Contaminants of Emerging Concern (CEC) and Publicly Owned Treatment Works (POTWs)

Purpose of Presentation

AWARENESS

- Awareness likely contaminants that may not be regulated yet, but are of concern; potential impacts on human health and the environments

SOURCES

- Likely sources of these contaminants

PREVENTION

- Source water protection; Source control; Product substitution; Minimization

PARTNERSHIPS

MITIGATION

- Destruction; Treatment

Emerging Pollutants – A Moving Target

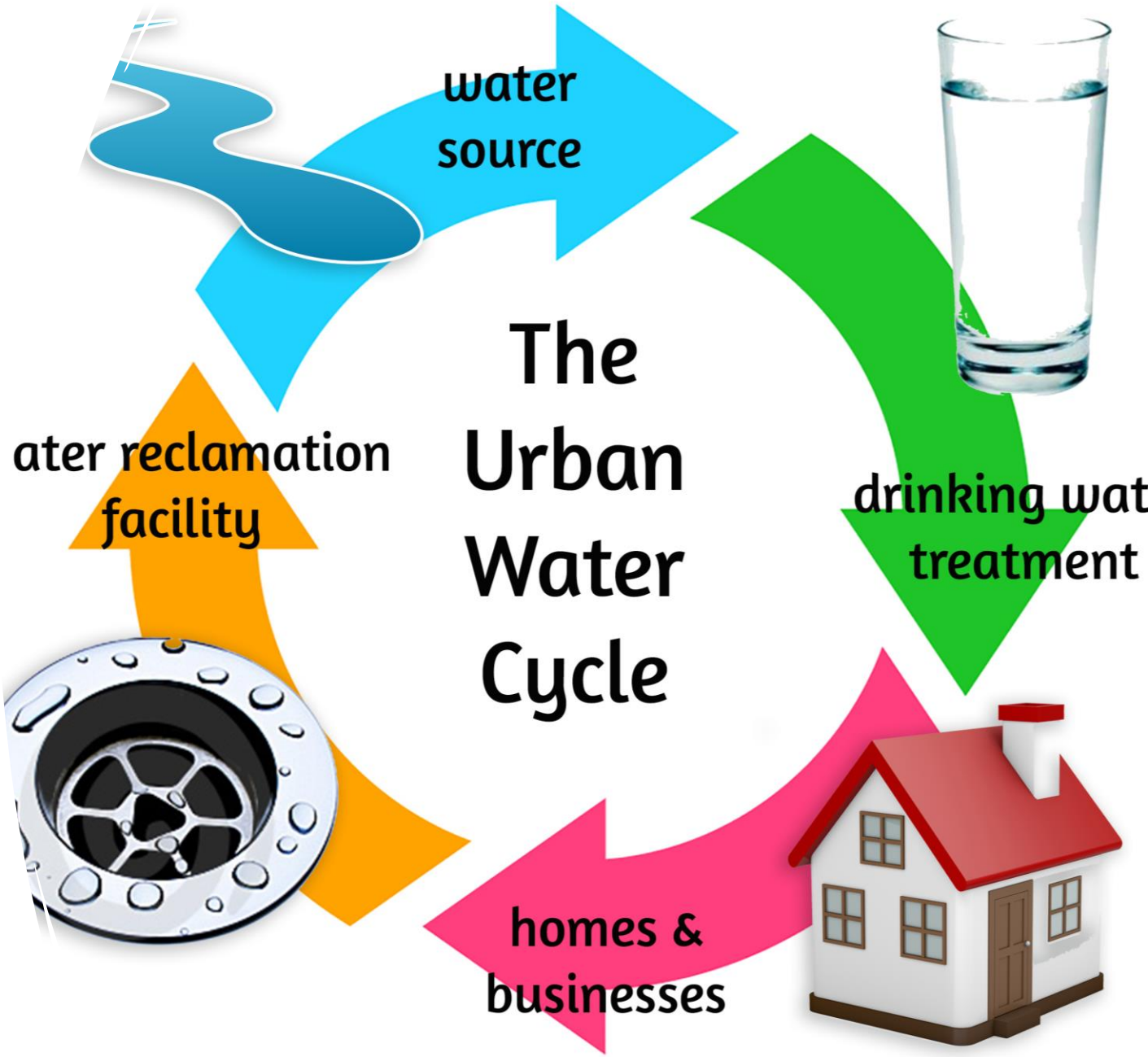
Contaminants of Emerging Concern (CECs) and Publicly Owned Treatment Works (POTWs)

Topics

- What are contaminants of emerging concern (CEC)?
- Why should we care?
- What are the pathways into drinking water and wastewater?
- What are EPA and States doing to address CECs?
- POTW Assessments.
- Strategies to reduce discharges to POTWs.

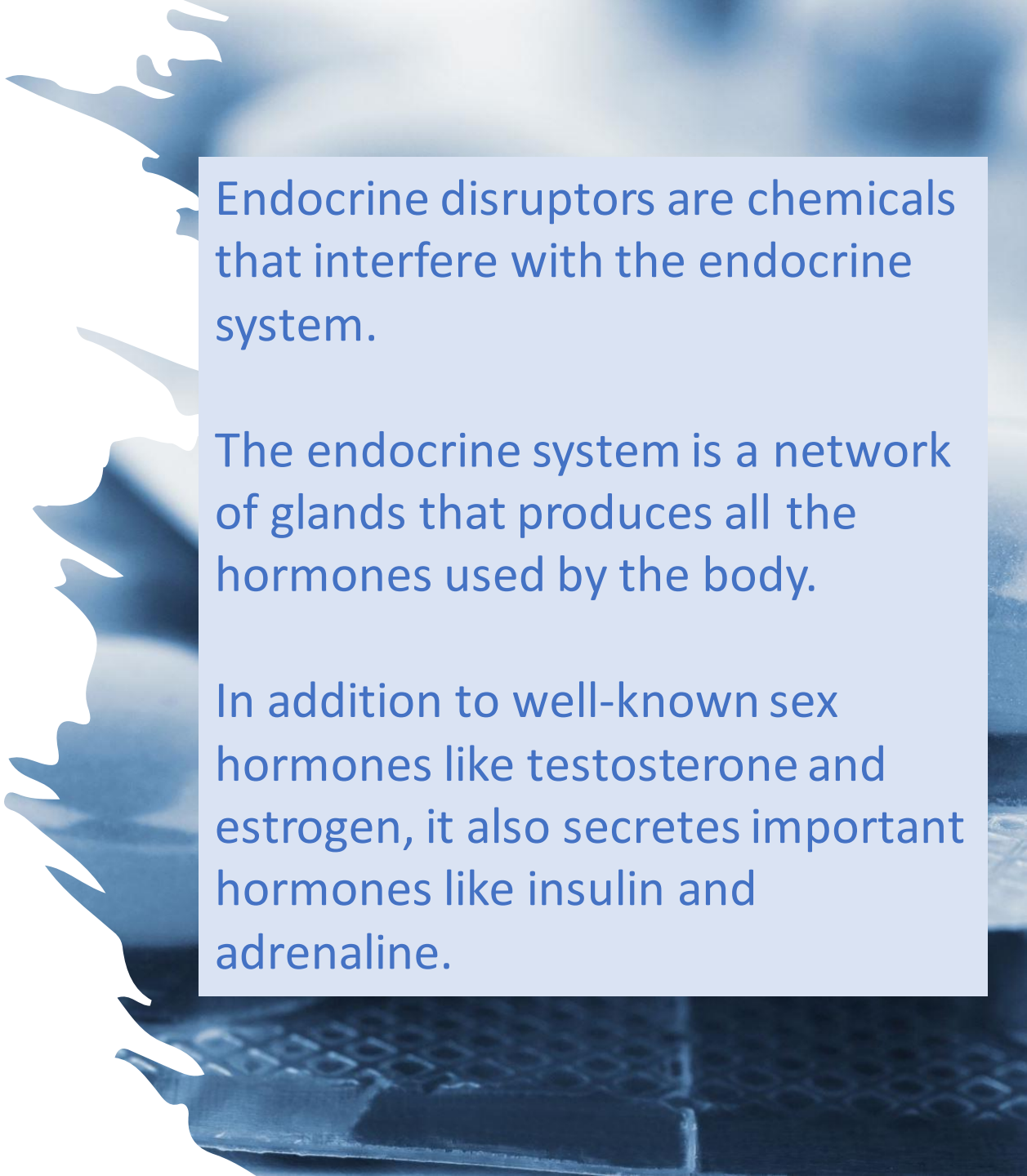
What are Contaminants of Emerging Concern?

- Contaminants of emerging concern are chemicals and toxics found in waterbodies that may cause ecological or human health impacts and they are not currently regulated.
- Treatment plants cannot always remove these contaminants.
- Cleaner raw water = lower treatment costs and fewer public health risks



Endocrine Disrupters

- **Bisphenols (BPA)**
- **Phthalates**



Endocrine disruptors are chemicals that interfere with the endocrine system.

The endocrine system is a network of glands that produces all the hormones used by the body.

In addition to well-known sex hormones like testosterone and estrogen, it also secretes important hormones like insulin and adrenaline.

Bisphenol A

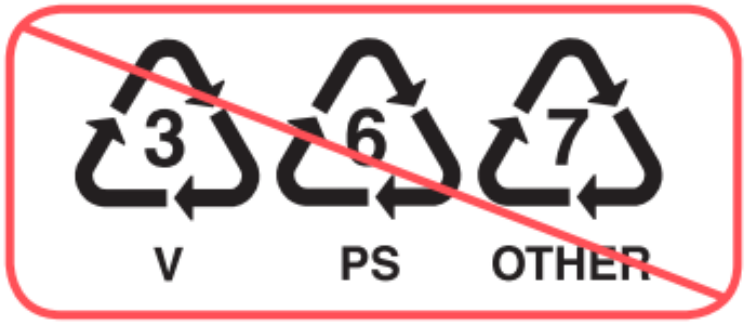
- Food can linings
- Polycarbonate drink containers
- Thermal receipt paper
- Some dental sealants

Phthalates

- Food production equipment
- Beauty and skin care products
- PVC materials
- Household products made from vinyl

Safer plastics:

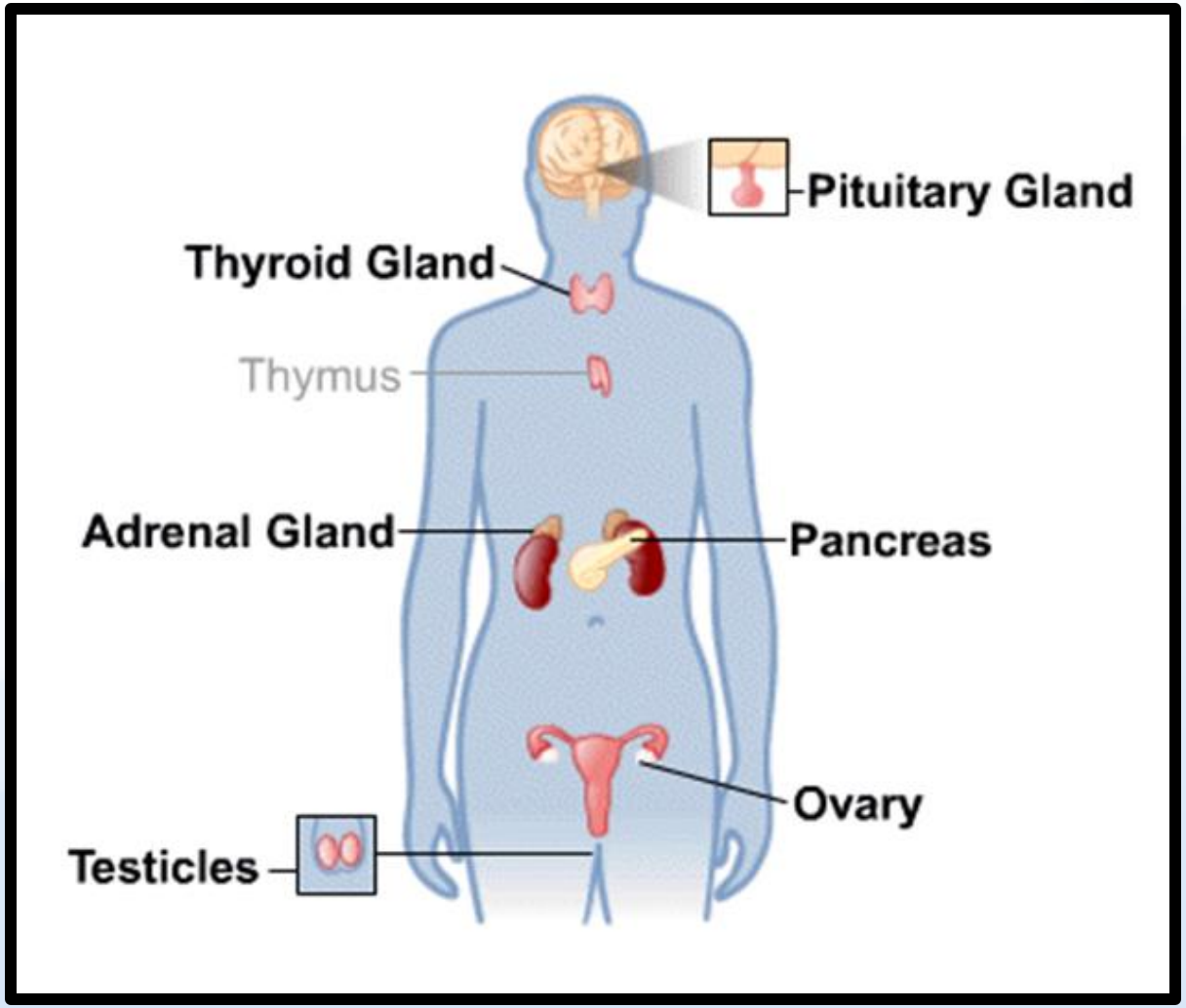
NO!
Plastics to avoid:

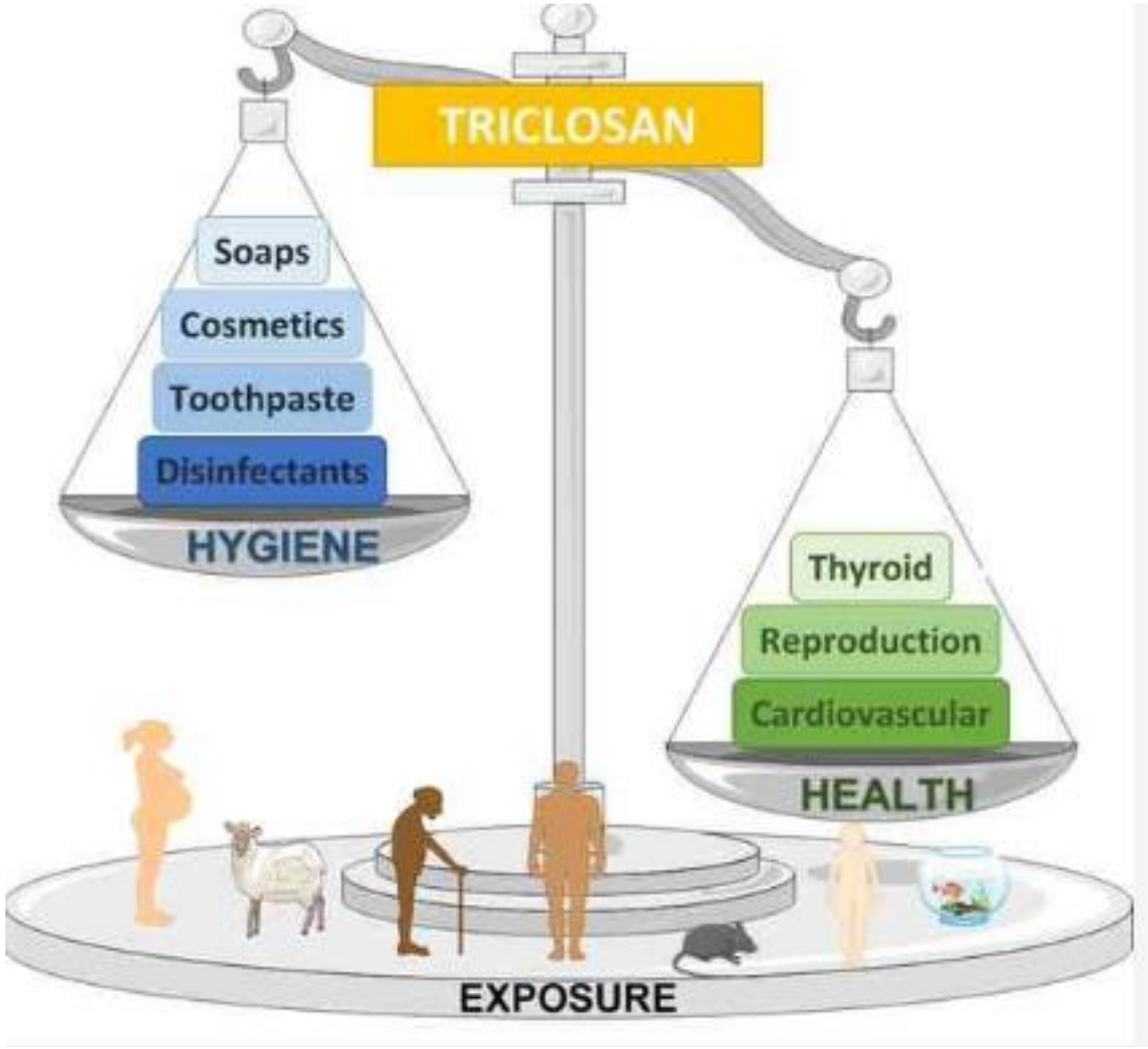


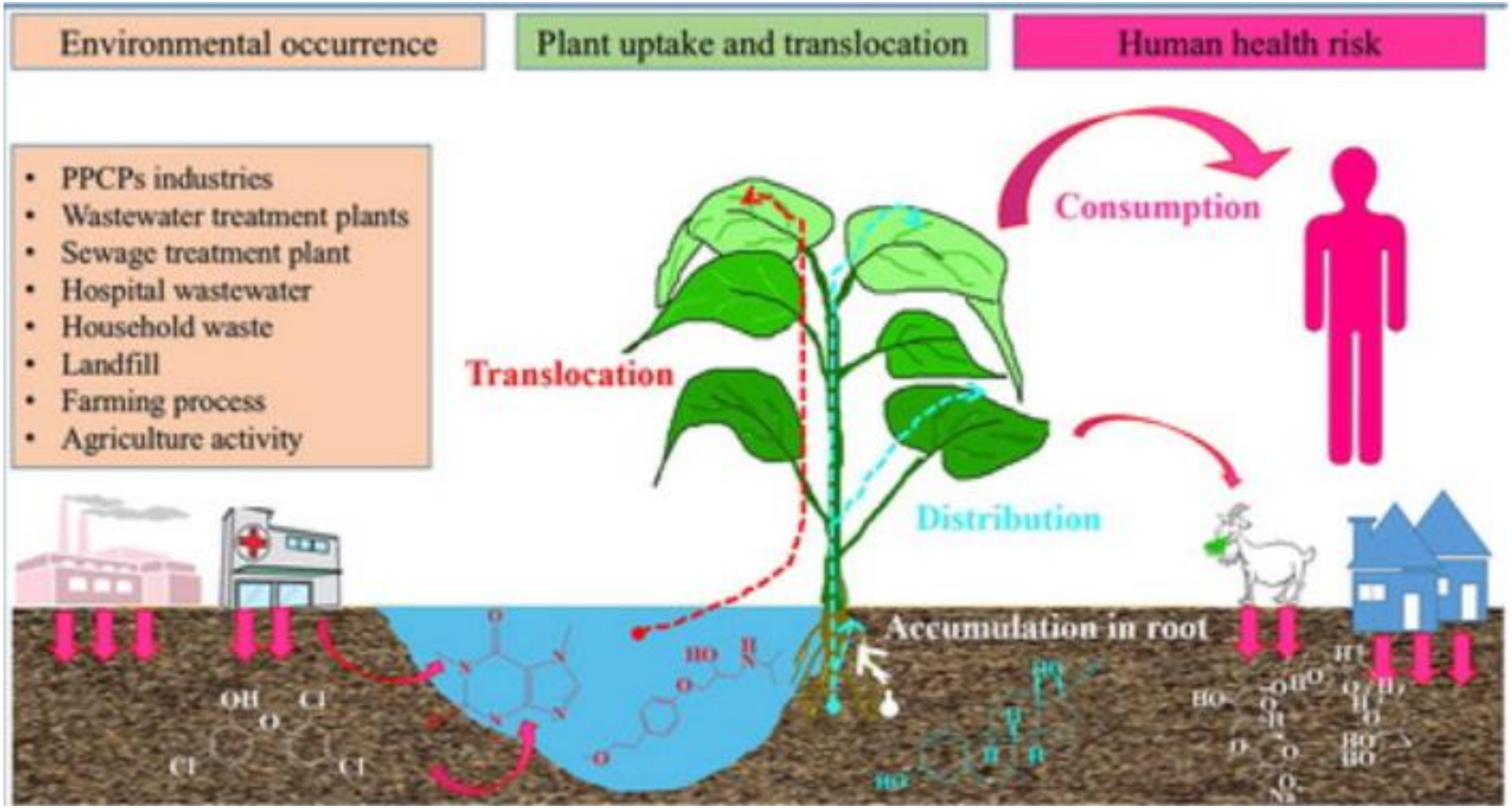
Endocrine Disrupters

- **Bisphenols (BPA)**
- **Phthalates**
- **Triclosan**
- **Polychlorinated biphenyls (PCB)**
- **Some pharmaceuticals**
- **Some Personal Care products**

Human Endocrine System




TRICLOSAN
Soaps
Cosmetics
Toothpaste
Disinfectants
HYGIENE
Thyroid
Reproduction
Cardiovascular
HEALTH
EXPOSURE


Environmental occurrence
Plant uptake and translocation
Human health risk
PPCPs industries
Wastewater treatment plants
Sewage treatment plant
Hospital wastewater
Household waste
Landfill
Farming process
Agriculture activity
Consumption
Translocation
Distribution
Accumulation in root

Pesticides

Point Sources are regulated

Pet Flea and Tick products contribute significantly

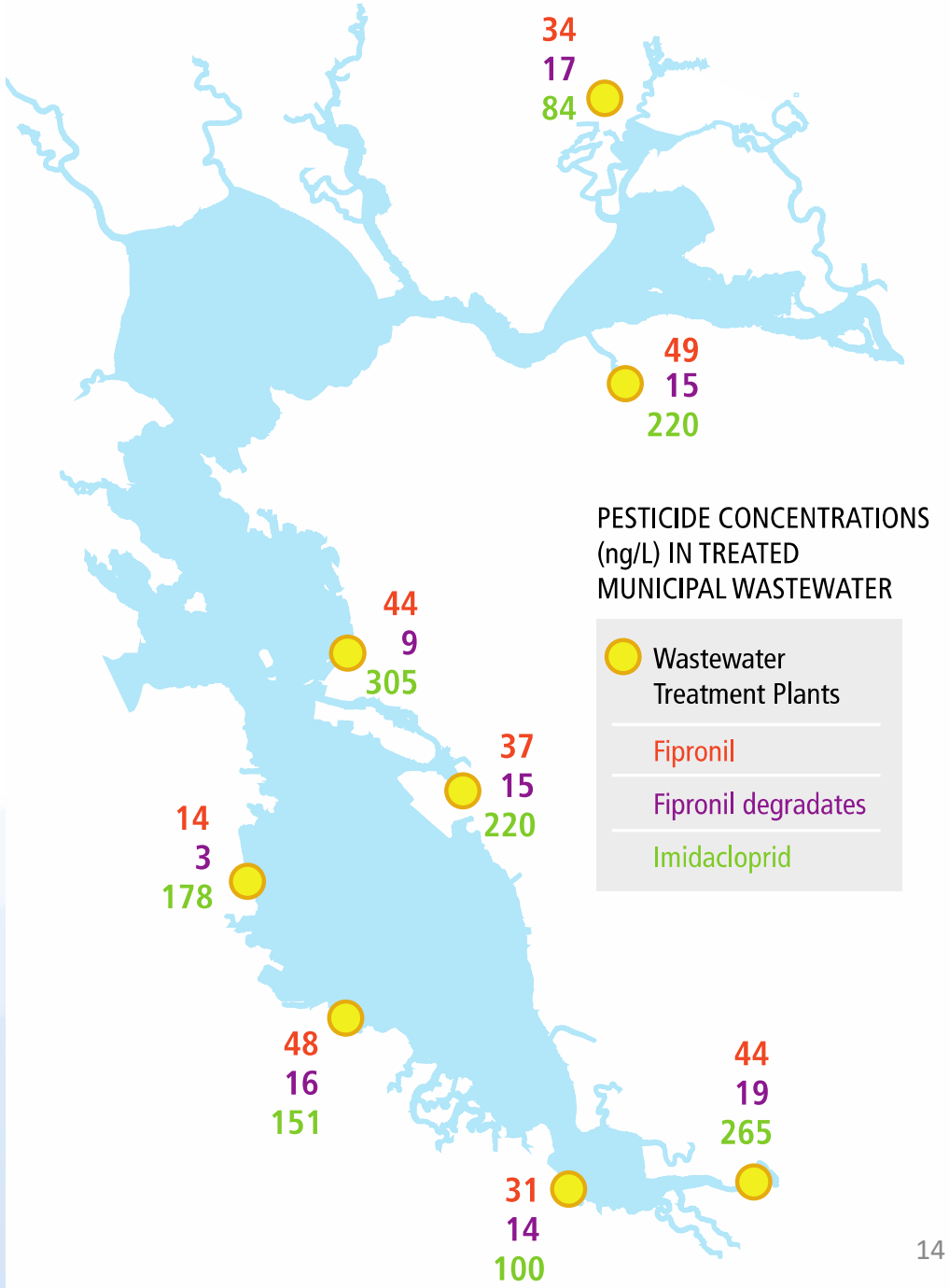
Nonpoint Sources contribute more contaminants than point sources

More in Stormwater than wastewater

Impacts to Health and Environment

- Acute & Chronic human effects
- generational/cumulative health impacts
- degradation of water bodies-drinking water sources

This study conducted in the San Francisco Bay Area provided evidence that **fipronil** and **imidacloprid** pass through wastewater treatment at concentrations > toxicity thresholds for sensitive organisms



Aquatic toxicity thresholds:
11 ng/L for fipronil
10 ng/L for imidacloprid

Sadaria, A.M. et al. 2017. Passage of Fiproles and Imidacloprid from Urban Pest Control Uses Through Wastewater Treatment Plants in Northern California. *Environmental Toxicology and Chemistry*. 36 (6), 1473-1482.

