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Per- and Polyfluoroalkyl Substances (PFAS)

Learn about a group of contaminants in the environment called Per- and polyfluoroalkyl substances (PFAS). Find out where they have been found and what Massachusetts is doing to address them.

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What are PFAS and why are they a problem?

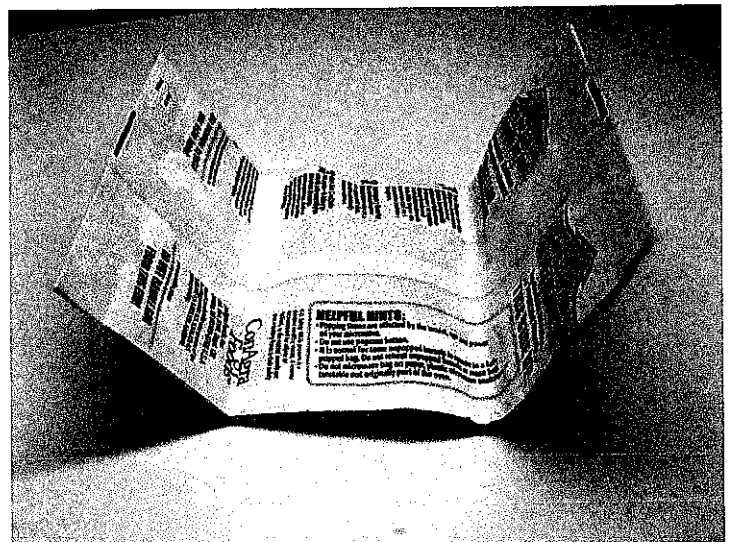
Per- and polyfluoroalkyl substances (PFAS) are a family of chemicals used since the 1950s to manufacture stain-resistant, water-resistant, and non-stick products. PFAS are widely used in common consumer products as coatings, on food packaging, outdoor clothing, carpets, leather goods, ski and snowboard waxes, and more.

Certain types of firefighting foam—historically used by the U.S. military, local fire departments, and airports to fight oil and gasoline fires—may contain PFAS.

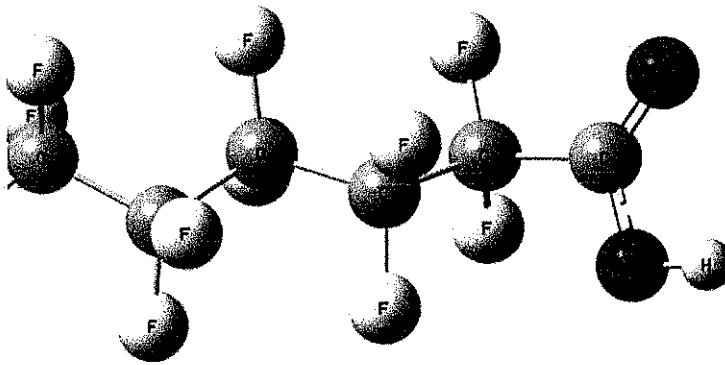
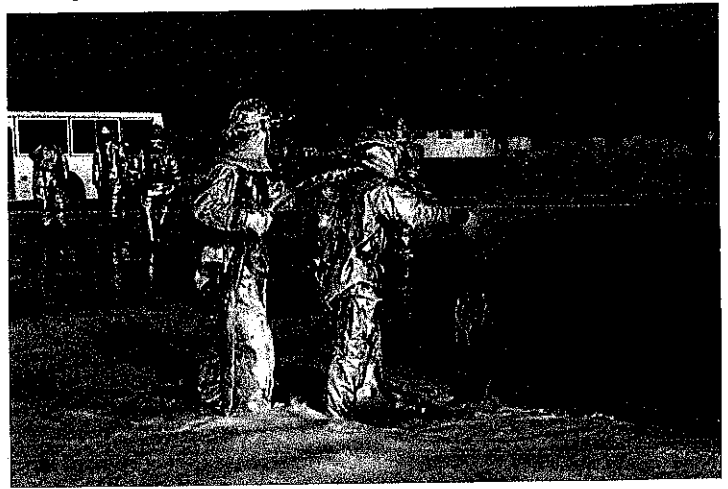
PFAS in drinking water is an important emerging issue nationwide. Because PFAS are water soluble, over time PFAS from some firefighting foam, manufacturing sites, landfills, spills, air deposition from factories and other releases can seep into surface soils. From there, PFAS can leach into groundwater or surface water, and can contaminate drinking water. PFAS have also been found in rivers, lakes, fish, and wildlife.

