



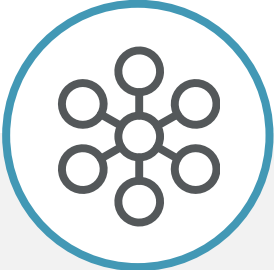
Sustainable Solutions

Navigating Regulatory Pressures While Driving Community Well-Being and Economic Prosperity

Rodney Cook Sr Park, Atlanta, GA



Drivers for One Water Planning



**Integrated
Regional Solutions**



**Utility Collaboration
& Partnerships**



**Balance Interconnected
Regulatory Requirements**



**Budget Constraints
& Affordability**



**Prioritize & Schedule
Investments**



**Plan Higher Value,
Multi-Benefit Investments**

963 UTILITIES
67 MANUFACTURERS
62 CONSULTANTS

\$81M
RESEARCH CONTRACTED
IN CASH & COST-SHARE

264
ACTIVE PROJECTS

\$.78
OF EVERY DOLLAR
SUPPORTS PROGRAM SERVICES

1.4B
MEDIA REACH

69,926
SOCIAL MEDIA
FOLLOWERS

Most Viewed Research Project Pages

1. [PFAS One Water Risk Communication Messaging for Water Sector Professionals: One Water Toolkit \(5124\)](#)
2. [Residential End Uses of Water, Version 2 \(4309\)](#)
3. [Guidelines for Optimizing Nutrient Removal Plant Performance \(4973\)](#)
4. [Standardizing Methods with QA/QC Standards for Investigating the Occurrence and Removal of Antibiotic Resistant Bacterial/Antibiotic Resistance Genes \(5052\)](#)
5. [An Enhanced Source Control Framework for Industrial Contaminants in Potable Reuse \(4960\)](#)

Most Viewed Website Resources

1. [Greenhouse Gas Emissions in the Water Sector: Let's Uncover the Basics! *Webcast*](#)
2. [PFAS One Water Risk Communication Messaging for Water Sector Professionals: One Water Toolkit \(5124\)](#)
3. [PFAS One Water Risk Communication Messaging for Water Sector Professionals: UCMR5 Toolkit \(5124\)](#)
4. [Residential End Uses of Water, Version \(4309\) Report](#)
5. [Standardizing Methods with QA/QC Standards for Investigating the Occurrence and Removal of Antibiotic Resistant Bacterial/Antibiotic Resistance Genes \(5052\) Report](#)

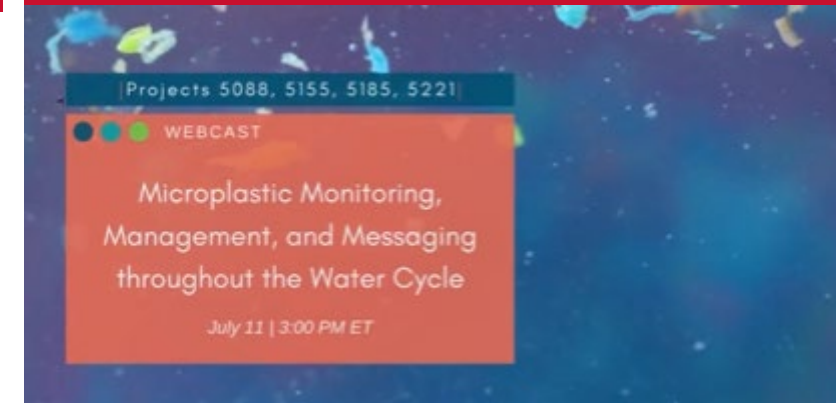
Top Visitor Countries

1. United States
2. Canada
3. China
4. India
5. United Kingdom
6. Australia
7. Germany
8. Philippines
9. Netherlands
10. Mexico

Most Popular Topics

1. PFAS
2. Advanced Treatment
3. Climate Change
4. Lead & Copper
5. Integrated Planning & Water Management
6. Biosolids
7. Energy Optimization
8. Resource Recovery
9. Utility Management
10. Water Use & Efficiency

Most Popular Webcast



Highest Reach Article Mention

[How dangerous was the Ohio chemical train derailment? An environmental engineer assesses the long-term risks](#)

64M Reach



Top Social Media Post

[Dr. William Tarpeh Receives 2023 Paul L. Busch Award](#)



21K Impressions



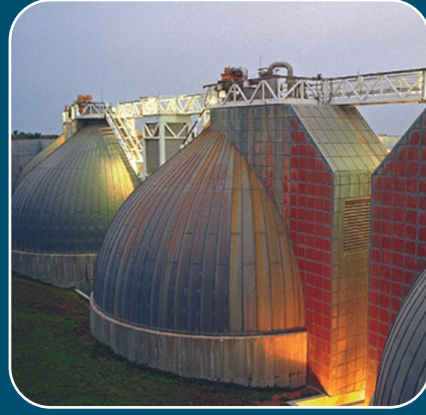
Healthy Communities & Environment

- Holistic Watershed Management & Integrated Planning
- Monitoring Tools at Watershed & Sewershed Scale
- Receiving Water Quality Management



Treatment: Innovation and Optimization

- Treatment & Process Optimization
- Nature-based Solutions
- Diversifying Water Systems



Efficient Resource Use & Recovery

- Energy Efficiency, Intensification & Resource Recovery
- Climate Change Mitigation: Addressing Greenhouse Gases
- Nutrient Removal & Recovery
- Solids Management



Resilient Infrastructure

- Asset Management
- Distribution System Integrity & Water Quality
- Collection Systems Integrity & Water Quality Impacts



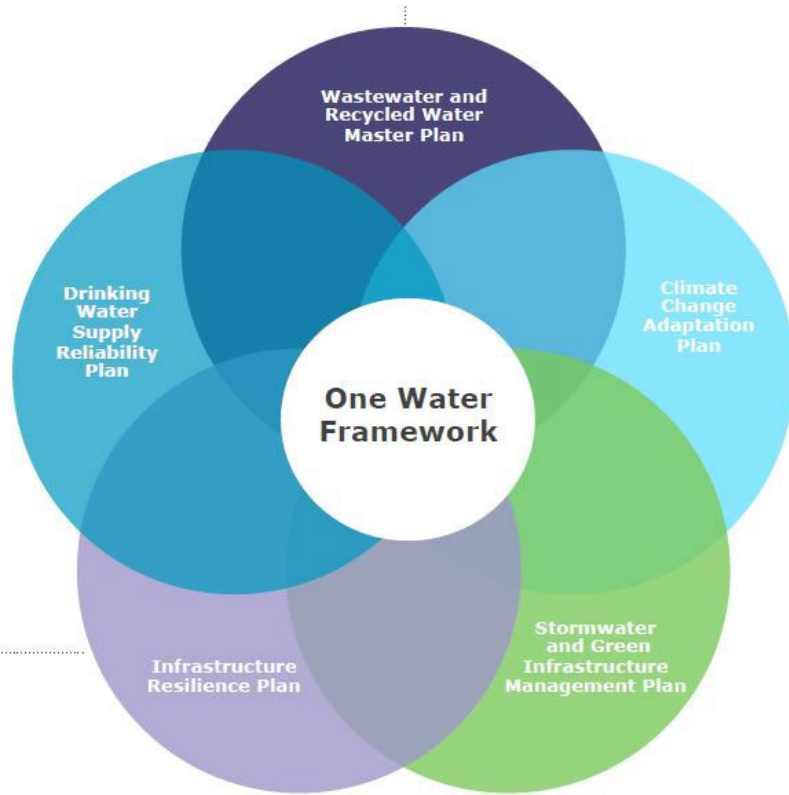
Utility Operations & Management

- Water Resource Planning
- Workforce Management
- Financial Management

Climate Risk Assessment & Adaptation, Communication, Environmental Justice, Digital Transformation



