Water Affordability, Bill Delinquency, and Low-Income Rate Assistance

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California: Water Affordability

Generating Increasing Attention

Affordable? Measured by % income spent on water (& wastewater) services

- EPA Thresholds: 2% (water) & 4.5% (water and wastewater)
- California Threshold (SWRCB): 1.5% (water)

The cost of water has been rising…

Discretionary income falling…

- Income - cost essential needs.
- 13 million low-income residents
- Stagnate wages for low-income

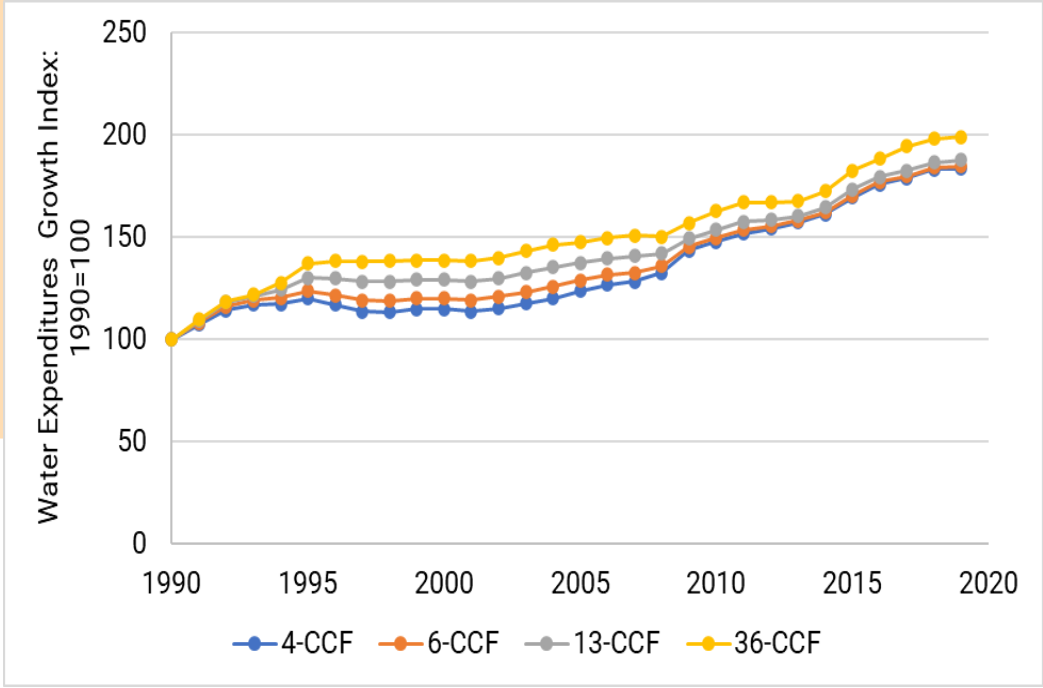


Figure 1. Household water expenditures index since 1990 for various water use measures, 1990=100. Source: Nemati and Schwabe (2023)

Nationally : Water Affordability

Generating Increasing Attention

- Up to 17% of households in the US pay > 4.5% of income on water and wastewater services[1]
- Of 795 utilities surveyed by EPA, ~ *20% offer bill discounts* in their LIRA programs[2]
- 2021: 1st ever federal program (Low-Income Household Water Assistance Program – LIHWAP) established to assist low-income households in paying water bills[3]
- Federal government (recent bills): $15 billion for water infrastructure, management, reliability, quality
- $3.5 billion for underserved communities

[1] Cardoso and Wichman 2022; Patterson et al. 2023; [2] USEPA, 2016; [3] https://www.acf.hhs.gov/ocs/programs/lihwap

Why might water affordability become more challenging?

The cost of delivering high-quality, reliable water will likely increase…

Aging infrastructure

- Significant investments are needed to address water scarcity (current infrastructure is inadequate)

Water quality Challenges

- Emerging contaminants and new standards (PFAS/PFOS, etc.)
- 250 water systems (~900,000 people) out of compliance w/ drinking water standards
- Groundwater contamination
- Funding gap: $4.6 billion over the next 5 years

Climate-induced extremes

- Intense, long, and frequent droughts, severe floods

Objectives of Research Agenda

Evaluate Water Affordability Metrics in California

- Regional district-level magnitudes and variation
  - Role of size, pricing structure, location

- Household-level Analyses for individual districts
  - Identify vulnerable households for targeted programs
  - Allows for program evaluation (e.g., AMI)

$$\textit{Water Expenditure Ratio } (WER_i) = \frac{Household_i\ Expenditures\ on\ Water\ Services}{Household_i\ Income} \times 100$$

