Maryland PFAS Action Plan

Prepared for:
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Table of Contents

List of Tables

List of Abbreviations

AFFF	Aqueous Film-Forming Foam
APHL	Association of Public Health Laboratories
ATSDR	Agency for Toxic Substances and Disease Registry
BMP	Best Management Practice
BRAC	Base Realignment and Closure
CCR	Consumer Confidence Report
CDC	Centers for Disease Control
CFR	Code of Federal Regulations
CHS	Controlled Hazardous Substances
COMAR	Code of Maryland Regulations
CWA	Clean Water Act
CWS	Community Water Systems
DoD	Department of Defense
DRMO	Defense Reutilization and Marketing Office
DSMOA	Defense-State Memorandum of Agreement
DWM	Drinking Water Monitoring Section
DWSRF	Drinking Water State Revolving Fund
EC	Emerging Contaminants
EJ	Environmental Justice
EPA	Environmental Protection Agency
FARD	Federal Assessment and Remediation Division
FCA	Fish Consumption Advisories
FIERP	Field Investigations and Environmental Response Program
FTE	Full-time Employees
GDPD	Groundwater Discharge Permits Division
GenX	Hexafluoropropylene oxide dimer acid or HFPO-DA
GIS	Geographic Information Systems
GWUDI	Groundwater Under Direct Influence
HB	House Bill
HDPE	High Density Polyethylene
HFPO-DA	Hexafluoropropylene oxide dimer acid or GenX
I&GPD	Industrial and General Permits Division
IR	Integrated Report

ISPD	Industrial Stormwater Permits Division
LMA	Land and Materials Administration
LRP	Land Restoration Program
MCL	Maximum Contaminant Level
MD	Maryland
MDA	Maryland Department of Agriculture
MDE	Maryland Department of the Environment
MDH	Maryland Department of Health
MDNR	Maryland Department of Natural Resources
MES	Maryland Environmental Service
MOU	Memorandum of Understanding
MRL	Minimum Risk Level
MTBE	Methyl tert-butyl ether
NAS	Naval Air Station
NDAA	National Defense Authorization Act
NPDES	National Pollutant Discharge Elimination System
NPL	National Priority List
NSAA	Naval Support Activity Annapolis
NSF	Naval Support Facility
NTNC	Non-Transient Non-Community Systems
OCPSF	Organic chemicals, plastics & synthetic fibers
OSDS	Onsite Sewage Disposal Systems
PA	Preliminary Assessment
PAYGO	Pay-As-You-Go
PCB	Polychlorinated biphenyls
PFAS	Per- and Polyfluoroalkyl Substances
PFBS	Perfluorobutane sulfonate
PFHxS	Perfluorohexanesulfonic acid
PFNA	Perfluorononanoic acid
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctanesulfonic acid
POE	Point of Entry to Distribution
POTW	Publicly Owned Treatment Works
POU	Point of Use
PTFE	Polytetrafluoroethylene
PWS	Public Water System
RI	Remedial Investigation
RP	Responsible Party
SAR	State Assessment and Remediation
SB	Senate Bill
SDC	Small Disadvantaged Communities
SDWA	Safe Drinking Water Act
SI	Site Investigation
SVOC	Semivolatile Organic Compounds

SW	Stormwater
SWA	Solid Waste Acceptance
SWPPP	Stormwater Pollution Prevention Plan
TBEL	Technology-Based Effluent Limitations
TCE	Trichloroethylene
TMDL	Total Maximum Daily Load
TNC	Transient Non-Community System
UCMR5	Unregulated Contaminant Monitoring Rule 5
VOC	Volatile Organic Compounds
WIC	Women, Infants, and Children
WPPRP	Wastewater Pollution Prevention and Reclamation Program
WQBEL	Water Quality-Based Effluent Limits
WSA	Water and Science Administration
WSP	Water Supply Program
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant

1.0 Introduction

The George “Walter” Taylor Act requires the Maryland Department of the Environment and the Maryland Department of Health, on or before December 31, 2023, to jointly prepare, in coordination with other relevant State agencies, the federal government, local governments, and the public, and submit to the General Assembly, in accordance with § 2–1257 of the State Government Article, a PFAS Action Plan to identify **strategies**, **actions**, and **funding alternatives** to:

(1) minimize environmental exposure to PFAS chemicals for Maryland residents, in addition to regulating its use in fire–fighting foam, food packaging and food packaging components, rugs, and carpets;

(2) minimize future releases of PFAS chemicals into the environment;

(3) identify, assess, and clean up historical releases of PFAS chemicals in Maryland;

(4) assess any concerns related to environmental justice, health equity, and PFAS chemical contamination; and

(5) educate and communicate to Maryland residents the risks associated with PFAS chemicals.

2.0 Purpose

The PFAS Action Plan serves as a comprehensive roadmap designed to safeguard the health and environment of Maryland's residents against the detrimental effects of PFAS chemicals. These synthetic chemicals, recognized for their longevity and resistance to degradation, have infiltrated various aspects of daily life, from drinking water to household products, posing potential health risks and environmental challenges. By implementing this plan, the state aims to identify, regulate, and mitigate the presence of PFAS in the environment, ensuring reduced exposure for its residents. Furthermore, given the extensive use and distribution of PFAS in the environment and in the economy, the plan underscores the importance of collaboration among state agencies, the federal government, local governments, and the public, to work cohesively in addressing current PFAS contamination, preventing future releases, and fostering awareness and education about these chemicals throughout Maryland.

3.0 PFAS Actions Summary

The following table provides a summary of all the PFAS actions in this report including the agency conducting the action, a description of the action, time frame for implementation of the action, current status of the action, and reference to the section in the report providing detailed information.

Table 1: PFAS Actions Summary

Agency	Category	Action	Time Frame	Status	Plan Section
MDE/ MDH	Drinking Water	Conduct PFAS monitoring of all Community Water Systems (CWSs) in Maryland. There are a total of 437 CWSs.	2020-2023	Completed	4.1
MDE	Drinking Water	Recommend that CWSs with exceedances of proposed maximum contaminant levels (MCLs) notify users, conduct additional sampling, and develop a remediation plan to reduce PFAS in their drinking water. A total of 63 CWSs exceed proposed MCLs.	2021-2025	In Progress	4.1
MDE	Drinking Water	Provide technical assistance to CWSs with exceedances of proposed MCLs and connect them with Federal funding to address PFAS contamination in their drinking water.	2021-2025	In Progress	4.1
MDE/ MDH	Drinking Water	Conduct PFAS monitoring of all Non-Transient Non-Community (NTNC) water systems in Maryland. There are over 400 NTNC water systems which include schools, offices, and daycare centers.	2023-2024	In Progress	4.1
MDE	Drinking Water	Inform NTNC water systems with exceedances of proposed MCLs and recommend actions based on EPA's proposed regulations which may include additional monitoring, public notifications, and implementation of corrective actions.	2023-2024	In Progress	4.1

MDE	Drinking Water	Provide technical assistance to NTNC water systems with exceedances of proposed MCLs and connect them with Federal and State funding to address PFAS contamination in their drinking water. Only publicly owned (non-federal) and non-profit water systems qualify for funding.	2023-2026	Not Started	4.1
MDE	Drinking Water	Develop a private well fact sheet with information and resources to assist private well owners in testing and installing treatment for their systems.	2023	Completed	4.1
MDH/ MDE	Drinking Water	Develop an outreach plan with local health departments to provide private well owners with information and resources on new well construction and existing wells.	2024	Not Started	4.1
MDH/ MDE	Drinking Water	Use an existing web-based application to identify areas of known and potential PFAS contamination throughout the State to inform the public and private well owners where testing and treatment is recommended. MDH will provide a display through its Environmental Public Health Tracking portal.	2024-2025	Not Started	4.1
MDE	Drinking Water	Consider requiring PFAS testing in Certificate of Potability (COP) for new private wells and apply proposed MCLs as thresholds to ensure drinking water is safe for consumption.	2024	Not Started	4.1
DNR/ MDH	Drinking Water	Conduct biannual PFAS monitoring of Transient Non-Community (TNC) water system at DNR's Fair Hill facility due to a known source of PFAS contamination to ensure effectiveness of treatment system and to support MDE site investigations.	2023 -	In Progress	4.1

DNR/ MDH	Drinking Water	Conduct PFAS monitoring of all DNR Water Treatment Plants (WTPs) and install treatment when PFAS levels exceed proposed MCLs.	2023 - 2024	In Progress	4.1
DNR/ MDH	Drinking Water	Conduct PFAS monitoring of all wells on DNR owned properties throughout the State.	2023 - 2025	In Progress	4.1
MDE	Fish Consumption	Conduct State-wide PFAS monitoring in fish tissue to establish fish consumption advisories.	2020 - 2023	Completed	4.2
MDE	Fish Consumption	Develop new Fish Consumption Advisory thresholds for PFAS using Center for Disease Control (CDC) reference doses.	2023	Completed	4.2
MDE	Fish Consumption	Release new Fish Consumption Advisories for PFAS. A total of 73 new advisories will be assigned to different fish species and waterbodies throughout the State.	2023	Completed	4.2
MDE	Fish Consumption	Develop a web-based PFAS-specific Fish Consumption Advisory map in addition to the current map that includes advisories for PFAS, mercury, PCBs, and pesticides.	2023	Completed	4.2
MDE/ MDH	Fish Consumption	Resume State-wide Fish Consumption Monitoring Program, monitoring for PFAS, mercury, and polychlorinated biphenyls (PCBs) annually in fish tissue throughout the State on a five-year cycle.	Fall 2023 -	In Progress	4.2

MDE	Fish Consumption	Release new PFAS fish tissue impairment listings in Maryland's Integrated Report (IR) for 2024. Over 40 impairment listings are currently proposed.	2024	In Progress	4.2
MDE	Product Bans	Develop an Aqueous Film Forming Foam (AFFF) take-back program. MDE is currently processing a contract with Maryland Environmental Service (MES) to facilitate this program. MES will arrange for the recovery, transportation, and disposal out-of-state of AFFF from fire departments located in Maryland.	2023 - 2024	In Progress	4.3
MDE/ MDH	Product Bans	Release public notification of the requirements in the George "Walter" Taylor Act to ban the use, manufacturing, sale, or distribution of AFFF in rugs/carpet, and food packaging. Public notification will include postings on the MDE website, and letters directed to manufacturers, vendors, distributors, and other potentially affected entities informing them of the requirements of the Act. MDE will work with MDH to ensure actions in food packaging are coordinated with food manufacturing and processing requirements.	Fall 2023 - 2024	In Progress	4.3
MDE	Air Emissions	Evaluate whether air emissions contribute to PFAS contamination in public water supplies or waterbodies impaired for fish tissue when source trackdown investigations are required. If potential air sources are found, MDE would implement measures to gather records and test data, when feasible, to determine if further actions are required.	2024 -	Not Started	4.4

MDE/ MDH	Municipal Wastewater Treatment Plants (WWTPs)	Conduct PFAS monitoring of Wastewater Treatment Plants (WWTPS) through voluntary sampling by facilities and surveys conducted by MDE. Over 100 facilities have had their influent, effluent, and biosolids sampled for PFAS.	2020 -	In Progress	5.1
MDE	Municipal WWTPs	Municipal WWTPs with elevated PFAS levels in their effluent and biosolids are required to conduct additional monitoring and submit a comprehensive PFAS source tracking and minimization plan. Currently, 14 National Pollutant Discharge Elimination System (NPDES) municipal WWTP permits include these requirements. If applicable, coordination with the industrial pretreatment program will be required to address industrial facilities discharging PFAS to the sanitary sewer system.	2021 -	In Progress	5.1
MDE	Municipal WWTPs	Connect municipal WWTPs with Federal and State funding that require financial assistance to address PFAS contamination in their effluent and biosolids.	2024 -	Not Started	5.1
MDE/ MDH	Biosolids	Conduct PFAS monitoring of all WWTPs that have their biosolids used for land application (Class B facilities). There are currently 35 facilities in Maryland.	2023	Completed	5.2
MDE	Biosolids	Implement a hold on the issuance of new sewage sludge utilization permits until a policy decision is made on what levels of PFAS are acceptable for land application.	2023 - 2024	Policy changes In Progress	5.2

MDE	Biosolids	Require all out-of-state sewage sludge utilization permittees to submit PFAS data from their biosolids.	August 2023 deadline	Completed	5.2
MDE	Biosolids	Conduct a comprehensive review of all biosolids data and determine how to proceed with land application permits.	2023 - 2024	In Progress	5.2
MDE/ MDH	Biosolids	Consider conducting PFAS monitoring of municipal WWTPs that have their biosolids used in commercial fertilizer and composting operations (Class A facilities) if future research demonstrates these sources pose a risk to public health and the environment.	2024 -	Not Started	5.2
MDE/ MDH	Spray Irrigation Facilities	Conduct PFAS monitoring of all WWTPs that discharge their effluent through spray irrigation. There are currently 46 active facilities in Maryland.	2023	Completed	5.3
MDE/ MDH	Spray Irrigation Facilities	Conduct a comprehensive review of all effluent data from spray irrigation facilities and select a facility with elevated levels of PFAS for a pilot study to assess the impacts of PFAS in soil and groundwater.	2023 - 2024	In Progress	5.3
MDE	Landfills	Include PFAS monitoring requirements in Refuse Disposal Permits for leachate, surface water and groundwater for active facilities, and for closed facilities still required to perform monitoring. If future monitoring reveals PFAS contamination at levels of concern, existing regulations can be used to require investigation and remediation.	2024	Not Started	5.4
MDE	Septics	Consider developing a pilot study and action plan to characterize	2024	Not Started	5.5

		PFAS levels in septic systems throughout the State from residential, commercial, and industrial sites.			
MDE	Industrial Facilities	Implement voluntary survey for industrial facilities regulated under the general permit for industrial stormwater to identify sources of PFAS in their activities. Survey indicated that 14 % of facilities that responded had sources of PFAS on-site.	2021	Completed	5.6
MDE	Industrial Facilities	Implement a requirement in the new General Permit for Industrial Stormwater (issued February 2023) that all industrial facilities identify potential sources of PFAS that could be exposed to stormwater and address these sources in their Stormwater Pollution Prevention Plans (SWPPPs).	2023 - 2024	In Progress	5.6
MDE	Industrial Facilities	Incorporate new permit requirements for industrial dischargers (surface, groundwater or stormwater) with reasonable potential to violate water quality for PFAS. Each permit is being evaluated upon renewal and specific requirements will be determined on a case-by-case basis.	2021 - 2027	In Progress	5.6
MDE	Industrial Facilities	Provide oversight to counties and municipalities with delegated authority over pretreatment permits for industrial facilities. Monitoring may be required at these facilities discharging to the sanitary sewer system when there is reasonable potential for these facilities to be the cause of elevated PFAS levels at WWTPs. As the approval authority, MDE will also provide guidance to the delegated authorities as necessary to ensure all appropriate standards and/or limitations are enforced.	2024 -	Not Started	5.6
MDE	Pesticides	MDE is considering actions to address PFAS in the general permit for pesticide application which will be up for renewal in 2025. MDE	2025	Not Started	5.7

		also plans to review the findings of the pesticide study to potentially inform actions in the general permit.			
MDE/ MDH	Source Identification	Develop and implement a framework to address environmental impacts of PFAS using a two-prong adaptive strategy to track down sources of ongoing and historic PFAS releases: 1) Investigations of potential PFAS sources in areas of known drinking and surface water impacts, focusing on potential public health risks to Maryland residents, and 2) Investigations of known or suspected PFAS use and storage areas to identify and mitigate historic and ongoing releases of PFAS to waters of the state.	2023 -	In Progress	6.1
MDE	Federal Facilities/ National Priority List (NPL) Sites	Work with the U.S. Department of Defense (DoD) and the U.S. Environmental Protection Agency (USEPA) to assess, remediate and monitor DoD sites and private National Priority List (NPL) sites in Maryland where PFAS are present. DoD provides funding to MDE to oversee assessment, remediation, and monitoring of military installations.	2018 -	In Progress	6.2
MDH	Analytical Services	Bring on and/or develop new PFAS testing methods as needed to provide laboratory services to MDE and other State agencies to analyze any needed samples for PFAS in support of monitoring surveys and investigations to characterize PFAS levels and to identify, control, and remediate sources of PFAS contamination impacting the environment and public health within the State of Maryland.	2020 -	In Progress	9.1

4.0 Minimizing Environmental Exposure to PFAS Chemicals

4.1 Drinking Water

Background

Throughout the nation, Per- and Polyfluoroalkyl Substances (PFAS) have been detected in drinking water, groundwater, surface water, soils, and other environmental media. Since the 1940s, PFAS have been present in a variety of industrial and commercial applications and products because of their ability to resist heat, oil, and water.

