

# EPA's PFAS Strategic Roadmap: Three Years of Progress

November 2024



# Introduction

PFAS, the common term used for per- and polyfluoroalkyl substances, are an urgent threat to public health and the environment. Communities across the nation are discovering these chemicals in their air, land, and water. The science is clear: exposure to certain PFAS poses significant risks to human health, including cancer, even at very low levels. That's why, in 2021, EPA Administrator Michael Regan established the EPA Council on PFAS and multiple offices within the EPA developed the Agency's PFAS Strategic Roadmap. The Roadmap is our commitment to the American people to confront PFAS contamination head on—by following the science, leveraging all available tools and authorities, holding polluters accountable, and investing historic resources to protect communities. The Roadmap is structured around three overarching goals:

## RESTRICT

Pursuing a comprehensive approach to proactively prevent PFAS from entering air, land, and water at levels that can adversely impact human health and the environment.

## REMEDiate

Broadening and accelerating the cleanup of PFAS contamination to protect human health and ecological systems.

## RESEARCH

Investing in research, development, and innovation to increase understanding of PFAS methods, human health and environmental risks, and technologies.

In the Roadmap, the EPA committed to issuing an annual public report on progress toward the Agency's PFAS commitments. The EPA followed through on this commitment through progress reports in [November 2022](#) and [December 2023](#). This report synthesizes the Agency's progress addressing PFAS under the Biden-Harris Administration, and sets the stage for future priority actions to protect communities from PFAS.

The EPA acknowledged in 2021 that the Roadmap itself would not solve all of the nation's PFAS

challenges overnight, but that its actions would help turn the tide by harnessing the collective resources and authority across federal, Tribal, state, and local governments to empower meaningful action. Under the Biden-Harris Administration, under the PFAS Strategic Roadmap, and in coordination with federal partners in the [Interagency Policy Committee on PFAS](#), the EPA has taken unprecedented steps to safeguard human health and protect the environment from PFAS:

**Protecting Drinking Water:** Under the PFAS Roadmap, in April 2024, the EPA took a signature step to protect public health by [establishing](#) the first federal, legally enforceable drinking water standards for several PFAS individually and in mixtures. The EPA estimates the final rule will reduce PFAS exposure for approximately 100 million people and prevent thousands of premature deaths, tens of thousands of serious illnesses, including cancers and liver and heart impacts in adults, and immune and developmental impacts to infants and children. And since early 2021, the EPA has been undertaking the largest nationwide effort to understand the frequency that PFAS is found in drinking water, and at what levels, under the [fifth Unregulated Contaminant Monitoring Rule \(UCMR\)](#). Under this program, the EPA is collecting and making publicly available data on 29 different PFAS in drinking water at approximately 10,000 water systems. These data will help the Agency make determinations about future actions to protect public health under the Safe Drinking Water Act, as well as supporting water systems' implementation of the new PFAS standards.

**Cleaning Up PFAS Contamination:** Through science, policy, and regulation, the EPA has catalyzed the cleanup of PFAS contamination by federal agencies, states, and responsible parties to protect people, communities, and the environment. The EPA [finalized](#) the designation of PFOA and PFOS as hazardous substances under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, or Superfund) in 2024. Finalizing this critical regulatory tool enables the EPA to use cost recovery and enforcement authorities to address PFOA and PFOS releases, which ensures that polluters pay for investigations and cleanup. The EPA has continued to integrate peer-reviewed science into its site assessments and decision-making, [rescinding](#) outdated groundwater cleanup guidance for PFOA and PFOS in 2023 and continuing to update its



April 2024 - EPA Administrator Michael Regan, White House Council on Environmental Quality Chair Brenda Mallory, North Carolina Governor Roy Cooper, and state and community leaders in Fayetteville, NC to announce the first enforceable drinking water standards for certain PFAS.

contaminated [site screening level tables](#) with new final toxicity values for these and other PFAS. In April 2024, the EPA also synthesized significant new research and issued [updated guidance](#) that describes approaches for managing the destruction and disposal of PFAS-containing materials and recommends practices associated with these technologies that minimize PFAS releases to the environment. And in early 2024, the EPA laid the foundation for final PFAS action under the Resource Conservation and Recovery Act (RCRA) to [designate certain PFAS as hazardous constituents](#), ensuring that PFAS can be cleaned up at facilities that handle waste using RCRA corrective action. Through this work, the EPA has broadened and accelerated the cleanup of PFAS contamination to protect human health and ecological systems.

**Advancing Chemical Safety:** Since January 2021, the EPA has taken dozens of actions to harness the authorities of the Toxic Substances Control Act and other laws to protect people from PFAS and account for risks to vulnerable subpopulations, like children. For PFAS for which manufacture and processing has ceased, the EPA issued a Significant New Use Rule (SNUR) to prevent resumed manufacture or

processing of hundreds of [inactive PFAS](#) without a robust up-front EPA safety review. The EPA has also issued SNURs to ensure that existing protections imposed on submitters of PFAS through the EPA's Toxic Substances Control Act (TSCA) new chemicals program are more broadly applicable to all future manufacturers and processors of those chemicals. And to ensure adequate review of new PFAS, or chemicals not previously in commerce, the EPA [announced policy changes](#) in April 2021 and [proposed regulations](#) in May 2023 to close premarket review exemptions for PFAS and other persistent, bioaccumulative, and toxic chemicals. And to guide the EPA's review of new PFAS before they are made, the Agency [released a framework](#) in June 2023 to ensure rigor and consistency in its reviews, and, as necessary, to ensure these chemicals are effectively managed to protect against risk to people's health or the environment.

