



Public Workshop

on Food Packaging Containing Perfluoroalkyl or
Polyfluoroalkyl Substances

August 31, 2020 • Facilitator: Asha Setty, Public Participation Specialist



Department of Toxic
Substances Control





Web attendees: Raise your hand to comment verbally, or type your comment in the Q&A

Phone attendees: Submit your comments to
SaferConsumerProducts@dtsc.ca.gov



Department of Toxic Substances Control



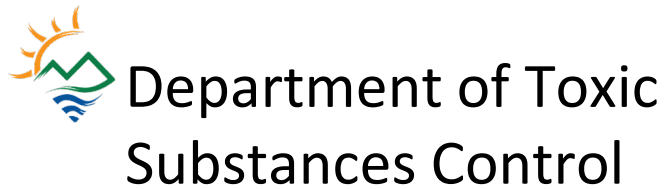
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Opening remarks

Karl Palmer

Acting Deputy Director, SCP Program, Karl.Palmer@DTSC.ca.gov

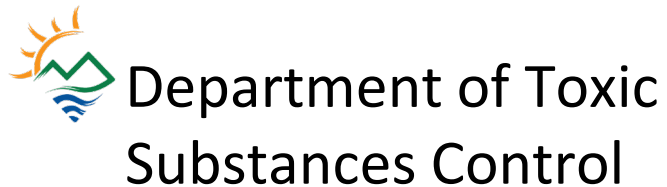




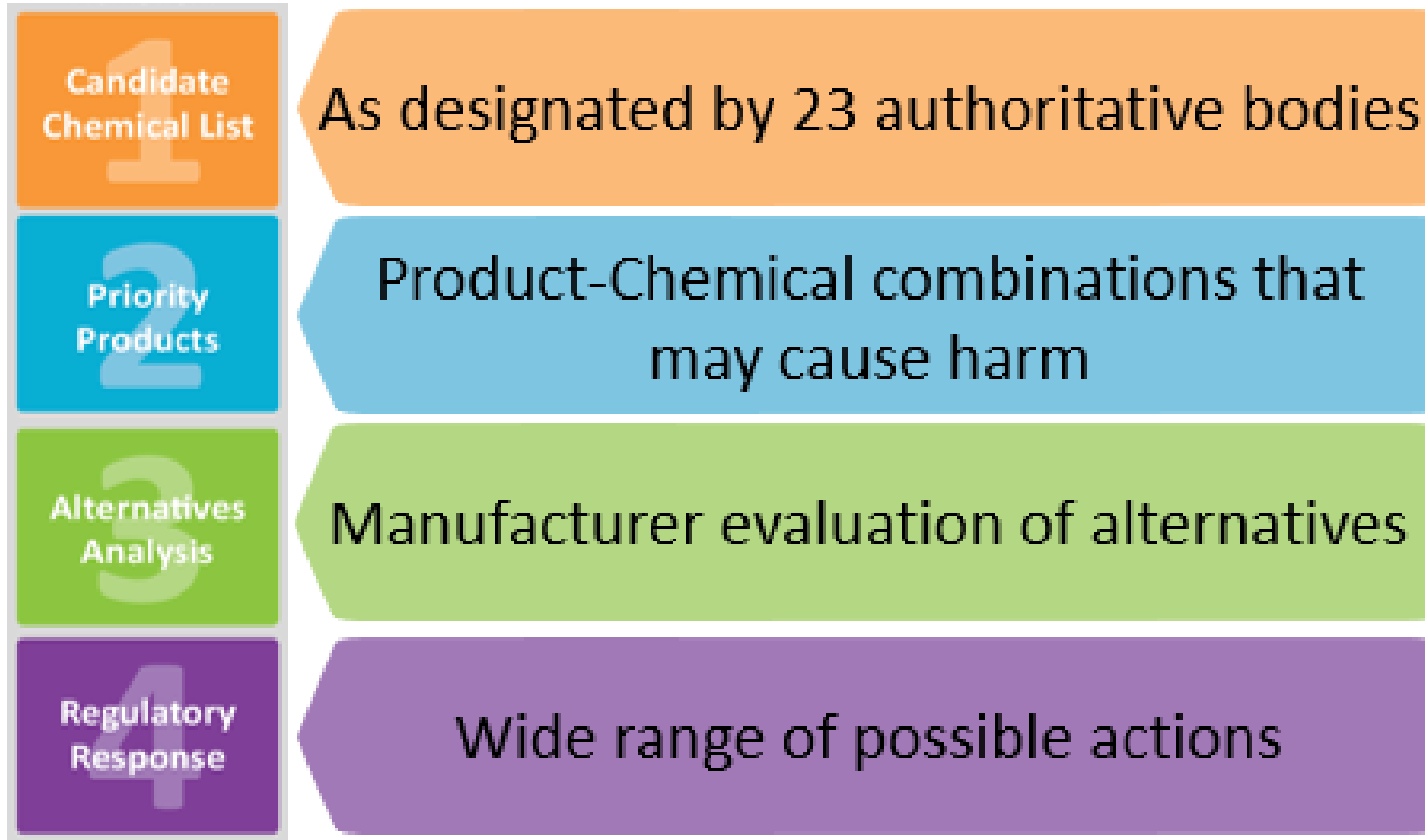
Overview of the Safer Consumer Products process

