



Santa Cruz Integrated Regional Water Management Region

Water & Sewer Service Affordability Assessment



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Executive Summary

Study Region

This study examines water and sewer service affordability at the household level within the Santa Cruz Integrated Regional Water Management region. The assessment is based on costs of service for six public water service providers and eleven sewer service providers.¹ The six water service providers are:

- City of Santa Cruz
- City of Watsonville
- Davenport County Sanitation District
- San Lorenzo Valley Water District
- Scotts Valley Water District
- Soquel Creek Water District

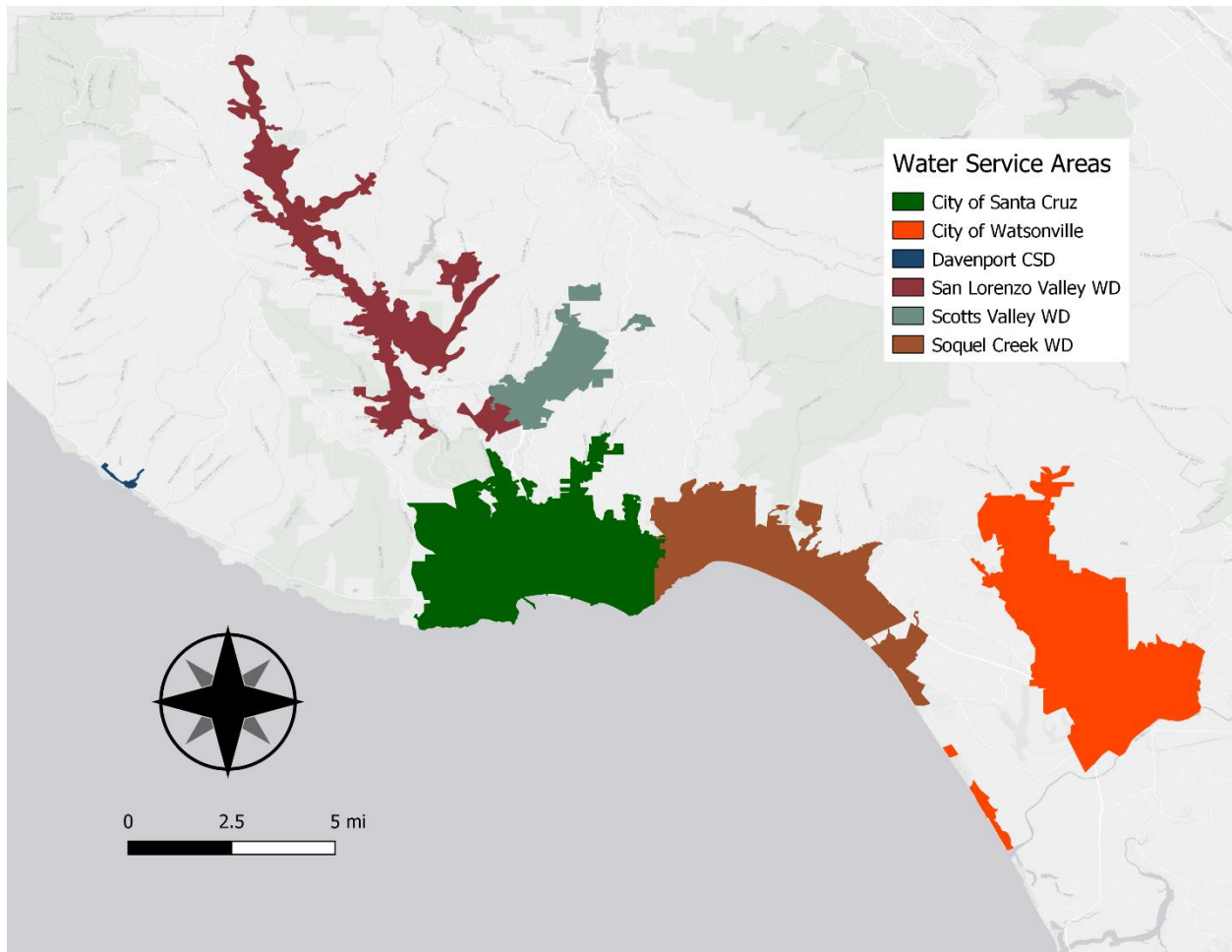
The eleven sewer service providers are:

- City of Santa Cruz
- City of Watsonville
- County Service Area 2 – Place de Mer
- County Service Area 5 – Sand Dollar Beach and Canon del Sol
- County Service Area 10 – Rolling Woods/Wood Cove
- County Service Area 20 – Trestle Beach
- Davenport County Sanitation District
- Freedom County Sanitation District
- Santa Cruz County Sanitation District
- San Lorenzo Valley Water District -- Bear Creek Estates
- Salsipuedes Sanitation District

Additionally, the analysis considers costs of wastewater disposal for households on septic systems located throughout the County's Septic Maintenance District (CSA 12) and in unsewered parts of the sanitation districts. A map of the study region is provided in Figure ES 1.

¹ While the six public water service providers included in this study serve most of the region's population, other smaller public and private water agencies also provide water service in the region. Readers are referred to the [Santa Cruz IRWM Plan Update 2014](#) for additional information on the region and its water service providers.

Figure ES 1. Study Region Map



Utility Service Affordability Metrics

Building on methods recommended by Raucher, et al. (2013), Raucher, et al. (2019), and Teodoro (2018), this study uses a geographically disaggregated set of metrics to assess water and sewer service affordability. Geographic disaggregation enables the analysis to account for differences in household size and income, other housing costs, and rates and charges for water and sewer service, which all vary significantly both within and between service areas.

Three affordability metrics are used in this study:

1. The water bill affordability ratio (AR_{WB}) measures water service cost for essential indoor use as a percentage of household income adjusted for housing cost.
2. The combined water and sewer bill affordability ratio (AR_{WSB}) measures the combined cost of water and sewer service for essential indoor use as a percentage of household income adjusted for housing cost.

- The financial burden score (FB) scores from low to high the financial burden of the combined cost of water and sewer service for essential indoor use considering both a household's AR_{WSB} and poverty prevalence within the neighborhood in which the household is located.

The scoring matrix used to determine the FB scores is shown in

Table ES 1.

Table ES 1. Water & Sewer Service Financial Burden Scoring Matrix

AR_{WSB}	Poverty Prevalence Indicator (PPI)			
	< 10%	10 – 30%	30 – 50%	> 50%
< 1.5%	Low	Low	Low-Moderate	Low-Moderate
1.5% - 2.5%	Low	Low-Moderate	Moderate	Moderate
2.5% - 3.5%	Low-Moderate	Moderate	Moderate	Moderate-High
3.5% - 4.5%	Moderate	Moderate	Moderate-High	High
> 4.5%	Moderate-High	Moderate-High	High	High

AR_{WSB} : Percentage of adjusted MHINHC needed to pay for combined water and sewer service.

PPI: Percentage of households in neighborhood with income less than twice the federal poverty level.

Essential Indoor Use

Service affordability in this study is based on essential indoor use (EIU). EIU is generally defined as the amount of water needed for basic drinking, cooking, health, and sanitation. EIU depends on household size. This study uses the average household size in each census block group to determine EIU for households according to the schedule shown in Table ES 2. To create this schedule, EIU was set to 35 gallons per capita day (GPCD). This was multiplied by a block group's average household size, converted to CCF per month, and rounded up to the nearest whole CCF. Using the schedule in Table ES 2, the average EIU for the study region works out to 40 GPCD, which closely matches estimates of average indoor water use for Santa Cruz County water suppliers prepared by the California Department of Water Resources (2021).²

Table ES 2. EIU by Average Household Size

Average Household Size of Block Group	EIU (CCF/Month)
<2.1	3
2.1-2.8	4
2.8-3.5	5
3.5-4.2	6
4.2-4.9	7
>4.9	8

² Although 35 GPCD is used as the basis for EIU, the average for the region is 40 GPCD. The difference is caused by rounding up household monthly EIU to the nearest whole CCF. Most water service providers do not bill in fractional CCF. To reflect this fact and ensure that bills for EIU accurately reflect what households would actually have to pay, household EIU is rounded up to the nearest whole CCF before calculating water service bill amounts.

Septic System Costs

A significant proportion of households in the study region depend on septic systems for wastewater disposal. Costs for replacing or upgrading existing septic systems are expected to increase significantly in response to new standards in the County's Local Agency Management Program (LAMP) for onsite wastewater treatment systems. Septic system costs used in this study were calculated considering the new standards, known constraints to use of conventional septic systems, past history of septic system upgrades, and extrapolation to larger areas of the county. Appendix B provides the estimation details. Since it cannot be known with certainty when these replacement or upgrade costs will be incurred by homeowners, the affordability metrics for septic systems presented in this study are best viewed as indicative of affordability challenges homeowners with septic systems will face when they need to replace or upgrade their current system. Most households with septic systems are not incurring these costs at present.

Key Findings

Key findings from the analysis are as follows:

- For most households in the study region, water service costs do not presently claim a significant share of household income even after adjusting it for other housing-related costs. Water service costs are less than 1.5% of adjusted income for more than 70% of households. Only 4% of households are estimated to have water service costs in excess of 3.5% of adjusted income. These households are clustered in the City of Santa Cruz, City of Watsonville, and Davenport County Sanitation District service areas.
- The picture changes considerably when sewer costs are factored into the analysis. While it remains the case that these utility services can be deemed affordable for most households in the region, combined water and sewer costs exceed 4.5% of adjusted income for 18% of households. All service areas in the study region, other than the City of Scotts Valley, have sizable numbers of households for which combined water and sewer service costs may constitute a financial burden.
- Combined water and sewer service affordability may be an issue for all customers in the Davenport County Sanitation District.
- In the case of the cities of Watsonville and Santa Cruz, customers facing affordability challenges are clustered in the parts of the service area with relatively low income and high housing costs (normalized for income).
- In the case of the San Lorenzo Valley and Soquel Creek water districts, customers facing affordability challenges are clustered among households with septic systems. It is important to remember that most of households with septic are not currently incurring these high costs, but rather will incur them at some future date when they are required to repair or upgrade their

existing system.

- There is considerable variation in financial burden scores within and between water service areas. The majority of households in the study area (74%) received a financial burden score of moderate or lower. The other 26% received a financial burden score of moderate-high or greater, with 14% scored high. In the City of Santa Cruz, City of Scotts Valley, and Soquel Creek Water District, the majority of households received scores of moderate or less, whereas in the City of Watsonville, Davenport County Sanitation District, and San Lorenzo Valley Water District, the majority of households received scores of moderate or greater.
- Water and sewer service costs are more likely to claim a larger share of household income for households with septic systems. The likelihood that water and sewer costs exceed 3.5% of adjusted income is nearly four times greater for households on septic than on sewer. Similarly, households on septic are twice as likely to have received a financial burden score of moderate-high or high as households on sewer. Thus, it is clear that septic system costs tilt the affordability picture away from affordable and toward unaffordable. Again, however, it is important to stress that most households on septic are not currently incurring these costs, but rather will incur them upon upgrading or replacing their existing system.
- Given the high costs involved with upgrading or replacing an existing septic system, households may choose to defer doing so for as long as possible. This in turn may have implications for the success of the LAMP in addressing existing septic systems that are contributing to impairment of county waterbodies due to pathogens and nutrients.³ This suggests the County and Central Coast Regional Water Quality Control Board may need to consider ways of lessening the LAMP's cost impacts on households with septic, including considering modifications to the standards and providing means-tested financial assistance. Additionally, some parts of the study region, particularly in parts of Soquel Creek Water District may be suitable for conversion to sewer service given their adjacency to existing sewer lines.
- There is considerable policy interest at the local, regional, and state level in the affordability of water and sewer service for households in DAC-designated regions. The affordability assessment indicates that the likelihood that water and sewer service costs exceed 4.5% of adjusted household income is nearly five times greater for households in DAC block groups than for those in non-DAC block groups. The financial burden scores exhibit an even greater disparity. Households in DAC block groups are 15 times more likely to receive a high financial burden score

³ See, for example, Section 2.3.2 of the LAMP for discussion of the impact of existing septic systems on impair and vulnerable waterbodies in the county.

than are households in non-DAC block groups.

- Thus, it is clear that households in DAC block groups are much more likely to face water and sewer service affordability challenges than are households in non-DAC areas. However, it is not the case that water and sewer service affordability is exclusively a DAC issue. There are clusters of households in non-DAC census block groups in the San Lorenzo Valley, City of Santa Cruz, and City of Watsonville service areas that nonetheless are confronting water and sewer service affordability challenges. More often than not, however, the households in non-DAC census block groups with high financial burden scores have on-site septic systems. As noted previously, these households may not presently be experiencing financial challenges, but will face them when they are required to replace or upgrade their existing septic system. By comparison, less than one percent of the households with high financial burden scores in DAC block groups are on septic. These households are facing affordability challenges now.
- This affordability assessment is based on water and sewer service rates and charges in effect as of July 1, 2021. In this respect, it provides a snapshot of the current water and sewer service affordability in the study region. However, water and sewer service rates have been escalating faster than inflation in recent years and this trend is projected to continue. Several of the water and sewer service providers in the study region have either adopted or notified customers of the likelihood of sustained rate increases over the next five or so years. Given this, it will be important to reassess water and sewer service affordability at regular intervals in order to understand how the affordability picture is changing over time.

1 Introduction

This study examines water and sewer service affordability at the household level within the Santa Cruz Integrated Regional Water Management (IRWM) area. The assessment is based on costs of service for six public water service providers and eleven sewer service providers. The six water service providers are:

- City of Santa Cruz
- City of Watsonville
- Davenport County Sanitation District
- San Lorenzo Valley Water District
- Scotts Valley Water District
- Soquel Creek Water District

The eleven sewer service providers are:

- City of Santa Cruz
- City of Watsonville
- County Service Area 2 – Place de Mer
- County Service Area 5 – Sand Dollar Beach and Canon del Sol
- County Service Area 10 – Rolling Woods/Wood Cove
- County Service Area 20 – Trestle Beach
- Davenport County Sanitation District
- Freedom County Sanitation District
- Santa Cruz County Sanitation District
- San Lorenzo Valley Water District Bear Creek Estates
- Salsipuedes Sanitation District

Additionally, the analysis considers costs of wastewater disposal for households on septic systems located throughout the County's Septic Maintenance District (CSA 12)) and in unsewered areas of the sanitation districts.

Water and sewer bills have been escalating rapidly in recent years and there is growing concern at the local, state, and federal levels that water and sewer service is becoming unaffordable for low-income households. The impact of the COVID-19 pandemic on employment and income, particularly among low-income households, has intensified this concern. The federal government recently launched the new Low-Income Household Water Assistance Program (LIHWAP) established under the Consolidated Appropriations Act of 2021. LIHWAP is intended to provide emergency assistance to low-income households that pay a high proportion of household income for drinking water and sewer services. LIHWAP funds will be channeled to public water systems and wastewater treatment works to reduce customer arrearages or subsidize service rates for qualifying low-income households. Even before the pandemic, water and sewer service affordability were a concern in California. AB 401 (Dodd, 2015)) directed the State Water Resources Control Board to develop a plan for funding and implementing a

Low-Income Water Rate Assistance Program. The California Public Utilities Commission has required Class A investor-owned water utilities to provide subsidized rates to qualifying low-income customers for more than a decade. Recently, it adopted several utility service affordability metrics to be used by the water and energy utilities it regulates during rate setting. The implementation of similar rate assistance programs by public water suppliers has been hamstrung by Proposition 218 (Hanak, et al., 2014).⁴

EPA started assessing water and sewer service affordability in the mid-1990s to determine whether federal water and sewer-related mandates might result in undue economic hardship within a community (Raucher, et al., 2019). EPA's work led to two metrics commonly used by utilities and rate analysts to judge water and sewer service affordability:

- 1) Sewer service is deemed affordable if the typical household bill is less than 2% of service area median household income.
- 2) Combined water and sewer service are deemed affordable if the typical household bill is less than 4.5% of service area median household income.

As discussed in the next section of this report, a number of criticisms have been leveled at these metrics, primarily on the grounds that they may paper over important differences among customers within a service area. Indeed, while it is usually the case that water and sewer service are broadly affordable for most customers in a service area, it is also true that there is usually a subset of customers for which the costs of these services constitute a financial burden. From this perspective, it is easy to see why the conventional service-area-wide affordability metrics may be inadequate. The key questions are how many customers may be struggling with water and sewer service costs, how severe is the problem for these customers, and how are they distributed within the service area? Service-area-wide affordability metrics cannot get at these questions. An alternative approach is needed.

Building on methods recommended by Raucher, et al. (2013), Raucher, et al. (2019), and Teodoro (2018), this study uses a geographically disaggregated set of metrics to assess water and sewer service affordability. The geographic unit of analysis is the census block group, a statistical division of a census tract containing roughly 200 to 1,000 households. The number of block groups in a service area varies with the service area's geographic extent and population density. In this study, the number of block groups in a service area ranges from just one for the Davenport County Sanitation District to 83 for the City of Santa Cruz. Disaggregating the study region by census block group allows for a more complete picture of water and sewer service affordability. It enables the analysis to account for differences in household size and income, other housing costs, and rates and charges for water and sewer service, which all vary significantly both within and between service areas.

The next section of this report provides an overview of affordability metrics that have been proposed in the literature, focusing on the strengths and limitations of alternative approaches. This is followed by a

⁴ Proposition 218 applies most directly to water rates and other fees for water service provided to property (and the customers who reside on that property). Its requirement that these charges not exceed the proportional cost of service to individual parcels means that public water suppliers cannot use water rates to fund low-income rate assistance programs as this would result in cross-subsidization unrelated to the proportional cost of providing a parcel with water service.

discussion of the metrics used for this study and the data gathered to construct them. After this, the affordability assessment results are presented. Results are grouped by water service provider. Following the supplier-level presentation, summary results for the study region are presented with particular attention paid to the affordability of water and sewer service for households within census block groups designated by DWR as disadvantaged communities (DAC). Lastly, the study considers the impact of future water and sewer rate increases on the affordability assessment results.

2 Overview of Affordability Metrics

Most water and sewer service affordability indicators stem from affordability criteria developed by EPA in the mid-1990s for assessing whether federal water and sewer-related mandates might result in undue economic hardship within a community (Raucher, et al., 2019). Within the context of wastewater regulation, EPA put forward two impact measures:

- **Residential Indicator (RI).** This indicator is the ratio of average household sewer service cost to service area median household income (MHI). Based on this ratio, sewer service cost is classified into one of three categories:
 - **Low financial impact:** costs per household are less than 1% of MHI.
 - **Mid-range financial impact:** costs per household are between 1% and 2% of MHI.
 - **High financial impact:** costs per household are greater than 2% of MHI.
- **Financial Capability Index (FCI).** This is a composite of six economic indicators of a municipality's financial capacity. Lower composite scores indicate weaker economic conditions and thus greater likelihood federal mandates would cause undue economic impact to the service area. The six economic indicators are:
 - Municipal bond rating
 - Net debt service
 - MHI
 - Unemployment rate
 - Property tax burden, and
 - Property tax rate.

Whereas the Residential Indicator is focused on household affordability, the Financial Capability Index addresses the community's overall ability to pay for compliance costs. As noted by Raucher, et al. (2013), the two concepts are interrelated in the sense that the community's ability to comply with water quality mandates depends on "the ability (and willingness) of its residential and other customers to provide sufficient revenue to assure sustainable utility operation and credit-worthiness."

During the same time period, EPA also considered the affordability of drinking water regulations within the context of small communities (those with populations under 10,000). Specifically, EPA stated it would deem a National Primary Drinking Water Regulation to be unaffordable to small communities if it resulted in an average bill in excess of 2.5% of national MHI. According to Raucher, et al. (2019), the 2.5% of national MHI benchmark was specific to small water systems. EPA did not develop similar benchmarks for larger water system (i.e., those serving populations greater than 10,000). Nonetheless, the following benchmarks are frequently advanced in the context of water and sewer service affordability, regardless of population served:

- Water service is deemed affordable if the typical household bill is less than 2.5% of service area MHI.

- Sewer service is deemed affordable if the typical household bill is less than 2% of service area MHI.
- Combined water and sewer service is deemed affordable if the typical household bill is less than 4.5% of service area MHI.

These benchmarks have been subject to a number of critiques (Raucher, et al. 2013, Raucher, et al. 2019, Teodoro 2018) which generally distill into the following:

- **Average Use vs Essential Indoor Use.** Traditionally, average household water use has been used to assess water and sewer service affordability. This can imbed a large amount of discretionary water use (primarily for landscape irrigation). Critics of traditional affordability metrics have argued that affordability assessments should be based on essential indoor use (EIU) rather than average household use. Residential water use in Santa Cruz County currently averages 53 gallons per capita per day (GPCD) with 77% of this going to indoor uses and 23% going to outdoor uses.⁵ Thus, indoor residential water use in Santa Cruz County is currently about 41 GPCD. For an average sized household in the County, monthly indoor residential water use is about 4.5 CCF while monthly total residential use averages about 5.8 CCF.⁶
- **Average or Median Household Income vs Low Income.** Measuring affordability on the basis of an entire community's average income or MHI is likely to overlook impacts on lower-income households. Other income thresholds have been suggested. DWR, for example, defines a Disadvantaged Community (DAC) as a Census geography (e.g., block group or tract) with MHI that is less than 80% of statewide MHI. It defines a severely disadvantaged community (SDAC) as one with MHI that is less than 60% of statewide MHI. Raucher, et al. (2019) and Teodoro (2018) recommend assessing affordability on the basis of the 20th percentile income level for the community. They argue that the 20th percentile income level is typically identified with the lower boundary of the middle class where households may have limited financial resources, but also may not qualify for income assistance programs. Another approach is to disaggregate the analysis. Rather than calculate a single affordability metric for the service area, disaggregate the service area into smaller geographic units, such as Census tracts, block groups, or blocks, and separately calculate affordability for each geographic unit. As well as allowing for spatial

⁵ Total residential water use is calculated with [State Water Board](#) data derived from monthly reports of water use from urban retail water suppliers in Santa Cruz County. Indoor residential water use is based on estimates developed by the California Department of Water Resources (2021) for City of Santa Cruz, City of Watsonville, San Lorenzo Valley WD, Scotts Valley WD, and Soquel Creek WD. The breakdown between indoor and outdoor residential use cited above is a countywide average. There is considerable variation at the household level both within and between different service areas.

⁶ One CCF is equal to 748 gallons. According to the 2019 American Community Survey (5-yr estimate), the average household size in Santa Cruz County is 2.7 people. Monthly indoor residential water use for an average sized household in the County is therefore about 4.5 CCF ($41 \text{ GPCD} \times 2.7 \times 365 / 12 / 748$) while total residential water use is about 5.8 CCF ($53 \text{ GPCD} \times 2.7 \times 365 / 12 / 748$).

differences in household income, occupancy, and water use, this approach has the advantage of identifying which neighborhoods within a service area most likely are experiencing affordability challenges.

- **Gross vs Disposable Income.** Basing an affordability assessment on gross rather than disposable income ignores the effect of other essential living expenses on the affordability of utility service. Utility service costs may appear affordable on the basis of gross income, but unaffordable after gross income has been adjusted to account for other essential living costs, such as food, housing, health care, and taxes. The difference between gross and disposable income can be especially large in regions with high housing costs like Santa Cruz County.

In response to these critiques, several alternative affordability metrics have been proposed. A general overview of the six approaches that have received the most attention is provided below. For a more detailed discussion of their advantages and limitations, see Raucher et al. (2019).

- **Household Burden Indicator (HBI).** The HBI metric was proposed in Raucher et al. (2019). It is a variant of EPA's RI discussed previously. There are two key differences between the HBI and RI. First, HBI is calculated using the combined cost of water and sewer service whereas RI only considers sewer service. Second, HBI uses the 20th rather than the 50th percentile income level. Justifications for using the 20th percentile income level include: (1) households at or below the 20th percentile typically are the most economically disadvantaged members of the community; (2) the 20th percentile is generally considered the demarcation between low income and middle-class households; (3) many assistance programs have eligibility cut-offs at or near the 20th percentile; and (4) income distribution data are readily available from the US Census facilitating computation of the metric.
- **Affordability Ratio at 20th Income Percentile (AR₂₀).** The AR₂₀ metric was proposed by Teodoro (2018). It compares the cost of essential water and sewer service to the 20th percentile income level net of costs for housing, food, health care, energy, and taxes. As a general rule of thumb, Teodoro suggests a 10% threshold for assessing affordability. In other words, water and sewer service are deemed affordable if they cost less than 10% of disposable income at the 20th percentile income level. The primary limitation of this metric is its dependence on disposable income. Computation of representative costs for housing, food, health care, etc., is not straightforward and data needed to estimate these quantities are not always available. For example, although the American Community Survey compiles data on housing costs, it does not have similar series on costs for food, health care, and taxes needed to calculate the AR₂₀ metric.
- **Weighted Average Residential Index (WARI).** The WARI metric was proposed as a way to account for geographic differences in household income, occupancy, and water use in assessing

water and sewer service affordability. WARI leverages the fact that the US Census reports the number of households in each census tract by income category (e.g., number of households with income between 10-20K, 20-40K, 40-60K, etc.). The average or minimum bill is calculated for each census tract using customer-level billing data and this bill is then divided by the midpoint of each income category. These income-category-specific RIs are then formed into a weighted average RI for the census tract where the weights are equal to the number of households in each income category. A service area weighted average RI can then be formed from the census tract RIs where the weights are the number of households in each census tract. The main advantage of this approach is that it provides geographically disaggregated estimates of utility service affordability. This is useful for locating the parts of the service area where affordability challenges are likely to be present. It is useful to note that using block groups rather than census tracts will result in roughly a three-fold increase in the level of geographic disaggregation. The tradeoff, however, is that Census block group estimates of household income and housing costs are subject to more sampling error than are Census tract estimates.

- **Hours at Minimum Wage (HM).** The HM metric divides the cost of essential water and sewer service by the locally prevailing minimum wage to determine the number of hours a minimum wage worker would need to work in order to pay for water and sewer service. This is not a useful metric because there is no obvious relationship between household income and the prevailing minimum wage.⁷ This metric is not considered further in this report.
- **Poverty Prevalence Indicator (PPI).** Proposed by Raucher, et al. (2019), PPI is not a water and sewer service affordability indicator. Rather it indicates the percentage of households that have income below 200% of the Federal Poverty Level (FPL). They argue that twice the FPL is a commonly used cutoff point for a range of Federal and state income assistance programs. PPI is intended to be used in conjunction with an affordability metric such as the HBI metric. The Financial Burden Matrix discussed next is one example of how PPI may be combined with water/sewer service affordability metrics to produce a more comprehensive assessment of household financial burden associated with utility service costs.
- **Financial Burden Matrix (FBM).** The FBM combines a measure of utility service affordability with a measure of poverty prevalence to gain a more complete picture of the extent to which utility service affordability is likely to be an issue within a geographic unit of analysis. Areas

⁷ Household income reported by the Census American Community Survey is comprised of wage and salary income; net self-employment income; interest, dividends, or net rental or royalty income or income from estates and trusts; Social Security or Railroad Retirement income; Supplemental Security Income (SSI); public assistance or welfare payments; retirement, survivor, or disability pensions; and all other income. Despite its obvious limitations, the [California Public Utilities Commission](#) has recently adopted HM as one of three metrics for assessing utility service affordability.

where both indicators are high are more likely to face affordability challenges than areas where only one or the other is high. Raucher et al. (2019) used PPI and HBI metrics to rank regions in terms of overall financial burden of utility service costs. Similarly, the Alliance for Water Efficiency (2020) combined HBI and PPI metrics to assess water and sewer service affordability by Census tract for Detroit, Michigan.

3 Affordability Metrics Used in Study

3.1 Metric Construction

This study uses a composite of metrics to assess water and sewer service affordability in Santa Cruz County. The goal is to leverage the best features of the alternative metrics described in the previous section. The approach used in this study aligns with the WARI metric in that it uses geographically disaggregated data to assess water and sewer service affordability at the parcel and census block group level.⁸ Additionally, it aligns with the Affordability Ratio advocated by Teodoro (2018) in that it adjusts MHI for median housing cost (MHC) to serve as a proxy of disposable income.⁹ Like Raucher et al. (2019), affordability metrics are calculated using EIU rather than average water use. Lastly, similar to the approaches used in Raucher et al. (2019) and Alliance for Water Efficiency (2020), the approach combines affordability and poverty prevalence metrics to score the financial burden of water and sewer service costs for parcels within each census block group.

The metrics used by this study are constructed as follows:

1. Residential parcels are matched to water and sewer service providers and census block groups.
2. Using data from the 2019 American Community Survey, each residential parcel is matched to its block group MHI, MHC, and PPI. Median household income net of housing cost (MHINHC) is then calculated by subtracting MHC from MHI. While not a full measure of disposable income, MHINHC is close. In addition to basic rent and mortgage costs, MHC accounts for other major non-discretionary housing expenses, including real estate taxes, property insurance, homeowner association fees, and utility service costs for electricity, gas, water, and sewer.
3. Using current rates and charges for water and sewer service, EIU water and sewer costs are calculated for each residential parcel.¹⁰ Water and sewer service cost calculations are described in Appendix A. For parcels with on-site septic systems, sewer service cost is calculated as the sum of the amortized capital and operating costs for a septic system meeting State and County design and operational requirements.¹¹ Septic system cost calculations are described in Appendix B.

⁸ A block group is a statistical division of a census tract and is generally defined to contain between 600 and 3,000 people. A block group usually covers a contiguous area. Within the standard census geographic hierarchy, block groups never cross state, county, or census tract boundaries.

⁹ The approach of using household income adjusted for housing costs represents a middle ground between gross income and disposable income. While economic theory gives preference to using disposable income, there are practical limitations to its calculation. The [California Public Utilities Commission](#) has recently adopted this definition of adjusted income for use in the assessment of utility service affordability.

¹⁰ Rates and charges for water and sewer service effective July 1, 2021, are used to calculate water and sewer costs.

¹¹ The Santa Cruz County Code Chapter 7.38 specifies the standards for septic system installation in unincorporated Santa Cruz County and the cities of Santa Cruz, Scotts Valley, and Capitola. In addition to establishing the design and operational standards for new conventional septic systems, it includes provisions for the management and

4. A water service affordability ratio is calculated for each residential parcel. The water service affordability ratio is equal to the EIU cost of water service divided by MHINHC after adding back water cost. Water cost is added back to MHINHC because the ratio is intended to measure water cost as a proportion of MHI net of housing-related costs other than water service. Since the census calculation of MHC includes the water service cost, it is necessary to add this cost to the ratio's denominator.
5. A combined water and sewer affordability ratio is calculated for each residential parcel. The combined water and sewer affordability ratio is equal to the EIU cost of water and sewer service divided by MHINHC after adding back water and sewer cost. Water and sewer costs are added back to MHNHC because the ratio is intended to measure water and sewer cost as a proportion of MHI net of housing-related costs other than water and sewer service. Since the census calculation of MHC includes water and sewer costs, it is necessary to add these costs to the ratio's denominator.
6. Lastly, each residential parcel is scored in terms of the financial burden of water and sewer service costs using the Financial Burden Matrix in Table 1. This matrix is based on the one used in Alliance for Water Efficiency (2020).

Letting WB and WSB represent the water bill and combined water and sewer bill for EIU, the affordability ratios are calculated as follows:

$$AR_{WB} = \frac{WB}{MHI - MHC + WB}$$

$$AR_{WSB} = \frac{WSB}{MHI - MHC + WSB}$$

Table 1. Water & Sewer Service Financial Burden Scoring Matrix

AR _{WSB}	Poverty Prevalence Indicator (PPI)			
	< 10%	10 – 30%	30 – 50%	> 50%
< 1.5%	Low	Low	Low-Moderate	Low-Moderate
1.5% - 2.5%	Low	Low-Moderate	Moderate	Moderate
2.5% - 3.5%	Low-Moderate	Moderate	Moderate	Moderate-High
3.5% - 4.5%	Moderate	Moderate	Moderate-High	High
> 4.5%	Moderate-High	Moderate-High	High	High

AR_{WSB}: Percentage of adjusted MHINHC needed to pay for combined water and sewer service.

PPI: Percentage of households with income less than twice the FPL.

repair or upgrade of existing systems, and for the use of enhanced treatment systems where the design and operational standards for conventional systems cannot be met.

3.2 Data Sources

Data sources used to construct the affordability ratios used in this study are listed in Table 2.

Table 2. Study Region Data Sources

Data Category	Data Source
Utility service boundaries	Boundary shape files were provided by each water service provider. Additionally, the County of Santa Cruz Department of Public Works provided boundary shape files for each sanitation district it operates. ¹²
Parcel boundaries, land use classification, and dwelling units	Parcel boundaries, land use classifications, and dwelling unit counts were determined using the County of Santa Cruz Assessor Parcels shape file. ¹³
Household size, household income, housing cost, and poverty prevalence	2019 Census American Community Survey 5-Year Estimates for census block groups. ¹⁴
DAC status	DWR DAC Mapping Tool data layers for census block groups and census designated places
Utility rates and charges	Posted rates and charges for water and sewer service as of July 1, 2021.
Septic system cost	As described in Appendix B.

3.3 Essential Indoor Use

Water and sewer costs used to assess affordability are based on Essential Indoor Use (EIU), which is generally defined as the amount of water needed for basic drinking, cooking, health, and sanitation. According to the World Health Organization (2003), between 50 and 100 liters (13.2 and 26.4 gallons) of water per person per day are needed to ensure basic needs are met. Per capita residential water use in most developed countries greatly exceeds this amount. While California Water Code Section 106.3 establishes the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes, it does not to define how much water is required for these purposes. California EPA’s Office of Environmental Health Hazard Assessment (2021) selected 6 CCF per month as representing essential water needs. The State Water Board (2020) has likewise proposed using 6 CCF per month for determining low-income rate assistance. Similarly, the California Public Utilities Commission (2020) has based affordability metrics used for rate setting purposes on 6 CCF per month. None of these state agencies provides strong empirical justification for setting EIU to 6 CCF per month. Instead, they engage in circular reasoning by each citing the other as the primary justification for this quantity. For an average sized household in Santa Cruz County, 6 CCF per month is equivalent to 55 gallons per person per day, double the upper end of the World Health Organization’s recommended range. The California

¹² These include Santa Cruz County Sanitation District, Freedom County Sanitation District, Davenport County Sanitation District, CSA 02 – Place de Mer, CSA 05 – San Dollar, CSA 07 – Boulder Creek, CSA 10 – Rolling Woods, and CSA 20 – Trestle Beach. A map showing the location of each sanitation district can be accessed [here](#).

¹³ Downloaded from the [County of Santa Cruz GIS website](#) on September 16, 2021.

¹⁴ Davenport County Sanitation District is an exception. As described later, MHI, MHC, and PPI are for the Davenport Census Designated Place (CDP) rather than for the block group overlaying the Davenport CDP.

Department of Water Resources (2021) estimates that indoor residential water use in Santa Cruz County currently averages 41 GPCD. For a typical household, this translates to 4.5 CCF per month. Thus, setting EIU to 6 CCF would overstate the amount of water needed for basic drinking, cooking, health, and sanitation purposes for most households in the county.

At the household level, EIU depends on the number of people living in a home. In a home with two people, an EIU of 40 GPCD is equivalent to 3.25 CCF per month while in a home with four people, it is equivalent to 6.5 CCF. This study therefore uses each block group's average household size to determine EIU for households in the block group according to the schedule shown in Table 3. To create this schedule, EIU was set to 35 GPCD. This was multiplied by a block group's average household size, converted to CCF per month, and rounded up to the nearest whole CCF.¹⁵ Table 3 shows the household size transition points between the resulting EIU quantities expressed in CCF/ month. Using the schedule in Table 3, the average EIU for the study region works out to 40 GPCD, which closely matches DWR's estimate of indoor per capita water use for the county.

Table 3. EIU by Average Household Size

Average Household Size of Block Group	EIU (CCF/Month)
<2.1	3
2.1-2.8	4
2.8-3.5	5
3.5-4.2	6
4.2-4.9	7
>4.9	8

3.4 Septic System Costs

Wastewater disposal costs for parcels using onsite septic systems were calculated considering the new standards in the County's Local Agency Management Program (LAMP), known constraints to use of conventional septic systems, past history of septic system upgrades, and extrapolation to larger areas of the county (see Appendix B for details). For this study, it is assumed that at some time in the future all existing systems will need to be replaced or upgraded due to old age and system failure or desire by the property owner to remodel their home or add an accessory dwelling unit, which requires that the system be brought up to current standards. Sewer service affordability metrics for parcels with septic systems are based on the expected cost for replaced or upgraded systems. Since it cannot be known with certainty when these replacement or upgrade costs will be incurred by homeowners, it is important to recognize that the affordability metrics for septic systems presented in this study provide an upper-bound estimate and are best viewed as indicative of affordability challenges homeowners with septic systems will face when they need to replace or upgrade their current system.

¹⁵ Most utilities do not bill in fractional CCF. To ensure households receive an EIU of at least 35 GPCD, fractional CCF are round up to the nearest whole CCF.

