



The California Journey Towards a Resilient Water Supply

Next Water 2025
Melbourne, Australia

Agenda

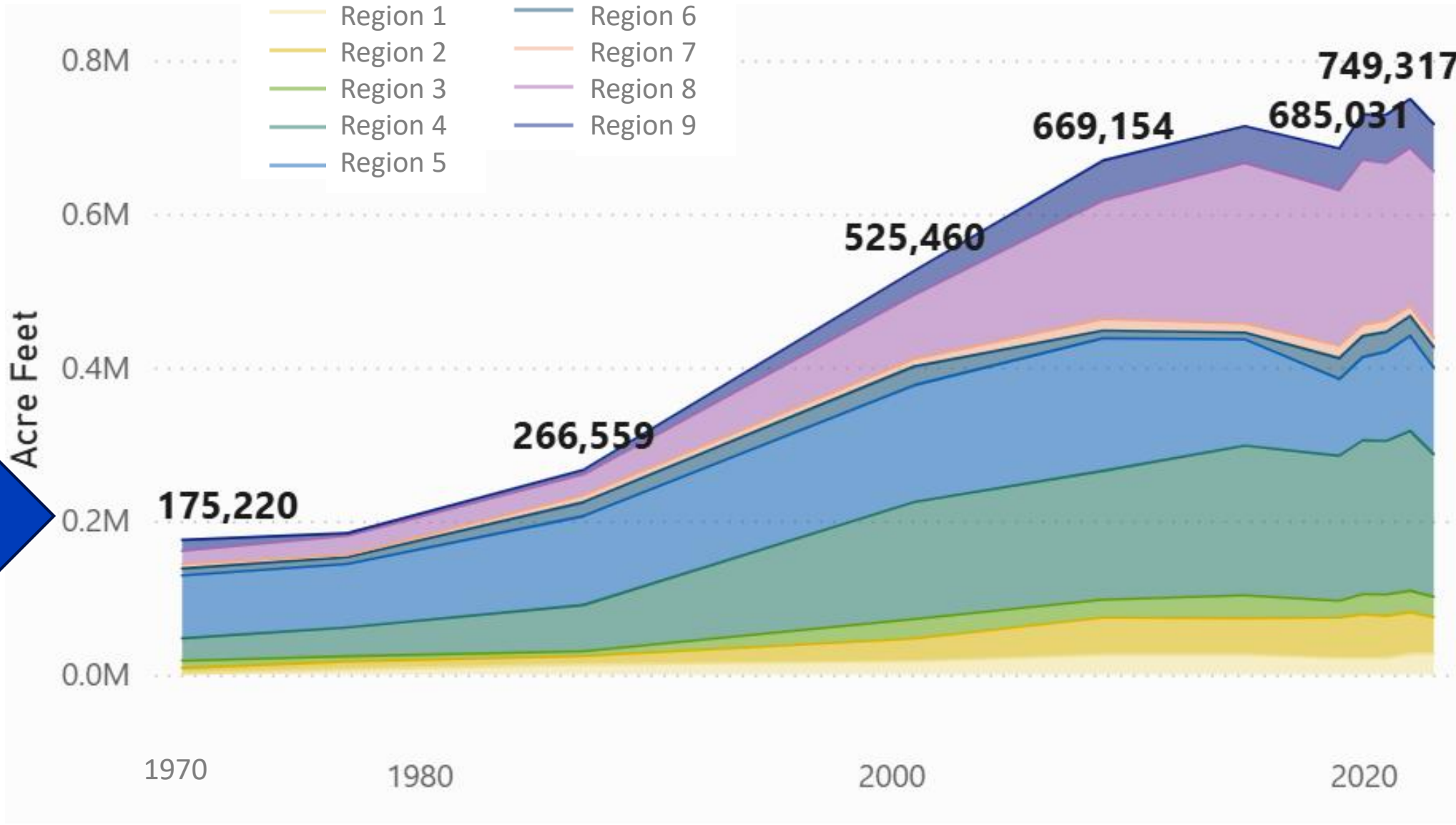
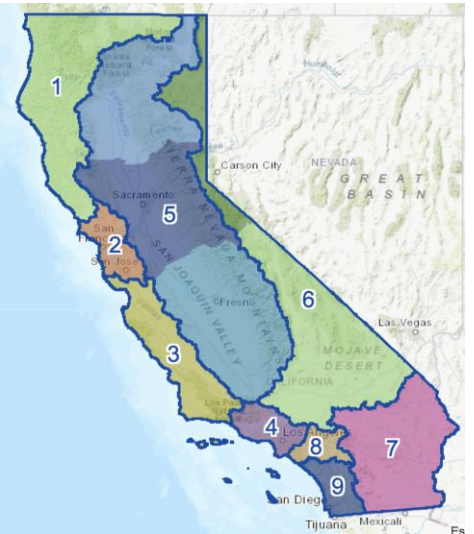
- Water Reuse in California
- Managing Environmental and Health Risk
- Indirect and Direct Potable Reuse – A Regulator’s Perspective
- A One Water Approach to Ensure a Resilient Water Supply

Water Reuse in California

Kevin Hardy, National Water Research Institute

California Reuse Volume, 1970 - 2023

247 MCM per year



California History Slides Courtesy of the Los Angeles County Sanitation Districts (the OG!)

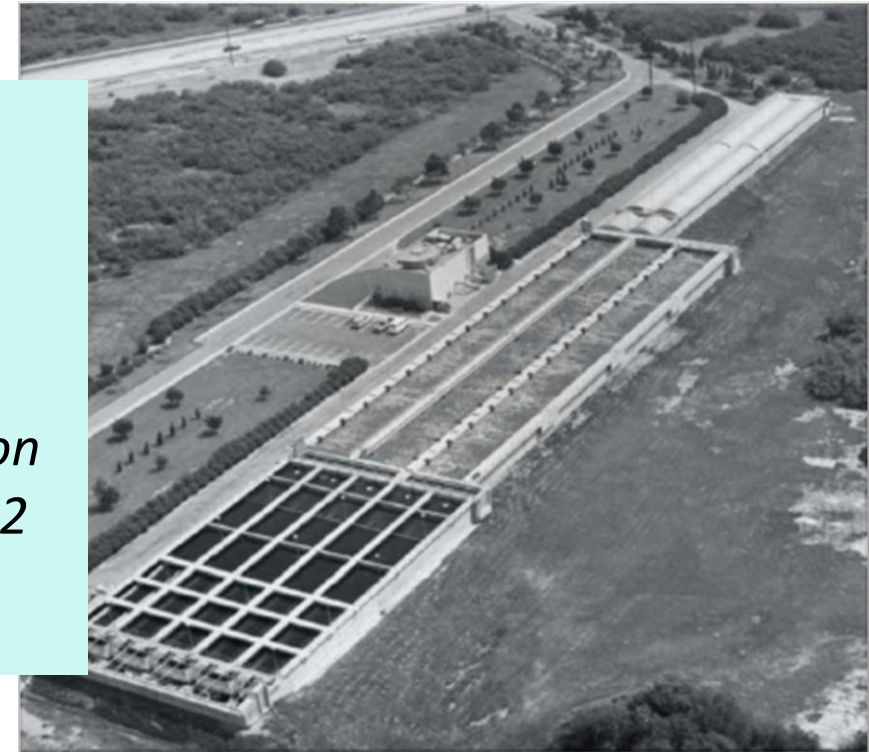
1962

First Potable Reuse Project: Montebello Forebay

*ASCE Historic
Civil
Engineering
Landmark
Plaque*



*Whittier
Narrows
Water
Reclamation
Plant: 1962*



1978

First general regulations for groundwater recharge (spreading)



