ASSOCIATION OF METROPOLITAN WATER AGENCIES

CDM Smith

Breaking Down PFAS: Complying with the New PFAS Regulations

May 15, 2024

WELCOME REMARKS

ERICA BROWN

Chief Policy and Strategy Officer,
AMWA

REMINDERS

1. All attendees will be muted. If you have any questions or comments, please put them in the questions box.
2. The slides and recording will be available after the presentation on the AMWA website.

UPCOMING EVENTS

1. Register NOW for AMWA's upcoming webinar: Engaging Customers and Building Trust Amid Changing Regulations.

2. The association will be launching its communities in early 2025.

INTRODUCING SPEAKERS

SUSAN CRAWFORD

Water Services Group Leader, CDM Smith

MARK WHITE

Drinking Water Practice Leader, CDM Smith

JAMIE BAIN HEDGES

General Manager, Fairfax Water

JAMIE REVELS

Utility Director, Town of Cary North Carolina

GINA AYALA

Director of Public Affairs, Orange County Water District

AGENDA

1. Regulatory Overview
2. Fairfax Water Case Study
3. Town of Cary Case Study
4. OCWD PFAS Communications Program
5. Treatment Options
6. Q&A

Regulatory Overview

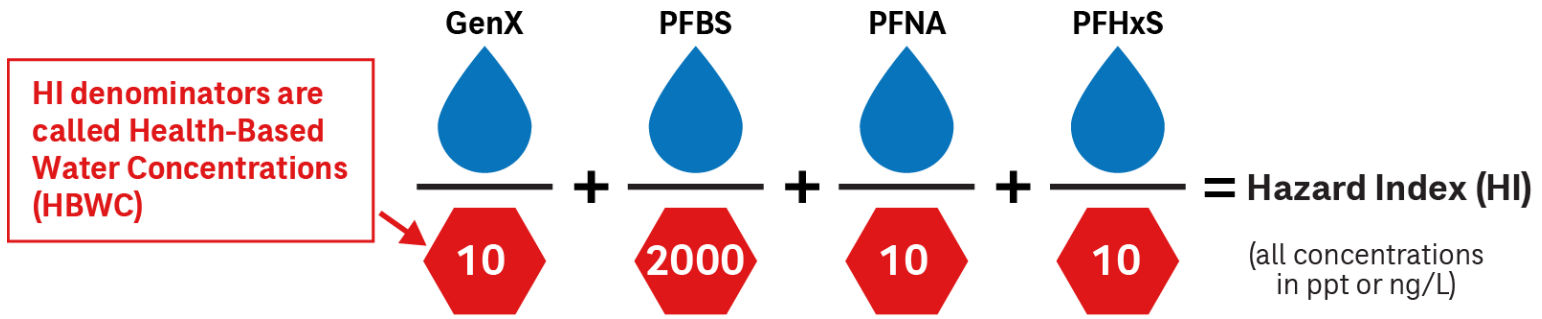
Final EPA National Primary Drinking Water Regulations

Parameter	Maximum Contaminant Level Goal (MCLG)	Maximum Contaminant Level (MCL)
PFOA	0	4.0 ppt
PFOS	0	4.0 ppt
PFNA	10 ppt	10 ppt
PFHxS	10 ppt	10 ppt
GenX (HFPO-DA)	10 ppt	10 ppt
Mixture of 2 or more: PFNA, PFHxS, GenX, PFBS	Hazard Index (HI) of 1	HI of 1

- **PFOA** and **PFOS** MCLs: **4.0 ppt** ***[remained the same]***
- **PFNA**, **PFHxS**, and **GenX (HFPO-DA)** MCLs: **10 ppt** ***[new MCLs]***
- **Hazard Index** for mixture of PFAS MCL: **1 unitless** ***[changed from 1.0]***

Final EPA National Primary Drinking Water Regulations

Parameter	Maximum Contaminant Level Goal (MCLG)	Maximum Contaminant Level (MCL)
PFOA	0	4.0 ppt
PFOS	0	4.0 ppt
PFNA	10 ppt	10 ppt
PFHxS	10 ppt	10 ppt
GenX (HFPO-DA)	10 ppt	10 ppt
Mixture of 2 or more: PFNA, PFHxS, GenX, PFBS	Hazard Index (HI) of 1	HI of 1



Key Compliance Activities

- Initial PFAS monitoring:
  - Entry point to the distribution system
  - Samples taken quarterly over 12 months
- Compliance Monitoring
  - Quarterly monitoring, unless approved for reduced monitoring
  - Compliance based on running annual average (RAA) ***[specified # of significant figures]***
  - Two tiers of reduced monitoring available for PFAS results below trigger levels (annual or triennial sampling)
- Include PFAS results in annual Consumer Confidence Report (CCR)

Compliance Schedule Deadlines

April 25, 2024

- Final PFAS rule published

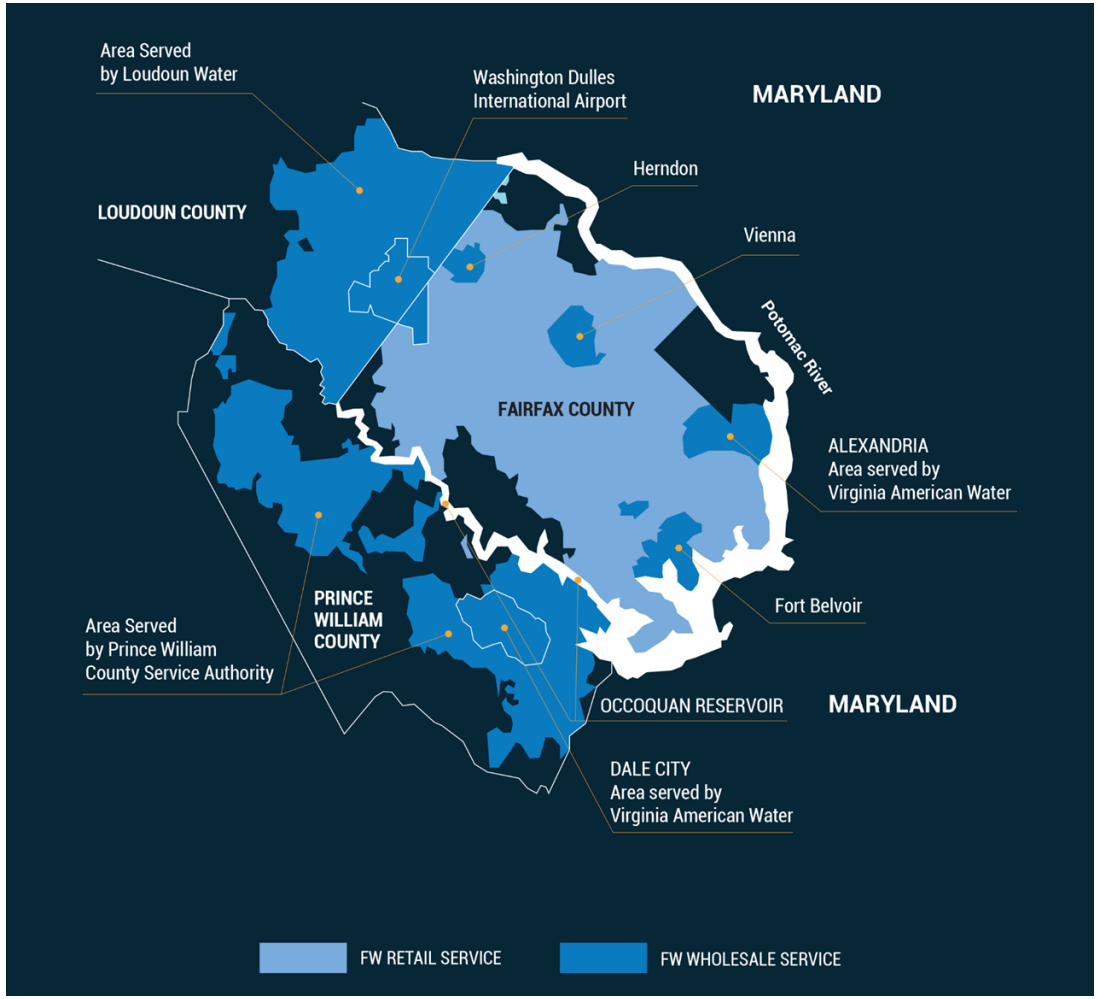
April 25, 2027

- Complete initial monitoring
- Initiate PFAS compliance monitoring and CCR reporting

April 25, 2029

- Compliance deadline for MCLs

Fairfax- Jamie Bain Hedges



Fairfax Water Overview

- Produce high-quality drinking water for over two million residents of Northern Virginia.
- Operate and maintain over $2 billion of water infrastructure from the source to the tap.
- Retail and wholesale water provider.
- Maintain a long-term focus on water supply, infrastructure, and financial planning.
- Work collaboratively with regional partners to ensure a robust water supply for Northern Virginia and the Washington Metropolitan area.