PFAS stay in the environment for a long time and do not break down easily. As a result, PFAS are widely detected in soil, water, air, and food. Some PFAS can accumulate in the food chain. Exposure can occur when someone uses certain products that contain PFAS, eats PFAS-contaminated food, or drinks PFAS-contaminated water. When ingested, some PFAS can build up in the body and, over time, these PFAS may increase to a level where health effects could occur.

Studies indicate that exposure to sufficiently elevated levels of certain PFAS may cause a variety of health effects including developmental effects in fetuses and infants, effects on the thyroid, liver, kidneys, certain hormones and the immune system. Some studies suggest a cancer risk may also exist in people exposed to



higher levels of some PFAS. Scientists and regulators are still working to study and better understand the health risks posed by exposures to PFAS, and MassDEP is following developments in this burgeoning area closely.



Interagency Task Force and AG Lawsuit

In 2020, the Massachusetts legislature appointed the PFAS Interagency Task Force to investigate water and ground contamination of PFAS across the Commonwealth. The Task Force held nine public hearings throughout 2021 and heard testimony from a wide range of stakeholders, including researchers, advocacy groups, community members, municipal officials, state agencies, public water systems, industry groups, and legislators.

Learn more about the [PFAS Interagency Task Force](https://malegislature.gov/Commissions/Detail/556/Hearings) (<https://malegislature.gov/Commissions/Detail/556/Hearings>) and see the [Final PFAS Interagency Task Force Report](https://malegislature.gov/Commissions/Detail/556/Documents) (<https://malegislature.gov/Commissions/Detail/556/Documents>)

On May 25, 2022, Attorney General Maura Healey sued 13 manufacturers of PFAS "forever chemicals" used in firefighting foam for causing millions of dollars in damages to communities across Massachusetts by knowingly contaminating drinking water sources, groundwater, and other natural resources with highly toxic PFAS chemicals that pose a serious threat to public health and the environment.

See more information about the lawsuit: [AG Healey Sues Manufacturers of Toxic 'Forever'](#)

[Chemicals](#) ([/news/ag-healey-sues-manufacturers-of-toxic-forever-chemicals-for-contaminating-massachusetts-drinking-water-and-damaging-natural-resources](#))

Drinking Water Standards and Health Information

Massachusetts PFAS Standard for Public Drinking Water Supplies

On October 2, 2020, MassDEP published its PFAS public drinking water standard or Massachusetts Maximum Contaminant Level (MMCL) of 20 nanograms per liter (ng/L), or parts per trillion (ppt) applicable to community (COM) and non-transient non-community (NTNC) systems for the sum of the concentrations of six specific PFAS. The six PFAS are: PFOS, PFOA, PFHxS, PFNA, PFHpA, and PFDA. MassDEP abbreviates this set of six PFAS as "PFAS6." This drinking water standard is set to be protective against adverse health effects for all people consuming the water.

[More information on the development of a PFAS6 MCL in Massachusetts](#) ([/lists/development-of-a-pfas-drinking-water-standard-mcl](#))

[More Information for Public Water Suppliers about compliance with the PFAS6](#)

[MCL](#) ([/lists/massachusetts-pfas-drinking-water-standard-mcl#information-for-pws-regarding-compliance-with-the-mcl](#))

EPA Proposed National Primary Drinking Water Regulation

On March 14, 2023 EPA released proposed National Primary Drinking Water regulations for PFOA, PFOS and four other PFAS. EPA is proposing to set a Maximum Contaminant Level (MCL) of 4.0 parts per trillion (ppt) for PFOA and 4.0 ppt for PFOS and is proposing to address four additional PFAS (GenX, PFBS, PFNA, and PFHxS)

as a mixture using a Hazard Index. A Hazard Index accounts for the increased risk from mixtures of PFAS.