The U.S. Environmental Protection Agency (EPA) and U.S. Centers for Disease Control (CDC) and Prevention Agency for Toxic Substances and Disease Registry (ATSDR) continue to investigate the human health impacts of chronic exposure to PFAS. According to ATSDR, studies have suggested that chronic exposure to two PFAS, PFOA and PFOS, may be linked to: increased cholesterol levels, increased risk of high blood pressure or pre-eclampsia in pregnant women, changes in liver enzymes, decreased vaccine response, and small decreases in infant birth weights. Additionally, the EPA has classified PFOA and PFOS as having potential carcinogenic effects in humans.

Maryland Department of the Environment's (MDE) earliest efforts to assess PFAS in drinking water were primarily fueled by federal initiatives, specifically the testing required by EPA under the Third Unregulated Contaminant Monitoring Rule (UCMR 3). That effort in 2012-2015 identified only one Public Water System (PWS) in Maryland with quantifiable levels of PFAS above the 2012/2015 PFOA+PFOS limits of detection of 20-40 ppt. Due to increasing understanding of human health risks, public concern surrounding this group of compounds, improved analytical methods and lower limits of detection, MDE initiated its multi-phased PWS Study in 2020. The study phases are described in the sections below.

In March 2023, the EPA published proposed enforceable limits in drinking water for PFOA and PFOS at 4 parts per trillion (ppt) each. In addition, EPA published a proposed Hazard Index for four PFAS (PFNA, PFHxS, PFBS, and HFPO-DA (GenX)). This Hazard Index is based on the following Health-Based Water Concentrations: 9 ppt for PFHxS, 10 ppt for PFNA, 10 ppt for HFPO-DA (GenX), and 2,000 ppt for PFBS.

Throughout this process, MDE has worked closely with other state and federal agencies, particularly the Maryland Department of Health (MDH) and its Laboratories Administration, to evaluate and assess the contamination and health implications of PFAS in drinking water.

MDE's Water Supply Program (WSP) provided a Resource Investment Plan to EPA in May 2022. The staffing levels described in that plan will be sufficient to perform the work described in this report. As described in that plan, additional funding may be needed to support these positions.

Community Water Systems

In September 2020, MDE's WSP initiated its multi-phased PWS study for PFAS to better understand the occurrence of PFAS in state public drinking water sources. MDE determined that Community Water Systems (CWS) were at the highest risk of long-term exposure; therefore, the PWS study began by focusing on CWSs. CWSs are public water systems that supply water to the same population year-round. In Maryland, 89% of the state population, approximately 5.4 million individuals, is served by CWSs. During phases 1-3, every CWS that supplies its own water to its customers was sampled. A total of 437 CWSs were sampled. Phase 4 was used to evaluate and confirm the occurrence of PFAS in the drinking water of CWSs that had previous detections of PFOA and PFOS during Phases 1-3. MDE-WSP collaborated with MDE field services and the MDH to collect and analyze all drinking water samples during the four phases. A total of 126 CWS were sampled during Phase 4; 63 of those systems had levels that exceeded one or more proposed Maximum Contaminant Levels (MCLs). Approximately 165,000 individuals are served under these 63 systems, which is approximately 3% of the population served by CWSs. WSP worked with water systems with levels of PFAS above EPA's proposed regulations and recommended that these systems notify their customers, conduct additional sampling of affected sources, and develop a plan for reducing the PFAS levels in their drinking water. Reduction strategies recommended included:

- Taking impacted sources offline
- Connecting to a nearby system (regionalization)
- Developing alternative sources of drinking water
- Installing treatment to remove PFAS

WSP has been providing technical assistance to systems and connecting them with funding available through the Infrastructure Investment and Jobs Act (Bipartisan Infrastructure Law), including the Drinking Water State Revolving Fund for Emerging Contaminants (DWSRF-EC) and the Emerging Contaminants in Small or Disadvantaged Communities (EC-SDC) Grant. During the funding process, the system's EJ score is taken into consideration; however it is MDE's goal to fund all PFAS related projects that are submitted.

In response to the EPA's March 2023 announcement of proposed regulations for six of the PFAS compounds, MDE required all systems sampled during 2022 to include PFAS sampling results in the system's Consumer Confidence Report (CCR) beginning in July 2023 to inform consumers of the status of their drinking water. This requirement will be continued in upcoming years.

Public Communication

More detailed information about individual Phase sampling can be found on our website in the Phase 1-4 Reports.

MDE-WSP is currently developing an interactive map showing all sample data collected during the PWS study, with the goal of it eventually being available for public viewing on our website.

MDE did, in some cases, identify PFAS results that prompted additional actions. For instance, in 2021 MDE identified a Frederick County non-transient, non-community system in which the levels of Perfluorohexanesultonic acid (PFHxS) exceeded the ATSDR minimum risk level (MRL), prompting MDH to issue a Health Advisory for this compound in drinking water.

Future Actions

EPA's regulations will require all CWS and NTNCs to monitor for PFAS, likely starting in late 2026 or early 2027. NTNCs are public water systems that regularly supply water to at least 25 of the same people at least six months per year. WSP's goal is to have all CWSs and NTNCs in the state compliant when the EPA's PFAS regulations go into effect. MDE-WSP continues to work with CWSs to ensure they are on track to meet this goal.

According to the EPA, under the proposed monitoring requirements, systems will initially be required to collect two or four samples over one year, depending on the system's population size and system type. The initial monitoring results will determine the ongoing compliance monitoring requirements. These proposed ongoing monitoring requirements include either quarterly monitoring for all sample locations or reduced monitoring (once or twice every three years) for sample locations where the results fall below one-third of the MCLs. Water systems with regulated PFAS above their proposed MCLs will be required to install treatment or take other actions to reduce regulated PFAS levels in the drinking water and meet MCLs.

Fifth Unregulated Contaminant Monitoring Rule (UCMR)

Under UCMR5, all of Maryland's public water systems serving a population of 3,300 and over will be required to sample for 29 PFAS between January 2023 and December 2025. According to the EPA, the data collected will be used to make science-based decisions and help prioritize the protection of disadvantaged communities. The sample data collected will also provide Maryland's public water systems with more information to help improve their understanding of their system's water quality. This effort is being organized and led by EPA.

Non-Transient Non-Community Water Systems (schools, offices)

Phase 5 Monitoring

Phase 5 of MDE's PWS study will sample NTNCs in the state. Phase 5 is scheduled to begin in Summer 2023, with a goal of completion by late 2024. It will consist of sampling the over 400 NTNC systems in the state. Systems located in the fractured rock region of the state (systems with sources located west of I-95), will be prioritized for sampling. Samples from this phase are being analyzed by MDH Laboratories Administration using EPA Method 533. All previous phases were analyzed by MDH Laboratories Administration using EPA Method 537.1 (See Section 9 for additional information on these analytical methods.)

Once MDE receives sampling results, systems will be informed of their results and MDE, in consultation with MDH, will recommend certain actions, based on EPA's proposed regulations for the six PFAS compounds. These may include additional monitoring, public notifications, and the implementation of corrective actions.

MDE will provide technical assistance to help systems determine the best course of action for addressing PFAS contamination. MDE will also notify systems of available funding opportunities. For publicly-owned (non-federal) and non-profit water systems, funding for remediation is available for projects addressing PFAS through the Infrastructure Investment and Jobs Act (Bipartisan Infrastructure Law).

MDNR Facility Drinking Water Monitoring

The Maryland Department of Natural Resources (MDNR) is currently monitoring water systems at their Fair Hill facility every six months due to a known PFAS contamination source. Samples are taken before and after treatment to ensure public health in the drinking water and also to aid in tracking the groundwater contamination plume. Samples are analyzed by MDH Laboratories Administration using EPA Method 533.

MDNR has begun testing every MDNR-owned water treatment plant in both raw and processed water to identify any potential PFAS contamination. MDNR has so far monitored around 80% of their water treatment plants.

MDNR is currently developing a project to test every drinking water well on MDNR-owned property throughout the State regardless of use. Monitoring will include a thorough water quality test potentially including all priority pollutants, standard water quality parameters, bacteria, PFAS, Methyl tert-butyl ether (MTBE), Polychlorinated biphenyls (PCB), nutrients, and potentially viruses and other environmentally concerning or enhancement factors. This project is contingent upon funding, and is expected to start in early winter.

Transient Non-Community Water Systems (parks, places of worship)

A Transient Non-Community Water System (TNC) is a water system at places such as gas stations or campgrounds where people do not remain for long periods of time. Under EPA's proposed PFAS regulations, TNCs are not required to monitor for PFAS, since the MCLs for PFAS are based on chronic exposures. At this time, MDE does not have any plans to monitor TNC. There are over 2,000 TNCs in Maryland, and MDE has considered sampling at TNC wells in order to develop a higher-resolution understanding of the prevalence of PFAS concentrations in the state's surficial aquifers. These aquifers are shallow and unconfined, directly influenced by the water table, and susceptible to contamination from the surface. TNC wells tend to be shallower than CWS wells, and there is a potential for concentrations in these wells to be different from those found in CWSs or NTNCs. This data collection effort could also be supplemented with targeted sampling of water from private wells.

Private Wells

Private wells provide water to 10% of Maryland's population. Water quality in private wells is not regulated by the state or federal government to nearly the same degree as public water systems. Private wells require construction permits to drill and are initially sampled for certain pollutants in order to issue a certificate of compliance, but there is no required ongoing water quality monitoring and application of Safe Drinking Water Act standards. MDE will consider requiring PFAS testing in the Certificate of Potability (COP) for newly constructed private wells and apply proposed MCLs as thresholds to ensure drinking water is safe for consumption. Limited sampling of PFAS in private wells has been done by MDE in support of targeted investigations. MDE-WSP will continue to provide support for these investigations if requested by LMA. For example, in the vicinity of the WL Gore facilities at Cherry Hill and Fair Hill, near Elkton, MD, MDE has sampled water from over 100 private wells. Samples were collected by MDE Field Services and were analyzed by the MDH Laboratories Administration. Private well owners are notified of the results and encouraged to connect to public water, where possible, or to install treatment systems on their water.

Public Communication

MDE has developed a private well fact sheet with information and resources to assist private well owners with the next steps. This is available on MDE's website and is included in the information sent to homeowners whose wells have been tested. MDE has also worked with MDH and local health officials, who in most cases are responsible for the regulation of private wells under delegation from the Secretary of MDE, to provide information about PFAS to private well owners. MDE plans to create an interactive mapping application to relay PFAS drinking water data and to provide information about potential and known PFAS sources to the public.

4.2 Fish Consumption

Background

Some chemicals in surface waters and sediments tend to concentrate - or bioaccumulate - in fish and shellfish. The presence of chemicals in fish and shellfish and the associated potential health risks to those individuals who consume the fish are of concern, especially vulnerable communities or populations influenced by environmental justice inequities.

All 50 states, and some U.S. territories and tribes, issue advisories to protect people from the potential health risks of eating contaminated fish caught in local waters. EPA encourages states, territories, and tribes to also issue safe eating guidelines. These guidelines tell people which fish they can eat safely and encourage eating fish and shellfish as part of a healthy diet.

Since the 1980s, MDE has issued waterbody-specific and species-specific Fish Consumption Advisories (FCAs) for PCBs, mercury, and pesticides. MDE has collaborated with many other agencies and stakeholders such as the MDH, Maryland Department of Agriculture (MDA), and the University of Maryland to produce outreach materials promoting a healthy diet through the consumption of recreationally caught fish. In recent years, MDE has focused our outreach efforts on the consumption of invasive species and working with communities with EJ concerns.

In general, fish targeted for collection have included popular recreational fish. Eels, fallfish, and other species are collected when target species are not readily available. The types of fish sampled include important predatory game species (e.g., smallmouth bass and striped bass), common recreational panfish species (e.g., white perch, bluegill, and crappie) as well as bottom-dwelling, accumulator species with relatively high fat content (e.g., carp, catfish, and American eel). A secondary goal of the monitoring program is to assess temporal and geographic trends in fish tissue contamination by obtaining the same species during revisits to the sites. When routine monitoring indicates potential hazards to the public and environment, additional monitoring of the affected area may be conducted to verify the initial findings and identify the appropriate species and size classes associated with harmful contaminant levels.

Findings from such studies are the basis for the fish consumption advisories. Because the issuance of a fish advisory is fundamentally a risk management action, factors in addition to the technical risk assessment are often considered prior to issuing fish consumption advisories (e.g., weighing the risks associated with exposure to contaminants with the benefits of including fish as part of a healthy diet).

Current actions

Fish Tissue PFAS Monitoring (3-year survey)

Because a PFAS source was identified in the watershed (Joint Base Andrews), in 2020, MDE monitored and issued PFOS-based FCAs for certain species of fish in the Piscataway watershed in Prince George's County.

Since then, MDE has initiated a statewide monitoring strategy, including targeted monitoring for PFAS in specific water bodies that have been identified as having nearby potential sources of PFAS, to determine the concentrations of PFAS contaminants in fish tissue that may require FCAs. Areas frequented by subsistence anglers and fishers were also monitored. The targeted fish samples for PFAS remain the same as those from previous collections: game/predator, panfish, and bottomfeeders as well as species known to be consumed by recreational anglers were sampled including rockfish, crabs, and oysters.

Fish Consumption Advisory Thresholds

In contrast to carcinogenic hazards, non-cancer hazards assume that toxic effects only occur after exposure is greater than some threshold level that exceeds the body's natural defense mechanisms. The Reference Dose (RfD) is a rough estimate, allowing for some uncertainty, of the daily amount people, including sensitive groups, can be exposed to without significant risk of harmful effects over a lifetime. MDE is using the CDC RfDs to calculate advisory thresholds, as the EPA has not provided recommendations on what RfDs to apply. The upper advisory threshold limit of 8 meals/month is presented in the table below.

Table 1: Fish Consumption Advisory Thresholds

Contaminant	RfD	Upper Advisory Threshold (ug/kg)		
		General Population (76 kg)	Women Child-Bearing Age (67 kg)	Children (14.5 kg)
PFOS	2.0E-06	2.4	2.1	1.2
PFOA	3.0E-06	3.6	3.2	1.8
PFBS	3.0E-04	360.0	317.4	183.2
PFNA	3.0E-06	3.6	3.2	1.8
PFHxS	2.0E-05	24.0	21.2	12.2
GenX (HPFO-DA)	3.0E-06	3.6	3.2	1.8

Piscataway Fish Consumption Advisories

MDE found that fish tissue PFOS concentrations in redbreast sunfish and yellow bullhead catfish in the non-tidal portion of Piscataway Creek exceeded PFOS MDE site-specific fish consumption screening criteria. Similarly, largemouth bass in the tidal headwaters of Piscataway Creek exhibited PFOS concentrations exceeding MDE's site-specific fish consumption screening criteria.

