New Environmental Mandates: **PFAS – Drinking Water & CERCLA Regulations**

91st Annual Meeting of The United States Conference of Mayors

June 3, 2023

Adrienne Nemura, P.E.
Geosyntec Consultants
anemura@Geosyntec.com
734.476.0357

Janet Anderson, Ph.D.
GSI Environmental Inc.
jkanderson@gsi-net.com
513.226.6528

Chris Moody, P.E.
American Waterworks Association
cmoody@awwa.org
202.326.6127

Chad Seidel, Ph.D., P.E.
Corona Environmental Consulting, LLC
cseidel@coronaenv.com
303.887.1853

WaterAdvisory
Water & Health Advisory Council

National Priority Drinking Water Rulemaking → Community Impacts → Implementation Costs → Science → CERCLA

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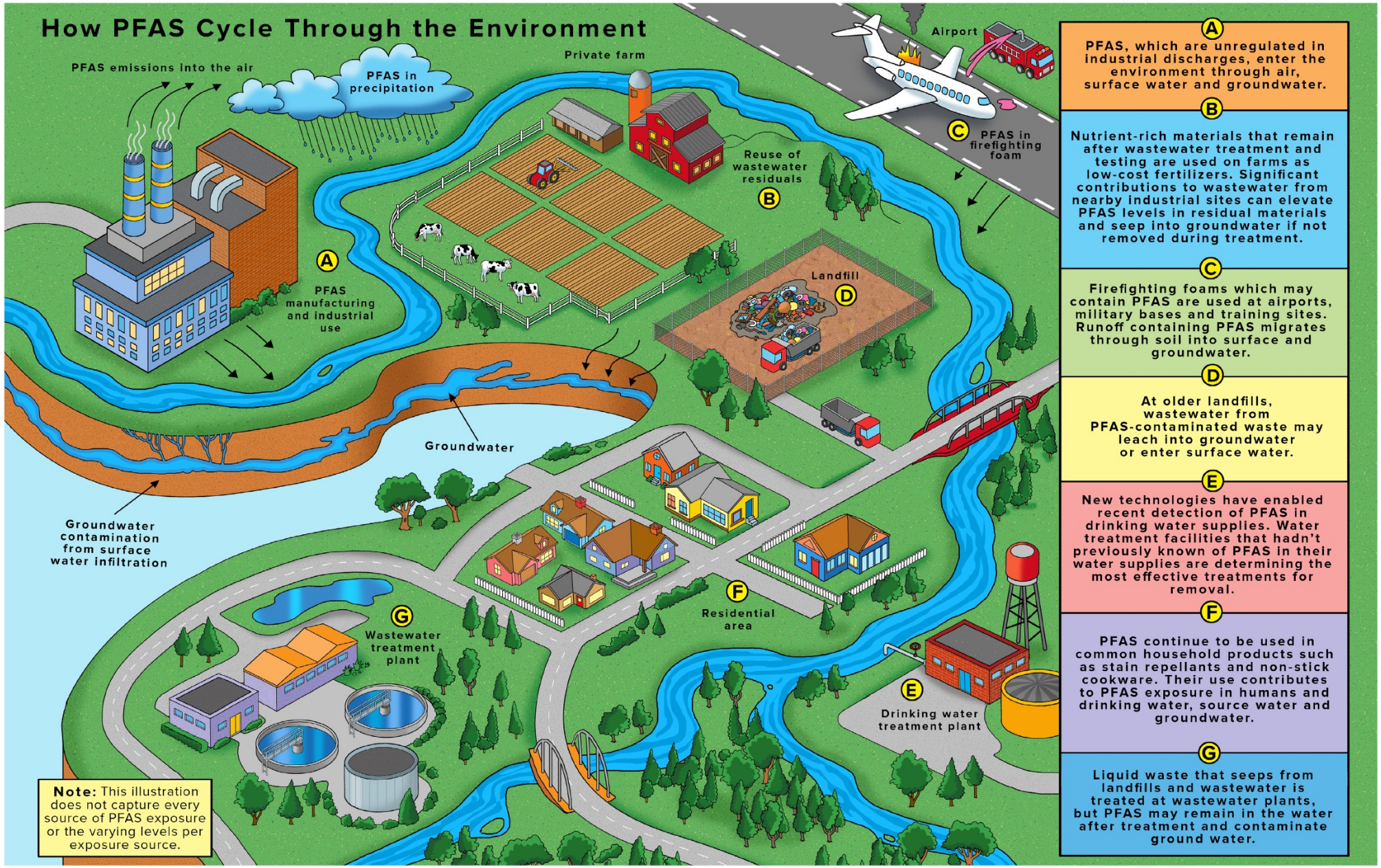


PFAS have been widely used since the 1940s

American Water Works Association

PFAS Strategic Roadmap:
EPA's Commitments to Action 2021-2024

epa.gov/pfas

PRINCIPLES

- Consider PFAS lifecycle
- Get upstream of the problem
- Hold polluters accountable
- Science-based decision-making
- Prioritize protection of disadvantaged communities

GOALS

- **Research** with best available science
- **Restrict** introduction to avoid adverse impacts to human health & environment
- **Remediate** to accelerate cleanup of contamination to protect human health & ecological systems

- THE US EPA LIFETIME DRINKING WATER HEALTH ADVISORIES FOR PFOS AND PFOA ARE OFTEN LOWER THAN THEIR RESPECTIVE LEVELS IN RAINWATER AND THE DANISH DRINKING WATER LIMIT VALUE FOR Σ4 PFAS IS ALSO OFTEN LOWER THAN THE LEVEL OF Σ4 PFAS IN RAINWATER
- THE EUROPEAN UNION (EU) ENVIRONMENTAL QUALITY STANDARD (EQS) FOR PFOS FOR FRESHWATERS IS OFTEN LOWER THAN LEVELS IN RAINWATER
- THE CYCLING OF PFAAs IN THE WORLD'S HYDROSPHERE MEANS THAT LEVELS OF PFAAs IN RAINWATER WILL BE PRACTICALLY IRREVERSIBLE

Environmental Science & Technology

pubs.acs.org/est

Perspective

Outside the Safe Operating Space of a New Planetary Boundary for Per- and Polyfluoroalkyl Substances (PFAS)

Ian T. Cousins,* Jana H. Johansson, Matthew E. Salter, Bo Sha, and Martin Scheringer

