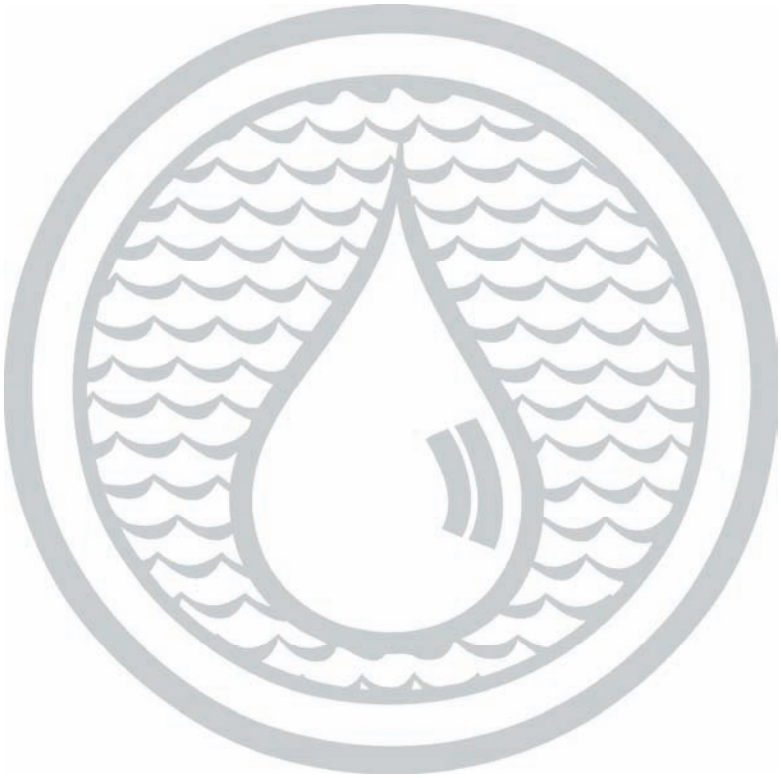
Getting Started

Water Use Efficiency Guidebook

July 2007



Washington State Department of Health

Division of Environmental Health
Office of Drinking Water

DOH PUB. #331-375

It's Worth Saving Drinking Water

Getting Started

Water Use Efficiency Guidebook

July 2007

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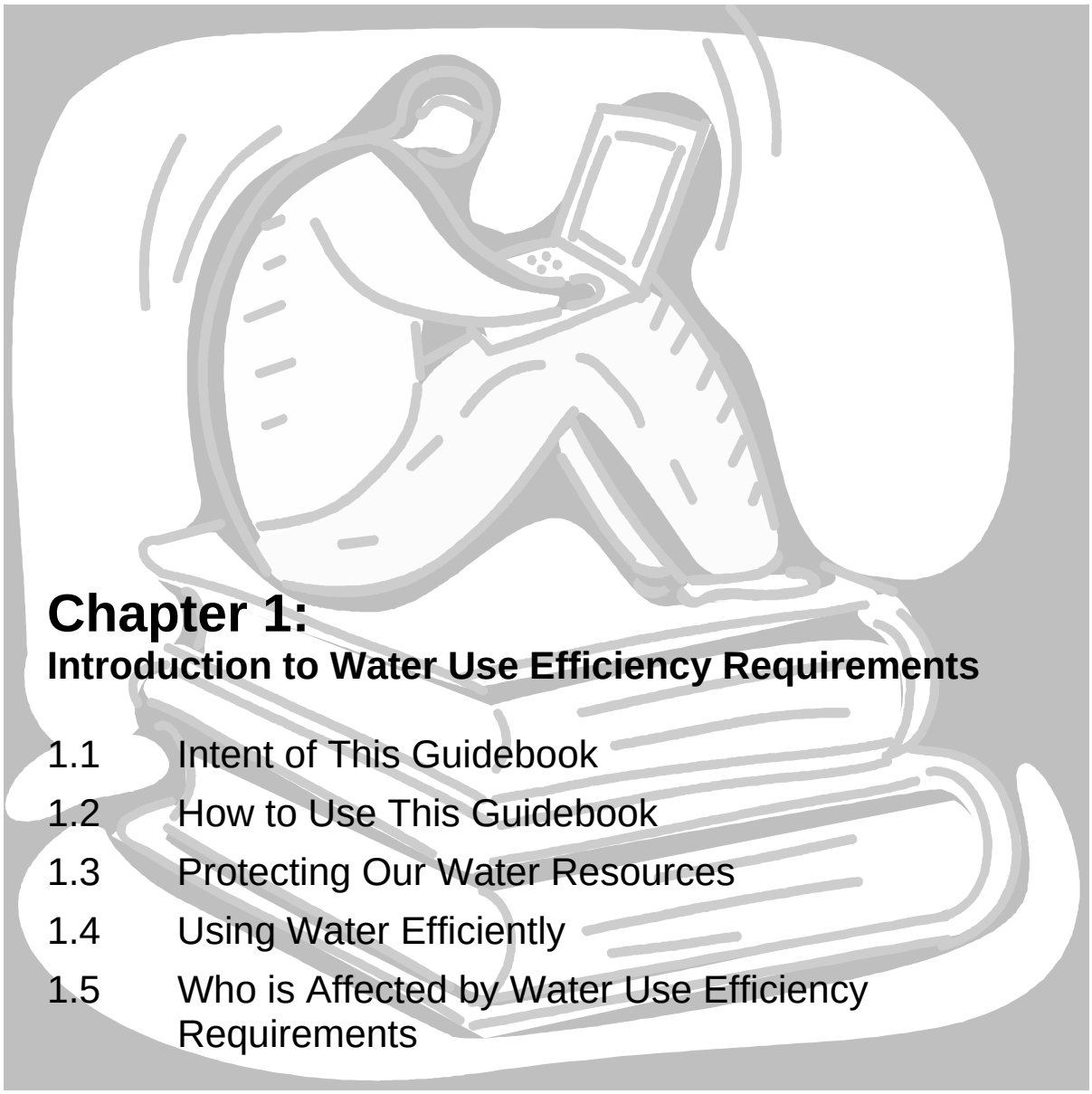
Acronyms and Abbreviations

AC	- Authorized consumption
DSL	- Distribution system leakage
DOH	- Department of Health
Ecology	- Department of Ecology
EPA	- U.S. Environmental Protection Agency
gpm	- Gallons per minute
MWS	- Municipal water supplier
ODW	- Office of Drinking Water
SWSMP	- Small water system management program
TP	- Total produced and purchased
WAC	- Washington Administrative Code
WLCAP	- Water Loss Control Action Plan
"We"	- 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

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1.1 Intent of This Guidebook

Developing an effective water use efficiency (WUE) program can take a lot of time and effort. The information contained within this guidebook is intended for use by any water system developing a WUE program and can be modified to meet your specific needs. It will provide assistance in understanding the state's new WUE requirements and will help municipal water suppliers and consultants implement the WUE rule [chapter 246-290 Washington Administrative Code (WAC)].

This guidebook is designed to help you:

- Create a WUE program that works for your water system.
- Understand the WUE requirements.

Based on water system size and complexity, some water systems may find parts of this guidebook more useful than others may. The Department of Health (DOH) addressed the most immediate concerns expressed by those affected by the requirements. More detailed guidance will be developed as we continue with WUE rule implementation. Please contact your Regional Office if you have any questions. See Appendix A for contact information.

1.2 How to Use This Guidebook

You should refer to Section 1.5 of this chapter to determine if you are a municipal water supplier (MWS). The WUE requirements apply only to municipal water suppliers [WAC 246-290-800(2)]. All other water systems must develop a WUE program within a planning document but do not have to meet the WUE requirements required for municipal water suppliers [WAC 246-290-100(4)(f)(i) and 246-290-105(4)(g)].

If you are a MWS, you have new requirements and deadlines to meet. Chapters in this document provide general guidance and examples to help you meet these requirements. This guidebook can be used for training sessions, general reference, and guidance for developing a successful WUE program. The appendices contain an annual reporting form, templates, useful references, and examples. This guidebook is also available electronically on the Web at: http://www.doh.wa.gov/ehp/dw/municipal_water/water_use_efficiency_rule.htm

1.3 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 DOH 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.

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 needs.

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 municipal water suppliers 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 of 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 new requirements involve the customers and the public into 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.

1.4 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 Conservation Planning Requirements document (DOH Pub. #331-008) 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 new requirements emphasize the importance of measuring water usage 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, municipal water suppliers 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 – Municipal water suppliers 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 now required.

Goal Setting and Performance Reporting – Municipal water suppliers are required to set WUE goals through a public process and report annually on their performance to their customers and DOH. They also must make the information available to the public.