Water Treatment Plants

Griffith Water Treatment Plant

Corbalis Water Treatment Plant

- Griffith Water Treatment Plant
  - 120 MGD capacity
  - Sourced by Occoquan Reservoir
    - Less than 600 square mile watershed
    - Indirect potable reuse system
- Corbalis Water Treatment Plant
  - 225 MGD capacity
  - Sourced by Potomac River
- Both plants utilize ozone and biofiltration

PFAS Monitoring Efforts and Results

Griffith WTP Results (Occoquan)

PFAS Compound	MCL	QRAA	Max Result
PFOS	4 ppt	2.8 ppt	6.2 ppt
PFOA	4 ppt	4.2 ppt	8.7 ppt
GenX, PFBS, PFHxS, PFNA	HI<1	<1	

As PFAS data is collected, it is posted on our website: https://www.fairfaxwater.org/water-quality/facts-about-pfas

- UCMR3
  - Non-detect for both Occoquan and Potomac
- Virginia Department of Health Monitoring
  - Single events in 2021 and 2023
- Voluntary Monitoring
  - Quarterly between 2021 through 2023
- UCMR5 monitoring in 2024
- Potomac River Results < MCLs and HI
- Occoquan exceeds PFOA MCL
- More PFAS compounds at higher concentrations in the Occoquan supply

PFAS Approach

Fairfax Water SUMMER 2023

STRAIGHT FROM THE TAP

In the News: Poly- and Perfluoroalkyl Substances (PFAS)

What are PFAS, and how do they get into drinking water?

PFAS are a group of over 12,000 man-made chemicals manufactured and used in home and consumer products, such as carpets, clothing, food packaging, and cookware, since the 1940s. They are also used in firefighting foam and other industrial processes. Most of a person's exposure to PFAS is through food and other consumer products. Drinking water makes up a small portion of a person's total exposure to PFAS. Peer-reviewed studies show that exposure to elevated levels of PFAS may lead to adverse health outcomes in humans.

Due to years of use, PFAS are everywhere in the environment. Industrial sites might release PFAS into the water or air. The use of household products containing PFAS may release PFAS when those products are thrown away or washed down the drain. These chemicals do not break down naturally. They build up in the environment over time, eventually entering our bodies through food and drinking water.

What is Fairfax Water doing about PFAS?

Fairfax Water has been proactively testing for PFAS for 2 years. This has helped us get a clear understanding of PFAS levels in our source water prior to any US Environmental Protection Agency (EPA) regulations. While our testing has shown the presence of PFAS compounds, they are at extremely low levels. To learn more about our PFAS sampling and results, please visit the link at the bottom of the page.

As PFAS data is collected, it is posted on our website: https://www.fairfaxwater.org/water-quality/facts-about-pfas

- Review treatment alternatives
- Develop planning level cost estimates
- Identify and mitigate PFAS sources within watersheds
- Develop regional PFAS laboratory capability
- Collaborate with regulators and stakeholders
- Understand impacts to water supply planning and operations
- Enhance education and outreach

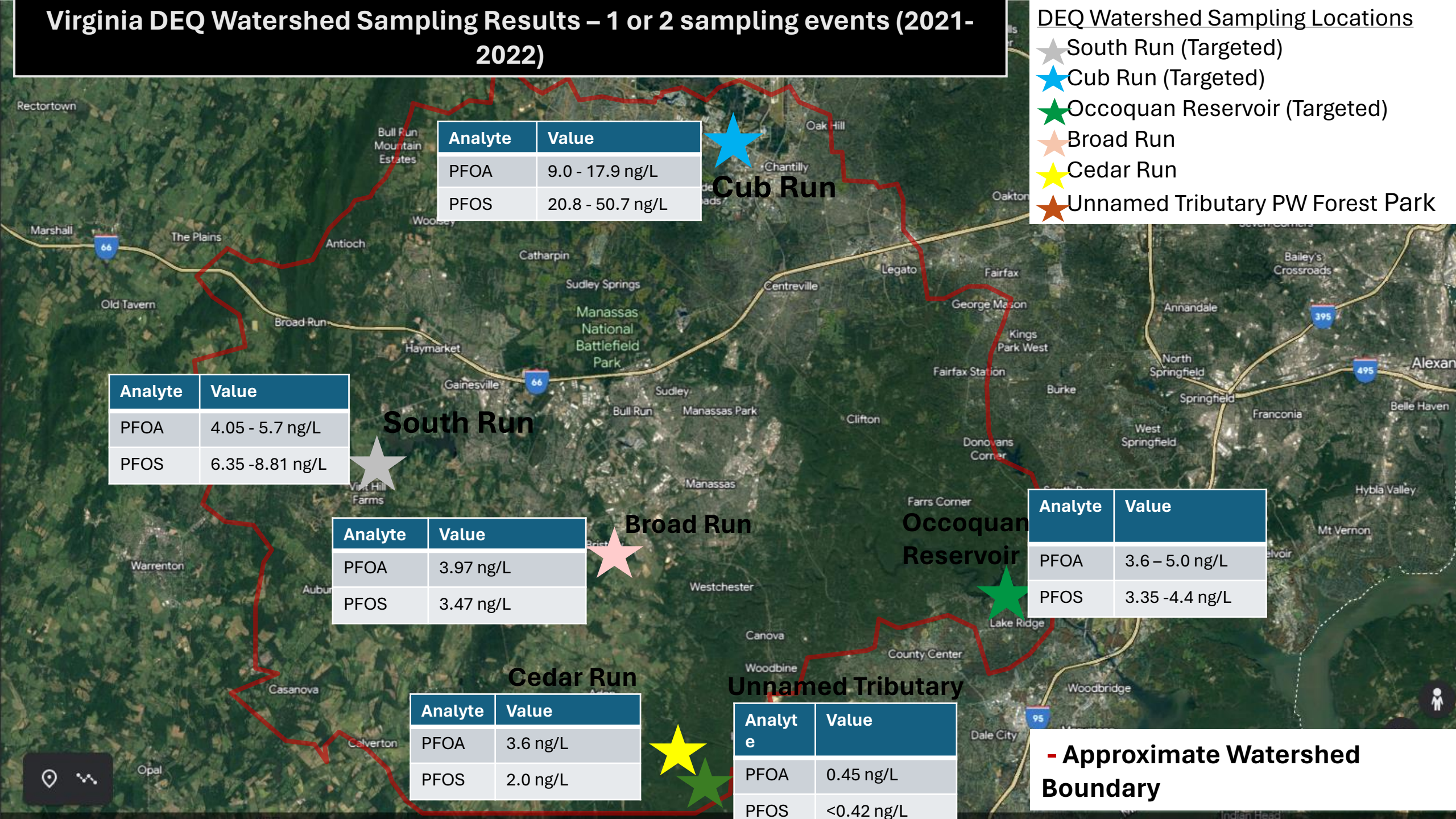
PFAS Bench Scale Study

- Study components
  - Jar testing of powdered activated carbon (PAC)
  - Rapid small scale column testing (RSSCT)
  - Desktop evaluation of membranes
  - Development of planning level capital and O&M costs
- Media tested
  - Granular activated carbon (GAC)
  - Ion exchange
  - Novel media
- Results to inform full-scale pilot studies

PFAS Treatment Costs

Technology	Capital		O&M		Notes
	Low	High	Low	High	
Powdered Activated Carbon	$ 14 M	$ 30 M	$ 22 M	$ 44 M	
Granular Activated Carbon	$ 180 M	$ 390 M	$ 17 M	$ 24 M	Pressure Vessels
Granular Activated Carbon	$ 140 M	$ 310 M	$ 17 M	$ 24 M	Gravity Contactors
Anion Exchange	$ 140 M	$ 310 M	$ 13 M	$ 18 M	Pressure Vessels Only
Novel Media (FluoroSorb)	$ 210 M	$ 450 M	$ 10 M	$ 14 M	Pressure Vessels Only
Membranes – NF/RO	$ 410 M	$ 880 M	$ 13 M	$ 20 M	

Virginia DEQ Watershed Sampling Results – 1 or 2 sampling events (2021-2022)



DEQ Watershed Sampling Locations

- South Run (Targeted)
- Cub Run (Targeted)
- Occoquan Reservoir (Targeted)
- Broad Run
- Cedar Run
- Unnamed Tributary PW Forest Park

Analyte	Value
PFOA	9.0 - 17.9 ng/L
PFOS	20.8 - 50.7 ng/L

Cub Run

Analyte	Value
PFOA	4.05 - 5.7 ng/L
PFOS	6.35 -8.81 ng/L

South Run

Analyte	Value
PFOA	3.97 ng/L
PFOS	3.47 ng/L

Broad Run

Analyte	Value
PFOA	3.6 – 5.0 ng/L
PFOS	3.35 -4.4 ng/L

Occoquan Reservoir

Analyte	Value
PFOA	3.6 ng/L
PFOS	2.0 ng/L

Cedar Run

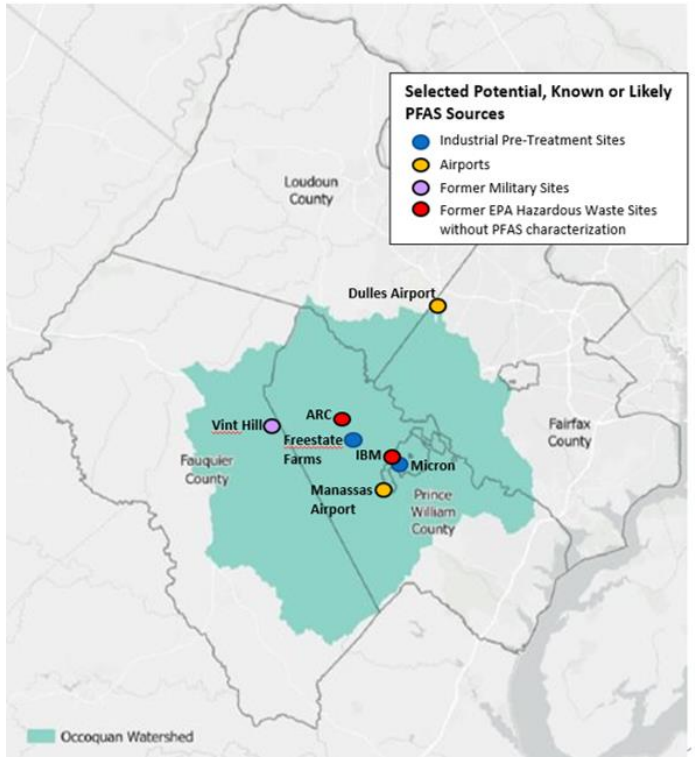
Analyte	Value
PFOA	0.45 ng/L
PFOS	<0.42 ng/L

Unnamed Tributary

- Approximate Watershed Boundary

Known or Probable PFAS Sources

OCCOQUAN WATERSHED



Federal/Military
- Vint Hill Farms

Airports
- Dulles International
- Manassas

Industrial Pre-Treatment Facilities
- Freestate Farms
- Micron

Former/Legacy CERCLA Sites
- Atlantic Research Corporation
- IBM Manassas

AFFF Release at the Manassas Airport on February 7, 2020

PFAS Watershed Studies

OCCOQUAN AND POTOMAC

Occoquan Watershed

Characterize PFAS compounds in the Occoquan Watershed and Identify Sources of PFAS to support efforts to reduce or eliminate sources.