4 Water & Sewer Service Affordability Assessment

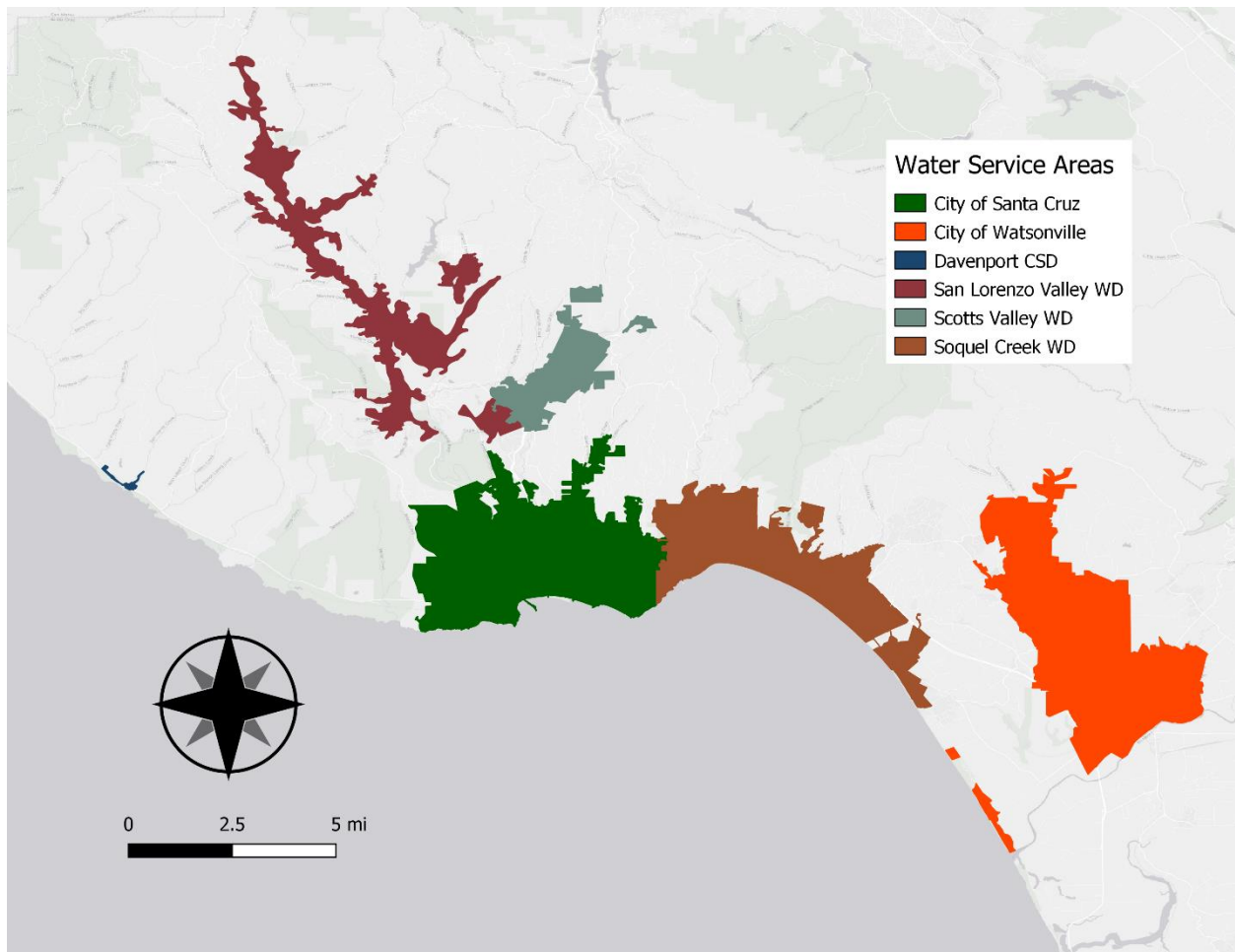
4.1 Study Region

The study region is shown in Figure 1 and includes the following six public water service providers:

- City of Santa Cruz
- City of Watsonville
- Davenport County Sanitation District
- San Lorenzo Valley Water District
- Scotts Valley Water District
- Soquel Creek Water District

The following sections present the affordability analysis results for each water service provider. Following this a summary for the entire region is presented.

Figure 1. Study Region Map

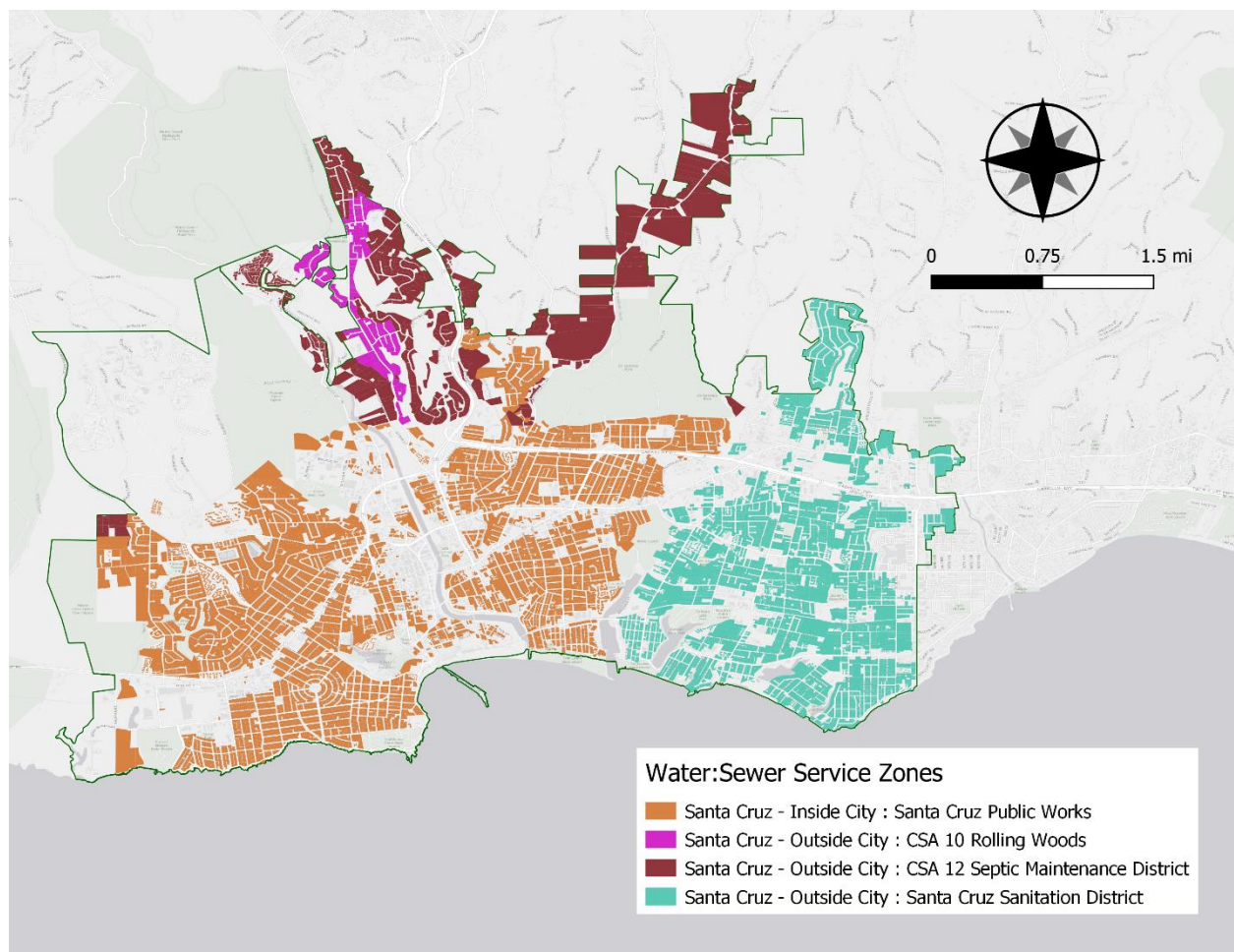


4.2 City of Santa Cruz

4.2.1 Service Area

The Santa Cruz Water Department (Santa Cruz WD) is a municipal utility that is owned and operated by the City of Santa Cruz. The Santa Cruz WD serves a 20 square mile area that extends from the farm fields west of the city to 41st Avenue in the City of Capitola. The service area includes the UC Santa Cruz campus, Live Oak, Pasatiempo, and other unincorporated areas surrounding the city. The Santa Cruz WD serves a population of approximately 96,000 through more than 24,000 service connections. About two-thirds of the service area population resides within the city limits and one-third resides outside the city limits in portions of Capitola and unincorporated Santa Cruz County. The City of Santa Cruz Public Works Department provides sewer service to city residents. Customers outside the city limits either are served by the Santa Cruz County Sanitation District, CSA 10 Rolling Woods, or have on-site septic. Figure 2 shows residential parcels in Santa Cruz WD service area by water-sewer service provider.

Figure 2. SCWD Service Area Residential Parcels by Water-Sewer Service Provider



4.2.2 Residential Parcels, Dwelling Units, and Census Block Groups

According to county assessor data, there are 23,745 residential parcels within the Santa Cruz WD's service area. An estimated 35,306 dwelling units are associated with these parcels.¹⁶ These parcels and dwelling units are distributed across 83 census block groups.

4.2.3 Household Size and EIU

Table 4 gives a breakdown of household size and EIU for the Santa Cruz WD.¹⁷ More than 80% of dwelling units are located in block groups with calculated EIU of 4 CCF/month or less.

Table 4. Santa Cruz WD EIU Breakdown

	Count of Dwelling Units	Percent of Dwelling Units	Mean PPH
EIU (CCF/Month)			
3	8,557	24.2%	1.8
4	20,143	57.1%	2.5
5	6,122	17.3%	3.1
6	484	1.4%	3.5
Total	35,306	100.0%	2.4

Count of DU within block groups with indicated EIU

PPH = Persons per household

4.2.4 Income and Housing Cost

Service area MHI is \$85,500. A breakdown of MHI for the service area is provided in Table 5. For the service area as a whole, housing costs account for 32% of MHI. A breakdown of MHC for the service area is provided in Table 6.

Table 5. Santa Cruz WD MHI Breakdown

	Count of Dwelling Units	Percent of Dwelling Units	Mean MHI (Thou.\$)
MHI Category (Thou.\$)			
< 50	6,409	18.2%	37.7
50-75	7,225	20.5%	63.1
75-100	9,937	28.1%	86.4
100-150	10,787	30.6%	119.2
> 150	948	2.7%	187.7
Total	35,306	100.0%	85.5

Count of DU within block groups with MHI in MHI Category

¹⁶ The estimated number of dwelling units for a parcel is based on the parcel's land use code, as described in Appendix C.

¹⁷ This and subsequent tables show the count of dwelling units in block groups where the variable of interest falls within the indicated range. For example, the table shows that 8,557 dwelling units are in block groups with a calculated EIU of 3 CCF/month. Mean household size for dwelling units in these block groups is 1.8 persons.

Table 6. Santa Cruz WD MHC Breakdown

	Count of Dwelling Units	Percent of Dwelling Units	Mean MHC (% of MHI)
MHC Category (% of MHI)			
< 20	3,769	10.7%	17.0
20-40	25,249	71.5%	28.1
40-60	4,422	12.5%	47.6
60-80	693	2.0%	65.2
> 80	1,173	3.3%	94.3
Total	35,306	100.0%	32.3

Count of DU within block groups with MHC in MHC Category

4.2.5 Poverty Prevalence and DAC Status

PPI is the percentage of population in a block group with income that is less than twice the federal poverty level (FPL). Table 7 gives a breakdown of PPI for Santa Cruz WD. Twelve percent of dwelling units are in census block groups where more than 50% of the population have income that is less than twice FPL.

DAC status indicates whether DWR has designated the block group as a disadvantaged community (i.e., has MHI less than 80% of state MHI). Table 8 gives a breakdown of DAC status in Santa Cruz WD. Twenty one percent of dwelling units are in census block groups that DWR has designated as DAC. On average, MHI in these DAC block groups is less than half that in the non-DAC block groups in the service area.

Table 7. Santa Cruz WD PPI Breakdown

	Count of Dwelling Units	Percent of Dwelling Units	Mean PPI
Poverty Prevalence Category			
<10%	3,266	9.3%	5.3
10-30%	16,230	46.0%	19.9
30-50%	11,585	32.8%	36.9
>50%	4,225	12.0%	60.9
Total	35,306	100.0%	29.0

Count of DU within block groups with PPI in PPI Category

Table 8. Santa Cruz WD DAC Status Breakdown

	Count of Dwelling Units	Percent of Dwelling Units	Mean MHI (Thou.\$)
DAC Status			
Data Not Available	2,810	8.0%	62.0
Not DAC	25,270	71.6%	98.9
DAC	7,226	20.5%	47.7
Total	35,306	100.0%	85.5

Count of DU within block groups designated DAC

4.2.6 Water and Sewer Service Costs

Average annual water service cost for alternative EIU quantities is summarized in Table 9. Water service costs are based on rates and charges in effect July 1, 2021. In the case of single-family dwelling units, monthly service charges are based on the charge for a 5/8" standard meter. In the case of multi-family and mobile home dwelling units, monthly service charges are a function of the number of dwelling units estimated to be served by the meter (see Appendix A for details).

Average annual sewer service cost is summarized in Table 10. Residential sewer charges are invariant to the volume of discharge and therefore do not vary by EIU quantity. Sewer service costs are based on rates and charges in effect July 1, 2021 (see Appendix A for details). The annual cost for homes with on-site septic systems is calculated as the sum of the amortized capital and operating costs for a septic system meeting County design and operational requirements (see Appendix B for details).

Table 9. Santa Cruz WD Annual Water Service Costs by EIU Quantity

	Count of Dwelling Units	EIU Monthly Quantity					
		3 CCF	4 CCF	5 CCF	6 CCF	7 CCF	8 CCF
Santa Cruz Inside-City							
Multi-Family	5,525	399	526	653	804	955	1,131
Mobile Home	355	384	511	638	789	940	1,116
Single-Family	15,420	517	644	771	922	1,073	1,249
Santa Cruz Outside-City							
Multi-Family	2,466	453	597	742	913	1,085	1,286
Mobile Home	2,249	438	582	727	899	1,070	1,271
Single-Family	9,291	588	732	876	1,048	1,220	1,421

Based on rates effective July 1, 2021. See Appendix A for calculation details.

Table 10. Santa Cruz WD Annual Sewer Service Costs for EIU

	Count of Dwelling Units	Mean Annual Sewer Bill
CSA 10 Rolling Woods		
Single-Family	331	315
CSA 12 Septic Maintenance District		
Single-Family	1,100	2,692
Multi-Family	23	1,107
Santa Cruz County Sanitation District		
Single-Family	7,860	847
Multi-Family	2,443	732
Mobile Home	2,249	732
Santa Cruz Public Works		
Single-Family	15,420	648
Multi-Family	5,525	530
Mobile Home	355	530

Based on rates effective July 1, 2021. See Appendix B for calculation details.

4.2.7 Water Service Affordability Ratio

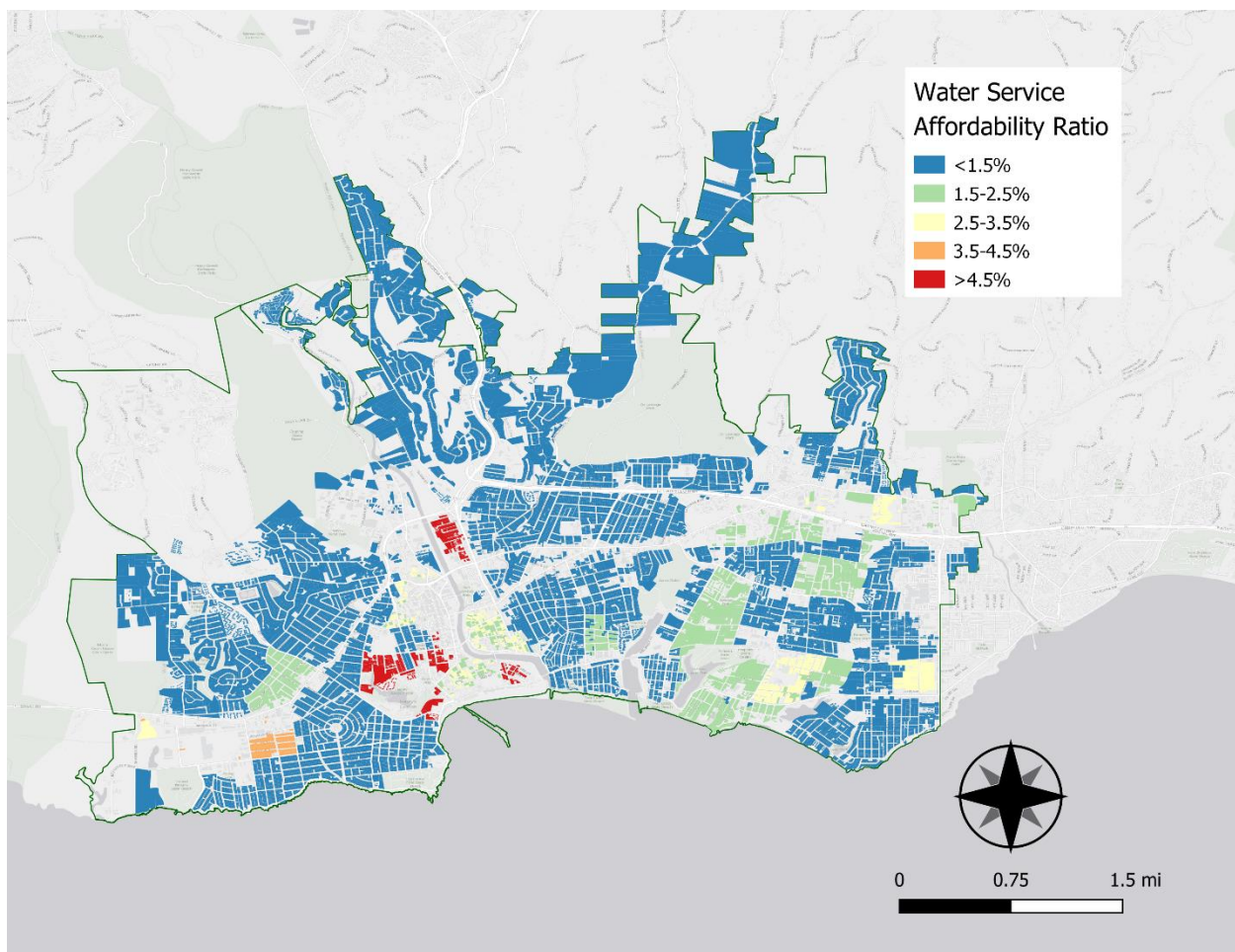
A breakdown of water service ARs for Santa Cruz WD is provided in Table 11 and Figure 3. Nearly three-quarters of households have a water service AR under 1.5% and it is under 2.5% for 89% of households. About 6% of households in the service area have a water service AR greater than 3.5%. These households are clustered in the downtown portion of the service area.

Table 11. Santa Cruz WD Water Service Affordability Ratio Distribution

	Count of Dwelling Units	Percent of Dwelling Units	Mean Water AR for EIU
Water AR for EIU			
<1.5%	26,102	73.9%	0.9%
1.5-2.5%	5,433	15.4%	2.0%
2.5-3.5%	1,710	4.8%	2.8%
3.5-4.5%	195	0.6%	3.7%
>4.5%	1,866	5.3%	8.3%
Total	35,306	100.0%	1.6%

Count of DU within block groups with Water AR for EIU within indicated range.

Figure 3. Santa Cruz WD Water Service Affordability Ratio Distribution



4.2.8 Water & Sewer Service Affordability Ratio

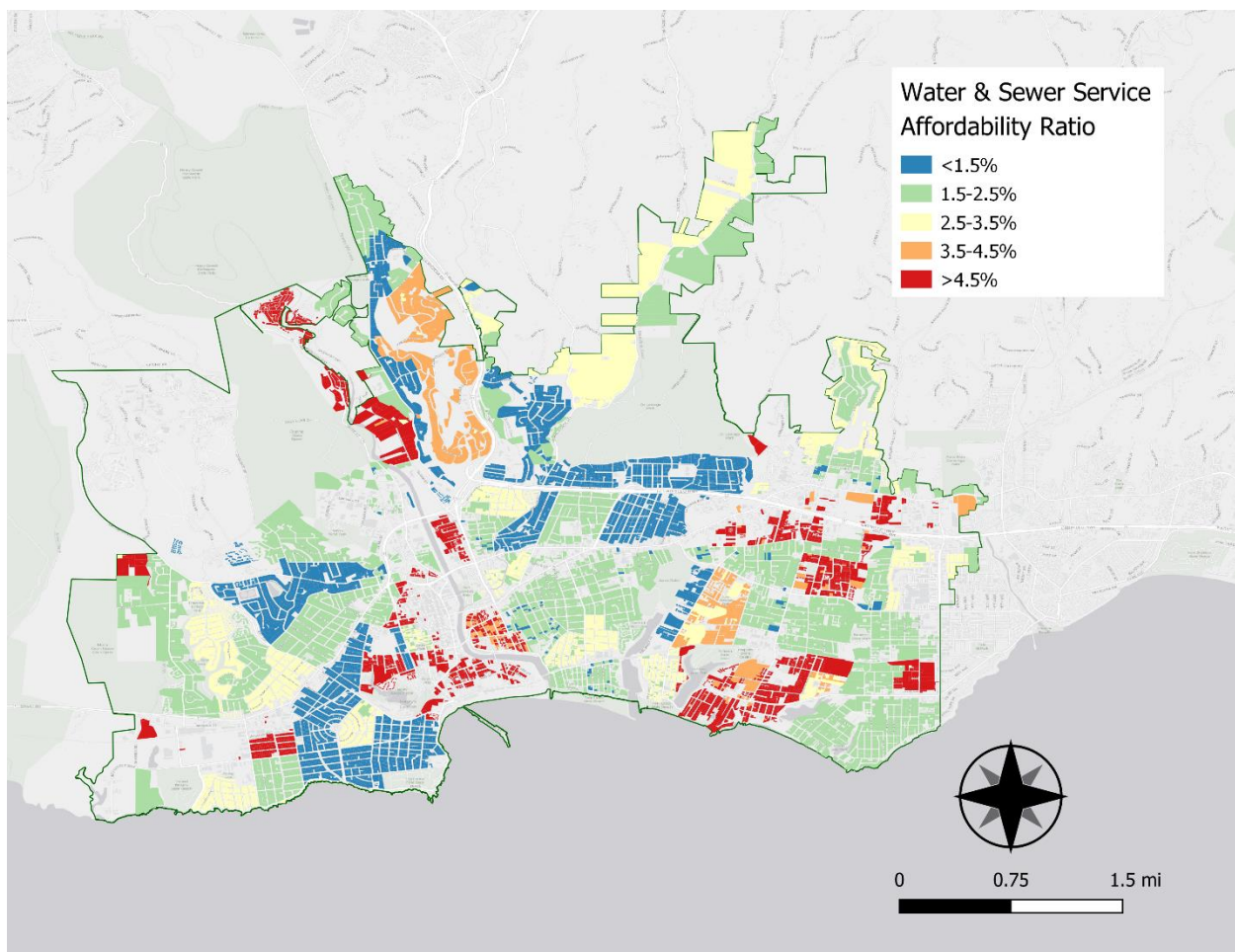
A breakdown of water & sewer service ARs for Santa Cruz WD is provided in Table 12 and Figure 4. About three-quarters of households have a water & sewer service AR under 3.5%. About 19% of households have a water & sewer service AR greater than 4.5%. These households are distributed throughout the service area but with significant clustering in the downtown area.

Table 12. Santa Cruz WD Water & Sewer Service Affordability Ratio Distribution

	Count of Dwelling Units	Percent of Dwelling Units	Mean Water & Sewer AR for EIU
Water & Sewer AR for EIU			
<1.5%	6,636	18.8%	1.2%
1.5-2.5%	14,723	41.7%	2.0%
2.5-3.5%	5,024	14.2%	2.9%
3.5-4.5%	2,347	6.6%	4.1%
>4.5%	6,576	18.6%	8.5%
Total	35,306	100.0%	3.3%

Count of DU within block groups with Water & Sewer AR for EIU within indicated range.

Figure 4. Santa Cruz WD Water & Sewer Service Affordability Ratio Distribution



4.2.9 Water & Sewer Service Financial Burden Score

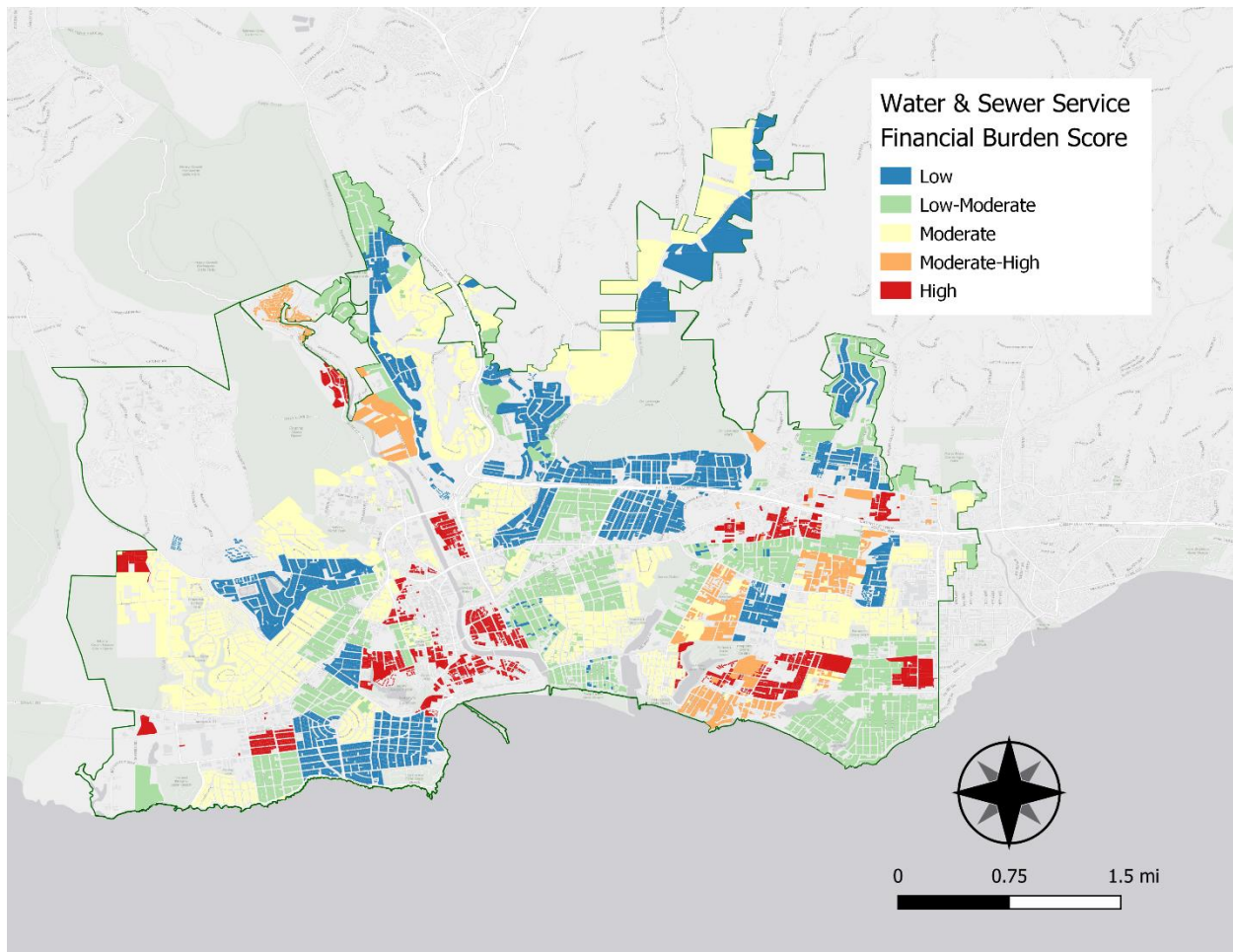
A breakdown of water & sewer service financial burden scores for Santa Cruz WD is provided in Table 13 and Figure 5. About 77% of households have a water & sewer service financial burden score of moderate or lower. The remaining 23% of households with financial burden scores of moderate-high or high are distributed throughout the service area but with significant clustering in the downtown area.

Table 13. Santa Cruz WD Water & Sewer Service Financial Burden Score Distribution

	Count of Dwelling Units	Percent of Dwelling Units	Mean Value W&S AR	PPI
Financial Burden Score for EIU				
Low	6,752	19.1%	1.4%	12.0%
Low-Moderate	10,208	28.9%	1.9%	21.7%
Moderate	10,102	28.6%	2.5%	32.6%
Moderate-High	2,388	6.8%	4.5%	28.7%
High	5,856	16.6%	8.8%	55.3%
Total	35,306	100.0%	3.3%	29.0%

Count of DU within block groups with indicated Financial Burden Score.

Figure 5. Santa Cruz WD Water & Sewer Service Financial Burden Score Distribution

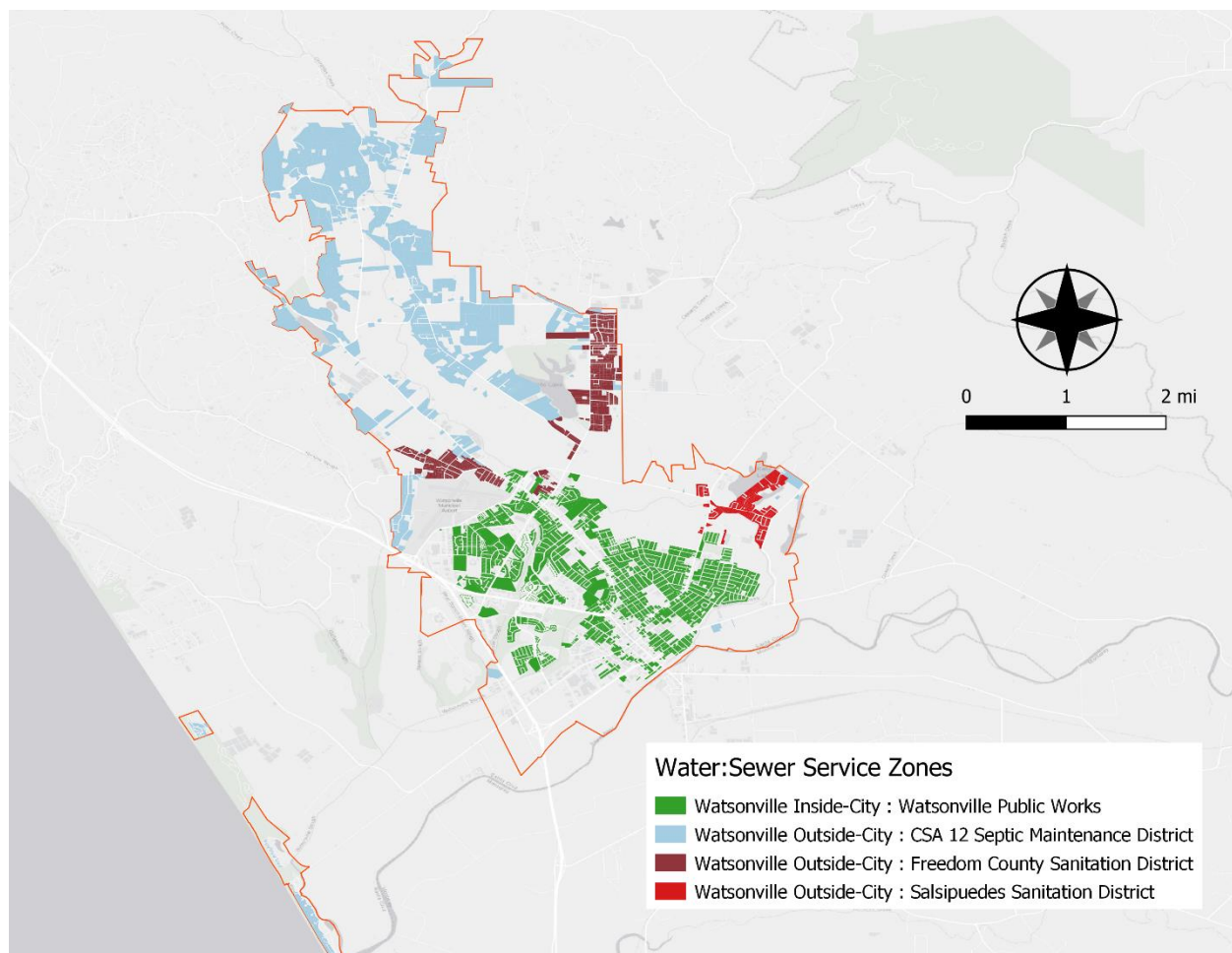


4.3 City of Watsonville

4.3.1 Service Area

The City of Watsonville operates a municipal water utility that serves the city and surrounding unincorporated areas of the county. The system is divided into nine hydraulic pressure zones and serves a population of approximately 65,000 from 14 groundwater wells, eight reservoirs and water storage facilities, nine booster stations, and more than 190 miles of pipeline. Water from Corralitos and Browns creeks is brought into the system through the Corralitos Filter Plant. Three different sewer systems operate within the WSA. The City of Watsonville Public Works Department provides sewer service to city residents. The Freedom County and Salsipuedes Sanitation Districts provide sewer service to WSA customers within the boundaries of these systems. The remaining WSA customers rely on on-site septic systems. Figure 6 shows residential parcels in the City of Watsonville's water service area (WSA) by water-sewer service provider.

Figure 6. City of Watsonville WSA Service Area Residential Parcels by Water-Sewer Service Provider



4.3.2 Residential Parcels, Dwelling Units, and Census Block Groups

According to county assessor data, there are 12,232 residential parcels within the City of Watsonville's service area. An estimated 18,101 dwelling units are associated with these parcels.¹⁸ These parcels and dwelling units are distributed across 46 census block groups.

4.3.3 Household Size and EIU

Table 14 gives a breakdown of household size and EIU for the City of Watsonville WSA.¹⁹ Household size and EIU is larger in the Watsonville WSA than in the other parts of the study region. Approximately 58% of households in the Watsonville WSA have EIU of 6 CCF or greater.

Table 14. City of Watsonville WSA EIU Breakdown

	Count of Dwelling Units	Percent of Dwelling Units	Mean PPH
EIU (CCF/Month)			
3	259	1.4%	2.1
4	3,804	21.0%	2.5
5	3,555	19.6%	3.1
6	7,152	39.5%	3.9
7	2,685	14.8%	4.4
8	646	3.6%	5.5
Total	18,101	100.0%	3.6

Count of DU within block groups with indicated EIU

PPH = Persons per household

4.3.4 Income and Housing Cost

Service area MHI is \$63,800. A breakdown of MHI for the service area is provided in Table 15. For the service area as a whole, housing costs account for 32% of MHI. A breakdown of MHC for the service area is provided in Table 16.

Table 15. City of Watsonville WSA MHI Breakdown

	Count of Dwelling Units	Percent of Dwelling Units	Mean MHI (Thou.\$)
MHI Category (Thou.\$)			
< 50	4,635	25.6%	39.2
50-75	8,430	46.6%	59.1
75-100	4,062	22.4%	87.9
100-150	935	5.2%	119.8
> 150	39	0.2%	158.0
Total	18,101	100.0%	63.8

Count of DU within block groups with MHI in MHI Category

¹⁸ The estimated number of dwelling units for a parcel is based on the parcel's land use code, as described in Appendix C.

¹⁹ This and subsequent tables show the count of dwelling units in block groups where the variable of interest falls within the indicated range. For example, the table shows that 259 dwelling units are in block groups with a calculated EIU of 3 CCF/month. Mean household size for dwelling units in these block groups is 2.1 persons.

Table 16. City of Watsonville WSA MHC Breakdown

	Count of Dwelling Units	Percent of Dwelling Units	Mean MHC (% of MHI)
MHC Category (% of MHI)			
< 20	1,309	7.2%	17.6
20-40	14,066	77.7%	29.9
40-60	2,351	13.0%	49.1
60-80	375	2.1%	67.0
Total	18,101	100.0%	32.3

Count of DU within block groups with MHC in MHC Category

4.3.5 Poverty Prevalence and DAC Status

PPI is the percentage of population in a block group with income that is less than twice the federal poverty level (FPL). Table 17 gives a breakdown of PPI for the City of Watsonville WSA. Forty-one percent of dwelling units are in census block groups where more than 50% of the population have income that is less than twice FPL.

DAC status indicates whether DWR designated the block group as a disadvantaged community (i.e., has MHI less than 80% of state MHI). Table 18 gives a breakdown of DAC status for City of the City of Watsonville WSA. Roughly half of all dwelling units are in census block groups that DWR has designated as DAC. On average, MHI in these DAC block groups is 62% that in the non-DAC block groups in the service area.

Table 17. City of Watsonville WSA PPI Breakdown

	Count of Dwelling Units	Percent of Dwelling Units	Mean PPI
Poverty Prevalence Category			
<10%	887	4.9%	5.2
10-30%	2,828	15.6%	20.2
30-50%	6,942	38.4%	37.6
>50%	7,444	41.1%	59.5
Total	18,101	100.0%	42.3

Count of DU within block groups with PPI in PPI Category

Table 18. City of Watsonville WSA DAC Status Breakdown

	Count of Dwelling Units	Percent of Dwelling Units	Mean MHI (Thou.\$)
DAC Status			
Not DAC	9,129	50.4%	78.8
DAC	8,972	49.6%	48.6
Total	18,101	100.0%	63.8

Count of DU within block groups designated DAC

4.3.6 Water and Sewer Service Costs

Average annual water service cost for alternative EIU quantities is summarized in Table 19. Water service costs are based on rates and charges in effect July 1, 2021. In the case of single-family dwelling units, monthly service charges are based on the charge for a 5/8" standard meter. In the case of multi-family and mobile home dwelling units, monthly service charges are a function of the number of dwelling units assumed to be served by the meter (see Appendix A for details).

Average annual sewer service cost is summarized in Table 20. Residential sewer charges are invariant to the volume of discharge and therefore do not vary by EIU quantity. Sewer service costs are based on rates and charges in effect July 1, 2021 (see Appendix A for details). The annual cost for homes with on-site septic system is calculated as the sum of the amortized capital and operating costs for a septic system meeting State and County design and operational requirements (see Appendix B for details).

Table 19. City of Watsonville Annual Water Service Costs by EIU Quantity

	Count of Dwelling Units	EIU Monthly Quantity					
		3 CCF	4 CCF	5 CCF	6 CCF	7 CCF	8 CCF
Watsonville Inside-City							
Multi-Family	4,004	200	247	295	342	404	466
Mobile Home	944	171	218	266	313	375	437
Single-Family	8,591	487	535	582	630	692	754
Watsonville Outside-City							
Multi-Family	370	206	253	300	348	410	472
Mobile Home	256	161	208	256	303	365	427
Single-Family	3,936	548	595	642	690	752	814

Based on rates effective July 1, 2021. See Appendix A for calculation details.

Table 20. City of Watsonville Annual Sewer Service Costs for EIU

	Count of Dwelling Units	Mean Annual Sewer Bill
CSA 12 Septic Maintenance District		
Multi-Family	148	741
Mobile Home	79	295
Single-Family	2,030	2,576
Freedom County Sanitation District		
Multi-Family	202	454
Mobile Home	177	701
Single-Family	1,448	695
Salsipuedes Sanitation District		
Multi-Family	20	547
Single-Family	458	553
Watsonville Public Works		
Multi-Family	4,004	553
Mobile Home	944	553
Single-Family	8,591	553

Based on rates effective July 1, 2021. See Appendix B for calculation details.

