



Direct Potable Reuse: Industry Trends in Water Supply

Water Resources Review Committee



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*Colorado State Capitol
Denver, CO | October 29, 2015*



Basin Implementation Plans call for more reuse – e.g., the South Platte BIP:

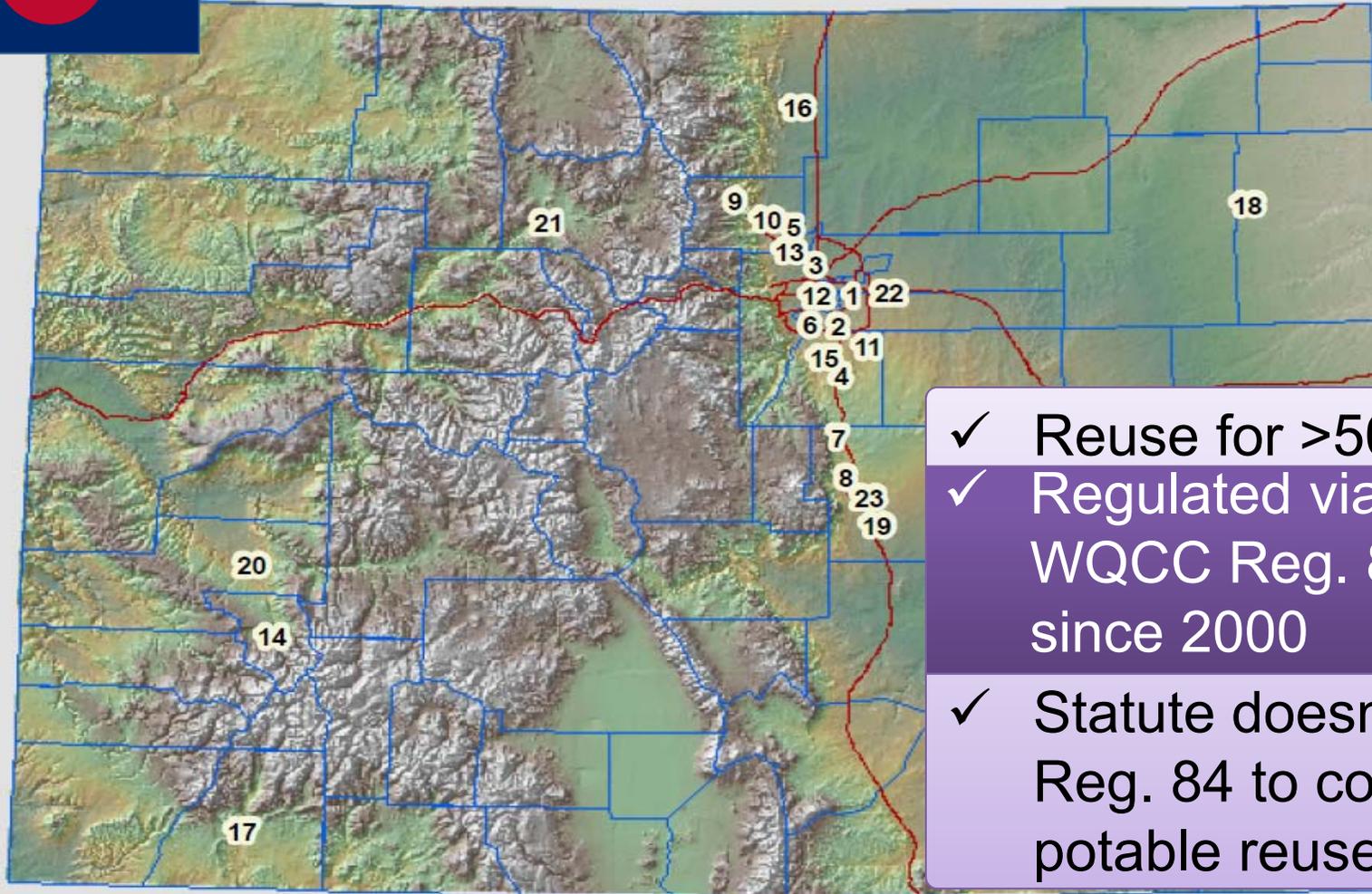
- “...**enhance current levels** of municipal water **reuse**.”
- “...continue to make the **most efficient use** of their supplies.”
- “...water **reuse** and conservation is a **critical component** of meeting future water needs.”



“...conservation and **reuse** will help address Colorado’s growing demands while **upholding our Water Values**.”



