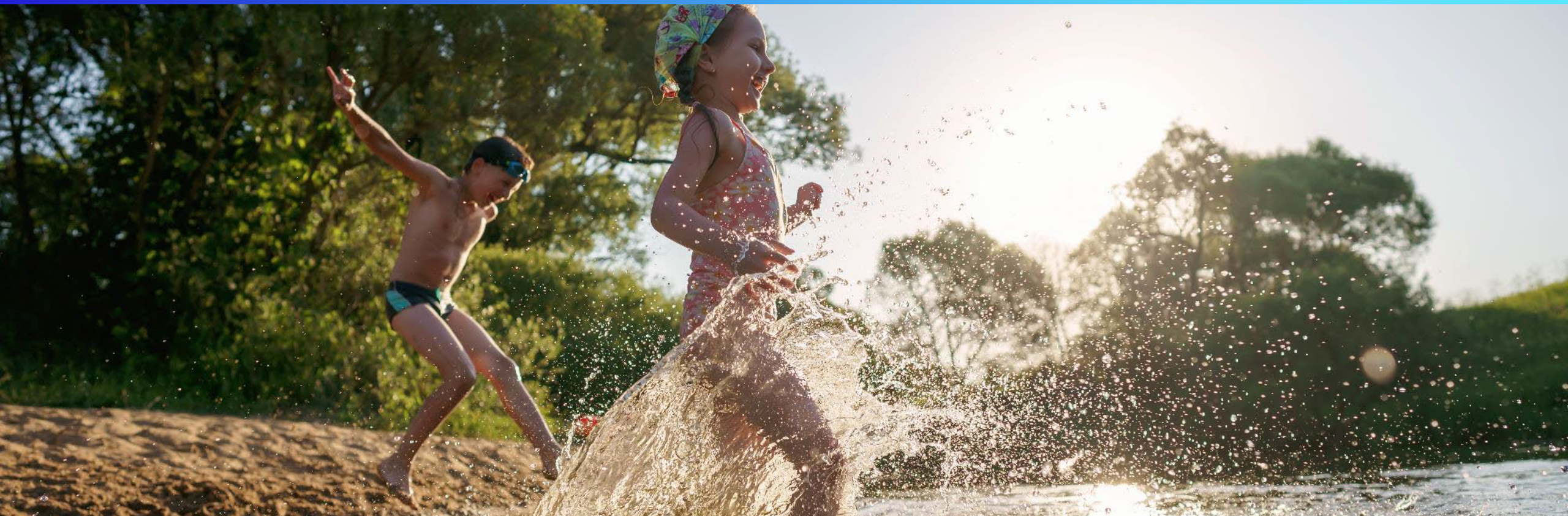


The Changing Landscape of Forever Chemicals

Silvia Vlad, Scott Grieco, Jane Thrasher

WaterNZ, October 2023



PFAS Regulatory Update

Regulatory Context

- PFAS occurrence
- Evolving research on health impacts
- Regulatory challenges

Recent Regulatory Shifts

- United States
- Canada
- Europe
- United Kingdom

New Zealand Status

Key Take Aways

What are PFAS?

1000s of per- and polyfluoroalkyl substances

Long chain
(7 > carbons)

Short chain
(4 - 6 carbons)

Ultra short chain
(< 4 carbons)

Perfluorooctanesulfonic acid (PFOS)
Perfluorooctanoic acid (PFOA)

Increasingly regulated

Increasingly produced

Big news overseas...

The New York Times

April 11, 2022

U.S.

PFAS: The 'Forever Chemicals' You Couldn't Escape if You Tried



The New York Times

Feb. 21

CLIMATE

How Widespread Are These Toxic Chemicals? They're Everywhere.

The New York Times

May 29

LIVE

How Much Can a Water Filter Do?

The New York Times

June 21

BUSINESS

3M Reaches \$10.3 Billion Settlement in 'Forever Chemicals' Suits

The deal followed an agreement by Chemours, DuPont and Corteva to pay \$1.19 billion to help resolve claims that the chemical manufacturers contaminated drinking water across the country.

