SAFER CONSUMER PRODUCTS

Regulating PFASs as a Chemical Class Under the California Safer Consumer Products Program

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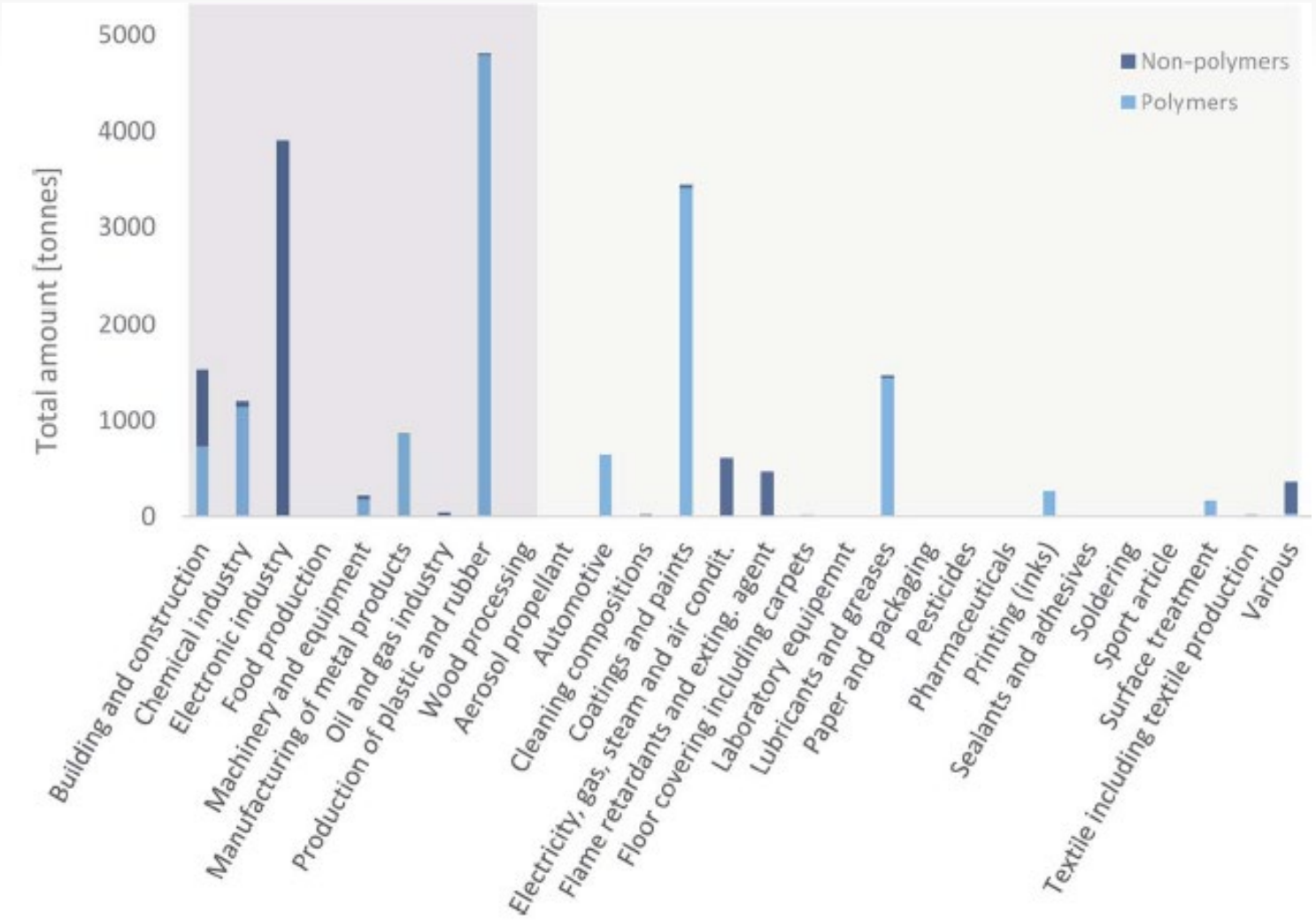
The Science of PFAS: Public Health & The Environment