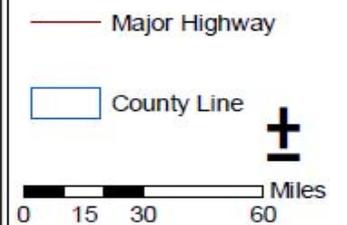
Nonpotable Reuse in Colorado



- ✓ Reuse for >50 years
- ✓ Regulated via WQCC Reg. 84 since 2000
- ✓ Statute doesn't allow Reg. 84 to cover potable reuse

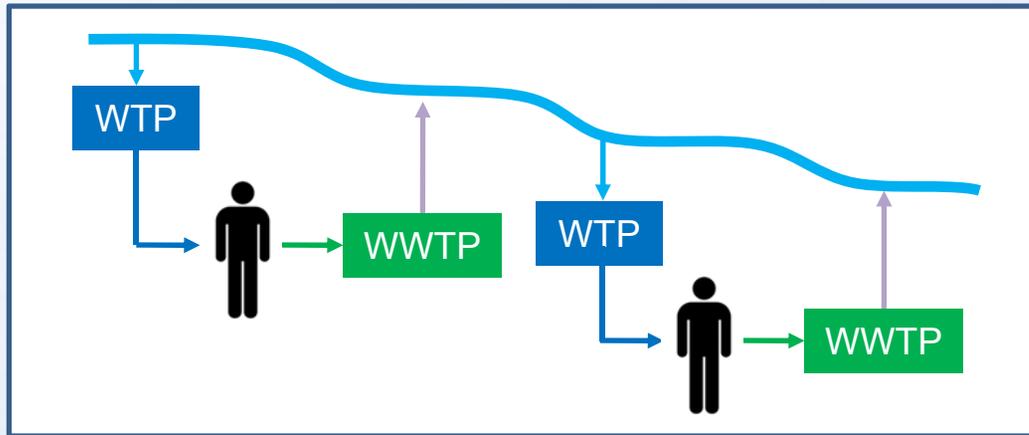
Colorado Reclaimed Water Providers

- | | | |
|---|---|--|
| 1 City of Aurora | 7 Donala - (Upper Monument Creek) | 16 Fort Collins |
| 2 Centennial Water and Sanitation | 8 JD Philips - Colorado Springs Utilities | 17 Tamaron Management - (Durango) |
| 3 City of Westminster | 9 Fairways Metro District - (Jamestown) | 18 Yuma |
| 4 Plum Creek Wastewater -(Castle Rock) | 10 Superior/Superior Metro District | 19 Fort Carson - (Colorado Springs) |
| 5 City of Louisville | 11 Stonegate Village - (Parker) | 20 Cornerstone Metro District - (Montrose) |
| 6 Meridian Metro District - (Englewood) | 12 Denver | 21 Kremmling |
| | 13 Broomfield | 22 Front Range Airport - (Watkins) |
| | 15 Lone Tree | 23 Las Vegas - Colorado Springs Utilities |

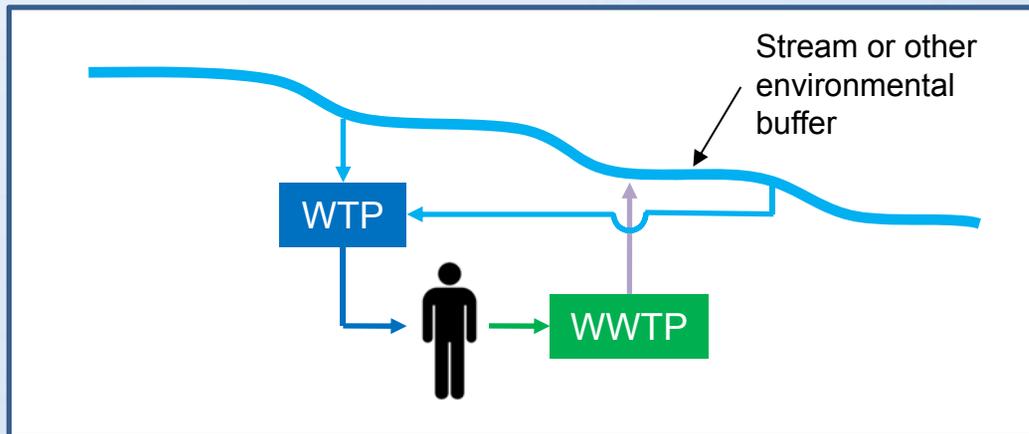


Types of Potable Water Reuse

“Unplanned” or “De Facto” Indirect Potable Reuse



“Planned” Indirect Potable Reuse



Indirect Potable Reuse is Essentially Commonplace Across the Nation

Examples of prominent IPR projects

San Diego:
Reservoir
Augmentation
Demonstration

Aurora & Parker:
Recapture of
Return Flows

**Upper
Occoquan:**
Surface Water
Augmentation

**Orange County
Water District:**
Groundwater
Replenishment

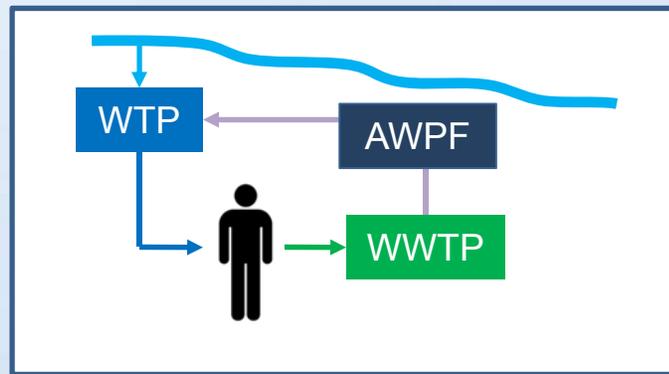
Gilbert:
Groundwater
Recharge
Ponds

NTMWD:
Surface Water
Augmentation

Types of Potable Water Reuse

Direct Potable Reuse (DPR)

- Advanced Water Purification Facility
- No Environmental Buffer
- Engineered Storage Buffer Replaces Environmental Buffer



DPR is Getting “Closer to Home”



Why is POTABLE Reuse Attractive Here?

