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

# State Water Board
# Division of Drinking Water

Update on Onsite Non-potable Water Systems
&
Regulations for Direct Potable Reuse of Recycled Water


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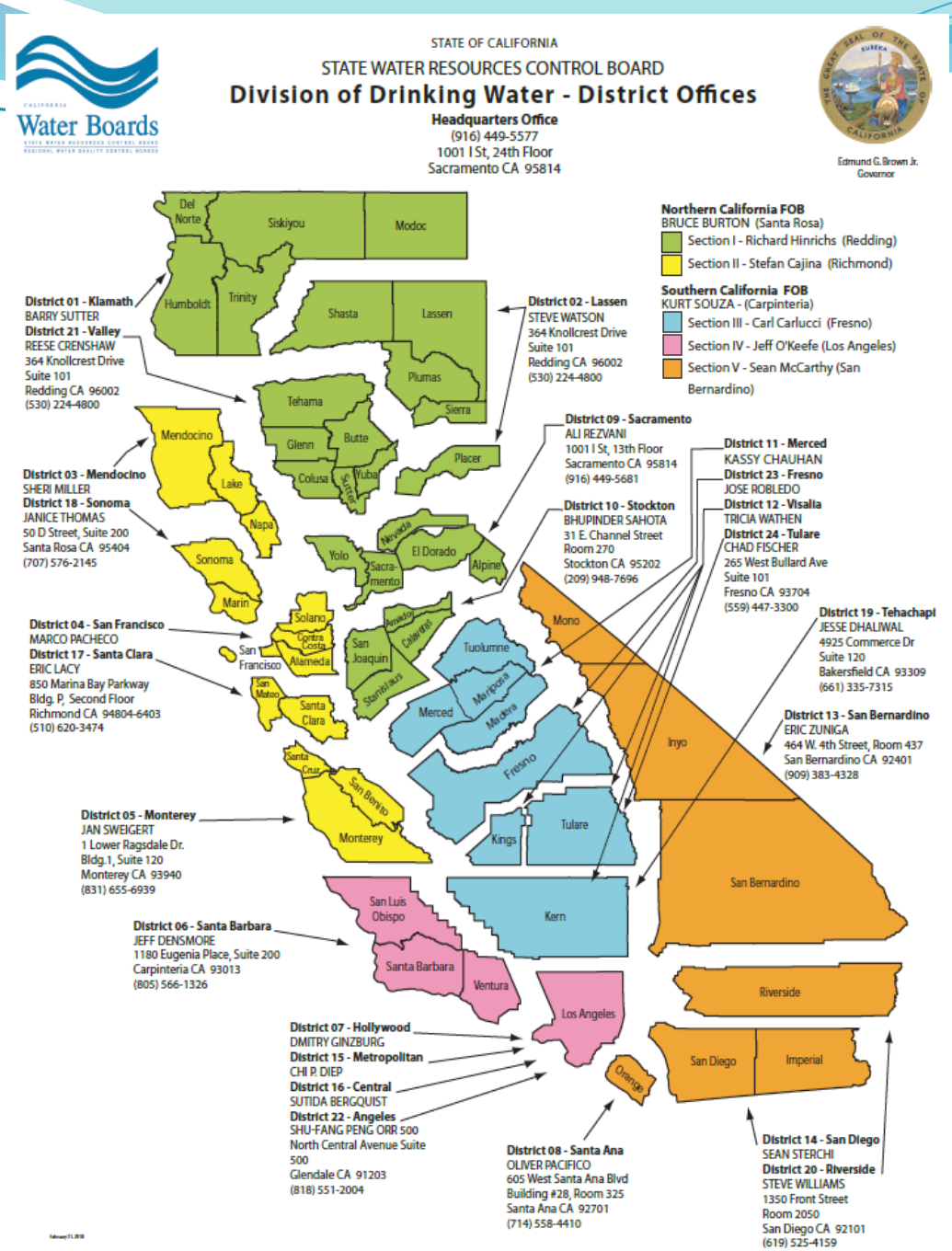
Division of Drinking Water

# Division of Drinking Water

- 24 Local District offices – Staff of 5 -6 Sanitary Engineers and/or Environmental Scientists
- District staff enforces Safe Drinking Water Act Requirements
- Approximately 7,500 Public Water Systems Statewide



# Onsite Water Reuse Systems (ONWS)

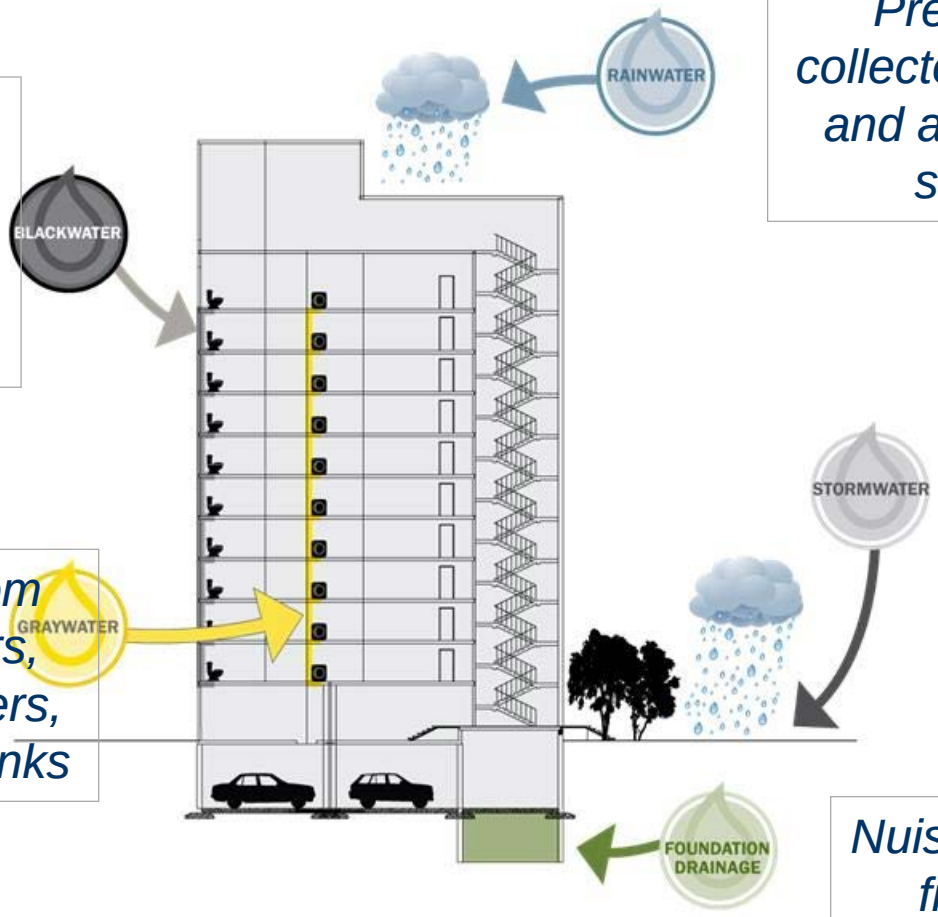
## Current Regulatory Framework

- National standards or guidelines for ONWS **do not exist** in the U.S.
- Typically, **states and local public health agencies** are responsible for developing approaches
- Many states allow for **single residence use** of roof runoff and graywater
- As interest in ONWS on a building or district scale grows the potential for human contact and problems grows

