

Perfluoro and PolyfluoroAlkyl Substances (PFAS): Regulatory Overview (California)

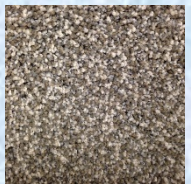
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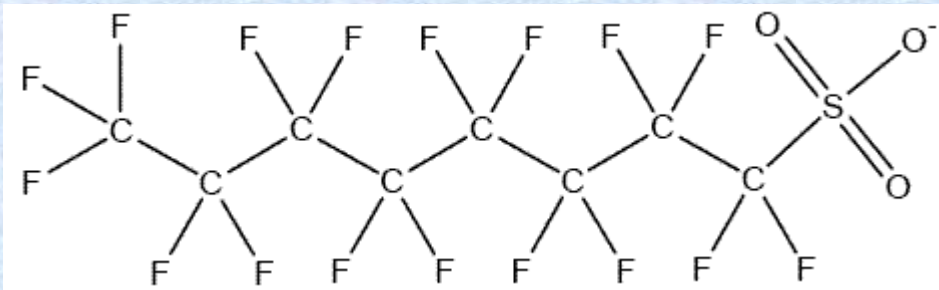


Perfluoro and Polyfluoroalkyl Substances (PFAS)

PFAS: Synthetic chemicals characterized by fluorine atoms attached to a carbon chain. They are valued for their chemical stability and their oil, water and stain repellent properties



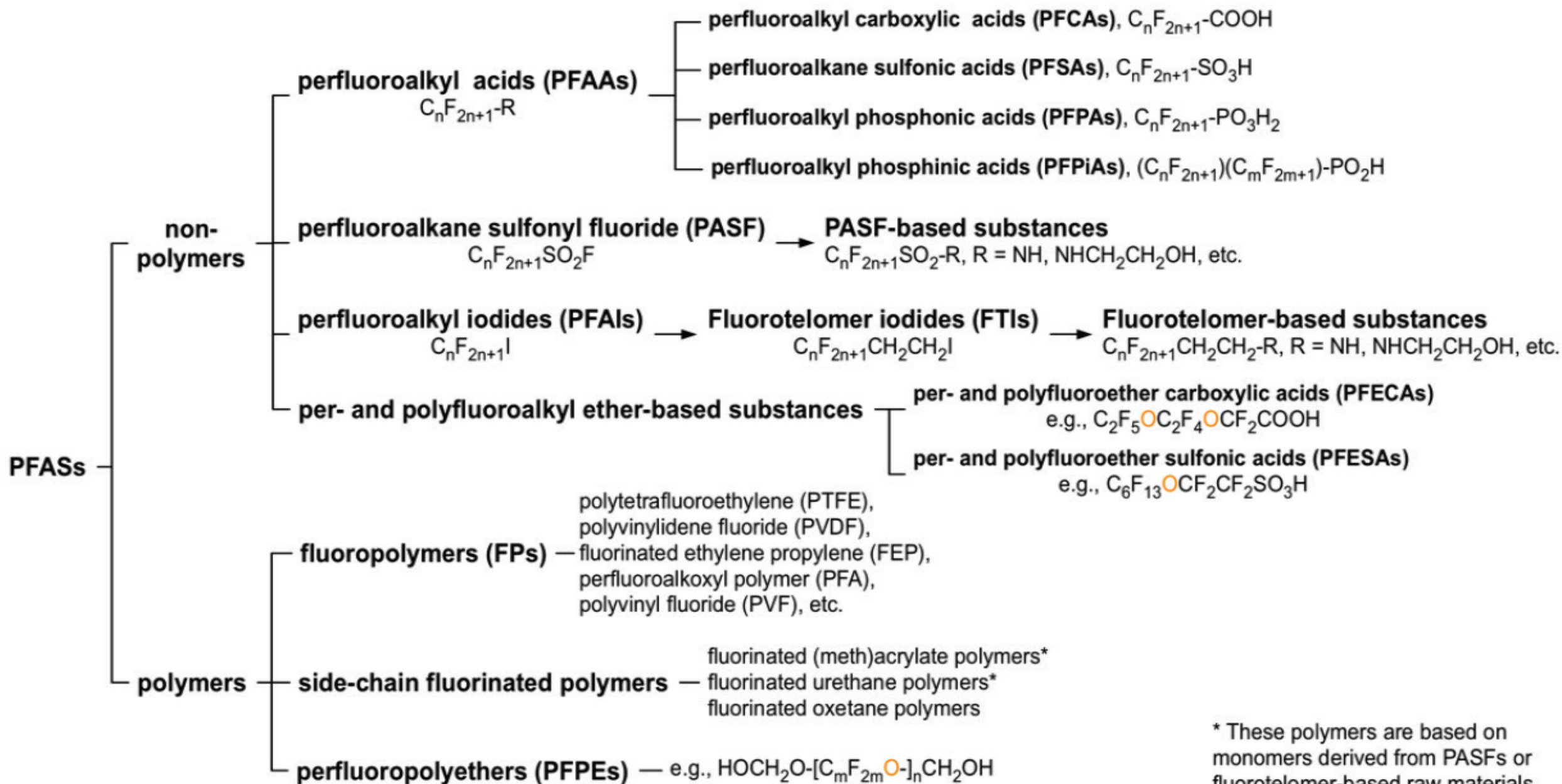
PFOS (C₈HF₁₇O₃S)



