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A Situation Assessment of Washington's Municipal Water Efficiency Statute and Regulation

Conducted for the Washington State Governor's Office and Legislature by the William D. Ruckelshaus Center

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For more information about the Center, please visit https://ruckelshauscenter.wsu.edu/about/

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Definitions

Organizations	
The Center	The William D. Ruckelshaus Center
The Project Team	Center Faculty and Staff Assigned to the Completion of this Situation Assessment
Commerce	Washington Department of Commerce
Ecology	Department of Ecology; State of Washington
FPHS	Department of Health - Foundational Public Health Services
WDOT	Department of Transportation
Water suppliers	Municipal Water Supplier (sometimes referred to as water utilities or water purveyors)
WASWD	Washington Association of Sewer and Water Districts
WWUC	Washington Water Utility Council
AWWA	American Water Works Association
WSU	Washington State University
SOE	Washington State University School of The Environment
TWDB	Texas Water Development Board
Documents	
The Audit	Assessing the Effectiveness of Washington's Water use Efficiency Regulation
Laws, Statutes, and Rules	
The Statute	RCW 70A.125.170 & WAC 246-290 WAC Combined
RCW	Revised Code of Washington
WAC	Washington Administrative Code
MWL	Municipal Water Law
Measuring and Tracking Methods	
DSL	Distribution System Leakage
WAM	AWWA Water Audit Methodology (also known as the IWA/AWWA Water Audit Methodology)
Others	
WUE	Water Use Efficiency
WRIAs	Water Resource Inventory Areas
AMI	Advanced Metering Infrastructure

Executive Summary

Washington's Municipal Water Use Efficiency (WUE) requirements (defined in RCW 79A.125.170 and implemented in WAC 246-290-820) in short, direct municipal water suppliers to integrate conservation into their planning, engage in leak detection and reduction, and report on progress and performance annually. These rules aim to ensure conservation through efficient water use while staying financially sound and reliable to their ratepayers. The Washington Department of Health (DOH) is currently tasked with enforcing these rules associated with WUE and water system leakage.[1] In 2023, Washington's State Auditor conducted a performance audit of the municipal water use efficiency laws, where they identified several areas for improvement.[2] The audit also recommended shifting oversight of water use efficiency from DOH to the Department of Ecology. However, some interested and affected parties disagreed with some aspects of the audit's findings and recommendations. In response, the Washington State Legislature directed the William D. Ruckelshaus Center (the Center) to conduct a situation assessment to "... evaluate and recommend actions to increase the effectiveness of the state's municipal water [use efficiency] statute at RCW 70A.125.170 and regulation at chapter 246-290 WAC".[3] To review the legislative proviso language see Appendix D.

This report synthesizes insights gathered through interviews with representation from a broad range of perspectives including municipal water suppliers, state agency staff, tribes and other interested and affected parties (Appendix A lists all interviewees) as well as research on best practices used across the nation and provides a detailed summary of key findings for improving the Municipal Water Law's Water Use Efficiency Rule (WUE) and implementation. The report contains the following structure: Diving In: An Introduction and History, Pooling Perspectives: Insights from Research and Interviews, Conserving Tomorrow: Final Thoughts and Recommendations, and Final Drop: Conclusion.

Key Findings

Funding was unanimously identified as the primary barrier to successful municipal water conservation. Sustainable implementation of the Water Use Efficiency program requires consistent and dedicated state funding to support staffing and program oversite. Additionally, funds are needed for grants and low-interest loans to help water suppliers meet efficiency goals to offset reduced revenue necessary for increasingly costly infrastructure need due to less water use from conservation and to assist smaller water system improvements without over burdening ratepayers from a business standpoint. Interviewees frequently expressed a desire for the state to become a partner in water conservation.

Many interviewees noted the vital role municipal water conservation plays in ensuring adequate current and future water supply; however, they emphasized that greater opportunities for efficiency and conservation lie in addressing water use and efficiency in

[1] RCW 70A.125.170 Water use efficiency requirements—Rules. https://app.leg.wa.gov/rcw/default.aspx?cite=70A.125.170

[2] Office of the Washington State Auditor, (2023). Assessing the Effectiveness of Washington's Water Use Efficiency Regulations. https://sao.wa.gov/reports-data/audit-reports/assessing-effectiveness-water-use-efficiency-regulations

[3] 68th Legislature. (2024). ESSB 5950.SL, p.803.https://fiscal.wa.gov/statebudgets/2024proposals/Documents/co/5950-S.SL.pdf

agriculture and creating more integrated collaborative approaches to conservation across sectors and agencies and with all federally recognized tribes. Therefore, many viewed changing the regulatory agency as "asking the wrong question" and largely favored municipal water conservation oversight remaining at DOH with a greater focus on collaboration and breaking down sector silos.

Although not unanimous, many interviewees suggested a range of adjustments that could be made to the municipal WUE requirement. This included better data collection and measurements, tiered rate structures, state investment in new technologies, and increased focus on outdoor municipal water conservation, especially in connection to landscaping standards and rebate programs.

Public awareness and purveyor education were regularly identified as a primary means of increasing WUE. The state should develop and distribute standardized public awareness materials to help suppliers engage the public in conservation. Additionally, ongoing training opportunities for water system staff (e.g., webinars, conferences, etc.) could be expanded. Overall, state agency support for smaller water systems that frequently lack adequate resources was continuously championed as a means of increasing water conservation statewide.

Where it is feasible and without placing financial strain on ratepayers, the state should fund and/or facilitate the consolidation of small, nearby water systems to improve efficiency, reduce costs, and expand access to resources. This would need careful consideration. Interviewees overall noted support for dedicated funding for consolidation but also shared concern over any mandate-driven consolidation and the potential associated unintended consequences (such as cross-subsidization).

The state should invest more in collecting accurate data and supporting the development of tools and systems for long-term water planning that provide comprehensive water supply and demand forecasting across all sectors and regions of the state.

Final Thoughts and Recommendations

Following the insights provided by the interviews and research, the following recommendations should be considered by the state. The state should increase dedicated funding for municipal WUE requirements to reduce the burden placed on water systems and provide increased support for the regulatory agency to support water purveyors especially as it relates to data collection, accurate measuring, system planning that addresses WUE issues, and public awareness. Establish statewide forums and encourage the development of regional collaboratives across the state to bring together diverse parties. Explore additional options and incentives to promote water management that enables more flexible, efficient water use, especially around use of reclaimed water and aquifer recharge. Actively provide opportunities (with necessary funding) for more collaboration across sectors, agencies, and with federally recognized tribes. Lastly, the state should put increased and dedicated effort into addressing agricultural water conservation as it makes up 66 percent of water use across Washington.

Diving In: An Introduction and History

Contextualizing the State Audit and Proviso

In 2003, the Washington state legislature enacted the Municipal Water Law (MWL), which included the creation of a new rule on water use efficiency (WUE) in the Revised Code of Washington (RCW) 70A.125.170 and Washington Administrative Code (WAC) 246-290-820 (combined referred to as the Statute), in part to improve municipal water use through conservation measures.[4] The Statute targets municipal water suppliers with an aim to reduce water demands by ratepayers and to minimize water lost in municipal water system conveyance. The Statute charged the Department of Health (DOH) with responsibility for its regulation. From 2003 to 2007, the state provided funding through the state general fund and a temporary annual fee of 25 cents per residential connection to assist DOH in implementing water conservation activities. The legislature cut both streams of funding in 2007 and did not earmark funding to replace them.[5] In January 2007, the state-mandated Water Use Efficiency Rule became effective and set conservation requirements for municipal water suppliers. As part of this rule, water suppliers are required to annually report on their progress towards improving water use efficiency.

The State Audit Findings

In 2023, the state Auditor's Office initiated a performance audit of the Statute. State performance audits examine the efficiency, effectiveness, and economy of government projects. The Auditor's Office can initiate an audit for a variety of reasons. The audit report, online at *Assessing the Effectiveness of Washington's Water Use Efficiency Regulations* (the Audit),[6] made several recommendations that included: addressing issues with the regulation of municipal water loss through preparation of a strategic workplan, improving support for water suppliers during the annual reporting process, providing better track of system compliance, assisting water suppliers with running their systems more efficiently and cut down on water loss (suggestions leveraged findings from a water efficiency pilot study completed in 2018),[7] and moving conservation regulation from DOH to the Department of Ecology (Ecology). For the full detailed list of recommendations, refer to the Audit linked above.

Legislative Proviso

The Audit's findings about WUE, and the subsequent reactions to these findings, prompted the legislature to develop the 2024 proviso (Appendix D). The proviso directed the William D. Ruckelshaus Center (the Center) to review the Audit's findings and recommendations by conducting a situation assessment—a series of interviews to gain insight from representatives of diverse interested and affected parties who work closely on WUE and related issues. The proviso instructed the Center to "evaluate and recommend actions to increase the

[4] 58th Legislature, (2003). HB1138. https://lawfilesext.leg.wa.gov/biennium/2003-04/Pdf/Bills/Session%20Laws/House/1338-S2.SL.pdf
[5] Office of the Washington State Auditor, (2023). Assessing the Effectiveness of Washington's Water Use Efficiency Regulations. https://sao.wa.gov/reports-data/audit-reports/assessing-effectiveness-water-use-efficiency-regulations
[6] Office of the Washington State Auditor, (2023). https://sao.wa.gov/reports-data/audit-reports/assessing-effectiveness-water-use-efficiency-regulations
[7] A summary of water loss training and technical assistance programs can be found at https://arcg.is/1nrHTv0

effectiveness of" Washington's "municipal water [use efficiency] statute (RCW 70A.125.170) and regulation at Chapter 246-290 WAC."

The proviso language proposed that recommendations *may* include: (1) statutory or regulatory changes to increase program effectiveness, (2) modifying regulatory oversight, (3) improving coordination between departments, (4) identify sufficient funding to effectively implement the program, (5) and other ideas on municipal water use conservation and efficiency strategies. The proviso required the final Situation Assessment Report be submitted to the Governor and appropriate legislative committees by June 30, 2025. The final report must provide (1) recommendations for a long-term strategy for program implementation and (2) estimated cost for ongoing implementation and regulatory changes.

The Situation Assessment Process

This report summarizes insights gathered through research and interviews with parties interested in and affected by the Statute. The Center's project team (the Project Team, listed on page ii) gathered and analyzed perspectives and suggestions on the implementation of the Statute. The assessment interviews, and this report, also cover important related issues and identify areas of common ground and differing perspectives regarding the future of the WUE programs including suggestions for increasing program effectiveness.

The Center's interviews focused primarily on key constituencies that represent the broader context in which the Statute operates. These interviews helped illuminate current challenges, opportunities for improvement, and considerations for potential next steps. The team supplemented interview findings with additional research around best practices in the global and national context.

Methodological Approach

This assessment began in July 2024 with background research on municipal water law. This included conversations with the Governor's Office, DOH, the Department of Ecology (Ecology), the Washington Water Utility Council (WWUC), and the Washington Association of Sewer and Water Districts (WASWD). Those conversations helped the Project Team develop a semi-structured interview protocol that covered the following areas:

- Familiarity with RCW.70A.125.70
- Municipal water conservation goals
- Areas of success in water conservation
- Potential improvements to water conservation
- Recommended changes to RCW.70A.125.70
- Water conservation and leakage measurement and reporting
- Familiarity with the AWWA Water Auditing Methodology
- The preferred regulatory body (DOH or Ecology)
- Recommended interviewees and additional comments

Appendix C outlines the full interview protocols.

When reviewing likely candidates for the interview process, the team sought a balanced, diverse, and inclusive set of representatives involved in municipal water conservation across

Washington State. This included attention to geographic diversity, capturing both urban and rural perspectives, and a range of roles and viewpoints from water suppliers, regulatory agencies, and technical experts. Participants that demonstrated subject matter expertise and/or leadership in municipal water conservation and systems were particularly encouraged to participate. A snowball sampling approach was used to reach participant saturation.

The interviews lasted from 1-2 hours based on interviewee's availability. Most took place between October 2024 and February 2025, with some interviews continuing into June 2025. The Project Team interviewed agency staff, municipal water suppliers, representatives of federally recognized tribe's water systems, state agencies, and others. Appendix A provides a full list of the 48 interviewees, while Appendix B provides a geographic representation of the water suppliers that participated (note that this does not represent the full-service area that those suppliers supply). Appendix B does not include interviewees who represent organizations that work across multiple communities and/or the state, such as DOH or Ecology.

Analysis of the interview data focused primarily on identifying common themes and perspectives. The team analyzed these data through a variation of Grounded Theory Coding (GTC) which uses a multi-step process to identify themes as they naturally emerge out of the data (in this case interview notes) without applying preconceived notions of what will be found.[8] As themes emerge, they provide structure to the current data while also highlighting new areas of interest for further analysis and data collection.

In addition to expert interviews, the Center contracted with the Washington State University (WSU) School of the Environment (SOE) to hire a graduate student to conduct a qualitative analysis of annual WUE reporting data. This analysis focused on comparing the reports from years 2014 and 2023 to evaluate the responses from water suppliers as they relate to WUE goals and progress to understand how WUE efforts have evolved over the past decade. The report was used to further inform this Situation Assessment and is titled "Long-term Water Use Efficiency Progress in Municipal Water Systems in Washington State (2014-2023)" (2014-2023 WUE Study). See Appendix F.

The Center shared an initial draft of this Situation Assessment with all interviewees, who had two weeks to review and provide comments on factual inaccuracies. The team then incorporated these comments into this final report to the Washington State Governor's Office and Legislature.

During the situation assessment, broader discussions often arose about water rights, water conservation, infrastructure investment, and customer behavior that required additional regional, topical, and political context to clearly understand. For those unfamiliar with the nuances of water supply and demand in our region, this section provides an introduction and overview of water management and policy in Washington and the western United States.

Putting Conservation in Context for the Western United States

Climate change will continue to decrease average annual snowpack levels throughout the Northwest. Lower snowpack negatively impacts summer instream flows and reduces the

[8] Kathy Charmaz, (2006). *Constructing Grounded Theory: A Practical Guide Through Qualitative Analysis*. Sage.

amount of water available for municipal, industrial, and agricultural purposes.[9] As a result, many cities in the Northwest and beyond have developed water conservation strategies to reduce existing and future water demands. For example:

- **Ashland, Oregon,** experienced significant population growth in the late 1980s. To increase its water availability, Ashland implemented a four-point water conservation program. The program involved showerhead replacement, toilet replacement, leak detection, and conservation-based water rates. The program also offered customer water audits. By 2001, nearly 1,900 residences had received water audits and 85 percent of those residences had participated in the showerhead and/or toilet replacement initiatives. The four-point conservation program reduced Ashland's water demand by 395,000 gallons per day. The program also resulted in annual savings of 514,000 kilowatt-hours of electricity.[10]
- About 43 percent of the water supply in **Houston, Texas,** comes from groundwater sources increasingly threatened by land subsistence, saltwater intrusion, and flooding. In response, Houston has implemented several conservation initiatives to manage groundwater use. These include outreach programs, irrigation audits, plumbing retrofits, and leak detection. Houston distributed 10,000 conservation kits with efficient showerheads and faucet aerators to local fifth graders. About 8,000 kits have been installed in homes. Houston's conservation initiatives have reduced water demand by an estimated 7.3 percent and saved approximately $260 million.[11]
- Population growth, drought conditions, and rising water prices led **Irvine, California,** to adopt a tiered-rate structure. The structure aims to reward water conservation and identify leakage. Irvine individualizes water prices for its customers based on square footage, the number of residents, and any specific needs (such as medical needs). When customers use more water than necessary, they receive progressively more costly penalties. The penalties alert customers to leakage and allow them to correct any problems. Once the problems are fixed, the city removes the penalties. Irvine implemented the tiered-rate structure in 1991 and reduced water consumption by 19 percent in the first year. Between 1991 and 1997, Irvine saved an estimated $33.2 million on water purchases.[12]
- **Seattle, Washington,** has little long-term storage capacity and relies on melting snow for its summer water supply. To save water, Seattle uses a multifaceted approach that includes plumbing fixture codes, water-saving products, public awareness campaigns, and seasonal rates. Seattle also targets residential customers with specific programs: the Home Water Savers program distributes efficient showerheads, while the WashWise program provides rebates for efficient washing machines. Seattle's approach has reduced water consumption by an estimated 30 million gallons/day. Plumbing fixture codes, seasonal rates, and efficiency improvements have led to measurable success.[13]

[9] US Department of Agriculture. "Snow Water Equivalent – Its importance in the US." https://www.climatehubs.usda.gov/hubs/northwest/topic/snow-water-equivalent-swe-its-importance-northwest
[10] Environmental Protection Agency. 2017. "Cases in Water Conservation: How Efficiency Programs Help Water Utilities Save Water and Avoid Costs." https://www.epa.gov/sites/default/files/2017-03/documents/ws-cases-in-water-conservation.pdf.
[11] Environmental Protection Agency. 2017.
[12] Environmental Protection Agency. 2017.
[13] Environmental Protection Agency. 2017.

Seattle's approach has reduced water consumption to the same level it was in the 1950s even as its population doubled. Plumbing fixture codes, seasonal rates, and efficiency improvements have been especially successful.[11]

These strategies capture an enormous breadth of ideas that have been effectively implemented and highlight the range of tools available for municipal water conservation.

Municipal Water in Washington

Water Rights Overview

In Washington, Ecology assigns and manages water rights. All water users follow the system of *Prior Appropriation*, which determines how to assign water rights to users who wish to put water to a beneficial use.[14] This system assigns water rights based on a "first in time – first in right" manner, giving seniority to those with the oldest rights. Those with senior rights have priority in diverting or withdrawing water over junior water rights holders. Junior rights may only be fulfilled after all senior rights have been met. If there is not enough water available at the time to meet the needs of all water right holders, those users holding the most junior rights are prohibited from using water. Prior Appropriation applies to both surface and groundwater sources.

