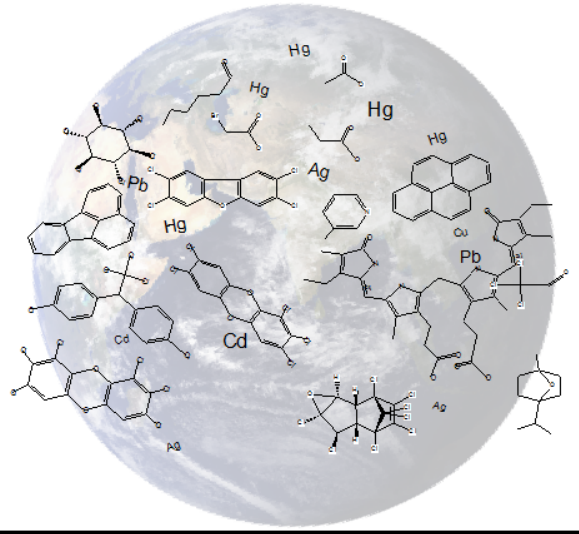
When do we need PFASs?:

A policy and purchasing strategy

Arlene Blum, Thomas A. Bruton, Anna Soehl, Avery E. Lindeman

Green Science Policy Institute, Berkeley, CA, USA

A Planetary Boundary for Chemical Pollution



Chemical pollution is global:

- Rapidly increasing global production
- Persistence and long range transport
- Finite capacity of the earth to absorb toxics

Demands a globally coordinated response

Diamond et al, 2015, Environment International

GREEN SCIENCE POLICY INSTITUTE
www.GreenSciencePolicy.org

Is it necessary?

Is it worth it?

Is there a safer alternative?

Transition to the Green economy

6-7 September
Bratislava

- To achieve a green & circular economy, we should avoid the use of hazardous substances
- Products containing harmful chemicals cannot be reused or recycled and must be land filled or destroyed removing them from circular economy

U.S. Toxic Substances Control Act (1976)

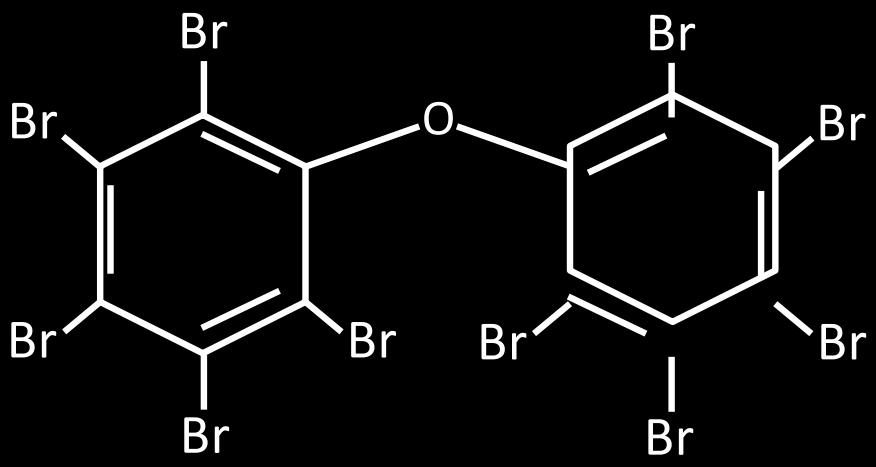
- 62,000 previous chemicals "grandfathered"
- 20,000 new chemicals
  - 85% have no health data
  - 67% have no data at all

Problem
Human Toxicological Trial?

"We are conducting a massive clinical toxicological trial, and our children and our children's children are the experimental subjects."