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

Table 1-1: Summary of WUE Requirements

Requirement	Deadline for municipal water suppliers under 1,000 connections	Deadline for municipal water suppliers with 1,000 or more connections
Begin collecting production and consumption data	January 1, 2008	January 1, 2007
Include WUE program in planning documents	January 22, 2008	January 22, 2008
Set your own WUE goals	January 22, 2009	January 22, 2008
Submit service meter installation schedule	July 1, 2009	July 1, 2008
Submit first annual performance report	July 1, 2009	July 1, 2008
Meet distribution leakage standard (based on 3-year rolling average)	July 1, 2011, or three years after installing all service meters	July 1, 2010, or three years after installing all service meters
Complete installation of all service meters	January 22, 2017	January 22, 2017

1.5 Who is Affected by Water Use Efficiency Requirements

Disclaimer: This section is an attempt by the Department of Health to simplify the definition of a municipal water supplier. If you require further assistance with a legal determination, please contact the Department of Ecology.

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

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

1. My system has 15 or more residential service connections *or* provides water in a residential manner to a non-residential population that averages at least 25 people for at least 60 days a year.
2. My system provides water to a city, town, public utility district, sewer district or water district.
3. 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 do not meet the definition of a MWS and do not have to meet the WUE requirements. Water systems solely regulated under the Federal Safe Drinking Water Act, and not state authority, are also not required to meet WUE requirements. This includes federal government water systems, including federal installations and facilities.

It is in the best interest of all water systems to use water resources wisely. **If your water system does not have to meet the WUE requirements, you are still required to have a WUE program within your planning document [WAC 246-290-100(4)(f)(i) and 246-290-105(4)(g)]**. 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.

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.

DOH 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 could be **examples of municipal water suppliers**:

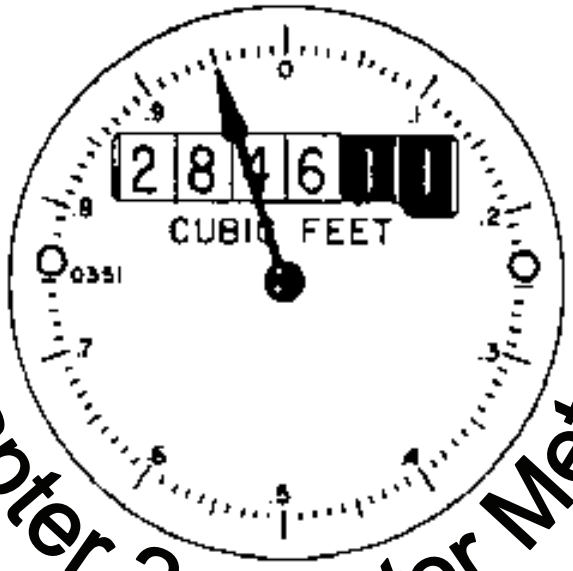
- City
- Subdivision
- Mobile home park
- Water association

If your water system is a non-community 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.

If you are not sure whether you are a municipal water supplier, contact the Department of Ecology at the numbers listed on the next page. You can also read their policy on municipal water suppliers at www.ecy.wa.gov/programs/wr/rules/images/pdf/pol2030.pdf

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



Chapter 2: Water Meters

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 accurate information necessary to calculate distribution system leakage (see Chapter 6). They also provide useful information to evaluate the effectiveness of your WUE program. Metering and data collection deadlines are listed in order by due date in Table 2-1.

Table 2-1: Summary of WUE Requirements for Meters and Data Collection

Requirements	Deadline for municipal water suppliers under 1,000 connections	Deadline for municipal water suppliers with 1,000 or more connections
Install production meter(s)	January 22, 2007	January 22, 2007
Begin collecting production and consumption data	January 1, 2008	January 1, 2007
Submit service meter installation schedule	July 1, 2009	July 1, 2008
Complete installation of all service meters	January 22, 2017	January 22, 2017

2.2 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 Health (DOH) or 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 do not provide the type of production data necessary to successfully calculate distribution system leakage.

You must install source meter(s) by January 22, 2007.

We expect that you are recording monthly production data. If you do not 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.

2.3 Consumption Meters

Consumption meters, also referred to as service or customer meters, provide information to your customers regarding their water usage. Service meter data also provides the most accurate assessment of distribution system leakage (see Chapter 6).

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 2.6).

You must meter all existing service connections by January 22, 2017.

Beginning January 22, 2007, new connections must be metered at the time water is provided to the customer [WAC 246-290 (2)(d)]. Service meters do not need to be installed until a customer requests water from the distribution system (for example, when a service connection is activated).

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

[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.

2.4 Intertie Meters

Permanent and Seasonal Interties

Meters must be installed on all interties used as permanent or seasonal sources by January 22, 2017 [WAC 246-290-496 (2)(e)]. You may need to install intertie meters at an earlier date in order to accurately calculate distribution system leakage.

Emergency Interties

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

Exceptions to the Service Meter Requirement

Exceptions to the service meter requirement are limited and described in Section 2.6 of this chapter.

2.5 Meter Installation Schedule

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

1. Submit a meter installation schedule with your initial performance report.
2. Implement activities to minimize leakage.
3. Report status of installing meters and minimizing leakage in annual performance reports and in any planning documents submitted for approval.

Submit a Meter Installation Schedule

You must submit a meter installation schedule to DOH by the deadlines in Table 2-1. Use the initial performance report to document when and how you plan to install meters (see Appendix E for an Annual Water Use Efficiency Performance Report Form).

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

Submit annual distribution system leakage calculations (see Chapter 6) once you have installed meters on all existing service connections and interties.

Do not submit leakage information until your system is fully metered. Until you are 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 and Minimizing Leakage

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

Indicate when your system is fully metered in your performance report and WUE program.

2.6 Clustered Entities

WUE requirements allow you to measure the volume of water through a single meter for the following clustered entities:

- Campground
- Recreational vehicle park
- Designated mobile home park[3]
- Building with multiple units (for example, an apartment building)
- Complex with multiple buildings served as a single connection (for example, a business park)

Metering Requirements for Municipal Water Suppliers That Serve Clustered Entities

If your 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 designated mobile home park, **and** considered a municipal water supplier, you do not have to install meters on all of your direct service connections (see ***Note*** below). 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. We will develop an alternative methodology to determine leakage for these systems [WAC 246-290-820(3)].

Note: If you are a complex with multiple buildings and 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.

[3] To determine if your property is considered a designated mobile home park, please contact your local planning authority for information about zoning designations. State law defines a mobile home park as:
RCW 59.20.030 (6) "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.

2.7 Selection, Installation, Maintenance, and Operation of Meters

You must select, install, operate, and maintain your meters using generally 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. Source meters are usually more difficult installations and must be installed correctly to be accurate.

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.

The accuracy of your meters diminishes over time, and older meters may require calibration or replacement. Water systems should develop a process and timeline for inspecting, testing, calibrating, and replacing meters as prescribed by the manufacturer. How often you do this depends on the size of the meter, water quality, and other factors.

A useful reference for meters is the American Water Works Association's M6 Manual of Water Supply Practices, "Water Meters – Selection, Installation, Testing, and Maintenance."[4]