**Safeguarding our Waterways:** Since early 2021, the EPA has put critical building blocks in place for understanding and addressing PFAS in our nation's waters under the Clean Water Act. The EPA finalized two critical methods, EPA Methods [1621](#)

and [1633](#), for measuring PFAS in a range of different environmental media. The EPA released two sets of [recommendations](#) for how EPA Regions and states can use key Clean Water Act permitting authorities to collect information on PFAS discharges, consider and incorporate PFAS-reduction measures, and set technology-based effluent limits, with rules to be proposed that codify final analytical methods and require PFAS be disclosed in Clean Water Act permit applications. The EPA is working to propose the first-ever technology-based Effluent Limitations Guidelines for PFAS manufacturers, and expects proposed rules for metal finishers and landfills to follow. The EPA in October 2024 finalized recommended water quality criteria for the protection of aquatic life from the effects of PFOA and PFOS as well as water quality benchmarks for other PFAS, and [released](#) a recommended list of PFAS to monitor for in state and Tribal fish and shellfish advisory programs. And in the coming months, the EPA expects to release draft recommended water quality criteria for the protection of human health from the effects of several PFAS as well as a draft risk assessment of PFOA and PFOS in biosolids to inform future Clean Water Act steps.



*EPA scientist Sarah Kadlec performs experiments to evaluate the effect of PFOS and other substances on aquatic organisms. In October 2024, the EPA published Aquatic Life Criteria for certain PFAS.*

**Catalyzing Infrastructure Investments:** Just one month after Administrator Regan released the PFAS Strategic Roadmap, President Biden signed the Bipartisan Infrastructure Law (BIL). Through the BIL, the Biden-Harris Administration is supporting [transformational investments in our nation's water infrastructure](#) with an unprecedented more than \$50 billion to invest in drinking water and clean water infrastructure around the country. Of those funds, \$10 billion are dedicated to assist communities and water systems impacted by PFAS and other emerging contaminants, with billions more in general funds also available to support progress on PFAS. Many of the programs delivering this funding are part of the President's Justice40 Initiative, which sets the goal that 40% of the overall benefits of certain federal investments in climate, clean water, and other areas flow to disadvantaged communities that are marginalized by underinvestment and overburdened by [pollution](#). The BIL uses both existing and new EPA water finance programs to provide communities with funding for emerging contaminants, and more than half of that \$10 billion must be provided as grants or forgivable loans. This funding has provided a tremendous opportunity to advance the research and policy actions in the Roadmap with financial resources to protect people and the environment from PFAS contamination. These BIL investments are already helping communities from Tucson, AZ, to North Attleboro, MA, and from Yukatat, AK, to Darlington County, SC, to make transformative investments to protect drinking water, pilot wastewater capture solutions, and reduce PFAS levels in people and the environment.

**Pursuing Enforcement and Compliance:** PFAS contamination is personal for many communities across the country and has imposed significant costs on state and local governments, water systems, and individuals. Addressing and redressing decades of contamination by the manufacturers and users of these chemicals will rely on key actions the EPA has put in place during the last three years. The EPA's final designation of PFOA and PFOS as CERCLA hazardous substances is a centerpiece of this effort – enabling the EPA to use the full suite of available CERCLA authorities to address more contaminated sites, take earlier action, and expedite eventual cleanup. Additionally, the EPA's [PFAS Enforcement Discretion and Settlement Policy Under CERCLA](#) reinforces the EPA's laser focus on the significant

contributors to the PFAS contamination challenge – and not on entities where equitable factors do not support seeking response actions or costs under CERCLA, such as farms where biosolids are applied to the land, community water systems, or publicly owned treatment works. And the EPA’s addition of [Addressing Exposure to PFAS](#) as a National Enforcement and Compliance Initiative will ensure the Agency continues to build upon its goals to take enforcement actions to protect public health. For example, in November 2022, the EPA [announced](#) a Safe Drinking Water Act [emergency order](#) requiring 3M to sample, test, and treat the drinking water around its Cordova, Illinois, facility to address PFAS contamination.

**Advancing our Understanding of PFAS:** Data on PFAS are essential for improving our understanding of this large, diverse class of chemicals. As we learn more about the potential risks to human health and the environment from PFAS, we can do more – at all levels of government – to reduce these risks. Since 2021, the EPA has leveraged its research and regulatory programs to collect and generate more data on PFAS. This includes the EPA’s previously mentioned nationwide drinking water monitoring program, UCMR5; [finalizing a regulation](#) under TSCA that will generate the largest-ever dataset of PFAS manufactured and used in the United States; and significant improvements to Toxics Release Inventory PFAS reporting that have [eliminated exemptions](#) that previously allowed facilities to avoid reporting, by [regularly adding PFAS](#) to the TRI list as science evolves, and by proposing a rule in October 2024 that would require reporting on 16 individual PFAS and 15 categories of PFAS, representing over 100 individual PFAS. The EPA has leveraged its authorities under TSCA to develop, implement, and refine the Agency’s [National PFAS Testing Strategy](#), which is building the available information on categories of PFAS that lack adequate data to inform future decisions. And to provide a transparent and accessible resource to the public on PFAS manufacture, release, and occurrence, the EPA released its [PFAS Analytic Tools](#) in January 2023. These tools bring together multiple sources of information in one spot with mapping, charting, and filtering functions, allowing the public to see where testing has been done and what level of detections were measured. Finally, the Agency has continued to pursue a rigorous research agenda focused on developing new methods to detect PFAS in the

environment, advancing the science needed to assess the human health and environmental risks from PFAS, and testing technologies for reducing PFAS in the environment. Results from this research have already informed both federal and state actions on PFAS and will continue to serve as the scientific foundation for future decision-making.

**Reducing PFAS in Products and Purchasing:**

Reinforcing the EPA’s regulatory efforts to prevent PFAS releases to the environment, the EPA has taken significant action to reduce PFAS uses in commerce, in coordination with federal partners and complementing significant efforts by several states. Following through on Executive Order 14057 on federal sustainability, the EPA has developed and refined a number of [online resources](#) to educate purchasers and other users on which ecolabels and sustainability standards restrict or eliminate PFAS from their products. The EPA has ensured that its information and tools focus on removing PFAS as a class of chemicals rather than only a few chemicals at a time. The EPA has [removed PFAS](#) from the Safer Choice program’s Safer Chemical Ingredients List and is ensuring that PFAS are not intentionally added to Safer Choice-certified products. The EPA has taken action to [remove 12 PFAS](#) from the list of inert ingredients approved for use in nonfood pesticide products. And the EPA has taken significant steps alongside the General Services Administration (GSA) to ensure the most widely used procurement tools across the federal government – the largest consumer of goods and services in the world - are highlighting the products that do not contain PFAS. In addition, the EPA and GSA [successfully updated](#) GSA’s National Custodial specification to ensure all cleaning products being used to clean federal buildings do not contain PFAS.