By Lisa Friedman and Vivian Giang

PRINT EDITION 3M Reaches Settlement In Lawsuits With Cities | June 23, 2023, Page B1



The Guardian

News Opinion Sport Culture Lifestyle More

Environment Climate crisis Wildlife Energy Pollution

Drinking water of millions of Americans contaminated with 'forever chemicals'

The Guardian

News Opinion Sport Culture Lifestyle More

Environment Climate crisis Wildlife Energy Pollution

Asian Americans have much higher 'forever chemicals' levels than other groups, study finds

The Guardian

News Opinion Sport Culture Lifestyle More

Environment Climate crisis Wildlife Energy Pollution

'Forever chemical' exposure linked to higher cancer odds in women

The Guardian

News Opinion Sport Culture Lifestyle More

Environment Climate crisis Wildlife Energy Pollution

In our blood: how the US allowed toxic chemicals to seep into our lives



Gathering attention in New Zealand

Home / Northern Advocate

Channel Infrastructure fined \$169,000 for using banned firefighting foam



By [Mike Dinsdale](#)

23 Nov, 2022 04:34 PM 3 mins to read

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Home / New Zealand

Toxic chemicals still cropping up at shut Auckland water treatment plant



RNZ

18 Jul, 2023 12:21 PM 2 mins to read

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Channel I

NEW ZEALAND / ENVIRONMENT

EPA proposes broad ban of 'forever chemicals' in cosmetics

7:51 pm on 11 March 2023

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NEW ZEALAND / HEALTH

Watercare looking to take more from Waikato River, change drought levels due to PFAS

12:08 pm on 12 December 2022

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NEW ZEALAND / ENVIRONMENT

PFAS contamination: Scientists keen to find source of pollutants in urban water systems

11:43 am on 3 February 2022

Share this

Phil Pennington, Reporter @pippenn phil.pennington@rnz.co.nz

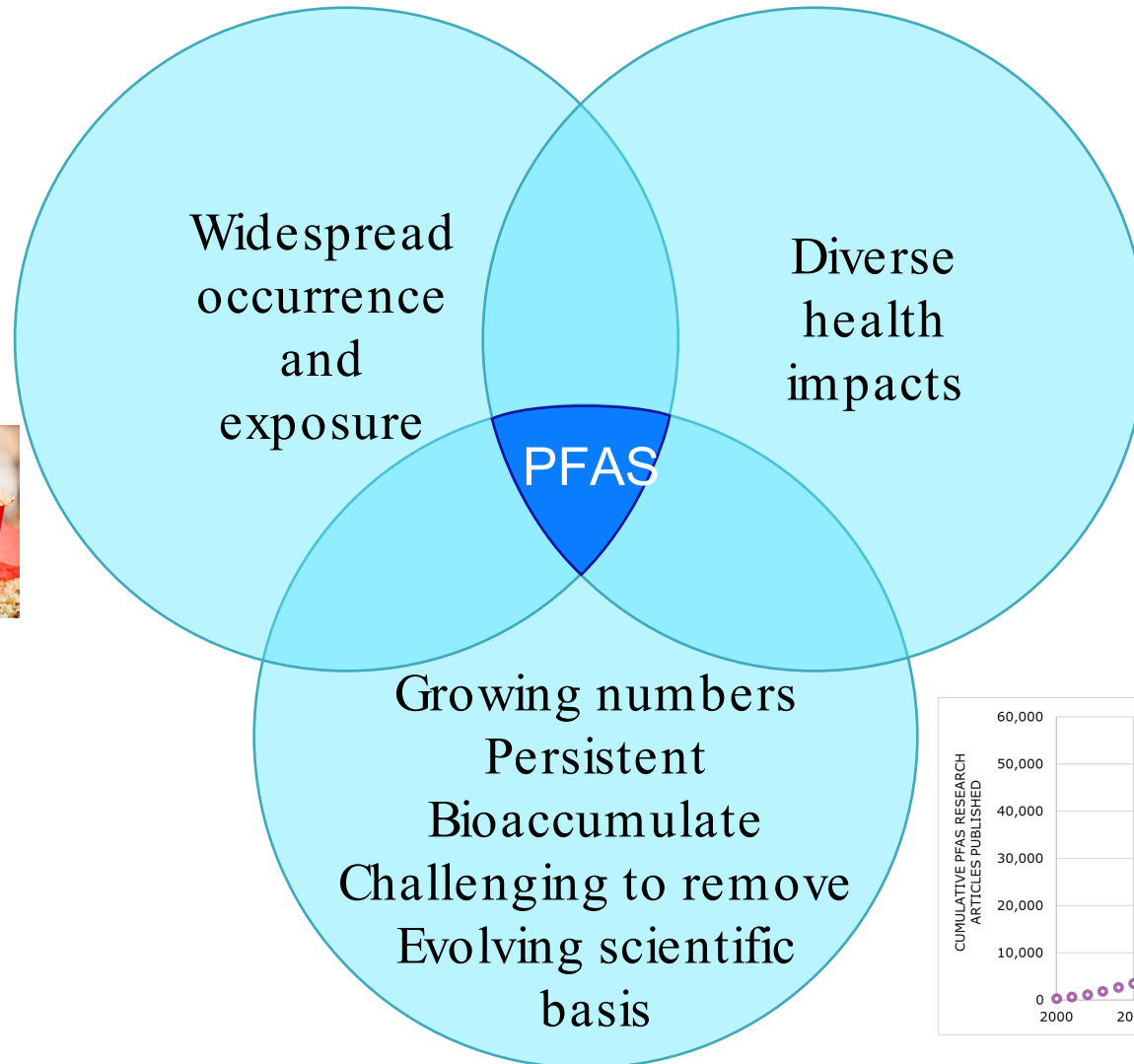
Longlasting pollutants linked to health scares overseas have been found in this country's urban water systems for the first time.