- *Drought-resistant*
- *Local*
- *Lower energy*
- *Uses existing infrastructure*
- *Can be cost-effective*

Direct potable reuse

IPP Groundwater

Water

Other nonpotable uses

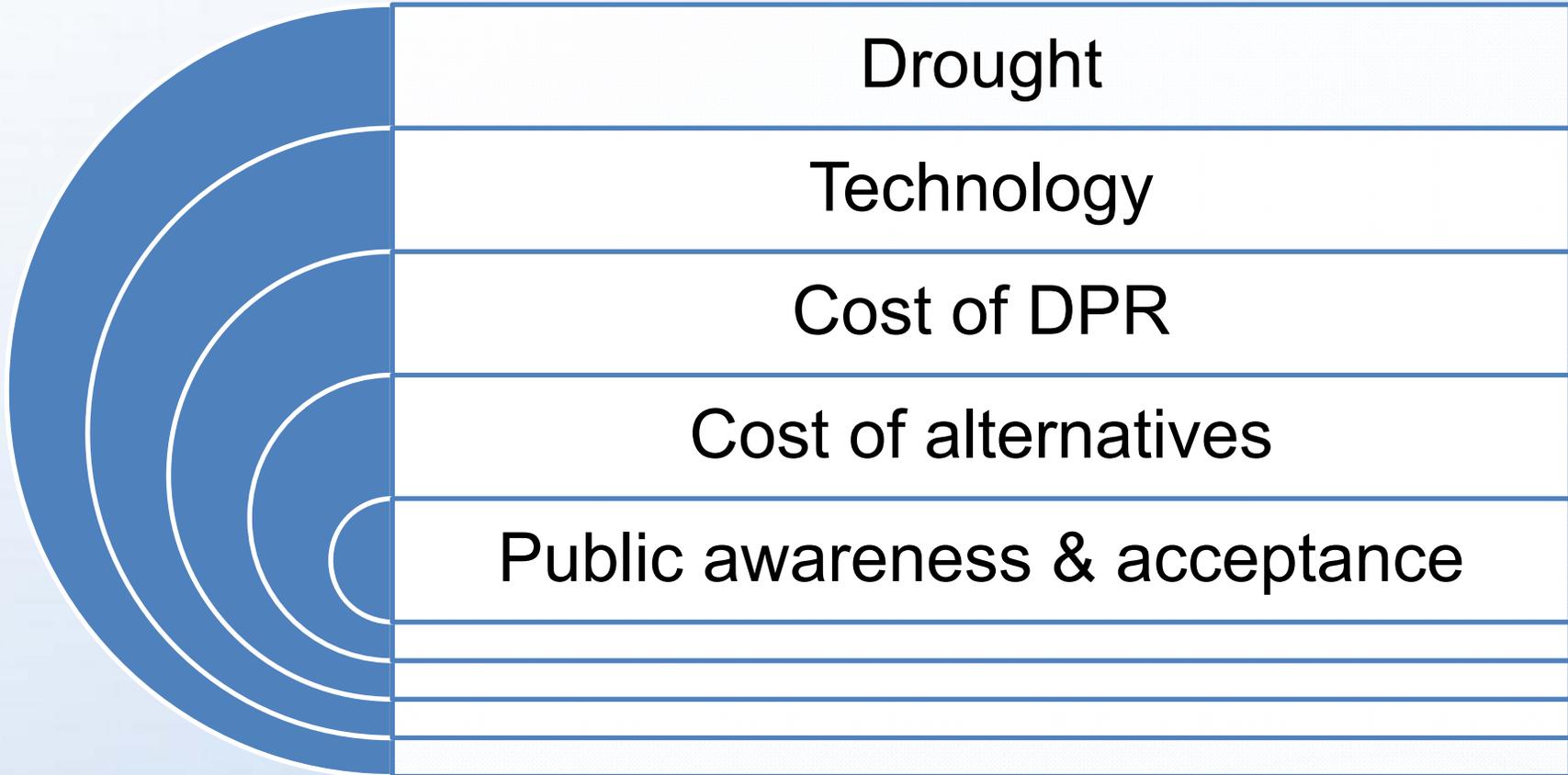
Landscape Irrigation

Year-round

Year-round

Seasonal

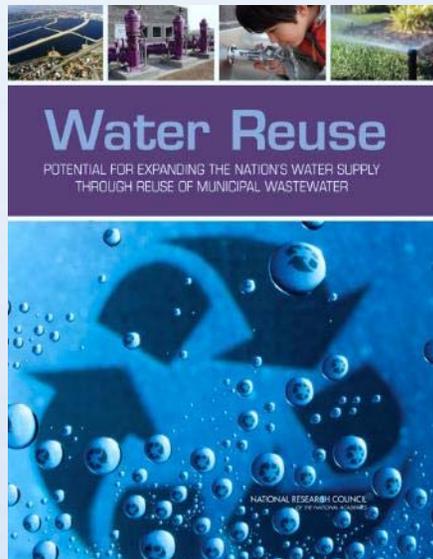
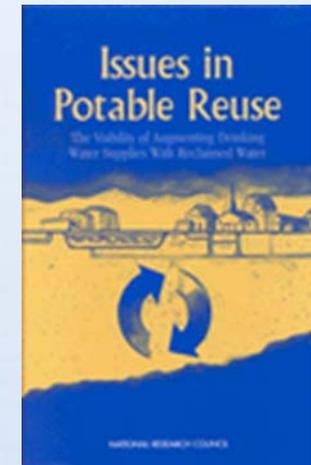
Why Did DPR Suddenly Gain Traction in TX and NM?