MassDEP Comments on PFAS National Primary Drinking Water Regulation

[Rulemaking \(/doc/massdep-comments-on-pfas-national-primary-drinking-water-regulation-rulemaking/download\)](#)

[Find out more information on EPA's proposed MCL for PFAS \(/info-details/epa-proposed-maximum-contaminant-level-mcl-for-pfas\)](#)

Health Information for Consumers

[MassDEP Fact Sheet - Questions and Answers for Consumers \(/doc/massdep-fact-sheet-pfas-in-drinking-water-questions-and-answers-for-consumers/download\)](#)

[CDC ATSDR Information on PFAS for consumers and health professionals \(https://www.atsdr.cdc.gov/pfas/index.html\)](https://www.atsdr.cdc.gov/pfas/index.html)

PFAS detected in drinking water supplies in Massachusetts

This story map consists of seven tabs that present interactive maps, dashboards and photographs that describe the efforts by MassDEP and Public Water Suppliers to address the PFAS contamination. Click on the full screen symbol in the bottom right corner for best viewing.

MassDEP addressing PFAS contamination

Projects by Public Water Systems PWS in Massachusetts to address PFAS contamination. This story map consists of clickable seven tabs that present interactive maps, dashboards and photographs that describe the efforts by MassDEP and the PWSs to address PFAS contamination.



► 1 Introduction

Massachusetts, along with many other states, faces an emerging public health challenge from a group of chemicals called per- and polyfluoroalkyl substances or "PFAS." Massachusetts provided funding testing of water supplies for PFAS grants for the design of PFAS remediation in Public Water Systems and construction loans to communities to address contamination issues. This story map details where PFAS has been detected in public drinking water sources, what Public Water Suppliers (PWS) are doing to address PFAS, and state grants and loans that have been awarded for assisting these PWS.

► 2 Testing

► 3 PFAS detections and responses by public water systems

► 4 Removing PFAS from

PFAS testing data

PFAS sampling results from PWS are available on the [Massachusetts EEA Data Portal \(https://eeasonline.eea.state.ma.us/portal#/i/search/drinking-water\)](https://eeasonline.eea.state.ma.us/portal#/i/search/drinking-water). Search under the contaminant group "PFAS" or for the sum of the six compounds in the MCL, search under the chemical name "PFAS6".

PFAS and Environmental Justice Communities

The U.S. Government Accountability Office issued a report on October 19, 2022. The report concludes: "In Massachusetts, communities with higher percentages of non-White or Hispanic/Latino residents and/or families living in poverty were less likely than other communities to have PFAS in their drinking water." See [https://www.gao.gov/products/gao-22-105135 \(https://www.gao.gov/products/gao-22-105135\)](https://www.gao.gov/products/gao-22-105135)

New drinking water source approvals and PFAS

MassDEP requires PWS to test all new sources of drinking water for PFAS, including replacement sources and satellite wells, using EPA method 537 (14 compounds) or 537.1 (18 Compounds) and report all results. For more information about the new source approval process, contact your MassDEP Regional Office. [List of MassDEP Regional Offices by community](#) (/info-details/massdep-regional-offices-by-community) or email the MassDEP Drinking Water Program program.director-dwp@mass.gov (mailto:program.director-dwp@mass.gov).

Laboratories, testing and sample collection for drinking water

Private Well Owners

If you are a **private well owner**, for more information about whether you should test, how to test and your drinking water treatment options, please see [PFAS in Private Well Drinking Water Supplies](#)

[FAQ](#) (/info-details/pfas-in-private-well-drinking-water-supplies-faq).

Public Water Suppliers

[Field Sampling Guide](#) (/doc/field-sampling-guide-for-pfas/download) and video of sample collection procedures for Public Water

Suppliers: <https://youtu.be/zrwhwSI-R9M> (<https://youtu.be/zrwhwSI-R9M>)

Drinking Water Laboratories

Drinking water samples must be analyzed for PFAS by labs using EPA Methods: 537 or 537.1.

To find a certified lab see: [MassDEP certified labs](#) (/certified-laboratories)

If you are a laboratory and are interested in becoming certified, see: [Laboratory certification office policy on PFAS](#) (/doc/memorandum-on-revised-massachusetts-regulations-for-the-certification-and-operation-of) and [Laboratory Certification Forms](#) (/lists/laboratory-certification-forms)



Free PFAS Analyses Program

The MassDEP Free PFAS Analysis Program was active from July 2020 through June 30, 2022 and provided the opportunity for free laboratory analyses of PFAS drinking water samples for all Public Water Systems and select private wells in 85 towns where 60% or more of the residents were served by private wells. The [Final Report](#) (/doc/massdep-free-pfas-analysis-program-final-report/download) provides a summary of the key elements of the Program, the findings and results, and an overview of other PFAS actions taken by MassDEP and the Commonwealth.