Table 2: Piscataway Creek Fish Consumption Advisories

Site Description	Species Common Name	General Population (76 kg)	Women Child-bearing Age (67 kg)	Children (14.5 kg)
Non-Tidal Piscataway Creek	Yellow Bullhead Catfish	No Limit	No Limit	7
Non-Tidal Piscataway Creek	Redbreast Sunfish	1	1	1
Tidal headwaters of Piscataway Creek	Largemouth Bass	3	3	2

Fish Consumption Advisories (2023 Release)

FCAs (meal recommendations) are calculated for several of the PFAS compounds, and only PFOS levels in certain fish from specific water bodies resulted in fish consumption advisories where MDE would recommend limiting consumption for certain population groups: general population, women, and children. Samples were analyzed for many of the various PFAS compounds including 5 of the 6 PFAS proposed by EPA for National Primary Drinking Water regulation: PFOA, PFOS, PFHxS, PFBS, and PFNA. The sixth proposed PFAS Drinking Water compound, GenX, was not included in the surface water and fish tissue monitoring conducted to date, as the commercial laboratories used did not analyze for that contaminant in the PFAS chemical suite at the time. GenX (and all 39 other PFAS for which standards are available) is now included in the PFAS chemical suite analyzed by our current lab (MDH Laboratories Administration) and will be analyzed in all samples moving forward, though it is unlikely to result in any advisories as it does not generally bioaccumulate in fish.

One compound, PFOS, was identified at greater concentrations and a higher frequency than other PFAS. There are no advisory recommendations for other PFAS at this time. Overall, PCBs and mercury continue to be the fish consumption risk drivers (i.e., the contaminant that results in the fewest recommended meals consumed per month) for most species and water bodies. Of the 457 total consumption advisories in Maryland, 73 are proposed PFOS fish consumption advisories, accounting for 16% of the total.

Table 3: Fish Consumption Advisories (2023)

Fish Consumption Advisories	PFOS	PCBs/Hg
"Avoid"(>1 Meal every other Month)	5	28
"No limit" (>8 Meals/Month)	10	84
Range (1 - 8 Meals per Month)	58	272
Total	73	384

From the fall of 2020 to the fall of 2022, there were a total of 150 PFAS fish composites collected in Maryland, resulting in 106 separate consumption advisories specifically for PFAS. Of those, 73 of the collection locations resulted in Fish Consumption Advisories with PFOS as the driver, and 33 remained unchanged based on the existing contaminant drivers. It is also important to note that of the 73 PFOS advisories, 40 of those are newly sampled areas (22 new areas) or newly caught fish species in existing areas (18 new fish species) with no data available for other potential chemical contaminants.

Crabs and oysters sample concentrations of PFAS were below consumption screening criteria, therefore, no advisories are warranted. However, surveillance will continue as needed. Striped Bass (Rockfish) were specifically targeted for collection and analysis for PFAS, of the eight separate locations where PFAS were collected, seven sites had a resulting consumption advisory based on PFAS. Of those seven sites, two of the sites have multiple PFOS advisories based on different sizes of Striped Bass. It should be noted that all seven of these sites with the resulting PFAS advisories had no previous advisories for other contaminants, thus per procedure, the PFAS advisory is the driving advisory. In all locations where Striped Bass had previously been collected and analyzed for PCBs and Hg, these advisories remained the same, with the same drivers.

The total cost for this analysis was $125,360, spread out over three labs (Alpha Analytical, GEL Laboratories, and the Maryland Department of Health Laboratory) in a three-year time frame. Funding was sourced from the annual fish consumption advisory program, Watershed Protection, Restoration and Planning Program, Land Management Program, and an EPA Multi Use grant. Over 95% of the fish, crabs, and shellfish were collected by the MDE Field Investigations and Environmental Response Program, and the remaining 5% (Striped Bass targeted effort) were collected by MDNR.

Public communications

There will be a new, PFAS-specific interactive advisory map on the MDE PFAS Landing Page. In addition, there will be a PFAS Collection Layer on the Fish Consumption Advisory map. This layer shows the locations, samples collected, date, media, and results for all PFAS sampling for the Fish Consumption Advisory Program. There is also a new ability to overlay the MDE Environmental Justice (EJ) layers on the Fish Consumption Advisory map.

Fish Consumption Advisories for PFAS/PFOS Layer: The Fish Consumption Advisory for PFAS/PFOS sublayer shows the consumption advisory specifically for PFAS/PFOS, the waterbody, the fish part, the species, and a species photo.

Both of these maps are in addition to the regular public communications information that MDE provides, including (but not limited to) static listings of most recent fish consumption advisories, brochures to local health departments (for Women, Infants, and Children (WIC) programs), local signs with links back to MDE FCA's interactive maps and static listings placed by the county (working in conjunction with MDE) at water bodies of concern.

EJ considerations

Maryland's Recreational Fish Consumption Advisories are calculated with the most vulnerable populations in mind, also known as subsistence fishing communities. Subsistence fishing typically involves communities relying on local ecosystems for their food and livelihoods. These communities are directly dependent on the health and sustainability of the environment, making them vulnerable to any environmental degradation. Environmental justice is closely linked to the fair and just implementation of policies and regulations and should be considered when making decisions because it impacts subsistence fishing communities and the overall well-being of

these communities and the sustainable use of natural resources. When selecting locations to sample for PFAS contamination, MDE worked in conjunction with MDNR to select subsistence fishing spots. MDE also plans to overlay the EJ layer (a separate MDE Web Application) onto the Fish Consumption Advisory map, so that it may be selected to show up on the map.

Fish Tissue Impairment Listing (2020/2022 IR Listings for Piscataway)

The Piscataway Targeted PFAS study concluded that PFOS is present in the non-tidal and tidal waters of Piscataway Creek at concentrations below risk-based recreational use swimming screening criteria but exceeded fish tissue PFOS consumption site-specific screening criteria. The results and conclusions from this study assisted the Water and Science Administration in listing the Piscataway Creek (tidal and non-tidal waters) as impaired in Maryland's Combined 2020-2022 Integrated Report of Surface Water Quality for elevated levels of Perfluorooctane Sulfonate (PFOS) in fish tissue.

Future actions

Statewide Fish Consumption Advisory Monitoring Program (5-year cycle)

MDE plans to add PFOS to the list of chemicals (along with PCBs and mercury) sampled on a routine (5-year cycle core sites) basis. These new advisories, where applicable, will be updated annually. MDE will also revisit sites where fish that are more likely to bioaccumulate PFAS (e.g. bass, sunfish, etc.) were unable to be collected, and target sites where newly collected WWTP effluent data is demonstrating elevated concentrations.

Fish Tissue Impairment Listings (2024 IR)

MDE anticipates several new PFOS listings in fish tissue in the 2024 IR. MDE plans to develop an approach to address these listings through a TMDL alternative using source trackdown investigations to identify, control, or remediate sources of PFAS contamination responsible for impairing the listed waterbodies.

Public Communications

MDE has given and will continue to give presentations on the latest advisory updates to local health departments, at the national fish forum (EPA), and other stakeholder events.

MDNR Fish Nursery Monitoring

MDNR has also requested that MDE collect fish from the stocking ponds for put-and-take fish. This effort will cost approximately $3,000 to sample these locations, plus lab testing costs (MDH charges $200 per composite sample to test fish tissue for 40 different PFAS using EPA analytical Method 1633, which is the new state-of-the-art EPA method for testing non-drinking water samples and for use in permitting (see Section 9).

MDH/Local Health Department Actions

At this time, the Fish Consumption Advisory program is poised to release an updated fish consumption advisory with PFAS-driven advisories. This updated advisory will have a full press release and coordinate with a press release from MDNR. As with other fish advisories (PCBs, mercury), MDH and Local Health Departments have followed MDE's lead and collaborated with MDE to provide information to the public on consumption advisories.

All data collected regarding consumption advisories is analyzed for potential Environmental Justice aspects, and we will continue to do so in the future. Care will be taken to involve the local health departments when vulnerable communities are implicated in fish consumption advisories.

4.3 Product Bans for AFFF, food packaging, Rugs/Carpet, and Cosmetics

Background

Aqueous Film Forming Foams (AFFF)

The sale, use, manufacturing or distribution of PFAS-containing fire-fighting foam is banned after January 1, 2024, except for use at an airport, port, or refinery, until October 1, 2024, or at a terminal, until January 1, 2028. Any use of the foam requires collection and proper disposal of the foam and any runoff, with notification of MDE within 5 days.

After October 1, 2023, any fire-fighting protective equipment that is sold must include a notice that it contains PFAS and the reason it does. The notice must be retained by the seller and the purchaser for 3 years from the date of purchase.

Rugs/Carpet

On or after January 1, 2024, no rug or carpet containing intentionally added PFAS can be sold in Maryland, and the manufacturer selling such products here must develop a certificate of compliance attesting that the floor covering complies. The certificate must be provided to MDE within 30 days of a request.

Food Packaging

On or after January 1, 2024, food packaging components that are intended for direct food contact and are composed in substantial part of paper, paperboard, or other materials originally derived from plant fibers, and contain PFAS that were intentionally added, cannot be manufactured, sold, offered for sale or distributed in Maryland. MDE can request that manufacturers provide a certification of compliance, or grant an exemption under certain circumstances. MDH Office of Food Protection is monitoring national and state activities in this area and will collaborate with MDE regarding implementation of any additional proposed actions, to ensure the continued safety of food products manufactured, processed, or distributed in Maryland.

Cosmetics

Cosmetics in Maryland are subject to regulation under Health-General, Title 21, which authorizes the Department of Health to regulate cosmetics that are considered “adulterated.” Currently, MDH does not have any specific programmatic activities related to cosmetics.

Current Actions/Future Actions

AFFF Take-back Program

MDE is actively negotiating with Maryland Environmental Service (MES) to arrange for the recovery, transportation, and disposal out-of-state of PFAS-containing fire-fighting foam concentrate from fire departments located in Maryland. MDE has been allocated $500K to fund the take-back program. However, it is unclear if this will be sufficient due to the high demand for PFAS and other hazardous waste disposal capacity. Three positions have also been authorized for MDE’s Solid Waste Program to manage PFAS activities including product bans and the hiring is currently underway.

Public Communications

MDE will be undertaking public notification of the statute's requirements starting in the fall of 2023 and will develop regulations as provided for in the George “Walter” Taylor Act. Public notification will include postings on the MDE website, and letters directed to manufacturers, vendors, distributors, and other potentially affected entities informing them of the requirements of the Act. MDE will collaborate with MDH regarding any additional required regulatory actions.

4.4 Air Emissions

Background

Little is known or definitive about levels in the atmosphere or the amount or concentration of PFAS emitted from individual facilities or categories of facilities. Air emissions generally only come into focus when a water supply or water body becomes contaminated with PFAS and a search is undertaken to determine the source of the contamination.

Despite the lack of tools to measure PFAS air emissions and ambient concentrations, a review of sources that have permits to emit air pollutants that may use raw materials containing PFAS-related compounds in their process lines revealed that Maryland does not have sources that emit significant amounts of PFAS into the air through a smokestack or roof vent. From MDE’s knowledge of the types of operations at facilities in Maryland that have been issued permits to emit pollutants into the air and the materials used at those facilities, Maryland does not have any sources that manufacture PFAS, nor does Maryland currently have any known sources that directly use PFAS-containing raw materials to manufacture a product. Additionally, neither the two municipal waste incinerators nor the lone medical waste incinerator in Maryland have contracts with other commercial entities or the military to burn stockpiled materials containing PFAS. Permitted Hazardous Waste Incinerators burning large quantities of PFAS

materials as a means to eliminate stockpiles of PFAS-containing foams have been identified as a significant airborne source of contamination elsewhere within the United States.

There are more than 2,000 commercial and industrial facilities across Maryland that, based on products they manage, use, treat, store, or distribute, may have released or may currently be releasing PFAS into the air. No facility in Maryland is known, however, to be a significant source of PFAS air pollution. For example, approximately one-quarter of the facilities that may be potential PFAS air emission sources are believed to be facilities that only store or distribute PFAS-containing fire-fighting products, which are activities with either zero or insignificant levels of PFAS air emissions. Fire protection, fire equipment suppliers, and fire stations are examples of such facilities.

Other facilities, based on the nature of their operations, may have used PFAS-containing products or materials and emitted PFAS at some point in the past but no longer do so because they have ceased operations. Over 400 brownfield and formerly utilized defense sites fall within this grouping. Dozens of closed industrial operations, including incinerators, a tannery, paper box, and printing companies, a shoe manufacturing company, and a few electroplaters are also included in this category. Whether any PFAS were ever emitted from any of these facilities or to what degree is not able to be determined.

A further example is carpet manufacturing. Carpet manufacturing is generally known to be a potential source of PFAS air emissions, but there are no known conventional carpet manufacturing facilities in Maryland. Maryland's carpeting industry is limited to warehouse, cleaning, sales, and distribution facilities that provide carpet products and related services, such as applying stain repellents based on customer requests. The application of the stain repellent would likely cause PFAS to be emitted into the atmosphere as fugitive emissions, but not at levels that would require an air permit. Similarly, there are no conventional oil refineries in Maryland, but there are blending and storage operations and operations that process oil in some fashion to create a product, such as biodiesel. These facilities are not known to emit PFAS, as they involve processing products at ambient or low temperatures, which is not an environment that is conducive to emitting PFAS.

There are also a significant number of facilities, such as landfills, rubble fills, and wastewater treatment plants that may take in materials containing PFAS but are not known to be significant emitters of those same PFAS. Municipal waste incinerators also take in materials that may contain PFAS. Both of Maryland's municipal waste incinerators operate at high temperatures, which is helpful in destroying long-chained PFAS compounds, and are well-controlled for particulate matter, which helps capture short-chained PFAS compounds. There is very little emission-related information in the literature about PFAS from incinerators handling normal municipal waste. The incinerators that have principally been under the microscope are those that have incinerated large volumes of products containing PFAS, such as firefighting foam stockpiles and biosolids, and caused contamination in the surrounding areas. There are no facilities of this type located in Maryland.

Chromium electroplating operations are also potential sources of PFAS air emissions, due to the use of PFAS-containing fume suppressants over the plating tanks to control emissions of

chromium VI, a highly toxic air pollutant. Maryland had 9 chromium electroplaters, but only 3 remain. In 2015, the EPA banned PFAS-containing fume suppressants, at which time two Maryland electroplaters switched to Fumertal 21, others chose to cease (or earlier ceased) chrome electroplating, and still others were too small to warrant the use of a fume suppressant. Fume suppressants by their nature are designed to prevent air emissions, so any PFAS in the suppressants would not be expected to be released into the air in any significant quantities.

MDE Regulatory Authority

The lack of information on air quality owes to the fact that an ambient air quality standard does not exist and there currently is no approved ambient monitoring method available and in use in the United States. At the individual facility level, there is no regulatory requirement to measure or estimate PFAS emissions and it is only recently that the EPA has started to develop methods to test for PFAS from individual sources. Work has been done to modify existing PFAS testing methods to measure PFAS from sources, but for only a small number of PFAS compounds and on a very limited basis. As part of its 2020 update to its PFAS Action Plan, the EPA announced it is developing new methods to test for PFAS in air and emissions. Such testing is not part of mainstream technology at this time.

Although there are some concerns related to its toxicity, PFAS has not been included as a listed Hazardous Air Pollutant and no maximum achievable control technology requirement to reduce PFAS emissions has been set for sources.

Current/Future Actions

MDE is following what is being developed at the federal level to measure PFAS emissions from individual sources. As modified or new emission test methods are developed and approved for use, they will be put to use in Maryland as the need arises. MDH Laboratories Administration has an Air Quality Lab and is poised to bring on this testing method if needed. Whether to test and to what degree will be decided later and likely be based on several factors, such as the potential risk a source may pose, the proximity of a source to an identified contaminated area or water body, and how many sources are in the same source category.

MDE is also closely following what is happening in other states that have confirmed contamination at sites where the culprit is an air emission source in an effort to understand more about PFAS and its pathways into the air and to avoid similar incidents here.

As part of MDE's comprehensive plan for understanding, communicating, and managing PFAS risk, should a water body or water supply source contain PFAS contamination at a level that triggers the need for an investigation of the source of the PFAS, MDE would evaluate whether air emissions contribute or contributed to the contamination. If potential air sources are found, MDE would implement measures to gather records and test data, when feasible, to determine if further actions are required.

