

WATER USE EFFICIENCY PROGRAM

The following describes the City's current water use efficiency (WUE) goals, current and future water conservation measures, and potential water savings from the City's WUE program.

Past and Present Programs

The City's past conservation program set a goal in 2009 to reduce water use by 2 percent by the year 2013. The City implemented several efficiency measures to meet these goals, which are described below.

Unmetered Use Estimates

The City has estimated unmetered water use since 1993. In 2016, the Water Division estimated unmetered use at approximately 15 million gallons (MG). This figure includes individual measurements or estimates in the following categories: metered hydrant usage, hydrant operations, leak detection and adjustments, main flushing, blow-offs, street cleaning, and fire system testing.

Leak Detection

Since 1996, the City has contracted for five days of leak detection services per year. Beginning in 2010, the City has also conducted 10 days of in-house leak detection efforts per year. Each year, this has allowed for testing of approximately 10 percent of the distribution system. Since 1996, an estimated total of over 420 MG in leaks has been detected and repaired as a result of these surveys. Table 1 summarizes the results of the City's leak detection program.

Table 1
Distribution System Leak Detection Survey Results

Year	Miles Surveyed	Leaks Found	Estimated Savings (MG/yr)
1996-2009	Unknown	Unknown	340.6
2010	47.8	21	30.7
2011	54.1	10	12.2
2012	75.2	16	16.8
2013	71.5	18	6.1
2014	63.4	16	7.3
2015	37.2	6	0.8
2016	50.2	5	2.3
2017	57.3	16	6.5
Total	456.7	108	82.7

The City purchased a sonic leak detector to improve these leak detection efforts. The City uses the detector to locate the general area of leaks so that when the leak detection contractor arrives, they can concentrate on pinpointing the exact location rather than looking system-wide.

Program Promotion and Customer Education

Water conservation brochures are available to the public at the City's Water Utility billing and permit counters. The City's annual water quality report provides water conservation tips. The City also provides water conservation information on its website at www.ci.puyallup.wa.us.

Construction Requirements

The City building code requires new construction to install low flow toilets and showerheads. Low flow toilet tanks are rated at 1.6 gallons and showerheads are rated at 2.5 gallons per minute. These requirements apply to both residential and commercial construction.

Customer Leak Detection

When a customer's usage changes by more than 10 percent from the previous year, the utility notifies customers of possible leaks on the residential side of the meter. The utility offers a billing adjustment when the customer provides proof of repair to the billing department.

Bills Showing Consumption History

Beginning December 2003, the City's water bills began showing water consumption history. By allowing customers to track and compare their usage, they can monitor their water use more closely, increasing conservation and also awareness of potential leaks.

Irrigation Management

The City's Parks Department operates a computerized irrigation control system for 30 acres of City parks. Flow meters, master valves, and radio telemetry units have been installed for irrigation system control. The City has also recently purchased an evapotranspiration monitor that has been integrated into the system.

Landscape Management

The Planning Department promotes landscaping with native vegetation, which generally needs less irrigation than non-native species, and Puyallup Municipal Code section 19.12.070 requires native vegetation to be planted in new developments.

Conservation Rate Structure

The City instituted an inclining block structure for single family residents in 1999. The rates are structured such that customers are billed a service charge which covers 2 months and are charged an increasing amount per ccf (hundred cubic feet) of water as usage increases.

The City also bills customers for sewer services based on water use. Commercial customers have different fees based on what type of business or industry they are. By billing customers for sewer in direct proportion to water use, customers have a greater incentive to conserve water since they can save money on both utility bills.

Effects of Past Measures

Since the City developed its 2009 conservation plan, there has been a notable reduction in customer water use. The average ERU¹ value decreased from 187 gallons per day per ERU (gpd/ERU) to 172 gpd/ERU between 2009 and 2016. This reduction represents an 8 percent decrease over a 6-year period, or approximately 2.5 gpd /ERU per year.