- ✓ Performed by Occoquan Watershed Monitoring Laboratory (OWML) of Virginia Tech
- ✓ Local capability to analyze PFAS compounds using EPA methods
- ✓ 1-year study initiated January 2024

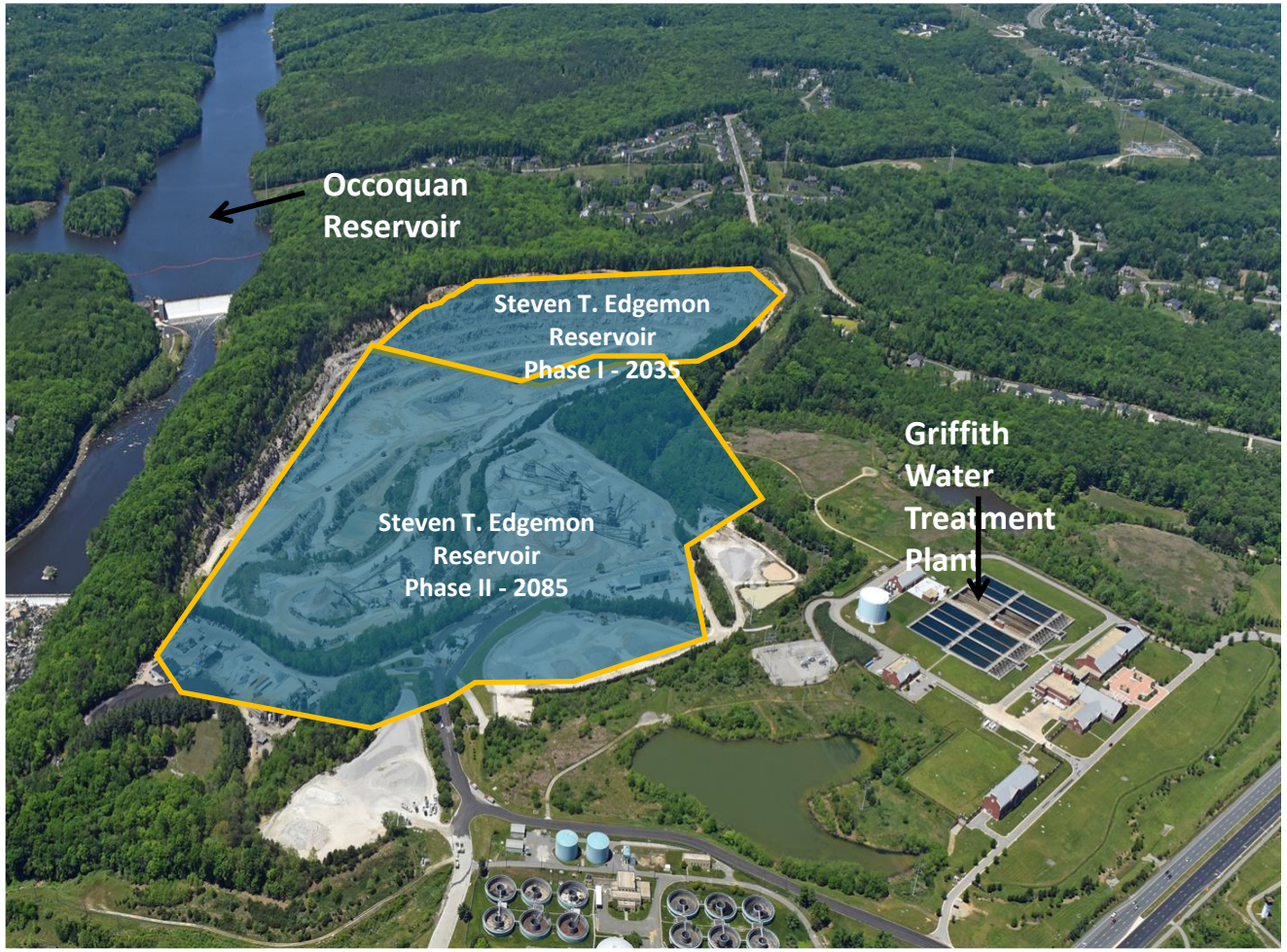
Potomac Watershed

Understand the Factors Affecting **PFAS Variability** in the Potomac River Watershed

- ✓ Coordinated through the Potomac River Drinking Water Source Protection Partnership
- ✓ 1-year study at 10 locations in the watershed
- ✓ Prioritized sites based on PFAS source tracking tools

PFAS Impacts on Water Supply Planning

- Future reservoir considerations
  - Fill modes include recycling of process water
  - PFAS treatment may be required on recycle stream
  - Residuals processing facilities may be required
- Reduction in available land for other planned facilities
- Potomac plant considerations



