



Draft White Paper Discussion on Proposed Recommendations for the Drinking Water Needs Assessment Affordability Indicators

September 2022

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I. Summary

The State Water Resources Control Board (State Water Board) and the Office of Environmental Health Hazard Assessment (OEHHA) are conducting three public workshops on proposed enhancements to the affordability indicators for the 2023 Drinking Water Needs Assessment¹ (Needs Assessment) and for future Needs Assessments. Workshop 1 was held on August 11, 2022. Workshop 2 is being held on September 20, 2020, and Workshop 3 is being held on November 1, 2022. Registration can be found on the SAFER Needs Assessment page.² The goals of this white paper, which complements Workshop 2, is to:

- 1) Discuss implications of expanding the methodology and thresholds used to identify disadvantaged community (DAC) and severely disadvantaged community (SDAC) to include regional variations in income.
- 2) Discuss potential affordability indicators:
 - a. Four indicators are being recommended to be included in the 2023 Needs Assessment: Percent Median Household Income (%MHI), Extreme Water Bill, Housing-Burdened Low-Income Households (Housing Burden), and Poverty. Additional affordability indicators are explored in this white paper for future iterations of the Needs Assessment when data become available.

These recommendations will be discussed in Workshop 2 and options to define the Affordability Threshold will be discussed in Workshop 3. Along with these three workshops, the State Water Board and OEHHA will continue to host public workshops to provide opportunities for stakeholders to learn about and contribute to the State Water Board's efforts to develop affordability indicators.

II. Introduction

The annual Drinking Water Needs Assessment is an analysis conducted by the State Water Board to help inform the implementation of the Safe and Affordable Funding for Equity and Resilience (SAFER) Program. The State Water Board has developed methodologies and indicators to identify At-Risk community water systems (CWSs), K-12 schools, state small water systems (SSWSs) and domestic well (DW) users. The

¹ [2022 Needs Assessment](https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/needs/2022needsassessment.pdf).

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

² https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/needs.html

State Water Board's Needs Assessment consists of three core components: the Risk Assessment, Cost Assessment, and Affordability Assessment.

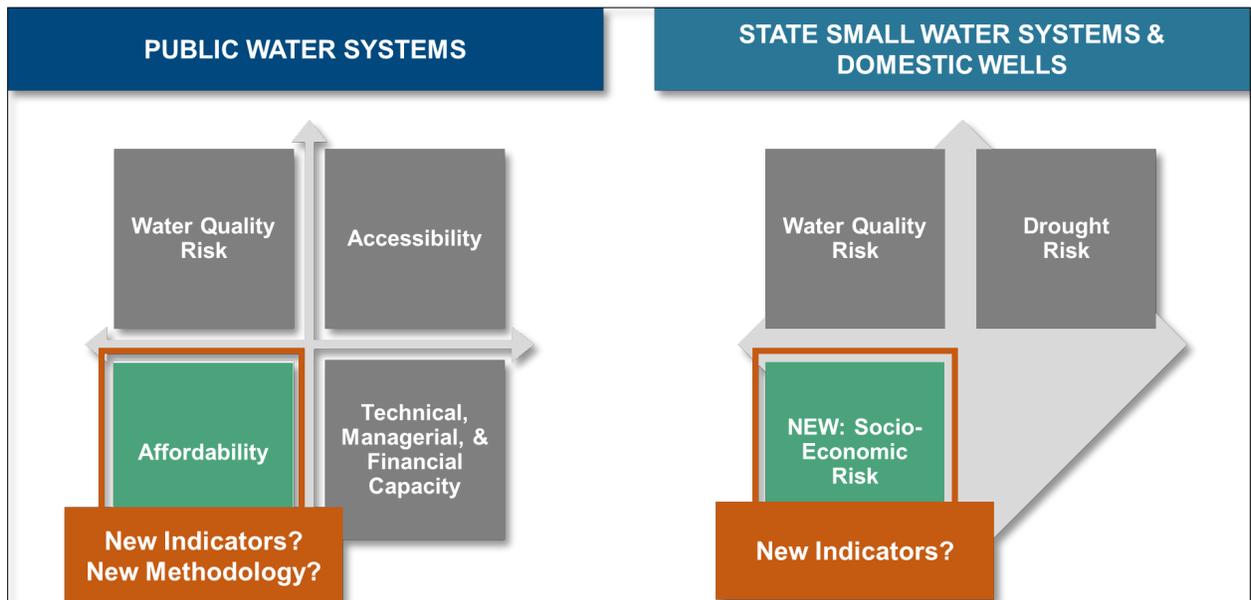
The Needs Assessment is used by the State Water Board and the SAFER Advisory Group³ to inform prioritization of public water systems, SSWSs, and DWs for funding in the SAFER Expenditure Plan⁴; inform direction for State Water Board technical assistance; and to develop strategies for implementing interim and long-term solutions. Although they are included in the Needs Assessment, the State Water Board does not have regulatory authority over SSWSs or DWs. Counties are responsible for permitting and inspections of SSWSs and DWs, and Counties may provide resources to support communities served by them.

The Needs Assessment utilizes measures of drinking water affordability in both the Affordability Assessment and the Risk Assessment. The purpose of the Affordability Assessment is to identify communities that may struggle to pay for drinking water. The Affordability Assessment is conducted for all community water systems. The Risk Assessment uses the affordability indicators, in conjunction with water quality, accessibility, and TMF (technical, managerial, and financial) capacity indicators, to identify small and medium-sized community water systems and K-12 schools that are at risk of failing (See Figure 1 below).

³ [SAFER Advisory Group](https://www.waterboards.ca.gov/safer/advisory_group.html). https://www.waterboards.ca.gov/safer/advisory_group.html

⁴ [SAFER Fund Expenditure Plan](https://www.waterboards.ca.gov/water_issues/programs/grants_loans/sustainable_water_solutions/safer.html). https://www.waterboards.ca.gov/water_issues/programs/grants_loans/sustainable_water_solutions/safer.html

Figure 1: Goals for 2023 Risk Assessment—Affordability Indicators



Specifically for the Affordability Assessment, Senate Bill 200 requires the identification of DAC and SDAC systems that meet the Affordability Threshold. For the purposes of the Affordability Assessment, the State Water Board currently determines DAC and SDAC economic status, Step 1 of the process, for water systems using available data. DAC means the entire service area of a community water system, or a community therein, in which the median household income (MHI) is less than 80% of the statewide annual MHI level. SDAC means the entire service area of a community water system in which the MHI is less than 60% of the statewide MHI. Step 1 identifies 1,366 CWSs (48% of all 2,686 CWSs) that are DAC and SDAC⁵. This means that 52% of CWSs are not evaluated in the Affordability Assessment. This white paper critically examines the currently used approach and explores options for expanding the DAC and SDAC determination method to include regional cost of living differences.

Out of the 1,366 CWSs that are identified as DAC or SDAC, 836 systems (61%) charge for water. This excludes a total of 71% of 2,868 CWSs from the Affordability Assessment since systems that do not meet the DAC/SDAC criteria and that do not charge for water are not identified in the Affordability Assessment. However, many of them may still face affordability challenges, which supports the need for re-evaluating

⁵ [2022 Drinking Water Needs Assessment](https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/needs/2022needsassessment.pdf).

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

the DAC/SDAC methodology as well as incorporating non-rate-based affordability indicators.

Stakeholder feedback regarding the use of MHI has also been raised throughout the processes of re-evaluating affordability indicators for use in the Needs Assessment. While MHI has been widely used in regulation and historically to measure affordability, the use of MHI may not capture low-income households and communities that struggle to pay their water bills, especially in high-income service areas. This metric does not account for differences in cost of living and does not consider household size. To address these concerns, stakeholders identified alternative metrics for measuring affordability during Needs Assessment workshops hosted in 2019 and 2020. The State Water Board has partnered with the OEHHA to explore these previously identified metrics and new metrics and approaches for measuring affordability. The current affordability workshops and discussion on appropriate affordability metrics will help inform future data to be required to be submitted to the State Water Board by community water systems (such as arrearage and/or shut-off data).

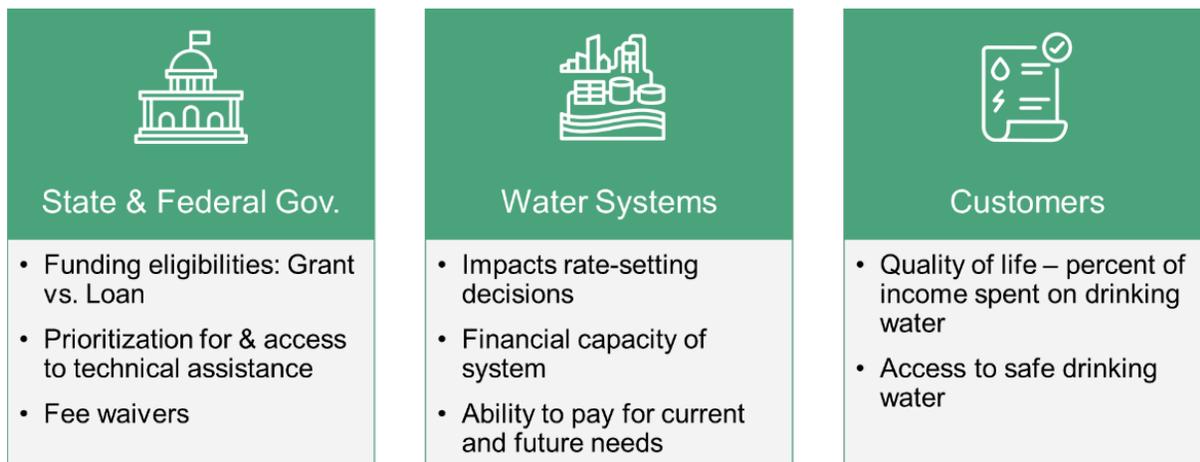
Historically, the Needs Assessment has not included affordability indicators in the Risk Assessment for SSWs and DW communities. Based on stakeholder feedback, the State Water Board and OEHHA are exploring potential affordability indicators, applicable to SSWs and DWs, for inclusion in the Needs Assessment. OEHHA has been exploring new affordability and socio-economic metrics that can be applicable to these communities.

III. Why Measuring Drinking Water Affordability Matters

While there are many existing or emerging programs and efforts to mitigate drinking water affordability challenges, it is important to step back and examine why measuring drinking water affordability is important. Affordability is difficult to measure and discuss. Different terms and metrics have been used to describe affordability in the water sector for decades, and they have been used to influence important decisions. For instance, affordability metrics are used to determine which communities or water systems are eligible for state and federal assistance. Water systems meeting certain affordability thresholds qualify for more grant vs. loan funding for infrastructure projects. These systems and communities are frequently prioritized for state and federal technical assistance as well.

Affordability metrics are often used by water systems when exploring possible rate changes. Systems serving communities with affordability challenges often struggle to raise their rates, thus affecting their long-term financial capacity. Customers unable to pay their water bill or unable to maintain their domestic well may then experience challenges in accessing a reliable source of safe drinking water (See Figure 2 below).