Landscape Irrigation

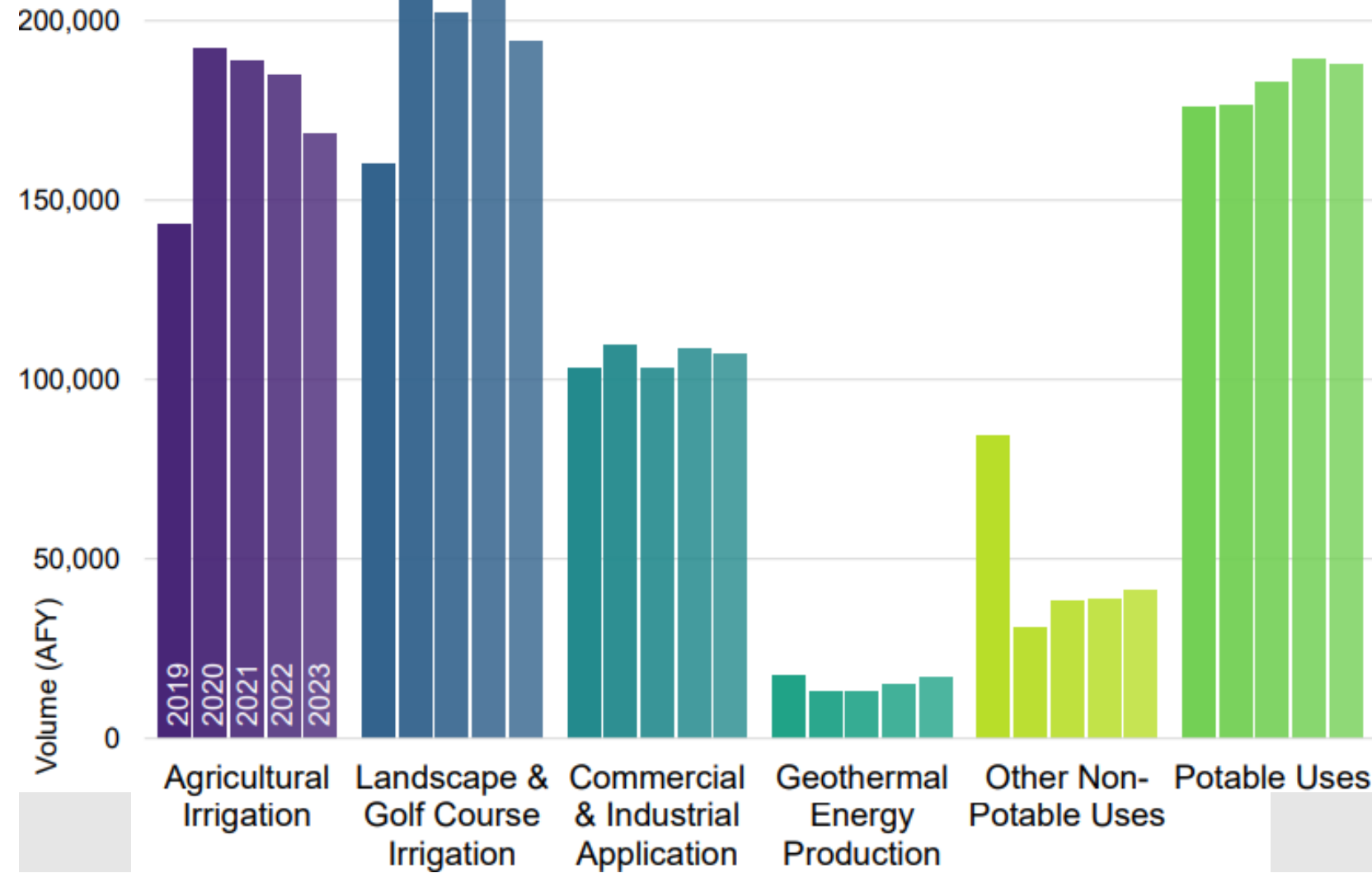


Agriculture



Groundwater Recharge

Types of Reuse in California



LACSD and the First IPR Project in CA



**LOS ANGELES COUNTY
SANITATION DISTRICTS**
Converting Waste Into Resources

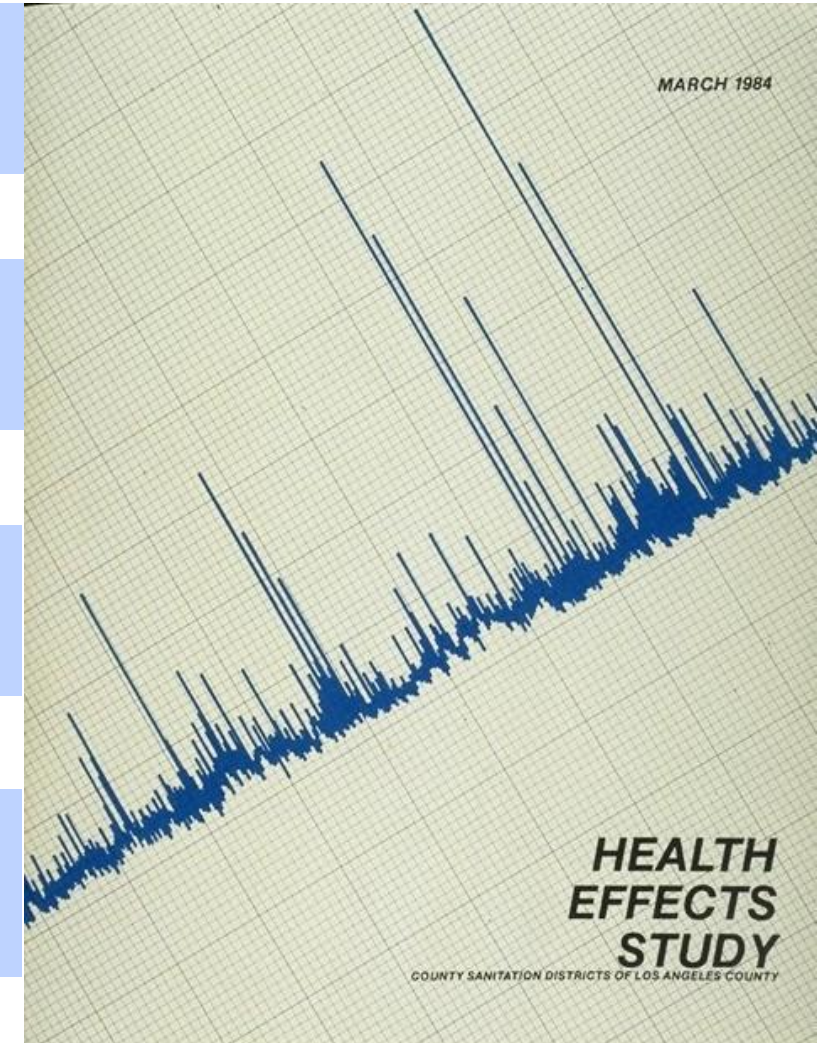
LACSD Epidemiologic Studies

1981, 1982, 1983: Frerichs, et al: birth outcomes between 1969 and 1980. **No adverse impacts**

1984: LACSD – Health Effects Study based on 1976 State Blue Ribbon Panel report. **No adverse impacts**

1987: State Blue Ribbon Panel report on Health Effects Study.

1996: Rand Corporation (Sloss, et al): birth outcomes (1982 – 1993) & epidemiologic assessment (1987-1991) **No adverse impacts**



Other Early Projects – Seawater Intrusion Barriers

Water Factory 21, 1976



GWRS, 2008



West Coast Basin Barrier, 1995



Challenges – Public Acceptance

Toilet-to-tap or showers-to-flowers?

From The Associated Press

SAN DIEGO
A city councilman wants to flush a toilet-to-tap proposal that would mix a small amount of treated sewage with the city's drinking water. Instead, he is floating a "showers-to-flowers" plan.

Both ideas are attempts to satisfy water-hungry San Diego.

Under the toilet-to-tap propos-

"I'm going to push hard for this, and I hope to kill toilet-to-tap in the process. I have been hearing from constituents on this issue. They do not want to drink what they perceive as other people's toilet water."

San Diego City Councilman Juan Vargas

developers must pay the city to connect each new home to city water and sewer systems, Vargas said.

Vargas' position means that at least two of the nine council members oppose the water purification project to extract drinking-quality water from some city sewage.

Councilman George Steven also has criticized the project, on the grounds that it would supply substandard water to parts of

Skepticism greets L.A.'s toilet-to-tap water project

By Harrison Sheppard and Michael Coit

LOS ANGELES DAILY NEWS

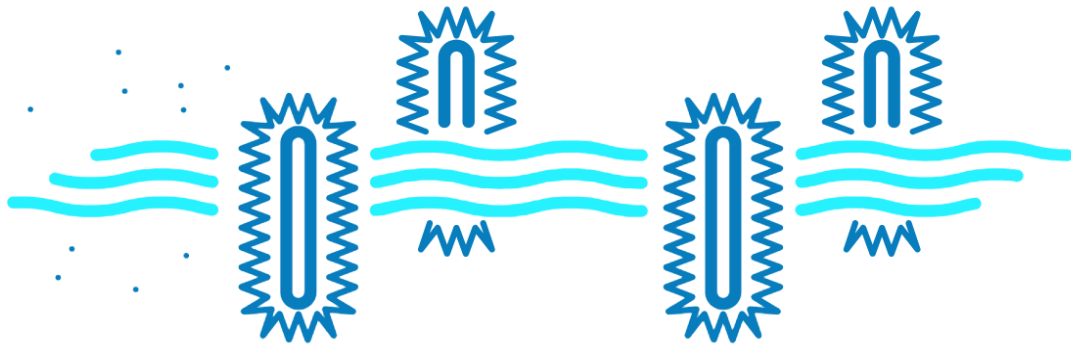
Storm Brews Over Prospect of Recycled Water in Beer

■ **Sewage:** Miller Co. in Irwindale is suing to halt \$25-million project. District dismisses concerns.

Challenges - NDMA

Water Factory 21

- Detections in monitoring wells in May 2000 led to implementation of UV/AOP at GWRS



Montebello Forebay

- 2008 NDMA Attenuation and Dilution Studies
- Process changes
 - UV
 - Flow equalization
 - Optimized chemical use
 - Optimized aeration

More IPR Projects

1999: IEUA

2005-6: Alamitos and Dominguez Gap Barriers

2019: Albert Robles Center

2020: Pure Water Monterey

2022: Pure Water Oceanside

2024: Santa Monica, East Valley

2025: Pure Water Soquel

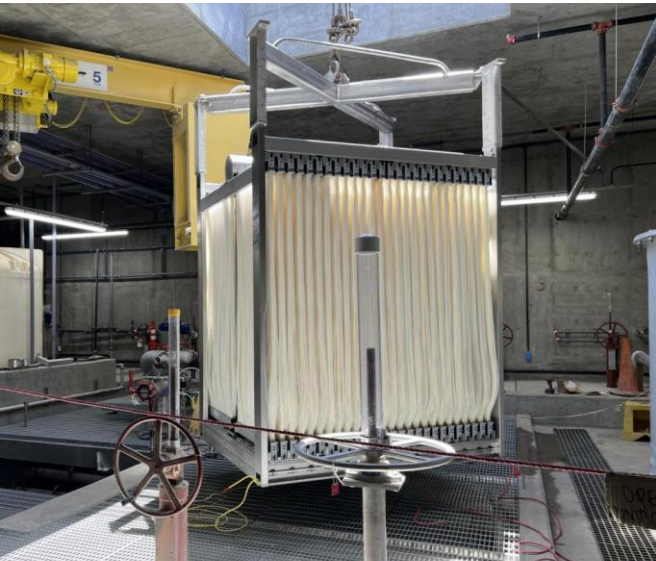
Coming Soon:

Pure Water San Diego

East County Advanced Water Purification Program

Los Angeles Groundwater Replenishment Project

Pure Water Las Virgenes-Triunfo



Santa Monica's Membrane Bioreactor



Sterling Natural Resource Center (East Valley)



Pure Water San Diego Demonstration Facility

Evolution of Early IPR Regulations

1970s

1978: Groundwater recharge by spreading **recognized as an acceptable use**

1976 draft: First internal draft criteria, requirements for treatment and water quality (MCLs, TOC, COD), underground travel time (1-year) and dilution ($\geq 50\%$)

1980s

1988 draft: Filtration required, limit for total N, added minimum distance to withdrawal (500 ft)

1989 draft: First regulations for direct injection

1990s

1996: Proposed framework for regulating **surface water augmentation**

2000 –
2010s

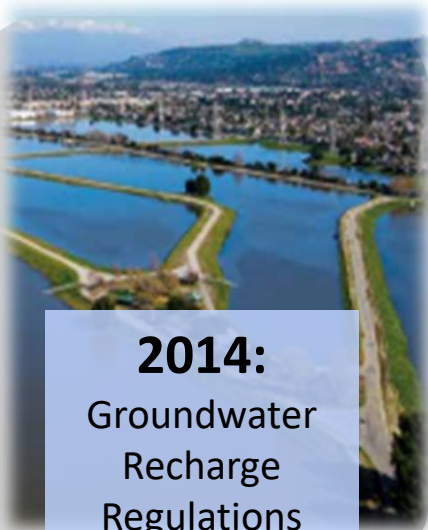
2001 draft: Reverse osmosis (RO) required for injection

2002 – 2011 drafts: Changes to address emerging contaminants (TOC limit, other requirements to address NDMA and 1,4-dioxane)

Path to Final IPR Regulations



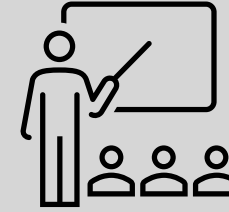
2010 & 2013:
SB 918 and 322



2014:
Groundwater
Recharge
Regulations



2009-2018:
Recycled Water
Policy



2014-2016:
Expert Panels for SWA
and DPR



2018:
Surface Water
Augmentation
Regulations

Pathogen Control

- Risk-based LRVs
- Multiple barriers

Chemical Control

- Treatment for unregulated compounds (FAT or SAT)
- Source control

Program/ Operational Requirements

- Technical/ managerial capacity
- Reliability features

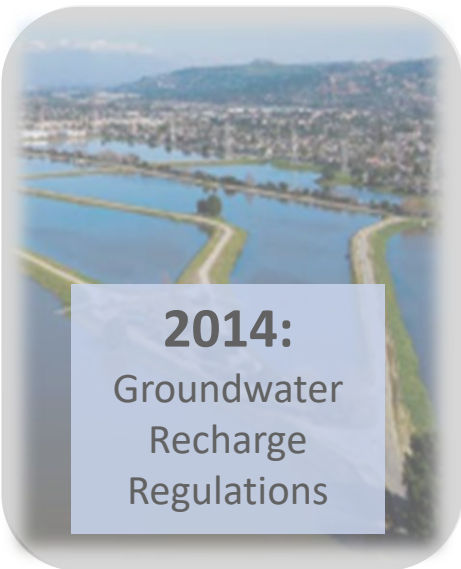
Environmental Buffer

- Retention time
- SAT/Pathogen removal (GWR)

Direct Potable Reuse Regulations



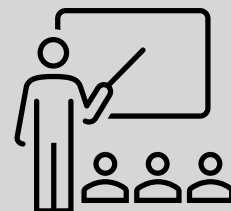
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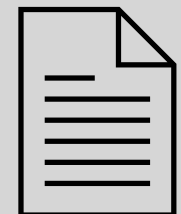
2014:
Groundwater
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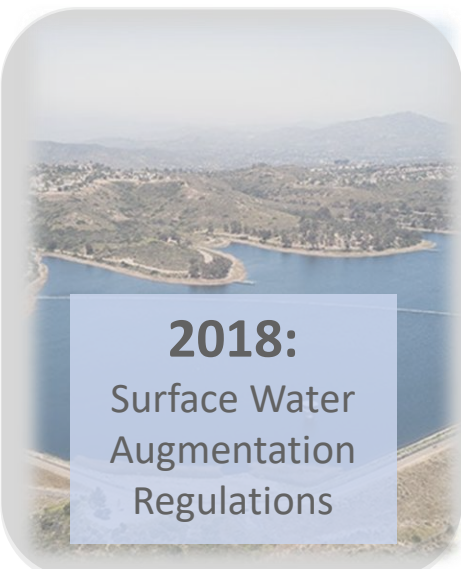
2014-2016:
Expert Panels for SWA
and DPR



2016:
DPR Feasibility Report



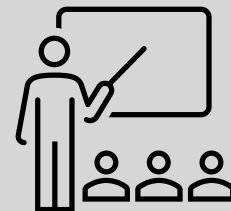
2017:
AB 574



2018:
Surface Water
Augmentation
Regulations



2018-2021:
DPR Framework &
Research



2022-2023:
DPR Criteria Expert
Panel



2024:
Direct Potable
Reuse
Regulations



Managing Environmental and Health Risk – Trade Waste Control

Lydia Holmes and Andrew Salveson, Carollo Engineers

Which Industry Is Least Problematic for PRW?



**Organic Soup
Company**



**Oil and Gas
Processing**



**RV Park in Small
Beach
Community**

Survey!

menti.com

code: **4170 5398**

Which Industry Is Least Problematic for PRW?



