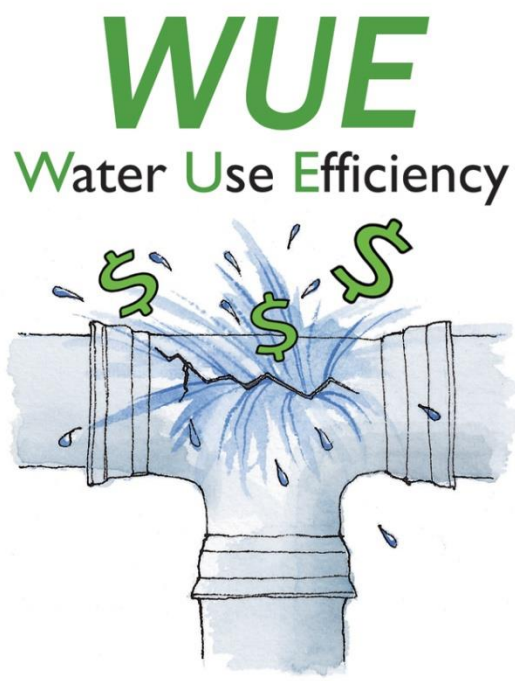
Water Use Efficiency Guidebook

Third Edition
Revised January 2017



Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

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Acronyms and Abbreviations

AC	Authorized consumption
DOH / department	Department of Health
DSL	Distribution system leakage
Ecology	Department of Ecology
EPA	U.S. Environmental Protection Agency
ERU	Equivalent residential unit
gpm	Gallons per minute
MWS	Municipal water supplier
ODW	Office of Drinking Water
Planning documents	Water system plan or small water system management program
SWSMP	Small water system management program
TP	Total produced and purchased
WAC	Washington Administrative Code
WLCAP	Water Loss Control Action Plan
"We" or "Us"	Department of Health, Office of Drinking Water
WSP	Water system plan
WUE	Water use efficiency
"You" or "Your"	Your water system

Chapter 1: Introduction to Water Use Efficiency Requirements

1.1 Intent of This Guidebook

Developing an effective water use efficiency (WUE) program can take a lot of time and effort. The intent of this guidebook is to provide basic information for any water system developing a WUE program. Based on water system size and complexity, some water systems may find parts of this guidebook more useful than others may.

The main purpose of the guidebook is to help you understand the state WUE requirements (chapter 246-290 Washington Administrative Code (WAC)), however, it does not cover all of them. Each chapter summarizes how to implement the WUE rule by providing guidance and examples. Our goal is to clarify how to meet the Department of Health's expectations for complying with the WUE rule.

This guidebook will help you:

- Create a WUE program that works for your water system.
- Understand the fundamental WUE requirements:
    1. Planning.
    2. Distribution system leakage standard.
    3. Customer goal setting.
    4. Annual WUE reporting.

Using Water Efficiently: What is a WUE Program?

Using water efficiently can help you meet future needs, operate successfully within financial, managerial, and technical constraints, and continue to deliver safe and reliable drinking water. We encourage and appreciate all efforts you are taking to conserve water and use it efficiently.

A WUE program is a plan your water system follows to increase water supply and water demand efficiency. The intent is to minimize water withdrawals and water use by implementing water saving activities and adopting policies, resolutions, ordinances, or bylaws.

See Appendices R and S for real examples of WUE programs for both a large and a small water system here in Washington.

We want to keep you informed of any new guidance that may assist you in developing your WUE program. If you have any questions, please visit our WUE website at www.doh.wa.gov/ehp/dw/programs/wue.htm or contact:

- Your regional office planner (see Appendix A for contact information).
- Mike Dexel, WUE Program Lead, (360) 236-3154 or michael.dexel@doh.wa.gov

1.2 Protecting Our Water Resources

In 2003, the Washington State Legislature passed Engrossed Second Substitute House Bill 1338, better known as the Municipal Water Law, to address the increasing demand on our state's water resources. The law established that all municipal water suppliers must use water more efficiently in exchange for water right certainty and flexibility to help them meet future demand. The Legislature directed the Department of Health to adopt an enforceable WUE program, which became effective on January 22, 2007. Creating a regulatory WUE program is intended to achieve a consistently high level of stewardship among all municipal water suppliers (MWS).

Pressure on our state's water resources comes from many sources, including population growth, instream flows, and business needs. As the potential for developing new sources of water within the state diminishes, the efficient use of water is necessary to meet future demand.

Water efficiency is a "proactive approach" to protecting public health.
The Office of Drinking Water's mission focuses on public health. The WUE program draws the connection between water resources and safe and reliable drinking water by expanding our perspective to include water efficiency. Our WUE program will increase awareness about how the efficient use of water strengthens the relationship between the reliability and safety of our water supplies. This connection also enhances our ability to accomplish our mission.

The WUE program is a priority for the Office of Drinking Water. Droughts, climate change, growth demands, and fewer granted water rights all signal the possibility of future long-term water disruptions and temporary interruptions during peak demand due to declining water supplies. The WUE program requires water systems to pay attention to their usage patterns by reporting annually and managing water loss. Water systems can proactively prevent potential health risks to their customers by effectively planning and implementing WUE measures that can result in fewer emergencies.

The WUE requirements support our common goal of ensuring safe and reliable drinking water in the following ways:

Contribute to long-term water supply reliability and public health protection.
Water systems must have a reliable supply of water to meet current and future needs. WUE requirements help MWS operate efficiently to protect against:

- Temporary water service interruptions during peak usage.
- Long-term or repeated water disruptions due to limited water supply.
- Contamination of the water supply due to leaky pipes.

Public health is always at risk during these events. Water systems position themselves to provide a reliable drinking water supply for their customers by implementing an effective WUE program.

Promote good stewardship of the state's water resources.
Pressure on the state's limited water supplies is steadily increasing. Water systems using their water efficiently allow growth in their communities and water for other environmental uses. The efficient use of water helps ensure reliable water supplies are available for your customers.

Ensure efficient operation and management of water systems.
For most water systems, conserved water can be the least costly source for new supply. Water system managers have to balance operation and growth costs with customer revenue when making decisions on the future of their water system. The WUE requirements involve the customers and the public in the decision-making process through the goal setting public forum. This input helps water system owners and managers make smart choices about how to use water efficiently.

1.3 Using Water Efficiently

The Office of Drinking Water considers using water efficiently an important part of the planning program. Since 1994, we have used the publication Conservation Planning Requirements to describe how water systems should incorporate water use efficiency into their planning process. Many water systems have based their successful conservation programs on the 1994 document. This guidebook replaces that document.

The WUE requirements emphasize the importance of measuring water use and evaluating the effectiveness of your WUE program. There are three fundamental elements:

Planning Requirements—As part of a water system plan or a small water system management program, MWS are required to:

- Collect data.
- Forecast demand.
- Evaluate WUE measures.
- Calculate distribution system leakage.
- Implement a WUE program to meet their goals.

Distribution Leakage Standard—MWS are required to meet a distribution system leakage standard to minimize water loss from their distribution system. In order to calculate leakage, production (source) and consumption (service) meters are required.

Goal Setting and WUE Reporting—MWS are required to set WUE goals through a public process and report annually on their performance to their customers and the Department of Health. They also must make the information available to the public.

1.4 Who is Affected by Water Use Efficiency Requirements

The Municipal Water Law (RCW 90.03.015(3)) says that WUE requirements apply to all water systems defined as municipal water suppliers (MWS). A MWS is "an entity that supplies water for municipal water supply purposes."

Your water system is most likely a MWS if you can answer "yes" to any of the following:

- My system has 15 or more residential service connections.
- My system provides water to a city, town, public utility district, sewer district, or water district.
- My system provides water in a residential manner to a non-residential population that averages at least 25 people for at least 60 days a year.
- My system provides water indirectly for purposes listed in 1 or 2, through the delivery of water to another water system.

If you answered "no" to all of these questions, you most likely don't meet the definition of a MWS and don't have to meet the WUE requirements.

Most Group A Community Water Systems are Considered MWS

The definition of a MWS includes water systems that serve 15 or more residential connections, which includes most Group A community water systems. However, not all Group A water systems are municipal water suppliers.

Our regulations consider both residential and non-residential connections when defining a Group A water system. A water system using a water right to serve 15 homes would be a MWS. A water system serving 14 homes and a business would not be a MWS because a business is a non-residential connection. Both systems, however, are Group A community water systems.

In general, the following Group A water systems are **examples of municipal water suppliers**:

- City
- Water district
- Mobile home park
- Water association

Some Noncommunity Water Systems May Be Considered MWS

If your water system is a noncommunity water system that provides water that is used in a residential manner (such as drinking, cooking, cleaning, and sanitation), you may be considered a MWS if you provide water to a non-residential population for an average of at least 25 people for at least 60 days a year.

Some noncommunity water systems may be MWS, however this is determined on a case-by-case basis. We coordinate with the Department of Ecology on making these determinations. If you have a noncommunity water system and are not sure whether you qualify as a MWS, you may need to contact the Department of Ecology at the numbers listed below.

Department of Ecology's Regional Offices:

Central Regional Office (Yakima):	(509) 575-2490
Eastern Regional Office (Spokane):	(509) 329-3400
Northwest Regional Office (Bellevue):	(425) 649-7000
Southwest Regional Office (Lacey):	(360) 407-6300

1.5 Complying with the Water Use Efficiency Requirements

Litigation over the constitutionality of the MWL created some uncertainty for privately owned water systems. On June 11, 2008, King County Superior Court Judge Jim Rogers struck parts of the MWL. The ruling invalidated definitions of "municipal water supplier" and "municipal supply purposes", which temporarily removed privately owned water systems from the municipal water supplier definition. However, on October 28, 2010, the Washington State Supreme Court affirmed the constitutionality of the MWL. The Supreme Court upheld the sections of the law that were invalidated by the King County Superior Court.

These sections were the definitions of municipal water supplier and municipal water supply purposes, and the "in good standing" status of water rights based on system capacity rather than water use. The Supreme Court found that these sections do not violate separation of powers or facially violate the right to due process. Privately owned water systems are once again defined as municipal water suppliers, and they must comply with the WUE regulations.

Many privately owned water systems delayed implementing the WUE requirements until the Supreme Court issued an official decision. The majority of the WUE requirements and deadlines have passed for privately owned water systems (except for the service meter installation deadline). Since those deadlines have passed, we recommend that all privately owned systems comply with the WUE requirements listed in the third column of Table 1-1.

Most notably, privately owned water systems must submit the first annual WUE report by July 1, 2011, even if they haven't fulfilled all of the WUE requirements. This report must include the following information:

- Service meter installation schedule.
- Identify the established WUE customer goal.
- Total production—the annual total amount of water pumped from all source meter(s).
- Authorized consumption—the annual total amount of water consumed from customer meter records plus any other authorized unmetered uses (see Chapter 6).
- Information regarding progress of fulfilling any of the other WUE requirements, such as reducing water loss.

The requirements and compliance deadlines are listed in order by due date in Table 1-1.

Table 1-1: Summary of Water Use Efficiency Requirements

Requirements	Deadlines for MWS under 1,000 connections	Deadlines for MWS with 1,000 or more connections	Deadlines for privately owned water systems
Include WUE program in planning documents	January 22, 2008	January 22, 2008	December 31, 2011
Submit first annual WUE report	July 1, 2009	July 1, 2008	**July 1, 2011**
Submit service meter installation schedule	July 1, 2009	July 1, 2008	**July 1, 2011**
Set your own WUE goals	**July 1, 2010**	**July 1, 2009**	**July 1, 2011**
Meet distribution leakage standard (based on 3-year rolling average)	**July 1, 2011, or 3 years after installing all service meters**	**July 1, 2010, or 3 years after installing all service meters**	**July 1, 2013, or 3 years after installing all service meters**
Complete installation of all service meters	**January 22, 2017**	**January 22, 2017**	**January 22, 2017**

Enforcing the WUE Requirements

We will enforce the WUE requirements consistent with our compliance strategy. Initially, we will focus our compliance efforts on technical assistance and guidance to help you develop an effective WUE program that meets the intent of the WUE rule. Egregious violators may be targeted for more formal enforcement if your water system fails to demonstrate that you have met the WUE requirements. This may affect the status of your operating permit.

Show us that you have achieved WUE compliance by summarizing your efforts in the annual WUE report. The annual WUE report is important. It tells us that you have made progress in achieving water efficiency within your water system by explaining how you have performed from year-to-year in the following categories:

- Reducing leaks.
- Installing or replacing meters.
- Implementing measures to help your customers use less water.

Once you submit your report, we will ensure that a customer goal has been established for your water system and determine whether you are in compliance with the distribution leakage standard (see Chapter 6). We will keep a record of all annual WUE report submittals, and notify you if you fail to report.

Your WUE program will be reviewed for approval by our regional planners when you submit your small water system management program or water system plan to us for approval. Planners may withhold approval until you have demonstrated compliance with the WUE regulations.

You don't need to send your WUE program to us, unless we request it. In many cases, the WUE program will be kept for your own records as part of your planning document.

Chapter 2: Water Meters

2.1 Overview of the Metering Requirement

Measuring your water use with production and consumption meters is fundamental to helping you develop a successful water use efficiency (WUE) program. Installing meters is one of the most significant WUE requirements. Meters provide the information necessary to calculate accurate distribution system leakage. They also provide useful information to evaluate the effectiveness of your WUE program. Metering deadlines are listed in Table 2-1.

Table 2-1: Summary of Water Use Efficiency Requirements for Meters

Requirements	Deadline
Install production meters	January 22, 2007
Submit service meter installation schedule	With your first annual WUE report
Complete installation of all service meters	January 22, 2017

2.2 Why Meters Are Important

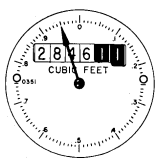
Installing meters is the most important step you can take to establish an effective WUE program. Meters provide the information you need to evaluate water use and leakage, and they help you prioritize your WUE efforts. Installing service meters and billing your customers based on the amount of water they use is the most effective water efficiency measure you can implement. Once customers realize how much water they are using, water demand tends to decrease.

If you are not required to install consumption meters (see Section 2.7), you can install zone meters to isolate sections of the distribution system. Zone meters will help you identify and prioritize areas with the most leaks and evaluate how to proceed with a water loss control action plan.

If you plan on installing meters in the future, you can get a head start by installing meter boxes at each customer connection when street or sidewalk repairs, landscaping projects, or other excavation/utility projects occur in your community.

Installing Meters Makes Economical Sense
Meters accurately identify water loss within the distribution system. Lost water has a value. Consider the cost to pump, treat, store, and distribute the water. Add up these factors and you'll find that fixing leaks makes economical sense. The best way to accurately determine water loss is to install consumption meters.

How Much Will the Customer Meter Cost?
We estimate the per-connection cost for installing a meter is $5.30 to $7.35 per month. This includes the cost of the meter, installation, and meter reading with financing through a 15-year loan at 6 percent interest. Over time, today's investment in service meters and repairing leaks will pay for itself.



2.3 Production Meters

Production meters, also referred to as source meters, are required on all existing and new water sources. Measuring the water produced from your source and purchased from other water systems is the first step in managing water efficiently. This information assists you in tracking water production, understanding seasonal variations, and accounting for overall use of the resource.

You are required to measure the volume of water produced or purchased upstream of the distribution system with a production meter (WAC 246-290-496(1)(a)). Most water systems will use their source meter to provide this information. If your water system has extensive transmission mains, you may install a production meter at the beginning of the distribution system to calculate distribution system leakage. Installing a meter at the beginning of the distribution system does not alter the source metering requirements adopted by the Department of Ecology, which may have different installation and reporting requirements.

Source meters must be able to measure the volume of water (WAC 246-290-496(1)(a)). Hour meters, dedicated power consumption meters, and other non-volume meters don't provide the type of production data necessary to successfully calculate distribution system leakage.

Source meters are required as of January 22, 2007.

We expect that you are recording monthly production data. If you don't have a meter on all of your sources, you should install one immediately. Source meters are not under the same 10-year installation schedule as service and intertie[1] meters.

[1] An intertie means an interconnection between public water systems, allowing the exchange or delivery of water between those systems.

2.4 Consumption Meters

Consumption meters, also referred to as service or customer meters, provide information to you and your customers regarding their water usage. Service meter data also provides the most accurate assessment of distribution system leakage.

Service meters are required on all existing and new direct service connections[2] and clustered entities (WAC 246-290-496(2)(c) and (2)(d)). The requirements allow clustering of certain customers using a single meter (see Section 2.7).

New connections must be metered at the time water is provided to the customer (WAC 246-290-496(2)(d)). Service meters don't need to be installed until a customer requests water from the distribution system (for example, when a service connection is activated).

2.5 Intertie Meters

Permanent and Seasonal Interties

Meters must be installed on all interties used as permanent or seasonal sources (WAC 246-290-496(2)(e)). You may need to install intertie meters at an earlier date in order to calculate accurate distribution system leakage.

Emergency Interties

Emergency interties, described in WAC 246-290-132(4), are exempt from the metering requirement.

2.6 Meter Installation Schedule

Meter installation schedule requirements only apply if you don't already have service or intertie meters installed. If you don't have service meters installed on all existing direct service connections and intertie connections, you must meet the following three requirements until your water system is fully metered (WAC 246-290-496(2)(f)):

[2] A direct service connection is a service hookup to a property that connects to a distribution main and where additional distribution mains are not needed to provide service.

1. Submit a meter installation schedule with your first WUE report.
2. Implement activities to minimize leakage.
3. Report status of installing meters and minimizing leakage in your annual WUE report, and in any planning document you submit for approval.

Submit a Meter Installation Schedule

You must submit a meter installation schedule to the Department of Health if you aren't fully metered. **Use your first WUE report to document when and how you plan to install meters.**

Your meter installation schedule must include:

- A schedule for completing installation on all existing connections and interties by January 22, 2017 (WAC 246-290-496(2)(c) and 246-290-496(2)(f)).
- Documentation showing steady and continuous progress toward complying with the service and intertie meter requirements (WAC 246-290-496(2)(f)(i)(C)). This may include:
  - Percentage of meters that will be installed each year.
  - Funding strategy to cover the metering expenses.

Implement and Report Activities to Minimize Leakage

If you aren't fully metered, there are actions you must take to minimize leakage (WAC 246-290-496(2)(f)(ii)). These activities may include:

- Leak detection survey.
- Leak repair.
- Night usage survey.
- Planned replacement of leaking mains.
- Improved data collection.

Report Status of Installing Meters

You must report your progress on installing meters in your annual WUE report and WUE program (WAC 246-290-496(2)(f)(iii)). Meter installation progress should be consistent with the meter installation schedule provided to us.

2.7 Exceptions to the Service Meter Requirement

The following clustered entities can measure the volume of water through a single meter:

- Campgrounds.
- Recreational vehicle parks.
- Property designated as a mobile home park.
- A building with multiple units (for example, an apartment building).
- Complexes with multiple buildings served as a single connection (for example, a business park).

Am I a Designated Mobile Home Park?

To determine if your property is considered a designated mobile home park, please contact your local planning authority (usually the county assessor). If the local authority has a zoning designation, use code, property class, or similar term used to describe the property as a "mobile home park" for the entire tax parcel or property legal description, then it is what we would consider a "designated mobile home park" as written in WAC 246-290-496(2)(g)(iii). Designated mobile home parks don't need to install service meters.

State law (RCW 59.20.030(6)) defines a mobile home park as:

> "Mobile home park" or "manufactured housing community" means any real property which is rented or held out for rent to others for the placement of two or more mobile homes, manufactured homes, or park models for the primary purpose of production of income, except where such real property is rented or held out for rent for seasonal recreational purpose only and is not intended for year-round occupancy.

Metering Requirements for Municipal Water Suppliers That Serve Clustered Entities

If your water system serves a clustered entity, only one meter is required to measure consumption. For example, if you provide water to an industrial park with six buildings, only one meter is required to measure the consumption for the entire park. You would consider the industrial park as one single connection since you have no authority over the distribution system within the park. Consider the water used by the industrial park as an authorized consumption when calculating leakage.

Metering Requirements for Clustered Entities That Are Municipal Water Suppliers

If you are a campground, recreational vehicle park, or if your property is designated as a mobile home park, **and** considered a municipal water supplier, you don't have to install meters on all of your direct service connections. You may use a single meter (for example, source meter) or multiple meters to measure consumption in your distribution system. However, you are required to meet all other WUE requirements, including the distribution system leakage standard.