# Types of Alternate Water Sources

*Precipitation collected from roofs and above-grade surfaces*

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




*Precipitation collected at or below grade*

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

*Nuisance groundwater from dewatering operations*

# Risk-Based Framework for the Development of Public Health Guidance for Decentralized Non-Potable Water Systems

# Risk-Based Framework Report

## What does it cover?

1. Introduction
2. Risk-Based Management Considerations for Decentralized Non-Potable Water Systems
3. Risk-Based Pathogen Reduction Targets
4. Selecting and Evaluating Unit Operations to Achieve Pathogen Reduction Targets
5. Tiered Management Approach for Decentralized Non-Potable Water Systems
6. Process Performance Evaluation and Monitoring
7. Storage, Distribution, and Use of Water from Decentralized Non-Potable Water Systems
8. Permitting and Reporting for DNW Systems
9. Example Applications of Framework for Decentralized Non-Potable Water Systems
10. Future Needs

# Types of Potable Reuse

## Indirect Potable Reuse

1. **"Indirect potable reuse for groundwater recharge"** means the planned use of recycled water for replenishment of a groundwater basin or an aquifer that has been designated as a source of water supply for a public water system

2. **"Reservoir water augmentation"** means the planned placement of recycled water into a raw surface water reservoir used as a source of domestic drinking water supply for a public water system or into a constructed system conveying water to such a reservoir

## Direct Potable Reuse

1. **"Raw water augmentation,"** which means the planned placement of recycled water into a system of pipelines or aqueducts that deliver raw water to a drinking water treatment plant that provides water to a public water system

2. **"Treated drinking water augmentation,"** means the planned placement of recycled water into the water distribution system of a public water system

