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MID-ATLANTIC REGION

You have arrived at:

Regulatory Updates on PFAS: Forever Chemicals Here to Stay

Welcome!

We will get started soon.

EPA MID-ATLANTIC REGION
2023 SUMMIT
Engaging and Investing for a
Healthy and Sustainable Future

Regulatory Updates on PFAS: Forever Chemicals Here to Stay

May 17, 2023
EPA Mid-Atlantic Summit
Ruby Stanmyer (EPA R3), Charles Brown (EPA R3), Amy Williams (PADEP)
EPA Mid Atlantic Region

Friendly Reminders Before We Get Started

Please mute yourself and turn off your webcam during presentations.

If you encounter technical difficulties during the meeting, you can:

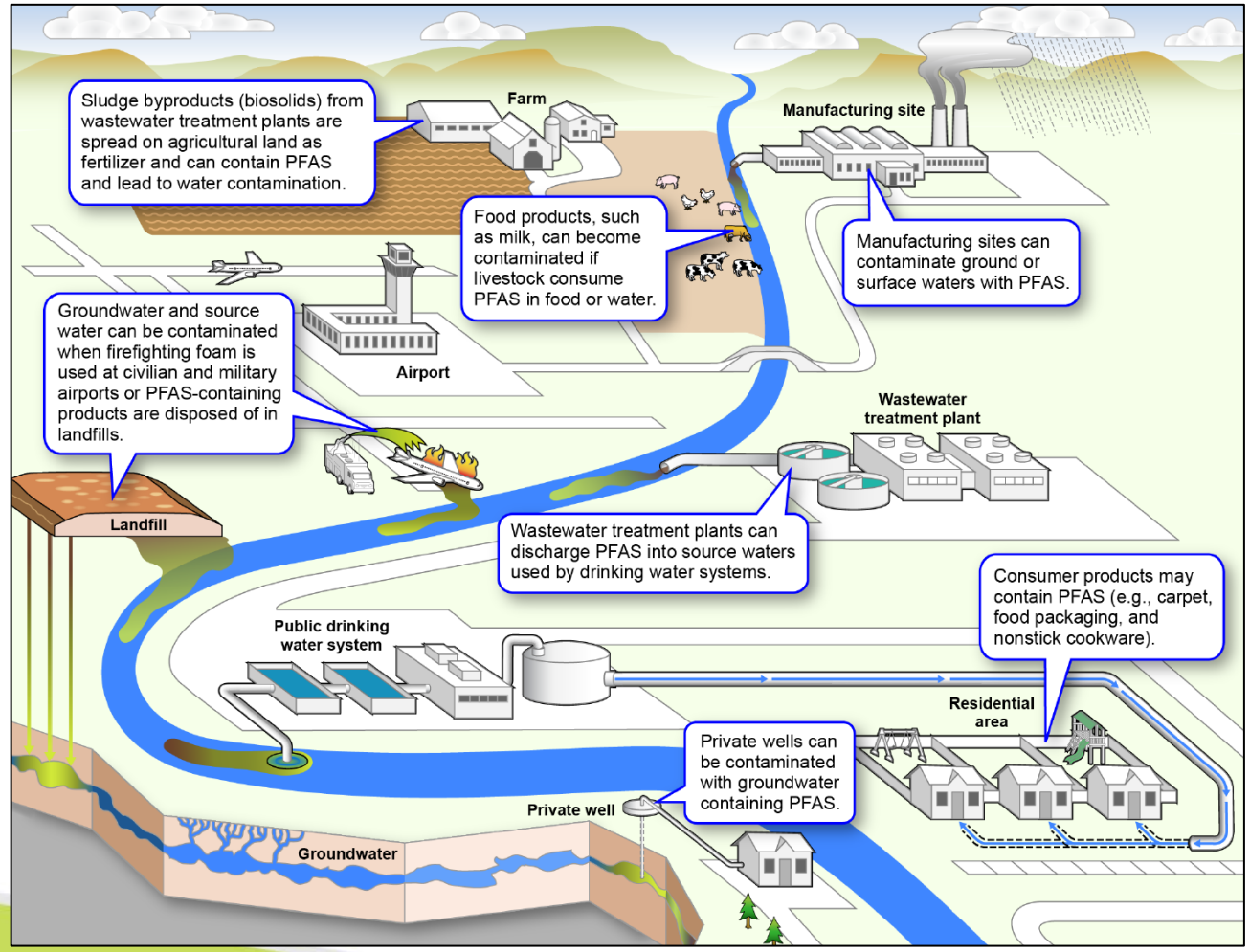
- ✓ Send a chat message directly to Host or IT Support
- ✓ Email epamidatlsummit@michaeldbaker.com with the subject line “Zoom Support“

This session is being recorded and will be made available after the summit.

Overview

- Updates on EPA's PFAS Strategic Roadmap
- Background on Per- and Polyfluoroalkyl Substances (PFAS)
- EPA's Approach and Goals on Water Actions
- Bipartisan Infrastructure Law and PFAS
- Pennsylvania's Updates on PFAS

PFAS Lifecycle and EPA's Approach



Source: GAO | GAO-21-37

- EPA Administrator Michael Regan established the EPA Council on PFAS in April 2021.
- The Council developed the PFAS Strategic Roadmap, released in October 2021 – a bold, strategic, whole-of-EPA strategy to protect public health and the environment from PFAS.
- The PFAS Strategic Roadmap:
  - Lays out EPA's whole-of-agency approach to tackling PFAS;
  - Sets timelines for concrete actions from 2021 to 2024;
  - Fills a critical gap in federal leadership;
  - Supports states' ongoing efforts; and
  - Builds on the Biden-Harris Administration's commitment to restore scientific integrity.

What Are Per- and Polyfluoroalkyl Substances (PFAS) and Why Are We Concerned?

PFAS captures a large class of synthetic chemicals.

- Chains of carbon atoms surrounded by fluorine atoms.
- Wide variety of chemical structures.

Used in homes, businesses, and industry since the 1940s.

- Used by a number of industries and found in many consumer products.
- Detected in soil, water, and air samples.
- Most people have been exposed to PFAS.

Known or suspected toxicity.

- Potential developmental, liver, immune, and thyroid effects.
- Some are relatively well understood; many others are not.
- Resist decomposition in the environment and in the human body.

Bipartisan Infrastructure Law and PFAS

The Bipartisan Infrastructure Law provides $10 billion to invest in communities impacted by PFAS and other emerging contaminants.

$4 billion	Drinking Water State Revolving Fund
$1 billion	Clean Water State Revolving Fund
$5 billion	Small or Disadvantaged Communities Drinking Water Grants

February 13 allotment announcement:

- EPA announced the first round of allotments under the ***Emerging Contaminants in Small or Disadvantaged Communities*** grant program for FY22/FY23.
- EPA will award $178.5 Million to Region 3 grantees (DC, DE, MD, PA, VA, and WV)
- Guidance available at: https://www.epa.gov/dwcapacity/emerging-contaminants-ec-small-or-disadvantaged-communities-grant-sdc

Bipartisan Infrastructure Law SRF Funding

3 Pots of Supplemental DWSRF Funds for 5 years

GENERAL SUPPLEMENT - $11.7B

EMERGING CONTAMINANTS SUPPLEMENTAL - $4B

LEAD SERVICE LINE SUPPLEMENTAL - $15B

2 Pots of Supplemental CWSRF Funds for 5 years

GENERAL SUPPLEMENT -$11.7B

EMERGING CONTAMINANTS SUPPLEMENTAL - $1B

Protecting our Water

Set enforceable limits for PFOA and PFOS in drinking water

Improve PFAS drinking-water data through monitoring, toxicity assessments, and health advisories

Develop technology-based PFAS limits for industrial dischargers

Address PFAS in Clean Water Act permitting, analytical methods, water quality criteria, and fish advisories

Evaluate risks of PFAS in biosolids

EPA's Proposed Action for the PFAS NPDWR

Compound	Proposed MCLG	Proposed MCL (enforceable levels)
PFOA	0 ppt*	4.0 ppt*
PFOS	0 ppt*	4.0 ppt*
PFNA	1.0 (unitless) Hazard Index	1.0 (unitless) Hazard Index
PFHxS		
PFBS		
HFPO-DA (commonly referred to as GenX Chemicals)		

The Hazard Index is a tool used to evaluate potential health risks from exposure to chemical mixtures.

- EPA held a public hearing on May 4, 2023, where members of the public provided verbal comments to EPA on the rule proposal.
- The public comment period is open through May 30, 2023. Available online.

EPA's Proposed Action for the PFAS NPDWR

- The proposed rule would require public water systems to:
  - Monitor for these PFAS;
  - Notify the public of the levels of these PFAS; and
  - Reduce the levels of these PFAS in drinking water if they exceed the proposed standards.
- EPA is requesting comment on the proposed rule.
- EPA is also requesting comment on its preliminary determinations to regulate PFHxS, PFNA, PFBS, GenX Chemicals, as well as mixtures of these four PFAS.
- This action is not final and does not require any actions until after EPA considers public input and finalizes the regulation.
- EPA anticipates that if fully implemented the rule will prevent

Unregulated Contaminant Monitoring Rule (UCMR5)

- EPA's Fifth Unregulated Contaminant Monitoring Rule (UCMR5) will sample for 29 PFAS.
  - Sampling to occur between January 2023-December 2025.
  - All PWSs serving 3,300 or more people + representative PWSs serving <3,300 will collect samples.
  - EPA to arrange for the analysis of small-system samples and will pay for shipping and analytical costs.
  - This significantly expands the number of water systems participating in sampling.

