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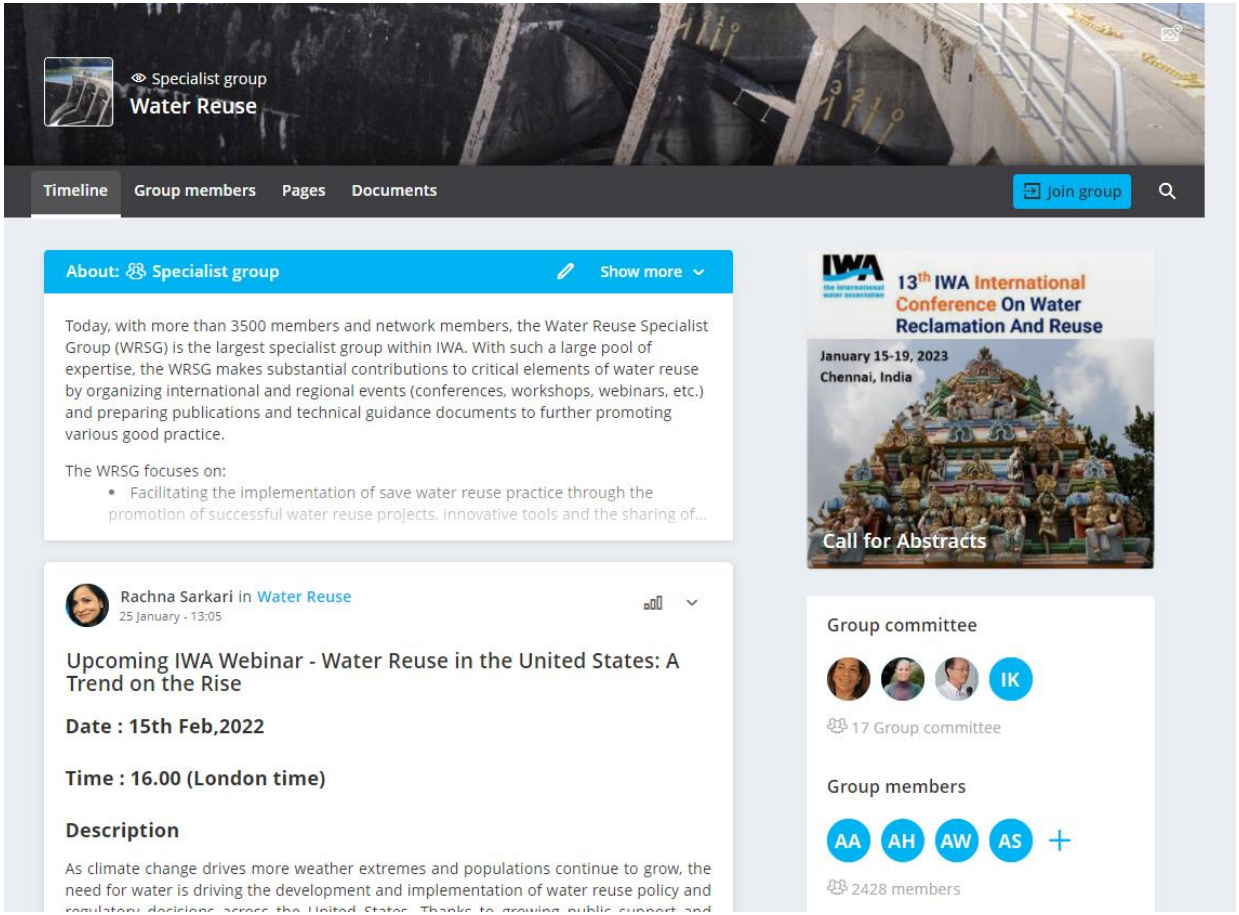
IWA WATER REUSE SG



The IWA WRSG makes substantial contributions to critical elements of water reuse by organizing international and regional events (conferences, workshops, webinars, etc.) and preparing publications and technical guidance documents to further promoting various good practice.

Join the IWA Water Reuse SG on IWA Connect!

https://iwa-connect.org/group/water-reuse/timeline

WEBINAR INFORMATION

- This webinar will be **recorded and made available "on-demand"** on the IWA website.
- Following the webinar, you will be sent a **post-webinar email** with the on-demand recording, presentation slides, and other information.

- **'Chat' box**: please use this for general requests and for interactive activities.
- **'Q&A' box**: please use this to send questions to the panelists.

  (We will answer these during the discussions)

Please Note: *Attendees' microphones are muted. We cannot respond to 'Raise Hand'.*

AGENDA

- Welcome, introduction, housekeeping rules & Poll
  Melissa Meeker
- Introductory remarks
  Jörg Drewes
- Water Reuse Research in the US
  Julie Milton
- Building 21st Century Water Infrastructure in California
  Jennifer West
- Water Reuse in Rest of US: Driving Change & Catching Up
  Eva Steinle-Darling
- Q&A Panel Discussion
- Final remarks and conclusion

MODERATOR & PANELISTS

Melissa Meeker
The Water Tower, USA

Jörg Drewes
Technical University of Munich, Germany

Julie Minton
Water Research Foundation, USA

Jennifer West
Water Reuse California, USA

Eva Steinle-Darling
Carollo Engineers, USA

LEARNING OBJECTIVES

1. Emerging practices around designing water reuse treatment schemes;
2. The latest developments in regulation of reuse schemes;
3. Ongoing research projects and focus areas;
4. Examples of different full-scale reuse projects.

POLL

1. Poll is composed by single-choice or multiple-choice questions;
2. Attendees must use the desktop application or the Zoom mobile app to participate in polls.

Technical University of Munich

IWA WATER REUSE
the international water association

Introductory remarks

JÖRG E. DREWES, TECHNICAL UNIVERSITY OF MUNICH

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WATER REUSE – FIT FOR PURPOSE

Non-potable reuse:

- Landscape irrigation
  - Challenges
    - Seasonal application
    - Nutrient-rich effluents
    - Decentralized use
- Cooling water
- Groundwater recharge
- Habitat restoration
- Toilet flushing
- Car wash, fountains

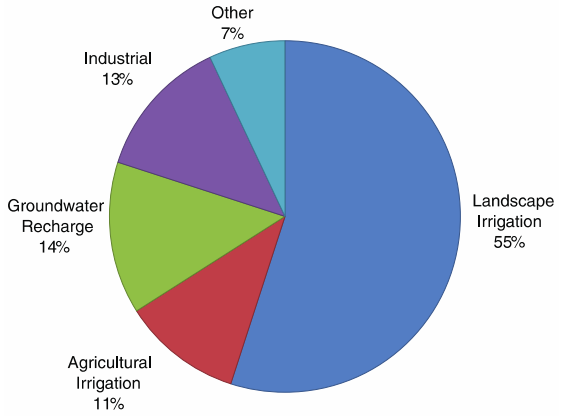
Potable reuse:

- Indirect potable reuse (groundwater recharge, surface water)
- Direct potable reuse (DPR)

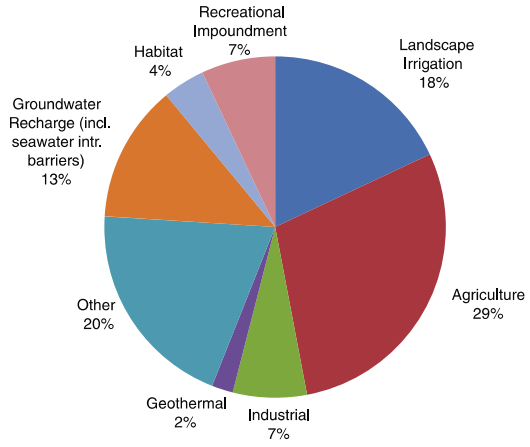
WATER REUSE IN THE USA WIDELY ACCEPTED

- 43 of the 50 U.S. states are practicing water reuse

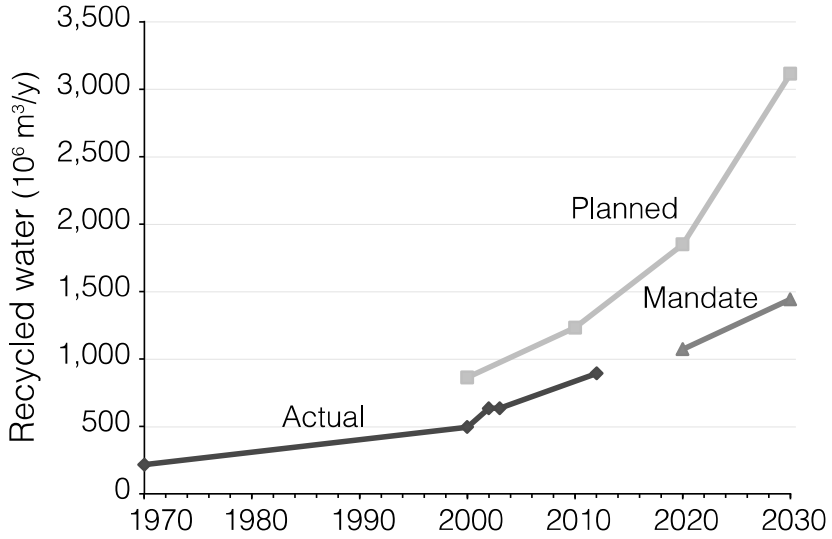
Florida



California

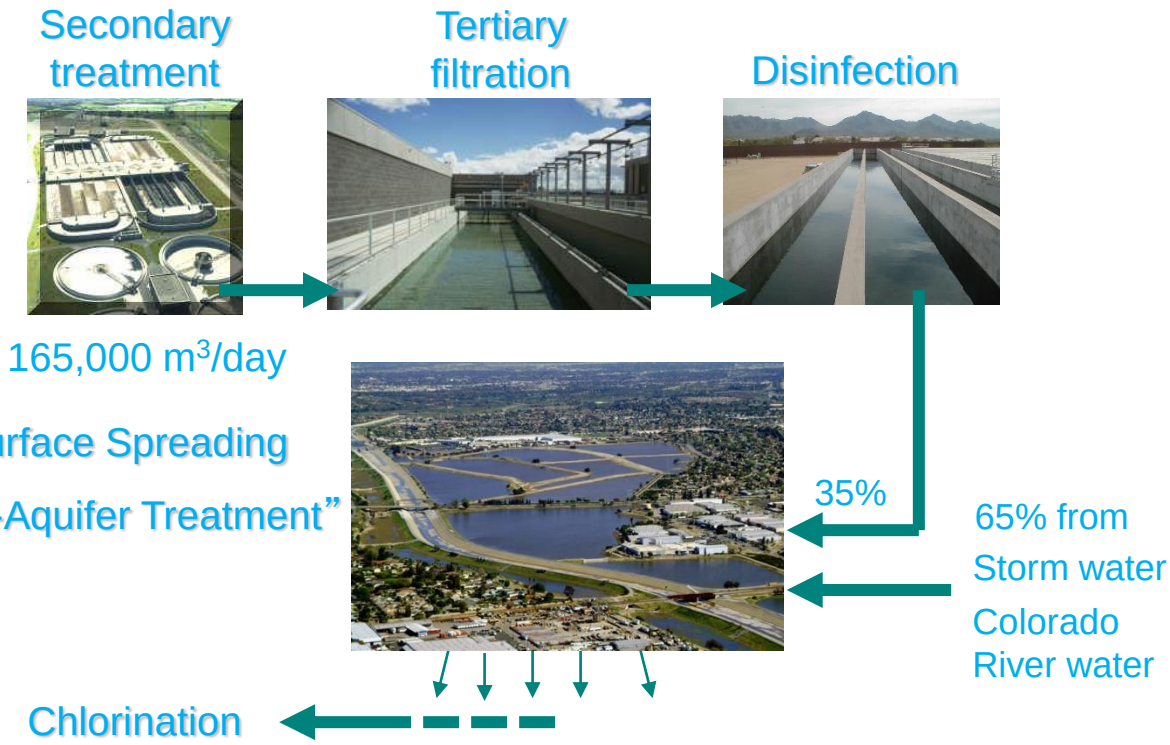


California Recycled Water Policy

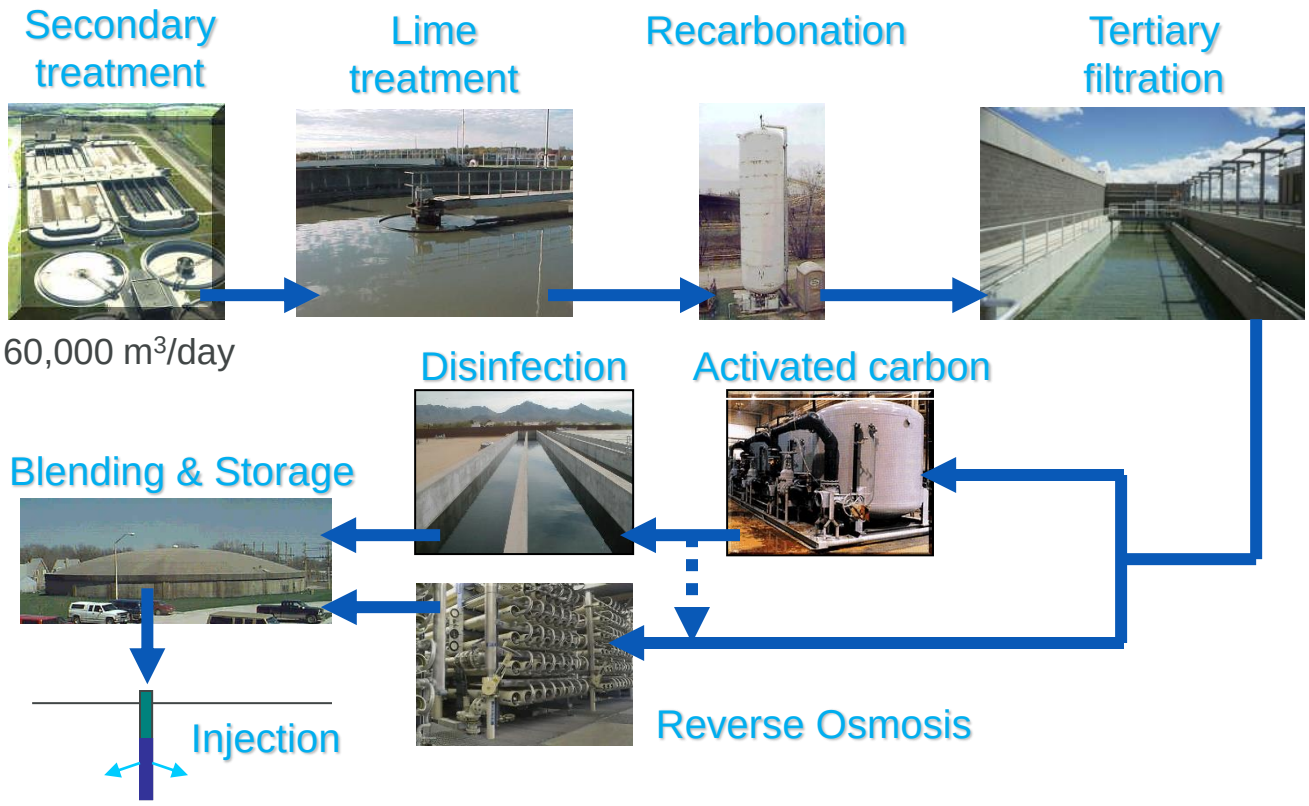


Source: National Research Council (2012); Harris-Lovett and Sedlak (2015)