5.0 Minimizing Future Releases of PFAS Chemicals

5.1 Municipal Wastewater Treatment Plants

Background

Municipal Wastewater Treatment Plants (WWTPs) play a crucial role in managing and treating wastewater generated by residential, commercial, and industrial activities within a city or municipality. These plants are designed to remove contaminants, pollutants, and pathogens from the wastewater before it is discharged back into the environment through discharges into either surface water or groundwater. The capacity and efficiency of these plants vary depending on the size of the community they serve and the level of technology used in their treatment works.

Environmental Risk

The potential PFAS risk from wastewater discharge arises from the presence of these chemicals in the effluent released by WWTPs into the environment. There are several pathways through which PFAS can enter WWTP and, eventually, the environment:

Industrial Discharge: Industrial processes that use or produce PFAS-containing products can release these chemicals into wastewater. Industries involved in manufacturing, firefighting, electronics, and textiles are known to be potential sources of PFAS contamination.

Domestic and Commercial Sources: PFAS can also enter wastewater from residential and commercial sources. Consumer products like nonstick cookware, food packaging, stain-resistant fabrics, and firefighting foams can release PFAS into household wastewater.

Stormwater Runoff: PFAS from various sources on the land can enter stormwater runoff, which may eventually be combined with wastewater and directed to WWTPs. This occurrence is expected to increase as a result of climate change.

Once inside the WWTP, conventional treatment processes may not effectively remove PFAS, leading to their release into the environment through treated wastewater discharges or the disposal of sludge/biosolids generated during the treatment process. This poses a significant challenge for managing PFAS contamination and protecting water sources, highlighting the need for improved treatment technologies and regulatory measures to address this emerging environmental concern. There are several potential risks associated with their discharge:

Environmental Contamination: If not effectively treated, PFAS can be released into the environment through the WWTP's effluent. This can contaminate surface water bodies, groundwater, and soil near the discharge point, potentially affecting aquatic ecosystems and the surrounding wildlife.

Bioaccumulation: PFAS are known to bioaccumulate, meaning they can build up in the tissues of aquatic organisms over time. This can lead to higher concentrations of PFAS in the food chain, with potential impacts on aquatic life and the animals that consume them, including humans.

Drinking Water Contamination: In areas where surface waters are used as a source of drinking water, the discharge of PFAS from WWTPs can lead to the contamination of drinking water supplies. This can pose a risk to human health if people are exposed to elevated levels of PFAS through drinking water consumption.

Human Exposure: PFAS contamination in surface water and soil near the discharge points can also lead to human exposure through direct contact, ingestion of contaminated water or food, or inhalation of PFAS-containing particles.

MDE Regulatory Authority

The National Pollutant Discharge Elimination System (NPDES) permit program, established under the authority of the Clean Water Act (CWA), is a federal initiative responsible for regulating point sources of pollution that release pollutants into the waters of the United States. MDE is granted delegation by the EPA to issue NPDES permits, which govern the discharge from Maryland's WWTP in accordance with COMAR 26.08.04.07. As PFAS falls under the category of pollutants within the CWA, the NPDES permit program is utilized to effectively regulate PFAS discharges and mitigate their potential environmental impact. MDH Laboratories Administration is EPA-approved to run Method 1633 for quantifying 40 PFAS in wastewater for NPDES permitting.

Current actions

Since early 2020, MDE has been conducting outreach with the municipal utilities in the state to collaborate on PFAS data collection from the municipal WWTPs. To date, through either voluntary sampling or surveys conducted by MDE, samples from more than 100 municipal wastewater facilities in the state have been collected and analyzed.

Samples have been taken from the following components in the wastewater treatment work from facilities involved in the surveys:

Influent from the collection system: The process begins with the collection of wastewater from homes, businesses, and industries through a network of sewer pipes. This collected wastewater is known as "raw" or "influent" wastewater.

Biosolids generated from the sludge treatment process: The sludge collected during the primary and secondary treatment stages contains both organic and inorganic materials. This sludge needs further treatment to stabilize it and reduce its volume. Common sludge treatment methods include anaerobic digestion, aerobic digestion, and dewatering processes. The end product of these processes is biosolids.

Effluent to be discharged into receiving stream or land: The final treated wastewater, after undergoing the required treatment processes, is known as "effluent".

Recycled Flow: A portion of the flow in the later stage of the WWTP treatment work is recycled back to an earlier stage of the treatment process (such as headworks). This is typically done by diverting a fraction of the partially treated effluent or wastewater generated by processes such as sludge dewatering/filter backwashing and combining it with the influent wastewater.

WWTP Data Assessment Process

Data collected from all facilities are being meticulously gathered and subjected to statistical analysis to establish "tiered" level baselines (e.g. 75th percentile, median, and 25th percentile) for each of the 40 PFAS chemicals scrutinized in the survey and quantified byMDH Laboratories Administration. The sampling results reported for each facility will then be compared against these tier values. Facilities found to have PFAS chemicals exceeding the median tier level will be given priority for further monitoring and source tracking/minimization efforts. This prioritization approach aims to effectively address and manage facilities with higher PFAS concentrations, ensuring a proactive approach to safeguarding the environment from potential contamination risks.

Public Communications

The results for each facility participating in the survey will be accessible to the public on the Wastewater Pollution Prevention and Reclamation Program's (WPPRP) website, ensuring transparency and public awareness. Moreover, MDE will publish the tentative determination, along with PFAS-specific requirements, for proposed discharge permits in local newspapers to encourage public comments and requests for a public hearing. This proactive approach fosters public engagement and allows stakeholders to contribute their valuable input to the permitting process.

Future Actions

The survey results will inform future permits for facilities with effluent containing elevated PFAS levels (above the overall median level baseline). Such facilities will be mandated to conduct additional monitoring of their influent, effluent, and biosolids, and MDH Laboratories Administration is EPA-approved to run Method 1633 and can serve as a reference laboratory for this program to ensure accurate results. Furthermore, the facility will be required to submit a comprehensive PFAS source tracking and minimization plan. If applicable, coordination with the industrial pretreatment program delegated to the utility will be essential. This plan will outline the specific approaches to be undertaken by the facility whenever PFAS levels in the effluent exceed the defined action levels. Additional requirements will be incorporated through permit modifications once the EPA and the Department have finalized the ambient water quality standards and biosolid application restrictions for PFAS substances. By taking these proactive measures, the permitting process aims to effectively manage and mitigate the impact of PFAS contamination, ensuring the protection of water quality and public health.

As of now, utilizing preliminary survey data and risk assessments, MDE has successfully issued over 14 NPDES municipal discharge permits (with more on the way) including specific PFAS monitoring requirements (for influent, effluent, and biosolids), as well as the mandate to develop comprehensive PFAS source tracking and minimization plans (through the coordination between their pretreatment program and industrial users). Facilities will be required to monitor and track PFAS within their treatment works in the first year of the upcoming permit cycle. This proactive approach underscores MDE's commitment to effectively minimize PFAS contamination through municipal wastewater facilities and ensure the protection of water quality and public health. These requirements are also consistent with EPA's guidance memo published in December 2022:

EPA NPDES PFAS Guidance Memo

To identify potential "hotspots" in the state's waterways and communities whose livelihood may be dependent on them, MDE will compare and evaluate monitoring results collected from the WWTPs with data gathered from ambient water quality and fish tissue surveys. This comprehensive approach aims to proactively address PFAS contamination risks and ensure the well-being of both the environment and affected communities.

The MDE's preliminary Publicly Owned Treatment Works (POTW) PFAS survey conducted between 2022 and 2023 has yielded valuable insights for the NPDES municipal permit division. This information has identified facilities with elevated PFAS levels in their effluent/biosolids and subsequently impose additional permit requirements, including monitoring and source tracking.

Public Communications

During the discharge permit renewal process, the notice of tentative determination published for facilities identified with elevated PFAS risk will outline proposed PFAS-specific requirements to be implemented in the permit, ensuring comprehensive awareness among all stakeholders during the public participation process. Furthermore, MDE will provide guidance to utilities facing financial challenges on how to access support from the Clean Water and Drinking Water State Revolving Funds and the Bipartisan Infrastructure Law to cover the costs associated with mitigating the risks posed by PFAS.

Municipal Groundwater Permits

To identify the need to impose monitoring requirements in municipal groundwater, discharge permits will require a risk assessment study to evaluate facilities engaged in discharging practices that have the potential to contaminate groundwater quality, posing risks to public health, food safety, and other environmental impacts. This comprehensive approach to monitoring ensures a proactive stance in safeguarding the well-being of the public and protecting the environment from potential contamination threats.

5.2 Biosolids

Background

WWTPs receive sewage sludge from residential and commercial sources. The sewage sludge is screened, dewatered, treated, and tested to produce biosolids. Biosolids are sewage sludge that has met regulatory limits for pathogens and metals to be utilized for beneficial use such as land application as a fertilizer. MDE has 55 WWTP and 242 land application sewage sludge utilization permits that regulate biosolids. MDE issues various other sewage sludge utilization permits for sewage sludge transportation, marketing, composting, incineration, storage, distribution, energy generation, or incineration.

Environmental Risk

PFAS contained in biosolids applied to fields may leach into soils. PFAS may be taken up in wildlife and livestock, then in turn to human consumption. A 2017 case in Maine found high levels of PFAS in dairy cows and the drinking water possibly due to PFAS-contaminated sewage sludge that was applied on the farm. The farmer had 20 times higher than normal PFAS levels in his blood.

MDE Regulatory Authority

COMAR 26.04.06.06C authorizes MDE to require analyses for sewage sludge constituents other than those already identified in that regulation to adequately assess the quality of sewage sludge.

COMAR 26.04.06.74 authorizes MDE to suspend a permit. If MDE does not receive the requested PFAS data, MDE may and has suspended permits.

Current actions

WWTP Biosolids and Spray Irrigation Monitoring Survey

Eighty-one (81) municipal wastewater facilities (35 associated with Class B biosolids generation and 46 associated with spray irrigation practices) were included during the 2023 PFAS Intensive Survey performed by MDE. Samples were collected from these facilities' influent, effluent, and biosolids, and analyzed by MDH Laboratories Administration using EPA Method 1633 (see Section 9).

WWTP Data Assessment

Data collected from all facilities are being gathered and analyzed statistically to establish “tiered” levels (75th percentile, median level, 25th percentile) for each of the 40 PFAS chemicals analyzed in the survey. The sampling results reported for each facility will be compared against these tier values. Facilities with PFAS chemicals exceeding the median tier level will be prioritized for additional monitoring and source tracking/minimization.

Public Communications

On 2/28/23, MDE gave a regulatory update via its website concerning PFAS in biosolids. In this update, MDE announced that it was going to put on hold all new permit applications for land-applying sewage sludge. MDE will continue to process these permit applications until more data is collected. MDE also announced that it would be seeking PFAS data from all out-of-state permittees bringing biosolids into the state of Maryland.

Sewage Sludge Utilization (Permit Hold)

MDE has received some inquiries on when decisions will be made regarding the issuance of sewage sludge utilization permits that are currently on hold. MDE has been informing stakeholders that it expects the sampling of WWTP's biosolids to be complete by the end of the third quarter of the calendar year, and a decision is expected to be made by the end of 2023.

Sewage Sludge Utilization (Out-of-State Sources)

In March of 2023, MDE sent letters to 15 out-of-state sewage sludge utilization permittees requesting that PFAS sampling data from their biosolids be submitted to MDE by May 1, 2023. MDE received data from some of these facilities. In July 2023, MDE sent follow-up letters to 9 of these permittees that did not submit the requested PFAS sampling data. Three facilities did not submit data by the August 2023 deadline provided in the letter, resulting in suspension for two of the sewage sludge utilization permits and modification for the remaining permit.

Future Actions

The reason why MDE conducted the monitoring survey of biosolids is so that MDE can make a data-driven decision on the next steps. The regulatory decision-making for sewage sludge utilization permits will depend on a comprehensive review of all survey data and relevant information, including EPA's Risk Assessment for Biosolids. The more data MDE has available to review, the better data-driven decisions can be made. MDE is aware that EPA is considering developing limits for PFAS in biosolids.

As the next step, MDE may select facilities with elevated PFAS within their biosolids found in the current survey and the sites where these biosolids are currently or were historically land applied as the subjects for comprehensive risk assessment pilot studies including assessments on the impacts to the soil and groundwaters. MDH Laboratories Administration is EPA-approved to test for 40 PFAS in soils and groundwater using EPA Method 1633, and an MOU with the Land and Materials Administration (LMA) is already in place.

POTWs with industrial users that generate PFAS in their manufacturing process will be required in their upcoming NPDES permits to monitor its influent, effluent, and biosolids and perform source tracking/minimization through their Pretreatment Programs.

Currently, only biosolids from Class B facilities that are land applied for agricultural purposes have been characterized for PFAS. MDE will consider characterizing biosolids from Class A facilities that are used in commercial fertilizer and compost if future research demonstrates these sources pose a risk to human health and the environment. MDE and MDA may also consider investigations of PFAS levels in animal manure due to potential PFAS uptake in livestock and the use of manure for land application.

Public Communications

MDE's EJ Screening Tool provides a map of historic and active land application sites.

PFAS-specific requirements will be included in the tentative determination for each permit during the public participation process to ensure all stakeholders are well informed.

Financial Assistance for Utilities

The Department will also provide guidance to utilities with financial challenges to apply for assistance from the Clean Water and Drinking Water State Revolving Funds and the Bipartisan Infrastructure Law to pay for the cost to minimize the threat of emerging contaminants such as PFAS.

5.3 Industrial and Municipal Wastewater Spray Irrigation Facilities

Background

For municipal and industrial wastewater treatment facilities, spray irrigation is an effective option for managing wastewater disposal. The practice involves spraying treated wastewater over designated land areas to allow it to infiltrate the soil and be naturally purified. This process helps in water reclamation, reducing water pollution, and can be used for agricultural or non-agricultural purposes.

Environmental Risk

While wastewater spray irrigation facilities offer several benefits, they also come with potential risks and challenges. These risks mainly concern public health, groundwater contamination, and environmental issues:

Public Health Risks: If the wastewater treatment process is inadequate or ineffective, spraying untreated or poorly treated wastewater can lead to the contamination of crops, soil, and nearby water sources, posing health risks to the public if consumed or inhaled. The spray irrigation process can create aerosols that carry contaminants into the air. Inhalation of these aerosols may lead to health problems for nearby residents or workers.

Groundwater Contamination: If not adequately treated and managed by the wastewater facilities, pollution in the wastewater can infiltrate the groundwater and contaminate drinking water sources. These pollutants can also accumulate in the soil and be taken up by crops, posing risks to food safety.

Environmental Impact: If effluent discharge occurs near sensitive ecosystems or aquatic habitats, introducing excessive pollutants can alter the ecosystem and harm aquatic lives.

MDE Regulatory Authority

MDE plays a crucial role in overseeing and regulating spray irrigation facilities to safeguard public health, protect the environment, and ensure sustainable water management practices. MDE is responsible for regulating the disposal of treated municipal and industrial wastewater into the State's groundwater through permit issuance (COMAR 26.08.04). These discharge permits protect groundwater by ensuring compliance with operating and maintenance conditions, best management practices, and effluent and groundwater quality testing to safeguard public health and the environment.

To address the potential PFAS contamination in spray irrigation, the groundwater discharge permit will require the implementation of the best management practices that adhere to applicable regulatory guidelines. In addition, regular monitoring and testing of the effluent used for spray irrigation will be required to ensure compliance and protect public health and the environment.

Current Actions

WWTP Monitoring Survey

Forty-six (46) WWTPs authorized to spray irrigate their wastewater (industrial and municipal) are included during the 2023 PFAS Survey performed by MDE. Samples were collected from these facilities' influent, effluent, and biosolids, and analyzed for 40 different PFAS by MDH Laboratories Administration using EPA Method 1633.