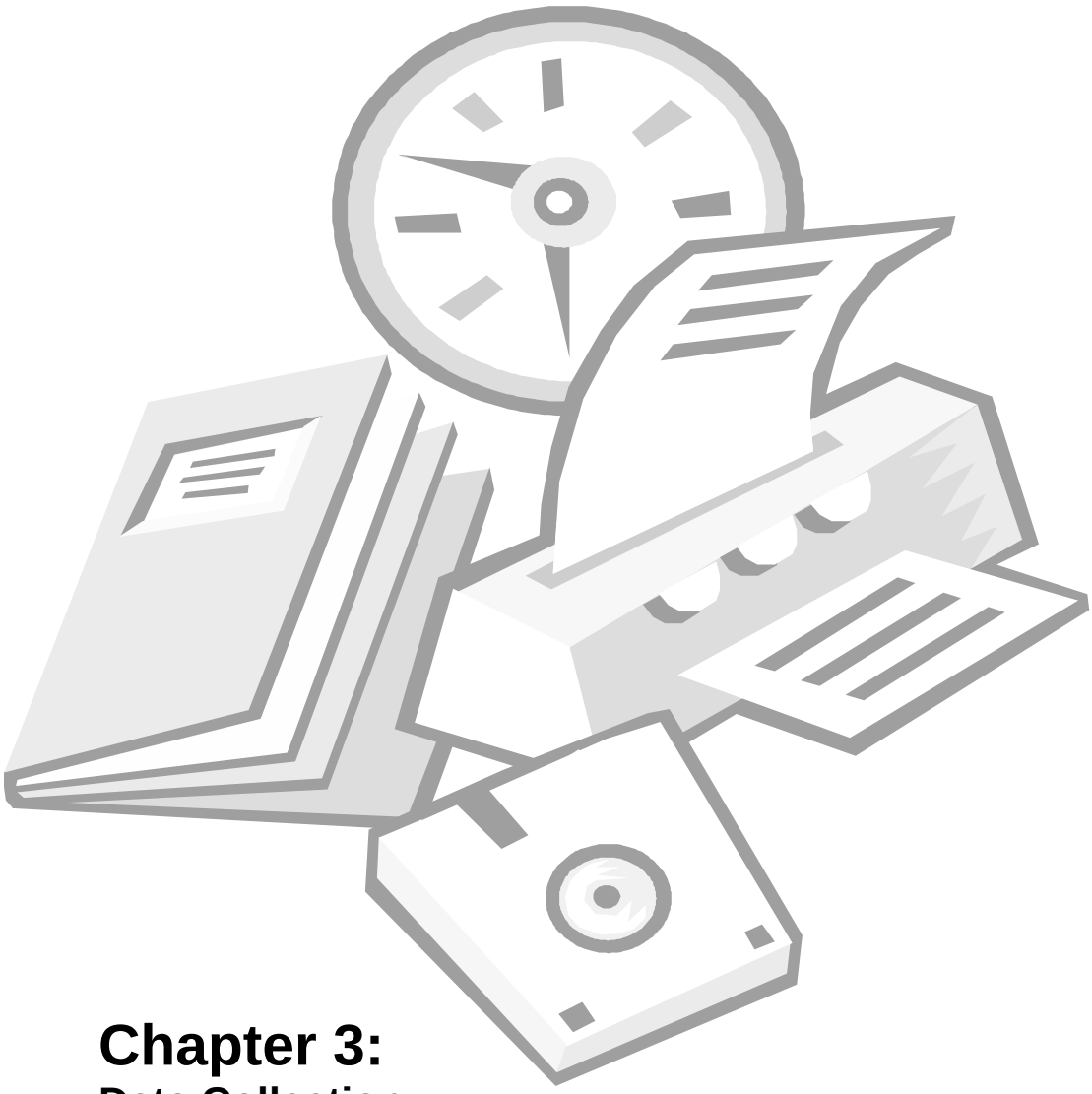
2.8 Funding Options for Installing Meters

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)

"Funding for Drinking Water Capital Improvement Projects," DOH Pub. #331-344, has information on the programs listed above.

[4] To purchase this document go to www.techstreet.com/awwagate.html and type "M6" in the search box.



Chapter 3:
Data Collection

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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 water use efficiency 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 new requirements, you need to collect production and consumption data on a regular basis and report that information in your planning document and annual performance report (see Chapters 5 and 8). Water production and consumption data are critical for calculating distribution system leakage (see Chapter 6). Table 3-1 shows data collection start times that allow you to meet annual reporting requirements.

Table 3-1: Summary of When to Begin Data Collection

Requirement	**Deadline for municipal water suppliers under 1,000 connections**	**Deadline for municipal water suppliers with 1,000 or more connections**
Begin to collect production and consumption data	January 1, 2008	January 1, 2007

These dates are not required deadlines as the table might suggest. Rather they are recommendations so that you have a year's worth of data available to prepare your annual performance report. Annual performance reports are due each year by July 1.

Water use data will be used 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

This 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)].

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 (Consumed Water)

This 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 (Purchased Water)

This is the amount of water you purchase 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).

If you are a wheeling water system, measure the water that enters and leaves your distribution system to calculate leakage. TP includes all water that enters your system, including wheeled water. Once wheeled water leaves your system, consider that volume AC.

If you are the originating water supplier, include this information in your AC data when calculating leakage.

If you are the water system receiving the water (end user), include this information in your TP data when calculating leakage

3.4 Collecting Service Meter Data

Service meters are required on all direct service connections (see Chapter 2). 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 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 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 one to two months to obtain meaningful data for decision-making.

Customer Class

Report your annual water consumption data for each customer class. Examples of class types are residential, non-residential, commercial, industrial, single family and multi-family.

Small water system management programs: You must report 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 report 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 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 one to two months. 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 leakage calculations may not be accurate. You have the flexibility to collect annual data on a schedule that meets your needs.

To report the required annual totals for production and consumption data, you might choose a "data collection year" beginning on May 1 and ending on April 30. Adjustments may be necessary when collecting data to reflect a 12-month time period. We recommend evaluating billing cycles and data collection methods to ensure leakage calculations are accurate.

3.6 Water Supply Characteristics

We encourage you to be aware of the factors that influence your ability to use your water supply. In order to gain better information about the long-term reliability of your source(s), you should understand your water supply characteristics and consider them when making management decisions.

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), and 246-290-830(6)(a)]. Understanding water supply characteristics will help you set a quantifiable water savings goal and create a WUE program that uses water wisely.

Documenting Water Supply Characteristics

In order to provide context for customers and the public about your WUE program you must consider water supply characteristics or a source description when setting your goals and make this information available to the public [see Chapter 7 and WAC 246-290-830(6)(a)]. In addition to using this information to set goals, water supply characteristics must also be included in planning documents [WAC 246-290-105 (4)(f) and 246-290-100 (4)(f)(ii)(B)].

Use existing data and studies when seeking information about water supply characteristics. You should try to find and report as much information as possible. This will be valuable documentation when planning for the future of your 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 ecosystem, and the need to meet short- and long-term goals (see Appendix C for an example).

Small Water System Management Programs (SWSMP) – Source Description
You must describe your source(s) of water [WAC 246-290-105 (4)(f)]. This description is similar to the information required in a wellhead protection plan. For systems completing a SWSMP, the water supply characteristics must include the:

- Source(s) description.
- Name and location of the source from which water is used.

Water System Plans (WSP) – Water Supply Characteristics
You must provide a narrative describing your source(s) 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.

The water supply characteristics must include:

- Source(s) description
- Name and location of the source(s)
- Production capacity
- Seasonal variability
- Water rights
- Legal constraints

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

Where to Find Existing Water Supply Characteristics Information

To find information to fulfill this requirement, you may go to:

- 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.
- Comprehensive plans prepared by your city or county.
- Studies prepared by local city or county government water resource departments.
- Coordinated water system plans, if one covers your service area.
- 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.html
- 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 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 permit(s). You can find this information by contacting your local Ecology regional office (see Section 1.5) 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/ws_update.html
- The U.S. Geological Survey (USGS) has completed studies in some parts of Washington State, including information about streamflow. Select your appropriate county or basin on the USGS search page: http://wa.water.usgs.gov/pubs/

Here's an Idea

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

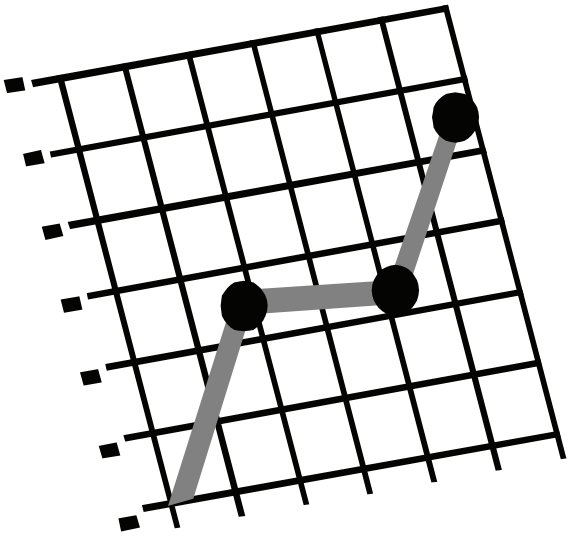
Do the same for water depth records. Water depth can fluctuate a great deal, depending on when the depth is measured and the last time the pump ran. Look for long-term or seasonal trends rather than changes from one month to the next.

If you do not 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.

- 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
- Ecology's Instream Resources Protection Program (IRPP) contains important information relative to water availability. To find IRPP 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


It's Worth
Saving
Drinking Water



Chapter 4:
Demand Forecasting

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 new criteria for you to consider when preparing demand forecasts (see Section 4.3).

Demand forecasting is important because it identifies how much water will be needed in the future. You need to collect consumption data (see Chapter 3) on a regular basis from your service meters and use that information to calculate demand forecasts in your planning document.

Because demand forecasting is part of the WUE planning requirements, the deadline for including the new demand forecast information is the same as the deadline for meeting the planning requirements in Table 4-1. This deadline is the same for all water systems, regardless of size.

