

Potential Expansion of the Existing Designated Chemical Group “Perfluoroalkyl and Polyfluoroalkyl Substances (PFASs)”

to

“Perfluoroalkyl and Polyfluoroalkyl Substances (PFASs) and Other Substances with Carbon-Fluorine Bonds”

Martha Sandy, MPH, PhD
Meltem Musa, MS, PhD

Office of Environmental Health Hazard Assessment
Presentation to the Scientific Guidance Panel
August 2023 SGP meeting (rescheduled to November 6, 2023)



Background

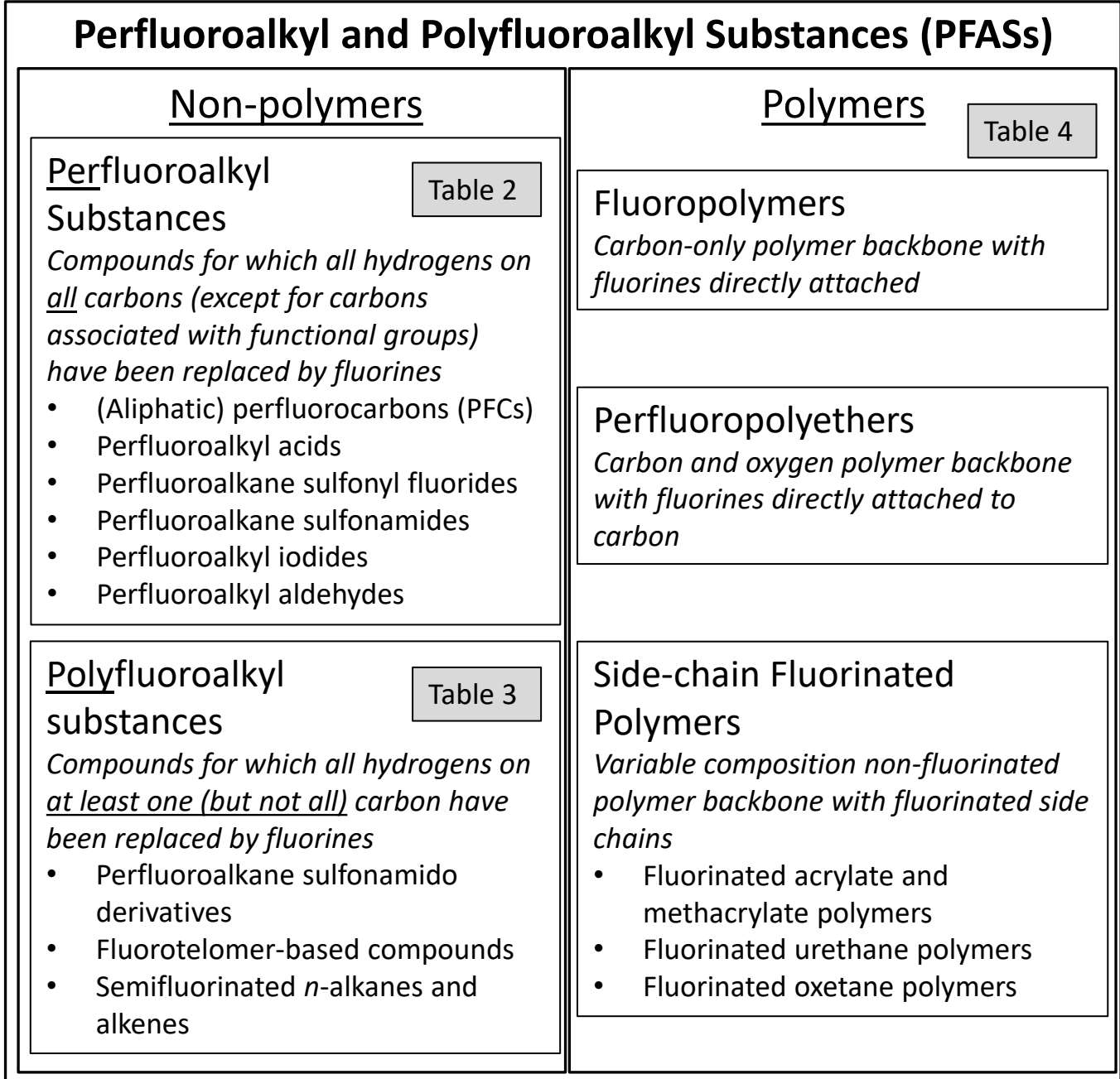
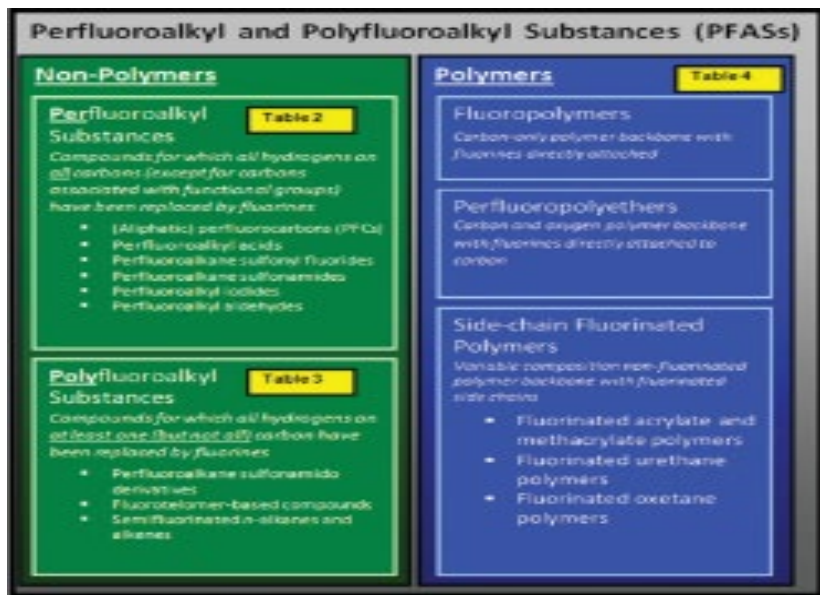
- **Perfluoroalkyl and Polyfluoroalkyl Substances (PFASs) - as a class**
 - SGP recommended addition to Biomonitoring California's lists of:
 - Designated chemicals in March 2015
 - Priority chemicals in November 2015
- Includes chemicals covered in Buck et al. (2011)