A good way to determine leakage in the absence of service meters is by conducting night flow testing. Measuring the amount of water used from your source meter or how much your reservoir has emptied between the hours of 2:00 and 4:00 a.m. is a good indicator of your water loss.

If your water system provides service to a complex with multiple buildings (such as public college) and is a municipal water supplier, you must install service meters on all direct service connections and must meet all other WUE requirements, including the distribution system leakage standard.

Here's an Idea

Consider installing the latest meter technology to track water use and leaks within your customers' homes.

The new automatic meter reading (AMR) and automatic meter infrastructure (AMI) meters are worth the investment. They automatically collect information from your meters and some have the ability to detect low flows (such as leaking faucets and toilets) and bill for that usage. Perhaps, most importantly, these meters:

- Increase your revenue, without increasing rates.
- Reduce apparent losses (which reduces annual leakage percentage)
- Save water.
- With AMI, systems can see hourly reading for all connections.
- With high-resolution registers, you will be able to identify who your largest users are and more importantly when they are using the water.
- You will be able to identify which customer has a leak and how large it is.
- You will be able to provide usage information to your customer's fingertips.
- You will have access to the data that will help you predict future demands.

2.8 Selection, Installation, Maintenance, and Operation of Meters

You must select, install, operate, and maintain your meters using accepted industry standards, and as required by the manufacturer (WAC 246-290-496(3)).

We recommend that a qualified professional install your service meters in accordance with the manufacturer's instructions. If you install your water system's service meters, take extra care not to disturb the distribution system. Contamination to the distribution system can occur when the water lines are disrupted, compromising your ability to provide safe and reliable water.

Meters must be installed and calibrated correctly to be accurate. The accuracy of your meters diminishes over time, and older meters may require calibration or replacement. Inaccurate meters results in lost revenue. Even a few percentage points of inaccurate measurement on a larger meter can cost you hundreds or thousands of dollars every month. Develop a process and timeline for inspecting, testing, calibrating, and replacing meters as recommended by the manufacturer. How often you do this depends on the size of the meter, water quality, and other factors.

On a Budget?
Save Money with Good Quality Used Meters

Many large water utilities are replacing their older meters with new automatic meter reading (AMR) and automatic meter infrastructure (AMI) technology. The older (used) meters may still be in good working condition. If you are a private water system looking for an inexpensive option to install meters for the first time, or replace very old inaccurate meters, consider contacting your local utility to see what they are doing with their old meters. Your regional office planner or engineer may also know which systems are replacing their meters. See Appendix A for regional office contact information.

Before purchasing used meters, verify that the utility has tested a representative sample for accuracy. It's a good idea to look for meters that are above 95 percent accurate before you purchase them.

2.9 Funding Options for Installing Meters and General WUE Efforts

Generally, funding for meters is only available when meter installation is part of a larger capital improvement project. A few state and federal loan or grant programs may provide funding for meters, including:

- Drinking Water State Revolving Fund (loan).
- Public Works Trust Fund (loan).
- Community Development Block Grant (grant with a match requirement).
- U.S. Department of Agriculture Rural Development (loan, may include partial grant).

New Resource Available

In response to the American Recovery and Reinvestment Act, www.grants.gov was established to improve government services to the public. This website is a central storehouse for information on over 1,000 grant programs and provides access to approximately $500 billion in annual awards. For more information visit www.grants.gov

Chapter 3: Data Collection

3.1 Overview of the Data Collection Requirement

Understanding your impact on the water supply is important for making informed water resource decisions. The water use efficiency (WUE) requirements include collecting data and describing water source and supply characteristics (such as instream flow restrictions, salt-water intrusion, and aquifer depletion).

Good information is needed to develop a successful WUE program. By understanding how much water is used by you and your customers, you can make educated choices about how best to conserve water.

Under the requirements, you need to collect production and consumption data on a regular basis and report that information in your planning document and annual WUE report. Water production and consumption data are critical for calculating distribution system leakage.

Water use data is needed for the following:

- Calculating leakage.
- Forecasting demand for future water needs.
- Identifying areas for more efficient use of water.
- Evaluating the success of your WUE program.
- Describing your water supply characteristics.
- Aiding in decision-making about water management.

3.2 Collecting Source Meter Data

Source meters are required on all existing and new water sources (WAC 246-290-496(1)). Within a water system plan (WAC 246-290-100(4)(b)(ii)) or small water system management program (WAC 246-290-105(4)(h)), you must include the following:

- Monthly and annual totals of water produced.
- Monthly and annual totals of water purchased from another water system.
- Annual totals of water supplied to other water systems through interties.

Water Produced

Water produced is the amount of water you use from your source. You must collect this data monthly and calculate annual totals from each source (WAC 246-290-100 (4)(b)(ii)(A)). **When submitting your annual WUE report each year, you will need this information.**

Source meters should be installed as soon as possible. You won't be able to comply with the WUE rule without this basic information. If you don't have a meter on all of your sources, develop a plan and budget to get one installed now.

3.3 Collecting Intertie Data

Interties provide consumption and production data. If you supply water through an intertie, consider it authorized consumption (AC). If you receive water through an intertie, consider it total produced and purchased (TP).

Water Supplied

Water supplied is the amount of water you provide to another water system through an intertie. Include this information in your AC data when calculating leakage (see Chapter 7). You must collect this data annually from each intertie (WAC 246-290-100(4)(b)(ii)(C)).

Water Received

Water received, often purchased water, is the amount of water you get from another water system through an intertie. Include this information in your TP data when calculating leakage (see Chapter 7). You must collect this data monthly from each intertie and calculate annual totals (WAC 246-290-100(4)(b)(ii)(A)).

Wheeled Water

Wheeled water is a term that identifies an originating water supplier that uses another water supplier's pipes (wheeling water system) to supply water to a receiving water system (end user). This water is not directly used by the wheeling water system or its customers. Leakage must be tracked for each water system (originator, wheeling water system, and end user).

3.4 Collecting Service Meter Data

Service meters are required on all direct service connections. For water system plan (WAC 246-290-100(4)(b)(ii)) or small water system management program (WAC 246-290-105(4)(h)), you must report the following:

- Water consumed.
- Annual totals for each customer class (such as single-family residence or commercial use).
- Customer class seasonal variations (1,000 or more connections only).

Water Consumed

Obtaining consumption data from service meters is the most accurate method to know how much water is used and determine leakage within your water system. You must collect annual consumption data on how much water is being used by your customers (WAC 246-290-496(2), 246-290-100(4)(b)(ii), and 246-290-105(4)(h)(ii)). This data is useful in forecasting demand and determining leakage. To help determine leakage, you should estimate and record any authorized uses such as water system flushing, street washing, and firefighting.

Collecting regular consumption data will help you understand how water is being used, allow for evaluating rate structures, recognize water-saving opportunities, and evaluate progress on meeting goals. We recommend reading your service meters every month to obtain meaningful data for decision-making.

Customer Class

Include your annual water consumption data in your planning document for each customer class. Examples of class types are residential, non-residential, commercial, industrial, single family and multifamily.

Small water system management programs: You must include the annual amount of water consumed by your residential and non-residential customers (WAC 246-290-105(4)(h)(ii)).

Water system plans: You must include the annual amount of water used in each customer class (WAC 246-290-100(4)(b)(ii)(B)). You have the flexibility to define your own customer classes based on the types of customers in your water system.

Seasonal Variations in Customer Class for Water Systems With 1,000 or More Connections

Consumption data for customer classes may vary from season to season, particularly in the summer when water uses increase. For water systems with 1,000 or more connections, you must collect seasonal data to describe the variations in water consumption trends (WAC 246-290-100(4)(b)(ii)(D)). This data may be collected monthly, every other month, quarterly, or seasonally.

3.5 How to Collect Data

We suggest reading all meters (source, intertie, and service) every month. This will help you detect significant changes in water usage and manage any potential major problems or leaks.

It is important to collect data from source and service meters at the same time, otherwise you will get inaccurate water loss results for the year. Adjustments may be necessary when collecting data to reflect a 12-month period. Evaluate your billing cycles, billing software and data collection methods to ensure total production and authorized consumption annual values are accurate.

You have the flexibility to collect annual data on a schedule that meets your needs. For instance, you might choose a "data collection year" beginning on May 1 and ending on April 30 the following year. However, when you submit your annual WUE report, you will be asked to identify a "reporting year" (such as 2010) that verifies you have met the annual WUE reporting requirement.

The reporting year is similar to a tax year. For example, when you submit your report in 2011, you are reporting data from the previous year, and the reporting year in this example is 2010.

When you submit your annual report each year, you will be asked to identify your total water produced and authorized consumption for the previous year. Make sure you have collected this information. The online reporting system will automatically calculate annual DSL percentage, annual volume and DSL average percentage for the last 3 years.

3.6 Water Supply Characteristics

You will need to be aware of the factors that influence your ability to access your water supply. In order to gain better information about the long-term reliability of your sources, take the time to understand your water supply characteristics and consider them when making management decisions (see Appendix C for more information).

There are two fundamental WUE requirements regarding water supply characteristics:

- You must describe water supply characteristics or provide a source description to customers, the public, and Department of Health (WAC 246-290-105(4)(f), 246-290-100(4)(f)(ii)(B)).
- You will also need to consider the water supply characteristics when establishing a quantifiable water savings goal for your customers (WAC 246-290-830(6)(a)).

Connect Your WUE Program to Your Water Supply Characteristics

In order to provide context for customers and the public about your WUE program you must describe your water supply characteristics or a source description when:

- Setting your goals (WAC 246-290-830(6)(a)).
- Developing your planning document (WAC 246-290-105(4)(f) and 246-290-100(4)(f)(ii)(B)).

Small Water System Management Programs—Source Description

You must describe your sources of water (WAC 246-290-105(4)(f)). This description is similar to the information required in a wellhead protection plan. Your water supply characteristics must include:

- Sources description.
- Name and location of the source from which water is used.

Water System Plans—Water Supply Characteristics

You must provide a narrative describing your sources and any foreseeable impact (such as drought) to the resource (WAC 246-290-100(4)(f)(ii)(B)). Base your narrative on existing information, no additional studies are required. Using existing data and studies, describe how using water from your source—now and in the future—will affect the quantity and quality of that water. Your water supply characteristics must include:

- Sources description.
- Name and location of the sources.
- Production capacity.
- Seasonal variability.
- Water rights.
- Legal constraints.

Here's an Idea

When you submit your annual WUE report to customers, provide some background on the water supply characteristics or watershed in which you live. This example comes from the City of Seattle's Saving Water Partnership.

Watersheds:
The Source of Our Water

The region's fresh supply water comes primarily from two sources: the Cedar River Watershed and the Tolt River Watershed, both located in eastern King County. The watersheds are large, uninhabited areas of land that gather and store rain and snowmelt.

Year-round, 26 cities and water districts rely on a limited supply of stored water from these two sources to meet most of the daily needs of business, government, institutions, and 1.3 million people in our region. In addition to providing clean, clear, reliable drinking water, the watersheds also provide habitat for fish and wildlife.

You should try to find and report as much information as possible. This will be valuable documentation when planning for the future of your water system.

Your water supply characteristics or source description should be written in easy-to-understand language. You want your customers to understand water supply availability, its value to them and the environment, and the need to meet short- and long-term goals.

Appendix C has a list of questions to ask yourself when describing your water supply characteristics. It also includes examples of what a source description or water supply characteristics would look like within your planning document.

Where to Find Existing Water Supply Characteristics Information

Information from the Department of Health

- Your planning document, sanitary survey report, source metering records, water depth records, or historical information prepared by your city or county.
- Planning documents submitted by other water systems in the area that have completed a water supply characteristics narrative.
- Coordinated water system plans, if one covers your service area.

Information from the Department of Ecology

- Ecology has completed groundwater studies in some parts of Washington State. See the following link for information:

  www.ecy.wa.gov/programs/eap/groundwater/completedstudies.htm
- Water system plan reviewers in Ecology's Water Resources Program.
- Well logs. These are available online at http://apps.ecy.wa.gov/welllog/
  You need to know the original owner of the well, street address, or legal location of the

Here's an Idea

To get an idea of water reliability, graph your monthly water use over time to see how it varies.

Do the same for water depth records. Water depth can fluctuate a great deal, depending on when the depth is measured and the last time the pump ran. Look for long-term or seasonal trends rather than changes from one month to the next.

If you don't have a way to measure water depth, we encourage you to contact a qualified well driller to install a water level recorder.

This information is inexpensive to collect and can provide valuable data about the long-term reliability of your water source.

well (township, range, and section). Look at the well log for pump test information and water depth measurements made by the driller. Also, note the date the well was drilled and the depth.

- Check the Report of Examination for the water right permits. You can find this information by contacting your local Ecology Regional Office or the following link: www.ecy.wa.gov/org.html
- Watershed plans. Ecology's Watershed Planning Unit staff may know of watershed plans or existing studies for your service area. See the following link: www.ecy.wa.gov/watershed/index.html
- Ecology's Instream Resources Protection Program contains important information relative to water availability. To find the rules within your watershed, see the following link: www.ecy.wa.gov/laws-rules/ecywac.html#wr
- Additional sources of water supply information are available from Ecology at www.ecy.wa.gov/programs/wr/ws/wtrsuply.html

Other Resources

- Comprehensive plans prepared by your city or county.
- Studies prepared by local city or county government water resource departments.
- The U.S. Geological Survey has completed studies in some parts of Washington State, including information about streamflow. Select your appropriate county or basin on the their search page: http://wa.water.usgs.gov/pubs/
- Colleges and universities have completed watershed studies throughout the state. Search your local school to find a study near you: www.hecb.wa.gov./Links/colleges/collegesindex.asp

Chapter 4: Demand Forecasting

4.1 Overview of the Demand Forecast Requirement

As communities grow, the demand for water use often grows with it. In order to adequately serve new customers, you must forecast future water demands to make sure you can provide service to growing communities. The water use efficiency (WUE) requirements add criteria for you to consider when preparing demand forecasts.

Demand forecasting is important because it identifies how much water will be needed in the future. You need to collect consumption data on a regular basis from your service meters and use that information to calculate demand forecasts.

4.2 Projecting Demand Forecasts: Factors to Consider

Prepare your demand forecast within your planning document (WAC 246-290-100(4)(b)). The WUE goals you establish may have an effect on the water demand for your water system. When preparing your demand forecast you must project your demand both with and without savings obtained from your WUE program (WAC 246-290-100(4)(c)).

You must include demand forecasting information within your WUE program.

Consider these factors when calculating your future water system supply needs:

- Population (current and future).
- Historic water use patterns.
- Local land use plans.
- Water rates and their impact on consumption.
- Employment (economic development and employment trends).
- Projected water use efficiency savings.

Population

Population forecasts should be based on information approved by your local planning agency or the Washington State Office of Financial Management (OFM). Alternative forecasts may be provided to establish a potential population of high, medium, and low levels and corresponding water demand forecast ranges, or as agreed to by the local planning agency.

Water systems often grow at a different rate than predicted. Review the number of connections added to your water system, and compare this number with the OFM or local population projections.

Historic Water Use Patterns

Historic water use patterns are an important component for accurate demand forecasting. This figure is the basis for future projections. For some water systems, understanding the usage patterns for different categories of customers and seasonal variations may be useful.

Current Land Use, Zoning, and Capacity

Adopted local government comprehensive plans and land use plans, including plans developed under the Growth Management Act, should be used as the basis for forecasting the impact of development on water use.

Water Rates

Rate structures can have an impact on the forecasted demand. You should identify your existing rate structure as part of your planning requirement. Setting rates is the responsibility of the elected governing board, governing body, owner, or the Washington State Utilities and Transportation Commission.

Employment

Employment trends may change as businesses in your community expand. Understand how economic development will affect the demands of your water system. Predicting these changes should be considered when forecasting demand.

Projected Water Use Efficiency Savings

Implementing a WUE program may affect your demand forecast. Projected savings from the WUE program can help you determine whether capital improvements can be delayed or eliminated, and how much additional growth may be permitted. The forecasted reduction in demand should be monitored against actual water use data to monitor conservation success. Adjustments to future projections can be made as actual water use data becomes available.

4.3 Demand Forecast Methods

Demand forecasts are the basis for determining your capacity and infrastructure needs. Depending on the type of planning document and water system size, there are different ways to calculate demand forecasts. The forecast should identify the projected needs of your water system and any contractual agreements you have to provide water to other public water systems.

Water System Plan

If you are completing a water system plan, you must project your demand for the plan approval period and for at least a 20-year period, consistent with the water demand design criteria identified in WAC 246-290-221. More information about design criteria and demand forecasting are available in the *Water System Design Manual* (DOH 331-123).

You must include projections based on two different scenarios (WAC 246-290-100(4)(c)):

1. **Forecast demand *without* projected water savings from your WUE program.** This is the forecast we require in the hydraulic analysis and capital improvement program.

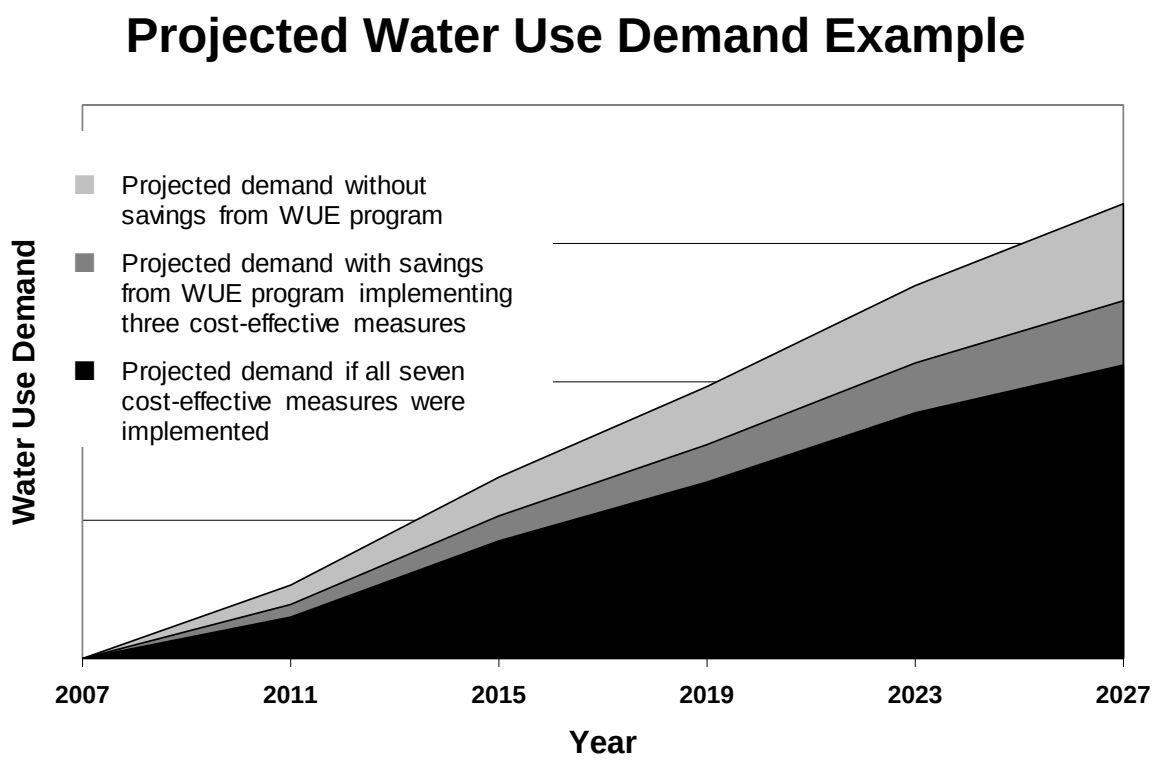
2. **Forecast demand *with* projected water savings expected from your WUE program.** This is based on cost-effective measures implemented by your water system to meet your selected goals.

If you serve 1,000 or more connections, you must provide a third demand forecast scenario (WAC 246-290-100(4)(d)):

3. **Forecast demand if *all* WUE measures deemed cost-effective were *implemented*** (WAC 246-290-810). If you do not choose to implement all of the cost-effective WUE measures you have evaluated to meet your goal, you must complete an additional demand forecast showing what the demand with projected water savings would look like if **all of those measures were implemented**.

All water systems must evaluate or implement WUE measures based on water system size (WAC 246-290-810(4)(d)(i)). The example in Figure 4.1 is for a water system with 53,000 connections in which the customers are using 80 gallons per person per day. The water system determined that seven of 10 measures were cost-effective. Because of the low average daily customer use, this water system chose to implement three of the seven cost-effective measures to meet its goal.

