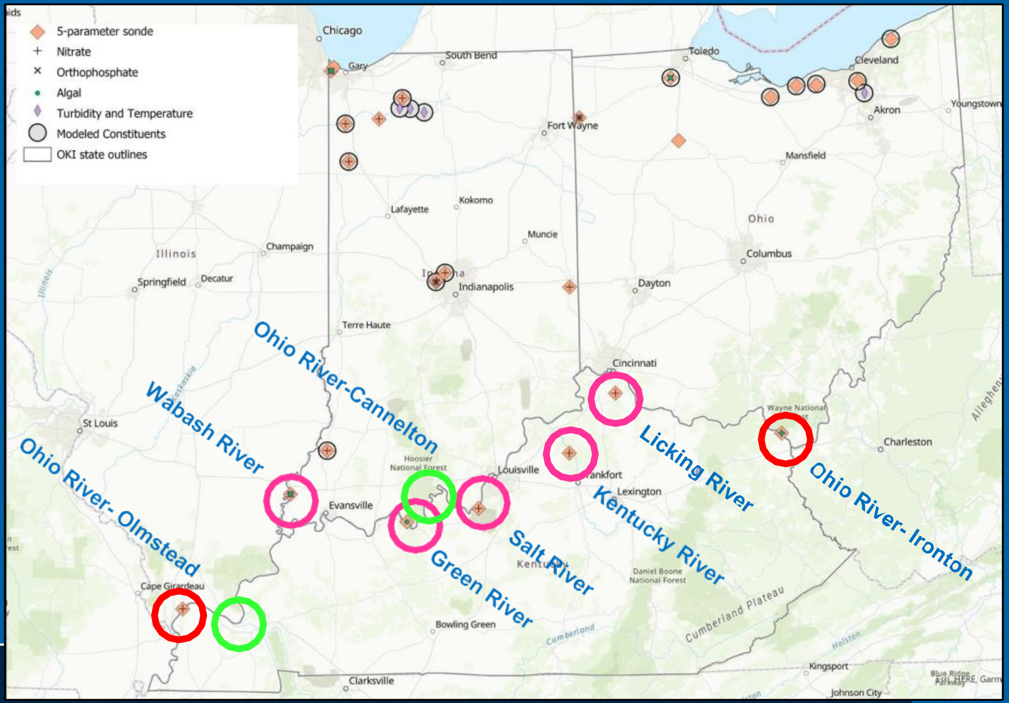
Ohio River Monitoring Network

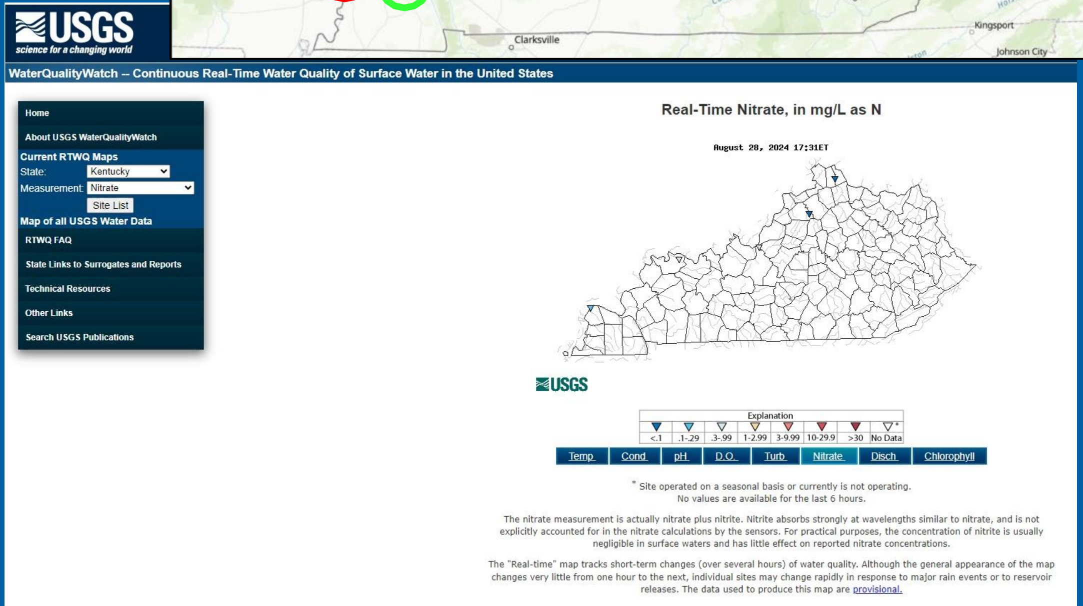
Ohio River Basin
Nutrient Supergages

- Ohio River at Ironton
- Ohio River at Olmstead
    - Licking River near Alexandria
    - Kentucky River at Lockport
    - Salt River at West Point
    - Green River at Spottsville
    - Wabash River at New Harmony

National Water Quality Network

- Ohio River at Cannelton
    - Tennessee River nr Paducah
-



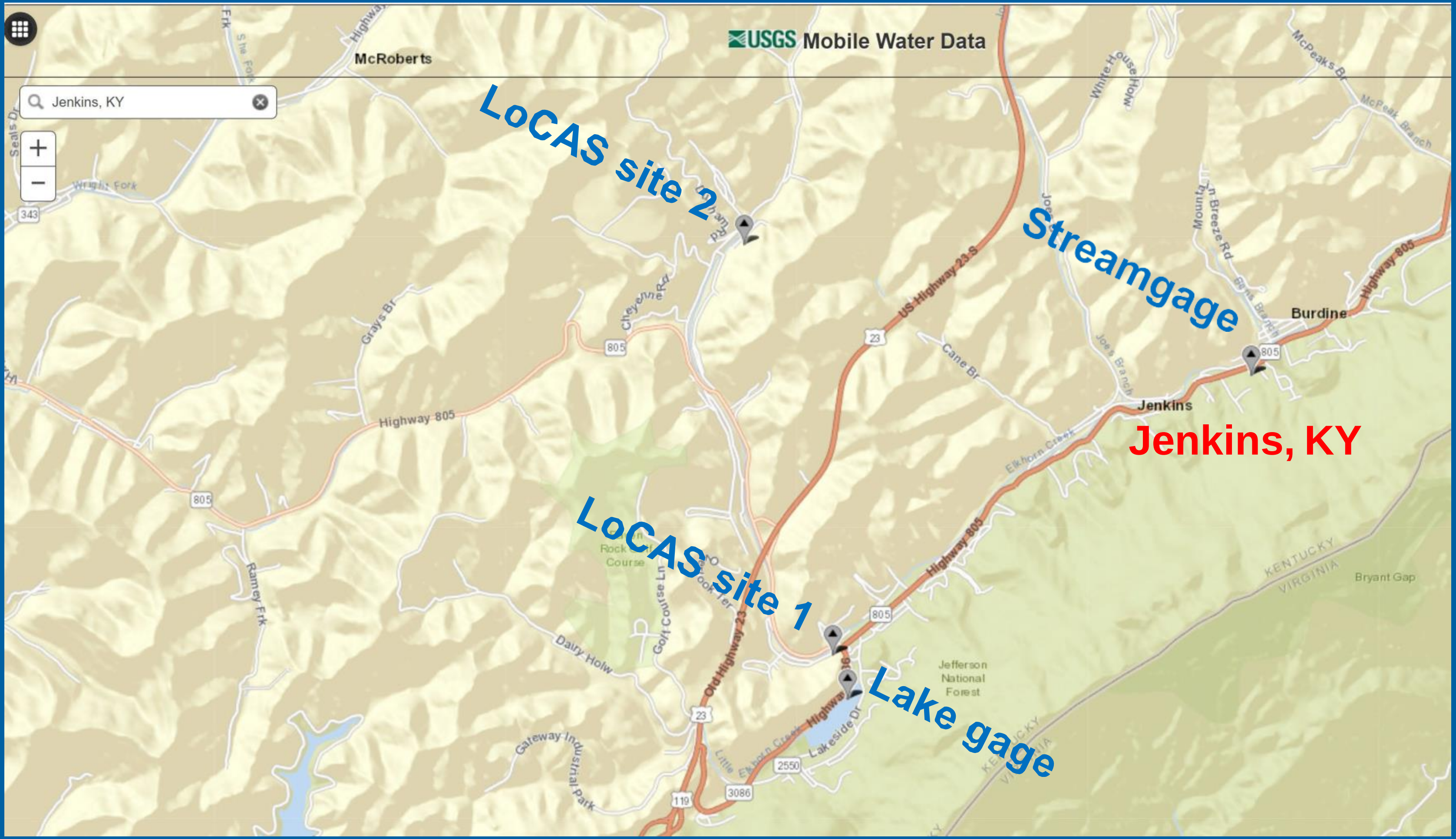


[Real-time water quality (usgs.gov)]

USGS

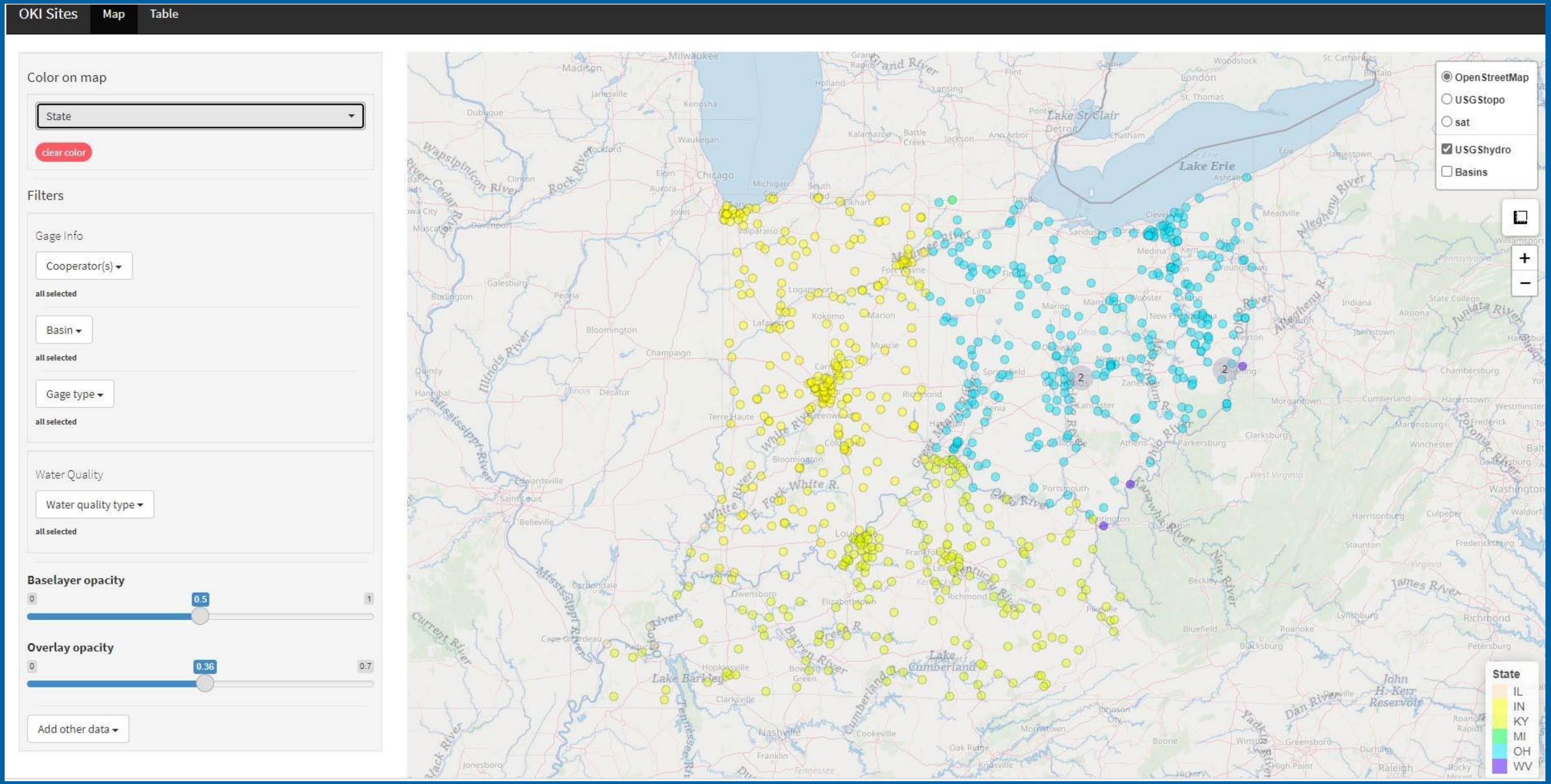
OKI Streamgage Fit for Purpose

How can we deal with flashy, deadly streams, especially in poorer regions, where it is too costly?



OKI Monitoring Dashboard

How can we determine what all of the streamgages are being used for?

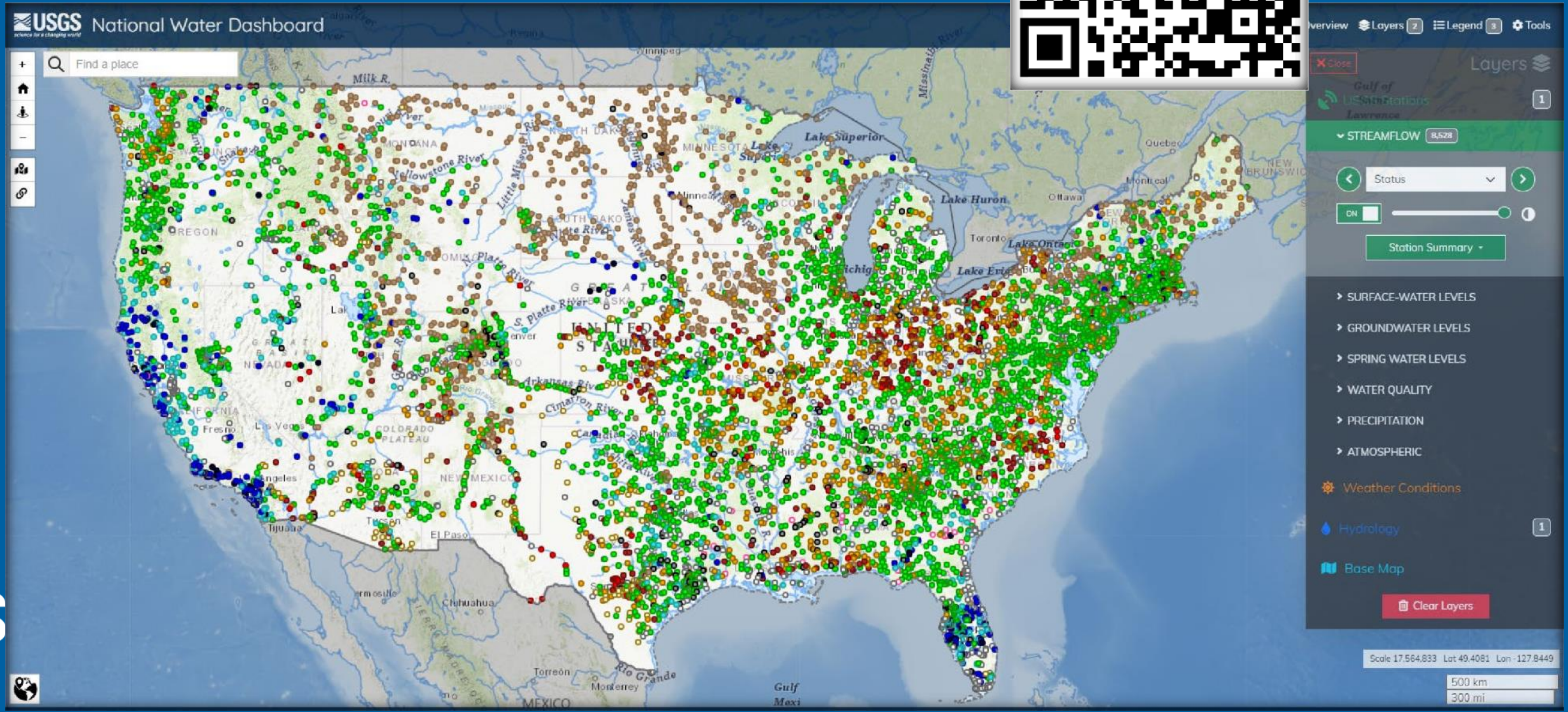


USGS

USGS Tools for Water Resources

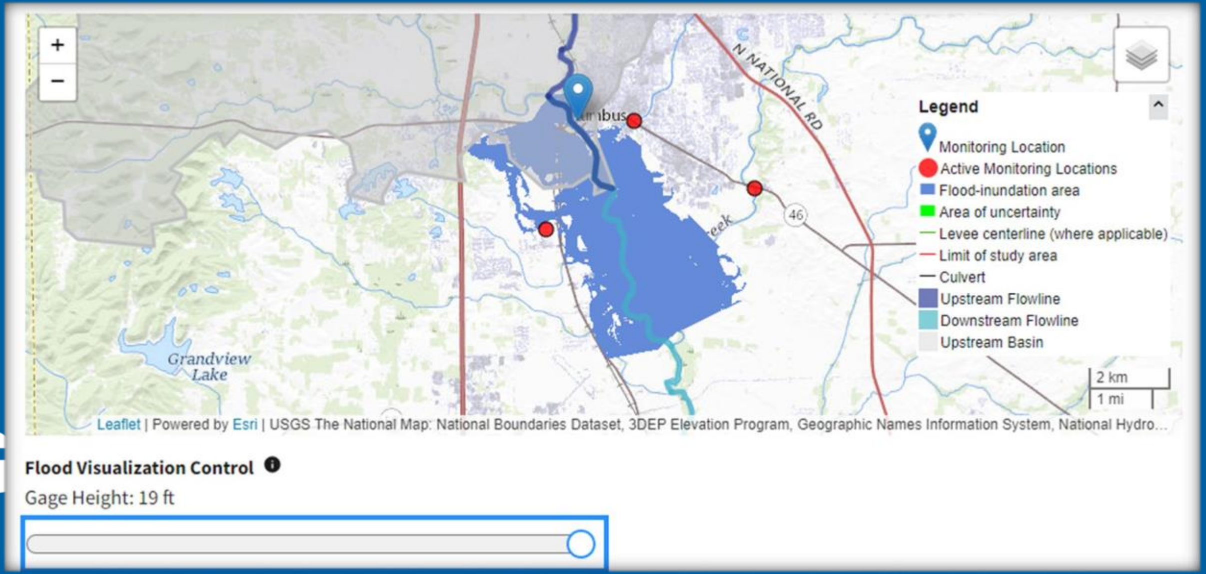
Water Data for the Nation (WDFN)

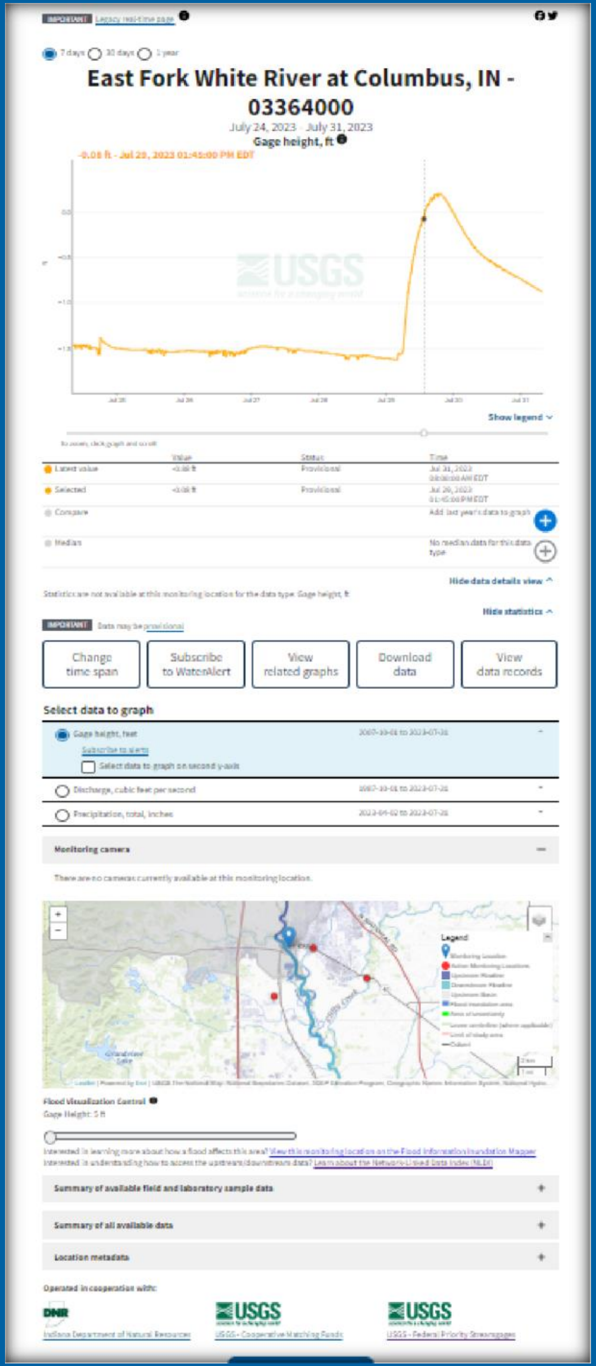
- **National Water Dashboard**



Water Data for the Nation

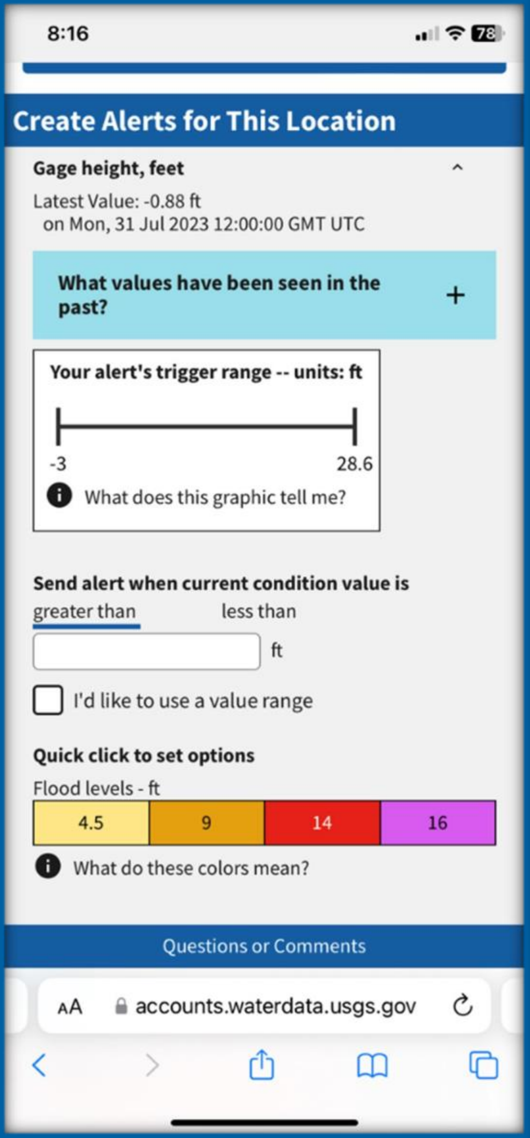
- **Interactive webpages**
  - **Plot multiple sites or parameters**
- **Flood Inundation Maps**



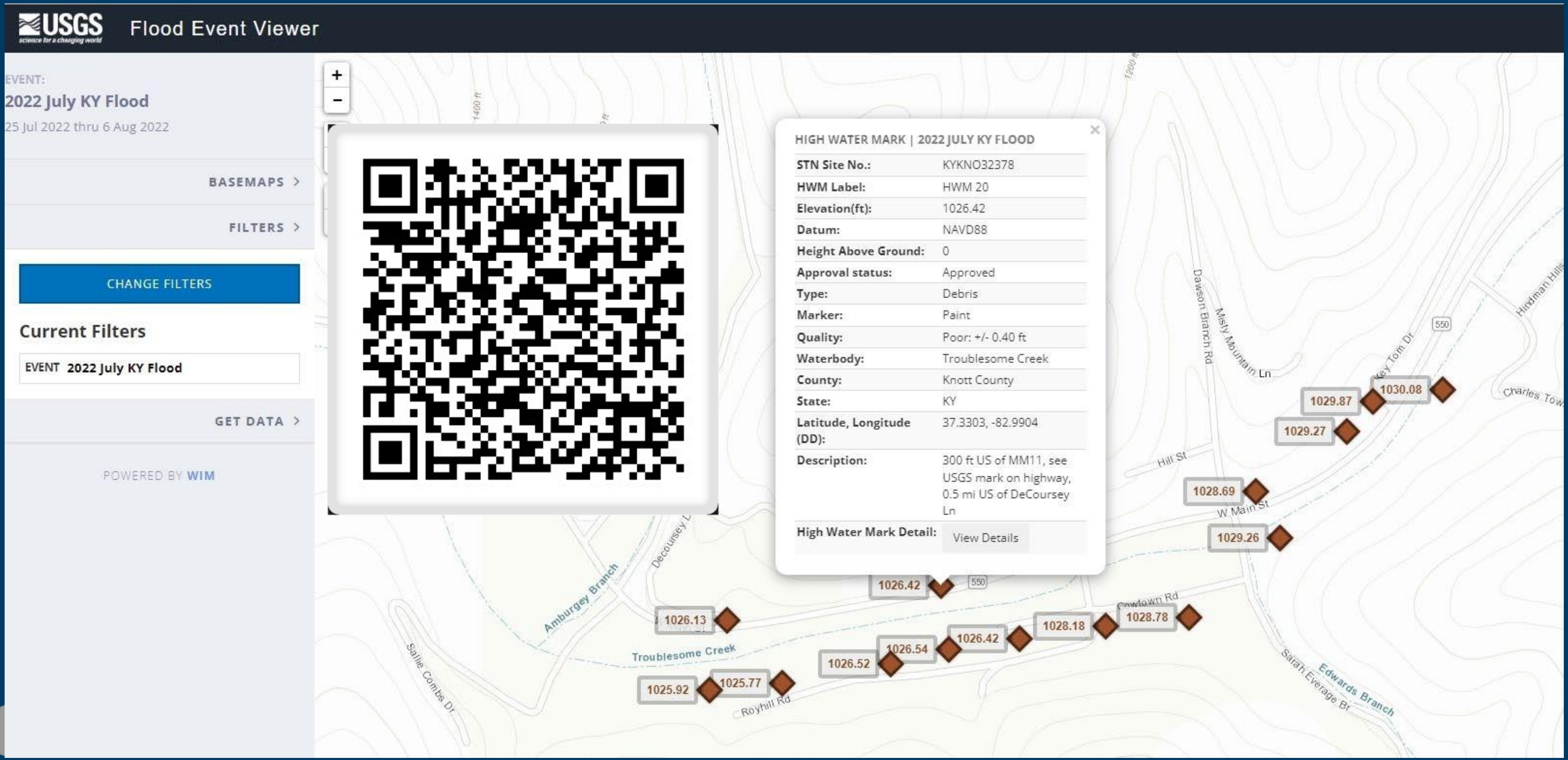


Water Alert

- Provides alerts via text or email
- Daily updates or real-time.
- Surface Water, groundwater, WQ, or precipitation

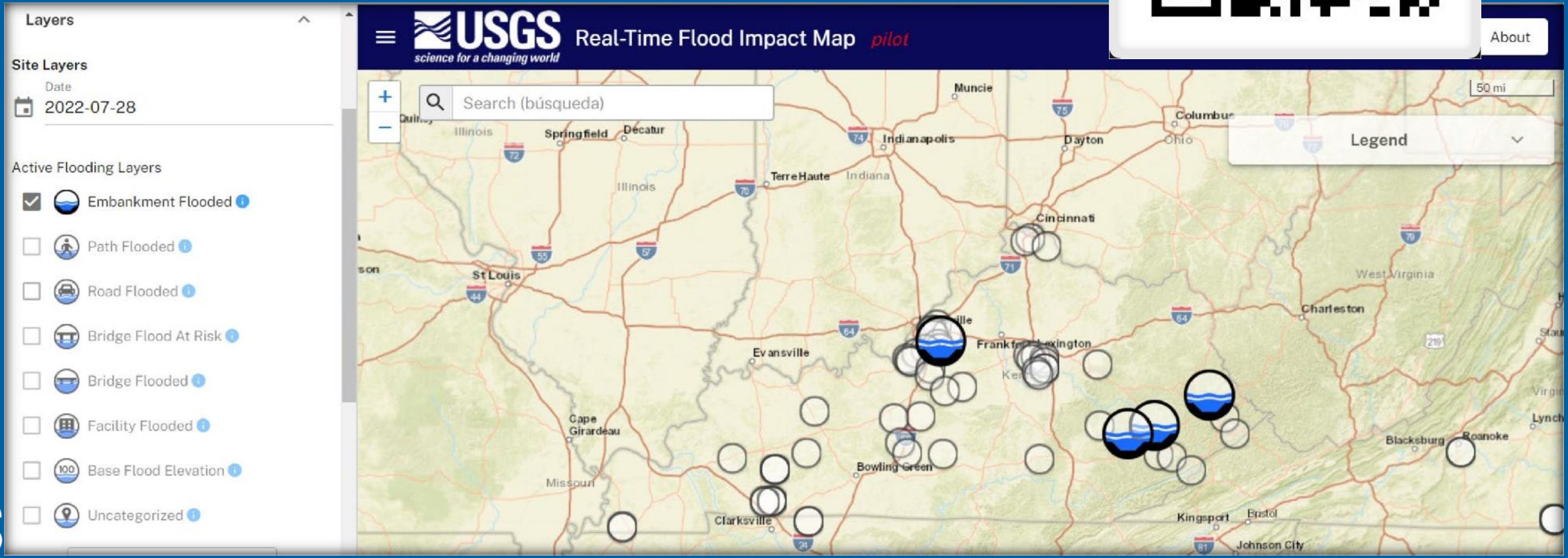


USGS Flood Event Viewer (FEV)



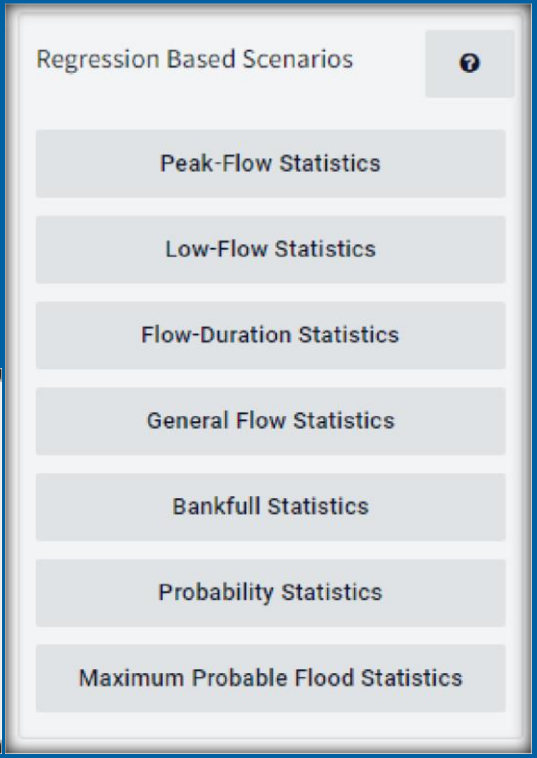
USGS Realtime Flood Impact Map

- **Surveyed points of interest**



Indiana Streamstats

- **Spatial analytical tools that are useful for water-resources planning and management, and for engineering and design purposes**
  - **Delineation**
  - **Basin edit tools**
  - **At-site statistics and data**
  - **Ungaged estimates**
  - **Flood frequency estimates**

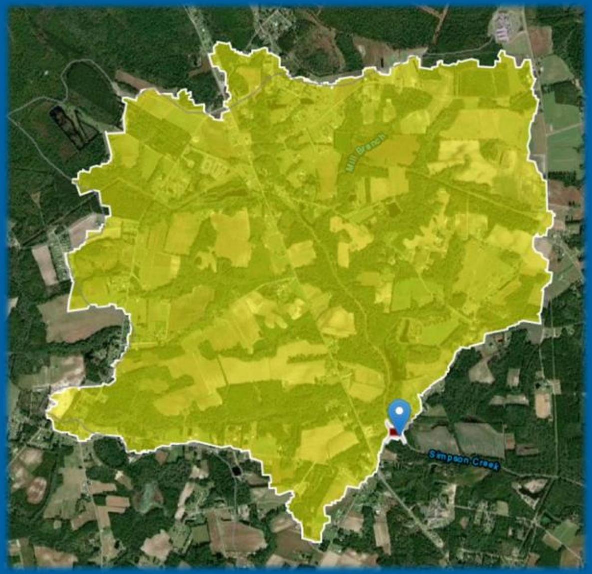


USGS

Indiana StreamStats

- **StreamStats functions to delineate a basin at ungaged sites**

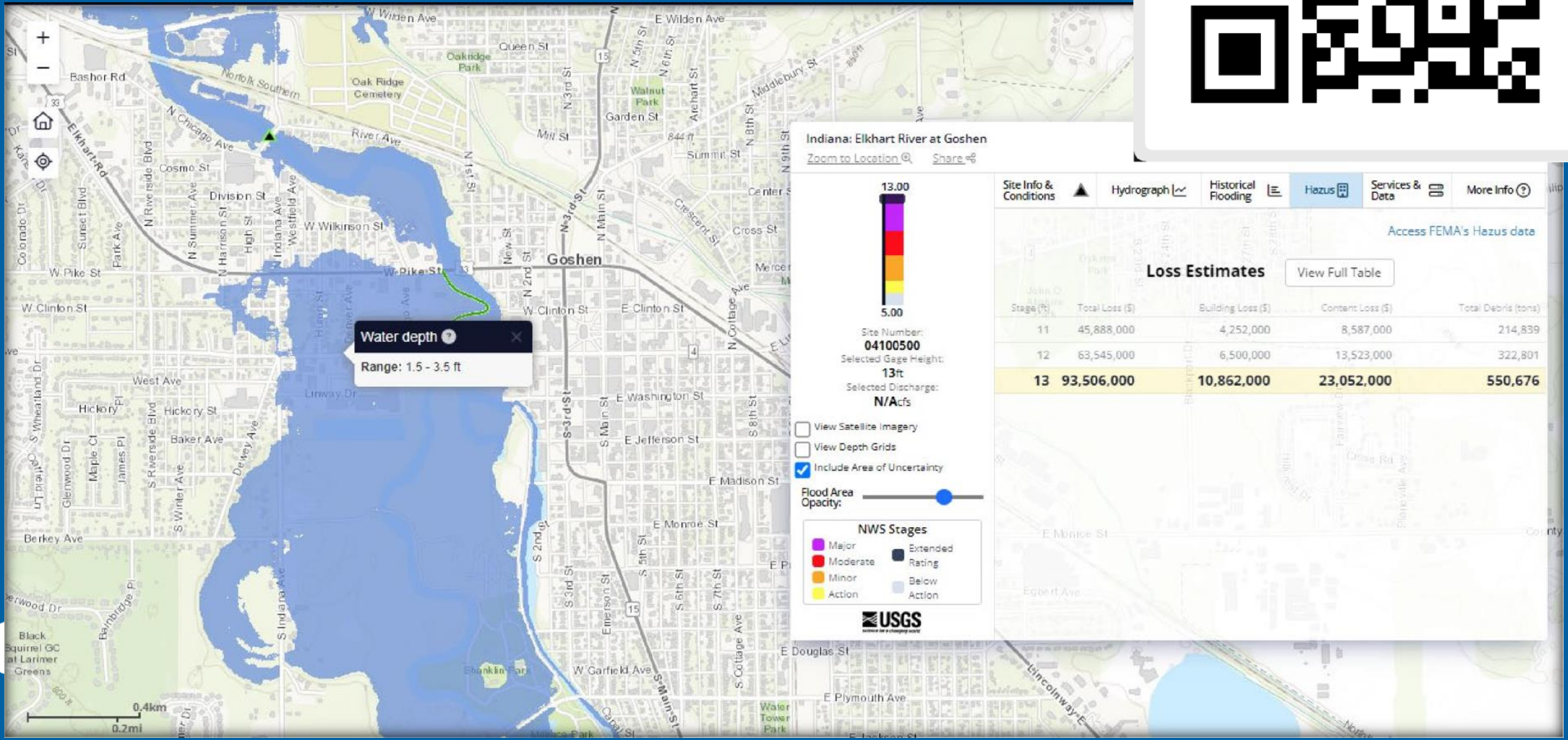
  - **Compute (or retrieve) basin characteristics**
  - **Compute (or retrieve) streamflow estimates**
  - **Other estimates (bankfull, etc)**
    - **Peak-flow equations**
    - **Bankfull-channel-dimension equations**
    - **Harmonic mean, low-flow frequency, and probability of zero flow equations**



USGS

USGS Flood Inundation Mapper

- High resolution flood impacts



USGS

Questions?

