2022

DRINKING WATER
NEEDS ASSESSMENT
DROUGHT INFRASTRUCTURE COST ASSESSMENT

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

Full report:
https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/needs/2022needsassessment.pdf

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Acknowledgements

Contributors

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DEFINITION OF TERMS

This report includes the following defined terms.

"**Affordability Threshold**" means the level, point, or value that delineates if a water system's residential customer charges, designed to ensure the water systems can provide drinking water that meets state and federal standards, are unaffordable. For the purposes of the 2022 Affordability Assessment, the State Water Board employed affordability thresholds for the following indicators: Percent Median Household Income; Extreme Water Bill; Percent Residential Arrearages; and Residential Arrearage Burden. Learn more about current and future indicators and affordability thresholds in Appendix E.

"**Adequate supply**" means sufficient water to meet residents' health and safety needs at all times. (Health & Saf. Code, § 116681, subd. (a).)

"**Administrator**" means an individual, corporation, company, association, partnership, limited liability company, municipality, public utility, or other public body or institution which the State Water Board has determined is competent to perform the administrative, technical, operational, legal, or managerial services required for purposes of Health and Safety Code section 116686, pursuant to the Administrator Policy Handbook adopted by the State Water Board. (Health & Saf. Code, §§ 116275, subd. (g), 116686, subd. (m)(1).)

"**Affordability Assessment"** means the identification of any community water system that serves a disadvantaged community that must charge fees that exceed the affordability threshold established by the State Water Board in order to supply, treat, and distribute potable water that complies with federal and state drinking water standards. The Affordability Assessment evaluates several different affordability indicators to identify communities that may be experiencing affordability challenges. (Health & Saf. Code, § 116769, subd. (2)(B).

"**Arrearage**" means debt accrued by a water system's customers for failure to pay their water service bill(s) that are at least 60 days or more past due.

"**At-Risk public water systems**" or "**At-Risk PWS**" means community water systems with up to 30,000 service connections or 100,000 population served and K-12 schools that are at risk of failing to meet one or more key Human Right to Water goals: (1) providing safe drinking water; (2) accessible drinking water; (3) affordable drinking water; and/or (4) maintaining a sustainable water system.

"**At-Risk state small water systems and domestic wells**" or "**At-Risk SSWS and domestic wells**" means state small water systems and domestic wells that are located in areas where groundwater is at high-risk of containing contaminants that exceed safe drinking water standards. This definition may be expanded in future iterations of the Needs Assessment as more data on domestic wells and state small water systems becomes available.

"**California Native American Tribe**" means federally recognized California Native American Tribes, and non-federally recognized Native American Tribes on the contact list maintained by the Native American Heritage Commission for the purposes of Chapter 905 of the Statutes of 2004. (Health & Saf. Code, § 116766, subd. (c)(1).) Typically, drinking water systems for

federally recognized tribes fall under the regulatory jurisdiction of the United States Environmental Protection Agency (U.S. EPA), while public water systems operated by non-federally recognized tribes currently fall under the jurisdiction of the State Water Board.

"**Capital costs**" means the costs associated with the acquisition, construction, and development of water system infrastructure. These costs may include the cost of infrastructure (treatment solutions, consolidation, etc.), design and engineering costs, environmental compliance costs, construction management fees, general contractor fees, etc. Full details of the capital costs considered and utilized in the Needs Assessment are in Appendix C.

"**Community water system**" or **CWS**" means a public water system that serves at least 15 service connections used by yearlong residents or regularly serves at least 25 yearlong residents of the area served by the system. (Health & Saf. Code, § 116275, subd. (i).)

"**Consistently fail**" means a failure to provide an adequate supply of safe drinking water. (Health & Saf. Code, § 116681, subd. (c).)

"**Consolidation**" means joining two or more public water systems, state small water systems, or affected residences into a single public water system, either physically or managerially. For the purposes of this document, consolidations may include voluntary or mandatory consolidations. (Health & Saf. Code, § 116681, subd. (e).)

"**Constituents of emerging concern**" means synthetic or naturally occurring chemicals or material that have been detected in water bodies, that cause public health impacts, and are not regulated under current primary or secondary maximum contaminant level (MCL). For purposes of the 2022 Risk Assessment, three chemicals: hexavalent chromium, 1,4-dioxane, and per- and polyfluoroalkyl substances (PFAS), were incorporated.

"**Contaminant**" means any physical, chemical, biological, or radiological substance or matter in water. (Health & Saf. Code, § 116275, subd. (a).)

"**Cost Assessment**" means the estimation of funding needed for the Safe and Affordable Drinking Water Fund for the next fiscal year based on the amount available in the fund, anticipated funding needs, and other existing State Water Board funding sources. Thus, the Cost Assessment estimates the costs related to the implementation of interim and/or emergency measures and longer-term solutions for HR2W list systems and At-Risk public water systems, state small water systems, and domestic wells. The Cost Assessment also includes the identification of available funding sources and the funding and financing gaps that may exist to support interim and long-term solutions. (Health & Saf. Code, § 116769.)

"**Disadvantaged community**" or "**DAC**" means the entire service area of a community water system, or a community therein, in which the median household income is less than 80% of the statewide annual median household income level. (Health & Saf. Code, § 116275, subd. (aa).)

"**Domestic well**" means a groundwater well used to supply water for the domestic needs of an individual residence or a water system that is not a public water system and that has no more than four service connections. (Health & Saf. Code, § 116681, subd. (g).)

“**Drinking Water Needs Assessment”** or “**Needs Assessment**” means the comprehensive identification of California drinking water needs. The Needs Assessment consist of three core components: the Affordability Assessment, Risk Assessment, and Cost Assessment. The results of the Needs Assessment inform the State Water Board’s annual Fund Expenditure Plan for the Safe and Affordable Drinking Water Fund and the broader activities of the SAFER Program. (Health & Saf. Code, § 116769.)

“**Electronic Annual Report**” or “**EAR**” means is a survey of public water systems, currently required annually, to collect critical water system information intended to assess the status of compliance with specific regulatory requirements, provides updated contact and inventory information (such as population and number of service connections), and provides information that is used to assess the financial capacity of water systems, among other information reported.

“**Fire flow**” it is the amount of water designated to be used for firefighting purposes.

“**Fund Expenditure Plan**” or “**FEP**” means the plan that the State Water Board develops pursuant to Article 4 of Chapter 4.6 of the Health and Safety Code for the Safe and Affordable Drinking Water Fund, established pursuant to Health and Safety Code section 116766.

“**Human consumption**” means the use of water for drinking, bathing or showering, hand washing, oral hygiene, or cooking, including, but not limited to, preparing food and washing dishes. (Health & Saf. Code, § 116275, subd. (e).)

*“***Human Right to Water**” or “**HR2W***”* means the recognition that “every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking and sanitary purposes,” as defined in Assembly Bill 685 (AB 685). (California Water Code § 106.3, subd. (a).)

“**Human Right to Water list**” or “**Failing: HR2W list**” means the list of public water systems that are out of compliance or consistently fail to meet primary drinking water standards. Systems that are assessed for meeting the HR2W list criteria include Community Water Systems and Non-Community Water Systems that serve K-12 schools and daycares. The HR2W list criteria were expanded in April 2021 to better align with statutory definitions of what it means for a water system to “consistently fail” to meet primary drinking water standards. (Health & Saf. Code, § 116275(c).)

“Intertie” means an interconnection allowing the passage of water between two or more water systems.

“**Local Primacy Agency**” or “**LPA**” means a local health officer within a county to whom the State Water Board has delegated primary responsibility for the administration and enforcement of California Safe Drinking Water Act. LPA is authorized by means of a local primacy delegation agreement if the local health officer demonstrates that it has the capability to meet the local primacy program requirements established by the State Water Board pursuant to subdivision (h) of Health and Safety Code section 116375. (Health & Saf. Code, § 116330, subd. (a).)

“**Maximum Contaminant Level**” or “**MCL**” means the maximum permissible level of a contaminant in water. (Health & Saf. Code, § 116275, subd. (f).)

