

2021

DRINKING WATER AFFORDABILITY ASSESSMENT

Informing the 2021-22 Safe & Affordable
Drinking Water Fund Expenditure Plan

**The Affordability Assessment is a component of the Needs
Assessment. Access full Needs Assessment Report:**

https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/needs/2021_needs_assessment.pdf



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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 2021 Affordability Assessment, the State Water Board employed affordability thresholds for the following indicators: Percent Median Household Income; Extreme Water Bill; and Percent Shut-Offs. 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).)

“At-Risk public water systems” or **“At-Risk PWS”** means community water systems with 3,300 service connections or less 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).)

“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.)

“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 § 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 **“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. (California Health and Safety Code § 116275(c).)

“Interim replacement water” or **“Interim solution”** includes, but is not limited to; bottled water, vended water, and point-of-use or point-of-entry treatment units. (Health & Saf. Code, § 116767, subd. (q).)

“Loan” means any repayable financing instrument, including a loan, bond, installment sale agreement, note, or other evidence of indebtedness.

“Local cost share” means a proportion of the total interim and/or long-term project cost that is not eligible for a State grant and would therefore be borne by water systems, their ratepayers, and/or domestic well owners. Some local cost share needs may be eligible for public or private financing (i.e. a loan). Some local costs share needs may not be eligible for financing and is typically funded through available reserves or cash on hand.

“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.

“Net present worth” or **“NPW”** means the estimate of the total sum of funds that need to be set aside today to cover all expenses (capital, including other essential infrastructure costs, and annual O&M) during the potential useful life of the infrastructure investment, which is conservatively estimated at 20-years. The estimate of the total sum of funds is adjusted by an annual discount rate which accounts for the higher real cost of financial outlays in the immediate future when compared to the financial outlays in subsequent years.

“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.

“Other essential infrastructure” or **“OEI”** encompasses a broad category of additional infrastructure needed for the successful implementation of the Cost Assessment’s long-term modeled solutions and to enhance the system’s sustainability. OEI includes storage tanks, new wells, well replacement, upgraded electrical, added backup power, replacement of distribution system, additional meters, and land acquisition.

“Potentially At-Risk” means community water systems with 3,300 service connections or less 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, § 116365, subd. (j). (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, pretreatment, 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).)

“Refined grant needs” means the estimated costs, generated from the Cost Assessment Model, that have been adjusted by removing costs for water systems that have existing funding agreements with the State Water Board and identifying the proportion of costs that are grant-eligible.

“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.

“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.

“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).)

“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))

“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”** 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.

“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 Section 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.



AFFORDABILITY ASSESSMENT RESULTS

OVERVIEW

Ensuring drinking water is affordable is key to meeting California’s Human Right to Water mandate.¹ The COVID-related economic crisis has served to further highlight the need to address affordability, both to ensure that households can afford the water that they drink as well as to support drinking water systems in maintaining enough financial viability to provide safe reliable drinking water.²

The purpose of the Affordability Assessment is to identify disadvantaged community water systems, that have instituted customer charges that exceed the “Affordability Threshold” established by the State Water Board in order to provide drinking water that meets State and Federal standards.³ Legislation does not define what the Affordability Threshold should be. Nor is there specific guidance on the perspective in which the State Water Board should be assessing the Affordability Threshold. Figure 43 illustrates the nexus of affordability definitions that exist.

Figure 43: Nexus of Affordability Definitions



¹ [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

² [Drinking Water COVID-19 Financial Impacts Survey | California State Water Resources Control Board](https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/covid-19watersystemsurvey.html)

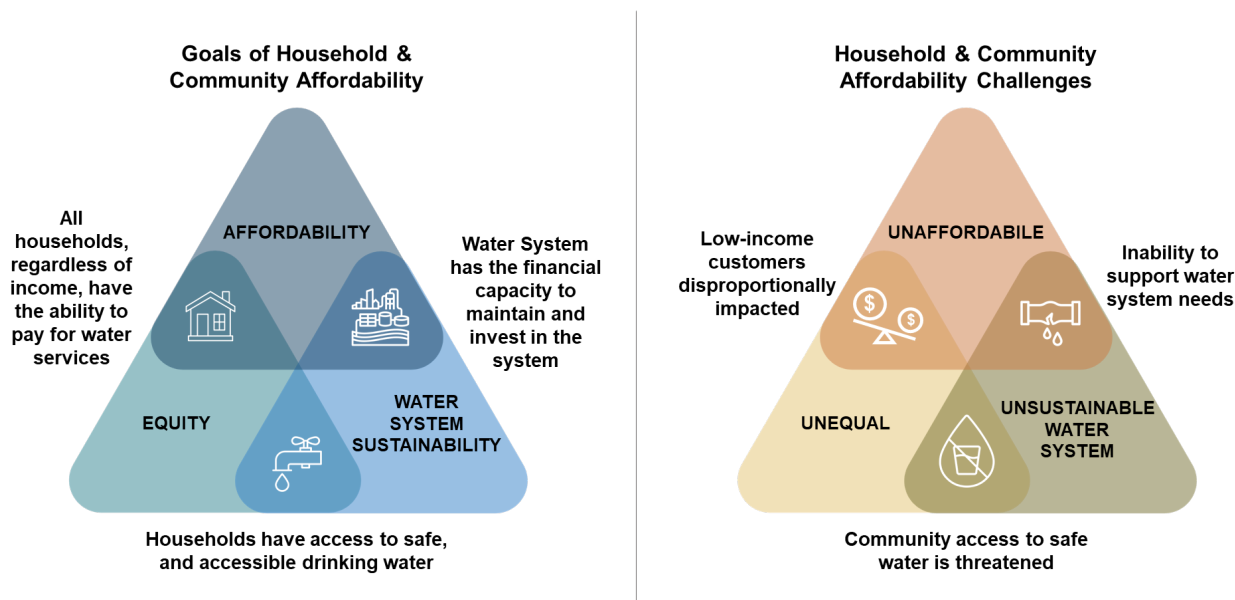
https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/covid-19watersystemsurvey.html

³ California Health and Safety Code, § 116769, subd. (a)(2)(B)

- (1) **Household Affordability:** The ability of individual households to pay for an adequate supply of water.
- (2) **Community Affordability:** The ability of households within a community to pay for water services to financially support a resilient water system.
- (3) & (4) **Water System Financial Capacity:** The ability of the water system to financially meet current and future operations and infrastructure needs to deliver safe drinking water. The financial capacity of water systems affects future rate impacts on households. The inability to provide adequate services may lead households served by the system to rely on expensive alternatives such as bottled water.

Affordability of drinking water services is an important challenge to assess because issues surrounding equity and water system sustainability overlap in numerous aspects of addressing affordability challenges and ensuring that all Californians have safe drinking water. Figure 44 illustrates this relationship and the potential consequences of inaction.

Figure 44: The Relationship Between Affordability, Equity and Water System Sustainability



AFFORDABILITY ASSESSMENT METHODOLOGY

The Affordability Assessment is conducted annually for all Californian community water systems. It is worth noting that, while there is some overlap, the systems included in the Affordability Assessment differ from the list of water systems analyzed in the Risk Assessment for public water systems. The Affordability Assessment includes large and small community water systems and excludes non-transient, non-community water systems, like schools. The Risk Assessment, on the other hand, analyzed smaller public water systems with 3,300 service connections or less and non-transient, non-community K-12 schools are included. Table 45 provides an overview of the systems included in the Affordability Assessment.

Table 45: Systems Included in the Affordability Assessment

SAFER Program Status	Risk Assessment	Affordability Assessment
HR2W List Systems	326	276
At-Risk Systems	617	467
Not HR2W or At-Risk System	1,836	2,134
TOTAL:	2,779	2,877

In 2020, the State Water Board conducted an Affordability Assessment for community water systems, which analyzed one affordability indicator, water charges as a percent of median household income (%MHI), for the FY 2020-21 Safe and Affordable Drinking Water Fund Expenditure Plan. The Fund Expenditure Plan used an affordability threshold of 1.5% MHI to identify DAC water systems that may have customer charges that are unaffordable.⁴

For the 2021 Needs Assessment, the State Water Board explored additional affordability indicators to identify disadvantaged communities (DAC)⁵ and Severely Disadvantaged Communities (SDAC)⁶ that may be experiencing affordability challenges. The identification of additional affordability indicators was undertaken in conjunction with the identification of possible affordability risk indicators for the Risk Assessment. A full list of potential affordability indicators considered can be found in the white paper *Evaluation of Potential Indicators & Recommendations for Risk Assessment 2.0 for Public Water Systems*.⁷

Ultimately, the affordability indicators “Extreme Water Bill” and “% Shut-Offs” were included in the 2021 Risk Assessment and Affordability Assessment alongside %MHI. The State Water Board analyzed all three affordability indicators for the Affordability Assessment and applied the same thresholds as utilized in the Risk Assessment. The prevalence of community water systems that meet these thresholds, and are DAC or SDAC systems, are summarized for each affordability indicator in the sections below.

Additional analysis was conducted to identify the DAC and SDAC water systems that met more than one affordability indicator threshold. Scores of 0 (no threshold met), 1 (lower “minimum”

⁴ [FY 2020-21 Fund Expenditure Plan](https://www.waterboards.ca.gov/water_issues/programs/grants_loans/sustainable_water_solutions/docs/sadwfep_2020_07_07.pdf)

https://www.waterboards.ca.gov/water_issues/programs/grants_loans/sustainable_water_solutions/docs/sadwfep_2020_07_07.pdf

⁵ Disadvantaged Community or DAC mean the entire service area of a community water system, or a community therein, in which the median household income is less than 80 percent of the statewide annual median household income level.

⁶ Severely Disadvantaged Community or SDAC means the entire service area of a community water system in which the median household income is less than sixty percent of the statewide median household income.

⁷ October 7, 2020 White Paper:

[Evaluation of Potential Indicators & Recommendations for Risk Assessment 2.0 for Public Water Systems](https://www.waterboards.ca.gov/safer/docs/e_p_i_recommendations_risk_assessment_2_public_water_systems.pdf)

https://www.waterboards.ca.gov/safer/docs/e_p_i_recommendations_risk_assessment_2_public_water_systems.pdf

threshold met), and 1.5 (higher “maximum” threshold met) were applied to each affordability indicator threshold and tallied across the three indicators for each system to identify which systems may be facing the greatest affordability challenges.

% Median Household Income

This indicator measures annual system-wide average residential customer charges for 6 Hundred Cubic Feet (HCF) per month relative to the annual Median Household Income (MHI) within a water system’s service area. Six HCF indoor water usage per month is roughly equivalent to 50 gallons per person per day for a three-person household for 30 days.

