

DRINKING WATER

# POINT-OF-USE POINT-OF-ENTRY REPORT



## **Acknowledgments**

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Kevin Berryhill (*Provost & Pritchard Consulting Group*), Heather Lukacs (*Community Water Center*), Shannon Murphy (*Aquamor, LLC*), *3M*, *Amway*, *AO Smith*, *Aqua Clara International*, *AquiSense Technologies*, *BSH*, *Canopus Water Technologies*, *Culligan Water*, *Ecowater Systems*, *Elkay*, *Franklin Electric*, *Free Fall Innovation, LLC.*, *Graver Technologies*, *Hydro-Flow Filtration Systems*, *Hydroviv*, *Ideal Living*, *International Association of Plumbing and Mechanical Officials*, *Membrane Specialists*, *Miltec Inc.*, *NSF International*, *Oman Oasis*, *Pacific Purification*, *Pacific Water Quality Association*, *Strix Technology*, *Water Quality Association*, and *Waterline Technology*.

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## EXECUTIVE SUMMARY

In 2016, the State Water Board adopted a Human Right to Water Resolution making the Human Right to Water (HR2W), as defined in Assembly Bill 685, a primary consideration and priority across all the state and regional boards' programs.<sup>2</sup> The HR2W recognizes that **“every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes.”**

In 2019, to advance the goals of the HR2W, California passed Senate Bill 200 (SB 200) which enabled the State Water Board to establish the Safe and Affordable Funding for Equity and Resilience (SAFER) Program. SB 200 established a set of tools, funding sources, and regulatory authorities the State Water Board can harness through the SAFER Program to help struggling water systems achieve sustainability and affordably provide safe drinking water to their customers.

In 2021, the State Water Board completed its first Drinking Water Needs Assessment report<sup>3</sup> designed to help inform the prioritization of available state funding and technical assistance within the Safe and Affordable Drinking Water Fund (SADWF) Fund Expenditure Plan (FEP). While consolidation with a larger water system is typically considered the most sustainable long-term solution, geographic distances can make that economically infeasible. The initial Needs Assessment showed that POE/POU treatment is potentially the most affordable solution for approximately 100 community water systems and K-12 schools. The Needs Assessment also estimated that 303 state small water systems and 37,000 domestic wells may require the installation of POU/POE as a long-term treatment. Additionally, POU/POE treatment units may be necessary for interim solutions in some locations while a permanent solution is being developed.

The State Water Board recognizes that POU/POE devices are needed to meet the goals of the HR2W legislation, particularly in rural areas, and that there are significant obstacles to the successful implementation of POU/POE as a drinking water solution. In alignment with the

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<sup>2</sup> [State Water Board Resolution No. 2016-0010](https://www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/2016/rs2016_0010.pdf)

[https://www.waterboards.ca.gov/board\\_decisions/adopted\\_orders/resolutions/2016/rs2016\\_0010.pdf](https://www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/2016/rs2016_0010.pdf)

<sup>3</sup> [2021 Drinking Water Needs Assessment](https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/needs/2021_needs_assessment.pdf)

[https://www.waterboards.ca.gov/drinking\\_water/certlic/drinkingwater/documents/needs/2021\\_needs\\_assessment.pdf](https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/needs/2021_needs_assessment.pdf)

Fiscal Year 2021-22 FEP<sup>4</sup>, this POU/POE Report (Report) outlines the technological, regulatory, performance certification and testing, installation challenges, reliable O&M, and socioeconomic, and sociocultural challenges that often accompany POU/POE implementation. Accordingly, this Report:

- Documents the current state of POU/POE usage in California
- Catalogs stakeholder input on POU/POE
- Shares project case studies
- Identifies opportunities and challenges
- Develops recommendations
- Proposes pilot studies to better inform the successful implementation of POU/POE

This Report will be shared through a public webinar and posted on the State Water Board's website to assist in statewide education on POU/POE issues and to further enhance collaboration with PWSs, local agencies, counties, community partners, manufacturers, and other stakeholders. Using the results of this Report, the State Water Board also intends to develop additional web-based education and materials to support continued education.

Given the large number of proposed POU/POE treatment units forecasted for use in California, this Report also evaluates equity factors in the distribution and use of POU/POE devices across the state. This equity component is particularly important because it is generally recognizes that POU/POE is a less sustainable water treatment alternative and should typically only be utilized where other options have been exhausted and are not economically or technically feasible. Therefore, the State Water Board seeks to ensure that programmatic decisions regarding the use and funding of POU/POE devices in California foster environmental justice rather than unintentionally exacerbate existing socio-economic and racial inequities.

