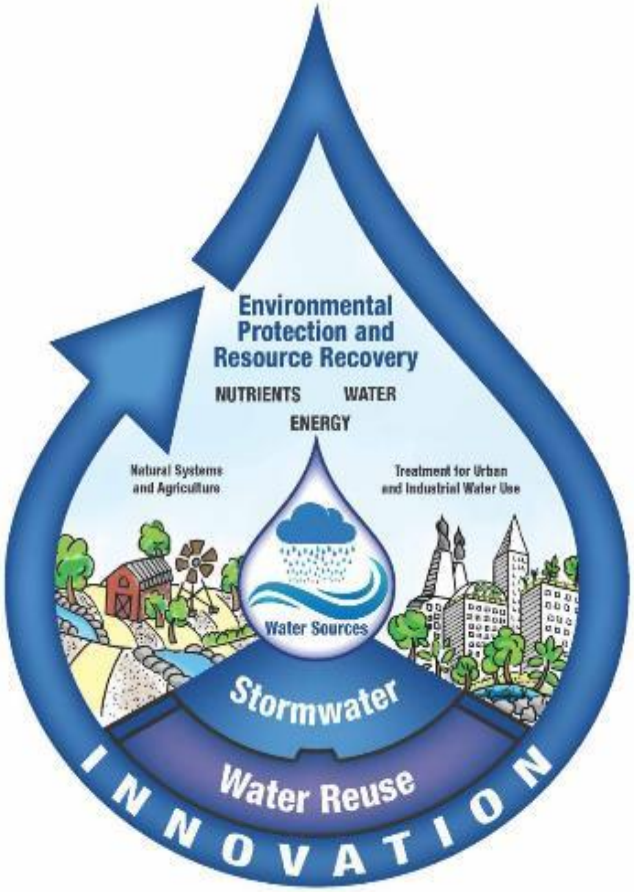
Embracing One Water For Supply Sustainability

Melissa Meeker
mmeeker@werf.org
Chief Executive Officer

Central States Water Environment Association
Government Affairs Annual Meeting
Madison, WI
February 23, 2017

About Water Environment & Reuse Foundation



WERF and WRRF merged in May 2016

WE&RF: *Dedicated to research on renewable resources from wastewater, recycled water, and stormwater while maintaining the quality and reliability of water for the environment and communities.*

New Focus: One Water.

WateReuse brings recycled water, desalination and related topics.

WERF brings wastewater, resource recovery, stormwater, receiving waters, climate change, and integrated water.

WATEREUSE

WERF
Water Environment Research Foundation
Collaboration. Innovation. Results.

WATER ENVIRONMENT & REUSE FOUNDATION
WE&RF

Bottom Line: Major Paradigm Shift

PAST

Collect wastewater, move it quickly downstream, treat it to acceptable standards, and dispose of waste without harming the environment

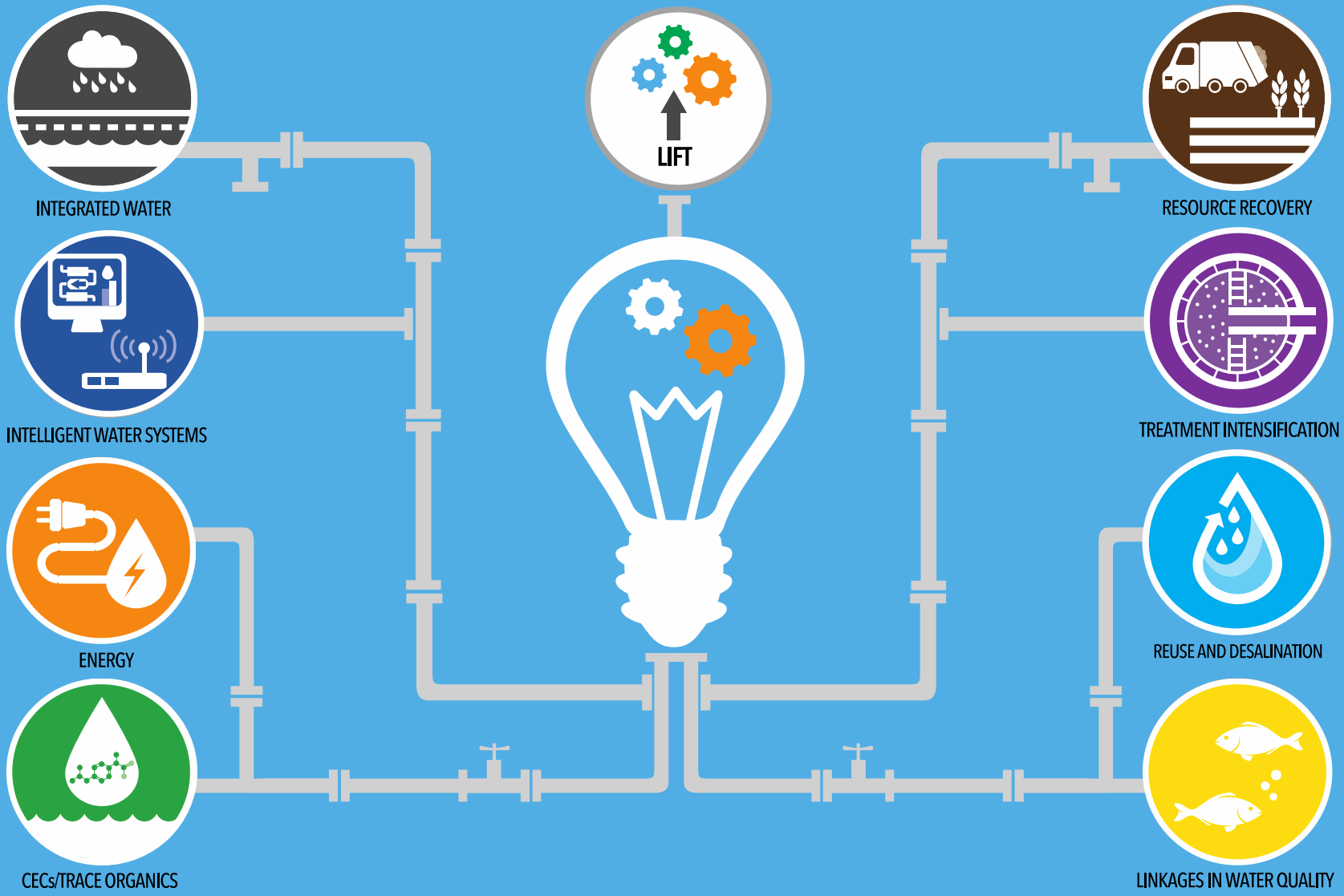
FUTURE

- Manage resources to generate value for the utility and its customers
- Improve environmental quality, at least cost to the community
- Use a holistic "one water" approach to water management

WATER RESOURCES UTILITY OF THE FUTURE

WATER ENVIRONMENT & REUSE FOUNDATION WE&RF

WE&RF RESEARCH PORTFOLIO



Strategic Collaborations

- Federal and State Agencies
- Water sector partners and NGOs
- Global Partners

NWRI National Water Research Institute

Water Research Foundation℠

U.S. DEPARTMENT OF ENERGY

CALIFORNIA Water Boards
STATE WATER RESOURCES CONTROL BOARD
REGIONAL WATER QUALITY CONTROL BOARDS

Water Environment Federation
the water quality people

Global Water Research Coalition

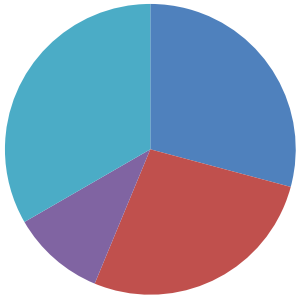
THE WORLD BANK

NACWA
A Clear Commitment to America's Waters

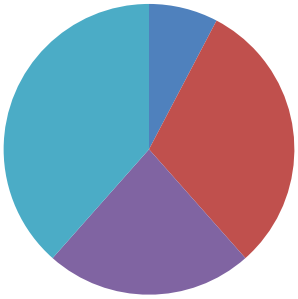
WATER ENVIRONMENT & REUSE FOUNDATION
WE&RF

WE&RF Research Focus Areas (Water)