“Blueprint for One Water” and “One Water Cities”



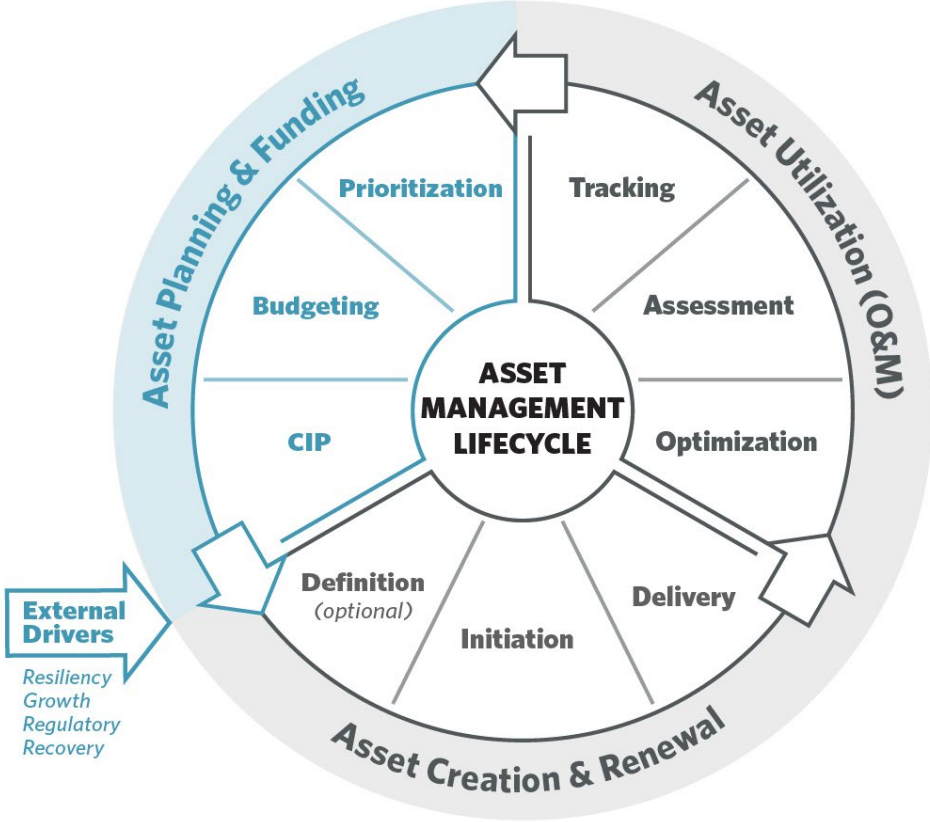
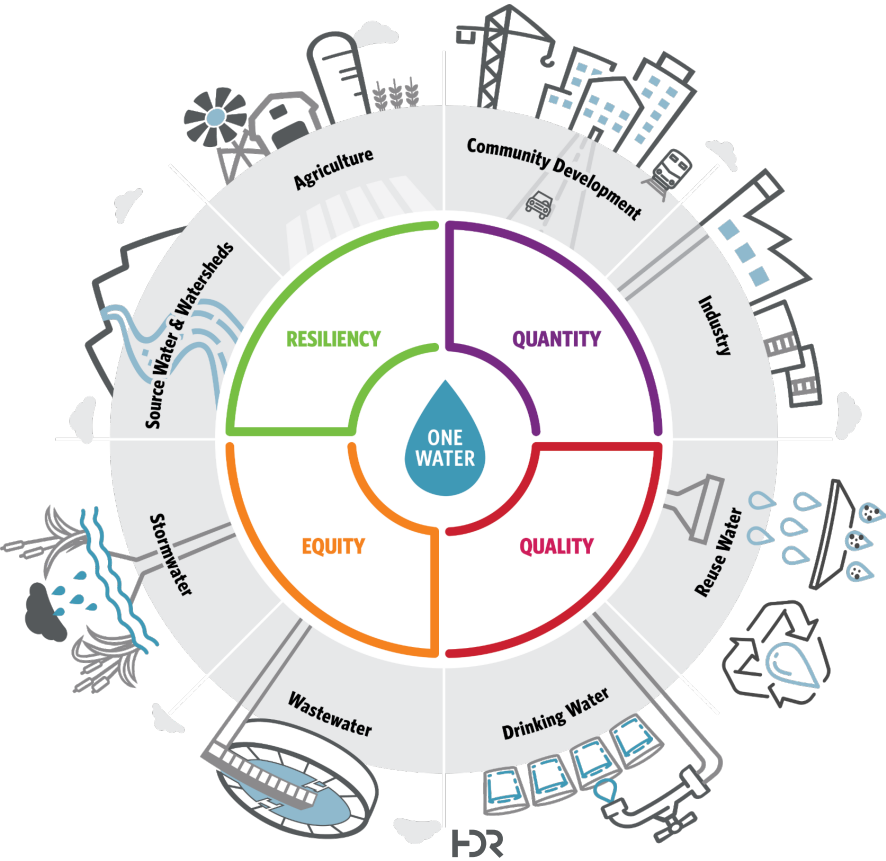
WRF Project [4660](#)



■ “One Water” concept recognizes that water from *all sources* must be *managed holistically and cooperatively* to meet social, economic, and environmental needs.

WRF Project [4969](#)

One Water Planning & Program Management



Applying a One Water Planning Lens

WRF 5175 - Navigating One Water Planning through Municipal Water Programs

Taking a One Water Program Delivery Approach

WRF 5196 – One Water Program Management



WRF 5175 - Navigating One Water Planning through Municipal Water Programs

Goal: Utility-facing One Water decision support framework and planning methodology to address multiple regulatory obligations, utility-specific drivers, regional challenges, and institutional structures.

Specific objectives include:



Achieve multiple **social and environmental** benefits



Deploy **decision support to address regulatory policies and processes** using One Water planning.



