

Section 4

Water Use Efficiency

4.1 Introduction

The State of Washington Department of Health (DOH) revised water conservation planning requirements as a result of the 2003 Municipal Water Law. An outgrowth of that law is the Water Use Efficiency Rule (Rule), which was finalized in January 2007. The WUE Rules have since been updated. Per statutory requirements the PUD adopted its original Water Use Efficiency Plan in January 2008. As required by the Rule the PUD must update this plan every six years during the update of its Water System Plan (WSP). The WUE was updated in conjunction with the 2012 Water System Plan update.

4.1.1 Water Use Efficiency Goals and Measures

The goals of a conservation program should reflect the drivers of why a utility is pursuing conservation. Conservation drivers can include meeting regulatory requirements, minimizing impacts on water resources, decreasing operating costs, deferring capital improvements, and obtaining new supply. The conservation driver(s) applicable to any one utility depend on that utilities' specific supply situation and cost structures.

The PUD's conservation program is driven by the desire to reduce system leakage both in the PUD's distribution system and the customer's water system, to reduce operating costs, to educate and provide opportunities for customers to reduce their water consumption, and to meet regulatory requirements. It should be noted that the PUD will continue to monitor source meters, service meters, perform system leak detection and repair, and address the capital improvement projects listed in its current WSP.

4.1.1.1 Supply-Side Measures

The PUD Supply-Side conservation program consists of the two measures listed below.

4.1.1.1.1 Distribution System Leakage of 10 Percent or Less of Production

It is the goal of the PUD to perform annual leak detection surveys and to repair leaking distribution mains in a timely manner. This will ensure that the water system leakage remains below 10 percent of production. Since 2012 the PUD has replaced 42,240 feet of steel main, a source of major leaks in the system. The 2016 distribution system leakage was 6.2 percent and the 6-year average was 6.6 percent. The rolling three-year average from 2014-2016 is 6.8 percent. Assuming this stays relatively consistent; the PUD will continue to meet the standard of 10 percent or less of production goal.

4.1.1.1.2 Replace Customer Service Meters and Source Production Meters

The PUD initiated an Automated Meter Reading (AMR) program in 2004 which provides for the replacement and/or retrofitting of inaccurate and outdated meters with new electronic meters that can be read with an automated meter reading device. The AMR customer meter replacement/retrofit program was completed by 2012. In addition, the PUD replaced all propeller driven source production meters with more accurate magnetic meters. Replacing both service and source meters has ensured accurate readings and allows for better analysis of water loss. Accurate meters result in quicker repair of system and customer service leaks. Accurate customer meter readings should also encourage customer conservation.

4.1.1.2 Demand-Side Measures

The PUD conservation program for 2018-2023 will consist of the six measures listed below. These measures have been selected due to a combination of factors including applicability to the PUD service area, customer acceptance, cost effectiveness, and/or savings potential. Descriptions of each measure are discussed below.

4.1.1.2.1 Billing Statements Showing Consumptive History

The PUD will continue to show consumptive history on customer billing statements. Customer bills providing historical consumption data allow customers to understand how their use varies throughout the year and from year-to-year. This information helps customers make informed choices about how they manage their water use, including implementing conservation. PUD customer bills have included historical consumption data since the early 1990s. The bills have shown customer consumption for the same period from the previous year. Customer billing statements also include a graph showing water use for the previous 12 months.

4.1.1.2.2 Customer Education

The PUD will continue to provide conservation information and tips on its website, in its customer handbook, customer brochures, and on customer bills. The PUD will continue to provide and make available to students and teachers water and water conservation education programs. Education includes sponsoring and providing programs such as Xeriscape landscaping practices and irrigation efficiency.

4.1.1.2.3 Free Toilet Leak Detection Dye Tablets

This measure provides free toilet leak detection dye tablets for customers to determine if their toilets leak and provides detailed information on how to fix leaks. This measure applies to single family and multifamily sectors, both existing and new customers, as well as to businesses with tank-style toilets. Only tank-style toilets are targeted since most leaks occur in that type of toilet, usually via flapper leaks.