- Industrial uses:
 - Automotive, aerospace, construction, electronics
- Found in many products
 - Class B firefighting foams
 - Non-stick cookware
 - Food containers
 - Consumer products (stain-proof fabrics and carpets, rain gear, personal care products, detergents)



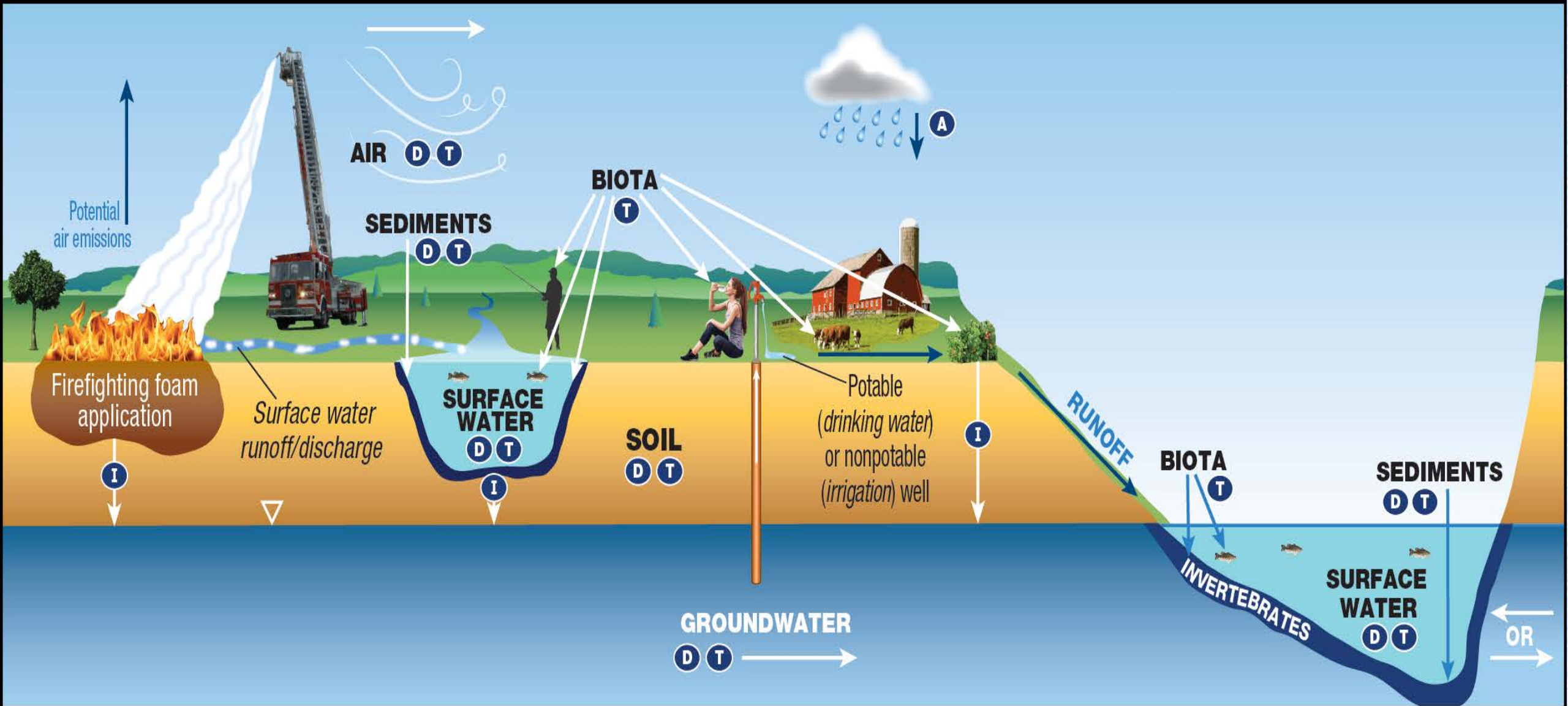
Per- and polyfluoroalkyl substances (PFASs)