4.3.7 Water Service Affordability Ratio

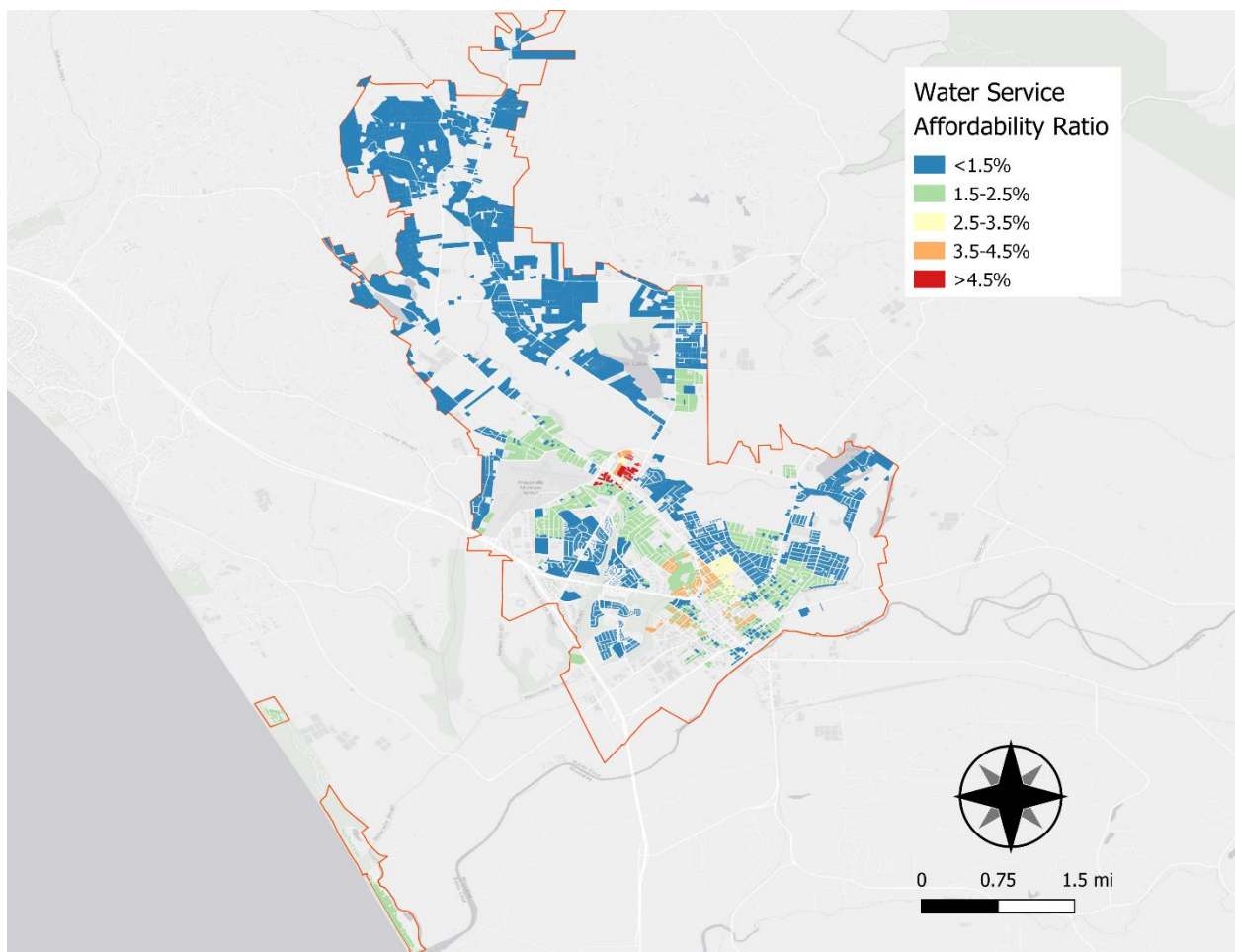
A breakdown of water service ARs for the City of Watsonville WSA is provided in Table 21 and Figure 7. Fifty-seven percent of households have a water service AR under 1.5% and it is under 2.5% for 93% of households. About 5% of households in the service area have a water service AR greater than 3.5%. These households are mainly in the Inside-City portion of the service area.

Table 21. City of Watsonville WSA Water Service Affordability Ratio Distribution

	Count of Dwelling Units	Percent of Dwelling Units	Mean Water AR for EIU
Water AR for EIU			
<1.5%	10,369	57.3%	0.9%
1.5-2.5%	6,413	35.4%	1.8%
2.5-3.5%	447	2.5%	3.0%
3.5-4.5%	742	4.1%	3.6%
>4.5%	130	0.7%	7.8%
Total	18,101	100.0%	1.4%

Count of DU within block groups with Water AR for EIU within indicated range.

Figure 7. City of Watsonville WSA Water Service Affordability Ratio Distribution



4.3.8 Water & Sewer Service Affordability Ratio

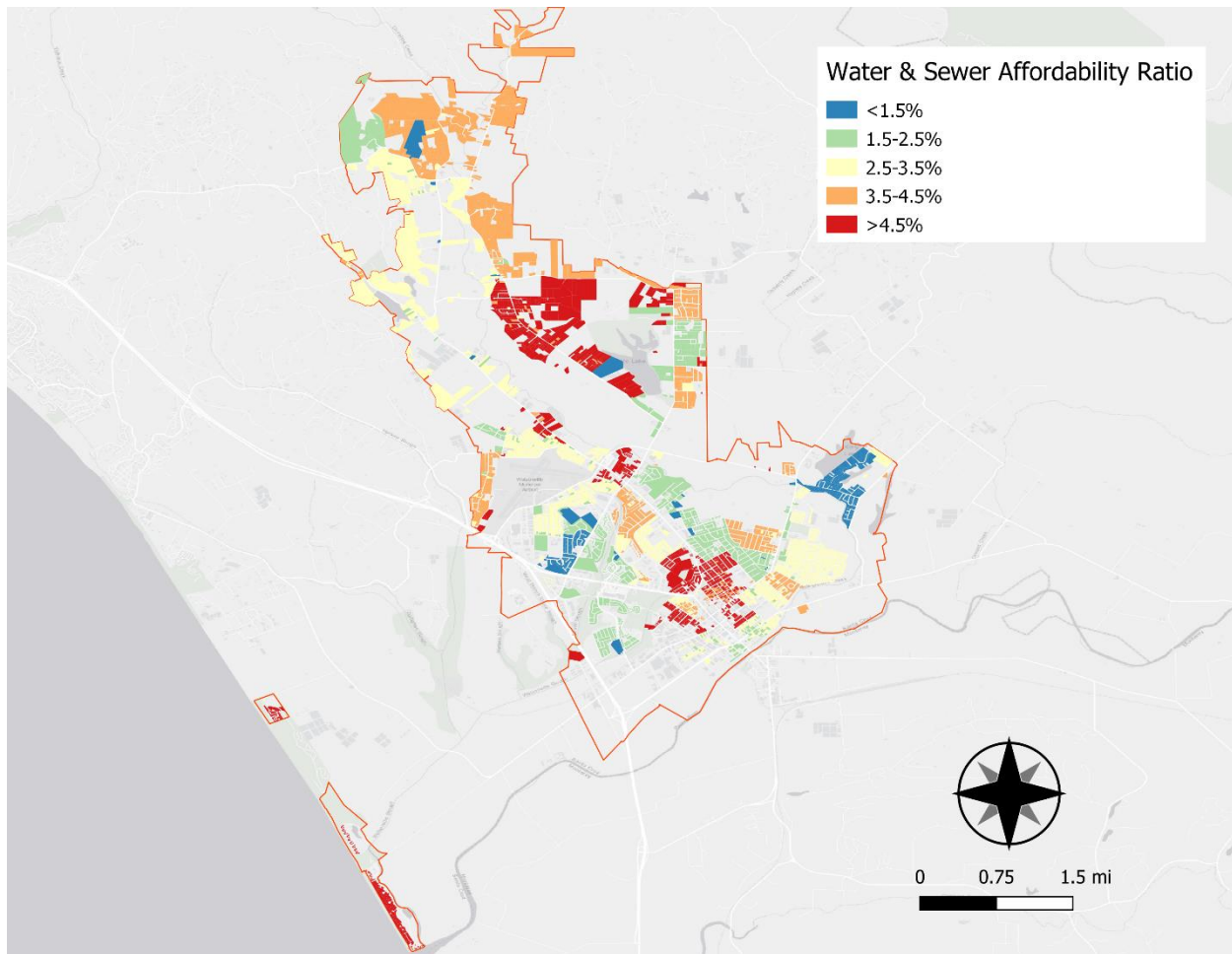
A breakdown of water & sewer service ARs for the City of Watsonville WSA is provided in Table 22 and Figure 8. About two-thirds of households have a water & sewer service AR under 3.5%. About 19% of households have a water & sewer service AR greater than 4.5%. These households are clustered in the northeastern and southern parts of the service area.

Table 22. City of Watsonville WSA Water & Sewer Service Affordability Ratio Distribution

	Count of Dwelling Units	Percent of Dwelling Units	Mean Water & Sewer AR for EIU
Water & Sewer AR for EIU			
<1.5%	1,361	7.5%	1.2%
1.5-2.5%	5,459	30.2%	2.0%
2.5-3.5%	5,113	28.2%	2.9%
3.5-4.5%	2,786	15.4%	3.9%
>4.5%	3,382	18.7%	6.7%
Total	18,101	100.0%	3.4%

Count of DU within block groups with Water & Sewer AR for EIU within indicated range.

Figure 8. City of Watsonville WSA Water & Sewer Service Affordability Ratio Distribution



4.3.9 Water & Sewer Service Financial Burden Score

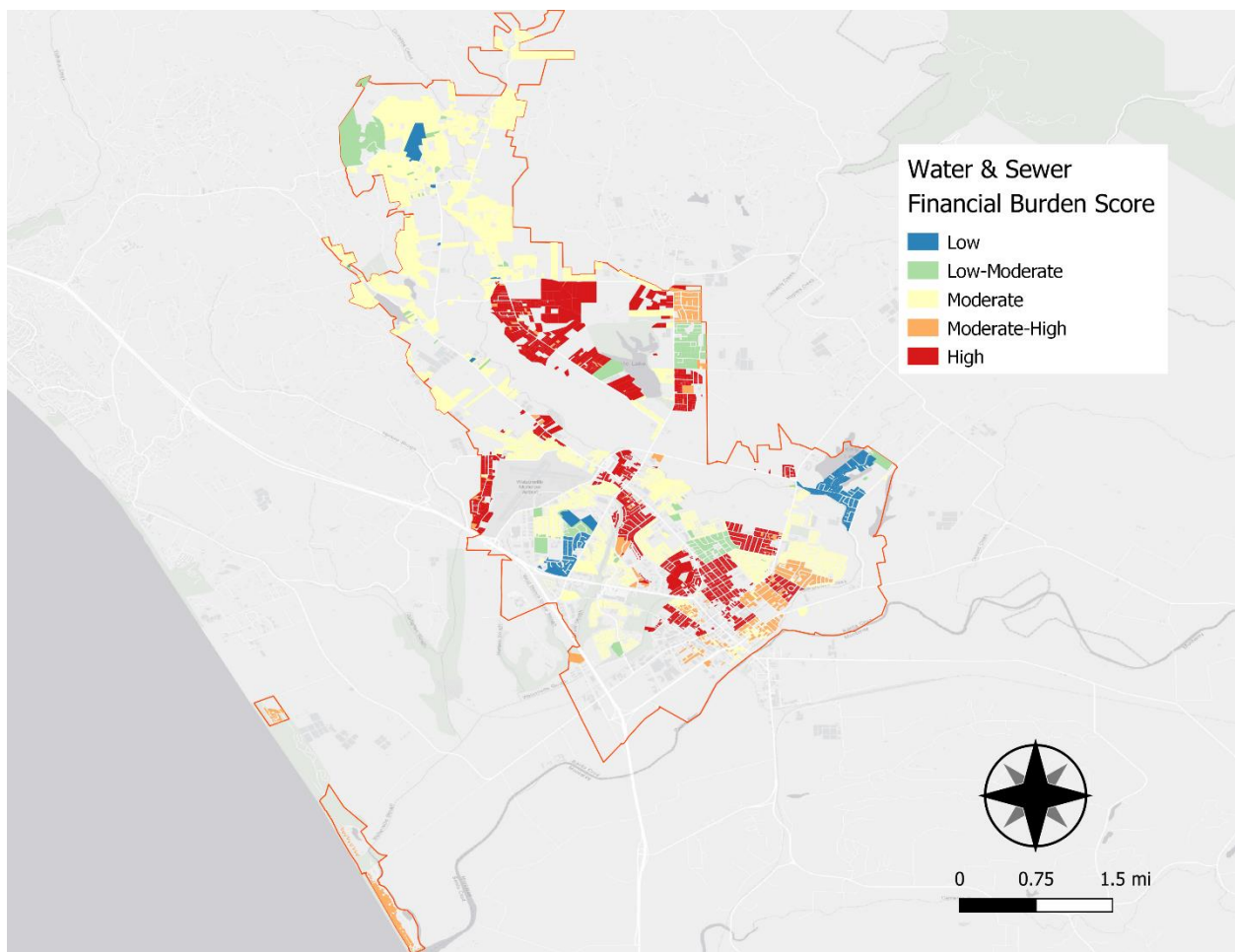
A breakdown of water & sewer service financial burden scores for the City of Watsonville WSA is provided in Table 23 and Figure 9. About 57% of households have a water & sewer service financial burden score of moderate or lower. The remaining 43% of households with financial burden scores of moderate-high or high are distributed throughout the service area but with significant clustering in the downtown area.

Table 23. City of Watsonville WSA Water & Sewer Service Financial Burden Score Distribution

	Count of Dwelling Units	Percent of Dwelling Units	Mean Value	
			W&S AR	PPI
Financial Burden Score for EIU				
Low	914	5.0%	1.2%	8.1%
Low-Moderate	1,608	8.9%	2.0%	24.6%
Moderate	7,867	43.5%	2.4%	37.2%
Moderate-High	2,991	16.5%	4.0%	48.5%
High	4,721	26.1%	5.4%	59.5%
Total	18,101	100.0%	3.4%	42.3%

Count of DU within block groups with indicated Financial Burden Score.

Figure 9. City of Watsonville WSA Water & Sewer Service Financial Burden Score Distribution

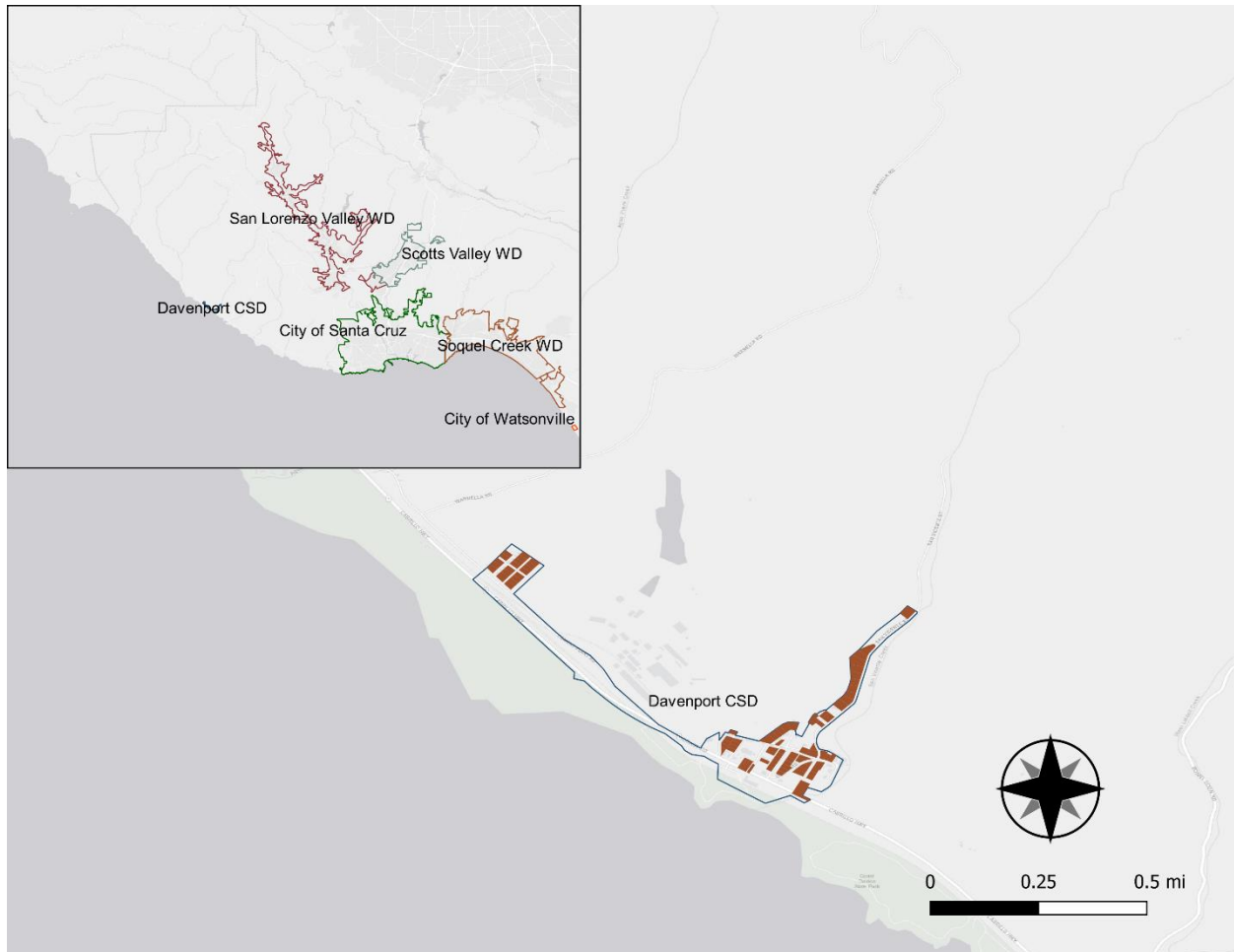


4.4 Davenport County Sanitation District

4.4.1 Service Area

The Davenport County Sanitation District (Davenport CSD) provides water and sewer service to 114 connections in the Old Town, New Town, and San Vicente areas of Davenport. The district relies on surface water diverted from Mill Creek and San Vicente Creek for supply. The district is managed by the County Department of Public Works. Figure 10 shows residential parcels in the Davenport CSD service area by water-sewer service zone.

Figure 10. Davenport CSD Service Area Residential Parcels by Water-Sewer Service Zone



4.4.2 Residential Parcels, Dwelling Units, and Census Block Groups

According to County of Santa Cruz assessor data, there are 90 residential parcels within the Davenport CSD's service area. An estimated 105 dwelling units are associated with these parcels.²⁰ These parcels and dwelling units fall within a single census block group (Census GEOID 060871202001). This block group is large in geographic extent and contains more than 1,000 households. Davenport CSD comprises just 10% of the households in the block group. For this reason, block group statistics are unlikely to

²⁰ The estimated number of dwelling units for a parcel is based on the parcel's land use code, as described in Appendix C.

provide accurate estimates of MHI, MHC, or PPI for Davenport CSD. However, the community of Davenport is a Census Designated Place (CDP) for which estimates of MHI, MHC, and PPI specific to the community are available.²¹ The information that follows is based on data for the Davenport CDP.

4.4.3 Household Size and EIU

Average household size in Davenport is 2.8 persons. Based on this, EIU for Davenport is set to 4 CCF/month.²²

4.4.4 Income and Housing Cost

Davenport MHI was \$51,250. On average, housing cost accounts for 32% of MHI.

4.4.5 Poverty Prevalence and DAC Status

A breakdown of poverty prevalence for Davenport CSD is provided in Table 24. Based on these data, the PPI (i.e., percentage of population with income less than twice the federal poverty level) for Davenport CSD is 37%. DWR has designated the Davenport CDP as a DAC.

Table 24. Davenport CSD Ratio of Income to Federal Poverty Level

Income to federal poverty level ratio	Population	% Population	% Cumulative
Under .50	9	2%	2%
.50 to .99	7	2%	4%
1.00 to 1.24	43	12%	16%
1.25 to 1.49	39	11%	27%
1.50 to 1.84	18	5%	32%
1.85 to 1.99	18	5%	37%
2.00 and over	229	63%	100%

Source: 2019 ACS 5-Year Estimates, Table ID: C17002

4.4.6 Water and Sewer Service Costs

Average annual water service cost for four alternative EIU quantities is summarized in Table 25. Water service costs are based on rates and charges in effect July 1, 2021. Davenport CSD charges a flat annual rate for water service (see Appendix A for details). The one multi-family property in the service area pays the single-family rate for each dwelling unit.²³

²¹ CDPs are statistical geographic entities representing closely settled, unincorporated communities that are locally recognized and identified by name. They are the statistical equivalents of incorporated places, with the primary differences being the lack of a legally defined boundary and an active, functioning governmental structure, chartered by the state, and administered by elected officials.

²² This and subsequent tables show the count of dwelling units in the Davenport CDP where the variable of interest falls within the indicated range. For example, the table shows that the average household size in the Davenport CDP is 2.8 persons and the corresponding EIU is 4 CCF.

²³ Personal communication with Ashleigh Trujillo, Santa Cruz County Department of Public Works, September 21, 2021.

Average annual sewer service cost is summarized in Table 26. As with water service, the Davenport CSD charges a flat annual rate for sewer service. Sewer service costs are based on rates and charges in effect July 1, 2021 (see Appendix A for details).

Table 25. Davenport County Sanitation District Annual Water Service Costs by EIU Quantity

	Count of Dwelling Units	EIU Monthly Quantity					
		3 CCF	4 CCF	5 CCF	6 CCF	7 CCF	8 CCF
Davenport CSD							
Multi-Family	6	1,831	1,831	1,831	1,831	1,831	1,831
Single-Family	97	1,831	1,831	1,831	1,831	1,831	1,831

Based on rates effective July 1, 2021. See Appendix A for calculation details. Davenport CSD charges a flat annual rate for water service that is invariant to quantity used.

Table 26. Davenport County Sanitation District Annual Sewer Service Costs

	Count of Dwelling Units	Mean Annual Sewer Bill
Davenport CSD		
Multi-Family	6	2,664
Single-Family	97	2,664

Based on the annual flat fee effective July 1, 2021. See Appendix B for calculation details.

4.4.7 Water Service Affordability Ratio

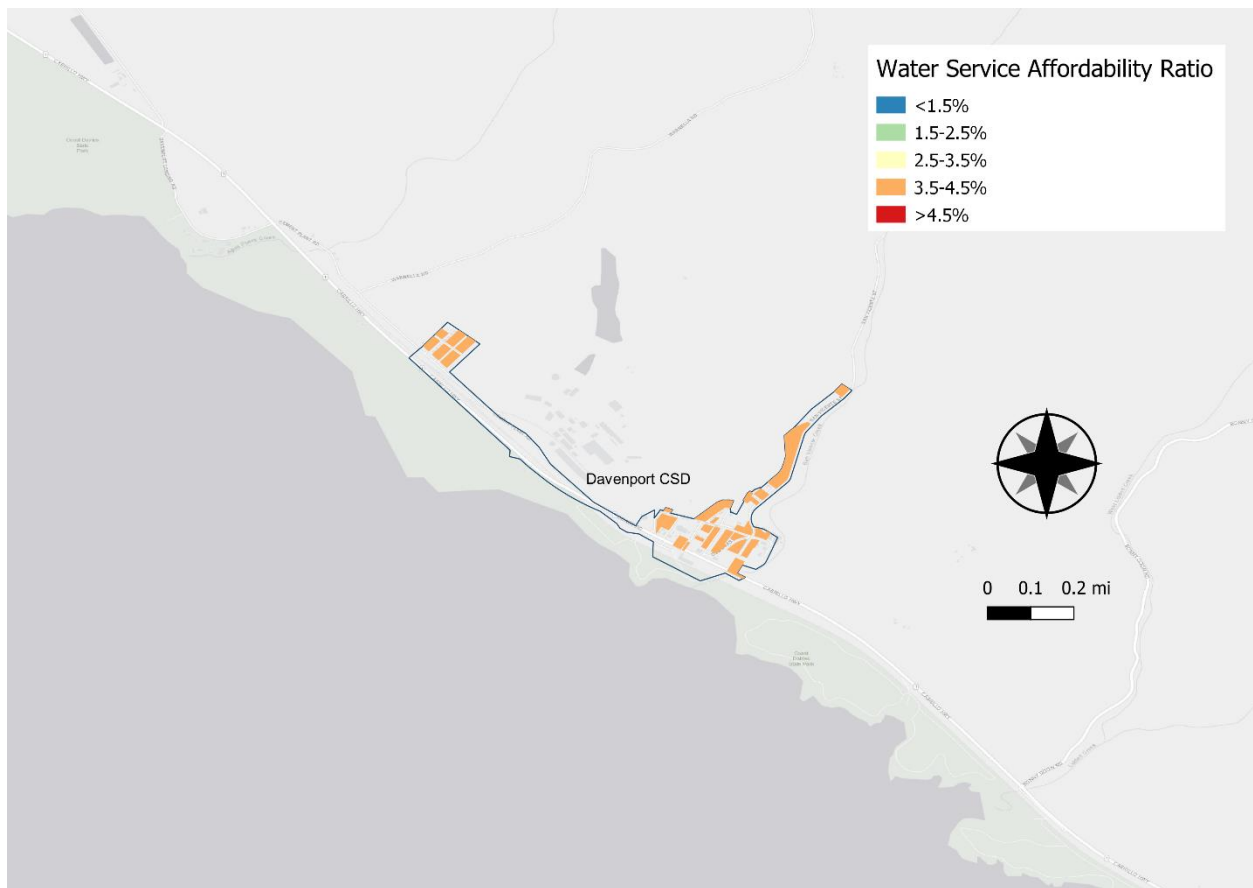
The average water service AR for Davenport CSD is 4.4% of adjusted MHI, as shown in Table 27 and Figure 11.

Table 27. Davenport CSD Water Service Affordability Ratio Distribution

	Count of Dwelling Units	Percent of Dwelling Units	Mean Water AR for EIU
Water AR for EIU			
3.5-4.5%	103	100.0%	4.4%
Total	103	100.0%	4.4%

Count of DU within block groups with Water AR for EIU within indicated range.

Figure 11. Davenport CSD Water Service Affordability Ratio Distribution



4.4.8 Water & Sewer Service Affordability Ratio

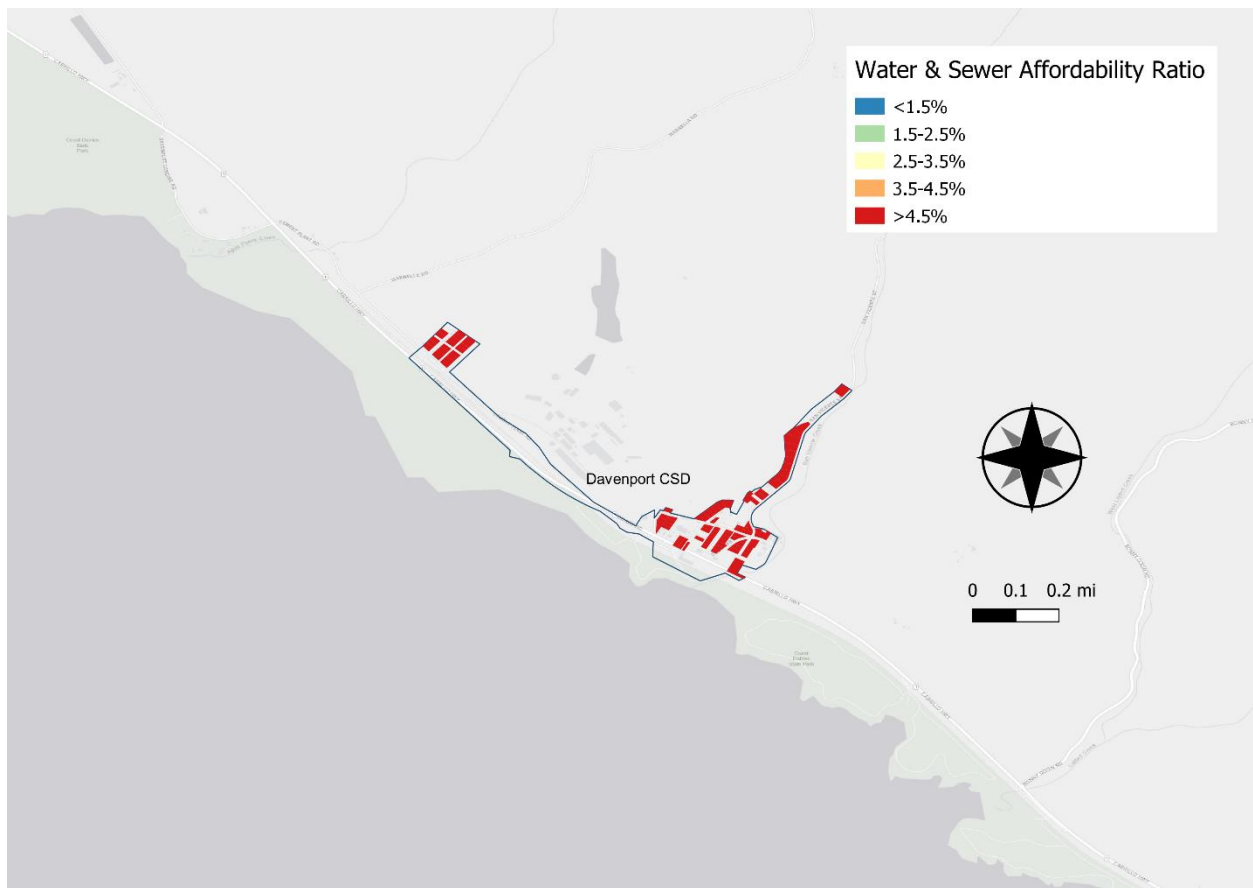
The average water & sewer service AR for Davenport CSD is 10.2%, as shown in Table 28 and Figure 12. This is the highest average water & sewer service AR in the study region.

Table 28. Davenport CSD Water & Sewer Service Affordability Ratio Distribution

	Count of Dwelling Units	Percent of Dwelling Units	Mean Water & Sewer AR for EIU
Water & Sewer AR for EIU >4.5%	103	100.0%	10.2%
Total	103	100.0%	10.2%

Count of DU within block groups with Water & Sewer AR for EIU within indicated range.

Figure 12. Davenport CSD Water & Sewer Service Affordability Ratio Distribution



4.4.9 Water & Sewer Service Financial Burden Score

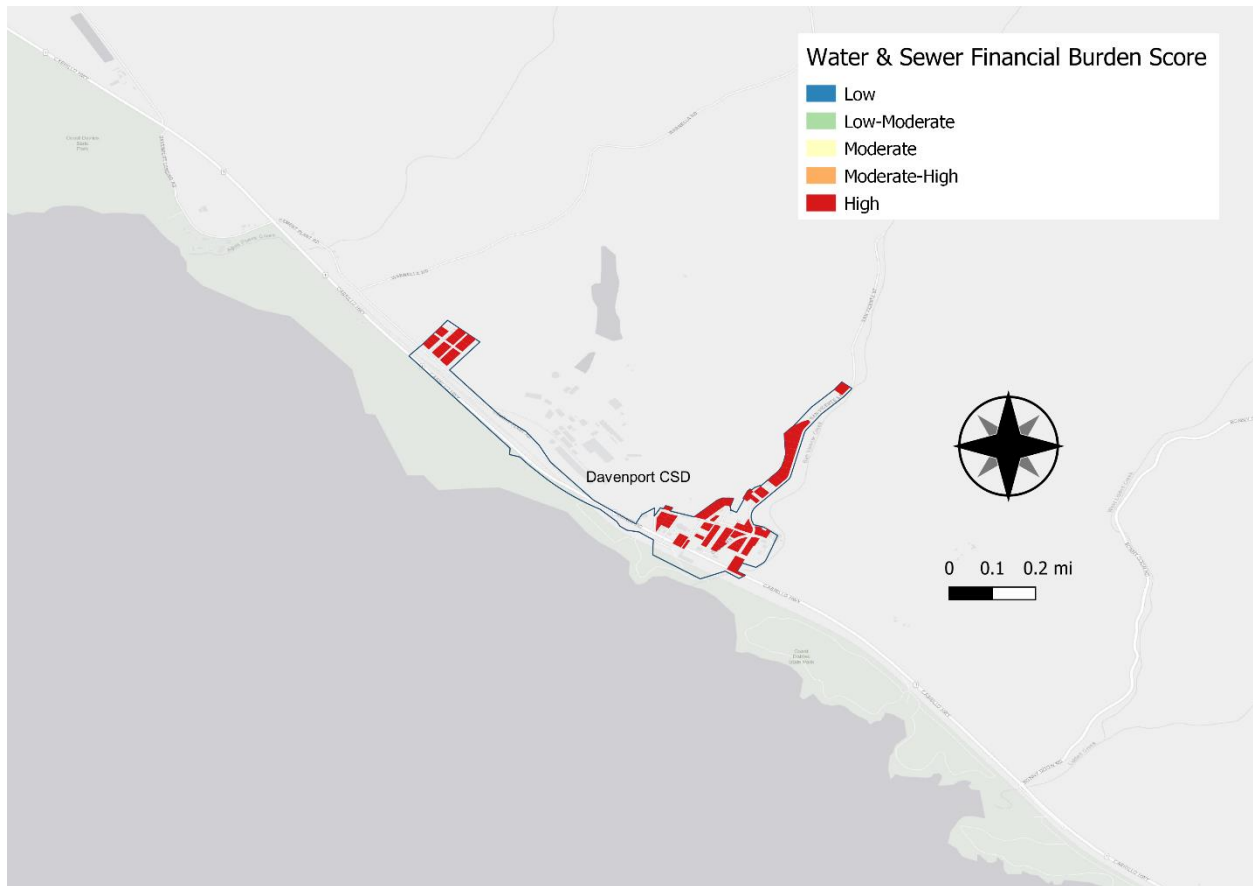
Due to the combination of the very high water & sewer service AR, low MHI, and relatively high PPI, the average water & sewer service financial burden for EIU is scored high for Davenport CSD, as shown in Table 29 and Figure 13.

Table 29. Davenport CSD Water & Sewer Service Financial Burden Score Distribution

	Count of Dwelling Units	Percent of Dwelling Units	Mean Value W&S AR	PPI
Financial Burden Score for EIU High	103	100.0%	10.2%	33.3%
Total	103	100.0%	10.2%	33.3%

Count of DU within block groups with indicated Financial Burden Score.

Figure 13. Davenport CSD Water & Sewer Service Financial Burden Score Distribution

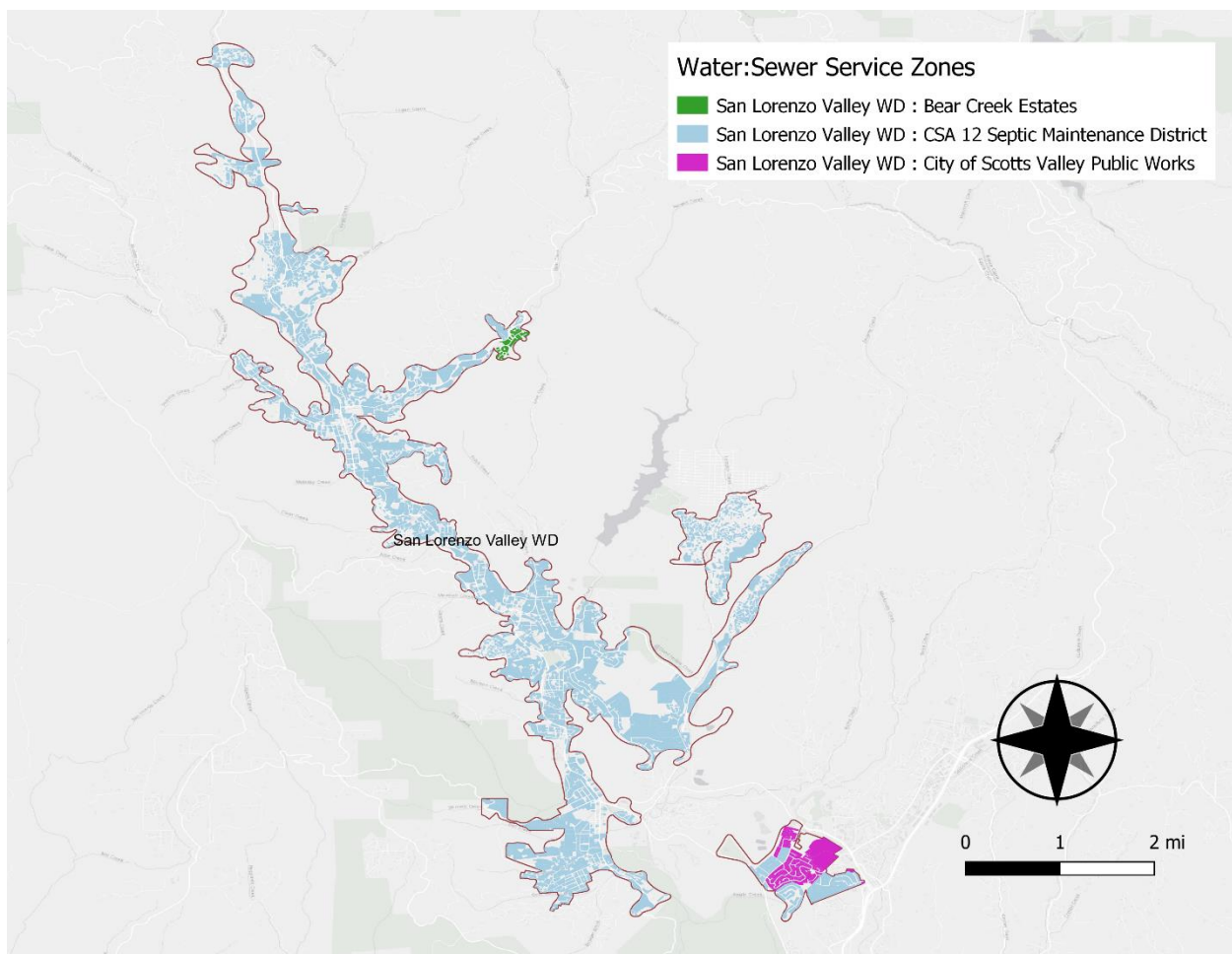


4.5 San Lorenzo Valley Water District

4.5.1 Service Area

The San Lorenzo Valley Water District (San Lorenzo Valley WD) serves a 62 square mile area that covers most of the western portion of the San Lorenzo River watershed. The District provides water service to the communities of Boulder Creek, Brookdale, Ben Lomond, Zayante, Felton, Lompico, and portions of the City of Scotts Valley. Service area population is approximately 23,000. San Lorenzo Valley WD customers primarily rely on on-site septic systems for wastewater disposal. San Lorenzo Valley WD owns and operates a sewer system in Boulder Creek's Bear Creek Estates which serves 56 homes. The system collects and treats domestic wastewater which is discharged to a subsurface leach field. Some San Lorenzo Valley WD customers in the southern part of the service area receive sewer service from the City of Scotts Valley. Figure 14 shows residential parcels in the San Lorenzo Valley WD service area by water-sewer service provider.

Figure 14. SLVWD Service Area Residential Parcels by Water-Sewer Service Zone



4.5.2 Residential Parcels, Dwelling Units, and Census Block Groups

According to county assessor data, there are 7,105 residential parcels within the San Lorenzo Valley WD service area. An estimated 8,273 dwelling units are associated with these parcels.²⁴ These parcels and dwelling units are distributed across 22 census block groups.

4.5.3 Household Size and EIU

Table 30 gives a breakdown of household size and EIU for the San Lorenzo Valley WD.²⁵ More than 80% of dwelling units are located in block groups with calculated EIU of 4 CCF/month or less.

Table 30. SLVWD EIU Breakdown

	Count of Dwelling Units	Percent of Dwelling Units	Mean PPH
EIU (CCF/Month)			
3	692	8.4%	2.1
4	6,312	76.3%	2.4
5	1,269	15.3%	3.0
Total	8,273	100.0%	2.5

Count of DU within block groups with indicated EIU

PPH = Persons per household

4.5.4 Income and Housing Cost

Service area MHI is \$104,000. A breakdown of MHI for the service area provided in Table 31. For the service area as a whole, housing costs account for 25% of MHI. A breakdown of MHC for the service area is provided in Table 32.

