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**Water  
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FOUNDATION



Webcast

# Solutions for Underperforming Drinking Water Systems in California (WRF 5015)

January 21, 2021



# Agenda

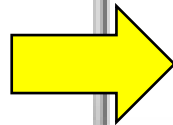
Topic	Presenter	Timing
• Introductions .....	• Maureen Hodgins, WRF	5 minutes
• 5015 Project Overview, Findings, & Insights .....	• Katie Porter, California Urban Water Agencies • Laura Feinstein, SPUR • Morgan Shimabuku, Pacific Institute	25 minutes
• Safe and Affordable Funding for Equity and Resilience (SAFER) .....	• Michelle Frederick, California State Water Resources Control Board, Division of Drinking Water	15 minutes
• Q&A .....		15 minutes



# Webcast Platform

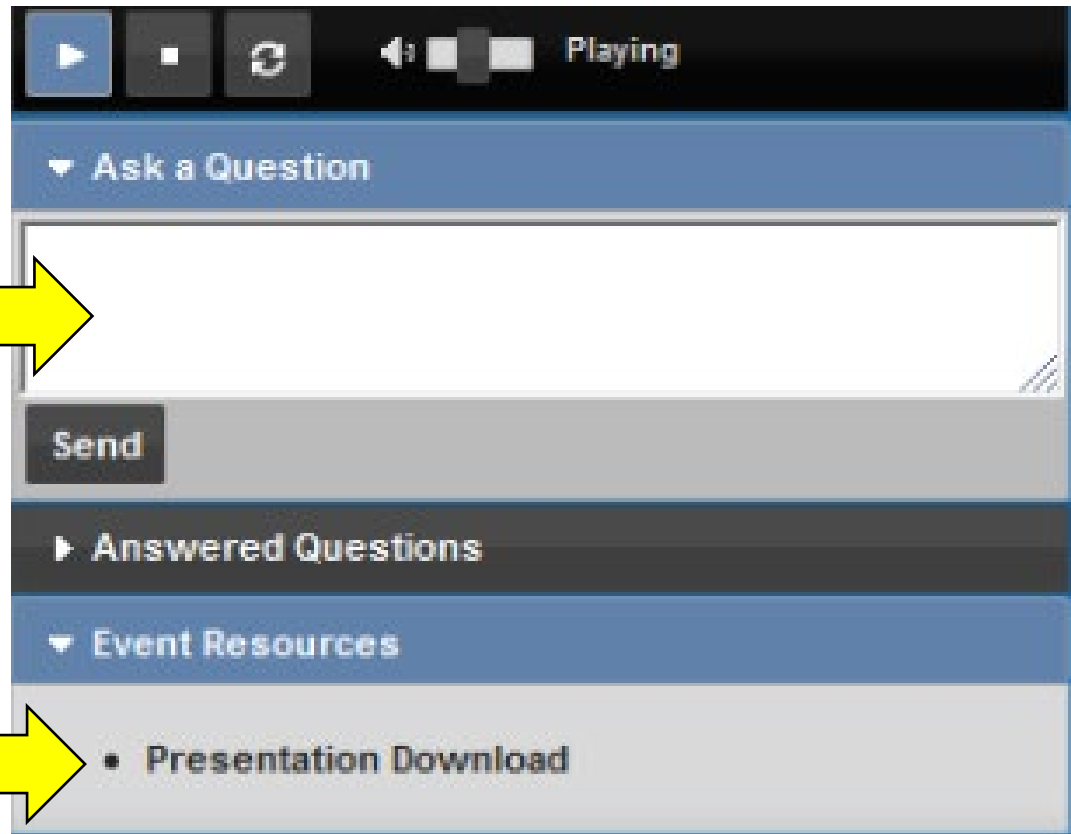
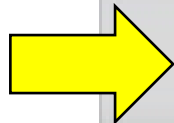
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advancing the science of water ®

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This series of synthesis reports details how WRF's research and innovation activities support all aspects of water.

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Project #5015

## Solutions for Underperforming Drinking Water Systems in California

Principal Investigator  
KATIE PORTER

Research Manager  
DR. KENAN OZEKIN

Contractor  
CALIFORNIA URBAN WATER AGENCIES

Related Topics  
WATER QUALITY  
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Research Investment \$157,000    Completion Year 2020

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FINAL REPORT



## Solutions for Underperforming Drinking Water Systems in California

REPORT #5015 09/29/2020  
09/29/2020

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THE Water Research FOUNDATION

PROJECT NO. 5015

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CALIFORNIA URBAN WATER AGENCIES

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## Webcast

# Solutions for Underperforming Drinking Water Systems in California (WRF 5015)

Katie Porter, California Urban Water Agencies

Laura Feinstein, SPUR

Morgan Shimabuku, Pacific Institute



# Why we are doing this work?

- Californians receive drinking water from:
  1. **public water systems** (focus of this analysis)
  2. state small water systems, and
  3. private domestic wells
- Approximately a million people receive unsafe drinking water from underperforming public water systems alone.
- We can address a substantial part of the problem and achieve near-term progress by focusing on severely impacted public water systems.
- There is new urgency as the world grapples with the consequences of the COVID-19 pandemic.



# The Water Research Foundation Funded Research

- Pacific Institute, California Urban Water Agencies (CUWA), and The Water Research Foundation (WRF) are nonprofit organizations dedicated to solving water challenges with evidence-based solutions
- We have different organizational histories and strategies, but we share the belief that everyone should have safe, affordable, accessible tap water, and that communication across interest groups can help achieve that goal

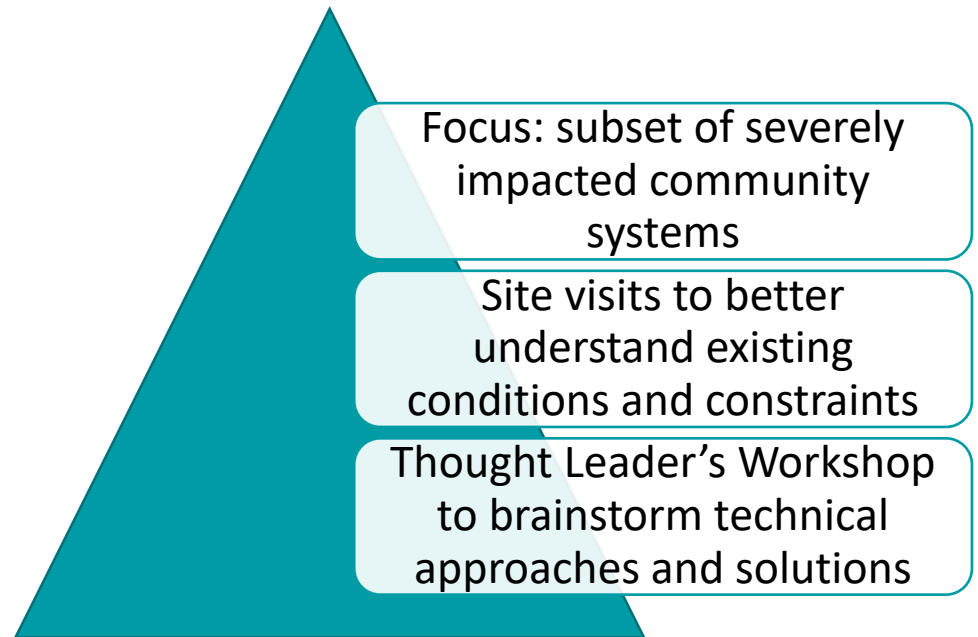
## Builds Upon:

- **Measuring Progress on Universal Access to Water and Sanitation in California** (Pacific Institute 2018)  
*Service ladder approach to ranking water quality*
- **Issue Brief on Restoring Water Accessibility** (CUWA 2019)  
*Classified small water systems by persistence of violations*

# WRF 5015: Solutions for Underperforming Drinking Water Systems in California

## Research Project Goals

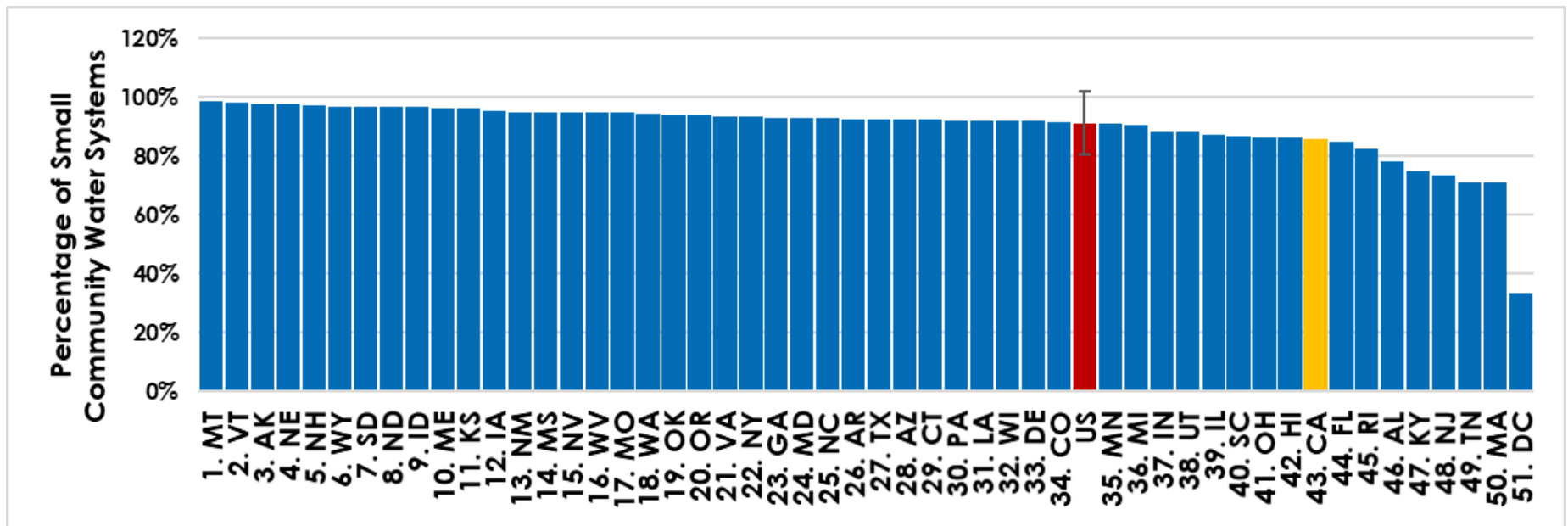
- Develop a systematic approach to identifying solutions for small underperforming drinking water systems
- Use small underperforming public water systems in California as a case study for a framework that could be applied in other states



