



# EPA Activities on Per- and Polyfluoroalkyl Substances (PFAS)

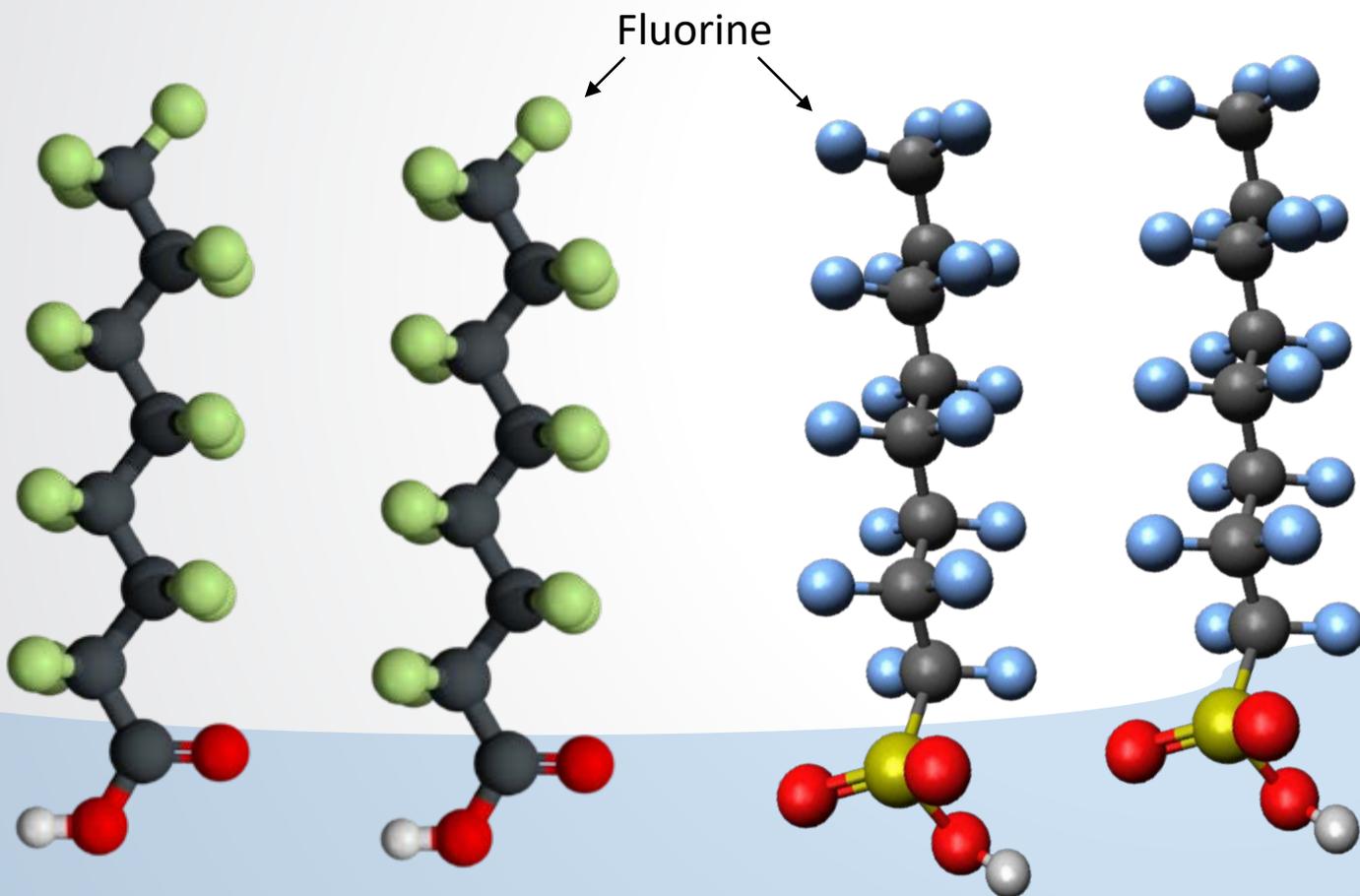
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U.S. Environmental Protection Agency

- What are Per- and Polyfluoroalkyl Substances (PFAS)?
- How are PFAS used?
- What is EPA doing about it?

