WASHINGTON STATE DEPARTMENT OF HEALTH

Statewide Low-Income Assistance Program for Water and Wastewater Customers

An Assessment of Need and Feasibility

Washington State Department of HEALTH

DOH 331-779 • June 2025

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Abbreviations and Acronyms

AC	Advisory Committee
ASCE	American Society of Civil Engineers
CAP	customer assistance program
CCA	Climate Commitment Act
CWS	community water service
Commerce	Washington State Department of Commerce
DOH	Washington State Department of Health
ECY	Washington State Department of Ecology
EFC	Environmental Finance Center
EPA	U.S. Environmental Protection Agency
FPG	federal poverty guideline
HM	Hours of Minimum Wage
LIHEAP	Low-Income Home Energy Assistance Program
LIHWAP	Low-Income Household Water Assistance Program
LQI	lowest quintile income
MHI	median household income
PFAS	Per- and polyfluoroalkyl substances
POTW	publicly owned treatment works
RI	Residential Index
SNAP	Supplemental Nutrition Assistance Program
TANF	Temporary Assistance for Needy Families
WWTP	wastewater treatment plant

NOTE/ACKNOWLEDGEMENTS

We would like to thank the members of the stakeholder advisory committee for their thoughtful contributions to this report. The advisory committee's expertise was instrumental in guiding the researchers in this study and ensuring the recommendations of this report are actionable and equitable. We're grateful for their collaboration, participation, and insight.

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Executive Summary

The Department of Health (DOH) in collaboration with the Department of Commerce (Commerce) and informed by stakeholder advisory group, initiated an **Assessment of Need and Feasibility for a Statewide Low-Income Assistance Program for Water and Wastewater Customers** Study (study) in fulfillment of a 2023-2025 Biennial Budget Proviso (WA Legislature, 2024).[1] The proviso language directed the departments to study options then offer recommendations for the design of a statewide drinking water and wastewater utility assistance program, that included data collection and coordination, program eligibility, outreach and community engagement in multiple languages, program administration, funding and ongoing reporting. It also required the convening of a stakeholder group to advise the agencies.

As a first step an Advisory Committee (AC) was formed. The AC provided their assessment of existing studies and data and assisted in developing the approach to completing this study and building recommendations. This included conducting a statewide survey and examining similar programs being considered or already implemented in other states and local jurisdictions both in and outside of Washington state.

AC members, representing a range of perspectives, participated in thoughtful discussions that greatly informed our recommendations on how a statewide assistance program could be successfully designed and applied in Washington state,

Findings

This study finds there is demonstrable need for a statewide low-income assistance program for water and wastewater utility customers and that such a program appears administratively feasible upon completion of additional work to fill data gaps and compare potential program frameworks to ensure the effectiveness of the program.

Note to readers: Throughout the study, drinking water providers are referred to as community water services (CWS), and wastewater providers are referred to as publicly owned treatment works (POTW) although not all wastewater providers own treatment works. The terms "provider" and "water service provider" are used interchangeably when discussing both CWSs and POTWs. Additionally, the focus of the estimated cost burden analysis are the residential connections of water service providers, which do not necessarily include rental units in which utilities are included in rent. Therefore, estimates of cost burden included in this study should be considered a minimum.

[1] Section 222, Subsection 150 of SB 5920 (page 488)

Increased Affordability Challenges

Since the late 1990s, water and wastewater service costs have increased twice as fast as median income (Berahzer et al., 2023). Washington state's 20-year infrastructure investment needs are estimated at more than $16 billion for drinking water (EPA 2023), and nearly $12 billion for wastewater treatment and conveyance (EPA 2024c). These needs place the state in the nation's 8th and 5th ranks respectively, with the expectation that needs will only grow.

Reduced Historic Funding Sources

For many years federal infrastructure grants helped to keep local water costs lower. From 1957 to 1986 federal grants to states averaged $11.7 billion per year (2016 dollars). After that, through 2016, the annual investments fell by half. This reduction, as well as reductions in other fund sources, contributed to today's increased local costs. Without these extra funds local rate payers had to make up for the difference by paying higher rates.

Customer Assistance Program Approaches and Utilization

Despite the increased costs of water service, less than 30 percent of drinking water providers nationwide offer low-income customer assistance programs (CAP) (EPA 2016). During the COVID-19 pandemic, the federal government temporarily funded the Low-Income Household Water Assistance Program (LIHWAP), and gave states block grants to provide needed assistance to households. The Washington LIHWAP program, implemented by Commerce, was funded at nearly $20 million in Fiscal Year (FY) 21 and assisted an estimated 18,394 households (Sarensen 2025). However, this funding expired at the end of 2023.

Programs of this type are not adopted by all utilities. A survey[2] completed for this study found that of the 196 Washing state water providers responding, only 28 offered CAPS. However, those 28 respondents collectively serve 712,000 residential connections—suggesting that nearly half of the state's residents may have access to a low-income benefit program.

Of the 28 utilities surveyed that do provide a program, enrollment rates for the existing programs are low, with fewer than 10 percent of eligible households participating. This is consistent with the low enrollment rates for similar programs reported in nationwide surveys and research. Administrative challenges to implementing these programs include reaching customers in need of assistance, promoting program awareness, educating the target

[2] From Date to Date a survey was distributed to 5.300 individuals listed as points of contact for Washington utility providers, The mailing list was found to have a number of outdated or duplicates entries: From that list 196 utilities responded to the study survey. Additional information about the survey methodology may be found on page #,

audience, and devoting staff time to meet these challenges (EPA 2016). Understanding the barriers to enrollment would be necessary should the state create a similar program.

Community Impacts

Limited access to affordable water services harms communities. Without financial assistance, water bills can create a financial strain for households and destabilize water service providers. When households fail to pay their bills, providers struggle to maintain safe and reliable service for all of their customers. Utility shut-offs can also create stress for both affected households and the staff responsible for enforcing shut-offs. For the most vulnerable, shut offs exacerbate housing and health issues and may contribute to a lifetime of additional instability issues. Clean water supports the hygiene and sanitation that helps prevent the spread of infectious diseases. Households experiencing financial strain may delay home maintenance or allow other bills to stack up (OTDA).

Washington State's Household Cost Burden

No national standard exists for measuring the water services cost burden. The development of a Washington state program will require adopting a standard.

For this study we used a Residential Index (RI), a common measurement developed by the EPA. The RI measures water bills as a percentage of household income. To understand the potential magnitude of affordability issues in Washington state, we used the EPA's suggested affordability thresholds which are 2 percent of income for drinking water and 2.5 percent of income for wastewater. This creates a total affordability threshold for water services set at 4.5 percent (EPA 2016).

Wide Variation in Costs and Needs

At the statewide level there is wide variation in costs and needs depending, in part, on where in the state it is being served and the size of the utility providing services. Insufficient data is available to fully understand the magnitude or impact of an assistance program.

The state has over 2,200 drinking water providers and more than 250 wastewater providers (Figure ES-1)[3]. This number of providers and a lack of available data made it impractical to determine the current cost burden for each provider by estimating water bills and income levels. Instead, we evaluated a subset of providers for which data was available. Understanding that many factors can impact costs and the ability of a provider to provide programs, we collected data from a stratified random sample. The sample included all the regions of the state and a mix of utility sizes. RI values were then calculated for the sample

[3] A comprehensive list of the wastewater providers in the state was not available. Figure ES-1 shows the location of drinking water providers throughout the state, many of which do also provide wastewater services; therefore Figure ES-1 is the best representation of both drinking water providers and wastewater providers given the current data limitations.

providers and then extrapolated to estimate the statewide cost burden for low-income households.

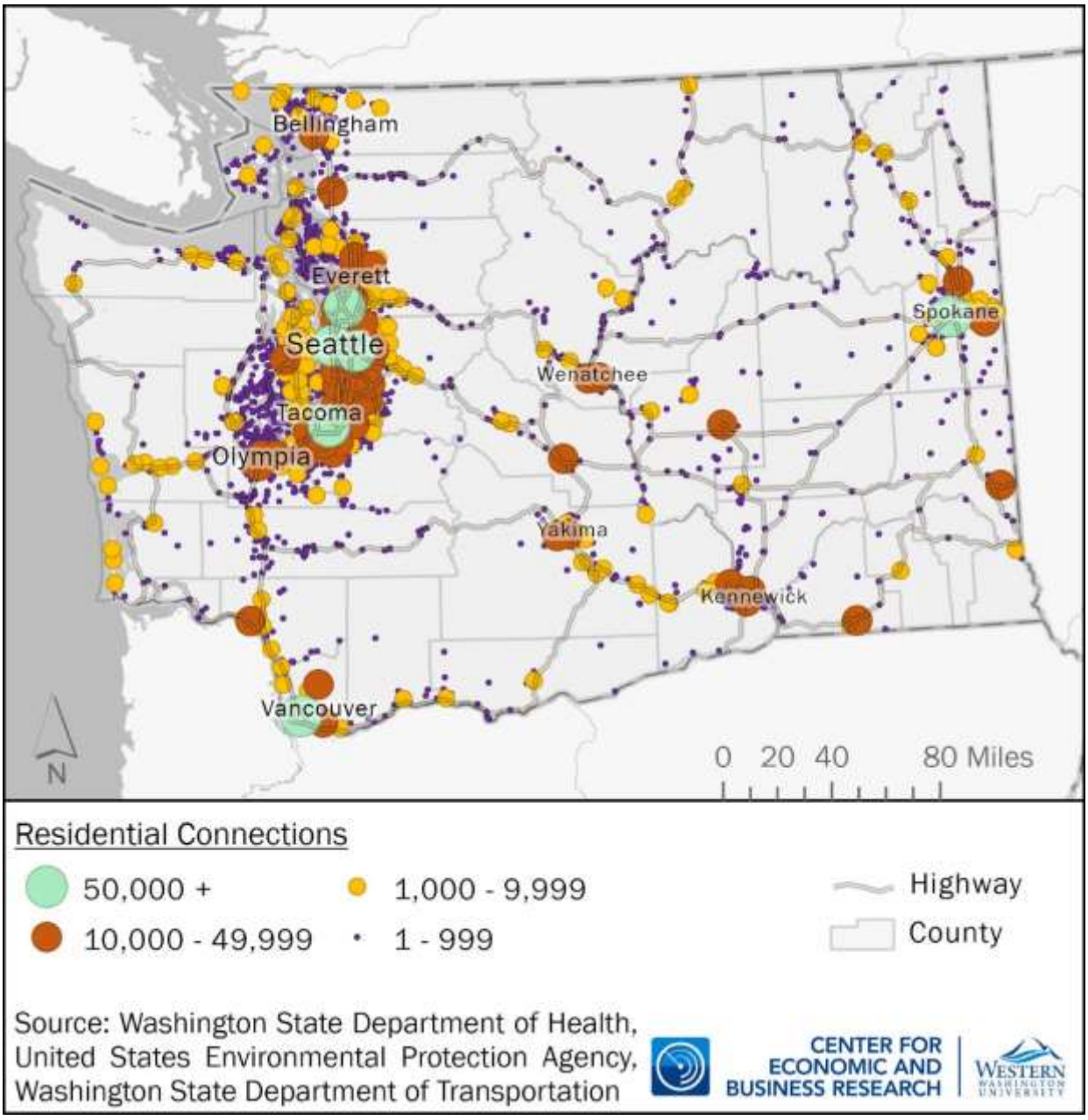

Figure ES-1. Statewide Providers by Number of Residential Connections

The averages used in this study give a general idea of the statewide cost burden but do not identify cost burdens for individual households. Affordability issues can occur in households served by any provider in the state.

Estimates of the statewide cost burden can be considered a good first step in understanding the magnitude of the statewide water service affordability challenge. However, an ongoing

commitment to addressing it for both households and providers will require undertaking the work necessary to close or eliminate existing data gaps and inconsistencies.

For this study, two different RI values were calculated for each provider to understand the cost burden for both low-income households and moderate-income households, The cost burden for low-income households measures the percentage of the average lowest quintile income (LQI) in the provider's service area, needed to cover the estimated provider-specific water service bill, annotated as RILQI.5 The cost burden for moderate-income households measures the percentage of the average median household income (MHI) in the provider's service area needed to cover the estimated provider-specific water service bill, annotated as RIMHI.6

Statewide Cost Burden

- At least 90,000 low-income residential connections (1 in 28 connections) face a cost burden (e.g., an RI_{LQI} value greater than 4.5 percent of income) (Figure ES-2).

- In general, residential connections served by smaller water systems (those providers serving less than 999 connections) experience a higher cost burden than residential connections (e.g., have higher RI_{LQI} values) served by larger providers.

    - The highest cost burdens are estimated to be over 11 percent of LQI, mainly in smaller systems (as indicated by the size of the bubbles in Figure ES-2).

    - Large systems often benefit from lower costs due to economies of scale (as indicated by the size of the bubbles located below the 4.5 percent threshold level in Figure ES-2).

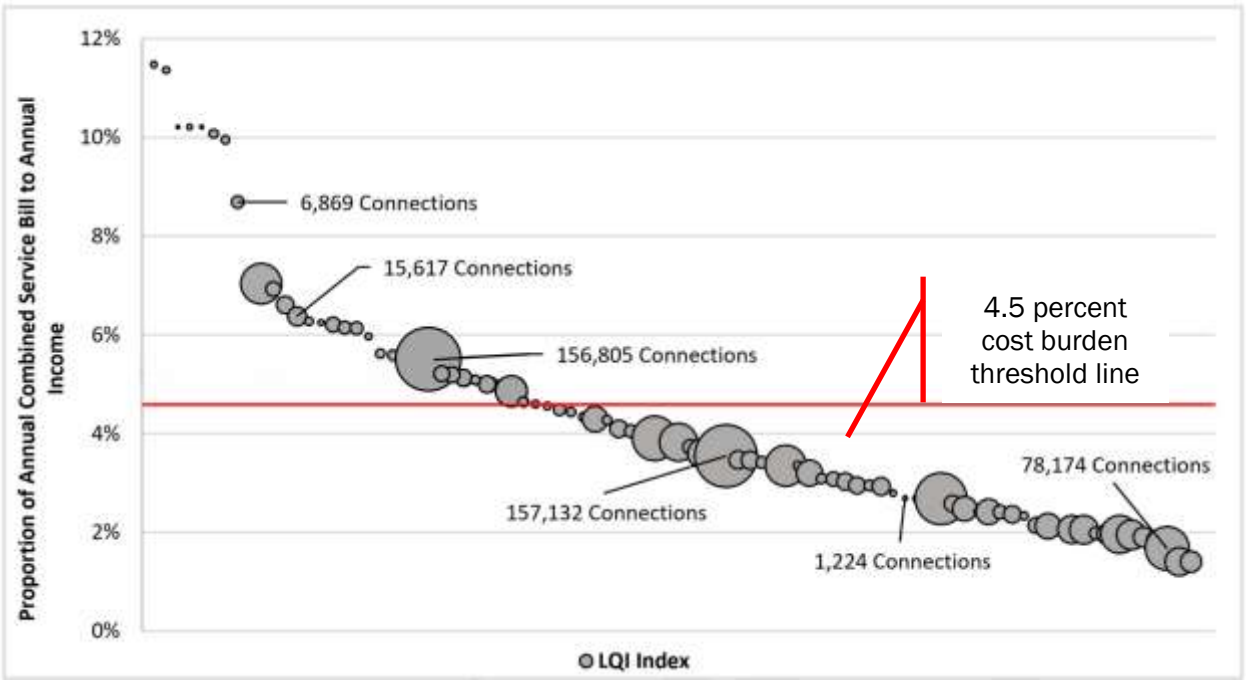

Figure ES-2. Residential Indices of Combined Water Service Bills by Lowest Quintile Income

When comparing the estimated cost burden for drinking water bills (Figure ES-3) to the cost burden for wastewater bills (Figure ES-4):

- Residential connections face a greater cost burden on their wastewater bills than on their drinking water bills. One in 35 residential connections face a drinking water cost burden, where one in 1 in 14 residential connections face a wastewater cost burden.

- Some low-income households may be paying just over 7 percent of their income on wastewater service and just over 6 percent on drinking water. Making these percentages three times greater than what EPA considers affordable.

- Households with higher drinking water costs are often served by small (less than 1,000 connections) CWSs.

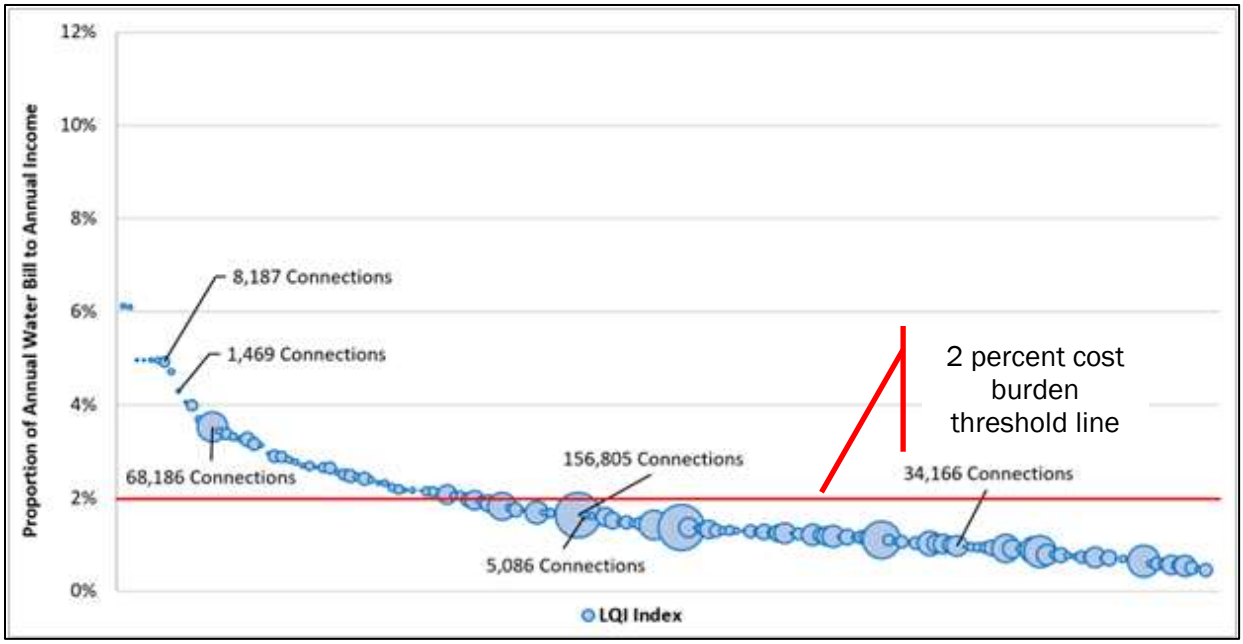

Figure ES-3. Residential Indices of Drinking Water Service Bills by Lowest Quintile Income

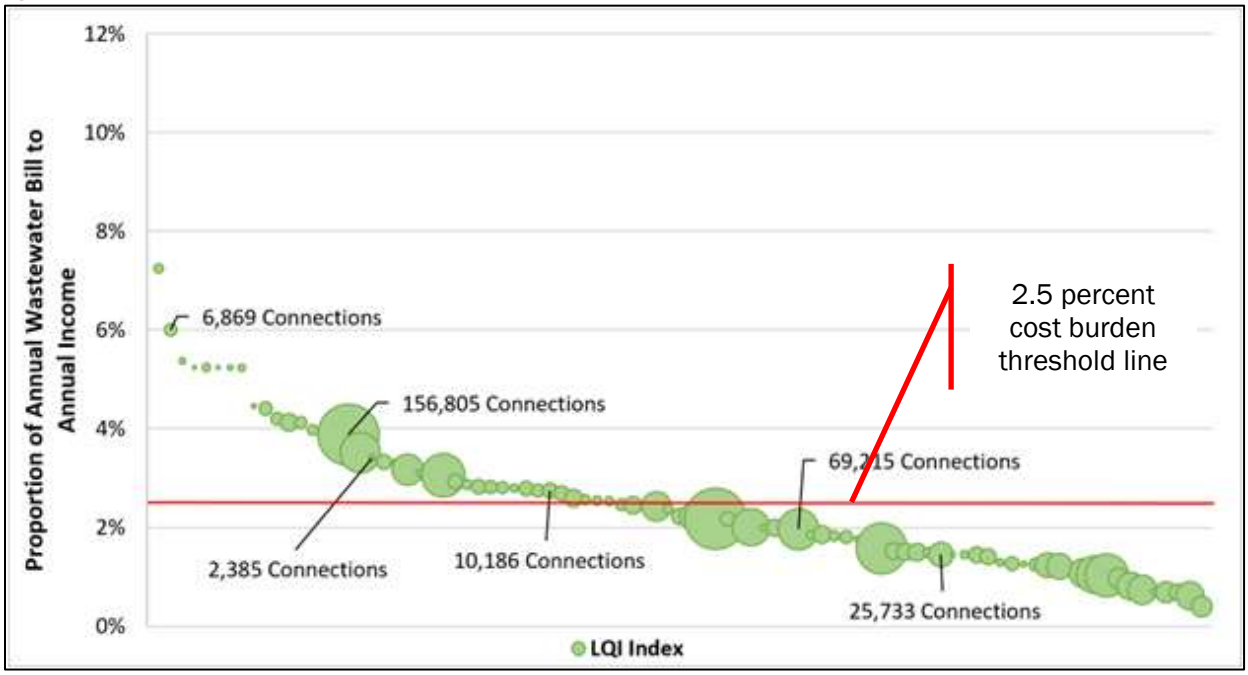

Figure ES-4. Residential Indices of Wastewater Service Bills by Lowest Quintile Income

Figures ES-3 and ES-4 show that a significant number of water and wastewater connections are close to exceeding affordability limits (e.g., RI_{LQI} values above 2 percent of drinking water and above 2.5 percent for wastewater).

Costs of a Statewide Low-Income Assistance Program

To make a rough estimate of the program cost, we used EPA's 4.5 percent income cost burden and then estimated the number of households that pay more than that. Under those parameters, it would require a minimum of $160 million[4] per biennium in funding to achieve statewide affordability. This funding would provide $802 per year for over 90,330 residential connections. The estimated $160 million per biennium serves as a starting point for understanding the investment needed.

Program costs would increase if rate increases outpaced income increases. Even a modest local utility rate increase could have a disproportionately large impact on the cost of a state program, because of the increased number of participants and the additional funding needed to achieve a 4.5 percent affordability goal.

Recommendations

We, DOH and Commerce, offer recommendations in eight categories.

A. Ongoing data collection on water-related assistance need of households

1) Fill data gaps, co-locating data for both water and wastewater rates in one location, managed by one agency. Data gaps include but are not limited to all service provider:
- Drinking water and wastewater rates
- Estimated bills and estimated household income by service area boundaries
- Numbers and types of connections.

2) Provide ongoing monitoring and reporting of program results.
3) Consistently Improve and refine data management based on monitoring and feedback on program performance.

B. Intake coordination and data sharing across statewide programs serving low-income households.

4) Utilize categorical eligibility to create administrative efficiency
5) Requiring data sharing across the statewide agencies that manage social support programs.
6) Adapt the procedures already in place in the management of similar assistance programs.

[4] A more refined cost estimate would require more research. The $160 million per biennium estimate assumes that no households in the state earn less than their community's LQI threshold. It also assumes that only households served by providers with an RILQI greater than the affordability threshold would be eligible for support. However, many households likely earn less than this threshold, which would raise the level of support required. Continued analysis could help identify these unmet needs and refine the estimate of funding requirements.

C. Program Eligibility

7) Establish a statewide affordability threshold
8) Continue data collection and evaluation of the most efficient and feasible method to establish eligibility including:
    - Income verification
    - Categorical eligibility (automatically qualifying an applicant based on their participation in another benefit program like SNAP or LIHEAP)
    - Self-attestation
    - Combining household income information with provider specific water service bills as a percentage of income (the RI) to prioritize households most in need.

D. Multilingual Services

9) Adapt the procedures already in place in the management of the on-going Low Income Home Energy Assistance Program (LIHEAP), the federally defunded LIHWAP program, and Clean Energy Credits for Washington Families.

E. Outreach and Community Engagement

10) Adapt the procedures already in place in the management of LIHEAP, LIHWAP, and the Clean Energy Credits for Washington Families.

F. Program Administration

11) Adapt the procedures already in place in the management of LIHEAP, LIHWAP and the Clean Energy Credits for Washington Families.

G. Funding

11) Continue identifying federal and other non-profit and public/private external fund resources.
12) Support federal policies that allow federal assistance monies to pay for drinking water.
13) Identify a mix of funding sources to create a diverse and reliable stream of funding options.
14) Tie program financing sources with the program objectives.
15) Recognizing funding limitations and the diverse interests of the other stakeholders drawing from the same state and local government fund sources, continue executive branch discussions on potential funding streams considering benefits and disadvantages of each. Present options and analysis for consideration of the Legislature. Analysis to consider a range of sources including:
    - General Fund
    - Redirection of a portion of the 4.6 percent public utility tax (PUT) (RCW 82.16)[5]

[5] Drinking water utilities pay 5.029 percent public tax to the state (Department of Revenue n.d.). A portion of

- Affordable Housing Fund expansion to include utility bill assistance.
- Climate Commitment Act (CCA)
- Ratepayer contribution through recurring fees

16) Identify options for providers with an existing CAP to opt out of the statewide program.

Phased Approach

17) Adopt a Phased Approach
    - There is a need to address the known data limitations in estimating the cost burden and uncertainty about possible funding sources. The first phase of the program would focus on building the foundation of the program through filling in data gaps, identifying funding sources, defining program eligibility standards, and refining the estimate of program need.
    - Future phases of the program could implement a pilot program, prioritizing those providers with the highest RI scores.
    - Use information gained from the pilot program is to refine monitoring and reporting and inform program adaptations to help increase the certainty that an expanded program is efficient and sustainable.

Expand the Alternatives to Address Affordability Concerns

As part of future phased program enhancement, it is recommended that the agencies evaluate other forms of providing assistance to eligible households or water/wastewater systems in addition to or as an alternative to a reduction in monthly or bi-monthly water service bills. Other forms of assistance that should be evaluated in future phases of a CAP include:

- Provide Assistance for Household Repairs
- Shut-off Protections for Disadvantaged Populations, Including Seniors, Families with Children, and People with Medical Needs.
- Eliminate Barriers to the Provision of Assistance to Low-Income Renters.
- Reduce provider operating costs.
- Reduce cost of service through innovate funding options like expansion of eligibility for the state Treasurer's Local Option Capital Asset Lending Program
- Lower the overall cost of service by regionalizing the provision of safe and reliable drinking water through consolidations or restructuring of struggling or failing systems, and to achieve better economies of scale for water and wastewater provision.

Conclusion and Next Steps

Our study shows that there is a need for consideration of a statewide low-income program given that many residents do not currently have access to a local program. Furthermore,

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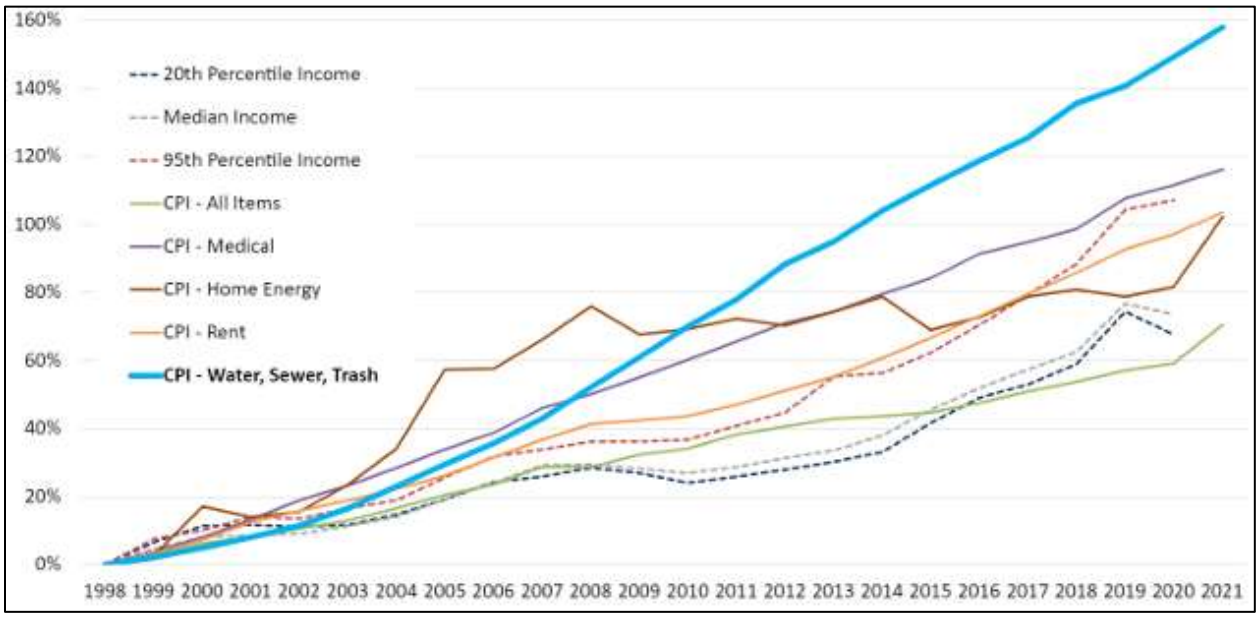
the tax is paid into the Public Works Assistance Account; however, 4.6 percent of the tax goes directly to the General Fund.

based on our review of similar programs from across the US, it is clear that a program that is well-designed and adequately funded is viable. We have provided a set of recommendations and program elements for consideration by policymakers.

Background

In Washington and nationwide, providing affordable, clean drinking water and proper wastewater treatment has been increasingly costly. Since the late 1990s, water and wastewater service costs have increased twice as fast as measures of median income (Berahzer et al., 2023). The cost of water, wastewater, and trash services increased nearly 160 percent from 1998 to 2021, while household incomes (for both low and medium-income earners) only grew approximately 55 percent (Figure 1). This difference in growth rates has led to an affordability gap for low- and moderate-income households.



Source: Low-Income Water Customer Assistance Program Assessment, Final Report: April 20, 2023, Berahzer et al., 2023. Based on data from the Federal Reserve Economic Data and the U.S. Census Bureau.

Figure 1. Percentage Increase in Income and Essential Expenses

The rising cost of water services is driven by the need for significant investments to fix aging infrastructure, comply with regulations, address climate change, and treat new contaminants. About 95 percent of the nation's drinking water and wastewater systems are funded locally, as federal support has decreased since the 1970s (EFAB 2025). Despite recent one-time federal funding from the Bipartisan Infrastructure Law, affordability challenges are still increasing. According to the American Society of Civil Engineers (ASCE), over the next 20 years, U.S. drinking water systems will need more than $625 billion in investments (ASCE 2025), to maintain the water aging infrastructure that was primarily built in the '60s, '70s, and '80s.

Washington state has more than 2,200 water service providers, serving over 2.5 million households (Figure 2). The Department of Health (DOH) and the Department of Ecology (ECY) work with these community water services (CWS) and publicly owned treatment works

(POTW) to determine the investment needed to meet Clean Water Act requirements and ensure safe drinking water for residents over the next 20 years. A total investment of $28.1 billion over the next 20 years. Note, throughout the document, drinking water providers are referred to as CWSs, and wastewater providers are referred to as POTWs. Note that not all wastewater providers own treatment works. The terms “provider” and “water service provider” are used interchangeably when discussing both CWSs and POTWs.

Rising costs and affordability issues have led to several studies in Washington state. One study from the Evans School of Public Policy and Governance, commissioned by DOH, found that over half of the CWSs surveyed reported that low-income households pay more than 3 percent of their income on water services, with over 13 percent spending more than 5 percent on water bills (excluding wastewater) (Franks et al., 2023). Additionally, a Puget Sound Institute study found that low-income households paying for wastewater services, where POTWs release treated waste into Puget Sound, spend an average of 4 percent of their income on these bills (Burke et al., 2023). These studies indicate that some low-income households in Washington state might spend between 7 and 9 percent of their income on water service bills.

For reference, in 2023, the U.S. Department of Agriculture estimated that low-income households spend 32.6 percent of their after-tax income on food, while medium-income households spend 13 percent (Sweitzer and Davidenko 2024). This means that low-income households might spend up to 40 percent of their income on food and water services.

When these households struggle to pay their water bills, it affects their financial security and the providers that serve them. When bills go unpaid, it can hurt the financial stability of water systems. Additionally, shutting off water service creates psychosocial distress (Gaber et.al., 2020 Zhang et.al., 2023) for households and providers’ staff. According to a study by the Evans School, about 60 percent of CWSs reported that in 2022 up to 4 percent of their total connections experienced a water shutoff of up to 6 hours (Franks et al., 2023).

Many water utilities provide CAPs for their customers. However, the effectiveness of these programs may be limited. Among the water service providers that offer a CAP, 60 percent have less than 10 percent of eligible households enrolled in the program.[6] Survey respondents reported factors that contribute to the low enrollment include limited customer awareness, complicated application processes and eligibility requirements, staffing shortages, and lack of funding.

Furthermore, the issues of water affordability include more than paying monthly or bi-monthly bills. Affordability issues include service disconnections, arrearages, penalty fees, and hard-to-reach customers (Berahzer et al., 2023).

[6] The survey asked if there were the following types of CAPs: low-income assistance, discounts for seniors, assistance for people with disabilities, and emergency assistance programs.

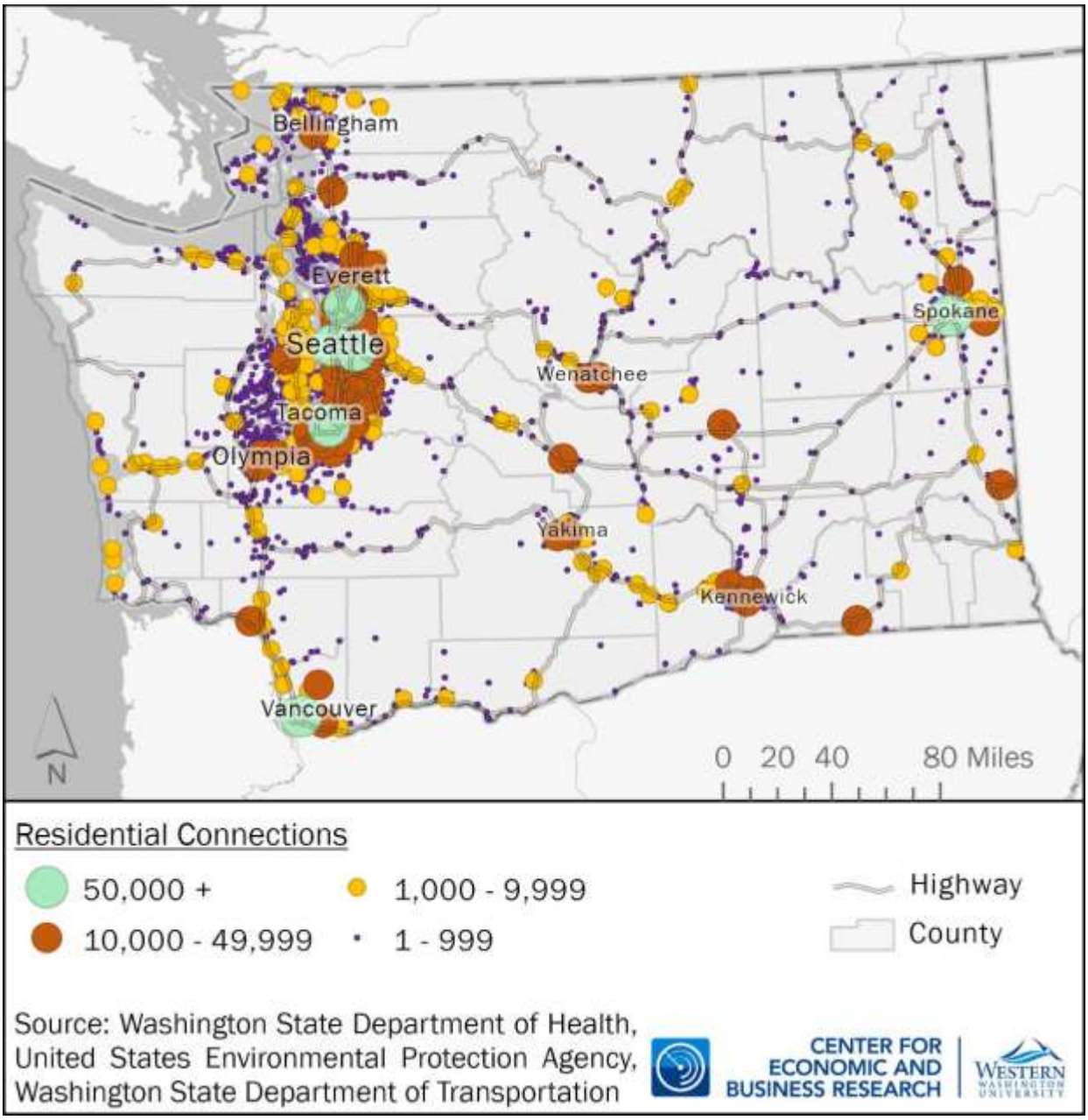


Figure 2. Statewide Providers by Number of Residential Connections

The Washington State Legislature is leading an effort to explore low-income CAPs through a feasibility study. At the federal level, the U.S. Environmental Protection Agency (EPA) recently recommended creating a federal water assistance program in its Water Affordability Needs Assessment: Report to Congress (EPA 2024b). Additionally, five major water industry groups are also pushing for a federally funded nationwide low-income CAP (Berahzer et al.,

2023).[7]The budget proviso from the Washington State Legislature calling for this study directed:

> *"(a) (i) A summary of existing local, state, and federal low-income assistance;*
> *(ii) A review of low-income populations' water utility service cost burden; and*
> *(iii) Recommendations for the design of a statewide drinking water and wastewater utility assistance program, which must include:*
> *(A) Ongoing data collection on water-related assistance need of households;*
> *(B) Intake coordination and data sharing across statewide programs serving low-income households;*
> *(C) Program eligibility;*
> *(D) Multilingual services;*
> *(E) Outreach and community engagement;*
> *(F) Program administration;*
> *(G) Funding; and*
> *(H) Reporting*
>
> *(b) Before commencing the study, the department of health and the department of commerce must convene a stakeholder group to advise the agencies throughout the study. The stakeholder group must include representatives from the governor's office, low-income advocates, wastewater system operators, drinking water system operators, and other interested parties."*

Per the requirements of the budget proviso language, DOH and the Department of Commerce (Commerce) formed a stakeholder group, referred to as the Advisory Committee (AC). The AC advised on program goals, provided insights about the analysis of cost burden and suggested recommendations. They also considered various potential sources of funding for a statewide program.

The AC first met in September 2024 and held bi-weekly two-hour meetings from late December 2024 to May 2025. The AC meetings created a respectful space for members to discuss affordability challenges, discuss their agencies' challenges and successes, as well as the objectives of the study. The AC did not vote on recommendations but rather provided insights and advice to DOH and Commerce. The recommendations in this study are those of the departments.

The recommendations in this study focus on ways to reduce the cost burden of water service on low-income households. Where cost burden is measured as the percentage of income required to pay water service bills. The percentage is referred to as a residential index (RI) in

[7] The 2023 Berahzer et al. paper was prepared for the American Water Works Association, the Association of Metropolitan Water Agencies, the National Association of Clean Water Agencies, the National Association of Water Companies, and the Water Education Foundation.

the water utility literature. The EPA suggests that combined water service bills that exceed 4.5 percent of income (e.g., an RI greater than 4.5 percent) may be a cost burden.

The EPA breaks down that 4.5 percent cost burden even further, suggesting that drinking water bills above 2.0 percent of income and wastewater bills above 2.5 percent of income may be a cost burden. The RI values for all of Washington state's water providers were estimated to determine the cost burden on low-income households and used to estimate the program cost of a statewide low-income assistance program.

The study provides details and a significant amount of discussion about the recommendations for a low-income statewide program, the estimated cost burden facing the state's low-income households, and the estimated program costs. This detail is presented in three sections, consistent with the budget proviso language. Section one summarizes low-income CAPs per the budget proviso language. The second section offers recommendations to help the Legislature meet today's affordability challenge, the third and final section describes the methodology used to estimate statewide provider-specific detail about the cost burden faced by the state's low-income households as well as an estimate of what a statewide low-income program would cost to implement.