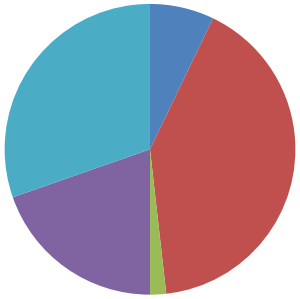
2001 - 2004



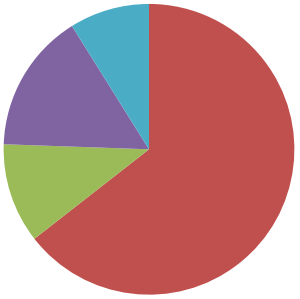
2005 - 2008



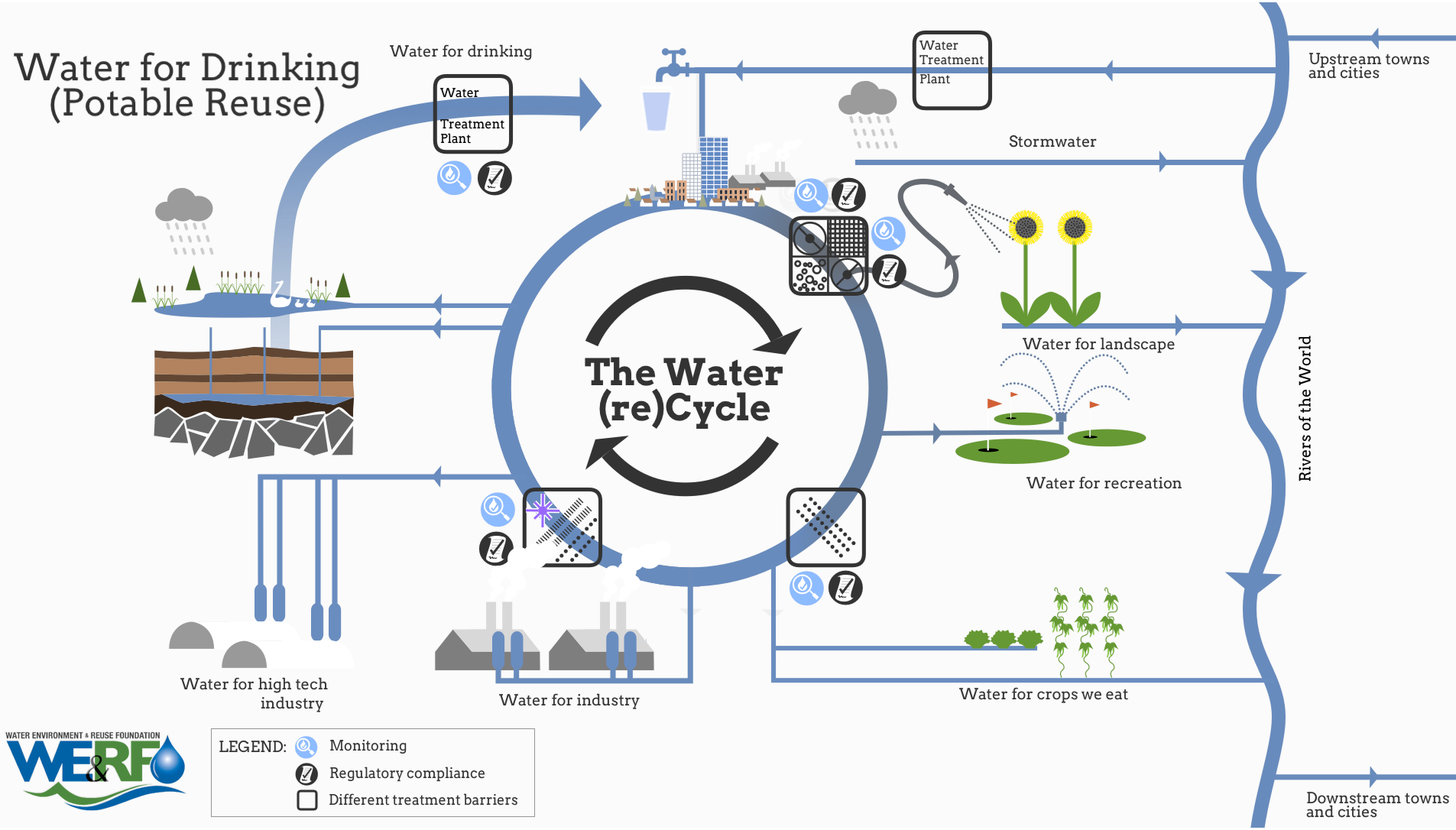
2009 - 2012



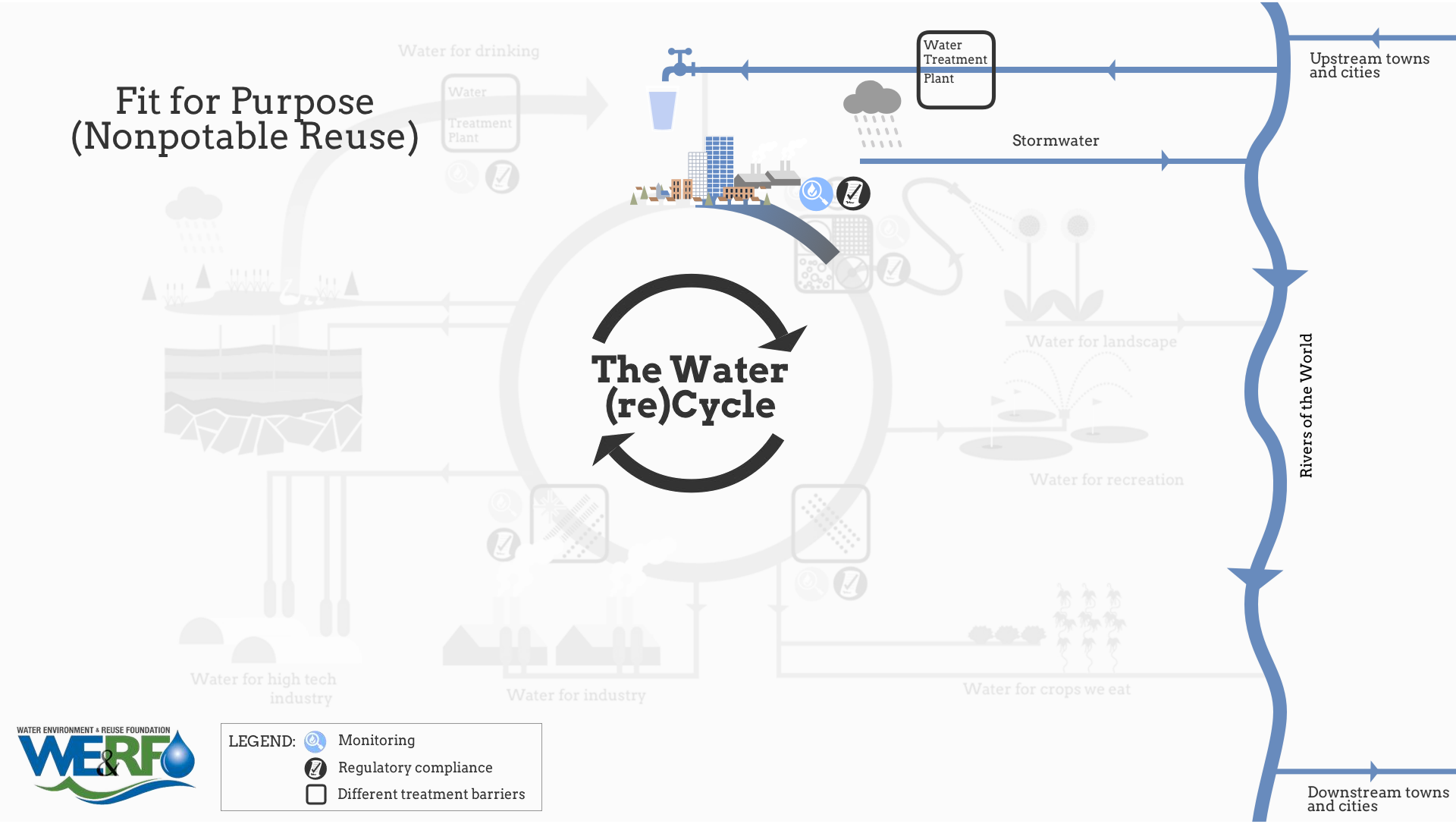
2013 - Present



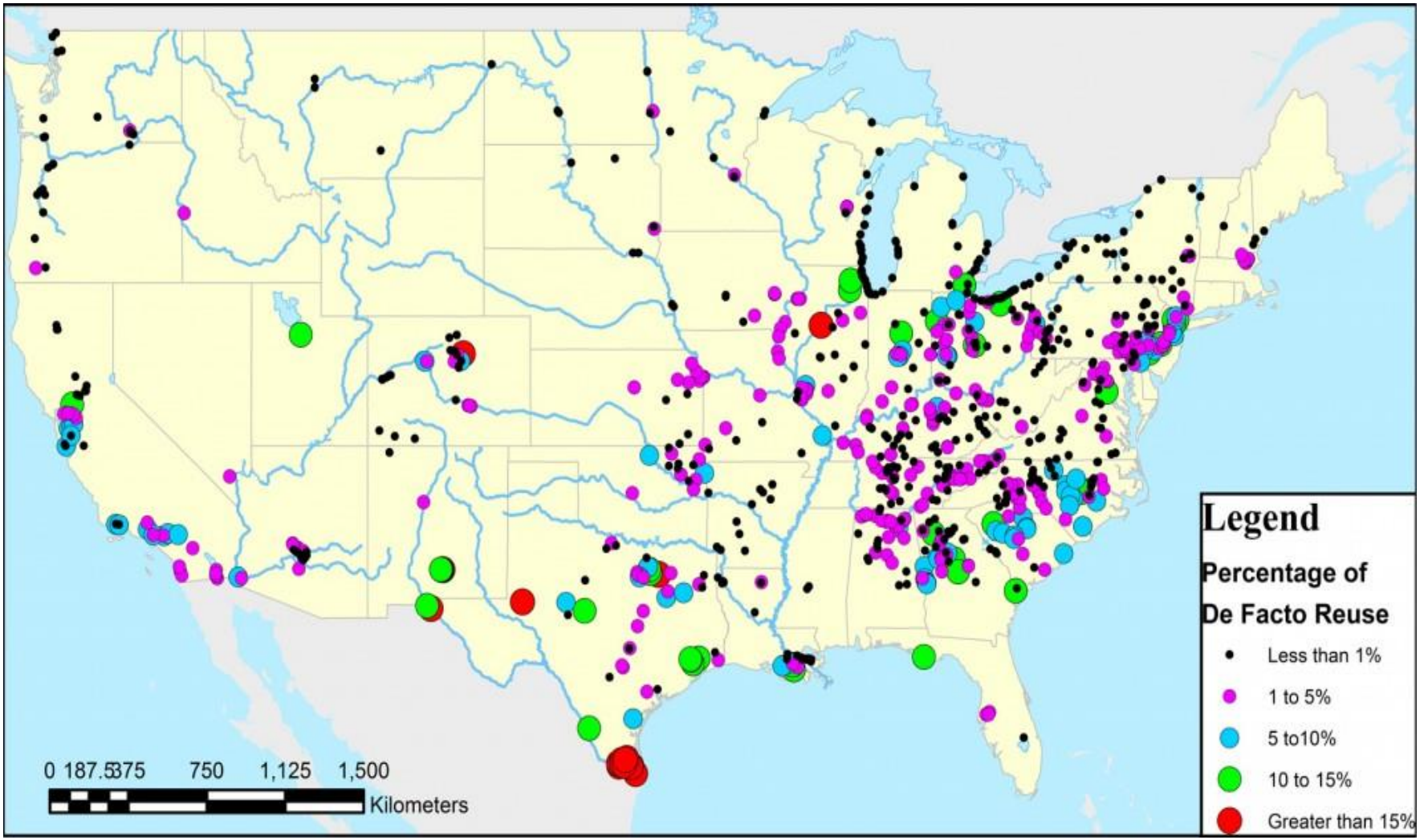
Non-Potable Reuse
Potable Reuse
Industrial Reuse
Desal/Salinity Mgmt
Social Science