Cite This: https://doi.org/10.1021/acs.est.2c02765

Read Online

PFAS (ppt)	USEPA Lifetime Health Advisories*	Tibetan Rain	Antarctic Rain
PFOA	0.004	0.055	0.22
PFOS	0.020	0.005	0.106

* Proposed 6/21/22; Scheduled to be final 9/3/24

Proposed Lifetime Health Advisory Levels (6/21/22)

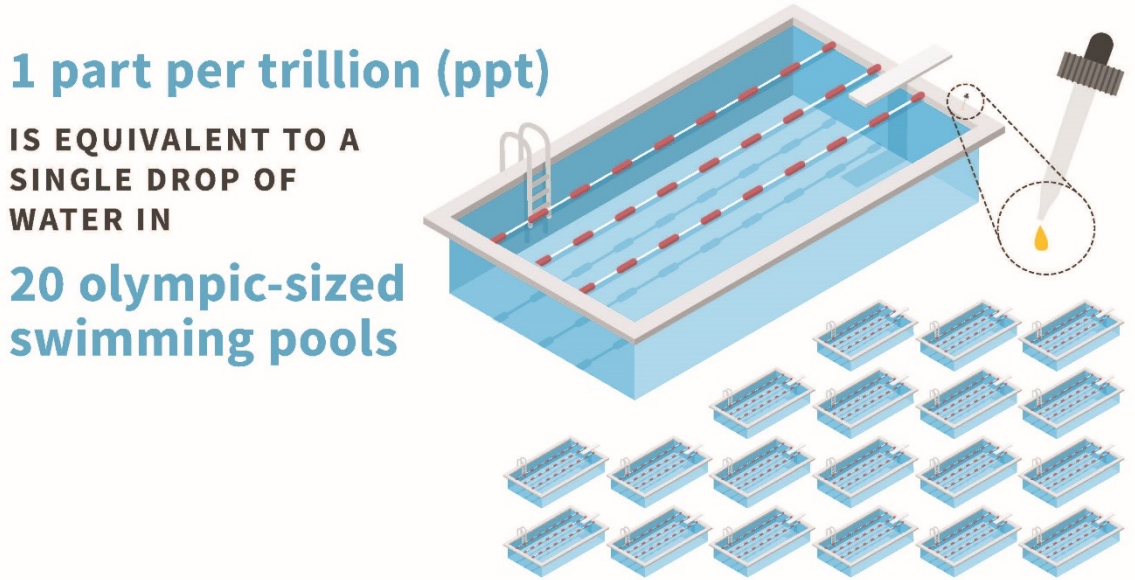
PFOA & PFOS = 0.004 ppt = 4 ppq

If you were 31.8 million years old, 1 part per quadrillion (ppq) or a picogram per liter is equivalent to a blink.

Proposed National Primary Drinking Water Regulation

(comment period expired 5/30/23)

PFOA & PFOS = 4 ppt



https://www.michigan.gov/-/media/Project/Websites/PFAS-Response/Images/PPT-Swimming-Pool.pdf?rev=5104c6f80cc74cf79fcb5e2add3c9088

CERCLA Designation – Advanced Notice of Public Rulemaking

- PFOA and PFOS already proposed (Sep. 2022)
- Scope
  1) 7 additional PFAS
  2) Their precursors (including PFOA and PFOS), and
  3) Groups of PFAS
- Comments due June 12

"We believe that CERCLA gives us that enforcement discretion. I want to be clear that the water utilities and our farmers and agriculture are not the target, but the target is those who are putting this pollution into our air and our water."
EPA Administrator Regan

"We've never amended CERCLA to exempt potentially responsible parties from specific contaminants before, and now is not the time to start."
Christine Santillana, EarthJustice

PFAS Human Health Risk What Are the Potential Community Impacts to Low Levels?

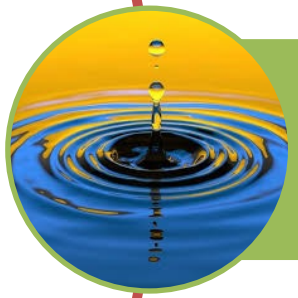
Janet Anderson, PhD, DABT
Principal Toxicologist

June 3, 2023

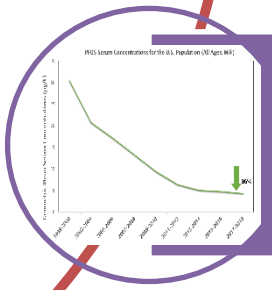
US Conference of Mayors

Key Points

Human health risks associated with low levels of PFAS in drinking water are **HIGHLY UNCERTAIN**



EPA's Proposed Drinking Water Regulations are EXTREMELY COSTLY and have **WIDE REACHING** impacts



Gen. population exposures to PFOA/PFOS have **DRAMATICALLY DECREASED** in the last two decades

EPA's Proposed PFAS Standards for Drinking Water (MCLs)

GSI ENVIRONMENTAL

WHAT

- MCLs for PFOA and PFOS at 4 ppt each
  - Based on analytical method quantitation limits ("PQL")
- MCL of a Hazard Index of 1.0 for PFBS, PFHxS, GenX, PFNA
- Compliance = Running annual average

$$\text{Hazard Index} = \left(\frac{[\text{GenX}_{water}]}{[10\ ppt]}\right) + \left(\frac{[\text{PFBS}_{water}]}{[2000\ ppt]}\right) + \left(\frac{[\text{PFNA}_{water}]}{[10\ ppt]}\right) + \left(\frac{[\text{PFHxS}_{water}]}{[9.0\ ppt]}\right)$$

SCHEDULE

- Public comments due May 30th
- Finalization by end of 2023
- Initial monitoring to start within 3 yrs to establish baseline
- Compliance based on quarterly monitoring, with option for 1x or 2x every 3 yrs, if below 1/3 of the MCL

Rule Trigger Levels (1/3 Proposed MCLs)

- PFOA and PFOS = 1.3 ppt
- Hazard Index PFAS = 0.33

Do the Benefits Outweigh the Costs?