Complementary effort to California State Water Control Board Needs Assessment (ongoing)

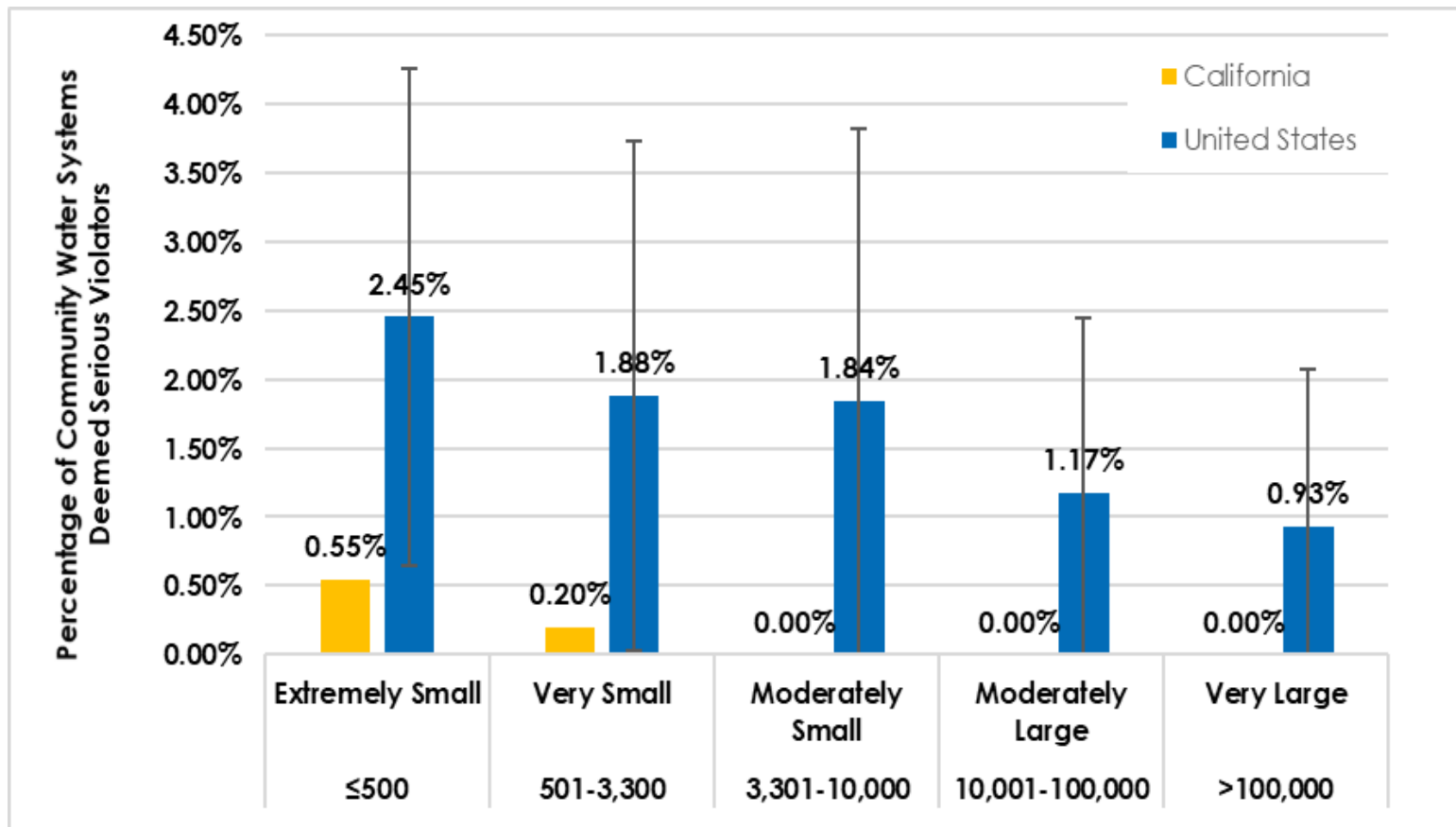
# California is Not Alone

- California has many small systems compared to other states because of its size
- However, the percentage of systems that are small is a bit lower than the national average



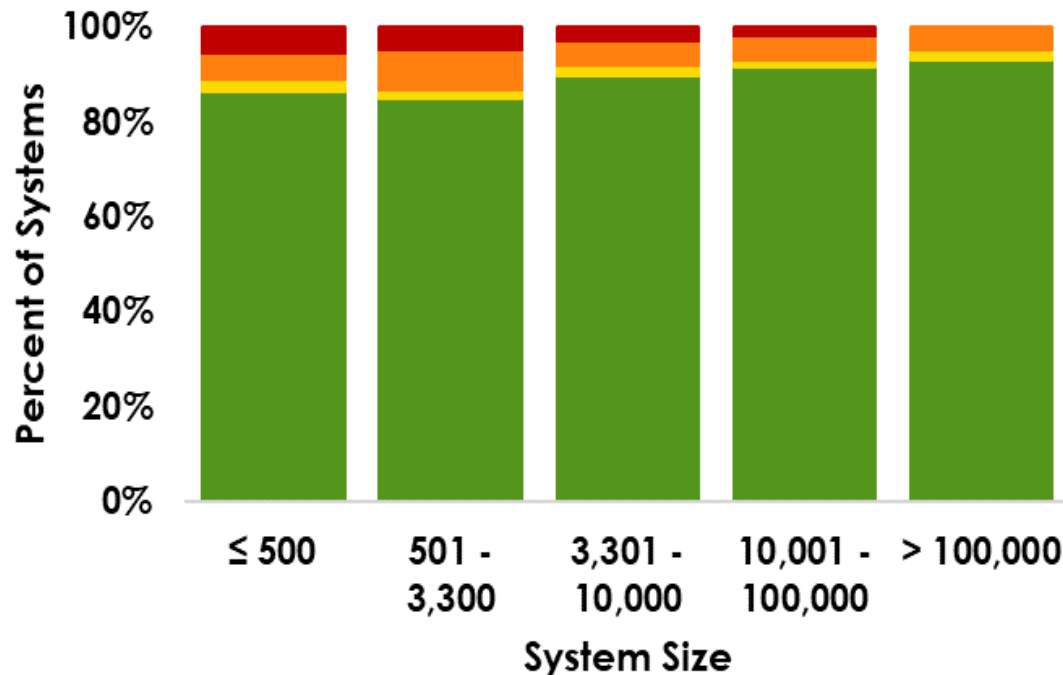
# California is Not Alone

- Small systems are more likely to be serious violators than large systems nationwide.



# Performance Assessment

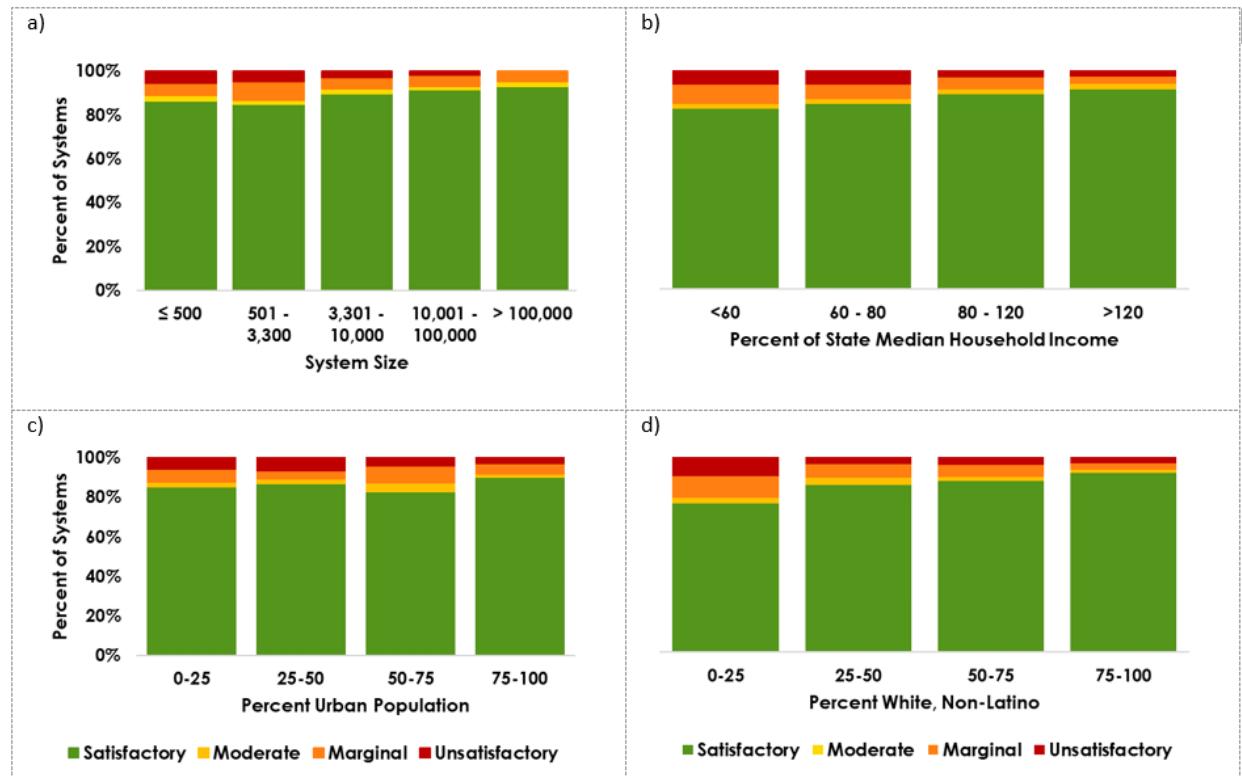
	Performance Category	Number of Health-Based Violations in Three Years
	Satisfactory	0
	Moderate	1
Underperforming {	Marginal	2 to 8
	Unsatisfactory	9 or more