Just which is full of h

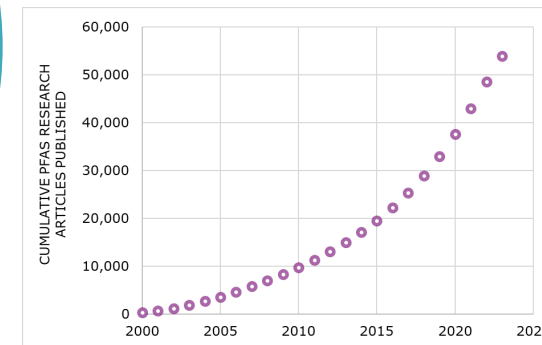
Toxic PFAS have:



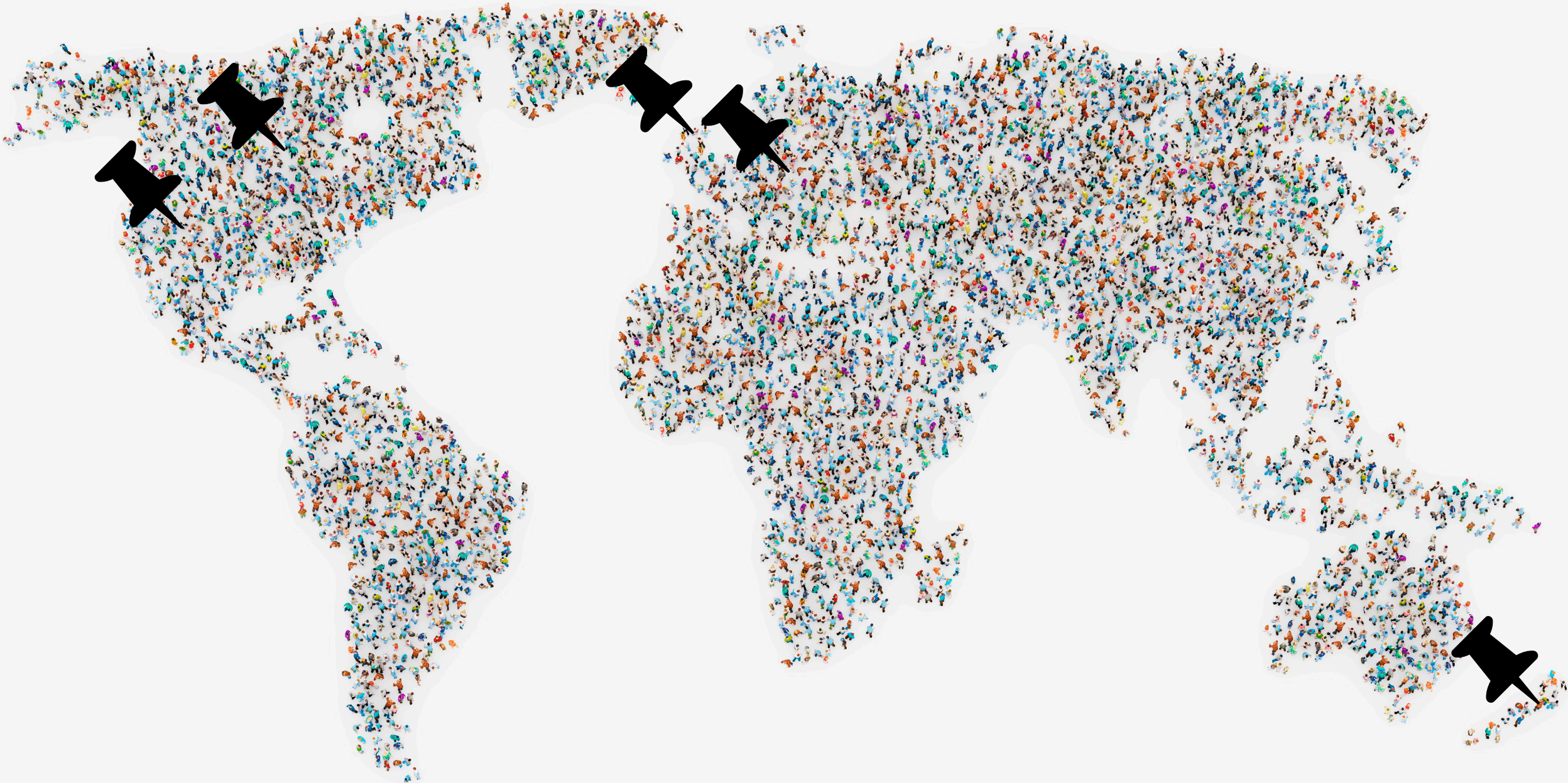
Framing the Regulatory Challenge



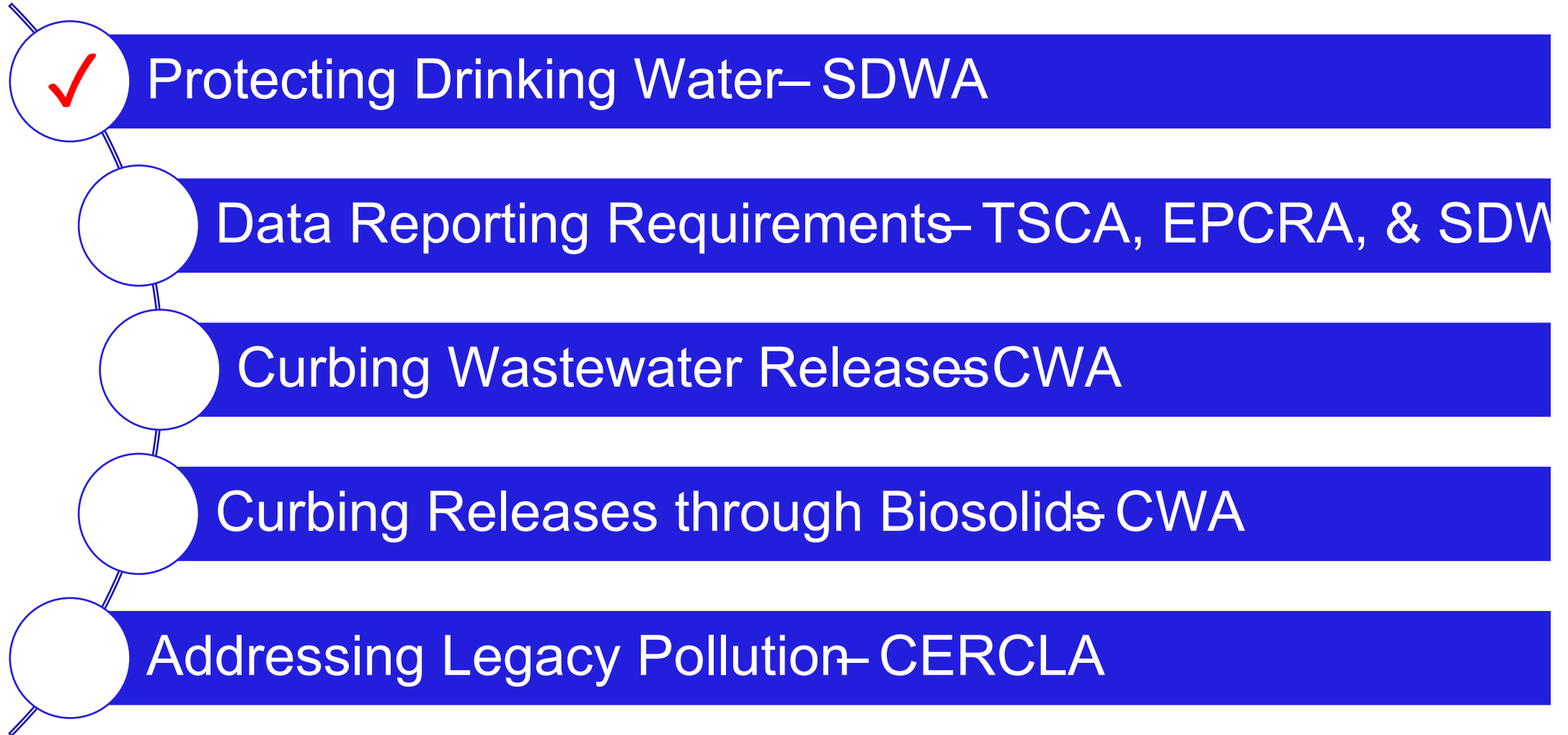
- Cancer
- Liver impacts
- Kidney impacts
- Increased cholesterol
- Asthma
- Thyroid disease
- Reduced fertility
- Developmental impacts
- Reduced vaccine response