Figure 2: Why Measuring Affordability Matters



To better navigate the different metrics and approaches used to measure affordability, the State Water Board developed Figure 3 to illustrate the nexus of affordability definitions that exist.

Figure 3: Nexus of Affordability Definitions



Affordability indicators can be categorized into the following three categories which describe affordability burden at the household level, at the community level and for the water system to financially be able to sustain itself and meet safe drinking water standards.

- (1) **Household Affordability:** The ability of individual households to pay for an adequate supply of water.
- (2) **Community Affordability:** The ability of households collectively 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.

When exploring potential affordability indicators, it is important to distinguish between indicators that rely on the “price” of water services (rate-based indicators) and those that do not (non-rate-based indicators). California has 691 or 24.1% CWSs that do not charge their customers directly for drinking water services (e.g., mobile home parks that imbed water charges into their rent). Furthermore, SSWs and DWs also do not charge customers directly for water, but affordability challenges affect the ability of these communities to effectively maintain their systems.

- (1) **Rate-Based Affordability Indicators:** rate-based indicators include cost information (water bills for CWSs) in their calculation.
- (2) **Non-Rate-Based Affordability Indicators:** non-rate-based indicators are any indicator of affordability that does not use cost information.

IV. History of Measuring Affordability in the SAFER Needs Assessment

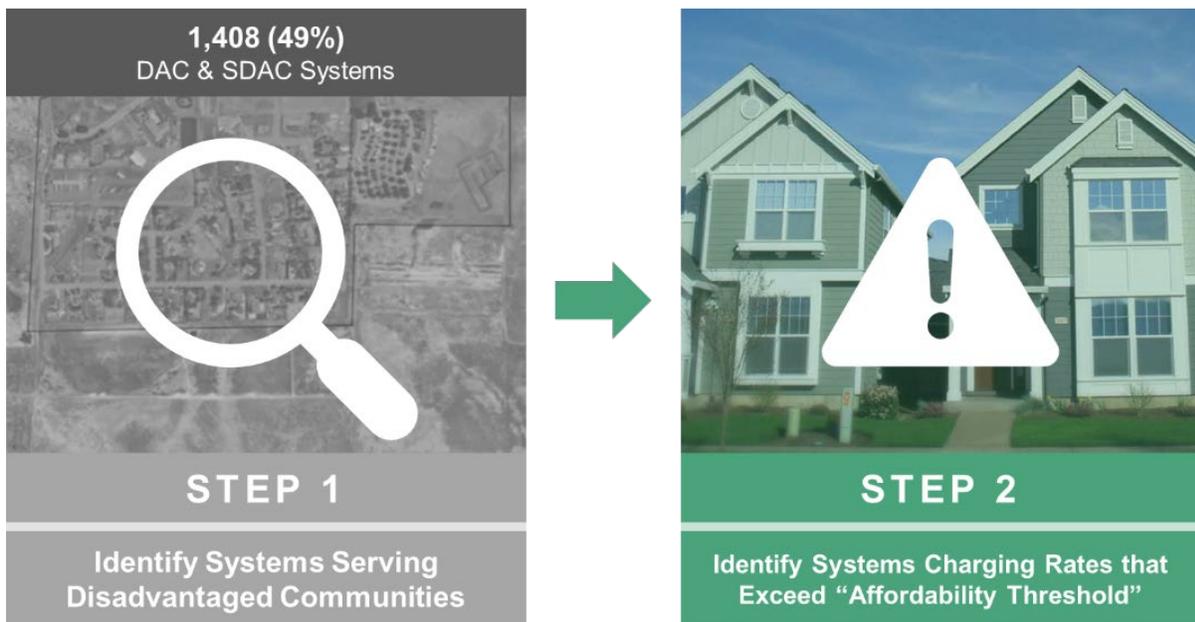
Senate Bill 200 requires that the State Water Board:

STEP 1: Identify DAC water systems that have instituted customer charges.

STEP 2: Of these DAC water systems, the State Water Board must identify those that exceed an “Affordability Threshold” in order to provide drinking water that meets State and Federal standards (Health and Safety Code Section 116769(a)(2)(B)).

In Step 1 of this process, DAC and SDAC communities are currently identified using U.S. Census (Census) MHI data within a system’s service area. Currently, a water system is a DAC if the average MHI of the water system service area is below 80% of the statewide MHI and it is considered to be an SDAC if the average MHI is below 60% of the statewide MHI.

Figure 4. Steps for the Affordability Assessment as defined by Senate Bill 200



In 2020, for Step 2, the State Water Board conducted an Affordability Assessment for community water systems for the FY 2020-21 Safe and Affordable Drinking Water Fund Expenditure Plan⁶. That analysis relied on one affordability indicator, water charges as a percent of median household income, referred to as %MHI. From April through October 2020, the State Water Board conducted extensive research and public engagement to identify other potential affordability indicators that could be used to identify DAC⁷ and SDAC⁸ that may be experiencing affordability challenges.⁹ This effort identified 23

⁶ 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: [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

⁷ 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.

⁸ 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.

⁹ 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 &

potential affordability indicators (white paper, Table 10).¹⁰ Due to limitations in data availability, the State Water Board selected two additional affordability indicators from the list of 23 to incorporate into the 2021 Risk Assessment and 2021 Affordability Assessment. These two indicators were: “Extreme Water Bill” and “% Shut-offs.”

In 2020, Governor Newsom issued an Executive Order that prohibited water shut-offs beginning March 4, 2020, through December 31, 2021, in response to the COVID-19 pandemic.¹¹ Therefore, data for ‘% Shut-offs’ was unavailable for the majority of 2020 and all of 2021. Thus, the State Water Board removed this affordability indicator from the 2022 Needs Assessment and will not be able to include it in the 2023 Needs Assessment.

In 2022, the State Water Board replaced “% Shut-offs” with two new affordability indicators: “Percentage of Residential Arrearages” and “Residential Arrearage¹² Burden.” These risk indicators were meant to identify water systems in communities that are experiencing household affordability challenges and are a direct measure of household drinking water affordability. Data for these two indicators came from a one-time customer assistance payment program conducted in the fall of 2021. The history of affordability indicators used in the Needs Assessment is shown in Table 1.

¹⁰ [White Paper: Evaluation of Potential Indicators and Recommendations for Risk Assessment 2.0 for Public Water Systems. 2020.](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

¹¹ [Governor Newsom Executive Order.](https://www.gov.ca.gov/2020/04/02/governor-newsom-issues-executive-order-protecting-homes-smallbusinesses-from-water-shutoffs/) <https://www.gov.ca.gov/2020/04/02/governor-newsom-issues-executive-order-protecting-homes-smallbusinesses-from-water-shutoffs/>

¹² 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.

Table 1: CWS Affordability Indicators 2020-2022¹³

Indicator	Definition	2020	2021	2022
Percent of Median Household Income (%MHI)	Annual system-wide average residential water bill for six hundred cubic feet (HCF) per month relative to the annual MHI within a water system’s service area.	X	X	X
Extreme Water Bill	Drinking water customer charges that meet or exceed 150% of statewide average drinking water customer charges at the six HCF level of consumption.		X	X
% Shut-Offs	Identifies water systems that have residential customers struggling to pay their water bills due to affordability challenges.		X	
Percentage of Residential Arrearages	Identifies water systems that have high percentage of their residential customers that have not paid their water bill and are at least 60 days or more past due. The higher the percentage of residential customers, the more vulnerable the community is to affordability challenges.			X
Residential Arrearage Burden	Identifies water systems that would have a high residential arrearage burden if they were to distribute their residential arrearages accrued during the COVID-19 pandemic period (March 4, 2020 through June 15, 2021) across their total residential rate base. This indicator measures how large of a burden non-payment is across the water system’s residential customers.			X

¹³ [Table 11 Source: 2022 State Water Resources Control Board Drinking Water Risk Assessment for Public Water Systems.](https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/needs/2022needsassessment.pdf)
https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/needs/2022needsassessment.pdf

V. Summary of Recommendations

The State Water Board and OEHHA are seeking stakeholder feedback on the following proposed changes to affordability indicators in the Needs Assessment for 2023 and beyond. These recommendations are further outlined in Section VII.

Determining Disadvantaged Community (DAC) Status (Step 1)

The current threshold for DAC determination is the statewide MHI. A water system is considered a DAC if its average MHI less than 80% of the statewide MHI and is considered a SDAC if it is less than 60% of the statewide MHI, as determined by Census data. Currently, 80% of the statewide MHI is \$62,938¹⁴ and 60% is \$47,203. Going forward, the State Water Board and OEHHA recommend that both county and state income thresholds be used to determine DAC and SDAC status for water systems. A water system would be considered a DAC or SDAC if they are either below the county low-income threshold for a family of four¹⁵ (from the Department of Housing and Community Development (HCD)) or if the system is below statewide low-income threshold (80% of statewide median income, as determined by the Census).

Conducting Affordability Assessment for Public Water Systems (Step 2)

For the 2023 Needs Assessment the State Water Board and OEHHA recommend the following:

- Add two new indicators of socio-economic burden: Housing Burden and Poverty. This allows for the inclusion of water systems that do not charge customers directly for water in the assessment.
- Continue to use the rate-based indicators of Water Bill Percent of Median Household Income (%MHI) and Extreme Water Bill.

For future assessments, the State Water Board and OEHHA recommends:

- Begin collecting residential arrearage and shut-off data in the State Water Board's Electronic Annual Report (EAR) survey to enable the incorporation of Percentage of Residential Arrearages, Residential Arrearage Burden, and shut-off metrics into future iterations of the Needs Assessment.

¹⁴ [The most recent MHI from the Census](https://www.census.gov/quickfacts/fact/table/CA/INC110220#INC110220) is for 2020 and is \$78,672. <https://www.census.gov/quickfacts/fact/table/CA/INC110220#INC110220>

¹⁵ [Housing and Community Development Income Limits](https://www.hcd.ca.gov/state-and-federal-income). <https://www.hcd.ca.gov/state-and-federal-income>

The State Water Board and OEHHA recommend incorporating two new indicators of socioeconomic burden: Housing Burden and Poverty, into the Risk Assessment for SWSs and DWs. In future assessments, the State Water Board and OEHHA will endeavor to incorporate measures of cost specific to SWSs and DWs. This may include:

- Indicators that measure costs associated with drilling a new well: drilling costs and permitting costs.
- Indicators that assess and quantify county funding resource availability to support SWSs and DWs.

VI. Summary of Feedback Received from Workshop 1

Summary of Workshop 1 Engagement

On August 11, 2022, the State Water Board hosted an online public webinar to obtain feedback on possible affordability metrics. The webinar provided an overview of the current methodologies for assessing DAC status and affordability criteria. Attendees included representatives of water companies/systems, government agencies, educational institutions, advocacy organizations, and the general public.