“**Median household income**” or “**MHI**” means the household income that represents the median or middle value for the community. The methods utilized for calculating median household income are included in Appendix A and Appendix E. Median household incomes in this document are estimated values for the purposes of this statewide assessment. Median household income for determination of funding eligibility is completed on a system-by-system basis by the State Water Board’s Division of Financial Assistance.

“**Medium Community Water Systems”** means water systems that served up to 30,000 service connections or 100,000 population served.

“**Non-Community Water System**” means a public water system that is not a community water system. (Health & Saf. Code, § 116275, subd. (j).)

“**Non-transient Non-Community Water System**” means a public water system that is not a community water system and that regularly serves at least 25 of the same persons for six months or more during a given year, such as a school. (Health & Saf. Code, § 116275, subd. (k).)

“**Operations and maintenance**” or “**O&M**” means the functions, duties and labor associated with the daily operations and normal repairs, replacement of parts and structural components, and other activities needed by a water system to preserve its capital assets so that they can continue to provide safe drinking water.

“**Point-of-use**” or **“POU**” means a water treatment device that treats water at the location of the back-end customer.

“**Point-of-entry**” **or “POE**” means a water treatment device that is located at the inlet to an entire building or facility.

“**Potentially At-Risk**” means community water systems with 30,000 service connections or less, or population served up to 100,000 and K-12 schools that are potentially at-risk of failing to meet one or more key Human Right to Water goals: (1) providing safe drinking water; (2) accessible drinking water; (3) affordable drinking water; and/or (4) maintaining a sustainable water system.

“**Primary drinking water standard**” means: (1) Maximum levels of contaminants that, in the judgment of the state board, may have an adverse effect on the health of persons. (2) Specific treatment techniques adopted by the state board in lieu of maximum contaminant levels pursuant to Health & Saf. Code, section 116365, subd. (j). and (3) The monitoring and reporting requirements as specified in regulations adopted by the state board that pertain to maximum contaminant levels. (Health & Saf. Code, § 116275, subd. (c).)

“**Public water system**” or “**PWS**” means a system for the provision to the public of water for human consumption through pipes or other constructed conveyances that has 15 or more service connections or regularly serves at least 25 individuals daily at least 60 days out of the year. A PWS includes any collection, pre-treatment, treatment, storage, and distribution

facilities under control of the operator of the system that are used primarily in connection with the system; any collection or pretreatment storage facilities not under the control of the operator that are used primarily in connection with the system; and any water system that treats water on behalf of one or more public water systems for the purpose of rendering it safe for human consumption. (Health & Saf. Code, § 116275, subd. (h).)

"**Resident**" means a person who physically occupies, whether by ownership, rental, lease, or other means, the same dwelling for at least 60 days of the year. (Health & Saf. Code, § 116275, subd. (t).)

"**Risk Assessment**" means the identification of public water systems, with a focus on community water systems and K-12 schools, that may be at risk of failing to provide an adequate supply of safe drinking water. It also includes an estimate of the number of households that are served by domestic wells or state small water systems in areas that are at high risk for groundwater contamination. Different Risk Assessment methodologies have been developed for different system types: (1) public water systems; (2) state small water systems and domestic wells; and (3) tribal water systems. (Health & Saf. Code, § 116769)

"**Risk indicator**" means the quantifiable measurements of key data points that allow the State Water Board to assess the potential for a community water system or a transient non-community water system that serves a K-12 school to fail to sustainably provide an adequate supply of safe drinking water due to water quality, water accessibility, affordability, institutional, and/or TMF capacity issues.

"**Risk threshold**" means the levels, points, or values associated with an individual risk indicator that delineates when a water system is more at-risk of failing, typically based on regulatory requirements or industry standards.

"**Sanitary survey**" means a comprehensive inspection to evaluate water system potency to provide safe drinking water to their customers and to ensure compliance with the federal Safe Drinking Water Act (SDWA).

"Sounder" means a tool used to measure groundwater depth in a well.

"**Significant Deficiencies"** means identified deficiencies by State Water Board staff or LPA staff during a Sanitary Survey and other water system inspections. Significant Deficiencies include, but are not limited to, defects in the design, operation, or maintenance, or a failure or malfunction of the sources, treatment, storage, or distribution system that U.S. EPA determines to be causing or have the potential for causing the introduction of contamination into the water delivered to consumers.

"**Safe and Affordable Drinking Water Fund**" or "**SADWF**" means the fund created through the passage of Senate Bill 200 (SB 200) to help provide an adequate and affordable supply of drinking water for both the near and long terms. SB 200 requires the annual transfer of 5 percent of the annual proceeds of the Greenhouse Gas Reduction Fund (GGRF) (up to $130 million) into the Fund until June 30, 2030. (Health & Saf. Code, § 116766)

"**Safe and Affordable Funding for Equity and Resilience Program**" or "**SAFER Program**" means a set of State Water Board tools, funding sources, and regulatory authorities designed

to meet the goals of ensuring safe, accessible, and affordable drinking water for all Californians.

"**SAFER Clearinghouse**" means a database system, developed and maintained by the State Water Board to assist with the implementation, management, and tracking of the SAFER Program.

"**Safe drinking water**" means water that meets all primary and secondary drinking water standards, as defined in Health and Safety Code section 116275.

"**Score**" means a standardized numerical value that is scaled between 0 and 1 for risk points across risk indicators. Standardized scores enable the evaluation and comparison of risk indicators.

"**Secondary drinking water standards**" means standards that specify maximum contaminant levels that, in the judgment of the State Water Board, are necessary to protect the public welfare. Secondary drinking water standards may apply to any contaminant in drinking water that may adversely affect the public welfare. Regulations establishing secondary drinking water standards may vary according to geographic and other circumstances and may apply to any contaminant in drinking water that adversely affects the taste, odor, or appearance of the water when the standards are necessary to ensure a supply of pure, wholesome, and potable water. (Health & Saf. Code, § 116275, subd. (d).)

"**Service connection**" means the point of connection between the customer's piping or constructed conveyance, and the water system's meter, service pipe, or constructed conveyance, with certain exceptions set out in the definition in the Health and Safety Code. (See Health & Saf. Code, § 116275, subd. (s).)

"**Senate Bill No. 200**" means a legislative law that enabled the State Water Board to establish the Safe and Affordable Funding for Equity and Resilience (SAFER) Program to advance the goals of the Human Right to Water. (Senate Bill No. 200, CHAPTER 120)

"Senate Bill No. 552" means a legislative law that requires small water suppliers and non-transient non-community water systems, to apply draught resiliency measures subject to funding availability. (Senate Bill No. 552, CHAPTER 245)

"**Severely disadvantaged community**" or "**SDAC**" means the entire service area of a community water system in which the MHI is less than 60% of the statewide median household income. (See Water Code § 13476, subd. (j))

"**Source capacity**" means the total amount of water supply available, expressed as a flow, from all active sources permitted for use by the water system, including approved surface water, groundwater, and purchased water. (Title 22 of the California Code of Regulations, § 64551.40.)

"**Small community water system**" means a CWS that serves no more than 3,300 service connections or a yearlong population of no more than 10,000 persons. (Health & Saf. Code, § 116275, subd. (z).)

“**Small disadvantaged community**” or “**small DAC**” or “**SDAC**” means the entire service area, or a community therein, of a community water system that serves no more than 3,300 service connections or a year-round population of no more than 10,000 in which the median household income is less than 80% of the statewide annual median household income.

“**State small water system**” or “**SSWS**” means a system for the provision of piped water to the public for human consumption that serves at least five, but not more than 14, service connections and does not regularly serve drinking water to more than an average of 25 individuals daily for more than 60 days out of the year. (Health & Saf. Code, § 116275, subd. (n).)

“**State Water Board**” means the State Water Resources Control Board.

“Static well level” means the resting state of the water level in a well under normal, no pumping conditions.

“**Technical, Managerial and Financial capacity**” or “**TMF capacity**” means the ability of a water system to plan for, achieve, and maintain long term compliance with drinking water standards, thereby ensuring the quality and adequacy of the water supply. This includes adequate resources for fiscal planning and management of the water system.