Water for Drinking (Potable Reuse)
Water for drinking
Water Treatment Plant
Water Treatment Plant
Upstream towns and cities
Stormwater
The Water (re)Cycle
Water for landscape
Water for recreation
Rivers of the World
Water for high tech industry
Water for industry
Water for crops we eat
Downstream towns and cities
LEGEND:
Monitoring
Regulatory compliance
Different treatment barriers

Fit for Purpose (Nonpotable Reuse)



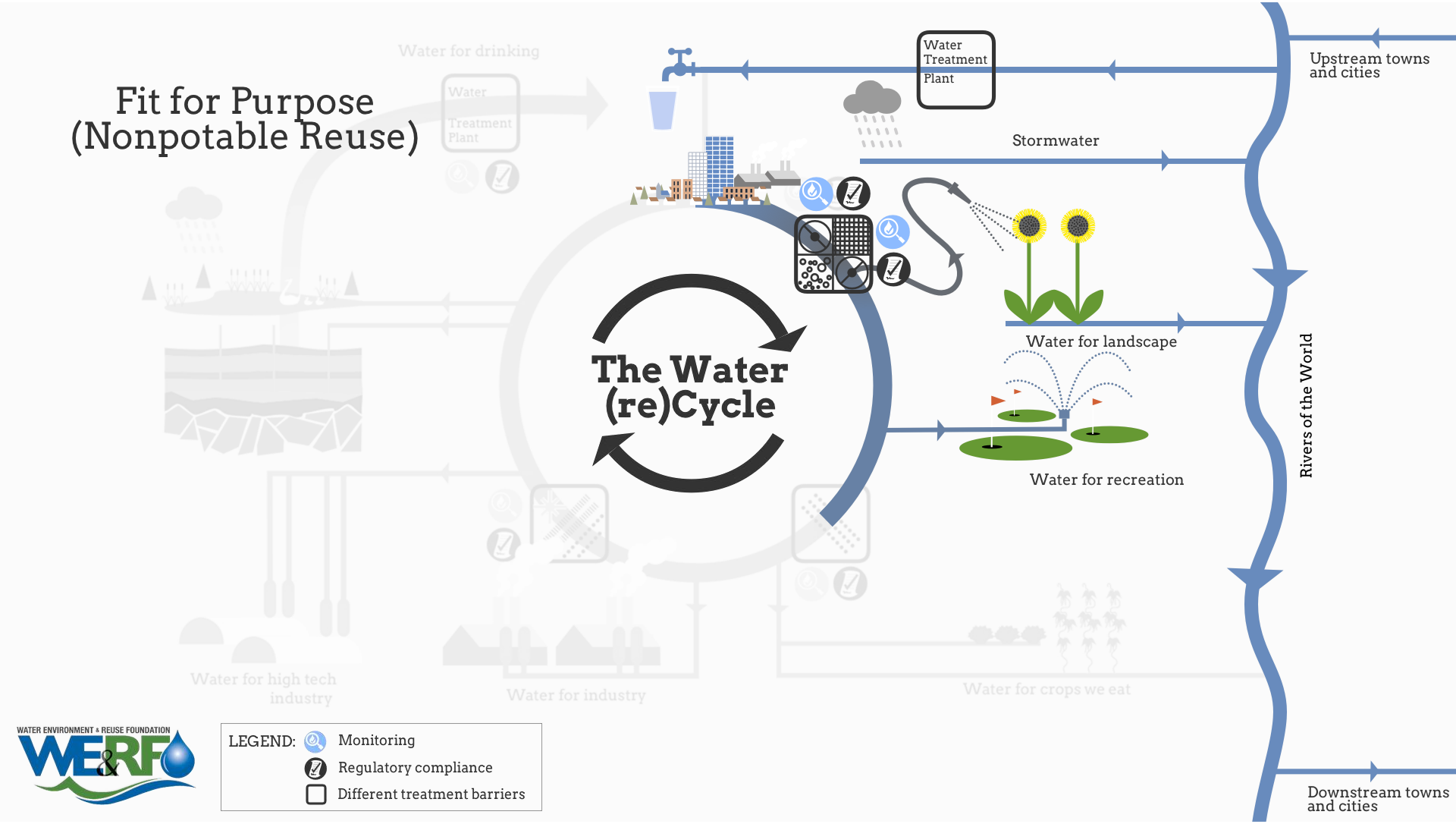
De Facto Water Reuse in the US



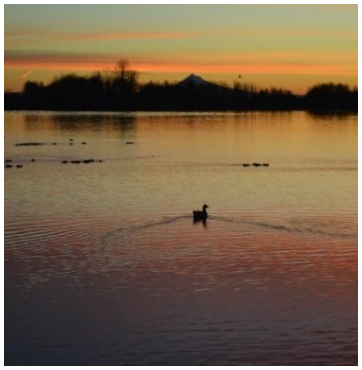
Assessment of De Facto Wastewater Reuse across the U.S.: Trends between 1980 and 2008
Jacelyn Rice†*, Amber Wutich‡, and Paul Westerhoff†

WATER ENVIRONMENT & REUSE FOUNDATION
WE&RF

Fit for Purpose (Nonpotable Reuse)



Oregon's Lott Clean Water Alliance



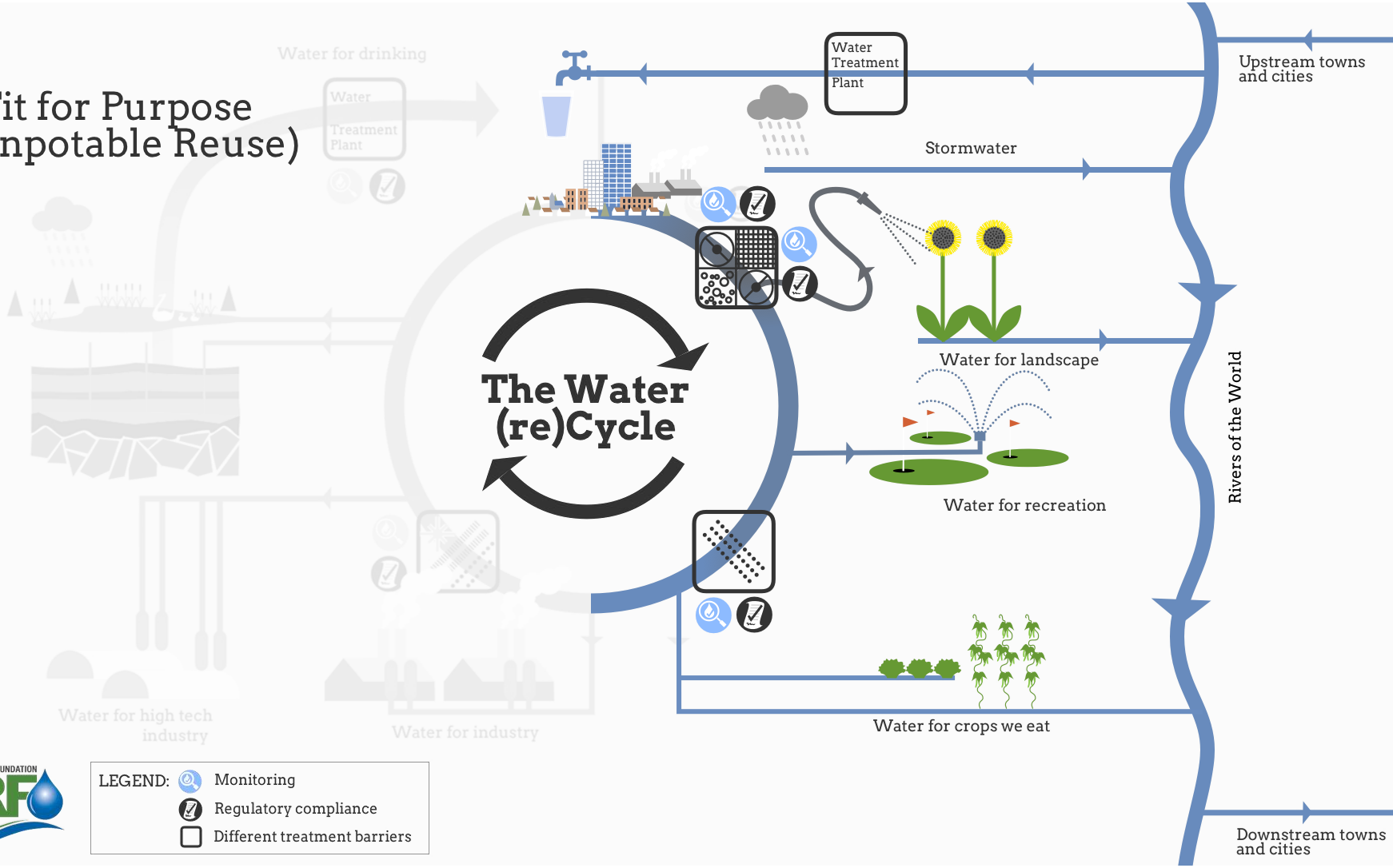
Oregon's Largest Reuse Program

100 million gallons a year of Class A water to meet seasonal demands. Uses include:

- Municipal parks, schools and athletic fields
  - Community amenity
- Golf courses
- Wetland recharge and restoration

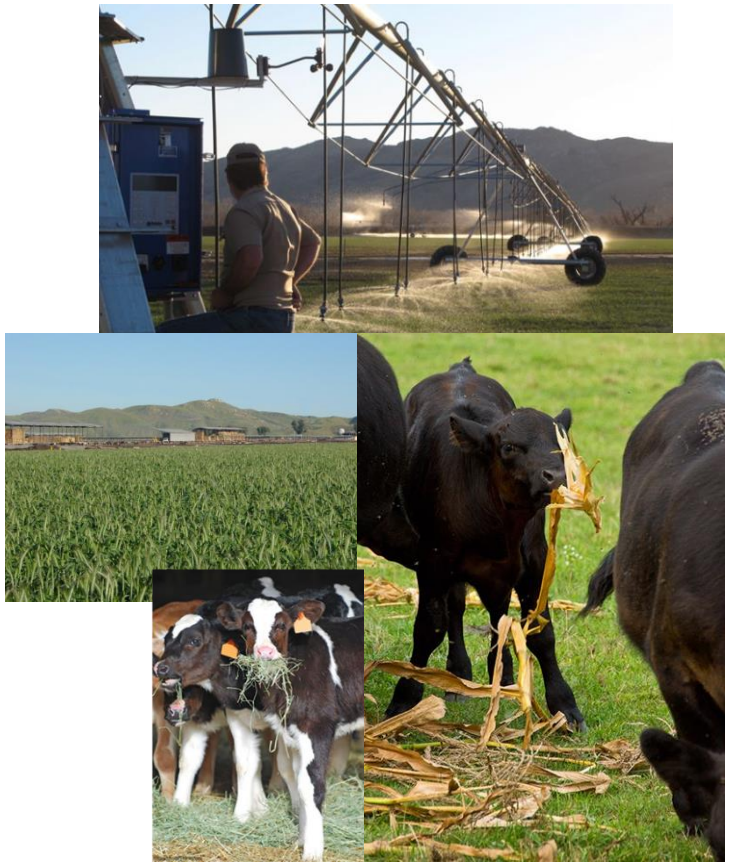
WATER ENVIRONMENT & REUSE FOUNDATION
WE&RF

Fit for Purpose (Nonpotable Reuse)



Eastern Municipal Water District

- EMWD has four facilities that create a total of 45MGD of tertiary treated recycled water
- Additional water quality treatment is conducted through created wetland habitat
- The largest use of this water is agricultural irrigation, including fruits, vegetables and fodder for cattle and dairy.
- Other uses include non-crop irrigation and industrial.



Monterey County Water Recycling Project
Monterey, CA

- 20 MGD
- Irrigation for 222 Farm Parcels
- 46 miles of transmission/ distribution pipelines
- 11-year Wastewater Reclamation Study - assess safety/feasibility of recycled water to irrigate raw vegetable crops
- 5-year demonstration project
- Never experienced human health incidence
- Crops include lettuce, celery, broccoli, cauliflower, artichokes, strawberries

WATER ENVIRONMENT & REUSE FOUNDATION
WE&RF

Fit for Purpose
The right water for the right use

Agricultural Reuse

Great potential for enhanced utilization of recycled water

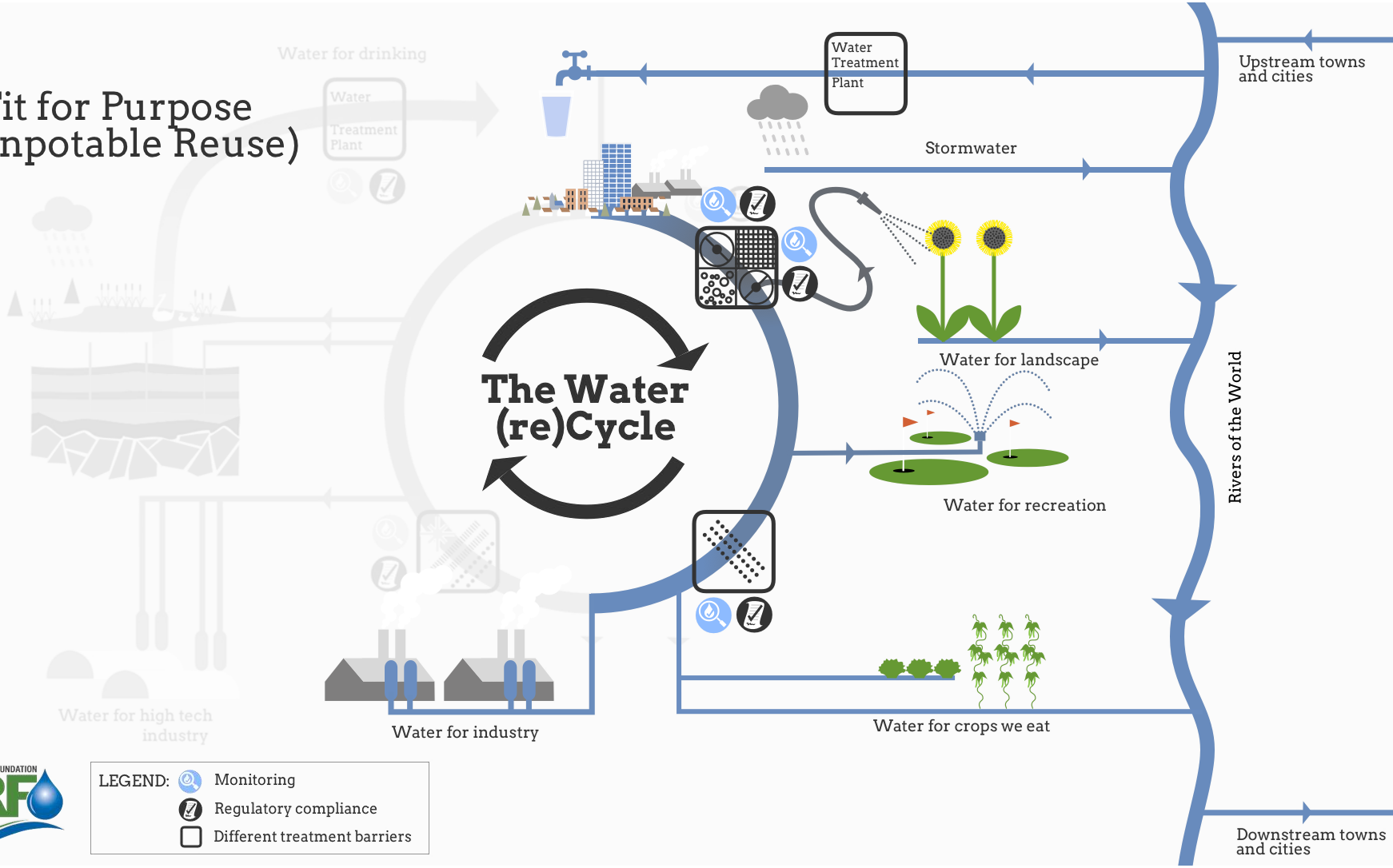
Ongoing research: WRRF-15-08 - State of Irrigated Agricultural Water Reuse - Impediments and Incentives

Upcoming research to identify existing uses, characterize potential, and develop strategies for overcoming barriers and incentivizing greater use of recycled water

Will evaluate existing governance frameworks and develop recommendations

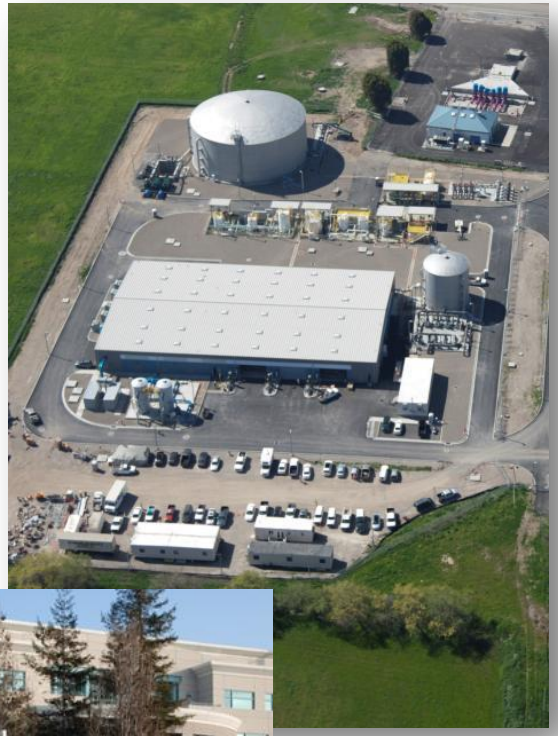
New research: Evaluating Economic and Environmental Benefits of Water Reuse for Agriculture

Fit for Purpose (Nonpotable Reuse)



Santa Clara Valley Water District Constructed a New Recycled Water Purification Facility

- 8 million gallons per day of purified water
- Uses Microfiltration, Reverse Osmosis & Ultraviolet Light Disinfection
- Water is currently used for manufacturing and irrigation
- The agency is planning a Potable Reuse Facility.