Organic Soup Company



RV Park in Small Beach Community

Oil and Gas Processing



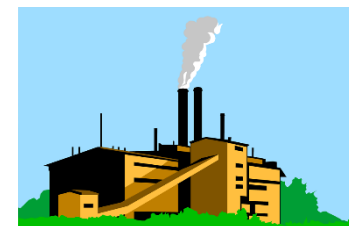
Overview of Enhanced Source Control for PRW

// Pretreatment Programs Are Designed to Protect the WWTP and the Effluent Discharge

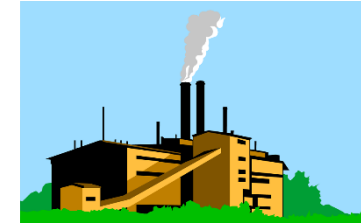
- Small WWTPs < 5 mgd...
 - Are not required to have a program,
 - Often little industry to worry about
 - Other than implementing FOG programs



- Large WWTPs focus upon SIUs and CIUs, in addition to nuisance challenges like FOG.
 - SIU – Significant Industrial User
 - Defined by 40CFR 403.3(v)
 - $\geq 25,000$ gpd average discharge
 - $\geq 5\%$ or more of WWTP dry weather capacity or organic load
 - Has a reasonable potential to adversely impact the WWTP
 - CIU – Categorical Industrial User
 - CIUs are SIUs that are defined by the CFRs due to their potential to adversely impact the WWTP

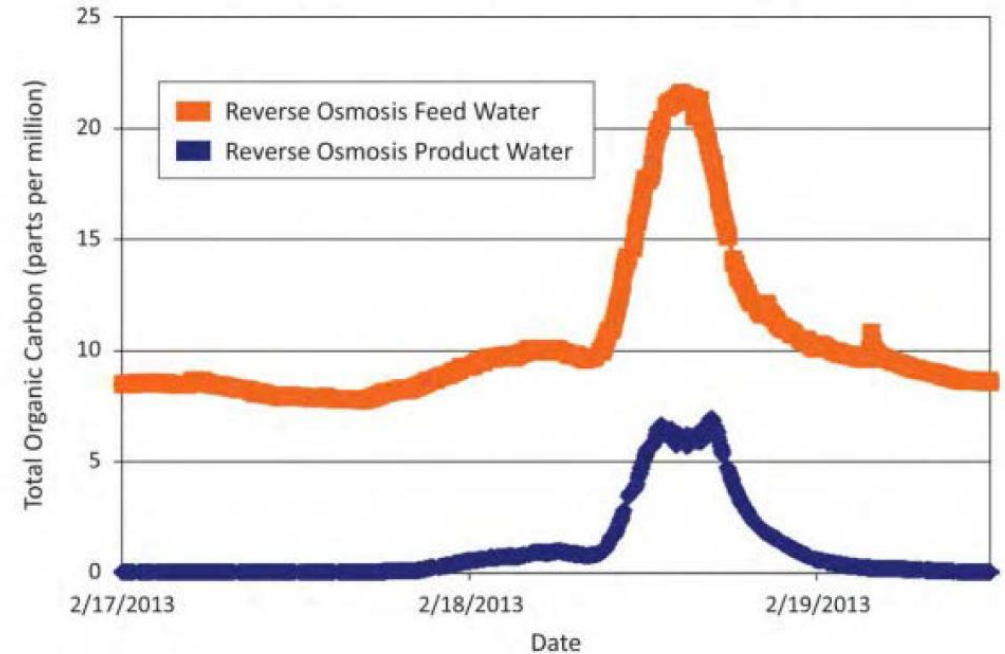


// USEPA Mandates that a Range of Industries be Designated as CIUs Due to Their Potential WWTP & NPDES Impact

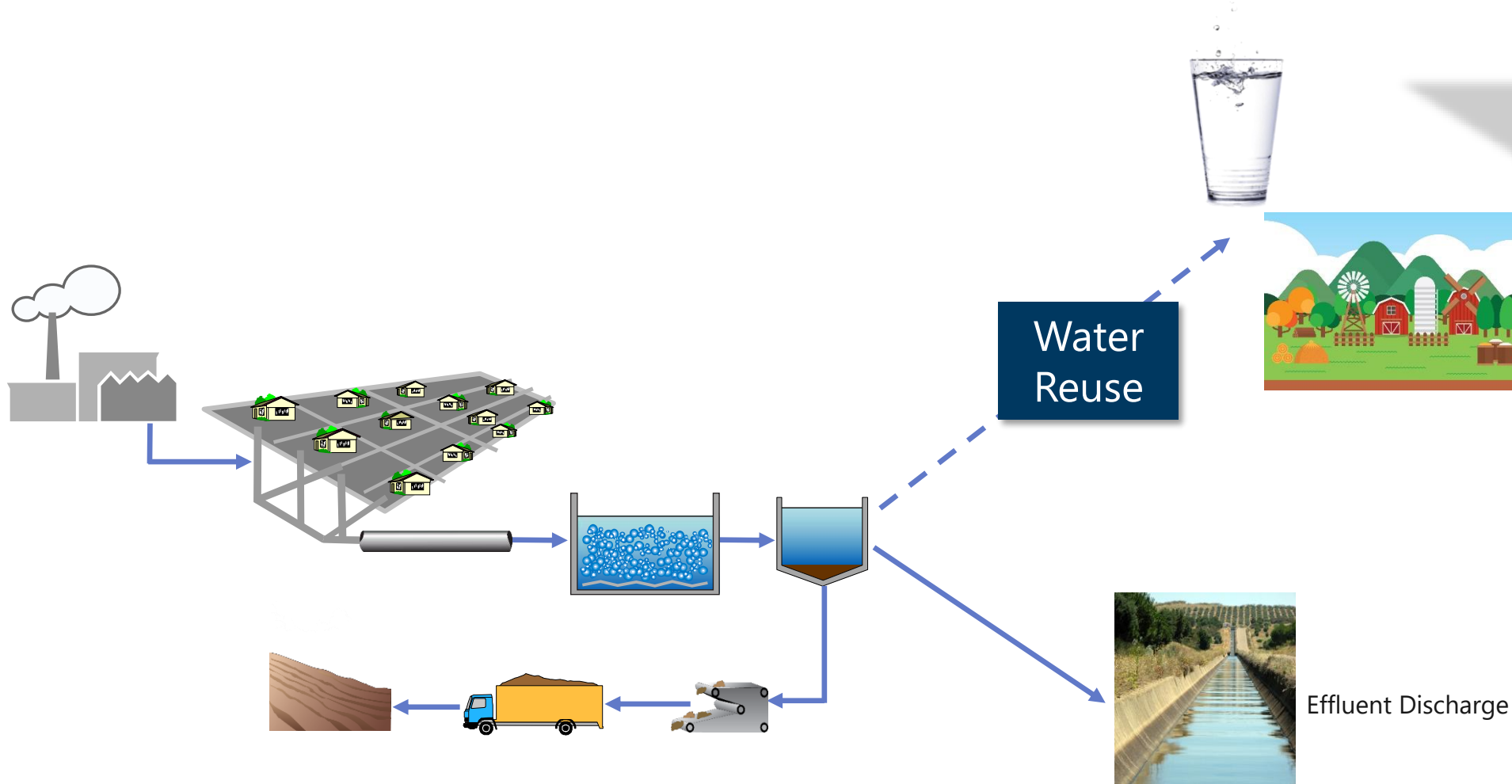
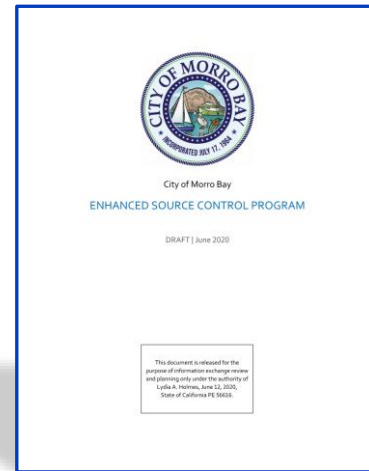


Aluminum Forming	Electrical & Electronic Components	Iron & Steel Manufacturing	Organic Chemicals, Plastics & Synthetic Fibers	Pulp, Paper & Paperboard
Battery Manufacturing	Electroplating	Leather Tanning & Finishing	Paint Formulating (New Sources Only)	Rubber Manufacturing (New Sources Only)
Carbon Black Manufacturing (New Sources Only)	Fertilizer Manufacturing (New Sources Only)	Metal Finishing	Paving & Roofing (Tars and Asphalt)	Soap & Detergent Manufacturing (New Sources Only)
Centralized Waste Treatment	Glass Manufacturing (New Sources Only)	Metal Molding & Casting	Petroleum Refining	Steam Electric Power Generating
Coil Coating	Grain Mills (New Sources Only)	Nonferrous Metals Forming and Metal Powders	Pesticide Chemicals	Timber Products Processing
Concentrated Animal Feeding Operations (New Sources Only)	Ink Formulating (New Sources Only)	Nonferrous Metal Manufacturing	Pharmaceuticals Manufacturing	Transportation Equipment Cleaning
Copper Forming	Inorganic Chemicals Manufacturing	Oil & Gas Extraction	Porcelain Enameling	Waste Combustors

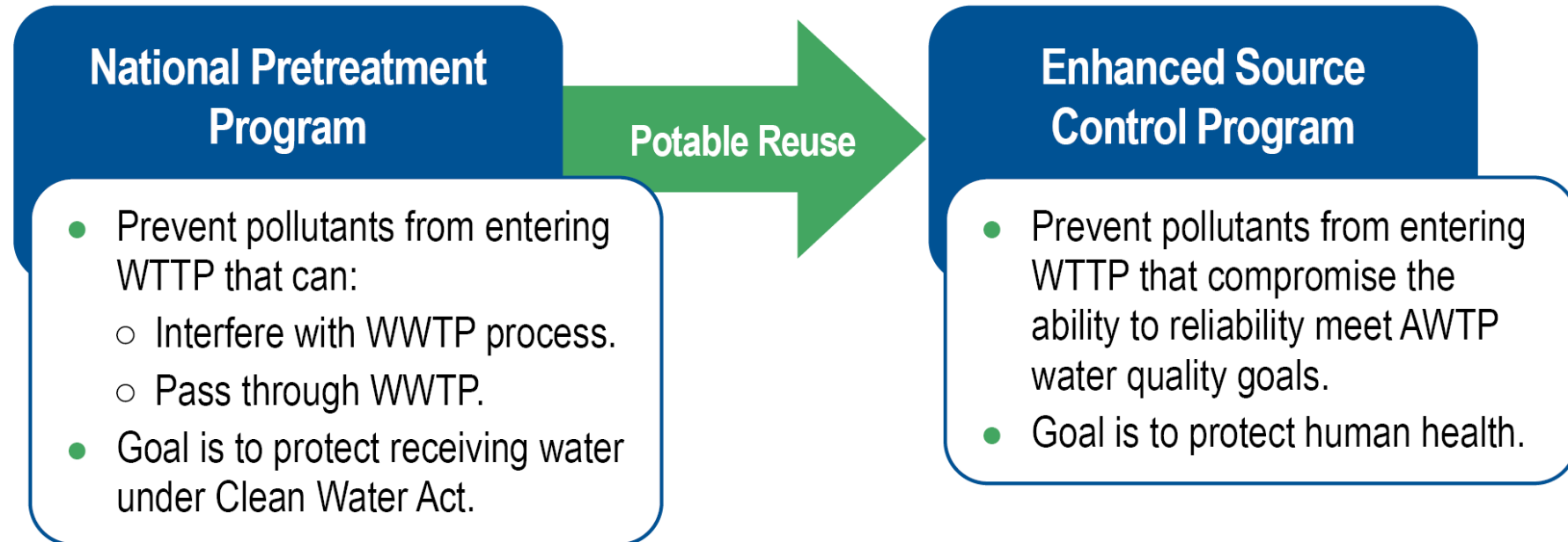
// With a Good Pretreatment Program, Many Industrial Challenges Can Be Avoided...But Not All



// Water Reuse Expands the Goals and Brings New Approaches to Existing Pretreatment Programs, Resulting in the Development of the Enhanced Source Control Program



// ESCPs Result in New Thinking on Source Control



// ESCPs Result in New Thinking on Source Control

Example Secondary Effluent Inventory Action Plan for City of Oxnard, CA

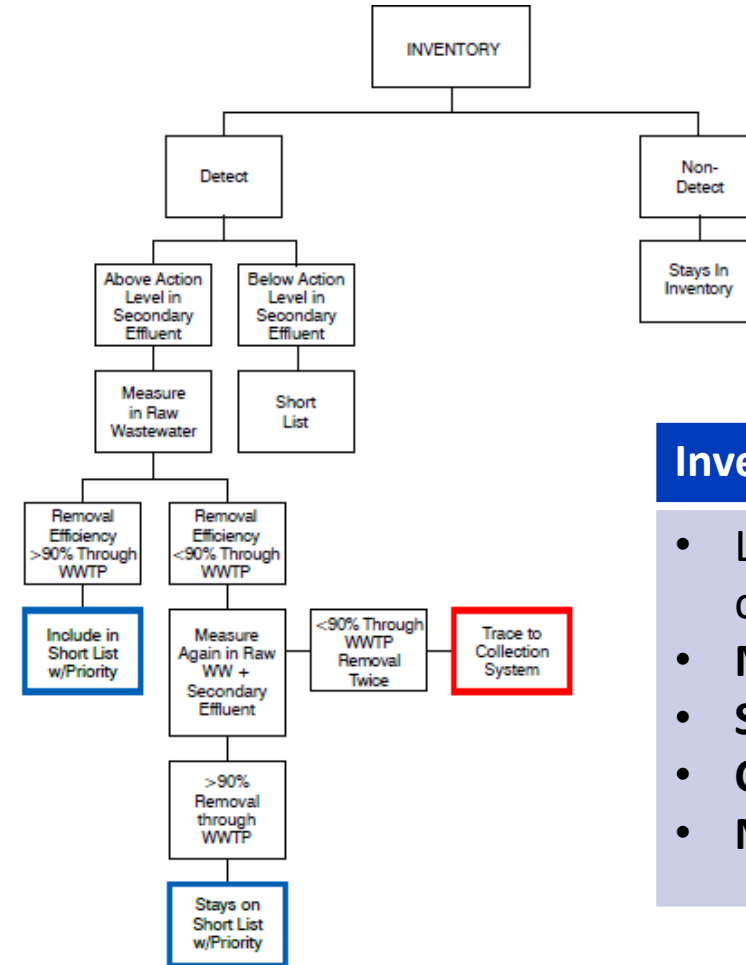
Enhanced Source Control means more...