Percent median household income (%MHI) is commonly used by state and Federal regulatory agencies and by water industry stakeholders for assessing community-wide water charges affordability for decades. %MHI is utilized by the State Water Board (at 1.5% threshold) and the U.S. EPA (at 2.5% threshold) for assessing affordability. The State Water Board uses %MHI to determine DAC status⁸ and has for some time used the 1.5% MHI threshold in the Drinking Water State Revolving Fund (DWSRF) program as a metric for determining whether a small DAC will receive repayable (loan) or non-repayable (e.g., grant or non-repayable) funding.

The FY 2020-21 Fund Expenditure Plan uses 1.5% of the annual median household income (MHI) of the community served by the water system as the Affordability Threshold. Any community water system with annual customer charges, based on residential customer water usage of six hundred cubic feet (HCF) of water per month, that exceeded 1.5% of the MHI was identified on the list included in Appendix A for the FY 2020-21 Fund Expenditure Plan.⁹

For the 2021 Affordability Assessment, the State Water Board utilized two % MHI affordability thresholds. These thresholds correspond to the same thresholds used in the Risk Assessment. The minimum affordability threshold is 1.5% MHI and the maximum affordability threshold was set at 2.5% MHI. Additional details on the data sources, calculation methodology, and full analysis results for % MHI are in Appendix E.

While exceeding these thresholds alone does not necessarily mean that water charges are unaffordable for a community, the 1.5% and 2.5% MHI affordability thresholds allow for a preliminary evaluation of systems that may have challenges with affordable customer charges.

⁸ It is important to note that the estimated designation of community economic status is for the purposes of the Affordability Assessment only and will not be used by the State Water Board’s Division of Financial Assistance (DFA) to make funding decisions. Further MHI analysis on a per system basis will be conducted by DFA when a system seeks State Water Board assistance.

⁹ [FY 2020-21 Fund Expenditure Plan Appendix A](#)

https://www.waterboards.ca.gov/board_info/agendas/2020/jul/070720_6_draftfinal_sadwfep_appendices_clean.pdf

Extreme Water Bill

This indicator measures drinking water customer charges that meet or exceed 150% and 200% of statewide average drinking water customer charges at the six HCF level of consumption. The State Water Board's AB 401 report¹⁰ recommended statewide low-income rate assistance program elements which utilize the two recommended tiered indicator thresholds of 150% and 200% of the state average drinking water bill for 6 HCF.

% Shut-Offs

This affordability indicator measures the percentage of a water system's residential customer base which experienced service shut-offs due to non-payment in a given year. For the purposes of the State Water Board's Needs Assessment a threshold of 10% or greater customer shut-offs over the last calendar year for non-payment was utilized.

It is worth noting that on April 20, 2020, in response to the COVID-19 crisis, Governor Newsome issued an Executive Order N-42-20 to temporarily restrict water shut-offs due to non-payment.¹¹ The data used for this indicator is from the 2019 reporting year Electronic Annual Report (EAR). While the data utilized in the 2021 Needs Assessment was not impacted by the Executive Order, it will be taken into account in future years of the Needs Assessment.

AGGREGATED AFFORDABILITY ASSESSMENT RESULTS

AFFORDABILITY RESULTS BY COMMUNITY ECONOMIC STATUS

For the 2021 Affordability Assessment, State Water Board staff analyzed 2,877 community water systems, of which approximately 32 water systems lacked the data necessary to calculate any of the three affordability indicators. Some additional water systems lacked the necessary data for calculation of some of the affordability indicators and are summarized in Table 46.

Overall, comparing the three indicators in cases where data were available, systems were slightly more likely to exceed an Extreme Water Bill threshold (22% of systems with data) than a %MHI threshold (21% of systems with data). Systems were much less likely to exceed the % Shut-Offs threshold. Staff identified 592 water systems that exceeded the minimum 1.5% MHI affordability threshold, 222 of which exceeded the maximum 2.5% MHI threshold. Of those, 121 systems were identified that serve DACs and 313 systems that serve SDACs. The Assessment identified 628 water systems that exceeded the minimum 150% extreme water bill threshold and 365 of those systems exceeded the maximum 200% extreme water bill threshold. Of those that exceeded the 150% extreme water bill threshold, 113 systems were

¹⁰ AB 401 Final Report:

[Recommendations for Implementation of a Statewide Low-Income Water Rate Assistance Program](https://www.waterboards.ca.gov/water_issues/programs/conservation_portal/assistance/docs/ab401_report.pdf)

https://www.waterboards.ca.gov/water_issues/programs/conservation_portal/assistance/docs/ab401_report.pdf

¹¹ Executive Department, State of California. [Executive Order N-42-20](https://www.gov.ca.gov/wp-content/uploads/2020/04/4.2.20-EO-N-42-20.pdf)

<https://www.gov.ca.gov/wp-content/uploads/2020/04/4.2.20-EO-N-42-20.pdf>

identified that serve DACs and 122 that serve SDACs. Finally, staff identified 139 systems that exceeded the 10%+ shut-offs for non-payment affordability threshold. Of those, 35 systems were identified that serve DACs and 62 that serve SDACs.

Table 46 summarizes the number of water systems, by their community economic status, that exceeded the minimum affordability threshold for each indicator assessed.

Table 46: Aggregated Assessment Results by Community Economic Status

Community Status	Total Systems	% MHI Min. Threshold Met	Extreme Water Bill Min. Threshold Met	% Shut-Offs Min. Threshold Met
DAC	578	121 (21%)	113 (20%)	35 (6%)
SDAC	993	313 (32%)	122 (12%)	62 (6%)
Non-DAC	1,210	158 (13%)	393 (32%)	40 (3%)
Missing DAC Status	96	0 (0%)	0 (0%)	2 (2%)
TOTAL:	2,877	592 (21%)	628 (22%)	139 (5%)
Missing Data		<i>201 (7%)</i>	<i>118 (4%)</i>	<i>49 (2%)</i>

Figure 45: Number of Water Systems, by Community Economic Status, that Exceeded Each Minimum Affordability Indicator Threshold

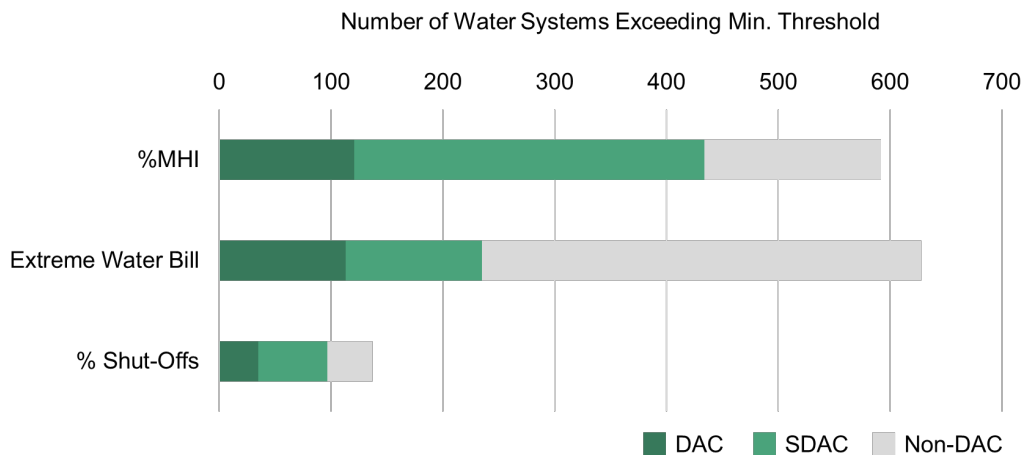
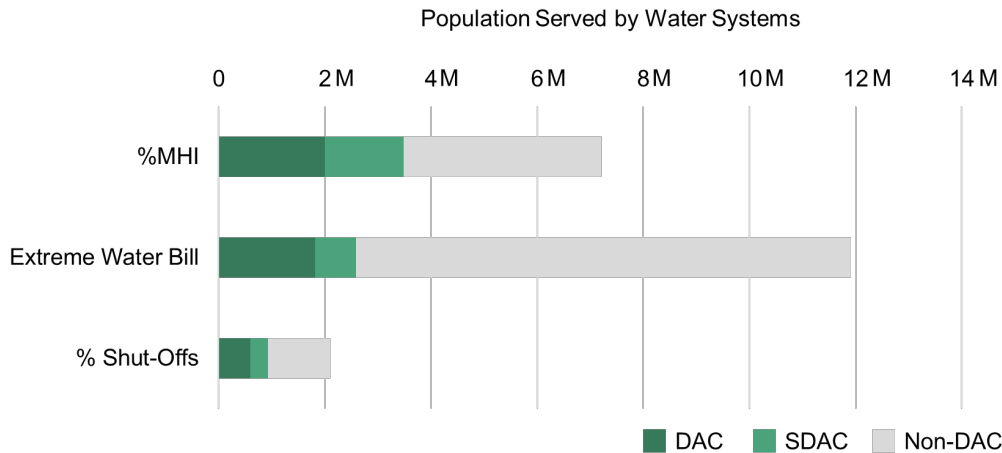


Figure 46: Population of Systems that Exceeded Each Affordability Indicator Threshold



To assess which systems may be facing the greatest affordability challenges, State Water Board staff further analyzed how many water systems exceeded the affordability threshold for one or more affordability indicator (Table 47). Of the 2,877 water systems analyzed, two thirds of water systems (n=1911) did not exceed any of the minimum affordability thresholds for the three indicators assessed. It is worth noting, there are no clear trends across community economic status and the number of systems exceeding affordability thresholds.

Staff identified 585 water systems that exceeded only one of the three minimum affordability thresholds, 46 of which are DACs and 224 are SDACs. The Assessment identified 267 water systems that exceeded two of the three minimum affordability thresholds, 73 of which are DACs and 74 are SDACs. Finally, staff identified 139 water systems that exceeded all three minimum affordability thresholds; 35 of these water systems are DACs and 60 are SDACs. It is worth noting that of the 139 water systems that exceeded all three affordability indicator thresholds, 7 systems exceeded all maximum affordability thresholds (e.g. 2.5% MHI, 200% Extreme Water Bill, and 10% or greater % Shut-Offs).