Perspectives are Quickly Evolving on Augmenting Potable Supplies with Purified Water

“...a solution of last resort...”

National Research Council – 1998

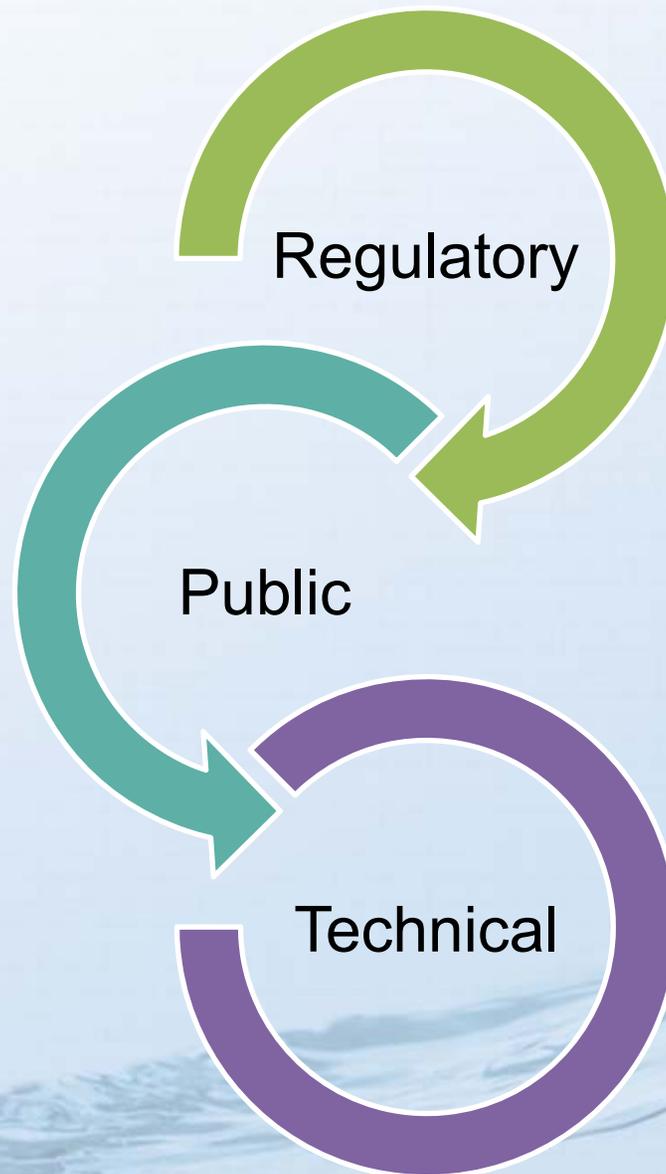


“...could significantly increase the nation’s total available water resources.”

AND... potable reuse projects can provide a higher quality water than conventional water supplies.

