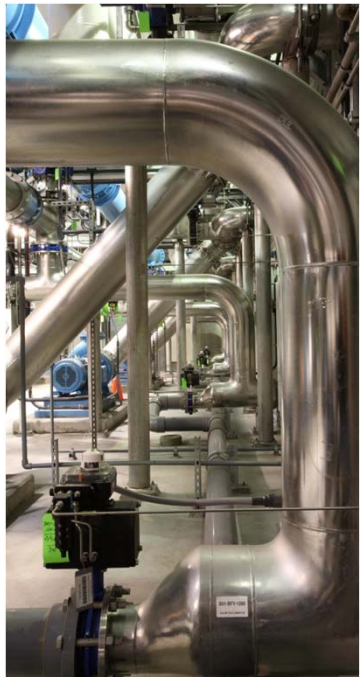
WateReuse in the West – Strong and Growing

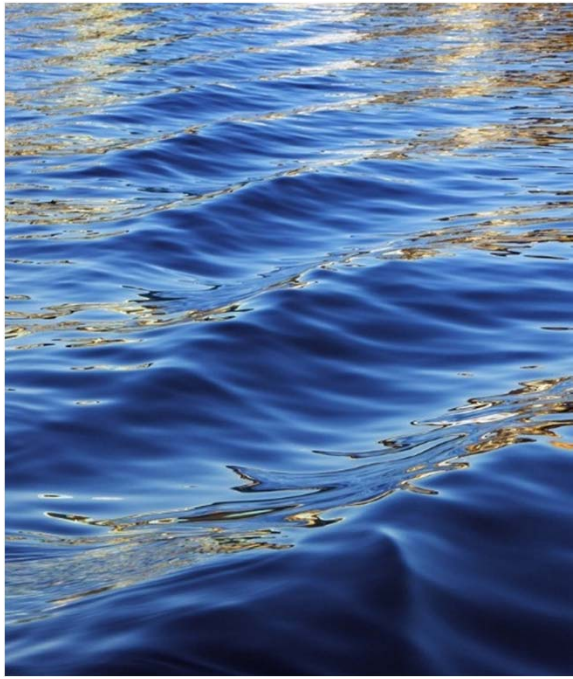
Robert (Bob) M. Johnson
McManus & Johnson, Inc.
President, WateReuse Association

May 21, 2014

WATEREUSE ASSOCIATION

Sustainable Solutions for a Thirsty Planet®





Topics

- Overview of Water Reuse
- WateReuse Association
- Success Stories
- Water Scarcity
- Water Reuse in the West
- Direct Potable Reuse
- The Future

WATEREUSE ASSOCIATION
Sustainable Solutions for a Thirsty Planet®

WATEREUSE ASSOCIATION

Sustainable Solutions for a Thirsty Planet®

Factors Driving Water Reuse

- Drought
- Population growth
- Increased municipal, industrial, and agricultural demand
- Dependence on single source of supply
- TMDLs/Nutrient load caps

"Water scarcity"

WATEREUSE ASSOCIATION
Sustainable Solutions for a Thirsty Planet®

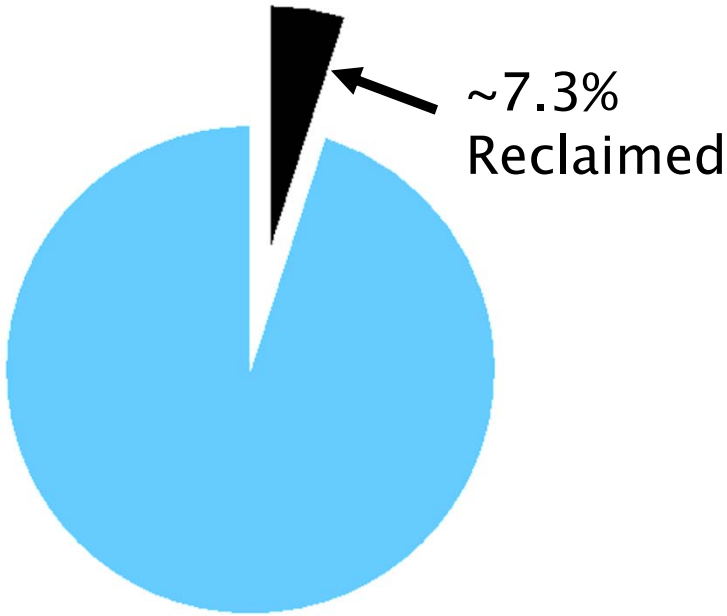
Water Reuse Challenges

- Technical Challenges
  - Chemical Risks
  - More Cost-Effective Technologies
  - Energy/Water Nexus
- Public Perception/Acceptance
  - Planned vs. Unplanned Reuse
  - The Media
  - Lack of Political Support
- Funding
  - Better Understanding of Economics
- Climate Change

WATEREUSE ASSOCIATION
Sustainable Solutions for a Thirsty Planet®

Potential for Water Reuse

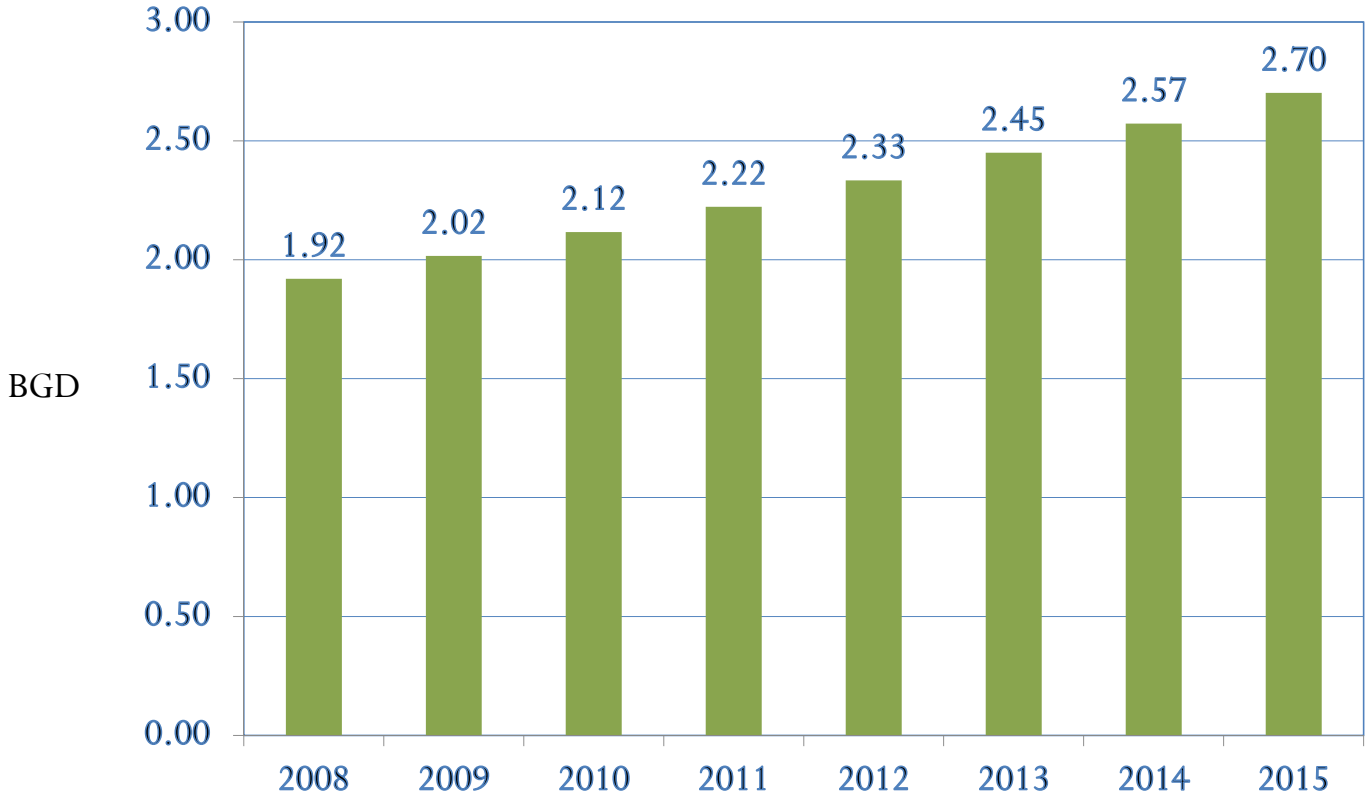
- About 7% of municipal wastewater effluent in the U.S. is reclaimed and beneficially reused
- Israel reuses more than 70%
- Singapore reuses 30%, up from 15% in recent years
- Australia, now at 8%, has a national goal of 30% by 2015