Additional Resources

[MassDEP Free PFAS Analysis Program Final Report](#) (<https://www.mass.gov/doc/massdep-free-pfas-analysis-program-final-report/download>) (English, PDF 6.64 MB)

Bottled water and home water filters

The Massachusetts Department of Public Health (MDPH) Food Protection Program publishes a [list of companies licensed to sell or distribute bottled water or carbonated non-alcoholic beverages in Massachusetts](#) (/media/2291036/). The list includes bottling company weblinks to enable searches for products sold in Massachusetts. Licenses are renewed annually, and the MDPH list will be updated quarterly.

The MDPH list includes only bottlers licensed by MDPH after they provided test results which show that their bottled water or beverages comply with final drinking water standards for PFAS, and other contaminants established by:

- The Massachusetts Department of Environmental Protection,
- The US Environmental Protection Agency, and
- The US Food and Drug Administration.

In 2022, the MDPH conducted a [pilot surveillance program on PFAS in bottled water](#) (/info-details/water-quality-standards-for-bottled-water-in-massachusetts#pfas-bottled-water-pilot-program-) sold in Massachusetts. All bottled water test results met the MassDEP PFAS6 MCL and the US EPA's proposed MCLs.

Information from MDPH regarding bottled water, including contact information, can be found [here](#) (/info-details/water-quality-standards-for-bottled-water-in-massachusetts).

Home Water Filters

There are also home water treatment filters capable of removing PFAS from drinking water for the countertop or under the sink. Treatment systems and devices are not specifically designed to meet Massachusetts' drinking water standard for PFAS6. There are systems that have been designed to reduce the sum of PFOS and PFOA to below EPA's former Health Advisory of 70 ng/L. Any treatment device you use should be certified to meet the National Sanitation Foundation (NSF)

(<https://www.nsf.org/consumer-resources/articles/pfoa-pfos-drinking-water>) standards to remove PFOS and PFOA compounds so that the sum of their concentrations is below 70 ng/L. **Please be aware that 70 ng/L is significantly greater than the MassDEP's drinking water standard of 20 ng/L for the PFAS6 compounds.** Many of these treatment devices certified to meet NSF standards will likely be able to reduce PFAS6 levels to well below 70 ng/L, but there are no federal or state testing requirements for these treatment devices. If you choose to install a treatment device, you should check to see if the manufacturer has independently verifiable PFAS6 monitoring results demonstrating that the device can reduce PFAS below 20 ng/L. See more detailed information on treatment systems in the [Private Well Factsheet](#)

([/info-details/pfas-in-private-well-drinking-water-supplies-faq](#)).



PFAS and waste sites

PFAS are considered to be "hazardous material" subject to the notification, assessment and cleanup requirements of the Massachusetts [Waste Site Cleanup Program](#) ([/topics/cleanup-of-sites-spills](#)). A detailed Fact Sheet (below) provides guidance regarding when and how to sample and analyze for Per- and Polyfluoroalkyl Substances at disposal sites regulated under the Massachusetts Contingency Plan ("MCP", [310 CMR 40.0000](#) ([/regulations/310-CMR-4000-massachusetts-contingency-plan](#))).

Final PFAS-related MCP Revisions

Revisions to the Massachusetts Contingency Plan establishing notification requirements and cleanup standards for PFAS in soil and groundwater are now final, effective December 27, 2019. [Documents related to these regulations are now available](#) ([/lists/preview-of-the-final-pfas-related-revisions-to-the-mcp-2019](#)).

Additional Resources

[Private Wells PFAS Sampling Program 21E Questions and Answers](#) (<https://www.mass.gov/doc/private-wells-pfas-sampling-program-21e-questions-and-answers/download>)

[Sampling and Analysis Guidance for PFAS at Disposal Sites Regulated under the Massachusetts Contingency Plan \(November 2023\)](#)

(<https://www.mass.gov/doc/sampling-and-analysis-guidance-for-pfas-at-disposal-sites-regulated-under-the-massachusetts-contingency-plan-november-2023/download>) (English, PDF 437.81 KB)

PFAS in Fire Fighting Foam

Takeback Program

MassDEP, in partnership with the Massachusetts Department of Fire Services (MassDFS), initiated a legacy "Aqueous Film-Forming Foam" (AFFF) collection and destruction program in 2018 that has collected (to date) more than 330,000 pounds (over 39,500 gallons) of legacy foam from 148 fire departments and facilities across the Commonwealth and MassDOT.