-Herbert Needleman & Philip Landrigan

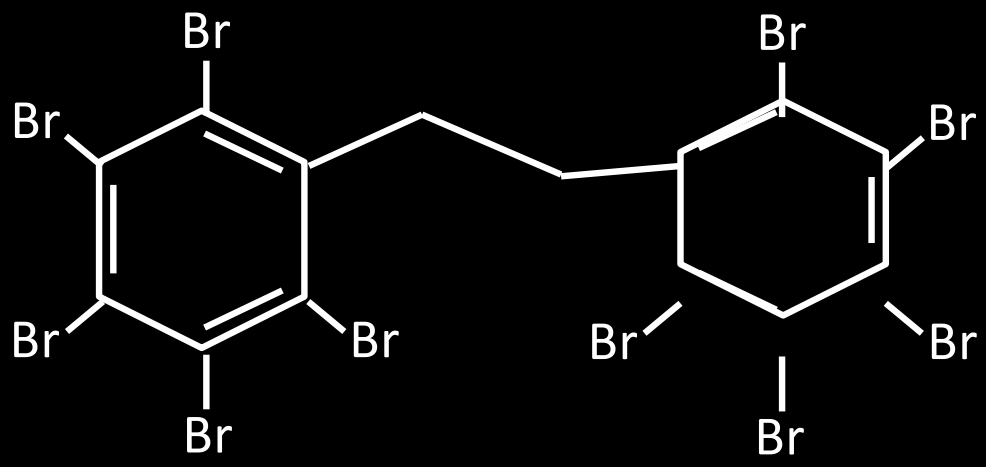
Problem
Regrettable Substitution



Decabromodiphenyl ether

Concerns:

- Persistence
- Bioaccumulation
- Toxicity



Decabromodiphenyl ethane

Concerns:

- Persistence
- Bioaccumulation
- Toxicity

GREEN SCIENCE POLICY INSTITUTE
www.GreenSciencePolicy.org


EVALUATING TENS OF THOUSANDS OF
INDIVIDUAL CHEMICALS IS UNWORKABLE

BUT ADDRESSING SIX GROUPS OF CHEMICALS OF CONCERN IS MANAGEABLE

The Six Classes

1. Highly fluorinated chemicals (PFASs)
   stain and water repellants
2. Chlorinated antimicrobials
   triclosan and triclocarban
3. Flame retardants
   brominated, chlorinated, phosphate
4. Bisphenols and phthalates
   phthalates, BPA, BPS, etc.
5. Organic solvents
   benzene, methylene chloride, xylene, etc.
6. Certain metals
   lead, mercury, chromium, cadmium, arsenic, etc.

1	2	3	4	5	6
Highly Fluorinated	Antimicrobials	Flame Retardants	Bisphenols + Phthalates	Some Solvents	Certain Metals






The Six Classes Challenge

Can the use of the Six Classes in consumer products be reduced by 50% in five years?

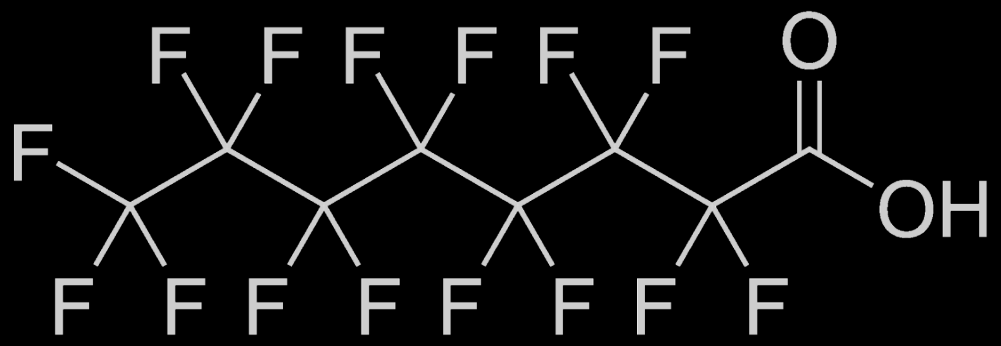
SixClasses.org
15-minute webinars on Six Classes containing chemicals of concern

GREEN SCIENCE POLICY INSTITUTE
www.GreenSciencePolicy.org

Class 1: Highly Fluorinated Chemicals (PFAS)

Carbon-Fluorine bond strength:

- Leads to oil and water repellency
- Lasts for geologic time!



Adapted from slide by Dr. Jennifer Field

PFASs exposure is a health concern

Detectable serum PFASs

Non-detect

<u>Exposure linked to health risks:</u>
Cancer, elevated cholesterol, obesity, immune suppression, and endocrine disruption

Courtesy, Cindy Hu, Harvard University

(Ref: Lewis et al., 2015; Grandjean et al., 2012; Braun et al., 2016; Barry et al., 2013)