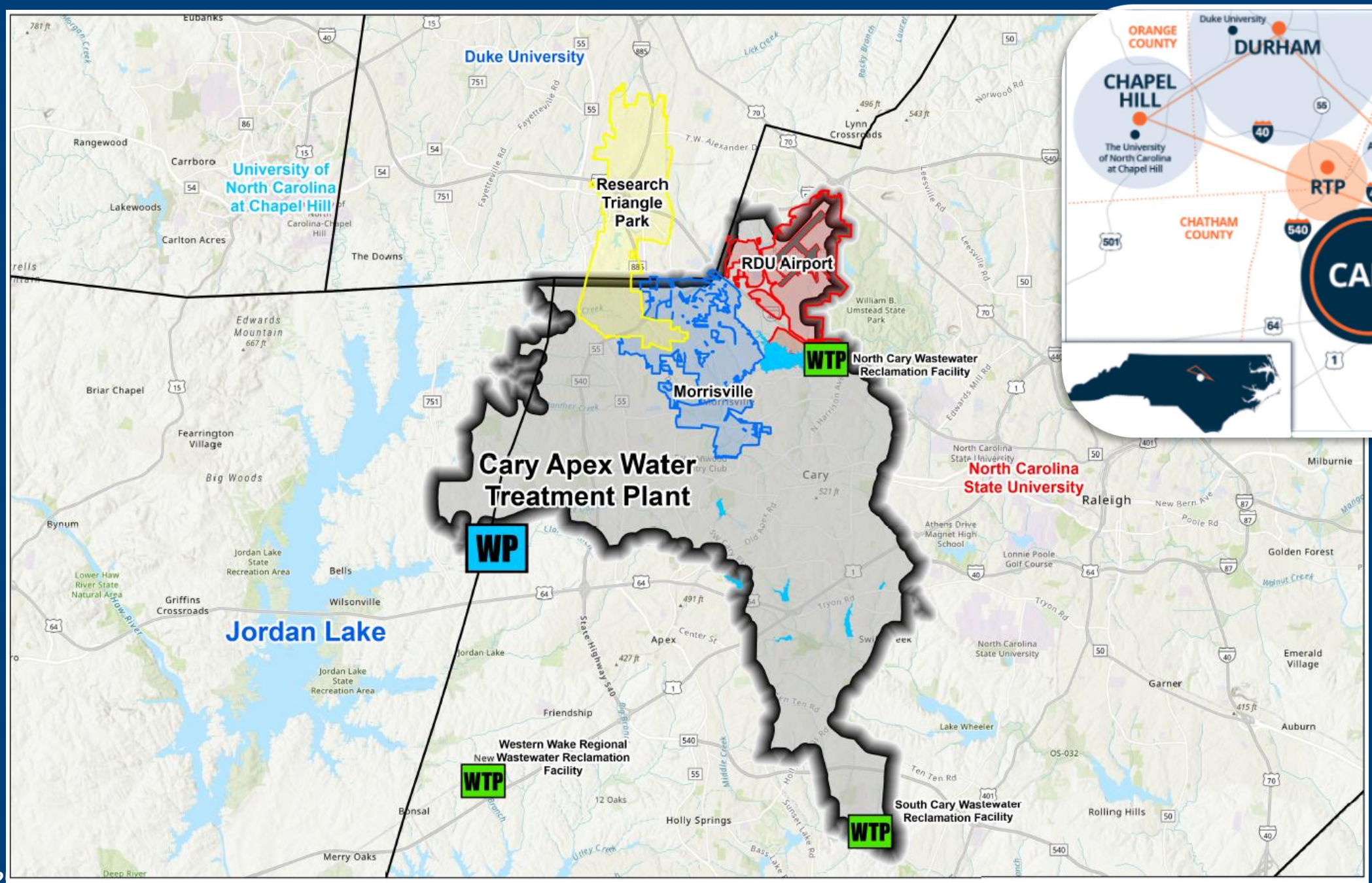
Fairfax Water

Cary- Jamie Revels

CARY
LIVE INSPIRED

Cary's Experience with PFAS Management

May 15, 2024


Duke University
Research Triangle Park
RDU Airport
University of North Carolina at Chapel Hill
Rangewood
Carrboro
Lakewoods
Carlton Acres
The Downs
Edwards Mountain
667 ft
Briar Chapel
Fearrington Village
Big Woods
Bynum
Jordan Lake State Recreation Area
Lower Haw River State Natural Area
Griffins Crossroads
Bells
Wilsonville
Jordan Lake
Jordan Lake State Recreation Area
Lynn Crossroads
William B. Umstead State Park
WTP
North Cary Wastewater Reclamation Facility
Morrisville
Cary Apex Water Treatment Plant
WP
Cary
North Carolina State University
Raleigh
Milburnie
Athens Drive Magnet High School
Lonnie Poole Golf Course
Golden Forest
Apex
Center St
Tryon Rd
Emerald Village
Garner
Auburn
Friendship
Western Wake Regional New Wastewater Reclamation Facility
WTP
12 Oaks
Bonsal
Holly Springs
Lake Wheeler
OS-032
Ten Ten Rd
South Cary Wastewater Reclamation Facility
WTP
Rolling Hills
Merry Oaks
Deep River
ORANGE COUNTY
Duke University
DURHAM
DURHAM COUNTY
WAKE COUNTY
CHAPEL HILL
The University of North Carolina at Chapel Hill
RDU AIRPORT
RTP
CHATHAM COUNTY
CARY
RALEIGH
NC State University
Wake Technical College

Jordan Lake


Jordan Lake watershed
Jordan Lake watershed
Jordan Lake
ROCKINGHAM
CASWELL
PERSON
GUILFORD
ALAMANCE
ORANGE
DURHAM
RANDOLPH
CHATHAM
WAKE
Reidsville
Greensboro
Burlington
Graham
Mebane
Hillsborough
Durham
Chapel Hill
Morrisville
Siler City
Chapel Hill
Apex
Asheboro
Raleigh
N
5 MILES

Cary/Apex Water Treatment Facility

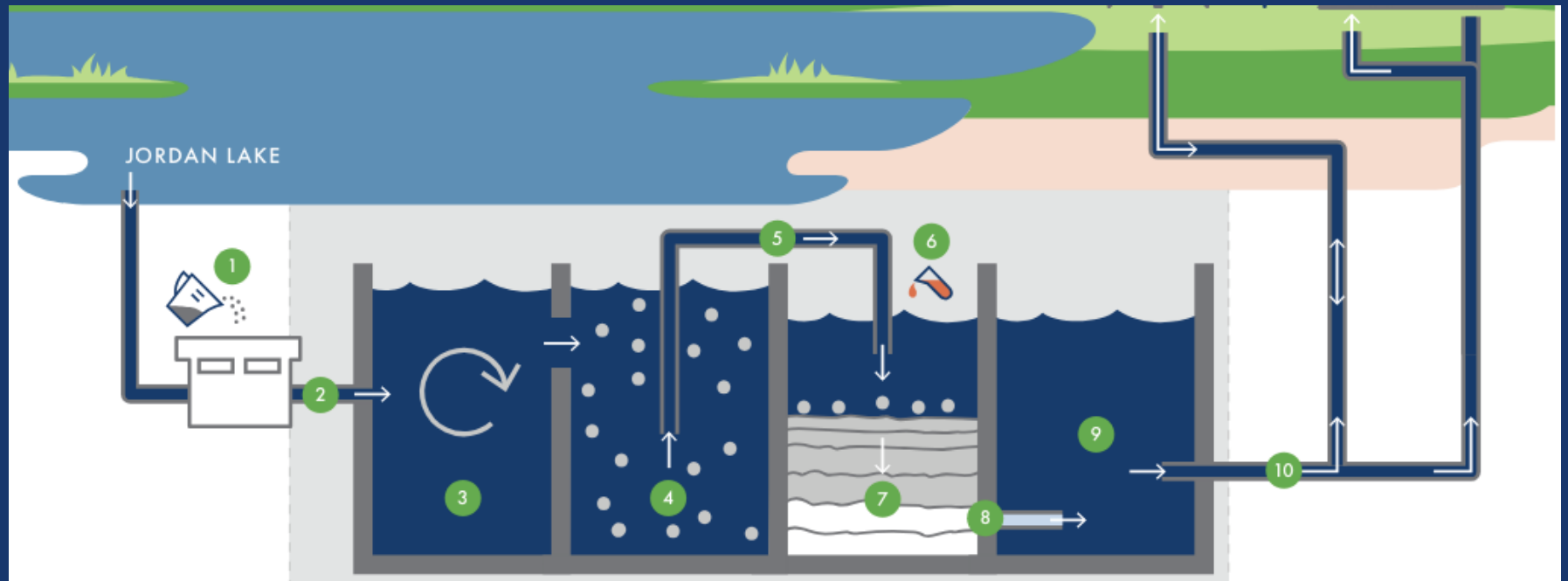
Drinking Water Treatment for Cary, Apex, Morrisville, Wake Co. RTP and RDU Airport

Vital Statistics

- Began Operating in summer 1993
- 56-MGD Facility
- Provides drinking water to approximately 300,000 citizens
- Source Water: Jordan Lake

Water Treatment Process

- PAC, Powdered Activated Carbon
- Ozonation
- Super Pulsator Clarifiers
- Conventional and Biological Filters
- Disinfection – Chloramines



1 Pump Station: Powdered activated carbon is added to our source water, Jordan Lake, and pumped 6 miles to our Cary/ Apex Water Treatment Facility where additional powdered activated carbon may be added.

2 Ozonation: Ozone is used to oxidize organics, remove color, and to treat taste and odors.

3 Mixing: Aluminum sulfate and polymer are added in our Rapid Mix to help particles stick together.

4 Clarification: Water is pulsed up from the bottom of our SuperPulsators where floc collects on the baffles and the clean water goes out through the collection channels at the top.

5 Ozonation: There is an option for additional ozonation of the settled water.

6 Disinfection: As water flows to our filters, chlorine in the form of liquid bleach is added for disinfection.

7 Filtration: Water flows down through layers of sand and carbon in our conventional or biological filters, where additional particles are removed from the water.

8 Post Treatment: We add fluoride for dental health and chemicals to adjust the pH (acidity) of the water and for corrosion control in our water pipes.

9 Clearwell: Filtered water is put in clearwells for disinfection and storage until it is ready to be used. Chlorine and ammonia are added separately to form chloramines, which disinfects the water.

10 Distribution System: Water is pumped through underground water pipes in our community to water storage tanks and over 1,000 miles of smaller pipes. Elevated water tanks help maintain water pressure, ensure water is available for fire protection, and help us meet daily variations in water use.

2015 – Early Experience with PFAS Begins with UCMR 3

- 1 Detection in 4 Rounds of Testing
- Single detection was at 0.01 ug/L or 10 parts per trillion

Perfluorinated Compounds Data (µg/L)					
		Town of Cary's Data			
		2015 UCMR3 Finished Water Data			
Name	Acronym	2/4/2015	5/6/2015	8/10/2015	11/4/2015
Perfluorobutanoic acid	PFBA				
Perfluorodecanoic acid	PFDA				
Perfluoroheptanoic acid	PFHpA	<0.01	<0.01	<0.01	0.01
Perfluorohexanoic acid	PFHxA				
Perfluorohexansulfonate	PFHxS	<0.03	<0.03	<0.03	<0.03
Perfluorononanoic acid	PFNA	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid	PFOA	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonate	PFOS	<0.04	<0.04	<0.04	<0.04
Perfluoropentanoic acid	PFPA				
Perfluorobutanesulfonic acid	PFBS	<0.09	<0.09	<0.09	<0.09

CARY

2017 – Local University Scientist Tested Cary's Water for Perfluorinated Compounds

- University Testing Showed Some Detections
- Started our Own Testing Program
- Media Reports Followed

WRAL NEWS

LOCAL NEWS

Elevated levels of unregulated chemicals found in Jordan Lake, Cary drinking water

Researchers at Duke University have discovered elevated levels of several perfluorinated compounds - an unregulated family of industrial chemicals including some that can raise cancer risks - in Jordan Lake and drinking water treated by Cary.