4.1.1.2.4 Free Bathroom Faucet Aerators

This measure provides free bathroom faucet aerators for residential customers to replace less efficient aerators. The aerators will be 1.0 gpm, which is more efficient than the maximum 2.5 gpm allowed under the plumbing code for residential sectors. The target audience includes both existing and new customers.

4.1.1.2.5 Free Showerheads

This measure provides free low-flow showerheads to residential customers. The main flow rate on the showerheads is 2.0 gpm, which is more efficient than the maximum 2.5 gpm allowed under the plumbing code. The showerheads also have a built in “soap & shave valve”, which is a button that can be pressed to reduce the flow rate to 1.0 gpm while soaping up or shaving, which do not require the full stream of water. The target audience is single family and multifamily sectors, both existing and new customers.

4.1.1.2.6 Irrigation Efficiencies and Landscape Management

The PUD will partner with local colleges and university extension offices to provide customer education regarding irrigation efficiencies and landscape management. The PUD will utilize staff at the colleges and extension offices to provide expert advice and services in developing programs that promote irrigation and water use efficiencies. The PUD will also partner with other agencies such as the Bonneville Power Administration, DOH, Ecology, and the local watershed conservation groups to help secure funding to assist the PUD and its customers in changing irrigation equipment and practices. The PUD has applied irrigation efficiencies and landscape management at its own facilities to reduce water use and promote drought tolerant landscaping.

4.1.1.2.7 Estimated Savings through Measure Implementation – Proposed WUE Budget

The estimated savings and direct costs of the conservation program are shown in **Table 4-1**. At full program implementation, at the end of 2023, the program is estimated to save 40,000 gallons per day (gpd). The program has a total budget over the 6-year planning period of approximately \$30,000, which is an average annual cost of approximately \$5,000. The program will be funded through rates. The savings achieved by the program, and the corresponding progress towards reaching the PUD goal of saving 40,000 gpd by the end of 2023, will be estimated by tracking the number of devices and rebates distributed and multiplying them by their per-unit savings. In addition, the cost of energy savings due to reduced water production will be calculated using the following formula: Water production per kilowatt hour (333 gal/kW) times the cost of electricity per kilowatt hour = energy savings.

Table 4-1
Savings and Direct Costs Summary

Measure	Sectors ¹			Quantity of Devices ²		Savings (at full implementation)		Direct Costs		
	SF	MF	C	Total	Average Annual	GPD	% of Total	Total Over Plan Period	Average Annual	% of Total
1. Bills Showing Consumptive History	X	X	X	n/a		Not Quantified		\$0	\$0	0%
2. Customer Education	X	X	X	n/a		Not Quantified		\$5,000	\$1,000	17%
3. Free Toilet Leak Detection Dye Tablets	X	X	X	17,500	3,500	9,100	23%	\$10,000	\$2,000	33%
4. Free Bathroom Faucet Aerators	X	X		3,500	700	10,100	25%	\$5,000	\$1,000	17%
5. Free Showerheads	X	X		3,500	700	8,500	21%	\$5,000	\$1,000	17%
6. Irrigation Efficiencies Landscape Management	X	X	X	n/a		12,300	31%	\$5,000	\$1,000	16%
Total						40,000	100%	\$30,000	\$5,000	100%

Notes:

- SF = single family. MF = multifamily. C = commercial.
- The number of devices is higher than the number of participants since each participant has more than one fixture and the program assumes participants upgrade all their fixtures.

4.1.2 Impact on Demand Forecast

The conservation program will be implemented over the 6-year planning period from 2018-2023. The PUD demand will be reduced by the expected savings from the conservation program. The cumulative annual savings, as well as their relationship to the demand forecast, are provided in **Table 4-2**.

Table 4-2
Savings Schedule and Impact on Demand

Year	Cumulative Annual Savings (gpd)	Projected Demand Without Conservation (ADD gpd)	Savings as % of Demand with Conservation
2018	27,500	4,570,000	0.60%
2019	31,000	4,610,000	0.67%
2020	34,000	4,650,000	0.73%
2021	36,000	4,690,000	0.77%
2022	38,000	4,720,000	0.81%
2023	40,000	4,760,000	0.84%

Tables 4-3 and 4-4 represent the forecasted average day demand (ADD) for the PUD for a 20-year period and the forecasted average day demand after implementation of the PUD’s WUE program.