Per- and Polyfluoroalkyl substances (PFAS)

PFAS - per- and polyfluoroalkyl substances

- More than 12,500 PFAS compounds (aka “forever chemicals”), and some have been found to be extremely persistent, bioaccumulative and toxic to humans and wildlife
- Some of the most common include Perfluorooctane Sulfonate (PFOS) and Perfluorooctanoic Acid (PFOA), Perfluorobutanoic Acid (PFBS), a.k.a. C8

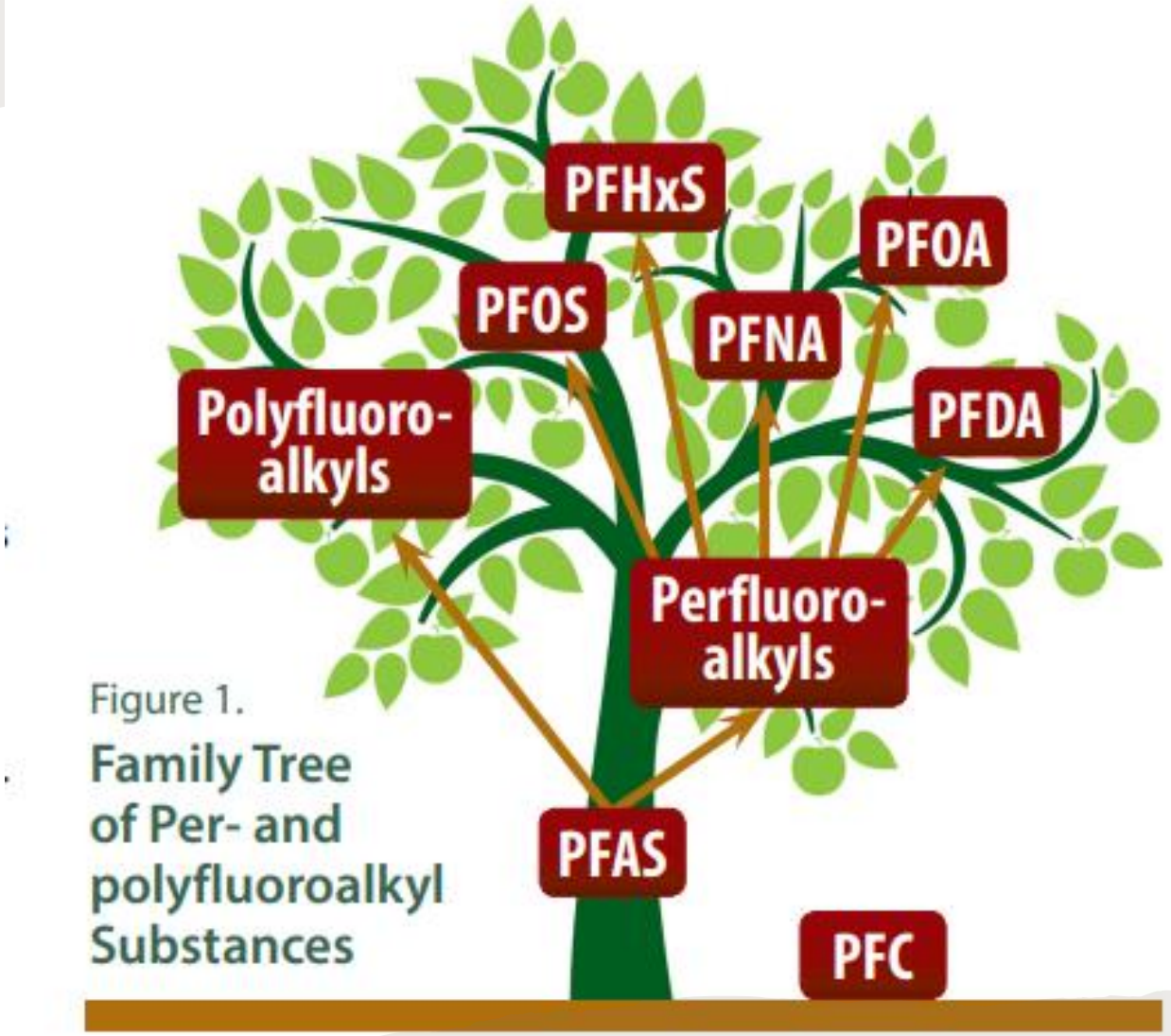
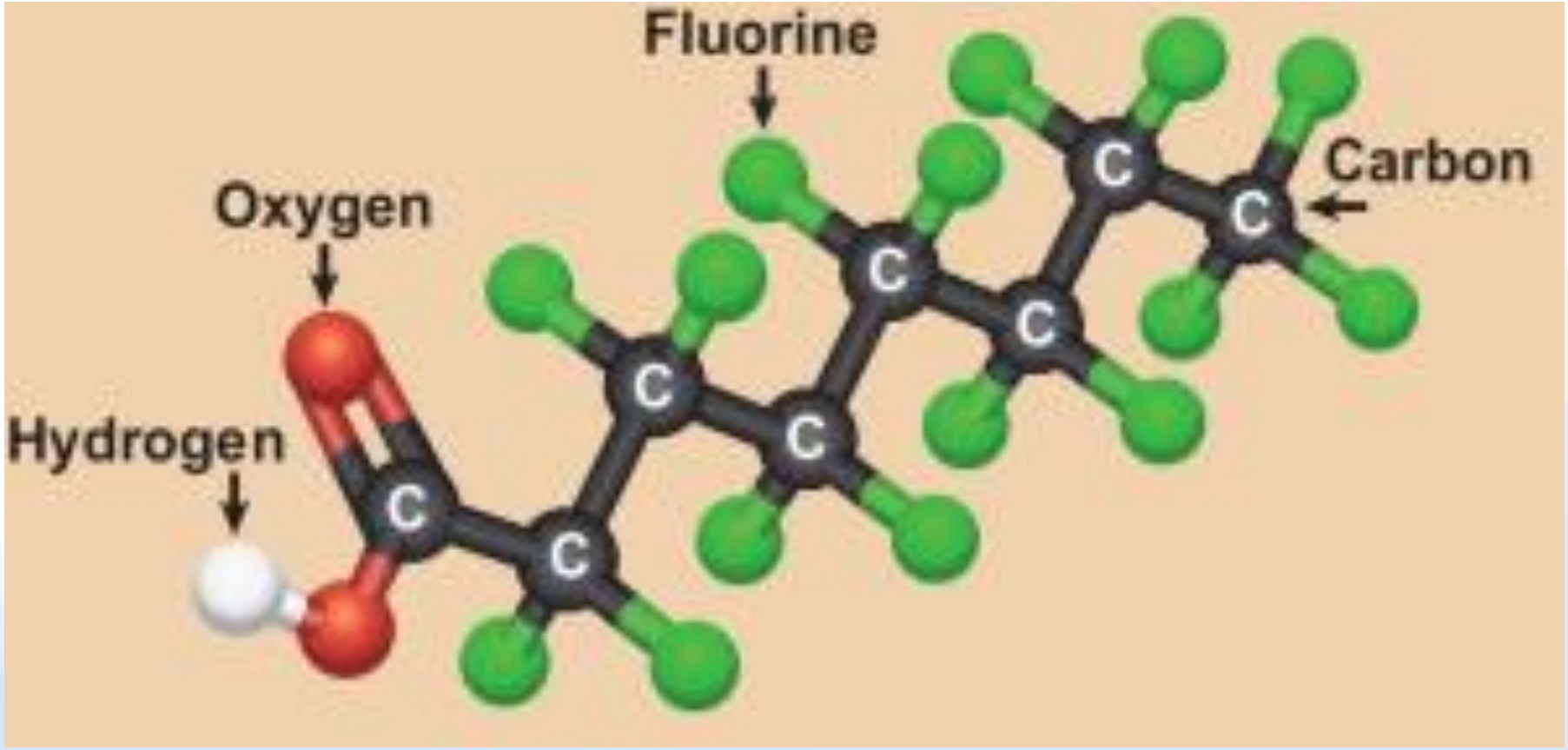


Figure 1.
Family Tree of Per- and polyfluoroalkyl Substances

Chemical Structure of PFAS: C-8



Where are PFAS compounds commonly found?

Why should we care?

- Human and aquatic life
- "Unsuspected" compounds found in waterways, fish, humans
- Lawsuits
- Water reclamation concentrates contaminants
- Public pressure on regulators
- Clean Water Act regulations are on the way
  - EPA 2022 memo to states recommends monitoring & new NPDES permit conditions

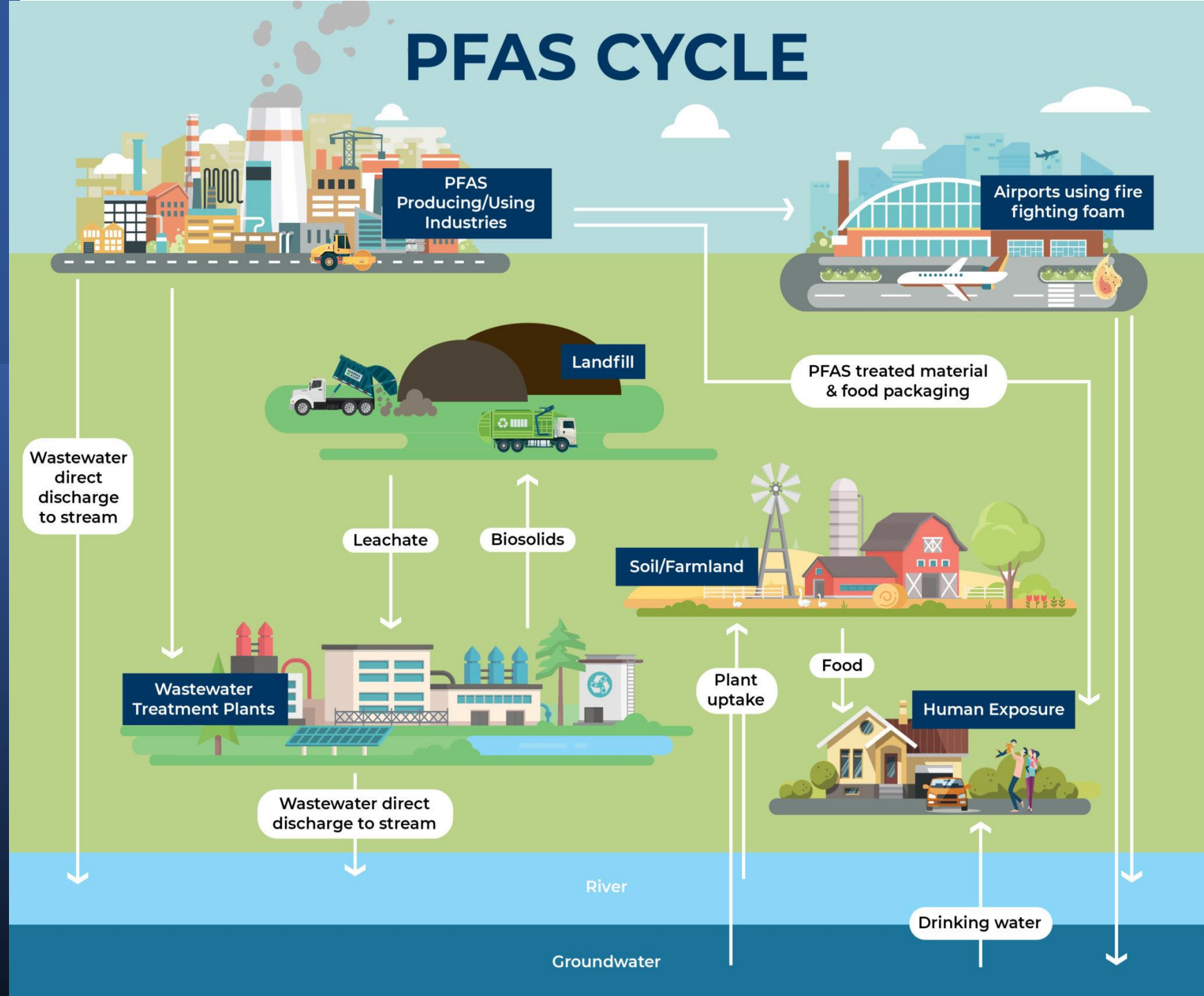
High Levels of Some PFAS Can Impact Health

1. Increase cholesterol
2. Kidney cancer
3. Testicular cancer
4. Thyroid disease
5. Pre-eclampsia

Why Should We Care?