# Types of Potable Reuse


Groundwater Augmentation

Regulations adopted in 2014


Surface Water/ Reservoir Water Augmentation

Regulations adopted in 2018

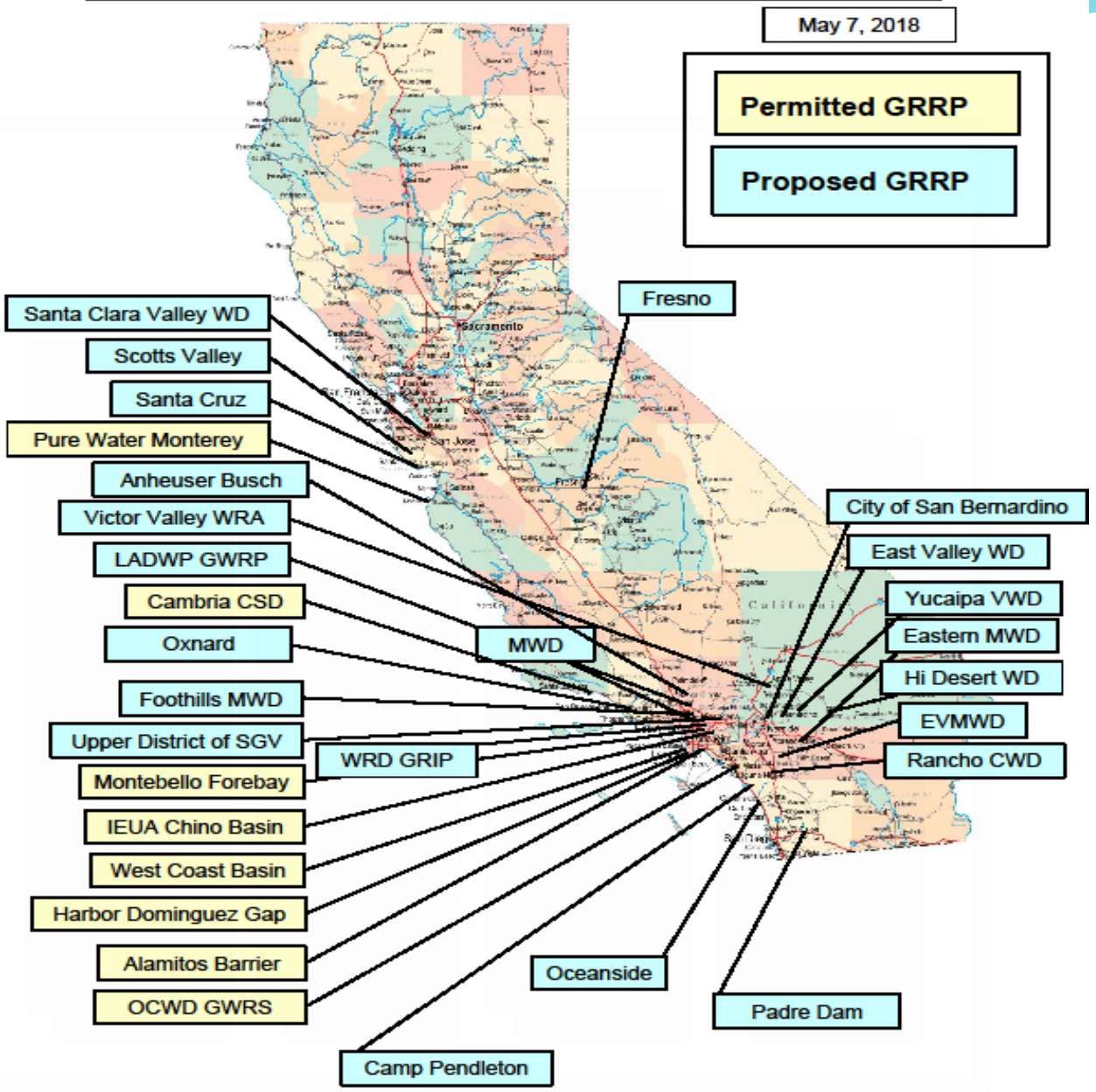

Raw Water Augmentation

Regulations mandated by 2023

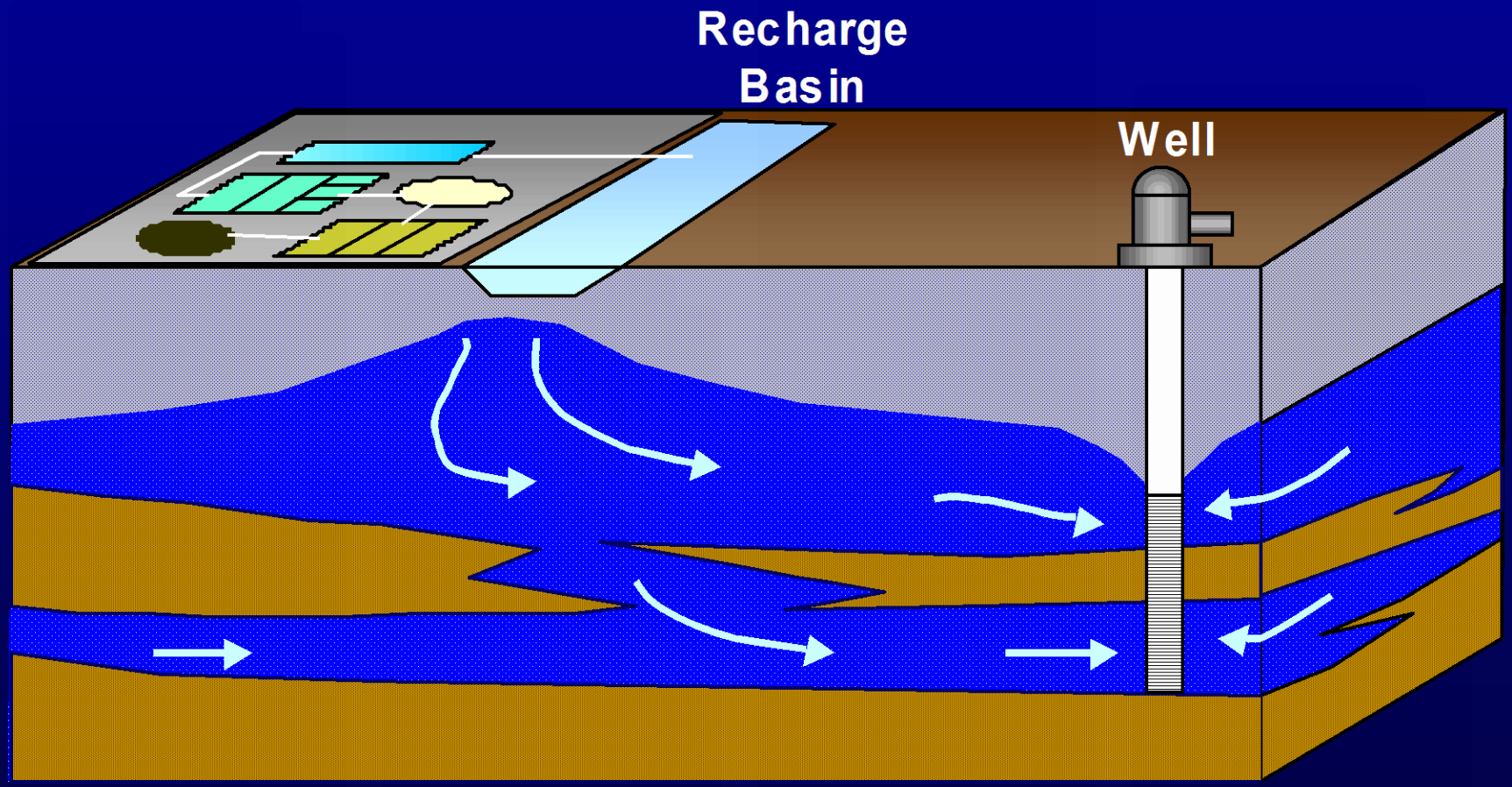

Drinking Water Augmentation

Regulations, timing unknown

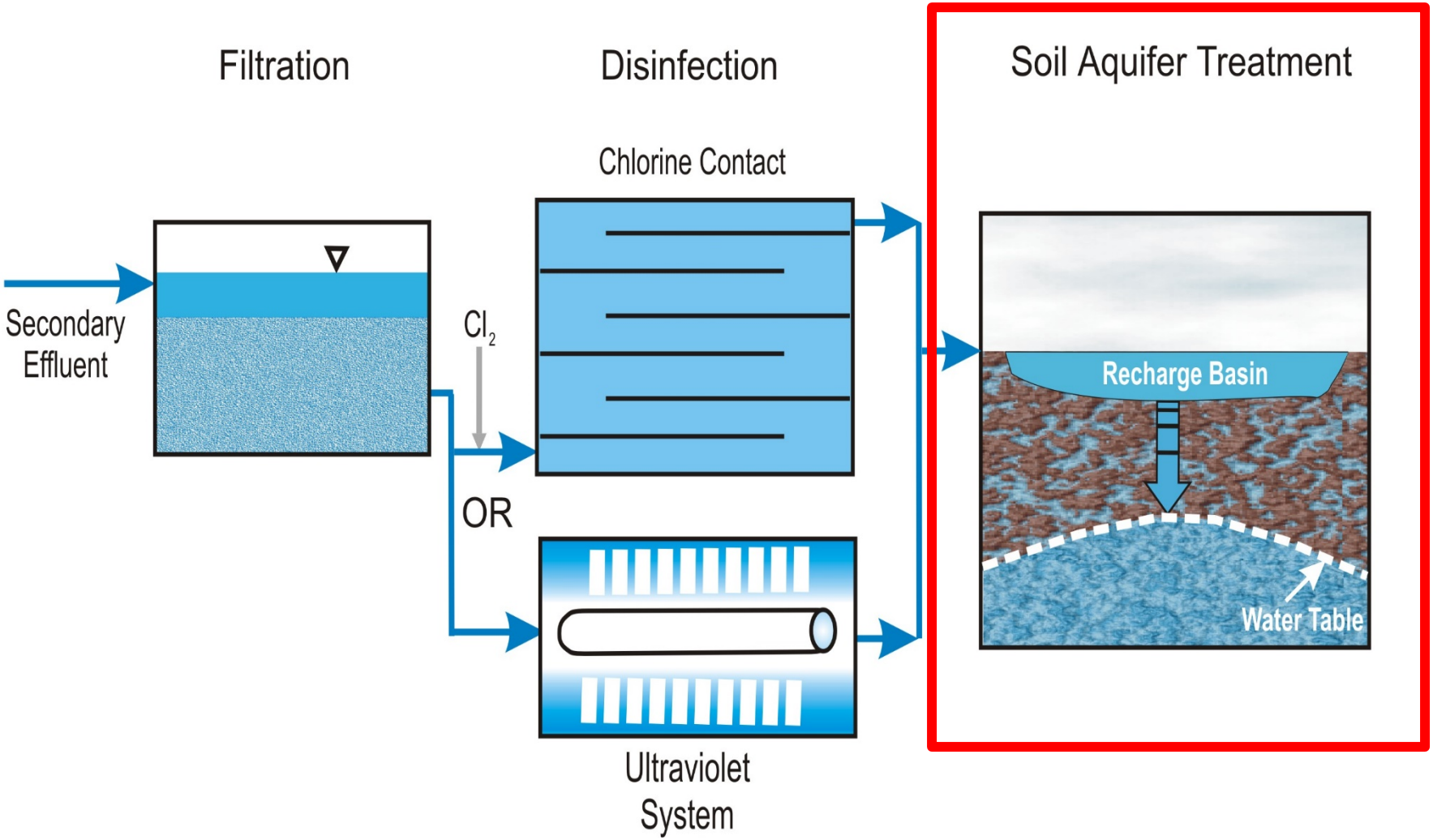
# Groundwater Recharge Projects (GRRP) - California



