Water Research Foundation Updates

HWWA Annual Conference 2025

THE Water Research FOUNDATION®

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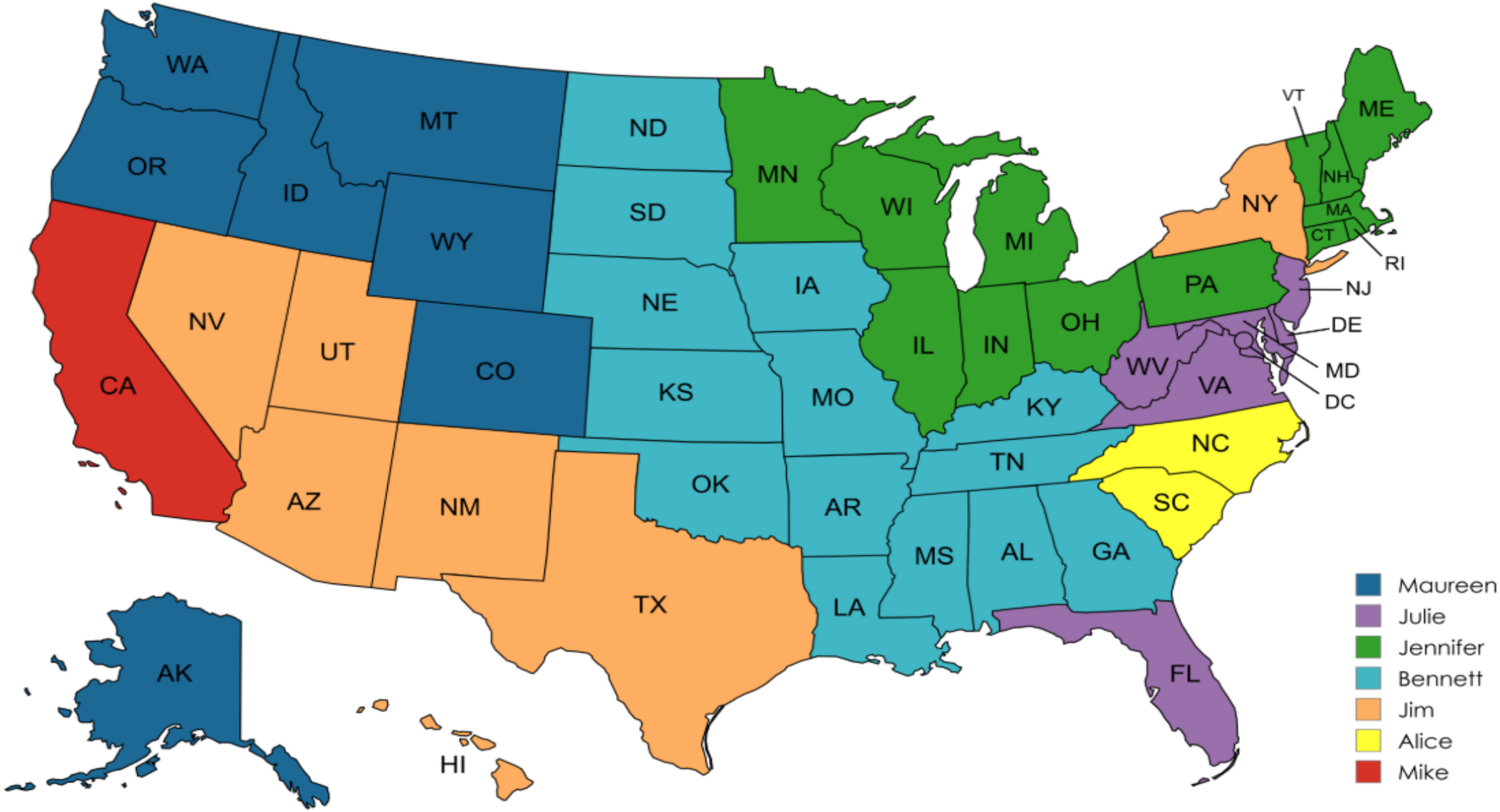
Hawai‘i Current and Past Utility Subscribers

Honolulu Board of Water Supply
City & County of Honolulu
Kaua‘i Board of Water Supply
Maui Department of Water Supply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HI
Maureen
Julie
Jennifer
Bennett
Jim
Alice
Mike

WATER RESEARCH FOUNDATION UPDATES

- Who We Are and What Do We Do?
- Some Recent Trends
  - One Water
  - Water Reuse
  - Artificial Intelligence
  - Microplastics
- What's Next

Do not edit
How to change the design

Important Dates in Water History

ⓘ The Slido app must be installed on every computer you're presenting from

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THE Water Research FOUNDATION®

WHO WE ARE

The WRF is the leading research organization advancing the science of water to meet the evolving needs of our subscribers and the water sector. WRF is a 501(c)(3) nonprofit, educational organization that funds, manages, and publishes actionable research on drinking water, wastewater, water reuse, and stormwater topics—all in pursuit of improving water services and protecting and restoring the environment.

THE Water Research FOUNDATION

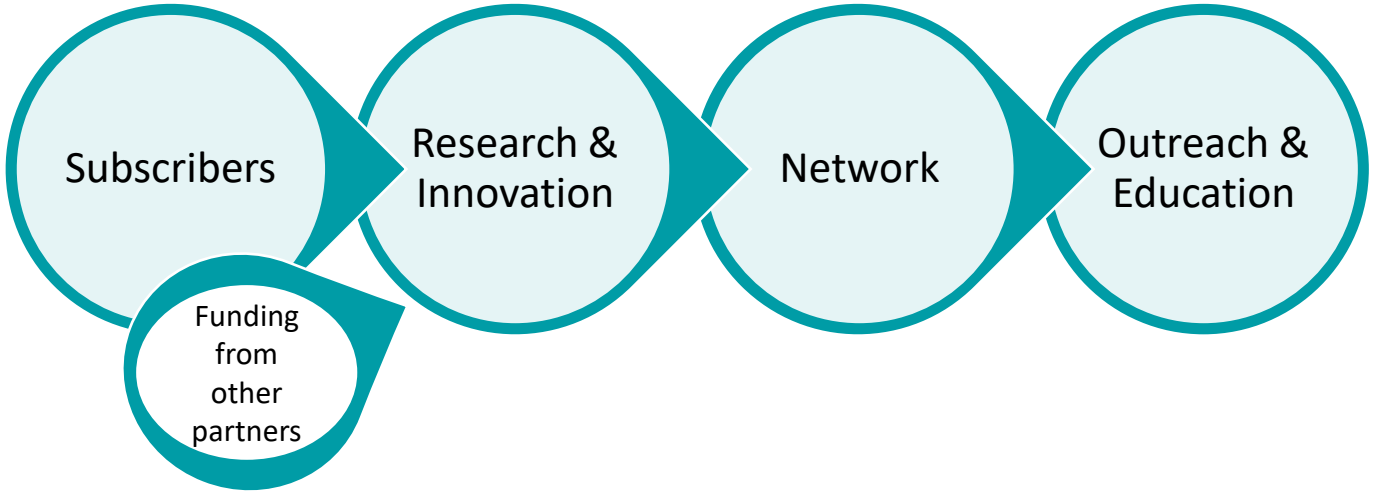
Merged - 2018

WATER ENVIRONMENT & REUSE FOUNDATION WE&RF + Water Research Foundation® advancing the science of water