Address interconnected **CWA and SDWA regulatory** obligations.

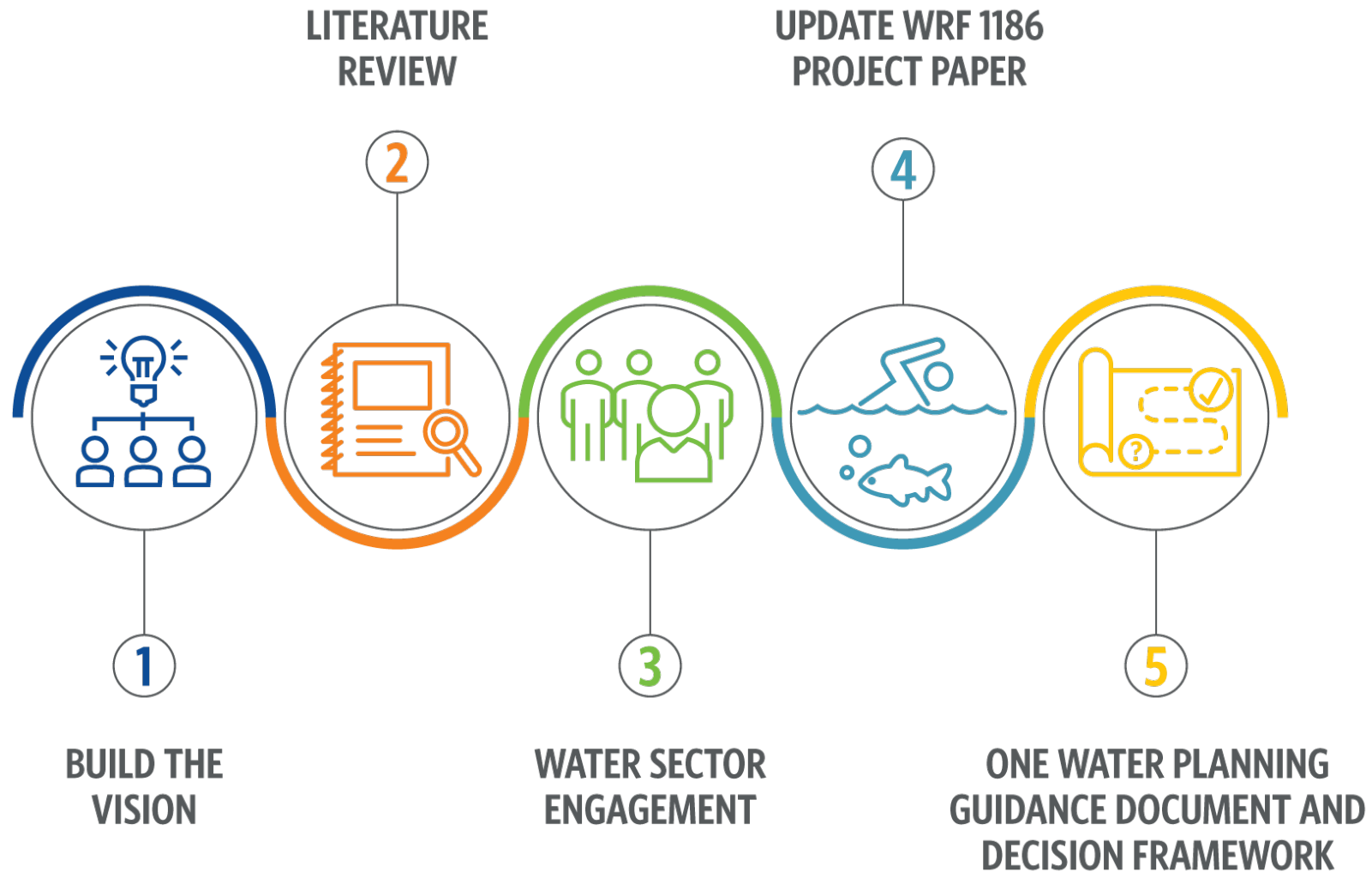


Leverage **broad and diverse Water Sector engagement** to advance One Water concepts.