Table 4-3
Forecasted Water Demand

Year	Customers	ADD (mgd)
2018	7,229	4.57
2019	7,293	4.61
2020	7,357	4.65
2021	7,415	4.69
2022	7,474	4.72
2023	7,533	4.76
2024	7,593	4.80
2025	7,693	4.84
2026	7,653	4.87
2027	7,711	4.91
2028	7,770	4.95
2029	7,829	4.99
2030	7,889	5.02
2031	7,949	5.06
2032	8,010	5.10
2033	8,071	5.14
2034	8,132	5.18
2035	8,194	5.22
2036	8,257	5.26
2037	8,319	5.30
2038	8,383	5.34

Table 4-4
Forecasted Water Demand with WUE

Year	Customers	ADD (mgd)
2018	7,229	4.54
2019	7,293	4.58
2020	7,357	4.62
2021	7,415	4.65
2022	7,474	4.68
2023	7,533	4.72
2024	7,593	4.76
2025	7,693	4.80
2026	7,653	4.83
2027	7,711	4.87
2028	7,770	4.91
2029	7,829	4.95
2030	7,889	4.98
2031	7,949	5.02
2032	8,010	5.06
2033	8,071	5.10
2034	8,132	5.14
2035	8,194	5.18
2036	8,257	5.22
2037	8,319	5.26
2038	8,383	5.30

4.1.3 Water Use Efficiency Program Effectiveness

To address the effectiveness of its Water Use Efficiency Program, the PUD will continue to compare production versus consumption to determine water loss and will look at annual production and compare it against customer usage per year, per month, and per day. Funds will be spent on those goals and measures that represent the highest return or most water savings for each dollar spent.

4.1.4 Current and Past Conservation Activities

The PUD has demonstrated a very low distribution system leakage of 6.6 percent on average over the past 6 years. This is an indication of the excellent overall integrity of the water distribution system. Since adopting its initial Water Use Efficiency Plan in January 2008 the PUD has been actively pursuing its supply-side and demand-side goals. **Figures 4-1** and **4-2** show historical water loss and historical water loss compared with water demand or production.

Figure 4-1
Historical Distribution System Leakage (1973-2016)

