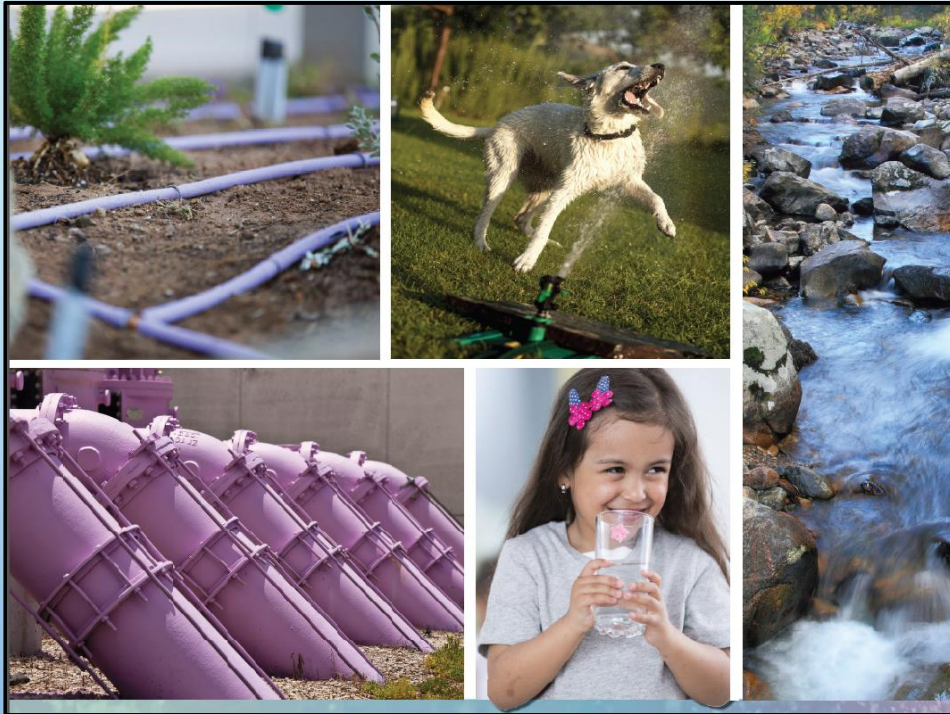


# Water Reuse in Colorado 2019 Update



Interim Water Resources  
Review Committee  
October 24, 2019

*Laura Belanger*

Water Resources Engineer  
Western Resource Advocates

*Donene Dillow*

Environmental Specialist  
Colorado Springs Utilities

*Damian Higham*

Senior Planner  
Denver Water



# Outline

- Reuse Overview
- Progress Update and Next Steps
  - Reclaimed Water
  - Direct Potable Reuse



**Currently, we have more reusable water than we are able to use.**

80% of Colorado voters polled support increasing water conservation and reuse - 2018 State of the Rockies, Colorado College Poll

# Colorado Water Plan and Reuse



- 2050 Municipal & Industrial (M&I) supply-demand gap as high as 560,000 acre-feet/year
- “Water conservation activities and water reuse will play an important role in balancing the need for additional water supply with strategies to lessen that need.”
- “Widespread development of potable reuse will be an important facet of closing the future water supply and demand gap.”



