



PFAS in Cropping Systems



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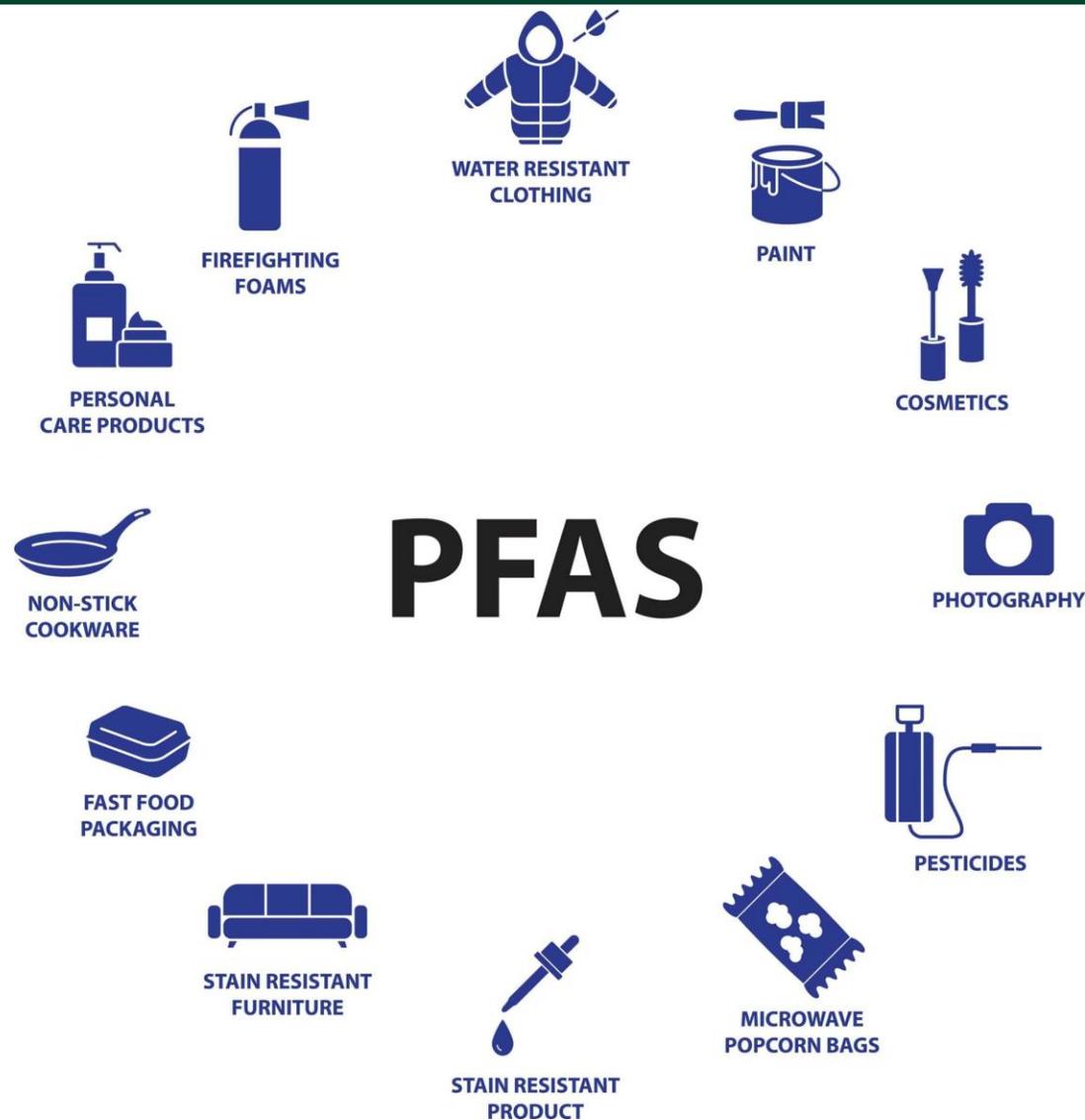
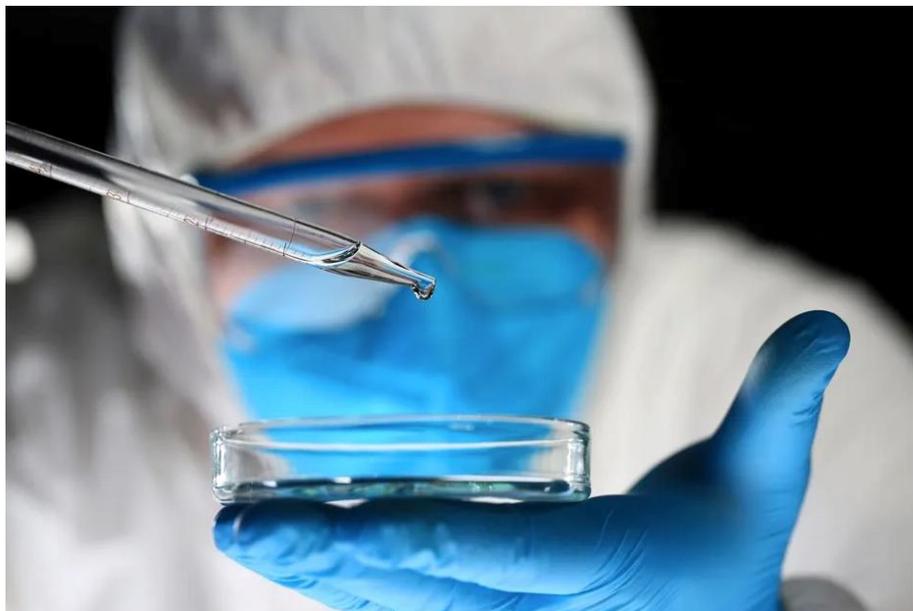
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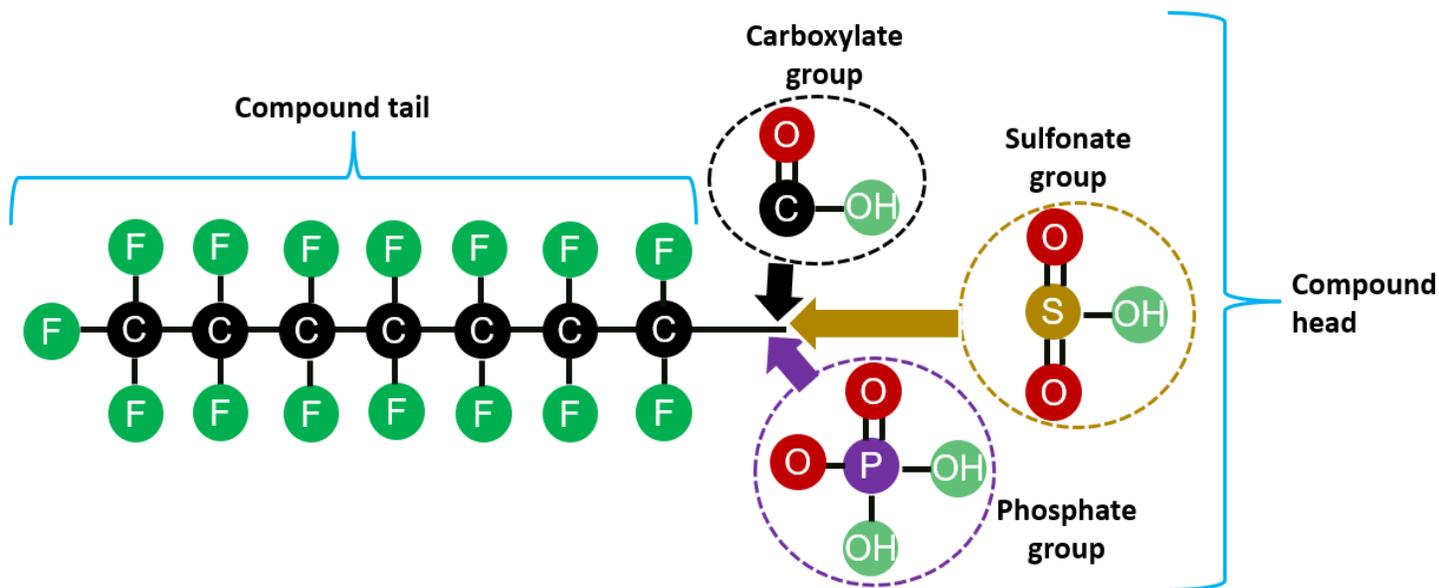
<https://www.sciencefocus.com/science/are-synthetic-chemicals-really-bad-for-you>

- Manmade, fluorinated organic chemicals widely used in industrial processes and consumer products.
- Widely used because they provide water, oil, heat, and stain resistance, along with nonstick performance, chemical stability, and durability.
- No single accepted definition of PFAS, but by some estimates there are more than 14,000.

<https://efcnetwork.org/forever-chemicals-pfas-in-water-and-3-ways-to-treat-them/>



Per- and Polyfluoroalkyl Substances (PFAS)



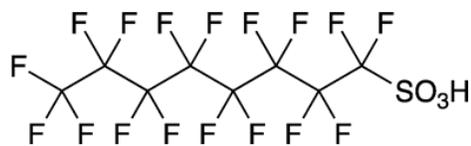
C Carbon **F** Fluorine **O** Oxygen **P** Phosphorus **S** Sulphur **H** Hydrogen

<https://extension.psu.edu/understanding-pfas-what-they-are-their-impact-and-what-we-can-do>

Legacy PFAS

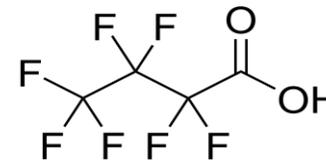


PFOA

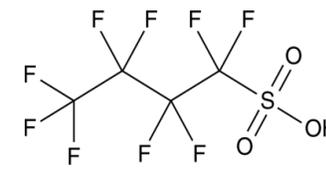


PFOS

Short-chain PFAS



PFBA



PFBS

PFOS replacement



<https://en.wikipedia.org/wiki/Lava>

Breaking C-F bonds usually requires extreme conditions such as high heat, strong oxidation, electrochemical treatment, or other high-energy processes.



<https://thehill.com/changing-america/sustainability/environment/3579922-increasing-levels-of-forever-chemicals-seen-in-antarctica/>

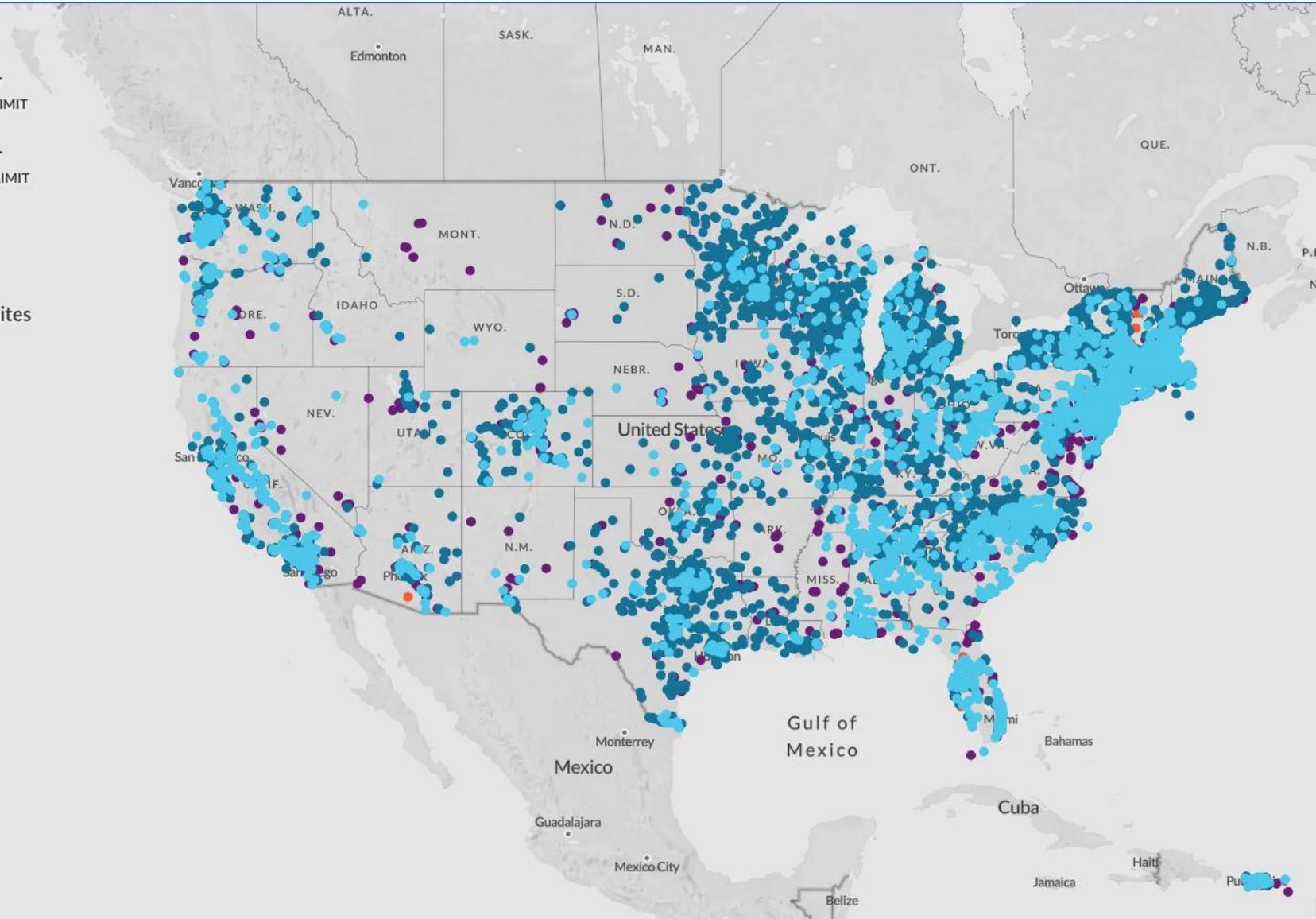


Increasing levels of PFAS seen in Antarctica



PFAS contamination in the U.S. (August 14, 2025)