EPA must justify MCLs based on:

- **Adverse** health effects
- Occurrence in drinking water at **frequency** and **levels of concern**
- "Meaningful" public health benefit

No Consensus Opinion on Association Between PFOA/PFOS Exposure & Causation Of Adverse Health Outcomes

GSI ENVIRONMENTAL

Human studies show associations with…

- Effects on immune system
- Elevated cholesterol
- Decreased birth weight
- **Cancer**

"limited or no evidence for any causal link… and any human disease"

- limited or no evidence of human disease
- lack of clinical significance
- may be explained by reverse causation or confounding

Australian Government Department of Health

"The available epidemiological studies **suggest associations** between perfluoroalkyl exposure and several health outcomes; however, **cause-and-effect relationships have not** been established…"

ATSDR

EUROPEAN FOOD SAFETY AUTHORITY

Committee on Toxicity

World Health Organization

Australian Government Department of Health

Government of Canada

Cancer Conclusions Inconsistent Worldwide

United States Environmental Protection Agency

"Data on the association between PFOA exposure and kidney cancer are **limited** but **suggest** a positive association between exposure and increased risk of kidney cancer."

For PFOS, there is **suggestive evidence** of carcinogenic potential in humans.

United Kingdom

Committee on Toxicity

"…no evidence for a link between exposure to PFASs and cancer risk."

World Health Organization - Draft

Conclusions

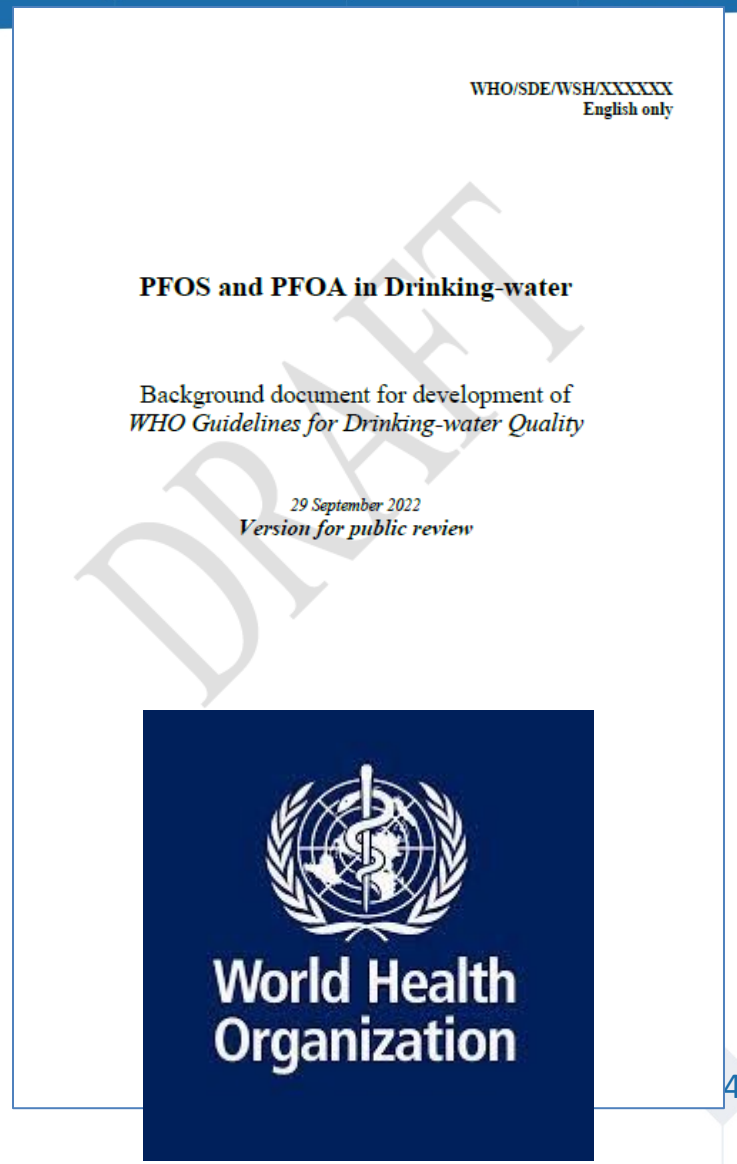
- Due to the potential adverse health effects … following higher level exposure… a guidance value **is warranted**

HOWEVER…

- the **uncertainties … are too significant** to derive a health-based value with confidence

A **pragmatic solution** proposed:

- Provisional drinking water guidance values of
  - 100 ppt for PFOA
  - 100 ppt for PFOS
  - 500 ppt for total PFAS

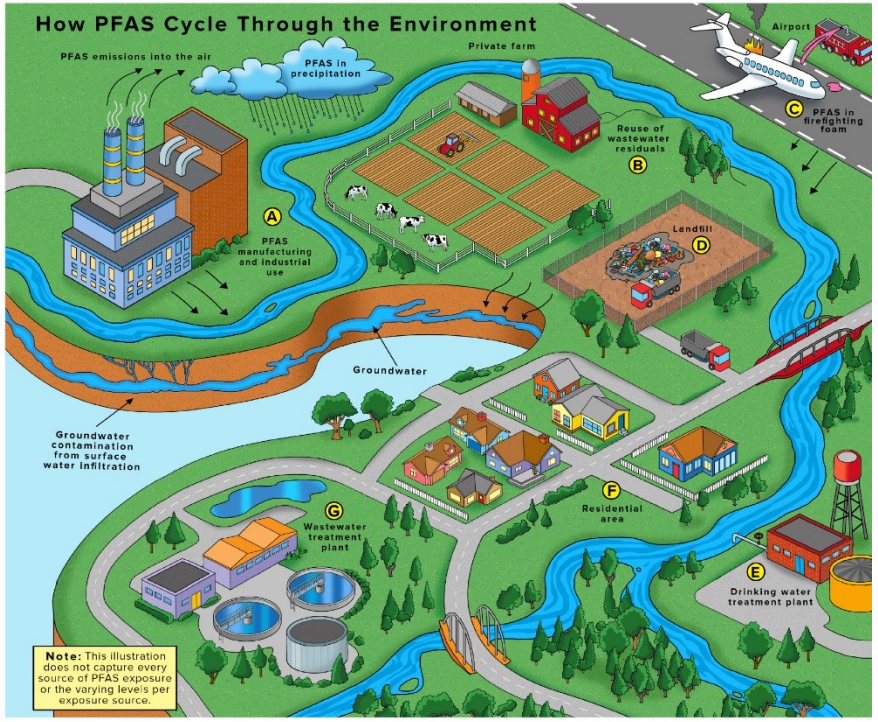


It's Not Just Public Drinking Water…
Other Applications of EPA's Risk-Based Values

GSI ENVIRONMENTAL

- CERCLA and RCRA remediation programs
- Discharge limits/stormwater/wastewater
- Property redevelopment/transfer/liability
- Fish Advisories
- Other federal agencies? FDA? USDA? CDC?