Jeff Frey: jwfrey@usgs.gov
Jeff Woods: jwoods@usgs.gov

USGS

Agenda Item 8:
Ohio Freshwater Mussel Propagation, and Mussel Surveying and Abundance, in the Ohio Basin in Pennsylvania

Andrew Phipps, USFWS

Rick Spear, PA DEP

PADEP/ USFWS Mussel Propagation Memorandum of Agreement

ORSANCO TEC Meeting

October 8, 2024

Josh Shapiro, Governor

Jessica Shirley, Acting Secretary

Aquatic Life Kill Dunkard Creek 2009

Pennsylvania
Department of Environmental Protection

Aquatic Life Kill Dunkard Creek 2009

Pennsylvania
Department of Environmental Protection

Aquatic Life Kill Dunkard Creek 2009

Dunkard Creek had 22 Freshwater Mussels Species all gone.

Pennsylvania
Department of Environmental Protection

Aquatic Life Kill Dunkard Creek 2009

Dunkard Creek had an estimated 15, 382 Freshwater Mussels perish due to the discharge of Highly Saline Mine water and a subsequent invasive Golden Algae Bloom (*Prynesium parvum*).

Sand and Gravel Dredging

Pennsylvania
Department of Environmental Protection

Propagation of Plain Pocketbooks

In 2017 in Dunkard Creek we stocked 4, 003 juvenile Plain Pocketbook Mussels (*Lampsilis cardium)* into Dunkard Creek from the WSSNFH

Pennsylvania
Department of Environmental Protection

Propagation of Fatmucket Mussels

Propagation of Wavy Rayed Lampmussel

Pennsylvania
Department of Environmental Protection

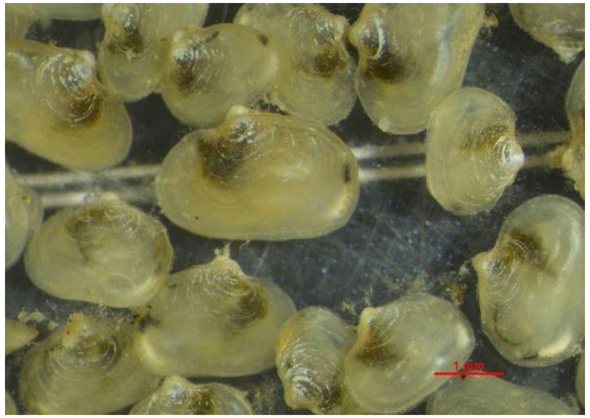
Propagation of Pink Muckets

Pennsylvania
Department of Environmental Protection

Propagation of Round Hickorynuts

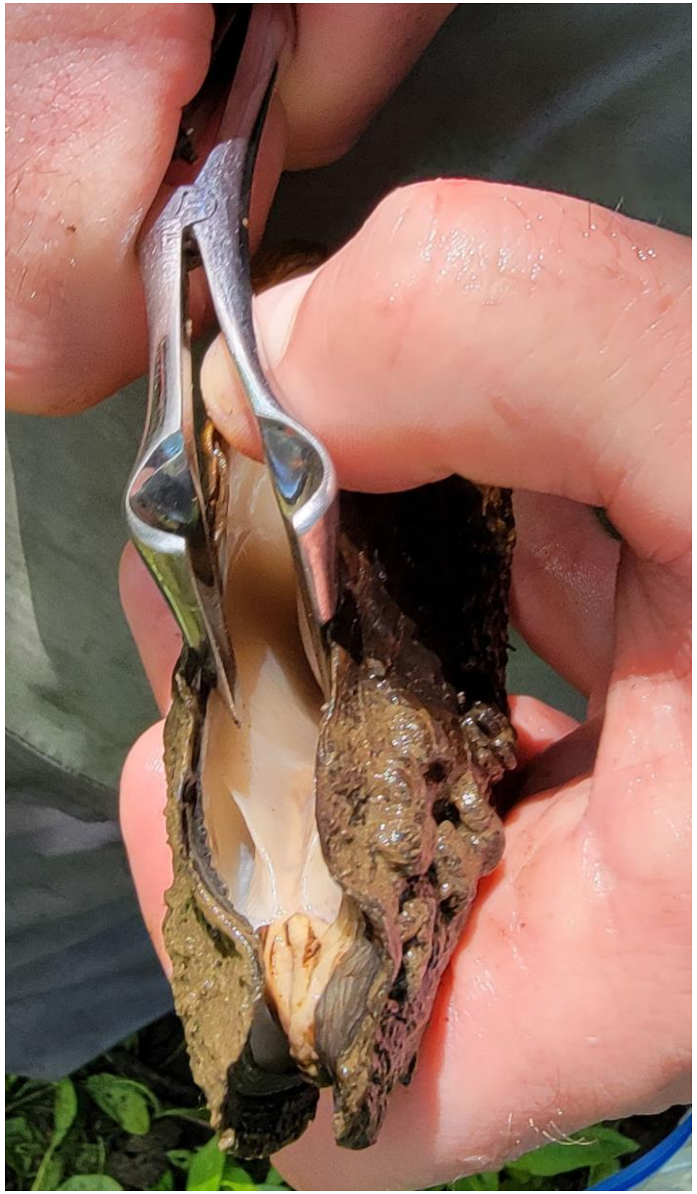
Pennsylvania
Department of Environmental Protection

Propagation of Salamander Mussels



Pennsylvania
Department of Environmental Protection

Propagation of Pistogrip Mussels



Pennsylvania
Department of Environmental Protection

Stocking of Mussels

Pennsylvania
Department of Environmental Protection

Stocking of Mussels

Photo credit Janell Howard (PFBC)

Pennsylvania Department of Environmental Protection

Stocking of Mussels

Pennsylvania
Department of Environmental Protection

Stocking of Mussels

Pennsylvania
Department of Environmental Protection

Rick Spear
Aquatic Biologist Supervisor
PA DEP SWRO Pittsburgh, PA
412-442-5874
rspear@pa.gov

WHITE SULPHUR SPRINGS NFH


WHITE SULPHUR SPRINGS
NATIONAL FISH HATCHERY
AQUATIC RESOURCE
RECOVERY CENTER

MUSSEL BUILDING

2019-2023 PRODUCTION

https://alleghenyriverstone.org/local-attractions/

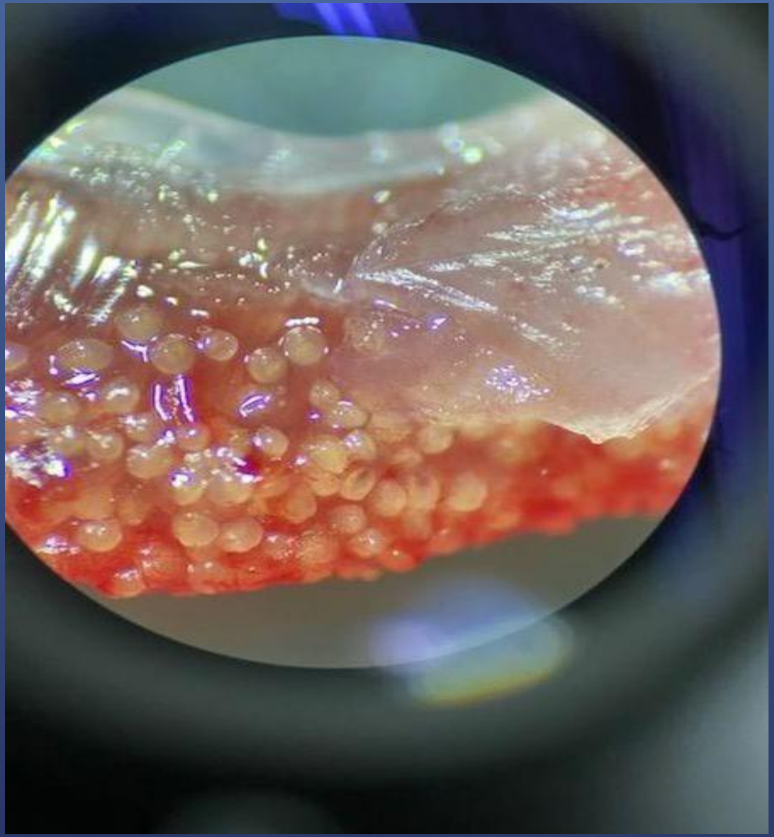
PROPAGATION FOR PENNSYLVANIA DEP

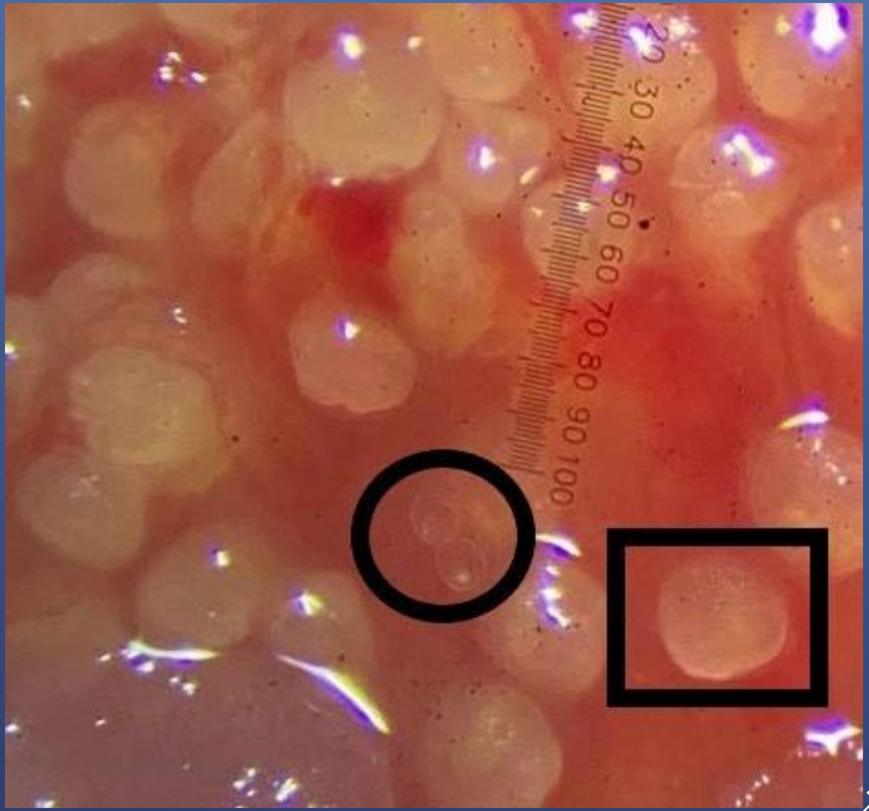
https://tpwd.texas.gov/huntwild/wild/wildlife_diversity/texas_nature_trackers/mussel/biology/

https://inaturalist.ca/taxa/112591-Simpsonaias-ambigua

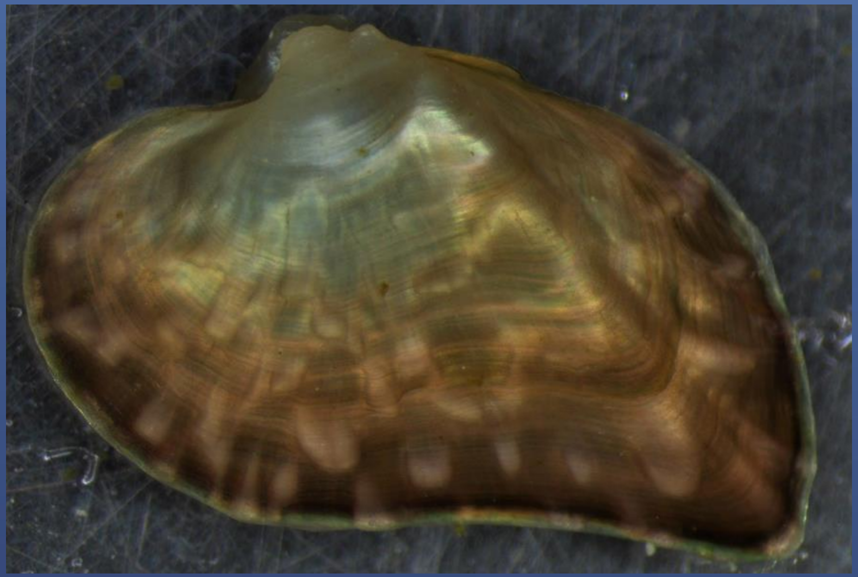
SPECIES PROPAGATED

Problems with Pistolgrip




20 30 40 50 60 70 80 90 100

PISTOLGRIP

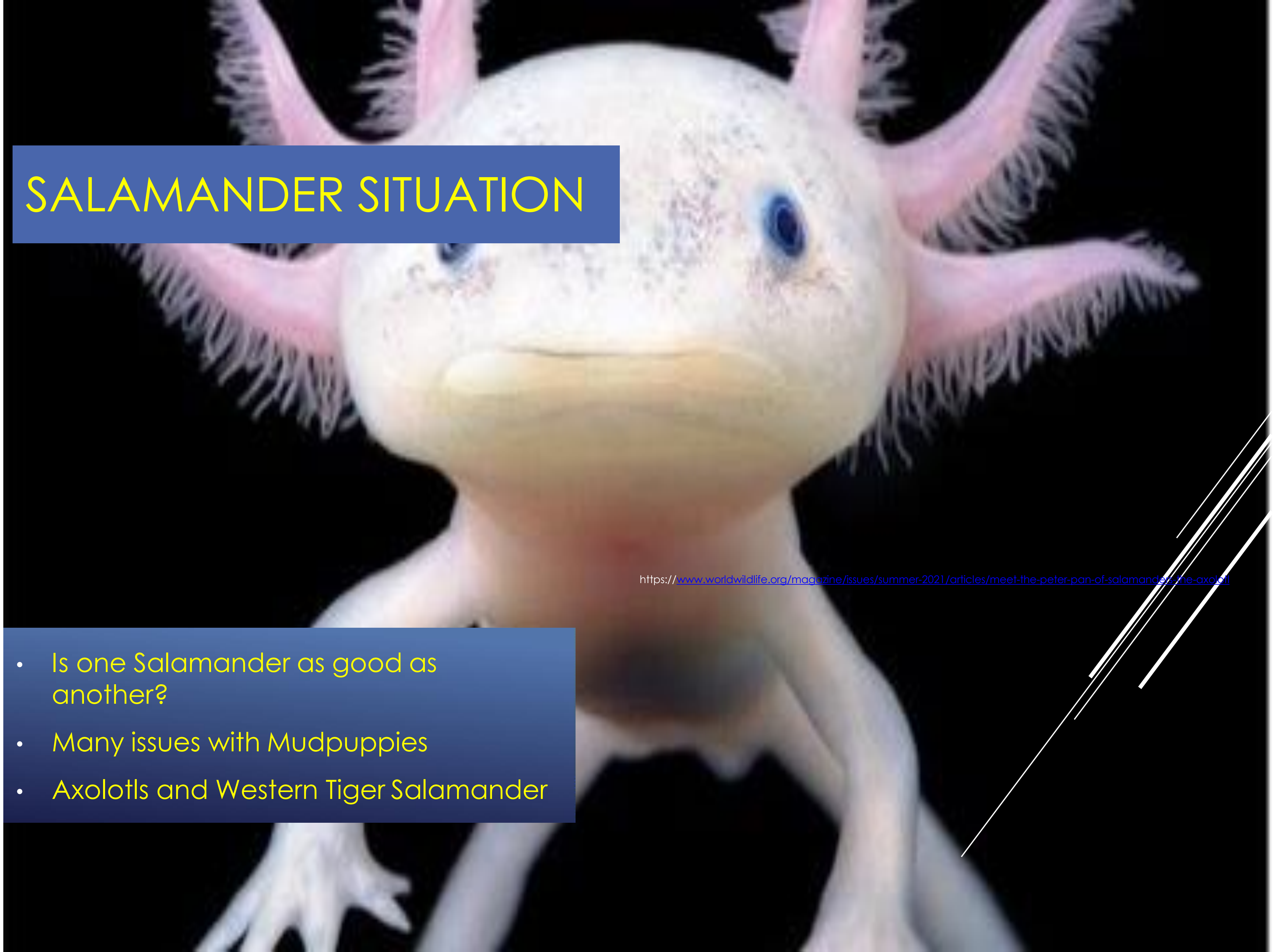


- Stocked ~1000 individuals in 2022
- ~25mm in October
- Stocked ~10,200 individuals in 2024
- Allegheny River, Dunkard Creek

2023 SUCCESS

- Broodstock Collected by PAFBC PADEP
- 8 gravid individuals
- ~6000 juveniles produced
- 93 Taggable Individuals Produced in 2023

SALAMANDER SITUATION



https://www.worldwildlife.org/magazine/issues/summer-2021/articles/meet-the-peter-pan-of-salamanders-the-axolotl

- Is one Salamander as good as another?
- Many issues with Mudpuppies
- Axolotls and Western Tiger Salamander



Species	Common Name	Year	Number Produced	Value
Lampsilis abrupta	Pink Mucket	2019	1103	77210
Obovaria subrotunda	Round Hickorynut	2019	2,049	102450
Lampsilis cardium	Plain Pocketbook	2019	1,933	57990
Lampsilis siliquoidea	Fat Mucket	2023	4,500	135000
Simpsonaias ambigua	Salamander Mussel	2023	93	19760.64
Tritogonia verrucosa	Pistolgrip	2022	1,000	129300
Tritogonia verrucosa	Pistolgrip	2024	10,200	1318860
			20,878	1,840,570.64

ROUND HICKORYNUT

- 2 host species confirmed
- Possible that host fish differ by drainage
- Culture slowly
- Stocked 129 individuals Ohio River Islands NWR

FOOD COLOR TREATMENT

Control

Red

Blue

Purple

Orange

Group

FUTURE WORK

- P. clava, E. rangiana
  - Develop Host and Propagation Methods for Clava
  - Cooperation with PAFO PAFBC
  - Animals to be stocked throughout Ohio

RESEARCH

- Tagging Study
- Food Studies
- Host Fish Production
- Graduate Students

PARTNERS

- PADEP
- PFBC
- Normandeau Associates, Inc

QUESTIONS AND COMMENTS

Agenda Item 9:
Long-Term Water Quality Trends in Indiana Streams

Jessica Weir, IDEM

Long Term Water Quality Trends in Indiana:

Trends in Concentrations of Nutrients, Metals, and Ions in Indiana Streams 2011-2020

Jit Weir, PhD
Technical Environmental Specialist
Indiana Department of Environmental Management

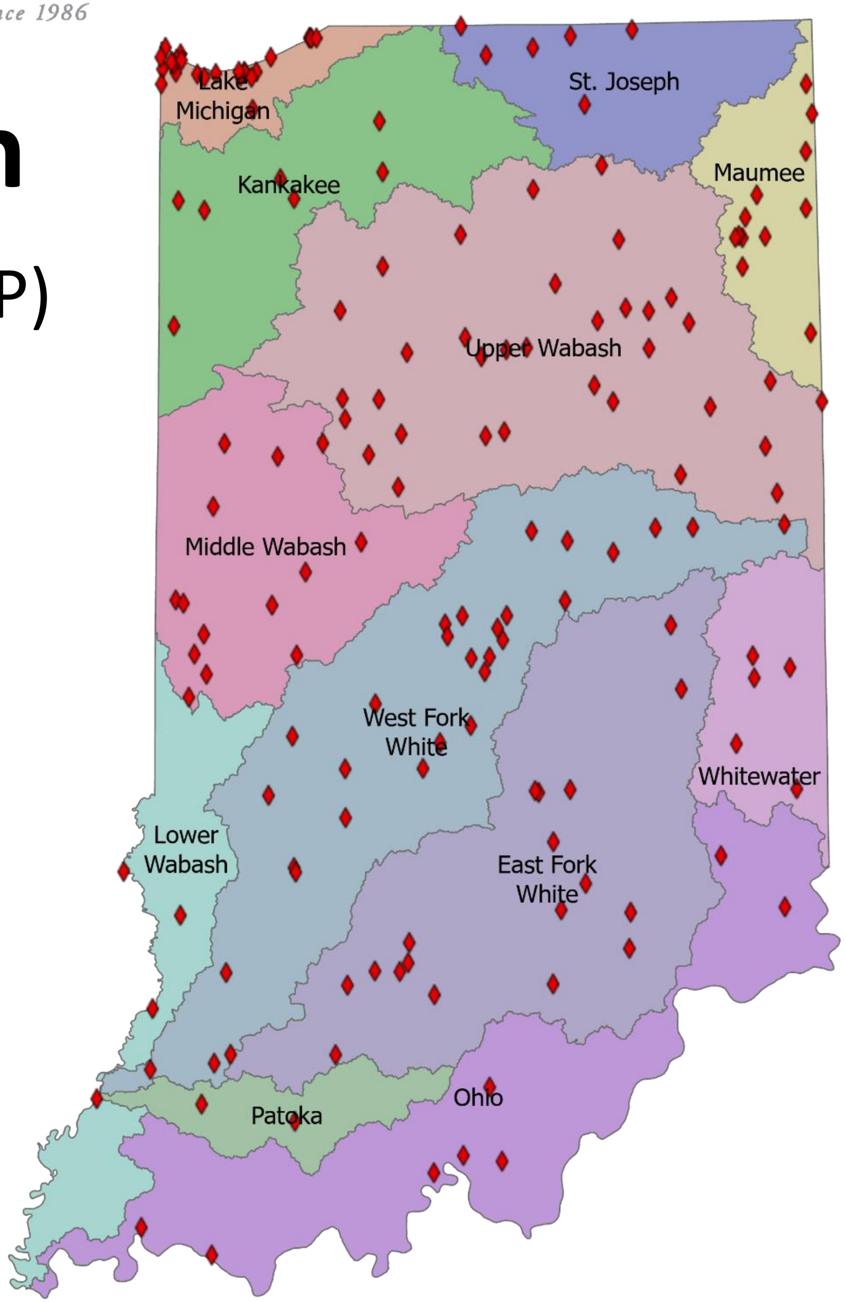
ORSANCO Technical Committee Meeting, Charleston, WV
October 8-9, 2024

Introduction

Fixed Station Monitoring Program (FSMP)

- Began in 1957
- Water samples collected monthly
- 165 sites

Bridge sampling device



Introduction – FSMP data use

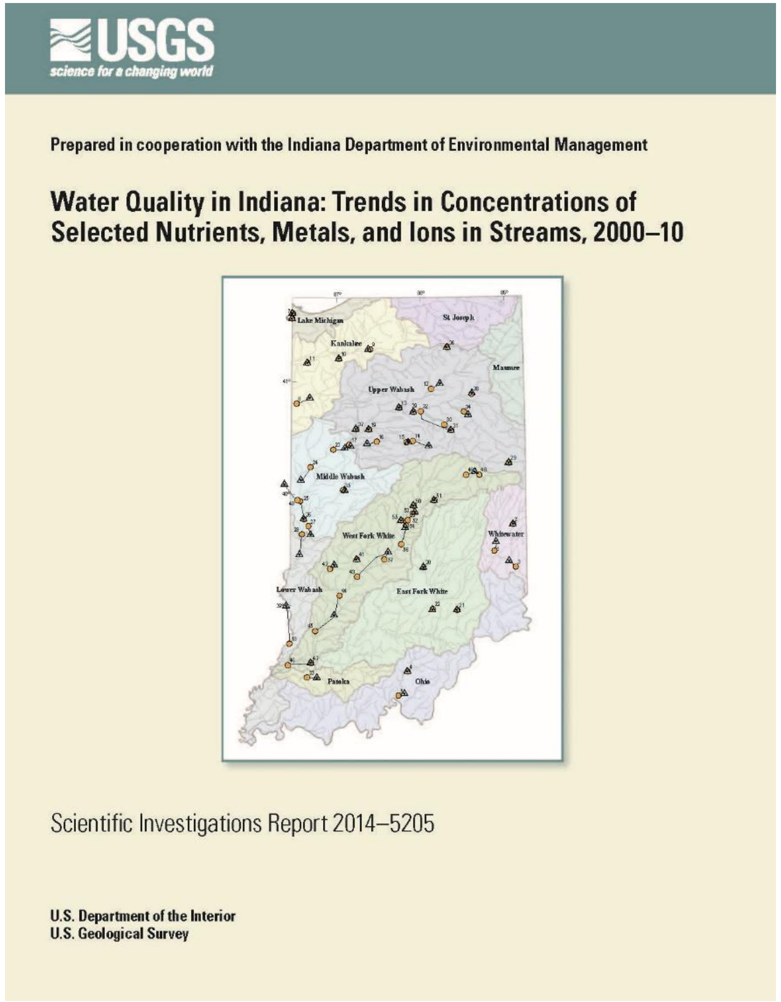
Waste load allocation models

Designated use assessments

- Define water quality goals for waterbodies

Water quality trends

- USGS study 2000-2010


USGS
science for a changing world

Prepared in cooperation with the Indiana Department of Environmental Management

Water Quality in Indiana: Trends in Concentrations of Selected Nutrients, Metals, and Ions in Streams, 2000–10

Scientific Investigations Report 2014–5205

U.S. Department of the Interior
U.S. Geological Survey

Methods

R-QWTREND package (Vecchia & Nustad, 2020):

- Variability in streamflow impacts measured concentration
- Co-located with a USGS streamgage

Limitations:

- Time period (10 years)
- Completeness of samples
- Sensitivity of lab analyses (non-detects)

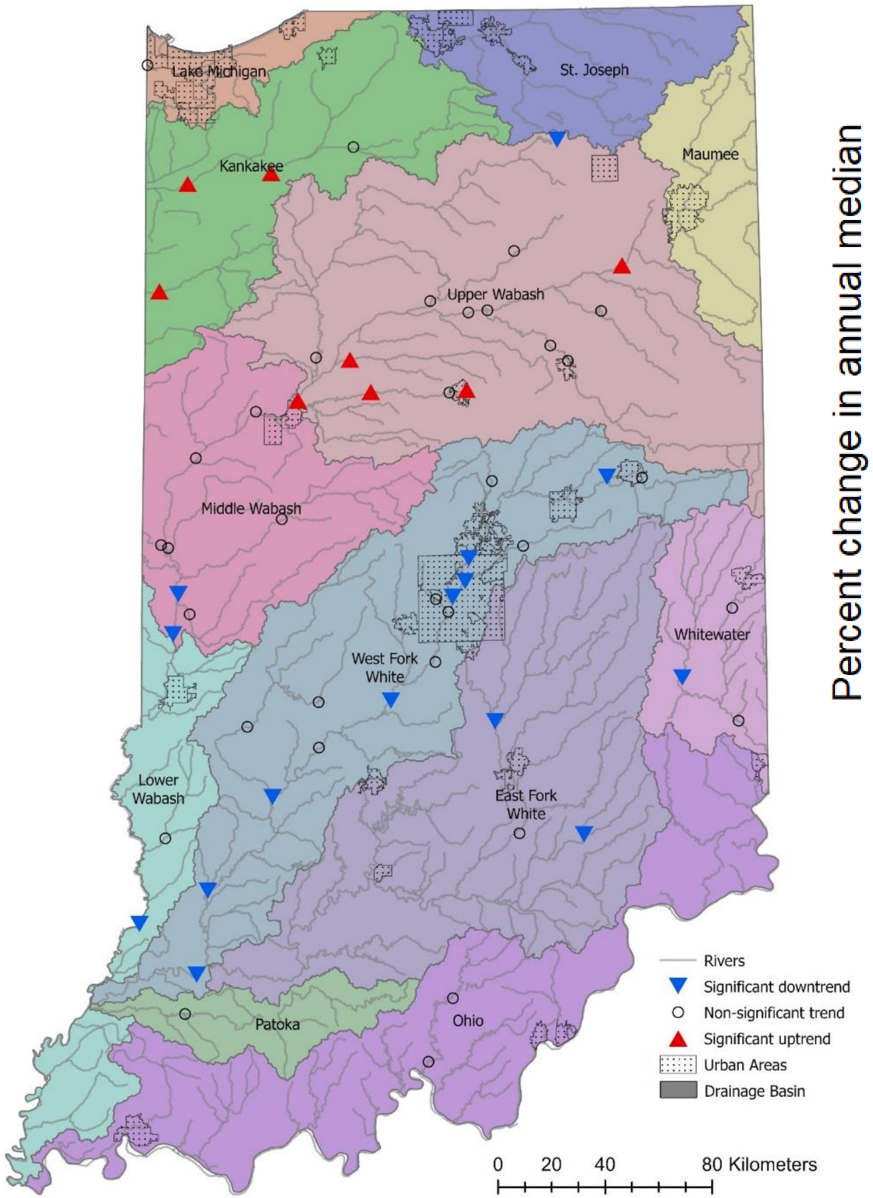
USGS Streamgage

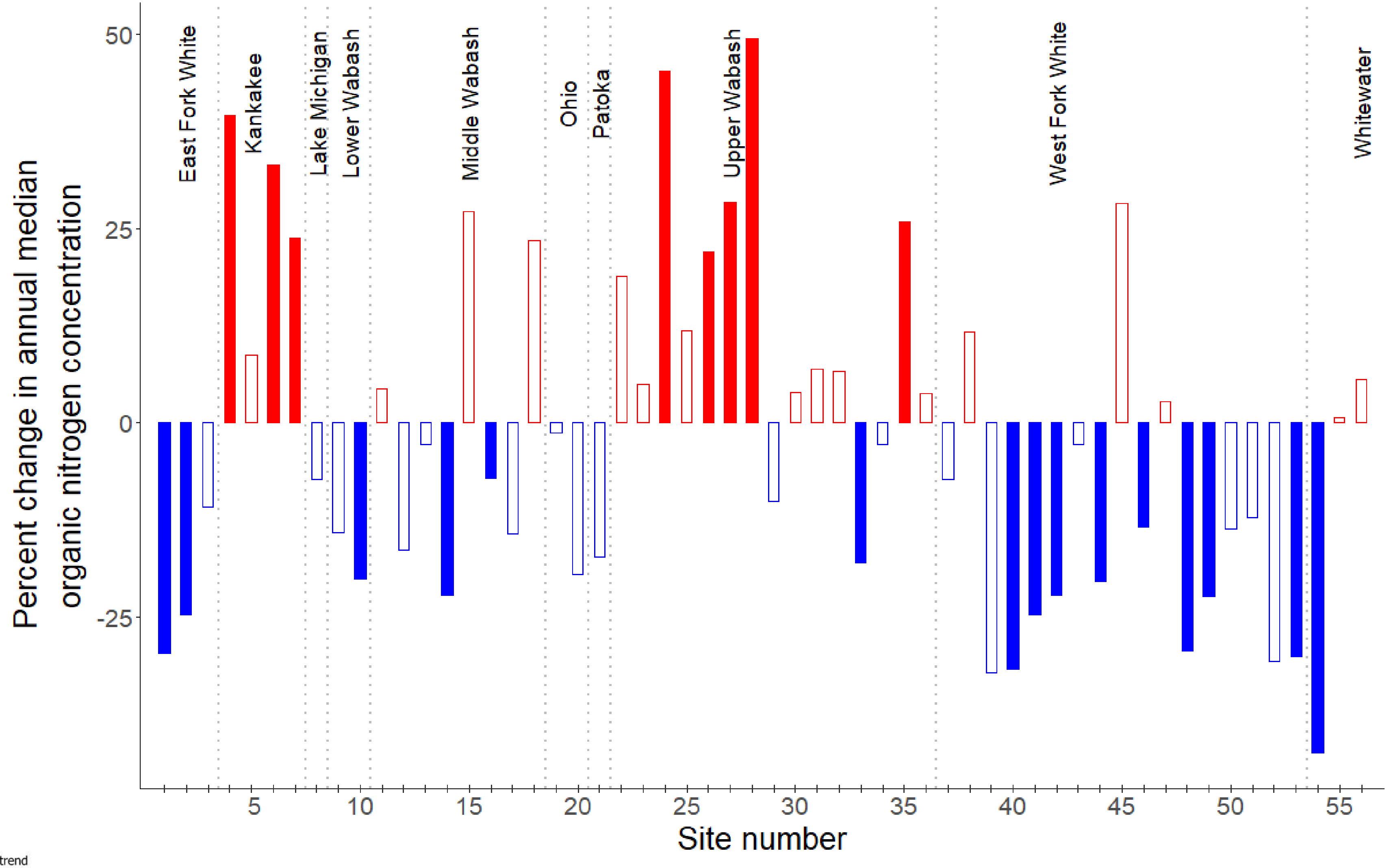
Methods

- 56 sites
- 12 contaminants
  - **Nutrients:** Nitrate, organic nitrogen, phosphorus, and total suspended solids
  - **Ions:** Chloride, sulfate, hardness, and total dissolved solids
  - **Metals:** Lead, iron, copper, and zinc
- 8,530 stream samples
- 672 trend analyses

IDEM staff Joel Armstrong manages water samples at a fixed station site.