Create One Water decision framework to **prioritize projects and initiatives.**

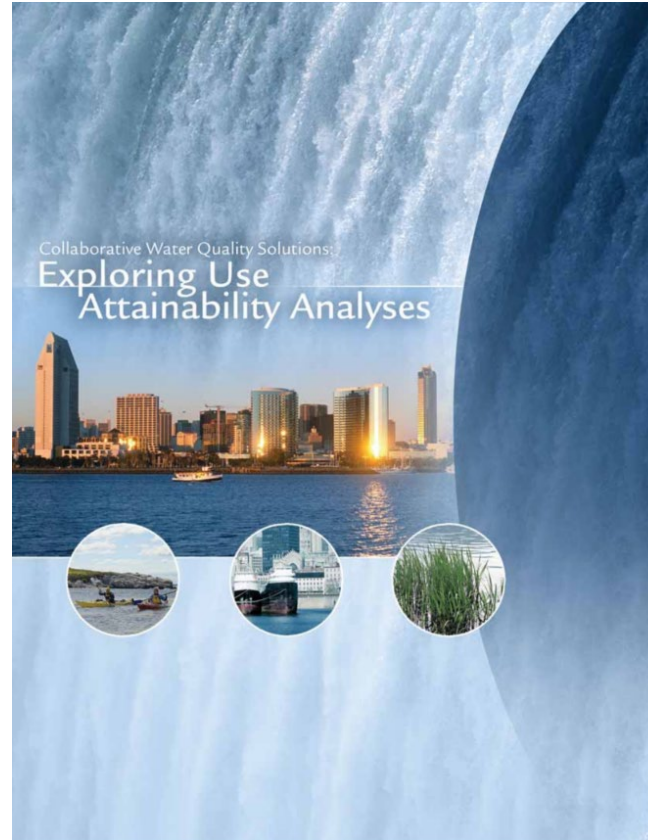
Research Approach



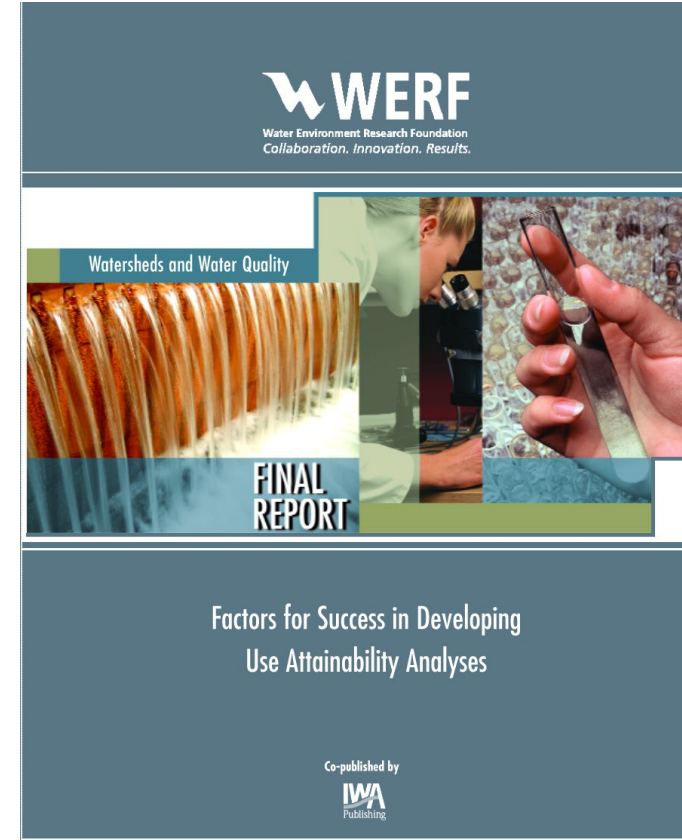
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WRF 1186 Project Paper Update

- Develop Scope of Update
- Research Successful Use Attainability Analyses (UAAs) and UAA Alternatives
- Engage Regulatory Agencies to Assess Key Success Factors
- Update WRF 1186 with WRF Project Paper



WRF 1186 - Collaborative Water Quality Solutions: Exploring Use Attainability Analyses



WRF 1183 – Factors for Success in Developing Use Attainability Analyses

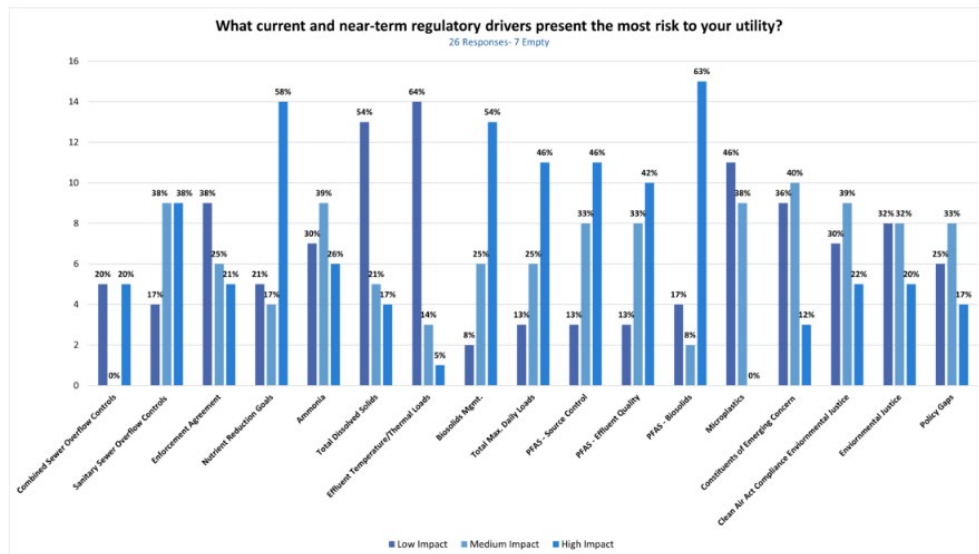
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Water Sector Engagement

- Inform One Water Planning Guidance and Decision-Making Framework
- Oct 2023 to Sep 2024 Timeframe

Survey

Wastewater Regulatory



Virtual Workshops

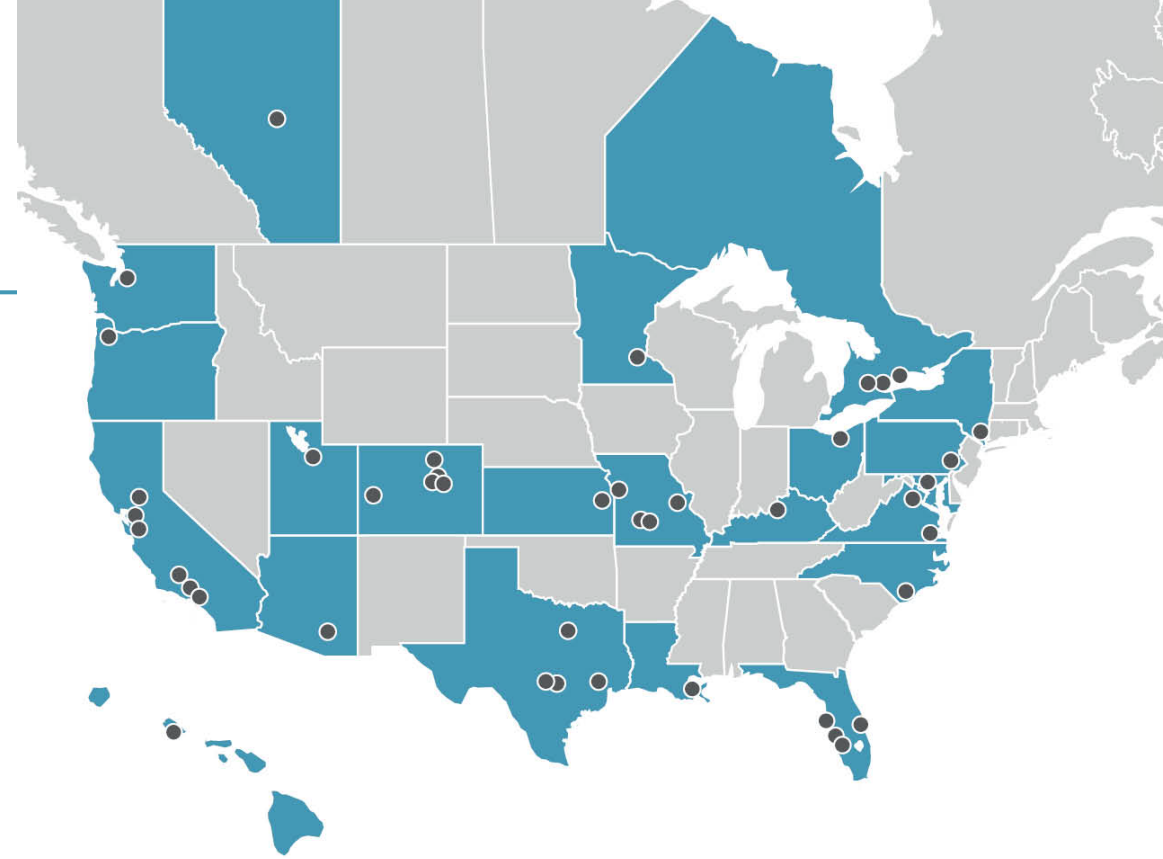
- Water Utilities – 2 Workshops
 - Participating Utilities
- Water Sector Associations – 2 Workshops
 - NACWA, AMWA, WEF, AWWA, WaterReuse, US Water Alliance, Alliance for Water Efficiency
- Federal and State Regulatory Agencies – 2 Workshops
 - EPA, States, Provinces, ECOS, ACWA, ASDWA
- One Water Stakeholders – 1 Workshop
 - Academia, Agriculture, Industry, Watershed Organizations, Environmental Advocacy Groups
- One Water Framework Focus Group – 1 Workshop
 - Select Utilities, Sector Associations, Regulatory Agencies, One Water Stakeholders