In addition to complying with water right priority, most water rights holders must put water to "beneficial use." In Washington, this means documenting what the water is being used for and the volume of water required to fulfill the specified use. Beneficial use is key to maintaining a water right: if the water right voluntarily goes unused for extended periods of time, the state may wholly or partially reclaim the water right. In general, five or more years of successive non-use will flag a water right for relinquishment unless the water right holder can show sufficient cause to explain the non-use. ***Washington State's MWL exempts municipal water systems from relinquishment rules, which offers water suppliers flexibility to manage water rights in anticipation of future growth***. Since municipal water suppliers must be able to accommodate future water demands, most have water rights that claim volumes of water greater than their current beneficial use (inchoate water rights). These inchoate (unused) water rights allow water suppliers to plan ahead by developing new sources of water without having to use them immediately. This is important, since building new water infrastructure and securing additional water rights involve significant costs and time. Therefore, the MWL protects inchoate municipal water rights from being revoked or diminished.[15]

Planning and Management

In 1971 the State Legislature passed the Watershed Resources Act (RCW 90.54) that created rules to manage water rights conjunctively (considering groundwater impacts on surface water) and a framework for watershed planning at the local level to encourage context-specific collaborative planning between local governments, tribes, and other interested and affected parties in shared Water Resource Inventory Areas (WRIAs).[16]. This resulted in 62 water management units, or WRIAs, delineated by a combination of hydrologic (water system) and

[14] Washington State Legislature. Revised Code of Washington 09.03.010.
[15] Washington State Department of Ecology. (n.d.). *Municipal Water Law*. https://ecology.wa.gov/regulations-permits/guidance-technical-assistance/municipal-water-law
[16] Washington State Legislature. (1998). *Watershed Planning Act*, Revised Code of Washington § 90.82. Retrieved from https://app.leg.wa.gov/rcw/default.aspx?cite=90.82

jurisdictional boundaries. WRIAs serve as one of the broadest units of water management in the state, with many locations planning water supply and demand at finer spatial scales depending on user needs and issues. Municipal water suppliers are an example of planning and management at this finer spatial resolution. Larger municipal water systems (Group A systems) serving more than 1000 connections must complete a water system plan that provides a description of the water system, contextualizes historical and future water supply and demand, summarizes system assets, facilities, finances, operations, source protection, and capital improvements, as well as details existing and planned WUE strategies. Each system must update its plan every ten years, or sooner if the system significantly expands either geographically or infrastructurally.

As of 2015, a United States Geological Service study estimated that Washington state surface and ground water sources supported withdrawals of approximately 4.25 billion gallons per day across all water users.[17] This represents a significant increase in water use since the year 2000. To counter increasing demand, the WUE rule (WAC 246-290-800 through 840)[18] actively promotes municipal water conservation efforts across all Washington state watersheds. This rule adds flexibility to the state's evaluation of municipal inchoate rights in exchange for water suppliers making measurable progress towards reducing water use. Under this rule, water suppliers must identify and evaluate water savings goals on an annual basis through a WUE Planning Program, ensure that all customer connections are metered, and work towards reducing systemwide leakage rates to 10 percent or below. Since 2005, total water withdrawals for municipal water systems in Washington have increased only slightly, despite burgeoning population growth. This indicates that the WUE rule is likely helping reduce municipal water use.

Washington's Municipal Water Law

Agency Oversight

The MWL involves two key agencies with distinct, complementary responsibilities. DOH oversees water quality and efficiency, in relation to safe and reliable drinking water for Washington residents. Ecology manages the allocation and protection of the state's water resources by overseeing water rights permitting, instream flows for ecosystems, and the enforcement of water quality standards under state and federal law. Both agencies share responsibilities in overseeing municipal water systems through the review of water system plans and coordinating policies to align water supply planning and regulatory requirements.[19] To align their efforts, the agencies have developed a Memorandum of Understanding and Joint Review Procedures that outlines their roles and responsibilities.[20] The agencies have also identified coordination liaisons. The liaisons meet semi-annually to discuss water system plans, water resource issues, and other aspects of the MWL.

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[17] USGS. 2015. *Water Use in Washington, 2015.* https://pubs.usgs.gov/fs/2018/3058/fs20183058.pdf

[18] https://app.leg.wa.gov/WAC/default.aspx?cite=246-290&full=true#246-290-800

[19] "Municipal Water Law - Washington State Department of Ecology." n.d. Accessed March 20, 2025. https://ecology.wa.gov/regulations-permits/guidance-technical-assistance/municipal-water-law.

[20] Washington State Department of Health, and Department of Ecology State of Washington, (2024). *Memorandum of Understanding between State of Washington Department of Health and Department of Ecology Related to the Coordination Between Planning, Engineering, Public Health and Safety Processes, and Water Resources.* *https://doh.wa.gov/sites/default/files/2024-09/ECY-DOH-MOU-Signed.pdf*
Washington State Department of Health, and Department of Ecology State of Washington, (2024). *Joint Review Procedures: Procedures for Planning and engineering Documents*. https://apps.ecology.wa.gov/publications/documents/2411026.pdf

Municipal Water and the Courts

In addition to the MWL, DOH, Ecology, and water suppliers must work within the legal precedent established by Washington court cases. The Washington state court cases that have shaped municipal water conservation include:

- ***Washington Department of Ecology v. Theodoratus (1998)*** held that the quantification method used to issue water rights must be based upon the actual application of water. State law does not allow for water rights to be granted based on system capacity alone.[21]
- Following *Theodoratus*, the state legislature amended the Municipal Water Law to describe when water rights become fully vested. ***Lummi Indian Nation v. State (2010)*** ruled that the amendments did not violate due process or separation of powers.[22]
- ***Cornelius v. Washington Department of Ecology (2015)*** held that certain water rights can be reclassified for municipal purposes, exempting them from relinquishment due to nonuse. The reclassification of water rights does not violate constitutional principles.[23]
- ***Crown West Realty v. Pollution Control Hearings Board (2019)*** ruled that municipal classifications do not apply to commercial establishments. Water rights not designated for municipal purposes as subject to relinquishment after five years of nonuse.[24]
- ***Foster v. Washington Department of Ecology (2015)*** ruled that "out-of-kind mitigation" cannot be used to justify instream flow impairment resulting from water allocation. No amount of impairment is allowed, regardless of magnitude or ecological impact.[25]
- ***Hirst v. Whatcom County (2016)*** ruled that counties must ensure that permit-exempt water uses, such as wells, do not affect instream flows. Counties cannot rely on permit-exempt groundwater wells to supply new development and must make independent decisions about legal water availability.[26]

Components of the Municipal Water Use Efficiency Rule

There are two primary components to addressing municipal WUE: supply and demand.[27] While interviewees working in water municipal supply may see both as areas for "conservation," the term *conservation strategies* generally refers to demand-side efficiency measures to reduce water use by households, businesses, and other end users. *System leakage reduction* (also known as "non-revenue water") focuses on supply-side efficiency by addressing water lost within the distribution and transmission systems due to leaks, infrastructure problems, or malfunction; system maintenance; unmetered water use (such as water used by fire

[21] Ridgley, John B. 1998. "Washington Dep't of Ecology v. Theodoratus, 957 P.2d 1241 (Wash. 1998)." The University of Denver. https://digitalcommons.du.edu/cgi/viewcontent.cgi?article=3066&context=wlr

[22] Lahner, John. 2011. "Lummi Indian Nation v. State, 241 P.3d 1220 (Wash. 2010)." The University of Denver Water Law Review 467. https://digitalcommons.du.edu/cgi/viewcontent.cgi?article=1590&context=wlr#:~:text=Lummi%20Indian%20Nation%20argued%20that,standing'%20of%20certain%20water%20rights.

[23] Washington State Supreme Court. 2015. *Cornelius v. Washington Department of Ecology*. https://appswr.ecology.wa.gov/docs/WaterRights/wrwebpdf/88317-3%20Opinion.pdf

[24] Washington State Court of Appeals. 2019. *Crown West Realty, LLC v. Pollution Control Hearings Board.* *https://appswr.ecology.wa.gov/docs/WaterRights/wrwebpdf/356108_pub.pdf*

[25] Washington State Department of Ecology. 2024. "Water Resource Management: Where We Are Today." https://apps.ecology.wa.gov/publications/documents/1611003.pdf

[26] Washington State Department of Ecology. 2024.

[27] Jacque et. al., (2024).

departments); or inaccuracies in metering that may misrepresent actual water losses.[28]

Strategies for improving municipal conservation often include customer awareness campaigns, tiered rate structures, and water-efficient devices.[29] Water-efficient devices typically achieve the most consistent water savings, with the potential to reduce water use by 50 percent in the United States and Europe. Examples of water-efficient devices include smart meters, smart irrigation systems, and high efficiency household appliances. However, water savings vary by location, infrastructure, and ratepayer base.[30] Examples of supply-side efficiency strategies include infrastructure improvements, leakage reduction techniques, and water recycling initiatives.[31] In aging water systems, leakage can account for a significant portion of total water loss. Water suppliers may use many tools (sensors, meters, etc.) to identify and prioritize repairs to aging infrastructure.

Added Benefits of Water Use Efficiency

Increasing municipal WUE through conservation and the reduction of leakage and non-revenue water can support the state's resilience to climate change. For example, utilities often report the largest share of municipal energy use, meaning that water savings can result in significant energy savings.[32] The building sector, which accounts for 40 percent of global energy use, requires energy for pumping and heating water. This sector has the highest potential for energy savings through municipal water conservation.[33] With this in mind, WUE plays an important role among conservation initiatives across Washington.

Pooling Perspectives: Insights from Research and Interviews

Reactions to the State Audit

According to the Center's background fact finding and interviews, following the publication of the Audit in 2023, interested and affected parties across sectors identified points of support for and concern about the Audit's findings and recommendations.

Many interviewees supported the Audit's findings addressing the need to improve data collection and engagement, provide greater technical support for water suppliers (especially for smaller systems), and update DOH's WUE website and supplier contact information. Interviewees also expressed excitement that the Audit drew increased attention to water conservation at the state level and hoped that the Center's work could spark greater state attention to water use across Washington state.

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[28] Conservation is framed in various ways through the literature associated with water use efficiency. The framing used in this report, in which conservation is associated with end use or rate payor usage reduction is in alignment with the framing established in the Audit and much of the academic literature. However, there is recognition that this language creates permeable boundaries that do not always neatly fit into any framings and results in many people viewing conservation as an umbrella term that encompasses end use and system leak reduction and/or non-revenue water. Regardless, the findings from interviewees remain stable especially when considering Ecology's involvement in the regulation of the Statute.

[29] Jacque et. al., (2024).

[30] Jacque et. al., (2024).

[31] Jacque et. al., (2024).

[32] Jacque et. al., (2024).; Environmental Protection Agency. 2025. "*Energy Efficiency for Water Utilities.*" https://www.epa.gov/sustainable-water-infrastructure/energy-efficiency-water-utilities#:~:text=Renewable%20Energy%20Options-,Overview,per

[33] Jacque et. al., 2024.

Similarly, interviewees hoped the Center's report would call attention to the fact that municipal water conservation across the state has achieved significant successes, with many systems using far less water than before. This is especially true for larger water suppliers who supply 70 percent of the state's population with water.[34] Interviewees also appreciated that the Audit recognized the importance of addressing water conservation in agriculture and other water use sectors.

Although most interviewees agreed with many aspects of the Audit, disagreement and confusion arose around a few areas of the findings and recommendations. For example, the Audit's recommendation to shift oversight of water conservation from DOH to Ecology raised concerns about whether such a change would lead to meaningful improvements in the WUE program. Several interviewees cited strained working relationships between water suppliers and Ecology as a primary concern, while also emphasizing funding limitations as the main barrier to implementation, regulation, and compliance. Interviewees overwhelmingly agreed that there were insufficient resources for WUE oversight since the withdrawal of earmarked state funds in 2007. Additionally, some findings in the Audit were perceived as misrepresenting key aspects of the MWL and the operational realities of small water systems. For example, the Audit appeared to conflate all municipal water suppliers with Group A systems, despite statutory language indicating that municipal water suppliers are not necessarily public water systems. It is also criticized the DOH for lacking complete email contact information for these suppliers, without acknowledging the structural and communication challenges involved. More detail about the various perspectives surrounding this Audit recommendation to move conservation oversight and funding will be discussed later in this report, in Funding and Changing the Regulatory Agency.

Coincidentally, DOH increased staff time associated with the Statute from 0.5 to 1 FTE. DOH was able to respond to the Audit findings and recommendations using funding from the Foundational Public Health Services (FPHS). Overall, broad agreement emerged around the need for more staff time to address other recommendations from the Audit.

Funding

Agency staff members and water suppliers unanimously agreed on the need for more state funding to successfully implement the Statute. In fact, increased funding emerged as the only unanimous finding of this report. Interviewees expressed funding concerns in relation to two primary areas. First, interviewees see a need for additional funding to support DOH and any other regulatory agencies. Second, water suppliers say they could use additional grants and low- or no-interest loans to implement conservation practices and make infrastructure improvements without financially straining systems or ratepayers as they have seen declines in revenue as customers conserve water. While these are the main points of discussion, interviewees generally agreed that more state funding across all water use sectors would improve WUE.

While discussing funding, interviewees expressed a strong desire to partner with the state. They recognized that the state has provided more funding to other initiatives, such as energy

[34] Office of the Washington State Auditor, (2023).

conservation, than to water conservation. They also pointed out that our planet's changing climate is shifting our region's hydrology in ways that reduce the overall availability of water in the summer high demand period. They would like to see water conservation become a higher priority for the state legislature. As the timing and availability of the state water supply availability changes, the legislature's proactive attention is required to ensure water is available for municipal and other uses in the future.

DOH Funding

A consistent theme from both interviews and agency feedback was that DOH lacks sufficient funding to fully implement the Statute. As of the writing of this report, DOH can only support approximately 0.6 FTE for WUE activities due to state budget cuts and hiring freezes. While staffing was temporarily increased to a 1.0 FTE prior to the Audit using Foundational Public Health Services funding, this level is not currently sustainable without additional funding. The lack of sufficient dedicated funding has serious staffing implications for DOH.

When discussing FTE funding, interviewees recognized that DOH has had high staff turnover, which some viewed as a lack of sufficient funding to allow DOH to recruit and retain the qualified and knowledgeable personnel needed to assist water suppliers across the state. With this view, staff retention is tied to the building and maintaining of necessary trusted relationships with water suppliers. Many interviewees praised DOH for its efforts despite limited resources, but agreed that stable, dedicated funding specifically earmarked for WUE is essential to recruit and retain qualified staff to elevate WUE as a priority in the agency. Dedicated WUE funding would also help reduce internal competition with other public health programs that currently receive higher prioritization due to more acute health impacts.

In June of 2025, the Project Team met with multiple representatives from DOH to discuss what would be needed to fully implement and regulate the Statute, considering the additional support water suppliers are seeking which is detailed in the Desired Assistance section of this report. With this level of assistance in mind, DOH provided a detailed breakdown of how much it would cost to fully implement the Statute. Recognizing the need for the development of new data collection systems, the first year of funding to fully support the Statute implementation and regulation, DOH estimates it would require a one-time budget of $2,305,266. This incorporates direct and indirect costs associated with 5.0 FTEs and includes $1,000,000 for personal services contracts. The associated FTE' would include one Environmental Planner 4 position (at 1.0), two Public Health Advisor 3 positions (each at 1.0), 0.7 FTE for an IT App Development-Senior/Specialist, 0.6 FTE for an IT Business Analyst-Journey, 0.3 for an IT Project Management-Journey, and 0.4 for an IT Quality Assurance-Journey.

In terms of the ongoing costs necessary to provide support and regulatory oversight to municipal water purveyors long-term, the budget would drop significantly after the first year, moving to a biannual budget of $1,294,260 (or $647,130/year). The biannual budget would include 3.3 FTEs. The 3.0 proposed FTE would include one Environmental Planner 4 position, two Public Health Advisor 3 positions while the remaining 0.3 would include 0.1 for an IT App Development-Senior/Specialist, 0.1 for an IT Business Analyst, and 0.1 for an IT Quality Assurance. The biannual budget incorporates direct and indirect costs from salaries and

benefits, goods and services, and personal services contracts (dropping to $100,000 following year-one implementation).

Ecology Funding

Shifting oversight to Ecology without providing adequate funding would likely not yield additional benefits according to several interviewees. According to an Ecology representative, successful regulation by that agency would require at least $750,000 in biannual funding to support two FTEs. Ecology staff also cited a one-time need of $250,000 to successfully develop a reporting program for conservation efforts, develop associated policy and procedure documents, train individuals, and adapt current memoranda of understanding (MOUs) and Joint Review Procedures (JRP) between Ecology and DOH. While recognizing that the aforementioned funding would result in only the conservation aspect of the Statute moving to Ecology, many interviewees thought that DOH would continue to need increased funding to provide adequate regulation of non-revenue water and leakage. Cuts to Ecology's budget in the 2025 legislative session decreased capacity within Ecology that the agency would need to successfully implement conservation regulation.

It is important to note that there is a $544,260 difference between the DOH and Ecology sustained biannual budgets. However, Ecology's budget was provided prior to developing a full understanding of the desired assistance water purveyors would like to receive from the state's regulatory agency. Additionally, as interviewees noted that even if the conservation aspect of the Statute moved to Ecology, DOH would continue to need funding to continue to implement supply side regulation such as system leakage. Therefore, there would continue to be a need for state biannual funding available to DOH on top of Ecology's $750,000 if the Statue were to be fully funded.

Water System Funding

Interviewees emphasized that while water conservation and efficiency efforts can lead to immediate economic benefits, such as lower utility bills for ratepayers and reduced costs for utilities staffing, infrastructure, and maintenance, they can also pose financial challenges.[35] For example, when customers use less water, this can lead to lower revenues for utilities, potentially challenging their financial stability and ability to pay for needed infrastructure repairs and upgrades. According to a study conducted in California, the decreased profits resulting from demand-side strategies far exceed the cost savings.[36] This tension is especially apparent when considering infrastructure investments in smaller systems. Interviewees frequently mentioned the need for increased state funding for new infrastructure. They specifically noted the high cost of new infrastructure for systems with fewer ratepayers and larger geographic footprints, where costs are spread across fewer connections per mile.

Additionally, infrastructure often outlives rule changes and technological advances. The Statute has been in effect for 22 years, while the average lifespan of water system infrastructure is 50 years. Therefore, even as new technologies and advances in conservation and leakage detection become available, it is more cost effective for systems to wait until the natural end of

[35] Jacque et. al., 2024.
[36] Escriva-Bou, A., J. R. Lund, and M. Pulido-Velazquez. 2018. "Saving Energy from Urban Water Demand Management." *Water Resources Research* 54 (7): 4265–76. https://doi.org/10.1029/2017WR021448.

life of their existing system before investing in new infrastructure and practices to avoid financially overburdening their organization and ratepayers. If the state wants faster adoption of new infrastructure and technologies, it will need to provide funding through grants and low- or no-interest loans, especially as federal funding declines.