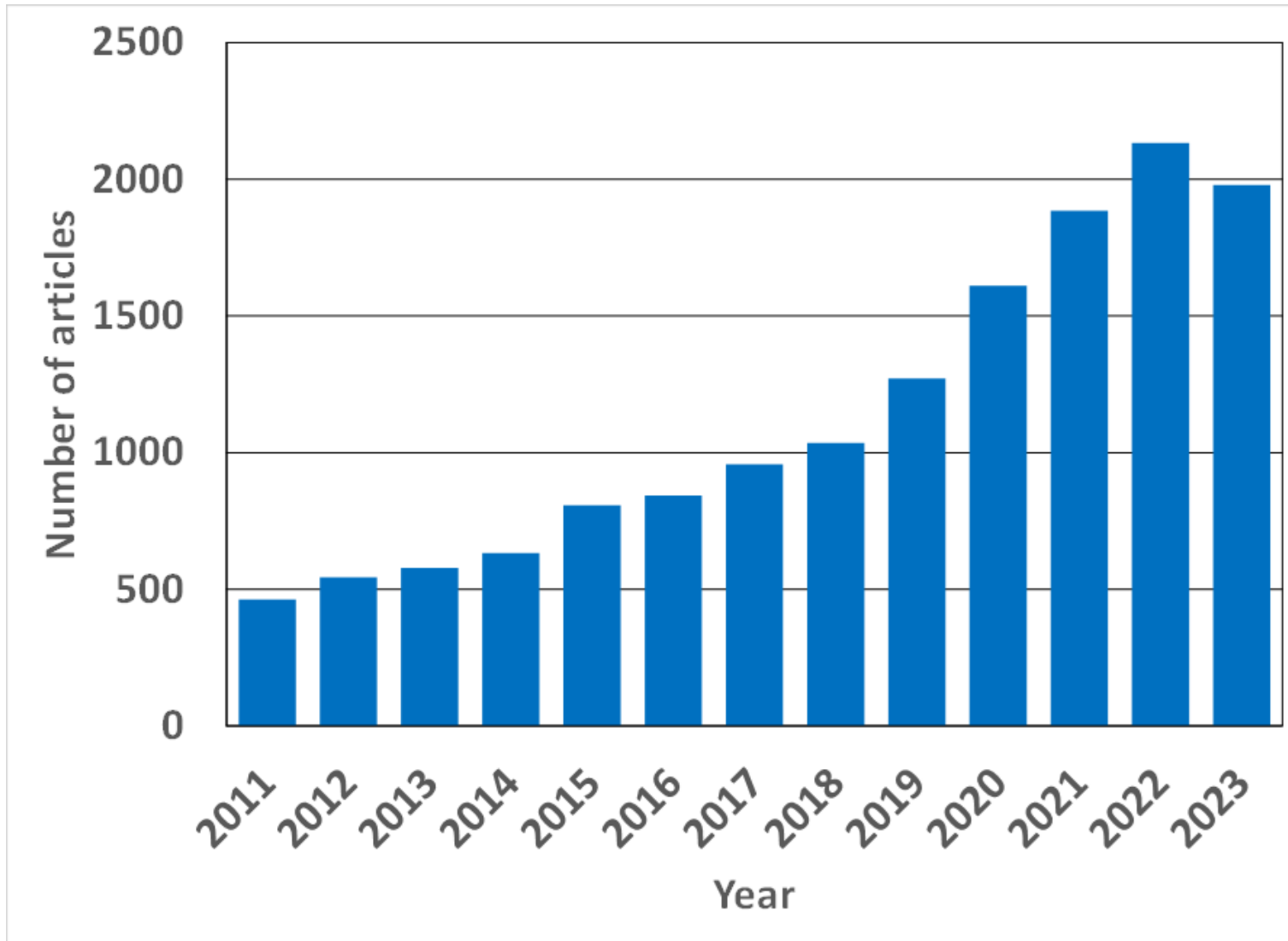
PFASs: Recent presentations & discussions at SGP meetings