Figure 4.1 Demand Forecast Example for a Water System with 1,000 or More Connections



Small Water System Management Program

If you are completing a small water system management program, you must project demand for all of your approved connections (WAC 246-290-105(4)(k)). If your existing number of connections equals the approved number of connections, simply project your existing demand. Describe the demand projection using your average daily demand (see WAC 246-290-221 for water demand design criteria).

You should base this projection on historical water use patterns, using actual water use and the zoning and land use data from your local government comprehensive or land use plan.

Chapter 5: Water Use Efficiency Program

5.1 Overview of the Water Use Efficiency Program Requirement

Developing your water use efficiency (WUE) program is the foundation for using water wisely. A WUE program is a plan you follow to increase water supply and water demand efficiency. The intent of the plan is to minimize water withdrawals and water use by implementing water saving activities and adopting policies, resolutions, ordinances, or bylaws. Appendices R and S have a large and small system example of WUE programs here in Washington.

Your WUE program should be:

- Consistent with the goals established by the elected governing board or governing body of your water system.
- Designed to achieve the goals by implementing cost-effective water use efficiency measures.

You are required to develop and implement a WUE program as part of your planning document (WAC 246-290-800(2) and 246-290-810(2)). The requirement applies to water system plans submitted for approval under WAC 246-290-100 and small water system management programs developed and implemented **or** submitted for approval under WAC 246-290-105.

It is up to you to get the WUE program done and have it available for review if we request to see it. WUE programs are generally submitted with your planning document. Depending on when your next planning document is due, this would be the time to make sure it is ready for our review. In most cases, we would not request to see your WUE program until you submit your planning document for approval.

Appendix A identifies where to include WUE requirements in your planning documents.

5.2 Process for Developing a Water Use Efficiency Program

Setting goals will help you and your customers use water efficiently. Every goal must have a benchmark that is quantifiable within a prescribed amount of time.
Consider the following eight steps when developing your WUE program:

1. Evaluate the effectiveness of your current and prior water conservation programs.
2. Select cost-effective WUE measures that support your proposed goals.
3. Establish one or more quantifiable goals through a public process.
4. Fund your WUE program. Consider combining financial resources and forming partnerships with other entities, such as nearby water systems, working toward the same goal.
5. Educate your customers about the benefits of conservation.
6. Be prepared to offer incentives or develop ordinances for using water efficiently.
7. Keep your customers involved by informing them of new measures that support your goals.
8. Set up a method to evaluate the effectiveness of your WUE program every few years.

Partnering With Other Water Systems

If you want to lower your WUE program costs, one option is to team up with other water systems. By combining resources, you can save money on developing and promoting educational messages. You may also save by coordinating on bulk purchases of water-efficient devices.

You can learn valuable information from neighboring water systems. Water systems with similar characteristics to yours may have already implemented successful WUE measures. Take the opportunity to learn more from those water systems, because those same measures may work for your water system.

Here's an Idea

You may want to consider coordinating your WUE efforts with neighboring water systems, other types of utilities, and local businesses. Pooling resources can lead to greater water conservation savings.

Partnerships may help you achieve your goal in the following ways:

- Combine financial resources.
- Purchase items in bulk to save money.
- Share technical information and expertise.
- Improve relationships.
- Increase public acceptance and awareness of using water efficiently.
- Provide marketing opportunities for local businesses.

These can be win-win situations for everyone involved.

Partnering With Other Types of Utilities

Another option is to work with other types of utilities. Energy utilities are interested in customers using less energy. Wastewater utilities are interested in decreasing wastewater volume. Consider partnerships that help everyone achieve their goals of efficiency. Your local energy or wastewater utility may already have programs in place, so you may want to partner with them on educational efforts and materials.

Partnering With Local Businesses and Organizations

Partnerships with local businesses and nonprofit organizations can assist with promoting your WUE program. Local nurseries and landscaping companies can showcase native and drought-tolerant plants to their customers with a water-efficient demonstration garden. Hardware stores may highlight water-efficient fixtures and irrigation supplies. Nonprofit organizations interested in water efficiency and water resources may assist by providing bulk-purchasing possibilities, such as the Partnership for Water Conservation at www.partners4water.org/

5.3 What to Include in Your Water Use Efficiency Program

You must include specific information in your WUE program. A thorough analysis of your current WUE program will help you develop an attainable goal, define parameters for cost-effectiveness, and customize the program to meet the needs of your water system. The following 11 items summarize what to include in a WUE program:

1. **Describe your current water conservation program.** Describe what you are currently doing to use water efficiently. This would include your "demand side" measures, such as offering free faucet aerators to your customers; your "supply side" measures such as a recent leak detection survey; or both.

   Water systems with 1,000 or more connections must also estimate the amount of water saved by implementing their current WUE program over the prior 6 years or over the most recent water system plan approval period (WAC 246-290-810(4)(b)).

2. **Describe the WUE goals that support your WUE program and how the goals were established.** Describe how the elected governing board or governing body developed the goals through a public process (WAC 246-290-830). Include a copy of any adopted resolution or other official document that identifies your elected governing board took an action to adopt the goal. See Chapter 7 for a complete description of how to set your goals.

3. **Evaluate WUE measures for cost-effectiveness**. Take some time to research which measures would be a "good-fit" for your customers and evaluate whether they would be cost-effective. See Section 5.6 for guidance on what to include for this part of your WUE program.

4. **Describe the WUE measures you will implement to meet your established goals for the next 6 years.** Identify which measures will be funded to support the program and help you meet your established goals. A minimum number of measures must be evaluated or implemented based on the number of connections for your water system (see Section 5.6).

5. **Describe how you will educate customers to use water efficiently.** General education to your customers about the importance of using water efficiently is required under WAC 246-290-810(4)(f). In order to meet this requirement, you'll need to educate your customers at least once per year. See Section 5.7 and Appendix J for water conservation tips to use for your customers.

6. **Estimate projected water savings from the selected WUE measures.** Every measure you select to implement should result in water savings. You will need to predict:

   - How each measure supports the goal.
   - The amount of water savings that will result from each implemented measure.

   The measures you select establish your WUE program and will affect your future water demand. See Chapter 4 for guidance on how to predict water savings based on different WUE programs.

7. **Describe how you will evaluate the effectiveness of your WUE program.** WUE programs change for a number of reasons. Things such as a drought, budget constraints, changes in demographics, and climate change all may contribute to shifts in water use patterns. Plan to adapt and amend your WUE program to keep it economical and effective.

8. **Evaluate distribution system leakage.** When you submit your planning document, you must report distribution system leakage (DSL) for the previous 6 years or for the entire water system plan approval period if it's longer than 6 years (WAC 246-290-810(4)(i)(i)). A water loss control action plan must be included with your planning document if the rolling 3-year average of DSL exceeds the leakage standard (WAC 246-290-810(4)(i)(ii)).

9. **Evaluate rate structures that encourage water demand efficiency.** The rate structure you implement can have a significant effect on water use and promote water efficiency. See Section 5.4 for guidance on what to include in this part of your WUE program.

10. **Evaluate reclaimed water opportunities.** You must evaluate reclaimed water opportunities if you serve 1,000 connections or more. See Section 5.5 for guidance on what to include in this part of your WUE program.

11. **Describe your water supply characteristics.** Both you and your customers should understand the impact of water use in your community. Awareness of the water supply characteristics within your watershed should help guide your WUE program and goal setting decisions. See Chapter 3 and Appendix C for guidance on what to include in this part of your WUE program.

5.4 Evaluate Your Rates

Implementing a rate structure that encourages efficient use of water is a good way to help educate your customers about the costs of providing safe and reliable drinking water and influence their water use.

You must **evaluate** a rate structure that encourages water demand efficiency (WAC 246-290-100(4)(j)(iv)(B) and 246-290-105(4)(l)). There are a couple of things to consider when performing this evaluation:

- **First, describe your current rate structure**. Some of the most common rate structures do not encourage your customers to use water efficiently. These are declining block rate (charge per unit of water decreases with higher use), flat rate (fixed fee regardless of water use), and uniform rate (same charge per unit of water use).
- **Second, evaluate at least one of the following conservation rate structures:**
  - **Inclining block rates:** Charge per unit of water increases with higher use.
  - **Seasonal rates:** Charge per unit increases during peak usage season; generally targets outdoor summer use.

Evaluate the feasibility of adopting and implementing a conservation rate structure. The evaluation should identify the pros and cons of the chosen rate structure for both your water system and your customers. Describe how rates may help fund your water system, your WUE program, and established goals.

Uniform block rates are more effective than declining block or flat rates because they are based on consumption. We realize that some water systems will see water savings by changing from one of these rate structures to a uniform rate structure. You can only evaluate uniform rates only if you are currently using a declining block rate or flat rate.

Implementing a new rate structure takes time. The elected governing board or governing body should ensure the rate structure will cover all of the needs of your water system.

You should also inform and educate your customers about what the new rate structure is, how it will affect their bill, and why the rate structure change is necessary. Describe exactly what expenses the rate increase will cover, and inform customers that efficient use of water may eliminate or delay the need for costly new sources that would cause an even greater rate increase.

Other things to consider:

- Explain to your customers that if they use water efficiently, then their water bills will not go up. Give them ideas to use water efficiently to prevent higher water bills.
- Establish a rate committee to work with you on proposing a new rate structure.
- Prepare mock bills so your customers can see how the new rate structure will affect their bill before they actually have to pay the higher amount.
- Provide historical use data in water bills to show customers how much they used previously.
- Washington Utilities and Transportation Commission regulated water systems may have additional requirements to follow. For more information, contact Utilities and Transportation Commission by email at consumer@wutc.wa.gov or 1-800-562-6150.

5.5 Evaluating Reclaimed Water Opportunities

The use of reclaimed water can help balance the water use demands of water systems, leading to greater water savings. We support the use of reclaimed water for nonpotable purposes such as irrigation, industrial uses, and groundwater recharge. Using reclaimed water saves potable water for drinking water purposes and is an efficient use of the state's water resources.

Water systems with 1,000 or more connections must collect information on reclaimed water opportunities and include that information in their planning documents. (WAC 246-290-100(4)(f)(vii)). When evaluating opportunities for the use of reclaimed water, you should identify:

- Where reclaimed water could potentially be used, such as parks, golf courses, groundwater recharge facilities, and car washing facilities.
- Where reclaimed water production facilities exist and the locations of reclaimed water distribution lines (purple pipes).
- Any barriers to the use of reclaimed water, such as cost, permitting issues, water rights mitigation, and local regulations that govern the use of reclaimed water.

Did you know?

Saving Water Reduces Other Utility Bills

Many people forget that when they save water, they also save money on sewer fees and energy costs.

If you use less hot water when you're washing the dishes or taking a shower, you're also saving on your energy or gas bill.

Sewer rates, often based on water use, can be as much as two to four times higher than water rates. So, by using less water you also save money on your sewer bill.

- Contractual obligations and agreements that limit the use of reclaimed water.
- Where reclaimed water is used or proposed within your water service area. Provide a description and estimate usage.
- Your efforts to develop existing or new opportunities for the use of reclaimed water.

The use of reclaimed water is considered a WUE measure, or multiple WUE measures if you use it for multiple purposes (see Section 5.7).

5.6 Evaluation of Water Use Efficiency Measures

You must evaluate or implement a specified number of measures specifically targeted for your customers. Each evaluation is related to the cost-effectiveness of the measure. The number of measures you must evaluate or implement is based on the size of your water system. Larger water systems must evaluate or implement more measures. Table 5-1 identifies the number of measures you must evaluate or implement based on your number of existing connections. This number represents a minimum number of measures. You may evaluate or implement additional measures if necessary to meet your goals.

Remember, you must evaluate measures that support the goal you are proposing or have established for your customers. Each measure you select to implement must have an implementation schedule (WAC 246-290-830(6)(d)).

Supply side measures, such as leak detection surveys or replacing meters are not one of the minimum number of measures you are required to evaluate or implement. These types of measures must be implemented in order to reduce water loss and achieve the leakage standard.

Measures must be evaluated for cost-effectiveness from the following categories, if applicable to your water system (WAC 246-290-810(4)(d)):

- Indoor residential
- Outdoor
- Industrial/commercial/institutional

Table 5-1 Water Use Efficiency Measures Based on Total Number of Service Connections

Number of Connections	Less than 500	500 - 999	1,000 - 2,499	2,500 - 9,999	10,000 - 49,999	50,000 or more
Water Use Efficiency Measures	1	4	5	6	9	12

On a Budget?

Choosing Inexpensive Measures to Achieve Your Goals

Does your water system operate with limited financial resources and staff?

Choosing the right measures to achieve your WUE goals can be a challenging task if you've never done it before. For smaller water systems with less than 1,000 connections, we recommend that you implement at least one quantifiable measure.

Inexpensive quantifiable measures include things such as faucet aerators, low-flow showerheads, and hose repair kits. You don't need to buy one of these for every customer, consider purchasing enough quantities to reach 50% of your customers and have them available for pick-up to save on mailing costs.

Some of the most inexpensive measures (such as education) are the most difficult to quantify. Here are some commonly used WUE measures that water systems implement:

- Sending water savings tips to your customers in the annual water quality report.
- Conservation rate structures.
- Educating customers to identify and repair leaks in and around their homes.
- Sending our *Stop Water Waste* brochure once a year.
- Educating customers how to save money on water and energy bills by installing WaterSense fixtures and appliances.
- Showing consumption history on water bills.
- Placing water saving educational materials on their website.

Evaluation Criteria

If you choose to implement a WUE measure, you don't have to evaluate it for cost-effectiveness. Even though you don't have to evaluate the measure for cost-effectiveness, an evaluation of water savings may still be necessary to forecast demand. Knowing the expected costs to implement a measure will help you develop your budget. We encourage you to implement WUE measures that will meet your goal and support your WUE program.

Water systems with less than 1,000 connections—Describe how you evaluated any measures you chose not to implement.

Water systems with 1,000 or more connections—There are three evaluations a water system must consider when determining if a WUE measure is cost-effective (WAC 246-290-810(4)(d)(iv)). They include:

1. **Water system's perspective:** This looks to see if it would be cost-effective for the water system. Water systems must include the marginal costs of producing water. Marginal costs are the costs associated with developing supply to meet future demand and may include such costs as a new well, new distribution or transmission lines, new storage, or a new booster station. In other words, the benefits of using water more efficiently should be quantifiably measured against the potential costs of developing new sources of supply.

2. **Cost-sharing perspective:** This looks to see if it would be cost-effective if the costs were shared with other entities, such as neighboring water systems, water conservation partners, sewer districts, regional partners, wholesale water agencies, and energy utilities. Cost sharing can reduce WUE program implementation costs and give water systems a way to identify measures that will also benefit other entities with common interests.

3. **Societal perspective:** This looks to see if it would be cost-effective if all costs and benefits were included. Water systems should begin by identifying some of the other benefits that may occur by implementing the WUE measures. This may include environmental, recreational, or aesthetic benefits such as more water in the river. This can be a quantitative or qualitative evaluation because these benefits are more difficult to quantify.

Here's an Idea

Evaluating Cost Effectiveness

The Partnership for Water Conservation has a free "Water Conservation Measures List and Measure Evaluation Tool" for its members. This tool will help you choose cost effective measures and estimate water savings.

For more information about the Partnership for Water Conservation visit:

www.partners4water.org/index.html

What is a credible cost-effective evaluation?
A cost-effective analysis is used to compare WUE measures on a dollar value basis. Identifying the benefits and costs associated with each WUE measure will help you determine which measures should be implemented to meet your goal. A WUE measure is cost-effective if the benefits exceed the cost.

A simple way to do this is to look at the difference between the per gallon cost of conservation and the per gallon cost of supply.

A credible evaluation of each measure should consider:

1. Cost of the measure:
   - Materials
   - Rebates
   - Contractor costs
   - Labor
   - Staffing
   - Advertising
2. Estimate of savings:
   - Number of units to be installed
   - Water savings per unit

3. Cost benefit comparison
4. Net benefit of conservation

More information is available in the U.S. Environmental Protection Agency's Water Conservation Plan Guidelines at www.epa.gov/watersense/pubs/guide.html

What is WaterSense?

WaterSense is a program sponsored by the U.S. Environmental Protection Agency (EPA). Much like the ENERGY STAR symbol for energy-efficient products and practices, WaterSense is the symbol for water efficient products, services, and practices.

WaterSense helps your customers identify products that meet EPA's criteria for water efficiency and performance. WaterSense labeled products, such as washing machines, faucets, and showerheads, use 20% less water than standard products. **Best of all, they work without sacrificing performance!** You may remember that many "low-flow" toilets from the 1990s performed terribly. The WaterSense labeled water-saving products of today are tested to ensure water efficiency **and** performance. Look for

WaterSense labeled products and start saving water today!

Why You Should Join WaterSense

First of all, it's free! Second, it's very likely that your customers aren't aware that purchasing WaterSense certified fixtures and appliances are guaranteed to save them water. Third, it's an easy way to help you achieve your Water Use Efficiency (WUE) goals.

Remember, the WUE rule says that you must educate your customers. As a Water Sense partner, you'll receive a free educational tool kit available only to partners to help you inform your customers about the WaterSense program. Use these free resources to meet the WUE educational requirement!

How to Become a WaterSense Partner

Visit www.epa.gov/watersense/partners/promotional.html for more information

5.7 What Qualifies as a Water Use Efficiency Measure

A WUE program must include both supply and demand efficiencies. Certain measures must be implemented while other measures must be evaluated. Measures may include water efficient devices, actions, business practices, or policies or ordinances that promote efficient water use.

Supply-side measures (such as leak detection surveys, installing or replacing meters, and water audits) that support supply-side goals to reduce leaks don't count towards the minimum number of measures listed in Table 5-1 that must be evaluated or implemented in WAC 246-290-810(4)(d)(ii). These are considered activities that your water system implements to understand and control water loss.
The measures you evaluate or implement must focus on encouraging your customers to use water efficiently. The following mandatory measures don't count towards the minimum number of measures listed in Table 5-1.

Mandatory Measures You Must Implement or Evaluate

You must implement the following WUE measures:

- Install production (source) meters—WAC 246-290-496(1).
- Install consumption (service) meters—WAC 246-290-496(2).
- Perform meter calibration—WAC 246-290-496(3).
- Implement a water loss control action plan to control leakage—WAC 246-290-820(4).
- Educate customers about how they can use water efficiently at least once per year (see more about education on the next page)—WAC 246-290-810(4)(f).

You must evaluate the following WUE measures:

- Evaluate rates that encourage water demand efficiency (WAC 246-290-100(4)(j)(iv) and 246-290-105(4)(l)). See Section 5.4 for more information.
- For water systems with 1,000 or more connections, evaluate reclamation opportunities (WAC 246-290-100(4)(f)(vii)). See Section 5.5 for more information.

Does Your Existing WUE Program Already Meet the Minimum Number of Measures?

Many activities from your current WUE program may already qualify as implemented measures. Here are a few that you may currently be implementing, and they would count towards the minimum number of measures listed in Table 5-1:

Conservation Rate Structures
You must evaluate a rate structure to increase water demand efficiency (WAC 246-290-100(4)(j)(iv) and 246-290-105(4)(l)). Because these sections only require an evaluation,

implementing a conservation rate structure counts as a WUE measure (WAC 246-290-810(4)(d)). We encourage you to adopt rates that encourage customers to use less water while at the same time fund your WUE program and maintain revenue.

Reclaimed Water
Water systems with 1,000 or more connections must evaluate reclamation opportunities (WAC 246-290-100(4)(f)(vii)). Because this section only requires an evaluation, the actual use of reclaimed water counts as a WUE measure (WAC 246-290-810(4)(d)). The use of reclaimed water is considered a WUE measure or multiple WUE measures if you use it for multiple purposes. See Section 5.5 for additional information about reclaimed water.

Notifying Customers About Leaks on Their Property
Educating your customers about fixing the leaks within their homes or on their property counts as a WUE measure (WAC 246-290-810(4)(d)). Also, if you have a program that notifies customers of unusually high water bills that may be due to a leak on the customer side of the meter, it counts as a WUE measure.

Educating Your Customers
You must educate your customers about the importance of using water efficiently. This may include communicating this message through a newsletter, customers' bills, or your annual consumer confidence report (WAC 246-290-810(4)(f)). If you educate your customers more than once per year, it counts as a WUE measure. This would include educational measures, such as school programs, advertising (such as bus ads), or consumer education at fairs (WAC 246-290-810(4)(d)).