Table 47: Total Number of Systems that Exceeded an Affordability Indicator Threshold

Community Status	Total Systems	None	1 Indicator	2 Indicators	3 Indicators
DAC	578	416 (72%)	46 (8%)	73 (13%)	35 (6%)
SDAC	993	627 (63%)	224 (23%)	74 (7%)	60 (6%)
Non-DAC	1,210	784 (65%)	256 (21%)	120 (10%)	44 (4%)
Missing DAC Status	96	84 (88%)	2 (2%)	0 (0%)	0 (0%)
TOTAL:	2,877	1,911 (66%)	528 (18%)	267 (9%)	139 (5%)
Missing Data		32* (1%)			

* These water systems were missing data necessary to calculate all three affordability indicators. All other water systems had sufficient data to calculate at least one affordability indicator.

Figure 47: Total Number of Systems, by Community Economic Status, that Exceeded an Affordability Indicator Threshold

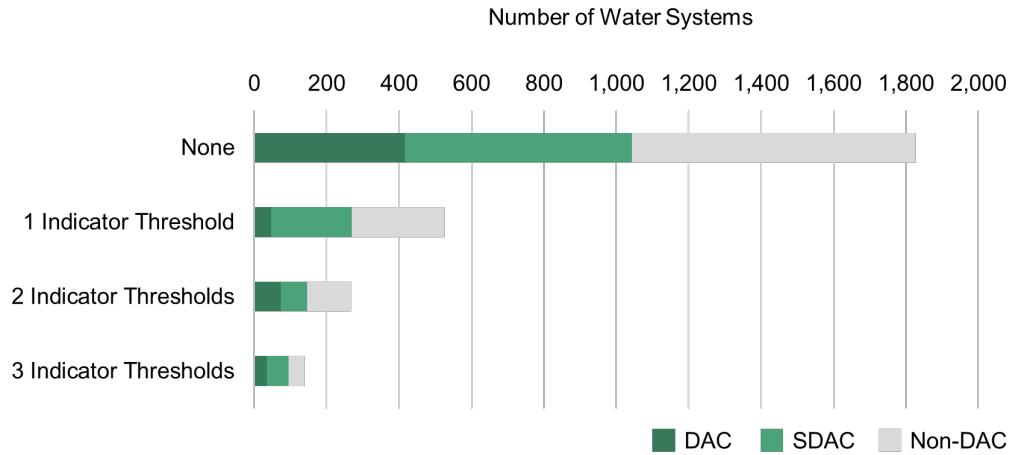


Figure 48: Population of Water Systems, by Community Economic Status, that Exceeded an Affordability Indicator Threshold

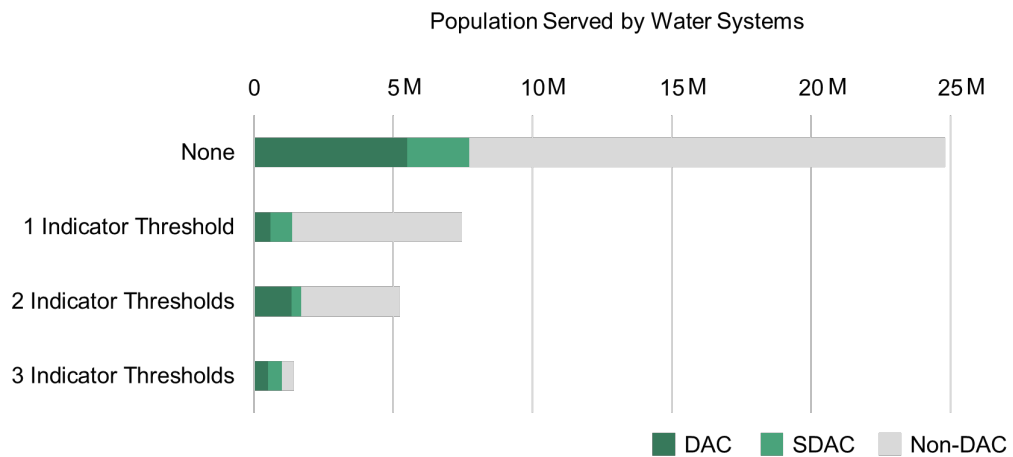
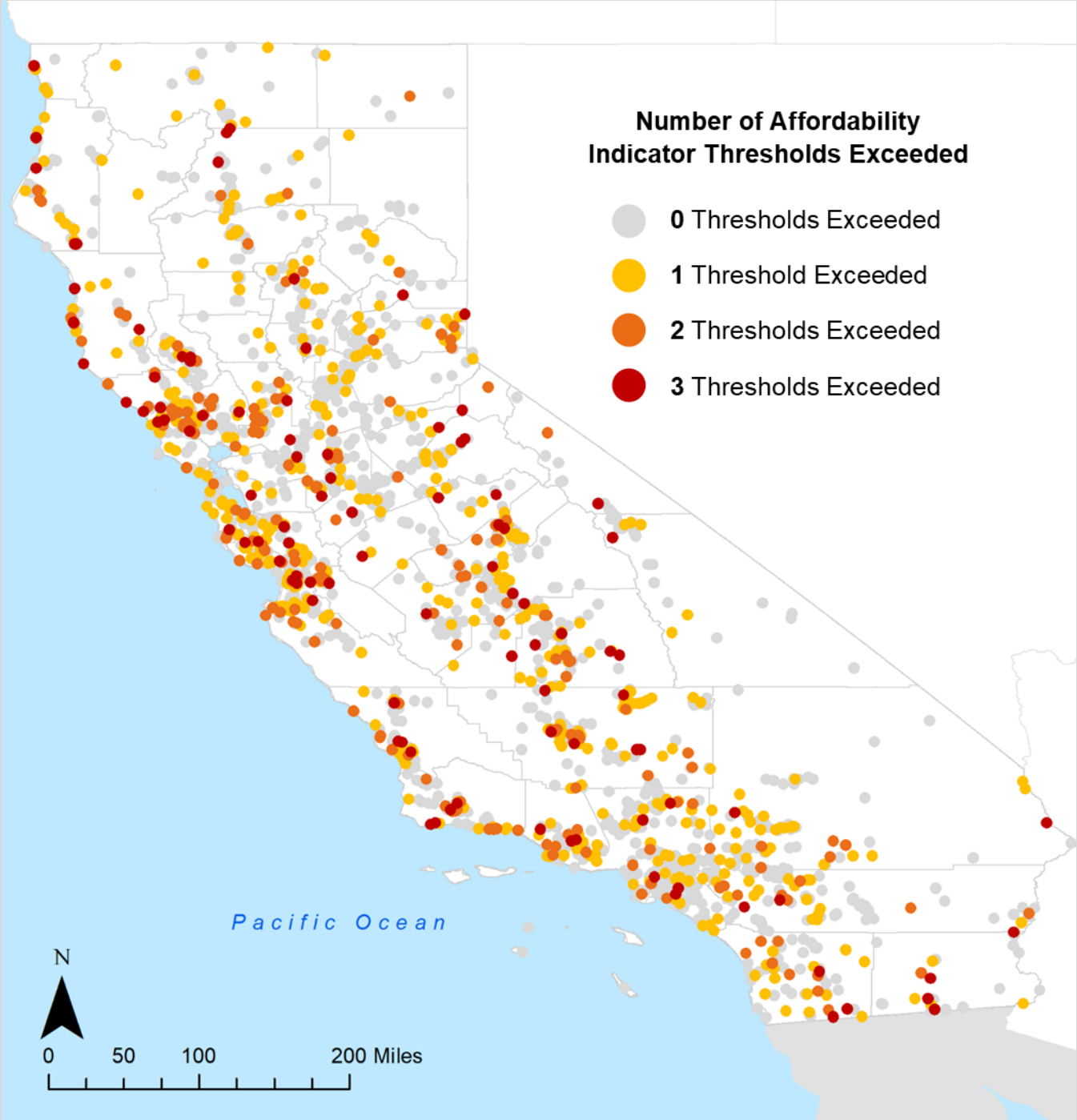
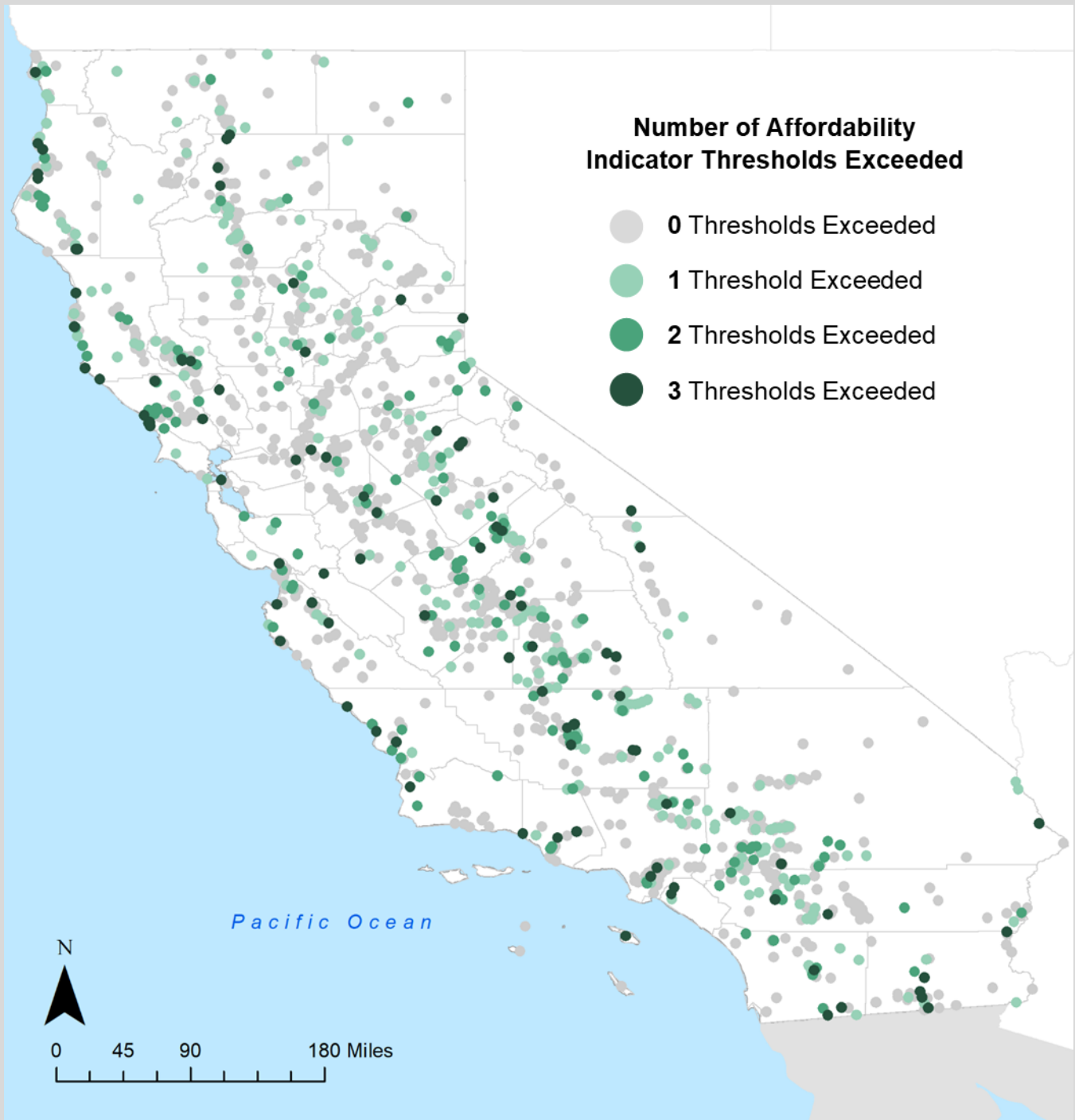


Figure 49: All Water Systems that Exceeded an Affordability Indicator Threshold (n=2,189)*



* 86 water systems were not able to be mapped due to missing service area boundaries.