WWTP Data Assessment

Data collected from all facilities are being gathered and analyzed statistically to establish “tiered” levels (75th percentile, median level, 25th percentile) for each of the 40 PFAS chemicals analyzed in the survey. The sampling results reported for each facility will be compared against these tier values. Facilities with PFAS chemicals exceeding the median tier level will be prioritized to perform follow-up monitoring, source tracking/minimization, and other site-specific evaluations.

Public Communications

Results for each facility involved in the survey will be made available to the public on the WPPRP website.

Future Actions

Based on the survey results, future permits for facilities with effluent containing elevated PFAS levels will be required to perform additional monitoring of its influent, effluent, and biosolids. Action levels for PFAS chemicals will be defined in the permit. The facility will also be required to submit a PFAS source tracking and minimization plan to specify approaches the facility will take whenever monitored effluent shows PFAS concentrations exceeding these action levels.

Moving forward, MDE will prioritize facilities with elevated PFAS levels in their effluents, as identified in the survey, along with the associated sites where these effluents are being sprayed. MDE will conduct pilot studies that encompass thorough assessments of impacts on both soil and groundwater. MDE is currently planning to select a facility with elevated levels of PFAS to conduct an investigation beginning in 2024.

The monitoring requirements will apply to any facility engaged in discharging practices that have the potential to contaminate groundwater, posing risks to public health, food safety, and other environmental impacts. This comprehensive approach to monitoring ensures a proactive stance in safeguarding the well-being of the public and protecting the environment from potential contamination threats.

Public Communications

PFAS-specific requirements will be included in the tentative determination for each permit during the public participation process to ensure all stakeholders are well informed.

Financial Assistance for Utilities

MDE will also provide guidance to utilities with financial challenges on how to apply for financial support from the Clean Water and Drinking Water State Revolving Funds and the Bipartisan Infrastructure Law to pay for the cost to minimize the threat of emerging contaminants such as PFAS.

5.4 Landfills

Background

Solid Waste Acceptance Facilities include intermediate and final disposal sites such as landfills, waste-to-energy facilities, incinerators, waste processing facilities, and waste transfer stations. A list of active facilities can be found here: Permitted Solid Waste Facilities (maryland.gov).

Processing facilities and transfer stations are generally required to perform these activities inside a building, limiting the potential escape of PFAS into the environment. They may contribute small amounts of washwater to public sanitary sewers or onsite septic systems during floor and equipment cleaning activities. Waste-to-energy and incineration facilities also generally store waste indoors and if operated properly are likely to destroy a large percentage of any PFAS chemicals that are disposed of in the waste they accept.

Some classes of landfills, notably land-clearing debris landfills that only accept stumps, brush, and other natural wood, and “clean fills” that only accept soil, rocks, and clean masonry, asphalt, and concrete from excavation activities are also unlikely to be sources of PFAS in the environment. However, municipal waste, industrial waste, and construction and demolition debris landfills may accept some PFAS-containing wastes.

Environmental Risk

The principal risk posed by solid waste acceptance facilities is generally from pollution of surface and groundwaters. Precipitation falling on active landfills soaks into the waste, and leaches pollutants out of the waste, creating a liquid termed “leachate” which generally contains both organic and inorganic pollutants of diverse kinds. Under the influence of gravity, leachate migrates towards the bottom of the landfill. All active municipal, industrial, and rubble landfills in Maryland are required to be designed and constructed with liners and leachate collection systems that prevent the direct discharge of leachate to the groundwater, but these systems do not entirely mitigate the risk.

Although it is prohibited by statutes, regulations, and permit conditions, periods of higher-than-normal precipitation can cause leachate to break out of the sides of a landfill. If left uncontrolled, leachate can run off into the landfill’s sediment controls, which ultimately discharge to local streams. Landfill operators are required to look for and repair leachate outbreaks, diverting the leachate into the site’s leachate control and storage system. However, the leachate collected in these systems is transported to municipal or commercial WWTPs, which can treat most contaminants but are generally not entirely effective against PFAS chemicals.

Groundwater contamination from inactive landfills: municipal, industrial, and rubble landfills that have closed since 1987 have been required to be “capped” with low-permeability layers that greatly reduce the infiltration of precipitation, and thereby limit the contribution of contaminants to the underlying groundwater. However, waste has been disposed of in landfills since the State was occupied by human beings, so there are many landfills and middens that preceded the capping requirements. Some of these, which were active after the introduction of PFAS may be leaching PFAS into the local environment.

Although no humans are believed to be exposed to groundwater contaminated by landfill leachate in Maryland at this time, it is possible that unknown or old, unmonitored sites could be having such an impact. As noted above, the disposal of leachate at wastewater treatment plants may be causing a risk through surface water or fish downstream of WWTP discharge points.

MDE Regulatory Authority

MDE has ample authority to address discharges from permitted solid waste acceptance facilities through existing water pollution control and permitting statutes and regulations. New requirements can be added to permits at renewal, or through compliance actions if a discharge is detected through monitoring. The NPDES requirements for landfills include 1) industrial stormwater permits, for landfill activities that don’t mix with leachate, 2) individual industrial permits for the treatment and discharge of leachate, and 3) pretreatment and diversion of leachate to be treated at municipal wastewater treatment plants.

Current Actions

MDE is in the process of adding PFAS monitoring requirements for leachate, surface water, and groundwater to the Refuse Disposal Facilities for the active facilities, and for closed facilities still required to perform monitoring. At this time, as PFAS have not previously been subject to analysis, we are not aware of any landfill-related PFAS releases. However, PFAS chemicals are not likely to migrate by themselves but will occur with the numerous other chemicals that are contained in landfill leachate, for which monitoring and remedial activities are performed. If future monitoring reveals PFAS contamination, existing regulations can be used to require investigation and remediation. Public notification is already part of this process. Landfill permittees will be required to perform an initial assessment, followed by ongoing monitoring if a problem is revealed.

Future Actions

If EPA issues regulations rendering PFAS-containing wastes to be hazardous waste over a specified concentration, MDE will adopt that requirement into Maryland’s regulations governing Controlled Hazardous Substances (CHS). Maryland’s Refuse Disposal Permits already prohibit the disposal of CHS of any type, so this prohibition would be effective immediately.

If any solid waste acceptance facility is found to be causing a release of PFAS or any other contaminant above established MCLs, compliance action will be taken. For landfills, permits

include requirements for monitoring, additional investigation, and remediation if a release is detected. These include public notification and public comment and participation in the selection of remedies.

5.5 Septic Systems

Background

A plethora of groundwater contaminants are known to be associated with the use of septic systems in Maryland. While certain chemical and bio-chemical compounds may be addressed in typical Onsite Sewage Disposal Systems (OSDS) treatment and natural renovation actions in the receiving environment, compounds such as PFAS/PFOS are not typically identified through standard evaluation parameters. MDE is considering developing pilot studies for the detection, quantification, and mobilization of these contaminants on a specific and targeted scale while capturing residential, commercial, and industrial applications of OSDS. Additionally, the overall density, OSDS type, and land-use history should be considered.

There are surface water contamination risks from disposal of septic sludge at SWA facilities (landfill discharges to WWTPs or directly to surface water), with potential impacts to aquatic life and human health from fish consumption and drinking water due to source water contamination (groundwater and surface water).

MDE, through the Onsite Systems Division within the Wastewater Pollution Prevention and Reclamation Program, delegates the authority for evaluation and permitting of OSDS. Safe and adequate OSDS is the responsibility of all stakeholders for the protection of public health and the environment. Parameters for OSDS permitting outside of those associated with Groundwater Discharge Permits have focused on satisfactory treatment of wastewater discharge for the protection of ground and surface water resources with respect to contaminants such as pathogens and contaminants associated with eutrophic impacts. Additionally, potability standards for individual drinking water wells typically associated with OSDS sites in Maryland do not include chemical compounds addressed in this Action Plan, including VOC/SVOCs.

Current/Future Actions

The Onsite Systems Division should work in concert with our internal and external partners to develop a pilot study and action plan that will capture data relevant to PFAS/PFOS. For the Onsite Systems Division, this would require the bolstering of the program with at minimum, one additional full-time employee solely dedicated to this task. MDE will explore potential Federal funding sources to assist.

5.6 Industrial Facilities (Wastewater and Stormwater)

Background

MDE regulatory authority to address PFAS contamination in industrial facility discharges is based on our NPDES program under the Clean Water Act. Industrial wastewater sources can

range from process wastewater at manufacturing facilities to cooling water originating from potable water sources to remediated groundwater and more. Additionally, industrial permits must regulate the discharge of stormwater from industrial activities identified in 40 CFR 122.26.

This authority currently allows MDE to address spills, storage, and products through best management practices, narrative controls, and monitoring. The framework for applicable water quality criteria and technology standards are also in development, which will allow MDE to apply effluent limitations as applicable.

At MDE, discharges from industrial sites are managed by three separate divisions within the WPPRP:

- Groundwater Discharge Permits Division (GDPD): writes and manages permits that regulate the discharge of industrial sources to groundwater;
- Industrial Stormwater Permits Division (ISPD): writes and manages permits which primarily focus on regulating stormwater associated with industrial and construction activities as well as pesticide discharges; and
- Industrial and General Permits Division (I&GPD): writes and manages permits which primarily focus on regulating surface water and pretreatment discharges of process wastewater sources from industrial facilities.

Within their scope of activity, each of the above divisions of the WPPRP proposes to identify and limit PFAS for discharges to surface or groundwater.

Specific industrial categories have been defined by the EPA Strategic Roadmap as having reasonable potential to discharge PFAS. As a result, these categories are initially the primary focus of the WPPRP efforts. Specifically, these industrial categories include:

- Organic chemicals, plastics & synthetic fibers (OCPSF),
- Metal finishing, electroplating, electric and electronic components,
- Landfills,
- Pulp, paper & paperboard,
- Leather tanning & finishing,
- Plastics molding & forming,
- Textile mills,
- Paint formulating, and
- Airports.

Additionally, the WPPRP recognizes other site characteristics that may increase the reasonable potential for PFAS presence in discharges. Specific examples include but are not limited to facilities that use firefighting foam (currently or previously), sites where spills of industrial products have occurred, and manufacturing facilities that discharge process wastewater and currently use or formerly used PFAS-containing raw materials.

It is important that WPPRP evaluates all discharges to surface or groundwater. The migration of groundwater contamination over time can impact aquifers used for drinking water. Many surface water bodies in the State are identified for use as a public drinking water supply. In addition to

the human health concern for drinking water, the Department must also consider human health criteria, which protect those consuming fish, oysters, or other aquatic life that exists in surface water bodies. For these reasons, source reduction, elimination, and pollution prevention are key.

Past/Current Actions

Voluntary Industrial Facility Survey

MDE distributed a voluntary survey to industrial sites that are regulated under the general permit for industrial stormwater. The survey results indicate that 14% of the facilities that responded had PFAS sources on-site. This relatively high percentage of "positive" reports supports the requirements in the upcoming Industrial Stormwater General Permit (20SW) for all sites to conduct PFAS source identification and planning in the Stormwater Pollution Prevention Plan (SWPPP), and the urgency to get this permit issued as soon as possible.

Based on the survey, MDE is interested in considering providing vehicle maintenance shops with guidance for the cleanup of residue from fire extinguishers, and alternatives for PFAS-containing products. PFAS has been commonly used in many household and commercial products for over 50 years. Waste from these products ultimately ends up going into a landfill. The leachate from these landfills is therefore likely to contain PFAS. Leachate has to be controlled and cannot be discharged without treatment. Of the 23 active municipal solid waste landfills, 22 discharge their leachate at a WWTP. Based on the survey, these data further support the Department's decision to investigate PFAS in WWTPs. MDH Laboratories Administration has the capability to test landfill leachates for 40 PFAS compounds using EPA Method 1633 and has already done so in a study with EPA.

General Permit for Industrial Stormwater

The 20SW Industrial Stormwater permit was issued and effective February 2023. The Permit requires operators to identify potential sources of PFAS that could be exposed to stormwater and address these sources in Stormwater Pollution Prevention Plans (SWPPPs). Each SWPPP is submitted with a Notice of Intent to obtain coverage and reviewed by MDE staff prior to issuing a permit registration. SWPPPs are supposed to be "living documents," in that each facility should update its plan anytime there is a change in operations or controls.

Individual Industrial Permits and Pretreatment Permits

MDE has begun considering permit requirements for industrial surface and groundwater dischargers to determine whether PFAS is present in industrial activities. Specifically, MDE is considering requirements to monitor raw and treated leachate for municipal landfills.

Public communications

The permit requires that all permits be prepared with a full fact sheet and evaluation of all pollutants with a reasonable potential to impact water quality.

Future Actions

Evaluation of Reasonable Potential

MDE has begun to incorporate new permit requirements for industrial dischargers (surface, groundwater, or stormwater), as recommended in EPA's NPDES Memo to States (*Addressing PFAS discharges in NPDES Permits*). MDE began evaluating permits for reasonable potential over the past 1-2 years and each permit is evaluated as it comes up for renewal. Thus, all permits are anticipated to be evaluated by no later than 2027.

For individual permits, permit monitoring requirements are being considered based on a case-by-case analysis of reasonable potential. Reasonable potential is evaluated based on a combination of factors including but not limited to existing effluent data, industrial category, and an assessment of raw materials/chemicals that may contribute to wastewater.

Facilities that have influent or effluent data showing elevated PFAS concentrations and facilities found to be very likely to have reasonable potential based on other factors will have routine effluent (and influent, if applicable) monitoring in their NPDES permits. The frequency of monitoring will be determined on a case-by-case basis depending on the level of concern.

Facilities determined to *possibly* have reasonable potential based on factors evaluation will have requirements to collect 1-4 samples for PFAS. The exact requirements will be based on a case-by-case analysis.

Facilities determined to not have reasonable potential for PFAS will be educated on potential concerns. Existing permit conditions require notification if a permittee becomes aware of any unregulated pollutants in their discharges. By educating all permittees about PFAS, they will be more equipped to provide the required notice if site activities change. Should unregulated pollutants be discovered, MDE examines the nature of the data and may address them through required best management practices or permit modification to establish new monitoring or limitations.

All decision-making regarding PFAS will be rationalized in the fact sheet associated with each individual permit.

For industrial stormwater, PFAS contamination will be addressed through pollution prevention (e.g., stormwater BMP implementation). Once limits have been universally implemented through regulation, MDE will include Technology-Based (TBELs) and Water Quality-Based (WQBELs) effluent limits.

Future Source of Permit Limitations

EPA's Effluent Guidelines Program Plan 15: The Clean Water Act requires EPA to biennially publish a plan establishing a schedule for reviews, revisions, and promulgation of guidelines not previously established for industrial categories. Plan 15, published in January 2023, is the most recent document meeting this purpose. It includes a continued focus on and evaluation of the extent of PFAS discharges and assessment for means to limit those discharges across multiple

industrial categories. MDE will monitor the outcomes of this plan and institute applicable technology standards as determined to be appropriate by the EPA.

Water Quality Standards: MDE will consider Federal water quality criteria (and future State criteria, if applicable) in its reasonable potential analysis to determine if effluent limitations are necessary to protect uses of receiving waters for each permit.

Each individual and general permit issued by MDE contains a standard condition that allows the permit to be reopened to address any new or changed standards.

Pretreatment

A majority of pretreatment permits for industrial facilities are managed by counties or municipalities, which have delegated pretreatment programs to serve as the control authority. MDE's Pretreatment Program, which lies within the I&GPD, provides oversight to local programs as the approval authority. MDE also issues pretreatment permits where there is no delegated program (there are currently 4 such permits across the State).

Based on the results of WWTP monitoring (as addressed in sections 2.1, 2.2, and 2.3 in this Plan), it may be necessary to track industrial sources to the WWTP using their pretreatment permit requirements. The expectation of MDE as the approval authority is for delegated local control authorities to implement monitoring where pretreatment permittees have reasonable potential to be the cause of elevated PFAS in monitoring at the WWTP. MDE will take this approach as applicable to the pretreatment permits it issues.