André Algazi

Chief, Chemical-Product Evaluation Section, Andre.Algazi@DTSC.ca.gov



The Safer Consumer Products Framework



A Priority Product is a product-chemical combination that meets these criteria:



- 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**.

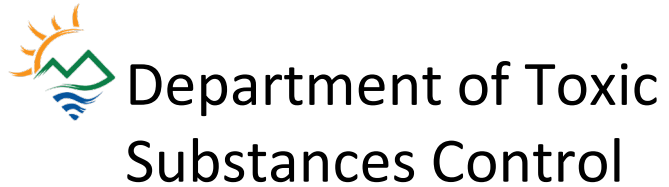




Overview of DTSC's findings

Simona Bălan, PhD

Senior Environmental Scientist (Specialist), Simona.Balan@DTSC.ca.gov



Research results

<https://calsafer.dtsc.ca.gov/cms/commentpackage/?rid=12752>



Definitions and scope

Potential for exposure

Potential adverse impacts

Potential alternatives



Scope of product: Plant fiber-based food packaging



Paper

e.g., bakery sleeves and bags, deli liners, fast food wrappers, microwave popcorn bags, butter wraps, baking paper, paper for dry foods



Paperboard

e.g., French-fry containers, food trays and boats, takeout boxes and clamshells, icecream tubs, paper plates



Molded fiber

e.g., clamshells, food bowls, plates, egg trays, food trays

Definitions and scope

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Scope of Candidate Chemical: Perfluoroalkyl and polyfluoroalkyl substances (PFASs)

- PFASs are a class of nearly 5,000 man-made chemicals with at least one fully fluorinated carbon atom.
- All members of this class are Candidate Chemicals for the SCP program, due to listing by Biomonitoring California as Priority Chemicals in 2015.

Definitions and scope

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PFASs are ubiquitous

- In the environment
- In plants, animals, and humans
- In human food and drinking water



Definitions and scope

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PFAS presence in food packaging products

- PFASs are used in food packaging to confer oil, grease, or water resistance and to release the slurry from the manufacturing mold.
- Recent testing found PFASs in a wide range of food packaging products.
- FDA approved 28 food contact notifications (FCNs) for 17 distinct PFAS formulations from 6 manufacturers.
- A voluntary phaseout will reduce this to 13 approved FCNs, for 6 distinct PFAS compositions from 3 manufacturers.

Definitions and scope

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Main PFAS subclasses

Kowiatkowski et al. (2020)
available at
<https://pubs.acs.org/doi/10.1021/acs.estlett.0c00255>

Perfluoroalkyl acids and perfluoroalkylether acids (PFAA), e.g.

perfluoroalkyl carboxylic acids (PFCA), $C_nF_{2n+1}-COOH$, e.g. PFOA

perfluoroalkane sulfonic acids (PFSA), $C_nF_{2n+1}-SO_3H$, e.g. PFOS

perfluoroalkyl phosphonic acids (PFPA), $C_nF_{2n+1}-PO_3H_2$

perfluoroalkyl phosphinic acids (PFPIA), $(C_nF_{2n+1})(C_mF_{2m+1})-PO_2H$

perfluoroalkylether carboxylic acids (PFECA), e.g. $C_2F_5OC_2F_4OCF_2COOH$

perfluoroalkylether sulfonic acids (PFESA), e.g. $C_6F_{13}OCF_2CF_2SO_3H$

Precursors to PFAA, e.g.

