Supplemental Appendix D.3
Potential Affordability Risk Indicator Evaluations

October 7, 2020

Table of Contents

Percent of Median Household Income (%MHI)

Percent Median Household Income 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.

%MHI = [6 HCF water rate per month X 12] / [service area annual MHI] X 100

Step 1: Applicability: Good
This indicator is commonly used by water industry stakeholders. It is utilized by the State Water Board and the U.S. EPA and has been used as a metric measuring community-wide affordability for decades. The Board and DWR use %MHI to determine Disadvantaged Community status, among other income-related metrics. The University of North Carolina Environmental Finance Center's California Financial Dashboard for Community Water Systems (with 500-3,300 service connections) and OEHHA's Human Right to Water (HR2W) tool also utilize this metric.

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.

Step 2: Data Fitness (For public water systems with 3,300 connections or less)

Required Risk Indicator Data Points & Sources:

- 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]).

Risk Indicator Calculation 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 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 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.

Data Coverage: Fair

- Water system service area boundaries: **Good**
    - There is no required reporting of water system service areas, however; current data coverage is 96.78%.
- 5-Year Block group-Income in Past 12 Months: **Good**
    - Income in the past 12 Months data from the American Community Survey has 100% coverage and federal law (Title 13, U.S. Code) requires collection.
- Drinking Water Customer Charges: **Fair**
    - The 2017 & 2018 eAR provided water rate data coverage of 54% for systems with 3,300 service connections or less.
    - The State Water Board will be making water rate data required in the 2020 eAR reporting year. It is anticipated that the coverage for drinking water rates will improve. Therefore, an upgraded "Fair" score is applied.

Data Availability: Good

- Water system service area boundaries: **Good**
    - The State Water Board updates water service area boundaries on an ongoing basis.
- 5-Year Block group-Income in Past 12 Months: **Good**
    - The American Community Survey is administered annually to a small percentage of households to provide current community-wide data between the collections in the decennial census.
- Drinking Water Customer Charges: **Good**
    - The eAR is administered annually and starting in 2020 reporting year, drinking water customer charges data will be required reporting.

Data Accuracy/Quality: Fair

- Water system service area boundaries: **Fair**
    - Water system boundaries in SABL often do not reflect the water system's "water service area," instead it sometimes reflects the water system's jurisdictional area. The State Water Board is working with water systems to verify their water system boundaries and is building a new tool to allow water systems to edit their boundaries in real time.
- 5-Year Block group-Income in Past 12 Months: **Fair**
    - Census data is accurate. However, the process for assigning census block data to water system boundaries has spatial limitations and may produce inaccurate data, especially for smaller water systems.
- Drinking Water Customer Charges: **Fair**
    - The State Water Board is working to improve accuracy of rate drinking water charges in the 2020 eAR reporting year.

Step 3: Combined Evaluation: Maybe
Median Household Income (%MHI) meets some of the combined criteria and may be considered for inclusion in Risk Assessment 2.0. Continued efforts to improve drinking water customer charges data collection through the eAR will improve the data fitness of this indicator.

- STEP 1 APPLICABILITY: **Good**
- STEP 2: DATA FITNESS
    - Coverage: **Fair**
    - Availability: **Good**
    - Quality: **Fair**
- STEP 3: COMBINED EVALUATION: **Maybe**

Percent of County Poverty Threshold (%CPT)

Percent of County Poverty Threshold measures the annual system-wide average residential water bill for 6 Hundred Cubic Feet (HCF) per month relative to the county poverty income level. The CPT considers disposable income of households as opposed to gross income.

%CPT = [6 HCF water rate per month X 12] / [service area CPT] X 100

Step 1: Applicability: Good
This indicator is utilized by OEHHA in its Human Right to Water (HR2W) tool. This metric in turn relies on County Poverty Threshold data obtained from the Public Policy Institute of California (PPIC) which allows for consideration of water charges in the context of the amount of disposable income needed for a household of four to stay out of poverty. The main downsides of this indicator are that county-wide cost of living measures inherently obscure differences in intra-county costs, that such measures applied to water will be biased towards high cost counties where the poverty thresholds are much higher, and are not detailed enough geographically to best match to community water system boundaries.

Step 2: Data Fitness (For public water systems with 3,300 connections or less)

Required Risk Indicator Data Points & Sources:

- Water system service area boundaries; State Water Board Service Area Boundary Layer (SABL) (updated as needed, not required).
- Drinking Water Customer Charges; eAR (updated annually, required as of 2020).
- County Poverty Threshold; Public Policy Institute of California (PPIC) County Poverty Measure (CPM) (used 3-year averages, derived from required reporting).

Risk Indicator Calculation Methodology:

The County Poverty Measure (CPM) is based on calculations from California samples of the American Community Survey (ACS) along with several other auxiliary data sources, and is part of a joint research effort between the PPIC and the Stanford Center on Poverty and Inequality. Unlike the official poverty measure developed by the U.S. Census Bureau, this CPM metric considers cost of living and resources from social safety net programs using data on expenditures needed to stay out of poverty in a given country. Essentially, the focus remains on poverty-level budget as opposed to income. The CPM poverty threshold is based on data for a family of 4 that rents their dwelling.

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.

Data Coverage: Fair

- Water system service area boundaries: **Good**
    - There is no required reporting of water system service areas, however; current data coverage is 96.78%.
- Drinking Water Customer Charges: **Poor**
    - The 2017 & 2018 eAR provided water rate data coverage of 54% for systems with 3,300 service connections or less. However, the State Water Board will be making water rate data required in the 2020 eAR reporting year.
- PPIC California Poverty Measure: **Fair**
    - PPIC-CPM data covered 57 counties and data coverage is at 100%, ideally this data would be more granular to determine poverty at the census track level. This data is derived from U.S. Census/ACS data, which is required reporting.

Data Availability: Good

- Water system service area boundaries: **Good**
    - The State Water Board updates water service area boundaries on an ongoing basis.
- Drinking Water Customer Charges: **Good**
    - The eAR is administered annually and starting in 2020 reporting year, drinking water customer charges data will be required reporting.
- PPIC California Poverty Measure: **Fair**
    - The PPIC-CPM data relied on 3-year averages from the U.S. Census/ACS data, most recently from 2016-2018. PPIC is not required to maintain the dataset, therefore the availability score has been downgraded to "Fair."

Data Accuracy/Quality: Fair

- Water system service area boundaries: **Fair**
    - Water system boundaries in SABL often do not reflect the water system's "water service area," instead it sometimes reflects the water system's jurisdictional area. The State Water Board is working with water systems to verify their water system boundaries and is building a new tool to allow water systems to edit their boundaries in real time.
- Drinking Water Customer Charges: **Fair**
    - The data itself is reported and submitted by water systems and reviewed by DDW staff. However, there are existing concerns regarding eAR data being missing or unreliable.
    - State Water Board is working to improve accuracy of rate drinking water charges in the 2020 eAR reporting year.
- PPIC California Poverty Measure: **Fair**
    - Census/ACS data is accurate and reliable, but the spatial matching of county level data to water system boundaries leads to highly rough and potentially inaccurate results at the system level.

Step 3: Combined Evaluation: **Maybe**
Percent of County Poverty Threshold (%CPT) meets some of the combined criteria and may be considered for inclusion in Risk Assessment 2.0.

- STEP 1 APPLICABILITY: **Good**
- STEP 2: DATA FITNESS
    - Coverage: **Fair**
    - Availability: **Good**
    - Quality: **Fair**
- STEP 3: COMBINED EVALUATION: **Maybe**

Percent of Deep Poverty Income (%DP)

Percent of Deep Poverty Income measures the annual system-wide average residential water bill for 6 Hundred Cubic Feet (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. The calculation below represents 6 HCF water rates divided by water service area deep poverty income (50% of county poverty threshold).

%DP = [6 HCF water rate per month X 12] / [0.5 X service area annual CPT] X 100

Step 1: Applicability: Good
This indicator is utilized by OEHHA in its Human Right to Water (HR2W) tool. This metric in turn relies on County Poverty Threshold data obtained from the Public Policy Institute of California (PPIC) which allows for consideration of water charges in the context of the amount of disposable income needed for a household of four to stay out of deep poverty. The main downsides of this indicator are that county-wide cost of living

measures inherently obscure differences in intra-county costs, that such measures applied to water will be biased towards high cost counties where the poverty thresholds are much higher, and are not detailed enough geographically to best match to community water system boundaries.

Step 2: Data Fitness (For public water systems with 3,300 connections or less)

Required Risk Indicator Data Points & Sources:

- Water system service area boundaries; State Water Board Service Area Boundary Layer (SABL) (updated as needed, not required).
- Drinking Water Customer Charges; eAR (updated annually, required as of 2020).
- County Poverty Threshold; Public Policy Institute of California (PPIC) County Poverty Measure (CPM) (used 3-year averages, derived from required reporting).

Risk Indicator Calculation Methodology:

The County Poverty Measure (CPM) is based on calculations from California samples of the American Community Survey (ACS) along with several other auxiliary data sources, and is part of a joint research effort between the PPIC and the Stanford Center on Poverty and Inequality. Unlike the official poverty measure developed by the U.S. Census Bureau, this CPM metric considers cost of living and resources from social safety net programs using data on expenditures needed to stay out of poverty in a given country. Essentially, the focus remains on poverty-level budget as opposed to income. The CPM poverty threshold is based on data for a family of 4 that rents their dwelling.

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.

Data Coverage: Fair

- Water system service area boundaries: **Good**
  - There is no required reporting of water system service areas, however; current data coverage is 96.78%.
- Drinking Water Customer Charges: **Poor**
  - The 2017 & 2018 eAR provided water rate data coverage of 54% for systems with 3,300 service connections or less. However, the State Water Board will be making water rate data required in the 2020 eAR reporting year.
- PPIC California Poverty Measure: **Fair**

    - PPIC-CPM data covered 57 counties and data coverage is at 100%, ideally this data would be more granular to determine poverty at the census track level. This data is derived from U.S. Census/ACS data, which is required reporting.