**Table 2
Effects of Past WUE Plan**

	2010	2011	2012	2013	2014	2015	2016
ERU Value (gpd/ERU)	175	174	174	181	177	184	172
Goal ERU Value (gpd/ERU)	185	183	181	179	177	175	173
Water Saved (MG)	74	80	80	98	62	18	92
Total Water Saved (MG)							505

The City set a goal to decrease the per-ERU water use by 2 gpd/ERU annually, between 2009 and 2016. The goal was met each year (with the exception of 2015, which was a dry year) and has resulted in a savings of nearly 505 MG total since 2009. Due to the gains realized, the City plans to continue implementing most of the current measures as part of the updated Water Use Efficiency Program.

¹ Equivalent Residential Unit – approximately equal to the average water consumption of a single-family residence

DISTRIBUTION SYSTEM LEAKAGE

The WUE Rule requires that water distribution systems have a leakage rate of less than 10 percent of finished water production based on a 3-year rolling average. Distribution system leakage (DSL) is defined as the difference between total water produced or purchased from another purveyor and all water sold through meters or otherwise utilized in an authorized manner. Known or credibly estimated authorized use of water can be excluded from the leakage calculation and may include uses such as construction, firefighting, and flushing.

Distribution system leakage for the City equals the difference between the total production measured at each source and intertie and the volume measured at the customers' meters and all credible estimates of unmetered use. Since 2010, distribution system leakage has ranged from 104 to 232 MG per year, or 8 percent to 17.6 percent of total treated supply. Figure 1 provides annual data of distribution system leakage from 2010 to 2016. The City's 3-year rolling average in 2016 was 9.9 percent, which meets the 10 percent DSL requirement set forth in the WUE Rule.