Note to readers: Throughout the study, drinking water providers are referred to as community water services (CWS), and wastewater providers are referred to as publicly owned treatment works (POTW) although not all wastewater providers own treatment works. The terms "provider" and "water service provider" are used interchangeably when discussing both CWSs and POTWs. The CWSs included in this study are only the Group A drinking water providers, e.g. a water system providing service to 15 or more service connections used by year-round residents for 180 or more days within a calendar year. Additionally, the focus of the estimated cost burden analysis are the residential connections of water service providers, which do not necessarily include rental units in which utilities are included in rent. Therefore, estimates of cost burden included in this study should be considered a minimum.

Summary of Existing Federal, State, and Local Low-Income Assistance Programs

A review of federal, state, and local CAPs for drinking water and wastewater services provides ideas and options for how the state may want to create a CAP. The review includes:

- An examination of existing federal, state, and local CAPs in other states, along with a review of related literature.
- A survey was sent to over 5,000 email addresses for individuals representing water and wastewater providers in Washington. This survey gathered data on the availability of CAPs, eligibility requirements, benefits, administrative processes, funding sources, operational challenges, and overall need.

Existing Federal, State, and Local Customer Assistance Programs

Existing Literature

Many studies show what utilities consider when creating and using CAPs. These studies include lessons learned and tips for success. **Appendix A** lists the sources that were reviewed. One important study is the Low-Income Household Water Assistance Program (LIHWAP) Assessment (Berahzer et al., 2023). It was written in response to federal efforts to help customers pay for water and wastewater services. This study includes a useful way to evaluate programs and understand what makes them successful. The evaluation framework has specific criteria to assess different designs and management options for a permanent LIHWAP. The three main criteria examined are:

- Effectiveness: How well the assistance program helps households manage and pay their water bills.
- Efficiency: How timely and impactful the relief is compared to the program's administrative costs.
- Equity: How to treat households in similar situations fairly, ensuring that help goes to the communities that most need it.

This assessment reviewed several federal assistance programs, checking their eligibility rules, funding sources, and administrative setups. The assessment then compared these

programs against the criteria of effectiveness, efficiency, and equity. This approach provides Washington state with useful insights into developing and implementing similar programs for water and wastewater. The following summarizes CAPs from the federal government, other states, and city-wide initiatives.

Case Studies

This review looks at programs that assist low-income households at the federal, state, and local levels. It examines program structure, funding, management, and how eligibility is determined. The review also assesses the outcomes of these programs to find effective methods and potential challenges. Below are the highlights of the programs reviewed, with more details provided in **Appendix A**.

Federal Programs

Two federal programs for low-income assistance were assessed: the Low-Income Home Energy Assistance Program (LIHEAP) and the short-term 2019 Coronavirus pandemic program LIHWAP.

LIHEAP

A vital program for low-income households in the U.S., LIHEAP helps low income households pay their energy bills.

> **LIHEAP Case Study, New York**
>
> LIHEAP is managed by the Office of Temporary and Disability Assistance and local social service departments. The Mass Authorization (Autopay) process makes it easier to distribute benefits and reach eligible households by automatically providing assistance to those who already receive SNAP or TANF. A tiered system based on income levels ensures that lower-income households receive higher benefits. Automation reduces administrative costs and directs more support to households with the lowest incomes.

Funding and Distribution

Funding comes from a variety of federal funding sources, including appropriations and additional federal support during economic crises through the Bipartisan Infrastructure Investment and Jobs Appropriations Act. This funding structure helps build a strong administrative framework and fosters relationships with energy providers. LIHEAP uses a block grant system that combines federal oversight with flexibility for states. This allows states to create strategies that fit their needs. States can use the funds for various types of assistance, including heating, cooling, crisis intervention, and administrative costs, which can be up to 10 percent of the total funds.

Eligibility

The LIHEAP federal statute (Section 2605(b)(2)(b) of Public Law 97- 35) established 150 percent of the poverty guidelines (FPG) as a maximum income level allowed in determining LIHEAP eligibility, except where 60 percent of a state's median income (SMI) is higher (LIHEAP, 2024). States can set their own specific rules, such as stricter income limits or additional factors like household size. States may also allow eligibility for those already receiving benefits from other assistance programs.

Administration

Operates on two levels. Federal laws provide general guidelines, while states decide the specific eligibility criteria, enrollment methods, application deadlines, and assistance amounts.

LIHWAP

This COVID-19 pandemic program was the first federal initiative created to help low-income households pay for drinking water and wastewater services. It addressed a critical gap in support during the pandemic's economic challenges. The Washington program assisted an estimated 18,394 households and at least 58,860 household members. 77percent of LIHWAP-assisted households fell at or below 100 percent of the FPG, with 59 percent of households served having extremely low incomes (under 75 percent of the FPG). In 2023, 75 percent of the federal poverty level equated to $22,500 annually for a family of four (Sarensen 2025). Funding was not provided for the program on an ongoing basis.

Eligibility

Similar to LIHEAP, LIHWAP helps disadvantaged populations and households with income limits. To qualify, households had to earn 150 percent or less of the FPG or 60 percent or less of their state's median income. This ensured that assistance reached those who needed it the most. By June 30, 2023, LIHWAP had helped over one million households nationwide, positively easing financial stress.

Administration

LIHWAP was organized to use different levels of government and community resources to speed up its implementation. State agencies received block grants to create local plans that address water affordability issues. These plans outlined how benefits would be distributed in each state.

State-Level Programs

Maine, Maryland, Michigan, Minnesota, and Washington were selected for analysis due to their various state-level assistance programs and other important features.

Eligibility

Programs that provide financial help based on household income, like Michigan's proposed water affordability program, ensure that assistance goes to those who need it. Michigan plans to limit water costs to 2-3 percent of a household's income. This way, those facing more financial difficulty receive more support.

Administration

The way assistance programs are designed affects how easily they are accessed, how efficiently they run, and how well they help those in need. Programs focusing on accessibility understand that many barriers prevent marginalized groups from participating, which can hurt outcomes.

- Washington's Clean Energy Credits Grant Program shows that having a private contractor manage a program can help coordinate eligibility determination across many different utilities' service areas.

- Maine's water assistance program uses direct payments to utilities to make getting help easier while keeping the program strong. Maine Housing pays water utilities directly for low-income customers, ensuring they do not lose water service and reducing inconvenience for those receiving help.

- Minnesota's financial programs took advantage of existing systems to deliver assistance effectively and ensure long-term funding. Some programs function through established property tax systems, adding minimal extra costs.

Success Criteria

The analyzed state programs showed different levels of effectiveness, efficiency, and equity in funding and management. Programs like Minnesota's Fiscal Disparities Program, and Local Government Aid have shown they can provide meaningful help over time. In contrast, Maine's short-term program funded by the American Rescue Plan Act, and Washington's Clean Energy Credits helped residents in need but were not permanent and did not solve systemic affordability issues. Regarding efficiency, programs that made administration easier through direct payments, such as Maine's water assistance program, reduced administrative burdens for those receiving help.

Bay Restoration Fund Case Study, Maryland

The Bay Restoration Fund collects a monthly fee from each Maryland home that uses a wastewater treatment plant or septic system. This fund supports efforts to reduce nitrogen pollution in Chesapeake Bay. Households that regularly pay their bills are charged a $5 monthly fee. For users of onsite sewage disposal systems or sewage holding tanks who do not receive a water bill, there is a $60 annual fee. Fees from wastewater treatment plant users bring in about $100 million each year. This funding is separate from yearly budget decisions and directly supports the program's goals.

Local-Level Programs

We evaluated seven cities to understand different ways of delivering assistance programs. The cities included Seattle and Bellevue, Washington; Madison, Wisconsin; Detroit, Michigan; Portland, Oregon; Austin, Texas; and Philadelphia, Pennsylvania. We also considered the differences between fixed discounts and income-based approaches for enrollment and funding.

Funding and Distribution

In the U.S., approximately 14 percent of utilities with CAPs pay for these through their budgets or rates (EPA 2016). Cities like Seattle, Bellevue, Philadelphia, and Austin have created funding models that support their assistance programs through utility rates.

In Seattle, all customers help fund the program through utility rates. Bellevue also pays for its Utility Bill Assistance program by spreading the costs across all customers through rates and community-based programs funded through donations and city matches.

Philadelphia funds its program by charging approximately 26 cents for every 1,000 gallons of water used. This charge is part of the overall rate and ensures that all customers share the program costs. Households that use more water pay more, which supports conservation pricing without negatively impacting lower-income households. This system also creates a reliable funding source that changes with water usage and provides steady revenue. Austin Water has a similar charge of 30 cents for every 1,000 gallons of water used each month for customers who do not qualify for CAPs, and this helps fund the CAP program.

Assistance Approaches

Two main approaches to offer longer term aid: fixed discounts on standard rates and income-based rates were observed. Discount programs, like Seattle's Utility Discount Program and Madison's CAP, lower water bills by a set percentage for qualifying households. For example, Seattle offers a 50 percent discount, while Madison provides a monthly credit between $20 and $30.

In contrast, income-based programs, like Philadelphia's Tiered Assistance Program and Detroit's Water Affordability Program, limit water bills to a percentage of a household's income, typically between 2 and 4 percent, regardless of how much water is used. These programs define affordability based on what households can pay rather than simply providing a discount on standard rates. In Philadelphia, some of the lowest-income households might see their bills drop by as much as 85 percent compared to regular rates.

The difference between discount-based and income-based approaches shows varying ideas about equity in utility rates. Discount models focus on reducing the normal cost of service, while income-based models prioritize what households can afford when determining their bills. This difference adds to the challenges in both the technical and political sides of designing water assistance programs.

Administration

Philadelphia has created a progressive way to manage water assistance by using existing public data systems. The city's water department has signed data-sharing agreements with several agencies. This allows them to check eligibility quickly. They can find eligible households automatically by looking at Supplemental Nutrition Assistance Program (SNAP), Temporary Assistance for Needy Families (TANF), and Medicaid enrollment data. Once identified, they send pre-qualification letters directly to these households. The application process is simple, requiring minimal documentation from households that have already

been pre-identified. Philadelphia has passed laws to support these data-sharing agreements and has set strict privacy rules to protect personal information while ensuring the process is accessible. This system has helped Philadelphia reach one of the highest enrollment rates for water assistance programs in large cities, with approximately 60,000 households enrolled as of 2024.

Portland will soon start a pilot Smart Discount Program that automatically enrolls low-income customers. The City will use a supervised machine learning algorithm to look at utility account data and public information. This will help identify eligible customers and apply the discount automatically. The program aims to reduce the administrative burden for both customers and the utility, which could lead to more households enrolling and greater accessibility.

For more information on federal, state, and local CAP case studies, see **Appenidx A**.

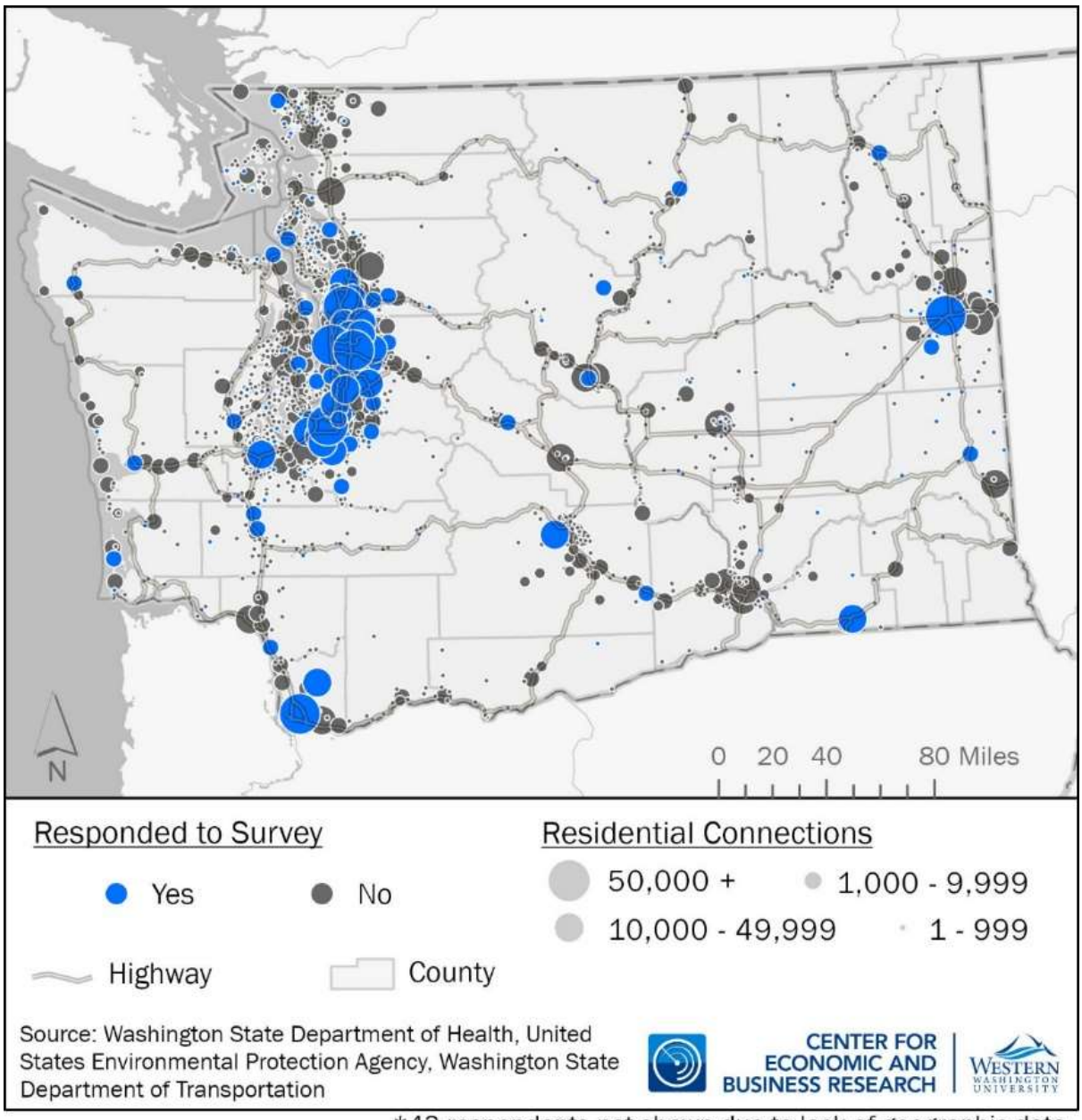
Survey Results

This study surveyed water service providers to check the status of CAPs available to households (see **Appendix B**). The survey included questions about:

- Whether they offered low-income CAPs.
- Estimated participation rates.
- Estimated number of qualifying households.
- Challenges faced in implementation.

Approximately 5,300 water and wastewater utilities in Washington state received the survey via email. A total of 239 providers responded, with 196 responses usable.[8] Figure 3 shows where these providers are located and the number of connections.

[8] See **Appendix D** for details about the challenges encountered in obtaining a complete email list of providers.



*43 respondents not shown due to lack of geographic data.

Figure 3. Statewide Providers and Respondents to Survey by Location and Size

The 196 respondents represent approximately 1.3 million residential connections, or approximately 50 percent of the 2.5 million total CWS connections in the state (Table 1).

Table 1. Statewide Providers and Survey Respondents, by Size

Size	Statewide Total (1)		Survey Respondents (2)	
Range of connections	Providers	Connections	Providers	Connections
Greater than 50,000	6	650,140	6	650,140
Between 49,999 and 10,000	50	1,054,715	20	459,190
Between 9,999 and 1,000	178	612,024	39	163,858
Between 999 and 15	1,967	226,554	131	26,063
Total	**2,201**	**2,543,433**	**196**	**1,299,251**

Sources: (1) Washington State Department of Health, (2) Stantec

Below are the key findings from the survey:

- Out of 196 respondents, 28 reported that **they offer a low-income household CAP** (Table 2). These providers serve a total of **712,000 residential connections** out of 2.5 million in the state.

- Among the water service providers that offer a CAP, 60 percent have **less than 10 percent of eligible households enrolled in the program.**[9] Survey respondents reported factors that contribute to the low enrollment include limited customer awareness, complicated application processes and the eligibility requirements, staffing shortages and lack of funding.

- Of the 196 survey respondents, 146 (75 percent) did not know how many households in their service areas might be eligible for a CAP, showing a significant need for more data collection to inform the development of a statewide CAP.

- Additionally, 118 providers, serving a combined total of 425,000 residential connections, reported that they do not offer any type of CAP.

Providers that serve over 10,000 residential connections account for 85 percent of the total connections reported in the survey. All six of the largest providers, which serve more than

[9] The survey asked if there were the following types of CAPs: low-income assistance, discounts for seniors, assistance for people with disabilities, and emergency assistance programs.

50,000 residential connections, responded to the survey (Table 1). The number of providers that responded decreased as the size of the providers got smaller.

Smaller providers are less likely to offer low-income assistance programs than larger providers (Table 2). Approximately 50 percent of the largest providers, which serve more than 50,000 connections, offer these programs. For providers serving between 1,000 and 9,999 connections, only 25 percent provide low-income assistance CAPs. Among the smallest providers, only 4 percent offer low-income CAPs.

Table 2. Statewide Providers Delivering a Low-Income Customer Assistance Programs by Size

Size	Statewide Providers (1)	Respondents (2)		Report Low-Income CAP	
Range of connections		Providers	Percent of Total	Providers	Percent of Total
Greater than 50,000	6	6	100%	3	50%
Between 49,999 and 10,000	50	20	40%	11	55%
Between 9,999 and 1,000	178	39	22%	10	25%
Between 999 and 15	1,967	131	7%	4	4%
Total	2,201	196	9%.	28	14%

Sources: (1) Washington State Department of Health, (2) Stantec

For more information on the survey results, see **Appendix B.**

Existing CAPS Conclusions

A review of water and wastewater affordability assistance programs at the federal, state, and local levels shows many different program models can be successful. The study found that some utilities in Washington state have created their own programs to help households afford water and wastewater services. However, not every utility has such a program and utilities that provide a local CAP report participation rate of approximately 10 percent.

Additionally, we found that there is a lack of information. Over 70 percent of the surveyed providers did not know how many single-family homes qualify for their existing assistance programs.

Recommendations for the Design of a Statewide Drinking Water and Wastewater Utility Assistance Program

The recommendations in this study are those of DOH and Commerce, informed by advice and discussions that took place over the six months the AC met. Please see the acknowledgements at the beginning of this report for a list of all AC members.

The budget proviso required recommendations on specific topics. In addition to these topics, this report includes further recommendations to support the development of a statewide CAP that can address the affordability challenge.

Budget Proviso Required Recommendations

The budget proviso requested recommendations on the following topics:

- Ongoing data collection on water-related assistance needs of households.
- Intake coordination and data sharing across statewide programs serving low-income households.
- Program eligibility.
- Multilingual services.
- Outreach and community engagement.
- Program administration.
- Funding.
- Reporting.

Each topic is discussed below in detail.

Ongoing Data Collection on Water-Related Assistance Need of Households

The need for better data about drinking water and wastewater providers cost of service, service areas, socioeconomic characteristics, size, geographic location and infrastructure were known prior to this study. Confirming this need is the language from proposed House Bill 1690, considered in the most recent Legislative session, which accurately stated:

> *The legislature finds that the lack of comprehensive statewide information on the status of water and sewer systems and the upgrades that are needed for these systems is of critical environmental, public health, and economic consequence to the state.*

Although House Bill 1690 did not make it out of committee and therefore does not represent a statement from the legislature, the proposed language affirms the need for better data.

In addition to addressing the data gaps and limitations is the need to identify an entity to serve as the manager for provider data. Data management includes developing a central collection system and repository and dissemination of data. For example, North Carolina's Department of Environmental Quality, Division of Water Infrastructure, funds the University of North Carolina Environmental Finance Center (EFC) to maintain and report information about drinking water and wastewater utilities located within the state (UNC n.d.). The EFC's dashboard of data assists North Carolina utility managers and local officials to benchmark residential water and wastewater rates against multiple attributes including system characteristics, customer base, socioeconomic conditions and geography.

Washington state, DOH and ECY have dashboards for data. The state supports Results Washington (Washinton state n.d.) which provides links to various agencies' dashboard. DOH supports the Washington Tracking Network providing information on various health outcomes throughout the state and limited data on drinking water systems (DOH n.d.). Through ECY's webpage there is access to the Washington state Residential Utility Rates Dashboard, reporting on wastewater and stormwater providers, including provider name, rate, rate versus income data and availability of CAPs (ECY n.d.).

Improving these existing Washington state dashboards, beginning with a data collection effort including but not limited to data from both CWSs and POTWs about: rates, connections, service area boundaries, household income within service area boundaries would provide decision makers with a tool to help inform fact-based policies. An improved tool could provide the data necessary to inform the state about the on-going water service cost burden. For example, if such a tool currently existed in Washington state, the majority of work completed under this study would have focused more on data analysis and less on data gathering. The information provided to utility industry experts, local governments and the state is a public benefit provided by state investment.

Intake Coordination and Data Sharing Across Statewide Programs Serving Low-Income Households

The recommendation to utilize categorical eligibility for part of the CAP may require data sharing across the statewide agencies that manage the TANF, SNAP, and Supplemental Security Income (SSI) programs. This effort will leverage the procedures already in place in the management of LIHEAP, LIHWAP and the Clean Energy Credits for Washington Families.

Program Eligibility

Some assistance programs, for example LIHEAP, determine eligibility on the basis of income and may define a household as "categorically" eligible, also referred to as "automatically" eligible, if at least one person in that household receives assistance under TANF, SNAP or SSI.

Categorical eligibility can help reduce the administrative costs of determining eligibility and is already being used at the state level in several assistance programs and should be considered for use in a statewide low-income water CAP. It frequently results in an equal payment amount being distributed to qualifying households. For example, the Clean Energy Credits for Washington Families reduced 675,000 qualifying Washington households' electric bills by $200 each. Because this eligibility criteria provides the same amount of benefit to qualifying households it is often referred to as an equality-based criteria.

Some assistance programs, such as Michigan's proposed program, set a goal that "*Customer payment not to exceed 2% of average household income in first tier; 3% of average household income in second tier.*" (Michigan Water Plan n.d.). This goal would be based on the RI of households and requires both information about income and provider-specific water bills. The RI-based eligibility criteria prioritize those households most in need, e.g., paying the highest percentage of income to water service bills. Because this eligibility prioritizes need based on cost burden instead of providing the same amount of benefit to qualifying households, it is often referred to as an equity-based criteria.

The advantages and disadvantages of each type of eligibility criteria are discussed below.

Equity-Based Indexed Metric

The advantage of the equity-based approach is that it identifies the households with the relative greatest need. For example, two households with similar low-income levels may be facing dissimilar monthly water bills, based on the cost of service of the water providers that serve them. A household that is served by a provider with relatively low water and wastewater rates may be paying 4 percent of its income on water service. This household, while low-income, may not be facing a water service cost burden. Whereas a household with similar income may be served by providers with relatively higher rates and therefore may be paying up over 10 percent of its income on water bills, as the results of this study found. This second household would be considered heavily burdened by its water bills. Therefore, considering income alone does not identify the highest equity outcomes.

One concern of the equity-based approach is the fact that it is data intensive. Using an RI metric to determine eligibility requires significantly more data than basing eligibility on income alone, which would create more administrative burden for the program. The higher the administrative burden could potentially reduce the amount of money available to help low-income households. However, once established and the data management process is developed an equity-based program could provide produce a more efficient outcome.

Because an equity-based model targets benefits appropriate to need, households are not over-subsidized nor are they given an amount that does not help keep them out of crisis. Even if it was more expensive to stand up and set up appropriate data systems for an equity-based model, the program may save costs in the long run through targeted benefits and purposeful efficiency. Such a program may be less susceptible to "government waste" criticism.

The second concern is that the funds may not provide benefits to every providers' households. Providers with relatively lower costs of service could find that they, through their households, receive less assistance than higher cost providers. This may appear to be punishing the low-cost providers and rewarding the high-cost providers. If a high-cost provider has ways to reduce service costs, using an equity-based metric might discourage them from making those utility-level investments to lower cost of service as their households are eligible for equity-based assistance.

This unintended and undesirable outcome could also make funding a program more difficult, particularly if one method of funding the program would include a fee on all water bills. Low-cost providers would be collecting a fee, passing the revenue to the state to fund a statewide program, but not see the funds being returned to the households they serve. This type of income transfer is working in the Chesapeake Bay Restoration Fund Program, where a $5.00 per household surcharge is added to residential users' wastewater bills to fund infrastructure improvements at wastewater treatment plants, thereby improving environmental outcomes and minimizing cost of service increases that might be incurred but for the infrastructure grants and loans. However, the proposed surcharge may have contributed to the failure of the Michigan bill to pass in 2024 legislative session as indicated by the change to the amount of the fee in the reintroduced version of the bill, down from $2.00 per connection to $1.25 per connection.

Equality-Based Metric

The advantage of the equality-based metric addresses one of the possible concerns of the equity-based metrics; relatively minimal data needs and every provider in the state would most likely receive assistance, regardless of their relative cost of service rates. The primary disadvantage is, of course, that it does not target the households with the highest water cost burden first and it provides less surety that the assistance granted is meeting the intended purpose of reducing water burden below the targeted level.

Hybrid of Equity and Equality Based Metric

One possible metric would be to develop a tiered system, where the first tier(s) would be based on an equal metric. Subsequent tiers could be based on equality metrics.

Multilingual Services

This effort could leverage the procedures already in place in the management of LIHEAP, and the Clean Energy Credits for Washington Families. For example, Commerce launched a new, more accessible website at the end of 2024 (Commerce, 2024). The website includes language translation for 10 languages. Currently, content is machine translated with a disclaimer to let users know. Commerce officials said machine translation is the most cost-effective way to provide content in multiple languages for a website the size of Commerce. However, as work continues to improve the website, Commerce pledges that it will identify critical content that should be professionally translated.

Outreach and Community Engagement

This effort could leverage the procedures already in place in the management of LIHEAP, LIHWAP and the Clean Energy Credits for Washington Families. Commerce's Community Engagement team members live in the communities that represent. The team members help connect citizens to resources and assistance via long-term relationships with Tribal leaders and program staff, community-based organizations, elected officials, faith-based and informal community leaders (Commerce n.d.b.).

Program Administration

The state has significant experience administering low-income assistance programs, having administered LIHEAP, LIHWAP and the Washington Families Clean Energy Credits Grant Program.[10] Leveraging this experience with centralized data collection provides administrative efficiencies of a statewide low-income CAP.

However, some CWSs already administer a low-income assistance program. 29 of the 199 water service providers that responded to this study's survey reported having a low-income CAP, representing over 689,000 residential connections. However, those same providers reported less than a 10 percent participation rate of any of the CAPs. Additionally, 147 of the 199 providers that responded to the survey did not know how many of their customer base would be eligible for a CAP. This is not a surprising result, as utilities are not in the business of collecting information about the income of their rate payers. This lends credence to the idea that a state agency, in the business of providing assistance to low-income families, has administrative experience on which a statewide program can capitalize.

There should be consideration of an opt-out provision for utilities that provide local CAPs. Since some water service providers have already developed and implemented a low-income CAP, there was interest in opting out of the state's administration of a program. However, those providers were interested in receiving funding, in the form of a pass-through, from the state should money be provided for a program. The particulars of an opt-out program would require further investigation and negotiation and is recommended in a later phase of the program development.

Funding

There are several possible funding sources for consideration. Stable funding from multiple sources could serve to provide a diverse and more reliable revenue amount that creates a connection between program financing sources and their objectives.

General Fund

Funding a portion of the CAP with monies from the General Fund acknowledges the public benefits provided by reliable water service. Access to clean water as a public benefit protects public health by ensuring proper hygiene and sanitation, reducing the spread of

[10] The Washington Families Clean Energy Grants Program was administered through the engagement of Promise. Throughout the country, Promise helps government agencies more effectively reach out to and enroll eligible participants into affordability programs.

infectious diseases. Additionally, affordable water and wastewater services support economic stability by allowing families to afford essentials like food, rent, and medicine, reducing cascading effects of financial strain, such as the inability to cover other expenses, or deferred home maintenance. Lastly, affordable water and wastewater services prevent housing instability, and reduce the risk of evictions, homelessness, and health crises that often result from unaffordable utility bills lessening the demand for housing assistance, emergency healthcare, and social safety net programs by helping households remain self-sufficient. Therefore, the state's General Fund should help support the CAP for water services.

Public Utility Tax Reallocation

Drinking water utilities pay 5.029 percent public tax to the state (Department of Revenue n.d.). A portion of the tax is paid into the Public Works Assistance Account; however, 4.6 percent of the tax goes directly to the General Fund. This recommendation suggests that the legislature consider dedicating some portion of the 4.6 percent to a statewide low-income assistance program. The link between revenue source and use of the funds is clear and logical. This recommendation suggests a reallocation of funds from the General Fund, and not an increase in the tax rate. By reallocating the fund but not raising the tax rate utilities would not increase beyond what they are already pays. This recommendation also strongly suggests that the reallocation would not take money away from the Public Works Assistance Account, as it is that portion that currently goes to the General Fund.

Affordable Housing Funding

Affordable utility bills are a necessary component of affordable housing costs. As such, the state could dedicate additional affordable housing dollars to assist low-income households in paying water service bills and avoiding shutoffs. The Washington State Community Action Partnership states that once housing costs exceed 30 percent of income, it becomes "near impossible" to cover other basic expenses (Washington State Community Action Partnership n.d.). Housing costs include rent, mortgage payments, property taxes, insurance and utilities.

Climate Commitment Act

The Climate Commitment Act (CCA) prioritizes environmental justice and equity. In addition to funds going to communities that bear the greatest burdens from air pollution, funds also go to programs that address health disparities across the state (Commerce n.d.a.). Specifically, a minimum of 35 percent of investments must provide direct and meaningful benefits to vulnerable populations within the boundaries of the identified overburdened communities. (NCEL n.d.a.).

Disparities in water service costs exist because low-income households face the same rates as higher income households. As such a low-income household can pay the same amount for water service as a higher income household, which translates into the low-income household paying a much higher percent of income than a high-income household. This disparity, in the percentage of income spent on water service, could be argued to be the type of disparity that the CCA is seeking to lessen.

One of the drawbacks of using CCA funds to pay for a portion of the low-income water CAP is that the funds are temporary. As fossil fuel use declines in the state, so do the purchases of credits and therefore the revenue for the CAP. However, even in the short run CCA money could be useful as other funding mechanisms are found and/or ways of reducing providers' cost of service are found.

Recurring Fee on Water Providers' Bills

A fee, added to water utility customer recurring bills, should also be considered. This fee could be applied to water service connections across the state. A fee is how Maryland pays for the Chesapeake Bay Fund and it is in the proposed legislation in front of the Michigan State Legislature. The idea of a fee met with concern at the AC meetings, however. Larger drinking water providers stated that a fee that would go to the state, for redistribution throughout the state could be difficult for policy makers. Additionally, AC members pointed out that such a fee has the unintended consequence of increasing water bills and could drive up need for assistance beyond current levels. While there is not clear stakeholder support for a fee, studying the fee option in the first phase of the program (see below) may be warranted. Some water service providers with limited staff resources to administer a program may well still be interested in a fee, although less desirable than money provided directly from the state.

Reporting

This effort could leverage the procedures already in place in the management of LIHEAP, LIHWAP and the Clean Energy Credits for Washington Families, including the following performance measures (Berahzer et al., 2023).

- Number and percentage of eligible households receiving assistance.
- Decreases in outstanding water and wastewater bill balances of eligible households.
- Estimated number and percentage of applicants not receiving assistance (by reason).
- Average number of days from participant application to receipt of assistance funds.
- Number and percent of recipients by service provider size.
- Number and percent of funds distributed to economically disadvantaged rural communities.
- Average reduction in water cost burden for recipients.

Other Possible Program Elements and Recommendations

In addition to recommendations requested in the budget proviso language, there are several other ideas that emerged from discussion among the AC members that the legislature may want to address.

- Using a phased approach to develop a CAP (objectives for the first two phases are also recommended).

- Identifying possible future expansion of the scope of the statewide affordability CAP.

- Identifying ways to lower the overall providers' cost of service, which would reduce households' cost burdens by reducing water service rates.

Each of these ideas is discussed below.

Phased Approach to a Statewide Low-Income CAP

Current data limitations and uncertainty about funding sources present barriers to the successful development of a statewide CAP. One way around these challenges and uncertainties is to adopt a phased approach to program development that would increase the certainty of establishing a robust and efficient program.

- **Phase 1, Build a Foundation of Data and Information.** Given the known data limitations in estimating the cost burden and uncertainty about possible funding sources, the first phase of the program would focus on building the foundation of the program. Specifically filling data gaps, establishing the funding sources, refining the estimate of program need as well as identifying an agency to implement a comprehensive data collection effort and develop a data dashboard

- **Phase 2, and Beyond.** Subsequent phases of the program could implement a pilot program, prioritizing those providers with the highest RI scores, or utilize categorical eligibility to expedite providing needed assistance to households. The goal of the pilot program is to slowly rollout the monitoring and reporting informing adaptations to the program that can help increase the certainty that an expanded program is efficient and sustainable.

Possible Scope Expansion Elements

The recommendations for a statewide CAP focus on providing assistance to eligible households in the form of a reduction in monthly or bi-monthly water service bills. However, there are other forms of assistance that should be considered in future phases of a CAP, described below.

Investigating Potential Opportunities to Provide Assistance for Household Repairs

A Washington state CAP could offer home repairs for broken water and wastewater infrastructure. This would be similar to the LIHEAP program, which the U.S. Department of Energy funds, which can be used to provide residential weatherization or other energy-related home repairs (U.S. Department of Energy n.d.).

The advantage of offering household repairs is the ability to reduce inefficient water use, maintain a lower water bill and potentially assist families from abandoning a home with broken plumbing. Broken pipes can waste water, creating higher than average bills and be prohibitively expensive to repair. Without the repairs, a household could end up with another

unaffordable water bill very shortly after receiving assistance to pay a bill incurred when fixtures were broken.

One of the disadvantages of offering assistance for household repairs is an administrative question. What is the best way to provide the assistance and ensure that the repairs are carried out? The administration of such a program could be cumbersome and expensive, reducing the amount of funds available for assistance.

Investigating Mechanisms to Provide Balanced Shut-off Protections for Disadvantaged Populations, Including Seniors, Families with Children, and People with Medical Needs

During the Covid pandemic, in 2020, Governor Inslee called upon utilities to suspend water shut-offs for failure to pay for those households impacted during the state of emergency. In 2023, Washington state passed legislation to ensure power and water remain connected during National Weather Service heat warnings. The AC members had two dissimilar views of a suspension of shut-offs therefore more study is recommended.

Eliminate Barriers to the Provision of Assistance to Low-Income Renters

Renters whose water service payment is included in their rental payment are often left behind in CAPs. A statewide assistance program could focus on extending benefits to low-income renters. While there were not enough resources to fully study this issue, it remains a concept the state should further assess in the future.

Actions to Reduce Cost of Water Service and Increase Federal Support

The affordability challenge can be addressed through assistance to households, and/or through reduction of providers' cost of service. Historically, the federal government helped reduce the cost of water service by providing grants to build infrastructure (Davis, 2017). Efforts to reduce providers' cost of service can begin to make up for this loss in federal funding, particularly when facing the challenge of replacing aging infrastructure and increasing costs. Three ideas seem likely to provide significant benefit are summarized below and discussed in detail in Appendix F.

Improving Bond Ratings

Currently, water and sewer districts are ineligible for Office of the State Treasurer ("OST") Local Option Capital Asset Lending Program because they are not taxing authorities. As such, water and sewer districts face higher interest rates on capital projects. For example, an average financed project of $2.5 million dollars financed with a bond at 4 percent would cost the district $1.4 million in interest. The same project, funded with a Public Works Board bond at 1 percent would cost the district $270.5 thousand, a cost savings of over 1.1 million over a 20-year payback (McMillian 2025). See Appendix F for details about the required changes to regulations needed, and the potential savings affording providers.

Accessing the Potential to Consolidate Some of the State's over 2,200 Group A Drinking Water Providers

Smaller CWSs, e.g., those serving relatively fewer connections than large providers, can be less financially resilient to escalating costs of service and have more difficulty adjusting to regulatory changes. In many areas and specific cases, opportunities exist to lower the overall cost of service by regionalizing the provision of safe and reliable drinking water through consolidations or restructuring of struggling or failing systems, and to achieve better economies of scale for water and wastewater provision. Savings from local resource sharing can be used for needed improvements, funding reserves, or paying debts and are especially useful in rural areas where operators and specialized staff are less accessible.

In Washington the size of CWSs varies widely. 1,967 (89 percent of the total) of the 2,200 group A CWSs serve an average 115 connections (these are the CWSs classified as small). Another 178 CWSs, classified as medium, serve an average of 3,438 connections. Over 40 percent of the connections of these small and medium CWSs are estimated to have water bills that are above the cost burden threshold of 2 percent of LQI. The study recommends that the Legislature consider a program to study possible cost savings measure for some of these CWSs.

Support EPA's Recommendation for a Federally Funded Low-Income Assistance Program

Another way to provide assistance to low-income households is to support the call of both EPA and industry trade organizations for a federally funded low-income assistance program (EPA 2024, Berahzer et al., 2023). In the 2023 research supported by the American Water Works Association, the Association of Metropolitan Water Agencies, the National Association of Clean water Agencies, the National Association of Water Companies and the Water Education Foundation entitled *Low-Income Water Customer Assistance Program Assessment*, the authors write (Berahzer et al., 2023, page E-1, emphasis added).

> *…water affordability has become an acute challenge for many economically disadvantaged households. Federal, state, and local actors must collaborate to enable system investment while ensuring that households can afford life-essential water services.* ***A federally funded low-income assistance program can be an important component of that collaboration.***

Recommendation Conclusions

Table 3 summarizes the recommendations by phase.

Table 3. Legislature's Requested Recommendations by Program Phase

Recommendation Category	Phase 1 Foundation Development	Phase 2 & Beyond Distributions
Objective	Fill data gaps, study feasibility of proposed funding sources	Pilot program distributions, adaptations based on reporting and data analysis
A. Ongoing data collection on water-related assistance needs of households		
Lead agency(ies)	Identify	Refine management
Data management team	Identify and fund team	Maintain systems
Provider-specific data	develop database and data collection protocols	Maintain systems
Demographic /Income	develop database & data collection protocols	Maintain systems
Dashboard	NA	Develop or build on ECY's existing platform
B. Intake coordination and data sharing across statewide programs serving low-income households		
	Based on LIHEAP/LIHWAP	Implement
C. Program eligibility		
Categorical Eligibility	Refine categorical approach, confirm data sharing and communication across agencies	Utilize for pilot program and beyond
Refine eligibility for bill assistance	NA	Consider adding an equity-based eligibility criterion
Scope expansion	NA	Study 1) inclusion of home repairs to infrastructure, 2) expansion of bill assistance to renters, 3) shut-off actions
D. Multilingual services		
	Based on LIHEAP/LIHWAP	Implement
E. Outreach and community engagement		
	Based on LIHEAP/LIHWAP	Implement
F. Program Administration		
	Based on LIHEAP/LIHWAP	Implement
G. Funding		
General Fund	Refine estimate of need	Funding implemented
Public Utility Tax	Address legal and political requirements for changing current distribution of funds	Funding implemented
Connection surcharge	Further explore providers' concerns/interest	Continued exploration
Affordable Housing fund	Address reallocation of existing funds	Funding implemented

Recommendation Category	Phase 1 Foundation Development	Phase 2 & Beyond Distributions
Climate Commitment Act	Address legal and political requirements for distribution of funding	Funding implemented
Other	Explore	Explore
H. Reporting	Based on LIHEAP/LIHWAP	Implement

Review of Low-Income Water and Wastewater Service Cost Burden

Introduction and Objectives

The water industry has not agreed on a clear definition of what a cost burden is for low-income households. The EPA says that a household experiences undue hardship when its combined water and wastewater bill exceeds 4.5 percent of its income (EPA 2024b). Some researchers argue that a better way to measure affordability is by looking at how many hours a minimum-wage worker would need to work to pay for their water bill.