The cost of water remains relatively low to ensure equitable access to all users; however, identifying the location of leaks and repairing them often costs more than the amount of water lost. This again disproportionately affects smaller systems that have fewer connections per mile and smaller ratepayer supports, because finding leaks is more challenging in longer pipes with fewer connections. Again, according to interviewees, grants and low- or no-interest loans, with flexibility in how systems can use the funds, would significantly help address these issues at an accelerated rate.

Desired Assistance

The project team asked water suppliers what they need from state agencies to be more effective in their WUE efforts. In addition to the general funding discussions, many interviewees specifically suggested that increasing the number of FTEs at DOH could improve municipal water conservation efforts across the state. With sufficient funds to attract and retain qualified staff, DOH would be better positioned to:

- Review, modify, and improve specific statewide and local WUE goals for water suppliers to improve regulatory outcomes.
- Improve the level of assistance for leak detection, planning implementation, facilitating grant and loan applications, providing additional training sessions on leading edge practices, and assisting with public awareness materials.
- Build stronger relationships with water suppliers and Ecology to support collaboration across water systems and state agencies.
- Review annual reports, audit water suppliers, and track success towards water use efficiency goals at the supplier and state levels.

Interviewees highlighted most of these as especially important for smaller (often rural) water suppliers who may not always have the staff, resources, or knowledge necessary for success without state or regional help.

Connected, interviewees identified the lack of water purveyor staff and resources as a barrier for professional development opportunities for smaller water suppliers, for whom travel is inaccessibly expensive. Several water suppliers indicated that increased technical support from properly funded state agencies would make them less reliant on contractors, which could lower costs for system improvements. None of these sentiments were unanimously expressed by interviewees, but they raise important considerations that relate to the Audit's findings.

To further support claims of the need for increased state support for local water suppliers, the Center's interviews uncovered varied familiarity with the Statute and overall water laws. This variance in familiarity highlights the need for more state-level technical and informational assistance and training.

Changing the Regulatory Agency

The Audit identifies water conservation and leakage reduction as the Statute's main goals. Specifically, the Audit concluded that water "conservation is the second of the main goals of the state water use efficiency requirements" and that "those efforts may be better housed within [Ecology], which already has expertise in natural resource conservation."[37] Therefore, the Audit recommended moving water conservation to Ecology and keeping leakage reduction with DOH.

Although it was not unanimous, most interviewees expressed a strong desire for conservation regulation to stay with DOH. This preference was grounded in clear themes such as trust, technical expertise, and long-standing working relationships that many suppliers have developed with DOH staff. Interviewees emphasized that these factors contribute to more effective communication and implementation of conservation requirements. While these views were dominant, some interviewees did express support for Ecology taking on a larger role, believing that its approach could bring greater accountability and enforcement to the WUE program. However, these perspectives were in the minority. Overall, the prevailing sentiment was that DOH is better positioned to support water suppliers in meeting conservation goals due to its established role and collaborative approach to regulation and enforcement.

Leaving Conservation with DOH

Collaboration and Relationships

Many interviewees said that DOH approaches regulation collaboratively, partnering with water suppliers to meet conservation goals and providing technical or other assistance before enforcement activities. DOH also recognizes that strict regulation can often lead to added costs being incurred by water systems that would perhaps be better spent addressing the issues rather than paying fines. A DOH representative explained that when water systems have compliance issues related to the WUE and the Statue, these issues are often accompanied by other problems, such as drinking water quality violations. As a result, WUE compliance is typically addressed as part of a broader enforcement action rather than in isolation. These actions are often documented in comprehensive enforcement reports that cover multiple regulatory areas, making it difficult to separate and identify enforcement efforts specific to WUE alone. These discussions were also paired with DOH's continued collaborative approach to compliance. Rather than relying heavily on punitive measures, such as permit revocation or issuing red operating permits. DOH generally favors providing technical assistance and compliance letters. This approach includes working with purveyors to develop comprehensive plans to address compliance issues, including the submission of water loss control action plans. However, some interviewees expressed a desire for stricter enforcement, particularly in cases where their existing compliance approaches have been ineffective. For example, some noted that DOH could be more assertive when it comes to certain types of systems, such as recreational vehicle parks and trailer home communities, where multiple dwelling units are attached to the same meter.

Some interviewees viewed Ecology as less accommodating and less collaborative than DOH. They believe that Ecology enforces regulations without considering the needs of water

[37] Office of the Washington State Auditor, (2023). p.3

suppliers. Some water suppliers claimed that Ecology doesn't provide enough time to solve issues, which places them under financial pressure. Importantly, interviewees said that they thought this perceived rigidity comes from the agency's culture rather than individual employees, which some attributed to a history of high-profile litigation that has caused abrupt shifts in water use practices.

Based on input from many interviewees, DOH has stronger relationships with water suppliers than Ecology. Some interviewees noted that when contacting DOH, they receive timely feedback and assistance. Conversely, many water suppliers have been working with Ecology for years to solve water rights issues that remain stuck in limbo, which further informs their perception of Ecology as less cooperative. In response, Ecology cited the complexity of water law as a significant contributor to its backlog of more than 4,000 water right applications and inquiries, which has resulted in an average of 18-years to process water right applications. This further supports the need identified by interviewees for more state resources and attention to water issues across the state. Along these lines, many interviewees recognized that water suppliers consider Ecology an obstacle and DOH a trusted partner. They added that over time, leaders at Ecology have assigned varying levels of importance to customer service. Some interviewees expressed hope that the agency's new Director will increase Ecology's focus on customer service and seek to be a more collaborative partner.

System Knowledge

Interviewees reported that DOH has deep knowledge of individual water system engineering, capacity, footprint, infrastructure status and condition, financing, governance, and budgeting regarding both conservation and leak detection. Therefore, they believe DOH is better equipped to provide technical assistance than Ecology, which lacks the same understanding of water system operations. Without this understanding, interviewees stated that Ecology could not provide adequate assistance and support, especially to smaller systems.

Competing Interests

Some interviewees expressed concern that Ecology's environmental focus would overshadow the complex and varied needs of municipal water systems. Those interviewees recognized that Ecology has complex relationships with environmental advocates, state agencies, federal agencies, and tribes, which they perceived as leading to less understanding of the needs and issues faced by water suppliers. They believe that Ecology staff have higher priorities than water systems and their ratepayers and may not recognize that water systems must balance factors such as environmental protection, water access, and affordability. Ultimately, these interviewees expressed concern about Ecology's ability to see the full picture. However, other interviewees noted Ecology's dedication to ensuring adequate water resources for both the environment and people and believe the agency does consider the needs of water suppliers. They also pointed out that Ecology has to carry out its mission within the current legal framework.

Access to Water Rights

Interviewees noted that Ecology has a responsibility to ensure beneficial use. While it is widely understood that drinking water is not subject to relinquishment of water rights for nonuse (as noted in previous water rights overview section), Ecology does retain the right to diminish a

certified municipal water right under very specific conditions (change, transfer, or amendment). Those who mentioned this clause expressed concern that Ecology could leverage efficiency rules or action to consolidate to deny a water right. Decreased water rights would bring significant challenges, especially as communities continue to grow. Interviewees said that the "use it or lose it" policy inadvertently discourages water conservation and can lead water suppliers to use more water than necessary to protect their existing water rights. However, only a small number of interviewees raised this concern, while at the same time recognizing the importance of conservation.

Others expressed concern about the challenge of obtaining or modifying rights under Washington's prior appropriation doctrine, where securing new water rights or making changes to existing ones can be complex, time consuming, expensive, and in some cases impossible, even in the face of growing population and rising demand. This highlights a point that many interviewees raised: the importance of regulatory flexibility and proactive planning to support water conservation, without compromising future water availability.

Splitting the Statute

DOH currently oversees water system planning. DOH also works with Ecology to ensure water systems comply with policies on water rights and instream flows. Under this structure, DOH must coordinate with Ecology while overseeing both conservation and efficiency. Many interviewees agreed that moving conservation oversight to Ecology would unnecessarily burden water suppliers as it would require them to complete two WUE reports across separate reporting platforms. This is especially true for smaller systems with limited staff and resources that could be quickly overburdened. However, one interviewee pointed out that such concerns could be mitigated by continuing to centralize reporting on one platform, with the expectation that DOH would share the conservation data with Ecology for review.

DOH representatives acknowledged the need and opportunity to improve collaboration between DOH and Ecology on data collection. According to these representatives, these conversations between the agencies have begun, but making necessary improvements to the data systems and regularly assessing the information collected requires significant funding resources that are currently not available. This supports the need for increased funding to support stable and sustained implementation of the Statute.

Moving Conservation to Ecology

A minority of interviewees supported a move of efficiency oversight to Ecology. Those who supported the move described a need for more aggressive regulation, misperceptions of the agency, and the alignment of conservation with the agency's mission.

Aggressive Regulation

The primary justification cited for moving conservation to Ecology is a perceived need for more aggressive regulation. Some interviewees said that Ecology takes a stronger regulatory approach (given appropriate funding), which they believe is necessary to adequately enforce conservation efforts. They claimed that, without enforcement, conservation goals are meaningless.

Misperceptions

Some interviewees commented that perceptions of Ecology as an adversarial entity are exaggerated. Enforcement is costly for Ecology, and the agency seeks to avoid enforcement whenever possible. Interviewees said the primary enforcement tool in municipal conservation is the threat of denying water system connections. If that action is needed, Ecology takes it in collaboration with DOH. This practice would not change if conservation moved to Ecology.

Interviewees also addressed concerns about Ecology's relationship with water suppliers. They claimed that Ecology currently has multiple competing priorities, but that if conservation moved, the relationship would become stronger simply through more consistent interaction. However, these views came with the recognition that oversight of conservation would be a new role for Ecology and the resources needed for such a shift are not likely to be made available, particularly given the state's recent 2025 budget cuts.

Alignment of Mission

While most interviewees viewed conservation as more aligned with the mission of DOH due to the agency's focus on human consumption, others believe that conservation fits better with Ecology's focus on both the environment and people. According to these latter interviewees, Ecology has the potential to give municipal water conservation more attention than DOH, which they see as prioritizing water quality over quantity.

If the Statute's conservation component was transferred to Ecology, some individuals pointed out that the agency already has broad responsibilities. Within the scope and scale of its jurisdiction, municipal water conservation would comprise a relatively small area of focus. Ecology may not have any more capacity to prioritize this work than DOH.

Concerns Based on Findings

The findings of this assessment revealed little to no evidence that conservation would markedly improve if oversight was moved to Ecology. Weak or strained relationships between water suppliers and Ecology could bring new challenges. Instead of moving the program, interviewees said that increased collaboration among all the interested and affected parties would yield more benefits.

Asking the Wrong Question

Some interviewees noted that debating which agency should be responsible for water conservation distracts from the real issues. These interviewees said there are bigger problems related to water, including the need for collaboration across sectors, among water users in regional water basins, and around the state. Municipal water use accounts for only 23 percent of the state's total water use. Many interviewees noted that addressing water use holistically would be much more effective than focusing on municipal water systems alone. Interviewees emphasized that such an approach would require collaboration among multiple entities, including DOH, Ecology, Department of Commerce (Commerce), Department of Transportation (WSDOT), water suppliers, agricultural entities, federally recognized tribes, cities, and counties. Notably, Ecology also encouraged collaboration among these entities in its 2024 Washington State Climate Resilience Strategy (Climate Resilience Strategy), which outlines a state strategy

to work with tribes, local governments, and state agencies to address the complexities of a changing climate, including a reduction of available water in the future.[38]

Additionally, many interviewees noted that municipal water conservation efforts are working. Communities across the state are using less water than before, despite population growth. While some smaller systems struggle with conservation, they represent a minority (7 percent)[39] of the state's water use making further investment in these systems costly with limited return. One interviewee pointed to the Audit, which highlighted the inefficiency of applying the same conservation requirements to small systems as to larger ones. They suggested that a potential solution to this would be that the conservation rule only apply to systems with more than 500 connections, aligning with thresholds already recognized in the MWL. This would reduce the regulatory burden on the 90 percent of Group A systems that serve a small fraction of the population. Some interviewees also recommended that DOH focus its limited resources on providing more technical assistance, especially for small systems. Furthermore, the interviewees suggested the state should focus further conservation efforts on agricultural water conservation as it represents 66 percent of Washington's water use.[40]

Interviewee Suggestions for Regulatory Changes

The Center's tasks included making recommendations for changes to the Statute to improve its effectiveness beyond which agency regulates various parts of the Statute. According to most interviewees, a complete overhaul of the Statute is not needed; however, tweaks to the system could help. ***While no consensus arose on which tweaks should be considered or prioritized, multiple ideas surfaced.***

Water Use Efficiency Reports and Data

The Audit provided strong evidence that the annual WUE Reports completed by water suppliers often lack information and are rarely reviewed by DOH or any other entity. Information gathered through the Center's interview process corroborated such claims, while also demonstrating that data associated with WUE goals and progress have remained relatively under-reviewed over the past two decades. Recognizing interviewee's claims that they had made substantial progress towards achieving WUE, the Center contracted with the WSU's SOE to evaluate changes in water conservation reporting over a ten-year period (reviewing the 2014 and 2023 reports) for the entire State of Washington (2014-2023 WUE Study). This evaluation focused in particular on the narrative data each supplier provides to document their annual WUE goals and progress. The unstructured nature of these data make it difficult to analyze and compare, requiring each entry to be read and categorized individually. The findings of this work suggest that without regular review and response, WUE goals and achievements are less likely to be well articulated and documented, which makes it difficult for DOH to evaluate the effectiveness of the program as a whole. The full report from this evaluation can be found in Appendix F .

[38] Department of Ecology State of Washington, (2024). *Washington State Climate Resilience Strategy*. https://apps.ecology.wa.gov/publications/documents/2401006.pdf
[39] Office of the Washington State Auditor, (2023).
[40] Office of the Washington State Auditor, (2023).

The fact that WUE reports vary greatly in detail and type of information bolsters the Audit's recommendation to improve data collection and tracking to ensure that all required data is reported and that every supplier reports on the same information. While interviewees recognized the need for improving data collection and review, they again noted that this would require resources to add agency FTEs to support and train (especially smaller) water suppliers.

Leakage Detection

Leakage detection plays an important role in WUE. In RCW 70A.125.170 section 4-b it states,

> *Develop water distribution system leakage standards to ensure that municipal water suppliers are taking appropriate steps to reduce water system leakage rates or are maintaining their water distribution systems in a condition that results in leakage rates in compliance with the standards. Limits shall be developed in terms of percentage of total water produced and/or purchased and shall not be lower than ten percent. The department may consider alternatives to the percentage of total water supplied where alternatives provide a better evaluation of the water system's leakage performance. The department shall institute a graduated system of requirements based on levels of water system leakage. A municipal water supplier shall select one or more control methods appropriate for addressing leakage in its water system;*

Furthermore, the WAC provides guidance (Ch. 246-290) on exceptions to the 10 percent Distribution System Leakage (DSL) rule (a percentage based on three-year averages). It states that any system with fewer than 500 connections can be held to a 20 percent leakage rate with written approval from DOH. Additionally, water suppliers can work with DOH to establish alternative tracking measures. These include any alternative method that "is contained in published standards of specifications of the [DOH], Environmental Protection Agency, American Water Works Association, American Public Works Association, or American Society of Civil Engineers," and "is approved for statewide use by [DOH], to provide a better evaluation of distribution system leakage than percent of total water produced and purchased, is appropriate for the system requesting to use it, and uses numerical standards so that compliance and action levels can be determined."

Percent-based Measuring

The above Statute sections surfaced as an area of potential statutory and regulatory change during the Center's interviews. Interviewees claimed that percent-based measuring practices for DSL create disparities among different sized water suppliers. Larger systems with more connections per mile can more easily attain a 10 percent DSL average due to the larger amount of water being distributed to geographically concentrated ratepayers (as compared to smaller systems with fewer connections per mile). With a smaller geographic footprint, it is easier to identify leaks and more cost effective to repair them. Smaller systems find it difficult to achieve even a 20 percent DSL because the system distributes less water over a larger geographic footprint with more costly infrastructure per connection. In this type of system, even a small leak can exacerbate the DSL percentage simply because less water runs through the system.

The cost of identifying and fixing even a small leak that increases water loss above 20 percent may outweigh the economic benefit to the system. In these instances, it becomes more cost effective to live with the small leak and wait until the entire system needs replacing, while

monitoring to ensure the leak remains minor. DOH has shown support for shifting away from the percent DSL process in favor of other methods, as discussed below.[41] Importantly, one interviewee stated that AWWA formally abandoned percentage-based metrics back in 2020 in favor of gallons/connection/day indicators, since they are volume-based.

AWWA Water Audit Methodology

Some DOH representatives recommended the International Water Association (IWA)/American Water Works Association (AWWA) Water Audit Methodology (WAM) as an alternative to percent DSL measures. While it is listed as a potential alternative in the current regulations, these interviewees have proposed that it serve as the standard. From 2017-2018, DOH conducted a WAM pilot program with 10 water suppliers of varying sizes from across the state.[42] According to the report, the pilot program was able to enhance the participating utilities' understanding of water loss, data reliability, and system management. Using the AWWA methodology and third-party validation, utilities were able to produce more accurate leakage estimates and expressed support for the approach. Based on those outcomes, the program recommended statewide adoption of the AWWA methodology (also recommended in the state Audit of WUE), expanded training, and technical assistance to improve water loss tracking and capacity. The report also noted that this approach would require more training programs in the use of the methodology and potential amendment of its administrative rules (WAC 246-290) to incorporate AWWA methodology, including level 1 validation.

DOH notes that this methodology provides a distinction between real loss and apparent loss, while DSL calculations capture both as leakage. *Real loss* represents water unaccounted for, such as water lost due to leaks in the system, while *apparent loss* represents "water that is delivered to a customer but not tracked due to customer meter inaccuracy, data handling issues, or theft."[43] Some at DOH also support using WAM because the necessary software is available for free on AWWA's website along with technical assistance from AWWA.[44] This software not only provides water loss data but can help guide a water system's water loss control and revenue recovery.

AWWA recommends conducting an annual audit, although some interviewees stated that bi-annual would suffice and be more cost effective, especially for small water systems. Additionally, some interviewees noted that increased support from DOH would be required to ensure sustained long-term support of WAM data practices. According to one interviewee who recently worked with a consultant from the Texas Water Development Board (TWDB), Texas has two dedicated FTEs working with utilities on their leakage data in addition to other FTEs working on other aspects of conservation.