Highlight how water affordability metrics are influenced by

- Customer water usage (e.g., indoor, overall)
- Income measure (e.g., MHI, 20th Percentile)

Investigate the impacts of LIRA (low-income rate assistance) programs

Case Studies

MWD Service Area

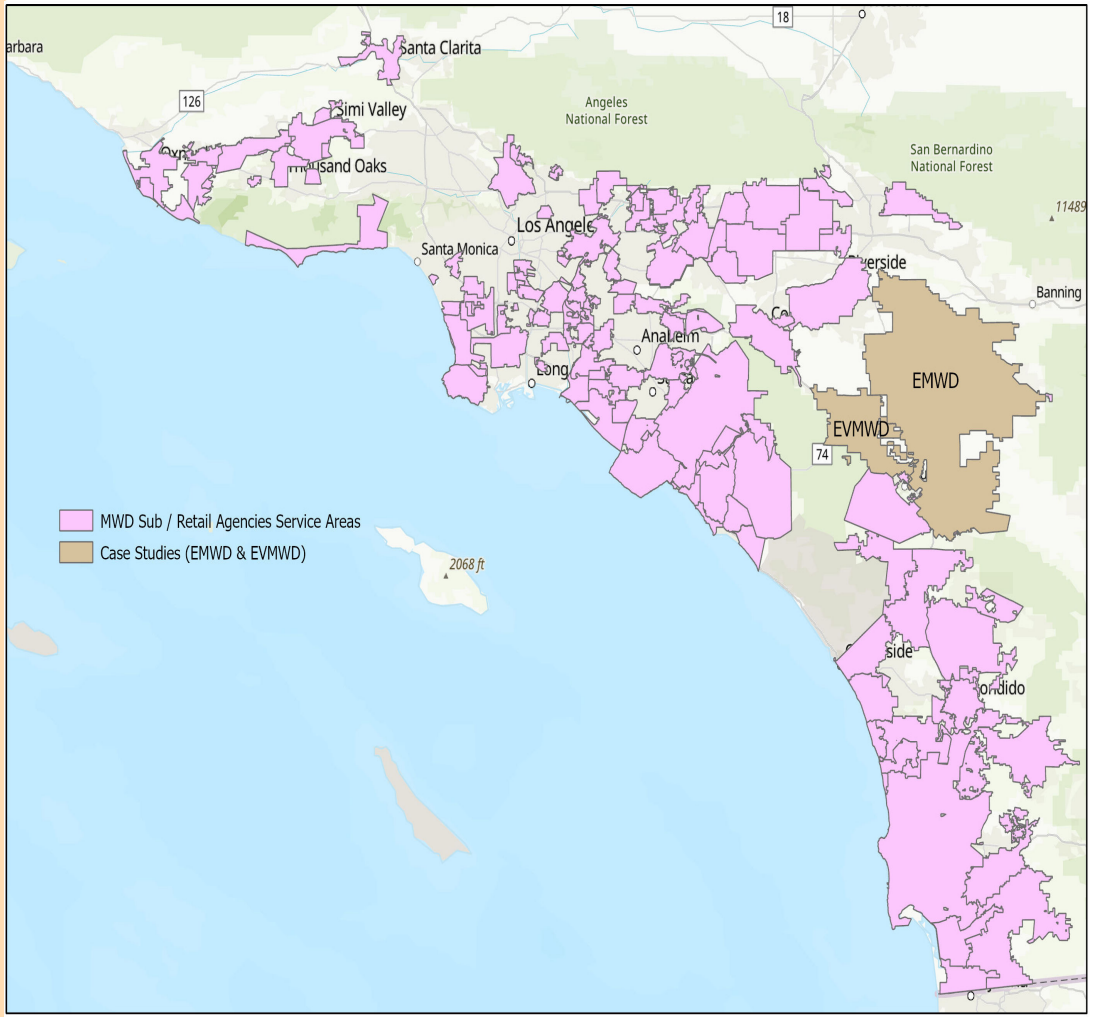
- ~160 retail agencies
- Water and sewer costs
- Income by census tract

Eastern MWD

- MHI ~ $22,210 to $119,464
- ~ 138,000 residential accounts
- Monthly data 2011-21
- Water and sewer cost
- Affordability metrics

Elsinore Valley MWD

- MHI ~ $29,070 to $165,481
- ~38,000 residential accounts
- Monthly data 2011-21
- Water and sewer cost
- Affordability metrics
- Bill delinquency measures