Founded - 1966

Awwa Research Foundation
Advancing the Science of Water®

By the Numbers



904 UTILITIES
48 CONSULTANTS
30 MANUFACTURERS

$79M
FUNDED RESEARCH

222
ACTIVE PROJECTS

9
FEDERAL/ STATE GRANTS

~60
2024 PROJECTS FUNDED

~1,350
PROJECT ADVISORY COMMITTEE MEMBERS

~2,000
UTILITY PARTICIPANTS

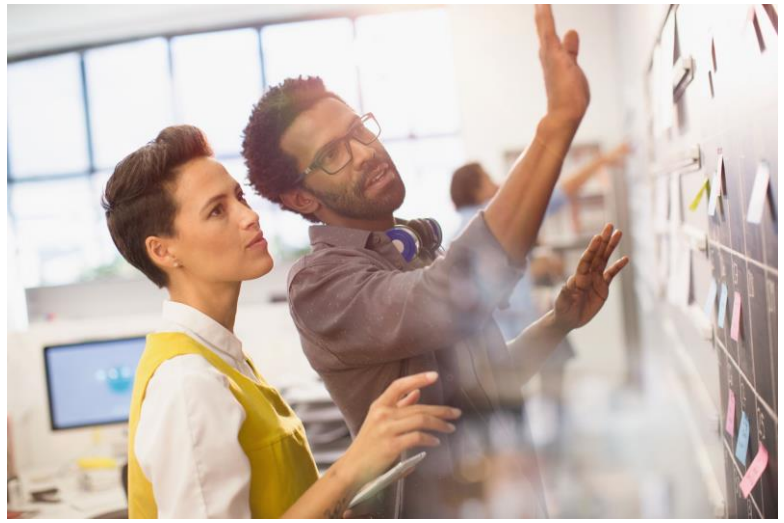
~275
RESEARCH PLANNING COMMITTEE MEMBERS 2024

32
PROJECTS PUBLISHED 2024

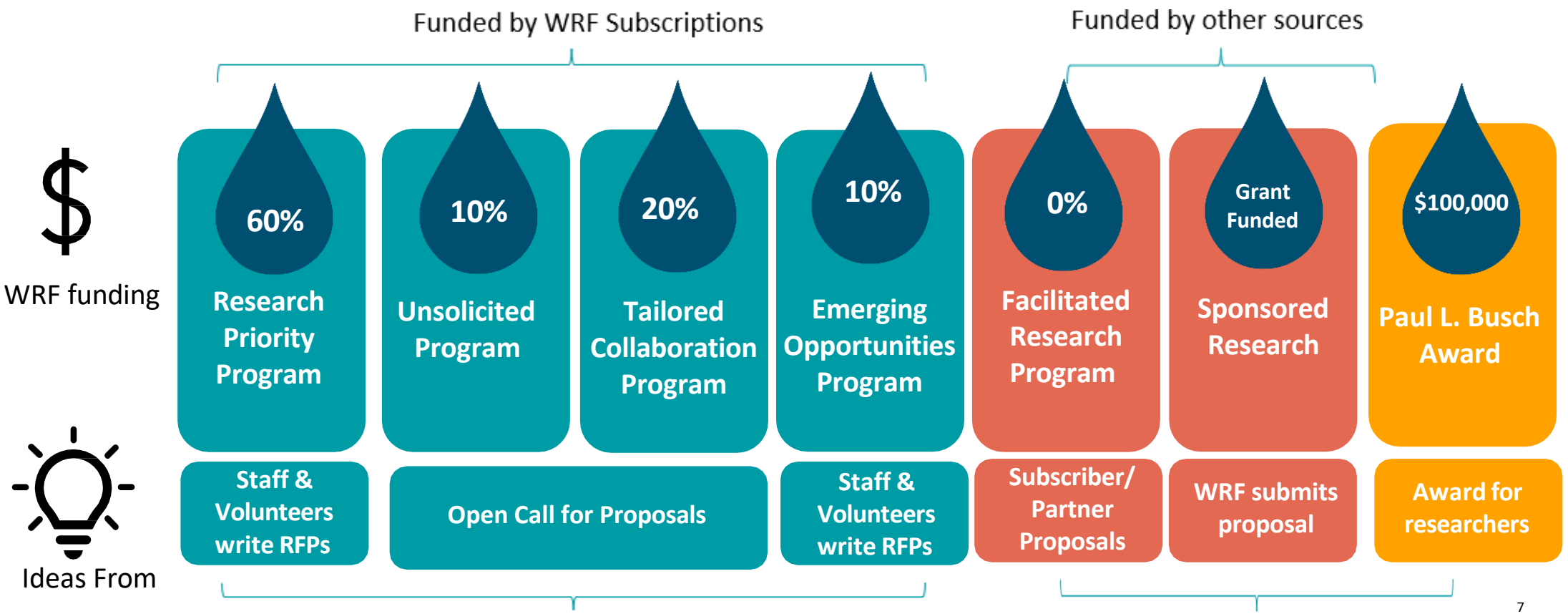
23
WEBCASTS 2024

8,882
WEBCAST VIEWS 2024

83,600
SOCIAL MEDIA FOLLOWERS



Research Programs



7

More than $8 Million in 2025

15 awards (current)
$19 M (award & cost share)

PROJECT NO.
4637

Impacts of Climate Change on Honolulu Water Supplies and Planning Strategies for Mitigation

Board of Water Supply

Tailored Collaboration Project – Completed 2019

Project Sponsor - Barry Usagawa, PE. Honolulu BWS

Technical Advisory Committee included members from University of Hawaii, Pacific Regional Integrated Sciences and Assessments, USGS, Commission on Water Resource Management, and Hawaii DOH

Principal Investigators:
Dean Nakano; Lynn Williams Stephens, PE; and Jonathan Turk, PG (Brown and Caldwell)

Project Advisory Committee included members from Denver Water, National Center for Atmospheric Research, AWWA, and Honolulu BWS

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2025 Engagement Dashboard – Q2

WEBSITE PAGEVIEWS	FILE DOWNLOADS	WEBCASTS	EMAILS	SOCIAL MEDIA FOLLOWERS	MEDIA REACH
198,617	12,938	AVG Registrations: 547 AVG Live Viewers: 279	AVG Open Rate: 34% AVG CTR: 9%	83,600	405M

Most Viewed Research Project Pages

1. Residential End Uses of Water, Version 3: A Single-Family and Multi-Family Study (5242)
2. Understanding Gasification for PFAS Removal (5107)
3. The Role of Generative AI (GenAI) for the Global Water Sector (5321)
4. Data-Driven Process Control for Maximizing Resource Efficiency (5141)
5. Mainstream Deammonification with Biological Phosphorus Removal (5095)

