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Monitoring Unregulated Drinking Water Contaminants

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Fifth Unregulated Contaminant Monitoring Rule

Access Results

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The Safe Drinking Water Act (SDWA) requires that once every five years the EPA issue a list of unregulated contaminants to be monitored by public water systems (PWSs).

The fifth Unregulated Contaminant Monitoring Rule (UCMR 5) was published on December 27, 2021. UCMR 5 requires sample collection for 30 chemical contaminants between 2023 and 2025 using analytical methods developed by the EPA and consensus organizations. This action provides the agency and other interested parties with scientifically valid data on the national occurrence of these contaminants in drinking water. Consistent with the EPA's [PFAS Strategic Roadmap](#), UCMR 5 will provide new data that will improve the agency's understanding of the frequency that 29 per- and polyfluoroalkyl substances (PFAS) and lithium are found in the nation's drinking water systems, and at what levels. The monitoring data on PFAS and lithium will help the EPA make determinations about future regulations and other actions to protect public health under SDWA. The data will also ensure science-based decision-making, help the agency better understand whether these contaminants in drinking water disproportionately impact communities with environmental justice concerns, and allow the EPA, states, Tribes, and water systems to target solutions.

- [40 CFR \(Code of Federal Regulations, Title 40\) Part 141: Final - Revisions to the Unregulated Contaminant Monitoring Rule \(UCMR 5\) for Public Water Systems and Announcement of Public Meetings \(pdf\)](#) (27 pp, 650 K, [About PDF](#))

- [Press Release: EPA Releases Initial Nationwide Monitoring Data on 29 PFAS and Lithium](#)
- [UCMR 5 Program Overview Fact Sheet \(pdf\)](#) (281.6 KB, December 2021, EPA 815-F-21-009)
 - [Hoja informativa del programa \(pdf\)](#) (383.3 KB, December 2021, EPA 815-F-21-009S) (Spanish Version)
- [Sample Collection Training Video for Small Public Water Systems](#)
- [EPA Approved Laboratories for UCMR 5](#)

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UCMR 5 Questions and Answers

The EPA has released the [third set of data](#) collected under UCMR 5 for 29 PFAS and lithium. The data released to date represent approximately 24% of the total results that the EPA expects to receive until completion of data reporting in 2026. The agency continues to conduct research and monitor advances in techniques that may improve our ability to measure these and other contaminants at even lower levels.

In March 2023, the EPA [proposed standards to limit certain PFAS in drinking water](#) that would allow PWSs to use results from UCMR 5 to meet the rule's initial monitoring requirements. In the interim period before the PFAS drinking water standard is final, [the EPA has provided health advisories](#) for four PFAS included in UCMR 5 monitoring. The agency continues to advance the science on the potential health effects of a wide range of PFAS, including many of those monitored for under this program.

The [Bipartisan Infrastructure Law](#) (BIL) provides an unprecedented \$9 billion specifically to invest in communities with drinking water impacted by PFAS and other emerging contaminants. This includes \$4 billion via the Drinking Water State Revolving Fund (DWSRF) and \$5 billion through the EPA's "Emerging Contaminants in Small or Disadvantaged Communities" [grant program](#). States, Tribes, and communities can further leverage an additional nearly \$12 billion in BIL DWSRF funds and billions more in annual DWSRF funds dedicated to making drinking water

safer. These funds will help communities make important investments in solutions to remove PFAS from drinking water.

Answers to common questions on accessing and understanding the UCMR 5 data, and on PFAS and lithium in drinking water, are provided below. Before conducting your own assessment of the data, please review the [UCMR 5 Data Summary](#).

Accessing and Understanding the UCMR 5 Data

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1. Where can I access UCMR 5 results?

The UCMR 5 analytical results are publicly available through the [UCMR 5 Data Finder](#), the [UCMR Occurrence Data webpage](#) for drinking water (via text files), and the [PFAS Analytic Tools](#). The UCMR 5 Data Finder allows people to easily search for, summarize, and download the available UCMR 5 analytical results. Results can be filtered using multiple data fields, including public water system (PWS), state, contaminant, source water type, results at or above UCMR minimum reporting levels (MRLs), and results above health-based reference concentrations. For those interested in large-scale data processing using statistical or data analysis software, the text files containing the UCMR 5 analytical results, as well as additional data element and ZIP Code information reported by participating PWSs, are recommended. Additionally, the [UCMR 5 Data Summary](#) summarizes the UCMR 5 results to

date at the national level, available contaminant health effects information, and data considerations and definitions for the UCMR 5 Data Finder and text files. Monitoring results will be updated in the UCMR 5 Data Finder, Data Summary, and text files on a quarterly basis until completion of data reporting in 2026. A document with instructions and tips for accessing results and a video demonstration of the UCMR 5 Data Finder are available on the [UCMR Occurrence Data webpage](#). For more information, please refer to the [UCMR 5 Accessing Data and Communicating Results](#) presentation.