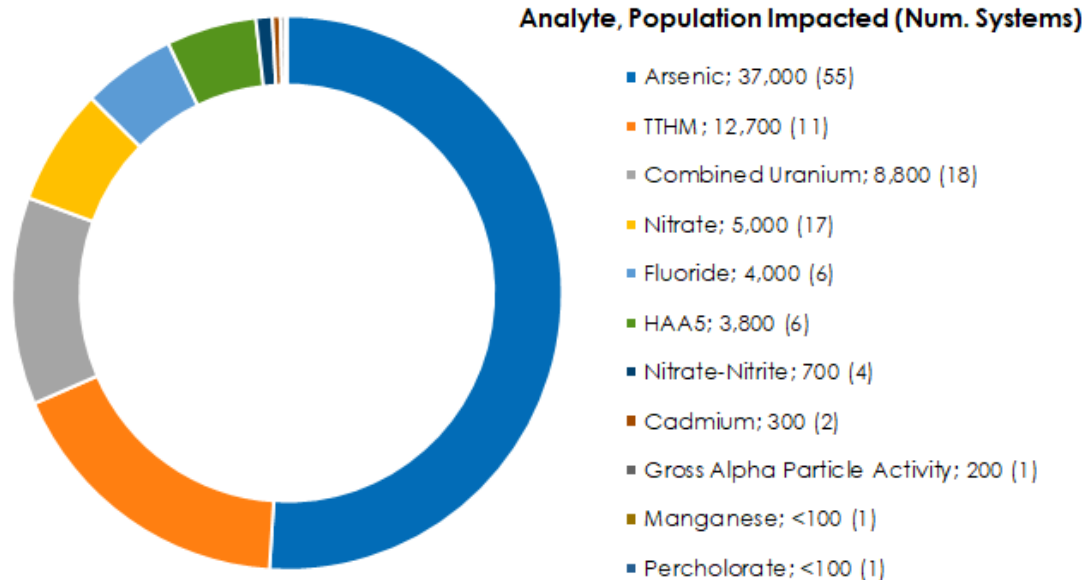
- Most systems had no violations
- A fraction of systems, mostly small ones, constitute the vast majority of persistent health-based violations in California

# Prioritize Low-Income Communities of Color to Correct Historic Inequity

- Systems serving low-income areas are 3x as likely to have persistent water quality violations
- Systems serving communities of color 4 times as likely to have persistent water quality violations



# Arsenic Was the Most Common Persistent Violation for Small Systems in CA

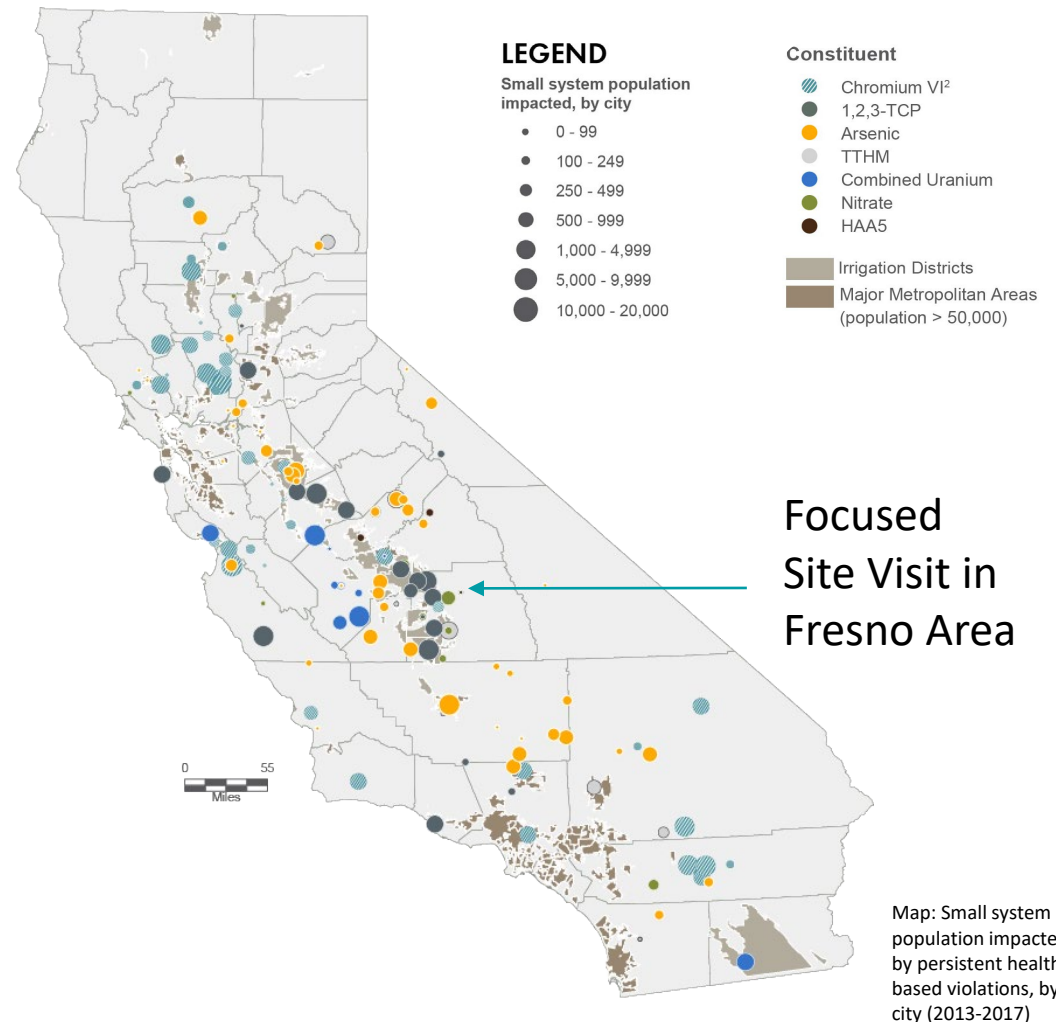


## Persistent Violations for Small Systems

Population served by an “Unsatisfactory” small system (at least nine health-based violations from 2016 Q2 to 2019 Q1), by analyte. Some people are served by systems with persistent violations for more than one analyte. Depicts both small CWS and school and daycare systems.

# Site Visits and Thought Leader's Workshop Provide Key Input

- Jointly brainstorm potential technical solutions with local stakeholders and partners
  - 37 participants from more than 20 organizations
- Understand challenges and root causes of persistent problems
- Identify key ideas to promote safe drinking water in small systems





# Top Challenges for Small Water Systems

- Addressing system repair/replacement
- Addressing emerging contaminants and drought conditions
- Maintaining local expertise in certified operators, staff, and board members
- Reacting quickly to real-time challenges
- Identifying most effective technical solutions and pairing with available funding
- Limited revenue and low economies of scale



# Summary of Solutions

## Operational Solutions

Implementing remote or contract operations, providing operators remote access of equipment, real-time monitoring, and other smart technology options.

**Key Benefits:** increase efficiency and improve performance by helping operators focus on the most critical tasks without having to be present at each site all the time.

## Treatment Solutions

Optimizing the existing facility through process, mechanical, and/or structural improvements.

**Key Benefits:** Cost effective and requires less time than building a new facility.

## Source Water Solutions

New water supplies (e.g., raw or treated water from a neighboring drinking water system; water from a nearby irrigation district; or recycled water).

**Key Benefits:** Connecting with a new source that already meets existing standards allows the system to continue to operate without having to increase operator treatment qualifications.

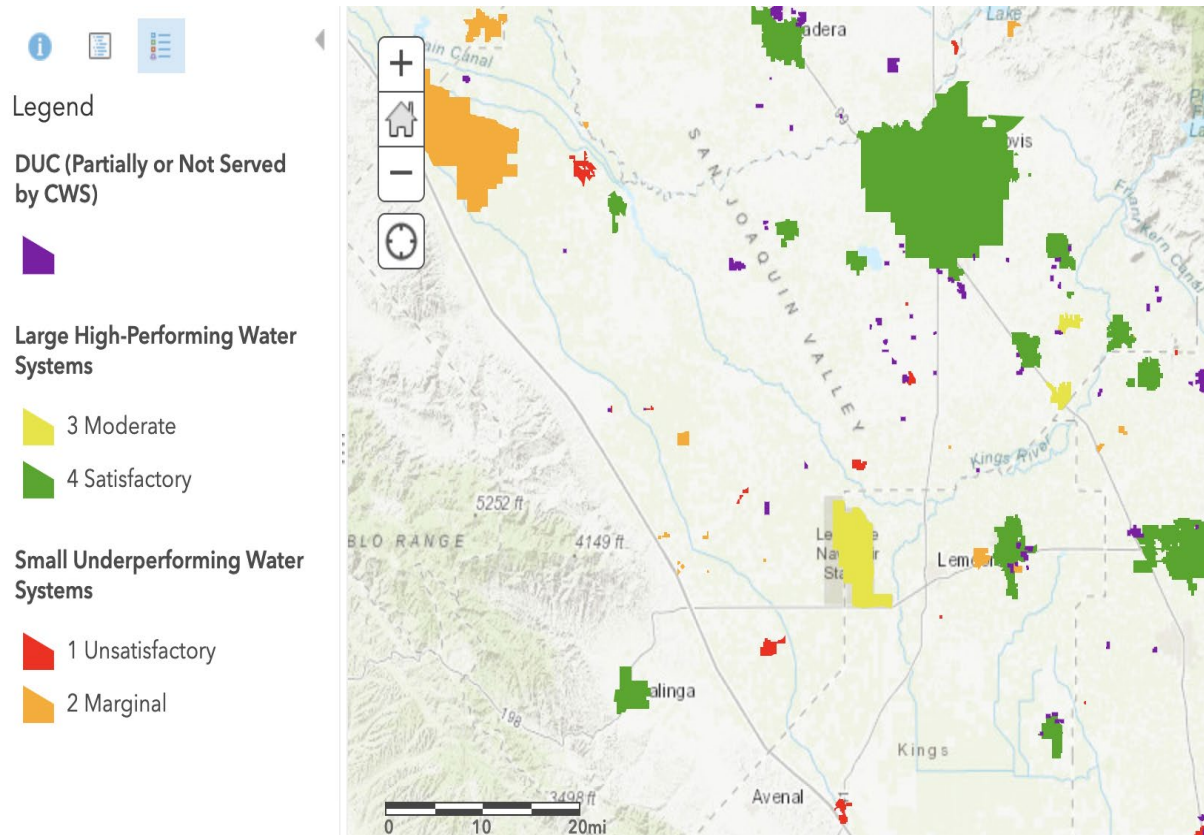
## Partnership Solutions

Finding the right technical partner to assist the plant, finding the most effective mutual aid, or finding a partner for consolidation. Consolidation can be physical or managerial, voluntary (preferred) or mandatory.