Key Findings: Regional Analysis of Water Expenditure Ratio

Data / Focus (MWD Retail Area)

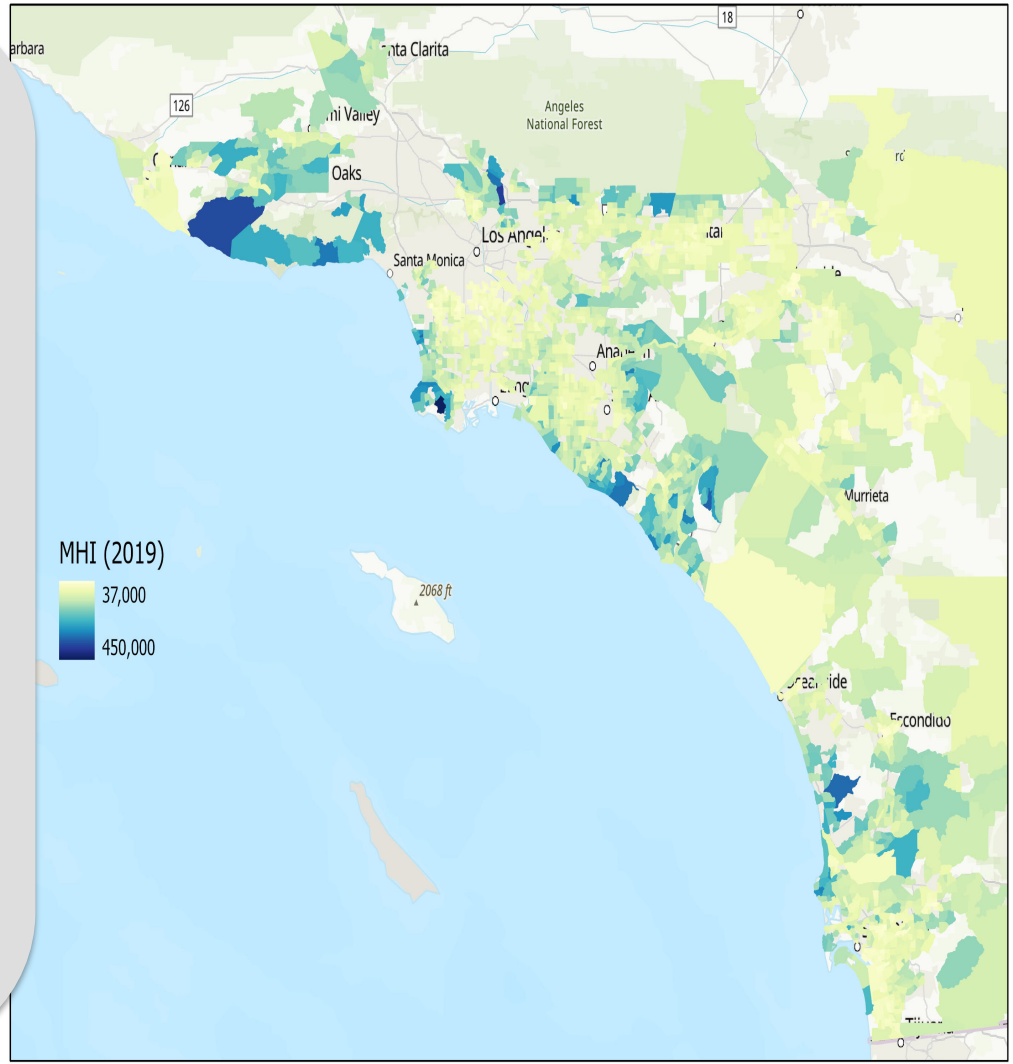
- 122 water retailers
- Weighted MHI 2021 (~ $49,692 to $209,460)

Evaluate the following factors

- Price and pricing structure
- Water and wastewater cost for 6 CCF
- Size
- Water source
- Water conservation programs (e.g., AMI)

Preliminary results for 6 CCF

- WER: 0.14 to 1.76
- WWER: 0.22 to 1.89
- # agencies>1.5% MHI: 2 agencies



Extent of “Unaffordability” in EVMWD (EPA Threshold of 4.5%)

How do water expenditures trend over time for SFR households in the 20th percentile of income?