National Research Council – 2012

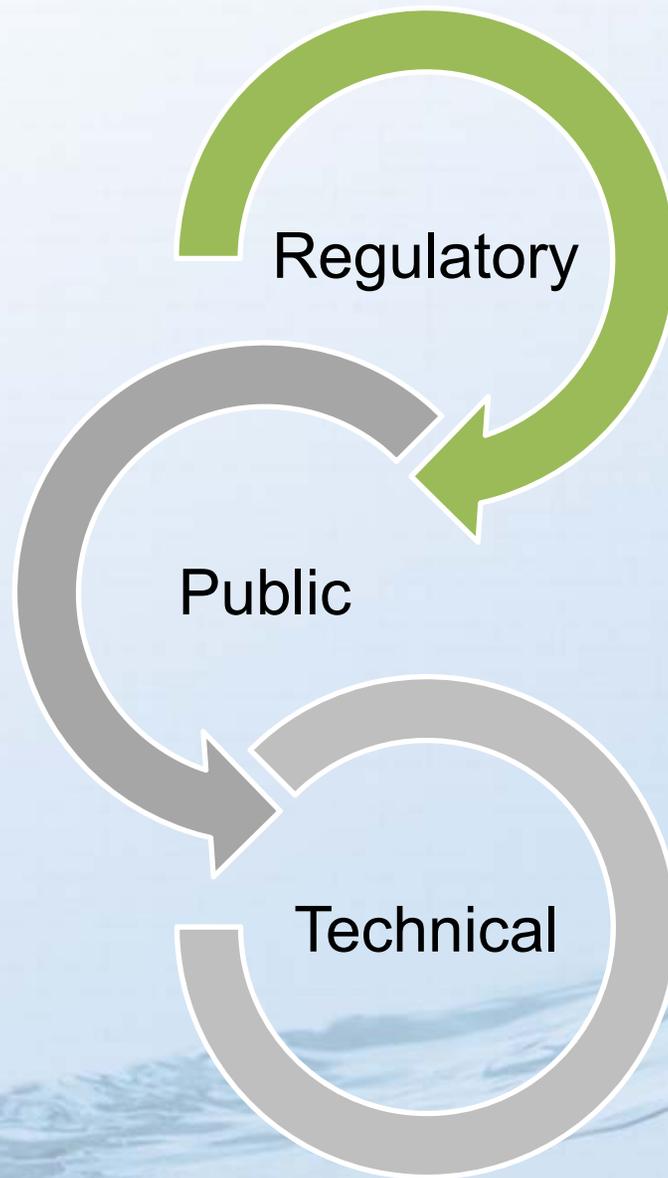
Three Key DPR Areas to Address



**WERF / CWCB
Workshop
May 2015:**

**Implementing
DPR in
Colorado**

Three Key DPR Areas to Address



What are our primary water quality concerns with potable reuse?

Acute

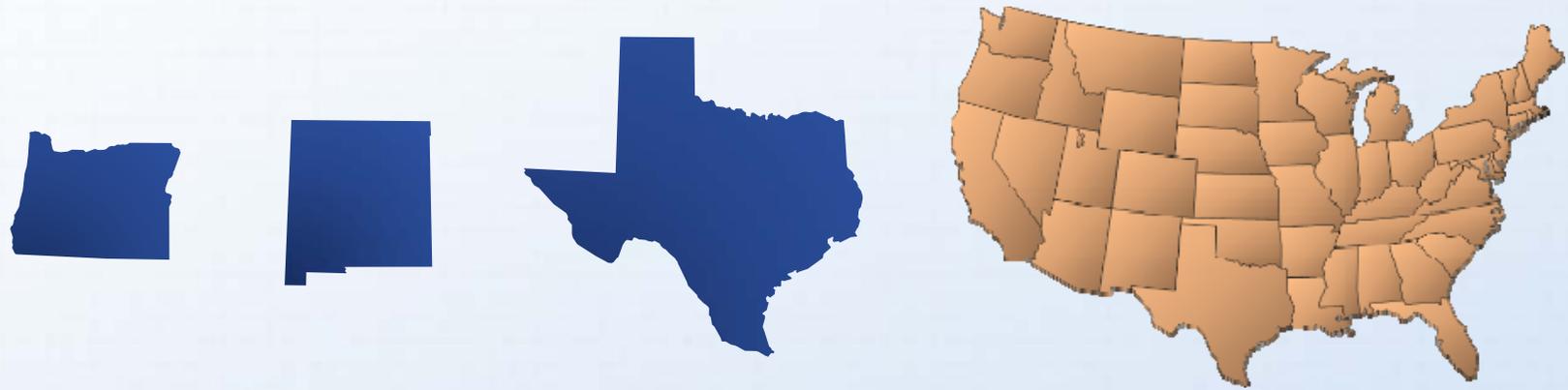
- Pathogens
(virus, crypto, giardia, bacteria)

Chronic

- Trace Organic Compounds

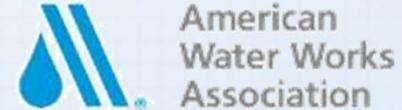
Example treatment goal: 12-log virus reduction

99.999999999999% removal



Oregon DEQ,
New Mexico Environment Dept.,
Texas CEQ, and
NWRI National Expert Panels
all agree that DPR can be implemented safely

Path Toward National Guidelines



- No National Regulations Exist
- Many States and Considering Their Own Approaches (TX, CA, OK, NM)
- National Framework published by industry leading organizations in September 2015.