April 5, 2022

Department of Toxic Substances Control

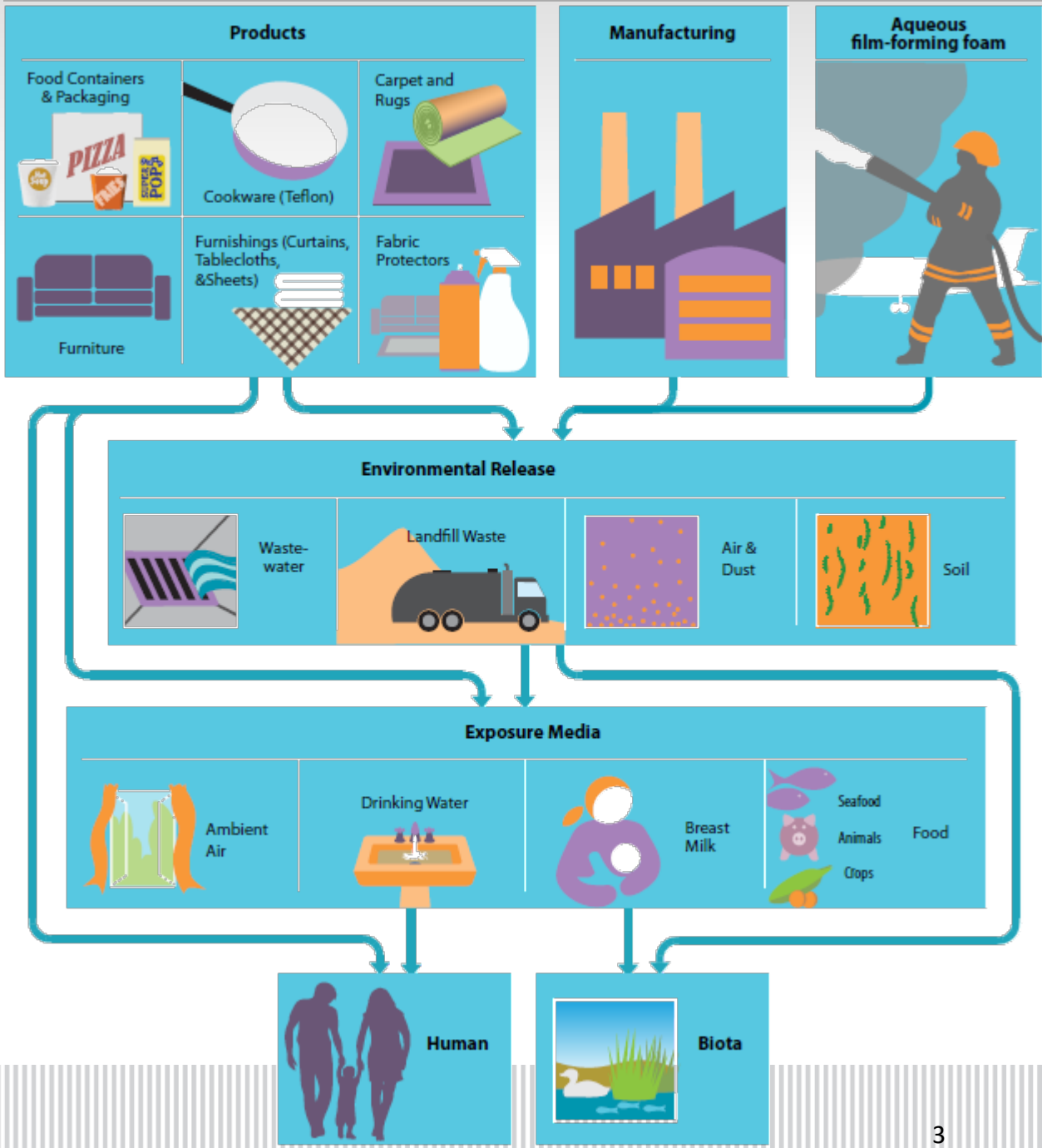
Cal/EPA

There are thousands of PFASs, with >200 uses!



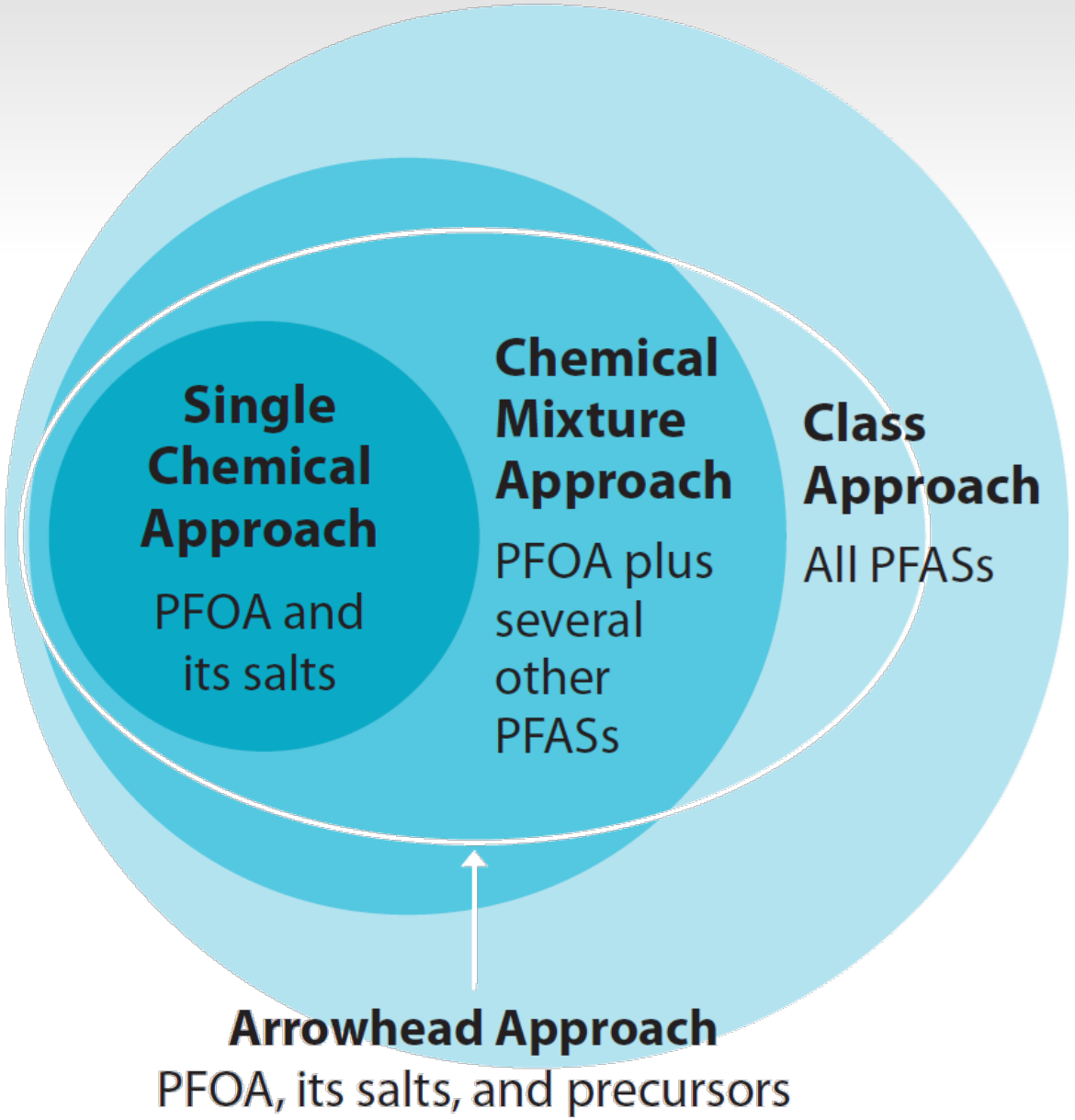
Glüge et al. (2020) Environ Sci: Processes Impacts 22:2345-73