- On Drinking Water ABOVE PROPOSED LIMIT
- On Drinking Water BELOW PROPOSED LIMIT
- On Military Sites
- On Other Known Sites

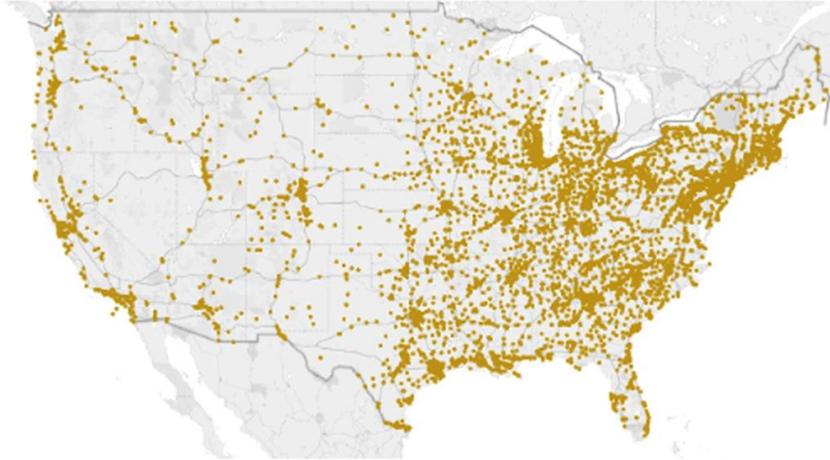


- Proposed limit:**
- PFOA: 4 ppt
 - PFOS: 4 ppt
 - PFHxS, PFNA, HFPO-DA (GenX): 10 ppt each

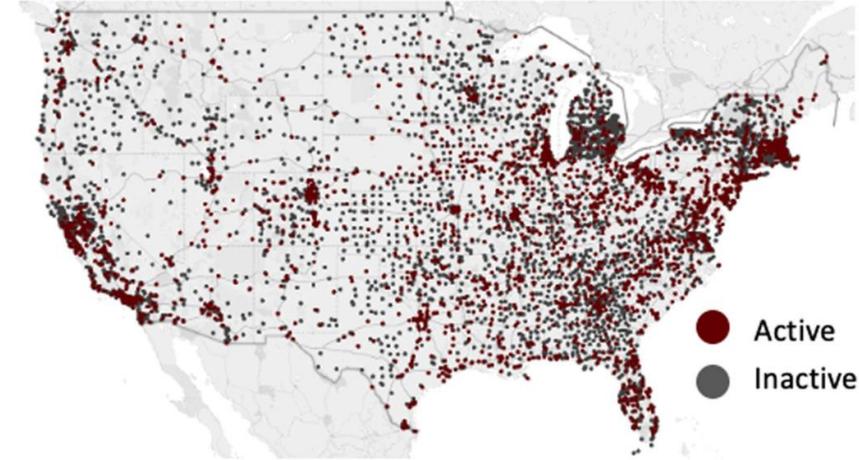




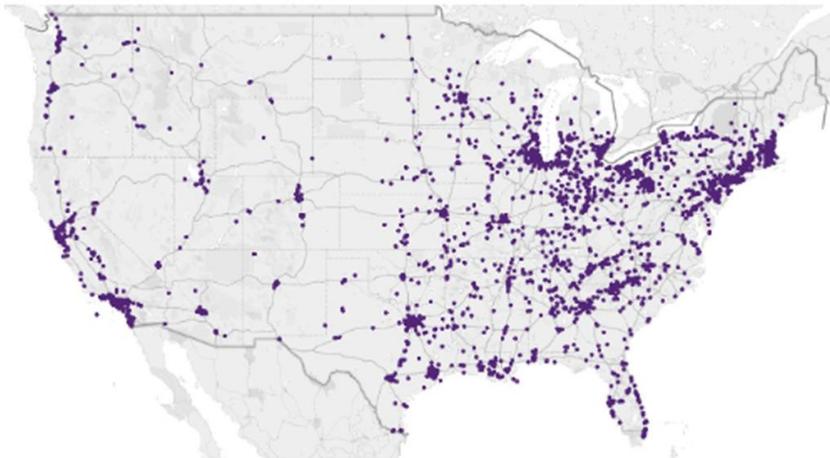
Major wastewater treatment plants



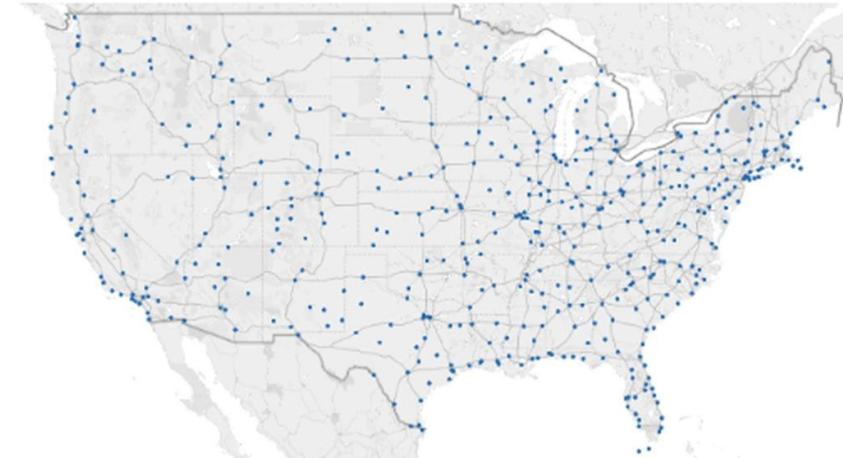
Landfills (active and inactive)



Electroplating and metal finishing



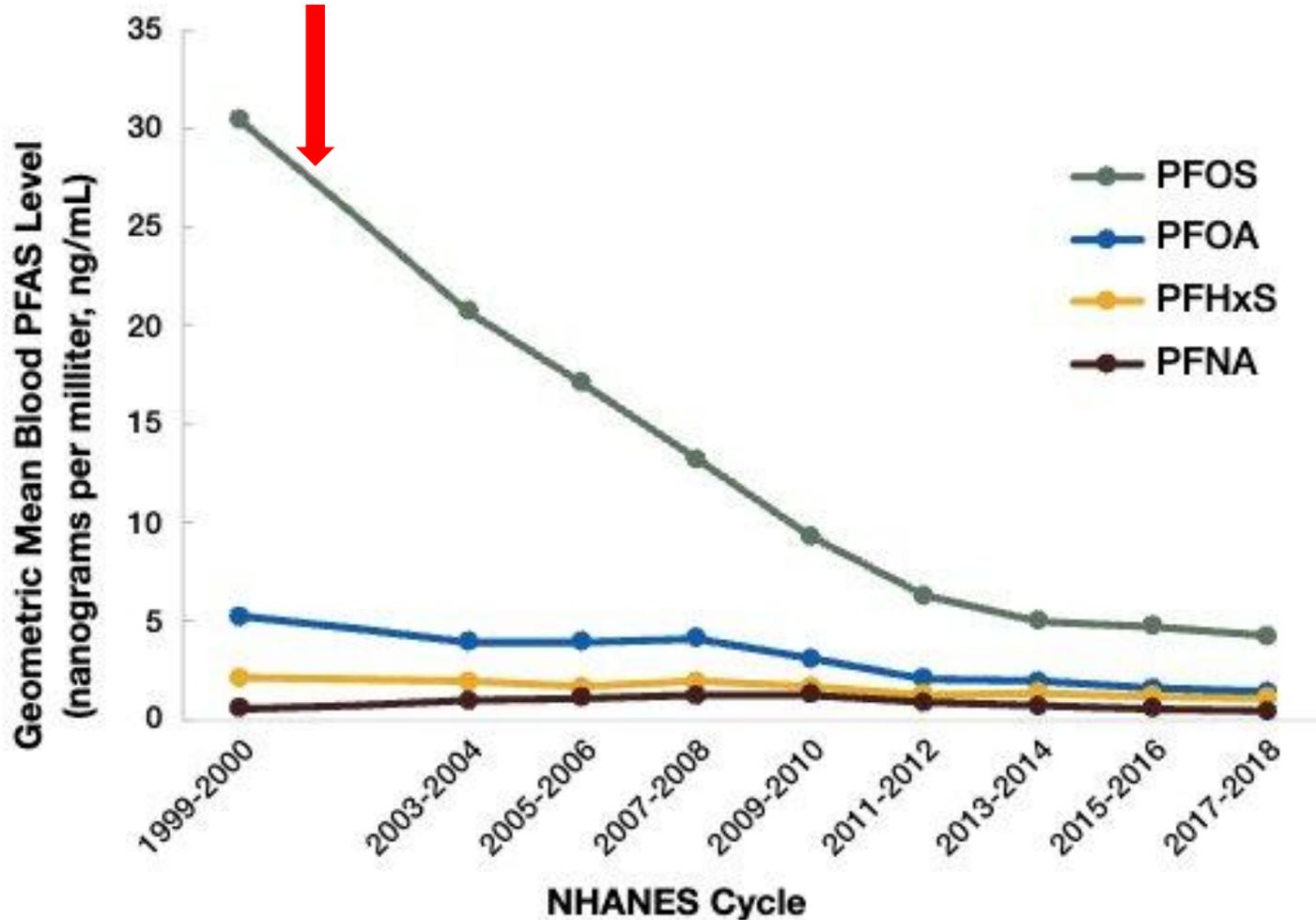
FAA part 139 airports



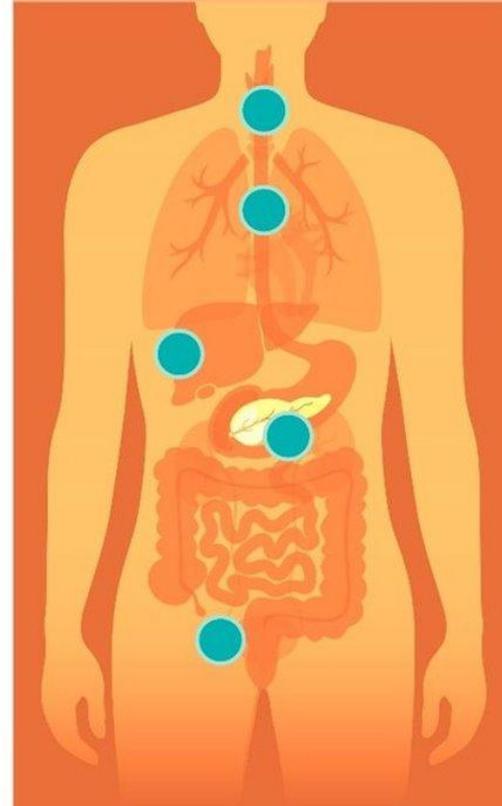
Maps showing the locations of four different types of potential per- and polyfluoroalkyl substances dischargers in the contiguous United States, including landfills, wastewater treatment plants, electroplating, and metal finishing facilities and airports



Geometric Mean PFAS Blood Levels in the United States

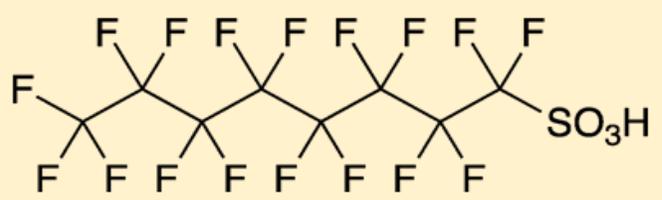
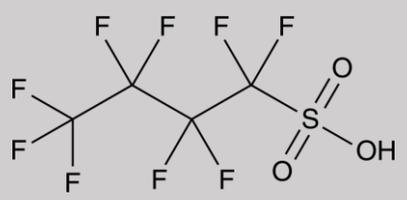