Blending Requirements
Direct Potable Reuse T

**DEVELOPING A DIRECT POTABLE REUSE
FRAMEWORK WHITE PAPER FOR THE
WATERREUSE ASSOCIATION**

**Third Meeting
NWRI Expert Panel**
Washington, DC
January 21, 2015

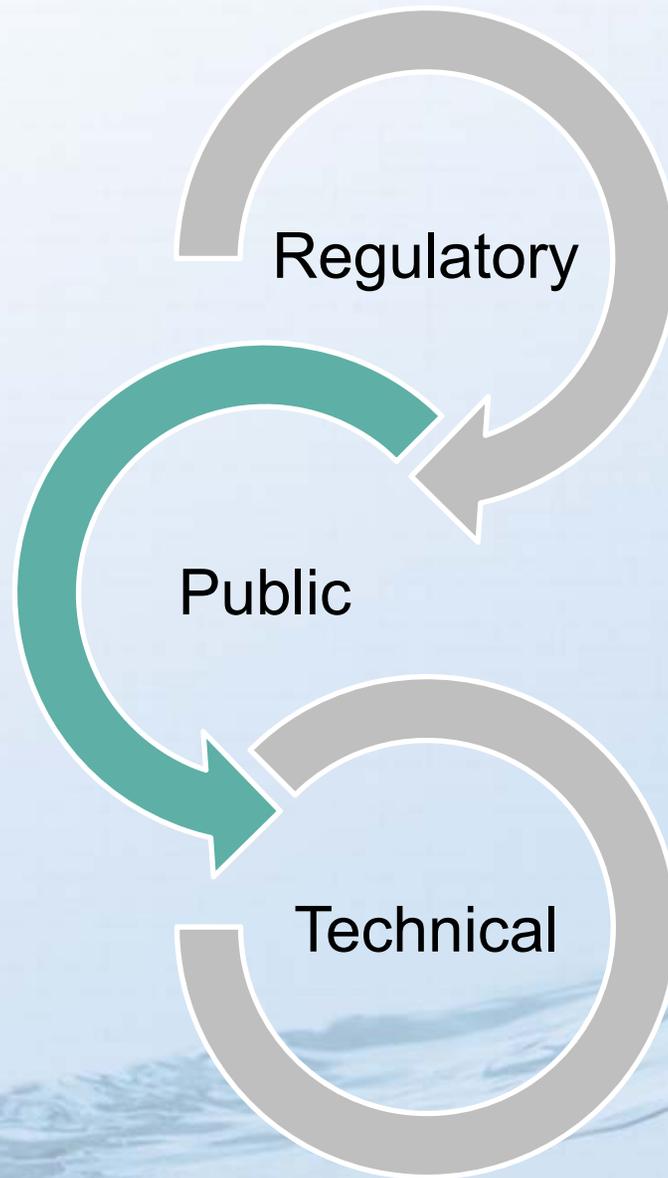
National Water Research Institute
Fountain Valley, California



...y of Innovative Treatments
Reclaimed Water



Three Key DPR Areas to Address



California's OCWD has Successfully and Consistently Addressed Public Concerns about IPR Since 1976

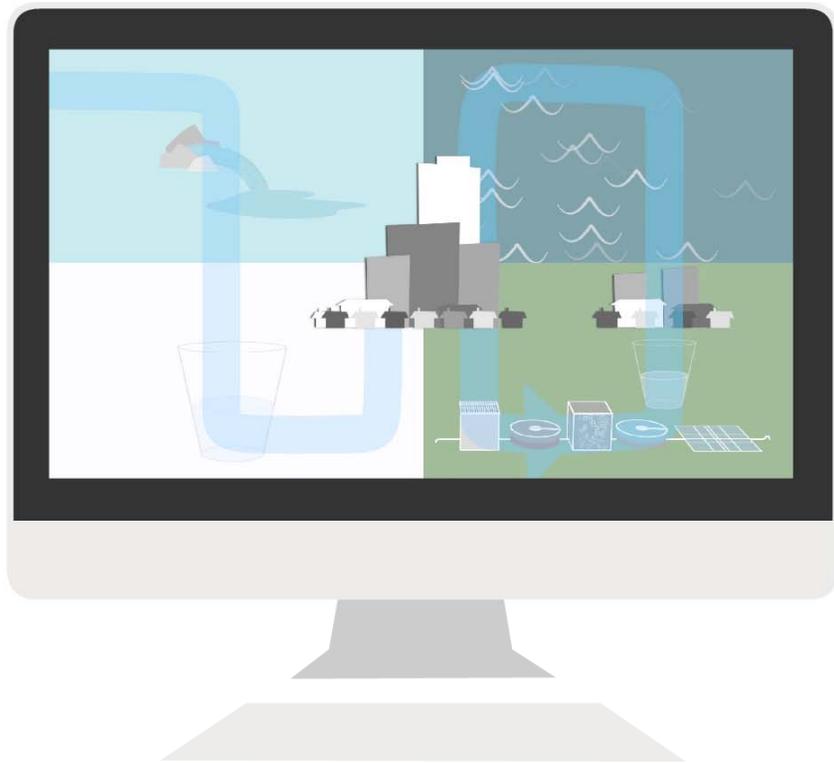


The Ways of Water



Educational messages delivered in a clear, straightforward way can facilitate the understanding and acceptance of direct potable reuse.

"After viewing a short animation of water supply (The Ways of Water), subscribers who support West Basin's Water Reliability 2020 program expressed a remarkable level of support for direct potable reuse"



*If the survey respondents were aware direct potable reuse is the lower cost option, the "low-cost" and "direct pathway" votes for Q14 ("reflecting your opinion") could arguably be combined