How Does PFOA/PFOS Criteria Protect Aquatic Life?

Charles Brown

EPA Region 3

Standards and TMDL Section

EPA
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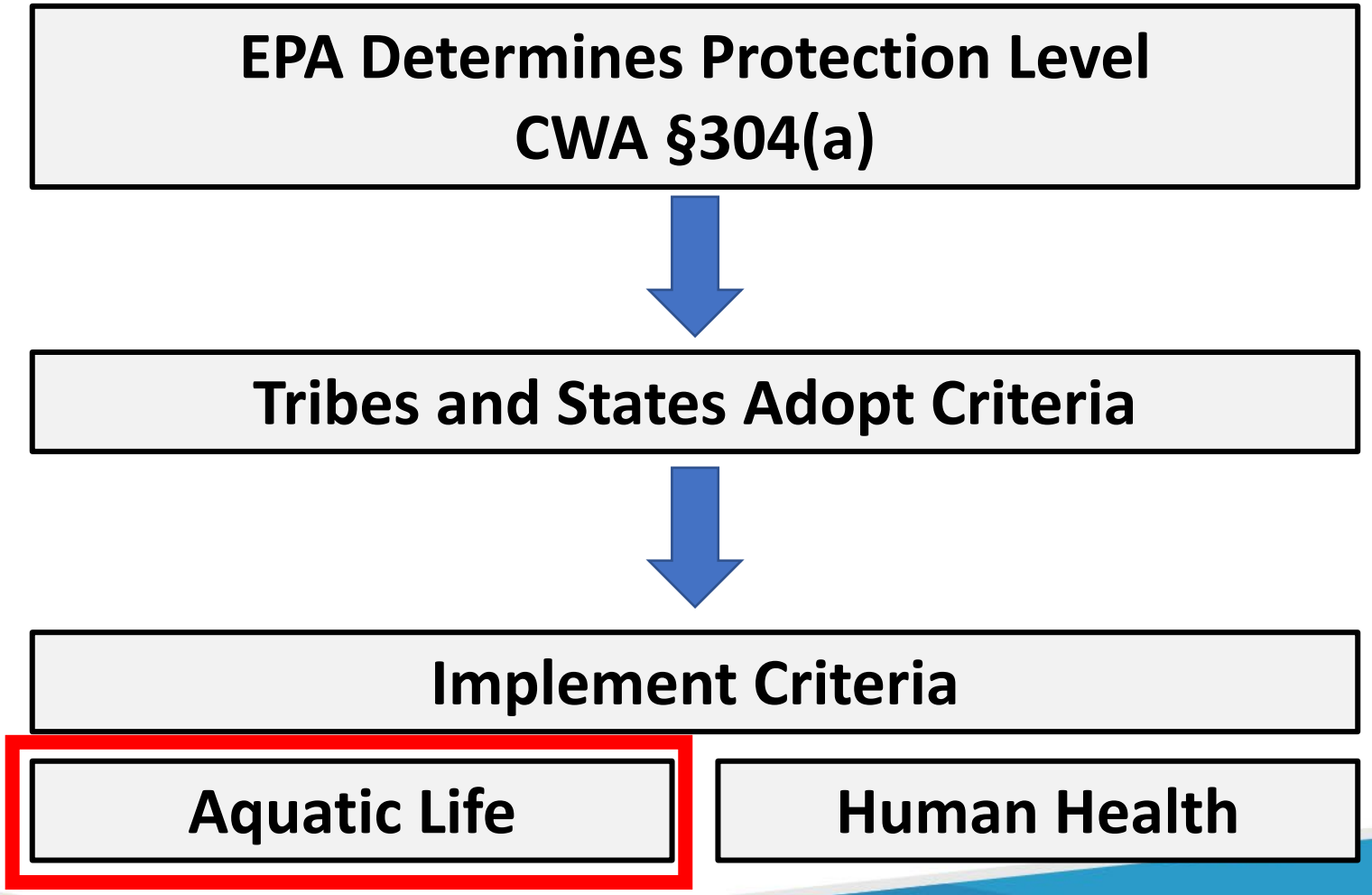
What are Water Quality Criteria?



Aquatic Life Criteria

Three Components of Criteria

Magnitude **Duration** **Frequency**

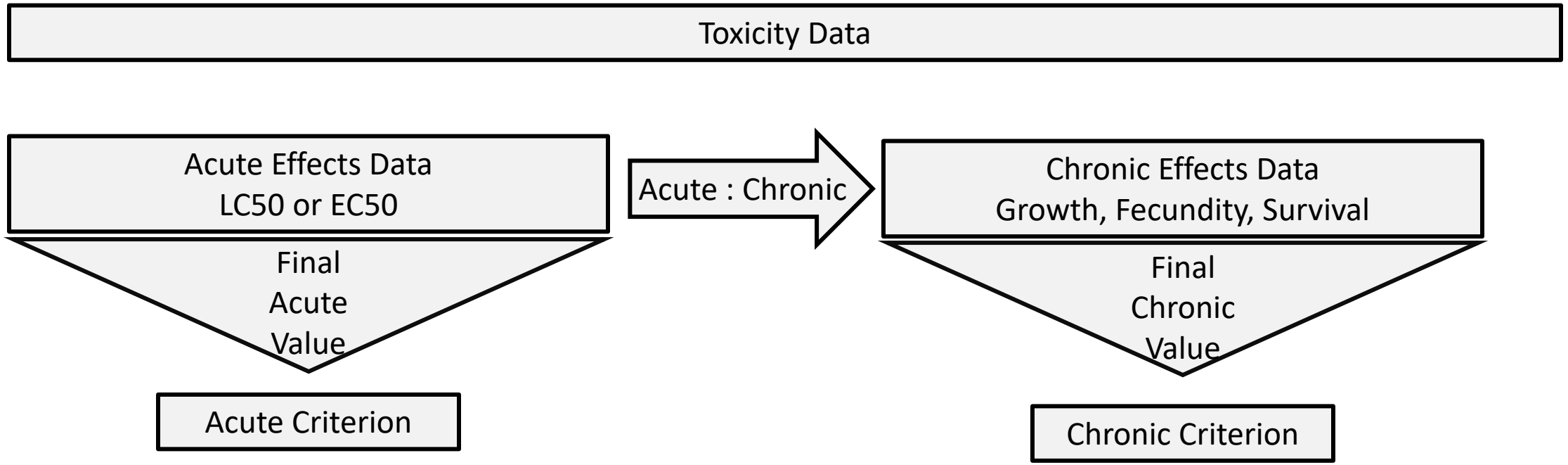
Acute

- Protective of Short-Term Exposures
  - Lethal: Survival
  - 1 hour
  - ≤ Once every three years

Chronic

- Protective of Long-Term Exposures
  - Sub-Lethal: Population success
  - 4-day average
  - ≤ Once every three years

Steps in Deriving Criteria



Freshwater **and** Saltwater

Calculation Requirements: Aquatic Community

- Three Vertebrates
  1. Salmonid
  2. Fish from a family other than salmonidae
  3. A third aquatic chordate – can be other than fish
- Five Invertebrates
  1. Planktonic crustacean
  2. Benthic crustacean
  3. Insect – those with aquatic larval form
  4. Non-Chordata or Anthropoda phylum – rotifer, annelid, mollusk
  5. A unique second order of insect or a fourth phylum
- Data Requirements
  - Control, single sp. for each compound, native to N. America, flow-through (acute), reporting experimental conditions (pH, temp, hardness, etc.)