POTABLE REUSE VIA GROUNDWATER RECHARGE - MONTEBELLO FOREBAY, CALIFORNIA (SINCE 1962)



POTABLE REUSE VIA DIRECT INJECTION SINCE 1975 - ORANGE COUNTY, CALIFORNIA (WATER FACTORY 21)



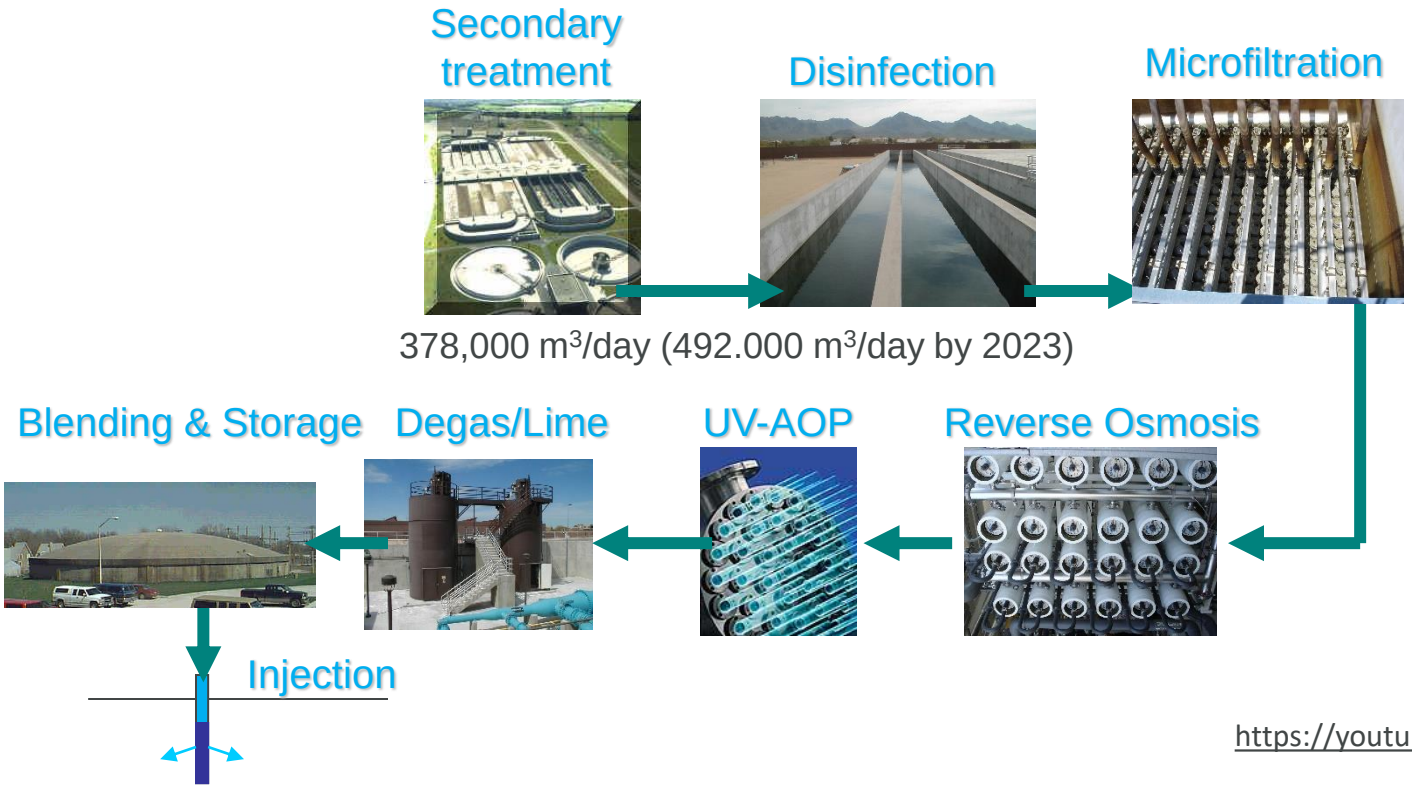
POTABLE REUSE VIA DIRECT INJECTION - ORANGE COUNTY, CALIFORNIA (WATER FACTORY 21)

Key Milestones:

- First use of reverse osmosis membrane treatment since 1975
- First application of GC/MS analysis for trace organic chemical removal
- First use of full-scale microfiltration membranes
- First use of integrated membrane systems (MF-RO)
- First use of full-scale UV-AOP

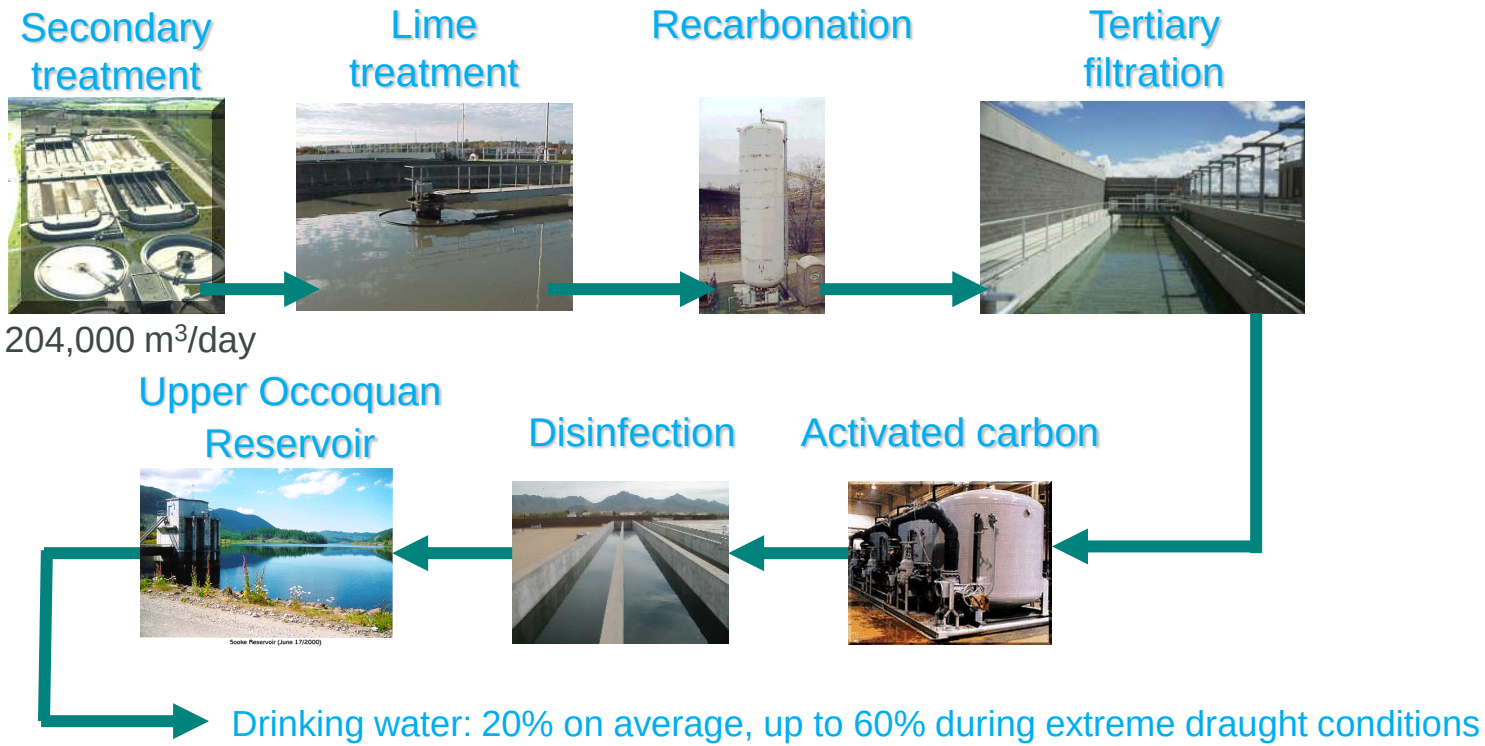
Source: Orange County Water District

GROUNDWATER REPLENISHMENT SYSTEM - ORANGE COUNTY, CALIFORNIA (SINCE 2005)



https://youtu.be/vPCGRulQcnA

POTABLE REUSE VIA SURFACE WATER AUGMENTATION
- UPPER OCCOQUAN, VIRGINIA (SINCE 1978)



POTABLE REUSE VIA GROUNDWATER RECHARGE - PRAIRIE WATERS PROJECT, COLORADO (SINCE 2010)

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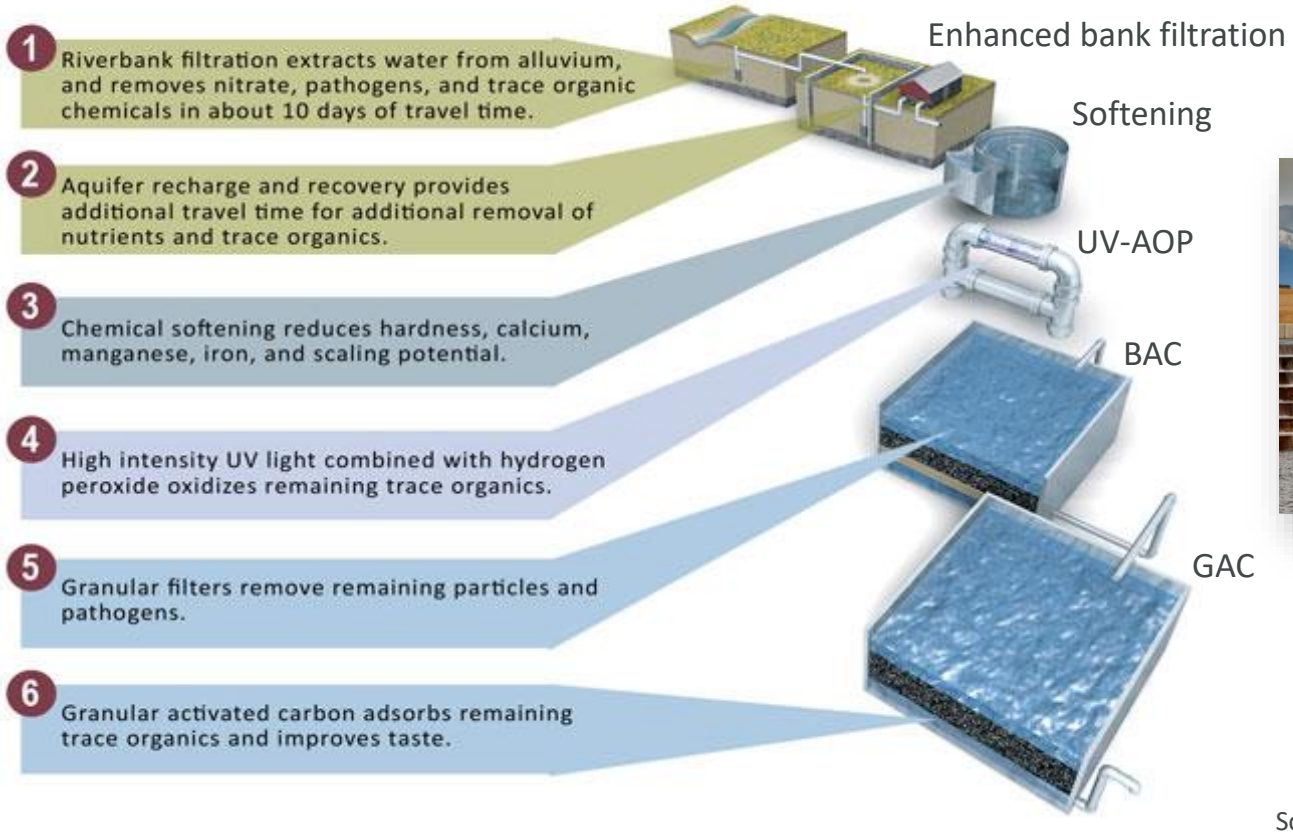

Source: Aurora Water, Prairie Waters Project

UNIT CONVERSIONS (FROM ENGLISH TO METRIC)

- mgd (million gallons per day): 1 gal = 3.78 liter

  Example: 100 mgd = 378.000 m^3/day

- AFY (acre foot per year): 1 acre foot = 1,233 m^3

  Example: 240k AFY = 790.000 m^3/day

Water Reuse Research in the US

JULIE MINTON, WATER RESEARCH FOUNDATION, USA

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AGENDA

- Overview of Water Research Foundation
- WRF Potable Reuse Research
- EPA's Water Reuse Action Plan (WRAP)
- Development of Water Reuse Research Strategy (WRAP Action 7.2)

WRF AT A GLANCE

THE Water Research FOUNDATION®

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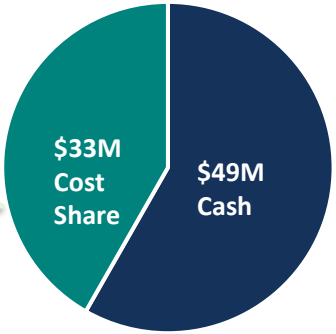
Funded Research

$82M

Contractually Funded Research

Managed by 54 Staff



Research Portfolio

- **1** Federal Contracts
- **3** Private Grants
- **6** Federal/State Grants
- **72** Co-funded Projects

15 Co-funders

264 Active Projects

Subscribers

1030 UTILITIES

79 CONSULTANTS

57 MANUFACTURERS

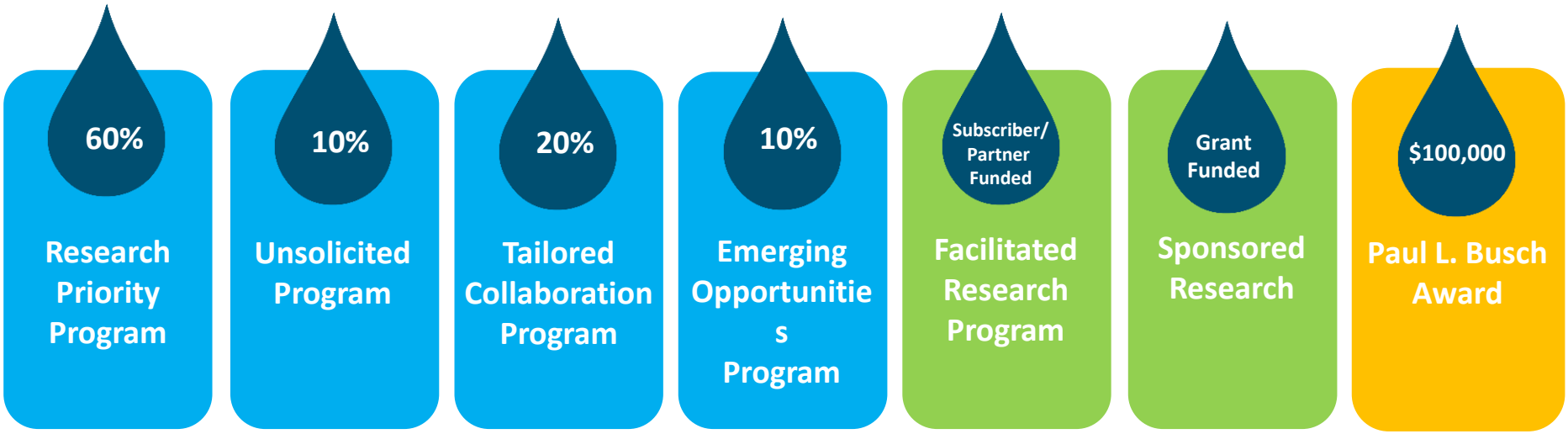
* As of October 18, 2021

Research & Innovation Programs

- Research Priority
- Tailored Collaboration
- Emerging Opportunities
- Grants/Awards *Paul L. Busch Award*
- Facilitated Research
- Unsolicited Research