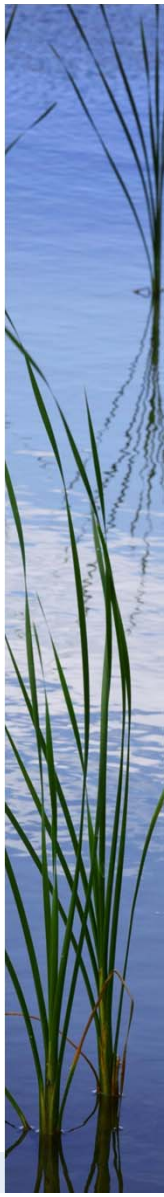


About 33 BGD of municipal effluent is produced annually in the U.S.

WATEREUSE ASSOCIATION
Sustainable Solutions for a Thirsty Planet®

Projection of Water Reuse levels through 2015





WATEREUSE ASSOCIATION
Sustainable Solutions for a Thirsty Planet®

Applications

- Landscape Irrigation
- Agricultural Irrigation (Edible & Non-Edible Crops)
- Industrial and Commercial
- Environmental Uses
- Non-Potable Urban Uses (Urinal Flushing in High Rise Buildings)
- Groundwater Recharge
- Potable Water Supply Augmentation

WATEREUSE ASSOCIATION
Sustainable Solutions for a Thirsty Planet®

Benefits

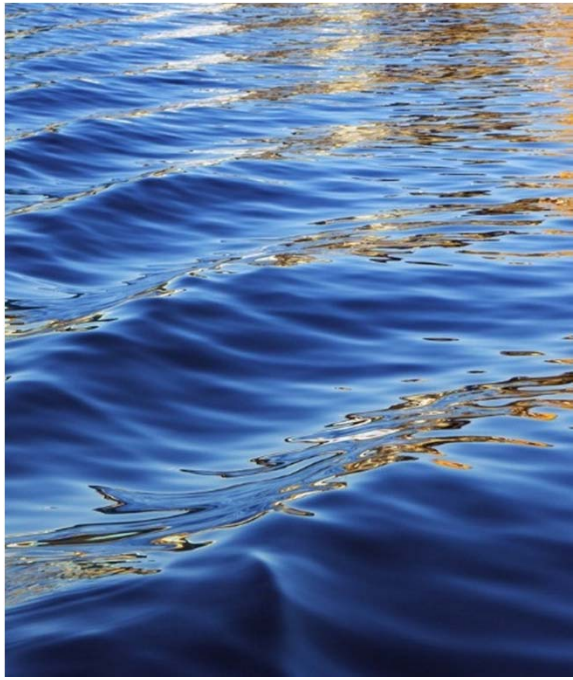
- Dependable Source of Supply
- Locally Controlled
- Environmentally Friendly
- Low or No Capital Costs
- Augments Existing Supplies

WATEREUSE ASSOCIATION
Sustainable Solutions for a Thirsty Planet®

WATEREUSE ASSOCIATION

Sustainable Solutions for a Thirsty Planet®

The WateReuse Association



WateReuse Association - *A Trade Association*

Four Strategic Initiatives

- Advocacy (Lobbying) -- National & State
  - Obtain Funding for Local Projects
  - Obtain Funding for Research
  - Influence National Water Policy
- Research (through WateReuse Research Foundation) -- $51MM
  - Invested in 171 Research Projects since 2000
- Education & Outreach (Publications, Conferences, Webcasts, Website)
- Membership

WATEREUSE ASSOCIATION
Sustainable Solutions for a Thirsty Planet®

Mission

- To advance the beneficial and efficient uses of high-quality, locally produced, sustainable water sources for the betterment of society and the environment through advocacy, education and outreach, research, and membership.

WATEREUSE ASSOCIATION
Sustainable Solutions for a Thirsty Planet®

Background

- 1985- Started in California
- 2000- Became national organization
- 2008- International presence
- 2014- More than 400 organizational members:
- 7 State Sections;
- Members in Australia, Canada, Spain, Saudi Arabia, Mexico

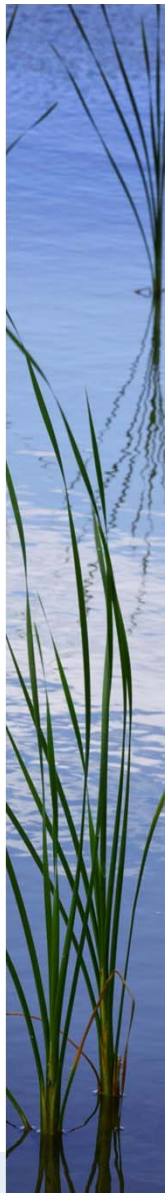
WATEREUSE ASSOCIATION
Sustainable Solutions for a Thirsty Planet®

Membership

- ~180 Water Agency Members
- Virtually all Major Consulting Engineering Firms (e.g., CH2M Hill, Black & Veatch)
- Many Major Equipment Suppliers (e.g., GE Water, Aqua Aerobic Systems, Xylem)
- Membership is Growing