Data Availability: Good

- Water system service area boundaries: **Good**
    - The State Water Board updates water service area boundaries on an ongoing basis.
- Drinking Water Customer Charges: **Good**
    - The eAR is administered annually and starting in 2020 reporting year, drinking water customer charges data will be required reporting.
- PPIC California Poverty Measure: **Fair**
    - The PPIC-CPM data relied on 3-year averages from the U.S. Census/ACS data, most recently from 2016-2018. PPIC is not required to maintain the dataset, therefore the availability score has been downgraded to "Fair."

Data Accuracy/Quality: Fair

- Water system service area boundaries: **Fair**
    - Water system boundaries in SABL often do not reflect the water system's "water service area," instead it sometimes reflects the water system's jurisdictional area. The State Water Board is working with water systems to verify their water system boundaries and is building a new tool to allow water systems to edit their boundaries in real time.
- Drinking Water Customer Charges: **Fair**
    - The data itself is reported and submitted by water systems and reviewed by DDW staff. However, there are existing concerns regarding eAR data being missing or unreliable.
    - State Water Board is working to improve accuracy of rate drinking water charges in the 2020 eAR reporting year.
- PPIC California Poverty Measure: **Fair**
    - Census/ACS data is accurate and reliable, but the spatial matching of county level data to water system boundaries leads to highly rough and potentially inaccurate results at the system level.

Step 3: Combined Evaluation: Maybe

Percent of Deep Poverty Income (%DP) meets some of the combined criteria and may be considered for inclusion in Risk Assessment 2.0.

- STEP 1 APPLICABILITY: **Good**
- STEP 2: DATA FITNESS
    - Coverage: **Fair**
    - Availability: **Good**
    - Quality: **Fair**
- STEP 3: COMBINED EVALUATION: **Maybe**

Per Capita Income

This indicator measures the average per capita income for a water service area. This indicator is calculated by using census block group per capita income data from the census and aggregating it using spatial-weighting to the water system service area.

Step 1: Applicability: Fair
Per Capita Income is as component of the Customer Base Socio-Economics risk indicator utilized in DWR's Drought and Water Shortage Risk Scoring Tool. However, State Water Board staff believes this indicator, when considered alone, may not accurately represent the affordability risk present to diverse populations within a water system's community.

Step 2: Data Fitness (For public water systems with 3,300 connections or less)

Required Risk Indicator Data Points & Sources:

- Water system service area boundaries; State Water Board Service Area Boundary Layer (SABL) (updated as needed, not required).
- Block Group-Per Capita Income in the Past 12 Months- U.S. Census Bureau's American Community Survey (ACS updated annually, required by federal law).

Risk Indicator Calculation Methodology:

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 per capita income to a community water system we aggregate spatially weighted per capita income data by census block within the water system service area.

Data Coverage: Good
- Water system service area boundaries: **Good**
    - There is no required reporting of water system service areas, however; current data coverage is 96.78%.
- 5-year Block group-Per Capita Income in the Past 12 Months: **Good**
    - Block group-Per Capita Income has 100% coverage in the 5-year ACS and federal law (Title 13, U.S. Code) requires collection.

Data Availability: Good
- Water system service area boundaries: **Good**
    - The State Water Board updates water service area boundaries on an ongoing basis.
- 5-year Block group-Per Capita Income in the Past 12 Months: **Good**
    - The American Community Survey is administered annually to a large representative sample of households to provide current community-level data.

Data Accuracy/Quality: Fair

- Water system service area boundaries: **Fair**
    - Water system boundaries in SABL often do not reflect the water system's "water service area," instead it sometimes reflects the water system's jurisdictional area. The State Water Board is working with water systems to verify their water system boundaries and is building a new tool to allow water systems to edit their boundaries in real time.
- 5-year Block group-Per Capita Income: **Fair**
    - Census block per capita income data is accurate. However, the process for assigning census block per capita income to water system boundaries has spatial limitations and may produce inaccurate data, especially for smaller water systems. Moreover, it may not accurately represent the range of incomes within the community water system.

Step 3: Combined Evaluation: No
Per Capita Income does not meet the combined criteria and should not be considered for inclusion in Risk Assessment 2.0.

- STEP 1 APPLICABILITY: **Fair**
- STEP 2: DATA FITNESS
    - Coverage**: Good**
    - Availability: **Good**
    - Quality: **Fair**
- STEP 3: COMBINED EVALUATION: **No**

Average Median Household Income

This risk indicator measures the average median household income for a water system service area. This indicator is calculated by aggregating spatially weighted median household income by census block within a water system boundary.

Step 1: Applicability: Fair
Average Median Household Income is as component of the Customer Base Socio-Economics risk indicator utilized in DWR's Drought and Water Shortage Risk Scoring Tool. However, State Water Board staff believes this indicator, when considered alone, may not accurately represent the affordability risk present to the most vulnerable households within a water system's community.

Step 2: Data Fitness (For public water systems with 3,300 connections or less)

Required Risk Indicator Data Points & Sources:

- Water system service area boundaries (CWS < 3300 service connections) - State Water Resource Control Board Service Area Boundary Layer (SABL) (updated as needed, not required).
- 5-year Block Group-Median Household Income in the Past 12 Months- U.S. Census Bureau's American Community Survey. (ACS updated annually, required by federal law).

Risk Indicator Calculation Methodology:

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 we aggregate spatially weighted median household income data by census block within the water system service area.

Data Coverage: Good

- Water system service area boundaries: **Good**
  - There is no required reporting of water system service areas, however; current data coverage is 96.78%.
- 5-year Block group-Median Household Income in the Past 12 Months: **Good**
  - Block group-Median Household Income has 100% coverage and federal law (Title 13, U.S. Code) requires collection.

Data Availability: Good

- Water system service area boundaries: **Good**
  - The State Water Board updates water service area boundaries on an ongoing basis.
- 5-year Block Group-Median Household Income in the Past 12 Months: **Good**
  - The American Community Survey is administered annually to a large representative sample of households to provide current community-level data.

Data Accuracy/Quality: Fair

The accuracy of an average of medians without knowing the underlying distribution for each block group is inherently questionable.

- Water system service area boundaries: **Fair**
  - Water system boundaries in SABL often do not reflect the water system's "water service area," instead it sometimes reflects the water system's jurisdictional area. The State Water Board is working with water systems to verify their water system boundaries and is building a new tool to allow water systems to edit their boundaries in real time.
- 5-year Block group-Median Household Income: **Fair**
  - Census block median household income data is accurate. However, the process for assigning census block median household income to water system boundaries has spatial limitations and may produce inaccurate

data, especially for smaller water systems. Moreover, it may not accurately represent the range of incomes within the community water system.

Step 3: Combined Evaluation: No
Average Median Household Income does not meet the combined criteria and should not be considered for inclusion in Risk Assessment 2.0.

- STEP 1: APPLICABILITY: **Fair**
- STEP 2: DATA FITNESS
  - Coverage: **Good**
  - Availability: **Good**
  - Quality: **Fair**
- STEP 3: COMBINED EVALUATION: **No**

Percentage of Poverty (% Poverty)

This metric measures the percentage of the population served by a water system that lives at or below the federal poverty line. This indicator is calculated by aggregating both spatially weighted population and population in poverty data by census block within a water system boundary.

The assigned population in poverty is then divided by the population and multiplied by 100 to determine the percentage of poverty in the water system.

[Population at or below poverty level / Total Population] X 100

Step 1: Applicability: Good
Percentage of Poverty is as component of the Customer Base Socio-Economics risk indicator utilized in DWR's Drought and Water Shortage Risk Scoring Tool.

Step 2: Data Fitness (For public water systems with 3,300 connections or less)

Required Risk Indicator Data Points & Sources:

- Water system service area boundaries (CWS < 3300 service connection) - State Water Resource Control Board Service Area Boundary Layer (SABL) (updated as needed, not required).
- 5-Year Block group-Population- U.S. Census Bureau's American Community Survey. (ACS updated annually, required by federal law).
- 5-Year Block group-Poverty Status in the Past 12 months- US Census Bureau's American Community Survey. (ACS updated annually, required by federal law)

Risk Indicator Calculation Methodology:

Community Water System boundaries typically do not align with census boundaries where per capita income data is regularly collected. In order to assign a percentage in poverty to a community water system we aggregate both spatially weighted population and poverty status data by census block group within the water system service area.

Data Coverage: Good

- Water system service area boundaries: **Good**
  - There is no required reporting of water system service areas, however; current data coverage is 96.78%.
- 5-Year Block group-Population: **Good**
  - Block group-Population has 100% coverage and federal law (Title 13, U.S. Code) requires collection.
- 5-Year Block group-Poverty Status in the Past 12 Months: **Good**
  - Block group-Poverty Status in the Past 12 Months has 100% coverage and federal law (Title 13, U.S. Code) requires collection.

Data Availability: Good

- Water system service area boundaries: **Good**
  - The State Water Board updates water service area boundaries on an ongoing basis.
- 5-Year Block group - Population: **Good**
  - The American Community Survey is administered annually to a large representative sample of households to provide current community-level data.
- 5-Year Block group-Poverty Status in the Past 12 Months: **Good**
  - The American Community Survey is administered annually to a large representative sample of households to provide current community-level data.

Data Accuracy/Quality: Fair

- Water system service area boundaries: **Fair**
  - Water system boundaries in SABL often do not reflect the water system's "water service area," instead it sometimes reflects the water system's jurisdictional area. The State Water Board is working with water systems to verify their water system boundaries and is building a new tool to allow water systems to edit their boundaries in real time.
- 5-Year Block group-Population: **Fair**
  - Census block group population data is accurate. However, the process for assigning census block population to water system boundaries has spatial limitations and may produce inaccurate data, especially for smaller water systems.
- 5-Year Block group-Poverty Status: **Fair**
  - Census block poverty status data is accurate. However, the process for assigning census block Poverty Status data to water system boundaries

has spatial limitations and may produce inaccurate data, especially for smaller water systems.

Step 3: Combined Evaluation: Maybe
Percentage of Poverty meets some of the combined criteria and may be considered for inclusion in Risk Assessment 2.0.