Figure 50: DAC and SDAC Water Systems that Exceeded an Affordability Indicator Threshold (n=1,554)*



* One system was unable to be mapped due to missing service area boundary.

AFFORDABILITY RESULTS BY WATER SYSTEM SAFER PROGRAM STATUS

While SB 200 only mandates the identification of DAC water systems that have customer charges that exceed affordability thresholds, the 2021 Affordability Assessment also identified if HR2W list and At-Risk public water systems exceeded affordability thresholds as well. Table 48 and the section below summarizes the number of failing HR2W list and At-Risk water systems, by their community economic status, that exceeded the minimum affordability threshold for each indicator assessed.

% MHI: Staff identified 77 HR2W list systems (10 DAC and 56 SDAC) and 119 At-Risk (20 DAC and 63 SDAC) water systems that exceeded the minimum 1.5% MHI affordability threshold. Of these, 32 HR2W list systems (5 DAC and 23 SDAC) and 55 At-Risk (5 DAC and 40 SDAC) water systems exceeded the maximum 2.5% MHI threshold.

Extreme Water Bill: 54 HR2W list systems (10 DAC and 20 SDAC) and 106 At-Risk (19 DAC and 33 SDAC) water systems exceeded the minimum 150% statewide MHI affordability threshold. Of these, 29 HR2W list systems (6 DAC and 8 SDAC) and 67 At-Risk (9 DAC and 17 SDAC) systems exceeded the maximum 200% statewide MHI threshold.

% Shut-Offs: Finally, staff identified 21 HR2W list systems (4 DAC and 13 SDAC) and 17 At-Risk (2 DAC and 12 SDAC) water systems that exceeded the 10% or greater shut-offs for non-payment affordability threshold.

The full results of this analysis by affordability indicator are detailed in Appendix E.

Table 48: Aggregated Affordability Assessment Results by Water System SAFER Program Status

SAFER Program Status*	Total Systems	% MHI Min. Threshold Met	Extreme Water Bill Min. Threshold Met	% Shut-Offs Min. Threshold Met
HR2W Systems	276	77 (28%)	54 (20%)	21 (8%)
HR2W DAC	45	10	10	4
HR2W SDAC	142	56	20	13
At-Risk Systems	467	119 (25%)	106 (23%)	17 (4%)
At-Risk DAC	103	20	19	2
At-Risk SDAC	189	63	33	12
Not HR2W or At-Risk System	2,134	396 (19%)	468 (22%)	101 (5%)
DAC	430	91	84	29
SDAC	662	194	69	37
TOTAL:	2,877	592 (21%)	628 (22%)	139 (5%)
Missing Data		201 (7%)	118 (4%)	49 (2%)

* Water systems that are not DAC/SDAC or are missing DAC status designations are excluded from sub-categories within this table.

Figure 51: Total Number of HR2W List and At-Risk Water Systems that Exceeded Each Minimum Affordability Indicator Threshold

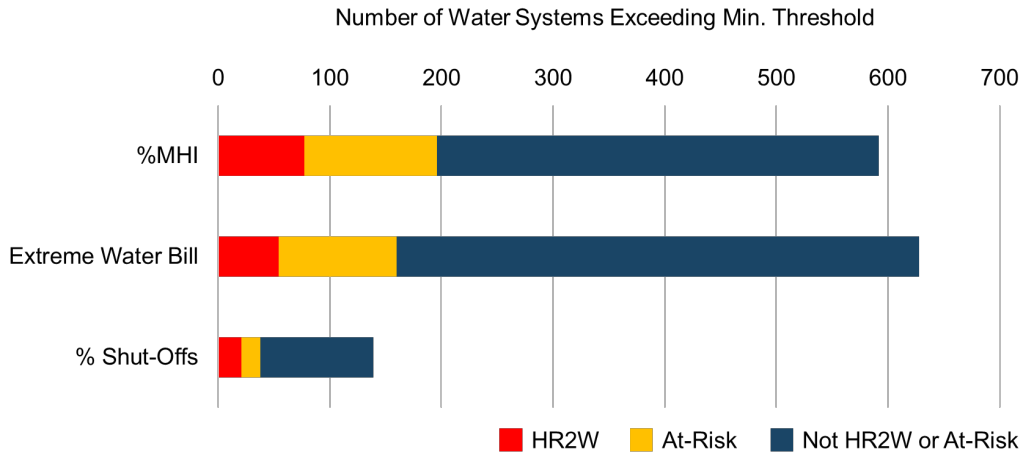
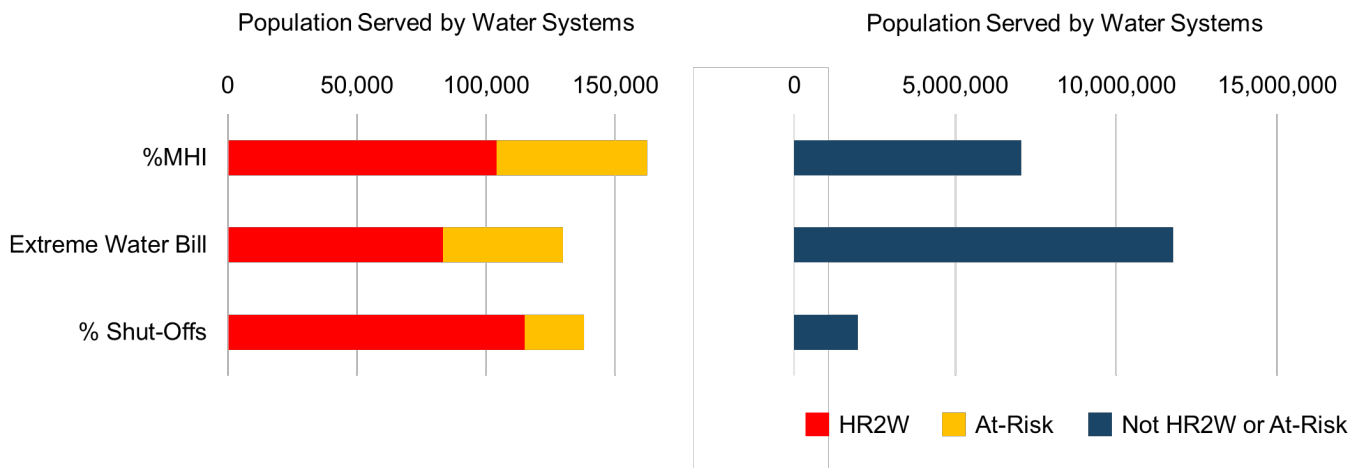


Figure 52: Total Population of Water Systems that Exceeded Each Affordability Indicator Threshold



Further analysis of the aggregated Affordability Assessment results shows that HR2W list systems and At-Risk water systems exceeded one or more affordability thresholds at the same proportion (within 30%) as Not-HR2W or Not At-Risk water systems (Table 49).

Table 49: Aggregated Affordability Assessment Results by Water System SAFER Program Status: Total Number of Systems that Exceeded an Affordability Indicator Threshold

SAFER Program Status	Total Systems	None	1 Indicator	2 Indicators	3 Indicators
HR2W Systems	276	168 (61%)	58 (21%)	28 (10%)	18 (7%)
HR2W DAC	45	30	3	5	5
HR2W SDAC	142	77	38	16	9
At-Risk Systems	467	311 (67%)	63 (13%)	54 (12%)	34 (7%)
At-Risk DAC	103	80	5	13	5
At-Risk SDAC	189	114	39	17	16
Not HR2W or At-Risk System	2,134	1,432 (67%)	407 (19%)	185 (7%)	87 (4%)
DAC	430	306	38	55	23
SDAC	662	436	147	41	34
TOTAL:	2,877	1,911 (66%)	528 (18%)	267 (9%)	139 (5%)
<i>Missing Data</i>		32* (1%)			

* These water systems were missing data necessary to calculate all three affordability indicators. All other water systems had sufficient data to calculate at least one affordability indicator.