WATEREUSE ASSOCIATION
Sustainable Solutions for a Thirsty Planet®

WATEREUSE ASSOCIATION
Sustainable Solutions for a Thirsty Planet®

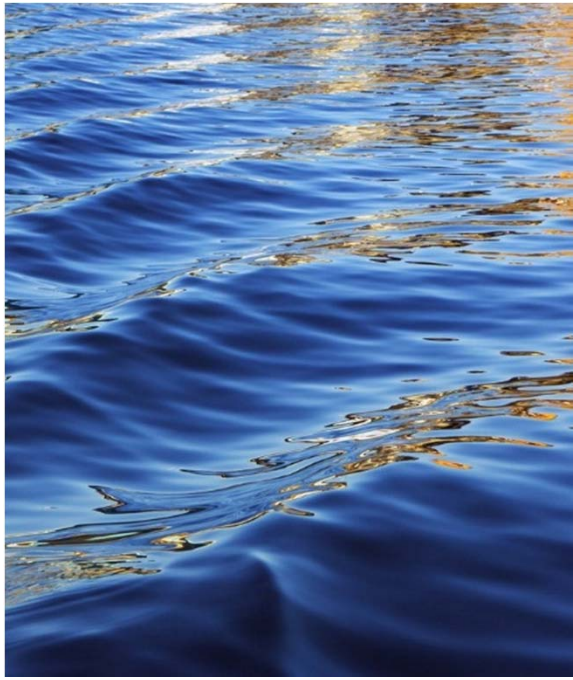


WATEREUSE ASSOCIATION
Sustainable Solutions for a Thirsty Planet®

WATEREUSE ASSOCIATION

Sustainable Solutions for a Thirsty Planet®

Water Reuse – Great Success Stories



Success Stories

- OCWD's Groundwater Replenishment System
- West Basin's Reuse Facility – Producing "Designer Water"
- MRWPCA–Recycled Water for Edible Crops
- Pinellas County's Dual Distribution Systems
- Conserv II– Irrigating Citrus Crops in Florida for Three Decades
- LACSD—Producing Recycled Water at 11 Facilities
- Santa Rosa—Recycling 100% of its Effluent
- UOSA—Surface Water Augmentation since '78
- Scottsdale Water Campus—IPR since 2001
- El Paso Water Utilities – IPR since 1985