PFAS Baseline Human Health Conceptual Site Model



American Water Works Association

Contaminant Source

PFAS release

Environmental Media

Groundwater

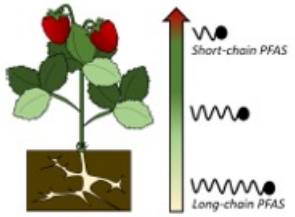
Surface water/Sediment

Soil

Plants and Wildlife

Exposure Routes

Ingestion



PFAS build-up in plants.

EPA's Exposure Assumption

Default "Relative Source Contribution"

EPA Toxicity Value = Threshold daily intake exposure level (mg/kg-day)

Other Sources 80%

WATER 20%

KEY POINT:
Most of our exposure comes from NON-drinking water sources?

FDA Update on PFAS Activities

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Constituent Update

May 31, 2023

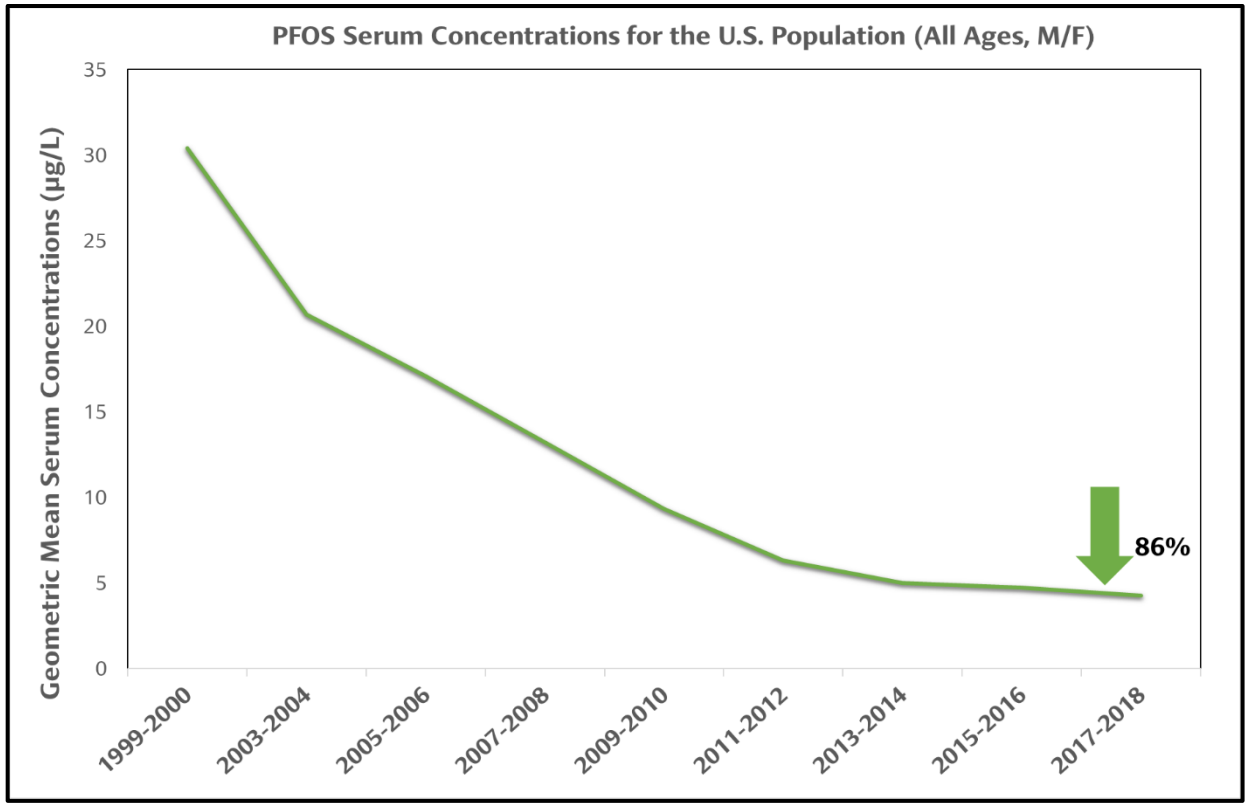
Today, the U.S. Food and Drug Administration (FDA) is sharing updates on our activities to better understand PFAS in the general food supply including, recent testing results, progress on seafood related work, and advances in testing methods.

Testing Results for PFAS in the General Food Supply

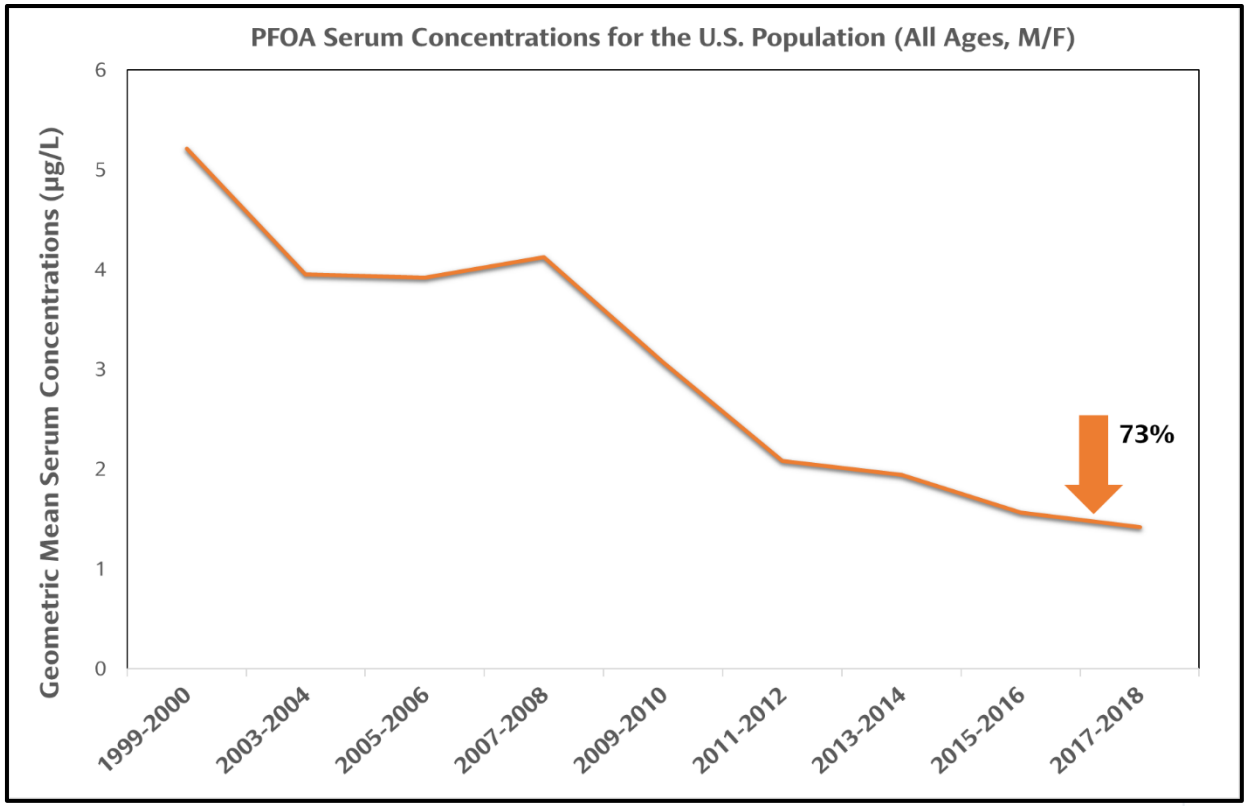
To estimate dietary exposure to PFAS from the general food supply, the FDA has been testing fresh and processed foods consistently since 2019. To date, we have tested nearly 800 samples from a wide range of foods collected for the FDA's Total Diet Study (TDS) or collected as part of targeted assignments. Our testing for PFAS in the general food supply is ongoing and we are taking steps to expedite our testing schedule by increasing our lab capacity.