$.84 OF EVERY DOLLAR supports program services

RESEARCH PROGRAMS



2022 Budget: $6.32M

RESEARCH PRIORITY PROGRAM

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Research Themes

Resource Efficiency and Recovery

- *Advancing the water sector toward a circular economy.*

Treatment Optimization

- *Maximizing performance of treatment processes and technologies to produce clean and safe water.*

Resilient Infrastructure

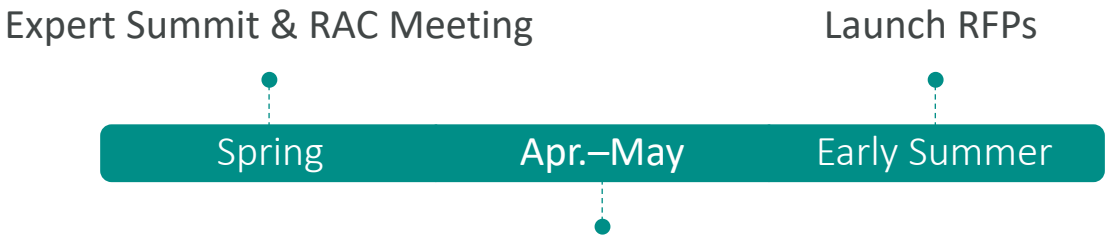
- *Improving the water sector's resilience by overcoming infrastructure and water quality challenges.*

Utility Operations and Management

- *Supporting financially sustainable, optimized, and forward-thinking utilities.*

Healthy Communities and Environment

- *Improving watershed resilience, enhancing community benefits, and protecting public health and the environment.*



TAILORED COLLABORATION PROGRAM 2022

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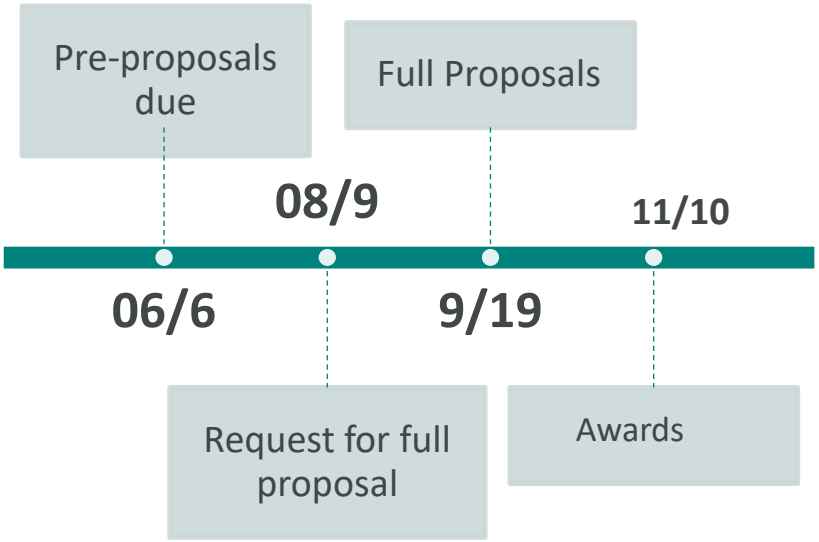
20% research budget

Utility Sponsor

WRF matches 1:1 funding up to $150K



2021 TC Awards

- Impact of UV Treatment on Microbial Communities in a Full-Scale Drinking Water Distribution System (City of Ann Arbor)
- Identifying Service Line Materials without Excavation: Distinguishing LSLs from non-LSLs (DC Water)
- Evaluation of Bench-Scale Methods to Predict Drinking Water PFAS Removal Performance of Ion Exchange and Novel Adsorbents at Pilot- and Full-Scale (Orange County Water District)
- Autonomous In Situ Monitoring of Harmful Algal Blooms (Great Lakes Water Authority)
- Developing Strategic Consumer Messaging for Microplastics in Drinking Water Supplies (Golden State Water Company)

UNSOLICITED PROGRAM 2022

- Funds innovative research projects that will significantly advance knowledge and scientific understanding and that could provide fundamentally transformative results
- 10% of research budget, every other year with two years of funding
  - **$1M budget in 2022 → Maximum $175K per project**

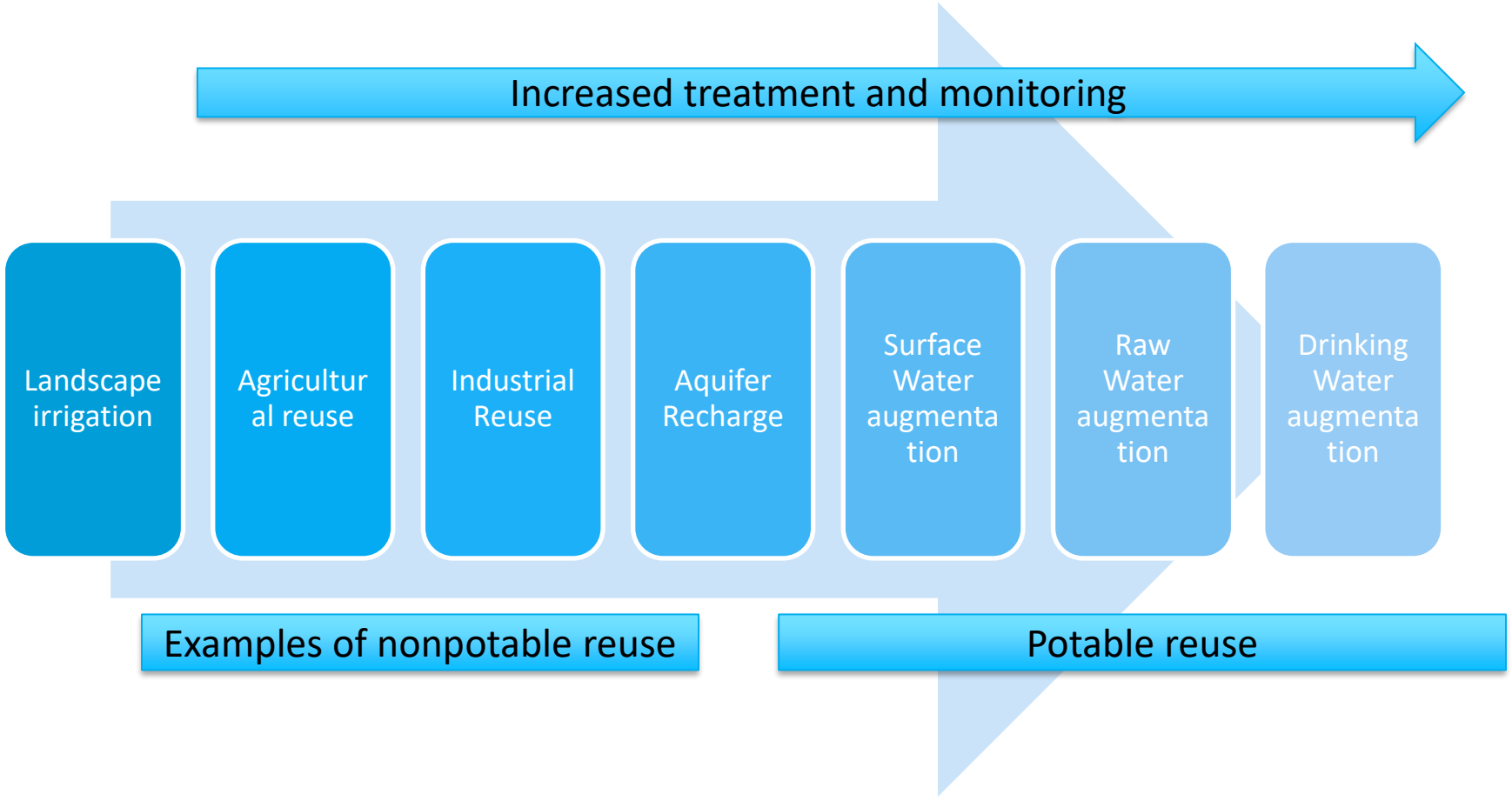
Schedule

Jan 10, 2022	Subscriber Webcast
Jan 12, 2022	Program launch
March 31, 2022	Pre-proposal due date
June 13, 2022	Pre-proposal(s) notification and shortlist full proposal invitation
July 28, 2022	Full proposal due date
Sept 19, 2022	Notifications sent to proposers

AGENDA

- Overview of Water Research Foundation
- **WRF Water Reuse Research Portfolio**
- EPA Water Reuse Action Plan
- Development of Water Reuse Research Strategy (WRAP Action 7.2)

FIT FOR PURPOSE RESEARCH



WRF has funded over $100M reuse research since 1990s

THE POTABLE REUSE CONTINUUM

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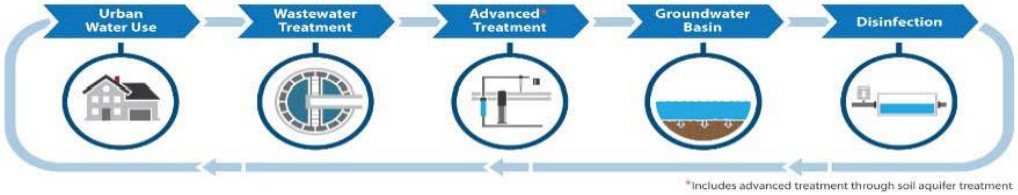
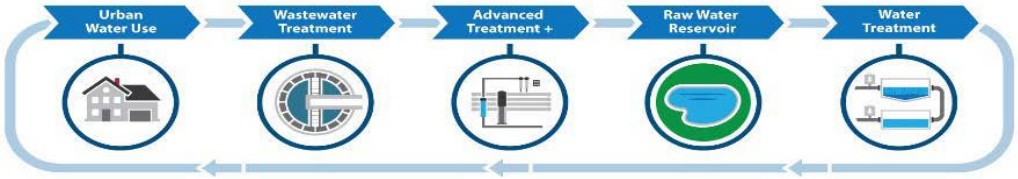
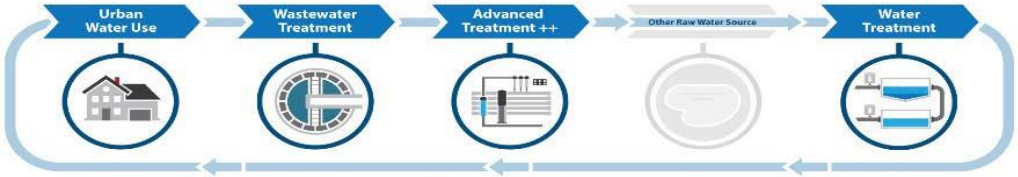
Groundwater recharge