Attendees expressed some concern about boundary alignment with water systems and DACs and certain reporting and analysis requirements. Attendees also had questions about the relationship between the State Water Board's approach to measuring affordability compared to the metrics utilized by the California Public Utilities Commission (CPUC). Participants suggested consideration of the percentage or number of households on payment plans as a possible affordability metric. They also expressed concern with using shutoffs as a metric, as many households enter payment plans or pay off debts once service is cut off. The public also expressed concern for using the extreme water bill metric, as it may not indicate whether the public is truly able to pay. The full list of questions and responses from Workshop 1 is available in Appendix A.

VII. Recommendations for Step 1: CWS DAC Determination

In accordance with Senate Bill 200, the State Water Board must identify DAC and SDAC 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 (Health and Safety Code Section 116769(a)(2)(B)). Therefore, the first step in this process is to identify DAC and SDAC water systems as defined in statute using Census MHI data within a system's service area.

One threshold—a percentage of the California MHI from the Census (80% or 60%)—applies to all water systems in California, despite the varying levels of income and cost of living across the state and excludes many communities from Affordability Assessment. Using this methodology excludes 52% of CWSs from the Affordability Assessment from being evaluated for affordability challenges. Thus, the State Water Board and OEHHA recommend that the identification of DAC and SDAC communities be expanded to include both the statewide MHI and county low-income thresholds published by HCD.

HCD State Income Limits

California's HCD publishes an annual database of income limits for very low, low, median, and moderate households by county which accounts for regional cost of living differences¹⁶. In general, the low-income limits represent 80% of the MHI for each county, however, HCD as well as the federal Department of Housing and Urban Development (HUD) incorporate data about fair market rents, regional MHIs, the statewide MHI, amongst other data to establish income limits that more accurately reflect the cost of living in each county. Put simply, HCD adjusts the income levels in locations with high costs of housing compared to the median incomes, resulting in different low-income and very low-income ceilings than would be expected based on regional median household income.

For these reasons, HCD low-income limits may be more accurate for identifying communities facing affordability issues than using a statewide comparison, especially in high income or high cost of living areas.

Limitations of the Statewide MHI for DAC determination

MHI is the historical and most used metric to describe socioeconomic vulnerability, defined as the household income level at the 50th percentile for an area or region such as a state. MHI has been used nationally and among many states to reflect the socioeconomic vulnerability of the area and the ability of its population to pay water service fees. Concerns over using this threshold have been raised by researchers, governmental organizations, and non-governmental organizations for various reasons described below.

Use of median income data skews the metric in high-income service areas where there may be significant numbers of households that struggle to pay their water bills. Statewide MHI as an affordability measurement is also insensitive to regional differences such as the varying housing costs throughout the state, urban and rural

¹⁶ [HCD Income Limits](https://www.hcd.ca.gov/income-limits). <https://www.hcd.ca.gov/income-limits>

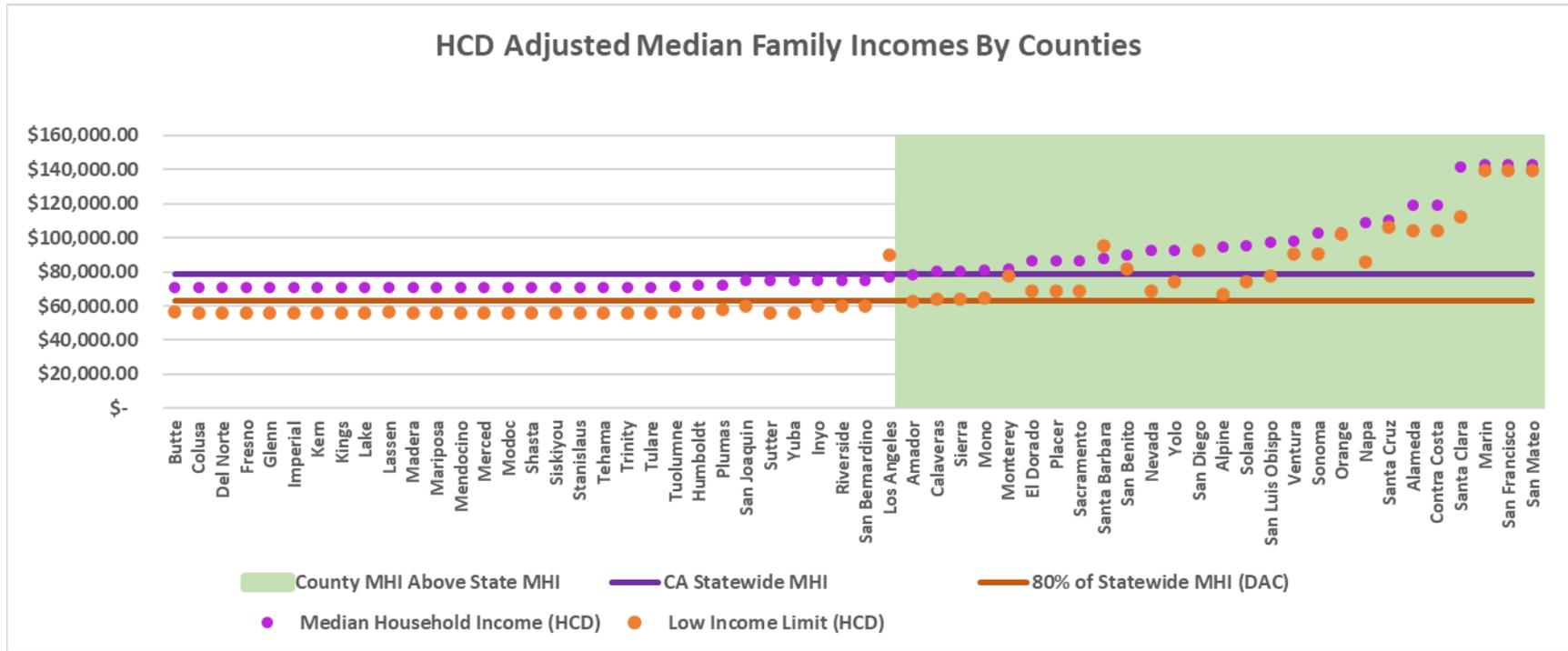
differences, and county-to-county differences.¹⁷ See also Appendix B for additional discussion on the use of MHI in the ‘%MHI’ indicator used in the Affordability Assessment.

Figure 5 shows how the statewide MHI (\$78,672) and the current DAC threshold (80% of the statewide MHI: \$62,938) compare across counties using the HUD median and low-income limits. It is apparent here that the distribution of income can vary greatly depending on the county. For example, a water system with an average MHI of \$65,000 in Santa Clara County, the county with the fourth highest median family income, would not be considered a DAC even though its MHI is well below the HCD low-income threshold of \$112,150.¹⁸

¹⁷ Teodoro, “Measuring Household Affordability for Water and Sewer Utilities.”

¹⁸ These limits are based on HCD’s 2020 Income Limits, which were used to match the most recent 2020 Census data. If this method is adopted, then the most recent available data could be used for the DAC determination.

Figure 5: Statewide MHI, and HCD Median Household Income and Low-Income Limits by County



Currently, if a water system's MHI is less than \$62,938 (horizontal solid orange line), it would be considered a DAC. However, many counties (in the figure, Amador onwards) have higher MHIs than the state MHI, and therefore have higher low-income limits. In these counties, many systems are not considered DACs under the current guidelines because their incomes are not below the orange solid line. Although the incomes are higher in these areas, the cost of living is also higher. Using the HUD county adjusted income limits would allow more systems in higher income counties to be eligible as DACs.

Proposal for DAC Determination (Step 1)

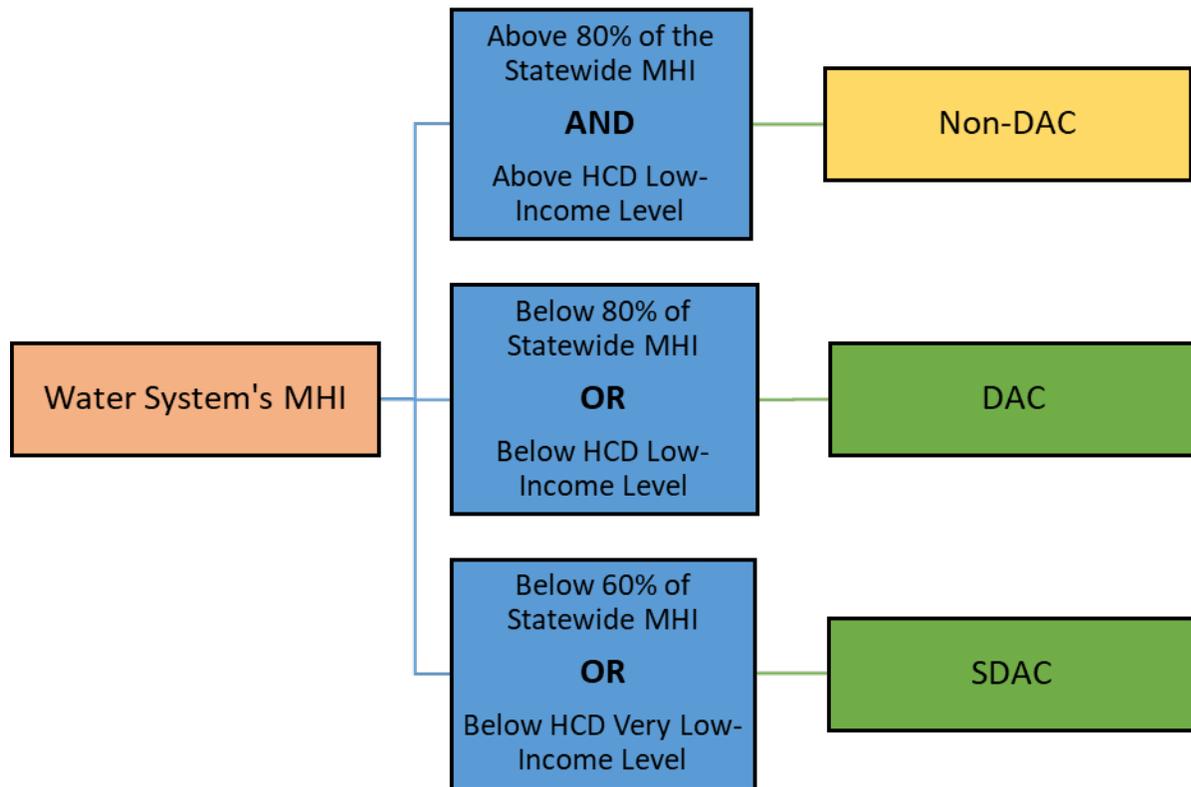
One way to better characterize systems that have a high affordability burden that may be masked due to higher income levels in the area is to include HCD's low-income as a threshold for determining DAC status. With this approach there may still be locations where the 80% of the statewide MHI identifies systems that would not fall under the HCD low-income limits. For this reason, we propose to use the lower of either threshold to allow for more systems to be identified as DACs and SDACs.