"...exposure to the PFAS at the levels measured ... are not likely to be a health concern..."

Good News! Exposures Are Declining Even Without MCLs



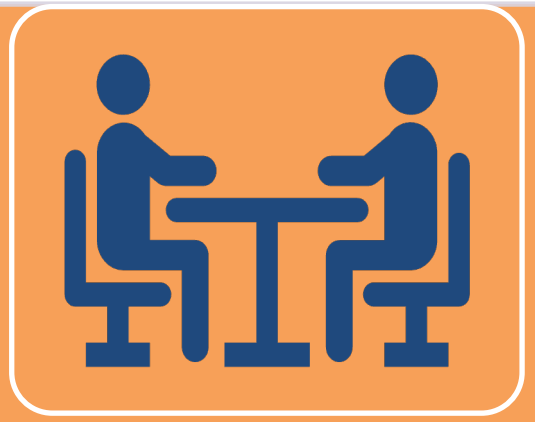
PFOS



PFOA

Sources:
NHANES, 1999-2010. https://www.cdc.gov/exposurereport/pdf/FourthReport_UpdatedTables_Volume1_Mar2021-508.pdf
NHANES, 2011-2018. https://www.cdc.gov/exposurereport/pfas_early_release.html

Conclusions



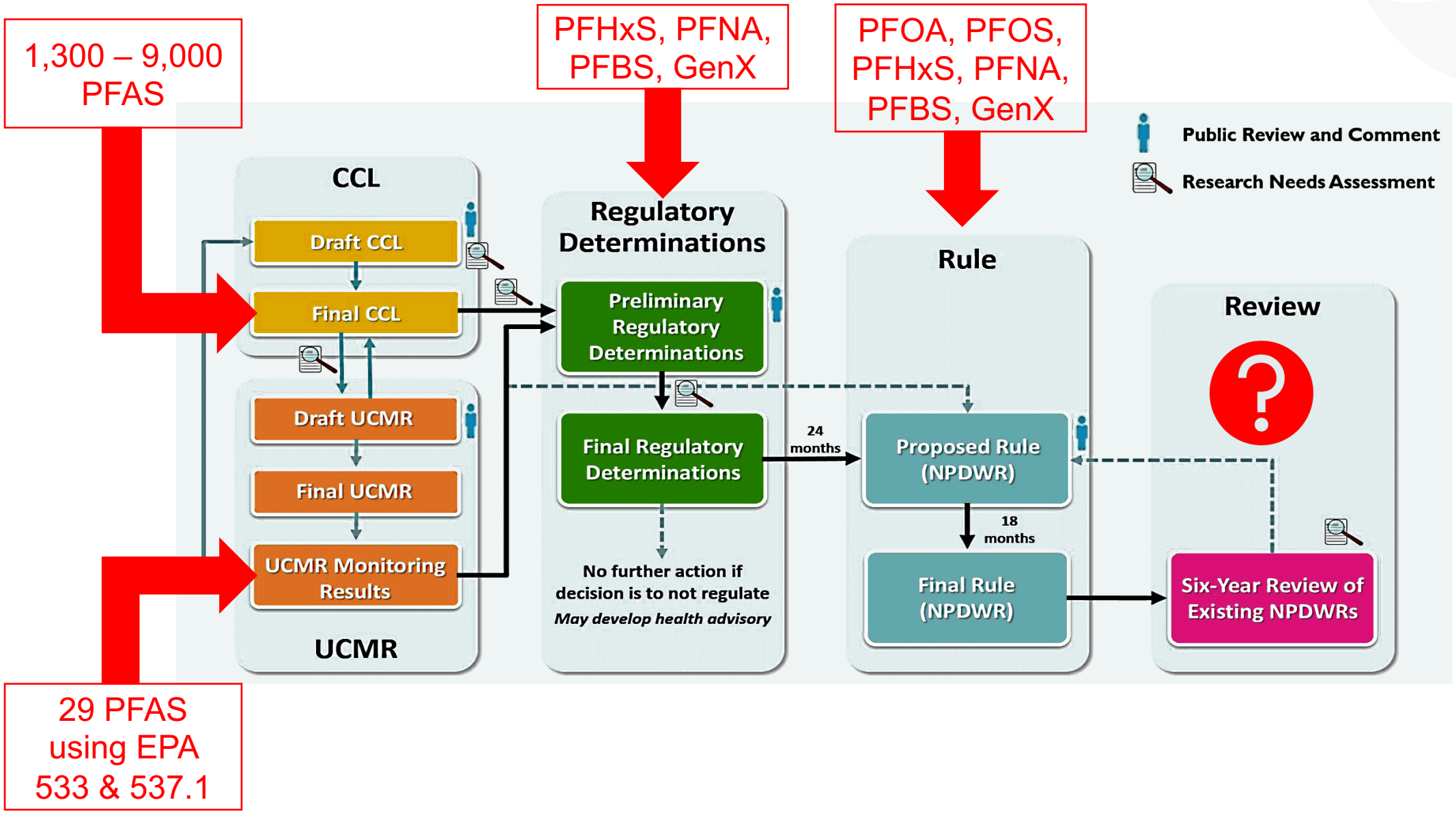
DRINKING WATER REGULATIONS FOR PFAS

CHRIS MOODY, PE

REGULATORY TECHNICAL MANAGER

AWWA GOVERNMENT AFFAIRS

ADDRESSING PFAS IN DRINKING WATER SUPPLIES



PROPOSED STANDARDS

Compound	Health Effect	MCLG	MCL	Best Available Treatment
PFOA	Cancer	0 ppt	4.0 ppt	Granular Activated Carbon Ion Exchange Resin Nanofiltration Reverse Osmosis
PFOS	Cancer	0 ppt	4.0 ppt	