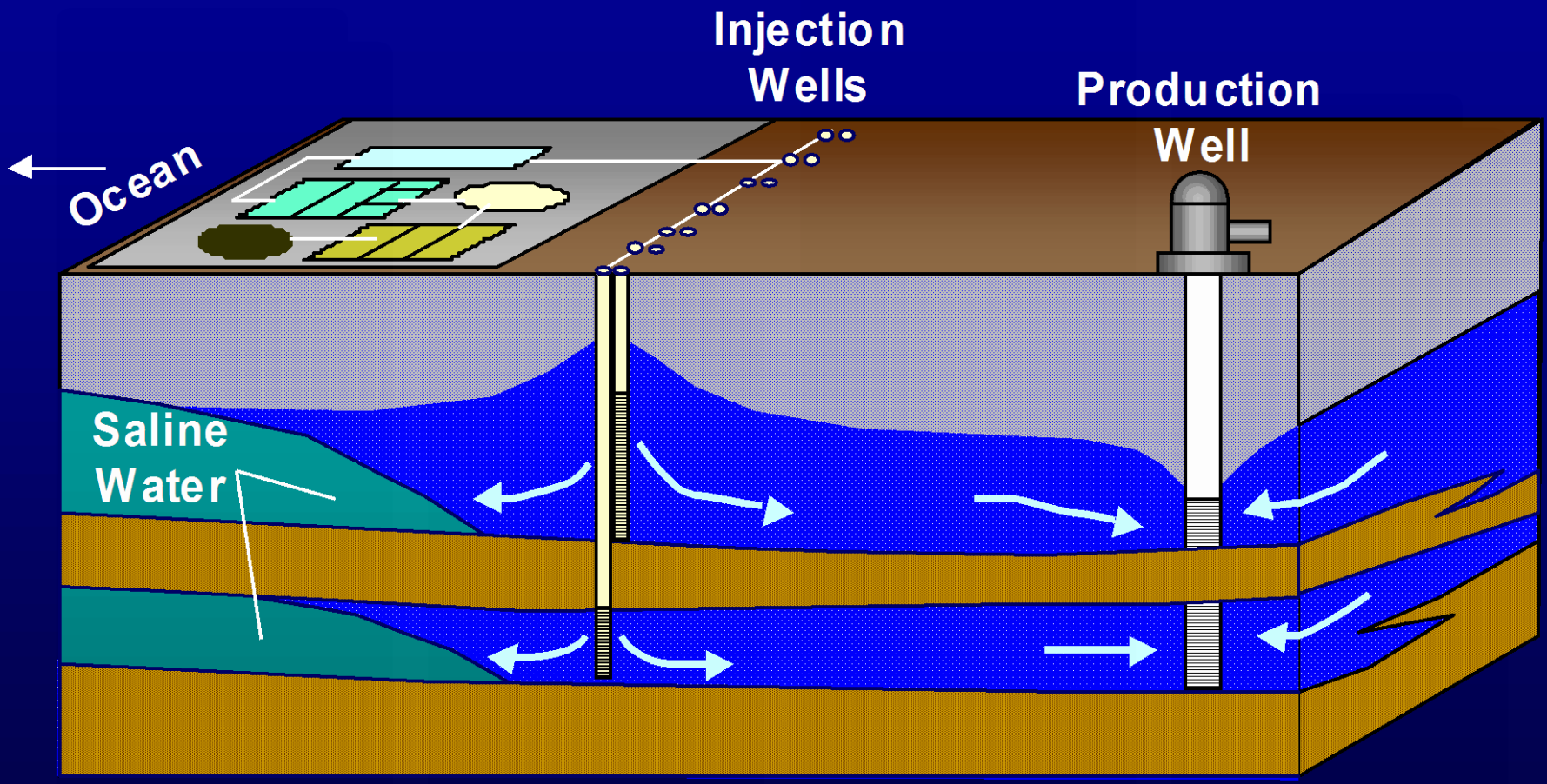
# Groundwater recharge by surface spreading