CARPETS


CARPET CLEANING PRODUCTS


FOOD PACKAGING


FURNISHINGS


COSMETICS


OUTDOOR GEAR


CLOTHING


ADHESIVES + SEALANTS

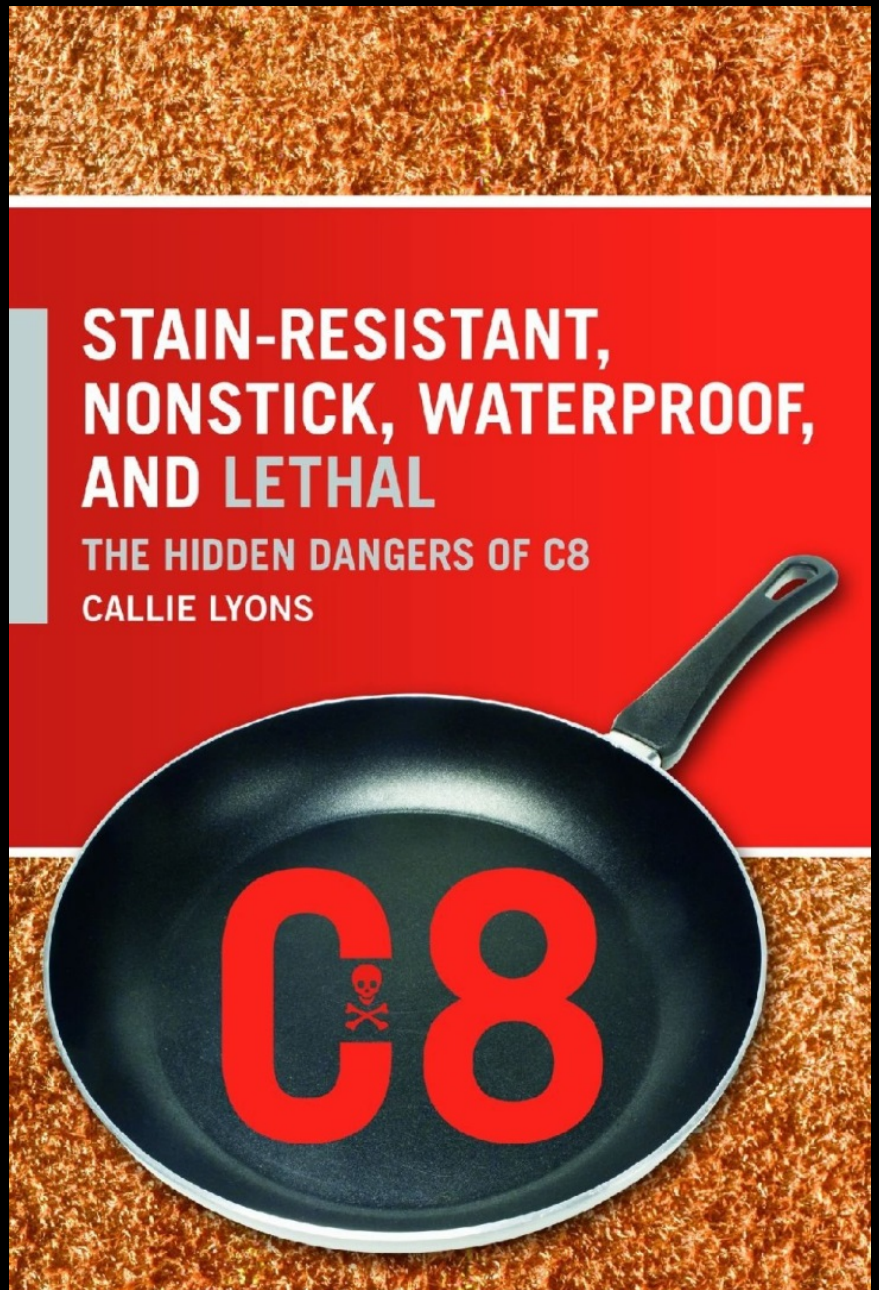

PROTECTIVE COATINGS


NON-STICK COOKWARE


CARSEATS


FIREFIGHTING FOAM

Published 2007



2015 Madrid Statement on Highly Fluorinated Chemicals

"We call on the international community to cooperate in limiting the production and use of PFASs and in developing safer non-fluorinated alternatives."

Signed by 230 scientists from 40 countries

2015: Environmental Health Perspectives

In the news

The Opinion Pages | OP-ED COLUMNIST

The New York Times

Chemicals in Your Popcorn?

JUNE 4, 2015

Nicholas Kristof

What do a pizza box, a polar bear and you have in common?

All carry a kind of industrial toxicant called poly- and perfluoroalkyl substances, or PFASs, that do two things: They make life convenient, and they also appear to increase the risk of cancer.