Generally, the HCD county-level income levels (median, low, etc.) are used to determine applicant eligibility for programs such as affordable housing placement. In implementing Assembly Bill 1550, the California Air Resources board uses both HCD county and state income levels to identify low-income communities as 'Priority Population' for California Climate Investments¹⁹. In this designation, a census tract is eligible if it is either below the HCD county low-income level or if the tract is below 80% of the statewide MHI.

The State Water Board and OEHHA propose a similar methodology used to identify 'Priority Populations' at the water system level. This will allow more systems to be considered for funding. Figure 6 shows this proposed DAC/SDAC determination process.

¹⁹ [California Climate Investments Priority Populations](https://www.caclimateinvestments.ca.gov/priority-populations). <https://www.caclimateinvestments.ca.gov/priority-populations>

Figure 6. Proposed DAC determination



Below is hypothetical example of System A in Napa County with a MHI of \$65,357. Under the current methodology, this water system is not considered a DAC. However, if HCD county income levels were used as a threshold in addition to the statewide MHI, then this water system would be considered a DAC because Napa County has a low-income level of \$85,800.

Figure 7. Hypothetical example of the recommendation for a system in Napa County

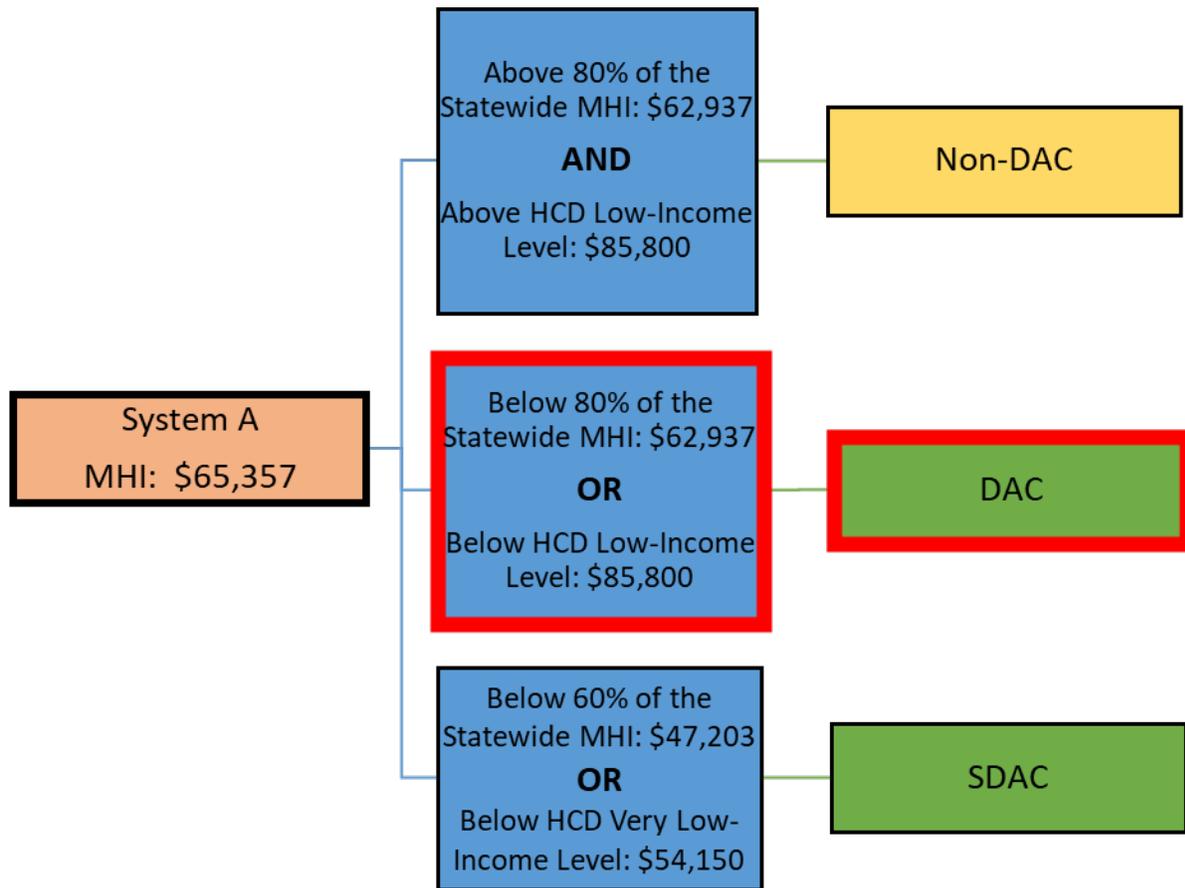


Table 2 shows the number of systems that would qualify as DACs, SDACs and Non-DACs using the Statewide MHI, HCD county incomes or using either methodology. As seen with this water system example for System A in Napa County, there would be 321 water systems that are currently not considered a DAC, but under the recommended methodology, would be considered DACs or SDACs. On the other hand, keeping the statewide MHI portion of the methodology is important since 111 water systems would be removed without using the statewide MHI. Expanding the criteria for the DAC determination would be more inclusive and allow for more systems to be eligible for more favorable funding terms.

Table 2: Number of water systems that are DACs, SDACs or Non-DACs for each methodology.

	<u>Current Approach</u> Systems below Statewide 80% MHI	<u>HCD Income Limits Only</u> Systems below HCD Low-Income Levels	<u>Recommended</u> Statewide MHI or HCD Methodology	Difference between current and recommended method
DAC or SDAC	1,366	1,576	1,687	+ 321 systems
Non-DAC	1,394	1,184	1,073	- 321 systems
Missing	108	108	108	
Total	2,868	2,868	2,868	

VIII. Recommendations for Affordability Assessment Indicators (Step 2)

Senate Bill 200 requires the State Water Board to conduct an annual Affordability Assessment to determine which CWSs that are DACs have exceeded an “affordability threshold” in order to provide drinking water that meets State and Federal standards. Since 2020, Affordability indicators have been identified and developed for inclusion in both the Affordability Assessment and Risk Assessment (Table 3). All indicators used so far have relied on the water systems charging for water. Out of the 1,366 CWSs that are designated as DAC or SDAC according to Step 1 methodology, 530 CWSs (almost 39% of DAC/SDAC CWSs) get excluded from getting further evaluated for affordability challenges (Step 2) because those water systems do not charge for water.²⁰ For example, small mobile home parks may include their water bill in their monthly rent and therefore, would not be included in this assessment. Including non-rate-based indicators is necessary to include these CWSs that do not charge for water. This section focuses on re-evaluating previously utilized affordability indicators and includes an evaluation of possible new affordability indicators for CWSs, SSWSs and DWs for the 2023 Needs Assessment and beyond.

²⁰ Based on 2020 EAR

Table 3: History and Proposed of Affordability Assessment Indicators

2020	2021	2022	2023 ²¹ [CWSs]	2023 ¹⁹ [SSWSs and DWs]
% Median Household Income	% Median Household Income Extreme Water Bill % Shut-Offs	% Median Household Income Extreme Water Bill % Shut-Offs % of Residential Arrearages Residential Arrearage Burden	% Median Household Income Extreme Water Bill % of Residential Arrearages Residential Arrearage Burden <u>Poverty Prevalence Indicator</u> <u>Housing Burden</u>	<u>Poverty Prevalence Indicator</u> <u>Housing Burden</u>

Review of Current and Previous Affordability Indicators

Arrearage and Shut-off Indicators

Recent actions have affected the available data for use in affordability indicators in the 2023 Needs Assessment. In the 2022 assessment, Percent Shut-offs was removed as an affordability indicator due to the shut-off moratorium from March 2020 – January 2022. In addition, arrearage data was a collected one-time in the 2021 Drinking Water Arrearage Payment Program, which ended in June 2021. For these reasons, Percentage of Residential Arrearages, Residential Arrearage Burden, and Percent Shut-off metrics will not be included in the 2023 Needs Assessment since data to support these metrics has not been collected or is otherwise not meaningful. These indicators were advantageous to include in the Needs Assessment because they represent a direct measurement of households struggling to pay their water bills. As the shut-off moratorium ends and data collection resumes, data on payment plans and the reason(s) for shut-offs (to confirm it is not due to account deactivation) would make this

²¹ Proposed indicators. Indicators in strikethrough are not proposed for inclusion in the assessment. Underlined indicators are new and proposed for inclusion in the assessment.

indicator more robust in identifying customers struggling to pay their water bills. Therefore, for future versions, the State Water Board and OEHHA recommend that the Water Board collect residential arrearage and shut-off data in the EAR to incorporate Percentage of Residential Arrearages, Residential Arrearage Burden, and shut-off metrics in future Needs Assessments.

%MHI

%MHI measures annual system-wide average residential customer charges for six Hundred Cubic Feet (HCF) per month relative to the annual MHI of a water system's service area. Despite the limitation of utilizing a metric that includes MHI, as discussed in previous section of this white paper and in Appendix B, %MHI is an established metric and industry threshold commonly used by state and federal regulatory agencies and has been used historically to measure affordability for decades. Therefore, it is recommended to continue to include this indicator in future iterations of the Needs Assessment.

Extreme Water Bill

Extreme Water Bill identifies communities that are paying much higher rates and may identify systems that could struggle to raise rates in the future. We continue to recommend this indicator in future iterations of the Needs Assessment. It is however important to note that there are limitations with this indicator if analyzed on its own. This indicator does not account for regional or technical factors that may lead to higher rates. It also does not account for "ability" to pay. For example, the customer base may be able to afford higher rates.

Evaluation of Additional Affordability Indicators

Indicators described in the 2020 Potential Affordability Risk Indicator Evaluations white paper,²² which evaluated affordability indicators for CWSs, have been re-evaluated here using updated criteria. Other socioeconomic indicators were also added for consideration to include in the Risk Assessment for SSWSs and DWs.

Appendix C at the end of this white paper has the list of indicators evaluated and Supplemental Appendix C1²³ includes more detail on the indicators evaluated. Including multiple indicators of both rate-based and non-rate-based indicators (or socioeconomic

²² [Supplemental Appendix D.3. Potential Affordability Risk Indicator Evaluations.](https://www.waterboards.ca.gov/safer/docs/safer_supp_appxd3_101320.pdf)
https://www.waterboards.ca.gov/safer/docs/safer_supp_appxd3_101320.pdf

²³ [Supplemental Appendix C1. Affordability Indicators Analysis for PWS SSWS and DW](https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/sws/2022/Supplemental-Appendix-C1-Affordability-Indicators-Analysis-for-PWS-SSWS-and-DW.xlsx)
https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/sws/2022/Supplemental-Appendix-C1-Affordability-Indicators-Analysis-for-PWS-SSWS-and-DW.xlsx

indicators) allows for some level of consistency across CWSs as well as SWSs and DWs. Similar to how the affordability indicators were evaluated in 2020, the following criteria helped guide the indicator selection process for this proposal.

Factors considered when evaluating indicators:

- The suite of indicators should account for cost differences and varying levels of income.
- The indicators should represent affordability burden for low-income families.
- The geographic unit of the indicator should be considered.
- The indicators should be relatively easy to explain.
- Indicators should aim to be applicable to both CWSs, SWSs and DWs, which means they should include rate-dependent indicators and non-rate-dependent indicators, to better understand the ability to pay for water services.
- Indicators should have ample data coverage, quality, and availability.
- The suite of indicators should aim to capture affordability at a household level and community level.