No matter how the cost burden is measured, experts, water service providers, and policymakers recognize that not paying for water services can worsen public health problems and increase social and economic inequality and psychosocial distress (Gaber, et.al., 2020, Zhang, et.al., 2023). Understanding how big the cost burden issue is in Washington state is the first step in creating a workable and fair program that includes input from stakeholders.

This section of the report examines how much water and wastewater bills cost low-income households in Washington state. Since there is no clear definition of what makes these costs affordable, a review of existing literature on affordability was the first step. Then, an analysis of the cost burden faced by Washington state residents was conducted and measured. The key questions this section addresses are:

1. How is affordability measured?
2. How much do low-income households in Washington state pay for water and wastewater bills?
3. Are low-income households in Washington state concerned about affordability?[11]
4. What is the estimated revenue needed to support a low-income CAP?

This section explains how the research questions are answered. It describes the chosen way to measure affordability, the main sources of data used, and any key limitations of the methods. The results are also discussed by highlighting important trends, concerns, and possible next steps for further analysis. Additional supporting figures, tables, and details are provided in the appendices.

[11] Affordability refers to how easily a household can pay for basic water services like drinking, cooking, cleaning, and sanitation without facing financial strain. The American Water Works Association (Patterson, L.A., 2021) defines this ability as household affordability. The term "undue hardship," which describes too much financial strain, varies in meaning. The EPA states that undue hardship occurs when a household's water and wastewater bill exceeds 4.5 percent of its annual income (EPA, 2024b).

Literature Review of Affordability Measurements

Unlike general accounting or cost-of-service principles that help manage utilities, no national standards for measuring affordability exist. The EPA's guidance for the *Clean Water Act Financial Capability Assessment Guidance (EPA 2024)* highlights how complex affordability is and how researchers and water systems evaluate it. While there might not be one perfect way to assess affordability, using a range of metrics to create a complete picture provides useful information. The insights gained from these affordability metrics can differ based on whether they focus on community-level or household-level affordability.

Community-level metrics examine the incomes of households in a certain area. A common measure is median household income (MHI), which shows that half of households earn more, and half earn less. MHI is often used to compare the cost of water and wastewater services to community income.[12] While MHI helps in comparing income and service costs between different communities, it does not fully reflect the financial situation of lower-income households (Patterson). The EPA's *Clean Water Act Financial Capability Assessment Guidance* uses three community-level metrics: the Residential Indicator, the Financial Capability Indicator, and the Lowest Quintile Poverty Indicator.

- The Residential Indicator shows how much each household pays for services compared to the area's MHI.
- The Financial Capability Indicator evaluates how well a municipality or wastewater utility managed its finances and demographics compared to national standards.
- The Lowest Quintile Poverty Indicator measures how serious and widespread poverty is in the community's service area.

The community-level metrics, created to assess how well systems meet the financial needs for critical infrastructure, can also help evaluate the overall affordability of the infrastructure.

Measuring water costs at the household level is becoming a popular way to explain and show affordability. One useful metric is the Income Dedicated to Water Services, which looks at the percentage of household income spent on water services. Some researchers support this method (Cardoso & Wichman 2022a, Patterson et al., 2023). By combining this metric with a specific affordability threshold, a water system can estimate how many households in its area struggle to pay for these services. However, experts disagree on the right threshold value, and different values can lead to different policy actions.

If the MHI metric is used, a threshold of 3 (EPA 2024a) to 4.5 percent of household income (Cardoso & Wichman 2022, Berahzer et al., 2023, Mack & Wrase 2017) is accepted for combined drinking water and wastewater costs. However, some suggest different threshold

[12] Many metrics use a modified version of MHI called area median income. This measure still looks at income levels in specific communities, but it can be tailored to fit different service areas.

levels to make water bills equitable for CAP households. For example, the *2023 Low-Income Water Customer Assistance Program Assessment* offered a range of cost burden thresholds for combined water and wastewater costs (Berahzer et al., 2023) (Figure 4):

- **Equal Cost Approach:** Low- and medium-income households pay a higher percentage of their income for water and wastewater services compared to higher-income households (see Threshold #1 in Figure 4). This means everyone pays the same cost, representing a different share of their income.

- **Equal Percentage Approach**: All households pay the same percentage of their income for water and wastewater services, no matter their income level (see Threshold #2 and Threshold #3 in Figure 4).

- **Progressive Approach**: Low-income households pay a smaller percentage of their income for water and wastewater services compared to higher-income households (see Threshold #4 in Figure 4).

Income Range	Threshold #1	Threshold #2	Threshold #3	Threshold #4
<$10,000	8%	4.5%	3%	2.0%
$10,000 - $14,999	7%	4.5%	3%	2.5%
$15,000 - $24,999	6%	4.5%	3%	3.0%
$25,000 - $34,999	5%	4.5%	3%	3.5%
$35,000 - $49,999	4%	4.5%	3%	4.0%
$50,000 - $74,999	3%	4.5%	3%	4.5%

Source: Berahzer et al., 2023

Figure 4. Water Services as a Percentage of Income by Affordability Threshold

Some newer metrics, like AR20 Affordability Ratio and Hours of Minimum Wage (HM), can provide insights into water affordability at the household level. AR20 looks at how a water system's prices compare to the disposable income of households at the 20th percentile. Meanwhile, HM looks at how many hours a household earning minimum wage needs to work to pay for monthly water and wastewater services. These measures were first proposed by Teodoro in 2018 and expanded in 2019 (Teodoro & Saywitz). In 2024, a nationwide report (Teodoro & Thiele) used these measures to show a six-year trend of decreasing affordability. The report found that fewer low-income communities can afford water services, contributing to a decline in national affordability.

HM is rarely used alone to measure affordability, as fewer workers nationally earn minimum wage. For example, HM's ability to measure affordability is limited when the local area median income is high, suggesting very few customers earn minimum wage, which reduces the impact of a high HM value on the community. Inversely, HM works better in areas where the area median income is lower and wages are closer to the minimum wage. HM is almost

always combined with another metric to provide a clearer picture of affordable living for households or communities.

Some of the best answers to questions about affordability use different types of data and metrics. For example, Thiele et al. (2024) looked at information from the U.S. Census Bureau, the University of Wisconsin-Madison, and the Wisconsin Public Service Commission to create a comprehensive financial score for every water utility in Wisconsin, except cooperatives. The financial scores had two main benefits:

1. The Wisconsin Public Service Commission gathered financial information from public and private water systems, including current customer rates. This helped combine local socioeconomic data (like MHI) from the U.S. Census Bureau with utility rates.

2. HM was used to measure housing costs to improve the affordability part of the financial score. This included a ratio of the cost of water service to add a progressive element to the analysis.

Combining this information could produce an analysis of affordability for each system. However, Wisconsin collects more data than most states, making it hard to replicate this study elsewhere. Still, it shows that affordability can be determined by using multiple metrics. Resolving data inconsistencies is a key challenge for providers and the state before using these metrics.

In summary, there has been more discussion about how affordable water and wastewater services are. However, there are still questions about whether community-level affordability is enough to guide policy decisions, and which metrics are most useful. Most experts, including the EPA, agree that using a mix of metrics is the best way to assess affordability for households within a water system. Combining community and household metrics gives a clearer picture of how water and wastewater costs affect households.

This study used a modified RI defined by the EPA, replacing the MHI with the LQI to create the RI_{LQI}. A 4.5 percent affordability threshold was set to understand the cost burden of Washington state households. Due to data limitations (summarized in the Recommendation Section and detailed in **Appendix D**), other affordability metrics were not calculated.

Analyzing the Cost Burden of Water Service

To evaluate the need for a statewide low-income CAP program, provider-specific RI values were calculated for water service providers across the state. The provider-specific RIs were also used to both understand the magnitude of the low-income cost burden as well as to estimate a range of program costs.

Methodology for Estimating Provider-Specific Residential Indices

Estimating the provider-specific RI values was a four-step process, namely:

- Obtain a list of all service providers in Washington state.
- Select a stratified random sample of these providers.
- Calculate provider-specific RI values for the sampled providers by:
    - Gathering data, including:
        - Drinking water and wastewater rates from public websites.
        - Service boundaries supplied by the providers.
        - Household income data from the U.S. Census Bureau in Washington state.
    - Estimate the annual water service bills for each provider.
    - Estimate the MHI and LQI for households within the providers service area.
    - Estimate the provider-specific RI values by combining the estimated provider-specific water service bills with the estimated provider-specific LQI and MHI income data.
- Estimate the statewide cost burden by extrapolating the provider-specific RI values of the sampled providers to all of the water service providers in the state.

A detailed explanation of each step follows, including a discussion of data limitations.

Washington State Service Providers

This study looked at the potential cost burden for drinking water (CWS) and wastewater (POTW) providers.

Drinking Water Providers

DOH maintains a database of all CWSs in the state. The database includes details on over 6,894 CWSs, however only 2,201 are classified as Group A[13] Community and Active systems, which are the focus of this study (Bergstrom 2025). The 2,201 CWSs are located throughout the state and vary in size (measured by the number of connections) and ownership type (Figure 5).

The ownership type of the 2,201 CWSs in the state is diverse (Table 4). The CWSs are owned by five different types of organizations. Associations own 29 percent of the systems, while private CWSs account for 23 percent. Special districts own 17 percent, and investor-owned systems make up 18 percent. At 13 percent, the smallest group includes CWSs owned by cities, towns and counties.

Although cities, towns, and counties own the fewest CWSs in the state, they provide water to 62 percent of the state's 2.5 million connections, over 1.5 million households. In contrast,

[13] Group A drinking water providers are systems that serve at least 15 service connections or 25 people each day for 60 days or more (Bengsten 2024b). Community CWSs in Group A regularly serve 15 or more service connections year-round, or 25 or more residents all year long (Bengsten 2024b).

associations and private CWSs, which comprise the largest number of ownership types of the CWSs in the state, serve only 7 percent of the connections.

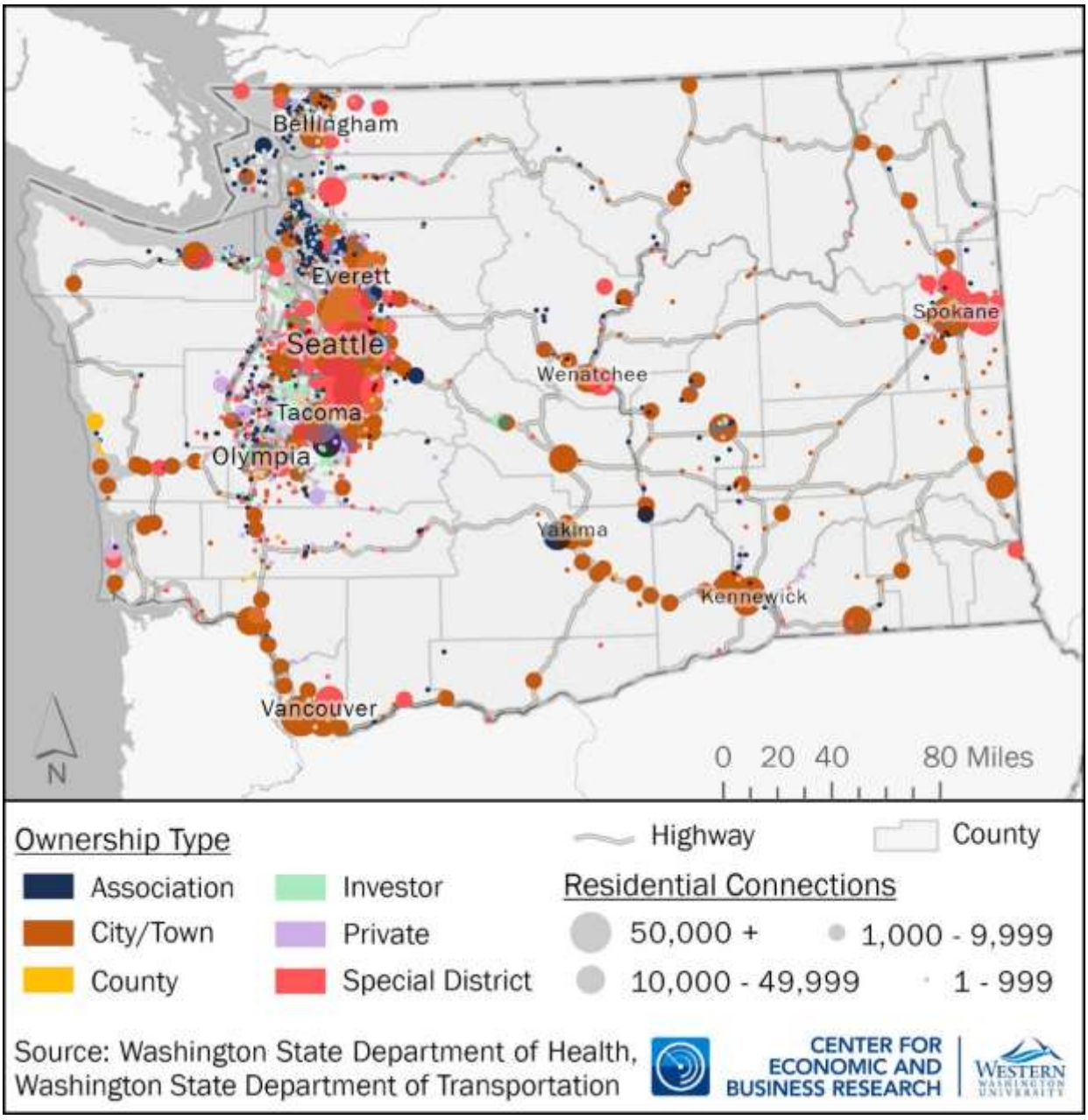


Figure 5. Community Water Services by Size and Ownership Type

CWSs also vary in size. Six CWSs serve more than 50,000 connections each (Table 4). This study refers to these as Mega CWSs, and together they provide water to 26 percent of all residential connections in the state. Alternatively, 1,967 small CWS, classified in this study as those that serve fewer than 1,000 residential connections each, collectively serve 9 percent of the residential connections in the state.

Table 4. Statewide Community Water Services by Size and Ownership Type

Ownership Type	Size (Number of Connections)					
	Mega (greater than 50,000)	Large (49,999 to 10,000)	Medium (9,999 to 1,000)	Small (less than 1,000)	Total	Percent of Total
Number of CWSs						
Association	0	2	10	631	643	29%
City/Town/County	5	27	99	156	287	13%
Investor	0	1	9	367	377	17%
Private	0	2	5	497	504	23%
Special District	1	18	55	316	390	18%
Grand Total	6	50	178	1,967	2,201	100%
Number of Residential Connections						
Association	0	24,513	24,711	52,764	101,988	4%
City/Town/County	570,140	598,401	344,773	54,050	1,567,364	62%
Investor	0	15,902	20,910	33,084	69,896	3%
Private	0	23,881	9,615	35,724	69,220	3%
Special District	80,000	392,018	212,015	50,932	734,965	29%
Grand Total	650,140	1,054,715	612,024	226,554	2,543,433	100%
Average Connection Count per CWS Ownership Type and Size						
Association	NA	12,257	2,471	84	159	NA
City/Town/County	114,028	22,163	3,483	346	5,461	NA
Investor	NA	15,902	2,323	90	185	NA
Private	NA	11,941	1,923	72	137	NA
Special District	80,000	21,779	3,855	161	1,885	NA
Grand Total	108,357	21,094	3,438	115	1,156	NA

Source: Washington State Department of Health

The difference in size and ownership of CWSs in the state is apparent when looking at the average number of residential connections each type serves. Mega CWSs, mostly owned by cities, towns, or counties, serve an average of 108,357 connections each. In contrast, small CWSs serve just 115 connections on average, most of which are run by associations or private groups. This variation in size and ownership of Washington state's CWSs may make it harder to develop a one-size-fits all CAP.

Publicly Owned Treatment Works

The POTWs are not regulated by DOH or the Department of Ecology (ECY) unless the POTW owns and operates a wastewater treatment plant (WWTP) or a combined sewer system. Many POTWs in the state own and operate waste collection and distribution systems but find it more efficient to buy waste treatment services from larger entities that manage WWTPs. For instance, King County owns and operates three WWTPs and provides wholesale wastewater treatment services to 18 cities, 15 local sewer utilities, and the Muckleshoot Indian Tribe in King, Snohomish, and Pierce counties (King County).

Because a comprehensive list of POTWs was not available, the random stratified sampling method used to develop provider-specific RI values for CWSs could not be used to estimate the cost burden of POTWs. Instead, the method used leveraged the fact that many CWSs in the state provide both drinking water and wastewater treatment services. Of the 163 CWSs sampled in the study, 88 also provide wastewater treatment. Therefore, these 88 providers were used as the basis of the extrapolation of all POTWs in the state (Figure 6).

To support the assumption that these 88 combined water service providers adequately represent the cost burden for all POTWs, the list of POTWs included in the study was checked against data reported by ECY. A data dashboard, developed by ECY, shows wastewater rates (ECY n.d.), discount criteria, and compares rates to income for 288 POTWs in the state. A disclaimer on the data dashboard states, "*This dashboard doesn't represent all existing or current data ….*"[14]

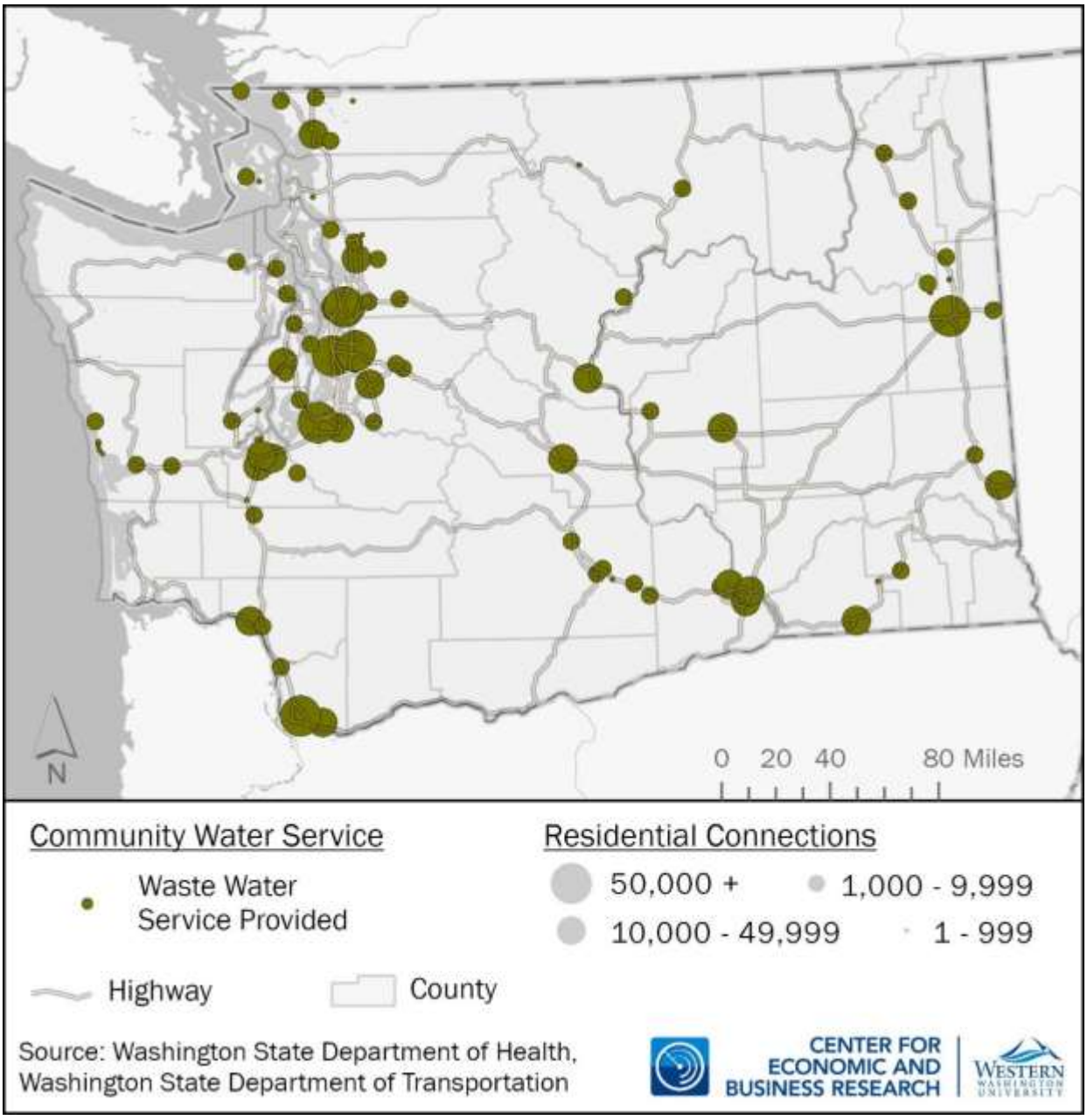
Nearly all of this study's sampled providers were listed on ECY's dashboard however, the dashboard does not provide the POTW's service areas boundaries, the number of connections, or an estimate of the monthly/bi-monthly bill for each POTWs. To make up for this data gap this study assumed the service area boundaries and the number of connections for each CWS as a proxy for the missing POTWs data. This method also assumes that wastewater service costs or providers that serve both drinking water and wastewater services are similar. This approach seemed reasonable and efficient given the data limitations but could be improved upon in subsequent work (Figure 6).[15]

As a result of this approach, to account for POTWs tables reporting results in this study may show different residential connection totals depending on how the data was grouped. For example, a system that provides both drinking water and wastewater will appear in the drinking water only analysis, wastewater only analysis, and combined water services analysis; while a system that provides only drinking water services will appear only in the

[14] See Washington state Residential Utility Rate Dashboard at https://app.powerbigov.us/view?r=eyJrIjoiYWQ3MmM4ZmMtZTA3Mi00MDBhLTkzZTMtODYzMWRhY2IzY2RlIiwidCI6IjExZDBlMjE3LTI2NGUtNDAwYS04YmEwLTU3ZGNjMTI3ZDcyZCJ9.

[15] It is worth noting that this method may not accurately represent the POTWs across the state, as it only assesses the cost of providers that co-administration water and wastewater. Further study could assess whether rates of POTWs that only provider wastewater services may be different from rates of co-administered POTWs. For example, are the POTWs that are administered by CWSs alike in other characteristics (such as MHI or other demographics)?

drinking water analysis. As a result, the connection counts shown in tables throughout this report reflect distinct groupings of data based on service type and are not meant to be added together or interpreted as parts of a shared total. For more information, see **Appendix D**.



Source: Washington State Department of Health.
Note: The connection numbers for the POTWs are not known. For this analysis and the map, the CWS connection numbers were substituted.

Figure 6. Sampled Publicly Owned Treatment Works by Size and Ownership Type

Sampling Plan

Due to the large number of CWSs in the state, a random sample of providers were selected in order to limit the number of providers for which rate and income data was collected. Since all rate data and income data were obtained via web searches of publicly available sources, this stratified random sampling approach successfully limited the number of providers for which data was collected to a manageable number while assuring that the data was representative of all providers in the state. Note there is higher confidence that the sampling approach represents all of the CWSs in the state than the POTWs in the state for the reasons discussed above.

The following steps were taken for the sampling plan:

- Review data for the 2,201 CWSs in the DOH database for completeness, such as checking details like locations, number of connections, and service area boundaries.
- Determine a set of categories (stratum) to guide the sampling plan.
- Randomly select from the full dataset, adjusting the sample as needed due to data limitations.

For more details on this sampling plan, see **Appendix C**.

Residential Indicator

Provider-specific RI values were calculated using two types of income data: the LQI and the MHI from the U.S. Census Bureau. The RI values calculated with the LQI provides a measure of cost burden for low-income households and is referred to in the study as $RI_{LQI.}$ The RI values calculated with the MHI provides a measure of cost burden for moderate-income households and is referred to as $RI_{MHI.}$ While the RI_{MHI} values are not used to estimate the state's water service cost burden, they do serve as a good reference point to compare the cost burden of low-income households to moderate to median income households.

To calculate provider-specific RI values requires three pieces of data: 1) estimated monthly/bi-monthly bills for individual CWSs and POTWs, based on their rates, 2) income data (from the U.S. Census Bureau) by census track, and 3) provider's service area boundaries.

Calculation of CWS and POTW Service Bills

To calculate water service bills for households served by specific water providers, two items were needed: a list of rates from these providers and an estimate of how much water each household uses. Below is a description of how the information about rates and usage was gathered.

Water Rates

There is no public database for drinking water and wastewater service rates in Washington state. Rate data was obtained from the websites of some water systems, and a database

was created with this information.[16] Rates can vary in several ways: some are flat fees, others depend on how much water is used, and some are charged every two months, while others are charged monthly.

Water Usage

An average water usage of 6.93 thousand gallons per month per household was used to estimate water service bills. This estimate assumes a state-wide average of 2.53 people per household (U.S. Census Bureau 2023) and an average daily water use of 90 gallons per person (USGS, NEEF). Assuming an average water use per household is a simplifying assumption made to isolate the impact of water rates on water bills. However, in reality water usage can change significantly by household depending on factors such as the age and type of indoor fixtures, outdoor water use, and temperature.

It may be worth noting that, pairing affordability with conservation education helps ensure that affordability doesn't lead to waste. Also structuring the CAP so that lower water users receive higher discounts can lead to reduced water consumption. The water usage assumption should be reviewed if this approach is used in further data analysis as the CAP is implemented.

Estimation of Provider-Specific Income Data

DOH's drinking water service area data was used to link water service areas with income data specific to census tracts.[17] Income data, which includes MHI and LQI, was obtained from the U.S. Census Bureau's five-year American Community Survey for 2014-2019. Census tracts were used as they are the smallest geographic units that have published income data, providing a detailed breakdown.

Census tracts were matched to CWS service areas using a spatial overlay. Figure 7 shows how census tract boundaries and CWS service areas overlap in the state's Southwest Region. More details, including additional diagrams for CWSs in the Northwest and Eastern regions of the state, can be found in **Appendix C**. Note that water service area boundaries do not always align with census tract boundaries. To estimate the income specific to each water service area from census tract data, a method was developed to average the income data. This method accounts for the variations in income of the households served.

The individual service area income estimates were calculated to deal with the misalignment between census tracts and water service boundaries. These estimates were based on an average of each census tract within a service area, weighted by the percentage of land overlap. Figure 8 shows the challenges of misaligned boundaries, showing examples where a service area overlaps multiple census tracts, often with only partial overlap, and areas that

[16] Only water systems that made their rate data for drinking water and wastewater services available to the public were included in this analysis. For more details about the challenges faced during the rate data collection process, see **Appendix D**.

[17] Since the DOH only maintains oversight of public drinking water systems, the boundary data used in this analysis reflects drinking water service areas only. As a result, the spatial coverage used to estimate income data corresponds specifically to the drinking water systems in the sampled population.

fit entirely within a census tract. Although these income estimates may not capture all variations in income among households, they are useful for identifying trends in communities facing affordability challenges. For more detailed information on how income levels were estimated for individual water areas, see **Appendix C**.

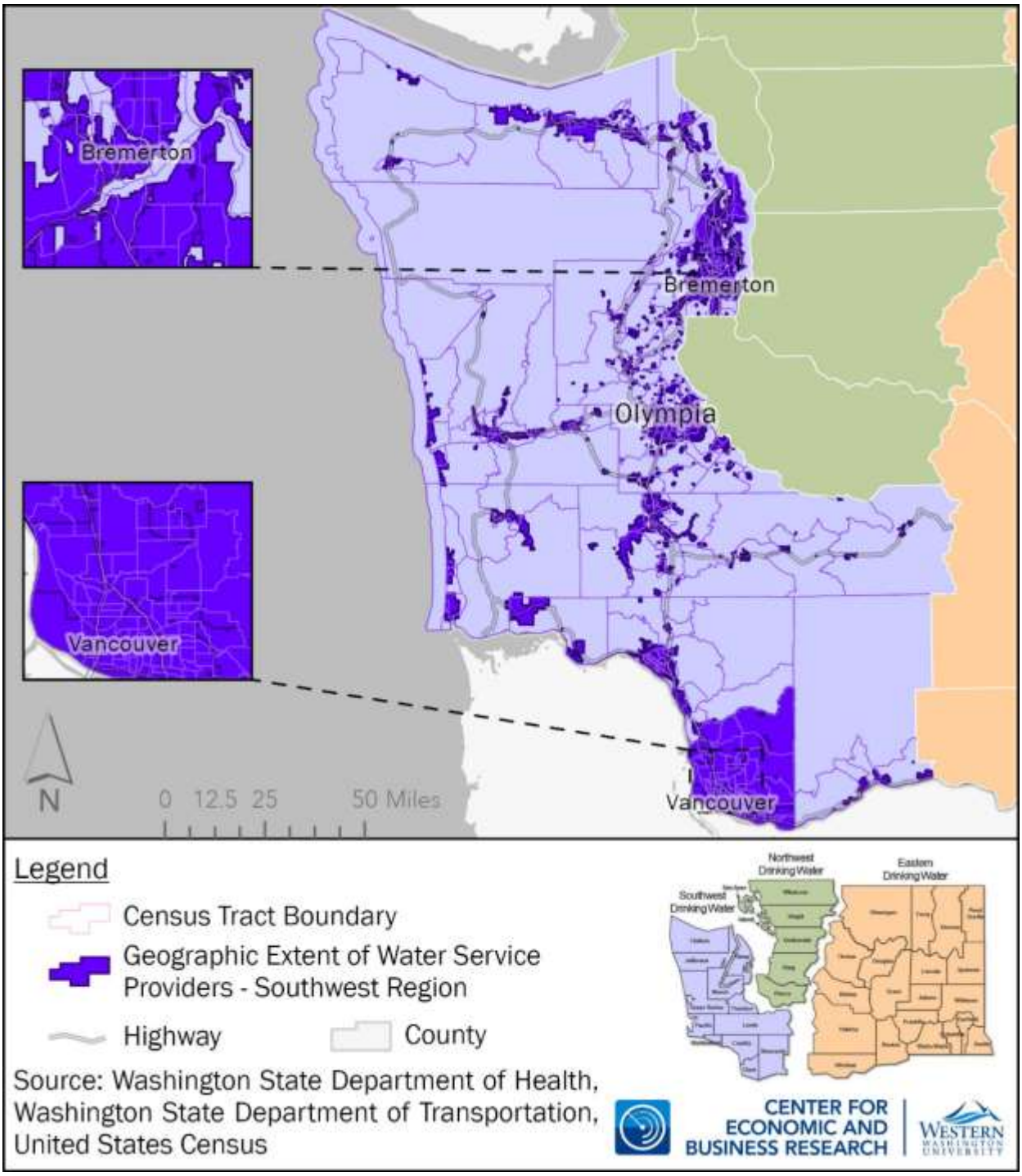


Figure 7. Southwest Water System Service Areas and Census Tracts

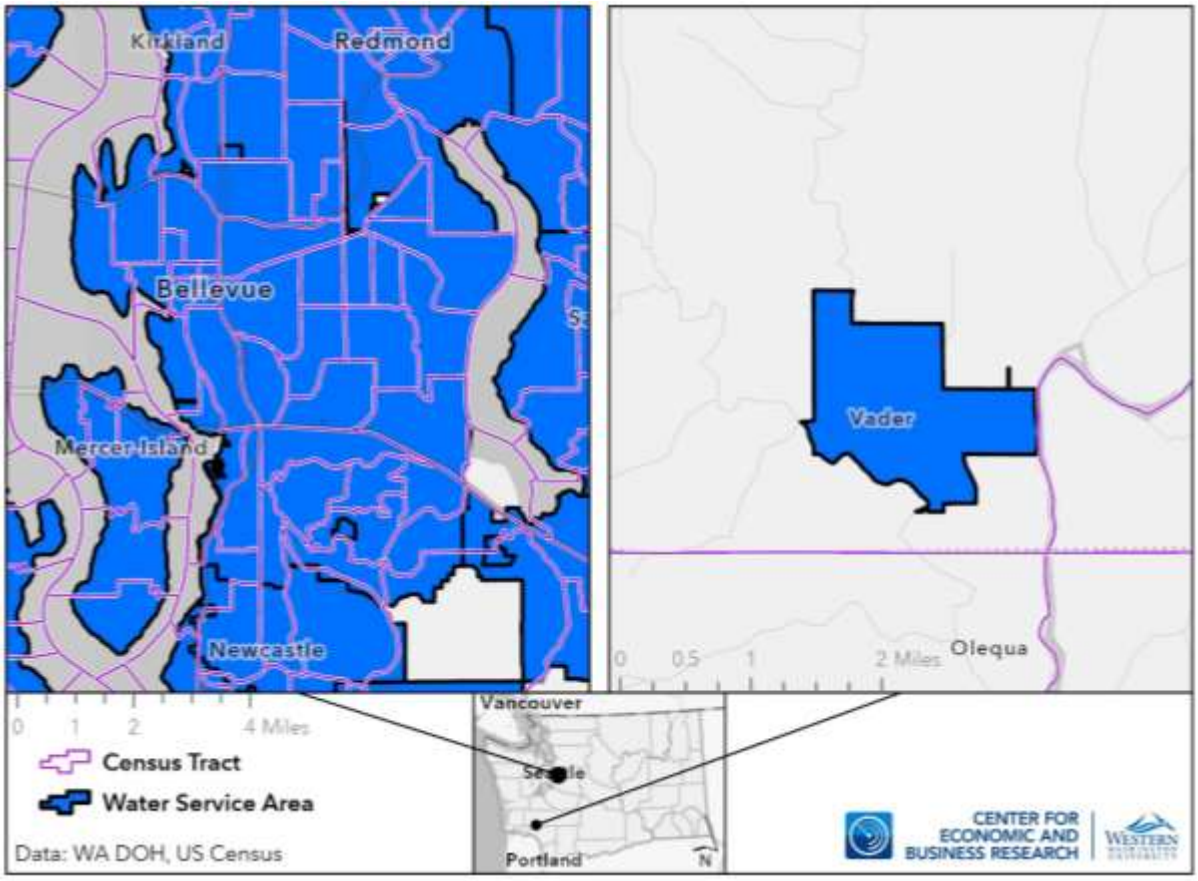


Figure 8. Overlap of Water System Service Areas and Census Tracts

Cost Burden Analysis Results

The following sections present the estimated income, water service bills, and RI_{LQI} estimates for each sampled water provider. It also includes an extrapolation of these findings to all connections in the state.

Estimated Average LQI and MHI for Households Located with Sampled Providers Service Boundaries

Figure 9 shows the estimated MHI and the LQI for each of 163 sampled providers. Each vertical line in the graph represents one provider.[18] The lowest point on each line represents the provider's estimated average LQI, while the highest point represents the estimated MHI for that CWS. The highest average MHI is over $185,000, and the lowest is approximately $46,000. The highest average annual LQI is just over $92,000, while the lowest is just under $14,000. This wide range in estimated average income for water provides suggests there might be significant differences in water cost burdens across the state.

[18] Of the 163 sampled providers, all of them serve drinking water (e.g., are CWS) but only 88 of them also provide wastewater services. The income levels shown here were used to calculate the RI values for both CWSs and POTWs.

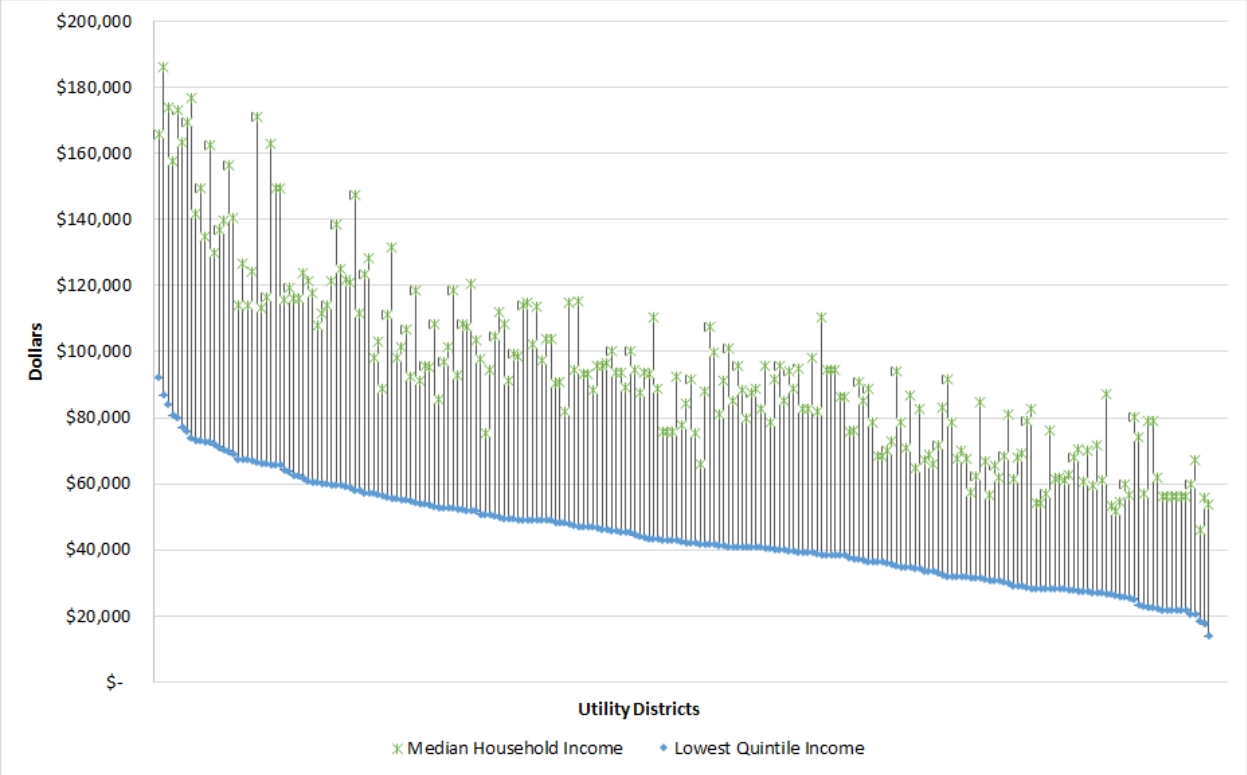


Figure 9. Estimated Median Household Income and Estimated Lowest Quintile Income, Sampled Providers

Figure 10 shows income data sorted by the provider's geographic region. The provider with the highest annual MHI is in the Northwest region, earning over $180,000. Conversely, providers in the Eastern region have the lowest low-income threshold, earning about $17,000 per year. Overall, incomes in the Eastern region are slightly lower than in the Southwest and Northwest, suggesting that the cost burden might be greater in the Eastern region if water bills are not also lower in the East. For more information on income data by other categories, see **Appendix E**.

