

Title: Improving Understanding and Coordination of Science Activities for Per- and Polyfluoroalkyl Substances (PFAS) in the Chesapeake Bay Watershed

Issue: Per- and polyfluoroalkyl substances (PFAS) have been manufactured and used in a variety of industries in the United States since the 1940s. PFAS are ubiquitous and persistent in the environment and have the potential to have adverse human and ecological health effects. The Chesapeake Bay Program (CBP) partnerships has concerns about how PFAS will affect the Chesapeake Bay ecosystem. The CBP Scientific and Technical Advisory Committee (STAC) hosted a workshop in 2022 to better understand the state of the science, improve science coordination, and propose approaches to improve our knowledge of PFAS.

Objectives of the PFAS workshop

The STAC workshop was held May 17-18 and gathered speakers from Chesapeake Bay jurisdictions, federal agencies, and academic institutions, including representatives from across the Nation. The specific objectives of the workshop were:

- Summarize current understanding of sources, occurrence, and fate of PFAS,
- Identify current efforts and approaches to inform the potential effects on fish and wildlife, and their consumption by humans,
- Consider study designs, and comparable sampling and analysis methods, for a more coordinated PFAS science effort,
- Identify key research needs/data gaps and actionable recommendations associated with better understanding potential effects on fish, wildlife, and their consumption as an impact on human health.

The findings and recommendations from the workshop have been summarized in a STAC report, which was led by the U.S. Geological Survey, and released in March 2023.

Findings of the Report

The workshop report summarizes the current understanding of sources, occurrence, and fate of PFAS and identifies on-going efforts and approaches to inform the potential effects on fish and wildlife, and their consumption by humans. The report provides overarching guidance for research and monitoring to address science gaps, foster communication and collaboration, to help stakeholders better coordinate PFAS efforts to ensure data comparability across the entire Chesapeake Bay Watershed.

Science Gaps

The 10 science gaps identified by the workshop participants are organized by priority need and listed below:

Science gap category (SG)	Description	Suggested timeframe to address gap
SG1: Source, fate, and occurrence	Temporal and spatial assessment of PFAS occurrence in tributaries, including first order streams, to determine where loadings are coming from with an emphasis on both point and nonpoint sources	Urgent, short-term
SG2: Exposure and bioaccumulation	Coupled fish and surface water samples to develop species-specific bioaccumulation factors (“early warning system”), including more regional studies to related surface water and tissue PFAS concentrations across a range of species using standardized methods	Urgent, short-term
SG3: Fish consumption	Development of a uniform bioconcentration factor approach regionally between the states to drive fish consumption advisories	Near-term
SG4: Ecological effects	Information on effects of PFAS on different life stages of fisheries in estuarine and freshwater systems	Near-term
SG5: Ecological effects	Studies addressing the biological effects of PFAS at lower concentrations	Near-to mid-term
SG6: Exposure and bioaccumulation	Studies directly designed to address food chain/ biomagnification of PFAS	Near-to mid-term
SG7: Source, fate, and occurrence	Better understanding of what land uses are most likely to contribute to PFAS detections and whether that information can be used to predict occurrence, delivery, and load	Near-to mid-term
SG8: Ecological effects	Cumulative effects of PFAS and other contaminant and biological stressors on aquatic species, synergistic effects that have the potential to enhance the risk of PFAS	Long-term
SG9: Ecological effects	Studies specifically designed to provide information on chronic toxicity for larval oysters and blue crabs with an emphasis on long-term exposures	Long-term
SG10: Ecological effects	Emphasize/prioritize more studies directly assessing the interface between the aquatic and terrestrial environments (e.g., ducks and other avian species)	Long-term

Actionable Recommendations

Six actionable recommendations were identified by the workshop participants, each recommendation was organized by the science gap or gaps they filled and were subsequently binned by the steering committee into three overarching themes:

Theme 1: Communicate and collaborate

- ✓ Enhance interaction between management agencies and scientists to facilitate broad coordination across the Chesapeake Bay Watershed.
- ✓ Develop data needs for fish consumption advisories collaboratively across jurisdictions.

Theme 2: Study design and approaches

- ✓ Design a PFAS monitoring network within the Chesapeake Bay Watershed.
- ✓ Prioritize studies designed to address PFAS occurrence and effects in different land-use settings.