Table 4-1: Summary of WUE Planning Requirements

Requirement	**Deadline for municipal water suppliers under 1,000 connections**	**Deadline for municipal water suppliers with 1,000 or more connections**
Include WUE Program in Planning Documents	January 22, 2008	January 22, 2008

4.2 Projecting Demand Forecasts: Factors to Consider

Prepare your demand forecast within your planning document [WAC 246-290-100 (4)(b)]. The goals you establish may have an affect on the water demand for your system (see Chapter 7). When preparing your demand forecast you must project your demand both with and without savings obtained from your water use efficiency program [WAC 246-290-100 (4)(c)].

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.[5]

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 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.

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

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

You must project your demand for a consecutive six-year and 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 Pub. #331-123).

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

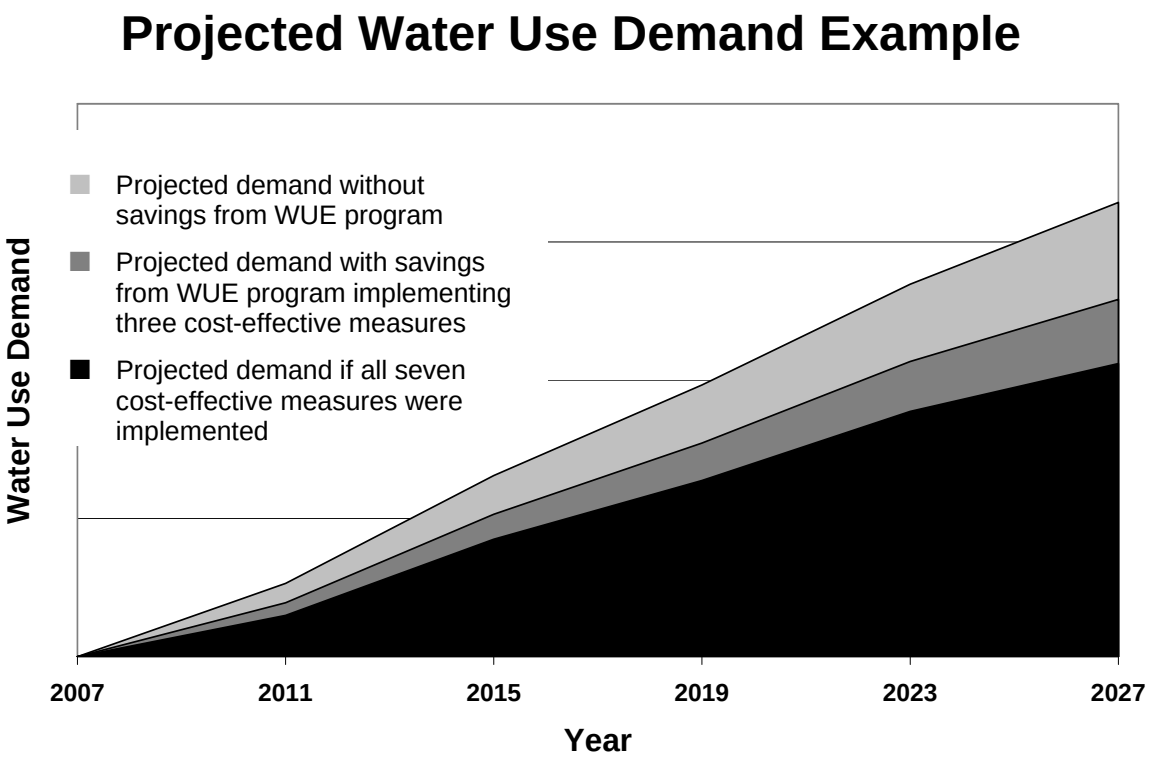
1. **Forecast demand *without* projected water savings from your WUE program.** This is the forecast we require in the hydraulic analysis and capital improvement program.

2. **Forecast demand *with* projected water savings expected from your WUE program.** This is based on cost-effective measures (see Chapter 5) implemented by your water system to meet your selected goals (see Chapter 7).

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**.

Figure 4.2: Demand Forecast Example for a Water System with 1,000 or More Connections



Note: All water systems must evaluate or implement WUE measures based on system size [WAC 246-290-810 (4)(d)(i)]. This example 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 system chose to implement three of the seven cost-effective measures to meet its goal.

Small Water System Management Program (SWSMP)

If you are completing a SWSMP, 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

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. Your WUE program should be consistent with the goals established by the elected governing board or governing body of your water system (see Chapter 7). Setting goals will help you use water efficiently. Your WUE program should be designed to meet the established goals by implementing cost-effective water use efficiency measures.

You are required to develop and implement a WUE program by January 22, 2008 [WAC 246-290-800(2) and 246-290-810(2)]. The requirement applies to water system plans (WSP) submitted for approval under WAC 246-290-100 and small water system management programs (SWSMP) developed and implemented **or** submitted for approval under WAC 246-290-105. WUE program and compliance deadlines are the same for all municipal water suppliers, regardless of size. The requirement is shown in Table 5-1.

Table 5-1: Summary of WUE Program Requirement

WUE Requirement	Deadline for municipal water suppliers under 1,000 connections	Deadline for municipal water suppliers with 1,000 or more connections
Include WUE program in planning documents	January 22, 2008	January 22, 2008

If you submit your draft planning document for approval prior to January 22, 2008, you do not have to meet the WUE program requirements. However, you must describe your current conservation program [WAC 246-290-810(1)]. Any plans submitted for first review after the January 22, 2008, deadline are required to meet the WUE program requirements.

Appendix A explains where WUE requirements need to be included in your planning documents (WSP or SWSMP).

5.2 Process for Developing a Water Use Efficiency Program

Consider the following eight steps when developing your WUE program:

1. Evaluate the effectiveness of your current and prior water conservation programs.
2. Establish one or more quantifiable goals through a public process (see Chapter 7).
3. Select cost-effective WUE measures that support your established goals.
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 non-profit 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. Your WUE messages can easily be shared with their customers. Hardware stores may highlight water-efficient fixtures and irrigation supplies. Non-profit organizations interested in water efficiency and water resources may assist by developing materials or helping you develop goals for a successful WUE program.

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 may include "demand side" measures, such as educating customers about using water efficiently; "supply side" measures, such as a recent leak detection survey; or both.

   Note: Water systems with 1,000 or more connections must also estimate the amount of water saved by implementing their current WUE program over the past six years (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). Also, describe how the goals were designed to help you use water more efficiently from both the supply and demand side. See Chapter 7 for a complete description of how to set your goals.

3. **Evaluate water use efficiency measures for cost-effectiveness**. 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 six 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). See Section 5.7 for more information about educating your customers.

6. **Estimate projected water savings from the selected WUE measures.** See Chapter 4 for guidance on what to include in this part of your WUE program.

7. **Describe how you will evaluate the effectiveness of your WUE program.** WUE programs change for a number of reasons. Plan to adapt and change your WUE program to keep it economical and effective.

8. **Evaluate distribution system leakage.** You must report distribution system leakage (DSL) for the six years prior to submittal date of the planning document [WAC 246-290-810(4)(i)(i)]. A water loss control action plan must be included with the planning document if the rolling three-year average of DSL exceeds the leakage standard [WAC 246-290-810(4)(i)(ii)]. Any transmission line loss excluded when calculating DSL must be reported, as well as the steps you are taking to minimize transmission line leakage [WAC 246-290-810(4)(i)(iii)].

9. **Evaluate rate structures that encourage water demand efficiency.** See Section 5.4 for guidance on what to include in this part of your WUE program.

10. **Evaluate reclaimed water opportunities.** If you serve 1,000 connections or more, see Section 5.6 for guidance on what to include in this part of your WUE program.

11. **Describe your water supply characteristics.** See Chapter 3 and Appendix C for guidance on what to include in this part of your WUE program.

5.4 Evaluate Your Rates

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)]. You are not required to implement it, but 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.

In order to be credible, an evaluation of rates that encourage water demand efficiency should address the following:

- **Describe your current rate structure**. Some of the most common rate structures 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). These rates do not encourage using water efficiently.
- **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 the water system and your customers. Describe how rates may help fund your water system, your WUE program, and established goals.

Note: 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 evaluate uniform rates if you are currently using declining block or flat rates.

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:

- 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.
- Offer tips on how to reduce water usage.
- Provide historical use data in water bills to show customers how much they used previously.
- Utilities and Transportation Commission (UTC) regulated water systems may have additional requirements to follow. For more information, contact UTC by e-mail at consumer@wutc.wa.gov or call 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 non-potable 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.
- 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 water use efficiency measure, or multiple water use efficiency measures if you use it for multiple purposes (see Section 5.7).

