

Delaware River Basin Commission

PFAS Monitoring

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PFAS Monitoring Overview

Scheduled

- Surface water samples added to the estuary monitoring (DRBC's BoatRun) program under 106 grant in 2021
- Additional samples will be collected from ambient water, sediment and fish funded by DWCF and PACZM grants in 2021

Proposed

- Collaboration with URI and DNREC for PFAS passive sampler and bioaccumulation study (proposal for study period 2022 -2027)
- Point source discharge monitoring under consideration
 - EPA Memo on interim strategy for PFAS (https://www.epa.gov/sites/production/files/2020-11/documents/pfas_npdes_interim_strategy_november_2020_signed.pdf)
 - Phased in monitoring and BMP requirements in federally issued NPDES permits

Delaware Estuary Water Quality Monitoring Program Locations & DRBC Water Quality Zones



PFAS Monitoring DRBC's BoatRun

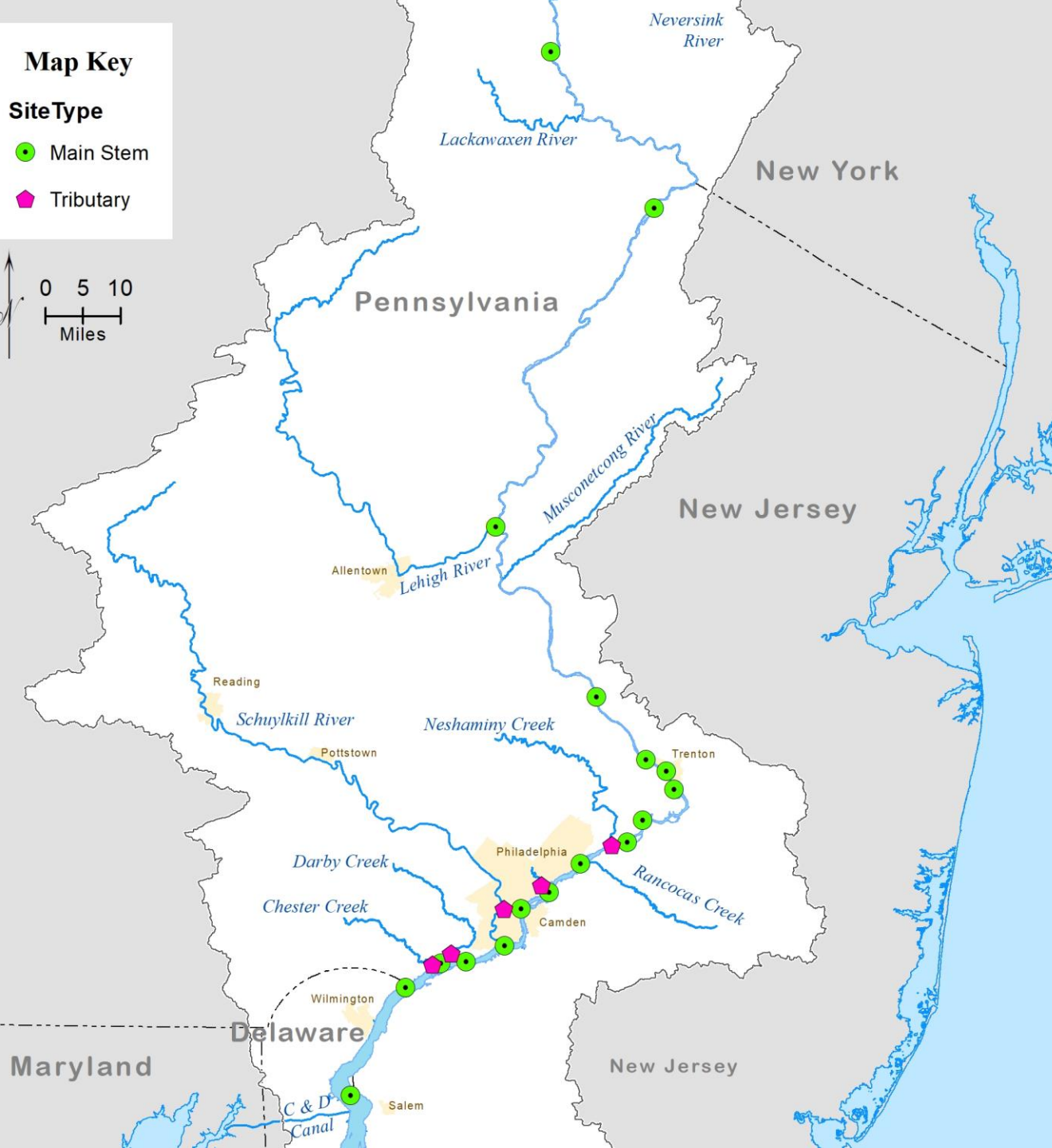
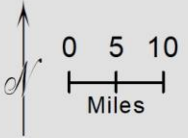
PFAS added to the estuary monitoring (DRBC's BoatRun) program in 2021 under 106 grant