- STEP 1: APPLICABILITY: **Good**
- STEP 2: DATA FITNESS
  - Coverage**: Good**
  - Availability: **Good**
  - Quality: **Fair**
- STEP 3: COMBINED EVALUATION: **Maybe**

Demographic and Socioeconomic Characteristics of Customer Base

This indicator measures various demographic and socioeconomic characteristics of the water system customer base. This indicator is calculated by aggregating the spatially weighted census data by census block group within a water system boundary for the following characteristics:

- 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

The assigned percent of population or households with each demographic or socioeconomic characteristic is then divided by the population or households and multiplied by 100 to determine the percentage of the population or households that fits that characteristic.

Example: [Characteristic Population / Population] X 100

Step 1: Applicability: Poor
Demographic and Socioeconomic Characteristics are used as risk indicators in DWR's Drought and Water Shortage Risk Scoring Tool. However, State Water Board staff and UCLA believes this indicator does not accurately represent the affordability risk present to diverse populations within a water system's community. Specifically, many of the

individual characteristics may directly relate to a community's socioeconomic vulnerability, but do not directly correspond to affordability.

Step 2: Data Fitness (For public water systems with 3,300 connections or less)

Required Risk Indicator Data Points & Sources:

- Water system service area boundaries (CWS < 3300 service connection) - State Water Resource Control Board Service Area Boundary Layer (SABL) (updated as needed, not required).
- 5-Year Block group-Population- U.S. Census Bureau's American Community Survey. (ACS updated annually, required by federal law).
- 5-Year Block group-Households- U.S. Census Bureau's American Community Survey. (ACS updated annually, required by federal law).
- Block group - Population over 65 Years Old – U.S. Census Bureau's American Community Survey. (ACS updated annually, required by federal law).
- 5-Year Block group - Population under 5 Years Old – U.S. Census Bureau's American Community Survey. (ACS updated annually, required by federal law).
- 5-Year Block group - Population over 25 Years Old with no High School Diploma - US Census Bureau's American Community Survey. (ACS updated annually, required by federal law).
- 5-Year Block group - Population Unemployed among Employable Age – U.S. Census Bureau's American Community Survey. (ACS updated annually, required by federal law).
- 5-Year Block group - Single Parent Households with Children under 18 Years Old- U.S. Census Bureau's American Community Survey. (ACS updated annually, required by federal law).
- 5-Year Block group - Households with No Vehicle – U.S. Census Bureau's American Community Survey. (ACS updated annually, required by federal law).
- 5-Year Block group - Mobile Households – U.S. Census Bureau's American Community Survey. (ACS updated annually, required by federal law).
- 5-Year Block Group - Population living in Group Quarters – U.S. Census Bureau's American Community Survey. (ACS updated annually, required by federal law)

Risk Indicator Calculation Methodology:

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 Demographic or Socioeconomic Characteristic to a community water system we aggregate spatially weighted census data by census block within the water system service area.

Data Coverage: Good

- Water system service area boundaries: **Good**

    - There is no required reporting of water system service areas, however; current data coverage is 96.78%.
- Block group data points: **Good**
    - 100% coverage and federal law (Title 13, U.S. Code) requires collection.

Data Availability: Good

- Water system service area boundaries: **Good**
    - The State Water Board updates water service area boundaries on an ongoing basis.
- Block group-data points: **Good**
    - The American Community Survey is administered annually to a small percentage of households to provide current community-wide data between the collections in the decennial census.

Data Accuracy/Quality: Fair

- Water system service area boundaries: **Fair**
    - Water system boundaries in SABL often do not reflect the water system's "water service area," instead it sometimes reflects the water system's jurisdictional area. The State Water Board is working with water systems to verify their water system boundaries and is building a new tool to allow water systems to edit their boundaries in real time.
- Block group data: **Fair**
    - Census block data is accurate. However, the process for assigning census block data to water system boundaries has spatial limitations and may produce inaccurate data, especially for smaller water systems.

Step 3: Combined Evaluation: No
Demographic and Socioeconomic Characteristics does not meet the combined criteria and should not be considered for inclusion in Risk Assessment 2.0.

- STEP 1: APPLICABILITY: **Poor**
- STEP 2: DATA FITNESS
    - Coverage**: Good**
    - Availability: **Good**
    - Quality: **Fair**
- STEP 3: COMBINED EVALUATION: **No**

Household Burden Indicator (HBI) for Drinking Water

Household Burden Indicator (HBI) 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). Customer water service costs include total drinking water, wastewater, and storm water service costs borne by households.* This indicator is

calculated by adding the average water service costs, dividing them by the 20th Percentile income in a community water system, and multiplying this by one hundred.

HBI = ([Average Drinking Water Cost + Average Wastewater Cost + Average Stormwater Cost] / 20th Percentile Income) X 100

*For the purpose the State Water Board's Needs Assessment only drinking water costs would be utilized.

HBI for Drinking Water = ([Average Drinking Water Cost] / 20th Percentile Income) X 100

Step 1: Applicability: Good
University of North Carolina's Environmental Finance Center measures HBI in their water system financial dashboards provided for several states including the dashboard provided in California's Water System Needs Assessment. Several national water associations including AWWA, NACWA, & WEF recommend the U.S. EPA use Household Burden Indicator as an affordability metric.[1]

The denominator of the HBI considers the 20th percentile household income for the relevant service area. Households at and below the 20th percentile typically reflect those households that are the most economically challenged members of the community, more so than Median Household Income (MHI). The 20th percentile is generally considered the demarcation between low income and middle-class households.

Step 2: Data Fitness (For public water systems with 3,300 connections or less)

Required Risk Indicator Data Points & Sources:

- Water system service area boundaries; State Water Board Service Area Boundary Layer (SABL) (updated as needed, not required).
- 5-Year 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]).
- To calculate full HBI:
    - Wastewater Customer Charges; State Water Board Wastewater Survey (updated annually, not required).
    - Stormwater Customer Charges; Not currently available.

Risk Indicator Calculation Methodology:

[1] https://www.awwa.org/Portals/0/AWWA/ETS/Resources/DevelopingNewFrameworkForAffordability.pdf?ver=2020-02-03-090519-813

The 20th percentile income is determined for a water system using American Community Survey block group data for household income. The income bracket in the ACS data that the 20th percentile falls in is then averaged. The average is used because the exact dollar amount of each household income is not reported, only whether households fall in income brackets.
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.

Data Coverage: Fair

- Water system service area boundaries: **Good**
    - There is no required reporting of water system service areas, however; current data coverage is 96.78%
- 5-Year Block group-Income in Past 12 Months: **Good**
    - Income in the past 12 Months data from the American Community Survey has 100% coverage and federal law (Title 13, U.S. Code) requires collection.
- Drinking Water Customer Charges: **Fair**
    - The 2017 & 2018 eAR provided water rate data coverage of 54% for systems with 3,300 service connections or less.
    - The State Water Board will be making water rate data required in the 2020 eAR reporting year. It is anticipated that the coverage for drinking water rates will improve. Therefore, an upgraded "Fair" score is applied.

- For full HBI:
    - Wastewater Customer Charges: **Poor**
        - There is no analysis of the coverage of the SWRCB Waste Water Survey.
    - Stormwater Customer Charges: **Poor**
        - There is no identified coverage of storm water rates available.

Data Availability: Good

- Water system service area boundaries: **Good**
    - The State Water Board updates water service area boundaries on an ongoing basis.
- 5-Year Block group-Income in Past 12 Months: **Good**
    - The American Community Survey is administered annually to a small percentage of households to provide current community-wide data between the collections in the decennial census.
- Drinking Water Customer Charges: **Good**

    - The eAR is administered annually and starting in 2020 reporting year, drinking water customer charges data will be required reporting.

- For full HBI
    - Wastewater Customer Charges: **Fair**
        - The Wastewater Survey is administered annually but does not appear to be required.
    - Stormwater Customer Charges: **Poor**
        - No identified source for regular collection of stormwater costs.

Data Accuracy/Quality: Fair

- Water system service area boundaries: **Fair**
    - Water system boundaries in SABL often do not reflect the water system's "water service area," instead it sometimes reflects the water system's jurisdictional area. The State Water Board is working with water systems to verify their water system boundaries and is building a new tool to allow water systems to edit their boundaries in real time.
- 5-Year Block group-Income in Past 12 Months: **Fair**
    - Census data is accurate. However, the process for assigning census block data to water system boundaries has spatial limitations and may produce inaccurate data, especially for smaller water systems.
- Drinking Water Customer Charges: **Fair**
    - The State Water Board is working to improve accuracy of rate drinking water charges in the 2020 eAR reporting year.

- For full HBI:
    - Wastewater Customer Charges: **Fair**
        - Rate reporting in the SWRCB Waste Water Survey varies and does not capture rates at a specific consumption level, limiting its accuracy for this analysis.
    - Stormwater Customer Charges: **Poor**
        - No identified source for regular collection of stormwater costs.

Step 3: Combined Evaluation: Maybe
Household Burden Indicator (HBI) meets some of the combined criteria and may be considered for inclusion in Risk Assessment 2.0. Continued efforts to improve drinking water customer charges data collection through the eAR will improve the data fitness of this indicator. However, if the State Water Board wishes to utilize HBI that includes ALL water service costs, a long-term strategy is needed for collecting wastewater and stormwater customer charges to make full calculation of this indicator this feasible.

- STEP 1 APPLICABILITY: **Good**
- STEP 2: DATA FITNESS
    - Coverage: **Fair**
    - Availability: **Good**

    - Quality: **Fair**
- STEP 3: COMBINED EVALUATION: **Maybe**

Poverty Prevalence Indicator (PPI)

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

This indicator is calculated by aggregating both spatially weighted population and Population at or below 200% FPL data by census block within a water system boundary. The assigned population at or below 200% FPL is then divided by the population and multiplied by 100 to determine the percentage at or below 200% FPL in the water system.

[Population at or below 200% FPL / Total Population] X 100

Step 1: Applicability: Good
University of North Carolina's Environmental Finance Center measures PPI in their water system financial dashboards provided for several states including the dashboard provided in California's Water System Needs Assessment. Several national water associations including AWWA, NACWA, & WEF recommend the US EPA use Poverty Prevalence Indicator as an affordability metric.[2]

As pointed out by industry stakeholders, Poverty Prevalence Indicator is a good metric for determining the breadth and need for a household low-income rate assistance (LIRA) program in a community water system. However, SB 200 does not support a household LIRA program, but rather community-wide considerations of affordability as they relate to a system' ability to remain in compliance with drinking water standards.