Education should focus on informing your customers about hardware measures that are guaranteed water savers. Hardware measures (such as telling your customers to look for the WaterSense label) are those that can be easily quantifiable and rely less on behavior changes (such as turning off the faucet when brushing teeth).

Did you know?

Estimated Faucet Leakage Rates (number of drips)

60 drops/minute	= 192 gallons/month
90 drops/minute	= 310 gallons/month
120 drops/minute	= 429 gallons/month

2010 EPA WaterSense Promotional Partner of the Year

Cascade Water Alliance
With only one full-time staff member overseeing water conservation programs, Cascade Water Alliance successfully used its WaterSense partnership to help stretch limited resources and expand into an even more comprehensive water conservation program for its eight member agencies in King County, Washington. Collaborating with local retailers and professionals, Cascade was able to promote WaterSense and the importance of water efficiency to the 400,000 residents and 22,000 businesses it serves, without breaking the bank.

Cascade worked with nearly 100 plumbers and prominent retailers including The Home Depot, Lowe's, and Ace Hardware to help make WaterSense a permanent fixture in more than 2,000 households and local businesses. Cascade promoted its toilet rebate program by working closely with these organizations and even filmed an informational video to educate residents about the benefits of WaterSense labeled toilets.

Cascade also recognized the importance of educating consumers at the point of purchase and provided free training for retailer staff; issued point-of-purchase materials; and conducted regular, in-store visits, which helped establish strong relationships and encouraged promotion of the WaterSense label. According to sales staff, some retailers estimated that thanks to Cascade's rebate program, 75 to 90 percent of their toilet sales are WaterSense labeled toilets—up from virtually zero a couple years ago. Ninety-four percent of customers surveyed by Cascade said their new toilets perform as well as or better than their previous models, affirming EPA's performance criteria for WaterSense labeled products. Cascade also collaborated with Seattle Public Utilities to achieve water savings outdoors, offering $50 rebates to consumers hiring primarily WaterSense irrigation partners to install rain sensors.

Cascade also took WaterSense on the road with the WaterSense Road Show—a traveling display that visits public events distributing free water-saving plumbing fixtures and educating residents about using less with WaterSense. During WaterSense's Fix a Leak Week, Cascade distributed more than 100,000 toilet leak detection kits by mail to encourage families to check for leaks and look for the WaterSense label when considering new fixtures. The leak detection kit won the

The more often you educate your customers, the more likely you will change your customer's behavior about using water efficiently and help you meet your goal. Whenever possible, reward your customers for their efforts to use less water. Help them understand they are part of the solution. When educating your customers, explain to them:

- Why water conservation is necessary (such as protecting future water supplies).
- The financial benefits of conserving water (such as how it might save them money on their utility bills).
- What might happen if water is not conserved (such as mandatory restrictions during a drought).
- What your customers can do to help you achieve your goal (such as providing tips on how to save water and **what types of water saving devices achieve long-term savings**).

Customer Class
If a specific WUE measure is being implemented for different customer classes, it counts as multiple WUE measures. For example, toilet rebates across three customer classes (single family, commercial, and multifamily) count as a measure for each customer class, for a total of three implemented measures.

For more examples of WUE measures, see Appendix B.

5.8 Water Use Efficiency Programs for Nonmunicipal Water Suppliers

While most Group A community water systems are considered municipal water suppliers, many noncommunity water systems aren't municipal water suppliers. It is in the best interest of all water systems to use water resources wisely.

Even if you don't qualify as a municipal water supplier, as a public water system, **you are still required to have a basic WUE program within your planning document (WAC 246-290-100(4)(f)(i) and 246-290-105(4)(g))**.

See Appendix U for an example of what to include in your WUE program if you are a nonmunicipal water supplier. The requirements are different depending on whether you must prepare a small water system management program or water system plan.

Chapter 6: Distribution System Leakage

6.1 Overview of the Distribution System Leakage Requirement

The distribution system leakage (DSL) standard is a significant element of the water use efficiency (WUE) requirements. Collecting source and service meter data is the best way to obtain accurate water loss information and provides the most accurate information to calculate DSL.

Leaky water systems are costly. Significant revenue is lost through leaks, including:

- Energy costs for pumping water.
- Water treatment costs.
- Water that could be sold to other customers.

Water is a precious and limited resource. You should make every effort to keep leakage to a minimum and strive to meet the DSL standard. Compliance with the leakage standard is based on a 3-year average.

In order to calculate DSL, you must first install service meters on all existing direct service connections (WAC 246-290-820(2)(a)). Until then, report your progress towards installing meters and all actions taken to minimize leakage in your annual WUE report (see Section 2.6).

6.2 Water Loss Terminology

Water systems have been using the term "unaccounted-for water" for many years, yet the term does not have a standardized definition. All water should be accounted for, nothing should be unaccounted for.

The WUE requirements use the terms "authorized consumption" and "distribution system leakage." In order to account for water loss, all water that enters the distribution system must go into the authorized consumption or distribution system leakage category.

Authorized Consumption

Authorized consumption is defined as the volume of water **authorized for use** by the water system. All unauthorized uses and any water that cannot be tracked is considered DSL (WAC 246-290-820(2)(c)).

If authorized uses are tracked and estimated, these volumes of water can be added into the authorized consumption category. Any authorized water not estimated will be considered DSL, so it is important to track these events.

You cannot estimate consumption by unmetered customers/connections to the water system such as residential homes or city parks. Even though these are authorized uses, they must be metered and will count as DSL until a meter is installed. These types of existing connections to your water system must have a meter installed by January 22, 2017.

Some examples of unmetered authorized uses that can be tracked and estimated include:

- Maintenance flushing of the water system
- Cleaning of water tanks or reservoirs
- Fire-fighting (hydrant)
- Street cleaning

Distribution System Leakage

All water that is not authorized consumption is considered DSL. DSL is defined as the water lost from the distribution system and includes both apparent losses and real losses. Apparent losses include things such as theft, meter inaccuracies, and data collection errors. Real losses are the physical losses from the distribution system and include such things as reservoir overflows, leaky valves, and water main breaks. Neither apparent nor real losses are authorized uses of water, therefore they are considered leakage even if they are not actual "leaks."

Some examples of water loss that you would put in the DSL category include:

- Theft
- Meter inaccuracies
- Meter reading errors
- Data collection errors
- Calculation errors
- Water main breaks

Transmission Line Leakage

Some water systems have extensive transmission lines. You may exclude transmission line losses from the DSL calculation when there is a production meter located upstream of the entry to the distribution system (WAC 246-290-820(2)(b) and 246-290-496(1)(a)). If an additional production meter is not installed upstream of the distribution system, the entire transmission line losses are considered DSL (WAC 246-290-820(2)(c)).

If you are excluding transmission line leakage from DSL, you must describe transmission line leakage and the efforts taken to minimize leakage in your planning document (WAC 246-290-810(4)(i)(iii)). This does not replace any source meter requirements or waste of water requirements adopted by the Department of Health or the Department of Ecology.

6.3 Calculating Distribution System Leakage

Annual DSL is calculated in both percentage and volume. At a minimum, collect:

- The amount of water produced from the source(s).
- The amount of water purchased from another supplier.
- The amount of water consumed by your metered customers and any other estimated authorized use.

Below are the equations used for calculating the volume and percent DSL.

Note: When submitting your annual WUE report online, you don't need to calculate DSL, the database will do it for you.

Calculating Volume Distribution System Leakage

To calculate volume DSL, use the following equation:

Volume DSL = TP - AC
Report volume DSL in gallons

Calculating Percent Distribution System Leakage

To calculate percent DSL, use the following equation:

Percent DSL = ((TP - AC) / (TP)) x 100
Where:
DSL = Percent (%) of distribution system leakage
TP = Total water produced and purchased
AC = Authorized consumption
Round your percentage to the nearest tenth.

Use Appendix D and the following three guidelines to help you determine your TP and AC for the year.

1. Add up the amount of water produced from all sources and any water purchased from other water systems.
   a. Most water systems will use source meters for determining water produced.
   b. Water systems excluding transmission lines will use the production meter located prior to the distribution system.
   c. Other water systems will only use the amount of water purchased through an intertie, if this is the only source of water.
   d. Complex water systems may use all of the above.

   This is your total production and purchased (TP).

2. Add up the following categories to determine authorized consumption:
   a. Amount of water delivered to customers from service meters.
   b. Amount of water sold to another water system.
   c. Estimated authorized consumption (for example, fire flow and flushing of water mains). When calculating DSL you may subtract unmetered or unbilled authorized use from your TP if these events are tracked and estimated. Events not tracked are considered DSL.

   This is your authorized consumption (AC).

3. Calculate volume and percent DSL.

Table 6-1 shows how data might be used to calculate DSL. Your water system may have different data to include or exclude in your DSL calculation.

Table 6-1: Water System Distribution System Leakage Calculation Example

Add up the amount of water produced from all sources	5,000 MG
Add any water purchased from other water suppliers	500 MG
TOTAL PRODUCTION AND PURCHASED (TP)	5,500 MG
Add up the annual amount of water delivered to customers from your service meters	4,300 MG
Add any water sold to another water system	0 MG
Add all estimated authorized uses (fire flow, flushing of mains, and other authorized uses)	
Flushing	3 MG
Fire flow	1 MG
TOTAL AUTHORIZED CONSUMPTION (AC)	4,304 MG
Volume DSL = 5500—4304 = 1,196,000,000 gallons[3]	
Percent DSL = (5500—4304)/5500 x 100 = 21.7%[4]	

[3] Report volume DSL in gallons.
[4] When calculating percent DSL, round up or down to the nearest tenth.

6.4 Alternative Methods to Calculating Distribution System Leakage

WUE requirements allow alternative methodologies for calculating DSL. The alternative methodology allows you to use a different formula for calculating DSL—it does not replace the service meter requirement. We must approve any alternative methodologies that provide a better evaluation of DSL. Once approved, the alternative methodology can be used statewide. At this time, there are no department-approved alternative methods to evaluate DSL, so use the formula provided in WAC 246-290-820(2).

Any alternative methodology must be (WAC 246-290-820(3)):

1. Approved by the Department of Health.
2. Published as a standard or specification by one of the following agencies:
    - Environmental Protection Agency.
    - American Water Works Association.
    - American Public Works Association.
    - American Society of Civil Engineers.
    - Department of Health.
3. Contain numerical standards so that compliance with the DSL standard can be determined.

If you are exempt from installing service meters (see Chapter 2), you are not exempt from meeting the DSL standard. A good way to determine leakage in the absence of service meters is by conducting night flow testing. Measuring the amount of water used between the hours of 2:00 and 4:00 a.m. is a good indicator of the extent of your water loss.

Here's an Idea

Use AWWA's free water audit software to conduct a standard water audit

Water audits are one of the most useful tools to determine your water loss. The Water Loss Control Committee of the American Water Works Association created free water audit software in 2006 in order to standardize the auditing process and provide you with a user-friendly tool to conduct a standard water audit.

Once you understand where your losses are coming from through completion of a water audit, you can focus your efforts on reducing leakage to obtain real and meaningful water savings.

Visit AWWA's web site to download the free water audit software:

http://www.awwa.org/Resources/WaterLossControl.cfm?ItemNumber=48511&navItemNumber=48158

Two good references for controlling water loss:

- *Water Loss Control-Second Edition*, Thornton, Sturm, and Kunkel, McGraw Hill Company, 2008.
- AWWA's M36 Manual-Third Edition, 2010

6.5 Distribution System Leakage Standard Compliance

In order to reduce leakage within your distribution system, we expect you to troubleshoot where your apparent losses are occurring (such as inaccurate meters) and make efforts to find and repair leaks (such as conducting a leak detection survey).

After 3 years of collecting leakage data, calculate the average of those 3 years. Compare this 3-year average to the DSL standard. This is the compliance point for meeting the DSL standard.

For every year thereafter, DSL is calculated using a rolling 3-year average[5] from the previous 3 years. When calculating percent DSL, round up or down to the nearest tenth.

There are four ways to comply with the DSL standard.

1. **Ten percent or less DSL** (WAC 246-290-820(1)(b)(i))
   WUE requirements establish a 10 percent or less DSL standard based on a 3-year rolling average. If your water system meets this standard, you are in compliance.

2. **Alternative methodology** (WAC 246-290-820(1)(b)(ii) and 246-290-820(3))
   Water systems that use an alternative methodology to calculate leakage must meet the numerical standard established for that alternative methodology. We will develop compliance and action levels to determine whether a water system is in compliance.

3. **Twenty percent or less for water systems with less than 500 connections**
   (WAC 246-290-820(1)(b)(iii) and 246-290-820(5))
   Water systems with less than 500 connections are allowed up to 20 percent DSL **only if they specifically request the higher level of leakage and submit the following evidence to the department**:
   - Production volume.
   - DSL volume.
   - A leak detection survey has been completed in the most recent plan approval period for water system plans and in the last 6 years for small water system management programs. .
   - All leaks found have been repaired.
   - Unable to find more leaks in the water system.
   - Efforts to minimize leakage are part of the WUE program.
   - Justification of the technical, economical or water system characteristics for the higher level of leakage.

[5] For example, after the third year of reporting leakage, you will take the average of years 1-3. In year 4, average leakage is based on years 2-4, and so on.

4. **Water loss control action plan** (WAC 246-290-820(1)(b)(iv) and 246-290-820(4))
   If your water system exceeds the DSL standard, you must develop and implement a water loss control action plan (see Section 6.7 for an example). If you have developed and are implementing your water loss control action plan, you are in compliance. Completing the International Water Association's water audit as part of your WLCAP will result in compliance as well. If your water system exceeds the DSL standard, summarize your water loss control efforts in the annual WUE report. (See Section 6.7 for more information about the water audit.)

6.6 Reducing Leakage

You comply with the DSL standard if you develop and implement a water loss control action plan. Depending on the amount of leakage, you may need to take aggressive action to get leakage under control.

There are three categories of water loss control action plans:

For water systems greater than 10 and less than 20 percent DSL, you must:

1. Assess data accuracy.
2. Assess data collection methods and errors.

For water systems between 20-29 percent DSL, within 12 months you must:

3. Complete 1 and 2 above.
4. Implement field activities to reduce leakage.

For water systems with 30 percent or greater DSL, within 6 months you must:

5. Complete steps 1, 2, and 4 above.
6. Implement additional water loss control methods to reduce leakage.

Water Loss Control Methods

Water loss control methods are the activities your water system implements to reduce leakage in the distribution system. The following list of water loss control methods can help you lower DSL:

- Conduct a water audit (we recommend you use the IWA Water Audit).
- Conduct a leak detection survey.
- Repair leaky storage tanks.
- Calibrate or replace meters.
- Synchronize production and consumption meter reading schedules.
- Develop a schedule and budget for replacing old distribution lines.
- Control theft of water.

Implementing water loss control methods will help you achieve the DSL standard and identify actions you can take to reduce wasted water. Once losses are controlled, you will benefit from lower operating costs, lower energy bills, and increased safety and reliability in providing water to your customers.

6.7 Water Loss Control Action Plan: What to Include and How to Submit

Your water loss control action plan must be submitted within your planning document, or if requested by us (WAC 246-290-820(4)). **We recommend that you summarize your water loss efforts within your annual WUE report.**

At a minimum, include the following in your water loss control action plan:

- Water loss control methods you will implement to strive for the DSL standard.
  - Such as leak detection, meter replacement, or perform a water audit.
- An estimate of how long it will take you to achieve the standard.
  - You may want to establish a goal to identify a benchmark.
- A budget that demonstrates how you will pay for controlling leakage.
  - Consider a rate increase, to apply for loans and grants, or any other means to pay for infrastructure improvements.
- Any technical or economic concerns that will prevent you from complying with the standard.
  - If you feel that you cannot meet the DSL standard, you must explain what factors are keeping you from complying. A strong case will need to be made in order to be credible.

Example of a Water Loss Control Action Plan

Our water system established a supply-side goal to reduce DSL to less than 10% by 2010 or within 3 years after becoming fully metered. We finished installing water meters on all connections and city-owned facilities in April 2010. The DSL was at 20% for 2008 and was reduced to 19.2% in 2009; which is a savings of 1 MG per month on average.

We have been very active in taking steps to help reduce the DSL, such as repairing leaks when they are found or when we are notified, and replacing older water lines and leaking valves. We also set up a meter replacement schedule for the larger outdated commercial and industrial water meters, which is expected to be completed in 2012.

As a result of replacing these meters, we expect our revenue to increase from more accurate measurements. The city has taken steps to verify the collection of the monthly data and to have the source meters calibrated for accuracy.

We plan to propose a 1% rate increase to our city council this spring to cover the expenses of needed infrastructure improvements to reduce DSL. We are concerned with the amount of DSL and committed to finding, repairing, and meeting the established system distribution leakage standard by 2013.

Complying with the DSL Standard by Completing the International Water Association Water Audit

In 2010, AWWA published their M36 Manual that adopted the International Water Association (IWA) water audit methodology to evaluate water loss. Completing the IWA water audit is the best action you can take to demonstrate compliance with the DSL standard. We think it's an appropriate way to show that you understand what to do to control water losses and meets the intent of the WUE rule. This new water audit method is, in our opinion, currently the best available option for you to evaluate water loss.

Meter Inaccuracies are Considered in the IWA Water Audit

If you're concerned about meter inaccuracies, the IWA water audit method recognizes and allows for customer meter inaccuracies across the entire distribution system when evaluating water loss. This will address any concerns some water utilities may have regarding upsizing of meters to meet residential fire sprinkler flow requirements.

How to Demonstrate Compliance

You can prove that you are serious about reducing DSL within your water system by completing the IWA water audit. Upon completing the audit, you will receive a score that identifies focus areas for you to plan for and implement in order to reduce water losses. Use the planning tool to establish timeframes and benchmarks for achieving water loss reductions.

You will be in compliance with the DSL standard, regardless of your level of DSL, if you complete the IWA water audit as part of your water loss control action plan.

Follow this step-by-step process to complete the IWA water audit and include it in your water loss control action plan:

1. Collect annual total production and authorized consumption as you normally do each year.
2. Enter that information in the online reporting database.
3. If your calculated 3-year average DSL is over 10%, then you must complete a WLCAP.
4. You have the option of completing the IWA water audit within your WLCAP to demonstrate compliance with the DSL standard.

The WLCAP must include:

- A completed IWA water audit.
- Water loss control methods you will implement to strive for the DSL standard.
- An estimate of how long it will take you to achieve the standard.
- A budget that demonstrates how you will pay for controlling leakage.
- Identify actions and benchmarks to achieve water loss reductions as a result of completing the IWA water audit.
- Implement the recommended "functional focus areas" within the "water loss control planning guide" of the IWA water audit based on your individual water audit data validity score.
- Establish a supply-side goal, including a timeframe, to achieve an infrastructure leakage index (ILI) of 3.0 or lower.
- Implement water loss control activities that strive to achieve an ILI of 3.0 or lower.
- Include a copy of the IWA water audit results within the WUE Program of a water system plan or small water system management program or to the department upon request.

AWWA's M36 Manual Overview

- Clear steps to compile the IWA water audit.
- Rational terms, definitions, and performance indicators that give water utilities objective ways to assess their water loss standing and reliably plan loss control activities.
- Worksheets, sample calculations, and references to AWWA's free water audit software.
- Techniques to capture more revenue by controlling apparent losses in customer metering and billing operations, as well as unauthorized consumption.
- Innovative technologies to move from reactive, "break and fix" leakage response to proactive leakage management featuring component analysis, pressure management, leak noise logging and other advanced technologies: successful approaches to minimize unnecessary source water withdrawals and excessive water production costs.
- Structured guidance on planning the loss control program.
- Considerations for small water utilities.
- Case study accounts from small, medium, and large water utilities.
- View this website to learn more about the IWA water audit method:

  http://www.awwa.org/Resources/WaterLossControl.cf

Chapter 7: Goal Setting and the Public Forum

7.1 Overview of the Goal Setting Requirement

One of the most important steps in using water efficiently is setting goals that can be measured. Goals provide a benchmark for achievement and play a significant role in defining the success of your water use efficiency (WUE) program. You must set your own goals through a public process (WAC 246-290-830(4)(a) at least every 6 years.