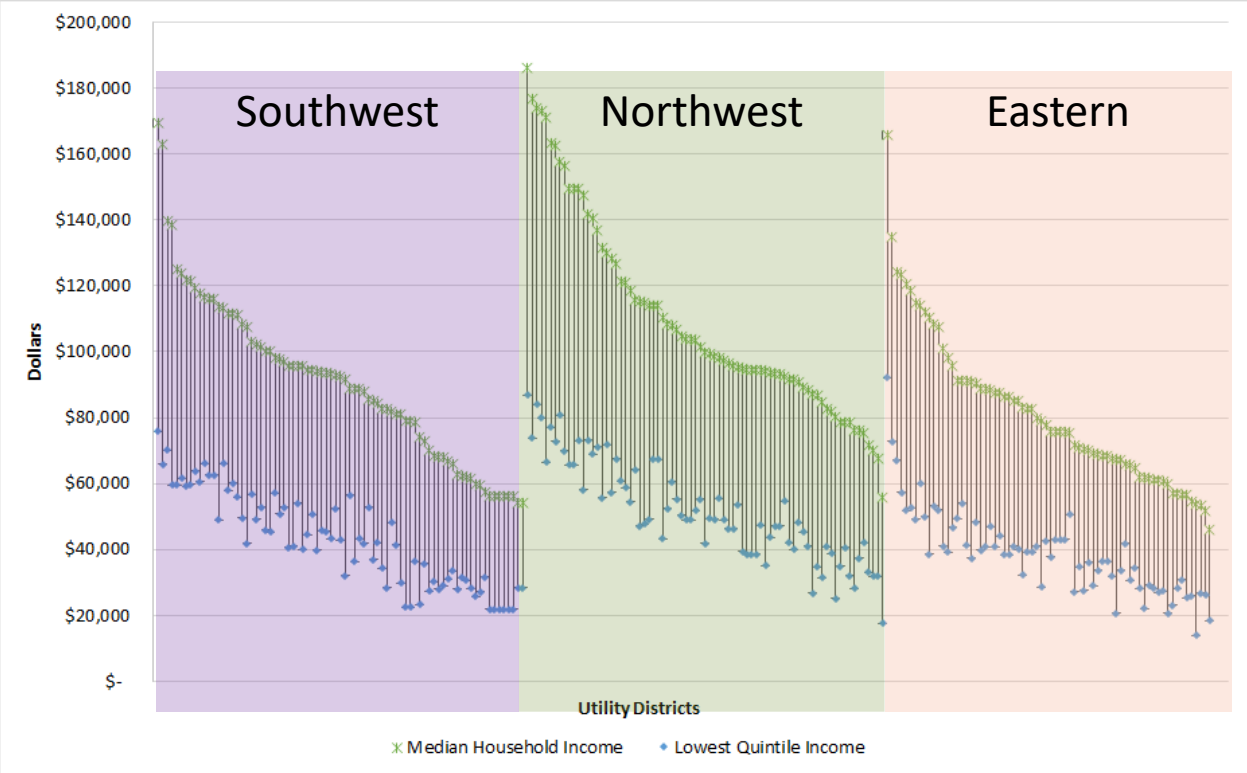


Figure 10. Estimated Median Household Income and Estimated Lowest Quintile Income by Geographic Region, Sampled Providers

Estimated Monthly Drinking Water and Wastewater Bills for Sampled Providers

Figure 11 shows the monthly drinking water bills for all sampled CWSs. Each dot on the graph represents one CWS. Just like income, there is a wide range of drinking water bills. The highest bill is almost $160 per month, while the lowest is just over $20 per month. On average, water bills are $55 per month, and the median bill is $50 per month. The differences in estimated monthly bills suggest, similar to the differences in estimated income, that the cost burden may vary by provider.

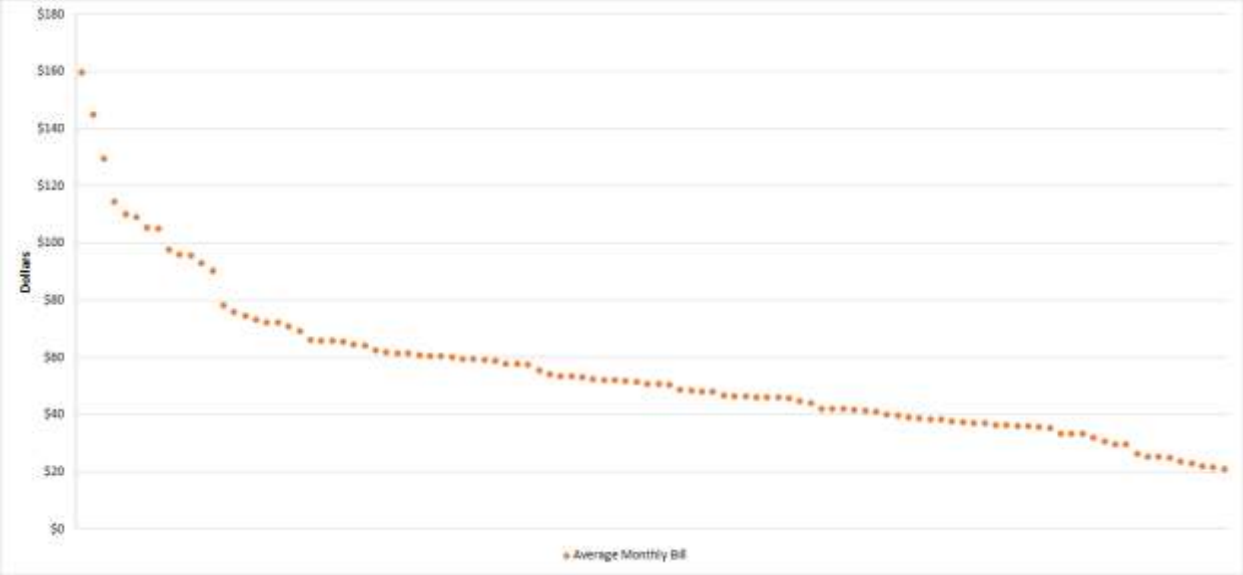


Figure 11. Estimated Average Monthly Drinking Water Bills, Sampled Providers

Figure 12 shows the monthly wastewater bills for all sampled POTWs. Each dot on the graph represents one POTW. In general, the estimated wastewater bills are higher than for drinking water. The bills range from a high of $180 per month, to a low of $20 per month. On average, wastewater bills are just under $75 per month, and the median bill is $68 per month.

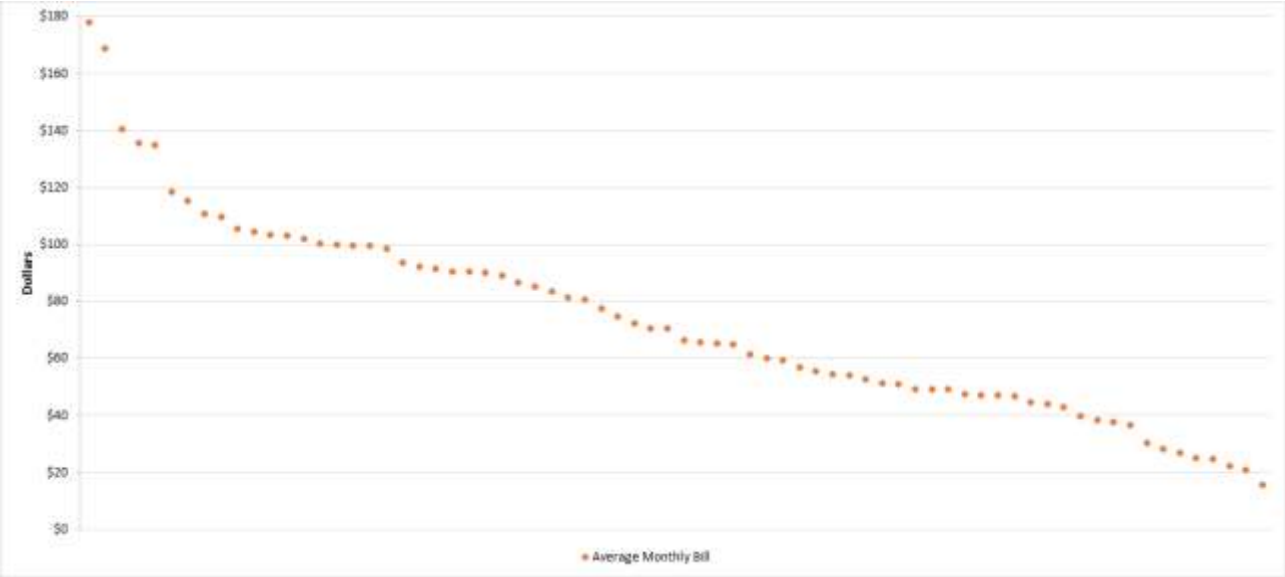


Figure 12. Estimated Average Monthly Wastewater Bills, Sampled Providers

Looking at the estimated drinking water and wastewater bills based on the size of the provider shows how economies of scale may affect water and wastewater costs. Figure 13 shows the estimated water bill for CWSs based on their size, which is measured by the

number of residential connections. The estimated drinking water bills for Mega CWSs are lower than those for large and medium CWSs. Mega CWSs usually operate in densely populated urban settings, serving more households and spreading costs across a larger number of connections.

It is worth noting that small CWSs have an estimated average drinking water bill lower than the bills from larger systems. The reason for these lower rates cannot be known without an analysis of individual providers. However, two possible reasons include small CWSs are not charging enough to cover all their costs, or that they are less expensive to operate. If they are undercharging, there could be a concern about possible deferred maintenance and a higher risk of system failures in small CWSs. With 1,967 small CWSs in the state, each serving an average of 115 connections, both situations could be true, and could be studied further when data gaps are filled.

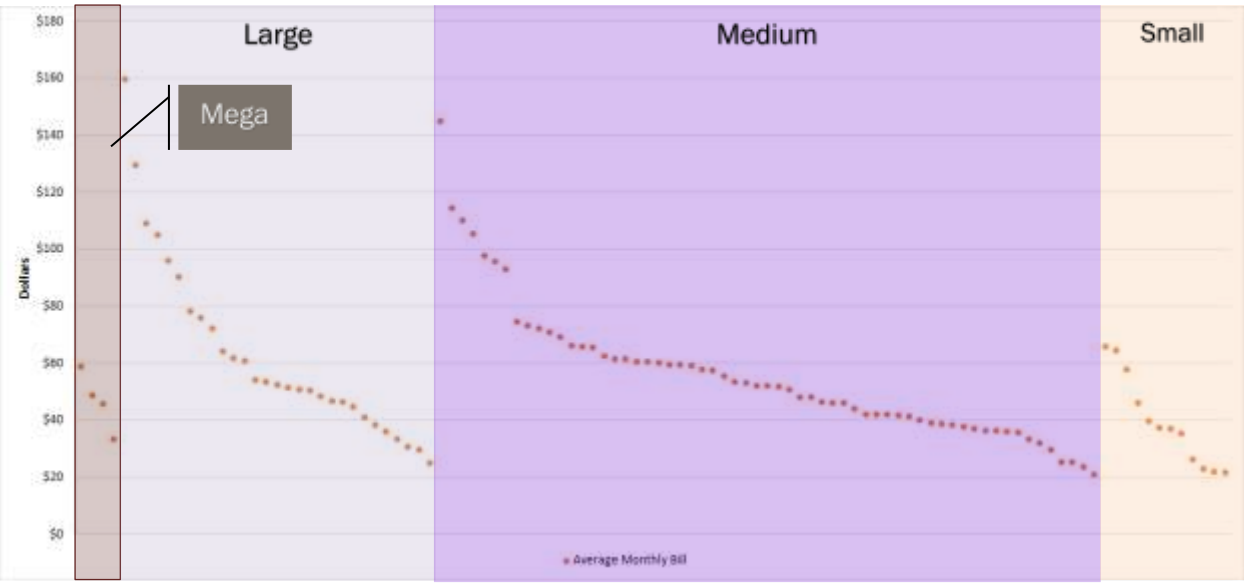


Figure 13. Estimated Average Monthly Drinking Water Bills by Size, Sampled Providers

Figure 14 shows the estimated wastewater bill for CWSs based on their size, which is measured by the number of residential connections. The differences in estimated wastewater bills by size are not as large as those for drinking water bills. This may indicate the impact of factors such as region, discharge locations, ambient water quality conditions of receiving waters and type of treatment. For more information on estimated water service bill data by other categories, see **Appendix E**.

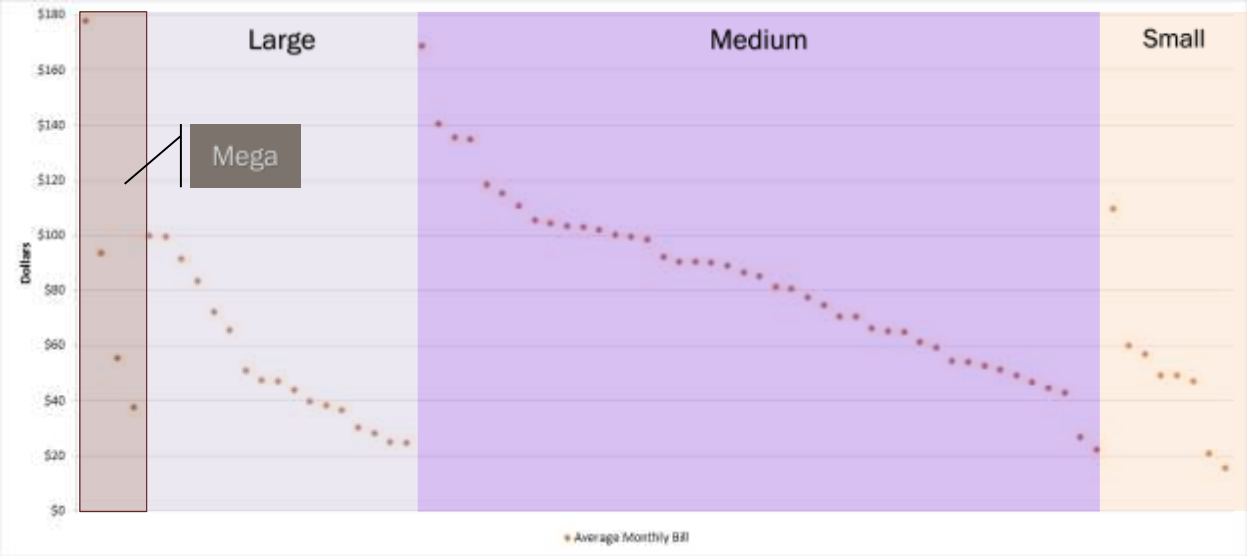


Figure 14. Estimated Average Monthly Wastewater Bills, Sampled Providers by Size

Table 5 summarized the assumptions used to calculate the water service bills and used in the calculation of the RI values.

Table 5. Data Assumptions

Assumption	Description	Rationale	Source
Household Size	Assumed average household size of 2.53 persons	Standardized household size for household water use estimates	US Census
Water Use per Capita	Assumed daily water use of 90 gallons per person	Standardized per-person water use for household water use estimates	U.S. Department of Agriculture
Water Use per Household	Assumed monthly water use of 6.93 thousand gallons per month	Standardizes water usage across households for comparing water service affordability across systems	N/A
Residential Meter Size	Assumed all residential connections have the smallest residential meter (5/8" or ¾")	Represents a typical residential service connection	N/A
Seasonality	Summer rates were collected when sampled water systems published seasonal rate schedules	Reflects higher seasonal rates typically seen during peak water usage months, resulting in more conservative affordability estimates	N/A

Assumption	Description	Rationale	Source
Inside City vs. Outside City Rates[19]	Used rates charged to inside city customers for affordability analysis	Inside the majority of residential customers and standardized rate comparisons	
Census Tract Weighting & Population Distribution	Assumed even population distribution across census tracts	Enabled calculating weights for each census tract.	N/A

Estimated RI of Sampled Providers

Figure 15 and Figure 16 present the estimated RI values for the sampled CWSs and POTWs, respectively. The cost burden threshold is shown on each figure as a red line: 2 percent (of income) for CWS and 2.5 percent (of income) for POTWs (EPA 2024a).

Thirty two percent (50) of the sampled CWSs have RI_{LQI} values above the 2 percent cost burden threshold (Figure 15). Two CWS even have a RI_{MHI} value over the 2 percent threshold, highlighting the benefit of assessing cost burdens with the RI metric versus income metric alone.

More POTWs have RI values above the cost burden threshold than CWS. Forty-four percent (39), of the 88 sampled POTWs have RI_{LQI} values above the 2.5 percent cost burden threshold (Figure 16). This suggests wastewater bills may create a higher cost burden on households than drinking water bills. Like CWSs, one POTWs even has a RI_{MHI} value over the 2 percent threshold, highlighting the benefit of assessing cost burdens with the RI metric versus income metric alone.

It should be noted that these RIs are based on average bills and average income. Meaning even if the average provider-specific RI_{LQI} and RI_{MHI} is below the cost burden threshold, there may still be households served by those providers facing a cost burden. Using the average LQI to calculate the RI values still means that half of the low-income households' income levels are below the estimated provider-specific LQI. This analysis uses average numbers to give a general idea of the statewide cost burden, but does not identify the cost burdens for individual households within a providers' service area.

[19] "Inside" rates refer to charges applied within a defined service area; "outside" rates refer to areas outside that boundary. While not always aligned with city boundaries, this distinction is commonly used in rate structures. "Inside" rates were used consistently to standardize across systems with multiple rate zones.

Figure 15. Community Water Service Residential Indices for Median Household Income and Lowest Quintile Income, Sampled Providers

Figure 16. Publicly Owned Treatment Works Residential Indices for Median Household Income and Lowest Quintile Income, Sampled Providers

The question of whether RI values, and therefore cost burdens, vary by provider size could inform future implementation choices for a CAP. The results of the analysis show that, in general, Mega CWSs have lower RI values (e.g., create less of a cost burden) than large and medium CWSs (Figure 17). Suggesting that economies of scale may reduce the service cost for Mega providers. However, the same is not true for Mega POTWs, where RI values of Mega providers are similar to those of large providers, but in general the medium sized POTWs have the highest RI values (Figure 18). This analysis for POTWs may be less informative than the analysis on CWS simple because, due to previously discussed data

limitations on POTWs, all the POTWs in this study serve both drinking water and wastewater services.

Figure 17. Community Water Service Residential Indices for Median Household Income and Lowest Quintile Income, Sampled Providers by Size

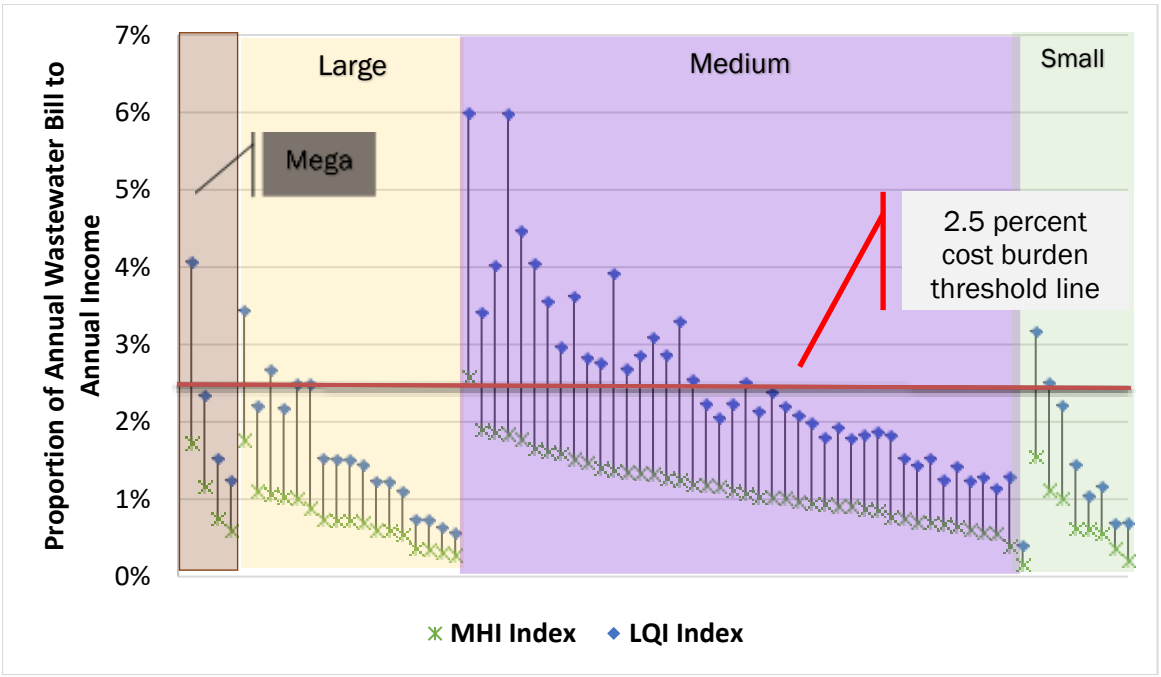


Figure 18. Publicly Owned Treatment Works Residential Indices, Median Household Income and Lowest Quintile Income, Sampled Providers by Size

The final step in the analysis considers the cost burden of combined drinking water and wastewater services (collectively water services). Recall, of the 163 providers in the sample only 88 providers served both drinking water and wastewater, therefore the combined analysis dropped 75 providers, only reporting on the 88 providers that serve both drinking water and wastewater services. (see **Appendix C** for more details).

Out of the 88 water service providers examined, 34 systems (38 percent) have RI values above the 4.5 percent threshold for combined services (Figure 19). The RI_{LQI} values range from a high of approximately 11 percent of LQI to below 2 percent of LQI, a significant range. When the range of RI values is large, the policy options for the development of an efficient and equitable CAP may want to consider how to provide assistance to those most in need first; again pointing out the equity benefit of using an RI metric versus an income metric to determine eligibility.

Figure 19. Combined Water Service Residential Indices for Median Household Income and Lowest Quintile Income, Sampled Providers

Estimated Statewide Cost Burden

The final step in the analysis estimates the total cost burden in the state by applying the sampled providers' cost burden data to all providers. After calculating RI values for all providers, the number of connections each provider serves is factored in the analysis. This process results in an estimate of affected connections and the potential costs of a low-income statewide CAP.

Approximately 353,000 residential connections, 14 percent of the total CWS connections in the state, are served by CWSs that have RI_{LQI} values above the 2 percent cost burden threshold for drinking water (Figure 20). Assuming the LQI households represent 20 percent of those connections, then an estimated 70,600 households are burdened to pay their

drinking water bills. Most of those providers are small to medium sized, as represented by the size of the bubble on Figure 20. Recall from the results of the statewide survey of providers, that many of these smaller to medium providers do not offer a low-income CAP, meaning these households face a cost burden without any assistance. Notably, none of the state's mega providers exceed the 2 percent cost burden threshold for drinking water service, and only a few large systems do. This continues to reinforce the idea that smaller systems may struggle with infrastructure, operations, and finances, leading to higher service costs and/or serve communities with relatively high-income disparities.

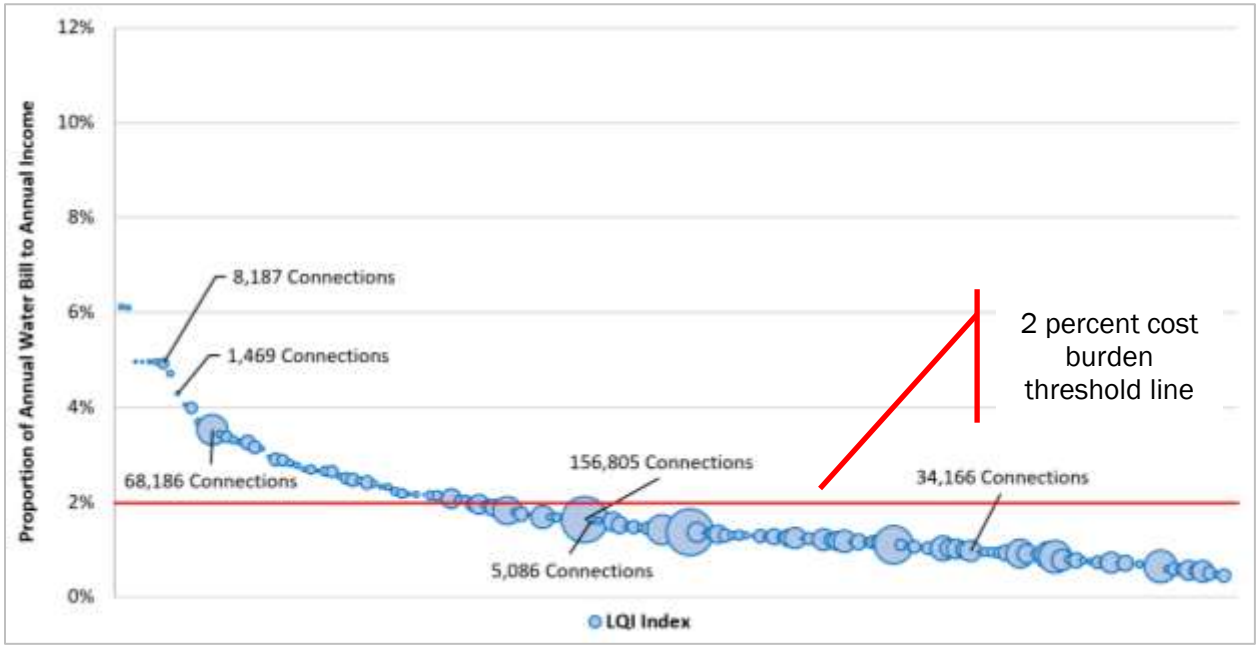


Figure 20. Connections by Community Water Services' Lowest Quintile Income Residential Index, Statewide

Approximately 556,000 connections, or 33 percent of residential wastewater connections represented in this study are served by providers with RI_{LQI} values above this 2.5 percent income threshold for wastewater services. Assuming the LQI households represent 20 percent of those connections, then an estimated 111,200 households are burdened to pay their wastewater bills. In comparison, 70,600 households were estimated to face a cost burden to pay their drinking water bills, confirming the fact that wastewater bills present more of a cost burden for low-income households than drinking water bills

Most POTWs with RI_{LQI} values above 2.5 percent are small to medium-sized systems. However, even Mega POTWs are estimated to have RI_{LQI} higher than the cost burden threshold.

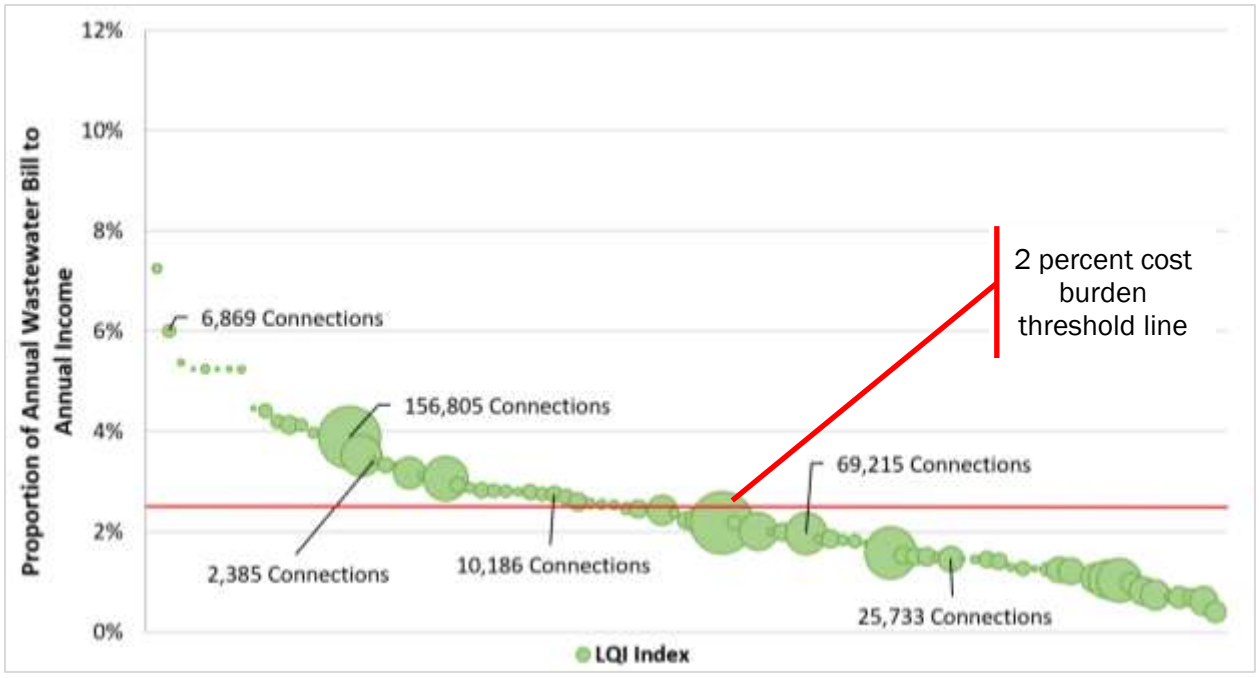


Figure 21. Connections by Publicly Owned Treatment Works' Lowest Quintile Income Residential Index, Statewide

This shows the RI_{LQI} values for combined water services, like drinking water and wastewater. The values are weighted by the number of households each system serves. The red line marks the affordability threshold at 4.5 percent of annual income.

For combined water services, an estimated 451,648 households are served by providers with RI_{LQI} values above the 4.5 percent cost burden threshold (Figure 22). Assuming the LQI households represent 20 percent of those connections, then an estimated 90,330 households are burdened to pay their combined water service bills. Most of the providers above the 4.5 percent threshold are small or medium, but some large and mega providers also exceed the cost burden threshold.

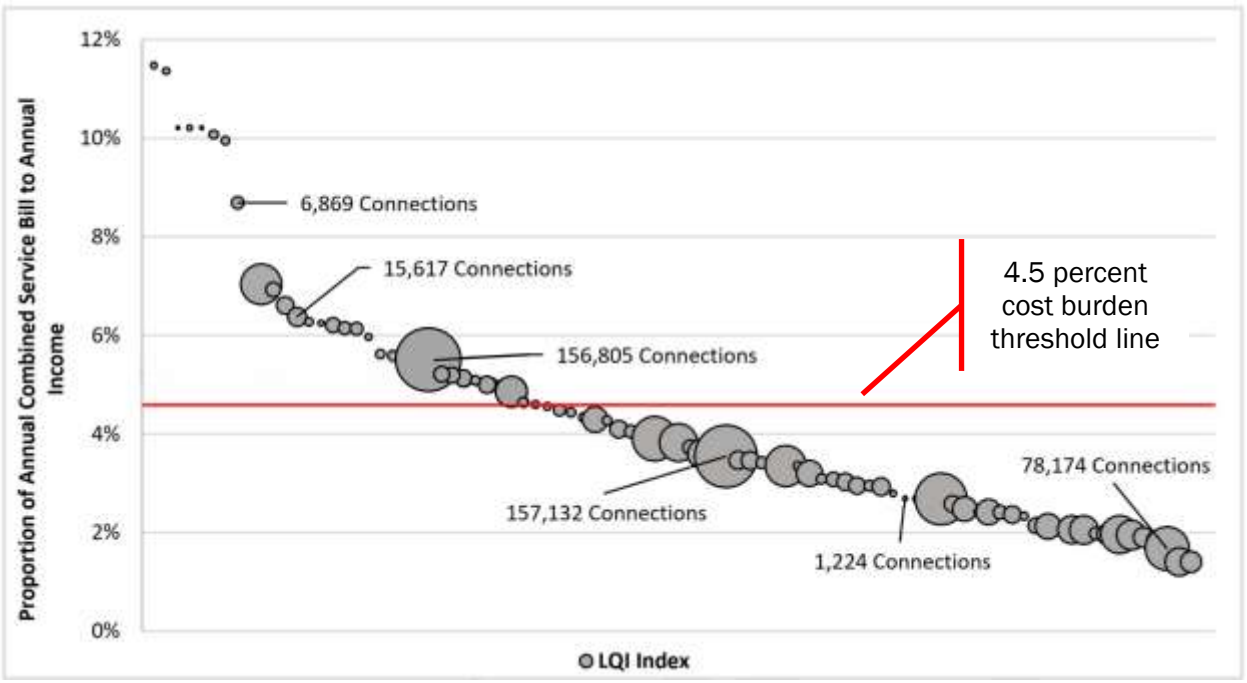


Figure 22. Connections by Combined Water Service Lowest Quintile Income Residential Index, Statewide

These findings highlight the need for a statewide low-income CAP, especially in areas served by small systems or in regions with high costs. The next section looks into the costs of creating a statewide assistance program to help Washington's most vulnerable households.

While the research methods used in this study meet industry standards, significant data challenges were faced. Limitations in the availability and quality of data required several assumptions. These challenges suggest areas for further study when better data becomes available. The next section discusses the data challenges and assumptions made throughout this analysis. For more details on these challenges and their impact on the results, see Appendix D.

Estimated Statewide Low-Income Assistance Program Cost

An estimated $160 million per biennium could fund a statewide CAP with the goal that no household pay more than 4.5 percent of their income for combined water and wastewater services (Table 6). This amount would assist over 90,000 households by providing $802 per year in bill assistance. At this assistance level 20 percent of low-income households (e.g., the LQI households) served by providers with water bills above the cost burden threshold (e.g., the "connection bubbles" shown in Figure 22 that are above the 4.5 percent threshold line) would receive assistance.

For reference, Commerce estimates that the annual average energy burden for low-income households in the state ranges between $551 per household to $1,661 per household,

depending on county (Commerce, 2025). And in Michigan the estimated average annual gap payment per household needed to achieve Michigan's goal, of making water services affordable, ranges between $444 per household and $517 per household. Although comparing the per-household gap payment required under a different program, in a state with different income and utility structures, may not be comparable, it may be useful to see the magnitude of benefits provided,

Table 6. Estimated Costs and Benefits of Statewide Low-Income Assistance Programs

Water Service Providers RI_{LQI} Greater than 4.5%	Residential Connections Served by Systems with RI_{LQI} Greater than 4.5%	Estimated Residential Connections at or Below LQI	Estimated Program Cost per Biennium (millions)	Estimated Annual per Connection Benefit
305	451,649	90,330	$160	$802

The estimated $160 million per biennium program cost is likely a minimum needed to start to make a difference in the lives of low-income households.[20] The $160 million does not account for:

- Households served by providers whose RI_{LQI} values are below the cost burden threshold, but whose income is significantly below the estimated provider-specific average LQI. Those households could likely need assistant. Incorporating those households could be included in a next step that addresses data gaps.

- A few providers' RI_{MHI} values were above the affordability threshold, as such are not included in the $160 million per biennium estimate. Again, those households could be included in a next step that addresses data gaps.

- The program cost does not include low-income households that live in apartments or rent homes and pay for water services as a component of rent. This initial estimate of cost burden could only focus on residential connections due to data limitations

In addition to the limitations listed above, the program cost estimate many also increase as providers, on the verge of needed infrastructure upgrades, would be forced to increase rates to pay for the upgrades. The study found that even a modest 5 percent increase in the rates charged by providers can have a disproportionately large impact on the overall program costs, estimated to be over a 20 percent increase (Table 7). This disproportionate effect happens for two key reasons:

[20] The estimated $160 million per biennium assumed that administrative costs would be approximately 10 percent of the estimated household need.

- Increased Demand for Assistance: When rates rise, more households may find themselves unable to meet the higher costs and thus require assistance. This results in a higher number of households seeking help under the program. For example, under a 4.5 percent cost burden threshold if water service rates increase by 5 percent, the number of households in need increases from an estimated 90,330 to 98,776 (Table 7), or just under a 9 percent increase.

- Higher Intensity of Need: Not only do more households require assistance, but the level of support each household needs also increases. In other words, the same rate increase causes existing recipients to require more help, thereby compounding the overall cost. For example, under a 4.5 percent cost burden threshold if water service rates increase by 5 percent, the per households need increases from an estimated $801 per year to $893 per year (Table 7), or just over an 11 percent increase.

Table 7. Estimated Program Need, Households, Per Household Monthly Assistance and Total Program Costs, Range of Cost Burden Thresholds and Rate Increases

Rates	Cost Burden Threshold		
	3.0%	4.5%	6.5%
Households			
Current	209,284	90,330	24,155
Current + 5 Percent	215,570	98,776	30,317
Current + 10 Percent	215,997	102,371	33,727
Per Household Monthly Assistance			
	3.0%	4.5%	6.5%
Rates (study)	$1,014	$801	$417
Rates +5%	$1,137	$893	$481
Rates +10%	$1,290	$1,027	$591
Total Program Cost per Biennium (Millions)			
Rates (study)	$467	$159	$22
Rates +5%	$539	$194	$32
Rates +10%	$613	$231	$44

To put it simply, the estimated program costs are highly sensitive to even a small rate hike because of the dual effect on both the number of households needing assistance and the level of funds necessary per household. For example, under a 4.5 percent cost burden threshold if water service rates increase by 5 percent, the estimated program cost per biennium increases from just under $160 million to $194 million, a 22 percent increase in

costs (Table 8). Program costs are also sensitive to a change in the cost burden threshold, as a threshold level of 6 percent of income reduced program costs from just over $160 million per biennium.to $22 million per biennium. See Appendix E for more details on overall cost burden and program costs.

Data Limitations

During the analysis, several data challenges emerged. The main issue in collecting data was the limited availability of information. Table 8 outlines the data limitations encountered, which could lead to misleading findings. The list of potential sources of error should be considered when using this data or the results of this analysis. For more on the data limitations, assumptions, and how they affected the results, see **Appendix D**.

Table 8. Data Limitations

Data Area	Limitation	Extent	Impact
Water System Database	Data gaps in number of residential connections	100%	Increase or decrease the estimated cost burden and program cost depending on the change in the connection counts.
	Ownership Type	All systems	Ownership type definitions.
Wastewater System Database	Was not found (1)	100%	Current analysis likely underestimates the program costs related to wastewater as likely the real connection count is higher than what was used in the analysis. Limits understanding of wastewater-only affordability.
Water System Rates	Rate Availability	?	Missing rate data reduces sample representativeness and accuracy of estimated affordability. Many of the small CWSs did not have web presences, and therefore are underrepresented in the current analysis
	Third-party management	?	Third-party management companies often do not publish system-specific rates, complicating accurate affordability assessments.
Representative sample	Available rates were not collected from all water systems in Washington	?	See Methodology Appendix
Water System Service Areas	Missing sampled water system service area boundaries	23.0% of Providers 3.3% of Residential Connections	Likely the provider-specific LQI and MHI for providers missing service area boundaries is incorrect, but the direction of the error is not known

Data Area	Limitation	Extent	Impact
	Overlap of sampled water system service area boundaries	100%	Mapping providers' service area-to-census tract income data led to excluding some areas from the results.

Note (1) Washington State Department of Ecology tracks the permitted wastewater treatment plants and rates. However not all publicly owned treatment works own and operate wastewater treatment plants that are permitted by Washington State Department of Ecology.

Conclusion of the Review of Low-Income Water and Wastewater Service Providers Cost Burden

This analysis estimates the cost burden low-income households in Washington state may face paying their drinking water and wastewater bills. Combined water and wastewater bills are higher than 4.5 percent of income for approximately 90,000 households in Washington state. A statewide low-income assistance program is estimated to cost approximately $160 million per biennium, which would provide approximately $800 per year of support to households in need.

This study encountered several issues with data, including limited access, poor quality, and missing information, see **Appendix D**.

For more detail on how the estimates were calculated, see **Appendix C**.

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Appendix A: Case Studies of Federal, State, and Local Customer Assistance Programs

Customer Assistance Programs Case Studies

Introduction

The summary of existing programs includes both:

- A review of existing federal, state and local customer assistance programs (CAP), outside of Washington, including a review of the literature of existing programs.
- A summary of the results of a survey administered to Washington state water and wastewater providers, inquiring about CAPs they offer.

The review of existing federal, state, and local CAPs, primarily for drinking water and wastewater services, offers insights that may guide Washington state in developing its own statewide program. Given Washington's complex water utility infrastructure, which includes over 2,200 individual drinking water providers and nearly 300 wastewater treatment providers, tailored and adaptable strategies may help develop a statewide program that is efficient, effective, and equitable. Ultimately, this review seeks to identify best practices and explore strategies that are compatible with Washington's diverse demographic of water service providers as well as water and wastewater customers.

To supplement the review of existing federal, state, and local CAPS, the Washington State Department of Health (DOH) and the Washington State Department of Commerce (Commerce) also sent over 5,000 surveys to water service providers throughout Washington state.[21] The survey collected data on customer assistance programs availability, eligibility criteria, benefit structures, administrative processes, funding sources, operational challenges, and overall need. The survey data was analyzed to identify patterns in program availability, design variations, and implementation barriers.

Review of Existing Federal, State and Local Customer Assistance Programs

Existing Literature

There is extensive literature documenting key considerations that utilities account for when developing and implementing CAPs, including lessons learned and tips for success (AWWA 2022a, AWWA 2022b, Cromwell et al., 2010, Levine et al., 2022; UNC EFC 2017, Ward et

[21] See Appendix E, Data Limitations, for a detailed description of the data challenges faced in acquiring contact information and e-mail addresses for the Washington state CWS and POTWs. Specifically, why 5,000 e-mails were sent for the survey when there are only 2,201 CWS and 288 POTWs.

al., 2024). In particular, the Low-Income Water Customer Assistance Program (LIWCAP) Assessment, written in response to several federal initiatives to help customers afford water and wastewater services, includes a program evaluation framework to understand what constitutes program success (Berahzer et.al., 2023). The framework was designed with specific evaluation criteria to assess various potential federal program designs and administrative pathways for a permanent low-income water assistance program. The three main criteria considered included:

- Effectiveness. The extent to which the assistance program provides a meaningful and tangible difference in a household's ability to manage and pay their water bills
- Efficiency. The impact and timeliness of the relief provided by the program compared to its administrative costs
- Equity. The fair treatment of households in similar circumstances, including target efficiency to ensure that assistance reaches the communities most in need of support

Using these criteria, the study evaluated several existing federal-level assistance programs, including the Supplemental Nutrition Assistance Program (SNAP), Low Income Home Energy Assistance Program (LIHEAP), and Low-Income Household Water Assistance Program (LIHWAP). The study examined each program's eligibility criteria, funding methods, and administrative structures and evaluated the structures against the criteria of effectiveness, efficiency, and equity. This examination method, especially in terms of water and wastewater, offers Washington state valuable insights into how other entities' programs are developed and implemented. Below is a summary of the CAPs from the federal government, other states, and city-wide initiatives.

