Final Significant Analysis
and
Small Business Economic Impact Statement
for Rule Concerning
Chapter 246-290 WAC
Water Use Efficiency

December 2006

Executive Summary

Growing communities, agriculture, industry, and the importance of conserving water for fish and other beneficial uses have placed an increasing demand on our state's water resources. To help meet these ever-increasing needs, the Washington State Legislature passed the Municipal Water Supply – Efficiency Requirements Act of 2003, Chapter 5 Laws of 2003 First Special Session, better known as the Municipal Water Law. The law established a definition of municipal water supplier and gave entities that meet the definition certain benefits and obligations. The benefits include water right certainty and flexibility to help them meet future demands. The obligations include using water more efficiently. The Department of Health (DOH) was directed by the Washington State Legislature to adopt a water use efficiency rule that municipal water suppliers must meet to demonstrate they are fully meeting their obligations.

Benefits of the Rule

DOH conducted an analysis and concludes that the probable benefits of the rule are greater than the probable costs. The quantitative benefits alone, including the savings to municipal water suppliers and the value of water saved are compelling. Combined with the qualitative benefits of this rule, including preserving the state's water resources and enhancing public health protection by improving water system reliability, the benefits far outweigh the costs of the rule.

Value of Water Saved

DOH analyzed the statewide economic value of water saved as a result of implementing this rule by estimating the amount of water that would be saved and placing a dollar value on that water. This analysis demonstrates that, over a period of 30 years, the value of water saved by implementing this rule would be worth about $3.5 billion based on a weighted 21 percent savings from current average water use. To lend credence to the overall analysis we also computed the value of water saved to be $1.6 billion using a very conservative 10 percent savings. In both cases, which should be characterized as the best estimate and most conservative estimate, the dollar figures are greater than the probable costs. The best estimate using the weighted 21 percent savings is also considered conservative for a number of reasons:

- Savings related to waste water disposal are not included in these values. These typically far exceed the cost of supplying water.
- The inflation rate of three percent used for the projection is considered modest. Water resources are expected to become scarcer in the future; therefore, the cost of water supplies are expected to grow at a much higher rate.
- Qualitative benefits such as the value of more water for in-stream resources like fish, and increased public health protection are not captured. These benefits are not easily quantifiable and are therefore expressed in a qualitative manner.
- The significant benefits gained by municipal water suppliers from provisions of the Municipal Water Law are not easily quantifiable and are not included.

Caution should be used when evaluating the projected $3.5 billion savings. Since DOH used an average water rate as a basis for this calculation, there may be a tendency to think of this as dollars saved by all municipal water supplier customers. This is not an accurate view. The average rate is calculated from a variety of rate structures across the state. These rates include both fixed and variable costs. Municipal water suppliers will always need to collect sufficient revenue to maintain their water system in good operating condition, and most of these costs are fixed. Some customers may benefit by using less water, others may not, depending upon the rates charged by municipal water suppliers as they attempt to recover fixed, as well as variable costs of supplying water. Thus, for the purpose of the analysis, the average water rate should be viewed as a basis for projecting the economic value of water over time.

Costs Associated with the Rule

DOH analyzed the costs associated with the rule by defined procedures and actions required by the rule, assigning labor and materials costs to them, and projecting them out 30 years. Procedures include activities such as developing water use efficiency and Water Loss Action Plans, holding meetings to establish goals, and submitting information to DOH. Actions include activities such as implementing selected efficiency measures and installing service meters. **The cumulative cost of these requirements to municipal water suppliers, after 30-years of implementation is estimated at $544 million.** This is considered a conservative figure because DOH used high end estimates from a range of estimated costs for water systems of different sizes. DOH was unable to determine some costs, such as those associated with repair and installation of meters on existing interties. DOH was also unable to determine the costs of finding and repairing leaks for the following reasons:

- Water systems typically track total water loss. Total water loss can include operational losses (*i.e*. system flushing), inaccurate measurement, firefighting, and as well as leaks. Water loss data often does not indicate which portion is attributable to physical loss (leakage), so it is difficult to project the number of water systems that may exceed the leakage standard.
- Although leakage has been an issue for many years, separating the distribution system from the transmission system is new, so leaks on transmission mains are distinguished from leaks on distribution mains.
- Cost estimates for infrastructure repairs do not distinguish between repairs being done to address leakage from those being done for other reasons.
- The steps any water system may need to take to resolve a leakage problem are expected to be highly variable and dependent upon water system specific circumstances, such as the age of the materials used, the depth of pipe burial, and the type of pipe.

One should note that costs to repair leaking infrastructure are not entirely associated with this rule. Existing state and federal regulations require water system owners to maintain their water system in good operating condition, leakage being one of those most important. Addressing leakage is considered essential to protecting public health because it minimizes potential risk to contamination associated with breaks in lines and with a reduction in pressure.

Small Business Economic Impact Statement

The central questions addressed by the Small Business Economic Impact Statement are:

- Does the rule have a disproportionate impact on small businesses?
- If yes, what did the agency do to minimize the impact on small businesses?

DOH assessed the impact on water systems of different sizes by evaluating the costs on a "per connection" and on a "per employee" basis. We concluded that this rule would have significant costs for all municipal water suppliers, including small businesses. Municipal water suppliers who own small water systems would have a disproportionate impact. DOH staff consulted with business interests and small water system owners throughout the rule development process and incorporated several provisions designed to minimize the cost of the rule, while still ensuring the rule meets the intent of the law.

Contents

Section 1: Analysis Structure

Administrative Procedures Act Requirements

The Department of Health (DOH) prepared this analysis to meet the requirements of the Administrative Procedures Act, chapter 34.05 RCW. The 2003 Washington State Legislature directed DOH to adopt a water use efficiency rule. Under the Administrative Procedures Act, DOH is required to conduct an analysis of new rules. The Administrative Procedures Act provides for exceptions to this requirement for rules "adopting…without material change, Washington State statutes, rules of other Washington state agencies…or national consensus codes that generally established industry standards…" A portion of the water use efficiency rule adopts state statutes.

The analysis is structured as follows:

Section 1: Analysis Structure – outlines the structure of this analysis and defines key definitions.

Section 2: Introduction – provides background information on the Municipal Water Law.

Section 3: Purpose of the Water Use Efficiency Rule – provides the Administrative Procedures Act required description of the rule and its purposes.

Section 4: Benefits of the Water Use Efficiency Rule – presents the analysis of the overall benefits of the rule.

Section 5: Analysis of Overall Costs of the Water Use Efficiency Rule – presents the analysis of the overall costs of the rule.

Section 6: Section-by-Section Analysis of the Water Use Efficiency Rule – presents the section-by-section analysis of the rule. The primary focus is the detailed costs that would be associated with each requirement. This section also briefly describes the specific benefits associated with each section of the rule.

Section 7: Consideration of Alternative Versions of the Water Use Efficiency Rule – provides the required assessment of alternative versions of the rule and DOH's statement regarding potential impacts to public and private entities.

Section 8: Consistency and Coordination with Federal, State, and Local Requirements – provides the required assessment of consistency with other laws and coordination with other agencies.

Section 9: Small Business Economic Impact Statement Chapter 246-290 WAC Water Use Efficiency – provides the required assessment of the potential impact on small businesses.

Appendices – supporting documentation for the analysis.

Key Definitions

For the purpose of this analysis, several terms must be understood to avoid confusion.

Public Water System Terminology

The Municipal Water Law introduces a new term, "municipal water supplier," that is defined in RCW 90.03.015(3) as:

> " '**Municipal water supplier**' means an entity that supplies water for municipal water supply purposes."

Municipal water suppliers are considered purveyors, as defined in WAC 246-290-010 *Definitions*:

> " '**Purveyor**' means an agency, subdivision of the state, municipal corporation, firm, company, mutual or cooperative association, institution, partnership, or person or other entity owning or operating a public water system. Purveyor also means the authorized agents of these entities."

It is important to make a distinction between the purveyor and the physical water system itself. The term "public water system" found in WAC 246-290-020(1) *Applicability* helps clarify this distinction. Use of the terms "public water system", "water system", or "system" refers to the physical water system as defined below:

> **" 'Public water system'** – means any system providing water for human consumption through pipes or other constructed conveyances, excluding a system serving only one single-family residence and a system with four or fewer connections all of which serve residences on the same farm. The term includes:
>
> (a) Collection, treatment, storage, and/or distribution facilities under control of the purveyor and used primarily in connection with the system; and
>
> (b) Collection or pretreatment storage facilities not under control of the purveyor, but primarily used in connection with the system."

Section 2: Introduction

Background

Growing communities, agriculture, industry, and the importance of conserving water for fish and other beneficial uses have placed an increasing demand on our state's water resources. To help meet these ever-increasing needs, the Washington State Legislature passed the Municipal Water Supply – Efficiency Requirements Act of 2003, Chapter 5 Laws of the 2003 First Special Session, better known as the Municipal Water Law (see Appendix A). The law established a definition of municipal water supplier, and gave entities that meet that definition certain benefits and obligations. The benefits include water right certainty and flexibility to help them meet future demand. Their obligations include using water more efficiently. DOH was directed by the Washington State Legislature to adopt a water use efficiency rule that municipal water suppliers must meet to demonstrate they are fully meeting their obligations.

Water Use Efficiency Rule Elements

The water use efficiency rule contains three elements:

- Water Use Efficiency Planning Requirements – As part of a water system plan (WSP) or a small water system management program (SWSMP), municipal water suppliers would have to collect data, forecast demand, evaluate leakage, enact water use efficiency measures (including rates that encourage water use efficiency), and implement a water use efficiency program to meet their goals.
- Distribution Leakage Standard – Municipal water suppliers would be required to meet a state distribution system leakage standard in order to minimize loss of water from leakage in the distribution system.
- Water Use Efficiency Goal-Setting and Performance Reporting – Municipal water suppliers would be required to set water use efficiency goals through a public process and report annually on their performance to customers and to DOH, and also make it available to the public.

Focus of the Water Use Efficiency Rule

The Washington State Legislature directed DOH to establish requirements to increase water use efficiency. A great deal of flexibility is given to water systems because of the complexity of the factors that influence water consumption, and the water system's limited ability to influence those factors. The rule is focused on what they can do to increase water use efficiency. Maximizing efficiency is critical because water is a limited resource and the water system has limited ability to increase the amount of water available for its customers. However, in terms of consumption, the water system has much more influence and therefore more opportunities to improve the efficiency of how water is delivered from the source to the customer.

The Department of Health's Role in Water Conservation

DOH rules are designed to ensure that water systems provide drinking water in a safe and reliable manner. Water system managers and operators are responsible for meeting all water quality standards and for distributing water in sufficient quantity and pressure at all times. To be successful, water systems must not only understand the limitations on their sources of supply but also the engineering limits of their water system, the financial constraints on their organization, and their managerial capacity to meet future challenges. Using water resources in the most efficient manner is critical to meet future needs, operate successfully within existing financial, managerial, and technical constraints, and continue to deliver safe and reliable drinking water.

Since the late 1980s, DOH has had an increasing role in utility water conservation. Efforts initiated by the 1988 Washington State Legislature resulted in DOH's current planning guidance related to water rights and utility water conservation. In 1989, the Washington State Legislature passed the Water Use Efficiency Act. This legislation updated the plumbing code to require efficient fixtures for new construction and established the requirement that utility water conservation programs be included in WSPs.

In 1994, DOH, the Department of Ecology, and the Washington Water Utility Council, published the *Conservation Planning Requirements* (DOH PUB 331-008) describing how water systems completing a WSP should incorporate water use efficiency into their planning process. This guidance covers the areas of data reporting, demand forecasting, and evaluation of conservation measures. Since publication of that guidance, water use efficiency has become an integral part of DOH's planning program.

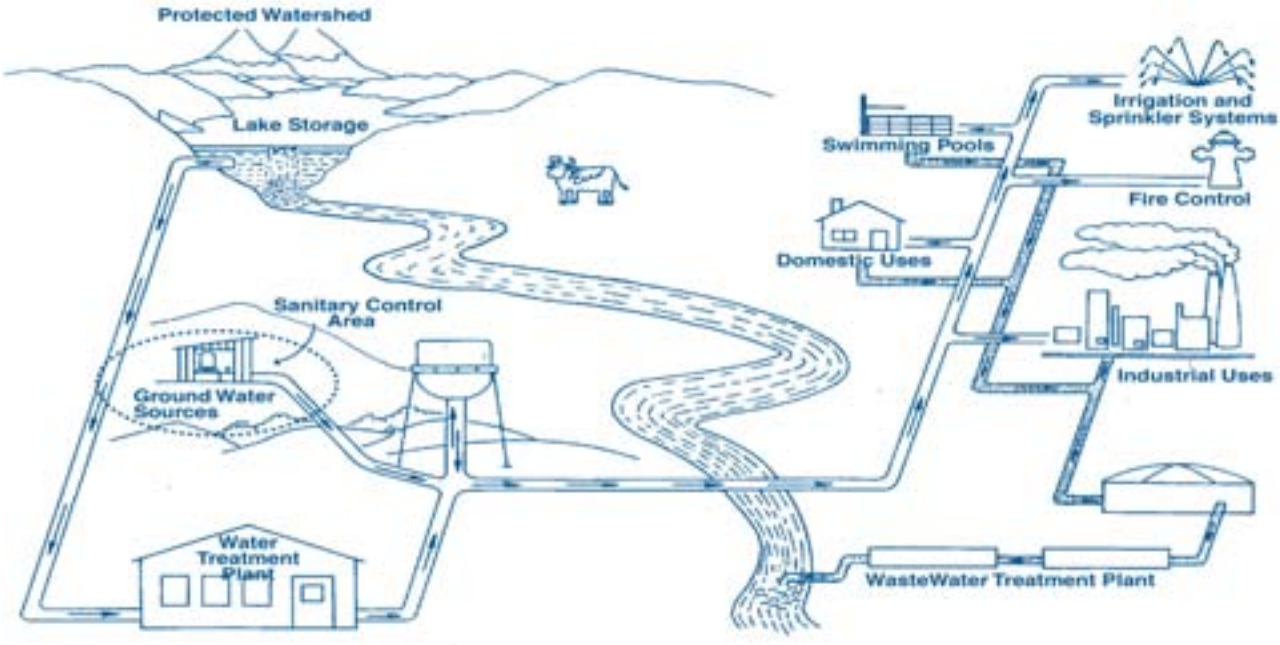
In 1999, in support of Governor Gary Locke's Salmon Recovery Strategy, the Washington State Legislature provided funding to DOH to provide technical assistance to local governments and special districts on water conservation and reuse. This funding was used to establish three staff positions to provide technical assistance to water systems with 100 to 1,000 connections.

The most recent step was passage, in 2003, of the Municipal Water Law, which directed DOH to adopt a water use efficiency rule. This rule moves the existing planning program, from a mostly voluntary program, to an enforceable regulatory program.

Water Systems Affected by the Water Use Efficiency Rule

Water systems provide water for human consumption, irrigation, industry, and many other uses. A typical water system has many components. These may include a source of supply, pumps, reservoirs, storage tanks, treatment plants, water mains, pipes, control valves, fire hydrants, flow meters, etc. Figure 2.1 – Typical Water System shows components of a typical water system from source to users.

Figure 2.1 – Typical Water System



The Municipal Water Law directed DOH to develop a water use efficiency rule for water systems defined as municipal water suppliers in RCW 90.03.015. The definition of a municipal water supplier is close, but not identical, to the definition of a Group A water system regulated by DOH.

The definition of a Group A water system comes from the Federal Safe Drinking Water Act. WAC 246-290-020(5) *Applicability* defines Group A water systems as community and noncommunity water systems:

> "(a) Community water system means any Group A water system providing service to fifteen or more service connections used by year-round residents for one hundred eighty or more days with in a calendar year, regardless of the number of people, or regularly serving at lest twenty-five year-round (i.e., more than one hundred eighty days per year) residents.
>
> Examples of a community water system might include a municipality, subdivision, mobile home park, apartment complex, college with dormitories, nursing home, or prison.
>
> (b) Noncommunity water system means a Group A water system that is not a community water system. Noncommunity water systems are further defined as:
>
> (i) Nontransient (NTNC) water system that provides service opportunity to twenty-five or more of the same nonresidential people for one hundred eighty or more days within a calendar year.

Examples of a NTNC water system might include a school, day care center, or a business, factory, motel, or restaurant with twenty-five or more employees on-site.

(ii) Transient (TNC) water system that serves:

(A) Twenty-five or more different people each day for sixty or more days within a calendar year.

(B) Twenty-five or more of the same people each day for sixty or more days, but less than one hundred eighty days within a calendar year; or

(C) One thousand or more people for two or more consecutive days within a calendar year.

Examples of a TNC water system might include a restaurant, tavern, motel, campground, state or county park, an RV park, vacation cottages, highway rest area, fairground, public concert facility, special event facility, or church."

A municipal water supplier is defined in RCW 90.03.015 (see Appendix A for the full text of the law):

"(3) "Municipal water supplier" means an entity that supplies water for municipal water supply purposes.

(4) "Municipal water supply purposes" means a beneficial use of water:

(a) For residential purposes through fifteen or more residential service connections or for providing residential use of water for a nonresidential population that is, on average, at least twenty-five people for at least sixty days a year;…"

DOH has assessed the potential impacts of this rule on the different sized water systems. For the purpose of this analysis, DOH broke down the water system size categories as:

Size Category	Residential Connections
Very Small	< 100
Small	100 – 999
Medium	1,000 – 9,999
Large	> 9,999

DOH's data indicates that as of October 2005, there were 2,124 community water systems with 15 or more residential connections as shown in Table 2.1 – Community Water Systems That are Municipal Water Suppliers. Of these 2,124 water systems, 90 percent are in the small and very small categories that serve fewer than 1,000 connections each. Although large in number, these small and very small water systems serve only about 10 percent of the residential population[1] served by water systems. The very small water systems with 100 or fewer connections represent nearly 64 percent of the water systems, but only serve 2 percent of the people. In contrast, the medium and large water systems constitute only 10 percent of the water systems, but serve 90 percent of the people.

Table 2.1 – Community Water Systems That are Municipal Water Suppliers

Size Category	Residential Connections	Number of Water Systems	Percent of Water Systems	Number of Residents Served	Percent of Residents Served
Very Small (< 100 Connections)	15 – 100	1,369	64%	131,050	2%
Small (100 – 999 Connections)	101 – 999	549	26%	421,702	8%
Medium (1,000 – 9,999 Connections)	1,000 – 9,999	169	8%	1,539,152	29%
Large (> 9,999 Connections)	10,000 or more	37	2%	3,212,226	61%
Total		**2,124**	**100%**	**5,304,130**	**100%**

In addition to the 2,124 community water systems that are municipal water suppliers, there are also 118 Group A community water systems that do not meet the municipal water supplier definition. This group consists of those community water systems that have fewer than 15 residential connections, but serve 25 or more people. These 118 water systems collectively serve only about 7,000 people and are not included in this analysis.

The definition of municipal water supplier includes some noncommunity water systems. To determine which noncommunity water systems are municipal water suppliers, it is necessary to examine the water rights they hold and look at how water is used by each water system. This will require DOH and the Department of Ecology to assess each water system on a case-by-case basis. Table 2.2 – Noncommunity Water Systems that may be Municipal Water Suppliers illustrates the potential number of water systems that could be affected by the water use efficiency rule. For the purposes of this analysis, it is assumed that half of the noncommunity water systems (322 + 1,219 ÷ 2 = 771) will be found to be municipal water suppliers and that the costs associated with this rule will be similar to the very small category of community water systems. Throughout this analysis, the number of very small water systems will be 2,140 (1,369 + 771).

[1] The percent of residential population served was determined by using figures reported by water systems on their Water Facility Inventory form and maintained in DOH's database, Sentry, for residential population served.

Table 2.2 – Noncommunity Water Systems that may be Municipal Water Suppliers

Number of Connections	Number of Nontransient Noncommunity Water Systems	Number of Transient Noncommunity Water Systems
1	113	289
2 – 100	205	872
101 – 1,000	2	56
> 1,000	2	2
Total	**322**	**1,219**

Section 3: Purpose of the Water Use Efficiency Rule

The Administrative Procedures Act requires a statement of the general goals and specific objectives of the rule. It also requires that DOH make a determination that the rule is needed to achieve the general goals and specific objectives of the statute and analyze alternatives to rule development and the consequences of not adopting the rule.

Necessity of the Water Use Efficiency Rule and Consequences of Not Adopting

The rule is necessary because RCW 70.119A.180 requires its adoption. DOH will be in violation of state law if this rule is not adopted.

Goals and Objectives

The first section of the statute provides the following statement of intent:

RCW 70.119A.180(1):

> "It is the intent of the legislature that the department (of health) establish water use efficiency requirements designed to ensure efficient use of water, while maintaining water system financial viability, improving affordability of supplies, and enhancing water system reliability."

The rule would ensure efficient use of water by requiring that municipal water suppliers:

1. Establish water use efficiency goals in an open public forum and report annually on progress toward meeting those goals.
2. Develop and implement water use efficiency programs to meet their own efficiency goals they establish through an open public forum.
3. Meet a statewide distribution system leakage standard.

The rule would also ensure that the following general goals were achieved.

Protect the health of people in Washington State, now and in the future, by enhancing long-term water system reliability.

This rule considers reliability within a broad context that includes the ability of the water system to ensure sufficient water supply to meet current and future needs and avoid temporary service interruptions caused by water shortages or infrastructure failure. Many provisions of this rule would help ensure that water systems are operating at a maximum efficiency and positioning themselves to ensure safe and reliable drinking water for their customers.

Ensure good stewardship of the state's water resources by municipal water suppliers.

The Municipal Water Law provides significant benefits to all municipal water suppliers by giving them greater certainty and flexibility in the exercise of their water rights. Pressure on the state's limited water supplies is steadily increasing. Under the voluntary program, many water systems are not placing a high priority on water use efficiency. There is strong consensus that a regulatory approach is needed to achieve the level of stewardship necessary to protect and preserve the state's water resources.

Ensure efficient operation and management of water systems.

Under the voluntary program, many water systems are not making the best use of the least costly source of supply – conserved water. With increasing costs and complexity of water system operations, water system managers face difficult choices about how to invest limited resources. This rule would ensure that efficiency is appropriately assessed when water system managers are making critical decisions about how to invest their resources.

Alternatives to Rule Making

There is no alternative to developing a water use efficiency rule since it is required by RCW 70.119A.180.

Section 4: Benefits of the Water Use Efficiency Rule

The Administrative Procedures Act requires that DOH make a determination that the probable benefits of the water use efficiency rule are greater than the probable costs. After a thorough and very conservative analysis, DOH has determined the probable benefits to those directly and indirectly affected by the rule are greater than the probable costs.

Quantitative Assessment of Benefits

DOH analyzed the statewide economic value as a result of implementing the rule by estimating the amount of water that would be saved and placing a dollar value on that water. This analysis demonstrates that, over a period of 30 years, the water saved by implementing the rule would be worth approximately $3.5 billion based on a weighted 21 percent savings from today's average water use. To lend credence to the overall analysis, DOH also computed the value of water saved to be about $1.6 billion using a very conservative 10 percent savings. In both cases, which are the best estimate (21 percent) and most conservative estimate (10 percent), the dollar figures are far greater than the probable costs. A more detailed discussion of this analysis is presented below.

DOH also assessed the direct benefits of this rule to municipal water suppliers, their customers, and the citizens of the state. These benefits are more difficult to quantify on a statewide level because they are highly variable from one municipal water supplier to another. The Municipal Water Law addresses some of the factors that create this variability.

> RCW 70.119A.180(4)(c)(i)
>
> "…In setting water conservation goals the water supplier may consider historic conservation performance, and conservation investment, customer base demographics, regional climate variations, forecasted demand and system supply characteristics, system financial viability, system reliability, and affordability of water rates..."

<u>Estimate of Economic Value of Saved Water</u>

The method used to calculate the economic value of water saved was:

1. Estimate expected consumption reduction on a per-capita basis.
2. Assign a dollar value of a unit of saved water.
3. Calculate the total present value of the water saved over the 30-year timeframe.

DOH applied a weighed 21 percent savings to consumption values supported by actual water use data as the basis for determining the value of water saved. Twenty-one percent was derived by calculating a weighted average of expected savings from four water system size categories. This analysis assumes that the savings will be realized after 30 years. In conducting this analysis, DOH also recognized achieving a 21 percent savings is based on how well the rule is implemented by both DOH and municipal water suppliers. For this reason, DOH also applied a

very conservative 10 percent savings to these same consumption values to determine the value of water saved if the rule is not implemented to the extent necessary to achieve 21 percent savings. The results of this analysis are shown on Table 4.4 –Estimate of the Value of Saved Water.