The Impact of WUE Goals/Programs on Utility Revenue
There is no question that implementing a WUE program and goals to reduce customer consumption has the potential of reducing your revenue. While this may be the case, it's no excuse to not use water efficiently and should not prevent you from developing an effective WUE program. Since you are required to put together a WUE program and goals, you'll need to take a serious look at the effect on revenue and find a way to keep those dollars coming in the door to maintain financial viability.

Here are some tips to create a successful path forward:

- Before you establish a goal, recognize that you may reduce revenue, and consider a rate increase. You may need to re-think your rate structure entirely and adopt a tiered rate approach.
- Consider rate increases on those customers that use the most water, this will help you obtain the revenue you need. Reward those customers that use the least water by not raising their rates at all, if possible.
- Determine the revenue effect of a WUE goal before you establish it. For example, if you establish and achieve a 5% reduction goal over 5 years, how will that affect your revenue?

7.2 Goal Setting Considerations

Goals should be designed to use water more efficiently. You are encouraged to adopt goals that help you and your customers use water in the most efficient way possible. Understand your water supply characteristics, infrastructure improvements, and future needs before establishing goals.

Each goal must identify the measurable water savings that will be achieved at a specific time in the future. See Appendix I for 15 examples of goals that meet the regulatory requirements.

You must consider the following information and make it available to the public prior to the goal setting public forum[6] (WAC 246-290-830(4)(d)):

1. Your existing WUE program (see Chapter 5 and WAC 246-290-810(4)):
   - Water saved as a result of implementing WUE measures over the last 6 years (1,000 or more connections only).
   - Current goals.
   - WUE measures currently implemented.
   - WUE measures that have been evaluated.
   - How you are educating your customers (see Section 5.7).
   - A projection of how much water you can save by implementing your chosen WUE measures.
   - How you will evaluate your WUE program.
   - Distribution leakage information.
   - The water loss control action plan, if required (see Section 6.7).
2. Any previous annual WUE reports (see Chapter 8).
3. Water supply characteristics information (see Chapter 3 and Appendix C).
4. Water demand forecasts information (see Chapter 4).
5. Summary of any comments received about the proposed goal and how you considered these comments prior to formally establishing the goal.

[6] In order to make the information easily accessible by the public, the information should be available directly from the water system(place it on your Web site, if you have one). You might also consider sending a copy of the information to your local library.

Process for Establishing a Goal

When getting ready to propose a goal, there are a few key things to think about in order to move the process along smoothly (see Appendices H, I, and O for more on goal setting). Examples for each step are provided to help you start developing your own goal setting strategy:

- Define your objective for proposing the goal, based on the information listed above.

  Example: Reducing per capita consumption will help us provide better service, save money, and may allow us to add more connections for future growth.

- Propose measurable water saving goals that will support your objective.

  Example: Demand Side Goal—Reduce our annual consumption per residential connection by 3 percent over a 10-year period.

- Establish a timeframe for achieving the proposed goals.

  Example: Our demand forecast shows a need for new connections within 10 years therefore, we have established a 10-year timeframe to achieve our goals.

- Determine the cost-effective WUE measures to support the goal.

  Example: Faucet aerators, conservation rate structures, and educational outreach at the county fair are the cost-effective measures that will help support our goal.

- Determine funding source for the WUE measures to achieve the goal.

  Example: We will switch from a flat rate structure to an inclining block rate structure for water use.

- Make information available to the public at least 2 weeks before your public forum.

  Example: An information packet is available for viewing at our billing office and local library.

- Provide public notice 2 weeks prior to goal setting public forum.

  Example: Public notice is posted on the Office of Drinking Water's website, the local library, published in the local newspaper, and on the utility's website.

- Hold a public forum and consider public comments.

  Example: Public forum held at the town meeting hall, all public comments recorded.

- Establish goals.

  Example: After considering public comments, our elected governing board establishes the proposed goal and will make slight water rate increases every year over the next 10 years.

7.3 Goal Setting Authority

Goals must be established by the elected governing board or the governing body of the water system (WAC 246-290-830(1)). The elected governing board or the governing body has the flexibility to establish its own goal to achieve its objective.

A governing body is "the individual or group of individuals with ultimate legal responsibility for operational, technical, managerial, and financial decisions for a public water system" (WAC 246-290-010). Examples include the president of the homeowners association or the owner of the water system.[7]

An elected governing board is also defined in WAC 246-290-010 as "the elected officers with ultimate legal responsibility for operational, technical, managerial, and financial decisions for a public water system." Examples include your city council, board of county commissioners, or elected water board.

7.4 Regional Program Goals

You may find regional goals established for a particular area will best meet your needs. If a regional goal is proposed, your governing board or elected governing body must formally establish this regional program goal as your own goal through your own public process (WAC 246-290-830(4)).

When completing your WUE report, describe the progress made towards achieving the regional goal. You should also document the specific measures you are implementing for your water system that help achieve the regional goal.

[7] Private systems not organized under an elected governing board must set WUE goals in a manner that allows customers the same opportunities to provide input, such as during an annual meeting.

Replace these two pages with the PDF of the news release

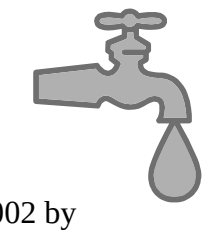
7.5 Goal Setting for Customers and Your Water System

You have the flexibility to determine a goal that makes sense for your customers and set as many goals you want. You may consider setting two types of goals: One that reflects supply-side efficiencies and one that reflects demand-side efficiencies. Your demand-side goal might focus on trying to get each customer to use less water during peak summer demand. **At a minimum, you must establish one goal through a public process, designed to help your customers use water efficiently.**

An ongoing supply-side management strategy to remain under the leakage standard is a good goal to have. For example, you may want to set a supply-side efficiency goal to reduce distribution system leakage to less than 10 percent by a certain date. If you are over the leakage standard, we encourage you to set goals both for reducing leakage within your water system, and for reducing water use by your customers.

Remember, setting a supply-side goal to reduce leaks is optional. You will need to implement supply-side measures, such as replacing service meters, performing a leak detection survey, and accounting for unmetered authorized uses, to comply with the leakage standard. These measures are required.

How water conscious are you?



Did you know that a study conducted in 2002 by the East Bay Municipal Water District in Oakland, CA found that:

- Even with service meters, 60 percent of single-family households **thought they used less than 50 gallons per day/per house!** The study found that they were actually using 228-450 gallons per day/per house.

The U.S. Environmental Protection Agency's WaterSense Program predicts that:

- Each person uses an average of 100 gallons of water every day.
- The average person **unknowingly wastes up to 30 gallons of water every day.**
- Indoors you can save about 30 gallons of water per person per day by upgrading your house with water efficient fixtures and appliances.

Changing Your WUE Measures to Achieve the Goal

Choosing the right WUE measures is critical to helping you achieve your goals. WUE measures should be directly related to your goals, otherwise they will not be effective in achieving your goals. If you are not achieving your goals, consider implementing different WUE measures.

Setting an Attainable Goal

Every water system will have different reasons for setting a goal for their water system. We encourage you to adopt the most water use efficient goal possible. Every goal is specific to each water system and may involve different motivating factors such as water supply characteristics, infrastructure upgrade needs, social pressures, reducing irrigation demands, or the need to obtain additional connections to meet future supply.

The first step in exploring what type of goal to set for your water system begins with stating a clear objective. It is important to relate the goals back to the unique needs and limitations of your water system. **Make it real for your customers so that the goals address the needs of the water system and the measures support your goals.** Starting with a clear objective will lead to development of an attainable goal.

Imagine the Savings!

One of the most difficult things to do when establishing a goal is to accurately predict the water savings. If you only adopt non-hardware measures (such as education and outreach) to achieve your goal, you will have a difficult time quantifying the savings. Consider adopting at least one hardware measure (such as offering free faucet aerators) to give you a better idea about how much water might be saved by installing these low-flow fixtures.

Some water systems establish a conservative goal with a 1 to 3% savings per year for a 10-year period, or within the plan approval period if it's less than 10 years. If you're having a difficult time quantifying the savings, you may want to go with a conservative goal like that for now and see how you do. Remember, if you don't achieve your goal, you just need to adjust your WUE program, which may mean implementing different measures or establishing a new goal entirely.

Example of a 1% reduction target goal: "Reduce per capita consumption, currently 95 gallons per person per day, by 1% annually, so that by 2027 we have reduced consumption to 85.5 gallons per person per day."

Assuming you were to establish a 1% savings annually over a 10-year period, you might achieve a 10% reduction in per capita use/connection over today's consumption levels (let's assume that's 95 gallons per person per day). At the end of that 10-year period, you'll need to re-establish a new goal.

Now imagine this, if you were to establish the same 1% reduction goal over the next 10 years, it would then turn into a 20% reduction over today's consumption. A 1% WUE goal might not sound like much, but over 20 years, that might reduce per capita consumption from 95 gallons per person per day to 76 gallons per person per day, and that's making progress!

Here are a few driving factors that may lead you to a specific goal:

1. **Meet regulatory requirements.** You may choose to implement or evaluate required minimum number of measures, choosing low cost measures, within reasonable budget.
2. **Demonstrate stewardship.** You may choose to implement more measures than the minimum required, within a reasonable budget level or—implement the minimum number of measures, but at a higher implementation intensity.
3. **Decrease operating costs.** You may choose to implement any conservation that is more cost-effective than the variable cost of supplying water.
4. **Defer or avoid capital costs.** You may choose to implement the amount of conservation necessary to obtain the savings necessary to defer or avoid capital costs.
5. **Obtain additional water supply (traditional supply available).** You may choose to implement any conservation that is more cost-effective than the cost of developing new traditional supply.
6. **Obtain additional water supply (traditional supply not available).** You may choose to implement all measures necessary (chosen in order of cost-effectiveness) to obtain the amount of supply needed.

Quantify the Predicted Water Savings for Each Measure

Before you establish your goal, **make sure that you have taken the time to predict the water savings you will achieve from each implemented measure.** This critical step is often overlooked and may lead you to choosing a less aggressive customer goal or a goal that is not attainable. It is much easier to predict the water saved from replacing a 3-gallon per flush toilet with a 1.3 gallon per flush toilet than predicting how the water saving ideas in your quarterly newsletter will affect customer behavioral water use patterns. Predicting the amount of water each measure will save supports your goal assumptions.

Are You Only Using Education to Achieve the Goal?

Educating your customers is a good way to get them involved in your water saving efforts. Remember, you must educate your customers at least once per year. The actual amount of water savings achieved from educational programs is very difficult to measure. You may find that the ability to achieve your goal is hindered if you rely entirely on educational tools. Without frequent reminders, some customers might slip back into their old habits of wasting water.

Long-term goals for saving water should focus on true water savings devices (such as low-flow showerheads), appliances (such as washing machines), and policies (such as ordinances). If your WUE program implements these measures, make it a point to use your educational tools (such as bill stuffers) to notify your customers about these long-term water saving options.

Stressed Water Supplies are a Great Reason to Focus Your Goals on WUE Efforts

When competition for water increases and factors, such as drought, place a strain on water supplies, it's time to revisit your WUE program and goals. During times like these, elected board members and customers are likely to support a more aggressive approach to saving water.

When you adopted your WUE goals, did you look at your existing WUE/conservation program and decide to keep doing what you've always done. If so, ask yourself this:

- Did we establish a meaningful WUE goal or was our response more of an exercise to meet the state's goal setting requirements and deadlines?
- Is there more we could do to save water? And why would we want to?
- What could we do to encourage customers to do more?

Take this opportunity to evaluate your existing WUE program and consider setting short-term goals that could help your system get through a drought or shortage. And how about setting a more aggressive water-saving goal for the long-term? Remember, you can establish as many WUE goals as you want to.

Achieving goals that are more aggressive will take more than sending annual conservation tips to your customers. Consider implementing efficiency measures that really save water, such as setting up a rebate program to help customers replace old, inefficient showerheads and toilets with WaterSense-labeled ones. The WaterSense logo identifies products that meet EPA water efficiency criteria.

Setting a Goal That Meets Our Requirements

Goals must be measurable and have a timeframe. You must establish a measurable goal that maintains or reduces water use (WAC 246-290-830(6)(b)). For example, express your goals in terms of water produced from the source, customer usage, or other measurable basis.

See Appendix I for 15 examples of goals that meet the regulatory requirements.

Setting a timeframe for achieving each particular goal is important. You may want to achieve your goal in 10 years to coincide with your water system plan update. Or perhaps 3 years, to allow enough time to see if a particular WUE measure is successful in achieving the goal.

Setting a Goal to Maintain Historic Use

After reviewing the information, if you determine no further reduction is reasonably achievable, you may propose a goal that maintains water consumption levels. Before assuming that you cannot achieve further reductions in water use, ask yourself these questions:

1. Have we looked at all the possible conservation measures?
2. Are there cost-effective measures I may not know about?
3. Have I surveyed my customers to find out which measures they might consider trying?
4. Does my budget support additional measures?

We recommend against maintaining a historic consumption level. Instead, think about how you might be able to narrow your focus in different areas. Consider establishing a goal for:

- A particular customer class (such as industrial/commercial).
  For example: "Reduce consumption by 10% for our industrial and commercial customers by the year 2020."
- Seasonal consumption. Consider a goal that may reduce seasonal outdoor water use.
  For example: "Reduce the amount of water pumped from our source well by 5% in July and August each year through 2020."
- Your customers that use the most water.
  For example: "Reduce average monthly seasonal consumption by 15% for our top 10% highest water users by 2022."

If you end up establishing a goal to maintain a historic level (such as maintaining daily consumption at 65 gallons per person per day), you must explain why you are unable to reduce water use below that level (WAC 246-290-830(3)). **Justification must be included in your annual WUE report** and planning document (WAC 246-290-830(3)).

Documenting Goals

Keep records that show you met all the WUE requirements when you established your goals. We may ask to see this information. Records should include such things as:

- Meeting notice details, such as place and time of meeting, where and when notice was posted, and how the public was able to access the materials supporting your proposed goals.
- Public comments received about your proposed goals and how they were considered prior to formally establishing the goals.

Saving Water and Energy in Small Water Systems

The Montana Water Center has developed a training course to help small water systems operate efficiently with respect to water and power. This program consists of four 45-minute presentations meant for use in a classroom type setting. **Use it to educate your elected governing board when establishing WUE goals/programs and options for saving water and energy for your water system**.

Four main topics are covered: Energy management, Water Conservation, Alternative Energy in Water Treatment, and Water Accounting (Audits and Leak Detection). Each presentation covers:

- Why a water system should care about this topic.
- What steps to take and how to measure success.
- Case history experiences of small water systems.
- Pertinent laws and regulations.

Download it from the Montana Water Center website or order the CD (preferred for ease of use) from the National Environmental Services Center at 1-800-624-8301 and ask for product #DWCDTR29.

7.6 Setting Goals Through a Public Forum

How Do I Establish Goals If I Don't Have Customer Meters?

You probably already have a source meter, if not, you must install one immediately. Since goals must have a water savings target and timeframe/benchmark for achieving that target, then your source meter is your only option to establish a WUE goal if you don't have customer meters.

For example, your goal could be, "Reduce the amount of water pumped from our source well by 2 percent each year through 2027 during the months of July and August."

How Often Do I Need to Evaluate and Re-establish Goals?

Goals must be evaluated and re-established when either of the following occur:

- Every 6 years if you are required to develop a small water system management program.
- As part of any water system plan or water system plan update submitted to the Department of Health for approval.

You may want to consider evaluating and re-establishing goals as part of your 10-year planning update, if you are required to do so. Evaluation and re-establishment of goals must follow the same public process and the same goal criteria used to establish the original goals.

Changes to goals are allowed at any time (WAC 246-290-830(8)). If you want to change your established goals, you must:

- Modify the goal by following the same public process and goal setting criteria used to establish previous goals.
- Identify the change to the goal in your next annual WUE report and planning document (WAC 246-290-830(8)).
- Make necessary changes to your WUE program to achieve the modified goal (WAC 246-290-830(9)).

Setting the Stage for a Public Forum

You must engage your customers and interested members of the public in a public forum (meeting) when establishing your WUE goals (WAC 246-290-830(4)(a)). This meeting has many benefits. It ensures your customers and the public can provide input on the decisions made by the governing body. It also helps the public understand the need to use water more efficiently and teaches them how they can help you achieve your goals.

Identifying Your Target Audience

You should look at three distinct groups of attendees:

- Your water system's customers.
- Local community members.
- Special interest groups such as the environmental community, local tribes, and watershed planning units.

Public Notice Requirements

The communication method you choose will be based on the audience you are trying to reach. You must provide notice at least 2 weeks in advance of the meeting (WAC 246-290-830(4)(b)).

Posting your public notice on the Office of Drinking Water's website is one acceptable way of getting the message out. If your customers would not consider visiting the Office of Drinking Water's website to learn about the meeting scheduled to adopt your goals, then use other methods of notification.

The notice must include the following information:

- Purpose of the meeting.
- Date of the meeting.
- Time when the meeting begins.
- Location for the meeting (include map if needed).

- Where your audience can find additional information supporting your proposed goal.

If public notice requirements in WAC 246-290-830(4)(b) are met, you may use an existing public meeting already scheduled, such as a city council meeting. Otherwise, you will need to arrange a special goal setting meeting.

Ways to Provide Public Notice

You can provide public notice in several different ways. A combination of the following examples may be needed to make sure your target audience is aware of the public forum:

- Develop a bill stuffer to include in customers' billing statement.
- Send direct mailing to customers and interested parties.
- Contact your customers and interested parties by phone or email.
- Put up neighborhood posters.
- Include the public notice in your newsletter.
- Put posters in windows of local businesses.
- Run a public notice as an advertisement in your local newspaper or community shoppers' guide.
- Publish in bulletins put out by churches or civic organizations.
- Publish on your website.
- Distribute a news release to local print media, radio, and TV stations.
- Publish on the Office of Drinking Water's Web at www.doh.wa.gov/ehp/dw/programs/wue.htm

Handling Meeting Logistics

Select a meeting room large enough to accommodate the number of expected attendees. You should designate one person to handle all logistical arrangements:

- Find out if there is a cost for using the room.
- Visit the room ahead of time to make sure the room will work for you.
- Make sure the room is accessible to people with disabilities.
- Reserve the meeting room or building.
- Identify and supply any needed equipment, such as recording equipment.
- Determine how you want the meeting room set up.
- Establish who lets you in, if the building is locked after hours.
- Identify who will take meeting minutes.
- Provide a sign-in sheet for attendees.
- Have an agenda and handouts available.
- Consider using a facilitator to run the meeting.

If your regularly scheduled meetings are closed to the public, dedicate the first half hour of the meeting to the public for goal setting, then ask those non-members to leave so that you can conduct your private meeting afterwards.

Tips for Conducting Effective Public Forums

Start and end the meeting on time, based on an agenda created prior to the meeting. Be clear about the purpose of the meeting and expected outcomes. In addition to preparing **what** you want to say, spend time practicing **how** the content will be delivered. Choose someone in your organization with good communication skills, who is comfortable speaking in public.

At the beginning of the meeting, introduce water system personnel in attendance. Stop frequently to provide attendees the opportunity to ask questions. Answer their questions as completely as possible in a clear, concise way. Always end the meeting thanking everyone for coming and provide contact information for follow-up comments or questions.

Remember, successful public forums require preparation, practice, and good communication skills.

Key Message to Use When Setting Goals

When the public, your customers, or the elected boards ask, "Why are we here?" think of some key messages that they might relate to, such as:

1. Using water efficiently will save you and your customers money!
2. You value the water supply (both quantity and quality).
3. You are doing your part to ensure water is available for future generations.
4. Point out the importance of relating the goals back to the unique needs and limitations of your water system.
5. Make it real for your customers so that the goals address the needs of the water system and the measures support your goals.

Chapter 8: Annual WUE Report

8.1 Overview of the Annual WUE Reporting Requirement

One of the best ways to communicate your water use efficiency (WUE) efforts is through your annual WUE report. Your report must include information about how much water was pumped from your source(s), how much water was consumed by you customers (authorized consumption), and what progress has been made toward achieving your water savings goals for the year.

Submit your WUE Report by July 1

By July 1 every year, WUE reports must be submitted to your customers and the Department of Health, and also made available to the public.