The Audit favored WAM as a best practice, and some interviewees expressed support for it. They suggested that Washington should not "reinvent the wheel" given well-established international and national practices. However, some water suppliers either showed indifference to it or made claims that other, more detailed and tailored tracking methodologies they

[41] As evidenced by the Washington Water Audit Pilot Results and Recommendations Final Report
[42] WUE-AuditReport.pdf
[43] WUE-AuditReport.pdf; Water Loss Control - American Water Works Association
[44] Free Water Audit Software - American Water Works Association

currently use make more sense for larger, more complex systems. However, over the last two decades, WAM usage has grown to the point where many states rely on it for their annual water loss tracking methodology, including Texas and California, both large states with diverse system needs.

The Statute allows water suppliers to submit a request to DOH to use an alternative leakage tracking methodology to WAM, if they feel it is more suitable, and work with the agency to establish the necessary reporting practices. However, even for the systems that track water loss in more complex ways, having WAM as the base model for them to meet and exceed could assist in creating more uniform and accurate data collection across the state.

Changing the Percentage Rule or Size Standard

The Audit also recommended increasing the percentage of acceptable water loss for smaller systems. Additionally, some interviewees recommend increasing the number of system connections that can qualify for a higher water loss rate to more than 500 or less, which is the current cut off.

With the Statute allowing for system-specific alterations, it is worth noting that most other states, even those using WAM, regularly make system specific alterations or have a higher connection standard for what is considered a small system. For instance, the TWDB standard for system alterations allows them for systems with fewer than 3,300 connections, while the California State Water Board set the standard at 3,000 connections, or for systems that provide less than 3,000 acre-feet of water annually.[45] Both states work with systems that qualify annually (under either the connection or acre-feet metric) to establish standards that work for those systems by factoring in their infrastructure (i.e. main pipe materials and/or soil) and financial needs. The water boards in both states have the capacity to work closely with water suppliers thanks to dedicated state water conservation funding.

Furthermore, Texas has established water loss rate standards based on the number of connections per mile. The TWDB holds systems with more than or equal to 32 connections per mile to a real water loss rate (based on WAM) of less than 30 gallons per connection per day, while allowing systems with fewer than 32 connections per mile a real loss rate of 57 gallons per connections per day, even if their overall connections exceed 3,300.[46]

Tiered Rate Structures

Tiered rate structures are another common approach to increasing WUE mentioned by interviewees. They claimed that while many water suppliers have incorporated tiered rate structures, they are not statewide because smaller systems lack the resources to implement them and they can disproportionately impact disadvantaged communities. Tiered rate structures entail setting a standard base rate (tier 1) for water use based on an average water use per household metric. In increasing tiered rate structures, ratepayers who exceed the standard base amount pay a higher price per unit of water as they enter additional tiers. For each tier they go up, the price of one acre-foot or hundred cubic feet of water goes up. Many of

[45] Initial Statement of Reasons - Water Loss
[46] Texas Administrative Code; Water Loss Audit Manual for Texas Utilities

our interviewees discussed having three tiers, with the top tier (tier 3) being the most expensive. Some water suppliers have up to 5 tiers.

Water suppliers that support tiered rate structures say they incentivize ratepayers to use less water. Others cite the additional revenue that a tiered rate structure can generate—revenue that water suppliers can bank and use later to address infrastructure needs. One interviewee discussed how their water supplier dedicated all the funds generated by the top tier of its rate structure to capital infrastructure needs. Interviewees also suggested that tiered rate structures might use the money collected from top tier users to subsidize water for lower-tier users on the same system who struggle to afford water, addressing equity issues that can arise from increasing rates.

According to representatives from the Moses Lake supplier system, at a public presentation in March 2025, implementing a three-tiered rate structure helped reduce water use during summer peak seasons. The supplier reduced use from 18 million gallons per day to 15.5 million between 2022 and 2024. Based on this success, they plan to implement a fourth tier.[47]

Increase Base Water Rates

Some interviewees also discussed the need to pair tiered rate structures with active efforts to increase base water rates in water systems that do not charge enough. Water rates, these interviewees said, should cover the cost of supplying water, as well as generate savings sufficient to address capital infrastructure needs as they arise. Achieving this statewide would require a dedicated effort (through entities such as DOH's Office of Drinking Water) to work with local water suppliers and elected boards who set the water rates to audit their systems and increase base rates as needed. Combining increased base rates with tiered rate structures that use top tiers to help subsidize water for low-income users can offset other economic disparity concerns.

Technology and Materials

One area of the Statute that some interviewees suggested merits changing is regulation of the technologies and materials water suppliers use to maintain and replace water system infrastructure. However, they made these suggestions with the understanding that changes to infrastructure for water suppliers are expensive and take time. Therefore, the implementation timeframe standards would need to vary depending on the current state of each system. Additionally, interviewees felt that the makeup of the soil around system infrastructure components, as well as the size of the systems, should be considered for necessary exceptions to regulatory changes.

Advanced Metering Infrastructure

Interviewees recognized Advanced Metering Infrastructure (AMIs) as an important tool for conservation efforts, since AMIs allow for faster identification and repairing of leaks on the ratepayer's end while also reducing energy use. AMIs show when a connection has continuous flow within a 24-hour period, even when only a small fraction of a gallon is being used. A recommendation emerged to require that all systems move to using AMIs since they allow real-time data collection that can increase the rate of identifying leaks. Additionally, many AMI

[47] This information comes from a presentation given during the Columbia River Basin Sustainable Water Coalition March 20, 2025, meeting.

systems are now sophisticated enough to allow the collection of a wide array of data that can further improve overall data collection.

Interviewees recognized that while AMI systems require a costly initial investment, in the long run they can reduce the cost to a system via reductions in both leakage and the labor necessary for meter reading. They suggested that state funds through grants (favored by interviewees) or low burden loan funding could provide the capital needed for implementation. However, concerns arose that requiring AMIs statewide could put an unequitable burden on smaller systems. Regulatory exceptions may be necessary for smaller systems. Alternatively, extended timelines or added state funding could reduce these burdens.

Another concern expressed was that systems using wireless communications in an area with topographic variability, such as mountainous communities, might struggle to successfully implement AMI because the mountains block wireless signals. Some interviewees suggested this might require a geographical exception to AMI for these situations.

Recognizing that not everyone wants AMI meters, ratepayers who opt out of AMIs in other states are charged an additional monthly metering fee to cover the costs of truck roll outs for meter checks. These monthly fees range from $20-$40 depending on the system needs (such as distance between connections).

Outdoor Municipal Use: Irrigation and Landscaping

Outdoor water use represents a large portion of water used each year in municipal water systems. During dry, warm months many customers use municipal water to water lawns, trees, and gardens, and to maintain pools and ponds. Typically, in summer months, outdoor water use in the U.S. requires water suppliers to increase their water supply by 3-4 times the amount used during the winter.[48]

Many interviewees noted that conservation techniques aimed at improving indoor water use efficiency, such as rebates and building standards, have been successful where implemented and believe that similar success can be achieved in outdoor use. While this may be true for new developments where water efficient landscaping is part of the residential design, interviewees discussed how campaigns targeting existing outdoor water use have had varying levels of success for several reasons. These include the reality that landscaping and advanced irrigation technologies are a significant investment for homeowners who may be unwilling to replace their current landscaping or technologies with water-saving options. Still, many outdoor water use recommendations surfaced in the Center's interviews.

Landscaping Rebates

Rebates associated with landscaping and irrigation have been part of municipal conservation strategies for years; however, few interviewees provided examples of rebate programs for outdoor water use, suggesting that these programs do not appear widespread. An increase in

[48] Idaho Washington Aquafer Collaborative (2020). *Efficient Irrigation and Landscape Standards.* https://www.iwac.us/wp-content/uploads/2020/08/IWAC-BROCHURE-6-22-20-PRINT.pdf

outdoor-focused rebates for landscaping and irrigation systems could offer an opportunity to increase WUE.

According to representatives of the Heritage Garden Program, during their public presentation for the Columbia River Basin Sustainable Water Coalition, 30 percent of potable water used during summer months is to water lawns and gardens. This equates to nine billion gallons of water use per day in the U.S., a strain on water systems at a time of year when water tends to be less available.

Landscaping rebate programs may provide significant reduction of water in peak seasons; once native plants are established, natural rainfall can sustain them. For example, the Icicle Creek Water Smart Gardens Program (WSGP) pairs awareness of native plant gardens with a rebate of $2.00 per square foot of lawn removed (up to 1,500 square feet) in communities along Icicle Creek. These rebate programs incentivize ratepayers to invest in shifting from nonnative to native landscaping. According to the program, a 4 by 10-foot heritage garden can save 8,000 gallons per year. In 2024, the 14 gardens certified by the Heritage Garden Program in the Columbia River Basin region saved an estimated 254,750 gallons per year.[49]

Although few interviewees discussed these rebate opportunities, research indicated that some local governments and non-governmental entities across the state have developed programs for bringing conservation awareness to local communities on landscaping with native plants. Beyond the Heritage Garden Program focused on the Columbia River Basin, other examples include Wisescape in Pullman and the City of Spokane, which provides resources for its residents. Furthermore, work done by WSU Extension on Rain Gardens illustrates that putting effort into landscaping and irrigation practices that use native plants in strategically placed rain gardens increases water use efficiency and naturally filter contaminants from rainwater runoff into streams, rivers, and other water bodies.

These awareness and rebate programs point to the ways collaborations between water suppliers, local governments, nonprofits, DOH, and Ecology can improve water use efficiency. State leaders could create similar opportunities for irrigation replacements. However, lawmakers will need to provide enough resources for water suppliers and DOH to actively establish working relationships with these entities and advance such programs.

Irrigation Standards

When discussing outdoor conservation opportunities, some interviewees recognized the importance of irrigation design standards to help ensure WUE. They explained that residential irrigation systems are the only component of single-family residence construction with no professional standards or code. This means that irrigation systems are routinely designed and installed by individuals with no qualifications or understanding of WUE. Interviewees suggested that creating standards for irrigation across communities can help decrease the strain systems experience during peak season. For example, the Idaho Washington Aquifer Collaborative developed a guide for efficient irrigation and landscape design standards.[50] With irrigation standards, rebate options for smart irrigation systems can support water conservation by

[49] Per a presentation given by Kelsey Kimmel from the Heritage Garden Program for the Columbia River Basin Sustainable Water Coalition on March 20, 2025.
[50] Efficient Irrigation and Landscape Design Standards

incentivizing ratepayers to install irrigation systems that sense moisture and only turn on when needed.

Irrigation Technology Rebates

While irrigation technology exists to help people water only when plants need it (e.g. irrigation systems on timers, or with soil moisture sensors), they cost a lot to install and maintain. Despite the benefits such technology may provide in terms of reducing water use, the costs mean such technology is not as widely used as it would be if incentives or subsidies were available to lower costs.

Water Use Restrictions

Historically, customers have been free to decide how and when to use water outdoors. In combination with relatively low water rates, this has created a standing tradition of overwatering in many residential and commercial areas. Some municipalities institute voluntary or required restrictions on outdoor water use during summer months (e.g., odd-numbered houses can water on Tuesdays, Thursdays, and Saturdays between 5 p.m. and 10 a.m.).

Policies restricting outdoor water use are unpopular among many ratepayers. These policies require utilities to spend time and resources notifying customers, enforcing standards, and monitoring outcomes, which can get expensive. In response, some interviewees would like to see more support from the state in developing and enforcing restrictions. That is, some interviewees view state-level involvement in establishing and enforcing water restriction policies as a critical step toward achieving meaningful and consistent water conservation across the state. They argue that without clear oversight and enforcement mechanisms from the state, local efforts will remain fragmented, under-resourced, and in places politically constrained—ultimately limiting the effectiveness of conservation measures. Interviewees raised an important caveat about outdoor restrictions, however; environmental justice concerns arise when such restrictions impact people who have gardens to feed their families.

Water Reuse

Some interviewees emphasized water reuse (treating and using greywater for irrigation and other purposes) as a way to alleviate the need for new freshwater withdrawals. However, interviewees did note that implementation of greywater reuse would encounter legal and regulatory challenges in Washington. Health and safety concerns arise when piped potable water supplies are in proximity to non-potable piped water alternatives; this risks cross-connection contamination. Approval of co-located potable and non-potable pipes would need to be secured in consultation with the Regional Engineer and meet project approval criteria set forth in the water system design manual.

Under state law, all waters, no matter the source, are considered a public resource and are subject to permitting and oversight.[51] It is important to note that DOH stated that onsite non-potable water system (ONWS) regulation is currently under development.

[51] Washington State Legislature. Revised Code of Washington 09.03.010. Retrieved from https://app.leg.wa.gov/rcw/default.aspx?cite=90.03&full=true#:~:text=RCW%2090.03.010-,Appropriation%20of%20water%20rights%E2%80%94Existing%20rights%20preserved.,be%20the%20first%20in%20right.

Rebates for Indoor Water Use Efficiency

In addition to rebates for outdoor use, many water suppliers across the state use rebate programs incentivizing the installation of high efficiency appliances and plumbing options. When it comes to these rebates, not many strong opinions emerged; however, some takeaways merit consideration. First, local water suppliers often advertise rebate programs in partnership with local stores (e.g., neighborhood hardware stores) and pair them with awareness raising opportunities to help the public understand the importance of conservation. Second, many smaller water systems struggle to adequately provide rebates due to lack of funding or staff availability. This emerged as another place where more state support in the form of grants or shared services across multiple water systems could help, according to interviewees.

Interviewees also suggested that rebate programs need to be structured flexibly. For instance, in some situations, only specific toilets qualified for rebates; this can result in relatively few ratepayers taking advantage of the program to increase the efficiency of their toilets. This led some interviewees to suggest that rebate programs should provide a range of options for people to consider.

Interviewees also noted that property owners who rent to others do not currently have an incentive to install energy-efficient appliances or plumbing since they often do not pay the water bill. This can lead to disparities that disproportionately burden historically disadvantaged community members. Some interviewees recognized a need to incentivize property owners to install efficient technologies, even when tenants pay the bill.

Public Awareness and Behavioral Change

Multiple interviewees described public awareness as a vital part of water conservation. While some technologies, such as efficient fixtures and leak detection tools, can help reduce water use, their impact is limited without corresponding shifts in public attitudes and behaviors. Public awareness and behavior change go hand in hand. Outreach informs and motivates the behavior change, in this case conservation, needed to achieve long-term water efficiency goals. Due to water supplier variability, in resources, staffing, and other areas, a wide array of public awareness practices surfaced in interviews. Public awareness can take the form of K-12 programs, supplier booths at local community events, public awareness campaigns, information on water supplier and state websites, information on billing statements and/or newsletters, or even lawn signs or sandwich boards. Many utilities already use one or more of these practices and are seeing success. For others, a lack of resources has made it difficult to implement public awareness programs in meaningful ways.

Several communities were highlighted for their innovative public awareness efforts. Everett and Bellingham both received praise for their K-12 programs. These programs provide information about the importance of (and techniques for) water conservation. Multiple interviewees also praised Kitsap County for its conservation awareness efforts, which largely involved engaging with community members at public events. Interviewees even discussed yard signs in Olympia that homeowners put outside to explain to neighbors that they chose not to water their lawn to save water, which helped to shift community behavior through social pressure. Many water

suppliers also noted that sending conservation tips and usage data on monthly bills or welcome letters to new ratepayers helped build awareness and encourage voluntary reductions.

Interviewees emphasized that reducing water demand through behavior change, such as taking shorter showers and eliminating non-native lawns or watering them less, is often more feasible and cost effective than supply-side strategies. In addition, demand-side strategies may not always benefit utilities socially or financially. Municipal water conservation therefore requires careful collaboration and coordination between utilities, ratepayers, and multiple levels of government to align messaging, provide incentives, and ensure consistency.

According to DOH representatives, WUE programs could be implemented as a shared service. This would have an impact by sharing the cost across multiple systems, each paying for a smaller share than they would with independent programs. DOH already has a potential tool to coordinate such programs through its Coordination Act Program. If the state does move toward this type of program, some interviewees expressed a desire to increase state level support for public awareness programs. The TWDB shows how state resources can assist local water suppliers in establishing public awareness programs and practices. The "programs include K-12 school-based programs, training and workshops for adults, distribution of conservation literature, and municipal outreach and awareness programs." [52] To take it further, the K-12 programming provides age-specific curriculum from 4th and 5th grades to the high school level. These practices align with what some interviewees would like to see in Washington State.

Concerns and Barriers

Although most interviewees expressed support for public awareness, concerns and barriers were also raised. Some pointed out that the effectiveness of awareness programs can vary depending on the context. In more politically individualistic or affluent areas, such efforts may have less influence. A 2017 study suggests that appeals highlighting a mismatch between personal values and environmental habits can have a greater impact on changing behavior than monetary incentives. While monetary incentives might make sense from a cost-benefit standpoint, they often fail to raise enough concern to change behavior.[53]

Interviewees pointed to smaller water suppliers as entities that frequently struggle to implement public awareness programs and practices since those can take time, labor, and resources that they do not have. This was suggested as another area where DOH could have more impact if it had more resources to provide materials and curricula for local communities to use.

Relationships and Collaboration

Ecology and Water suppliers

Relationships surfaced as an important part of water efficiency efforts and an area where dedicated state support is necessary to ensure more collaborative statewide and regional action. As previously discussed in the section on agency oversite interviewees emphasized the

[52] Texas Water Development Board. (n.d.) *Conservation Education.* https://www.twdb.texas.gov/conservation/education/index.asp
[53] Tijs, Margot S., Johan C. Karremans, Harm Veling, Martijn A. de Lange, Puk van Meegeren, and René Lion. 2017. "Saving Water to Save the Environment: Contrasting the Effectiveness of Environmental and Monetary Appeals in a Residential Water Saving Intervention." *Social Influence* 12 (2–3): 69–79. **https://doi.org/10.1080/15534510.2017.1333967.**

need to improve the long-standing, limited relationship between Ecology and water suppliers, recommending more consistent engagement to build trust and mutual understanding.

Additional Relationships

Beyond the relationship of water suppliers and Ecology however, it will take strong attention and resources to building regional and state collaboration among multiple interested and affected parties to elevate WUE into a more productive and long-term minded strategy. Collaborative efforts to build relationships around WUE should include (or at least invite) all federally recognized tribes, DOH, Ecology, Commerce, WDOT, local governments, private and public municipal water suppliers, agricultural water suppliers, and industrial water suppliers. It is important for these entities to regularly engage with one another as their work often overlaps and connects them to one another and/or the same water resources across the state. For example:

- Federally recognized tribes have a strong influence in their region due to their senior water rights and their overlap with the same water sources water suppliers utilize.
- Commerce is deeply tied to land use and growth management that has a direct impact on municipal and other water use
- Choices made by WDOT often result in expensive system infrastructure changes to water systems.
- All water users who draw from the same water sources or who have rights associated with the same systems need to consider each other's water uses and demands.