These Chemicals in Pizza Boxes and Carpeting Last Forever

More than 200 scientists around the world document the threats of perfluorinated compounds and call for more government control.

By **Lindsey Konkel**, National Geographic

PUBLISHED MAY 01, 2015

NATIONAL GEOGRAPHIC

The Intercept_

THE TEFLON TOXIN

DuPont and the Chemistry of Deception

Sharon Lerner

Aug. 11 2015, 3:35 p.m.

133

Home

The New York Times Magazine

The Lawyer Who Became DuPont's Worst Nightmare

Rob Bilott was a corporate defense attorney for eight years. Then he took on an environmental suit that would upend his entire career — and expose a brazen, decades-long history of chemical pollution.

By NATHANIEL RICH JAN. 6, 2016

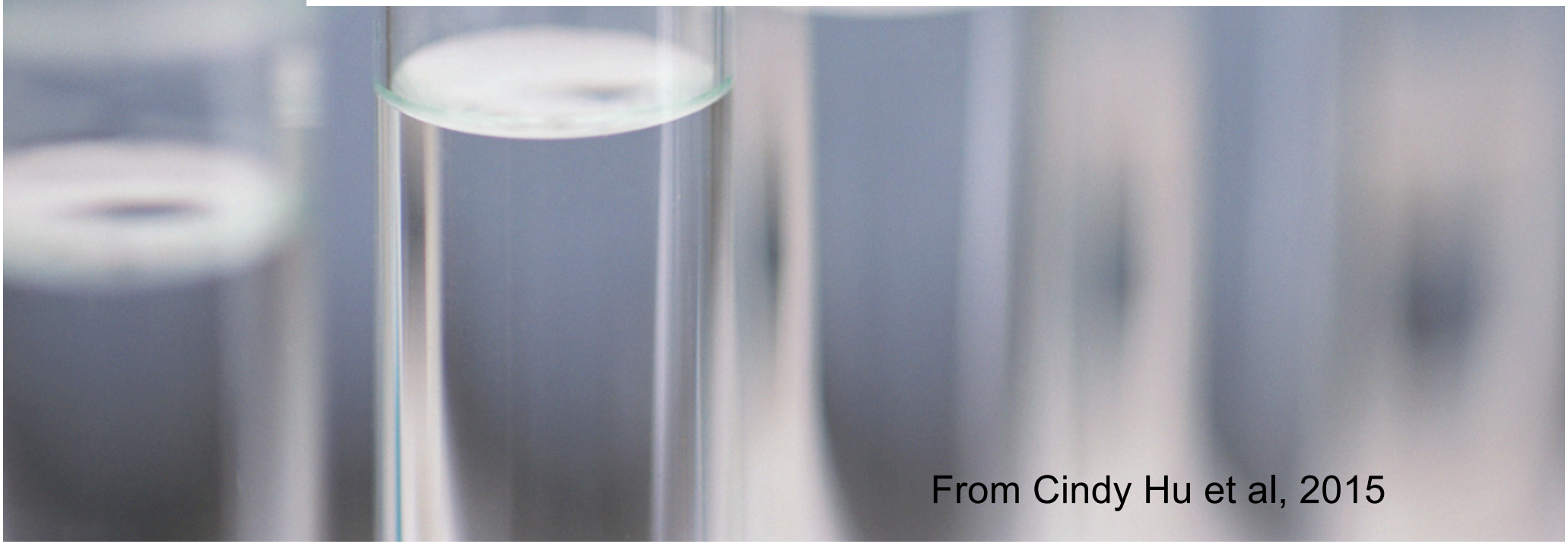
Data from U.S. EPA's Third Unregulated Contaminant Monitoring Rule

2013 – 2015

4864 public water systems

36149 drinking water samples

Six PFASs (PFBS, PFHxS, PFHpA, PFOA, PFOS, PFNA)



From Cindy Hu et al, 2015

Drinking Water Health Advisory Levels

January 2009: EPA Provisional Short Term Health Advisories of 400 ppt for PFOA and 200 ppt for PFOS

May 2016: EPA Lifetime Health Advisory of 70 ppt for PFOA,PFOS

December 2016: Vermont enforceable standard for 20 ppt for PFOA, PFOS

January 2017: New Hampshire enforceable standard of 70 ppt for PFOA, PFOS

September 2016: Draft New Jersey Drinking Water Quality Institute recommended enforceable standard for PFOA of 14ppt

Drinking Water Health Advisory Levels

January 2009:

EPA Provisional Short Term Health Advisories of 400 ppt for PFOA and 200 ppt for PFOS

May 2016:

EPA Lifetime Health Advisory of 70 ppt for PFOA and PFOS

December 2016:

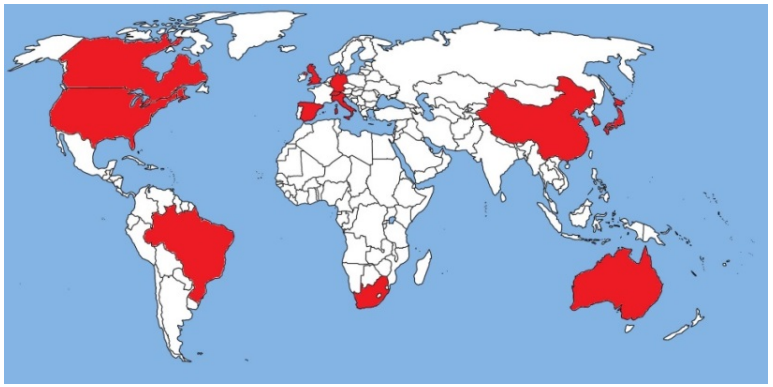
Vermont enforceable standard for 20 ppt for PFOA and and PFOS

January 2017:

New Hampshire enforceable standard of 70 ppt for PFOA and PFOS

September 2016:

Draft New Jersey Drinking Water Quality Institute recommended enforceable standard for PFOA of 14 ppt



PFASs have been detected worldwide in surface water, wastewater, groundwater, drinking water, and landfill leachates.

UCMR3 requires monitoring for six PFASs in US drinking water. Monitoring began in 2013, and latest data release was January 2015.

PFAS	MRL (ng/L)	Occurrence (%)	Max (ng/L)
C7	10	0.66	82 (NY, DE, PA)
C8	20	0.96	349 (PA)
C9	20	0.05	55.8 (NJ, PA)
PFBS	90	0.03	150 (CO, PA, AL)
PFHxS	30	0.61	680 (DE, PA, CO)
PFOS	40	0.81	1,800 (DE, CO, PA)

To date: 22,942 samples from 3,605 PWSs

PFAS detects: 351 samples (1.5%) from 132 PWSs (3.7%)

Of samples with PFAS detects: 22.8% derived from surface wate

Slide courtesy Andy Lindstrom USEPA

Drinking Water
Health Advisory Levels

January 2009:

Provisional level of 400 ppt for PFOA and 200 ppt for PFOS

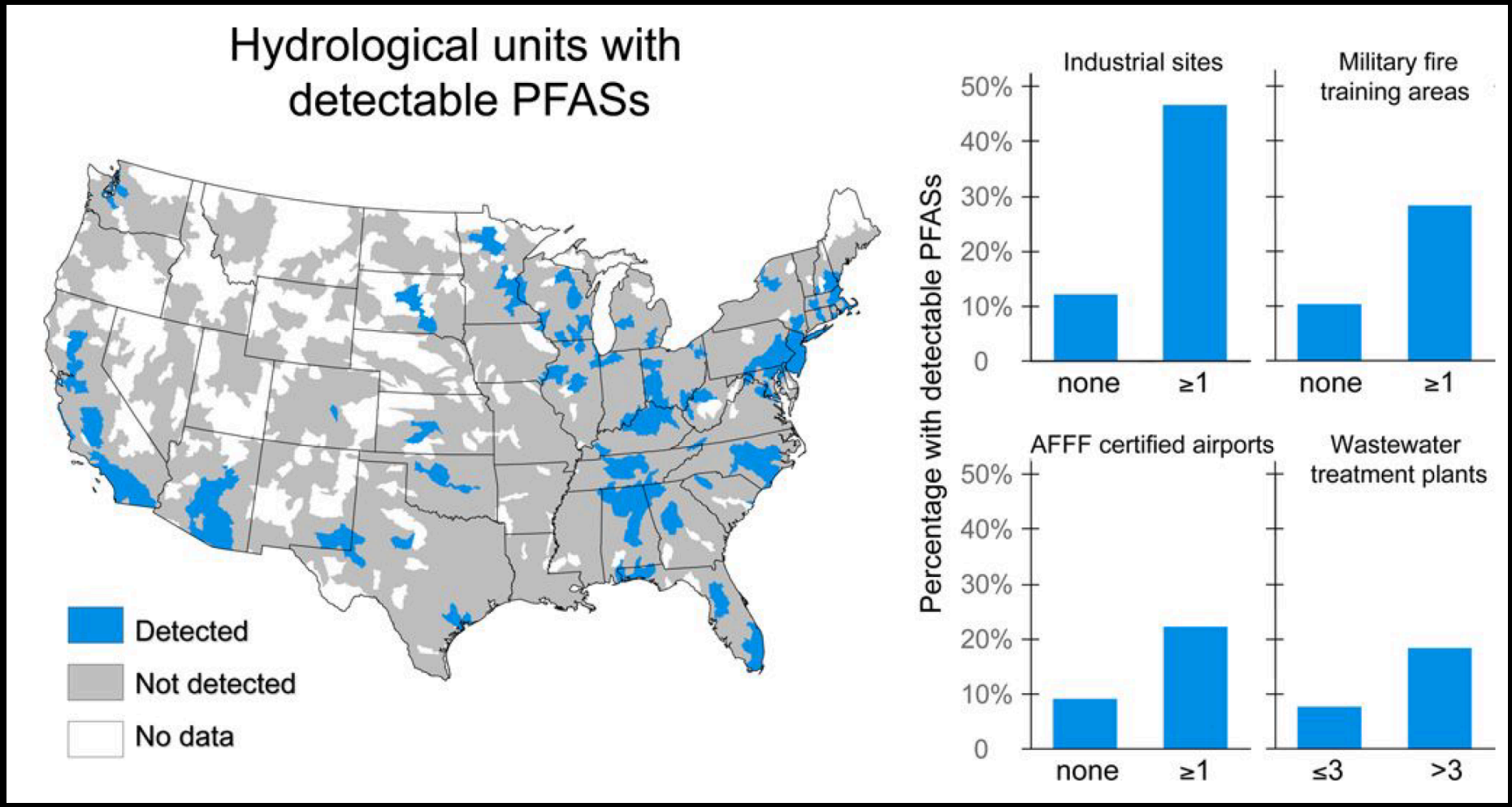
May 2016:

Lifetime level of 70 ppt for PFOA and PFOS – individually or combined (more than six million people above that level.

September 2016:

Draft New Jersey Drinking Water Quality Institute recommended enforceable standard for PFOA of 14ppt