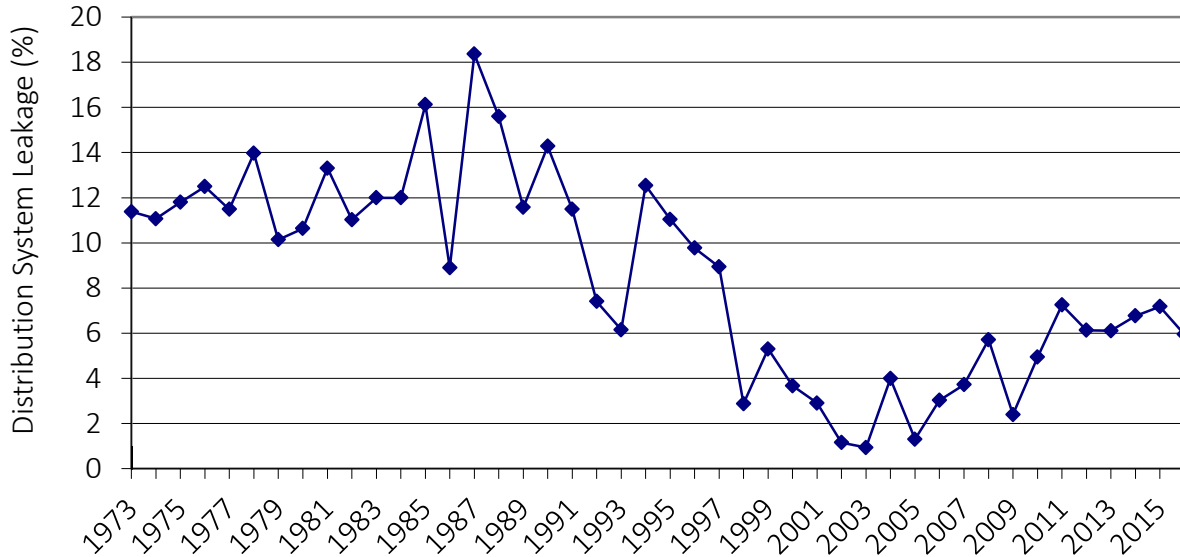
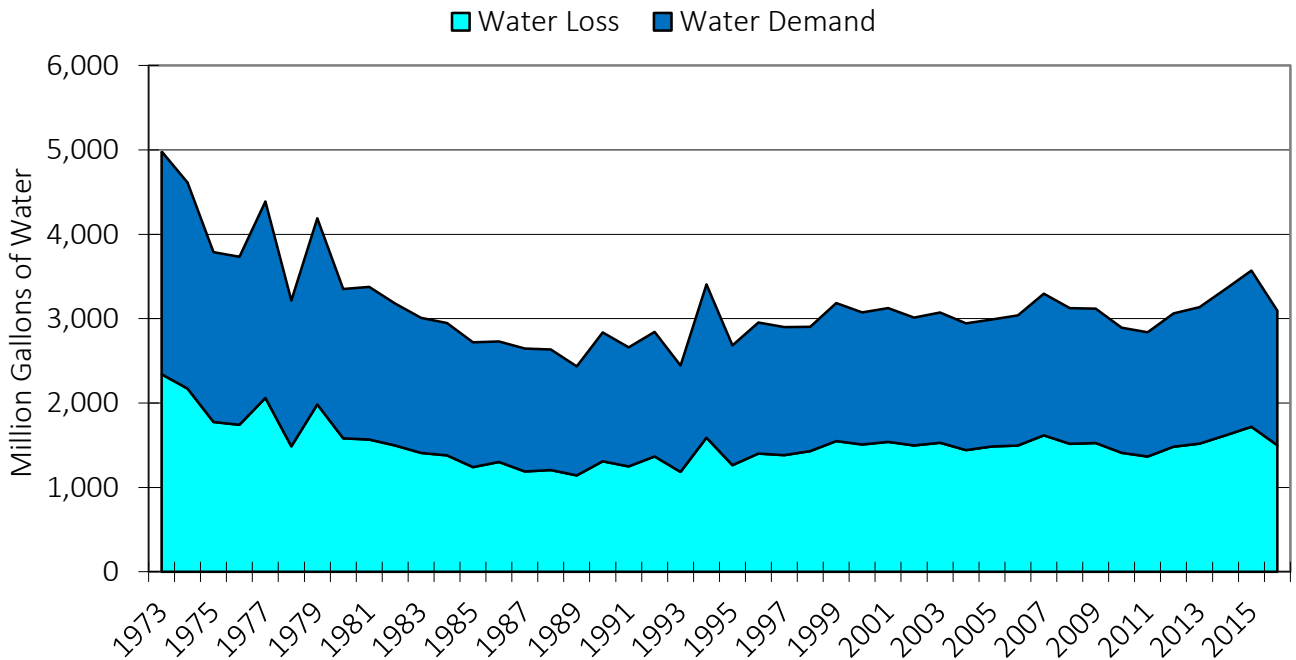


Figure 4-2
Historical Distribution System Leakage and Water Demand (1973-2016)



The PUD uses other methods to promote water conservation such as school outreach, billing showing consumption history, leak detection and meter installation. The PUD historical and ongoing conservation activities are summarized by category in **Table 4-5**.