Strong collaborative relationships among all water suppliers can greatly increase water use efficiency while collectively supporting water reduction.

Again, the Ecology Climate Resilience Strategy has already outlined a framework for bringing these entities together to make collaborative decisions to address the changing climate which include many of the above listed entities.[54]

Interpretation of Law

Interviewees recognized that Ecology and DOH need to collaborate more effectively when it comes to interpreting water law in order to build a collective understanding that provides more consistency for water suppliers and reduces frustrations.

Regional Water Boards

Interviewees regularly identified the need for overarching regional approaches to increase water use efficiency to ensure adequate water in the future. This would entail encouraging regional water boards to foster collaboration across water users in their jurisdictions holistically, by bringing together federally recognized tribes, Ecology, DOH, Commerce, WSDOT, and water suppliers. Interviewees noted that in many places in Washington regional water boards exist in the form of a Water Utility Coordinating Committee (WUCC), established by the Coordination Act (RCW 70A.100.040 and .050), administered by DOH. Potential updates to the Coordination Act are being considered to more strongly integrate it into Growth Management Act planning processes.

[54] Department of Ecology State of Washington, (2024).

While implementing the Coordination Act (noted above) statewide would help to reduce the further proliferation of small, inadequate water systems, the statute forbids statewide implementation unless the state funds the planning process.

Other states have established regional boards based on the boundaries of water basins, with a similar geographic "catchment area" approach as Ecology used to create 62 WRIAs, encoded in the Washington state Water Resources Act (ESHB 2514) of 1998. For instance, Florida has regional boards across the state to ensure collaboration between all entities associated with and affected by various water sources. However, it is important to note that Florida does not address water rights through the same prior appropriation doctrine (senior and junior water rights) that many western states do. As a result, regional boards may require varied responsibilities and look overall different. However, some interviewees claimed that such boards could help to improve collaboration across water regions.

Beyond examples from other states, there are examples of strong regional approaches within Washington, e.g., the Yakima Basin Integrated Plan. This example shows sustained state and federal funding can enable coordinated and effective regional action by diverse interests around water resources, even—or especially—in the face of scarcity.

Similarly, the Ecology Office of the Columbia River's responsibility of perusing additional water supplies around the Columbia River Basin establishes another regional approach to fostering efficient long-term water use through dedicated state funding. These examples point to the power of state support and its potential to improve water use efficiency across every region of Washington.

Beyond the Statute

Upgrading and Modernizing Agricultural Irrigation Systems

When asked how to improve municipal water conservation, nearly every interviewee said some version of the same statement: at this point, focusing on municipal water use (relative to other sectors) no longer offers significant water savings; if we want to achieve real gains in water use efficiency, we must look at agricultural water uses. In this area, multiple suggestions arose, the most common of which included:

- Repair irrigation systems to reduce and/or prevent leakage
- Cover irrigation canals to mitigate evaporative water loss (potentially with solar panels), which would avoid land use conflicts that have challenged clean energy facility siting in Washington)
- Increase the use of technology, such as sensors that gauge levels of moisture and trigger irrigation systems to water only when necessary

Because agricultural use makes up most of the water use in the state, it is an important part of the conversation discussion, when considering WUE holistically. That said, it is not clear to the Project Team how familiar municipal water purveyors truly are with the actions being taken around agricultural water use (assuming it varies across interviewees). Additionally, agricultural use is outside the scope of the Statute this report addresses and was therefore not a primary research area of the Project Team. Therefore, while this report highlights comments made by interviewees, more research is needed for the Center's Project Team to make robust

recommendations on the best ways to increase water conservation in agricultural use. However, as has been discussed, increased collaboration across sectors is an important step in ensuring adequate water supply for all uses far into the future.

Consolidating Water Systems

In many areas across Washington, multiple small systems exist in close proximity to one another. Many interviewees suggested consolidating these into larger systems or combining them with already established larger systems as a promising strategy. Interviewees identified consolidation as a promising strategy to improve efficiency, reliability, and oversight of (specifically) small water systems. From their perspective, it is becoming increasingly difficult for the hundreds of small systems (including group B systems, systems serving fewer than 15 connections and fewer than 25 people per day[55]) to identify, hire, train, and retain the specialized staff of engineers, technicians, system operators, and maintenance workers needed to consistently meet drinking water standards. Consolidation could help to address some of the source limitations small systems face; however, consolidation is expensive, particularly for the acquiring water system and their ratepayers.

Currently, from what interviewees noted, consolidation is primarily used as an end-solution for failing systems. With major operational and infrastructural deficits typical of the potentially acquired system, these consolidation plans place massive cost burdens on the acquiring system. To increase efficiency, consolidation needs to be a proactive choice rather than a reactive measure taken as a system is in costly decline. While proactive state funded efforts could mitigate the financial burden of consolidation and improve water quality and quantity regulatory oversight across the state, this needs to be balanced with concerns about mandate-driven consolidation and any associated unintended consequences (such as cross-subsidization). Others recognized the need for flexibility in the utilization and consolidation of any water rights held by systems to increase the incentivization of consolidating smaller systems.

Interviewees noted that consolidation could be successful with strong leadership and adequate state financial support. As a result, a good place to start is to make dedicated state funds available for grants that local water systems could apply for in partnership with DOH and Ecology to consolidate systems when deemed necessary. It is important to note that consolidation has been a point of discussion for a while. DOH provided multiple legislative reports over the last 30 plus years advocating for consolidation.[56]

Many of the requested legislative actions outlined in these reports align with interviewee insights. Additionally, DOH informed the Center's Project Team that it is drafting a report on the subject that it plans to send to the legislature in June 2025. DOH also provided the Project Team with two figures from its upcoming report illustrating the number of water systems across the state, including their size, ownership, and proximity to each other. The figures are included in Appendix E. The first, "WCS Connections and Ownership," shows all systems across the state. The second, "WCS Connections and Ownership (Smalls)," shows all small systems with less than

[55] https://doh.wa.gov/community-and-environment/drinking-water/water-system-assistance/group-b
[56] 1991 Legislative Report; 2008 Legislative Report; 2009 Legislative Report

1,000 connections. These visuals can be used to identify where proactive consolidation may be considered.

Statewide Coordination of Planning / Governance

Many interviewees suggest that tinkering with the Statute or its implementation will not bring significant improvements. Instead, the collective wisdom of interviewees points to a need to assess the challenges and opportunities around the potential for regional governing structures for water suppliers (while keeping DOH as the statutory regulatory agency). While Florida is a very different context, with distinct water conditions, riparian water rights, and legal frameworks, it may still offer useful insights. An example of regional water governance is the South Florida Water Management District, which runs a water conservation program and implements a strategic plan as part of its broader role overseeing water supply, flood control, water quality, and ecosystem restoration across 16 counties, stretching from Orlando to the Florida Keys.

Interviewees noted that Washington is one of the few states that doesn't have a statewide water plan. In contrast, other states have developed plans that assess population growth and water consumption, demand, and supply. They typically outline specific, actionable strategies and include projected costs and funding sources in these plans. Even in the absence of a state water plan, some interviewees suggested that water conservation should be incorporated into the state's comprehensive climate change strategy.

Conserving Tomorrow: Final Thoughts and Recommendations

The purpose of this situation assessment was to (A) evaluate and recommend actions to increase the effectiveness of Washington's Municipal Water Use Efficiency Statute (RCW 70A.125.170) and regulations (chapter 246-290 WAC), (B) provide recommendations for a long-term strategy for program implementation, and (C) estimate costs for ongoing implementation.

A. Evaluate and Recommend Actions to Increase Statute Effectiveness: Potential Actions

Increased Funding for Implementation

Funding was the only unanimously agreed upon issue associated with the Washington Municipal Water Use Efficiency Statute (RCW 70A.125.170) and regulations (chapter 246-290 WAC) (the Statute). As a result, the most significant recommendation related to that Statute that emerged from the interviews was a need to increase funding to DOH to meet the needs of municipal water suppliers tasked with increasing WUE. According to DOH, robust implementation would entail a one-year budget of $2,305,266, followed by biannual budgets of $1,294,260, if the program were to stay at DOH as most interviewees supported. If moved to Ecology, a rough budget, provided by Ecology, entailed a one-time cost of $250,000 for system set up, in addition to $750,000 biannually for sustained implementation. However, even with this move, DOH would continue to require increased funding to support staffing for oversight of leakage and non-revenue water. While funding necessary for ongoing implementation in DOH and Ecology will be discussed in 'C. Estimate Costs of Ongoing Implementation' below, the

feasibility of many of the following recommendations is reliant on the regulatory agency, or agencies, receiving the appropriate funding to provide the necessary support.

Improved Data Collection, Tracking, and Management

A greater focus on data quality, consistency, and accessibility is needed, as recommended by the Audit. This data should support regulatory compliance, as well as to identify municipal water system planning conservation opportunities, track progress toward water use efficiency goals, and inform decisions around growth management, water supply, and infrastructure investments in collaboration with water suppliers. The regulating agency could also use this data in support of regular communication with water suppliers, promoting transparency and shared learning. With adequate resources (i.e. funding and staffing), DOH can ensure that all systems are reporting the data required per the Statute, while increasing the uniformity of data is aggregation and assessment, even if large systems track water efficiency in more nuanced and complex ways that go above the required baseline. Additionally, DOH should continue to look for ways to create a collaborative data system that incorporates municipal water reporting needs for DOH and Ecology, which they are currently exploring with their 0.6 FTE following 2025 budget cuts.

Currently, while the WUE plans are collected from water suppliers each year, the data on consumption and production could benefit from more accuracy and consistency. In any given year, there are hundreds of water suppliers who report more consumption than water produced, or report numbers that are exactly the same, which seems unlikely to occur since all systems leak to an extent. These types of data collection issues should be addressed to better track water use across the state.

Improved resources will support DOH's ability to track and utilize reported data more consistently and provide technical assistance where needed. According to interviewees, as of now, much of the data that is reported receives inadequate attention. Regular review and analysis of the reported data will improve collaborative efforts between DOH, Ecology, and water suppliers in developing plans for future water use efficiency that are tailored to the specific needs of each water system. This flexibility is imperative to the Statute's effectiveness, because each system requires different approaches due to geographic, hydrologic, institutional, and cultural differences.

This is supported by the findings and recommendations from the 2014-2023 WUE Study (Appendix F), which highlight both progress and persistent challenges in the current reporting system. While there has been increased use of multi-year planning and greater incorporation of technical conservation strategies, reduced participation rates and frequent omission of clearly defined goals point to systemic issues in data collection and reporting. A main recommendation from the WUE study is the development of a standardized reporting framework that explicitly prompts water suppliers (utilities) to define measurable goals, identify timeframes, and report on outcomes. The study also highlights the role of regulatory oversight in outcome reporting. Without consistent review and feedback from DOH, reporting risks becoming a procedural formality rather than a tool for accountability and improvement. See Appendix F for the full study report.

AWWA Water Audit Methodology.

One recommendation that could improve alignment across water suppliers and provide more detailed data tracking and management of municipal water systems would be to shift to a more nuanced methodology, like the AWWA Water Audit Methodology. This represents a trusted standard in many other states and could provide more useful baseline data. Larger systems could continue collecting data beyond this standard, while smaller systems would benefit from free software and support to meet baseline requirements. Systems seeking alternative methodologies could work collaboratively with DOH for approval. In the same vein, DOH could decide whether running annual water audits is necessary or if bi-annual audits, or other time scales, would suffice.

Other Leakage Options

Currently, systems with fewer than 500 connections are not held to the statewide leakage standards. In interviews, questions were raised about whether the 500-connection threshold is appropriate. Given that many other states, such as Texas and California, base this on a 3,000-connection range, or on connections per mile or acre-foot water use, the state could consider whether the 500-connection threshold is appropriate, or the threshold should be adjusted in the Statute.

Currently, the Statute uses language about WUE that is relatively vague compared to what can be identified and measured when considering all sources of non-revenue water in a drinking water system. Clearer language could facilitate efficiency improvements, especially if it helps water suppliers identify where targeted improvements could be made given their resources and capacity.

Increased Support for Smaller Systems

A clear priority area that emerged during interviews was the need to address the many challenges that smaller systems face. Small systems make up roughly 90 percent of water systems across the state and often struggle financially to meet reporting requirements and maintain and/or update aging infrastructure.[57] Additional support is needed to help many of these systems meet state standards. Interviewees suggested that increased state assistance may be warranted and also suggested sector-specific strategies that could alleviate some of the current resource gaps, such as sharing tools (such as leak detection equipment) and public awareness materials more widely and expanding training opportunities to include staff from neighboring systems.

(Tiered) Rate Structures

Tiered rate structures were identified in the Center's interviews and research as one way of improving conservation within communities; this is one area where the state could act. DOH could work with water suppliers to implement rate structures that make sense for their system while developing the infrastructure to help systems implement them without excessive strain. These rate structures can then be used to help systems secure needed capital funds for future system needs or to help address equity issues for households that struggle to afford water.

[57] Office of the Washington State Auditor, (2023).

Furthermore, the state could assist water suppliers in conducting system audits to identify an appropriate base rate that ensures capital funds sufficient to maintain and replace system infrastructure as needed. Many interviewees recognized that many water system base rates are not set to an amount that secures these funds.

Meters

By 2017, meters were required for every connection. However, Advanced Metering Infrastructure (AMI's) has been a proven way to increase water use efficiency. The state could consider moving all meters to some sort of AMI system. It was also noted that some smaller and more rural systems may not be able to implement top-of-the-line AMIs that provide daily in-time data, but could still implement baseline AMI's that catch leaks sooner. Interviewees noted that this would ensure that every connection across the state is able to catch and address leaks on an escalated time schedule. However, such a move would require a time scale of at least 15 years to allow systems to replace meters as they age out to reduce the financial strain on the water system and ratepayers. If the state took this approach, there may need to be options for houses to opt out of AMIs. However, in many states, these opt-out options come with additional fees ranging from $25-40 to cover the cost of deploying staff to read meters.

Interviewees also recognized that fire hydrants could be placed on meters. While some are, it is not currently statewide practice. No one claimed that every hydrant should be metered, but increasing the number of metered hydrants across the state could improve tracking of non-revenue water. This would allow better tracking of water used to fight fires and reduce non-revenue water. This may become increasingly significant as climate change continues to lead to more natural fires during peak summer seasons, adding extra strain on water systems. In lieu of metering every fire hydrant, DOH (with appropriate funding) could coordinate a study of metered hydrants to establish better estimates of non-metered hydrant use for more accurate data collection.

Public Awareness

Public Awareness

Another recommendation emerging from interviews is support from the state regulatory body (currently DOH) in providing public awareness materials for local water supplier ratepayers, especially smaller systems. Statewide materials would assist in provide consistent messages to state ratepayers. One state that provides a robust example of public awareness resources and materials that can be drawn upon is Texas, which provides a wide array of options including a K-12 curriculum tailored to different age groups.[58]

Supplier Education

Additionally, interviewees expressed a desire for DOH to provide more education opportunities for water system employees. These can include webinars, conferences, and other options that allow employees to continuously improve their knowledge on water use efficiency techniques and technologies.

[58] Texas Water Development Board. (n.d.)

Equipment

Many interviewees remarked on their willingness to engage in more data-driven monitoring approaches for leak detection. However, many lack the ability to invest in such equipment. Given adequate resources, one possibility suggested by interviewees is for the state to purchase leak detection equipment to rent to local water suppliers who cannot afford the equipment on their own. This practice could provide water suppliers with top-of-the-line equipment to address system issues at increased rates without creating financial strain. One example of such a model comes from Texas, which allows local water suppliers to rent equipment in 30-day intervals free of charge.[59] Another possibility would be a program to allow larger systems to share resources and equipment with smaller systems.

Outdoor Municipal Water Use

Irrigation and Landscaping

Interviewees also expressed interest in the state taking a more direct role in increasing municipal water outdoor use conservation. This could include developing irrigation standards for municipal landscaping. One example of such standards was created by the Idaho Washington Aquifer Collaborative, which developed a guide for Efficient Irrigation and Landscape Standards.[60]

In collaboration with landscaping standards, evidence shows that landscaping with native plants can go a long way towards water conservation, especially in the peak summer season. Although there are collaborative programs across the state between local governments, water suppliers, and non and for-profit organizations to help ratepayers learn about and implement native plant landscaping, these programs are not statewide. Additionally, some of these efforts provide rebate programs for replacing nonnative with native landscaping, but they are the exception rather than the norm.

The DOH Office of Drinking Water (ODW) has begun to consider how to better support and develop municipal water outdoor use conservation programs statewide by working with local conservation districts. To help implement landscaping standards or native landscaping rebate programs, green initiative building standards and water efficient plumbing and appliance rebate programs can be used as guiding models. For example, some interviewees pointed out that land use codes play significant roles in influencing the amount of water consumed by new developments, whether residential or commercial. If water systems worked with counties and the Departments of Commerce and Ecology to integrate water efficiency measures into land use codes, it could significantly increase water conservation statewide. Specific suggestions from interviewees included that cities and counties should 1) make the installation of irrigation systems in new residential developments the exception rather than the rule, 2) incentivize the design and development of communities that use significantly less water, and 3) mandate the use of reclaimed water for all outdoor uses.

[59] Texas Water Development Board. (n.d). *Leakage Detection*. https://www.twdb.texas.gov/conservation/municipal/waterloss/leak-detection.asp

[60] Idaho Washington Aquafer Collaborative (2020).

Water Restrictions

Another potential outdoor water use recommendation for consideration is for the state to become a partner in implementing and enforcing outdoor water use restrictions during summer peak seasons. Interviewees discussed how some communities across Washington have worked to develop such restrictions. However, they noted that restrictions are hard to implement due to a lack of enforcement capability or consistency of water use restrictions across the state. The state could assist by establishing and enforcing restrictions on outdoor water use when regions of the state experience water system strain.