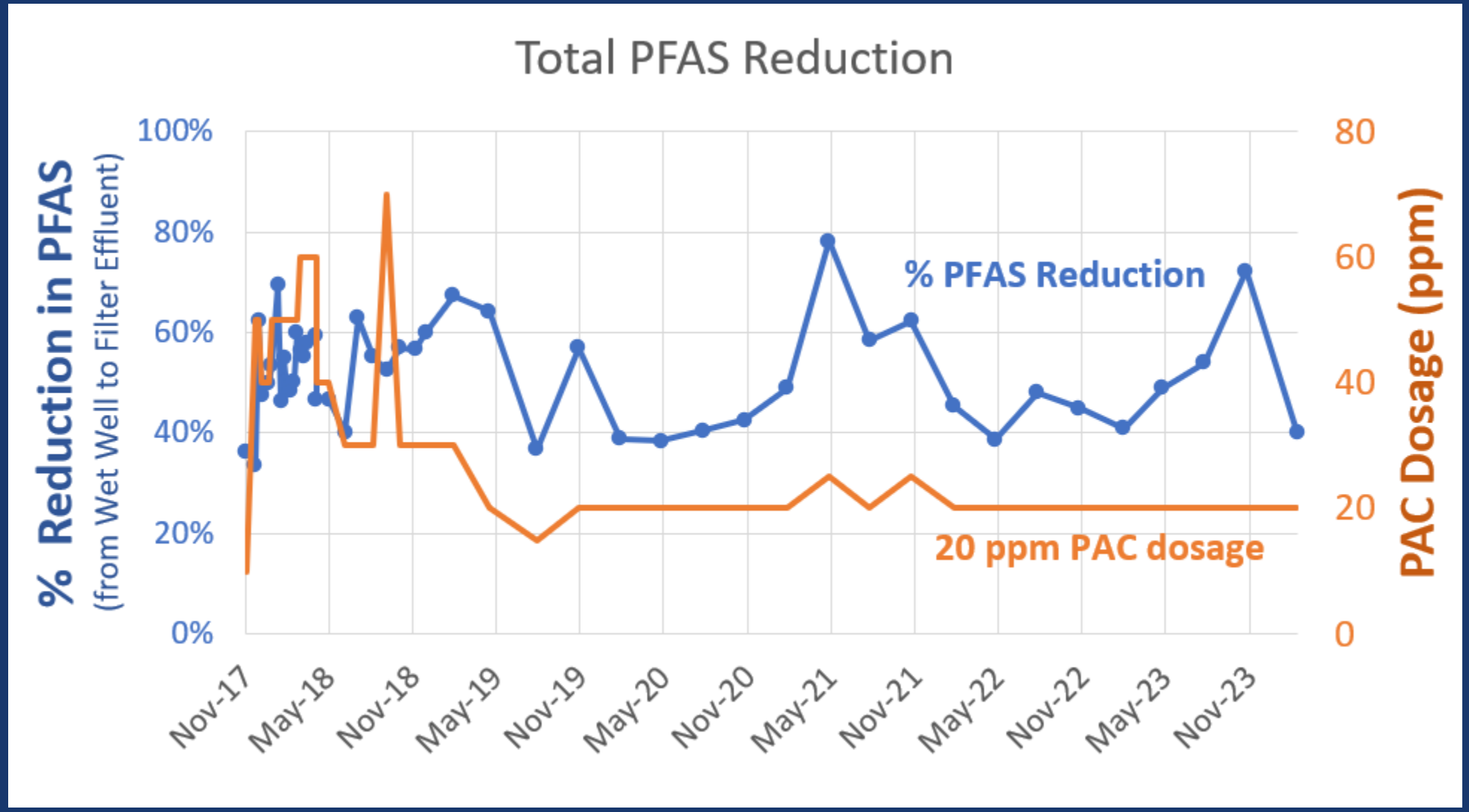
Posted 2:38 p.m. Dec 21, 2017 - Updated 4:39 p.m. Dec 21, 2017

CARY

2018 – Multiple Strategies Implemented

- Tested Several Carbon Products
- Contracted CDM to Evaluate PFAS Mitigation Options
- Met with State Regulatory Officials
- Provided Public Information
- Added Testing Reports to Web Page

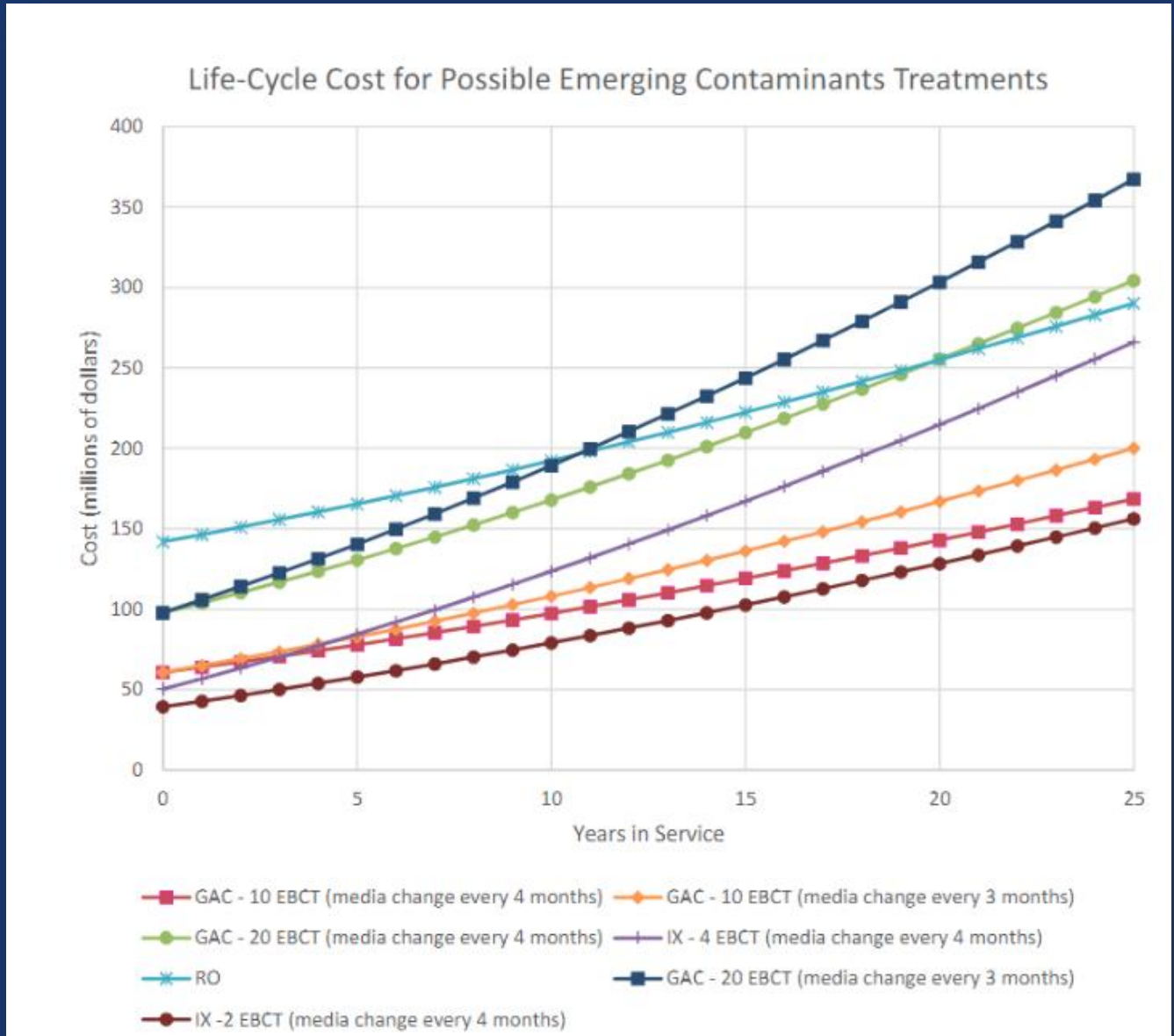
PAC Dosage of 20 ppm



PAC Silos Added with 2018 Expansion Project

2019 – Study was Completed

- Granular Activated Carbon, Ion Exchange and Reverse Osmosis were all evaluated along with current practice of PAC adsorption
- GAC and PAC proved effective, but require ongoing replacement
- RO demonstrated excellent removal for a wide range of contaminants



Costs are presented in 2019 dollars.

Figure 50. Life-Cycle Cost for Potential Emerging Contaminants Treatments

PFAS Updates and Information in Annual Consumer Confidence Report

EMERGING CONTAMINANTS

SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	HEALTH ADVISORY	AVG. AMOUNT DETECTED	RANGE	VIOLATION	SOURCE
1,4-Dioxane (ppb)	2021	35	<0.07	<0.07 – 0.18	NA	By-product in paint strippers, dyes, greas aircraft deicing fluids, deodorants, shampo manufacture of pharmaceuticals and manufacture of PET plastic.
Perfluorobutanesulfonic acid (PFBS) (ppt)	2021	N/A	<2	<2 – 2.7	N/A	Man-made chemicals used for waterproof and stain proof fabrics, nonstick cookware, some food packaging materials and fire suppression foams.
Perfluorobutanoic acid (PFBA) (ppt)	2021	N/A	7.2	<5 – 8.1	N/A	
Perfluorohexanoic acid (PFHxA) (ppt)	2021	N/A	3.9	2.6 – 5.2	N/A	
Perfluoropentanoic acid (PFPeA) (ppt)	2021	N/A	5.4	3.4 – 7.6	N/A	

Perfluorooctanoic acid (PFOA) and Perfluorooctane sulfonic acid (PFOS) were not detected. For a complete list of substances tested, including non-detects, see 2021 Water Quality Testing Summary online: townofcary.org/testingsummary