Amount of Saved Water

The amount of saved water is based on data collected from two separate surveys of planning documents approved by DOH (see Appendix B: Water System Consumption in Washington State). Table 4.1 – Median Average Day Demand for Water Systems in Washington presents the results of that analysis.

Table 4.1 – Median Average Day Demand for Water Systems in Washington

Size Category	Median Average Day Demand (gpd/connection)	Median Average Day Demand (gpd/capita)*
Very Small (< 100 Connections)	341	136
Small (100 – 999 Connections)	340	136
Medium (1,000 – 9,999 Connections)	301	120
Large (> 9,999 Connections)	232	93

* This column converts the median consumption value to gallons per day, per-capita, using a conversion factor of 2.5 people per household from WAC 246-290-010 *Definitions* definition of "service connection."

There is little information to cite that provides insight into what kind of consumption levels can be achieved. The primary reason it is difficult to find data to support assumptions is the rule would give great flexibility to municipal water suppliers to set their own goals and select their own methods to achieve those goals. However, information from the *Handbook of Water Use and Conservation*[2] indicates that an average consumption level of 75 gallons per day, per-capita, is a reasonably achievable consumption level for all water systems. Using this consumption level as a benchmark, an estimate can be made of expected average consumption levels for water systems in each of the four size categories. To make a reasonable estimate of expected consumption levels, the 75 gallons per day, per-capita figure has been adjusted to a more conservative figure by taking into account the following factors:

- The current median consumption level is different for each size category.
- Results will depend upon how well DOH implements the rule and follows through on compliance.
- Results will depend upon how well municipal water suppliers comply with the rule and the effectiveness of the water use efficiency measures they chose to implement.

[2] Vickers, Amy, 2001, *Handbook of Water Use and Conservation*, Waterplow Press, Amherst, MA.

With consideration of these factors, DOH assumed the following:

1. DOH will prioritize water use efficiency with large and medium size water systems, and on average they realize 80 percent of potential reductions in consumption.
2. DOH will place a moderate emphasis on small water systems, and on average they realize 60 percent of potential reductions in consumption.
3. DOH will place minimum emphasis on very small water systems, and on average they realize 40 percent of potential reductions in consumption.

These assumptions are based on knowing that there is a variety in land use and water use across the state that will affect what water systems ability to reduce usage to 75 gallons per day per connection. Using these assumptions, DOH estimated the average expected consumption level for water systems in each size category to get the most likely attainable savings:

Table 4.2 – Per-capita Consumption Reduction Expected to Result from the Rule

Size Category	CC	AC	PS = CC-AC	EF	ES =PS*EF	EC = CC-ES	Percent of Savings
Very Small (< 100 Connections)	136	75	61	40%	24	**112**	**18%**
Small (100 – 999 Connections)	136	75	61	60%	37	**99**	**27%**
Medium (1,000 – 9,999 Connections)	120	75	45	80%	36	**84**	**30%**
Large (> 9,999 Connections)	93	75	18	80%	14	**79**	**15%**
Total Weighted Average Percentage Savings*							**21%**

CC = Current Per-capita Consumption Level (gallons per day per-capita)
AC = Achievable Per-capita Consumption Level (gallons per day per-capita)
PS = Potential Per-capita Savings (gallons per day per-capita)
EF = Effectiveness Factor
ES = Expected Per-capita Savings from the Rule (gallons per day per-capita)
EC = Expected Per-capita Consumption Level (gallons per day per-capita)
Percent of Savings = Estimated gallons saved divided by current per-capita consumption level (gallons per day per-capita)
* Total weighted average percentage savings is computed by multiplying the percent of savings per size category by the number of people in each category divided by total people serviced.

The current consumption levels and the expected consumption levels are used to determine a percent reduction in consumption. This is then used to project water savings and the value of saved water.

Table 4.3 – Total Daily Consumption Reduction Expected to Result from the Rule

Size Category	RS	CC	CTC	EC	ECL	TDCR
Very Small (< 100 Connections)	131,050	136	17,822,800	112	14,677,600	3,145,200
Small (100 – 999 Connections)	421,702	136	57,351,472	99	41,748,498	15,605,974
Medium (1,000 – 9,999 Connections)	1,539,152	120	184,698,240	84	129,288,768	55,409,472
Large (> 9,999 Connections)	3,212,226	93	298,737,018	79	253,765,854	44,971,164
Total	**5,304,130**		**558,609,530**		**439,480,720**	**119,128,810**

RS = Number of Residents Served
CC = Current Per-capita Consumption Level (gallons per day per-capita)
CTC = Current Total Consumption Level (gallons per day)
EC = Expected Per-capita Consumption Level (gallons per day per-capita)
ECL = Expected Consumption Level (gallons per day)
TDCR = Total Daily Consumption Reduction (gallons)

Statewide Percent Reduction =
[(558,609,530 gpd – 439,480,720 gpd) / (558,609,530 gpd)] x 100 = 21 percent

gpd = gallons per day

Using the figures in Table 4.3 – Total Consumption Reduction Expected to Result from the Rule, the statewide reduction in consumption is estimated to be 21 percent.

Assigning a Dollar Value to Saved Water

DOH considered the following approaches for assigning a dollar value to saved water:

1. Base the value on the cost of developing new supplies.

   This method was rejected because this approach cannot be applied on a statewide basis. The factors that affect this cost are highly variable and must be considered on a water system specific basis. Another limitation is that it only captures the value from the perspective of the municipal water supplier.

2. Base the cost on the prices recently paid for municipal water rights in the Pacific Northwest region.

   Using this approach potentially has the benefit of capturing the value of alternative uses of water. It is unlikely that the full value of alternative uses of water, including environmental uses, is reflected in the price of water rights. Information from the Department of Ecology indicates that the price of water rights is difficult to establish. The Department of Ecology recently estimated the value of an acre-foot of water at $255.50 in its significant rule analysis for the Columbia River Initiative. This figure is based on recent water right purchases for municipal and industrial water. Their analysis indicated that there was very little information available to provide a basis for the value of water rights. Another concern is that the price of water rights only reflects the purchase price of the right to access the water. It does not provide a good reflection of the value of that water over time.

3. Base the value on average water rates paid by water system customers.

   A limitation of using average water rates to assign a dollar value to saved water is that rate levels are highly variable across the state. This may be due to the fact that rates are set within a political context and that different water systems face different costs. Another limitation is that it only captures the value from the perspective of the municipal water supplier.

   Strengths of this approach are that it allows for statewide application, captures the ongoing cost of water service, and reflects the cost of water to customers who directly or indirectly bear the burdens and enjoy the benefits of this rule.

Of the three choices, DOH concluded that an average water rate is the best basis for assigning an economic value to saved water. DOH used information compiled in 2004 by the Association of Washington Cities to estimate the average water rate in the state. While this only represents a subset of water systems, DOH concluded that it is an acceptable basis for understanding water rate levels in the state. The data were assessed to determine the total single family residential charge for 1,000 cubic-feet of water. The range of charges was from $3.28 to $77.18, with an average charge of $30.27. For the purposes of this analysis a value of $30.27 per 1,000 cubic-feet will be used to calculate the total statewide value of saved water.

Caution should be used when evaluating the projected $3.5 billion savings. Since DOH used an average water rate as a basis for this calculation, there may be a tendency to think of this as dollars saved by customers of municipal water suppliers. This is not an accurate view. The average rate is calculated from a variety of rate structures seen across the state. These rates include both fixed and variable costs. Municipal water suppliers will always need to collect sufficient revenue to maintain their water systems in good operating condition and most of these costs are fixed. Some customers may benefit by using less water, others may not, depending upon the rates charged by municipal water suppliers as they attempt to recover fixed, as well as variable costs, of supplying water. Thus for the purpose of this analysis, the average water rate should simply be viewed as a basis for projecting the economic value of water over time.

Total Present Value of Saved Water

The mathematical model that was used to make this projection can be found in Appendix C: Value of Water Use Efficiency Savings. Table 4.4 – Estimate of the Value of Saved Water presents the results of those calculations. Table 4.4 shows the total present value of saved water at 30 years, assuming a constant conservation rate over a 30-year timeframe to achieve a 10 percent savings, and weighted average savings of 21 percent.

Table 4.4 – Estimate of the Value of Saved Water by Water System Size Category

Present Value of Saved Water	Year 30
10% Reduction Very Small (< 100 Connections)	$52,480,505
10% Reduction Small (100 – 999 Connections)	$168,875,497
10% Reduction Medium (1,000 – 9,999 Connections)	$543,857,134
10% Reduction Large (> 9,999 Connections)	$879,652,444
Total Savings at 10%	$1,644,865,580
18% Reduction Very Small (< 100 Connections)	$95,772,604
27% Reduction Small (100 – 999 Connections)	$470,132,464
30% Reduction Medium (1,000 – 9,999 Connections)	$1,692,386,062
15% Reduction Large (> 9,999 Connections)	$1,330,699,457
Total Weighted Savings at 21%	$3,588,990,587

The costs shown above are considered conservative for a number of reasons:

- Savings related to wastewater disposal are not included. These typically far exceed the cost of supplying water.
- The inflation rate of three percent used for the projection is considered modest. Water resources are expected to become scarcer in the future; therefore, the cost of water supplies are expected to grow at a much higher rate.
- The value of qualitative benefits like more water for fish and other societal benefits of preserving the water resource is not included. These benefits are not easily quantifiable but if they were quantified the overall benefits of the rule would increase significantly.

Other Financial Benefits

Water use efficiency has many benefits for water systems. The benefits are difficult to quantify on a statewide level because they are highly variable and dependent upon the unique circumstances of each water system. The following assessment examines some of these benefits. Where possible, quantitative information, or examples, are included. Appendix D: Summary of Conservation Case Studies provides additional examples of benefits realized by water systems through implementation of cost-effective water conservation programs.

Direct Savings from Efficient Water System Operation

Operating a more efficient water system will save money for the water system and its customers. One of the most significant results of reducing consumption and minimizing leaks is lower energy bills. Seamount Estates, a 151 connection water system in Kitsap County, reduced its electrical bill from $400 to $200 a month because it installed service meters, found leaks, and repaired them.

Avoided Costs of Preventing or Reducing the Duration of Water Shortage

A building moratorium due to insufficient water availability can have numerous and severe economic impacts, such as property owners face costly construction delays, water systems lose revenue from connection fees, and new customers. The community loses wages and tax revenues if businesses choose other locations. Efficient use of existing water resources can reduce the frequency and duration of water shortages, extend the life of sources, and support growth into the future.

Reduced Costs to Customers

Costs for distributing water and the costs of water lost to leakage are typically passed onto customers in the form of rate increases. Operating within acceptable industry standards for efficiency can hold down rates. In 2005, Port Angeles surveyed one-fifth of their water system in four days at a cost of $5,000. Sixteen small leaks were found and repaired. They reduced water leakage by 92,000 gallons per day or 33.6 million gallons in a year. If this water had been charged at their current residential rate, it would have totaled $53,516.

Reduced Drinking Water and Wastewater Treatment Cost

Water and wastewater treatment costs are typically big-ticket items faced by communities across the state. Treatment costs are directly related to the amount of water that must be treated. Reducing water consumption and loss can minimize treatment costs. The City of Aberdeen was facing expansion of its drinking water treatment facility. They decided that it was time to increase efficiency and installed service meters in 2001. A 100,000 gallons per day savings was realized from major service line leak repairs. A 700,000 gallon per day savings was realized by re-lining their reservoir. Another 300,000 gallon per day savings was realized when their wastewater treatment plant began recycling its own water. Aberdeen has seen a 50 percent decrease in peak day demands. Its existing treatment facility will now be able to serve the needs of the city into the foreseeable future.

Reduced Costs through Deferred Infrastructure

Extending infrastructure life by using water in the most efficient manner is similar to keeping a car that is well maintained. It extends operational life of equipment, which means that replacement can be deferred. Friday Harbor, Eastsound, and Doe Bay are all surface water systems that were reaching treatment plant capacity. Rather than build more capacity, they each chose to implement water use efficiency programs to delay large capital expenditures, reducing the rate impact to their customers.

Improved Recreational Opportunities

The rule is likely to result in additional water in surface water bodies throughout the state. This will be particularly important in spring, summer, and fall when people seek opportunities for boating, rafting, swimming, and fishing. The Department of Ecology has estimated that the total expenditures related to recreational fishing in Washington is about $854 million per year. Commercial fisheries in Washington generate $146 million per year in economic benefits[3]. This represents only a portion of the aquatic recreation enjoyed by citizens and visitors to our state.

Qualitative Assessment of Benefits

There are a number of impacts and benefits that cannot be evaluated or expressed in quantifiable terms. These must be explained in qualitative terms. For the purposes of this analysis, qualitative assessment relates to measuring the increase or decrease in quality of public health and safety; occupational health and safety; environmental and natural resource protection; consumer protection; economic opportunity; quality of life; and personal rights. The effects of this rule in these areas are discussed below.

Public Health and Safety

The public health and safety benefits of water use efficiency are numerous:

- Water systems that operate at **maximum efficiency** are in the best position to ensure safe and reliable drinking water for their customers.
- Water use efficiency enhances **water system reliability**, by reducing the demand on infrastructure and water sources.
- The public participation required in this rule will result in customers that are **better educated** about the value and responsible management of water supplies. This can result in a customer base more willing to change habits, particularly when faced with water shortages.
- Leak reduction strategies will help **increase the focus on aging infrastructure**, reducing the chances of large main breaks, and minimizing the threat of contamination through leaky pipes.
- Conserving limited water resources will **ensure supplies of healthy drinking water** to meet the health and sanitation needs of a growing population in Washington State, as well as provide water for other beneficial uses.

Occupational Health and Safety

No identifiable impacts.

[3] "An Evaluation of Probable Benefits and Costs – For the Proposed Rule to Establish the Columbia River Water Resources Management Program chapter 173-565, 04-11-032, December 2004"

Environmental and Natural Resource Protection

Reduced impact to the state's water resources: Water use efficiency can reduce the adverse impacts to water sources throughout the state. This can take the form of minimizing aquifer "mining" or drawing down aquifers beyond their ability to naturally recharge and reducing impacts to stream flows. The importance of reducing withdrawals of groundwater and surface water cannot be overstated.

- Aquifer depletion and subsiding of land has occurred in Washington State.
- Over 12,000 miles of river in Washington State are impaired by flow modifications.
- Fifteen runs of wild salmon are listed under the federal Endangered Species Act as threatened or endangered.
- Sixteen of 62 Water Resource Inventory Areas have an Endangered Species Act listing and 37 Water Resource Inventory Areas were prioritized by the Department of Ecology because they need instream flows set.

Improved habitat for aquatic species: Retaining the amount of water in our rivers can have important benefits for aquatic species. According to the National Academy of Sciences, more water in the summer will benefit fish by lowering water temperatures. More water in rivers will also provide increased spawning and rearing habitat, effects that have been repeatedly proven to have a direct relationship to the health of salmon runs. Finally, more water can alleviate water quality concerns through simple dilution of contaminants.[4]

Improved statewide water resource management: Water resource managers in the private and public sectors must have good information. Through public performance reporting, the public will have access to information on water usage. This data will greatly enhance statewide water resource management.

Consumer Protection

Under this rule, consumer protection would be enhanced in four ways: improved water system efficiency; better access to decision-making processes of municipal water suppliers; better information about water usage; and better information about impacts to water sources by municipal waters suppliers.

Improved water system efficiency: As stated earlier, water use efficiency translates directly into economic efficiency. This means customers ultimately get a better deal for their water service.

Better access to decision-making processes: The public process provisions of this rule would give consumers the opportunity to participate in the decision-making processes regarding water usage.

[4] Department of Ecology, Small Business Impact Statement for Proposed Columbia River Water Management Program Rule, 2004.

Better information about water usage: This rule contains specific requirements to report usage data and publish annual performance reports. This is essential information that consumers can use to evaluate how municipal water suppliers are carrying out their water resource stewardship responsibilities.

Better information about water sources: This rule would require municipal water suppliers to complete a more thorough assessment of their water sources. This would give municipal water suppliers and the general public better tools to assess the impact of water system growth and expansion projects on the water resource and identify any potential water quality threats to the source.

Economic Opportunity

Plentiful water supplies are needed for healthy economics. This rule would enhance economic opportunity at the water system and community level by compelling municipal water suppliers to stretch existing resources to supply the demands of economic growth. DOH has observed that water systems that have the highest level of financial and operational performance tend to have effective water use efficiency programs. Given the limited nature of water resources, communities that don't invest in water use efficiency place their communities at risk for water shortages and economic strain caused by the need to develop new sources and expand water system infrastructure.

Quality of Life

A safe and reliable supply of drinking water results in higher quality of life for the consumer by providing personal enjoyment of drinking water that is trusted to be safe and aesthetically pleasing. Increased efficiency means that more people will be able to enjoy drinking water.

Personal Rights and Equity

Washington State laws related to water resource management are structured to allocate limited water resources. The efficient use of water protects certain legal rights and ensures equal use of the state's limited water resources. The legal responsibility to assure efficient water use means that the benefits of water are more equally shared to meet the many competing demands for water. This applies not only to present needs, but also the needs of future generations. This rule would help Washington State develop a culture of efficiency that would minimize the water resource challenges that would otherwise be passed on to future generations.

Section 5: Analysis of Overall Costs of the Water Use Efficiency Rule

The Administrative Procedures Act allows either an analysis of the rule as a whole or a section-by-section analysis – DOH did both. Analysis of the rule as a whole provided a better assessment of benefits. Section-by-section analysis was necessary to identify the specific costs of the rule. This section assesses the costs of the water use efficiency rule as a whole. In Section 6, Section-by-Section Analysis of the Water Use Efficiency Rule, DOH conducted a section-by-section analysis of the rule.

DOH used cost estimates deemed to be on the high end of the potential range of costs, to present a fair assessment of the burden this rule could place on any given municipal water supplier and its customers. **By using high end costs, DOH's calculations tend to overstate the burden of the rule.** The costs used for this analysis only represent new costs resulting from the rule. For example, existing rules require water systems completing a WSP to evaluate the feasibility of implementing conservation-oriented rates. That requirement is captured in the rule, but because it is not a new requirement, costs associated with the evaluation are not included in this analysis.

Some new costs associated with the rule are related to provisions taken directly from statute. The Administrative Procedures Act does not require analysis of these costs so they are not included in estimates. These include the requirement to evaluate the feasibility of rates that encourage water conservation in SWSMPs and the evaluation of opportunities for reclaimed water required in WSPs. For a more detailed description of the changes that will result from the rule, refer to Appendix E: Analysis of Group A Rule Changes from the Water Use Efficiency Rule.

For a basis of comparison, costs are determined on an annual basis, then projected forward over the same 30-year timeframe used to assess the benefits of this rule, using a mathematical model similar to the one used to project the value of saved water (see Section 4: Benefits of the Water Use Efficiency Rule).

Types of Costs

The rule would require municipal water suppliers to accomplish different types of activities. These can be divided into two categories: procedures and actions. Procedures include activities such as developing plans, holding meetings, and submitting information to DOH. Actions include activities such as installing meters and repairing leaks.

<u>Procedures</u>

The cost of activities in the procedure category is estimated by determining the number of staff hours needed to complete the activity and multiplying that by an assumed labor cost. Estimates are made for water systems in each size category for the following activities:

- Preparing source descriptions.
- Data collection, analysis, and reporting.
- Program development and reporting.

- Evaluation of distribution system leakage and determining steps to reduce leakage, if necessary.
- Development of a Water Loss Control Action Plan (WLCAP), if necessary.

The costs shown below in Table 5.1 – Cost of Procedural Activities are taken from Section 6: Section-by-Section Analysis of the Water Use Efficiency Rule. DOH calculated the costs to ensure they are not underestimated and use the high end of the potential range of costs for calculations in Table 5.1. In addition, no adjustment is made for cost reductions over time, even though it is expected that these costs would decline as municipal water suppliers get their programs up and running. **By using high end costs and carrying forward the start-up costs for this rule, DOH's calculations tend to overstate the burden of procedural costs of the rule.**

Table 5.1 – Cost of Procedural Activities

		Very Small (< 100 Connections)	**Small** (100 – 999 Connections)	**Medium** (1,000 – 9,999 Connections)	**Large** (> 9,999 Connections)	**Total**
Cost for Water Systems Developing a WSP	**Average Annual Cost per Water System**	$1,364	$3,555	$7,484	$8,121	
	Number of Water Systems	197 See Note 1	256 See Note 1	169	37	
	Statewide Average Annual Cost	$268,708	$910,080	$1,264,796	$300,477	**$2,744,061**
Cost for Water Systems Developing a SWSMP	**Average Annual Cost per Water System**	$1,254	$2,497	See Note 3	See Note 3	
	Number of Water Systems	1,943 See Note 2	293	See Note 3	See Note 3	
	Statewide Average Annual Cost	$2,436,522	$731,621	See Note 3	See Note 3	**$3,168,143**
Total Statewide Average Annual Cost						**$5,912,204**
Statewide Cumulative Present Value Cost after 30-year Implementation Period *						**$177,366,148**

* The Statewide Cumulative Present Value Cost was calculated using the following formula:

$PV = \sum C_t*(1+i)/(1+r)^t$

Where:
PV = Total present value cost
C = Annual first year cost
t = number of years
i = interest rate (3 percent was used for this calculation)
r = discount rate (3 percent was used for this calculation)
Notes for Table 5.1 – Cost of Procedural Activities

1. The number of water systems in the very small and small categories that must submit a WSP varies from year to year. According to DOH's database, Sentry, 197 very small water systems and 256 small water systems have completed a full WSP. For the purposes of this analysis it is assumed that these numbers will remain constant.

2. This number includes 771 noncommunity water systems. It is not possible to determine how many noncommunity water systems are municipal water suppliers. For the purposes of this analysis, DOH assumed half of them will be municipal water suppliers. See Section 2: Introduction, for further discussion on community and noncommunity water systems.

3. All water systems with 1,000 or more connections must complete a WSP.

Water Loss Control Action Plans

The cost estimates provided above does not include developing a WLCAP. This is because only those water systems that do not meet the leakage standard of 10 percent would be required to prepare a WLCAP. DOH conducted two surveys on the planning documents that have been submitted to DOH. The information from those two surveys allows DOH to estimate the number of water systems that would be required to prepare a WLCAP and the resulting statewide costs. The full results of those two surveys are presented in Appendix G: 2005 Water Use Efficiency Survey, and Appendix J: Technical Assistance Survey.

Table 5.2 – Water Systems Reporting Leakage in Excess of Ten Percent

Size Category	2005 Water Use Efficiency Survey	Technical Assistance Survey
Very Small (< 100 Connections)	21%	24%
Small (100 – 999 Connections)	17%	18%
Medium (1,000 – 9,999 Connections)	40%	39%
Large (>9,999 Connections)	20%	54%

Based on DOH staff review, it was concluded that the results for the very small and small water systems was not accurate. Staff assumptions are that 50 percent of water systems in these categories will exceed the leakage standard and need to prepare a WLCAP. The reason for the difference between survey results and staff field experience may be that the survey only looked at planning documents submitted to DOH and therefore the sample set may not be representative of all water systems in these categories.

DOH staff also felt that the assumption that 20 percent of large water systems will exceed the leakage standard was more accurate than 54 percent. The survey results in this case may not be representative simply because the surveys included a very small number of large water systems.

Table 5.3 – Percent of Water Systems Assumed to be in Excess of Ten Percent Leakage

Size Category	Percent Expected to Exceed Standard
Very Small (< 100 Connections)	50%
Small (100 – 999 Connections)	50%
Medium (1,000 – 9,999 Connections)	40%
Large (>9,999 Connections)	20%

Table 5.4 – Average Cost of Water Loss Control Action Plan Development provides an average annual cost per water system for each size category. It is assumed that these costs are spread over a six-year planning period. For example, Table 5.4 lists $348 for a very small water system. The assumption is that it would cost that water system $2,088 to prepare a WLCAP. That cost is divided by six to obtain an annual cost. This is assumed to be a one-time cost.