Proposed Affordability Assessment Indicators for 2023

Considering the above criteria and the limitations of the 2022 Affordability Assessment's rate-dependent indicators, the affordability indicators recommended for inclusion in the 2023 Needs Assessment in addition to **%MHI** and **Extreme Water Bill** are Poverty, referred to here as the **Poverty Prevalence Indicator** (PPI) and **Housing Burden**. (See Table 3 earlier in this section to see the changes in indicators used in the Needs Assessment over time.)

In 2020, stakeholders recommended the inclusion of two new affordability indicators: PPI and Housing Burden. These recommendations are detailed in the 2020 white paper. The PPI measures the percent of the population living below two times the federal poverty level and can be represented reliably at the census block group level and higher. The Housing Burden Indicator measures the percent of households in a census tract that are both low income (making less than 80% of the HUD Area Median Family Income) and severely burdened by housing costs (paying greater than 50% of their income to housing costs). Although the Housing Burden indicator uses information from the HUD income limits instead of California's HCD income limits (which are only available at the county scale), it provides a measure of housing cost burden at the census tract scale instead of the county scale. Thus, it is a more applicable

Proposed 2023 Affordability Assessment Indicators

% Median Household
Income

Extreme Water Bill

Poverty Prevalence
Indicator

indicator. PPI accounts for the poorer, low-income communities and Housing Burden accounts for both low-income communities along with their housing and utility cost burden, the combination of the two would create a more comprehensive picture of socioeconomic vulnerability while accounting for the varying levels of income and cost burden throughout California.

A combination of indicators can also help account for the variability within water system service areas, which can be explored more in the future. OEHHA has successfully used these indicators in the CalEnviroScreen²⁴ tool, which has received public feedback on the indicators' importance in measuring socioeconomic vulnerability at the community scale. With the advantages of the direct measurements of affordability risk for CWSs and the socioeconomic indicators that account for low-income families and cost of living differences across regions, this set of four indicators for the 2023 Needs Assessment provides a step toward compiling a robust set of indicators to measure water affordability for all Californians. In future versions of the Needs Assessment, these four indicators along with an indicator representing **shut-offs due to non-payment, % of Residential Arrearages, Residential Arrearage Burden** will be included. See Appendix D on the methodology for the proposed affordability indicators.

Proposed Future Affordability Assessment Indicators

% Median Household Income

Extreme Water Bill

% of Residential Arrearages

Residential Arrearage Burden

% Shut-offs Due to Non-Payment

Risk Assessment Affordability Indicators for SWSs and DWs

Earlier this year, the Water Board released the 2022 Risk Assessment for SWSs and DWs which included information on 'Water Quality Risk' and 'Drought Risk.'²⁵ In response to public feedback, the State Water Board and OEHHA have begun to explore how to incorporate measures of socio-economic risk into this Assessment. The 2022 affordability metrics for CWSs (%MHI, Extreme Water Bill, Residential Arrearage Burden, % of Residential Arrearages, or % Shut-offs) are not applicable to SWSs and DWs because they are cost or rate-dependent.

²⁴ [CalEnviroScreen4.0](https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-40). <https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-40>

²⁵ [2022 Risk Assessment for State Small Water Systems and Domestic Wells](https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/needs/2022sswsanddwri skassessment.pdf). https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/needs/2022sswsanddwri skassessment.pdf

Current CWS indicators do not account for regional factors, such as housing costs, that may impact affordability water service, whether through a water provider or domestic well. Indicators that measure costs for SWSs and DWs associated with drilling and maintaining a new well such as drilling costs and permitting costs are currently being explored and may be included in the future. Although the State Water Board does not have regulatory authority over SWS or DWs, county funding resource availability to support SWSs and DWs is also being assessed for possible future inclusion. Supplemental Appendix E²⁶ provides more information on work being done to assess costs for SWSs and DWs.

Potential Methods to Incorporate Housing Burden and PPI in the Needs Assessment

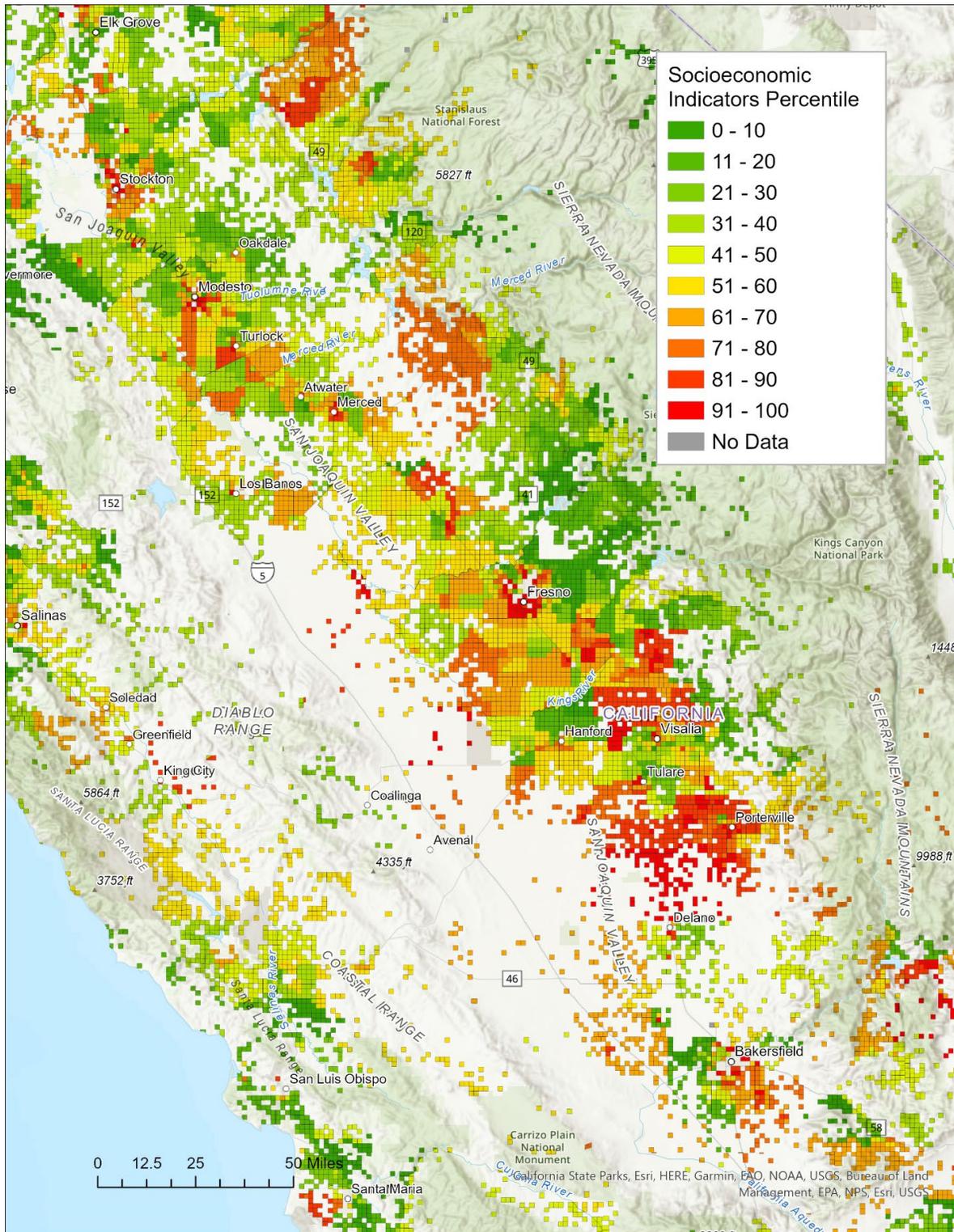
There are various methodologies that could be used to explore how to include Housing Burden and PPI as affordability indicators for CWSs, SWSs and DWs. These will be discussed in detail in Workshop 3. As an initial example of analysis, both Housing Burden and PPI indicators were individually ranked and assigned percentile scores. These percentile scores can be used to combine the results for the two indicators. This methodology, referred to as a percentile approach, could include averaging percentiles and then re-ranking the resulting score into one final percentile score. Figure 8 below shows this combined percentile score in the Central Valley for Public Land Survey System sections (one-by-one mile grid) that are likely served by domestic wells.

Another method, called a matrix approach, could assign a score to brackets or bins of indicator percentiles. A bivariate choropleth map showing the results of combined Housing Burden and PPI percentile scores in a matrix is shown in Figure 9. The top percentiles for both indicators are shown in dark purple. Possible thresholds to explore could include using the top 25% from the averaged percentile scores for the percentile approach. This threshold is used in by CalEPA when designating CalEnviroScreen scores as disadvantaged communities (as defined in Health and Safety Code Section 39711)²⁷. A matrix model could be proposed that categorizes each indicator into “high risk,” which could be the top 10% (score of 1), “medium risk,” or top 25% (score of 0.25), and “low risk,” or bottom 75% (score of 0). These thresholds will be discussed in workshop 3.

²⁶ [Supplemental Appendix E. Future socioeconomic indicator considerations for SWSs and DWs](https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/sws/2022/Supplemental-Appendix-E-Future-Socioeconomic-Indicator-Considerations-for-SWSs-and-DWs.pdf)
https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/sws/2022/Supplemental-Appendix-E-Future-Socioeconomic-Indicator-Considerations-for-SWSs-and-DWs.pdf

²⁷ [California Climate Investments to Benefit Disadvantaged Communities](https://calepa.ca.gov/envjustice/ghginvest/).
<https://calepa.ca.gov/envjustice/ghginvest/>

Figure 8: Distribution of combined PPI and Housing Burden indicator percentiles for sections being served by SSWs or DWs in the Central Valley



Appendix A

Summary of Engagement

On August 11, 2022, the State Water Board hosted an online public webinar to obtain feedback on possible affordability metrics. Attendees expressed concern with certain metrics, identified other potential indicators, and discussed the process for submitting new information in the required annual report. One written comment letter was sent after the webinar; it provided feedback on DAC identification and affordability metrics. These comments have been summarized below.

Questions and answers from Workshop 1 regarding Step 1, DAC determination

These questions and answers have been edited for clarity and conciseness.

Workshop Discussion Question 1: Should Median Household Income (MHI) continue to be the metric used to identify disadvantaged community water systems? Are there other approaches that should be considered?

Workshop Discussion Question 2: Even more broadly, should disadvantaged systems be identified outside of the metrics used to measure affordability burden (currently STEP 2)?