Figure 53: Total Number of HR2W List and At-Risk Systems that Exceeded an Affordability Indicator Threshold

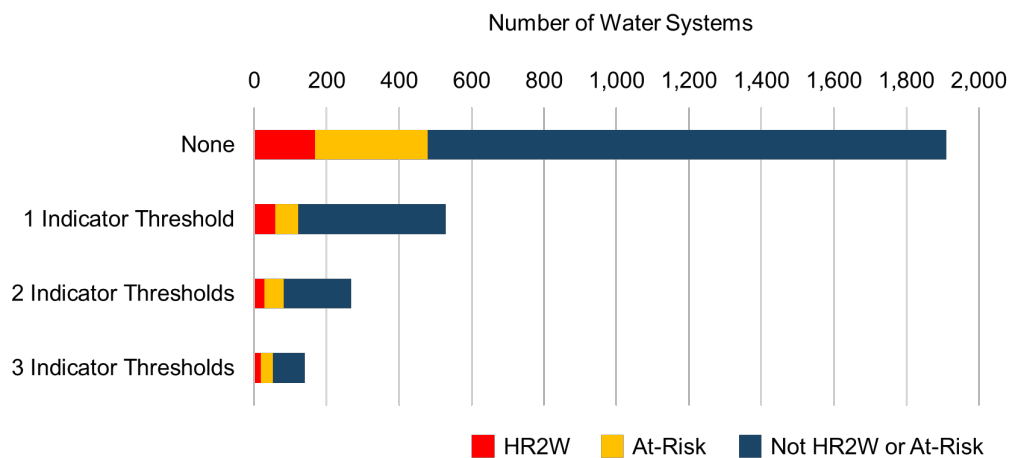


Figure 54: Total Population of Water Systems that Exceeded an Affordability Indicator Threshold

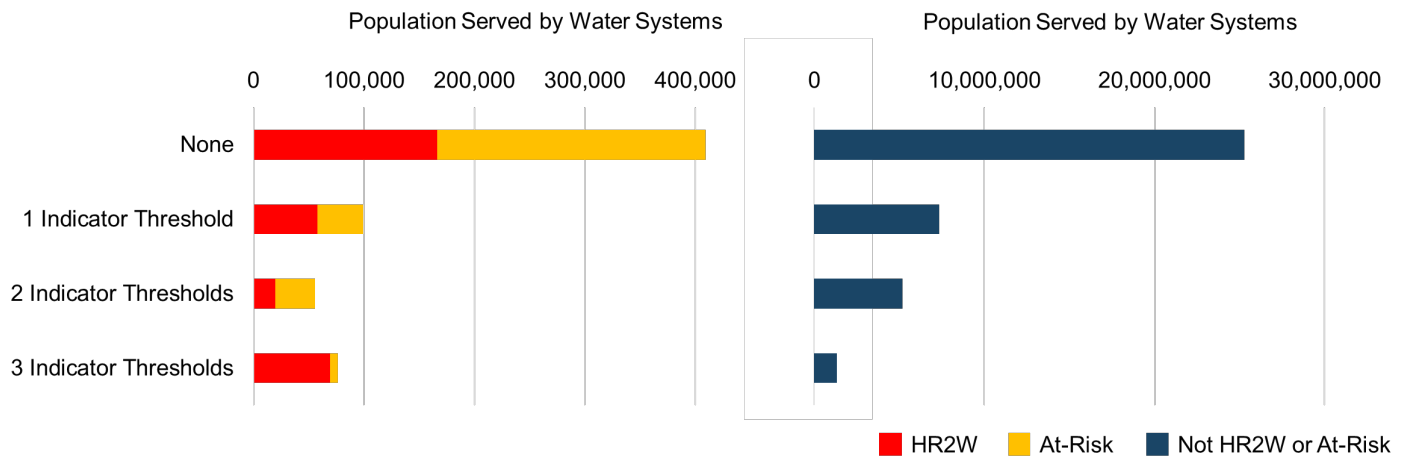
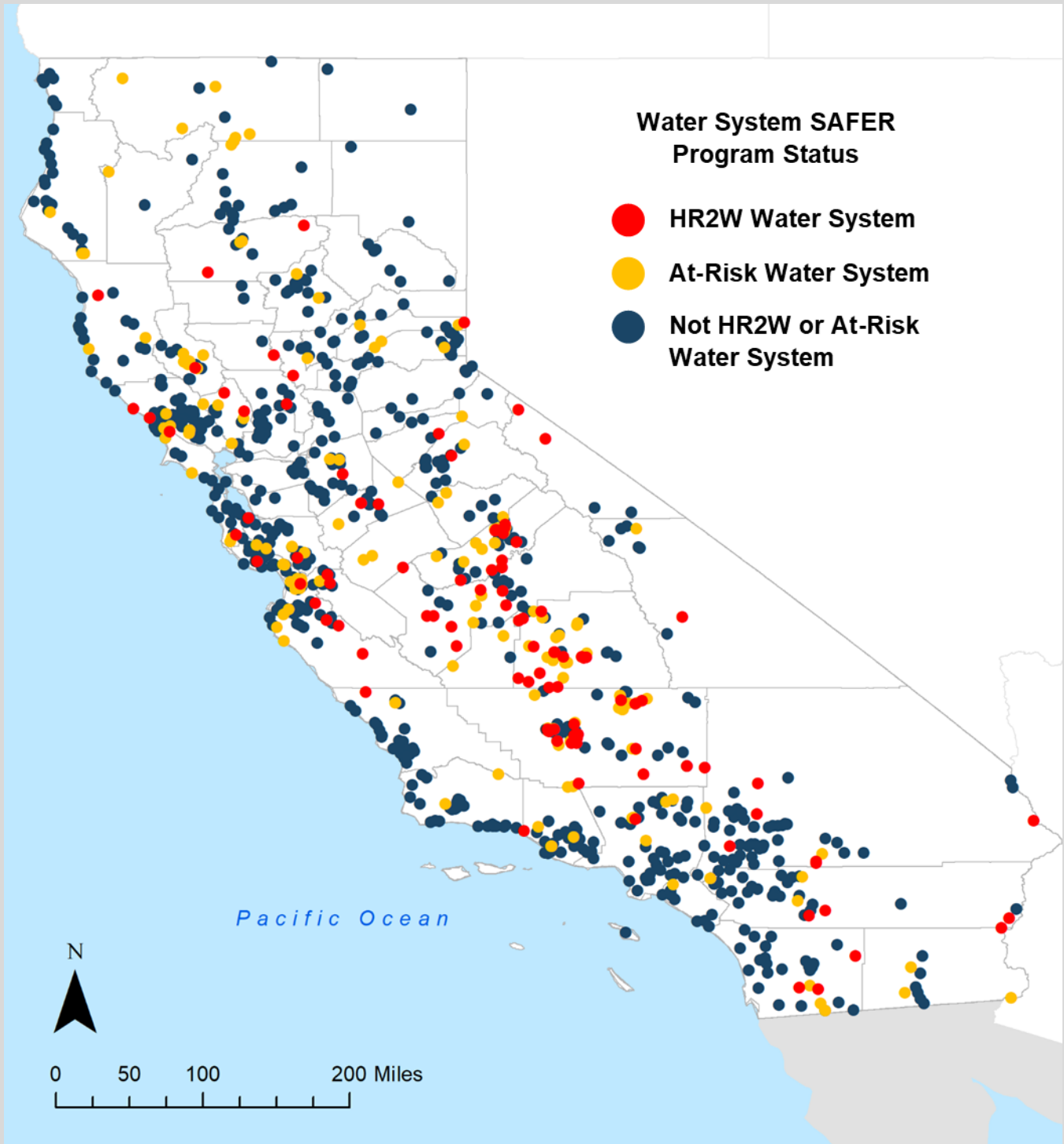


Figure 55: HR2W List and At-Risk Water Systems that Exceeded an Affordability Indicator Threshold (n=932)*



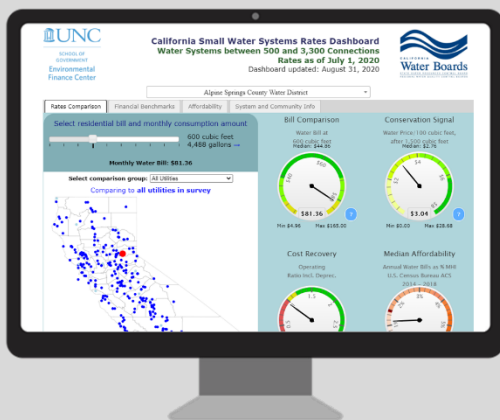
*Two water systems were not able to be mapped due to missing service area boundaries.

SMALL WATER SYSTEM RATES DASHBOARD

The California Small Water Systems Rates Dashboard (dashboard) is an online information sharing resource with an interactive interface that allows users to compare or benchmark residential rates, financial, and system performance data of community water systems serving between 500 and 3,300 connections. This dashboard was commissioned by the State Water Board as a pilot resource for small community water systems as part of the Needs Analysis contract with UCLA. The dashboard was created by the Environmental Finance Center at the University of North Carolina, Chapel Hill (EFC at UNC), working with the UCLA Luskin Center for Innovation, during the spring and summer of 2020. A publicly available white paper¹² on the dashboard was published and a public webinar was held on its potential uses on October 30, 2020.¹³ The release of the publication and webinar was followed by a public comment period.

The dashboard utilizes an interactive interface that visualizes information via easy-to-understand graphics. The visualization allows the user to gain a multi-faceted understanding of the water system's financial health and performance. The dashboard is already populated with data for each water system and no data inputs are required.

The dashboard was created with data that were available during the summer of 2020. Not all data were available for every water system on the dashboard. As detailed in the white paper and dashboard itself, key data categories are: residential water rates and rate structures, water system financial indicators, other water system characteristics including compliance status data, and socioeconomic and population data joined from the U.S. Census. The data displayed in the dashboard are not updated by the State Water Board or the EFC at UNC. The State Water Board is exploring how tools like the dashboard can help water systems better assess affordability of drinking water services in their community.



Explore the Rates Dashboard

The California Small Water Systems Rates Dashboard allows comparison and benchmarking of water rates, financial metrics, and other system performance measures with peers, according to important factors such as system size and customer demographics.

<https://efc.sog.unc.edu/resource/california-small-water-systems-rates-dashboard>

¹² October 30, 2020 White Paper:

[Introducing the California Small Water Systems Rates Dashboard](https://www.waterboards.ca.gov/drinking_water/programs/safer_drinking_water/docs/introducing_california_small_water_systems_rates_dashboard.pdf)

https://www.waterboards.ca.gov/drinking_water/programs/safer_drinking_water/docs/introducing_california_small_water_systems_rates_dashboard.pdf

¹³ [October 30, 2020 Webinar Presentation](https://www.waterboards.ca.gov/drinking_water/programs/safer_drinking_water/docs/rates_dashboard.pdf)

https://www.waterboards.ca.gov/drinking_water/programs/safer_drinking_water/docs/rates_dashboard.pdf

AFFORDABILITY ASSESSMENT LIMITATIONS

The 2021 Affordability Assessment makes progress in identifying communities that may be struggling with water affordability challenges; however, State Water Board staff have identified the following limitations that are worth noting:

Affordability Assessment Scope

As described above, there are multiple lenses through which to assess water “affordability.” SB 200 does not define how the State Water Board should measure affordability. Nor does it specify if the “Affordability Threshold” is meant to assess household affordability, community affordability, and/or a water system’s financial capacity. All three aspects of affordability are interrelated, but metrics or indicators that measure each can differ greatly. More engagement with the public, water systems, and stakeholders is needed to better define the scope of the Affordability Assessment and how its results will be utilized.

Affordability Indicator Data

The State Water Board acknowledges that there are some data coverage issues and data quality uncertainties for all the affordability indicators utilized in the Affordability Assessment. Customer charges, MHI, and/or customer shut-off data are not available for some water systems included in this assessment. Water system customer charge data do not always represent the current same or current year for systems in the Affordability Assessment and Risk Assessment. This data is self-reported and has historically lacked full quality assurance. Finally, water system boundaries, which are used to calculate MHI, may not be accurate. In some cases, they reflect a water system’s jurisdiction boundary rather than their service area boundary.