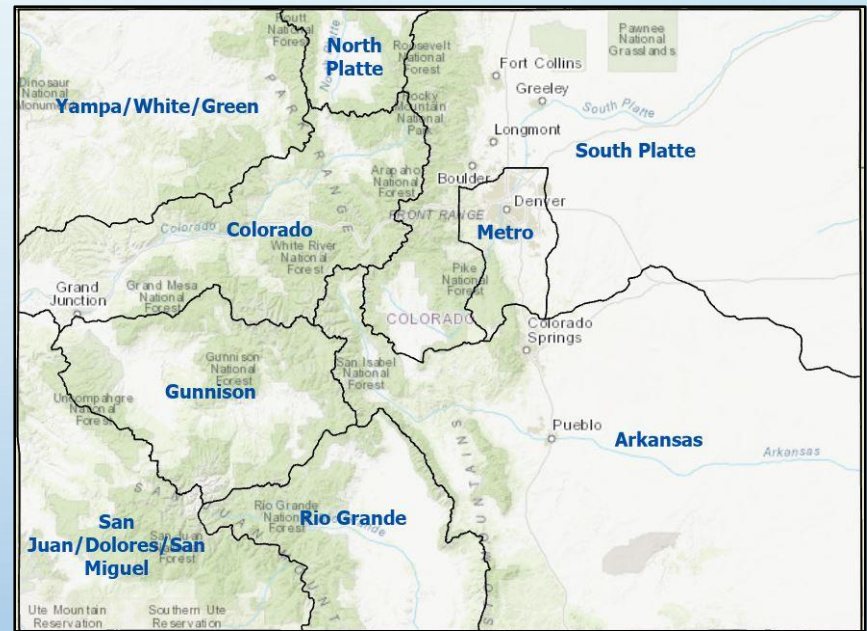
# Colorado Water Plan and Reuse



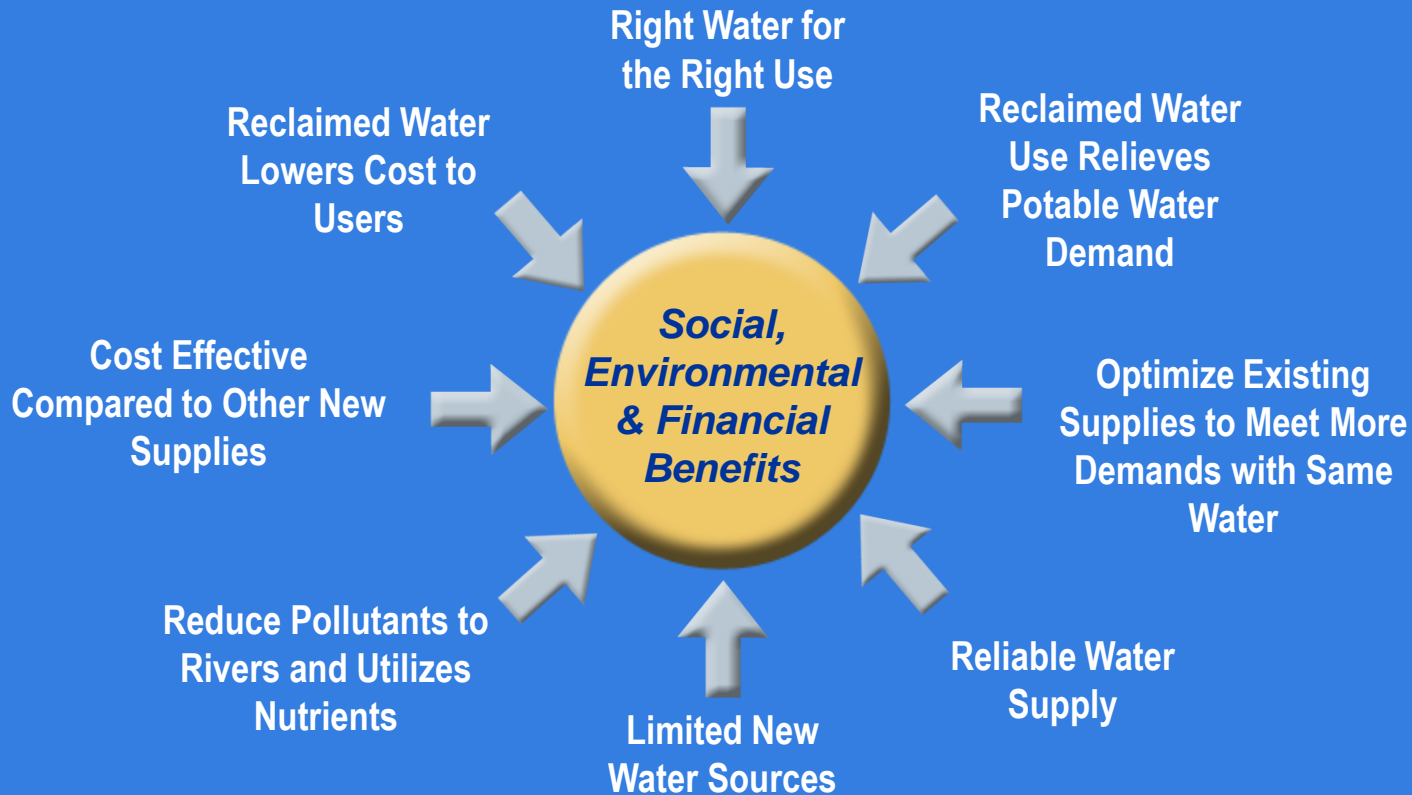
- “The CDPHE is committed to working with stakeholders to ensure that health and environment are protected while water reuse expands”
- Encouraging reuse in Colorado:  
Increase funding and incentives for water recycling and expand approved uses of recycled water.