perfluoroalkane sulfonyl fluorides (PASF)
perfluoroalkanoyl fluorides (PACF) and their
derivatives, $C_nF_{2n+1}SO_2-R$ / $C_nF_{2n+1}CO_2-R$

n:2 fluorotelomer-based substances
 $C_nF_{2n+1}CH_2CH_2-R$

per- and polyfluoroalkylether-based
substances
e.g. $C_nF_{2n+1}OC_mF_{2m+1}-R$

side-chain fluorinated polymers
e.g. (meth)acrylate, urethane, or
oxetane polymers with non-fluorinated
backbones and fluorinated side-chains

non-polymers
 $R = NH, NHCH_2CH_2OH$, etc.

some hydrofluorocarbons (HFCs, e.g. $C_nF_{2n+1}-C_mH_{2m+1}$), hydrofluoroethers (HFEs,
e.g. $C_nF_{2n+1}OC_mH_{2m+1}$) and hydrofluoroolefins (HFOs, e.g. $C_nF_{2n+1}-CH=CH_2$);
perfluoroalkyl ($C_nF_{2n+1}C(O)C_mF_{2m+1}$) and semi-fluorinated ($C_nF_{2n+1}C(O)C_mH_{2m+1}$) ketones;
perfluoroalkyl alcohols ($C_nF_{2n+1}OH$)

Fluoropolymers, e.g.

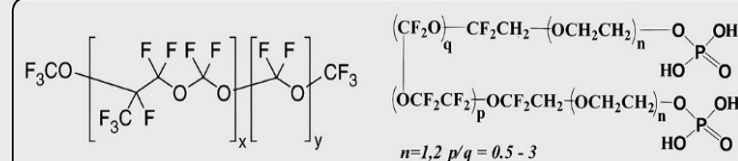
polytetrafluoroethylene (PTFE), $-(CF_2CF_2)_n-$

polychlorotrifluoroethylene (PCTFE), $-(CF_2CFCl)_n-$

polyvinylidene fluoride (PVDF), $-(CF_2CH_2)_n-$

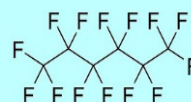
fluorinated ethylene propylene (FEP), $-(CF_2CF_2)_n-(CF_2C(CF_3)F)_m-$

Perfluoropolyethers, e.g.

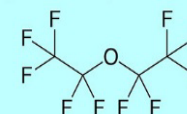


Other PFAS*, e.g.

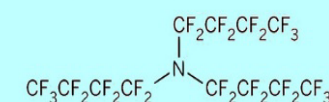
perfluoroalkanes, e.g.



perfluoroalkylethers, e.g.



perfluoroalkylamines, e.g.



* These PFAS have been less discussed in the public domain, but they meet the definition of PFAS as recommended in Buck et al. (2011) and OECD (2018). They are primarily PFAS with limited chemical reactivity.