# Key Accomplishments: 2024

## Protecting Drinking Water

Safe drinking water is fundamental to healthy people and thriving communities. For years, communities, states, and bipartisan leaders in Congress have called for the EPA to set nationwide drinking water standards for PFAS. In April 2024, Administrator Regan [announced](#) the first-ever, nationwide, legally enforceable drinking water standards for PFAS – the most significant action the EPA has taken on these ‘forever chemicals.’ The final rule will reduce PFAS exposure for approximately 100 million people, prevent thousands of deaths, and reduce tens of thousands of serious illnesses. In the final rule, the EPA established legally enforceable drinking water standards for several PFAS individually and in mixtures, including limits for five individual PFAS as well as limits on mixtures of any two or more of four PFAS. Decades of research shows that mixtures of different chemicals can have additive health effects, even if the individual chemicals are each present at low levels that may not be expected to result in health effects alone. The rule is achievable using a range of available technologies and approaches, and drinking water systems will have flexibility to determine the best solution for their community. The EPA will be working closely with state co-regulators in supporting water systems and local officials to implement this rule.

To help catalyze the infrastructure investments and public health protections in communities across the country, the EPA continues its work to implement the unprecedented funding provided in President Biden’s BIL. The BIL invests a total of \$9 billion to address emerging contaminants like PFAS in drinking water, and the EPA has announced \$6.2 billion of this funding to date. Coupled with the final rule in April 2024, the EPA announced [\\$1 billion of this funding](#) to address PFAS and other emerging contaminants in small or disadvantaged communities. Also in April, the EPA announced [Fiscal Year 2024 funding allocations](#) of almost \$1 billion for emerging contaminants work under the Drinking Water State Revolving Fund. In May 2024, the EPA also announced its [Fiscal Year 2024 funding allocations](#) for the EPA’s Tribal infrastructure financing programs for PFAS and other emerging contaminants, including more than \$35

million for drinking water and \$4.5 million for clean water. And in October 2024, the EPA announced [Fiscal Year 2025 allocations](#) of almost \$1 billion for emerging contaminants through the Drinking Water State Revolving Fund. The remaining \$2.8 billion in emerging contaminants funding through the Bipartisan Infrastructure Law will become available during FY 2025 and FY 2026.

In 2024, the EPA continued to release data collected under the fifth UCMR. Under the rule, more than 10,000 water systems are collecting data on 29 PFAS in drinking water to provide unprecedented data on national-level exposure to these PFAS. As of October 2024, the EPA has [released](#) six quarters of monitoring data, representing half of the total data expected from 2023-2025. UCMR monitoring is not only providing information for water systems and the public they serve, but will also enable the EPA, states, and the public to better understand potential disproportionate PFAS exposures in drinking water as data collection is completed. Looking further into the future, in February 2024 the EPA [requested comments](#) on monitoring approaches for the next round of unregulated contaminant monitoring (2028-2030), including total fluorine methods for drinking water.

## Cleaning Up PFAS Contamination

The EPA’s authorities under CERCLA and RCRA provide critical tools for cleaning up PFAS contamination and holding polluters accountable. In April 2024, the EPA [finalized](#) a critical final rule designating two PFAS—PFOA and PFOS, including their salts and structural isomers—as hazardous substances under CERCLA. This designation makes available CERCLA enforcement authority to compel potentially responsible parties to conduct or pay for cleanup of PFOA- or PFOS-contaminated sites and improves equities by transferring costs of cleaning up PFOA and PFOS from the Superfund, which has been historically funded by taxpayer dollars, to those responsible for contamination. In addition to the final rule, the EPA issued a separate [PFAS Enforcement Discretion and Settlement Policy Under CERCLA](#) that makes clear that the Agency will focus on holding responsible entities who significantly contributed to

the release of PFAS into the environment, including parties that manufactured PFAS or used PFAS in the manufacturing process, federal facilities, and other industrial parties.

Ensuring the appropriate management of PFAS-containing waste is also a critical EPA priority. In February 2024, the EPA proposed two rules under RCRA. In the first rule, the EPA [proposed](#) to amend its RCRA regulations to add nine PFAS, their salts and structural isomers, as hazardous constituents. These PFAS would be added to the list of substances identified for consideration in facility assessments and, where necessary, considered in any further investigation and cleanup through the corrective action process at hazardous waste treatment, storage, and disposal facilities. In the second rule, the EPA [proposed](#) to modify the definition of hazardous waste as it applies to cleanups at permitted hazardous waste facilities. This rule would ensure the EPA's regulations clearly reflect the EPA's and authorized states' authority to require cleanup of the full range of substances that RCRA intends. The EPA is currently reviewing public comments received on these proposed rules.

To inform PFAS cleanup decisions, the EPA has continued to update its [Regional Screening Level](#) and [Regional Removal Management](#) Level tables, which provide risk-based values that help the EPA determine if further attention is warranted or a removal is needed. In May 2024, the EPA made further updates

to these tables based on new final scientific values for PFOA and PFOS developed as part of the EPA's final PFAS drinking water regulation.