PFHxS	Thyroid Effects	Hazard Index 1.0		
PFNA	Developmental Effects			
GenX	Liver Effects			
PFBS	Thyroid Effects			

EPA Proposed a standard for PFHxS, PFNA, GenX, and PFBS at the same time as the preliminary determination

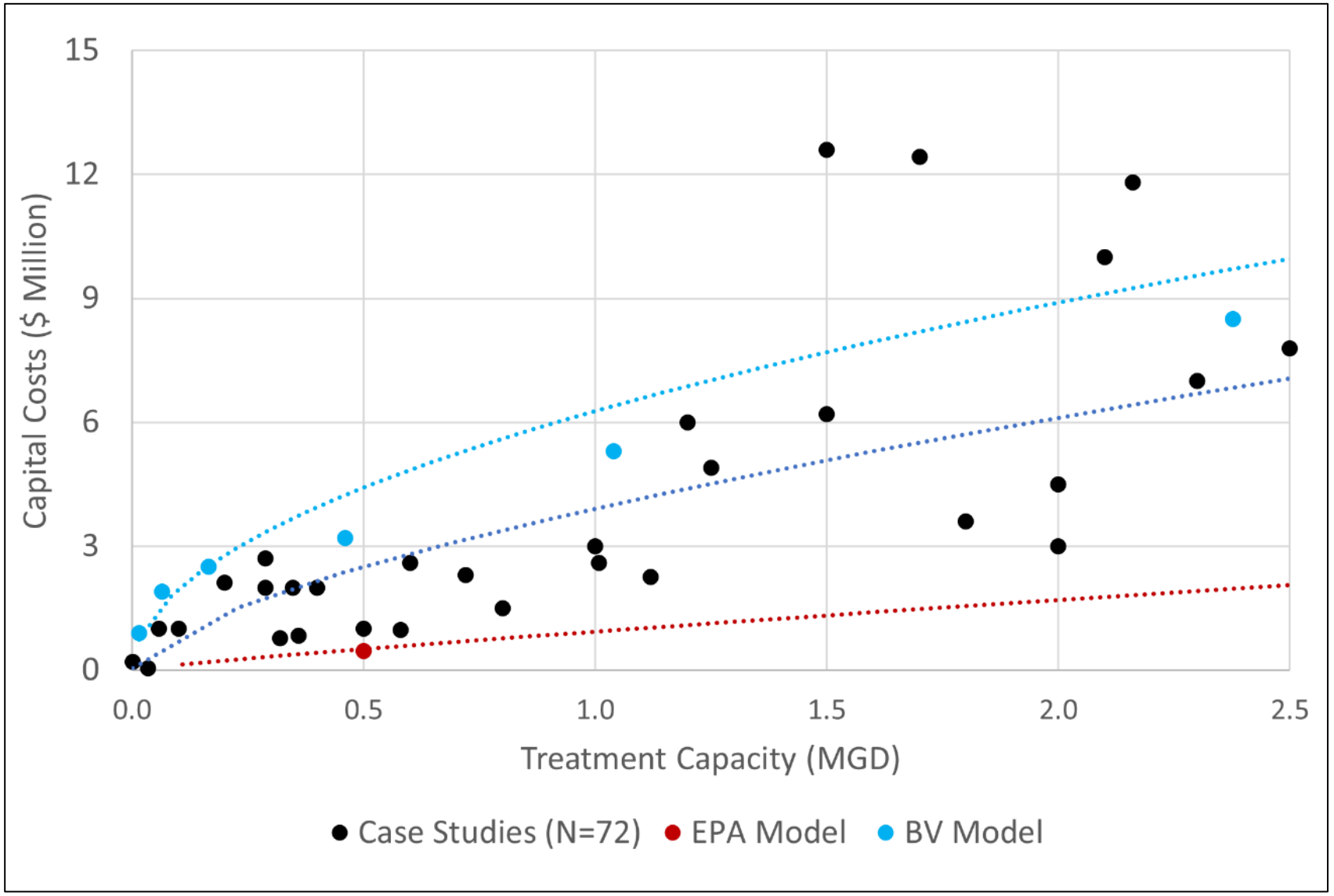
KEY CONCERNS

- ✓Health effects rely on inconsistent conclusions of toxicological data
- ✓Hazard index lacks a basis in science and agency guidance
- ✓Underlying occurrence, cost, and benefit analysis is flawed
- ✓EPA's proposal for additional PFAS moves ahead of SDWA authority
- ✓Implementation will not be feasible – timeline, costs
- ✓Determination that benefits justify costs relies on poor analyses
- ✓Household affordability challenges will be significant

IMPLEMENTATION CHALLENGES

- Workforce Limitations
- Laboratory Demands
- Supply Chain Strains
- Compliance Costs
- Timeline