HUMAN HEALTH RISKS



- Immune response
- Thyroid function
- Lipid and insulin regulation
- Liver disease and cancer
- Reproduction and development



Category	<p style="text-align: center;">Long-chain PFAS</p>  <p style="text-align: center;">PFOS</p>	<p style="text-align: center;">Short-chain PFAS</p>  <p style="text-align: center;">PFBS</p>
Toxicity	<ul style="list-style-type: none"> • Often more toxic at lower doses • Longer residence time in body • Stronger biological interactions 	<ul style="list-style-type: none"> • Generally lower toxicity per exposure • Shorter residence time in body • Still not harmless
Bioaccumulation	<ul style="list-style-type: none"> • High bioaccumulation in humans and wildlife • Slow elimination (years in humans) • Builds up over time 	<ul style="list-style-type: none"> • Lower bioaccumulation • Faster elimination (days–weeks) • Less buildup in tissues
Mobility	<ul style="list-style-type: none"> • Lower mobility in water/soil • Stronger sorption to organic matter • More likely to stay near source 	<ul style="list-style-type: none"> • High mobility in water/soil • Weak sorption → travels easily • More difficult to contain



FACT SHEET
PFOA & PFOS Drinking Water
Health Advisories



<https://www.iatp.org/documents/forever-chemicals-and-agriculture-case-study>

First Evidence of PFAS in the Environment

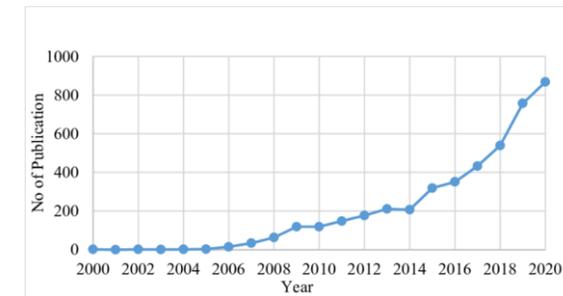
Increased Awareness and Regulations



First Synthesized and Commercialized

PFAS Contamination in Agriculture Identified

Research, Regulations and Mitigation Efforts

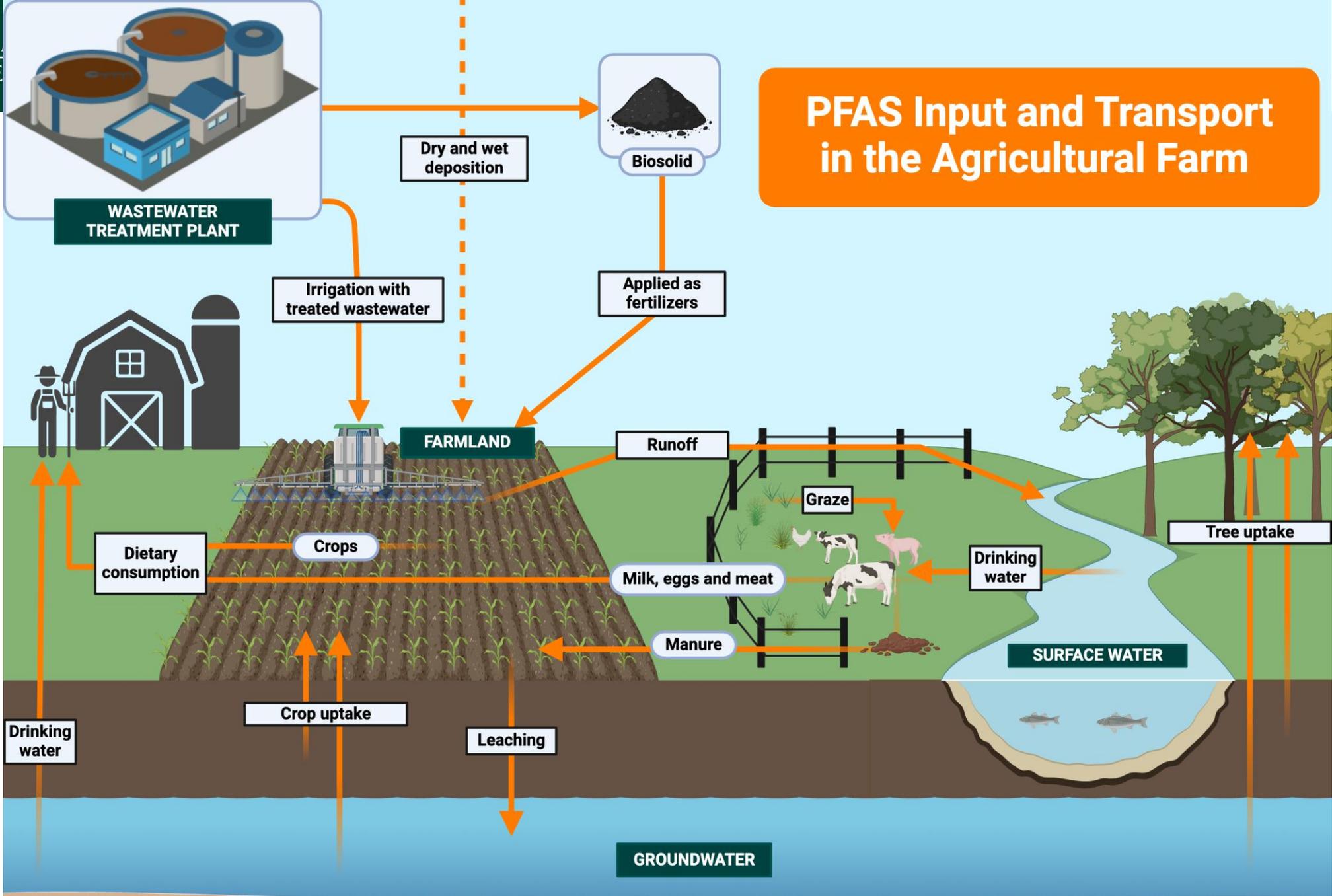


(Abunada et al., 2020)

<https://cen.acs.org/environment/persistent-pollutants/California-bans-PFAS-firefighting-foams/98/i38>

<https://www.teflon.com/en/industries-and-solutions/solutions/consumer-applications/nonstick-coatings/how-nonstick-coatings-work>

PFAS Input and Transport in the Agricultural Farm

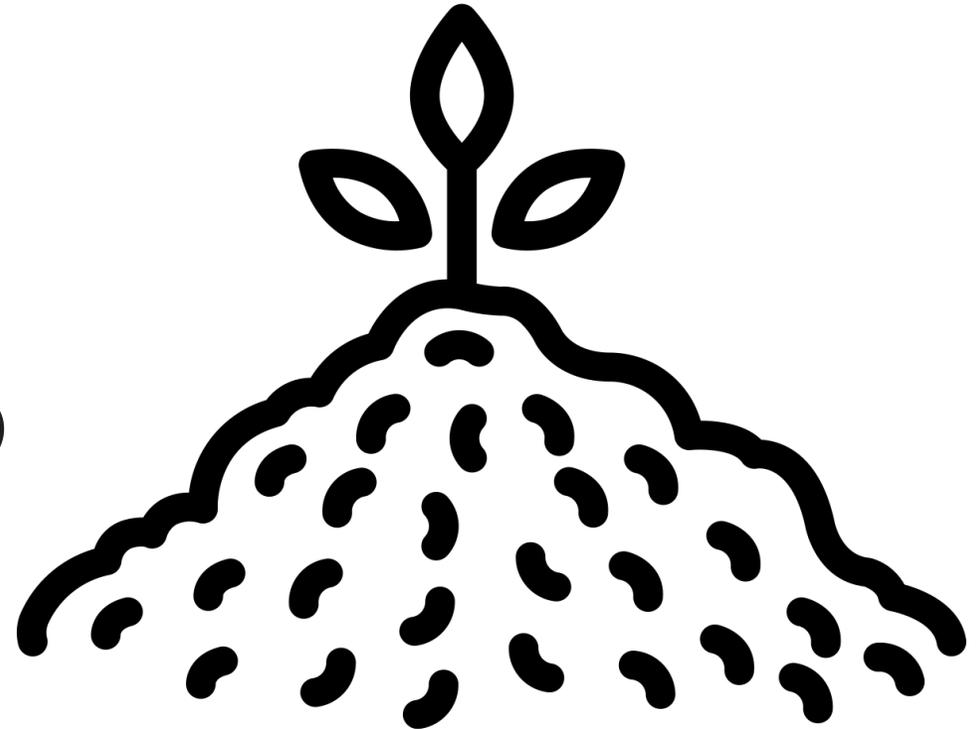


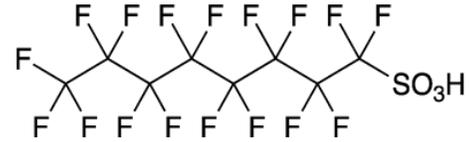


Options for PFAS in Soil

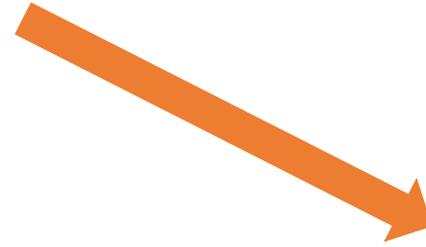
Many technologies remain in the laboratory research phase

- Destruction
 - Incineration
 - Smoldering
- Removal
 - Soil washing
 - Ball milling (crushing/grinding)
- Phytoremediation (using plants to remove or degrade)
- Stabilization of PFAS in the soil
 - Granular activated carbon
 - Biochar (made from biomass)
 - Clays
 - Ash
 - Commercial products (such as RemBind[®])



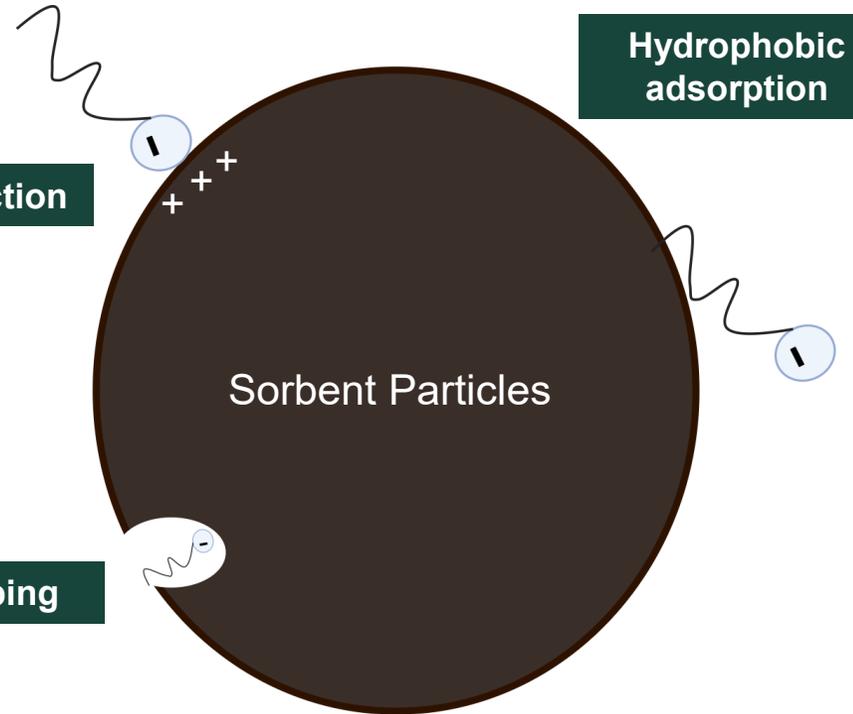


<https://rembind.com/uploads/RemBind-Presentation-Battelle-June-2024.pdf>



Electrostatic attraction

Micropore trapping





Options for PFAS Contamination in Water

- Conduct risk assessment for what is being grown
- Conduct risk assessment for impacting nearby ground water
- Filters
 - Flow rate
 - Contamination levels
 - Maintenance costs
- New surface water source
- New well if clean ground water is possible





MENU ☰

TIME

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NOV 26, 2025 9:52 AM ET

The EPA Is Embracing PFAS Pesticides. These Are The Health Risks

HEALTH

ENVIRONMENT



ADD TIME ON GOOGLE



by **Jeffrey Kluger**

EDITOR AT LARGE



Spraying a field on the eastern shore of Maryland *Edwin Remsberg/Universal Images Group—Getty*



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FACT CHECK: EPA Debunks False Claims that Agency Recently Approved "Forever Chemical" Pesticides

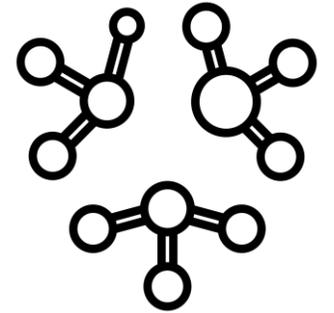
November 26, 2025

Contact Information

EPA Press Office (press@epa.gov)



PFAS Definitions



- There is no universally agreed upon definition of PFAS
- Different organizations, states, and governments define PFAS differently
- The most broad definition of PFAS includes chemicals containing at least one fully fluorinated carbon atom
 - Several states use or reference this definition
- Michigan's working description classifies PFAS as having at least two fully fluorinated carbon atoms



EPA Office of Pollution Prevention and Toxics Definition

- PFAS is defined as including at least one of these three structures:
 - $R-(CF_2)-CF(R')R''$, where both the CF_2 and CF moieties are saturated carbons
 - $R-CF_2OCF_2-R'$, where R and R' can either be F , O , or saturated carbons
 - $CF_3C(CF_3)R'R''$, where R' and R'' can either be F or saturated carbons

As an example, in Minnesota there are 875 pesticide active ingredients registered:

- Using the EPA's definition, there are **6** active ingredients that contain PFAS
- Using the state's definition of PFAS (1 fully fluorinated Carbon) there are **97** pesticide active ingredients that contain PFAS



PFAS in Pesticides- not new, but increasing

Table 1. Conventional U.S. pesticide active ingredients (AI) that are organofluorines or PFAS as of 2021.