As the EPA's regulatory actions and complementary state and Tribal steps accelerate actions to remove PFAS from drinking water, clean up contaminated sites, and dispose of legacy PFAS-containing products like firefighting foam, stakeholders are increasingly seeking clarity about ways to safely destroy or dispose of PFAS-containing materials. In April 2024, the EPA reached a key milestone in this effort by [releasing updated interim guidance](#) on the destruction and disposal of PFAS-containing materials, building on an earlier document the Agency issued in 2020 and incorporating new peer reviewed science. The updated guidance reflects the latest, best available science to provide information that managers of PFAS wastes can use to evaluate the most appropriate destruction and disposal methods among those currently available. The guidance also recommends that decision-makers prioritize the use of destruction and disposal technologies that have a lower potential for environmental release, to better protect people and communities from PFAS exposures. The EPA launched an extended public comment period on the revised interim guidance and continues to communicate with stakeholders on how the Agency can continue to provide updates as regulations and research advance.



*The EPA and State of Washington presenting PFAS drinking water sampling results to residents of the West Plains Community near Spokane, WA.*

## Holding Polluters Accountable

The EPA has continued to prioritize holding polluters and other responsible parties accountable for their actions and for PFAS remediation efforts by using enforcement tools to identify and address PFAS releases. The EPA selected *Addressing Exposure to PFAS* as one of six [National Enforcement and Compliance Initiatives](#) for 2024-2027. In December 2023, the EPA [announced an agreement](#) with the Chemours Company to conduct sampling for PFAS contamination near the company's Washington Works facility, a well-known source of PFAS contamination for decades. Using the EPA's authorities under RCRA, the agreement requires the company to take samples and analyze soil, surface water, sediment, groundwater, and certain waste streams generated by the facility to collect information on known and potential PFAS contamination. This agreement will provide data to improve the Agency's understanding of the extent of PFAS contamination and how migration of PFAS contamination may impact communities.



*EPA inspectors collect samples of drinking water for PFAS analysis.*

The EPA has also continued to focus its enforcement efforts on identifying and responding to PFAS releases from federal facilities. In May 2024, the EPA issued a Safe Drinking Water Act [order](#) to the Department of the Air Force to ensure the Air Force meets its responsibilities for protecting drinking water supplies adjacent to the Tucson International Airport Area Superfund Site, including in communities with environmental justice concerns. And in July 2024, the EPA and the Department of the Army [announced](#) a joint project to conduct sampling and testing of private drinking water wells located near Army installations with known, significant PFAS contamination to address the presence of PFAS. This sampling effort initially focuses on nine priority Army installations and will provide critical data to ensure military families and the general public remain safe from exposure to PFAS potentially originating from these installations. This project builds on the EPA's regular sampling of private drinking water wells near military installations with known PFAS contamination to assess whether contamination has migrated off-site and potentially impacted nearby communities.

The EPA's designation of PFOA and PFOS as CERCLA hazardous substances provides the EPA with critical tools to improve transparency and accountability for PFAS cleanups. In developing the rule, the EPA heard concerns from stakeholders about how the Agency might use its CERCLA enforcement authorities or its CERCLA enforcement discretion. The EPA held two public listening sessions to seek input on concerns about enforcement under CERCLA for PFAS contamination. In April 2024, the EPA issued a PFAS Enforcement Discretion and Settlement Policy Under CERCLA that is consistent with the EPA's historical approach of developing and applying enforcement discretion policies that are effective, well-received by stakeholders, and have given the EPA the needed flexibility to offer liability comfort or protections when circumstances warrant. The PFAS Enforcement Discretion and Settlement Policy Under CERCLA makes clear that the EPA intends to focus its enforcement efforts on entities who significantly contributed to the release of PFAS into the environment, including parties that have manufactured PFAS or used PFAS in the manufacturing process, federal facilities, and other industrial parties. The EPA's PFAS Enforcement Discretion and Settlement Policy under CERCLA provides additional clarity on the Agency's intent not to pursue certain parties



where equitable factors do not support seeking response actions or costs under CERCLA, including, but not limited to, community water systems and publicly owned treatment works, municipal separate storm sewer systems, publicly owned/operated municipal solid waste landfills, publicly owned airports and local fire departments, and farms where biosolids are applied to the land.

## Enhancing Chemical Safety

In the PFAS Strategic Roadmap, the EPA committed to leveraging all of its authorities to restrict PFAS, and that begins with responsible use and management of these chemicals within the marketplace. The TSCA and Toxics Release Inventory (TRI) are foundational tools that the EPA uses to ensure the safety of chemicals in commerce, to collect information on PFAS, and to increase transparency so people know how and where these chemicals are being used and released. The EPA has continued to use these authorities to limit use when the Agency knows the use presents unreasonable risk, or when the EPA does not have sufficient information to ensure that unreasonable risks will not occur, including to potentially exposed or sensitive populations like children and older adults.

Over the last year, the EPA has continued to leverage TSCA and TRI to restrict PFAS and to provide additional information to the public. The EPA has continued to make progress on implementing the National PFAS Testing Strategy – announced concurrently with the PFAS Strategic Roadmap – including issuing additional test orders in [March 2024](#) requiring two companies to conduct testing on a chemical used in products and found in air and in biosolids, and in [October 2024](#) to five companies for a chemical used to manufacture plastics, resins, textiles, apparel, leather, and other chemicals. Information collected under these test orders will enable the EPA to build data on categories of PFAS and to take any necessary action to protect people and the environment. In August 2024, EPA scientists [published](#) a paper describing an approach for assigning individual PFAS to categories based on chemical structure and selecting one or more representative PFAS from a category for additional data collection. The EPA intends to use this updated approach to more than double the number of PFAS considered for data collection efforts under the National PFAS Testing Strategy.

The EPA has continued to take steps to ensure that potentially harmful PFAS receive robust EPA health and safety reviews. In January 2024, the EPA [finalized a rule](#) that prevents companies from starting or resuming the manufacture or processing of 329 PFAS that have not been made or used for many years without a complete EPA review and risk determination. In the past, these chemicals, known as “inactive PFAS,” may have been used without review in many industries and may also have been released into the environment. This action will ensure that the EPA can conduct a robust review of health and safety information to determine if any significant new use may present unreasonable risk to human health or the environment and that the EPA can put any necessary restrictions in place before the use could restart.