In the 2022 Drinking Water Needs Assessment, six contaminants were identified as the top contaminants contributing to higher risk designations in domestic wells and state small water systems, including nitrate, arsenic, 1,2,3-trichloropropane (TCP), gross alpha, uranium, and hexavalent chromium. As new tools become available, including the 2022 Aquifer Risk Map<sup>5</sup>, a more comprehensive picture emerges that outlines the density of domestic wells in relation to contaminants present in drinking water sources. This tool will likely assist collaborators, including state and local agencies, environmental justice groups, and technical assistance providers in prioritizing resources and efforts to support vulnerable populations with drinking water solutions.

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<sup>4</sup> [State of CA FY 2021-22 Fund Expenditure Plan](https://www.waterboards.ca.gov/water_issues/programs/grants_loans/sustainable_water_solutions/docs/2021/final_2021-22_sadwfep.pdf)

[https://www.waterboards.ca.gov/water\\_issues/programs/grants\\_loans/sustainable\\_water\\_solutions/docs/2021/final\\_2021-22\\_sadwfep.pdf](https://www.waterboards.ca.gov/water_issues/programs/grants_loans/sustainable_water_solutions/docs/2021/final_2021-22_sadwfep.pdf)

<sup>5</sup> [2022 Aquifer Risk Map \(ca.gov\)](https://gispublic.waterboards.ca.gov/portal/apps/webappviewer/index.html?id=17825b2b791d4004b547d316af7ac5cb)

<https://gispublic.waterboards.ca.gov/portal/apps/webappviewer/index.html?id=17825b2b791d4004b547d316af7ac5cb>

There are currently 122 public water systems currently permitted to use or proposing to use POU/POE treatment. This includes community (C), non-transient noncommunity (NTNC), and transient noncommunity (TNC) classifications, shown in Table 1.

*Table 1: Estimated Systems to Implement POU/POE*

<b>System Type</b>	<b># of Systems Evaluated</b>	<b>POU/ POE</b>
<b>HR2W list</b>	305	106 (35%)
<b>At-Risk SSWS</b>	455	303 (67%)
<b>At-Risk Domestic Well</b>	62,607	36,911 <sup>6</sup> (59%)

The State Water Board estimates approximately 64% of public water systems currently utilizing or proposing to meet compliance through POU/POE treatment devices provide water to a DAC or SDAC community. Furthermore, 58% of California public water systems currently utilizing or proposing to meet compliance through POE/POU treatment serve water to homes where the primary race is Hispanic.

The State Water Board conducted four stakeholder outreach sessions to contribute to this report. The four sessions were split into technical assistance providers, local government, community-based organizations, and the water industry. Challenges to implementing successful POU/POE programs highlighted in the stakeholder outreach sessions were:

Technical Assistance Providers

- A loss of community confidence if treatment devices fail
- Property value decreases related to water contamination
- Financial assistance is key to maintaining devices
- Lack of master template contract for operations
- Coping with bacteriologically contaminated sources

Local Government and Agencies

- Difficulty to get customers/homeowners, regulatory authorities, service providers (operators, samplers, laboratories, manufacturers), funding sources, etc. to cooperate
- Customer confidence
- Cumbersome processes
- Third-party assistance difficulties
- Variable water quality within a community
- Compliance reporting hurdles

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<sup>6</sup> Nitrate modeled above 25 mg/L as N in 1,216 domestic wells and 15 SSWS. POU treatment is not a viable option if the nitrate concentration is this high. Water quality samples should be collected to determine which sources are above this threshold. POU treatment has been budgeted as the modeled solution.

## Community-Based Organizations

- Consistent engagement
- Ongoing treated water testing
- Better specific language and communication
- Build trust and confidence in impacted communities

## Water Industry and Manufacturers

- Lack of customer access to identify appropriate devices
- Lack of certifications available for PFAS compounds, 1,2,3-TCP, hexavalent chromium, uranium for POE devices, and problematic bacteriological water quality
- Lack of NSF/ANSI 53 Drinking Water Treatment Units – Health effects, compliant POE media, and concerns about device failure
- Funding for use of POU/POE units should be expedited

Equity and environmental justice are of concern in implementing POU/POE treatment in California. The State Water Board seeks to ensure that low-income communities and people of color are not disproportionately provided POU/POE treatment instead of more robust solutions. The State Water Board, environmental justice groups, and community partners have all expressed the desire to see POU/POE treatment in California utilized in an equitable and just way.