Recent Global Regulatory Approaches



United States – Federal Actions for PFAS

- 
- ✓ Protecting Drinking Water– SDWA
 - Data Reporting Requirements– TSCA, EPCRA, & SDWA
 - Curbing Wastewater Releases CWA
 - Curbing Releases through Biosolids CWA
 - Addressing Legacy Pollution– CERCLA

USA–EPA Proposed PFAS National Primary Drinking Water Regulation

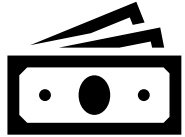
COMPOUND	PROPOSED NON ENFORCEABLE GOALS	PROPOSED ENFORCEABLE LIMITS	HEALTH EFFECT EVALUATED
PFOA	Zero	4.0 ng/L	Cancer
PFOS	Zero	4.0 ng/L	Cancer
PFNA	1.0 (unitless) Hazard Index	1.0 (unitless) /9 ng/L	Thyroid effects
PFHxS		Hazard Index, /10 ng/L	Developmental effects
PFBS		contributions /10 ng/L	Liver effects
HFPODA (GenX)		on right: /2,000 ng/L	Thyroid effects

$$Hazard\ Index\ (HI) = \frac{[PFHxS]}{9\ ng/L} + \frac{[PFNA]}{10\ ng/L} + \frac{[GenX]}{10\ ng/L} + \frac{[PFBS]}{2,000\ ng/L}$$

Consultation and Feedback



- Almost 122,000 comments received, including a 54 -page detailed letter from the AWWA



- Concerns over cost-benefit analysis
 - Benefit-cost evaluation overestimated
 - Basis of implementation cost model being underestimated
 - Seeking reinforcement of polluter-pays principle



- Data limitations for PFNA, HFPO-DA, and PFBS – included in UCMR5
 - HI for the 4-PFAS mixture implied dose additivity of PFAS can be applied for dissimilar health impacts



- Timeframe challenges
 - Laboratory capacity is lagging
 - Finance application cycles
 - Pilot testing schedule requirements

US State Regulations – Maine example

- Combined limit of 20 ng/L for six PFAS in drinking water:
 - PFOS
 - PFOA
 - PFNA
 - PFHxS
 - PFHpA
 - PFDA
- Requires sludge to be tested for PFAS
- 2022 banned the land application of sludge and sludge-derived products.
- In 2021, banned PFAS in all products sold in Maine (by 2030)