The EPA has also used its TSCA authorities to address the presence of specific PFAS formed during the fluorination of plastic containers, an issue first brought to the EPA’s attention in 2020. In February 2024, the EPA released a new method for detecting low levels of PFAS in the walls of plastic containers, allowing companies to test their containers before use and prevent further contamination. In July 2024, the EPA [granted a petition](#) submitted to the Agency by community groups, committing to promptly commence an appropriate proceeding under TSCA Section 6. On September 30, 2024, the EPA published a notice in the Federal Register [seeking additional data](#) on the prevalence of certain PFAS during the fluorination of certain plastic containers, as well as on the prevalence of fluorinated containers in the U.S., alternative processes, and risk management measures, to inform the Agency’s path forward with respect to regulation under TSCA section 6.

The 2016 amendments to TSCA strengthened the EPA’s gatekeeper role to ensure that the Agency can review the potential risks of new chemicals before they can enter U.S. commerce and, when necessary, require appropriate safeguards. Building on a [policy change](#) announced in April 2021 and [proposed regulations](#) in May 2023, the EPA is working to finalize regulations that, if finalized as proposed, would codify reforms to the TSCA new chemical review process to ensure that new PFAS are categorically ineligible for two exemptions to the full TSCA review process, which would ensure that new PFAS would go through the full robust safety review process before they can enter commerce. In carrying out these reviews,

the EPA also continues to implement the June 2023 framework to ensure consistency in the assessment of new PFAS and effective protections against risks to people's health and the environment.

In the last year, the EPA has further built on earlier progress to provide high-quality information to the public on PFAS releases under TRI. In January 2024, the EPA [announced](#) the addition of six additional PFAS to TRI for the 2024 reporting year. And in October 2024, the EPA [proposed](#) a rule to add 16 individual PFAS and 15 categories of PFAS – representing more than 100 individual chemicals – to TRI. These additions build on a final rule from October 2023 requiring reporting on listed PFAS even when present in small concentrations, resulting in a more complete picture of the releases and other waste management quantities for these chemicals.

Reducing the levels of PFAS in products is also a critical step toward restricting PFAS, and the EPA has taken significant steps toward providing additional information and resources on PFAS in products, and toward preventing PFAS nonessential uses. In January 2024, the EPA enhanced its online search tool for its [Recommendations of Specifications, Standards, and Ecolabels for Federal Purchasing](#) to highlight how standards and ecolabels address PFAS. Consistent with the federal government's goal to avoid procuring products containing any type of PFAS, the EPA's tool no longer highlights ecolabels or standards that only

address individual chemicals like PFOA or PFOS. And in April 2024, the EPA and the General Services Administration [announced](#) that GSA will be directing government contractors to purchase cleaning products for federal buildings that are free from PFAS. Currently, GSA's Public Buildings Service has more than 600 contracts for custodial services at more than 1,500 U.S. government-owned buildings at a cost of more than \$400 million per year. These steps by the EPA and GSA are critical to advancing the federal government's ongoing efforts to address PFAS in products and procurement and underscores federal agencies' accelerated priority to combat PFAS.

## Safeguarding Lakes, Rivers, and Other Waters

The Clean Water Act provides powerful tools for the EPA to turn off the tap for PFAS discharges to waterways and prevent contamination at its source. Key to these efforts are multi-laboratory-validated methods to detect PFAS in wastewater and other environmental media. In January 2024, the EPA finalized two Clean Water Act analytical methods that the EPA recommends be applied in Clean Water Act permits. Final [EPA Method 1633](#), validated in close coordination with the Department of Defense, tests for 40 PFAS in wastewater, surface water, groundwater, soil, biosolids, sediment, landfill leachate, and fish tissue. Final [EPA Method 1621](#) is used to determine



*EPA inspector Chelsea Dixon and team member collect samples of water for PFAS analysis near Nellis Air Force Base in Reno, NV.*

concentrations of organofluorines in wastewaters and surface waters. As a next step, the EPA expects to propose both methods for adoption in the Code of Federal Regulations (40 CFR Part 136), a necessary step for them to be nationally required for Clean Water Act use. In the coming months, the EPA also plans to propose a rule that would require PFAS data be reported as part of Clean Water Act permit applications.

In the coming months, the EPA expects to propose Effluent Limitations Guidelines for the PFAS manufacturing sector, which will establish nationally applicable technology-based standards on some of the largest sources of PFAS discharges to waterways. These standards, when finalized after considering public comments, will be the first of multiple rules that the EPA is developing to restrict PFAS discharges from metal finishers and from landfills. The EPA is also moving forward with a nationwide study of PFAS influent and sewage sludge at wastewater treatment facilities and is expecting to publish updates on its information collection request in the near future before beginning a two-year study effort. Through this study, the EPA plans to collect and analyze nationwide data on PFAS to wastewater treatment plants as well as PFAS in their influent, effluent, and in sewage sludge (biosolids).

In the PFAS Strategic Roadmap, the EPA identified a critical need to provide high-quality scientific information on the potential risks of PFOA and PFOS in biosolids that are, for example, land applied as a beneficial use. Biosolids, the solid material left over from the wastewater treatment process, can contain PFAS. When PFAS-contaminated biosolids are applied to agricultural fields as fertilizer, there is a potential for the contamination of crops and livestock and impacts to farmers' lives and livelihoods. The EPA regulates the disposal and use of biosolids under the Clean Water Act. In the coming months, the EPA expects to release a draft risk assessment for these two PFAS in biosolids to better characterize potential risks and to inform any appropriate future Clean Water Act decisions. As this longer-term effort proceeds, the EPA continues to coordinate closely with federal partners at the U.S. Department of Agriculture and the Food and Drug Administration, as well as with state and utility partners, to identify shorter term steps to use Clean Water Act authorities and other tools to reduce PFAS in biosolids and to communicate risks.