Most Viewed Resources

1. Concept of Operations (CONOPS) Plan for Water Distribution System Testing and Recovery *Project Paper*
2. The Role of Generative AI (GenAI) for the Global Water Sector *Webcast*
3. Utility Field Guide for Developing a Cyanobacteria and Cyanotoxin Monitoring Program *Project Paper*
4. Autonomous in situ Monitoring of Harmful Algal Blooms *Webcast*
5. Diversifying Water Portfolios through Stormwater Capture and Use: Contributing to a Water Resilient Future *Webcast*

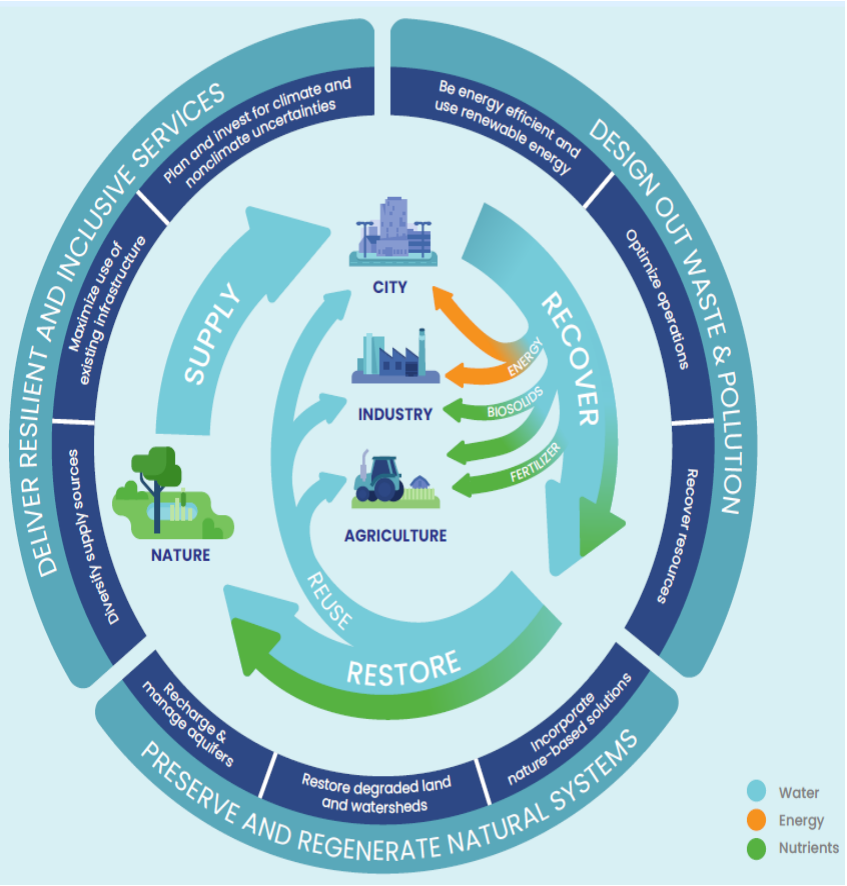
Most Popular Topics

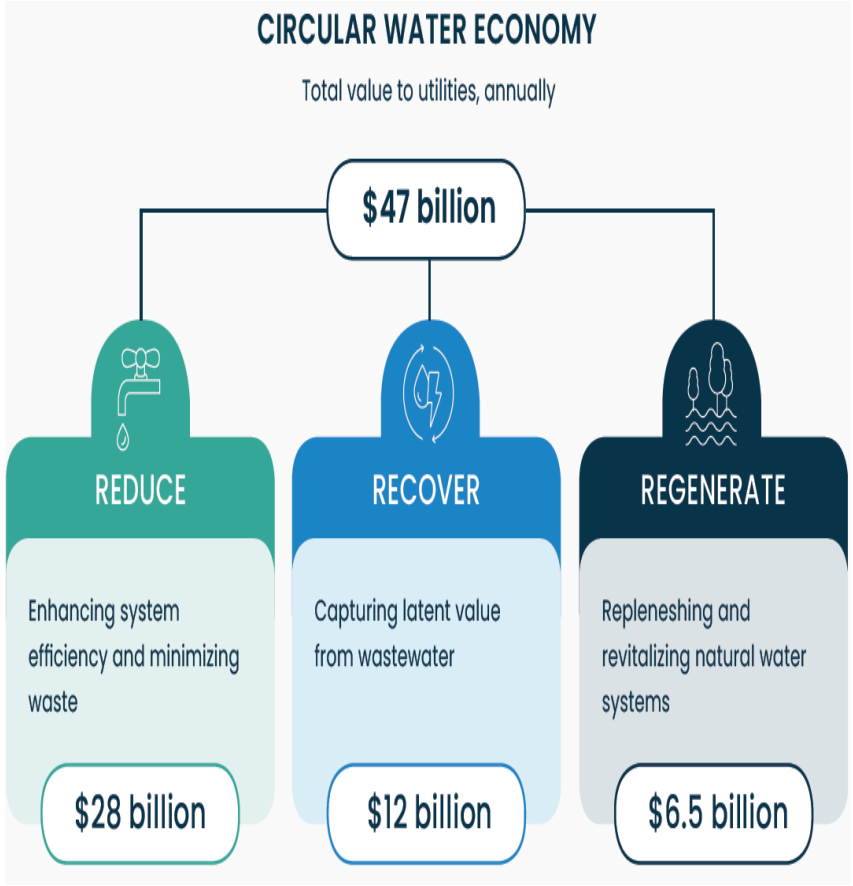
1. Climate Change
2. Advanced Treatment
3. Per- and Polyfluoroalkyl Substances (PFAS)
4. Water Use & Efficiency
5. Cyanobacteria & Cyanotoxins
6. Intelligent Water Systems
7. Asset Management
8. Biosolids
9. Integrated Planning & Water Management
10. Microplastics