UCMR 5 data are also included in the EPA's [PFAS Analytic Tools](#) and are updated soon after each public release of the data.

Real-time UCMR results are stored in the EPA's web-based Safe Drinking Water Accession and Review System (SDWARS) prior to public release. Representatives of PWSs participating in UCMR 5 must register for a [CDX/SDWARS](#) account to receive automated notices when their results are ready to view in SDWARS. The EPA also encourages states to register for a CDX/SDWARS account for timely access to results. Please refer to the [UCMR 5 Reporting Requirements webpage](#) to access SDWARS walkthrough videos for PWS and state users.

2. Where can I find a summary of health information about UCMR 5 contaminants?

The UCMR 5 Data Summary is available on the [UCMR Occurrence Data webpage](#) and will be updated on a quarterly basis until completion of data reporting in 2026. The Data Summary identifies previously published information and publicly available EPA resources that provide context around UCMR 5 results in relation to their minimum reporting levels (MRLs) and available non-regulatory health-based reference concentrations. Within the Data Summary, reference concentrations (i.e., health advisories for four per- and polyfluoroalkyl substances [PFAS], health reference level for lithium) are provided in µg/L for comparison with UCMR 5 results, and underlying final toxicity assessment values (e.g., EPA Integrated Risk Information System [IRIS], Agency for Toxic Substances and Disease Registry [ATSDR]) are provided in mg/kg-day. This information will be updated as the agency completes health assessments on PFAS and concludes the process of developing a final PFAS National Primary Drinking Water Regulation (NPDWR).

3. Are public water systems (PWSs) required to report their UCMR 5 results to their customers?

PWSs are required to [notify](#) customers through Tier 3 Public Notification (PN) about the availability of all UCMR results no later than 12 months after they

are known by the PWS. Community water systems (CWSs) are also required to report UCMR results in their annual [Consumer Confidence Report \(CCR\)](#) when unregulated contaminants are found (i.e., measured at or above minimum reporting levels [MRLs]). CWSs must report the average and range of the prior year's monitoring results. If timing and delivery requirements are met, CWSs may include their PN within their CCR, also known as an annual drinking water quality report, which is to be delivered to all billing customers each year by July 1. EPA resources for PWSs are available on the [CCR](#) and [PN](#) Compliance Help webpages.

4. What concentration units are UCMR 5 analytical results reported in?

Analytical results from the UCMR program are reported by laboratories and provided by the EPA in micrograms/liter ($\mu\text{g/L}$, or parts per billion). To convert results in $\mu\text{g/L}$ to nanograms/liter (ng/L , or parts per trillion), multiply the value by 1,000.

5. What is a minimum reporting level (MRL) for the UCMR program?

The EPA established minimum reporting levels (MRLs) for lithium and the 29 PFAS included in UCMR 5. The EPA establishes MRLs to ensure consistency in the quality of the information reported to the agency. UCMR MRLs are determined using data from multiple laboratories that participate in EPA's UCMR MRL-setting studies and are not associated with contaminant health effects information. The UCMR MRL is the lowest measurable concentration of a contaminant that, with 95% confidence, is achievable by at least 75% of laboratories nationwide using a specified analytical method (recognizing that individual laboratories may be able to measure or quantify analytes at lower levels). The EPA's MRLs for the 29 PFAS included in UCMR 5 range from 0.002 to 0.02 $\mu\text{g/L}$ (parts per billion), which is equivalent to 2 to 20 ng/L (parts per trillion). The EPA's MRL for lithium is 9 $\mu\text{g/L}$ (parts per billion). For more information, please refer to the [UCMR 5 Data Summary](#). Note that the Agency for Toxic Substances and Disease Registry (ATSDR) uses the term "MRL" for a different purpose (i.e., to describe "Minimal Risk Level"). The UCMR term and the ATSDR term have no relationship to each other.