...Local limits / inventory

...Routine monitoring

...Action plan events

...Staff time and cost!



Inventory List

- Local Limit constituents
- MCLs
- SMCLs
- CECs
- NLs

// Enhanced Source Control Programs (ESCPs) are Required Components of PRW in California

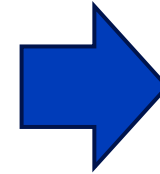
§60320.106. Wastewater Source Control.

A project sponsor shall ensure that the recycled municipal wastewater used for a GRRP shall be from a wastewater management agency that:

- (a) administers an industrial pretreatment and pollutant source control program; and
- (b) implements and maintains a source control program that includes, at a minimum;
 - (1) an assessment of the fate of Department-specified and Regional Board-specified chemicals and contaminants through the wastewater and recycled municipal wastewater treatment systems,
 - (2) chemical and contaminant source investigations and monitoring that focuses on Department-specified and Regional Board-specified chemicals and contaminants,
 - (3) an outreach program to industrial, commercial, and residential communities within the portions of the sewage collection agency's service area that flows into the water reclamation plant subsequently supplying the GRRP, for the purpose of managing and minimizing the discharge of chemicals and contaminants at the source, and
 - (4) a current inventory of chemicals and contaminants identified pursuant to this section, including new chemicals and contaminants resulting from new sources or changes to existing sources, that may be discharged into the wastewater collection system.

34

Last updated October 1, 2018—from Titles 22 and 17 California Code of Regulations State Board, Division of Drinking Water, Recycled Water Regulations



City of Morro Bay

ENHANCED SOURCE CONTROL
PROGRAM

FINAL | July 2022

ESCP and pretreatment program elements



Source Control Program Manager (SCPM)



Industrial Waste Survey (IWS)



Sewer Use Ordinance (SUO)



Industrial Discharge Limits



Enforcement Response Plan (ERP)



Funding and Resources Report



Monitoring, Mapping, and Response Plan



Outreach Program

Water Research (US) ESCP Tools Can Be Considered and Adapted for Australia

Examples of WRF's Research on Collection Systems and Pretreatment



PROJECT NO.
4971A

**Leveraging Pretreatment Programs for
One Water Initiatives: Synthesis of Best
Practices and Path Forward**



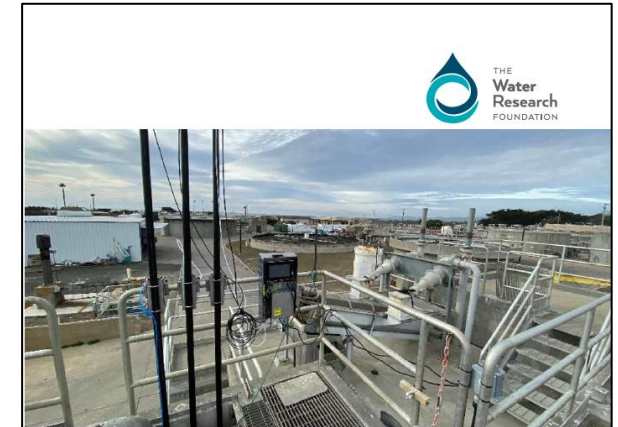
PROJECT NO.
WRF-17-30/4908

**Demonstrating Real-Time Collection
System Monitoring for Potable Reuse**



PROJECT NO.
4960

**An Enhanced Source Control
Framework for Industrial
Contaminants in Potable Reuse**



PROJECT NO.
5048

**Integrating Real-Time Collection
System Monitoring Approaches into
Enhanced Source Control
Programs for Potable Reuse**



WRF 4960

An Enhanced Source Control Framework for Industrial Contaminants in Potable Reuse

Prepared by:

Tyler Nading, Larry Schimmoller, Talia Assi, Erik Desormeaux
Jacobs

Andy Salveson, Amos Branch
Carollo Engineers, Inc

Eric Dickenson, Kyle Thompson
Southern Nevada Water Authority

Co-sponsored by: California State Water Resources Control Board

2023

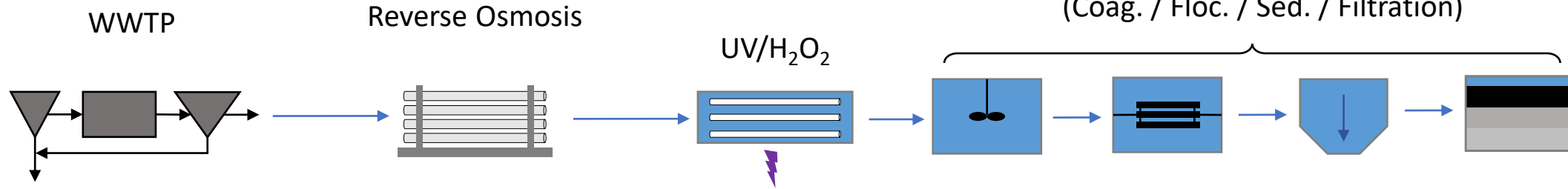


// **Water Research Foundation Project 4960** Asks “What Risk is Posed from Various Industrial Effluents to Water Reuse Water Quality?”

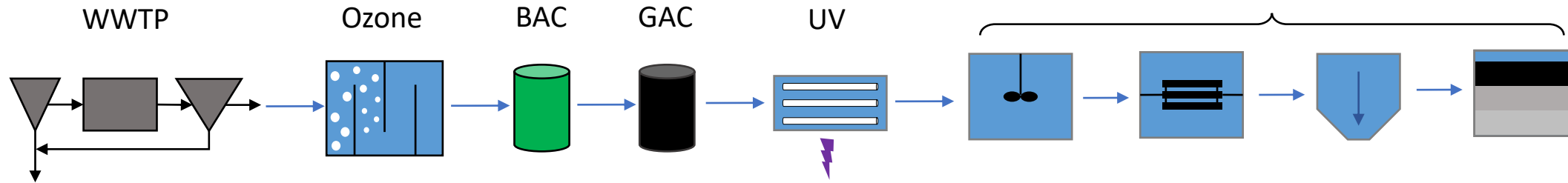
- Industrial contaminants can provide a significant risk to potable reuse systems due to:
 - Chemical Spikes
 - Lack of online monitoring
 - Constant creation of new chemicals with unknown toxicity
- What industries create WWTP and AWWPF challenges?
- What lessons can be learned through surveys and interviews of potable water reuse utilities?

Advanced Treatment Trains Evaluated

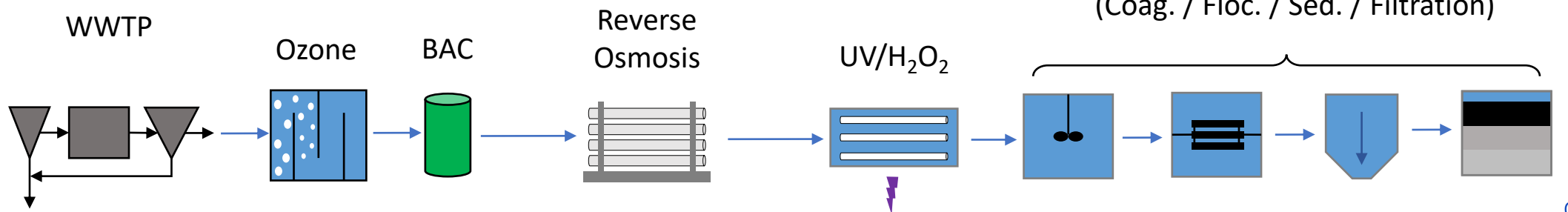
Train A: RO-based Advanced Treatment



Train B: O₃/BAC/GAC or Carbon-based Advanced Treatment



Train C: Proposed CA Direct Potable Reuse Train



Objective 1: Pass-Through and Interference

- A **pass-through** hazard was defined as a chemical that has less than 90 percent (%) removal across an advanced treatment train.
- An **interference** hazard is defined as a chemical that can inhibit or disrupt the treatment system's processes or operations and compromise the safety of the water by means other than pass-through.
 - Examples of interference hazards include
 - Oxidant scavenging
 - Membrane scaling
 - Biological inhibition
 - Chemicals with the potential to biodegrade or oxidize into other chemicals that would be more toxic.

Objective 1: Pass-Through Hazards

Train B - Carbon-based

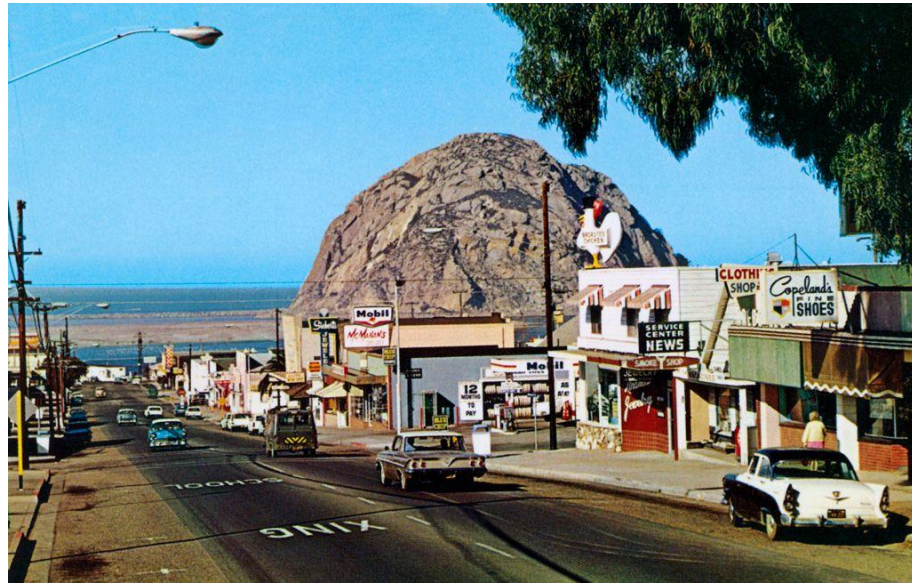
Train A – RO-based

1,4-Dioxane
NDMA
Nitrate*

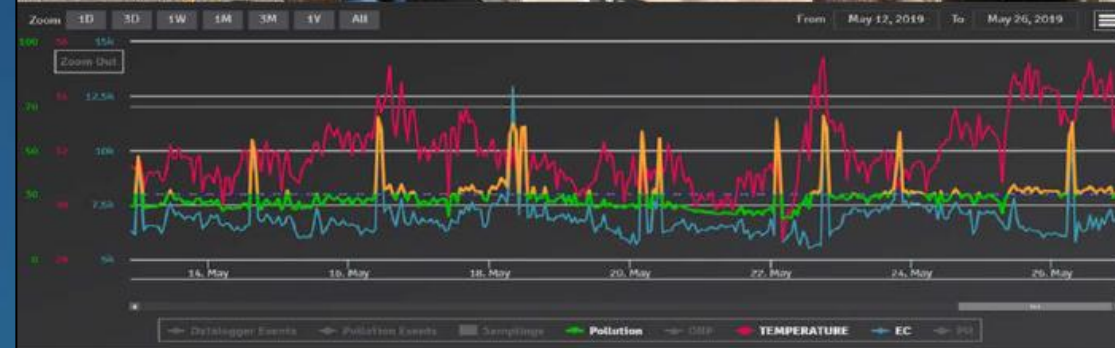
Aluminum	Copper	PFBS	PFPeA
Barium	Diatrizoic Acid	PFBA	PFDA
Cadmium	Fluoride	PFHpA	Strontium
Calcium	Gabapentin	PFHxS	Sulfate
Chloride	Mercury	PFHxA	Uranium
Chromium	Nickel	PFNA	Zinc
Cobalt	NMOR	PFOA	PFOS

Train C – CA DPR Train

ESCPs for PRW are a Necessity, Regardless of the Size of a Program or Nature of Industry



...but the complexity differs dramatically.