Participating Utilities

46 Participating Utilities

Diverse Utility Engagement

- Geography
- Utility Types
- Size
- Customer Demographics
- Institutional Structure

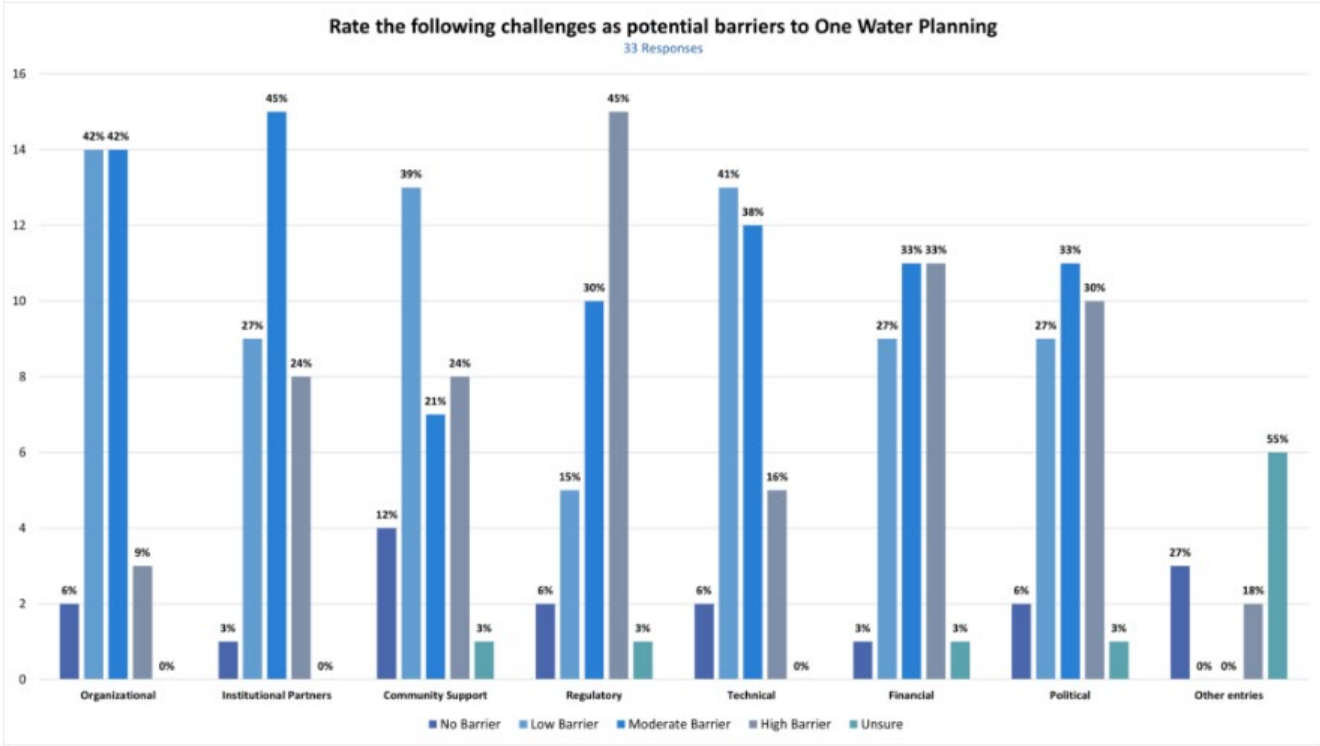


- Anne Arundel County
- City of Aurora
- City of Boerne
- California Association of Sanitation Agencies
- Cape Fear Public Utility Authority
- Central Contra Costa Sanitary District
- Clean Water Services
- Dallas Water Utilities
- Denver Water
- EPCOR
- City of Fort Collins
- City of Grand Junction
- Hampton Roads Sanitation District
- City and County of Honolulu
- City of Houston
- Indian River County Utilities
- Johnson County Wastewater
- City of Kansas City
- Loudoun Water
- Louisville/Jefferson County Metropolitan Sewer District
- Metropolitan Council Environmental Services
- Metro Water Recovery
- Moulton Niguel Water District
- New Braunfels Utilities, City and GBRA
- Sewerage & Water Board of New Orleans
- New York City DEP
- Northeast Ohio Regional Sewer District
- Ontario Clean Water Agencies
- Orange County Water District
- Peace River Manasota Regional Water Supply Authority
- Philadelphia Water Department
- Pinellas County Utilities
- Regional Municipality of Durham
- Region of Peel
- Salt Lake City Corp.
- Santa Ana Watershed Project Authority
- Seattle Public Utilities
- City of Springfield
- City Utilities of Springfield
- St Louis MSD
- City of St Petersburg
- Toronto Water
- Tucson Water
- Valley Water
- City of Westminster
- York Region

One Water Challenges and Barriers

- Regulatory Inflexibility
- Institutional Partnerships
- Community Support
- Political Will
- Financial Constraints