➤ **A class of man-made chemicals**

- Chains of carbon (C) atoms surrounded by fluorine (F) atoms
  - Water-repellent (hydrophobic)
  - Stable C-F bond
- Some PFAS include oxygen, hydrogen, sulfur and/or nitrogen atoms, creating a polar end

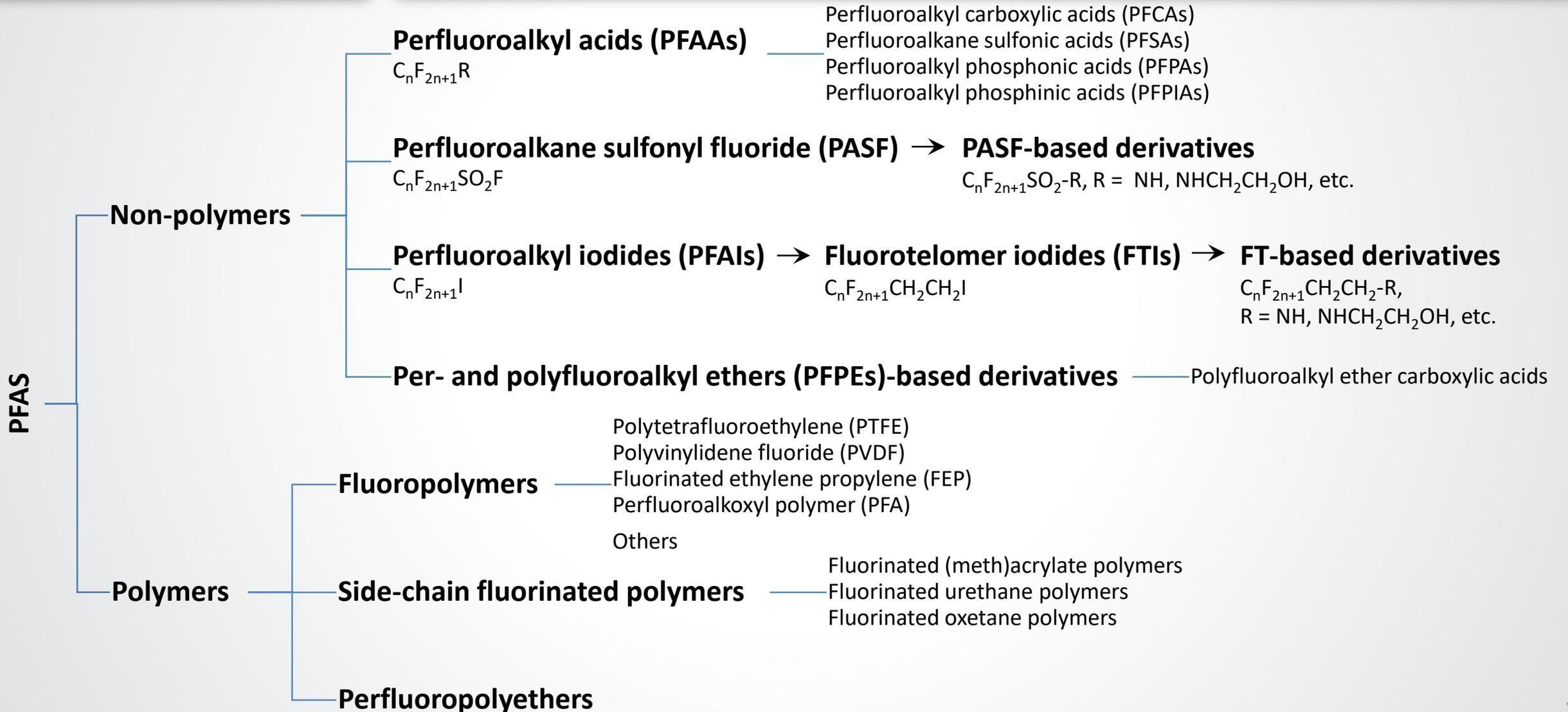


*Perfluorooctanoic acid (PFOA)*

*Perfluorooctanesulfonic acid (PFOS)*



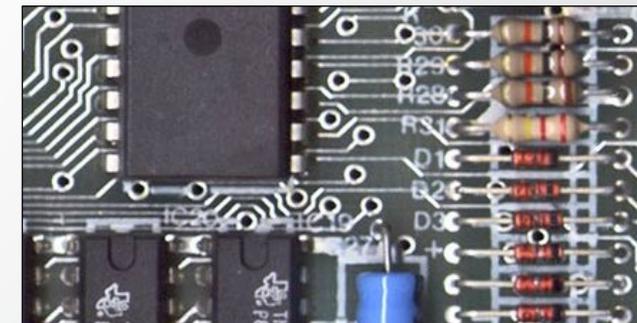
# Thousands of Chemicals: More Than Just PFOA and PFOS





# Used in Homes, Businesses & Industry

- Food contact surfaces such as cookware, pizza boxes, fast food wrappers, popcorn bags, etc.
- Polishes, waxes, and paints
- Stain repellants for carpets, clothing, upholstered furniture, etc.
- Cleaning products
- Dust suppression for chrome plating
- Electronics manufacturing
- Oil and mining for enhanced recovery
- Performance chemicals such as hydraulic fluid, fuel additives, etc.