“**Waterworks Standards**” means regulations adopted by the State Water Board entitled “California Waterworks Standards” (Chapter 16 (commencing with § 64551) of Division 4 of Title 22 of the California Code of Regulations). (Health & Saf. Code, § 116275, subd. (q).)

“**Weight**” means the application of a multiplying value or weight to each risk indicator and risk category within the Risk Assessment, as certain risk indicators and categories may be deemed more critical than others.

DROUGHT INFRASTRUCTURE COST ASSESSMENT RESULTS

OVERVIEW

In 2021, the State Water Board conducted a Cost Assessment to estimate the cost of implementing interim and long-term solutions for Failing: HR2W list systems, At-Risk public water systems, state small water systems, and domestic wells. Due to minor changes to the number of Failing: HR2W and At-Risk systems in 2022, the State Water Board has not updated the Cost Assessment estimates this year. However, in September 2021 the Governor approved Senate Bill (SB) 552[1] which requires small water systems (15 – 2,999 connections) and K-12 schools to meet new drought infrastructure resiliency measures. In response to stakeholder feedback for better drought-related cost estimates and the need to support SB 552 planning, the State Water Board has conducted a targeted Drought Infrastructure Cost Assessment for the 2022 Needs Assessment.

The State Water Board will be updating the full Cost Assessment for Failing: HR2W list and At-Risk public water systems, state small water systems, and domestic wells in the 2023 Needs Assessment. The State Water Board will also be refining future iterations of the Cost Assessment model to incorporate the cost assumptions employed in the Drought Infrastructure Cost Assessment to better estimate long-term solutions.

SB 552 REQUIREMENTS

On September 23, 2021, the California legislature passed Senate Bill 552[2] (SB 552) to support planning and implementation of drought resiliency measures by counties and small water systems. SB 552 has four main resiliency areas:

[1] Senate Bill No. 552, section 10609.62, Chapter 245
https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=202120220SB552

[2] Senate Bill No. 552
https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202120220SB552

- Implementation of water shortage contingency plans,
- Implement resiliency infrastructure for small community water systems and K-12 schools that are non-community water systems,
- County planning requirements for domestic wells and state small water systems, and
- State Water Board and Department of Water Resource Tool development and coordination activities.

Under the infrastructure resiliency implementation, SB 552 specifically requires small water suppliers, defined as community water systems (CWS) serving 15 to 2,999 service connections and non-transient, non-community water systems that are K-12 schools, to implement the following drought resiliency measures, subject to funding availability:

1. **No later than January 1, 2023, implement monitoring systems sufficient to detect production well groundwater levels:** Drought and other weather-related conditions can influence well water levels. It is important to monitor and measure well water levels regularly to identify and diagnose well capacity issues before they result in a water outage or pump damage. There are many ways to measure static well levels. Systems may use electric sounders, an electric depth gauge, wetted tape, an airline method, etc.

2. **Beginning no later than January 1, 2023, maintain membership in the California Water/Wastewater Agency Response Network (CalWARN)[3] or similar mutual aid organization:** Mutual aid organizations, like CalWARN, usually provide assistance to water suppliers by responding and preparing for an emergency disaster. Failure to have mutual aid agreements prior to an emergency may make it difficult to obtain reimbursement for some types of emergency response activities. CalWARN membership is provided at no cost and members benefit from a variety of services, such as:
    - A standard omnibus mutual assistance agreement and process for sharing emergency resources among signatories statewide.
    - The resources to respond and recover more quickly from a disaster.
    - A mutual assistance program consistent with other statewide mutual aid programs and the Standardized Emergency Management System (SEMS) and the National Incident Management System (NIMS).
    - A forum for developing and maintaining emergency contacts and relationships.
    - New ideas from lessons learned in disasters.

3. **No later than January 1, 2024, to ensure continuous operations during power failures, provide adequate backup electrical supply:** a reliable backup generator is required for any water system, without one, the system will be at risk of interrupted water supply for the customers during an unplanned power outage. Water suppliers need to be prepared for emergency power shutoffs by having a backup generator sized to fit their source capacity needs that is installed properly and maintained effectively.

[3] CalWARN Members Dashboard: https://www.calwarn.org/

4. **No later than January 1, 2027, have at least one backup source of water supply, or a water system intertie, that meets current water quality requirements and is sufficient to meet average daily demand:** Water systems dependent on a single source to meet their maximum day demand, need to have another source to provide emergency supply and ensure system redundancy during an emergency. Reliance on a single source to meet customer demand is an accessibility risk for a water system. The water system is at a higher risk of failure if their single source were to become contaminated, dry, collapses, or is taken out of service (i.e., for maintenance etc.).

5. **No later than January 1, 2032, meter each service connection and monitor for water loss due to leakages:** Metering service connections at individual households is an important drought mitigation measure because it allows a water system to monitor water usage, identify potential water loss (repair and replacement needs), and may also help customers reduce demand when needed.

6. **No later than January 1, 2032, have source system capacity, treatment system capacity if necessary, and distribution system capacity to meet fire flow requirements (*excluded from the Cost Assessment*)[4]:** An essential element to control and extinguish a fire is having an adequate water supply, storage capacity, and hydraulic pipeline network. A water system must explicitly consider fire flow requirements when sizing pipes, pumps, and storage tanks. For larger water systems, fire protection may have a marginal effect on sizing decisions, but for smaller water systems these requirements can correspond to a significant increase in the size of many essential water infrastructure components.[5]

KEY 2021 AND 2022 COST ASSESSMENT DIFFERENCES

Table 1 summarizes the important differences between the 2021 Cost Assessment and the 2022 Drought Infrastructure Cost Assessment. There are some overlapping cost estimates that span the two Cost Assessments; therefore, it is not advised for the 2022 Drought Cost Assessment results to be *added* to the 2021 Cost Assessment results. The 2022 Drought Infrastructure Cost Assessment results should be considered separately as a targeted cost estimate for SB 552 requirements. These estimates also do not include costs related to other non-infrastructure portions of SB 552, such as planning and technical assistance.

[4] Due to the lack of available and machine-readable asset inventory and local fire protection requirements, the State Water Board excluded this requirement from the analysis.

[5] AWWA Distribution System Requirements for Fire Protection: https://www.awwa.org/portals/0/files/publications/documents/m31lookinside.pdf

Table 1: Key 2021 and 2022 Cost Assessment Differences

	2021 Cost Assessment	2022 Drought Cost Assessment
Systems Included	• Failing: HR2W list systems • At-Risk public water systems • At-Risk state small water systems & domestic wells	• Small community water systems (15 to 2,999 connections) • K-12 schools[6]
Long-Term Cost Estimate Infrastructure/Activity	• Treatment • Physical consolidation • POU/POE[7] • Other Essential Infrastructure (OEI): storage tanks, new wells, well replacement, upgraded electrical, backup power, distribution replacement, additional meters, etc. • Technical assistance	• Monitor static well levels • Mutual aid participation • Backup electrical supply • Back-up source: new well or intertie • Meter all service connections • Excluded: Fire flow requirements
Interim Cost Estimate	• POU • POE • Bottled Water	• Excluded
20-Year Operation & Maintenance Costs	• Included	• Excluded

WATER SYSTEMS ASSESSED

The State Water Board used water system self-reported data from the 2020 Electronic Annual Report (EAR) and basic inventory information to determine which water systems are not currently meeting each SB 552 requirement. It is important to note that many of the datapoints utilized from the 2020 EAR were not required to be submitted by water systems. Therefore, data was missing for many water systems and several assumptions had to be made as to which systems may not be meeting SB 552 requirements. The data points, data sources, and assumptions made for the inventory of systems not meeting SB 552 requirements are detailed on Appendix C. The State Water Board is developing a strategy to collect the required data in the future to improve the identification of systems in need. Figure 1 summarizes the estimated

[6] Community and non-community K-12 schools are included.

[7] Point-of-use (POU) is a water treatment device that treats water at the location of the customer. Point-of-entry (POE) application is a water treatment device that is located at the inlet to an entire building or facility.

number of K-12 schools and small community water systems (15 – 2,999 service connections) that may not be meeting SB 552 requirements.