The State Water Board recognizes that the following challenges impact residents accessing safe water through POU/POE devices: 1) the presence of untreated water in the home, 2) shifting responsibility to residents, 3) reliability of POU/POE units, 4) performance indication devices and failure alarms, 5) wastewater production, and 6) community trust. These challenges may have additional burdens on disadvantaged communities and residents with language barriers.

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## PUBLIC WATER SYSTEM CHALLENGES

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### Engineering Firm Experience

Assistance from an engineering firm is often required for small water systems implementing POU/POE treatment. A professional engineer may complete a study demonstrating that centralized treatment is not economically feasible, recommend appropriate POU/POE treatment units, prepare a pilot study protocol, oversee the pilot study, prepare the report, conduct the customer survey, and prepare permit application documents.

### Coordinating Professional Services

Installation and maintenance require an operator to coordinate professional services. Master contracts to encompass all POU/POE services may offer a more coordinated and streamlined approach.

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## STATE SMALL WATER SYSTEM AND SELF-SUPPLIED CHALLENGES

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### Assessment of Water Quality at Private Homes

The State Water Boards' 2021 Drinking Water Needs Assessment outlines the water quality risk assessment methodology estimated at 77,973 domestic wells and 611 State Small Water Systems in California in the high-risk category. The state-wide characterization approximates the risk and assists tremendously with identifying potentially vulnerable regions in the State. However, water quality specific to a source is imperative to making informed treatment decisions.

### Assessment of Treatment Needs at Private Homes

There can be constituents present in source water that may affect the overall treatment approach. The type of contaminant and overall water quality determines structured treatment approaches. The large number and individuality of each water source require enormous resources to properly assess individual needs.

### Lack of Programs/Resources in Place

The State Water Board has made funding available to Counties and Regional partners to implement programs to address water shortage and address water quality issues for private wells and self-supplied households. Few Counties and NGOs (less than 25% of the State) have expressed interest, received funding, and are currently implementing these programs.

### Better Support and Guidance to Residents/Counties/TA Providers

Because many private wells potentially benefit from a POU/POE solution, an in-depth water quality analysis is less viable than a public water system application. The State Water Board should work with partners to develop and make available best practices and guidance on POU/POE implementation.

### Initial and On-going Sampling

Each private well and/or self-supplied household requires initial sampling to understand water quality. Ongoing water quality sampling is required to ensure POU/POE devices are functioning well and removing contaminants as expected.

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## RECOMMENDATIONS

Based on the identified deficiencies, this report recommends the following pilot studies to gather information and experience to inform gaps in the implementation of POU/POE as a drinking water solution.

1. **Educational Strategy and Materials** – Develop a strategy and materials to better educate individuals and implementation partners on POU/POE treatment, in multiple languages. Because greater individual involvement is needed for success, a broad educational and marketing strategy is needed, along with the associated resources to fund it.



2. **Performance Certification** – Establish performance certifications in conjunction with NSF/ANSI for 1,2,3-TCP, hexavalent chromium, uranium, and high concentrations of nitrate applicable for POU and/or POE devices.
3. **POU/POE Operator Education Cohort and Workforce Development** – Launch an educational curriculum and program for individuals to effectively implement POU/POE treatment in impacted communities. Provide a salary or stipend for these individuals to participate in the program and develop needed skills. The purpose would be to create job opportunities and develop the skills necessary for community outreach, trust building, installation, technical aspects, and operation and maintenance. This program would operate primarily in low-income areas where POU/POE treatment usage is likely to be significant.
4. **Bacteriological Contamination in Domestic Wells** - Pilot UV disinfection and/or other disinfection technology in combination with POU/POE treatment at residences that use domestic wells and individual surface water intakes. Gather data to determine real-world pathogen reduction and best practices for implementation of POU/POE treatment. Determine limitations, if any, that may be due to raw water quality problems that prevent the ability to produce a safe supply.
5. **POU/POE installations using Smart Technology** – Pilot POU/POE treatment devices equipped with smart technology to demonstrate their efficacy and ease of use. Smart technology should allow for continuous performance monitoring and less intrusive O&M. Gather data on real-time device performance, optimize O&M costs and practices, and if it results in an increase in individual and community trust.
6. **POU vs. POE** - Determine if POE usage at individual homes is superior to POU treatment when analyzing ease of installation, resident perception, ease of operation and maintenance, ease of access, and treatment effectiveness. The focus of these pilots should be to ensure equitable access to water that meets drinking water standards to enhance the public health of residences across all racial and socioeconomic communities where these devices are used.