Ventura, CA: Water Pure Demonstration



Ventura Water Pure Demonstration

abc 7 EYEWITNESS NEWS
ABC7 • LOS ANGELES

70° Los Angeles, CA
CLEAR EDIT

SECTIONS TRAFFIC VIDEO

BREAKING NEWS 6 SoCa

BEAT THE DROUGHT
VENTURA COMPANY MAKING WASTEWATER DRINKABLE

BEAT THE DROUGHT
VENTURA COMPANY MAKING WASTEWATER DRINKABLE

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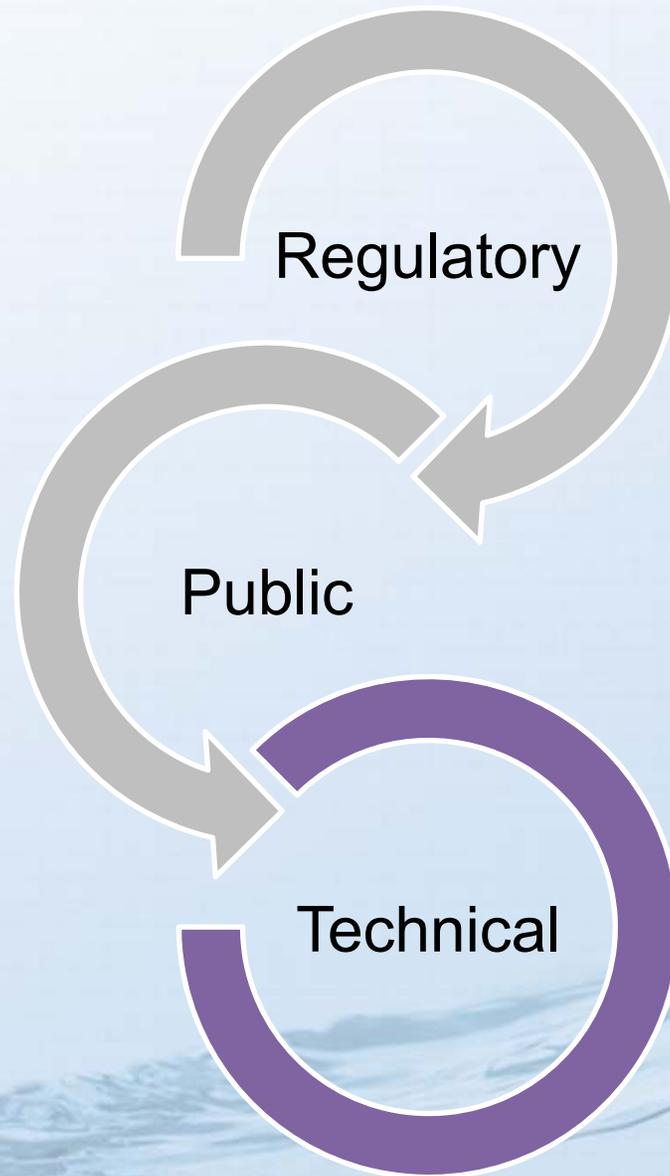
water

Water conservation leaves devastating

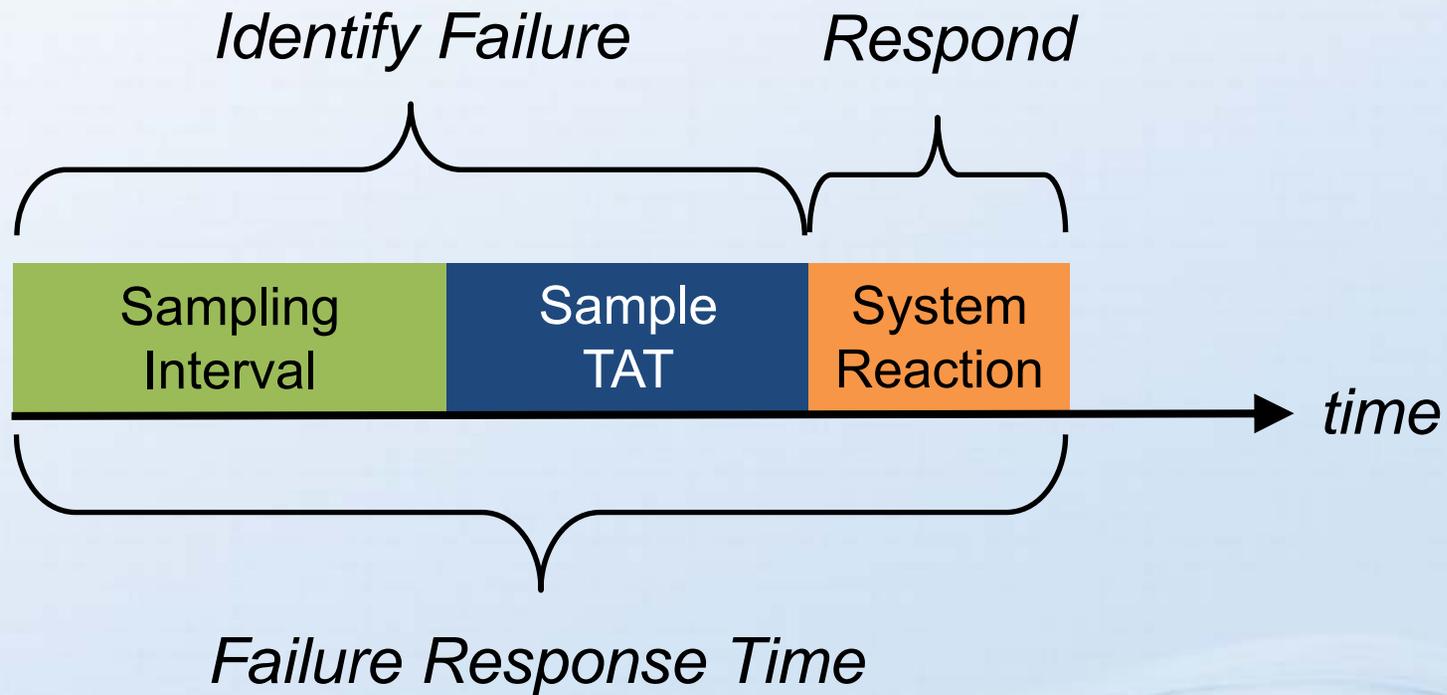
<http://abc7.com/news/ventura-company-making-wastewater-drinkable/859119/>