Case Studies

- The review of existing CAPs considers at federal, state, and local levels. This includes examination of program structures, funding mechanisms, eligibility criteria, administrative processes, and program outcomes to identify effective practices and potential challenges. At the federal level, the review includes an analysis of two programs including:
- LIHEAP.
- LIHWAP.
- At the state level, the review encompasses multiple programs (not just CAPs) including:
- Washington's Clean Energy Grants Program,
- Maine Housing's Water Assistance Program,
- Maryland's Bay Restoration Fund,
- Michigan's Proposed Water Assistance Program,
- Minnesota's Fiscal Disparities Program and Local Government Aid.

- At the local level, the analysis examines programs implemented in:
- Seattle, Washington.
- Bellevue, Washington.
- Madison, Wisconsin.
- Detroit, Michigan.
- Portland, Oregon.
- Austin, Texas.
- Philadelphia, Pennsylvania.

Federal Programs

Of the two federal low-income assistance programs described below, LIHEAP is still fully funded. LIHWAP received funding during the Coronavirus Disease 2019 pandemic but has since been defunded.

Low Income Home Energy Assistance Program

Since its establishment in 1981 under the Omnibus Budget Reconciliation Act, LIHEAP has evolved into a vital lifeline for low-income households across America. LIHEAP addresses a persistent national energy insecurity challenge, with recent data revealing that 20 percent of U.S. households are unable to pay their full energy bill at least once annually. Additionally, 51 percent of low-income households reported having to reduce spending on other necessities such as food and medicine to afford their energy bills (LIHEAP 2022).

Funding and Distribution

To offer support on a yearly basis, LIHEAP relies on a permanent federal funding structure that enables long-term planning and services delivery. LIHEAP receives annual funding from Congress that has ranged from $3 billion to $4 billion over the last decade, with additional federal support provided during periods of economic crises. This consistent funding structure allows LIHEAP to develop strong administrative infrastructure and establish relationships with energy providers that serve approximately 5.3 million households annually (Wein 2023).

LIHEAP's effectiveness also comes from its block grant structure that balances federal oversight with state-level flexibility. The Department of Health and Human Services (HHS) manages LIHEAP at the federal level then distributes these funds based on a formula that weighs levels of low-income energy expenses across different states. The block grant structure allows states to create implementation strategies tailored to their specific needs, climate considerations, weatherization services, and existing administrative structures. States are then able to allocate funds across several assistance categories, including heating, cooling, crisis intervention, and administrative costs, which are capped at 10 percent of the total allocation.

Eligibility

Eligibility for LIHEAP assistance is targeted at households with low incomes. Federal law sets the overarching guidelines for income eligibility at up to 150 percent of the federal poverty guideline (FPG) or 60 percent of the state median income. However, each state has the authority to establish its own unique requirements, such as imposing stricter income caps and considering additional elements such as household size.

Beyond income-based eligibility, states have the option to establish categorical eligibility. This allows households to automatically be deemed eligible for LIHEAP if at least one household member is currently receiving benefits from programs such as Temporary Assistance for Needy Families (TANF), Supplemental Nutrition Assistance Program (SNAP), Supplemental Security Income (SSI), and certain veterans' assistance programs.

Administration

LIHEAP administration also operates on a dual level with federal statutes offering broad guidelines and states determining specific eligibility requirements, enrollment methods, application deadlines, assistance amounts, and more. To facilitate the local delivery of LIHEAP services and the application process, states often enter into contracts with community-based organizations. Some states also utilize categorical eligibility to streamline the application process for individuals already participating in other assistance promote LIHEAP benefits access.

For example, the state of New York exemplifies an integrated social services model by managing LIHEAP through its Office of Temporary and Disability Assistance (OTDA) and county social service departments (LIHEAP 2022). Its Mass Authorization (Autopay) process streamlines benefit distribution and maximizes outreach to eligible populations. The system automatically provides LIHEAP benefits to households already receiving ongoing SNAP or Temporary Assistance benefits. The program employs a tiered benefit structure, with households classified into Tier I or Tier II based on income levels to ensure that lower-income households receive proportionally higher benefits. Eligibility is determined using existing data in the Welfare Management System to ensure that households meeting all LIHEAP criteria receive assistance efficiently. By automating this process, New York reduces administrative costs and targets the highest level of assistance to households with the lowest income through. For payments that are authorized through Autopay, New York's OTDA utilizes a Mass Authorization Report which lists all Family Assistance, Safety Net Assistance and SNAP cases that automatically triggers a LIHEAP payment (New York State OTDA 2024). It provides detailed information on each transaction, including unique authorization numbers for payments, which ensures accuracy and accountability in benefit distribution and allows districts to track and verify payments for transparency.

Low Income Household Water Assistance Program

The LIHWAP was established in 2021 as a critical response to the COVID-19 pandemic and the growing crisis of water affordability across the United States. This initiative represented the first federal program specifically designed to ensure low-income households could maintain access to safe drinking water and wastewater services and addressed a critical

gap in assistance following the economic disruption triggered during the pandemic. The program's primary objectives focused on immediate relief rather than long-term structural solutions such as restoring disconnected household water due to non-payment, preventing imminent disconnections of water services for households in arrears, reducing accumulated water bill debts, and reducing current water bills to ensure ongoing affordability.

Funding and Distribution

LIHWAP received $638 million of funding through the Consolidated Appropriations Act of 2021 and an additional $500 million from the American Rescue Plan Act (ARPA) (Office of Community Services 2025). Unlike its energy counterpart LIHEAP, LIHWAP was implemented as a temporary emergency program set to expire at the end of Fiscal Year 2023. Funds were disbursed as direct payments to public water and wastewater utilities on behalf of approved eligible households to reduce arrearages and address ongoing service costs.

The Administration for Children and Families (ACF) within the HHS oversaw LIHWAP implementation nationally with program operations initially set to conclude by December 31, 2023. However, in 2023, HHS announced a No Cost Extension (NCE) allowing grant recipients to request a six-month extension, pushing the new deadline to June 30, 2024. Approximately 65 percent of participating state and territories and 55 percent of participating Tribes were granted these extensions, indicating a necessity for continued support to maintain access to water services (Office of Community Services 2025).

Eligibility

Like LIHEAP, LIHWAP was designed to support disadvantaged populations and mirrored LIHEAP's eligibility requirements based on income thresholds and categorical criteria. For example, participation in programs such as LIHEAP, SNAP, SSI, TANF, and Means-tested Veterans Programs could qualify households for LIHWAP assistance. The income threshold was set at 150 percent or less of the FPG or 60 percent or less of a state's Median Income (SMI), ensuring that assistance reached those most in need. As of June 30, 2023, LIHWAP had served over one million households nationwide, demonstrating its significant need and impact in alleviating financial burdens.

Administration

LIHWAP's administrative structure followed a model that leveraged different levels of government and existing community networks to accelerate implementation. At the federal level, HHS established program guidelines, allocated funds based on a formula that considered population size, poverty rates, and water costs, and provided technical assistance to implementing agencies. This federal oversight created a unified framework while allowing for state-level adaptation. State agencies, typically those administering LIHEAP or similar benefit programs, received block grants and developed state-specific implementation plans to address local water affordability challenges. These plans established state-specific benefit and distribution methodologies.

Success Criteria

LIHEAP and LIHWAP operate under different frameworks that influence their effectiveness and efficiency. LIHEAP benefits from permanent federal funding and an established structure that offers sustained assistance in addressing energy insecurity. The consistent funding from an established source allows for predictability and ongoing support for low-income households to manage recurring energy costs year after year. In contrast, while LIHWAP was effective in providing significant relief for immediate water and wastewater charges and prevented service shutoffs, its temporary nature limited its ability to offer a sustained solution for long-term water affordability.

In terms of equity, both programs provided states to tailor eligibility and administration to best serve each state. Some states opted to implement tiered benefit structures that prioritized households with the lowest income and highest energy or water burdens to ensure more funding reached those with the greatest demonstrated need.

State-Level Programs

Maine, Maryland, Michigan, Minnesota, and Washington were selected for analysis due to their representation of diverse state-level assistance programs as well as other programs that have notable elements/concepts. Maine's water assistance program was evaluated for its administrative model, particularly its use of direct payments to utilities on behalf of customers. Maryland's Bay Restoration Fund offered a unique example of statewide funding through wastewater rates. Michigan was selected due to its significant legislative efforts and advocacy in establishing a comprehensive statewide water affordability program. Minnesota provided valuable long-term funding models through its Fiscal Disparities tax-base sharing Program (FDP) and Local Government Aid (LGA). Lastly, Washington state was evaluated to assess current efforts and highlight potential areas of growth.

Funding and Distribution

Programs with dedicated funding sources have exhibited greater stability and implementation effectiveness than those relying solely on annual appropriations. For example, Washington's Clean Energy Credits Grant Program established a direct connection to carbon auction proceeds, creating a dedicated revenue stream that grows with carbon pricing (Cornfield 2024). Similarly, Minnesota's FDP has established stability through its self-financing structure based on tax-base sharing and has operated for nearly five decades with minimal structural changes (Swanson and Hinze 2020). In contrast, Maine's reliance on short-term ARPA appropriations resulted in program termination despite successfully assisting over 1,000 households and the ongoing need for support (Maine Water n.d.). While Maine's program provided immediate relief, it failed to address systemic affordability challenges or establish a sustainable framework for ongoing assistance that could adapt to evolving community needs. This indicates that assistance programs may be more successful by incorporating multiple funding streams where possible, potentially including dedicated tax revenues or utility surcharges.

A notable example of funding collection is Maryland's Bay Restoration Fund (BRF) established in 2004. The BRF charges a monthly fee from each Maryland home serviced by a wastewater treatment plant or septic system to create a dedicated fund for implementing nitrogen reduction strategies in Chesapeake Bay. Each residential dwelling and each onsite sewage disposal system or holding tank that receives a water bill is subject to a $5 monthly fee, while each user of an onsite sewage disposal system and each user of a sewage holding tank who does not receive a water bill is subject to a $60 annual fee (Maryland Department of Environment n.d.). These collected fees from wastewater treatment plant users generate an estimated $100 million per year. This ensures a reliable revenue source independent of annual appropriations, creating a direct connection between program financing and its objectives. As of 2025, the BRF is still active and continues to provide funding for wastewater treatment plant upgrades and septic system replacements. The program has made significant achievements including funding over 15,600 septic system upgrades, over 1,500 home-to-public sewers connections, and supporting upgrades to all 67 major wastewater treatment plants, which reduced approximately 7.5 million pounds of nitrogen per year to Chesapeake Bay. These strategies demonstrate how purpose-specific fees can create sustainable funding streams that endure political and economic fluctuations, while fostering public support through transparent links between revenue collection and benefit outcomes.

Eligibility

Customer assistance program effectiveness relies heavily on eligibility criteria for benefit distribution.

Programs that offer graduated benefits targeting households at different percentages of area median income, such as Michigan's proposed income-based water affordability program, ensure that resources are directed toward those who are most in need. Michigan's proposed approach exemplifies a strategic benefit design that caps water expenditures at 2-3 percent of household income based on poverty level (Blitchok 2025). This structure aligns assistance with individual need and ensures that those who face greater financial strain receive a proportional amount of support. By moving away from uniform assistance for all households within a specific income bracket, this method addresses concerns about potential disparities in fund distribution and allows for a more tailored allocation that reflects the varying levels of financial burdens. In contrast, Washington's Families Clean Energy Credits Grant Program employed a non-tiered eligibility structure, offering a flat $200 bill credit to all qualifying households regardless of their income level within the low-income threshold range (Washington Commerce n.d.a.). While this approach simplified administration and allowed for quick and broad access, it fell short in addressing the varying degrees of energy cost burdens faced by eligible households.

These varied approaches demonstrate that assistance programs must balance targeted relief with implementation feasibility, while recognizing that more nuanced benefit structures typically require more complex administrative systems that may create barriers to participation for those most in need of assistance.

Administration

The administrative design of assistance programs heavily influences program accessibility, efficiency, and ultimate effectiveness in delivering aid to intended beneficiaries. Each state's approach reveals insights about program implementation strategies and their consequences.

Washington's Clean Energy Credits Grant Program demonstrated how centralized administration through a private contractor can coordinate assistance across the numerous and fragmented utility systems. By partnering with Promise, a private firm, Washington created a streamlined system for eligibility verification and credit distribution across multiple utility providers. To enhance accessibility, Promise set up a dedicated website and provided support via email and phone for applicants. This approach successfully reduced electricity bills for up to 675,000 households by providing $200 credits applied directly to customer accounts. (Washington state n.d.b.). However, the program's first-come, first-served structure creates equity concerns, potentially disadvantaging rural residents and non-English speaking communities with limited access to application resources.

Maine's water assistance program revealed how direct payment models can simplify assistance delivery while maintaining program integrity. Rather than requiring customers to navigate complex payment processes, Maine Housing made payments directly to water utilities on behalf of qualifying low-income customers. This ensured uninterrupted water services while eliminating administrative burden for recipients. The program's benefit matrix point system identified households with the greatest need, with payments ranging from $200 to $500 based on eligibility criteria. By March 2023, the initiative had served 1,018 households and disbursed approximately $624,000 for past due water and wastewater bills (NCSHA 2023). However, the program's one-time nature and reliance on temporary ARPA funding limited its long-term impact and sustainability.

Minnesota's fiscal programs showcase how leveraging existing administrative structure can create efficient assistance delivery and sustainable funding. Both the LGA program and the FDP operate through established property tax administration systems with minimal additional overhead. LGA is administered by the Department of Revenue with payments distributed twice annually, while the FDP involves annual administrative tasks performed by property tax administrator, including calculations and coordination among county officials. However, both LGA and FDP rely on intricate formulas to determine aid distribution using factors such as population decline, age of the housing stock, industrial or utility property tax base, percentage of residents 65 and more. These complex formulas require a high level of expertise and precise data collection and analysis which can complicate the administrative process. Furthermore, these formulas have led to challenges in transparency and communication, leaving some communities questioning why they did not receive any benefits. This administrative paradox illustrates how systems optimized for operational efficiency and equity can simultaneously create barriers to program understanding, reform, and participation underscoring the importance of balancing technical effectiveness with administrative transparency and accessibility.

Successful administrative strategies involve categorical eligibility across related programs, easy to navigate platforms that streamline application processes, multilingual access, community-based application assistance, and presumptive eligibility systems for qualified households. These accessibility-oriented designs recognize that barriers to program participation often disproportionately impact marginalized groups, ultimately compromising program outcomes.

Success Criteria

The analyzed state programs demonstrate varying levels of effectiveness, efficiency, and equity in their funding and implementation designs. In terms of effectiveness and equity, programs with stable and dedicated funding sources like Washinton's Clean Energy Credits and Minnesota's long-standing FDP and LGA demonstrate sustained ability to provide meaningful assistance. On the other hand, Maine's short-term ARPA-funded program, despite reaching over 1,000 households, was less successful in providing lasting impact and addressing systemic affordability issues. While Michigan's proposed assistance program did not pass in the legislature, its graduated benefits model represents a more equitable approach by limiting water and wastewater services costs to 2-3 percent of household income. Overall, programs most successful at addressing equity incorporated categorical eligibility, easy-to-navigate platforms, multilingual access, and community-based application assistance to increase access for marginalized communities. In terms of efficiency, administrative designs that streamlined delivery using direct payment models, such as Maine's Water Assistance Program, reduced administrative burdens for credit recipients.

Local-Level Programs

Several city-level programs are discussed below, comparing and contrasting the various elements of the program. The elements of each program considered in the discussion include:

- Basis of aid, e.g., fixed discounts versus variable income-based approaches.
- Enrollment Methods.
- Funding.

The seven cities selected for analysis include Seattle, Washington; Bellevue, Washington; Madison, Wisconsin; Detroit, Michigan; Portland, Oregon; Austin, Texas; Philadelphia, Pennsylvania. The cities were chosen to illustrate the spectrum of program designs from traditional discount-based models to more modern income-based frameworks, while highlighting different funding sources, eligibility requirements, and administrative approaches. Seattle was selected to showcase a discount-based approach through its Utility Discount Program and how traditional percentage-based discount structures can be implemented on a significant scale while maintaining administrative simplicity. Madison was included to examine its monthly fixed bill credits (will need to expand). Detroit was examined for its Water Affordability Program that implements an income-based framework and

prioritization of ability-to-pay principles in bill determination for disadvantaged households. Portland was selected to illustrate its ongoing transition from a flat discount model towards a tiered model. Austin was included due to its Community Benefit Charge and volumetric funding approaches tied with water conservation incentives. Finally, Philadelphia was selected as an example of comprehensive income-based assistance through its Tiered Assistance Program and success in achieving high enrollment rates.

Funding and Distribution

Nationally, approximately 14 percent of utilities with customer assistance programs fund them through utility budgets or rate components (EPA 2016). Several cities, including Seattle, Bellevue, Philadelphia, and Austin, adopted funding models where assistance programs are funded directly through rate structures.

In Seattle, the Utility Discount Program is funded by all customers through utility rates, regardless of water use. Similarly, the City of Bellevue also funds its Utility Rate Relief program through its utility operating budget with costs distributed across the customer base via rates rather than external or general fund sources.

Philadelphia funds TAP through a volumetric rate component assessed at approximately 26 cents per 1,000 gallons of water consumed. This volumetric charge is embedded within the overall rate and equitably distributes program costs across customer base. This structure results in larger water consumers, typically commercial and industrial users, contributing proportionally more to funding the program. It also aligns with broader principles of conservation pricing while avoiding regressive impacts on lower-income households who typically consume less water. The volumetric approach creates a more resilient funding mechanism that adjusts automatically to consumption patterns and provides predictable revenue streams. Austin Water has also implemented a similar community benefit charge of 30 cents per 1,0000 gallons of water billed each month to Non-CAP customers to fund the CAP.

The volumetric approach reinforces water conservation incentives by marginally increasing the cost of each additional unit of water consumed. While the per-thousand-gallon charges in both cities are modest, they nevertheless contribute to the price signal encouraging efficient water use and creates policy coherence across conservation and equitable rate goals.

Eligibility

Local water assistance programs take two main approaches to affordability: fixed discounts structures and income-based approaches. Traditional discount-based programs, exemplified by Seattle's Utility Discount Program and Madison’s CAP operate by reducing standard water bills by a fixed percentage for qualifying households. For example, Seattle provides a substantial 50percent discount and Madison offers a $20 to $30 monthly bill credit. These approaches maintain the fundamental rate structure while providing relief through straightforward percentage reductions. The primary advantages of this approach include

administrative simplicity, predictable revenue impacts, and easier integration with existing billing systems. However, these programs provide limited responsiveness to variations in household economic circumstances or consumption patterns.

In contrast, income-based payment programs like Philadelphia's Tiered Assistance Program (TAP) and Detroit's Water Affordability Program (DWAP) cap water bills at a percentage of household income, typically 2 - 4 percent, regardless of actual consumption. This approach explicitly defines affordability as a function of household economic capacity rather than a discount on standard rates. Philadelphia's program represents this approach, with bills potentially reduced by as much as 85 percent compared to standard rates for the lowest-income households.

The divide between discount-based and income-based approaches reflects different conceptions of utility rate equity. Discount models emphasize cost of service, with assistance as a secondary consideration, while income-based models prioritize ability to pay in bill determination for disadvantaged households. This disparity contributes to the complexities faced in both the technical and political aspects of water assistance program design.

Administration

Philadelphia has implemented one of the most progressive administrative approaches by leveraging existing public assistance data systems. The city's water department established formal data-sharing agreements with multiple agencies allowing for cross-verification of eligibility. This system enables automatic identification of eligible households through SNAP, TANF, and Medicaid enrollment data, followed by pre-qualification letters sent directly to eligible households. The process includes streamlined application procedures with minimal documentation for pre-identified households. Philadelphia enacted specific legislation authorizing these data-sharing agreements, addressing privacy concerns through strict protocols while prioritizing accessibility. This administrative framework has contributed to Philadelphia achieving one of the highest enrollment levels among large-city water assistance programs, with approximately 60,000 households enrolled as of 2024.

Similarly, Portland is set to launch a pilot Smart Discount Program that will automatically enroll low-income customers into the program. By utilizing a supervised machine learning algorithm to analyze utility account data and publicly available information, the city will proactively identify eligible customers and automatically apply the discount. The program is predicted to eliminate administrative burden on both the customer and the utility potentially leading to higher enrolment rates and increase accessibility.

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Appendix B: Survey Instrument and Results

Washington Water and Wastewater Affordability Survey

A survey was developed in response to the Budget Proviso language stating:

> *The study must include: (i) A summary of existing local, state, and federal low-income assistance; ….*

The survey instrument was developed in collaboration with members of the Advisory Committee (AC). Upon completion of the draft survey, several members of the AC tested the survey to verify that both the questions and the electronic online survey instrument were as expected.

The survey was emailed to over 5,300 email addresses provided by Department of Health (DOH) and Department of Ecology (ECY) February 14, 2025, from Stantec (Pettit, C.).[22] The cover email is shown in Figure B-1. The survey was open for two weeks and subsequently extended for an additional week with a reminder email sent to increase response rates. The final closing data for the survey was March 3, 2025.

Figure B-1. Copy of Survey Distribution E-Mail

WA DOH/DOC Water and Wastewater Affordability Survey

Oh, Yuna
To: Burke, Susan

Reply | Reply All | Forward

You replied to this message on 2/14/2025 3:50 PM.

Hello,

This email is being sent to you on behalf of Washington State Department of Health (DOH) and the Department of Commerce (DOC).
Washington State Legislature has requested the Washington DOH and DOC to assess the feasibility of developing a statewide low-income customer assistance program (CAP) for water and wastewater utility customers. We invite you to participate in a survey (link below) seeking information on your organization's existing CAPs to gain a comprehensive understanding of available resources and challenges. Results from the survey will help inform the legislature about community needs and may lead to potential funding opportunities for Washington utilities and the communities served.

Completing the survey will take no longer than 15-20 minutes. If you're unable to complete the survey, please forward this email to the appropriate person in your organization.

Please submit your responses by [02/24/2025].

Best,
Yuna Oh
Data Analyst, Stantec MTC Financial Management
Direct: 383 285-4525
Yuna.Oh@stantec.com

Stantec

Both the Survey instrument and summary statistics of the survey responses are included below.

[22] See Appendix E, Data Limitations for a description of the challenges in obtaining a comprehensive list of e-mail addresses and contact names for the CWSs and POTWs surveyed.

Survey Instrument

A copy of the survey instrument questions is reproduced below.

The Washington State Department of Health (DOH) and the Department of Commerce (DOC) are conducting this survey to assess the feasibility for a statewide low-income assistance program for water and wastewater utility customers in Washington. This survey seeks information on your organization's existing assistance programs to gain a comprehensive understanding of available resources. Please complete the following questions. We estimate it should take no longer than 15-20 minutes to complete.

If you do not have access to the information requested, please forward this email to the appropriate person. Results from this survey will help assess community needs and inform recommendations for the feasibility of a statewide low-income drinking water and wastewater utility program. We appreciate your responses and support for this study. All responses will remain anonymous and will be reported in aggregate. No individual names will be shared without explicit permission. For any inquires you may have regarding this study, please contact chris.pettit@doh.wa.gov. For any inquiries you may have regarding survey questions, please contact susan.burke@stantec.com or yuna.oh@stantec.com.

PLEASE RETURN BY 03/07/2025.

Please enter N/A for required questions that do not apply.

---

1. **Please select/type the services your utility system provides:**
   a. **Water only**
   b. **Wastewater only**
   c. **Both water and Wastewater**
   d. **Other:**
2. **Provide water or wastewater system name.**
3. **If a water system provider, provide DOH Water System ID Number.**
4. **Please list all zip codes that your system operates in.**
5. **What is the ownership type of your system?**
   a. **Association**
   b. **City/town**
   c. **County**
   d. **Investor-owned**
   e. **Private**
   f. **Special District**
   g. **Other:**
6. **How many single-family water residential connections does your utility serve?**
7. **How many single-family wastewater residential connections does your utility serve?**
8. **What type of customer assistance program has been implemented? Select all that apply**
   a. **Low-Income Household Water Assistance Program**
   b. **Disability Assistance Program**
   c. **Senior Citizen Discounts**
   d. **Emergency Assistance Program**
   e. **No existing customer assistance program**
   f. **Other: ____**

9. If you have a customer assistance program, what year(s) were they implemented? Please write in the type of program and the year(s).

10. If available, please provide a link to the customer assistance program.

11. Select the eligibility requirements for the customer assistance program(s) your utility offers. Type all that apply

- **a. Senior**
- **b. Home owner**
- **c. Bill payer**
- **d. Income based**
- **e. Disability/hardship**
- **f. N/A**
- **g. Other:**

12. What percent of your total residential connections is enrolled in the customer assistance program?

- **a. 0%-3%**
- **b. 4%-10%**
- **c. 11%-15%**
- **d. 16%-20%**
- **e. 21%-30%**
- **f. More than 30%**
- **g. N/A**

13. What proportion of your single-family residential connections are eligible for your customer assistance program?

- **a. 0%-3%**
- **b. 4%-10%**
- **c. 11%-15%**
- **d. 16%-20%**
- **e. 21%-30%**
- **f. More than 30%**
- **g. Data unknown**
- **h. N/A**

14. How is your customer assistance program funded? Select all that apply

- **a. Rate payer revenue**
- **b. Donations**
- **c. Bill roundup**
- **d. Other: ___**

15. Does your organization contract or partner with an outside social service agency for administering your organization's customer assistance program?

- **a. Yes**
- **b. No**
- **c. N/A**

16. If yes, please provide the name of the agency.

17. What challenges are faced in implementing or promoting the customer assistance programs? Select all that apply.

- **a. Lack of funding**
- **b. Limited customer awareness**
- **c. Insufficient staff resources**
- **d. Complicated application processes**
- **e. Eligibility requirements**
- **f. Other: ___**

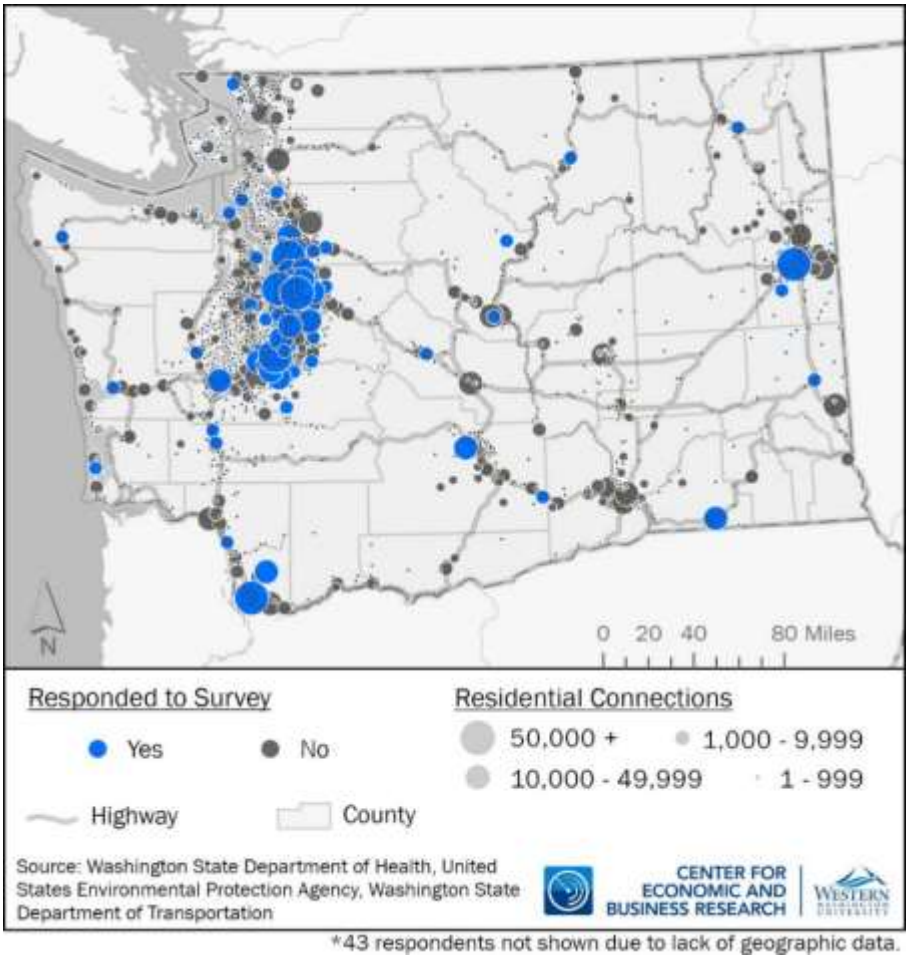
18. Do you have any additional information or comments you would like to share? For example, program features or best practices.

19. Provide respondent's (your) name.

20. Provide respondent's (your) email.

Composition of Surveyed Water Utilities

Of the over 5,300 emails sent, 196 providers' responses were found to be complete and therefore used in the analysis. The providers' responses that were complete serve approximately 1.3 million residential connections, 50 percent of the total 2.5 million community water service (CWS) in the state (Figure B-2).



*43 respondents not shown due to lack of geographic data.

Figure B-2. Water Service Provider Survey Respondents, Location and Size.

Table B-1 shows the geographic region of the survey respondents. The respondents fairly evenly represent the three geographic regions of the state. For example, 40 percent of all systems are in the Northwest, and 42 percent of the respondents are from the Northwest.

Table B-1. Survey Respondents by Geography, Number of Providers and Residential Connections

	Region			
	Eastern	*Northwest*	*Southwest*	*Total*
Survey Responses				
Residential Connections	141,687 (11%)	925,573 (71%)	231,991 (18%)	1,299,251 (100%)
Number of Systems	71 (36%)	82 (42%)	43 (22%)	196 (100%)
Total Statewide Water Systems				
Residential Connections	524,461 (21%)	1,488,595 (59%)	530,377 (21%)	2,543,433 (100%)
Number of Systems	620 (28%)	887 (40%)	694 (32%)	2,201 (100%)

Table B-2 shows the size of the survey respondents. The respondents are primarily mega, large and medium systems. Representing a greater percent of responses than the statewide totals, for example large systems comprise 2 percent of the total systems in the state but make up 10 percent of the responses. Small systems are underrepresented in the response pool.

Table B-2 Survey Respondents by Size, Number of Providers and Residential Connections

	Residential Connection Size				
	Small	*Medium*	*Large*	*Mega*	*Total*
Survey Responses					
Residential Connections	26,063 (2%)	163,858 (13%)	459,190 (35%)	650,140 (50%)	1,299,251 (100%)
Number of Systems	131 (67%)	39 (20%)	20 (10%)	6 (3%)	196 (100%)
Total Statewide Water Systems					
Residential Connections	226,554 (9%)	612,024 (24%)	1,054,715 (41%)	650,140 (26%)	2,543,433 (100%)
Number of Systems	1967 (89%)	178 (8%)	50 (2%)	6 (<1%)	2,201 (100%)

Table B-3 shows the rural, urban and suburban designations of the survey respondents. The respondents are rural systems. Notably relatively few suburban systems responded to the survey.

Table B-3 Survey Respondents by Rural, Urban and Suburban, Number of Providers and Residential Connections (1)

	Rural-Urban Commuting Area Codes			
	Rural	Suburban	*Urban*	*Total*
Survey Responses				
Residential Connections	718,839 (55%)	10,423 (1%)	569,989 (44%)	1,299,251 (100%)
Number of Systems	146 (74%)	11 (6%)	39 (20%)	196 (100%)
Total Statewide Water Systems				
Residential Connections	355,360 (14%)	243,403 (10%)	1,859,836 (76%)	2,458,599 (100%)
Number of Systems	550 (33%)	540 (32%)	597 (35%)	1,687 (100%)

Note: (1) Rural, urban and suburban and characteristics were only developed for the 1,687 water service systems included in the pool used for the random sample. The difference between 1,687 system counts and 2,201 is the number of systems that were dropped from the sample because there was no self-reported service area boundary.

Survey Results

A summary of the 196 respondents shows that 40 percent offer a customer assistance program (CAP) of some type (Table B-4). This rate is slightly higher than findings from the U.S EPA's review of 795 utilities across the nation, which reported 30 percent of utilities offering one or more CAPs (EPA 2016).

The providers' survey responses were matched to specific provider data for the DOH data. The providers that responded to the survey are estimated to serve 1.3 million residential connections. Of those 1.3 million connections approximately 712,000 of the connections are served by providers that offer low-income CAPs, making it the most widely available form of support by CAP type. Disability assistance programs and senior citizen discounts follow, serving 40 percent and 35 percent of residential connections, respectively. This leaves 33 percent of residential connections represented in the survey without an available CAP.

While these programs reach a large share of residential connections, the number of providers offering the programs was also considered to identify potential gaps at the provider level. The count of providers that offer each type of assistance was lower overall, 15 percent of providers offer low-income assistance, 12 percent offer disability-related support, and 19 percent offer senior discounts. By contrast, 60 percent of responding providers do not offer any type of customer assistance programs.

Table B-4. Community Water Services that Report a Customer Assistance Program, by Type

Program	Residential Connections Served (1)	Water System Respondents (1)
Disability Assistance Program	426,741 (33%)	22 (11%)
Low-Income Household Water Assistance	711,863 (55%)	28 (14%)
Senior Citizen Discounts	453,112 (35%)	36 (18%)
Emergency Assistance Program	417,597 (32%)	15 (8%)
No Existing Customer Assistance Program	424,987 (33%)	118 (60%)
Total	1,299,251 (100%)	196 (100%)

Source: Stantec
Note (1) Does not sum to 100% as Community Water Services can select multiple options at once.

Table B-5 summarizes responses about the percentage of the residential connections enrolled in a CAP. Survey result indicate that 23 percent of water providers represent 436,446 connections and have less than 13,090 (3 percent) of their connections enrolled in a CAP. Similarly, 7 percent of providers have 4 - 10 percent enrolled in CAP representing less than 37,070 (10 percent) of connections enrolled in CAP. Together these two groups of providers represented 72 percent of all residential connections of the survey.

Table B-5. Residential Connections and Systems Enrolled in Customer Assistance Program(s)

System-Wide Participation Level	Number of Connections (1)	Number of Water Provider Respondents to Question Twelve (1)
0% to 3%	436,446 (34%)	46 (23%)
4% to 10%	370,777 (29%)	14 (7%)
11% to 15%	908 (0.07%)	1 (.5%)
16% to 20%	727 (0.06%)	1 (.5%)
21% to 30%	43 (<0.01%)	1 (.5%)
More than 30%	0 (0%)	0 (0%)
Unknown/NA	490,350 (38%)	133 (68%)
Total	**1,299,251 (100%)**	**196 (100%)**

Source: Stantec
Note (1) Does not sum to 100% due to rounding.

Table B-6 summarizes responses about the percentage of respondents' residential connections eligible for their customer assistance program.

Table B-6. Residential Connections and Systems Eligible for Customer Assistance Program(s)

System-Wide Eligibility Level	Residential Connections Eligible for Customer Assistance Programs	Number of Water Provider Respondents to Question Thirteen
0% to 3%	130,380 (10%)	22 (11%)
4% to 10%	36,718 (3%)	7 (4%)

System-Wide Eligibility Level	Residential Connections Eligible for Customer Assistance Programs	Number of Water Provider Respondents to Question Thirteen
11% to 15%	53,103 (4%)	4 (2%)
16% to 20%	168.358 (13%)	3 (2%)
21% to 30%	157,132 (12%)	1 (1%)
More than 30%	25,113 (2%)	13 (7%)
Unknown/NA	728,447 (56%)	146 (74%)
Total	**1,299,251 (100%)**	**196 (100%)**

Note (1) Does not sum to 100% due to rounding.

Together, Tables B-5 and Table B-6 point to a widespread disconnect between eligibility and access. Many water systems report low enrollment in CAPs, even when a substantial portion of their customer base is estimated to qualify for support. Table B-5 and Table B-6 help explain why this gap exists by identifying who qualifies for assistance and whether there are barriers systems face in offering or promoting these programs.

Table B-7 presents the results about eligibility requirements applicable to their customer assistance program.

Table B-7. Eligibility Requirements for Customer Assistance Program

Eligibility Requirement(s) for CAP(s)	Residential Connections Served (1)	Water System Respondents (1)
Bill Payer	369,994 (28%)	28 (14%)
Disability/Hardship	424,457 (33%)	27 (14%)
Home-Owner	1,105,442 (15%)	17 (9%)
Income Based	799,045 (62%)	46 (23%)

Senior	582,142 (45%)	39 (20%)
Total	**1,299,251 (100%)**	**196 (100%)**

Note (1) Does not sum to 100% as Community Water Services can select multiple options at once.

Table B-8 summarizes responses about challenges providers encountered in implementing or promoting their customer assistance program. These responses highlight operational challenges that may further restrict access to CAPs. Limited customer awareness is the most frequently cited issue, affecting 57 percent of residential connections. Nearly half of systems identified complicated application processes (49 percent) and the eligibility requirements (43 percent) as obstacles. Staffing shortages (32 percent) and lack of funding (13 percent) were also reported. These challenges suggest that even when CAPs are available, program design and administrative capacity limit their effectiveness.

Results indicate the respondents face nearly every challenge listed fairly evenly. This result suggests the need for a unified statewide low-income assistance program may be more effective even in enrollment.

Table B-8. Challenges Faced Implementing or Advertising Customer Assistance Program(s)

Challenges Faced with CAP(s)	Residential Connections Served (1)	Water System Respondents (1)
Complicated Application Processes	700,350 (46%)	23 (12%)
Eligibility Requirements	417,025 (32%)	40 (20%)
Insufficient Staff Resources	490,0009 (38%)	43 (22%)
Lack of Funding	200,885 (38%)	76 (39%)
Limited Customer Awareness	636,183 (49%)	36 (18%)
Total	**1,299,251 (100%)**	**196 (100%)**

Note (1) Does not sum to 100% as Community Water Services can select multiple options at once.

Many water systems do not have the tools or resources to identify eligible households, streamline enrollment, or ensure that assistance programs are accessible. Improving data collection, simplifying application procedures, and expanding outreach could help close the

gap between eligibility and participation. The study hopes to support these efforts by providing a clearer picture of current program coverage and the barriers that prevent low-income households from receiving support.

References

Environmental Protection Agency, 2016. Drinking Water and Wastewater Utility Customer Assistance Programs, April 2016

Pettit, C. Personnel e-mail communication from Chris Pettit, Drinking Water State Revolving Fund Manager, Office of Drinking Water WA Department of Health, sent the Susan Burke, Stantec on February 2, 2025.

Appendix C: Methodology

Introduction

The methodologies used to estimate the statewide cost burden are described in this appendix. Beginning with how the stratified random sample was used to identify a subset of the 2,201 Community Water Services (CWS) that form the basis of the analysis, through to the estimation of the sampled CWS and POTW residential indices (RI) and concluding with the extrapolation of the sampled indices back to the 2,201 CWSs and POTWs. The steps below were followed.

- Developed a statistical sampling plan used to select a subset of Washington state service providers that would represent providers throughout the state.
- Calculated provider-specific RIs for the sampled providers as follows.
  - Gathered provider-specific data including:
    - Drinking water and wastewater rates from public websites.
    - Provider-supplied service boundaries.
    - Washington state household income by U.S. census track.
  - Estimated provider-specific annual water service bills.
  - Estimated provider-specific median household income (MHI) and lowest quintile income (LQI) household incomes.
- Extrapolated the sampled providers' RIs to estimate the cost burden for all residential connections served within Washington state.
- Estimate the low-income CAP costs.