# How Much Can We Reuse?

- Potential reuse volumes are not well quantified
- ~90,000 AF reuse yield from Metro, South Platte and Arkansas Basin projects in 2015 SPBIP & SWSI 2010
- Upcoming: Basin Implementation Plan updates will review and update reuse projects and potential yields.



# Some of the Reasons to Reuse Water



Water can be treated to meet the water quality & safety needs of any intended use.

# **Non-Potable Reuse (Reclaimed Water) in Colorado**

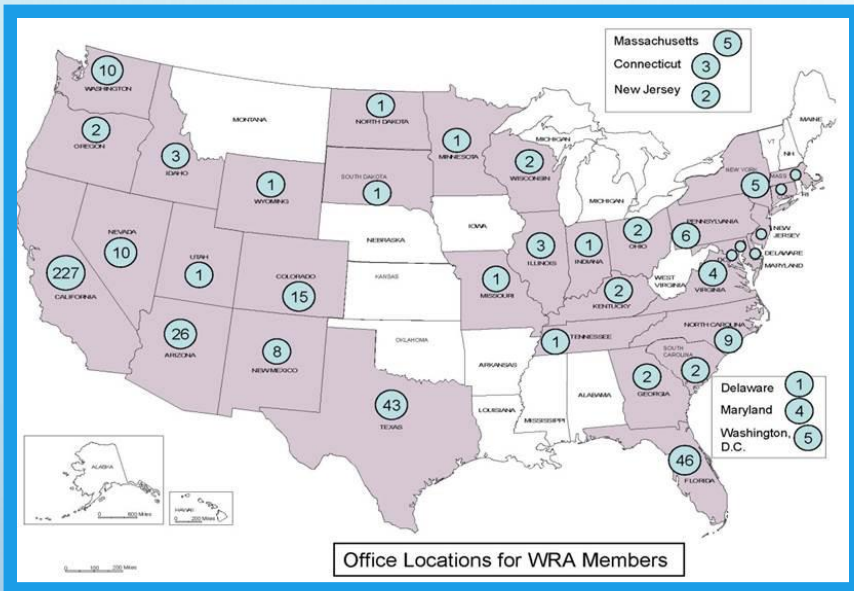
# Reclaimed Water Basics

- Source = Wastewater that has been treated to meet permit limitations then further treated by a reclaimed water treatment facility to meet specific water quality standards
- WQCC Regulation 84 governs reclaimed water
- 5.2 billion gallons/year potable water saved with non-potable reuse in CO
- Delivered in separate purple pipe distribution systems
- Currently, seasonal landscape irrigation makes up the majority of consumption





# Historical Use



## Globally

- Israel (80%)
- Singapore (15%)
- Australia (8%)
- United States (6%)