Table 5.4 – Average Cost of Water Loss Control Action Plan Development

	Very Small (< 100 Connections)	**Small (100 – 999 Connections)**	**Medium (1,000 – 9,999 Connections)**	**Large (> 9,999 Connections)**
Average Annual Cost	$348	$649	$877	$1,247
Total Number of Water Systems in Size Category	2,140	549	169	37
Percent of Water Systems Expected to Need a WLCAP	50%	50%	40%	30%
Number of Water Systems Expected to Need a WLCAP	1,070	275	68	8
Average Annual Cost for All Water Systems	$372,360	$178,475	$59,636	$9,976
			Statewide Annual Cost	**$620,447**
Statewide Cumulative Present Value Cost after 30-year Implementation Period *				**$18,613,413**

* The Statewide Cumulative Present Value Cost was calculated using the following formula:

$PV = \sum C_t*(1+i)/(1+r)^t$

Where:
PV = Total present value cost
C = Annual first year cost
t = number of years
i = interest rate (3 percent was used for this calculation)
r = discount rate (3 percent was used for this calculation)

The annual cost listed in Table 5.4 is only projected for the first six years of rule implementation. No costs are added for this provision beyond the six-year point. This analysis assumes that all water systems that need to complete a WLCAP will be identified and develop that plan within six years of rule adoption.

Actions

The other types of costs associated with this rule are for activities that require more than water system staff time. These are the actions that a municipal water supplier must complete to comply with the rule. The following items fall into this category:

- Water use efficiency program implementation.
- Finding and repairing distribution system leaks.
- Installing, reading, and maintaining meters.

Water Use Efficiency Program Implementation

The Municipal Water Law directs the municipal water supplier to implement cost-effective measures necessary to meet its goals. Since the decision to implement any measure is entirely up to the municipal water supplier based on their analysis of cost-effectiveness, it is neither possible nor appropriate to include implementation costs in this analysis.

Finding and Repairing Leaks

There is insufficient information available to make assumptions with any degree of confidence about the costs associated with finding and repairing leaks. DOH reviewed WSPs, Drinking Water State Revolving Fund loan applications, and industry literature. The most that can be asserted is that water systems that have neglected to repair significant leaks could face significant costs to repair them. Costs can be expected to be in terms of thousands of dollars for very small and small water systems, tens of thousands of dollars for medium size water systems and hundreds of thousands of dollars for very large water systems.

Installing, Reading, and Maintaining Meters

DOH only included costs associated with installing, reading, and maintaining service meters for water systems that do not already have them. Including service meter costs for water systems that already have them would grossly misrepresent the impact of this rule. The rule also requires meters on new connections. This cost is considered insignificant which is factored into the cost in the new connection.

The rule also requires meters to measure production volumes (*i.e.*, source meters) and meters on water system interties. Current law and rule already requires source meters and meters on new water system interties. Some water systems have existing interties that will require meters, but the number of these is expected to be small and have little impact on the overall cost of the rule.

To estimate the number of water systems that would be required to install service meters, DOH reviewed two surveys of planning documents submitted to DOH. The full results of those surveys are presented in Appendix G and Appendix H. According to those two surveys, the percentage of water systems with all sources and services metered or in the process of installing source and service meters are:

Table 5.5 – Water Systems Fully Metered or Installing Meters

Size Category	2005 Water Use Efficiency Survey	Technical Assistance Survey
Very Small (< 100 Connections)	85%	82%
Small (100 – 999 Connections)	97%	87%
Medium (1,000 – 9,999 Connections)	97%	94%
Large (> 9,999 Connections)	100%	92%

Based on staff review DOH concluded that the percent of small and very small water systems that reported being fully metered or scheduled to install meters was inconsistent with field experience. Staff expectations are that 50 percent of water systems serving fewer than 100 connections and 70 percent of water systems serving between 100 and 999 connections will be fully metered (all sources and services). The reason for the difference between survey results and staff field experience may be that the survey only looked at planning documents submitted to DOH and therefore the sample set may not be representative of all water systems in these categories.

Table 5.6 – Percent of Water Systems Assumed to be Fully Metered

Size Category	Percent of Water Systems
Very Small (< 100 Connections)	50%
Small (100 – 999 Connections)	70%
Medium (1,000 – 9,999 Connections)	95%
Large (> 9,999 Connections)	See Note 1

Notes for Table 5.6

1. This analysis assumes that there are two large water systems with a total of 45,000 un-metered services.

DOH reviewed Drinking Water State Revolving Fund loan applications and industry literature and determined that the average cost to install, read, and maintain each meter can be reasonably estimated to be $6/month, or $63.60/year, for the service life of the meter. That is based on a total cost of $570, a service life of 15 years, and a loan payback period of 15 years, except for very small water systems where DOH used an estimated total cost of $800 based on input from industry professionals. They argued that more often than not there are difficult installation factors, such as finding existing water lines, accessing old lines, repairing old lines, and proper site remediation that increase costs. For more information on meter costs see Section 6: Section-by-Section Analysis of the Water Use Efficiency Rule.

The number of unmetered connections was then estimated by multiplying the average number of connections for each size category. The annual cost for a meter was then multiplied by the estimated number of unmetered connections to estimate the total annual cost of service meters. For example, for the very small size category there are 2,131 water systems, and the average number of connections for water systems in this category is 40 connections. It is assumed that 50 percent of these will be un-metered.

Annual Statewide Cost for Service for Very Small Water Systems =
(2,140 water systems) x (40 connections/water system) x (0.5) x $87.00/year) = $3,723,600

Table 5.7 – Service Meter Costs

	Very Small (< 100 Connections)	**Small** (100 – 999 Connections)	**Medium** (1,000 – 9,999 Connections)	**Large** (> 9,999 Connections)
Total Number of Water Systems in Size Category	2,140	549	169	37
Percent of Un-metered Water Systems Expected to be Un-metered	50%	30%	5%	See Note 1
Number of Water Systems Expected to Need Meters	1,070	165	8	See Note 1
Average Number of Connections Served by Water Systems in Size Category	40	324	3,218	See Note 1
Annualized Cost Per Connection	$87	$63.60	$63.60	$63.30
Annual Cost for All Water Systems	$3,723,600	$3,400,056	$1,637,318	$2,862,000
Statewide Annual Cost				**$11,622,974**
Statewide Cumulative Cost after 30-year Implementation Period *				**$348,689,276**

* The Statewide Cumulative Present Value Cost was calculated using the following formula:

$PV = \sum C_t*(1+i)/(1+r)^t$

Where:
PV = Total present value cost
C = Annual first year cost
t = number of years
i = interest rate (3 percent was used for this calculation)
r = discount rate (3 percent was used for this calculation)

Notes for Table 5.7

1. This analysis assumes that there are two large water systems with approximately 45,000 un-metered services.

While this can be considered appropriate, it can also be seen as somewhat overstating the real cost. Meters can be expected to be kept in service beyond their manufacturer's stated service life, and meter replacement costs should be significantly lower than initial installation.

Total Cost of the Water Use Efficiency Rule

Table 5.8 – Total 30 Year Cost of the Rule by Water System Size Category summarizes the results of this analysis by presenting the sum of the three cost factors that represent potential new costs. These do not include the cost for rule provisions that are directly taken from statute, such as evaluating opportunities for reclaimed water. In addition to the costs listed, some water systems may be facing significant costs to find, repair leaks, and install meters on existing interties.

Table 5.8 – Total 30 Year Cost of the Rule by Water System Size Category

	Number of Water Systems	Annual Cost	Cumulative Present Value Cost after 30 Years
Procedural Costs			
Very Small (< 100 Connections)	2,140	$2,705,230	$81,156,913
Small (100 – 999 Connections)	549	$1,641,701	$49,251,038
Medium (1,000 – 9,999 Connections)	169	$1,264,796	$37,943,886
Large (> 9,999 Connections)	8	$300,477	$9,014,311
Procedural Costs Subtotal		**$5,912,204**	**$177,366,148**
WLCAP Costs			
Very Small (< 100 Connections)	1,070	$372,360	$11,170,802
Small (100 – 999 Connections)	275	$178,475	$5,354,251
Medium (1,000 – 9,999 Connections)	68	$59,636	$1,789,080
Large (> 9,999 Connections)	8	$9,976	$299,280
WLCAP Costs Subtotal		**$620,447**	**$18,613,413**
Service Meters Costs			
Very Small (< 100 Connections)	1,070	$3,723,600	$111,708,018
Small (100 – 999 Connections)	165	$3,400,056	$102,001,696
Medium (1,000 – 9,999 Connections)	8	$1,637,318	$49,119,548
Large (> 9,999 Connections)	2	$2,862,000	$85,860,014
Service Meters Costs Subtotal		**$11,622,974**	**$348,689,276**
Subtotal Very Small (< 100 Connections)			**$204,035,733**
Subtotal Small (100 – 999 Connections)			**$156,606,985**
Subtotal Medium (1,000 – 9,999 Connections)			**$88,852,514**
Subtotal Large (> 9,999 Connections)			**$95,176,605**
Total			**$544,688,837**

Section 6: Section-by-Section Analysis of the Water Use Efficiency Rule

The Administrative Procedures Act allows either an analysis of the rule as a whole or a section-by-section analysis – DOH did both. Analysis of the rule as a whole provided a better assessment of benefits. Section-by-section analysis was necessary to identify the specific costs of the rule. This section looks at each provision of the rule separately. In Section 5, Analysis of Overall Costs of the Water Use Efficiency Rule, DOH assessed the cost of the rule as a whole.

A brief description of the potential benefits of each individual section is presented. While the benefits can be described, they are difficult to quantify because they cannot be separated from the other efficiency efforts. For this reason, this section does not attempt to quantify the benefits of any individual section.

Costs of each section are estimated in terms of average costs for water systems within each size category. Caution should be used when using this analysis to assess costs or benefits to any particular water system and/or customer. They are highly variable and the individual circumstances of each water system can have a large impact.

In order to present a fair assessment of the costs, the following approach was used:

- Where a range of costs are identified, the high end of that range was used.
- Consideration of free assistance that DOH intends to provide was not factored into the analysis.
- If a reasonable estimate could not be made for a provision, it was noted in the text.
- No cost is identified for provisions that are taken directly from state law. In some cases, costs are provided for information only.
- Many water systems are performing well above current minimum standards and are expected to meet the requirements with minimal effort. However, unless otherwise noted, it was assumed that water systems are only meeting current minimum requirements.

DOH conducted two surveys to assess the performance of the state's water systems in the area of water conservation. The results of those surveys are summarized in Appendix G and H.

Purpose and Applicability – WAC 246-290-800

This section clarifies the purpose and applicability of the rule. This section contains no specific requirements and therefore it has no associated costs or benefits.

Water Use Efficiency Planning – WAC 246-290-810

The rule includes new and amended planning provisions to implement the direction of the Washington State Legislature.

The benefits of planning are well stated in *The Handbook of Water Use and Conservation*[5]*:*

> "A carefully designed plan is the blueprint for a successful water conservation program for water and wastewater systems seeking to implement water-efficiency measures that will reduce water demand and wastewater flows and thereby achieve a range of economic, environmental and regulatory benefits."

The planning provisions of this rule provide the basic framework to construct an effective water use efficiency program. The following sections examine each planning element. DOH is directed by statute to include these elements for both WSP and SWSMP. WSPs are required for new water systems, expanding water systems, and any water system serving more than 1,000 connections. All other water system must develop and implement a SWSMP.

Water Use Efficiency Program Development – WAC 246-290-810(3)

The rule requires municipal water suppliers to develop and implement a cost-effective water use efficiency program. The key to this process is the selection of water use efficiency measures. The decision-making process, a description of the water use efficiency program, and the savings estimated from that program must be documented in WSPs. This documentation must include an evaluation of the cost-effectiveness of the program.

Other sections of this rule require municipal water suppliers to establish goals in a public forum and report annually on their water use efficiency performance. Because the process of selecting measures, establishing goals, and reporting performance are integrally linked, the costs associated with establishing water use efficiency goals and preparing performance reports are included in the Table 6.1 – Average Cost of Water Use Efficiency Program Development for Water Systems Plans[6].

In addition to the general benefits of planning as stated above, the processes established by this rule ensures that all municipal water suppliers follow a similar a process of decision making and documentation that allows customers and the general public to participate in the water use efficiency program development.

The provisions related to cost-effectiveness evaluations ensure that municipal water suppliers take a meaningful account of the costs and benefits of implementing any particular water use efficiency measure. Table 6.1 provides the average annual cost per water system for each size category. For more information on how the cost estimate was developed see Appendix F: Water Use Efficiency Rule Planning and Process Costs. The activities associated with this cost estimate include the following:

[5] Vickers, Amy , 2001, *Handbook of Water Use and Conservation*, Waterplow press, Amherst, MA, Page 1.
[6] DOH changed the number of measures a very small water system (< 100 connections) must assess from three measures to one measure. The estimated costs in Table 6.1, were estimated for the costs of assessing three measures and maybe overstated.

- Describing the existing program.
- Selecting a method to educate customers.
- Evaluating cost-effectiveness of water use efficiency measures.
- Estimating savings in the past six years (water systems serving > 1,000 total connections).
- Defining proposed goals and options.
- Holding meeting(s) and determining goals.
- Documenting the goal-setting process.
- Reporting performance in meeting the goal.

Table 6.1 – Average Cost of Water Use Efficiency Program Development for Water System Plans

	Very Small (< 100 Connections)	**Small** (100 – 999 Connections)	**Medium** (1,000 – 9,999 Connections)	**Large** (> 9,999 Connections)
Cost Range for Water Systems Developing a WSP	$235 – $411	$676 – $996	$1,185 – $2,971	$1,537 – $3,498
Cost Range for Water Systems Developing a SWSMP	$198 – $359	$572 – $995	N/A	N/A

Water Use Efficiency Program Implementation – WAC 246-290-810(3)

A key provision of this rule and the law is the specific requirement to implement the activities outlined in water use efficiency planning documents. The costs listed above for program development do not include costs associated with program implementation. The authorizing statute directs the municipal water supplier to implement cost-effective measures. Since the decision to implement a measure is entirely up to the municipal water supplier based on their analysis of cost-effectiveness, it is neither possible nor appropriate to include the implementation costs in this analysis.

Source Description for Water Systems Plans – WAC 246-290-100(3)

The rule contains new requirements related to water supply characteristics. In addition to the information required by current rules, WSPs must include a description of water supply characteristics. The benefit of this provision is improved public access to information about the impact on water sources. This is essential information needed to make good decisions about consumption. This information will give municipal water suppliers and the general public better tools to assess the impact of water system growth and expansion projects on the water resource, and identify and potential water quality threats to the source. This will be of critical importance in basins where water resources are stretched.

Table 6.2 – Average Cost of Requirements Associated with Source Descriptions for Water Systems Plans provides the average annual cost per water system for each size category. For more information on how the cost estimate was developed, see Appendix F. The activities associated with this cost estimate include the following:

- Researching required information on sources of supply.
- Coordinating with DOH and Department of Ecology.
- Documenting source description for WSPs.

Table 6.2 – Average Cost of Requirements Associated with Source Descriptions for Water System Plans

	Very Small (< 100 Connections)	**Small** (100 – 999 Connections)	**Medium** (1,000 – 9,999 Connections)	**Large** (> 9,999 Connections)
Cost Range for Water Systems Developing a WSP	$29 – $88	$82 – $196	$131 – $327	$196 – 490
Cost Range for Water Systems Developing a SWSMP	$0	$0	N/A	N/A

Evaluation of Rates for Water System Plans – WAC 246-290-100 (4)(j)(iv)(B) and WAC 246-290-105(4)(m)

This provision requires municipal water suppliers to evaluate the feasibility of adopting and implementing rate structures that encourage the efficient use of water. This provision is included in the rule directly as it is written in statute. For this reason, an assessment of the costs and benefits of this provision is not included.

Evaluation of Distribution System Leakage for Water System Plans – WAC 246-290-810(4)(i)

The rule requires municipal water suppliers to include an evaluation of distribution system leakage and the steps that will be taken to resolve any leakage problems. The requirement to determine distribution system leakage is found in WAC 246-290-820 *Distribution system leakage standard*. The linkage to planning documents created by this provision ensures that efforts to minimize leakage are appropriately integrated with operation, management, and maintenance programs.

Minimizing leakage in water systems has many benefits for the water system and its customers. The benefits include:

- Improved operational efficiency.
- Reduced potential for contamination.
- Extended life of facilities.
- Reduced potential of property damage and water system liability.
- Reduced water outage events.
- Improved public relations.
- Lowered water system operational costs.

Table 6.3 – Average Cost to Evaluate Distribution System Leakage in Water System Plans provides the average annual cost per water system for each size category. For more information on how the cost estimate was developed, see Appendix F. The activities associated with this cost estimate include the following:

- Collecting and analyzing data.
- Performing an annual accounting audit from metered production and consumption data.
- Reporting results.

The cost table below includes the cost of extracting and calculating data on an annual basis for performance reports and determining a leakage rate. Costs associated with determining steps to reduce leakage, if necessary, are not included. These are addressed below under the heading Developing a Water Loss Control Action Plan.

Table 6.3 – Average Cost to Evaluate Distribution System Leakage in Water System Plans

	Very Small (< 100 Connections)	**Small** (100 – 999 Connections)	**Medium** (1,000 – 9,999 Connections)	**Large** (> 9,999 Connections)
Cost Range for Water Systems Developing a WSP	$366 – $528	$754 – $1,136	$1,132 – $1,738	$1,524 – $2,344
Cost Range for Water Systems Developing a SWSMP	$396 – $528	$754 – $1,136	N/A	N/A

Data Collection and Reporting – WAC 246-290-100(4)(b) and WAC 246 -290-105(4)(i)

The rule contains specific data collection requirements for WSPs and SWSMPs. It also deletes duplicative production and consumption data reporting requirements from the water facility inventory form section of WAC 246-290. The benefits of this provision include:

- Consistent data collection and reporting.
- Better information to develop a successful water use efficiency program.
- Better understanding of how much water is used, where it goes, and who is served.
- Better information to make choices about how best to save water.
- Better information about the impact on sources of water.
- Reduced cost of compiling data for planning documents expected to result from the more rigorous data collection requirements of this rule.

Table 6.4 – Average Cost for Data Collection and Reporting for Water System Plans provides the average annual cost per water system for each size category. For more information on how the cost estimate was developed, see Appendix F. The activities associated with this cost estimate include the following:

- Visiting sources and recording production data monthly.
- Reporting monthly production data.
- Collecting and reporting annual consumption data.
- Determining consumption by customer class.
- Determining seasonal variation in consumption patterns.

Table 6.4 – Average Cost for Data Collection and Reporting for Water System Plans

	Very Small (< 100 Connections)	Small (100 – 999 Connections)	Medium (1,000 – 9,999 Connections)	Large (> 9,999 Connections)
Cost Range for Water Systems Developing a WSP	$0 – $396	$0 – $1,097	$0 – $2,253	$0 – $1,593
Cost Range for Water Systems Developing a SWSMP	$0 – $352	$0 – $352	N/A	N/A

Demand Forecasts – WAC 246-290-100(4)(c) and WAC 246 -290-105(4)(l)

The rule requires water systems to complete demand forecast assuming two different scenarios. Scenario one forecasts water demand if goals are achieved. The second scenario projects forecasts water demand if no further water use efficiency measures are implemented. This element of the rule is consistent with current *Conservation Planning Requirements* (DOH PUB 331-008). The benefits associated with the demand forecasting provisions are similar to those for data collection. The demand forecast is an essential tool to make good decisions about water use efficiency. It also provides customers and the general public with information they need to participate in the decision-making process.

Table 6.5 – Average Cost for Data Collection and Reporting for Water System Plans provides the average annual cost per water system for each size category. For more information on how the cost estimate was developed, see Appendix F. The activities associated with this cost estimate include the following:

- Visiting sources and recording production data monthly.
- Reporting monthly production data.
- Collecting and reporting annual consumption data.
- Determining consumption by customer class.
- Determining seasonal variation in consumption patterns.

Table 6.5 – Average Cost for Data Collection and Reporting for Water System Plans

	Very Small (< 100 Connections)	Small (100 – 999 Connections)	Medium (1,000 – 9,999 Connections)	Large (> 9,999 Connections)
Cost Range for Water Systems Developing a WSP	$0 – $29	$0 – $131	$0 – $196	$0 – $196
Cost Range for Water Systems Developing a SWSMP	$0 – $15	$0 – $15	N/A	N/A

Evaluation of Reclaimed Water – WAC 246-290-100(4)(f)(viii)

This provision requires municipal water suppliers serving 1,000 connections or more to evaluate opportunities for reclaimed water where those opportunities exist. This provision is included in the rule directly as it is written in statute. For this reason, an assessment of the costs and benefits of this provision is not included.

Distribution System Leakage Standard – WAC 246-290-820

The rule establishes a distribution system leakage standard of 10 percent of total water produced or purchased. If leakage exceeds the standard, municipal water suppliers must develop and implement a WLCAP to address any technical or economic issues that affect their ability to find and repair leaks. Minimizing leakage in water systems has many benefits for the water system and its customers. The benefits include:

- Improved operational efficiency.
- Reduced potential for contamination.
- Extended life of facilities.
- Reduced potential of property damage and water system liability.
- Reduced water outage events.
- Improved public relations.
- Lowered water system operational costs.
- Reduced cost of producing water (pumping, treating).
- Avoided costs for development of new supplies deferred through leak detection and repair.
- Identifying and resolving minor maintenance problems before they become major problems.

Given the variability in water system sizes, the amount of leakage required to be eliminated, the nature of the leaks, and the savings water systems will experience as a result of implementing this rule, it is not possible to determine the net cost. However, a literature search of experiences by utilities across the country suggest that, in most cases, the cost of implementing a leak detection and repair program is typically more than offset by the savings gained by having to produce less water.

The costs associated with the distribution system leakage standard can be divided into three activities:

- Determining leakage.
- Developing a WLCAP, if necessary.
- Finding and repairing leaks.

Determining Leakage

The cost of extracting the necessary data and determining leakage is included in the planning sections of this document.

Developing a Water Loss Control Action Plan

The complexity of developing a WLCAP and the steps necessary to address the leakage problem will be highly variable. For some, it may be as simple as correcting data collection errors. Others may be facing water main replacements. Table 6.6 – Average Cost of Water Loss Control Action Plan Development provides the average annual cost per water system for each size category. For more information on how the cost estimate was developed, see Appendix F. The activities associated with this cost estimate include the following:

Table 6.6 – Average Cost of Water Loss Control Action Plan Development

	Very Small (< 100 Connections)	Small (100 – 999 Connections)	Medium (1,000 – 9,999 Connections)	Large (> 9,999 Connections)
Cost Range	$0 – $348	$0 – $649	$0 – $877	$0 – $1,247

Finding and Repairing Leaks

Water systems with leakage in excess of 10 percent will be faced with detecting, locating, and correcting enough leaks to meet the 10 percent requirement. The cost of finding and repairing leaks will be highly variable. Leak detection programs will vary with the type and extent of the leaks, the size of the water system, and the period of time over which the water system implements its leak detection and correction program. Repairing leaks may only require tightening easily accessible joints with a wrench, or may involve distribution pipe maintenance involving the use of heavy equipment for excavation, shoring of the trench, repair of the pipe, refilling the trench, and repair of the street or other surface features. In cases of older distribution lines, the water system may find it more cost-effective to replace the line rather than attempting to repair numerous leaks.

Given this variability it is not possible to determine with any degree of certainty the cost for finding and repairing leaks. DOH reviewed WSPs, Drinking Water State Revolving Fund loan applications, and industry literature. The most that can be asserted is that water systems that have neglected to repair significant leaks could face significant costs to repair them. Costs can be expected to be in terms of thousands of dollars for very small and small water systems, tens of thousands of dollars for medium-sized water systems, and hundreds of thousands of dollars for very large water systems.

Water Use Efficiency Goal Setting – WAC 246-290-830 and Performance Reporting – WAC 246-290-840

The rule requires municipal water suppliers to establish goals at least once every six years. Goals must be established in a public forum. The rule includes procedures that must be followed related to public notice and process for the public forum. The rule also requires that municipal water suppliers prepare annual performance reports, make them available to the public, and distribute them to DOH, their customers, and interested parties.

The benefits of these requirements are entirely related to engaging customers and the general public in the process of developing water use efficiency programs. The decisions made by water systems have an impact on the state's resources and the budgets of their customers. These provisions of the rule give anyone the ability to participate in the decision-making process and monitor a water system's performance over time.