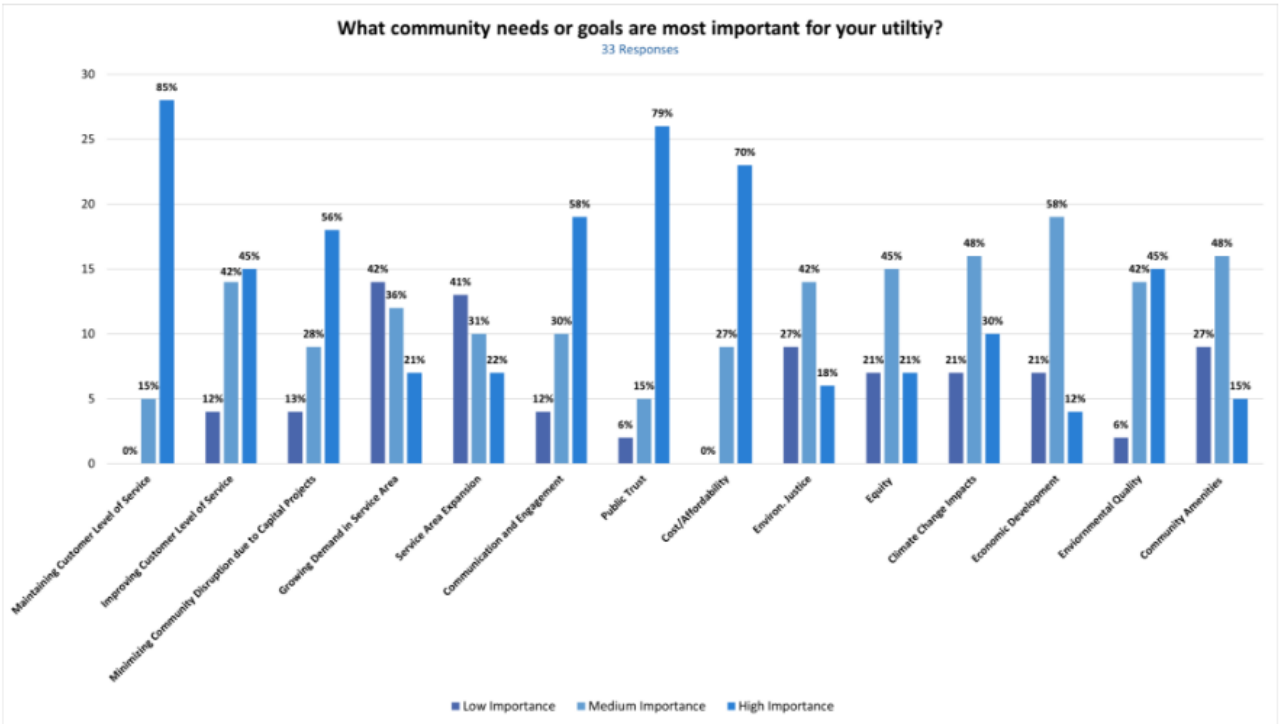
Navigating One Water Planning through Municipal Water Programs



Community Needs and Goals

- Level of Service
- Limiting Public Disruption
- Communications
- Public Trust
- Affordability
- Environmental Improvement & Climate Impacts
- Equity & Environmental Justice

Navigating One Water Planning through Municipal Water Programs



MSD Supports the Local Economy

\$144M

Of daily business output (GDP) occurs with MSD's service boundaries.



**Over
19,000**

Business establishments are supported by MSD's wastewater, stormwater drainage, and flood protection services

Within MSD's Service Area

550K

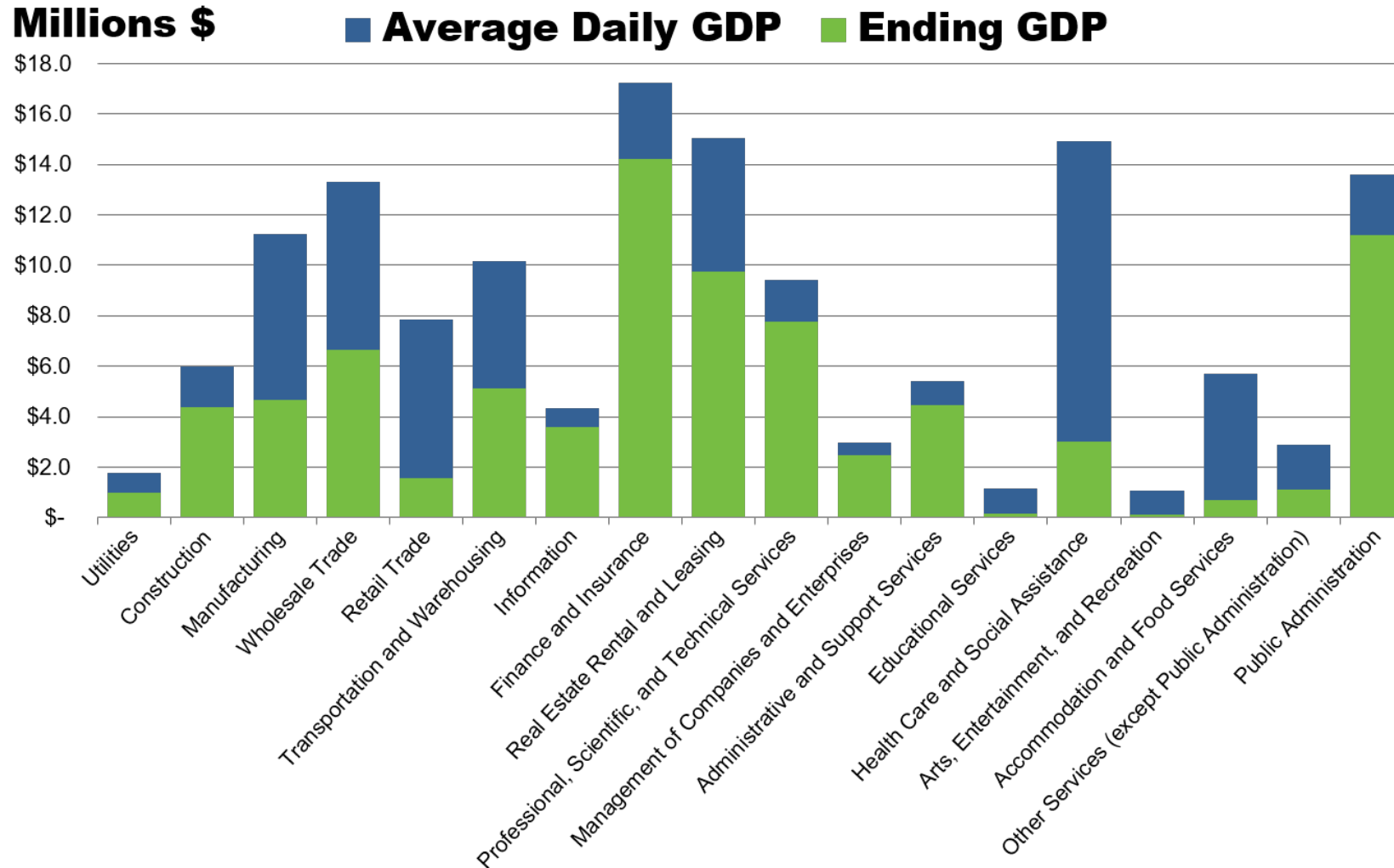
Employees work, earning

\$95M

Of compensation each day

MSD serves **800,000** people and protects **\$24B** of property value with its flood protection services

Industry GDP Before and After Two-Week Interruption



Economic Value of Wastewater Services

After 2 weeks of critical infrastructure failure

- Loss of \$700 million of GDP
- Loss of \$310 million of total compensation
- 200 thousand jobs lost



Faces Major Financial Decisions in Long-Range Planning Horizon



We Need to Look Deeper than Least-Cost Approach to Capital Investments

Alternatives	Capital Cost (\$M)	Expansion Costs (\$M)	Annual O&M (\$M)	Present Value Cost (\$M)
Current Service Area WWTP/Pump Station	\$276	\$92	-\$0.70	\$417
Regional Solution	\$414	\$75	-\$0.90	\$561