GWR System (OCWD and OCSD)
Advanced Water Treatment Flow Diagram

Enhanced Source Control

↓

Secondary Treatment

OCSD Secondary Effluent

86 MGD
Microfiltration
(MF)

↓

Backwash
OCSD Plant 1

↓

70 MGD
Reverse Osmosis
(RO)

↓

Brine
OCSD Outfall

↓

70 MGD
Ultraviolet Light
(AOP)

with hydrogen peroxide

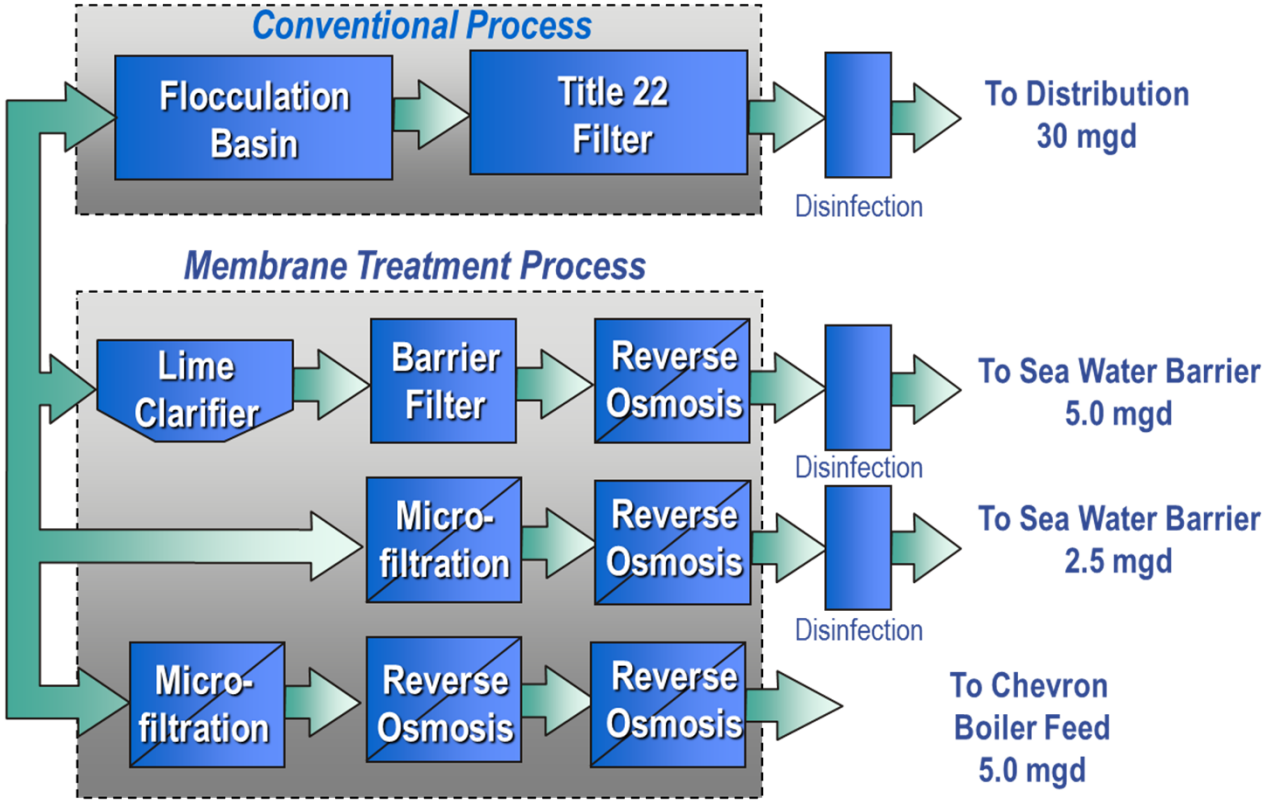
Purified Water

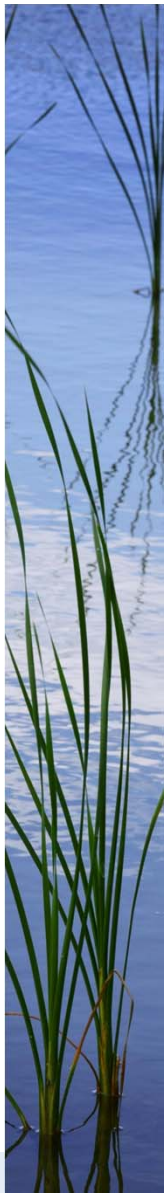
↓

Natural soil filtration

WATEREUSE ASSOCIATION
Sustainable Solutions for a Thirsty Planet®

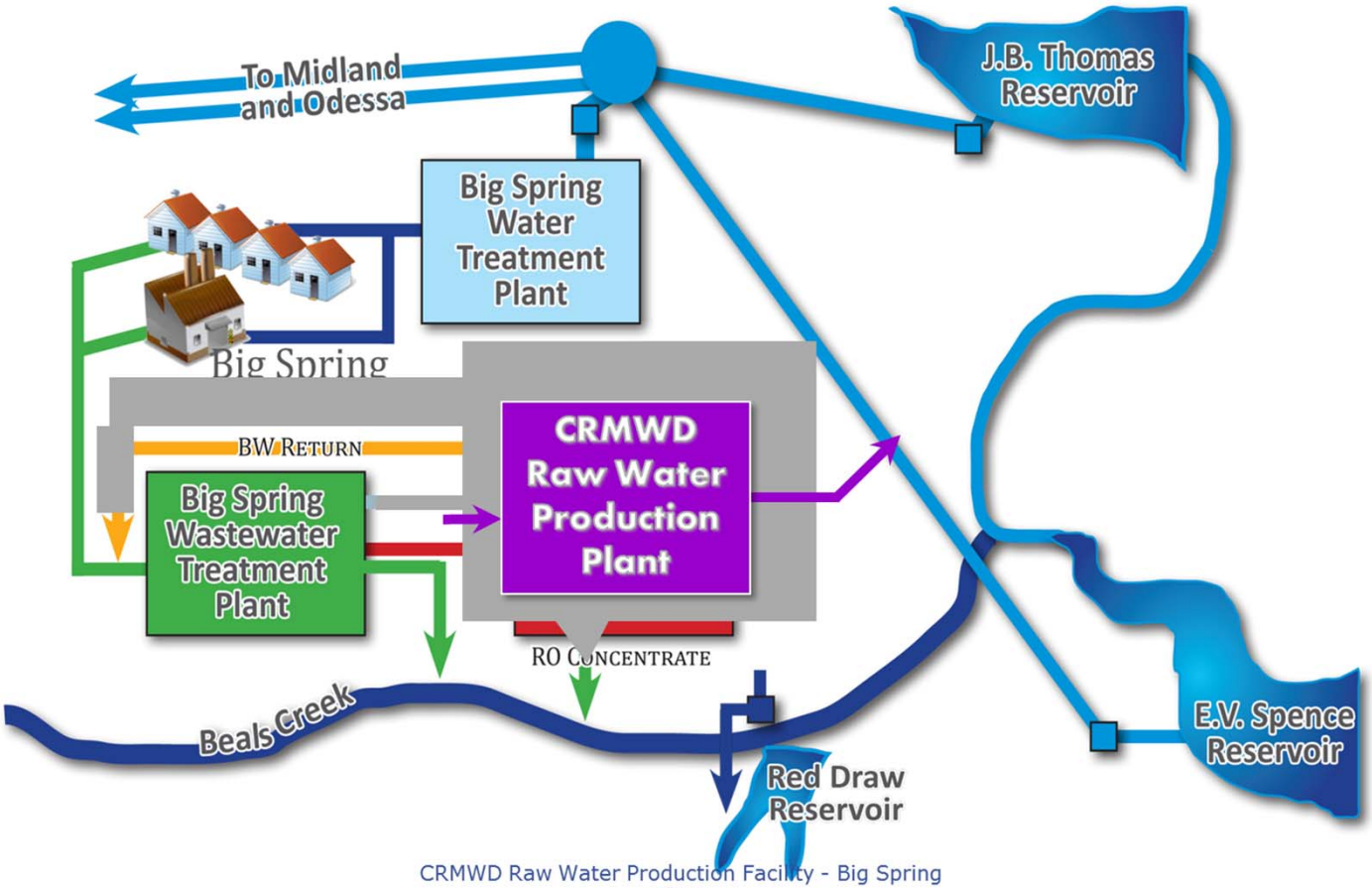
West Basin Water Recycling Plant





WATEREUSE ASSOCIATION
Sustainable Solutions for a Thirsty Planet®

Big Springs, TX Reclamation Project



CRMWD Raw Water Production Facility - Big Spring Plant

WATEREUSE ASSOCIATION
Sustainable Solutions for a Thirsty Planet®

Wichita Falls, TX

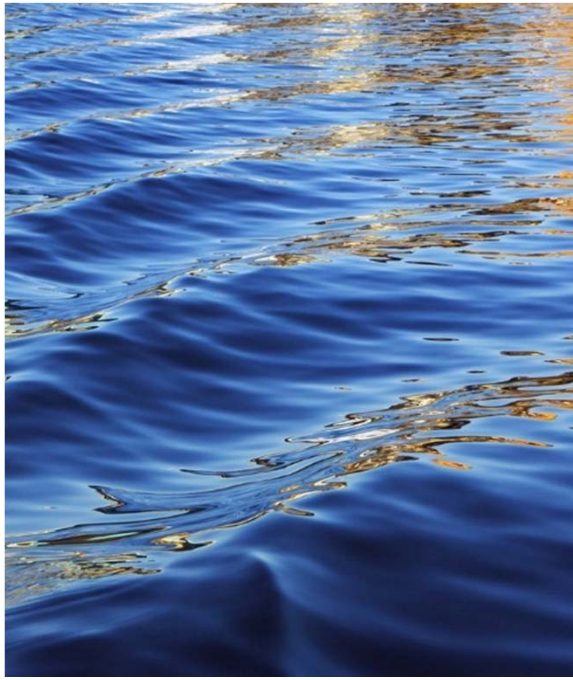
- System in development identical to Big Springs Concept
- Water reclamation plant capacity – 5 MGD
- Blend with surface water from supply – 5 MGD
- Total water supply doubles to 10 MGD from source
- Total Wichita Falls water needs 15 MGD