Definitions and scope

Potential for exposure

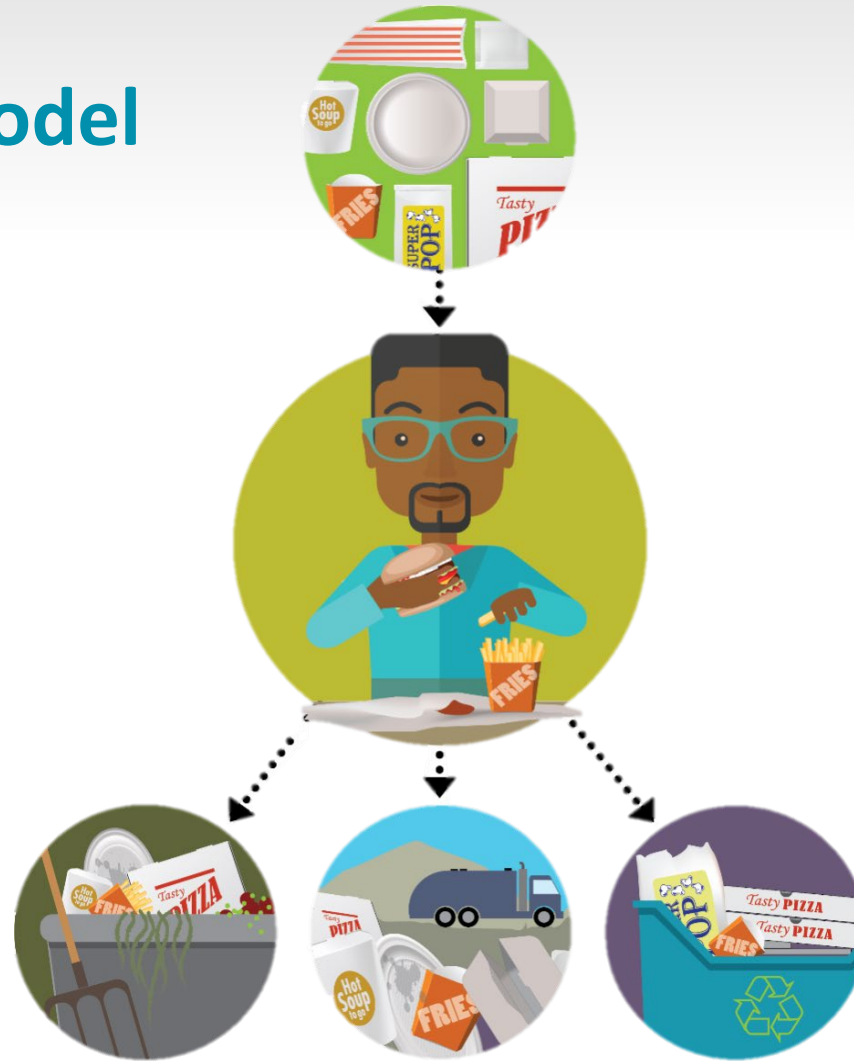
Potential adverse impacts

Potential alternatives



Conceptual exposure model

- Migration into food
- Composting
- Landfilling
- Recycling
- Incineration



Definitions and scope

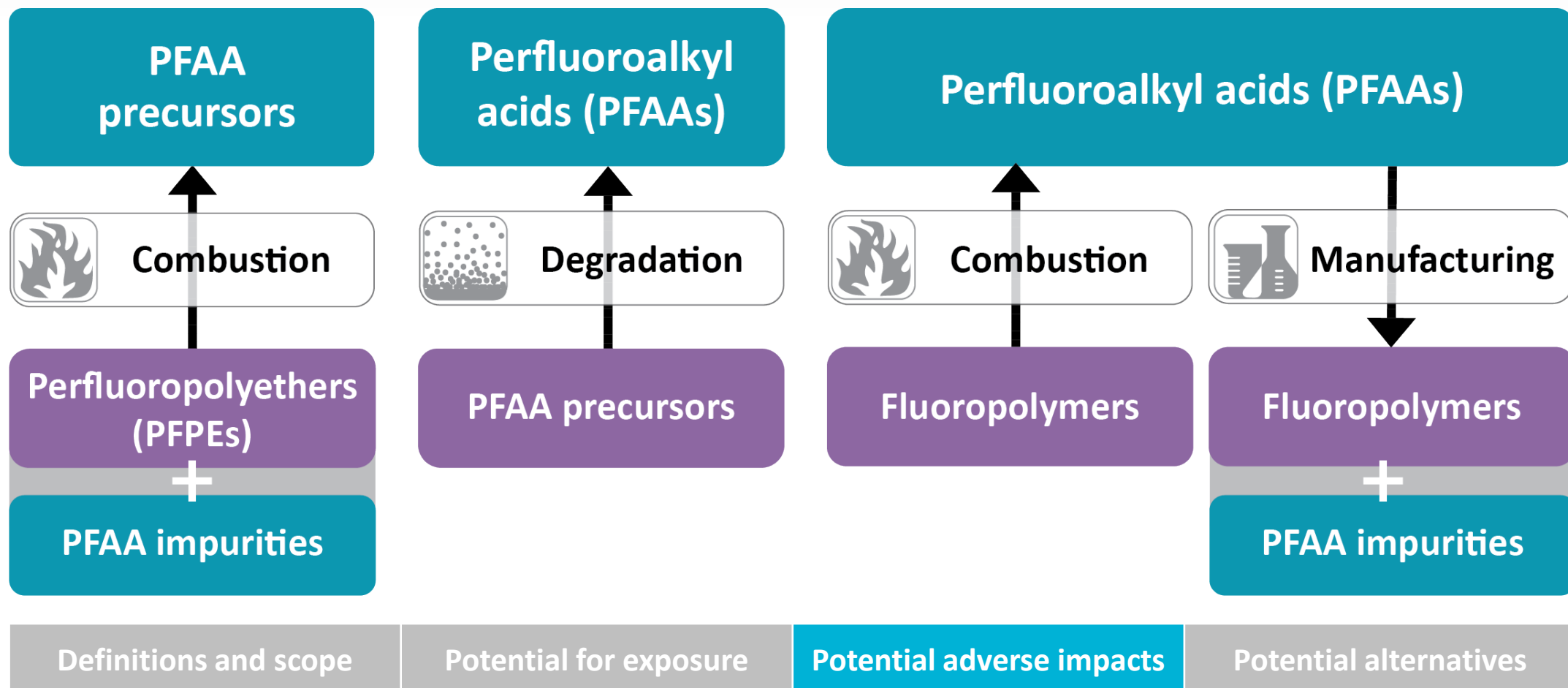
Potential for exposure

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All PFASs are either of concern or have degradation, reaction, or metabolism products of concern



Exposure potential hazard traits

- Environmental persistence
- Mobility in the environment
- Bioaccumulation