## Locally

- 27 providers
- Over 50 years of use in both Colorado Springs and Aurora
- 15 years in Denver

## Nationally

- >100 years of use in crop irrigation
- >70 years of use for landscape irrigation
- >40 years for drinking water augmentation

# Reclaimed Water History & Future



2000  
**New Reg 84:**  
landscape irrigation

2005  
**Reg 84:**  
expanded irrigation

2018  
**Legislation**  
**Reg 84:**  
toilet flushing and localized systems

2020  
**Upcoming**  
**Reg 84:**  
oil and gas production and development



**One Water?**

2004  
**Reg 84:**  
cooling towers, industrial and commercial

2013  
**Reg 84:**  
commercial laundries and car washes



2019  
**Reg 84:**  
edible [food] crops and industrial hemp



# **Potable Reuse (Purified Water) in Colorado**

# Potable Reuse



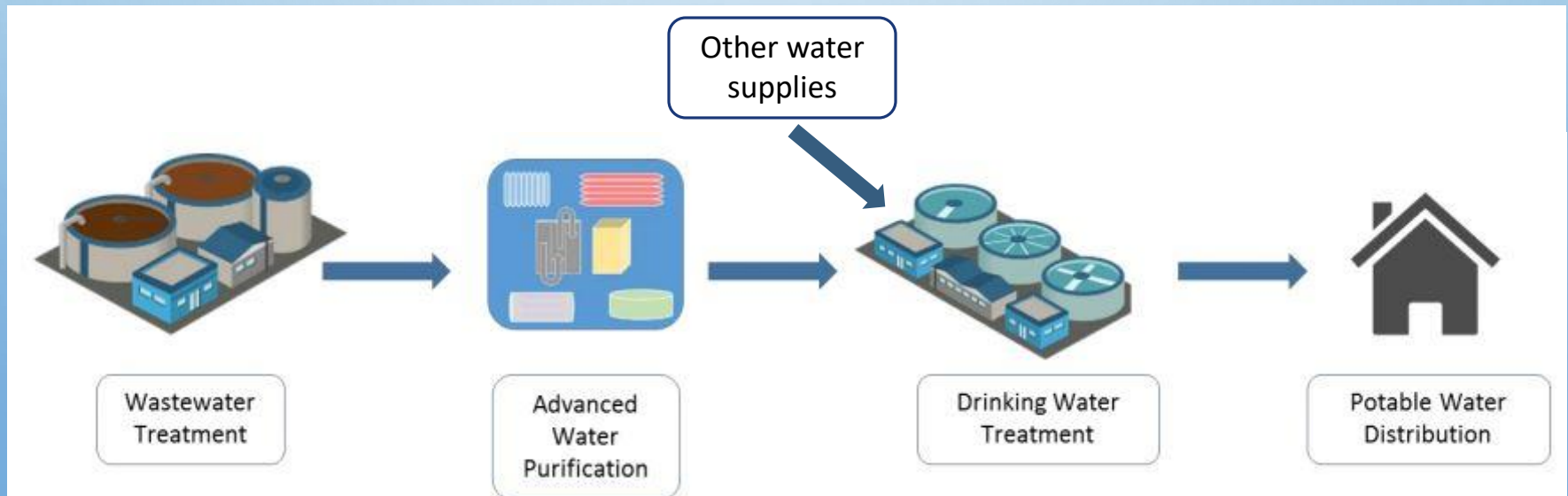
Today: Indirect Potable Reuse (IPR)

Discharge to “environmental barrier” (stream, lake, groundwater) first

Coming: Direct Potable Reuse (DPR)

No “environmental barrier”

More demands can be met with potable reuse from the subsequent reuse of indoor return flows.