Of the 471 unique, conventional AIs registered in the U.S., 107 were fluorinated and 66 met OECD's definition of PFAS. In the last 10 years (2012–2021), 33 of 54 approved AIs were organofluorines, and 16 of 54 were PFAS.

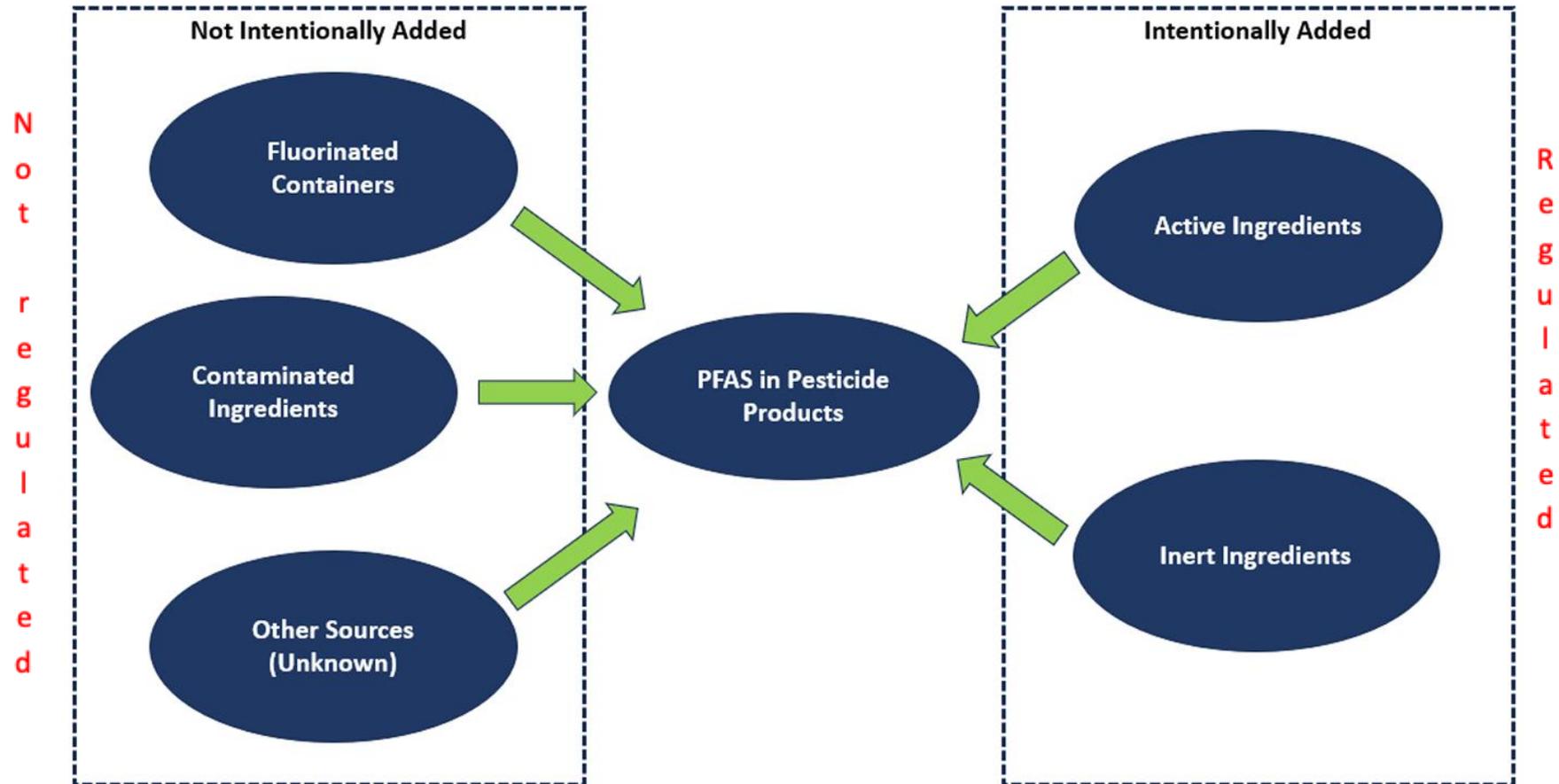
	Organofluorines	PFAS
Conventional AIs/ all registered AIs	107/471 23%	66/471 14%
Conventional AIs/ all AIs registered 2012–2021	33/54 61%	16/54 30%

Table adapted from Figure 1 in Donley et al. (2024). PFAS: per- and polyfluoroalkyl substances, OECD: Organization for Economic Co-operation and Development.

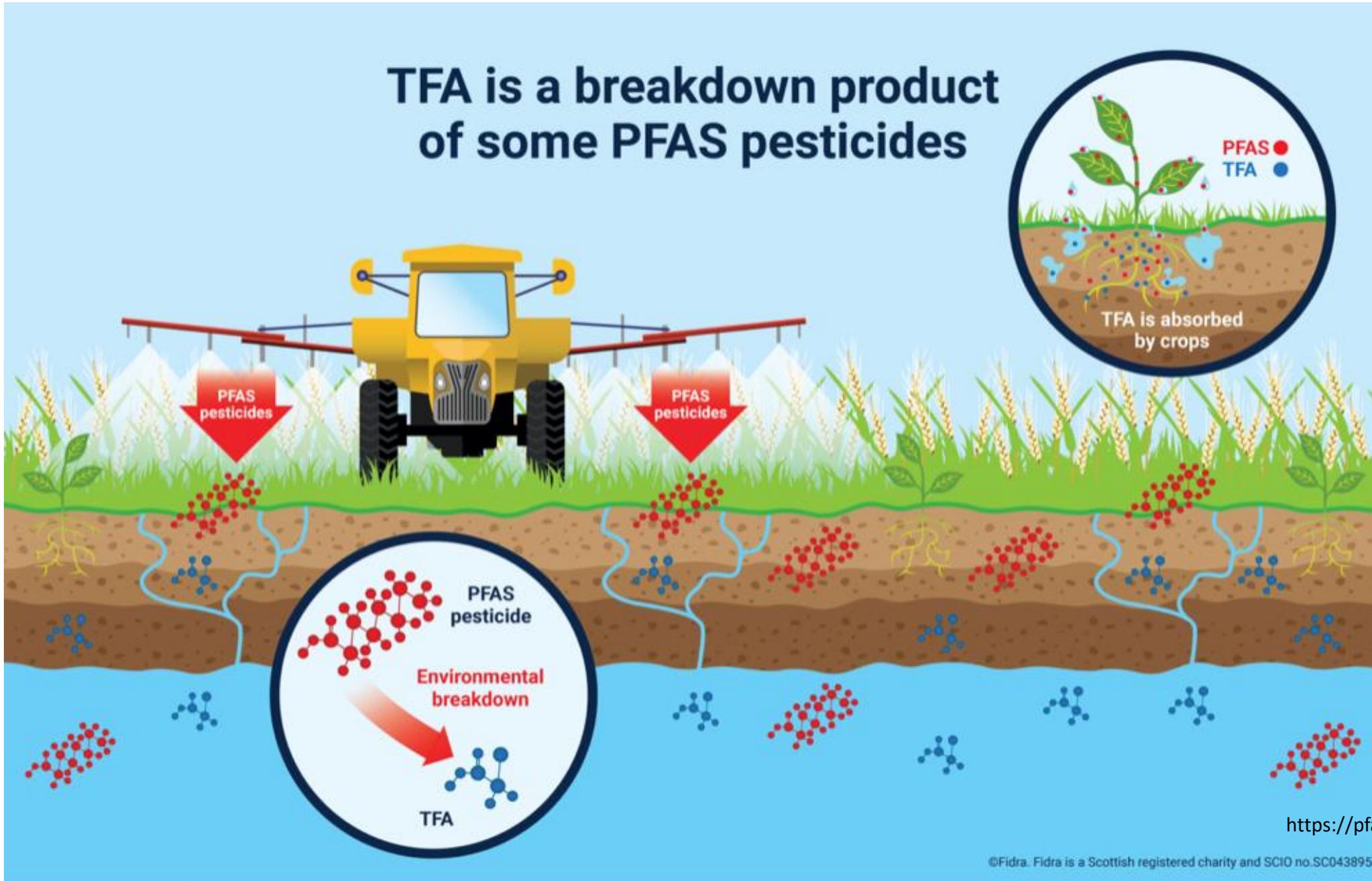
- OECD: one perfluorinated methyl (-CF₃) or methylene group (-CF₂-)
- Organofluorine: have at least one carbon-fluorine bond



Sources of PFAS in Pesticides



TFA is a breakdown product of some PFAS pesticides



<https://pfasfree.org.uk/pfas-in-pesticides>

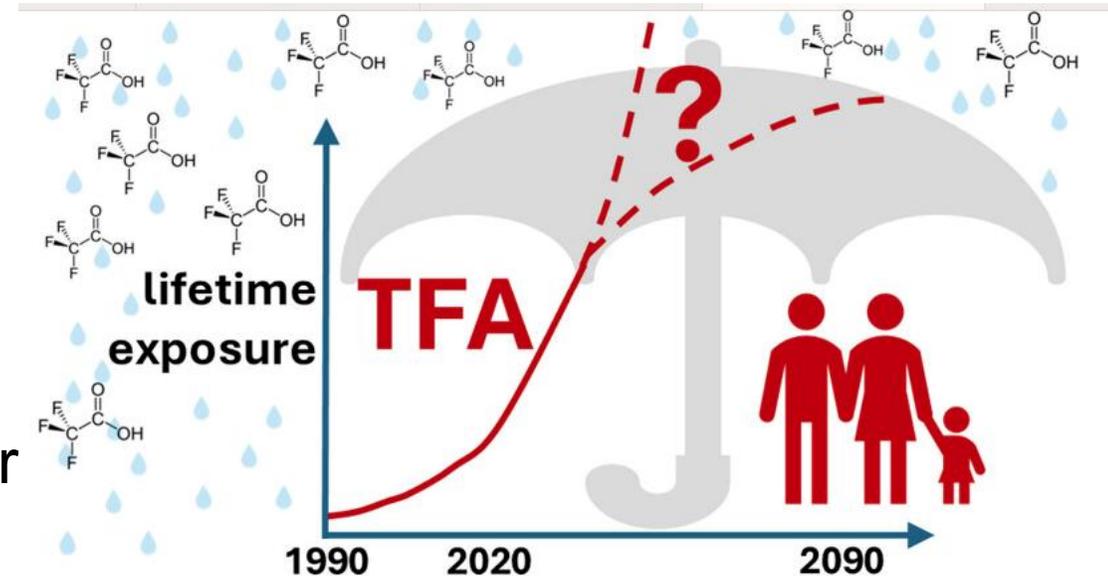
©Fidra. Fidra is a Scottish registered charity and SCIO no.SC043895

Figure 1: TFA forms from the environmental breakdown of some PFAS pesticides, where it can contaminate soils, water supplies, crops and harm wildlife.