To emphasize the importance of partnership across levels of government, the EPA's Office of Water joined with state environmental and agricultural agency leaders to release a Statement of Principles for Managing PFAS in Biosolids to guide collaboration on the issue. And, recognizing the complexity of this aspect of PFAS, in 2023-2024 the EPA convened a working group of representatives from regulators and regulated entities across the wastewater, agriculture, and solid waste sectors to share knowledge and considerations for the management of PFAS in biosolids, with a summary report anticipated for release in the near future.

The EPA is also focused on protecting people and the environment from PFAS in fish, shellfish, and other aquatic life. In July 2024, the EPA [released updated recommendations](#) under the Clean Water Act for contaminants that states, Tribes, and territories should consider monitoring in locally caught, freshwater fish. With this announcement, the EPA suggested that states, Tribes, and territories monitor for twelve PFAS in these fish to help ensure that state and Tribal fish advisories consider the latest science. And in September 2024, the EPA published final, national recommended aquatic life criteria for PFOA and PFOS in freshwater under the Clean Water Act. The Agency also published acute freshwater benchmarks for eight additional PFAS that have limited data and acute benchmarks for PFOA and PFOS in estuarine and marine waters. States and authorized Tribes can adopt the EPA's final recommended criteria into their water quality standards and consider the EPA's aquatic life benchmarks in developing their water quality standards to protect against harmful effects of PFOA and PFOS on aquatic life.

## Strengthening the Scientific and Data Foundation

As the EPA has taken these tangible actions both upstream and downstream of the PFAS problem, the Agency has continued to pursue a rigorous scientific agenda to better characterize toxicities, understand exposure pathways, and identify new methods to treat and remediate PFAS pollution. Over the past year, EPA researchers published nearly 30 papers on PFAS in peer-reviewed scientific journals. These publications present new information on methods for measuring PFAS, human exposure to PFAS, human health and ecological effects of individual PFAS and PFAS

mixtures, treatment of PFAS-contaminated water, and destruction and disposal of PFAS-containing materials. The EPA also updated key data resources – including the EPA’s [Drinking Water Treatability Database](#), the [ECOTOX Knowledgebase](#), and the [CompTox Chemicals Dashboard](#) – to transparently share new information. As the EPA learns more about this class of chemicals, the Agency – and others – can do more to protect public health and the environment.

In the last year, the EPA continued its work to advance the science to assess human health and environmental risks from PFAS. In 2024, the EPA has continued to make progress in assessing PFAS under the Agency’s Integrated Risk Information System program, releasing a [final assessment](#) for perfluorodecanoic acid (PFDA) and a [draft assessment](#) for perfluorononanoic acid (PFNA) for public comment and peer review. Both assessments highlight the susceptibility of early lifestages to the health impacts of PFAS, relying on data demonstrating decreased birth weight in children exposed to PFAS in setting reference levels. Recognizing the time- and resource-intensive nature of traditional human health assessments, the EPA is also pursuing approaches for generating reference values for chemicals in a more timely way. In March 2024, the EPA released the first final assessment under the [EPA’s Transcriptomic Assessment Product \(ETAP\)](#). ETAP is a human health assessment that uses transcriptomics, which measures gene activity, to determine the amount of a chemical that alters normal biological processes. ETAP provides a reference value for the daily dose of a chemical where there is likely no appreciable human health risk and can provide this information for data-poor chemicals in a timeframe of months rather than years. The EPA’s [first final ETAP](#) provides such a value for perfluoro-3-methoxypropanoic acid (MOPA or PFMPA).

Given the environmental persistence and health impacts of PFAS, it is important to understand how these chemicals accumulate in agricultural plants and animals, potentially contaminating our food supply. The EPA, in partnership with the U.S. Department of Agriculture, announced more than \$15 million in grant funding in September 2024 to [ten institutions](#) for research to reduce PFAS exposure from food and protect our farmland and farming communities. Using the EPA’s funding, these community-engaged research projects will investigate topics including

how PFAS accumulates in crops and livestock; the effects of biosolids, compost and irrigation water on PFAS plant uptake and accumulation; and strategies to reduce the risks of PFAS contamination in the food supply.

Finally, EPA-funded research played a key role in the Agency’s updated interim guidance on PFAS destruction and disposal. EPA researchers used the Agency’s Rainbow furnace to conduct [pilot-scale studies](#) that provided important insight into the conditions needed to fully destroy PFAS via thermal treatment. EPA researchers also authored scientific reviews of [PFAS in combustion-based thermal waste systems](#) and [PFAS in landfills](#). The scientific review of PFAS in landfills was informed by work funded by the EPA in 2019 to [identify practical methods to analyze and treat PFAS in solid waste, landfills, wastewater/leachates, soils, and groundwater to protect human health and the environment](#). Additionally, the EPA released [Other Test Method \(OTM\) 50](#), which measures 30 volatile fluorinated compounds in air, and an update to [OTM-45](#). The EPA’s updated interim PFAS destruction and disposal guidance recommends the use of OTM-50 to help collect more data and reduce uncertainty concerning products of incomplete combustion from the thermal treatment of PFAS-containing materials.



*EPA researcher Erin Shields testing at the "Rainbow furnace," the EPA's innovative, pilot-scale tunnel incinerator, designed to test the effectiveness of PFAS destruction by incineration.*

# Partnerships for Progress

Critical to the EPA's success under the PFAS Strategic Roadmap have been the partnerships with states, Tribes, and other federal agencies in the Biden-Harris Administration.

## States and Tribes

Through the actions outlined in the PFAS Roadmap, the EPA is providing federal leadership on PFAS, most significantly through the EPA's final PFAS drinking water standard. At the same time, the EPA has sought to support states' ongoing efforts to tackle PFAS by building critical science, methods, tools, and technologies. Many states have been taking strong action for years to characterize PFAS contamination, set enforceable or non-enforceable health-based standards, and to hold polluters accountable. In the past few years, several states have taken their focus fully upstream of the PFAS problem by enacting legislation to require data collection on the presence of PFAS in products and to prohibit PFAS in certain nonessential products and uses.