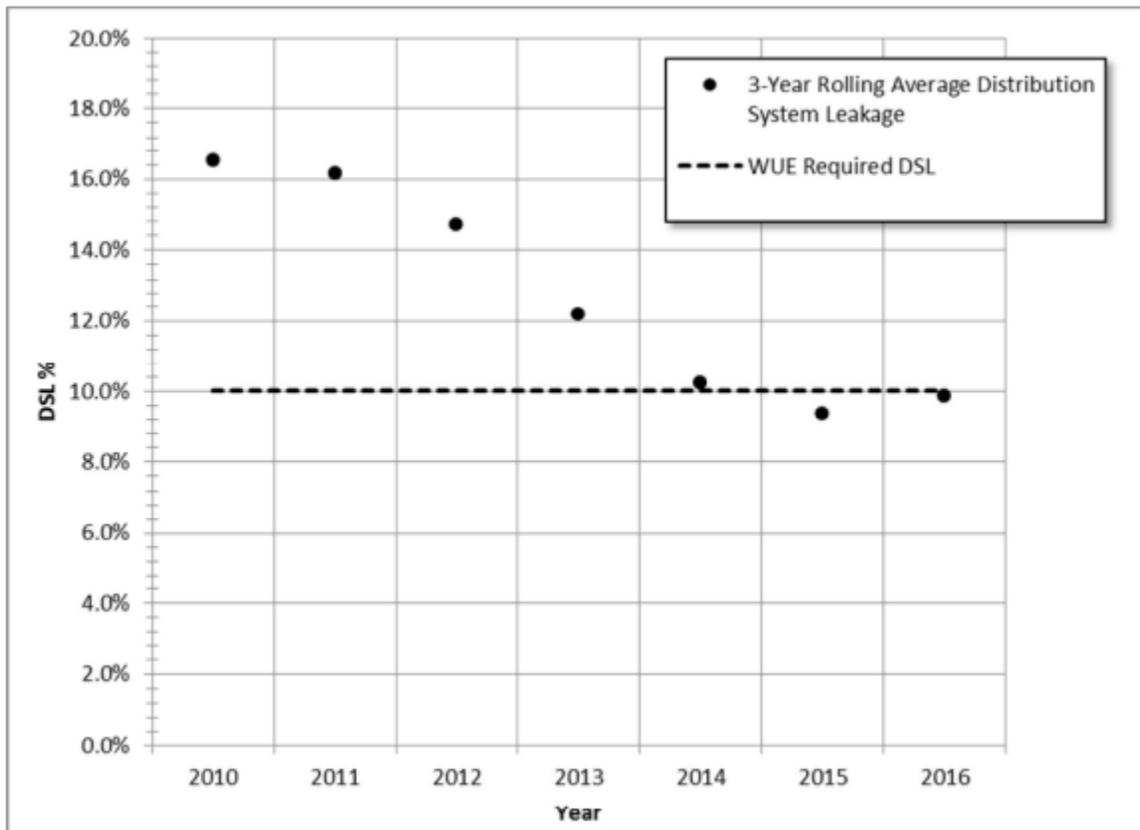


Figure 1
Summary of Distribution System Leakage

WATER USE EFFICIENCY PROGRAM REQUIREMENTS

Under the WUE Rule, the City must set water use efficiency goals and measure progress each year toward meeting these goals. Goals must include a measurable outcome, address water supply or demand characteristics, and include an implementation schedule. The City must also evaluate or implement efficiency measures to help meet these goals. The goals will be set in a public meeting in 2018.

Goals

Goal 1 of the water use efficiency program is to continue to reduce distribution system leakage. The 3-year rolling average DSL as of 2017 is 9.9 percent. The City implemented the same goal of reducing DSL in 2008. As demonstrated in Figure 1, over the past 7 years, the City has approached the DSL goals set in 2008 but has not been able to achieve them. However, the 3-year rolling average has been on a downward trend for much of the duration. The City's goal is to reduce the three-year rolling average DSL to 9 percent by 2022.

Goal 2 of the WUE program is to reduce the customer consumption per Equivalent Residential Unit (ERU) by 1 gpd per year over a 10-year period, beginning in 2018. This is less aggressive than the 2 gpd/ERU per year reduction goal in the previous WUE program, as the decline in per ERU usage rate has slowed in recent years.

New homes generally use less water than older homes for two major reasons . First, new homes are being constructed to a greater density than seen in the past, which results in less lawn area for irrigation. Second, current building codes require the installation of higher efficiency plumbing fixtures that result in lower water consumption. The Water Research Foundation (www.waterrf.org) reports an average indoor water use reduction of 20% in new houses built to meet EPA's WaterSense efficiency standards, as compared to older single family homes with less efficient fixtures.

The effects of past conservation efforts are indicated in Table 2. These effects are expected to continue in future years but additional reductions are projected at a lesser rate. Table 3 shows the projected ERU usage with the anticipated reductions from this goal.

**Table 3
Summary of ERU Reduction Goals**

Year	ERU Value (gpd/ERU)
2017	175
2018	175
2019	174
2020	173
2021	172
2022	171
2023	170
2028	166

Water Use Efficiency Measures

The WUE Rule states several measures that must be implemented or evaluated and provides a list of measures that can count as additional measures in the WUE Program. WAC 246-290-810 identifies the minimum number of water use efficiency measures that must be evaluated based on system size. The City serves between 10,000 and 49,999 connections and therefore must evaluate or implement nine supplementary water use efficiency measures in addition to the mandatory measures. The following sections describe both the mandatory and supplementary water use efficiency measures evaluated and indicate which have been or will be implemented by the City.

Mandatory Implementation – Source and Service Metering and Meter Calibration

As stated previously, the City currently meters all customers and sources, including the Tacoma Intertie. The City meters all new customers and sources as well. All source meters are tested and recalibrated, if necessary, every three years on average.

Mandatory Implementation – Leak Detection and Water Accounting

The City will continue their current leak detection and water accounting program in an effort to reduce distribution system leakage. Distribution system leakage rate has averaged 12 percent per year over the past six years although the current 3-year rolling average is 9.9 percent. The City will increase their efforts to reduce leakage.

Mandatory Implementation – Customer Education

As described above, the City provides information and tips for efficient water use for customers on their web page and in brochures available at several city offices. The City will continue to make educational resources available to the public.

Mandatory Evaluation – Rates that Encourage Efficiency

In their last rate study, the City evaluated an inclining block rate structure with increased rates from their previous structure. The City evaluated increasing both the bimonthly base rate and also the inclining block increment. Future evaluations may include an inclining block rate for multi-family and commercial customers as well. The current rate structure is described above.