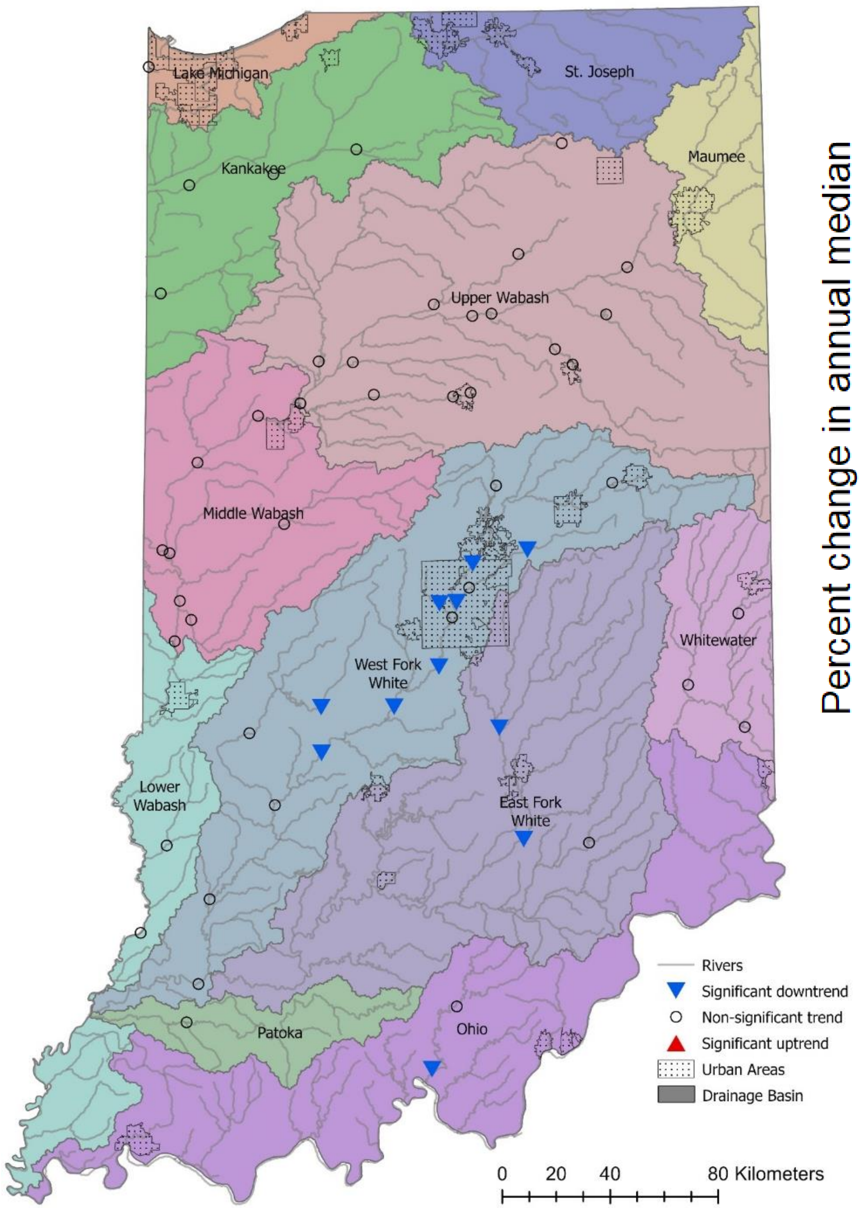
Organic nitrogen

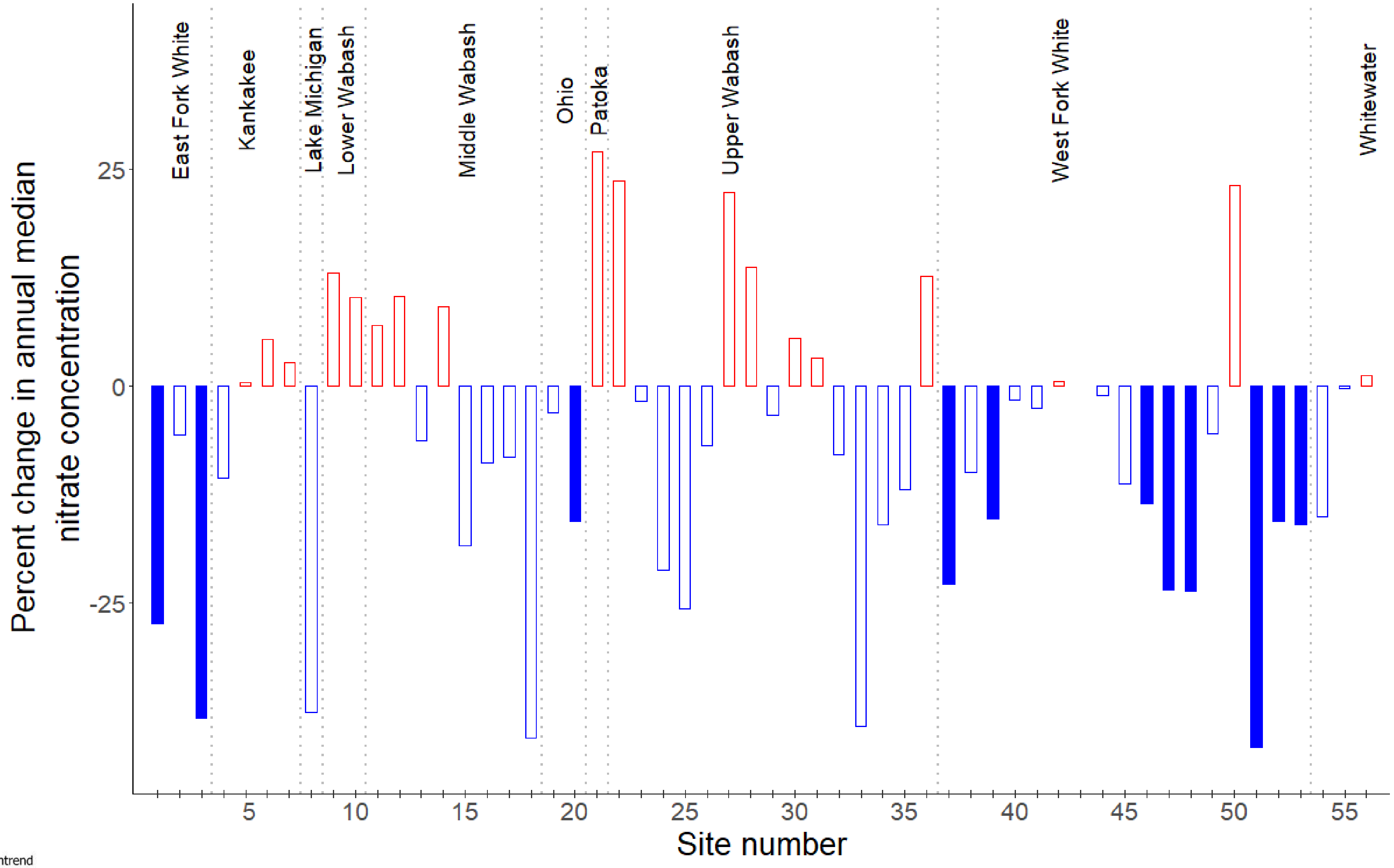




- Organic nitrogen declined at 15 sites – Southern
- Increases at 8 sites – Northern

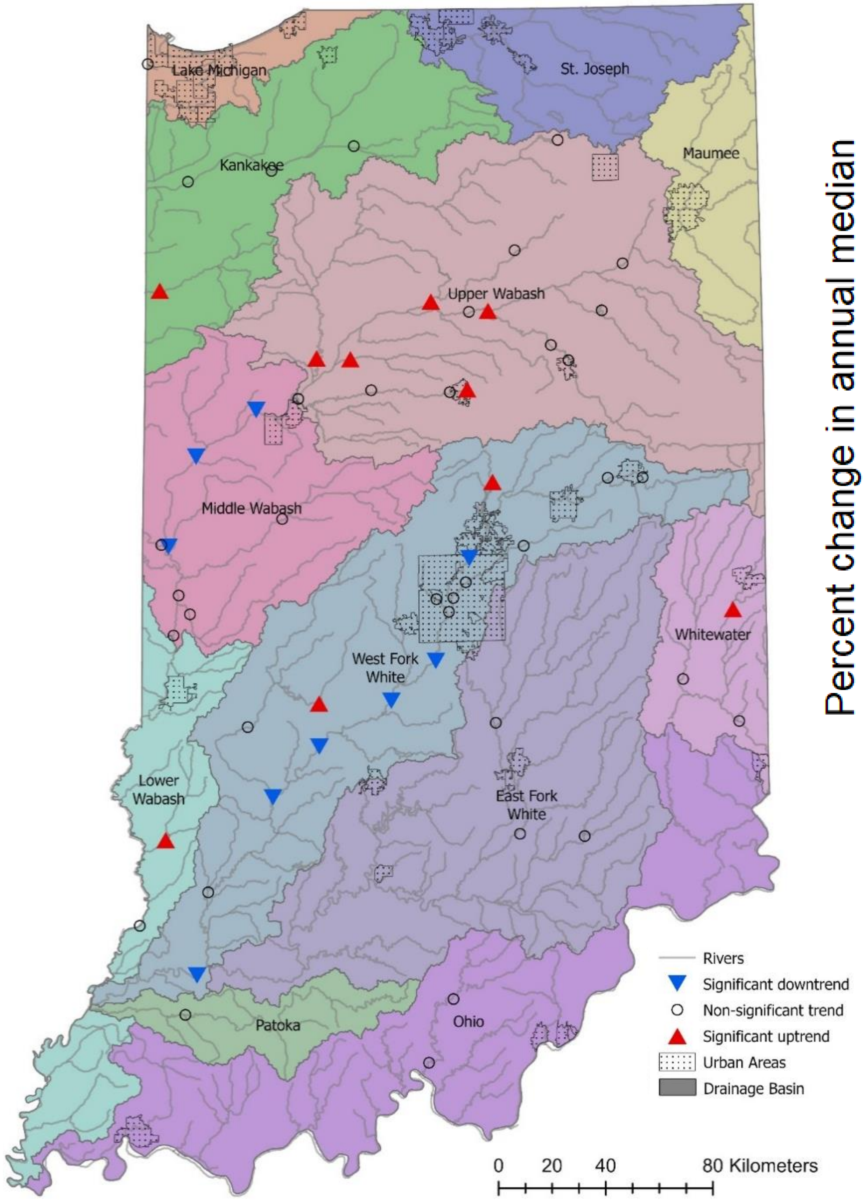
Nitrate

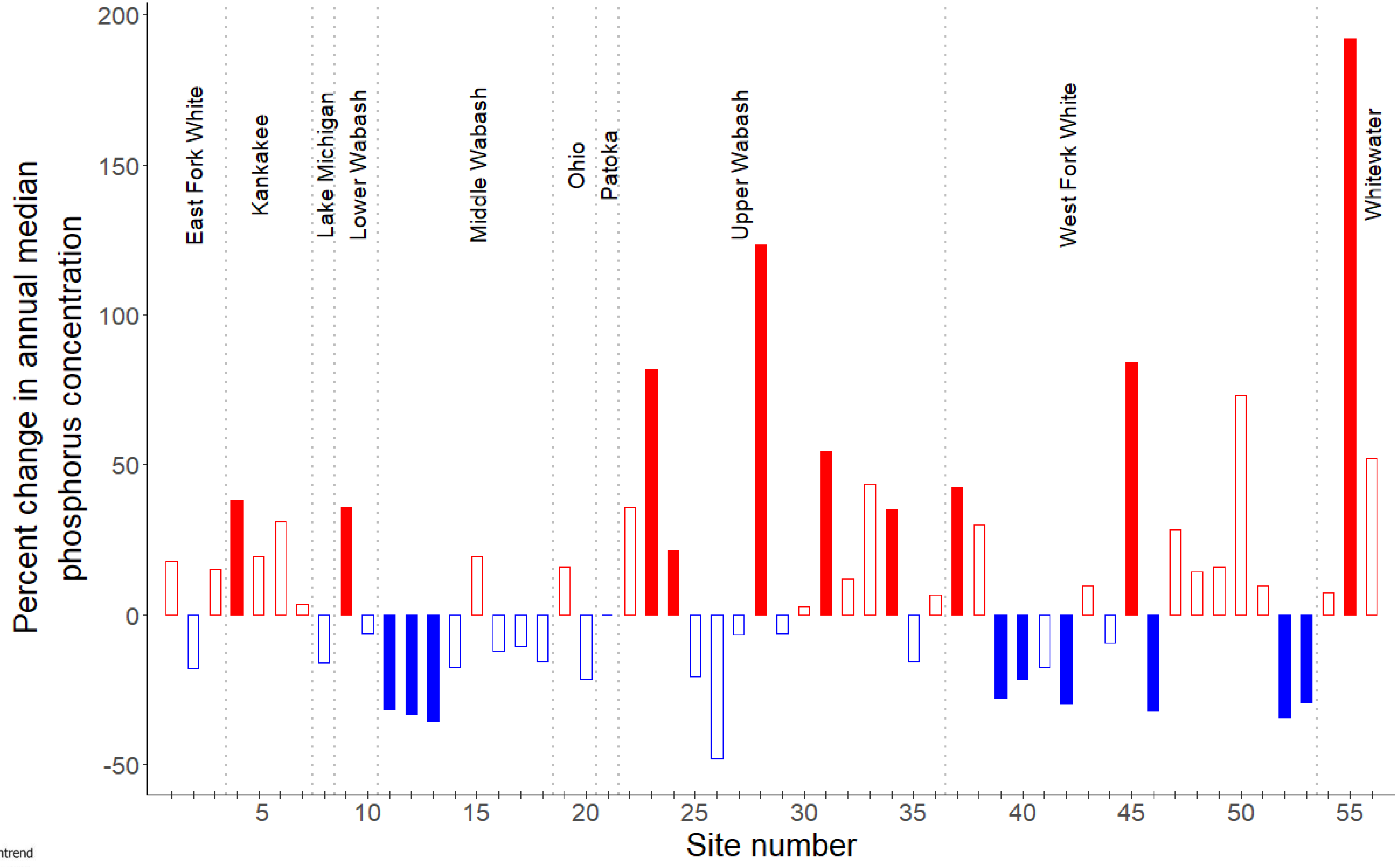




- Nitrate (nitrate + nitrite) has significantly declined; many sites in the West Fork White River Basin

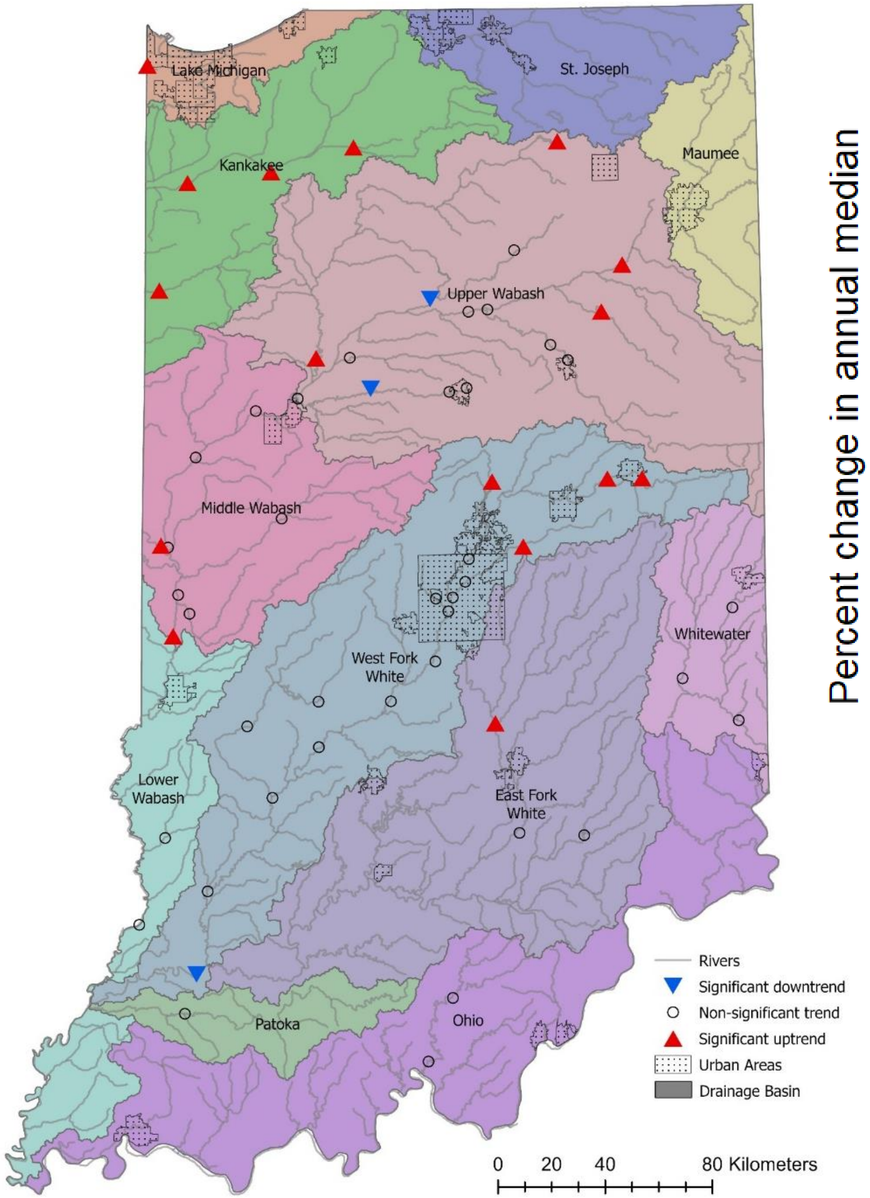
Phosphorus

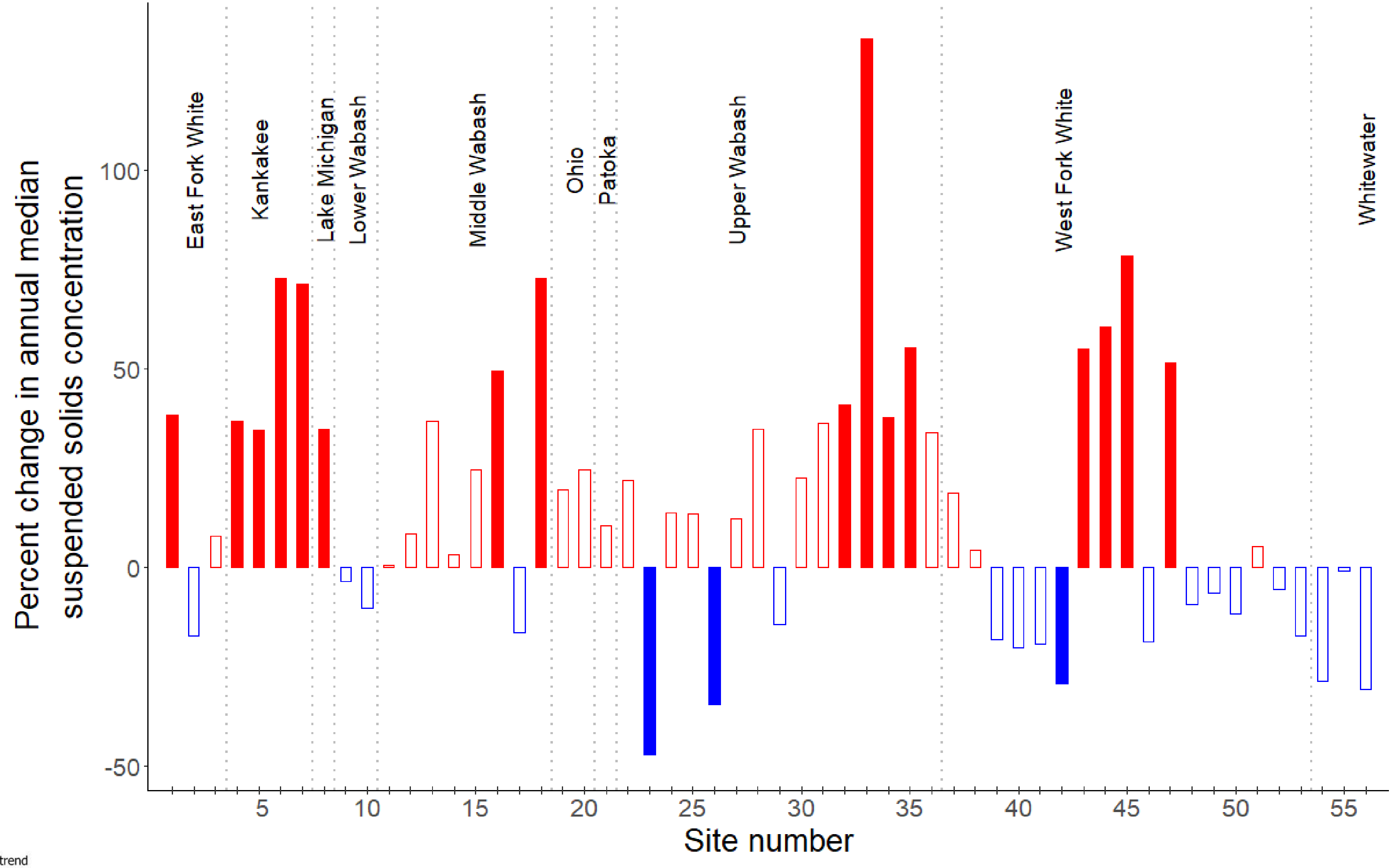




- Phosphorus declined at 9 sites across the state
- Increases seen at 10 sites

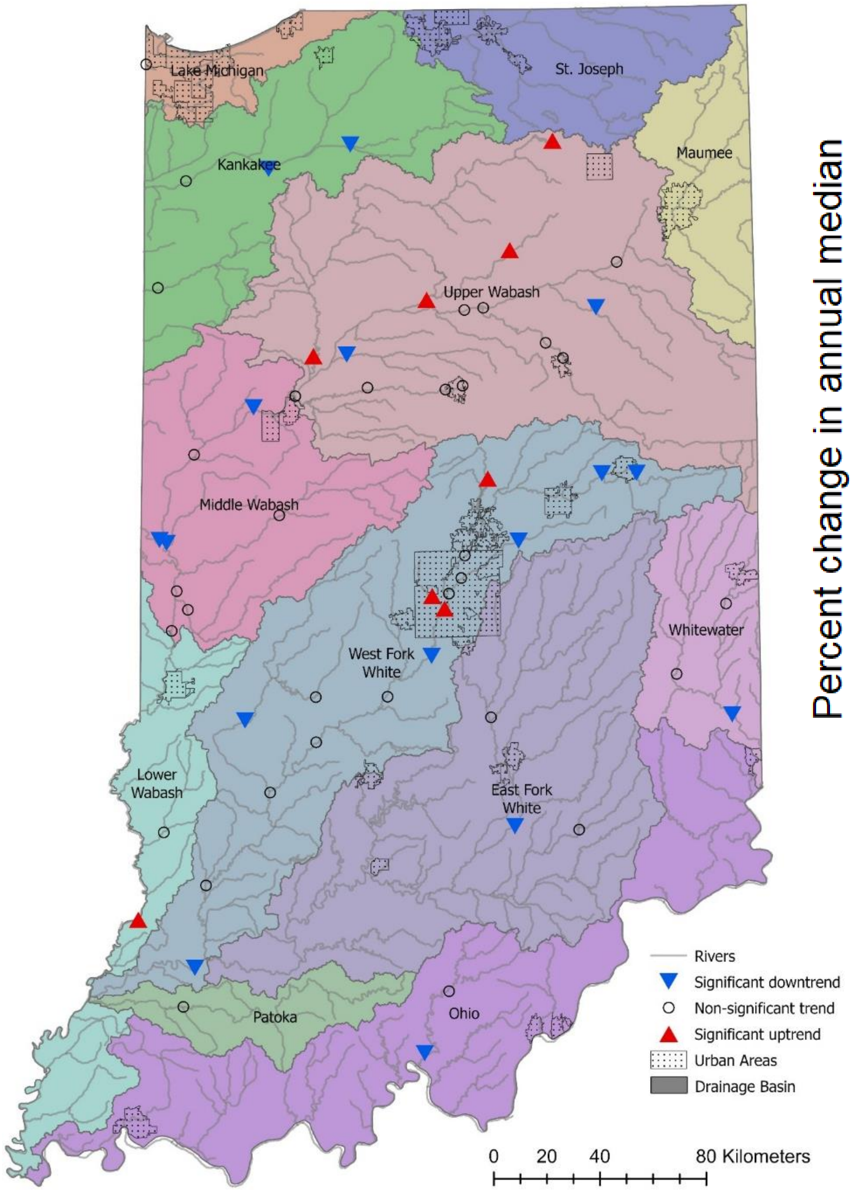
Suspended solids

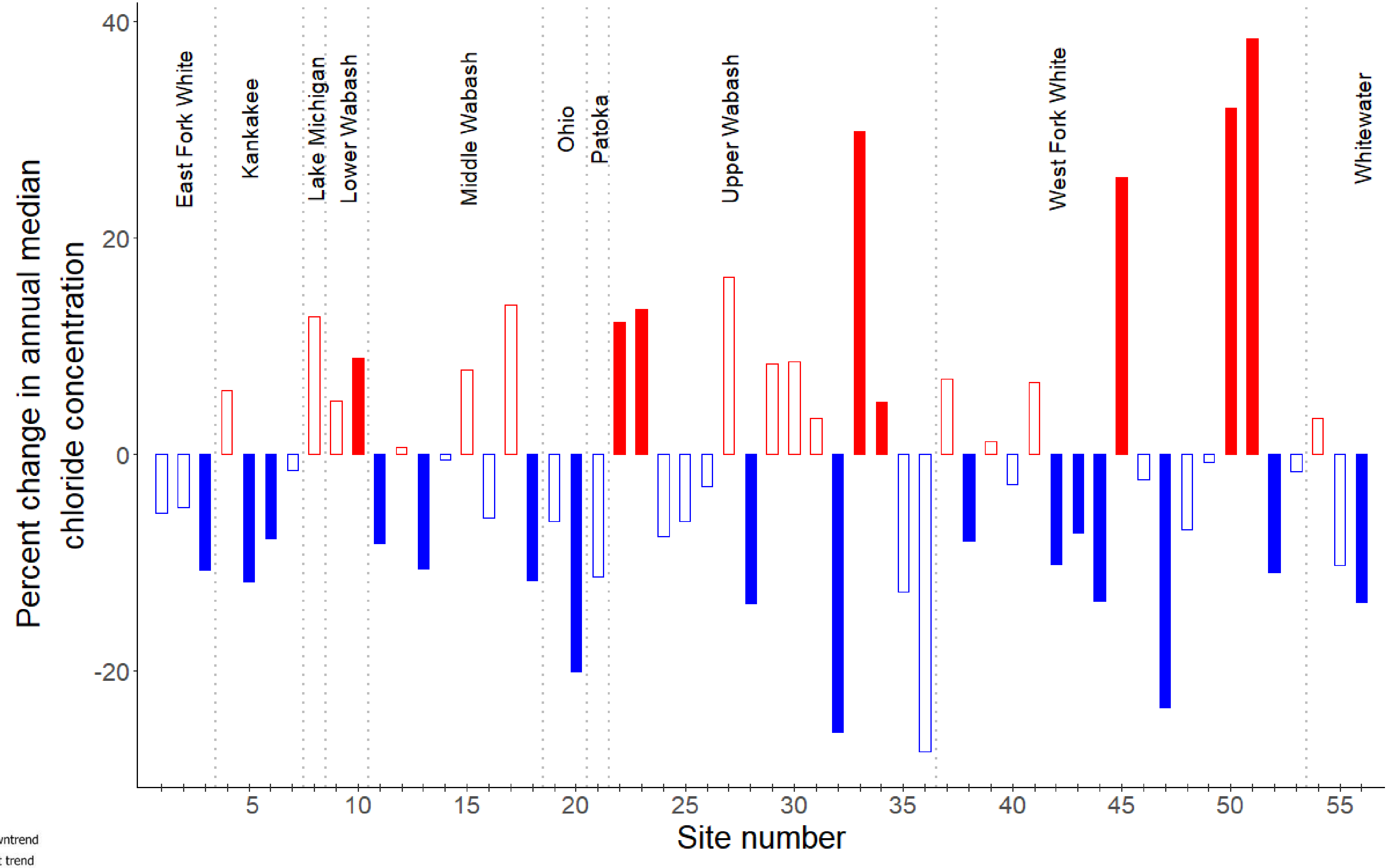




- Suspended solids declined in 3 sites
- Significant increases seen at 16 sites

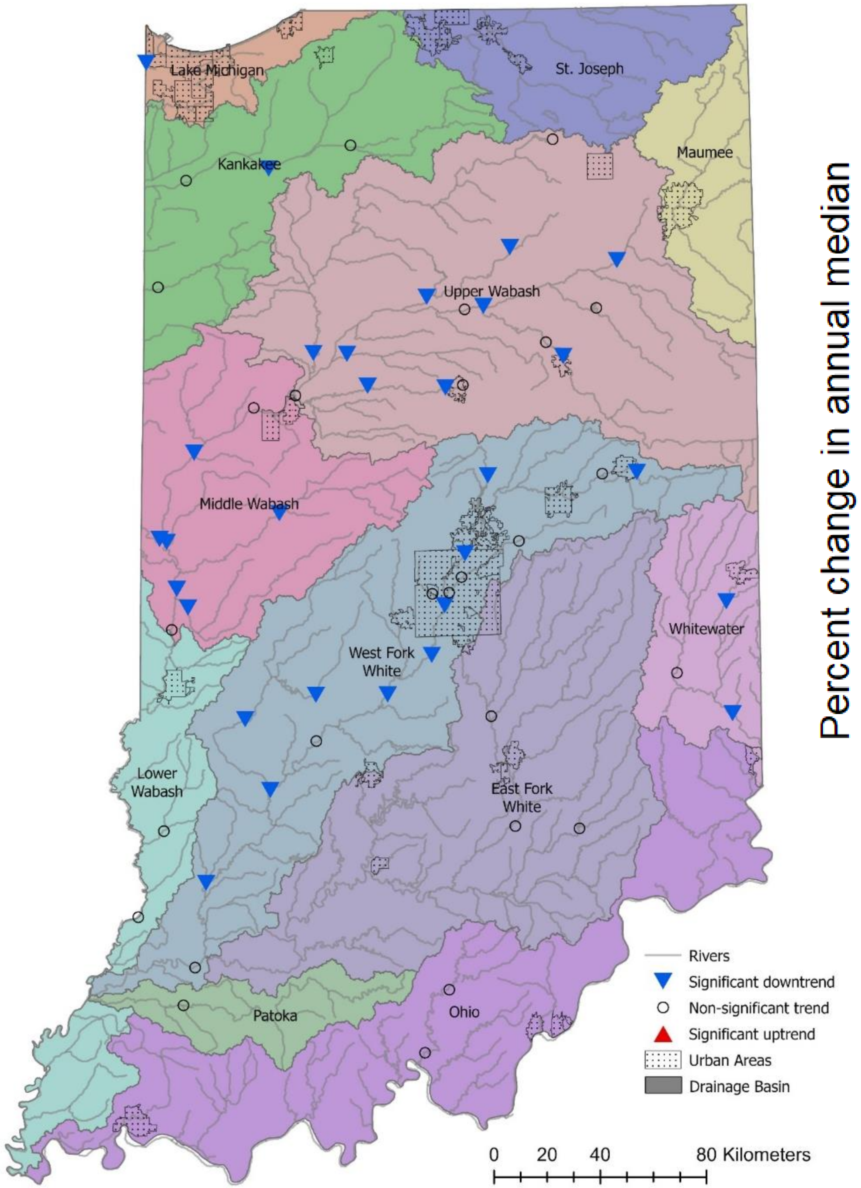
Chloride

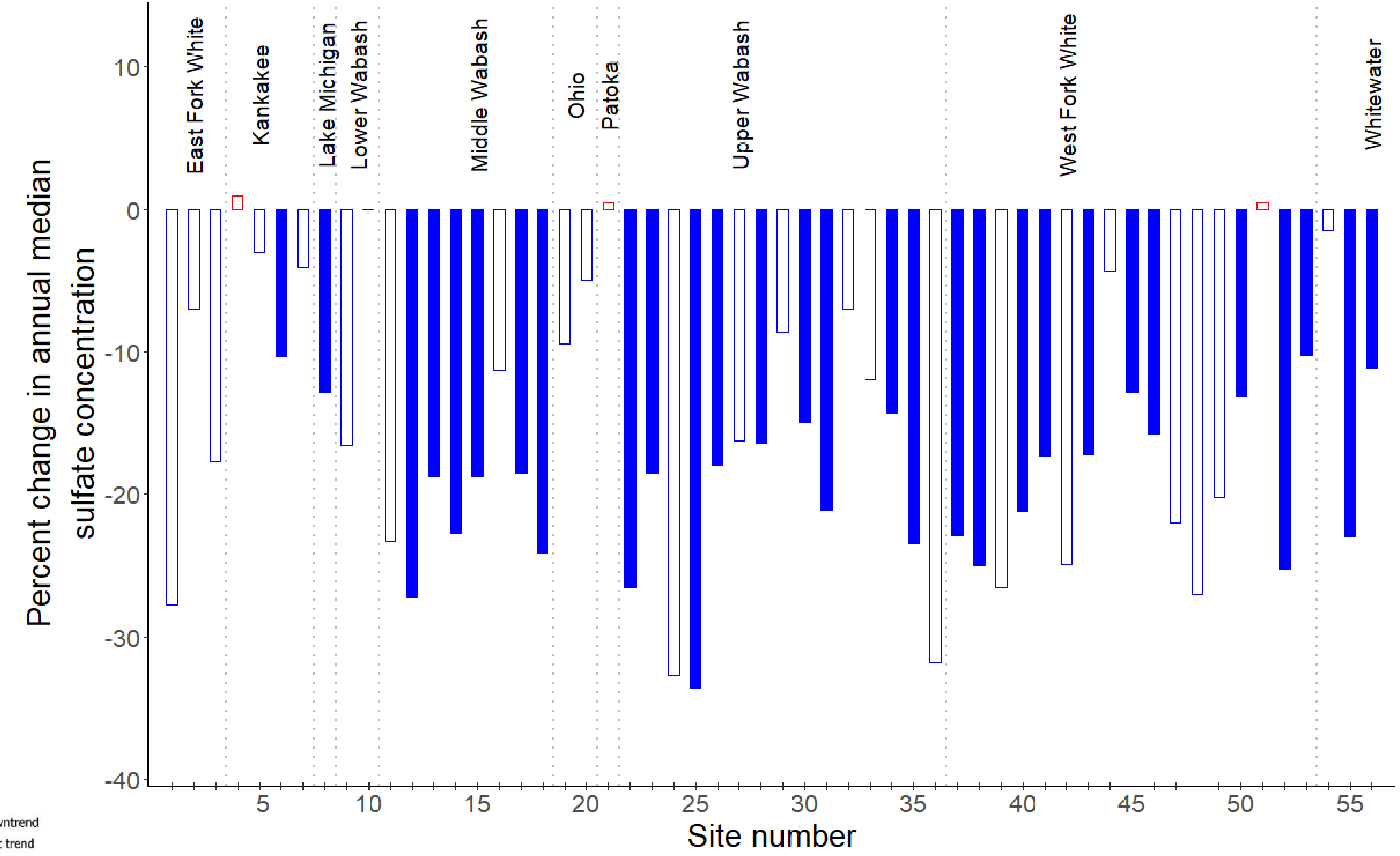




- 8 sites with significant increase in chloride; 4 in the Upper Wabash
- 16 sites with significant declines in chloride across the state