**Key Benefits:** Technical partners can facilitate plant optimization and increase efficiency. The right mutual aid can help the plant improve operation. Consolidation provides a way for utilities to pool resources (e.g. financial, operational, managerial) to solve common problems.

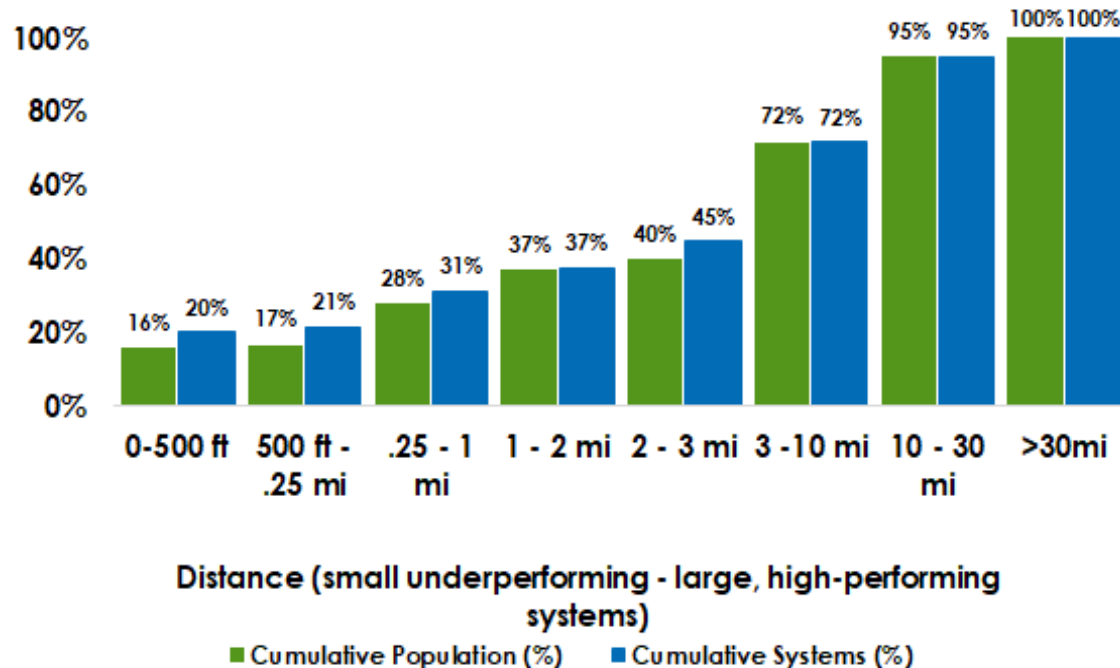
# Water Partnership Assessment

- How many small, underperforming systems are good candidates for physical or managerial consolidation with a large, high-performing system?
- How many Disadvantaged Unincorporated Communities reliant on domestic wells are good candidates for consolidation?



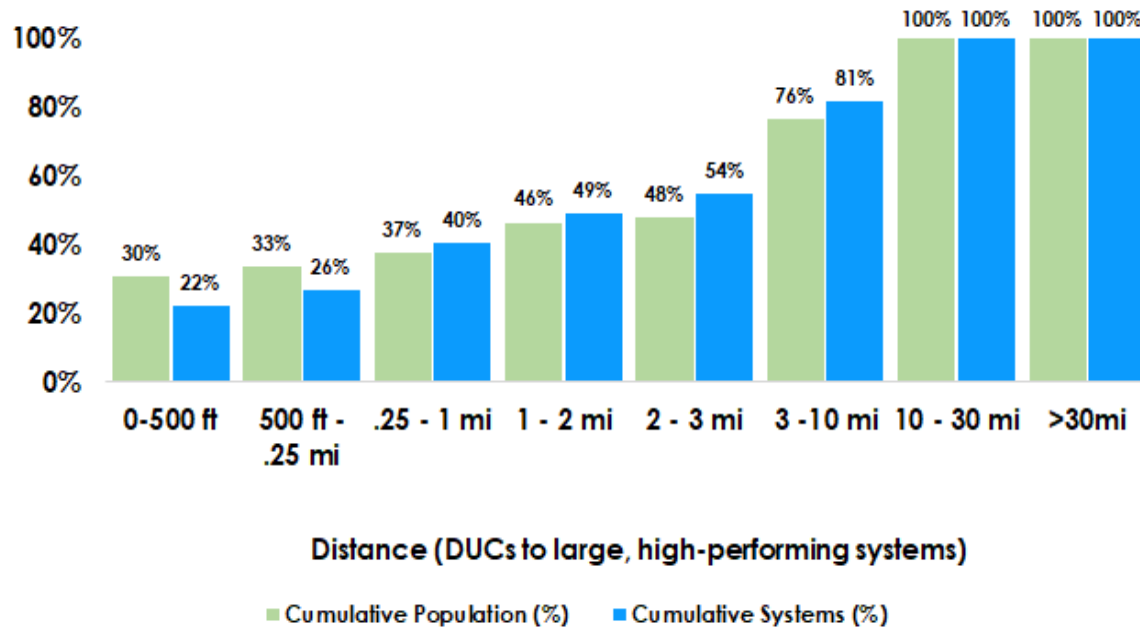
Disadvantaged Unincorporated Communities (DUCs) are relatively densely populated, low-income unincorporated areas.

# Partnership Zones Offer a High-Impact Opportunity for Progress



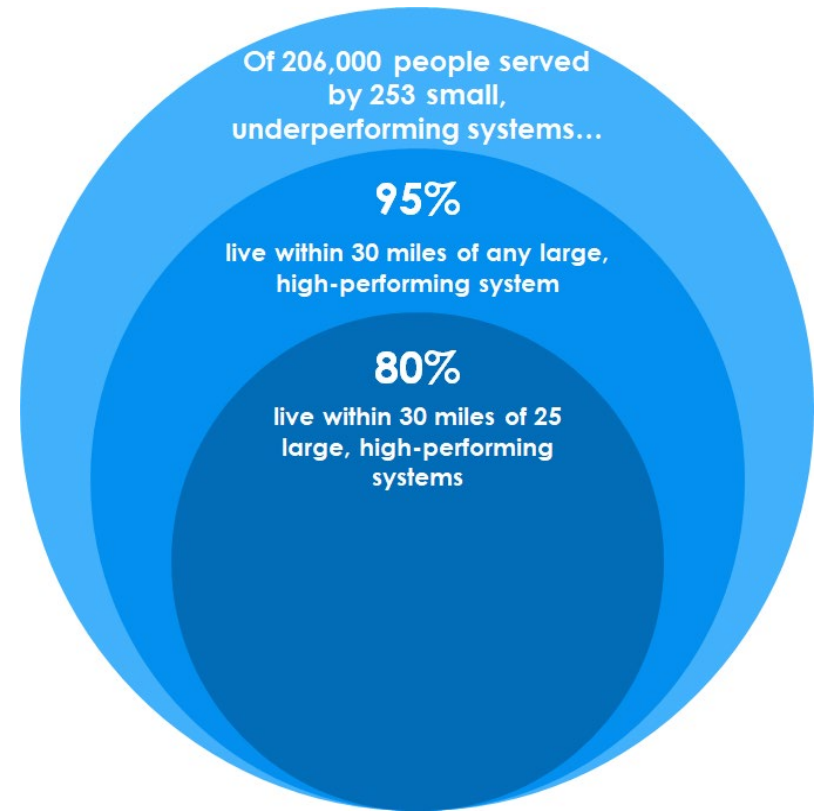
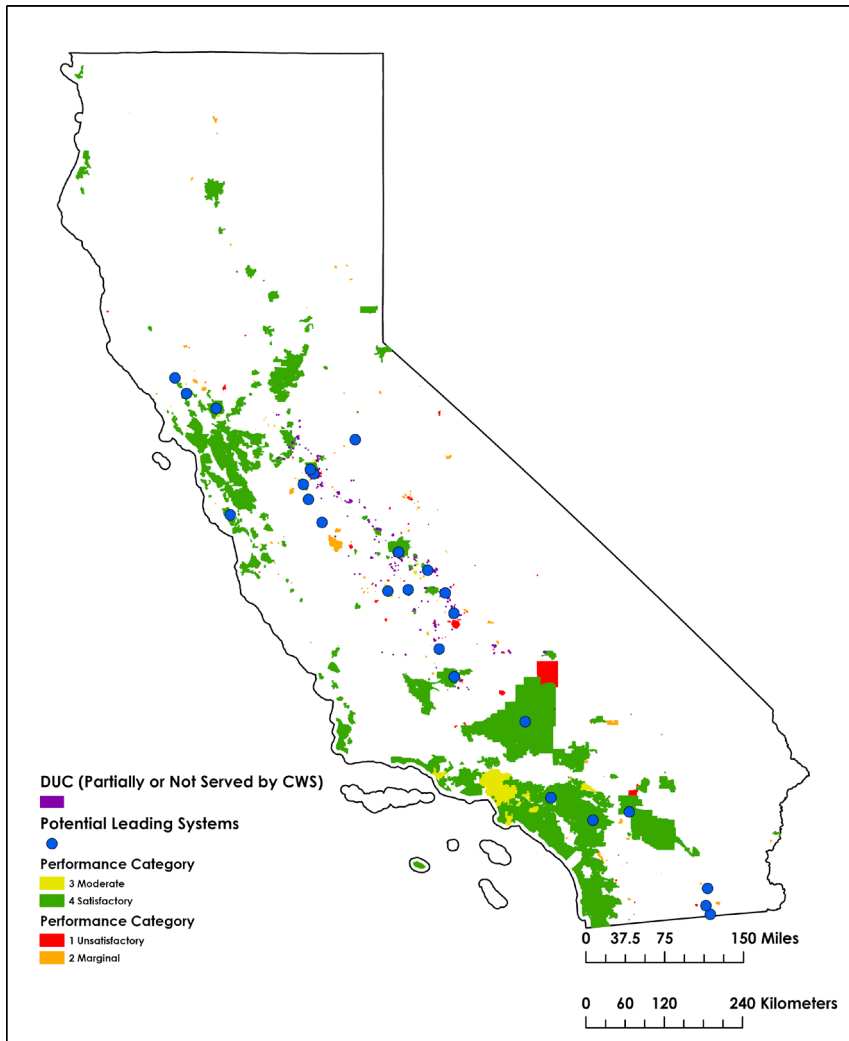
- Nearly half of small underperforming systems are within 3 miles of a large, high-performing water system
- Nearly all the small underperforming systems were within 30 miles of a large, high-performing water system