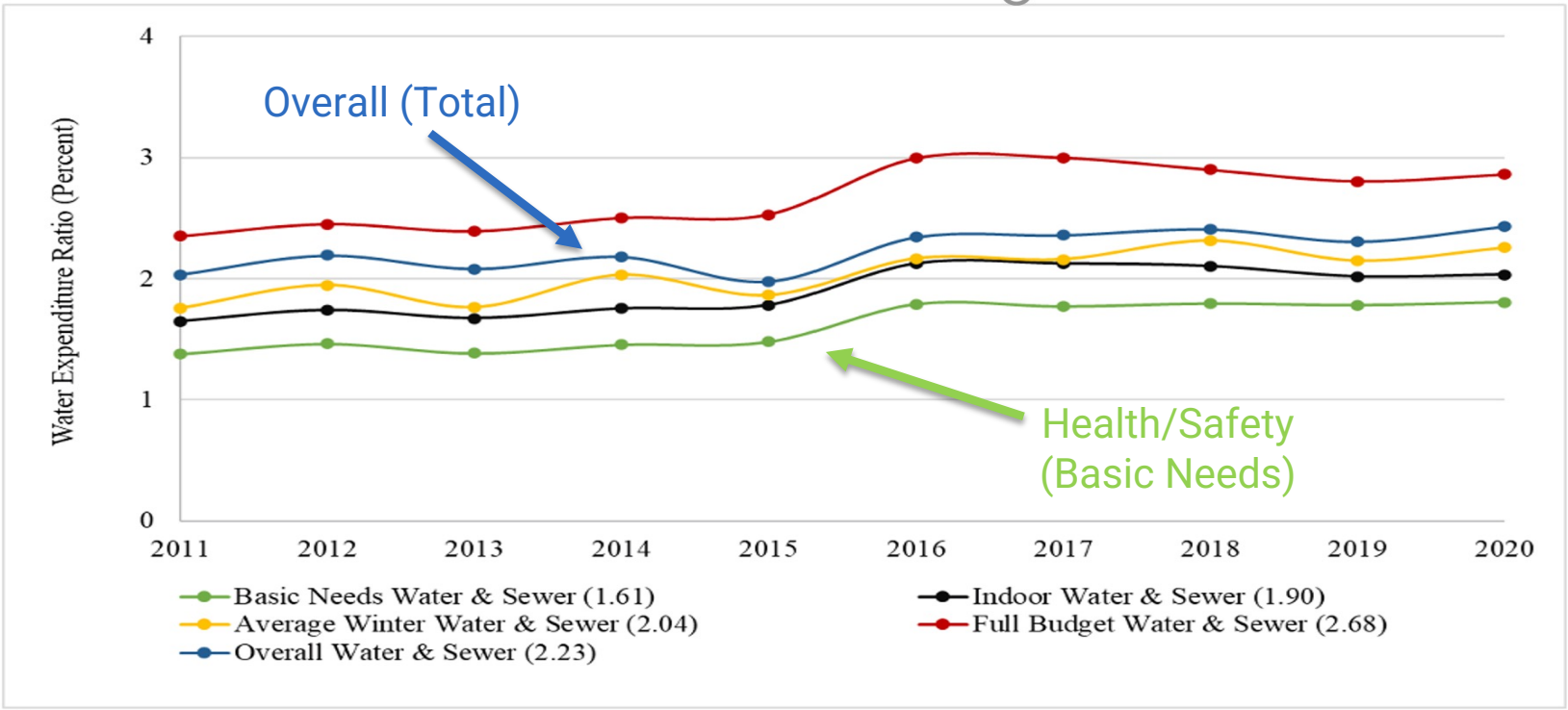


Figure 1.2. Comparing annual water expenditure ratio for the 20th percentile income over the study period (2011–2020)[21]

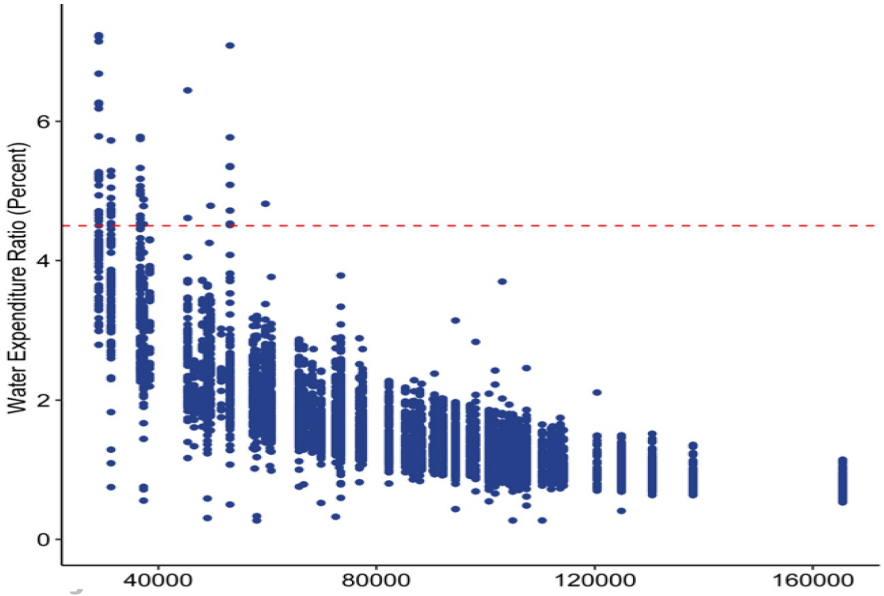
Extent of “Unaffordability” in EVMWD (EPA Threshold of 4.5%)