5.6 Evaluation of Water Use Efficiency Measures

As part of a water system plan or small water system management program, you are required to evaluate or implement a specified number of measures. The evaluation is related to the cost-effectiveness of the measures. 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 5-2 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.

The evaluation focuses on customer demand efficiencies. 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 5-2: 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

Evaluation Criteria

If you choose to implement a WUE measure, you do not have to evaluate it for cost-effectiveness. Even though you do not have to evaluate the measure for cost-effectiveness, an evaluation of water savings may still be necessary to forecast demand (see Chapter 4). 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 water use efficiency 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.

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
   - Labor
   - Rebates
   - Staffing
   - Contractor cost
   - 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 EPA's Water Conservation Plan Guidelines at: www.epa.gov/watersense/pubs/guide.htm

5.7 What Qualifies as a Water Use Efficiency Measure

A WUE program must include both supply and demand efficiencies (see the "water use efficiency program" definition in WAC 246-290-010). 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.

Any supply side measures that you implement do not count towards the minimum number of measures that must be evaluated or implemented in WAC 246-290-810(4)(d)(i). These are considered activities that your system implements to understand and control leakage including things such as meters, leak detection surveys, and water audits.

WAC 246-290-810(4)(d)(i) says that a minimum number of measures must be evaluated or implemented based on the number of connections in your water system (Section 5.6). The measures you evaluate or implement must focus on encouraging your customers to use water efficiently. **These minimum number of measures are separate from the required measures that must be implemented or evaluated as described below.**

Measures You Must Implement

The following WUE measures are mandatory:

- 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 water use efficiency practices – WAC 246-290-810(4)(f).

Because these measures are mandatory, they cannot be counted as one of the minimum evaluated or implemented measures under WAC 246-290-810(4)(d)(i).

Measures You Must Evaluate

In addition to the mandatory measures, there are also measures that you must evaluate. These are:

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

Measures You Can Count in Your WUE Program

Many activities from your WUE program will qualify for credit as implemented measures. Here are a few that you may already be implementing:

Conservation Rate Structures

Water systems 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 water systems to adopt rates that encourage water use efficiency and fund WUE programs.

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)]. See Chapter 3 for additional information about reclaimed water.

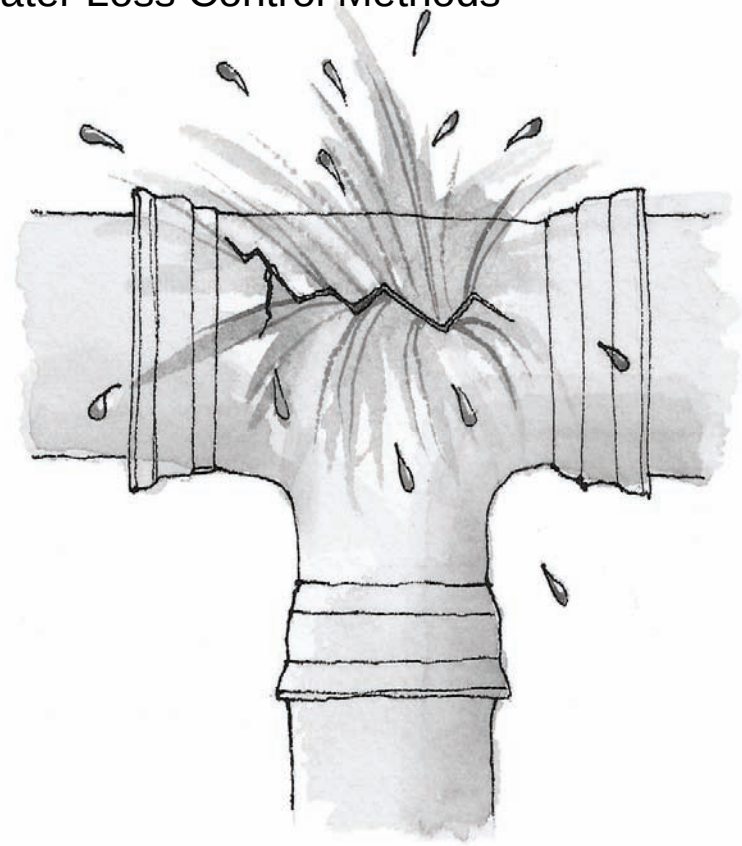
Customer Leaks
We expect you to strive to meet the distribution leakage standard. If you educate your customers about fixing the leaks within their homes, it counts as a WUE measure [WAC 246-290-810(4)(d)].

Education
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)]. Other specific educational programs (such as student education or consumer education at fairs) count as WUE measures [WAC 246-290-810(4)(d)].

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

For more examples of WUE measures, see Appendix B.

Chapter 6:
Distribution System Leakage



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 new water use efficiency (WUE) requirements. The best way to obtain the most accurate assessment of leakage information includes collecting service meter data. Nothing provides more accurate information than using consumption data collected from service meters 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 and should be used efficiently. You should make every effort to keep leakage to a minimum and strive to meet the DSL standard. Once you are fully metered, calculate DSL annually and include it in your annual performance reports and planning documents. Compliance with the leakage standard is based on a three-year average (see Section 6.5). Table 6-1 lists the requirement for meeting the DSL standard.

In order to calculate DSL, you must first install service meters on all existing direct service connections [WAC 246-290-820(2)(a)]. The deadline for completing service meter installation is January 22, 2017. Until then, report your progress towards installing meters and all actions taken to minimize leakage (see Chapter 2, Section 2.6).

Table 6-1: Summary of WUE Leakage Requirements

Requirement	**Deadline for municipal water suppliers under 1,000 connections**	**Deadline for municipal water suppliers with 1,000 or more connections**
Meet distribution leakage standard (based on three-year rolling average)	July 1, 2011, or three years after installing all service meters	July 1, 2010, or three years after installing all service meters

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. The WUE requirements use the terms "authorized consumption" and "distribution system leakage."

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 subtracted when calculating DSL. Any authorized water not estimated will be considered DSL, so it is important to track these events.

Some examples of authorized uses, if they are tracked and estimated:

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

Distribution System Leakage

All water that is not authorized consumption is considered DSL. Distribution system leakage 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 and leaky water mains. Because these types of losses cannot be authorized by the water system, they are considered leakage.

Some examples of water use considered leakage include:

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

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

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 (DOH) or the Department of Ecology.

6.3 Calculating Distribution System Leakage

Report DSL in both percentage and volume. The data required for calculating DSL depends on the complexity of the water system. At a minimum, collect:

- The amount of water produced from the source.
- The amount of water purchased from another supplier.
- The amount of water consumed.

Calculating Percent DSL

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

Calculating Volume DSL

To calculate volume DSL, use the following equation:

Volume DSL = TP - AC

Report volume DSL in millions of gallons or gallons

Use Appendix D and the following three guidelines to help you calculate annual DSL.

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[6] (for example, fire flow and flushing of water mains).

    This is your authorized consumption (AC).

3. Calculate percent and volume DSL.

Table 6-2 is provided below to help you see how your data might be used to calculate DSL. Your water system may have different data to include or exclude in your DSL calculation.

Table 6-2: Sampleville Water System DSL 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 = 1196 MG	
Percent DSL = (5500 – 4304)/5500 x 100 = 22%[7]	

[6] When calculating DSL you may subtract unmetered or unbilled authorized use from your total production (TP) if these events are tracked and estimated. Events not tracked are considered DSL.
[7] When calculating percent DSL, round up or down to the nearest whole number.

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 will approve alternative methodologies that provide a better evaluation of DSL than the formula provided in WAC 246-290-820(2). Once approved, the alternative methodology can be used statewide.

Any alternative methodology must meet the following three criteria before it can be used [WAC 246-290-820 (3)]:

1. Approved by DOH.
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. We will develop a way for these types of systems to calculate DSL using an alternative methodology Until this is developed, these systems must report on any actions taken to minimize leakage (see Section 2.6).

6.5 Distribution System Leakage Standard Compliance

We encourage you to reduce leakage within your distribution system. We expect you to find ways to control DSL and make efforts to find and repair leaks.

After three years of collecting leakage data, calculate the average of those three years. Compare this three-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 three-year average[8] from the three previous years. When calculating percent DSL, round up or down to the nearest whole number percentage.

[8] For example, after the third year of reporting leakage, you will take the average of years one through three. In year four, average leakage is based on years two through four, and so on.

There are four ways to comply with the DSL standard.

1. **10 percent or less distribution system leakage** [WAC 246-290-820(1)(b)(i)]
   WUE requirements establish a 10 percent or less DSL standard based on a three-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 system is in compliance.