As the approval authority, MDE will also provide guidance to control authorities as necessary to ensure all appropriate standards and/or limitations are enforced.

EJ considerations

If elevated concentrations are detected and no responsible party is identified, MDE will use its regulatory tools to require that the party responsible for the PFAS pollution is also responsible for paying the cost to monitor and treat polluted water.

Drinking water and subsistence fish consumption are additional EJ concerns that are addressed through the limits established in the permits.

5.7 Pesticides

Background

Polyfluoroalkyl substances (PFAS) are a group of manufactured chemicals that have been used in industry and consumer products since the 1940s because of their useful properties. These compounds are synthetic and have multiple fluorine atoms attached to an alkyl chain. There are thousands of different PFAS, some of which have been more widely used and studied than others. Perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS), for example, are two of the most widely used and studied chemicals in the PFAS group. PFOA and PFOS have been replaced in the United States with other PFAS in recent years. One common characteristic

of concern of PFAS is that many break down very slowly and can accumulate in humans, animals, plants, and the environment over time (https://www.epa.gov/pfas/our-current-understanding-human-health-and-environmental-risks-pfas).

PFAS can be found in water, soil, air, and food, as well as in households or workplaces. Some examples are drinking water, soil, and water at or near waste sites, fluorinated containers, some pesticide formulations, fire extinguisher foam, biosolids, manufacturing sites that produce or use PFAS, food, food packaging, household products and dust, personal care products, automotive, aviation, aerospace, and defense industries, electronics, cosmetics, personal care products, medical articles, textiles, and leather. These sources have potential for contaminants to enter the environment, human and animal food chain, as well as humans. Due to their widespread production and use, as well as the ability to be transported and persist in the environment, surveys conducted by the Centers for Disease Control and Prevention (CDC) since 1999 have measured at least 12 PFAS in blood serum. Blood serum was obtained from participants, aged 12 years and older, who have taken part in the National Health and Nutrition Examination Survey (NHANES) published in 2018 (https://www.cdc.gov/nchs/nhanes/index.htm).

PFAS have been linked to adverse dyslipidemia, metabolic syndrome, impaired immune system responses, liver damage, cancer, neurodevelopmental issues, decreasing bone density, reducing antibody response to vaccines, declines in birth weight, reproductive health issues, and certain cancers. No studies have been identified that specifically address health impacts of PFAS in pesticides. No studies have been identified that provided exposure models or epidemiologic data that assess the degree to which PFAS in pesticides contribute to human exposure or health effects.

MDA Regulatory Authority

According to the Agricultural Article, Title 5 Pesticide and Pest Control, Subtitle 1 Maryland Pesticide Registration and Labeling Law, § 5-100 defines an adulterated pesticide as (c) A pesticide is “adulterated” if (1) its strength or purity falls below the professed standard or quality expressed on the labeling under which it is sold, (2) any substance has been substituted wholly or partially for the article, or (3) any valuable constituent of the article has been wholly or partially abstracted. In order for a stop sale to be issued against an adulterated pesticide, it would have to be analyzed in the program’s laboratory. MDA could then issue a stop sale against that lot number of the product.

MDA will consider a pesticide product adulterated if PFAS is found in the formulation itself. The product would have to be analyzed prior to issuing a stop sale for the product. MDA also can review the CSF’s for the particular EPA Number to determine if PFAS compounds are listed as inert ingredients, and are currently allowed by the EPA.

EPA Initiatives on PFAS in Pesticides

Currently, the Analytical Chemistry Branch (ACB), Analytical Chemistry Laboratory (ACL), Biological and Economic Analysis Division (BEAD), Office of Pesticide Programs (OPP), and Office of Chemical Safety and Pollution Prevention (OCSPP) of the USEPA have developed and internally validated two methods for certain types of pesticide formulations and for fluoridated containers that are used in many mosquito control products, as well as analyzed samples provided by Maryland Department of Agriculture and Dr. Steven Lasee from Texas Tech University.

In December 2021, the Massachusetts Department of Environmental Protection and Public Employees for Environmental Responsibility (PEER) published results of PFAS analysis of several mosquito control products used in the state to control mosquito populations. This analysis found the total PFAS concentration in the range of non-detects – 2,500 ppb. The methods used were based upon Liquid Chromatography Mass Spectrometry/Mass Spectrometry (LC-MS/MS) technologies, and one of the methods used was not internally validated.

The ACB analyzed samples taken from mosquito control products used on the Eastern Shore by MDA's Mosquito Control Program, Permenone 30-30 and PermeSease 30-30. Three samples were also analyzed from the manufacturer of Permenone 30-30. The samples obtained from the manufacturer were a retained sample from a lot produced 9 days after the lot purchased by Mosquito Control, and three samples taken from different points along a recent Permenone 30-30 production line and from storage. Twenty-eight PFAS compounds were analyzed by the oily matrix method using LC-MS/MS and Liquid Chromatography-High resolution Accurate Mass Spectrometry (LC-HRAMS) as a confirmation analysis. The oily matrix method is described in further detail below. The ACB found none of the targeted analytes in the samples from the Department nor in any product received from the manufacturer.

The ACB published a report dated March 04, 2021, on rinsing studies on selected fluorinated and non-fluorinated HDPE containers and a limited number of mosquito control products. There were seven fluorinated jugs/drums and two non-fluorinated jugs. The method for the rinsates was developed to determine the PFAS concentration that could be rinsed from the inside and the outside of the containers. The method is straightforward and easy to perform. The unused non-fluorinated jugs (exterior = 0.79 ng total PFAS, interior = 0.17 ng total PFAS) have substantially less total PFAS than the unused fluorinated jugs and drums (21 – 345 ng total PFAS. The used 2.5-gallon jug had 15.2 ng total PFAS rinsed from the outside, and 8.6 ng total PFAS rinsed from the inside. The fluorinated drums have the highest PFAS content. This would indicate that the PFAS in pesticide formulations is actually being leached from the container. The USEPA has contacted pesticide manufacturers of mosquito control products, and they have switched from fluorinated containers to stainless steel containers or non-fluorinated containers.

An oily matrix method report was published by the USEPA on September 28, 2021, for the validation of twenty-eight PFAS compounds. The method was validated using a clean oily matrix formulation containing no active ingredient. The oily matrix analyzed can include oil, petroleum distillates, or mineral oils that are used in pesticide formulations. The method limit of detection is

0.025 µg/kg (ppb or 25 ppt) for most of the analytes. Briefly, the method takes the oily sample and passes it through a Solid Phase Extraction (SPE) cartridge. After loading the SPE cartridge, the matrix is washed off the cartridge with a mixture of solvents, leaving the PFAS compounds behind on the cartridge. The PFAS compounds are eluted off the SPE cartridge by another mixture of solvents, concentrated down to a known volume, and analyzed by LC-MS/MS using the instrument parameters described in EPA Method 537.1. Isotopically labeled standards were added prior to sample processing to assess signal enhancement and suppression. There are interferences that can be expected that will lead to false positive identification and elevate quantitation levels. Recoveries varied throughout the study and do not appear to be concentration dependent.

On May 18, 2023, the USEPA published a memorandum for ACB Project B23-05b, which involved the analysis of 10 pesticide products that were analyzed using a dilute and shoot method reported in “Targeted Analysis and Total Oxidizable Precursor Assay of Several Insecticides for PFAS" by Lasee, et.al., in Journal of Hazardous Materials Letters, 2022, 3, 100067. This article reported PFAS concentrations in the 10 products ranging from non-detects to 19.2 mg/kg (ppm) PFOS in the products. The samples were analyzed by two methods: 1) the method developed by the study author, and 2) the surfactant and oil method. Twenty-six PFAS analytes were screened in the EPA study and the Lasee method. There were three compounds added to the EPA study that were not included in the Lasee study.

The main difference between the two methods is the sample preparation step. Lasee’s method is a simple dilution method with a solvent/water mixture and using a single instrument for analysis. The ACB’s method involves a more intense extraction and clean up procedure to isolate the PFAS compounds from the sample matrix before instrumental analysis, reducing matrix interferences that give more accurate results and detection limits. Both methods use isotopically labeled standards and surrogates to monitor the performance of the method and to accurately quantitate the compounds of interest. The ACB method used two different instruments to analyze the compounds: LC-MS/MS and LC/HRAMS. The HRAMS instrument is more sensitive and has higher selectivity than the MS/MS instrument. The results of the study showed no PFAS compounds, including PFOS, were detected above the method detection limits by either instrument.

Current Actions

MDA reported the findings of a Pesticide PFAS Testing Study to the General Assembly on November 1, 2023 as required under SB-0158. Considering the lack of reliable results when measuring PFAS in pesticide formulations, MDA is not currently pursuing any actions at this time. MDA would have to set up an analytical laboratory group capable of analyzing PFAS compounds in pesticide formulation. This would involve renovation of a storage room, purchasing of equipment, and the hiring of Full Time Employees (FTE’s). This is needed in order to ascertain what products to stop selling. Any actions by MDA would have to be based on accurate results.

The Pesticide PFAS Testing Study provided the following recommendations. The first would be to follow EPA’s lead on the formulation issue and the other would be to analyze formulations that

are registered with MDA's State Chemist Section, in order to acquire baseline data. Following EPA's lead would fit into the agency's PFAS Roadmap but would take time. The second recommendation may be the most expedient. The analysis of pesticide formulations would provide the data needed to make well-informed decisions based upon good science. This route would necessitate the establishment of a PFAS testing program within the State Chemist Section. The section has over 30 years' experience dealing with pesticide formulations, whether analyzing for the active ingredients, or contaminants in the formulations itself. The section has over 30 years' experience in the analysis of contaminants in environmental samples, including water, ground water, sediment, soil, vegetation, and animal tissue.

Future Actions

The main issue that remains is analysis and monitoring of pesticides. There are only two PFAS detection methods that have been validated for only two categories of insecticides. Interferences from the chemical properties of insecticides can cause false positive results for PFAS compounds. Improved methods need to be developed and validated to eliminate the interference. Partnering with academic partners who can seek Federal funding to complete the basic science needed to implement new methods is the best way to expand opportunities to test pesticides.

MDE General Permit for Pesticide Application

Certain applications of pesticides, when applied in the floodplain or directly to waters of this state, require NPDES permit authorization. This is achieved through the state's General Permit for discharges from the application of pesticides. The permit expires in 2025 and must be renewed. MDE is considering actions to address PFAS in the general permit and plans to review the findings of MDA's pesticide study to determine the appropriate course of action.

6.0 Identifying, Assessing, and Cleaning up Historical Releases of PFAS Chemicals

6.1 Source Identification

Source Identification Framework

MDE's Land Restoration Program (LRP) has developed a framework to address the environmental impacts of PFAS. The LRP envisions a two-prong adaptive strategy to track down sources of ongoing and historic PFAS releases: 1) Investigations of potential PFAS sources in areas of known drinking and surface water impacts, focusing on potential public health risks to Maryland residents, and 2) Investigations of known or suspected PFAS use and storage areas to identify and mitigate historic and ongoing releases of PFAS to waters of the state.

The first priority is to identify and investigate potential PFAS sources in areas of known drinking and surface water impacts. 70% of LRP's PFAS source identification and mitigation effort will focus on a list of public water supply wells that have documented PFAS contamination. This

effort will address immediate, known impacts on the health of Maryland residents, with a focus on overburdened and/or underserved communities. In addition, water bodies where elevated surface water concentrations of PFAS have been identified may undergo investigation, to identify, quantify, and reduce risks associated with fish consumption and to further investigate contamination leading to drinking water sources. The specific tasks to be included in this portion of LRP's work are as follows:

I. Prioritize source investigations in the vicinity of PFAS-contaminated water supply wells for investigation and mitigation using the Water and Science Administration's (WSA) 2022/2023 well sampling data based on human health impact potential.

II. The prioritization process will use the following decision-making criteria:

1) Severity of the PFAS concentrations,
2) Size and EJScreen score of the population served by the impacted drinking water source,
3) Availability of an alternative drinking water supply to the affected community
4) Guidance from and collaboration with WSA

III. Prioritize surface water bodies for investigation using available fish tissue and surface water quality data. The prioritization process will use the following decision-making criteria:

1) Analysis of PFAS concentration in fish or shellfish tissue and surface water in consultation with WSA staff. MDH Laboratories Administration has the capability to test fish, crabs, and shellfish for 40 PFAS compounds using EPA Method 1633,
2) Size of the population impacted by fish contamination (WSA and MDNR collaboration),
3) Known groundwater or surface water discharges to impacted water bodies (WSA and LMA programs).

The second priority is to conduct a statewide PFAS source area investigation. The remaining 30% of LRP's effort will be PFAS source area investigations targeting known or suspected PFAS users throughout the State. The magnitude of potential contamination can vary significantly by type of industry, hydrogeology, and concentration of industrial facilities. The LRP will prioritize sites for investigation according to their potential to have impacted target populations. The specific tasks to be included in this portion of LRP's work are as follows:

I. The investigation process will include the identification of sites with known current or historical PFAS releases and expand outward as new information about potential PFAS sources becomes available through continued research. Site identification will start with a review of Maryland industries and site types that fit the generally accepted profile of common PFAS use and release locations. Such locations include, but are not limited to:

1) Airports (military installations have begun this process as required by Congress in the National Defense Authorization Act))
2) WWTPs
3) Landfills
4) Biosolid Land Application Sites
5) Fire Departments and Fire Training Areas
6) Industries, including but not limited to: polytetrafluoroethylene (PTFE) manufacturers and users; metal finishers; electroplaters; paper & paperboard manufacturers; tanneries; dry cleaners.

II. Additional Methods for Source Identification

1) Source information and monitoring data provided by other MDE programs (landfills, wastewater treatment plants, biosolid application sites).
2) Reviews of technical literature to identify the latest information on identifying potential PFAS sources and Industries.
3) MDH Laboratories Administration has procured a state-of-the-art high-resolution mass spectrometer and has entered into a 2-year collaboration with EPA to develop a 'PFAS forensics' tool for source investigations (see Section 6).

III. Conduct targeted environmental sampling at suspected PFAS source areas identified during Step I in order of priority as determined by their potential to impact human health. The initial target sites will be selected to represent a variety of industries, geologic settings, and population centers. Sites identified by other MDE programs, administrations, and/or other state agencies for investigation will also be considered in the site selection process.

Funding for PFAS source identification and mitigation

LRP receives limited funding for the collection and laboratory testing of environmental media samples from sites. Sites determined to be contaminated above risk-based standards and where no financially viable responsible person exists to remediate the property are identified. These sites undergo additional investigation and subsequent remediation and are eligible for PAYGO or taxable bond funding.

The LRP has an approved pre-remedial cooperative agreement with the EPA Site Assessment program to include a PFAS source identification initiative that began July 1, 2023. This allows for the initial assessment of new sites to be funded by EPA's Site Assessment program and MDE funding. LRP has access to small amounts of additional funding from an EPA State Response grant to support this broader set of state-wide investigations. Site Investigations to systematically investigate major classes of potential sources of PFAS using these grant funds could include the following, with emphasis on communities with EJ concerns.

LRP will also investigate other potential sources of funding, information, or resources, including, but not limited to, academic researchers.

Future Needs

MDE does not currently have a funding source for sampling of groundwater, surface water, soil, and sediment for potential source identification and remediation. The number of potential sources, strength of the carbon-fluorine bond, and fate and transport of PFAS compounds make it a much more complicated process to delineate and remediate PFAS contamination. PFAS can be found in firefighting foam, wastewater treatment effluent, landfill leachate, commercial products, personal care products, industrial processes, manufacturing, and more.

All military installations and Formerly Used Defense Sites are required under the National Defense Authorization Act to perform PFAS preliminary assessments and site investigations by the end of 2023. Once data is validated, the Federal Assessment and Remediation Division (FARD) in LRP will have a significantly increased workload in staff time to review reports and plans.