ESTIMATES OF COMPLIANCE COSTS

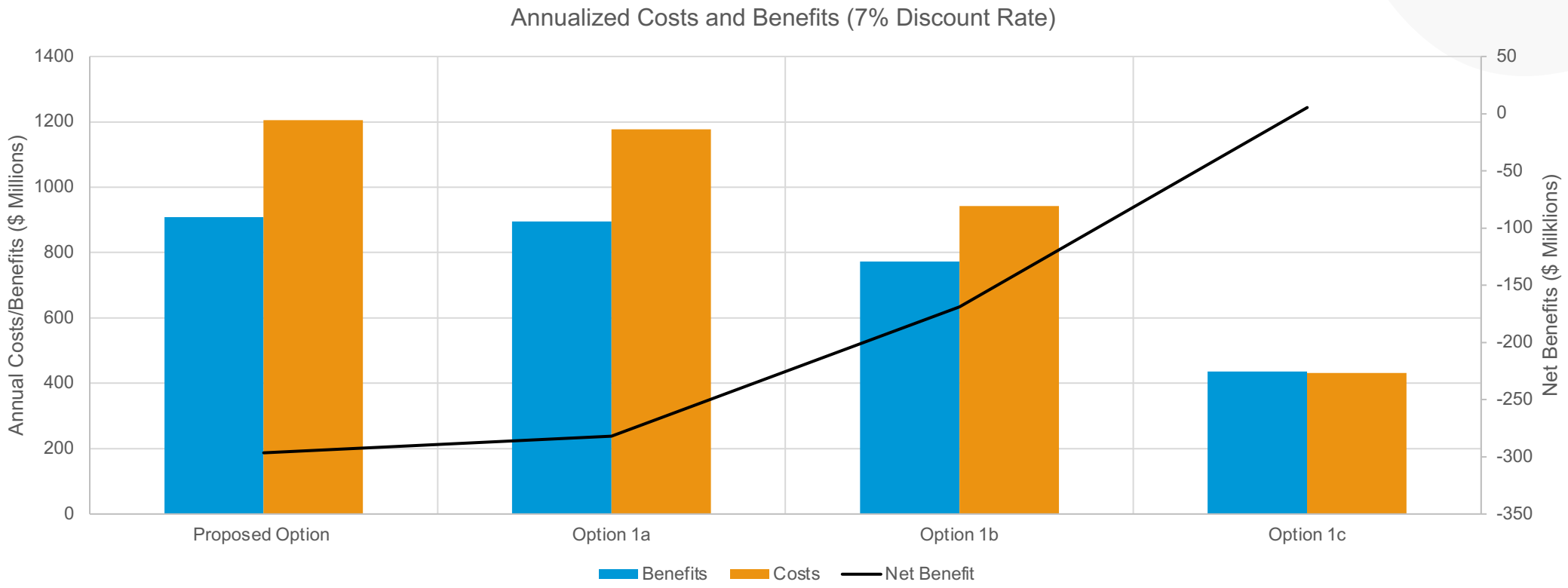


AWWA Estimates & Case Studies **300% Higher** than EPA Estimates

WHY IS THE COST ANALYSIS THIS IMPORTANT?

- Transparency on Impacts
- Justification of the Rule's Merits
- Affordability
- Identifying Public Health Priorities

DO THE BENEFITS JUSTIFY THE COSTS?



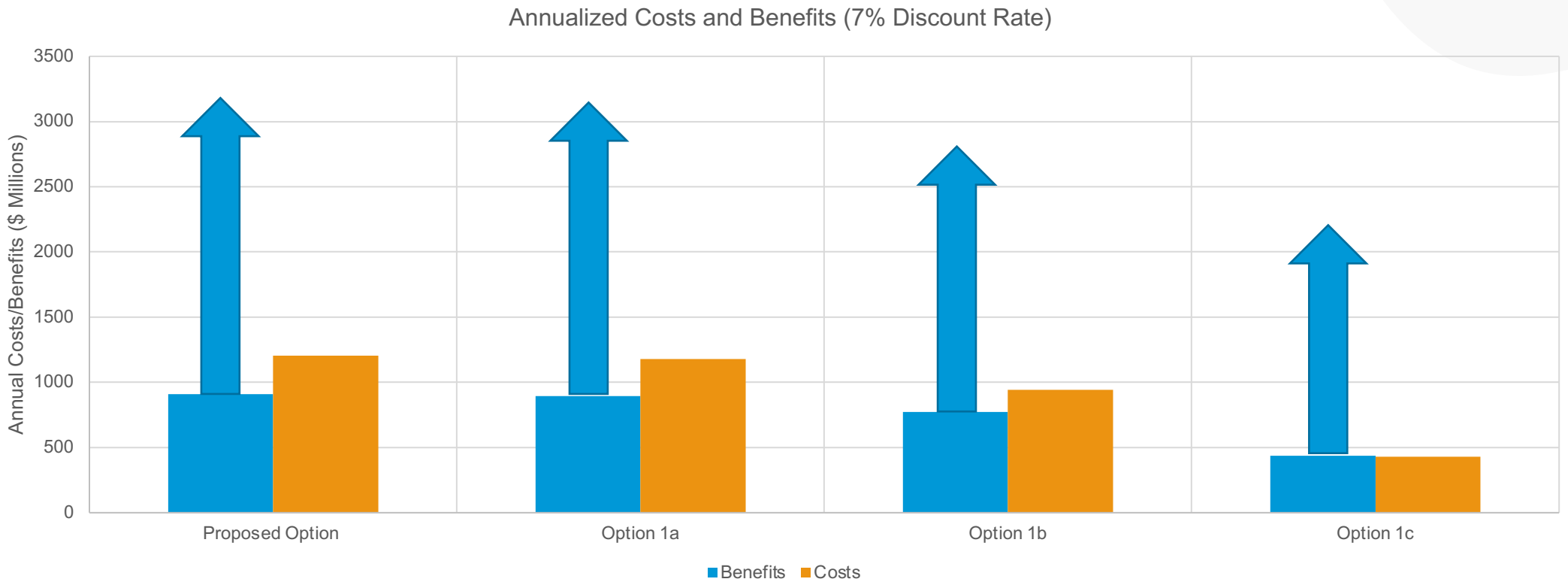
Proposed Option:
- 4 ppt PFOA, 4 ppt PFOS
- HI=1 (PFNA, PFHxS, HFPO-DA, PFBS)

Option 1a:
- 4 ppt PFOA & 4 ppt PFOS

Option 1b: 5 ppt PFOA & 5 ppt PFOS

Option 1c: 10 ppt PFOA & 10 ppt PFOS

DO THE BENEFITS JUSTIFY THE COSTS?