Minimum Data Requirements (MDR)

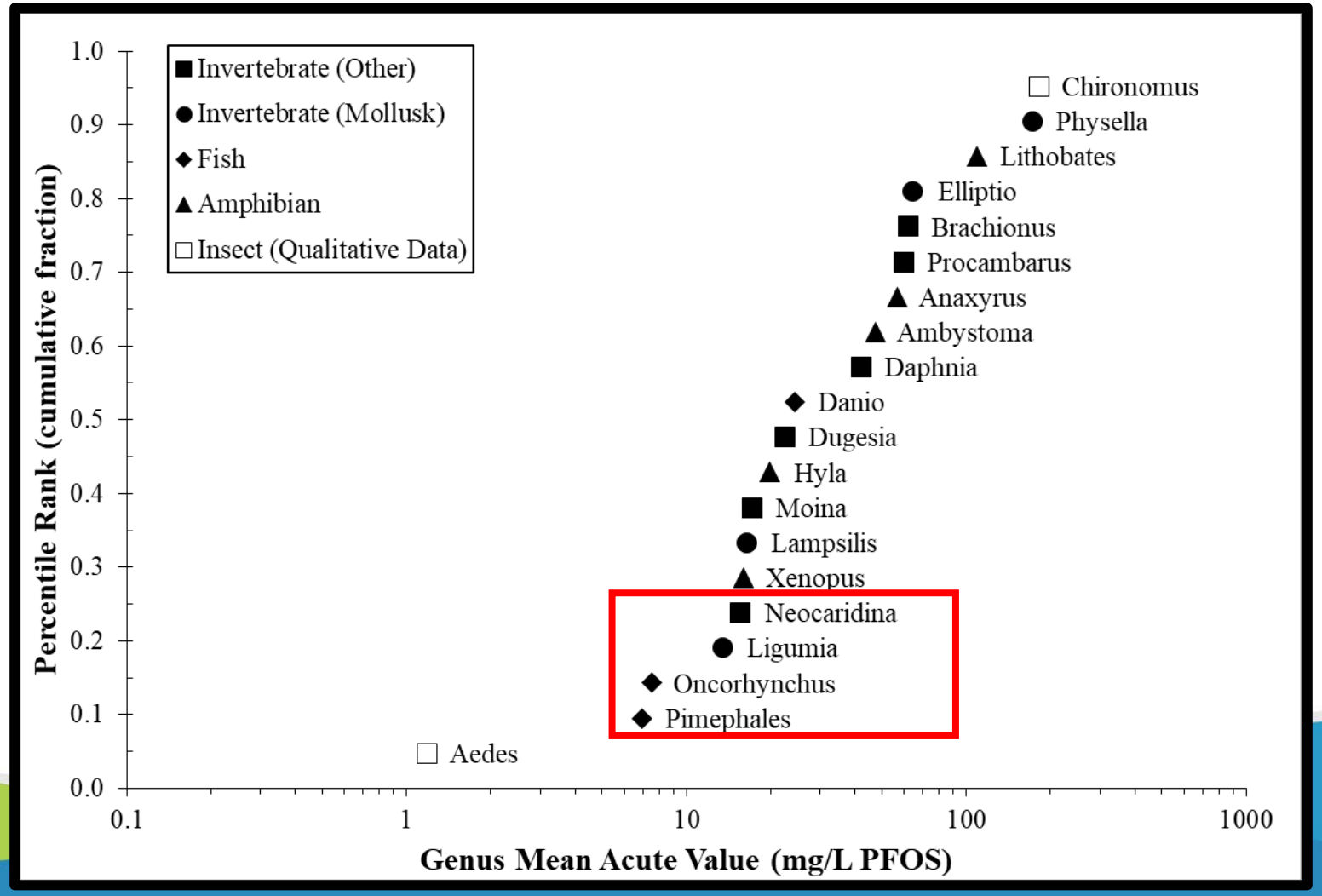
Must Consider How Exposure Occurs

- PFOA and PFOS possess unique chemical properties
  - Resistant to biodegredation
  - Relatively long elimination half-life
  - Proteinophilic

- Aqueous – sorption to proteins in blood at gills
- Sediment/Dietary – sorption to sediments and biofilms
- Maternal transfer – binding to yolk proteins

- Adequate data is limited!

Representatives of the FW Aquatic Community



Representatives of the FW Aquatic Community

PFOS - Acute

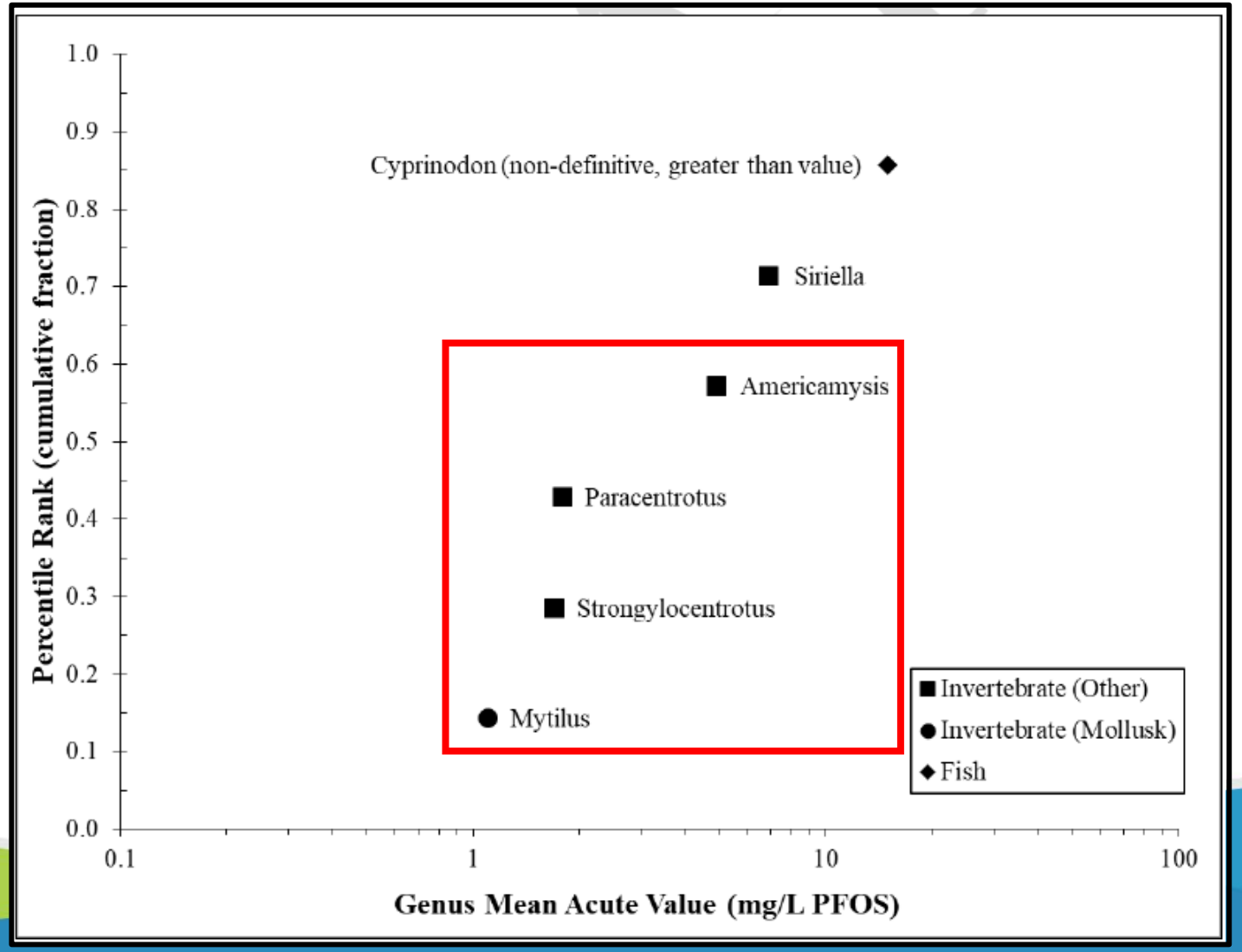
Rank	Species Type (Phylum)	Species	GMAV (mg/L)
1	Fish (Chordate)	Fathead minnow *(P. promelas)*	6.950
2	Fish (Chordate)	Rainbow trout *(O. mykiss)*	7.515
3	Invertebrate (Mollusk)	Black sandshell *(L. Recta)*	13.5
4	Invertebrate (Arthropod)	**Japanese swamp shrimp *(N. Denticulata)***	15.61

PFOA - Acute

Rank	Species Type (Phylum)	Species	GMAV (mg/L)
1	Invertebrate (Arthropod)	Cladoceran (*C. sphaericus)*	93.17
2	Invertebrate (Arthropod)	Cladoceran (*D. carinata, D. magna, D. pulicaria)*	144.1
3	Invertebrate (Arthropod)	Rotifer *(B. calyciflorus)*	150.0
4	Invertebrate (Mollusk)	Black sandshell mussel *(L. recta)*	161.0

Bold denotes non-resident species

Representatives of the SW Aquatic Community



Representatives of the SW Aquatic Community

PFOS - Acute

Rank	Species Type	Species	GMAV (mg/L)
1	Invertebrate (Mollusk)	**Mediterranean mussel *(M. galloprovincialis)***	1.1
2	Invertebrate (Echinoderm)	Purple sea urchin *(S. purpuratus)*	1.7
3	Invertebrate (Echinoderm)	**Sea urchin *(P. lividus)***	1.795
4	Invertebrate (Arthropod)	Mysid *(A. bahia)*	4.914

PFOA - Acute

Rank	Species Type	Species	GMAV (mg/L)
1	Invertebrate (Arthropod)	**Mysid *(S. armata)***	15.5
2	Invertebrate (Mollusk)	**Mediterranean mussel (*M. galloprovincialis*)**	17.58
3	Invertebrate (Echinoderm)	Purple sea urchin (*S. purpuratus*)	20.63
4	Invertebrate (Arthropod)	Mysid (*A. bahia*)	24