The pre-2003 versions of the foam use certain PFAS compounds, which have contaminated some groundwater and drinking water sources across the country. The take-back program ensures that these foams are removed from current stockpiles and appropriately neutralized.

In August 2021, the Massachusetts Department of Fire Services and Department of Environmental Protection issued a joint Advisory for AFFF containing PFAS. A link to the Advisory can be found below.

Fluorine-Free Foam Information



Massachusetts Department of Environmental Protection (MassDEP), in partnership with the Connecticut Department of Energy and Environmental Protection (CTDEEP) and fire service in both states, has conducted a study involving the analysis of six aqueous film-forming foams (AFFF) currently on the market and listed as "fluorine-free". Off-the-shelf foams were acquired by CTDEEP and provided to MassDEP's contract laboratory Alpha Analytical Laboratories, Inc. for PFAS analyses. Additional analyses, not specific to PFAS, were also conducted by Alpha Analytical Laboratories, Inc., Harvard University and Sterling Analytical, Inc.

A summary of this work may be downloaded below.

Additional Resources

Program to Remove Legacy Firefighting Foams from Fire Department Stockpiles

(<https://www.mass.gov/news/commonwealth-begins-program-to-remove-legacy-firefighting-foams-from-fire-department>)

PFAS Foam Advisory (<https://www.mass.gov/doc/pfas-foam-advisory/download>) (English, PDF 216.61 KB)

Summary of the MassDEP/CTDEEP sampling analysis of select "fluorine-free" foams

(<https://www.mass.gov/doc/summary-of-the-massdepctdeep-sampling-analysis-of-select-fluorine-free-foams/download>) (English, PDF 213.16 KB)

MassDEP Legacy Firefighting Foam Take-Back Program 2018 Project Summary

(<https://www.mass.gov/doc/massdep-legacy-firefighting-foam-take-back-program-2018-project-summary/download>) (English, PDF 188.23 KB)

PFAS in Residuals

Overview

MassDEP regulates the land application of sludge and septage for beneficial purposes under 310 CMR 32.00. This includes:

- treated biosolids (residuals) produced from sanitary wastewater sludge
- drinking water treatment facility sludge
- residuals from industrial facilities
- short paper fiber

All residuals and sludge products sold, distributed, and land applied for beneficial reuse in Massachusetts are subject to an Approval of Suitability (AOS), which classifies residuals for different uses based on chemical quality and treatment to reduce pathogens. Each approval cannot be renewed for more than five years.

Since August 2020, MassDEP has required quarterly monitoring of per- and polyfluoroalkyl substances (PFAS) in residuals that have an Approval of Suitability (AOS) and are permitted to be reused through land application. This increased frequency in monitoring, which had been required annually since January 2019, was implemented to address the need for more information on PFAS characteristics in residuals. This data is uploaded to a [public portal](https://eeonline.eea.state.ma.us/portal#/search/npdes) (<https://eeonline.eea.state.ma.us/portal#/search/npdes>).

More information

- [Public PFAS portal with residuals data](https://eeonline.eea.state.ma.us/portal#/search/npdes) (<https://eeonline.eea.state.ma.us/portal#/search/npdes>)
- [Efforts to establish standards for PFAS in residuals](#) (/info-details/pfas-in-residuals)
- [Approved laboratories and laboratory testing methods for residuals](#) (/info-details/testing-of-pfas-in-wastewater-and-residuals)
- [How to submit residuals PFAS data in eDEP](#) (/how-to/submit-wastewater-residuals-pfas-data-via-edep)
- [Other information on MassDEP residuals regulations](#) (/service-details/residuals-biosolids)

For more information about MassDEP's regulation of residuals, contact the Residuals Program at massdep.residuals@mass.gov (<mailto:massdep.residuals@mass.gov>).

PFAS in Wastewater Facilities with NPDES Permits

Overview

Facilities that treat wastewater that is discharged to surface water hold National Pollution Discharge Elimination System (NPDES) permits and state Surface Water Discharge (SWD) Permits. In Massachusetts, EPA and MassDEP both regulate these facilities.

As NPDES permits are renewed, PFAS testing requirements are being added to the permits. The data is uploaded to a [public portal](https://eeonline.eea.state.ma.us/portal#/search/npdes) (<https://eeonline.eea.state.ma.us/portal#/search/npdes>).