Goal-setting is integrally linked to the selection of water use efficiency measures that occurs during the planning process. Similarly, the process of developing performance reports is closely linked to the data collection efforts undertaken for planning purposes as well as the goal setting process. For this reason, the costs associated with establishing goals are included above under the heading Water Use Efficiency Program Development.

Metering Requirements – WAC 246-290-496

Production Meters

The rule requires municipal water suppliers to measure all water that enters their distribution system. Current rules and laws already require all water sources to be metered. This is not a new requirement. Therefore, the associated costs and benefits are not assessed.

Service Meters

The rule requires that all direct service connections and water system interties be metered to measure water consumption. After extensive analysis and stakeholder discussion, DOH concluded that service meters are necessary to provide credible determinations of distribution system leakage. The benefits associated with service meters are numerous and significant. Throughout the process of rule development, service meters were cited by many stakeholders and industry professionals as the most cost-effective measure a water system can implement. The California Urban Water Conservation Council found that "savings have been reported in the range of 20 to 40 percent…"[7] in studies on the effect of service metering. In addition, installing service meters has the following benefits:

- Identifies how much water customers use.
- Assists in determining trends and variations in water usage.
- Provides a tool to educate customers about water use.
- Aids in the creation of customer-specific water use efficiency programs.
- Allows municipal water suppliers to begin to charge equitably based on usage.
- Increases efficiency, which can expand water system capacity, especially when combined with leak detection, leak repairs, and a consumption-based rate structure.

Service Meter Installation

Residential service lines are typically metered with 5/8 or 3/4 inch meters. Manual-read meters of this size that meet industry accuracy standards are available for less than $100. This price includes the necessary fittings and a shutoff valve, where meters are not already installed. The meter boxes for this size meter cost approximately $15 to $25. The total cost for meters, shutoff valve, fittings, and boxes in which to place them should, in most cases, be less than $125. The costs associated with installation of water service meters are water system-specific and vary depending on a number of factors. Installing meters on existing services typically costs more than installing meters at the time new service lines are installed. The increased costs associated with existing services include the labor, tools, and material necessary to locate the service line, dig out a hole of sufficient size for the meter box, cut the service line, install the fittings, meter, and shutoff valve if needed, repair any damage done at the time to sidewalks, paving, landscaping or other surface features, and provide disinfection of lines that have been opened.

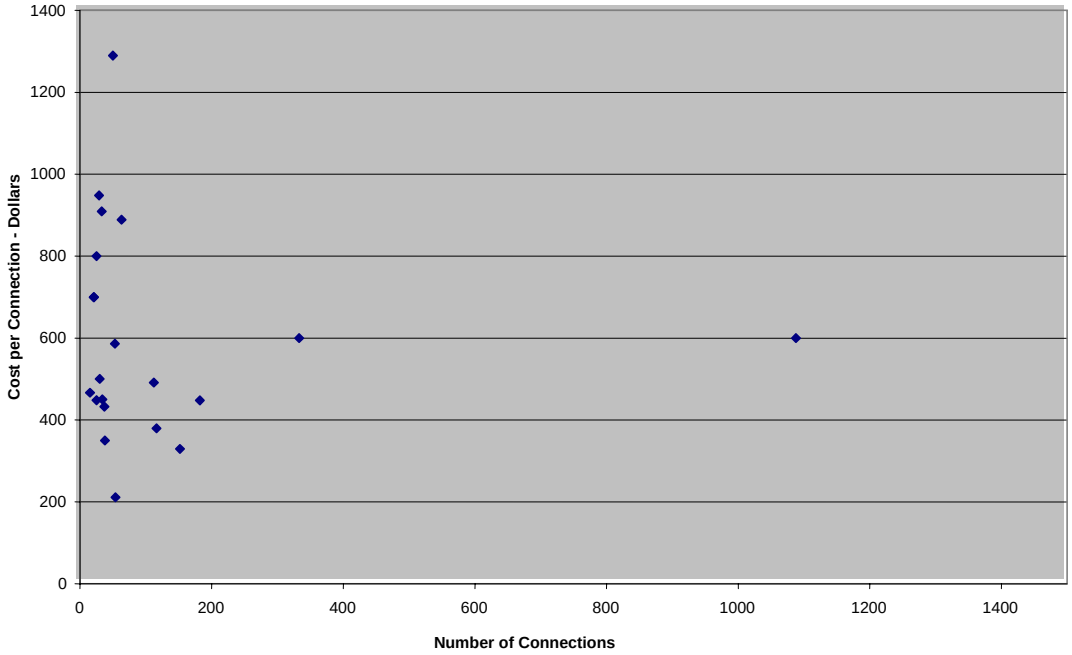
[7] California Urban Water Conservation Council, BMP Costs & Savings Study, Sacramento, CA., 2000. pp 2-7 2-10.

The estimated cost for purchasing and installing water meters in small water systems is available from the Drinking Water State Revolving Fund Program. Most water systems applying for funding under the Drinking Water State Revolving Fund Program are required to install service meters as part of the project if they are not currently metered. The loan applications from 21 water systems in 2003–2005, varying in size from 15 to 1,088 connections, illustrate the variability in estimated costs for installing meters. As seen in Chart 1: Estimated Cost of Installing Meters 2003–2005, Drinking Water State Revolving Fund Program, the estimated costs ranged from $211 to $1,290 per connection with an average cost of $570.

In evaluating the data, there appears to be little relationship between water system size and per-meter cost in this sample of water systems. The highest costs estimated are for a water system of 50 connections and the lowest for a water system of 54 connections. However, several industry professionals indicated that more often than not there are difficult installation factors, such as locating existing water lines, accessing old lines, repairing old lines, and proper site remediation that increase costs for water systems with less than 100 connections. For this reason, DOH elected to use an average per connection cost of $800 to calculate costs for very small water systems with fewer than 100 service connections and $570 for water systems with 100 or more service connections.

Chart 1: Estimated Cost of Installing Meters

2003 – 2005 Drinking Water State Revolving Fund Projects



Most of the Drinking Water State Revolving Funds projects involving meter installation are in the small water system category and the average per connection cost is expected to be higher compared to larger water systems. Larger water systems may able to: use creative financing to install meters at a lower cost; have more current information about the location of existing lines (less time locating the lines); and benefit from an economies of scale when installing large numbers of meters. One example is a city of about 6,000 connections in western Washington where the installed cost of remote-reading meters (which are higher cost than manual-reading meters) was approximately $300 per connection.

Water meters at the costs cited above (fewer than $100 for the meter itself) are available with a 15-year warranty to meet industry accuracy standards and therefore a 15-year replacement cycle can be used to calculate the monthly costs. Assuming the water system can borrow the $570 at an interest rate of 6 percent for the cost of purchasing and installing the meters, and with the assumption that the meters must be replaced every 15 years, the monthly per-connection charge is approximately $4.80. For those water systems that can purchase and install meters at the rate of $300/connection, the monthly cost would be about $2.50. For the very small water systems where the meter cost is $800, the per connection monthly costs will be about $6.75.

Service Meter Reading

Since most of the water systems that will be required to add meters are small, it is expected that manually-read meters will be installed. Based on observation of meter readers and a review of available literature, one person can read between 300 and 500 meters a day. Assuming an average of 400 meters a day, one meter per connection, read once per month, at a labor rate of $25/hour (see Appendix I: Labor Costs), the monthly per connection cost is approximately:

(20 workday/month) * ($25/hour) * (8 hours/workday) / (400 meters/day) * (20 days) = $4,000/ 8,000 meters = $0.50/connection

Summary of Costs Associated with Service Meters

DOH considered that different municipal water suppliers will fund service meter installation in different ways. Some will pay for meters from reserve funds; some will charge each customer at the time of service meter installation; and others will borrow the money needed to install meters. Since the total cost is highest if money is borrowed to pay for meters, DOH used that approach for this analysis. DOH recognizes that the total cost does not always provide a complete picture of the severity of the impact. Some small water systems will not have sufficient reserve funds nor will they be able to borrow money. These water systems will need to raise money from their customers. This is one of the reasons DOH is allowing a generous amount of time to install service meters.

Based on the above assumptions and calculations, the average estimated total cost to install, read, and replace meters on an ongoing basis is estimated to be about $5.30/connection/month for water systems with 100 or more service connections and about $6.75 per connection per month for the very small water systems, with less than 100 service connections. Some water systems have been able to install meters for much less and others have estimated a significantly higher cost. These costs are conservative and therefore provide a credible basis to calculate the cost impact of this rule.

Cost Category	Very Small (< 100 Connections)	Small, Medium, and Large (> 100 Connections)
Initial Meter and Installation Cost	$6.75	$4.80
Meter Reading Cost	$0.50	$0.50
Total Monthly Cost	$7.25	$5.30
Total Annual Cost	**$87.00**	**$63.60**

Intertie Meter Costs

DOH rules currently require that meters be installed on water system interties when they are constructed. This has been required since April 9, 1999. Existing interties were not required to be metered when that rule was adopted. A relatively small number of water systems will be required to install meters on existing interties to comply with this rule. This cost could be significant for the affected water systems. DOH did not attempt to determine which water systems will fall into this category or estimate the cost to those water systems. With regard to existing interties, the reason for the uncertainty is very straightforward. There simply is no accurate inventory of existing water system interties that will need to be metered. The number of municipal water suppliers that will need to install meters on existing interties is expected to be small.

Section 7: Consideration of Alternative Versions of the Water Use Efficiency Rule

DOH staff worked closely with stakeholders to minimize the burden of this rule. The primary mechanism for stakeholder input was a subcommittee of the Washington Water Supply Advisory Committee convened to assist DOH with development of this rule. The Water Use Efficiency Subcommittee included a cross-section of utilities, local governments, environmental-interest groups, business groups, state agencies, and utility customers. Tribal representatives observed in the process. The subcommittee worked together for one year to create a report of recommendations and options, which was submitted to DOH in April 2005. The report captured the full range of views offered by the subcommittee. Early in the process, the subcommittee agreed that it was not seeking consensus, but rather intended to provide a full array of recommendations and options to DOH.

In developing this rule, DOH began with the recommendations and options presented in the subcommittee report, and considered advice and comments from other stakeholder groups and DOH staff. Each suggestion was weighed against the following criteria:

1. Is the advice consistent with the intent and the direction of the Municipal Water Law?
2. Will the suggestion improve efficient use of water resources and eliminate waste?
3. Does the advice integrate existing successful practices, such as those in the DOH *Conservation Planning Requirements* (DOH PUB 331-008)?
4. What is the resource impact on the regulated community?
5. Do water utilities have the ability and expertise to implement the regulatory requirements?
6. What is the resource impact on DOH?
7. Does DOH have the ability and expertise to administer recommendations from a regulatory standpoint?
8. Is the recommendation understandable? Will it lead to successful implementation?

Cost Saving Features of the Water Use Efficiency Rule

The rule contains a number of features that are incorporated to minimize the cost and complexity of rule implementation.

1. Planning requirements under the rule are integrated to the maximum extent possible with current planning requirements.
2. Data collection and reporting requirements are limited to only those elements that are deemed essential to meet the purposes of the law.
3. Goal setting processes are structured to allow the municipal water supplier to combine them with their existing WSP update process.
4. Municipal water suppliers are allowed to measure production at any point prior to their distribution system. This will allow them to use existing source meters.
5. Data reporting for performance reports and distribution system leakage are combined to simplify data reporting requirements.
6. Municipal water suppliers are given 10 years to install meters.

A number of features are also incorporated to minimize the burden to small municipal water suppliers.

1. Water systems that prepare SWSMPs have simplified requirements for source description and cost-effectiveness evaluations.
2. The number of water use efficiency measures that must be evaluated or implemented varies with water system size.
3. Water systems with fewer than 1,000 connections are not required to describe seasonal variations in consumption patterns.
4. The performance reporting requirement is delayed by one year for water systems with fewer than 1,000 connections.
5. Small water systems may request a leakage compliance level greater than 10 percent.

After receiving comments on the informal draft of the proposed rule, DOH identified several issues that required further consultation with stakeholders. Some of those issues related to proposals to reduce the cost of the rule. The proposals that DOH considered worthy of a more quantitative assessment are described below:

1. Allow water systems with fewer than 100 connections to estimate leakage using production meters.

   This approach would result in a significant reduction in cost for the smallest water systems since service meters would not be required. The analysis of service meter costs concluded that installation, maintenance, and replacement of service meters would cost customers on the average $6.75/month, assuming the cost is spread over a period of 15 years. DOH's survey of planning documents (see Appendix G and Appendix H) indicated that 80 percent of the water systems in this category already have service meters. This conflicts with subjective accounts from staff and technical service providers; they place the estimate closer to 50 percent.

   DOH concluded it was essential for a water system to have meters to determine leakage.

2. Reduce the requirements associated with evaluation of water use efficiency measures for water systems with fewer than 1,000 connections that have low consumption, are fully metered, and use a rate structure that encourages efficiency.

   The concept behind this proposal is that the water system described does not need to do any additional planning. While this appears to be a reasonable proposal, the performance threshold that DOH staff felt would be appropriate would need to be in the range of 75 to 100 gallons per-capita per day. There are very few water systems performing at this level so the overall cost reduction is likely to be small.

   On an individual water system basis, some savings would be realized. The portion of planning costs associated with evaluation of measures is in the range of $140 to $300 per year. This would save the customer on a 15-connection water system approximately $1.67 per month. Performance reports and goal setting would still be required. DOH's

interpretation of the Municipal Water Law is that water systems cannot be exempted from these elements of the law. DOH could reduce the frequency of reports, but the rule has been structured so that the performance reports are used as the primary method of tracking water system performance, in particular the distribution leakage standard. This was done to avoid the cost and complexity of another reporting mechanism.

DOH concluded that little savings could be achieved while still meeting the intent of the law.

3. Reduce the time allowed to install service meters.

   DOH's original proposal required service meter installation on existing service within twelve years. We received many comments indicating that twelve years to install service meters was too long, particularly for large water systems. Shorter timeframes of six or ten years were suggested. From the perspective of the work that needs to be done to install meters, it was concluded that any water system could have meters installed within ten years and probably could do so within six years. The question becomes one purely of cost.

   DOH originally assessed the cost by simply dividing the cost of meter installation by 144 months. At the assumed average cost of $570, this amounts to $3.99 per month per connection. Using this simple analysis, the cost would be $8.00 per month for a six year schedule, $5.94 for an eight-year schedule and $4.75 for ten years. This reflects the magnitude of the impact for a water system that does not obtain financing to install meters, but installs them outright. It should be noted that this does not take inflation into account.

   Many larger water systems will be able to use set-aside funds or financing to install meters. For these water systems there really is no effect on the cost of the rule by the reduced timeline.

   DOH concluded that many unmetered water systems will need considerable time to educate their customers, and complete the work of installing meters. Ten years from the date of rule adoption was considered sufficient to install service meters. The rule requires service meter installation on existing service within ten years.

Impacts on Public and Private Entities

The rule does not impose more stringent performance requirements on private entities than on public entities. All municipal water suppliers of identical size will have identical requirements.

The rule applies to all Group A water systems that meet the definition of municipal water supplier, regardless of their ownership. All Group A water systems currently operate under the same regulatory structure. This structure has developed over many years with consideration of the different types of entities that own and operate water systems. Integration of water use efficiency requirements with the existing rules helps ensure equitable treatment of all water systems.

In addition, DOH carefully considered two issues that were raised by the subcommittee that relate to the differences between public and private entities: consistency with the Utilities and Transportation Commission (UTC) requirements, and public process requirements related to establishing goals.

A number of issues were raised about possible conflicts between this rule and existing UTC rules. There was particular concern about water rates, because under this rule municipal water suppliers must evaluate the feasibility of adopting rates that encourage water use efficiency. Municipal water suppliers that are regulated by the UTC must establish rate levels and rate structures in accordance with UTC requirements. Some of these requirements create disincentives for establishing rate structures that encourage water use efficiency. DOH worked with UTC and the member of the subcommittee that was from a UTC-regulated company. With their help, DOH was able to craft rule language that did not create additional concerns for UTC-regulated municipal water suppliers. In regard to the concern over rates, all agreed that since the rule does not require adoption of any particular rates structure it does not conflict with UTC requirements.

Municipal water suppliers must establish their water use efficiency goals in a public forum under the Municipal Water Law. This rule incorporates that provision of the law. Most municipal water suppliers already have some form of public process, or meetings that can be used to meet the intent of this provision. Some private municipal water suppliers do not. This rule allows the use of existing processes, but establishes minimum criteria for all municipal water suppliers. In this way cost and complexity is minimized while ensuring fair treatment of all municipal water suppliers and their customers.

Section 8: Consistency and Coordination with Federal, State, and Local Requirements

The Administrative Procedure Act requires DOH to ensure that the rule does not require those to whom it applies to take an action that violates the requirements of federal or state law, does not differ from any applicable federal rule or statute, and is coordinated to the maximum extent possible with other applicable laws.

Federal Laws and Rules

At the federal level, DOH conducted a search of laws and rules that relate to water use efficiency and water conservation by water systems. None of the federal laws or rules reviewed appeared to conflict with the rule. The only relevant citation was found in Section 134 of the Safe Drinking Water Act. This provision was part of the 1996 amendments to the Safe Drinking Water Act. It directed the Environmental Protection Agency to develop guidelines for water conservation plans. It also authorized states to require a conservation plan as part of any application for a Drinking Water State Revolving Fund loan. DOH adopted a rule that requires conservation plans as part of State Revolving Fund loan applications. Those plans would now need to meet the requirements of this rule. This rule enhances the federal requirements.

State Laws and Rules

DOH conducted a search of existing RCWs and the WACs to ensure consistency and coordination with applicable state laws. DOH concluded from this search that the rule is consistency and coordinates with applicable state laws. A list of RCWs and WACs reviewed is provided at the end of this section. None of the provisions of this rule appear to conflict with any state law or rule. In general DOH found that there are numerous citations in state law related to water use efficiency and that this rule will compliment and enhance the findings and authorities given to local governments by the Washington State Legislature.

The rule does differ from the DOH's State Revolving Fund rule in regard to exemptions from service metering. The existing State Revolving Fund rule requires service meter installation, but provides an exemption for certain types of water systems. This rule takes a different approach because the Municipal Water Law requires that requirements apply to all municipal water suppliers. This rule instead focuses on the type of service connection and provides an exemption for only certain types of services. These provisions do not create a conflict, but they are inconsistent. DOH will revise the State Revolving Fund rule to be consistent with this rule after it is adopted.

In addition, the Water Use Efficiency Subcommittee that helped DOH develop this rule included representatives from Department of Ecology and UTC. DOH also consulted with Department of Ecology and UTC throughout the rule development process to ensure consistency and coordination of this rule with the rules under their jurisdiction. DOH will continue to work with UTC and Department of Ecology throughout rule adoption and implementation.

Local Requirements

To ensure consistency and coordination with local requirements, DOH primarily relied on outreach and consultation with representatives from local governments and watershed planning units. The subcommittee also included representatives from local governments. None of the provisions of this rule were identified as having potential conflicts with local requirements.

A key provision of state law ensures that DOH will continue in an ongoing process to coordinate this rule with local requirements. The Municipal Water Law amended chapter 43.20 RCW to require that DOH ensure that WSPs are consistent with comprehensive plans, land use plans, and development rules adopted by cities, towns, or counties.

State Laws and Rules Related to Water Use Efficiency

Citation	Title	Description of Related Provisions
RCW 19.27.170	Water Conservation Performance Standards – Testing and Identifying Fixtures that Meet Standards – Marketing and Labeling Fixtures	Establishes state low flow plumbing fixture requirements.
RCW 35.67.020	Sewerage Systems – Authority to Construct Systems and Fix Rates and Charges	Authorizes cities / towns to consider the achievement of water conservation goals and the discouragement of wasteful water use practices when setting sewer rates.
RCW 35.92.010	Municipal Utilities – Authority to Acquire and Operate Waterworks – Classification of Services for Rates	Authorizes cities / towns to consider the achievement of water conservation goals and the discouragement of wasteful water use practices when setting water rates.
RCW 35.92.017	Authority to Assist Customers in the Acquisition of Water Conservation Equipment – Limitations	Authorizes cities to provide technical assistance to promote water conservation.
RCW 36.94.460	Water Conservation Programs – Counties Authorized to Provide Assistance to Water Customers	Authorizes counties to provide technical assistance to promote water conservation.
RCW 43.20.230	Water Resources Planning – Procedures, Criteria, Technical Assistance	Directs DOH, consistent with the water resources planning process of Department of Ecology, to develop procedures and guidelines related to water use efficiency to be included in the development and approval of cost-effective water system plans.
RCW 43.20.235	Water Conservation – Water Delivery Rate Structures	Requires water purveyors who develop water systems plans to evaluate the feasibility of adopting and implementing water delivery rate structures that encourage water conservation.
RCW 43.27A.090	Powers and Duties of Department	Directs Department of Ecology to adopt policies to ensure water is “used, conserved and preserved” for the best interests of the state.
RCW 43.70.310	Cooperation with Department of Ecology	Directs DOH, where feasible, to integrate our efforts and endorse policies in common with Department of Ecology.
RCW 43.83B.300	Legislative Findings – General Obligation Bonds Authorized – Issuance, Terms – Appropriation Required	Legislative finding that states it is in the interest of the state to emphasize the efficient use of water in the management of the state’s water resources.
RCW 43.155.100	Water Conservation Account	Establishes a water conservation account to fund certain conservation related projects.

Citation	Title	Description of Related Provisions
RCW 54.16.032	Authority to Assist Customers in the Acquisition of Water Conservation Equipment – Limitations	Authorizes public utility districts to provide technical assistance to promote water conservation.
RCW 57.08.160	Authority to Assist Customers in the Acquisition of Water Conservation Equipment - Limitations	Authorizes water and sewer districts to provide technical assistance to promote water conservation.
RCW 57.08.170	Water Conservation Plan – Emergency Water Use Restrictions – Fine	Authorizes water and sewer districts to implement and enforce emergency water use restrictions.
RCW 70.116	Public Water System Coordination Act	Establishes procedures for development of coordinated water system plans.
RCW 70.119A	Public Water Systems – Compliance and Penalties	Establishes the authority for the Department of Health's compliance program.
RCW 90.03.005	State Water Policy – Cooperation with other Agencies – Reduction of Wasteful Practices	Instructs Department of Ecology to reduce wasteful practices in the exercise of water rights "to the maximum extent practicable."
RCW 90.03.386	Coordination of Approval Procedures for Compliance and Consistency with Approved Water System Plan	Directs the Department of Ecology and Department of Health to coordinate water right administration process with procedures water system plan and small water system management program approval procedures. Establishes specific requirements for the water use efficiency programs developed by municipal water suppliers.
RCW 90.03.400	Crimes Against the Water Code	Establishes that the willful or negligent waste of water to the detriment of another shall be a misdemeanor.
RCW 90.03.570	Change or Transfer or an Unperfected Surface Water Right for Municipal Water Supply Purposes	Allows change or transfer of the unperfected portion of a surface water right held by a municipal water supplier under certain conditions. One of those conditions is that the municipal water supplier is in compliance with the conservation element of their water system plan or small water system management program.
RCW 90.03.590	Municipal Water Suppliers – Watershed Agreement – Pilot Project	Establishes a watershed management pilot program. To participate in the program a municipal water supplier must meet water use efficiency requirements established by the Department of Health.
RCW 90.42.005	Policy – Findings	Includes a statement recognizing that water use efficiency is one method to meet current unmet needs and assist in meeting future needs.
RCW 90.42.030	Contracts to Finance Water Conservation Projects – Public Benefits – Trust Water Rights	Authorizes the state to enter into contracts to fund water conservation projects as part of the trust water right program.