Bold denotes non-resident species

Representatives of the SW Aquatic Community

PFOS - Chronic

Rank	Species Type	Species	GMCV (mg/L)
1	Invertebrate (Mollusk)	**Asian green muscle *(P. viridis)***	0.0033
2	Invertebrate (Arthropod)	Mysid *(A. bahia)*	0.3708
3	Invertebrate (Arthropod)	**Copepod *(T. japonicus)***	0.7071
4	-	-	-

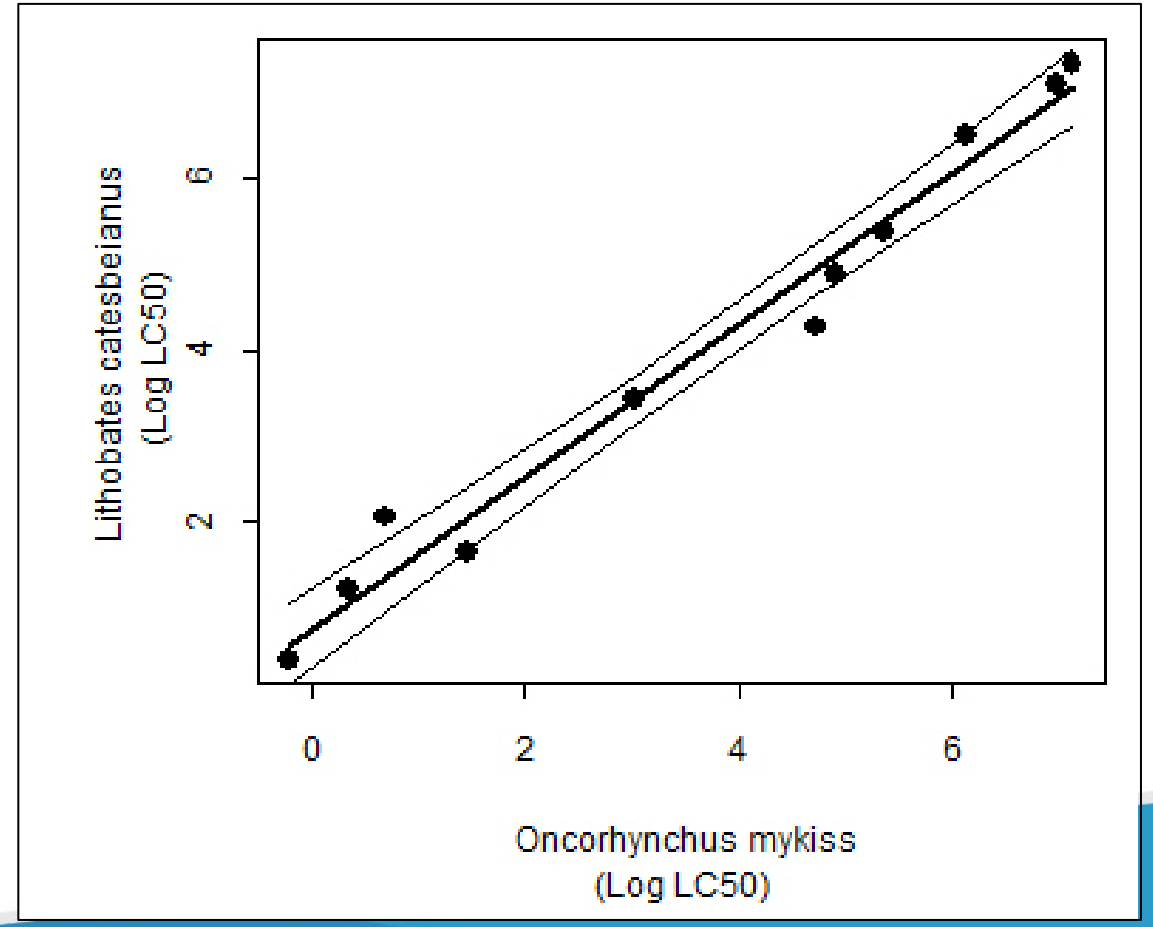
PFOA - Chronic

Rank	Species Type	Species	GMCV (mg/L)
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

Bold denotes non-resident species

Data Limitations for Marine/Estuarine Criteria

- New Approach Method
  - Technology, methodology, and/or approach that can reduce animal testing
- Model toxicity using WEB-ICE
  - Regression models of toxicity of two species across a range of chemicals
  - General comparison of sensitivity
  - If sensitivity is known for one organism, it can be inferred for the other



Web-ICE Used for PFOS Criteria for Saltwater

Eastern Oyster (*Crassostrea virginica*)

Surrogate Species	Slope	Intercept	d.f.	R^2	p-value	Mean Square Error	Cross-Validation Success (%)	Use in Criteria	Est. Toxicity (mg/L)
Americamysis bahia	**0.44**	1.76	114	**0.34**	<0.001	0.88	55	**Reject**	**2.52**
Daphnia magna	**0.44**	1.54	116	**0.28**	<0.001	**1.08**	58	**Reject**	**4.19**
Lampsilis siliquoidea	0.82	-0.28	3	0.95	0.0041	0.06	100	Accepted	**1.56**
Oncorhynchus mykiss	**0.59**	0.97	120	**0.5**	<0.001	0.68	68	**Reject**	**2.01**
Pimephales promelas	0.75	0.44	24	0.61	<0.001	0.68	69	Accepted	**2.28**

WQ: Aquatic Life Criteria - Draft

	Acute 1-Hour Average		Chronic 96-Hour Average	Instantaneous		
	Fresh water (mg/L)	Salt water* (mg/L)	Fresh water (mg/L)	Invertebrate Whole Body (mg/kg ww)	Fish Whole Body (mg/kg ww)	Fish Muscle (mg/kg ww)
PFOA	49	7	0.094	1.11	6.10	0.125
PFOS	3	0.55	0.0084	0.937	6.75	2.91

*New Approach Method – Available toxicity data and modeled estimates

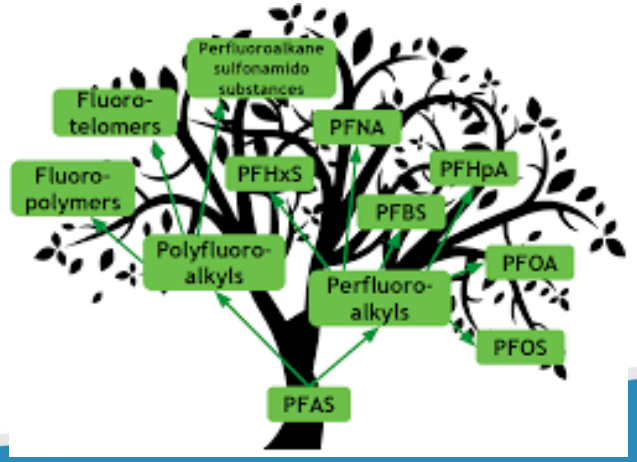
- Chronic criteria designed to be protective from bioaccumulation
  - Tissue Criteria = Chronic Water Column Criteria X BAF
- Marine criteria may likely change as new data comes in
  - Use of toxicity data preferred over ICE data
- Consumption of fish

WQ: Human Health Criteria

- Difficult to establish criteria because it's difficult to determine health effects for several reasons
  - Use the latest science to determine what is protective of human health
  - Rapidly evolving
  - Route of exposure (ingestion of water and fish consumption); Duration and Frequency; Age
  - Many PFAS compounds
- Expected Fall of 2024

Questions?

- For more information on PFAS in Water:
- Review the PFAS Roadmap and go to EPA's Website
- https://www.epa.gov/pfas
- https://www.epa.gov/pfas/epa-actions-address-pfas



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Thank you!

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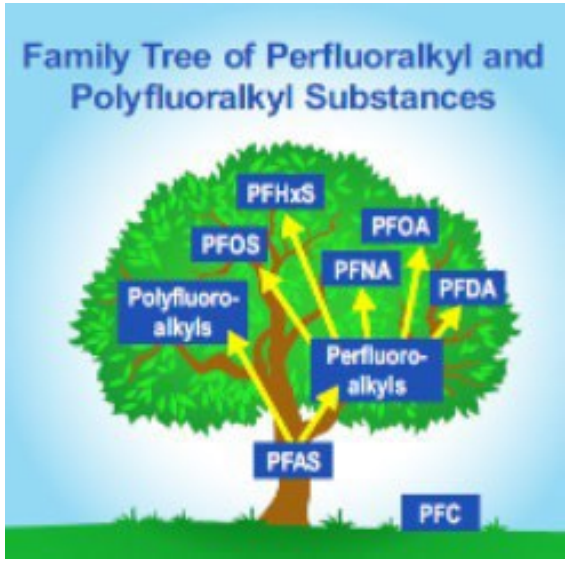
Pennsylvania DEP Surface Water PFAS Monitoring

2019 - 2023

Amy Williams, Water Program Specialist, Water Quality Division

What are PFAS?