Figure 1: Estimated Number of Systems that Do Not Meet SB 552 Requirements

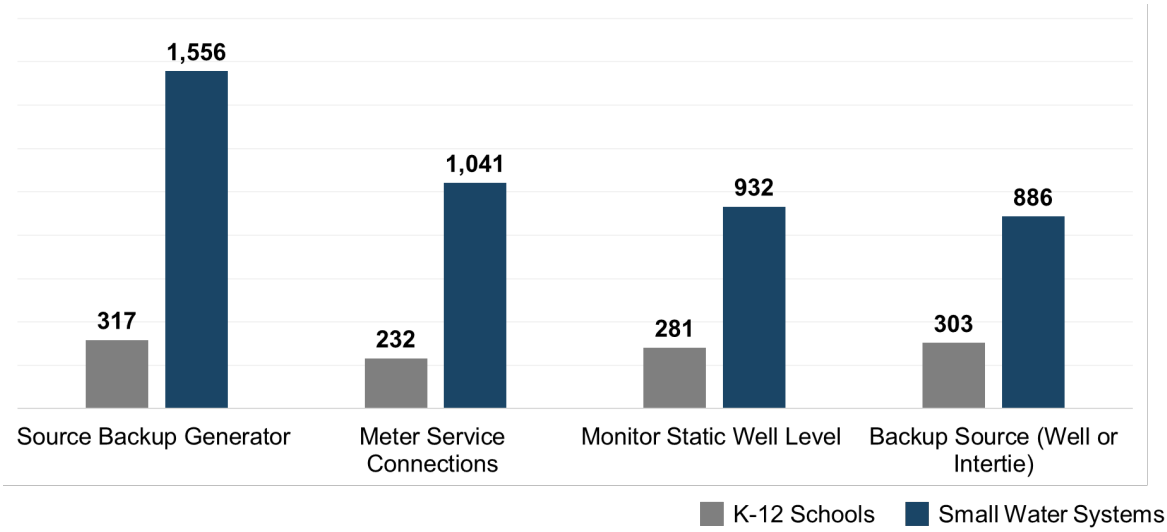


Table 2 summarizes the estimated number of unique systems not meeting SB 552 requirements by their SAFER and disadvantage community status. The analysis estimates there are 1,781 (68%) K-12 schools and small water systems not currently meeting all of the SB 552 requirements (excluding fire flow requirement).

Table 2: Number of K-12 & Small Systems Not Meeting SB 552 Requirements by SAFER Status

SAFER Program Status	Total Systems	Missing All Reqs.	Missing 3 Reqs.	Missing 2 Reqs.	Missing 1 Reqs.	Meeting All Reqs.
Failing: HR2W Systems	**309**	**55 (17%)**	**102 (33%)**	**73 (24%)**	**67 (22%)**	**12 (4%)**
DAC/SDAC	161	24	48	47	35	7
Not DAC/SDAC	83	11	25	20	23	4
Missing DAC Status	65	20	29	6	9	1
At-Risk Systems	**440**	**102 (23%)**	**125 (29%)**	**116 (26%)**	**75 (17%)**	**22 (5%)**
DAC/SDAC	240	50	62	65	47	16
Not DAC/SDAC	128	29	33	36	25	5
Missing DAC Status	72	23	30	15	3	1
Potentially At-Risk	**395**	**73 (18%)**	**118 (30%)**	**112 (28%)**	**81 (21%)**	**11 (3%)**
DAC/SDAC	214	41	57	66	42	8
Not DAC/SDAC	131	22	33	38	35	3
Missing DAC Status	50	10	28	8	4	0
Not At-Risk Systems	**1,490**	**141 (9%)**	**369 (25%)**	**462 (31%)**	**410 (28%)**	**108 (7%)**
DAC/SDAC	597	44	143	174	180	56
Not DAC/ SDAC	580	30	93	206	205	46
Missing DAC Status	313	67	133	82	25	6
TOTAL:	**2,634**	**371 (14%)**	**714 (27%)**	**763 (29%)**	**633 (24%)**	**153 (6%)**

ASSESSMENT COSTED SOLUTIONS & ADJUSTMENTS

COSTED SOLUTIONS PER SB 552 REQUIREMENT

The State Water Board utilized cost assumptions that were in the 2021 Cost Assessment and developed new cost assumptions as needed to conduct the Drought Infrastructure Cost Assessment. New cost data and information were collected from projects funded by the State Water Board as well as cost estimates from external manufacturing venders and consulting firms. Table 3 includes an overview of the infrastructure solutions and additional costs included in the cost estimate for each SB 552 requirement (excluding fire flow). Refer to Appendix C for a more detailed overview of the Drought Infrastructure Cost Assessment assumptions and calculation methodologies.

Table 3: Summary of Costed Solutions per SB 552 Requirement

Drought Requirement	Costed Solution
Monitor Static Well Levels	Sounder equipment
Membership CalWARN / Mutual Aid	None, membership is free
Back-up electrical supply	Emergency power source generator
Back-up source	New Well (For systems with a single source that is a well). Cost includes: • Well drilling • Well development • Well pump and motor • Electrical and SCADA • CEQA Or Intertie (For a system with a single source that is not an intertie). Cost includes: • Pipeline cost • Service line • Connection fees • Admin/legal/CEQA
Meter all service connections	• Meter cost • Software upgrades

The State Water Board conducted a cost assessment for all SB 552, Water Code section 10609.62, requirements except for the requirements for adequate fire flow capacity. The State Water Board does not have authority to develop or enforce requirements regarding fire flow.

Fire flow responsibility and jurisdiction falls to local fire officials. Thus, the State Water Board does not have a machine-readable asset inventory, asset condition data and local fire protection requirements, which would be necessary to develop a cost estimate. The State Water Board will contact the Office of the State Fire Marshall to develop collaborative approaches for determining appropriate fire protection requirements for future iterations of the Needs Assessment.

COST ESTIMATE ADJUSTMENTS

All cost estimates presented in the subsequent sections were adjusted to account for the following elements:

Inflation
To acknowledge the recent escalation in construction industry prices, and based on public feedback, the State Water Board factored in a 4.7% inflation rate which was applied to all costed requirements.

Regional Cost Adjustments
Cost estimates were regionally adjusted to account for varied construction and service costs across the state. Water systems in rural counties did not require a price adjustment; however, water systems in urban and suburban counties had a price multiplier of +32% and +30% subsequently applied to their cost estimates.

Other Adjustments
Many of the requirements needed a specific multiplier to account for additional associated costs. For example, a 5% multiplier was applied to backup generators to account for air pollution permitting fees; a 25% multiplier was applied to new wells and interties; and an additional 20% contingency multiplier was applied to intertie costs.

COST ESTIMATION LEVEL OF ACCURACY

It is important to note that the Drought Infrastructure Cost Assessment results summarized in the subsequent section correspond with a Class 5 Cost estimate as defined by Association for the Advancement of Cost Engineering (AACE) International[8]. Class 5 cost estimates are considered appropriate for screening level efforts, such as the Cost Assessment, and have a level of accuracy ranging from -20% to -50% on the low end and +30% to +100% on the high end. The full range of estimate is thus -50% to +100%. A Class 5 cost estimate is standard for screening construction project concepts. These costs are for budgetary purposes only. A more site specific and detailed assessment will be needed to refine the costs and select a local solution that is most appropriate.

For the recommended drought infrastructure measures, a point estimate is shown, however the reader will be able to view each value within the accuracy range. For example, if a cost of $100 is presented, the corresponding range of anticipated costs is $50 to $200. For more

[8] ACE International Recommended Practice No.17R-97 Cost estimate Classification System, TCM Framework: 7.3 -Cost Estimating and Budgeting, Rev. August 7, 2020.

information regarding cost assumptions and methodology see Appendix C.