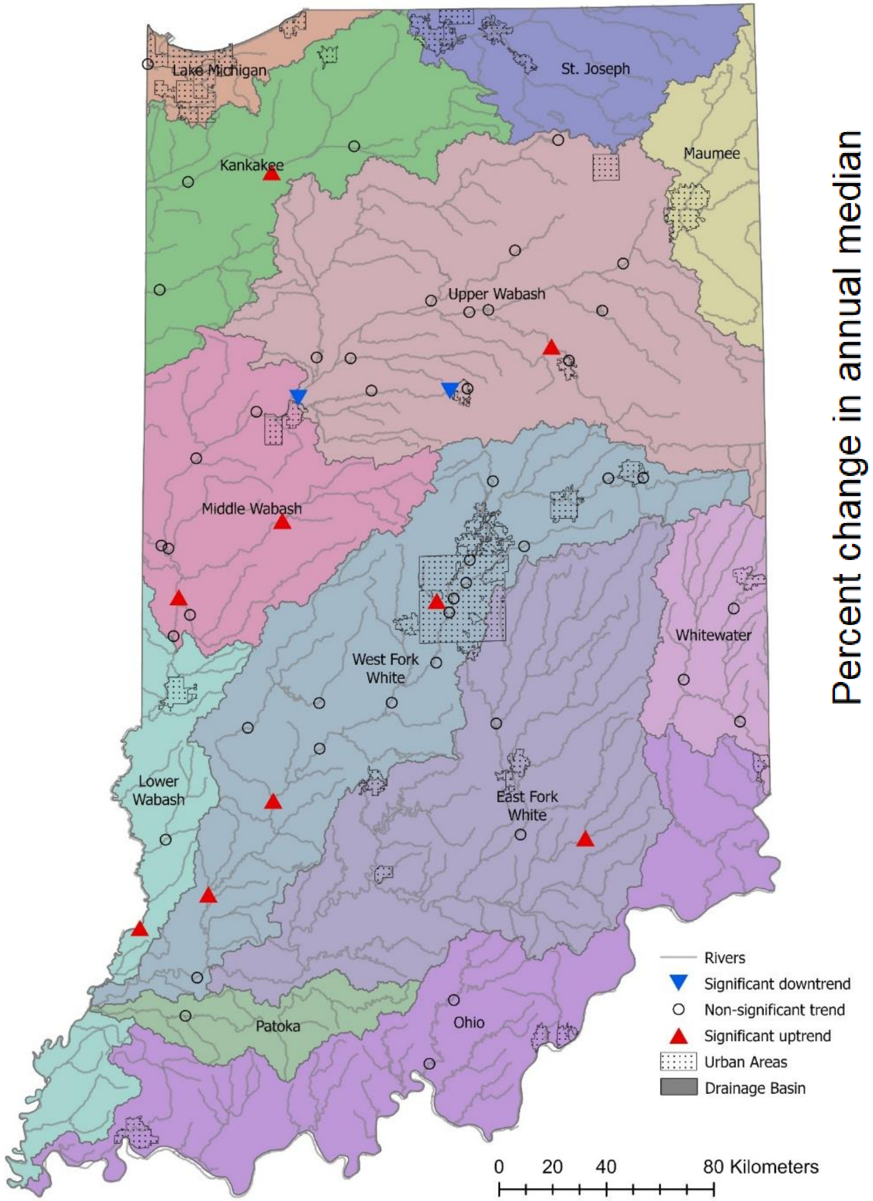
Sulfate

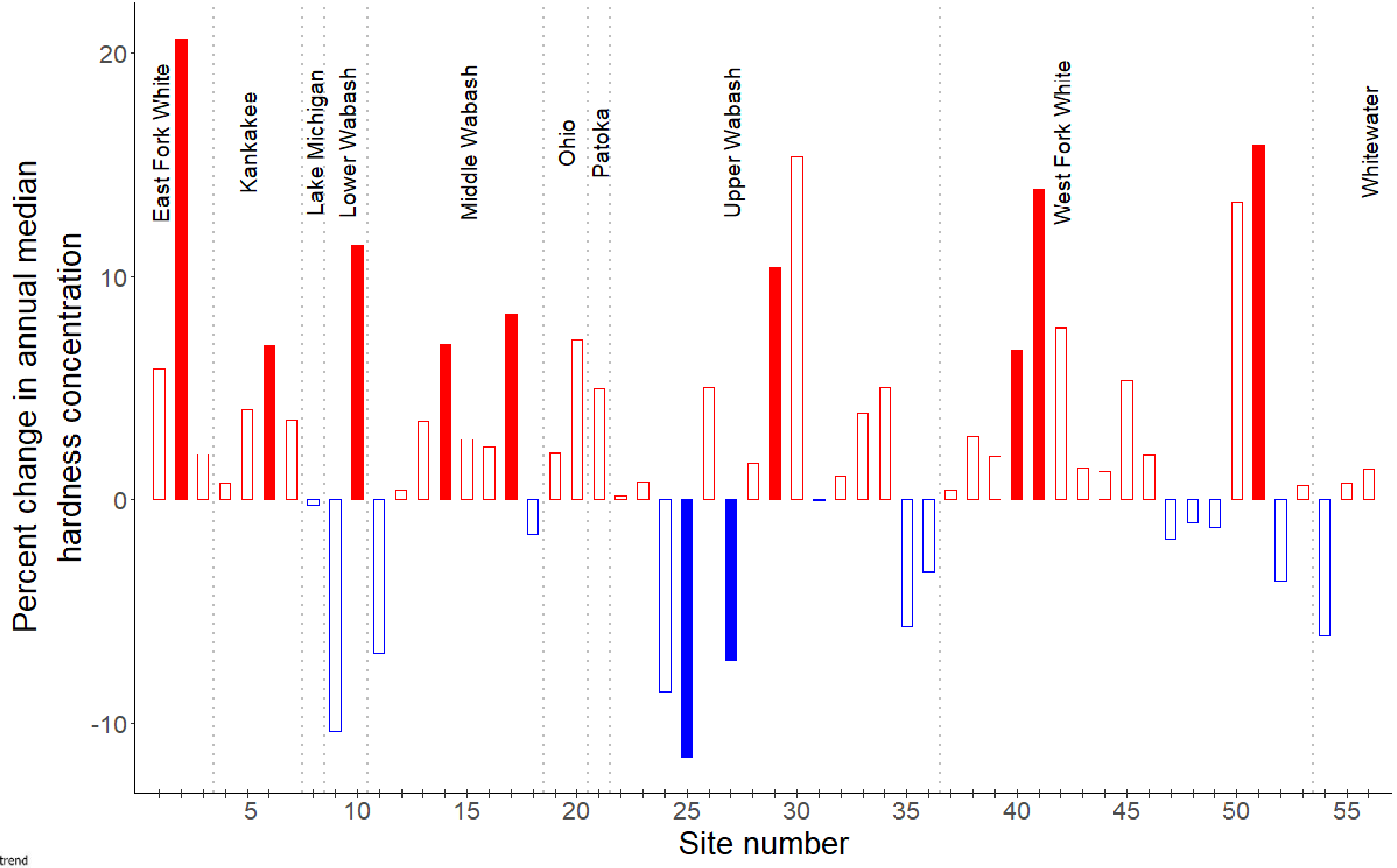




- Sites across the state with significant declines in sulfate concentration

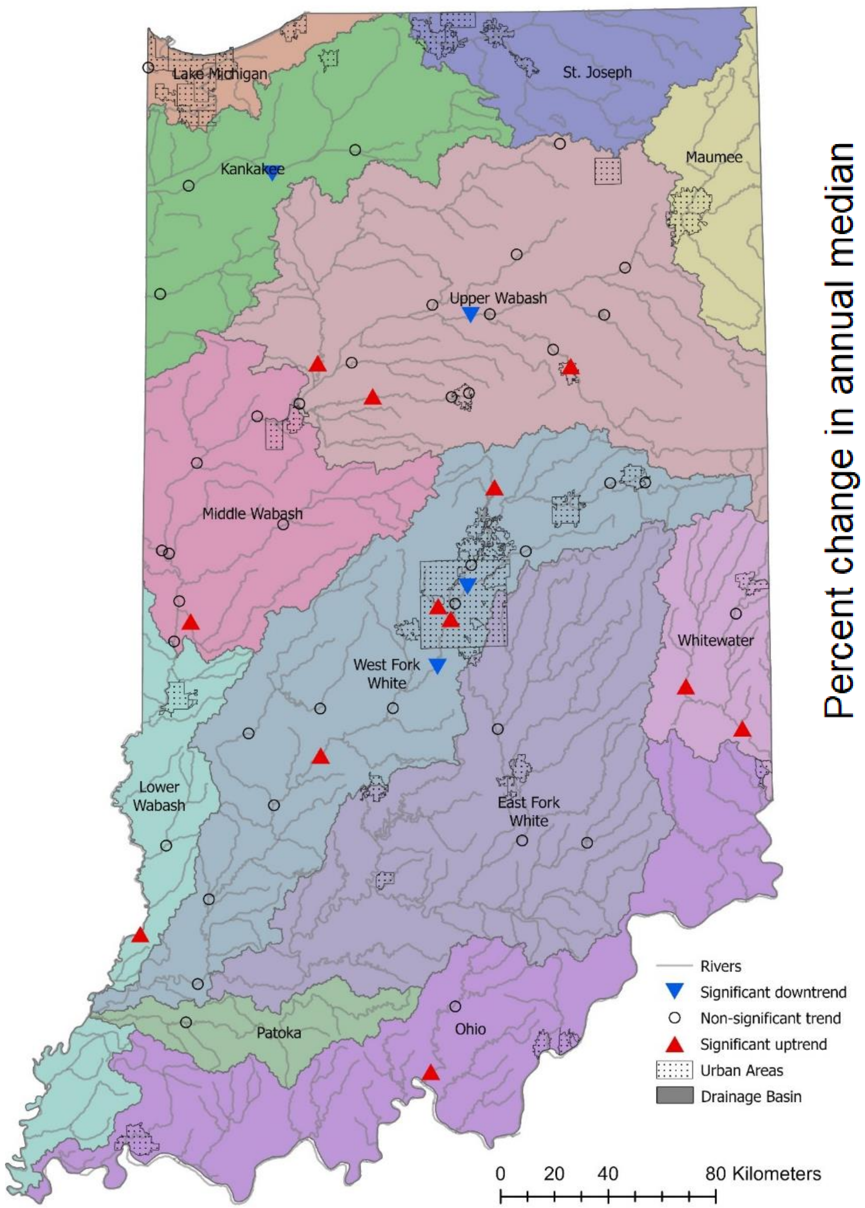
Hardness

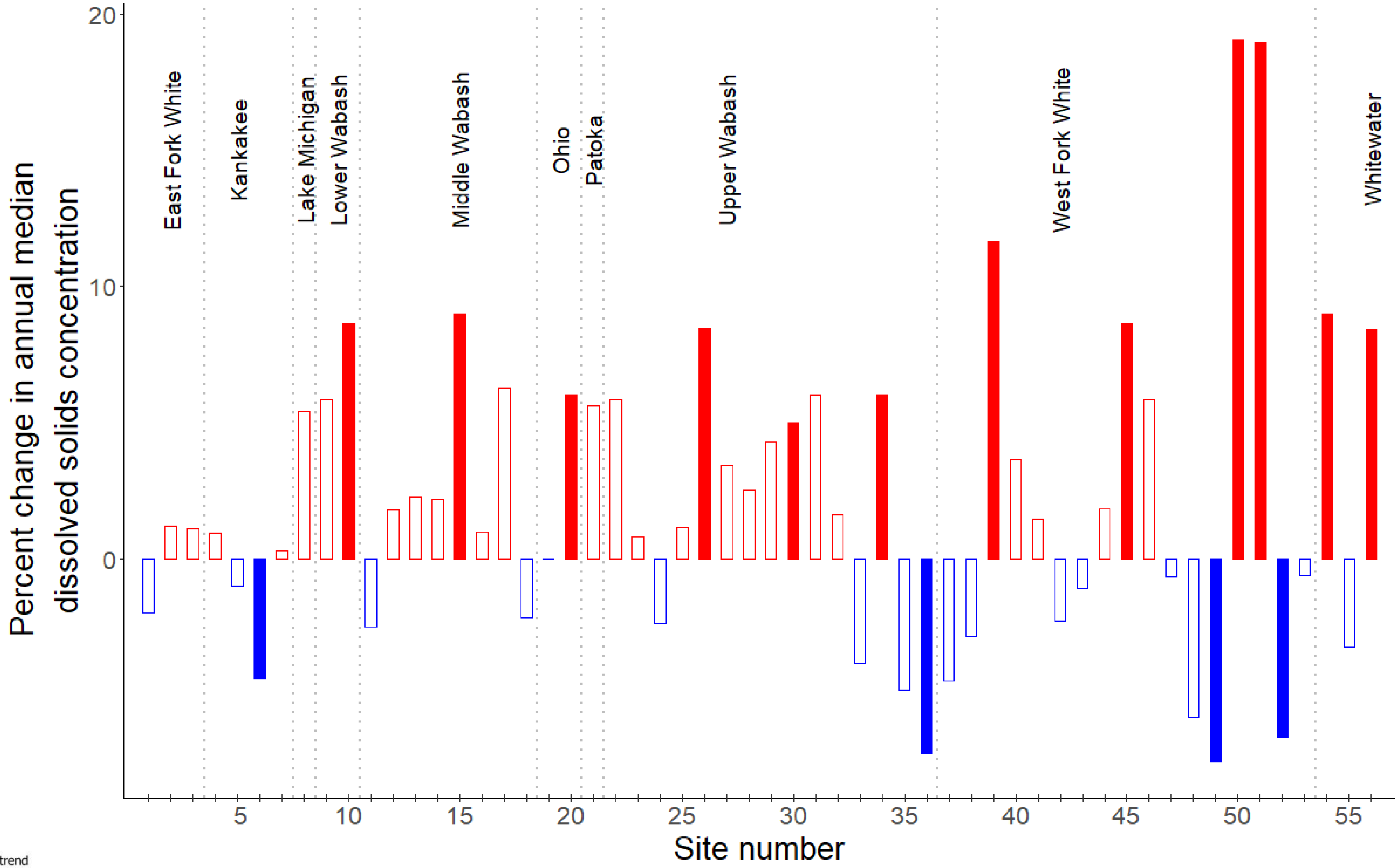




- 9 sites with significant increase in hardness across the state
- 2 sites with significant declines in the Upper Wabash

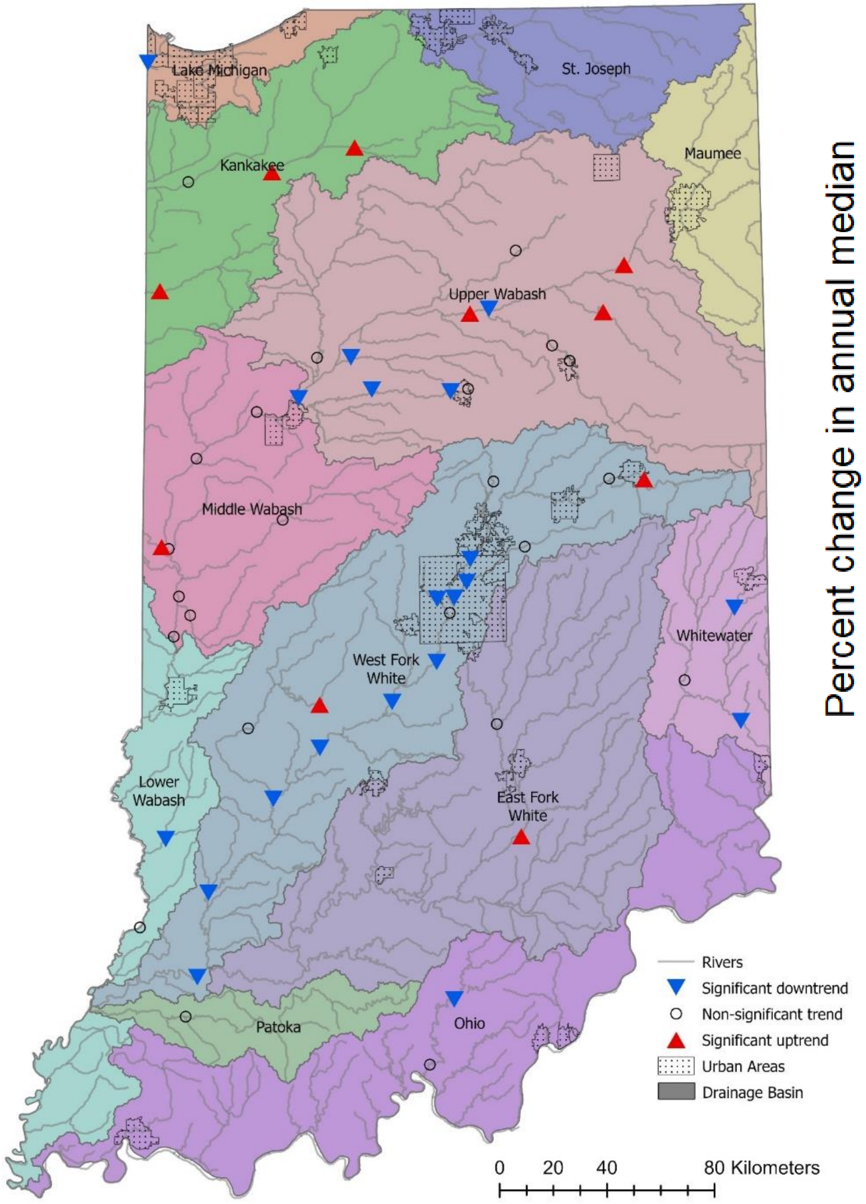
Dissolved solids

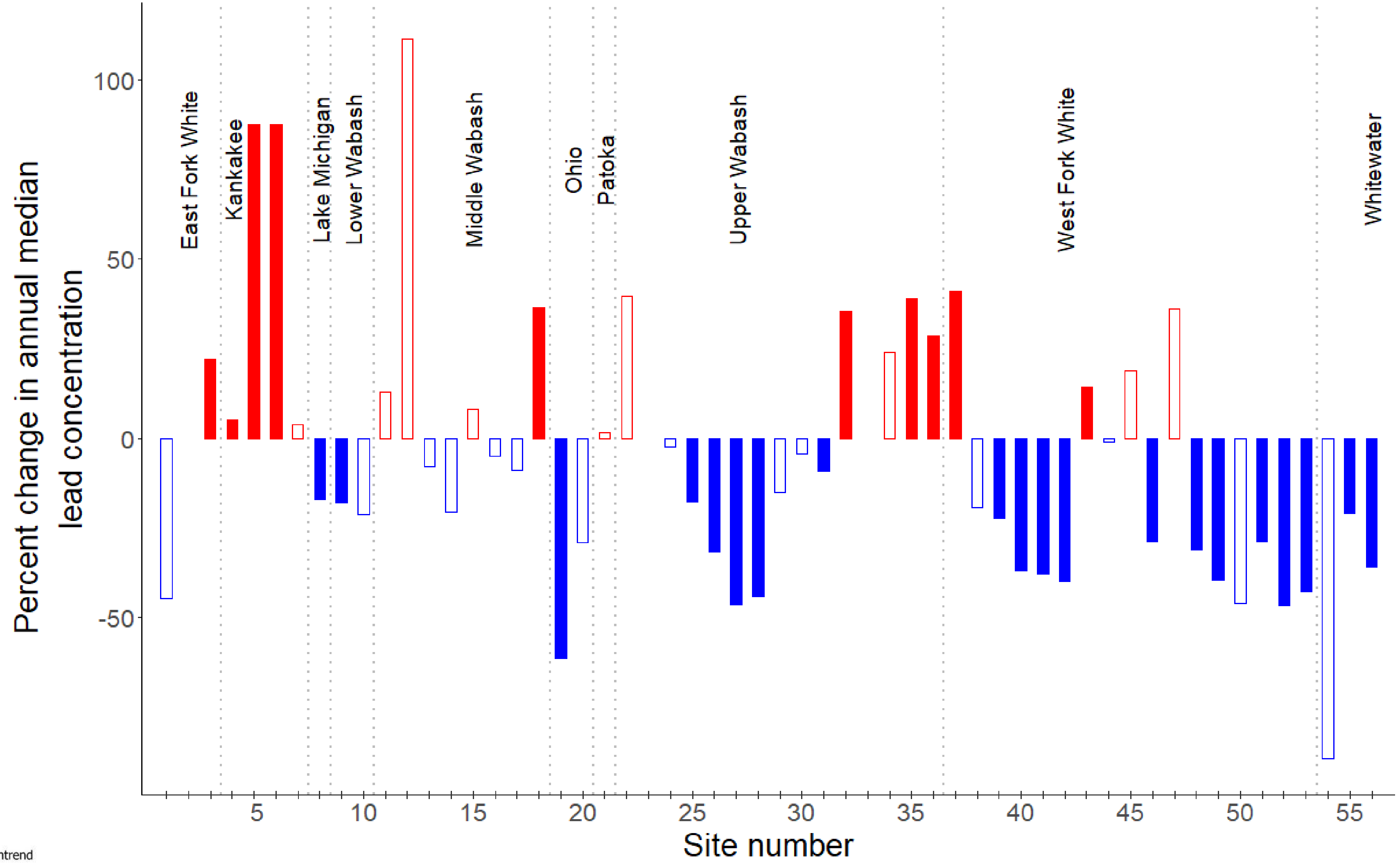




- Dissolved solids increased significantly in 12 sites across the state.
- Significant declines observed in 4 sites across the state

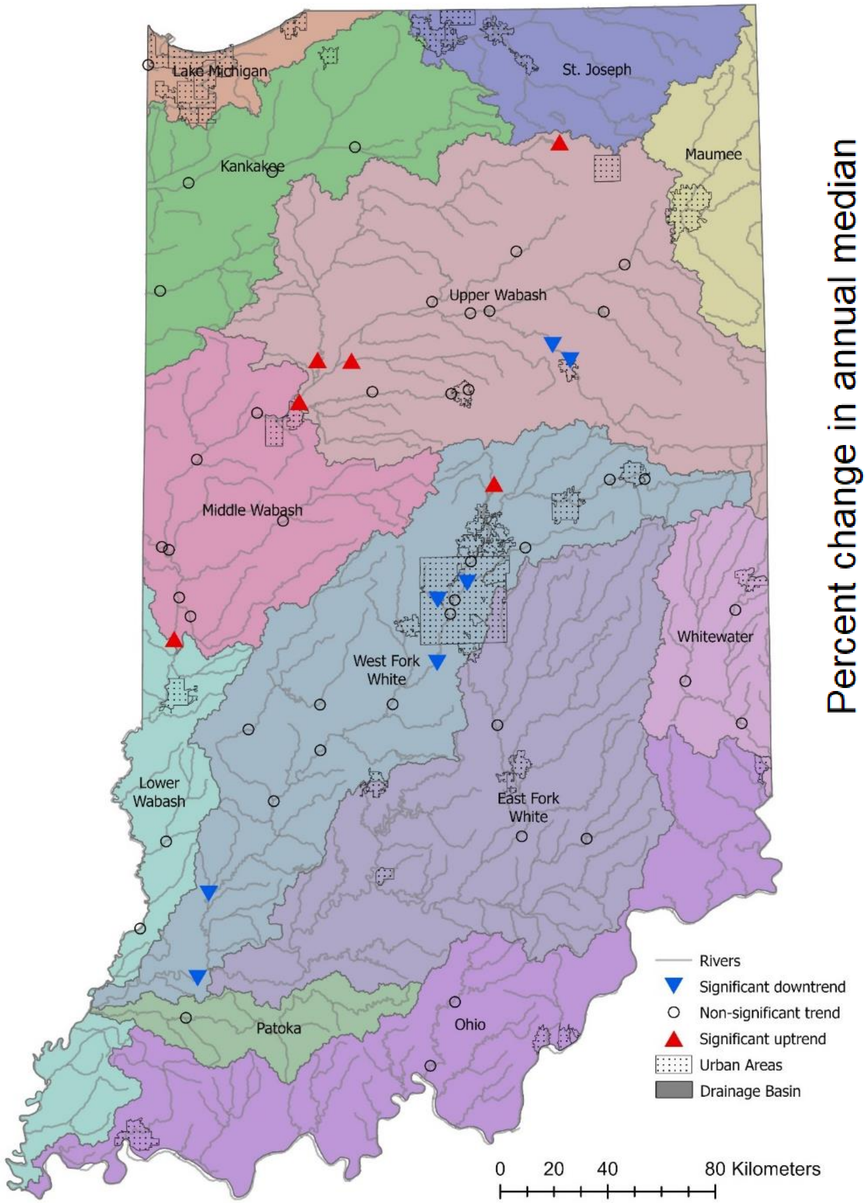
Lead

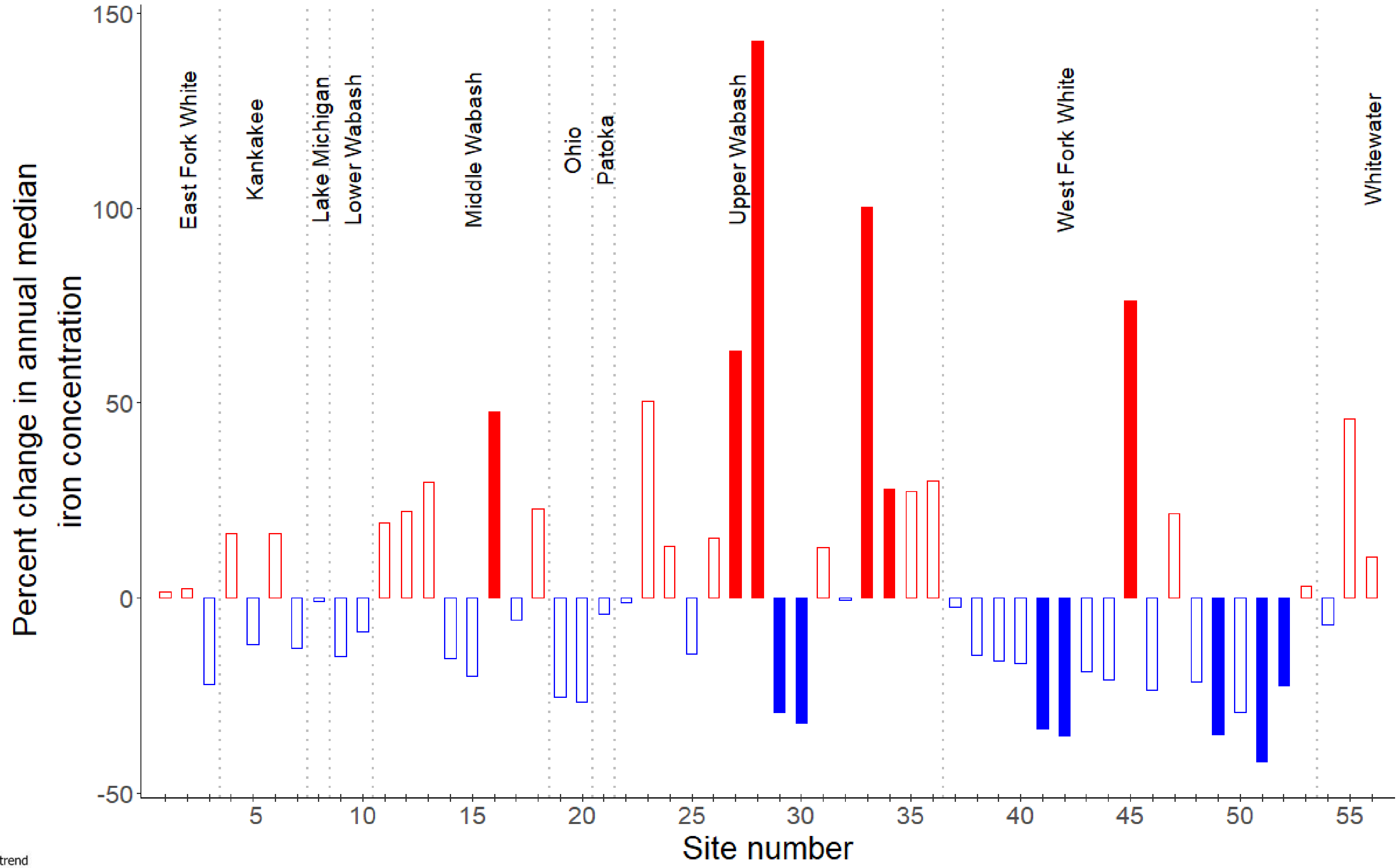




- 20 sites with significant declines in total lead
- 10 sites with significant increase in total lead across the state

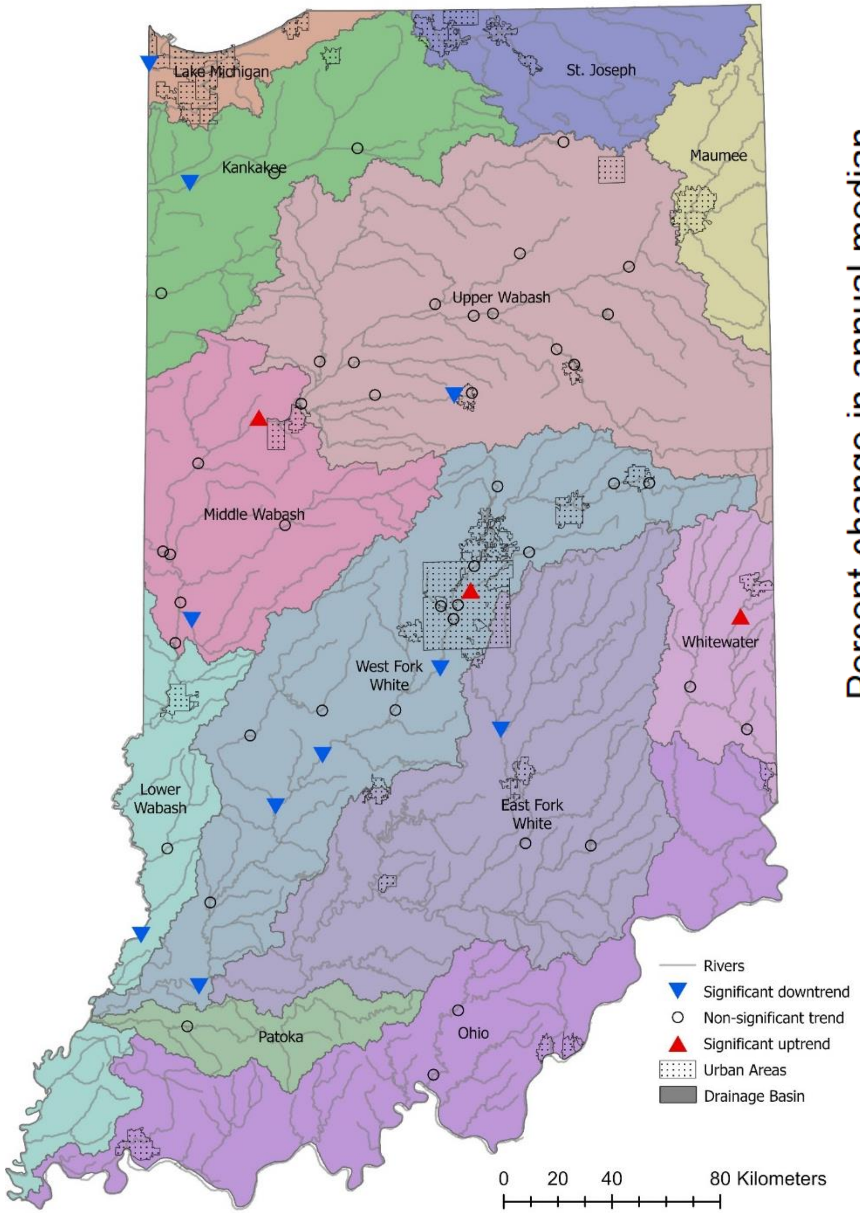
Iron

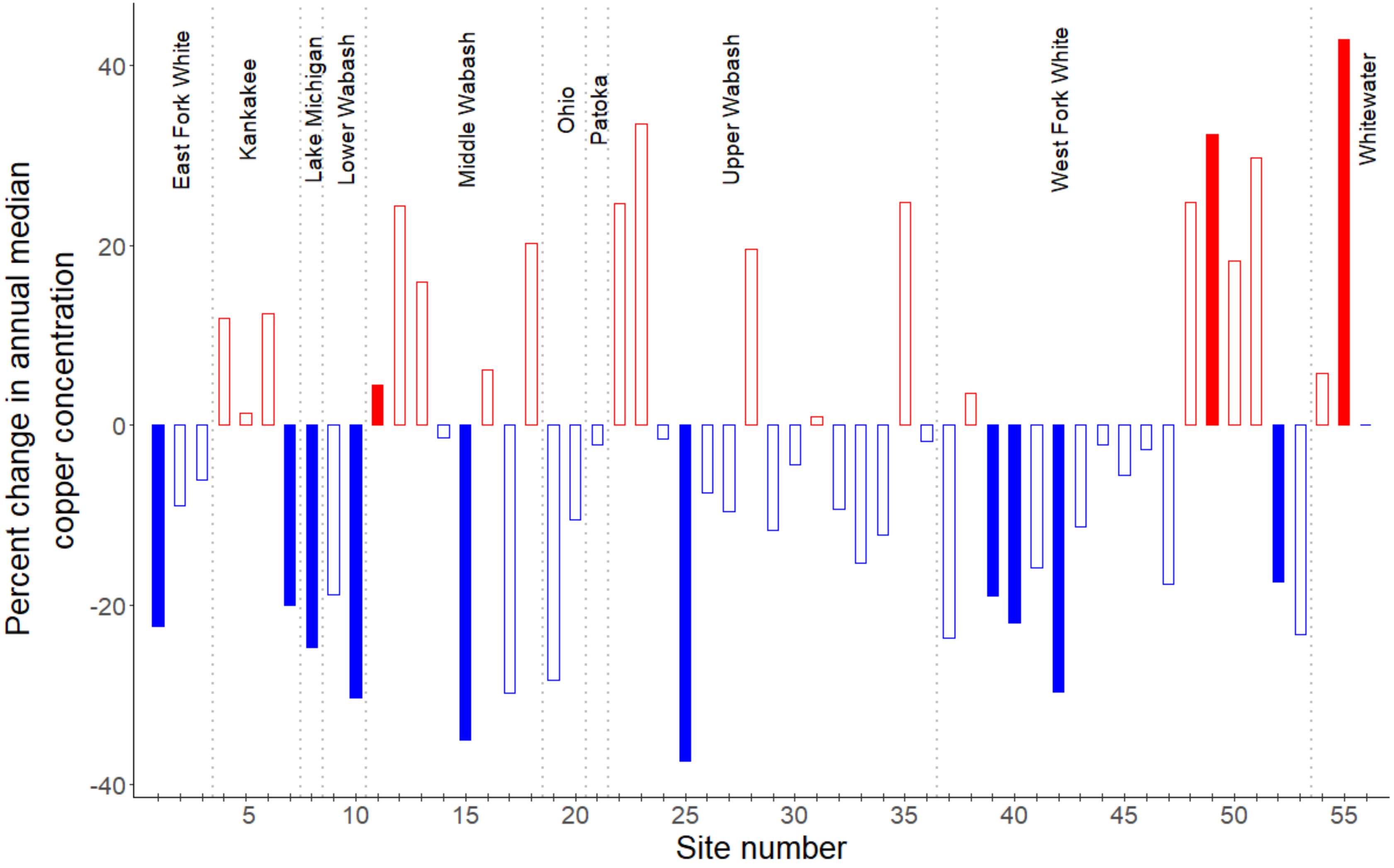




- 6 sites with significant increase in iron concentration (Northern)
- 7 sites with significant decline in iron concentration; 5 sites in the West Fork White River Basin

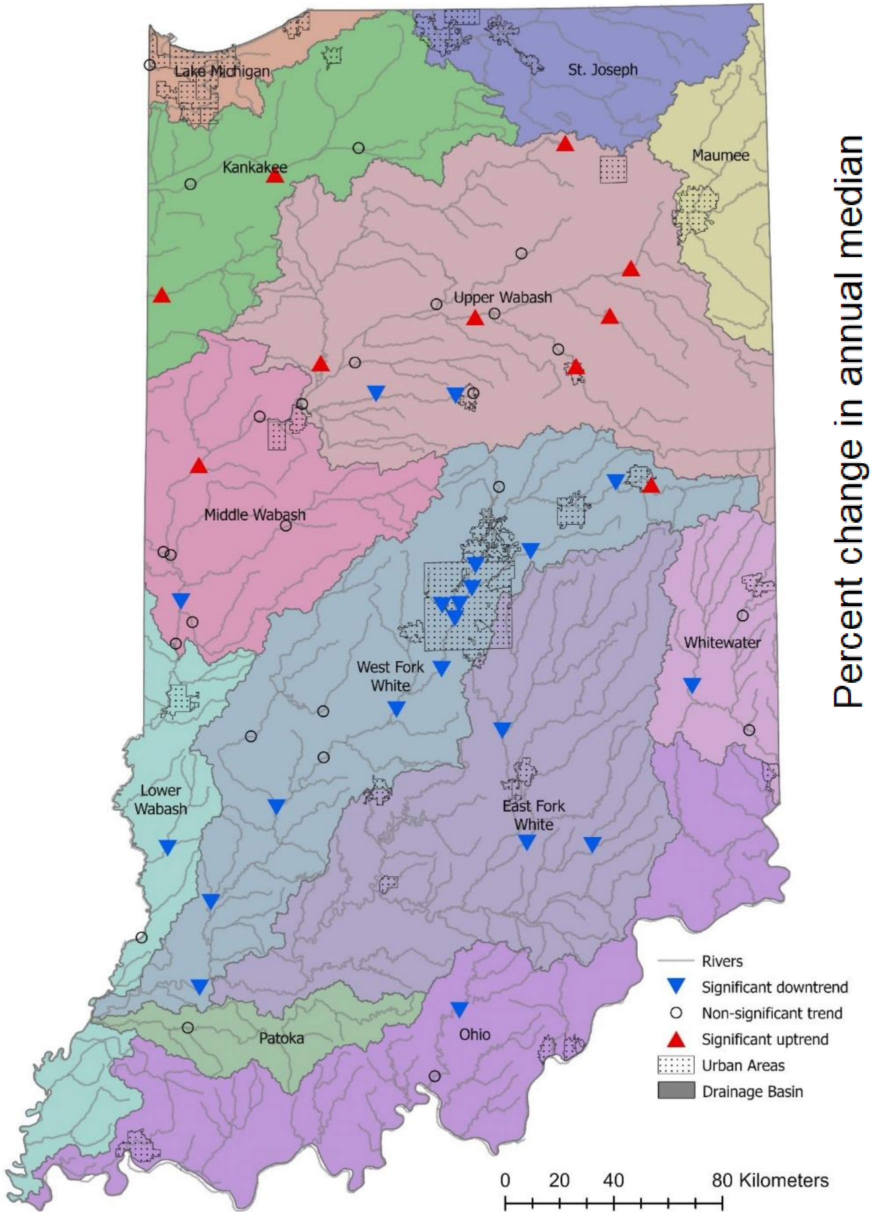
Copper

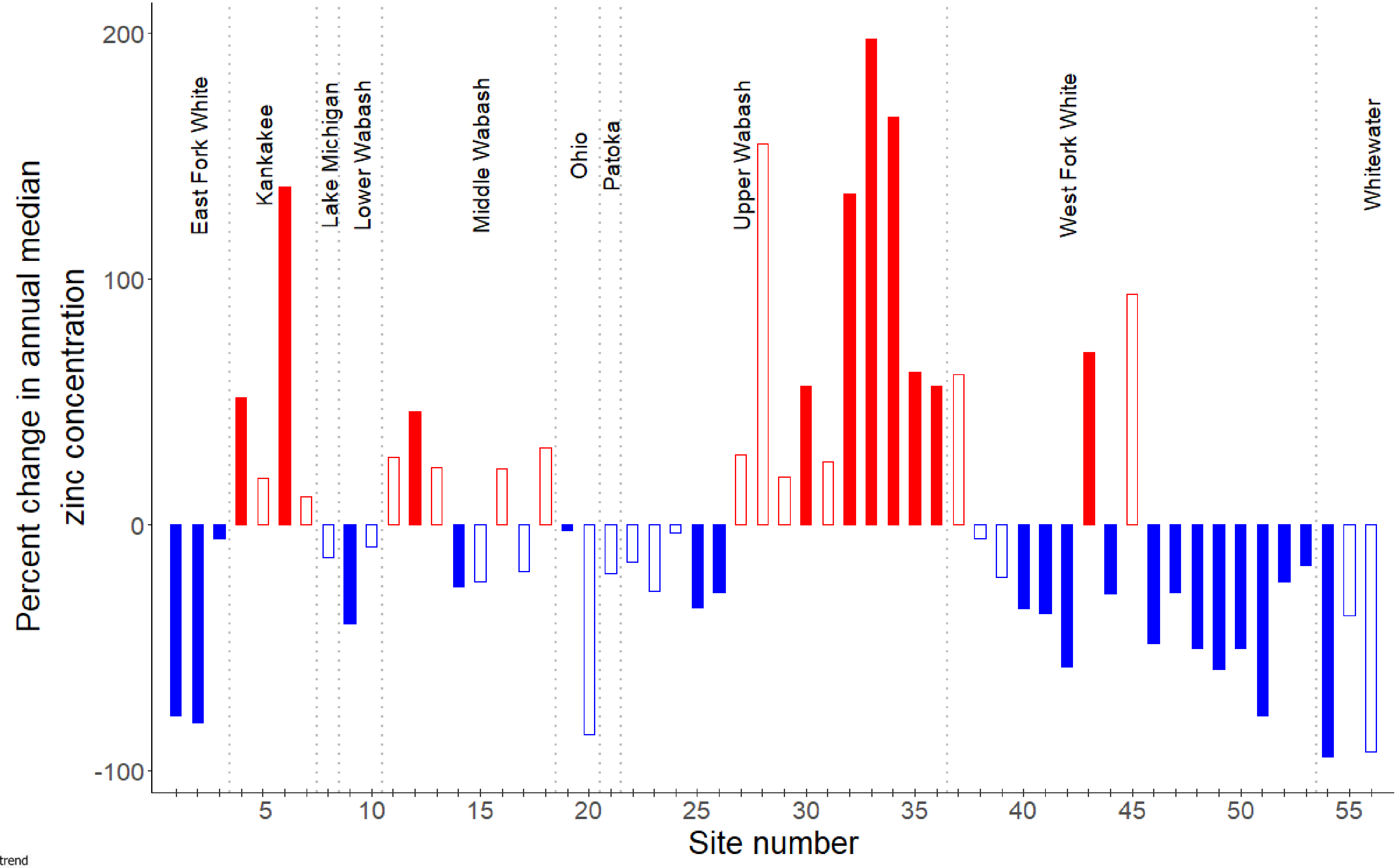




- 3 sites downstream of urban areas with significant increase in copper concentration
- 10 sites with significant declines across the state