3. **20 percent or less for 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 if they specifically request the higher level of leakage and submit evidence to DOH of the following:
   - Production volume.
   - DSL volume.
   - A leak detection survey has been completed in the last six years.
   - All leaks found have been repaired.
   - Unable to find more leaks in the system.
   - Efforts to minimize leakage are part of the WUE program.
   - Justification of the technical, economical or system characteristics for the higher level of leakage.

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 (WLCAP). If you have developed and are implementing your WLCAP, you are in compliance (see Section 6.6).

6.6 Reducing Leakage

You are in compliance 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 WLCAPs:

For systems between 11-19 percent DSL, you must:
1. Assess data accuracy.
2. Assess data collection methods and errors.

For systems between 20-29 percent DSL, you must:

3. Complete 1 and 2 above.
4. Implement field activities to reduce leakage within 12 months.

For systems with 30 percent or greater DSL, you must:

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

How to Submit and What to Include in Your WLCAP

Your WLCAP must be submitted within your planning document, or if requested by DOH [WAC 246-290-820 (4)]. At a minimum, include the following in your WLCAP:

- 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.
- Any technical or economic concerns that will prevent you from complying with the standard.

6.7 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.
- 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. A good reference for controlling water loss is the *Water Loss Control Manual*, Julian Thornton, McGraw Hill Company, 2002.


It's Worth
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Chapter 7:
Goal Setting and the Public Forum

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)]. See Table 7-1 for compliance deadlines related to goal setting.

Table 7-1: Summary of WUE Goal Setting Requirement

Requirement	Deadline for municipal water suppliers under 1,000 connections	Deadline for municipal water suppliers with 1,000 or more connections
Set your own WUE goals	January 22, 2009	January 22, 2008

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. Your water system needs to understand your own characteristics and future needs, and consider specific information before establishing goals.

You must consider the following information and make it available to the public prior to the goal setting public forum[9] [WAC 246-290-830(4)(d)]:

1. The existing WUE program [see Chapter 5 and WAC 246-290-810(4)]:
   - Water saved as a result of implementing WUE measures over the last six years (1,000 or more connections only).
   - Current goals.
   - Water use efficiency measures currently implemented.

[9] 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.

- Water use efficiency measures that have been evaluated.
- How you are educating your customers.
- 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 6.6).

2. Any previous annual performance 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.

After reviewing the information, if you determine no further reduction is reasonably achievable, you may propose a goal that maintains water consumption levels. If you choose to maintain current consumption levels, you must provide justification that considers historic WUE performance and investment and any other supporting information. This must be included in planning documents and performance reports [WAC 246-290-830(3)].

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. 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: Fixing our leaks 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: Supply Side Goal – Reduce our DSL to 15 percent in six years.
  Demand Side Goal – Reduce our annual consumption per residential connection by three percent over a six-year period.

- Establish a timeframe for achieving the proposed goals.

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

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

  Example: Service meter replacement, a toilet rebate program, 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 two weeks before your public forum.

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

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

  Example: Public notice is posted at the local library, published in the local newspaper, and on our Web site.

- 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.[10]

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.

[10] 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.

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 [Section 7.5 and WAC 246-290-830(4)].

When completing your Annual Water Use Efficiency Performance Report Form (see Appendix E), describe the progress made towards achieving the regional goal in the goal setting information section. You should also document the specific measures you are implementing for your water system that help achieve the regional goal.

7.5 Goal Setting Criteria

If you are over the leakage standard, we encourage you to set goals that focus on reducing leakage within your water system, reducing water use by your customers, or both. We realize that fixing your own leaks may be a priority and that your goal reflects this. As you fix your leaks and approach the leakage standard, we expect your goals to focus on getting your customers to use less water.

Choosing or Changing Your WUE Measures to Achieve the Goal

Choosing the right WUE measure(s) 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, you may choose to implement different WUE measures at any time to get there. For more information about WUE measures, see Chapter 5.

Setting an Attainable Goal

The first step in exploring what type of goal to set for your water system begins with stating a clear objective. 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. Starting with a clear objective will lead to development of an attainable goal.

Stating Your Goals

Goals must be measurable and have a timeframe. You must establish measurable goals that maintain or reduce 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.

Setting a timeframe for achieving each particular goal is important. For example, you may want to achieve your goal in six years to coincide with the goal re-evaluation requirement or your water system plan update. Or perhaps three years, to allow enough time to see if a particular water use efficiency measure is successful in achieving the goal.

The following are examples of acceptable goals:

- Reduce total production from our wells by five percent within six years.
- Maintain daily per capita consumption at 65 gallons per person per day for the next two years (justification required for maintaining consumption levels (see WAC 246-290-830(3) and Section 7.2).
- Reduce regional consumption by one percent at the end of three years (based on a regional program goal).

Number of Goals

You have the flexibility to set as many goals you consider appropriate. You may consider setting two types of goals: One that reflects supply-side efficiencies and one that reflects demand-side efficiencies. For example, a water system may want to set a supply-side efficiency goal to reduce distribution system leakage to less than 10 percent by a certain date. A demand-side goal might focus on trying to get customers to use less water per customer during the summer.

Goal Re-Evaluation Requirement

Goals must be re-evaluated every six years unless a change to the goal is made prior to the six-year re-evaluation cycle [WAC 246-290-830 (7)]. Re-evaluation 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 performance 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)].

Documenting Goals

Keep records that show you met all the WUE requirements when you established your goals. 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 goal.
- Public comments received about your proposed goal and how they were considered prior to formally establishing the goal.

Funding the Goal

There are many affordable measures you can implement to achieve your goals. Establish a budget to fund the measures that support your goals. See Chapter 5 for information about the cost-effectiveness of WUE measures.

7.6 Setting Goals Through a Public Forum

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 two weeks in advance of the meeting [WAC 246-290-830 (4)(b)].

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 (see Section 7.2).

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, a special meeting will need to be established and advertised.

Ways to Provide 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 e-mail.
- 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 Internet homepage.
- Distribute a news release to local print media, radio and TV stations.

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.

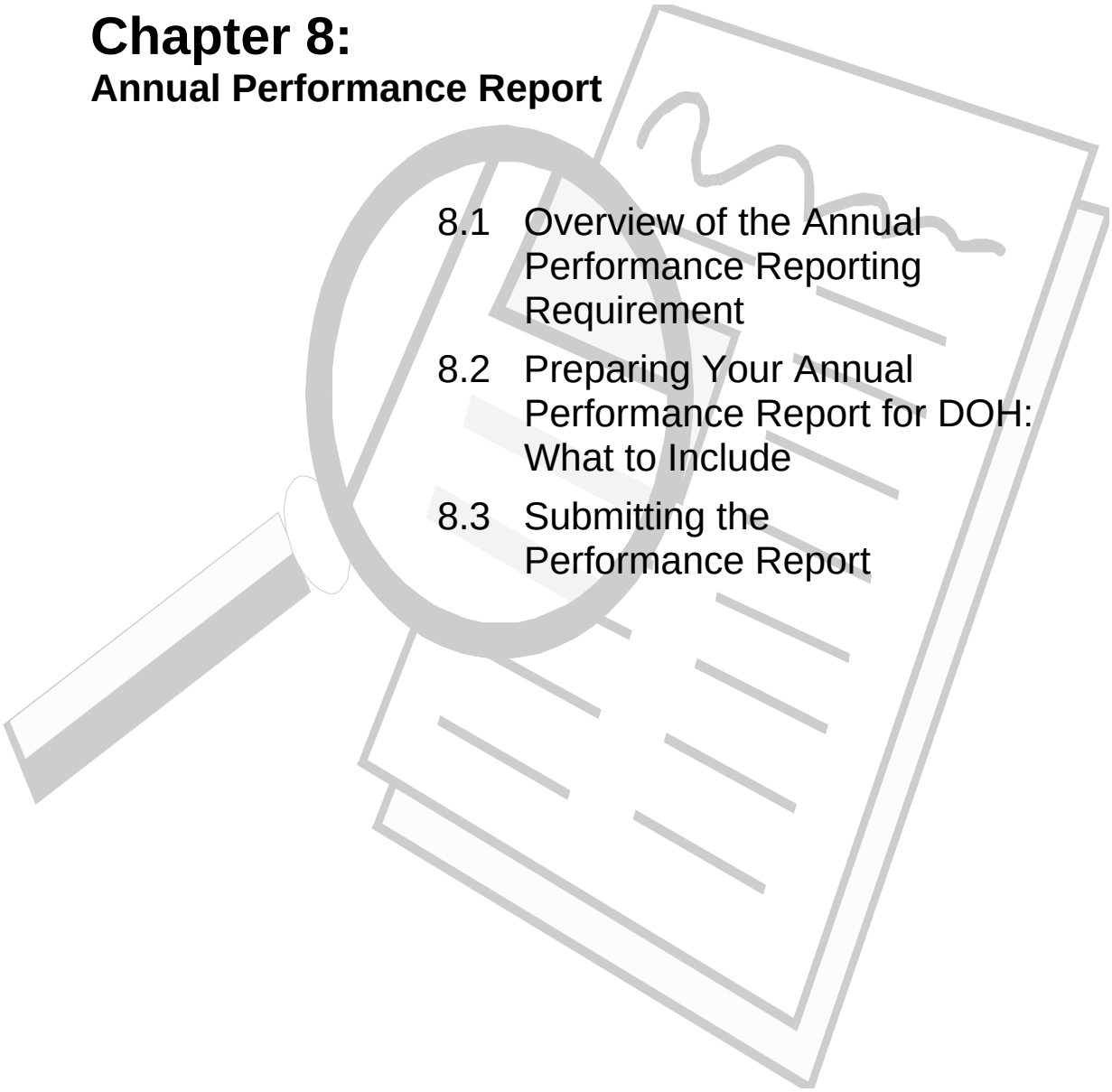
Tips for Conducting Effective Public Forums

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 if they have follow-up comments or questions.