- Man-made chemicals; not found naturally
- Perfluoroalkyl carboxylates: PFBA, PFPeA, PFHxA, PFHpA, PFOA ,PFNA ,PFDA, etc.
- Perfluoroalkyl sulfonates: PFBS, PFHxS, PFOS, etc.
- PFProPrA (GenX)
- There are thousands of different PFAS chemicals



Source: PA DEP

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PFAS Uses

- Firefighting Foams
- Detergents
- Paint
- Food Packaging
- Non-Stick Coatings
- Stain, water, and grease resistance
- Metal plating
- Pesticides
- Photography

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Sources of PFAS Ingestion

- Drinking water
- Fish
- Meat
- Paper products
- Indoor dust
- Consumer products
- Placental transport
- Breast milk
- Food is thought to be the primary source for exposure

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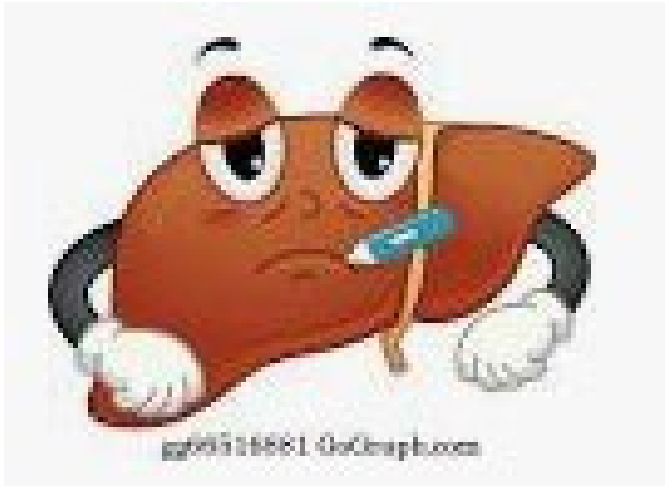
Harmful Effects of PFAS

- Persistent in human body
- Could be associated with increases in blood cholesterol and high blood pressure
- May cause liver damage
- May cause problems with development and reproductive systems



Source: PA Dept of Health

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Why study PFAS in PA Surface Waters?

- They are persistent in the environment – they do not break down readily
- PFAS have been detected in PA public water systems
- Areas of concentration include Aqueous Film Forming Foam (AFFF) sites (military bases, airports), industrial areas, landfills, wastewater treatment

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Surface Water PFAS Monitoring 2019

- 178 water quality network (WQN) stations sampled
- 33 PFAS chemicals and 19 total oxidizable precursors (TOP) sampled
- SGS AXYS Methods MLA-110 and MLA-111
- Extensive quality assurance
- Passive water samplers also deployed at 18 sites across Pennsylvania

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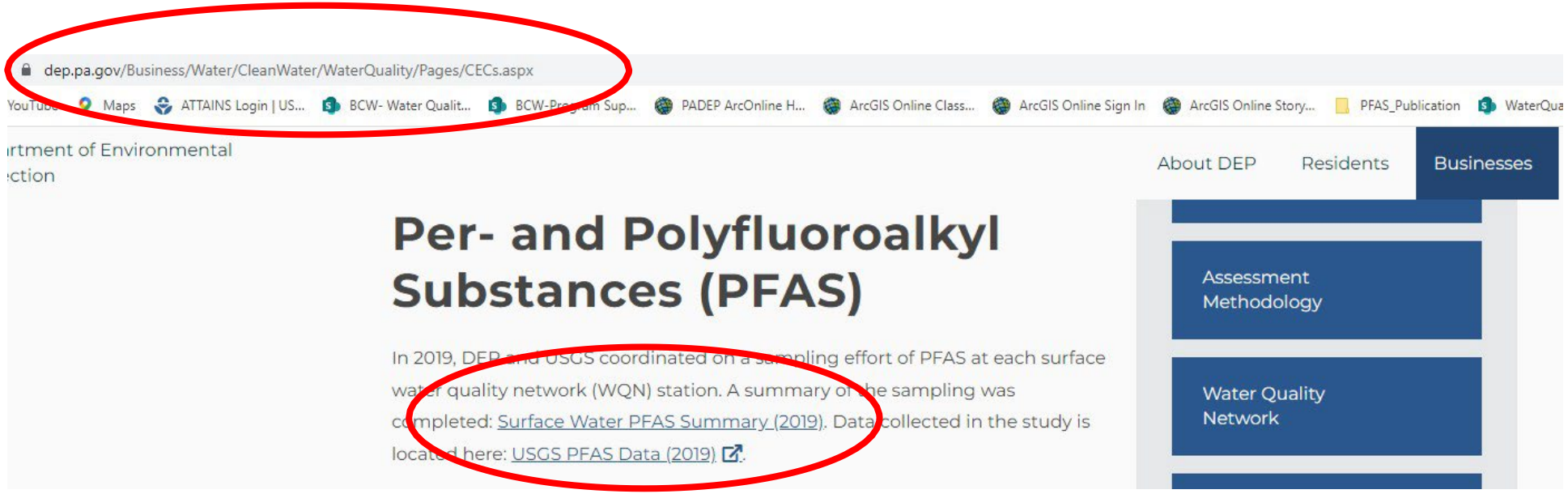
Surface Water PFAS Monitoring 2019

- Results are linked at the following website:



- Highest PFOS + PFOA discrete water concentrations were found in SE PA at WQN stations 121 (Neshaminy Creek), 154 (Valley Creek near Valley Forge), and 193 (Wissahickon Creek)

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Surface Water PFAS Monitoring 2019

Compound	Abbreviation	TOP Analysis
11-chloroeicosafluoro-3-oxaundecane-1-sulfonate	11Cl-PF3OUdS	
4:2 fluorotelomersulfonate	4:2 FTS	
6:2 fluorotelomersulfonate	6:2 FTS	
8:2 fluorotelomersulfonate	8:2 FTS	
9-chlorohexadecafluoro-3-oxanonane-1-sulfonate	9Cl-PF3ONS	
4-dioxa-3H-perfluorononanoate	ADONA	
Perfluoro-2-propoxypropanoate	HFPO-DA	
N-Ethylperfluorooctanesulfonamide	N-EtFOSA	
N-Ethylperfluorooctanesulfonamidoacetic acid	N-EtFOSAA	
N-Ethylperfluorooctanesulfonamidoethanol	N-EtFOSE	
N-Methylperfluorooctanesulfonamide	N-MeFOSA	
N-Methylperfluorooctanesulfonamidoacetic acid	N-MeFOSAA	
N-Methylperfluorooctanesulfonamidoethanol	N-MeFOSE	
Perfluorobutanoate	PFBA	X
Perfluorobutanesulfonate	PFBS	X
Perfluorodecanoate	PFDA	X
Perfluorododecanoate	PFDoA	X
Perfluorododecanesulfonate	PFDoS	X
Perfluorodecanesulfonate	PFDS	X
Perfluoroheptanoate	PFHpA	X
Perfluoroheptanesulfonate	PFHpS	X
Perfluorohexanoate	PFHxA	X
Perfluorohexanesulfonate	PFHxS	X
Perfluorononanoate	PFNA	X
Perfluorononanesulfonate	PFNS	X
Perfluorooctanoate	PFOA	X
Perfluorooctanesulfonate	PFOS	X
Perfluorooctanesulfonamide	PFOSA	
Perfluoropentanoate	PFPeA	X
Perfluoropentanesulfonate	PFPeS	X
Perfluorotetradecanoate	PFTeDA	X
Perfluorotridecanoate	PFTrDA	X
Perfluoroundecanoate	PFUnDA	X

Surface Water PFAS Monitoring 2019

- Deployed polar organic chemical integrative samplers (POCIS) at 18 sites
- POCIS are comprised of microporous polyethersulfone membranes with a solid phase sorbent (Oasis HLB) that samples hydrophilic contaminants
- Samplers are placed in the field for approximately one month and are capable of detecting low-level contaminants or contamination that occurs infrequently and may be missed by traditional discrete samples.

Passive Water Samplers

Polar Organic Chemical Integrated Sampler (POCIS):

Photos: Environmental Sampling Technologies, Inc.