GWSP
GLOBAL WATER SECURITY & SANITATION PARTNERSHIP

Water Environment Federation

Water2050™
American Water Works Association

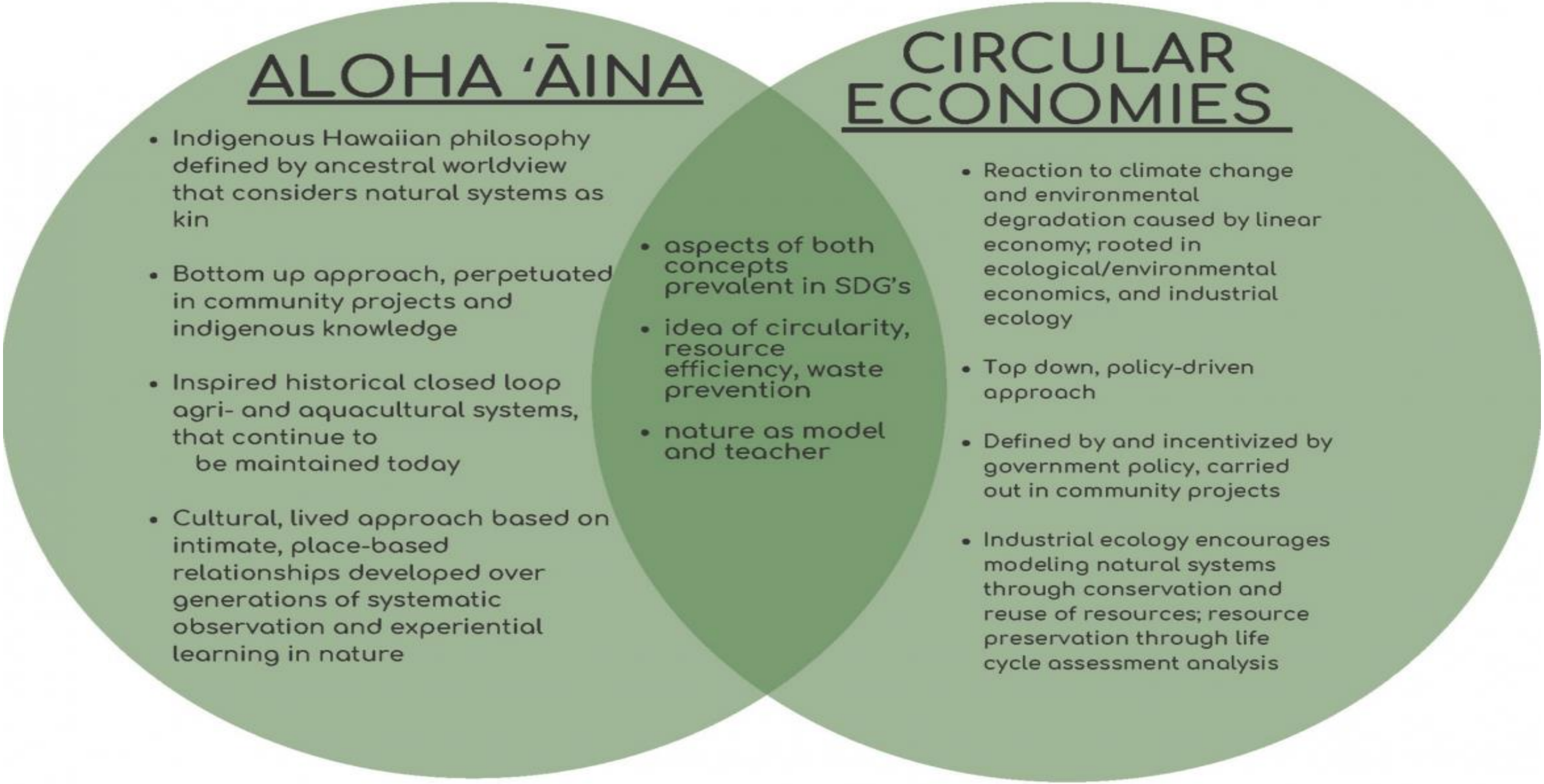




Delgado et. al., (2021) *Water in Circular Economy and Resilience Framework*

Valuing the Circular Water Economy. Water Environment Federation (2025).

AWWA Water 2050 -*Securing Our Future in a Circular Water Economy - webinar*



Give, Take, Regenerate: A Circular Economy is Vital to Hawaii's Future. Honolulu Civil Beat (2021)

Improving Sustainability and Resilience
Moving from Straight Lines to Circles

Image: Polynesian Star Compass, MauiMagazine.net

Moving to a One Water Approach

New Concept, Vision Setting

- Institutional Issues for One Water Management (4487), 2015
- Blueprint for One Water (4660), 2017

Communications

- Technical Brief: Constituents of Emerging Concern Using a One Water Approach (5036) , 2021
- PFAS One Water Risk Communication Messaging for Water Sector Professionals (5124), 2022

Water Quality

- Leveraging Pretreatment for One Water (4971), 2023
- Navigating One Water Planning through Municipal Water Programs: Meeting Multiple Objectives and Regulatory Challenges (5175), ongoing 2026
- A One Water Approach to Managing PFAS Pollution (5345), ongoing 2027

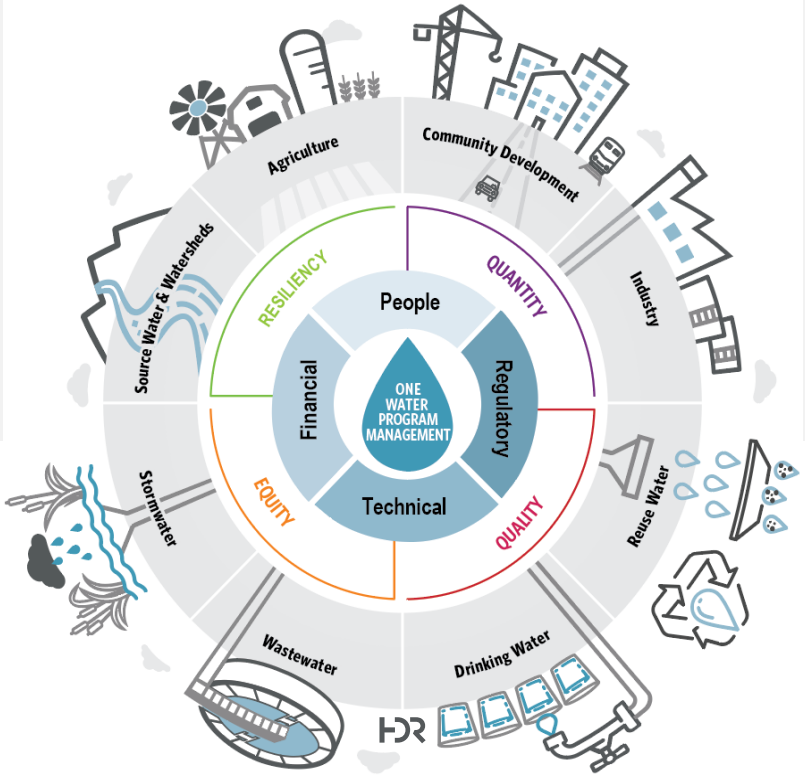
Program Management

- One Water Program Management – A Knowledge Base and Guidance Manual (5196), ongoing 2026

Cities

- ***One Water Cities: Development of Guidance Documents and Assessment Metrics (4969), 2024***

One Water Program Management: A Knowledge Base and Guidance Manual (5196)



Julie L. Labonte, PE
HDR, Principal Investigator
Julie.Labonte@hdrinc.com

Research Value $1.6M (almost all cash)
Schedule 2022-2026

Co PIs: Jacquelin Mutter, Karen Pappas, Scott Aurit, Alice Wang, HDR

Key Partners: Johan Torroledo, Ruwanka Purasinghe, Erin Maciel, LADWP & Christina Becerra Jones, LA Sanitation and Environment