# Direct Potable Reuse (DPR) Considerations

## Benefits

- Purified water provides a safe, high-quality drinking water supply
  - Can use for anything, including indoors, making the most of each drop
  - Water supply & demand timing is not an issue
- Financial
  - Avoid transit losses, pumping, and transmission costs compared to IPR and traditional source waters
  - Increasingly stringent effluent discharge limitations may make treatment to drinking water standards more cost effective
  - Does not require purple pipe infrastructure

## Issues to Address

- Regulatory Uncertainty
  - No federal or Colorado state regulations
  - Difficult to plan and design potential projects without regulations
- Public Perception

## Solutions

- WRCO project to develop DPR regulatory framework & WQCC DPR Rulemaking
- Potable reuse education

# WaterReuse Colorado (WRCO) DPR Project

Collaborative, Phases 1 & 2

Colorado Water Conservation Board

CDPHE Water Quality Control Division

Basin Roundtables: Metro, South Platte, Colorado, North Platte

WaterReuse Colorado

WaterReuse Association

Water Research Foundation

National Water Research Institute

Western Resource Advocates

Denver Water

City of Aurora

Town of Castle Rock

South Metro Water Supply Authority

Centennial Water & Sanitation District

Plum Creek Water Reclamation Authority

Colorado Springs Utilities

Meridian Metropolitan District

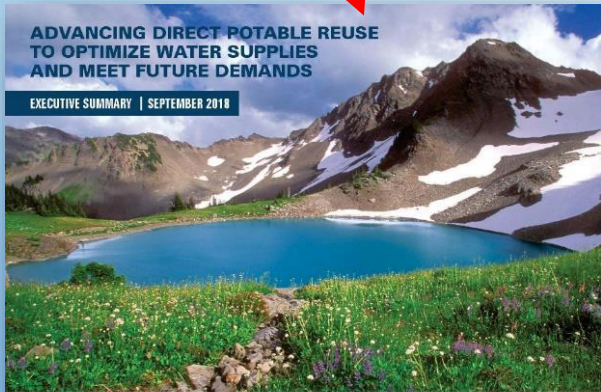
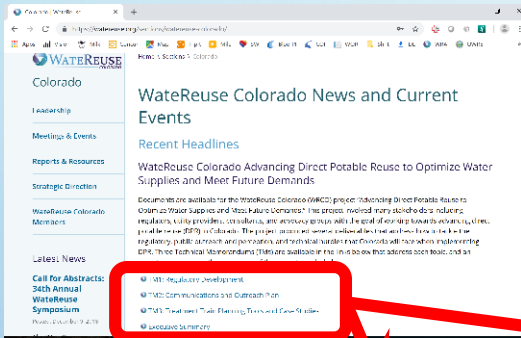
Carollo Engineers

MSK Consulting

Stantec

Jacobs

# WaterReuse Colorado DPR Project: Phase 1 (2018) Results



Executive  
Summary



WaterReuse Colorado  
Advancing Direct Potable Reuse to Optimize  
Water Supplies and Meet Future Demands  
Technical Memorandum 1  
DEVELOPMENT OF DPR  
REGULATIONS IN COLORADO

FINAL | July 2018



Tech Memo 1  
Reg Framework



WaterReuse Colorado  
Advancing Direct Potable Reuse to Optimize  
Water Supplies and Meet Future Demands  
Technical Memorandum 2  
COMMUNICATIONS AND OUTREACH  
PLAN FOR DIRECT POTABLE REUSE  
IN COLORADO

FINAL | July 2018



Tech Memo 2  
Outreach



WaterReuse Colorado  
Advancing Direct Potable Reuse to Optimize  
Water Supplies and Meet Future Demands  
Technical Memorandum 3  
POTABLE REUSE PLANNING TOOLS  
AND CASE STUDIES

FINAL | September 2018



Tech Memo 3  
Planning Tools

# Critical Categories Identified for DPR Regulation

1. Definitions/Terminology
2. Source Control
3. Wastewater Treatment
4. Pathogen Disinfection/Removal
5. Chemical Pollutants
6. Advanced Treatment Processes
7. Monitoring Requirements
8. Reporting
9. Facility operations/ certification programs
10. Education and outreach
11. Technical, Managerial and Financial (TMF) capacity