Watersheds with point sources have higher detection frequencies for PFASs

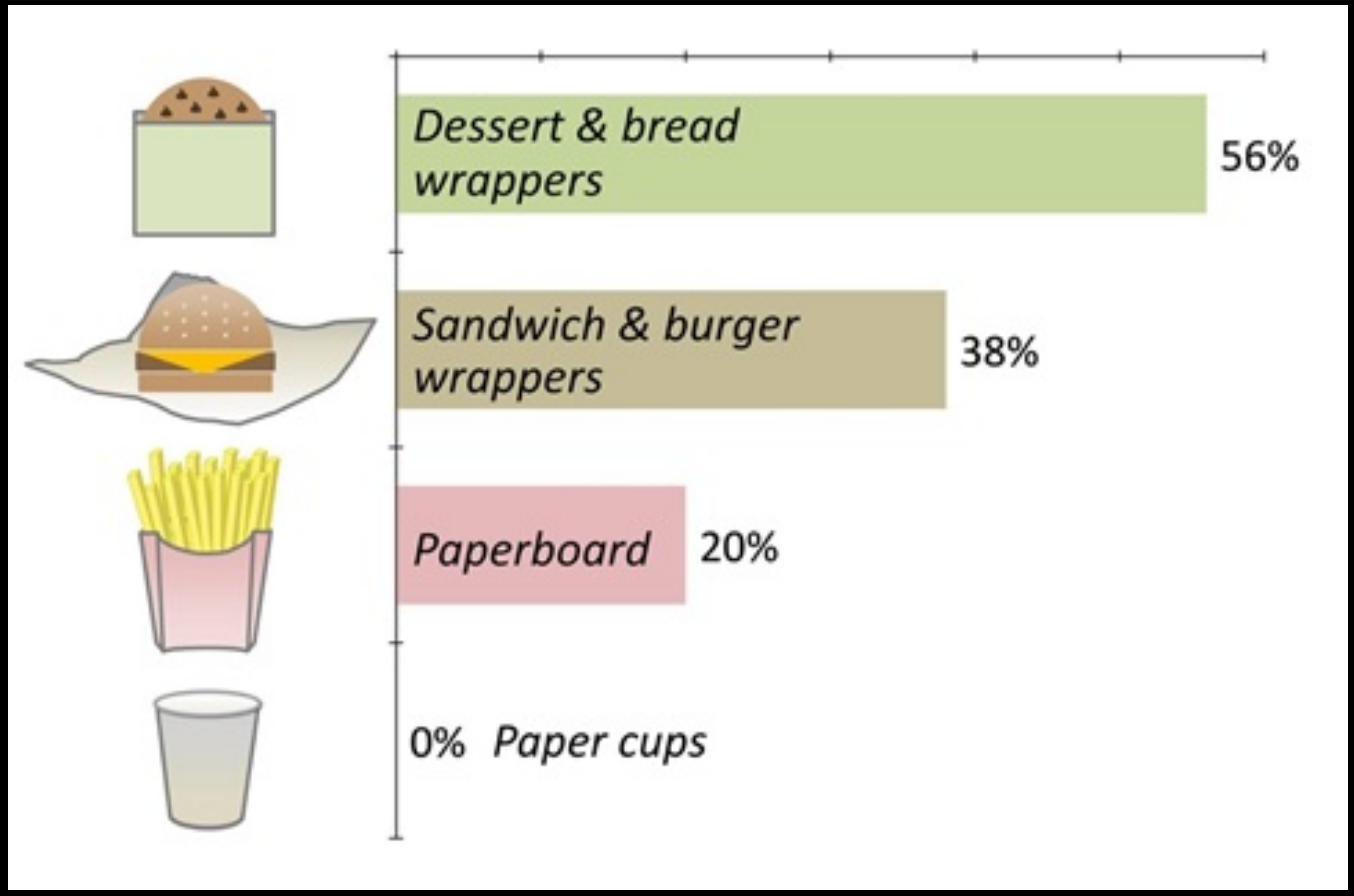


Air Force to stop using AFFF foam in training exercises

- Drinking water of six million Americans contaminated with PFAS
- AFFF firefighting foams used in training are a major contributor
- Air Force, on 19 August 2016, said:
  - "will stop using foam in training exercises"
  - "will replace all C8 foam with C6 by the end of this year"

Fluorine in U.S. fast food packaging paper

(percent positive; 400 products sampled)



Adopted from Schaider L. 2016 *Fluorinated compounds in U.S. fast food packaging*.

Should these products be considered compostable?

The Teflon Toxin Goes to Court.

Sharon Lerner: The Intercept

September 2015: 3,500 personal injury and 37 wrongful death claims in Ohio Valley against DuPont went to trial

October 2015: $1.6 million to a woman who developed kidney cancer.

July 2016: $5 million to a man with testicular cancer.

January 2017: $10.5 million for malice to man with testicular cancer

February 2017: $671 million to settle claims in Ohio Valley

"If the chemical were really dangerous, DuPont attorneys contend, government agencies would have regulated it. "

Microwave Popcorn Bags

- PFAS coating used to increase resistance of paper to hot butter
- Higher PFAS concentrations than other food packaging materials[1-4]
- Coop Denmark - halted popcorn sales in 2015 over PFAS concerns
- RESULT: innovative PFAS-free packaging

1. Zabaleta, I., et al. Talanta. 152, 353-363. (2016)
2. Zafeiraki, E., et al. Chemosphere. 94, 169-176. (2014)
3. Dolman, S. and Pelzing, B. J. Chrom. B. 879:22, 2043-2050. (2011)
4. Begley, T. H., et al. Food Add. and Cont. 22:10, 1023-1031. (2005)

State efforts regarding PFASs in food packaging

- Washington HB 1744 (sponsored by Toxic-Free Future)
  - Opposition comments from Feb. 2 hearing:
    - Bill is overly broad
    - Premature due to pending "action plan" for PFASs being developed in WA
    - Unnecessary, as PFASs are already regulated by FDA
- Washington State Children's Safe Products Act
  - Proposal to add entire class to list of chemicals of high concern at Apr 25 hearing

- California AB 958 (Ting)
  - "would prohibit a food provider from serving, selling, offering for sale, or offering for promotional purposes prepared food or fast food in, on, or with take-out food service ware or packaging that contains a fluorinated chemical, as defined."