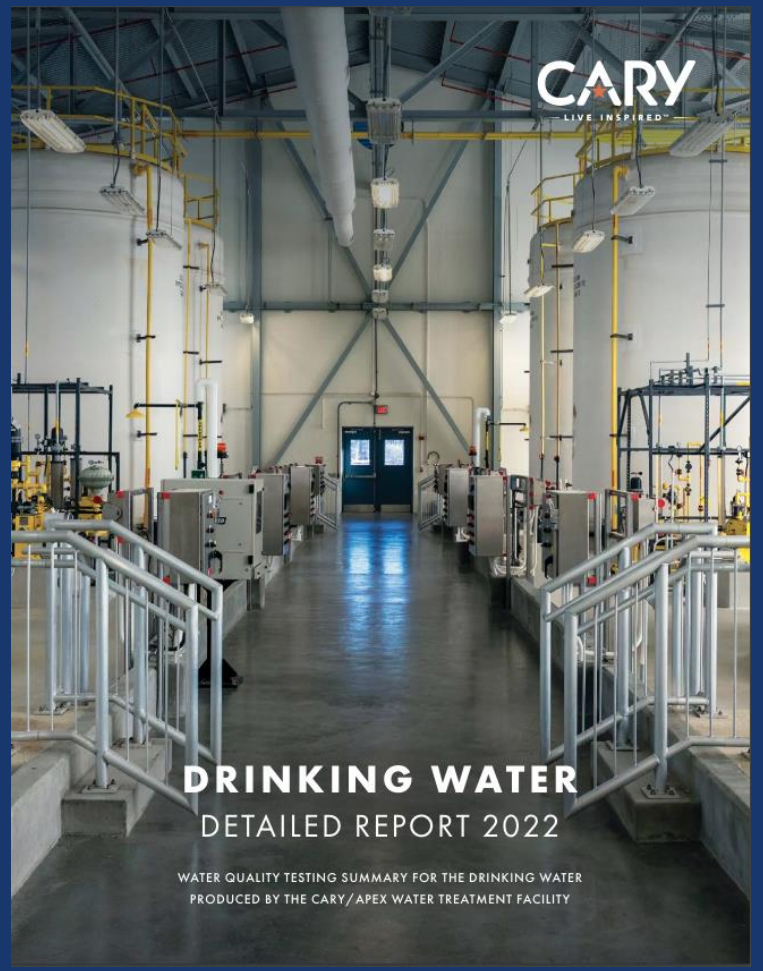
Consumer Confidence Report Link

CARY

Expanded Annual Detailed Testing Report

PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS)

CONTAMINANT (UNITS)	YEAR SAMPLED	TEST FREQUENCY	AVERAGE AMOUNT DETECTED	RANGE DETECTED	VIOLATION	SOURCE
10:2 Fluorotelomer sulfonic acid (10:2 FTS) (ppt)	2022	4 or 5 Times	ND	No range	N	Man-made chemicals used for waterproof and stain proof fabrics, nonstick cookware, some food packaging materials, and fire suppression foams
4:2 Fluorotelomer sulfonic acid (4:2 FTS) (ppt)			ND	No range		
6:2 Fluorotelomer sulfonic acid (6:2 FTS) (ppt)			ND	No range		
8:2 Fluorotelomer sulfonic acid (8:2 FTS) (ppt)			ND	No range		
ADONA (ppt)			ND	No range		
F-53B Major (ppt)			ND	No range		
F-53B Minor (ppt)			ND	No range		
GenX (ppt)			ND	No range		
N-ethylperfluorooctane sulfonamide (NEtFOSA) (ppt)			ND	No range		
N-ethylperfluorooctane sulfonamidoethanol (ppt)			ND	No range		
N-methylperfluorooctane sulfonamide (NMeFOSA) (ppt)			ND	No range		



Drinking Water Detailed Testing Report Link

CARY

2023 Testing Data

[Emerging Contaminants Webpage Link]

[PFAS Fact Sheet Link]

Summary of Detected PFAS in 2023

	Maximum Contaminant Level (MCL)*	Average Detection	Range Detected (ppt)
Perfluorooctanoic acid (PFOA)	4 ppt	2.1 ppt	ND—3.2
Perfluorooctane sulfonate (PFOS)	4 ppt	ND	ND
Perfluorohexanesulfonic (PFHxS)	10 ppt	ND	ND
Perfluorononanoic acid (PFNA)	10 ppt	ND	ND
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA or GenX)	10 ppt	ND	ND
Perfluorobutanesulfonic acid (PFBS)	No Individual	3.5 ppt	2.5—4.7
Mixture of two or more: PFHxS, PFNA, HFPO-DA, and PFBS	1.0 (unitless) Hazard Index	< 0.1 (unitless) Hazard Index	No range
Perfluorohexanoic acid (PFHxA)	N/A	6.4 ppt	4.1—9.1
Perfluoropentanoic acid (PFPeA)	N/A	7.3 ppt	5.3—11
Perfluoroheptanoic acid (PFHpA)	N/A	ND	ND—2.9
Perfluorobutanoic acid (PFBA)	N/A	4.3 ppt	ND—10

*MCLs will become effective in 2029.

ppt = part per trillion or nanograms per liter ND = Non detect N/A = not applicable < = Less than

Summary of Actions to Address PFAS

(Our efforts began in 2017 when PFAS was first detected as a concern)

QUARTERLY SAMPLING AND TESTING FOR PFAS.

POSTING PFAS LAB REPORTS ON OUR WEB PAGE.

INCLUDING PFAS DATA IN ANNUAL WATER REPORTS.

ENGINEERING STUDY TO EVALUATE TREATMENT STRATEGIES.

FOLLOWING THE RESEARCH AND EVOLVING REGULATORY POLICY.

TREATING WITH ACTIVATED CARBON TO REDUCE PFAS.

CARY

Future Measures

- UCMR 5 (February 2025)
- Completing our RO Pilot Testing & Analysis
- Planning to Test Foam Fractionation Technology
- Explore Expanding our Water Treatment Facility to 66-MGD

For more information, contact:
Jamie Revels, Utilities Director
919.469.4303, *Jamie.Revels@carync.gov*

TAKE THE VIRTUAL TOUR!

SCAN the QR code

OR

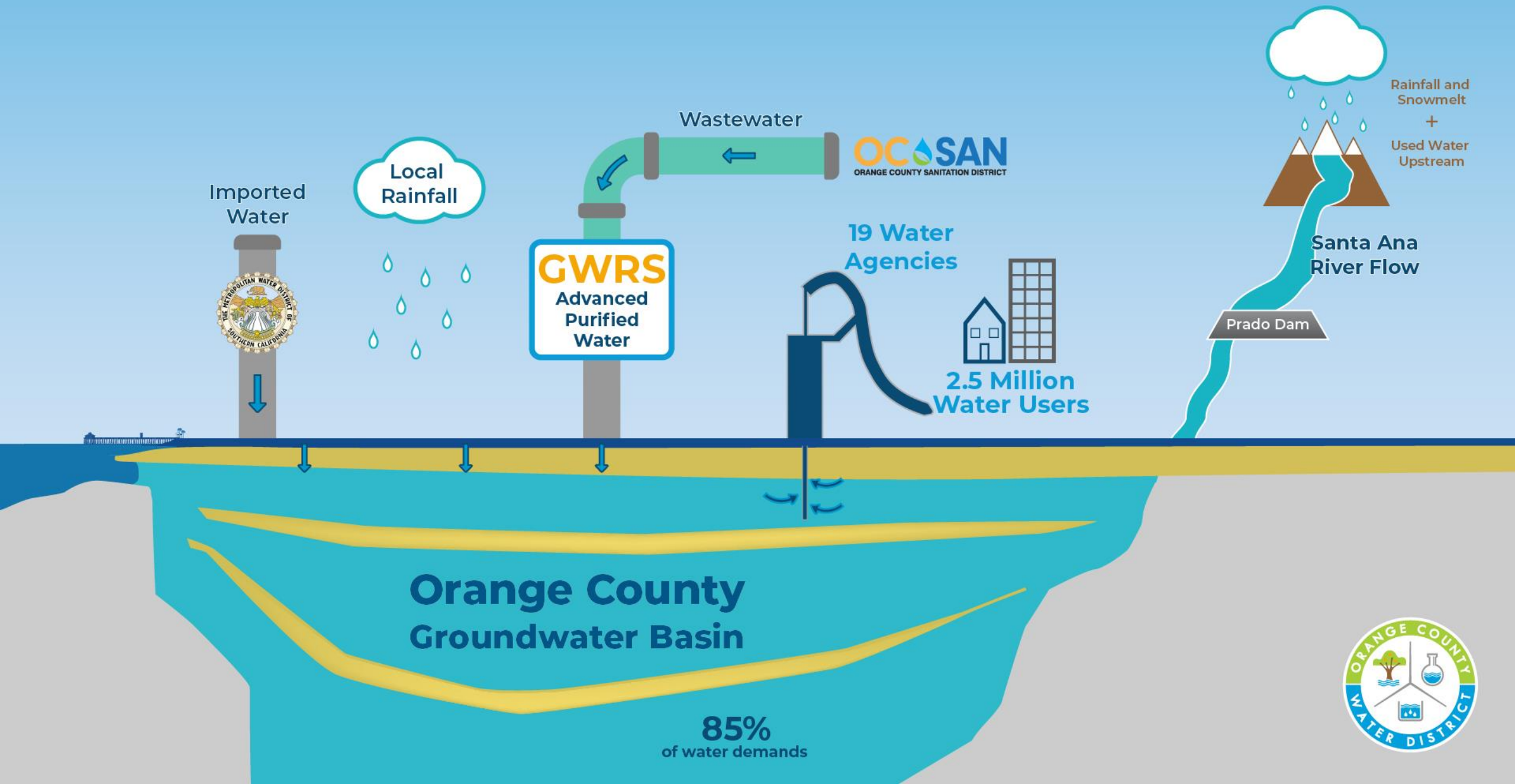
VISIT townofcary.org/CAWTFtour

Communication & Outreach – Gina Ayala

PFAS Communications: Orange County's Robust Response

Gina Ayala
Director of Public Affairs
Orange County Water District

AMWA/CDM Smith Webinar
May 15, 2024


Rainfall and
Snowmelt
+
Used Water
Upstream
Wastewater
OCSAN
ORANGE COUNTY SANITATION DISTRICT
Local
Rainfall
Imported
Water
GWRS
Advanced
Purified
Water
19 Water
Agencies
2.5 Million
Water Users
Santa Ana
River Flow
Prado Dam
Orange County
Groundwater Basin
85%
of water demands

PFAS Impacts* at OCWD

100+ WELLS

need treatment
(out of ~220 wells)

15 RETAILERS

impacted cities and water districts
(out of 19 member agencies)

$1.8 BILLION COST

Interim replacement water, treatment system capital, O&M, etc. (over 30 years)

100%

design and construction funded by OCWD

50%

ongoing O&M costs funded by OCWD

Current estimates. Impacts to cost and wells are approximate and will likely increase in the future.

