

Per and Polyfluoroalkyl Substances - PFAS

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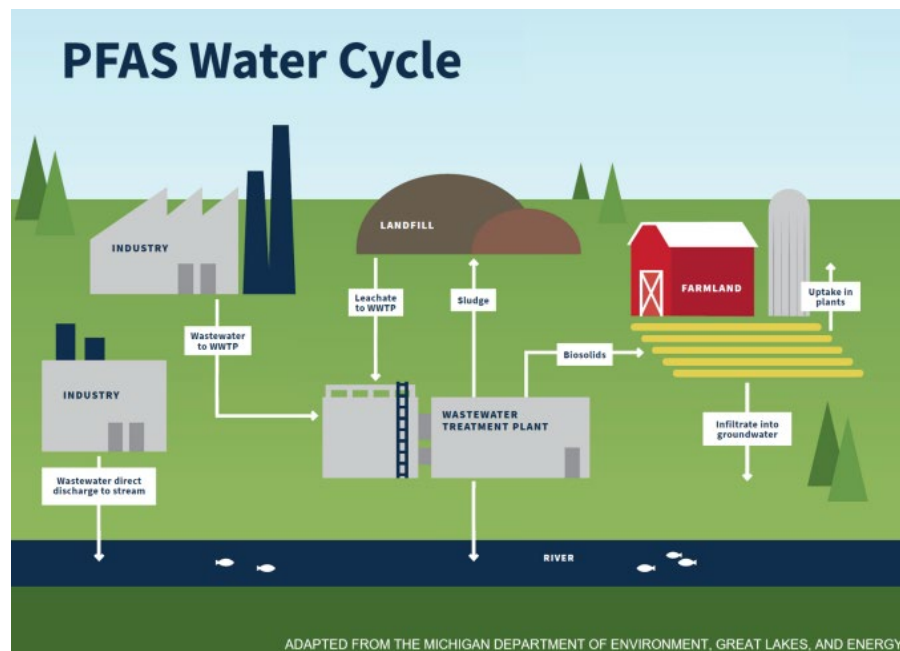
What is PFAS?



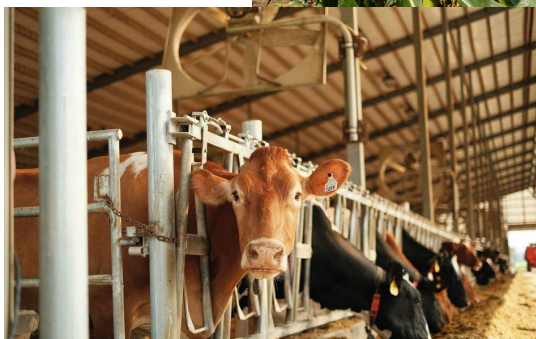
- **PFAS - Per and Polyfluoroalkyl Substances (multiple)**
 - Perfluorooctanoic acid (PFOA)
 - Perfluorooctanesulfonic acid (PFOS)
 - Perfluorononanoic acid
 - GenX Chemicals
 - Others
- **Commonly used, long lasting chemicals, aka “forever chemicals” that are used in the manufacturing and production of many common items such as:**
 - Non-stick pans
 - Fast food wrappers
 - Cosmetics
 - Stain and waterproof fabrics
- **PFOA and PFOS among most common PFAS and some of the most widespread pollutants**
- **Can contaminate, water, soil, animals and humans causing harmful health effects.**

PFAS in Agriculture

- **Main sources: polluted water, biosolids, and some pesticide formulations**
- **Being seen on some operations that apply waste waters sludge as ag fertilizer high in PFAS**
 - **Some waste waters sludge applied as early as the 1980s**
- **Contaminate drinking/ irrigation water, animals, and animal by-products**
 - **Milk**
 - **Meat**
- **Type of PFAS and soil organic matter affect plant uptake**



PFAS in Agriculture



- High levels found in leaves of certain cereal, leafy vegetables, and vegetable crops
- Low levels found in some potatoes and cereal seeds
- Plant uptake of PFAS changes with functional group, plant species, and carbon chain length.
- Adverse effects of PFAS exposure in animals includes:
 - Tumors
 - Developmental toxicity
 - Immunotoxicity
 - Neurotoxicity
 - Endocrine disruption
- Contaminate drinking/ irrigation water, animals, and animal by-products
 - Milk
 - Meat



PFAS Considerations for Agriculture

- Varying levels of PFAS uptake in crops.
- Ongoing research on PFAS in agriculture
 - Extensive research needed on PFAS remediation in crop-livestock systems
- Understanding the history and source of waste-derived soil amendments, farm feed, etc. on your operation
- Understanding potential PFAS uptake and concentrations depending on crop type
 - Vegetables plants have higher concentrations of PFAS than grains and fruits
- EPA is also proposing health-based, non-enforceable Maximum Contaminant Level Goals (MCLGs) for these six PFAS in drinking water.
- Chesapeake Bay Program – STAC recommending designing a PFAS monitoring network within the Chesapeake Bay Watershed



References

- [Accumulation of perfluorinated alkyl substances \(PFAS\) in agricultural plants: A review – ScienceDirect](#)
- [Sources, Fate, and Plant Uptake in Agricultural Systems of Per- and Polyfluoroalkyl Substances | SpringerLink](#)
- [IJERPH | Free Full-Text | Per- and Polyfluoroalkyl Substances \(PFAS\) in Integrated Crop–Livestock Systems: Environmental Exposure and Human Health Risks \(mdpi.com\)](#)
- [Improving Understanding and Coordination of Science Activities for Per- and Polyfluoroalkyl Substances \(PFAS\) in the Chesapeake Bay Watershed – STAC](#)
- [PFAS Explained | US EPA](#)

Questions



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