PROJECT NO.

● ● ● ● WRF-17-30/4908

**Demonstrating Real-Time Collection
System Monitoring for Potable Reuse**

WRF 4908



WRF 5048

PROJECT NO.
5048



**Integrating Real-Time Collection
System Monitoring Approaches into
Enhanced Source Control
Programs for Potable Reuse**

// Water Research Foundation Project 4908 & 5048 Ask if we can improve ESCP through real time monitoring

What does “*better*” mean?

We envision real-time monitoring to result in:

1. *Better visibility* – “see” more individual discharge violations
2. *Better compliance* –improve discharger behavior
3. *Less effort* – reduce monitoring and enforcement effort



WRF 4908
Reality strikes back:
Maintenance, ragging, etc.

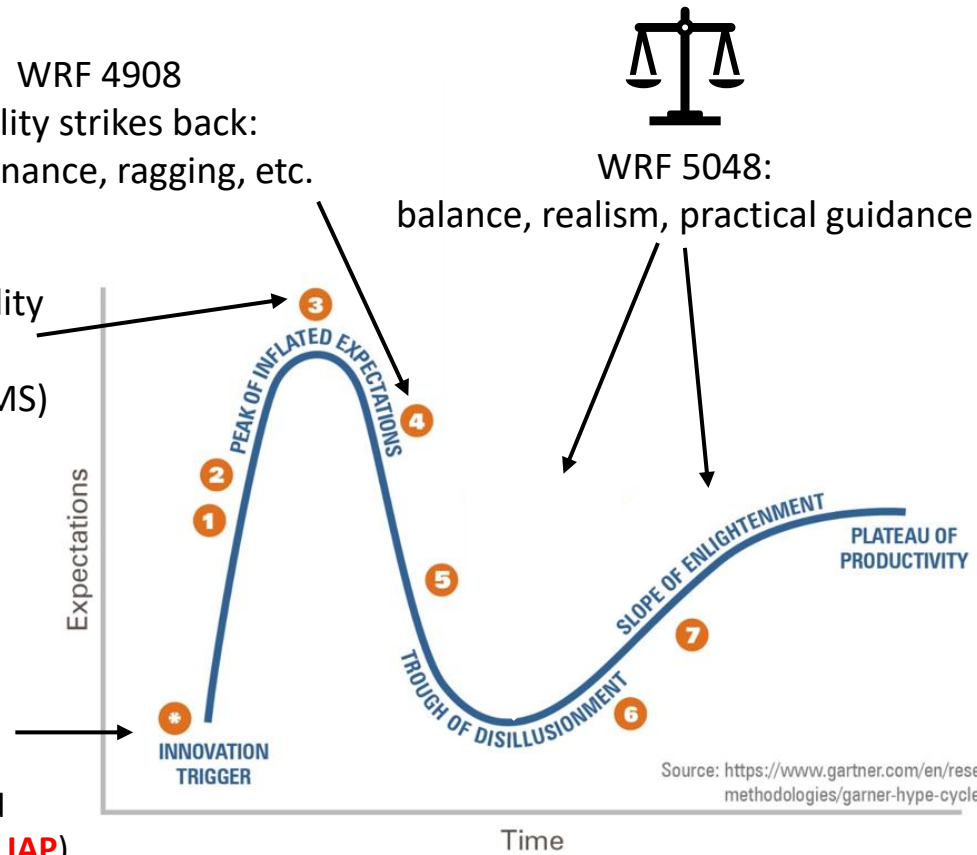


WRF 5048:
balance, realism, practical guidance

Sensors for broader variety of water quality parameters become available (optical, specific metals, automated GC/MS)



Idea conceived to use real-time sewer shed monitoring to protect reuse (2017 Israel NWRI IAP)



Water Research Australia Project 3056

Scope

Task 1

Summarize existing ESCP frameworks (US, Singapore) & trade waste approaches (Australia)

Task 2

Survey utility and regulatory stakeholders

Develop gap analysis

Task 3

Develop Australian ESCP framework

Task 4

Apply Australian ESCP framework to **three** utility project partners

Examining Different ESCP Framework Pathways

Prescriptive (Arizona)

Established framework

Exact process to be followed

Same approach used for all utilities

Conceptual (California)

Established framework

Allows for alternatives

Goal is to be tailored to utility and project





Case by Case (Texas)

No framework is established

A council/board examines project on a case by case basis and sets guidelines

Project Schedule

Workshops Happening Now in Melbourne, Brisbane, and Sydney

	Month																	
	April	May	June	July	August	Sept	Oct	Nov	Dec	Jan	Feb	March	April	May	June	July	Aug	Sept
Australian ESCP Framework for PRW Projects																		
Source Control Program Manager																		
Industrial Waste Survey																		
Sewer Use Ordinance																		
Industrial Discharge Limits																		
Enforcement Response Plan																		
Funding and Resources																		
Monitoring, Mapping, and Response Plan																		
Outreach Program																		
Surveys for Feedback																		
Draft Framework																		
Final Framework																		
Australian ESCP Case Studies																		
Small Agency																		
Medium Agency																		
Large Agency																		
ESCP TMs																		

Survey!

menti.com

code: **4170 5398**



Indirect and Direct Potable Reuse: A Regulator's Perspective

State of California Division of Drinking Water

Division of Drinking Water

- The Drinking Water Program:
 - Develops regulations for drinking water
 - Regulates 7,500 public water systems in the state
 - Sets standards for wastewater reuse to protect public health
 - Provides technical support in permitting of non-potable and indirect potable reuse projects

Path to Potable Reuse

- Conventional Sources
- De facto potable reuse
 - In California conventional sources < 5% wastewater contribution
 - No precedents for semi-potable reuse, unlike other states
- Extremely impaired source procedure
- Groundwater replenishment (operations starting 1960's)
- Surface water augmentation (operations starting 2020's)
- Direct potable reuse (operations starting 2030's?)

Legal Environment for Potable Reuse

- Water Code
 - Recycling Criteria for specific uses (Title 22)
 - Other recycled water uses considered on a case-by-case basis
- Health and Safety Code
 - Evaluate and permit individual sources
 - “may impose conditions ... necessary to ensure ... water ... that is pure, wholesome, potable, and does not endanger the health of consumers.”
 - Drinking Water Regulations (Title 22)

Potable Reuse Principles

- Pure, Wholesome, Potable, and Healthful
- As safe as high-quality conventional California sources
- Unregulated chemicals of concern (CECs) kept below levels found in the high-quality conventional sources
- Pathogenic microorganism annual risk of infection below 10^{-4}

Potable Reuse Principles

- Two independent analyses of safety
 - Safe relative to previous steps on the path
 - Conventional → De facto reuse → Groundwater replenishment → Surface water augmentation
 - Compensate for the differences at each step
 - Absolute evaluation of safety
- Low risk of failure
 - Multiple barriers for contaminants
 - Appropriate monitoring & control

Potable Reuse Principles - DPR

- Regulate the advanced treatment under the Safe Drinking Water Act
- Focus on acute risks (pathogens)
- Provide sufficient barriers with:
 - Real-time organism reduction verification monitoring, or
 - Best available monitoring with sufficient redundant barriers to drastically limit the chance of off-spec water
- Provide a fail → safe response to a system problem

Potable Reuse Regulations



Groundwater Recharge 2014

Title 22, Chapter 3 Water Recycling Criteria



Surface Water Augmentation 2018

Title 22, Chapter 3 Water Recycling Criteria and
Title 22, Chapter 17 Surface Water Treatment



Direct Potable Reuse 2023

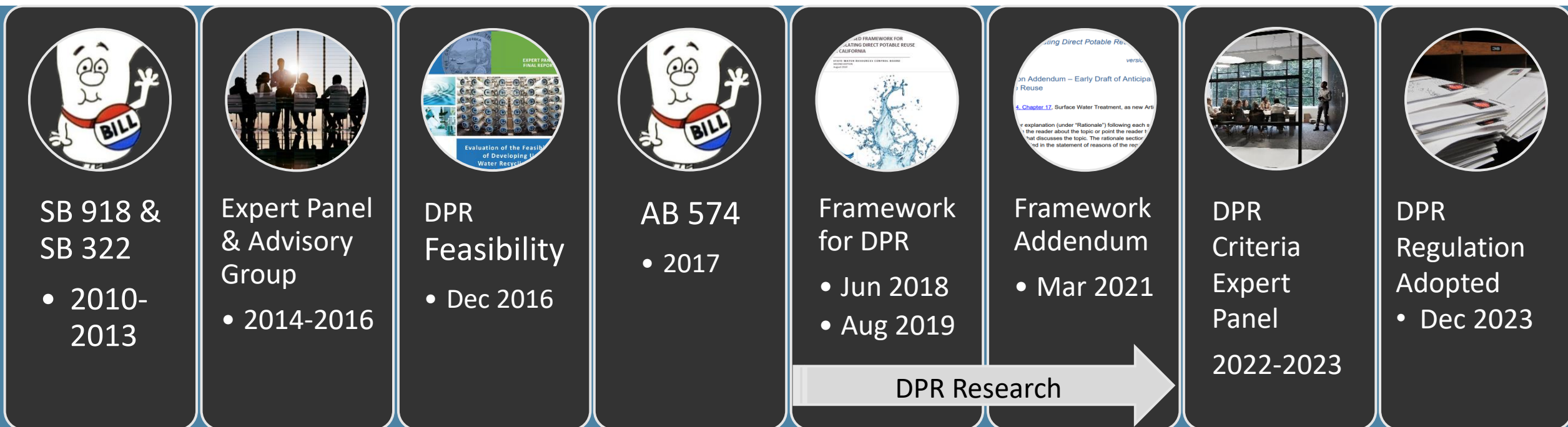
Title 22, Chapter 17 Surface Water Treatment

Water Quality and Treatment Criteria

- **Groundwater Recharge**
 - Designed to yield a drinkable water at the extraction well
- **Surface Water Augmentation**
 - Designed to yield a drinkable water following the pathogen reduction required by the Federal and State Surface Water Treatment requirements (log reductions of 4/3/2 for V/G/C)
- **Direct Potable Reuse**
 - Designed to yield a drinkable water suitable for distribution

Overview of IPR and DPR Regulatory Requirements

DPR Regulatory Development Timeline

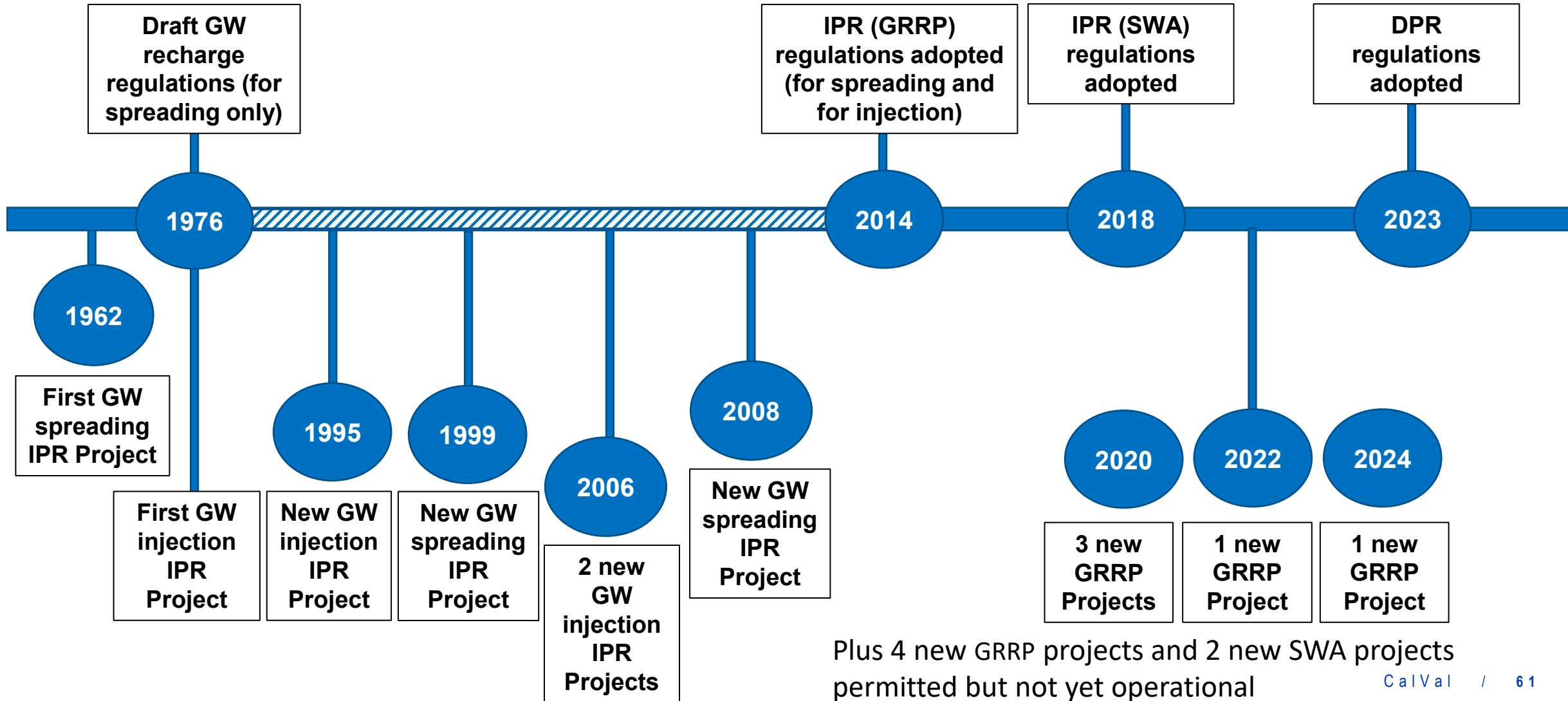


AB 574: Adopt uniform water recycling criteria for direct potable reuse through raw water augmentation by December 31, 2023