mwd/101311.pptx/21

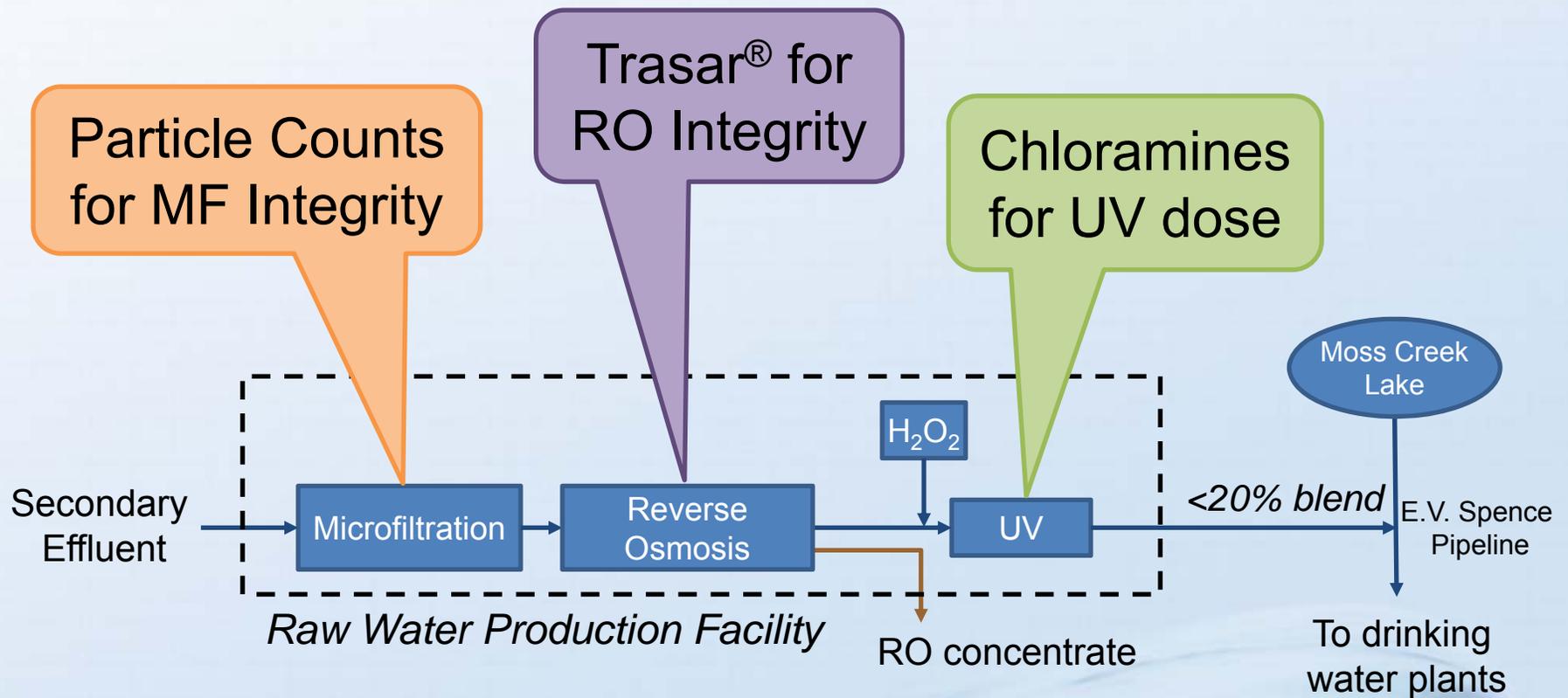
Three Key DPR Areas to Address



Failure response time becomes critical with potable reuse



Monitoring study at Big Spring is assessing new monitoring tools with potential regulatory benefits



How is Research Advancing Potable Reuse?

\$6 million
pledged for research

\$4.5 million
on
25 projects
to date

California DPR Initiative

- DPR vs. alternatives
- Economics
- Potential DPR trains
- Reliable, redundant treatment performance
- Critical control points
- Pathogens: Surrogates, credits
- Pathogens: Rapid/continuous monitoring
- Failure and Resiliency
- Public perception and acceptance
- CEC removal and risk
- Operations Training, Framework
- Source Control

Source: WateReuse Association California Direct Potable Reuse Initiative
REPORTING ON SIGNIFICANT PROGRESS
Fall 2014/Winter 2015

Proactive Steps to Prepare Colorado for Direct Potable Reuse



2016 CWCB WSRA Grant Application

Advancing DPR to Optimize Water Supplies and Meet Future Demands

- ✓ **Regulatory Framework**
- ✓ **Public Outreach at Local & State Level**
- ✓ **Leveraging DPR Planning Tools**

Key Takeaways: What the Future Holds

Progress will be a function of...

Scarcity /
Options

Provider
Interest

Technology
& Costs

Public
Acceptance

- Potable reuse is a game-changer for our industry
- Regs are being driven by projects and “demand”
- DPR drives a need for new monitoring technologies and a focus on response times
- Applied research is paving the way for understanding treatment options, treatment goals, and operational guidance



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*Colorado State Capitol
Denver, CO | October 29, 2015*