Maryland
Department of
the Environment

PFAS Public Water System Study at Priority Locations across the State of Maryland

What You Need to Know

Per- and polyfluoroalkyl substances, also known as PFAS, are a group of over 5,000 human-made compounds. Used since the 1940s, PFAS compounds can be in a wide range of consumer and industrial products and processes. PFAS released to the air, soils, ground- or surface water can enter into nearby drinking water sources. To assess the presence of PFAS in state drinking water sources, the Maryland Department of the Environment (MDE, or 'the Department') has initiated a multi-phased, statewide study for the compounds.

Overview

- MDE has initiated an assessment of the occurrence of PFAS in drinking water from 137 selected Community Water Systems (CWS) Water Treatment Plants (WTPs), starting September 2020.
- Study results will help the Department better understand the prevalence of PFAS in Maryland's drinking water sources.
- Study results may trigger the need for additional finished water sampling, monitoring of raw water sources, and other actions.
- Study results will help water systems make informed decisions.

Approach

- The Department plans to collect finished water samples from 137 Community Water System (CWS) Water Treatment Plants (WTPs) (see attached map of locations of targeted systems).
- Sixty (60) CWSs utilize the identified 137 CWS WTPs. These CWS WTPs treat 249 raw water sources. Collectively these systems provide drinking water to over 4.3 million people (i.e. approximately 70% of Maryland's population).
- These CWS-WTPs have been identified as having the highest **relative risk for** PFAS contamination. Risk has been defined as a combination of the estimated degree of threat (i.e. PFAS source type and proximity to drinking water sources), vulnerability (i.e. source waters from surface water or groundwater in unconfined or semi-confined aquifers) and the frequency a system's customers receive their drinking water (i.e. customers receiving water from the same CWS every day).
- MDE will collect all finished water samples. Finished water samples will be analyzed for all eighteen (18) analytes listed under EPA Method 537.1 by the Maryland Department of Health's (MDH) Laboratories Administration- Division of Environmental Services with a limit of quantification of approximately 1 ppt for all analytes.

- Approximately 10% of samples will be analyzed for an extended list of twenty-nine (29) PFAS analytes, including the 18 listed under EPA Method 537.1.

Site Selection Criteria: Relative Risk

The 137 WTPs were selected based on several key factors:

- Consumer potential for long term exposure to PFAS (if present);
- CWS source water vulnerabilities to contamination (e.g., surface waters, unconfined and/or semi-confined aquifers); and
- Proximity and relative risk to potential PFAS sources (i.e., CWS source water is located near one or more locations where there is an increased probability of PFAS use and/or release).

In addition to the above selected criteria, 11 reference sites were also chosen so the Department is able to compare the 137 targeted sites to sites not expected to be at risk of PFAS contamination(e.g., 75% forested and no known proximity to potential PFAS sources or releases).

What is a Community Water System vs. a Water Treatment Plant vs. a Raw Water Source?

Community water systems (CWSs) supply drinking water to the same population year-round. To be considered a CWS, a system must provide finished drinking water to at least 25 of the same people (or 15 service connections). In Maryland, CWS can use one or more Water Treatment Plants (WTPs) treating source waters from surface water (i.e. lakes, reservoirs, rivers) or groundwaters from unconfined, semi-confined, or confined aquifers. Drinking water sources often require treatment before being considered acceptable for potable use. WTPs may treat one or multiple raw water sources.

Under Phase 1, finished water samples will be collected from 137 WTPs, treating 249 raw water sources and serving 60 CWS.

Why focus first on Community Water Systems?

In Maryland, 5.2 million people receive their drinking water from 464 regulated Community Water Systems (CWS). A single CWS can serve from 25 to more than 1.8 million people. The EPA Health Advisory and the EPA reference dose (RfD) for PFOA and PFOS is based on long-term health effects, not acute toxicity. Because of the large number of people served by CWS and the risk assessment endpoint being chronic risk, the initial phase of PWS sampling for PFAS will focus on CWS.

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What makes a CWS Source Water "vulnerable?"

Maryland's 464 CWSs withdraw from a variety of water sources, including surface (SW) and groundwater. Maryland's groundwater-based drinking water sources include waters from unconfined (UC), semi-confined (SC), and confined (C) aquifers. In Maryland, the majority of CWSs are dependent on one or a combination of these sources. Depending on the type or location of a source, vulnerability of a CWS source ranges from naturally protected, to very vulnerable and susceptible to external influences. For example, CWSs using groundwater from a confined aquifer are expected to be more naturally protected than other sources; however, waters from surface water, unconfined and/ or semi-confined aquifers are generally more vulnerable to contamination by pollution. 209 CWS out of MD's 464 total CWSs withdraw waters from surface water and/or groundwaters from unconfined or semi-confined aquifers.

How was information on potential PFAS sources in proximity to CWS used to identify PWS sampling locations?

To further prioritize Maryland's 209 CWSs using surface and groundwaters from unconfined and semi-confined aquifers, MDE considered the proximity, number, and type of potential sources of PFAS to these systems' untreated surface and groundwater sources.

MDE mapped over 2,000 potential sources of PFAS in Maryland. The 2,000 potential sources include military installations, fire training areas, airports, landfills, manufacturing facilities, and wastewater treatment plants. MDE then created a 1,000-foot buffer around each potential source of PFAS. If one or more of these 1,000-foot buffers intersected a CWS' source water protection area(s), then that CWS untreated source was considered as potentially at-risk for PFAS contamination. The number and types of PFAS sources intersecting with each CWS source protection area was recorded throughout this process. These potentially at-risk CWS sources were then consolidated to which WTP they serve. Based on these criteria, 137 CWSs WTPs were identified as the highest priority for initial finished drinking water sampling.

To determine where to sample first (i.e., which of the 137 CWSs WTPs to sample first), MDE further prioritized this list by assessing which PFAS sources presented a higher potential for PFAS release. For example, military installations, fire-training areas, or other types of sites with known historical usage of aqueous film forming foams (AFFF) would present a larger risk to drinking water sources than other potential PFAS sources.

These 137 CWS WTPs treat 249 raw water sources and provide treated waters to 60 CWSs.

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Reference Sites

In addition to the 137 investigative samples, MDE will collect "baseline" samples from eleven (11) WTPs serving CWS withdrawing from surface, unconfined, and semi-confined raw water sources to determine PFAS levels in locations not expected to have proximal PFAS sources. These reference sites are located in HUC-12 watersheds with 75% or more forested cover with no PFAS sources within 1,000 feet of their protection areas.

Follow-Up Sampling, Analysis, and Corrective Actions

The objective of the study is to understand the occurrence of PFAS in a subset of public water systems, which MDE believes may have the highest relative risk of contamination and which serve a large percentage of the population of Maryland. Study results may lead to further MDE actions if PFAS levels trigger the need for monitoring or risk mitigation measures.

Commitment to Protecting Public Health

The purpose of this initial sampling effort is to assess the occurrence of PFAS in Maryland's most vulnerable public drinking water sources and, when necessary, to take action to require monitoring or risk mitigation measures. Upon completion of this study, MDE may undertake additional sampling of PWS.

Questions

For more information on this sampling project, please contact Rebecca Warns at rebecca-ann.warns@maryland.gov or visit the MDE- Water Supply Program's PFAS Webpage here.

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Phase I: At-Risk and Baseline Community Water System (CWS)
Surface Water (SW), Unconfined (UC) and Semi-Confined (SC) Untreated Sources