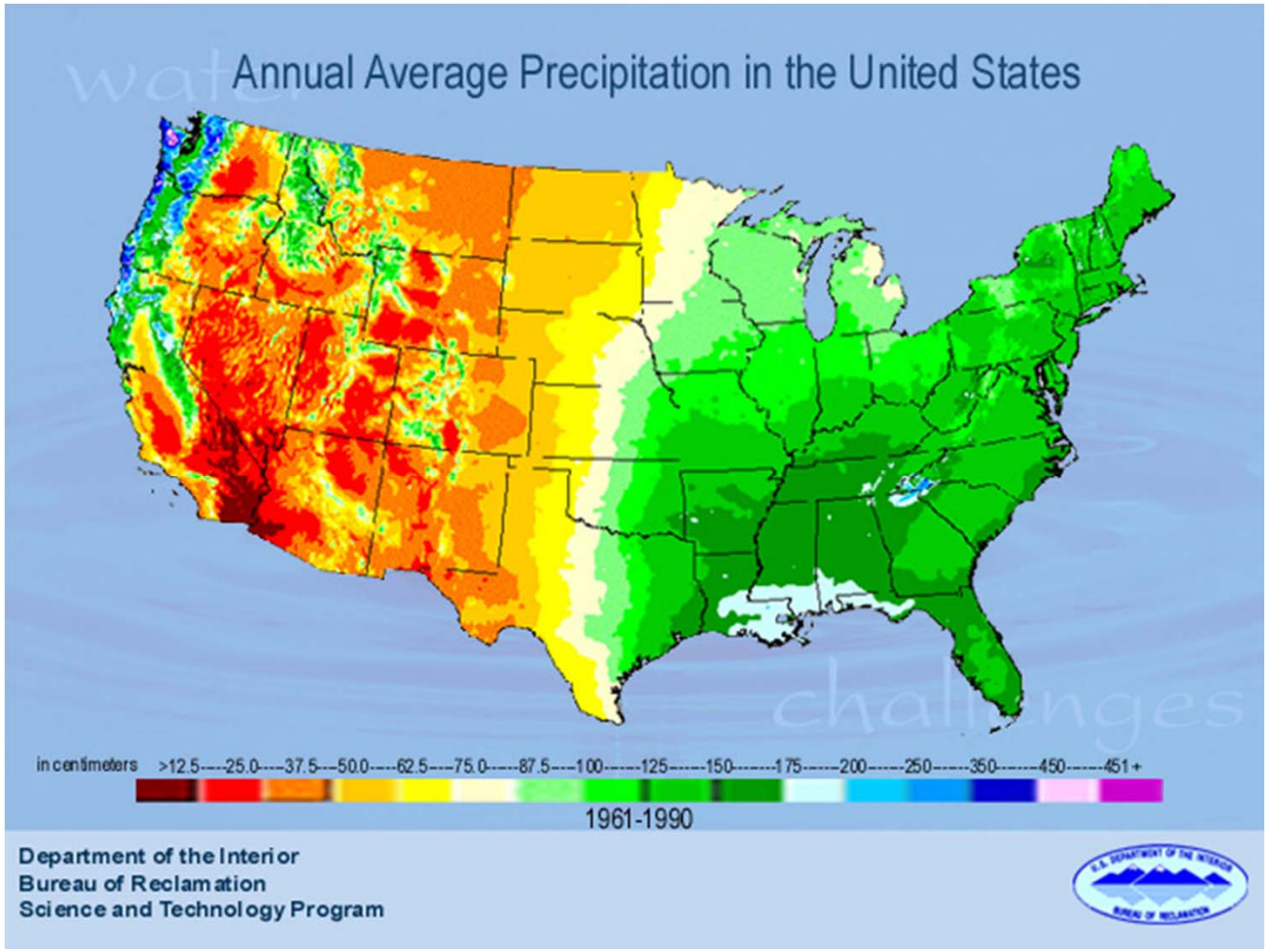
WATEREUSE ASSOCIATION
Sustainable Solutions for a Thirsty Planet®

WATEREUSE ASSOCIATION

Sustainable Solutions for a Thirsty Planet®

Water Scarcity

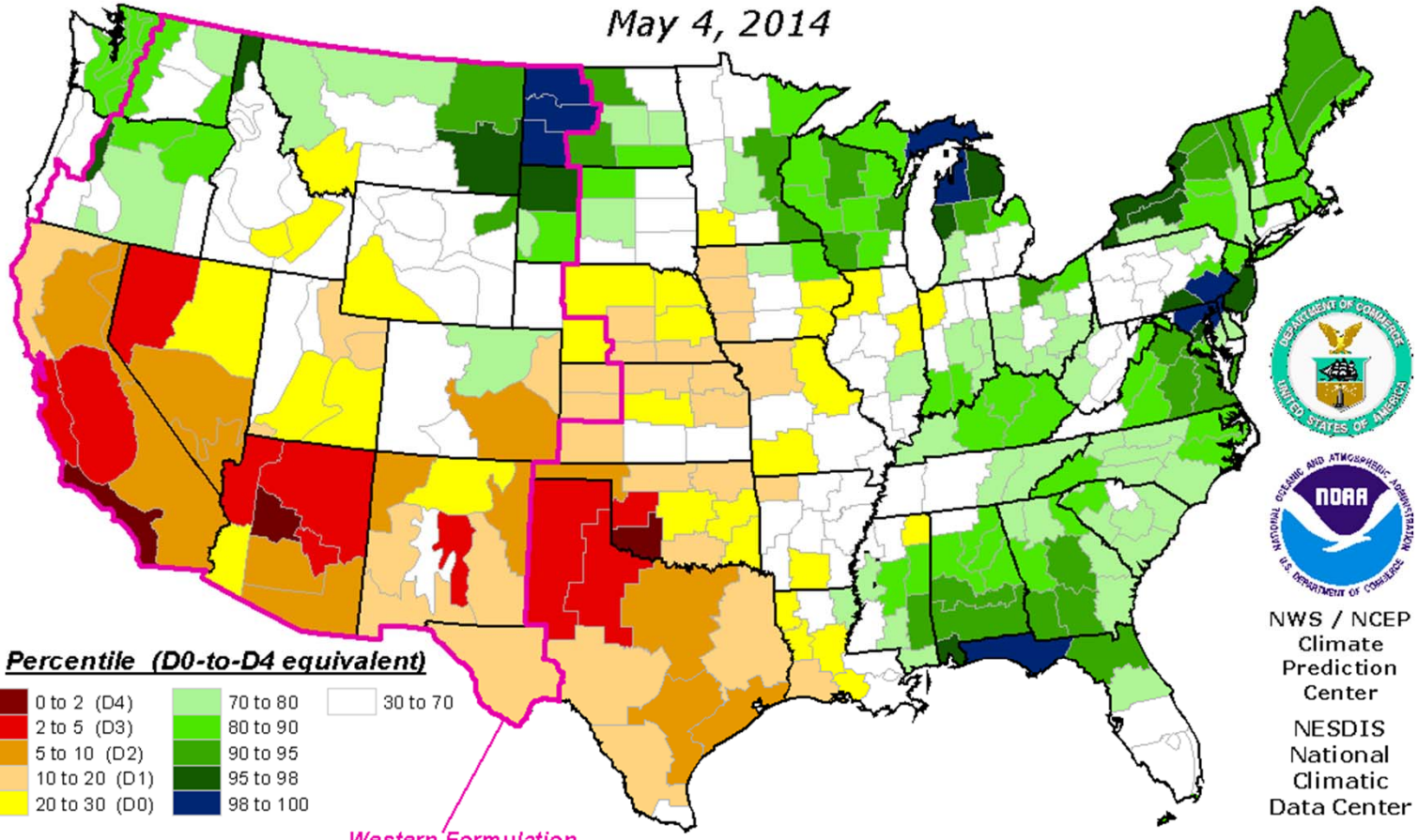




WATEREUSE ASSOCIATION
Sustainable Solutions for a Thirsty Planet®

Objective Long-Term Drought Indicator Blend Percentiles

May 4, 2014



Percentile (D0-to-D4 equivalent)

- 0 to 2 (D4)
- 2 to 5 (D3)
- 5 to 10 (D2)
- 10 to 20 (D1)
- 20 to 30 (D0)
- 30 to 70
- 70 to 80
- 80 to 90
- 90 to 95
- 95 to 98
- 98 to 100

NWS / NCEP Climate Prediction Center

NESDIS National Climatic Data Center

Inputs (as percentiles):

25% Palmer Hydrologic Index
20% 24-Month Precipitation
20% 12-Month Precipitation
15% 6-Month Precipitation
10% 60-Month Precipitation
10% CPC Soil Moisture Model

Western Formulation Inputs (as percentiles):

30% Palmer Hydrologic Index
30% 60-Month Average Z-Index
10% 60-Month Precipitation
10% 24-Month Precipitation
10% 12-Month Precipitation
10% CPC Soil Moisture Model

This map approximates impacts responding to precipitation over the course of several months to a few years, such as reservoir content, groundwater, and lake levels. HOWEVER, THE RELATIONSHIP BETWEEN INDICATORS AND WATER SUPPLIES CAN VARY MARKEDLY WITH LOCATION, SEASON, SOURCE, AND MANAGEMENT PRACTICE. Do not interpret this map too literally.