Surface Water Augmentation



Raw Water Augmentation



Drinking Water Augmentation

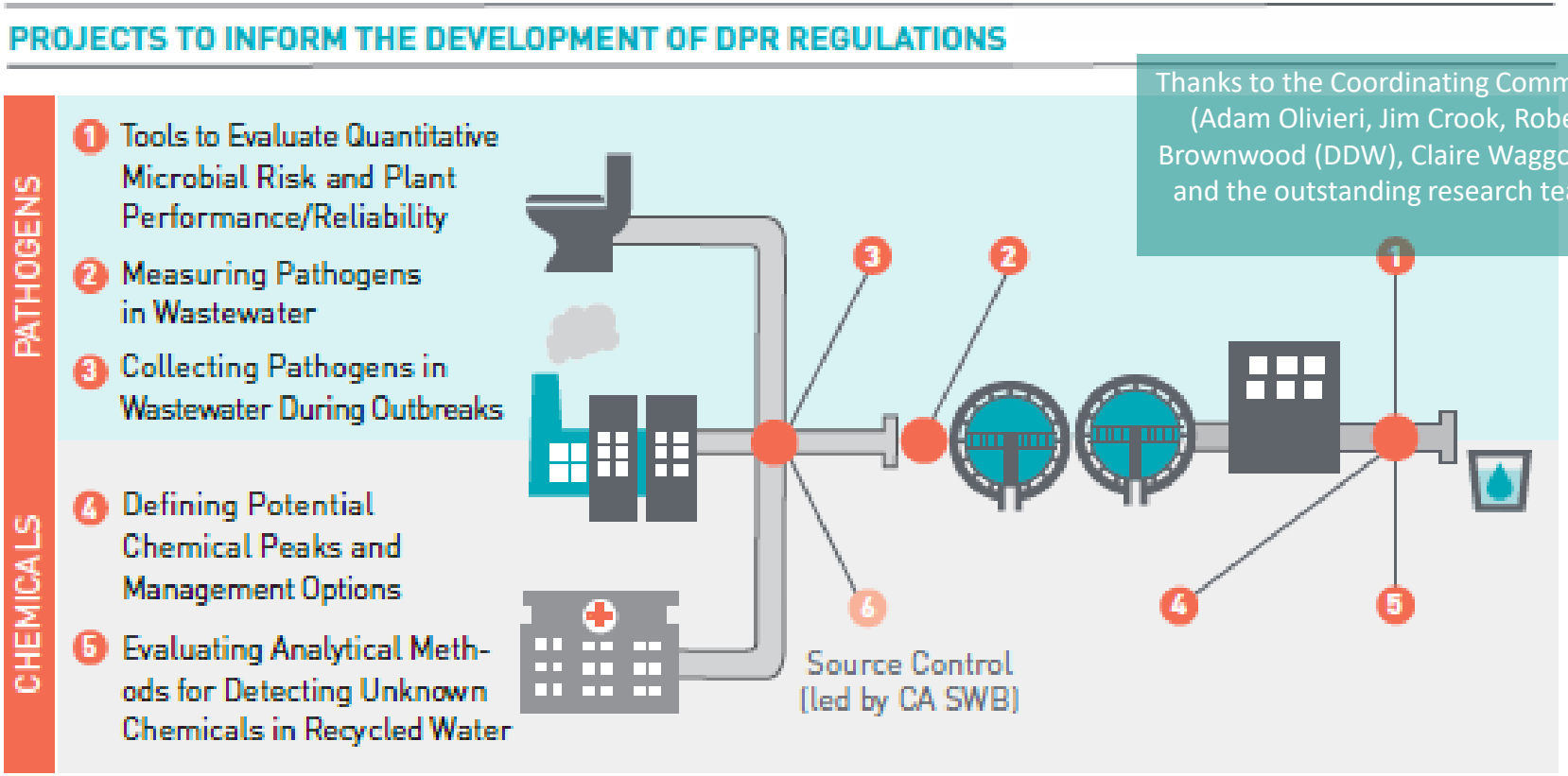
Indirect Potable Reuse

Direct Potable Reuse

Four Scenarios for Implementing IPR and DPR

WRF PARTNERSHIP WITH CA STATE WATER BOARD

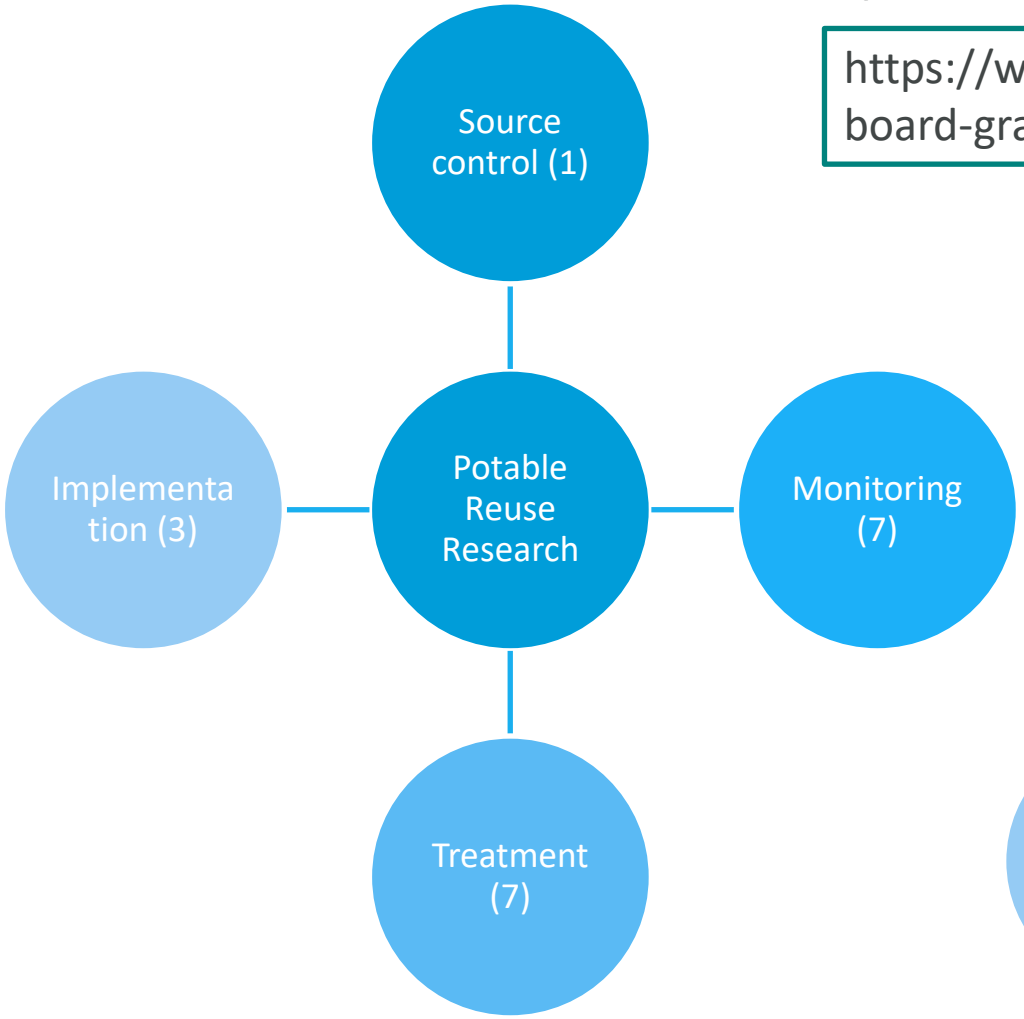
- The first grant ($1.4M) funded 5 projects which were recommended by the SWB Expert Panel in their report on the feasibility of developing criteria for DPR. Each of these studies have been completed
- CA legislation SB 574 (2017) established a deadline for the DPR regulations of 2023 – Expert Panel assembled now.

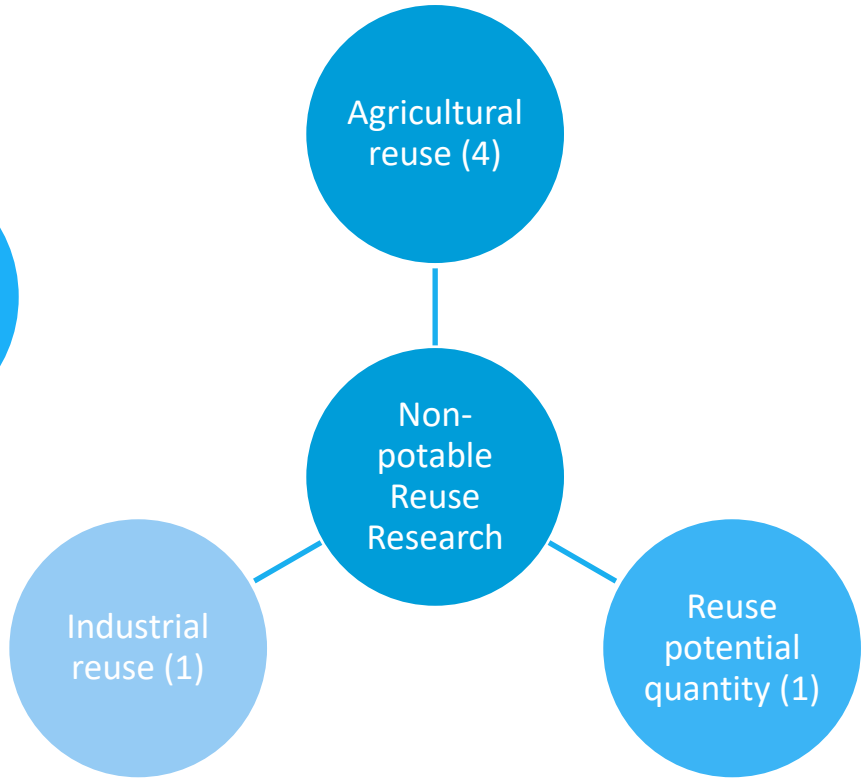


WRF PARTNERSHIP WITH CA STATE WATER BOARD

- Grant 2 ($3.1M) underway through 2024

https://www.waterrf.org/california-state-water-board-grant





CURRENT MONITORING PROJECT: ASSESSING WATER QUALITY MONITORING NEEDS, TOOLS, GAPS, AND OPPORTUNITIES FOR POTABLE WATER REUSE

the international water association

The source is raw wastewater, so must ensure treatment of pathogens and chemicals.

Monitoring is needed to overcome the lack of an environmental barrier.

Monitoring is through any or a combination of individual, surrogate, and/or bulk parameters.

Better Tools

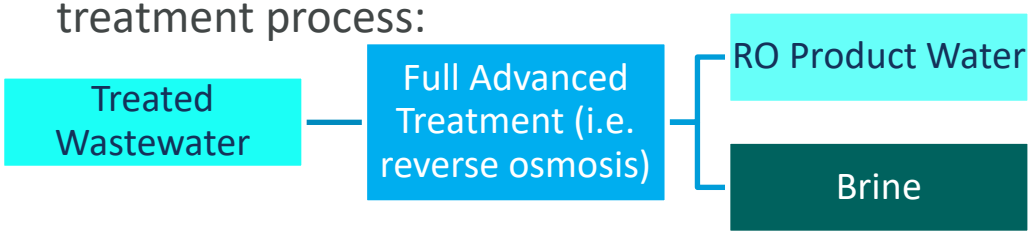
Improved operations and detection of compounds/potential hazards with improved sensitivity

Quicker response to upsets and better understanding of water quality and process performance

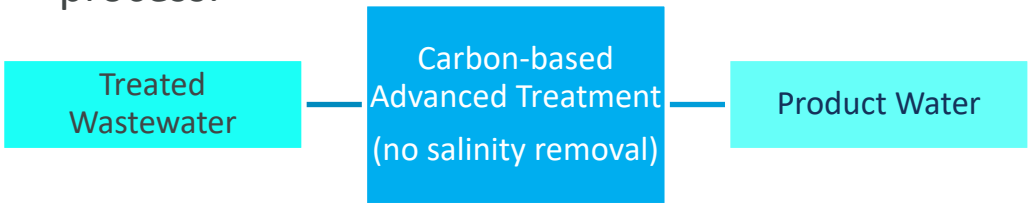
Needed: Tool refinement, validation, and advancement

OPTIMIZING CARBON-BASED ADVANCED TREATMENT (CBAT) FOR POTABLE REUSE: RESEARCH AREA OBJECTIVE

- Conventional/current potable reuse treatment process:



- Alternative, cheaper, non-brine generating process:

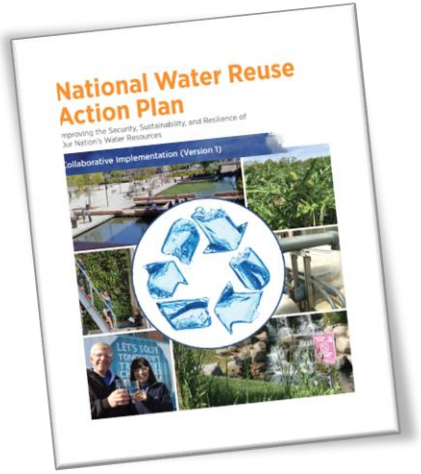


- Support potable reuse implementation without brine generation
- Understand pathogen and chemical removal in such processes
- Understand post-treatment challenges and treated water integration
- Develop novel methods for salinity management

AGENDA

- Overview of Water Research Foundation
- WRF Water Reuse Research Portfolio
- **EPA Water Reuse Action Plan**
- **Development of Water Reuse Research Strategy (WRAP Action 7.2)**

EPA'S WATER REUSE ACTION PLAN



EPA WRAP: WRF ACTIONS

the international water association

7.2 - Develop a Coordinated National Research Strategy

Partners

- U.S. Environmental Protection Agency (EPA)
  - Sharon Nappier nappier.sharon@epa.gov
- WateReuse Association (WateReuse)
  - Greg Fogel gfogel@watereuse.org
- Water Environment Federation (WEF)
  - Claudio Ternieden cternieden@wef.org

5.2 - Identify Monitoring Practices for Reuse Applications

Partners

- Southern California Coastal Water Research Project (SCCWRP)
  - Alvina Mehinto alvinam@sccwrp.org
- California State Water Resources Control Board
  - Claire Waggoner Claire.Waggoner@waterboards.ca.gov
  - Erica Kalve Erica.Kalve@waterboards.ca.gov
  - Laura McLellan Laura.McLellan@waterboards.ca.gov
- U.S. Environmental Protection Agency (EPA)
  - Nichole Brinkman Brinkman.Nichole@epa.gov
  - Elizabeth Medlock Kakaley MedlockKakaley.Elizabeth@epa.gov

5.2 IDENTIFY MONITORING PRACTICES FOR REUSE APPLICATIONS

ACTION IMPLEMENTATION

WRF 5079 - Assessing Water Quality Monitoring Needs, Tools, Gaps, and Opportunities for Potable Water Reuse

- Hold advisory committee workshop ☑
- Release RFP ☑
- Select contractor ☑
- Project survey/interviews
- Hold technology intake
- Present webcast

SCCWRP - Standardizing In Vitro Bioanalytical Tools for Ambient and Recycled Water Applications

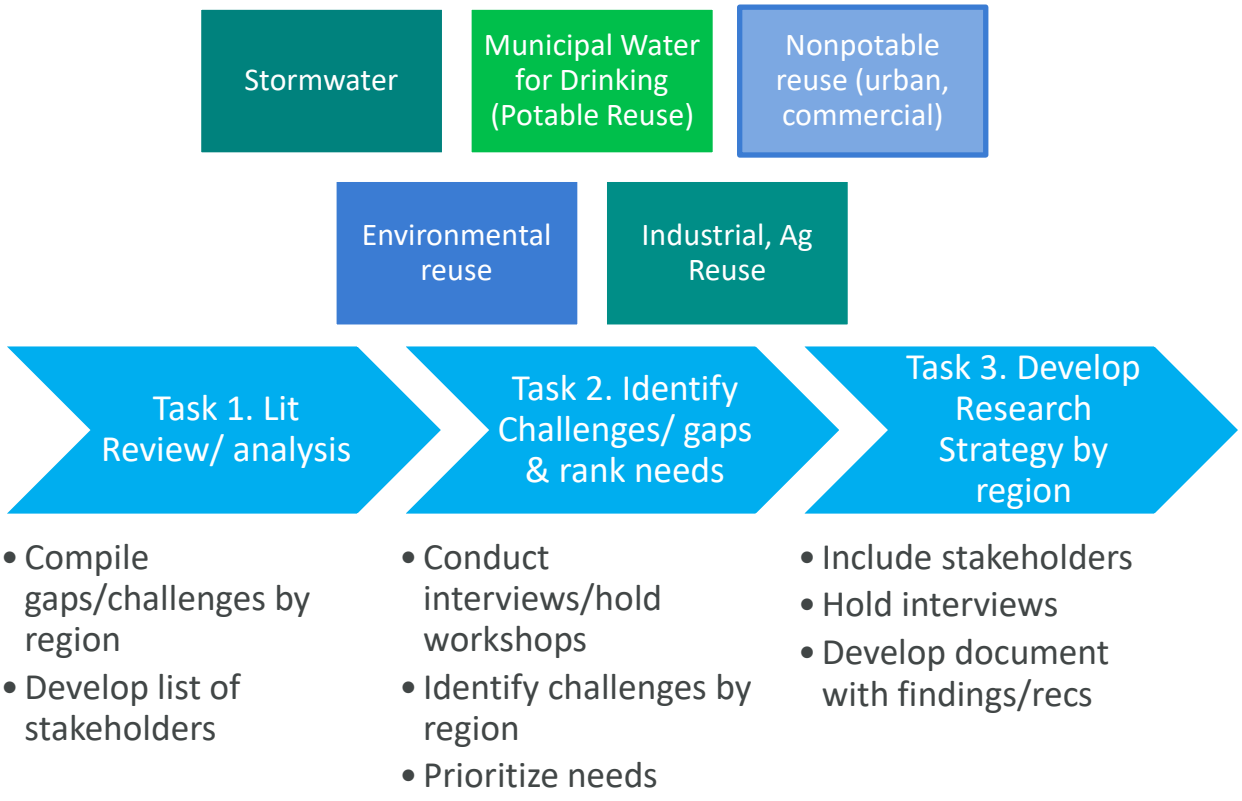
- Release RFQ for WRF 4828
- Select contractor for WRF 4828 ☑
- Present webcast on project findings ☑