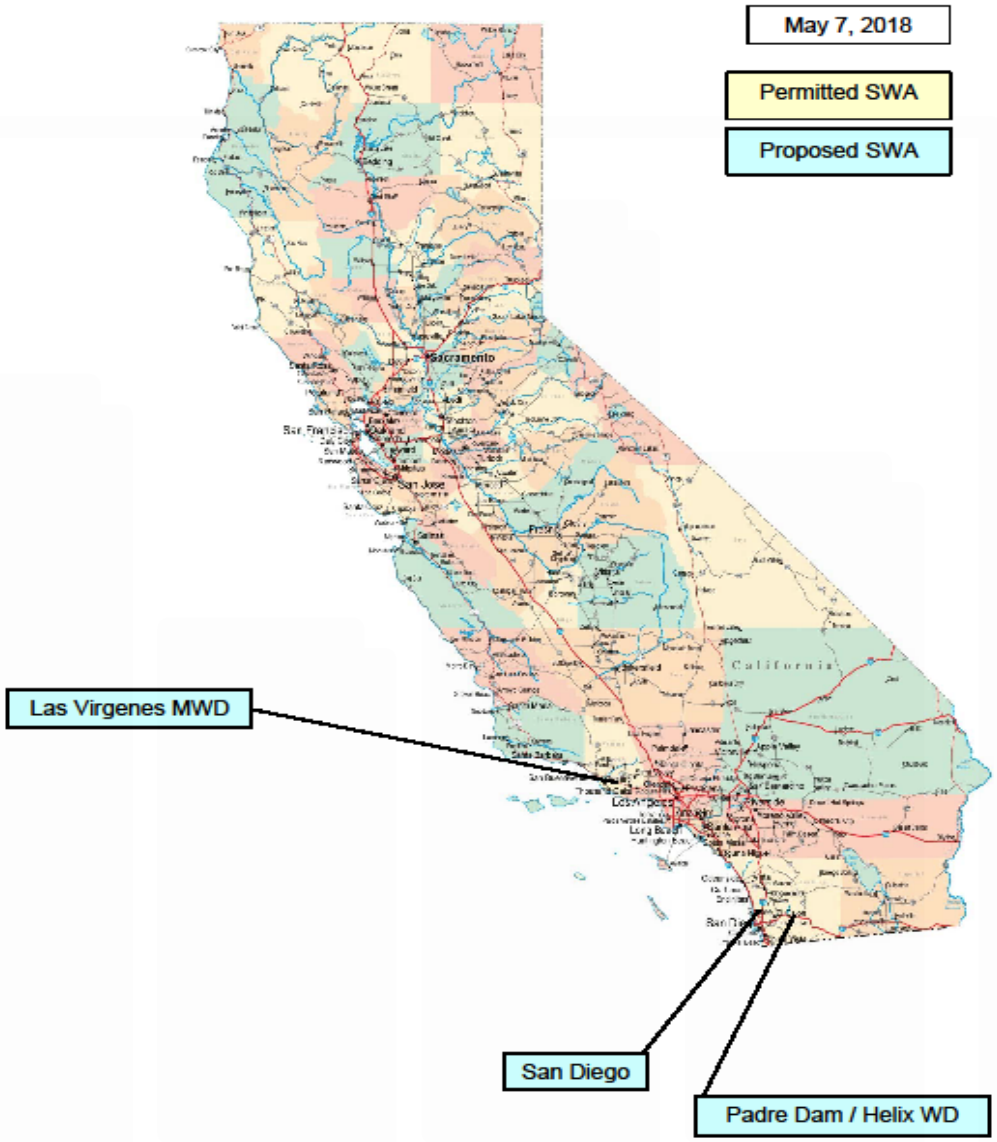
# Engineered and Soil Aquifer Treatment with Surface Spreading



# Groundwater recharge by direct injection for a salt water intrusion barrier



# Surface Water Augmentation Projects



# Reservoir Water Augmentation
## (also referred to as “Surface Water Augmentation”)

**“Reservoir water augmentation”** means the planned placement of recycled water into a raw surface water reservoir used as a source of domestic drinking water supply for a public water system or into a constructed system conveying water to such a reservoir

# IPR - Reservoir Water Augmentation

Drinking Water

# Miramar Reservoir – San Diego

## Red Line is Bike trail around the lake – 8 kilometers

# Miramar Reservoir – San Diego

# Miramar Reservoir – San Diego

# Highlights of the Peer Review of our Reservoir Water Regulations

- We were required to conduct a Peer Review of key elements of the Proposed Regulations.

- The purpose of the Peer Review is *"To get independent input on whether the scientific findings, conclusions, and assumptions are based upon sound scientific knowledge, methods, and practices."*

- There were 10 Items that the Peer Reviewers examined

1. **A combination of reverse osmosis (RO) treatment and an advanced oxidation process (AOP) will accomplish the water quality objective with respect to organic contaminants of emerging concern (CECs).**

   a. Although RO permeate largely meets the goal there are certain chemicals (e.g. 1, 4-dioxane and NDMA) that are not well removed and the AOP is required to address those certain chemicals not well treated by RO.

   b. Although RO and AOP in combination do not provide multiple barriers to each problematic chemical type, they do offer dissimilar treatment mechanisms that are likely to attenuate an unknown organic chemical contaminant.

   c. This combination of treatment processes is required for injection projects in the California regulations for groundwater replenishment indirect potable reuse and provides evidence that the required treatment can be operated to produce the intended water quality.

## 2. Treatment that provides a 12-log enteric virus, 10-log Giardia cyst, and 10-log Cryptosporidium oocyst reduction for potable reuse projects will ensure microbiologically safe drinking water.

a. Exposure to pathogenic microorganisms is controlled by requiring a total of 12-log enteric virus, 10-log Giardia cyst, and 10-log Cryptosporidium oocyst reduction between the raw wastewater and finished drinking water

b. Each 1-log reduction is the reduction of the organism density by a factor of ten.

c. These log reductions were determined based on the highest organism density that could be expected in raw municipal sewage

d. The U.S. EPA allowable drinking water densities are intended to limit the annual risk of infection to 1 in 10,000.

**3. The reservoir will enhance the reliability of a SWA project by mixing each portion of the recycled water flow, including any off-spec recycled water, with a large volume of water that meets the water quality requirements for a surface water source.**

a. In the event that there is a short-term failure of the wastewater treatment to meet the quality objectives, the reservoir provides the opportunity to mix off-spec water with a relatively large volume of suitable source water.

b. By mixing the off-spec water with suitable source water, the reservoir will dilute the excessive contaminants and attenuate the effect of the treatment failure.