PFAS exposure is complex

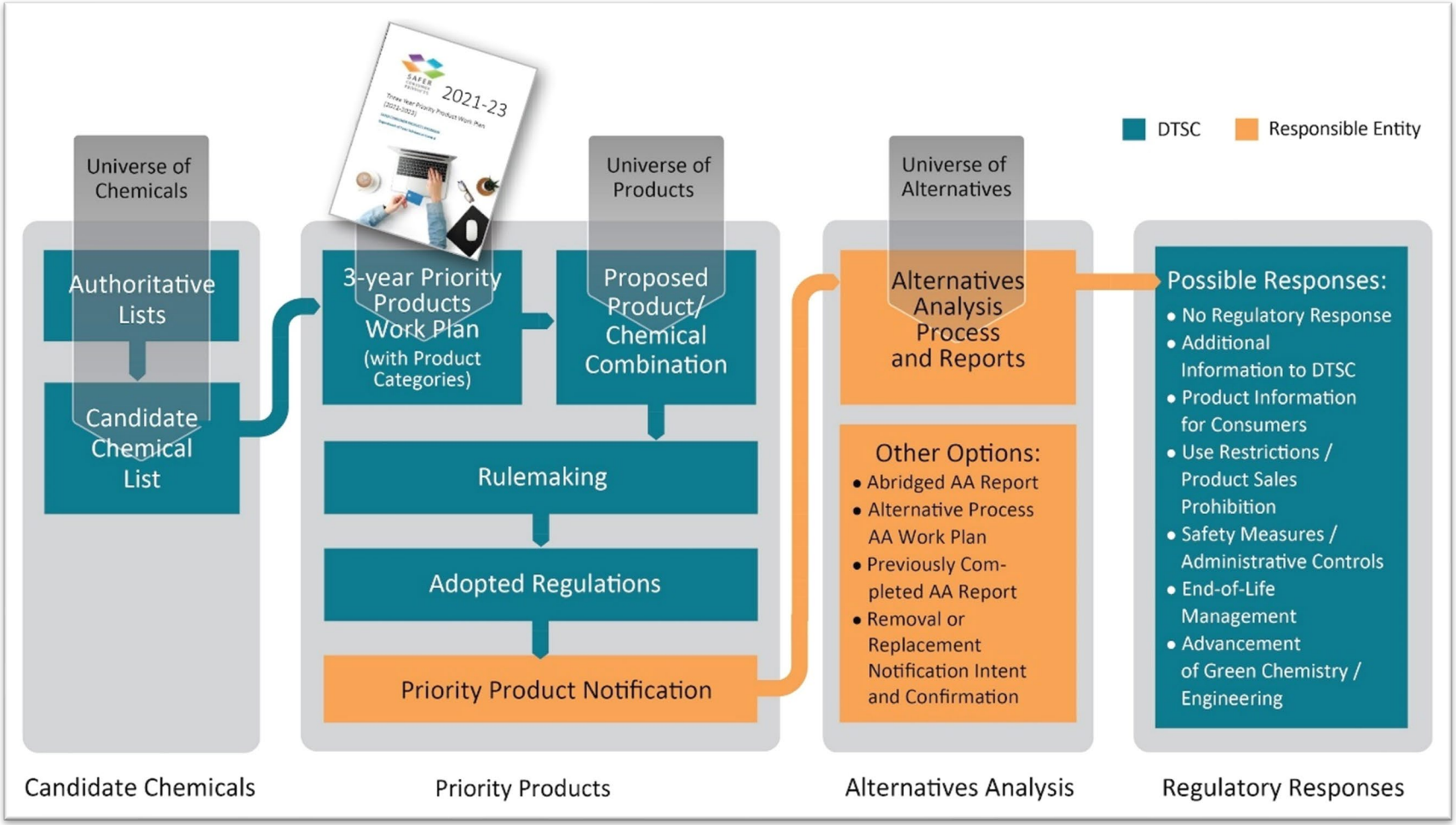


So what do we do about this?

Different approaches to PFAS regulation



The SCP regulatory framework



California Code of Regulations, Title 22, Division 4.5, Chapter 55

SCP's product-chemical prioritization follows a narrative standard

There are potential **exposures** to a Candidate Chemical in the product

AND

One or more exposures have the potential to contribute to or cause **significant or widespread adverse impacts**

All PFASs* became Candidate Chemicals under the SCP regulations in 2015

The class is on the
Priority Chemicals list for

BIOMONITORING CALIFORNIA

Krowech G et al. (2016) Environ Health Perspect 124(12): A219-226
*As defined in Buck et al. (2011) Integr. Environ. Assess. Manag. 7(4):513-41