Mandatory Evaluation – Reclaimed Water Opportunities

Per RCW 90.48.112, the City is obligated to evaluate the feasibility of water reuse.

The City has been active in using treated wastewater for wash down and process use at the wastewater treatment plant (WWTP). Treated sewage effluent is used in nonpotable water applications such as landscape irrigation at the WWTP. WWTP staff also use treated effluent for pre-chlorination at the clarifier and for mixing polymers for use in sludge thickening.

As discussed in the City’s Sanitary Sewer Comprehensive Plan of 2008, the total cost to implement reclaimed water is \$72 million. At this time, the production of reclaimed water does not appear to be cost-effective.

Supplementary Measures

The City will continue implementing all of their current measures described above as part of their new Water Use Efficiency Program. The following table summarizes these measures.

**Table 4
City WUE Program Measures**

Implemented Measure	Number of Applicable Customer Classes
Program Promotion	3
Construction Requirements	3
Conservation Rate Structure	1
Customer Leak Detection	3
Bills Showing Consumption History	3
Irrigation Management	1
Landscape Management	1
Total Measures Counted	15

Evaluation of Measures

Many of the measures selected for continued implementation require little funding, such as including consumption history in bills and notifying customers of potential leaks. The City will track the cost associated with each measure and compare it to water saved to evaluate the effectiveness of each measure. If measures do not provide enough savings to meet their goals, additional measures will be considered.

WATER USE PROJECTIONS AND SAVINGS

Sources of Supply

The City’s primary sources of supply are Salmon Springs and Maplewood Springs. Salmon Springs is located northeast of the City of Puyallup and provides constant gravity flow to the City’s lowest hydraulic zone. This source supplied approximately 53 percent of the total supply for the City in 2016. Maplewood Springs is located in the southwestern portion of the City of Puyallup and requires pumping to the distribution system. This source supplied approximately 19 percent of the total supply for the City in 2016. The City additionally has a total of four operational wells and an intertie with the City of Tacoma that supplements the City’s supply during times of particularly high demand.

The City’s sources are generally in good condition, and the City has sufficient water rights and source capacity to meet customer demand.

Projected Water Use

Water use in the City is projected to increase as the City’s population increases. This may eventually require the City to obtain or develop additional water sources. The Puget Sound Regional Council predicts the City’s population to grow an average of 1.7 percent per year through 2038. An effective WUE efficiency program can help to slow the increase in overall water demand even as the population grows. Table 5 includes the City’s projected annual water production to satisfy customer demands if no additional water savings measures are implemented.

**Table 5
Annual Water Use Projections**

Year	Annual Water Production (MG/yr)
2018	1,465
2019	1,489
2020	1,514
2021	1,539
2022	1,565
2023	1,591
2024	1,617
2025	1,644
2026	1,671
2027	1,699
2028	1,728
2038	2,039

Projected Water Savings

The following table demonstrates the anticipated water savings due to the City’s WUE program, including a reduction in DSL to 9 percent and a reduction in water use of 1 gpd/ERU each year.

**Table 6
Anticipated Water Savings due to WUE Measures**

Year	Annual Water Production (MG/yr)	Annual ERU Savings (MG)⁽¹⁾	Annual DSL Reduction Savings (MG)⁽²⁾	Total Savings (MG)	Savings as a Percentage of Total Water Produced	Annual Water Production with Water Savings (MG/yr)
2018	1,465	7	9	16	1%	1,449
2019	1,489	15	22	37	2%	1,452
2020	1,514	23	35	58	4%	1,456
2021	1,539	31	49	80	5%	1,459
2022	1,565	39	49	88	6%	1,477
2023	1,591	47	50	97	6%	1,494
2028	1,728	86	53	139	8%	1,589
2038	2,039	101	62	163	8%	1,876

(1) As compared to current 7-year average water usage rate of 176 gpd/ERU

(2) As compared to current 5-year average DSL of 12.7 percent