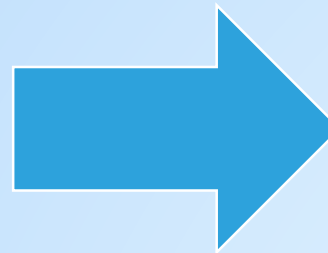
# WaterReuse Colorado's DPR Project Phase 2



- Collaborative effort:
  - NWRI expert panel
  - Colorado stakeholders
  - CDPHE & CWCB
- April 2018 – Dec 2019
- Develop detailed regulatory proposal with supporting technical information for a CDPHE DPR rulemaking



# Colorado's Three-Tiered Approach

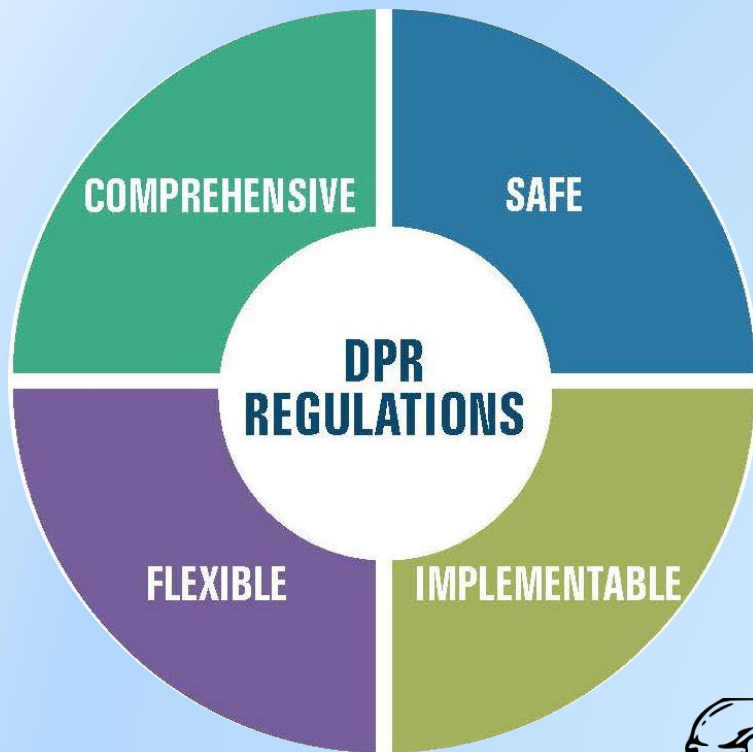


Flexibility



Adaptability

# Key Goals and Next Steps for Colorado DPR Regulations



## Next Steps:

- WRCO Phase 2 project will be completed in 2019
- Possibly begin rulemaking stakeholder work in 2020
- Possible WQCC rulemaking and CDPHE policy and guidance finalization in 2022



Purified water (DPR) projects can help ensure a sustainable water future for Colorado

# Colorado Springs Utilities DPR Demonstration

- Applied for CWCB grant (award announcement Nov. 2019)
- Collaborating with Colorado School of Mines
  - Other entities are also supporting or expressed interest in supporting: Aqua Aerobic LLC, HACH, Denver Water, Aurora Water, Plum Creek Sanitation District, WRCO
- Project designed, not to prove technology but as an introduction to DPR for our ratepayers and other stakeholders
  - Level out the education and acceptance curve for this water source
- Proposed water production July, Aug., Sept. 2020
  - Specifically chosen to capitalize on the 2020 WaterReuse Symposium being held in Denver (Sept 13-16, 2020)
- Beverage production planned