Definitions and scope

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Potential adverse impacts

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Exposure potential hazard traits

- Environmental persistence
- Mobility in the environment
- Bioaccumulation
- Lactational and transplacental transfer



Definitions and scope

Potential for exposure

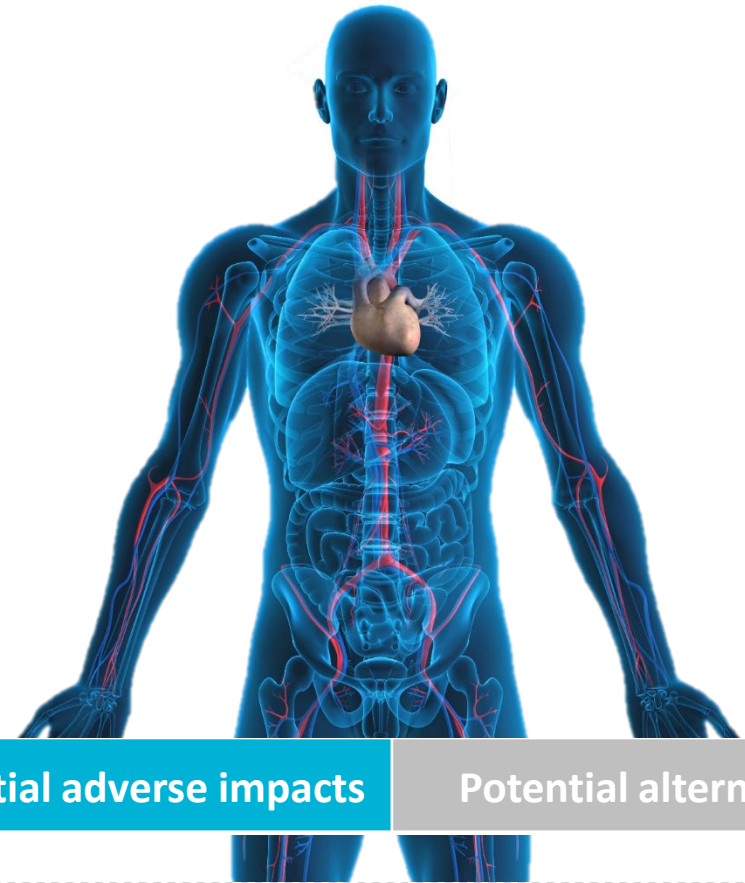
Potential adverse impacts

Potential alternatives



Known toxicological hazard traits of longer-chain PFAs

- Carcinogenicity
- Cardiovascular toxicity
- Endocrine toxicity
- Immunotoxicity
- Reproductive toxicity