Step 2: Data Fitness (For public water systems with 3,300 connections or less)

Required Risk Indicator Data Points & Sources:

- Water system service area boundaries; State Water Board Service Area Boundary Layer (SABL) (updated as needed, not required).
- 5-Year Block group-Population; U.S. Census Bureau's American Community Survey (ACS updated annually, required).

[2] https://www.awwa.org/Portals/0/AWWA/ETS/Resources/DevelopingNewFrameworkForAffordability.pdf?ver=2020-02-03-090519-813

- 5-Year Block group-Poverty Status in the past 12 Months; U.S. Census Bureau's American Community Survey (ACS updated annually, required).

Risk Indicator Calculation Methodology:

Community Water System boundaries typically do not align with census boundaries where per capita income data is regularly collected. In order to assign a percentage at or below 200% FPL to a community water system, spatially weighted poverty status data is aggregated by census block within the water system service area.

Data Coverage: Good

- Water system service area boundaries: **Good**
  - There is no required reporting of water system service areas, however; current data coverage is 96.78%.
- Block group-Population: **Good**
- Population data from the American Community Survey has a 100% coverage and federal law (Title 13, U.S. Code) requires collection.
- Block group-Poverty Stats in the past 12 Months: **Good**
- Poverty Status in the past 12 Months data from the American Community Survey has a 100% coverage and federal law (Title 13, U.S. Code) requires collection.

Data Availability: Good

- Water system service area boundaries: **Good**
  - The State Water Board updates water service area boundaries on an ongoing basis.
- Block group-Population: **Good**
  - The American Community Survey is administered annually to a small percentage of households to provide current community-wide data between the collections in the decennial census.
- Block group-Poverty Status in the past 12 Months: **Good**
  - The American Community Survey is administered annually to a small percentage of households to provide current community-wide data between the collections in the decennial census.

Data Accuracy/Quality: Fair

- Water system service area boundaries: **Fair**
  - Water system boundaries in SABL often do not reflect the water system's "water service area," instead it sometimes reflects the water system's jurisdictional area. The State Water Board is working with water systems to verify their water system boundaries and is building a new tool to allow water systems to edit their boundaries in real time.
- 5-Year Block group-Population: **Fair**
  - Census data is accurate. However, the process for assigning census block data to water system boundaries has spatial limitations and may produce inaccurate data, especially for smaller water systems.

- 5-Year Block group-Poverty Status in Past 12 Months: **Fair**
    - Census data is accurate. However, the process for assigning census block data to water system boundaries has spatial limitations and may produce inaccurate data, especially for smaller water systems.

Step 3: Combined Evaluation: Maybe
Poverty Prevalence Indicator meets some of the combined criteria and may be considered for inclusion in Risk Assessment 2.0.

- STEP 1 APPLICABILITY: **Good**
- STEP 2: DATA FITNESS
    - Coverage: **Good**
    - Availability: **Good**
    - Quality: **Fair**
- STEP 3: COMBINED EVALUATION: **Maybe**

Affordability Ratio (AR_{20}) for Drinking Water

This indicator measures the economic burden that relatively low-income households face in paying their water service bills by focusing on the percent of these expenditures relative to the 20th percentile discretionary household income (I.e. the Lowest Quintile of Income (LQI) for the service area). Bills included are for drinking water, wastewater, and stormwater services.* Discretionary income is found by subtracting household expenditures for essential goods and services (housing, healthcare, food, heating/energy, and taxes) from household income.

The standard version of AR_{20} is calculated by adding the average total water service customer charges, dividing them by the 20th percentile discretionary income in a community water system, and multiplying this by one hundred:

([Average Drinking Water Customer Charges + Average Wastewater Customer Charges + Average Stormwater Customer Charges] / 20th Percentile Discretionary Income) X 100

*For the purpose the State Water Board's Needs Assessment only drinking water costs would be utilized.

AR_{20} for Drinking Water = ([Average Drinking Water Customer Charges] / 20th Percentile Discretionary Income) X 100

Step 1: Applicability: Good
This indicator attempts to answer the question: "After a household covers other nondiscretionary expenses, what share of income goes to water service charges?"

The goal of this metric is to describe the impact that water service charges has on a household budget; that is, the percent of income that is spent water services, after housing costs and essential service charges for the other utility services are accounted for. Rather than measure affordability for a community in its entirety, this metric allows for the evaluation of household affordability. The indicator is also sensitive to geographic variations in the cost of living, which can significantly impact the amount of income available to cover utility expenses.[3]

The AR_{20} indicator was introduced by Manuel Teodoro in his 2018 paper, "Measuring Household Affordability for Water and Sewer Utilities."[4] It was officially adopted by the California Public Utility Commission (CPUC) in July 2020 as one of three metric in its "Framework to Assess Affordability of Utility Services."[5] Furthermore, several national water associations including AWWA, NACWA, & WEF identified this metric as a possible affordability indicator.[6] A survey of State Water Board engineers in July 2020 confirmed the applicability of this indicator.

Step 2: Data Fitness (For public water systems with 3,300 connections or less)

Required Risk Indicator Data Points & Sources:

- 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).
- Nondiscretionary Household Expenses - Regional Consumer Expenditure; Bureau of Labor Statistics Consumer Expenditure Survey (CES) (updated annually, required).
- Drinking Water Customer Charges; eAR (updated annually, required [2020 RY])

- For Full AR_{20}:
    - Wastewater Customer Charges; SWRCB Wastewater Survey (updated annually, not required)
    - Stormwater Customer Charges; Not currently available

Risk Indicator Calculation Methodology:

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[3] Paragraph adapted from CPUC :Affordability Metrics Framework Staff Proposal" R.18-07-006, January 24, 2020: https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M325/K620/325620620.PDF

[4] Teodoro, Manuel P., Measuring Household Affordability for Water and Sewer Utilities: http://mannyteodoro.com/wp-content/uploads/2014/03/Teodoro-JAWWA-2018-affordability-methology.pdf

[5] CPUC July 16, 2020 Press Release: https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M343/K980/343980714.PDF

[6] https://www.awwa.org/Portals/0/AWWA/ETS/Resources/DevelopingNewFrameworkForAffordability.pdf?ver=2020-02-03-090519-813

The 20th percentile income is determined for a water system using American Community Survey data for household income. The income bracket in the ACS data that the 20th percentile falls in is then averaged. The average is used because the exact dollar amount of each household income is not reported, only whether households fall in income brackets.

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.

Nondiscretionary Household Expenses:

Teodoro:

In his paper, Teodoro describes nondiscretionary household expenses as including local housing, food, medical, home energy, and tax costs for a given community. This data is not readily available for individual water system communities. In most cases analysis will depend on estimates of household income and expenditures and regression models to approximate nondiscretionary household expenses.

CPUC Approach:

- CPUC defines nondiscretionary household expenses as housing costs plus the essential service charges for utilities not under consideration. CPUC calculates the Affordability Ratio for water, electric, gas, communities, and all four combined.
    - Water AR = (water service costs) / (income – [housing + electric + gas + communications])
    - For housing costs, CPUC utilizes an approach to approximate housing costs using California Public Use Microdata Samples (PUMS) and a regression model. The regression model predicts housing costs based on household size (which CPUC keeps contact at the average size per Area) and household income.
    - Consult CPUC's "Affordability Metrics Framework Staff Proposal" for more information about how these expense are calculated: https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M325/K620/325620620.PDF

Data Coverage: Fair

- Water system service area boundaries: **Good**

    - There is no required reporting of water system service areas, however; current data coverage is 96.78%.
- 5-Year Block group-Income in Past 12 Months: **Good**
    - Income in the past 12 Months data from the American Community Survey has 100% coverage and federal law (Title 13, U.S. Code) requires collection.
- Regional Consumer Expenditures: **Poor**
    - The CES relies on a relatively small sample of households from metropolitan areas and is only available on a relatively large regional scale.
- Drinking Water Customer Charges: **Fair**
    - The 2017 & 2018 eAR provided water rate data coverage of 54% for systems with 3,300 service connections or less.
    - The State Water Board will be making water rate data required in the 2020 eAR reporting year. It is anticipated that the coverage for drinking water rates will improve. Therefore, an upgraded "Fair" score is applied.

- For full AR_{20}:
    - Wastewater Customer Charges: **Poor**
        - There is no analysis of the coverage of the SWRCB Waste Water Survey.
    - Stormwater Customer Charges: **Poor**
        - There is no identified coverage of storm water rates available.

Data Availability: Good

- Water system service area boundaries: **Good**
    - The State Water Board updates water service area boundaries on an ongoing basis.
- 5-Year Block group-Income in Past 12 Months: **Good**
    - The American Community Survey is administered annually to a small percentage of households to provide current community-wide data between the collections in the decennial census.
- Regional Consumer Expenditures: **Good**
    - The U.C. Census updates this data annually.
- Drinking Water Customer Charges: **Good**
    - The eAR is administered annually and starting in 2020 reporting year, drinking water customer charges data will be required reporting.

- For full AR_{20}:
    - Wastewater Customer Charges: **Fair**
        - The Wastewater Survey is administered annually but does not appear to be required.
    - Stormwater Customer Charges: **Poor**
        - No identified source for regular collection of stormwater costs.

Data Accuracy/Quality: Fair

- Water system service area boundaries: **Fair**
    - Water system boundaries in SABL often do not reflect the water system's "water service area," instead it sometimes reflects the water system's jurisdictional area. The State Water Board is working with water systems to verify their water system boundaries and is building a new tool to allow water systems to edit their boundaries in real time.
- 5-Year Block group-Income in Past 12 Months: **Fair**
    - Census data is accurate. However, the process for assigning census block data to water system boundaries has spatial limitations and may produce inaccurate data, especially for smaller water systems.
- Regional Consumer Expenditures: **Poor**
    - Regional estimates obscure variation in expenses faced at the community, much less household scale.
- Drinking Water Customer Charges: **Fair**
    - The State Water Board is working to improve accuracy of rate drinking water charges in the 2020 eAR reporting year.

- For full AR_{20}:
    - Wastewater Customer Charges: **Fair**
        - Rate reporting in the SWRCB Waste Water Survey varies and does not capture rates at a specific consumption level, limiting its accuracy for this analysis.
    - Stormwater Customer Charges: **Poor**
        - No identified source for regular collection of stormwater costs.