RESEARCH PRIMARY COLLABORATORS

City of Los Angeles Department of Water & Power

City of Los Angeles Sanitation & Environment

Aguas de Portugal Internacional/AdP Valor Grupo Aguas de Portugal

City of San Diego Public Utilities Department

City of San Francisco Public Utilities Commission

Hampton Roads Sanitation District

High Speed 2

Indian River County

Johnson County Wastewater

Los Angeles World Airports

Metropolitan Water District of Southern CA

Miami-Dade Water & Sewer Department

Passaic Valley Sewerage Commission

Philadelphia Water Department

Region of Peel Water & Wastewater

WRF 5196 – One Water Program Management: A Knowledge Base and Guidance Manual

Research Value $1.6M
Schedule 2022-2026

First-of-its-Kind Research

Study Objectives

- Increase the water industry's program management state of knowledge
- Expand the adoption of a program approach in the water industry
- Improve the coordination and collaboration across multiple program partners

2 Guidance Documents

4 Years of Work

15 Participating Agencies Globally

24 Guidance Manual Modules

120 Best Practices Documented

700+ Pages of Guidance

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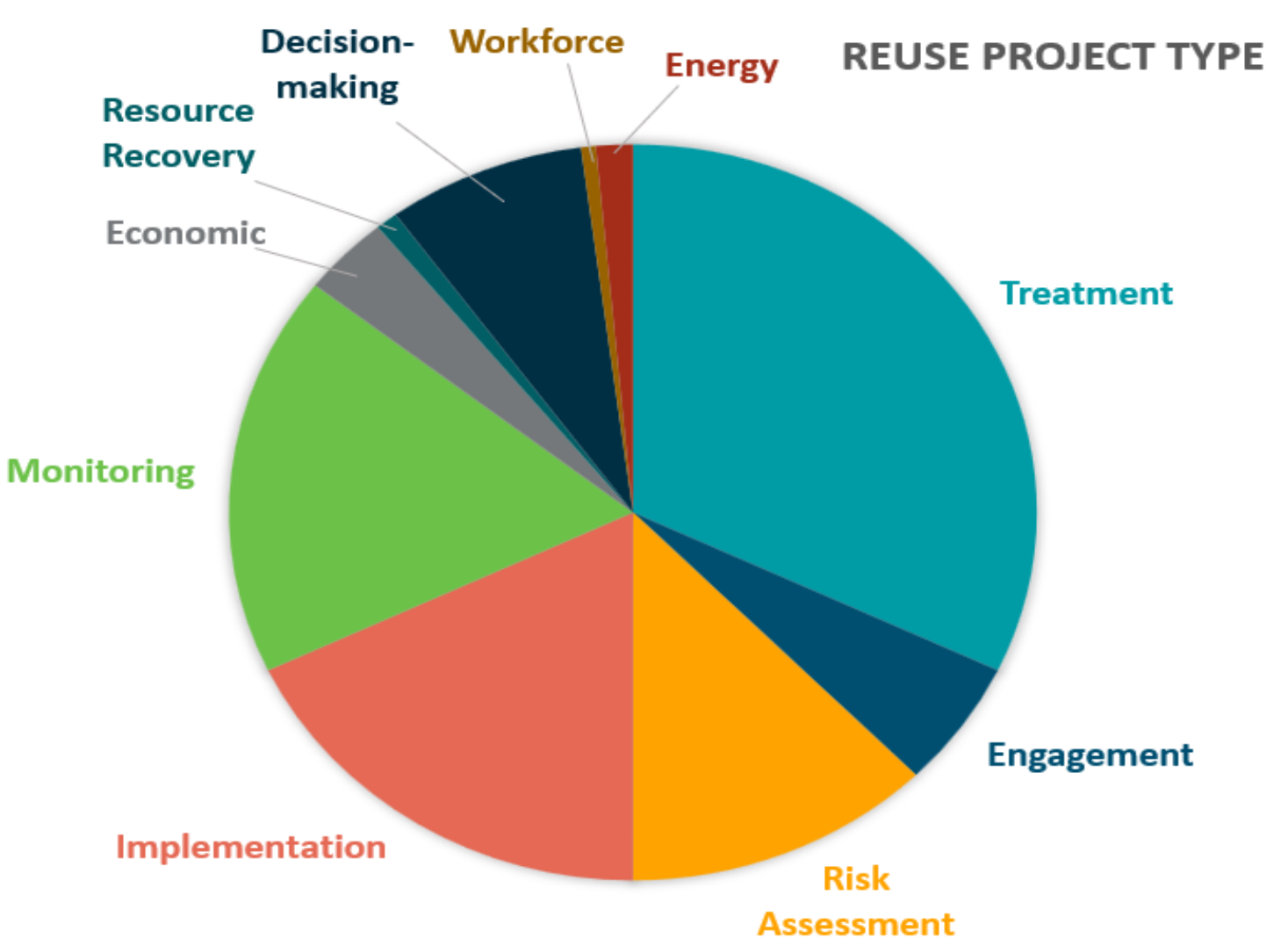
A Comprehensive Water Reuse Research Portfolio

286 Projects

30 years of Research



Water Reuse

Reuse: Potable

Reuse: Nonpotable

Reuse: Direct Potable

Reuse: Indirect Potable

Reuse: Membrane Technology

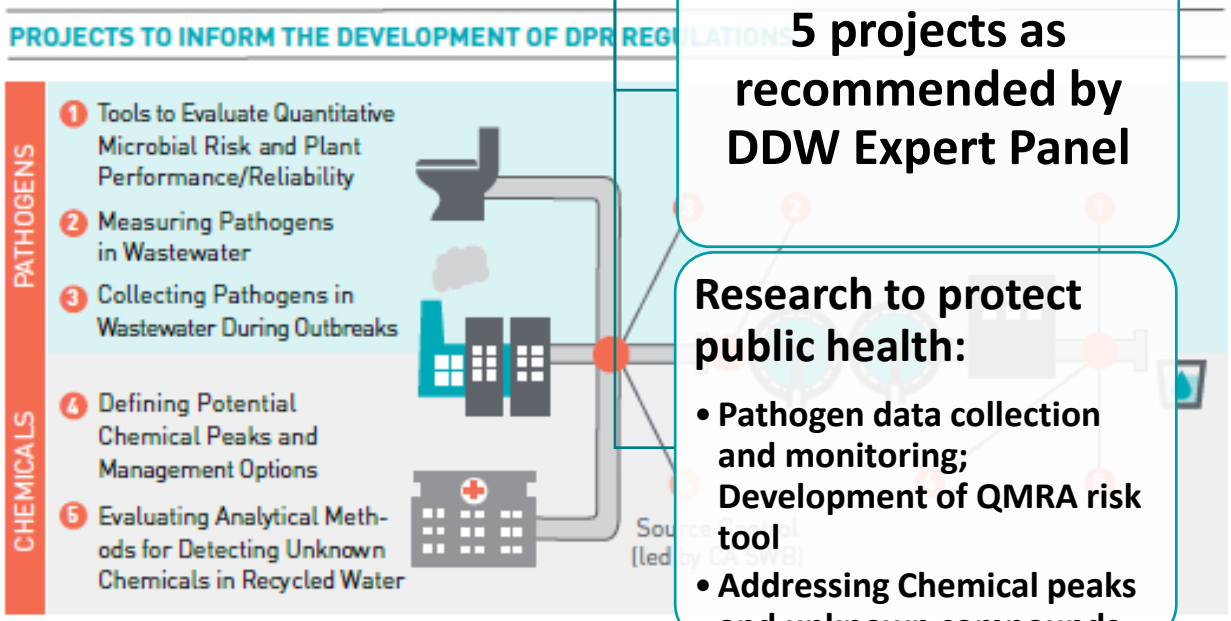
Reuse: Agricultural

Water Supply Planning

WRF|SWB Grants - Research to Advance Reuse in California

SWB Grant 1:

Direct Potable Reuse|2017 - 2023



5 projects as recommended by DDW Expert Panel

Research to protect public health:

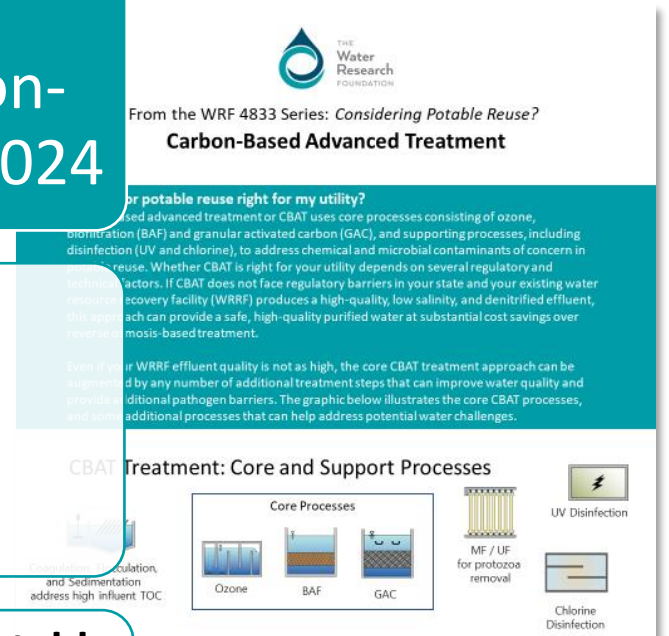
- Pathogen data collection and monitoring; Development of QMRA risk tool
- Addressing Chemical peaks and unknown compounds

SWB Grant 2:

Potable and Non-potable|2018 - 2024

Potable Reuse

- Source control
- Treatment
- Monitoring
- Implementation



General & Non-potable Reuse (Grant 2)

- Quantity to recycle in CA
- Agricultural reuse
- Addressing barriers

Pending Partnership with CA State Water Board

Grant 3 - $1.5M 2025 - 2030

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CALIFORNIA Water Boards

Purpose: fund research to accelerate potable and non-potable reuse in CA

THEME 1

Treatment Technologies & Optimization

THEME 2

Monitoring & Compliance

THEME 3

Environmental Benefit

THEME 4

Workforce, Public & Political Engagement

THEME 5

Planning, Implementation, & System Integration

Help Shape the Future of Water Reuse!

Take the survey to help set priorities!

Select Projects - Artificial Intelligence and Digital Water System

- The Role of Generative AI (GenAI) for the Global Water Sector (5321)
- Data-Driven Process Control for Maximizing Resource Efficiency (5141)
- Data Centers: Understanding Economic Considerations and Opportunities for Water and Wastewater Utilities (5367)
- Artificial Intelligence Adoption Framework for Water and Wastewater Utilities (5189)
- Preparing the Water Sector to Embrace Technology: Skillsets and Enterprise Management Approaches for the Digital Age (5178)
- Data Management Best Practices: Integrating Data Sources for Treatment Optimization and Efficiency (5294)
- The Emergence of AI in the Water Sector: Opportunities and Challenges for Water Resources Planning (5290)
- Development of Hybrid Digital Twins for Predictive Nutrient Control (5121)
- Designing Sensor Networks and Locations on an Urban Sewershed Scale with Big Data Management and Analytics (4797)

Do not edit
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AI Questions

ⓘ The Slido app must be installed on every computer you're presenting from

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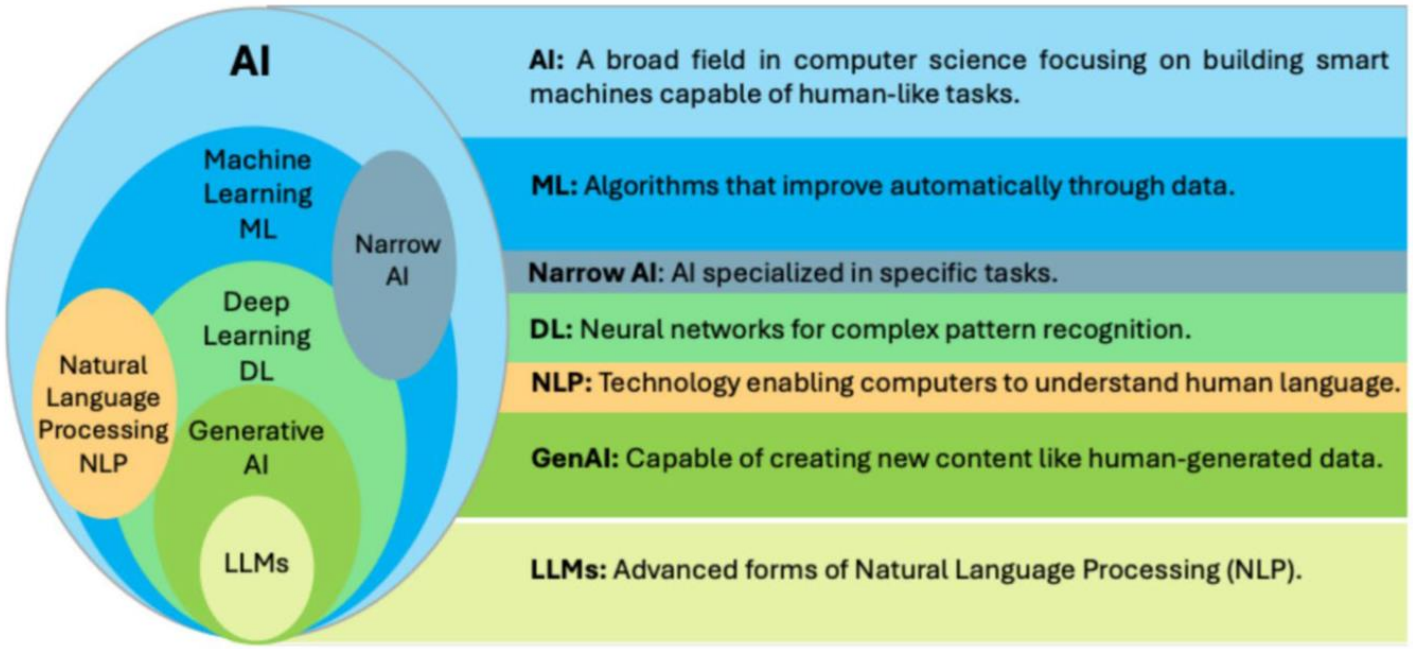
The Role of Gen AI in the Water and Wastewater Sector (WRF 5321)