Industrial facilities

Industrial facilities may be required to test for PFAS if the facility holds a NPDES/SWD permit, or if the facility discharges to a Publicly Owned Treatment Works (POTW) that holds a NPDES/SWD permit. Industries looking to decrease PFAS use can contact [Massachusetts Office of Technical Assistance and Technology \(OTA\)](#) ([/orgs/office-of-technical-assistance-and-technology-ota](https://orgs/office-of-technical-assistance-and-technology-ota)) for free and confidential pollution prevention assistance.

More information about PFAS monitoring for industrial facilities and how to work with OTA can be found on the [MassDEP PFAS in Industrial Discharges page](#) (/info-details/pfas-in-industrial-discharges).

MassDEP projects:

- Ongoing PFAS Pollution Prevention project – Collaborative effort of MassDEP, EEA Office of Technical Assistance (OTA), and EPA.
- [Analysis of PFAS in Massachusetts Rivers with the United States Geological Survey \(USGS\), August to November 2020](#) (/info-details/per-and-polyfluoroalkyl-substances-pfas#pfas-in-massachusetts-rivers-). Sampling sites were located upstream or downstream of discharges from 24 wastewater treatment facilities and at 16 other stream sites, including sites downstream of suspected nonpoint and industrial sources and at sites not associated with suspected PFAS sources.
- Ongoing study of PFAS in wastewater, in collaboration with the USGS, 2022 to present

More information

- [Public PFAS portal with wastewater data](#) (<https://eeaonline.eea.state.ma.us/portal#/search/npdes>)
- [Approved laboratories and laboratory testing methods for wastewater](#) (/info-details/testing-of-pfas-in-wastewater-and-residuals)
- [How to submit wastewater PFAS data into eDEP](#) (/how-to-submit-wastewaterresiduals-pfas-data-via-edep)

For more information about MassDEP's requirements for testing PFAS in Wastewater Facilities with NPDES-Permitted Discharges, contact the NPDES Program at massdep.npdes@mass.gov (mailto:massdep.npdes@mass.gov).

PFAS in Massachusetts Rivers (2020)

MassDEP's Watershed Planning Program (WPP) jointly funded a U.S. Geological Survey (USGS) water quality study to evaluate the presence of PFAS in Massachusetts' rivers and streams. USGS conducted three rounds of sampling at each of 64 sites in 27 rivers from August to November 2020 and analyzed the samples for 24 individual PFAS. Sampling sites were located upstream or downstream of discharges from 24 wastewater treatment facilities and at 16 other stream sites, including sites downstream of suspected nonpoint and industrial sources and at sites not associated with suspected PFAS sources. See "Additional Resources" for a summary of results and links to project information.

Additional Resources

[PFAS in Surface Water and Fish Tissue](#) (<https://www.mass.gov/info-details/pfas-in-surface-water-and-fish-tissue>)

PFAS in Freshwater and Fish Tissue (2022)

In the summer and fall of 2022, the Watershed Planning Program (WPP) initiated a study to collect surface water and fish tissue samples from 52 waterbodies throughout Massachusetts. The study focused on waterbodies near known or suspected sources of PFAS and also included six waterbodies in rural areas for comparison (i.e., "reference" waterbodies). Co-located surface water and fish samples were collected at each waterbody, and additional surface water samples were collected at a subset of waterbodies near beach swimming areas. In total, 66 surface water and 242 fish tissue composite samples (comprised of 948 fish) were analyzed for 40 PFAS compounds using the draft EPA Method 1633. See "Additional Resources" for a summary of results and links to project information.

Additional Resources

[PFAS In Surface Water and Fish Tissue](#) (<https://www.mass.gov/info-details/pfas-in-surface-water-and-fish-tissue>)

Pesticide products/mosquito control

PFAS contamination was identified in September 2020 through citizen science testing of a pesticide product for mosquito control. The U.S. EPA worked with MassDEP to investigate the source of the contamination. EPA determined that fluorinated high-density polyethylene (HDPE) containers that were used to store and transport a mosquito control pesticide product contained PFAS compounds that were leaching into the product.

For more information see: <https://content.govdelivery.com/accounts/USAEPAPPT/bulletins/2b8444f> (<https://content.govdelivery.com/accounts/USAEPAPPT/bulletins/2b8444f>)

RELATED

[US EPA PFAS information \(exit Mass.gov site\)](#) (<https://www.epa.gov/pfas>)