Step 3: Combined Evaluation: Future

Affordability Ratio (AR_{20}) does not meet necessary Step 2 criteria for data fitness, but is considered a good potential risk indicator for future iterations of the Risk Assessment. Continued efforts to improve drinking water customer charges data collection through the eAR will improve the data fitness of this indicator. However, if the State Water Board wishes to utilize AR_{20} that includes ALL water service costs, a long-term strategy is needed for collecting wastewater and stormwater customer charges to make full calculation of this indicator this feasible. Furthermore, a more granular dataset or calculation methodology is needed for the State Water Board to assess disposable income at the community level.

- STEP 1 APPLICABILITY: **Good**
- STEP 2: DATA FITNESS
    - Coverage: **Poor**
    - Availability: **Good**
    - Quality: **Fair**
- STEP 3: COMBINED EVALUATION: **Future**

WARi® for Drinking Water

This indicator uses a weighted average residential index (WARi®) to address differences in the distribution of income within a given geographic area and to account for bills paid for all water services across the service area. WARi® calculates (1) % Median Household Income (MHI) based on Census tract-level water bill (drinking water, wastewater, and stormwater)* and the midpoint income for each income bin (2) at each tract level WARI®, using the number of households in each income bin as the weight (3) the service area WARI® as the average of the tract-level results weighted by the households number in each census tract.

- Tract-Level WARi® = ∑ ([Census Tract-Level avg. Total Water Service Charges (Average Drinking Water Customer Charges + Average Wastewater Customer Charges + Average Stormwater Customer Charges) / Income Bin Mid-Point] X % households in Income Bin)
- Service Area WARi® = (∑ [Tract-Level WARi® X Households per Census Tract]) / Total Households

*For the purpose the State Water Board's Needs Assessment, only drinking water costs would be utilized.

- Tract-Level WARi® = ∑ [(Census Tract-Level avg. Total Water Service Charges (Average Drinking Water Customer Charges) / Income Bin Mid-Point) X % households in Income Bin]

Step 1: Applicability: Good
This indicator was developed by financial consultants at Stantec Consulting Services Inc. (Stantec) as an enhancement to U.S. EPA's Residential Indicator. A survey of State Water Board engineers in July 2020 confirmed the applicability of this indicator.

Step 2: Data Fitness (For public water systems with 3,300 connections or less)

Required Risk Indicator Data Points & Sources:

- Water system service area boundaries; State Water Board Service Area Boundary Layer (SABL) (updated as needed, not required).
- Census Tract-Households; U.S. Census Bureau's American Community Survey (ACS updated annually, required).
- Census Tract-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])

- For Full WARi®:
    - Wastewater Customer Charges; SWRCB Wastewater Survey (updated annually, not required)
    - Stormwater Customer Charges; Not currently available

Risk Indicator Calculation Methodology:

To calculate the first step of the WARi®, the midpoint of the ACS income bins between the low and high thresholds of each bin are averaged.

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.

Data Coverage: Fair

- Water system service area boundaries: **Good**
    - There is no required reporting of water system service areas, however; current data coverage is 96.78%.
- Census Tract-Income in Past 12 Months: **Good**
    - Income in the past 12 Months data from the American Community Survey has a 100% coverage and federal law (Title 13, U.S. Code) requires collection.
- Census Tract-Households: **Good**
    - Household data from the American Community Survey has a 100% coverage and federal law (Title 13, U.S. Code) requires collection.
- Drinking Water Customer Charges: **Fair**
    - The 2017 & 2018 eAR provided water rate data coverage of 54% for systems with 3,300 service connections or less.
    - The State Water Board will be making water rate data required in the 2020 eAR reporting year. It is anticipated that the coverage for drinking water rates will improve. Therefore, an upgraded "Fair" score is applied.

- For full WARi®:
    - Wastewater Customer Charges: **Poor**
        - There is no analysis of the coverage of the SWRCB Waste Water Survey.
    - Stormwater Customer Charges: **Poor**
        - There is no identified coverage of storm water rates available.

Data Availability: Good

- Water system service area boundaries: **Good**
    - The State Water Board updates water service area boundaries on an ongoing basis.
- Census Tract-Income in Past 12 Months: **Good**

    - The American Community Survey is administered annually to a small percentage of households to provide current community-wide data between the collections in the decennial census.
- Census Tract-Households: **Good**
    - The American Community Survey is administered annually to a small percentage of households to provide current community-wide data between the collections in the decennial census.
- Drinking Water Customer Charges: **Good**
    - The eAR is administered annually and starting in 2020 reporting year, drinking water customer charges data will be required reporting.

- For full WARi®:
    - Wastewater Customer Charges: **Fair**
        - The Wastewater Survey is administered annually but does not appear to be required.
    - Stormwater Customer Charges: **Poor**
        - No identified source for regular collection of stormwater costs.

Data Accuracy/Quality: Fair

- Water system service area boundaries: **Fair**
    - Water system boundaries in SABL often do not reflect the water system's "water service area," instead it sometimes reflects the water system's jurisdictional area. The State Water Board is working with water systems to verify their water system boundaries and is building a new tool to allow water systems to edit their boundaries in real time.
- Census Tract-Income in Past 12 Months: **Fair**
    - Census data is accurate. However, the process for assigning census block data to water system boundaries has spatial limitations and may produce inaccurate data, especially for smaller water systems.
- Census Tract-Households: **Fair**
    - Census data is accurate. However, the process for assigning census block data to water system boundaries has spatial limitations and may produce inaccurate data, especially for smaller water systems
- Drinking Water Customer Charges: **Fair**
    - The State Water Board is working to improve accuracy of rate drinking water charges in the 2020 eAR reporting year.

- For full WARi®:
    - Wastewater Customer Charges: **Fair**
        - Rate reporting in the SWRCB Waste Water Survey varies and does not capture rates at a specific consumption level, limiting its accuracy for this analysis.
    - Stormwater Customer Charges: **Poor**
        - No identified source for regular collection of stormwater costs.

Step 3: Combined Evaluation: Future

WARi® does not meet necessary Step 2 criteria for data fitness, but is considered a good potential risk indicator for future iterations of the Risk Assessment. Continued efforts to improve drinking water customer charges data collection through the eAR will improve the data fitness of this indicator. However, if the State Water Board wishes to utilize WARi® that includes ALL water service costs, a long-term strategy is needed for collecting wastewater and stormwater customer charges to make full calculation of this indicator this feasible.

- STEP 1 APPLICABILITY: **Good**
- STEP 2: DATA FITNESS
    - Coverage: **Poor**
    - Availability: **Fair**
    - Quality: **Poor**
- STEP 3: COMBINED EVALUATION: **Future**

Extreme Drinking 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.

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

Step 1: Applicability: Good
The Board's AB401 report recommended statewide low-income rate assistance program elements utilize this indicator. A survey of State Water Board engineers in July 2020 confirmed the applicability of this indicator. However, it is noted that some areas with extreme drinking water customer charges may be affluent or have very high water usage, which could result in a poor correlation with affordability.

Step 2: Data Fitness (For public water systems with 3,300 connections or less)

Required Risk Indicator Data Points & Sources:

- 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

Risk Indicator Calculation 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.

Data Coverage: Fair

- The 2017 & 2018 eAR provided water rate data coverage of 54% for systems with 3,300 service connections or less.
- The State Water Board will be making water rate data required in the 2020 eAR reporting year. It is anticipated that the coverage for drinking water rates will improve. Therefore, an upgraded "Fair" score is applied.

Data Availability: Good

The eAR is administered annually and starting in 2020 reporting year, drinking water customer charges data will be required reporting.

Data Accuracy/Quality: Fair

The State Water Board is working to improve accuracy of rate drinking water charges in the 2020 eAR reporting year.

Step 3: Combined Evaluation: Maybe

Extreme Drinking Water Bill meets some of the combined criteria and may be considered for inclusion in Risk Assessment 2.0. Continued efforts to improve drinking water customer charges data collection through the eAR will improve the data fitness of this indicator.

- STEP 1 APPLICABILITY: **Good**
- STEP 2: DATA FITNESS
    - Coverage: **Fair**
    - Availability: **Good**
    - Quality: **Fair**
- STEP 3: COMBINED EVALUATION: **Maybe**

% Shut-Offs

Percentage of residential customer base with service shut-offs due to non-payment.

Step 1: Applicability: Good

Most water systems use past-due balance and their billing cycle to determine residential accounts eligible for water shut-offs and issue warning before customers are disconnected. While shut-offs may not always reflect a customers inability to pay their water bill, it does serve as a key indicator that affordability challenges may exist.

Step 2: Data Fitness (For public water systems with 3,300 connections or less)

Required Risk Indicator Data Points & Source:

- Number of residential service connections with water shut off more than once due to failure to pay; eAR (annual, required, but was voluntary for large water systems prior to 2018)
    - Total Single-Family Shut-offs
    - Total Multi-Family Shut-offs
- Total Number of Service Connections: eAR (annual, required)

Risk Indicator Calculation Methodology:

- % Shut-Offs = ([Total Single-Family Shut-offs + Total Multi-Family Shut-offs] / Total Number of Service Connections) X 100

Data Coverage: Good

- Number of residential service connections with water shut off more than once due to failure to pay: **Good**
    - 96% coverage in 2018 for water systems with 3,300 service connection or less.
    - 12% coverage in 2017 for water systems with 3,300 service connection or less (only required for large water systems).
- Total Number of Service Connections: **Good**
    - 99% coverage 2018 for water systems with 3,300 service connection or less.

Data Availability: Good

- Number of residential service connections with water shut off more than once due to failure to pay: **Good**
    - This data is required reporting in the eAR annually.
- Total Number of Service Connections: **Good**
    - This data is required reporting in the eAR annually.

Data Accuracy/Quality: Fair

- Number of residential service connections with water shut off more than once due to failure to pay: **Fair**
    - Reporting to the State Water Board is dependent upon water systems self-reporting this information. Considering the self-reported nature of the data, and limited validation, State Water Board staff and UCLA suggest a data accuracy/quality score of “Fair.”
- Total Number of Service Connections: **Good**
    - Reporting to the State Water Board is dependent upon water systems self-reporting this information. Considering the self-reported nature of the data, and limited validation, State Water Board staff and UCLA suggest a data accuracy/quality score of “Good.”