Zinc

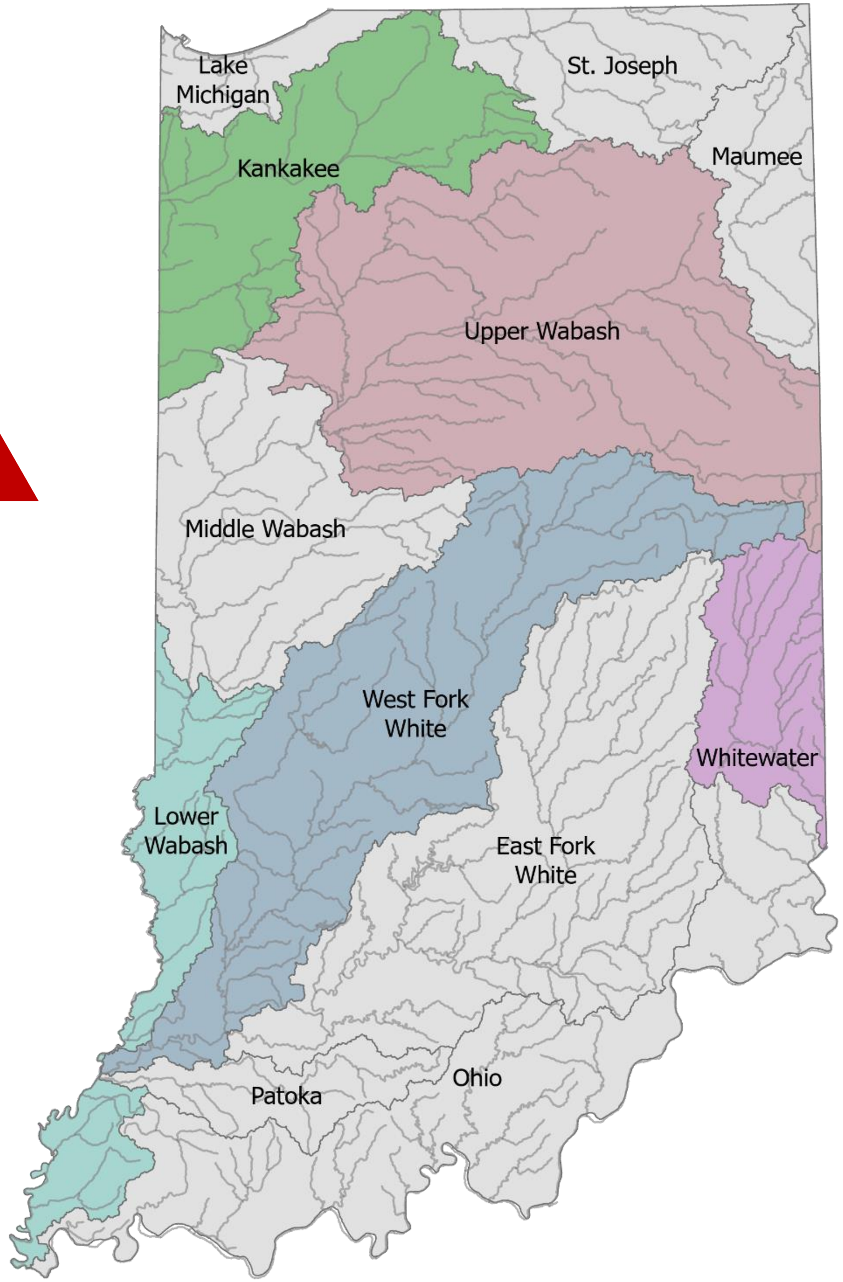




- 21 sites with significant declines in zinc concentration - Southern
- 10 sites with significant increase in zinc concentration - Northern

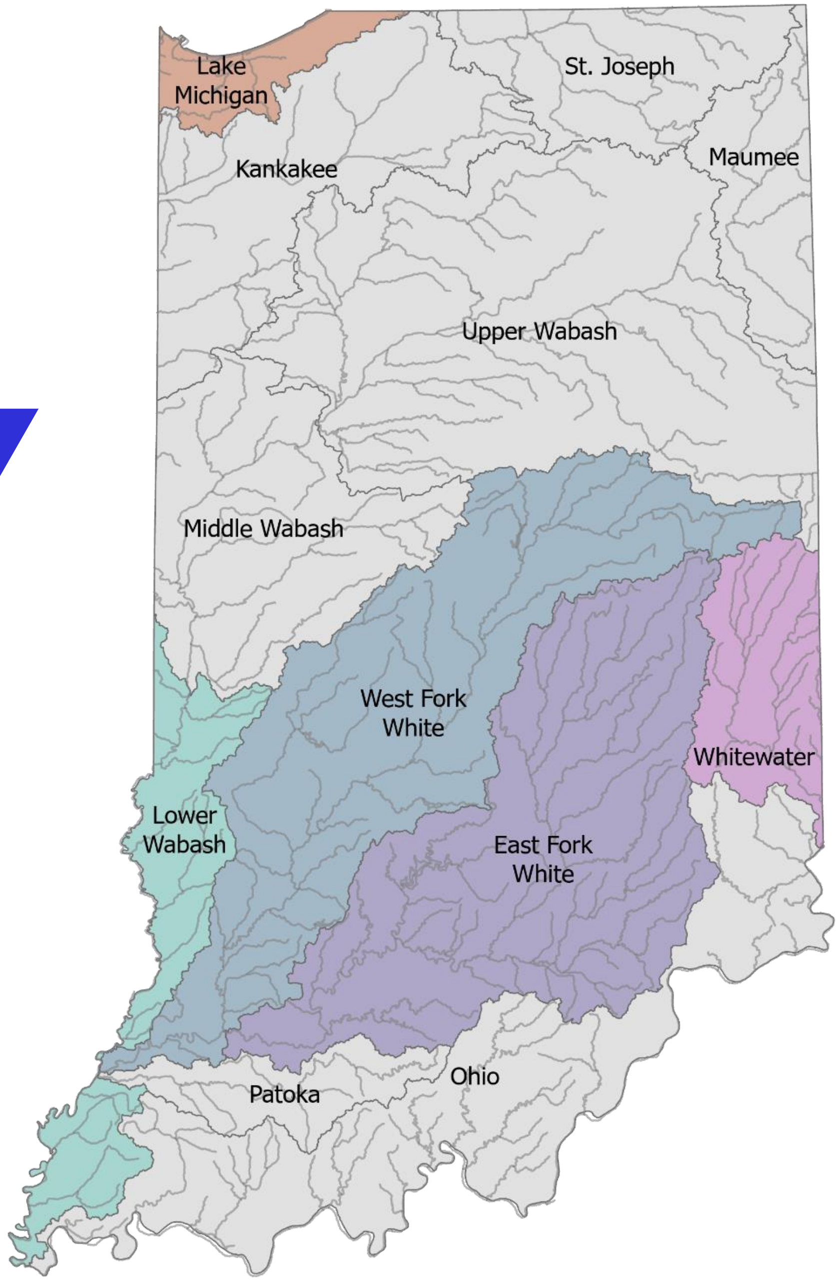
Summary – Regional results

River Basin	Uptrends
Kankakee	29%
Upper Wabash	20%
Lower Wabash	17%
Whitewater	11%
West Fork White	10%



Summary – Regional results

River Basin	Downtrends
West Fork White	35%
East Fork White	26%
Lake Michigan	25%
Whitewater	19%
Lower Wabash	17%



Summary – Surface Water Criteria

Substance	Criteria	% samples exceeding
Nitrate*	10 mg/L	0.4%
Chloride	516 - 881 mg/L	0%
Sulfate*	500- 2,689 mg/L	0%
Lead	37 – 280 µg/L	0%
Copper	10 - 63 µg/L	0.05%
Zinc	76 – 379 µg/L	0%

* Criteria for the protection of human health

Questions?

Take a closer look on our **ArcGIS Story Map** and **Interactive Maps**

Contact:
Jit Weir
Technical Environmental Specialist
Watershed Assessment & Planning Branch,
Office of Water Quality,
Indiana Department of Environmental Management

jweir@idem.IN.gov

236th Technical Committee Meeting

Scott Mandirola, Chair

Presiding

October 8-9, 2024

The meeting will reconvene at 8:30 A.M. (Eastern) on October 9 and conclude by Noon. Below are a few tips to effectively navigate the meeting:

- ***Mute your microphone at all times unless speaking.***
- ***Disable your camera unless you are a Technical Committee member.***
- ***The presenter will prompt participants for verbal questions, or use the Chat feature.***
- ***Detailed virtual meeting instructions and important information can be found in the previously emailed document, "ORSANCO Virtual Technical Committee and Commission Meeting Instructions."***

Agenda Item 10:
TEC Members Reports

- IL – Scott Twait
- IN – Gabrielle Ghreichi
- KY – Katie McKone
- NY – Damianos Skaros
- OH – Melinda Harris
- PA – Kevin Halloran
- VA – Jeffrey Hurst
- WV – Scott Mandirola
- USACE – Erich Emery
- USCG – Michael Franke-Rose
- USEPA – David Pfeifer
- USGS – Jeff Frey
- CIAC – Kathy Beckett
- PIAC – Cheri Budzynski
- PIACO – Betsy Bialosky
- POTW – Reese Johnson (Jim Gibson)
- WOAC – Heather Hulton VanTassel
- WUAC – Chris Bobay (Erica Pauken)

Agenda Item 11:

Ohio River Basin Water Quality Trading Program Update, and States' Round Robin Updates on Regulation of Nutrients and Nutrient Reduction Efforts

Jessica Fox and Jeff Thomas, EPRI

State TEC Members

Ohio River Basin Water Quality Trading Project

Update and Next Steps

Jessica Fox & Jeff Thomas - EPRI

ORSANCO Technical Committee Meeting
Charleston, West Virginia
October 9, 2024

OH, IN, and KY Sign 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.

Media Coverage

The Economist

THE WALL STREET JOURNAL.

Bloomberg BNA

IHS The Energy Daily

Greenwire

Environmental Finance

DAYTON BUSINESS JOURNAL

The Columbus Dispatch

INSIDEEPA.COM
an online news service from the publishers of Inside EPA

courier-journal.com

AG PROFESSIONAL

INSIDE INDIANA BUSINESS WITH GERRY DICK

BROWNFIELD AGRICULTURE TODAY

EPRI

Media Coverage


THE WALL STREET JOURNAL

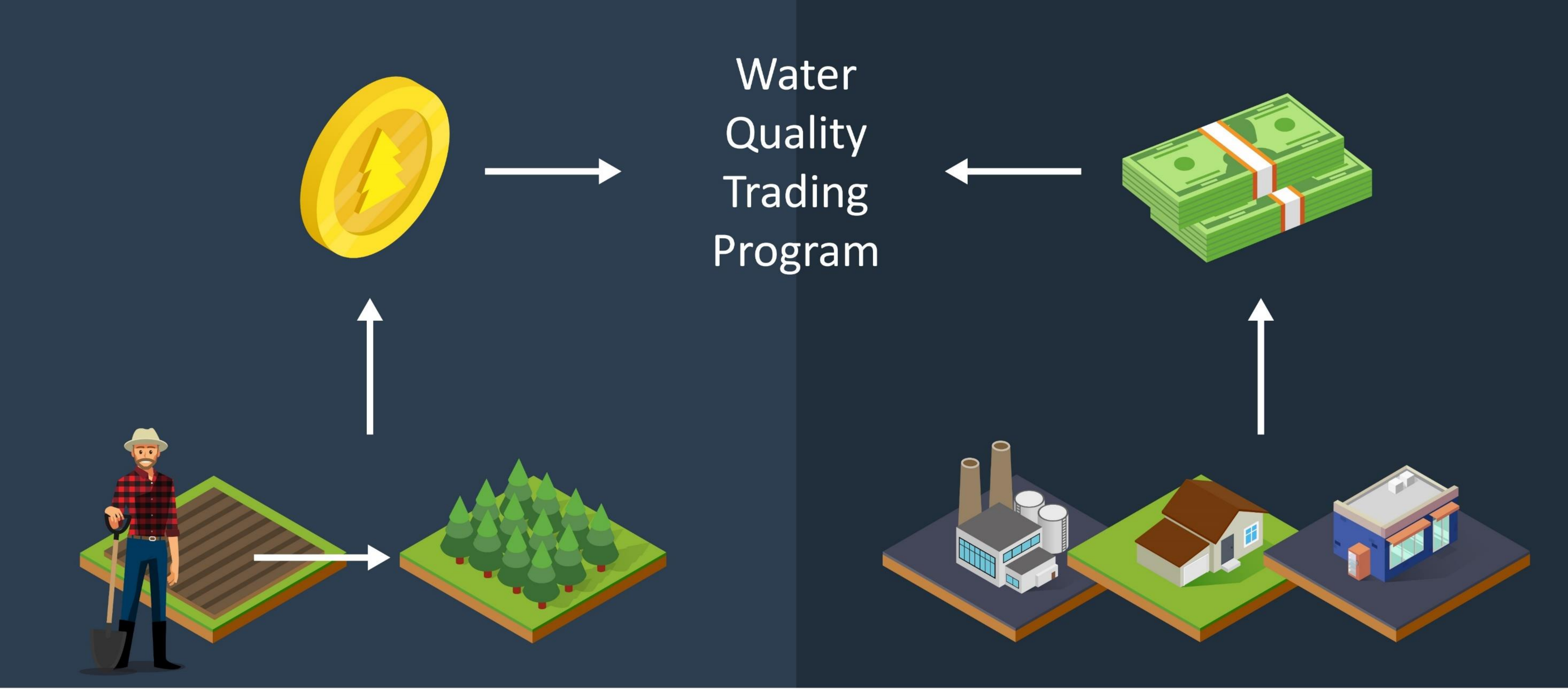
U.S. NEWS

Trading System Tackles Waste

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

Into the Dead Zone

National Public Radio 2016-2017

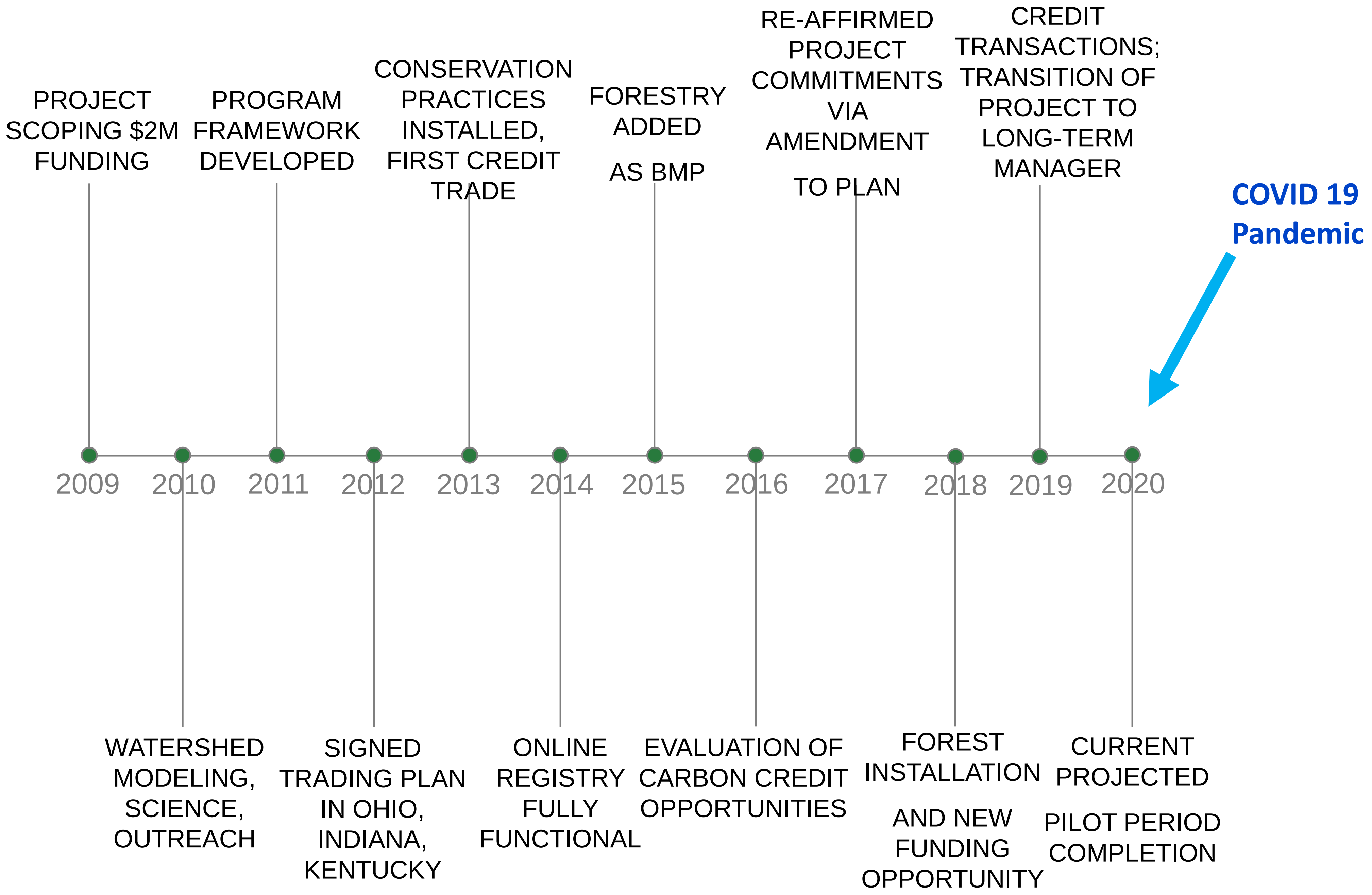


GRI Empowering Sustainable Decisions

SUSTAINABLE DEVELOPMENT GOALS

CDP DISCLOSURE INSIGHT ACTION

UN GLOBAL COMPACT The CEO Water Mandate


PROJECT SCOPING $2M FUNDING
PROGRAM FRAMEWORK DEVELOPED
CONSERVATION PRACTICES INSTALLED, FIRST CREDIT TRADE
FORESTRY ADDED AS BMP
RE-AFFIRMED PROJECT COMMITMENTS VIA AMENDMENT TO PLAN
CREDIT TRANSACTIONS; TRANSITION OF PROJECT TO LONG-TERM MANAGER
COVID 19 Pandemic
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
WATERSHED MODELING, SCIENCE, OUTREACH
SIGNED TRADING PLAN IN OHIO, INDIANA, KENTUCKY
ONLINE REGISTRY FULLY FUNCTIONAL
EVALUATION OF CARBON CREDIT OPPORTUNITIES
FOREST INSTALLATION AND NEW FUNDING OPPORTUNITY
CURRENT PROJECTED PILOT PERIOD COMPLETION

USEPA Supports 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

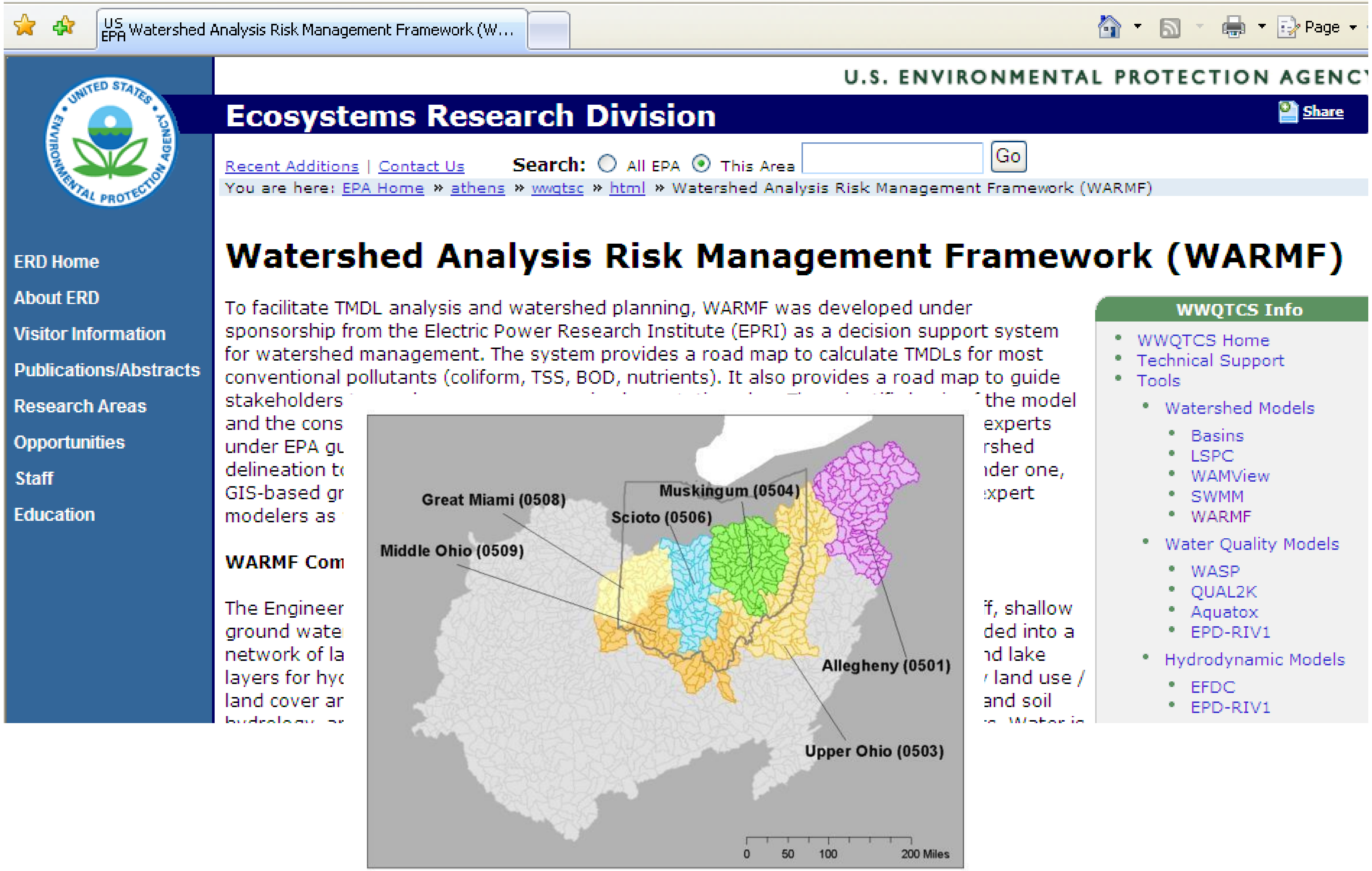
News Releases from Headquarters > Water (OW)

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

09/05/2019

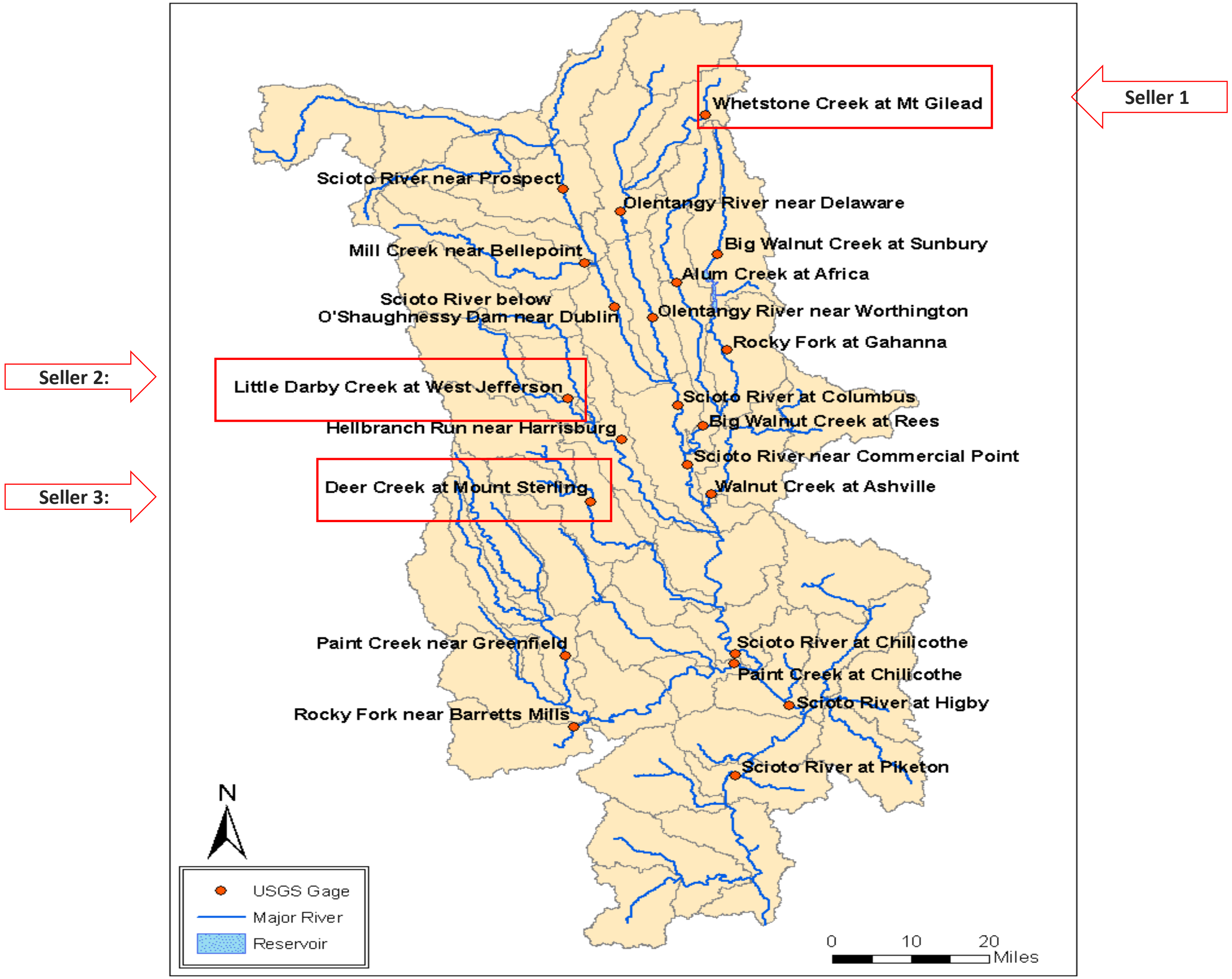
Tools & Methods

Watershed Model



ELECTRIC POWER RESEARCH INSTITUTE

Attenuation Tool & Modeling Specific Locations



First Journal paper on Credit Calculation Methods.

Published June 2014

Environmental Science & Technology

Article

pubs.acs.org/est

Attenuation Coefficients for Water Quality Trading

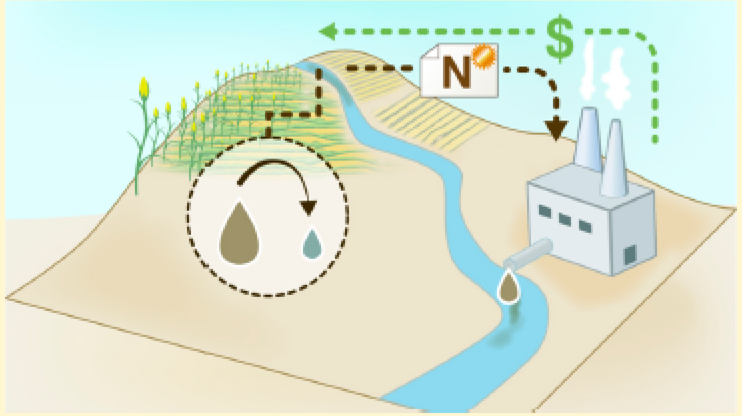
Arturo A. Keller,*,† Xiaoli Chen,† Jessica Fox,‡ Matt Fulda,† Rebecca Dorsey,† Briana Seapy,† Julia Glenday,† and Erin Bray†

†Bren School of Environmental Science and Management, University of California, Santa Barbara, California 93106-5131, United States

‡Electric Power Research Institute, Palo Alto, California 94304, United States

Supporting Information

ABSTRACT: Water quality trading has been proposed as a cost-effective approach for reducing nutrient loads through credit generation from agricultural or point source reductions sold to buyers facing costly options. We present a systematic approach to determine attenuation coefficients and their uncertainty. Using a process-based model, we determine attenuation with safety margins at many watersheds for total nitrogen (TN) and total phosphorus (TP) loads as they transport from point of load reduction to the credit buyer. TN and TP in-stream attenuation generally increases with decreasing mean river flow; smaller rivers in the modeled region of the Ohio River Basin had TN attenuation factors per km, including safety margins, of 0.19–1.6%, medium rivers of



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

Credit Calculation Report

Project Name: IN -

Date: 1-30-14

Name: Brian Br

Title: Director -

Organization: Americ

Method(s) for estimating r
the signed Trading Plan. N
variables such as soil type
of livestock to calculate re

Specify which method wa

☒ EPA Region 5

☐ Ohio DNR Lo

☐ Other. Specify

Briefly Describe the BMP

The Best Man

Year
1 2013
2 2014
3 2015
4 2016
5 2017

I certify that I am trained in the use
calculator(s) according to the criter
knowledge the credit estimates are

Attach a screenshot of credit calcul

Signed:

Print Name: Brian Bran

Organization Name: AFT

Feedlot Pollution Reduction

Please fill in the gray areas below.

Notes:
An animal lot refers to an open lot or combination of open lots intended for confined feeding, breeding, raising or holding animals. It is specifically designed as a confinement area in which manure accumulates or where the concentration of animals is such that vegetation cannot be maintained.
The purpose of these calculations is to represent Biological Oxygen Demand (BOD), phosphorus (P), and nitrogen reductions after an animal waste system is installed. This method has two assumptions: 1) the feedlot is adjacent to a receiving hydrological system without any buffering areas; and 2) installing the animal waste system will prevent any further pollutants from the lot from reaching the hydrologic system. Feedlots that cannot show impact to the hydrologic system being protected should not be evaluated with this computation.

The fundamental methodology of this worksheet is based on "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual" (Michigan DEQ, June 1999). However, the Michigan DEQ methodology was modified to calculate annual load through inclusion of climatological data. In addition, biological oxygen demand, phosphorus, and nitrogen constants used in this worksheet were derived from U.S. EPA's STEPL model, developed by Tetra Tech, Inc. in order to enhance consistency between methods.

STEP 1 — 0.19 — Contributing Area (acres): the area contributing polluted water to the discharge point(s).

STEP 2 — Percent Paved: Percent of the contributing area that is paved

- (●) 0-24%
- ( ) 25-49%
- ( ) 50-74%
- ( ) 75-100%

STEP 3 — Please select your State: Indiana — Please select your County: Dearborn — Nearest Weather Station: IN VERSAILLES WATER RK

Note: Precipitation data for Alaska and Hawaii were unavailable for this version of the workbook.

STEP 4

Animal Numbers	Animal Type	Design Weight*
0	Slaughter Steer	1,000
0	Young Beef	500
32	Dairy Cow	1,400
0	Young Dairy Stock	500
0	Swine	200
0	Feeder Pig	50
0	Sheep	100
0	Turkey	10
0	Chicken	4
0	Duck	4
0	Horse	1,000

*Design weight in pounds. Interpolation of values should be based on the maximum weight animals would be expected to reach.

SWCD Installation Report

Verification Report – State Ag Agency

Credit Verification Report

The completion of this report must be done during or after

Project Name: IN-

Verifier Information

Organization Name:

Contact Person: Tara

Project Docume

☑ Proje

☑ Cred

☑ Sign

☑ SWC

☑ Othe

Additional Req

☑ On-s

☑ New Credit Calculation Report, if it was re-

1 of 5

Verification Opinion IN-029-2013-106

Based on confirmation of Edge-of-Field nutrient load reductions calculations as specified in the
alculation Report, the Indiana State Department of
of the specified BMP Practice(s) will result in the

d site investigations conducted in accordance

ORB Program eligibility requirements;

plemented and maintained in accordance with
dards or approved modifications;

antified using appropriate metrics and
RB Trading Plan;

ntained and are performing as designed; and

ace to ensure the specified BMPs are
ntract.

Date: 10/9/2013

Agency: Indiana State Dept. of Agriculture

Credit Certification Report – State Permit Authority

Credit Certification Report

Completion of this report can only oc

Project Name: IN-029-2013

HUC 10 Project Location: 05090

(10-digit HUC watershed number)

☑ Credit Calculation Report

☑ Signed Producer Contract

Year			
2013	TI		
2014	TI		
	TN:	TP:	

The **Indiana Department of Environmental Management** certifies that IN-029-2013-106 conforms in all respects to the requirements of the Trading Plan, as amended, and all other applicable state requirements, that the specific Credits noted above are hereby authorized for registration and sale on the ORB Program Online Registry, and that these credits can be applied towards regulatory compliance requirements or stewardship commitments, as detailed in the Trading Plan, as amended. The foregoing certification shall be conditioned on the maintenance

The **Indiana Department of Environmental Management** certifies that IN-029-2013-106 conforms in all respects to the requirements of the Trading Plan, as amended, and all other applicable state requirements, that the specific Credits noted above are hereby authorized for registration and sale on the ORB Program Online Registry, and that these credits can be applied towards regulatory compliance requirements or stewardship commitments, as detailed in the

Signature: [signature]

Print Name: Paul Higginbotham

Title: Branch Chief

State Agency: IDEM

Date: 2/13/14

Credit Purchase Receipt

Transfer Details:

Source Account ID: 100000000026540
Source Account Name: EPRI Holdings Account
Project Name: TEST ORB PROJECT 09162013
Standard Name: Ohio River Basin Water Quality Interstate Trading Program
Vintage Year: 2014
Quantity: 20.00000
Credit Type: TP lbs/year
Serial number: ORB-BAW-US-100000000033830-01102013-30092014-1680154.001-1680174-MER-0-P
Watershed (HUC4): Scioto
Sub Watershed (HUC10): Headwaters Scioto River

Additional Information:

Nutrient Type: Nitrogen
Calculation Methodology: EPA Region 5 Model
Best Management Practice: Cover Crops & Buffer Strips
Potential Ancillary Benefits*: Carbon Sequestration, Pollinator Habitat, Soil Health, Erosion Control

Citation James N Galloway *et al* 2024 *Environ. Res. Lett.* **19** 103003

ENVIRONMENTAL RESEARCH
LETTERS

TOPICAL REVIEW • OPEN ACCESS

Footprint tools tiptoeing towards nitrogen sustainability

James N Galloway[1,*], Elizabeth A Castner[2], Elizabeth S M Dukes[1], Jessica Fox[3] and Allison M Leach[4]

Published 17 September 2024 • © 2024 The Author(s). Published by IOP Publishing Ltd

Environmental Research Letters, Volume 19, Number 10

Focus on Environmental Footprint Tools for Sustainability

Citation James N Galloway *et al* 2024 *Environ. Res. Lett.* **19** 103003

DOI 10.1088/1748-9326/ad677c

September 2024: This paper reviews footprint tools for people, institutions and communities, with a focus on nitrogen footprint tools (NFT).