TFA – Trifluoroacetic acid

- Ultra short chain PFAS (2C)
- Highly mobile (water, crop uptake)
- Extremely difficult to remove from water – expensive and high energy
- Used in many applications such as refrigerator coolant, pharmaceuticals
- Not routinely tested for or regulated
- Need more research to determine impacts on human health
 - Not thought to be bioaccumulative, however unknown impact of continuous exposure
 - Most research is based on short term exposure in lab animals (rats and fish)



Environmental Science & Technology > Vol 58/Issue 45 > Article

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PERSPECTIVE | October 30, 2024

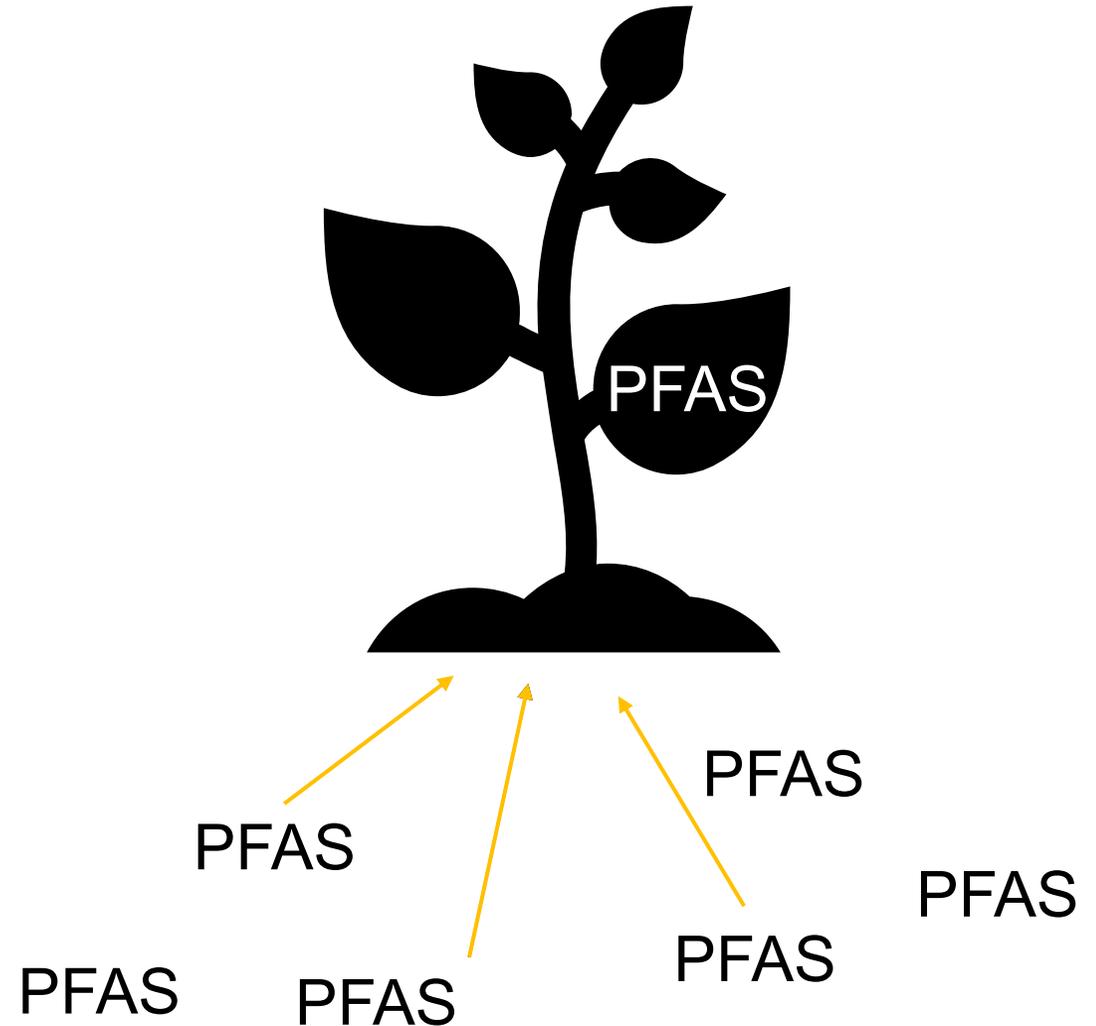
The Global Threat from the Irreversible Accumulation of Trifluoroacetic Acid (TFA)

Hans Peter H. Arp*, Andrea Gredelj, Juliane Glüge, Martin Scheringer, and Ian T. Cousins



Crop Uptake

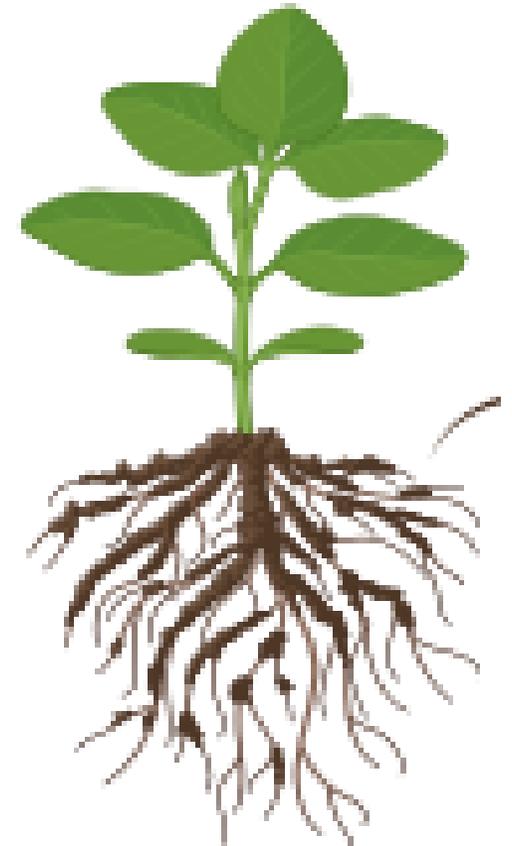
- To better understand risk associated with PFAS entering the food chain we need to know more about PFAS movement into plants
- The numerical value assigned to this movement is known as the **Transfer Factor**





Whether PFAS **stay in the soil** vs. **move into the ground water** vs. **uptake into the plant** varies due to:

- Specific structure and polarity of PFAS molecule
 - Soil carbon (organic matter)
 - Growing medium
 - Soil mineral content
 - Plant protein and lipid content
 - pH
 - Frequency of watering
 - Temperature
 - The interaction between all these variables
- + which portion of the plant is being consumed!





PFAS Forage Management Trial



Sonora Ortiz and Ellen Mallory, University of Maine Cooperative Extension

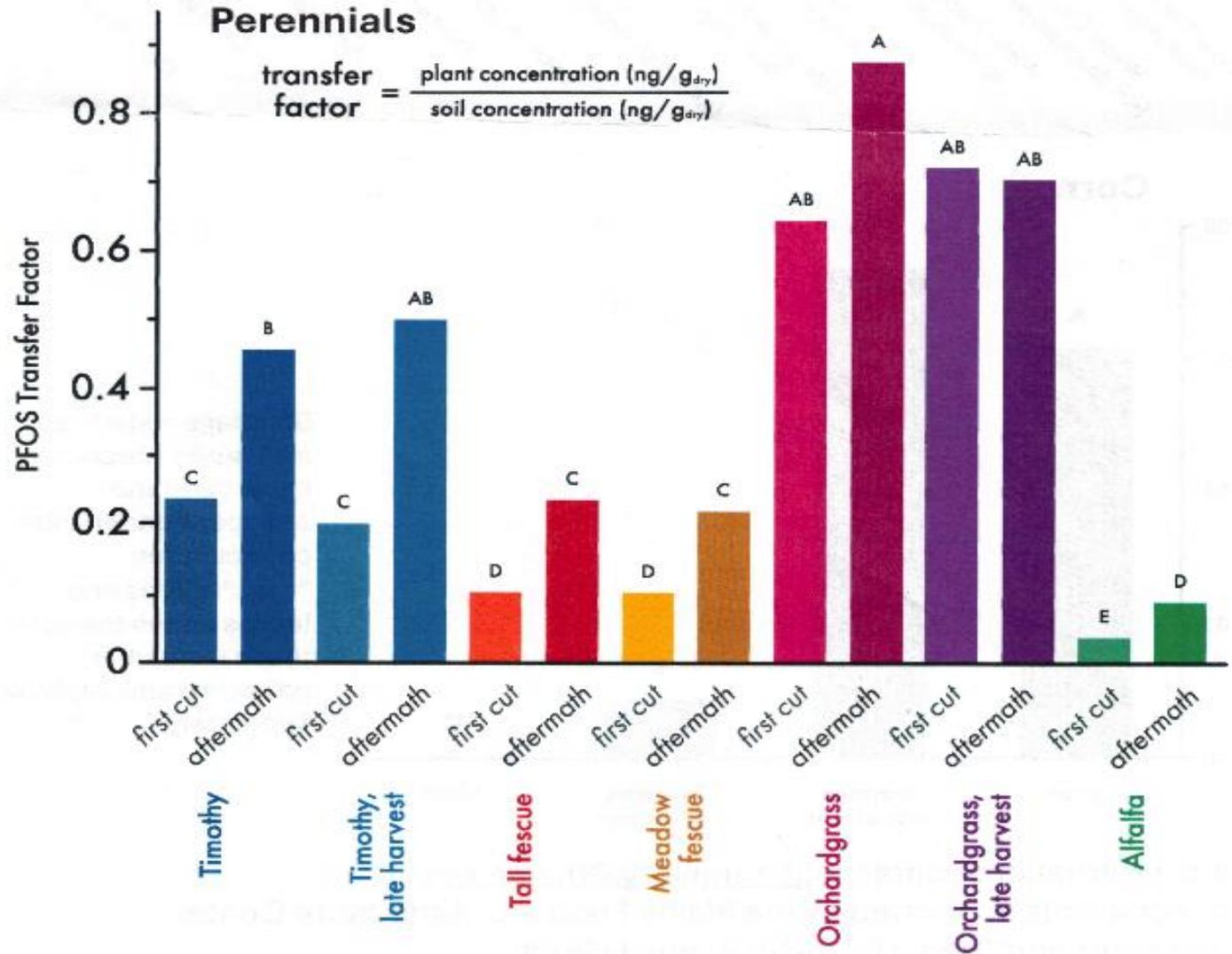
Research Objective - Identify management strategies that reduce PFAS concentrations in harvested forages.

Management Strategies Tested

- Crop types and species - annuals vs. perennials; grasses vs. legumes
- Cutting height – perennials only
- Harvest timing - optimal vs. late (perennials); boot vs. dough stage (cereals)
- Growing period - 1st vs. 2nd cut (perennials); standard vs. late planting (oat)
- Harvested product – whole plant vs. grain; silage vs. earlage vs. grain (corn)

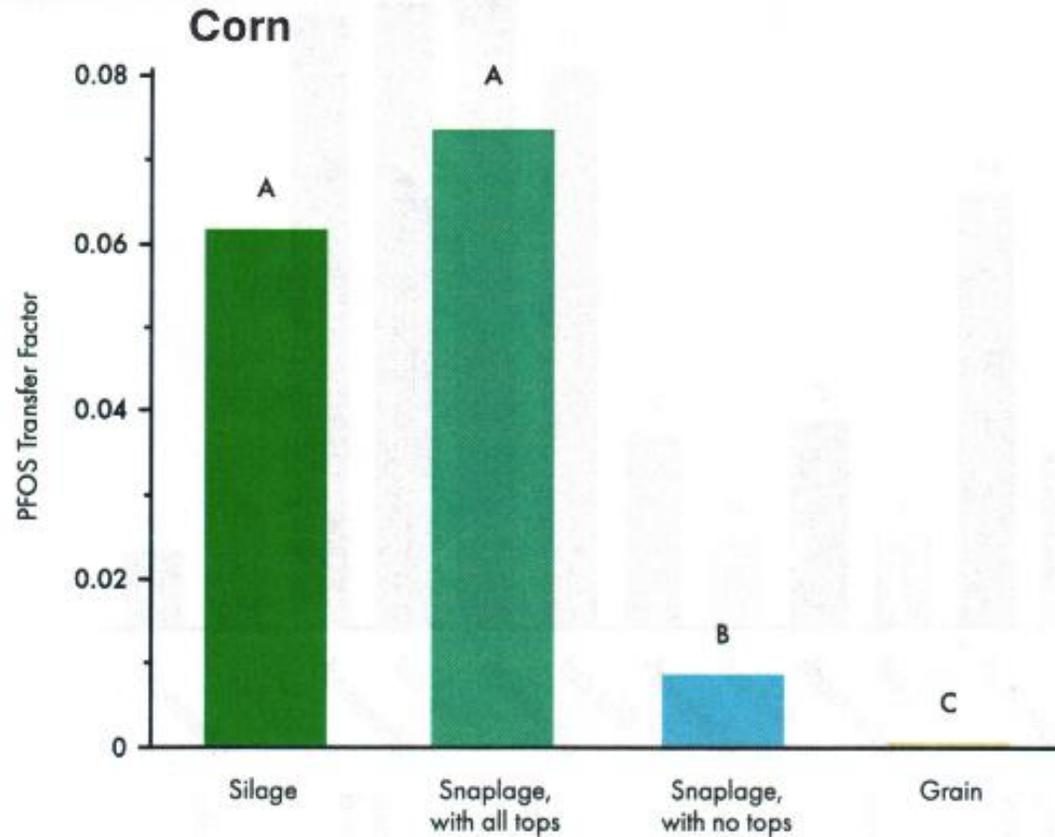
2024 Results

Treatments that do not share a letter are considered statistically different.