Reclaimed / Grey Water

Interviewees expressed concern about continuing to use drinking water for uses other than human consumption, such as residential irrigation. Some interviewees stressed that more state effort toward increasing the use of grey water (for landscape irrigation, toilets, and other uses) could dramatically increase water use efficiency. However, this would require policy changes and additional resources to build the necessary infrastructure. [61] For example, one interviewee noted that it would be helpful to have final adoption of the onsite non-potable water system (ONWS) state rulemaking[62] as well as staffing and plan for the permitting necessary to implement the ONWS rules.

Further, multiple interviewees specifically proposed that irrigation water should come from reclaimed sources, otherwise known as treated wastewater. More than one emphasized that if the state wants to conserve more water, it should incentivize water for outdoor use to come from reclaimed sources. These interviewees noted that using drinking water for irrigation is inefficient and inappropriate and stressed that outdoor uses, including municipal, rural, and agricultural, lend themselves to treated wastewater. Other interviewees noted challenges with grey water use: first, reclaimed sources may be unpopular among ratepayers and may require utilities to conduct communication campaigns around the safety of reclaimed water. Furthermore, there are barriers to getting reclaimed water to end users, including the need to lay separate pipes to convey reclaimed water (since it is not treated to drinking water standards and should not be co-mingled).

B. Recommendations for a Long-term Strategy

Conservation Oversight

Most interviewees showed a strong preference for conservation oversight to remain with DOH. Many observed that the positive relationships established between DOH and water suppliers are important to maintain, but that DOH's capacity to engage meaningfully in conservation oversight is hampered by a lack of funding and staff. This would suggest a strong preference for keeping the entire regulatory oversight of the Statute with DOH.

While the Audit's recommendation to move conservation oversight to Ecology has merit, interviewees generally think the overall lack of funding for WUE and distrust between water suppliers and Ecology raise questions about the effectiveness of a move to Ecology in increasing water conservation efforts and goals. The Center's assessment did not find strong support from

[61] Graywater use for subsurface irrigation is currently regulated by Health. See chapter 246-274 WAC Greywater Reuse for Subsurface Irrigation
[62] Washington Department of Health, Onsite Nonpotable Water Systems Rulemaking. See https://doh.wa.gov/community-and-environment/wastewater-management/rules-and-regulations/onsite-nonpotable-water-systems-rulemaking for more information.

interviewees for this move, nor did interviewees overwhelmingly indicate that such an action would improve municipal water conservation; rather it remains a theoretical possibility. Based on input gathered during this review, such a move could be an expensive decision with limited benefit. This would prove especially true if the state failed to provide additional funding to sustain the program. The funds needed to move conservation regulation from DOH to Ecology might instead be better spent to increase staffing for the existing program or to build collaboration across sectors, regions, and water use entities, such as municipalities, counties, and purveyors.

Interview responses did indicate, however, that regardless of the decision, improved collaboration between DOH and Ecology would enhance the effectiveness of the Statute. Interviewees expressed support for greater participation from Ecology in its current role of evaluating water system's water right self-assessment and in evaluating changes in each water system's place of use to ensure that the changes are consistent with adopted watershed plans under chapter 90.82 RCW or a comprehensive watershed plan approved under RCW 90.54.040(1). Ultimately, interviews suggest that success depends on whether the program has financial support and prioritization from state lawmakers. As many put it, they would like to see the state become a better partner in water policy issues, far beyond regulation.

Increased Collaboration

Interviewees identified the need to increase collaboration among multiple agencies (DOH, Ecology, Commerce, and WDOT), water suppliers, and federally recognized tribes; this offers an opportunity for coordinated action to advance mutual interests and reduce conflict while improving WUE. Such collaborations could reduce instances of water suppliers facing unexpected expenses, such when new road development requires changes in water system infrastructure. In short, it would improve holistic system planning at the local and state level, while providing resources to mitigate unexpected water system infrastructure costs. These collaborations would also provide a platform for discussions around other recommendations, e.g., increasing the use of grey water and reused water for municipal use.

Consolidation

Although considerations around consolidating smaller systems are nuanced and complex, consolidation offers one means to improve long-term WUE. Across the state, there are many smaller systems in close proximity. One recommendation that lawmakers could consider would be to provide state funding to consolidate these systems in a way that would not put financial strain on the systems themselves or the ratepayers. One interviewee noted that this would likely require lawmakers to grant the WUE regulatory agency (currently DOH) additional authority to evaluate systems and require existing systems to consolidate; ***however***, interviews highlighted that *mandating* consolidation without an inclusive, transparent process that include input from representatives of smaller systems would not be popular and would likely bring resentment.

Consolidation would reduce the level of resources that each system would have to allocate per connection while offering opportunities for economies of scale and reducing challenges around development of the workforce qualified engineers and system operators needed to maintain and manage the systems. This also would present an opportunity to help larger systems connect to smaller systems near them without financial strain. Appendix E provides a map of water systems in close proximity that could be considered for consolidation.

C. Estimated Costs for Ongoing Implementation.

To adequately address current needs, while assuming continued DOH oversight of the entire Statute, DOH would need a one-time budget of $2,305,266 (supporting 5.0 FTEs) followed by biannual budgets of $1,294,260 (supporting 3.3 FTEs). These funds would allow DOH to develop and launch necessary new data systems, provide technical support for water purveyors, review annual reports, and collaboratively develop tailored plans for water systems while ensuring its ability to recruit and retain qualified employees dedicated to oversight of the Statute.

Beyond funding for the regulatory agency/agencies, interviewees recommend identifying and setting aside additional money for grants and low- or no-interest loans for water suppliers. With decreasing federal funding available, the specific amount needed varies depending on what recommendations (from this report) state lawmakers opt to pursue (if any) and how the federal landscape continues to evolve. The amount also varies based on the timeframe granted for the implementation of these changes. To further refine these numbers would require coordination between water suppliers, DOH, and other state agencies.

Potential Funding Streams

One option that interviewees suggested to help long-term implementation of the Statute would be to reinstate funding streams available from 2003 to 2007. This would include both state general fund allocations and an annual ratepayer fee of $0.25 per residential connection. Furthermore, if the state implements AMI metering with an opt-out option, lawmakers could add a small fee for systems who opt out to help fund water use efficiency programs.

D. Broadening the Scope of Water Use Efficiency

A major theme from this assessment was the lack of sufficient data to make informed decisions. At the core of this issue is the lack of forward-looking data that can provide insights into how much water will be available for human and environmental needs at appropriate timescales. Nonetheless, the Project Team heard widespread agreement that Washington has made real progress in municipal water conservation, particularly among larger systems that supply most of the water to municipal ratepayers across the state and have the resources to plan, invest, and adapt. Having enough information to parse what this contribution is to the overall water budget for Washington would be valuable, especially when considering future water availability estimates.

Understanding the contribution water conservation makes to mitigating additional water needs becomes particularly important given that many interviewees made clear that water purveyors have reached a point where additional, significant gains in indoor water use efficiency have stalled, while there are still room for gains in municipal outdoor water use efficiency. They emphasized that continued improvements in WUE would require more than incremental fixes

that 'nibble around the edges' of a much larger and complex context that needs to be addressed. This section summarizes some of the ideas and concerns interviewees shared in thinking long-term about water conservation across the state.

Addressing Agriculture and Other Non-Municipal Water Use

Municipal conservation is just one piece of a much larger puzzle. Agricultural water use makes up a far greater share of total water use in the state (66 percent)[63] than municipal. ***Many interviewees stressed the need for more integrated, statewide approaches to efficiency and conservation that cross existing sector silos with holistic, inclusive, collaborative planning around water use.***

Water Planning

Making informed decisions about conservation, infrastructure needs, and long-term water supply requires accurate and accessible data on water use and availability. Long-term planning especially benefits from integrated approaches that build on existing local and regional efforts while improving statewide coordination among regulatory agencies and across ***all*** water use sectors including multiple levels of local governments *and* federally recognized tribes. This kind of water supply and demand synthesis has rarely occurred, though one example is the Water in the Skagit Basin: The big picture.[64] This project was led by Washington State University around water in the Skagit Basin

While Washington has local and regional planning frameworks, multiple interviewees bemoaned the lack of a unified statewide approach to water use efficiency and conservation. To date, Washington has focused on planning regionally because of the significant climatological differences that exist within the state (eastern vs. western WA) and other complexities. For example, the Office of the Columbia River (OCR) has a legislative mandate to re-evaluate the state of water supply and demand in the Columbia River Basin portion of the state (primarily eastern WA) every five years. This forecasting effort provides a WRIA-level, comprehensive assessment of changes to streamflow and reservoir storage (water supply) as well as estimates of water demands in the agricultural and municipal sectors and instream flow requirements. These types of data for other watersheds would help immensely with water system planning.

Water demand estimates have historically focused mostly on the largest water user: agriculture. Previous forecasting reports have assumed that changes to municipal water demands would follow historical trends, which may not fully capture the range and scope of conservation measures that water suppliers have implemented over the years. The simplification of municipal water demand estimates stems in part from the lack of a reliable database of information from which to study trends in water demand across Washington.

Many interviewees acknowledged that while a statewide approach (which some called "one size fits all") may not make sense given the significant hydrologic, institutional, and cultural differences across the state, more statewide discussions, perhaps as forums, could act as a

[63] Office of the Washington State Auditor, (2023).
[64] State of Washington Water Resource Center (20221). *Water in the Skagit Basin: The Big Picture*. https://wsuniv.maps.arcgis.com/apps/MapSeries/index.html?appid=1ff96129ebf04d728c56d35c0b04efc5

useful platform for sharing regional or geographic experiences and convene key parties to discuss issues holistically.

Collaborative efforts for developing a statewide plan (informed by regional water plans), coupled with making regional planning more robust across the state, could address many of the problems raised by interviewees. This could also help create a clearer picture of how much water is available now and how much would be available in the future under different scenarios.

As Ecology's 2024 Washington State Climate Resilience Strategy notes, collaboration will need to be a significant aspect of such efforts.[65] To ensure these collaboratives have a solid base for launching and continuing the work into the future, the state should consider adding a "third party" facilitator into the beginning stages. Impartial facilitators can bring tools to build trust and improve relationships among collaborators while providing structured processes that can help set the collaboratives up for long-term continued success.

Revisit Water Law

According to interviewees, Washington water users could make progress towards securing adequate future water supplies by revisiting portions of the current water law that limit the flexibility and innovation needed to address modern water challenges. While municipal water systems are partially exempt from losing unused water rights (See section "Municipal Water Conservation in Washington"), water systems still face pressures from challenges in acquiring additional new water rights. This is especially true in Water Resource Inventory Areas (WRIA) that have not undergone the lengthy legal process known as adjudication. More flexible options for water rights management would be especially beneficial for exploring less traditional solutions, such as increased use of reclaimed water or managed aquifer recharge, helping offset mismatches in the timing of when water is available and when users need water.

Final Drop: Conclusion

Since their 2003 launch, the MWL and associated WUE Statute have resulted in an overall reduction of municipal water use across the state—even with significant population growth. The 2023 Audit sparked new attention to the MWL and WUE Statute which resulted in the 2024 proviso (Appendix D) directing the completion of this situation assessment by the William D. Ruckelshaus Center. The assessment outlines context surrounding the MWL and associated WUE Statute, presents insights from over 40 interviewees across the state involved in municipal water and additional research, and provides recommendations on potential actions the state could consider to improve WUE throughout Washington state.

While the proviso ask was specific to municipal water use efficiency, due to the realities of climate change and additional forecasted population growth, input gathered during this assessment points to a pressing need to focus on the holistic landscape of water across the state if state leaders wish to ensure a resilient, long-lasting water supply into the future. Therefore, this situation assessment presents additional information and potential recommendations that surfaced through the assessment process.

[65] Department of Ecology State of Washington, (2024).

Interviewees expressed significant hope in the course of this assessment that the state will recognize how much success has occurred around municipal water use efficiency, use this as an opportunity to invest more robustly in water use efficiency holistically across sectors, and increase funding to provide further support for municipal water systems as they work to use water efficiently.

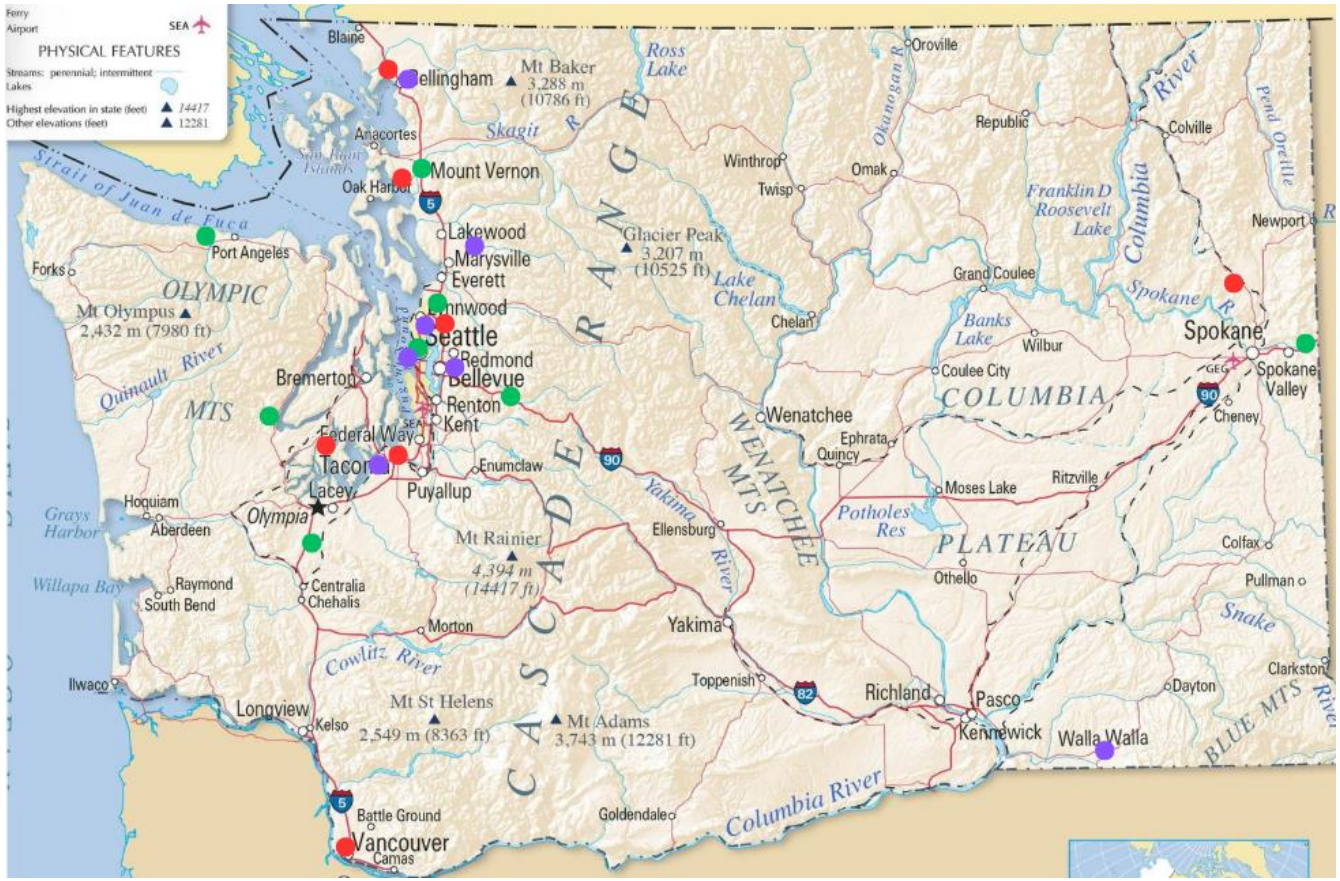
Appendix A: Interviewees

First Name	Last Name	Affiliation
BiJay	Adams	Liberty Lake Sewer and Water District
Matthew	Baerwalde	Snoqualmie Indian Tribe
Drew	Blackwell	Cavanaugh Solutions
Curt	Brees	Silver Lake Water and Sewer District
Mike	Brent	Cascade Water Alliance
Matt	Brown	WA Water Service
Brad	Burnham	WA Department of Health
Steve	Cavanaugh	Cavanaugh Solutions
Dave	Christensen	WA Department of Ecology
Justin	Clary	Lake Whatcom Water and Sewer District
Derrick	Dennis	WA Department of Health
Mike	Dexel	WA Department of Health
Anna	Dyer	Seattle Public Utilities
Urban	Eberhart	Kittitas Reclamation District
Beryl	Fredrickson	City of Spokane; WA Water Utility Council
Elizabeth	Garcia	Seattle Public Utilities
Judi	Gladstone	WA Association of Sewer and Water Districts
Clark	Halvorson	WA Association of Sewer and Water Districts
Darrel	Hawes	Stevens County PUD
James	Heitzman	Lummi Tribal Sewer and Water District
Marcus	Hoffman	Silverdale Water District
Kenneth	Jenkins	WA Water Service
Jeff	Johnson	Regional Water Cooperative of Pierce County
Bowen	Kendrick	PUD #1 of Clallam County
Dana	Larsen	Tacoma Water
John	McClellan	Alderwood Water and Wastewater District
Mike	Means	WA Department of Health

Marshall	Meyer	Lakewood Water District
Brandy	Milroy	Mason County PUD
Kelly	O'Rourke	Seattle Public Utilities
Jeff	Palmer	Hartstene Point Water and Sewer District
Kelsey	Payne	Snoqualmie Indian Tribe
Heather	Pennington	Tacoma Water
Darcey	Peterson	King County Water District 90
Chris	Pettit	WA Department of Health
Doug	Piehl	Thurston PUD
Mike	Poppe	Swinomish Indian Tribal Community
Diane	Pottinger	North City Water District
Zachary	Resch	City of Arlington
John	Roth	Clark Public Utilities
Susan	Saffrey	Seattle Public Utilities
Brian	Sayrs	WA Department of Health
George	Sidhu	Skagit PUD
Deborah	Stephens	Office of the WA State Auditor
Adrian	Sutor	City of Walla Walla
Justine	Taylor	Lummi Tribal Sewer and Water District
John	Weidenfeller	Thurston PUD
Mike	Wolaneck	City of Arlington
Hannah	Yourd	Office of the WA State Auditor
Maggie	Yuse	Seattle Public Utilities
Stefany	Zelepuza	WA Public Utility Districts Association

Appendix B: Geographic Representation of Participating Water Suppliers

Note: This map does not represent the entire coverage area of each water supplier. This map only provides a visual representation of the clusters of water suppliers in which the Center connected. The coverage of many of the water suppliers is larger than the dots signify. The color of dots only changes to help visually distinguish them especially in the areas where they are clustered closely together.