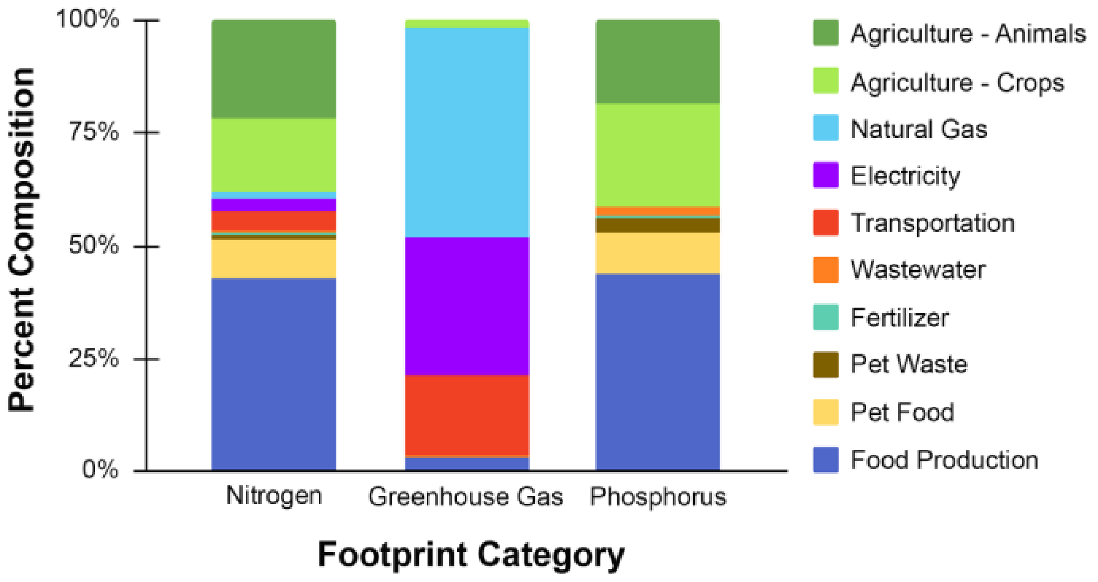


Figure 4. The percent composition of each of the three footprints (N, GHG, and P) by category. The percent composition shows the drivers which influence the footprint. N and P are largely driven by food purchased and agriculture while GHGs are largely driven by electricity and on-site natural gas use. Reproduced from Dukes (2022). CC BY 4.0.

Citation James N Galloway *et al* 2024 *Environ. Res. Lett.* **19** 103003

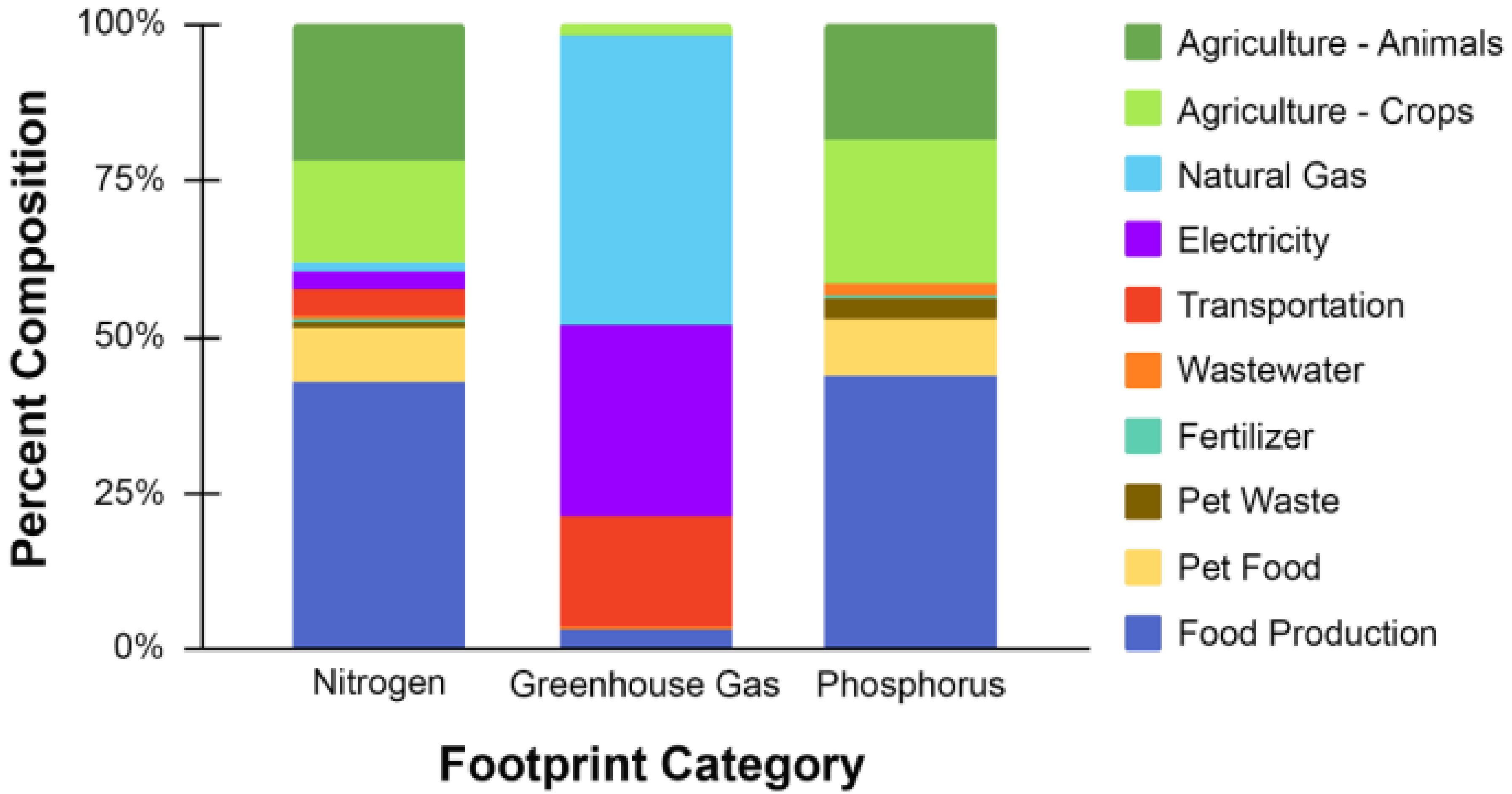


Figure 4. The percent composition of each of the three footprints (N, GHG, and P) by category. The percent composition shows the drivers which influence the footprint. N and P are largely driven by food purchased and agriculture while GHGs are largely driven by electricity and on-site natural gas use. Reproduced from Dukes (2022). CC BY 4.0.

Credit Supply - Farmers

Farmer & Landowner Funding Available!!


ELECTRIC POWER RESEARCH INSTITUTE

Request for Proposals for Producer Funding under the Ohio River Basin Water Quality Trading Pilot

(Released January 11, 2013)

River Basin (ORB) Water Quality Trading (WQT) Pilot Project is acceptir
ost-share for agricultural conservation projects that reduce loading of I
ous to waterways. Producers are invited to submit funding requests p
ns set forth i

d, producers
or the imple
by the Electr
Farmland Tr
s detailed b
.com/ohiori

FUNDING OPPORTUNITY NOTICE $600,000

PRIVATE LANDOWNERS & PRODUCERS IN OHIO, INDIANA, AND KENTUCKY UNDER THE OHIO RIVER BASIN WATER QUALITY TRADING PROJECT

With support from Ohio, Indiana, and Kentucky, the Electric Power Research Institute, American Farmland Trust, and a team of collaborators have been working since 2012 to install best management practices (BMPs) that generate "water quality credits" to improve water quality. Under this funding opportunity, EPRI is releasing $600,000 across Ohio, Indiana, and Kentucky to plant trees and complimentary agricultural BMPs. Funding applications will be ranked first by the cost per pound of nitrogen and phosphorus runoff avoided, and secondarily by the related positive benefits to the environment and community.

Go to http://wqt.epri.com for the full notice and watch videos of landowners who have previously received funding.

ELECTRIC POWER RESEARCH INSTITUTE | American Farmland Trust

Jessica Fox
Electric Power Research Institute
(650) 855-2138 (office)
jfox@epri.com

Brian Brandt
American Farmland Trust
(614) 430-8130 (office)
bbrandt@farmland.org

Before and After

Before

Runoff, erosion, sedimentation.

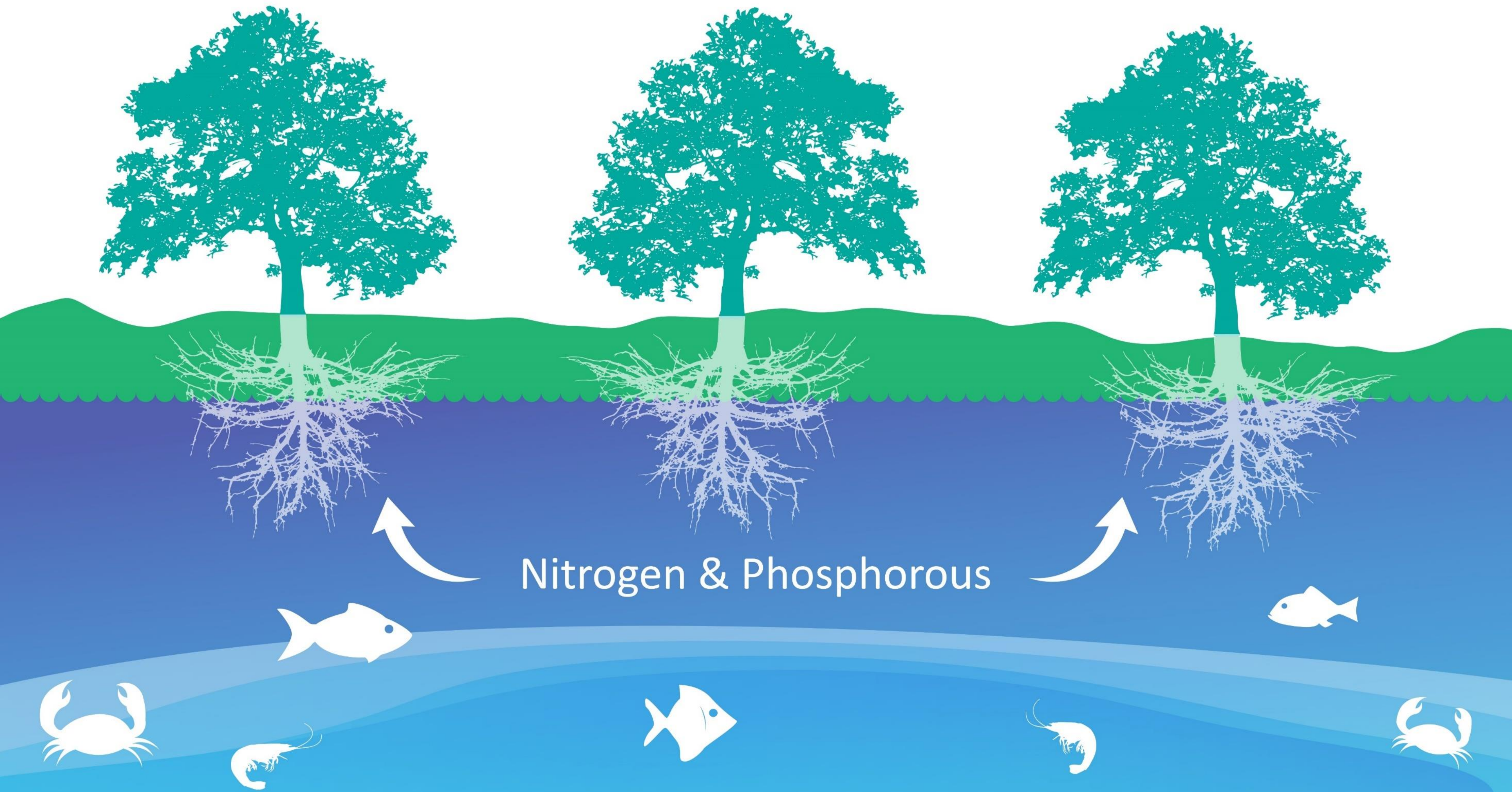
After

'Heavy Use Protection Area'

Social Aspects and Stories: Watch on YouTube

From the Field: Candid Comments from our Farmers

"My grandpa used to catch catfish in the area. The only thing I've seen was a little minnow. I know that someday I'm not gonna be here and somebody else will deal with whatever I leave them. This is a much better way to leave my legacy than some people in the past have done."


Nitrogen & Phosphorous

Credit Pool and Pipeline

- 49 Landowner Contracts
- 150,000 TN and TP Credits Available **NOW**

- Pipeline of Credits:
  - 5- to 40-year agreements with landowners.
  - BMPs: cover crops, hay conversion, cattle exclusion fencing, milkhouse waste management, heavy use areas, forestry.

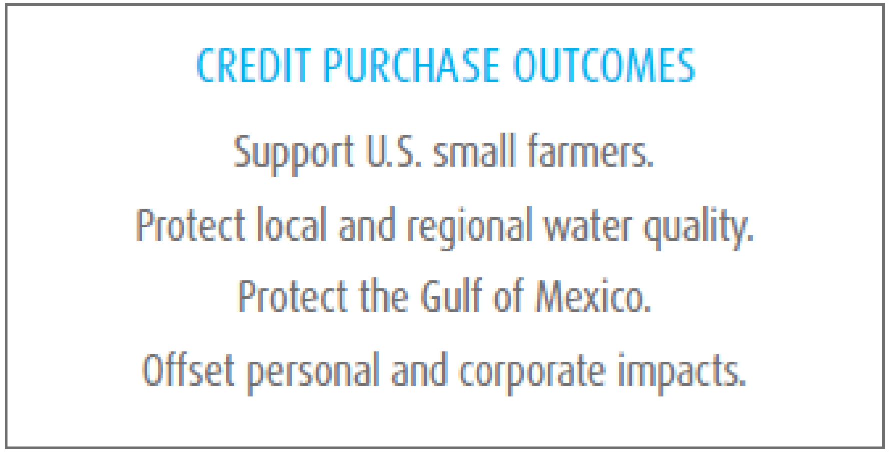
Credit Sales

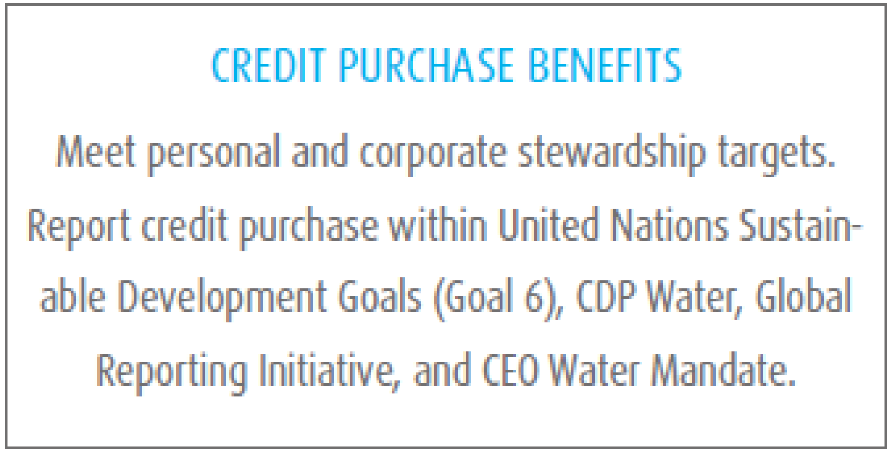
March 11, 2014: First Transactions

Hoosier Energy

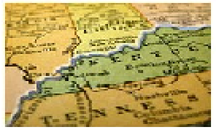
Duke Energy

American Electric Power





Purchase of Stewardship Credits



Ohio River Basin Trading Project

EPRI | ELECTRIC POWER RESEARCH INSTITUTE

Ohio River Basin - Water Quality Trading Project

Clear Search:

9,000 credits purchased and retired

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

Retirement Date	Vintage	Project	Account	Project Type	Retirement Quantity	Measurement	Type	Details
06 Mar 2014	2013	IN-177-2013-111	AEP	Phosphorus Reduction	403	TP lbs/year	UNIT	View
Serial No.: ORB-BAW-US-103000000005902-01122012-30112013-183599.001-184002-MER-0-P								
06 Mar 2014	2013	IN-177-2013-111	AEP	Nitrogen Reduction	809	TN lbs/year	UNIT	View
Serial No.: ORB-BAW-US-103000000005902-01122012-30112013-184103.001-184912-MER-0-P								
06 Mar 2014	2013	OH-029-2013-104	AEP	Nitrogen Reduction	338	TN lbs/year	UNIT	View
Serial No.: ORB-BAW-US-103000000006082-01122012-30112013-191270.001-191608-MER-0-P								
06 Mar 2014	2013	IN-115-2013-108	AEP	Nitrogen Reduction	91	TN lbs/year	UNIT	View
Serial No.: ORB-BAW-US-103000000005550-01122012-30112013-177677.001-177768-MER-0-P								
06 Mar 2014	2013	IN-137-2013-105	AEP	Phosphorus Reduction	59	TP lbs/year	UNIT	View
Serial No.: ORB-BAW-US-103000000005898-01122012-30112013-180588.001-180647-MER-0-P								
06 Mar 2014	2013	IN-137-2013-102	Duke Energy	Phosphorus Reduction	22	TP lbs/year	UNIT	View
Serial No.: ORB-BAW-US-103000000005895-01122012-30112013-182758.001-182780-MER-0-P								
06 Mar 2014	2013	IN-115-2013-108	Duke Energy	Nitrogen Reduction	46	TN lbs/year	UNIT	View
Serial No.: ORB-BAW-US-103000000005550-01122012-30112013-177768.001-177814-MER-0-P								
06 Mar 2014	2013	IN-137-2013-103	Duke Energy	Nitrogen Reduction	19	TN lbs/year	UNIT	View
Serial No.: ORB-BAW-US-103000000005896-01122012-30112013-183237.001-183256-MER-0-P								
06 Mar 2014	2013	IN-029-2013-106	Duke Energy	Nitrogen Reduction	374	TN lbs/year	UNIT	View
Serial No.: ORB-BAW-US-103000000005996-01122012-30112013-174927.001-175301-MER-0-P								

Unleashing Credit Sales - 2019

- EPRI Challenges to Unleashing Sales:
  - Require Large(ish) Buyer Contracts
  - Non-profit research organization focus on science
  - Not established for quick, on-line, transactions

- Solution:
  - Collaborate with another organization
  - Expertise: client reach, experience with environmental credits, easy transactions for credit buyers, trusted & respected.

Carbon-Water 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/

Public Events beginning 2019

DISCOUNT FOR PADDLEFEST!
Visit Our Booth with Aquarium Display

firstclimate
Ohio River Basin Trading Project
Certificate of Purchase – Water Quality Credit
YOUR NAME HERE!!!

Get your t-shirt & certificate!
Support the river, community, and farmers.

Need a Creative Gift?
Water Quality Credits!

Farmers Create Credits

Purchase Volume	1 - 100 credits	101 - 500 credits	> 500 credits
Unit Price (USD)	$12 if purchased at Paddlefest ~~$14~~	~~$13~~	$12

Environmental Markets Summit, Washington DC, October 2019
Navy Bean Festival 2019, Indiana

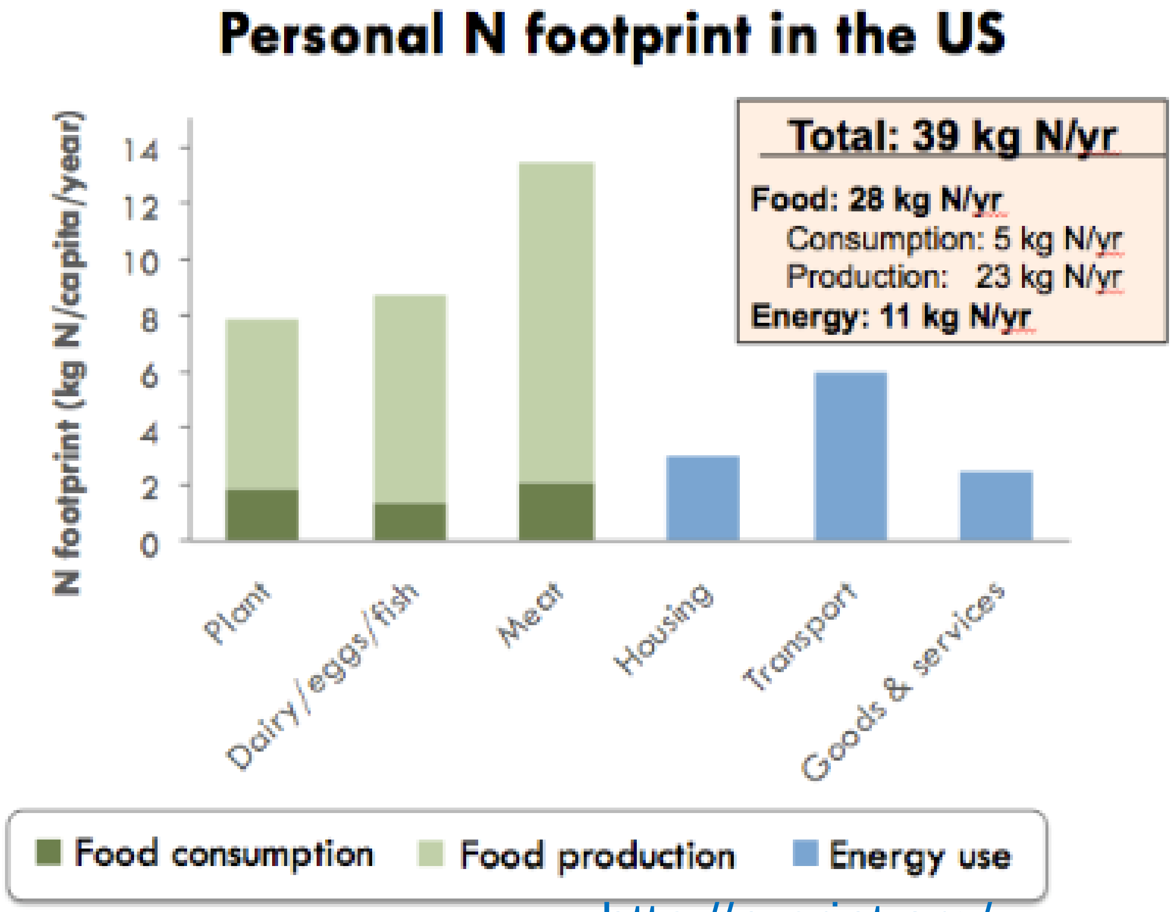
PaddleFest 2019. Cincinnati, Ohio, August 2019

PURCHASE NOW

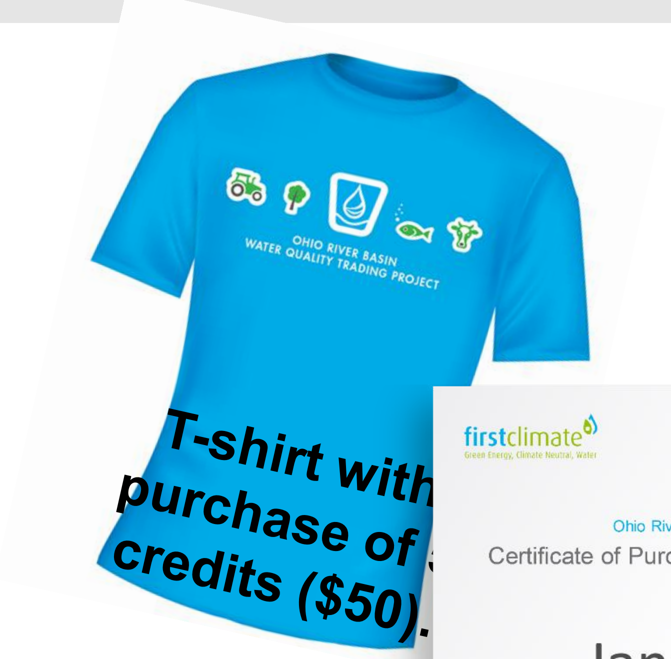
PayPal

What's YOUR Footprint?

Booth visitors could run their own N footprint using the web-based tool and determine the number of credits to purchase.



http://n-print.org/



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

Paper includes reflections on selling WQT Credits at public events . . . . people like Jeff!

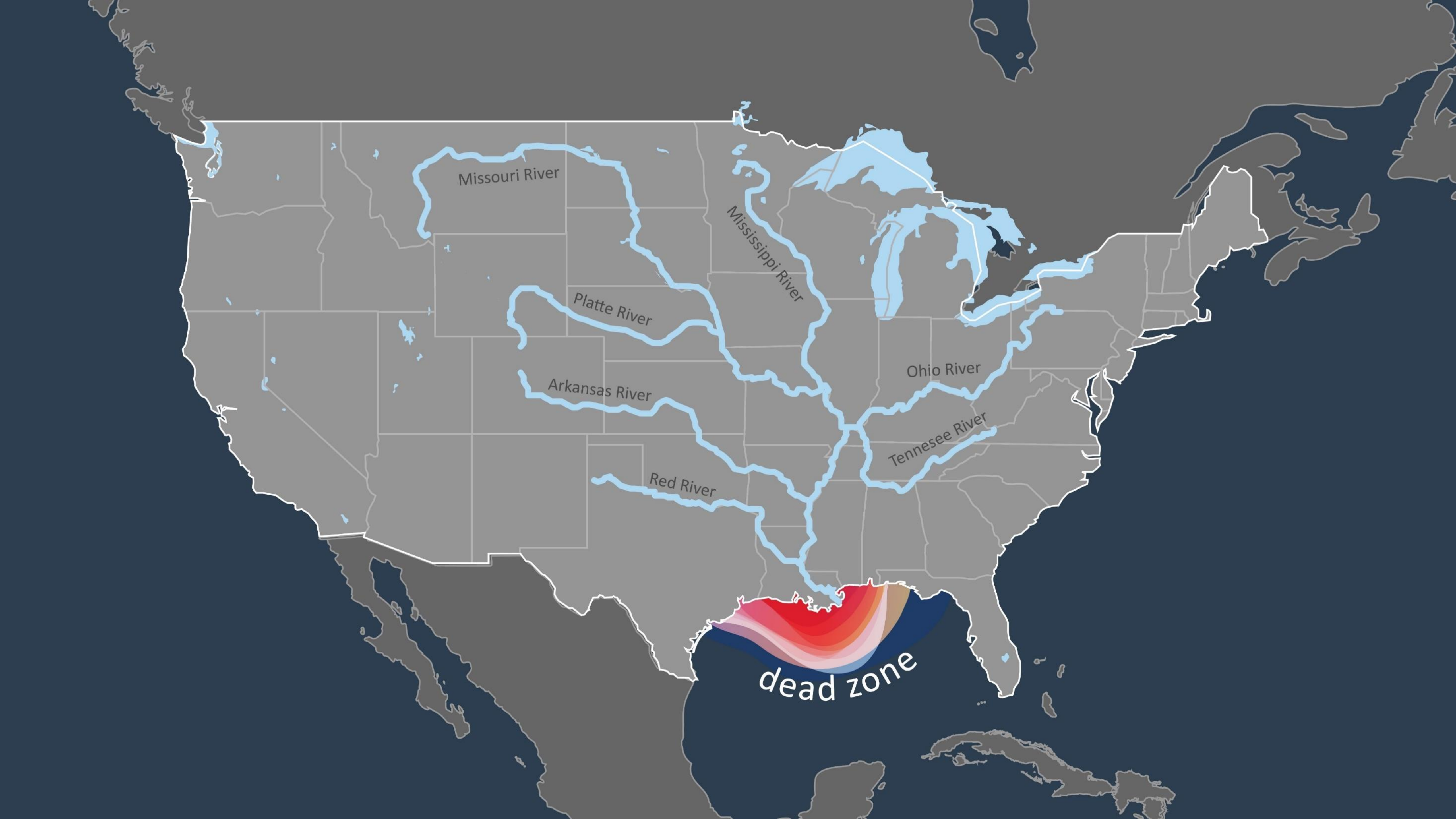
Navy Bean Festival 2019, Indiana

". . . . use of the nitrogen foot print tool was **incentivized by friendly project team members** being on-site to help people use the tool in real time, explain the results, and talk about personal connections to the ecosystem.

Even with scientifically informed calculations based on personal inputs, **most people simply purchased enough credits to get the 'free' T-shirt and certificate."**

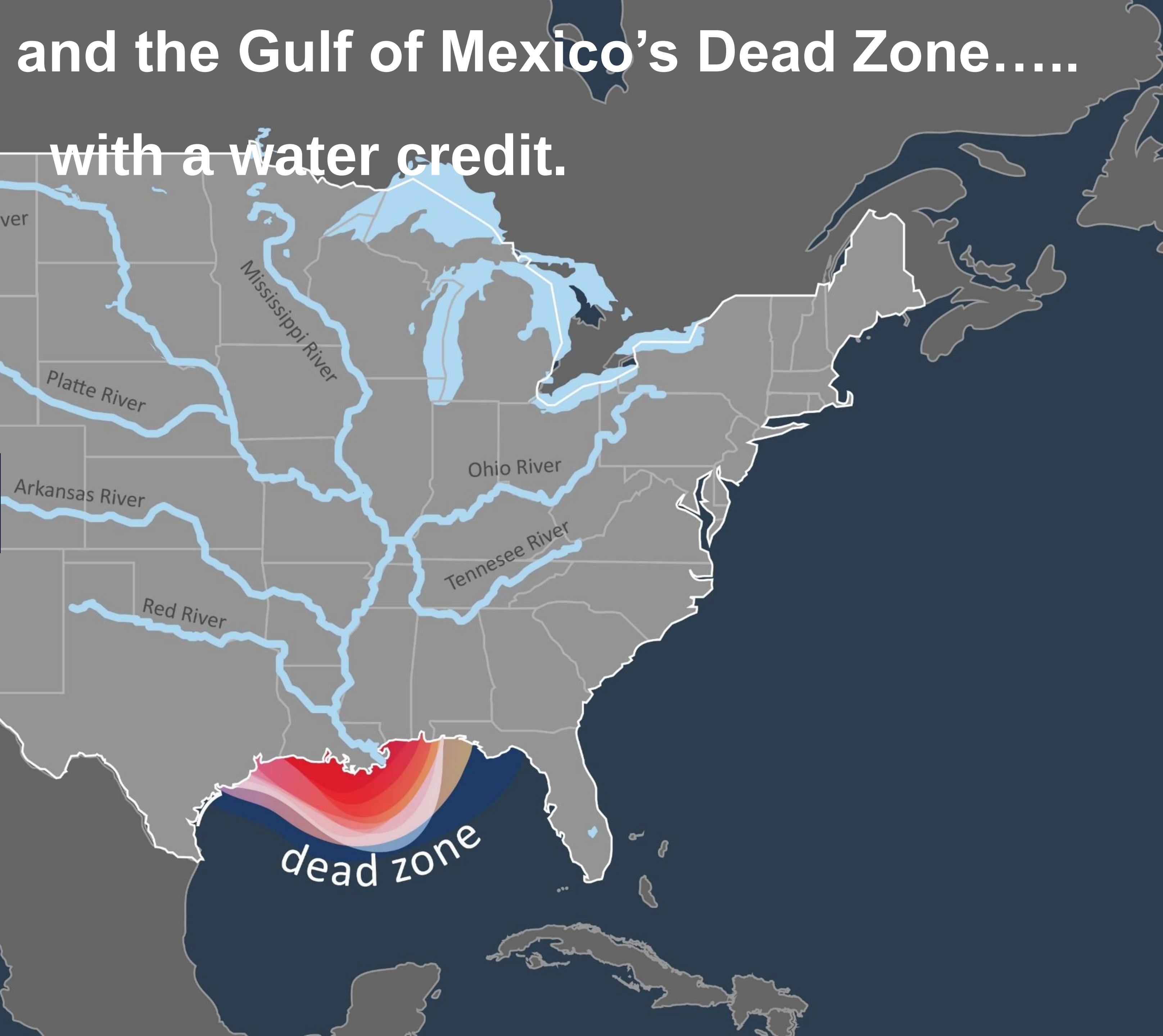
WHO declares coronavirus a global health emergency l ABC News
Watch later
Share
COVID-19 • Coronavirus disease 2019 is a contagious disease caused by the...
January 31, 2020
FIRST
HUMAN-TO-HUMAN
CASE IN U.S.
MORE VIDEOS
0:05 / 4:04

Potential


Missouri River
Mississippi River
Platte River
Ohio River
Arkansas River
Tennesee River
Red River
dead zone

Protect your dog and the Gulf of Mexico's Dead Zone…..

with a water credit.



Can WQT Achieve Nutrient reduction in Gulf of Mexico? (2016)

	N (tons/yr)	P (tons/yr)
Reductions needed to achieve 40%	228,000 to 247,000	10,000 to 16,000

- **For cover crops**
  - Typical BMP achieves 3-14 lb N and 1-7 lb P per acre/year
  - We need more than 100 million acres of new cover crops.
  - That's more than we have.
- **For cattle and dairy feedlots**
  - Typical BMP achieves 2.4-22 lb N and 0.7-5 lb P per head/year
  - We need more than 23 million heads of cattle under these practices.
  - There are only ~12M in the region.

Answer:

- WQT is a tool in the toolbox.
- A combination of crop, feedlot, and other more efficient BMPs will be required, as well as other approaches.
- Need to look at paying for performance, not paying for acres or calf/cow pairs. – I.e. optimizing placement and types of BMPs.

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


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

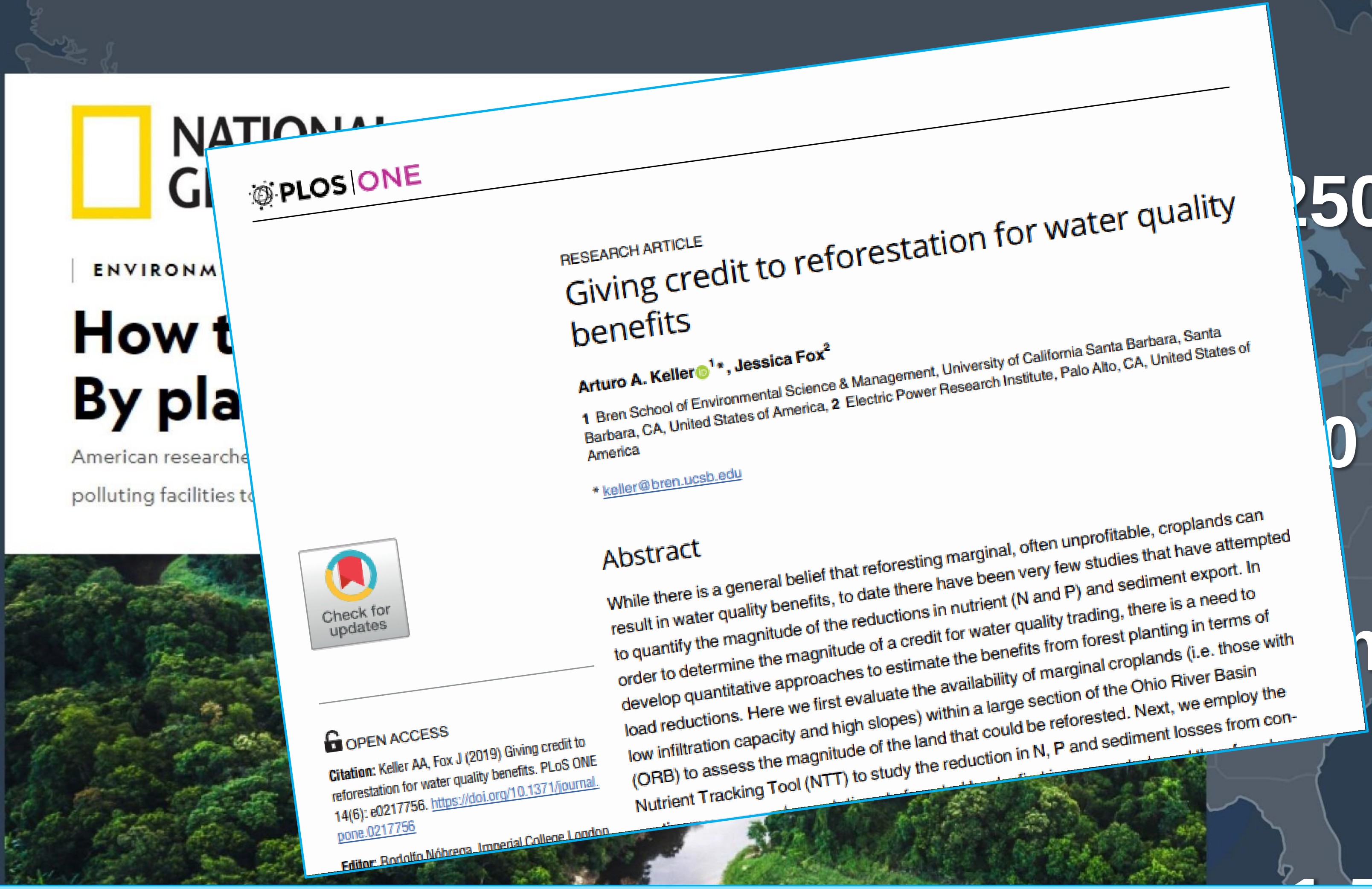
7 N Nitrogen

= 2 million kg

15 P Phosphorus

= 1.54 million

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



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

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-

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

Editor: Rodolfo Nóbrega, Imperial College London

250 million

0 million kg

7 N Nitrogen

million kg

15 P Phosphorus

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.

Aligning with Sustainability Principles & Disclosures

Food	Corporate
Milk	Walmart
Beef	Eli Lilly
Corn	Jim Beam
Soy	Wendy’s
Tobacco	JP Morgan Chase
Bourbon/Beer	Limited Brands
	Proctor & Gamble
	KFC/Pizza Hut
	Honda

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

Credibility

"Through solid science, transparency, and exceptional management, the EPRI project is a national model for how to advance non-traditional collaborations that benefit our common good. Now companies have the opportunity to be part of this effort, receive turn-key verified credits to meet their stewardship goals, and support local communities. Efforts like this will be critical for protecting America's waters for years to come."