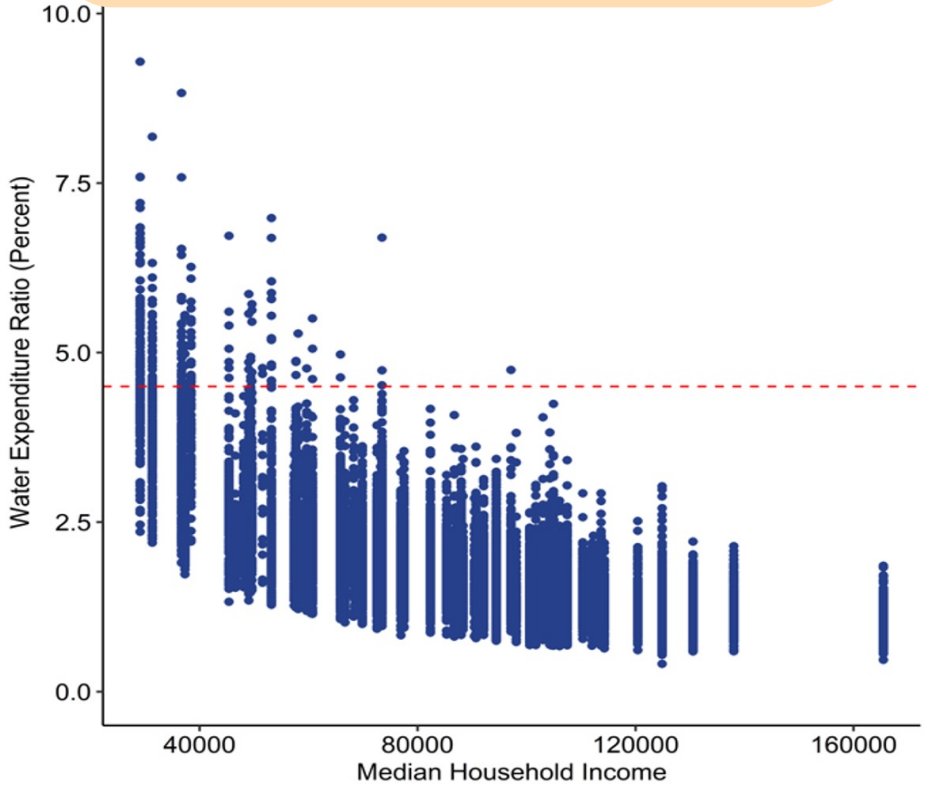
A. Indoor Standards (55 gpcd)

- WWER: 1.47
- 20th percentile income level: 1.90
- *74 out of 34,000 households* exceeded the threshold (~ 0.2%)

B. Actual (Total) Water Use

- WWER = 1.75
- 20th percentile income level: 2.23
- *208 out of 34,000 households* exceed the EPA threshold (~ 0.6%)





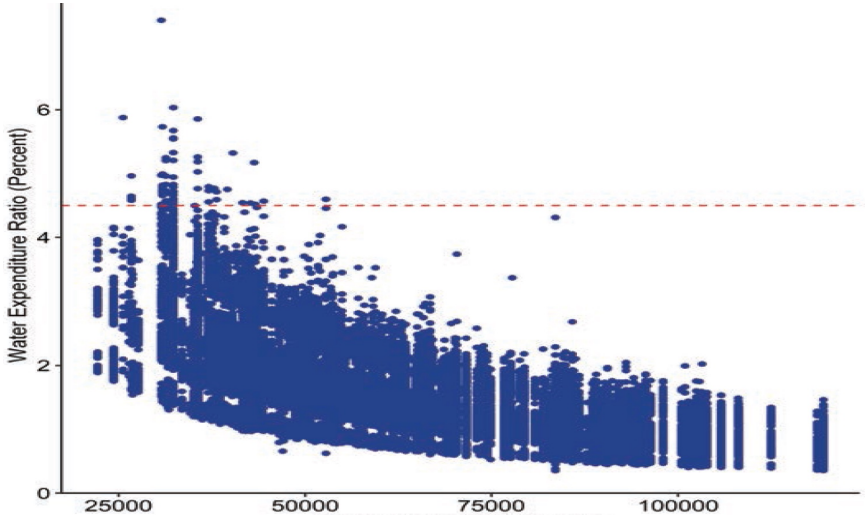
Extent of “Unaffordability” in EMWD (EPA Threshold of 4.5%)