Table 4-5 - Water Conservation Measures Implemented to Date

Measure	DOH Required or Recommended	Description of Activities	Year Implemented
Public Education			
School Outreach	N/A	Provide videos, pamphlets and teaching materials to local schools	2003
Program Promotion	Required	Distribution of brochures, customer newsletter	1988
Technical Assistance			
Bill Showing Consumption History	Recommended	Customer’s water consumption record provided on water bill	1988
System Measures			
Source Meters	Required	Installation of source meters on all water supply wells	Various
Service Meters	Required	Installation of service meters (all accounts are currently metered)	Ongoing
Non-Revenue Water/Leak Detection	Recommended	Repairing broken meters, identifying and repairing leaks	Ongoing
Incentives/Other Measures			
Conservation Pricing	Recommended	Replace declining block rate structure with uniform rate structure	1994

4.1.5 Conservation Pricing

Rates can be used to encourage conservation by customers. Rates typically consist of a fixed charge and a variable charge. There are four basic rate structures for the variable charge: uniform, declining block, increasing block and seasonal. Both increasing blocks and seasonal rates are considered conservation pricing. Increasing blocks charge more per unit of consumption with additional consumption. Seasonal rates charge more per unit of consumption during the peak season.

The PUD has a uniform rate (same charge per unit of water used). In 1994, the PUD moved from a declining block rate (the more you use the less you pay) to a uniform rate. The change resulted in a decrease in water use by 5 percent of customers – those who use the most water. Since 1994 the PUD Board of Commissioners has raised the monthly minimum charge (fixed charge) and the uniform consumptive rate several times. The primary driver behind the rate increases was to meet increased costs and capital improvement needs.

Through setting Water Use Efficiency – Conservation Goals the PUD evaluated the feasibility of adopting and implementing a conservation rate structure. The PUD evaluated implementing a seasonal conservation rate (the charge per unit increases during peak usage season; generally

targeting outdoor summer use). Peak season for the PUD is a 5-month period from June 1st through October 31st of each year.

For each class of customer, residential, multi-family, and commercial, those customers using over 500 cubic feet or 3,740 gpd would be subject to the increased seasonal rate charge. Based upon water use in 2016, the seasonal conservation rate would affect 358 residential customers, 34 multi-family customers, and 58 commercial customers. A total of 450 customers out of the nearly 7,200 customers would be subject to the conservation rate. After discussion of the conservation pricing, the PUD Board of Commissioners has chosen to not introduce a conservation rate at this time.

4.1.6 Water Reclamation Opportunities Evaluation

The PUD previously completed an evaluation of water reclamation opportunities. The feasibility of developing reclamation opportunities is limited by several factors. Once water produced by the PUD reaches and is processed by the City of Clarkston Wastewater Treatment Plant it becomes the property of the City. The PUD and the City have not met to discuss reclamation opportunities.

The location of the Treatment Plant in relation to entities evaluated and potential uses is a limiting factor. In order to get reclaimed water to the potential users, many miles of piping and appurtenances would need to be constructed. A project of this size would be cost prohibitive and would increase the price beyond the current PUD water rates.

4.1.7 Conservation Requirements and Compliance Summary

The conservation planning requirements that must be addressed in water system plans are contained in the DOH guidance documents and State law. The DOH revised water conservation planning requirements as a result of the 2003 Municipal Water Law. An outgrowth of that law is the Water Use Efficiency Rule (Rule), which was finalized in January 2007. The Rule has several requirements and corresponding compliance dates. Some of the requirements are associated with water system plans, while other requirements are independent of the 6-year water system planning cycle.

Table 4-6 lists the requirements of the Rule and shows that the PUD is currently in compliance, with conservation and water use efficiency requirements. There are seven main categories of requirements:

1. Meters
2. Data Collection
3. Distribution System Leakage
4. Goals
5. Efficiency Program
6. Demand Forecast
7. Performance Reports