WATER ENVIRONMENT & REUSE FOUNDATION
WE&RF

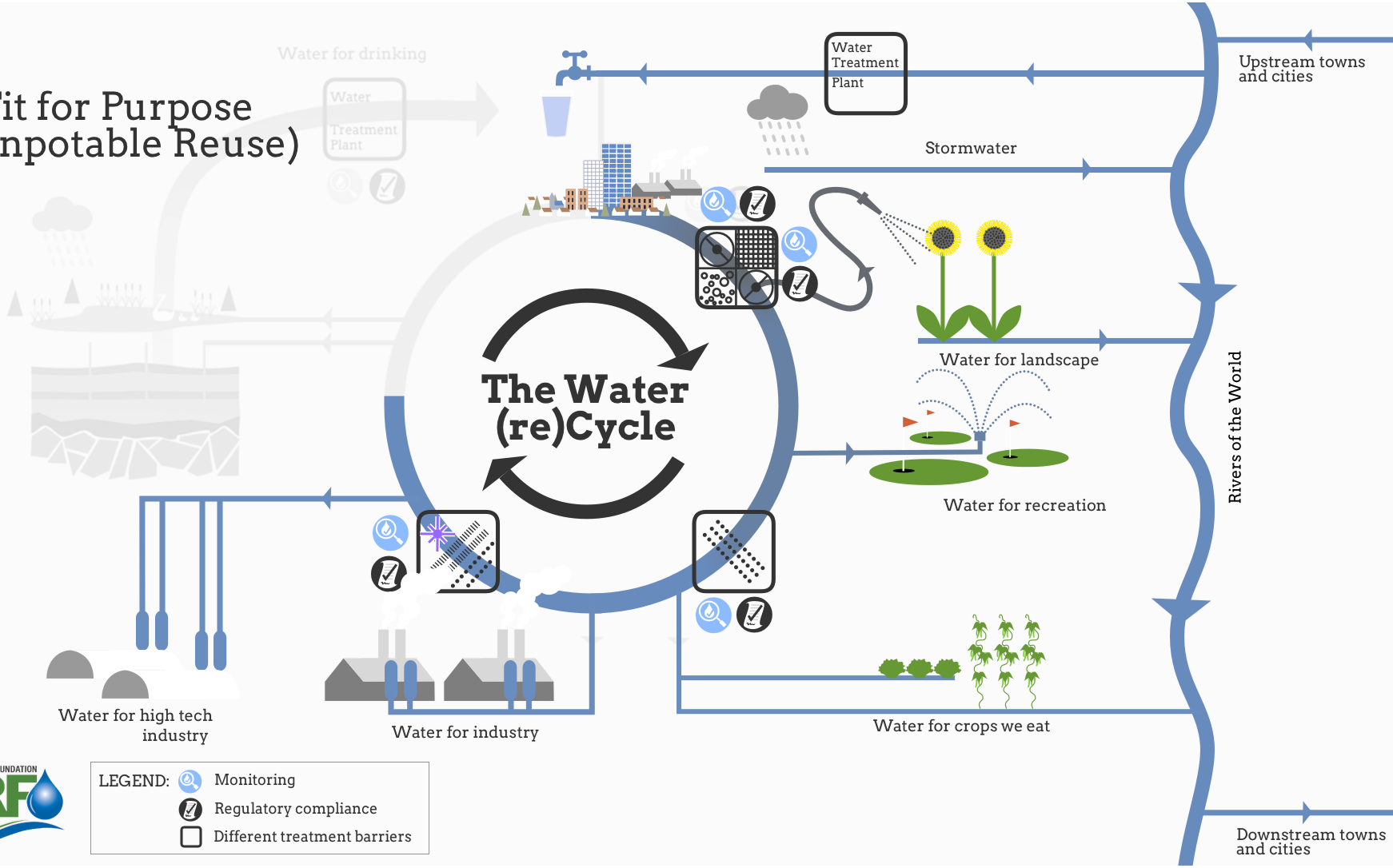
Fit for Purpose
The right water for the right use

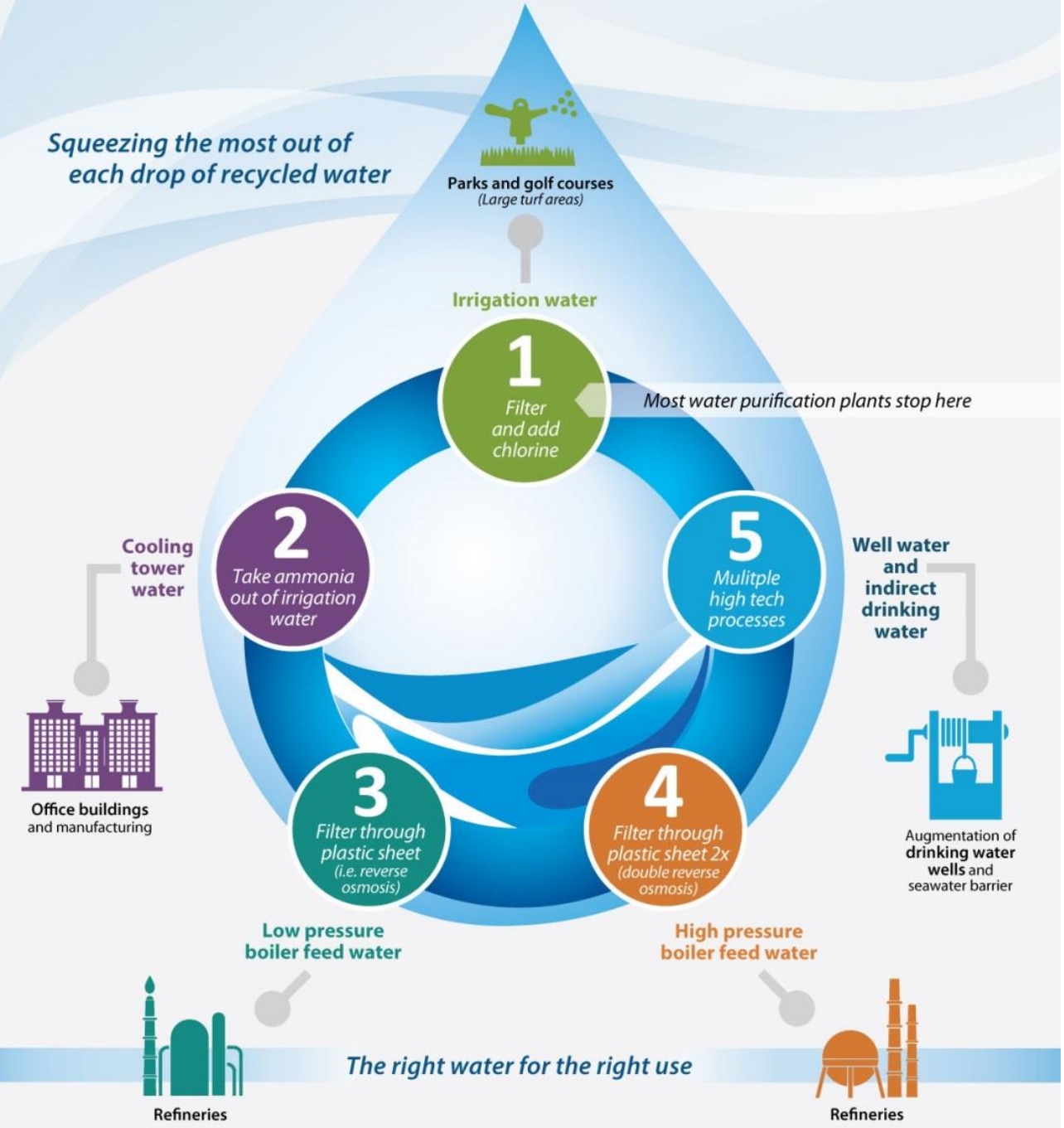
Industrial Reuse

Private businesses and government have different mandates and priorities	
Different industrial sectors have different needs for water quality and quantity	
Completed research seeks to bridge the gap between business and government as well as identify the similarities and differences between sector and end-use	WRRF-13-04 - Drivers, Successes, Challenges, and Opportunities of Onsite Industrial Water Reuse: a Path Forward for Collaboration and Growth
Ongoing research to develop a framework for onsite reuse and a decision support tool for evaluating the economics of potential projects	WRRF-14-04: A Framework for the Successful Implementation of Onsite Industrial Water Reuse

WATER ENVIRONMENT & REUSE FOUNDATION
WE&RF

Fit for Purpose (Nonpotable Reuse)