Implementing Robust Communications Program

Program Goals

- Provide proactive, frequent communications
- Develop clear, consistent messaging and consensus between all stakeholders
- Maintain public trust in local water supplies

Broad Audience

- Employees – all departments involved
- Board
- Retail water systems and their customers
- Regional water/wastewater agencies
- Media
- State/federal representatives
- Regulatory agencies
- City & county officials
- General public

Comprehensive Communications & Outreach

Internal & external communications

PFAS taskforce – all for one, one for all

Academic/research partnerships & studies

Construction outreach & toolkit

Communications Assets

- PFAS education center (website)
- Press releases
- Fact sheet
- FAQs
- Infographics
- Videos
- E-newsletter stakeholder updates
- Webinars
- Presentations, meetings, events, public updates

PFAS IN ORANGE COUNTY

PFAS are everywhere

Per- and polyfluoroalkyl substances (PFAS) are a large group of man-made chemicals used since the 1940s in common household and commercial products. PFAS chemicals are often used to keep food from sticking to cookware but are also used to make clothes, carpets, and furniture resistant to water and stains. Firefighting foams used to extinguish fuel and oil fires have historically also contained PFAS. Chemical manufacturers are the original source of PFAS chemicals.

Protecting water quality

Orange County Water District (OCWD) and the public water systems it serves provide safe and reliable drinking water that consistently meets all state and federal drinking water standards. PFAS have been detected in the Orange County Groundwater Basin, entering primarily via the Santa Ana River (SAR) whose flows infiltrate into the basin. Despite playing no role in releasing PFAS into the environment, OCWD is working with its cities and retail water districts to remove it from local water supplies.

- More than 100 out of 200 wells have been impacted due to various state and federal regulations.
- Fifteen impacted agencies will have to temporarily purchase more costly imported water to replace PFAS contaminated supplies.
- PFAS related costs are expected to be approximately $1.8 billion in Orange County over the next 30 years.

Swiftly addressing PFAS

STATE-OF-THE-ART TESTING
First public agency laboratory in California to achieve state certification to analyze for PFAS in drinking water.

RESEARCH
Launched the nation's largest pilot project to test different types of treatment media to determine the most effective solution that will restore the impacted drinking water supply.

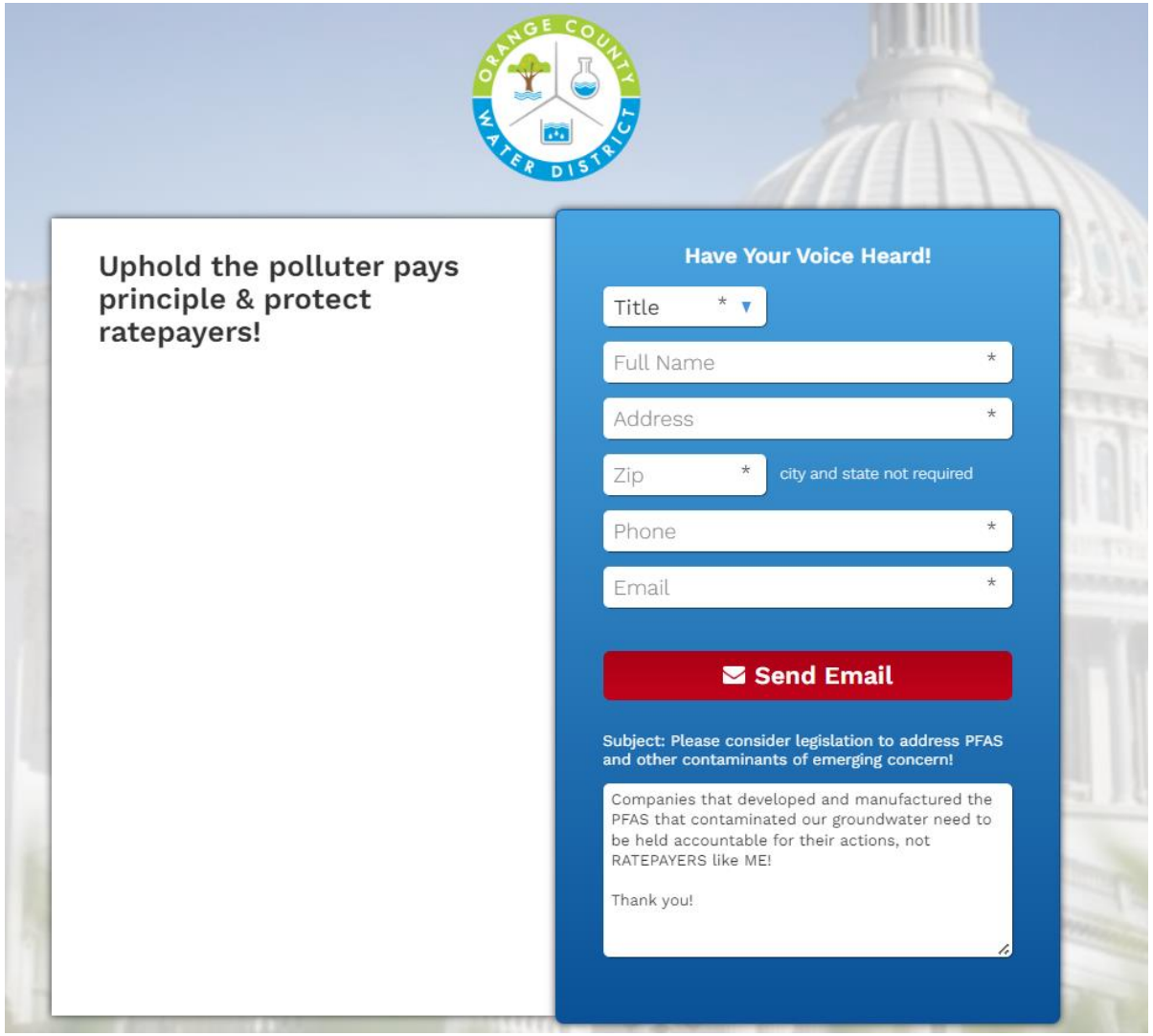
BUILD TREATMENT PLANTS
Funding 100% of the design and construction, and 50% of the operation and maintenance costs for treatment facilities.

LEGISLATIVE ADVOCACY
Actively monitoring for any state or federal regulatory changes and advocating to hold polluters accountable.

PROTECT RATEPAYERS
Filed a lawsuit against PFAS manufacturers who substantially contributed to the contamination of Orange County's groundwater, drinking water, and real property.

Legislation & Litigation

- Legislative outreach
  - Hold polluters accountable
  - Exempt water/wastewater agencies from clean-up liability
  - Need funding
  - Frequent meetings with state and federal officials
  - Identify grant opportunities
  - Take action
- Litigation
  - Lawsuit to hold manufacturers responsible
  - Protect ratepayers and ensure clean-up costs are borne to the extent possible by companies that developed PFAS products



Ongoing Commitment

- Ongoing, frequent stakeholder communications
- Highlight history of innovation and priority to ensure a safe, clean and reliable water supply
- Continue construction outreach and showcase completed projects
- Share best practices and results with others
- Serve as a resource and position OCWD as subject matter experts/leaders in the industry




Lessons Learned

- **Control** the narrative
- **Collaborate** locally, statewide, nationally
- **Develop** one consistent voice
- **Appreciate** the importance of legal and their guidance
- **Embrace** the issue: talk about it, show the facilities, offer tours
- **Establish** strong relationships with regulators
- **Don't be afraid** to make recommendations and asks for your agency’s needs
- **Understand** the evolving situation and adjust communications materials accordingly
- **Maintain** credibility and leadership

Thank You!

Gina Ayala, Director of Public Affairs
Orange County Water District
18700 Ward Street, Fountain Valley, CA 92708
(714) 378-3200
gayala@ocwd.com
www.OCWD.com

@OCWaterDistrict

Treatment Options

Feed water quality is key to selecting treatment technology

PFAS

- Which compounds are you treating for?
- MCLs, PFAS currently regulated by State, or short-chains too?
- Flexibility for future MCLs and/or more compounds regulated

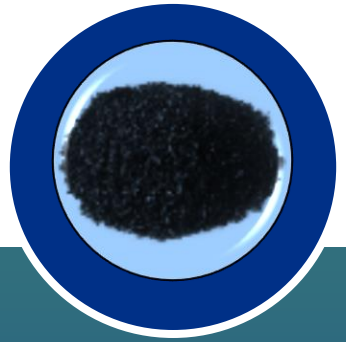
Treatment of Other Constituents

- Softening
- Iron/Manganese
- Nitrate
- VOCs
- Perchlorate
- Hexavalent chromium
- Emerging compounds – 1,4-dioxane
- Others?