# Partnership Zones Offer a High-Impact Opportunity for Progress



- About half of Disadvantaged Unincorporated Communities (DUCs) that rely on domestic wells are within 3 miles of a large, high-performing water system
- All the DUCs reliant on wells were within 30 miles of a large, high-performing water system

# 25 Partnership Zones Could Reach Most Underserved Californians



# Partnership Recommendations

Encourage water agencies to partner with state and local governments to assess potential service area expansions and consider possible State mechanisms or tools to facilitate success.

- Who should implement: State and Utilities

Increase incentives and reduce disincentives for high-performing public utilities to work with underperforming utilities, and mandate consolidations when voluntary efforts fail.

- Who should implement: State

Pursue physical consolidation as a top-priority solution

- Who should implement: State and Utilities

Develop partnership zones around the twenty-five strategically positioned, high-performing large systems throughout the state.

- Who should implement: State and Utilities





# Equity Recommendations

Work with DUCs first to achieve maximum impact on addressing problems for households reliant on domestic wells.

- Who should implement: State

State action is needed to follow through with its stated priority to correct disparities in the quality of water received by low-income communities of color.

- Who should implement: State

Prioritize the severely impacted populations, typically served by small systems with persistent water quality problems, for state financial assistance.

- Who should implement: State



# Recommendations on Planning and Research

Expand City, County, and State authorities to stop formation of new unsustainable small systems.

- Who should implement: State and Local Government

Plan for future emerging contaminants: protect source water and design treatment plants with built-in flexibility.

- Who should implement: State and Utilities

Research the relationship between TMF metrics and future system compliance.

- Who should implement: State with research partners

Refer to WRF 5015 Final Report for Greater Detail on Conclusions and Recommendations



# Operational Recommendations

Optimize treatment trains to reduce disinfection byproducts; offers low-hanging fruit to improve water quality.

- Who should implement: Utilities

Support pilot efforts of remote operating systems coupled with contract operation oversight to confirm technology effectiveness and establish a regional implementation program framework.

- Who should implement: State and Utilities

# Acknowledgements



- **WRF Project 5015** – Katie Henderson, Maureen Hodgins, Kenan Ozekin
- **Project Advisory Committee** - Michelle Frederick (DDW/SWRCB), Ari Neumann (RCAC), Michael Claiborne (Leadership Counsel), Adan Ortega (CalMutuals)
- **CUWA** - Cindy Paulson, Hamideh Riazzi, Alex Waite, Rucker Alex, Melanie Holmer, Katie Ruby
- **Pacific Institute** – Heather Cooley, Darcy Bostic

*CUWA and Pacific Institute gratefully acknowledge that WRF are funders of certain technical information upon which this presentation is based. CUWA and Pacific Institute thank WRF for their financial, technical, and administrative assistance in funding the project through which this information was discovered. This material does not necessarily reflect the views and policies of the funders, and any mention of trade names or commercial products does not constitute the funders' endorsement or recommendations thereof.*

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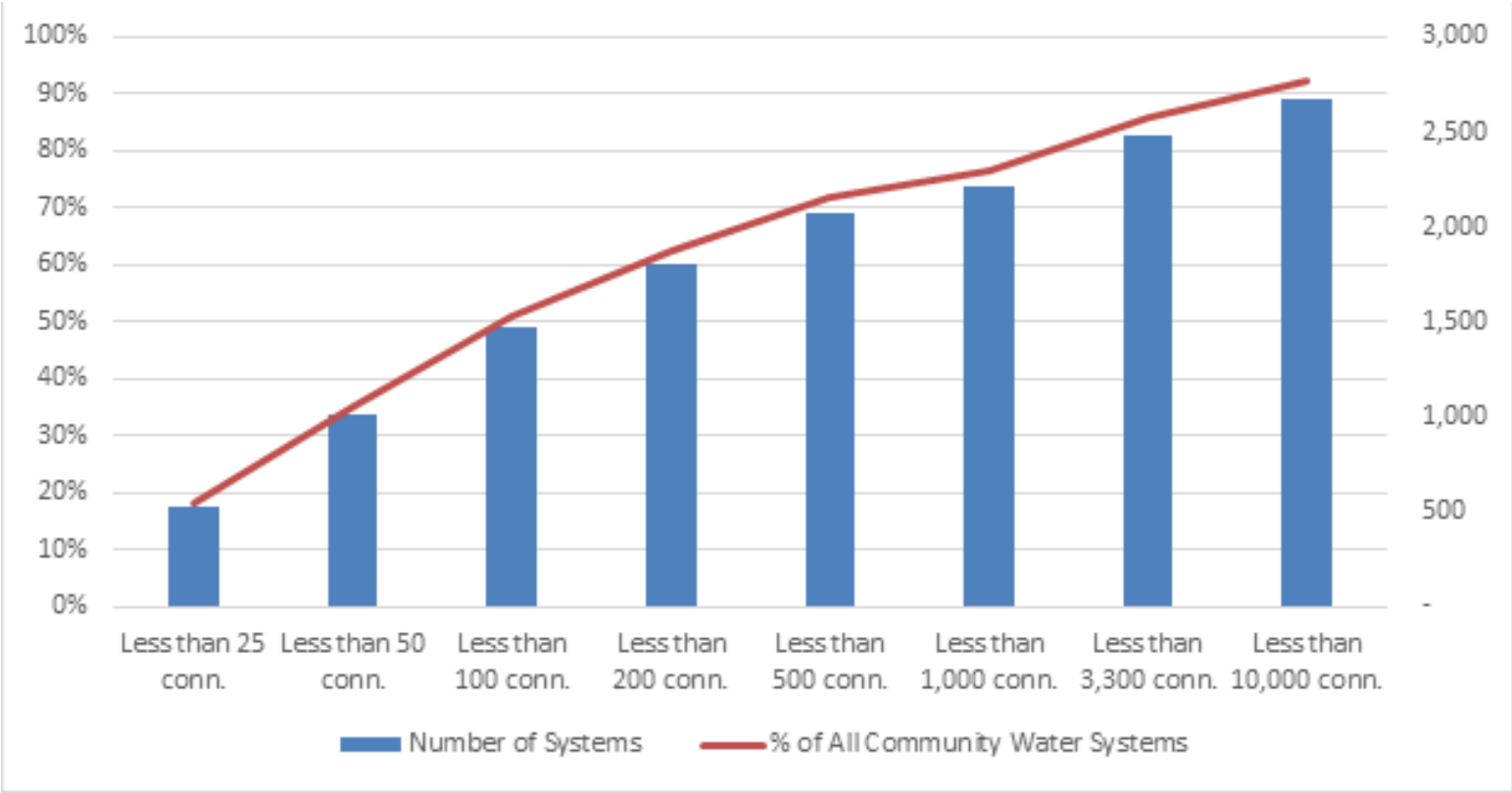


# Safe And Affordable Funding for Equity and Resilience (SAFER) Drinking Water Program

*Michelle Frederick, P.E.  
Supervising Engineer  
Division of Drinking Water, SAFER Program*