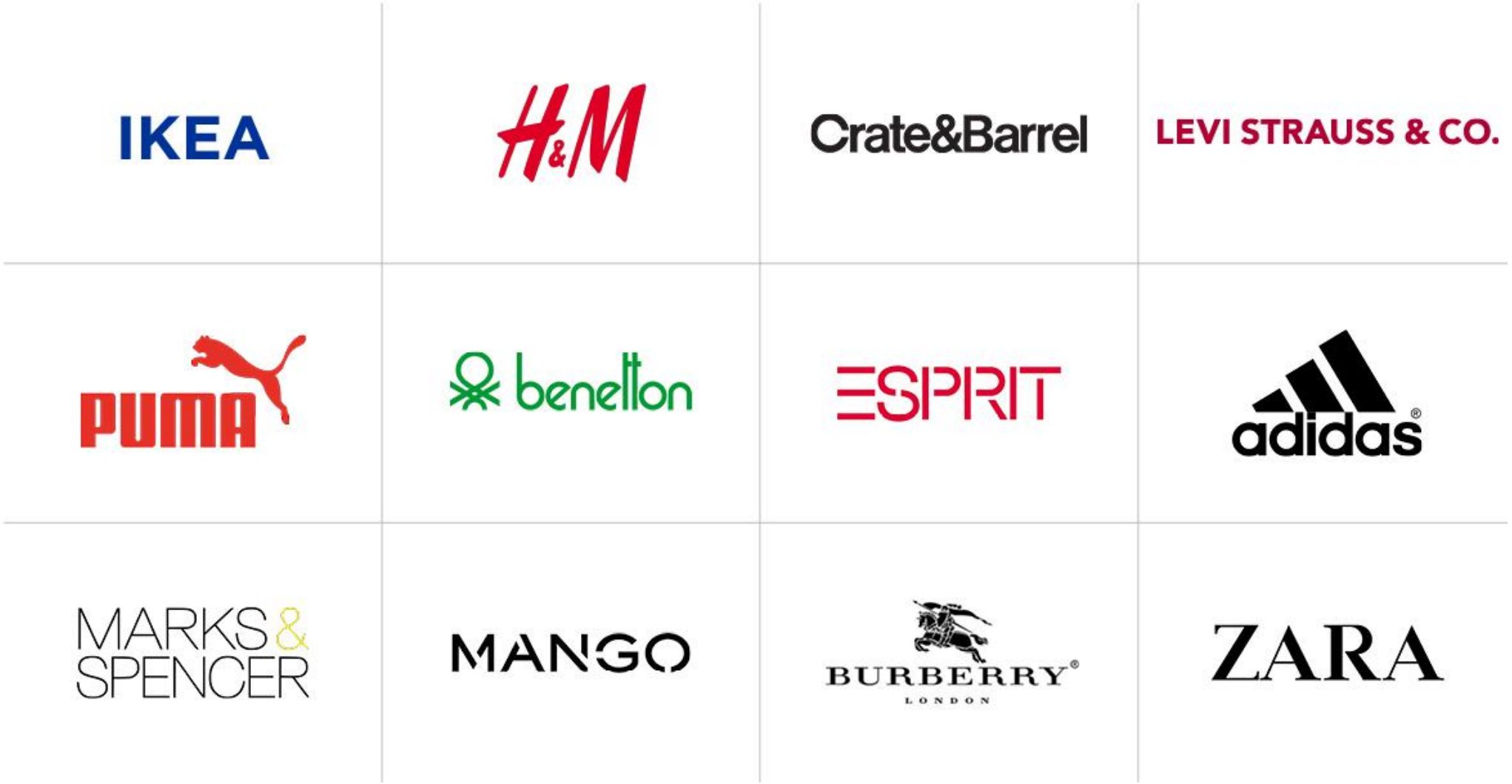
State Level Efforts

- Washington State Children's Safe Products Act
  - Proposal to add entire class to list of chemicals of high concern at Apr 25 hearing
- CA AB 958 (Ting)
  - *"would prohibit a food provider from serving, selling, offering for sale, or offering for promotional purposes prepared food or fast food in, on, or with take-out food service ware or packaging that contains a fluorinated chemical, as defined."*

Washington State bill on PFASs in food packaging

- HB 1744 (sponsored by Toxic-Free Future)
- Would prevent the use of all PFASs in food packaging
- A similar bill in California
- More toxicology information on fluorinated replacements needed

BRANDS ARE ELIMINATING HIGHLY FLUORINATED CHEMICALS




For monthly e-newsletters
www.greensciencepolicy.org
Questions:
Arlene@arleneblum.com