Table 31. SLVWD MHI Breakdown

	Count of Dwelling Units	Percent of Dwelling Units	Mean MHI (Thou.\$)
MHI Category (Thou.\$)			
50-75	257	3.1%	70.0
75-100	2,560	30.9%	87.9
100-150	5,184	62.7%	110.3
> 150	272	3.3%	169.0
Total	8,273	100.0%	104.0

Count of DU within block groups with MHI in MHI Category

²⁴ The estimated number of dwelling units for a parcel is based on the parcel's land use code, as described in Appendix C.

²⁵ This and subsequent tables show the count of dwelling units in block groups where the variable of interest falls within the indicated range. For example, the table shows that 692 dwelling units are in block groups with a calculated EIU of 3 CCF/month. Mean household size for dwelling units in these block groups is 2.1 persons.

Table 32. SLVWD MHC Breakdown

	Count of Dwelling Units	Percent of Dwelling Units	Mean MHC (% of MHI)
MHC Category (% of MHI)			
< 20	272	3.3%	15.2
20-40	8,001	96.7%	25.6
Total	8,273	100.0%	25.3

Count of DU within block groups with MHC in MHC Category

4.5.5 Poverty Prevalence and DAC Status

PPI is the percentage of population in a block group with income that is less than twice the federal poverty level (FPL). Table 33 gives a breakdown of PPI for the San Lorenzo Valley WD service area. No households are in census block groups where more than 50% of the population have incomes less than twice FPL. Approximately 9% of households are in census block groups where between 30% and 50% of the population have incomes less than twice FPL.

DAC status indicates whether DWR designated the block group as a disadvantaged community (i.e., has MHI less than 80% of state MHI). Table 34 gives a breakdown of DAC status for the San Lorenzo Valley WD. No households in the service area are currently located in DAC-designated census block groups. About 5% of households are located in block groups that DWR did not classify. MHI income in these block groups is not appreciably different than in the non-DAC designated block groups. Thus, it is very unlikely the undesignated block groups would qualify as DAC.²⁶

Table 33. SLVWD PPI Breakdown

	Count of Dwelling Units	Percent of Dwelling Units	Mean PPI
Poverty Prevalence Category			
<10%	1,003	12.1%	8.4
10-30%	6,559	79.3%	15.1
30-50%	711	8.6%	40.3
Total	8,273	100.0%	16.5

Count of DU within block groups with PPI in PPI Category

Table 34. SLVWD DAC Status Breakdown

	Count of Dwelling Units	Percent of Dwelling Units	Mean MHI (Thou.\$)
DAC Status			
Data Not Available	435	5.3%	103.3
Not DAC	7,838	94.7%	104.1
Total	8,273	100.0%	104.0

Count of DU within block groups designated DAC

²⁶ Current DWR DAC designations are based on 2018 ACS data. Previous designations based on 2016 ACS data indicated one DAC census block group (Geoid 060871203013) within SLVWD's service area.

4.5.6 Water and Sewer Service Costs

Average annual water service cost for alternative EIU quantities is summarized in Table 35. Water service costs are based on rates and charges in effect July 1, 2021. In the case of single-family dwelling units, monthly service charges are based on the charge for a 5/8" standard meter. In the case of multi-family and mobile home dwelling units, monthly service charges are a function of the number of dwelling units assumed to be served by the meter (see Appendix A for details). Single-family customers enrolled in PG&E's CARE Program are eligible for rate assistance. The rate assistance program is limited to 138 customers per fiscal year. Rate assistance customers receive a \$15 discount on their monthly service charge (up to \$180 annually).

Average annual sewer service cost is summarized in Table 36. Residential sewer charges are invariant to the volume of discharge and therefore do not vary by EIU quantity. Sewer service costs are based on rates and charges in effect July 1, 2021 (see Appendix A for details). Most households in the San Lorenzo Valley WD are on septic. The annual cost for homes with on-site septic systems is calculated as the sum of the amortized capital and operating costs for a septic system meeting County design and operational requirements (see Appendix B for details).

Table 35. SLVWD Annual Water Service Costs by EIU Quantity

	Count of Dwelling Units	EIU Monthly Quantity					
		3 CCF	4 CCF	5 CCF	6 CCF	7 CCF	8 CCF
San Lorenzo Valley WD							
Multi-Family	524	522	667	811	956	1,101	1,246
Mobile Home	489	448	593	738	882	1,027	1,172
Single-Family	7,260	838	983	1,128	1,272	1,417	1,562

Based on rates effective July 1, 2021. See Appendix A for calculation details.

Table 36. SLVWD Annual Sewer Service Costs

	Count of Dwelling Units	Mean Annual Sewer Bill
Bear Creek Estates		
Single-Family*	71	3,090
CSA 12 Septic Maintenance District		
Single-Family	6,783	2,632
Multi-Family	524	1,140
Mobile Home	60	680
City of Scotts Valley Public Works		
Single-Family	406	608
Mobile Home	429	406

Based on rates effective July 1, 2021. See Appendix B for calculation details.

* Dwelling unit counts are based on County assessor parcel information. SLVWD estimates that 56 homes with Bear Creek Estates are currently receiving sewer service.

4.5.7 Water Service Affordability Ratio

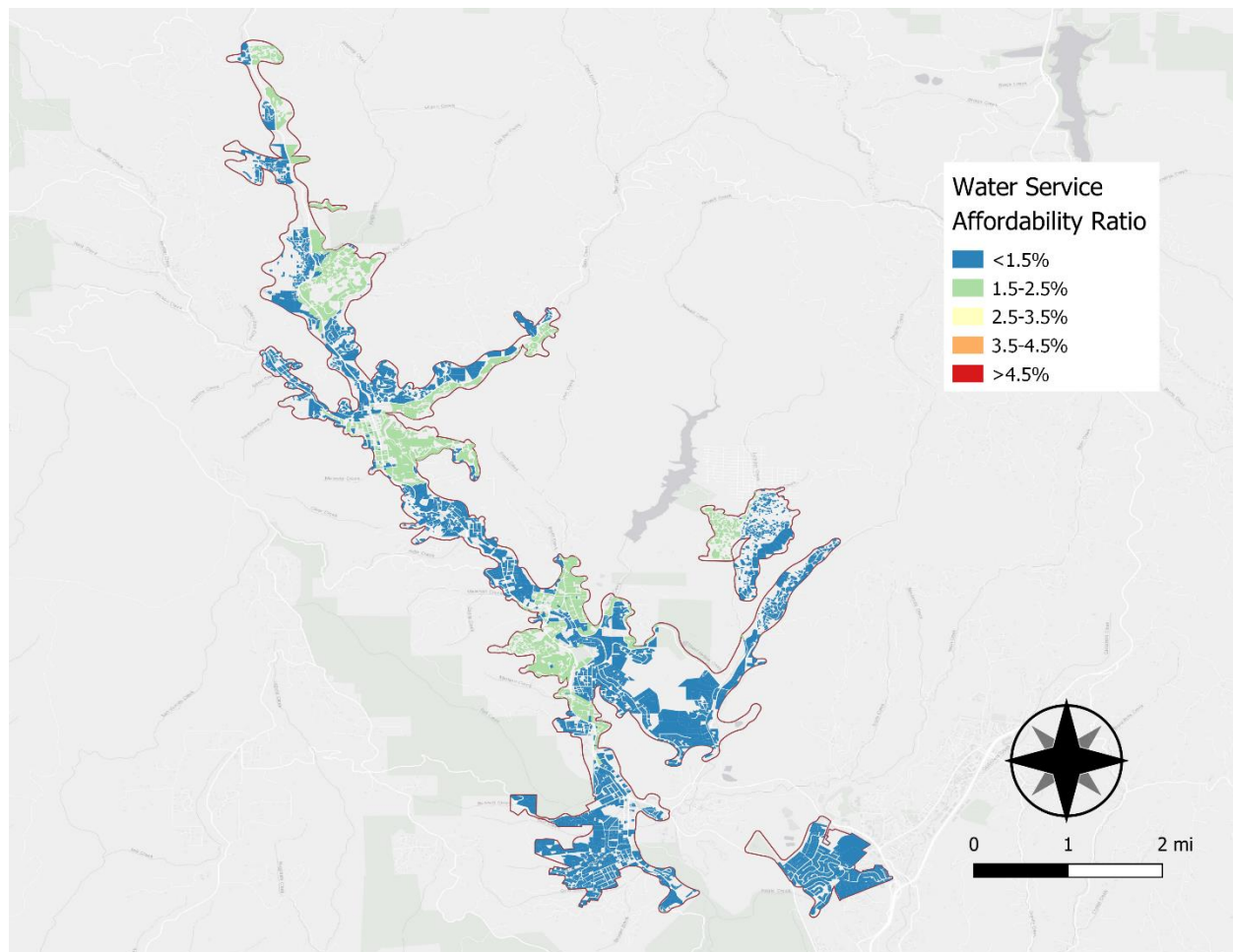
A breakdown of water service ARs for San Lorenzo Valley WD is provided in Table 37 and Figure 15. Nearly three-quarters of households have a water service AR under 1.5% and it is under 2.5% for all households.

Table 37. San Lorenzo Valley WD Water Service Affordability Ratio Distribution

	Count of Dwelling Units	Percent of Dwelling Units	Mean Water AR for EIU
Water AR for EIU <1.5%	6,128	74.1%	1.1%
1.5-2.5%	2,145	25.9%	1.7%
Total	8,273	100.0%	1.3%

Count of DU within block groups with Water AR for EIU within indicated range.

Figure 15. San Lorenzo Valley WD Water Service Affordability Ratio Distribution



4.5.8 Water & Sewer Service Affordability Ratio

A breakdown of water & sewer service ARs for San Lorenzo Valley WD is provided in Table 38 and Figure 16. About one-fifth of households have a water & sewer service AR under 3.5%. Forty-three percent have an AR greater than 4.5%. These households are distributed throughout the service area.

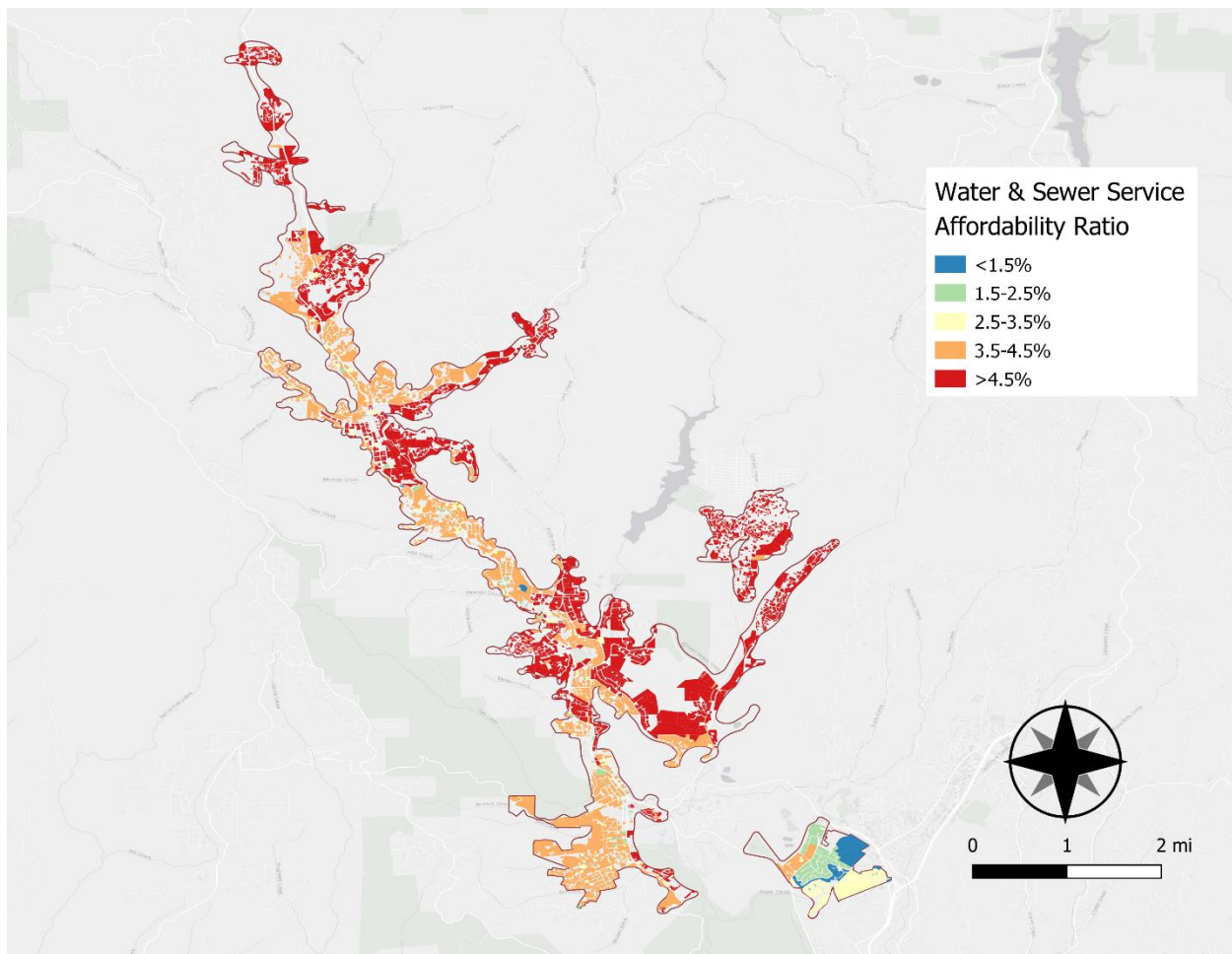
The large proportion of households with high water & sewer service ARs is driven by the large number of homes with septic systems and the relatively high annual costs of these systems. However, it is important to emphasize that most of these homes are not presently experiencing these high costs, but rather will incur them when they are required to replace or upgrade their current septic system. Thus, the results in this section are indicative of the water & sewer service affordability challenges that may arise in the San Lorenzo Valley WD service area as a result of the adoption and implementation of the County's Local Agency Management Program for Onsite Wastewater Treatment Systems.

Table 38. San Lorenzo Valley WD Water & Sewer Service Affordability Ratio Distribution

	Count of Dwelling Units	Percent of Dwelling Units	Mean Water & Sewer AR for EIU
Water & Sewer AR for EIU			
<1.5%	555	6.7%	1.1%
1.5-2.5%	692	8.4%	1.9%
2.5-3.5%	586	7.1%	3.0%
3.5-4.5%	2,894	35.0%	4.0%
>4.5%	3,546	42.9%	5.5%
Total	8,273	100.0%	4.2%

Count of DU within block groups with Water & Sewer AR for EIU within indicated range.

Figure 16. San Lorenzo Valley WD Water & Sewer Service Affordability Ratio Distribution



4.5.9 Water & Sewer Service Financial Burden Score

A breakdown of water & sewer service financial burden scores for San Lorenzo Valley WD is provided in Table 39 and Figure 17. About 57% of households have a water & sewer service financial burden score of moderate or lower. The remaining 43% of households with financial burden scores of moderate-high or high are clustered in particular parts of the service area as shown in Figure 17.

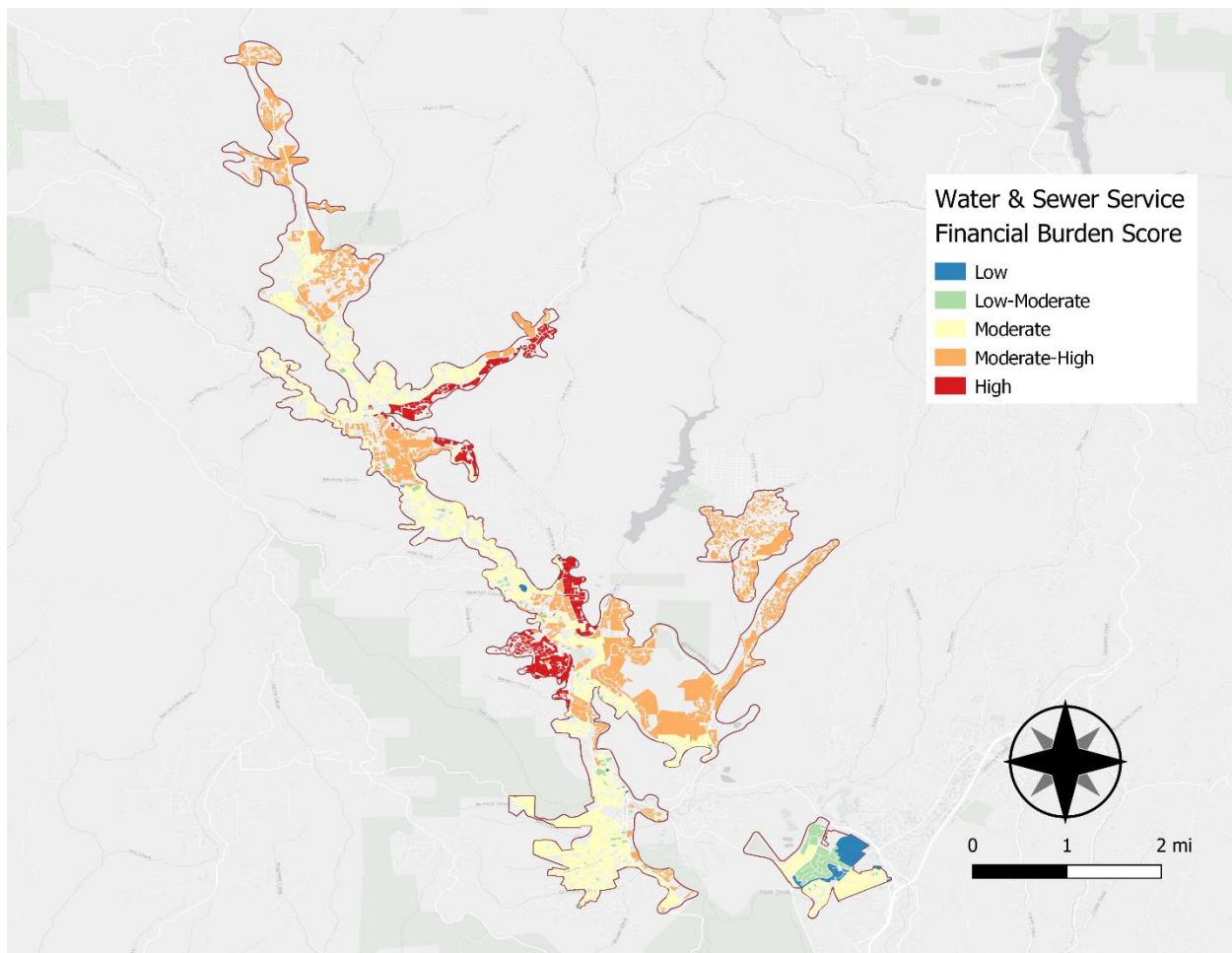
The higher financial burden scores are being driven by the large number of homes with septic systems and the relatively high annual costs of these systems. Again, it should be emphasized that most homes with septic systems are not presently experiencing these high costs, but rather will incur them when they are required to replace or upgrade their current septic system.

Table 39. San Lorenzo Valley WD Water & Sewer Service Financial Burden Score Distribution

	Count of Dwelling Units	Percent of Dwelling Units	Mean Value	
			W&S AR	PPI
Financial Burden Score for EIU				
Low	587	7.1%	1.2%	13.1%
Low-Moderate	692	8.4%	2.0%	13.8%
Moderate	3,438	41.6%	3.9%	14.3%
Moderate-High	2,879	34.8%	5.5%	14.9%
High	677	8.2%	5.7%	40.3%
Total	8,273	100.0%	4.2%	16.5%

Count of DU within block groups with indicated Financial Burden Score.

Figure 17. San Lorenzo Valley WD Water & Sewer Service Financial Burden Score Distribution



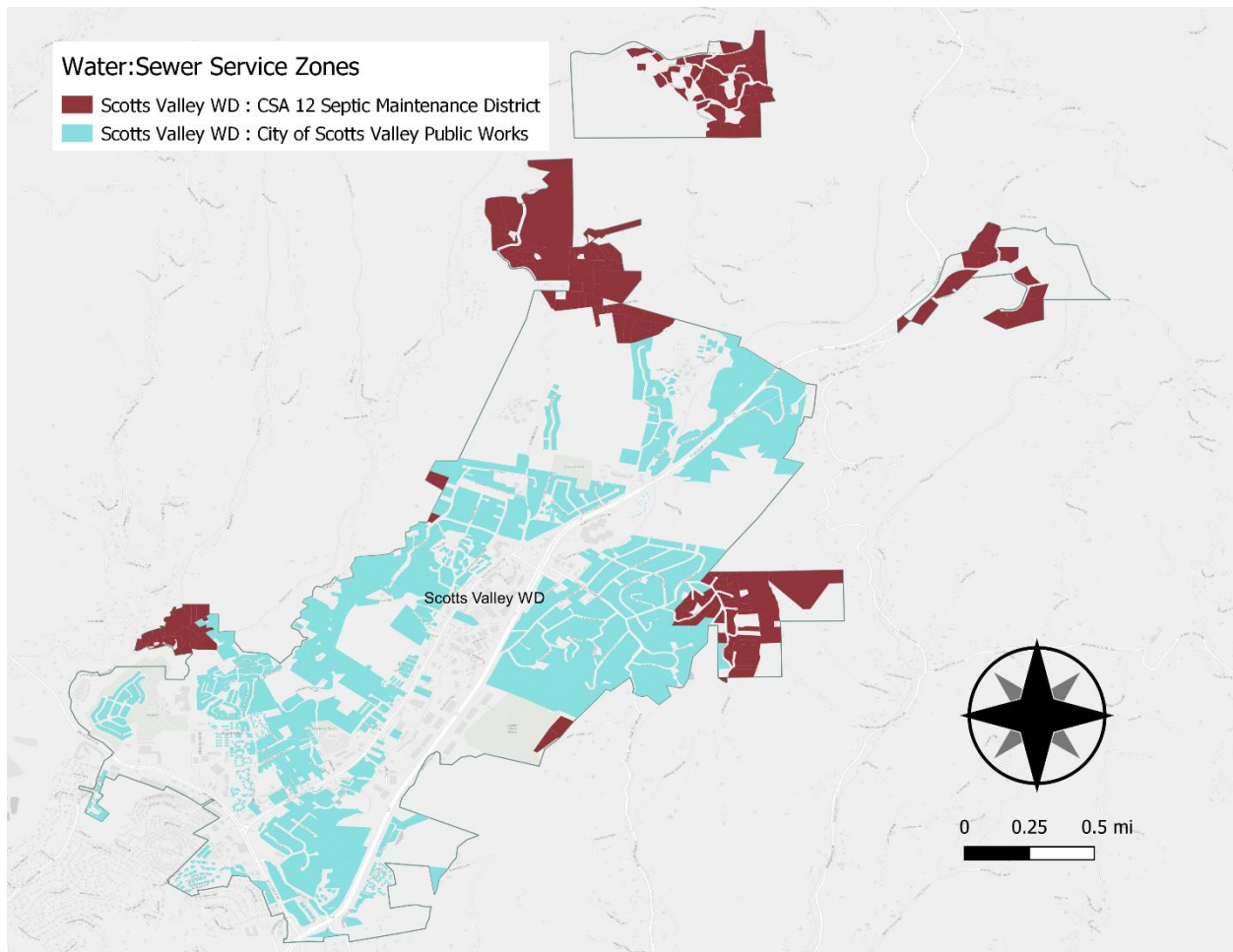
4.6 Scotts Valley Water District

4.6.1 Service Area

The Scotts Valley Water District (Scotts Valley WD) encompasses a six square mile area that includes the City of Scotts Valley and unincorporated areas to the north. The district serves a population of 11,000 through more than 3,700 connections of which more than 90% are residential. The district's water supply comes from three water-bearing formations within the Santa Margarita Groundwater Basin. The City of Scotts Valley owns and operates a wastewater tertiary-level treatment plant that produces an average of 185 acre-feet per year of recycled water used for irrigation. Scotts Valley WD is the permitted distributor of the recycled water.

Most customers in the service area are connected to the City's sewer system operated by the City of Scotts Valley Public Works Department.²⁷ A small number of customers are within the CSA 12 Septic Maintenance District and rely on on-site septic systems for wastewater disposal. Figure 18 shows residential parcels in the Scotts Valley WD service area by water-sewer service provider.

Figure 18. Scotts Valley WD Service Area Residential Parcels by Water-Sewer Service Zone



²⁷ Some customers in the southern part of the San Lorenzo Valley WD also are connected to this sewer system.

4.6.2 Residential Parcels, Dwelling Units, and Census Block Groups

According to county assessor data, there are 3,316 residential parcels within the Scotts Valley WD service area. An estimated 3,849 dwelling units are associated with these parcels.²⁸ These parcels and dwelling units are distributed across 11 census block groups.

4.6.3 Household Size and EIU

Table 40 given a breakdown of household size and EIU for Scotts Valley WD.²⁹ Roughly two-thirds of dwelling units are in block groups with calculated EIU of 4 CCF/month and one-third are in block groups with calculated EIU of 5 CCF/month.

Table 40. SLVWD EIU Breakdown

	Count of Dwelling Units	Percent of Dwelling Units	Mean PPH
EIU (CCF/Month)			
4	2,423	63.0%	2.6
5	1,426	37.0%	3.0
Total	3,849	100.0%	2.7

Count of DU within block groups with indicated EIU

PPH = Persons per household

4.6.4 Income and Housing Cost

Service area MHI is \$127,700. A breakdown of MHI for the service area provided in Table 41. For the service area as a whole, housing costs account for 25% of MHI. A breakdown of MHC for the service area is provided in Table 42.

Table 41. Scotts Valley WD MHI Breakdown

	Count of Dwelling Units	Percent of Dwelling Units	Mean MHI (Thou.\$)
MHI Category (Thou.\$)			
75-100	1,045	27.1%	91.0
100-150	2,025	52.6%	132.6
> 150	779	20.2%	164.2
Total	3,849	100.0%	127.7

Count of DU within block groups with MHI in MHI Category

²⁸ The estimated number of dwelling units for a parcel is based on the parcel's land use code, as described in Appendix C.

²⁹ This and subsequent tables show the count of dwelling units in block groups where the variable of interest falls within the indicated range. For example, the table shows that 2,423 dwelling units are in block groups with a calculated EIU of 4 CCF/month. Mean household size for dwelling units in these block groups is 2.6 persons.

Table 42. Scotts Valley WD MHC Breakdown

	Count of Dwelling Units	Percent of Dwelling Units	Mean MHC (% of MHI)
MHC Category (% of MHI)			
< 20	794	20.6%	18.6
20-40	3,055	79.4%	26.7
Total	3,849	100.0%	25.0

Count of DU within block groups with MHC in MHC Category

4.6.5 Poverty Prevalence and DAC Status

PPI is the percentage of population in a block group with income that is less than twice the federal poverty level (FPL). Table 43 gives a breakdown of PPI for Scotts Valley WD. No households in the service area are in census block groups where more than 30% of the population have incomes less than twice FPL.

DAC status indicates whether DWR has designated the block group as a disadvantaged community (i.e., has MHI less than 80% of state MHI). Table 44 gives a breakdown of DAC status in Scotts Valley WD. No households are in census block groups that DWR has designated as DAC.

Table 43. Scotts Valley WD PPI Breakdown

	Count of Dwelling Units	Percent of Dwelling Units	Mean PPI
Poverty Prevalence Category			
<10%	1,213	31.5%	4.1
10-30%	2,636	68.5%	15.6
Total	3,849	100.0%	12.0

Count of DU within block groups with PPI in PPI Category

Table 44. Scotts Valley WD DAC Status Breakdown

	Count of Dwelling Units	Percent of Dwelling Units	Mean MHI (Thou.\$)
DAC Status			
Not DAC	3,849	100.0%	127.7
Total	3,849	100.0%	127.7

Count of DU within block groups designated DAC

4.6.6 Water and Sewer Service Costs

Average annual water service cost for alternative EIU quantities is summarized in Table 45. Water service costs are based on rates and charges in effect July 1, 2021. In the case of single-family dwelling units, monthly service charges are based on the charge for a 5/8" standard meter. In the case of multi-family and mobile home dwelling units, monthly service charges are a function of the number of dwelling units assumed to be served by the meter (see Appendix A for details). Single-family customers enrolled in PG&E's CARE Program are eligible for rate assistance. Rate assistance customers receive a 30% discount on their monthly service charge and all consumption is charged the Tier 1 rate.

Average annual sewer service cost is summarized in Table 46. Residential sewer charges are invariant to the volume of discharge and therefore do not vary by EIU quantity. Sewer service costs are based on rates and charges in effect July 1, 2021 (see Appendix A for details).³⁰ The annual cost for homes with on-site septic system is calculated as the sum of the amortized capital and operating costs for a septic system meeting State and County design and operational requirements (see Appendix B for details). Residential customers enrolled in PG&E's CARE Program are eligible for rate assistance. Rate assistance customers receive a 12% discount on their monthly sewer charge.

Table 45. Scotts Valley WD Annual Water Service Costs by EIU Quantity

	Count of Dwelling Units	EIU Monthly Quantity					
		3 CCF	4 CCF	5 CCF	6 CCF	7 CCF	8 CCF
Scotts Valley WD							
Multi-Family	365	294	357	420	483	547	610
Mobile Home	324	557	620	684	747	810	873
Single-Family	3,160	705	768	831	894	957	1,020

Based on rates effective July 1, 2021. See Appendix A for calculation details.

Table 46. Scotts Valley WD Annual Sewer Service Costs

	Count of Dwelling Units	Mean Annual Sewer Bill
CSA 12 Septic Maintenance District		
Multi-Family	4	1,345
Single-Family	200	2,644
Scotts Valley Public Works		
Multi-Family	361	426
Single-Family	2,960	608
Mobile Home	324	406

Based on rates effective July 1, 2021. See Appendix B for calculation details.

4.6.7 Water Service Affordability Ratio

A breakdown of water service ARs for Scotts Valley WD is provided in Table 47 and Figure 19. All households in the service area are located in census block groups with a water service AR under 1.5%.

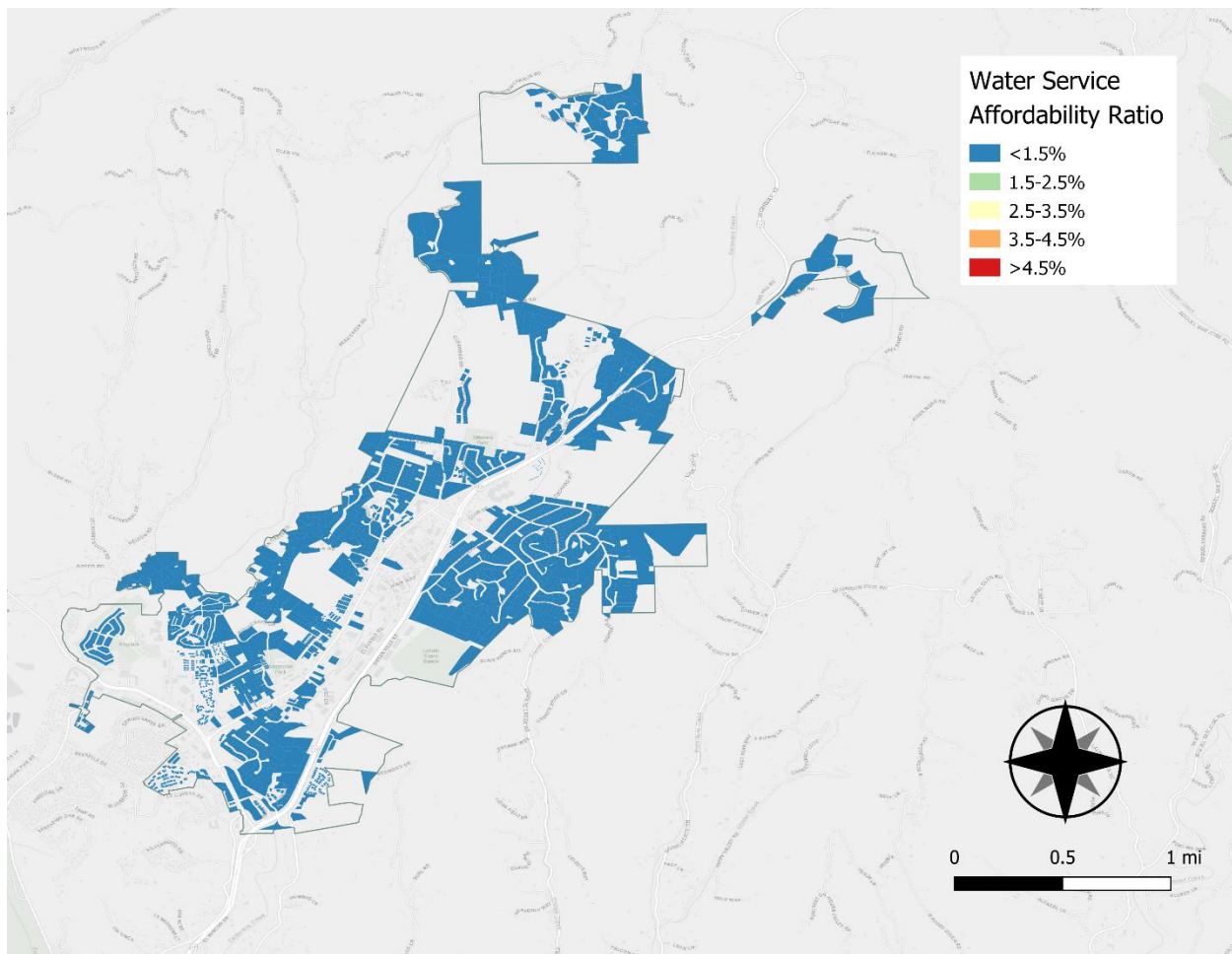
Table 47. Scotts Valley WD Water Service Affordability Ratio Distribution

	Count of Dwelling Units	Percent of Dwelling Units	Mean Water AR for EIU
Water AR for EIU <1.5%	3,849	100.0%	0.8%
Total	3,849	100.0%	0.8%

Count of DU within block groups with Water AR for EIU within indicated range.

³⁰ A small number of parcels within the City of Scotts Valley may have on-site septic systems. It was not possible with the data available to this project to identify these parcels. For the affordability analysis, it is assumed all parcels within the City of Scotts Valley are connected to the City's sewer system.

Figure 19. Scotts Valley WD Water Service Affordability Ratio Distribution



4.6.8 Water & Sewer Service Affordability Ratio

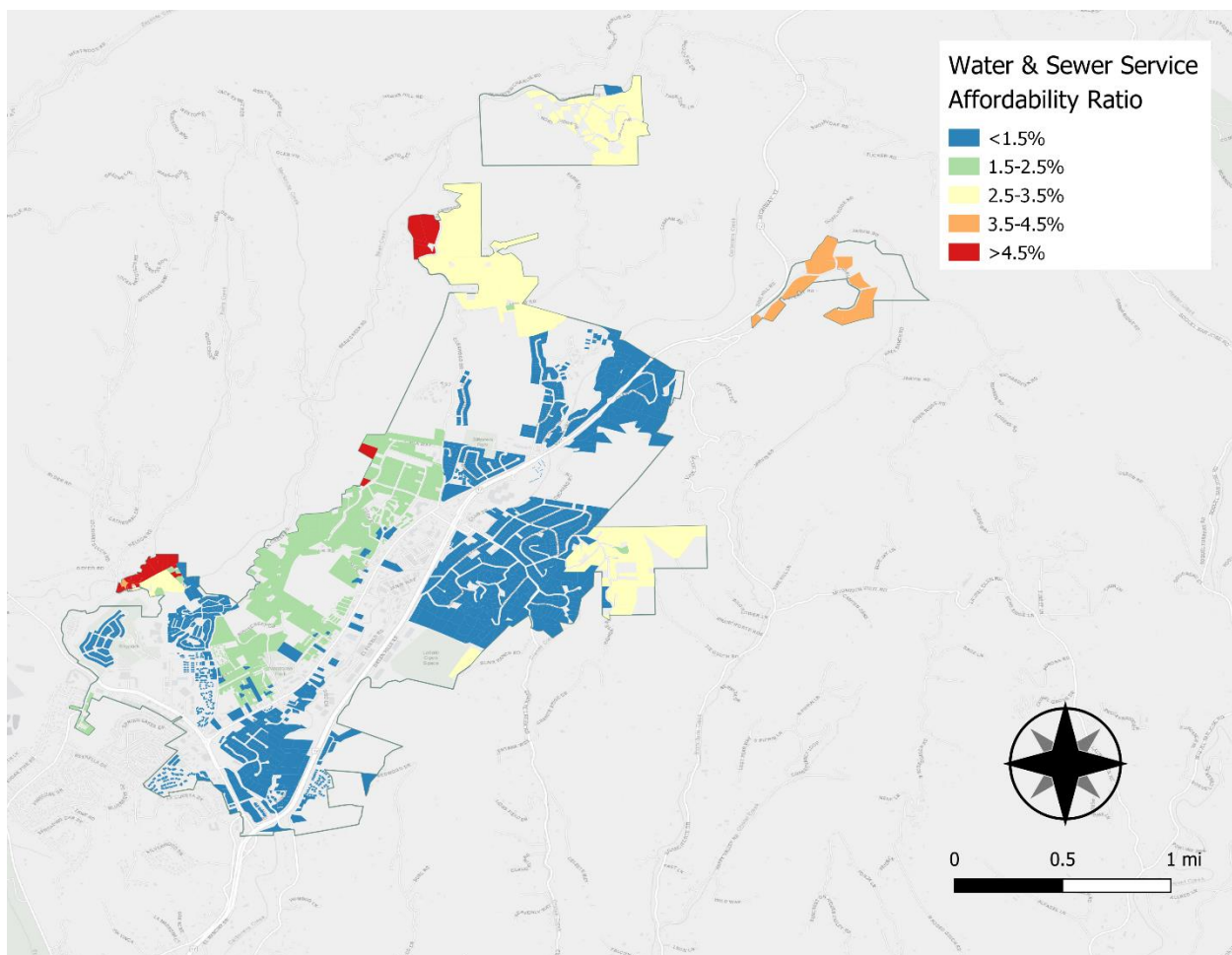
A breakdown of water & sewer service ARs for Scotts Valley WD is provided in Table 48 and Figure 20. Nearly all households have a water & sewer service AR under 3.5%. Less than 1% of households have a water & sewer service AR greater than 4.5%. These households have on-site septic systems. However, it is important to emphasize that most of homes on septic are not presently experiencing these high costs, but rather will incur them when they are required to replace or upgrade their current septic system. Thus, the results in this section are indicative of the water & sewer service affordability challenges that may arise for Scotts Valley WD customers with septic systems as a result of the adoption and implementation of the County's Local Agency Management Program for Onsite Wastewater Treatment Systems.

Table 48. Scotts Valley WD Water & Sewer Service Affordability Ratio Distribution

	Count of Dwelling Units	Percent of Dwelling Units	Mean Water & Sewer AR for EIU
Water & Sewer AR for EIU			
<1.5%	2,780	72.2%	1.2%
1.5-2.5%	876	22.8%	2.2%
2.5-3.5%	147	3.8%	3.0%
3.5-4.5%	19	0.5%	3.6%
>4.5%	27	0.7%	4.7%
Total	3,849	100.0%	1.5%

Count of DU within block groups with Water & Sewer AR for EIU within indicated range.