Bob Perciasepe, President, Center For Climate and Energy Solutions

Former Deputy Administrator, United States Environmental Protection Agency

US WATER PRIZE

2018 Environmental Finance Voluntary Carbon Markets Rankings WINNER

Brooks Smith, Partner, Troutman Sanders
Recognized as "Best Lawyer in America"

How can this program be helpful going forward?

OHIO RIVER BASIN
WATER QUALITY TRADING PROJECT

2018
Environmental Finance
Voluntary Carbon Markets Rankings
WINNER

npr

WaterWorld

US WATER PRIZE

Agenda Item 12:
Report of the Monitoring Strategy Committee

Jason Heath, ORSANCO

Report of the Monitoring Strategy Committee On Future Monitoring Needs and Priorities

1) Committee last met August 2024 to consider future monitoring needs and priorities.

2) An updated Monitoring Strategy document was also circulated for comment.

3) Recommendations for use of FFY25 EPA Supplemental Monitoring grant funds (~$66,000)

Monitoring Strategy Summary and Prioritization of Monitoring Needs

- Update bacteria, PCBs and dioxin data for 305b.
    - Bacteria data are so highly dependent on precipitation, unclear if there is any benefit to updating this data.
    - Bacteria trends showing some improvement.
    - PCBs and dioxin require high volume sampling which is resource intensive and not likely to change impairments
    - Could more easily do a subset of the last PCBs/dioxin survey.
    - Fish tissue showing improving trend for PCBs.
- Evaluate Proteus real time monitor for bacteria – this project begins in April.
    - Evaluate other technologies (Fluidion)? USGS is conducting an evaluation.
- Completing long-term trends on bacteria data.
- Add PFAS to the Bimonthly Clean Metals Sampling Program?
    - Currently monitoring fish tissue
    - Grab versus EDI sampling? Passive sampling?
- Mussel Surveys/Indicator development - $50k per pool. ID of threatened/endangered mussels would trigger enhanced protections.
- Tributary Metals - $60K annually + shipping.
- Microplastics Monitoring
- Long-Term Trends Analysis on Bimonthly/Clean Metals data (staff recommendation for FFY25 Supplemental Monitoring funds).
- Analysis of water quality data at high flow versus low flows versus normal flows (climate change analysis).
- Review Broad Scan Survey results (sampling completed 2023) for consideration of adding parameters to routine monitoing programs.
- Add new EPA recommendations for fish tissue contaminants monitoring.
- Additional Flow Measurement Stations.
- Add Hexavalent Chromium to suite of Bimonthly/Metals Analytes.
- Bacteria monitoring on major tributaries.

Summary of Committee Input (received from 4 states)

Top Priority (2 points)

Long-term Trends Analysis	IL, IN, OH	6
Add Hex Chrome to Bimonthly Metals Ambient Monitoring	IL, IN	4
Add PFAS to Bimonthly Ambient Monitoring	IN	2 (3)
BacT Monitoring – Tributaries; Mainstem to Update 305b/303d	KY	2
Mussel Surveys	KY	2 (3)
Metals Monitoring on Tributaries	KY	2

Medium Priority (1 point)

Add PFAS to Bimonthly Ambient Monitoring	KY	1
Mussel Surveys	IN	1
Microplastics Monitoring	IN	1
New Recommendations from EPA on Fish Tissue Monitoring	IN, KY	2
Additional Flow Measurement Stations	IN	1

Low Priority or Not Mentioned (0 points)

Additional BacT Monitoring	IN
PCBs & Dioxin Monitoring to Update 305b/303d data	IN, KY
Evaluation of Proteus & Other BacT monitors.	IN, KY
Long-term BacT trends analysis	IN
WQ data analysis by flow regimes	

Prioritization by Score

1) Long-term Trends Analysis
2) Add Hex Chrome to Bimonthly/Clean Metals Ambient Monitoring
3) PFAS Ambient Water Monitoring
3) Mussel Surveys
4) BacT Monitoring Tribs & Mainstem to Update 305b/303d
4) Metals Monitoring on Tribs
5) Add New EPA Recommendations for Fish Tissue Monitoring
6) Microplastics Monitoring
6) Add Flow Measurement Stations

Staff Recommendations Based on Committee Priorities

- Complete Long Term Trends Analysis of Bimonthly/Clean Metals data under EPA Supplemental Grant funding.
- Include Committee priorities in Monitoring Strategy document.
- Complete revised Monitoring Strategy document by year end.
- Continue regular meetings of the Monitoring Strategy Committee.
- Implement top priority recommendations as the budget allows.

Item 13: Alternative Waterbody Impairment Compilation Maps for the Ohio River Basin

Presenter: Bridget Borrowdale (bborrowdale@orsanco.org)

Content Creators:

Bridget Taylor (formerly ORSANCO)

Bridget Borrowdale (bborrowdale@orsanco.org)

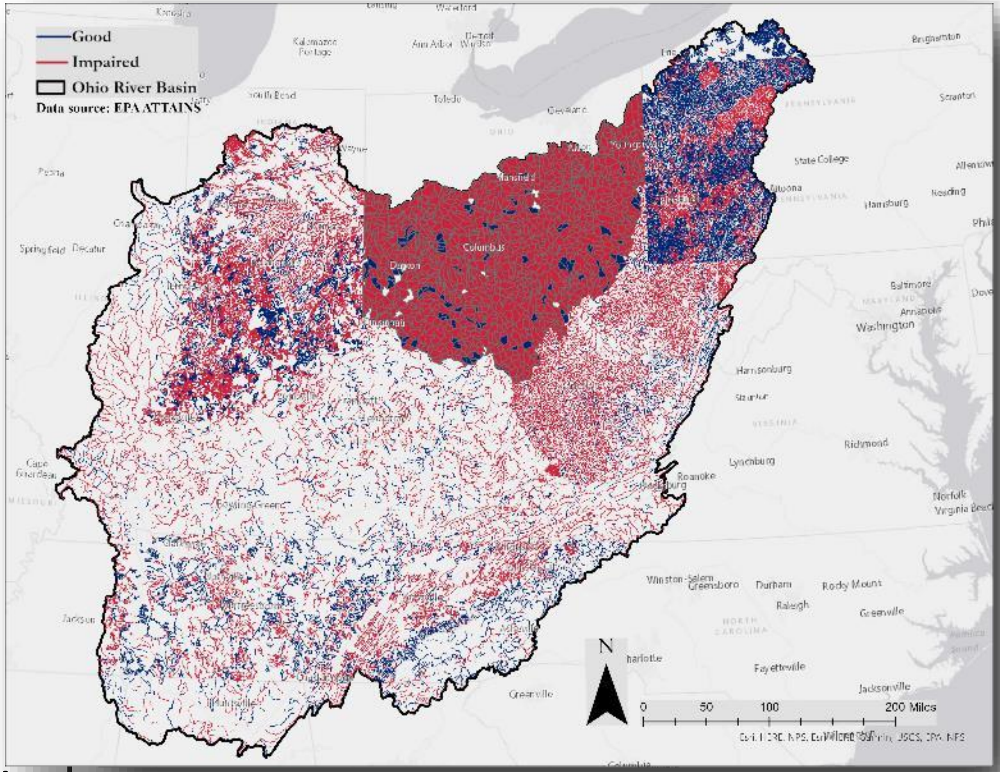
Importance of the Basin Impairment Map

Goal: Provide a basin-level perspective of impaired waterbodies and their contributing causes in order to inform and demonstrate the need for future restoration efforts within the Ohio River Basin (ORB)

Main Application: Garner support for additional basin funding (Ohio River Basin Restoration Plan). Communicate to representatives the impaired waterways within their individual congressional districts

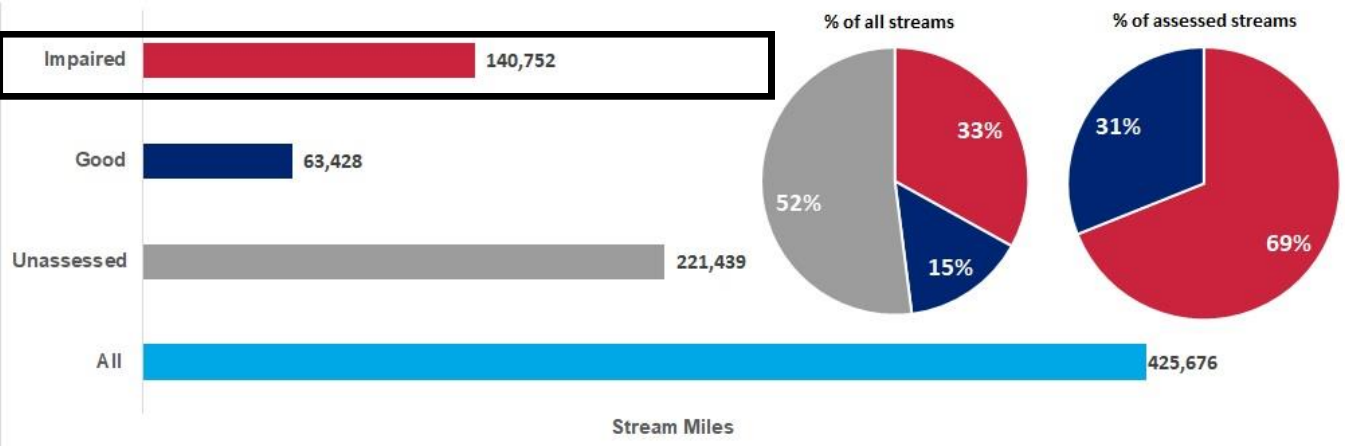
Addressing Storymap Comments (Feb 12th – May 8th)

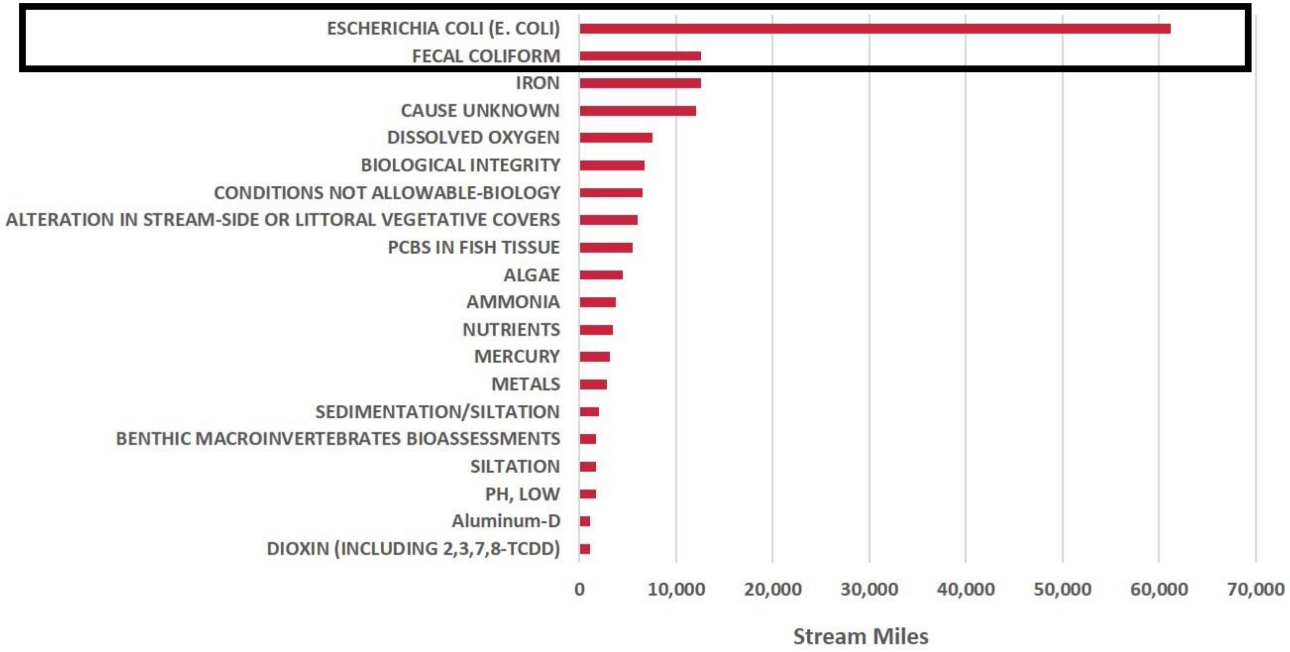
- Contacted all 14 State Agencies to confirm:
  - Correct resolution of "blue line" streams and lakes
    - i.e. What streams or lakes are assessed by each agency
  - Assessment content displayed
    - Correctly extracted from ATTAINS
    - Proportion contribution graphs of pollutants/causes

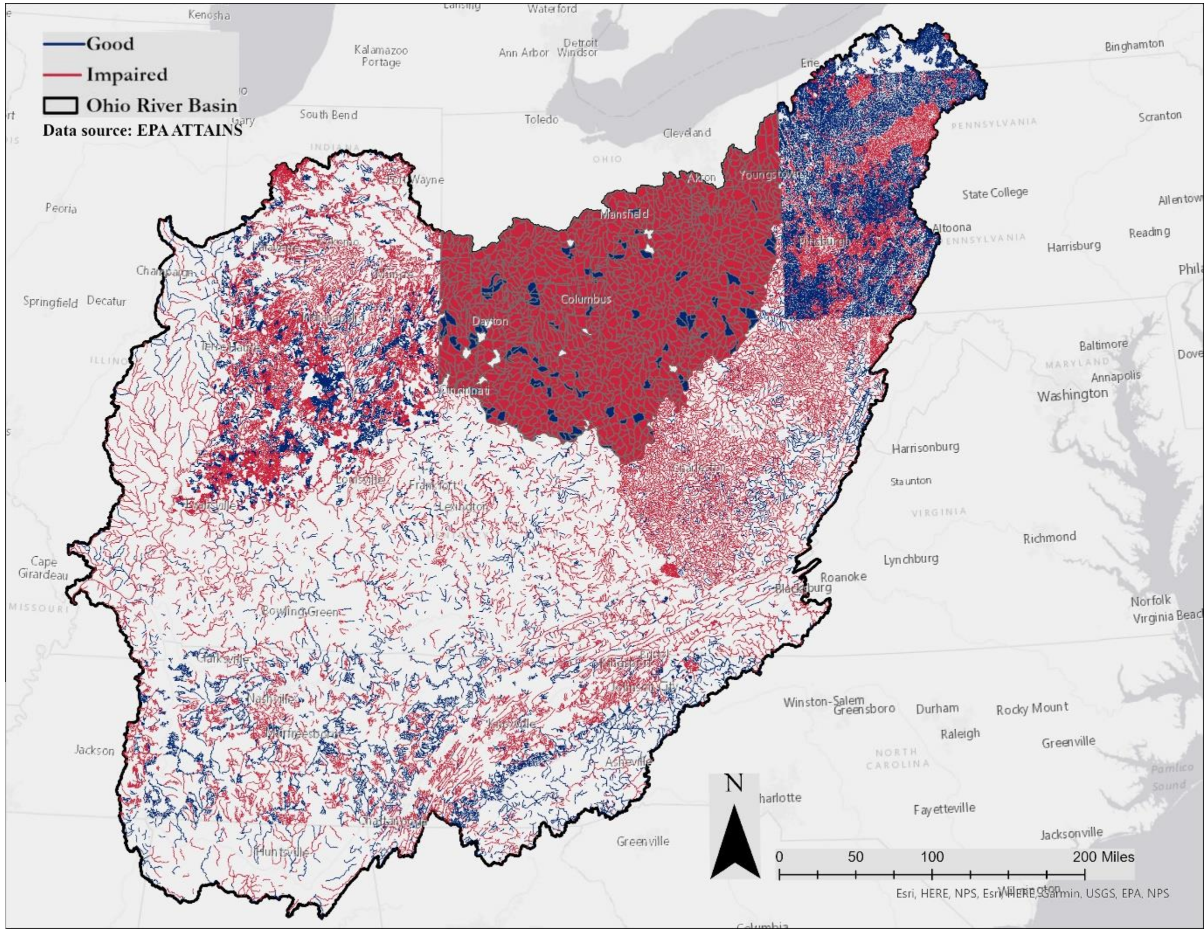


- Incorporated suggested edits
  - Addition of a "Goal" statement
  - Methods clarification in introduction
  - Additional links to state agency materials, as requested
  - Removal of non-point source pollution

Original Storymap

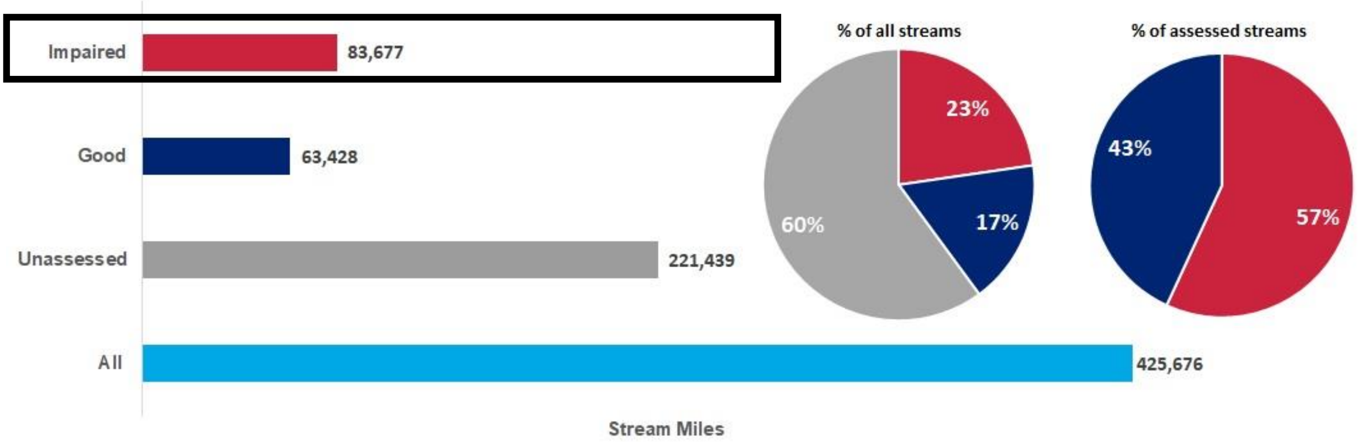


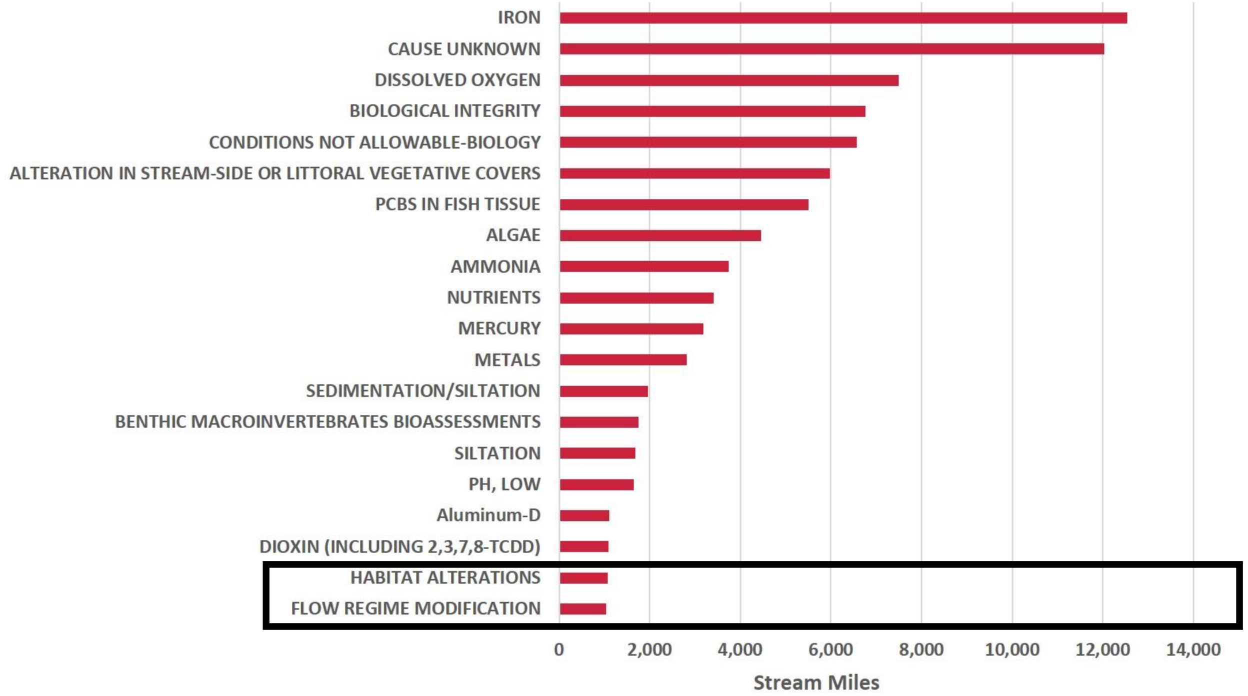


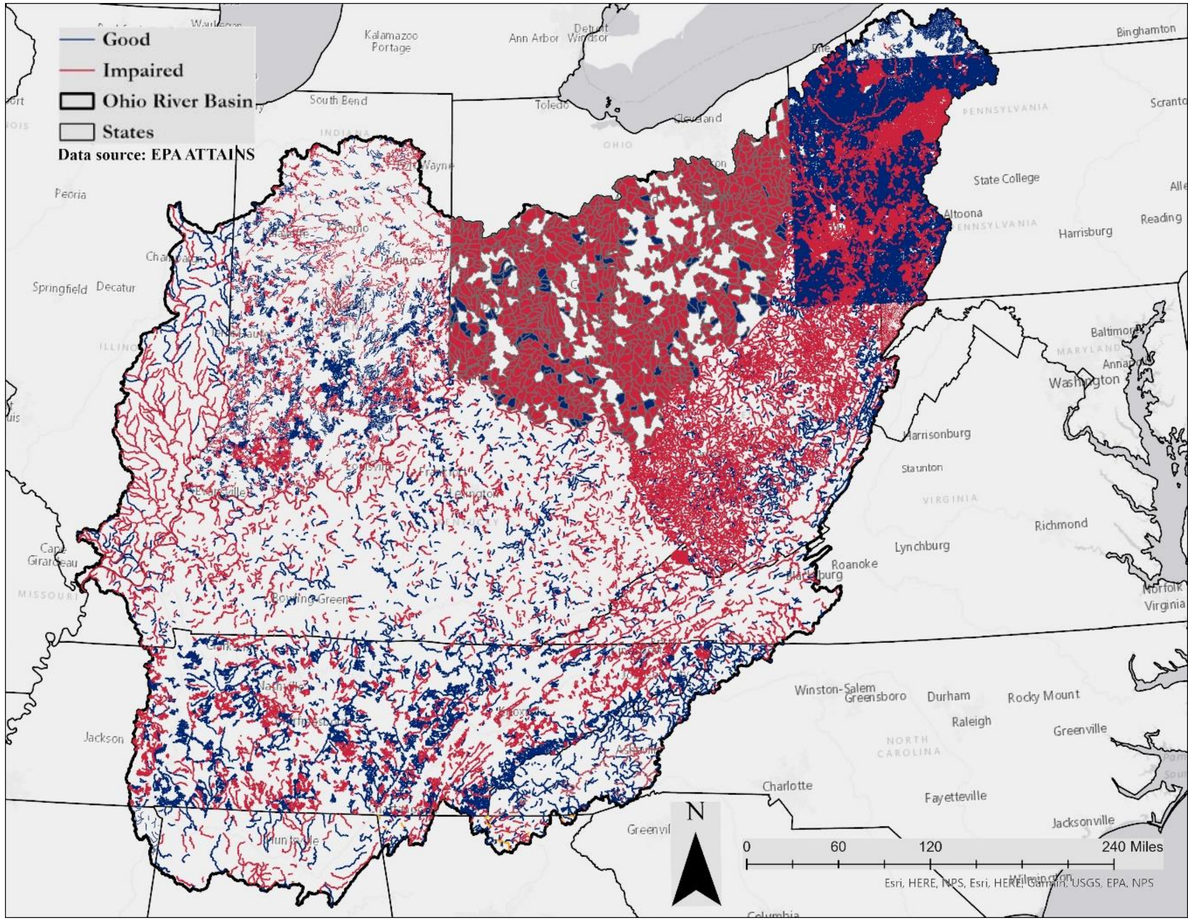


SCAN ME

Alternative Storymap Excluding Bacteria Impairments







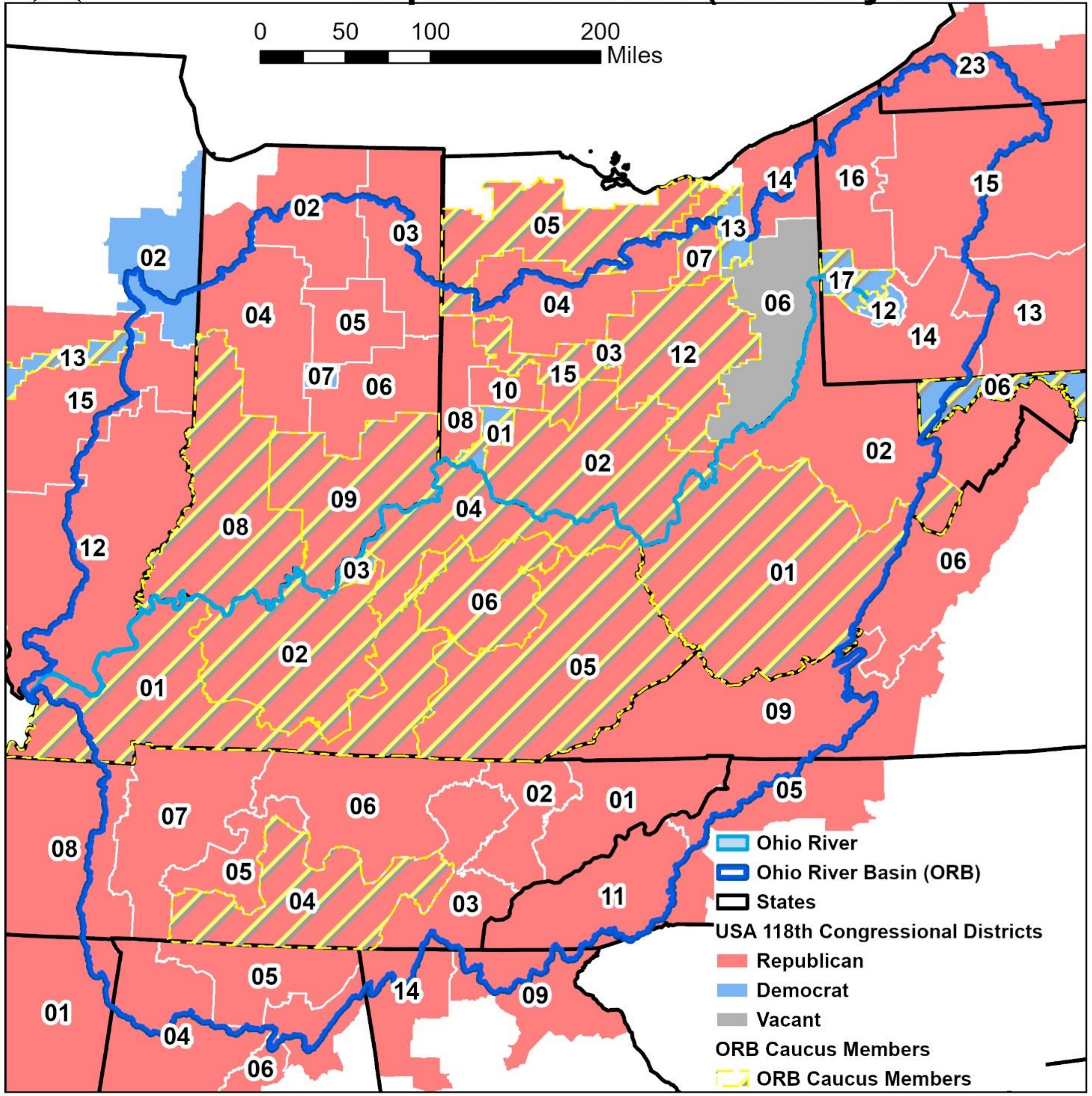
SCAN ME

Status of ORB Streams & Lakes

SCAN ME

N

Ohio River Basin 118th U.S. Congressional Representatives (January 2023-2025)



Alabama
04 Robert Aderholt
05 Dale Strong
06 Gary Palmer

Georgia
09 Andrew Clyde
14 Marjorie Taylor Greene

Illinois
02 Robin Kelly
12 Mike Bost
13 Nikki Budziniski
15 Mary Miller

Indiana
02 Rudy Yakym III
03 Jim Banks
04 James Baird
05 Victoria Spartz
06 Greg Pence
07 André Carson
08 Larry Bucshon
09 Erin Houchin

Kentucky
01 James Comer
02 Brett Guthrie
03 Morgan McGarvey
04 Thomas Massie
05 Hal Rogers
06 Andy Barr

Maryland
06 David Trone

Mississippi
01 Trent Kelly

New York
23 Nicholas Langworthy

North Carolina
05 Virginia Foxx
11 Chuck Edwards

Ohio
01 Greg Landsman
02 Brad Wenstrup
03 Joyce Beatty
04 Jim Jordan
05 Robert Latta
06 Michael Rulli
07 Max Miller
08 Warren Davidson
10 Michael Turner
12 Troy Balderson
13 Emilia Strong Sykes
14 David Joyce
15 Mike Carey

Pennsylvania
12 Summer Lee
13 John Joyce
14 Guy Reschenthaler
15 Glenn Thompson
16 Mike Kelly
17 Christopher Deluzio

Tennessee
01 Diana Harshbarger
02 Tim Burchett
03 Charles Fleischmann
04 Scott DesJarlais
05 Andrew Ogles
06 John Rose
07 Mark Green
08 David Kustoff

Virginia
06 Ben Cline
09 H. Morgan Griffith

West Virginia
01 Carol Miller
02 Alexander Mooney

**Caucus Members are highlighted and underlined

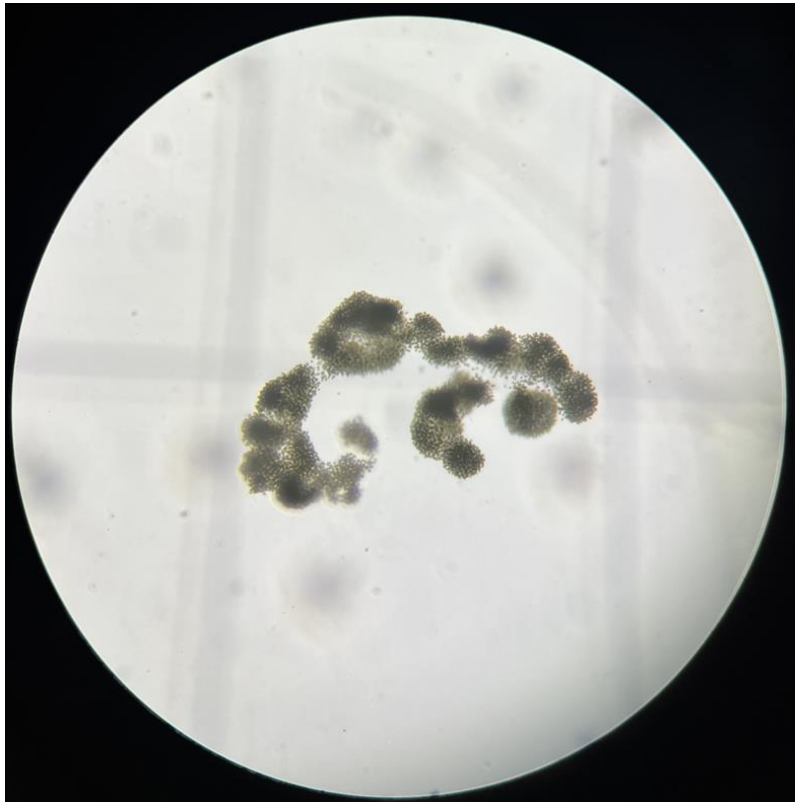
Cartographer: Bridget Borrowdale, ORSANCO

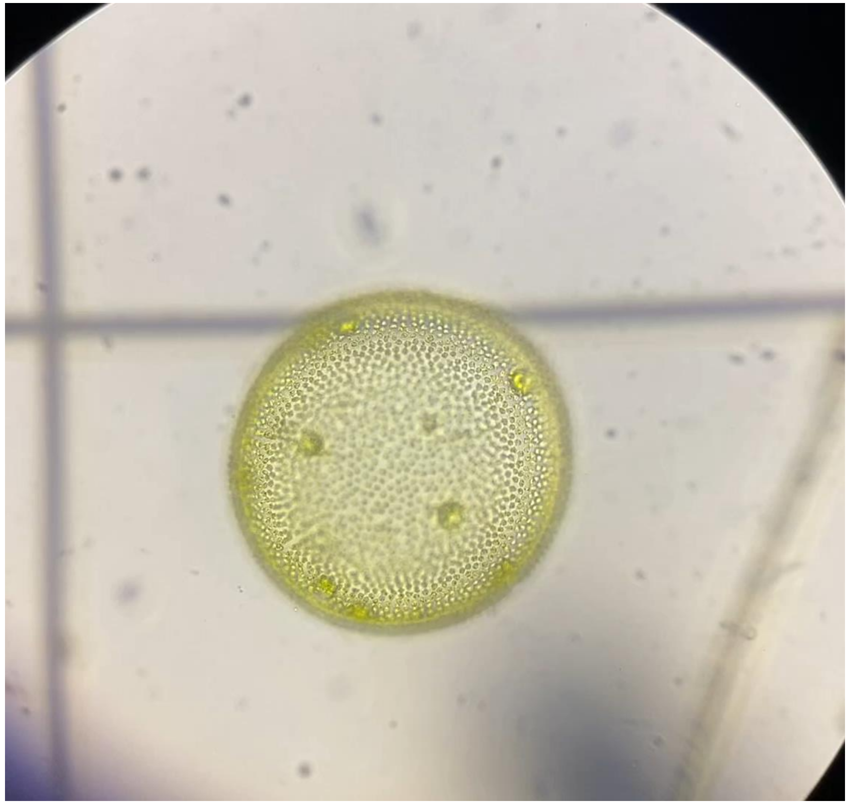
Thank you for your assistance!

Questions?

Agenda Item 14:
Report of 2024 HABs and Algal Conditions in the Ohio River

Greg Youngstrom, ORSANCO





2024 HABs and Algal Conditions

Agenda Item 14

Greg Youngstrom

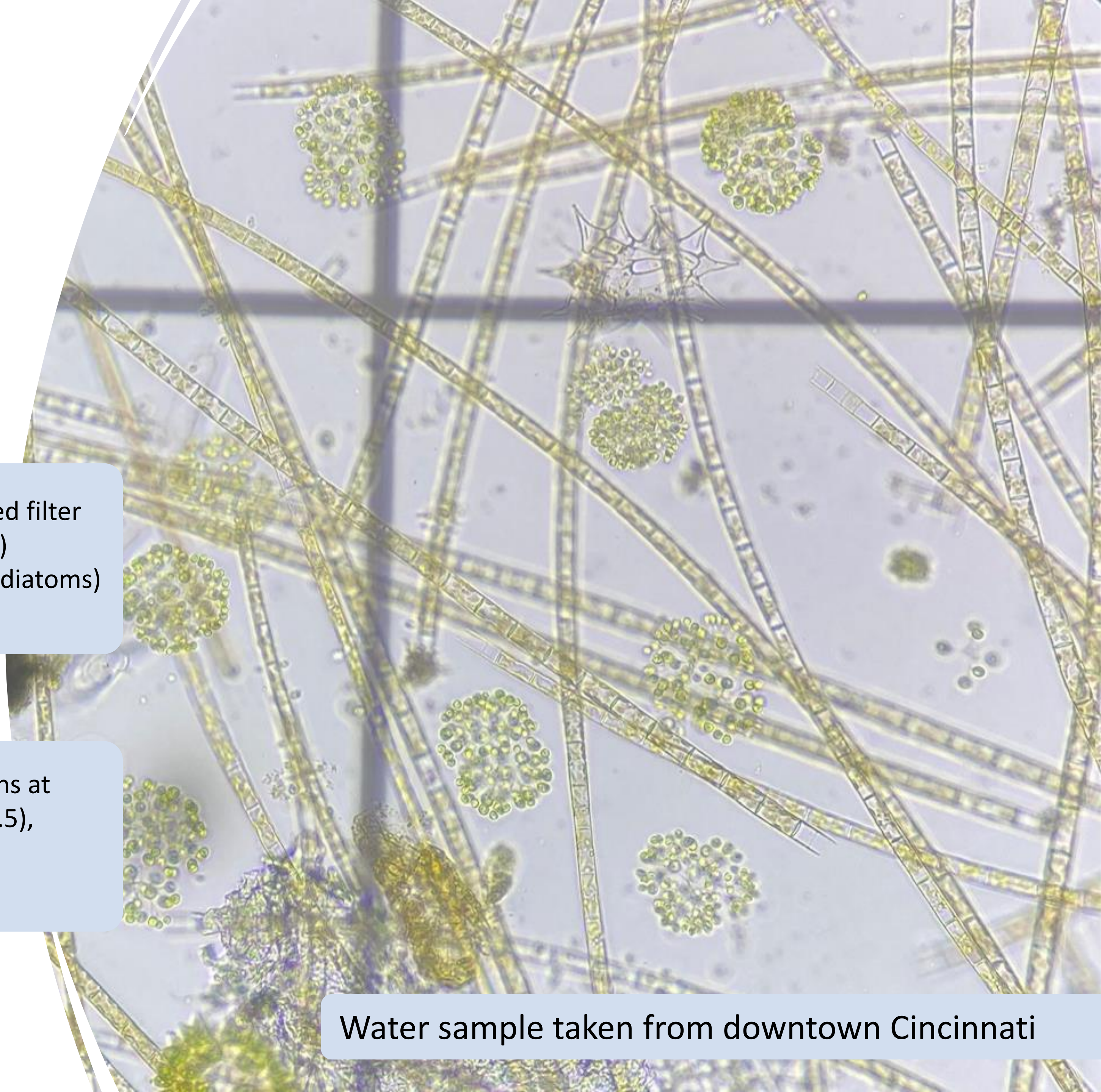
Aulacoseira Bloom #1

June 14th

Maysville (RM 408) reported reduced filter run time (from 5 days to less than 1)
4418.78 cells/mL at Maysville (60% diatoms)
end date?