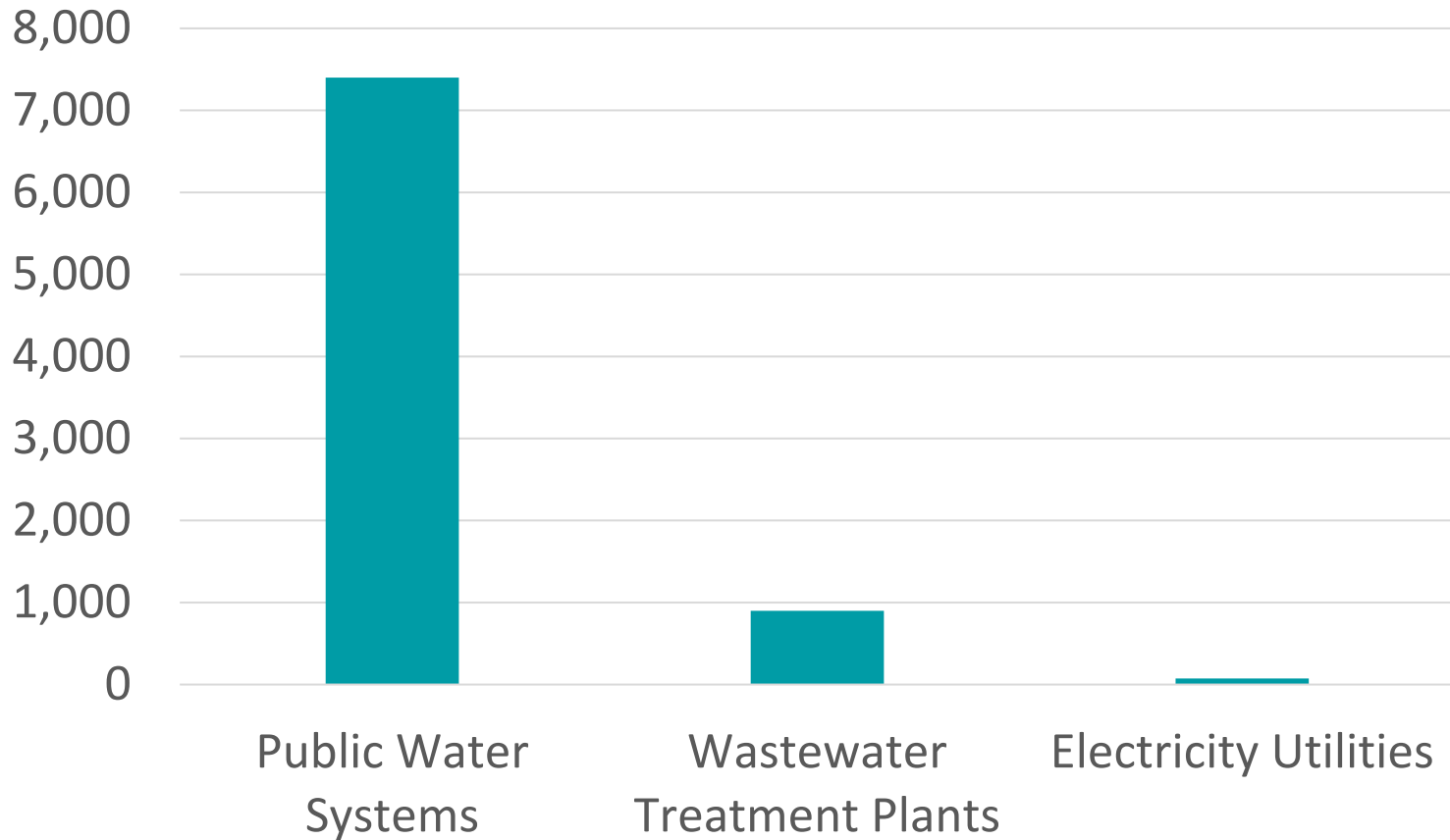


# Distribution of Community Water Systems

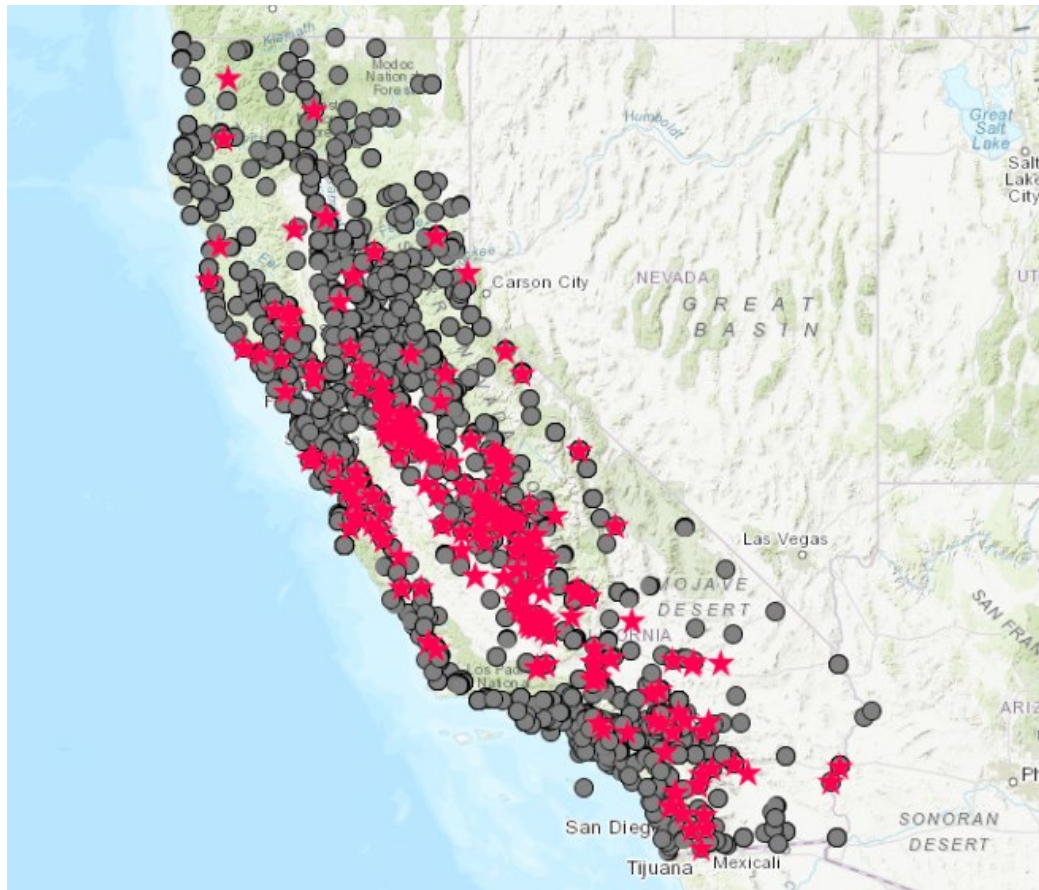




# Comparison with other CA Utilities



# Human Right to Water (HR2W) Systems – Water Quality Violations



- 7,400 Public Water Systems
- Red Stars Represent Water Systems with Violations in Community Water Systems or Schools
- **90% of Violations Occur in Water Systems Serving Less than 500 connections**

[https://www.waterboards.ca.gov/water\\_issues/programs/hr2w/index.html](https://www.waterboards.ca.gov/water_issues/programs/hr2w/index.html)

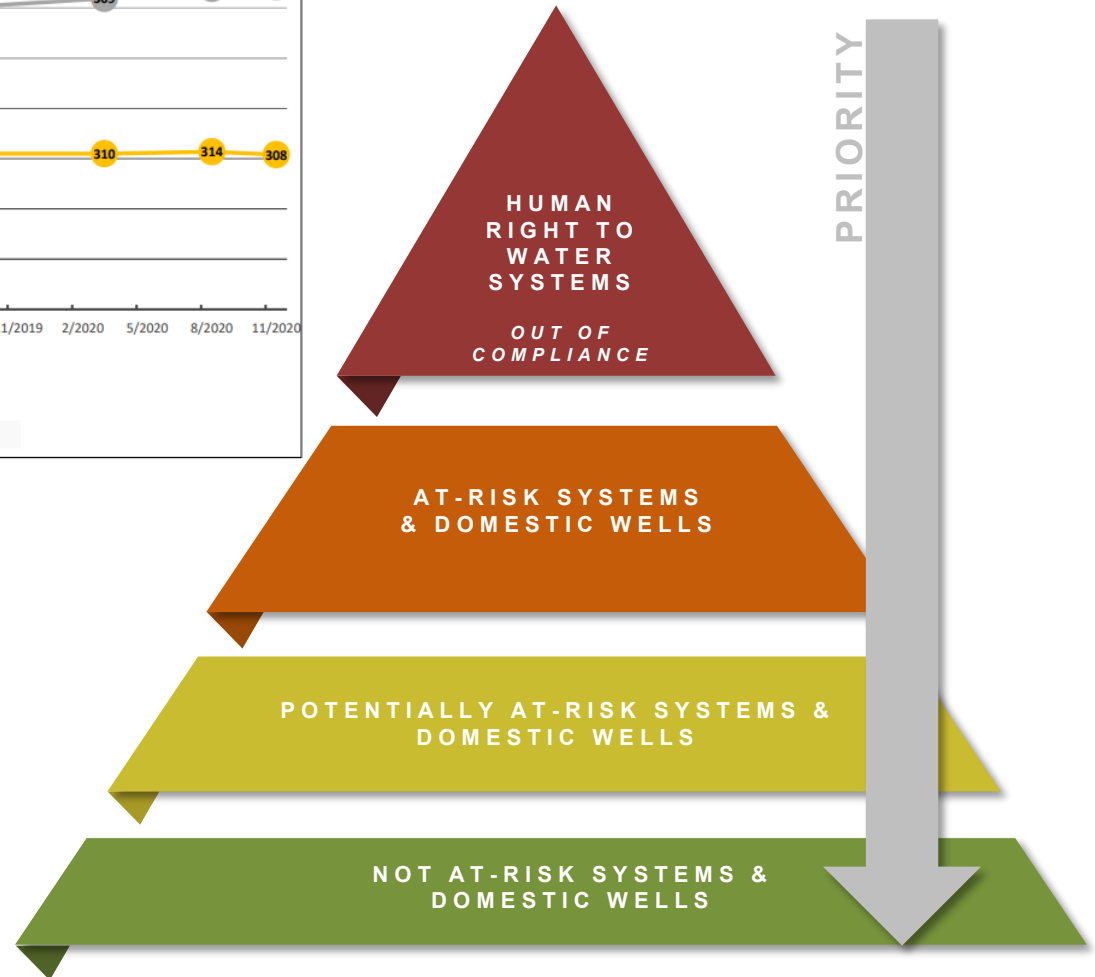
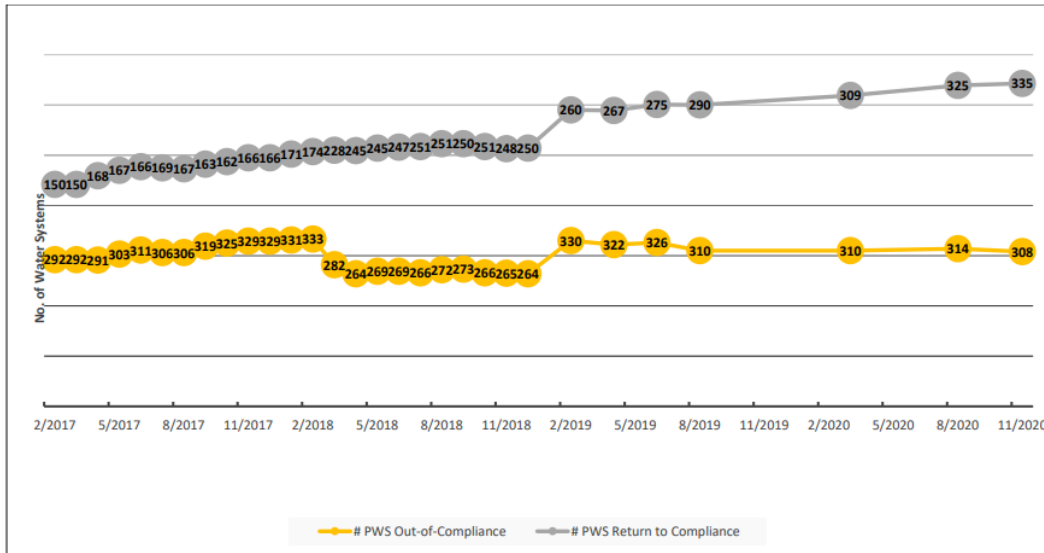