Citation	Title	Description of Related Provisions
RCW 90.44.110	Waste of Water Prohibited	No public ground waters that have been withdrawn shall be wasted without economical beneficial use. The Department of Ecology shall require both flowing and non-flowing wells to be constructed and maintained as to prevent the waste of public ground water through leaky pipes.
RCW 90.48.495	Water Conservation Measures to be Considered in Sewer Plans	Department of Ecology is to require sewer plans to include a discussion of water conservation measures considered or underway and their impact on public sewer service.
RCW 90.54.020	General Declaration of Fundamentals for Utilization and Management of Water of the State	Directs Department of Ecology to encourage federal, state, and local governments to carry out practices of conservation. Also indicates that improved water use efficiency and conservation shall be emphasized in the management of the state's water resources and in some cases will be a potential new source of water to meet future needs.
RCW 90.54.180	Water Use Efficiency and Conservation Programs and Practices	• Provides that increased water use efficiency should receive consideration as a potential source of water in state and local water resource planning processes and stipulates that water use efficiency programs should mix incentives and rule. • In determining cost-effectiveness of alternative water sources, consideration should be given to the benefits of conservation, wastewater recycling and impoundments. • Entities receiving state financial assistance for construction of water source expansion or acquisition of new sources shall develop, and implement if cost-effective, a water use efficiency and conservation element of a water system plan. • State programs to improve water use efficiency should focus on areas where water is over-appropriated. • State agencies should educate the public concerning the wise and efficient use of water.
RCW 90.82	Regional Watershed Planning	Local planning units developing watershed plans are required to develop an estimate of water actually being used (water use), an estimate of water needed in the future (water demand forecast), and strategy for increasing water supplies through conservation, reuse, etc. (water conservation).
WAC 51-56-0400 Chapter 4	Plumbing Fixtures and Fixture Fittings	Establishes rules for low-flow fixtures in new buildings.

Citation	Title	Description of Related Provisions
WAC 173-170-040	Comprehensive Water Conservation Plan – Contents – Funding	Establishes requirements for comprehensive water conservation plan content for agricultural water supply facilities applying for grants or loans under Referendum 39 (RCW 43.99E).
WAC 480-080	Utilities and Transportation Commission – Utilities General-Tariffs, Price Lists, and contracts.	Establishes general requirements related to tariffs charged by utilities.
WAC 480-110	Utilities and Transportation Commission – Water Companies	Establishes general requirements for water companies that fall under the jurisdiction of the utilities and transportation commission.
WAC 246-290	Group A Public Water Systems – Water System Plans	Requires water systems to address several elements including a "conservation program" in their water system plan. Water systems are also required to specifically address water demand forecasting, water use data collection, and enhanced water conservation planning where water rights will be needed within 20 years.
WAC 246-293	Public Water System Coordination Act	Establishes rules for development and approval of coordinated WSPs.
WAC 246-296	Drinking Water State Revolving Fund Loan Program	Establishes rules associated with the Drinking Water State Revolving Fund Loan Program.

Small Business Economic Impact Statement Chapter 246-290 WAC Water Use Efficiency

Is a Small Business Economic Impact Statement Required for this Rule?

The Regulatory Fairness Act, RCW 19.85, requires agencies to determine whether rules will have a disproportionate impact on small businesses and provide mitigation when appropriate. This Small Business Economic Impact Statement (SBEIS) has been prepared because this rule imposes more than minor costs on small businesses. The Department of Health (DOH) made this determination by identifying the affected industries and using Minor Impact Tables developed by DOH. The affected industries are those with Standard Industrial Classification Code 4941 for Water Supply Industries. According to DOH's Minor Impact Tables the minor impact threshold for this classification is $66.10. This figure is based on a one-time cost of one percent of average revenue. The cost of this rule exceeds $66.10.

Which Industries are Affected by this Rule?

The affected businesses are entities that own water systems that meet the definition of municipal water supplier in RCW 90.03.015. This includes community water systems serving more than 15 residential connections and some noncommunity water systems. DOH estimates that 2,124 community water systems and 771 noncommunity water systems will be affected by this rule. The total number of businesses affected will be smaller because many entities own several water systems. For the purpose of this analysis, cost estimates are based on the cost to each water system. For more details about the water systems affected by this rule, see Section 2 of DOH's *Final Significant Analysis and Small Business Economic Impact Statement for Rule Concerning Chapter 246-290 WAC Water Use Efficiency.*

What are the Costs of Complying with this Rule?

Since the cost of the rule exceeds the minor cost threshold, DOH must determine whether the rule will have a disproportionate impact on small businesses that must comply with the rule and provide mitigation when appropriate. DOH estimated the costs associated with this rule and described them in detail in Section 6 of DOH's *Final Significant Analysis and Small Business Economic Impact Statement for Rule Concerning Chapter 246-290 WAC Water Use Efficiency.*

Does this Rule Impose a Disproportionate Impact on Small Businesses?

The Regulatory Fairness Act requires agencies to:

> "…determine whether the proposed rule will have a disproportionate impact on small businesses, the impact statement must compare the cost of compliance for small business with the cost of compliance for the ten percent of businesses that are the largest businesses required to comply with the proposed rules…"

Defining the set of water systems that represent the largest ten percent is difficult. The rule is expected to affect approximately 3,000 water systems. The number of municipal water suppliers that operate these water systems is smaller because some own more than one water system. This analysis focuses on the water system as opposed to the municipal water supplier because implementation and compliance will be carried out on a system-by-system basis. The table below illustrates that the 300 water systems serving the largest number of total connections reach well into the "small" category of water systems. If the number of people served is used, which would be roughly proportional to volume of water sold, the set of large water systems are only a few very large water systems.

DOH concluded that the best way to illustrate how the rule affects water systems of different sizes is to look at each of the four size categories used in Section 2 of DOH's *Final Significant Analysis and Small Business Economic Impact Statement for Rule Concerning Chapter 246-290 WAC Water Use Efficiency.*

Community Water Systems Affected by the Water Use Efficiency Rule

Size Category	Residential Connections	Number of Water Systems	Percent of Water Systems	Number of Residents Served	Percent of Residents Served
Very Small	< 100	1,369	64%	131,050	2%
Small	100 – 999	549	26%	421,702	8%
Medium	1,000 – 9,999	169	8%	1,539,152	29%
Large	> 9,999	37	2%	3,212,226	61%
Total		**2,124**	**100%**	**5,304,130**	**100%**

The new costs that are not due to provisions taken directly from statute fall into two general categories: procedures and actions. Procedures include activities such as developing plans, holding meetings, collecting information, and submitting that information to DOH. Actions include water use efficiency program implementation, finding and repairing leaks, installing, reading, and maintaining meters. Except for the costs associated with service meters, DOH was either unable to determine the costs or already required by existing statute or rule.

Procedural Costs

Section 5, of DOH's *Final Significant Analysis and Small Business Economic Impact Statement for Rule Concerning Chapter 246-290 WAC Water Use Efficiency* provides estimates for the procedural activities associated with the rule. Those costs are summarized below. The costs used for this analysis are associated with water system plan development. Many small water systems are only required to develop a small water system management program. The water system plan costs were used because they are slightly higher. The cost of developing a Water Loss Control Action Plan is also included. This will not be required for all water systems, but it is included here to reflect the higher cost that some water systems will accrue.

Average Annual Cost of Procedural Activities –Water Use Efficiency Rule

	Very Small < 100 Connections	Small 100 – 999 Connections	Medium 1,000 – 9,999 Connections	Large > 9,999 Connections
Procedural Cost for Water Systems Developing a Water System Plan	$1,364	$3,555	$7,484	$8,121
Water Loss Control Action Plan Development Costs	$348	$649	$877	$1247
Total	**$1,712**	**$4,204**	**$8,361**	**$9,368**

The Regulatory Fairness Act, RCW 19.85, directs agencies to determine if costs are disproportionate "…using one or more of the following as a basis for comparing costs:

(a) Cost per employee;
(b) Cost per hour of labor; or
(c) Cost per one hundred dollars of sales."

DOH staff conducted an extensive search of available data and was unable to find data related to number of employees, hours of labor, or sales for all affected business. U.S. Department of Labor and Industry statistics show that the smallest for-profit entities in the water supply industry have an average of one employee and the largest an average of 20 employees. DOH staff feel that this is representative of most entities in the water supply industry. This would not hold true for large cities such as Seattle and Spokane. Those are likely to have hundreds of employees.

To illustrate the cost of procedural activities associated with the rule, the table below presents these cost using two approaches. The first shows the cost per connection using the average number of connections served by water systems in each size category. The second assumes an average number of employees for water systems in each size category. Using either approach, this rule appears to have a disproportionate impact on small businesses.

Cost Comparison for the Water Use Efficiency Rule

	Very Small < 100 Connections	Small 100 – 999 Connections	Medium 1,000 – 9,999 Connections	Large > 9,999 Connections
Procedural Costs	$1,712	$4,204	$8,361	$9,368
Average Number of Connections	40	324	3,218	27,014
Cost per Connection	**$43**	**$13**	**$3**	**< $1**
Average Number of Employees	1	2	20	150
Cost per Employees	**$1,712**	**$2,102**	**$418**	**$94**

Service Meter Costs

The cost of meter installation and maintenance was assessed only for water systems that are not already fully metered. Based on surveys conducted by DOH and experienced field staff, it is assumed that virtually all large water systems are fully metered and that approximately 50 percent of the smallest water systems are not. The impact of service meters costs could be considered disproportionate, because the cost for installing service meters appears to be higher for small water systems and the revenue base of smaller water systems is considerably smaller than large water systems.

If the Rule Imposes a Disproportionate Impact on Small Businesses, What Efforts were Taken to Reduce that Impact?

The rule contains a number of features that were incorporated to minimize the cost and complexity of rule implementation.

1. Planning requirements are integrated to the maximum extent possible with current planning requirements.
2. Data collection and reporting requirements are limited to only those elements that were deemed essential to meet the purposes of the law.
3. Goal-setting processes are structured to allow the municipal water supplier to combine them with their water system plan update process.
4. Municipal water suppliers are allowed to use existing processes to meet the public forum requirements.
5. Municipal water suppliers are allowed to measure production at any point prior to their distribution system. This will allow them to use existing source meters.
6. Performance reports include leakage data to avoid a separate reporting mechanism for the distribution system leakage standard.
7. Municipal water suppliers were given a generous amount of time (10 years) to install meters.
8. Municipal water suppliers may raise technical and economic issues related to the distribution system leakage standard in their Water Loss Control Action Plans.

A number of features were also incorporated specifically to minimize the burden to small municipal water suppliers.

1. Water systems that prepare small water system management programs have simplified requirements for source descriptions.
2. Water systems with fewer than 1,000 connections have simplified requirements for cost-effectiveness evaluations.
3. The number of water use efficiency measures that must be evaluated or implemented varies with water system size.
4. Water systems with fewer than 1,000 connections are not required to describe seasonal variations in consumption patterns.
5. The performance reporting requirement is delayed by one year for water systems with fewer than 1,000 connections.
6. Water systems with fewer than 1,000 connections are not required to assess the water savings from all measures they determine to be cost-effective but do not implement.

7. Water systems with fewer than 1,000 connections are not required to evaluate opportunities for reclaimed water.

How are Small Businesses Involved in the Development of this Rule?

DOH staff worked closely with stakeholders to minimize the burden of this rule. The primary mechanism for input was a subcommittee of the Washington Water Supply Advisory Committee to assist DOH with development of this regulation. The Water Use Efficiency Subcommittee consisted of 34 members, which included a cross-section of utilities, local governments, environmental-interest groups, business groups, state agencies, and utility customers. Tribal representatives also observed the process. Small water systems were given three seats on the Water Use Efficiency Subcommittee. One seat was given to a representative from business interests. Each meeting afforded time for public comments. In addition to committee members, small water system owners typically attended the meetings as members of the general public and provided comments. Repeatedly, the small water system representatives voiced the opinion that, while DOH should minimize costs to small water systems, those efforts should not dilute the basic requirements in the authorizing statute.

In July 2004, DOH distributed an informal water use efficiency regulation. This was sent to all Group A public water systems and stakeholder groups. All comments were reviewed and considered in revision of the rule. DOH developed a written response to all comments received during this informal review.

DOH made additional efforts to obtain input from the Washington PUD Association. PUD's typically manage many small water systems and provided insight into the challenges facing small water systems.

DOH staff met with a committee member representing small water systems that also represented a business that owned and operated several small water systems regulated by the Utilities and Transportation Commission. Those meetings focused on the unique challenges faced by the Utilities and Transportation Commission-regulated entities.

DOH staff made several presentations during development of the regulation targeted toward small water systems. In particular, there were special sessions for small water systems during the 2004 Drinking Water Seminars and presentations made at the 2003 and 2004 Evergreen Rural Water of Washington and Water and Wastewater Operators of Washington conferences.

Conclusion

This rule will have significant costs for all municipal water suppliers, including those that are small businesses. Those costs are expected to have a disproportionate impact on municipal water suppliers that own small water systems. DOH staff consulted with business interests and small water system owners throughout the rule development process and incorporated several provisions to minimize the cost of the rule for small businesses while still ensuring it meets the intent of the Washington State Legislature.

Appendices

Appendix A: The Municipal Water Supply – Efficiency Requirements Act of 2003, Chapter 5 Laws of the 2003 First Special Session

CERTIFICATION OF ENROLLMENT

SECOND ENGROSSED SECOND SUBSTITUTE HOUSE BILL 1338

Chapter 5, Laws of 2003

58th Legislature
2003 1st Special Session

MUNICIPAL WATER SUPPLY--EFFICIENCY REQUIREMENTS

EFFECTIVE DATE: 9/9/03

Passed by the House June 5, 2003 Yeas 83 Nays 14 FRANK CHOPP _____ **Speaker of the House of Representatives** Passed by the Senate June 10, 2003 Yeas 33 Nays 11 BRAD OWEN _____ **President of the Senate**		CERTIFICATE I, Cynthia Zehnder, Chief Clerk of the House of Representatives of the State of Washington, do hereby certify that the attached is **SECOND ENGROSSED SECOND SUBSTITUTE HOUSE BILL 1338** as passed by the House of Representatives and the Senate on the dates hereon set forth. CYNTHIA ZEHNDER _____ **Chief Clerk**
Approved June 20, 2003. GARY LOCKE _____ **Governor of the State of Washington**		FILED June 20, 2003 - 2:12 p.m. **Secretary of State** **State of Washington**

SECOND ENGROSSED SECOND SUBSTITUTE HOUSE BILL 1338

Passed Legislature - 2003 1st Special Session

State of Washington 58th Legislature 2003 Regular Session

By House Committee on Appropriations (originally sponsored by Representatives Linville, Kirby, Lantz, Rockefeller, Shabro, Jarrett, Grant, Quall, Hunt, Delvin, Wallace, Woods, Benson, Morris and Conway; by request of Governor Locke)

READ FIRST TIME 03/10/03.

AN ACT Relating to certainty and flexibility of municipal water rights and efficient use of water; amending RCW 90.03.015, 90.03.260, 90.03.386, 90.03.330, 90.48.495, 90.48.112, 90.46.120, and 70.119A.110; adding new sections to chapter 90.03 RCW; adding a new section to chapter 70.119A RCW; adding a new section to chapter 43.20 RCW; adding a new section to chapter 90.82 RCW; and adding a new section to chapter 90.54 RCW.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF WASHINGTON:

Sec. 1 RCW 90.03.015 and 1987 c 109 s 65 are each amended to read as follows:

((~~As used in this chapter:~~)) The definitions in this section apply throughout this chapter unless the context clearly requires otherwise.

(1) "Department" means the department of ecology((~~;~~)).

(2) "Director" means the director of ecology((~~; and~~)).

(3) "Municipal water supplier" means an entity that supplies water for municipal water supply purposes.

(4) "Municipal water supply purposes" means a beneficial use of water: (a) For residential purposes through fifteen or more residential service connections or for providing residential use of

water for a nonresidential population that is, on average, at least twenty-five people for at least sixty days a year; (b) for governmental or governmental proprietary purposes by a city, town, public utility district, county, sewer district, or water district; or (c) indirectly for the purposes in (a) or (b) of this subsection through the delivery of treated or raw water to a public water system for such use. If water is beneficially used under a water right for the purposes listed in (a), (b), or (c) of this subsection, any other beneficial use of water under the right generally associated with the use of water within a municipality is also for "municipal water supply purposes," including, but not limited to, beneficial use for commercial, industrial, irrigation of parks and open spaces, institutional, landscaping, fire flow, water system maintenance and repair, or related purposes. If a governmental entity holds a water right that is for the purposes listed in (a), (b), or (c) of this subsection, its use of water or its delivery of water for any other beneficial use generally associated with the use of water within a municipality is also for "municipal water supply purposes," including, but not limited to, beneficial use for commercial, industrial, irrigation of parks and open spaces, institutional, landscaping, fire flow, water system maintenance and repair, or related purposes.

(5) "Person" means any firm, association, water users' association, corporation, irrigation district, or municipal corporation, as well as an individual.

NEW SECTION. **Sec. 2** A new section is added to chapter 90.03 RCW to read as follows:

Beneficial uses of water under a municipal water supply purposes water right may include water withdrawn or diverted under such a right and used for:

(1) Uses that benefit fish and wildlife, water quality, or other instream resources or related habitat values; or

(2) Uses that are needed to implement environmental obligations called for by a watershed plan approved under chapter 90.82 RCW, or a comprehensive watershed plan adopted under RCW 90.54.040(1) after the effective date of this section, a federally approved habitat conservation plan prepared in response to the listing of a species as being endangered or threatened under the federal endangered species

act, 16 U.S.C. Sec. 1531 et seq., a hydropower license of the federal energy regulatory commission, or a comprehensive irrigation district management plan.

NEW SECTION. **Sec. 3** A new section is added to chapter 90.03 RCW to read as follows:

When requested by a municipal water supplier or when processing a change or amendment to the right, the department shall amend the water right documents and related records to ensure that water rights that are for municipal water supply purposes, as defined in RCW 90.03.015, are correctly identified as being for municipal water supply purposes. This section authorizes a water right or portion of a water right held or acquired by a municipal water supplier that is for municipal water supply purposes as defined in RCW 90.03.015 to be identified as being a water right for municipal water supply purposes. However, it does not authorize any other water right or other portion of a right held or acquired by a municipal water supplier to be so identified without the approval of a change or transfer of the right or portion of the right for such a purpose.

Sec. 4 RCW 90.03.260 and 1987 c 109 s 84 are each amended to read as follows:

(1) Each application for permit to appropriate water shall set forth the name and post office address of the applicant, the source of water supply, the nature and amount of the proposed use, the time during which water will be required each year, the location and description of the proposed ditch, canal, or other work, the time within which the completion of the construction and the time for the complete application of the water to the proposed use.

(2) If for agricultural purposes, ((it)) the application shall give the legal subdivision of the land and the acreage to be irrigated, as near as may be, and the amount of water expressed in acre feet to be supplied per season. If for power purposes, it shall give the nature of the works by means of which the power is to be developed, the head and amount of water to be utilized, and the uses to which the power is to be applied.

(3) If for construction of a reservoir, ((it)) the application

shall give the height of the dam, the capacity of the reservoir, and the uses to be made of the impounded waters.

(4) If for community or multiple domestic water supply, the application shall give the projected number of service connections sought to be served. However, for a municipal water supplier that has an approved water system plan under chapter 43.20 RCW or an approval from the department of health to serve a specified number of service connections, the service connection figure in the application or any subsequent water right document is not an attribute limiting exercise of the water right as long as the number of service connections to be served under the right is consistent with the approved water system plan or specified number.

(5) If for municipal water supply, ((~~it~~)) the application shall give the present population to be served, and, as near as may be estimated, the future requirement of the municipality. However, for a municipal water supplier that has an approved water system plan under chapter 43.20 RCW or an approval from the department of health to serve a specified number of service connections, the population figures in the application or any subsequent water right document are not an attribute limiting exercise of the water right as long as the population to be provided water under the right is consistent with the approved water system plan or specified number.

(6) If for mining purposes, ((~~it~~)) the application shall give the nature of the mines to be served and the method of supplying and utilizing the water; also their location by legal subdivisions.

(7) All applications shall be accompanied by such maps and drawings, in duplicate, and such other data, as may be required by the department, and such accompanying data shall be considered as a part of the application.

Sec. 5 RCW 90.03.386 and 1991 c 350 s 2 are each amended to read as follows:

(1) Within service areas established pursuant to chapter((~~s~~)) 43.20 ((~~and~~)) or 70.116 RCW, the department of ecology and the department of health shall coordinate approval procedures to ensure compliance and consistency with the approved water system plan or small water system management program.

(2) The effect of the department of health's approval of a planning or engineering document that describes a municipal water supplier's service area under chapter 43.20 RCW, or the local legislative authority's approval of service area boundaries in accordance with procedures adopted pursuant to chapter 70.116 RCW, is that the place of use of a surface water right or ground water right used by the supplier includes any portion of the approved service area that was not previously within the place of use for the water right if the supplier is in compliance with the terms of the water system plan or small water system management program, including those regarding water conservation, and the alteration of the place of use is not inconsistent, regarding an area added to the place of use, with: Any comprehensive plans or development regulations adopted under chapter 36.70A RCW; any other applicable comprehensive plan, land use plan, or development regulation adopted by a city, town, or county; or any watershed plan approved under chapter 90.82 RCW, or a comprehensive watershed plan adopted under RCW 90.54.040(1) after the effective date of this section, if such a watershed plan has been approved for the area.

(3) A municipal water supplier must implement cost-effective water conservation in accordance with the requirements of section 7 of this act as part of its approved water system plan or small water system management program. In preparing its regular water system plan update, a municipal water supplier with one thousand or more service connections must describe: (a) The projects, technologies, and other cost-effective measures that comprise its water conservation program; (b) improvements in the efficiency of water system use resulting from implementation of its conservation program over the previous six years; and (c) projected effects of delaying the use of existing inchoate rights over the next six years through the addition of further cost-effective water conservation measures before it may divert or withdraw further amounts of its inchoate right for beneficial use. When establishing or extending a surface or ground water right construction schedule under RCW 90.03.320, the department must take into consideration the public water system's use of conserved water.

Sec. 6 RCW 90.03.330 and 1987 c 109 s 89 are each amended to read as follows:

(1) Upon a showing satisfactory to the department that any appropriation has been perfected in accordance with the provisions of this chapter, it shall be the duty of the department to issue to the applicant a certificate stating such facts in a form to be prescribed by ((~~him~~)) the director, and such certificate shall thereupon be recorded with the department. Any original water right certificate issued, as provided by this chapter, shall be recorded with the department and thereafter, at the expense of the party receiving the same, be transmitted by the department ((~~transmitted~~)) to the county auditor of the county or counties where the distributing system or any part thereof is located, and be recorded in the office of such county auditor, and thereafter be transmitted to the owner thereof.

(2) Except as provided for the issuance of certificates under RCW 90.03.240 and for the issuance of certificates following the approval of a change, transfer, or amendment under RCW 90.03.380 or 90.44.100, the department shall not revoke or diminish a certificate for a surface or ground water right for municipal water supply purposes as defined in RCW 90.03.015 unless the certificate was issued with ministerial errors or was obtained through misrepresentation. The department may adjust such a certificate under this subsection if ministerial errors are discovered, but only to the extent necessary to correct the ministerial errors. The department may diminish the right represented by such a certificate if the certificate was obtained through a misrepresentation on the part of the applicant or permit holder, but only to the extent of the misrepresentation. The authority provided by this subsection does not include revoking, diminishing, or adjusting a certificate based on any change in policy regarding the issuance of such certificates that has occurred since the certificate was issued. This subsection may not be construed as providing any authority to the department to revoke, diminish, or adjust any other water right.

(3) This subsection applies to the water right represented by a water right certificate issued prior to the effective date of this section for municipal water supply purposes as defined in RCW 90.03.015 where the certificate was issued based on an administrative policy for issuing such certificates once works for diverting or withdrawing and distributing water for municipal supply purposes were constructed rather than after the water had been placed to actual beneficial use. Such a water right is a right in good standing.

(4) After the effective date of this section, the department must issue a new certificate under subsection (1) of this section for a water right represented by a water right permit only for the perfected portion of a water right as demonstrated through actual beneficial use of water.

NEW SECTION. **Sec. 7** A new section is added to chapter 70.119A RCW to read as follows:

(1) It is the intent of the legislature that the department establish water use efficiency requirements designed to ensure efficient use of water while maintaining water system financial viability, improving affordability of supplies, and enhancing system reliability.

(2) The requirements of this section shall apply to all municipal water suppliers and shall be tailored to be appropriate to system size, forecasted system demand, and system supply characteristics.

(3) For the purposes of this section:

(a) Water use efficiency includes conservation planning requirements, water distribution system leakage standards, and water conservation performance reporting requirements; and

(b) "Municipal water supplier" and "municipal water supply purposes" have the meanings provided by RCW 90.03.015.