- **Collaboration between AWWA, WEF, WRF**
- Research lead-Gigi Karmous-Edwards, Karmous-Edwards Consulting
- Schedule 2024-2025
- ***May 26, 2025, WRF Webcast**
- ***Sep 26, 2025, White Paper**
- **Upcoming Webcast**



GenAI/LLM, aka **Digital Assistants**

Practical, scalable, affordable tools to address our sectors most persistent challenges

Use unstructured data (handwritten notes, images, voice memos etc.) to **create new content**

Digital Assistant - Use Examples of Gen AI

What	Supplemental Monitoring of Wastewater Facilities	Access Standard Operating Procedures	Query on Chlorine Residuals in Well Water Systems
For Whom	Operators	Lab technicians	Small Water System Operators
How	Computer Vision continuous automated monitoring	Voice-activated AI assistant	Chat GPT called “What Would Jerry Do”
Details	Detect pipe leaks, corrosion, humans, & smoke/fire.	Access SOPs without removing lab gloves, hands free	Pulls from a 2-hour interview with Jerry and many other literature sources

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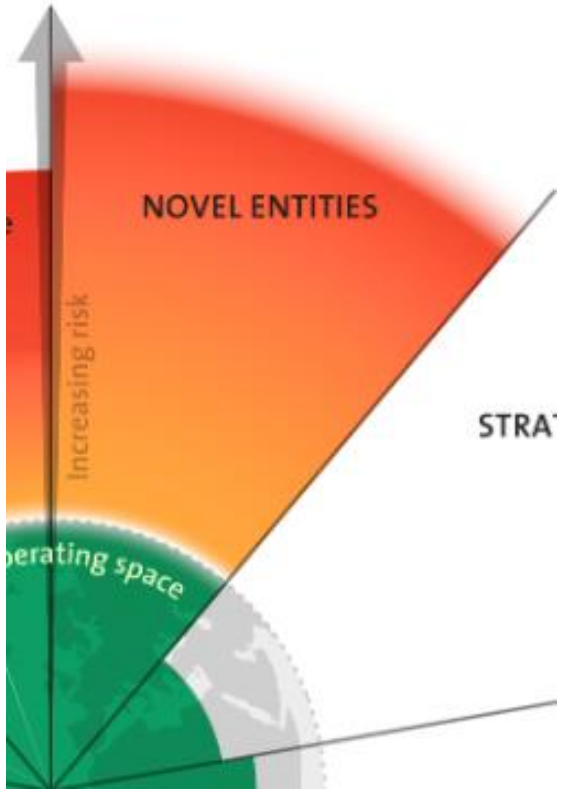
Microplastics

Microplastics in Water Fact Sheet

Microplastics



Stockholm Resilience Centre, 2025

Table 4. Ranked Water Quality Concerns (n = 3,307; All Respondents)

1	Per- and polyfluoroalkyl substances (PFAS)
2	Pathogens
3	Microplastics
4	Nonpoint source pollution
5	Lead and copper
6	Disinfection byproducts (DBPs)
7	Nutrient removal
8	Cyanotoxins

AWWA State of the Water Industry Report, 2025

PROJECT NO.
5318

Collaborative Forum on
Microplastics Summary Report

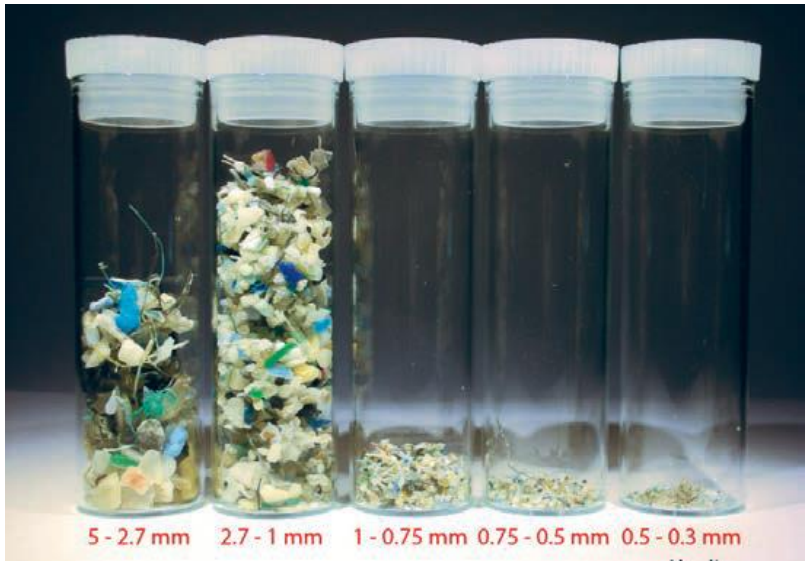
Forum Objectives:

- Build institutional knowledge of microplastics in the water community.
- Capture the state-of-the-science for microplastics in water
- Foster increased collaboration and coordination among microplastics researchers and the water sector
- Identify microplastics research needs