Electronically Submitting to the Department of Health

When reporting to us, you **must** submit your WUE information through our online reporting database. **We will not accept mail, email, or faxed reports.**

Follow these steps to submit your report:

1. Go to http://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/WaterSystemDesignandPlanning/WaterUseEfficiency
2. On the right hand side of the page click on "Submit Your Annual WUE Report Now."
3. Click on the link "Submit WUE Report Now."
4. Enter your water system ID number.
5. Complete the form.
6. Review the information for accuracy before you submit.
7. Hit the submit button. YOU'RE DONE!

After you successfully submit your annual report, you will receive a confirmation email. Then your report, along with every other WUE Report, will be available to the public online.

Please don't include any other materials (such as the WUE section from your water system plan, pictures, graphs, tables, charts, or examples of educational brochures) in your annual WUE report. Instead, include this type of information on your website or in the annual report to your customers (consumer confidence report).

Submit to Customers

Send the WUE report by email or regular mail to your customers by July 1 every year. Consider providing detailed information in the report to your customers about your WUE program rather than in the summarized version you submit to us. Sending your customers the same report you submit to the department may confuse them. Instead, summarize the WUE information in your Consumer Confidence Report or newsletter.

Make Available to the Public

You are also required to make your annual WUE report available to the public (WAC 246-290-840(1)(a)). Some ways you can do this include:

- Posting it on your website.
- Distributing it to local libraries.
- Letting your local media know it is available.

At minimum, you must provide your annual WUE report to the general public upon request.

Share the Info, Share the Wealth

You can view any submitted WUE Report by clicking on "Search for Completed WUE Reports" from the main WUE website. Take this opportunity to see what neighboring water systems are doing to use water efficiently. See how your WUE goals compare to others in the state. You may even find some water-saving ideas for your own water system. Then, consider forming partnerships with your neighbors to save money and develop a more effective community outreach program.

8.2 Preparing Your Annual WUE Report

This section contains general information to help you fill out the online annual WUE report. We intend to maintain a reporting system that is as streamlined and easy to use as possible. We will make every effort to ensure that you can successfully submit your WUE information by updating the reporting system as necessary. Look for a reporting worksheet on our WUE reporting website at https://fortress.wa.gov/doh/eh/portal/odw/wue/default.aspx or in the Guidebook's Appendix E.

Review this List Before You Submit Your WUE Report

There are a number of things you'll want to know before you submit your report to us each year. Below is list of general guidelines about what to expect:

General Information

- Be brief and concise when reporting to us. The online form limits the space you have.
- Avoid using graphs, tables, special characters, symbols, bold or underline text, and special fonts. The database may see this as a security risk and delete it from your report. Instead, include this information on your web site or annual report to customers.
- Please fill out all fields in the WUE report. Some fields are required and won't allow you to proceed if you leave them blank.
- Submit your report even if you don't have all of the information. By submitting your WUE report to us, you can show what progress you have made and meet the annual reporting requirement. Use the extra space provided at the end of the WUE report to explain any data fields you may have left empty.
- You'll need to know the first five numbers of your water system identification number to get into the reporting system.
- After thirty (30) minutes of inactivity, the system is designed to close automatically. If this occurs, any information entered will be lost. You will be warned before it closes and have an opportunity to keep working on the report.
- Use the WUE reporting worksheet to gather information before you submit the report.
- You will have an opportunity to review the report for accuracy. Once you submit the report, you will not be able to re-open it for editing.

Meter Information

- If your system isn't fully metered, tell us approximately what percentage of the system is metered and when you intend to be fully metered.

Reporting Year Information

- Select a reporting year from the drop down box. The reporting year is just like a tax year.
- You may submit information from previous years.
- 12-Month WUE Reporting Period: Enter the beginning and ending months that establish your annual data information. For example, if you have determined that May 1 to April 30 is your annual data for the 2009 reporting year, enter 05/01/2008 to 4/30/09.
- If you don't have a full years worth of data (for example, maybe your software data collection system crashed), then explain that in the space provided.

Production, Consumption, and DSL Information

- Enter your total metered water use (total production), in gallons, from all sources for the year. This has nothing to do with your water rights. See Chapter 6 for a complete explanation as to what you need to report for total production.
- Enter your total metered water use (authorized consumption), in gallons, from all of your customers for the year. This has nothing to do with your water rights. See Chapter 6 for a complete explanation as to what you need to report for authorized consumption.
- After you have entered total production and authorized consumption, the database will automatically calculate DSL volume and percentage for the year.
- Three-year average DSL percentage will automatically calculate once you have submitted 3 years worth of data. The oldest year will be dropped from the average.

Goal Setting Information

- Indicate the date that you held your public forum to establish goals.
- Identify the WUE goal that was established by the elected governing board. Make sure you identify a water savings target and timeframe for achieving the goal.
- Report all progress you have made in achieving water efficiency for your water system and your customers.
- Identify any WUE measures you are currently implementing (such as customer education, conservation rate structures, or offering low-flow showerheads).
- If you established a goal to maintain a historic level (such as maintaining daily consumption at 65 gallons per person per day for the next two years) you must explain why you are unable to reduce water use below that level.
- If you are exceeding the DSL standard, briefly explain what you are doing to control water loss by summarizing your water loss control action plan.

Appendices

Appendix A:	Integrating Water Use Efficiency Requirements Into Your Planning Documents
Appendix B:	Water Use Efficiency Measures
Appendix C:	Water Supply Characteristics and Examples
Appendix D:	Distribution System Leakage Template, Instructions, and Calculation Example
Appendix E:	Water Use Efficiency Annual Reporting Worksheet
Appendix F:	Recommended Publications and Websites
Appendix G:	Water Volume Conversions
Appendix H:	Goal Setting Flowchart
Appendix I:	Examples of Customer Goals
Appendix J:	Water Conservation Tips
Appendix K:	*Stop Water Waste*
Appendix L:	*Water Tap Special Report: Water Shortage* and *Tips to Reduce Outdoor Water Use This Summer*
Appendix M:	U.S. Environmental Protection Agency's WaterSense Program
Appendix N:	Local Stories of Successful Water Use Efficiency Programs
Appendix O:	*Setting Goals to Use Water Efficiently*
Appendix P:	*Reduce Leaks*
Appendix Q:	*Water Conservation Leadership Guide: Issues for an Elected Governing Board to Consider* and *Sprayed Away: Seven Ways to Reduce Texas' Outdoor Water Use*
Appendix R:	Example of a Large Municipal WUE Program
Appendix S:	Example of a Small Municipal WUE Program
Appendix T:	Examples of a Water Loss Control Action Plan
Appendix U:	Water Use Efficiency Requirements for Nonmunicipal Water Suppliers

Appendix A: Integrating Water Use Efficiency Requirements Into Your Planning Documents

Beginning January 22, 2008, water system plans and small water system management programs submitted for review and approval must include the water use efficiency (WUE) planning requirements. This appendix provides suggestions for incorporating WUE requirements with existing plan layouts from the Water System Planning Handbook (DOH 331-068) and the Small Water System Management Program Guide (DOH 331-134). Plan contents must be tailored according to individual water system needs, size, and complexity. A number of different layouts are possible and this is only a suggested approach.

Nonmunicipal water suppliers should consult Appendix U to determine planning requirements regarding water efficiency.

A pre-plan meeting with Department of Health staff before writing a planning document will assist you in organizing the WUE sections in your planning document. This meeting is an important initial step in the water system planning process. Telephone numbers for the Office of Drinking Water regional offices are listed below.

For more information, contact your regional planner:

Eastern Regional Office—Spokane Valley—Main Office: (509) 329-2100

Northwest Regional Office—Kent—Main Office: (253) 395-6750

Southwest Regional Office—Tumwater—Main Office: (360) 236-3030

Where to Include Water Use Efficiency in Your Planning Document

Deadlines and Water System Size			Water System Plan Chapter*							Small Water System Management Program Element**						
Less than 1,000	**1,000 or more**	**Water Use Efficiency Requirement**	2	3	4	6	8	9		3	12	13	14	15	16	17
Jan. 01, 2008	Jan. 01, 2007	Begin collecting production and consumption data	✓		✓							✓	✓			
Jan. 22, 2008	Jan. 22, 2008	Include WUE program in planning documents (see Appendix C and Chapter 5)			✓								✓			
Jan. 22, 2008	Jan. 22, 2008	Evaluate a rate structure for affordability and encourage water use efficiency***			✓			✓					✓			✓
n/a	Jan. 22, 2008	Evaluate reclaimed water opportunities			✓											
July 1, 2010	July 1, 2009	Set your own WUE goals			✓								✓			
July 1, 2009	July 1, 2008	Submit first annual WUE report			✓					✓			✓			
July 1, 2009	July 1, 2008	Submit service meter installation schedule			✓		✓	✓			✓		✓	✓	✓	✓

Continued

Deadlines and Water System Size			Water System Plan Chapter*							Small Water System Management Program Element**						
Less than 1,000	**1,000 or more**	**Water Use Efficiency Requirement**	2	3	4	6	8	9		3	12	13	14	15	16	17
July 1, 2010 or 2011, or 3 years after installing all service meters		Meet distribution leakage standard (based on 3-year rolling average)****	✓	✓		✓						✓	✓			
Beginning in 2012		Implement Water Loss Control Action Plans If over 10 percent leakage standard (based on 3-year average)	✓		✓	✓						✓	✓			
January 22, 2017		Complete installation of all service meters			✓	✓	✓	✓					✓	✓	✓	

* Water system plan chapters from the Water System Planning Handbook (DOH 331-068) suggested water system plan framework, layout, and organization

** Small water system management program elements from Small Water System Management Program Guide (DOH 331-134) layout and organization

*** Included in the water use efficiency program (counts as a water use efficiency measure if implemented)

**** For water systems with less than 500 connections, submit request for 20 percent distribution system leakage standard

Appendix B: Water Use Efficiency Measures

Examples of measures that meet water use efficiency requirements

Indoor Residential

- Toilet or urinal retrofit
- Rebate program
- Showerhead or faucet replacement
- Indoor water audit
- School outreach
- Displays at fairs and events
- Speakers bureau
- Targeted marketing
- Advertising (media)
- Conservation rates
- Customer leak detection education (indoor leak repair)
- Water bill showing consumption history

Outdoor

- Workshops for landscape professionals
- Soil moisture sensors
- Rain sensors
- Irrigation timers
- Xeriscaping (low-water use landscaping)
- Demonstration garden
- Turf replacement rebate
- Landscape ordinances
- Drip irrigation
- Landscape water audit
- Irrigating with reclaimed water

Industrial/Commercial/ Institutional

- Recycling or reuse
- Commercial pre-wash sprayers
- Showerhead or faucet replacement
- Cooling tower improvements
- Toilet or urinal retrofit
- Cooling systems retrofit
- Air-cooled refrigeration
- Water use audits (including irrigation systems)
- Water bill showing consumption history
- Using reclaimed water

These measures can be used in more than one category

- School outreach
- Displays at fairs and events
- Speakers bureau
- Targeted marketing
- Advertising
- Conservation rates
- Water bill showing consumption history
- Water use ordinances
- High efficiency shower heads
- High efficiency faucet aerators
- Toilet or urinal retrofit
- Xeriscaping (low water use landscaping)
- Using reclaimed water
- Rebate programs (such as toilets or washing machines)

Appendix C: Water Supply Characteristics and Examples

You must consider the water supply characteristics in your watershed when establishing your WUE goals and program. This appendix is designed to assist you in describing your water supply characteristics or source description. Answering the questions below will help you describe the water supply characteristics for your water system.

"Water supply characteristics" means the factors related to a public water system's source of water supply that may affect its availability and suitability to provide for both short-term and long-term needs. Factors include, but are not limited to, source location, name of any body of water and water resource inventory area from which water is diverted or withdrawn, production capacity, the source's natural variability, the system's water rights for the source, and other legal demands on the source such as water rights for other uses, conditions established to protect species listed under the Endangered Species Act in 50 CFR 17.11; instream flow restrictions established under Title 173 WAC, and any conditions established by watershed plans approved under chapter 90.82 RCW and RCW 90.54.040(1) or salmon recovery plans under chapter 77.85 RCW.

For small water system management programs identify you source description:

- **Source description:** Do you use groundwater or surface water, or both? What body of water or watershed is your source taken from?

For water system plans address the following five water supply characteristics:

1. **Source description:** Do you use groundwater or surface water, or both? What body of water or watershed is your source taken from?
2. **Production capacity:** What is your water system's total source production capacity by source?
3. **Variability:** Do your sources consistently produce the water needed to meet demand or are there seasonal variations that limit use of the water?
4. **Water rights:** Does your water system have sufficient water rights? Include a copy of your water rights self-assessment.
5. **Legal constraints:** If you share a water source with senior water right holders or other legal considerations, how does this limit your ability to use the water you rely on (such as the Endangered Species Act, Tribal treaty rights, instream flows, or watershed planning limitations)?

Additional considerations that may apply to your water supply characteristics:

- Are there any limitations that may affect your ability to continue to use water from the existing source location or develop future supply from the source?
- Is the aquifer or surface water body from which you divert or withdraw water able to meet current and future needs?
- What external, social, economic, and environmental trade-offs result as the need to develop additional water supply occurs?
- Can you delay developing additional water supply by wiser and more efficient use of the resource?
- Is your water delivered to a different watershed than the one it is taken from?
- Are your sources located in any of the 16 fish-critical basins established by the Department of Ecology? If yes, please name them and describe any impact because of the designation.
- Have you considered how a drought or climate change impacts your ability to provide water to your customers?
- What are the historical natural variations? What are the low flow-months for the watershed in which your water source is located? How do these low-flow months compare with your peak demand?
- What are the water rights? Are they sufficient? Is there a future need to add new supply? Will water right limits be reached in the next 6 years? In the next 20 years? In the next 50 years?
- Are new water rights limited in your watersheds, or are your sources located in a closed basin?
- Do your water rights require additional data collection and tracking? If yes, please describe.
- Does the watershed have endangered or threatened species that rely on streamflows, wetlands, or riparian habitat?
- Do any current instream flow requirements affect your diversions or withdrawals, presently or in the future? At what year will the effect be noticeable?
- Are there any conditions from approved watershed plans or salmon recovery plans that apply to your sources?
- Is there documentation that shows a hydraulic connection between the aquifer from which you withdraw water and a river or stream? Which river or stream?
- What are the development patterns near your source or supply? Could these developments affect aquifer recharge and local hydrology (for example, an increase in impervious surfaces and exempt wells)?

For **surface water sources**, the following questions should be answered:

- Is instream flow mitigation a condition of your water rights?
- Are there any agreements or legal constraints that change your supply and demand management strategies during the summer and fall flows or when droughts occur?
- Is water quality impaired (such as Total Maximum Daily Load or 303(d) list) for the source stream? If yes, describe how the water quality is impaired (such as turbidity) and how it may affect your ability to use water from your source.

For **ground water sources**, the following questions should be answered:

- What is the natural range of source changes over the past decades?
- Have you ever observed a change in production capacity?
- During extended drought summers or because of increased growth demand, has static water level declined? What is the range? How many months does it take to return to normal? Is this the norm? What has caused the most concern?
- Have you ever had to modify your well(s) level or rehabilitate your well(s) in order to keep them pumping at the desired withdrawal rate?

How Well Do You Know Your Water Supply?

Does your water source consistently provide enough water to meet your needs? How does it hold up during drought? These are questions all water utilities should consider, especially when establishing water use efficiency programs and water-saving goals.

Understanding where your water comes from is more complex than identifying it as groundwater or surface water. It's recognizing that others rely on the same water source you use every day. It's being aware that while the quality and quantity of your water supply may be adequate now, it may not always be that way.

"Water supply characteristics" are factors that may affect the availability and suitability of your water source to provide for short-term and long-term needs. Factors include source location, production capacity, the source's natural variability, and legally available water rights.

As you think about your water supply characteristics, consider who or what relies on the water downstream from you, especially neighboring water systems. Farmers, industry, and agriculture rely on water to do business and provide jobs for local residents. Yearly and seasonal variations in water supplies can put tremendous stress on aquifers, stream flow, and reservoirs, especially during a drought.

(continued)

How Well Do You Know Your Water Supply? (cont.)

In addition, depleting reservoirs and groundwater puts water supplies, human health, and the environment at serious risk. When water levels drop, concentrations of natural or human pollutants can rise.

Test your water supply knowledge
Here are questions to help you identify your water supply characteristics. You should use the answers to establish a water use efficiency program and goals:

Natural conditions

- Has drought ever significantly affected your system?
- Is your supply limited by seasonal variations?
- How have water levels changed in your well (summer to winter, year to year)?
- Can all your sources produce enough water to meet high demand?

Sharing the resource, sharing the risk

- How is your neighborhood or community changing? Could new development, such as an increase in paved surfaces and exempt wells, affect an aquifer or stream?
- Does customer demand change seasonally or year to year?
- How do static water levels change in your well?
- Have you ever had to deepen or rehabilitate your well to meet demand?
- Are you required to mitigate for instream flows as a condition of using your water? Can senior water rights, instream flows, or tribal rights interrupt your water use?
- How would an increase in well drilling and reliance on groundwater in your area affect your ability to meet current and future demand?

Options for the future and sustainability

- Do you have an emergency intertie with a neighboring utility? Might they ask you for one?
- Can you meet projected demand for the next 6, 20, and 50 years?
- Do you have additional water rights?
- If you need more water rights, can you buy more? How long will it take to get them?

If you know the answers to these questions, how do you use the information to manage your water system? How can you use your answers to establish a water use efficiency program and goals?

Many of these questions don't have simple or easy answers. So, it's important to start asking the questions now and plan accordingly. For help, email Mike Dexel, water resources policy lead, at michael.dexel@doh.wa.gov or call (360) 236-3154.

Source Description and Water Supply Characteristics

Small Water System Management Program Source Description

Our two sources of supply come from wells located in Water Resource Inventory Area 88. They are 200 feet and 350 feet deep, and produce 10 gallons per minute (gpm) and 50 gpm, respectively. The wells are located in Section 28, Township 99, Range 77, approximately 500 feet south of Blue Bird Creek.

Water System Planning Water Supply Characteristics

We have five active groundwater wells located in Water Resource Inventory Area (WRIA) 99. They are all in the Safe and Reliable Aquifer, drilled to a depth ranging between 220 and 410 feet below ground surface. They appear stable, as our static water level measurements show only a natural variability of 5-feet difference in the summer months. The wells produce between 80 and 100 gpm.

The U.S. Geological Survey tells us that our watershed recharges at the natural rainfall average of about 30 inches per year. When droughts occur, we often experience a slight drop in static well levels. This has not affected our ability to provide water to our customers, although during drought years we strongly encourage limited outdoor water use.

The Department of Ecology's Watershed Plan for WRIA 99 indicates that our wells are in a watershed basin closed to further water appropriations. They are hydraulically connected to the Blue Heron River, which has a minimum instream flow restriction of 50 cubic feet per second between April 1 and October 31. Our peak demand generally occurs between mid-July and late August. Our water rights have priority dates senior to the established instream flow, so we are able to use water from our wells without interruption from instream flow limitations.

The wells are not in a high- or medium-risk seawater intrusion area, as defined by our watershed plan, and the chloride levels are well below the maximum contaminant level. Iron and manganese are two naturally occurring elements in the Safe and Reliable Aquifer. We treat our water to remove these elements before we deliver water to our customers. Our wells have never needed rehabilitation.

Based on population trends for our county, it is anticipated that our population will increase by about 3 percent over the next 20 years. This may create a need to supply new customers in our service area. Our demand forecast predicts sufficient water rights to meet the 20-year demand. If new water rights are needed, the instream flow limitation would likely result in interruption during our peak demand.

Appendix D: Distribution System Leakage Template, Instructions and Calculation Example

Units can be recorded in millions of gallons, gallons, cubic feet, or acre-feet but **must be converted to gallons** when reporting information in the online Annual Water Use Efficiency Performance Report Form.

Water Volume Entering Distribution System:

Line 1 A—Total Volume Produced
This is the total metered volume of water produced from your source(s) of supply.

Line 1 B—Total Volume Purchased
This is the total volume of water purchased (as measured by intertie meters) from other water systems.

Line 1—Total Water Produced and Purchased (TP)
Add the sum of Lines 1 A and 1 B. This is the total water produced and purchased in the distribution system leakage calculation.

Volumes of Metered and Unmetered Water (Billed and Unbilled):

Line 2 A—Total Volume of Metered Water (Billed and Unbilled)
This is the sum of all categories (single family, commercial, and so on) of metered water delivered to a customer.
Note: Make sure you are reading your consumption meters for the same time period you are reading your production meters or make adjustments for your different meter reading schedules.