Question/Comment From Participants	Response
In cases where a DAC borders a non-DAC, special determinations are made using median household incomes; the analysis includes neighboring systems. Consider sectioning out systems and identifying who they are really serving and not classifying them with the broader community.	Yes, currently there are some data boundary issues with water systems and DACs. The SAFER program does work with the water systems to conduct a more detailed analysis for the median household income.
One system completed a median household income analysis and applied for funding. By the time that funding was ready, the analysis had expired and the system was asked to prepare another study. The SAFER program should consider allowing an MHI analysis to last through a whole cycle.	Comment noted and will be considered.
What is the statewide average water bill for 600 cubic feet?	64 dollars a month.
What is the statewide median household income?	78,000 dollars a year.

Questions and answers from Workshop 1 regarding Step 2, affordability indicators

Workshop Discussion Question 1: Should the State Water Board continue to utilize multiple affordability indicators in the affordability assessment, or should it use one?

Workshop Discussion Question 2: Should the state water board utilize both household and community level affordability indicators or only one category?

Workshop Discussion Question 3: Should the state water board develop new non-rate based affordability indicators so that water systems that don't charge for water can be included in the assessment?

Question/Comment From Participants	Water Board Comment/Response
<p>Is the Water Board coordinating with CPUC, which has adopted its own metrics?</p> <p>I brought up the CPUC indicator because the systems need to report everything in terms of rate changes. It would be best to avoid duplicate efforts or creating a whole new reporting process necessary for systems to pay attention to.</p>	<p>The board considered the CPUC metrics and evaluated them. There are some limitations to the CPUC metrics, which are discussed in the affordability white paper.</p> <p>What are your thoughts on the CPUC indicator?</p>
<p>You may want to consider the percentage or number of shutoffs that are re-connected after payment or start of a payment plan. Shutoffs don't tell the full story.</p> <p>After re-instituting shutoffs after the moratorium, almost everybody will pay the amount in arrears or enter into a payment plan to get reconnected. Using shutoffs as a metric doesn't illustrate a new problem, rather it's solving an old problem which is non-paying customers.</p>	<p>The State Water Board does not have as much data on payment-plans. Should additional tracking be considered for this metric?</p>

Question/Comment From Participants	Water Board Comment/Response
<p>What do you anticipate the outcomes of this will be? After identifying affordability challenges, what would we do? Do we require systems to not charge more, or impact the water rates in some way?</p>	<p>The Affordability Assessment is only one component. The results of this assessment will be used to identify communities that are more eligible or higher priority for funding and technical assistance. This information would be used to identify whether a system qualifies for grant or loan financing, as well as where the state can provide operations and maintenance funding through SAFER funds.</p> <p>The State Water Board does not have the ability to set rates; this effort is more related to how the Board can prioritize or incentivize the program.</p>
<p>As we try to bring systems in compliance through the SAFER program, it might align best with the objectives of the program to keep affordability at the system level and use household affordability to understand the constraints on that system. However, addressing household affordability would be best addressed through other means.</p>	<p>The scope of this effort is related to identifying affordability challenges; mitigating affordability challenges is its own task.</p> <p>There are many things that would help reduce a customer's debt, including affordability programs that should be informed by affordability measurements, but the core purpose of this task is measuring and identifying the level of affordability concern around the state.</p>
<p>If a system receives a grant that then expires, the system may raise rates?</p>	<p>Yes, this is a situation that can happen. Sometimes grants may alleviate the need for short-term rate increases, but increases will still be necessary at some point.</p>
<p>Why not just let water companies justify their rates based on their costs and let the State just pay the water bill for the disadvantaged. None of all this multiyear effort is then needed.</p>	<p>Some statewide funding is available, but this is not the scope of today's discussion.</p>

Question/Comment From Participants	Water Board Comment/Response
<p>As Class A PUC regulated utilities, water systems must offer customer assistance and rate-payer assistance programs. One metric could be the percentage of customers that are on those programs.</p> <p>This comment is less about affordability challenges and a delineator for the percent of low-income households. Because systems overlap a lot of census tracts, the data cleaning and identification of DACs can be messy. Utilizing discounts for lower-income households is worth considering when calculating the affordability indicators.</p>	<p>The SAFER Program has heard from larger systems that they want credit for offering these assistance programs, rather than having the number of people receiving assistance being used against them.</p>
<p>From 2020 to 2022, the indicators for affordability have changed; new indicators are added year to year. One challenge for water systems is to access and complete the electronic data requests. Some staff may not have access to the data, and data that is not reported doesn't get considered or factored into the risk score. In this case, simplicity is better. For question 3 above, developing a non-rate based indicator would be difficult. It is also important to note that multi-family units may have water costs bundled with rent.</p>	<p>We agree that it is hard to develop indicators that are not based on water rates. OEHHA is assessing options for non-rate based indicators, and these will be presented at the next webinar.</p> <p>The Board recognizes that it can be hard to report data, but data reporting has been improving recently. The Board wants to be thoughtful about the data that it requests in order to not make it a huge burden for systems. The Board does have debt and shutoff data.</p>
<p>Should the board collect data more frequently? Should the board collect data for how many customers are on payment plans? Any new data for an indicator would be something that systems would need to report and comply with.</p>	<p>In terms of collecting data on debt, the general experience has been that once you are allowed to resume shutoffs on customers, the debt/arrearage get addressed because there is a health and safety emergency when water is shut off. Additionally, many of the lowest-income customers live in multi-family units and don't have a specific water bill.</p>
<p>One comment about the extreme water bill metric: I noticed that the metric was listed as if the bill was over 200% of the</p>	<p>Comment noted and will be considered.</p>

Question/Comment From Participants	Water Board Comment/Response
<p>statewide average (\$64/month), the bill would be considered extreme. In some areas where you have DACs, there may not be economies of scale, so when measuring against the statewide average, the bill may be reasonable if the water is clean and safe, particularly if there is no need to buy bottled or trucked water. Instead, SAFER could consider using a regional average for the water bill, and/or adjusting the 200% higher.</p>	
<p>The CPUC tried to address affordability and issued a report a year ago. The used two metrics: AR 20 and AR 50, which is the affordability ratio for the 20th percentile income in the area and 50th percentile income in the area, respectively.</p> <p>The CPUC assessed investor owned utilities, and found that the AR 20 was about 5% burden, and the AR 50 was about 0.5% burden.</p>	<p>The CPUC also used the Social Vulnerability index, which includes CalEnviroScreen data. Even more recently, the CPUC started using the overall CalEnviroScreen scores instead of just the Social Vulnerability Index.</p>
<p>What is the gross estimate of households in the state that are facing non-affordable drinking water?</p>	<p>This has not been fully analyzed yet. Right now, data is only available at the water system level.</p>
<p>How much is the state spending on the SAFER program? Did the state authorize the money?</p>	<p>SAFER has worked with academic institutions with a 3 million dollar contract to conduct the needs analysis. Additionally, the state has funded the “Safe and Affordable Fund” and staff positions for the SAFER program. This is through the Division of Drinking Water and is funded at about 130 million each year. Most of this funding goes to drinking water solutions, but a portion goes to staff working in the program. The public fund expenditure plan contains this information.</p>

Question/Comment From Participants	Water Board Comment/Response
<p>I operate a state small water system with 14 customers. The customers may pay \$235 for 600 cf, and I'm not sure what would happen if they paid the affordable rates.</p>	<p>The program is not attempting to influence rate setting or other local decisions. It's possible to have a water system with a high bill that the customers can pay. The intent of this exercise is to identify communities are struggling to pay the water bill.</p>
<p>What do you do with communities that are struggling to pay the bill? Do you assist with capital improvement plans? There needs to be sustained revenue stream so the company can provide water – this doesn't seem to be looking at the whole system, only one side of it.</p>	<p>When trying to mitigate affordability challenge, we know that this information doesn't always capture long term trends. In some places, affordability challenges will likely persist. We want to identify where those challenges are still persisting.</p>

Written Feedback

One written comment was received from a large water provider regarding potential affordability indicators. The comment acknowledged the challenge of identifying DACs based on statewide MHI and supported the use of regional comparisons to better contextualize system incomes. The comment expressed concern over changing affordability metrics and recommended that SWRCB use consistent affordability metrics that are community based and quantifiable. The comment also included specific feedback and recommendations for certain affordability indicators. Specifically, %MHI was identified as a concern because it may not adequately account for households living in multi-family units that do not have discrete water bills. The comment recommended increasing the %MHI thresholds based on the fact that many rate-payers live in single-family homes and are likely to have greater financial capacity to pay for water.

Additionally, the comment expressed concern about using extreme water bill as an indicator, given it is using a statewide comparison, which is likely to show rural communities as at risk. The comment requests that at the very least, the risk threshold should be increased. There was also concern about residential arrearages as an indicator, because arrearages may not reflect the inability to pay for water, may be related to broader economic conditions, and the fact that arrearages are addressed differently by system, making it hard to compare systems across the state. Finally, the comment highlighted potential issues with using percent shut offs as an indicator, and requested that low-income credits/assistance be incorporated into affordability metrics to better reflect the true rate that low-income households pay for water.

Appendix B

Discussion of the use of MHI in the %MHI indicator

The %MHI indicator measures the relative cost of a 600 cf water bill compared to the MHI. Areas with high bills or low MHI (or a combination) would score highly in this indicator.

$$\frac{\text{Monthly Water Bill for 600 cf}}{\text{MHI}} = \% \text{ MHI}$$

While the indicator has the advantage of incorporating MHI and water bills simultaneously, there are several shortfalls that require additional consideration:

1. The use of median income data skews the metric in service areas with a wide range of incomes. It can skew towards higher incomes, ignoring communities within a service area that struggle to pay their water bills.²⁸ Incomes can diverge widely in a given area, if most households are clustered at either the low or high end of the income scale; the MHI indicator may obfuscate the presence of low-income pockets in higher-income areas.²⁹ Figure 10 on the following page shows that levels of poverty can vary dramatically within a single CWS, and that %MHI may not adequately illustrate lower-income neighborhoods in the same CWS as much higher-income areas.