# Safe and Affordable Fund for Equity and Resilience (SAFER) Program



# SAFER Program and Risk Assessment

Water System Compliance Status Trend Line for 3<sup>rd</sup> Quarter 2020



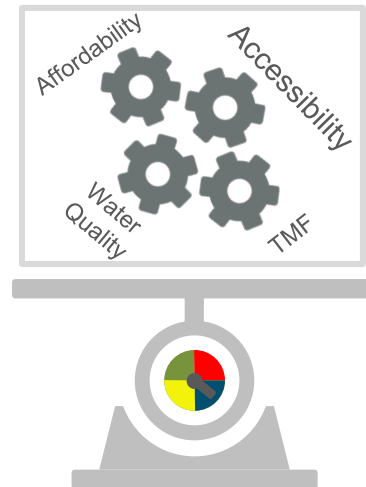
# Needs Assessment Components

## AFFORDABILITY ASSESSMENT



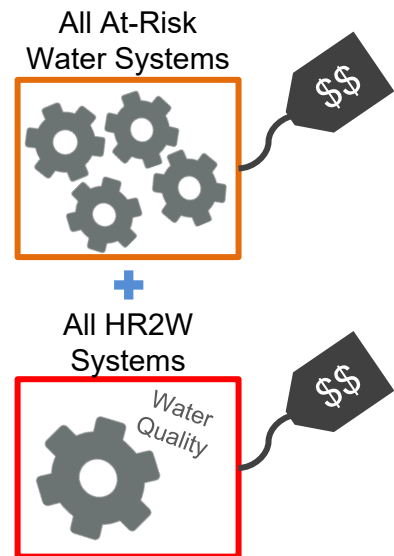
- *Public Water Systems (PWS)*

## RISK ASSESSMENT



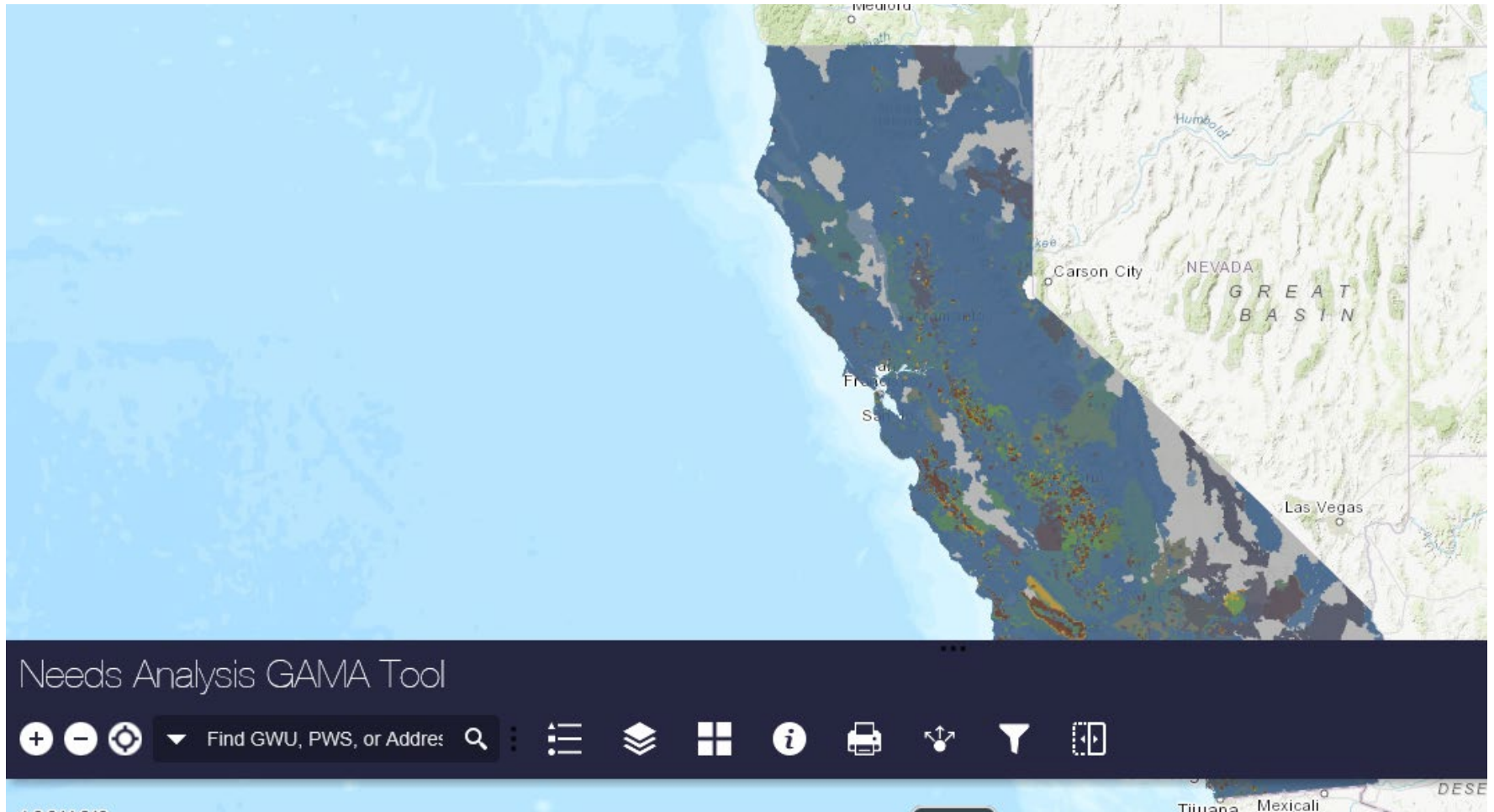
- *PWS <3,300 connections*
- *Tribal Systems*
- *State Small Water Systems*
- *Domestic Wells*

## COST ESTIMATE

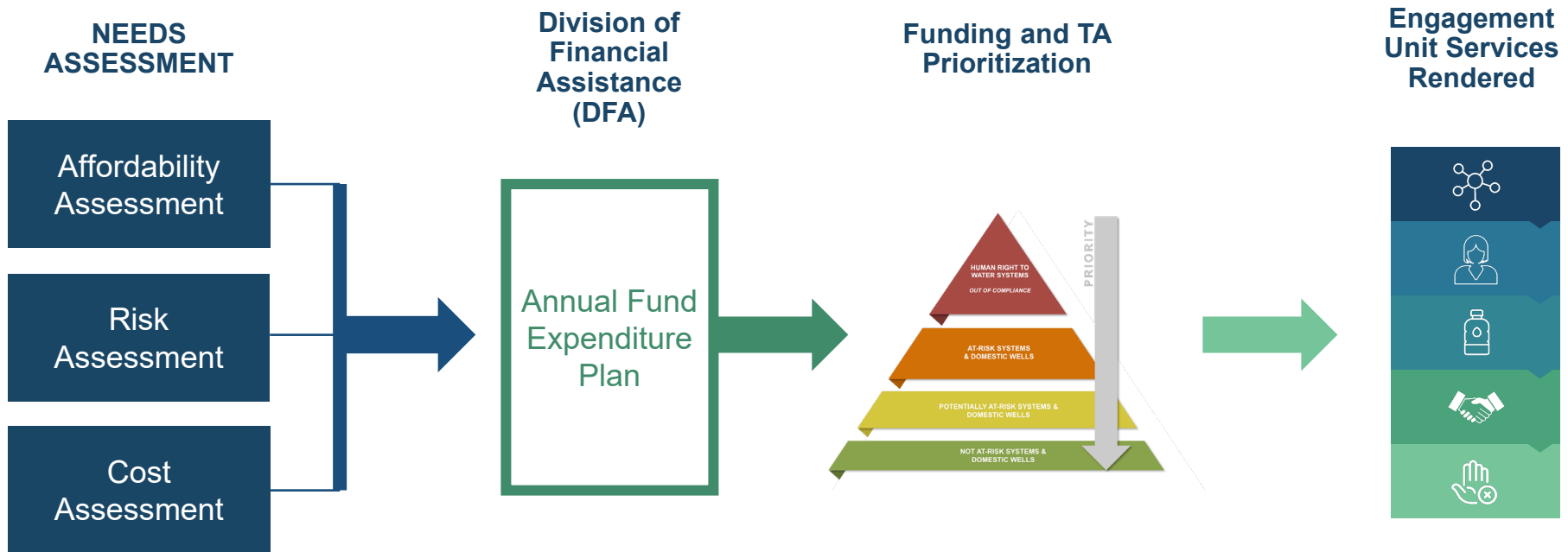


- *PWS <3,300 connections*
- *Tribal Systems*
- *State Small Water Systems*
- *Domestic Wells*