PFAS Forage Management Trial



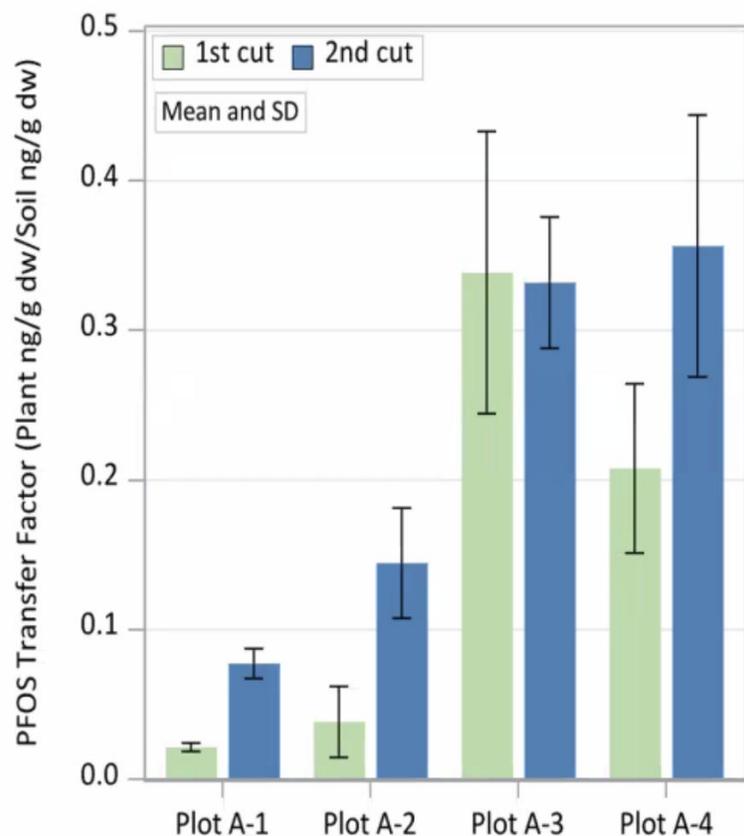
Snaplage = stalk, ears, and husks. Because most combine snapper headers also collect some "tops" (stems and leaves above the ears), these were also collected and analyzed separately.

For more information, contact ellen.mallory@maine.edu.
 This project was/is supported by the Maine Food and Agriculture Center, American Farmland Trust, USDA-NIFA, and USEPA.

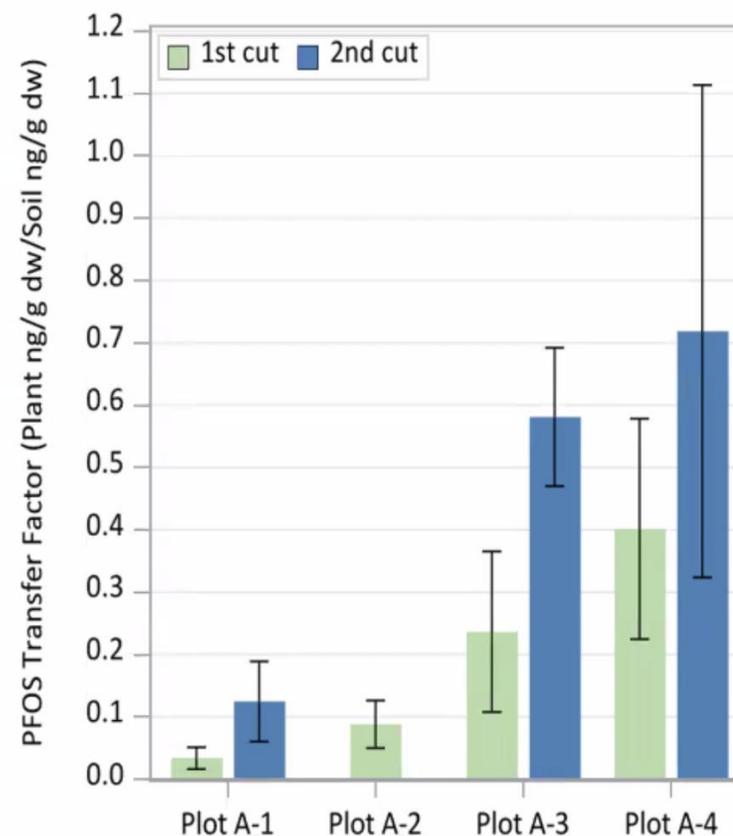


Field Plots 1st and 2nd Growth Cuttings

Year 2 Cuttings



Year 3 Cuttings





Journal of Agricultural and Food Chemistry > Vol 72/Issue 48 > Article

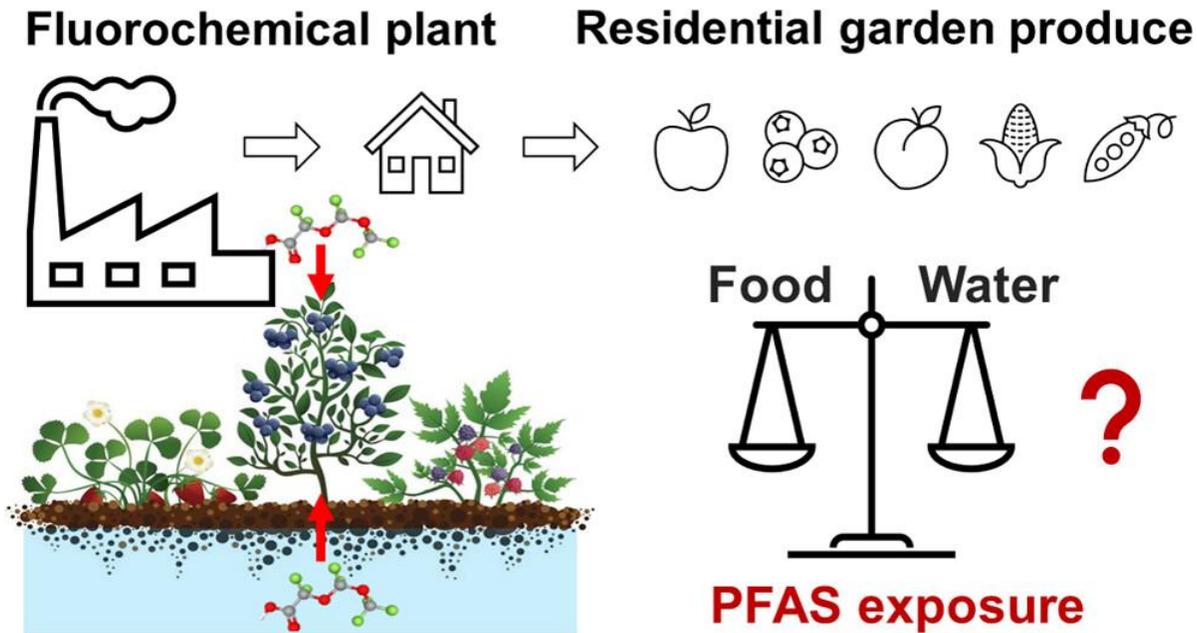
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FOOD SAFETY AND TOXICOLOGY | November 20, 2024

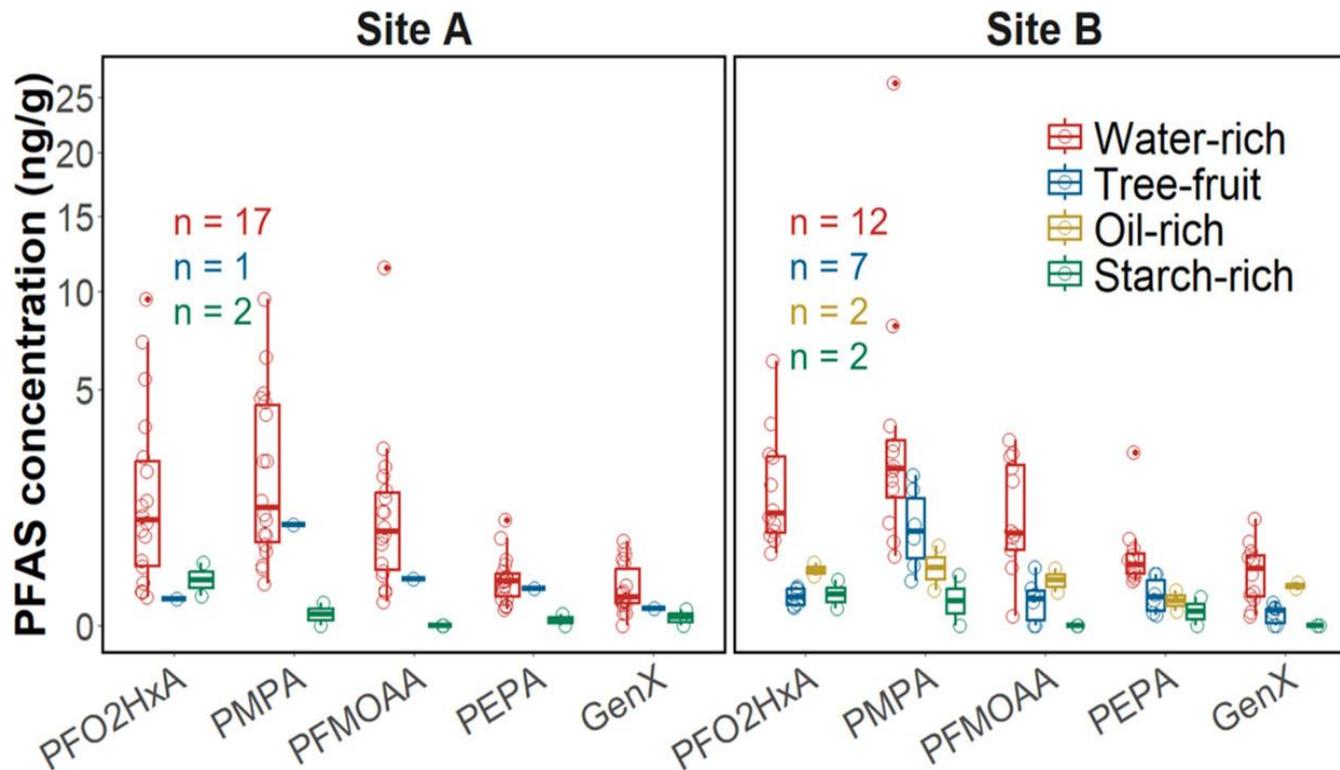
Residential Garden Produce Harvested Near a Fluorochemical Manufacturer in North Carolina Can Be An Important Fluoroether Exposure Pathway

Pingping Meng*, Nadia Sheppard, Sarangi Joseph, Owen W. Duckworth, Christopher P. Higgins, and Detlef R. U. Knappe