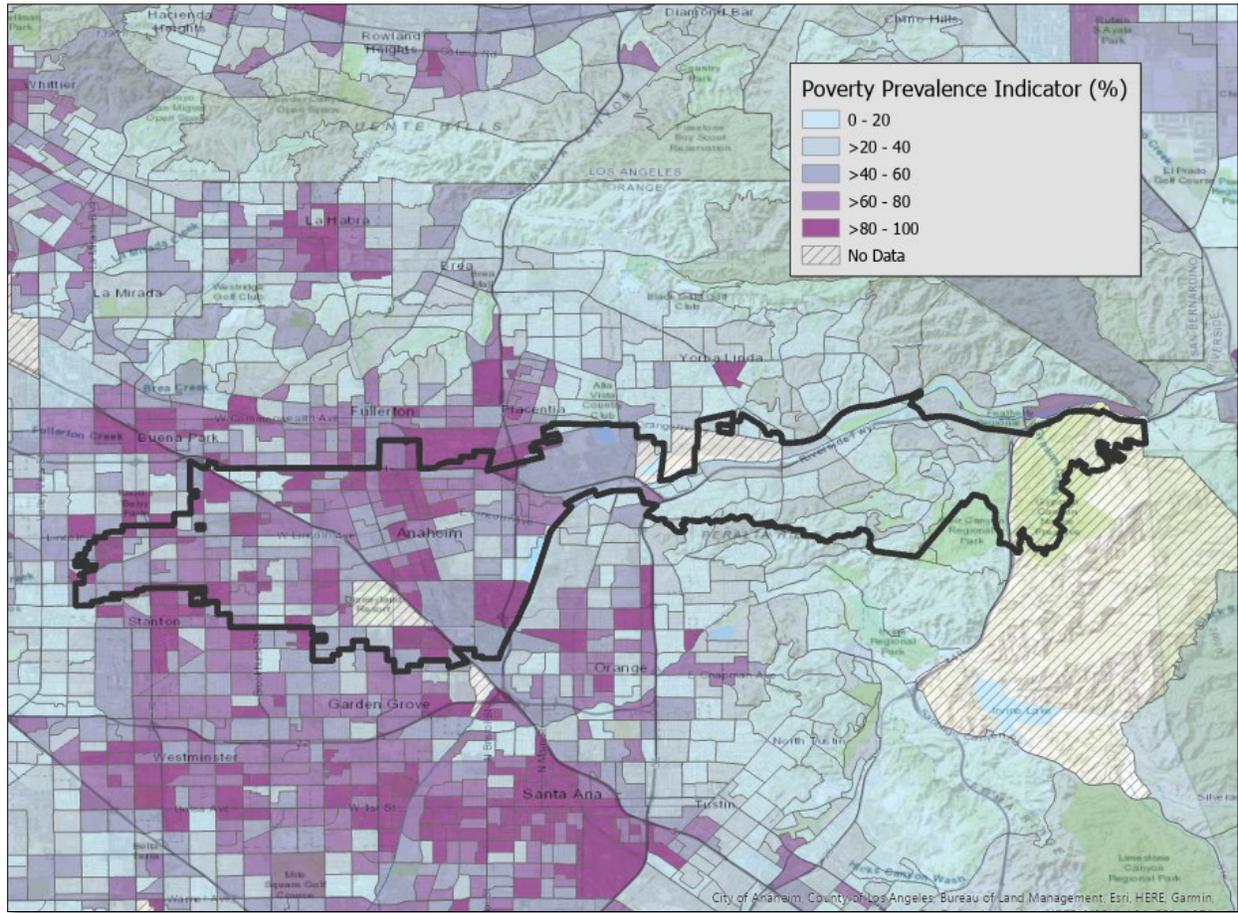
²⁸ Rubin, Scott. "A Nationwide Look at the Affordability of Water Service" 73533 (April 24, 2001).;

Stephen Ezennia, Ikenna, and Sebnem Onal Hoskara. "Methodological Weaknesses in the Measurement Approaches and Concept of Housing Affordability Used in Housing Research: A Qualitative Study." PLoS ONE 14, no. 8 (August 30, 2019): e0221246. <https://doi.org/10.1371/journal.pone.0221246>;

Teodoro, Manuel P. "Measuring Household Affordability for Water and Sewer Utilities." Journal AWWA 110, no. 1 (2018): 13–24. <https://doi.org/10.5942/jawwa.2018.110.0002>

²⁹ [Raucher, R, J Clements, E Rothstein, J Mastracchio, and Z Green. "Developing a New Framework for Household Affordability and Financial Capability Assessment in the Water Sector." Accessed June 12, 2022. https://www.acwa-us.org/documents/developing-a-new-framework-for-household-affordability-and-financial-capability-assessment-in-the-water-sector](https://www.acwa-us.org/documents/developing-a-new-framework-for-household-affordability-and-financial-capability-assessment-in-the-water-sector)

Figure 10. The percent of individuals below two times the federal poverty level within the boundary of City of Anaheim Public Utilities



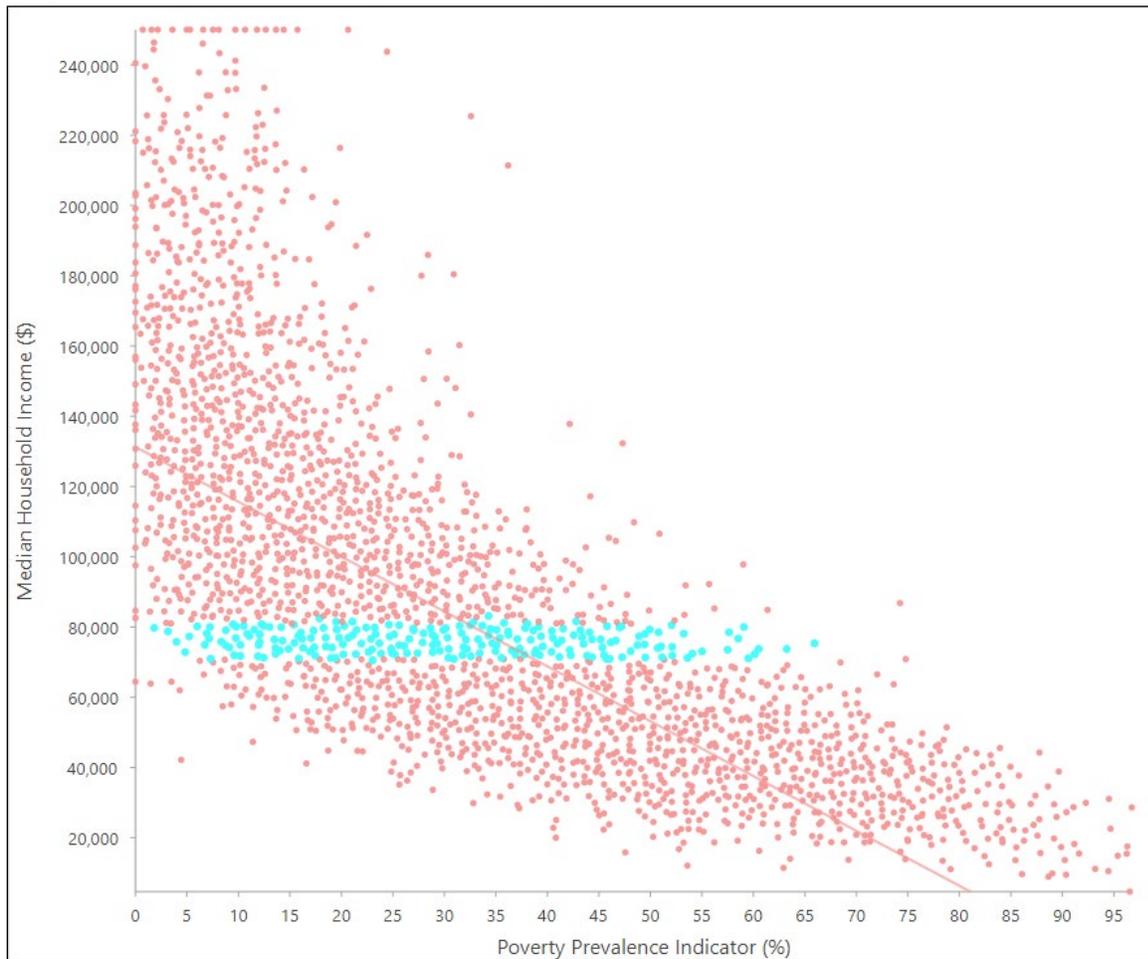
- Standard of living can also be very different from community to community, even if the median household income are the same.³⁰ For example, one community could have 20% of its households below poverty, while another with the same MHI has none.

Figure 11 shows communities in the Los Angeles region that have similar MHI but different levels of poverty, as represented by the PPI. PPI is the percent of individuals below two times the federal poverty level (\$52,400 for a 4-person household in 2020), defined by the federal government as a minimum income to

³⁰Rubin, Scott. "A Nationwide Look at the Affordability of Water Service" 73533 (April 24, 2001).

cover basic needs and it represents the households that are struggling the most.³¹ The 45th to 55th percentile MHI has been highlighted in bright blue to show the varying levels of poverty within a similar MHI range of around \$75,800. In this region, block groups with \$75,000 MHI can range from having less than 10% of the block group in poverty to over 50% in poverty. This demonstrates that simply using MHI in an indicator may not capture the magnitude of households that are in poverty and truly struggling in a community, because places with similar incomes may have dramatically different levels of poverty.

Figure 11. Relationship between PPI (%) and MHI (\$) by block groups in the Los Angeles Region (Los Angeles, Orange, and Ventura counties)



³¹ <https://www.census.gov/topics/income-poverty/poverty/guidance/poverty-measures.html>

3. Water systems that do not charge their customers directly for water services do not receive a score for the %MHI indicator. This is a significant fraction of systems with 530 or 39% of CWSs that are DACs or SDACs not charging directly for drinking water.
4. MHI does not account for household size and assumes that families and individuals have the same financial capacity.³²

³² Stephen Ezennia, I., & Hoskara, S. O. (2019). Methodological weaknesses in the measurement approaches and concept of housing affordability used in housing research: A qualitative study. *PloS one*, 14(8), e0221246.

Appendix C

Affordability Indicators Evaluated for DAC Determination

Indicators Evaluated for DAC Determination

These indicators are used to complete Step 1, disadvantaged community determination.

Potential Risk Indicator	Description	Previously evaluated in 2020?
Current SB 200 Definition: Water Service MHI compared to Statewide MHI	The water service area's average MHI is less than 80% of the Statewide MHI.	Yes
CalEnviroScreen Score (Top 25%)	The census tracts that receive cumulative CalEnviroScreen scores within the top 25% of the state.	No
AB 1550: Water System MHI compared to the HCD county low-income limits OR Statewide MHI	A water system would be eligible if its MHI is either below the HCD low-income limit for a family of four or below 80% of the statewide MHI.	No
HCD County Incomes Limits: Water Service MHI compared to the HCD County Low Income Limits	<p>County-level median income limits (median, low, etc.) are used to determine applicant eligibility for state programs such as affordable housing.</p> <p>The Department of Housing and Community Development (HCD) releases these county income limits annually.</p>	No

Affordability Indicators Evaluated for Step 2 of the 2023 Needs Assessment for CWSs, SSWs and DWs
Indicators Representing Thresholds or Income Levels

These indicators represent examples of thresholds or income levels. If used purely as socioeconomic indicators, they would not provide much information about the ability to pay in a community as incomes can vary greatly by location and the cost of living and the cost of water service also varies across areas. However, these indicators could be considered as part of the DAC determination process or as a part of other indicators. Out of these, ‘Average MHI’ and ‘Average Per Capita Income’ were previously evaluated.

The table below includes the risk indicator name, the most detailed geographic unit that the data is available, a brief description, and whether the indicator was previously evaluated in 2020.