# Groundwater Ambient Monitoring and Assessment Program (GAMA) - Individual Well Tool



# Needs Assessment Uses



# Engagement Unit Services Rendered



CONSOLIDATIONS  
& WATER  
PARTNERSHIPS



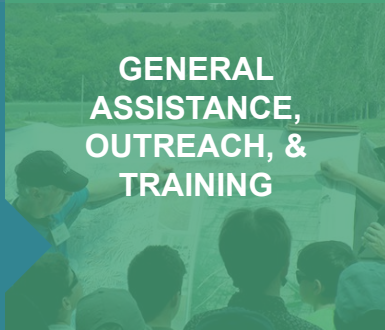
INTERIM SOLUTIONS



PREVENTION OF NEW  
WATER SYSTEMS



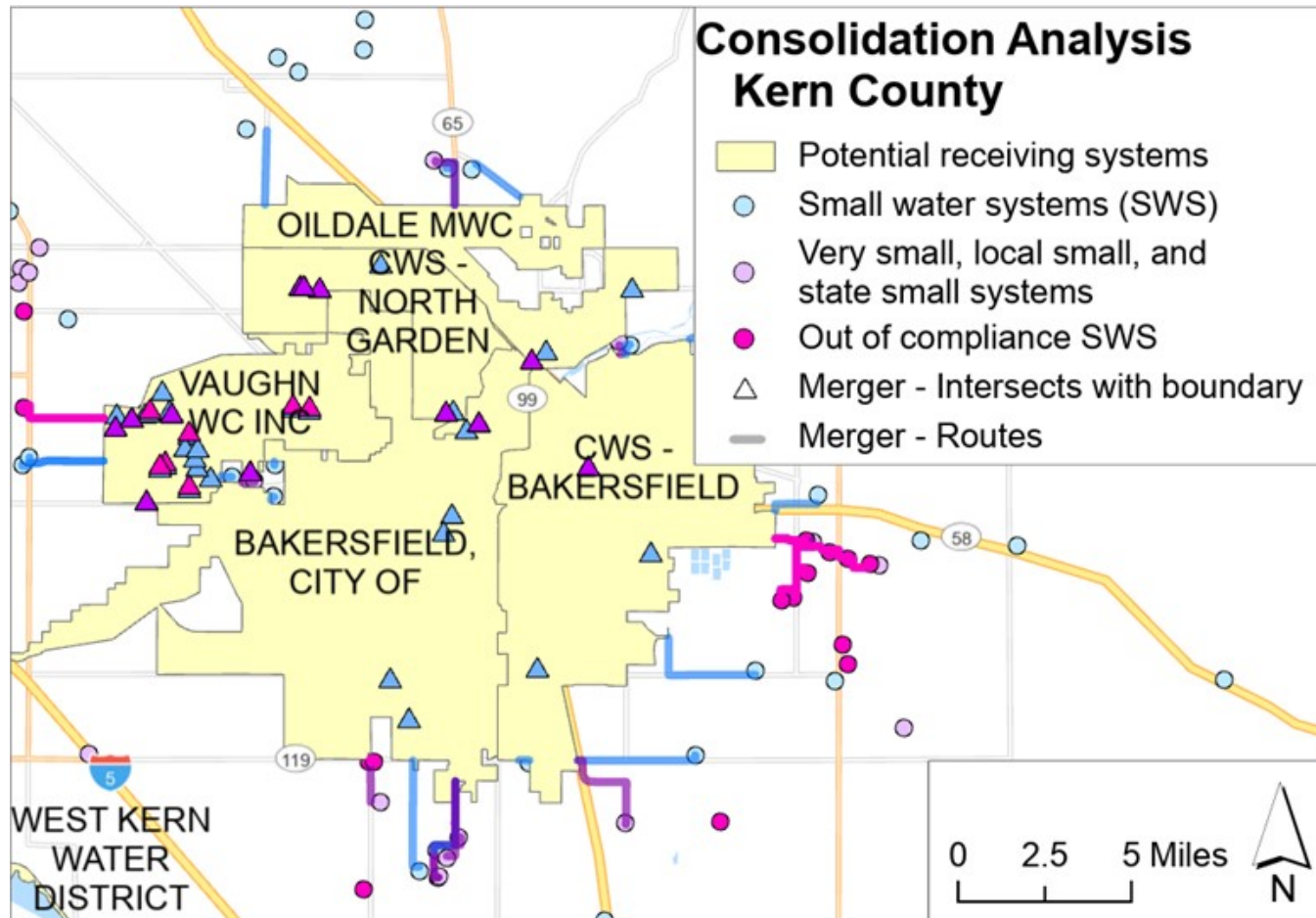
ADMINISTRATORS



GENERAL  
ASSISTANCE,  
OUTREACH, &  
TRAINING



# Example Consolidation Analysis



Courtesy of Corona Environmental and UCLA, Luskin Center



# Success Story: Mandatory Consolidation



## Ceres West MHP

- Arsenic & 1,2,3-TCP
- Initiated mandatory process
- Parties agreed to voluntarily consolidate
- Consolidation complete, August 2020

[https://www.waterboards.ca.gov/drinking\\_water/certlic/drinkingwater/partnershipsuccess.htm](https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/partnershipsuccess.htm)



**NEW!**



## ADMINISTRATORS



# Administrator Authority:

- Full-Scope Administrator:
  - Person or entity who is appointed and/or authorized to exercise total and complete managerial control over a designated water system.
- Applicability:
  - A public water system or state small water system that serves a disadvantaged community and that the state board finds consistently fails to provide an adequate supply of affordable, safe drinking water.
- Policy Handbook:  
[https://www.waterboards.ca.gov/board\\_info/agendas/2019/sept/091719\\_6\\_cs1\\_cleanversion.pdf](https://www.waterboards.ca.gov/board_info/agendas/2019/sept/091719_6_cs1_cleanversion.pdf)

# Drinking Water System Status Page

School?

County


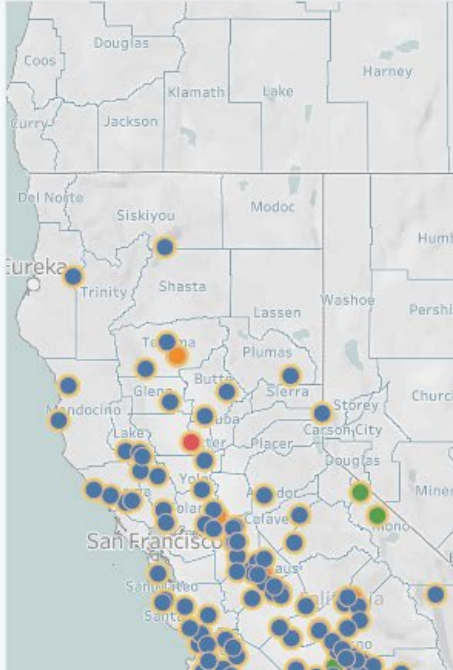
Category

Search Water System Name

Select Water System Name From List

**CALIFORNIA WATER BOARDS**  
State Water Resources Control Board

**Community, Schools, Daycares Public Water Systems in Human Right to Water List** [\(Click on a dot to see the details\)](#)



**WATER SYSTEM: All. Classification: All**  
**Data Updated on: 7/13/2020 11:20:12 PM**

**PWSID : All. County: All. Population: All (All). Service Connections: 1 to 45,521.**  
**Median Household Income: \$14,000 to \$146,118, % State: 18.6% to 194.1%, All**

**Analyte Name(S): All. Number of Violations: 1 to 80 Year of Oldest Violation (since 2012): 2012 to 2020**

**Financial Assistance Status: All**  
**Financial Assistance Project TYPE: All**  
**Financial Assistance Total: \$0 to \$21,324,477**

**# of Financial Assistance Projects: 0 to 3**  
**Project Description: All**

[https://www.waterboards.ca.gov/safer/dw\\_systems\\_violations\\_tool.html](https://www.waterboards.ca.gov/safer/dw_systems_violations_tool.html)



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# Questions?



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**Maureen Hodgins**

The Water Research Foundation

[mhodgins@waterrf.org](mailto:mhodgins@waterrf.org)

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CALIFORNIA URBAN WATER AGENCIES

# WRF Related Work

## Customer Assistance Programs

- 2017, [4557](#), Customer Assistance Programs for Multi-Family Residential and Other Hard-to-Reach
- 2017, [4671](#), Navigating Legal Pathways to Rate-Funded Customer Assistance Programs: A Guide for Water and Wastewater Utilities
- 2010, [4004](#), Best Practices in Customer Payment Assistance Programs

## Water Utility Partnerships

- 2019, [4750](#), Water Utility Partnerships: Resource Guide and Toolbox
- 2008, [4075](#), Estimating Benefits of Regional Solutions for Water and Wastewater Service
- 2006, [2950](#), Regional Solutions to Water Supply Provision

## Risk Management

- 2013, [4363](#), Risk Governance: An Implementation Guide for Water Utilities
- 2016, [4573](#), Securing Value: Integrating Risk Governance With Other Business Functions for the International Water Sector
- Ongoing, [4970](#), Obstacles and Solutions for Risk-Based Planning for Smaller Utilities and Limited Budgets

## Water Quality and Water Treatment

- Topic [summaries](#): Advanced Treatment, Disinfection Byproducts, Nutrients
- Research Areas: [Hexavalent Chromium](#), [Biofiltration](#), [Carcinogenic VOCs](#), [Nutrients](#)



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