Sampling Plan

The review of the Washington State Department of Health (DOH)-provided database that contained information about 2,201 CWSs revealed that the data was complete, but for the self-reported service area boundaries. Service area boundaries are necessary in order to map the census tract income data, to the CWSs. As a result, 510 of the CWSs were dropped from the dataset, resulting in 1,687 CWSs from which to sample (see Appendix E for details.

The second step in the stratified random sample development identified key variables (e.g., strata) on which to stratify the sample. Three strata were selected: Size, Location, and Urbanization.

Size

CWSs were differentiated on size in order to consider the scale and operational needs of various CWSs. Size is defined as the number of residential connections served. The size stratum classified systems as:

- Small. Fewer than 1,000 residential connections.
- Medium. 1,000 to 10,000 residential connections.
- Large. 10,000 to 49,999 residential connections.
- Mega. More than 50,000 residential connections.

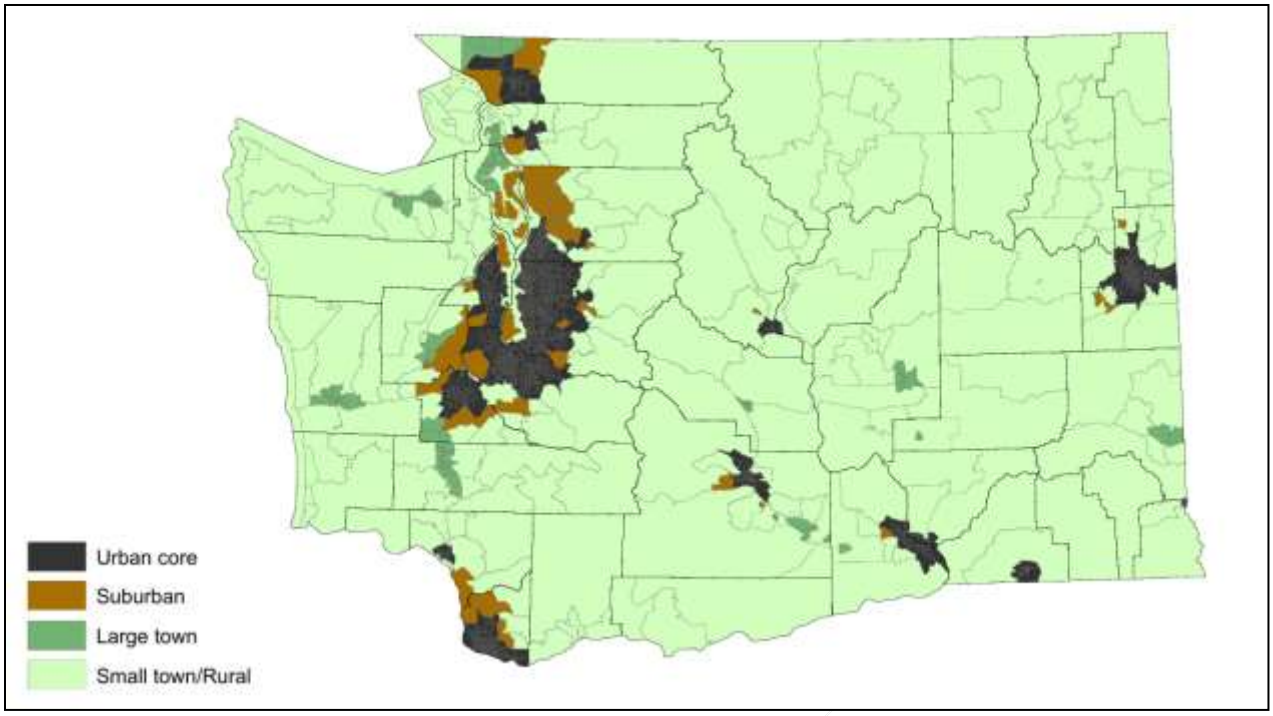
Geography Region

To consider how geography may impact CWSs operations and household income, the three DOH-designated geographic regions were used. Specifically, Eastern, Northwest and Southwest (Figure C-1).

Figure C-1. Geographic Regions per Department of Health Drinking Water Database

Rural, Urban, Suburban

To classify urbanization, the study used the U.S. Department of Agriculture's (USDA) Rural-Urban Commuting Area Codes, assigning CWSs into Urban, Suburban, or Rural categories based on the most prominent ZIP code within their service area (Figure C-2). The classifications are defined based on population density.



Source: USDA

Figure C-2. Rural-Urban Commuting Area Breakdown in Washington

CWSs with more than 50,000 residential connections were designated as Mega Connections (six total) and automatically included in the sample. The remaining systems were grouped into the strata, and five systems were randomly sampled from each stratum. The final sample combined the Mega Connections with the stratified sample to maintain statistical integrity while ensuring comprehensive representation.

Following the initial sampling of CWS the effort to collect CWS-specific rate data from publicly available sources (e.g., CWS webpages) began. Collecting data from the Mega, Large and Medium sized CWS was relatively straightforward, however rate data was unavailable for many of the small CWSs. A resampling of 52 small water systems was completed to adjust for this lack of data to improve representativeness and reliability of the analysis.

Similarly, resampling was conducted for Investor, Private, and Association-owned systems, as these ownership types were less likely to have publicly available rate data. Ensuring a balanced representation across these ownership types further strengthened the study's findings while preserving the integrity of the sampling process.

A sample weighting methodology was used to ensure that the stratified sample accurately represents the overall population. Each CWS in the stratified sample is weighted inversely proportional to its probability of selection based on its stratum. The weights correct for disproportionate subgroup representation and mitigate bias from over- or under-sampling. Incorporating these weights into the analysis enhances the precision of cost burden

estimates and strengthens the validity of inferences regarding the feasibility of a statewide low-income assistance program. This weighted approach ensures that the analysis reflects the broader characteristics of the entire water system population, yielding more reliable and generalizable results.

Table C-1 through Table C-3 report the sample, weighted sample and sampling populations by strata.

Table C-1. Community Water Service Sample, Weighted Sample and Sampling Population by Size

	Residential Connection Size				
	Small	*Medium*	*Large*	*Mega*	*Total*
Sample					
Residential Connections	11,353 (0.7%(	285,511 (18.3%)	610,622 (39.2%)	650,140 (41.7%)	1,557,626 (100.0%)
Number of Systems	43 (26.4%)	82 (50.3%)	32 (19.6%)	6 (3.7%)	163 (100.0%)
Weighted Sample					
Residential Connections	369,179 (14.7%)	607,515 (24.1%)	889,509 (35.3%)	650,140 (25.8%)	2,516,343 (100.0%)
Number of Systems	1,456 (86.3%)	176 (10.4%)	49 (2.9%)	6 (0.4%)	1,687 (100.0%)
Sampling Population					
Residential Connections	190,910 (7.8%)	607,716 (24.7%)	1,009,833 (41.1%)	650,140 (26.4%)	2,458,599 (100.0%)
Number of Systems	1,456 (86.3%)	176 (10.4%)	49 (2.9%)	6 (0.4%)	1,687 (100.0%)

Source: Department of Health.

Table C-2. Community Water Service Sample, Weighted Sample and Sampling Population by Region

	Region			
	Eastern	*Northwest*	*Southwest*	*Total*
Sample				
Residential Connections	348,617 (22.4%)	834,685 (53.6%)	374,324 (24.0%)	1,557,626 (100.0%)
Number of Systems	43 (26.4%)	62 (38.0%)	58 (35.6%)	163 (100.0%)

	Region			
	Eastern	*Northwest*	*Southwest*	*Total*
Weighted Sample				
Residential Connections	538,126 (21.4%)	1,432,357 (56.9%)	545,860 (21.7%)	2,516,343 (100.0%)
Number of Systems	322 (19.1%)	783 (46.4%)	582 (34.5%)	1,687 100%
Sampling Population				
Residential Connections	496,477 (20.2%)	1,438,273 (58.5%)	523,849 (21.3%)	2,458,599 (100.0%)
Number of Systems	322 (19.1%)	783 (46.4%)	582 (34.5%)	1687 (100.0%)

Source: Department of Health.

Table C-3. Community Water Service Sample, Weighted Sample and Sampling Population by Rural/Suburban/Urban Classification

	RUCA			
	Rural	*Suburban*	*Urban*	*Total*
Sample				
Residential Connections	183,511 (11.8%)	166,941 (10.7%)	1,207,174 (77.5%)	1,557,626 (100.0%)
Number of Systems	53 (32.5%)	41 (25.2%)	69 (42.3%)	163 (100.0%)
Weighted Sample				
Residential Connections	417,671 (16.6%)	363,024 (14.4%)	1,735,648 (69.0%)	2,516,343 (100.0%)
Number of Systems	550 (32.6%)	540 (32.0%)	597 (35.4%)	1,687 (100.0%)
Sampling Population				
Residential Connections	355,360 (14.5%)	243,403 (9.9%)	1,859,836 (75.6%)	2,458,599 (100.0%)
Number of Systems	550 (32.6%)	540 (32.0%)	597 (69.0%)	1687 (100.0%)

Source: Department of Health.

Another characteristic of the CWSs that is of interest but was not used as a stratum for the sampling was ownership type. The CWS's ownership type, as reported by DOH, is of interest as Investor-Owned utilities may not qualify for assistance under a statewide low-income CAP

(Table C-4). There are 48 CWS classified as Investor, serving 23,010 connections, or 2.85 percent of the connections in the state. Additionally, a lack of clarity regarding the difference between "associations" and "private" was difficult to distinguish.

Definitions of water system ownership types from the Washington Department of Health are as follows:

Association—A non-government water system owned by its consumers (sometimes referred to as members). It includes "mutual" water companies.

City/Town—A city or town incorporated in accordance with the applicable Revised Code of Washington.

County—A water system owned by county government such as a county park or public works maintenance facility.

Federal—A water system owned by the federal government such as veterans' hospital, national park, forest service facility.

Investor—A privately owned water system where the water system is operated with the intent of making a profit. The owner may be regulated—or potentially regulated—by the Washington Utilities and Transportation Commission (WUTC).

Private—A privately owned water system, not including associations, where the water system is not operated with the intent to make a profit. Examples: water systems serving mobile home parks, stores, industries, etc.

Special District—A special purpose district created in accordance with the applicable Revised Code of Washington such as a water or sewer district, public utility district, school district, fire district, or port district.

State—A water system owned by the state such as a state park, correctional facility, or department of transportation rest area or maintenance facility.

Table C-4. Community Water Service Sample, Weighted Sample and Sampling Population by Ownership

Ownership Type	Residential Connections	Water Systems
Association	177,638 (7.1%)	329 (19.5%)
City/Town	1,490,311 (59.2%)	319 (18.9%)

Ownership Type	Residential Connections	Water Systems
County	68,945 (2.7%)	271 (16.1%)
Investor	23,010 (0.9%)	48 (2.9%)
Private	121,006 (4.8%)	378 (22.4%)
Special District	635,433 (25.3%)	342 (20.3%)
Total	2,516,343 (100.0%)	1,687 (100.0%)

Source: Department of Health.

Residential Indicator

The metric chosen to assess cost burden of water service in the state is a Residential Indicator (RI). The RI is a commonly used metric in water and wastewater affordability analyses. The indicator represents the proportion of annual income spent by a typical single-family household on water and wastewater services. Figure C-3 shows the RI calculation.

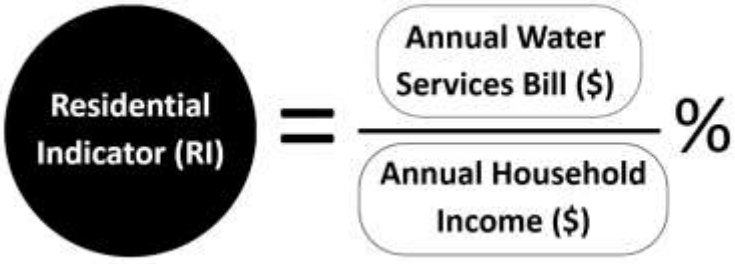


Figure C-3. Residential Indicator Calculation

The RI does have several limitations that are important to acknowledge. The RI is typically calculated using system-wide water average bill and average income estimates. Using averages masks the experience of individual households. Additionally, the RI does not account for other essential costs that impact cost-of-living such as housing, transportation, healthcare, and groceries. Despite its limitations, the RI remains an insightful metric in assessing affordability at the system or community level.

Since income is a key variable in the RI calculation (see Figure C-2) using different income benchmarks can yield valuable insights into how affordability challenges vary across different segments of the population. This study used three income measures to assess the

affordability landscape of water services in the state: LQI, 80 percent of MHI (MHI_80), and MHI.

LQI is an average of the annual income level for the lowest earning 20th percentile in a region. MHI_80 is an income threshold calculated to represent annual income that falls below 80 percent of the MHI. This is a commonly used benchmark for identifying low- to moderate-income populations in public policy and affordability studies because it includes a broader segment of lower- to moderate-income households that fall just below the median income level. MHI_80 captures households whose income is still relatively modest and may be vulnerable to affordability challenges, particularly in areas with high living costs reflect the needs of a wider share of the population.

Many households at the median income level also face significant financial stress, especially when confronted with rising utility costs and other essential expenses. Including MHI in the analysis helps capture affordability concerns that may exist among households who do not qualify as low-income by traditional standards but still struggle to cover basic needs. By incorporating both LQI, MHI_80, and MHI, this analysis provides a more comprehensive understanding of cost burden at various income levels and supports the development of more inclusive policy solutions. The following sections outline the steps involved in collecting, preparing, and analyzing the data used in calculating RIs for water systems across the state or limited access to assistance programs.

Calculation of Water Service Bills

Water service bills were calculated using provider specific rates, obtained via on-line searches and average water usage. Each component of the bill is discussed below.

Water Rates

Rate information is generally posted publicly on water system websites. Water systems were identified by their unique Water System Identification Number (WSID), assigned by DOH. All publicly available rate information was obtained from the sampled water system websites and entered into a rate database, capturing the unique format of each rate structure. Unique attributes of each water system were accounted for and recorded, such as whether the posted rate applied to service inside or outside of the city limits or if the rates applied to water or wastewater.

Water and wastewater rates usually consist of two components: 1) a service charge and 2) a volume charge. The service charge (hereafter referred to as "base" charge) is a fixed amount charged to each connection to cover the costs associated with the water system itself, i.e., to cover the cost of the water pipes that deliver water to users (EPA 2024). The volume charge (hereafter referred to as "usage" charge) reflects the cost of the amount of water used. However, rate structures are highly complex and can vary significantly in the design of the charges. This diversity in rate structures stems from each water system prioritizing multiple goals, including sufficient cost recovery, revenue stability, water conservation, etc.

Different rate structures are used to support the specific needs of a water system which is seen in Washington (AWWA 2017).

After collecting the publicly available rate information for the sampled water systems, the rate schedules had to be standardized to be used in the analysis. The sampled water systems used a variety of units to measure water usage and establish usage tiers, including cubic feet (CF), centum cubic feet (CCF), gallons (gal), and thousand gallons (or kilogallons) (kGal). The standardization process involved converting all tier levels into kGals.

Water Usage

The analysis assumed a monthly household usage of 6.93 kGals, based on a statewide average household size of 2.53 people (U.S. Census Bureau n.d.) and an average daily per capita water use of 90 gallons (EPA n.d.). This standardized estimate was applied to all systems to ensure consistency and comparability across rate structures. While actual household water usage varies by factors such as region, climate, household behavior, and system-specific metering policies, the 6.93 kGal/month value reflects a reasonable baseline drawn from national and state-level averages.

Two examples of water bill calculations are:

- Under a rate structure with a $15 base charge and a simple volume charge of $3 per kGal, the monthly household bill would be $35.79 ($15 + [$3*6.93]).
- Under a rate structure with a $15 base charge and a tiered volume charge of $2 per kGal for the first 4 kGals and $4 per kGal for any additional usage. Under the 6.93 kGal assumption, this bill would be $34.72 ($15 + [$2*4kGal] + [$4*2.93]).

Estimation of Provider-Specific Income Data

To estimate income levels for households across the state of Washington, this study sourced income data from the US Census Bureau's American Community Survey (ACS) five-Year Estimates. The data was collected for census tracts across the state. Census tracts were selected as the geographic unit for income data because they represent the smallest level of geography for which detailed, and statistically reliable income estimates are published by the U.S. Census Bureau. While block groups offer even finer granularity, they are more susceptible to sampling error, especially in rural areas or small populations. MHI data was sourced from ACS Table B19013 and LQI data was sourced from ACS Table B19080.

The boundaries of water and wastewater service areas define the geographic region within which the system has the infrastructure and authority to provide its services to households. The shapefile containing CWS area data was provided by DOH and hosted on the Washington State Geospatial Portal. This primary dataset was filtered to only include "Active," "Community," "Group A" water service areas. Of the 2,201 CWSs in the state, only 1,691 included self-reported service boundaries in the Washington State Geospatial Portal. Figure C-4 shows the water and wastewater service areas for which there are self-reported

service boundaries as a shape. Any dot on Figure C-4 is a CWS for which there is not self-reported service area boundary, and the CWS is located on the map using the CWS zip code.

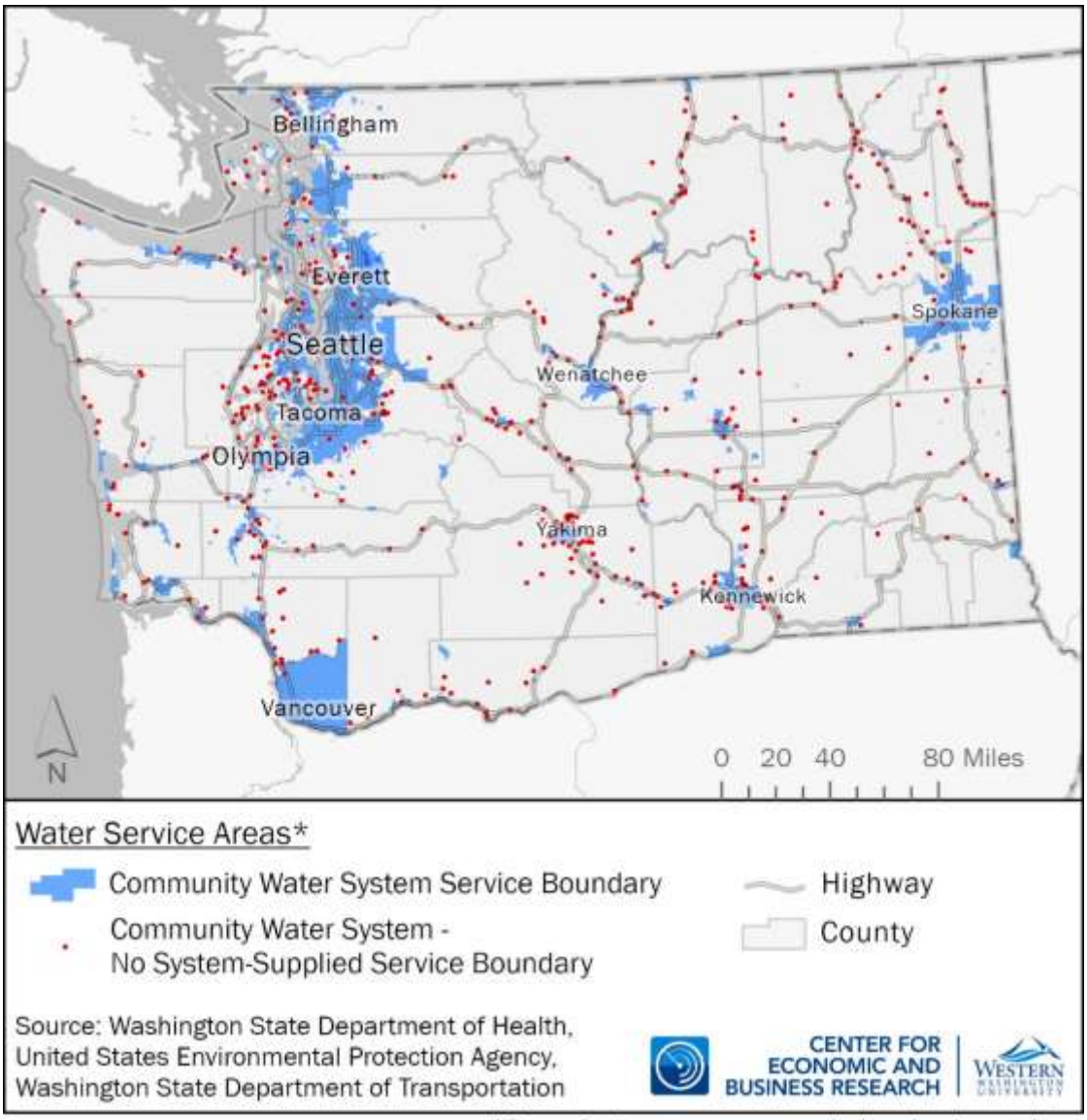


Figure C-4. Water System Service Area Boundaries in Washington State by Source

Water and wastewater service areas do not always align with political boundaries such as cities, ZIP codes, or census tracts, and can vary significantly in shape and coverage. Because of this irregularity, service areas often overlap multiple census tracts, with the degree of overlap ranging from minor edge intersections to near-total coverage. Accurately identifying which census tracts intersect a service area is a critical first step for corresponding income data with the population served by each water system. Mapping software was used to overlay census tract boundaries with service area boundaries and

identified which census tracts intersected each service boundary and calculated the proportion of overlap.

Figures C-5 and Figure C-6 show various challenges encountered in corresponding census tracks to CWS service area boundaries in the Northwest and Eastern regions of the state, respectively. In more urbanized regions such as the Northwest, water systems tend to have densely packed, overlapping boundaries that span dozens of census tracts, increasing the complexity of income estimation. In contrast, the Eastern Region is characterized by scattered, smaller systems with highly localized coverage. These geographic patterns underscore the importance of spatial analysis in assessing affordability.

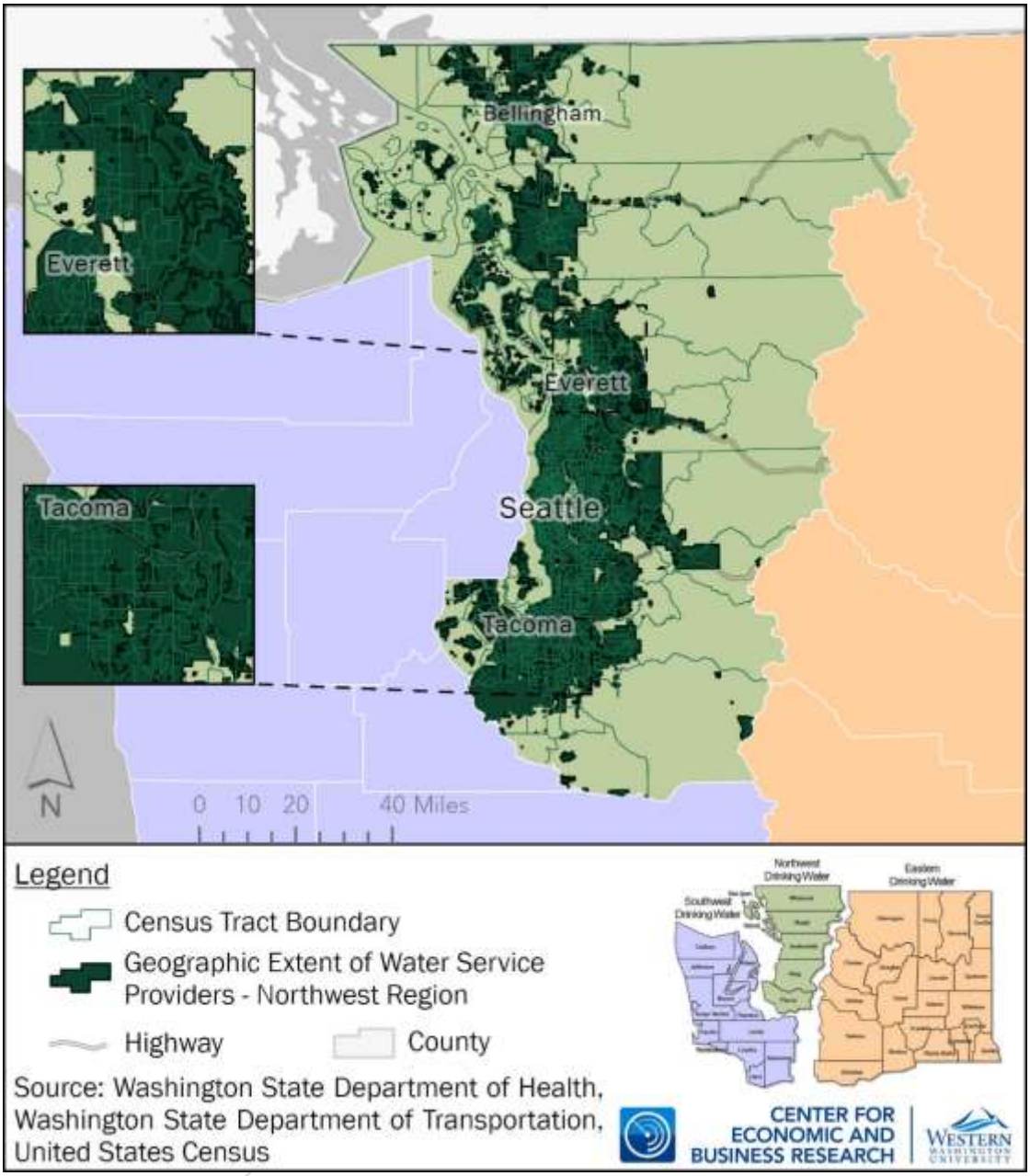


Figure C-5. Overlap of Water System Service Areas and Census Tracts in Northwest Region

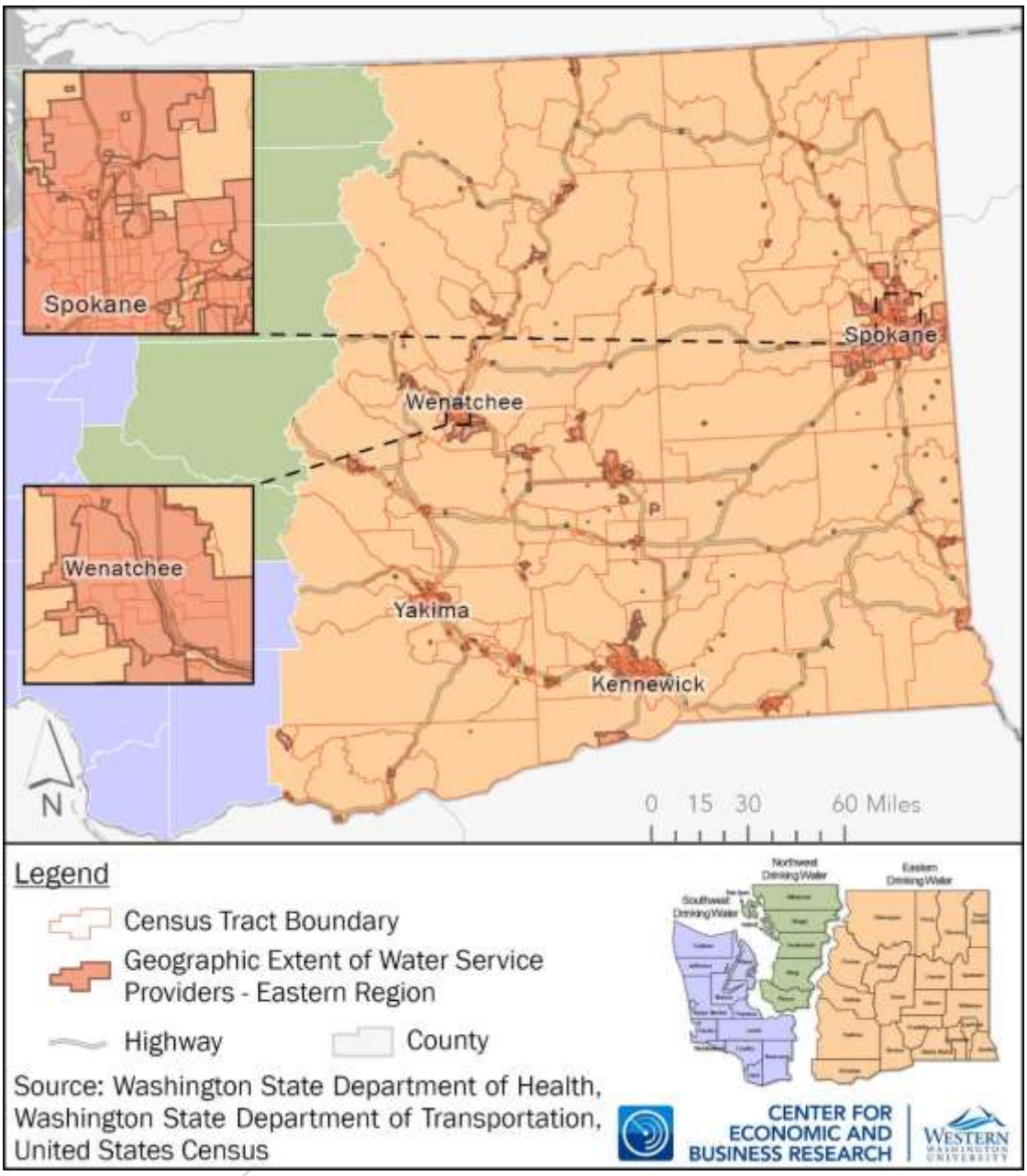


Figure C-6. Overlap of Water System Service Areas and Census Tracts in Eastern Region

For this study, income estimates were sourced from the U.S. Census Bureau and corresponded to water and wastewater service areas. To estimate household income levels for individual water service areas, this study employed a spatial weighting method based on the geographic overlap between service areas and census tracts. This was done by first calculating the area of a given geography, which in this study was always calculated in square miles. Then, two layers are passed through the "Identity" tool one as the "main input" (primary dataset) and one as "identity features" (data to be appended to primary dataset), which creates new features based on the intersections of the two layers and

excludes any features that do not intersect. Once complete, the area of these new, generally smaller, features are calculated once again. The new area is then divided by the original area. The resulting quotient is the ratio of the new feature as portion of the original feature. To account for this possible misalignment of census tracks to water service boundaries, the individual service area income estimates were calculated from an average of each census tract within a service area, weighted by the percentage of land area overlap.

Upon completion of the estimation of provider-specific water service bills and income levels, individual provider-specific RIs were calculated for the sampled CWSs.

Extrapolation of Sampled CWS Residential Indices to Statewide Providers

Since this analysis used a stratified random sampling approach, each sampled CWS serves as a proxy for a subset of unsampled systems with similar characteristics. To estimate the number of households each sampled system represents, the reported number of residential connections of each sampled system was multiplied by a weighting factor derived from the CWSs' stratum in the sampling plan (Table C1 through Table C-3). These weights account for system size, region, and service density, allowing the sample to be extrapolated to the full population of residential water system connections. By applying these weights to the RILQI results, the analysis can estimate the number of households across the state that may be facing affordability challenges

Program Cost Estimate

This study estimates the cost of a statewide program designed to reduce the RI value for systems that exceed a combined water and wastewater affordability threshold of 4.5 percent, using the Residential Indicator based on the Lowest Quintile Income (RI_{LQI}). Specifically, what would it cost to ensure that no household with an average LQI at or above the RI_{LQI} threshold pays more than 4.5 percent of that income on combined water services?

To develop this estimate, we first identified all systems that provide both water and wastewater services and have a RI_{LQI} value exceeding the 4.5 percent threshold. For each of these systems, we calculated the difference between the estimated average annual water bill and the hypothetical bill amount that would represent exactly 4.5 percent of the system-specific LQI threshold. This difference represents the annual per-household assistance needed to reduce the households water service bills (drinking water and wastewater) bill to 4.5 percent of average LQI.

Importantly, this approach produces a conservative, or lower-bound, estimate. It does not account for households with incomes below the LQI threshold that may also experience affordability challenges, nor does it account for households in systems below the 4.5 percent RI_{LQI} threshold who still may be facing hardship. Instead, the estimate focuses narrowly on the cost to reduce bills for households with incomes at the LQI threshold, served by systems currently above the benchmark.

To estimate the number of households in need of assistance, we assumed an even income distribution and applied the lowest income quintile (20 percent) to each system's residential connection count. This gave us an estimated number of LQI-level households served by each system. That figure was then multiplied by the per-household assistance cost to calculate a system-specific total. These values were summed across all relevant systems to produce a statewide estimate. Finally, to account for administrative and implementation costs, an additional 10 percent was added to the total.

The estimate of program costs is approximately $160 million per biennium. While this estimate does not reflect the full cost of a comprehensive assistance program, it offers a foundational baseline for understanding the potential scale of investment required to begin addressing water affordability challenges in Washington state.

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Appendix D: Data Limitations

Data Limitations

Multiple databases and data management methods were utilized in the estimation of the water service cost burden. Data limitations and the potential impact they have on the analysis are described in this Appendix. In general, analysis and recommendations were significantly limited by the lack of a comprehensive public facing platform for drinking water and wastewater providers throughout the state. Other states are developing such databases which may serve as a model for Washington. For example, the University of North Carolina hosts a Water and Wastewater Rates Dashboard to assist utility managers and local officials with benchmarking residential rates (UNC n.d.) Specific data limitations and the potential impacts on the analysis follow to identify areas for data gap closure efforts.

Drinking Water System Database

The Community Water System (CWS) database used in this analysis was obtained from the Washington State Department of Health (DOH), last updated in 2022 (Bengston 2025a). While this dataset served as a foundational data source, some inconsistencies and gaps in data quality were observed, particularly regarding ownership types and the number of residential connections.

Specifically:

- Connection counts for each CWS were assumed to be residential connections and may have been dated. Misreporting connection counts may lead to an over- or underestimate of the number of households facing a cost burden and the revenue needed to fund a statewide low-income assistance program.
- Service area boundaries were not available or not self-reported for over 500 of the CWSs in the database.
- Connections counts were ostensibly for single family residential connections. Connections to multifamily housing units such as apartment buildings were not included in the analysis, as such the number of “households” in the study is underreported.
- The CWS Contact information used for survey distribution was not consistently accurate or available, which may have contributed to the low response rate. As a result, there may be a higher count of existing customer assistance program (CAP) than recorded through the survey.
- CWS rate information is dated. This study utilized on-line web platforms to gather rates for CWSs and POTWs, however many CWSs did not have websites, particularly the small sized CWSs. Therefore, the water service cost of the small CWS may not be reflective of true costs. Some of the small CWSs may have unique water rates structure or charge a flat Association fee.
- Only fixed monthly service charges and volumetric usage charges were included in this analysis. Additional billing components, such as taxes, surcharges, or administrative

fees were excluded. Households may face higher bills in jurisdictions that layer multiple charges onto monthly bills. Therefore, the calculated bills represent minimum cost estimates for households and may not reflect the full amount customers are required to pay.

Wastewater System Data Gap

At the time this analysis was conducted, there was no centralized database of all wastewater systems and providers in Washington state. DOH regulates drinking water and maintains a database. However, no one agency oversees POTWs. Only drinking water system data was used for sample data, underrepresenting POTWs in the study. However, in order to include POTWs in the analysis the CWS that also provide wastewater treatment services were analyzed for both the drinking water bill and the wastewater bill. This could cause several impacts.

- Many utilities that provide both services may have a different number of drinking water connections than wastewater connections. Drinking water connections were used as a proxy for wastewater connection counts. The impact to results is uncertain as it is not clear whether there are more or less wastewater connections than drinking water connections.
- The service areas of POTW are not known, which may have impacted the estimated provider-specific income.
- Three types of providers are most likely to be misrepresented, decentralized wastewater providers, regional utilities with independent drinking water and wastewater infrastructure, and wastewater providers that do not maintain a drinking water system.

Consequently, while the wastewater results provide valuable insights, they are likely reflective of only a portion of the full system landscape in the state and may not capture the full extent of wastewater affordability challenges.

Representative Sample

A representative sample of water service providers was used for this analysis.[23] The sampling framework included variables such as the number of residential connections served and region. However, the use of a sample population introduces inherent limitations. Conclusions drawn from the results are subject to sampling errors and when combined with data availability constraints discussed above errors may be compounded. For example, certain strata only represented by a handful of water service providers may disproportionally influence group averages.

[23] See Appendix C, Methodology for a description on the sampling plan.

Additionally, the results rely on the assumption that the sampled water service providers are truly representative of the non-sampled water service providers, within their respective strata. If the available data differs significantly from the actual population of providers, it may introduce bias. While resampling and stratification helped mitigate this risk, translating sample results to statewide conclusions should be done cautiously.

Underrepresented Water System Rates

Many small CWSs lack a public online presence, making it difficult to locate current accurate rate information. In some cases, these small systems are owned or operated by third-party management companies that publish consolidate rate information across multiple service areas. Small systems, which are defined as serving less than 1,000 residential connections, make up 89 percent of the state's community water systems. System representation also differs significantly by region.

The final sample population total was 367 water service providers as shown in Figure D-1. Of those 367 sampled providers only 163 (44 percent) had publicly available rate information, meaning 56 percent of sampled systems lacked the necessary data to calculate an affordability index.

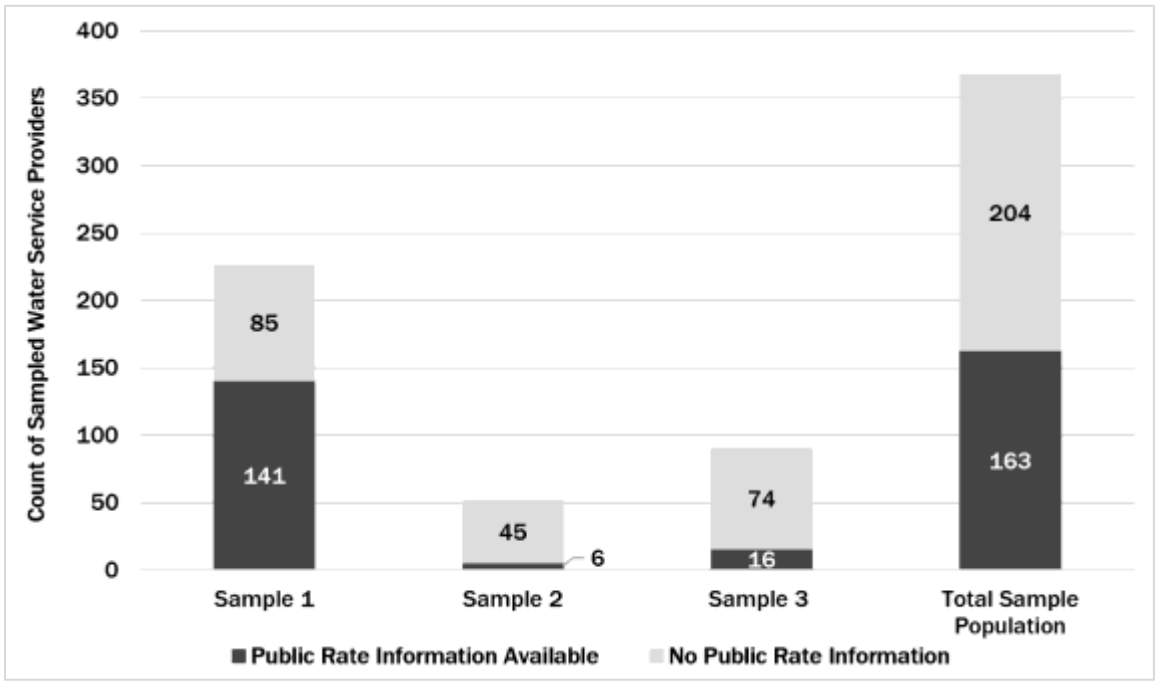

Figure D-1. Number of Sampled Systems vs. Systems with Rate Data, by Sample Variation

Figure D-2 further illustrates how rate data availability varies significantly by system size. While 84 percent of medium sampled providers and 94 percent large, sampled providers had public rate data available, only 43 of 229 small systems did—representing just

19 percent of sampled small providers. This imbalance shows that small systems are underrepresented in the rate-based affordability. This lack of visibility makes it difficult to fully assess the affordability landscape for smaller, often rural communities, many of which may serve low-income populations or face structural cost disadvantages due to limited economies of scale.