DROUGHT COST ASSESSMENT RESULTS

STATEWIDE COST ESTIMATE

Table 4 and Figure 2 summarizes the Drought Infrastructure Cost Assessment results per SB 552 requirement. Local solutions and actual costs will vary from system to system and will depend on site-specific details. Therefore, the Cost Assessment should not be used to inform site-specific decisions but rather should be viewed as an informative statewide estimate of need. The full results of the Drought Infrastructure Cost Assessment are in Supplemental Attachment C1 available on the State Water Board's website.[9]

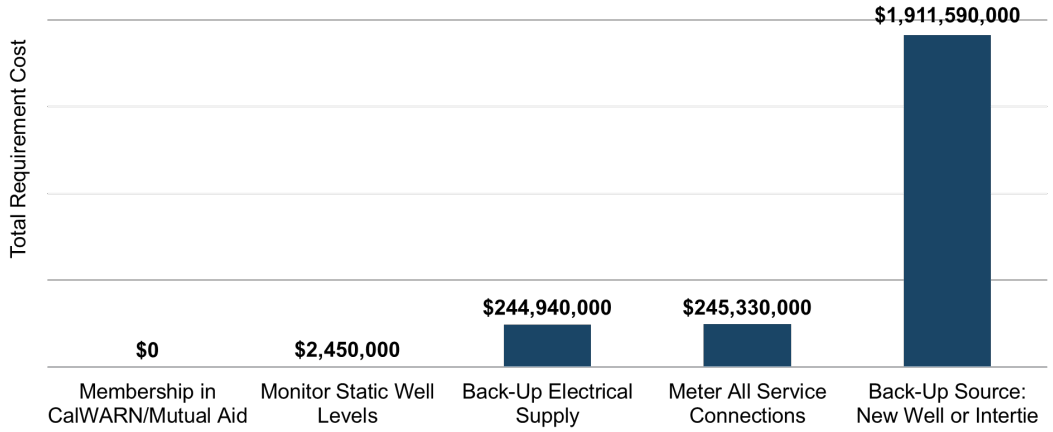
Table 4: Drought Cost Assessment Results for Small Water Systems

Drought Requirement	# Small CWS	Point Est. Total	Range Total in $ Millions
Monitor Static Well Levels	1,213 (46%)	$2,450,000	$1 M - $5 M
Membership CalWARN / Mutual Aid	2,634 (100%)[10]	$0	$0
Back-up electrical supply	1,872 (71%)	$244,940,000	$122 M - $490 M
Back-up source: new well	753 (29%)	$1,651,620,000	$826 M - $3,303 M
Back-up source: intertie	142 (5%)	$259,970,000	$130 M - $520 M
Meter all service connections	1,275 (48%)	$245,330,000	$123 M - $491 M
TOTAL:	**2,634**	**$2,404,320,000**	**$1,202 M - $4,809 M**

[9] Drought Infrastructure Cost Assessment Data and Results. Attachment C1. https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/needs/2022cost.xlsx

[10] Membership for CalWARN[10] is currently free, therefore no cost estimate was developed for this SB 552 requirement. The State Water Board is unable to determine how many community water systems are members of CalWARN or other mutual aid organizations currently. However, the State Water Board has included a new question in the 2021 EAR to begin collecting this information.

Figure 2: Cost Assessment Results for K-12 Schools & Small Water Systems



ESTIMATED AVERAGE COST PER CONNECTION

The cost per connection of a solution is an important consideration for state funding eligibility. Generally, the State Water Board can more easily fund grant projects for small, economically disadvantaged systems. The project funding range cap is often approximately $60,000 per connection, depending on the type of project. Table 5 summarizes the cost per connection for each SB 552 requirement. Water systems have been categorized by the number of connections they serve, from smaller to larger systems. This display of results illustrates the relatively higher per connection cost of bringing small systems into compliance, and thus the advantages of economies of scale.

Table 5: Average Cost by Number of Connections

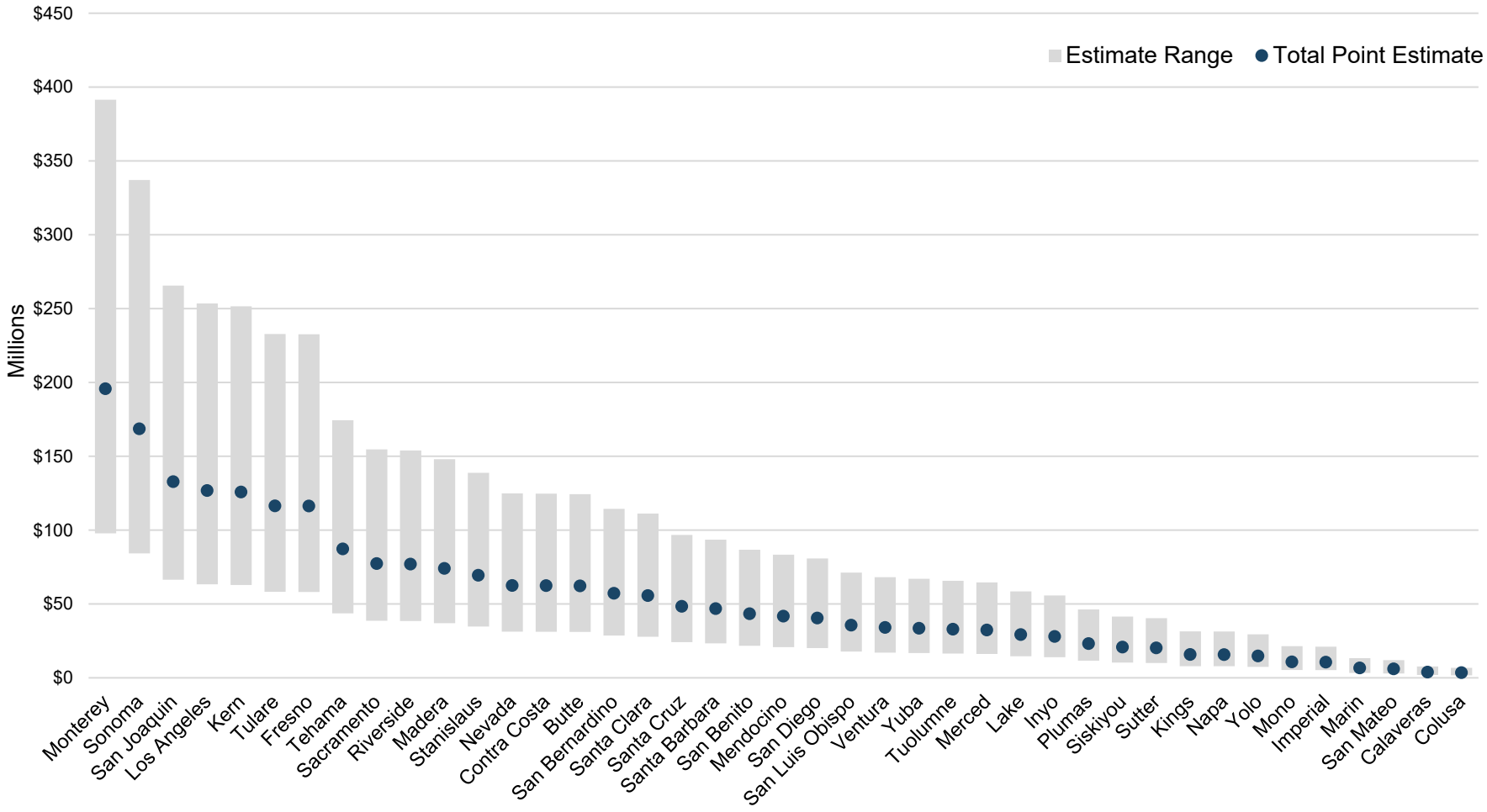
SB 552 Requirement	1 - 100	101 - 500	501 - 1,000	1,001 - 2,999
Number of Systems	**1,642**	**586**	**135**	**268**
Monitor static well levels	$314	$13	$3	$1
Membership CalWARN / Mutual Aid	$0	$0	$0	$0
Backup electrical supply	$8,620	$516	$370	$397
Back-up source: new well	$526,000[11]	$15,259	N/A	$1,817
Back-up source: intertie	$61,897	$15,701	$11,097	$10,425
Meter all service connections	$5,201	$1,366	$834	$914

[11] This high cost is driven by K-12 schools. Schools often have few service connections and when costs are spread out, it can drive up the cost per connection. The cost for small community water systems only, excluding K-12 schools for systems with 15 – 100 connections is $77,000.