Step 3: Combined Evaluation: Yes
Shut-Offs meets the combined criteria and should be considered for inclusion in Risk Assessment 2.0.

- STEP 1 APPLICABILITY: **Good**
- STEP 2: DATA FITNESS
    - Coverage: **Good**
    - Availability: **Good**
    - Quality: **Good**
- STEP 3: COMBINED EVALUATION: **Yes**

Duration of Shut-Offs

This metric represents the median duration of the shut-offs in number of days per year.

Step 1: Applicability: Good
A survey of State Water Board District engineers in July 2020 indicated that applicability of this indicator is "Good." Interruptions in water service create household hardship and reduced quality of life. Understanding the average duration of water system shut offs allow for analysis of this hardship.

Step 2: Data Fitness (For public water systems with 3,300 connections or less)

Required Risk Indicator Data Points & Source:

- Total single-family water shut-off duration (days); eAR (annual, required)
- Total multi-family water shut-off duration(days); eAR (annual, required)

Risk Indicator Calculation Methodology:

Duration of Shut-Offs = Weighted average of (Median Duration of total single-family Shut-Offs + Median Duration of total multi-family Shut-Offs).

Data Coverage: Good
The following analysis was completed using the average response rate between the 2017 and 2018 eAR reporting years for public water systems with 3,300 service connections or less:

- Total single-family water shut-off duration (days): **Good**
    - 96% coverage.
- Total multi-family water shut-off duration (days per year): **Good**
    - 12% coverage.

Data Availability: Good

- Total single-family water shut-off duration (days per year): **Good**
    - This data is required reporting in the eAR annually.
- Total multi-family water shut-off duration (days per year): **Good**
    - This data is required reporting in the eAR annually.

Data Accuracy/Quality: Fair

- Total single-family water shut-off duration (days per year): **Fair**
    - Reporting to the State Water Board is dependent upon water systems self-reporting this information. Considering the self-reported nature of the data, and limited validation, State Water Board staff and UCLA suggest a data accuracy/quality score of "Fair."
- Total multi-family water shut-off duration (days per year): **Fair**
    - Reporting to the State Water Board is dependent upon water systems self-reporting this information. Considering the self-reported nature of the data, and limited validation, State Water Board staff and UCLA suggest a data accuracy/quality score of "Fair."

Step 3: Combined Evaluation: Maybe
Duration of Shut-Offs meets some of the combined criteria and may be considered for inclusion in Risk Assessment 2.0.

- STEP 1 APPLICABILITY: **Good**
- STEP 2: DATA FITNESS
    - Coverage: **Good**
    - Availability: **Good**
    - Quality: **Fair**
- STEP 3: COMBINED EVALUATION: **Maybe**

Hours at Minimum Wage to Pay Drinking Water Bill

This indicator measures the minimum hours needed for a household to work, at minimum wage pay in the local area, to cover the cost of the water system's average drinking water customer charges at 6 Hundred Cubic Feet per month.
Minimum Work Hours = [Average Drinking Water Customer Charges] / [Current minimum hourly wage of water service area]

Step 1: Applicability: Good
Hours at Minimum Wage was adopted by the California Public Utility Commissions as an affordability metric.[7] Several national water associations including AWWA, NACWA, & WEF identified this metric as a possible affordability indicator.[8]

[7] CPUC: https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M343/K980/343980714.PDF

Risk Indicator Calculation 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.

Step 2: Data Fitness (For public water systems with 3,300 connections or less)

Required Risk Indicator Data Points & Sources:

- Water system service area boundaries; State Water Board Service Area Boundary Layer (SABL) (updated as needed, not required).
- Drinking Water Customer Charges; eAR (updated annually, required [2020 RY]).
- Local Minimum Wage; UC Berkeley Labor Center (ongoing updates, not required).

Risk Indicator Calculation 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 estimated customer charges (not collected through a customer bill) will be added to this figure to calculate Total Drinking Water Customer Charges.

Water system-level minimum wage is calculated by overlaying water system boundaries with municipal boundaries listed in the Berkeley Labor Center data. Local minimum wage rates are applied to water systems that fall within municipal boundaries. County or statewide minimum wages are applied to water systems which fall outside of localities which have passed their own minimum wage rates.

Data Coverage: Fair

- Water system service area boundaries: **Good**
    - There is no required reporting of water system service areas, however; current data coverage is 96.78%.

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[8] https://www.awwa.org/Portals/0/AWWA/ETS/Resources/DevelopingNewFrameworkForAffordability.pdf?ver=2020-02-03-090519-813

- Drinking Water Customer Charges: **Fair**
    - The 2017 & 2018 eAR provided water rate data coverage of 54% for systems with 3,300 service connections or less.
    - The State Water Board will be making water rate data required in the 2020 eAR reporting year. It is anticipated that the coverage for drinking water rates will improve. Therefore, an upgraded “Fair” score is applied.
- Minimum Wage: **Good**
    - 100% coverage. The statewide minimum wage is the default minimum wage when municipal deviations are not instituted.

Data Availability: Good

- Water system service area boundaries: **Good**
    - The State Water Board updates water service area boundaries on an ongoing basis.
- Drinking Water Customer Charges: **Good**
    - The eAR is administered annually and starting in 2020 reporting year, drinking water customer charges data will be required reporting.
- Minimum Wage: **NA**
    - Unable to determine regular availability of data from Berkeley Labor Center.

Data Accuracy/Quality: Fair

- Water system service area boundaries: **Fair**
    - Water system boundaries in SABL often do not reflect the water system’s “water service area,” instead it sometimes reflects the water system’s jurisdictional area. The State Water Board is working with water systems to verify their water system boundaries and is building a new tool to allow water systems to edit their boundaries in real time.
- Drinking Water Customer Charges: **Fair**
    - The State Water Board is working to improve accuracy of rate drinking water charges in the 2020 eAR reporting year.
- Minimum Wage: **Good**

Step 3: Combined Evaluation: Maybe

Hours at Minimum Wage meets some of the combined criteria and may be considered for inclusion in Risk Assessment 2.0. Continued efforts to improve drinking water customer charges data collection through the eAR will improve the data fitness of this indicator.

- STEP 1 APPLICABILITY: **Good**
- STEP 2: DATA FITNESS
    - Coverage: **Fair**
    - Availability: **Good**
    - Quality: **Fair**
- STEP 3: COMBINED EVALUATION: **Maybe**

Socioeconomic Vulnerability Index

Socioeconomic Vulnerability Index measures the relative socioeconomic characteristics of communities in terms of poverty, unemployment, educational attainment, linguistic isolation, and percent of income spent on housing. These indicators are used to quantify how the same rate impact may affect one community's ability to pay for water service more than another's.

Step 1: Applicability: Poor
This indicator is utilized by OEHHA in its CalEnviroScreen tool as well as by the CPUC in its Adopted Framework to Assess Affordability.[9] It was developed and identified as applicable to risks of pollution burden by OEHHA. The factors of Educational Attainment, Housing Burden, Linguistic Isolation, Poverty, and Unemployment are certainly socioeconomic factors that are broadly correlated with a range of community vulnerabilities and disadvantages.

However, the additive value of including a broad index of non-economic factors in the Risk Assessment when more specific data on income and living costs is available for direct inclusion is questionable. Moreover, the broadness of vulnerabilities highlighted in the SEVI index may reasonably be judged as outside the direct sphere of a customer's ability to pay their water bill.

Step 2: Data Fitness (For public water systems with 3,300 connections or less)

Required Risk Indicator Data Points & Sources:

- Water system service area boundaries; State Water Board Service Area Boundary Layer (SABL) (updated as needed, not required).
- Socioeconomic Vulnerability Index; California Office of Environmental Health Hazard Assessment (OEHHA) CalEnviroScreen (based on data collected every 10-years and annually, derived from required reporting).
    - Educational Attainment
    - Housing Burden
    - Linguistic Isolation
    - Poverty
    - Unemployment

Data Coverage: Good
- Water system service area boundaries: **Good**
    - There is no required reporting of water system service areas, however; current data coverage is 96.78%.
- Socioeconomic Vulnerability Index: **Good**

[9] CPUC: https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M343/K980/343980714.PDF

    - OHHA uses required census tract boundary reporting from the 2010 census for 8000 tracts in California. Data coverage is 100%.

Data Availability: Good

- Water system service area boundaries: **Good**
    - The State Water Board updates water service area boundaries on an ongoing basis.
- Socioeconomic Vulnerability Index: **Good**
    - OEHHA derives its data from U.S. Census results that are collected every 10 years as well as ACS survey results that are collected annually.

Data Accuracy/Quality: Fair

- Water system service area boundaries: **Fair**
    - Water system boundaries in SABL often do not reflect the water system's "water service area," instead it sometimes reflects the water system's jurisdictional area. The State Water Board is working with water systems to verify their water system boundaries and is building a new tool to allow water systems to edit their boundaries in real time.
- Socioeconomic Vulnerability Index: **Good**
    - Census/ACS data is accurate and reliable.

Step 3: Combined Evaluation
Socioeconomic Vulnerability Index does not meet the combined criteria and should not be considered for inclusion in Risk Assessment 2.0.

- STEP 1 APPLICABILITY: **Poor**
- STEP 2: DATA FITNESS
    - Coverage: **Good**
    - Availability: **Good**
    - Quality: **Fair**
- STEP 3: COMBINED EVALUATION: **No**

Households Delinquent in Paying Bills

This indicator measures the percentage of households which a water system serves who have missed one or more bill payments (30 days up to 90 days) during the year and have received a shutoff notice. A household that misses a payment for a prolonged period of time is considered delinquent in paying a bill.

Step 1: Applicability: Good

Several national water associations including AWWA, NACWA, & WEF identified this metric as a possible affordability indicator.[10]

Step 2: Data Fitness (For public water systems with 3,300 connections or less)

Required Risk Indicator Data Points & Sources:

- No existing data source is readily available to evaluate this indicator.