6. What is a health-based reference concentration for the UCMR program?

The EPA is providing a health-based reference concentration for some of the UCMR 5 contaminants where there is health and toxicological information (e.g., a lifetime health advisory [HA] level, health reference level [HRL]). Reference concentrations are for comparison and are taken from available health assessments published by the EPA or other governmental agencies. They are not legally enforceable federal standards and are subject to change as new health assessments are completed. For more information, please

refer to the [UCMR 5 Data Summary](#). The agency continues to assess the literature for health effects information, identify data gaps, and determine the need for future studies to improve our understanding of the possible health risks associated with these contaminants in public drinking water.

7. What is the difference between the minimum reporting level (MRLs) and health-based reference concentrations used in the EPA's UCMR 5 Data Finder and Data Summary?

The [UCMR 5 Data Finder](#) and [Data Summary](#) provide context around UCMR 5 results in relation to UCMR MRLs, which are based on laboratory analytical measurement capability, and health-based reference concentrations, which are from publicly available health effects information.

8. How are UCMR 5 results compared to health-based reference concentrations in the EPA's Data Finder and Data Summary?

The [UCMR 5 Data Finder](#) allows people to specifically search for analytical results greater than the available health-based reference concentrations. Additionally, Table 3 in the UCMR 5 Data Summary provides the number of sample results and water systems with results to date that are greater than the health-based reference concentrations. Health-based reference concentrations for UCMR 5 contaminants include the EPA's health advisory (HA) levels for four PFAS and health reference level (HRL) for lithium. These health-based values are expressed with one significant digit; comparison of UCMR results to the HAs and HRL is therefore based on one significant digit. For example, results $>0.015 \mu\text{g/L}$ for GenX chemicals and $>2.5 \mu\text{g/L}$ for PFBS round to $>0.02 \mu\text{g/L}$ and $>3 \mu\text{g/L}$, respectively, and are identified as above reference concentrations. Results $\geq 15 \mu\text{g/L}$ for lithium round to $20 \mu\text{g/L}$ and are likewise identified as above the reference concentration. For more information, please refer to the [UCMR 5 Data Summary](#).

9. What should I consider before downloading the detailed UCMR 5 results?

There are multiple options for viewing the UCMR 5 results. The [UCMR 5 Data Finder](#) allows people to quickly search for and summarize available UCMR 5 results by multiple data fields, including public water system (PWS), state, EPA Region, contaminant, source water type, results at or above UCMR minimum reporting levels (MRLs), and results above health-based reference concentrations. This tool can be used by federal, state, and local agencies as well as others to easily locate and retrieve specific results and assist with answering questions regarding UCMR 5 monitoring. Selected results can be viewed online or downloaded as an Excel file (.xlsx).

Monitoring results are also provided in [tab delimited occurrence data text files \(.txt\)](#) within zip files (.zip) on the agency's [UCMR Occurrence Data webpage](#). The data in these text files can be imported into various data analysis and software programs. The text files have field names in the first row and no text qualifier. The EPA recommends importing all ID fields into your choice of software as text since some of the IDs can otherwise be misinterpreted as long integer field types when they contain alpha characters. A null value (or blank) in the “AnalyticalResultValue” field of the text files indicates the result was less than the UCMR minimum reporting level (MRL). The “AnalyticalResultSign” field also indicates whether the analytical result is less than (<) the UCMR MRL or equal to (=) a numeric value at or above the UCMR MRL, which would be reported under “AnalyticalResultValue.”

Results at or above the UCMR MRL are provided in micrograms per liter (µg/L, or parts per billion). Each record represents a single analytical result measure for one contaminant in drinking water for one sampling point and sampling event from a PWS; UCMR 5 results do not represent location running annual averages. Data may be added, removed, or updated over the course of the reporting cycle following further review by analytical laboratories, PWSs, states, and the EPA. After reporting UCMR 5 monitoring results, water providers may take action to reduce contaminant levels in finished drinking water.

Detailed instructions for accessing results and a video demonstration of the UCMR 5 Data Finder are available on the [UCMR Occurrence Data webpage](#). Additional data considerations and data definitions are provided in the [UCMR 5 Data Summary](#).

10. How do I import the UCMR 5 data text files into Excel?

Please refer to the document “Instructions for Accessing Results from UCMR 5” on the [UCMR Occurrence Data webpage](#). Specific UCMR 5 analytical results can also be searched for and downloaded as an Excel file (.xlsx) using the [UCMR 5 Data Finder](#).