PFAS by Plant Type



Water-rich: blueberries, strawberries, tomatoes, lettuce, blackberries, figs

Tree-fruit: apples, peaches, pears

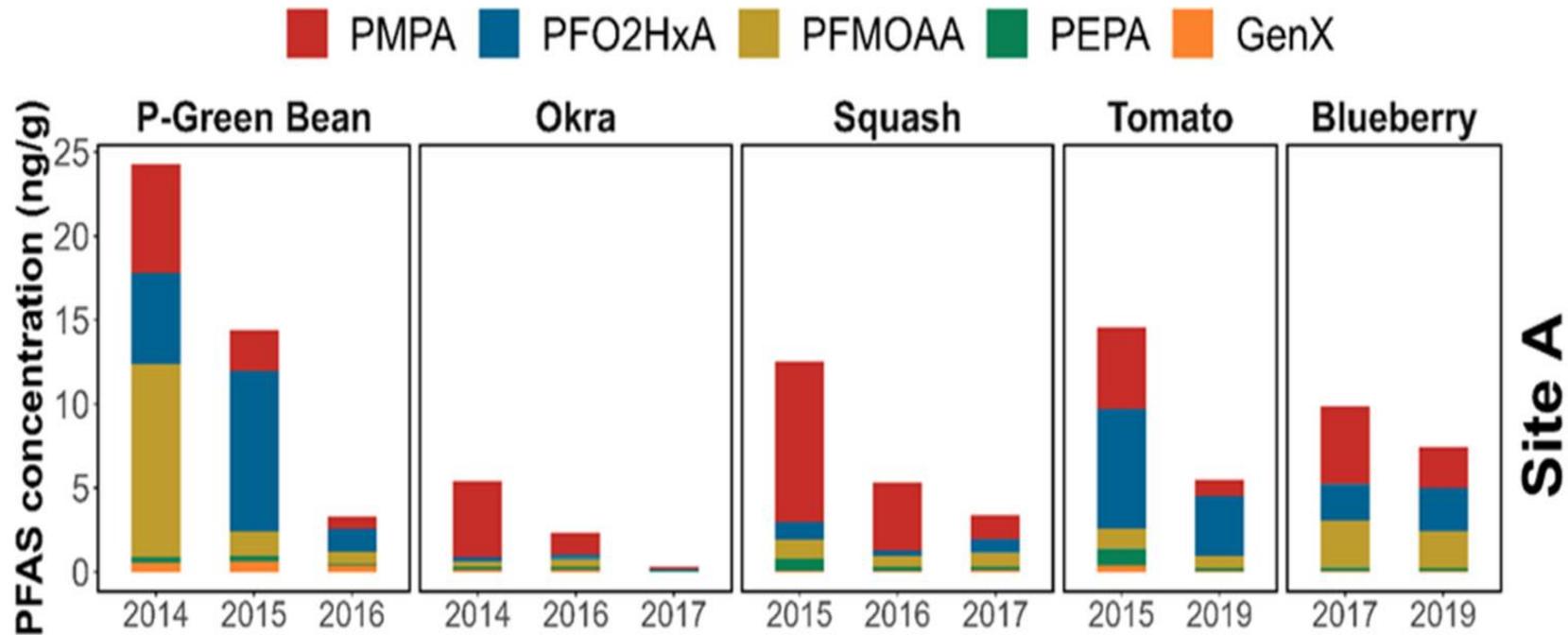
Oil-rich = pecans

Starch-rich = potato, corn, sweet potato

Effect of produce type on PFAS concentrations in produce.
The sample size for each box plot was labeled using colors that match the corresponding scatter points.



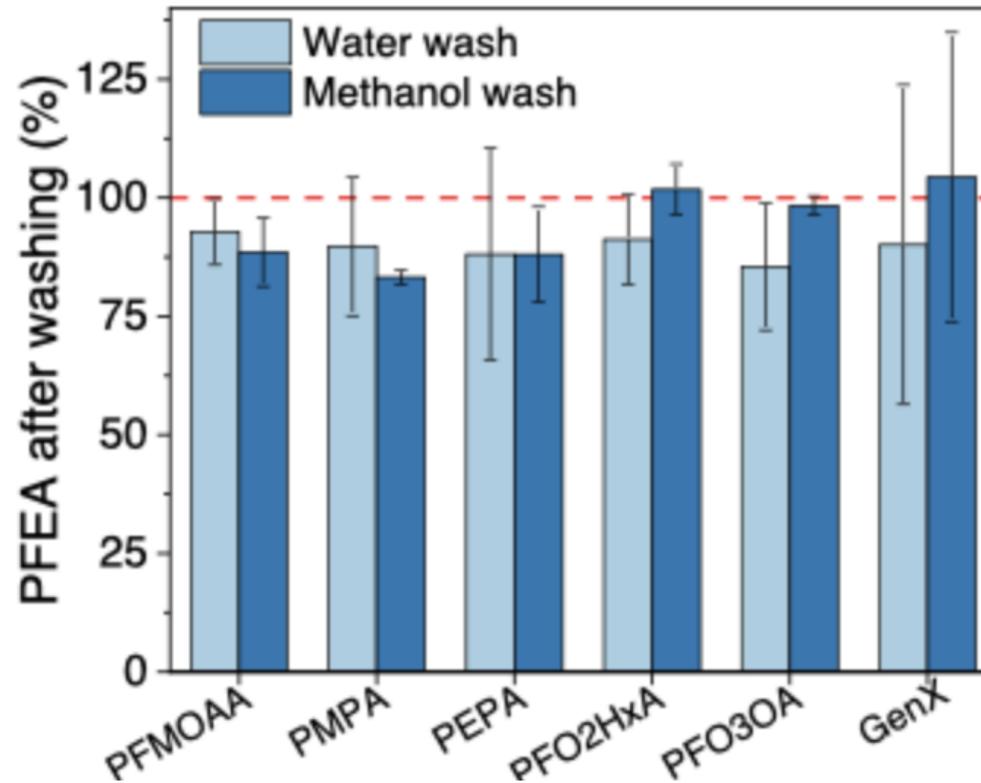
PFAS concentrations after air pollution control measures implemented (2013)



Temporal PFAS concentration trends in different produce types at two sampling sites.



Effect of washing the produce on PFAS

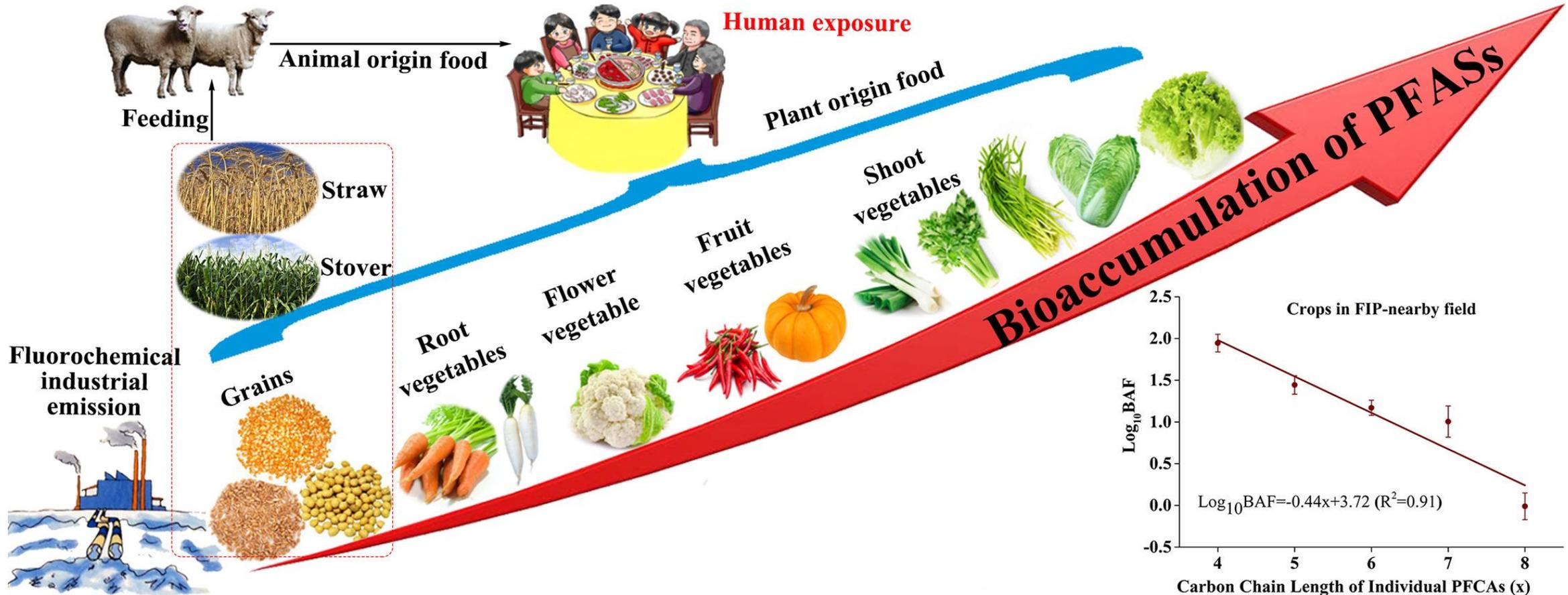


Suggests that PFAS had accumulated through internal plant uptake
- No soil data

Figure S10. Effect of washing on PFAS concentrations in blueberries. The bars represent the mean percentage of PFEAs remaining in the blueberry samples, and whiskers indicate one standard deviation.



Plant Accumulation of PFAS





Vegetable PFOS Uptake



Differing PFOS Uptake By Vegetables

Little	Some	More
Asparagus Bok Choy Corn (kernels) Green Beans Peppers Potatoes Rhubarb Broccoli	Arugula Carrots Kale Swiss Chard	Lettuce Spinach

Data is from Maine's Department of Agriculture, Conservation and Forestry (DACF) and is not published yet.



Maine Vegetable Farm

- 10-acre organic mixed vegetable and flower farm.
- Contaminated water (surface and ground) from neighboring dairy farm that had sludge applied to their fields.
- Irrigation was from a spring-fed surface water pond that had high levels of PFOS
- Drinking water in the home was also high
- Family members have elevated PFOS levels





Maine Vegetable Farm

Strategies:

- Worked with state agencies to determine contamination pattern of soils
- Moved from vegetables to flowers on the highest impacted fields
- Leafy greens grown on a small area lowest soil PFAS
 - Leafy greens accumulate PFOS at a high rate
- Difficulty with pest management due to lack of crop rotation ability





Maine Vegetable Farm

Strategies:

- Frac tank filled with 20,000 gallons of water from municipal treatment plant
 - Filter would not be able to keep up with irrigation demand
- Whole house filter for drinking water
- New 700-ft deep well
 - Down the road, across a creek, not impacted by PFOS from dairy farm applications
 - Slow process; ~ three years





Calculating the risks of PFAS in food

- What specific PFAS chemicals are being consumed?
 - Not all analytes are equal
- Who is consuming the PFAS?
 - Child or an adult?
 - Underlying health conditions?
- How much of the food is consumed?
 - 90th Percentile?
- What is the total dose of PFAS?
 - Background exposures?





What is a safe dose? Toxicity!

Agency	PFOS Toxicity Value (ng/kg-bw/day)	Year Derived
US EPA	20	2016
US EPA	0.1	2024
ATSDR	2.0	2021
MI SAWG	2.89	2019
CA OEHH	0.64	2024
European Union	0.63*	2022

*Sum of four PFAS (PFOS, PFOA, PFNA and PFHxS) with a tolerable weekly intake of 4.4 ng/kg-bw/week, effects on the immune system considered the critical effect.



PFAS Food Safety Standards in the European Union

- “Maximum Levels” on meats and eggs
- Investigative levels for milk, fruits, vegetables, starchy roots and tubers, wild fungi
 - Further investigation of the cause of contamination should be carried out when these levels are exceeded

Product	“Indicative Level”
Fruits, Vegetable, Starchy Roots, Tubers	10 ppt (ng/kg)
Wild Fungi	1500 ppt (ng/kg)
Milk	20 ppt (ng/kg)



PFAS in food supply



Analytical Results for PFAS in 2021 Total Diet Study Sampling (Parts Per Trillion)—Dataset 8

Note: The 92 samples were collected for the FY2021 Total Diet Study and analyzed for 30 types of PFAS in 2023. No PFAS were detected in 86 of the 92 samples, Measured Concentrations in parts per trillion (ppt=ng/kg)

Bread and Grains Method Detection Limits (MDL)	PFBA* MDL = 602	PFPeA* MDL = 242	PFHxA MDL = 25	PFHpA MDL = 24	PFOA† MDL = 28	PFOS† MDL = 21
Rice, white, enriched, cooked	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL
Corn, frozen, boiled	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL
Bread, white, enriched, pre-sliced	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL
Bread, whole wheat, pre-sliced	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL
Tortilla, flour	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL
Muffin, blueberry	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL
Cake, chocolate with chocolate icing	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL
Potato, peeled, boiled	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL
Potato, with peel, baked	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL
Bagel, plain, toasted	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL
English muffin, plain, toasted	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL
Potatoes, French fries, fast-food	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL
Cake, white with white icing	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL
Cinnamon roll, iced	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL
Biscuits, fast-food	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL
Tortilla, corn	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL
Bread, white roll/bun (hamburger/hotdog)	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL
Rice, brown, cooked	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL
Pizza fast food cheese	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL

*All PFBA and PFPeA detects must be confirmed using High-Resolution Mass Spectrometry (HR-MS).

†All PFOA, PFHxS, and PFOS results correspond to linear-only PFAS compounds. Branched compounds for these analytes were not detected.