PFASs can be grouped into 4 main subclasses

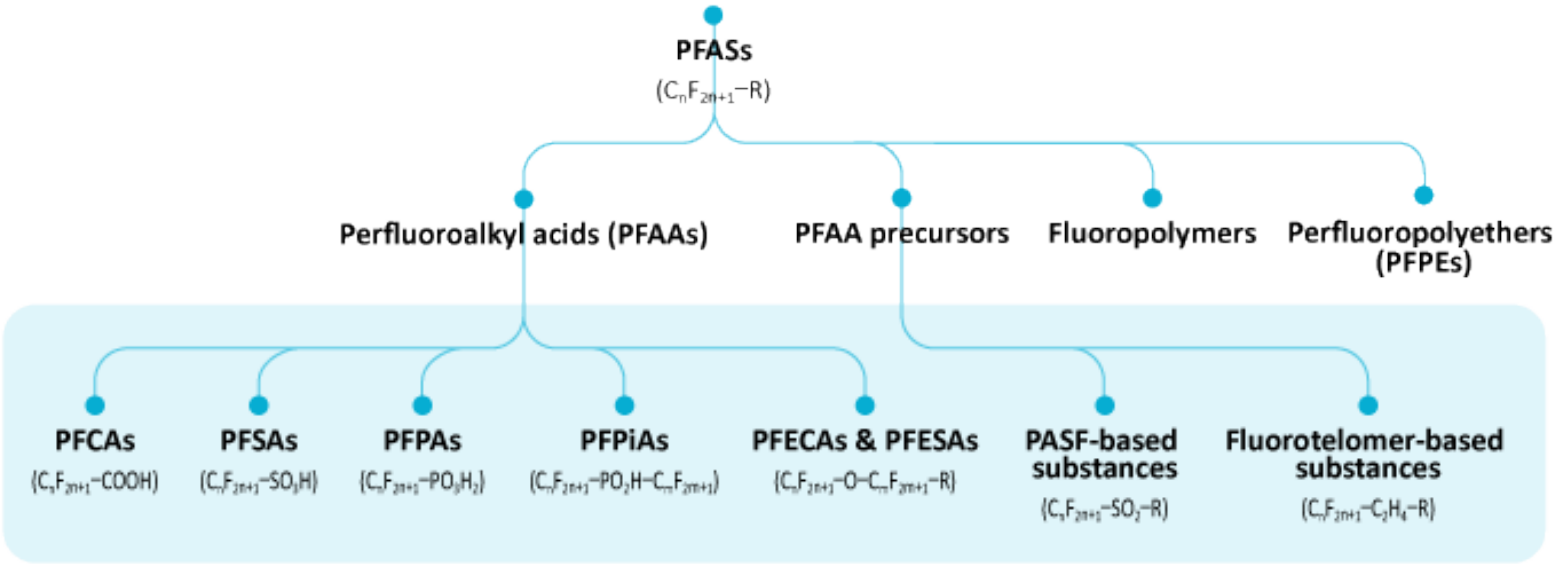


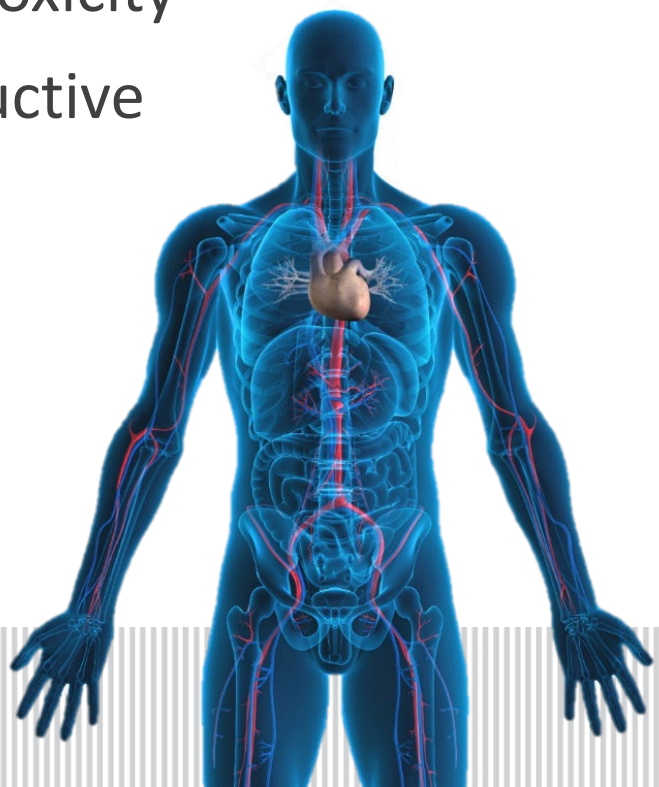
Image adapted from Wang et al. (2017) ES&T 51(5):2508-18

PFAS exposure potential hazard traits

- Environmental persistence
- Mobility in environmental media
- Bioaccumulation
- Lactational and transplacental transfer

PFAS toxicological hazard traits

- Carcinogenicity
- Cardiovascular toxicity
- Developmental toxicity
- Endocrine toxicity
- Hepatotoxicity
- Immunotoxicity
- Nephrotoxicity
- Ocular toxicity
- Reproductive toxicity