11. I don't see UCMR 5 results for a particular PWS. Where are they?

If you cannot find results for a public water system (PWS):

- The PWS may serve less than 3,300 individuals and was not selected for UCMR 5 monitoring as part of the nationally representative random sample of 800 PWSs serving that size group.
- The monitoring for a PWS may not have occurred yet. PWSs monitor during a single 12-month timeframe in the three years of monitoring (2023–2025).

- The monitoring results for a PWS may not have been reported yet. Laboratories supporting UCMR 5 are obligated to report their data to SDWARS within 90 days of sample collection. The PWS then has up to 30 days to review the data.
- A resample may be in process. If multiple resampling actions have taken place and the resample window has closed (e.g., it is time for the next sample event), or an issue at the laboratory precludes successful analysis, some data may not be reported.
- The PWS may be a transient non-community water system (TNCWS). UCMR 5 requirements apply to community water systems (CWSs) and non-transient non-community water systems (NTNCWSs).
- In the [UCMR 5 Data Finder](#), “<MRL” in the “Result” field indicates the result was less than the UCMR minimum reporting level (MRL). Only analytical results at or above the UCMR 5 MRL are reported to the EPA.
- In the text files, a null value (or blank) in the “AnalyticalResultValue” field indicates the result was less than the UCMR MRL. The “AnalyticalResultSign” field also indicates whether the analytical result is less than (<) the UCMR MRL or equal to (=) a numeric value at or above the UCMR MRL, which would be reported under “AnalyticalResultValue.” See the [UCMR 5 Data Summary](#) for more information.

12. How does the EPA ensure that the UCMR laboratory data are accurate?

Only laboratories that were approved for UCMR 5 participation through [EPA's Laboratory Approval Program](#), which includes laboratory Proficiency Testing, can analyze samples for the UCMR program. In addition, when a laboratory enters results into the data reporting system (SDWARS 5) on behalf of the PWS, they must also enter all associated method quality control (QC) data that apply to the sample results. All data fields in SDWARS 5 have built-in QC checks to ensure all data uploaded by approved laboratories meet the analytical method and UCMR reporting guidelines.

13. What visualization tools are available to view PFAS occurrence data?

The publicly available [PFAS Analytic Tools](#) on EPA's Enforcement and Compliance History Online (ECHO) webpage are integrated data visualizations that can be used to evaluate what is known about PFAS manufacture, release, and occurrence in communities. EPA's PFAS Analytic Tools integrate data from many sources including UCMR 3 monitoring for six

PFAS and UCMR 5 monitoring for 29 PFAS; UCMR 5 data will be updated soon after each public release of the data.

PFAS in Drinking Water

14. [What if I am concerned about PFAS in my drinking water?](#)
15. [What actions can water systems take if they find PFAS in drinking water?](#)
16. [Where can I find more information about PFAS in drinking water?](#)
17. [Why is the EPA collecting data on PFAS for which there isn't health effects information?](#)
18. [What is the EPA doing to improve our understanding of PFAS without health effects information? Will the agency have more health effects information \(i.e., toxicity values, reference concentrations\) available by the time UCMR 5 monitoring is complete?](#)
19. [What treatment technologies exist to remove PFAS from drinking water?](#)

14. What if I am concerned about PFAS in my drinking water?

If you get your water from a drinking water system, reach out to your local water utility to learn about how they may be addressing PFAS as well as ask them to test the water for PFAS or to share information with you if they have already tested the water. NOTE: Some public drinking water systems may not have this information. If you choose to test your water yourself, it is important to use a state-certified laboratory using EPA-developed testing methods. Check with your state's drinking water program to see if they have issued guidance or standards for PFAS in your state and what actions they recommend or require when there is PFAS contamination. If your state does not have standards or guidance for PFAS, see [EPA's health advisories for certain PFAS](#) for information regarding these PFAS in drinking water and advice on actions that you may want to consider. You may also consider installing in-home water treatment (e.g., filters) that are certified to lower the levels of PFAS in your water. [Learn about certified in-home water treatment filters](#). To learn more about PFAS and steps that can be taken to reduce risks: <https://www.epa.gov/pfas/meaningful-and-achievable-steps-you-can-take-reduce-your-risk>.