In the course of implementing the Roadmap, the EPA has partnered closely with states on a number of key areas through the formation of a state-EPA leadership workgroup to enhance coordination, information-sharing, and a wide range of PFAS issues impacting states and the EPA. Outcomes of this collaborative approach include a workshop on risk communications, the previously-mentioned [principles](#) on managing PFAS in biosolids, and efforts to better characterize the effectiveness of PFAS destruction technologies.

Over the course of the Roadmap's implementation, examples of collaboration to advance progress on PFAS across states and EPA regional offices and researchers include:

- Continued PFAS monitoring in surface waters and fish in the Great Lakes.
- Work with the Michigan agencies to investigate PFAS at RCRA sites, identifying data gaps and developing and implementing sampling plans at several sites in the state.

- Collaboration with California, Maine, Minnesota, and Maryland to overcome barriers to non-targeted analysis of PFAS samples and develop best practices for broadening its use.
- Partnering with the state of Washington to better understand groundwater contamination and support impacted communities.

Strengthening public health and environmental protection from PFAS in Indian country has been a particular priority for the EPA. Informed by ongoing dialogue with the [Tribal PFAS Working Group](#), an April 2023 [listening session](#) for Tribal partners, one-on-one support and technical assistance, and formal government-to-government consultation, the EPA has provided technical assistance, infrastructure funding, and other support to Tribal communities to better understand and address PFAS. EPA researchers have collaborated on projects with Tribal partners focused on identifying and characterizing the extent of PFAS contamination in water, sediment, fish, and plants near Tribal communities. Several EPA Regions have used Safe Drinking Water Act funding to [conduct sampling at Tribal public water systems](#) on a voluntary basis to better understand the prevalence of PFAS in these systems. Under BIL, the EPA is investing unprecedented funding to support drinking water and wastewater infrastructure in Tribal communities, including [more than \\$35 million](#) in Fiscal Year 2024. And the EPA has taken a number of actions directly responsive to Tribal concerns, including [recommendations](#) for which PFAS to monitor for in fish and shellfish advisory programs; awarding research grants to support an improved understanding of PFAS accumulation in finfish and shellfish species in Tribal regions of Northeastern Maine and how PFAS contamination may spread to native plants of cultural importance to Tribes; and releasing the [PFAS Analytic Tools](#) to better enable Tribal communities to evaluate their exposure to PFAS.

## Federal Partners

Alongside the EPA's October 2021 PFAS Strategic Roadmap, the White House Council on Environmental Quality [launched](#) the first cross-government Interagency Policy Committee on PFAS to share information and collaborate on new policy strategies to support research, remediation, and removal

of PFAS in communities across the nation. The EPA has played a leadership role in interagency efforts to accelerate PFAS cleanup, prevent PFAS contamination in the food system, address PFAS in federal procurement, and better understand PFAS in supply chains for potentially critical or essential uses. The White House published a [March 2023 report](#) highlighting coordinated progress by the Biden-Harris Administration under the Interagency Policy Committee on PFAS. And the EPA has coordinated closely with its federal partners on key technical and policy actions, such as the Department of Defense on validating [final EPA Method 1633](#), the General Services Administration on [removing PFAS from federal custodial contracts](#), and the Federal Aviation Administration on developing a [fluorine-free foam transition plan](#) for aircraft firefighting.

The EPA has also contributed to critical interagency federal research efforts on PFAS through the interagency PFAS research and development strategy team, coordinated by the White House Office of Science and Technology Policy. The strategy team published a [March 2023 report](#) summarizing PFAS research in key strategic areas, including safe removal and destruction of PFAS and alternatives to PFAS that are safer, as well as gaps in PFAS data and knowledge. And in September 2024, the strategy team published a [Federal Research and Development Strategic Plan](#) that lays out actions that federal agencies can take to address PFAS research needs.

## Looking Back and Leaning Forward

In the PFAS Strategic Roadmap, the EPA outlined five principles to guide the Agency's approach to addressing the unique challenges presented by PFAS contamination. As the EPA recognizes the actions it has taken over the last several years, it also acknowledges the efforts that will continue in the months and years ahead, and considers new areas of focus. Those principles and areas for future progress include:

*Consider the lifecycle of PFAS: The EPA will account for the full lifecycle of PFAS, their unique properties, the ubiquity of their uses, and the multiple pathways for exposure.*

The Roadmap's holistic focus on restricting, remediating, and researching PFAS acknowledged the challenging lifecycle of PFAS and need for the EPA to leverage the full range of its authorities to tackle the PFAS problem. The persistence of these 'forever chemicals' means that taking action to reduce them in one environmental media – for example, water – may create challenges in others – for example, biosolid waste. That's why actions like revised destruction and disposal guidance and the EPA's upcoming biosolids draft risk assessment are critical to help answer scientific questions and ensure public health and environmental protection. Looking forward, the EPA will need to further strengthen its focus on destruction and disposal issues to address PFAS-containing materials and to sustain growing interest in researching, developing, and deploying innovative technologies to remove PFAS from the environment and effectively destroy them without introducing additional contamination concerns. The EPA will also need to continue its scientific and policy efforts to understand particularly challenging, multi-media problems like PFAS in biosolids, which can involve complex interrelationships between wastewater treatment facilities, landfills, industrial dischargers, farmers, and the public.