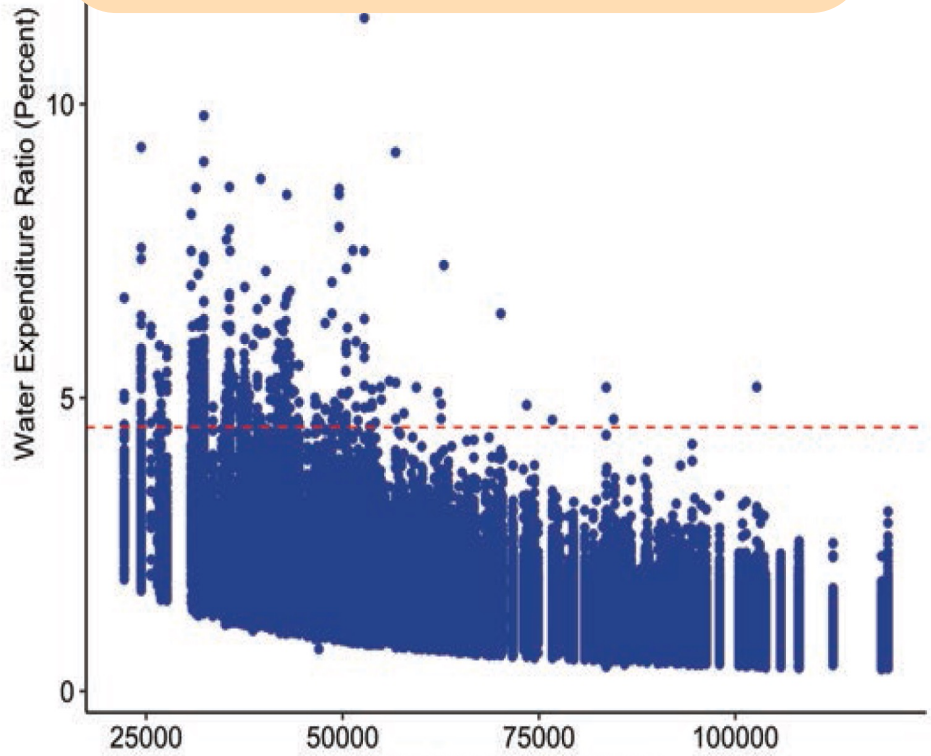
A. Indoor Standards (55 gpcd)

- WWER: 1.1
- 20th percentile income level: 1.44
- *69 out of 138,000 households* exceeded the threshold (~ 0.05%)

B. Actual (Total) Water Use

- WWER = 1.48
- 20th percentile income level: 1.98
- *550 out of 138,000 households* exceed the EPA threshold (~ 0.4%)





Key Findings: EMWD & EVMWD

- **Take-home messages**
  - Type of water services matters Essential needs, indoor, efficient, and actual water use.
  - Income measure matters – e.g., MHI District, MHI census track, 20th Percentile Income
  - "Affordability" measures can vary significantly within a water district, household level, etc.