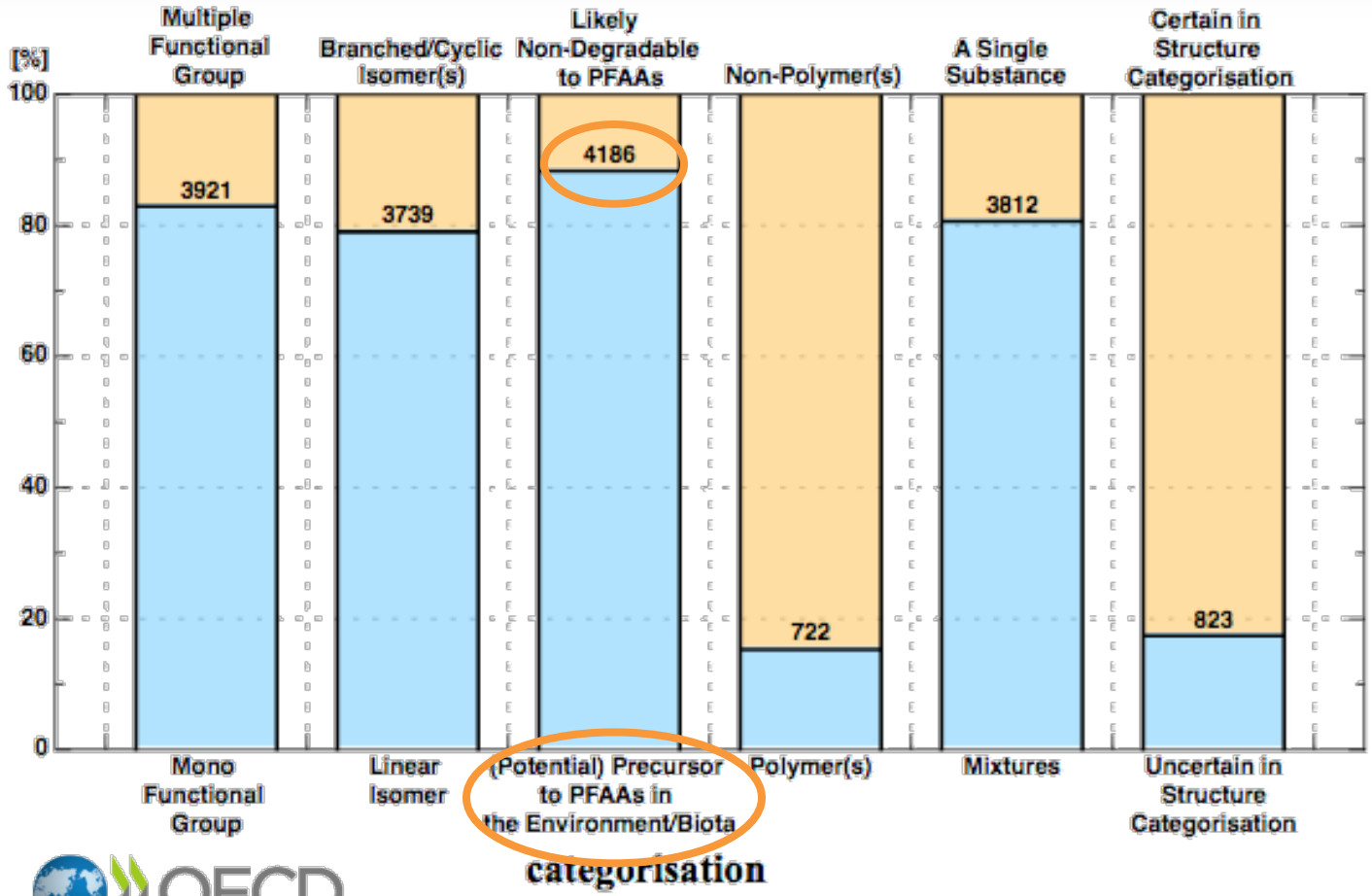
PFAS environmental hazard traits

- Phytotoxicity
- Wildlife developmental, reproductive, and survival impairment





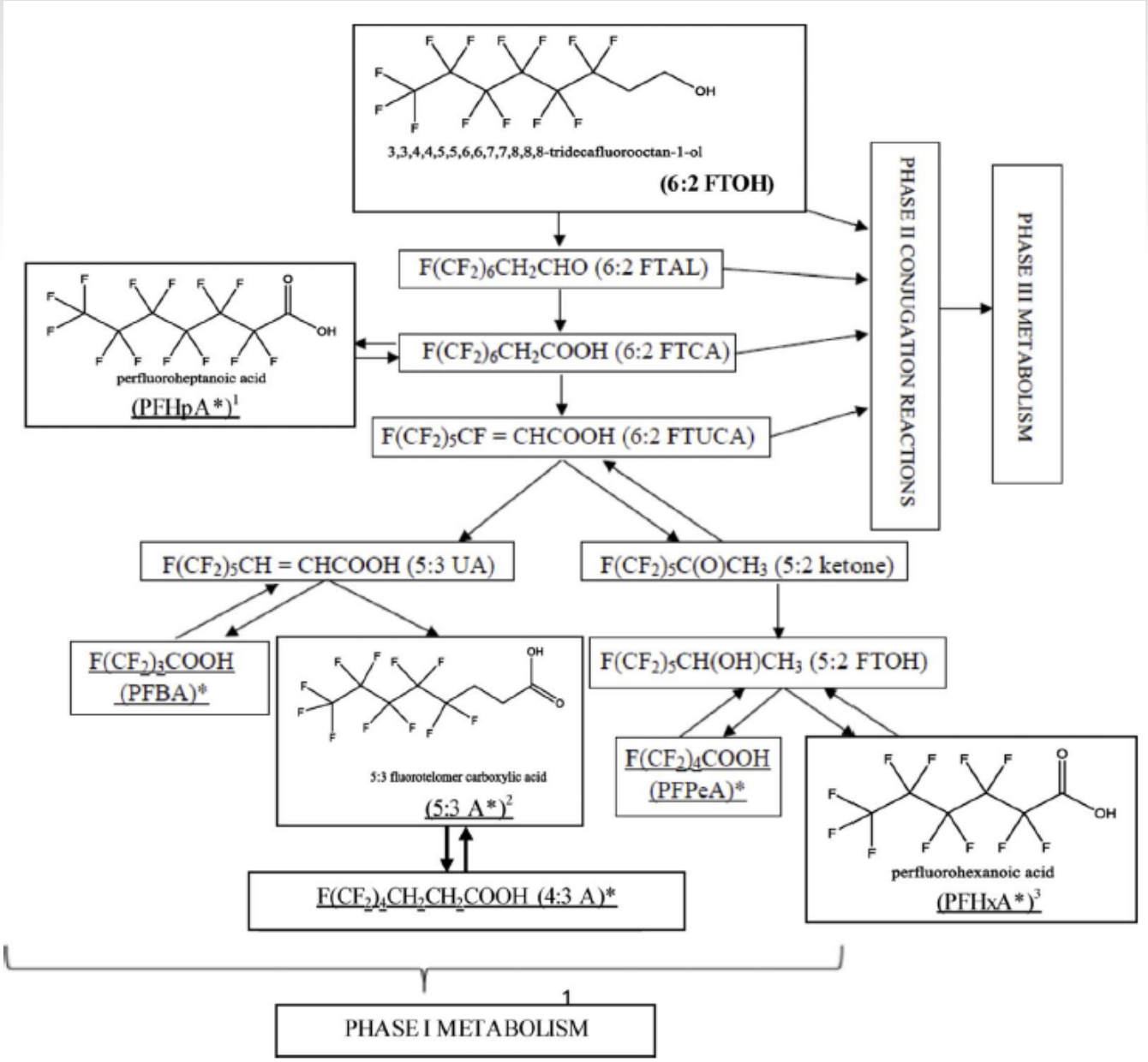
Over 80 percent of PFASs may degrade or metabolize to PFAAs