(4) To accomplish the purposes of this section, the department shall adopt rules necessary to implement this section by December 31, 2005. The department shall:

(a) Develop conservation planning requirements that ensure municipal water suppliers are: (i) Implementing programs to integrate conservation with water system operation and management; and (ii) identifying how to appropriately fund and implement conservation activities. Requirements shall apply to the conservation element of water system plans and small water system management programs developed pursuant to chapter 43.20 RCW. In establishing the conservation planning requirements the department shall review the current department conservation planning guidelines and include those elements that are appropriate for rule. Conservation planning requirements shall include but not be limited to:

(A) Selection of cost-effective measures to achieve a system's

water conservation objectives. Requirements shall allow the municipal water supplier to select and schedule implementation of the best methods for achieving its conservation objectives;

(B) Evaluation of the feasibility of adopting and implementing water delivery rate structures that encourage water conservation;

(C) Evaluation of each system's water distribution system leakage and, if necessary, identification of steps necessary for achieving water distribution system leakage standards developed under (b) of this subsection;

(D) Collection and reporting of water consumption and source production and/or water purchase data. Data collection and reporting requirements shall be sufficient to identify water use patterns among utility customer classes, where applicable, and evaluate the effectiveness of each system's conservation program. Requirements, including reporting frequency, shall be appropriate to system size and complexity. Reports shall be available to the public; and

(E) Establishment of minimum requirements for water demand forecast methodologies such that demand forecasts prepared by municipal water suppliers are sufficient for use in determining reasonably anticipated future water needs;

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

(c) Establish minimum requirements for water conservation performance reporting to assure that municipal water suppliers are regularly evaluating and reporting their water conservation performance. The objective of setting conservation goals is to enhance the efficient use of water by the water system customers. Performance reporting shall include:

(i) Requirements that municipal water suppliers adopt and achieve water conservation goals. The elected governing board or governing body of the water system shall set water conservation goals for the system. In setting water conservation goals the water supplier may consider historic conservation performance and conservation investment, customer base demographics, regional climate variations, forecasted demand and system supply characteristics, system financial viability, system reliability, and affordability of water rates. Conservation goals shall be established by the municipal water supplier in an open public forum;

(ii) Requirements that the municipal water supplier adopt schedules for implementing conservation program elements and achieving conservation goals to ensure that progress is being made toward adopted conservation goals;

(iii) A reporting system for regular reviews of conservation performance against adopted goals. Performance reports shall be available to customers and the public. Requirements, including reporting frequency, shall be appropriate to system size and complexity;

(iv) Requirements that any system not meeting its water conservation goals shall develop a plan for modifying its conservation program to achieve its goals along with procedures for reporting performance to the department;

(v) If a municipal water supplier determines that further reductions in consumption are not reasonably achievable, it shall identify how current consumption levels will be maintained;

(d) Adopt rules that, to the maximum extent practical, utilize existing mechanisms and simplified procedures in order to minimize the cost and complexity of implementation and to avoid placing unreasonable financial burden on smaller municipal systems.

(5) The department shall establish an advisory committee to assist the department in developing rules for water use efficiency. The advisory committee shall include representatives from public water system customers, environmental interest groups, business interest groups, a representative cross-section of municipal water suppliers, a water utility conservation professional, tribal governments, the department of ecology, and any other members determined necessary by the department. The department may use the water supply advisory

committee created pursuant to RCW 70.119A.160 augmented with additional participants as necessary to comply with this subsection to assist the department in developing rules.

(6) The department shall provide technical assistance upon request to municipal water suppliers and local governments regarding water conservation, which may include development of best management practices for water conservation programs, conservation landscape ordinances, conservation rate structures for public water systems, and general public education programs on water conservation.

(7) To ensure compliance with this section, the department shall establish a compliance process that incorporates a graduated approach employing the full range of compliance mechanisms available to the department.

(8) Prior to completion of rule making required in subsection (4) of this section, municipal water suppliers shall continue to meet the existing conservation requirements of the department and shall continue to implement their current water conservation programs.

NEW SECTION. **Sec. 8** A new section is added to chapter 43.20 RCW to read as follows:

In approving the water system plan of a public water system, the department shall ensure that water service to be provided by the system under the plan for any new industrial, commercial, or residential use is consistent with the requirements of any comprehensive plans or development regulations adopted under chapter 36.70A RCW or any other applicable comprehensive plan, land use plan, or development regulation adopted by a city, town, or county for the service area. A municipal water supplier, as defined in RCW 90.03.015, has a duty to provide retail water service within its retail service area if: (1) Its service can be available in a timely and reasonable manner; (2) the municipal water supplier has sufficient water rights to provide the service; (3) the municipal water supplier has sufficient capacity to serve the water in a safe and reliable manner as determined by the department of health; and (4) it is consistent with the requirements of any comprehensive plans or development regulations adopted under chapter 36.70A RCW or any other applicable comprehensive plan, land use plan, or development regulation adopted by a city, town, or county for

the service area and, for water service by the water utility of a city or town, with the utility service extension ordinances of the city or town.

NEW SECTION. **Sec. 9** A new section is added to chapter 90.82 RCW to read as follows:

(1) The timelines and interim milestones in a detailed implementation plan required by section 3, chapter . . . (Engrossed Second Substitute House Bill No. 1336), Laws of 2003 must address the planned future use of existing water rights for municipal water supply purposes, as defined in RCW 90.03.015, that are inchoate, including how these rights will be used to meet the projected future needs identified in the watershed plan, and how the use of these rights will be addressed when implementing instream flow strategies identified in the watershed plan.

(2) The watershed planning unit or other authorized lead agency shall ensure that holders of water rights for municipal water supply purposes not currently in use are asked to participate in defining the timelines and interim milestones to be included in the detailed implementation plan.

(3) The department of health shall annually compile a list of water system plans and plan updates to be reviewed by the department during the coming year and shall consult with the departments of community, trade, and economic development, ecology, and fish and wildlife to: (a) Identify watersheds where further coordination is needed between water system planning and local watershed planning under this chapter; and (b) develop a work plan for conducting the necessary coordination.

NEW SECTION. **Sec. 10** A new section is added to chapter 90.54 RCW to read as follows:

The department shall prioritize the expenditure of funds and other resources for programs related to streamflow restoration in watersheds where the exercise of inchoate water rights may have a larger effect on streamflows and other water uses.

Sec. 11 RCW 90.48.495 and 1989 c 348 s 10 are each amended to read as follows:

The department of ecology shall require sewer plans to include a

discussion of water conservation measures considered or underway that would reduce flows to the sewerage system and an analysis of their anticipated impact on public sewer service and treatment capacity.

Sec. 12 RCW 90.48.112 and 1997 c 444 s 9 are each amended to read as follows:

The evaluation of any plans submitted under RCW 90.48.110 must include consideration of opportunities for the use of reclaimed water as defined in RCW 90.46.010. Wastewater plans submitted under RCW 90.48.110 must include a statement describing how applicable reclamation and reuse elements will be coordinated as required under RCW 90.46.120(2).

Sec. 13 RCW 90.46.120 and 1997 c 444 s 1 are each amended to read as follows:

(1) The owner of a wastewater treatment facility that is reclaiming water with a permit issued under this chapter has the exclusive right to any reclaimed water generated by the wastewater treatment facility. Use and distribution of the reclaimed water by the owner of the wastewater treatment facility is exempt from the permit requirements of RCW 90.03.250 and 90.44.060. Revenues derived from the reclaimed water facility shall be used only to offset the cost of operation of the wastewater utility fund or other applicable source of system-wide funding.

(2) If the proposed use or uses of reclaimed water are intended to augment or replace potable water supplies or create the potential for the development of additional potable water supplies, such use or uses shall be considered in the development of the regional water supply plan or plans addressing potable water supply service by multiple water purveyors. The owner of a wastewater treatment facility that proposes to reclaim water shall be included as a participant in the development of such regional water supply plan or plans.

(3) Where opportunities for the use of reclaimed water exist within the period of time addressed by a water supply plan or coordinated water system plan developed under chapter 43.20 or 70.116 RCW, these plans must be developed and coordinated to ensure that opportunities for reclaimed water are evaluated. The requirements of this subsection

(3) do not apply to water system plans developed under chapter 43.20 RCW for utilities serving less than one thousand service connections.

NEW SECTION. **Sec. 14** A new section is added to chapter 90.03 RCW to read as follows:

(1) An unperfected surface water right for municipal water supply purposes or a portion thereof held by a municipal water supplier may be changed or transferred in the same manner as provided by RCW 90.03.380 for any purpose if:

(a) The supplier is in compliance with the terms of an approved water system plan or small water system management program under chapter 43.20 or 70.116 RCW that applies to the supplier, including those regarding water conservation;

(b) Instream flows have been established by rule for the water resource inventory area, as established in chapter 173-500 WAC as it exists on the effective date of this section, that is the source of the water for the transfer or change;

(c) A watershed plan has been approved for the water resource inventory area referred to in (b) of this subsection under chapter 90.82 RCW and a detailed implementation plan has been completed that satisfies the requirements of section 3, chapter . . ., Laws of 2003 (section 3, Engrossed Second Substitute House Bill No. 1336) or a watershed plan has been adopted after the effective date of this section for that water resource inventory area under RCW 90.54.040(1) and a detailed implementation plan has been completed that satisfies the requirements of section 3, chapter . . ., Laws of 2003 (section 3, Engrossed Second Substitute House Bill No. 1336); and

(d) Stream flows that satisfy the instream flows referred to in (b) of this subsection are met or the milestones for satisfying those instream flows required under (c) of this subsection are being met.

(2) If the criteria listed in subsection (1)(a) through (d) of this section are not satisfied, an unperfected surface water right for municipal water supply purposes or a portion thereof held by a municipal water supplier may nonetheless be changed or transferred in the same manner as provided by RCW 90.03.380 if the change or transfer is:

(a) To provide water for an instream flow requirement that has been established by the department by rule;

(b) Subject to stream flow protection or restoration requirements contained in: A federally approved habitat conservation plan under the federal endangered species act, 16 U.S.C. Sec. 1531 et seq., a hydropower license of the federal energy regulatory commission, or a watershed agreement established under section 16 of this act;

(c) For a water right that is subject to instream flow requirements or agreements with the department and the change or transfer is also subject to those instream flow requirements or agreements; or

(d) For resolving or alleviating a public health or safety emergency caused by a failing public water supply system currently providing potable water to existing users, as such a system is described in section 15 of this act, and if the change, transfer, or amendment is for correcting the actual or anticipated cause or causes of the public water system failure. Inadequate water rights for a public water system to serve existing hookups or to accommodate future population growth or other future uses do not constitute a public health or safety emergency.

(3) If the recipient of water under a change or transfer authorized by subsection (1) of this section is a water supply system, the receiving system must also be in compliance with the terms of an approved water system plan or small water system management program under chapter 43.20 or 70.116 RCW that applies to the system, including those regarding water conservation.

(4) The department must provide notice to affected tribes of any transfer or change proposed under this section.

NEW SECTION. **Sec. 15** A new section is added to chapter 90.03 RCW to read as follows:

To be considered a failing public water system for the purposes of section 14 of this act, the department of health, in consultation with the department and the local health authority, must make a determination that the system meets one or more of the following conditions:

(1) A public water system has failed, or is in danger of failing within two years, to meet state board of health standards for the delivery of potable water to existing users in adequate quantity or quality to meet basic human drinking, cooking, and sanitation needs or to provide adequate fire protection flows;

(2) The current water source has failed or will fail so that the public water system is or will become incapable of exercising its existing water rights to meet existing needs for drinking, cooking, and sanitation purposes after all reasonable conservation efforts have been implemented; or

(3) A change in source is required to meet drinking water quality standards and avoid unreasonable treatment costs, or the state department of health determines that the existing source of supply is unacceptable for human use.

NEW SECTION. **Sec. 16** A new section is added to chapter 90.03 RCW to read as follows:

(1) On a pilot project basis, the department may enter into a watershed agreement with one or more municipal water suppliers in water resource inventory area number one to meet the objectives established in a water resource management program approved or being developed under chapter 90.82 RCW with the consent of the initiating governments of the water resource inventory area. The term of an agreement may not exceed ten years, but the agreement may be renewed or amended upon agreement of the parties.

(2) A watershed agreement must be consistent with:

(a) Growth management plans developed under chapter 36.70A RCW where these plans are adopted and in effect;

(b) Water supply plans and small water system management programs approved under chapter 43.20 or 70.116 RCW;

(c) Coordinated water supply plans approved under chapter 70.116 RCW; and

(d) Water use efficiency and conservation requirements and standards established by the state department of health or such requirements and standards as are provided in an approved watershed plan, whichever are the more stringent.

(3) A watershed agreement must:

(a) Require the public water system operated by the participating municipal water supplier to meet obligations under the watershed plan;

(b) Establish performance measures and timelines for measures to be completed;

(c) Provide for monitoring of stream flows and metering of water use as needed to ensure that the terms of the agreement are met; and

(d) Require annual reports from the water users regarding performance under the agreement.

(4) As needed to implement watershed agreement activities, the department may provide or receive funding, or both, under its existing authorities.

(5) The department must provide opportunity for public review of a proposed agreement before it is executed. The department must make proposed and executed watershed agreements and annual reports available on the department's internet web site.

(6) The department must consult with affected local governments and the state departments of health and fish and wildlife before executing an agreement.

(7) Before executing a watershed agreement, the department must conduct a government-to-government consultation with affected tribal governments. The municipal water suppliers operating the public water systems that are proposing to enter into the agreements must be invited to participate in the consultations. During these consultations, the department and the municipal water suppliers shall explore the potential interest of the tribal governments or governments in participating in the agreement.

(8) Any person aggrieved by the department's failure to satisfy the requirements in subsection (3) of this section as embodied in the department's decision to enter into a watershed agreement under this section may, within thirty days of the execution of such an agreement, appeal the department's decision to the pollution control hearings board under chapter 43.21B RCW.

(9) Any projects implemented by a municipal water system under the terms of an agreement reached under this section may be continued and maintained by the municipal water system after the agreement expires or is terminated as long as the conditions of the agreement under which they were implemented continue to be met.

(10) Before December 31, 2003, and December 31, 2004, the department must report to the appropriate committees of the legislature the results of the pilot project provided for in this section. Based on the experience of the pilot project, the department must offer any suggested changes in law that would improve, facilitate, and maximize the implementation of watershed plans adopted under this chapter.

NEW SECTION. **Sec. 17** A new section is added to chapter 90.03 RCW to read as follows:

The department may not enter into new watershed agreements under section 16 of this act after July 1, 2008. This section does not apply to the renewal of agreements in effect prior to that date.

Sec. 18 RCW 70.119A.110 and 1991 c 304 s 5 are each amended to read as follows:

(1) No person may operate a group A public water system unless the person first submits an application to the department and receives an operating permit as provided in this section. A new application must be submitted upon any change in ownership of the system. Any person operating a public water system on July 28, 1991, may continue to operate the system until the department takes final action, including any time necessary for a hearing under subsection (3) of this section, on a permit application submitted by the person operating the system under the rules adopted by the department to implement this section.

(2) The department may require that each application include the information that is reasonable and necessary to determine that the system complies with applicable standards and requirements of the federal safe drinking water act, state law, and rules adopted by the department or by the state board of health.

(3) Following its review of the application, its supporting material, and any information received by the department in its investigation of the application, the department shall issue or deny the operating permit. The department shall act on initial permit applications as expeditiously as possible, and shall in all cases either grant or deny the application within one hundred twenty days of receipt of the application or of any supplemental information required to complete the application. The applicant for a permit shall be entitled to file an appeal in accordance with chapter 34.05 RCW if the department denies the initial or subsequent applications or imposes conditions or requirements upon the operator. Any operator of a public water system that requests a hearing may continue to operate the system until a decision is issued after the hearing.

(4) At the time of initial permit application or at the time of permit renewal the department may impose such permit conditions,

requirements for system improvements, and compliance schedules as it determines are reasonable and necessary to ensure that the system will provide a safe and reliable water supply to its users.

(5) Operating permits shall be issued for a term of one year, and shall be renewed annually, unless the operator fails to apply for a new permit or the department finds good cause to deny the application for renewal.

(6) Each application shall be accompanied by an annual fee as follows:

(a) The annual fee for public water supply systems serving fifteen to forty-nine service connections shall be twenty-five dollars.

(b) The annual fee for public water supply systems serving fifty to three thousand three hundred thirty-three service connections shall be based on a uniform per service connection fee of one dollar and fifty cents per service connection.

(c) The annual fee for public water supply systems serving three thousand three hundred thirty-four to fifty-three thousand three hundred thirty-three service connections shall be based on a uniform per service connection fee of one dollar and fifty cents per service connection plus ten cents for each service connection in excess of three thousand three hundred thirty-three service connections.

(d) The annual fee for public water supply systems serving fifty-three thousand three hundred thirty-four or more service connections shall be ten thousand dollars.

(e) In addition to the fees under (a) through (d) of this subsection, the department may charge an additional one-time fee of five dollars for each service connection in a new water system.

(f) Until June 30, 2007, in addition to the fees under (a) through (e) of this subsection, the department may charge municipal water suppliers, as defined in RCW 90.03.015, an additional annual fee equivalent to twenty-five cents for each residential service connection for the purpose of funding the water conservation activities in section 7 of this act.

(7) The department may phase-in the implementation for any group of systems provided the schedule for implementation is established by rule. Prior to implementing the operating permit requirement on water systems having less than five hundred service connections, the department shall form a committee composed of persons operating these

systems. The committee shall be composed of the department of health, two operators of water systems having under one hundred connections, two operators of water systems having between one hundred and two hundred service connections, two operators of water systems having between two hundred and three hundred service connections, two operators of water systems having between three hundred and four hundred service connections, two operators of water systems having between four hundred and five hundred service connections, and two county public health officials. The members shall be chosen from different geographic regions of the state. This committee shall develop draft rules to implement this section. The draft rules will then be subject to the rule-making procedures in accordance with chapter 34.05 RCW.

(8) The department shall notify existing public water systems of the requirements of RCW 70.119A.030, 70.119A.060, and this section at least one hundred twenty days prior to the date that an application for a permit is required pursuant to RCW 70.119A.030, 70.119A.060, and this section.

(9) The department shall issue one operating permit to any approved satellite system management agency. Operating permit fees for approved satellite system management agencies shall be one dollar per connection per year for the total number of connections under the management of the approved satellite agency. The department shall define by rule the meaning of the term "satellite system management agency." If a statutory definition of this term exists, then the department shall adopt by rule a definition consistent with the statutory definition.

(10) For purposes of this section, "group A public water system" and "system" mean those water systems with fifteen or more service connections, regardless of the number of people; or a system serving an average of twenty-five or more people per day for sixty or more days within a calendar year, regardless of the number of service connections.

NEW SECTION. **Sec. 19** If any provision of this act or its application to any person or circumstance is held invalid, the remainder of the act or the application of the provision to other

persons or circumstances is not affected.

Passed by the House June 5, 2003.
Passed by the Senate June 10, 2003.
Approved by the Governor June 20, 2003.
Filed in Office of Secretary of State June 20, 2003.

Appendix B: Water System Consumption in Washington State

Background

In 1997, the Washington State Legislature allocated funding to the Department of Health (DOH) to provide technical assistance to water systems in the area of water conservation. DOH Office of Drinking Water established one position in each of its three regional offices and one coordinator to implement this technical assistance program. This group determined that it was necessary to develop a consistent method for prioritizing their efforts. To support that prioritization process it conducted a survey of water system plans to establish a record of water conservation performance by water systems. The database of information collected for that effort contains information useful for understanding consumption patterns and water use efficiency performance in the state of Washington.

During the summer of 2005, the Office of Drinking Water conducted another survey to assess the performance of Washington's water systems in the area of water use efficiency. The question that provided the framework for the survey was the following:

> To what extent are public water systems in the state of Washington already meeting the requirements of DOH's proposed water use efficiency rule?

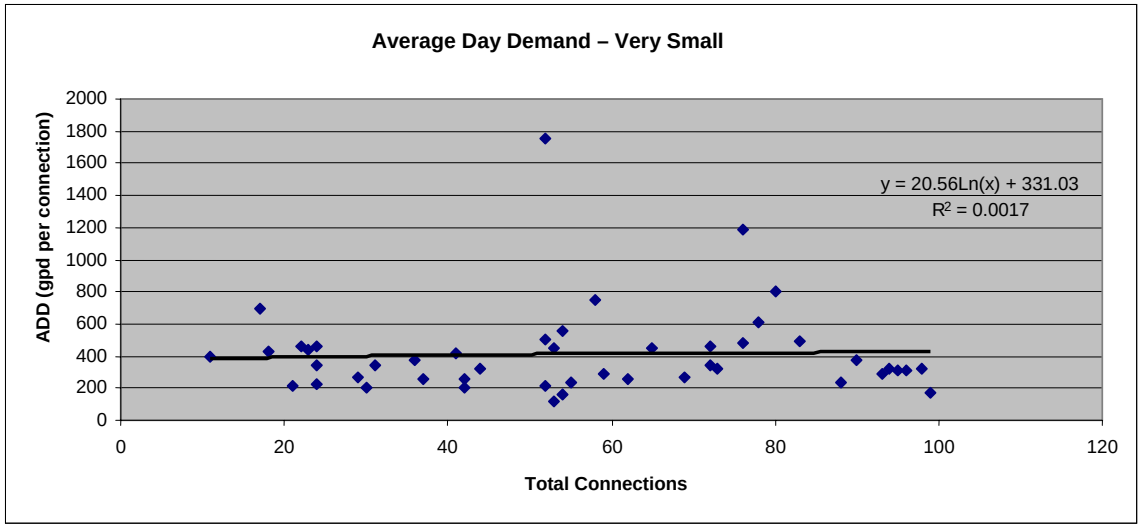
Survey Methods

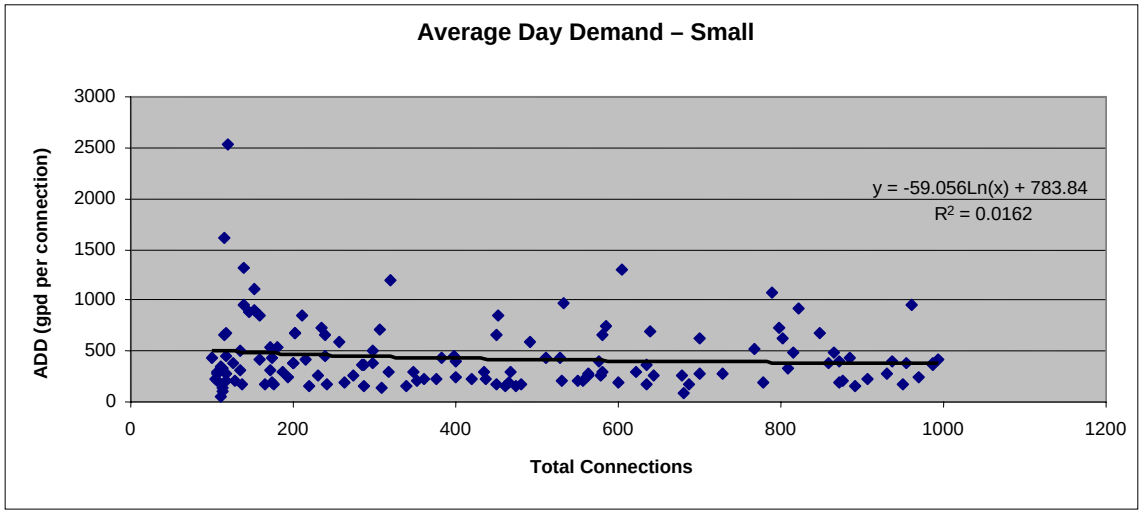
For more information about the how the surveys were conducted, refer to Appendix G: 2005 Water Use Efficiency and Appendix H: Technical Assistance Survey.