Potential Risk Indicator	Geographic Unit Available	Description	Previously evaluated in 2020?
HCD County Income Limits	County	County-level median incomes and affordability limits (moderate, low, etc.) are used to determine applicant eligibility for state programs such as affordable housing.	No
HUD Adjusted Income Limits	County/Metropolitan Area	Median Family Income limits specific to counties and based on a 4-person household.	No
County Poverty Threshold from County Poverty Measure (CPM)	County	Resources required for a family to live out of poverty, for a family of two adults and two children that rents their place of residence, according to CPM data averaged over 2017-2019 (inflation-adjusted to 2019 dollars).	No

Potential Risk Indicator	Geographic Unit Available	Description	Previously evaluated in 2020?
Deep Poverty Income from CPM	County	This indicator accounts for cost of living and resources from social safety net programs. It is defined as 50% of the County Poverty Threshold from PPIC and aims to focus on households in extreme need.	No
Average Per Capita Income	Block Group	Measures the average per capita income for a water service area	Yes
Average Median Household Income	Water System	Measures the area weighted average median household income for a water system service area.	Yes
Average 20th Percentile Household Income	Block Group	20th Percentile Household Income captures households with an income at or below the 20th percentile of household incomes for a given geographic unit.	No
Average 20th Percentile Household Income with Non-discretionary Household Expenses Subtracted	Block Group	Represents the 20th percentile household with nondiscretionary household expenses subtracted for a given geographic unit.	No

Indicators Using Water Bill Relative to Income Thresholds

These indicators are all calculated by comparing bill information provided by CWSs to different income thresholds.

Potential Risk Indicator	Geographic Unit Available	Description	Previously evaluated in 2020?
Bill Percent of Median Household Income (%MHI)	Block Group	Measures the annual system-wide average residential water bill for 600 cubic feet (6-HCF) per month relative to the annual Median Household Income (MHI) within a water system's service area.	Yes
Hours at Minimum Wage to Pay Drinking Water Bill	Water system	6-HCF Water Rates divided by minimum hourly wage of water service area.	Yes
Percent of County Poverty Threshold (%CPT)	County-Level or Local Area	Measures the annual system-wide average residential water bill for 6-HCF per month relative to the county poverty income level. The CPT considers disposable income of households as opposed to gross income.	Yes
Percent of Deep Poverty Income (%DP)	County-Level or Local Area	Measures the annual system-wide average residential water bill for 6-HCF per month relative to the county deep poverty threshold for the water system's county. It is an affordability measure that aims to focus on households in extreme need.	Yes

Potential Risk Indicator	Geographic Unit Available	Description	Previously evaluated in 2020?
Household Burden Indicator (HBI) for Drinking Water	Block Group	This indicator is the average water service cost, divided by the 20 th percentile income in a community water system.	Yes
Affordability Ratio (AR20) for Drinking Water	Block Group	Average water rate divided by 20 th percentile household income (discretionary after excluding costs for housing, food, healthcare, energy and taxes) for water service areas.	Yes
WARi® for Drinking Water	Census Tract	Weighted average residential index: Census tract-level water rates divided by census tract-level MHI, then multiplied by % households. For service area WARi®, sum across census tracts divided by total households.	Yes

Indicators Using Rate or Cost Dependent Factors

These indicators are other rate or cost dependent indicators that do not necessarily compare to an income threshold.

Potential Risk Indicator	Geographic Unit Available	Description	Previously evaluated in 2020?	Potential Inclusion in Needs Assessment
Extreme Drinking Water Bill	Water System	6-CCF water rates divided by state average water rate.	Yes	Yes
Households Delinquent in Paying Bills	Water system	Total number of accounts that missed one or more bill payments.	Yes	No
% Shut-Offs	Water System	Percentage of residential customer base with water service shut-offs due to non-payment.	Yes	Future
Duration of Shut-Offs	Water system	Represents the median duration of water service shut-offs in number of days per year.	Yes	Future
Customers Receiving Water Bill Payment Assistance	Water system	Measures the percentage of customers receiving water bill payment assistance from the water system's customer assistance program(s).	Yes	Future

Potential Risk Indicator	Geographic Unit Available	Description	Previously evaluated in 2020?	Potential Inclusion in Needs Assessment
Percent Residential Arrearages	Water System	Percentage of a water system's residential customers that have not paid their water bill and are at least 60 days or more past due.	No	Future
Arrearage Burden	Water System	Measures how high the residential arrearage is if it were distributed across the total residential rate base (total dollar amount/total residential customers)	No	Future
County Fee for New Well/Permitting	County	Measures the permitting fee for a new well or for terminating a well in each county.	No	Future
Cost of Drilling a Well	Unknown	Measures the cost of drilling a new well, including permitting fees, labor, and materials.	No	Future
SSWSs and DWs Receiving County or State Financial Assistance	County	Measures water systems that are receiving direct financial assistance from the state or county.	No	Future

Socioeconomic Indicators

These indicators reflect a combination of multiple socioeconomic factors. Although these combine multiple socioeconomic variables and are therefore robust, some of the individual indicators are not relevant to water affordability.

Potential Risk Indicator	Geographic Unit Available	Description	Previously evaluated in 2020?
Demographic and Socioeconomic Characteristics of Customer Base	Block Group	<p>Measures various demographic and socioeconomic characteristics of the water system customer base.</p> <ul style="list-style-type: none"> ·Percent of Population over 65 Years Old ·Percent of Population under 5 Years Old ·Percent of Population over 25 Years Old with no High School Diploma ·Percent of Population Unemployed among Employable Age ·Percent of Households Single Parent Households with Children under 18 Years Old ·Percent of Households with No Vehicle ·Percent of Households Mobile Households ·Percent of Population living in Group Quarters 	Yes
Socioeconomic Vulnerability Index	Census Tract	Measures the relative socioeconomic characteristics of communities in terms of poverty, unemployment, educational attainment, linguistic isolation, and percent of income spent on housing	Yes

Other Socioeconomic Indicators

Potential Risk Indicator	Geographic Unit Available	Description	Previously evaluated in 2020?	Potential Inclusion in Needs Assessment
Unemployment	Block Group	Percentage of the population over the age of 16 that is unemployed and eligible for the labor force. This measure excludes retirees, students, homemakers, institutionalized persons except prisoners, those not looking for work, and military personnel on active duty.	No	No
Households Receiving Public Assistance	Census tract	Percentage of households receiving public assistance.	Yes	No
Percent Extremely Low Income, Very Low-Income, or Low-Income Households (below 30%, 50%, and 80% HAMFI)	Census Tract	These metrics are calculated as the percent of households in a census tract that make less than 30%, 50%, or 80% of the HUD Area Median Family Income.	No	No
Percentage of Households Meeting LIHEAP Requirements	Block Group	This indicator represents the percentage of households in a community (or block group) that meets the LIHEAP requirements (annual pre-tax household income that is below income level guidelines.)	No	No

Potential Risk Indicator	Geographic Unit Available	Description	Previously evaluated in 2020?	Potential Inclusion in Needs Assessment
Households Below the Living Wage	County-Level	Percentage of households earning below the living wage.	Yes	No
Housing Burden	Census tract	Measures the percent of households in a water system's service area that are both low income and severely burdened by housing costs (households spending over 50% of their income on housing).	Yes	Yes
Shelter Cost (FMR)	Census Tract	Percentage of households spending more than 30% of income on shelter.	Yes	Maybe
Poverty Prevalence Indicator (PPI)	Block Group	Measures the percent of the population that lives at or below 200% the Federal Poverty Level (FPL).	Yes	Yes
Percentage of Poverty (%Poverty)	Block Group	Measures the percentage of the population that lives at or below the federal poverty line.	Yes	No
County Poverty Measure (CPM)	County	The CPM tracks the full range of necessary expenditures, adjusts for geographic differences in housing costs, and includes food stamps and other	No	No

Potential Risk Indicator	Geographic Unit Available	Description	Previously evaluated in 2020?	Potential Inclusion in Needs Assessment
		non-cash benefits as resources available to poor families.		
Supplemental Poverty Measure	Census Place	The official poverty measure is based on cash resources. The supplemental poverty measure uses cash resources and also includes noncash benefits and subtracts necessary expenses (such as taxes and medical expenses).	No	No

Appendix D

Methodology for the Proposed 2023 Affordability Indicators

%MHI Indicator

Application: CWSs

This indicator measures annual system-wide average residential customer charges for six HCF per month relative to the annual 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.

Source:

- Water system service area boundaries; State Water Board Service Area Boundary Layer (SABL) (updated as needed, not required).
- Block group-Income in the Past 12 Months; U.S. Census Bureau's American Community Survey (ACS updated annually, required).
- Drinking Water Customer Charges; EAR (updated annually, required [2020 RY]).

Methodology:

Median household income 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 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 within the water system service area.

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.

Equation: $\%MHI = [6 \text{ HCF water rate per month} \times 12] / [\text{service area annual MHI}] \times 100$

Extreme Water Bill

Application: CWSs

Extreme Water Bill 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 report³³ 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 six HCF.

Source:

- Drinking Water Customer Charges; EAR (updated annually, required [2020 RY])
- For Full WARI@:
 - Wastewater Customer Charges; SWRCB Wastewater Survey (updated annually, not required)
 - Stormwater Customer Charges; Not currently available

Methodology:

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.

Equation: Average Water System's 6 HCF Drinking Water Customer Charges / State Average Drinking Water Customer Charges = 150% ≥ State Average Water Rate

Poverty Prevalence Indicator

Application: CWSs, SWSs and DWs

This indicator measures the percentage of a census block group that lives at or below 200% the FPL. This measurement indicates the degree to which relative poverty is prevalent in the community.

³³ [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

Source:

2015-2019 US Census, American Community Survey (ACS)

Methodology:

A dataset containing the number of individuals above 200 percent of the federal poverty level was downloaded by block groups for the state of California. The number of individuals below 200 percent of the federal poverty level was calculated by subtracting the reported estimate of individuals in poverty (2 times the federal poverty level) by the total estimate. The number of individuals below 200% of the poverty level was divided by the total population for whom poverty status was determined.

PPI can be calculated for water systems from block groups using a population or area weighting methodology. For DWs and SSWSs, each Public Land Survey System section (1 x 1 mile grid) can be assigned a poverty status based on the block group that overlays the centroid of the section. Sections can be limited to those with known DWs and SSWSs. Options for these methods will be discussed in more detail in Workshop 3.

Housing Burden

Application: CWSs, SSWSs and DWs

Housing-Burdened Low-Income Households is calculated as the percent of households in a census tract that are both low income (making less than 80% of the HUD Adjusted Median Family Income) and severely burdened by housing costs (paying greater than 50% of their income to housing costs).

Source:

2014-2018 HUD Comprehensive Housing Affordability Strategy (CHAS)

Methodology:

A dataset containing cost burdens for households by HAMFI category was downloaded by census tract for the state of California. For each census tract, the data were analyzed to estimate the number of households with household incomes less than 80% of the county median *and* renter or homeowner costs that exceed 50% of household income. The percentage of the total households in each tract that are both low-income and housing-burdened was then calculated.

Housing Burden can be calculated for water systems from census tracts using a population or area weighting methodology. For DWs and SSWSs, each Public Land Survey System section (1 x 1 mile grid) can be assigned a Housing Burden score based on the census tract that overlays the centroid of the section. Sections can be limited to those with known DWs and SSWSs. Options for these methods will be discussed in more detail in Workshop 3.