Theme 3: Consistency in data collection

- ✓ Standardize field collection and analytical approaches to better compare data among studies and jurisdictions
- ✓ Collect standardized data to develop ecological risk assessments across a range of species for the protection of aquatic resources.

Implications and Next Steps

The recommendations are being considered by the CBP partnership with leadership from the Toxic Contaminant Workgroup (TCW). The TCW has increased focus on PFAS: [Toxic Contaminants Workgroup \(chesapeakebay.net\)](https://www.chesapeakebay.net/toxic-contaminants-workgroup)

The U.S. Geological Survey is conducting research on toxic contaminants and their effects on fish and wildlife in the Chesapeake Watershed, which include studies of PFAS: [Fish Health and Toxic Contaminants | U.S. Geological Survey \(usgs.gov\)](https://www.usgs.gov/monitoring-assessments/fish-health-and-toxic-contaminants)

For more information

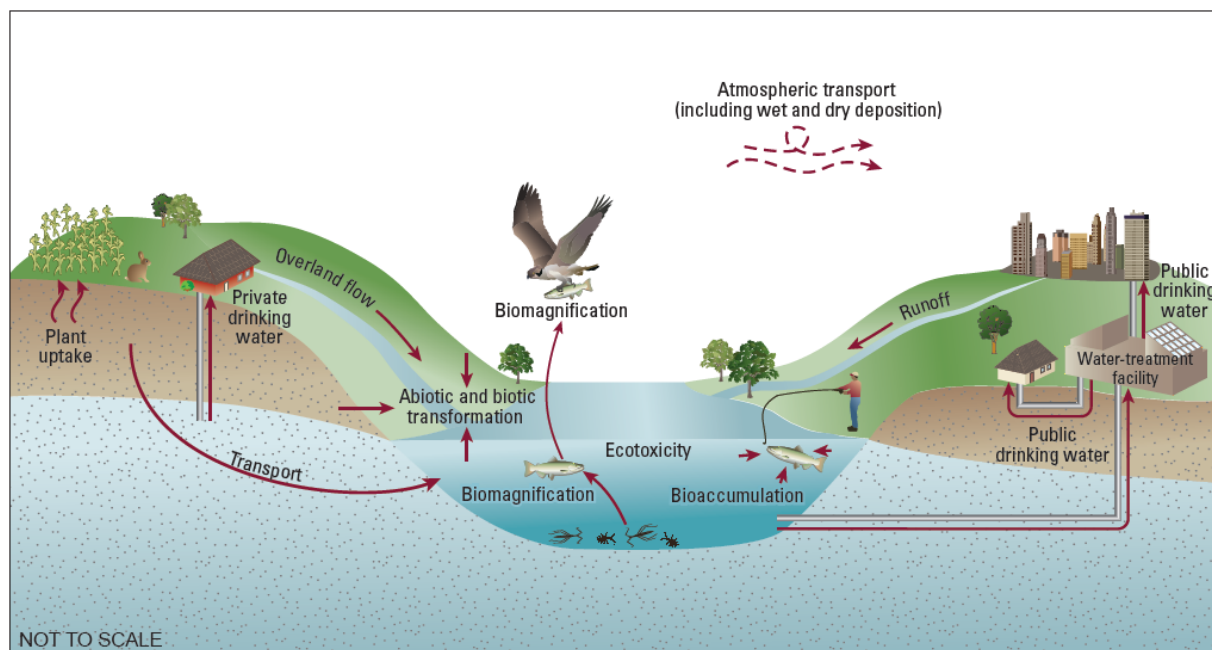
The report has been released and posted by STAC:

Smalling, K.L., Lorah, M., Allen, G., Blaney, L., Cantwell, M., Fowler, L., Ihde, T., Mank, M., Majcher, E., Onyullo, G. and Phillips, S., 2023. Improving Understanding and Coordination of Science Activities for Per- and Polyfluoroalkyl Substances (PFAS) in the Chesapeake Bay Watershed. STAC Publication Number 23-002, Edgewater, MD. 58 pp.

The STAC provides scientific and technical guidance to the Chesapeake Bay Program (CBP) on measures to restore and protect the Chesapeake Bay, for more information:

<http://www.chesapeake.org>

Diagram



Conceptual diagram showing the major mechanisms of the fate, transport, and exposure pathways of perfluoroalkyl and polyfluoroalkyl substances (PFAS) in the environment from Tokranov et al. (2022).