ESTIMATED COST PER COUNTY

Figure 3 shows the total cost by County for small community water systems and schools not meeting SB 552 requirements. As illustrated, some counties have more systems struggling to comply with these drought requirements and thus have the highest costs. For example: Monterey County has the highest point estimate cost due to the high counts of systems in need and due to the implemented regional cost adjustments.

Figure 3: Total Estimated Costs by County for Small Community Water Systems and K-12 Schools



DROUGHT INFRASTRUCTURE COST ASSESSMENT LIMITATIONS

The cost estimates developed for the 2022 Needs Assessment have several limitations and opportunities for improvement in future iterations. The Drought Infrastructure Cost Assessment will thus not be used to inform site-specific decisions but rather give an informative analysis on a statewide basis.

Water System Data Availability & Accuracy
A lack of inventoried data on water system assets and their condition for small community water systems and K-12 schools, led to the application of general assumptions around replacement and/or upgrade needs. Many of the datapoints utilized to determine the inventory of water systems that may not be meeting SB 552 requirements were based on voluntary and incomplete responses to the 2020 Electronic Annual Report (EAR). For example, many systems did not indicate clearly if they monitor their static well levels or if they have back-up power. Furthermore, the cost estimate utilized an estimated maximum day demand rather than actual figures per water system. Production and delivery data collected in the 2020 EAR was not accurately reported and unusable. Some of the information about existing infrastructure and asset condition, water production, and use rates is recorded in system-level sanitary surveys but is not in a database where it can be obtained for aggregated purposes such as the Needs Assessment.

Cost Data Quality
Cost estimates are based on consultant estimates and vender quotes, rather than historical cost data, especially work funded by the State Water Board, which would incorporate prevailing wage and have other administrative costs. Currently, the State Water Board captures funding agreement costs in the aggregate, but costs are not captured at the granular detail needed to directly inform the modeling for the long-term component of the Cost Assessment. For example, land acquisition costs for new wells are difficult to identify in the current State Water Board data and for this reason, it was excluded from this cost assessment.

Fire Flow Data
The State Water Board conducted a cost assessment for all SB 552, section 10609.62, requirements except for the final requirement for fire flow. The State Water Board does not have authority to develop or enforce requirements regarding fire flow. Fire flow responsibility and jurisdiction falls to local fire officials. Thus, the State Water Board does not have machine-readable asset inventory, asset condition data and local fire protection requirements, which would be necessary to develop a cost estimate. The State Water Board recognizes the significant need for adequate fire flow for the protection of communities and public safety, particularly considering climate change impacts. The State Water Board will contact the Office of the State Fire Marshall to develop collaborative approaches for determining appropriate fire protection requirements, identify data collection needs and investigate funding alternatives for fire capacity.

Regional Cost Differences
Regional differences in California may have significant impacts on costs, e.g., the cost to replace a pipeline in a downtown portion of the Bay Area is significantly different than the cost to replace the same length of pipe in a rural Central Valley area. The baseline cost estimates obtained from the subcontractors for this analysis were more focused on rural areas. A

standard factor was utilized to attempt to correlate between urban and rural areas to the extent possible. However, those correlations were based on broad assumptions of land use in various counties. Review of future projects funded by the State Water Board's Division of Financial Assistance may allow for more detailed information in future iterations.

DROUGHT INFRASTRUCTURE COST ASSESSMENT REFINEMENT OPPORTUNITIES

Future iterations of the Cost Assessment for Failing: HR2W list and At-Risk systems will incorporate elements of the drought infrastructure cost methodology detailed here. The Cost Assessment methodology will evolve over time to incorporate additional and better-quality data; better approaches modeling potential solutions for At-Risk water systems and domestic wells; and further input from the State Water Board and public.

Asset Data Collection
The State Water Board will begin developing strategies for collecting additional data to improve both the accuracy of the identification of water systems not meeting SB 552 requirements and the total cost estimate for each requirement. For example, machine-readable asset inventory, asset condition data and local fire protection requirements are needed for the State Water Board to estimate fire flow requirement costs. Additionally, there are data points that have recently been voluntary reporting in the EAR (i.e., back-up power) that will be refined, and the questions will be mandatory in the future. Moreover, the State Water Board collects water production data from water systems through EAR, but many data quality issues related to inaccurate units of measure have been identified. The State Water Board will work on enhancing data collection accuracy to make this data usable in future iterations of the Cost Assessment.

Cost Data Collection
The State Water Board's Division of Financial Assistance has begun developing a strategy to capture more detailed cost data. Adjustments to State Water Board managed databases will be made to better capture project and technical assistance cost data, especially for State Water Board funded projects through the SAFER Program.

Water System Boundaries
Improvement of water system boundary data statewide will enhance the accuracy of the Cost Assessment's modeling of potential interties for systems in needs of a back-up source. The State Water Board is evaluating how to best enhance System Area Boundary Layer (SABL) Admin App to allow District Offices, Local Primacy Agencies, and public water system staff to upload and verify water system area boundaries Concurrently, State Water Board has developed a new SABL-Look up Application that will combine the SABL, other reference geographical information systems (GIS) layers and analysis tools, and water system data.

APPENDIX C:
DROUGHT INFRASTRUCTURE COST ASSESSMENT

INTRODUCTION

On September 23, 2021, the California legislature passed Senate Bill 552[12] which has requirements for counties and small water systems around drought planning activities. A key requirement of SB 522 is for small water suppliers, defined as community water system (CWS) serving 15 to 2,999 service connections and non-transient, non-community water systems that are K-12 schools, is to implement the following drought resiliency measures (subject to funding availability):

1. No later than January 1, 2023, implement **monitoring systems** sufficient to detect **production well groundwater levels**.
2. Beginning no later than January 1, 2023, **maintain membership in the California Water/Wastewater Agency Response Network (CalWARN)** or similar mutual aid organization.
3. No later than January 1, 2024, to ensure continuous operations during power failures, provide adequate **backup electrical supply**.
4. No later than January 1, 2027, have at least **one backup source** of water supply, **or a water system intertie**, that meets current water quality requirements and is sufficient to meet average daily demand.
5. No later than January 1, 2032, **meter each service connection** and monitor for water loss due to leakages.
6. No later than January 1, 2032, have source system capacity, treatment system capacity if necessary, and distribution system capacity to meet **fire flow** requirements.

In response to stakeholder feedback and the need to support SB 552 planning, the State Water Board has conducted a targeted Drought Cost Assessment for the 2022 Needs Assessment. The following sections detail the assessment's underlying assumptions and calculation methods. For the purpose of this Cost Assessment, small water systems are CWSs with 15 – 2,999 service connections.

For all requirements, excluding fire flow, K-12 schools and small CWS needs were assessed and matched to their SAFER status. For example: lacking a source backup power was estimated for 274 Failing: HR2W list systems, 387 At-Risk systems and 371 Potentially At-Risk systems.

[12] Senate Bill No. 552, section 10609.62, Chapter 245: https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=202120220SB552

REGIONAL COST ADJUSTMENT

The cost estimates were adjusted for regional cost variance using RSMeans City Cost Index (CCI).[13] The CCI was used to compare and adjust costs between locations. The California CCI shown in Table C1 were applied based on each system's location (Table C2).

Table C1: RSMeans CCI Selected for Locational Cost Estimating

Location	RSMeans CCI	Percent Adjustment
Rural	+ 3.0	0%
Suburban	+ 3.97	+ 32%
Urban	+ 3.89	+ 30%

Table C2: California Counties Categorized by Generalized Model Location

Generalized Model Location	Counties
Rural	Alpine, Amador, Butte, Calaveras, Colusa, Del Norte, Fresno, Glenn, Humboldt, Imperial, Inyo, Kern, Kings, Lake, Lassen, Madera, Mariposa, Mendocino, Merced, Modoc, Mono, Nevada, Placer, Plumas, San Joaquin, Shasta, Sierra, Siskiyou, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, Yuba
Suburban	Alameda, Contra Costa, El Dorado, Marin, Monterey, Napa, Orange, San Benito, San Bernardino, San Luis Obispo, Santa Barbara, Santa Cruz, Solano, Sonoma
Urban	Los Angeles, Riverside, Sacramento, San Diego, San Francisco, San Mateo, Santa Clara, Ventura

INFLATION COST ADJUSTMENT

Current inflation in the construction industry can be attributed to many factors: the increase in demand pulls, increasing raw material cost from suppliers, and rising wage cost in labor market.[14] The increase in inflation can drive-up construction project costs and should be considered when developing cost estimates. The State Water Board applied a 4.7%[15] inflation multiplier to all costed requirements to conservatively adjust for rising inflation.