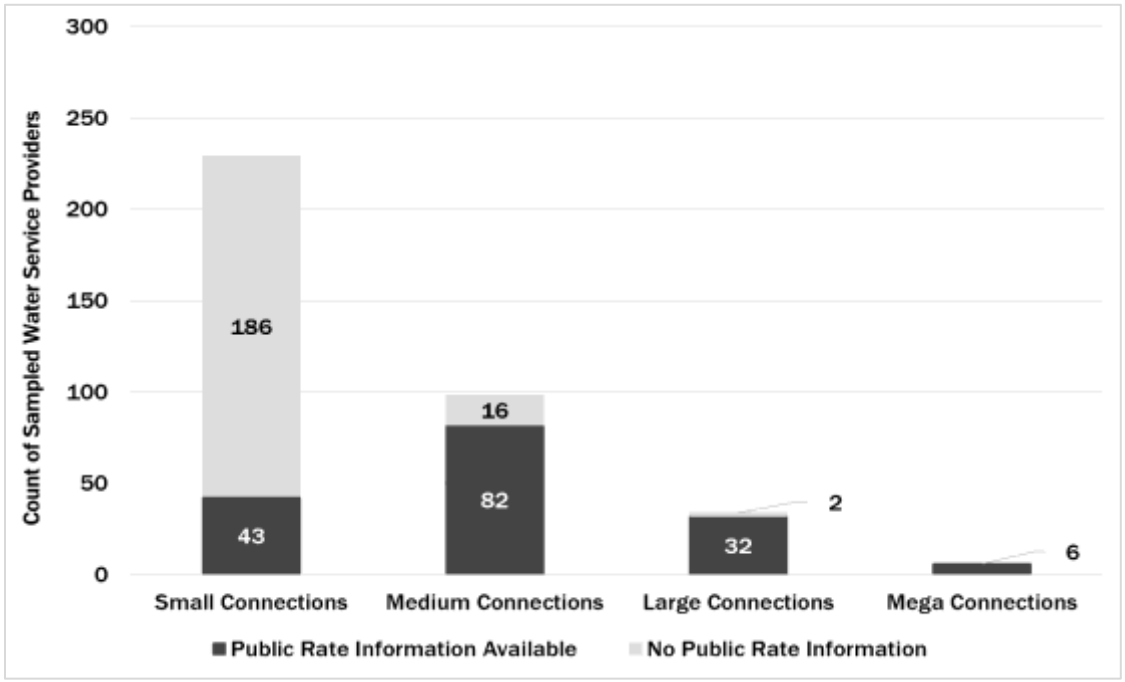

Figure D-2. Number of Sampled Systems vs. Systems with Rate Data, by Size

As shown in Figure D-3, sampled CWSs in the Eastern and Northwest regions of the state had higher proportions of sampled systems with missing rate data compared to the Southwest. For instance, in the Northwest region, 57 percent of sampled systems had no public rate schedule. As mentioned above, if the sampled water service providers without rate data are systematically different from those with available data (such as being smaller, privately managed, or operating under unique rate structures) then the affordability findings in this report may not fully represent the broader system landscape.

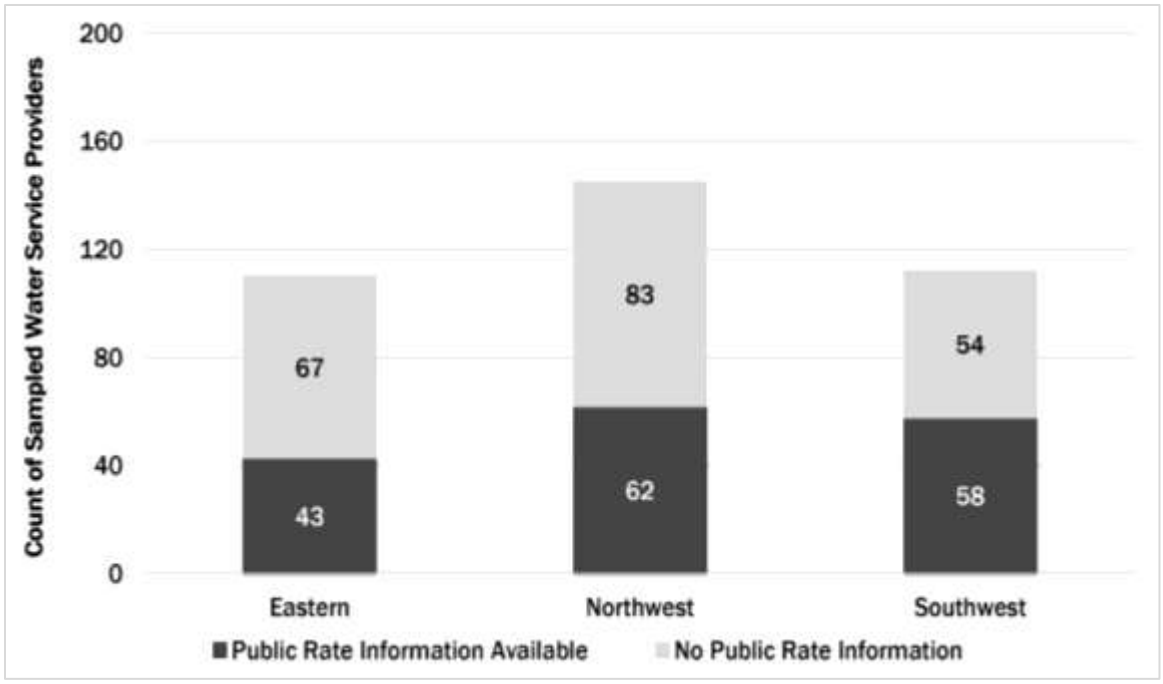

Figure D-3. Number of Sampled Systems vs. Systems with Rate Data, by Region

Taken together, these factors highlight that data availability is not uniform across regions or system types, and that calculated affordability indices likely represent conservative (lower-bound) estimates of the cost-burden faced by households in paying for water services.

Community Water System Service Boundaries

Geographic information systems provide a bridge between CWS data and census data. Several technical challenges arose around the availability of geospatial datasets, including incomplete data, and overlapping features.

DOH maintains a database of CWS provided service areas (DOH n.d.). However, for some of the identified Group A systems, service-provider boundaries were not available. The EPA has created a supplemental dataset that models areas that are not provided by the CWSs, but major differences in the levels of precision were identified. For that reason, the DOH spatial dataset was used. Figure D-4 highlights this disparity: systems shown in blue represent CWS with system-supplied service boundaries, while red dots show systems without system-supplied boundary data, despite being an active water system. These data gaps are not evenly distributed; they include entire cities and large portions of Mason and Island Counties. The lack of boundaries for such areas limits geographic coverage in the analysis, potentially excluding portions of the population from affordability evaluation.

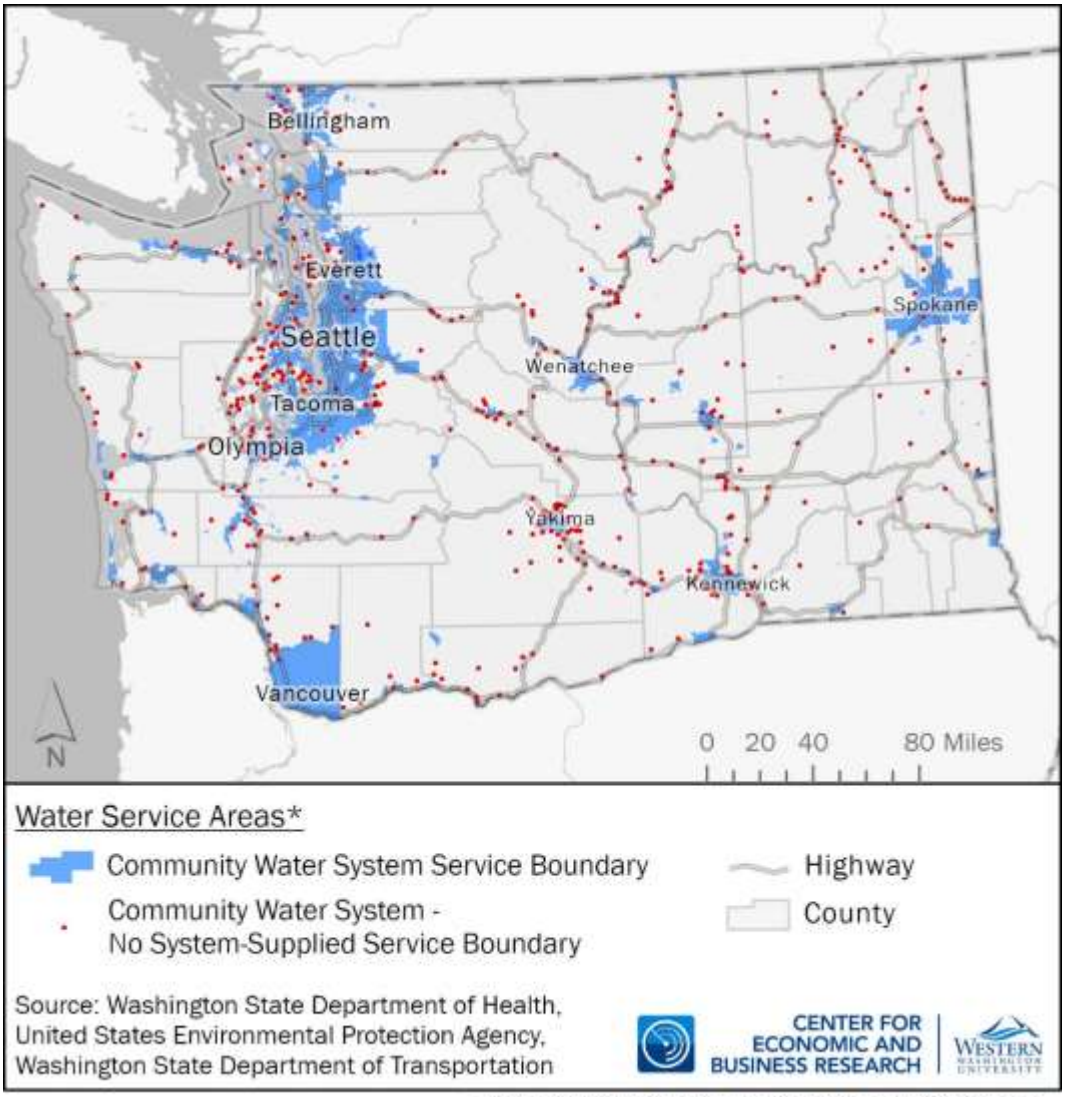

Figure D-4. CWS Service Areas—System Supplied vs. No System-Supplied Boundaries

The DOH dataset, however, had overlapping service area boundaries that also led to roadblocks in the analysis and introduced potential inconsistencies. The service area boundaries contained in the DOH dataset were supplied individually by each CWS, meaning the dataset was composed of features sourced from many independent sources. While some minor overlap is not uncommon in a large spatial dataset, particularly where jurisdictional boundaries are defined independently, more than 400 overlapping features were identified. These overlaps complicated efforts to determine which census tracts and population segments were served by each CWS. This spatial ambiguity introduces uncertainty into both the allocation of income estimates and the calculation of affordability metrics, especially in dense urban areas or places multiple service providers.

Community Water Service and Publicly Owned Treatment Works Email Contacts

The survey of the CWSs and the POTWS used to assess the prevalence of CAPs in Washington state required e-mail addresses for each provider. DOH-maintained database of Group A WCSs includes the name of a contact person for each WCS, but not their e-mail addresses and additional data gaps resulted in surveys being sent blindly (Petit 2025).

DOH provided a separate list of over 6,000 email addresses but lacked key identifiers to match the e-mails to the CWS database containing attributes about the CWS (e.g., location, size, ownership type). The list contained 700 duplicates, and more than 500 emails bounced back.

The survey was open for three weeks in total. The survey was distributed to 5,358 DOH Washington Water System Contacts. A total of 239 responses were received, yielding a response rate of approximately 3.8 percent. The effort to correspond survey responses to one of the 2,201 CWS in the DOH database was a manual effort. Forty survey responses could not be used in the final analysis due to missing or unmatched Water System ID numbers. As a result, only 199 responses were included in the final dataset.

Assumptions

Water Use per Household

This analysis assumes a standardized household water consumption estimate to ensure consistency and comparability across all sampled systems. The estimate is based on a statewide average household size of 2.53 persons (U.S. Census Bureau 2023) and an average daily per capita water use of 90 gallons, resulting in a total monthly use of 6.93 kilogallons per household. However, actual household water use may vary significantly based on factors such as household size and climate.

According to the United State Geological Survey's domestic[24] water use data for Washington state, the average per capita usage in 2015[25] was 88 gallons per day (USGS). Other Washington state estimates suggest an average per capita water use of 111 gallons per day for both indoor and outdoor use (NEEF). For this analysis, a per capita daily use of 90 gallons reflects a mid-range value that aligns with both indoor-use benchmarks and broader statewide patterns. This assumption introduces potential variability into individual-level affordability, particularly in systems with atypically high or low water use patterns.

[24] According to the USGS, domestic water use measures indoor household water uses such as cooking, bathing, and cleaning (USGS, n.d.).
[25] The USGS has not published water use data since 2015.

Residential Meter Size

It was assumed that all households in the sample are served by the smallest residential meter size available, typically either 5/8" or 3/4" depending on the system. Meter size directly affects the fixed portion of many water and wastewater bills. Larger meters often incur higher fixed charges, which could significantly impact affordability calculations. This simplifying assumption ensures uniformity in the analysis and reflects the typical configuration for most single-family residential households.

Seasonality

Many water providers use seasonal rate structures, typically charging higher rates in summer months when demand increases due to outdoor water use. In cases where both seasonal rates were published, summer rates were used in the affordability analysis. As shown in Figure D-5, summer rates consistently resulted in higher average monthly drinking water bills than winter rates across sampled systems. However, this assumption may slightly overstate average annual cost, particularly in communities with mild seasonal water use patterns or where peak demand is brief. Therefore, using summer rates in this analysis is a more conservative approach to estimate cost burden and affordability challenges.

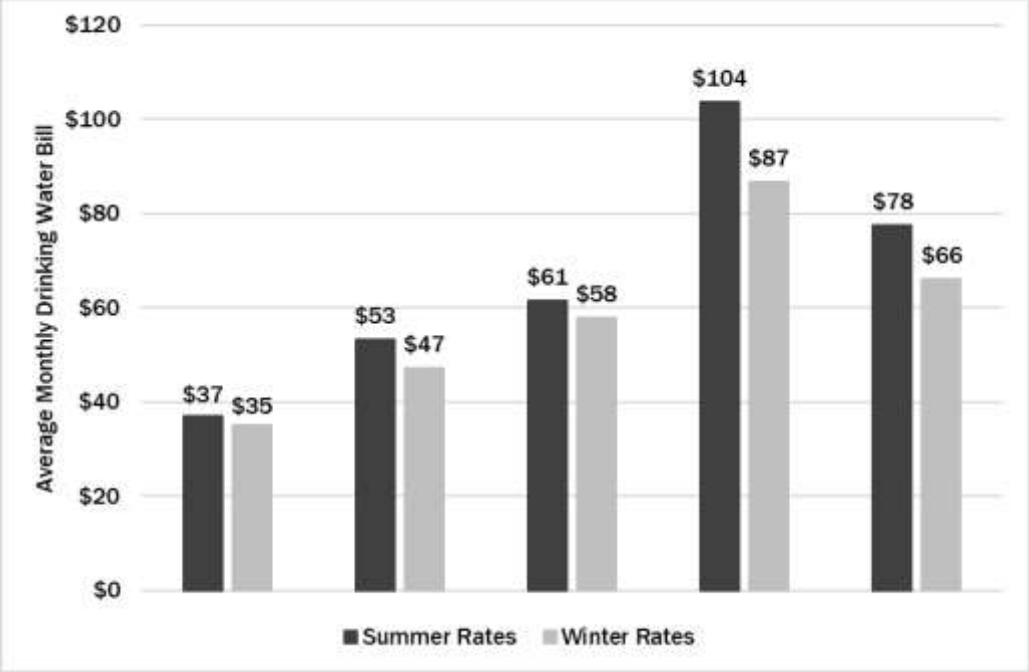

Figure D-5. Summer vs. Winter Drinking Water Bills in Sampled Water Providers with Seasonal Rate Structures

Inside vs. Outside Rates

Some utilities publish different rates depending on whether a customer resides inside or outside the city limits or the utility's service area. For consistency, this study collected rate data on "Inside" rates, which are the rates charged to customers located within a CWS

service boundary. Rates charged to customers that reside outside a given CWS's defined boundaries are higher, due to the extra costs per connection associated with providing drinking water and/or wastewater services (UNC). It was not feasible to calculate the proportion of households charged "Outside" rates due to a lack of billing data and project timeline

Household Income Level Estimates

Income levels were estimated using census tract-level data from the U.S. Census Bureau's American Community Survey. Each CWS service area was linked to one or more census tracts using spatial overlay analysis (see Appendix C). Income estimates were calculated using area-weighted averages of lowest quintile income, 80 percent of median household income, and median household income for the relevant tracts (see Appendix C). These estimates assume that income is evenly distributed within each census tract. In reality, income and population densities can vary widely within a tract, particularly in urban areas. This approach does not capture intra-tract variation or household-level affordability. The assumption also limits the ability to detect disparities within systems that span diverse socioeconomic neighborhoods.

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Appendix E: Residential Indices

Cost Burden Analysis Results

This appendix presents additional results of the cost burden analysis, based on both lowest quintile income (LQI) and median household income (MHI). This appendix includes a discussion on the estimated number of cost-burdened connections based on RI_{LQI}, broken down by geographic region and provider size. In addition, this appendix provides supplemental results using MHI (RI_{MHI}). Together, these results offer a more detail of household water service cost burden across income groups, regions, and provider types.

Household Income and Estimated Water Service Bills by Provider Size and Region

Figure E-1 shows the estimated income data of households within providers' service areas (e.g. provider-specific estimated household income). Both the average LQI and MHI, grouped by size of the provider, are shown. The highest estimated provider-specific MHI is found with medium providers, at over $180,000 per year. The lowest estimated provider-specific household LQI is under $20,000 found in the service area of the small providers.

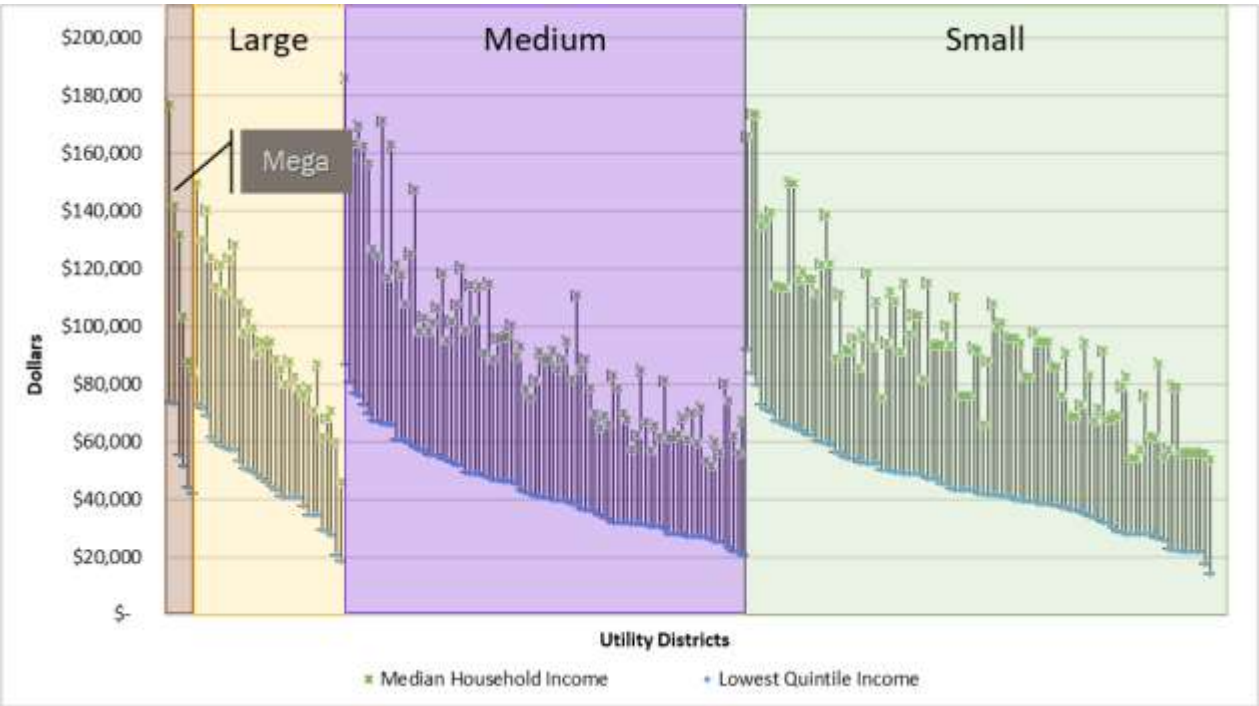

Figure E-1. Median Household Income and Lowest Quintile Income by Provider Size, All Sampled Providers

Figure E-2 shows the estimated average monthly drinking water bills for all sampled providers by region. Drinking water bills tend to be highest in the Southwest and Northwest regions, with several providers estimated monthly bill exceeding $100 per month. The

Northwest region shows a moderately wide range of bills, while the Eastern region has the lowest overall bills, with most average drinking water bills falling below $50 per month.

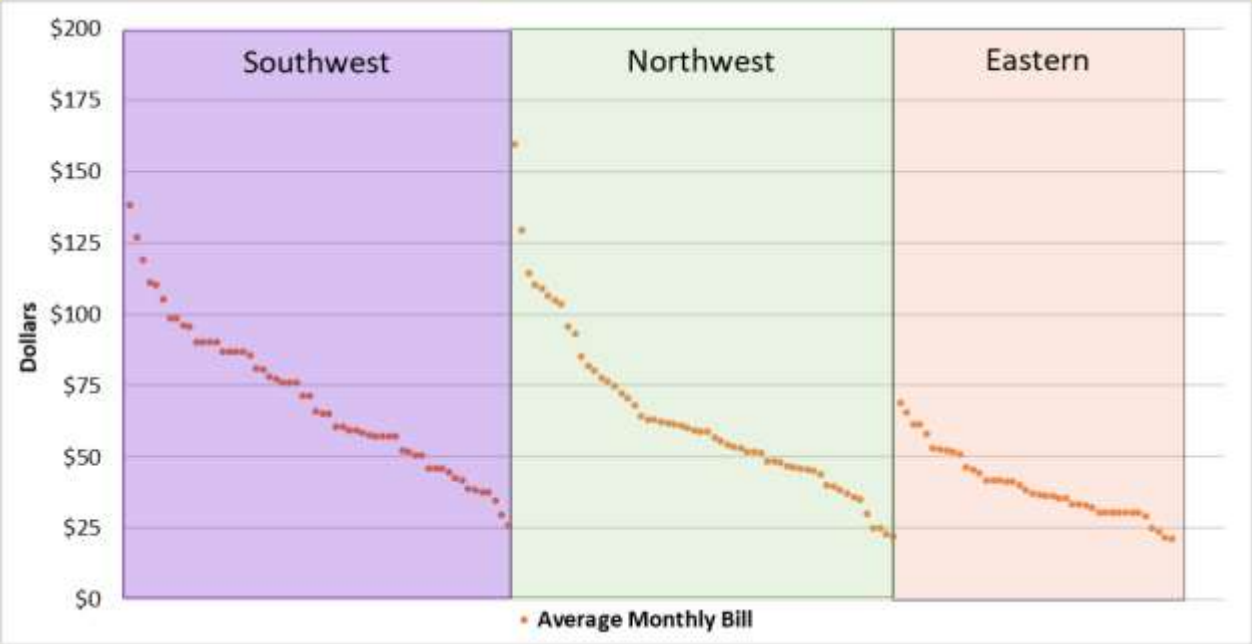

Figure E-2. Estimated Average Monthly Drinking Water Bill, All Sampled Providers, by Region.

Figure E-3 presents the estimated average monthly wastewater bills across all sampled providers, grouped by region. As with drinking water services, the highest wastewater bills are generally observed in the Southwest and Northwest regions. Both the highest estimated bill at $190 per month and the lowest estimated bill at $15 per month are found in the Northwest region. The Eastern region again displays relatively lower average bills.

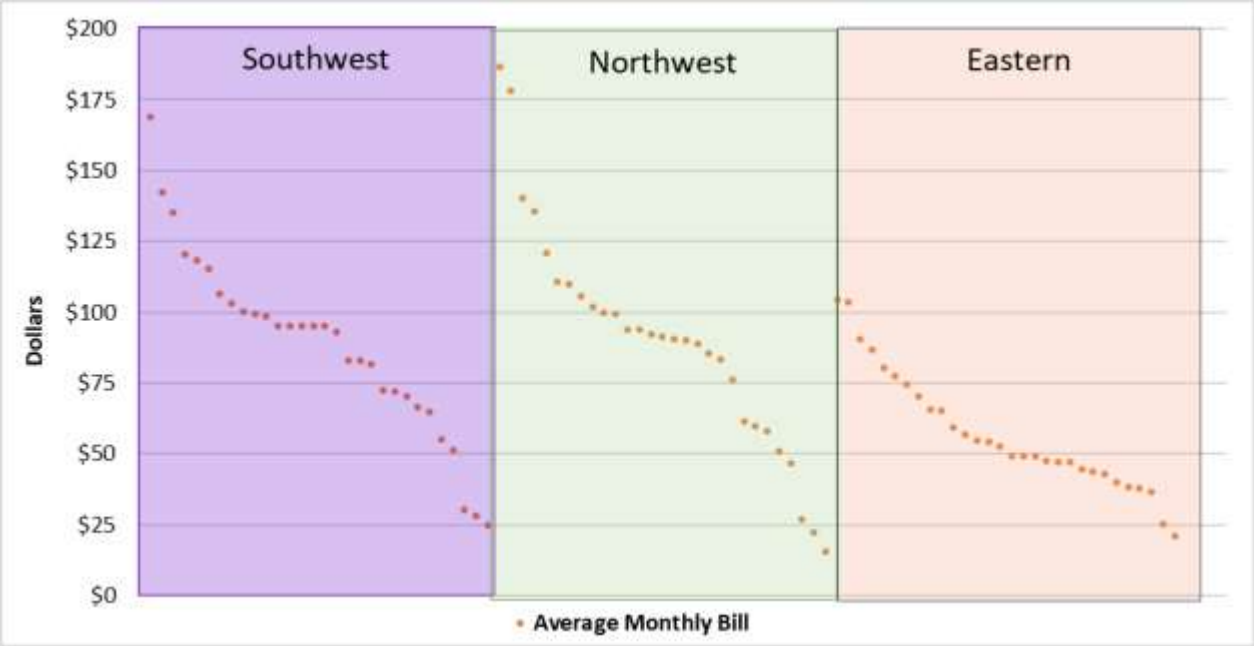

Figure E-3. Estimated Average Monthly Wastewater Bill, All Sampled Providers, by Region

Cost Burden Based on LQI, by Geographic Region

Table E-1 summarizes the cost burden analysis by geographic area. The rows in Table E-1 report the number of residential connections, the percent of connections in the state/region and the number of providers by geographic region. The column labeled "Total Number of Connections Served by Providers with RI_{LQI} Values Greater than 2.0 Percent" sums all the connection counts of providers that are estimated to have an RI_{LQI} value above the cost burden threshold. However, not all those connections would face a cost burdened because only 20 percent of those connections comprise the LQI households. As such, the estimated number of residential connections facing a cost burden is 20 percent of all the connections served by providers with an RI_{LQI} value greater than the cost burden threshold.

Of the 2.4 million drinking water connections in the state, an estimated 353,000 (14 percent) are served by providers with RI_{LQI} values above the cost burden threshold. Twenty percent of those 353,000 connections are assumed to be the LQI households, therefore 70,613 connections or 2.9 percent of total (1 in 35 households) are assumed to be facing a cost burden. However, neither the connections nor the cost burden is uniformly distributed throughout the state.

Well over half of the state's 2.4 million connections (56 percent) are located in the northwest region (Figure E-4). The remaining connections are evenly divided between the southwest region and the eastern region. Despite the northwest region being home to the

majority of connections, the southwest region has the greatest cost burden, both in terms of the number of connections estimated to be facing a cost burden (29,129) as well as the percent of connections facing a cost burden (5.3 percent of the regions 545,859 connections, or 1 in 20 households). The northwest region and the southwest region have far less connections facing a cost burden as a percent of total connections in each region. Where 2.0 percent of connections in the northwest region and 2.7 percent of connection in the eastern region are assumed to be facing a cost burden.

Information about the geographic region facing the relatively highest cost burden in the state may be useful if a low-income household CAP were to be phased in, or a pilot program was implemented. Targeting the region with the highest cost burden could improve the efficacy of the program.

The same affordability trend does not hold for wastewater bills. While the northwest region is still home to the majority of the state's estimated wastewater connections, with over 50 percent (894,042 of a total of 1,685,293 connections), an estimated 73,576, or 20 percent (1 in 5 connections) of the northwest regions' wastewater connections are assumed to be cost burdened (Table E-1). The southwest region and the eastern region are both estimated to have 5 percent of connections facing a cost burden. Note that the wastewater cost burden in all three geographic regions is higher than the estimated cost burden of drinking water Which translates into the statewide cost burden for wastewater being relatively higher than for drinking water. where an estimated 111,255 connections or 7 percent (1 in 14 connections) of wastewater connections face a cost burden compared to just under 3 percent of drinking water connections facing a cost burden.

One caveat about the wastewater results, however, recalls that all the wastewater providers selected in the random sample serve both water and wastewater. Once a more robust data management process fills in some of the data gaps about wastewater providers this result should be tested. However, if accurate, the fact that wastewater appears to present a larger affordability challenge than drinking water may be useful if a low-income household CAP is implemented in a phased approach, or with a pilot program, that only focused on one water service, targeting wastewater bill assistance may prove more efficient than targeting drinking water.

Figure E-4 Geographic Regions in Washington State

Table E-1. Estimated Cost Burden Based on RI_{LQI}, by Geographic Region

Region	Drinking Water Providers			Wastewater Providers		
	Total	*Total Number of Connections Served by Providers with RI_{LQI} Values Above the Cost Burden Threshold*	*Estimated Number of Cost Burdened Connections*	*Total*	*Total Number of Connections Served by Providers with RI_{LQI} Values Above the Cost Burden Threshold*	*Estimated Number of Cost Burdened Connections*
Southwest						
Connections	545,859	145,643	29,129	363,963	97,265	19,453
Percent of Total	22%	6%	5.3%	22%	27%	5%
Providers	581	340	340	238	161	161
Northwest						
Connections	1,383,021	136,374	27,275	894,042	367,881	73,576
Percent of Total	56%	6%	2.0%	53%	22%	4%
Providers	648	276	276	308	141	141
Eastern						
Connections	531,389	71,047	14,209	427,288	91,127	18,225
Percent of Total	22%	3%	2.7%	25%	5%	1%
Providers	320	25	25	264	235	235
Total						
Connections	2,460,269	353,064	70,613	1,685,293	556,273	111,255
Percent of Total	100%	14%	2.9%	100%	33%	7%
Providers	1,549	641	641	810	537	537

Note: Residential connection counts for water, wastewater, and combined service types are not cumulative. They reflect different components of the same sample population. The same holds true for provider count; all wastewater results reflect a subset of sampled drinking water providers that also provide wastewater services. A separate wastewater provider database was not used in this analysis, so the total number of wastewater providers is not additive with the drinking water provider count.

Cost Burden Based on LQI, by Provider Size

Table E-2 summarizes the cost burden analysis by provider size. The table displays the number of residential connections, the percent of connections served by each size of provider, and the number of providers falling above the RI_{LQI} cost burden threshold. As a reminder, the column labeled "Total Number of Connections Served by Providers with RI_{LQI} Values Greater than 2.0 Percent" sums the full count of residential connections served by providers estimated to have RI_{LQI} values above the affordability benchmark. Recall, however, that only 20 percent of those connections are estimated to be low-income households. Therefore, the column "Estimated Number of Cost Burdened Connections" reflects just 20 percent of connections served by providers above the threshold, representing households at or below the LQI level.

As presented in the regional analysis above, of the 2.4 million drinking water connections statewide, approximately 70,600 residential connections (2.9 percent of the statewide drinking water population) are estimated to face a cost burden. However, these burdened connections are not evenly distributed across provider sizes.

Over half, 53 percent, of the estimated 70,600 water connections facing a cost burden for drinking water are served by medium and small providers. Medium providers account for 30,863 of those connections while small providers account for the remaining 29,243 cost burdened connections. This suggests that medium and small sized providers may present a higher likelihood of affordability challenges for low-income households. By contrast, only 15 percent (10,507 connections) of cost burdened residential connections are served by large providers.

In this analysis, no mega providers have RI_{LQI} values above the cost burden threshold. That is not to say that there would be some households served by the mega providers that do experience a cost burden, as the LQI used to calculate the RI_{LQI} is an average. So, half of the low-income households in a service area make less than the average LQI and may well face a cost burden. However, for the purpose of accessing the statewide cost burden, it was necessary to use the average LQI. Should a low-income CAP be developed refining this estimate may be useful.

The results of the cost burden analysis by size of provider may help inform the phasing of a low-income household CAP, where targeting medium and small utilities first may assist those most in need.

As with the regional analysis, wastewater service results present different trends across provider sizes. Mega systems serve approximately 40 percent (650,140 connections) of the 1.7 million estimated statewide wastewater residential connections in this analysis. Unlike drinking water services, mega providers present the greatest cost burden across provider size, accounting for 47,361 cost burdened connections (43 percent). Additionally, of the approximately 111,000 cost burdened wastewater households, approximately 1 in 4

(25 percent) are served by medium sized providers. Small and large providers account for 16 percent (17,798 connections) and 17 percent (18,662 connections), respectively, of the cost burdened wastewater connections.

As with other wastewater-related results, these findings should be interpreted cautiously due to the data limitations discussed in Appendix D. Only providers that offer both drinking water and wastewater services were included in the wastewater analysis. The cost burden distribution presented here may therefore underrepresent communities served by separate wastewater utilities. See Appendix D for more information on this limitation. Taken together, these results reinforce that smaller providers represent the most concentrated share of households facing undue hardships due to water service bills and could be prioritized in the design of a future statewide affordability assistance program.

Table E-2. Estimated Cost Burden Households based on RI_{LQI}, by Size of Provider

Region	Drinking Water Providers			Wastewater Providers		
	Total	*Total Number of Connections Served by Providers with RI_{LQI} Values Above the Cost Burden Threshold*	*Estimated Number of Cost Burdened Connections*	*Total*	*Total Number of Connections Served by Providers with RI_{LQI} Values Above the Cost Burden Threshold*	*Estimated Number of Cost Burdened Connections*
Mega						
Connections	650140	0	0	650140	236805	47361
Percent of Total	26%	0%	0.0%	39%	14%	3%
Providers	6	0		6	2	2
Large						
Connections	889,509	52,534	10,507	484,391	93,312	18662.4
Percent of Total	36%	2%	0.4%	29%	6%	1%
Providers	49	4	4	25	6	6
Medium						
Connections	584,844	154,316	30,863	349,710	137,162	27432.4
Percent of Total	24%	6%	1.3%	21%	8%	2%
Providers	170	53		98	50	50
Small						
Connections	335,776	146,214	29,243	201,052	88,994	17798.8
Percent of Total	14%	6%	1.2%	12%	5%	1%
Providers	1,325	584	584	681	273	273
Total						
Connections	2,460,269	353,064	70,613	1,685,293	556,273	111,255
Percent of Total	100%	14%	3%	100%	33%	7%
Providers	1,549	641	641	810	537	537

Note: Residential connection counts for water, wastewater, and combined service types are not cumulative. They reflect different components of the same sample population. The same holds true for provider count; all wastewater results reflect a subset of sampled drinking water providers that also provide wastewater services. A separate wastewater provider database was not used in this analysis so the total number of wastewater providers is not additive with the drinking water provider count.

Cost Burden at Median Household Income

This section presents a summary of the results for the cost burden analysis, using Median Household Income (MHI) instead of LQI, to offer a broader view of the cost burden faced by households statewide. Recall that the residential index is calculated by dividing the estimated annual service bill by annual household income. The purpose of using MHI is instead of LQI in the analysis is to estimate any cost burdens at a higher income level. MHI is a commonly used benchmark in affordability analyses across the industry. However, MHI also presents its own limitations, particularly in masking affordability challenges experienced by lower-income households.

Figure E-7 displays the estimated RI_{MHI} values for sampled drinking water providers, organized by the number of residential connections. Most water providers fall below the 2 percent affordability threshold. Cost burdens may still be present in the drinking water providers that exceed the threshold.

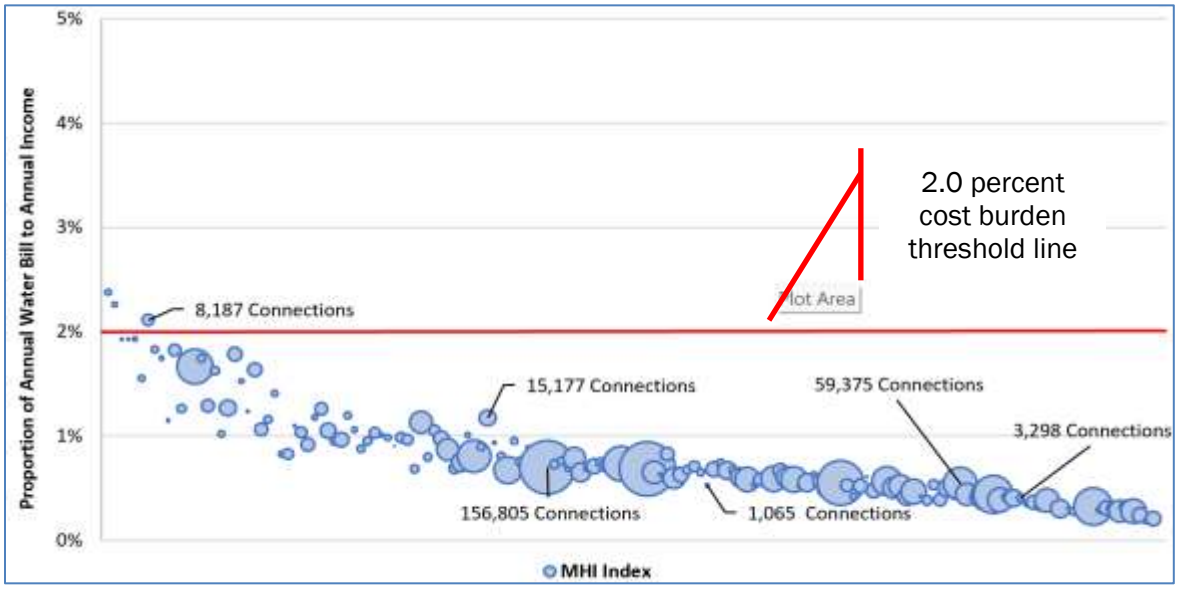

Figure E-7. Community Water Service Providers RI_{MHI} Connection Count

Figure E-8 shows that a large majority of residential connections across Washington are served by wastewater providers with RI_{MHI} scores below the 2.5 percent affordability threshold. The figure suggests that wastewater service costs are not a cost burden at MHI.