15. What actions can water systems take if they find PFAS in drinking water?

Steps to Assess Contamination

If water sampling results show the presence of PFOA, PFOS, GenX chemicals or PFBS in drinking water above the health advisory levels, the EPA recommends that water systems undertake additional sampling to assess the level, scope, and localized source of contamination to inform next

steps. The EPA also recommends that water systems work with state authorities on this step to determine if they have state requirements or guidance on concentrations of PFOA, PFOS, GenX chemicals and/or PFBS that warrant action or concern. Drinking water systems and public health officials should also provide consumers with information about the levels of PFAS in their drinking water.

Steps to Inform

If water sampling results show the presence of PFOA, PFOS, or levels of GenX chemicals or PFBS in drinking water above the health advisory levels, water systems should notify their state drinking water safety agency (or the EPA in jurisdictions for which EPA is the primary drinking water safety agency) and consult with the relevant agency on the best approach to conduct additional sampling. The EPA also recommends that water systems work with state authorities to determine if they have state requirements or guidance on concentrations of PFOA, PFOS, GenX chemicals and/or PFBS that may represent levels of concern. Drinking water systems and public health officials should continue to provide consumers with information about the levels of PFAS in their drinking water.

Steps to Limit Exposure

There are different ways to reduce risks from PFAS. In some cases, drinking water systems may be able to reduce concentrations of PFAS by closing contaminated wells or changing the rates of blending of water sources, where the available quantity of drinking water is not compromised. Systems may also remove PFAS by installing technologies such as granular activated carbon, ion exchange, or high-pressure membranes. These technologies can be installed at the treatment plant, or for some smaller systems or private wells it may be more effective to use point of use devices that have been demonstrated to remove PFAS.

16. Where can I find more information about PFAS in drinking water?

- EPA PFAS Explainers:
 - English: <https://www.epa.gov/pfas>
 - Spanish: <https://espanol.epa.gov/espanol/informacion-basica-sobre-pfas>
- EPA Health Advisories: <https://www.epa.gov/sdwa/drinking-water-health-advisories-has#published> (Materials available in Spanish, Mandarin, Arabic, Korean, Russian, Filipino, and Vietnamese)
- [Drinking Water Health Advisories for PFAS Fact Sheet for Communities](#)
- [Drinking Water Health Advisories for PFAS Fact Sheet for Public Water Systems](#)

- Questions and Answers: Drinking Water Health Advisories for PFOA, PFOS, GenX Chemicals and PFBS: <https://www.epa.gov/sdwa/questions-and-answers-drinking-water-health-advisories-pfoa-pfos-genx-chemicals-and-pfbs>. Examples of relevant Q&As:
 - [Why has EPA maintained the 2022 interim health advisories for PFOA and PFOS now that the PFAS National Primary Drinking Water Regulation has been proposed?](#)
 - [What are the lowest levels that PFOA, PFOS, GenX chemicals and PFBS can be reliably measured in water, and how do those levels compare to the health advisories?](#)
 - [If the health advisory levels for PFOA and PFOS are so low that we can't detect PFAS down to the health advisory levels, how will I know if there are health risks from drinking water in which these contaminants are not detected?](#)
 - [My water has measurable levels of PFOA, PFOS, GenX chemicals, and/or PFBS in it at levels above the health advisory:](#)
 - [Should I be concerned about my health?](#)
 - [Should I stop breastfeeding my infant?](#)
 - [Does bathing/showering with my tap water present a health risk?](#)
 - [Can PFOA, PFOS, GenX chemicals, or PFBS be boiled out of my water?](#)
 - [Should I drink bottled water?](#)

17. Why is the EPA collecting data on PFAS for which there isn't health effects information?

The Safe Drinking Water Act was amended by Section 7311 of the Fiscal Year 2020 National Defense Authorization Act (NDAA) to require that the EPA include all PFAS in UCMR 5 for which a drinking water method has been validated, and that are not subject to a National Primary Drinking Water Regulation (NPDWR). Therefore, UCMR 5 includes all 29 PFAS that are within the scope of EPA Methods 533 and 537.1.

18. What is the EPA doing to improve our understanding of PFAS without health effects information? Will the agency have more health effects information (i.e., toxicity values, reference concentrations) available by the time UCMR 5 monitoring is complete?