Partial list of food items with green circles highlighting specific entries:

- Rice, white, enriched, cooked
- Corn, frozen, boiled
- Bread, white, enriched, pre-sliced
- Bread, whole wheat, pre-sliced
- Tortilla, flour
- Muffin, blueberry
- Cake, chocolate with chocolate icing
- Potato, peeled, boiled
- Potato, with peel, baked
- Bagel, plain, toasted
- English muffin, plain, toasted
- Potatoes, French fries, fast-food
- Cake, white with white icing
- Cinnamon roll, iced
- Biscuits, fast-food
- Tortilla, corn
- Bread, white roll/bun (hamburger/hotdog)
- Rice, brown, cooked
- Pizza fast food cheese



MSU and MPART are working to develop a strategy for working with farms

- Education
- Risk assessment
- Sampling
 - Soil
 - Water
- Follow up discussions
- Mitigation strategies
 - Funding for infrastructure changes





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PFAS in Agriculture

Understanding the 'forever chemical' problem

So, what are PFAS?

PFAS, or per- and polyfluoroalkyl substances, are man-made chemicals used in things like non-stick cookware, water-resistant clothing, and firefighting foam. These chemicals don't break down easily, so they can stay in the soil, water, and even in plants and animals for a long time. This makes them a concern to farms because they can stick around and affect the environment and the safety of what you grow and raise.

Potential impact of PFAS

Human Health Implications

Research has shown that PFAS exposure can cause serious health problems, including an increased risk of cancer, developmental defects, immune system disruption, among others.

Economic Impact

PFAS contamination may render farmland unusable for traditional agriculture, reducing land value and productivity. Farm products may also be deemed unfit for human consumption.

Environmental Impact

When PFAS-contaminated water or soil from farms enters local ecosystems, it can pollute rivers, lakes, and groundwater, harming wildlife and plants. Aquatic life, like fish, can absorb PFAS, which then enters the food chain, affecting both animals and humans.

How do PFAS get to Farms?

PFAS have unintentionally entered farm soil and water through various sources, including biosolids from wastewater treatment plants, which are used as fertilizer. These chemicals can also come from contaminated groundwater, surface water, septic fields, paper sludge, and other soil amendments.

Once on the farm, PFAS can build up in crops, livestock, soil, and water supplies, potentially affecting food safety and public health.

What can Farmers do?

Water and Soil Testing

Especially if biosolids were applied to the farm or if it is located near known PFAS sources, such as airports or manufacturing facilities.

Identify the Source of Contamination

Understanding how PFAS got onto your farm is essential for addressing the problem.

Modify Farming Practices

Move animals to clean water sources and feed from uncontaminated areas.

Collaborate with MSU

Michigan State University can provide guidance on navigating the contamination problem.

How do PFAS affect Crops and Livestock?

Crops may uptake PFAS from contaminated soil and water. Some crops, like leafy greens, may accumulate more PFAS than others. Livestock can consume PFAS through contaminated feed or water, leading to accumulation in their bodies. This can contaminate the meat, milk, or eggs produced.

Resources and Support

PFAS can significantly impact farm productivity, product safety, and long-term land health. Managing contamination may be complex and challenging, but with the right support and strategy, farmers can effectively reduce its effects. Below are useful resources to help farmers better understand and address PFAS:

<https://www.canr.msu.edu/pfas>

<https://www.canr.msu.edu/pfas-research>

<https://www.michigan.gov/pfasresponse>

For more information, contact:
Faith Cullens-Nobis
 cullensf@msu.edu



How MSU Is Helping Farmers With PFAS Concerns

Sampling Resources



- If you have concerns about PFAS contamination in your drinking water, MSU has resources on home testing, how to avoid accidental contamination during sample collection, and lab result interpretation.
- The MSU Center for PFAS Research Analytical Lab or other certified labs can also test ground water, surface water, biota, blood, soil, etc.
 - We can provide a relative timeframe, cost and description of different methods used to test for PFAS in samples.
- Michigan State University can provide financial assistance to farms for testing if there are concerns about PFAS contamination.



Communicating With Consumers

- PFAS contamination on farms was not intentional. These contaminants entered farms in various ways that are out of the farm's control.
- If you discover your farm is contaminated, it is important to discuss what this means with consumers who may not know what PFAS are or the risks.
- We realize these conversations can be difficult, and MSU has created resources specifically for farmers on how to communicate with consumers.

Education & Research

- While PFAS research is ongoing and there are many data gaps to fill, scientists have discovered important findings about how PFAS is impacting the health of both humans and animals. MSU is currently conducting research on PFAS in cattle, field crops, specialty crops, and soils.
- Our goal is to work with the agricultural community to:
 - Educate farmers and consumers on potential health risks of PFAS
 - Relay current research findings on how to remediate animals and farmland
 - Provide practical solutions to keep farmers farming
- MSU Extension's PFAS and Agriculture website covers the basics of PFAS, how PFAS may be impacting farms, current research, mitigation strategies, and support for impacted producers.
 - We have printable handouts for those interested in learning more about PFAS and how it impacts farming.

Farm Visits & Site Assessments



- If you are interested in working with Michigan State University to identify contamination on your farm, we can work with you on:
 - Creating a sampling plan including where and what to test
 - Taking samples of water, soil, and agricultural products
 - Interpreting laboratory results
 - Developing a remediation plan aiming to reduce the levels of PFAS in your soil, water and farm products
- Funding may be available to help with remediation options.



Initial Testing



- For farms concerned about PFAS contamination, Michigan State University has funding available for testing.
- Funding may be prioritized to include:
 - Farms that are close to an MPART site or area of interest
 - Farms that have spread contaminated biosolids, sludge or soil amendments on their property
- Please reach out to MSU Extension for a confidential conversation if you are concerned about PFAS on your farm and/or have an interest in testing.



MSU Support & Resources

- If you are interested in working with Michigan State University or need more information, please contact Faith Cullens-Nobis at cullensf@msu.edu or Katie King at kingka22@msu.edu.
- To reach MSU Extension's PFAS webpage, scan the QR code or go to <https://www.canr.msu.edu/pfas/>.
- We are happy to have confidential conversations, answer any questions you may have about PFAS, or how this issue specifically relates to your farm.



Talking to Consumers about PFAS Contamination

If you've discovered that your farm has PFAS contamination, having open and honest conversations with your customers is an important step. Many consumers may not know what PFAS are, or they might hear exaggerated rumors and feel concerned about their health. Being informed and transparent can help ease fears and build trust. Here are some key points to stress when talking with consumers:



1

PFAS Contamination Was **Not Intentional**

PFAS chemicals can unintentionally enter farmland through sources that farmers may not be aware contain PFAS. These chemicals have been used in industrial processes, firefighting foams, and consumer products for decades, and they persist in the environment. Farmers are not responsible for this contamination.



Health Effects Come from **Long-Term Exposure**

Studies show that health risks are linked to chronic (long-term) exposure to PFAS. Short-term, infrequent, or low-level exposure is unlikely to cause harm. Sharing this context with consumers helps ensure accurate understanding and informed discussions.

2

3

Michigan Leads the Nation in PFAS Testing and Research

Michigan is one of the most proactive states in testing for PFAS, researching its effects, and working on solutions. It was also one of the first states to implement enforceable drinking water standards for 7 PFAS compounds. Buying local food remains one of the best ways to know where your food comes from and support your community.



There Are **No National Food Safety Standards for PFAS**

Currently, there are no official food safety standards or reporting requirements for PFAS in food. Just because a product is not tested for PFAS does not mean it is free of contamination, but transparency and ongoing research are crucial in addressing this issue.



4

5

Labeling Can Be **Misleading**

Some products may be labeled 'PFOA-free' or 'PFOS-free,' but this does not mean they are entirely free of PFAS. With thousands of different PFAS compounds in existence, testing for all of them is not currently possible.



Food Is **Not the Only Source** of PFAS Exposure

Food is not the only source of PFAS—these chemicals are found in many aspects of daily life. However, you can take steps to reduce your exposure by testing your water, following fish advisories, avoiding stain-resistant products, using stainless steel, ceramic or cast iron cookware, and supporting companies with a PFAS-free commitment.



6

By having transparent discussions and providing accurate information, farmers can reassure consumers and strengthen trust in local agriculture. Educated consumers are more likely to continue supporting their local farms, even in the face of PFAS-related challenges.



TIPS FOR COLLECTING WATER SAMPLES FOR PFAS ANALYSIS

PFAS are used in a variety of different products we use everyday. It is important to understand how to avoid cross contamination when collecting and handling samples intended for PFAS analysis.



WASH HANDS AND WEAR POWDERLESS NITRILE GLOVES

Make sure to use PFAS-free hand soap to wash hands thoroughly and then put on powderless nitrile gloves. PFAS contamination during sampling can occur from a number of common sources, such as food packaging, clothing, dust, personal care products, and certain foods and beverages. Replace gloves if they come in contact with anything that may contain PFAS. Proper hand washing and glove use will minimize accidental contamination of samples.

ENSURE RESULTS REPRESENT THE WATER SOURCE ITSELF

It is recommended that water is flushed from the faucet/ spigot until the water temperature stabilizes prior to sample collection (this may take several minutes) and that samples are collected from the location that is closest to the well. These recommendations help to identify if the water source itself is contaminated without interference from plumbing infrastructure that may contain PFAS.



MINIMIZE THE USE OF THESE PRODUCTS

Avoid using synthetic water-resistant and/or stain-resistant materials (e.g., Gore-Tex™, Scotchgard™, etc.) cosmetics, moisturizers, sun-blocks, insect repellants, fragrances, creams, Teflon® and other fluoropolymer-containing materials, paper packaging for food, new or unwashed clothing, clothing washed with fabric softeners, or waterproof notebooks. Do not use markers other than Fine or Ultra-Fine point Sharpies®, which have been proven to be PFAS-free.



KEEP SAMPLE BOTTLE CLOSED BEFORE AND AFTER COLLECTION

To avoid cross contamination, avoid any contact with the inside of the lid/cap. After filling the container, cover the sample with the lid or cap immediately. Be cautious of activities like vacuuming, cooking, applying personal care products, etc. while collecting samples. Make sure to use the correct sample bottle and follow all instructions provided by the laboratory or supplier of your test kit to ensure accurate results.

MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES AND ENERGY'S SAMPLING GUIDE



Scan this QR code for a full guide on how to collect water samples for PFAS analysis.

LABORATORIES IN MICHIGAN THAT DO PFAS TESTING



Scan this QR code for a full list of laboratories that analyze samples for PFAS compounds.



For more information, contact Faith Cullens-Nobis (cullensf@msu.edu) or Katie King (kingka22@msu.edu).



www.canr.msu.edu/pfas/

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Search...

MSU Extension
PFAS Contamination in Agriculture

What Does PFAS Mean To My Farm? | Health Impacts | Mitigation | Michigan's Response | Research | Resources | Home Gardening | Biosolids

Septage | Center For PFAS Research | Events

MSU Extension and statewide partners are working together to support agricultural producers and communities impacted by PFAS contamination. PFAS are a class of chemicals widely used in fire retardants, consumer products, and some manufacturing facilities.



Upcoming Webinars

MICHIGAN STATE UNIVERSITY | Extension

MSU Center for PFAS Research

PFAS IN AGRICULTURE WEBINAR SERIES 2026

Register for this free webinar series to get your questions answered about PFAS in agriculture.

TUESDAY, MARCH 17TH
Introduction to PFAS in Agriculture

THURSDAY, MARCH 19TH
PFAS in Crops (Row Crops and Produce)

TUESDAY, MARCH 24TH
PFAS in Livestock

THURSDAY, MARCH 26TH
PFAS in Biosolids and Septage

TUESDAYS & THURSDAYS FROM 10-11 AM

FEATURED SPEAKERS
Faith Cullens Nobis- MSU Extension
Katie King- MSU Center for PFAS Research
Marcus Wasilevich- Michigan Department of Agriculture and Rural Development

CULLENSF@MSU.EDU
Contact Faith with any specific questions you would like to have answered in this series.

ZOOM (REGISTER BELOW)



<https://events.anr.msu.edu/PFASinAg/>

CAN'T MAKE IT?
Zoom recordings will be available on our website:
<https://www.canr.msu.edu/pfas/resources>

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CEU Tracking Number: MI 56995 **Approved CEUs:**

Meeting Title: PFAS in Cropping Systems

Location: Online

Meeting Date: 03/19/2026, 10:00 AM to 11:00 AM

NM	SW	PM	CM	PD
0.0	1.0	0.0	0.0	0.0

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mail:

U.S. Department of Agriculture
Office of the Assistant Secretary for Civil Rights
1400 Independence Avenue, SW
Washington, D.C. 20250-9410; or

fax:

(833) 256-1665 or (202) 690-7442;

email:

program.intake@usda.gov.

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correo postal:

U.S. Department of Agriculture
Office of the Assistant Secretary for Civil Rights
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Washington, D.C. 20250-9410; o'

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(833) 256-1665 o' (202) 690-7442;

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