- CECs typically travel easily in water and do not easily break down, so they can enter the water supply and soil around factories or anywhere that the factories dispose of the chemicals.
- **They are Everywhere!**
  - Air *(atmospheric deposition to land & water)*
  - Landfills
  - Water supplies – surface and groundwater
  - Oceans, lakes, rivers, and streams
  - Wastewater treatment plants
  - Biosolids
  - Factories
  - Consumer products

Sources & Exposure Pathways



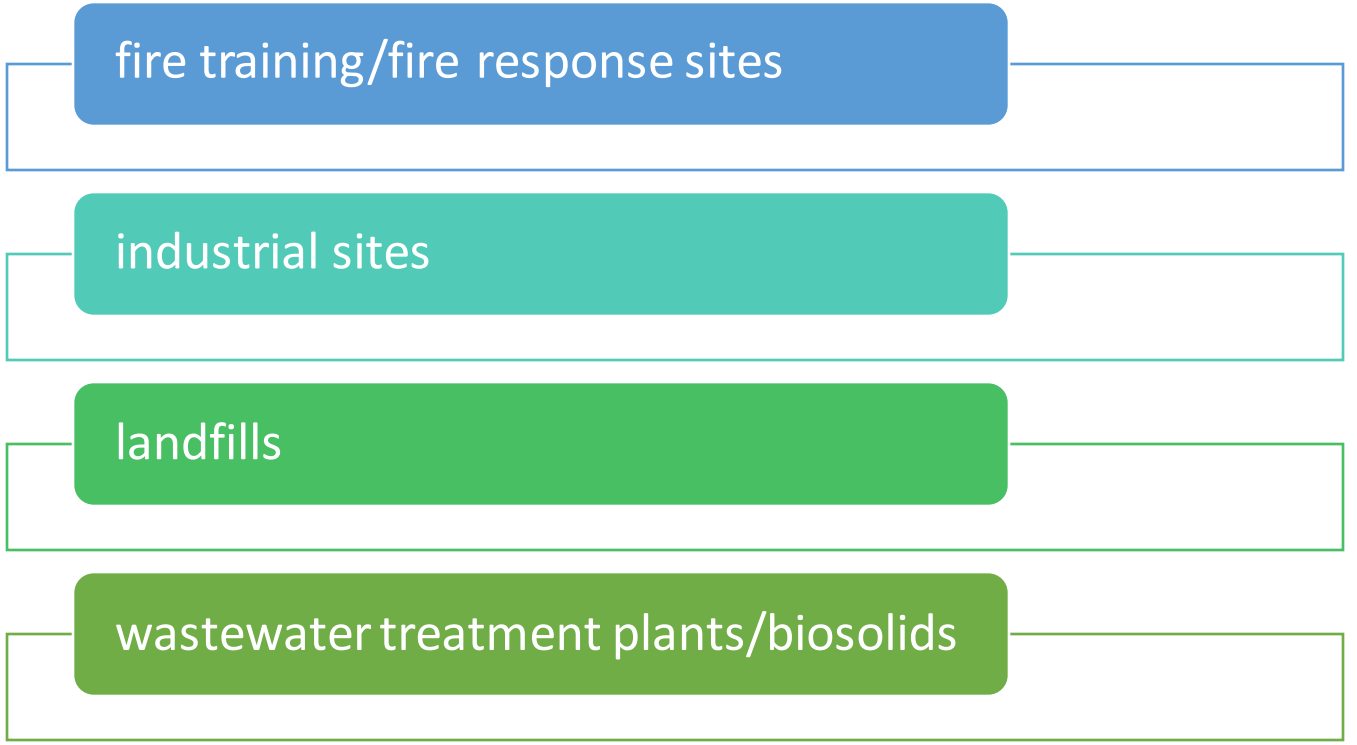
Legend

Sources

Exposure Pathways

Pathways to Drinking Water

Four major sources



Components of a Source Water Protection Program

Dealing with PFAS Require Both Regulatory & Non-Regulatory Approaches

"The breadth and diversity of PFAS pollution, coupled with a lack of research on health impacts, complicates the development of regulatory and non-regulatory approaches to managing PFAS."

-Minnesota PFAS Blueprint

Partnerships – "common interests"

- National Association of Clean Water Agencies (NACWA)
- Association of Clean Water Administrators (ACWA)
- Water Environment Federation (WEF)
- Water Research Foundation (WRF)
- American Public Works Association (APWA)
- American Water Works Association (AWWA)
- Rural Water Utilities Association (RWUA)
- Other Local/State Utility Associations
- Health Departments (State)
- Drug and Other Takeback Program Participation

What can we do to help?

- ❖ Build Awareness
- ❖ Educate the Public
- ❖ Get Involved
- ❖ Eliminate Availability
- ❖ Reduce Demand

Pharmaceutical Best Management Practices

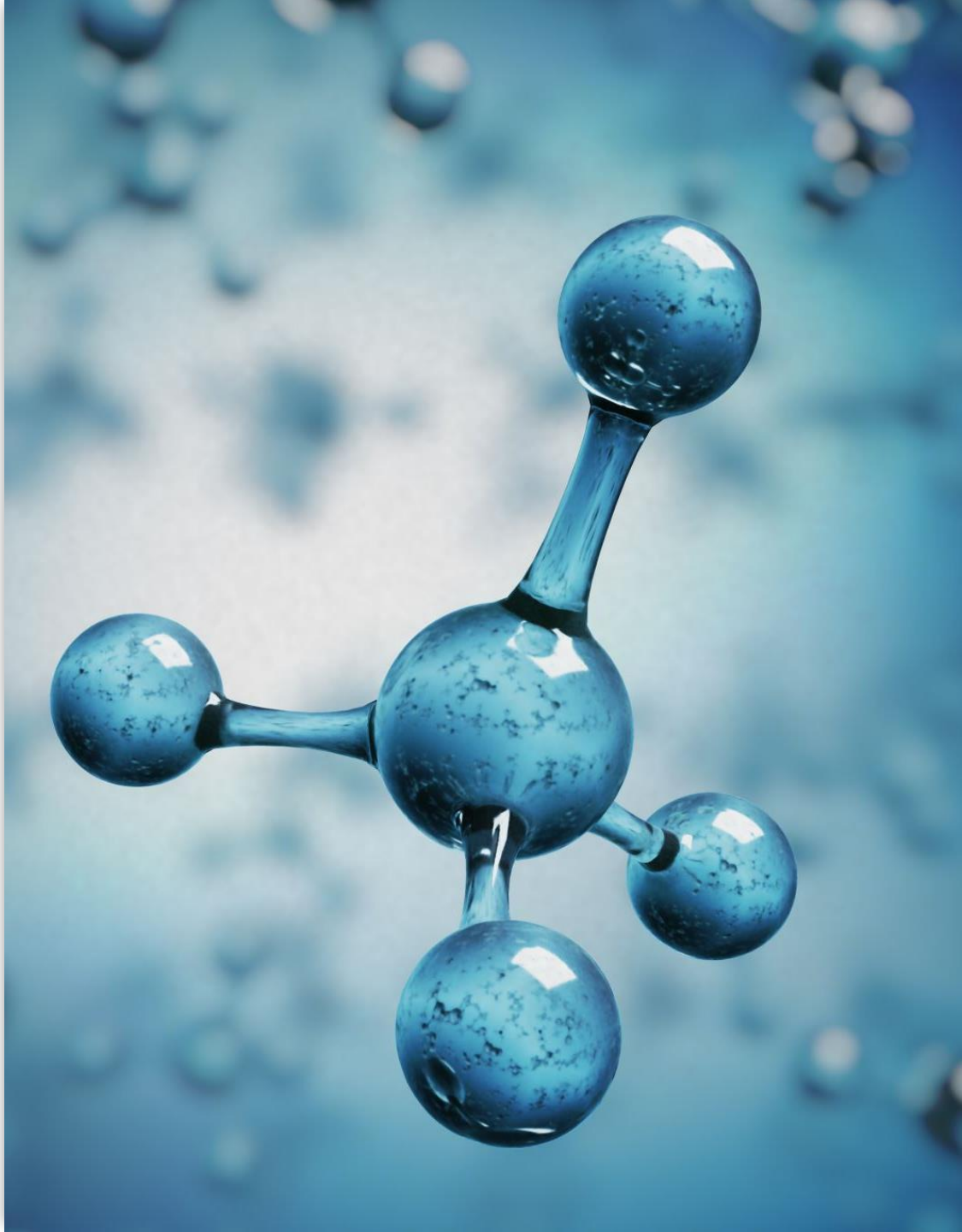
- US Drug Enforcement Agency (DEA) sponsors drug take back days.
  - https://www.dea.gov/takebackday provides more information
- Mix unused drugs with coffee grounds or kitty litter, put in container into landfill.

Targets of Regulations and Proposed Regulations

- Manufacturing
- Consumption
- Drinking Water Standards
- Water Quality Standards
- Biological Sludge Criteria
- Exposure Thresholds

EPA Proposed Drinking Water Standards

- On March 14, 2023, EPA announced the proposed National Primary Drinking Water Regulation (NPDWR) for six PFAS:
  - perfluorooctanoic acid (PFOA),
  - perfluorooctane sulfonic acid (PFOS),
  - perfluorononanoic acid (PFNA),
  - hexafluoropropylene oxide dimer acid (HFPO-DA, commonly known as GenX Chemicals),
  - perfluorohexane sulfonic acid (PFHxS), and
  - perfluorobutane sulfonic acid (PFBS).
- The proposed PFAS NPDWR does not require any actions until it is finalized.
- EPA anticipates finalizing the regulation by the end of 2023.