An additional consideration that may be impacting the results of the Affordability Assessment is that water system customer charges may not reflect the full cost water systems face in order to meet current and future operations and infrastructure needs to deliver safe drinking water. For example, many small water systems lack asset management plans, capital improvement plans, and financial plans to assist them in setting customer charges appropriately. This may result in customer charges that are lower than what is needed to support resilient water systems. If more systems were to implement full-cost pricing of their customer charges, the Affordability Assessment results may be different.

Affordability Indicators

There has been criticism of %MHI by academics, water system associations, and the broader water sector mostly around its accuracy in measuring household affordability for those truly in need and the setting of arbitrary %MHI thresholds, limitations which the U.S. EPA has recently acknowledged. Furthermore, some affordability indicators may be more applicable to some governance types of systems than others. For instance, some of the feedback received on the affordability indicators from the Risk Assessment public engagement was that using rates-based indicators, like %MHI and Extreme Water Bill, does not capture the ways in which some systems finance the full cost of service provision. Another point raised was that some individual water systems are connected to larger utility structures that help mitigate affordability challenges in ways that are not currently in the Affordability Assessment.

It is also worth noting that many other State agencies are developing and utilizing affordability indicators in similar complementary efforts. The selection of affordability indicators for the Needs Assessment fully considered affordability indicators used by the Office of Environmental Health Hazard Assessment (OEHHA), the Department of Water Resources (DWR), and the California Public Utilities Commission (CPUC). However, many of the indicators selected for the Needs Assessment differ from those used by these other efforts. The use of different indicators, and corresponding thresholds, across State agencies and Federal agencies can lead to some confusion for water systems and communities. The State Water Board will continue to collaborate with other State agencies and work towards better alignment.

AFFORDABILITY ASSESSMENT REFINEMENT OPPORTUNITIES

The State Water Board will be conducting the Affordability Assesses on an annual basis as part of the Needs Assessment. To begin addressing the limitations highlighted above, the State Water Board will begin exploring new opportunities to refine the next iteration of the Affordability Assessment:

Better Define Affordability Scope

The State Water Board will begin conducting targeted stakeholder engagement to better define the scope of the Affordability Assessment.

Improved Data Collection Efforts

The State Water Board has already begun taking necessary steps to improve data coverage and accuracy for the Affordability Assessment. Improvements to the 2020 reporting year EAR include new requirements for completing survey questions focused on customer charges and affordability.¹⁴ EAR functionality has been developed that will help auto-calculate average customer charges for 6 HCF, which will help reduce data errors. Furthermore, the EAR will be able to better distinguish between water systems that do not charge for water compared to those that do.

Refinement of Affordability Indicators and Thresholds

During the Risk Assessment methodology development process, three additional Affordability indicators were recommended for inclusion in future iterations of the Risk Assessment and, potentially, the Affordability Assessment as well:¹⁵ 'Household Burden Indicator,' 'Poverty Prevalence Indicator,' and 'Housing Burden.'¹⁶ The State Water Board will begin conducting

¹⁴ [Electronic Annual Report \(EAR\) | California State Water Resources Control Board](https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/ear.html)
https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/ear.html

¹⁵ October 7, 2020 White Paper:

[Evaluation of Potential Indicators and Recommendations for Risk Assessment 2.0 for Public Water Systems](https://www.waterboards.ca.gov/safer/docs/e_p_i_recommendations_risk_assessment_2_public_water_systems.pdf)
https://www.waterboards.ca.gov/safer/docs/e_p_i_recommendations_risk_assessment_2_public_water_systems.pdf

¹⁶ *Household Burden Indicator*: This indicator measures the economic burden that relatively low income households face in paying their water service costs by focusing on the percent of these costs to the 20th percentile income (i.e. the Lowest Quintile of Income (LQI) for the service area). This indicator is calculated by adding the average drinking water customer charges, dividing them by the 20th Percentile income in a community water system, and multiplying this by one hundred.

the proper research and stakeholder engagement needed to develop the appropriate affordability thresholds necessary for inclusion in the Risk Assessment and potentially the Affordability Assessment as well.

Improved Aggregated Assessment

Moving forward, the State Water Board will explore the possibility of developing a singular Affordability Threshold that can then be applied to a combined assessment of the identified affordability indicators.

Further consideration will also be given to how systems that do not charge for water services or have extremely low customer charges should be assessed for affordability and more broadly for risk. These systems may be more at-risk for falling out of water quality compliance or may be imposing affordability burdens on their customers through other means other than customer charges.

Poverty Prevalence Indicator: This indicator measures the percentage of population served by a community water system that lives at or below 200% the Federal Poverty Level. This measurement indicates the degree to which relative poverty is prevalent in the community.

Housing Burden: This indicator measures the percent of households in a water system's service area that are both low income and severely burdened by housing costs (paying greater than 50% of their income for housing costs). This metric is intended to serve as an indicator of the affordability challenges low-income households face with respect to other non-discretionary expenses, which may impact their ability to pay for drinking water services.

APPENDIX E: AFFORDABILITY ASSESSMENT METHODOLOGY

INTRODUCTION

The purpose of the Affordability Assessment is to identify disadvantaged community (DAC) and severely disadvantaged community (SDAC) water systems, that have instituted customer charges that exceed the “Affordability Threshold” established by the State Water Board in order to provide drinking water that meets State and Federal standards.¹⁷

The Affordability Assessment is conducted annually for all Californian community water systems. It is worth noting that, while there is some overlap, the systems included in the Affordability Assessment differ from the list of water systems analyzed in the Risk Assessment for public water systems. The Affordability Assessment includes large and small community water systems but excludes non-transient, non-community water systems, like schools. The Risk Assessment, on the other hand, analyzed smaller public water systems with 3,300 service connections or less and non-transient, non-community K-12 schools are included. Both assessments exclude all transient water systems, state small water systems and domestic wells. Table E1 provides an overview of the systems included in the Affordability Assessment.

Table E1: Systems Included in the Affordability Assessment

SAFER Program Status	Risk Assessment	Affordability Assessment
HR2W List Systems	326	276
At-Risk Systems	617	467
Not HR2W or At-Risk System	1,836	2,134
TOTAL:	2,779	2,877

The difference in the number of HR2W list systems and At-Risk systems between the Risk Assessment and Affordability Assessment in Table E1 demonstrates the impact of the type of systems analyzed. For example, schools on the HR2W list were not assessed for affordability and make up a large portion of the change in numbers assessed between the two pieces of the Needs Assessment.

¹⁷ California Health and Safety Code, § 116769, subd. (a)(2)(B)

AFFORDABILITY ASSESSMENT METHODOLOGY DEVELOPMENT PROCESS

From April through October 2020, the State Water Board and UCLA conducted extensive research and public engagement to identify potential affordability indicators that could be used to assess affordability challenges in both the Risk Assessment and Affordability Assessment. This effort identified 23 potential affordability indicators (white paper, Table 10)¹⁸ and six were ultimately recommended (Table E2). Three of the recommended affordability indicators were not used in either the 2021 Risk Assessment or the Affordability Assessment because the State Water Board did not have sufficient time to conduct the proper research and stakeholder engagement needed to develop appropriate affordability thresholds for the 2021 Needs Assessment. The State Water Board will begin conducting the proper research and stakeholder engagement needed to develop the appropriate affordability thresholds necessary for inclusion in the Risk Assessment and potentially the Affordability Assessment as well.

Table E2: Recommended Affordability Indicators

Affordability Indicator	Affordability Assessment
Percent of Median Household Income (%MHI)	2020, 2021
Extreme Water Bill	2021
% Shut-Offs	2021
Household Burden Indicator (HBI)	<i>Future</i>
Poverty Prevalence Indicator (PPI)	<i>Future</i>
Housing Burden	<i>Future</i>

AFFORDABILITY ASSESSMENT METHODOLOGY

In 2020, the State Water Board conducted an Affordability Assessment for community water systems, which analyzed one affordability indicator, water charges as a percent of median household income (%MHI), for the FY 2020-21 Safe and Affordable Drinking Water Fund Expenditure Plan. The Fund Expenditure Plan used an affordability threshold of 1.5% MHI to identify DAC water systems that may have customer charges that are unaffordable.¹⁹

For the 2021 Needs Assessment, the State Water Board explored additional affordability indicators to identify DACs and SDACs that may be experiencing affordability challenges.

¹⁸ [White Paper: Evaluation of Potential Indicators and Recommendations for Risk Assessment 2.0 for Public Water Systems](https://www.waterboards.ca.gov/safer/docs/e_p_i_recommendations_risk_assessment_2_public_water_systems.pdf)

https://www.waterboards.ca.gov/safer/docs/e_p_i_recommendations_risk_assessment_2_public_water_systems.pdf

¹⁹ [FY 2020-21 Fund Expenditure Plan](https://www.waterboards.ca.gov/water_issues/programs/grants_loans/sustainable_water_solutions/docs/sadwfep_2020_07_07.pdf)

https://www.waterboards.ca.gov/water_issues/programs/grants_loans/sustainable_water_solutions/docs/sadwfep_2020_07_07.pdf

Ultimately, the affordability indicators “Extreme Water Bill” and “% Shut-Offs” were included in the 2021 Risk Assessment and Affordability Assessment alongside %MHI. The State Water Board analyzed all three affordability indicators for the Affordability Assessment and applied the same thresholds as utilized in the Risk Assessment (summarized in the sections below).

Additional analysis was conducted to identify the DAC and SDAC water systems, HR2W list systems, and At-Risk water systems that met more than one affordability indicator threshold. Scores of 0 (no threshold met), 1 (lower “minimum” threshold met), and 1.5 (higher “maximum” threshold met) were applied to each affordability indicator threshold and tallied across the three indicators for each system to identify which systems may be facing the greatest affordability challenges.

DAC & SDAC DETERMINATION

SB 200 requires the identification of DAC systems that meet the Affordability Threshold. For the purposes of the Affordability Assessment, the State Water Board determined DAC and SDAC economic status for water systems using available data.

Disadvantaged Community or DAC mean the entire service area of a community water system, or a community therein, in which the MHI is less than 80% of the statewide annual MHI level.

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 MHI.

The State Water Board used the methodology detailed below to estimate MHI. **It is important to note that the estimated designation of community economic status is for the purposes of the Affordability Assessment only and will not be used by the State Water Board’s Division of Financial Assistance (DFA) to make funding decisions.** Further MHI analysis on a per system basis will be conducted by DFA when a system seeks State Water Board assistance.