[13] RSMeans City Cost Index: https://www.rsmeans.com/rsmeans-city-cost-index

[14] Impact of inflation rate on construction projects budget: A review: https://www.sciencedirect.com/science/article/pii/S2090447920300939

[15] Consumer Price Index Data for 2021: https://www.usinflationcalculator.com/inflation/consumer-price-index-and-annual-percent-changes-from-1913-to-2008/

COST ASSESSMENT METHOD PER REQUIREMENT

STATIC WELL LEVEL MONITORING

It is important to measure and monitor static well levels on a regular basis to diagnose well production or capacity issues before problems occur. The estimated inventory of systems that may require a sounder, which is a device that measures water levels without wellhead modifications, was identified based on water system responses to an optional question in the 2020 EAR, Section 5 (Source Inventory) regarding monitoring water level in wells. Water systems with wells that did not respond to this question or responded with "No" were assumed to lack equipment to be in compliance with this SB 552 requirements and were included in this cost estimate.

Cost Assumptions:

- Sounder cost estimate = $1,700[16]
- No well modification costs are assumed to be needed; the device uses sound waves to detect water level.[17]
- Total Cost = Sounder Cost + Regional Multiplier + 4.7% Total Cost Inflation

Table C3: K-12 Schools and Small CWS Monitor Well Level EAR Response by Count

2020 EAR Response	System Count	Failing: HR2W List Systems
No	866	115
Blank or NULL or N/A	347	38
Yes	1,020	136
TOTAL:	**2,233**	**289**

Table C4: K-12 Schools and Small CWS Sounder Cost

Service Connection Range	System Count	Estimated Cost ($)
< 500	1181	$2,390,000
500 - 1,000	13	$26,000
1,001 - 2,999	19	$37,000

[16] The base price is $1,245, the additional cost is shipping, handling and warranty. Eno Scientific Well Sounder 2010 PRO Water Level Meter: https://www.fondriest.com/eno-scientific-2010p.htm

[17] Well Sounder WS2010 Pro / WS2010 Pro User Manual: https://www.geotechenv.com/Manuals/Eno_Scientific_Manuals/Eno_Scientific_Well_Sounder_2010_User_Manual.pdf

[18] Responding to this question is voluntary in the EAR, so systems may choose to leave it "Blank", or if they did not complete the EAR survey a "NULL" response might populate. Other systems might mistakenly choose N/A, even though they have a well as one of their sources.

Service Connection Range	System Count	Estimated Cost ($)
TOTAL:	**1,213**	**$2,450,000**

MEMBERSHIP WITH CALWARN OR OTHER MUTUAL AID

Membership for CalWARN[19] is currently free, therefore no cost estimate was developed for this SB 552 requirement. The State Water Board is unable to determine how many CWSs are members of CalWARN or other mutual aid organizations currently. However, the State Water Board has included a new question in the 2021 to begin tracking this information.

BACKUP ELECTRICAL SUPPLY

To sustain operations during possible power outages, an onsite backup generator is necessary. The estimated inventory of systems requiring backup power was identified by analyzing 2020 EAR responses to a non-mandatory question in Section 16.A about source auxiliary power supply. Since responses to this question are limited, the State Water Board utilized all (none), (blank), (some) and (null) responses within this analysis. Table C5 summarizes the reported 2020 EAR responses for small CWSs and K-12 schools.

Table C5: Backup Power EAR Response by CWS Count

Response	K-12 Schools and Small CWS Count
None	1,018
Some	402
Blank	392
NULL	60
TOTAL:	**1,872**

Cost Assumptions:

- The cost for each system was identified based on their maximum day demand[20] (MDD), which is based on estimated average daily demand (ADD) of 150 gallon per day, served population, and a peaking factor of 2.25.
- Account for 5% permitting multiplier.

[19] CalWARN Website: https://www.calwarn.org/

[20] Maximum day demand definition in Title 22: “Maximum day demand (MDD) means the amount of water utilized by consumers during the highest day of use (midnight to midnight), excluding fire flow, as determined pursuant to Section 64554.

- The calculated MDD is then used in the equation below to calculate the cost per system.
- Total Cost Estimate ($)[21] = $30,134 + ($341 x MDD) + Regional Multiplier + 5% Total Cost Permitting + 4.7% Total Cost Inflation

Table C6 shows the cost of generators per systems size and the count of systems falling under each range size:

Table C6: K-12 Schools and Small CWS Generators Cost Per Service Connection Range

Connection Range	System Count	Estimated Cost ($)
< 500	1,639	$110,040,000
500 - 1,000	72	$19,510,000
1,001 - 2,999	161	$115,390,000
TOTAL:	**1,872**	**$244,940,000**

BACKUP SOURCE: NEW WELL OR INTERTIE

The estimated inventory of systems was determined by analyzing SDWIS data for the number of active sources per CWS. Any CWS with a single groundwater (well) water source was included in the cost estimate.

- Identified water systems with one active source.
- If a system's one active source is a well, they were included in the analysis.
- If the one active source is an intertie, the water system was excluded from the analysis due to lack of information on whether a new well is feasible in the water system's area.
- If a system's one active source is surface water, they were excluded from this cost estimate because no information is available to estimate water rights costs and availability.

The analysis first looked at the potential feasibility of an intertie. If an intertie is not potentially feasible, then a cost estimate for a new well was calculated.

[21] This equation was developed by Corona Environmental to estimate backup power cost in the 2021 Needs Assessment. https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/needs/2021_needs_assessment.pdf

Estimating New Intertie Costs

A spatial analysis was conducted to identify water systems where an intertie with a nearby water system may be feasible:

- Joining systems:[22] using the service area boundaries, a GIS layer was created based on the criteria: any CWS with a single source.
- Receiving systems: using the service area boundaries, a GIS layer was created based on the criteria: any CWS with 3,000 or more service connections.
- Identify joining systems that intersect a receiving system.
- Exclude any joining systems that already have an intertie as their only water source.

Cost Assumptions:[23]

- Buffer for intersects (added pipeline) = 1,000 ft
- Pipeline Cost per ft = $155
- Service line (system connection) =$5,000
- Connection fee ($/connection) = $6,600
- Admin/Legal $200,000
- Apply a 20% contingency = 20% of total cost estimate
- Apply 25% of total cost estimate for planning costs
- Total Cost Estimate = Pipeline cost + Service line cost + Connection fees + Admin/legal fees + 20% Total Cost Contingency + 25% Total Cost Planning + Regional Multiplier + 4.7% Total Cost inflation