Benefit-Cost Analysis Supports Higher Value Investment

Alternatives	Facility Present Value	Air Emission Reductions	Septic Tank Owner Savings	Water Quality	Land Value	Total Net Present Value	Benefit Cost Ratio
Current Service Area WWTP/Pump Station	- \$371	\$9.0	\$25	\$12	\$954	\$629	2.69
Regional Solution	- \$502	\$13.0	\$67	\$25	\$1,499	\$1,102	3.20

Utility Serves as Key Partner in Regional Economic Growth

Impact of new food manufacturing facility with 500 employees served by additional wastewater capacity

~1,300
total jobs

\$90M+
in labor income

~\$370M
in production/output

Impacts	Employment	Labor Income	Output
Direct	500	\$49,900,000	\$233,700,000
Indirect	441	\$25,900,000	\$80,300,000
Induced	339	\$17,000,000	\$54,700,000
Total	1,280	\$92,800,000	\$368,700,000



Formed under Colorado law in 1961, Metro treats about 135 MGD at two wastewater treatment facilities

400+ employees

40 board members

2.2+ million people served throughout Denver and parts of Adams, Arapahoe, Jefferson, Douglas, and Weld counties

62 local governments, including cities and sanitation districts

85% of river flow in the South Platte is treated water from Metro's facilities for at least half of the year



Metro's Service Area

UPPER TRINITY REGIONAL WATER DISTRICT



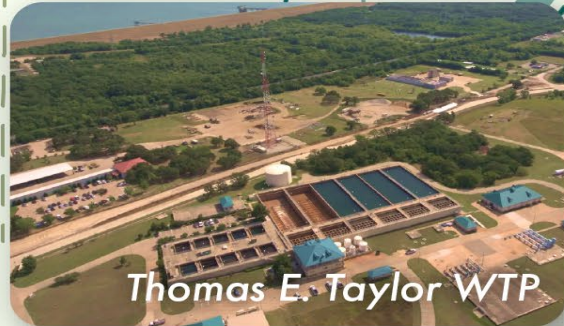
- ▲ Water Treatment Plant
- ★ Water Reclamation Plant

WHOLESALE SERVICES

- Treated Water
- Wastewater Treatment
- HHW Collection
- Water Conservation
- Watershed Protection
- Non-Potable Water

LAKE WATER SOURCES

- Lake Ray Roberts
- Lewisville Lake
- Jim Chapman (Cooper) Lake
- Lake Ralph Hall



MEMBERS

- Town of Argyle
- City of Aubrey
- Town of Bartonville
- City of Celina
- Town of Copper Canyon
- City of Corinth
- City of Denton
- Denton County
- DCFWSD #7 (Lantana)
- Town of Double Oak
- Town of Flower Mound
- City of Highland Village
- City of Irving
- City of Justin
- City of Krum
- Lake Cities MUA
- City of Lewisville
- Mustang SUD
- Town of Northlake
- City of Pilot Point
- Town of Ponder
- Town of Prosper
- City of Sanger

CUSTOMERS

- Argyle WSC
- Cross Timbers WSC
- DCFWSD #8A & 11A (Paloma Creek)
- Elm Ridge WCID
- Town of Providence Village

Toho by the numbers



Independent Authority **4** member governments
~**160,000** Connections (~**450,000** people)



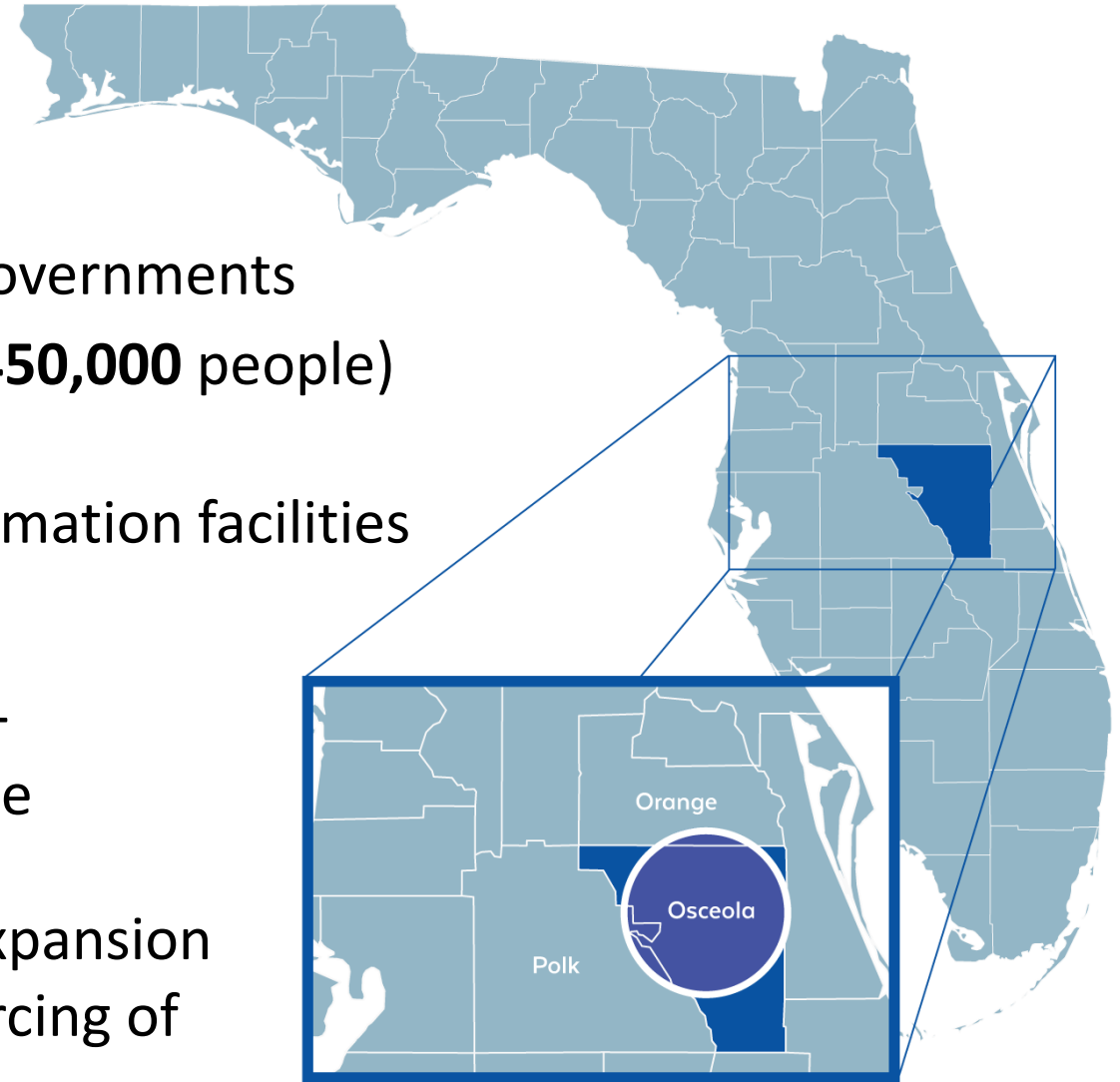
17 water and **9** water reclamation facilities