EPA Bioanalytical Tools Research

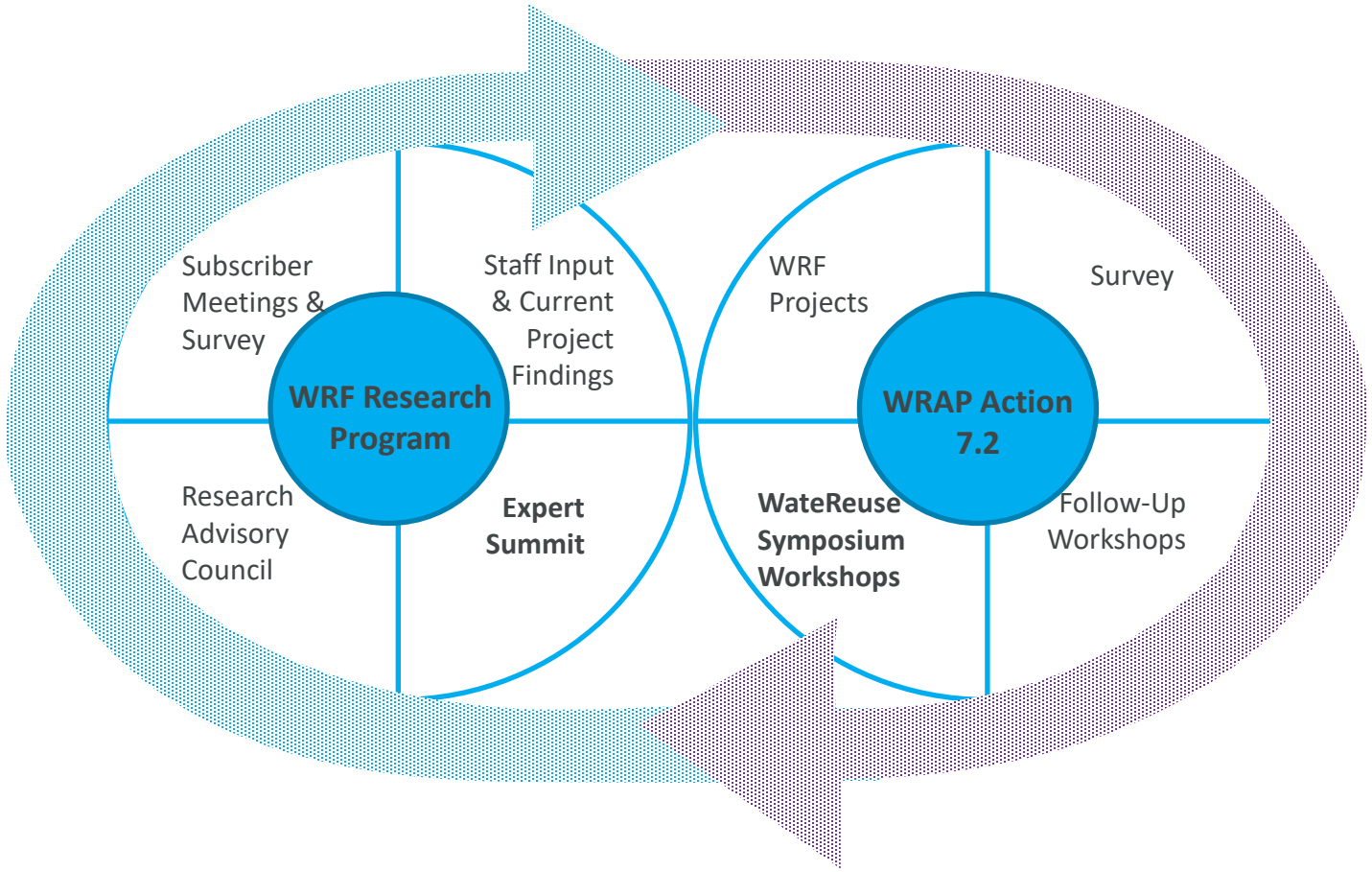
- Published a paper on bioassay application
- Adapt new bioassays for screening water ☑

7.2 DEVELOP A COORDINATED NATIONAL RESEARCH STRATEGY

SOW: APPROACH BY SOURCE WATER/ END USE



REUSE RESEARCH PLANNING SYNERGY



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@WaterResearchFoundation

water_research

WaterResearch

The Water Research Foundation

www.waterrf.org

jminton@WaterRF.org
Julie Minton – Research Unit Leader

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Building 21st Century Water Infrastructure in California

JENNIFER WEST, WATEREUSE CALIFORNIA

inspiring change

WATEREUSE CALIFORNIA

the international water association

Promotes responsible stewardship of California's water resources by maximizing the safe, practical and beneficial use of all types of recycled water use.

U.S. Drought Monitor

California

February 8, 2022

(Released Thursday, Feb. 10, 2022)

Valid 7 a.m. EST

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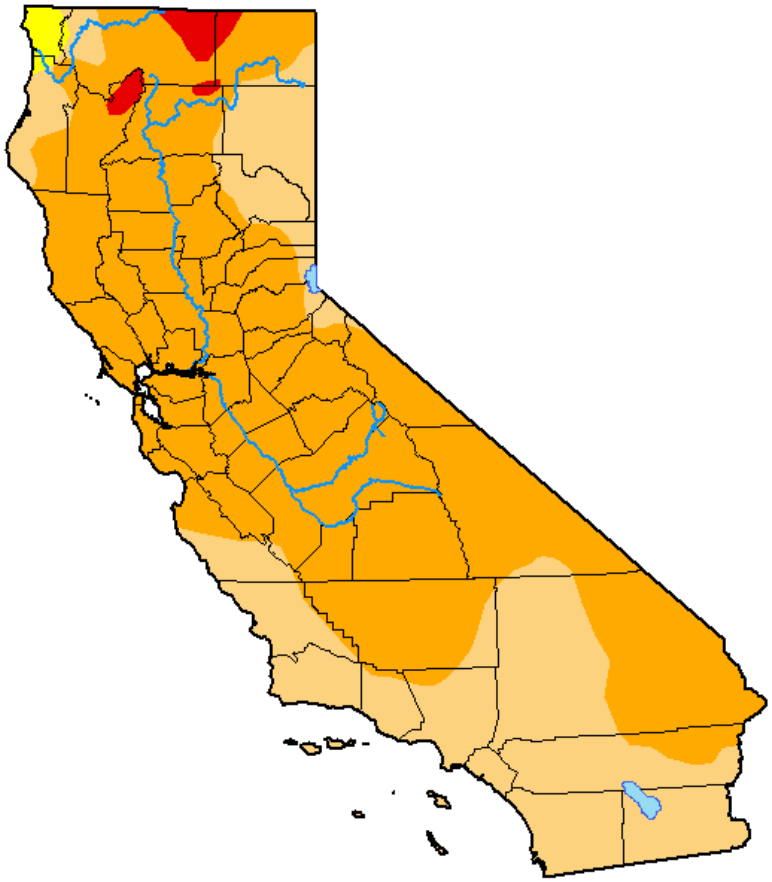


Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to https://droughtmonitor.unl.edu/About.aspx

Author:

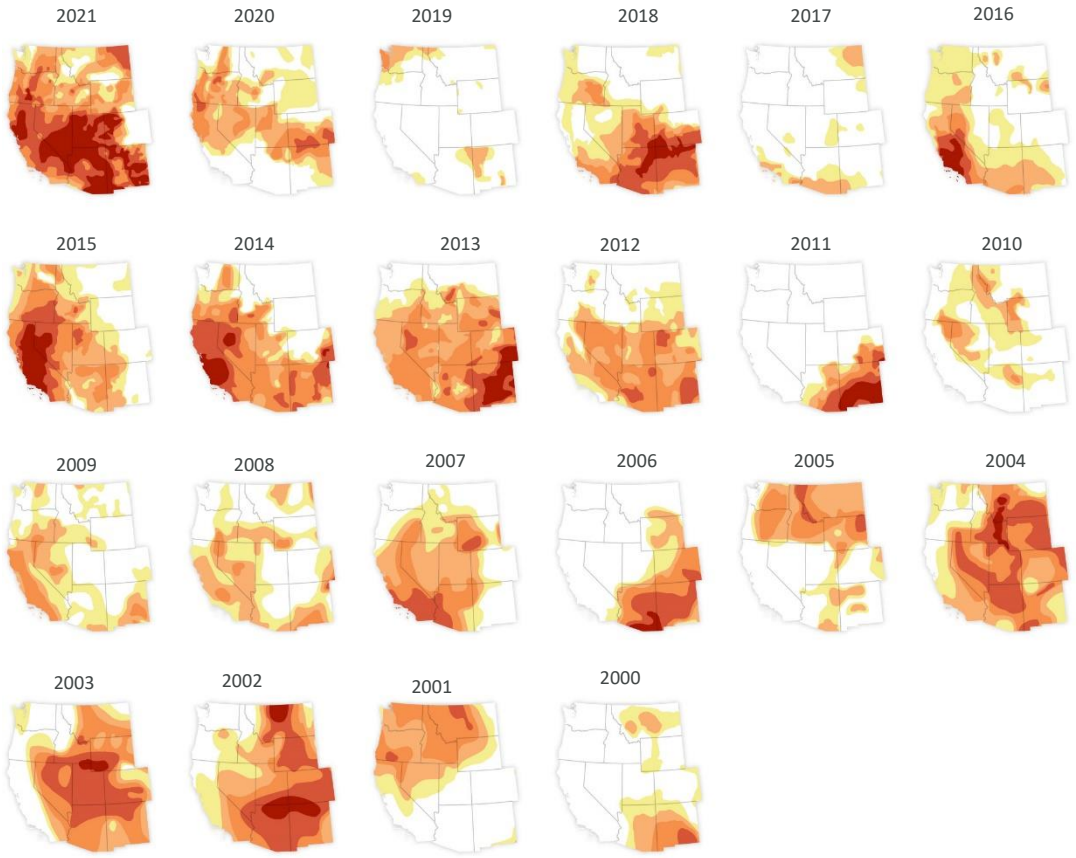
Deborah Bathke
National Drought Mitigation Center

droughtmonitor.unl.edu

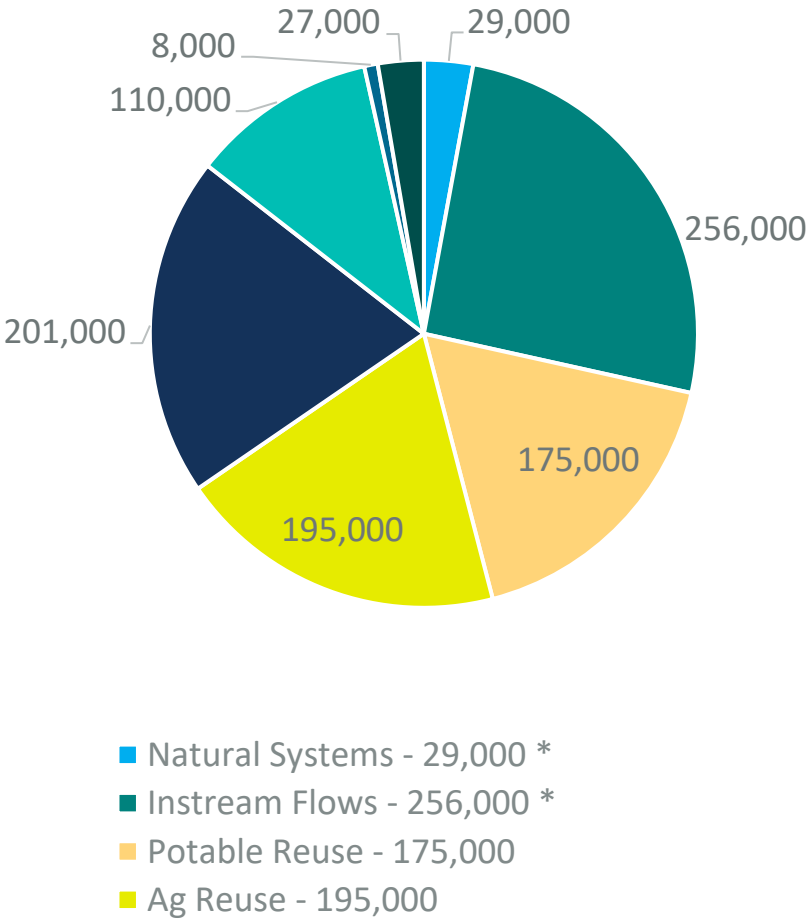
DROUGHT AND CLIMATE CHANGE: RECYCLED WATER DRIVERS IN CALIFORNIA AND WEST

the international water association

- Dark Red – Exceptional Drought
- Red – Extreme Drought
- Dark Orange – Moderate Drought
- Yellow – Abnormally Dry



2020 CALIFORNIA RECYCLED WATER HITS 1 MAF (TITLE 22 + ENVIRONMENTAL PURPOSES)



BUILDING LOCAL CLIMATE RESILIENT WATER SUPPLIES

the international water association

PURE WATER SAN DIEGO

- Provide almost half of the City of San Diego's water supply by the end of 2035. Phased multi-year project.
- Drivers: Reduce reliance of imported water supply -- water security, local control and reducing ocean discharges .
- Reservoir Augmentation with purified recycled water

S. CAL REGIONAL RECYCLED WATER PROGRAM

- Partnership Metropolitan Water District of S. Cal. and LA County Sanitation Districts.
- The Advanced Purification Center is a 0.5-mgd demonstration facility for the program, operating since 2019.
- A full-scale program would produce up to 150 million gallons daily, enough to serve more than 500,000 homes.
- Purified water may be used for potable reuse via groundwater replenishment and potentially raw water augmentation.

LOS ANGELES: OPERATION NEXT WATER SUPPLY PROGRAM

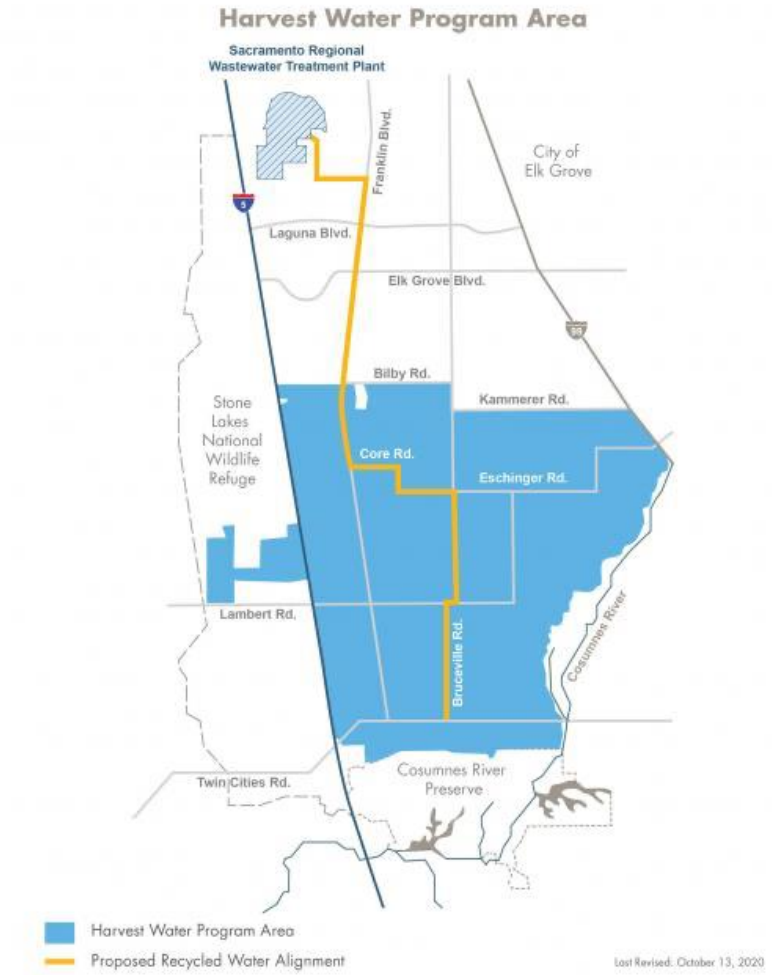
- Maximize recycled water beneficial use from Hyperion Water Reclamation Plant
- New, local supply up to 217MGD or 240k AFY (Current City Demand 500k AFY)
- Improve sustainability, reliability and resilience of water supply portfolio
- Utilize IPR and DPR strategies through groundwater and raw water augmentation