Health Canada draft drinking water guidelines

- Sum of total PFAS < 30 ng/L, measured via one or both of two US EPA Methods
- Would replace existing guidelines/screening values for 11 PFAS (ranging from 20–30,000 ng/L)

	USEPA METHOD 537.1	USEPA METHOD 533
LOWEST CONCENTRATION MINIMUM REPORTING LIMITS(LCMRL) (ng/L)	Dependent on the laboratory. Single-laboratory results range from 0.53 – 6.3 ng/L dependent on the analyte	Dependent on the laboratory. Single-laboratory results range from 1.4 – 16 ng/L dependent on the analyte
ANALYTES	18 PFAS compounds	25 PFAS compounds

Europe – Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)



- European Chemicals Agency considering two proposals for universal restriction of PFAS
 - A restriction on all PFAS in firefighting foams
 - A universal restriction on all PFAS use.



- Without the universal restriction, approximately 4.4 million tonnes of PFASs would end up in the environment over the next 30 years



- Proposal under consultation
 - Received over 5,600 comments on the proposal through September 2023







- Adoption of universal restriction proposal anticipated in 2025

European Union

- Revised Drinking Water Directive entered into force in early 2021, and includes:
 - 500 ng/L limit for Total PFAS
 - 100 ng/L limit for a subset of 20 PFAS
- Water Framework Directive “good” surface water quality standards (EQS)
 - PFAS < 0.65 ng/L
- October 2022, proposed new EQS: sum of 24 PFAS < 4.4 ng/L ‘*PFOA equivalents*’
 - Using relative potency factors ranging from 10 (PFNA) to 0.001 (PFBS)
 - Includes some PFAS not included in the drinking water regulations

United Kingdom – Regulatory Management Options Analysis (RMOA)

-  ■ Recognises toxicological data -gaps exist for all PFAS groups
-  ■ Identifies clear primary concern to the environment, driven by the extreme persistence of PFAS
-  ■ Identifies risk management measures:
 - Actions to support the restriction of PFAS under UK REACH
 - Restriction on wide dispersive uses, and the placing on the market of consumer articles from which PFAS are likely to be released
-  ■ Recommends development of statutory standards for PFAS in drinking water in England and Wales.

England & Wales – Drinking Water Inspectorate (DWI)

- DWI guidance to water companies for PFAS risk assessment and monitoring
- Risk-based escalating tiers for all PFAS, with minimum monitoring of 47 PFAS
 - any PFAS > 10 ng/ L: consult with local health professionals
 - any PFAS in the raw water supply > 100 ng/l: take action
- Monitoring results for the first year:
 - PFAS detected in 3.8% of tests
 - 35/47 PFAS compounds detected, 14 detected > 100 ng/ L, from seven individual water supply sites.

Scotland – Drinking Water Quality Regulator (DWQR)

- 100 ng/ L limit for the sum of 20 PFAS

New Zealand Context

New Zealand Context

- Lenka et al, 2022 identified PFAS in New Zealand's urban waters
- July 2023 EPA report on PFAS in groundwaters
- New Zealand's Drinking Water Standards (2022)
 - PFHxS + PFOS < 70 ng/ L
 - PFOA < 560 ng/ L
- Recreational water quality guidelines
 - PFHxS + PFOS < 2,000 ng/ L
 - PFOA < 10,000 ng/ L
- EPA proposal to restrict PFHxS as a persistent organic pollutant (consultation period in April 2023 received no submissions)
- Proposed ban on PFAS in cosmetics (consultation closed May 2023)