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Passive Water Samplers - Deployment

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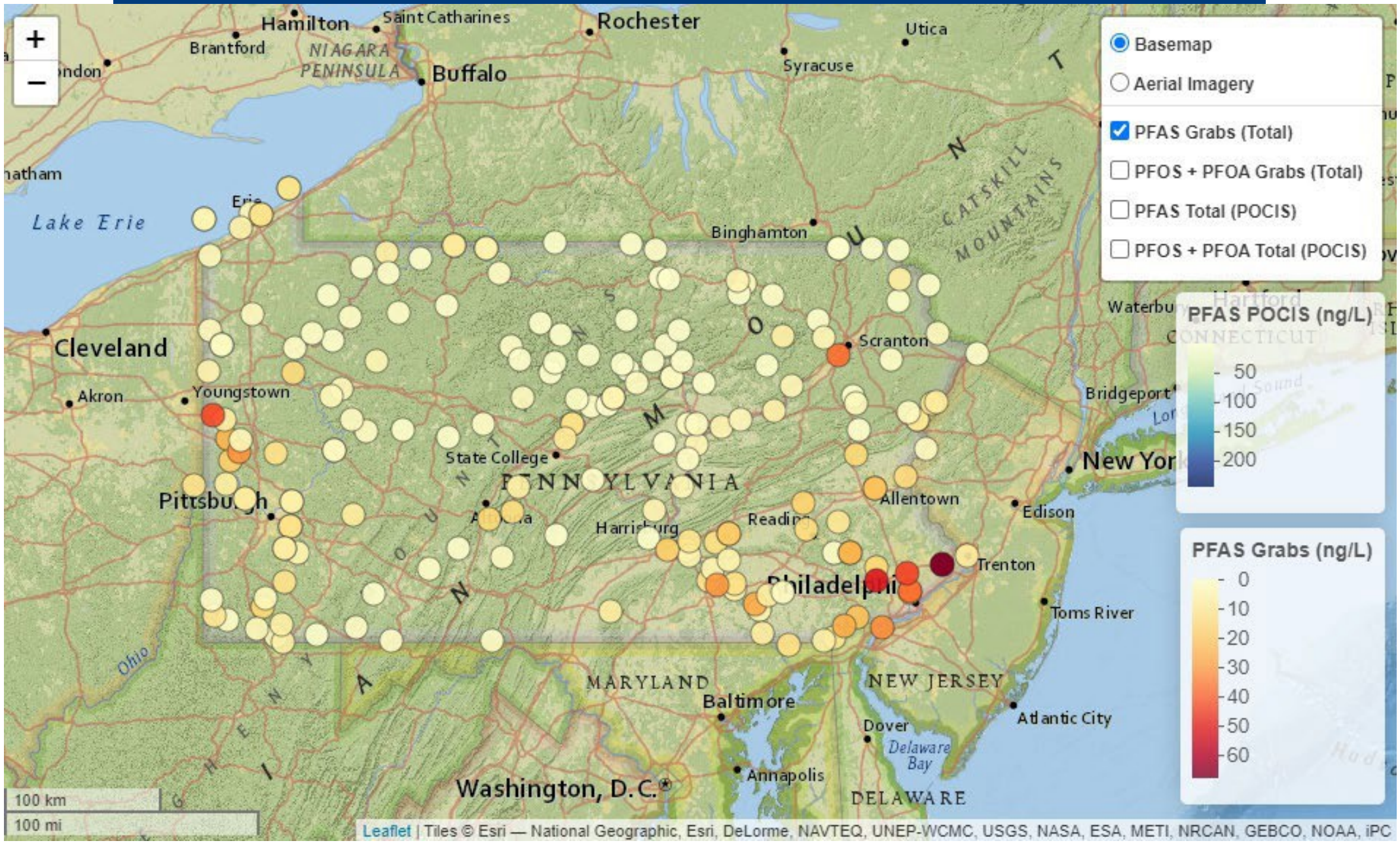
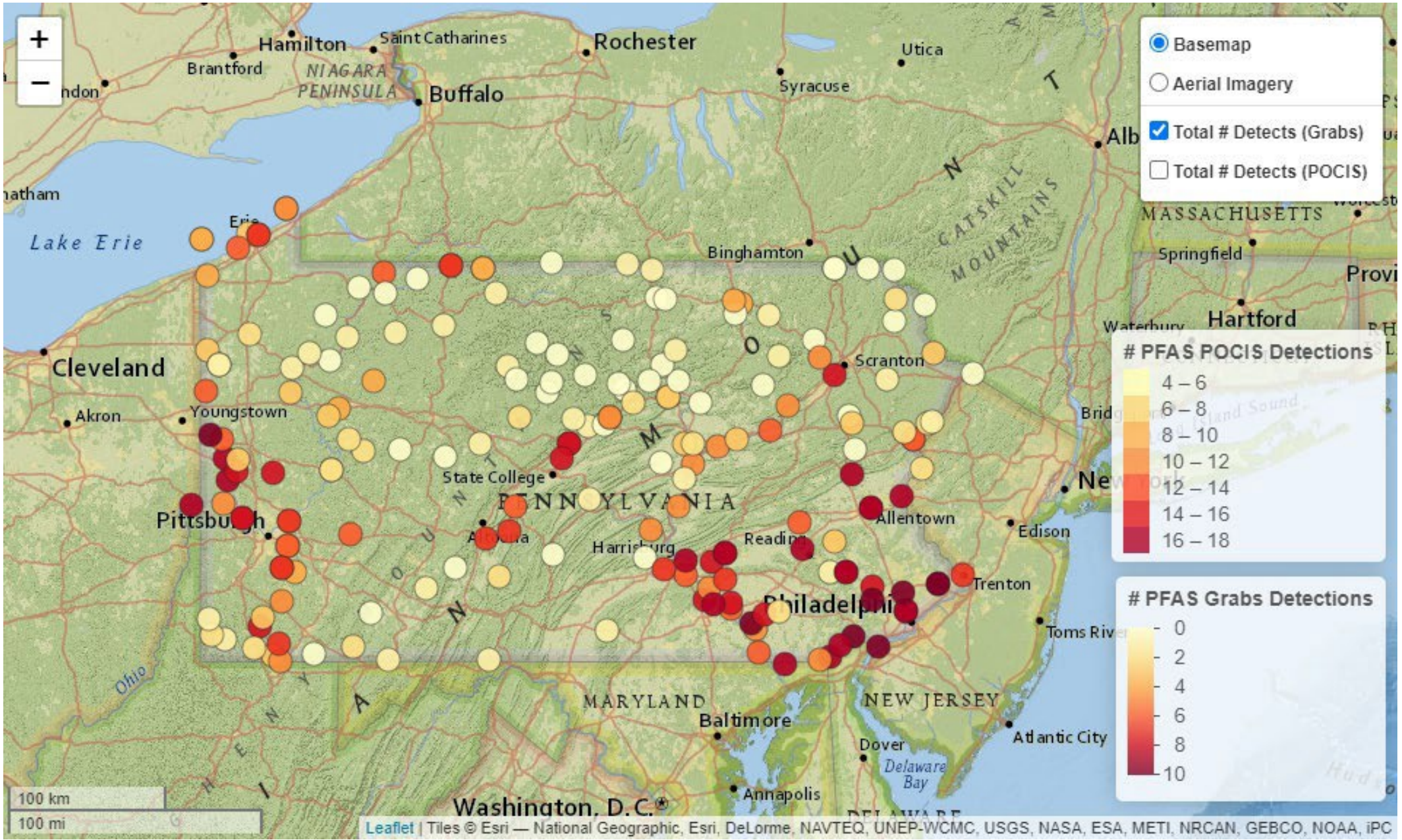
Passive Water Samplers - Retrieval

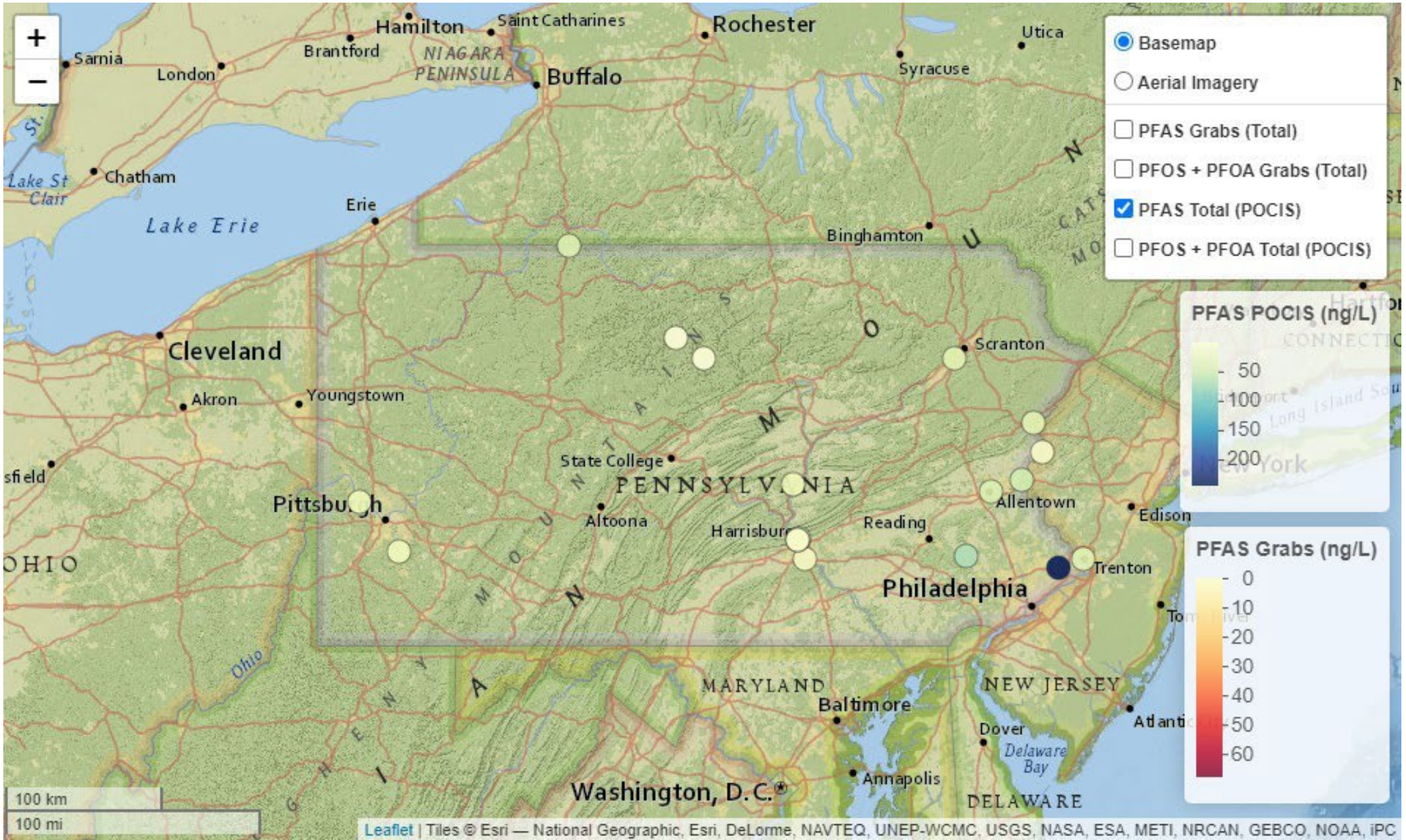
Surface Water PFAS Monitoring 2019 – Discrete Samples