This map is based on preliminary climate division data. Local conditions and/or final data may differ. See the detailed product suite description for more details.

WATEREUSE ASSOCIATION
Sustainable Solutions for a Thirsty Planet®

Drivers of Water Scarcity

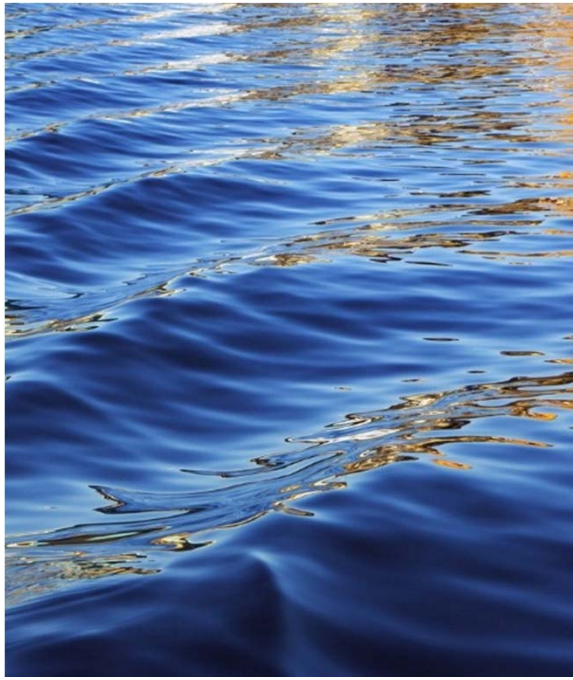
- Population Growth: a projected increase from 7 billion (2012) to 9 billion in 2035
- Energy/Water Nexus
- Climate Change
- Conclusion: we will need "new" water resources to provide water for growing food, water for energy, water for industry, and water to sustain life

WATEREUSE ASSOCIATION
Sustainable Solutions for a Thirsty Planet®

WATEREUSE ASSOCIATION

Sustainable Solutions for a Thirsty Planet®

Water Reuse in the West



Water Reuse in Five Western States (2009-2011 Data)

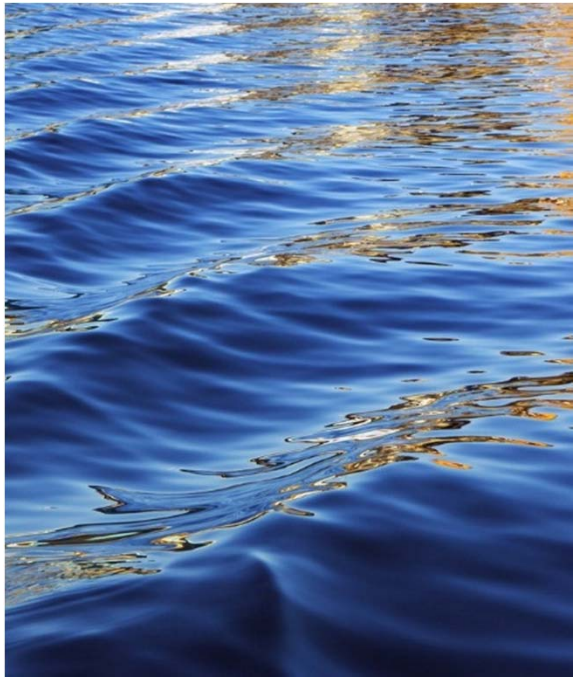
- California – 229 facilities recycle 597.38 MGD
- Texas – 74 facilities recycle 69.11 MGD
- Arizona – 52 facilities recycle 217.85 MGD (2010)
- Nevada – 7 facilities recycle 13.50 MGD (2011)
- Colorado – 14 facilities recycle 13.15 MGD
- PNW – Water Reuse is Growing