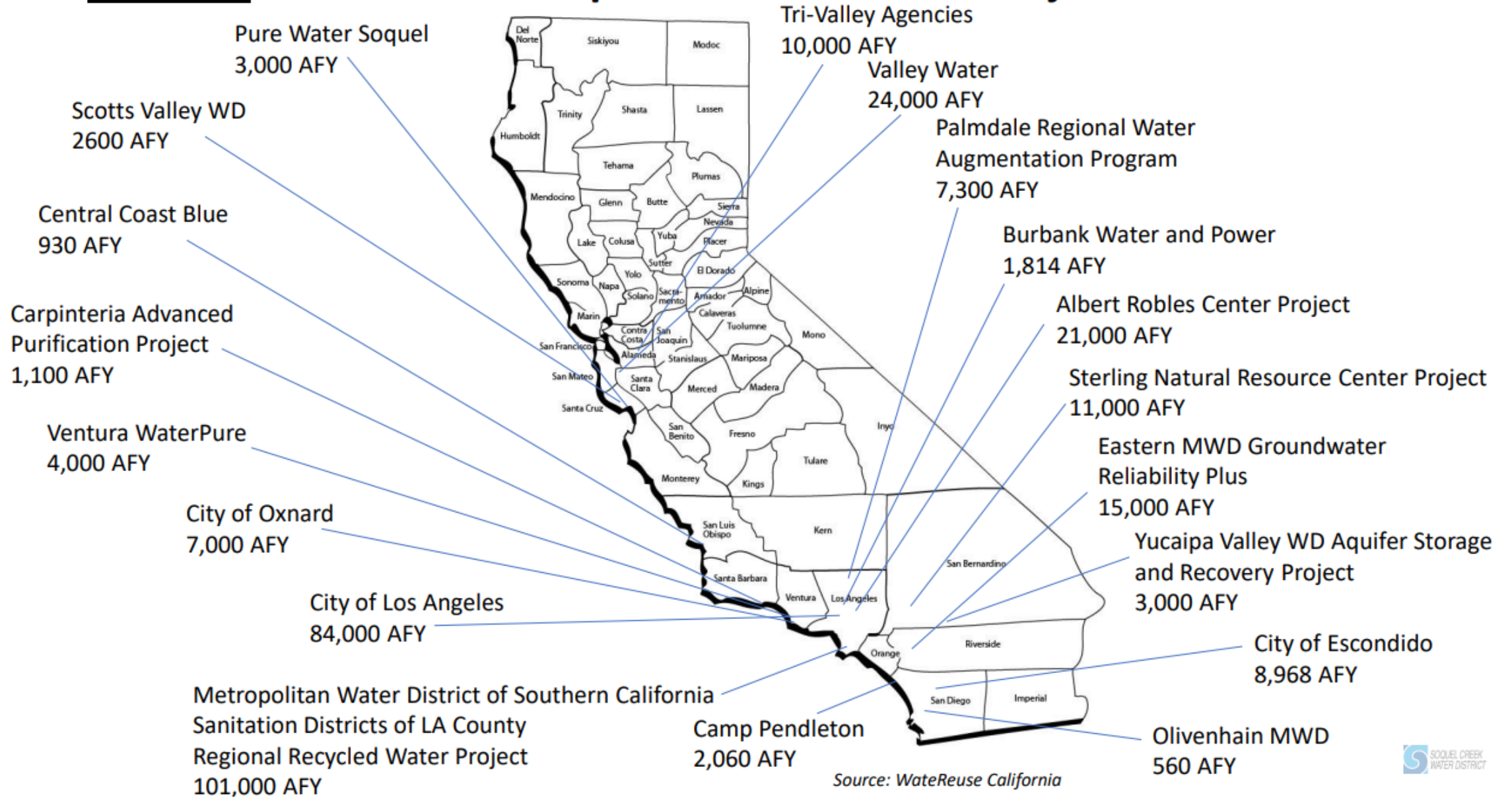
Potable Reuse Regulatory Development

- Consistent vision for public health protection
 - Robert Hultquist
 - David Spath
 - Steve Book
 - Jim Crook
 - Cindy Forbes
 - Kurt Souza
 - Mike McKibben
 - Brian Bernados
 - Randy Barnard

Potable Reuse Regs and Projects Timeline



Planned Groundwater Replenishment Reuse Projects in California



Source: *WaterReuse California*

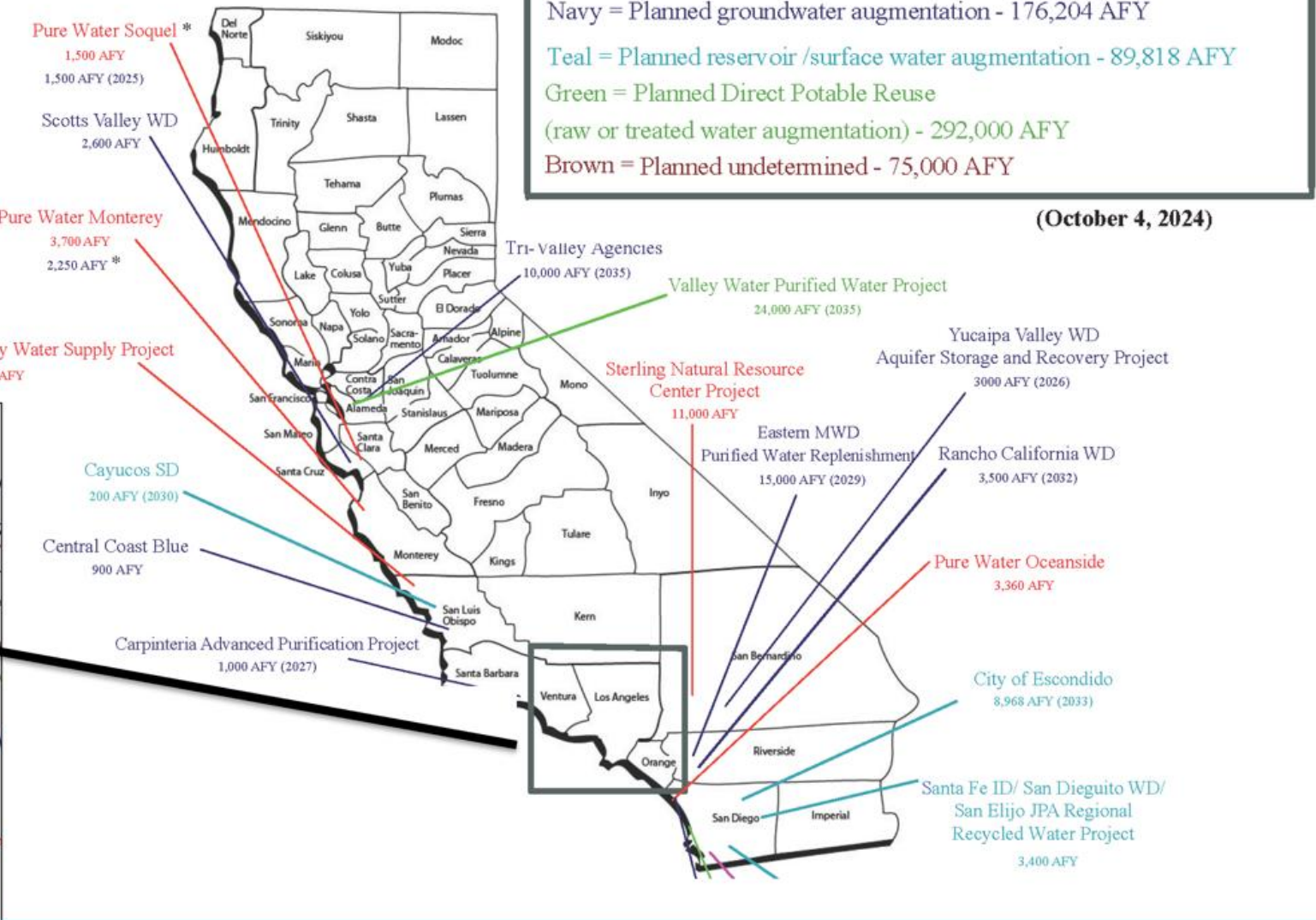
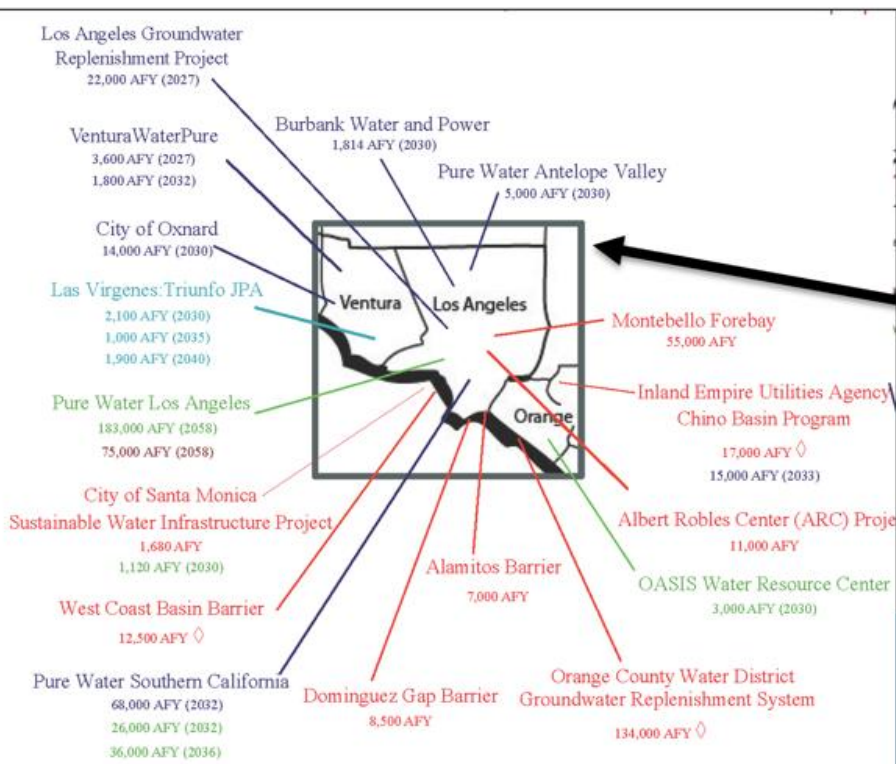


Number of Projects is Rapidly Growing



Red = Permitted groundwater augmentation - 257,072 AFY
 Purple = Permitted reservoir/surface water augmentation - 33,604 AFY
 Navy = Planned groundwater augmentation - 176,204 AFY
 Teal = Planned reservoir /surface water augmentation - 89,818 AFY
 Green = Planned Direct Potable Reuse (raw or treated water augmentation) - 292,000 AFY
 Brown = Planned undetermined - 75,000 AFY

(October 4, 2024)