Why are PFAS compounds of concern?

- **Widespread use:** Industry and consumer products
- **Persistent:** Does not break down easily in the environment
- **Bioaccumulates in humans and animals:** Found in more than 90% of the US population sampled (NHANES studies)
- **Ground water contamination:** Found in public drinking water sources
- **Concerns about health effects:**
 - affect growth, learning, and behavior of infants and older children
 - interfere with the body's natural hormones
 - increase cholesterol levels
 - affect the immune system and
 - increase the risk of cancer





(Source: ITRC Fact sheet "Environmental Fate and Transport of Per- and Polyfluoroalkyl Substances". Adapted from figure by L. Trozzolo, TRC, used with permission)



Perfluoro and Polyfluoroalkyl Substances (PFAS): Environmental Investigations (Cleanup Program)

- Federal Facility Sites (DoD)
 - Reviewed Work Plans for 12 current or former bases (14 PFASs were measured)
 - Received initial sampling results
 - Reviewing Site Inspection reports
 - PFASs detected in groundwater, wastewater treatment plant influent/effluent, and soil
- Industrial facilities
- Expanding the focus to other sites
 - Wastewater treatment plants
 - Major industrial sites
 - AFFF-certified airports
 - Tanneries
 - Landfills
 - Plating Facilities



DTSC – Environmental Investigations (Cleanup Program)

Current Recommended DTSC Screening Levels (SLs)

Table 1. Health-Based Drinking Water ¹		Table 2. DTSC Risk-Based Residential SLs ²	
EPA Health Advisory (HA) (µg/L)		Soil (mg/kg)	
PFOA	PFOS	PFOA	PFOS
0.07	0.07	1.3	1.3
PFOA + PFOS = 0.07			

¹USEPA lifetime drinking water health advisory level issued May 2016.

²DTSC-SLs calculated using DTSC recommended default exposure parameters and the RfD from the USEPA PFOA and PFOS HA.

Tapwater Risk-Based SL

For risk assessment purposes, the tapwater risk-based DTSC-SL

Table 3. DTSC Risk-Based Residential SLs ²	
Tapwater (µg/L)	
PFOA	PFOS
0.4	0.4



DTSC – Environmental Investigations (Cleanup Program)

- Next Steps for Risk Assessment

- DoD finishing site investigations – Is there PFAS contamination?
- Discussions with DoD on how to conduct a risk assessment at sites with known PFAS contamination in soil, groundwater and wastewater treatment plants
 - USEPA's RSL table does not list soils/water screening levels for PFOS/PFOA
 - Toxicity values for two other PFASs are listed on RSL table (Perfluorobutane sulfonic acid, Perfluorobutanesulfonate)
- One base installed activated carbon at wastewater treatment plant



Challenges and Ongoing Research

- Address the lack of toxicity criteria for all PFASs:
 - Responsive Evaluation and Assessment of Chemical Toxicity (REACT) – Collaborative program between NTP and USEPA to screen as many as 75 PFASs (identified by grouping similar compounds) through high throughput screening assays- initial *in vitro* and *in silico* methods, followed by select *in vivo* methods to generate information.
- How to perform risk assessments:
 - A relative potency factor approach, similar to dioxin evaluation (proposed by RIVM of the Netherlands)
- How to pinpoint the source of contamination - Found in almost everything



QUESTIONS?