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

Chapter 8:
Annual Performance Report



Chapter 8: Annual Performance Report

8.1 Overview of the Annual Performance Reporting Requirement

One of the best ways to communicate your water use efficiency (WUE) efforts is through the annual performance report. Your report must include information about how much water is produced, how much water is lost in the distribution system, and what progress has been made toward achieving your water savings goals for the year. You must use the Annual Water Use Efficiency Performance Report Form (DOH Form #331-376) when reporting to the Department of Health (DOH). See Appendix E for the form and an example. WUE requirements and deadlines for submitting your annual performance report are shown in Table 8-1.

Table 8-1: Summary of WUE Performance Reporting Requirements

Requirement	Deadline for municipal water suppliers under 1,000 connections	Deadline for municipal water suppliers with 1,000 or more connections
Submit first annual performance report	July 1, 2009	July 1, 2008
Submit service meter installation schedule	July 1, 2009	July 1, 2008

Note: For systems that do not have service meters on existing service connections and interties, a meter installation schedule is due with the first annual performance report (see Chapter 2).

8.2 Preparing Your Annual Performance Report for DOH: What to Include

This section is designed to help you fill out your Annual Water Use Efficiency Performance Report Form that you submit to DOH. See Section 8.3 for suggestions on reporting to your customers and the public.

Production and Distribution System Leakage Information

Total Water Produced and Purchased is the amount of water produced from all of your sources (for example, a well or surface water diversion), plus any water you purchased

(for example, water you received from an intertie with another water system). This annual total must be included in the performance report. Volume should be reported in millions of gallons or gallons (see Appendix G for a list of conversions).

Calculate *Distribution System Leakage* (see Chapter 6) and report that information in terms of:

- Volume (millions of gallons or gallons)
- Percent

If your system uses an alternative methodology for determining leakage, you must report your annual figures and the methodology's numerical standard(s) [WAC 246-290-820(3)(b)].

If you do not have service meters on all of your connections, do not report leakage information. Instead, you must describe any actions taken to control leakage and your progress toward installing meters [WAC 246-290-820(1)(a)(iii)]. Meters must be installed by January 22, 2017.

Goal Setting Information

Report the following information about your established WUE goals:

Date of Public Forum: Document the date of the most recent public forum when you established your water system's goals. You must establish your goals through a public forum (WAC 246-290-830(4)].

Changes to Goals: Identify whether you have changed your established goals since the last performance report [WAC 246-290-830 (8)].

Narrative Section:

1. **Identify Water Savings Goals:** Identify your goals established by the elected governing board, governing body, or owner of your water system (see Chapter 7).
2. **Schedule for Achieving the Goals:** Include a time schedule describing when you expect to meet your established goals.
3. **Progress Toward Achieving the Goals:** Tell the story of how your water system uses water efficiently from both the supply and demand sides. The narrative section provides an opportunity to showcase your achievements, recognize the opportunity to make some changes to your WUE program, or both. Address the following in your narrative:
    - Estimate how much water you have saved.
    - Report progress toward meeting goals within your established timeframe.
    - If you are not on track to reach your goals, identify any adjustments or changes to your WUE measures.
    - Include any other information that helps you tell your story.

Note: When reporting to DOH, provide a summary of your progress towards meeting your goals (see example in Appendix E). You may want to provide more detail in your narrative report to your customers and the public. If you have established a regional goal, see Section 7.4 on how to report your system's progress in meeting goals.

Meter Installation Information

Identify whether your system is fully metered. If yes, identify the month and year your system was fully metered. If you are not fully metered, document when and how you plan to install meters in your first Annual Water Use Efficiency Performance Report Form (Appendix E). Completing this section meets the "meter installation schedule" requirement in WAC 246-290-496 (2)(f). Also, report annually on your progress towards installing meters and minimizing leakage.

Date for Completing Installation of Meters

Service and intertie meters must be installed by January 22, 2017. Submit this information to DOH by:

- July 1, 2008, if your system has 1,000 or more connections.
- July 1, 2009, if your system has less than 1,000 connections.

Metering Progress and Efforts to Minimize Leakage

Briefly describe progress for the past year toward installing meters. This should be consistent with the meter installation schedule indicated in your first performance report. This may include:

- Percentage of meters that have been installed each year.
- Funding strategy to cover the metering expenses.

Briefly describe the steps you have taken over the past year to minimize leakage. These activities may include:

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

8.3 Submitting the Performance Report

By July 1 every year, performance reports must be submitted to your customers and DOH and also made available to the public.

Submit to Customers

Provide the performance report to your customers by July 1 every year. You may choose to report this information using:

- The Annual Water Use Efficiency Performance Report Form (DOH Form #331-376).
- Your annual Consumer Confidence Report that is also due July 1.
- Another format of your choice.

Note: You may want to provide more detailed information in the report to your customers about your WUE program and progress towards meeting your goals than in the summarized version you submit to DOH.

Make Available to the Public

You are also required to make the performance report available to the public. Some ways you can do this include:

- Post it on your Web site.
- Distribute it to local libraries.
- Let your local media know it is available.

At minimum, you must provide the performance report to the general public upon request.

Submit to DOH

Performance reports must be submitted to DOH using the Annual Water Use Efficiency Performance Report Form. This form is included in Appendix E and is available online at: www.doh.wa.gov/ehp/dw/municipal_water/water_use_efficiency_rule.htm

This form must be submitted to DOH by July 1 each year [WAC 246-290-840(1)(a) and (1)(d)]. We prefer that you send the form electronically through e-mail, but it may also be submitted by mail or fax. Submit the form to DOH using:

E-mail: wue@doh.wa.gov

Mail: WUE Program
Office of Drinking Water
PO Box 47822
Olympia, WA 98504-7822

FAX: (360) 236-2252

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

Beginning January 22, 2008, water system plans (WSP) and small water system management programs (SWSMP) submitted for review and approval must include the water use efficiency (WUE) planning requirements. This appendix provides a brief guideline for matching the WUE requirements with existing plan layouts from the Water System Planning Handbook[11] and the Small Water System Management Program Guide.[12]

A pre-plan meeting with Department of Health (DOH) 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 Office of Drinking Water regional offices are listed below.

This section provides suggestions for incorporating WUE requirements into your planning document. Plan contents must be tailored according to individual system needs, size and complexity. A number of different layouts are possible and this is only a suggested approach.

For more information, contact your regional planner:

Eastern Regional Office – Spokane – Main Office: (509) 456-3115

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

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

[11] Water System Planning Handbook, DOH Pub. #331-068, April 1997
[12] Small Water System Management Program Guide, DOH Pub. #331-134, January 2000

Where to Include WUE in Your Planning Document

Deadlines and 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			✓											
Jan. 22, 2009	Jan. 22, 2008	Set your own WUE goals			✓								✓			
July 1, 2009	July 1, 2008	Submit first annual performance report			✓					✓			✓			
July 1, 2009	July 1, 2008	Submit service meter installation schedule			✓		✓	✓			✓		✓	✓	✓	✓

Continued

Deadlines and 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 three 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% leakage standard (based on 3-year average)	✓		✓	✓						✓	✓			
January 22, 2017		Complete installation of all service meters			✓	✓	✓	✓					✓	✓	✓	

* WSP chapters from Planning Handbook (DOH Pub. #331-068) suggested WSP framework, layout and organization

** SWSMP elements from SWSMP Program Guide (DOH Pub. #331-134) layout and organization

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

**** For systems with less than 500 connections, submit request for 20% DSL 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 Example

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.