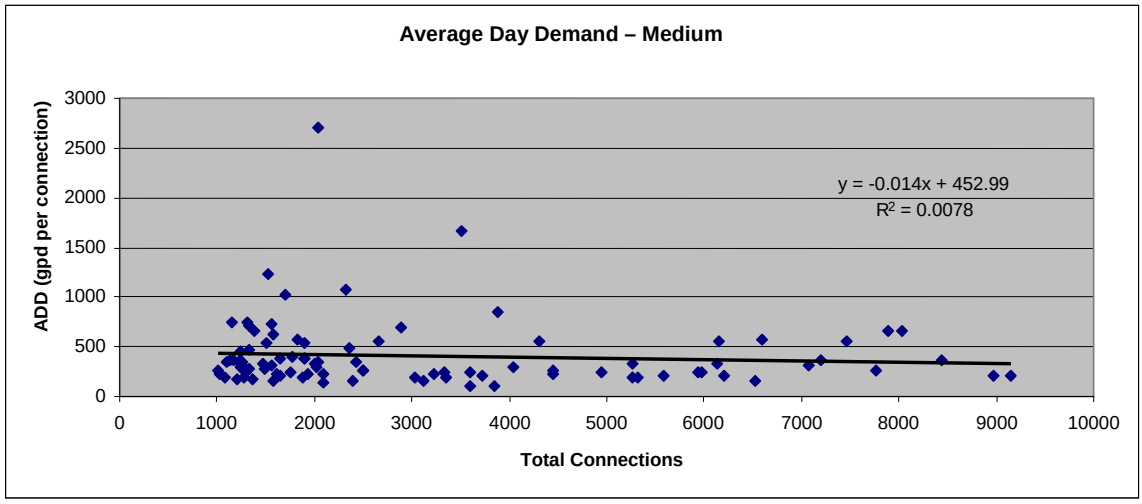
Consumption Data

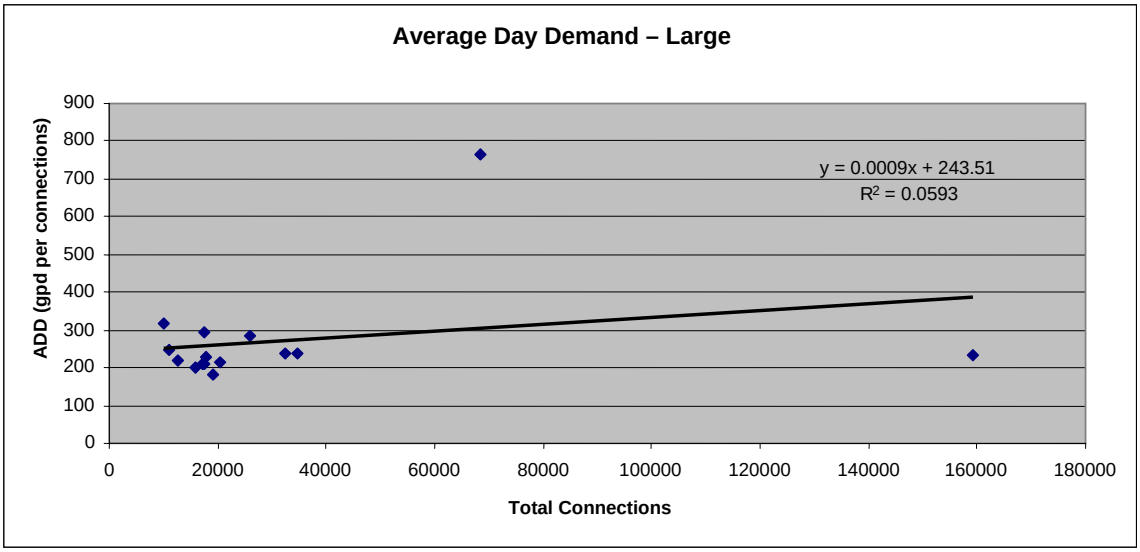
Both surveys recorded basic information about water consumption. For the purposes of this analysis, only water system Average Day Demand (ADD) was used. The data for each water system were reviewed for irregularities, such as a typical relationship between ADD and total water system consumption. This can occur when industrial customers dominate the water system. Any record that appeared suspect was removed from the data set.

The remaining records were used to plot ADD against water system size. This analysis showed virtually no statistical correlation with water system sizes. Other factors beyond the scope of this assessment likely influence consumption.


Average Day Demand – Very Small
ADD (gpd per connection)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
0
20
40
60
80
100
120
Total Connections
y = 20.56Ln(x) + 331.03
R² = 0.0017


Average Day Demand – Small
ADD (gpd per connection)
3000
2500
2000
1500
1000
500
0
0
200
400
600
800
1000
1200
Total Connections
y = -59.056Ln(x) + 783.84
R² = 0.0162


Average Day Demand – Medium
ADD (gpd per connection)
3000
2500
2000
1500
1000
500
0
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
Total Connections
y = -0.014x + 452.99
R² = 0.0078



The data were then separated to assess each size category used for this analysis, and outliers were removed from the data sets to calculate median ADD for each size category. While there was not a statistically significant correlation between water system size and per-capita consumption, there does appear to be a trend that larger water systems have lower per-capita consumption.

Size Category	Median ADD (Gallons per Day/Capita)
Very Small (< 100 Connections)	136
Small (100 – 999 Connections)	136
Medium (1,000 – 9,999 Connections)	120
Large (> 9,999 Connections)	93

Appendix C: Value of Water Use Efficiency Savings

The Department of Health (DOH) analyzed the statewide economic value of water saved as a result of implementing the water use efficiency rule by estimating the amount of water that would be saved and placing a dollar value on that water. DOH's *Final Significant Analysis and Small Business Economic Impact Statement for Rule Concerning Chapter 246-290 WAC Water Use Efficiency* analysis demonstrates that, over a period of 30 years, the value of water saved by implementing this rule would be worth about $3.5 billion based on a weighted 21 percent savings from current average water use. To lend credence to the overall analysis, we also computed the value of water saved to be $1.6 billion using a very conservative 10 percent savings. In both cases, which should be characterized as the best estimate and most conservative estimate, the dollar figures are greater than the probable costs. The following describes the method DOH used to calculate the economic value of water saved.

1. Estimate expected consumption reduction (savings) on a per-capita basis by applying a weighted 21 percent savings and a very conservative 10 percent savings to known consumption values of four different water systems size categories.
2. Assign a dollar value of a unit of saved water to each of savings calculations.
3. Calculate the total present value of the water saved over the 30-year timeframe.

The method and results for estimating per-capita consumption reduction and assigning a dollar value to a unit of water is outlined in Section 4: Benefits of the Water Use Efficiency Rule in DOH's *Final Significant Analysis and Small Business Economic Impact Statement for Rule Concerning Chapter 246-290 WAC Water Use Efficiency*. DOH developed a mathematical model to complete this final step. The heart of the model is a standard exponential growth equation that projects the amount and present value of accumulated conservation over time.

Two models were run for each of the four different water system size categories. Each water system size category includes a model run of the weighted savings rate as presented in Table 4-2 – Per-capita Consumption Reduction Expected to Result from the Rule, Section 4: Benefits of the Water Use Efficiency Rule, in DOH's *Final Significant Analysis and Small Business Economic Impact Statement for Rule Concerning Chapter 246-290 WAC Water Use Efficiency* and a model run for the conservative 10 percent savings rate. The weighted savings rates for the four water systems size categories are:

- 18 percent for very small water systems (< 100 connections).
- 27 percent for small water systems (100 – 999 connections).
- 30 percent for medium water systems (1,000 – 9,999 connections).
- 15 percent for large water systems (> 9,999 connections).

Through the calculations presented in Table 4-2 – Per-capita Consumption Reduction Expected to Result from the Rule, Section 4: Benefits of the Water Use Efficiency Rule, in DOH's *Final Significant Analysis and Small Business Economic Impact Statement for Rule Concerning Chapter 246-290 WAC Water Use Efficiency*, these represent a weighted 21 percent savings rate for implementation of the rule.

The models are designed as follows:

C = Total amount of water conserved in (n) years

C = p0 w0 [(1+g)^n] – p0 w0 [(1+g)^n * (1 – c)^n]

Where:

p0 w0 [(1+g)^n] = Water consumption in time (t) without conservation
p0 w0 [(1+g)^n * (1 – c)^n] = Water consumption in time (t) with conservation
p0 = Population during the year (0)
w0 = Per-capita daily water consumption during the year (0)
g = Population annual growth rate
c = Constant annual conservation rate
n = Time horizon

PVC = Present value of (C), the amount of water conserved in time (t)

PVC = $\sum$ C*t**(1+ *i*)^*t*/(1+*r*)^*t*

Where:

t = 0, 1, 2, 30
i = Annual rate of change in the price of water
r = Discount rate

Calculating the Amount and Present Value of Accumulated Conservation Very Small (< 100 Connections) Water Systems at 10 Percent Savings	
Per-capita daily consumption in year (0), w0; Gallons	136[1]
Time horizon 1 (period to achieve total savings, 30 years), t	30
Targeted conservation rate, (wn-w0)/w0	10%
wn/w0	0.9
Constant annual conservation rate, c	0.003506
Time horizon 2 (Interval for which calculation is being completed, 5,10, 20 or 30 years), n	30
1-c	0.996
(1-c)^n	0.900
(1-c)^(n+1)	0.897
Population in year (0), p0	131,050[2]
population growth rate, g	0.0115[3]
1+g	1.0115
(1+g)^n	1.4092
(1+g)^(n+1)	1.4254
Discount rate, r	0.030
1+r	1.030
(1+r)^(n+1)	2.500
Price of water in year (0), ($/1000 cf)	30.270
cf to Acre-ft conversion factor	43,560[4]
Price of water in year (0), I0	1,319
Price inflation rate, i	0.030
1+i	1.030
(1+i)^(n+1)	2.500
Acre/ft to Gallon exchange rate	325,851
Total water conservation in year (n)	
Daily consumption in year (n) with no conservation, wn1 = w0*p0*[(1+g)^n] , (Acre-ft)	77
Daily consumption in year (n) with conservation , wn2 = w0*[(1-c)^n]*p0*[(1+g)^n] , (Acre-ft)	69
Daily conservation in year (n) with conservation , Cn = wn1 - wn2 , (Acre-ft)	8
Total conservation in year (n), Cn = (wn1 - wn2)*365 , (Acre-ft)	2,813
Present value of total conservation (PVC) in 30 years	
Value of water consumed in 30 years with no conservation, VW30(1) = 365*wo*p0*I0*[R^(n+1) - R] / (R -1)	$947,538,783
Value of water consumed in 30 years with conservation, VW30(2) = 365*w0*p0*I0*[(R^(n+1))*(C^(n+1)) - (RC)] / (RC -1)	$895,058,278
Where: R = (1+i)*(1+g)/(1+r)	1.0115
RC = (1+i)*(1+g)*(1-c)/(1+r)	1.0036
R^n = ((1+i)^(n+1))*((1+g)^(n+1)) / ((1+r)^(n+1))	1.4254
(R^n)*(C^n) = ((1+i)^(n+1))*((1+g)^(n+1))*((1-c)^(n+1)) / ((1+r)^(n+1))	1.1173
Present value of total conservation in 30 years, PVC30 = VW30(1) - VW30(2)	***$52,480,505***

[1] The base year statewide consumption was obtained from the Department of Health's *Final Significant Analysis and Small Business Economic Impact Statement for Rule Concerning Chapter 246-290 WAC Water Use Efficiency* Appendix B Water System Consumption in Washington State.

[2] Population figure used for this model is taken from the Department of Health's *Final Significant Analysis and Small Business Economic Impact Statement for Rule Concerning Chapter 246-290 WAC Water Use Efficiency*, Table 4.3 – Total Consumption Reduction Expected to Result from Rule.

[3] The population growth rate was obtained from the Office of Financial Management.

[4] This model converts water volumes from cf to Acre-ft because that is common way of expressing average annual usage.

Calculating the Amount and Present Value of Accumulated Conservation Very Small (< 100 Connections) Water Systems at 18 Percent Savings	
Per-capita daily consumption in year (0), w0; Gallons	136[1]
Time horizon 1 (period to achieve total savings, 30 years), t	30
Targeted conservation rate, (wn-w0)/w0	18%
wn/w0	0.82
Constant annual conservation rate, c	0.006593
Time horizon 2 (Interval for which calculation is being completed, 5,10, 20 or 30 years), n	30
1-c	0.993
(1-c)^n	0.820
(1-c)^(n+1)	0.815
Population in year (0), p0	131,050[2]
population growth rate, g	0.0115[3]
1+g	1.0115
(1+g)^n	1.4092
(1+g)^(n+1)	1.4254
Discount rate, r	0.030
1+r	1.030
(1+r)^(n+1)	2.500
Price of water in year (0), ($/1000 cf)	30.270
cf to Acre-ft conversion factor	43,560[4]
Price of water in year (0), I0	1,319
Price inflation rate, i	0.030
1+i	1.030
(1+i)^(n+1)	2.500
Acre/ft to Gallon exchange rate	325,851
Total water conservation in year (n)	
Daily consumption in year (n) with no conservation, wn1 = w0*p0*[(1+g)^n] , (Acre-ft)	77
Daily consumption in year (n) with conservation , wn2 = w0*[(1-c)^n]*p0*[(1+g)^n] , (Acre-ft)	63
Daily conservation in year (n) with conservation , Cn = wn1 - wn2 , (Acre-ft)	14
Total conservation in year (n), Cn = (wn1 - wn2)*365 , (Acre-ft)	5,064
Present value of total conservation (PVC) in 30 years	
Value of water consumed in 30 years with no conservation, VW30(1) = 365*wo*p0*I0*[R^(n+1) - R] / (R -1)	$947,538,783
Value of water consumed in 30 years with conservation, VW30(2) = 365*w0*p0*I0*[(R^(n+1))*(C^(n+1)) - (RC)] / (RC -1)	$851,766,179
Where: R = (1+i)*(1+g)/(1+r)	1.0115
RC = (1+i)*(1+g)*(1-c)/(1+r)	1.0036
R^n = ((1+i)^(n+1))*((1+g)^(n+1)) / ((1+r)^(n+1))	1.4254
(R^n)*(C^n) = ((1+i)^(n+1))*((1+g)^(n+1))*((1-c)^(n+1)) / ((1+r)^(n+1))	1.1173
Present value of total conservation in 30 years, PVC30 = VW30(1) - VW30(2)	***$95,772,604***

[1] The base year statewide consumption was obtained from the Department of Health's *Final Significant Analysis and Small Business Economic Impact Statement for Rule Concerning Chapter 246-290 WAC Water Use Efficiency* Appendix B Water System Consumption in Washington State.

[2] Population figure used for this model is taken from the Department of Health's *Final Significant Analysis and Small Business Economic Impact Statement for Rule Concerning Chapter 246-290 WAC Water Use Efficiency*, Table 4.3 – Total Consumption Reduction Expected to Result from Rule.

[3] The population growth rate was obtained from the Office of Financial Management.

[4] This model converts water volumes from cf to Acre-ft because that is common way of expressing average annual usage.

Calculating the Amount and Present Value of Accumulated Conservation Small (100 – 999 Connections) Water Systems at 10 Percent Savings	
Per-capita daily consumption in year (0), w0; Gallons	136[1]
Time horizon 1 (period to achieve total savings, 30 years), t	30
Targeted conservation rate, (wn-w0)/w0	10%
wn/w0	0.9
Constant annual conservation rate, c	0.003506
Time horizon 2 (Interval for which calculation is being completed, 5,10, 20 or 30 years), n	30
1-c	0.996
(1-c)^n	0.900
(1-c)^(n+1)	0.897
Population in year (0), p0	421,702[2]
population growth rate, g	0.0115[3]
1+g	1.0115
(1+g)^n	1.4092
(1+g)^(n+1)	1.4254
Discount rate, r	0.030
1+r	1.030
(1+r)^(n+1)	2.500
Price of water in year (0), ($/1000 cf)	30.270
cf to Acre-ft conversion factor	43,560[4]
Price of water in year (0), I0	1,319
Price inflation rate, i	0.030
1+i	1.030
(1+i)^(n+1)	2.500
Acre/ft to Gallon exchange rate	325,851
Total water conservation in year (n)	
Daily consumption in year (n) with no conservation, wn1 = w0*p0*[(1+g)^n] , (Acre-ft)	248
Daily consumption in year (n) with conservation , wn2 = w0*[(1-c)^n]*p0*[(1+g)^n] , (Acre-ft)	223
Daily conservation in year (n) with conservation , Cn = wn1 - wn2 , (Acre-ft)	25
Total conservation in year (n), Cn = (wn1 - wn2)*365 , (Acre-ft)	9,053
Present value of total conservation (PVC) in 30 years	
Value of water consumed in 30 years with no conservation, VW30(1) = 365*wo*p0*I0*[R^(n+1) - R] / (R -1)	$3,049,057,610
Value of water consumed in 30 years with conservation, VW30(2) = 365*w0*p0*I0*[(R^(n+1))*(C^(n+1)) - (RC)] / (RC -1)	$2,880,182,112
Where: R = (1+i)*(1+g)/(1+r)	1.0115
RC = (1+i)*(1+g)*(1-c)/(1+r)	1.0036
R^n = ((1+i)^(n+1))*((1+g)^(n+1)) / ((1+r)^(n+1))	1.4254
(R^n)*(C^n) = ((1+i)^(n+1))*((1+g)^(n+1))*((1-c)^(n+1)) / ((1+r)^(n+1))	1.1173
Present value of total conservation in 30 years, PVC30 = VW30(1) - VW30(2)	***$168,875,497***

[1] The base year statewide consumption was obtained from the Department of Health's *Final Significant Analysis and Small Business Economic Impact Statement for Rule Concerning Chapter 246-290 WAC Water Use Efficiency* Appendix B Water System Consumption in Washington State.

[2] Population figure used for this model is taken from the Department of Health's *Final Significant Analysis and Small Business Economic Impact Statement for Rule Concerning Chapter 246-290 WAC Water Use Efficiency*, Table 4.3 – Total Consumption Reduction Expected to Result from Rule.

[3] The population growth rate was obtained from the Office of Financial Management.

[4] This model converts water volumes from cf to Acre-ft because that is common way of expressing average annual usage.

Calculating the Amount and Present Value of Accumulated Conservation Small (100 – 999 Connections) Water Systems at 27 Percent Savings	
Per-capita daily consumption in year (0), w0; Gallons	136[1]
Time horizon 1 (period to achieve total savings, 30 years), t	30
Targeted conservation rate, (wn-w0)/w0	27%
wn/w0	0.73
Constant annual conservation rate, c	0.010436
Time horizon 2 (Interval for which calculation is being completed, 5,10, 20 or 30 years), n	30
1-c	0.990
(1-c)^n	0.730
(1-c)^(n+1)	0.722
Population in year (0), p0	421,702[2]
population growth rate, g	0.0115[3]
1+g	1.0115
(1+g)^n	1.4092
(1+g)^(n+1)	1.4254
Discount rate, r	0.030
1+r	1.030
(1+r)^(n+1)	2.500
Price of water in year (0), ($/1000 cf)	30.270
cf to Acre-ft conversion factor	43,560[4]
Price of water in year (0), I0	1,319
Price inflation rate, i	0.030
1+i	1.030
(1+i)^(n+1)	2.500
Acre/ft to Gallon exchange rate	325,851
Total water conservation in year (n)	
Daily consumption in year (n) with no conservation, wn1 = w0*p0*[(1+g)^n] , (Acre-ft)	248
Daily consumption in year (n) with conservation , wn2 = w0*[(1-c)^n]*p0*[(1+g)^n] , (Acre-ft)	181
Daily conservation in year (n) with conservation , Cn = wn1 - wn2 , (Acre-ft)	67
Total conservation in year (n), Cn = (wn1 - wn2)*365 , (Acre-ft)	24,443
Present value of total conservation (PVC) in 30 years	
Value of water consumed in 30 years with no conservation, VW30(1) = 365*wo*p0*I0*[R^(n+1) - R] / (R -1)	$3,049,057,610
Value of water consumed in 30 years with conservation, VW30(2) = 365*w0*p0*I0*[(R^(n+1))*(C^(n+1)) - (RC)] / (RC -1)	$2,578,925,145
Where: R = (1+i)*(1+g)/(1+r)	1.0115
RC = (1+i)*(1+g)*(1-c)/(1+r)	1.0036
R^n = ((1+i)^(n+1))*((1+g)^(n+1)) / ((1+r)^(n+1))	1.4254
(R^n)*(C^n) = ((1+i)^(n+1))*((1+g)^(n+1))*((1-c)^(n+1)) / ((1+r)^(n+1))	1.1173
Present value of total conservation in 30 years, PVC30 = VW30(1) - VW30(2)	***$470,132,464***

[1] The base year statewide consumption was obtained from the Department of Health's *Final Significant Analysis and Small Business Economic Impact Statement for Rule Concerning Chapter 246-290 WAC Water Use Efficiency* Appendix B Water System Consumption in Washington State.

[2] Population figure used for this model is taken from the Department of Health's *Final Significant Analysis and Small Business Economic Impact Statement for Rule Concerning Chapter 246-290 WAC Water Use Efficiency*, Table 4.3 – Total Consumption Reduction Expected to Result from Rule.

[3] The population growth rate was obtained from the Office of Financial Management.

[4] This model converts water volumes from cf to Acre-ft because that is common way of expressing average annual usage.

Calculating the Amount and Present Value of Accumulated Conservation Medium (1,000 – 9,999 Connections) Water Systems at 10 Percent Savings	
Per-capita daily consumption in year (0), w0; Gallons	120[1]
Time horizon 1 (period to achieve total savings, 30 years), t	30
Targeted conservation rate, (wn-w0)/w0	10%
wn/w0	0.9
Constant annual conservation rate, c	0.003506
Time horizon 2 (Interval for which calculation is being completed, 5,10, 20 or 30 years), n	30
1-c	0.996
(1-c)^n	0.900
(1-c)^(n+1)	0.897
Population in year (0), p0	1,539,152[2]
population growth rate, g	0.0115[3]
1+g	1.0115
(1+g)^n	1.4092
(1+g)^(n+1)	1.4254
Discount rate, r	0.030
1+r	1.030
(1+r)^(n+1)	2.500
Price of water in year (0), ($/1000 cf)	30.270
cf to Acre-ft conversion factor	43,560[4]
Price of water in year (0), I0	1,319
Price inflation rate, i	0.030
1+i	1.030
(1+i)^(n+1)	2.500
Acre/ft to Gallon exchange rate	325,851
Total water conservation in year (n)	
Daily consumption in year (n) with no conservation, wn1 = w0*p0*[(1+g)^n] , (Acre-ft)	799
Daily consumption in year (n) with conservation , wn2 = w0*[(1-c)^n]*p0*[(1+g)^n] , (Acre-ft)	719
Daily conservation in year (n) with conservation , Cn = wn1 - wn2 , (Acre-ft)	80
Total conservation in year (n), Cn = (wn1 - wn2)*365 , (Acre-ft)	29,155
Present value of total conservation (PVC) in 30 years	
Value of water consumed in 30 years with no conservation, VW30(1) = 365*wo*p0*I0*[R^(n+1) - R] / (R -1)	$9,819,374,368
Value of water consumed in 30 years with conservation, VW30(2) = 365*w0*p0*I0*[(R^(n+1))*(C^(n+1)) - (RC)] / (RC -1)	$9,275,517,134
Where: R = (1+i)*(1+g)/(1+r)	1.0115
RC = (1+i)*(1+g)*(1-c)/(1+r)	1.0036
R^n = ((1+i)^(n+1))*((1+g)^(n+1)) / ((1+r)^(n+1))	1.4254
(R^n)*(C^n) = ((1+i)^(n+1))*((1+g)^(n+1))*((1-c)^(n+1)) / ((1+r)^(n+1))	1.1173
Present value of total conservation in 30 years, PVC30 = VW30(1) - VW30(2)	***$543,857,134***

[1] The base year statewide consumption was obtained from the Department of Health's *Final Significant Analysis and Small Business Economic Impact Statement for Rule Concerning Chapter 246-290 WAC Water Use Efficiency* Appendix B Water System Consumption in Washington State.

[2] Population figure used for this model is taken from the Department of Health's *Final Significant Analysis and Small Business Economic Impact Statement for Rule Concerning Chapter 246-290 WAC Water Use Efficiency*, Table 4.3 – Total Consumption Reduction Expected to Result from Rule.

[3] The population growth rate was obtained from the Office of Financial Management.

[4] This model converts water volumes from cf to Acre-ft because that is common way of expressing average annual usage.