SGP Meeting	Description
Nov 2016	Invited speaker (CTS: PFOA and PFOS in drinking water associated with higher serum levels)
March 2017	Two invited speakers (e.g., CDC biomonitoring activities, exposome approaches total organofluorine)
August 2018	Analyses of data from CARE, FOX, MIEEP, BEST, MAMAS, BEST, & ACE, ECL method development, plus 4 invited speakers (e.g., CDC methods and data, exposure sources, CalEPA activities)
Nov 2019	CARE-LA findings
March 2020	CARE-LA & CARE-2 summary findings
July 2020	CARE-LA & CARE-2 findings, plus 2 invited speakers (analytical methods/approaches, emerging sources, other biomonitoring study findings)
Nov 2021	Additional analyses from CARE, FOX, MIEEP, MAMAS, BEST, & ACE, plus 4 invited speakers (e.g., organofluorine analytical methods, exposure from air, dust, water, diet, and consumer products, CalEPA activities); request for Program report back on PFASs chemical group
March 2022	Report back, consider options (e.g., expanding the chemical group)
July 2022	CARE-3 findings
March 2023	Invited speaker (population-based pharmacokinetic modeling)

From our “report back” in March 2022

Adapted from Figure 4 in Buck et al. 2011
(p. 521)





Increased research on PFASs and other fluorinated chemicals since 2011

Research over the last 10+ years

- Increased awareness of the large number of PFASs and other organofluorine chemicals present in consumer products, the environment and biota, and increased characterization of exposures
 - Expanded analyses (targeted and non-targeted approaches) for perfluorinated and polyfluorinated chemicals
 - Measurements of total organofluorine
- Increased information on toxicity from epidemiology, animal toxicology and mechanistic studies