Table C7: Estimated K-12 Schools and Small CWS Intertie Costs

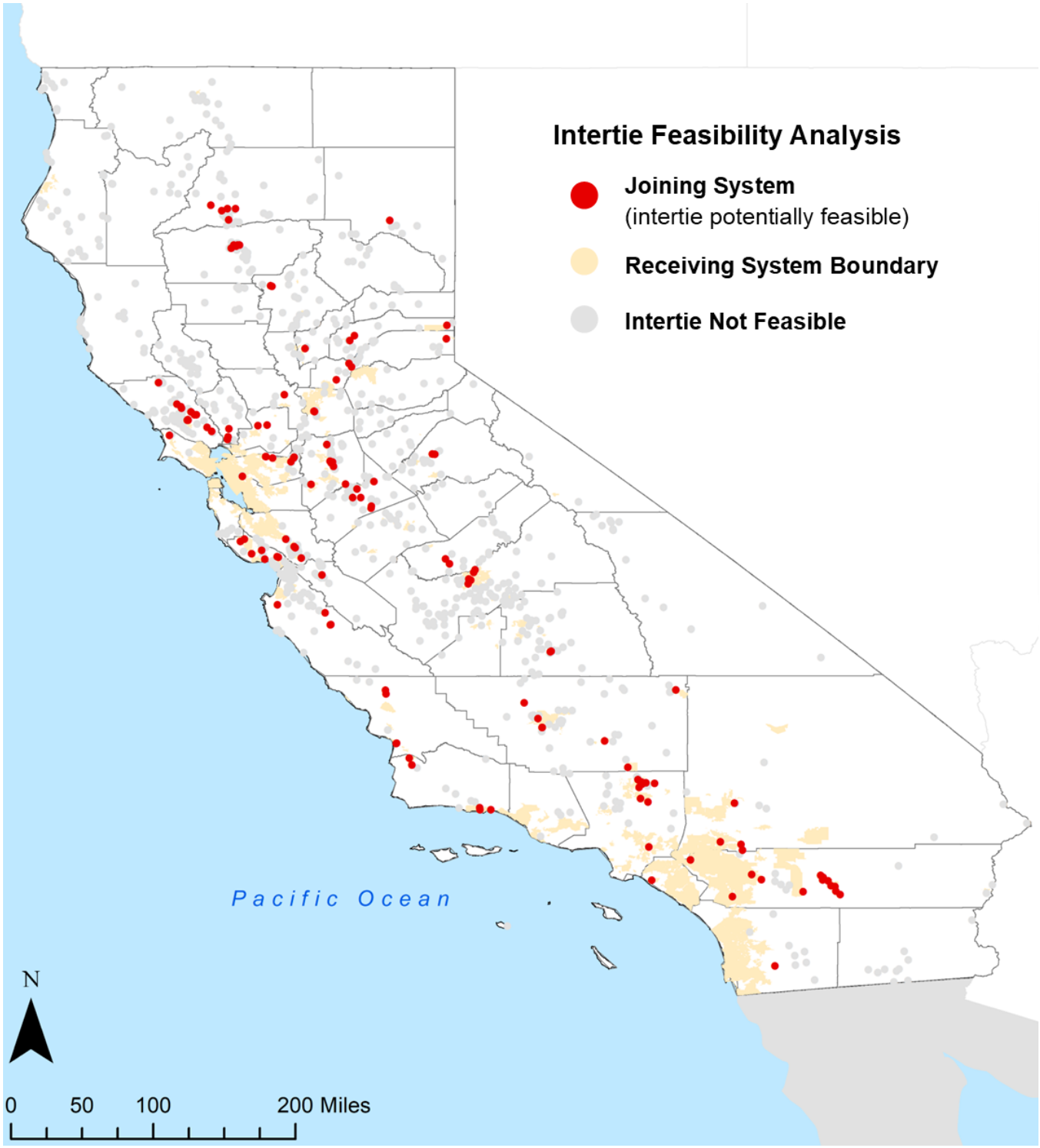
Service Connection Range	System Count	Estimated Cost ($)
< 500	139	$214,210,000
500 - 1,000	1	$6,960,000
1,001 - 2,999	2	$38,810,000
TOTAL:	**142**	**$259,970,000**

[22] Not all joining and/or receiving systems have boundaries, so the number of mapped systems is less than the actual number.

[23] The cost assumptions are based on Corona Environmental physical consolidation estimates used in the 2021 Needs Assessment: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/needs/2021_needs_assessment.pdf

The map below (Figure C1) shows the point locations (red dots) for systems where intertie was a feasible option and point locations (grey dots) where systems did not intersect a larger system, so intertie was not considered feasible.

Figure C1: Map of Feasible Intertie Locations



Estimating New Well Costs

If the construction of an intertie was not determined to be feasible using the methodology described above, the State Water Board estimated the cost of constructing a new well.

Cost Assumptions:

- Well drilling assumed to be for 1,000 ft depth at $1,200,000.[24]
- Required well production equals the Maximum Day Demand (MDD), which is calculated based on an average daily demand of 150 gpm and peaking factor of 2.25.
- $85,000 for CEQA[25]
- $100,000 for SCADA[26]
- Apply 25% of total cost estimate for planning costs.
- Well development Cost =[27] ($145.01 x Well Production (MDD)) + $32,268
- Well Pump and Motor Cost[28] = ($136.73 x Well Production (MDD)) + $116,448
- Total Cost ($) = Well drilling + CEQA+SCADA + Well Development+ Well Pump and Motor + 25% Total Cost Planning and Construction + Regional Multiplier + 4.7% Total Cost Inflation

As illustrated in Table C8, many systems that rely on a single source are systems with 500 service connections or less.

Table C8: Estimated K-12 Schools and Small CWS New Well Costs

Service Connection Range	System Count	Estimated Cost ($)
< 500	752	$1,649,610,000
500 – 1,000	0	$0
1,001 – 2,999	1	$2,010,000
TOTAL:	**753**	**$1,651,620,000**

[24] This cost estimate was developed based on internal and external feedback, also reviewing well installation cost data from various engineering reports.

[25] This cost was developed by Corona Environmental and used in the 2021 Needs Assessment https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/needs/2021_needs_assessment.pdf#page=253&zoom=100,69,515

[26] Based on vendors recommendations and pricing.

[27]This equation was developed by Corona Environmental and used in the 2021 Needs Assessment https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/needs/2021_needs_assessment.pdf#page=253&zoom=100,69,515

68: This equation was developed by Corona Environmental and used in the 2021 Needs Assessment https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/needs/2021_needs_assessment.pdf#page=253&zoom=100,69,515

METER ALL SERVICE CONNECTIONS

Metering service connections at individual households is an important drought mitigation measure because it allows a water system to monitor water usage, identify potential water loss, and may also help customers reduce demand when needed. The inventory of systems lacking meters for some, or all their service connections was identified by analyzing EAR responses to Section 4, specifically the question about the count of un-metered service connections. The highest number of un-metered service connection is attributed to smaller systems with less than 500 service connections.

Cost Assumptions:

Table C9 details the cost estimates for new meters.

- Table C10 summarize the costs estimates for residential water meters by system size.
- Total Cost = Meter Cost + Software + Regional Multiplier + 4.7% Total Cost Inflation

Table C9: Residential Meters Cost Assumptions

Equipment and Software (drive by[29])	1" Meters (drive by)
$29,000[30]	$1,200[31]

Table C10: K-12 Schools and Small CWS Residential Meters Cost Per Service Connection Range

Service Connection Range	System Count	Un-Metered Connections Count	Estimated Cost ($)
< 500	1,189	70,457	$138,990,000
500 – 1,000	31	13,022	$18,880,000
1,001 – 2,999	55	60,525	$87,460,000
TOTAL:	**1,275**	**144,004**	**$245,330,000**

FIRE FLOW

The State Water Board does not have authority to develop or enforce requirements regarding fire flow. Fire flow responsibility and jurisdiction falls to local fire officials. Thus, the State Water Board does not generally collect extensive information regarding fire flow in its standard data

[29] This type of meter allows the meter reader to drive by and take an automated reading, as opposed to a manual reading.

[30] This cost was used by Corona Environmental and utilized in the 2021 Needs Assessment https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/needs/2021_needs_assessment.pdf#page=253&zoom=100,69,515

[31] Based public feedback and on vendors recommendations and pricing.

collection processes, such as the electronic annual report. However, the State Water Board recognizes the significant need for adequate fire flow for the protection of communities and public safety, particularly considering climate change impacts.

Due to the lack of available and machine-readable asset inventory, asset condition data and local fire protection requirements, the State Water Board is unable to develop a cost estimate for this SB 552 requirement at this time. The State Water Board will contact the Office of the State Fire Marshall to develop collaborative approaches for determining appropriate fire protection requirements. The State Water Board will explore strategies to collect this information in the future to better identify systems unable to meet fire flow requirements. It is important to note that cost sharing may be appropriate to consider for the fire flow costs given that they are not directly related to drinking water but may still benefit the water system's day to day operations.