VALLEY WATER: PURIFIED WATER PROJECT

- Valley Water is working on a project to replenish groundwater with purified water, a drought-resilient, and locally controlled water source
- Utilizes P3 model
- The project will help Valley Water meet the goal of providing at least 10% of water demand in Santa Clara County through recycled and purified water by 2025

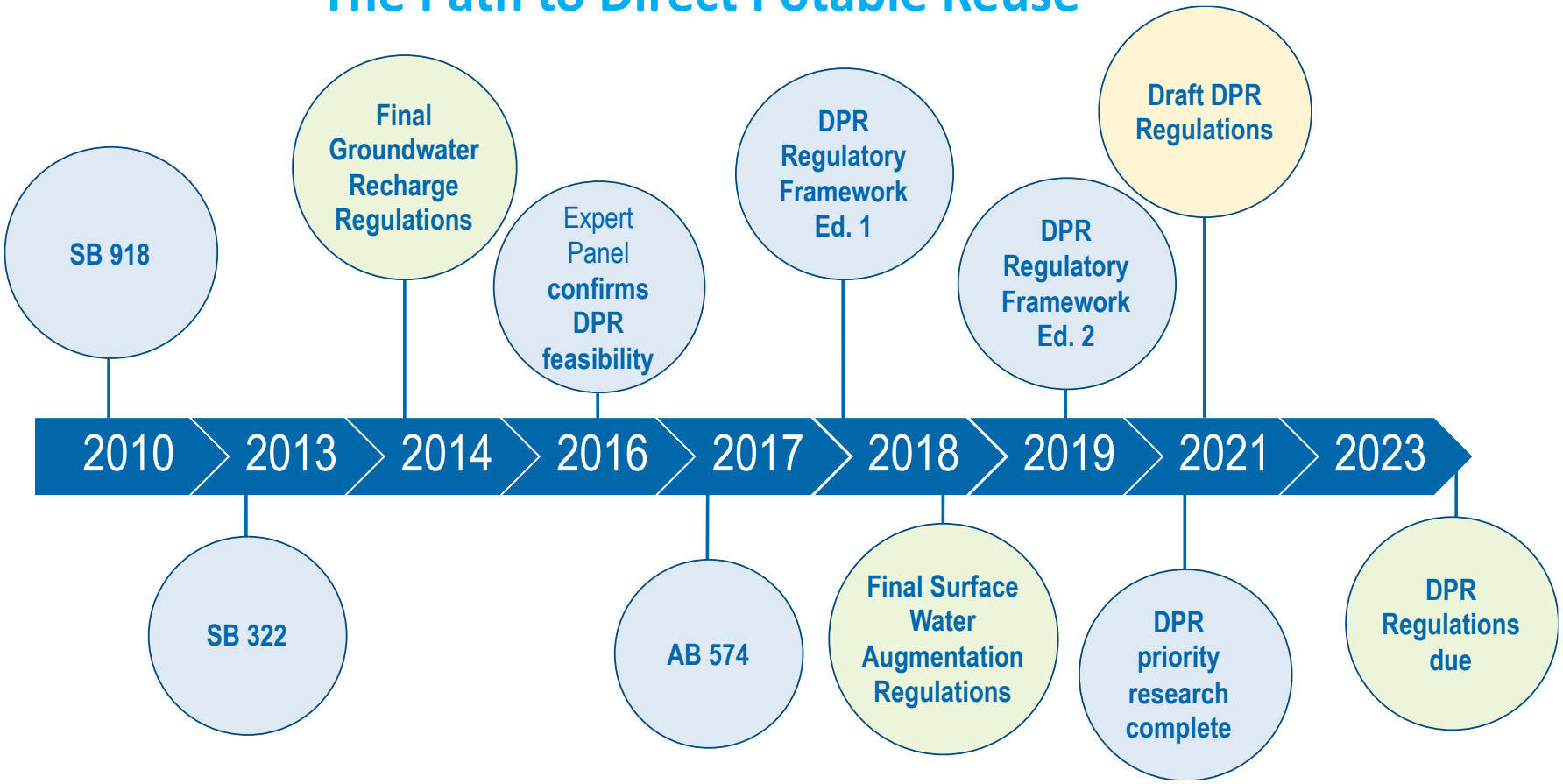
HARVEST WATER SACRAMENTO

- Agricultural water supply to reduce groundwater pumping
- Deliver up to 50,000 AFY of recycled water to 16,000 acres
- Increases groundwater storage by ~ 245,000 AF in 10 years
- Produces multiple public benefits
  - Groundwater restoration
  - Ecosystem improvements
  - Water quality improvements
  - Conjunctive use
- Construction anticipated in 2023 with delivery expected to begin in 2025



WATEREUSE CALIFORNIA

The Path to Direct Potable Reuse



50

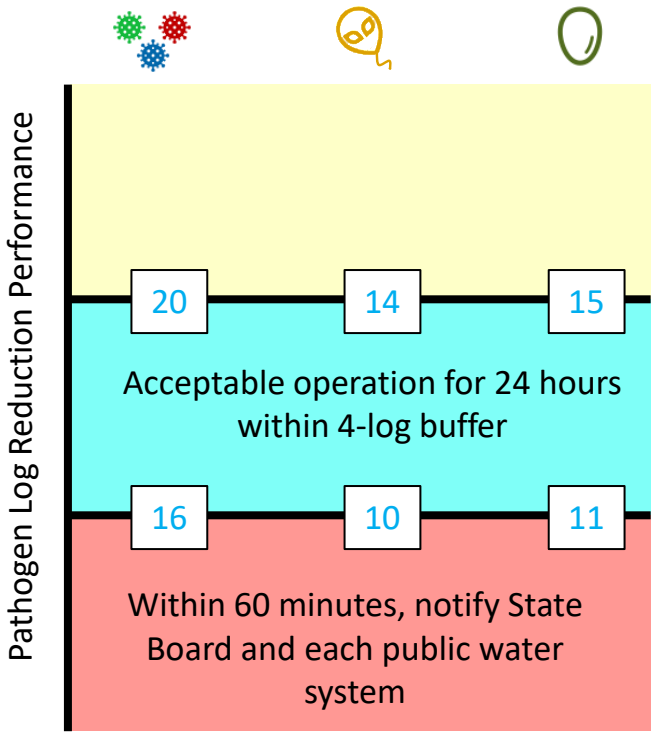
REGULATIONS BASED ON FRAMEWORKS

AB 574 DPR EXPERT PANEL

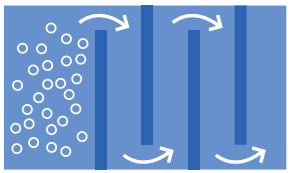
- **Co-Chair: James Crook, PhD, PE, Environmental Engineering Consultant**
- **Co-Chair: Adam Olivieri, DrPH, PE, EOA, Inc.**
- Richard Bull, PhD, Washington State University (Emeritus)
- Jörg E. Drewes, PhD, Technical University of Munich
- Charles Gerba, PhD, University of Arizona
- Charles Haas, PhD, Drexel University
- Amy Pruden, PhD, Virginia Tech
- Joan Rose, PhD, Michigan State University
- Shane Snyder, PhD, Nanyang Technological University
- Jacqueline E. Taylor, REHS, MPA, Director, Environmental Protection Branch, Los Angeles County Department of Public Health (Retired)
- George Tchobanoglous, PhD, PE, University of California, Davis (Emeritus)
- Michael P. Wehner, MPA, Orange County Water District (Retired)

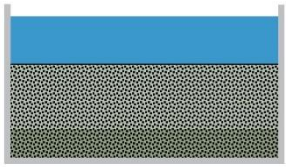
DPR PATHOGEN CONTROL

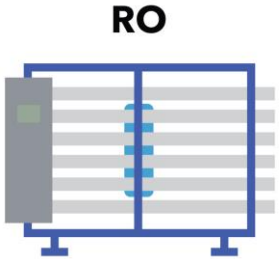
	Groundwater Recharge	Surface Water Augmentation	Direct Potable Reuse
Virus	12	12 to 14	20
Giardia	10	10 to 12	14
Cryptosporidium	10	10 to 12	15

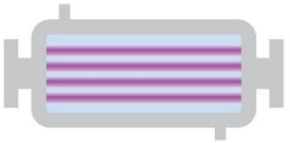


DPR CHEMICAL CONTROL – TREATMENT









New requirement

New operational triggers

Same as IPR

Expert Panel Recommends Treatment in this order

DPR ALTERNATIVES CLAUSE

- Contained in other potable reuse regulations: allows for new innovation
- Requires project specific expert panel, demonstration, public meeting and written approval
- Must show at least the same level of protection of public health

QUESTIONS?

JENNIFER WEST
JWEST@WATEREUSE.ORG
(916) 496-1470

the international water association

Water Reuse in Rest of US: Driving Change & Catching Up

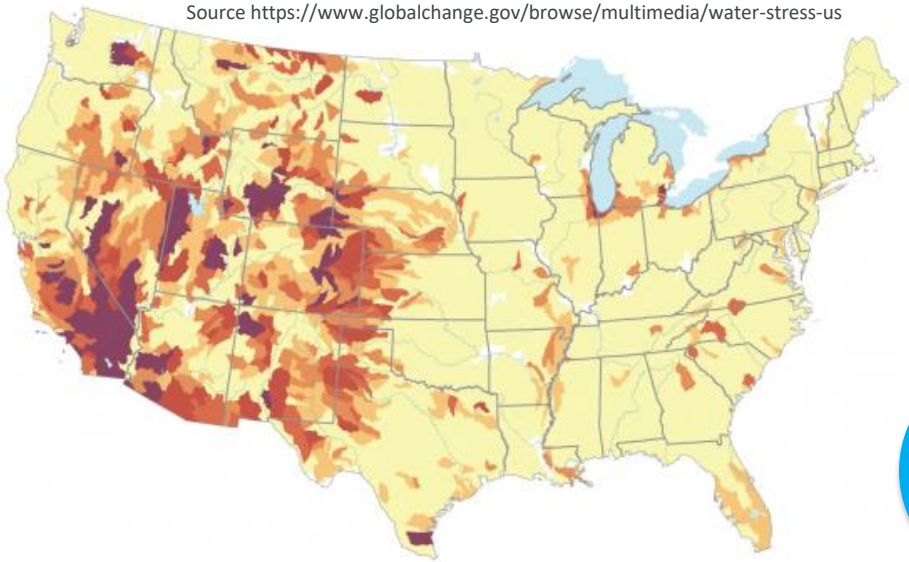
EVA STEINLE-DARLING, PHD, PE CAROLLO ENGINEERS, INC | USA

inspiring change

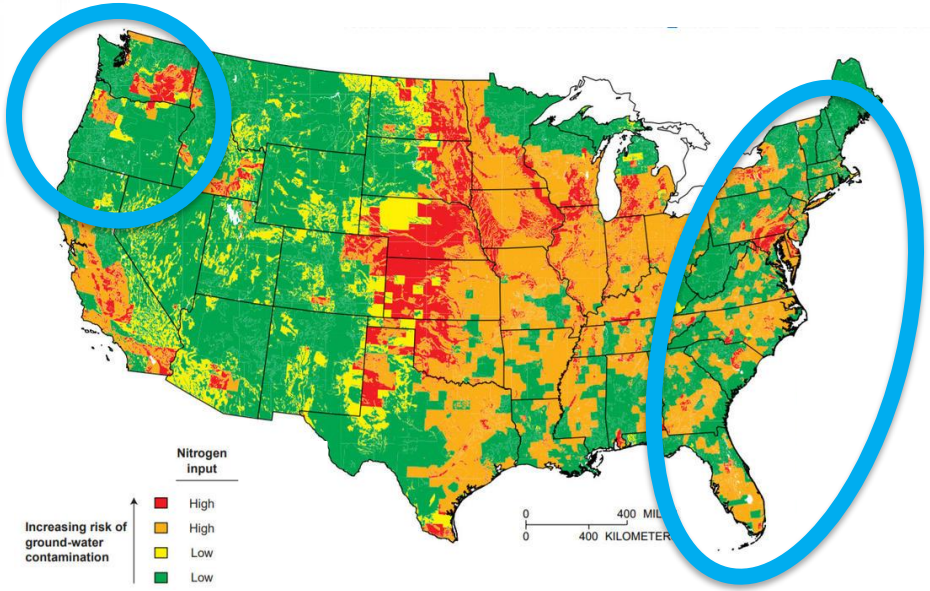
WATER STRESS: NOT THE ONLY DRIVER FOR WATER REUSE

Water Stress is a historical driver for reuse in the US

Source https://www.globalchange.gov/browse/multimedia/water-stress-us



Nutrient discharge limitations are pushing new regions to consider reuse



Source: https://www.usgs.gov/media/images/areas-high-risk-nitrogen-contamination-groundwater

RECYCLED WATER COAST-TO-COAST

6.5 Billion

Gallons of Recycled Water Used for Idaho Agriculture

92% of the recycled water Idaho produces is used to irrigate crops, a beneficial use that keeps **2000 tons of nitrogen and 500 tons of phosphorus** out of Idaho rivers and streams.

GM Saves

$2 Million

with Stormwater Reuse

General Motors captures and reuses stormwater for cooling towers at its Detroit-Hamtramck assembly plant, saving **$2 million a year.**

It's Patriotic to Generate

$4 Million

in Massachusetts

But for on-site, decentralized water recycling, Foxboro could not meet water demands for Gillette Stadium, home to the New England Patriots. This NFL team generates **$4 million annually** for the local economy.

850,000 Taps

Served Daily in California

Orange County annually recycles enough to supply drinking water for **one-third** of its homes and businesses.

Driving

20,000 Jobs

in Nevada's Desert

A planned 13-mile pipeline will provide **1.3 billion gallons** of recycled water annually to Tahoe Reno Industrial Center, home of Tesla, Switch, and Google...and **20,000 new jobs.**

Supporting **70%** of Global Internet Traffic through Virginia

Recycled water cools Loudoun County's "Data Center Alley" which processes more than **two-thirds** of the world's Internet traffic.

$35 Million

for Ski Slopes in Arizona

The Snowbowl, a ski resort in Arizona's San Francisco Peaks, uses recycled water for its slopes—sustaining a **$35 million** tourism industry.

2,000 Acres

of Wetlands and Reuse in Texas

Recycled water replenishes the Upper Trinity River and man-made wetlands—restoring a natural habitat for migratory birds and **supplying drinking water for the Dallas/Ft. Worth area.**

$600 Million

Hole-In-One in South Carolina

Hilton Head recycles water to irrigate eleven destination golf courses—sustaining **$600 million annually** in recreational tourism.