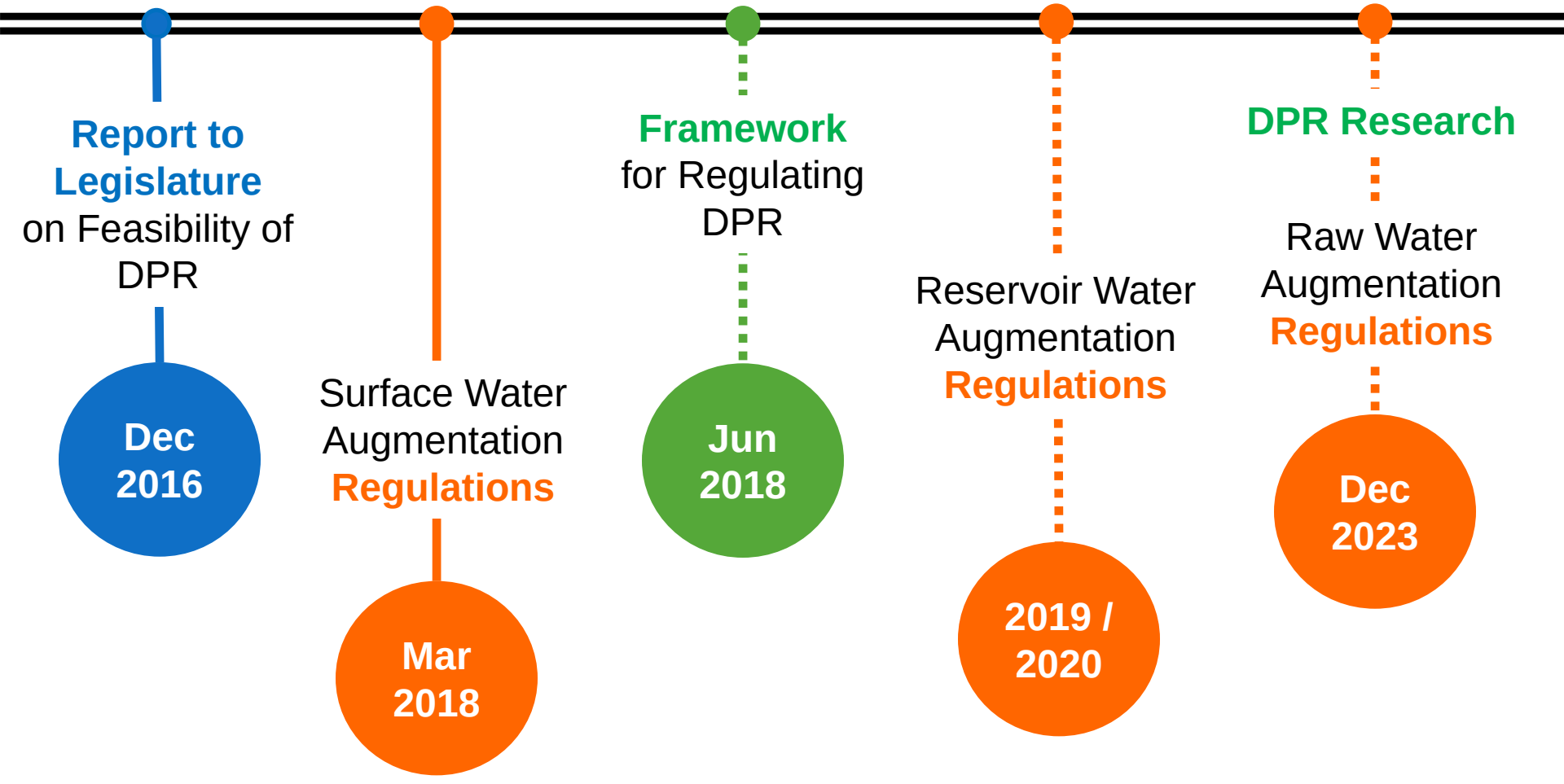
# IPR - Environmental Buffer

- Reliable
- Provide benefits such as.
  - Attenuation of chemical peaks
  - Robust pathogen barrier
  - Response time

# DPR Framework

- Risk Management Approach
- Research to fill knowledge gaps
- Stakeholder outreach
- Not a regulatory document

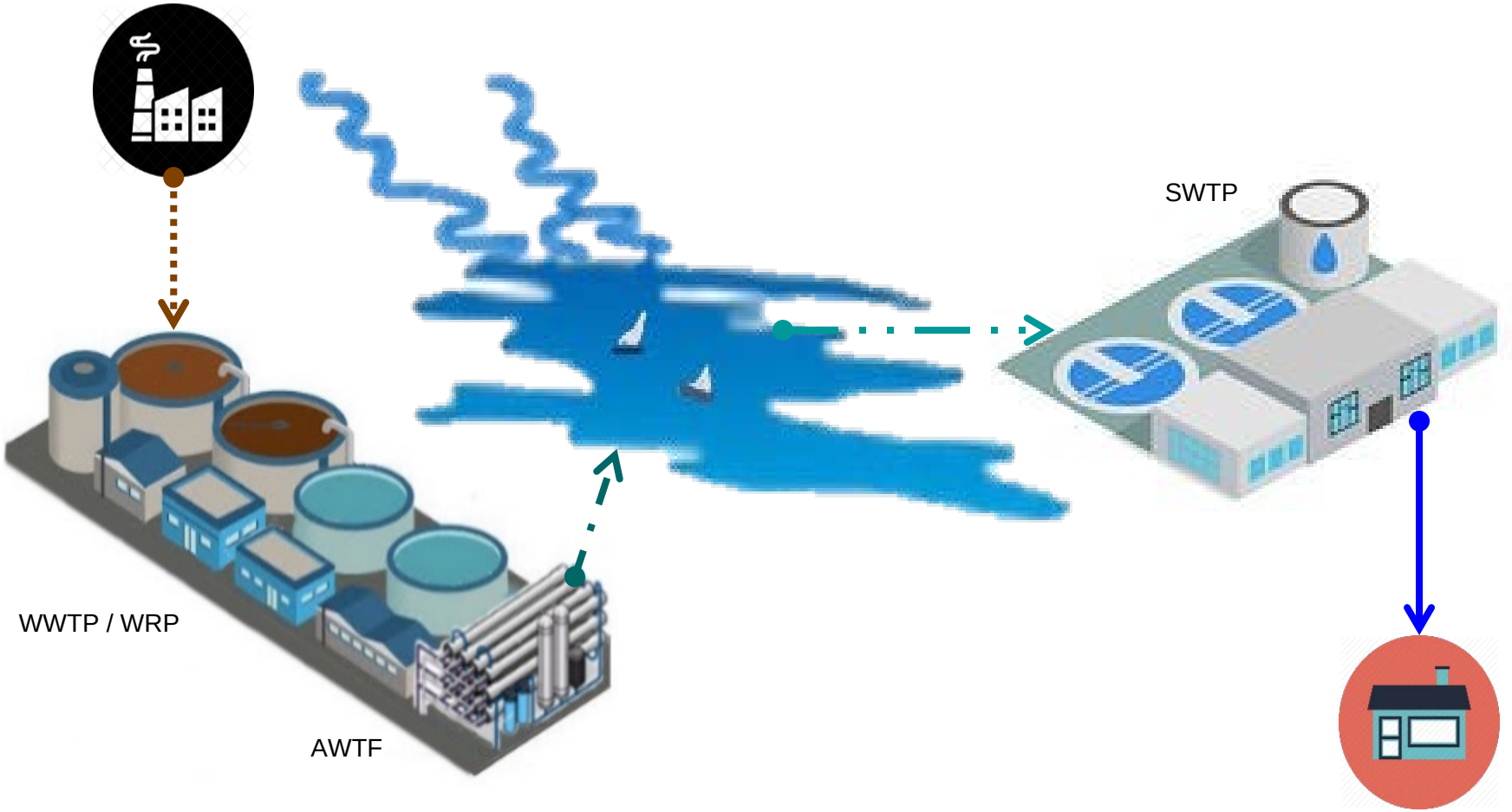
# Recent & Planned State Water Board Activities Related to Potable Reuse



# Contents of the Framework

- Section 1. Introduction
- Section 2. Types of potable reuse
- Section 3. DPR scenarios
- Section 4. Environmental buffer
- Section 5. Risk management approach
- Section 6. DPR criteria elements
- Section 7. Other considerations
- Section 8. Research status
- Section 9. Revising SWA regulations