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Option 1a:
- 4 ppt PFOA & 4 ppt PFOS

Option 1b: 5 ppt PFOA & 5 ppt PFOS

Option 1c: 10 ppt PFOA & 10 ppt PFOS

HOUSEHOLD AFFORDABILITY

PWS Size Category	Population Range	Average Service Population	Approximate Range of Costs per Household
1	25 to 100	59	$3570 - $3570
2	101-500	245	$1675 - $1750
3	501-1,100	736	$1360 - $1390
4	1,001-3,300	1,939	$575 - $640
5	3,301-10,000	5,696	$305 - $325
6	10,001-50,000	20,613	$200 - $225
7	50,001-100,000	67,417	$155 - $175
8	100,001-1,000,000	204, 194	$65 - $70
9	>1,000,000	1,700,000	$115 - $120

EPA's Affordable "Expenditure Margin ranges from $753 - $877

FUTURE UNKNOWNS

CERCLA Hazardous Liability

Future Health Assessments

Clean Water Act Requirements

Next Steps for SDWA

Lead and Copper Rule Improvements Rulemaking

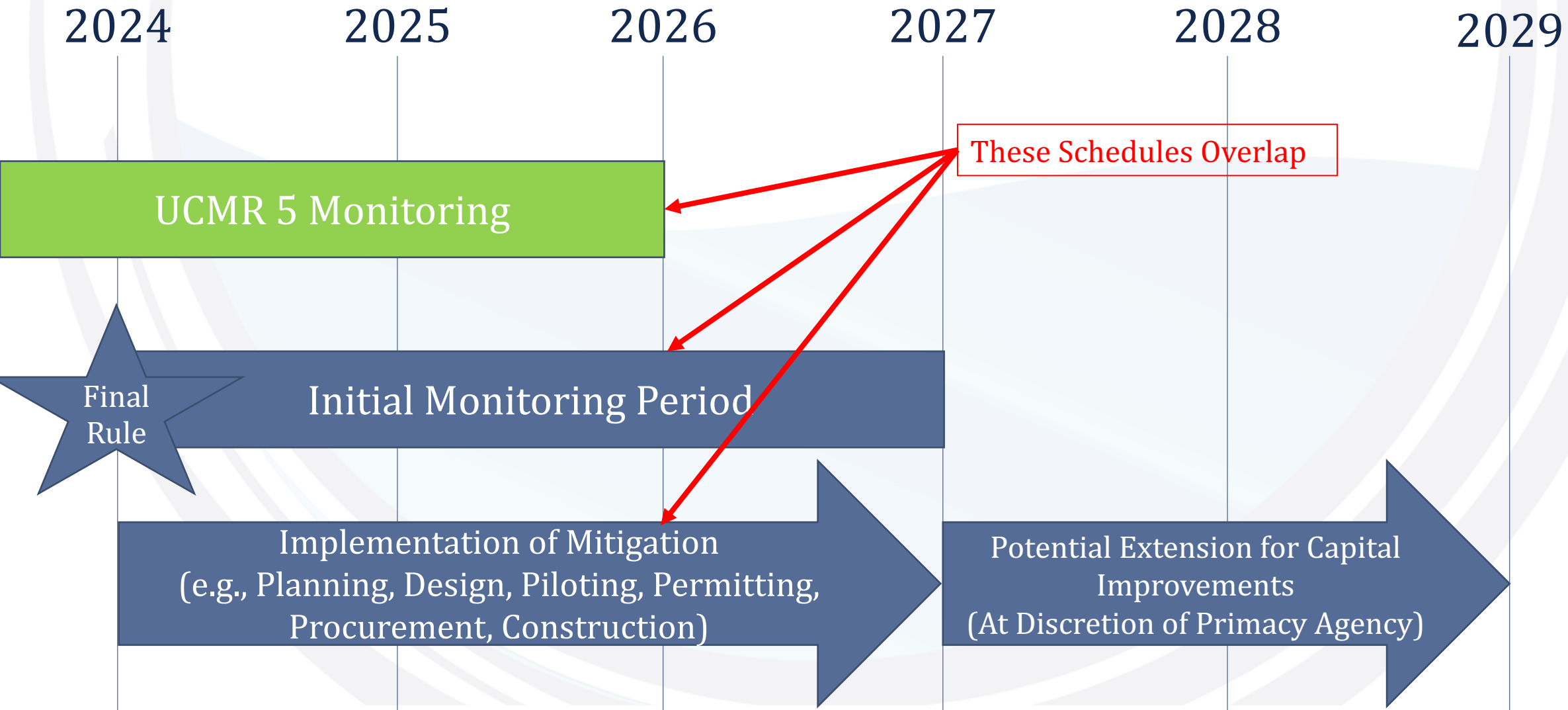
Economy

Practical Implications of the Proposed PFAS Regulation

U.S. Conference of Mayors
91st Annual Meeting

Chad Seidel, Ph.D., P.E.
Corona Environmental Consulting, LLC

Timeline for PFAS MCL Implementation



Planning for Impacted Communities

- Non Treatment
  - Take sources offline
  - Blending
- Treatment
  - Granular Activated Carbon (GAC)
  - Ion Exchange (IX)
  - Reverse Osmosis (RO)
- Lots of other peripheral details…
  - Operational feasibility
  - Waste stream disposal
  - Timeframe for implementation
  - Fiscal constraints for capital and operating expenses

GAC & IX Equipment Examples

Design, Permitting, Procurement, Construction, Operation

- Depends on several factors:
  - Project size
  - Equipment availability
  - Funding procedure
  - Project delivery approach

Design-Bid-Build

Pre-procurement of Equipment

Equipment Assigned to Contractor as Part of Design-Bid-Build

Design-Build

Impacted Community Response & Planning

- Implement risk communications with customers
- Monitor for PFAS if not performed yet including UCMR 5
- Pursue litigation cost recovery if impated
- Evaluate treatment and non-treatment alternatives to meet the new regulations if results are greater than draft MCLs
- Consider time required to plan, pilot, design, permit, procure, and construct PFAS treatment
- Expect future PFAS regulations to come with UCMR 5 results

Safe Drinking Water Act

"meaningful opportunity for health risk reduction"

What's the concern?

Unknown, unregulated risk	Unidentified DBPs, chemicals, microbes, PFAS
Known, unregulated risk	PFAS, chlorate, CCL contaminants, nitrosamines
Known, regulated risk	**Chemical:** Arsenic, Nitrate, TTHMs, etc. **Microbial:** *Cryptosporidium*, *Giardia*, etc.

What's the concern?

Not having water…

- Infrastructure failure
- Workforce limitations
- Natural disasters
  - Drought
  - Wildfires
  - Flooding

What's the Priority?

- Limited funding and competing priorities
- Prioritizing risks to be efficient with our limited funding and achieve the greatest health benefit