Over **4,400** miles of piping systems –
potable water, sewer, reuse



Growth through system expansion
and acquisition and insourcing of
some supporting functions



Challenges Ahead

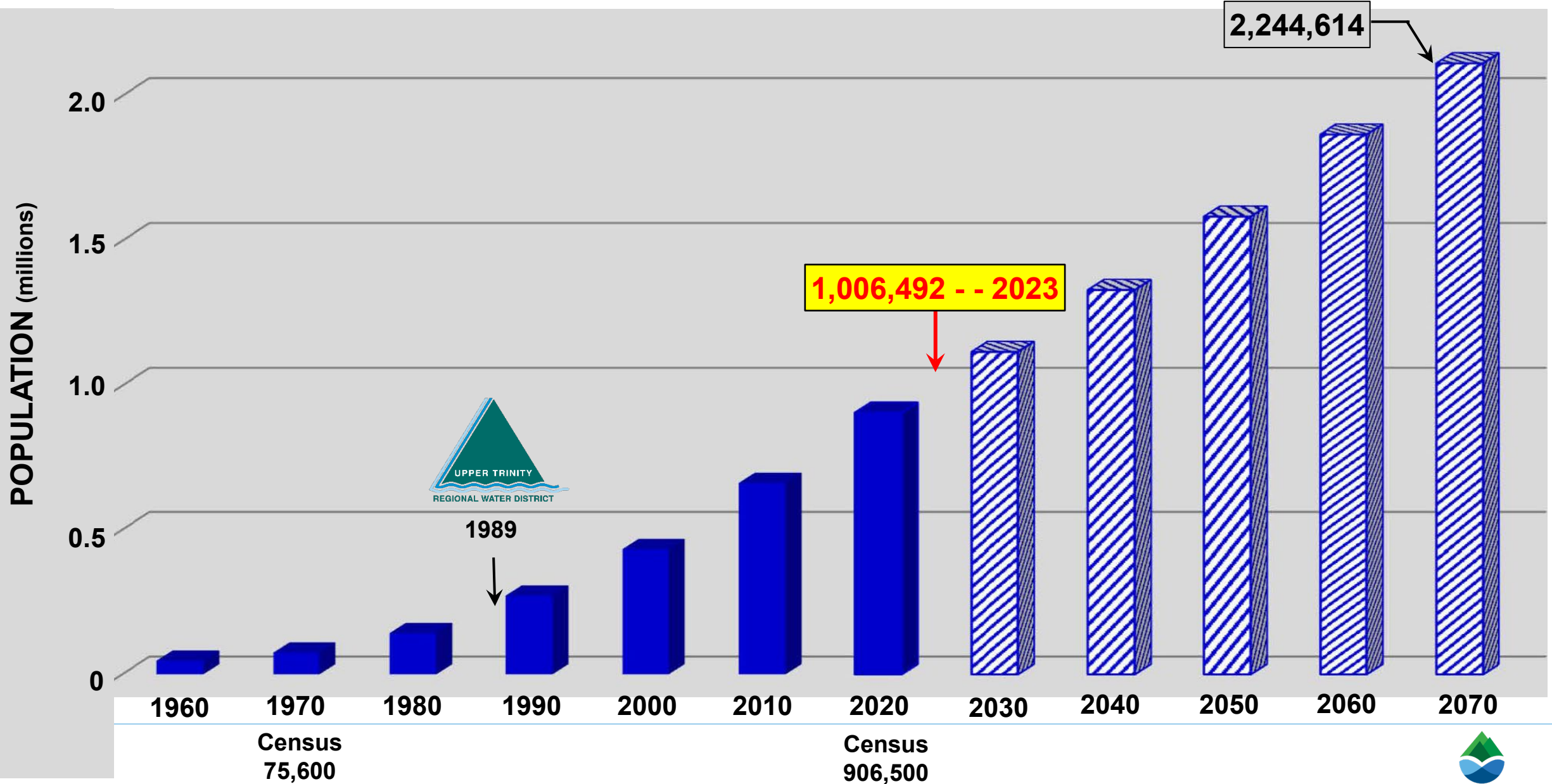
- Regulatory Unpredictability
- Emerging Containments (PFAS, temperature, nutrients)
- Aging Infrastructure
- Workforce
- Cost of Business
- One Water Commitment



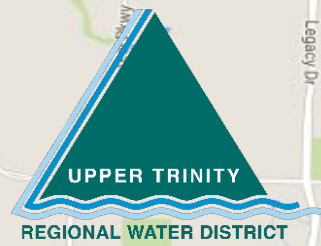
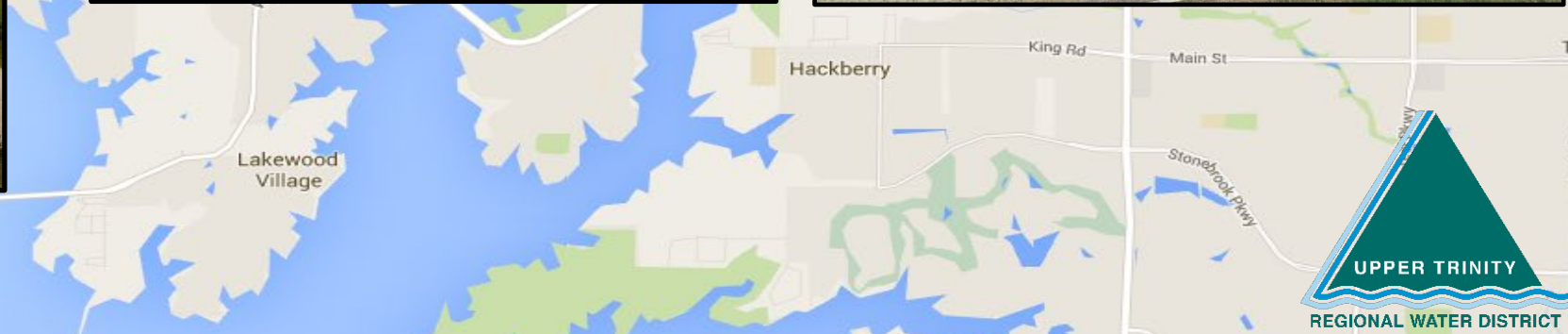
Source: World Bank Waste to Resource Initiative
#Waste2Resource



Denton County, Texas Population



Water Reclamation Plants



CHALLENGES



- Infrastructure to Meet Growing Service Area
- Funding for New Infrastructure
- Responding to Ever-Changing Regulatory Compliance
- New Generational Workforce / Attrition

HDR