Line 2 B—Exported Water
This is the total volume of water sold or exported to another water system.

Line 2 C—Estimated Authorized Uses
This is the estimated amount of authorized water used. These are restricted to uses of water authorized by the water system and may be unmetered or unbilled.

Line 2—Total Authorized Consumption (AC)
This is the sum of Lines 2 A + 2 B + 2 C.

Line 3—Total Volume of Distribution System Leakage (DSL)
Subtract Line 2 from Line 1. This is the DSL volume you must report.

Line 4—Percent Distribution System Leakage (DSL)
DSL percent is calculated by dividing Line 3 by Line 1, then multiplying that number by 100. This is the DSL percent you must report.

Distribution System Leakage Data Collection Worksheet—Year

Water Volume Entering Distribution System:

	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
1 A. Total Volume Produced													
1 B. Total Volume Purchased													
1. Total Water Produced and Purchased (TP)													

Total Volume Consumed:

	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
2 A. Water Volume Metered (billed and unbilled):													
Single-Family Residential													
Multifamily Residential													
Industrial/Commercial/ Institutional													
Other													

Continued

	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
2 B. Exported Water													
2 C. Estimated Authorized Uses (may be unbilled and unmetered)													
Utility Flushing and Tank Cleaning													
Fire Fighting and Training													
Storm or Sewer Cleaning													
Other													
2. Total Authorized Consumption (AC)													
3. Total Volume DSL													
4. Percent DSL													

Distribution System Leakage Data Collection Worksheet—2/08 to 1/09

Water Volume Entering Distribution System:

	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
1 A. Total Volume Produced	375	375	375	400	425	450	500	500	475	375	375	375	5,000
1 B. Total Volume Purchased							200	200	100				500
1. Total Water Produced and Purchased (TP)													**5,500**

Total Volume Consumed:

	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
2 A. Water Volume Metered (billed and unbilled):													
Single-Family Residential	210	210	210	215	240	275	450	450	275	210	210	210	3,165
Multifamily Residential	60	60	60	65	65	65	75	80	65	60	60	60	775
Industrial/Commercial/ Institutional	30	30	30	30	30	30	30	30	30	30	30	30	360
Other													Continued

	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
2 B. Exported Water													
2 C. Estimated Authorized Uses (may be unbilled and unmetered)													
Utility Flushing and Tank Cleaning			1			1					1		3
Fire Fighting and Training		0.2			0.2		0.2	0.2	0.2				1
Storm or Sewer Cleaning													
Other													
2. Total Authorized Consumption (AC)													**4,304**
3. Total Volume DSL													**1,196**
4. Percent DSL													**21.7**

Distribution System Leakage Calculation

Distribution System Leakage for Sampleville Water System

Add up the amount of water produced from all sources	5,000 MG
Add any water purchased from other water suppliers	500 MG
TOTAL PRODUCTION AND PURCHASED (TP)	5,500 MG
Add up the annual amount of water delivered to customers from your service meters	4,300 MG
Add any water sold to another water system	0 MG
Add all estimated authorized uses (fire flow, flushing of mains, and other authorized uses)	
Flushing	3 MG
Fire flow	1 MG
TOTAL AUTHORIZED CONSUMPTION (AC)	4,304 MG
Volume DSL = 5500—4304 = 1,196,000,000 gallons	
Percent DSL = (5500—4304) / 5500 x 100 = 21.7%	

Appendix E: Water Use Efficiency Annual Reporting Worksheet

Appendix F: Recommended Publications and Websites

Websites

Washington State Department of Health, Water Use Efficiency
www.doh.wa.gov/ehp/dw/programs/wue.htm

Evergreen Rural Water of Washington
www.erwow.org

Partnership for Water Conservation
www.partners4water.org

Alliance for Water Efficiency
www.allianceforwaterefficiency.org/

U.S. Environmental Protection Agency—WaterSense
www.epa.gov/watersense

Water: Use It Wisely
www.wateruseitwisely.com

American Water Works Association—WaterWiser
www.awwa.org/waterwiser

Saving Water Partnership
www.savingwater.org/education.htm

Green Plumbers
www.greenplumbersusa.com/

Disclaimer: Links to external resources are provided as a public service and do not imply endorsement by the Washington State Department of Health.

Publications

BMP Costs & Savings Study: A Guide to Data and Methods for Cost-Effectiveness Analysis of Urban Water Conservation Best Management Practices, prepared for California Urban Water Conservation Council by A & N Technical Services, Inc., March 2005

Handbook of Water Use and Conservation, Amy Vickers, 2002

Residential End Uses of Water, AWWA Research Foundation, 1999

Water Conservation Plan Guidelines, U.S. Environmental Protection Agency, 1998

Water Conservation Programs—A Planning Manual, AWWA Manual M52, 2006

Water Loss Control-Second Edition, Julian Thornton, Reinhard Sturm, George Kunkel, McGraw Hill Company, 2008

Water Audits and Loss Control Programs-Third Edition, AWWA Manual M36, 2010

Water Meters—Selection, Installation, Testing, and Maintenance, AWWA Manual M6, 1999

Appendix G: Water Volume Conversions

This appendix will help you convert water volume information in your annual WUE report to gallons. You can **record** water use data in the unit of measurement most convenient to your water system—most water meters measure water in cubic feet.

When you report to the Department of Health for the year, convert to gallons.

The American Water Works' WaterWiser website has a free unit conversion tool that you can download to your computer:

www.awwa.org/Resources/Content.cfm?ItemNumber=30807&navItemNumber=3347

The table below can help you convert some common volume units of measurement to gallons.

Table G-1: Water Volume Conversion

Convert from	Conversion factor	Convert to
gallons	divide by 1,000,000	millions of gallons
millions of gallons	multiply by 1,000,000	gallons
cubic feet	multiply by 7.48	gallons
100 cubic feet	multiply by 748	gallons
cubic meter	multiply by 264.17	gallons
acre-feet	multiply by 325,851	gallons

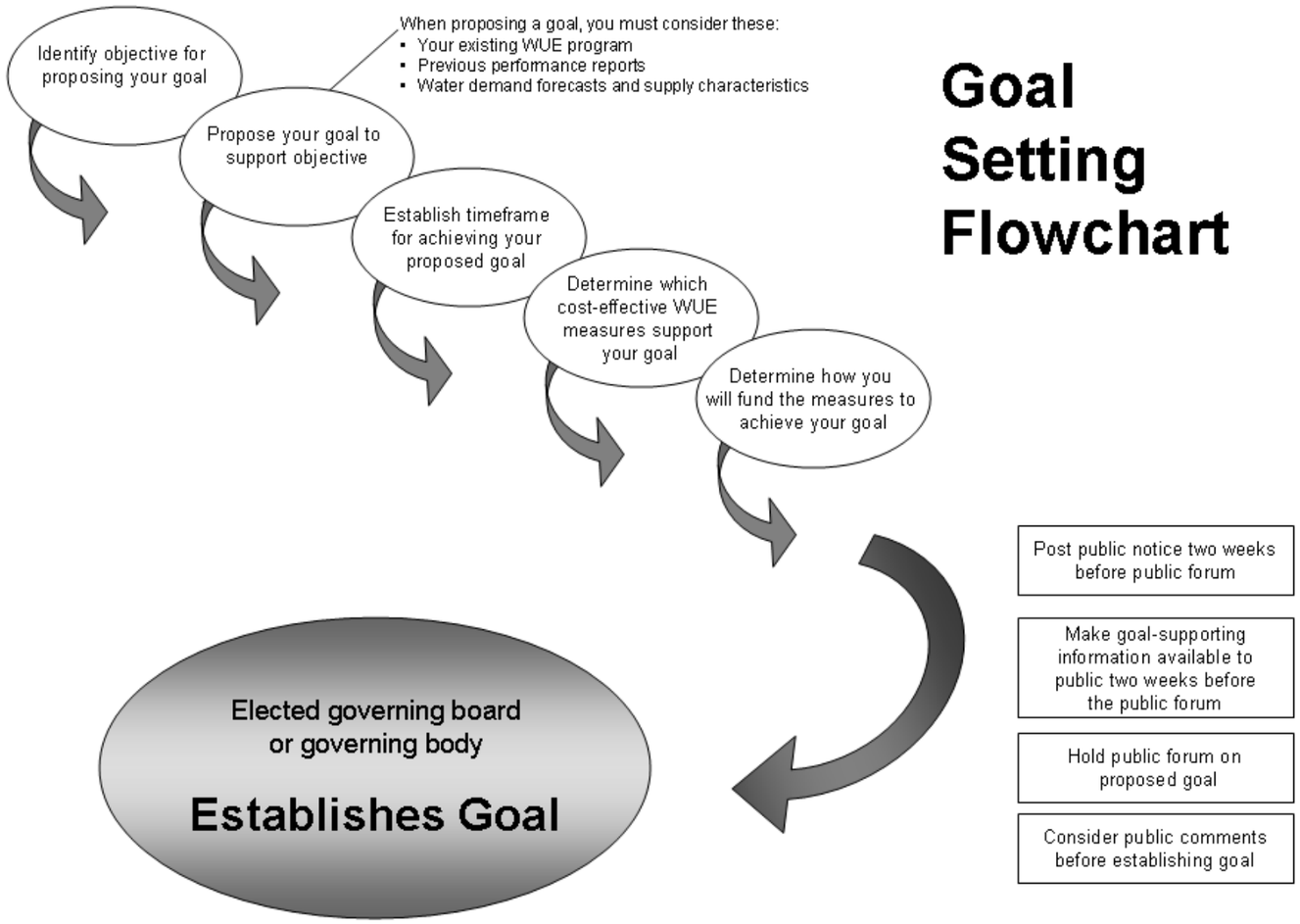
1 cubic foot = 7.48 gallons
100 cubic feet = 748 gallons
1 cubic meter = 264.17 gallons
1 acre foot = 43,560 cubic feet = 325,851 gallons

Appendix H: Goal Setting Flowchart

The goal setting flowchart on the next page shows the steps needed to establish your goal, including the public forum process. Chapter 7 and Appendix O have detailed information about goal setting. Here are some important things to remember about goal setting:

- If you have 1,000 or more connections, you have until July 1, 2009, to establish your goals.
- If you have less than 1,000 connections, you have until July 1, 2010, to establish your goals.
- A minimum of one goal is required.
- The goal must be designed to enhance the efficient use of water by your customers.
- If you established a goal to maintain a historic level (such as maintaining daily consumption at 65 gallons per person per day), you must explain why you are unable to reduce water use below that level (WAC 246-290-830(3)).
- Goals must be **evaluated and re-established when either of the following occur**:
  - Every 6 years if you are required to develop a small water system management program.
  - As part of any water system plan or water system plan update submitted to the Department of Health for approval.
- The elected governing board or governing body at your water system must establish your goals.

Goal Setting Flowchart



Appendix I: Examples of Customer Goals

Goal 1: Reduce average day demand per connection from 310 gallons to 260 gallons in 5 years.

Goal 2: Reduce daily use per person from 100 gallons to 70 gallons in 10 years.

Goal 3: Reduce water production per person, on an average annual basis, from 250 gallons per day to 230 gallons per day within 6 years.

Goal 4: Save 100,000 gallons per day, on an average annual basis, at full implementation of the conservation program in 6 years.

Goal 5: Reduce average 3rd-tier residential water consumption per customer by 15 percent by 2013.

Goal 6: Reduce seasonal outdoor water use by 2 to 3 percent by December 31, 2010.

Goal 7: Save 5 gallons per family home per day by 2014.

Goal 8: Reduce single-family residential water consumption by 25 gallons per day (gpd) per home by 2014.

Goal 9: Reduce per connection use by 7 percent by 2010.

Goal 10: By 2015, reduce consumption per equivalent residential unit (ERU) from 495 to 415 gpd/ERU.

Goal 11: Reduce consumption by 20 percent for the highest 10 percent water users in our single-family class customers by 2012.

Goal 12: Reduce seasonal summer demand by 25 gallons per day for residential customers within the next 6 years.

Goal 13: Reduce total production from our wells by 5 percent within 6 years.

Goal 14: Maintain daily per capita consumption at 65 gallons per person per day for the next 2 years (justification required for maintaining consumption levels (see WAC 246-290-830(3) and Section 7.5).

Goal 15: Reduce regional consumption by 1 percent at the end of 3 years (based on a regional program goal).

Appendix J: Water Conservation Tips

Saving water is easy and it starts with you! When you use water efficiently, you save money on your water, gas, and energy bills too. The average household spends as much as $500 a year on its water and sewer bill and can save about $132 per year by doing a few simple things to use water more efficiently.

Use these water conservation tips to:

1. Educate your customers and ask them to share these ideas with their family, friends, and neighbors.
2. Develop your own materials to personalize and reprint for your customers.

Indoor Use

General

- Never pour water down the drain when there may be another use for it. Use it to water your indoor plants or garden.
- Make sure your home is leak-free. When you are certain that no water is being used, take a reading of the water meter. Wait 30 minutes and then take a second reading. If the meter readings change, you have a leak!
- Monitor your water bill for unusually high use. Your bill and water meter are tools that can help you discover leaks.
- When cleaning out fish tanks, give the nutrient-rich water to your plants.
- Teach your children to turn off faucets tightly after each use.
- Know where your master water shot-off valve is located. This could save water and prevent damage to your home.
- Encourage your school system and local government to develop and promote water conservation among children and adults.
- Setting cooling systems and water softeners for a minimum number of refills saves water and chemicals, plus more on utility bills.
- Insulate hot water pipes for more immediate hot water at the faucet and for energy savings.
- Support projects that use reclaimed wastewater for irrigation and industrial uses.
- Report broken pipes, open hydrants, and errant sprinklers to the property owner or your water provider.
- Wash your pets outdoors in an area of your lawn that needs water.
- When you have ice left in your cup from a take-out restaurant, don't throw it in the trash—dump it on a plant.

Bathroom

- Take short showers instead of tub baths.
- In the shower, turn the water on to get wet; turn off to lather up; then turn the water back on to rinse. Repeat when washing your hair.
- Use a water-efficient showerhead. They're inexpensive, easy to install, and can save you up to 750 gallons a month.
- Shorten your shower by a minute or two and you'll save up to 150 gallons per month.
- If your shower fills a one-gallon bucket in less than 20 seconds, replace the showerhead with a water-efficient model.
- When running a bath, plug the tub before turning the water on, then adjust the temperature as the tub fills up.
- Bathe small children together.
- Place a bucket in the shower to catch excess water for watering plants.
- Never use your toilet as a wastebasket. Avoid flushing the toilet unnecessarily. Dispose of tissues, insects, and other similar waste in the trash rather than the toilet.
- Check for toilet leaks by adding food coloring to the tank. If you have a leak, the color will appear in the bowl within 30 minutes. Flush immediately to avoid stains. A leaky toilet can waste 200 gallons per day.
- Upgrade older toilets with water efficient models and ask your water provider if they offer rebates.
- If the toilet handle frequently sticks in the flush position letting water run constantly, replace or adjust it.
- If your toilet flapper doesn't close after flushing, replace it.
- If your toilet was installed before 1992, reduce the amount of water used for each flush by inserting a displacement device in the tank. Place a 1-gallon plastic jug of water into the tank to displace toilet flow or purchase a device available at most hardware and home centers designed for this purpose. Be sure installation does not interfere with the operating parts.
- Don't let the water run while brushing your teeth, shaving, or washing your face/hands.

Kitchen

- Keep drinking water in the refrigerator instead of letting the faucet run until the water is cool.
- Wash fruits and vegetables in a basin instead of running water from the tap. Use a vegetable brush. Re-use the water that vegetables are washed in for watering plants.
- Don't use running water to defrost meat or other frozen foods; thaw in the refrigerator overnight, or use the defrost setting on your microwave.
- Kitchen sink disposals require lots of water to operate properly. Add food wastes to your compost pile instead of using the garbage disposal.

- Operate automatic dishwashers only when they are fully loaded. Use the "light wash" feature if available to use less water.
- Most dishwashers can clean soiled dishes very well, so dishes don't have to be rinsed before washing. Just remove large particles of food, and put the soiled dishes in the dishwasher.
- Soak pots and pans instead of letting the water run while you scrape them clean.
- Don't waste water waiting for it to get hot. Capture it for other uses such as plant watering or heat it on the stove or in a microwave. Or install an instant water heater at your sink.
- Some refrigerators, air conditioners, and icemakers are cooled with wasted flows of water. Consider upgrading with air-cooled appliances for significant water savings.
- Run your dishwasher only when full.
- When you give your pet fresh water, don't throw the old water down the drain. Use it to water your trees or shrubs.
- Designate one glass for your drinking water each day or refill a water bottle. This will cut down on the number glasses to wash.

Laundry

- Wash only full loads of laundry or use the appropriate water level or load size selection on the washing machine.
- Consider purchasing a high efficiency washing machine, which can save over 50 percent in laundry water and energy use.
- Run your clothes washer only when full.
- When doing laundry, match the water level to the size of the load.

Long-term Indoor Water Conservation

- Retrofit all household faucets by installing aerators with flow restrictors.
- Consider installing an instant hot water heater on your sink.
- Insulate your water pipes to reduce heat loss and prevent them from breaking if you have a sudden and unexpected spell of freezing weather.
- If you are considering installing a new heat pump or air-conditioning system, the new air-to-air models are just as efficient as the water-to-air type and don't waste water.
- Install a water-softening system only when the minerals in the water would damage your pipes. Turn the softener off while on vacation.
- When shopping for appliances, look for the WaterSense and Energy Star labeled models, compare the resource savings to traditional models. Not only will you save water and energy, but your bills will go down too.
- Repair dripping faucets by replacing washers. One drop per second wastes 2,700 gallons of water per year!

Outdoor Use

General

- If you have a well at home, check your pump periodically. If the pump turns on and off while water is not being used, you have a leak.

Car Washing

- Use a shot-off nozzle on your hose that can be adjusted down to a fine spray, so that water flows only as needed. Check hose connectors to make sure plastic or rubber washers are in place to prevent leaks.
- Consider using a commercial car wash that recycles water.
- Wash your car on the lawn, and you'll water your lawn at the same time.

Lawn Care

- Thirty percent of water used by the average American household is devoted to outdoor water use, and more than half of that is used for watering lawns and gardens.
- More than 50 percent of residential irrigation water is lost due to evaporation, runoff, over watering, or improper system design/installation/maintenance.
- Don't over water your lawn. Lawns only need 1 inch of water per week. Buy a rain gauge so that you can better determine when to water.
- Water the lawn or garden early in the morning during the coolest part of the day. Consider installing an automatic timer. Don't forget to adjust your watering schedule, as days get longer or shorter.
- Check sprinkler systems and timing devices regularly to ensure they operate properly.
- Raise your lawn mower cutting height—longer grass blades help shade each other, reduce evaporation, and inhibit weed growth.
- Avoid over fertilizing your lawn. Applying fertilizer increases the need for water.
- Use a broom or blower instead of a hose to clean leaves and other debris from your driveway or sidewalk.
- Don't leave sprinklers or hoses unattended. Set a kitchen timer when watering your lawn or garden to remind you when to stop. A running hose can discharge up to 10 gallons a minute.
- Adjust sprinklers so only your lawn is watered and not the house, sidewalk, or street.
- To water sloping lawns, apply water for 5 minutes and then repeat 2-3 times.
- If installing a lawn, select a turf mix or blend that matches your climate and site conditions.
- If water runs off your lawn easily, split your watering time into shorter periods to allow for better absorption.
- Don't water your lawn on windy days when most of the water blows away or evaporates.

- Remove thatch and aerate your lawn at least once a year so water can reach the roots rather run off the surface.
- Use a minimum amount of organic or slow release fertilizer to promote a healthy and drought tolerant landscape.
- Use sprinklers for larger areas of grass. Water small patches by hand to avoid waste.
- Let your lawn to go dormant during the summer. Dormant grass only needs to be watered every 3 weeks or less if it rains.
- Install soil moisture sensors on sprinkler systems.
- Learn how to shut off your automatic watering system in case it malfunctions or you get an unexpected rain.
- Install a rain sensor on your irrigation controller so your system won't run when it's raining.