Definitions and scope

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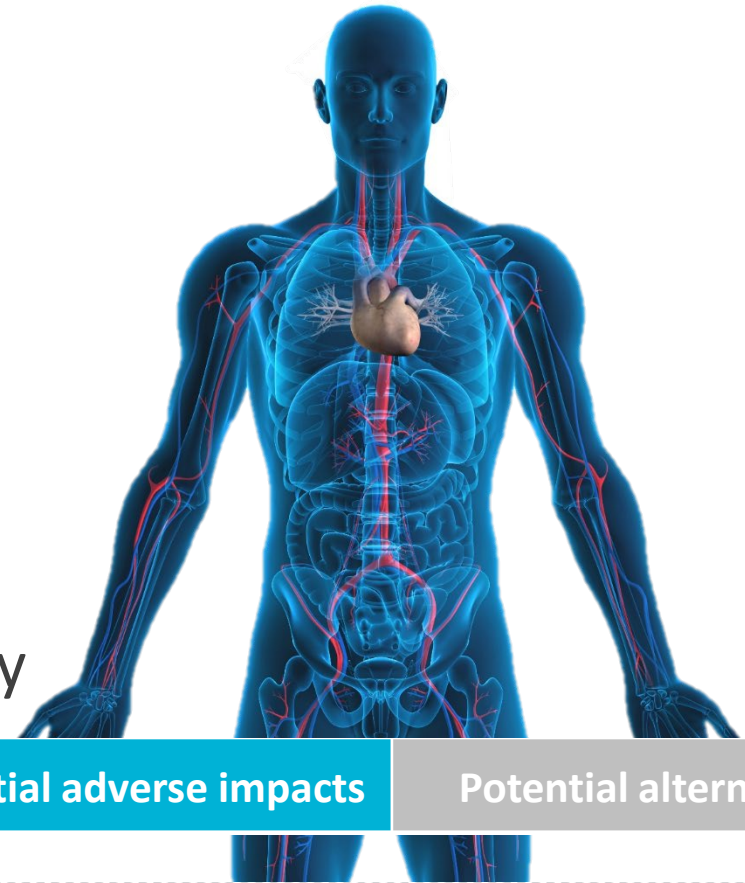
Potential adverse impacts

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Emerging toxicological hazard traits of shorter-chain PFAAs

- Developmental toxicity
- Endocrine toxicity
- Hematotoxicity
- Hepatotoxicity
- Neurodevelopmental toxicity
- Ocular toxicity
- Reproductive and developmental toxicity



Definitions and scope	Potential for exposure	Potential adverse impacts	Potential alternatives
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Environmental hazard traits

- Phytotoxicity
- Wildlife developmental, reproductive, and survival impairment



Definitions and scope

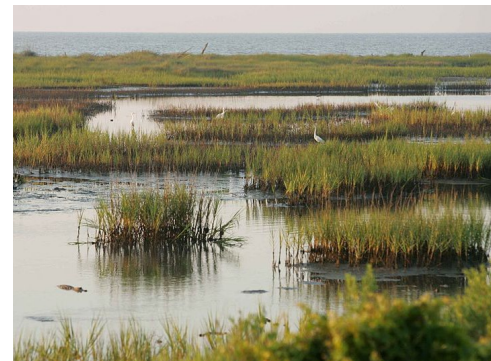
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Potential adverse impacts to sensitive subpopulations, endangered species, and sensitive habitats



Definitions and scope

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Potential alternatives

Alternative Type	Examples
Physical barriers	(bio)plastic, silicone, aluminum, clay, (bio)wax
Alternative processing	natural greaseproof paper, vegetable parchment, mechanical densification, mechanical glazing
Alternative chemical barriers/coatings	starch, aqueous dispersions of copolymers or waxes, chitosan, silicone
Alternative materials	palm leaf, bamboo, (bio)plastic

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**Submit your comments
on CalSAFER.dtsc.ca.gov
by 11:59 pm on
September 13th, 2020**



Contact information

- Join our E-list to get updates: <http://bit.ly/scpupdates>
- General questions: SaferConsumerProducts@dtsc.ca.gov
- Media inquiries: Sanford.Nax@dtsc.ca.gov
- Technical: Andre.Algazi@dtsc.ca.gov or Simona.Balan@dtsc.ca.gov





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Questions

1. Are the definitions of “plant fiber-based food packaging,” “paper,” “paperboard,” and “molded fiber” clear and unambiguous?
2. What significant and long-term changes have occurred in the food packaging industry as a result of the COVID-19 crisis?
3. Which PFAS-containing food packaging products do you recommend DTSC prioritizes and why?



Questions

4. Which specific plant fiber-based food packaging products:
 - tend to contain PFASs most commonly?
 - tend to contain PFASs in highest concentrations?
5. Which specific plant fiber-based food packaging products containing PFASs:
 - are sold in highest volume?
 - tend to be composted?



Questions

6. Are you able to provide DTSC with any additional information about the specific PFASs that are used in food packaging in the U.S., including but not limited to their impurities, by-products, or degradation products?
7. Do you have any further information on alternatives to food packaging containing PFASs?
8. How have manufacturers responded to the new compostability certification requirements that the products should be free of intentionally-added PFASs?





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