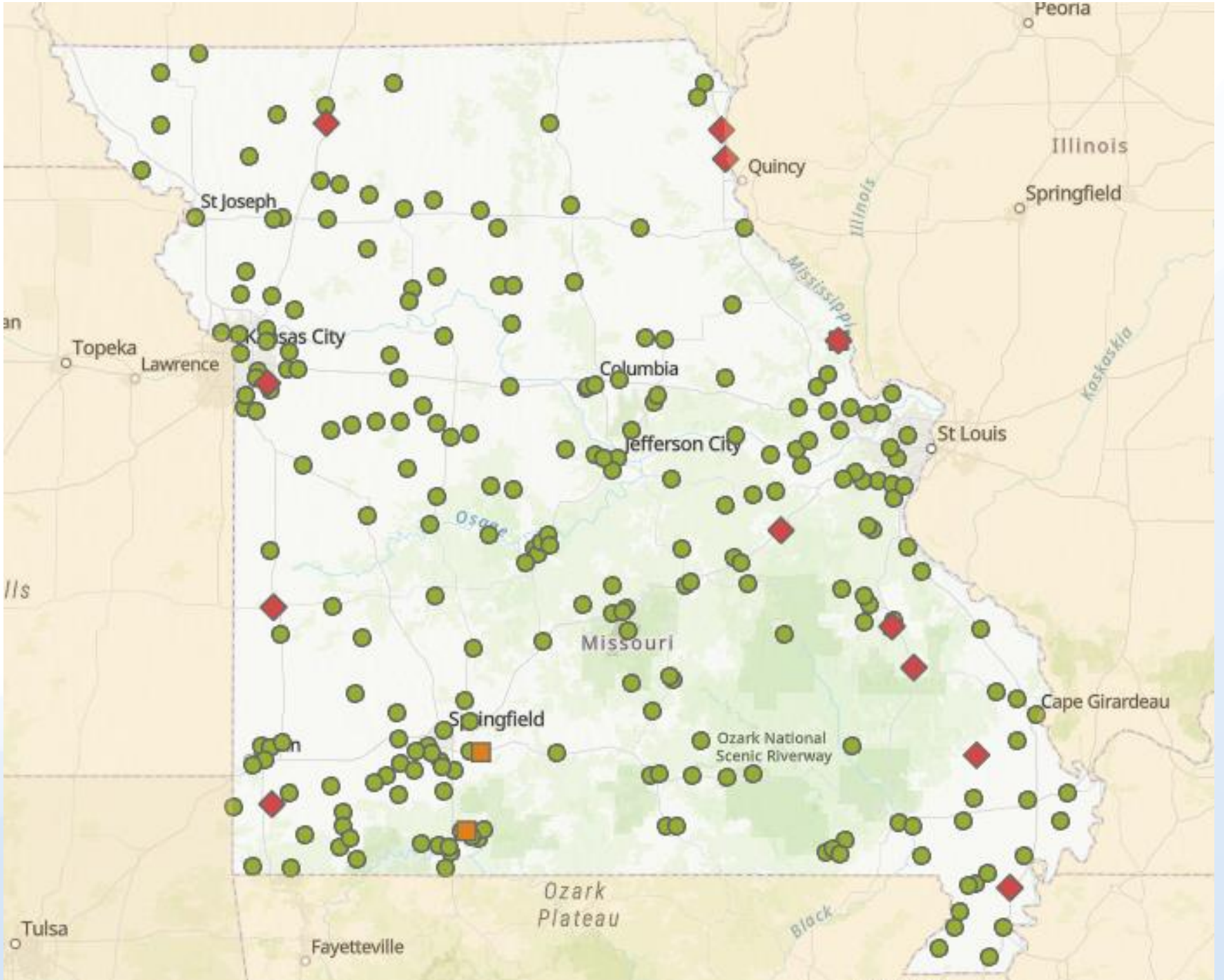
EPA Proposed Drinking Water Standards

The proposed rule would also require public water systems to:

- Monitor for these PFAS
- Notify the public of the levels of these PFAS
- Reduce the levels of these PFAS in drinking water if they exceed the proposed standards.

Compound	Proposed MCLG	Proposed MCL (enforceable levels)
PFOA	Zero	4.0 parts per trillion (also expressed as ng/L)
PFOS	Zero	4.0 ppt
PFNA		
PFHxS		
PFBS	1.0 (unitless) Hazard Index	1.0 (unitless) Hazard Index
HFPO-DA (commonly referred to as GenX Chemicals)		

Missouri DEQ Drinking Water Monitoring



What is EPA Doing to Address PFAS Under the CWA?

- EPA's Stategic PFAS Roadmap
  - Address PFAS in Clean Water Act permitting, analytical methods, water quality criteria & fish advisories (2022 & ongoing) through:
    - Effluent Guidelines
    - Sampling Methodology
    - Analytical Methods
    - Water Quality Criteria
    - Funding

EPA Industrial Effluent Limitation Guidelines

EPA's Plan 15 Summarizes New Rules and Studies Related to PFAS

- ❑ Regulatory actions for:
  - Organic Chemicals and Plastic Manufacturing
  - Electroplating and Metal Finishing
- ❑ Effluent guidelines for Landfills
- ❑ Textile mills study
- ❑ No further PFAS action planned for:
  - Electrical and Electronic Components
  - Pulp, Paper, and Paperboard Manufacturing

EPA Strategic PFAS Roadmap – CWA & POTWs

Establish universe upstream & downstream

- Conduct IU inventory of PFAS industries, including non-SIUs
- Collaborate with drinking water to determine downstream intakes
- Consider sludge disposal goals

Develop sampling plan

- Use method 1633 in conjunction with 1621
- Include IUs identified in PFAS inventory
- Select collection system monitoring locations to differentiate industrial vs. domestic influent contributions where possible
- Frequency recommendation: quaterly

Implement solutions

- Incorporate monitoring requirements into IU control mechanisms
- Incorporate local limits into IU control mechanisms
- Local limits can be BMPs
- Ensure IUs are in ICIS and submitting data electronically
- Notify affected public water suppliers

EPA Actions to Address PFAS

[Key EPA Actions to Address PFAS | US EPA](https://www.epa.gov/pfas/key-epa-actions-address-pfas)

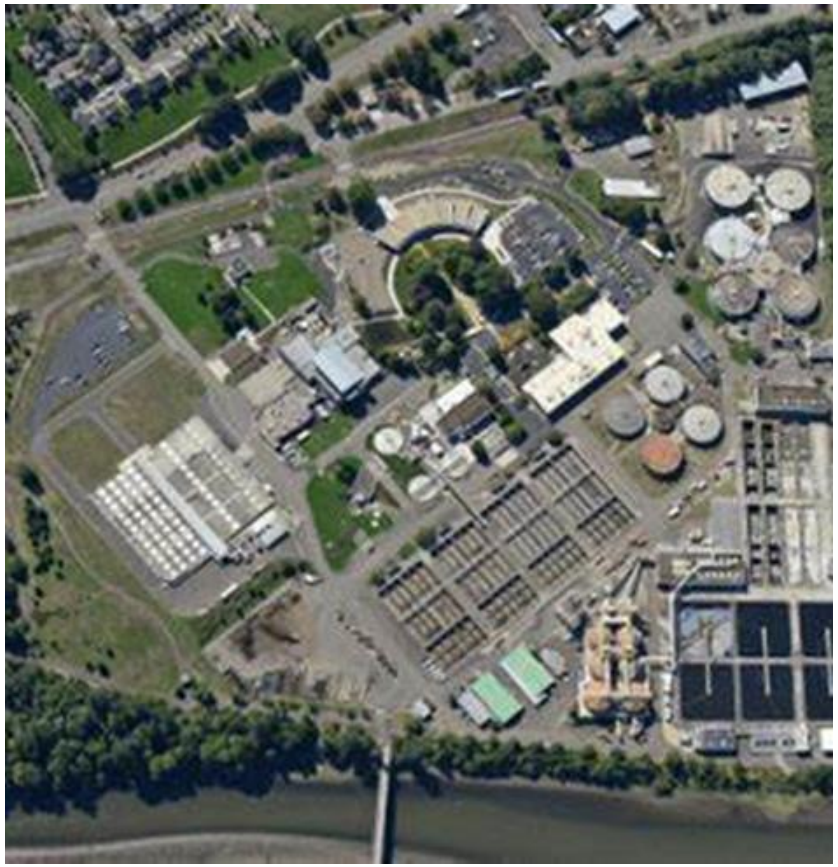
https://www.epa.gov/pfas/key-epa-actions-address-pfas

$2 Billion in Bipartisan Infrastructure Law Funding for PFAS and Emerging Contaminants in Drinking Water

- In February 2023, EPA announced the availability of $2 billion from President Biden's Bipartisan Infrastructure Law to address emerging contaminants, including PFAS, in drinking water across the country. This investment, which is allocated to states and territories, will be made available to communities as grants through EPA's Emerging Contaminants in Small or Disadvantaged Communities grant program. These funds will promote access to safe and clean water in small, rural, and disadvantaged communities while supporting local economies.
    - Learn more about this funding.

Proposed EPA PFAS POTW Study

- Purpose of study:
  - Identify categories of IUs discharging wastewater contaminated with PFAS.
  - Collect data on PFAS concentrations in domestic wastewater influent to POTWs.
  - Characterize PFAS currently being discharged from IUs and domestic sources.
  - Collect data on adsorbable organic fluorine (AOF) concentrations in wastewater.
  - Better understand PFAS pass-through in POTWs to biosolids and effluent.
- Estimated start: end of 2024, start of 2025



Proposed EPA PFAS POTW Study

- EPA proposes to work with NACWA
- Conduct WWTP influent, effluent, biosolids, and up to IUs/WWTP paired sampling
  - Draft EPA methods 1621 and 1633
- ~2,000 WWTPs across the U.S.
- Flow > 14 MGD
- States providing comments to NACWA - NACWA comments to EPA
- EPA may require under CWA Section 308
- Larger WWTP Estimated Cost - Avg $20K to $25K/WWTP

Sources of PFAS

Industry NAICS codes identified in proposed EPA PFAS rulemaking

- 488119 Aviation operations
- 314110 Carpet manufacturers
- 811192 Car washes
- 325 Chemical manufacturing
- 332813 Chrome electroplating, anodizing, and etching services
- 325510 Coatings, paints, and varnish manufacturers
- 325998 Firefighting foam manufacturers
- 562212 Landfills
- 339112 Medical Devices
- 922160 Municipal and fire depa rtments and firefighting training centers
- 322121 and 322130 Paper mills
- 325320 Pesticides and Insecticides
- 324 Petroleum and coal product manufacturing
- 324110 and 424710 Petroleum refineries and terminals
- 352992 Photographic film manufacturers
- 325211 Polymer manufacturers
- 323111 and 325910 Printing facilities where inks are used in photolithography
- 313210, 313220, 313230, 31324, 313320 Textile mills (textiles and upholstery)
- 562 Waste management and remediation services
- 221320 Wastewater treatment plants

What Analytical Methods and Sampling Guidelines to Use?

- EPA is in the process of finalizing rules
  - EPA Method 1621 – Unkown final rule date
  - EPA Method 1633 - Anticipated final rule 2023
- Other Methods that have been used
  - EPA Method 533, 537 and 537.1 (drinking water)
  - EPA Method 8327 (non-potable water)
- Various sampling guidelines in use
  - EPA
  - Interstate Technology Regulatory Council
  - New York
  - New Jersey
  - Michigan

PFAS Analytical Methods Development and Sampling Research

https://www.epa.gov/water-research/pfas-analytical-methods-development-and-sampling-research

LEVERAGE NPDES PERMITS TO REDUCE PFAS DISCHARGES

December 2022 – EPA issued a memo:

Addressing PFAS Discharges in National Pollutant Discharge Elimination System (NPDES) Permits and Through the Pretreatment Program and Monitoring Programs

Example Permit Language in NPDES Permits – New England EPA (Massachusetts POTWs)

6. Beginning the first full calendar year after the effective date of the permit, the Permittee shall commence annual sampling of the following types of industrial discharges into the POTW:

- Commercial Car Washes
- Platers/Metal Finishers
- Paper and Packaging Manufacturers
- Tanneries and Leather/Fabric/Carpet Treaters
- Manufacturers of Parts with Polytetrafluoroethylene (PTFE) or teflon type coatings (*e.g.*, bearings)
- Landfill Leachate
- Centralized Waste Treaters
- Known or Suspected PFAS Contaminated Sites
- Fire Fighting Training Facilities
- Airports
- Any Other Known or Expected Sources of PFAS

Sampling shall be conducted using Method 1633 for the PFAS analytes listed in Attachment E. The industrial discharges sampled, and the sampling results shall be summarized and included in the annual report (see Part I.E.3).

Implementation Strategies - POTWs & Pretreatment Programs

- Legal Authority
- Resources (training/implementation)/Funding (sampling budget increases?)
- Industrial User (IU) Inventory
  - Source Identification/Characterization, including existing Significant Industrial Users (SIUs)
- Industrial User Permits
  - Source Control/Waste Minimization
  - Monitoring of SIUs and IUs (PFAS 1633 and AOF 1621)
- Develop Local Limits and BMPs
- Non-Domestic Sources
  - Outreach/Education

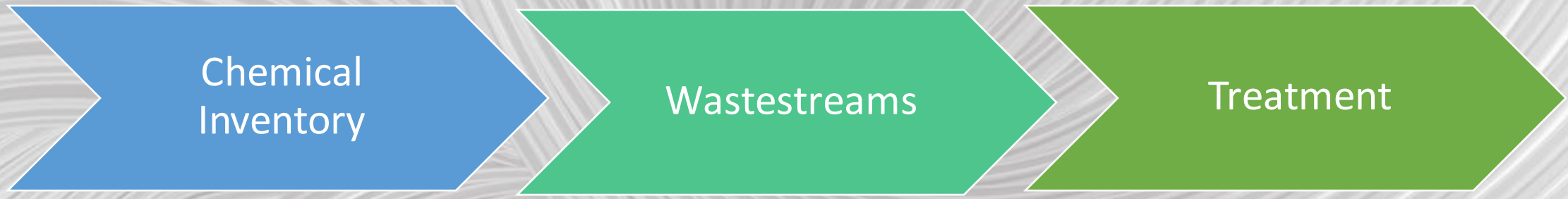
What Can Pretreatment Programs Do Now?