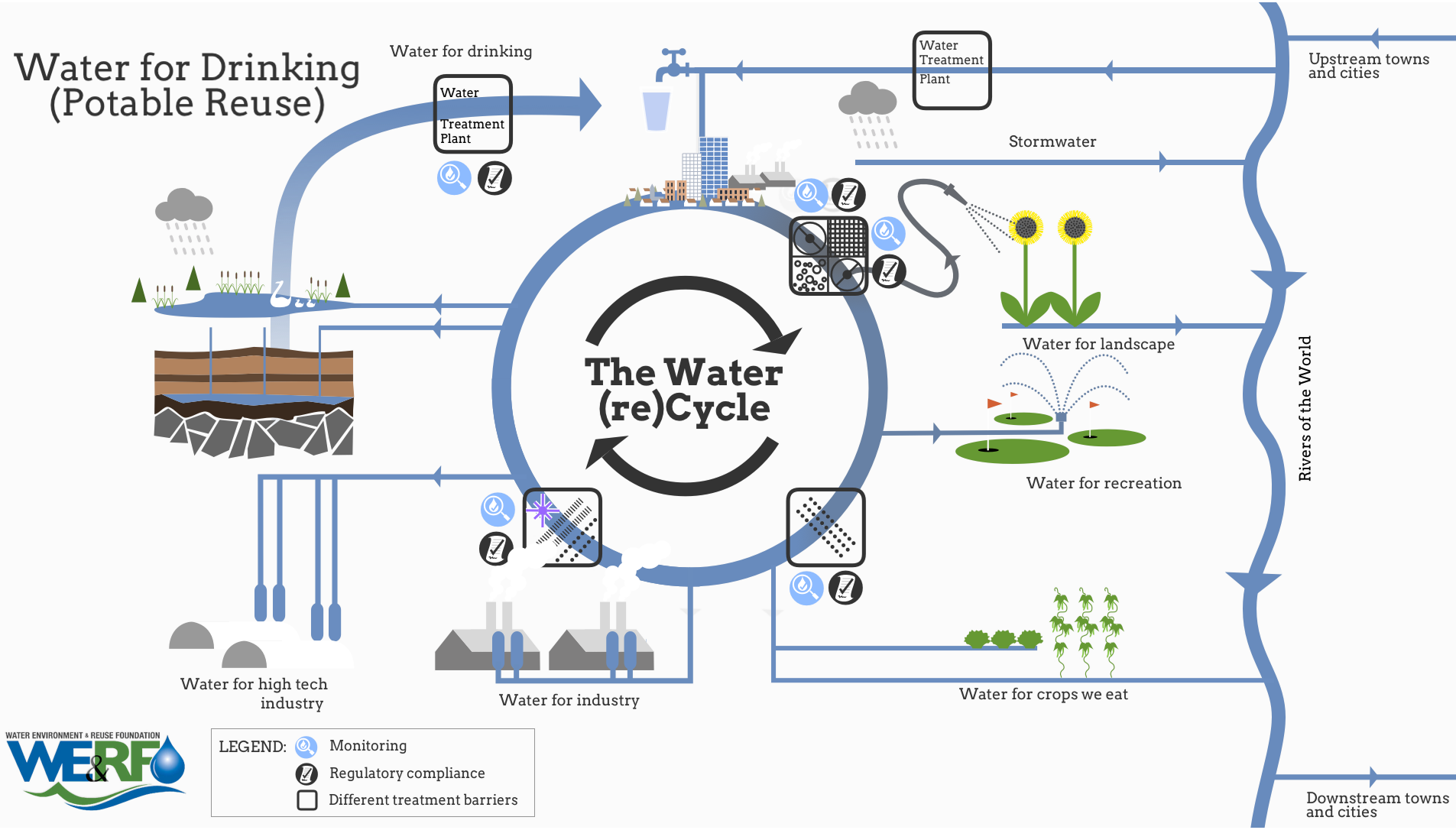




West Basin's Five Designer Waters

WEST BASIN MUNICIPAL WATER DISTRICT

WATER ENVIRONMENT & REUSE FOUNDATION
WE&RF


Water for Drinking (Potable Reuse)
Water for drinking
Water Treatment Plant
Water Treatment Plant
Upstream towns and cities
Stormwater
The Water (re)Cycle
Water for landscape
Water for recreation
Rivers of the World
Water for high tech industry
Water for industry
Water for crops we eat
Downstream towns and cities
LEGEND:
Monitoring
Regulatory compliance
Different treatment barriers

Potable Reuse

Drivers

- Drought
- Increased Demand
- Lack of/contaminated local supply

Potable Reuse is

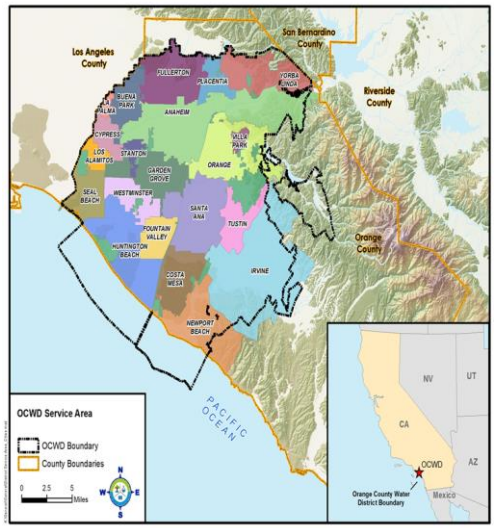
- Safe
- Reliable
- Locally-Controlled
- Environmentally-Friendly/Protective

Tools to deliver

- Research
- Technology
- Sound Science
- Innovation

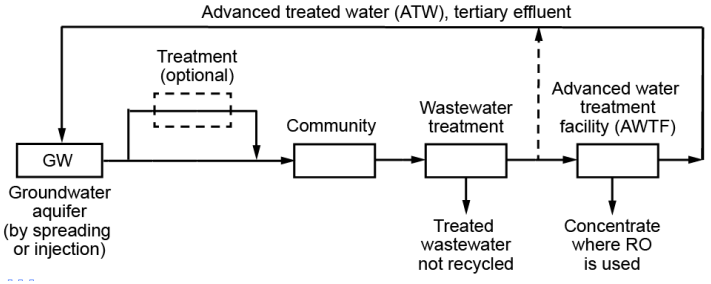
WATER ENVIRONMENT & REUSE FOUNDATION
WE&RF

Orange County Water District



Typical injection well - OCWD

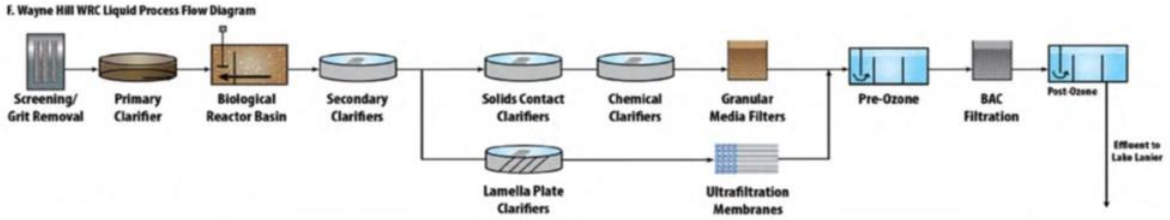
- Manage local groundwater basin
- Groundwater = 70% local supply for 2.4 million residents



WATER ENVIRONMENT & REUSE FOUNDATION
WE&RF

Gwinnett County Department of Water Resources

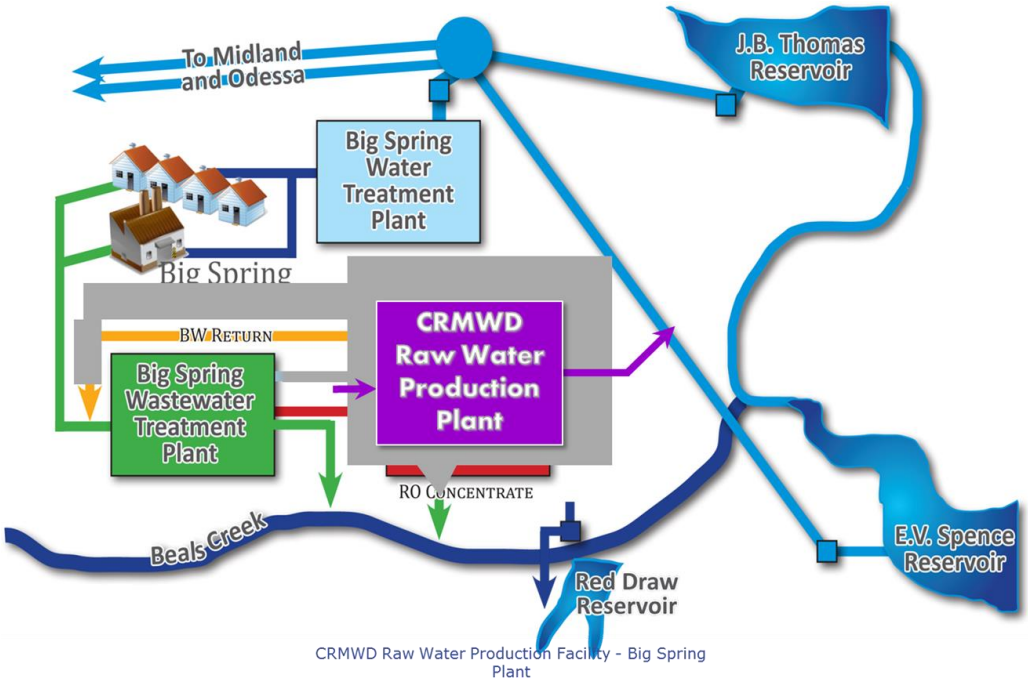
- Indirect Potable Reuse system
- Ozone-BAC based treatment at the F. Wayne Hill Water Resources Center
- Surface water discharge into Lake Lanier