# Sources of PFAS in the Environment



- Direct release of PFAS or PFAS products into the environment
  - Use of aqueous film forming foam (AFFF) in training and emergency response
  - Release from industrial facility
- Chrome plating and etching facilities
- Landfills and leachates from disposal of consumer and industrial products containing PFAS
- Wastewater treatment effluent and land application of biosolids

# Reasons for Concern

- Known or suspected toxicity
- PFAS and/or breakdown products are persistent in the environment
- Persistence in biota vary greatly across PFASs and species
- Used by a variety of industries
- Found in a variety of consumer products
- Most people have been exposed to PFAS





# EPA's Current PFAS Activities

- **Issues related to PFAS involve most EPA Programs and Regions**
  
- **Four broad goals:**
  - Fill data gaps related to human health toxicity to inform public concerns and risk mitigation
  - Establish validated methods for measuring many PFAS in different media
  - Reduce environmental exposures
  - Assure accurate and timely risk communications



# EPA's PFAS Coordinating Committee

- **EPA announced cross-Agency effort to address PFAS in December 2017**
- **Focus on near-term actions to support states, tribes and local communities, including:**
  - Fill data gaps related to toxicity of additional PFAS compounds
  - Develop analytical methods to expand the capacity for analysis of PFAS compounds in drinking water and other contaminated media
  - Provide treatability information for PFAS compounds in contaminated media
  - Expand tools for proactive risk communication with communities impacted by PFAS compounds
- **EPA's Office of Water is leading these efforts**
  - Includes members from EPA's air, chemicals, land, water, enforcement, and research offices as well as EPA regions to enhance cooperation with partners at the state and local level



# Current PFAS Activities in Water

- **Published Drinking Water Health Advisories (HA) in 2016 for PFOA and PFOS**
  - HAs are non-regulatory information for federal, state and local officials to consider when addressing drinking water contamination
  - Identified 0.07 µg/L (70 ppt) as the HA level for PFOA and PFOS combined and provided information about treatment and monitoring
  
- **Evaluating PFOA and PFOS for regulatory determination under the Safe Drinking Water Act (SDWA)**
  - PFOA and PFOS are on the fourth Contaminant Candidate List (CCL 4) published in November 2016. OW is assessing PFOA and PFOS against the three SDWA regulatory determination criteria
    - *May have an adverse effect on the health of persons*
    - *Is known to occur or there is a substantial likelihood that it will occur in public water systems with a frequency and at levels of public health concern*
    - *In the sole judgment of the Administrator, regulating the contaminant presents a meaningful opportunity for health risk reductions for persons served by public water systems*
  - From 2013 to 2015, EPA collected nationally representative data on the occurrence of six PFAS in public water systems (including PFOA and PFOS)



# Current PFAS Activities for Waste Sites

## ➤ **EPA Federal Facility Superfund Program**

- Actively engaged PFAS activities at 58 Federal Facility NPL Sites
- It is anticipated that this number will grow since there are known or suspected contaminations of PFAS at many of the 140 DoD Federal Facility NPL Sites
- PFAS detections in groundwater range from non-detect (based on analytical method limitations) or slightly exceeding the Drinking Water Health Advisory of 70 ppt (PFOA and PFOS combined) to 2,000,000 ppt
- Drinking water has been potentially impacted at 22 of these Federal Facility NPL sites

## ➤ **Office of Superfund Remediation and Technology Innovation (OSRTI)**

- 29 known impacted non-Federal NPL sites
- 100s of potential NPL sites (e.g., 100 metal plating sites, 300 landfills)

## ➤ **Regional Assistance**

- OLEM offices hold site-specific consultations with EPA Regions on investigations of PFAS contamination
- OSRTI/FFRRO provides ongoing technical assistance on PFAS issues and also coordinates with the Regions on their needs and priorities on PFAS issues
- Develop cleanup recommendations for PFOA/PFOS contaminated groundwater



# Current PFAS Activities in Chemical Use

## ➤ PFOA Stewardship Program

- Eight companies participated in the program and successfully eliminated production of PFOA
- Resulted in phase-out of PFOA and related PFAS, including potential PFOA precursors, by these companies by the end of 2015