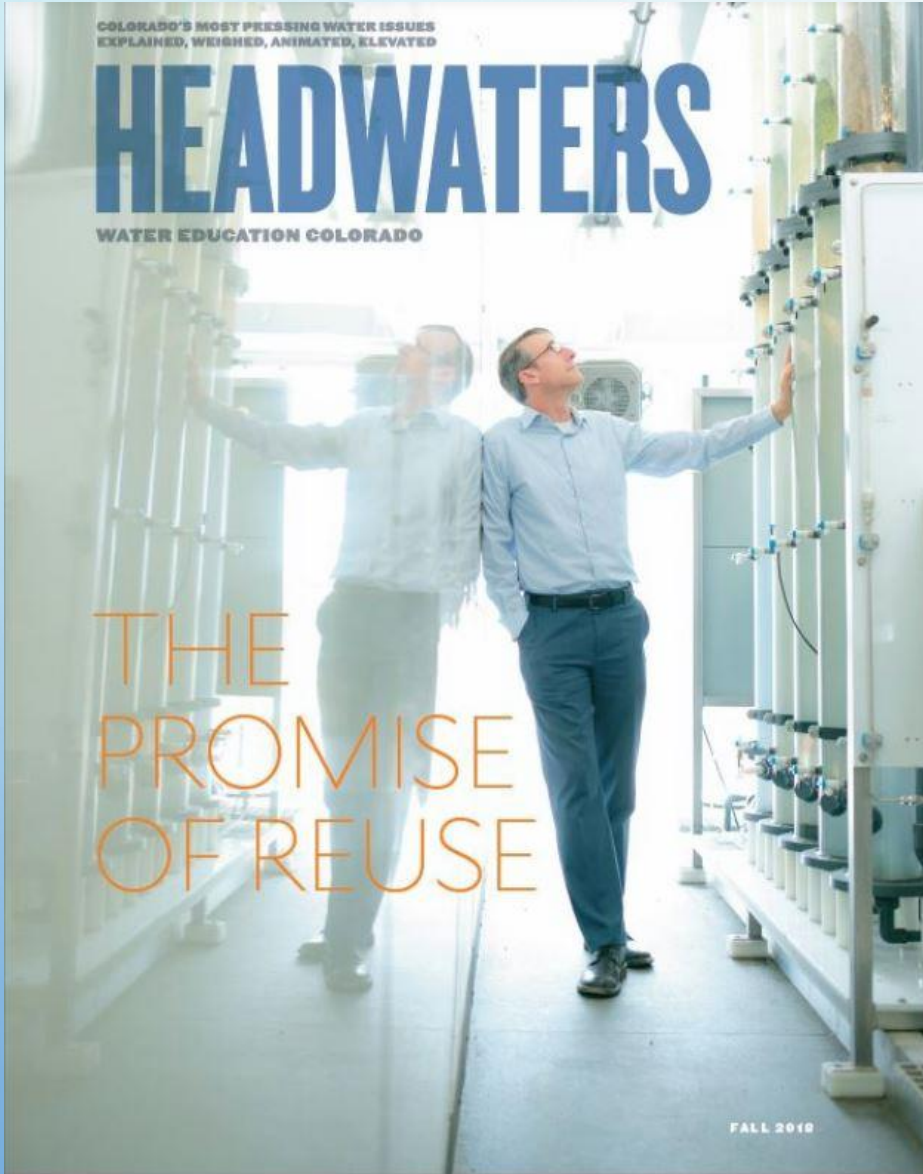
Hope to have both alcoholic and non-alcoholic beverages produced

Colorado Springs Utilities would be honored to have you attend a tour of our demonstration. You will receive an invitation in 2020.