WATER ENVIRONMENT & REUSE FOUNDATION
WE&RF

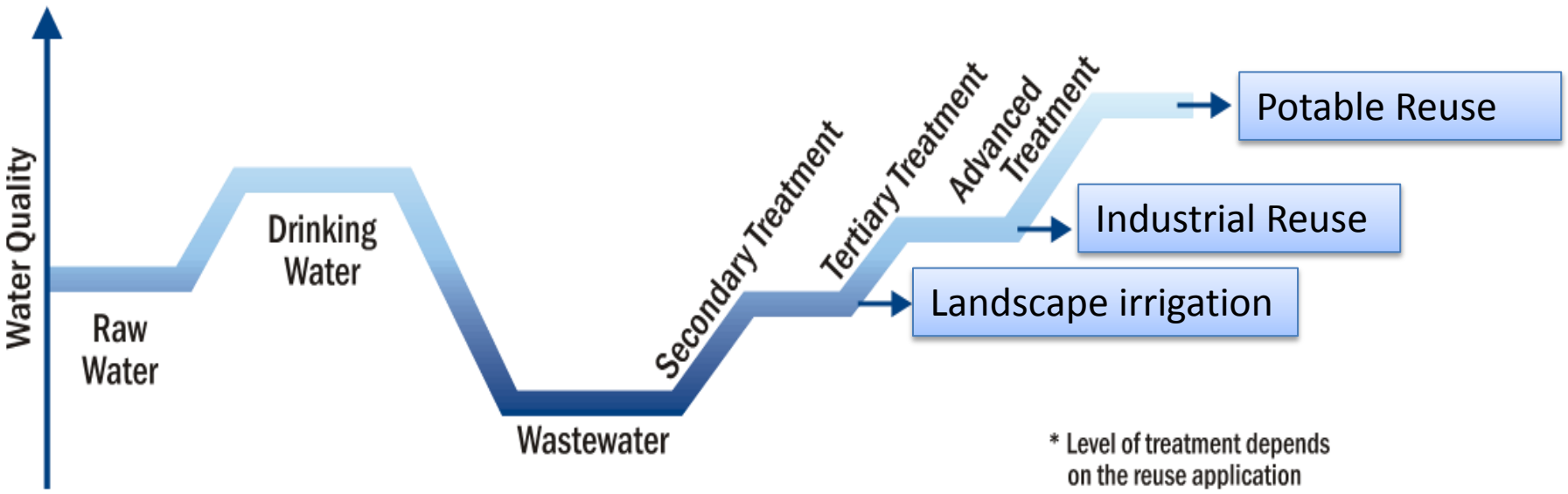
Big Spring Water Supply Augmentation

- Blends advanced treated reuse with lakes to produce a high-quality drinking water.
- 16 MGD with microfiltration, reverse osmosis, and ultraviolet disinfection.
- Blends advanced treated water with 21 MGD with traditional sources.



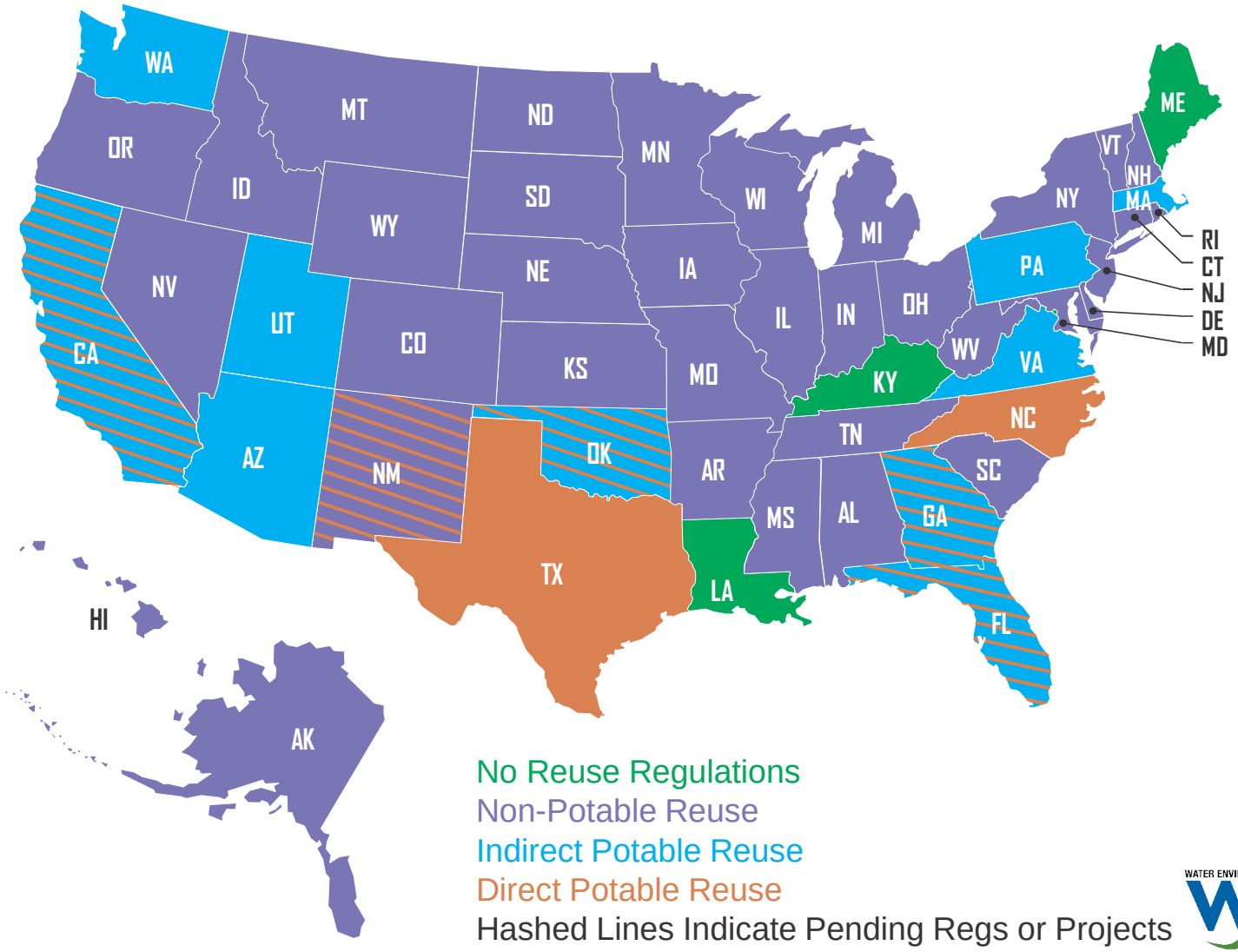
WATER ENVIRONMENT & REUSE FOUNDATION
WE&RF

Level of Treatment is dependent on End Use



Adapted from EPA Guidelines, 2012

The "State" of Reuse: Developing Consensus on Public Health Protection



No Reuse Regulations
Non-Potable Reuse
Indirect Potable Reuse
Direct Potable Reuse
Hashed Lines Indicate Pending Regs or Projects

WATER ENVIRONMENT & REUSE FOUNDATION
WE&RF

Status of Potable Reuse Regulations

California

- Regulations in place for GW recharge; Draft regulations for surface water augmentation expected in January 2017.
- Through **Expert Panel process**, State Water Board determined it is feasible to develop DPR regulations.
- More research needed, DPR sites can be permitted on case by case basis until regulations in place (2020+?).

Arizona

- IPR can be permitted.
- ADEQ in the process of updating the state's Reclaimed Water Rules – considering DPR regulations.

Nevada

- In November 2016, NV State Environmental Commission approved reclaimed water regulations that include provisions for IPR groundwater augmentation.
- Regional IPR demonstration project underway in Reno.

Colorado

- WateReuse CO formed **DPR Regulatory Workgroup** to develop recommendations for DPR regulations; DPR Outreach Workgroup also formed.

Oklahoma

- IPR regulations are in development with help from ***ad hoc* technical advisory group** to help review.

New Mexico

- *DPR Guidance Document* was developed by an **Expert Panel** to inform NMED's permitting process.
- DPR project in Cloudcroft, NM – expected in 2017.

Status of Potable Reuse Regulations (continued)

Texas

- Texas Water Development Board *sponsored a DPR Resource Document* to inform implementation of DPR projects.
- Big Spring, TX is only operational DPR site in US.

Florida

- Potable reuse interest is growing – multiple DPR and IPR pilots are on-going and/or planned.

Virginia

- IPR regulations in place:
  - Longest operational IPR (surface water augmentation) site in country – Upper Occoquan Service Authority (1978).
  - Hampton Roads Sanitation District (HRSD) is building a 1 MGD IPR (GW replenishment) demo to eliminate nutrient discharges to the Chesapeake Bay and overdrafting and subsidence. **Expert Panel** in place.

North Carolina

- IPR and DPR is possible. NC Department of Environment Quality's Public Water Supply division is determining how to regulate DPR beyond conventional technologies used in the state-wide *de facto* reuse practices.

Georgia

- IPR regs in development, DPR guidelines do not yet exist.
- Two notable planned IPR systems include those at Gwinnett County and Clayton County, both in suburban Atlanta.