The mandate to identify, assess, and clean up past releases and minimize future releases of PFAS will also significantly increase the workload of the State Assessment and Remediation (SAR) division in LRP. Potential sources of PFAS releases could include any vehicle fire along any road or runway in the state that was extinguished using aqueous film-forming foam (AFFF) since the 1960s, for instance. There is currently no funding source for non-Department of Defense investigations of PFAS in Maryland. SAR staff have seen large increases in Voluntary Cleanup Program (VCP) applications and Controlled Hazardous Substances Enforcement Program oversight of contaminated properties without the influence of PFAS. While the SAR division is currently investigating potential sources of PFAS contamination of drinking water, there is no regulatory authority to require remediation of PFAS until EPA finalizes Maximum Contaminant Limits (MCLs) and designates certain PFAS as hazardous substances.

Coordination is ongoing between LRP and other Land and Materials Administration programs (Solid Waste, Biosolids) and the WSA to better address and prioritize PFAS assessments and related actions.

Disposal of PFAS contaminated media issues

PFAS is not currently a designated hazardous substance, but the comment period on EPA's proposed rule has ended and EPA is currently reviewing over 150,000 comments received on the hazardous substance designation. EPA is predicting the promulgation of the final rule by Winter 2023/2024. However, this is subject to change. In addition, PFAS-containing material cannot be incinerated or landfilled in Maryland. That means that it must be shipped out of state. Entities will have to determine facilities that will accept it.

State Agency Coordination

MDE hosts monthly multi-agency meetings with various MDE programs, MDH, MDNR, and MDA to share information on actions being taken by the agencies to address PFAS.

MDE initiated an internal multi-administration (LMA and WSA), multi-program monthly coordination meeting. Clear communication between LMA and WSA is imperative for the effective and rapid response to concerns regarding PFAS when brought to the agency by the public.

Within LMA and WSA, additional quarterly meetings have been established to share data and information between the Land Restoration Program responsible for source identification and drinking water programs responsible for community water systems.

LRP is also coordinating with adjacent state departments of environmental protection to share lessons learned, source data, and information that may cross state boundaries.

Further coordination with County Health Departments is needed. MDH and MDE regularly coordinate on environmental health issues through presentations to the MDH-Health Officials Roundtable. MDE and MDH will continue to coordinate closely on the development of PFAS policy, communications, and responses.

LMA and WSA are working to define levels of PFAS compounds that “trigger” the need for a source investigation. The parties are developing levels below which there is no need for a source investigation, but rather MDE will connect public water systems with DWSRF funding, provide technical assistance to install treatment systems, and provide recommendations on Point of Use (POU) treatment systems for private well owners. MDE is currently planning a project to investigate the effectiveness of PFAS removal in POU treatment systems.

6.2 Federal Facilities & National Priority List (NPL) Sites

Background

MDE works with the U.S. Department of Defense (DoD) and the U.S. Environmental Protection Agency to assess, remediate, and monitor DoD sites and private National Priority List (NPL or Superfund) sites in Maryland where PFAS are present. Through the Defense-State Memorandum of Agreement (DSMOA), DoD provides funding to MDE to oversee the assessment, remediation, and monitoring of military installations to expedite the cleanup of hazardous waste to comply with federal and state laws. EPA is a partner in this process and also provides funding for non-DoD NPL sites through Cooperative Agreement grants to MDE.

DoD monitored military facilities throughout the country and in 2018 released a report on its investigation of PFAS at military bases. This report identified four sites in Maryland with PFAS contamination in groundwater. Those sites are the former Fort Meade Tipton Airfield; Naval Research Lab, Chesapeake Beach Detachment; the former Navy Bayhead Annex in Annapolis; and the former Naval Research Laboratory in White Oak.

Since that time, PFAS compounds have been identified at four additional military installations in Maryland. Those sites are Aberdeen Proving Ground, Naval Air Station Patuxent River, Joint Base Andrews, and the former Brandywine Defense Reutilization and Marketing Office. Preliminary Assessments/Site Inspections (PA/SIs) are being conducted at the rest of the military facilities in Maryland including Fort Detrick, Forest Glen Annex, and Naval Air Station Patuxent River's Webster Field Annex. These PA/SI's are required by Congress under the National Defense Authorization Act (NDAA) to be completed on all DoD facilities by December 2023.

Initial efforts were focused on determining whether any off-site properties are affected by PFAS. Three domestic wells at the Chesapeake Bay Detachment site had detections but they were far below the EPA's Health Advisory level at that time. As additional testing proceeds, there may be other DoD installations in Maryland where PFAS compounds are found in the groundwater.

Military Installations

Below is a summary of the actions at each of the bases in Maryland as of July 2023:

Navy Facilities

Naval Research Laboratory, Chesapeake Bay Detachment, Chesapeake Beach

The Navy Research and Development (R&D) community has conducted testing of aqueous film-forming foam (AFFF) products for the U.S. Navy from 1968 to the present. The base drinking water supply well, approximately 500 feet deep, was sampled for PFOA and PFOS in September 2016 and neither of those compounds were detected.

The Navy conducted a Site Investigation (SI) in 2017 that included the installation and sampling of deep and shallow groundwater monitoring wells on the base and near base boundaries to determine the likelihood of off-site migration and impact on private drinking water wells. Sample analysis included three compounds: PFOS, PFOA, and PFBS. The SI confirmed the point of release to be the fire-testing pad area. A large associated plume of contamination in the shallow aquifer extends over much of the facility, with the highest concentration at the fire-testing pad (234,000 parts per trillion (ppt) of PFOS).

As a result of this detection of PFAS in the shallow groundwater aquifer, the Navy began notifying the public in areas potentially impacted by groundwater contaminants. Although a 150-foot-thick clay formation separates the shallow aquifer from the deeper aquifer tapped by area private drinking water wells, the Navy nevertheless planned off-site private well sampling to ensure no site contaminants were affecting private drinking water wells. Sampling of approximately 80 private wells off-base took place in July of 2018 for 14 PFAS compounds, mainly to the northeast and southeast of the site, based on known groundwater flow direction. Although there were detections at three locations, none approached the EPA's PFAS Health Advisory (at the time) of 70 parts per trillion, being just above detection limits. A public meeting occurred prior to and after the sampling, first to inform the public and obtain permission for sampling, and then to explain sampling results and further planned activities on-site.

The Navy is conducting an Expanded Site Investigation of the Fire Training Area (Site 10), with additional soil, groundwater, and surface water sampling. Preliminary results show significant PFAS in the streams exiting the facility to the northeast and the southeast as well as significant PFAS in the discharge from the Wastewater Treatment Plant. Additional sampling is ongoing and interim measures are being designed to treat the surface water leaving the Northern Pond and the Wastewater Treatment Plant discharge. A 60% design for the interim measures is expected in August 2023.

Bay Head Road Annex, Annapolis

AFFF was used for fire training on a concrete burn pad at this former facility used by the Navy R&D community. The PFAS Remedial Investigation (RI) was finalized in May 2020. PFOS/PFOA contamination of surface/subsurface soil, surficial aquifer groundwater, and sediment/surface water downgradient of the former installation has been documented. There is no drinking water exposure to area residents, who are served by municipal water. A supplemental RI investigation was done to better characterize the vertical extent of the groundwater plume and its interaction with the Little Magothy River where the plume discharges into pore water and surface water.

Former Naval Research Laboratory, White Oak

AFFF was used at a few locations at the site, including Site 7 and Site 5, at burn pits. A Preliminary Assessment was completed in January 2021 and additional sampling is in process. The results of additional sampling will be presented in a Site Investigation, which is expected in late 2023.

Former Naval Training Center Bainbridge, Port Deposit

A Preliminary Assessment (PA) was completed in February 2021. The results of the PA and the PFAS sampling done during the Five-Year Review process at the Fire Training Pit during the summer of 2020 indicates that there is no significant PFAS at the former installation.

Naval Support Activity Annapolis (NSAA)

The Preliminary Assessment/Site Investigation was done in 2023. Very minor concentrations of some PFAS have been detected and several sites at the North Severn property will be going to Remedial Action. Currently, a Preliminary Assessment is completed for the Naval Academy property and one site will be going to a Remedial Investigation.

David Taylor Research Center, Annapolis

This site is a former R&D facility adjacent to NSAA's Sites 1 and 2. Groundwater sampling was done, and very low concentrations of PFAS were detected in some wells.

David Taylor Research Center, Carderock

A Preliminary Assessment was completed in 2023 and there was little evidence found of PFAS usage at the facility. It is unclear when further investigations will be conducted.

NSF Indian Head, Indian Head

A PA was recently completed. Five sites - three on the main facility and two on the Stump Neck Annex - have the potential to be contaminated with PFAS. The fieldwork for the Site Inspection is ongoing.

NAS Patuxent River, St Mary's County

The PFAS Site Investigation work plan was approved by LRP in June 2020. Sampling of groundwater and soil at sites where previous releases of AFFF were documented began in early July 2020. The Preliminary Assessment identified 19 sites where AFFF releases were either documented or likely. Per the Site Investigation work plan, soil and groundwater samples will be collected from these 19 sites. Six in-use potable drinking water wells at the base were sampled for PFAS constituents between December 2014 and June 2015 and the results were non-detected for PFAS constituents. The potable wells were resampled in 2020 and were still non-detected. Remedial Investigations are continuing to characterize the fate and extent of PFAS from the 19 sites across the installation.

NAS Patuxent River, Webster Annex, St Mary's County

The PFAS Site Investigation Work Plan was approved by LRP in June 2020. Sampling of groundwater and soil at two sites where previous releases of AFFF were documented were conducted in the summer and fall of 2020. The two sites identified in the PA where AFFF was used were the AFFF Crash Truck Maintenance Test Area and Fire Station 3. MDE received the first draft of the Site Investigation in March 2021. Two in-use potable drinking water wells at the base were sampled for PFAS constituents in October 2016 and the results were non-detect. These wells were resampled in 2021 and are still non-detected. The Remedial Investigation has begun which will include more groundwater and surface water sampling, including pore water sampling in the St Mary's River where groundwater is exiting to the surface water.

Solomons Island Recreation Center, Calvert County

A PA identified an AFFF foam spill in a grassed drainage swale at the facility. No cleanup was done after the spill, so an SI is presently being accomplished including soil and groundwater sampling.

Naval Support Facility Thurmont

A Preliminary Assessment was recently conducted. Two sites were identified as potential or confirmed PFAS release areas. A site assessment is underway which includes additional monitoring wells in the potential PFAS areas as well as soil, sediment, and surface water sampling. Due to the proximity of the sites to multiple private drinking water sources and federal and state park drinking water supplies an off-base drinking water sampling program was

conducted in March of 2023. At this point, none of these samples show significant PFAS contamination.

Army Facilities

Aberdeen Proving Ground, Aberdeen and Edgewood

A Preliminary Assessment and Site Inspection was completed in June 2023. Fifty-seven sites around the facility have been identified as sites where AFFF foam or other PFAS was used, or releases occurred. In addition, several biosolid disposal areas on the base were sampled. Of these sites, 35 sites showed significant PFAS contamination while another five showed lesser concentrations of PFAS in either groundwater, soil, sediment, or surface waters. At this point 36 of these sites, including several biosolid sites, are being included in a Remedial Investigation planned to begin in late 2023. The Harford County Perryman Well Field has been impacted by a groundwater plume emanating from a fire training pit at the Western Boundary Study Area of the Aberdeen Area above the EPA Health Advisory level. The water is treated with granulated activated carbon filtration and is tested monthly to ensure that there is no breakthrough in the carbon treatment. The Perryman well water is blended post-treatment with surface water from (primarily) the Loch Raven Reservoir and occasionally from the Susquehanna River before delivery to the public. It is expected that the SI Report will be completed in the winter of 2023 and a RI scoping will begin soon thereafter.

Forest Glen Annex, Silver Spring

A Preliminary Assessment was conducted. There is one confirmed usage of PFAS at the facility, at the fire station. By interview, it was shown that the PFAS was only stored and never used.

Fort Detrick, Frederick

The PFAS PA/SI was completed in the spring of 2022. Several sites were identified as having PFAS contamination and additional Remedial Investigation is planned. Groundwater near the landfill was sampled for PFAS in advance of the Preliminary Assessment/Site Investigation sampling to aid in the design of the treatment system for the pump and treat pilot study. This study is being done to determine the ability to remediate the Trichloroethylene (TCE) groundwater plume at Area B. During this sampling, levels of less than 20 parts per trillion of PFAS were detected in groundwater near the landfills in Area B.

Fort Meade BRAC (former and closed sections of the base), Odenton

The groundwater near Tipton Airfield was sampled in 2016. The highest detection near Tipton Airfield was 89,000 parts per trillion PFOS. Work in 2018 indicated that the PFAS was not migrating off-site, and not impacting water supplies for buildings on the Patuxent Wildlife Refuge. Additional PFAS sampling was conducted in 2020, and samples were all at or below the levels found in 2016. An RI for Tipton Airfield Is presently underway in 2023.

Fort Meade (the present base) Odenton

A Preliminary Assessment/Site Inspection has been completed. MDE expects that there will be additional sampling performed at areas associated with past and current fire department buildings and training areas. The base drinking water supply wells were tested in January 2021 and were non-detect for PFAS.

Army Research Laboratory, Adelphia

A Preliminary Assessment/Site Inspection was recently completed. It is expected that there will be sampling at several sites by late 2023.

Air Force Facilities

Maryland Air National Guard, Martin State Airport, Middle River

A Preliminary Assessment/Site Investigation was completed in 2019. The Preliminary Assessment identified 13 locations where releases of AFFF might have occurred, including fire training areas, former and current fire stations, hangars, hazardous waste storage facilities, fire fighting equipment testing areas, and stormwater outfalls with potential connectivity to areas of known or possible releases. Eleven of the 13 locations were recommended for further sampling. Eleven temporary wells were put in and nine of them showed concentrations above the EPA Health Advisory Level with concentrations for PFOS ranging from 71.2 to 13700 ppt. Concentrations of PFOA ranged from 92.9 to 1660 ppt. Concentrations of PFOA and PFOS combined ranged from 78.49 to 14500 ppt. MDE will conduct additional investigations when funding becomes available.

Joint Base Andrews, Camp Springs

The 2015 PA identified 10 AFFF areas requiring additional investigation. During the 2018 Site Investigation process, the number of sites was adjusted to nine, most of which are hangars and fire-training areas. The Site Investigation tested surface soil (up to 17,000,000 ppt PFOS; up to 150,000 ppt PFOA), subsurface soil (up to 21,000 ppt PFOS; up to 5,900 ppt PFOA), groundwater (up to 38,400 ppt PFOS/PFOA), surface water (up to 8,510 ppt PFOS/PFOA) and sediment (up to 27,000 ppt PFOS; up to 610 ppt PFOA) for PFBS, PFOA, and PFOS. Surface water sampling and fish tissue sampling by MDE during 2021 in Piscataway Creek (which begins in the southeastern corner of Joint Base, Andrews) showed significant PFAS contamination and led to a fish consumption advisory. Presently an RI is underway as well as an interim measure to treat the stormwater system that discharges into Piscataway Creek.

Brandywine Defense Reutilization and Marketing Office (DRMO), Brandywine

A Preliminary Assessment/Site Investigation was conducted in connection with the Joint Base Andrews effort. PFAS was found at one site due to improper storage of AFFF. The small groundwater plume will be investigated when resources become available.

U.S. Coast Guard Facilities

Coast Guard Yard, Curtis Bay, Baltimore City

Several sites have been identified at the facility during recent preliminary sampling as well as a recent spill in the summer of 2022. The PA/SIs are ongoing.

Private NPL Sites

Spectron, Inc Cecil County

Between 1961 and 1988, solvent recycling facilities conducted chemical product recycling and reclamation operations, including processing a wide range of industrial solvents on-site in an open lagoon. This site accepted liquid waste from neighboring chemical companies. The 2020 sampling of several monitoring wells in the source area and along the plume axis showed a maximum PFAS concentration in groundwater of 22.2 ppt. Further investigation is planned.