Appendix C: Interview Questions

1. Describe your current role related to municipal water conservation and your familiarity with the state's conservation statute (RCW 70A.125.170).

2. From your perspective, if the water conservation program in Washington state was working as well as possible in 20 years, what would that look like?

3. What is currently working well in municipal water conservation?

4. What is needed to improve the effectiveness of municipal water conservation?

    a. Are there parts of the statute that are difficult to implement or do not adequately address those needs?

5. Are there best practices or innovative conservation strategies you would like to adopt or have observed in other states that could improve water conservation?

6. If you could modify the current statute or regulations, what changes would you make to increase program effectiveness and improve compliance?

7. How do you currently measure water conservation? How do you report on it?

8. What method of tracking water leakage should be standard across the state?

9. What resources do you need to be better equipped to meet the conservation and leakage reduction requirements in accordance with RCW 70A.125.170?

10. What does a single water audit cost?

11. In 2023, the state auditor recommended that the regulation of municipal water conservation be moved from the Department of Health to the Department of Ecology. What are your thoughts about this recommendation?

12. What has worked well in the coordination between DOH and Ecology? How can coordination between the two agencies be improved?

13. Are there things you wanted to share that we didn't ask about?

14. Who else should we talk to?

15. Do you have any questions for us?

Appendix D: Legislative Proviso

broadband coordinator within the Washington State University extension program. This funding will support the salary and benefits of this position.

(46) $353,000 of the workforce education investment account—state appropriation is provided solely for the complex social interactions lab.

(47) $298,000 of the general fund—state appropriation for fiscal year 2025 is provided solely for the William D. Ruckelshaus center, working in collaboration with the departments of health and ecology, to evaluate and recommend actions to increase the effectiveness of the state's municipal water conservation statute at RCW 70A.125.170 and regulation at chapter 246-290 WAC. The center may contract with consultants or organizations with expertise on municipal water conservation programs. Recommendations may be informed by best practices in other states and include: Statutory or regulatory changes to increase program effectiveness, modifying regulatory oversight including whether the responsibility for parts or all of the program should be moved from the department of health to the department of ecology, improving coordination between the departments, identifying sufficient funding to effectively implement the program, including creation of a grant or loan program to assist municipal water systems in program implementation, or other ideas on municipal water use conservation and efficiency strategies.

(a) The center shall invite participation from federally recognized Indian tribes, municipal water systems and organizations, and relevant stakeholders in this evaluation.

(b) The center shall submit a report to the governor and the appropriate committees of the legislature, pursuant to RCW 43.01.036, by June 30, 2025, on work conducted within this subsection and must include:

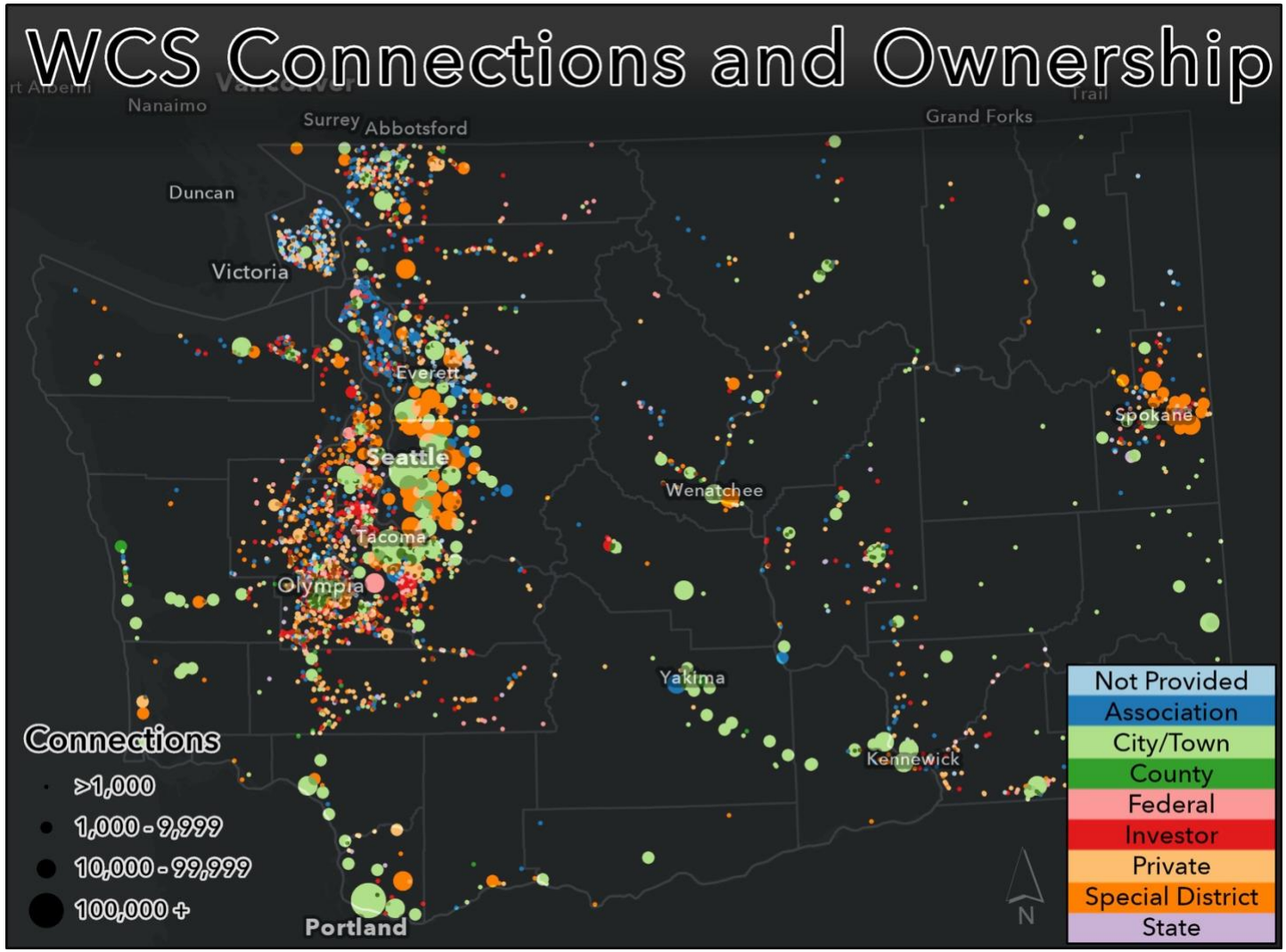
(i) Recommendation for a long-term strategy for program implementation; and

(ii) Estimated costs of ongoing expenses for program implementation, including any costs associated with changes in regulatory oversight of program elements or implementation.

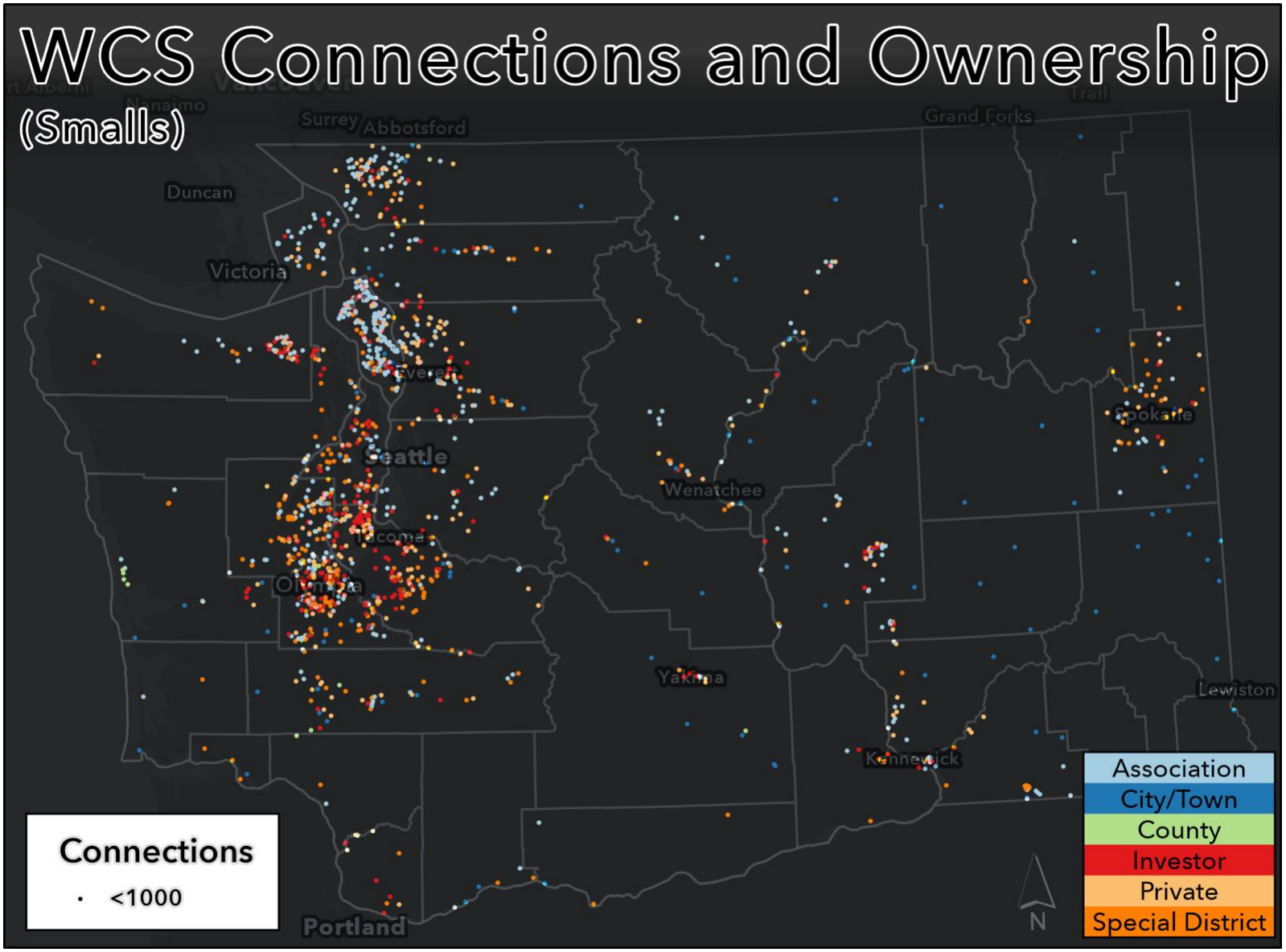
(48)(a) $135,000 of the general fund—state appropriation for fiscal year 2025 is provided solely for a study to investigate housing market conditions in tourism-dependent municipalities. The study must:

Appendix E: Washington State Water Systems Visual

Visual representation of all water systems across the state including their ownership. Provided by DOH.



Visual representation of all small water systems across the state including their ownership. Provided by DOH.



Appendix F: Long-term Water Use Efficiency Progress in Municipal Water Systems in Washington State (2014-2023)

30 June 2025

Jasmine Ortiz, Research Assistant, School of the Environment, Washington State University

Julie Padowski, Associate Professor, School of the Environment, Washington State University

Disclaimer:

The "*Long-term Water Use Efficiency Progress in Municipal Water Systems in Washington State (2014-2023)"* study (the Study) was conducted through contract with the Washington State University School of the Environment and is separate from the "*Situation Assessment of Washington's Municipal Water Efficiency Statute and Regulation*" report (the Situation Assessment). While the two reports are separate entities, the Situation Assessment did use the research and findings from the Study as an additional information sources.

Introduction

Water use efficiency (WUE) has become a cornerstone of sustainable water resource management, particularly in regions such as Washington State, where the availability of water is increasingly limited due to expected changes in climate variability and population growth. In response to this changing water availability, municipal water systems and other water users have been embracing WUE strategies to promote responsible consumption, delay the need for infrastructure expansion, and protect ecological water flows (Gleick, 2003). In 2003, the Washington State legislature passed Engrossed Second Substitute House Bill 1338, also known as the Municipal Water Law, to directly call for municipal water suppliers to use water more efficiently. Since the Department of Health (DOH) is the regulatory agency that works most regularly with municipal water suppliers, DOH was tasked with implementing and tracking progress towards WUE goals for each water supplier under its jurisdiction. As part of this process, each water supplier is required to complete an annual WUE report that details current water loss (as the difference between the volume of water produced and consumed), the number of connections that are metered, and any demand side goals and progress towards those goals. In its current format, these reporting questionnaires request both numerical and narrative responses from the respondents. Reports have been collected annually since 2009 and must be completed by all municipal water systems that serve more than 15 connections that are used year-round by residents for at least 180 days a year, or that regularly serve at least 25 year-round residents (Washington State Department of Health, n.d.-b).

For the past 15 years, approximately 2,000 water providers have been reporting on WUE annually. This time series of data has the potential to offer valuable insights into how efficiency goals and conservation have evolved over time for individual providers, and for municipal water systems as a water use sector. However, to date, DOH has had limited capacity to explore or utilize these data (*William D. Ruckelshaus Center, 2025*). This lack of human and financial resources within DOH for WUE programmatic management and evaluation means that long-term trends in WUE progress have yet to be understood. There remains potential to reveal insights into many factors that influence WUE including the role that institutional (dis)incentives play in motivating WUE progress, how conservation is framed both to water providers and to customers, and the extent to which strategic implementation of goals is effective (Callejas Moncaleano, Pande, & Rietveld, 2021).

To this end, this study explores two years of WUE reporting data, 2014 and 2023, to assess long-term progress towards meeting WUE goals related to leakage, metering, and WUE strategies and progress over a ten-year time period. This assessment provides key insights into progressive efforts towards increasing WUE in municipal water systems in Washington, highlighting both the

diversity of conservation strategies used across water systems, but also the challenges of comparing unstandardized self-reported data across systems and years.

Methods

To examine potential long-term progress towards WUE goals, we requested the full set of water provider responses for the years 2014 and 2023. Each year contains responses from approximately 2,000 water providers and includes information on self-reported leakage, metering coverage, and demand-side goals and progress. The data analyzed in this study were publicly available and were obtained from the Washington State DOH's Office of Drinking Water (Washington State Department of Health, n.d.-a).

Quantitative data was analyzed in Microsoft Excel. Qualitative data was coded using Dedoose, a cloud-based software for mixed-methods research (Dedoose, n.d.). Given the narrative nature of the qualitative data to be analyzed, a hybrid coding approach was employed. Initial codes were developed deductively based on prior literature on institutional goal setting, water conservation strategies, and reporting behaviors (Apio, Thiam, & Dinar, 2024; Callejas Moncaleano et al., 2021). These themes were supplemented by inductive coding as additional patterns emerged during the review of system-level narratives. The coding framework focused on several key analytical categories: the *structure and specificity* of demand-side efficiency goals, the *strategies used* to achieve those goals, the *timesteps used* to measure or evaluate progress, and *how goals were measured* whether through targeted system-level reductions (e.g., distribution leakage) or household-level use (e.g., gallons per capita). A total of 60 codes were generated throughout the process, though only those with substantial recurrence and relevance were used in the final synthesis. To ensure reliability and to illustrate thematic variance, representative quotations were recorded across both the 2014 and 2023 datasets.

Analysis

Results

System Characterization

Between the two reporting years, there were slightly more responses in 2014 (n=2084) than in 2023 (n=1838). Of these, 433 reported in 2014 and only 187 reported in 2023. The remaining 1651 records were common across both sets of years evaluated (representing 79% of systems reporting in 2014 and 90% of systems reporting in 2023). For the water systems that reported in both years (Table 1), we saw that most (n=1513, 92%) reported a moderate increase in the number of connections served (0-5% increase in the number of connections). Only a small number of systems showed no change between the two years assessed (n=137, 8%). One

system reported a large increase in the number of connections served over our study time period (>15% increase in the number of connections).

Table 1. Change in number of connections served between 2014-2023 by water system.

Change in connections	Number of water systems	Percent of water systems
<0%	137	8%
0-5%	1513	92%
5-10%	0	0%
10-15%	0	0%
>15%	1	0%
Total	1651	100%

Metering

One of the requirements for meeting WUE regulations is that water providers must be fully metered by 2017. Of those providers who reported in both years, 1255 (76%) of water systems showed no change in the percent of connections metered, indicating that there was no significant shift in the number of meters being added to the service area during this time. Of those reporting across both years, 187 of these systems reported that their system was less than 50% metered, and 1049 systems reported being 100% metered in both 2014 and in 2023. There were some systems that increased the number of metered connections during the study time period (n=363, 22%). Of these, 315 (19%) increased from not fully metered to 100% metered by 2023, indicating achieving WUE goals from this dimension (Table 2).

Table 2. Changes in the percent of connections metered between 2014 and 2023.

Metering Status	Number of water systems	Percent of water systems
No change from 2014-2023	1255	76%
Remain at <50%	187	11%
Remain at 50-75%	2	0%
Remain at >75%	17	1%
Remain at 100%	1049	64%
Increased from 2014-2023	363	22%
Increased to 100%	315	19%

Leakage

Reducing leakage is another key component of the suite of strategies by which water systems can become more efficient. Evaluating leakage has been problematic in the past for WA municipal water providers in part due to the lack of standardization in what counts as "leakage" and how to measure it. For the WUE annual reports, the percent of water lost (or "unaccounted for water") is determined via a simple difference between the amount of water produced and the amount of water consumed. As a rule of thumb, DOH warns that systems reporting negative, zero, less than 2%, or more than 50% water loss likely have inaccurate leakage values (Washington State Department of Health, 2025), a concern corroborated by studies highlighting the prevalence of unreliable self-reported leakage data in Washington compared to other states (Jernigan, 2015; Washington Department of Health, 2016). Of those systems reporting in both years, 478 (29%) show a percentage of unaccounted for water (UAW) that would be considered by DOH to be inaccurate (reporting either a negative, zero, less than 2% or more than 50% UAW amount). There were 133 systems (8%) that moved from likely accurate reports of UAW (values falling between 2-50% of UAW) to inaccurate reporting values. In contrast, 320 water systems (19%) went from reporting a likely inaccurate UAW value in 2014 to something considered to be more likely to be accurate in 2023. Only 720 systems (44%) reported likely accurate values in both 2014 and 2023 (Table 3).

Table 3. Changes in the accuracy of unaccounted for water reporting in 2014 and 2023.