## ➤ EPA's New Chemicals Program

- Since 2000 have reviewed hundreds of pre-market alternatives for PFOA and related chemicals
- Most were approved with restrictions and data-generation requirements

## ➤ Significant New Use Rule (SNUR)

- Proposed on January 21, 2015, to require manufacturers, importers, and processors of PFOA and related chemicals (including as part of articles), to notify EPA at least 90 days before starting or resuming new uses of these chemicals in any products
- Notification provides EPA opportunity to conduct risk assessment/management for the new use

## ➤ Gen X

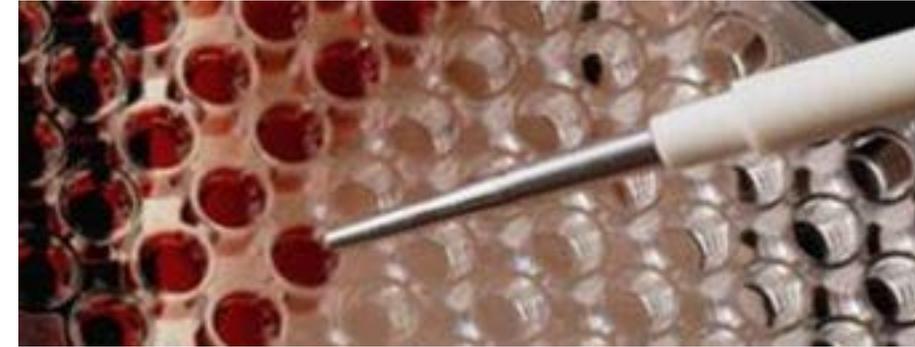
- Determining the need to revise the GenX risk assessment originally done for its pre-market approval, based on data received by the company and other information arising from the NC situation



# Current PFAS Research Activities

## ➤ Human Health/Toxicity

- Understand human health toxicity
- Inform risk mitigation activities
- Chemical library and high throughput toxicity testing



## ➤ Analytical Methods

- Establish validated methods for measuring PFAS in different environmental media

## ➤ Site Characterization/Exposure

- Develop sampling methods to characterize sources and contaminated sites
- Identify and estimate human exposure to PFAS from different sources



## ➤ Treatment/Remediation

- Identify/evaluate methods to reduce PFAS exposures
- Identify/evaluate methods to treat and remediate drinking water and contaminated sites





# Research: Human Health/Toxicity

- **Problem:** Lack of toxicity data for many PFAS compounds
- **Action:**
  - Literature review of published toxicity data for 31 PFAS of interest to EPA
  - Build PFAS chemicals standards repository for testing
  - Conduct additional assessments and work to address knowledge gaps through computational toxicology and rapid/high-throughput screening
- **Results:**
  - Literature review complete, ~21 PFAS with some in vivo data to support assessment
  - Standards repository in place (approaching 300 PFAS chemicals)
  - Toxicity assessment underway for GenX and PFBS
  - Potential additional PFAS toxicity assessments
  - Tier 1 computational assays underway for 75 PFAS representative of PFAS chemical space
- **Impact:** Provide timely results useful for risk communication and management decisions at affected sites



# Research: Analytical Methods

- **Problem:** Lack of standardized/validated analytical methods for many PFAS analytes (especially short chain), and in media other than drinking water
- **Action:** Perform multi-laboratory validations for analytical methods for (1) non-drinking water samples and solids (SW-846 Methods for facility or site investigation and remediation), (2) additional PFAS analytes for drinking water samples, and (3) methods for sampling air stack emissions
- **Results:**
  - Draft SW-846 Direct Injection analytical method external validation study underway
  - Draft SW-846 Method for Isotope Dilution procedure for non-drinking waters and solids in review. This method will address Department of Defense (DoD) analytical requirements for PFAS
  - EPA Method 537 work to include GenX
  - Draft SW-846 Method for solids in review
  - Method development for short-chained PFECAs (GenX, ADONA) in drinking water underway
  - Pilot test of air emission sampling methods underway in NH and NC
- **Impact:** Provide standardized analytical guidance for meeting a variety of site investigation and remediation needs



# Research: Site Characterization/Exposure

- **Problem:** Knowledge gaps on sources and exposure and site-specific concentrations of PFAS compounds
- **Action:** Develop methods for sampling and analysis to characterize PFAS contaminants
- **Results:**
  - Develop non-targeted analysis (NTA) methods for qualitatively/semi-quantitatively assessing the types of PFAS (including PFAS precursors) in environmental samples
  - Develop sampling and analytical methods to characterize contaminated sites (chemical production facilities, chrome plating/etching, AFFF sites, wastewater, landfills, etc.)
  - Develop exposure models for identifying pathways for PFAS to human and ecological receptors
- **Impact:** Provide stakeholders with new methods to assess site contamination and potential exposure to PFAS