- 15 sites (Biles Ch to Smyrna R)
- Frequency – 4x (every other month) March-Oct
- Surface water grab samples
- Analysis by SGS-AXYS Analytical Services
- 40 PFAS analytes by SPE LC-MS/MS ID

Map Key

Site Type

- Main Stem
- ◆ Tributary



PFAS Concurrent Sampling

PFAS

- Additional samples will be collected from surface water, sediment, and fish (subset of sites), funded by DWCF and PACZM grants in 2021
- Main stem and trib sites map will be updated to include non-tidal sites
- Frequency – 1x
- Sample collection by DRBC (seeking collaboration for fish collection)
- Analysis by SGS-AXYS Analytical Services
- 40 PFAS analytes by SPE LC-MS/MS ID

Perfluoroalkyl carboxylates	Perfluoroalkyl sulfonates	Perfluorooctane sulfonamidoacetic acids	Ether sulfonates
Perfluorobutanoate (PFBA)	Perfluorobutanesulfonate (PFBS)	N-Methylperfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	9-chlorohexadecafluoro-3-oxanonane-1-sulfonate (9Cl-PF3ONS)
Perfluoropentanoate (PFPeA)	Perfluoropentanesulfonate (PFPeS)	N-Ethylperfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	11-chloroeicosafluoro-3-oxaundecane-1-sulfonate (11Cl-PF3OUdS)
Perfluorohexanoate (PFHxA)	Perfluorohexanesulfonate (PFHxS)	Perfluorooctane sulfonamides	Leachate
Perfluoroheptanoate (PFHpA)	Perfluoroheptanesulfonate (PFHpS)	N-Methylperfluorooctanesulfonamide (N-MeFOSA)	3:3 perfluorohexanoic acid (3:3 FTCA)
Perfluorooctanoate (PFOA)	Perfluorooctanesulfonate (PFOS)	N-Ethylperfluorooctanesulfonamide (N-EtFOSA)	5:3 perfluorooctanoic acid (5:3 FTCA)
Perfluorononanoate (PFNA)	Perfluorononanesulfonate (PFNS)	Perfluorooctanesulfonamide (PFOSA), a.k.a FOSA	7:3 perfluorodecanoic acid (7:3 FTCA)
Perfluorodecanoate (PFDA)	Perfluorodecanesulfonate (PFDS)	Perfluorooctane sulfonamidoethanols	EPA 533
Perfluoroundecanoate (PFUnA)	Perfluorododecanesulfonate (PFDoS)	N-Methylperfluorooctanesulfonamidoethanol (N-MeFOSE)	Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)
Perfluorododecanoate (PFDoA)	Fluorotelomer sulfonates	N-Ethylperfluorooctanesulfonamidoethanol (N-EtFOSE)	Perfluoro-4-methoxybutanoate (PFMBA)
Perfluorotridecanoate (PFTTrDA)	4:2 fluorotelomersulfonate (4:2 FTS)	Ether carboxylates	Perfluoro-3-methoxypropanoate (PFMPA)
Perfluorotetradecanoate (PFTeDA)	6:2 fluorotelomersulfonate (6:2 FTS)	Perfluoro-2-propoxypropanoate (HFPO-DA)	Perfluoro-3,6-dioxaheptanoate (NFDHA)
	8:2 fluorotelomersulfonate (8:2 FTS)	4-dioxa-3H-perfluorononanoate (ADONA)	

40 Analytes
SGS AXYS
MLA-110
SPE
LC-MS/MS
ID

PFAS Monitoring Coordination With Agencies

In order to coordinate efforts related to monitoring fish and other aquatic biota (e.g., mussels), DRBC is requesting information on the collection schedule for 2021, 2022, and 2023 in the Delaware River and Bay by:

- Delaware
- New Jersey
- Pennsylvania
- New York
- PAFBC, USGS, others

Point Source Monitoring for PFAS

Outreach to Stakeholders

PFAS Production, PFAS Industry Sector and Landfill Leachate may be sources from direct discharge to surface water or indirect discharge through MWTPs

Contaminated Sites by firefighting foams or PFAS-contaminated industrial wastes may also be sources for MWTPs if they discharge to the sanitary sewer

- * What information to collect to identify priority dischargers?
e.g., Industry and MWTP with IPP
- * How to establish monitoring for dischargers?
e.g., frequency, methods, analytes, data reporting, information sharing
- * Should focus be on the identification, track down, and elimination of the sources?
e.g., Michigan Wastewater Monitoring for PFAS and others

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MacGillivray, A R (accepted article)
Temporal trends of PFAS in
Delaware River Fish, USA.,
Integrated Environmental
Assessment and Management.

<https://setac.onlinelibrary.wiley.com/doi/epdf/10.1002/ieam.4342>



Vilimanovic D, Andaluri G, Hannah R, Suri R, MacGillivray A R. 2020. Occurrence and aquatic toxicity of contaminants of emerging concern (CECs) in tributaries of an urbanized section of the Delaware River Watershed. AIMS Environ Sci 7:302–319.

<https://www.aimspress.com/article/10.3934/environsci.2020019>

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