OECD

Organisation for Economic Co-operation and Development

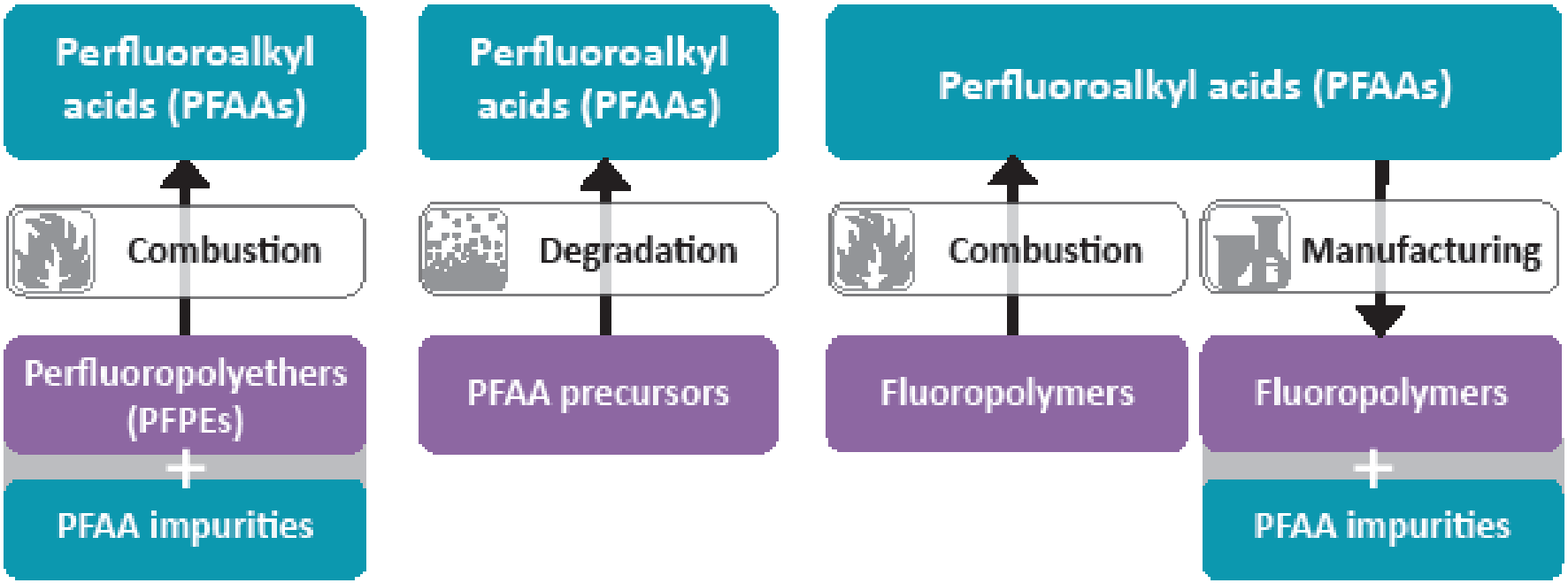
http://www.oecd.org/chemicalsafety/portal-perfluorinated-chemicals/



Intermediates may have higher biopersistence and toxicity than the final degradation products

Kabadi et al. 2018; 2020; Rice et al. 2020

PFASs or their degradation, reaction, or metabolism products are highly persistent



The P-sufficient approach

- "if a chemical is **highly persistent**, its continuous release will lead to **continuously increasing contamination** (…) [and] result in **increasing probabilities of the occurrence of known and unknown effects**." (Cousins et al. 2019)

- "Because persistence is an inherent property of a chemical in the environment that results in increased exposure to the chemical and consequently potential for health risks, **it can appropriately be identified as a hazard trait**." (OEHHA 2012)

https://pubs.rsc.org/en/content/articlelanding/2019/em/c8em00515j
https://oehha.ca.gov/media/downloads/risk-assessment/gcfsor011912.pdf

ehp Environmental Health Perspectives

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Vol. 129, No. 2 | Commentary

Regulating PFAS as a Chemical Class under the California Safer Consumer Products Program

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Abstract

Background: Perfluoroalkyl and polyfluoroalkyl substances (PFAS) are a group of manmade chemicals containing at least one fully fluorinated carbon atom. The widespread use, large number, and diverse chemical structures of PFAS pose challenges to any sufficiently protective regulation, emissions reduction, and remediation at contaminated sites. Regulating only a subset of PFAS has led to their replacement with other members of the class with similar hazards, that is, regrettable substitutions. Regulations that focus solely on perfluoroalkyl acids (PFAAs) are ineffective, given that nearly all other PFAS can generate PFAAs in the environment.

Objectives: In this commentary, we present the rationale adopted by the State of California's Department of Toxic Substances Control (DTSC) for regulating PFAS as a class in certain consumer products.