Figure 20. Scotts Valley WD Water & Sewer Service Affordability Ratio Distribution



4.6.9 Water & Sewer Service Financial Burden Score

A breakdown of water & sewer service financial burden scores for Scotts Valley WD is provided in Table 49 and Figure 21. Nearly all households have a water & sewer service financial burden score of moderate or lower. Less than 1% of households have financial burden scores of moderate-high. No

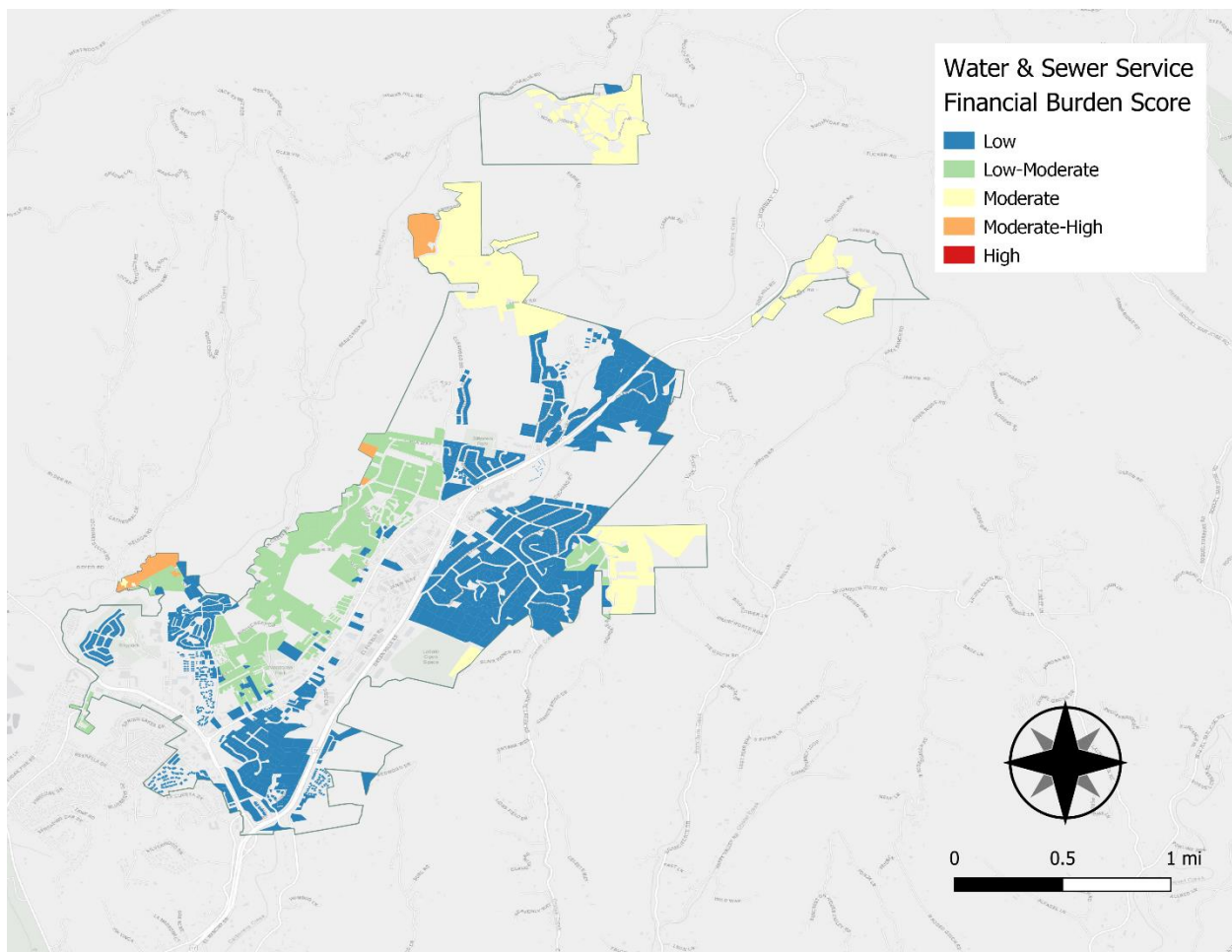
households were scored high in the service area. The relatively low financial burden scores are primarily due to high household income in the service area.

Table 49. Scotts Valley WD Water & Sewer Service Financial Burden Distribution

	Count of Dwelling Units	Percent of Dwelling Units	Mean Value W&S AR	PPI
Financial Burden Score for EIU				
Low	2,784	72.3%	1.2%	10.2%
Low-Moderate	898	23.3%	2.2%	17.0%
Moderate	140	3.6%	3.1%	15.4%
Moderate-High	27	0.7%	4.7%	12.6%
Total	3,849	100.0%	1.5%	12.0%

Count of DU within block groups with indicated Financial Burden Score.

Figure 21. Scotts Valley WD Water & Sewer Service Financial Burden Distribution

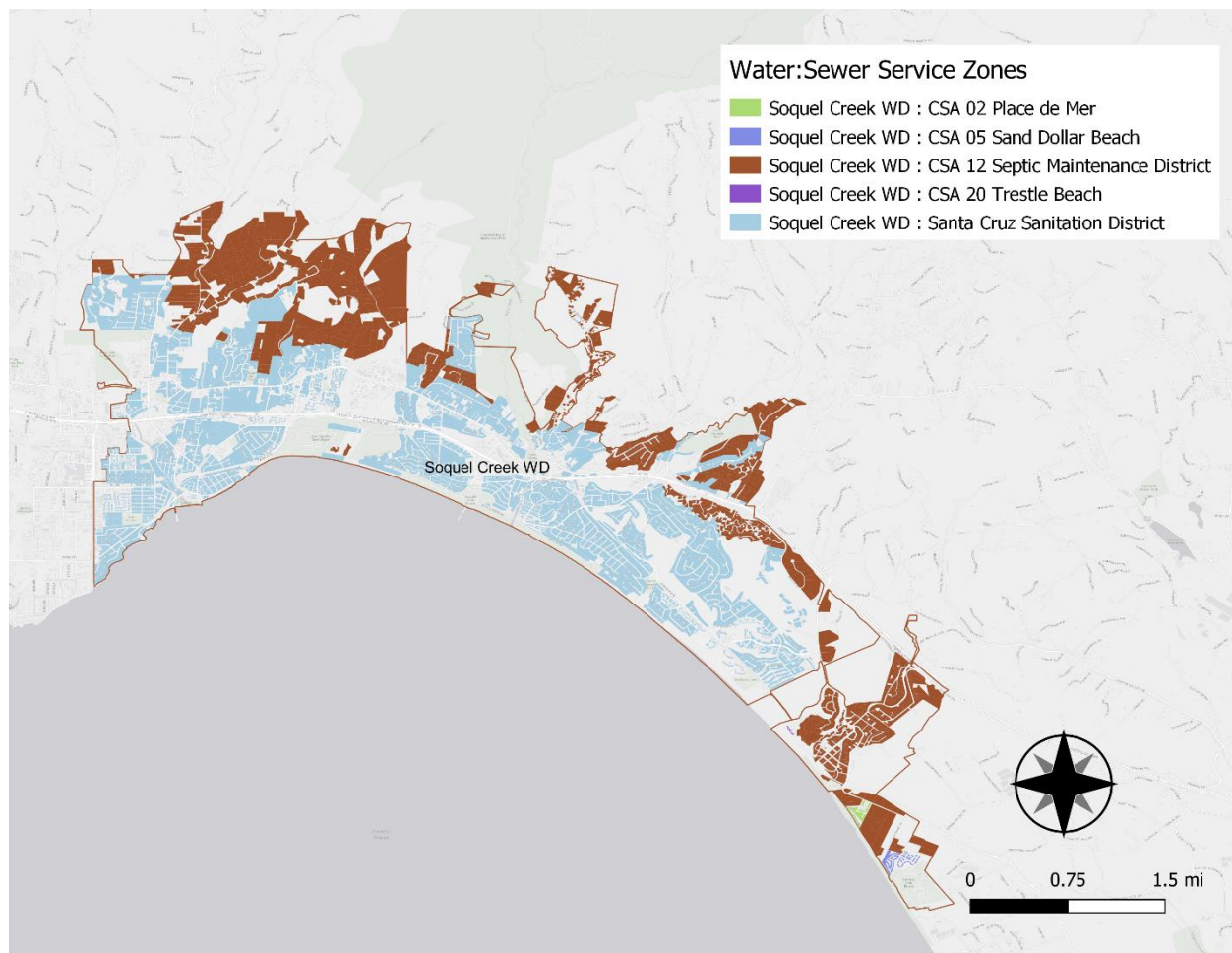


4.7 Soquel Creek Water District

4.7.1 Service Area

The Soquel Creek Water District serves a portion of the City of Capitola as well as the unincorporated areas of Soquel, Aptos, Sea Cliff, Rio Del Mar, Seascapes, La Selva Beach, and Canon del Sol. The district's service area encompasses 14 square miles. The district serves a population of 40,000 through 14,400 connections, of which more than 90% are residential. The district depends entirely on groundwater from the Purisima Formation and Aromas Red Sands aquifer for its water supply. Seawater intrusion into these groundwater basins is of increasing concern and the district is pursuing alternative sources of water supply as part of a groundwater basin recovery strategy. Most dwelling units in the service area (87%) receive sewer service from the Santa Cruz County Sanitation District. A small number of customers (1.5%) are served by the County's pocket treatment systems (CSA 02 Place de Mer, CSA 05 Sand Dollar Beach, and CSA 20 Trestle Beach), and the remainder (11.5%) rely on on-site septic. Figure 22 shows residential parcels in the Soquel Creek WD service area by water-sewer service provider.

Figure 22. Soquel Creek WD Service Area Residential Parcels by Water-Sewer Service Zone



4.7.2 Residential Parcels, Dwelling Units, and Census Block Groups

According to county assessor data, there are 15,867 residential parcels within the Soquel Creek WD's service area. An estimated 18,880 dwelling units are associated with these parcels.³¹ These parcels and dwelling units are distributed across 34 census block groups.

4.7.3 Household Size and EIU

Table 50 gives a breakdown of household size and EIU for Soquel Creek WD.³² More than 80% of dwelling units are in block groups with calculated EIU of 4 CCF/month or less.

Table 50. Soquel Creek WD EIU Breakdown

	Count of Dwelling Units	Percent of Dwelling Units	Mean PPH
EIU (CCF/Month)			
3	3,132	16.6%	1.9
4	14,342	76.0%	2.4
5	1,406	7.4%	2.9
Total	18,880	100.0%	2.4

Count of DU within block groups with indicated EIU

PPH = Persons per household

4.7.4 Income and Housing Cost

Service area MHI is \$95,300. A breakdown of MHI for the service area provided in Table 51. For the service area as a whole, housing costs accounted for 27% of MHI. A breakdown of MHC for the service area is provided in Table 52.

Table 51. Soquel Creek WD MHI Breakdown

	Count of Dwelling Units	Percent of Dwelling Units	Mean MHI (Thou.\$)
MHI Category (Thou.\$)			
< 50	667	3.5%	45.0
50-75	2,067	10.9%	68.0
75-100	9,699	51.4%	87.8
100-150	6,243	33.1%	119.3
> 150	204	1.1%	158.0
Total	18,880	100.0%	95.3

Count of DU within block groups with MHI in MHI Category

³¹ The estimated number of dwelling units for a parcel is based on the parcel's land use code, as described in Appendix C.

³² This and subsequent tables show the count of dwelling units in block groups where the variable of interest falls within the indicated range. For example, the table shows that 3,132 dwelling units are in block groups with a calculated EIU of 3 CCF/month. Mean household size for dwelling units in these block groups is 1.9 persons.

Table 52. Soquel Creek WD MHC Breakdown

	Count of Dwelling Units	Percent of Dwelling Units	Mean MHC (% of MHI)
MHC Category (% of MHI)			
< 20	1,367	7.2%	18.5
20-40	16,743	88.7%	26.7
40-60	770	4.1%	45.0
Total	18,880	100.0%	26.8

Count of DU within block groups with MHC in MHC Category

4.7.5 Poverty Prevalence and DAC Status

PPI is the percentage of population in a block group with income that is less than twice the federal poverty level (FPL). Table 53 gives a breakdown of PPI for Soquel Creek WD. No households are in census block groups where more than 50% of the population have income that is less than twice FPL. About 13% are in block groups where between 30% and 50% of the population have income that is less than twice FPL.

DAC status indicates whether DWR designated the block group as a disadvantaged community (i.e., has MHI less than 80% of state MHI). Table 54 gives a breakdown of DAC status for Soquel Creek WD. Less than 5% of households are in block groups that DWR has designated as DAC. On average, MHI in these DAC block groups is less than half that in the non-DAC block groups in the service area.

Table 53. Soquel Creek WD PPI Breakdown

	Count of Dwelling Units	Percent of Dwelling Units	Mean PPI
Poverty Prevalence Category			
<10%	3,234	17.1%	6.3
10-30%	13,161	69.7%	18.8
30-50%	2,485	13.2%	35.3
Total	18,880	100.0%	18.8

Count of DU within block groups with PPI in PPI Category

Table 54. Soquel Creek WD DAC Status Breakdown

	Count of Dwelling Units	Percent of Dwelling Units	Mean MHI (Thou.\$)
DAC Status			
Not DAC	18,110	95.9%	97.4
DAC	770	4.1%	46.6
Total	18,880	100.0%	95.3

Count of DU within block groups designated DAC

4.7.6 Water and Sewer Service Costs

Average annual water service cost for alternative EIU quantities is summarized in Table 55. Water service costs are based on rates and charges in effect July 1, 2021. In the case of single-family dwelling units, monthly service charges are based on the charge for a 5/8" standard meter. In the case of multi-family and mobile home dwelling units, monthly service charges are a function of the number of dwelling units assumed to be served by the meter (see Appendix A for details).

Average annual sewer service cost is summarized in Table 56. Unlike water service cost, which depends on EIU quantity, residential sewer charges are invariant to the volume of discharge and therefore do not vary by EIU quantity. Sewer service costs are based on rates and charges in effect July 1, 2021 (see Appendix A for details). The annual cost for homes with on-site septic system is calculated as the sum of the amortized capital and operating costs for a septic system meeting State and County design and operational requirements (see Appendix B for details).

Table 55. Soquel Creek WD Annual Water Service Costs by EIU Quantity

	Count of Dwelling Units	EIU Monthly Quantity					
		3 CCF	4 CCF	5 CCF	6 CCF	7 CCF	8 CCF
Soquel Creek WD							
Multi-Family	2,087	390	481	573	665	1,081	1,498
Mobile Home	1,098	510	602	694	785	1,202	1,618
Single-Family	15,695	804	896	987	1,079	1,496	1,912

Based on rates effective July 1, 2021. See Appendix A for calculation details.

Table 56. Soquel Creek WD Annual Sewer Service Costs

	Count of Dwelling Units	Mean Annual Sewer Bill
CSA 02 Place de Mer		
Single-Family	87	1,353
CSA 05 Sand Dollar Beach		
Single-Family	186	1,881
CSA 12 Septic Maintenance District		
Single-Family	2,064	2,682
Multi-Family	74	961
CSA 20 Trestle Beach		
Single-Family	21	3,726
Santa Cruz County Sanitation District		
Single-Family	13,337	847
Multi-Family	2,013	732
Mobile Home	1,098	732

Based on rates effective July 1, 2021. See Appendix B for calculation details.

4.7.7 Water Service Affordability Ratio

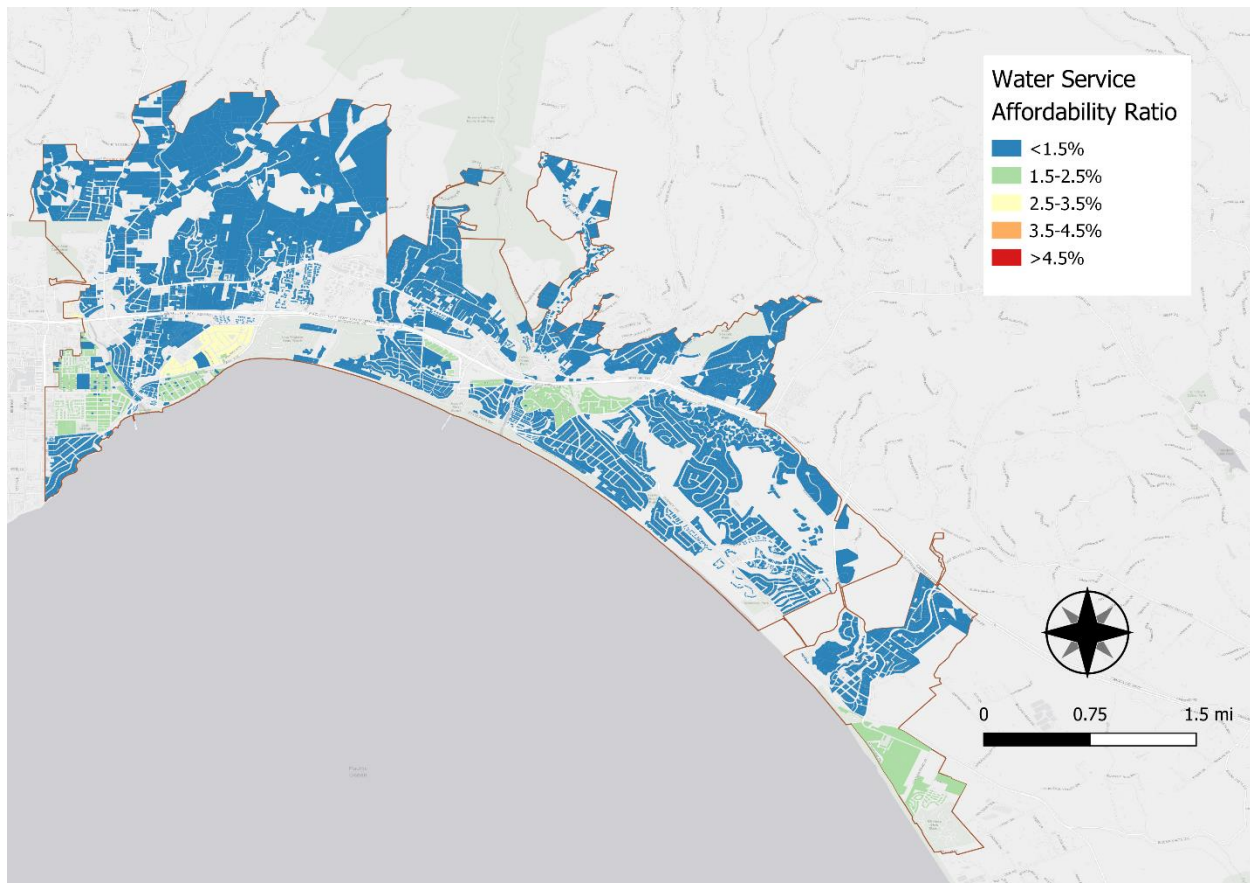
A breakdown of water service ARs for Soquel Creek WD is provided in Table 57 and Figure 23. More than 80% of households have a water service AR under 1.5% and it is under 2.5% for 96.5% of households. No households are in census block groups with a water service AR greater than 3.5%.

Table 57. Soquel Creek WD Water Service Affordability Ratio Distribution

	Count of Dwelling Units	Percent of Dwelling Units	Mean Water AR for EIU
Water AR for EIU <1.5%	15,347	81.3%	1.1%
1.5-2.5%	2,875	15.2%	1.7%
2.5-3.5%	658	3.5%	3.1%
Total	18,880	100.0%	1.3%

Count of DU within block groups with Water AR for EIU within indicated range.

Figure 23. Soquel Creek WD Water Service Affordability Ratio Distribution



4.7.8 Water & Sewer Service Affordability Ratio

A breakdown of water & sewer service ARs for Soquel Creek WD is provided in Table 58 and Figure 24. Eighty percent of households have a water & sewer service AR under 3.5%. Eight percent of households have a water & sewer service AR greater than 4.5%. Many of these households are on septic. It is important to emphasize that most of these homes are not presently experiencing these high costs, but

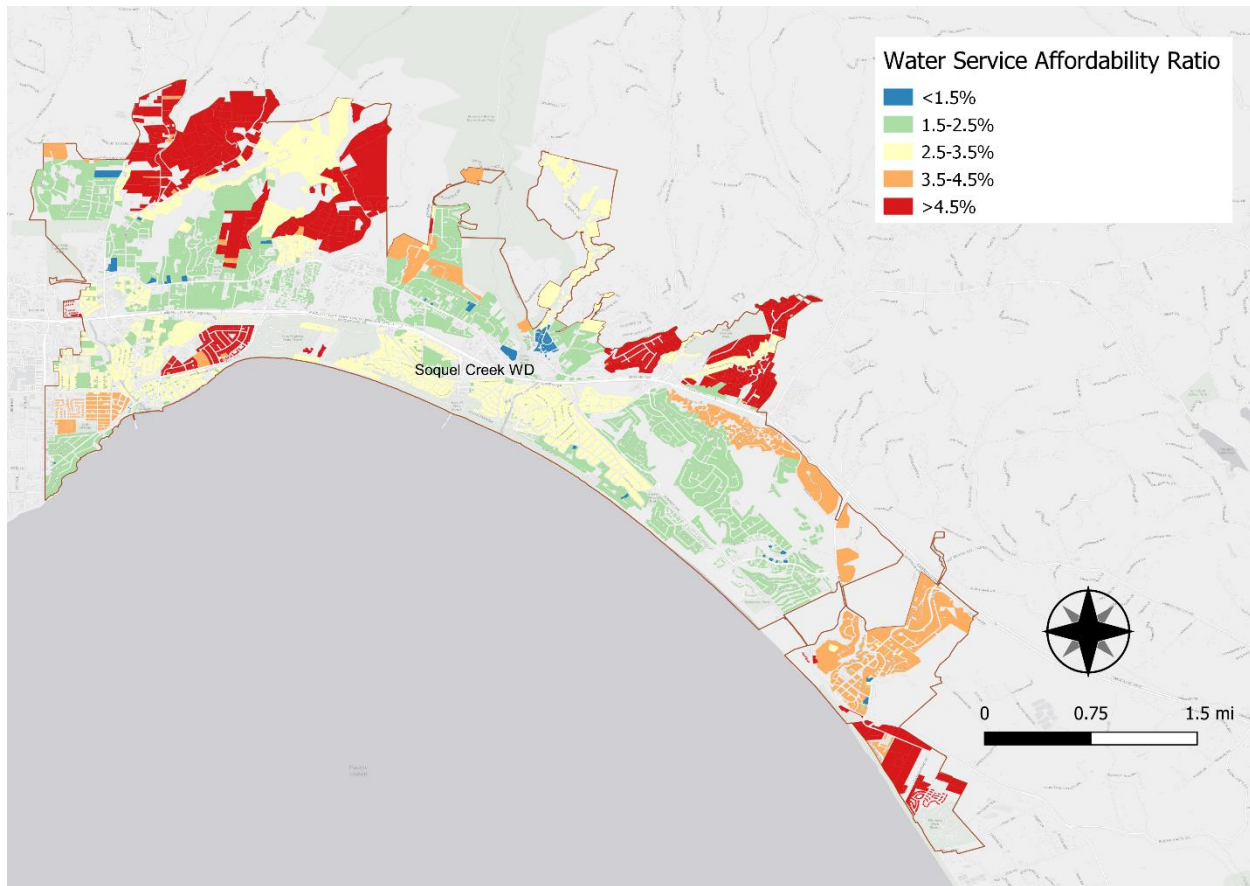
rather will incur them when they are required to replace or upgrade their current septic system. Thus, the results in this section are indicative of the water & sewer service affordability challenges that may arise for some households in the Soquel Creek WD service area as a result of the adoption and implementation of the County's Local Agency Management Program for Onsite Wastewater Treatment Systems.

Table 58. Soquel Creek WD Water & Sewer Service Affordability Ratio Distribution

	Count of Dwelling Units	Percent of Dwelling Units	Mean Water & Sewer AR for EIU
Water & Sewer AR for EIU			
<1.5%	445	2.4%	1.3%
1.5-2.5%	9,008	47.7%	2.0%
2.5-3.5%	5,701	30.2%	2.8%
3.5-4.5%	2,213	11.7%	3.8%
>4.5%	1,513	8.0%	5.5%
Total	18,880	100.0%	2.7%

Count of DU within block groups with Water & Sewer AR for EIU within indicated range.

Figure 24. Soquel Creek WD Water & Sewer Service Affordability Ratio Distribution



4.7.9 Water & Sewer Service Financial Burden Score

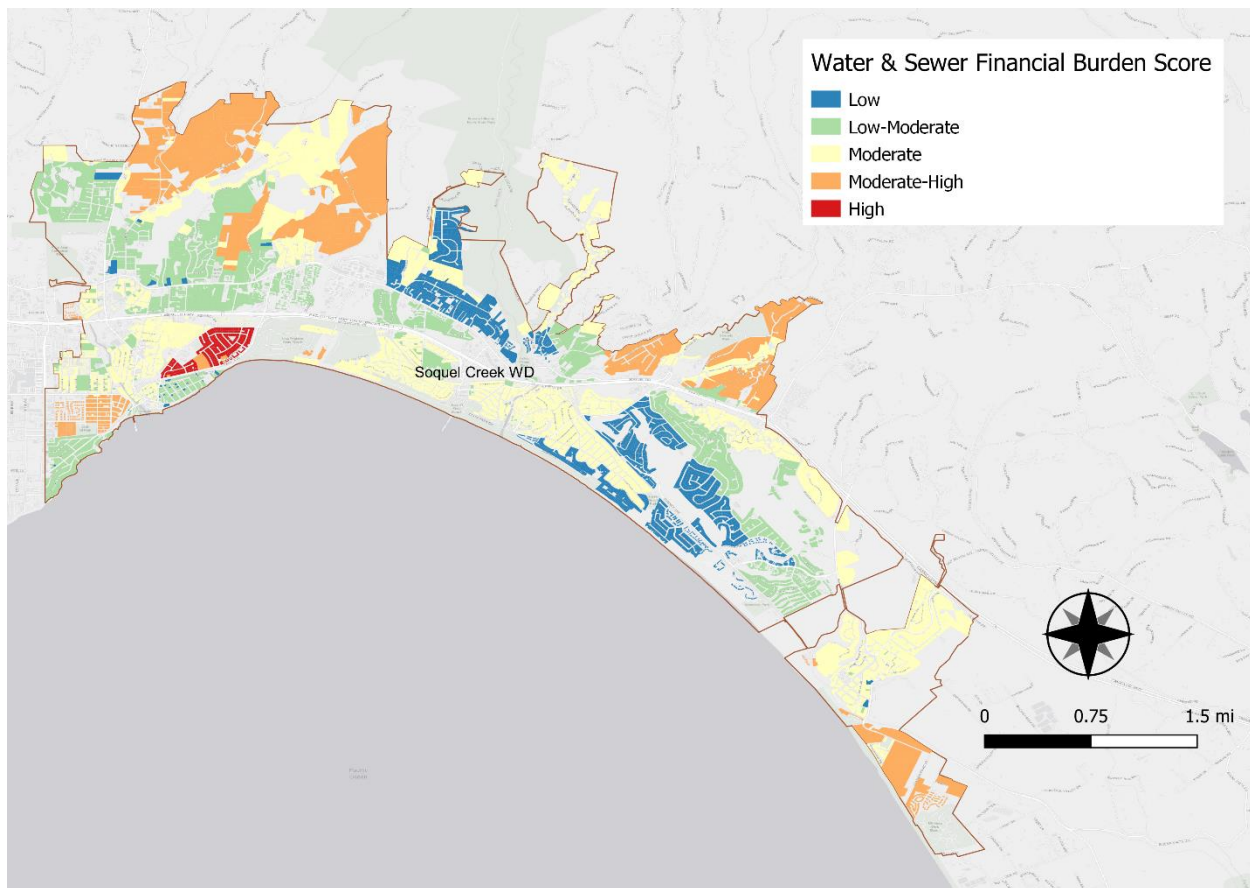
A breakdown of water & sewer service financial burden scores for Soquel Creek WD is provided in Table 59 and Figure 25. Eighty-seven percent of households have a water & sewer service financial burden score of moderate or lower. The remaining 13% of households with financial burden scores of moderate-high or high either have septic systems or are located in DAC block groups. As noted above, most of the homes on septic are not presently experiencing high costs but rather can expect to incur significantly higher costs when they are required to replace or upgrade their existing septic system in order to comply with County permitting requirements. The cluster of homes with high financial burden scores in southwest portion of the service area are located in DAC block groups.

Table 59. Soquel Creek WD Water & Sewer Service Financial Burden Score Distribution

	Count of Dwelling Units	Percent of Dwelling Units	Mean Value	
			W&S AR	PPI
Financial Burden Score for EIU				
Low	3,222	17.1%	1.8%	7.7%
Low-Moderate	6,152	32.6%	2.1%	17.3%
Moderate	6,940	36.8%	3.0%	22.2%
Moderate-High	2,011	10.7%	4.4%	24.8%
High	555	2.9%	6.3%	37.7%
Total	18,880	100.0%	2.7%	18.8%

Count of DU within block groups with indicated Financial Burden Score.

Figure 25. Soquel Creek WD Water & Sewer Service Financial Burden Score Distribution



4.8 Study Region Summary

The tables and figures in this section of the report provide side-by-side comparisons of the data developed for each water service area. These comparisons show how water and sewer service affordability varies across and within the study region's water service providers.

4.8.1 Household Size and EIU

Table 60 provides a breakdown of average household size and EIU for the region. This breakdown is also illustrated in the accompanying charts. Among the water suppliers in the study region, the City of Watsonville stands out as having larger households and consequently larger EIU. Whereas average household size for the entire region is 2.7 persons, for Watsonville it is 3.6. Similarly, while average EIU for the entire region is 4.3 CCF/month, for Watsonville it is 5.6 CCF/month. Figure 27 and Figure 29 clearly show how the distributions of household size and EIU for Watsonville are shifted to the right of the distributions for the other water suppliers. This provides a useful reminder that policies intended to help alleviate the financial burden of high water and sewer service costs need to consider the typical household size within the affected communities.

Table 60. Study Region Mean Household Size and EIU by Water Supplier

	Count of Dwelling Units	Mean Value	
		Persons Per Household	EIU (CCF/Month)
City of Santa Cruz	35,306	2.4	4.0
City of Watsonville	18,101	3.6	5.6
Davenport CSD	103	2.8	4.0
San Lorenzo Valley WD	8,273	2.5	4.1
Scotts Valley WD	3,849	2.7	4.4
Soquel Creek WD	18,880	2.4	3.9
Total	84,512	2.7	4.3

Figure 26. Study Region Household Size Distribution

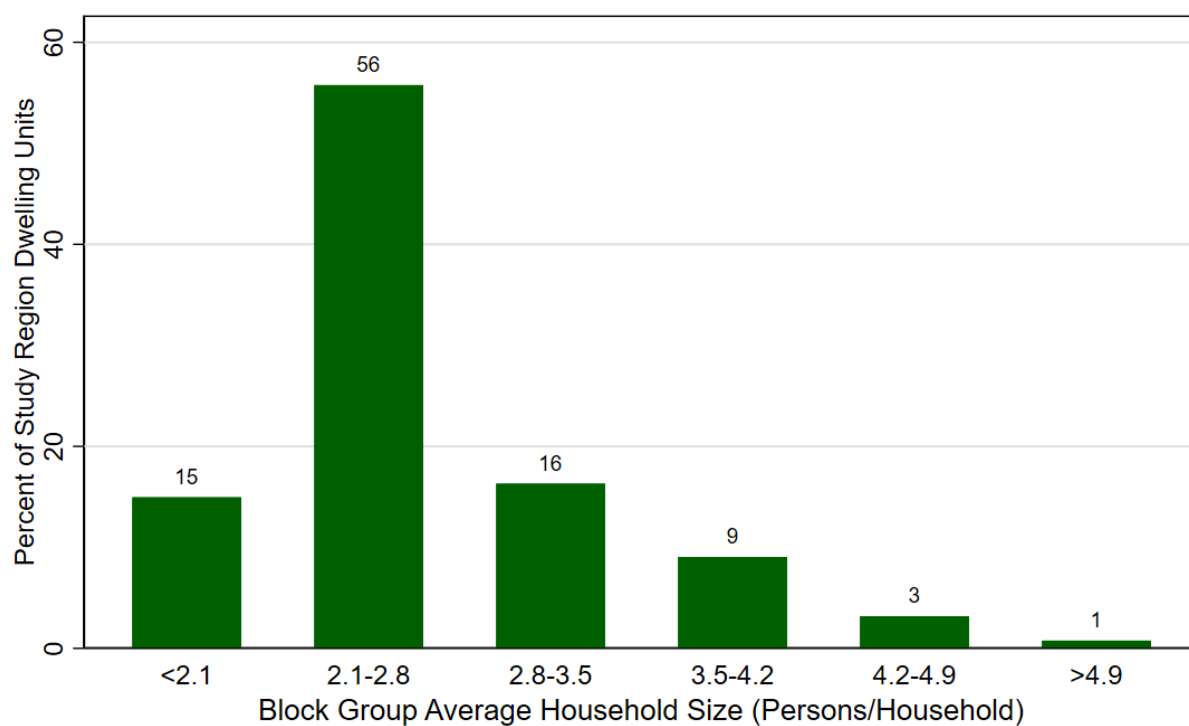


Figure 27. Study Region Household Size Distribution by Water Supplier

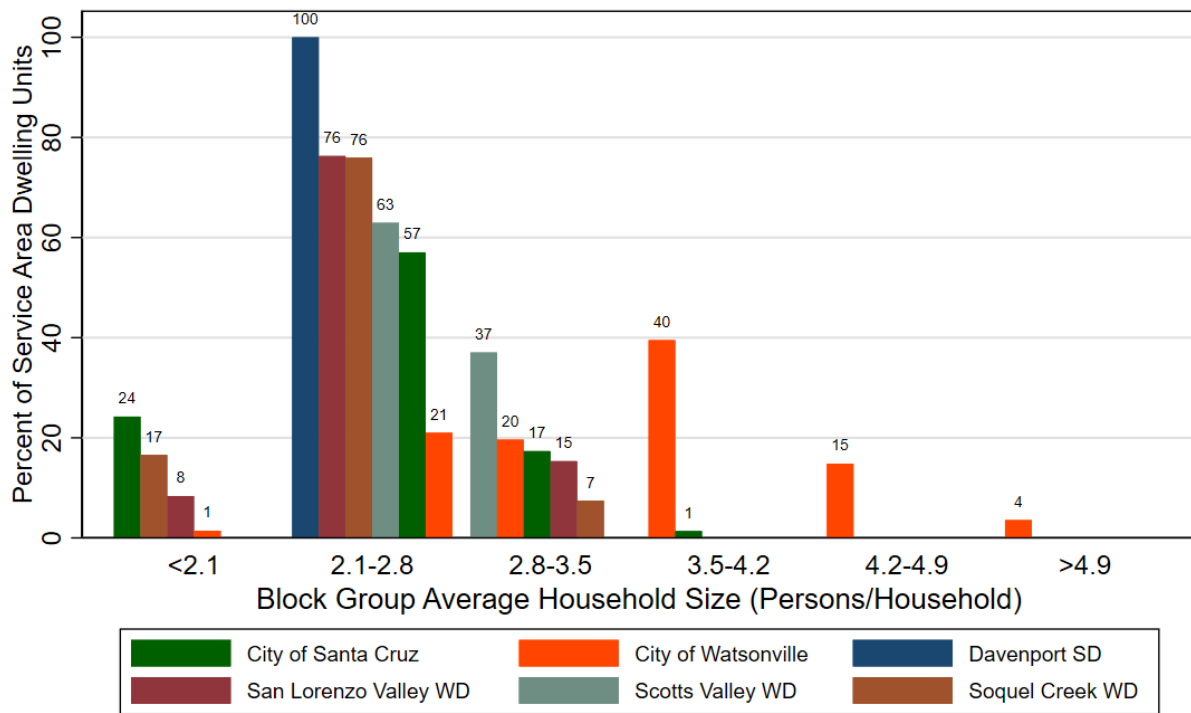


Figure 28. Study Region EIU Distribution

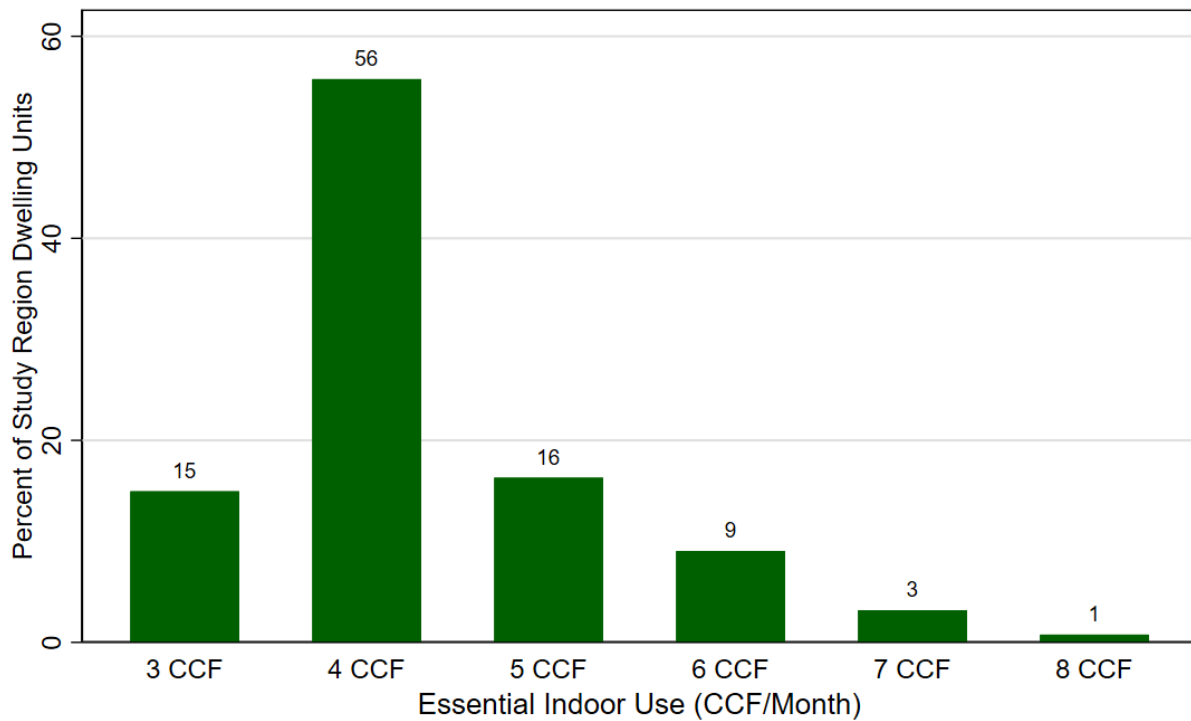
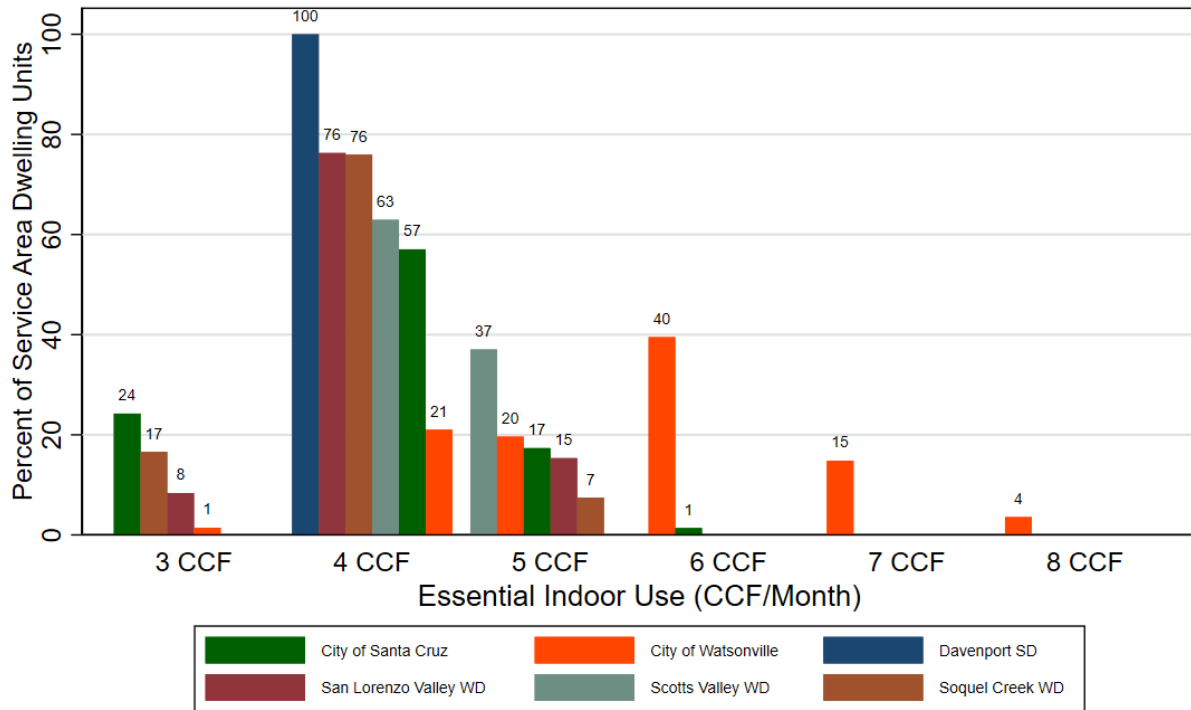


Figure 29. Study Region EIU Distribution by Water Supplier



4.8.2 Income and Housing Cost

Table 61 provides a breakdown of MHI and MHC (normalized for income) for the region. There are significant differences in MHI and MHC across the study region's water suppliers. City of Watsonville and Davenport CSD stand at the lower end of the income range while San Lorenzo Valley WD and Scotts Valley WD stand at the upper end. As shown in Figure 31, there also is considerable income variation within each supplier's service area. Thus, water and sewer service affordability is likely to be an issue for some households in every service area.