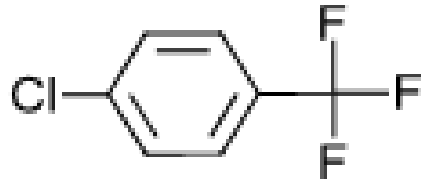
Program recommendation

- Expand the PFASs Chemical Group on the Designated Chemicals list to:
“Perfluoroalkyl and Polyfluoroalkyl Substances (PFASs) **and Other Substances with Carbon-Fluorine Bonds¹**”

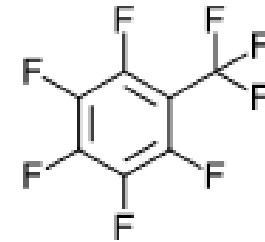
¹ Includes substances with at least one carbon-fluorine bond

Examples of chemicals that would be included in the proposed expansion

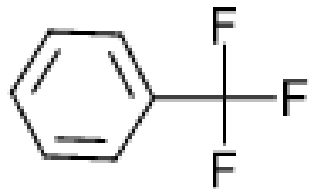
para-Chlorobenzotrifluoride (PCBTF)



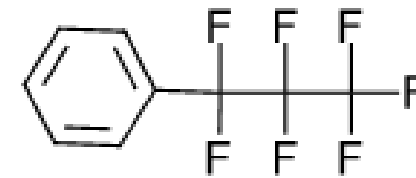
Perfluorotoluene



Benzotrifluoride

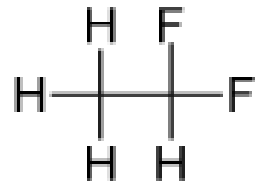


(Perfluoropropyl)benzene



Example chemicals (cont.)

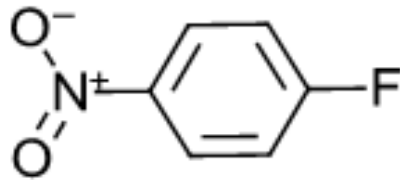
1,1-Difluoroethane



(Difluoromethyl)benzene



1-Fluoro-4-nitrobenzene



Fluorobenzene



Criteria for recommending designated chemicals

- Exposure or potential exposure to the public or specific subgroups
- The known or suspected health effects resulting from some level of exposure based on peer reviewed scientific studies
- The need to assess the efficacy of public health actions to reduce exposure to a chemical
- The availability of a biomonitoring analytical method with adequate accuracy, precision, sensitivity, specificity, and speed
- The availability of adequate biospecimen samples
- The incremental analytical cost to perform the biomonitoring analysis for the chemical

Proposed
Expansion:

Examples of
chemicals with
exposure/
potential for
exposure

Groundwater

- PCBTF
- Benzotrifluoride

Diet

- Bifenthrin
- Cyhalothrin

Air

- PCBTF
- Difluoromethane

Wildlife

- Bromethalin

Human biospecimens

- Fipronil

Proposed Expansion:

Examples of
chemicals with
health concerns/
potential
health concerns

Carcinogenicity

- PCBTF (IARC Group 2B; Proposition 65 listed)
- Tetrafluoroethylene (Proposition 65 listed)
- Bifenthrin, fipronil, ethalfluralin (US EPA Group C possible human carcinogens)

Endocrine disruption

- Bifenthrin

Nervous system effects

- Benzotrifluoride
- Bifenthrin
- Fipronil

Immunological effects

- Trifloxystrobin

Liver and kidney effects

- Benzotrifluoride
- Fipronil

Justification for expansion

- The carbon-fluorine bond is extremely strong.
- Several chemicals in the expanded group have been tested for toxicity, and cause adverse health effects (e.g., cancer, liver effects, kidney effects, neurotoxicity).
- Is a resource-efficient approach, facilitating use of non-targeted laboratory screening methods for chemicals with carbon-fluorine bonds and identification of emerging chemicals of concern.
- Gives the Program flexibility to choose to biomonitor additional substances with carbon-fluorine bonds of potential health concern and be responsive to market shifts in use.

Questions?