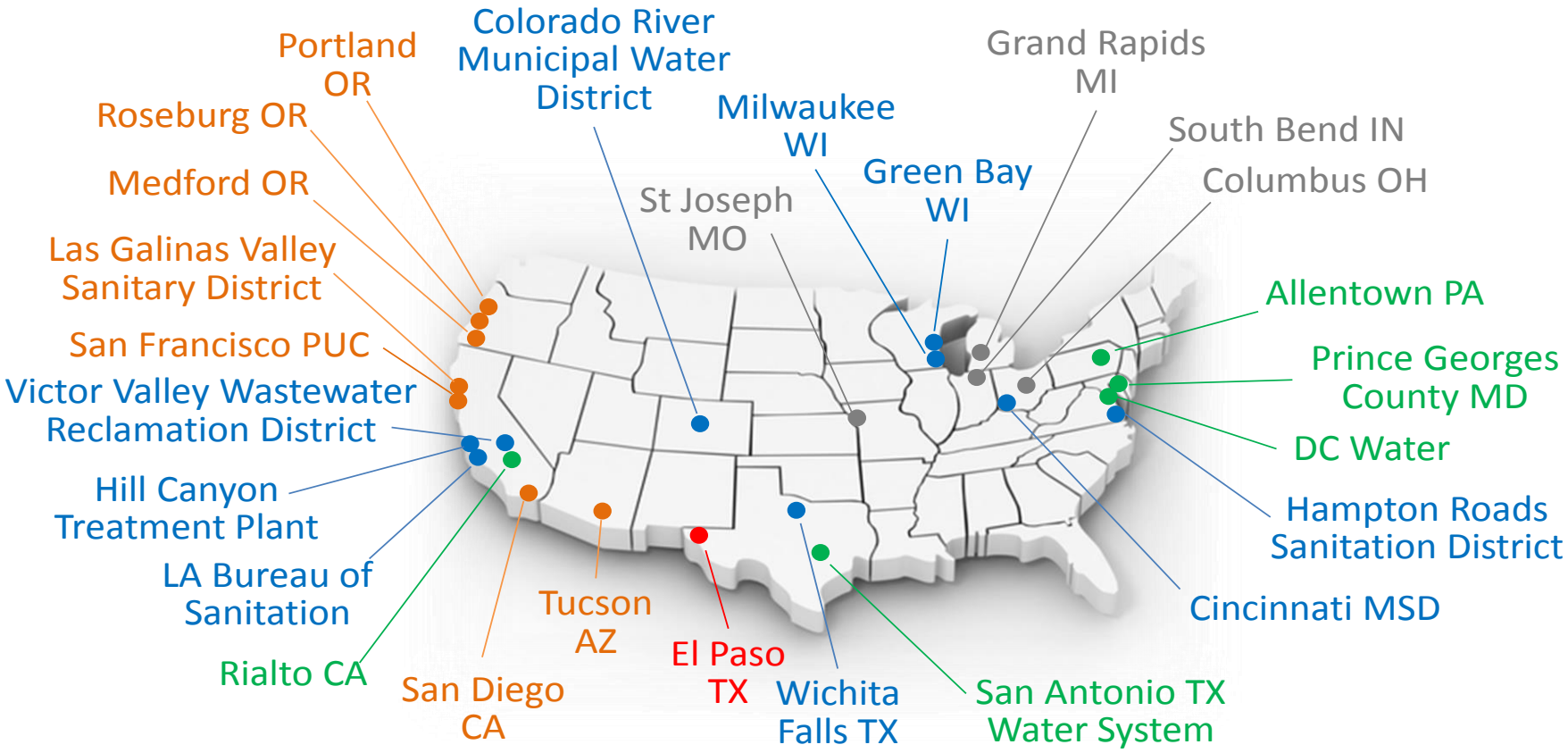
Maryland

- Maryland currently does not permit IPR or DPR projects.
- Limited groundwater supplies are pushing state regulators to consider IPR for groundwater replenishment.

Integrated Water Management

WATER ENVIRONMENT & REUSE FOUNDATION
WE&RF

Utilities of the Future



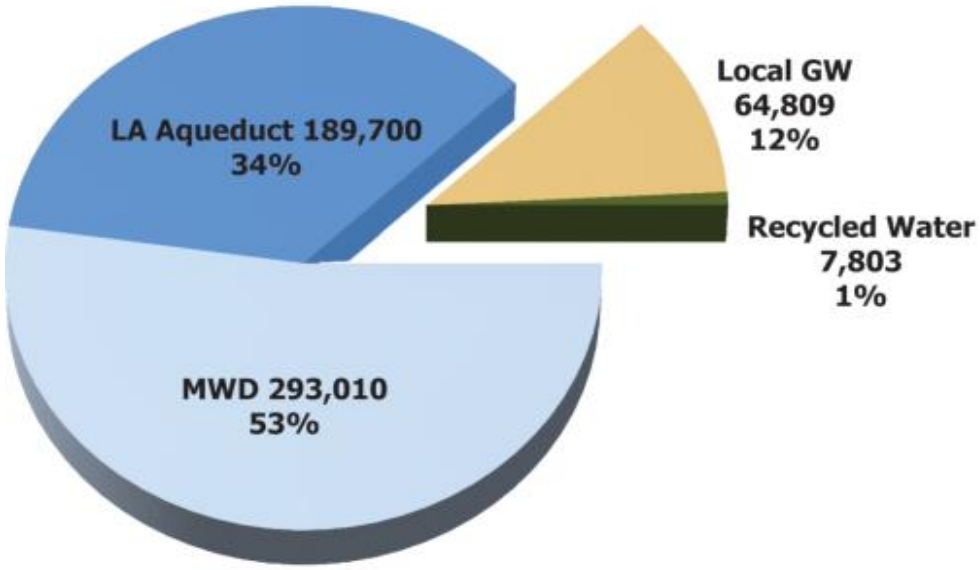
Utilities/Cities Cited for Clean Water Innovation:

- Innovative Utility Programs
- Technology Innovation
- Engineering Innovation
- Financial Innovation
- Government Innovation

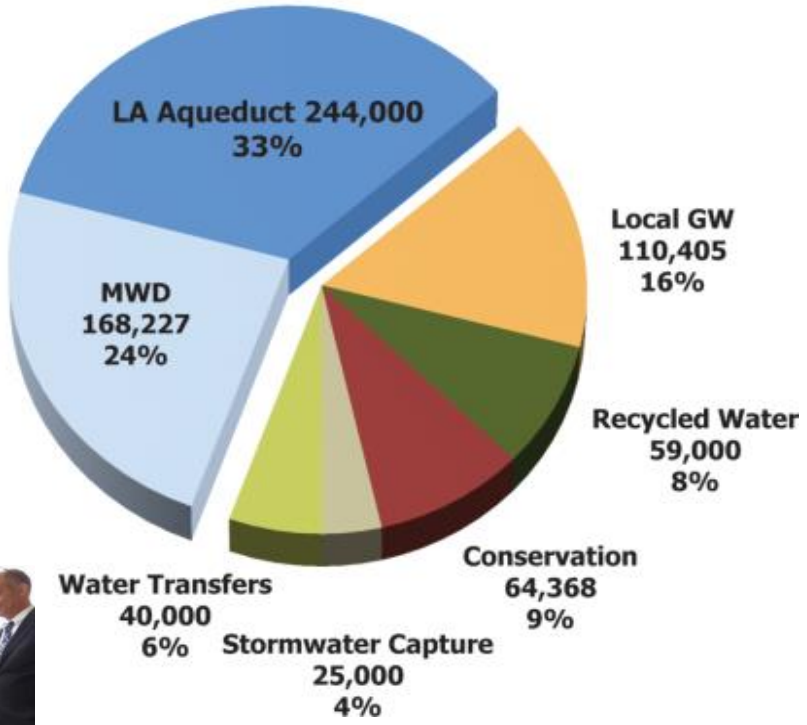
WATER ENVIRONMENT & REUSE FOUNDATION WE&RF

One Water LA Plan

FYE 2010 - 2014 Average
Total: 553,876 AFY



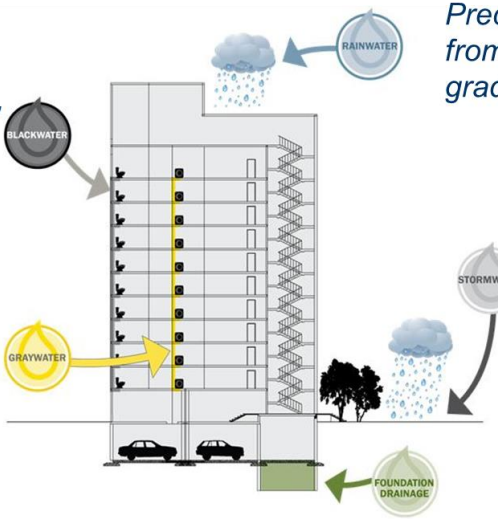
Fiscal Year 2034 - 35
Total: 711,000 AFY



Capturing Water for Non-potable Use

Wastewater from toilets, dishwashers, kitchen sinks, and utility sinks

Wastewater from clothes washers, bathtubs, showers, and bathroom sinks



Precipitation collected from roofs and above-grade surfaces

Precipitation collected at or below grade

Nuisance groundwater from dewatering operations

Source: SFPUC

National Blue Ribbon Commission
for Onsite Non-potable Water Systems

WATER ENVIRONMENT & REUSE FOUNDATION
WE&RF

Its not the history of the water that is important, it is the quality.

Melissa L. Meeker
mmeeker@werf.org

WATER ENVIRONMENT & REUSE FOUNDATION
WE&RF