While housing cost (normalized for income) is more tightly distributed across the water supplier's service areas, as illustrated in Figure 32 and Figure 33, the cities of Santa Cruz and Watsonville stand out as having relatively higher housing costs (normalized for income) than the other water service providers. Whereas normalized housing costs for the other suppliers are in line with the state average of 26%, costs in Santa Cruz and Watsonville are close to a quarter again higher than the statewide average. Higher normalized housing costs in these service areas are likely to increase utility service affordability challenges for many households.

Table 61. Study Region MHI and MHC by Water Supplier

	Count of Dwelling Units	Mean Value	
		MHI (Thou.\$)	MHC (% of MHI)
City of Santa Cruz	35,306	85.5	32.3%
City of Watsonville	18,101	63.8	32.3%
Davenport CSD	103	51.3	22.4%
San Lorenzo Valley WD	8,273	104.0	25.3%
Scotts Valley WD	3,849	127.7	25.0%
Soquel Creek WD	18,880	95.3	26.8%
Total	84,512	86.7	30.0%

Figure 30. Study Region MHI Distribution

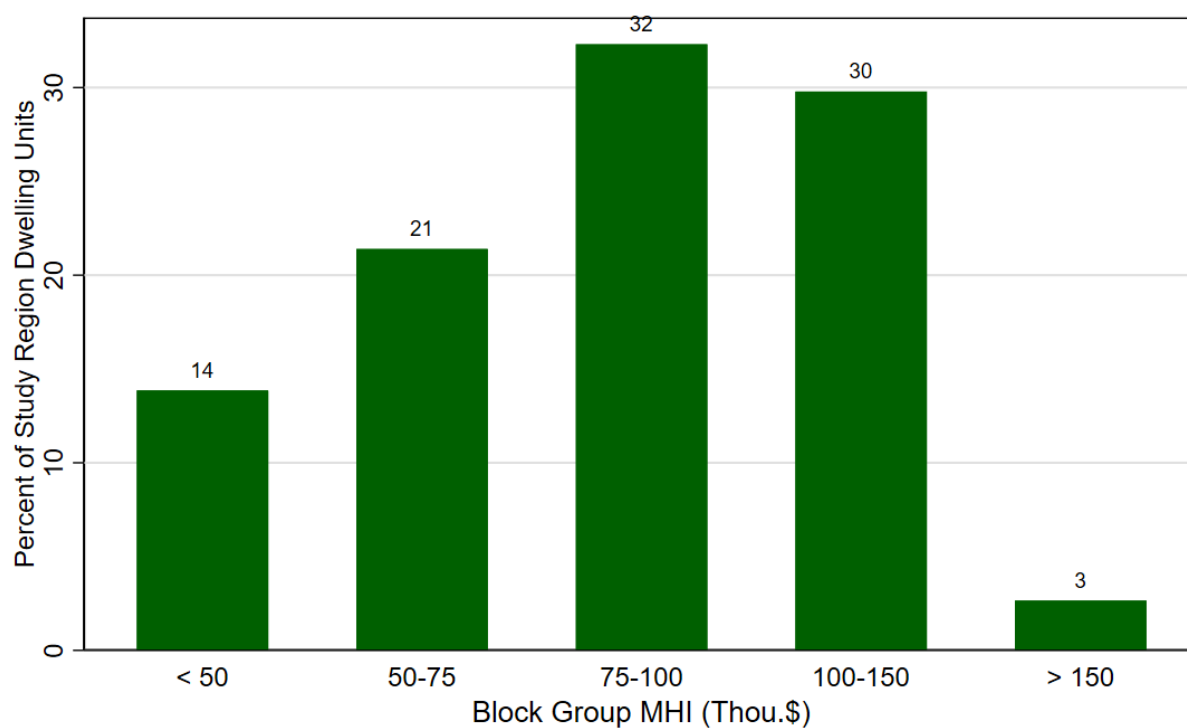


Figure 31. Study Region MHI Distribution by Water Supplier

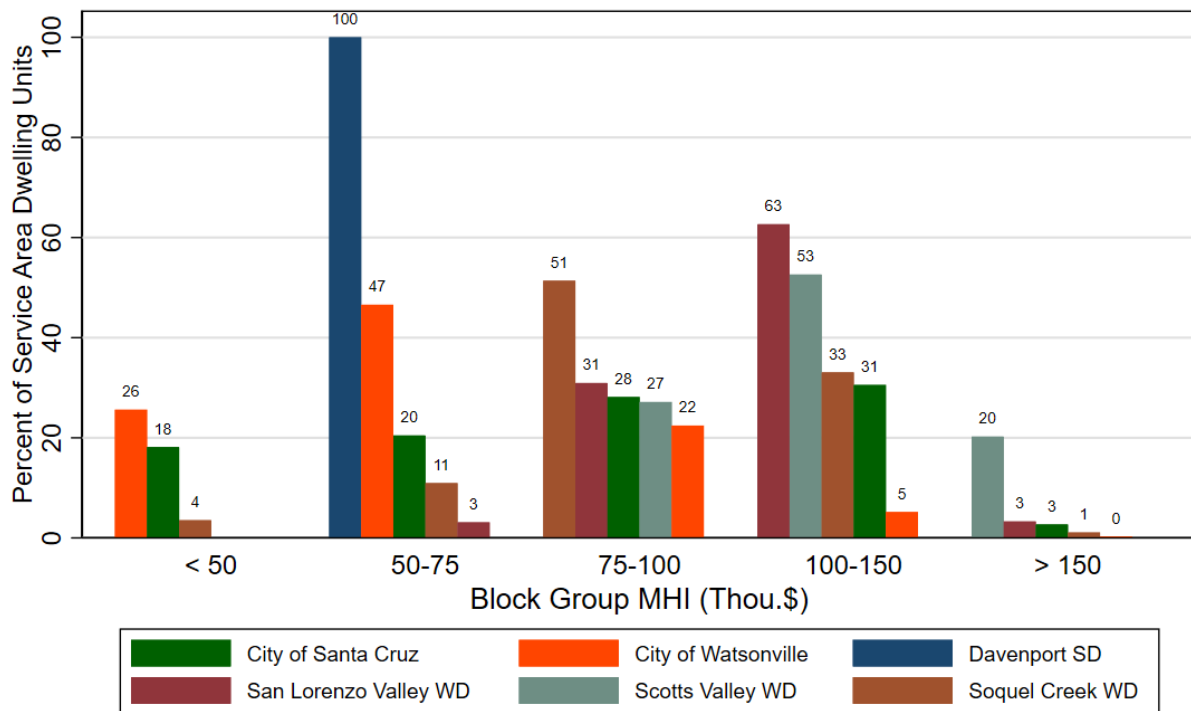


Figure 32. Study Region MHC Distribution

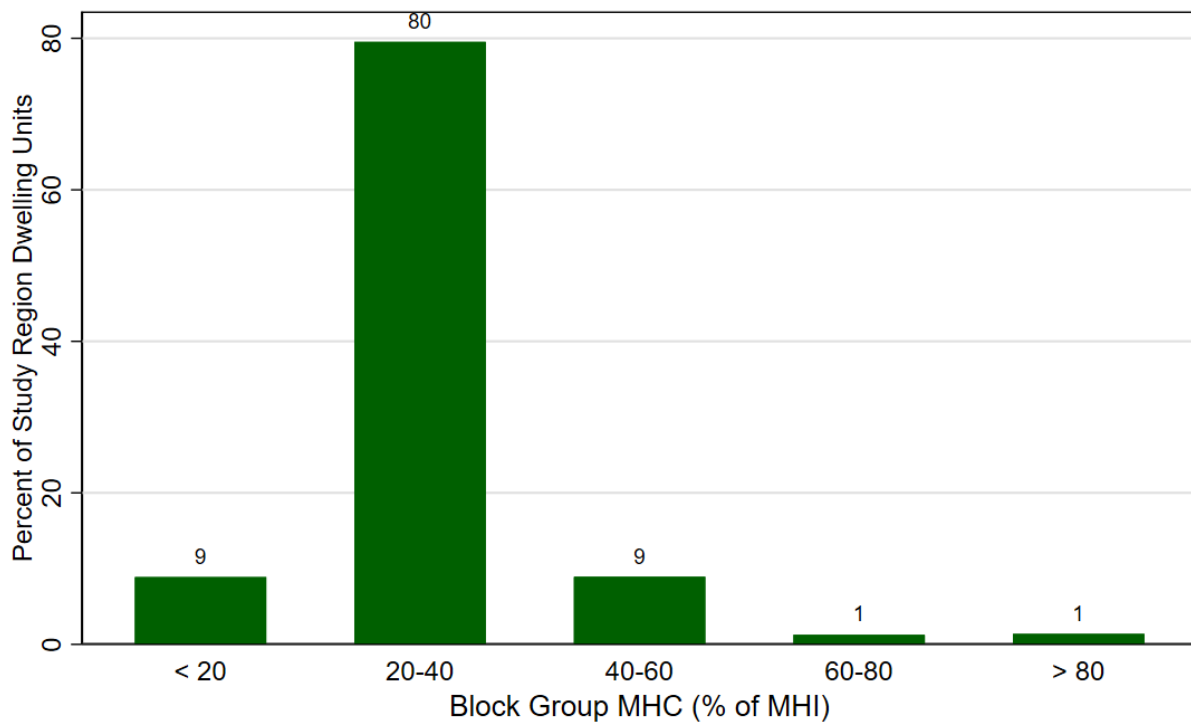
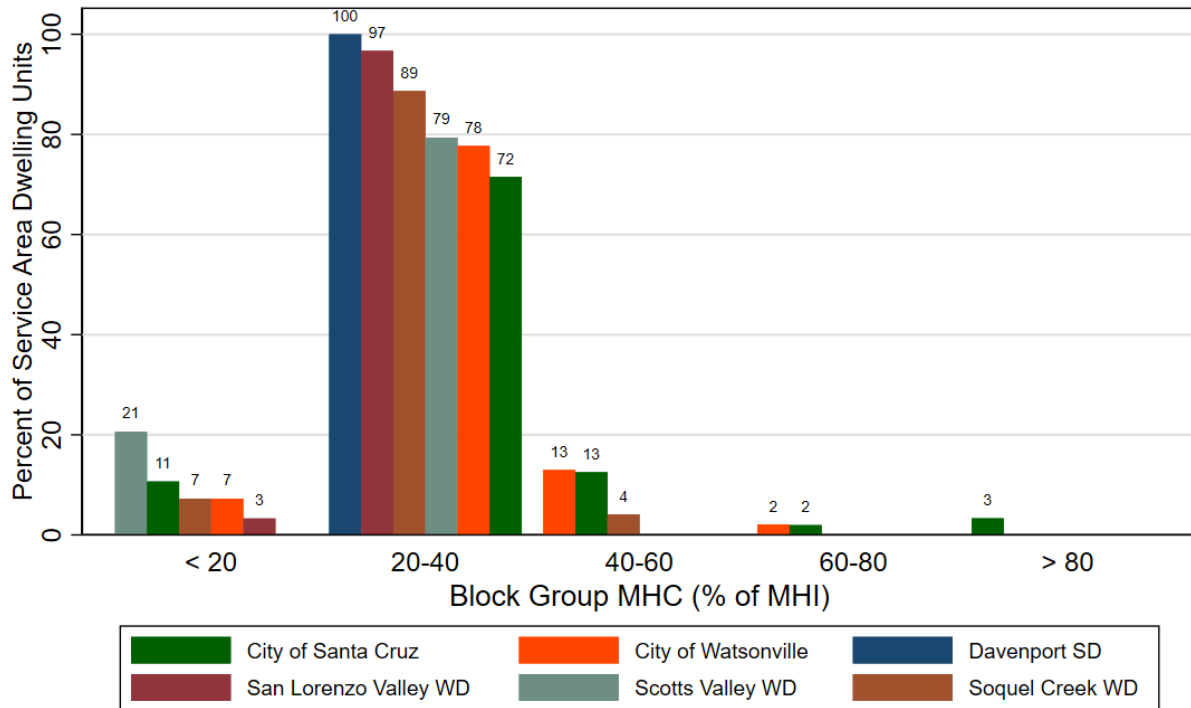


Figure 33. Study Region MHC Distribution by Water Supplier



4.8.3 Poverty Prevalence and DAC Status

Table 62 provides a breakdown of poverty prevalence (PPI) and DAC status for the study region. For the region as a whole, about 28% of the population have incomes less than twice the federal poverty level (FPL). There is significant variation in this percentage across the water supplier service areas, with PPI being well above the regional average in Watsonville and Davenport and being well below the regional average in San Lorenzo Valley WD, Scotts Valley WD, and Soquel Creek WD. There is also substantial variation in PPI within each service area, as shown in Figure 35. Thus, even in water service areas where average PPI is low, there may be pockets of households where utility service affordability is likely to be an issue.

Twenty percent of the households in the study region are in DAC block groups. As with PPI, this varies widely among the water service areas. In Watsonville, close to half of all households are in DAC block groups whereas in San Lorenzo Valley WD and Scotts Valley WD none are. Median household income for the 20% of households in DAC block groups is about half that of households in non-DAC block groups. Thus, utility service affordability is much more likely to be an issue for households in DAC block groups. However, as discussed in a subsequent section, households in non-DAC block groups may also struggle with utility service affordability. For example, although there are no DAC block groups in the San Lorenzo Valley WD, there are nonetheless pockets of the service area where the financial burden of water and sewer service is scored high (see Figure 54).

Table 62. Study Region PPI and DAC Status Distribution by Water Supplier

	Count of Dwelling Units	Mean Value PPI	DAC Status		
			Undesignated	Not DAC	DAC
City of Santa Cruz	35,306	29.0%	8.0%	71.6%	20.5%
City of Watsonville	18,101	42.3%	0.0%	50.4%	49.6%
Davenport CSD	103	33.3%	0.0%	0.0%	100.0%
San Lorenzo Valley WD*	8,273	16.5%	5.3%	94.7%	0.0%
Scotts Valley WD	3,849	12.0%	0.0%	100.0%	0.0%
Soquel Creek WD	18,880	18.8%	0.0%	95.9%	4.1%
Total	84,512	27.6%	3.8%	76.0%	20.2%

* Current DWR DAC designations are based on 2018 ACS data. Previous designations based on 2016 ACS data indicated one DAC census block group (Geoid 060871203013) within SLVWD's service area

Figure 34. Study Region PPI Distribution

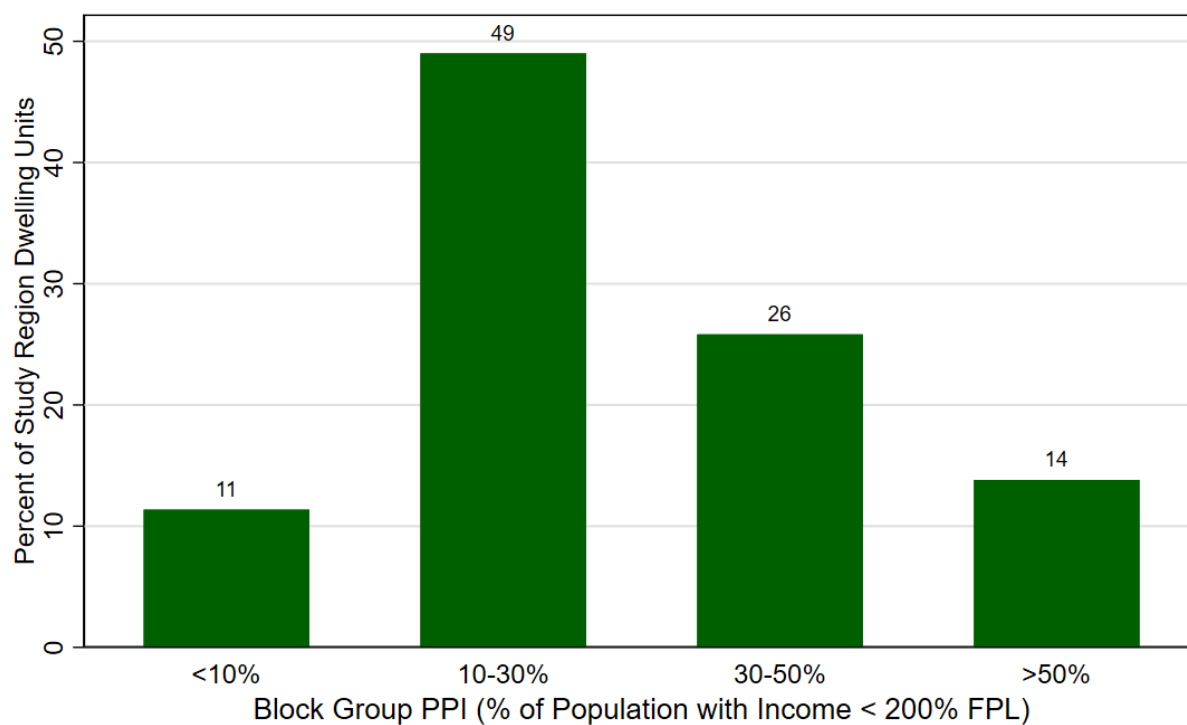


Figure 35. Study Region PPI Distribution by Water Supplier

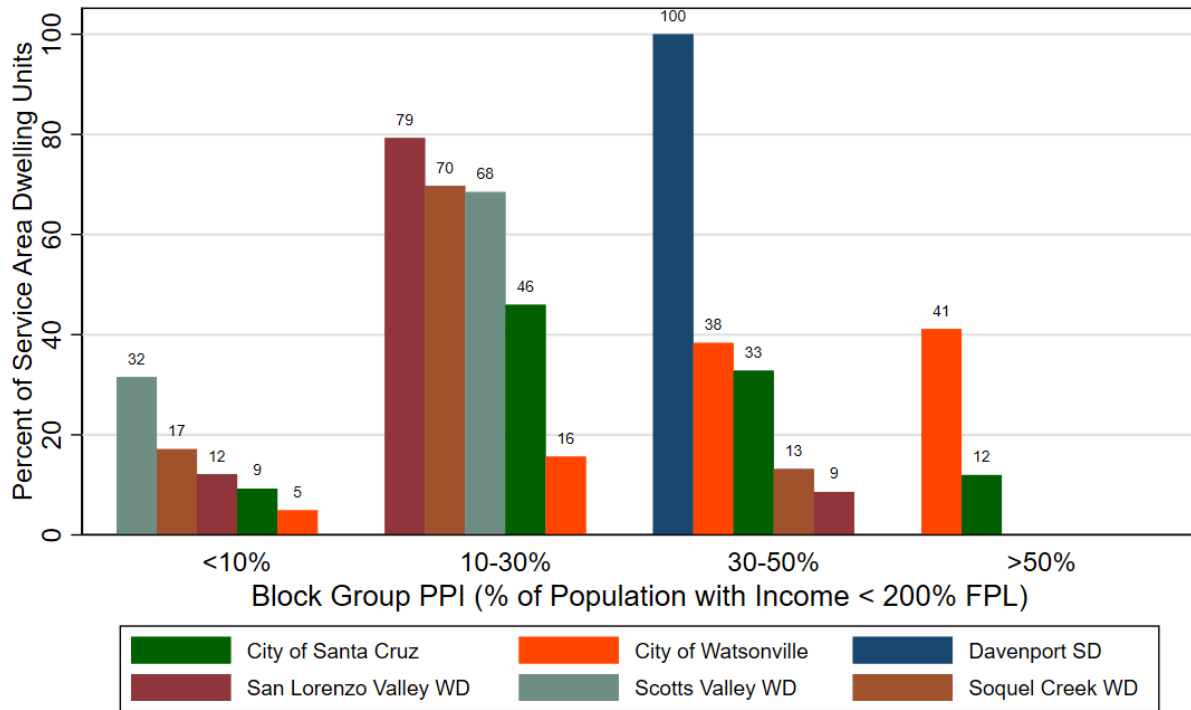


Figure 36. Study Region DAC Distribution

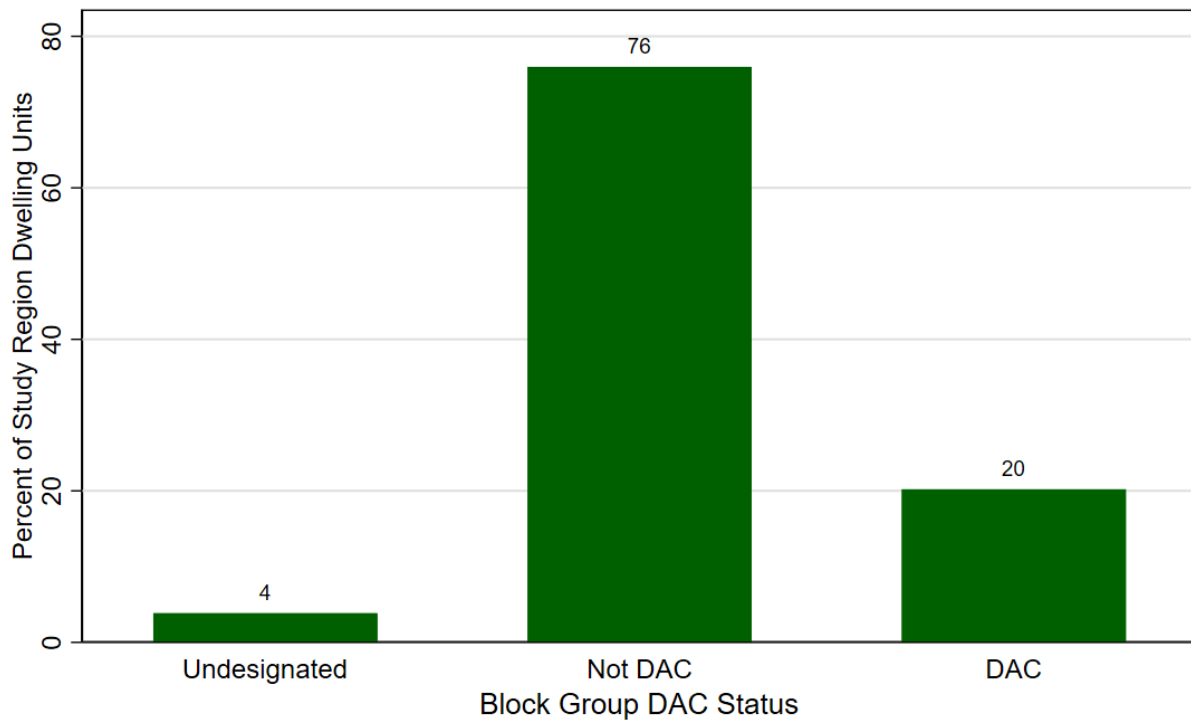
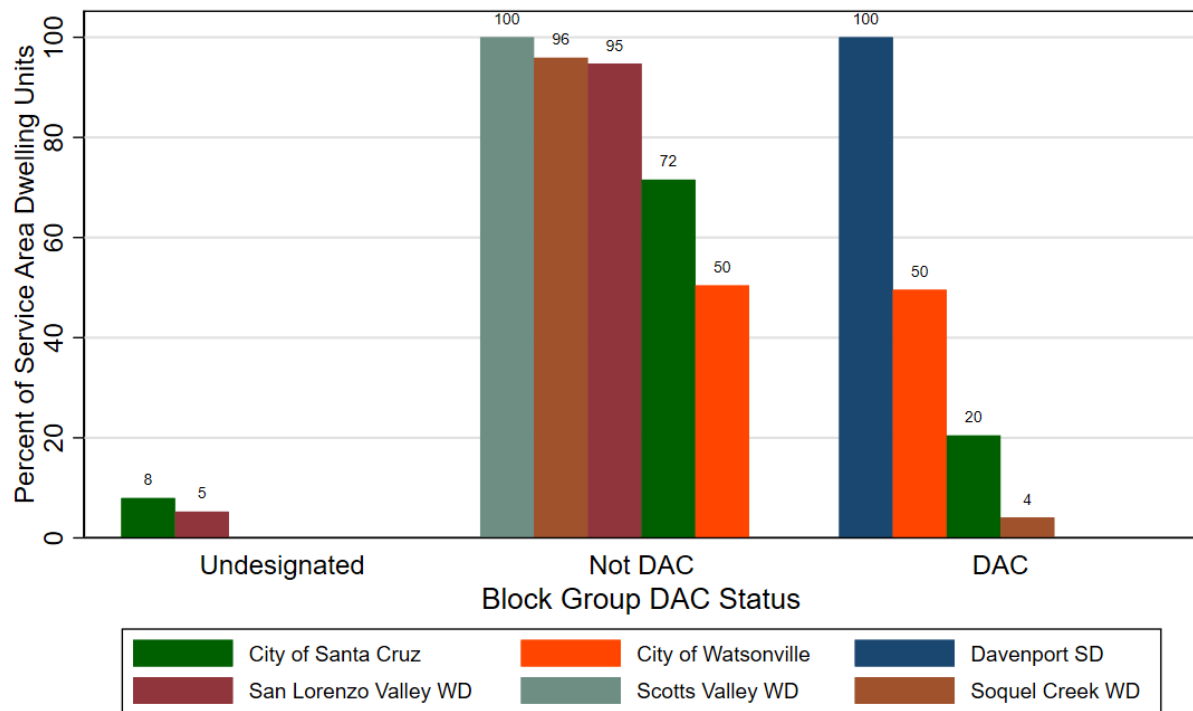


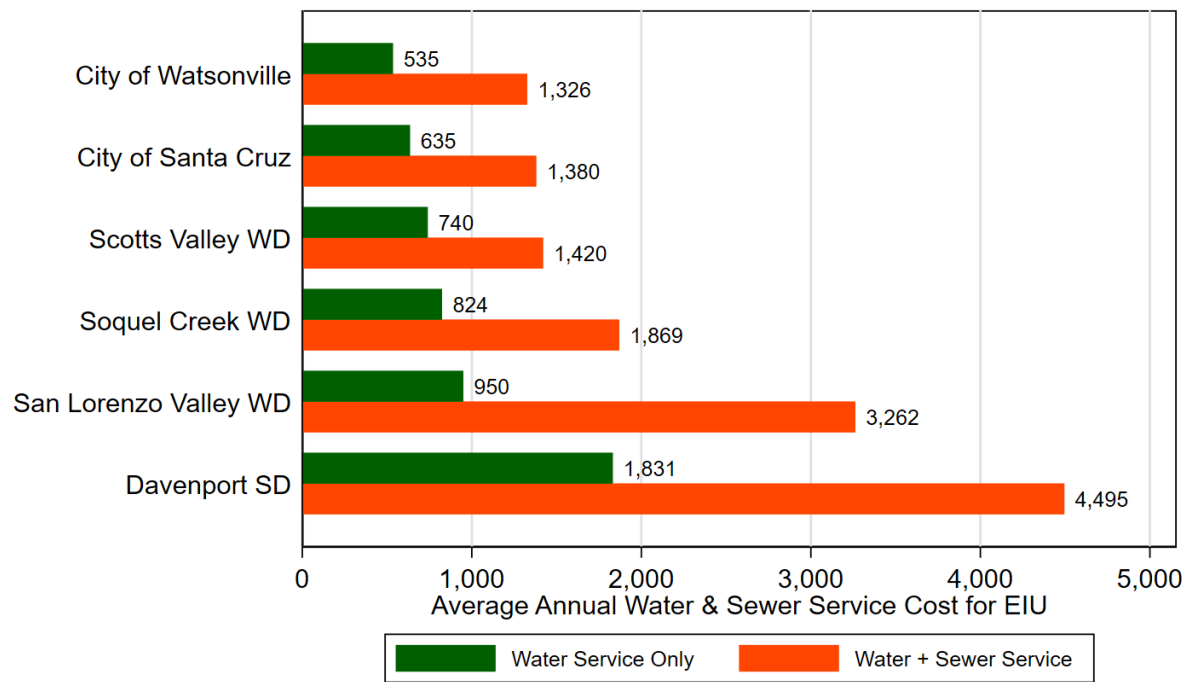
Figure 37. Study Region DAC Distribution by Water Supplier



4.8.4 Water and Sewer Service Costs

Figure 38 ranks the service areas by average annual water and sewer service cost for EIU. Davenport CSD stands out as having substantially larger costs than the other service areas. At the other end of the scale, despite having larger households and EIU, Watsonville nonetheless has lower water and sewer service costs for EIU than the other service areas. The relatively high combined water and sewer service cost in the San Lorenzo Valley WD is due to high septic system costs. However, it is important to emphasize that most customers with septic are not currently incurring these costs, but rather will incur them in the future when they are required to replace or upgrade their existing septic system.

Figure 38. Average Annual Water and Sewer Costs for EIU by Service Area



Based on rates and charges effective July 1, 2021. See Appendices A and B for details.

4.8.5 Water Service Affordability Ratios

Table 63 provides a breakdown of water service affordability ratios for the study region. Conventionally, water service is judged affordable if it is less than 2.5% of unadjusted MHI. This is the case for most households in the study region even after adjusting MHI for other housing costs. Indeed, water service costs are less than 1.5% of adjusted MHI for more than 70% of households in the study region. Water service costs exceed 3.5% of adjusted MHI for less than 4% of households. These households are mostly in the City of Santa Cruz, City of Watsonville, and Davenport CSD service areas. Figure 41 shows that water service costs do not presently claim a significant share of adjusted household income for most households throughout the study region. However, as discussed in Section 4.9, continued rapid escalation of water service costs in the region over the next decade could alter this situation.

Table 63. Study Region Water Service Affordability Ratio Distribution by Water Supplier

	Count of Dwelling Units	Water AR for EIU				
		<1.5%	1.5-2.5%	2.5-3.5%	3.5-4.5%	>4.5%
City of Santa Cruz	35,306	73.9%	15.4%	4.8%	0.6%	5.3%
City of Watsonville	18,101	57.3%	35.4%	2.5%	4.1%	0.7%
Davenport CSD	103	0.0%	0.0%	0.0%	100.0%	0.0%
San Lorenzo Valley WD	8,273	74.1%	25.9%	0.0%	0.0%	0.0%
Scotts Valley WD	3,849	100.0%	0.0%	0.0%	0.0%	0.0%
Soquel Creek WD	18,880	81.3%	15.2%	3.5%	0.0%	0.0%
Total	84,512	73.1%	20.0%	3.3%	1.2%	2.4%

Figure 39. Study Region Water Service Affordability Ratio Distribution

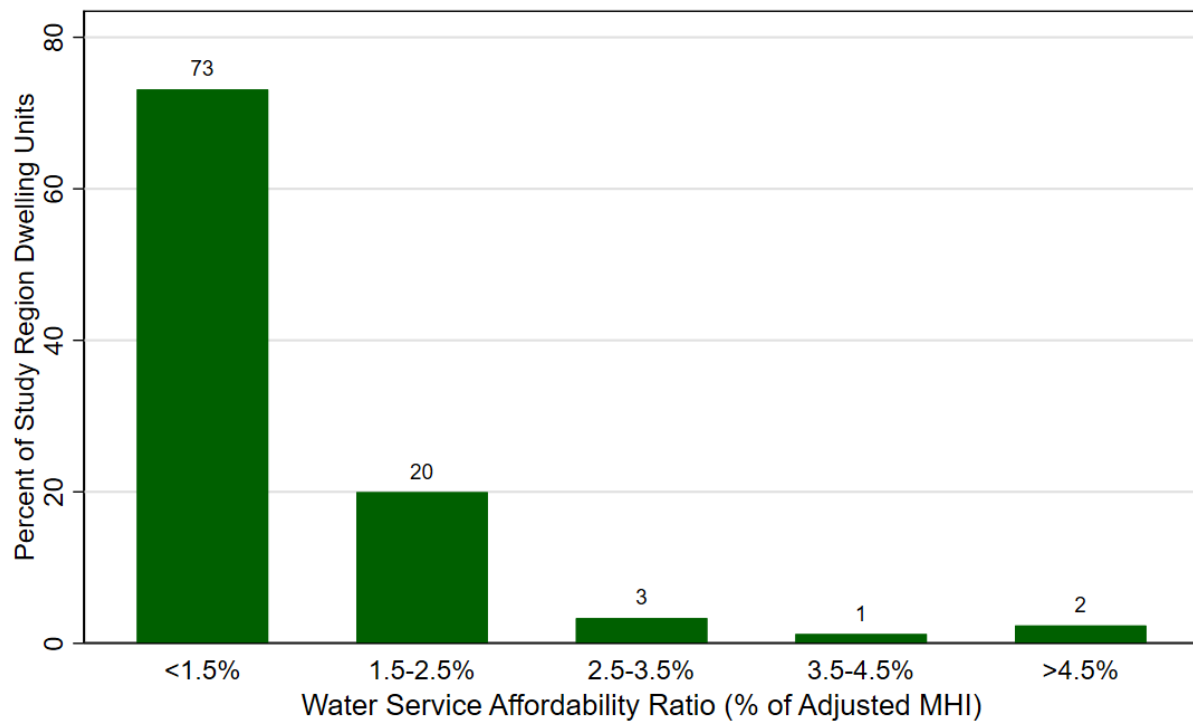


Figure 40. Study Region Water Service Affordability Ratio Distribution by Water Supplier

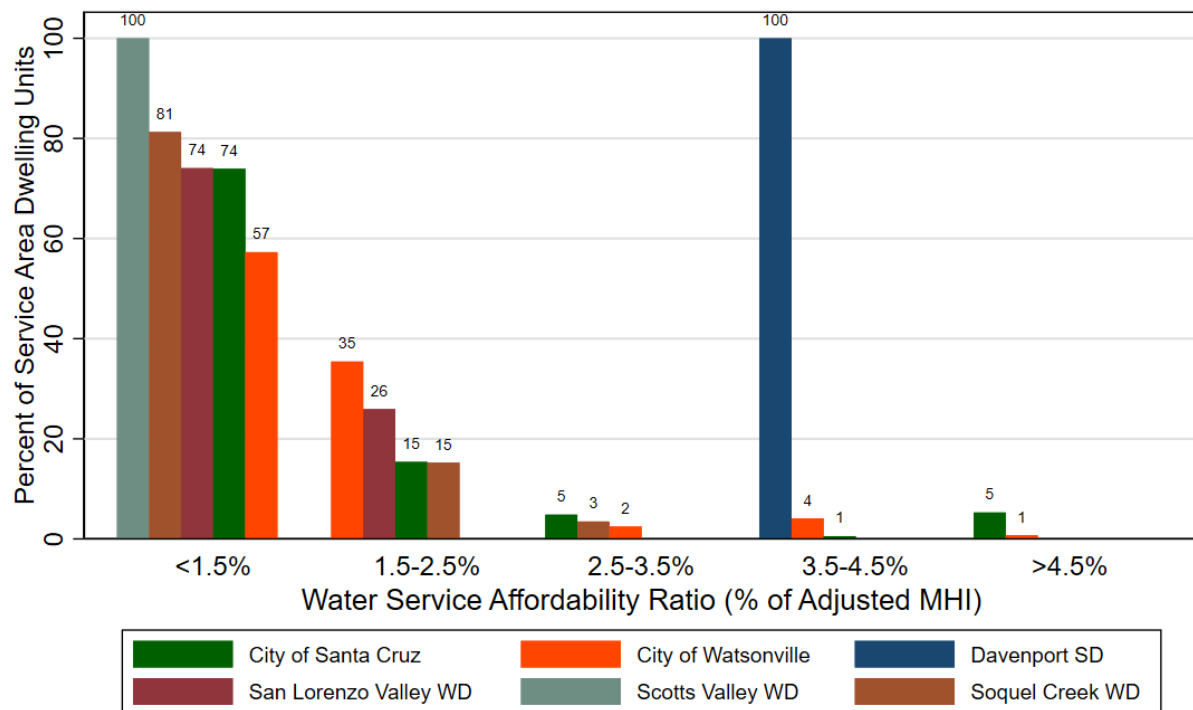
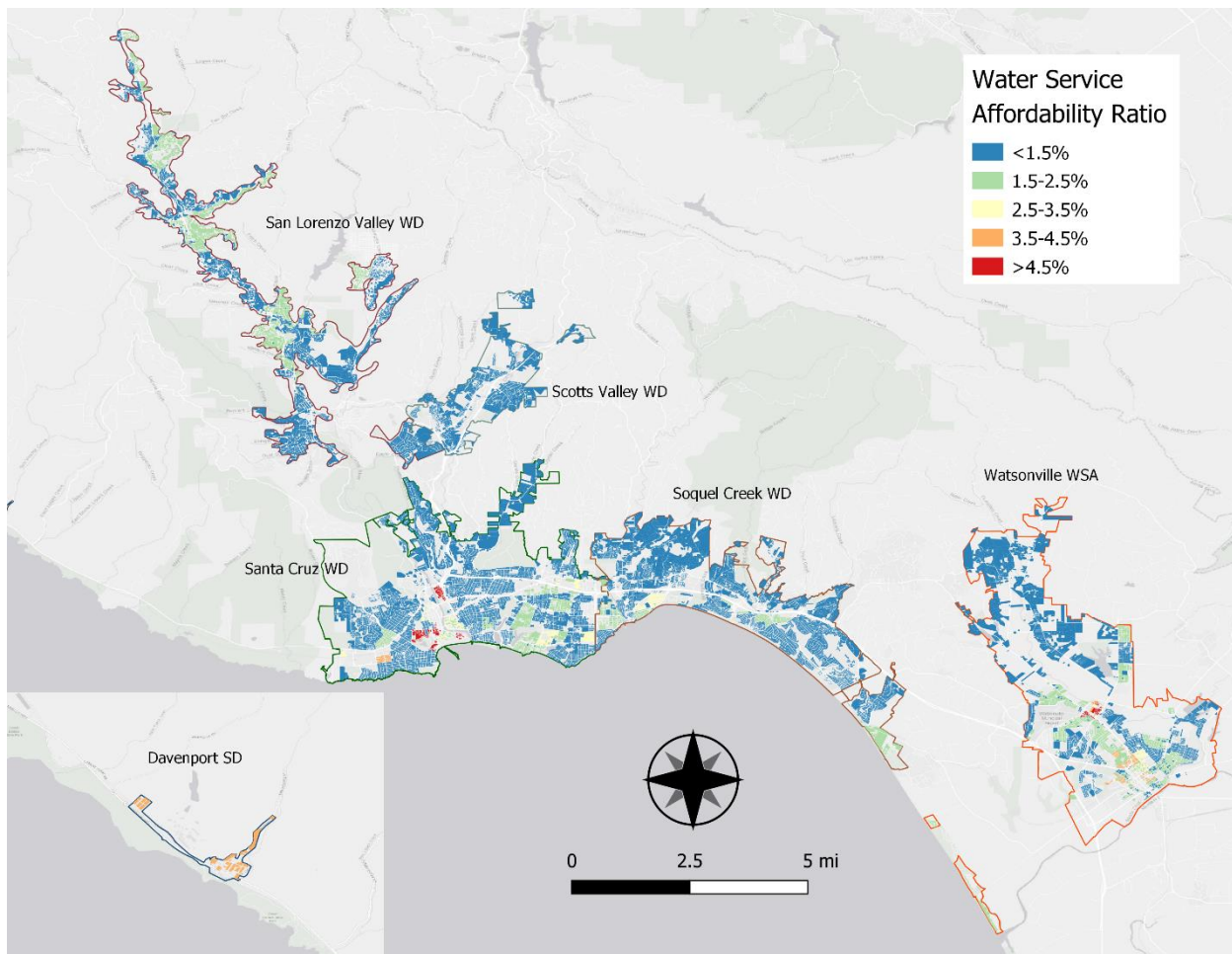


Figure 41. Study Region Water Service Affordability Ratio Distribution



4.8.6 Water & Sewer Service Affordability Ratios

The affordability picture changes significantly when sewer service costs are added to water service costs, as shown in Table 64 and Figure 44. Conventionally, combined water and sewer service is judged affordable if it is less than 4.5% of MHI. This is the case for more than 80% of the region's households, even after adjusting MHI for other housing costs. However, for 18% of households, combined water and sewer costs exceed 4.5% of adjusted MHI. For these households, water and sewer service costs may present affordability challenges.