Bedard, Forrest of Machinery

Industrial User Survey

- Expand to include IUs that have the potential to discharge PFAS
  - Known, expected, or suspected sources
  - Refer to EPA or other lists of industries
- Ancillary operations
- Historically used at site
- Pollution prevention/BMP educational opportunity
- Permit application as screening tool
- “Trust but verify.”

IU Permit Application Review



- Safety Data Sheets
- Storage
- Containment

- Process
- Non-process
- Point of generation
- Characteristics

- End-of-pipe
- End-of-process
- Instream vs side-stream

Safety Data Sheet (SDS) Review

- Chemicals with chloro- and flouro- bonds
- 1% or greater only reported on SDS.
- Trade-secret or confidential information
- SDS submittal with permit applications
- Inspections

SECTION III. Composition/Information on Ingredients

Chemical Name	Weight %*	CAS #
Water	> 56	7732-18-5
Hexylene Glycol	< 19	107-41-5
Proprietary mixture of fluorosurfactants and hydrocarbon surfactants	< 5	N/A

* % is rounded to the nearest appropriate number. Values are not to be considered product specifications

Note: Buckeye C6 3% Mil Spec A.F.F.F. does not contain PFOS and will not breakdown to yield PFOA in accordance with the goals of the US EPA 2010/15 PFOA Stewardship Program.

IU Inspections

Chemical Inventory

- Safety Data Sheets Current?
- Labels?
- Pollution Prevention Practices (BMPs)?

Process Wastestreams

- Accurate/verify?
- Leaks?
- Accidental Discharges?
- Reuse?

Treatment

- End-of-pipe?
- End-of-process?
- Wastestream Segregation?
- Reuse?

Pollution Prevention Act of 1990

- **The Pollution Prevention Act defines "source reduction" to mean any practice which:**
  - Reduces the amount of any hazardous substance, pollutant, or contaminant entering any waste stream or otherwise released into the environment (including fugitive emissions); prior to recycling, treatment or disposal; and
  - Reduces the hazards to public health and the environment associated with the release of such substances, pollutants or contaminants.

- The term includes:
  - Equipment or technology modifications;
  - Process or procedure modifications;
  - Reformulation or redesign of products;
  - Substitution of raw materials; and
  - Improvements in housekeeping, maintenance, training or inventory control.

Pollution "clean-up" is expensive!

Clean-up costs are 30-40 times more than pollution prevention.

EPA PFAS Pollution Prevention Strategies

Best Management Practices: Where to Start?

For some pollutants, developing numeric discharge limits may not be feasible.

The NPDES and Pretreatment regulations allow for Best Management Practices (BMPs) to be used in lieu of numeric, end-of-pipe limits in such instances. See 40 CFR 122.44(k) and 40 CFR 403.5(c)(4).

EPA has published guidance on implementing BMPs for NPDES and Pretreatment:

- EPA Guidance for Developing Best Management Practices https://www3.epa.gov/npdes/pubs/owm0274.pdf
- Chapter 9 of the NPDES Permit Writer's Manual https://www.epa.gov/sites/default/files/2015-09/documents/pwm_chapt_09.pdf
- Guides to Pollution Prevention: Municipal Pretreatment Programs https://www3.epa.gov/npdes/pubs/pretreatment_mun_guide.pdf
- Pretreatment Streamlining Rule Fact Sheet 7.0: Best Management Practices https://www.epa.gov/sites/default/files/2015-10/documents/pretreatment_streamlining_7.0.pdf

PFAS in Industrial Wastewater

PFAS can be found in the wastewater discharges of certain industrial facilities subject to NPDES permitting or pretreatment requirements (U.S. EPA, 2021).

Permit writers and pretreatment coordinators are encouraged to include PFAS monitoring in permits for facilities where PFAS are suspected of being present in the discharge. For some facilities where PFAS are found, it may be appropriate to require permit limits. In some cases, numeric discharge limits based on treatment technologies using granular activated carbon, ion exchange resins, reverse osmosis may be appropriate, but for others, pollution prevention practices and BMPs may be more appropriate.

Permit writers and pretreatment coordinators have observed some of the following pollution prevention practices for industries in their state or service area.

Chrome Finishing

PFAS can be found in the effluent discharged from chrome plating facilities due to the use of PFAS-containing chemical fume suppressants used primarily in hexavalent chrome plating operations. Many of these facilities discharge to wastewater treatment plants (U.S. EPA, 2009). According to EPA's Effluent Guidelines Program Plan 15 published in January 2023, preliminary investigations by EPA have indicated that some facilities may have the option of switching operations to trivalent chromium, which does not require the use of chemical fume suppressants, and that PFAS-free alternatives exist or are in development for processes which require hexavalent chromium (U.S. EPA, 2023). Additionally, because historic use of PFOS-containing fume suppressants is believed to be a legacy source of PFAS discharges, some agencies have found that equipment replacement has been necessary to achieve reductions in PFAS concentrations in effluent from these facilities (Michigan Department of Environment, Great Lakes and Energy, 2020).

EPA-833/F-23-008
July 2023

EPA-833/F-23-008 July 2023

Develop a Best Management Practices (BMP) Plan

- Identify potential permittees: IUs and SIUs
- Are PFAS used at this facility?
- Have PFAS historically been used at this facility?
- If PFAS are present in the facility's discharge, consider the permit language to evaluate the usage.

Develop a BMP Plan

- Product substitution and replacement.

- Good operating and housekeeping practices, such as:
  - Maintaining accurate chemical inventory.
  - Safe chemical storage.
  - Replacement of contaminated equipment.
  - Containing or reusing contaminated equipment
  - Containing contaminated rinse water.
  - Proper operation and maintenance.
  - Emergency response plan.
  - Employee education and training.
  - Proper management/disposal of legacy PFAS chemicals.

Develop a BMP Plan (continued)

- Solid waste disposal may be out of scope of NPDES but may be part of a holistic response.
- BMP plan should require an annual certification and maintenance of records.

Purchasing Policies

- Massachusetts PFAS-free Purchasing guide
- 7 easy pages; background, solutions, references
- 16 product categories

That May n PFAS	What to Ask Your Vendors	Massachusetts Statewide Contracts That Offer Safer Products
emicals, ners and for carpet and ters and es, glass, toilet bowls, s, as well as d metal	Ask vendors for cleaning products that are certified by: • Green Seal, which eliminated all cleaning and personal care products with PFAS from its certified directory in 2022; or • US EPA's Safer Choice Program, which never allowed PFAS as ingredients in its certified products, except for floor finishes. In addition, PFAS are no longer eligible for use in any Safer Choice-certified products. *Note:* UL is in the process of updating its ECOLOGO standard for cleaning chemicals and may prohibit PFAS in its certified cleaners when it does so.	***FAC118: Environmentally Preferable Cleaning Products, Programs, Equipment and Services*** Most non-disinfecting cleaning chemicals on this contract have one of these two certifications. ***FAC114: Environmentally Preferable Janitorial Services***
le Food re ost often lded fiber ls, trays, and portion l as non- wraps and	Ask vendors for (or check registries to find) disposable food service ware products that are certified by: • Biodegradable Products Institute (BPI); • Compost Manufacturing Alliance (CMA); or • GreenScreen for Safer Chemicals Compostable food service ware that are certified by BPI or CMA are tested to confirm they contain less than 100 parts per million (ppm) fluorine, which is designed to ensure they do not contain intentionally-added PFAS.	***GRO40: Food Service Supplies and Equipment*** Compostable food service ware items offered on this contract must be certified by BPI or CMA, which do not allow intentionally added PFAS in products they certify.

https://www.mass.gov/files/documents/2023/05/11/OSD%20PFAS%20Free%20Purchasing%20Guide.pdf

Non-Federal Examples of PFAS Activities

State Drinking Water Regulations

Advisories

- Minnesota
- New Mexico
- North Carolina
- Ohio
- Oregon
- Virginia
- Washington
- Alaska
- California
- Colorado
- Connecticut
- Delaware
- Florida
- Illinois
- Maryland

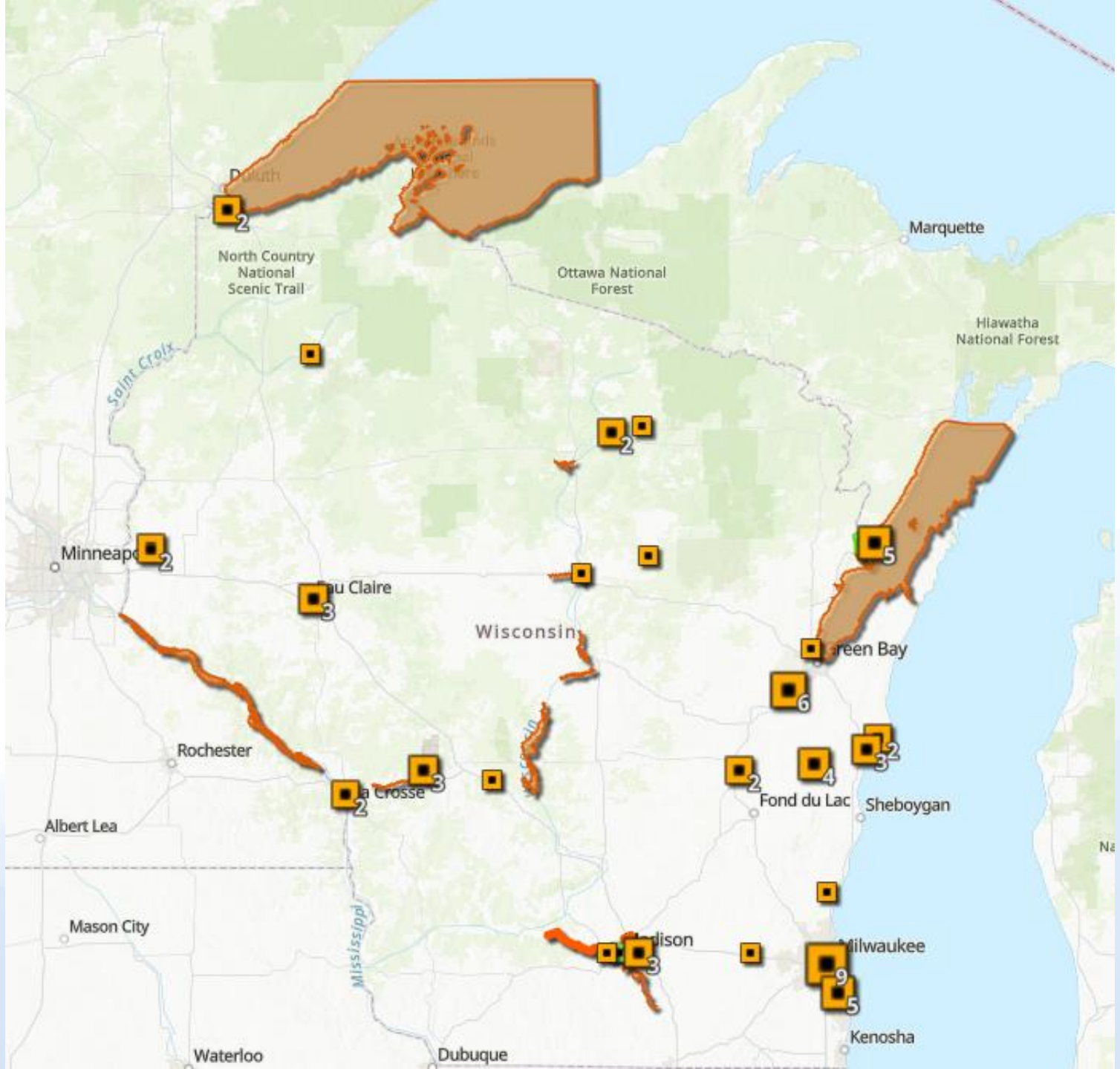
Enforceable

- Maine
- Massachusetts
- Michigan
- New Hampshire
- New Jersey
- New York
- Pennsylvania
- Rhode Island
- Vermont
- Wisconsin

Food Packaging Restrictions

- California
- Colorado
- Connecticut
- Florida
- Georgia
- Hawaii
- Iowa
- Illinois
- Maine
- Maryland
- Missouri
- Minnesota
- New Jersey
- New Hampshire
- New York
- Oregon
- Rhode Island
- Vermont
- Virginia
- Washington
- Wisconsin

Other state-based restrictions are at: https://www.saferstates.org/priorities/pfas/