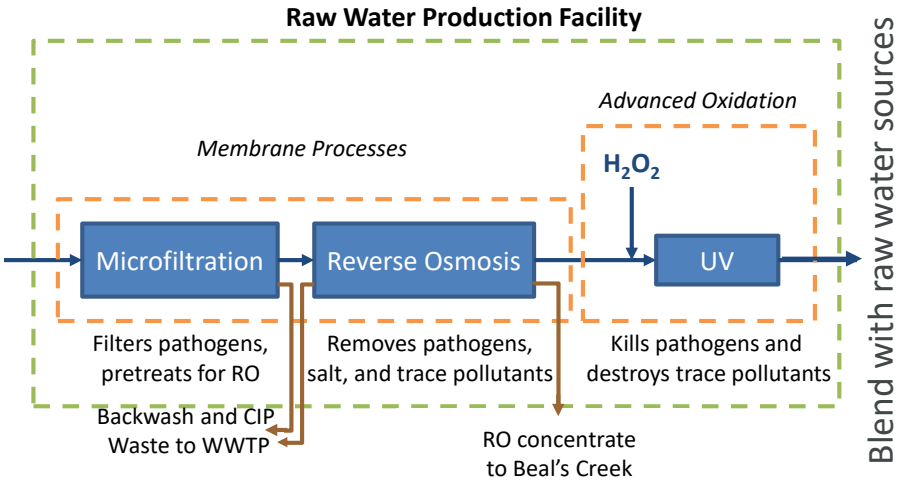
100,000 Homes

Powered in Florida

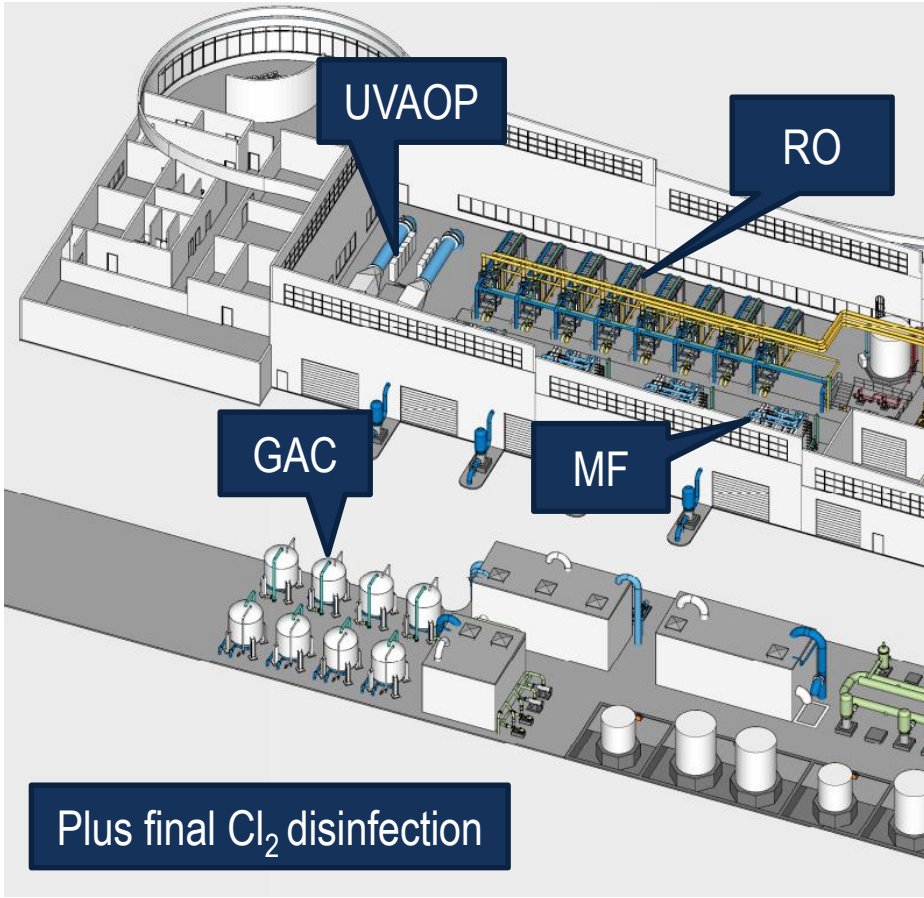
Tampa Electric uses recycled water to cool a power plant and generate electricity for **100,000 homes.**

WATEREUSE | **Let's Invest in Water Reuse for a Strong American Economy**

DPR OPERATING IN TEXAS SINCE 2013 …WITH MORE TO COME



2014 2021



El Paso Direct-to-Distribution DPR Design at 90%

DPR = Direct Potable Reuse, which is water reuse in a fully engineered loop that bypasses the natural environment.

OTHER STATES ARE FOLLOWING SUIT

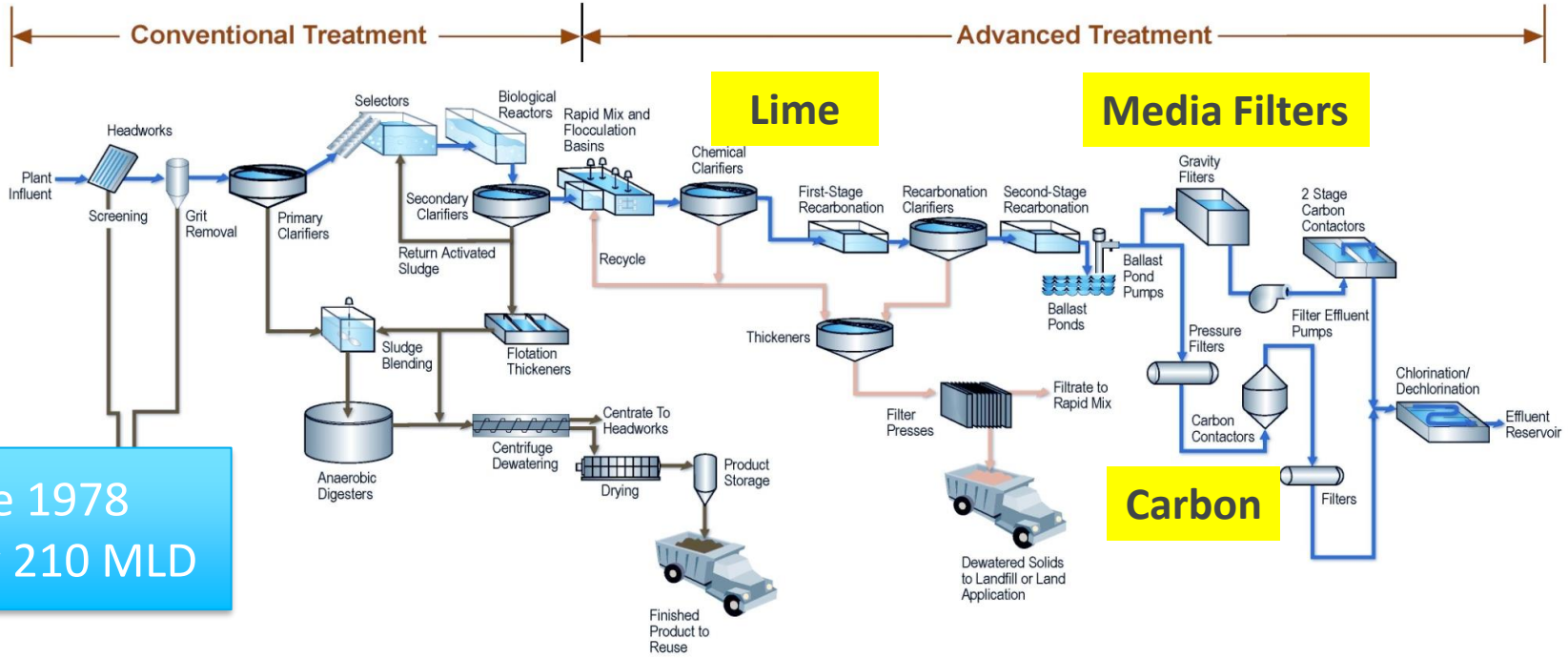
Arizona, Colorado, and Florida:

1. Stakeholder-driven guidance development for DPR: 2013-2020
2. Draft regulation development for DPR: 2021-present

WORKING BACKWARDS: WE ALSO HAVE A LONG HISTORY IN *INDIRECT* POTABLE REUSE

Surface Water Reservoir Augmentation in **Virginia (UOSA)**

Future Ozone

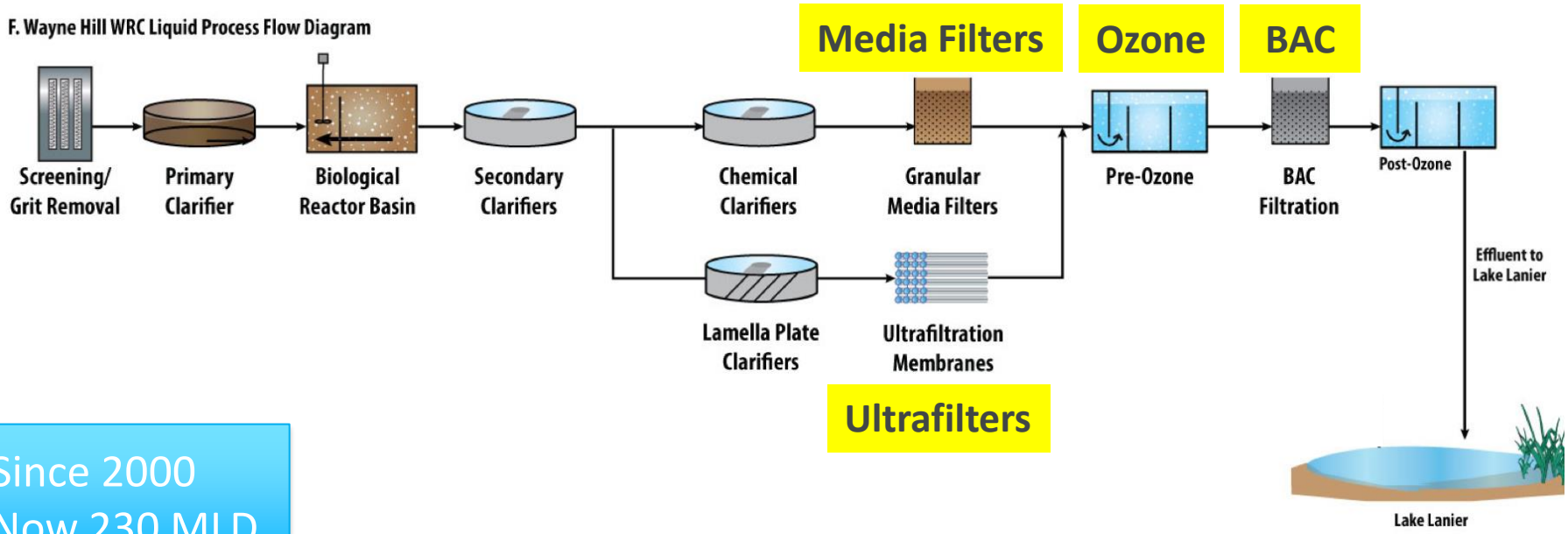


Since 1978
Now 210 MLD

Source: https://cdn.ymaws.com/www.vwea.org/resource/resmgr/Conference_Proceedings/2015_Lab_Practices/12_Brooks.pdf

WORKING BACKWARDS: WE ALSO HAVE A LONG HISTORY IN *INDIRECT* POTABLE REUSE

Surface Water Reservoir Augmentation in **Georgia (Gwinnett)**



Since 2000
Now 230 MLD

Source: https://www.aaees.org/_images/e3scompetition/2018grandprize-research07.jpg

WORKING BACKWARDS: WE ALSO HAVE A LONG HISTORY IN *INDIRECT* POTABLE REUSE

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Groundwater Augmentation in Texas (El Paso)

Carbon

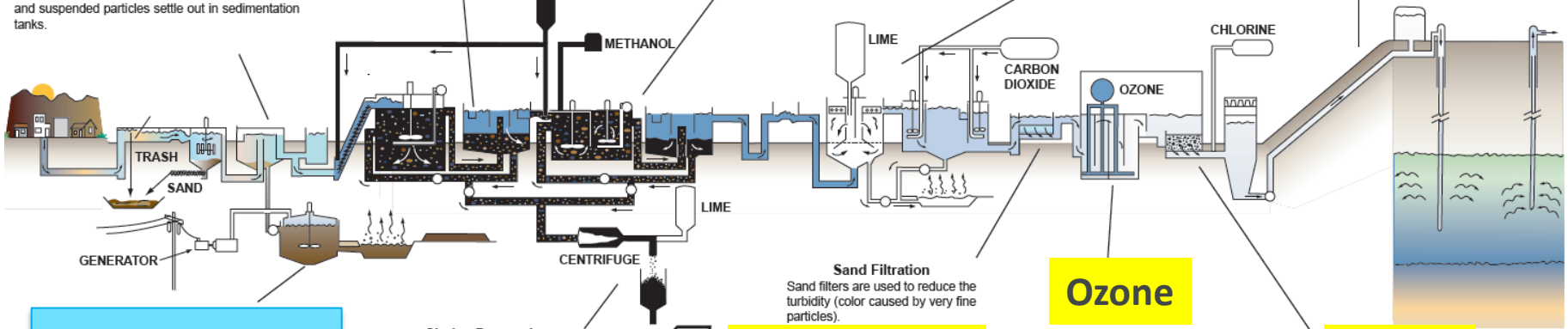
PACT® Process
Wastewater is aerated so that bacteria can feed on some pollutants and others are absorbed on powdered activated carbon. This process removes dissolved pollutants, ammonia, even minute concentrations of organic contaminants. Then, in a clarifier, bacteria and carbon are separated from the clean water.

Lime

Lime Treatment
Lime is added to the treated water to raise the pH, kill viruses, remove hardness, phosphorus and heavy metals. Carbon dioxide is then added to lower pH.

Storage and Recharge
The clean, treated water (effluent) is pumped to storage basins where it is analyzed for purity. A complete battery of tests is performed. Having passed the tests, the water is pumped into the groundwater aquifer. Over a two-year period, the water travels to one of El Paso's potable water wells to become part of the potable water supply. Water is also sold to various reuse customers.

Primary Treatment
Plant can receive 12 million gallons of wastewater each day from the northeast area of El Paso. Screens remove trash from the wastewater. Sand and suspended particles settle out in sedimentation tanks.



Sand Filtration
Sand filters are used to reduce the turbidity (color caused by very fine particles).

Ozone

Disinfection
Treated water is disinfected by exposing it to ozone. Ozone is generated on-site from oxygen using electricity.

Sludge Dewatering
Spent carbon and excess bacteria are removed from the PACT® process. Excess water is removed from this "waste" sludge by centrifuges. Lime is then added to stabilize the biosolids prior to final disposal at a landfill.

Media Filters

BAC

Finally, water is passed over activated carbon granules to absorb any remaining organic contaminants and to improve taste and color. This step "polishes" the water to the highest quality.