The EPA continues to assess the literature for health effects information, identify data gaps, and determine the need for future research to improve our understanding of the possible health risks associated with these contaminants in public drinking water. The [UCMR 5 Data Summary](#) will be updated as the agency completes health assessments on PFAS, such as through the Integrated Risk Information System (IRIS), and concludes the process of developing a final PFAS National Primary Drinking Water Regulation (NPDWR). Understanding where PFAS are present in drinking water, and at what levels, is also critical to taking steps to address these chemicals. Additionally, due to their widespread use and persistence, many PFAS are known to co-occur in drinking water and the environment—meaning that these compounds are often found together and in different combinations as mixtures. The agency’s evaluation of the best-available science indicates that mixtures of PFAS can pose a health risk greater than each chemical on its own. The data provided by UCMR 5 monitoring for 29 PFAS will help increase the EPA’s understanding of PFAS occurrence and co-occurrence in drinking water and help inform and prioritize research needs on the health effects of PFAS from drinking water. The EPA is continuing to develop and validate methods to detect and measure PFAS in the environment, including additional targeted methods for detecting and measuring specific PFAS, non-targeted methods for identifying unknown PFAS in the environment, and exploring “total PFAS” methods. Additionally, the EPA’s Office of Research and Development (ORD) is seeking input from science advisers on a new model to assess the toxicity of chemicals with little to no existing data, known as a [transcriptomic method](#).

19. What treatment technologies exist to remove PFAS from drinking water?

Proven technologies, including activated carbon, anion exchange, and high-pressure membranes, can remove PFAS and additional contaminants, such as disinfection byproducts, organic contaminants, certain heavy metals, and pesticides, from drinking water systems. These treatment technologies can be installed at a water system’s treatment plant and are also available as in-home filter options.

The EPA’s proposed PFAS drinking water regulation and related drinking water treatment supporting documents provide information on these treatment technologies that the agency has found effectively reduce PFAS. It may also be possible for water systems to reduce PFAS in their water by switching to other water supplies rather than through treatment.

Lithium in Drinking Water

20. [What are the environmental sources and uses of lithium?](#)

21. [Why is lithium included in UCMR 5 and what information is available?](#)
22. [What is the difference between an EPA health advisory \(for four of the PFAS\) and health reference level \(for lithium\)?](#)
23. [How can lithium be removed from drinking water?](#)

20. What are the environmental sources and uses of lithium?

Lithium is a naturally occurring metal in Earth's crust. Lithium may be found at higher concentrations in certain parts of the country, particularly in groundwater sources in arid locations in the Western U.S. Lithium has numerous commercial uses including as a pharmaceutical drug, an industrial chemical catalyst, a sanitizing agent for swimming pools and hot tubs, and increasingly as a component of batteries. Lithium is likely present in a variety of foods (such as cereal grains, leafy vegetables, and root crops), but it is not clear which foods may be significant sources of dietary lithium. There is currently no U.S. recommended dietary allowance for lithium.

21. Why is lithium included in UCMR 5 and what information is available?

Lithium is on the EPA's [Fifth Contaminant Candidate List \(CCL 5\)](#), a list of contaminants that are currently not subject to any proposed or promulgated National Primary Drinking Water Regulations (NPDWRs) but are known or anticipated to occur in public water systems (PWSs). Contaminants listed on the CCL may require future regulation under the Safe Drinking Water Act (SDWA). The EPA uses the CCL to identify priority contaminants for regulatory decision making and information collection needs. Lithium was selected for UCMR 5 through a contaminant prioritization process that considered expected or known occurrence in drinking water and the availability of health effects information. The UCMR 5 monitoring data for lithium will better inform research and determine whether the contaminant poses health risks to people through drinking water from PWSs. To learn more about the prioritization of lithium for UCMR 5, refer to the [Information Compendium for Contaminants](#).

The EPA does not currently have a health advisory for lithium in drinking water. However, the CCL program derived a health reference level (HRL) for screening purposes based on the EPA's provisional peer-reviewed toxicity value (PPRTV) assessment for lithium. HRLs are not final determinations about the level of a contaminant in drinking water that is necessary to protect any particular population. The HRL for lithium is based on adverse effects observed in patients administered lithium therapeutically. Lithium has been used in pharmaceuticals for decades to treat certain medical conditions. Despite the abundance of information on patients receiving lithium at therapeutic levels, there has historically been limited information available to

evaluate health risks in people at the levels associated with typical drinking water consumption. This is one of the reasons the EPA is choosing to monitor for the presence and levels of lithium in drinking water systems around the country. The science on lithium's effects on human health, and at what levels, is still evolving.