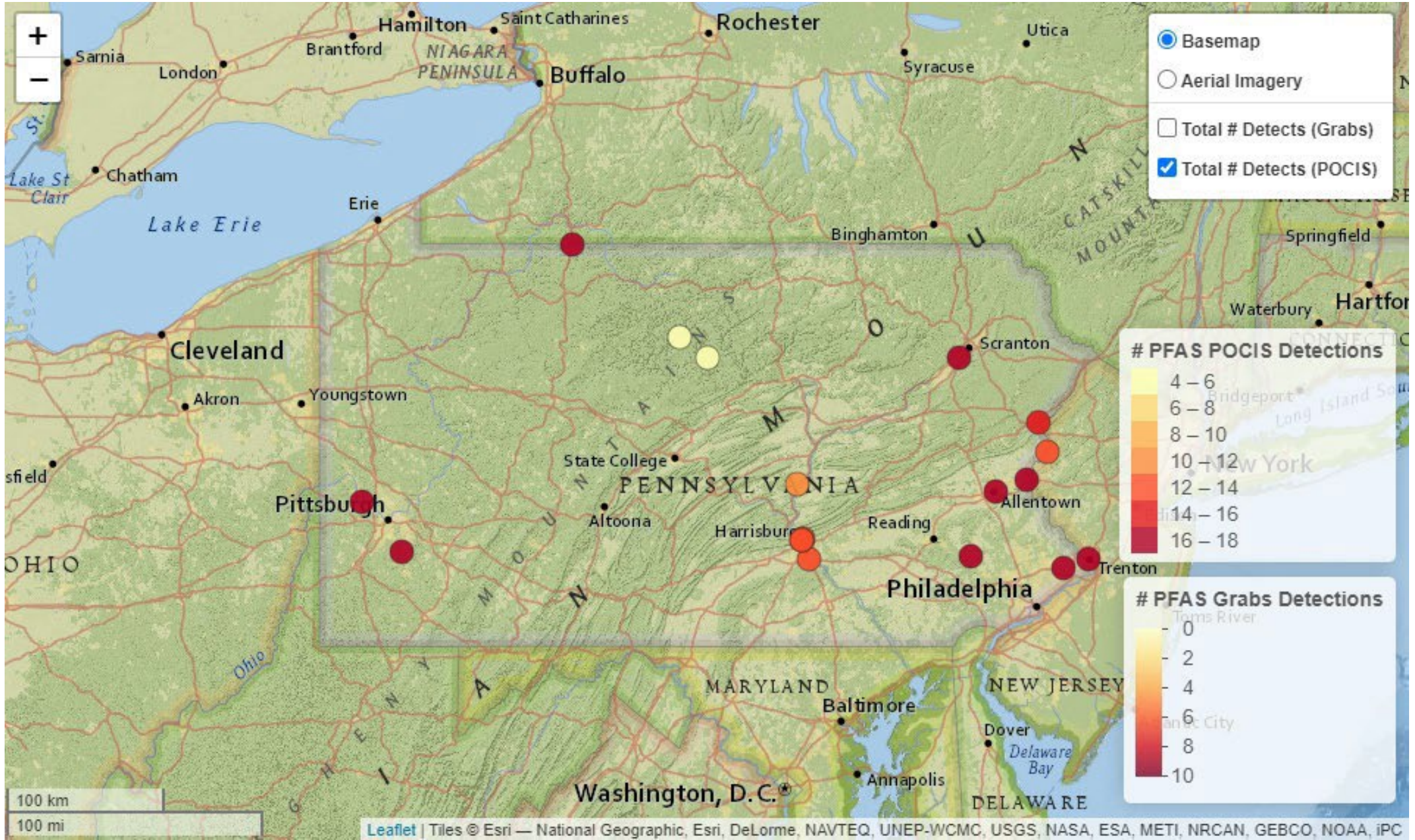
Surface Water PFAS Monitoring 2019 – Discrete Samples



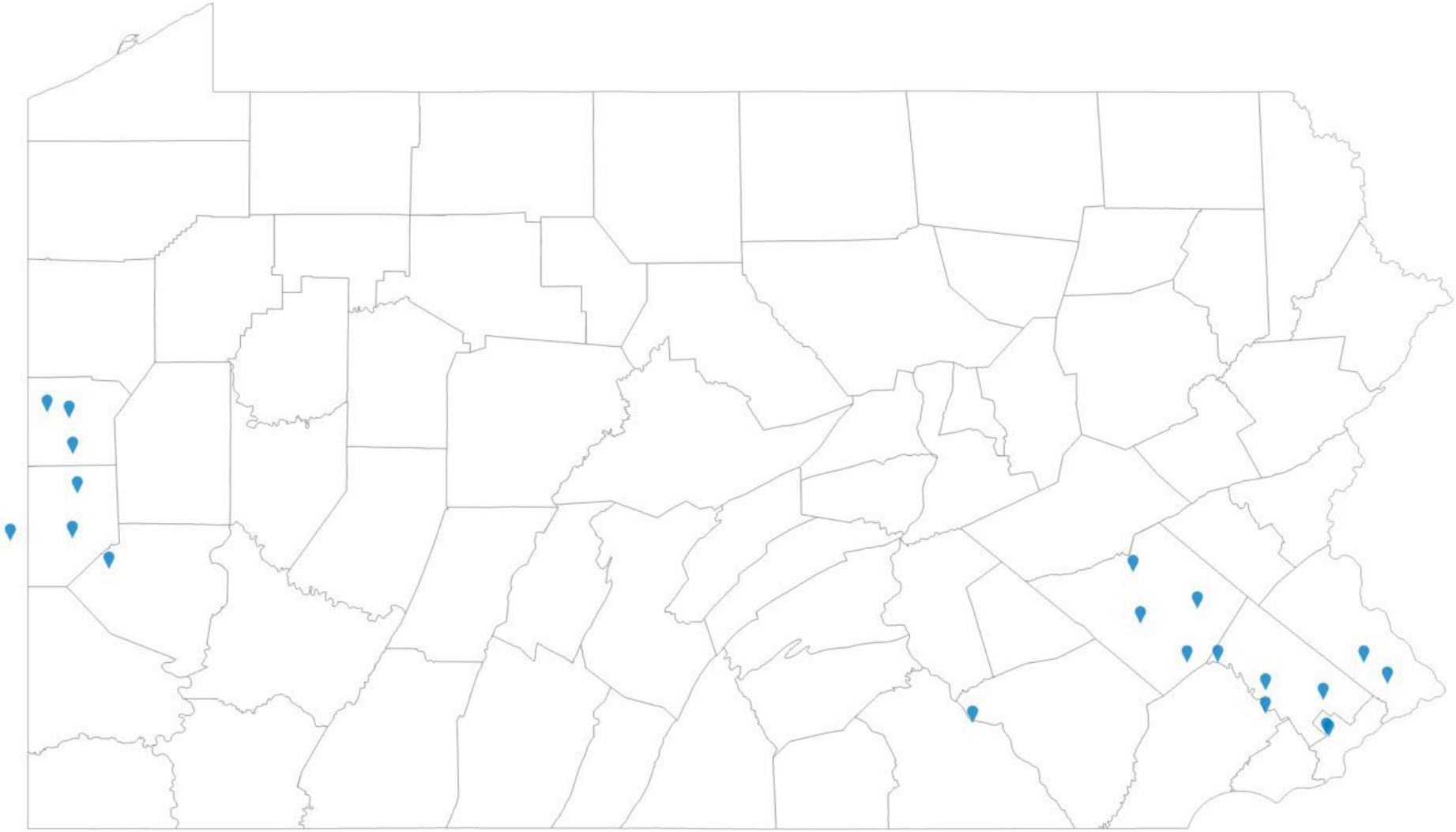
Surface Water PFAS Monitoring 2019 – Passive Samples