Table E3: Water System Community Economic Status for the Affordability Assessment

Community Economic Status	Total Systems	HR2W List Systems	At-Risk Systems
DAC	578	45	103
SDAC	993	142	189
Non-DAC	1,210	76	161
Missing DAC Status	96	13	14
TOTAL:	2,877	276	467

AFFORDABILITY INDICATORS

% MEDIAN HOUSEHOLD INCOME

This indicator measures the annual system-wide average residential water bill for 6 Hundred Cubic Feet (HCF) per month relative to the annual Median Household Income (MHI) within a water system's service area. To calculate %MHI for individual water systems, MHI must be determined for the water service area and customer charges are needed. The following section provides an overview of how the State Water Board determined these two datapoints and calculated %MHI.

Calculation Methodology

Required Risk Indicator Data Points & Sources:

- Water system service area boundaries: System Area Boundary Layer (SABL).²⁰
- 2015-2019 block group-Income: U.S. Census Bureau's American Community Survey.
- Drinking Water Customer Charges: Electronic Annual Report (EAR).

Average monthly drinking water customer charges is collected through the EAR. However, this data has historically not been required for reporting. Therefore, the 2019 EAR data had coverage and accuracy issues. The State Water Board attempted to validate and supplement this dataset through a water rate survey conducted in November 2020. Additionally, customer charges data was collected through the UNC EFC's development of the Small Water System's Rates Dashboard. This data was used when available and applicable. It is anticipated that the coverage and accuracy of drinking water customer charges data will improve with the revisions made to the 2020 reporting year EAR.

Risk Indicator Calculation Methodology:

Median household income (MHI) is determined for a water system using American Community Survey data for household income. Community Water System boundaries typically do not align with census boundaries where per capita income data is regularly collected. In order to assign an average median household income to a community water system spatially weighted income data is aggregated by census block group within the water system service area.

The methodology for this indicator was based on the Division of Financial Assistance (DFA) MHI methodology. While the MHI calculation methodology for the Affordability Assessment generally aligns with the DFA MHI determination methodologies, there are slight differences. The differences found in the calculation of MHI's for cities and census designated places and in the application of the Margin of Error (MOE).

The DFA methodology dictates that when it is determined that a system boundary exactly matches city boundaries or closely matches a census designated place boundary, the MHI for

²⁰ State Water Board [System Area Boundary Layer \(SABL\)](https://gispublic.waterboards.ca.gov/portal/apps/webappviewer/index.html?id=272351aa7db14435989647a86e6d3ad8)

<https://gispublic.waterboards.ca.gov/portal/apps/webappviewer/index.html?id=272351aa7db14435989647a86e6d3ad8>

the entire city or census designated place should be directly applied to the system rather than using areally-interpolated block group data. This likely leads to more accurate MHI estimation in these cases. However, this method was not used in the Affordability Assessment given that a case by case determination of matching of cities and census designated places to system boundaries was not feasible for the entire state. The MHI for each water system is a population-weighted MHI, using census block group area and population data. A population factor is generated based on the area of each census block group that falls within the water system boundary. The water system MHI is then calculated using population-adjusted MHIs for each census block group that falls within the water system boundary using the formula below:

$$\sum \frac{(Block\ Group\ MHI) \times (Adjusted\ Block\ Group\ Population)}{(Total\ Adjusted\ Block\ Groups\ Population)}$$

MOE for MHI American Community Survey data is also included in the MHI calculation. A population adjusted MOE is found using the same methodology described for MHI. The lower range of the MOE will be applied to a community’s estimated MHI up to a maximum MOE value of \$7,500 for communities with more than 500 people and \$15,000 for communities with 500 or fewer people. The MOE will be subtracted from the estimated MHI.

The DFA methodology uses a lower bound MHI by subtracting the block group MOE from the block group MHI, with limits based on community size prior to applying the population factor to MHI and MOE. The methodology applied in the Needs Assessment set margin of error limits and then applied them to population adjusted MHI figures, resulting in slightly different community water system MHI calculations than the DAF methodology.

As a result of these slight variations and the changing nature of household income, all funding related financial assessments must be completed by the DFA as their assessments are water system specific as opposed to the aggregated analysis done for the purposes of the Needs Assessment.

Average monthly drinking water customer charges are calculated using:

- Drinking water service costs estimated at 6 Hundred Cubic Feet per month. This level of consumption is in line with statewide conservation goals of 55 gallons per capita per day, in an average 3-person household.
- When data becomes available, additional approximated customer charges (not collected through a customer’s bill) will be added to this figure to calculate Total Drinking Water Customer Charges.

$$\%MHI = [Average\ Monthly\ Drinking\ Water\ Changes] / [MHI]$$

Threshold Determination

%MHI is commonly used by state and Federal regulatory agencies and by water industry stakeholders for assessing community-wide water charges affordability for decades. %MHI is utilized by the State Water Board (at 1.5% threshold) and the U.S. EPA (at 2.5% threshold) for assessing affordability. The State Water Board and DWR use %MHI to determine

Disadvantaged Community (DAC) status, among other income-related metrics. DAC status is often used to inform funding eligibilities for different financial programs offered by the State and other agencies. OEHHA’s Human Right to Water (HR2W) tool also utilizes²¹ the thresholds determined by the State Water Board for this indicator.²² Other states, including North Carolina,²³ presently or have recently used 1.5% of MHI spent on water and sewer costs as a threshold for water system funding decisions.

Table E4: % MHI Affordability Thresholds

Threshold Number	Threshold	Score
0	Below 1.5% MHI	0
1	1.5% to 2.49% MHI	1
2	2.5% MHI or greater	1.5

Indicator Analysis

State Water Board staff analyzed 2,877 community water systems, of which approximately 118 CWSs lacked the data necessary to estimate water rates and 83 water systems lacked the data to estimate MHI. Of the 2,676 water systems with sufficient data, staff identified 592 water systems that exceeded the 1.5% MHI affordability threshold, 222 of which exceeded 2.5% MHI. Of those, 121 systems were identified that serve DACs and 313 systems that serve SDACs. Tables E5 and E6 summarize the full results of this indicator analysis. The tables of the full results from the affordability threshold calculations are included in Attachment E1.²⁴

Table E5: % MHI Assessment Results by Community Status

Community Status	Total Systems	Threshold Not Met	Threshold 1 Met (1.5%)	Threshold 2 Met (2.5%)
DAC	570	449 (79%)	89 (15%)	32 (6%)
SDAC	902	589 (65%)	161 (18%)	152 (17%)
Non-DAC	1,204	1,046 (87%)	120 (10%)	38 (3%)

²¹ On the other hand, there has been criticism of this metric by academics, water system associations, and the broader water sector mostly around its accuracy in measuring household affordability for those truly in need and the setting of arbitrary %MHI thresholds, limitations which the U.S. EPA has recently acknowledged.

²² Arkansas Natural Resources Commission (2020). [Safe Drinking Water Fund Intended Use Plan SFY 2019](https://www.agriculture.arkansas.gov/wp-content/uploads/2020/05/0_-_2019_DWSRF_IUP_-_AMENDED_January_2019_01082019_1156hrs.pdf): https://www.agriculture.arkansas.gov/wp-content/uploads/2020/05/0_-_2019_DWSRF_IUP_-_AMENDED_January_2019_01082019_1156hrs.pdf

²³ North Carolina Department of Environmental Quality, [Joint Legislative Economic Development and Global Engagement Oversight Committee \(March 17, 2016\)](https://www.ncleg.gov/DocumentSites/Committees/JLEDGEOC/2015-2016/Meeting%20Documents/3%20-%20March%2017,%202016/2%20%20DEQ_Kim%20Colson%20Water%20Infrastructure%20JLOC%20EDGE%2020160317.pdf): https://www.ncleg.gov/DocumentSites/Committees/JLEDGEOC/2015-2016/Meeting%20Documents/3%20-%20March%2017,%202016/2%20%20DEQ_Kim%20Colson%20Water%20Infrastructure%20JLOC%20EDGE%2020160317.pdf

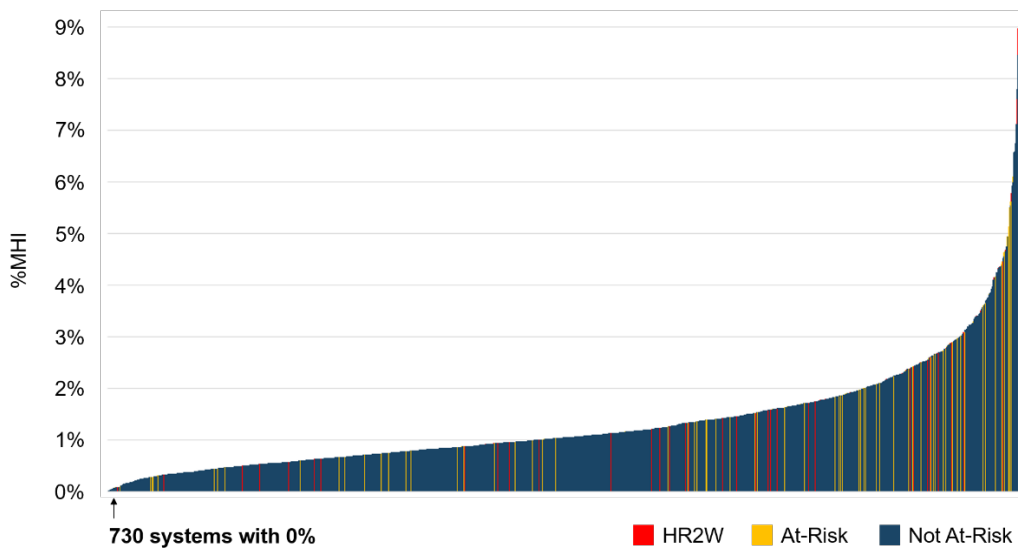
²⁴ [Attachment E1: 2021 Affordability Assessment Data](https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/docs/e1.xlsx)
https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/docs/e1.xlsx

Community Status	Total Systems	Threshold Not Met	Threshold 1 Met (1.5%)	Threshold 2 Met (2.5%)
TOTAL:	2,676	2,084 (78%)	370 (14%)	222 (8%)
<i>Missing Data</i>	201			

Table E6: %MHI Assessment Results by Water System SAFER Program Status

SAFER Program Status	Total Systems	Threshold Not Met	Threshold 1 Met (1.5%)	Threshold 2 Met (2.5%)
HR2W Systems	256	179 (70%)	45 (18%)	32 (12%)
HR2W DAC	43	33	5	5
HR2W SDAC	137	81	33	23
At-Risk Systems	434	315 (73%)	64 (15%)	55 (13%)
At-Risk DAC	103	83	15	5
At-Risk SDAC	172	109	23	40
Not HR2W or At-Risk System	1,986	1,590 (80%)	261 (13%)	135 (7%)
DAC	424	333	69	22
SDAC	593	399	105	89
TOTAL:	2,676	2,084 (78%)	370 (14%)	222 (8%)
<i>Missing Data</i>	201			

Figure E1: Distribution of %MHI, Excluding 12 Systems Above 10% (n=2,664)



EXTREME WATER BILL

This indicator measures drinking water customer charges that meet or exceed 150% of statewide average drinking water customer charges at the 6 Hundred Cubic Feet (HCF) level of consumption.