PFAS Advisories in Wisconsin

Minnesota PFAS Initiative

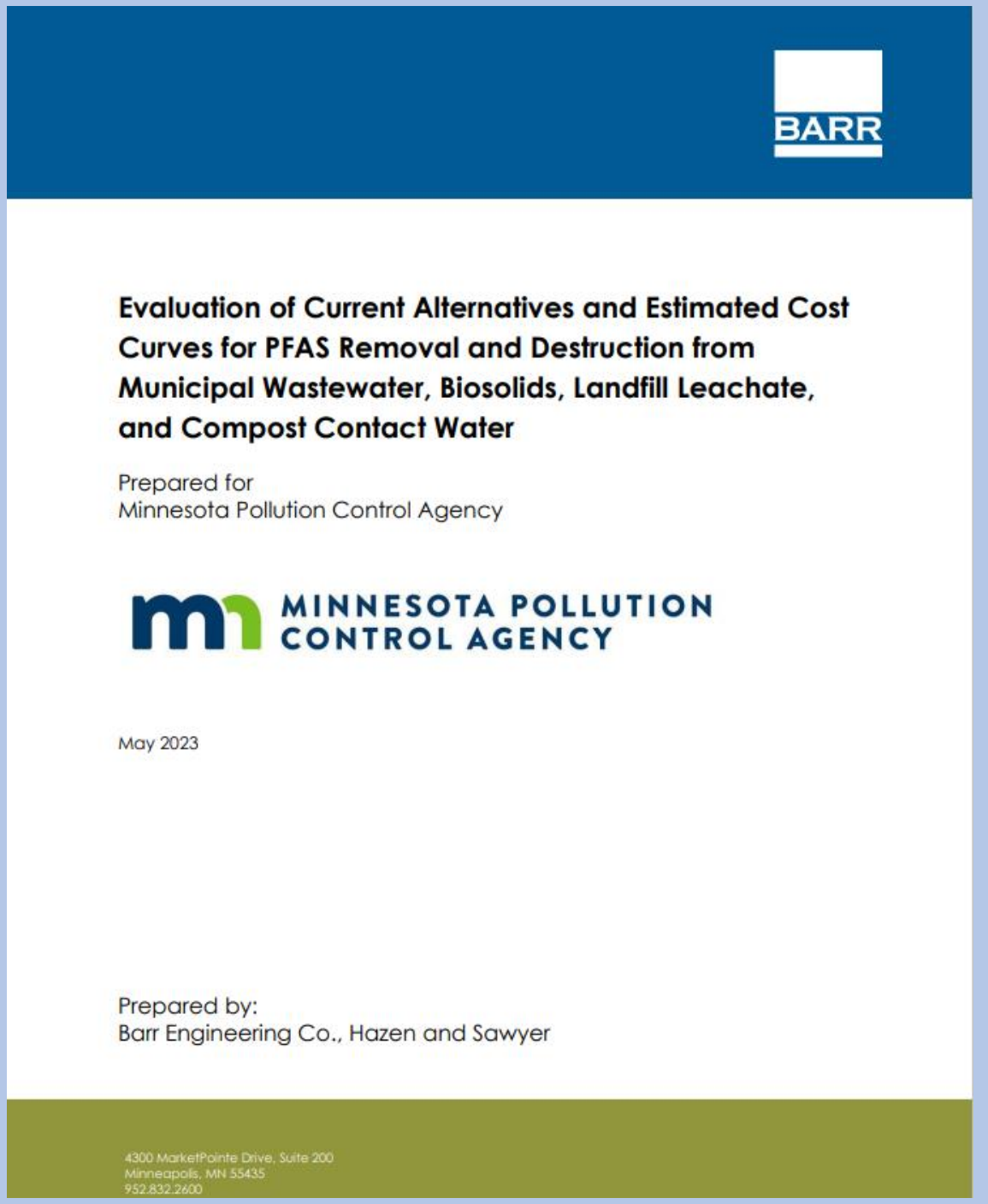
Minnesota's PFAS Blueprint

Protecting families and communities from PFAS pollution

MINNESOTA

Pollution Control Agency
Department of Agriculture
Department of Health
Department of Natural Resources

Minnesota PFAS Initiative



BARR

Evaluation of Current Alternatives and Estimated Cost Curves for PFAS Removal and Destruction from Municipal Wastewater, Biosolids, Landfill Leachate, and Compost Contact Water

Prepared for
Minnesota Pollution Control Agency

MINNESOTA POLLUTION CONTROL AGENCY

May 2023

Prepared by:
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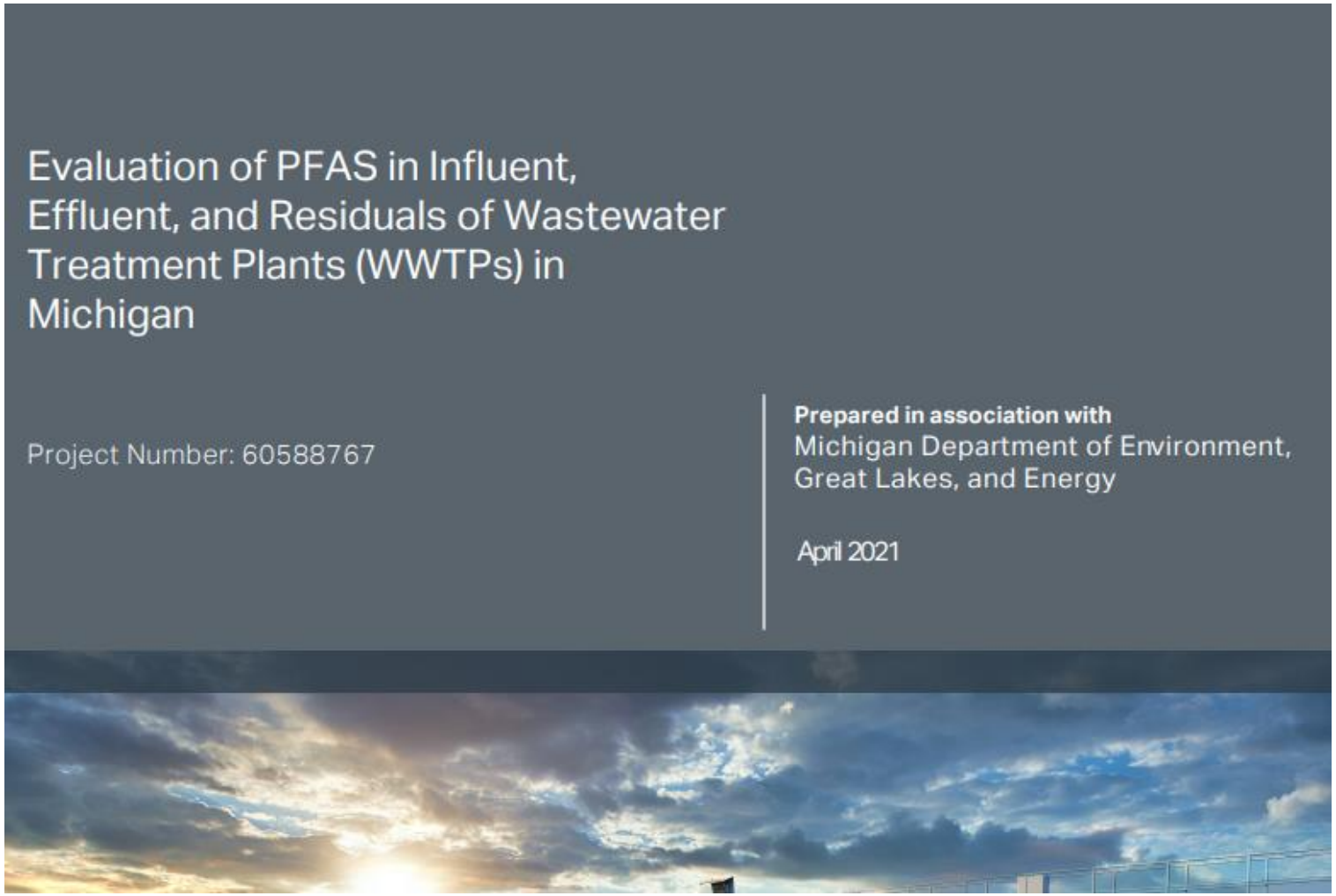
PFAS SEPERATION TECHNOLOGIES

Full Scale with a High Degree of Commercialization including Municipal Wastewater

Technology	Technology description
Nanofiltration NF)/Reverse Osmosis (RO) Membrane Separation	PFAS separated into a concentrate stream by physical separation via high-pressure membranes
Foam Fractionation	PFAS stripped from liquid phase as foam using fine air bubbles
Granular Activated Carbon (GAC)	PFAS sorbs to hydrophobic GAC surface in a fixed-bed pressure vessel.
Reactivated GAC	Similar to virgin GAC, PFAS sorbs to the hydrophobic GAC surface in a fixed-bed pressure vessel.
Colloidal Activated Carbon	PFAS sorbs to colloidal activated carbon particles in aqueous suspension
Ion Exchange Resins (SingleUse Media)	PFAS attaches to resin via surface charge interactions in a fixed bed pressure vessel.
Ion Exchange Resins (Regenerable Media)	PFAS attaches to resin via surface charge interactions with resin support material in a fixed-bed pressure vessel
Modified Clay	PFAS attaches to clay minerals, sometimes modified, via surface charge interactions. Media is in a fixed bed pressure vessel
Ion Exchange Resin Solvent Regeneration	A proprietary solvent brine solution removes PFAS from the IX media by targeting removal of the ionic head and desorption of the fluorinated carbon tail from the media

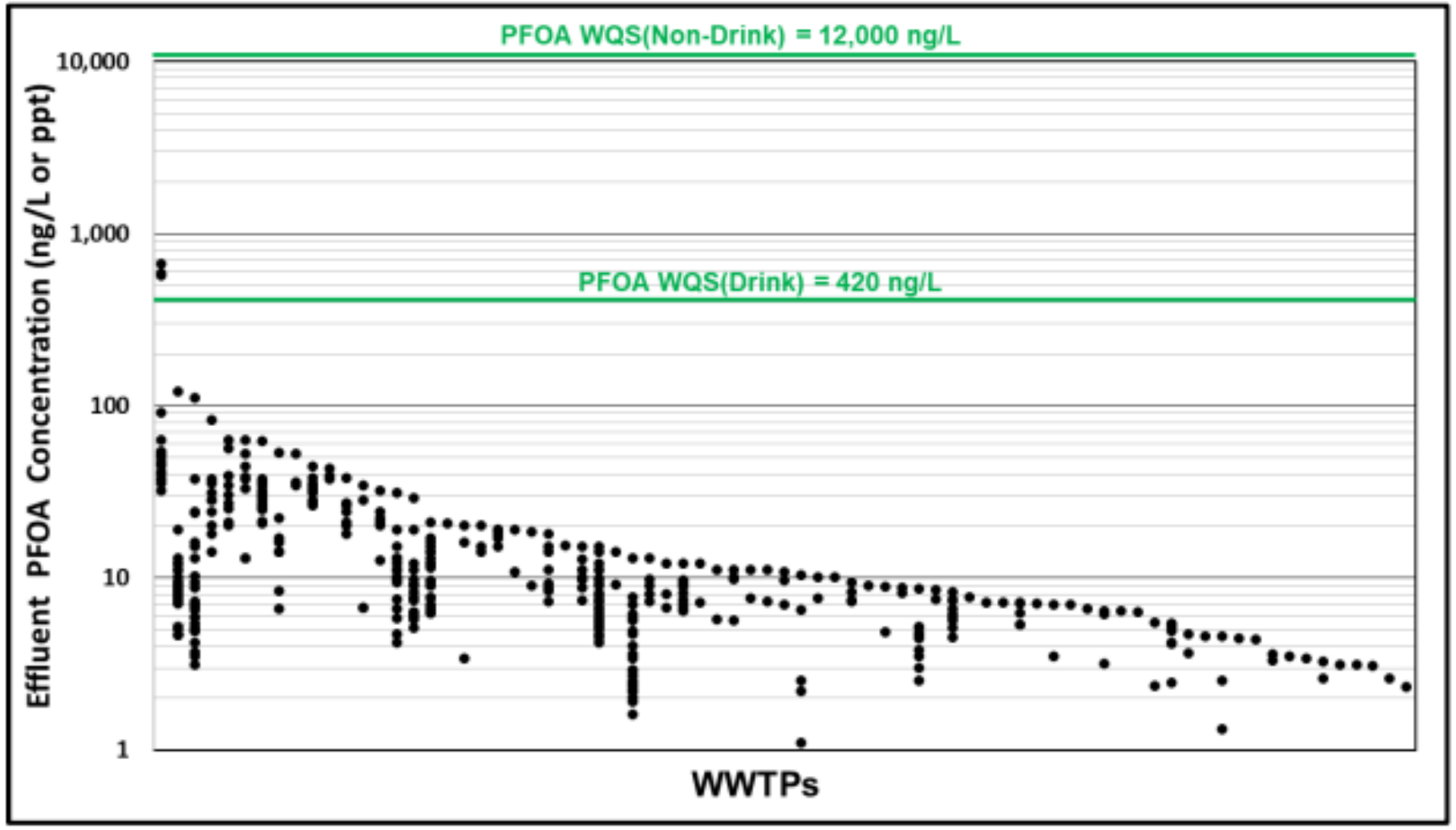


Michigan PFAS Initiative –

Wastewater Treatment Plants and Biosolids Study (2021)