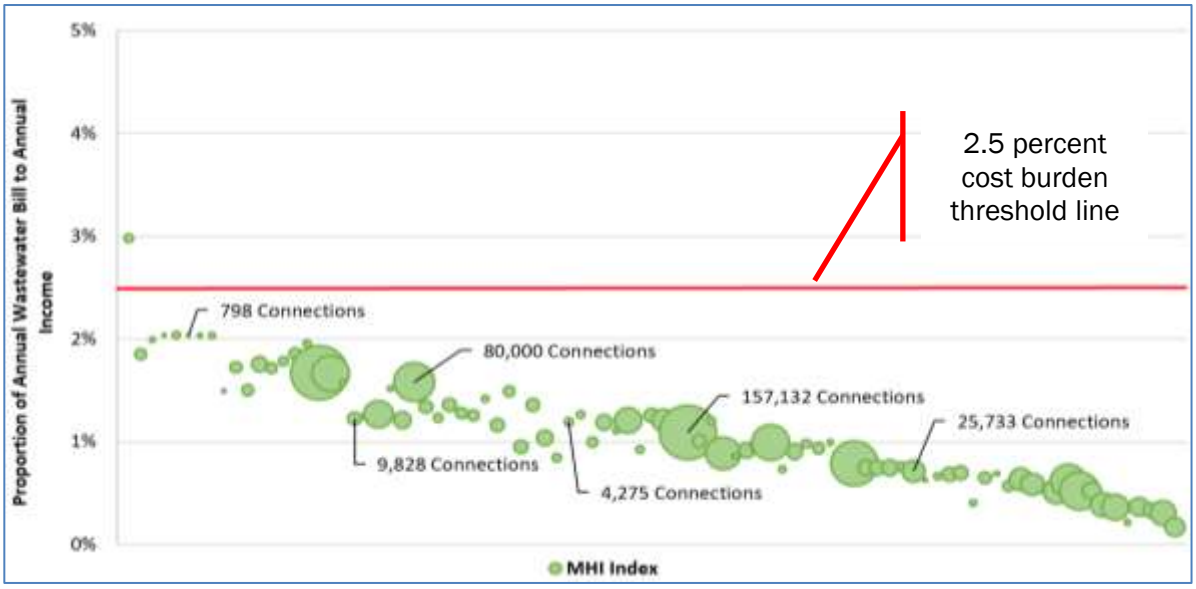

Figure E-8. Publicly Owned Treatment Works RI_{MHI} Connection Count

Figure E-9 illustrates that none of the sampled providers across Washington state have RI_{MHI} scores exceeding the 4.5 percent cost burden threshold for combined water services. This figure demonstrates that, at MHI, the cost of combined water services does not surpass the industry affordability benchmark for any provider in the sample.

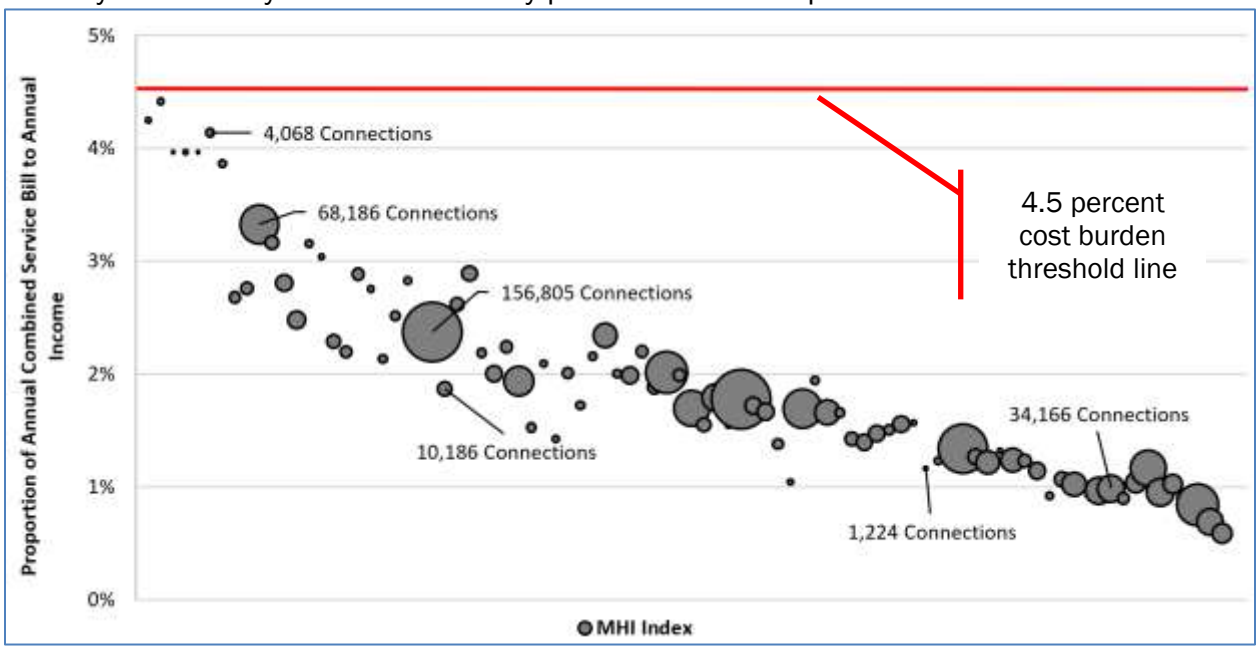

Figure E-9. Combined Water Service Providers RI_{MHI} Connection Count

In summary, the RI_{MHI} results for combined water services at MHI suggest that across the state there is no cost burden. However, as discussed in the cost burden results at LQI, this conclusion does not remain true at lower income levels, which according to this analysis, demonstrated a much higher cost burden among lower-income households for residential connections. These contrasting results underscore a key limitation of using MHI as the

standalone income measure in affordability analyses as using MHI masks cost burden pressures faced by low-income households. The findings presented in this analysis reinforce why it is important to rely on multiple income measures to fully understand the range and severity of the cost burden faced by communities. As these results show, relying solely on MHI overlooks those most vulnerable households facing the greatest cost burdens for combined water services statewide.

Appendix F: Other Considerations

Recommendations with Potential to Lower the Cost of Service

This appendix presents information about the recommendations to lower cost of service by:

- Accessing the potential to consolidate some of the state's over 2,200 Group A Drinking Water Providers.
- Supporting advantageous bond ratings to water providers.

Accessing the Potential to Consolidate Some Drinking Water Providers

In many areas and specific cases, opportunities exist to lower the overall cost of service by regionalizing the provision of safe and reliable drinking water through consolidations or restructuring of struggling or failing systems, and to achieve better economies of scale for water and wastewater provision.

To help identify areas in the state that may offer these types of regionalization opportunities information about number of Group A CWSs by size, by county, and the average connections per CWS for five counties with a majority of small CWSs is presented below. They are Island, Mason, Spokane, Thurston, and Whatcom counties.

Table E-1 through Table E-5 presents the CWS count and connection data using the DOH database that reports on the 2,201 Group A providers in the state. Figure E-1 through Figure E-5 are maps showing the locations of CWSs by size and type of ownership for each county. However, due to data gaps not all of the CWSs, reported in the tabular data, can be shown on the maps due to a lack of service area boundary data. Of the 2,201 Group A CWSs in DOH's database only 1,649 CWSs have self-reported service area boundaries. Also note, the DOH database reports that in addition to over 2,201 Group A CWS, there are also over 4,400 Group B CWSs, which are not included in this analysis.

Further regional study is recommended to develop additional analysis and recommended action in this area.

Island County

Island County has 228 individual CWSs, of which 225 are small and owned by associations (Table F-1). On average the small CWSs serve 93 connections each. There are three medium-sized CWSs in Island County which serve on average 3,523 connections. Two of the medium-sized CWSs are owned by towns, the remaining CWS is an association.

The opportunity for regionalization is not known with certainty however one factor to consider is the proximity of small providers to medium providers, for example Oak Harbor, a medium sized CWS is located near a cluster of small providers. This suggests that there may be opportunities for regionalization (Figure F-1).

Table F-1. Island County Community Water Services by Size and Ownership Type

Ownership Type	Size (Number of Connections)					
	Mega (greater than 50,000)	Large (49,999 to 10,000)	Medium (9,999 to 1,000)	Small (less than 1,000)	Total	Percent of Total
Number of CWSs						
Association	0	0	1	162	163	29%
City/Town/County	0	0	2	2	4	13%
Investor	0	0	0	31	31	17%
Private	0	0	0	15	15	23%
Special District	0	0	0	15	15	18%
Grand Total	0	0	3	225	228	100%
Number of Residential Connections						
Association	0	0	1,198	11,521	12,719	4%
City/Town/County	0	0	9,372	1,135	10,507	62%
Investor	0	0	0	2,662	2,662	3%
Private	0	0	0	764	764	3%
Special District	0	0	0	4,740	4,740	29%
Grand Total	0	0	10,570	20,822	31,392	100%
Average Connection Count per CWS Ownership Type and Size						
Association	0	0	1,198	71	78	NA
City/Town/County	0	0	4,686	568	2,627	NA
Investor	0	0	NA	86	86	NA
Private	0	0	NA!	51	51	NA
Special District	0	0	NA	316	316	NA
Grand Total	0	0	3,523	93	138	NA

Source: Washington State Department of Health.

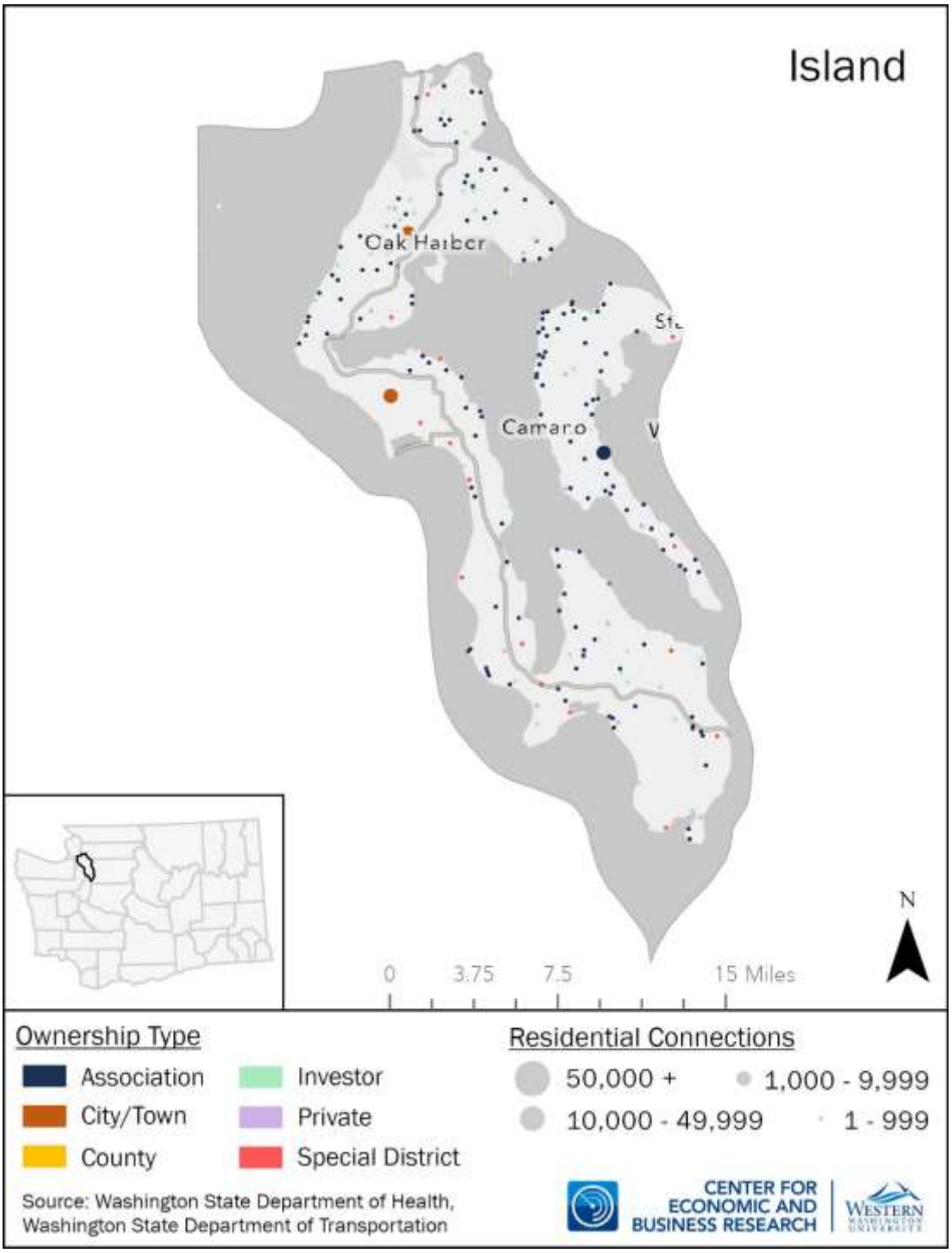

Figure F-2. Community Water Services by Number of Residential Connections and Ownership Type, Island County

Mason County

Mason County has 117 individual CWSs, of which 115 are small and the majority are either owned by associations or special districts (Table F-2). On average the small CWSs serve 112 connections each. There are three medium-sized CWSs in Mason County that serve on average 2,837 connections. Two of the medium sized CWSs are owned by towns, the remaining CWS is an association.

The opportunity for regionalization is not known with certainty however one factor to consider is the proximity of small providers to medium providers. In general, small CWS are located throughout Mason County, but for a small cluster near Shelton (Figure F-2).

Table F-2. Mason County Community Water Services by Size and Ownership Type

Ownership Type	Size (Number of Connections)					
	Mega (greater than 50,000)	Large (49,999 to 10,000)	Medium (9,999 to 1,000)	Small (less than 1,000)	Total	Percent of Total
Number of CWSs						
Association	0	0		39	39	33%
City/Town/County	0	0	1		1	3%
Investor	0	0		2	2	8%
Private	0	0		9	9	17%
Special District	0	0	1	19	20	39%
Grand Total	0	0		46	46	100%
Number of Residential Connections						
Association	0	0	0	3,556	3,556	19%
City/Town/County	0	0	4,068	601	4,669	25%
Investor	0	0	0	1,683	1,683	9%
Private	0	0	1,605	2,620	4,225	23%
Special District	0	0	0	4,457	4,457	24%
Grand Total	0	0	5,673	12,917	18,590	100%
Average Connection Count per CWS Ownership Type and Size						
Association	0	0	NA	91	91	NA
City/Town/County	0	0	4,068	301	1,556	NA
Investor	0	0	NA	187	187	NA
Private	0	0	1,605	138	211	NA
Special District	0	0	NA	97	97	NA
Grand Total	0	0	2,837	112	159	NA

Source: Washington State Department of Health.

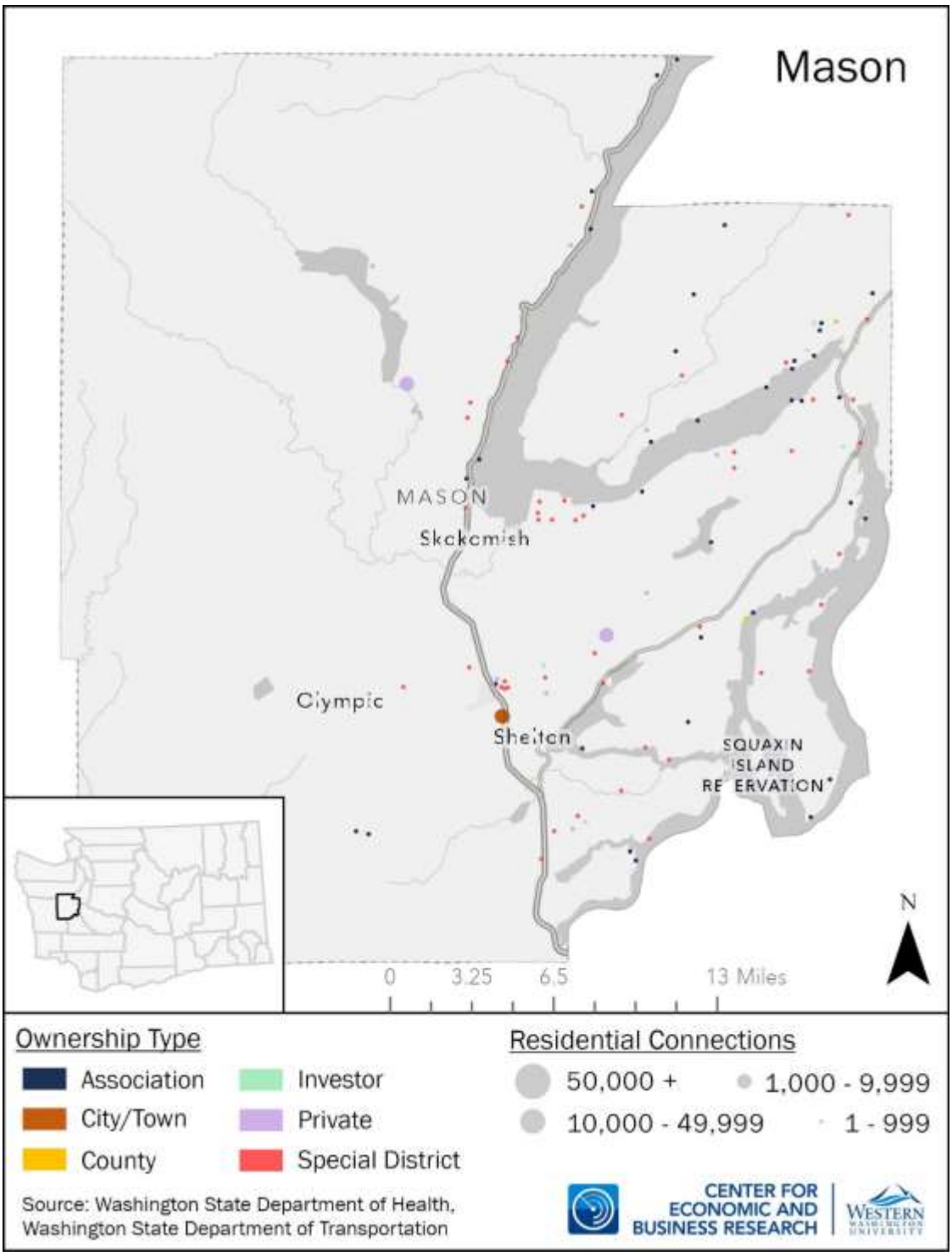

Figure F-2. Community Water Services by Number of Residential Connections and Ownership Type, Mason County

Spokane County

Spokane County has 81 CWS ranging from mega to small. 61 of the CWSs are small and are fairly evenly distributed across all ownership types, serving on average 139 connections each (Table F-3).

The opportunity for regionalization is not known with certainty however one factor to consider is the proximity of small providers to medium providers. In general, small CWS are located throughout Spokane County (Figure F-3).

Table F-3. Spokane County Community Water Services by Size and Ownership Type

Ownership Type	Size (Number of Connections)					
	Mega (greater than 50,000)	Large (49,999 to 10,000)	Medium (9,999 to 1,000)	Small (less than 1,000)	Total	Percent of Total
Number of CWSs						
Association	0	0	0	12	12	0%
City/Town/County	1	0	4	6	11	24%
Investor	0	0	1	6	7	6%
Private	0	0	0	19	19	0%
Special District	0	2	12	18	32	71%
Grand Total	1	2	17	61	81	100%
Number of Residential Connections						
Association	0	0	0	542	542	0%
City/Town/County	78,174	0	11,697	1,501	91,372	19%
Investor	0	0	8,793	527	9,320	14%
Private	0	0	0	1,536	1,536	0%
Special District	0	22,951	41,056	4,383	68,390	67%
Grand Total	78,174	22,951	61,546	8,489	171,160	100%
Average Connection Count per CWS Ownership Type and Size						
Association	NA	NA	NA	45	45	NA
City/Town/County	78,174	NA	2,924	250	8,307	NA
Investor	NA	NA	8,793	88	1,331	NA
Private	NA	NA	NA	81	81	NA
Special District	NA	11,476	3,421	244	2,137	NA
Grand Total	78,174	11,476	3,620	139	2,113	NA

Source: Washington State Department of Health.

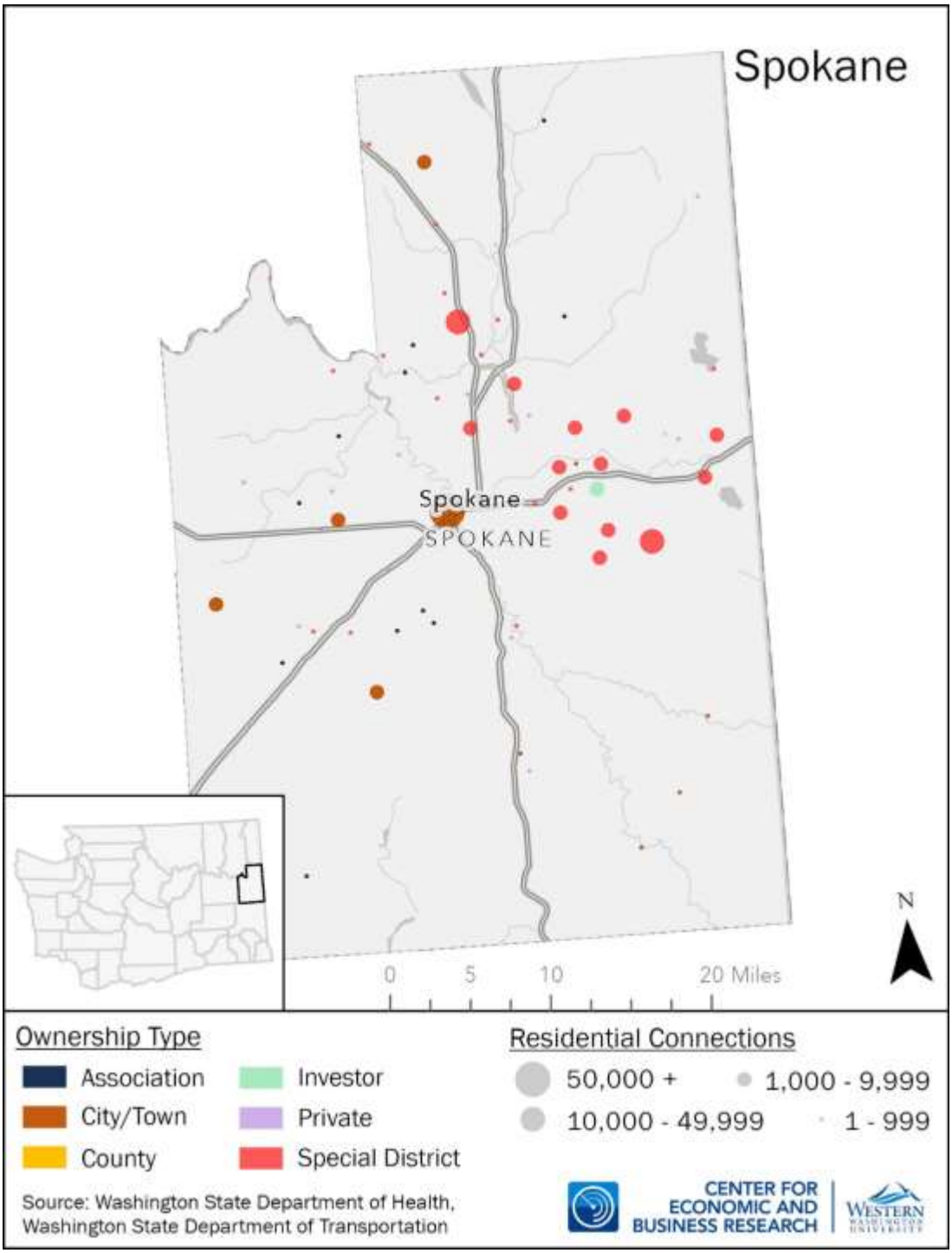

Figure F-3. Community Water Services by Number of Residential Connections and Ownership Type, Spokane County

Thurston County

Thurston County has 185 individual CWSs, of which 177 are small and the majority are either investor owned of special districts serving an average of 89 connections each (Table F-4). There are three large and five medium-sized CWSs in Thurston County, which serve on average 27,359 and 1,928 connections, respectively.

The opportunity for regionalization is not known with certainty however one factor to consider is the proximity of small providers to medium providers. In general, small CWS are located throughout Thurston County, with several located near the medium and large sized CWS (Figure F-4).

Table F-4. Thurston County Community Water Services by Size and Ownership Type

Ownership Type	Size (Number of Connections)					
	Mega (greater than 50,000)	Large (49,999 to 10,000)	Medium (9,999 to 1,000)	Small (less than 1,000)	Total	Percent of Total
Number of CWSs						
Association	0	0	0	36	36	20%
City/Town/County	0	3	1	7	11	4%
Investor	0	0	0	52	52	29%
Private	0	0	1	39	40	22%
Special District	0	0	3	43	46	24%
Grand Total	0	3	5	177	185	100%
Number of Residential Connections						
Association	0	0	0	4,386	4,386	28%
City/Town/County	0	82,076	3,939	2,357	88,372	15%
Investor	0	0	0	3,960	3,960	25%
Private	0	0	1,065	2,644	3,709	17%
Special District	0	0	4,638	2,473	7,111	16%
Grand Total	0	82,076	9,642	15,820	107,538	100%
Average Connection Count per CWS Ownership Type and Size						
Association	0	NA	NA	122	122	NA
City/Town/County	0	27,359	3,939	337	8,034	NA
Investor	0	NA	NA	76	76	NA
Private	0	NA	1,065	68	93	NA
Special District	0	NA	1,546	58	155	NA
Grand Total	0	27,359	1,928	89	581	NA

Source: Washington State Department of Health.

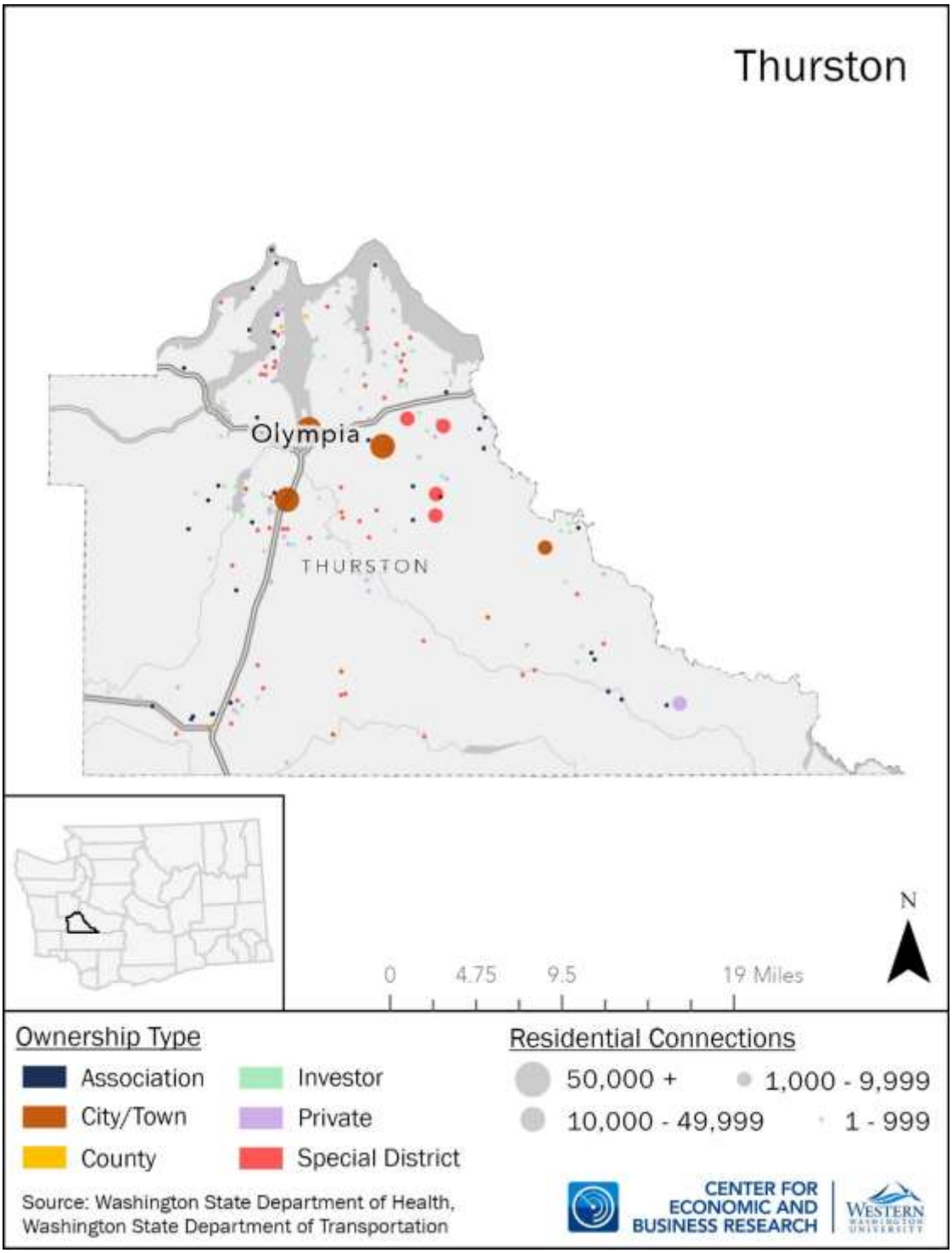

Figure F-4. Community Water Services by Number of Residential Connections and Ownership Type, Thurston County

Whatcom County

Whatcom County has 100 individual CWSs, of which 90 are small and the majority are either privately owned or associations serving an average of 126 connections each (Table F-5). There are three large and five medium-sized CWSs in Thurston County, which serve on average 27,359 and 1,928 connections, respectively.

The opportunity for regionalization is not known with certainty however one factor to consider is the proximity of small providers to medium providers. In general, small CWS are located throughout Whatcom County, with several located near the medium and large sized CWS (Figure F-5).

Table F-5. Whatcom County Community Water Services by Size and Ownership Type

Ownership Type	Size (Number of Connections)					
	Mega (greater than 50,000)	Large (49,999 to 10,000)	Medium (9,999 to 1,000)	Small (less than 1,000)	Total	Percent of Total
Number of CWSs						
Association	0	0	0	41	41	46%
City/Town/County	0	1	4	5	10	6%
Investor	0	0	0	8	8	9%
Private	0	0	0	31	31	34%
Special District	0	0	5	5	10	6%
Grand Total	0	1	9	90	100	100%
Number of Residential Connections						
Association	0	0	0	4,981	4,981	44%
City/Town/County	0	24,015	17,891	1,724	43,630	15%
Investor	0	0	0	294	294	3%
Private	0	0	0	2,853	2,853	25%
Special District	0	0	15,246	1,460	16,706	13%
Grand Total	0	24,015	33,137	11,312	68,464	100%
Average Connection Count per CWS Ownership Type and Size						
Association	0	NA	NA	121	121	NA
City/Town/County	0	24,015	4,473	345	4,363	NA
Investor	0	NA	NA	37	37	NA
Private	0	NA	NA	92	92	NA
Special District	0	NA	3,049	292	1,671	NA
Grand Total	0	24,015	3,682	126	685	NA

Source: Washington State Department of Health.

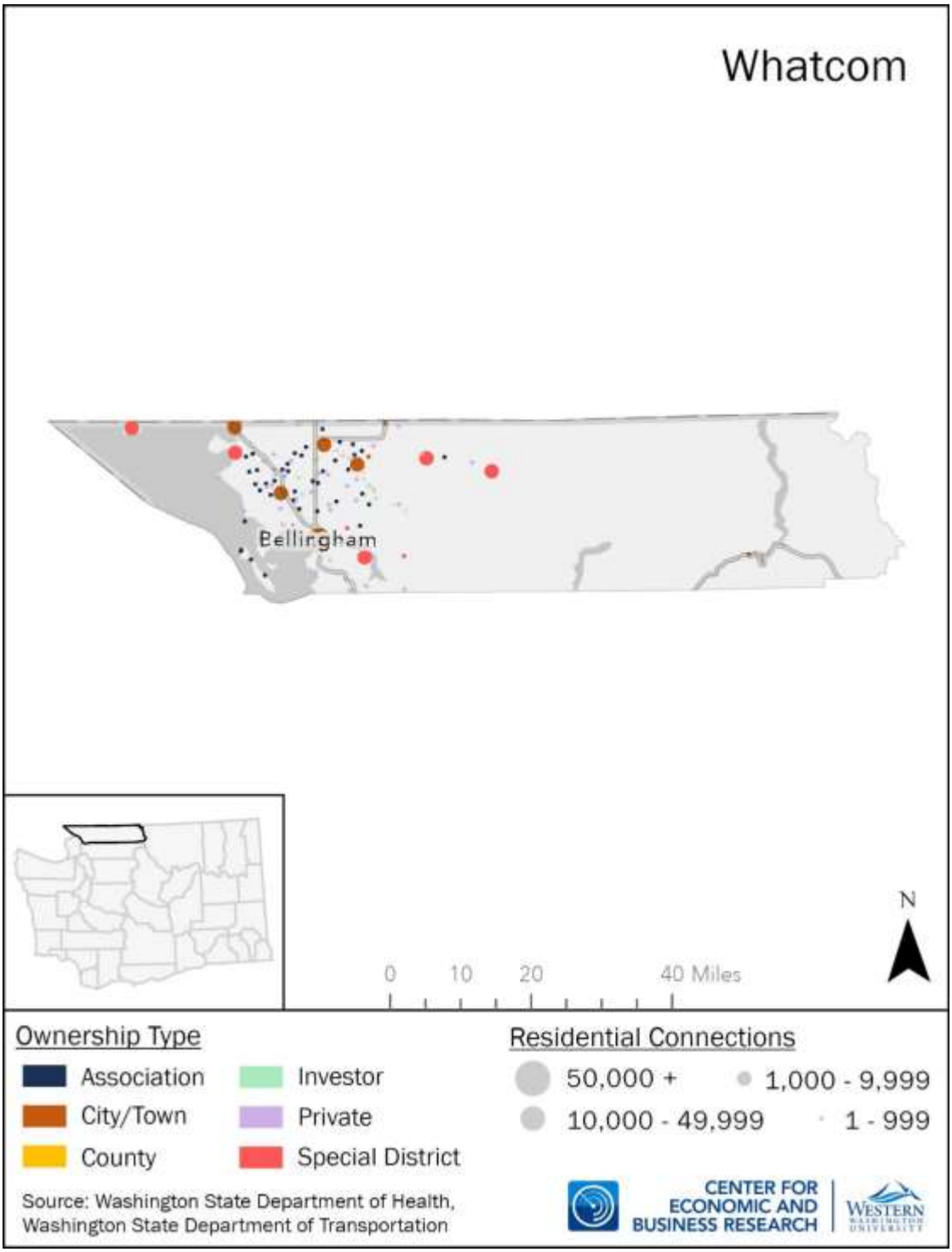

Figure F-5. Community Water Services by Number of Residential Connections and Ownership Type, Whatcom County

Supporting Advantageous Bond Ratings to Water Providers

Currently, water and sewer districts are ineligible for Office of the State Treasurer (OST) Local Option Capital Asset Lending (LOCAL) Program because they are not taxing authorities. As such, water and sewer districts face higher interest rates on capital projects. For example, an average financed project of $2.5 million dollars financed with a bond at 4 percent would cost the district $1.4 million in interest. The same project, funded with a Public Works Board bond at 1 percent would cost the district $270.5 thousand, a cost savings of over 1.1 million over a twenty-year payback (McMillian 2025).

The Birch Bay Water and Sewer District requested a memorandum from its attorney, Carmichael Clark, P.S. about eligibility options. That memo follows.

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bob@carmichaelclark.com

MEMORANDUM

TO: Dan Eisses, General Manager

FROM: Robert A. Carmichael and Colin Morrow

DATE: September 24, 2020

SUBJECT: Birch Bay Water Sewer District: District's LOCAL Program eligibility options.

Summary of Issues and Answers

LOCAL Program Eligibility Options. What strategies might the District consider to become eligible for the State LOCAL Program?

Short Answer: The District's eligibility could be enhanced by lobbying for the broadening of the LOCAL Program loan criteria and/or for expanded water-sewer district revenue powers under the water-sewer district statute (RCW Title 57). Working through WASWD is probably best.

Factual Background

Birch Bay Water Sewer District ("District"), submitted a request to the Office of the State Treasurer ("OST") to finance an equipment acquisition through the State's Local Option Capital Asset Lending Program ("LOCAL Program"). The LOCAL Program is a state-level financing program administered by the OST for the benefit of local municipalities and specialized districts. Although run through the OST, the financing contract used by the LOCAL Program must be submitted to and approved by the State Finance Committee ("SFC"). The SFC is a creation of the Washington State Legislature (see RCW 43.17.070) and is composed of three members: the state treasurer, the lieutenant governor, and the governor (per RCW 43.33.010). The state treasurer acts as the chairman of the committee and also provides administrative and clerical assistance as appropriate (per RCW 43.33.040 and 43.33.030). The SFC, among other responsibilities, is charged with approving the financing contracts of the state (per RCW 39.94.010).

In a memo dated August 25, 2020 and issued in response to the District's financing request, the OST denied said request, citing the District's inability to levy property taxes without a vote of its residents as rendering the District ineligible to participate in the LOCAL Program in light of the LOCAL Program's "general obligation pledge" requirement. Per said memo (emphasis added):

> OST interprets the general obligation pledge, which is one of the stated requirements of the LOCAL Program, to be a pledge that is supported by the taxing power of an agency, specifically through the levy of property taxes. Due to their greater complexities and increased risk profile, the LOCAL Program has historically been unable to work with "revenue-based credits", meaning agencies whose primary repayment pledge is supported by user-based revenues, as opposed to a traditional property tax based general obligation

pledge....*The LOCAL Program review team understands that the District does not currently levy property taxes and is unable to collect taxes without a vote of the people. Because of this, we have determined that the District is ineligible to participate in the LOCAL Program.*

Discussion

1. Modification of LOCAL Program loan criteria.

The District, lobbying through the Washington Association of Sewer and Water Districts ("WASWD"), could advocate for revisions to the LOCAL Program loan criteria that would render the District eligible to participate. Such lobbying efforts could be directed at either the OST, the SFC, or both. As the State Treasurer heads the OST and chairs the SFC, a strategy focused on lobbying his or her office specifically would be logical and efficient. Ultimately, it would be the SFC which has the authority (and responsibility) to review and approve/disapprove any revised version of the LOCAL Program financing contract containing the District's lobbied-for changes.

There are a number of ways the criteria could be adjusted to accommodate the District. The most direct approach would be to insert language into the financing contract permitting the required repayment pledge to be based upon user-based revenues rather than property taxes. RCW 57.20.18 authorizes water-sewer districts to issue revenue bonds without voter approval. In order to assuage OST and/or SFC doubts about the reliability of revenue-based pledges, the ability to make such a repayment pledge could be limited to local agencies capable of meeting specific financial health requirements.

Another approach, less conservative in nature, would be to allow the repayment pledge to be based upon a promise to, if necessary, seek a levy of property taxes by putting it to a vote of the people. Doubts about the security of such a pledge might be mollified by requiring local agencies to secure voter approval of such a levy in advance, before eligibility to participate in the LOCAL Program is approved.

2. Expansion of water-sewer district statutory powers.

The District, once again through WASWD, could also lobby the state legislature for key changes to the State's Water-Sewer District statute (RCW Title 57) targeted toward satisfying the existing LOCAL Program criteria. Currently, Title 57 does allow water-sewer districts to levy property taxes to cover general indebtedness incurred for the cost of additions and betterments to the district, but such levies are subject to a vote of the people. *See* RCW 57.20.019. The District's LOCAL Program eligibility could be improved if—like counties, cities, school districts, fire districts and hospital districts—water-sewer districts were given the authority to levy property taxes without a vote (subject to the same increase limitations as other entities with this power). Such an expansion of water-sewer district taxing power could be narrowed in scope and tailored to securing LOCAL Program participation (or participation in other state-level financing programs) by limiting said authority to levy a non-voted property tax increase only to those situations wherein doing so is required to uphold a LOCAL program general obligation pledge.

However, a more modest expansion of water-sewer district financing power might also be sufficient. Water-sewer districts currently lack the authority to issue limited tax general obligation bonds ("LTGO"). A statutory change granting the authority to issue such non-voted debt would enable water-sewer districts to offer the issuance of LTGO debt to pay LOCAL program obligations as

security for participation. This strategy is probably best combined with complementary efforts to lobby the OST/SFC to accept other forms of security for LOCAL Program participation.

Conclusion

District eligibility for the LOCAL Program could be enhanced by efforts to liberalize the LOCAL Program criteria (e.g., accept pledges of user-based revenues as sufficient security) of the SFC. Alternatively, the state legislature may be lobbied to expand water-sewer district revenue-raising power under RCW Title 57 (e.g, giving water-sewer districts the power to levy property taxes without a vote to satisfy LOCAL Program debt), or a hybrid approach (e.g., giving water-sewer districts the ability to issue LTGO debt and lobbying to expand the LOCAL Program criteria to accept LTGO debt as sufficient security). Lobbying efforts may be directed at either the OST or the SFC, but the SFC will ultimately need to approve a financing contract incorporating changes to the LOCAL Program criteria. As the State Treasurer is the key figure within both the OST and SFC, lobbying efforts trained on his or her office may make the most sense.

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