Data Coverage: Poor

Data Availability: Poor

Data Accuracy/Quality: Poor

Step 3: Combined Evaluation: Future
Households Delinquent in Paying Bills does not meet necessary Step 2 criteria for data fitness, but is considered a good potential risk indicator for future iterations of the Risk Assessment if cost of water service data can be improved.

- STEP 1 APPLICABILITY: **Good**
- STEP 2: DATA FITNESS
  - Coverage: **Poor**
  - Availability: **Poor**
  - Quality: **Poor**
- STEP 3: COMBINED EVALUATION: **Future**

Households Below the Living Wage

This indicator measures the percentage of a water system's households who are earning below the Living Wage. The Living Wage, developed by the Massachusetts Institute of Technology (MIT), is a measure of the amount of income that a household needs to pay for essential living expenses.

[Households below the living wage / Total Households] X 100 = Percent of Community Below a Local Living Wage Measure

Step 1: Applicability: Good
Several national water associations including AWWA, NACWA, & WEF identified this metric as a possible affordability indicator.[11]

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[10] https://www.awwa.org/Portals/0/AWWA/ETS/Resources/DevelopingNewFrameworkForAffordability.pdf?ver=2020-02-03-090519-813

Step 2: Data Fitness: (For public water systems with 3,300 connections or less)

Required Risk Indicator Data Points & Sources:

- Water system service area boundaries; State Water Board Service Area Boundary Layer (SABL) (updated as needed, not required).
- Block Group-Households; U.S. Census Bureau's American Community Survey (ACS updated annually, required).
- Block Group-Income in the past 12 months; U.S. Census Bureau's American Community Survey (ACS updated annually, required).
- Local Living Wage; MIT Living Wage Calculator (potentially a one-time assessment, no required).

Risk Indicator Calculation Methodology:

The Living Wage was developed by MIT. The MIT Living Wage calculator (http://livingwage.mit.edu) calculates, at the County level, the minimum wage needed to pay for essential expenditures in several categories, including food, housing (including utility costs), transportation, medical care, child care, and taxes, for different household sizes and arrangements.

Community Water System boundaries typically do not align with County boundaries where the Living Wage data is calculated. A water system's boundary will need be overlayed with County boundaries to determine appropriate Living Wage threshold.

Community Water System boundaries typically do not align with census boundaries where household income data is regularly collected. In order to assign an average income to a community water system spatially weighted household income data is aggregated by census block within the water system service area.

Data Coverage: Fair

- Water system service area boundaries: **Good**
  - There is no required reporting of water system service areas, however; current data coverage is 96.78%.
- Block Group-Households: **Good**
  - Household data from the American Community Survey has a 100% coverage and federal law (Title 13, U.S. Code) requires collection.
- Block Group-Income in Past 12 Months: **Good**

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[11] https://www.awwa.org/Portals/0/AWWA/ETS/Resources/DevelopingNewFrameworkForAffordability.pdf?ver=2020-02-03-090519-813

    - Income in the past 12 Months data from the American Community Survey has a 100% coverage and federal law (Title 13, U.S. Code) requires collection.
- Living Wage: **Fair**
    - Data has a 100% data coverage at the county level, ideally this data would be more granular to determine Living Wage at the census track level.

Data Availability: Fair

- Water system service area boundaries: **Good**
    - The State Water Board updates water service area boundaries on an ongoing basis.
- Block Group-Households: **Good**
    - The American Community Survey is administered annually to a small percentage of households to provide current community-wide data between the collections in the decennial census.
- Block Group-Income in Past 12 Months: **Good**
    - The American Community Survey is administered annually to a small percentage of households to provide current community-wide data between the collections in the decennial census.
- Living Wage: **Poor**
    - The data for MIT Living Wage analysis is published by a private, out of state university which cannot be regularly relied upon for ongoing production of the metric and discourages data scraping.

Data Accuracy/Quality: Fair

- Water system service area boundaries: **Fair**
    - Water system boundaries in SABL often do not reflect the water system's "water service area," instead it sometimes reflects the water system's jurisdictional area. The State Water Board is working with water systems to verify their water system boundaries and is building a new tool to allow water systems to edit their boundaries in real time.
- Block Group-Households: **Fair**
    - Census data is accurate. However, the process for assigning census block data to water system boundaries has spatial limitations and may produce inaccurate data, especially for smaller water systems.
- Block Group-Income in Past 12 Months: **Fair**
    - Census data is accurate. However, the process for assigning census block data to water system boundaries has spatial limitations and may produce inaccurate data, especially for smaller water systems.
- Living Wage: **Poor**
    - The MIT Living Wage analysis did not exclusively use federal data, calling into question the underlying data, and the process for assigning a living wage at county level to an individual water system lowers its validity.

Step 3: Combined Evaluation: Maybe

Household Below Living Wage does not meet necessary Step 2 criteria for data fitness, but is considered a good potential risk indicator for future iterations of the Risk Assessment if data can be improved. The development of a living wage calculation that is maintained by a reliable public source and that is calculated closer to the census tract is necessary for the use of this indicator.

- STEP 1 APPLICABILITY: **Good**
- STEP 2: DATA FITNESS
  - Coverage: **Fair**
  - Availability: **Fair**
  - Quality: **Fair**
- STEP 3: COMBINED EVALUATION: **Future**

Shelter Cost (FMR)

This indicator measures estimates the percentage of households spending more than 30% of income on shelter cost. This is calculated by using the U.S. Department of Housing and Urban Development's (HUD) Fair Market Rent (FMR)[12] metric (housing and utility costs), dividing it by average income for a water system, and multiplying this by 100.

[HUD FMR metric / Total income] X 100 = Percent of Shelter Cost.

Within HUD's current methodology, FMRs reflect three components: (1) the base shelter rent, as estimated with data from the American Community Survey (ACS), (2) an inflation factor that is applied to the base rent, and (3) a trend factor.

(1) Base shelter rent plus the cost of all necessary utilities, and exclude the cost of telephones, cable or satellite television service, and internet service.
(2) The inflation factor uses actual values on inflation to bring the base rent to current values.
(3) The trend factor uses forecasted values to bring the current values of the base rent to the future values, which will be published as the FMRs.

Fair Market Rents are described as the **40th percentile** of gross rents for typical, non-substandard rental units occupied by recent movers in a local housing market (24 CFR Part 888). The 40th percentile means that the average rent (50th percentile) is slightly higher.

[12] HUD Fair Market Rent: https://www.huduser.gov/portal/datasets/fmr.html#2021_documents

HUD annually estimates FMRs for more than 600 metropolitan areas and nearly 2,000 nonmetropolitan county FMR areas.

Step 1: Applicability: Good
This indicator directly considers the household burden of paying for water services together with some (but not all) other non-discretionary household expenditures. Several national water associations including AWWA, NACWA, & WEF identified this metric as a possible affordability indicator.[13]

Step 2: Data Fitness: (For public water systems with 3,300 connections or less)

Required Risk Indicator Data Points & Sources:

- 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)
- Fair Market Rent; HUD Fair Market Rent (FMR) (annual, required)

Risk Indicator Calculation Methodology:

Community Water System boundaries in California typically do not align with surrounding municipal or census boundaries where income data is regularly collected. In order to assign an average income and to a community water system aggregate, spatially weighted income data is aggregated by census block within the water system service area.

HUD Fair Market Rent data is applied at the county level. An FMR is assigned to each community water system based on the county they operate in.

It's important to note that the water utility costs included in the FMR do not represent the drinking water customer charge data collected by the State Water Board.

Data Coverage: Good
- Water system service area boundaries: **Good**
    - There is no required reporting of water system service areas, however; current data coverage is 96.78%.
- Block Group-Income in Past 12 Months: **Good**
    - Income in the past 12 Months data from the American Community Survey has a 100% coverage and federal law (Title 13, U.S. Code) requires collection.

[13] https://www.awwa.org/Portals/0/AWWA/ETS/Resources/DevelopingNewFrameworkForAffordability.pdf?ver=2020-02-03-090519-813

- Fair Market Rent: **Fair**
    - HUD FMR data coverage is 100% at the County and sometimes sub-county level.

Data Availability: Good

- Water system service area boundaries: **Good**
    - The State Water Board updates water service area boundaries on an ongoing basis.
- Block Group-Income in Past 12 Months: **Good**
    - The American Community Survey is administered annually to a small percentage of households to provide current community-wide data between the collections in the decennial census.
- Fair Market Rent: **Good**
    - Section 8(c)(1) of the USHA, as amended by HOTMA (Pub. L. 114-201, approved July 29, 2016), requires HUD to publish FMRs annually.

Data Accuracy/Quality: Fair

- Water system service area boundaries: **Fair**
    - Water system boundaries in SABL often do not reflect the water system's "water service area," instead it sometimes reflects the water system's jurisdictional area. The State Water Board is working with water systems to verify their water system boundaries and is building a new tool to allow water systems to edit their boundaries in real time.
- Block Group-Households: **Fair**
    - Census data is accurate. However, the process for assigning census block data to water system boundaries has spatial limitations and may produce inaccurate data, especially for smaller water systems.
- Fair Market Rent: **Fair**
    - The metric captures only a select set of non-discretionary household expenditures (utilities). Moreover, the process for assigning FMR at county level to an individual water system lowers its validity.

Step 3: Combined Evaluation: Maybe

Shelter Cost meets some of the combined criteria and may be considered for inclusion in Risk Assessment 2.0. Developing a more comprehensive collection of household expenditures will improve this indicator score. Additionally, higher spatial resolution of housing cost data is needed as a county-level data does not help characterize water-system level characteristics sufficiently.

- STEP 1 APPLICABILITY: **Good**
- STEP 2: DATA FITNESS
    - Coverage: **Good**
    - Availability: **Good**
    - Quality: **Fair**
- STEP 3: COMBINED EVALUATION: **Maybe**

Households Receiving Public Assistance

This indicator measures the percentage of households in the service area receiving public assistance in various forms. This metric is an indicator of the prevalence of economic hardship within a community.

[Number of households in service area receiving some form of public assistance / Total households in service area] X 100 = Percentage of Households Receiving Public Assistance

Step 1: Applicability: Poor
Several national water associations including AWWA, NACWA, & WEF identified this metric as a possible affordability indicator.[14] However, it was noted by industry stakeholders that when compared to other measures of poverty and disposable income, this metric may not be as applicable. Therefore, a downgraded score of "Poor" is assigned.