Table 4-6
Compliance with Water Use Efficiency Rule Requirements

Category	WAC Section	Compliance Date	New Requirement	PUD in Compliance?
1. Meters	246-290-496	Fully metered by January 22, 2017. Submit metering plan by July 1, 2008.	1. Meter all sources.	Yes, all seven wells are metered.
			2. Meter all service connections.	Yes, all service connections are metered.
			3. For systems not fully metered: Create meter installation plan, perform activities to minimize leakage until fully metered, and report annually on installation and leak minimization actions.	N/A, since PUD is fully metered.
2. Data Collection	246-290-100	WSPs submitted after January 22, 2008.	1. Provide monthly and annual production/purchase numbers for each source.	Yes, tracked monthly and accounted for in 2018 Water System Plan.
			2. Provide annual consumption by customer class.	Yes, tracked monthly and accounted for in 2018 Water System Plan.
			3. Provide "seasonal variations" consumption by customer class.	Yes, tracked monthly and accounted for in 2018 Water System Plan.
			4. Provide annual quantity supplied to other public water systems.	Yes, water supplied to other public waters systems is quantified.
			5. Evaluate reclaimed water opportunities.	Yes, evaluated in 2012 Water System Plan.
			6. Consider water use efficiency rate structure.	Yes, conservation rates have been evaluated. Rates were changed from a declining block to a uniform rate.
3. Distribution System Leakage	246-290-820	First report completed by July 1, 2008. First compliance determination made by July 1, 2010.	1. Calculate annual volume and percent using formula defined in the Rule.	Yes, 2016 distribution system leakage was 6.2% and the 3-year average was 6.8%. Assuming this stays relatively constant, the PUD will meet the 10% or less threshold. The leakage information is reported along with the annual Customer Confidence Report (CCR), which is distributed to all customers.
			2. Report annually: annual leakage volume, annual leakage percent, and, for systems not fully metered, meter installation progress and leak minimization activities.	
			3. Develop water loss control action plan (if leakage is over 10% for 3 year average).	

Category	WAC Section	Compliance Date	New Requirement	PUD in Compliance?
4. Goals	246-290-830	Goals established by January 22, 2008.	1. Establish measurable (in terms of water production or usage) conservation goals and re-establish every 6 yrs. Provide schedule for achieving goals.	Yes, Initial WUE adopted before January 22, 2008.
			2. Use a public process to establish the goals.	
			3. Report annually on progress.	Yes, the goals information is reported with the annual Water Use Efficiency Reports, which is available to all customers.
5. Efficiency Program	246-290-810	WSPs submitted after January 22, 2008.	1. Describe existing conservation program.	Yes, current conservation program described in 2012 Water System Plan and summarized in this report.
			2. Estimate water saved over last 6 years due to conservation program.	Yes, PUD has tracked estimated conservation savings. The PUD has tracked the decrease in water loss due to distribution line repairs.
			3. Describe conservation goals.	Yes, see section titled "...Proposed Water Conservation Goals..."
			4. Evaluate and implement 1-12 measures, depending on size. (6 measures for PUD)	Yes, PUD is required to evaluate and implement 6 measures. The PUD has proposed to evaluate and implement 8 measures.
			5. Describe conservation programs for next 6 years including schedule, budget, and funding mechanism.	Yes, see section titled "...Proposed Water Conservation Goals and Measures"
			6. Describe how customers will be educated on efficiency practices.	
			7. Estimate projected water savings from selected measures.	
			8. Describe how efficiency program will be evaluated for effectiveness.	
			9. Estimated leakage from transmission lines (if not included in distribution system leakage).	Yes, PUD has emergency interties with the Port of Wilma in Whitman County and with the City of Asotin. No water has been used through the City of Asotin line and very little has been used through the Port of Wilma line.

Category	WAC Section	Compliance Date	New Requirement	PUD in Compliance?
6. Demand Forecast	246-290-100	WSPs submitted after January 22, 2008.	1. Provide demand forecast reflecting no additional conservation.	Yes, provided in 2018 Water System Plan and detailed in this report.
			2. Provide demand forecast reflecting savings from efficiency program.	
			3. Provide demand forecast reflecting all "cost effective" evaluated measures.	N/A, since PUD is implementing more than the required minimum number of measures (6), this forecast is not required.
7. Performance Reports	246-290-840	First report completed by July 1, 2008.	1. Develop annual report including: goals and progress towards meeting them, total annual production, annual leakage volume and percent, and, for systems not fully metered, status of meter installation and actions taken to minimize leakage.	Yes, the goals information is reported with the annual Water Use Efficiency Report, which is available to all customers.
			2. Submit annually by July 1 to the DOH and customers and make available to the public.	