*Get upstream of the problem: The EPA will bring deeper focus to preventing PFAS from entering the environment in the first place—a foundational step to reducing the exposure and potential risks of future PFAS contamination.*

The EPA has brought deeper focus to restricting PFAS before they can cause contamination, including by imposing restrictions under TSCA on 'legacy' PFAS and by eliminating exemptions for new PFAS from robust EPA health and safety reviews. The EPA has also leveraged its Clean Water Act authorities through permitting and is poised to release technology-based effluent guidelines for the most significant categories of industrial PFAS dischargers. Going beyond the commitments in the Roadmap, the EPA has leveraged its leadership role in federal procurement by supporting Biden-Harris Administration efforts to restrict PFAS in products purchased by the federal government. As powerful state efforts to gather data on the presence of PFAS in products advance, and as the EPA's data collection under the TSCA PFAS reporting rule commences, the EPA, states, federal partners, and the public will have a better

evidence base than ever before to continue efforts to restrict PFAS nonessential uses as necessary and to ensure that PFAS are used responsibly where those uses must continue. The EPA will continue to implement its Roadmap commitment to build the technical foundation to address PFAS in air emissions, exploring opportunities to share data and approaches with state co-regulators to better understand and help address these upstream sources of PFAS pollution.

Hold polluters accountable: *The EPA will seek to hold polluters and other responsible parties accountable for their actions and for PFAS remediation efforts.*

Communities across the country are confronting the challenge of PFAS contamination that affects their lives and livelihoods. Catalyzed by regulatory actions by the EPA and states, and bolstered by unprecedented water infrastructure investments for PFAS in the BIL, communities are accelerating efforts to clean up PFAS contamination, install treatment technologies, and save lives. But the EPA believes – and communities know – that the costs of cleaning up PFAS contamination should be borne by those who significantly contributed to that contamination, not by communities. The EPA’s CERCLA regulations will help the agency to recover costs expended to clean up PFOA and PFOS contamination, which together with the agency’s enforcement discretion policy will help hold responsible entities who significantly contributed to the release of PFAS into the environment and support and sustain communities struggling with a PFAS burden they did not create. The EPA has continued to take action under the Addressing Exposure to PFAS National Enforcement and Compliance Initiative, which focuses on holding responsible those who significantly contribute to the release of PFAS into the environment, such as major manufacturers and users of manufactured PFAS, federal facilities that are significant sources of PFAS, and other industrial parties. By implementing the CERCLA designation, exploring additional designations, prioritizing PFAS in enforcement and compliance assurance, taking site-specific enforcement actions, and finalizing additional requirements like effluent guidelines, the EPA will continue to ensure that polluters and other responsible parties assume responsibility for remediation efforts and prevent future releases.

Ensure science-based decision-making: *The EPA will invest in scientific research to fill gaps in understanding of PFAS, to identify which additional PFAS may pose human health and ecological risks at which exposure levels, and to develop methods to test, measure, remove, and destroy them.*

Science forms the backbone of the actions discussed in the PFAS Roadmap, and science has played a foundational role in each of the EPA’s regulatory and policy actions on PFAS. The EPA’s final PFAS National Primary Drinking Water Regulation represents data-driven drinking water standards that are based on the best-available science and meet the requirements of SDWA. In developing limits for these PFAS, the EPA considered PFAS health effects information, evidence supporting dose-additive health concerns from co-occurring PFAS, as well as national and state data for the levels of multiple PFAS in finished drinking water. Similarly, EPA research and science were foundational to the Agency’s 2024 updates to interim guidance on PFAS destruction and disposal – evaluating the available science on PFAS in landfills and providing critical data on PFAS thermal treatment. Looking ahead, science will continue to guide the Agency’s work on PFAS, from better understanding the potential for PFAS transport in air, to evaluating less-studied PFAS exposure pathways like inhalation or through skin, to building on the categorization approaches in the EPA’s National PFAS Testing Strategy to evaluate how to best understand and address PFAS in groups and categories, not just one at a time.

Prioritize protection of disadvantaged communities: *When taking action on PFAS, the EPA will ensure that communities experiencing disproportionate and adverse human health or environmental burdens have equitable access to solutions.*

As discussed in the Roadmap, the EPA has worked to develop the data and tools needed to identify and protect overburdened communities and vulnerable populations that may be disproportionately impacted by PFAS contamination. Fulfilling a recommendation from the National Environmental Justice Advisory Council, the EPA engaged with thousands of individuals across the country in early 2023 to learn about how PFAS and other sources of pollution are impacting communities with environmental justice concerns. The EPA has taken significant steps toward gathering and sharing data on how PFAS

impacts communities, including publicly releasing the PFAS Analytic Tools and working to complete nationwide drinking water monitoring for 29 PFAS at more than 10,000 public water systems. These and other data will be critical to better understand and address the potential disproportionate impacts of this contamination. The EPA launched a new program to distribute \$5 billion in funding under BIL to address PFAS in drinking water in small or disadvantaged communities. As the EPA considers future action on PFAS, the EPA will be guided by the National Environmental Justice Advisory Council's encouragement to focus on assisting communities in responding to PFAS contamination and ensuring that the EPA provides the necessary resources for engagement and education.

As the EPA noted in the PFAS Strategic Roadmap, the actions the EPA outlines in the Roadmap are not the only actions underway at the EPA, nor will they be the last. As the EPA learns more about the family of PFAS chemicals, the Agency can do more to protect public health and the environment. As the EPA continues to build the evidence base, as regulatory work matures, and as the EPA learns more from its partnerships across the country, the Agency will deliver additional actions commensurate with the urgency and scale of response that the PFAS problem demands.

## Conclusion

Since releasing its PFAS Strategic Roadmap three years ago, the EPA has delivered on essential policies, investments, and research to protect all people and the environment from the harms associated with PFAS. With agencies across the Biden-Harris Administration, the EPA has led efforts to provide national leadership, restore scientific integrity, and accelerate efforts at every level of government to tackle PFAS. That progress provides a critical foundation of principles, knowledge, tools, and resources upon which the Agency will continue to build for years to come.

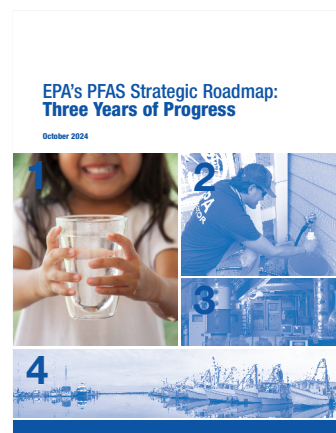
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