# DPR - Raw Water Augmentation



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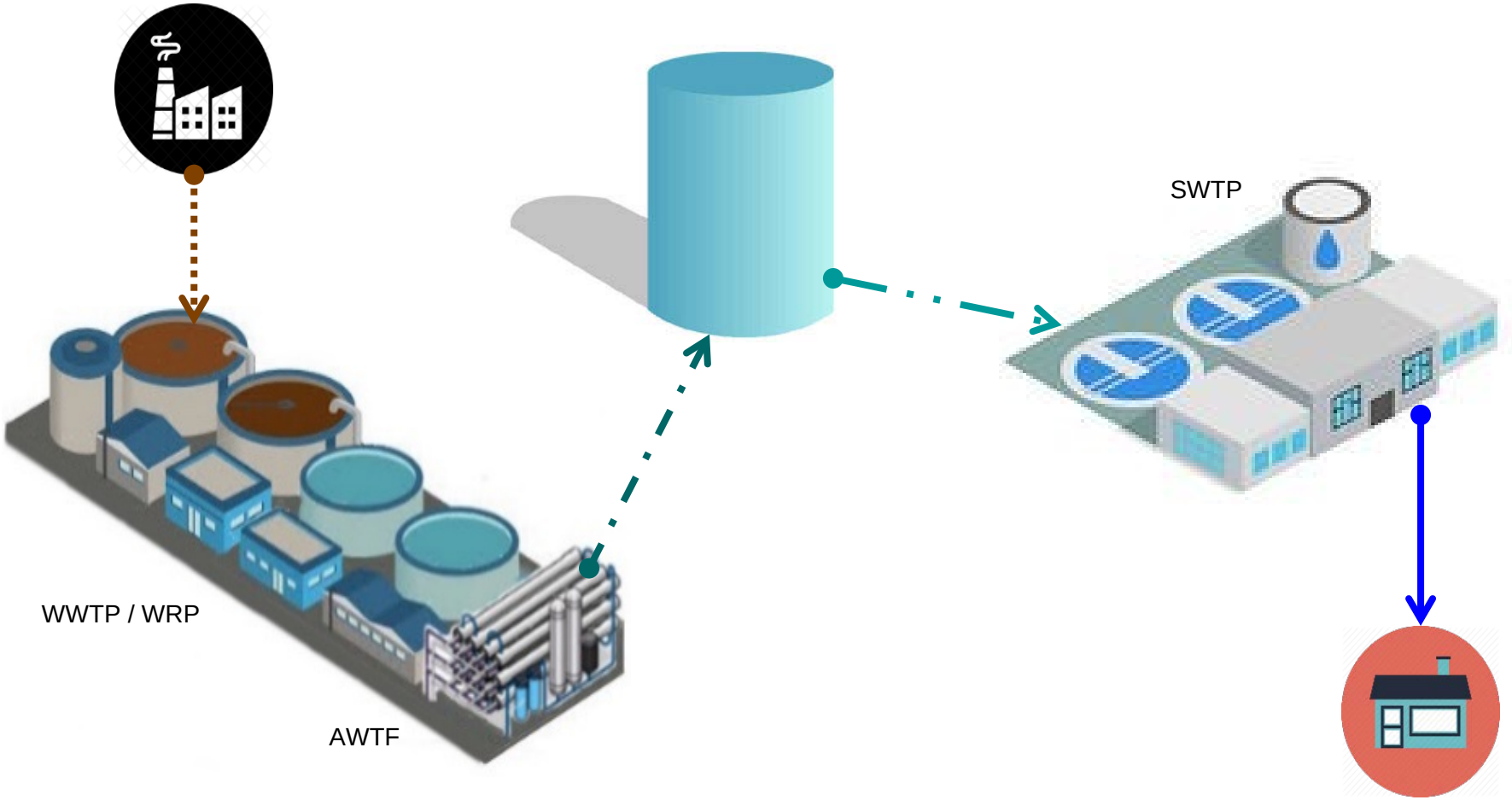