All the service areas other than Scotts Valley WD have sizable numbers of customers for which combined water and sewer service costs exceed 4.5% of adjusted MHI. In the case of Watsonville and Santa Cruz, customers facing affordability challenges are clustered in the parts of the service area with relatively low income and high housing costs (normalized for income). In the case of San Lorenzo Valley WD and Soquel Creek WD, customers facing affordability challenges are clustered among households with septic systems. In the latter case, it is again important to stress that most customers on septic are not currently incurring these high costs, but rather will incur them at some point in the future when they are required to repair or replace their existing septic system.

Table 64. Study Region Water & Sewer Service Affordability Ratio Distribution by Water Supplier

	Count of Dwelling Units	Water & Sewer AR for EIU				
		<1.5%	1.5-2.5%	2.5-3.5%	3.5-4.5%	>4.5%
City of Santa Cruz	35,306	18.8%	41.7%	14.2%	6.6%	18.6%
City of Watsonville	18,101	7.5%	30.2%	28.2%	15.4%	18.7%
Davenport CSD	103	0.0%	0.0%	0.0%	0.0%	100.0%
San Lorenzo Valley WD	8,273	6.7%	8.4%	7.1%	35.0%	42.9%
Scotts Valley WD	3,849	72.2%	22.8%	3.8%	0.5%	0.7%
Soquel Creek WD	18,880	2.4%	47.7%	30.2%	11.7%	8.0%
Total	84,512	13.9%	36.4%	19.6%	12.1%	17.9%

Figure 42. Study Region Water & Sewer Service Affordability Ratio Distribution

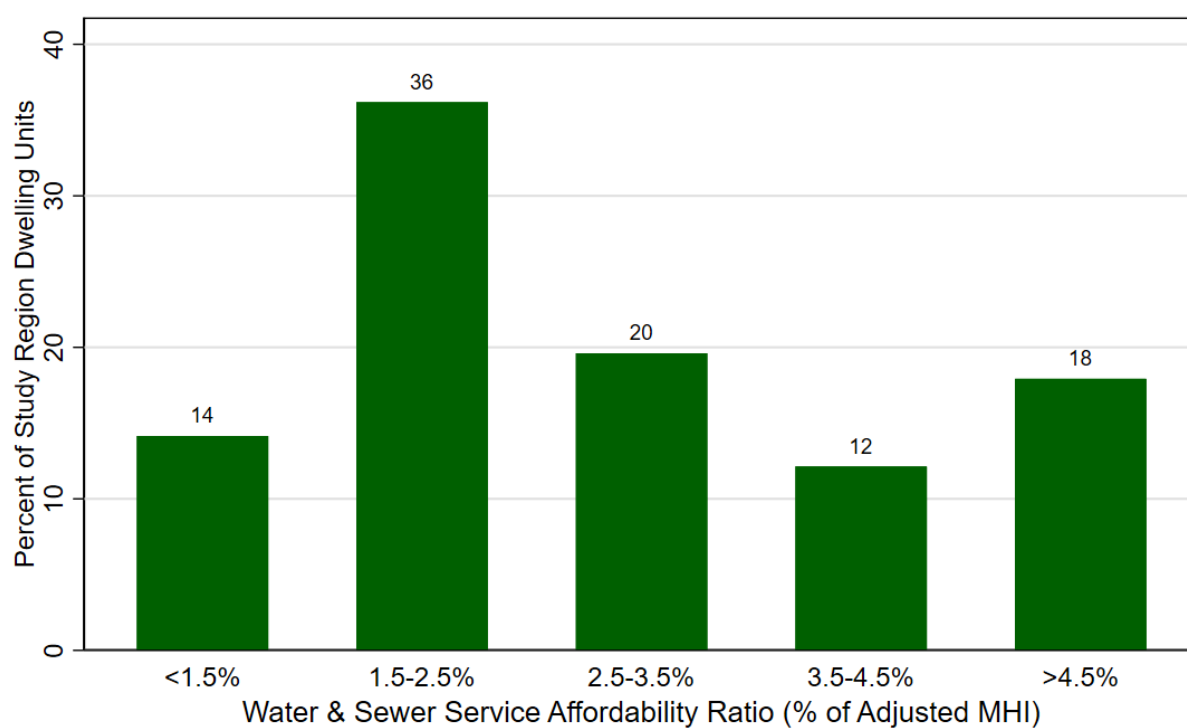


Figure 43. Study Region Water & Sewer Service Affordability Ratio Distribution by Water Supplier

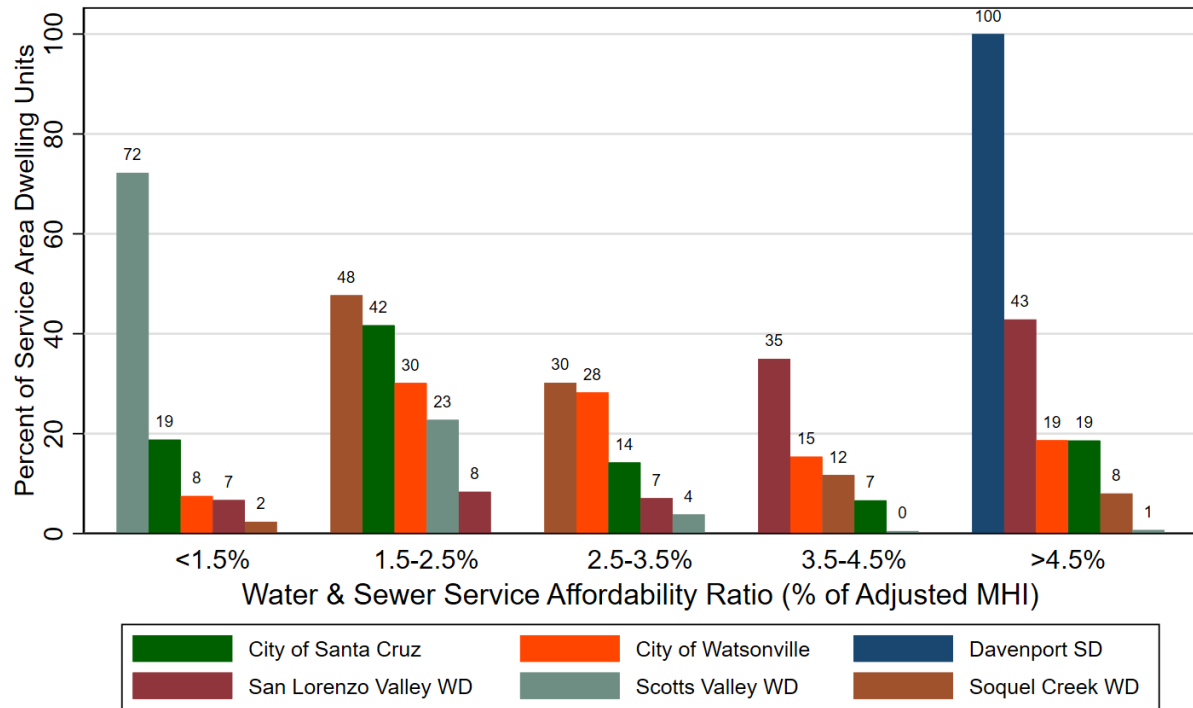
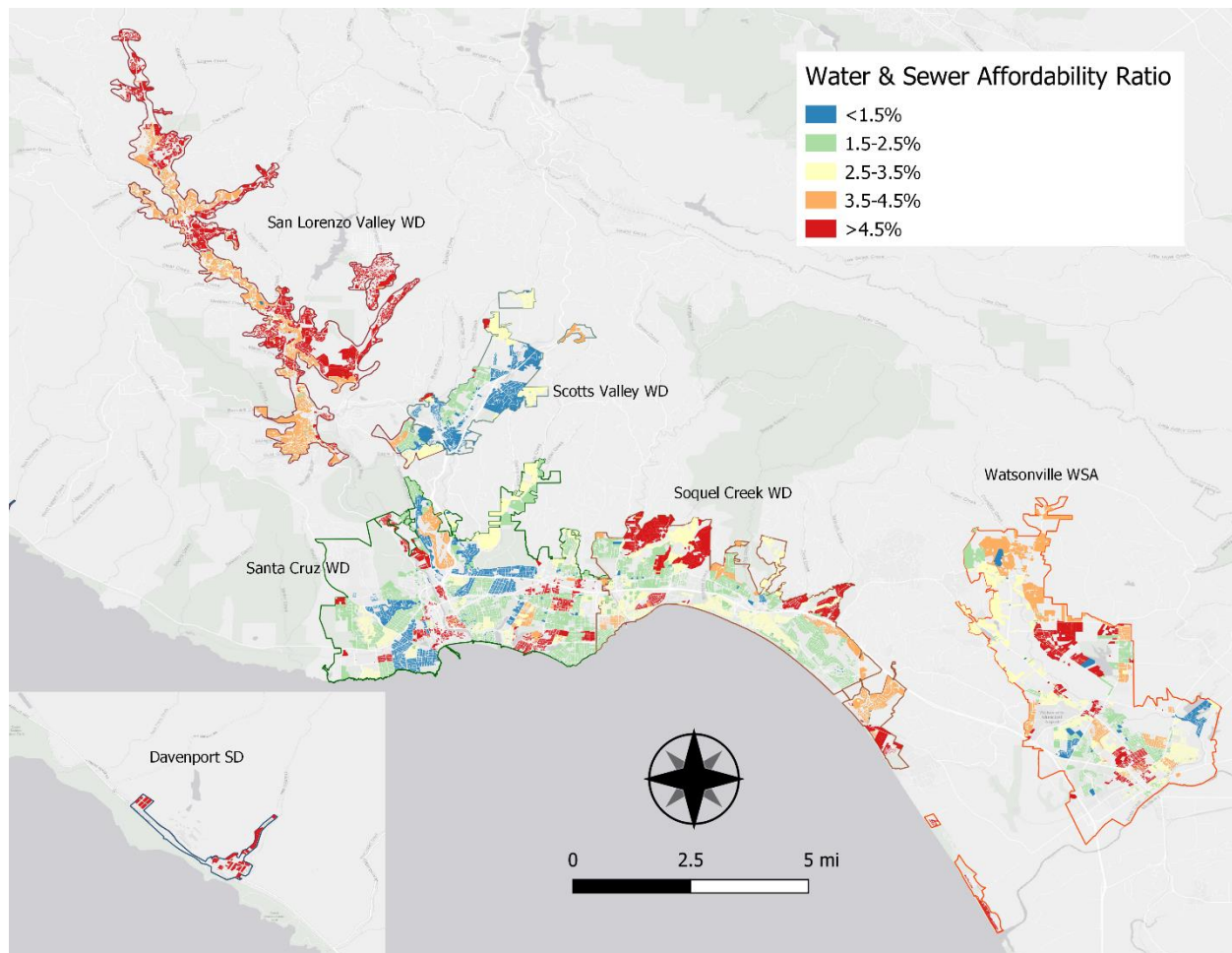


Figure 44. Study Region Water & Sewer Service Affordability Ratio Distribution



4.8.7 Water & Sewer Service Financial Burden Scores

The financial burden score combines information on poverty prevalence (PPI) and the water & sewer service affordability ratio to score the level of financial burden associated with water & sewer service. The majority of households in the study region (74%) have a financial burden score of moderate or lower. The other 26% have a financial burden score of moderate-high or greater, with 14% scored high.

There is considerable variation in financial burden scores between water service areas, as illustrated in Figure 47. For example, in the City of Santa Cruz, Scotts Valley, and Soquel Creek, the majority of households have scores of moderate or less, whereas in the City of Watsonville, Davenport CSD, and San Lorenzo Valley WD, the majority of households have scores of moderate or greater. There is also significant variation within individual service areas, the only exception being Davenport CSD where the financial burden is scored high for the entire service area.

Table 65. Water & Sewer Service Financial Burden Score Distribution by Water Supplier

	Count of Dwelling Units	Financial Burden Score for EIU				
		Low	Low-Moderate	Moderate	Moderate-High	High
City of Santa Cruz	35,306	19.1%	28.9%	28.6%	6.8%	16.6%
City of Watsonville	18,101	5.0%	8.9%	43.5%	16.5%	26.1%
Davenport CSD	103	0.0%	0.0%	0.0%	0.0%	100.0%
San Lorenzo Valley WD	8,273	7.1%	8.4%	41.6%	34.8%	8.2%
Scotts Valley WD	3,849	72.3%	23.3%	3.6%	0.7%	0.0%
Soquel Creek WD	18,880	17.1%	32.6%	36.8%	10.7%	2.9%
Total	84,512	16.9%	23.1%	33.7%	12.2%	14.1%

Figure 45. Study Region Water & Sewer Service Financial Burden Score Distribution

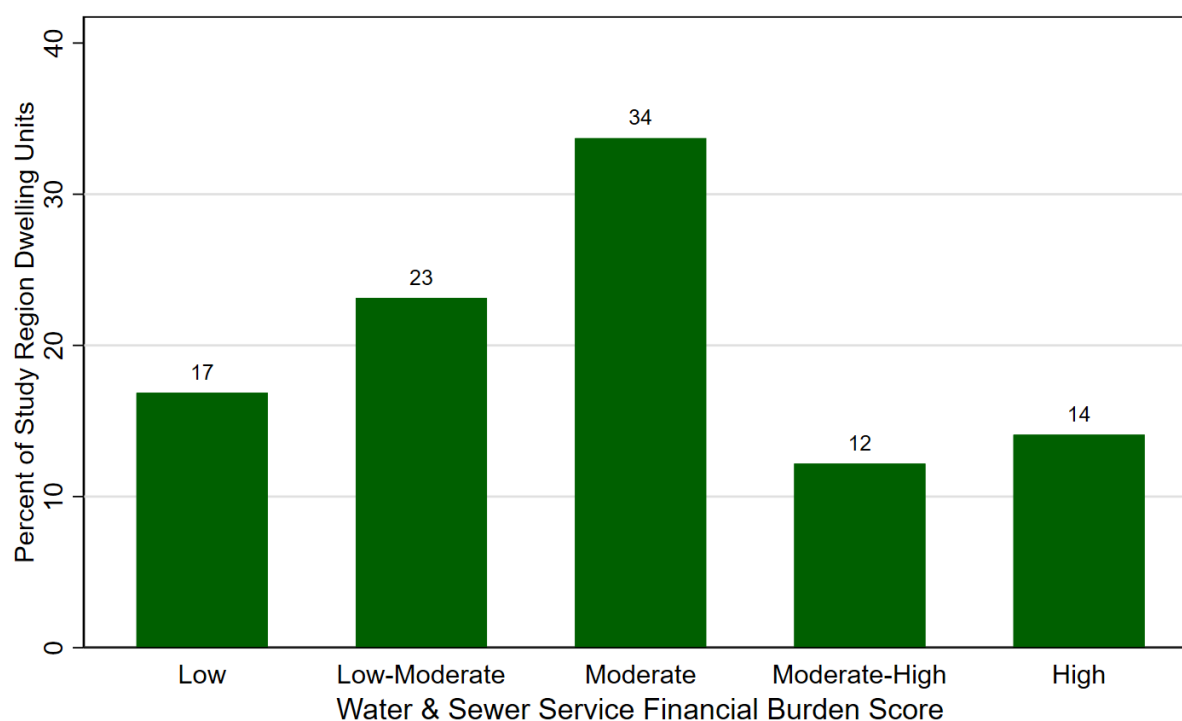


Figure 46. Study Region Water & Sewer Service Financial Burden Score Distribution by Water Supplier

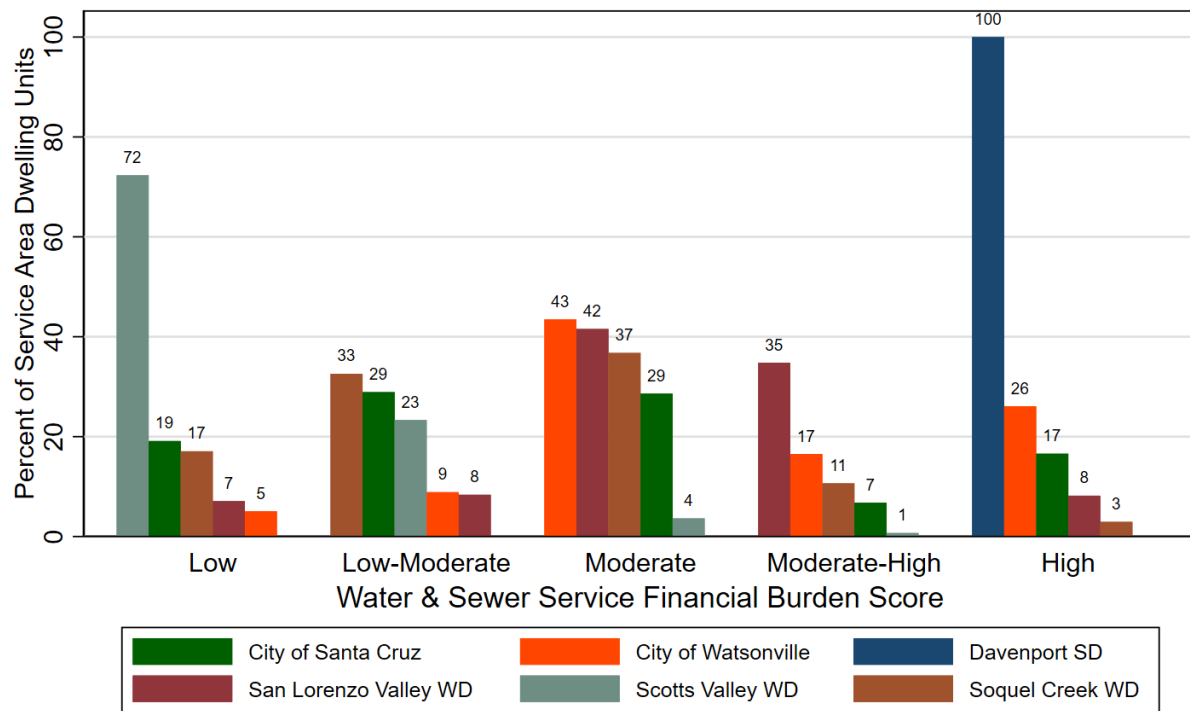
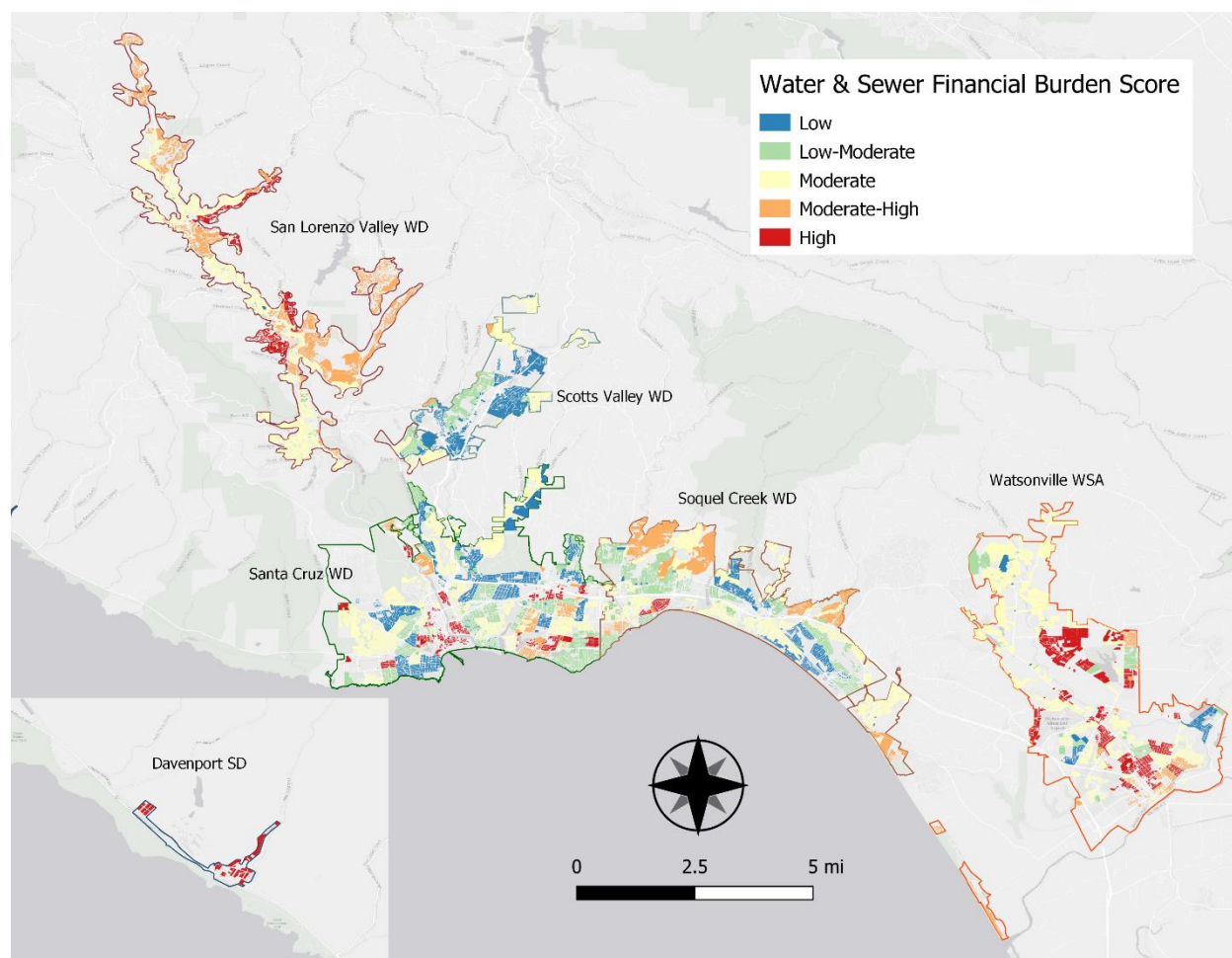


Figure 47. Study Region Water & Sewer Service Financial Burden Score Distribution



4.8.8 Results for Households with Sewer vs Septic

As noted already, septic system costs drive the affordability assessment results in San Lorenzo Valley WD and the parts of Soquel Creek WD and City of Watsonville WSA with high concentrations of households on septic. In this section, affordability metrics for households on sewer and septic are compared.

As seen in Table 66, water and sewer service costs are much more likely to claim a larger share of household income for households on septic. The likelihood that water and sewer costs exceed 3.5% of adjusted MHI is nearly four times greater for households on septic than on sewer. Similarly, households on septic are twice as likely to have received a financial burden score of moderate-high or high as households on sewer. Thus, it is clear that septic system costs tilt the affordability picture away from affordable and toward unaffordable.

Again, however, it is important to stress that most households on septic are not currently incurring these costs, but rather will incur them upon upgrading or replacing their existing system. Given the high costs involved, households may choose to defer doing so for as long as possible. This in turn may have implications for the success of the LAMP in addressing existing septic systems that are contributing to

impairment of county waterbodies due to pathogens and nutrients.³³ This suggests the County and Central Coast Regional Water Quality Control Board may need to consider ways of lessening the LAMP's cost impacts on households with septic, including considering modifications to the standards and providing means-tested financial assistance. Additionally, some parts of the study region, particularly in parts of Soquel Creek Water District may be suitable for conversion to sewer service given their adjacency to existing sewer lines.

Table 66. Sewer vs. Septic Water & Sewer Service Affordability Ratios

	Count of Dwelling Units	Water & Sewer AR for EIU				
		<1.5%	1.5-2.5%	2.5-3.5%	3.5-4.5%	>4.5%
Sewer	71,423	16.1%	42.0%	21.1%	7.5%	13.2%
Septic	13,089	2.1%	5.7%	11.3%	37.4%	43.5%
Total	84,512	13.9%	36.4%	19.6%	12.1%	17.9%

Table 67. Sewer vs. Septic Water & Sewer Service Financial Burden Scores

	Count of Dwelling Units	Financial Burden Score for EIU				
		Low	Low-Moderate	Moderate	Moderate-High	High
Sewer	71,423	19.6%	26.2%	31.4%	7.9%	14.9%
Septic	13,089	2.1%	6.3%	46.3%	35.3%	9.9%
Total	84,512	16.9%	23.1%	33.7%	12.2%	14.1%

³³ See, for example, Section 2.3.2 of the LAMP for discussion of the impact of existing septic systems on impair and vulnerable waterbodies in the county.

Figure 48. Sewer vs. Septic Water & Sewer Service Affordability Ratios

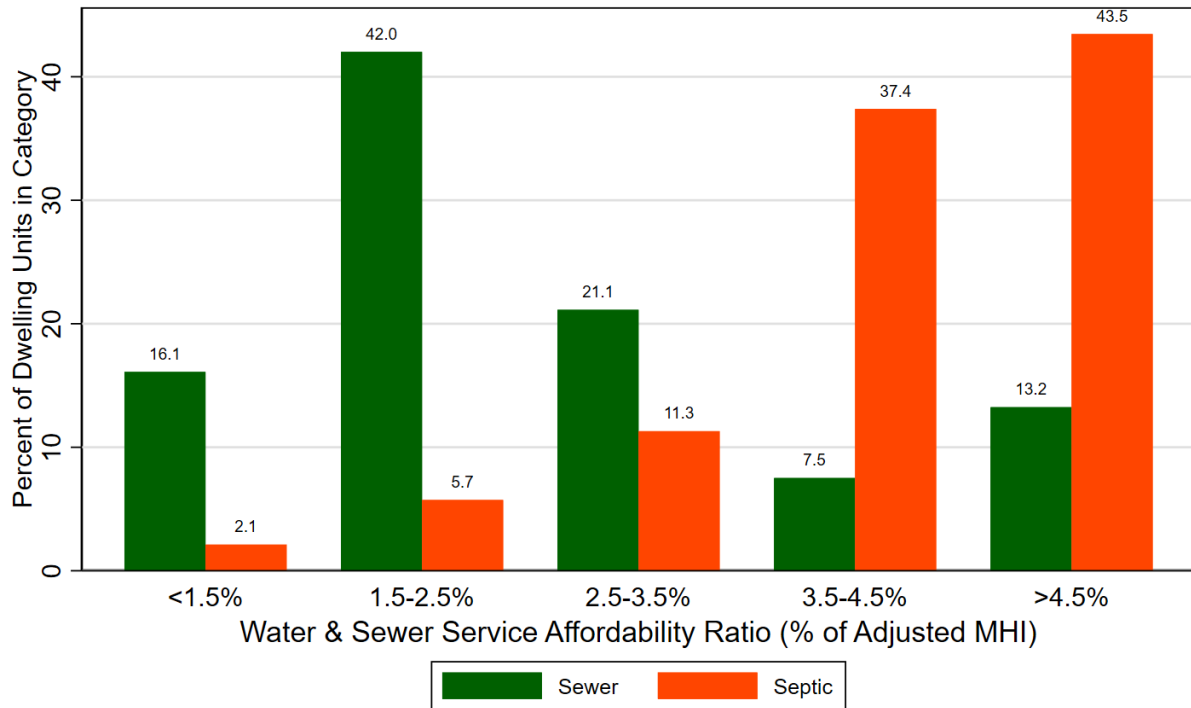
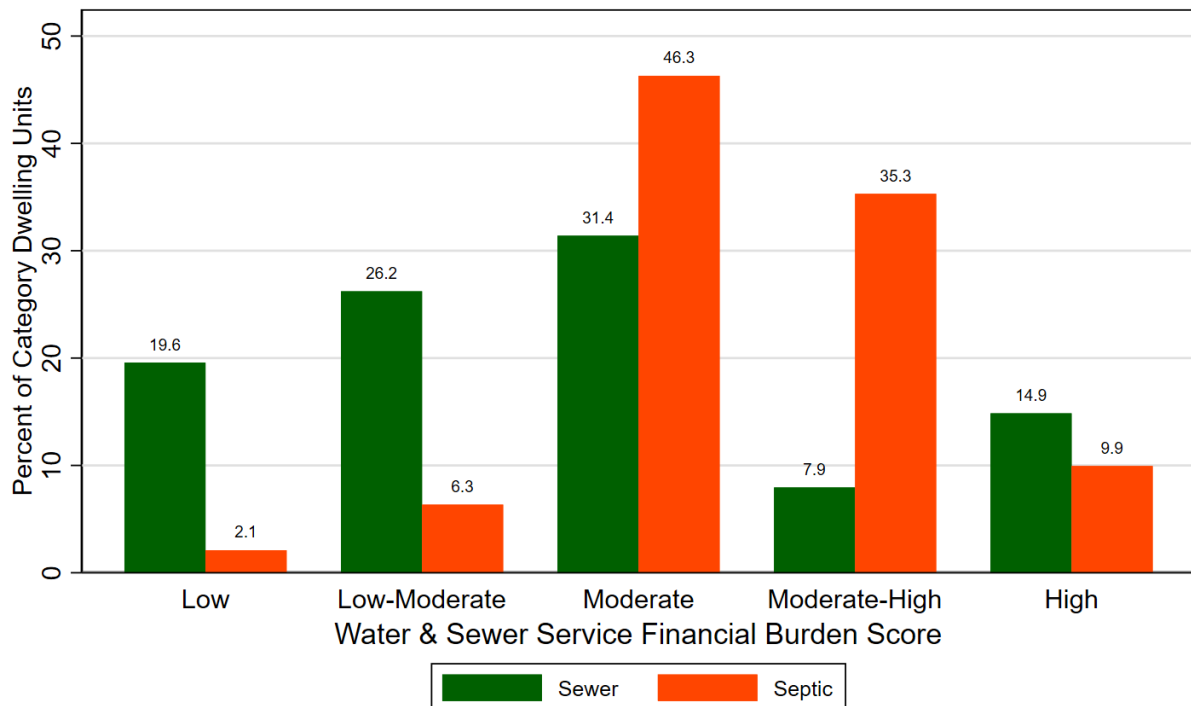


Figure 49. Sewer vs. Septic Water & Sewer Service Financial Burden Scores



4.8.9 Results for Households in DAC vs Non-DAC Block Groups

There is considerable policy interest at the local, regional, and state level in the affordability of water and sewer service for households in DAC-designated regions. In this section, affordability metrics for households in DAC and non-DAC census block groups are compared.

While water service can be deemed affordable for the majority of households regardless of DAC status, households for which water service cost exceeds 2.5% of adjusted MHI cluster in DAC block groups, as seen in Table 68. It is also true that the likelihood that water and sewer service costs exceed 4.5% of adjusted MHI is nearly five times greater for households in DAC block groups than for those in non-DAC block groups, as shown in Table 69. The financial burden scores exhibit an even greater disparity. Households in DAC block groups are 15 times more likely to receive a high financial burden score than are households in non-DAC block groups, as shown in Table 70. Thus, it is clear that households in DAC block groups are much more likely to face water and sewer service affordability challenges than are households in non-DAC areas.

However, it is not the case that water and sewer service affordability is exclusively a DAC issue. This is illustrated for the entire region in Figure 52 which shows households in DAC and non-DAC block groups that received high financial burden scores for water and sewer service. As seen in the figure, there are clusters of non-DAC households in the San Lorenzo Valley WD, City of Santa Cruz, and City of Watsonville service areas that nonetheless are confronting water and sewer service affordability challenges. Figure 55, Figure 56, and Figure 57 provide more detailed pictures for City of Santa Cruz and City of Watsonville where there are several clusters of households in non-DAC block groups with moderate-high and high financial burden scores.