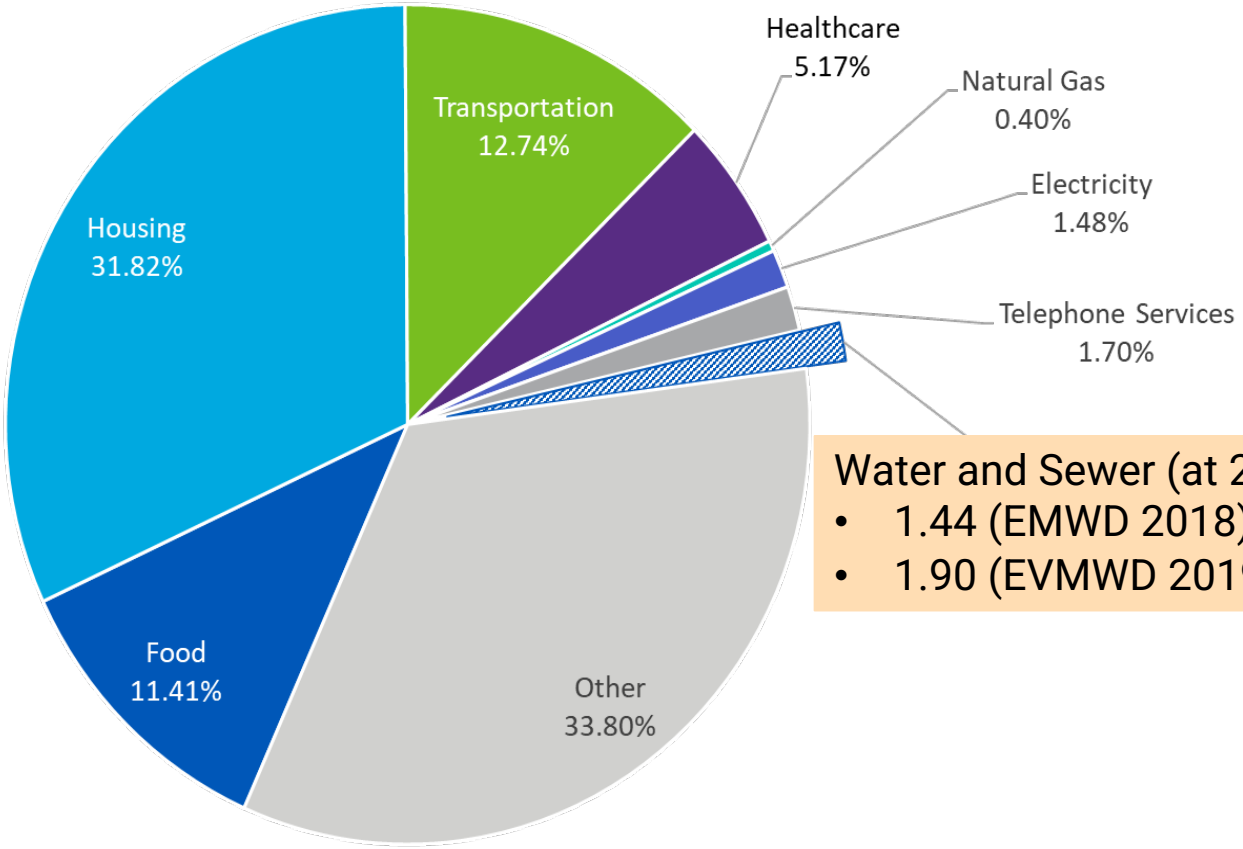
Results suggest that households above the EPA's 4.5% threshold live in block groups represented by:

- Lower median household income
- A higher percentage of renter-occupied,
- Lower median gross rent….but…
- …Higher median rent as a percentage of household income.

- **The implications could be significant since…**

As housing expenditures rise relative to income => households have less disposable income to spend on other essential services.