For Small Water System Management Programs identify you source description:

- **Source description:** Do you use ground water 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:

- **Source description:** Do you use ground water or surface water, or both? What body of water or watershed is your source taken from?
- **Production capacity:** What is your system's total source production capacity by source?
- **Variability:** Do your sources consistently produce the water needed to meet demand or are there seasonal variations that limit use of the water?
- **Water rights:** Does your water system have sufficient water rights? Include a copy of your water rights self-assessment.
- **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?

EXAMPLE

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 five 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 three 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

*Note: Units can be recorded in millions of gallons, gallons, cubic feet, or acre-feet but **must be converted** to millions of gallons or gallons or when reporting information in the Annual Water Use Efficiency Performance Report Form (DOH Form #331-376).*

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 DSL 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.

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 (DSL) 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													
Multi-family 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													

EXAMPLE

Distribution System Leakage (DSL) 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
Multi-family 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

EXAMPLE

	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													**22**

EXAMPLE

Distribution System Leakage Calculation

DSL 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 = 1196 MG	
Percent DSL = (5500 – 4304)/5500 x 100 = 22%[13]	

[13] When calculating percent DSL, round up or down to the nearest whole number.

Appendix E: Annual Water Use Efficiency Performance Report Form and Example

Annual Water Use Efficiency Performance Report Form

Please refer to the *Getting Started – Water Use Efficiency Guidebook*, DOH Pub. #331-375, for help in filling out this form.

General System Information:

System Name:

System ID #:

County:

Your Name:

Your Title:

Your Phone Number: ( ) -

Today's Date:

Production and Distribution System Leakage Information:

12-Month Performance Reporting Period:

_____ to _____ (Month/Year)

Distribution System Leakage Summary:	
Total Water Produced and Purchased – Annual Volume	☐ millions of gallons* ☐ gallons*
Distribution System Leakage – Volume	☐ millions of gallons* ☐ gallons*
Distribution System Leakage – Percent	%

**Report volume in millions of gallons or gallons: 1 cubic foot = 7.48 gallons*

DSL = [(TP - AC) / TP] x 100

Percent of Distribution System Leakage (DSL)
Total Water Produced and Purchased (TP)
Authorized Consumption (AC)

Goal Setting Information:

Date of Public Forum: _____ (Month/ Date/Year)
Note: Goals must be established through a public process.

Has goal been changed since last performance report? ☐ Yes ☐ No

In the following section, provide a narrative on progress in reaching your goals. Include the following information:

1. Identify water savings goals.
2. Identify the time schedule for achieving goals.
3. Describe progress made toward achieving goals, such as:
   - Estimate how much water you have saved.
   - Report progress toward meeting goals within your established timeframe.
   - If you are not on track to reach your goals, identify any adjustments or changes to your WUE measures.
   - Include any other information that helps you tell your story.

Note: If you cannot complete electronically, attach separate pages with general system information at the top.

Meter Installation Information:

Is your system fully metered? ☐ Yes ☐ No

If yes, _____ (Month/Year) If no, complete the rest of this section.

Date for completing installation on all existing connections and interties:
_____ (Month/Year) Due by January 22, 2017

Describe your progress in metering and any efforts taken to minimize leakage:

Note: If you cannot complete electronically, attach separate pages with general system information at the top.

Return this completed form to:
E-mail: wue@doh.wa.gov
Mail: WUE Program, Office of Drinking Water
PO Box 47822, Olympia, WA 98504-7822
FAX: (360) 236-2252

For more information, contact a regional planner:

Eastern Regional Office – Spokane – Main Office: 509-456-3115
Southwest Regional Office – Tumwater – Main Office: 360-236-3030
Northwest Regional Office – Kent – Main Office: 253-395-6750

EXAMPLE

Annual Water Use Efficiency Performance Report Form

Please refer to the *Getting Started – Water Use Efficiency Guidebook*, DOH Pub. #331-375, for help in filling out this form.

General System Information:

System Name: Sampleville Water System

System ID #: 61357D

County: Reliable

Your Name: John D. Sample

Your Title: Lead Water System Operator

Your Phone Number: (360) 123-4567

Today's Date: May 31, 2009

Production and Distribution System Leakage Information:

12-Month Performance Reporting Period:

February 2008 to January 2009 (Month/Year)

Distribution System Leakage Summary:	
Total Water Produced and Purchased – Annual Volume	5,500 ☒ millions of gallons* ☐ gallons*
Distribution System Leakage – Volume	1,196 ☒ millions of gallons* ☐ gallons*
Distribution System Leakage – Percent	22%

**Report volume in millions of gallons or gallons: 1 cubic foot = 7.48 gallons*

DSL = [(TP - AC) / TP] x 100

Percent of Distribution System Leakage (DSL)
Total Water Produced and Purchased (TP)
Authorized Consumption (AC)

EXAMPLE

Goal Setting Information:

Date of Public Forum: November 15, 2008 (Month/ Date/Year)
Note: Goals must be established through a public process.

Has goal been changed since last performance report? ☐ Yes ☒ No

In the following section, provide a narrative on progress in reaching your goals. Include the following information:

1. Identify water savings goals.
2. Identify the time schedule for achieving goals.
3. Describe progress made toward achieving goals, such as:
   - Estimate how much water you have saved.
   - Report progress toward meeting goals within your established timeframe.
   - If you are not on track to reach your goals, identify any adjustments or changes to your WUE measures.
   - Include any other information that helps you tell your story.

Supply Side Goal: Reduce DSL from 27% to 15% in six years

Demand Side Goal: Reduce average annual consumption per residential connection by three percent over a six-year period. This is a savings of 7.5 gallons per day per residential connection by 2013.

Supply Side Goal Progress: Our water system has been fully metered for 20 years. We have initiated a service meter replacement program for our customers over the next 10 years. In 2008, we performed a leak detection survey for 25% of our water distribution system and fixed the highest volume of leaky pipes. We reduced our leakage from 27% in 2007 to 22% in 2008. At this rate, we are on track to reduce leakage to 15% by 2013.

Demand Side Goal Progress: We have given over 100 rebates for low volume toilets (1.6 gallons per flush) over the past year. By converting to low-flow toilets, we estimate a minimal savings of 2,000 gallons per day. Our average daily demand for 2007 was 250 gallons per residential connection. Our 2008 average daily demand was 250 gallons per connection. The demand was unchanged, likely because of the hot summer of 2008. We also implemented educational efforts to inform our customers about using water efficiently, including an informational booth at the county fair. Even though our demand did not change from 2007 to 2008, we feel we have made progress due to the greater water demand resulting from the hot summer of 2008.

EXAMPLE

Meter Installation Information:

Is your system fully metered? ☒ Yes ☐ No

If yes, October 1987 (Month/Year) If no, complete the rest of this section.

Date for completing installation* on all existing connections and interties:

/ (Month/Year) *Due by January 22, 2017

Describe your progress in metering and any efforts taken to minimize leakage:

Our water system has been fully metered for 20 years.

Return this completed form to:

E-mail: mailto:wue@doh.wa.gov
Mail: WUE Program, Office of Drinking Water
PO Box 47822, Olympia, WA 98504-7822
FAX: (360) 236-2252

For more information, contact a regional planner:

Eastern Regional Office – Spokane – Main Office: 509-456-3115
Southwest Regional Office – Tumwater – Main Office: 360-236-3030
Northwest Regional Office – Kent – Main Office: 253-395-6750

Appendix F: Recommended Publications and Web Sites

Web Sites

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

Evergreen Rural Water of Washington
www.erwow.org

Partnership for Water Conservation
www.partners4water.org

Washington State Department of Ecology – Water Conservation Tips
www.ecy.wa.gov/programs/wr/drought/wtrcnsv.html

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

California Urban Water Conservation Council
www.cuwcc.org

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 Manual, Julian Thornton, McGraw Hill Company, 2002

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 performance report to millions of gallons or 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** your total production for the year and distribution system leakage (DSL) volume, convert to millions of gallons or gallons. Smaller water systems with few leaks may report DSL volume in gallons, while larger systems will likely report DSL volume in millions of gallons.

The American Water Works' WaterWiser Web site has a free unit conversion tool that you can download to your computer:
www.awwa.org/waterwiser/references/UnitConversion.cfm

You can also find this link on our water use efficiency Web site:
www.doh.wa.gov/ehp/dw/municipal_water/water_use_efficiency_rule.htm

The table below can help you convert some common volume units of measurement to millions of gallons or 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 shows the steps needed to establish your goal, including the public forum process. Chapter 7 has 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 January 22, 2008, to establish your goals.
- If you have less than 1,000 connections, you have until January 22, 2009, to establish your goals.
- You must re-evaluate your goals every six years.
- The elected governing board or governing body at your water system must establish your goals.

Goal Setting Flowchart