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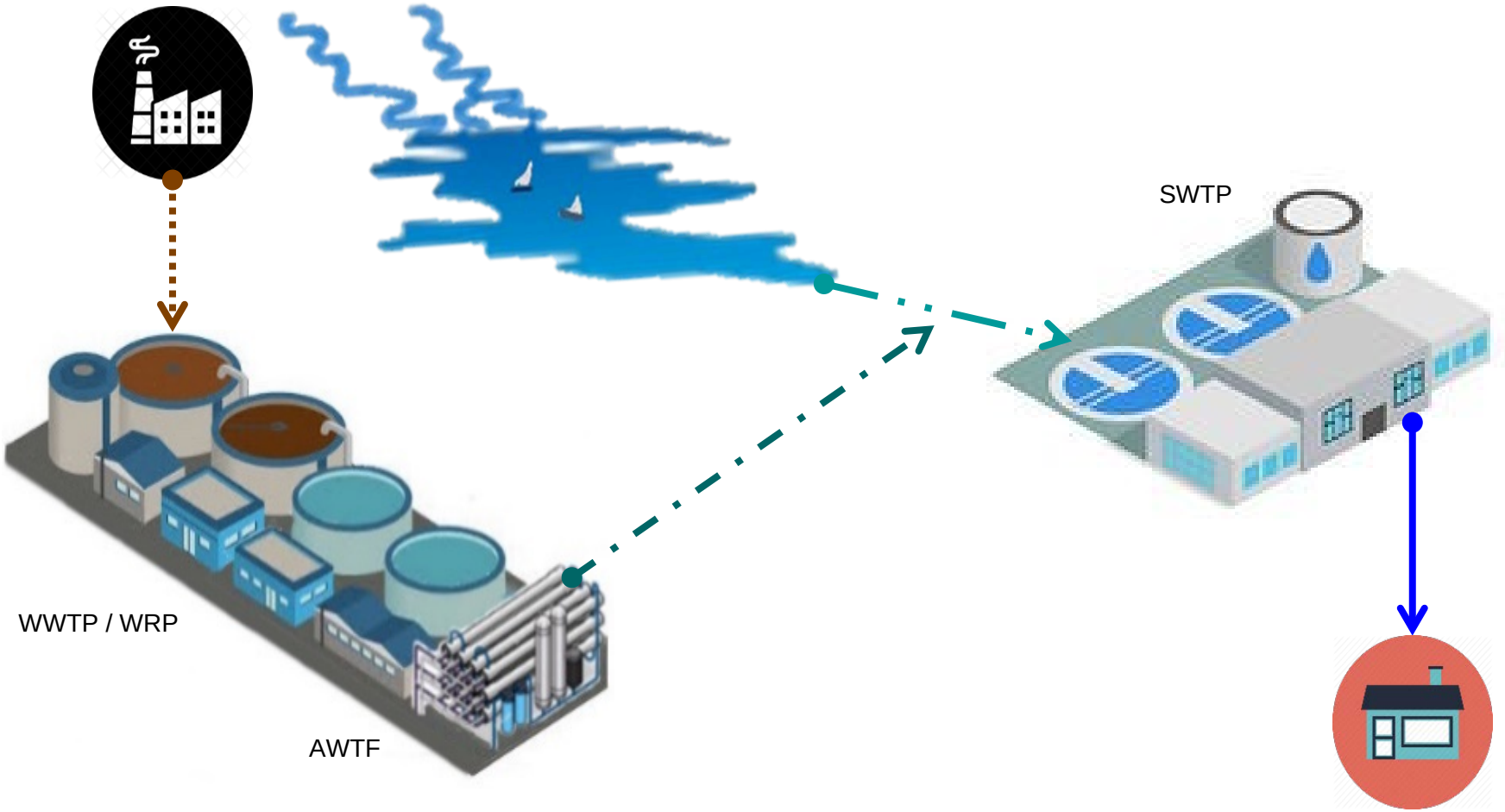
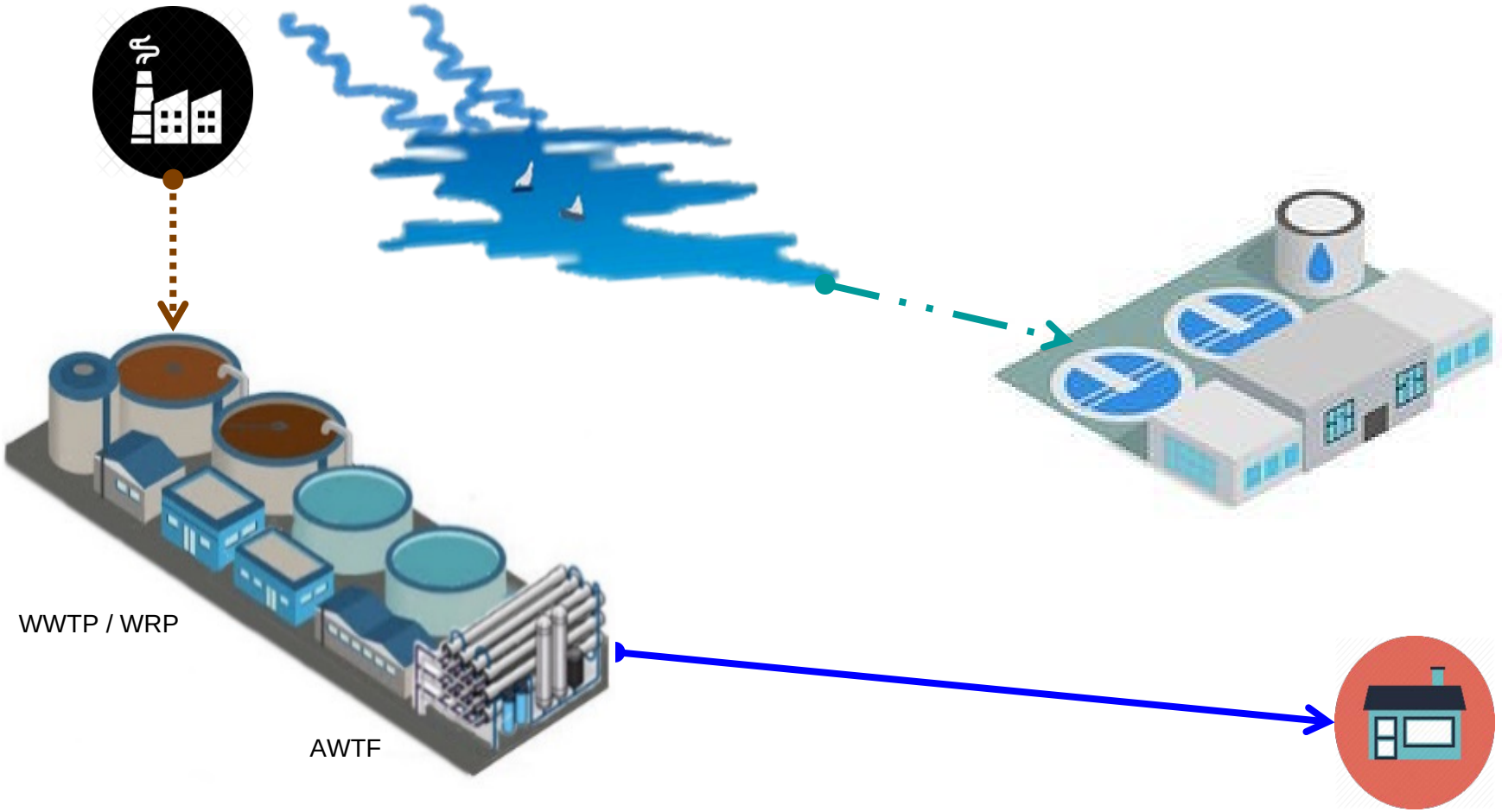
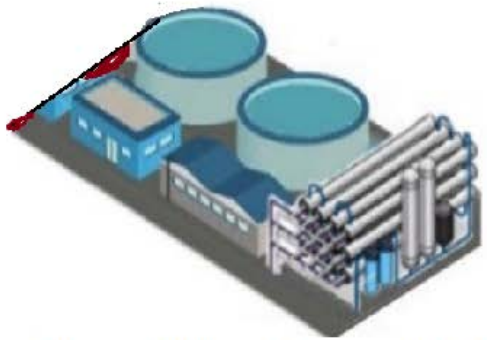


# DPR - Treated Water Augmentation



# DPR - Treated Water Augmentation



Advanced Water Treatment Facility - AWTF

+

Water Treatment Plant

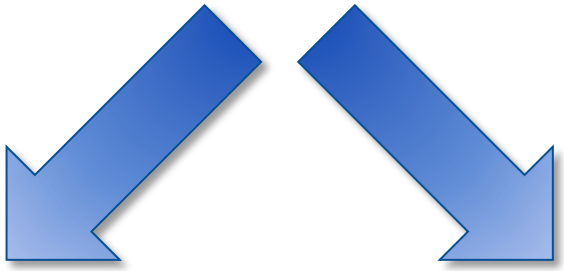
= Combined Functionality in ONE Plant

# HEALTH GOAL

Consistent level of safety as the type of DPR changes

# RISK MANAGEMENT

Compensate for the loss of a meaningful environmental buffer



**PATHOGEN CONTROL**

**CHEMICAL CONTROL**

# Contact Information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