# Research: Treatment/Remediation

- **Problem:** PFAS contamination of soil, groundwater, and drinking water contamination
- **Action:** Conduct research on treatment technologies and processes for managing PFAS in air, soil, groundwater, and drinking water
- **Results:**
  - Bench-, pilot- and full-scale research on activated carbon and ion exchange technologies for the removal of PFAS from drinking water and groundwater
  - Update EPA's Drinking Water Treatability Database to expand to PFAS other than PFOA/PFOS and include cost models for treatment technologies
  - Evaluating technologies for developing treatment trains to manage the risk of PFAS and associated co-contaminants in collaboration with DoD, WRF, industry, and academia
- **Impact:** Improved treatment strategies for removing PFAS from drinking water and manage PFAS sources



# External Research Coordination and Collaboration

## ➤ **Collaboration with States and Tribes**

- Engaging Environmental Council of States (ECOS) on multiple fronts, sharing briefings and sharing information about toxicity value development
- Exchanging information with the Environmental Research Institute of States (ERIS) and the Interstate Technology and Regulatory Council (ITRC)

## ➤ **Collaboration with federal partners**

- Co lead (with DoD and NIEHS) of recent Federal Information Exchange meeting on PFAS R&D
- Collaborating in human health effects R&D with NIEHS/NTP
- Coordinating with ATSDR on toxicity value development under an existing MOU
- Engaging with multiple federal stakeholders (DoD, NASA, USDA, FDA, others) on toxicity value determination
- Actively participating in DoD funded research focused on treatment and remediation



# PFAS Activities with State Partners

## EPA-ECOS-ASTHO Memorandum of Agreement

### **Communicating the Risks of PFAS: State Case Studies and Toolkits**

US EPA ORD is funding a project with the **Environmental Council of States (ECOS)** and the **Association of State and Territorial Health Officials (ASTHO)**. ECOS and ASTHO are compiling case studies as fact sheets, consisting of interviews and findings, with the goal to better understand how these state agencies manage their PFAS risk communication to the public.

#### • **Expected Outputs:**

- Report on existing risk communication toolkits
- ECOS states for PFAS state case studies (PA, MI and NH); ASTHO states (CO, MN and NY)
- Webinar showcasing PFAS state case studies and risk communication strategies (June 2018)

#### • **Expected Outcomes:**

- Improve public health, due to a greater awareness of PFAS risks
- Build diverse public health and environmental partnerships with states and their communities
- Increase understanding of state practices and experiences around PFAS risk communication strategies



# EPA's PFAS National Leadership Summit

- **Included representatives from over 40 states, tribes, and territories; 20 federal agencies; congressional staff; associations; industry groups; and non-governmental organizations.**
- **EPA provided the opportunity for the public to join in a portion of the meeting via streaming online and is asking the public to send written input to EPA**
  - visit <https://www.regulations.gov/> enter docket number: [OW-2018-0270](#)
- **During EPA's PFAS National Leadership Summit, participants worked together to:**
  - Share information on ongoing efforts to identify PFAS in communities and characterize risks from PFAS
  - Identify specific near-term actions, beyond those already underway, that are needed to address challenges currently facing states and local communities
  - Develop risk communication strategies that will help communities to address public concerns with PFAS



# EPA's PFAS Summit/Engagement

- **Administrator Pruitt announced four actions EPA will take following the summit:**
  - EPA will initiate steps to evaluate the need for a maximum contaminant level (MCL) for PFOA and PFOS.
  - EPA is beginning the necessary steps to propose designating PFOA and PFOS as “hazardous substances” through one of the available statutory mechanisms, including potentially CERCLA Section 102.
  - EPA is currently developing groundwater cleanup recommendations for PFOA and PFOS at contaminated sites and will complete this task by fall of this year.
  - EPA is taking action in close collaboration with our federal and state partners to develop toxicity values for GenX and PFBS by this summer.
- **EPA's Community Engagement**
  - Following the summit, EPA will travel to states with communities impacted by PFAS to further engage on ways the agency can best support work occurring at state, local and tribal levels
- **EPA plans to develop a PFAS Management Plan using information gained from the Summit, community engagements and information provided by the public.**



# Contacts

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