*You are  
Invited*

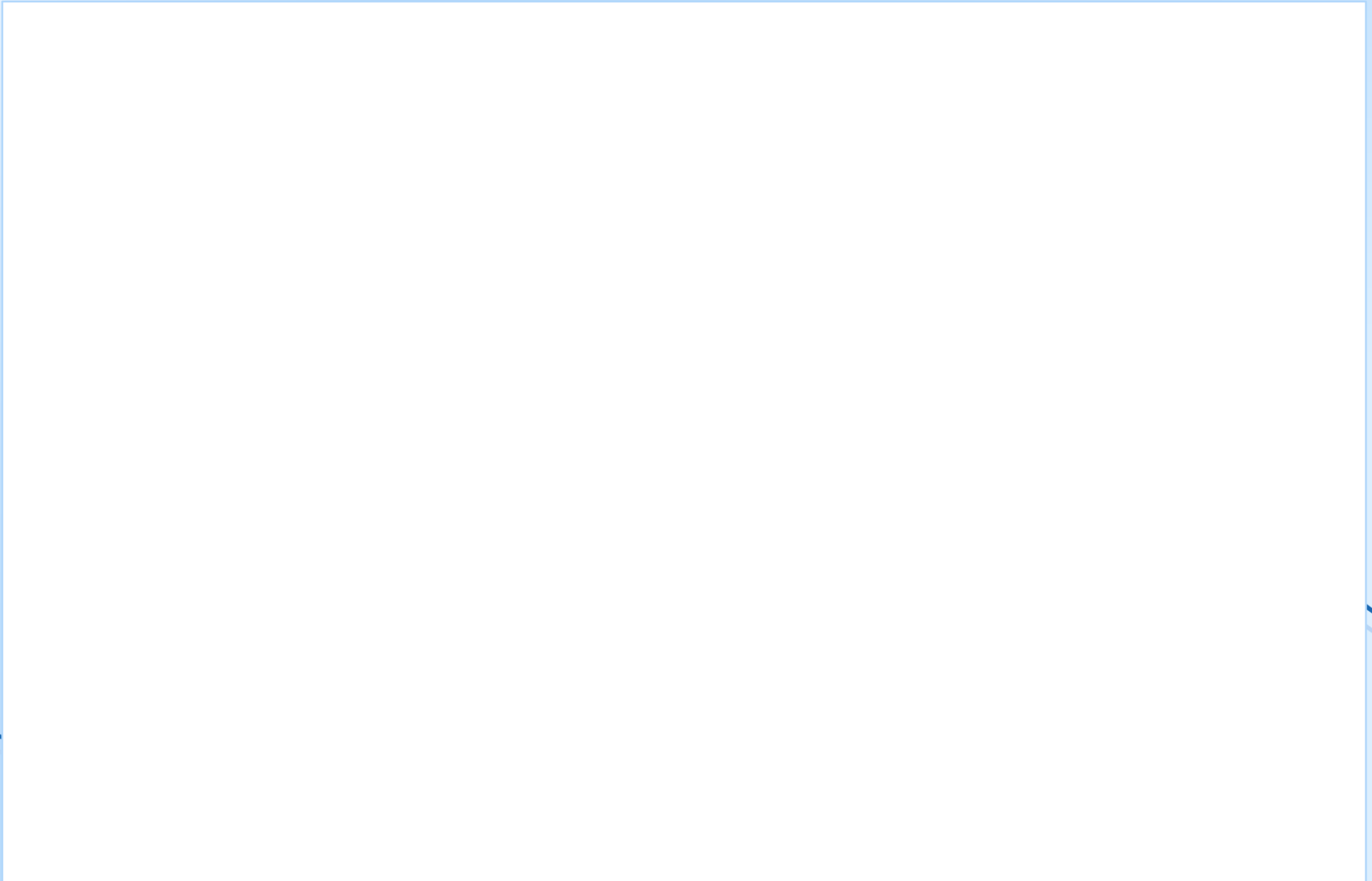




**Thank you  
Questions?**



## Clarification slides – use to answer questions



# Reuse Overview

- Reusable Water = Fully Consumable Water:
  - Transbasin Diversions (most)
  - Transferred Consumptive Use
  - Nontributary Groundwater
  - Other Decreed Reusable Supplies
- Methods of Water Reuse:
  - *De facto* Reuse (by downstream users)
  - Reuse by Exchange
  - Non-Potable Reuse
  - Indirect Potable Reuse
  - Future: Direct Potable Reuse