Calculation Methodology

Required Risk Indicator Data Points & Sources:

- Drinking Water Customer Charges: EAR
- Other Customer Charges: EAR

Average monthly drinking water customer charges is collected through the EAR. However, this data has historically not been required for reporting. Therefore, the 2019 EAR data had coverage and accuracy issues. The State Water Board attempted to validate and supplement this dataset through a water rate survey conducted in November 2020. Additionally, customer charges data was collected through the UNC EFC's development of the Small Water System's Rates Dashboard. This data was used when available and applicable. It is anticipated that the coverage and accuracy of drinking water customer charges data will improve with the revisions made to the 2020 reporting year EAR.

Risk Indicator Calculation Methodology:

Extreme Water Bill for a water system is determined using Average Monthly 6 HCF Drinking Water Customer Charges and Other Customer Charges divided by the State's Monthly Average Drinking Water Charges. The Risk Assessment is applied to water systems with less than 3,300 service connections, however, this methodology utilizes the statewide average customer charges to calculate extreme water bill, which includes systems with greater than 3,300 connections.

Threshold Determination

The State Water Board's AB 401 report²⁵ recommended statewide low-income rate assistance program elements utilize the two recommended tiered indicator thresholds of 150% and 200% of the state average drinking water bill for 6 CCF of service.

Table E7: Extreme Water Bill Affordability Thresholds

Threshold Number	Threshold	Score
0	Below 150% of the statewide average.	0
1	Greater than 150% of the statewide average.	1
2	Greater than 200% of the statewide average.	1.5

²⁵ AB 401 Final Report "[Recommendations for Implementation of a Statewide Low-Income Water Rate Assistance Program](https://www.waterboards.ca.gov/water_issues/programs/conservation_portal/assistance/docs/ab401_report.pdf)"

https://www.waterboards.ca.gov/water_issues/programs/conservation_portal/assistance/docs/ab401_report.pdf

Indicator Analysis

State Water Board staff analyzed 2,877 community water systems, of which approximately 118 water systems lacked the data necessary to estimate water rates. Of the 2,759 water systems with sufficient data, staff identified 628 systems that exceeded the 150% statewide MHI affordability threshold and 365 of those systems exceeded the 200% statewide MHI threshold. Of those that exceeded the 150% MHI affordability threshold, 113 systems were identified that serve DACs and 122 that serve SDACs. Tables E8 and E9 summarize the full results of this indicator analysis. The tables of the full results from the affordability threshold calculations are included in Attachment E1.²⁶

Table E8: Extreme Water Bill Assessment Results by Community Status

Community Status	Total Systems	Threshold Not Met	Threshold 1 Met (150%)	Threshold 2 Met (250%)
DAC	570	457 (80%)	57 (10%)	56 (10%)
SDAC	985	863 (88%)	60 (6%)	62 (6%)
Non-DAC	1,204	811 (67%)	146 (12%)	247 (21%)
TOTAL:	2,759	2,131 (77%)	263 (10%)	365 (13%)
<i>Missing Data</i>	118			

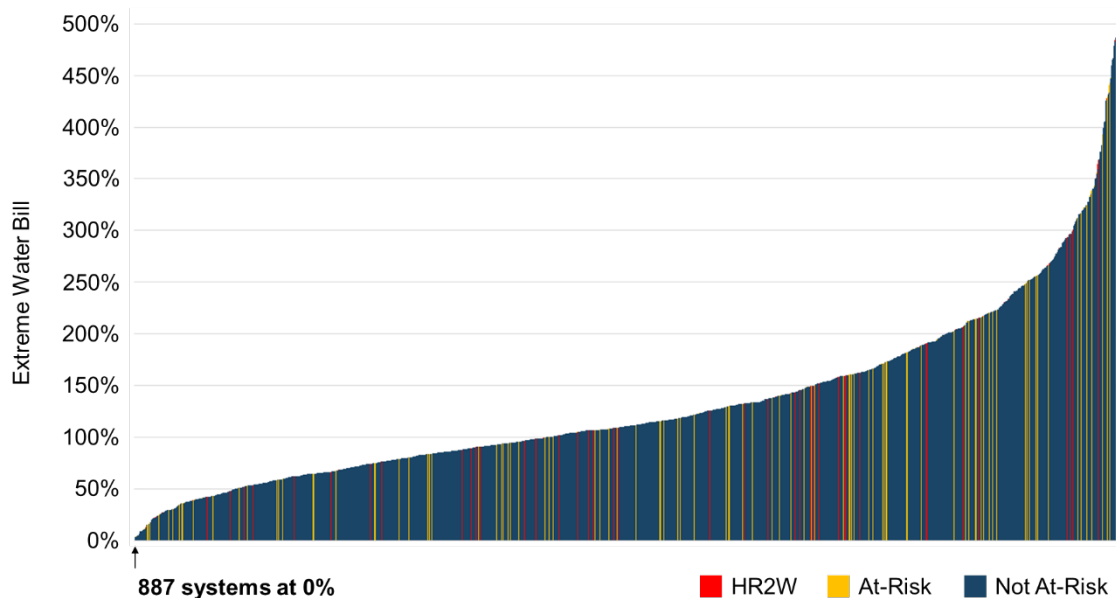
Table E9: Extreme Water Bill Assessment Results by Water System SAFER Program Status

SAFER Program Status	Total Systems	Threshold Not Met	Threshold 1 Met (150%)	Threshold 2 Met (250%)
HR2W Systems	259	205 (79%)	25 (10%)	29 (11%)
HR2W DAC	43	33	4	6
HR2W SDAC	140	120	12	8
At-Risk Systems	449	343 (76%)	39 (9%)	67 (15%)
At-Risk DAC	103	84	10	9
At-Risk SDAC	187	154	16	17
Not HR2W or At-Risk System	2,051	1,583 (77%)	199 (10%)	269 (13%)
DAC	658	340	43	41
SDAC	424	589	32	37
TOTAL:	2,759	2,131 (77%)	263 (10%)	365 (13%)
<i>Missing Data</i>	118			

²⁶ [Attachment E1: 2021 Affordability Assessment Data](#)

https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/docs/e1.xlsx

Figure E2: Distribution of Extreme Water Bill, Excluding 23 Systems Above 500% (n=2,736)



% SHUT-OFFS

Percentage of residential customer base with service shut-offs due to non-payment in a given year.

Calculation Methodology

Required Risk Indicator Data Points & Sources:

- Number of residential service connections with water shut-off more than once due to failure to pay: EAR
 - Total Single-Family Shut-offs
 - Total Multi-Family Shut-offs
- Total Number of Service Connections: EAR

Risk Indicator Calculation Methodology:

% Shut-Offs = $\left(\frac{\text{Total Single-Family Shut-offs} + \text{Total Multi-Family Shut-offs}}{\text{Total Number of Service Connections}} \right) \times 100$

Threshold Determination

An indicator threshold for the percent of residential service connections shut-off due to non-payment, as defined here or a similar measure, has not to the State Water Board’s knowledge been assessed in other previous studies as related to water system failure or to determine

affordability challenges. However, a standard of zero has been employed by the State,²⁷ other regulatory agencies and stakeholders as a threshold of concern particularly during the COVID-19 pandemic. For the purposes of the State Water Board’s Needs Assessment a threshold of 10% or greater customer shut-offs over the last calendar year for non-payment was utilized.

Table E10: % Shut-Offs Affordability Thresholds

Threshold Number	Threshold	Score
0	Below 10% customer shut-offs	0
1	Greater 10% or greater customer shut-offs.	1

Indicator Analysis

State Water Board staff analyzed 2,877 community water systems, of which approximately 49 water systems lacked the data necessary estimate the percent of customers who had their services shut-off due to non-payment. Of the 2,828 water systems with sufficient data, staff identified 139 systems that exceeded the 10% or greater shut-offs for non-payment affordability threshold. Of those, 35 systems were identified that serve DACs and 62 that serve SDACs. Tables E11 and E12 summarize the full results of this indicator analysis. The tables of the full results from the affordability threshold calculations are included in Attachment E1.²⁸

Table E11: % Shut-Offs Assessment Results by Community Status

Community Status	Total Systems	Threshold Not Met	Threshold Met (10% or more)
DAC	569	534 (94%)	35 (6%)
SDAC	974	912 (94%)	62 (6%)
Non-DAC	1,199	1,159 (97%)	40 (3%)
Missing DAC Status	86	84 (98%)	2 (2%)
TOTAL:	2,828	2,689 (95%)	139 (5%)
<i>Missing Data</i>	49		

²⁷ [Executive Order N-42-20](https://www.gov.ca.gov/wp-content/uploads/2020/04/4.2.20-EO-N-42-20-text.pdf)
<https://www.gov.ca.gov/wp-content/uploads/2020/04/4.2.20-EO-N-42-20-text.pdf>

²⁸ [Attachment E1: 2021 Affordability Assessment Data](https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/docs/e1.xlsx)
https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/docs/e1.xlsx

Table E12: % Shut-Offs Assessment Results by Water System SAFER Program Status

SAFER Program Status	Total Systems	Threshold Not Met	Threshold Met (10% or more)
HR2W Systems	271	250 (92%)	21 (8%)
HR2W DAC	43	39	4
HR2W SDAC	139	126	13
At-Risk Systems	457	440 (96%)	17 (4%)
At-Risk DAC	102	100	2
At-Risk SDAC	186	174	12
Not HR2W or At-Risk System	2,100	1,999 (95%)	101 (5%)
DAC	424	612	29
SDAC	649	395	37
TOTAL:	2,828	2,689 (95%)	139 (5%)
<i>Missing Data</i>	49		

Figure E3: Distribution of % Shut-Off, Excluding 54 systems with Shut-Offs above 50% (n=2,774)