Step 2: Data Fitness (For public water systems with 3,300 connections or less)

Required Risk Indicator Data Points & Sources:

- Water system service area boundaries; State Water Board Service Area Boundary Layer (SABL) (updated as needed, not required).
- Census Tract-Households; U.S. Census Bureau's American Community Survey (ACS updated annually, required).
- Census Tract-Households Receiving Public Assistance; U.S. Census Bureau's American Community Survey (ACS updated annually, required)

Risk Indicator Calculation Methodology:

Census/ACS reports the percentage of households receiving public assistance income and/or SNAP benefits at the block group level.

Community Water System boundaries typically do not align with surrounding municipal or census boundaries where population data is regularly collected. In order to assign a number of household and households receiving public assistance and to a community water system spatially weighted census data is aggregated by block group within the water system service area.

Data Coverage: Good
- Water system service area boundaries: **Good**

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[14] https://www.awwa.org/Portals/0/AWWA/ETS/Resources/DevelopingNewFrameworkForAffordability.pdf?ver=2020-02-03-090519-813

    - There is no required reporting of water system service areas, however; current data coverage is 96.78%.
- Block group-Households: **Good**
    - Household data from the American Community Survey has a 100% coverage and federal law (Title 13, U.S. Code) requires collection.
- Block group-Households Receiving Public Assistance: **Good**
    - 100% coverage and federal law (Title 13, U.S. Code) requires collection.

Data Availability: Good

- Water system service area boundaries: **Good**
    - The State Water Board updates water service area boundaries on an ongoing basis.
- Block group-Households: **Good**
    - The American Community Survey is administered annually to a small percentage of households to provide current community-wide data between the collections in the decennial census.
- Block group-Households Receiving Public Assistance: **Good**
    - The American Community Survey is administered annually to a small percentage of households to provide current community-wide data between the collections in the decennial census.

Data Accuracy/Quality: Fair

- Water system service area boundaries: **Fair**
    - Water system boundaries in SABL often do not reflect the water system's "water service area," instead it sometimes reflects the water system's jurisdictional area. The State Water Board is working with water systems to verify their water system boundaries and is building a new tool to allow water systems to edit their boundaries in real time.
- Block group-Households: **Fair**
    - Census data is accurate. However, the process for assigning census block data to water system boundaries has spatial limitations and may produce inaccurate data, especially for smaller water systems.
- Block group-Households Receiving Public Assistance: **Fair**
    - Census data is accurate. However, the process for assigning census block group data to water system boundaries has spatial limitations and may produce inaccurate data, especially for smaller water systems.

Step 3: Combined Evaluation: No

Households receiving public assistance does not meet the combined criteria and should not be considered for inclusion in Risk Assessment 2.0.

- STEP 1 APPLICABILITY: **Poor**
- STEP 2: DATA FITNESS
    - Coverage: **Good**
    - Availability: **Good**

    - Quality: **Fair**
- STEP 3: COMBINED EVALUATION: **No**

Customers Receiving Water Bill Payment Assistance

This indicator measures the percentage of customers receiving water bill payment assistance from the water system's customer assistance program(s).

[Number Customers Receiving Water Bill Assistance / All Residential (Single-Family and Multi-Family) Customers] X 100 = Percentage of Customers Receiving Water Bill Payment Assistance

Step 1: Applicability: Good
The State Water Board's AB 401 Final Report on Recommendations for Low Income Rate Assistance Programs outlines the scope, benefits, and impacts of payment assistance on affordability, and this indicator shows a clear nexus to affordability need.

Step 2: Data Fitness (For public water systems with 3,300 connections or less)

Required Risk Indicator Data Points & Sources:

- Customer Assistance Program Enrollment (total occupied residential accounts [Single Family and Multi-Family]): eAR (updated annually, required)
- Residential Accounts (Single Family and Multi-Family): eAR (updated annually, required)

Data Coverage: Poor
- Customer Assistance Enrollment: **Poor**
    - eAR data from 2017 and 2018 indicates 21 - 24% coverage for systems with 3,300 service connections or less.
- Residential Accounts: **Good**
    - 100% coverage for systems with 3,300 service connections or less.

Data Availability: Good
- Customer Assistance Enrollment: **Good**
    - Required annual reporting, although the coverage is low.
- Residential Accounts: **Good**
    - Required annual reporting

Data Accuracy/Quality: Fair
- Customer Assistance Enrollment: **Poor**
    - Small water systems often do not provide customer assistance programs, or have very low enrollment levels even among eligible customers.

Moreover, hard to reach households living in multi-family housing, often low-income, are underrepresented in customer assistance data.

- Residential Accounts: **Good**
    - Required data in the eAR is often verified by State Water Board staff.

Step 3: Combined Evaluation: Future
Customers Receiving Water Bill Payment Assistance does not meet necessary Step 2 criteria for data fitness, but is considered a good potential risk indicator for future iterations of the Risk Assessment if data fitness can be improved.

- STEP 1 APPLICABILITY: **Good**
- STEP 2: DATA FITNESS
    - Coverage: **Poor**
    - Availability: **Good**
    - Quality: **Fair**
- STEP 3: COMBINED EVALUATION: **Future**

Disadvantaged Community Status

This indicator looks at whether or not a water system service area is classified as a disadvantaged community as specified in section 79505.5 of the California Water Code, meaning that the water service area's Median Household Income (MHI) is less than 80% of the Statewide MHI.

Step 1: Applicability: Good
This indicator was used in the Risk Assessment 1.0 but operationalized in a different fashion. DAC status of a water system is used an eligibility criterion for multiple state funding assistance programs.

Step 2: Data Fitness (For public water systems with 3,300 connections or less)

Required Risk Indicator Data Points & Sources:

- Water System Boundaries; SABL (updated as needed, not required).
- Block group Median Household Income in the Past 12 Months; US Census Bureau/American Community Survey (annually, required).
- Statewide Median Household Income; U.S. Census Bureau/American Community Survey (annually, required).

Data Coverage: Good
- Water System Boundaries: **Good**
    - There is no required reporting of water system service areas, however; current data coverage is 96.78%.
- 5-Year Block Group Median Household Income in the Past 12 Months: **Good**

    - 100%
- Statewide Median Household Income: **Good**
    - 100%

Data Availability: Good

- Water system service area boundaries: **Good**
    - The State Water Board updates water service area boundaries on an ongoing basis.
- 5-Year Block Group Median Household Income in the Past 12 Months: **Good**
    - Data is collected annually and is required.
- Statewide Median Household Income: **Good**
    - Data is collected annually and is required.

Data Accuracy/Quality: Fair

- Water System Boundaries: **Fair**
    - Water system boundaries in SABL often do not reflect the water system's "water service area," instead it sometimes reflects the water system's jurisdictional area. The State Water Board is working with water systems to verify their water system boundaries and is building a new tool to allow water systems to edit their boundaries in real time.
- 5-Year Block Group Median Household Income in the Past 12 Months: **Good**
    - The data comes from a credible source and is fairly correctly reported.
- Statewide Median Household Income: **Good**
    - The data comes from a credible source and is fairly correctly reported.

Step 3: Combined Evaluation: Maybe
Disadvantaged Community Status meets some of the combined criteria and may be considered for inclusion in Risk Assessment 2.0.

- STEP 1 APPLICABILITY: **Good**
    - STEP 2: DATA FITNESS
    - Coverage: **Good**
    - Availability: **Good**
    - Quality: **Fair**
- STEP 3: COMBINED EVALUATION: **Maybe**

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.

Step 1: Applicability: Good

Some low-income households may absorb the cost of rising rates in the form of rent increases. For many renter households in California, drinking water costs are often incorporated into the price of their unit's rent. For example, among families at even 150% of the poverty level nationally, 49% do not receive a water bill directly.[15] Therefore, examining housing burden is applicable when determining household affordability risk for drinking water services.

Step 2: Data Fitness (For public water systems with 3,300 connections or less)

Required Risk Indicator Data Points & Sources:

- Water System Boundaries; SABL (updated as needed, not required).
- 5-Year Block Group Median Household Expenditures on Rent and Mortgages, U.S. Census Bureau/American Community Survey (annually, required); or
- Housing Burden; Housing and Urban Development (HUD) Comprehensive Housing Affordability Strategy (CHAS) data
    - CHAS data is a special analysis of U.S. Census data. CHAS tabulates household income by the percent of the area median (AMI) and includes variables of particular relevance to housing affordability analyses.

Data Coverage: Good

- Water System Boundaries: **Good**
    - There is no required reporting of water system service areas, however; current data coverage is 96.78%.
- 5-Year Block Group Median Household Expenditures on Rent and Mortgages: **Good**
    - 100% Coverage.

Data Availability: Good

- Water system service area boundaries: **Good**
    - The State Water Board updates water service area boundaries on an ongoing basis.
- 5-Year Block Group Median Household Expenditures on Rent and Mortgages: **Good**
    - Data is collected annually and is required.
- Statewide Median Household Income: **Good**
    - Data is collected annually and is required.

Data Accuracy/Quality: Fair

- Water System Boundaries: **Fair**

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[15] Bob Raucher, Janet Clements, & Lorine Giangola, "Customer Assistance Programs for Multi-family Residential and Other Hard to Reach Customers," February 2016. Available at: https://efc.sog.unc.edu/sites/www.efc.sog.unc.edu/files/2016/Affordability%20Hard%20to%20Reach_1.pdf.

    - Water system boundaries in SABL often do not reflect the water system's "water service area," instead it sometimes reflects the water system's jurisdictional area. The State Water Board is working with water systems to verify their water system boundaries and is building a new tool to allow water systems to edit their boundaries in real time.
- 5-Year Block Group Median Household Expenditures on Rent and Mortgages: **Good**
    - The data comes from a credible source and is fairly correctly reported.

Step 3: Combined Evaluation: Maybe
Housing Burden meets some of the combined criteria and may be considered for inclusion in Risk Assessment 2.0.

- STEP 1 APPLICABILITY: **Good**
- STEP 2: DATA FITNESS
    - Coverage: **Good**
    - Availability: **Good**
    - Quality: **Fair**
- STEP 3: COMBINED EVALUATION: **Maybe**