Forum was held March 2025, at American Water in Camden, New Jersey

Microplastics Forum Topics

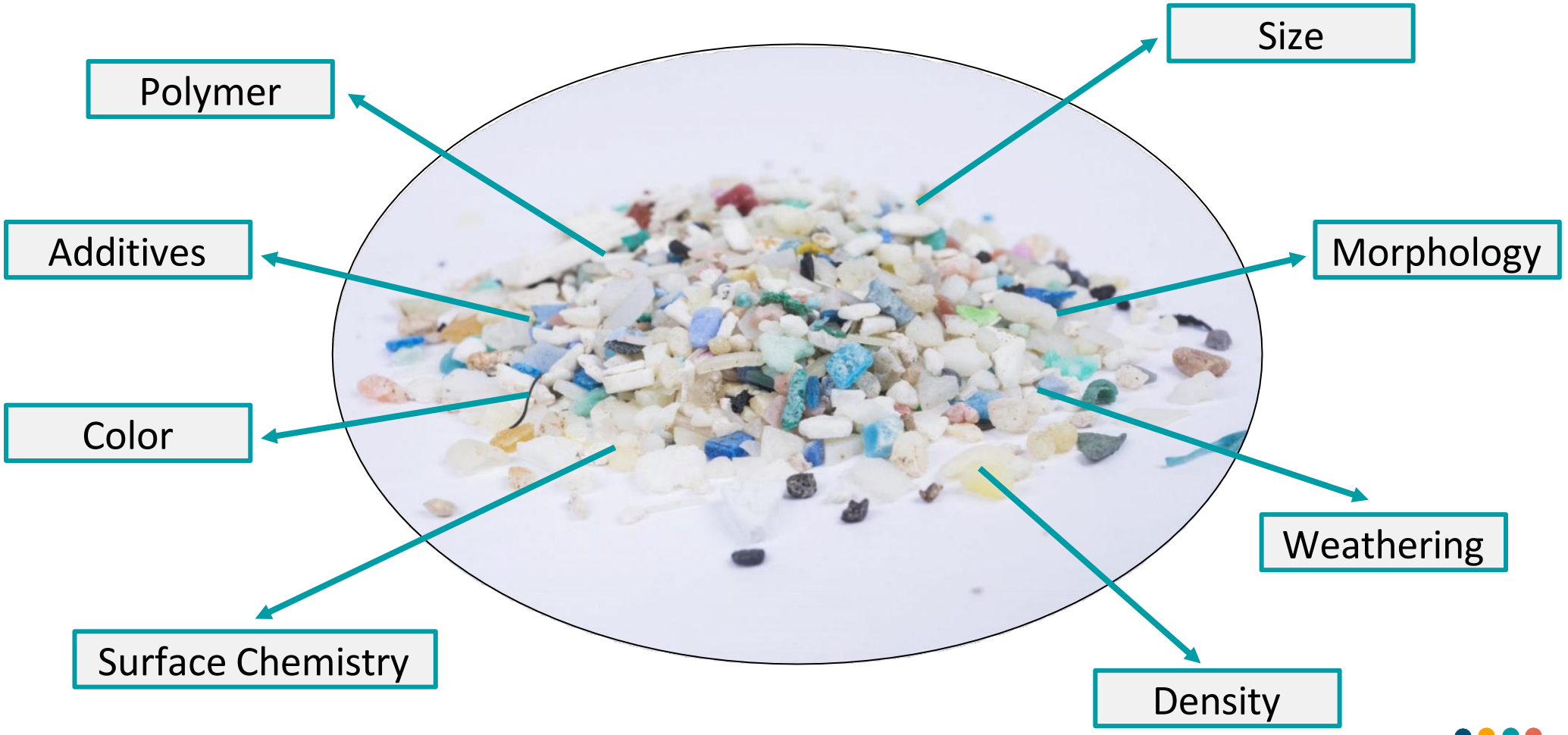
- Occurrence of microplastics in water
- Sampling and analyzing microplastics in water
- Impacts on human and ecological health
- Public communication
- Treatment for microplastics
- Regulatory environment



Source: Algalita
Size distribution of plastics from a typical Manta trawl

Graphic by C. Palm and P. Villarrubia-Gómez

Microplastics Are Diverse



Key Takeaways

- Microplastics are negatively impacting human health and the environment and are a concern for many water utility customers.
- More research is needed to advance scientific knowledge to develop comprehensive solutions.
- Some solutions to minimize impacts are already available.

Image credit: P. Villarrubia-Gómez and E. Wikander/Azote.

“Microplastics Make PFAS Look Easy!”

- Utilities should:
  - Stay current on the latest information
  - Develop messaging to appropriately communicate with their customers
- Opportunities for continued water sector collaboration

Select Microplastics Research Projects

Project #	Project Name	Project Status	Completion Year
5287	Method Refinement and Standardization for Microplastics Sample Collection and Analysis	Late 2025 start	TBD
5364	Prioritization and Validation Methods for Microplastic Analysis in Drinking Water	RFP closed	TBD
5088	Defining Exposures of Microplastics/Fibers in Treated Waters and Wastewaters: Occurrence, Monitoring, and Management Strategies	Ongoing	2025
5185	Fate of Microplastics in Drinking Water Treatment Plants	Ongoing	2026
5221	Impact of Solid Stream Treatment on Microplastics in Biosolids	Ongoing	2025/2026
5338	Microplastics in Drinking Water Distribution Systems	Ongoing	2028
5318	Collaborative Forum on Microplastics Research	Completed	2025
5155	Developing Strategic Consumer Messaging for Microplastics in Drinking Water Supplies	Completed	2024
4936	Determining the Fate and Major Removal Mechanisms of Microplastics in Water and Resource Recovery Facilities	Completed	2022

What's Next?

Check out what the water sector's asks for research in 2025!

https://portal.waterrf.org/outbound-grants

WRF Seeks Proposals for 23 New Research Projects Totaling $5.2M

Research Priority Program – 2025 Approved Projects

TOPIC	SUB-TOPIC	PROJECT **RFPS POSTED ON OUR WEBSITE**
Efficient Resource Use & Recovery	Addressing Greenhouse Gases	Quantification of Mitigation-Ready Methane Emissions from Point Sources at Water Resource Recovery Facilities, 5362
	Solids Management	Comprehensive Evaluation of Biosolids Drying Technologies, 5370
		Optimizing Densified Systems for Nutrient Removal, Energy Savings, and Reliable Performance, 5371
Healthy Communities and Environment	Holistic Watershed Management & Integrated Planning	**Ensuring Resilient and Successful Source Water Protection Programs under Extreme Events and in a Changing Climate, 5356**
	Monitoring Tools at Watershed & Sewershed Scale	**Developing a Robust Framework for PFAS Source Identification and Characterization, 5355**
		Prioritization and Validation Methods for Microplastic Analysis in Drinking Water, 5364
	Receiving Water Quality Management	**Evaluating and Linking Treatment Process Strategies with Irregular Water Quality Events in Source Waters, 5357**
Treatment: Innovation and Optimization	Diversifying Water Systems	A Framework for Evaluating the Economic, Environmental, and Social Costs and Benefits of **Alternative Water Systems**, 5368
	Nature-based solutions	Nature-Based Approaches for Concentrate and Salinity Management, 5366
	Treatment & Process Optimization	**Simultaneous Control of Regulated and Emerging DBPs of Health Concern, 5361**

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Research Priority Program – 2025 Approved Projects

RFPS POSTED ON OUR WEBSITE

Resilient Infrastructure	Asset Management	**Condition Assessment Technology and Analysis Methodology to Evaluate Risk of Failure of Corroded Ferrous Pipes, 5353**
		Application of Asset Health Monitoring to Buried Asset Management and Operations, 5354
	Collection Systems Integrity & Water Quality Impacts	State-of-Practice Manual for Inflow and Infiltration Detection and Mitigation at Street and Private Lateral Levels, 5365
	Distribution System Integrity & Water Quality	**Balancing Water Distribution System Flow Capacity and Water Quality for Fire and Natural Disasters, 5358**
		Maintaining a Minimum Disinfectant Residual in Distribution Systems: Technical Review and Practical Guidance, 5363
Utility Operations & Management	Financial Management	**Alternative Approaches to Water Shutoffs for Nonpayment of Bills, 5360**
		Data Centers: Understanding Economic Considerations and Opportunities for Utilities, 5367
	Water Resource Planning	**Building Better Forecasts: Improving Utility Demand Models with Climate, Development, and Socioeconomic Insights, 5359**
	Workforce	**Eliminating Barriers to Entry: Water Utilities as Community Partners for Career Pipelines, 5369**

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Mahalo!

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