Pool

- If you have a swimming pool, consider purchasing a new water-saving pool filter. A single back flushing with a traditional filter uses 180 to 250 gallons of water.
- Lower pool water level to reduce amount of water splashed out.
- Use a pool cover to reduce evaporation when pool is not being used.
- Install covers on pools and spas and check for leaks around your pumps.
- Make sure your swimming pools, fountains, and ponds are equipped with recirculating pumps.
- Use a grease pencil to mark the water level of your pool at the skimmer. Check the mark 24 hours later to see if you have a leak.
- When backwashing your pool, consider using the water on your landscaping.
- If you have an automatic refilling device, check your pool periodically for leaks.

Landscape Irrigation

- Detect and repair all leaks in irrigation system.
- Water trees and shrubs, which have deep root systems, longer and less frequently than shallow-rooted plants that require smaller amounts of water more often. Check with local extension service for advice on watering needs in your area.
- Use soaker hoses or trickle irrigation systems for trees and shrubs.
- Use mulch around shrubs, flowers, vegetables, and garden plants to reduce evaporation from the soil surface and cut down on weed growth.
- Mulching lawn mowers help protect water loss and do not require disposal of grass clippings.
- Spreading a layer of organic mulch around plants retains moisture and saves water, time, and money.

- Use mulch to retain moisture in the soil. Mulch also helps control weeds that compete with landscape plants for water.
- Plant with finished compost to add water-holding and nutrient-rich organic matter to the soil.
- When outdoor use of water is restricted during a drought, use the water from the air conditioning condenser, dehumidifier, bath, or sink on plants or the garden. Don't use water that contains bleach, automatic-dishwashing detergent, or fabric softener.
- Choose shrubs and groundcovers, instead of turf, for hard-to-water areas such as steep slopes and isolated strips.
- Plant in the fall when conditions are cooler and rainfall is more plentiful.
- Water your plants deeply but less frequently to encourage deep root growth and drought tolerance.
- Remember to check your sprinkler system valves periodically for leaks and keep the sprinkler heads in good shape.
- Water your lawn and garden in the morning or evening when temperatures are cooler to minimize evaporation.
- Water only when necessary. More plants die from over-watering than from under-watering.
- Adjust your watering schedule each month to match seasonal weather conditions and landscape requirements.
- Apply water only as fast as the soil can absorb it.

Long-term Outdoor Conservation

- Consider replacing all or even a portion of your lawn with plants and trees that require less water.
- Replace your lawn with a flower or vegetable garden. Not only will you have fresh flowers and vegetables, you'll also save money at the grocery store and you won't have to mow your lawn anymore.
- Plant it smart. Plant native and/or drought-tolerant grasses, ground covers, shrubs, and trees. Once established, they don't need water as frequently and usually will survive a dry period without watering.
- Install irrigation devices that are the most water efficient for each use. Micro and drip irrigation and soaker hoses are examples of efficient devices.
- Use native plants or practice xeriscape garden techniques in garden and lawn areas. Native plants generally require less water than exotic species.
- We're more likely to notice leaks indoors, but don't forget to check outdoor faucets, sprinklers and hoses for leaks.
- Consult with your local nursery for information on plant selection and placement for optimum outdoor water savings.

- Group plants with the same watering needs together to avoid over watering some while under watering others.
- Use a layer or organic material on the surface of your planting beds to minimize weed growth that competes for water.
- Direct water from rain gutters and HVAC systems towards water-loving plants in the landscape for automatic water savings.

Other Outdoor Uses

- Avoid installing ornamental water features, such as fountains, unless they use recycled water.
- Make sure your swimming pools, fountains, and ponds are equipped with recirculating pumps.
- Trickling or cascading fountains lose less water to evaporation, than those spraying water into the air.
- When the kids want to cool off, use the sprinkler in an area where your lawn needs it the most.
- Winterize outdoor spigots when temperatures dip below freezing to prevent pipes from leaking or bursting.

Industrial/Commercial or Institutional

Each industrial/commercial or institutional (ICI) facility is unique and may have water using processes not indicated here. Look for innovative solutions to reduce water use. Here are some water saving tips for the ICI customer class:

- Adjust pump cooling and flushing water to the minimum required.
- As equipment wears out, replace with water-saving models.
- Install air-cooled ice machines—Machines that use single pass cooling water for their condensers can use 10 times as much water as air-cooled units.
- Thaw frozen foods in the refrigerator rather than under running water.
- Replace pre-rinse shut-off spray nozzles—Spray Nozzles can use as much as 5 gallons of water each minute, while efficient low-volume nozzles use 1.6 gallons per minute. These units are designed to remove food as effectively as or even better than their high flow counterparts.
- Serve water in bars and restaurants only upon request.
- Wash only full loads in the dishwashers.

Eliminate single pass cooling—Single pass cooling uses water once and then discharges it to the sewer. Single pass cooling can use up to 40 times more water than a closed loop-cooling tower. Consider:

- Installing a cooling tower.
- Replacing single pass water-cooled equipment with air-cooled units.
- Reusing single pass water in other processes as long as water quality is acceptable.

Sterilizers and Autoclaves

Sterilizers and Autoclaves can account for as much as 10 percent of hospital water use. This high amount of water use is due to the large number of machines, their continuous availability, and often the inefficient design of older equipment.

- Retrofit units with solenoid operated valves—These valves can shut the unit off when not in service.
- Replace old inefficient units with new efficient models—Newer units are designed to recirculate water and shut the machine off when not in use.

Appendix K: *Stop Water Waste – It's Easier Than You Think!* (DOH 331-450)

The tips you'll find within this brochure are designed to not only save water, but also save you money on your water, energy/gas, and wastewater bills. Maybe all three!

It's available online at www.doh.wa.gov/ehp/dw/Publications/331-450.htm

Appendix L: *Water Tap Special Report: Water Shortage* and *Tips to Reduce Outdoor Water Use This Summer*

This special *Water Tap* report provides useful information about water use efficiency and water conservation.

It's available online at www.doh.wa.gov/ehp/dw/Publications/331-375-L1.pdf

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Need some tips for your customers on how to reduce outdoor water use? This one-page document can easily be shared with them.

It's available online at www.doh.wa.gov/ehp/dw/Publications/331-375-L2.pdf

Appendix M: U.S. Environmental Protection Agency's WaterSense Program

You've had the opportunity to review the requirements of the WUE rule, and one of your next steps is to educate your customers about efficient water use practices. Simple messages about the value of using water efficiently can help change the way people use water in your community.

Developing an effective WUE program takes time and effort. Fortunately, WaterSense, a free program sponsored by the U.S. Environmental Protection Agency, is partnering with water utilities, government agencies, and other promotional partners to help make water-efficient products and practices commonplace.

Educating Customers Can Save Water

Consistent water efficiency messaging is one of the most cost-effective ways to enhance the efficient use of water by your customers. WaterSense can help you develop your water efficiency program by providing you with a credible, national brand that has a strong and consistent water efficiency message.

Educating your customers is a requirement of the WUE rule, sending information periodically (more than once per year) to your customers is considered a water efficiency measure that can help you meet your water efficiency goal.

By joining WaterSense, you get a toolkit that will help you meet the minimum educational requirement.

WaterSense will provide you with many benefits to help effectively communicate water efficiency messages to your customers. Seasonal water efficiency messages are a great way to keep your customers informed throughout the year. Use the WaterSense tool kit to develop quarterly newsletter articles such as "This season's water efficiency tips."

The following materials are available exclusively to partners:

- Utility bill stuffers
- Artwork for promotional items
- Fact sheets
- Brochures

Building a Water Saving Certified Home

EPA recently announced the first WaterSense labeled homes in the country.

- The program is helping homebuyers cut their water and energy use while at the same time saving money on utility bills. Four WaterSense labeled new homes have been built by KB Home in Roseville, California, and will help families save an average of 10,000 gallons of water and at least $100 on utility costs each year.

- Since signing on as the first national builder to partner with WaterSense, KB Home has agreed to build three communities of homes that will earn the WaterSense label, which will be the first in the nation to meet WaterSense criteria for newly built homes. Each house includes WaterSense labeled plumbing fixtures, an efficient hot water delivery system, water-efficient landscape design, and other water and energy-efficient features.

- Each WaterSense labeled new home is independently inspected and certified to ensure EPA's criteria are met for both water efficiency and performance. A WaterSense labeled new home is built to use about 20 percent less water than a typical new home.

Join WaterSense Now

The Office of Drinking Water has already joined WaterSense, and we're encouraging drinking water utilities throughout our state to become WaterSense partners too. If you're ready to become a partner now, just go to their website www.epa.gov/watersense/ or contact the WaterSense Helpline by email at watersense@epa.gov or call 866-WTR-SENS (987-7367).

Appendix N: Local Stories of Successful Water Use Efficiency Programs

Do you have a successful WUE program that you would like to share with ODW? We want to hear from you! Send us your success story so that we can share it with others. Here are some examples:

Northwest Water Systems (Kitsap County)
"Last December, I had the three old toilets (3.5 gal./flush) replaced with three Toto double-flush low–volume (0.9/1.6 gal./flush) toilets. I have since been monitoring my bi-monthly water usage, and comparing it with the same bi-monthly periods for the previous year. For the period of January thru June of 2008, **I have reduced my potable water consumption by about 60 percent."**

Pasadena Park Irrigation District (Spokane County)
"Replacement of leaking lead joint water mains was the initial step in the water system's water use efficiency program. Before the main was replaced, Pasadena Park had a 45 percent water loss rate (over a million gallons a day), costing the system an estimated $75,000 a year in lost revenues and electricity, plus unknown costs in wear and tear. Concurrent with this project, Pasadena Park also implemented a metering program; upgraded their SCADA and began automatic meter reading; and conducted an annual water audit. As a result of the project and related water use efficiency efforts, the water system has **reduced its water loss to 9.8 percent, and has recaptured 875,908 gallons of water per day.** The value of their recaptured water is $177,000 per year, which makes the loan payments for the system improvements each year, plus $47,000 additional. That money is being used to fund radio read meters, which have a leak alert function that helps to find leaks faster."

Wind River Water Association (Skamania County)
"We were able to **detect a huge leak on a home after the meters went in.** We feel that almost a million gallons of water passed undetected before this discovery. We had no idea how out of control things were. Some people used as much as 65,000 gallons a month. Since the meters went in, not one residence has used more than 7,000 gallons a month. We were charging $12.00 a month for unlimited water before. Since the new water rates were implemented, we are saving about 80,000 gallons a month. Now, as you can see, we have a very aggressive rate plan to encourage continued conservation of water."

Appendix O: *Setting Goals to Use Water Efficiently* (DOH 331-402)

One of the most important steps in using water efficiently is setting water efficiency goals. Goals help you track your progress and determine the success of your water use efficiency (WUE) program. This six-page document helps you set goals to help manage the growing demand for water.

It's available online at www.doh.wa.gov/ehp/dw/Publications/331-402.pdf

Appendix P: *Reduce Leaks: Using water audits and leak detection surveys*

(DOH 331-388)

This six-page publication explains how to calculate your leakage rate, detect, and repair leaks.

It's available online at www.doh.wa.gov/ehp/dw/Publications/331-388.pdf

Appendix Q: *Leadership Guide: Issues for an Elected Governing Board to Consider* and *Sprayed Away: Seven Ways to Reduce Texas' Outdoor Water Use*

The Institute for Local Government in California developed a *Water Conservation Leadership Guide* to help their local officials with water conservation issues. The document includes:

- Water conservation options for local agency policies and programs.
- Water efficiency options for agency facilities.
- Water efficiency options in the community.
- Resources to help develop water efficiency policies and programs.

It's available online at www.doh.wa.gov/ehp/dw/Publications/331-375-Q1.pdf

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Here's a document from Texas that provides useful information. The intro to this document says it all:

> "Texas is the fastest growing state in the nation. Our water supplies are limited. So it is a shame that during the summertime, much of our most precious natural resource ends up... *Sprayed Away*."

It's available online at www.doh.wa.gov/ehp/dw/Publications/331-375-Q2.pdf

Appendix R: Example of Large Municipal WUE Program

Note/Disclaimer: The Department of Health did not officially approve this WUE program. We consider it to be a good example of how you might want to think about writing your own program if you operate a larger water system.

Appendix S: Example of a Small Municipal WUE Program

Note/Disclaimer: The Department of Health did not officially approve this WUE program. We consider it to be a good example of how you might want to think about writing your own program if you operate a smaller water system. The Partnership for Water Conservation helped this small water system create and write their WUE program.

Appendix T: Examples of a Water Loss Control Action Plan

Example #1:

Our water system established a supply-side goal to reduce Distribution System Leakage (DSL) to less than 10% by 2012 or within 3 years after becoming fully metered. We finished installing water meters on all connections and city-owned facilities in April 2012. The DSL was at 20% for 2010 and was reduced to 19.2% in 2011; which is a savings of 1 MG per month on average.

We have been very active in taking steps to help reduce the DSL, such as repairing leaks when they are found or when we are notified, and replacing older water lines and leaking valves. We also set up a meter replacement schedule for the larger outdated commercial and industrial water meters; which is expected to be completed in 2015.

As a result of replacing these meters, we expect our revenue to increase from more accurate measurements. The city has taken steps to verify the collection of the monthly data and to have the source meters calibrated for accuracy. We plan to propose a 1% rate increase to our city council this spring to cover the expenses of needed infrastructure improvements to reduce DSL. We are concerned with the amount of DSL and committed to finding, repairing, and meeting the established system distribution leakage standard by 2016.

Example #2:

Summary

The Water Department is effectively working to reduce our Distribution System Leakage (DSL). We established a supply side goal to reduce DSL from 15.2 % to 12.5% by 2015. We expect to achieve 10% or less DSL by 2017.

Finding Apparent Losses

The first step is to find out more about our apparent losses by obtaining more accurate data. To do this, we aim to resolve our method of reading meters this year. We installed radio-read meters last year to obtain more accurate consumption data year-round because we didn't read manual meters during the winter. We also plan to implement a system to account for the un-metered authorized water consumption, like hydrant flushing. Last year, we identified an unauthorized connection without a meter tapped into the system. The situation has been corrected and we continue to look for and remove any unauthorized consumption.

Finding Real Losses

Another priority of ours is to identify sources of water loss within our system. Our leak detection survey has been a great success. Initially in 2009, our calculated leakage was over 22%. We have reduced that to an average of 15% in 3 years and established future goals to reduce it to less than 10% DSL by 2017.

We had a company perform a leak detection survey in 2011; the results of that survey prompted us to replace 750 feet of water main. We also discovered many deteriorated service line connections (between the main water line and service lines to customers), and we have replaced or are working to replace those lines next year.

At this time, only two of six city-owned buildings/facilities have meters installed. We will install meters on those other four facilities by 2014.

We also have planned a new metered filling station for water trucks and the Fire Department. This will help us track previously unmetered authorized uses for trucks for cleaning streets, fire fighting, or construction.

In addition, we have taken the following measures to reduce the annual volume of water loss:

1. Resolution #304 enforces a $500 fine for unauthorized fire hydrant use.
2. Upgraded meter telemetry capabilities and reliability for increased monitoring of water production.
3. Calculating distribution system leakage twice a month as well as the required annual calculation.
4. Quick and efficient response by staff to all known distribution leaks.
5. The replacement of aging and unreliable watermains.
6. An annual leak detection program that will survey a minimum of 25% of our watermains every year until compliance is achieved.

Funding Our Water Loss Program

The water department staff and city council have made both a financial and philosophical commitment to using our water effectively and wisely, now and into the future. Through both changes to our rate structure and actively seeking out loans for needed system improvements/repairs, we expect to meet our DSL reduction goal. We will achieve this by:

- Enhancing Our Conservation Billing Structure – Our rates are designed to reward conservation and penalize over use. We adopted a third tier to the existing two-tiered rate billing system. Those customers in the third tier will now pay more for excessive water use, which will help fund our WUE program and provide general financial viability for our water system.
- Seeking Funding Opportunities: We will actively seek funding to repair our aging infrastructure, which is over 50 years old in some areas.

Appendix U: Water Use Efficiency Requirements for Nonmunicipal Water Suppliers

Small Water System Management Program (SWSMP)

These are the Water Use Efficiency Requirements for Nonmunicipal Systems if you are completing a Small Water System Management Program (SWSMP)

A complete water use efficiency (WUE) program includes both supply side (water system) and demand side (customer) strategies for efficient water use. A utility should demonstrate its efficient use of the resource and help their customers to use water efficiently. This guidance has been developed to assist nonmunicipal water systems in meeting the planning requirements and recommendations regarding water use efficiency.

WAC 246-290-105

(1) The purpose of a SWSMP is to:

a) Demonstrate the system's operational, technical, managerial, and financial capability to achieve and maintain compliance with all relevant local, state, and federal plans and regulations.

b) Establish eligibility for funding under chapter 246-296 WAC.

(2) All noncommunity and all community systems not required to complete a WSP as described under WAC 246-290-100(2) shall develop and implement a small water system management program.

Water Use Efficiency-Related Requirements

1. Per WAC 246-290-496(1)(a), Install production (source) meters.
2. Provide water production data monthly and annually for each source and provide water consumption data for residential and non-residential annual totals, WAC 246-290-105(4)(h)(i and ii).
3. Forecast demand considering water use trends based on actual water use records, WAC 246-290-105(4)(k)(i).
4. Evaluate a rate structure that would encourage water use efficiency, WAC 246-290-105(4)(l).
5. Create a water use efficiency program, WAC 246-290-105(4)(g).

Water Use Efficiency Program

WAC 246-290-010 defines a WUE program as policies and activities focusing on increasing water supply efficiency and water demand efficiency to minimize water withdrawals and water use.

The WUE program recommendations summarized below replace the Water Conservation Program (Element 14) previously required in the Small Water System Management Program.

We recommend that an effective WUE program should include:

- Set water saving goals for supply side (water system) and demand side (customer) to promote water use efficiency.
- Identify water saving measures to meet goals.
- Evaluate, report, and manage water loss.
- Educate your customers about WUE.
- Install consumption meters to determine annual residential and non-residential usage.
- Evaluate WUE program effectiveness every 6 years.
- Report WUE program success annually to your customers. Consider using an annual newsletter or your annual consumer confidence report.

Water System Plan (WSP)

These are the Water Use Efficiency Requirements for Nonmunicipal Systems if you are completing a Water System Plan (WSP)

A complete water use efficiency (WUE) program includes both supply side (water system) and demand side (customer) strategies for efficient water use. A utility should demonstrate its efficient use of the resource and help their customers to use water efficiently. This guidance has been developed to assist nonmunicipal water systems in meeting the planning requirements and recommendations regarding water use efficiency.

WAC 246-290-100 WAC

(1) The purpose of a Water System Plan is to:

a) Demonstrate the system's operational, technical, managerial, and financial capability to achieve and maintain compliance with relevant local, state, and federal plans and regulations.

b) Demonstrate how the system will address present and future needs in a manner consistent with other relevant plans and local, state, and federal laws, including applicable land use plans.

c) Establish eligibility for funding under chapter 246-296 WAC.

Water Use Efficiency-Related Requirements

1. Per WAC 246-290-496(1)(a), install production (source) meters.
2. Provide water production data monthly and annually for each source and provide water consumption data for each customer class (annual totals) per WAC 246-290-100(4)(b)(ii)(A and B). If over 1,000 connections, include seasonal variations, WAC 246-290-100(4)(d).
3. Provide a demand forecast for a consecutive 10-year and at least a 20-year period with and without efficiency savings, WAC 246-290-100(4)(c).
4. For systems serving 1000 or more connections, evaluate reclaimed water opportunities, WAC 246-20-100(4)(f)(vii).
5. Evaluate the affordability and feasibility of a water rate structure that will encourage water demand efficiency, WAC 246-290-100(4)(j)(iv).
6. Create a water use efficiency program, WAC 246-290-100(4)(f)(i), taking into consideration the water supply characteristics and affect from current and future use on water supply (see WAC 246-290-100 (4)(f)(ii)(B) and Appendix C).

Water Use Efficiency Program

WAC 246-290-010 defines a WUE program as policies and activities focusing on increasing water supply efficiency and water demand efficiency to minimize water withdrawals and water use.

The WUE program recommendations summarized below replaces the 1994 Conservation Planning Requirements/Guidelines used in Water System Plans.
We recommend that an effective WUE program should include:

- Set water saving goals for supply side (water system) and demand side (customer) to promote water use efficiency.
- Identify water saving measures to meet goals.
- Evaluate, report and manage water loss.
- Educate your customers about WUE.
- Install consumption meters to determine annual usage and customer class data.
- Evaluate WUE program effectiveness as part of every water system plan or plan update..
- Report WUE program success annually to your customers. Consider using an annual newsletter or your annual consumer confidence report.