Expenditures on Other Essential Services

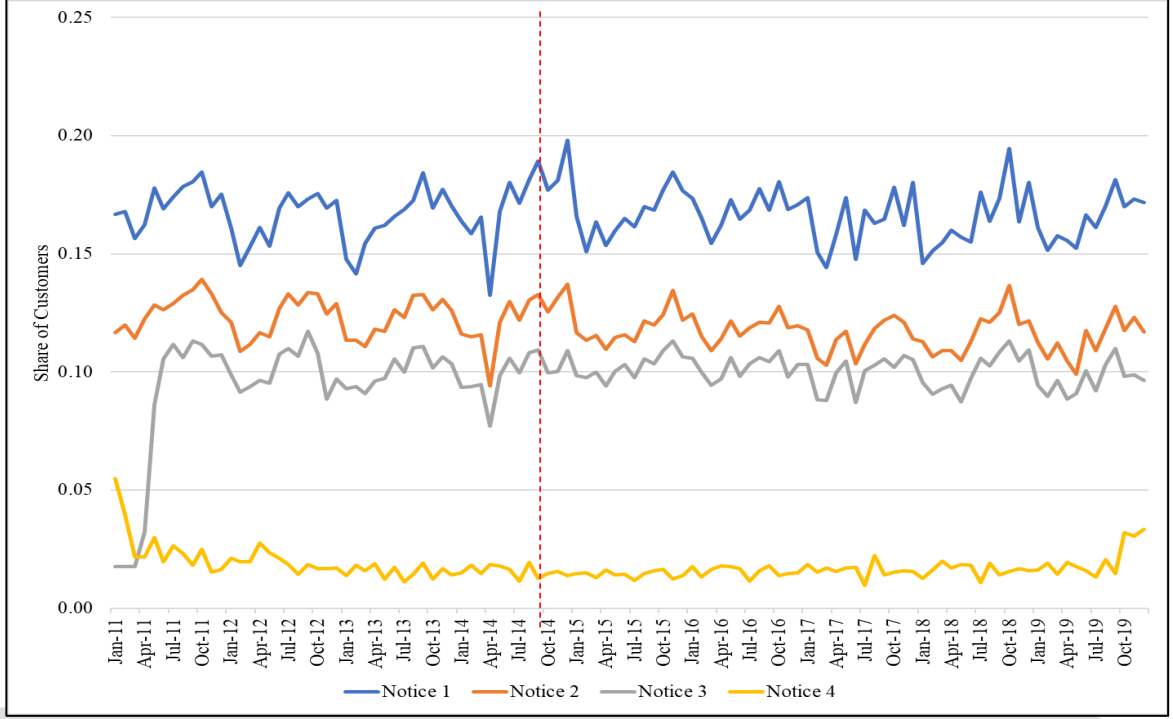


Water and Sewer (at 20th percentile income)

- 1.44 (EMWD 2018)
- 1.90 (EVMWD 2019)

Source: UCR and EMWD calculations based on the BLS CES 2019 data
(1) Food, housing, transportation, and healthcare costs based on Los Angeles Metropolitan Statistical Area
(2) Natural gas, electricity, and telephone service costs based on the Western United States, including AL, AZ, CA, Guam, HI, ID, NV, OR, and WA
(3) Balance of income not specifically associated with essential services listed above assumed to be spent in the "Other" category

Delinquency Analysis
(EVMWD)



Factors associated with delinquency rates	Correlation Direction
MHI	-
WERs	+
Irrigated areas	-
Efficiency (within budget)	-
Water use	+
Participation in rebate programs	-
Automated payment mechanisms	-

Solutions: Low-Income Rate Assistance (LIRA)?
(EVMWD)

Possible Contributions

- Very few analyses of the role of rate assistance programs on water affordability (Pierce et al. 2021)
- Policymakers need evidence to make informed and effective policies
- Investigate whether the widely-cited affordability ratios have any explanatory power on more objective measures of affordability

Case Study: EVMWD

- Household-level data, participation in the **Rate Assistance for Residents of Elsinore Valley (RARE)** program, and tax assessors' reports
- Criteria to Participate in the RARE Program
  - Current resident, meet low-income status (200% FPL)
  - Meet water use constraints (e.g., monthly use < 13 CCF)
  - Enrolled in CA state energy program

=> Provides subsidy for the bill (and maybe an incentive to reduce water use)

- ~ $20/month credit

Research Questions & Methods
(EVMWD)

Evaluate the impact of participation in the RARE program on…

- Water use
- Water bills
- Probability of delinquency
- Past-due/unpaid bill status

- Sample Characteristics from January 2011 to December 2019
  - **Treated Group:** 2,616 single-family residential households participated in the RARE program from Nov 2015 to Dec 2019
  - **Comparison Group**: 36,847 SFR hhs who never participated in the program
- Econometric Strategy: Fixed Effects Panel Data Estimators with & without matching and within census (program evaluation with nonexperimental design)

Key Findings

Did participation in the RARE program impact….

Monthly water use of participants?

- Yes (p-value <1%), but only about *3% per month* relative to comparison groups

Monthly water bills for participants?

- Yes (p-value <1%), but only about *$2/month (w/o credits)* relative to comparison groups

Monthly water bill delinquency?

- Yes (p-value <1%), but only about a *3% reduction* relative to comparison groups for Notices 1, 2, and 3 (Notice 4 ~ 0.1%)

Monthly past due the customer owes?

- Yes (p-value <1%), *around 15%* for Notices 1, 2, and 3 (Notice 4 ~ 1%)

Does the affordability ratio help explain variation in delinquency?

- Yes, both as a continuous and binary variable

Key Takeaways

Water in the region meets EPAs and SWRCB thresholds

- WWER in the MWD region ranges between 0.22 to 1.89
- WWER in the EMWD service area is 1.1
- WWER in the EVMWD service area is 1.47

Delinquency analysis suggests policy options to reduce affordability challenges

- lower and/or efficient water use
- Participation in rebate programs

Household-level analysis provides more information to better target programs.

- But we (and no one else) have renters in the analysis.

Affordability is a local issue.

- Income
- Investments
- Location

The RARE program statistically significantly impacts water use, water bills, delinquency, and past due amounts.

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