Surface Water PFAS Monitoring 2019 – Passive Samples



PFAS WQN Sites 2020 - 2022



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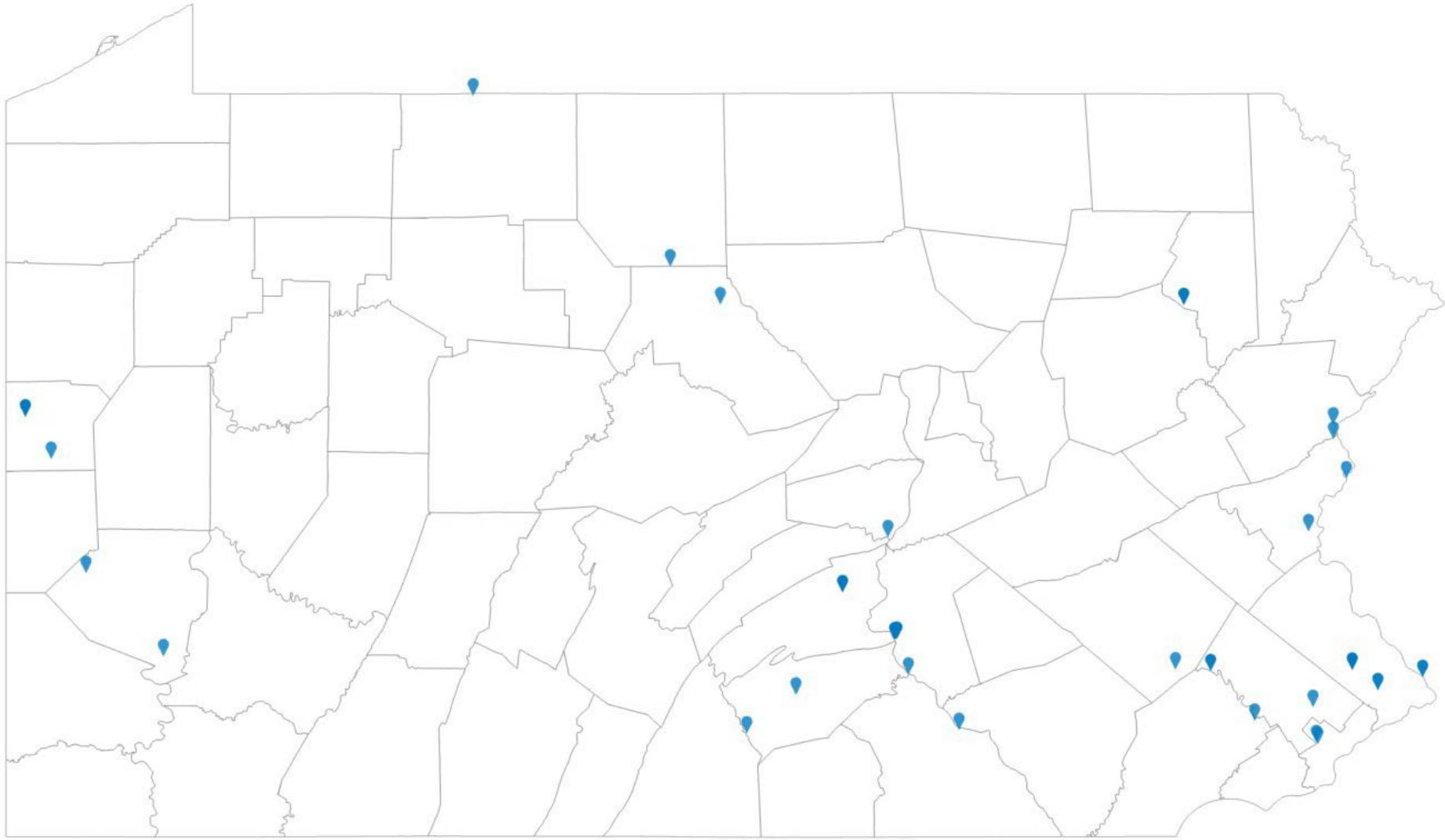
PFAS Passive + Discrete Sites 2019 - 2022



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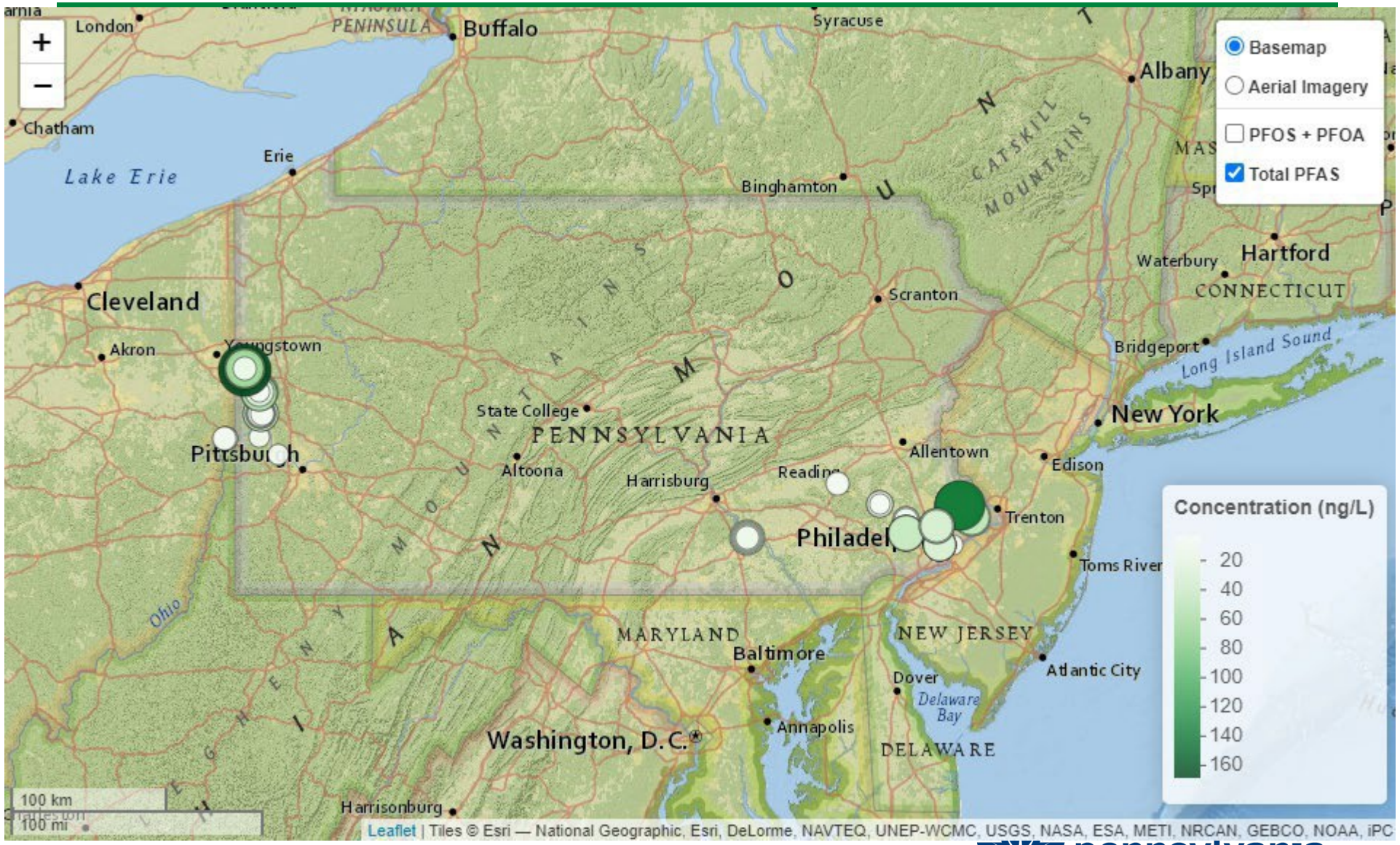
Surface Water PFAS Monitoring 2020-2021



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Fish Tissue

"The Pennsylvania Department of Agriculture (PDA), Department of Environmental Protection (DEP), and Department of Health (DOH), along with the Pennsylvania Fish and Boat Commission (Commission), announced a "DO NOT EAT" advisory for all fish species caught in the Neshaminy Creek basin in Bucks and Montgomery counties due to extremely high levels of Perfluorooctane Sulfonate (PFOS). The advisory extends to all fish throughout the Neshaminy Creek basin, including Neshaminy Creek State Park and Tyler State Park."

"Levels detected in fish tissue samples from the Neshaminy Creek watershed had levels over the 0.2 parts per million Do Not Eat advisory level."

https://www.dep.pa.gov/About/Regional/SoutheastRegion/Community%20Information/Pages/Neshaminy-Creek-Fish-Advisory.aspx

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Questions?

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Thank You!

Thanks for attending!

Standby for closing remarks from Regional Administrator Adam Ortiz.

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Closing Remarks

Adam Ortiz
EPA Mid-Atlantic Administrator

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