The EPA has developed a [Technical Fact Sheet: Lithium in Drinking Water \(pdf\)](#) (270.8 KB) to help Primacy Agencies interpret the UCMR 5 monitoring results, understand health risks based on available information, and respond to public inquiries. For more information, please refer to the EPA's provisional peer-reviewed toxicity value ([PPRTV](#)) assessment for lithium, the [CCL 5 supporting materials](#), and the [UCMR 5 Data Summary](#). The agency continues to review treatment literature and publish details regarding the removal efficiencies for various technology types via its [Drinking Water Treatability Database](#).

22. What is the difference between an EPA health advisory (for four of the PFAS) and health reference level (for lithium)?

[The EPA's lifetime health advisories](#) are non-enforceable and non-regulatory and identify levels to protect all people, including sensitive populations and life stages, from adverse health effects resulting from exposure throughout their lives to a contaminant in drinking water. The [Contaminant Candidate List \(CCL\) program](#) derives health reference levels (HRLs) for screening purposes using available data. HRLs are not final determinations about the level of a contaminant in drinking water that is necessary to protect any particular population and, in some cases, are derived prior to development of a complete exposure assessment. Lithium was selected for UCMR 5 to better inform research and determine whether the contaminant poses health risks to people through drinking water from public water systems. The science on lithium's effects on human health, and at what levels, is still evolving.

23. How can lithium be removed from drinking water?

Lithium cannot be removed by heating, boiling, or disinfecting water. Certain drinking water treatments can reduce lithium in drinking water. Available literature, based largely on bench- and pilot-scale research, suggests that ion exchange is effective for removing lithium from drinking water. Adsorption with novel media can also be effective. The EPA continues to review treatment literature and publish details regarding the removal efficiencies for various technology types via its [Drinking Water Treatability Database](#).

The U.S. Food and Drug Administration (FDA) has not established a standard for lithium in bottled water. The FDA bottled water resources are available on the [Bottled Water Everywhere: Keeping it Safe](#) webpage.

UCMR 5 Scope, Analytical Methods, and Contaminants

Monitoring Scope

Public water systems (PWSs) subject to UCMR 5 monitoring include:

- All community water systems (CWSs) and non-transient non-community water systems (NTNCWSs) serving more than 10,000 people (i.e., large systems)
- All CWSs and NTNCWSs serving 3,300 to 10,000 people, subject to availability of appropriations and sufficient laboratory capacity
- A representative sample of 800 CWSs or NTNCWSs serving fewer than 3,300 people
 - [PWS Types](#)

PWSs will collect samples for 29 per- and polyfluoroalkyl substances (PFAS) and lithium, during a 12-month period from January 2023 through December 2025. If the agency does not receive the appropriations needed in a given year, then a reduced number of small systems will perform monitoring. As the EPA finalizes its sampling design plan for each sample collection year, the agency will notify the participating small systems. The agency is undergoing its planning anticipating that necessary appropriations will become available.

The EPA continues to be responsible for all analytical costs associated with monitoring at systems serving 10,000 or fewer people. See table below for the monitoring design.

Table 1. UCMR 5 Monitoring Scope

System Size (# of people served)	System Participation in Monitoring for 30 Contaminants
Small Systems (fewer than 3,300)	800 randomly selected surface water (SW), ground water under the direct influence of surface water (GWUDI), mixed sources (MX), and ground water (GW) systems
Small Systems (3,300 – 10,000)	All SW, GWUDI, MX, and GW systems
Large Systems (10,001 and over)	All SW, GWUDI, MX, and GW systems

Contaminants and Analytical Methods

SDWA was amended by Section 7311 of the National Defense Authorization Act (NDAA) for Fiscal Year 2020. NDAA specifies that the EPA shall include all PFAS in UCMR 5 for which a drinking water method has been validated, and that are not subject to a National Primary Drinking Water Regulation. In addition to lithium, UCMR 5 includes all 29 PFAS that are within the scope of EPA Methods 533 and 537.1; see Table 2.