Discussion: We at the California DTSC propose regulating certain consumer products if they contain any member of the class of PFAS because: *a*) all PFAS, or their degradation, reaction, or metabolism products, display at least one common hazard trait according to the California Code of Regulations, namely environmental persistence; and *b*) certain key PFAS that are the degradation, reaction or metabolism products, or impurities of nearly all other PFAS display additional hazard traits, including toxicity; are widespread in the environment, humans, and biota; and will continue to cause adverse impacts for as long as any PFAS continue to be used. Regulating PFAS as a class is thus logical, necessary, and forward-thinking. This technical position may be helpful to other regulatory agencies in comprehensively addressing this large class of chemicals with common hazard traits.
https://doi.org/10.1289/EHP7431

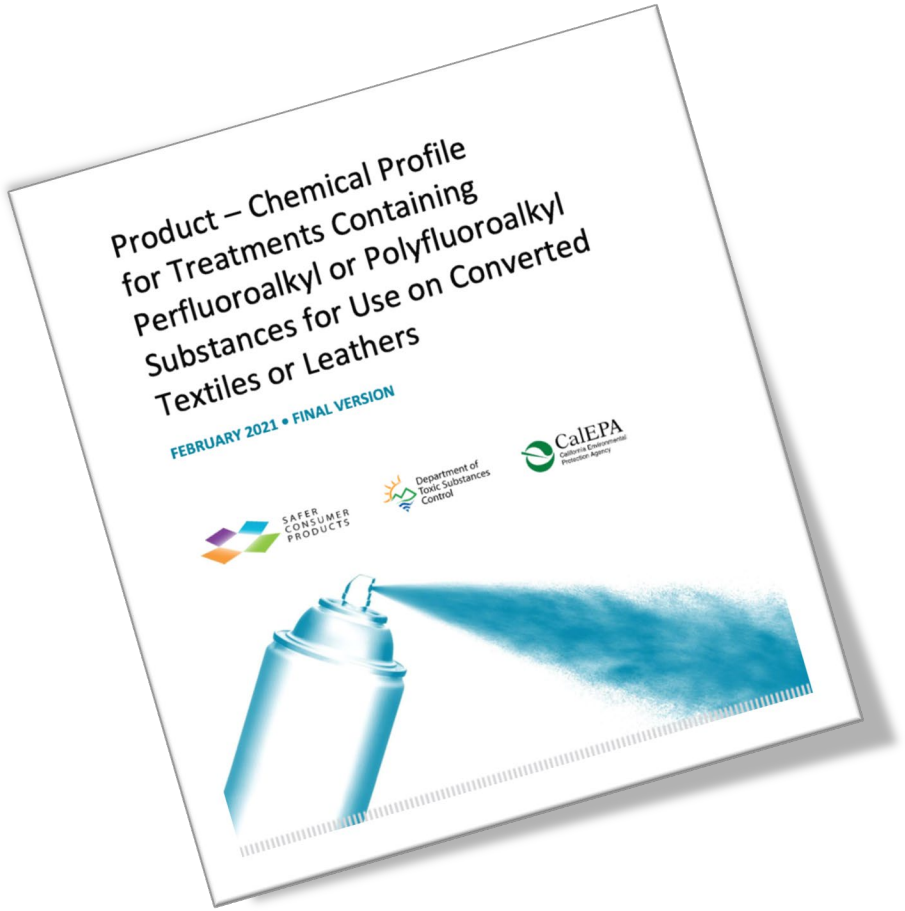
Priority Product as of July 1, 2021

Carpets and rugs with perfluoroalkyl or polyfluoroalkyl substances (PFASs)

https://calsafer.dtsc.ca.gov/cms/commentpackage/?rid=12751

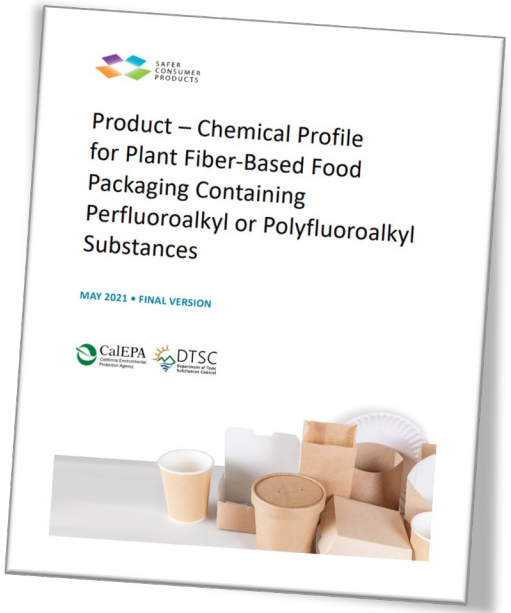
Priority Product as of April 1, 2022

Treatments with PFASs for use on converted textiles or leathers



https://calsafer.dtsc.ca.gov/cms/commentpackage/?rid=12759

AB 1200 bans plant fiber-based food packaging with intentionally added PFASs as of January 1, 2023