June 17th

Slight increase in algal concentrations at GCWW (RM 463) and LWC (RM 600.5), mostly diatoms with some greens
No decline in plant performances



Water sample taken from downtown Cincinnati

Aulacoseira Bloom #2

June 24th	First signs of Aulacoseira bloom in Louisville (RM 600.5)
July 3rd	Major Skeletonema bloom in Westport (RM 580.5) 24,193 total cells/mL
July 9th	Plankton tows at Cincinnati (RM 470) & Meldahl (RM 436.5) look like oil sludge due to high concentrations of Aulacoseira; some Microcystis colonies present
July 19th	Decreased abundance of Aulacoseira
July 23rd	Still some Aulacoseira, increases in Greens (Pediastrum and Volvox) and Cyanobacteria (Oscillatoria and Dolicospermum)

July 9th plankton tow at Meldahl Lock and Dam

Microcystis on the Kentucky River

July 31st: Clear water with no visible Microcystis colonies

July 25th

Louisville Water reported Microcystis bloom on Kentucky River (RM 546)
Estimated cell counts of 35,000-50,000, toxin levels 4.69ug/L

July 26th

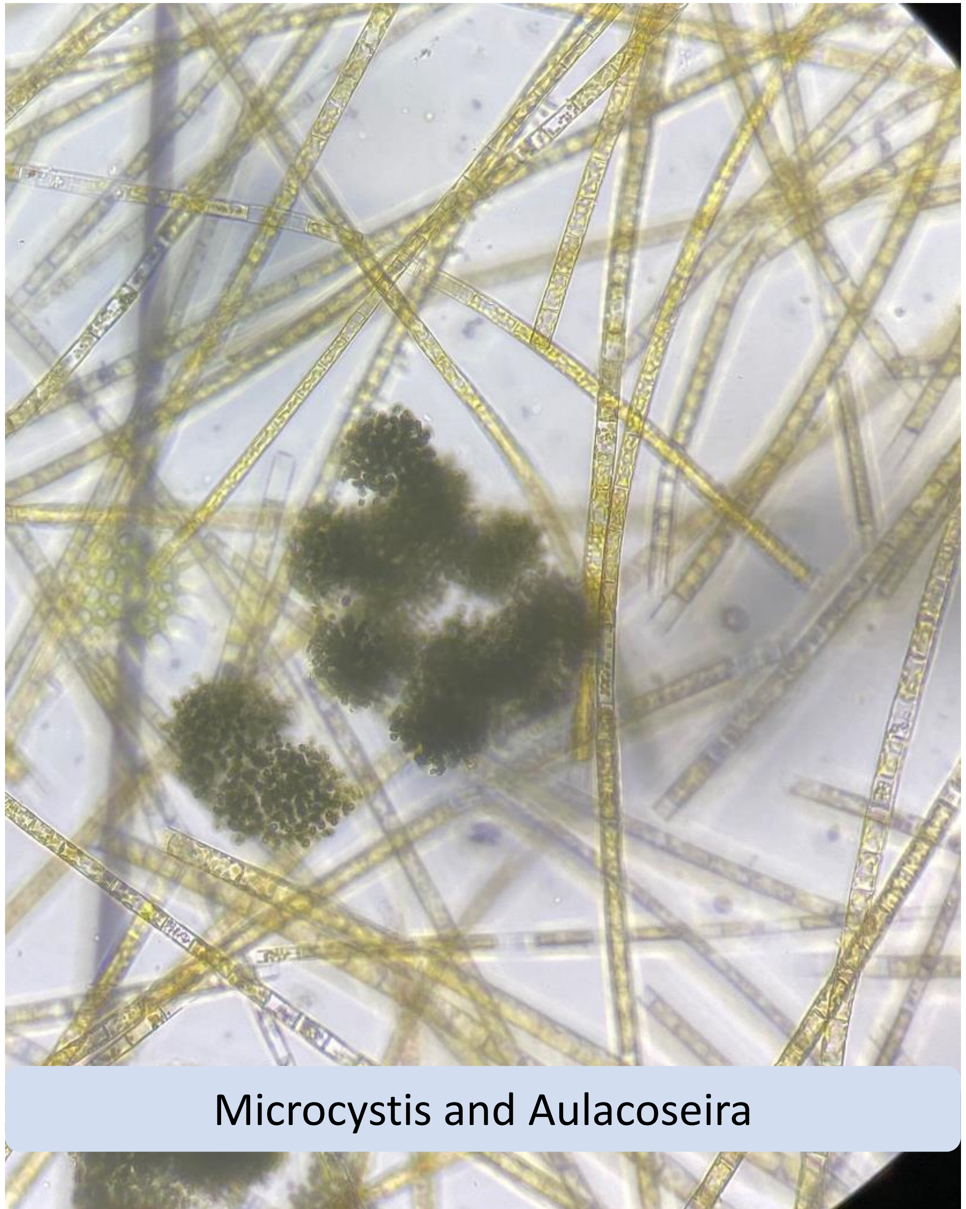
Kentucky Division of Water sent crews to investigate, reported no signs of bloom

July 31st

ORSANCO sampled the area, no signs of bloom. Toxin levels Non-Detect

July 25th: Water sample collected by Louisville Water with visible Microcystis colonies

Louisville Microcystis Bloom

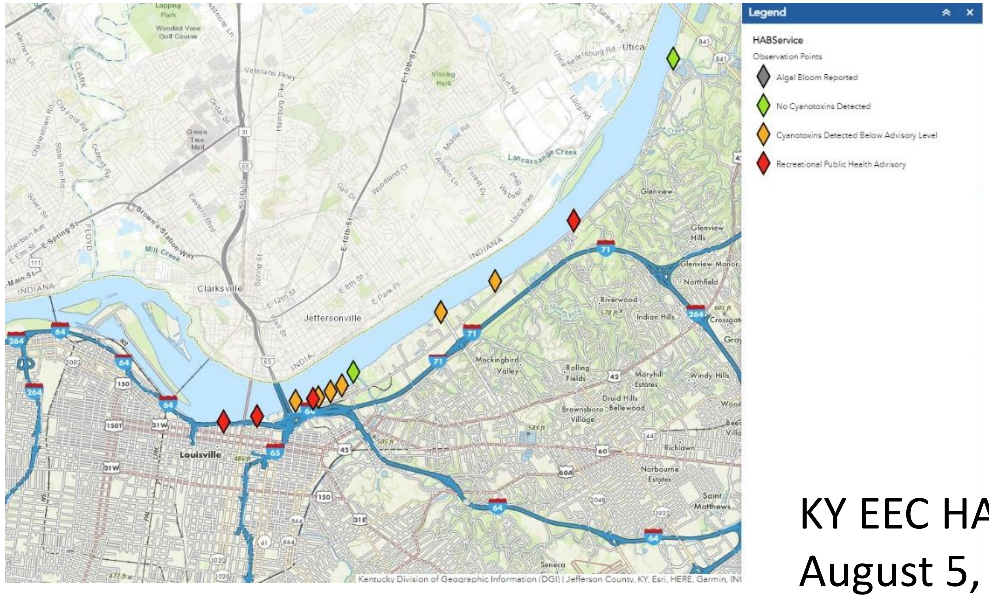


Microcystis and Aulacoseira

- **August 1st** — Report of HAB near Louisville (RM 502)

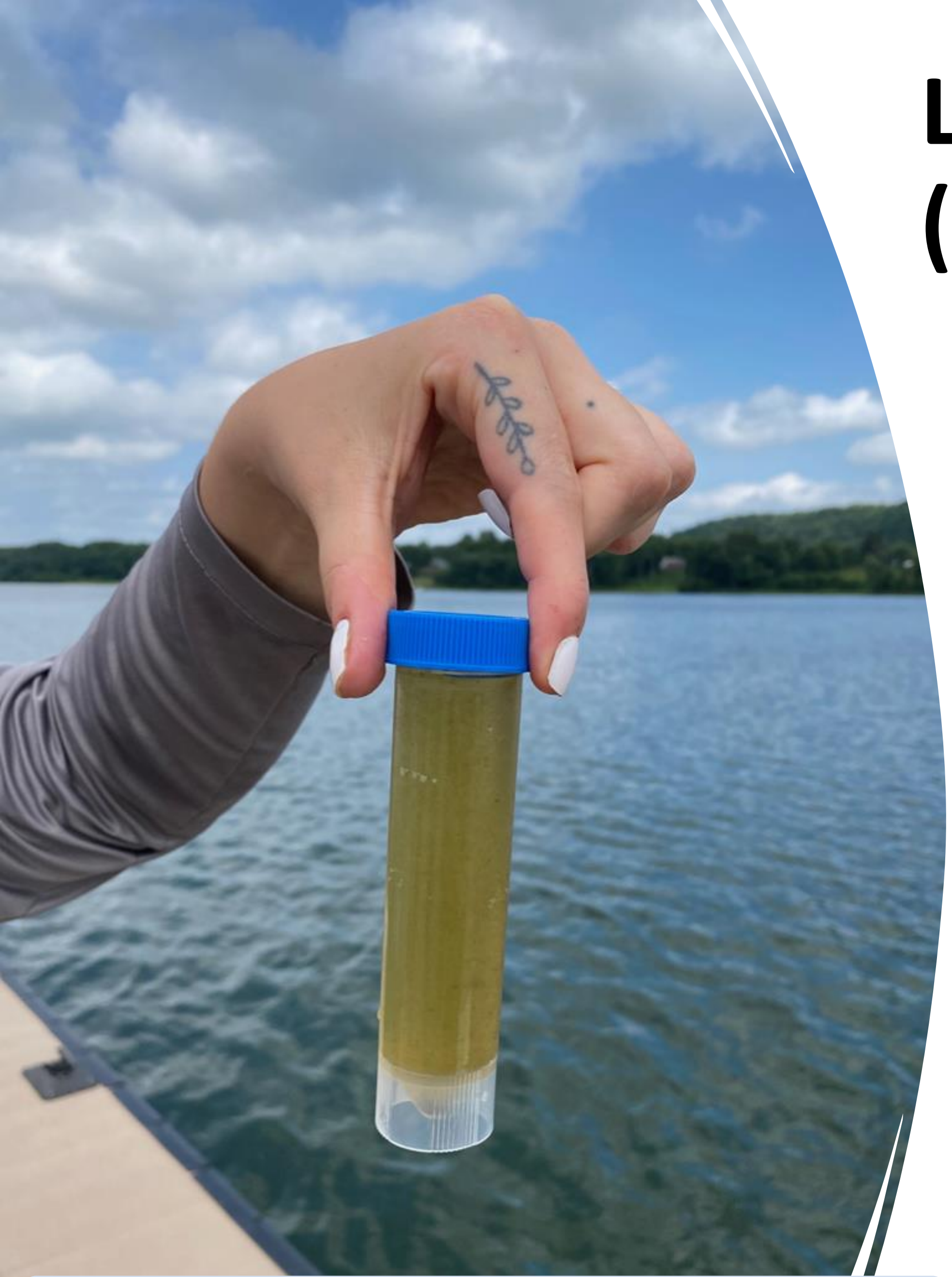
  Algal toxins present but below standard 8.0ug/L

- **August 2nd** — Algal toxins exceed standard, Kentucky Dept. of Water issues advisory (TOXIN RESULT)



KY EEC HAB Advisory Page
August 5, 2024

Louisville Microcystis Bloom (continued)



Plankton tow collected 8/7 at Madison, IN

August 7th

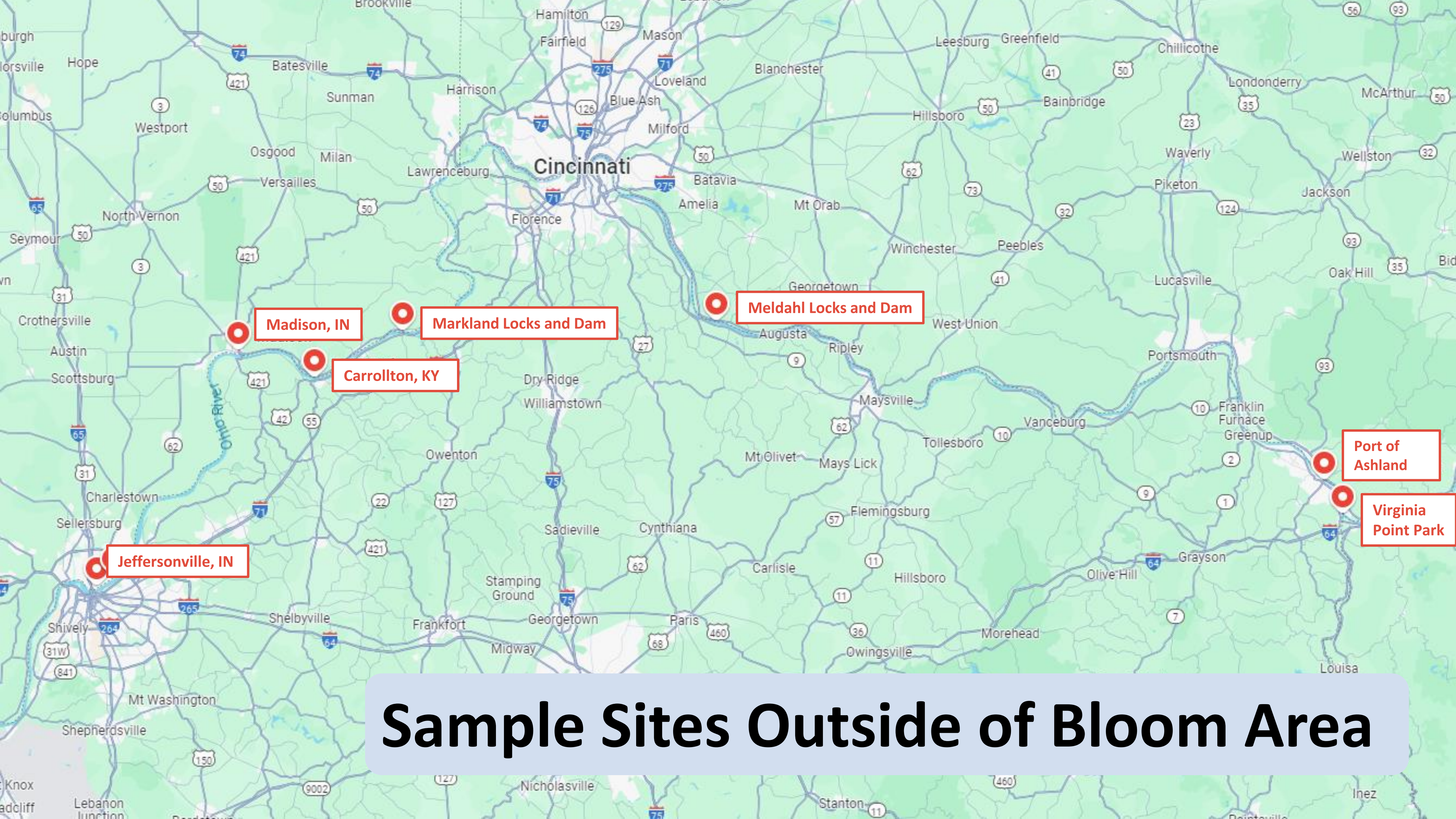
ORSANCO sampled Markland L&D (RM 531.5); Carrollton, KY (RM 545.5); Madison, IN (RM 558); and Jeffersonville, IN (RM 602.5)

All samples were non-detect

August 8th

ORSANCO sampled at Ashland, KY (RM 323) and Kenova, WV (RM 317)

All samples were non-detect



Sample Sites Outside of Bloom Area

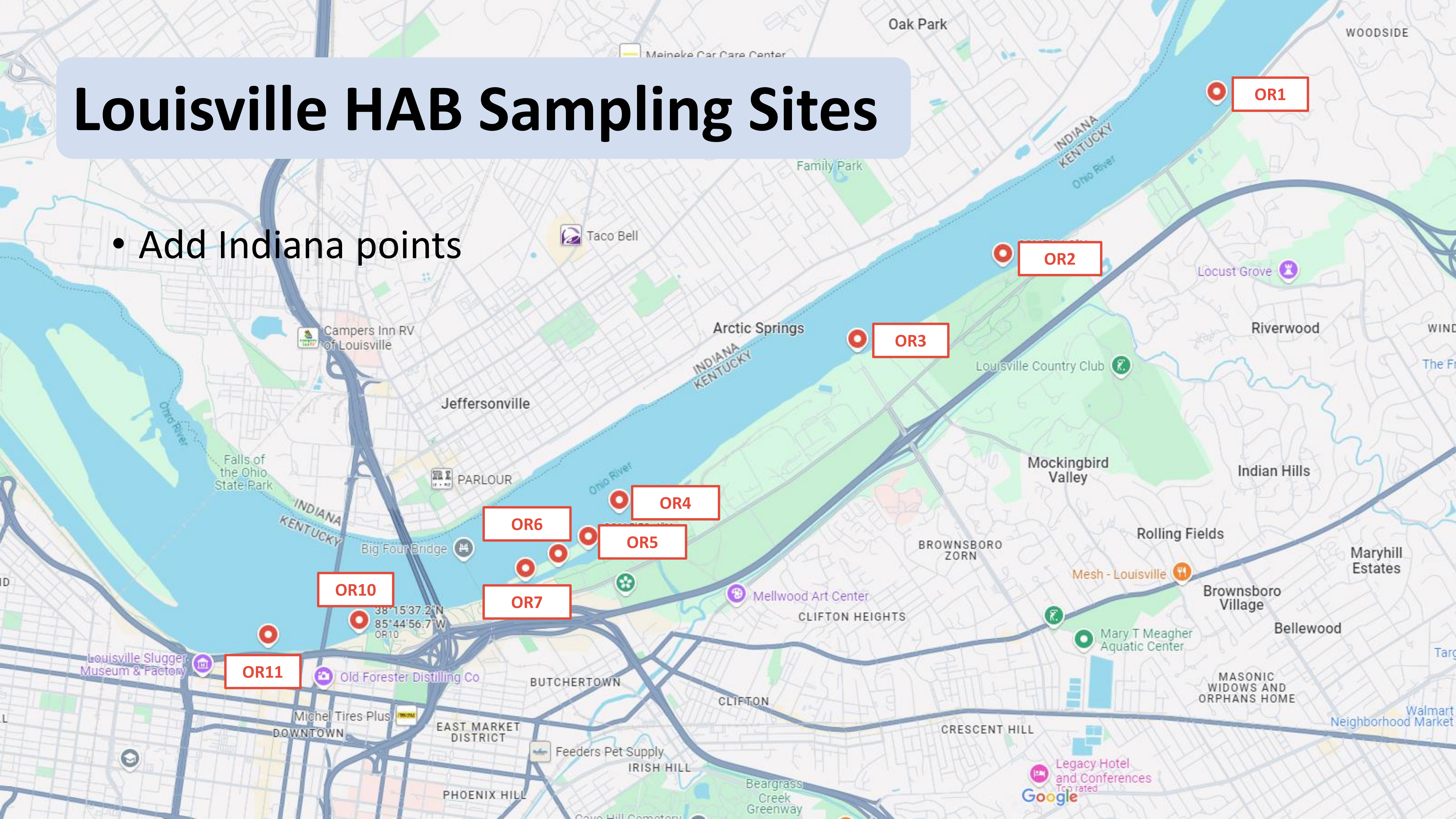
Louisville Microcystis Bloom (Cont)

- **August 14th** ORSANCO sampled at Louisville, KY and Jeffersonville, IN
  Two samples contained algal toxins below 8.0 ug/L
- **August 15th** ORSANCO sampled at Louisville, KY
  Three samples contained algal toxins below standard 8.0 ug/L
- **August 22nd** Recreational public health advisory lifted

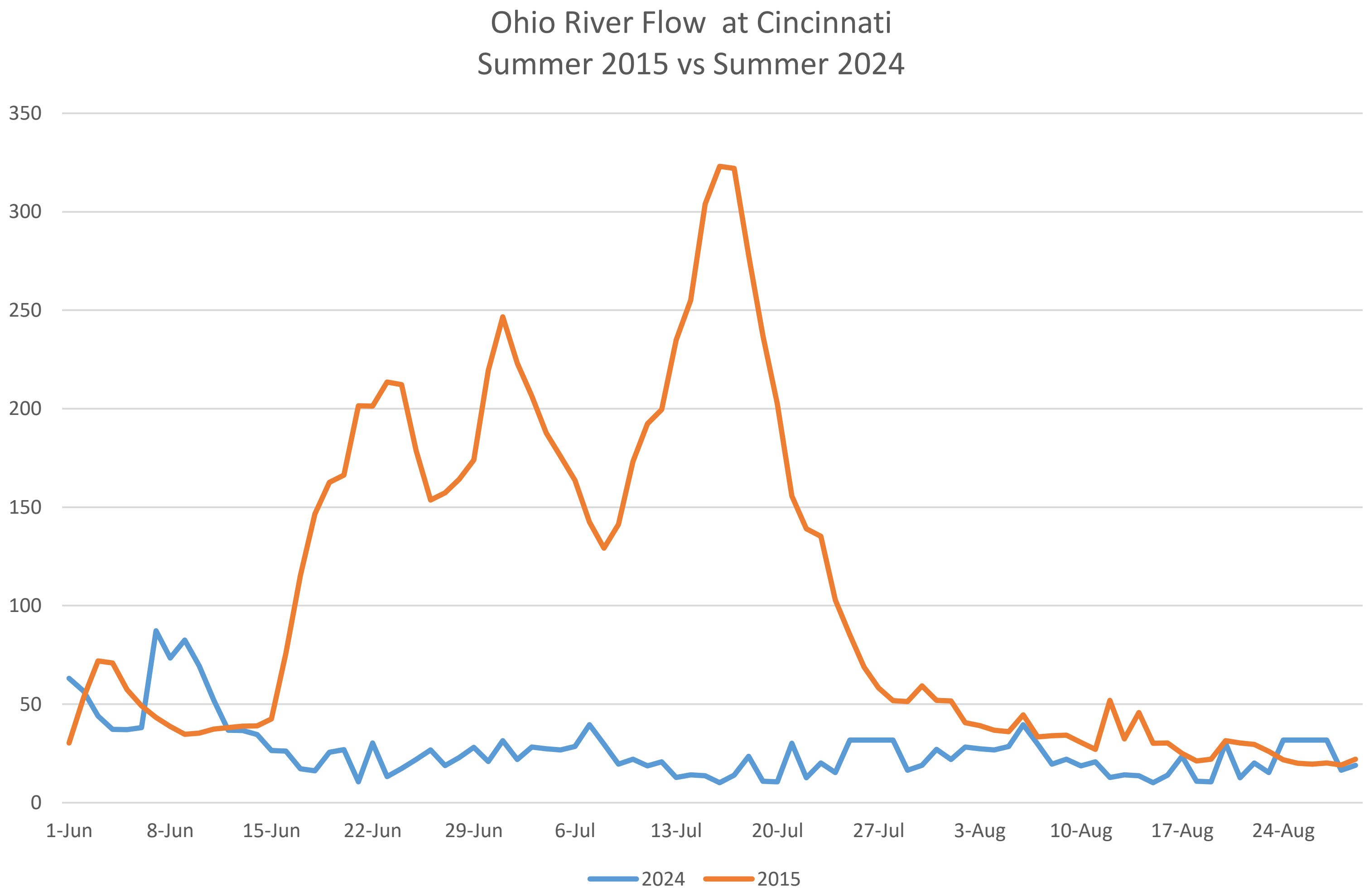
Microcystis sp. colony under microscope

Louisville HAB Sampling Sites

- Add Indiana points



2015 vs 2024 Flows



Agenda Item 15:
Update Regarding ORSANCO's Communication Plan

Annette Shumard, ORSANCO

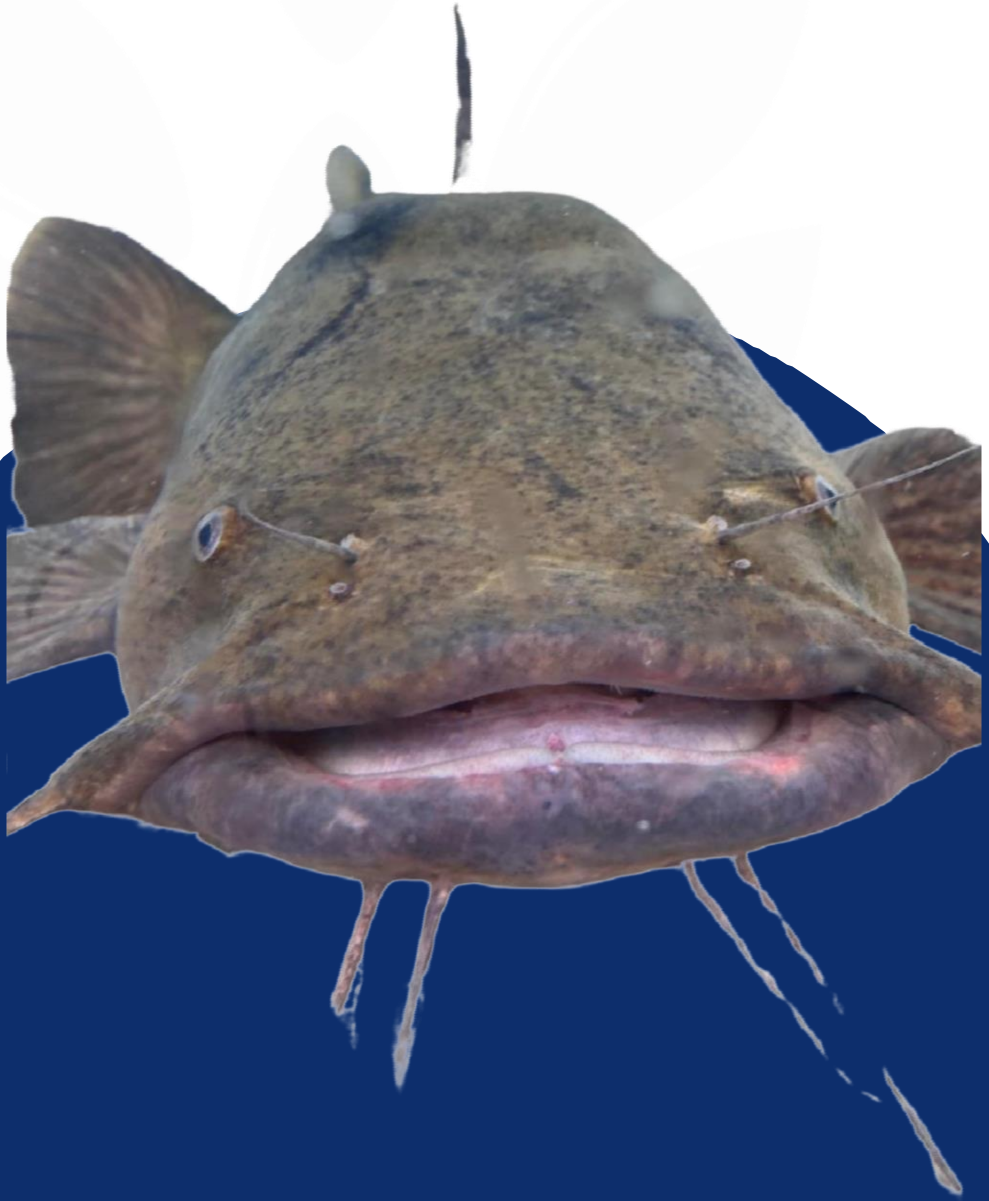

OHIO RIVER VALLEY
AN INTERSTATE AGENCY
ESTABLISHED JUNE 30, 1948
WATER SANITATION COMMISSION
ORSANCO
Communication & Public Involvement

Annette Shumard

ORSANCO Communication & Environmental Education Manager
FORE Executive Director

Communication & Public Information

Public Involvement



Budget & Fundraising

The Team Behind Us

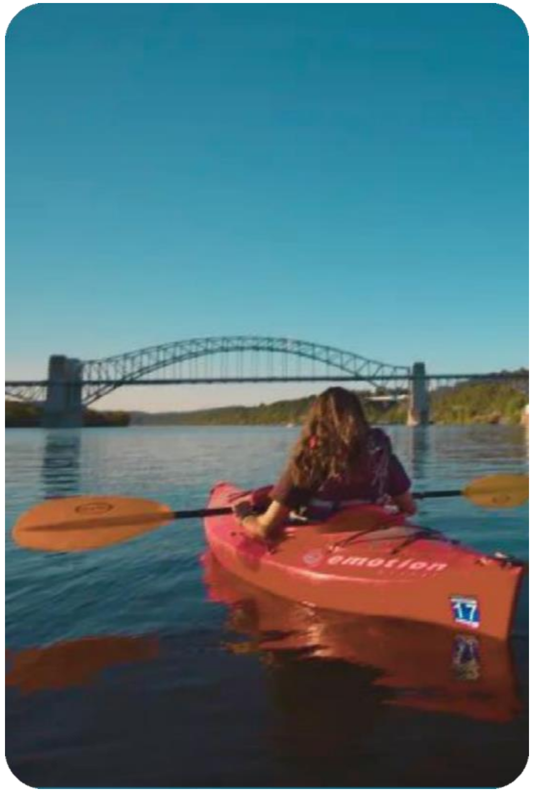
Teamwork Is The Key

The Team Behind Us

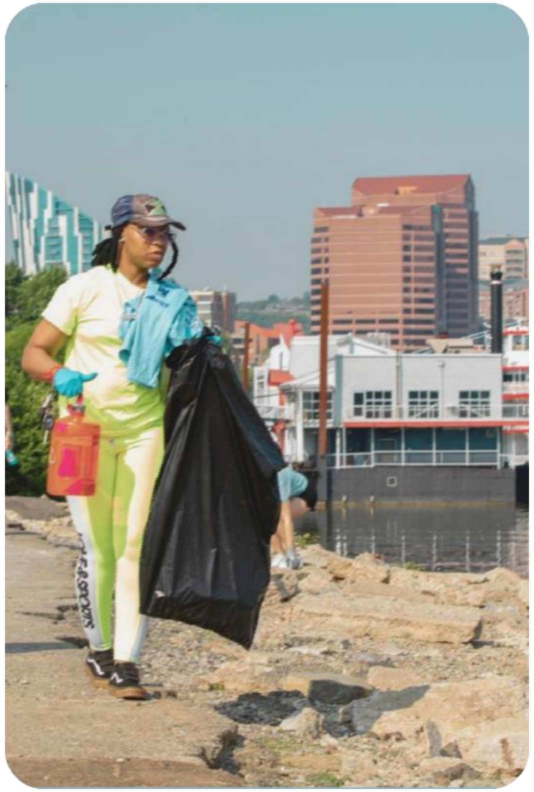
Teamwork Is The Key

ORSANCO Data Collection

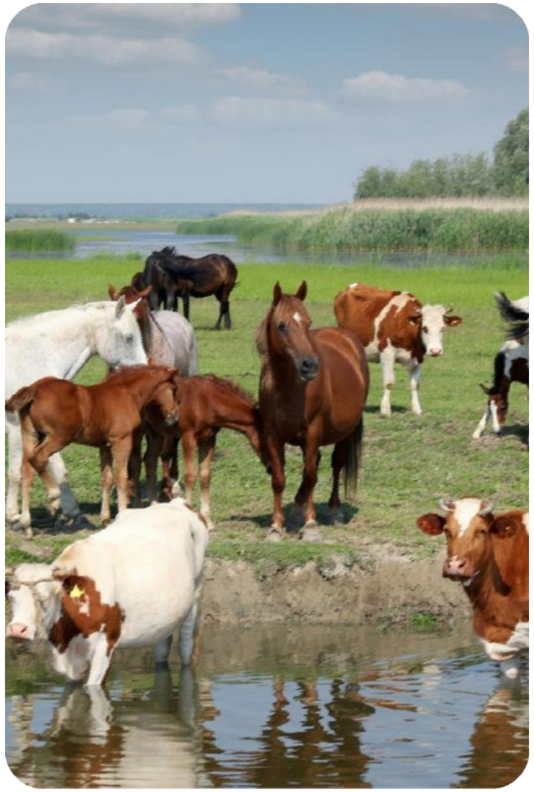
Public Information

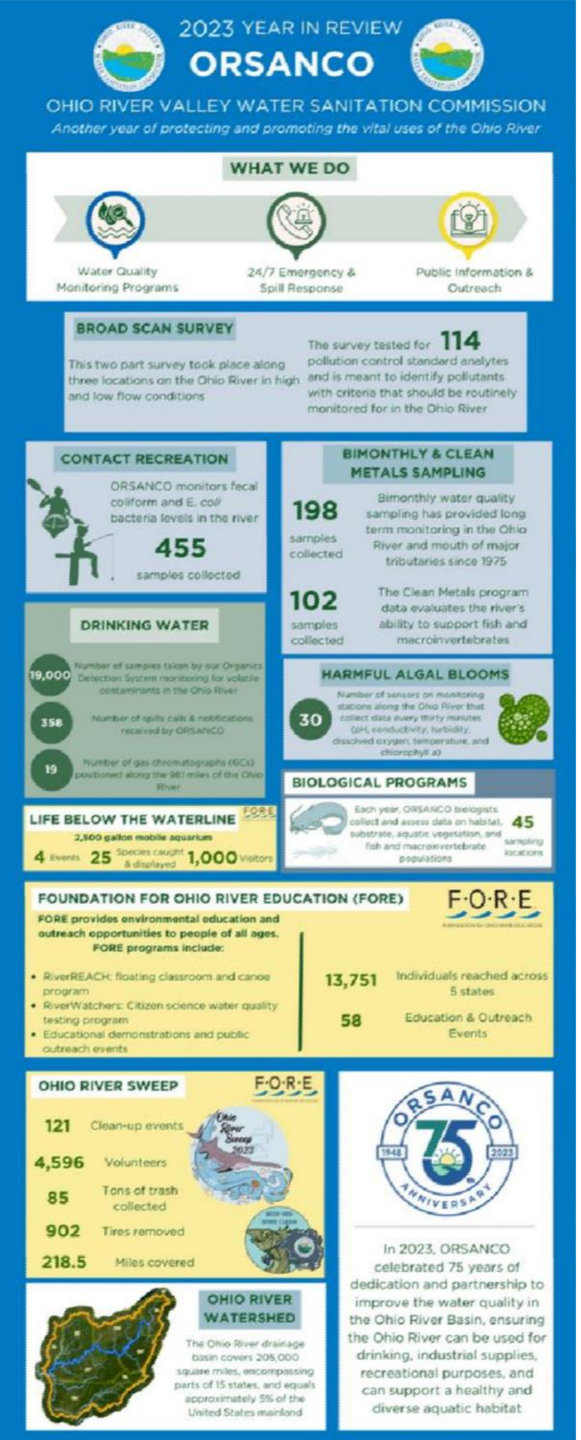



Public Involvement



Changed Behavior





ORSANCO

Impact

Other Business:

- Comments by Guests
- Announcement of Upcoming Meetings

  February 11-12, 2025: Covington, KY

  June 10-11, 2025: Morgantown, WV
- Adjourn

Chair, Scott Mandirola