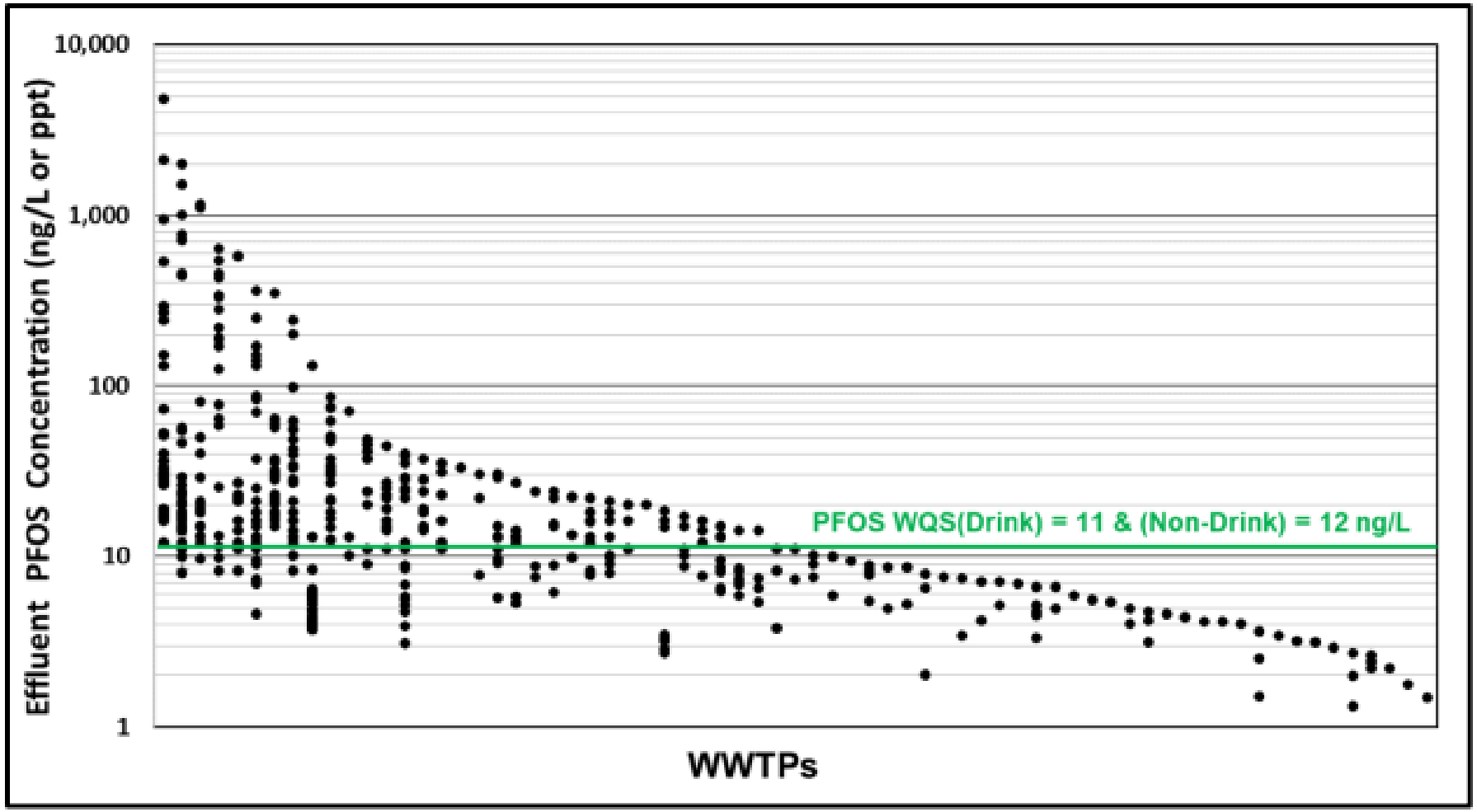
Michigan Wastewater Treatment Plants and Biosolids Study (2021)

Figure 5. Effluent PFOA Concentrations in WWTPs



Michigan Wastewater Treatment Plants and Biosolids Study (2021)

Figure 6. Effluent PFOS Concentrations in WWTPs



Michigan PFAS Initiative

EGLE MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

MICHIGAN INDUSTRIAL PRETREATMENT PROGRAM (IPP) PFAS INITIATIVE

Identified Industrial Sources of PFOS to Municipal Wastewater Treatment Plants

August 2020

EGLE, WATER RESOURCES DIVISION
800-662-9278 | Michigan.gov/EGLE

Michigan PFAS Initiative - Wastewater Treatment Plants and Biosolids Study (2021)

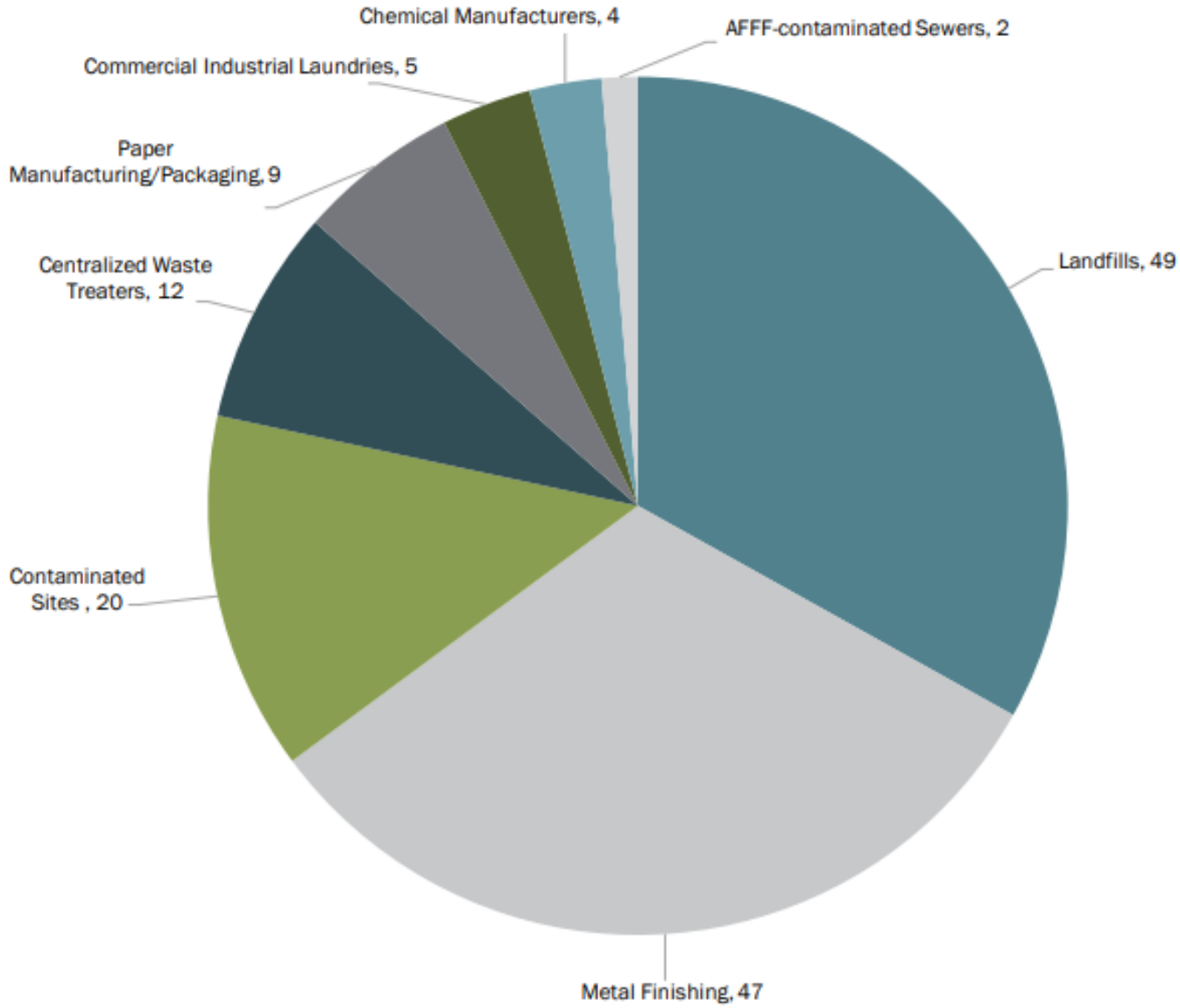
Due to the widespread use of PFAS in many industries and consumer products, industrial discharges are expected to be the primary sources of PFAS to WWTPs. Examples of industrial discharges that could be PFAS sources to WWTPs include (EGLE, 2020a):

- Electroplating & Metals Finishing Facilities
- Commercial Industrial Laundries
- Landfills
- Chemical Manufacturers
- Centralized Waste Management Facilities
- Plastics Manufacturers
- Airfields – Commercial, Private and Military
- Textile & Leather Facilities
- Department of Defense (DoD) Facilities
- Paint Manufacturers
- Fire Department Training Facilities
- Pulp & Paper Facilities
- Petroleum or Petrochemical Manufacturers and Storage Facilities

Michigan PFAS Initiative –

Industrial Pretreatment Programs

Figure 1. Sources of PFOS, Number by Type



U.S. Military Remediation

- Ft. Leavenworth – granular activated carbon filtration of groundwater
- Camp Pendleton – will implement granular activated carbon filtration
- Former Wurtsmith Air Force Base (MI) – cleaning up PFAS contamination

Emerging Pollutants Questions

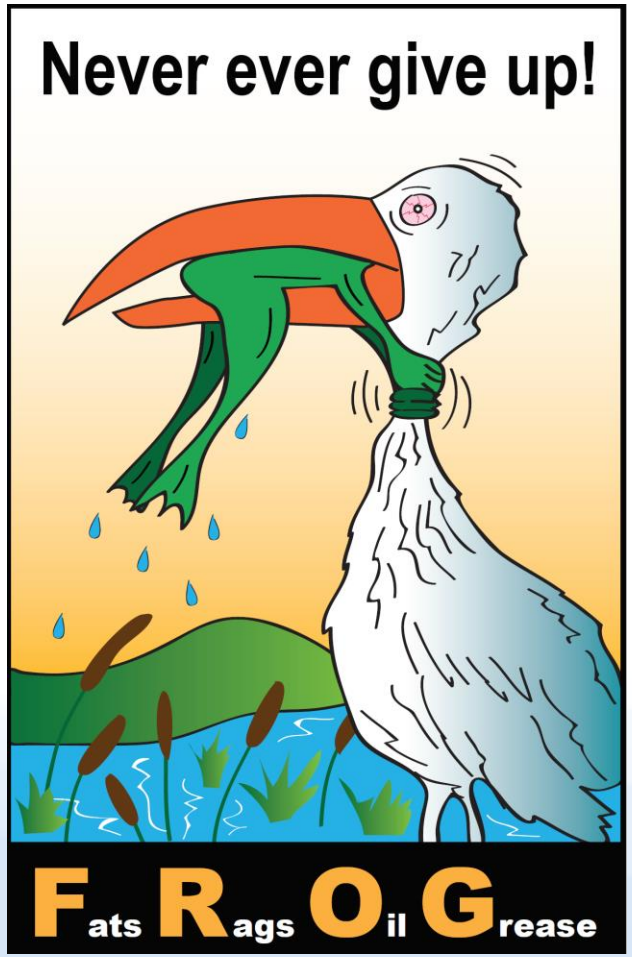
???

WSA
a project of pprc.org

- Please complete the course evaluation - satisfaction survey form
- Information supports on-going training
- USED TO CONFIRM CEU COMPLETION

Evaluation – Satisfaction Survey Form

EPA FOG Training Satisfaction Survey



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THANK YOU FOR ATTENDING

EPA FOG Training Satisfaction Survey

This training was developed under a Cooperative Agreement awarded by the U.S. Environmental Protection Agency (EPA) to the Pacific Northwest Pollution Prevention Resource Center (PPRC). It has not been formally reviewed by EPA.

WSA
a project of pprc.org