Regulatory Approach for Pathogens - Origins

- Between 1976 and 2010, CA draft groundwater recharge regulations were based on prescribed treatment for pathogen control
- In 2010 CA participated in the NatVal project, we found log reduction approach in Australian Guidelines useful
- Since 2011, CA has incorporated the log reduction concept for reference pathogens in groundwater recharge and subsequent potable reuse criteria, with a rigorous validation process (WaterVal) for individual barriers at the 5th percentile performance
- Adapted the WaterVal protocol template in the DPR regulation

Regulatory Approach for Pathogens

- The minimum log reductions were based on a cautious risk assessment/risk management process
- Organism log reduction treatment objective based on potential occurrence and safe drinking water level:
 - Initial point – highest organism density observed in raw municipal wastewater, and round up
 - For IPR, the endpoints are organism densities that yield a 10^{-4} annual risk of infection
 - For DPR, the endpoints are organism densities that yield a 10^{-4} daily risk of infection

Regulatory Approach for Pathogens

- Reference pathogens: enteric virus, Giardia lamblia cysts, Cryptosporidium oocysts (same ones for surface water treatment regulations, IPR, DPR)
- The log reductions required to get from raw municipal wastewater to drinking water are:
 - 12/10/10 virus/Giardia lamblia cyst/Cryptosporidium oocyst (V/G/C) for groundwater replenishment and surface water augmentation
 - protective for IPR
 - 16/10/11 V/G/C for direct potable reuse, plus extra 4-log reduction capacity beyond the minimum required log reductions (20/14/15)
 - highest available virus density data was for norovirus (NoV), gene copy
 - protective for DPR

Regulatory Approach for Pathogens

- Reliability - multi-barrier treatment, independent barriers, diverse treatment mechanisms*, extra log reduction capacity*
- Validate treatment LRVs to ensure effective pathogen removal
 - Have been accepting WaterVal protocols on a case-by-case basis
- Each IPR and DPR log removal is equally important
- System control additional focus for DPR - due to the proximity of wastewater to drinking water it is urgent that the control system automatically prevents distribution if critical limits are not known to be met

Regulatory Approach for Chemicals

- California Law requires that drinking water be pure, wholesome, and potable in addition to meeting all drinking water standards
- Use specific treatment processes that have demonstrated efficacy at removing unregulated toxic chemicals that may be present in municipal wastewater:
 - Soil-aquifer treatment, or RO and AOP for IPR
 - Ozone/BAC, RO, and AOP for DPR.

Regulatory Approach for Chemicals

- The treatment processes must meet certain design and performance criteria.
- Alternatives may be accepted if the project makes specified demonstrations including that the alternative provides an equivalent level of public health protection.
 - It is the responsibility of the alternative proponent to identify the metrics and means of demonstration

Role of Environmental Buffer

Groundwater Recharge

- Size of control zone depends on required response retention time - time to identify and respond to a treatment failure
- Quantify time in aquifer using models with tracer test verification
- Desired Virus LRV credit (Virus LRV credits for time underground 1 log per month)
- The groundwater source can become 100% recycled water

Role of Environmental Buffer

Surface Water Augmentation

- Size of reservoir depends on minimum theoretical retention time (total volume of water in the reservoir at the end of the month divided by the total outflow during the month), and
- Mixing in reservoir with other water or previously treated water such that the volume withdrawn contains no more than 1% by volume (or 10% with additional 1 log treatment) of previously treated water that was discharged in any 24-hour period, at all times and under all conditions → use hydrodynamic models with tracer test verification

Role of Environmental Buffer

- **Direct Potable Reuse**

- No environmental buffer - due to the proximity of wastewater to drinking water it is urgent that the control system automatically prevents distribution if critical limits are not known to be met
- For projects that may include blending, recharge or storage in a groundwater aquifer or mixing in a surface water reservoir that do not meet the IPR regulation minimum IPR environmental buffer requirements, a DPR project can demonstrate whether the blending, mixing, or retention time is sufficient to substitute for up to 2 logs of the 20/14/15 LRV requirement.



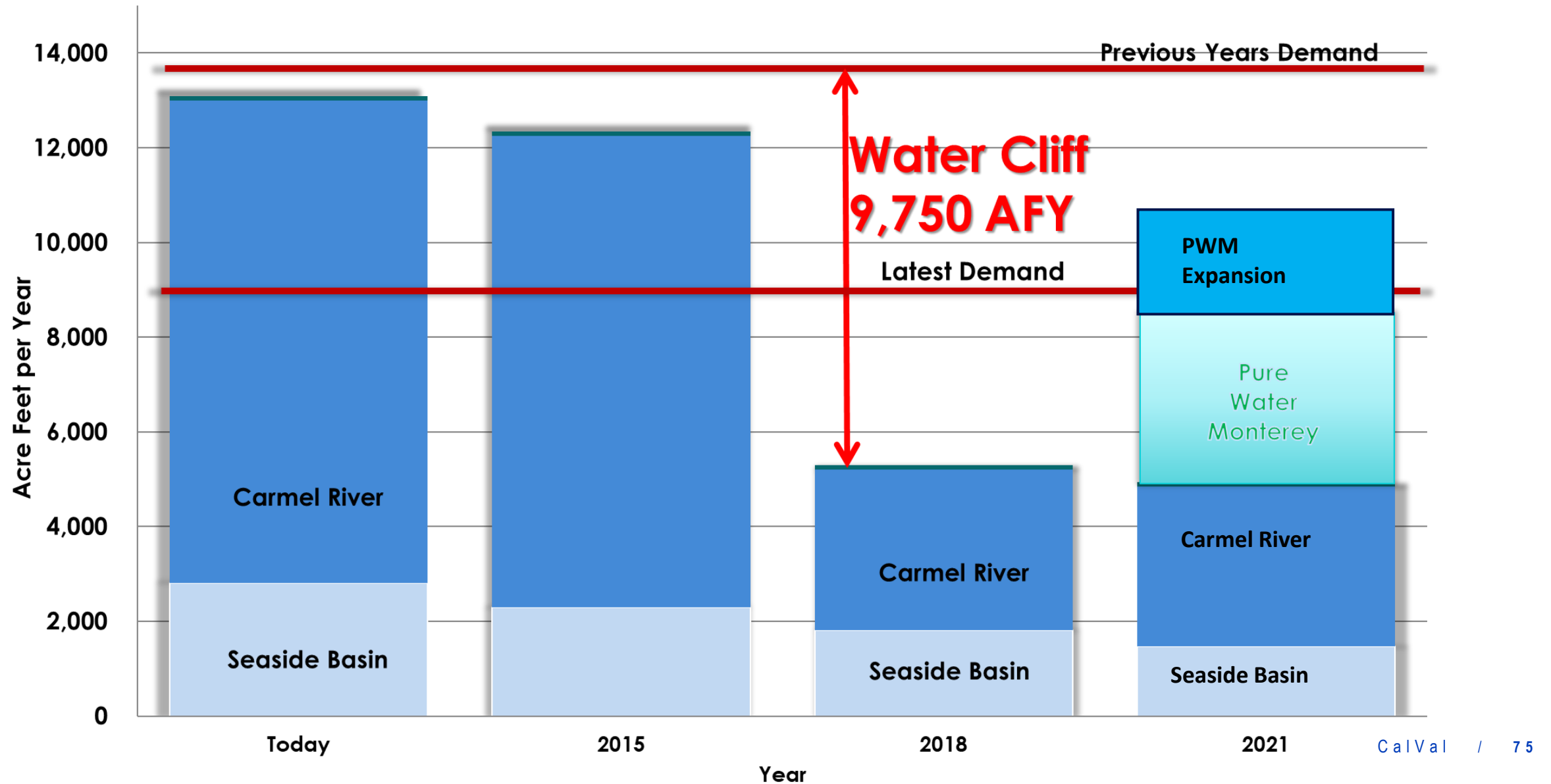
A One Water Approach to a Resilient Water Supply

Mike McCullough, Monterey Peninsula Water Management District, and
Shane Trussell, Trussell Technologies

One Water Approach – A Case Study – Monterey, CA



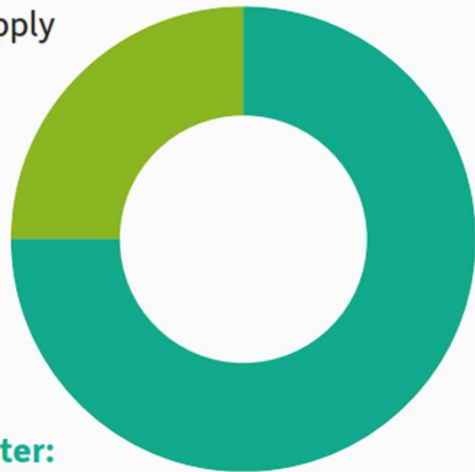
One Water Approach – Why?



One Water Approach – Why?

HISTORIC SOURCES

**Groundwater:
Seaside Basin**
25% of supply



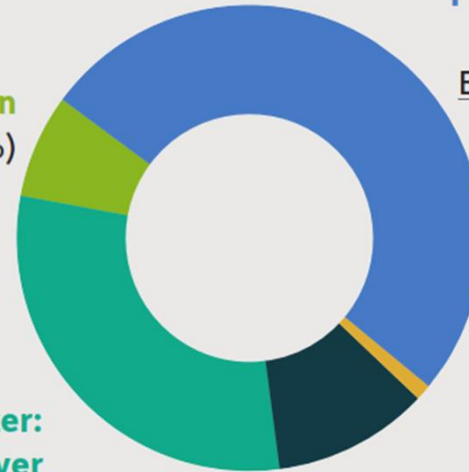
**Surface Water:
Carmel River**
75% of supply

NEW PORTFOLIO

For a resilient and sustainable supply

Groundwater: Seaside Basin
774 AFY (7%)

**Surface Water:
Carmel River**
3,376 AFY (30%)



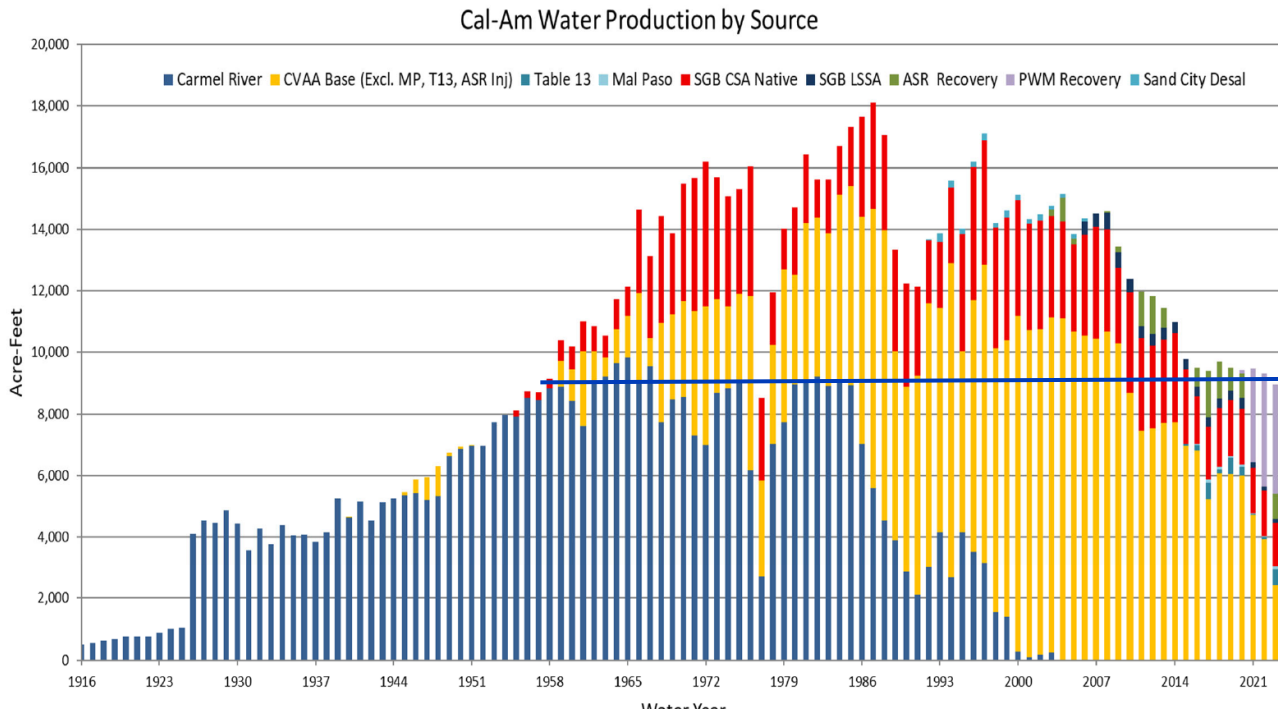
**Potable Reuse:
Pure Water Monterey**
Base: 3,500 AFY
Expansion: 2,250 AFY
Total: 5,750 AFY
(51%)