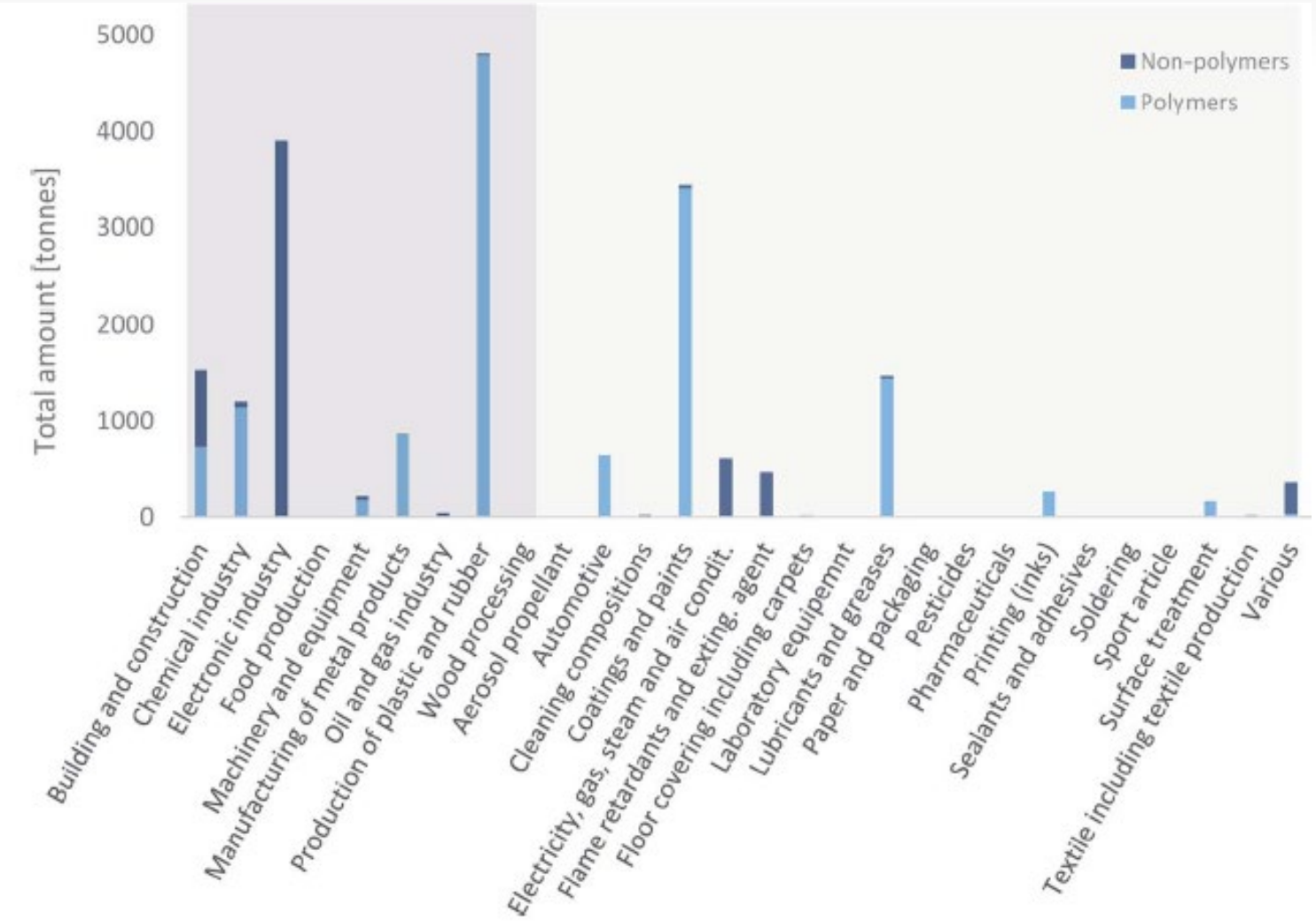


https://dtsc.ca.gov/scp/food-packaging-containing-pfass/

How can we tell if products contain PFASs?

Method Type	Advantages	Limitations
Total fluorine / total organic fluorine (TOF)	• Only way to confirm the absence of any PFAS • Relatively fast and inexpensive	• Not specific to PFASs
Targeted analysis	• Confirms presence of PFASs	• Limited to a subset of PFASs (up to ~70) that are not intentional ingredients
Total oxidizable precursor (TOP) assay	• Confirms presence of PFASs • Captures precursors that cannot be directly detected	• Doesn't capture all PFASs • More difficult and expensive
Non-targeted analysis	• Confirms presence of PFASs • Can detect up to >2,000 PFASs	• Most difficult and expensive

What's next?



Glüge et al. (2020) Environ Sci: Processes Impacts 22:2345-73

Our menu of options through 2023

https://dtsc.ca.gov/wp-content/uploads/sites/31/2021/04/Final-2021-2023-Priority-Product-Work-Plan.pdf

Thank you!

Contact me: simona.balan@dtsc.ca.gov

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CalSAFER: https://calsafer.dtsc.ca.gov/

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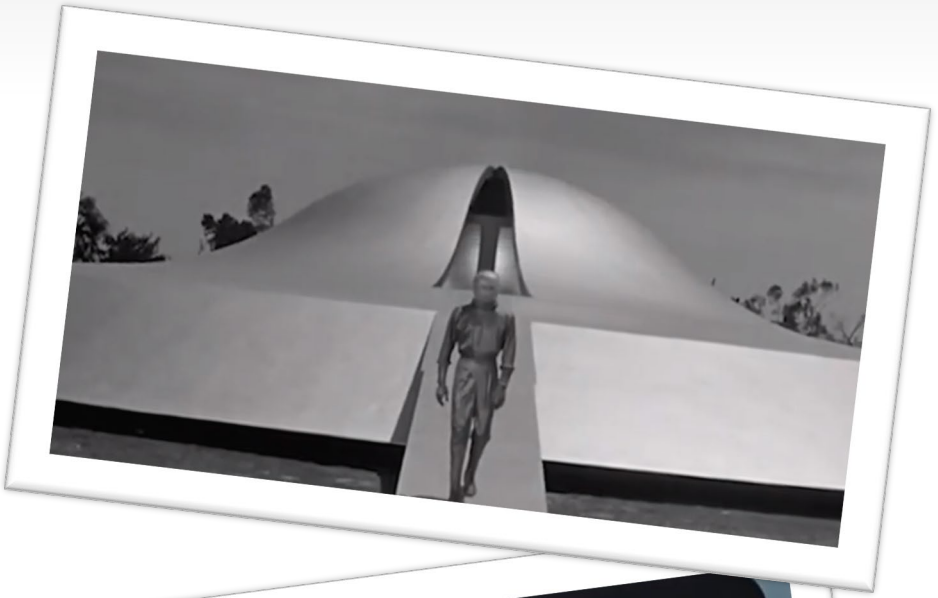
https://www.youtube.com/watch?v=E7-Nz6vTNSY&feature=youtu.be



https://www.youtube.com/watch?v=-p-10cKbIao