Table 68. Water Service Affordability Ratios for DAC and Non-DAC Households

	Count of Dwelling Units	Water AR for EIU				
		<1.5%	1.5-2.5%	2.5-3.5%	3.5-4.5%	>4.5%
Not DAC	64,196	86.4%	13.5%	0.1%	0.0%	0.0%
DAC	17,071	23.8%	46.9%	14.1%	6.1%	9.2%
Total	81,267	73.3%	20.5%	3.0%	1.3%	1.9%

Table 69. Water & Sewer Service Affordability Ratios for DAC and Non-DAC Households

	Count of Dwelling Units	Water & Sewer AR for EIU				
		<1.5%	1.5-2.5%	2.5-3.5%	3.5-4.5%	>4.5%
Not DAC	64,196	17.9%	42.4%	19.8%	10.4%	9.5%
DAC	17,071	0.3%	15.5%	18.0%	19.1%	47.2%
Total	81,267	14.2%	36.7%	19.4%	12.3%	17.4%

Table 70. Water & Sewer Service Financial Burden Scores for DAC and Non-DAC Households

	Count of Dwelling Units	Financial Burden Score for EIU				
		Low	Low-Moderate	Moderate	Moderate-High	High
Not DAC	64,196	22.2%	27.8%	36.8%	10.0%	3.3%
DAC	17,071	0.0%	5.2%	20.4%	22.7%	51.8%
Total	81,267	17.5%	23.0%	33.4%	12.6%	13.4%

Figure 50. Water Service Affordability Ratios for DAC and Non-DAC Households

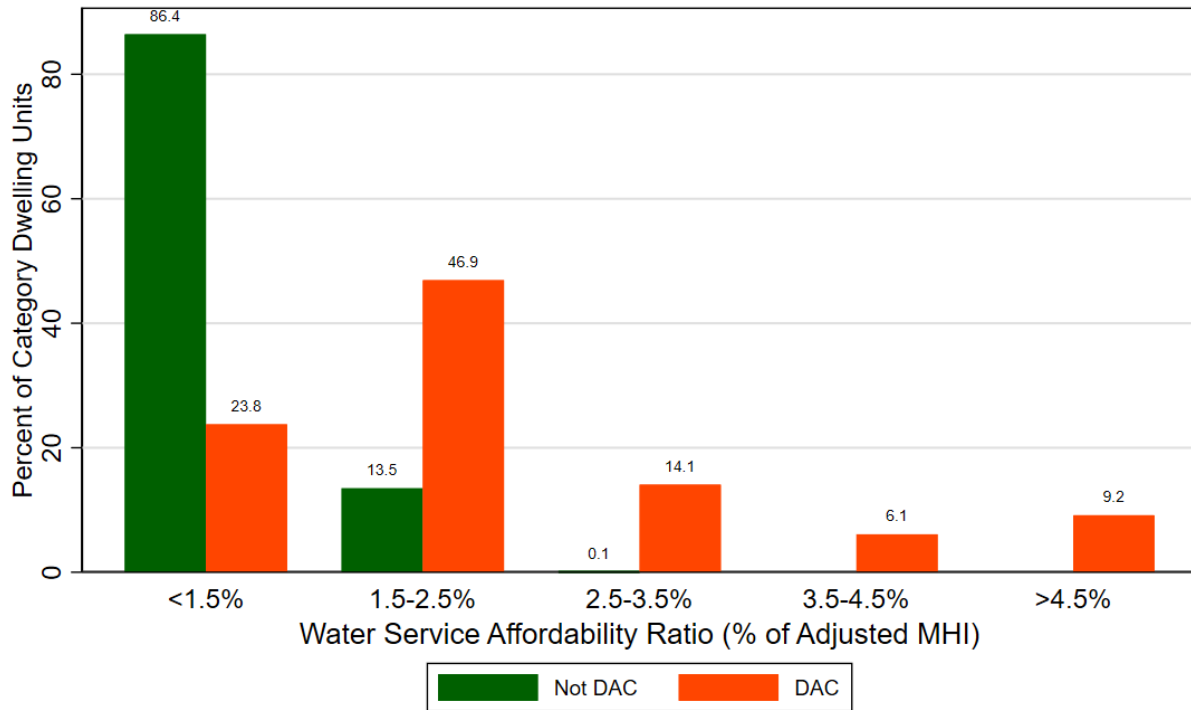


Figure 51. Water & Sewer Service Affordability Ratios for DAC and Non-DAC Households

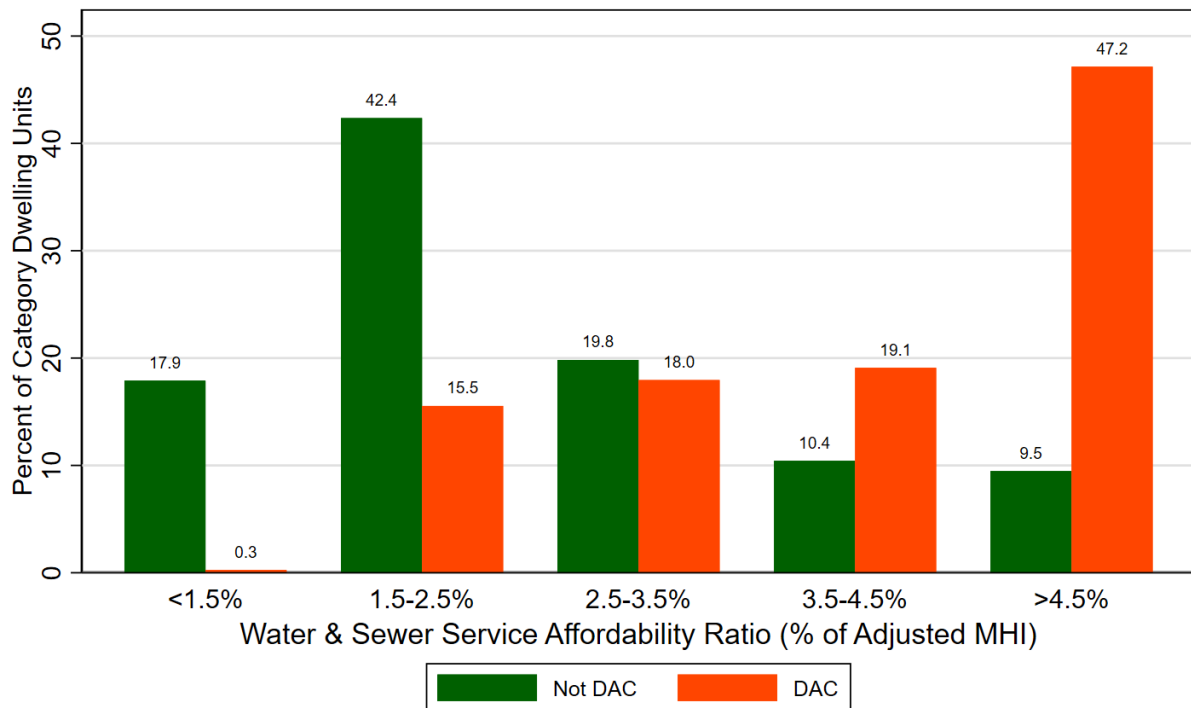


Figure 52. Water & Sewer Service Financial Burden Scores for DAC and Non-DAC Households

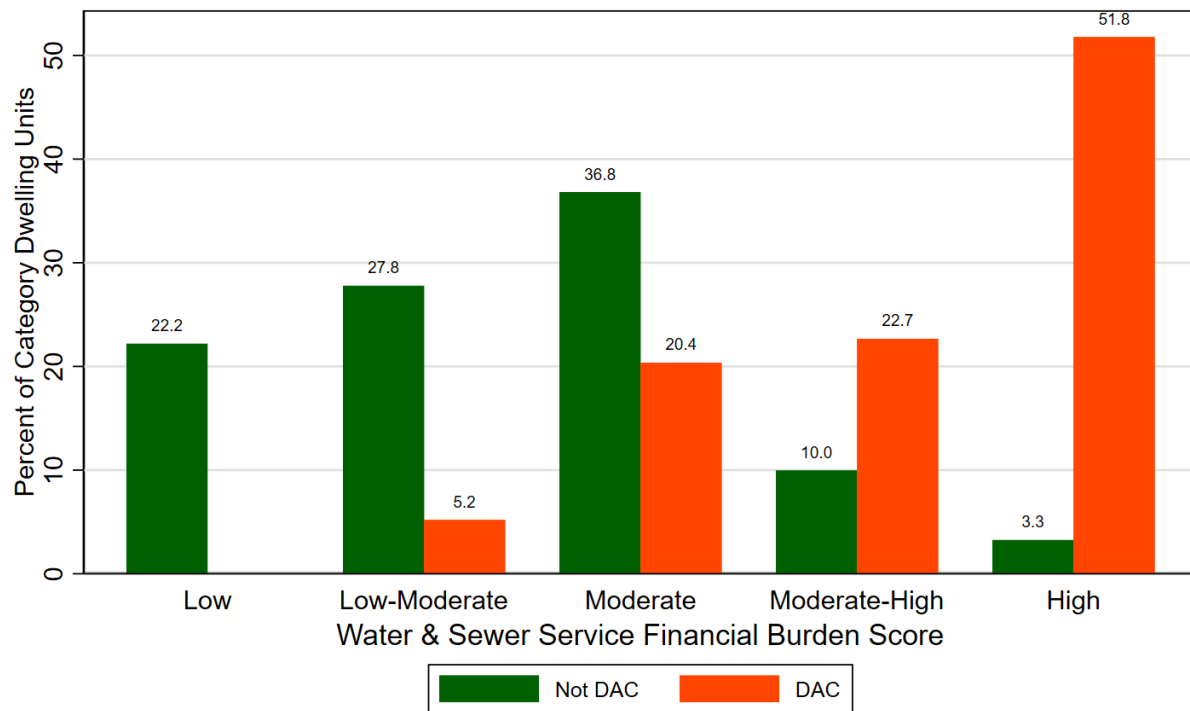


Figure 53. Map of Water & Sewer Service Financial Burden Scores for DAC Households

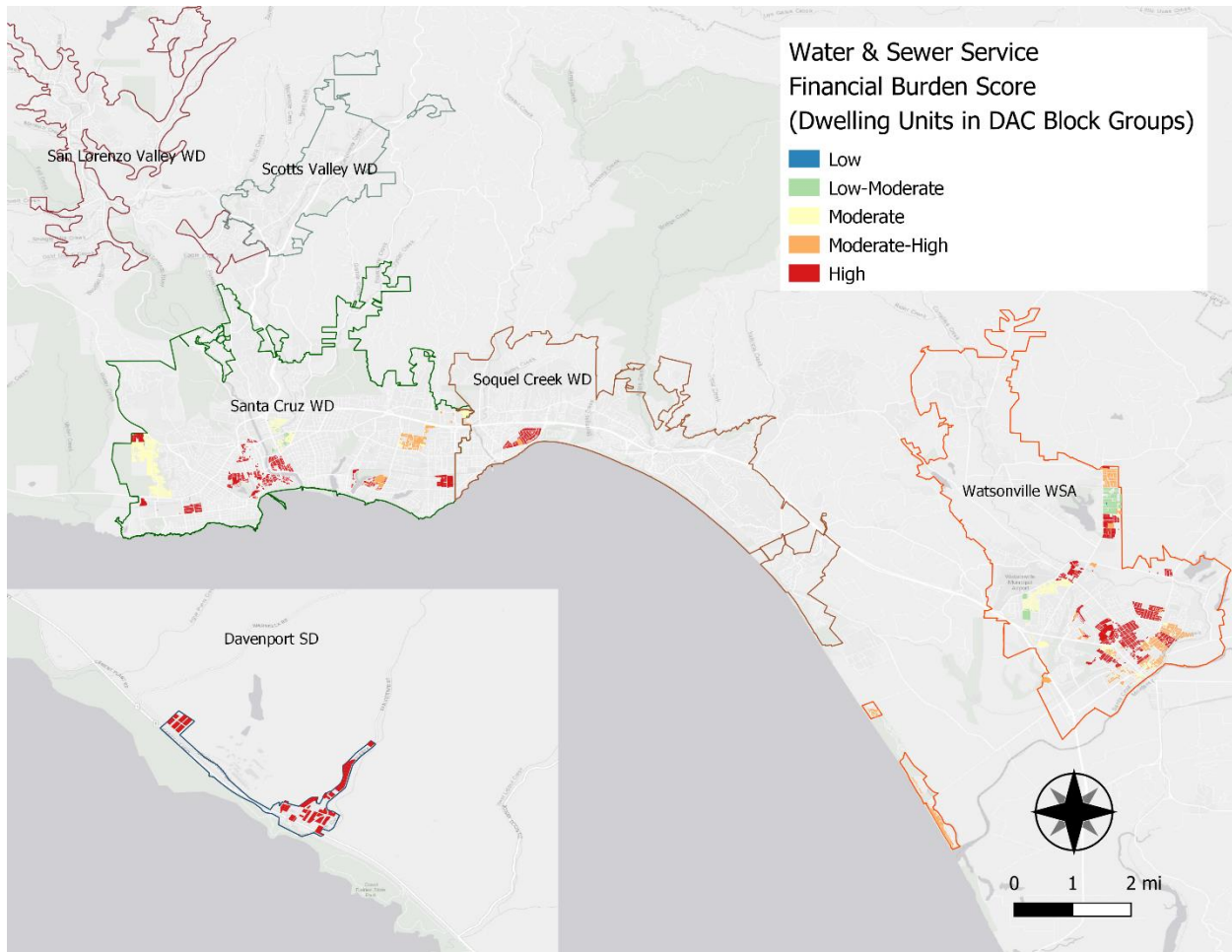


Figure 54. Map of DAC and Non-DAC Households with High Financial Burden Score

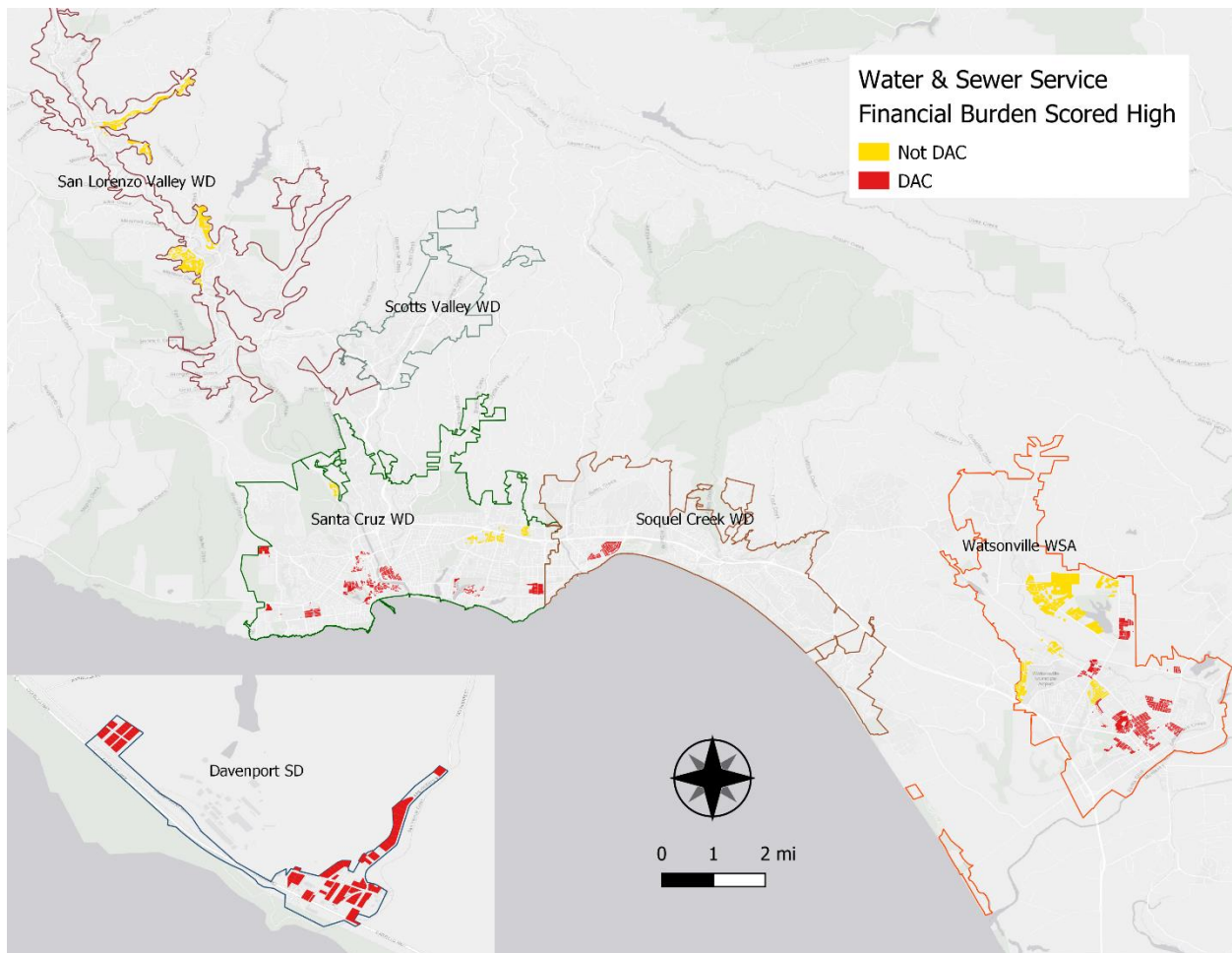


Figure 55. DAC Census Block Groups and Financial Burden Scores in Santa Cruz WD Service Area

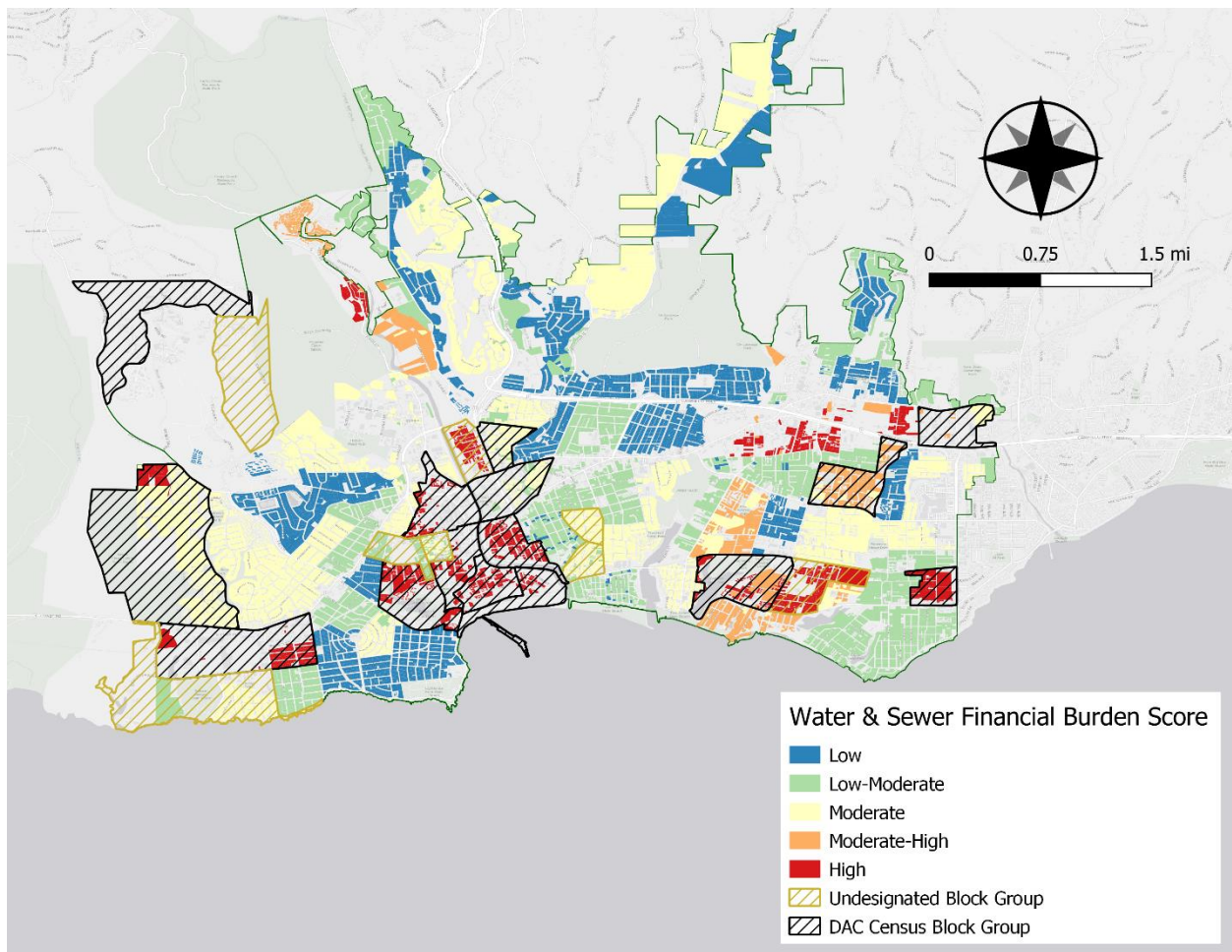


Figure 56. DAC Census Block Groups and Financial Burden Scores in City of Watsonville WSA

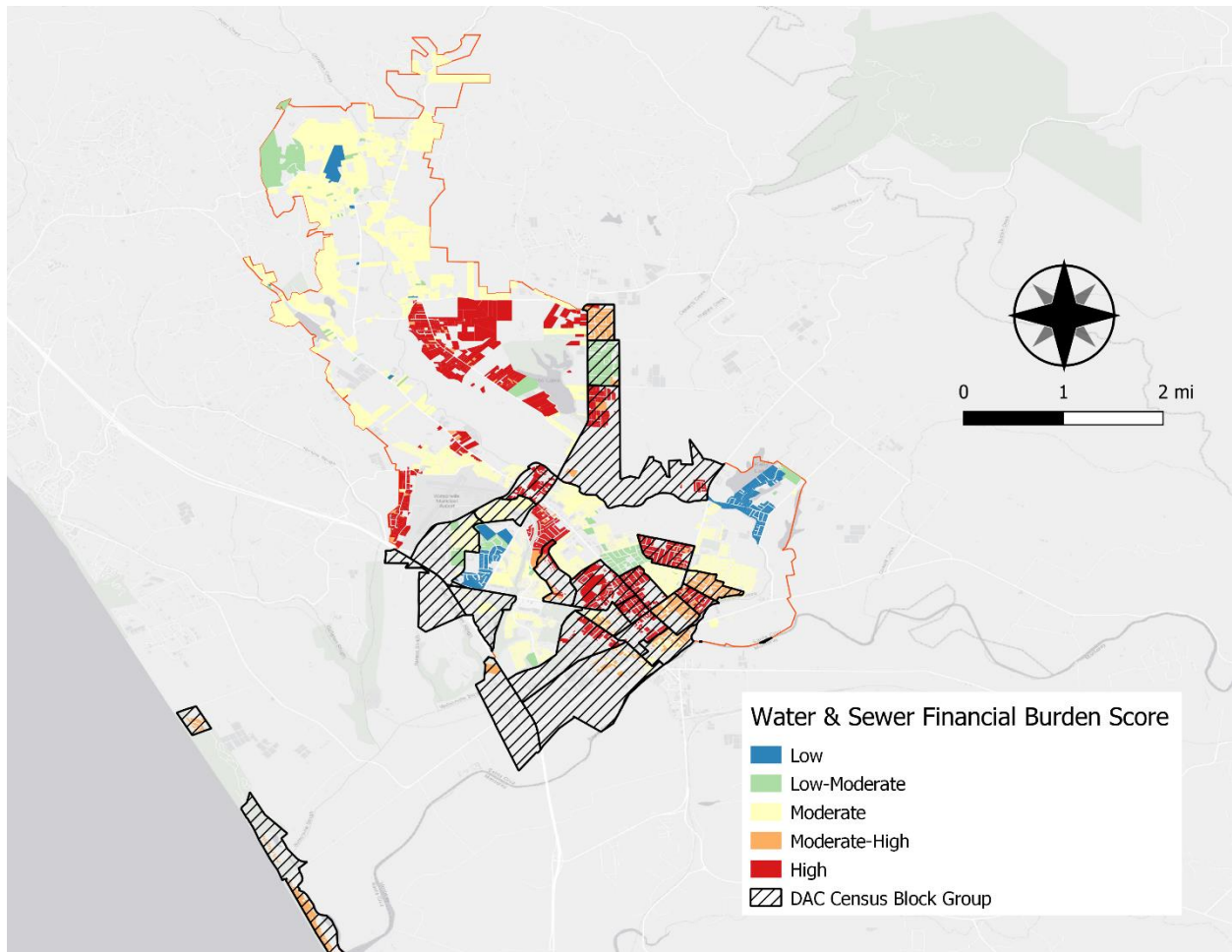
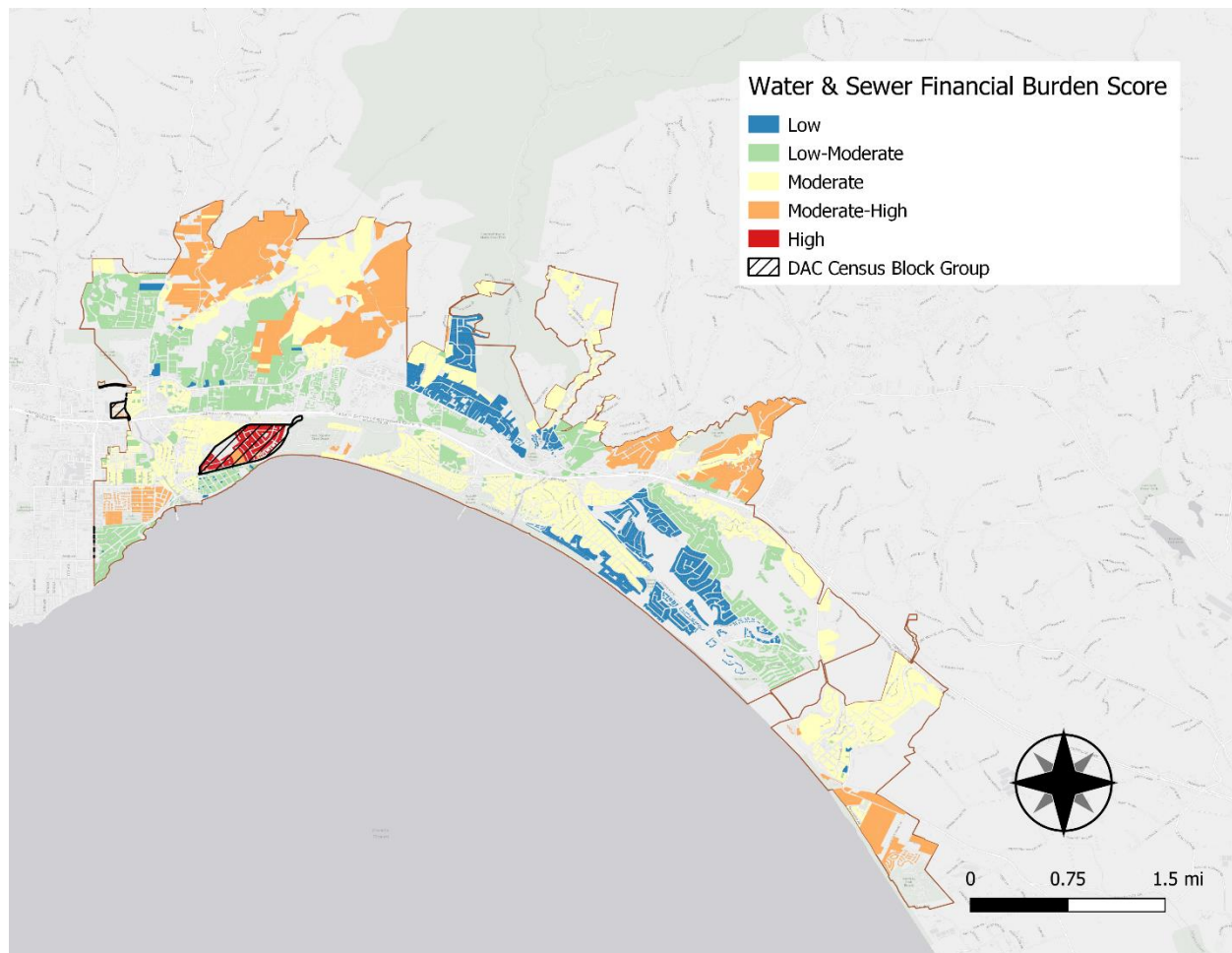


Figure 57. DAC Census Block Groups and Financial Burden Scores in Soquel Creek WD



4.9 Impact of Future Water & Sewer Rate Increases on Affordability Assessment Results

This affordability assessment is based on water and sewer service rates and charges in effect as of July 1, 2021. In this respect, it provides a snapshot of the current water and sewer service affordability in the study region. However, water and sewer service rates have been escalating faster than inflation in recent years and this trend is projected to continue. Several of the water and sewer service providers in the study region have either adopted or notified customers of proposed rate increases, as summarized in Table 71.

Sustained rate increases can be expected to erode utility service affordability unless increases in household income keeps pace. Over the last 10 years, MHI in California has increased at an average rate of 3.6% annually.³⁴ Assuming a typical household in the study region with income increasing at this rate,

³⁴ <https://fred.stlouisfed.org/series/MEHOINUSCAA646N>

Table 72 gives an illustrative example of the effect of a 40% increase in combined water and sewer costs between FY 2021 and FY 2026. Under this scenario, EIU water service cost goes from 1.5% to 1.8% of adjusted MHI while combined water and sewer service cost goes from 3% to 3.5%.

Results for actual households in the study region, of course, will vary from this stylized example depending on the differential rates of growth in household income and housing costs across census block groups, as well as the differential rates of increase in water and sewer costs across the various service providers. Given this, it will be important to reassess water and utility service affordability at regular intervals in order to understand how the affordability picture is changing over time.

Table 71. Water & Sewer Service Provider Proposed Rate Increases

Service Provider	Projected Rate Increase	Source of Estimate
Santa Cruz Water Department	Proposed 55% increase in cost of water service between FY 2021 and FY 2026 for single-family customer with 5/8" meter consuming 4 CCF/month	Draft Proposition 218 Notice of Proposed Rates. ³⁵
City of Santa Cruz Public Works Dept.	Adopted 20% increase in cost of residential sewer service between FY 2021 and FY 2024	Sewer Rate Schedule for FY 2019-FY2024. ³⁶
Scotts Valley WD	Proposed 28% increase in cost of residential water service between FY 2021 and FY 2026	Draft Water and Recycled Water Rate Study. ³⁷
City of Scotts Valley Public Works Dept.	Proposed 41% increase in cost of residential sewer service between FY 2021 and FY 2026	City of Scotts Valley City Council Staff Report, June 6, 2021. ³⁸
City of Watsonville	Adopted 44% increase in cost of residential sewer service between FY 2021 and FY 2026	City of Watsonville Water, Wastewater, and Solid Waste Rate Study Final Report, April 13, 2021. ³⁹

³⁵

<https://ecm.cityofsantacruz.com/OnBaseAgendaOnline/Documents/ViewDocument/PROP%20218%20NOTICE%20UPDATED.PDF.pdf?meetingId=1767&documentType=Agenda&itemId=17553&publishId=23095&isSection=false>

³⁶ <https://www.cityofsantacruz.com/government/city-departments/public-works/wastewater-treatment-facility/sewer-rate-table>

³⁷

https://www.svwd.org/sites/default/files/documents/reports/DRAFT_Water_and_Recycled_Water_Rate_Study_2021.pdf

³⁸ https://www.scottsvally.org/AgendaCenter/ViewFile/Agenda/_06162021-600

³⁹ https://www.cityofwatsonville.org/DocumentCenter/View/15948/Watsonville_Rate_Study_Report-2021-04-13_FINAL

Table 72. Income and Utility Rate Escalation Effect on Utility Service Affordability Ratios

Fiscal Year	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026
MHI	87,000	90,132	93,377	96,738	100,221	103,829
MHC (% of MHI)	25%	25%	25%	25%	25%	25%
ElU Cost						
Water (\$/Yr)	1,000	1,080	1,160	1,240	1,320	1,400
Sewer (\$/Yr)	1,000	1,080	1,160	1,240	1,320	1,400
AR Water	1.5%	1.6%	1.6%	1.7%	1.7%	1.8%
AR Water & Sewer	3.0%	3.1%	3.2%	3.3%	3.4%	3.5%

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Appendix A Water & Sewer Cost Calculation

Water and sewer service costs are based on the rates and charges in effect July 1, 2021. Water service meter charges and commodity rates by supplier are provided in Tables A1 and A2, respectively. Sewer rates are provided in Table A3. The meter charge for parcels with one dwelling unit (see Appendix C) is based on the 5/8" meter charge. The meter charge for parcels with multiple dwelling units is based on the number of dwelling units according to the schedule in Table A4. Meter sizes in Table A4 were determined using customer-level billing data for the Santa Cruz WD.

Table A1. Meter Charges (\$/Month)

	Meter Size				
	5/8"	3/4"	1"	1.5"	2"
Santa Cruz WD					
Inside-City	11.26	11.26	12.44	13.61	16.85
Outside-City	12.89	12.89	14.25	15.60	19.30
City of Watsonville					
Inside-City	28.76	28.76	57.11	104.37	161.07
Outside-City	33.78	33.78	69.65	129.46	201.22
San Lorenzo Valley WD	33.66	33.66	50.45	92.43	142.90
Scotts Valley WD	67.58 (SFR)				
	42.95	54.64 (MFR)	72.70	170.84	231.97
Soquel Creek WD	44.04	44.04	99.34	191.50	467.97
Davenport CSD*	152.61	152.61	152.61	152.61	152.61

* Davenport CSD charges a flat annual rate of 1,831.30 (or equivalently 152.61/mo.) for water service regardless of meter size.

Table A2. Water Supplier Commodity Rates

	\$/CCF
Santa Cruz WD Inside-City*	
0-5 CCF	10.60
6-7 CCF	12.58
8-9 CCF	14.64
Santa Cruz WD Outside-City*	
0-5 CCF	12.03
6-7 CCF	14.32
8-9 CCF	16.71
City of Watsonville	
0-6 CCF	3.95
7-12 CCF	5.17
San Lorenzo Valley WD	
All Units	12.06
Scotts Valley WD	
0-8 CCF	5.26
Soquel Creek WD	
0-6 CCF	7.65
> 6 CCF	34.69
Davenport CSD	
All Units	0.00

* Does not include elevation surcharge for pressure zones 180 feet above sea level.

Table A3. Sewer Charges

	\$/Month
Santa Cruz Public Works	
Single Family	54.00
Multi Family, per unit	44.20
City of Watsonville	
All dwelling units	46.06
San Lorenzo Valley WD	
Bear Creek Estates	257.47
City of Scotts Valley Public Works	
Single Family	50.67
Multi Family, per unit	35.49
Mobile Home	33.81
Santa Cruz County SD	
Single Family	70.58
Multi Family, per unit	60.98
Mobile Home	52.35
CSA No. 2 Place de Mer	
Condo	112.77
Multi Family, per unit	104.86
CSA No. 5 Sand Dollar/Cannon del Sol	
Single Family	156.78
Condo	131.47
CSA No. 10 Rolling Woods/Woods Cove Zone	
Single Family	26.24
CSA No. 20 Trestle Beach	
Single Family	310.50
Freedom CSD	
Single Family	57.90
Multi Family, per unit	37.81
Mobile Home	58.40
Salsipuedes CSD	
Single Family	60.83
Multi Family, per unit	45.62
Davenport CSD	
All dwelling units	222.00

Table A4. Meter Charge for Parcels with Multiple Dwelling Units

Parcel Dwelling Unit Count	Water Cost Based on Meter Charge for...
2-5	5/8" meter
6-15	1" meter
16-50	1.5" meter
>50	2" meter

Appendix B Septic System Cost Calculation

The expected costs for wastewater disposal using an onsite wastewater treatment system (OWTS), also known as a septic system, were calculated considering the new standards in the County's Local Agency Management Program (LAMP), known constraints to use of conventional OWTS, past history of OWTS upgrades, and extrapolation to larger areas of the county. For this project, it is assumed that at some time in the next 40 years an existing system would need to be replaced or upgraded due to old age and system failure or desire by the property owner to remodel their home or add an accessory dwelling unit, which requires that the system be brought up to current standards. New systems on undeveloped parcels are not addressed, as the rate of new development using OWTS is very low (10-30/year) compared to the 28,000 existing dwelling units served by OWTS in Santa Cruz County. It is expected that the proportion of conventional vs enhanced treatment OWTS for new development would be similar to the proportion of projected upgrades.

Santa Cruz County Environmental Health maintains a database of OWTS, which includes information on OWTS characteristics and site constraints such as stream setback, depth to shallow groundwater, limiting soil conditions (clay or sand), and parcel size. This database is relatively complete for the San Lorenzo Watershed but is much more limited for other parts of the county with system information only for OWTS installed since 1990. This database was used in 1995 to project the types of OWTS upgrades in the San Lorenzo Watershed that would be required to meet the standards in place at that time. For the current project, that algorithm was updated to reflect the more stringent standards of the LAMP and also reflect the type of system upgrades that have taken place since 1995 in the San Lorenzo Watershed and the rest of the county. Based on that algorithm and best professional judgement, estimates were made of the percentage of system upgrades that would fall into one of the three following categories:

- **Conventional Upgrade:** Parcel characteristics will allow the OWTS to be replaced/upgraded using a conventional septic tank and dispersal trench that meets all the requirements in the LAMP for stream setback, groundwater separation, soil percolation, slope, dispersal depth, and dispersal size.
- **Upgrade using Enhanced Treatment:** Where parcels cannot meet current standards for a conventional system the constraints can often be mitigated using enhanced treatment, and/or alternative dispersal methods such as pressurized drip dispersal or a mounded bed. Under the LAMP, enhanced treatment is required for reduced groundwater separation, reduced stream setback, clay soils, sandy soils, deep dispersal (including seepage pits), or reduced dispersal area. Enhanced treatment systems typically cost 2-3 times more than a conventional system.
- **Low-Flow or Nonconforming Systems:** There may be situations where an existing system is failing, the parcel cannot meet conventional standards, but the property owner cannot afford the cost of an enhanced treatment system. The LAMP allows the use of smaller, low flow conventional systems, or interim nonconforming systems that have an improved level of water quality protection, but that ultimately should use enhanced treatment to fully meet standards. These systems do need to be upgraded to meet standards at the time of property sale or building remodel.

Projected costs of the various types of system upgrades were developed by staff of Santa Cruz County Environmental Health by soliciting input from a number of local OWTS designers, installers, and service providers. Their anonymity has been maintained in order to secure their candid responses. Costs vary greatly depending on the specific site conditions and difficulty in obtaining a permit. Following is a table

showing the range of costs for the various steps of different types of system upgrades, along with the “typical” cost that was used in making area-wide cost projections. The costs for repair of a failing system may be somewhat lower, with a reduced permit fee and reduced design costs, but there is not likely a significant savings if the site is challenging.

Table B1. Typical Upgrade Component Costs

<u>Upgrade Component</u>	<u>Range in Cost</u>	<u>Typical Cost</u>
Site Assessment	2000-8000	7,000
Conventional Design and Support	3000-6200	5,000
Enhanced Design and Support	3000-8000	7,000
Installation Tank Only	10,000-20,000	15,000
Installation Conventional Dispersal Only	10,000-20,000	15,000
Installation Enhanced Treatment System	50,000-80,000	60,000
Annual Enhanced System Servicing	300-550	500
Tank Pumping (Every 5-7 years)	500-600	550

Annualized costs for different types of system upgrades are shown in Table B2. Installation costs are amortized over a 40-year useful life at a 3% interest rate. Table B3 gives the weighted-average annual cost for each water supplier based on expected percentages of each upgrade type.

There are a small number of multi-family and mobile home park parcels within the County’s Septic Maintenance District. It is assumed these parcels have septic systems. Cost per dwelling unit is scaled by the square root of the number of dwelling units on the parcel to account for scale economies of larger septic systems. Thus, septic system cost for a parcel with 10 units is assumed to be about three times the cost for a single-family system while cost for a parcel with 20 units is assumed to be about 4.5 times the cost for a single-family system.

Table B2. OWTS Annual Cost Estimates

System Upgrade	Site Evaluation	Design/ Support	Permit	Installation	Total Install Cost	Annualized Install Cost	Annual OSSP	Annual Permit	Annual Other	Total Annual Cost
Tank Only	0	0	1,254	15,000	16,254	703	0	25	100	828
Conventional Upgrade	7,000	5,000	3,277	25,000	40,277	1,742	0	25	100	1,867
Enhanced upgrade	7,000	7,000	4,352	60,000	78,352	3,390	500	167	200	4,257
Enhanced repair	5,000	6,000	2,038	50,000	63,038	2,727	500	167	200	3,594
Conventional Repair	3,000	5,000	1,223	20,000	29,223	1,264	0	25	100	1,389
Low Flow/Nonconforming Repair	3,000	4,000	1,223	15,000	23,223	1,005	0	101	100	1,206

Annualized installation cost based on amortized installation cost over 40-year useful life at 3% interest.

Table B3. OWTS Annualized Upgrade Cost by Water Supplier

System Upgrade	Based on Records of Previous Upgrades and Replacements	SLVWD/ Scotts Valley WD	Soquel Creek WD/ Santa Cruz WD	Watsonville
Tank Only				
Conventional Upgrade	85%	40%	20%	30%
Enhanced upgrade	10%	40%	45%	40%
Enhanced repair				
Conventional Repair				
Low Flow/Nonconforming Repair	5%	20%	35%	30%
Weighted Average Annualized Upgrade Cost	2,073	2,691	2,711	2,625

Appendix C Dwelling Unit Count Estimates

The estimated number of dwelling units associated with a residential parcel is based on County of Santa Cruz land use codes per the following table.

Parcel Land Use Code	DU
020-SINGLE RESIDENCE	1
021-CONDOMINIUM UNIT	1
023-NON-CONFORMING RES	1
024-SFR W/ SECONDARY USE	1
025-AFFORDABLE HOUSING	1
026-MOBILE HOME WITH LAND	1
027-TOWNHOUSE	1
028-SFR + SECOND UNIT	2
029-SFR + GRANNY UNIT	2
030-SINGLE DUPLEX	2
031-TWO SFRS/1 APN	2
032-3 OR 4 UNITS/2+ BLDGS	4
033-TRIPLEX	3
034-FOUR-PLEX	4
041-5 - 10 UNITS	8
042-11 - 20 UNITS	15
043-21 - 40 UNITS	30
044-41 - 60 UNITS	50
045-60 - 100 UNITS	80
046-OVER 100 UNITS	100
061-HOMESITE/1-4.9 ACRES	1
062-HOMESITE/5-19.9 ACRE	1
063-HOMESITE/20-49.9 ACRES	1
064-HOMESITE/50-99.9 ACRES	1
068-RURAL DWELLINGS/1 APN	1

In the case of mobile home parks, the count dwelling units is based on the number of spaces in the park which was determined for each park in the dataset using information on the internet.