Bush Valley Landfill, Harford County

This unrestricted industrial landfill might have received PFAS waste. Well sampling for PFAS was conducted in the fall of 2022 and detected up to 260 ppt in a perimeter well. Additional sampling of both groundwater and surface water is planned in the fall of 2023.

Funding

Funding for Federal Assessment and Remediation for DoD sites is covered by the Defense and State Memorandum of Agreement (DSMOA) Cooperative Agreement. Costs for assessment and remediation of the private NPL sites are partially funded by cooperative agreements through the U.S. Environmental Protection Agency with a smaller percentage from the State budget. LRP and EPA work together on the listing of additional Superfund sites and attempt to recover costs from responsible parties. Due to the potential for PFAS compounds to remain present in various media for extended periods of time, identifying Responsible Parties may be difficult. In those cases, additional Federal funding may be necessary if sites are designated as State-lead sites.

7.0 Assessing Environmental Justice and Health Equity Concerns

7.1 Summary of EJ-Related Actions

Specific EJ-related actions have been defined within each section under Objectives 1, 2, and 3 when applicable. The following section provides a summary of these actions.

- MDE will provide technical assistance to community water systems in certain overburdened and underserved communities and connect them with existing resources

to address PFAS contamination in their drinking water. MDE's drinking water infrastructure funding process considers the system's EJ score.

- When selecting locations to sample for PFAS contamination in fish tissue, MDE worked in conjunction with MDNR to select subsistence fishing spots.
- MDE plans to map EJ communities with the Fish Consumption Advisory map.
- All data regarding consumption advisories is analyzed for potential EJ aspects, and will continue to be analyzed in the future. Care will be taken to involve the local health departments when vulnerable communities are implicated in fish consumption advisories.
- MDE's EJ Screening Tool provides a map of historic and active biosolids land application sites which will inform MDE to prioritize investigations in disadvantaged areas.
- EJ is considered in the source identification prioritization process, which uses the following decision-making criteria:

    1. Severity of the PFAS concentrations,
    2. Size and EJScreen score of the population served by impacted drinking water source,
    3. Availability of an alternative drinking water supply to the affected community
    4. Guidance from and collaboration with WSA

- Additional funding for PFAS source identification and mitigation is available to LRP from an EPA State Response grant. These grant funds may support investigations with an emphasis on impacts to communities with EJ concerns.

8.0 Education and Communication on PFAS Risks

8.1 Summary of Public Education/Communication Related Actions

Specific education and communication related actions have been defined within each section under Objectives 1, 2, and 3 when applicable. The following section provides a summary of these actions.

MDE maintains a PFAS landing page that offers information on potential routes of exposure and sources of contamination, and the Department's ongoing efforts to better understand and address those. The landing page also contains attachments of previous study results and informational materials for Maryland residents on PFAS risks, guidance on how to proceed when a source of contamination has been identified, among others. Some of the content on the landing page include:

- Summary reports with the results of each phase of the multi-phase public water system studies on the MDE Water Supply Program's website.

- Educational materials on interpreting PFAS test results and a list of National Environmental Laboratory Accreditation Program accredited laboratories for drinking water monitoring.
- A private wells fact sheet to advise residents on risks, well testing, and what steps to take when results show PFAS compounds above EPA's proposed regulatory limits. MDE and MDH will maintain ongoing collaboration with local health officials to provide PFAS information to private well owners.
- The Fish Tissue tab links to the existing fish consumption advisory for PFOS and the study that led to such advisory. Statewide fish tissue sampling has led to additional fish consumption advisories that will be also linked to the landing page when published and available to the public.

By Spring 2024, MDE plans to expand the PFAS landing page with the following:

- An interactive map that displays all sampling data collected as part of the PWS study.
- A PFAS-specific interactive advisory map and an additional PFAS collection layer in the existing Fish Consumption Advisory map showing locations, samples collected, date, media, and results of the fish tissue PFAS monitoring.
- Wastewater Treatment Plant sampling results will be available on WPPRP's website.
- A PFAS Story Map, providing an overview of all PFAS related activities conducted by MDE.

Broader public communications and educational initiatives include:

- Providing regular public communications information that features static listings of the most recent fish consumption advisories, brochures to local health departments, and local signs with links back to MDE's interactive maps and static listings placed by the county (working in conjunction with MDE) at water bodies of concern.
- MDE will continue conducting presentations on the latest advisory updates to local health departments, at the National Fish Forum (EPA), and other stakeholder events. Presentations may also cover PFAS monitoring efforts and results on drinking water, fish tissue sampling, WWTP effluent, biosolids, spray irrigation, industrial facilities, and source trackdown investigations.
- By the end of 2023, MDE will begin undertaking public notification of the requirements of statutes regarding PFAS in Class B fire-fighting foam, rugs and carpets, food packaging, and cosmetics as provided for in the George "Walter" Taylor Act. This public notification includes postings on MDE's website, and letters to manufacturers, vendors, distributors, and other potentially affected entities informing them of the requirements.
- MDE will publish tentative determinations, along with PFAS-specific requirements, for proposed WWTPs discharge permits in local newspapers to encourage public comments and requests for a public hearing.
- During the WWTP discharge permit renewal process, the notice of tentative determination published for facilities identified with elevated PFAS risk will outline proposed PFAS-specific requirements to be implemented in the permit, to ensure comprehensive awareness among all stakeholders during the public participation process. MDE will offer guidance to utilities facing financial challenges in accessing

support from the Clean Water and Drinking Water State Revolving Funds and the Bipartisan Infrastructure Law to cover the costs associated with mitigating PFAS-related risks.
- Public notification and public comment and participation in the selection of remedies will be one of the permit requirements when a solid waste facility is found to be causing the release of PFAS above established MCLs.
- All Industrial Facilities permittees will be educated about PFAS so they are better equipped to detect and notify MDE if they become aware of any unregulated pollutants in their discharge.

9.0 Analytical and Field Services

While this section does not specifically address elements within the action plan, the analytical services provided by MDH and field services provided by MDE are crucial for MDE and other State agencies in order to conduct monitoring surveys and investigations which directly support actions to control and remediate sources of PFAS contamination impacting the environment and human health within Maryland. Without the support of MDH and MDE's Field Services, state agencies would be required to contract academic and private laboratories outside of Maryland for field and analytical support at significantly greater expense to the State.

9.1 MDH Laboratories Administration

Drinking Water

In February 2020, MDE asked MDH Laboratories Administration to bring on PFAS testing for drinking water to support a fast-paced, data-driven assessment of the PFAS problem in Maryland. Undeterred by the pandemic and frozen budgets, MDH Laboratories Administration was able to repurpose an old instrument and optimize EPA Method 537.1 to quantify 18 different PFAS at 1-2 parts-per-trillion sensitivity in drinking water. Through competitive external grants, MDH Laboratories Administration was subsequently able to procure automated extractors and further validate surface and groundwater testing (for source investigation). As a result, a single temporarily redirected scientist (voluntarily working overtime) was able to test >70% of Marylanders' drinking water in just 4 months (phase 1). With the increased demand for water testing, in 2021 MDH approved reassigning/reclassifying a scientist position to be dedicated for PFAS testing. In 2022, MDH Laboratories Administration brought on EPA Method 533 for drinking water and became the only laboratory in Maryland approved by the EPA for the Unregulated Contaminant Monitoring Rule 5 (UCMR5) program.

Multi-matrix testing

As the multi-agency collaboration progressed, it became clear that Maryland needed not only a competent routine testing laboratory but also a laboratory that could develop new methods to adapt to MDE's and MDNR's changing needs at rigorous EPA standards. A top priority was the ability to quantify PFAS in seafood (fish, crabs, oysters) and other challenging samples including wastewater and biosolids. These programs have significant environmental justice and climate change implications. MDH Laboratories Administration promoted a staff member to become its only dedicated Developmental Scientist, and in 2022, MDH Laboratories Administration became

one of only two public health labs in the nation to be part of an EPA/DoD multi-laboratory validation study for the state-of-the-art EPA Method 1633 that is able to quantify 40 different PFAS in ‘any’ non-drinking water samples including wastewaters, soils, sediments, landfill leachates, biosolids, and fish, chicken, and clam tissue. According to EPA, this is the largest multi-laboratory it has ever conducted, and required hundreds of overtime hours to be (voluntarily) worked by the Lab’s sole Developmental Scientist.

With Method 1633 accredited in April 2022, MDH Laboratories Administration turned to the Association of Public Health Laboratories (APHL) to recruit (from Alaska) a fully funded Fellow to assist in the testing temporarily (August 2022-August 2023). Finally, automation of Method 1633 has not yet been achieved. Due to its widely recognized expertise, MDH Laboratories Administration was selected to partner with a leading international company to develop a much-sought automated extractor for Method 1633. This work is ongoing, and is expected to offer additional testing capacity for WWTP monitoring.

PFAS Forensics

While EPA publicly documents the existence of 12,034 types of PFAS, current methods are able to detect only 40. Through competitive grants from APHL/CDC, MDH Laboratories Administration became the only public health lab in the nation to secure high-resolution mass spectrometry instrumentation for environmental testing. This instrument has the ability to detect ‘all’ PFAS (and indeed all chemicals). This cutting-edge capability resulted in MDH Laboratories Administration being selected as one of only two labs to partner with EPA’s Office of Research and Development through a 2-year collaborative grant to develop ‘PFAS forensics’. This state-of-the-art capability is already being used by MDH Laboratories Administration to investigate a recent industrial discharge in Maryland by W.L. Gore.

Future Actions

The only true way to understand environmental exposures is to conduct biomonitoring of populations for chemicals (usually in blood). CDC has performed this function for PFAS nationally, and awards competitive grants to state labs in 5-year cycles. CDC has reached out to MDH Laboratories Administration to encourage it to apply for the next cycle of grants (early 2024). Since 2009, 17 states have received grants to join this program. MDH Laboratories Administration will require assistance from Leadership to secure the required approvals to bring this program to Maryland in 2024, which will serve as a major environmental justice initiative.

Challenges

Due to its vital importance to the State, MDH Laboratories Administration developed PFAS testing. MDH Laboratories Administration was able to repurpose older instruments (that are ~8 years old now). However, given their age and extensive use to support large-scale PFAS testing of thousands of samples for 3 continuous years, these repurposed instruments are now experiencing falling sensitivities and frequent breakdowns. MDH Laboratories Administration needs to replace both of its two aging instruments with new models. While funds for these instruments may be available through the Bipartisan Infrastructure Law ($1,353,756), MDH Laboratories

Value

MDE firmly believes that the analytical services provided by MDH Laboratories Administration are crucial for MDE and other State agencies to conduct monitoring surveys and investigations that directly support actions to control and remediate sources of PFAS contamination in the environment thus reducing impacts on human health and aquatic life in Maryland. Without the support of MDH Laboratories Administration, state agencies would be forced to contract out-of-state/for-profit private and/or academic laboratories for analytical support at significantly greater expense and with inherent delays.

9.2 MDE Field Services

Drinking Water Monitoring Section

Background

The Field Investigations and Environmental Response Program (FIERP) Drinking Water Monitoring Section (DWM) works under the direction of the Water Supply Program to conduct Safe Drinking Water Act (SDWA) monitoring of public water systems statewide. Monitoring includes the collection of SDWA requirements as well as special collections in response to complaints or suspected contamination. DWM also routinely participates in additional monitoring as needed such as Groundwater Under Direct Influence (GWUDI), UCMR, and PFAS. Our section currently includes just 3 full-time employees (including the section head and a recently converted contractual position) and depends heavily on other staff within shared/overlapping responsibilities within the FIERP based on regions where staff reside to maximize our efficiency. Sixteen FIERP staff (including the 3 dedicated DWM section staff) are part of DWM efforts (recently down from 17 due to a retirement).

Current Actions

DWM began monitoring for PFAS in Community Water Systems in the fall of 2020. DWM has completed 4 phases of collections, totaling approximately 1369 samples (including blanks, Phase 1 153, Phase 2 181, Phase 3 812, Phase 4 223). We also collected 50 samples from private wells near WL Gore in Cecil County in March 2023. The addition of PFAS collections has pushed our capabilities to near maximum capacity. Factors contributing to the strain of PFAS monitoring within FIERP, in addition to the volume of samples collected, include 1) additional processing of bottles needed to reduce potential contamination, 2) collections often involve raw water collection or confirmation of sources, and 3) the timing and prioritization of collections specified. Preservatives must be added to PFAS bottles using a scale under ultra-clean conditions due to the ubiquitous nature of PFAS compounds. Other sample types, for example, enable samplers to add preservatives individually under much less extreme conditions. We routinely collect at the Point of Entry to Distribution (POE) of Water Treatment Plants (WTP) during ‘normal’ operation (which could involve combinations of various source waters). WTP

operators and DWM staff are familiar with these locations, and we typically simply record sources in operation at the time of collection. However, collection of each source water or collection of POE containing specific source waters requires much more time and effort. Timing and prioritization specificity are perhaps the most straining factors. For example, PFAS phases have typically started at points in the year when samplers have already visited WTPs to collect other compliance samples, thus requiring additional visits. The specific order of collection sequence required intensive scheduling, coordination, and tracking to align with staff availability due to their primary work responsibilities.

Future Actions

We anticipate first-time PFAS collections from all non-community public water systems as well as continued assistance to counties to better understand aquifers supplying Maryland residents served by private wells. Additional local investigations involving specific contamination sites are also likely. We also anticipate PFAS becoming a routine compliance sample in both community and non-community public water systems. Our DWM section will continue to do our best to accommodate these needs. However, we also foresee increases in PFAS monitoring and other emerging contaminant requirements throughout FIERP (e.g., shellfish monitoring, TMDL, Intensive Surveys, etc). Such increases could decrease the availability of FIERP-shared drinking water samplers, thus threatening the completion of any time-sensitive assignments. Some ways to help ensure our capabilities meet future demands include, 1) purchasing PFAS bottles that already contain preservatives, 2) limiting/standardizing PFAS collections to POE in public water systems and distribution in private wells (e.g, outside tap or kitchen sink), and 3) allowing adequate time and flexibility for DWM staff to conduct desired collections with maximum efficiency.

Bioregulatory Monitoring and Response Division

Background

The Field Investigations and Environmental Response Program's (FIERP) Bioregulatory Monitoring and Response Division works under the direction of Federal Clean Water Act directives to conduct Fish Tissue Monitoring in fishable waters throughout the State. The foundation of this monitoring is a list of 60 stations that have been monitored since the 1970s for contaminants, generally on a five-year rotation. The State's need for background PFAS data from fish tissue was addressed beginning in the fall of 2020. By the fall of 2022, most of the Core fish tissue monitoring stations had been sampled for fish tissue, and at least one surface water sample was taken. The exceptions were that no impoundments were sampled (10 stations). In addition to the Core stations, several other stations were sampled because of their proximity to potential sources of PFAS. Three additional stations were added to assess blue crabs. Sampling for other routine contaminants (PCBs and mercury) was suspended during the push to get this PFAS data. Our Division currently includes 4 permanent and 1 contractual full-time employees. Two of these five employees have the knowledge and experience to sample fish (the former Division Chief retired in April 2023).

Current Actions

FIERP is currently in the process of providing consumption advisory guidance based on the PFAS concentrations found in the samples collected in the last three years.

Future Actions

When the fish tissue and surface water data are fully analyzed, additional sampling will be conducted to fill data gaps, address new potential sources, and further refine the knowledge from areas where higher concentrations were found. In addition, routine statewide fish tissue monitoring of core stations on a five-year cycle will resume in Fall 2023. Samples will be analyzed for PCBs, mercury, and PFAS to support fish consumption advisories. Filling an existing vacancy (Natural Resources Planner V) in this section will be necessary to meet additional fish tissue and surface water sampling demands so that we do not need to request assistance from other Divisions within the FIERP or other cooperating agencies.