Table 2. Contaminants, Minimum Reporting Levels, Sampling Locations, and Analytical Methods

Twenty-nine Per- and Polyfluoroalkyl Substances

Contaminant	Chemical Abstract Service Registry Number (CASRN)	Minimum Reporting Level	Sample Point Location ¹	Analytical Methods ²
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	763051-92-9	0.005 µg/L	EPTDS	EPA Method 533
9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	756426-58-1	0.002 µg/L	EPTDS	EPA Method 533
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	0.003 µg/L	EPTDS	EPA Method 533
hexafluoropropylene oxide dimer acid (HFPO DA)	13252-13-6	0.005 µg/L	EPTDS	EPA Method 533
nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	151772-58-6	0.02 µg/L	EPTDS	EPA Method 533
perfluorobutanoic acid (PFBA)	375-22-4	0.005 µg/L	EPTDS	EPA Method 533
perfluorobutanesulfonic acid (PFBS)	375-73-5	0.003 µg/L	EPTDS	EPA Method 533
1H,1H, 2H, 2H-perfluorodecane sulfonic acid (8:2FTS)	39108-34-4	0.005 µg/L	EPTDS	EPA Method 533

Contaminant	Chemical Abstract Service Registry Number (CASRN)	Minimum Reporting Level	Sample Point Location¹	Analytical Methods²
perfluorodecanoic acid (PFDA)	335-76-2	0.003 µg/L	EPTDS	EPA Method 533
perfluorododecanoic acid (PFDoA)	307-55-1	0.003 µg/L	EPTDS	EPA Method 533
perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	113507-82-7	0.003 µg/L	EPTDS	EPA Method 533
perfluoroheptanesulfonic acid (PFHpS)	375-92-8	0.003 µg/L	EPTDS	EPA Method 533
perfluoroheptanoic acid (PFHpA)	375-85-9	0.003 µg/L	EPTDS	EPA Method 533
1H,1H, 2H, 2H-perfluorohexane sulfonic acid (4:2FTS)	757124-72-4	0.003 µg/L	EPTDS	EPA Method 533
perfluorohexanesulfonic acid (PFHxS)	355-46-4	0.003 µg/L	EPTDS	EPA Method 533
perfluorohexanoic acid (PFHxA)	307-24-4	0.003 µg/L	EPTDS	EPA Method 533
perfluoro-3-methoxypropanoic acid (PFMPA)	377-73-1	0.004 µg/L	EPTDS	EPA Method 533
perfluoro-4-methoxybutanoic acid (PFMBA)	863090-89-5	0.003 µg/L	EPTDS	EPA Method 533
perfluorononanoic acid (PFNA)	375-95-1	0.004 µg/L	EPTDS	EPA Method 533
1H,1H, 2H, 2H-perfluorooctane sulfonic acid (6:2FTS)	27619-97-2	0.005 µg/L	EPTDS	EPA Method 533

Contaminant	Chemical Abstract Service Registry Number (CASRN)	Minimum Reporting Level	Sample Point Location ¹	Analytical Methods ²
perfluorooctanesulfonic acid (PFOS)	1763-23-1	0.004 µg/L	EPTDS	EPA Method 533
perfluorooctanoic acid (PFOA)	335-67-1	0.004 µg/L	EPTDS	EPA Method 533
perfluoropentanoic acid (PFPeA)	2706-90-3	0.003 µg/L	EPTDS	EPA Method 533
perfluoropentanesulfonic acid (PFPeS)	2706-91-4	0.004 µg/L	EPTDS	EPA Method 533
perfluoroundecanoic acid (PFUnA)	2058-94-8	0.002 µg/L	EPTDS	EPA Method 533
N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	2991-50-6	0.005 µg/L	EPTDS	EPA Method 537.1
N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	2355-31-9	0.006 µg/L	EPTDS	EPA Method 537.1
perfluorotetradecanoic acid (PFTA)	376-06-7	0.008 µg/L	EPTDS	EPA Method 537.1
perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.007 µg/L	EPTDS	EPA Method 537.1

One Metal

Contaminant	Chemical Abstract Service Registry Number (CASRN)	Minimum Reporting Level	Sample Point Location ¹	Analytical Methods ²
lithium	7439-93-2	9 µg/L	EPTDS	EPA Method 200.7; SM 3120 B (2017); SM 3120 B-99 (1999); ASTM D1976-20

Notes

1. Sampling Location - Entry point to the distribution system (EPTDS)
2. EPA Analytical Methods
 - a. [EPA Method 533](#)
 - b. [EPA Method 537.1](#)
 - c. [EPA Method 200.7](#)

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