Potential Interferences with Treatment Technologies

- Radionuclides
- Hardness
- Metals
- Sand/fine sediment
- Organics (including TOC/DOC)
- Entrained air (common in wells)

Mainstream PFAS Treatment Technologies

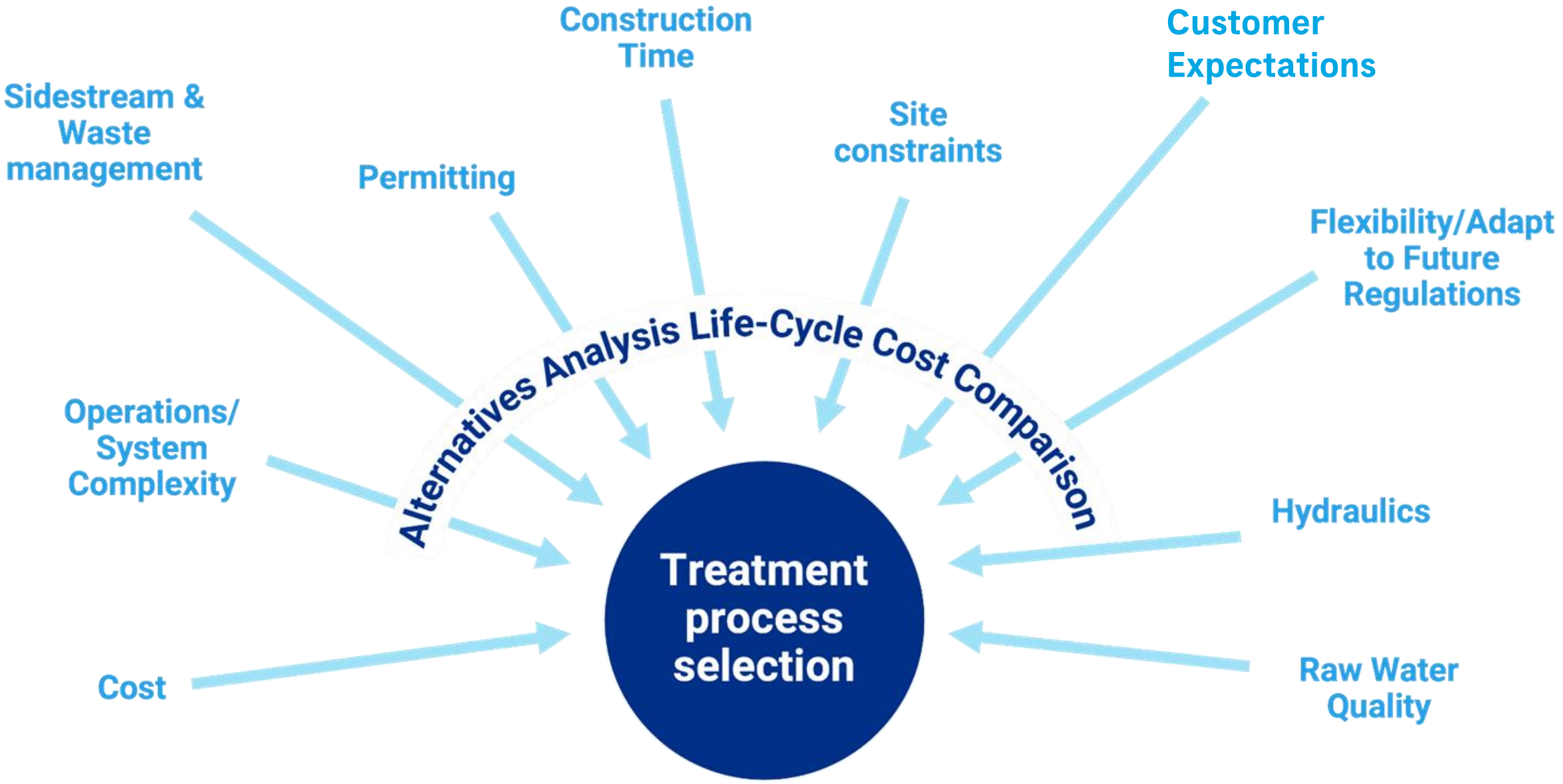


Granular Activated Carbon (GAC)

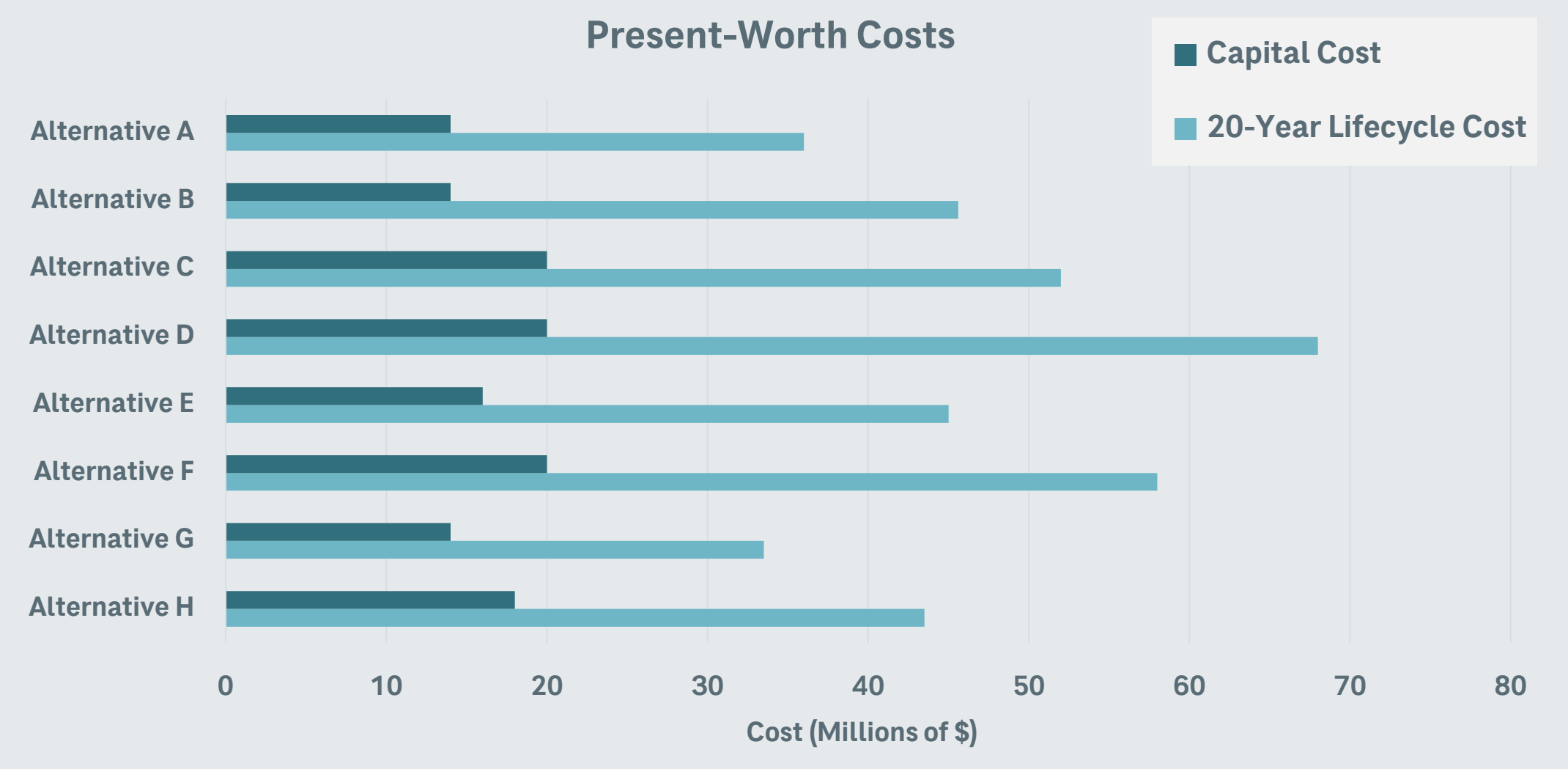
Ion Exchange Resin

Reverse Osmosis Membranes

PFAS are NOT removed appreciably by conventional drinking water treatment. High doses of Powder Activated Carbon (PAC) can assist removal.


Construction Time
Customer Expectations
Sidestream & Waste management
Permitting
Site constraints
Flexibility/Adapt to Future Regulations
Alternatives Analysis Life-Cycle Cost Comparison
Operations/ System Complexity
Hydraulics
Treatment process selection
Cost
Raw Water Quality

Consider Lifecycle Costs when Selecting PFAS Treatment



Site-Specific Testing Provides Process Validation and Optimization

Q&A

THANK YOU! CONTACT US AT:

SUSAN CRAWFORD

crawfordsl@cdmsmith.com

JAMIE REVELS

jamie.revels@carync.gov

MARK WHITE

whitemc@cdmsmith.com

GINA AYALA

gayala@ocwd.com

JAMIE BAIN HEDGES

jhedges@fairfaxwater.org

ERICA BROWN

brown@amwa.net