WATEREUSE ASSOCIATION
Sustainable Solutions for a Thirsty Planet®

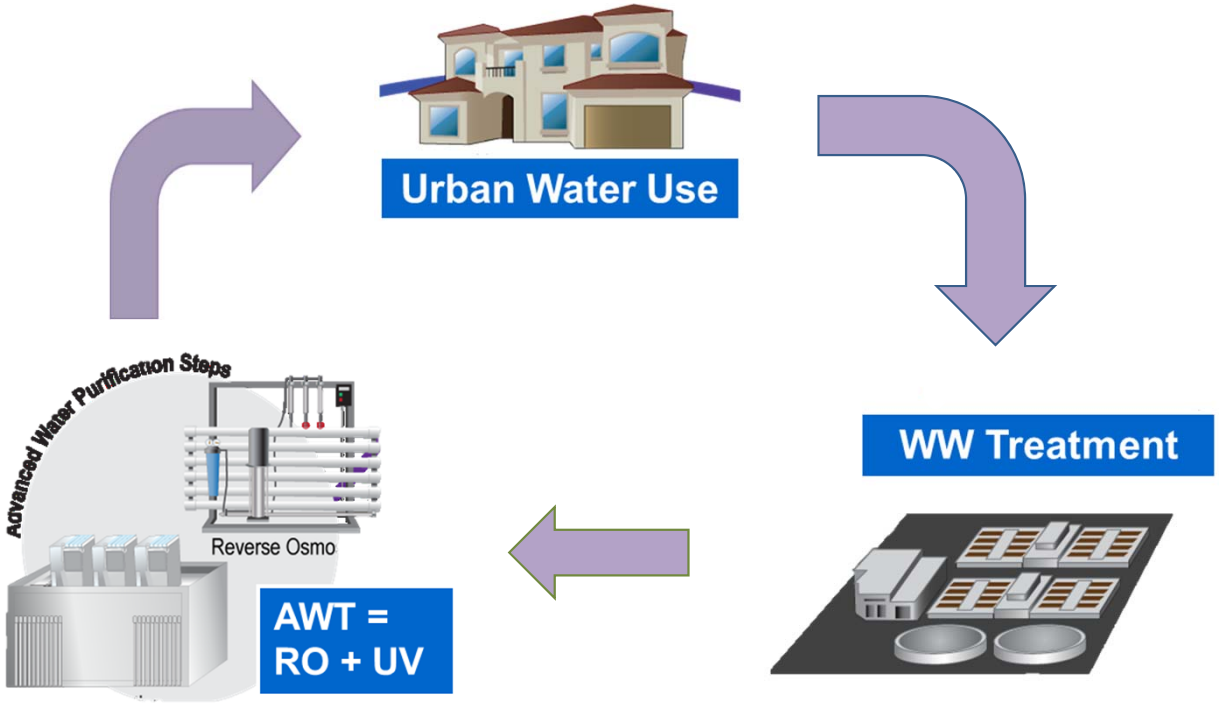
WATEREUSE ASSOCIATION

Sustainable Solutions for a Thirsty Planet®

The New Frontier in Water Reuse - DPR

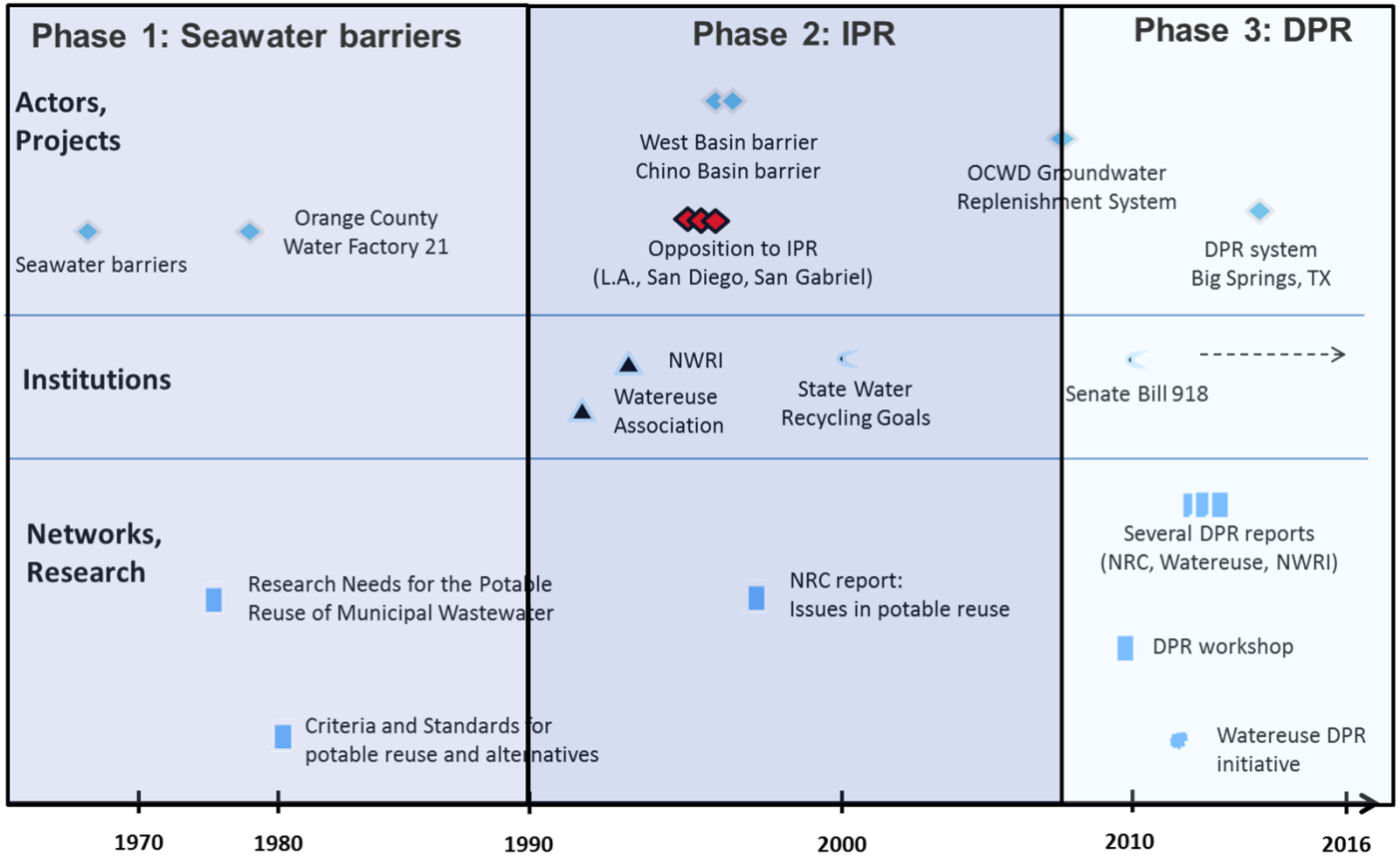


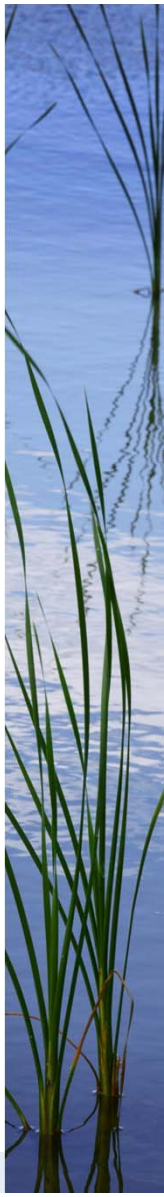
Direct Potable Reuse Concept



History of potable water reuse in California

Source: Christian Bain





Why Direct Potable Reuse?

- Impending water shortages
- States cannot achieve their water reuse goals with non-potable reuse
- Purple pipe installation costs + disruption of digging up city streets is unpalatable
- IPR will not work in every location due to geology or catchment constraints

WATEREUSE ASSOCIATION
Sustainable Solutions for a Thirsty Planet®

Summary of WateReuse's DPR Initiative

- 7-Year (and likely longer) Initiative; launched in 2009 by WRCA
- In 2010, workshop in Sacramento to discuss DPR regulatory barriers and needs
- Direct Potable Reuse: A Path Forward
- SB918 Enacted
- Fundraising initiative for needed research and for working with DPH, SWRCB, Legislature.
- To date: nearly $6M raised