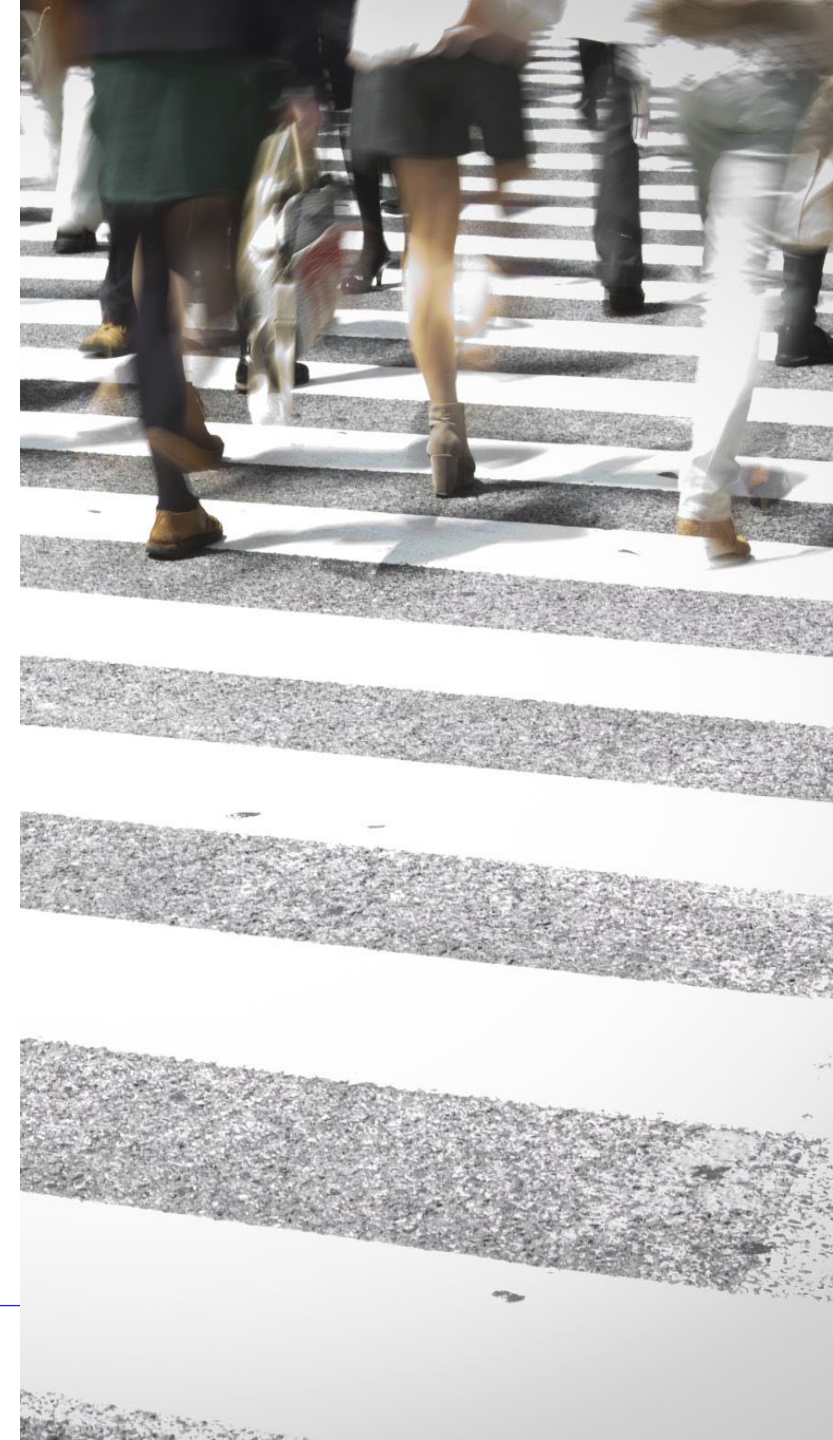
Overview & Take Aways

PFAS Drinking Water Regulatory and Guideline Overview

	New Zealand	England & Wales	Scotland	European Union	United States	Canada
Year	2022	2021	2022	2021	2023	2023
No. PFAS	3	47	20	20	6	18 – 30
Approach	Individual & combined	Individual	Cumulative	Cumulative	Individual & combined	Cumulative
Range	70 – 560 ng/L	100 ng/L	100 ng/L	100 ng/L	4 – 2,000 ng/L	30 ng/L

Take Aways

- Keen public engagement and scrutiny
- Evolving financial implications
- Shifting global regulatory landscape and trends
 - Restricted manufacturing, sale and use of PFAS products
 - Tracking and monitoring of PFAS sources
 - Restrictions on the disposal of sludge and residual streams
 - Cumulative or grouped approach to PFAS risk management in drinking water



Acknowledgements

- Chris Moody – AWWA
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- Scott Grieco – Global Principle, Jacobs

Thank you

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