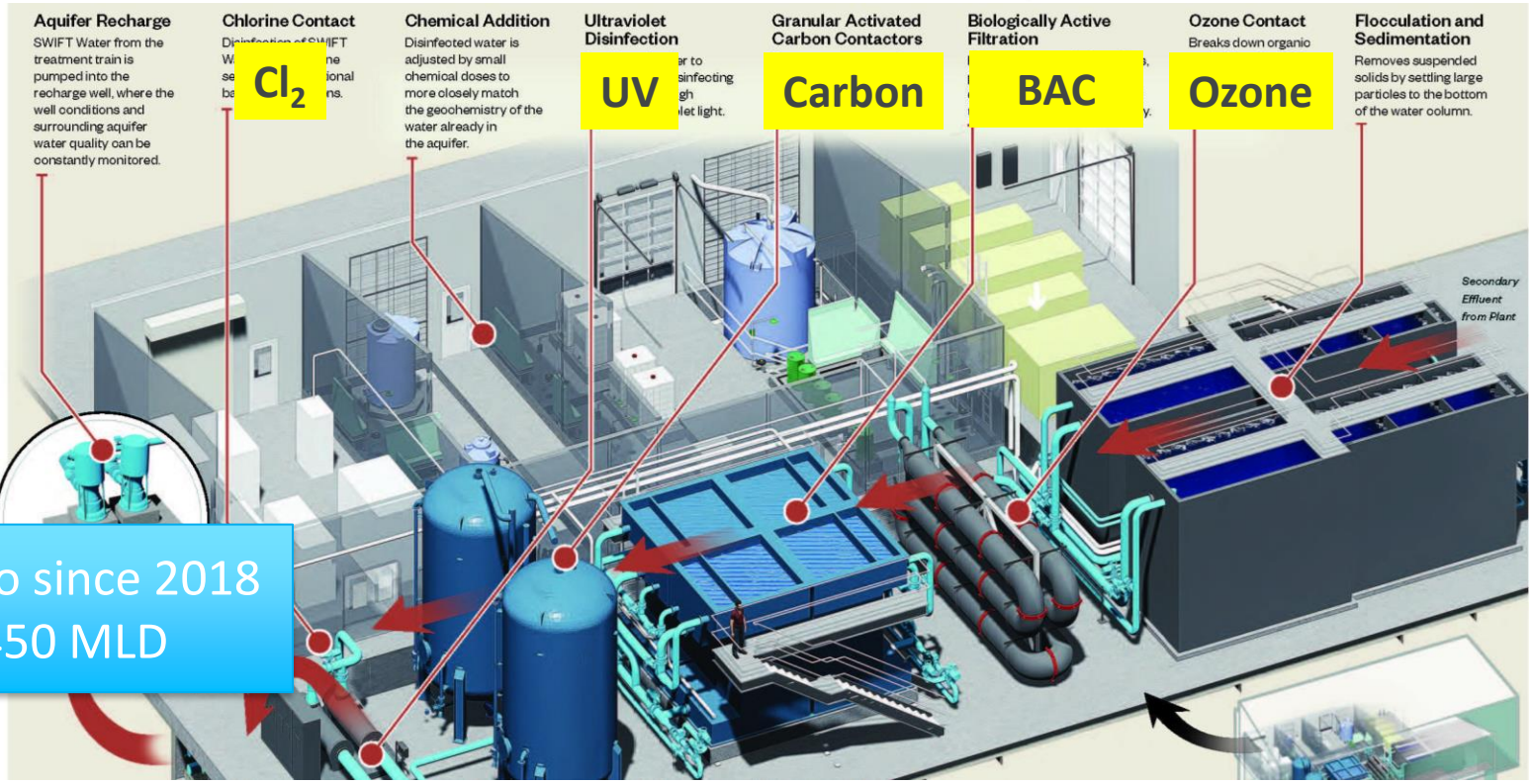
Since 1985
45 MLD

Source: https://blog.supplyhouse.com/wp-content/uploads/2018/12/Screen-Shot-2012-07-03-at-6.45.15-AM.png

WORKING BACKWARDS: WE ALSO HAVE A LONG HISTORY IN *INDIRECT* POTABLE REUSE

Groundwater Augmentation in Virginia (HRSD SWIFT)

Process flow



All without RO…!

4 MLD Demo since 2018
Ultimately 450 MLD

OTHER STATES LEADING CHARGE ON "ALTERNATIVE" TREATMENT FOR DPR

Example: Florida's PureALTA Demonstration Project (75 LPM since 2017)

Ozone

BAC UF GAC UV(AOP)

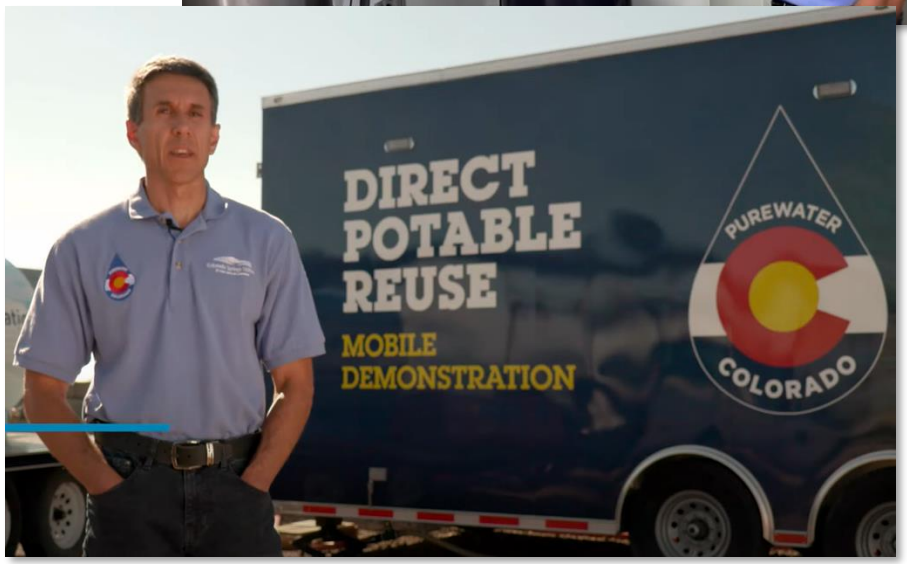
See: https://www.altamonte.org/1011/About-pureALTA for more information.

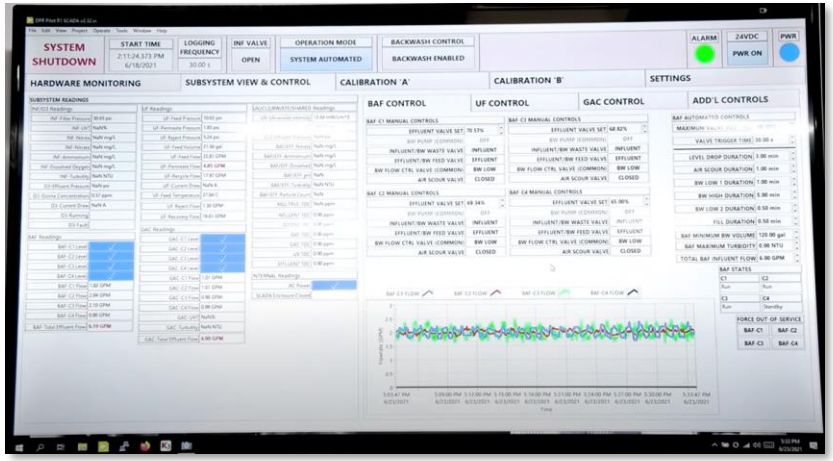
OTHER STATES LEADING CHARGE ON "ALTERNATIVE" TREATMENT FOR DPR

the international water association

Example: Colorado's DPR Mobile Demonstration (2021-)

1. Ozone
2. Biologically Active Carbon
3. Ceramic Microfiltration
4. GAC adsorption
5. UV Advanced Oxidation
6. Chlorine
7. Advanced Controls





See: https://youtu.be/pZO9AEAG7Ls for more information.

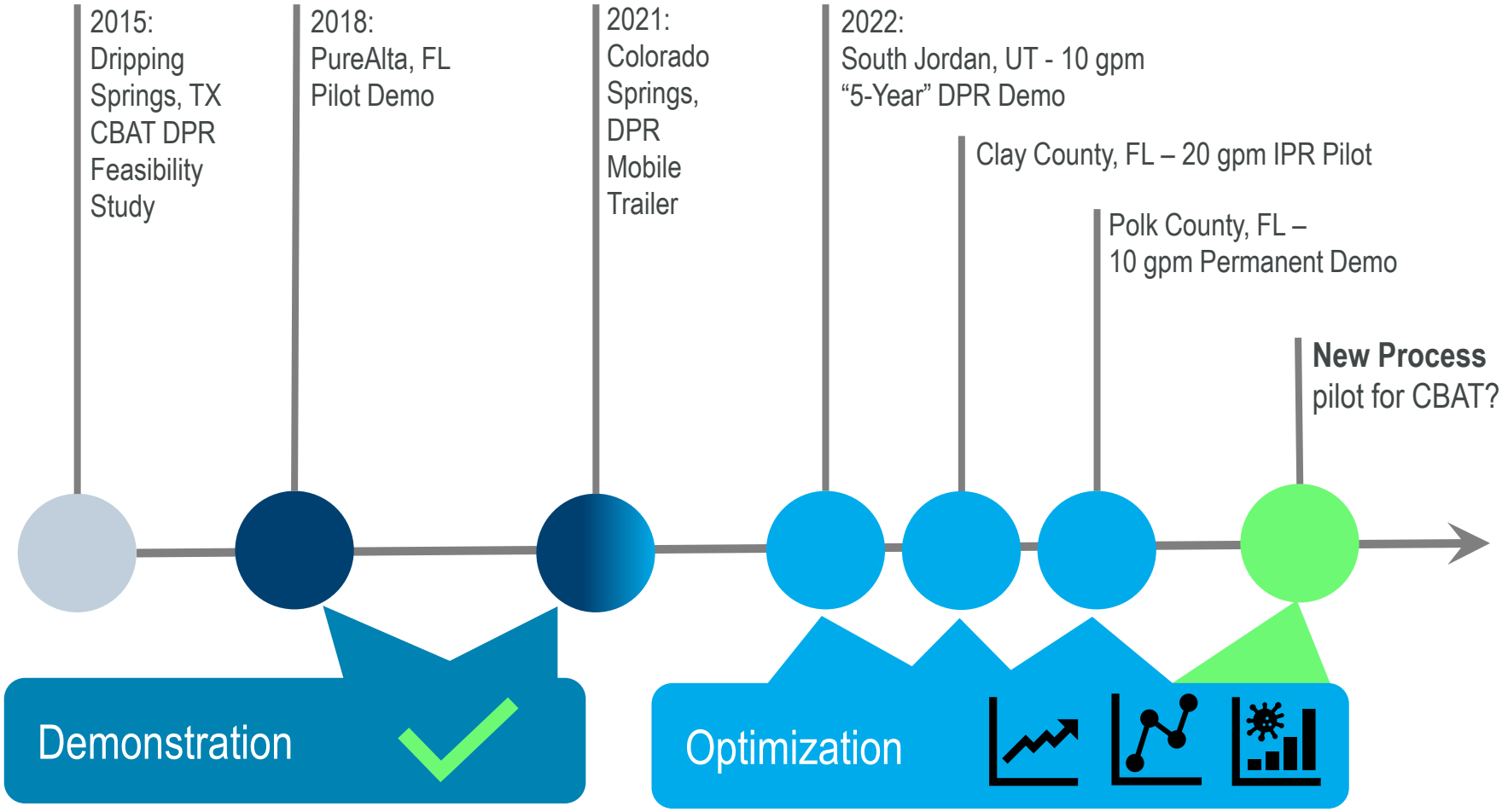
OTHER STATES LEADING CHARGE ON "ALTERNATIVE" TREATMENT FOR DPR

Example: Pure SoJo, South Jordan, Utah (Acclimation started December 2021)

0. *MBR with UV disinfection (full-scale)*
1. Ozone
2. Biologically Active Carbon
3. Ultrafiltration
4. GAC adsorption
5. UV Advanced Oxidation
6. *Demo only:* Point-of-use ion exchange
7. Chlorine

CARBON-BASED ADVANCED TREATMENT (CBAT) FOR DPR: MATURING THE FIELD

the international water association



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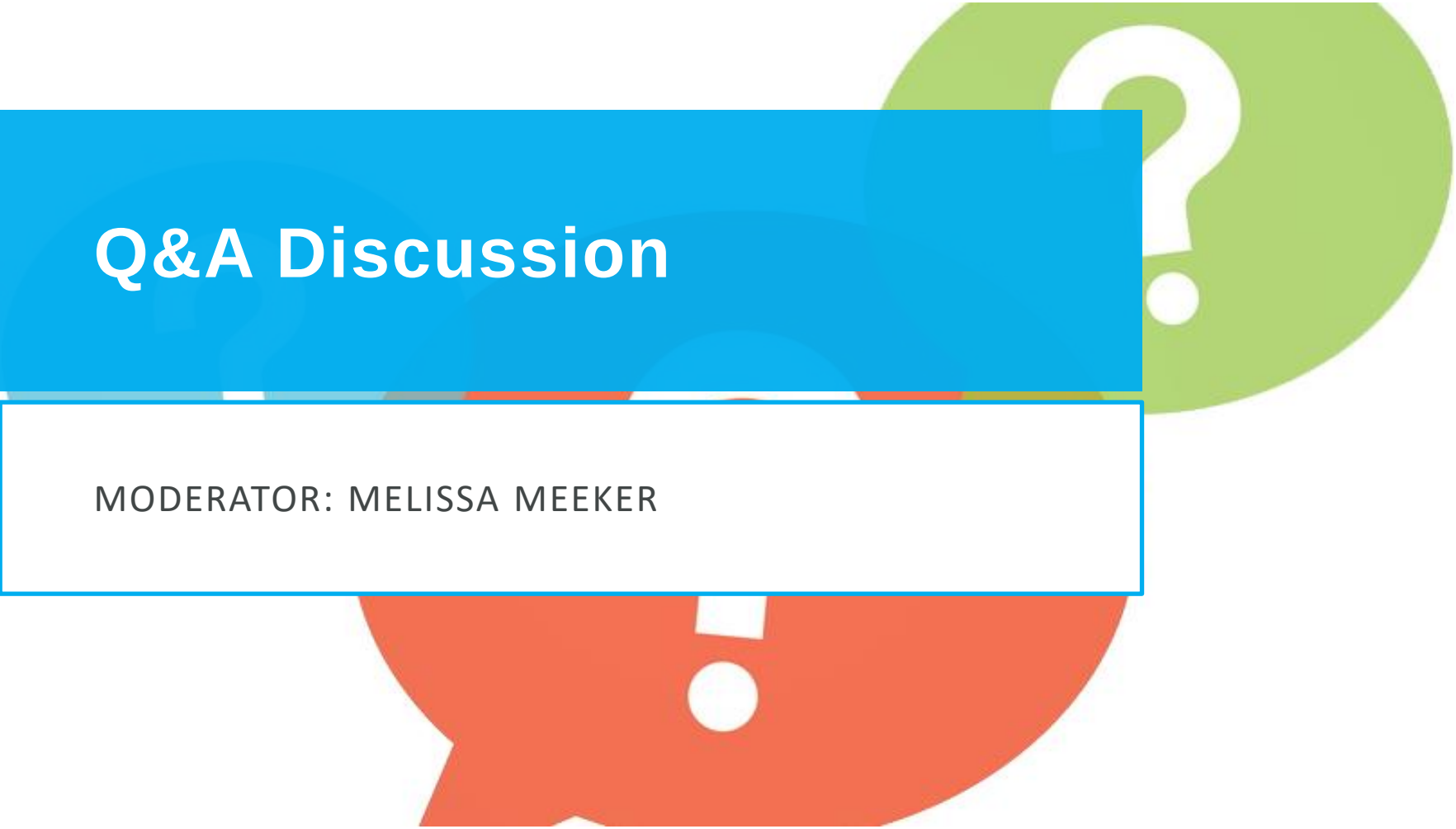
Q&A Discussion

MODERATOR: MELISSA MEEKER



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UPCOMING WEBINARS

Stay tunned for our next webinars:

https://iwa-network.org/learn/empowering-women-in-water-perspectives-from-latin-america-and-the-caribbean/

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