WATEREUSE ASSOCIATION
Sustainable Solutions for a Thirsty Planet®

States interested in DPR

- California
- Texas
- Arizona
- New Mexico
- Florida
- Ohio
- ????? - Next

WATEREUSE ASSOCIATION
Sustainable Solutions for a Thirsty Planet®

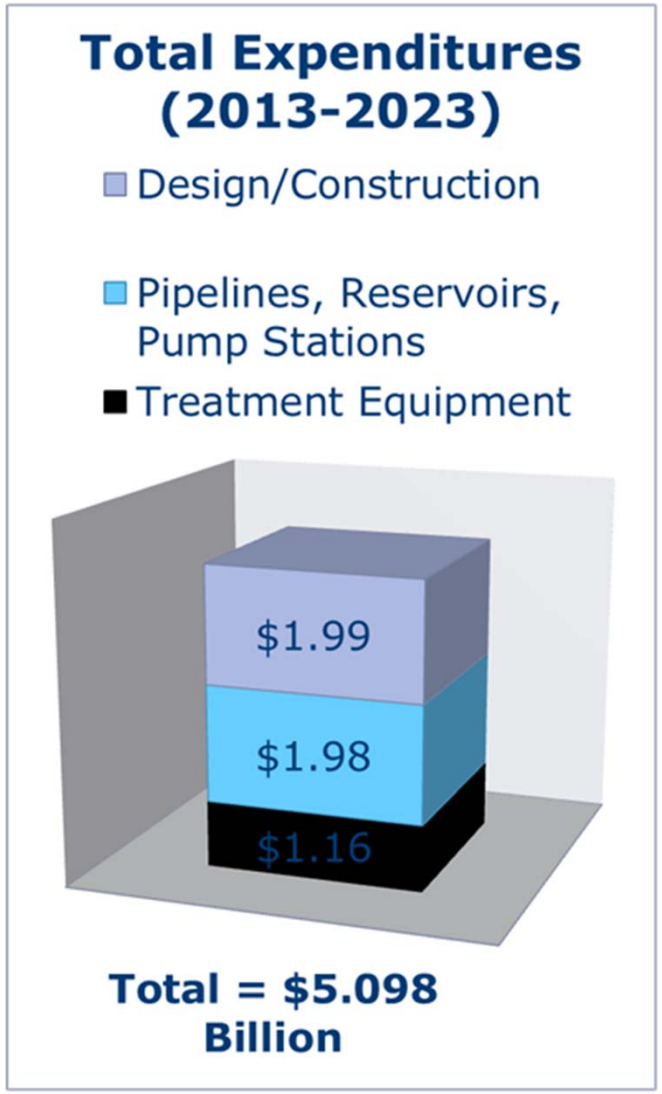
SCAPR Objectives in Arizona

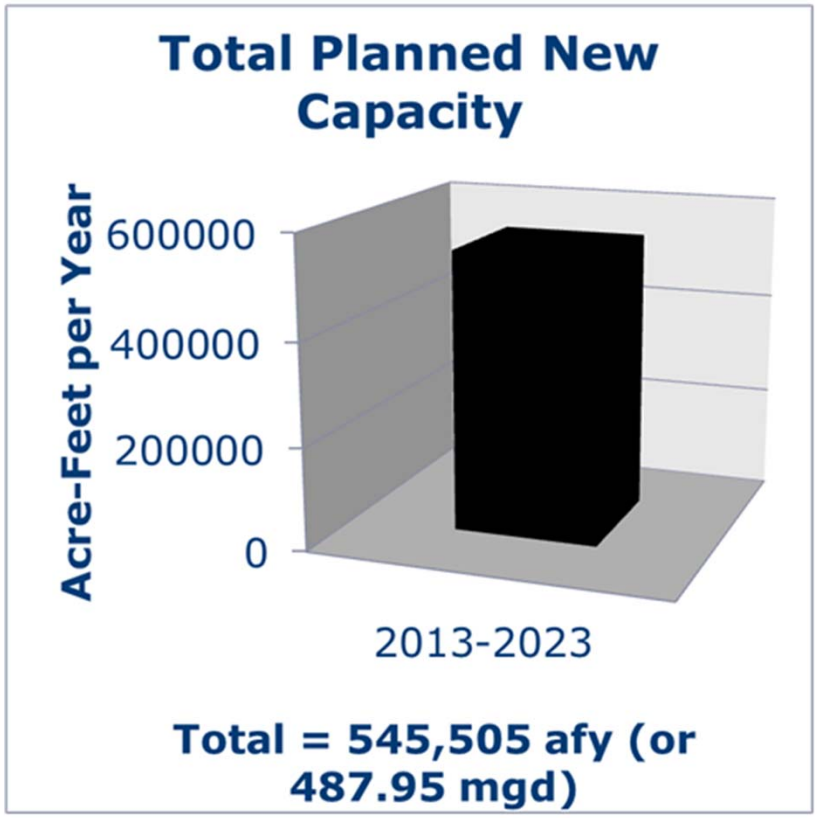
- Identify impediments
- Define a common terminology
- Gather best practices, state of the industry information, and case studies
- Track CA and TX efforts
- Create Advisory Panels
- Conduct scoping process to provide recommendations to ADEQ/ADWR
- Develop a road map to potable reuse in Arizona

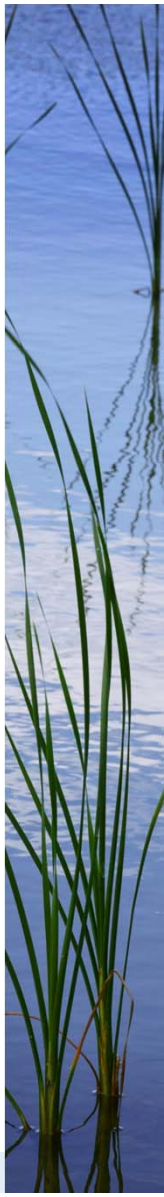
WATEREUSE ASSOCIATION
Sustainable Solutions for a Thirsty Planet®

TWDB Project in TX – Primary Tasks

- Review relevance of contaminants of concern (COCs) in Texas
- Define water quality performance goals
- Characterize stakeholder water quality
- Source control evaluation
- Evaluation of treatment technologies
- Quantitative Relative Risk Assessment (QRRA)
- Develop sample pilot protocols
- Regulatory/legal summary
- Prepare resource document







WATEREUSE ASSOCIATION
Sustainable Solutions for a Thirsty Planet®

The Future

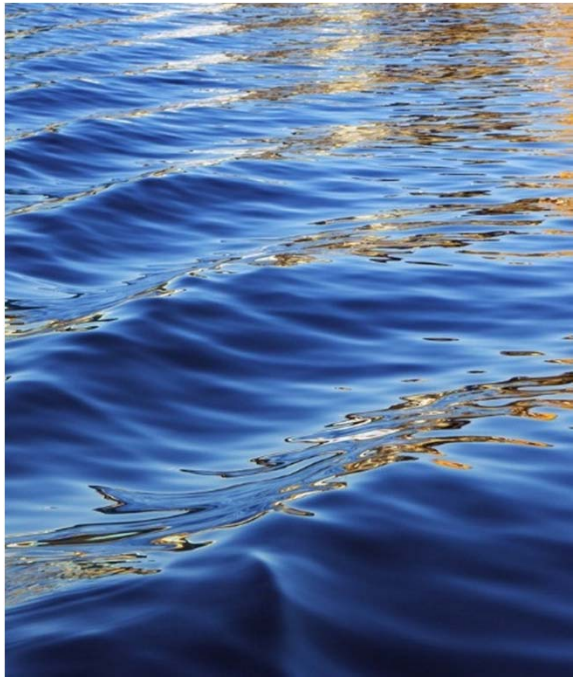
- Reuse and Desalination are Virtually Only Available Sources of "New Water"
- Direct Potable Reuse is Inevitable
- Increased Desalination – both Brackish Groundwater and Seawater – Also is Inevitable
- Industry will Play Key Role – in Research, Innovation, Creativity, Resources
- Need Government Leadership in Water Policy
- Need Substantially More Research

WATEREUSE ASSOCIATION
Sustainable Solutions for a Thirsty Planet®

WATEREUSE ASSOCIATION

Sustainable Solutions for a Thirsty Planet®

Thank you!

Robert (Bob) M. Johnson
rjohnson@mcmanusjohnson.com

WateReuse.org