Status of UAW reports	Number of water systems	Percent of water systems
Likely inaccurate in both years	478	29%

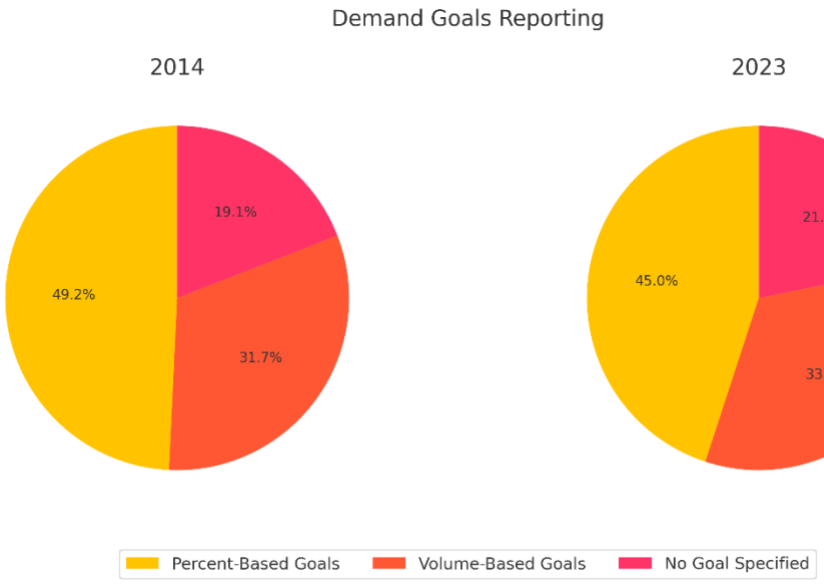
Likely accurate in 2014, inaccurate in 2023	133	8%
Likely inaccurate in 2014, accurate in 2023	320	19%
Likely accurate in 2014 and 2023	720	44%
Total	**1651**	**100%**

Demand Goals and Progress

The comparative analysis between the 2014 and 2023 WUE datasets revealed both quantitative and qualitative shifts in reporting behavior, goal structures, and implementation strategies. A total of 2,051 systems submitted reports that contained a narrative element in 2014, accounting for 98% of total responses that year. In 2023, 1,728 systems provided a narrative response, representing 94% of submissions—a 4% drop in participation.

It's important to note that this analysis does not track the same individual systems over time. Rather, it examines trends in the dataset as a whole, comparing the overall characteristics and reporting behaviors of systems in each respective year. While separate portions of this study may analyze individual-level change, this specific comparison is based on cross-sectional proportions within each year's dataset.

Figure 1. Proportion of water systems reporting demand reduction goal types in 2014 and 2023. Goals are categorized as percent-based, volume-based, or no goal specified.



In both 2014 and 2023, water systems reported demand reduction goals across three primary categories: percent-based, volume-based, and no goal specified (see *Figure 1*). Percent-based

goals framed conservation in relative terms. For example, one system wrote, *"To reduce outdoor water usage by 3% by December 2020."* This approach was the most frequently reported in 2014, cited by 49.2% of systems (1,009 out of 2,051). However, by 2023, the share of percent-based goals had declined to 44.9% (777 out of 1,728), suggesting a modest shift in how systems conceptualize measurable targets.

Volume-based goals, by contrast, used fixed numeric units, such as, *"Our goal is to reduce per person use by 2 gallons per day in 5 years."* These goals increased slightly from 31.6% in 2014 (649 systems) to 33.2% in 2023 (574 systems), reflecting greater use of absolute metrics over time.

The "no goal specified" category represented systems that submitted either blank responses, reports of "undefined goals, or general statements without quantifiable targets. In 2014, this group accounted for 19.1% (391 systems), increasing slightly to 21.8% (377 systems) in 2023. For example, one system explained, *"No goal has been set as there is no way to meter consumption,"* while others described broad strategies such as education or infrastructure improvements without linking them to specific outcomes.

While this analysis does not track individual systems across both reporting periods, it compares the proportion of systems in 2014 and 2023 that reported specific types of goals. Overall, these proportions remained fairly stable. Percent-based goals declined slightly, volume-based goals increased modestly, and nearly one-fifth of systems in both years still failed to define a clear, measurable objective. This consistency suggests ongoing variation in how systems interpret and implement Washington's water use efficiency reporting requirements.

Table 4. Unit of analysis counts and percentages

Unit of Analysis	2014 Count	2014 Percent	2023 Count	2023 Percent
Household (total)	824	40.2%	882	51.0%
└ Per-Capita	212	10.3%	163	9.4%
└ Per Connection	123	6.0%	305	17.7%
└ Household (other)	489	23.8%	414	24.0%
System	403	19.6%	330	19.1%
Not Specified	824	40.2%	516	29.9%
Total	**2,051**	**100%**	**1,728**	**100%**

The data in Table 4 shows a shift in how systems in a given reporting year defined their goals using specific units of analysis. Household-based units—including per capita, per connection, and general household framing—increased from 40.2% in 2014 to 51.0% in 2023. Notably, per connection goals more than doubled, while per capita goals, such as "*to reduce consumption by 10 gallons per capita*," remained consistent. The share of system-wide metrics held steady across both years at around 19%. Meanwhile, the portion of systems each year that did not report any unit of analysis declined by over 10 percentage points, suggesting gradual movement toward more structured and measurable reporting frameworks.

Figure 2. Proportion of water systems reporting demand reduction goal types in 2014 and 2023. Goals are categorized as percent-based, volume-based, or no goal specified.

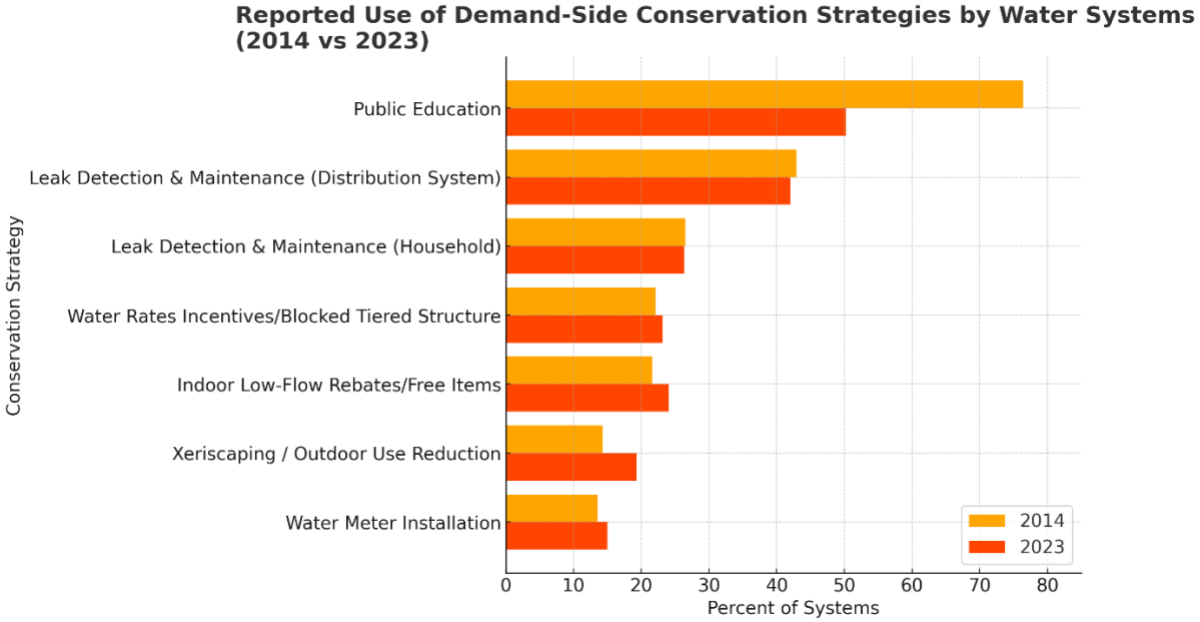


Table 5. Reported Use of Main and Sub-Strategies for Demand-Side Conservation by Water Systems (2014 and 2023)

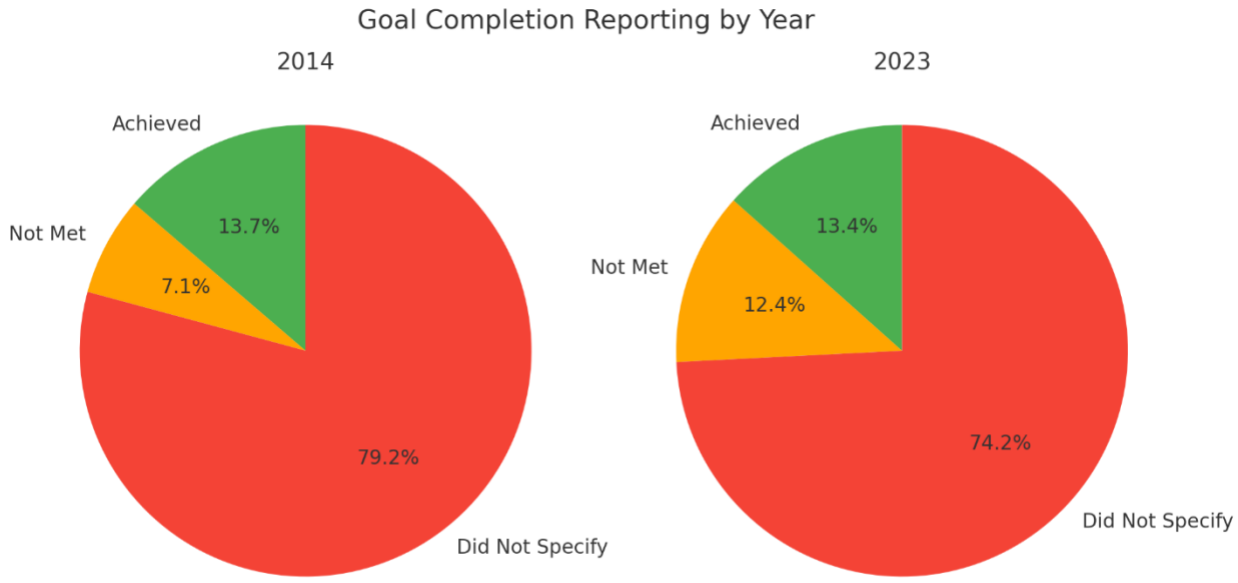
Main Strategy	Sub-Strategy	2014 Count	2014 %	2023 Count	2023 %
Public Education	Provide Customers with Usage History	272	13.3%	137	7.9%
Leak Detection (System)	Infrastructure Maintenance	267	13.0%	135	7.8%
Water Meter Installation	Update Old Meters	171	8.3%	115	6.7%

Figure 2 presents the percentage of water systems in 2014 and 2023 that reported using specific demand-side conservation strategies. Because systems often list multiple approaches to reach their goals, the categories are not mutually exclusive. Many utilities provided responses referencing several strategies within a single goal description. For instance, one noted: "*Customer education is accomplished with the annual Consumer Confidence Report. Members are encouraged to use separate irrigation water systems for outdoor watering rather than domestic water. A tiered billing structure has been implemented, resulting in substantial decreases in water usage.*" This single response was classified in multiple ways; under public education, xeriscaping/outdoor use reduction, and water rates incentives.

In both years, public education was the most frequently reported conservation strategy, cited by 76.4% of systems in 2014 and 50.3% in 2023. Leak detection and maintenance in the distribution system was the second most common, with relatively stable reporting rates, 42.9% in 2014 and 42.0% in 2023. Other commonly mentioned strategies across both years included leak detection at the household level, water rates incentives, and indoor low-flow rebates/free items.

While many of the most popular strategies remained consistent over the years, some shifts were evident. Systems were more likely to mention indoor low-flow rebates and xeriscaping/outdoor use reduction in 2023 than in 2014, suggesting modest growth in adoption of those approaches. In contrast, water meter installation appeared in a similar proportion of systems both years, while public education saw the sharpest decline in reported use.

Figure 3. Proportion of systems reporting achieved, not met, or unspecified water use efficiency goals in 2014 and 2023.



Across both datasets, a key area of focus was whether systems explicitly reported the outcome of their water use efficiency goals. Specifically, whether goals were achieved, not met, or left unspecified. In 2014, a majority of systems fell into the "did not specify" category, with only a small proportion clearly stating whether their goals had been met or not. While 13.7% of systems indicated that they achieved their goals and 7.1% reported they did not meet them, 79.2% offered no clear outcome assessment. In 2023, the trend shifted slightly: a larger share of systems acknowledged falling short of their goals (12.4%), and nearly the same proportion (13.4%) reported successful achievement. However, a substantial number of systems, 74.2%, still did not specify an outcome. Many of these systems described general strategies or provided consumption data without linking them back to goal performance. The persistence of vague or incomplete reporting across both years points to a broader disconnect between goal setting and evaluative follow-up in the narrative components of water use efficiency reporting.

Timesteps varied across both 2014 and 2023, with multi-year planning—often framed as six-year targets—emerging as the most common structure. In 2014, 85.8% of systems that reported a goal used multi-year timelines, compared to 74.5% in 2023. The use of yearly timeframes increased modestly from 5.9% to 11.4%, and daily tracking rose from 7.8% to 13.5%, indicating a shift toward more granular monitoring and evaluation. Some systems provided detailed multi-year data to support long-term progress assessment. One utility reported, *"Annual average water use per single family residence (ERU) has changed as follows: 2015 – 232 gpd… 2023 – 297 gpd."* Others focused on more immediate, quantitative targets,

such as the goal to *"Reduce average daily demand by 5 gallons per connection."* These examples demonstrate variability in how water systems define the timeframe and scale of their goals.

Discussion

The findings from this analysis reveal a broad diversity of ways in which Washington water systems report goals, assess outcomes, and describe conservation strategies. Despite some movement toward more structured reporting between 2014 and 2023, a diversity of responses between systems and across years remains a defining feature across these datasets. While the total number of systems submitting narrative components decreased slightly, from 2,051 in 2014 to 1,728 in 2023, the data reflect only marginal changes in how goals are structured and described.

One key area for consideration is the amount of unanalyzable data that exists in these datasets. For example, a large portion of systems failed to identify a quantifiable reduction target. Although volume-based goals saw slight growth in 2023, nearly one in five systems still provided no numerical target at all. These entries often included generalized statements—such as intentions to install meters, promote education, or maintain infrastructure—but without tying those strategies to specific performance benchmarks it is difficult to see how these systems will reduce water consumption and be held accountable to reach these goals. This trend suggests ongoing confusion about regulatory expectations or a continued emphasis on effort-based rather than outcome-based compliance (EPA, 2018). In other words, many systems appear to interpret the Water Use Efficiency (WUE) reporting requirements as a call to describe activities and intentions, such as increasing public education or replacing infrastructure rather than tangible goals of consumption reduction.

The reported units of analysis further highlight this variation. While household-based framing (per capita, per connection, or general household use) became more common in 2023, system-wide metrics remained static, and nearly 30% of systems in 2014 still failed to specify any unit. This makes the comparability of goals across systems and years difficult and poses challenges for statewide planning and evaluation. The increase in household-specific framing may reflect broader shifts in conservation discourse, where personal and per-household behavior is increasingly emphasized (Chappells & Shove, 2005).

Program strategy reporting offers another window into how systems understand and implement WUE planning. Public education remained the most cited approach, but the sharp decline in systems mentioning public education in 2023, alongside modest increases in more tangible

efforts like indoor rebates and xeriscaping, suggests a potential shift in priorities, constraints on outreach capacity, or a disinclination to report about activities that continue over multiple years. At the same time, the number of systems reporting strategies like leak detection and tiered rate structures remained consistent across time, reinforcing their centrality to municipal conservation. The use of sub-strategies, such as providing billing history or updating old meters, also underscores that many systems are adopting, at least in part, more targeted operational methods. However, the low overall frequency of such strategies (Table 5) indicates that capacity and resources may still limit broader implementation (Ingram et al., 2013).

Notably, the vast majority of systems across both datasets did not indicate whether their goals were met. This gap in evaluative reporting points to a disconnect between planning and performance measurement. While the proportion of systems explicitly stating "not met" outcomes increased slightly in 2023, most systems continued to omit progress updates or provide only raw consumption data without interpretation. As prior studies have shown, the lack of follow-through in water conservation programs is often tied to reporting fatigue, limited enforcement, or insufficient feedback mechanisms (Gleick, 2003; EPA, 2018).

The increase in utilities referencing multi-year plans, combined with expanded descriptions of technical interventions (e.g., enhanced monitoring, leak audits), suggests that institutional learning is occurring; however, and is consistent with the literature on performance management and adaptive governance (Apio, Thiam, & Dinar, 2024; Pahl-Wostl, 2009). At the same time, the decline in participation, 323 fewer systems reporting in 2023, may indicate a growing administrative burden, a lack of regulatory response for non-compliance, or shifting priorities within water systems. This warrants further investigation to determine whether reporting lapses stem from disengagement, structural barriers, or system closures and consolidations.

In summary, while specific trends, such as increased use of multi-year planning and greater incorporation of technical conservation strategies, reflect institutional progress over the time period studied, other findings, like reduced participation rates and more frequent omission of clearly defined goals, highlight problematic areas of data collection in the current reporting system that might be occurring more broadly over annually reported datasets. A central recommendation emerging from this analysis is the development of a standardized reporting framework that explicitly prompts utilities to define measurable goals, identify timeframes, and report on outcomes. Equally important is the role of regulatory oversight: without consistent review and feedback from the Washington State Department of Health (DOH), reporting risks becoming a procedural formality rather than a tool for accountability and improvement. Strengthening agency engagement in reviewing submissions could improve data quality and reinforce expectations for outcome-based compliance. A more structured framework would

also support comparability across systems and years, enhancing the potential of the WUE dataset as a monitoring tool. Future research could further explore how system size, ownership type, or resource capacity shapes reporting behaviors over time, providing additional insight into how to support diverse systems in meeting conservation expectations.

Conclusion

This study demonstrates that narrative WUE reports, though often underutilized, offer critical insights into the evolving strategies and priorities of water systems across Washington State. The comparison between 2014 and 2023 indicates a modest shift toward more structured goal setting, with increased use of specific timeframes, unit-based metrics, and technical conservation strategies. Yet, the persistence of vague or incomplete reporting, particularly the frequent omission of goal outcomes, underscores ongoing challenges in clarity, consistency, and regulatory alignment. These inconsistencies suggest that many systems continue to approach WUE reporting as formality rather than a tool for evaluating measurable outcomes. As climate change and population growth place mounting pressure on municipal water supplies, the importance of transparent, standardized, and comparable reporting cannot be overstated. A more robust narrative reporting framework, backed by consistent review from regulatory agencies such as the DOH, would strengthen the utility of these datasets and support more adaptive, data-informed water governance statewide.

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