**Desalination:
City of Sand City**
94 AFY (1%)

Aquifer Storage & Recovery
1,300 AFY (12%)

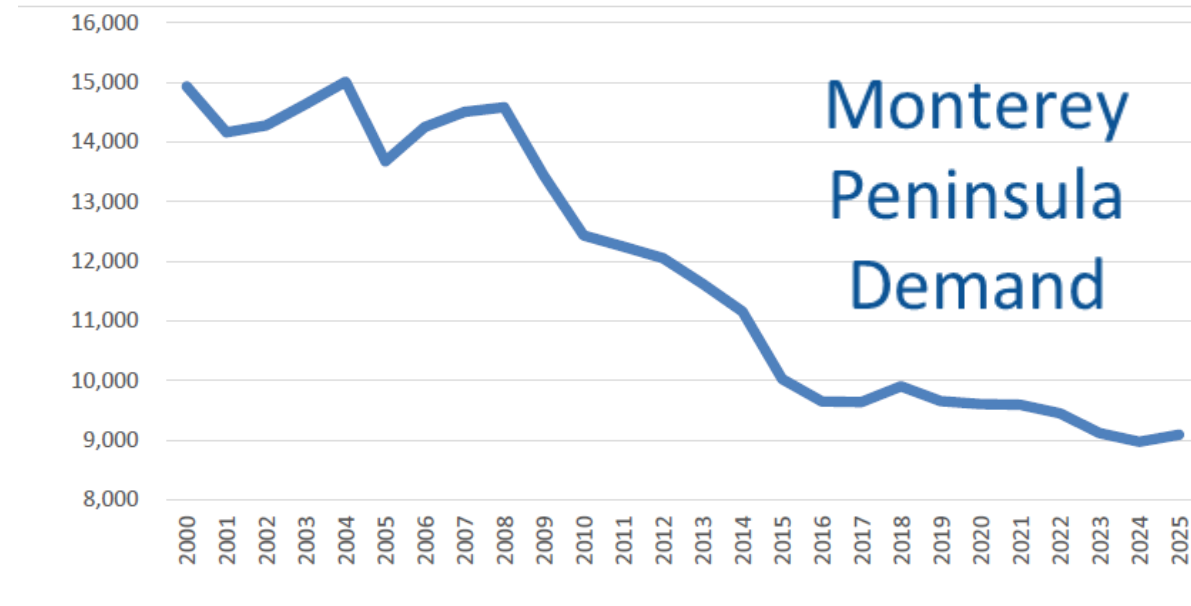
Desalination also under consideration by private water purveyor

One Water Approach – What does this mean?



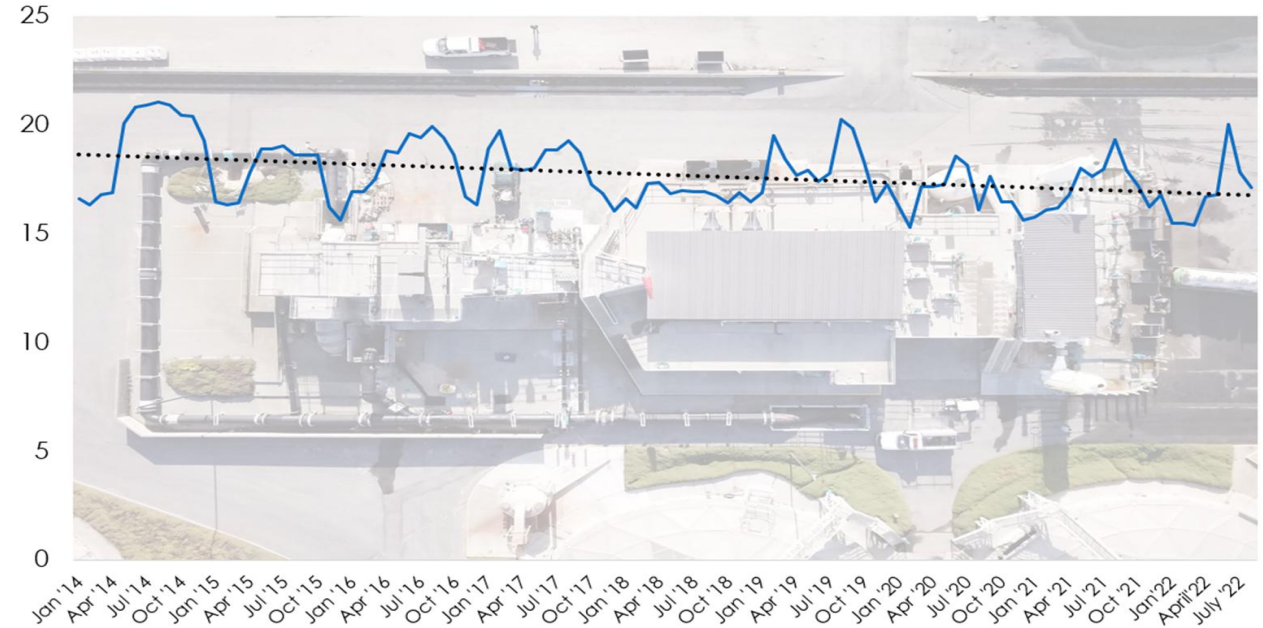
Same Demand as in 1958

Water Demand – Last 25 Years



One Water Approach Need more Supplies

RTP Avg Influent Flows (MGD)
2014-2022 (August)



FY2025-26 RTP Influent Flows vs RTP 5 I



- Non-Municipal WW
- Salinas
- Monterey Peninsula
- Marina
- Fort Ord
- Castroville
- - - 5-Year Monthly Average W/I

One Water Approach – Dual Purpose Infrastructure

Why have pre-existing infrastructure only being utilized for a small part of the calendar year?

Are there ways to re-purpose existing infrastructure so that it can be used during the other parts of the calendar year?

Modifying smaller sections of existing infrastructure (adding a valve, flow meter, etc.) can be cheaper than installing brand new infrastructure that has limited capacity

Google Earth – helped in looking for possibilities

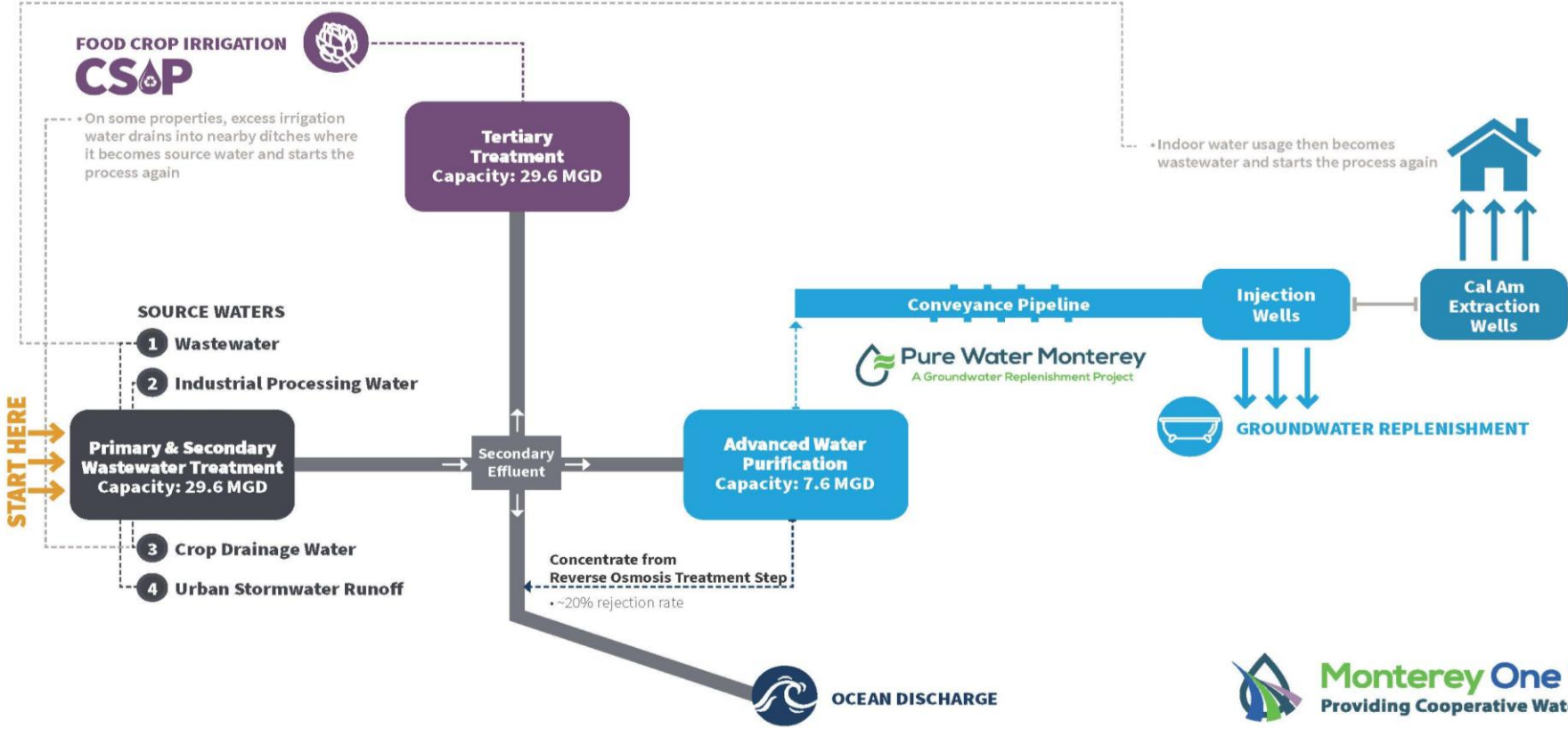
Seeking Input from All Staff or others can also generate new ideas and concepts (Don't keep it a secret)

Funding Agencies Love Multi-Purpose Projects



One Water Approach – Finding Other Wastewaters

Monterey One Water Operations



One Water Approach – City of Salinas & M1W Infrastructure



LEGEND	
STORM DRAIN	
SANITARY SEWER	
AG WASHWATER	
BLANCO DETENTION BASIN	
MANHOLES	



"Hot Tap" connection to Salinas Interceptor

24-in Force Main

Pond 3 Pump Station + Pond Grading

Redesigned Pond 3 PS to eliminate two of the three pumps and moved pump station to northwest corner of Pond 3 reducing pipe length.



Urban Storm Water Runoff

One Water Approach– Blanco Drain (ag runoff water)



One Water Approach – Reclamation Ditch (ag runoff water & Stormwater)



One Water Approach— Lake El Estero City of Monterey (Stormwater/urban runoff)



One Water Approach— Pacific Grove Stormwater Capture



One Water Approach— City of Del Rey Oaks – Year Round Weepage (pre-planning)



One Water Approach— PBCSD – Year Round Weepage (additional water to sewer)



One Water Approach— PBCSD – Coastal Shallow Well (additional water to sewer)



One Water Approach– Treatment Challenges

What does the water quality from these other sources do to sewage?

Is the Utility taking these waters all the time or can they start and stop the flows as needed?

Which sources cause concerns and why?

Processing Water from Produce Wash Facilities

Do Stormwater Flows cause Sewer Overflow Issues?

Sampling Prior to Acceptance is Required



One Water Approach– Interruptible Rate

How can the Utility (Monterey One Water) not charge existing customers for treating these other wastewater sources yet provide benefit to other parties for recycling these supplies?

Implementing a rate where the supplies can go to another location (disposal)

Call upon these supplies when needed and have a customer willing to pay the rate required to treat the water at the primary and secondary level

Install Flow Meters to insure these flows are accurate

Have SCADA controls at the M1W Operations Control Room to Accept or Turn Off flows as needed

Install Monitoring Equipment at Diversion Locations to insure Water Quality of these other supplies fall into an acceptable range to be treated at M1W



One Water Approach - Conclusions

Regional Planning

Works when the Big Picture of Water Use Efficiency is Constantly being Promoted

Shift in Mindset

Every Drop Counts – stormwater and other sources can be reused

Develops a Legacy

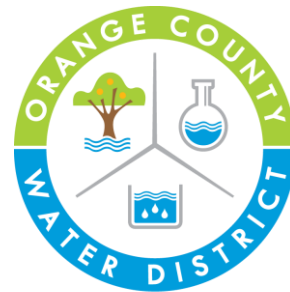
A Blueprint for Future Generations to Solve Local Problems

Conference Destination

Easy to Demonstrate to Outsiders what can be accomplished via Tours



Project Partners



Questions?

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