Calculating the Amount and Present Value of Accumulated Conservation Medium (1,000 – 9,999 Connections) Water Systems at 30 Percent Savings	
Per-capita daily consumption in year (0), w0; Gallons	120[1]
Time horizon 1 (period to achieve total savings, 30 years), t	30
Targeted conservation rate, (wn-w0)/w0	30%
wn/w0	0.7
Constant annual conservation rate, c	0.011819
Time horizon 2 (Interval for which calculation is being completed, 5,10, 20 or 30 years), n	30
1-c	0.998
(1-c)^n	0.700
(1-c)^(n+1)	0.692
Population in year (0), p0	1,539,152[2]
population growth rate, g	0.0115[3]
1+g	1.0115
(1+g)^n	1.4092
(1+g)^(n+1)	1.4254
Discount rate, r	0.030
1+r	1.030
(1+r)^(n+1)	2.500
Price of water in year (0), ($/1000 cf)	30.270
cf to Acre-ft conversion factor	43,560[4]
Price of water in year (0), I0	1,319
Price inflation rate, i	0.030
1+i	1.030
(1+i)^(n+1)	2.500
Acre/ft to Gallon exchange rate	325,851
Total water conservation in year (n)	
Daily consumption in year (n) with no conservation, wn1 = w0*p0*[(1+g)^n] , (Acre-ft)	799
Daily consumption in year (n) with conservation , wn2 = w0*[(1-c)^n]*p0*[(1+g)^n] , (Acre-ft)	559
Daily conservation in year (n) with conservation , Cn = wn1 - wn2 , (Acre-ft)	240
Total conservation in year (n), Cn = (wn1 - wn2)*365 , (Acre-ft)	87,465
Present value of total conservation (PVC) in 30 years	
Value of water consumed in 30 years with no conservation, VW30(1) = 365*wo*p0*I0*[R^(n+1) - R] / (R -1)	$9,819,374,368
Value of water consumed in 30 years with conservation, VW30(2) = 365*w0*p0*I0*[(R^(n+1))*(C^(n+1)) - (RC)] / (RC -1)	$8,126,988,306
Where: R = (1+i)*(1+g)/(1+r)	1.0115
RC = (1+i)*(1+g)*(1-c)/(1+r)	1.0036
R^n = ((1+i)^(n+1))*((1+g)^(n+1)) / ((1+r)^(n+1))	1.4254
(R^n)*(C^n) = ((1+i)^(n+1))*((1+g)^(n+1))*((1-c)^(n+1)) / ((1+r)^(n+1))	1.1173
Present value of total conservation in 30 years, PVC30 = VW30(1) - VW30(2)	***$1,692,386,062***

[1] The base year statewide consumption was obtained from the Department of Health's *Final Significant Analysis and Small Business Economic Impact Statement for Rule Concerning Chapter 246-290 WAC Water Use Efficiency* Appendix B Water System Consumption in Washington State.

[2] Population figure used for this model is taken from the Department of Health's *Final Significant Analysis and Small Business Economic Impact Statement for Rule Concerning Chapter 246-290 WAC Water Use Efficiency*, Table 4.3 – Total Consumption Reduction Expected to Result from Rule.

[3] The population growth rate was obtained from the Office of Financial Management.

[4] This model converts water volumes from cf to Acre-ft because that is common way of expressing average annual usage.

Calculating the Amount and Present Value of Accumulated Conservation Large (> 9,999 Connections) Water Systems at 10 Percent Savings	
Per-capita daily consumption in year (0), w0; Gallons	93[1]
Time horizon 1 (period to achieve total savings, 30 years), t	30
Targeted conservation rate, (wn-w0)/w0	10%
wn/w0	0.9
Constant annual conservation rate, c	0.003506
Time horizon 2 (Interval for which calculation is being completed, 5,10, 20 or 30 years), n	30
1-c	0.996
(1-c)^n	0.900
(1-c)^(n+1)	0.897
Population in year (0), p0	3,212,226[2]
population growth rate, g	0.0115[3]
1+g	1.0115
(1+g)^n	1.4092
(1+g)^(n+1)	1.4254
Discount rate, r	0.030
1+r	1.030
(1+r)^(n+1)	2.500
Price of water in year (0), ($/1000 cf)	30.270
cf to Acre-ft conversion factor	43,560[4]
Price of water in year (0), I0	1,319
Price inflation rate, i	0.030
1+i	1.030
(1+i)^(n+1)	2.500
Acre/ft to Gallon exchange rate	325,851
Total water conservation in year (n)	
Daily consumption in year (n) with no conservation, wn1 = w0*p0*[(1+g)^n] , (Acre-ft)	1,292
Daily consumption in year (n) with conservation , wn2 = w0*[(1-c)^n]*p0*[(1+g)^n] , (Acre-ft)	1,163
Daily conservation in year (n) with conservation , Cn = wn1 - wn2 , (Acre-ft)	129
Total conservation in year (n), Cn = (wn1 - wn2)*365 , (Acre-ft)	47,156
Present value of total conservation (PVC) in 30 years	
Value of water consumed in 30 years with no conservation, VW30(1) = 365*wo*p0*I0*[R^(n+1) - R] / (R -1)	$15,882,179,589
Value of water consumed in 30 years with conservation, VW30(2) = 365*w0*p0*I0*[(R^(n+1))*(C^(n+1)) - (RC)] / (RC -1)	$15,002,527,145
Where: R = (1+i)*(1+g)/(1+r)	1.0115
RC = (1+i)*(1+g)*(1-c)/(1+r)	1.0036
R^n = ((1+i)^(n+1))*((1+g)^(n+1)) / ((1+r)^(n+1))	1.4254
(R^n)*(C^n) = ((1+i)^(n+1))*((1+g)^(n+1))*((1-c)^(n+1)) / ((1+r)^(n+1))	1.1173
Present value of total conservation in 30 years, PVC30 = VW30(1) - VW30(2)	***$879,652,444***

[1] The base year statewide consumption was obtained from the Department of Health's *Final Significant Analysis and Small Business Economic Impact Statement for Rule Concerning Chapter 246-290 WAC Water Use Efficiency* Appendix B Water System Consumption in Washington State.

[2] Population figure used for this model is taken from the Department of Health's *Final Significant Analysis and Small Business Economic Impact Statement for Rule Concerning Chapter 246-290 WAC Water Use Efficiency*, Table 4.3 – Total Consumption Reduction Expected to Result from Rule.

[3] The population growth rate was obtained from the Office of Financial Management.

[4] This model converts water volumes from cf to Acre-ft because that is common way of expressing average annual usage.

Calculating the Amount and Present Value of Accumulated Conservation Large Water Systems at 15 Percent Savings	
Per-capita daily consumption in year (0), w0; Gallons	93[1]
Time horizon 1 (period to achieve total savings, 30 years), t	30
Targeted conservation rate, (wn-w0)/w0	15%
wn/w0	0.85
Constant annual conservation rate, c	0.005403
Time horizon 2 (Interval for which calculation is being completed, 5,10, 20 or 30 years), n	30
1-c	0.995
(1-c)^n	0.850
(1-c)^(n+1)	0.845
Population in year (0), p0	3,212,226[2]
population growth rate, g	0.0115[3]
1+g	1.0115
(1+g)^n	1.4092
(1+g)^(n+1)	1.4254
Discount rate, r	0.030
1+r	1.030
(1+r)^(n+1)	2.500
Price of water in year (0), ($/1000 cf)	30.270
cf to Acre-ft conversion factor	43,560[4]
Price of water in year (0), I0	1,319
Price inflation rate, i	0.030
1+i	1.030
(1+i)^(n+1)	2.500
Acre/ft to Gallon exchange rate	325,851
Total water conservation in year (n)	
Daily consumption in year (n) with no conservation, wn1 = w0*p0*[(1+g)^n] , (Acre-ft)	1,292
Daily consumption in year (n) with conservation , wn2 = w0*[(1-c)^n]*p0*[(1+g)^n] , (Acre-ft)	1,098
Daily conservation in year (n) with conservation , Cn = wn1 - wn2 , (Acre-ft)	194
Total conservation in year (n), Cn = (wn1 - wn2)*365 , (Acre-ft)	70,734
Present value of total conservation (PVC) in 30 years	
Value of water consumed in 30 years with no conservation, VW30(1) = 365*wo*p0*I0*[R^(n+1) - R] / (R -1)	$15,882,179,589
Value of water consumed in 30 years with conservation, VW30(2) = 365*w0*p0*I0*[(R^(n+1))*(C^(n+1)) - (RC)] / (RC -1)	$14,551,480,132
Where: R = (1+i)*(1+g)/(1+r)	1.0115
RC = (1+i)*(1+g)*(1-c)/(1+r)	1.0036
R^n = ((1+i)^(n+1))*((1+g)^(n+1)) / ((1+r)^(n+1))	1.4254
(R^n)*(C^n) = ((1+i)^(n+1))*((1+g)^(n+1))*((1-c)^(n+1)) / ((1+r)^(n+1))	1.1173
Present value of total conservation in 30 years, PVC30 = VW30(1) - VW30(2)	***$1,330,699,457***

[1] The base year statewide consumption was obtained from the Department of Health's *Final Significant Analysis and Small Business Economic Impact Statement for Rule Concerning Chapter 246-290 WAC Water Use Efficiency* Appendix B Water System Consumption in Washington State.

[2] Population figure used for this model is taken from the Department of Health's *Final Significant Analysis and Small Business Economic Impact Statement for Rule Concerning Chapter 246-290 WAC Water Use Efficiency*, Table 4.3 – Total Consumption Reduction Expected to Result from Rule.

[3] The population growth rate was obtained from the Office of Financial Management.

[4] This model converts water volumes from cf to Acre-ft because that is common way of expressing average annual usage.

Appendix D: Summary of Conservation Case Studies

Source: United States Environmental Protection Agency, Cases in Water Conservation: How Efficiency Programs Help Water Utilities Save Water and Avoid Cost (EPA 832-B-02-003), July 2002.

City	Problem	Approach	Results
Albuquerque, New Mexico	A dry climate and increased population growth put a strain on Albuquerque's water supply.	Albuquerque's Long-Range Water Conservation Strategy Resolution consisted of new conservation-based water rates, a public education program, a high-efficiency plumbing program, landscaping programs, and large-use programs.	Albuquerque's conservation program has successfully slowed the groundwater drawdown so that the level of water demand should stay constant until 2005. Peak demand is down 14% from 1990.
Ashland, Oregon	Accelerated population growth in the 1980s and the expiration of a critical water right created a water supply problem.	Ashland's 1991 water efficiency program consisted of four major components: system leak detection and repair, conservation-based water rates, a showerhead replacement program, and toilet retrofits and replacement.	Ashland's conservation efforts have resulted in water savings of approximately 395,000 gallons per day (16% of winter usage) as well as a reduction in wastewater volume.
Cary, North Carolina	With the population more than doubling during the past 10 years and high water demand during dry, hot summers, the city's water resources were seriously strained.	Cary's water conservation program consists of eight element: public education, landscape and irrigation codes, toilet flapper rebates, residential audits, conservation rate structure, new homes points program, landscape water budget, and a water reclamation facility.	Cary's water conservation program will reduce retail water production by an estimated 4.6 mgd by the end of 2028, a savings of approximately 16% in retail water production. These savings reduced operating costs and have already allowed Cary to delay two water plant expansions.
Gallitzin, Pennsylvania	By the mid-1990s, the town of Gallitzin was experiencing high water loss, recurring leaks, low pressure, high operational costs, and unstable water entering the system.	Gallitzin developed an accurate meter reading and system map, and a leak detection and repair program.	The results of the program were dramatic. Gallitzin realized an 87% drop in unaccounted-for water, a 59% drop in production, and considerable financial savings.

Source: United States Environmental Protection Agency, Cases in Water Conservation: How Efficiency Programs Help Water Utilities Save Water and Avoid Cost (EPA 832-B-02-003), July 2002.

City	Problem	Approach	Results
Gilbert, Arizona	Rapid population growth during the 1980s put a strain on the water supply of this Arizona town located in an arid climate.	Gilbert instituted a multi-faceted water conservation program that included building code requirements, an increasing-block water rate structure, a metering program, public education, and a low water-use landscaping program.	Gilbert has been particularly successful reusing reclaimed water. A new wastewater reclamation plant was built, as well as several recharge ponds that serve as a riparian habitat for a diverse number of species.
Goleta, California	A growing California town, Goleta was facing the possibility of future water shortages. Its primary water source, Lake Cachuma, was not sufficient to meet its needs.	Goleta established a water efficiency program that emphasized plumbing retrofits, including high-efficiency toilets, high-efficiency showerheads, and increased rates.	The program was highly successful, resulting in a 30% drop in district water use. Goleta was able to delay a wastewater treatment plant expansion.
Houston, Texas	Houston's groundwater sources have experienced increasing problems with land subsidence, saltwater intrusion, and flooding. These problems, along with a state regulation to reduce groundwater use, led Houston to explore methods for managing groundwater supplies.	Houston implemented a comprehensive conservation program that included an education program, plumbing retrofits, audits, leak detection and repair, an increasing-block rate structure, and conservation planning.	The dramatic success of pilot programs has led Houston to predict a 7.3% reduction in water demand by 2006 and savings of more than $260 million.
Irvine Ranch Water District, California	IRWD has experienced dramatic population growth, drought conditions in the late 80s and early 90s, and increasing wholesale water charges.	IRWD's primary conservation strategy was a new rate structure instituted in 1991. The five-tiered rate structure rewards water-efficiency and identifies when water is being wasted. The goal is to create a long-term water efficiency ethic, while maintaining stable utility revenues.	After the first year of the new rate structure, water use declined by 19%. Between 1991 and 1997, the district saved an estimated $33.2 million in avoided water purchases.

Source: United States Environmental Protection Agency, Cases in Water Conservation: How Efficiency Programs Help Water Utilities Save Water and Avoid Cost (EPA 832-B-02-003), July 2002.

City	Problem	Approach	Results
Massachusetts Water Resources Authority	MWRA is a wholesale water provider for 2.2 million people. From 1969 to 1988, MWRA withdrawals exceeded the safe level of 300 mgd by more than 10% annually.	MWRA began a water conservation program in 1986 that include leak detection and repair, plumbing retrofits, a water management program, an education program, and meter improvements.	Conservation efforts reduced average daily water demand from 336 mgd (1987) to 256 mgd (1997). This allowed MWRA to defer a water-supply expansion project and reduce the capacity of the treatment plant, resulting in total savings ranging from $1.39 million per mgd to $1.91 million per mgd.
Metropolitan Water District of Southern California	Metropolitan Water District is the largest supplier of water for municipal purposes in the United States. Metropolitan recognized the need for conservation, given increased economic and population growth, drought, government regulations, water quality concerns, and planned improvement programs.	Metropolitan's Conservation Credits Program provides funding for a large percentage of water conservation projects. Projects have included plumbing fixture replacement, water-efficiency surveys, irrigation improvements, training programs, and conservation-related research projects.	Conservation efforts have considerably reduced the cost estimate of Metropolitan's capital-improvement. Water savings have amounted to approximately 66,000 acre-feet per year, a savings of 59 mgd.
New York City, New York	By the early 1990s, increased demand and periods of drought resulted in water-supply facilities repeatedly exceeding safe yields. Water rates more than doubled between 1985 and 1993.	New York's conservation initiatives included education, metering, leak detection, water use regulation, and a comprehensive toilet replacement program.	Leak detection and repair, metering, and toilet replacements were particularly successful programs. New York reduced its per-capita water use from 195 gallons per day in 1991 to 167 gallons per day in 1998, and produced savings of 20 to 40% on water and wastewater bills.

Source: United States Environmental Protection Agency, Cases in Water Conservation: How Efficiency Programs Help Water Utilities Save Water and Avoid Cost (EPA 832-B-02-003), July 2002.

City	Problem	Approach	Results
Phoenix, Arizona	Phoenix is one of the fastest growing communities in the United States and suffers from low rainfall amounts. The state legislature has required that, after 2025, Phoenix and suburban communities must not pump groundwater faster than it can be replenished.	Water conservation programs instituted in 1986 and 1998 focused on pricing reform, residential and industrial/commercial conservation, landscaping, education, technical assistance, regulations, planning and research, and interagency coordination.	Phoenix's conservation program currently saves approximately 40 mgd. Phoenix estimates that the conservation rate structure alone saved 9 mgd.
Santa Monica, California	Santa Monica faced rapid population growth, which put a strain on its water supplies. Also, contamination was found in several wells in 1996, forcing the city to increase water purchases.	Santa Monica instituted a multifaceted water conservation program that includes water-use surveys, education, landscaping measures, toilet retrofits, and a loan program.	Santa Monica was able to reduce its water use by 14% and waste-water flow by 21%. The toilet retrofit program resulted in a reduction of 1.9 mgd and net savings of $9.5 million from 1990 to 1995.
Seattle, Washington	Steady population growth, dry summers, and lack of long-term storage capacity forced Seattle to choose between reducing use and developing new water sources.	Seattle's water conservation program has included a seasonal rate structure, plumbing fixture codes, leak reduction, incentives for water-saving products, and public education. Special emphasis has been placed on commercial water conservation.	Per-capita water consumption dropped by 20% in the 1990s. The seasonal rate structure, plumbing codes, and efficiency improvements are particularly credited with success. It is estimated that the commercial water conservation programs will save approximately 8 mgd.
Tampa, Florida	Rapid economic and residential population growth along with seasonal population growth has put a strain on Tampa's water supply.	Since 1989, Tampa's water conservation program has included high efficiency plumbing retrofits, an increasing-block rate structure, irrigation restrictions, landscaping measures, and public education. Particular emphasis has been put on efficient landscaping and irrigation.	Tampa's landscape evaluation program resulted in a 25% drop in water use. A pilot retrofit program achieved a 15% reduction in water use.

Source: United States Environmental Protection Agency, Cases in Water Conservation: How Efficiency Programs Help Water Utilities Save Water and Avoid Cost (EPA 832-B-02-003), July 2002.

City	Problem	Approach	Results
Wichita, Kansas	Ten years ago, analysts determined that the city's available water resources would not meet its needs beyond the first decade of the 21st century. Alternative sources were not available at an affordable price.	Wichita utilized an integrated resource planning approach. This included implementing water conservation, evaluating existing water sources, evaluating nonconventional water resources, optimizing all available water resources, pursuing an application for a conjunctive water resource use permit, evaluating the effects of using different water resources and communicating with key stakeholders.	Analysis of resource options for Wichita resulted in a matrix of 27 conventional and nonconventional resource options.
Barrie, Ontario	Rapid population growth put a strain on Barrie's water and wastewater infrastructure, forcing the city to consider expensive new supply options and infrastructure development.	Barrie's conservation plan focused on replacing inefficient showerheads and toilets.	Barrie was able to save an average of 55 liters (14.5 gallons) per person per day. The reduction in wastewater flows enabled Barrie to defer an expensive capital expansion project. Water conservation efforts saved an estimated $17.1 million (Canadian dollars) in net deferred capital expenditures.

mgd = million gallons per day

Appendix E: Analysis of Group A Rule Changes from the Water Use Efficiency Rule

Introduction

The Department of Health (DOH), Office of Drinking Water is amending its Group A Water System Rule, chapter 246-290 WAC to implement the water use efficiency provisions of the Municipal Water Supply – Efficiency Requirements Act of 2003, Chapter 5 Laws of the 2003 First Special Session (Municipal Water Law). The following is a section-by-section analysis of the changes.

The majority of changes to the current rule are located in a new Part 8, Water Use Efficiency. Some planning elements, specifically those related to source description, data collection, and demand forecasting, will be incorporated by amending existing planning rules into Part 2, Planning and Engineering Documents. Meter requirements will be incorporated into the existing Part 5, Water System Operations.

Amendments to WAC 246-290-100 and WAC 246-290-480

New and Amended Sections

The amended sections define some of the minimum planning requirements for the water use efficiency elements of water system plans (WSP). Planning requirements are outlined for source description, data collection and reporting, demand forecasts, evaluation of conservation rates, and evaluation of reclaimed water.

Analysis of Source Description Requirements

The amendments will require all Group A water systems that complete a WSP to include a description of water supply characteristics, which is a new requirement. Existing rules require a basic source description. Water supply characteristics are defined by the following new language:

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

This will require water systems to conduct additional research and coordination with DOH and the Department of Ecology during the development of their WSP.

Analysis of Data Collection and Reporting Requirements

The amendments will require all Group A water systems that complete a WSP to report monthly and annual production data and annual consumption data for each customer class. Water systems serving 1,000 connections or more will also describe seasonal variations in consumption for each customer class, which is a new requirement.

WAC 246-290-480 required production and consumption data as part of the water system's water facility inventory form. Those requirements were determined to be inconsistent with new requirements and are no longer necessary, since data requirements will now be specified in planning rules.

The basic data requirements, production, and consumption figures, including the amount of water purchased and sold, are fundamental for all water systems to forecast demand and complete a WSP. The specificity in rule on frequency and data points will be a new requirement. It is important to note that water facility inventory form requirements were for annual production and monthly consumption data. The rule will require monthly production and annual consumption data.

Breaking down consumption by customer class is not uncommon, but only a relatively small number of larger water systems typically provide this level of detail in their WSP. The rule will require all WSPs to breakdown consumption by customer classes, as determined by the water system.

Analysis of Demand Forecast Requirements

WAC 246-290-100 currently requires all Group A water systems that complete a WSP to prepare water demand forecasts for six- and twenty-year planning horizons. Amendments will require demand forecasts if goals are achieved. Demand forecasts must be consistent with existing rules in regard to calculation and forecast of average day demand, maximum day demand, population forecasts developed at the local or state level, actual water use trends, and local land use and zoning ordinances. The considerations and basic parameters to be addressed in demand forecasts are consistent with existing rules and DOH's *Water System Design Manual* (DOH PUB 331-123). The requirement to include demand forecasts with meeting water use efficiency goals and all measures are determined to be cost-effective is a new regulatory requirement.

Analysis of Requirements to Evaluate Rates that Encourage Water Use Efficiency

This provision of the Municipal Water Law was already part of state law. No change to existing rule is necessary.

Analysis of Requirement to Evaluate Opportunities for Reclaimed Water

Amendments will require water systems serving 1,000 or more connections to evaluate opportunities for reclaimed water. This provision is taken directly from state law.

Amendments to WAC 246-290-105 and WAC 246-290-480

New and Amended Sections

The amended sections define some of the minimum planning requirements for the water use efficiency program within small water system management programs (SWSMP). Planning requirements are outlined for source description, data collection and reporting, demand forecasts, and evaluation of conservation rates.

Analysis of Source Description Requirements

No changes for source description requirements for SWSMPs.

Analysis of Data Collection and Reporting Requirements

Amendments will require all Group A water systems that complete a SWSMP to report monthly and annual production, annual consumption for residential and non-residential connections, total annual volume of water sold, average daily demand, and annual average population served. Reporting these data elements in SWSMPs is a new regulatory requirement.

WAC 246-290-480 required production and consumption data as part of the water system's water facility inventory form. Those requirements were determined to be inconsistent with the new requirements and are no longer necessary since data requirements will now be specified in planning rules. It is important to note that water facility inventory form requirements were for annual production figures and monthly consumption figures. The rule would require monthly production and annual consumption data.

Analysis of Demand Forecast Requirements

Amendments will require all Group A water systems that complete a SWSMP to prepare a water demand forecast based on the water system's approved number of connections. The demand forecast must consider actual water use trends, local land use plans, and zoning ordinances. This would be a new requirement for SWSMPs.

Analysis of Requirements to Evaluate Rates that Encourage Water Use Efficiency

Amendments will require all Group A water systems that complete a SWSMP to evaluate the feasibility of adopting rate structures that encourage water use efficiency. This is a new requirement for SWSMPs, and is taken directly from state law.

Purpose and Applicability – WAC 246-290-800

New Section

The section establishes the purpose and applicability of the rule. The purpose and applicability of the rule is consistent with the requirements of RCW 70.119A.180 and RCW 90.03.015.

Analysis

The purpose and applicability of new requirements are delineated by the Washington State Legislature.

Water Use Efficiency Program – WAC 246-290-810

New and Amended Sections

The section defines the minimum planning requirements for water use efficiency programs in WSPs and SWSMPs.

Analysis

The rule would require municipal water suppliers to provide the information outlined below as part of their WSP and SWSMP. Current rules only require development of a "conservation program." All detail with regard to the content of the program is at the discretion of the municipal water supplier. Although it was always expected that water systems would implement the conservation program outlined in their WSP or SWSMP, the rule would clearly require implementation of their adopted water use efficiency program.

The following elements will be new requirements for SWSMPs, but are not considered to be new requirements for WSPs. DOH has required these elements through existing planning authorities and communicated these requirements through guidance and technical assistance materials:

- A description of the water system's current water use efficiency program, including a statement of water use efficiency goals.
- An evaluation that identifies the cost-effectiveness of conservation measures and a determination of measures that will be implemented.
- An implementation schedule and documentation of funding.
- An evaluation of distribution system leakage.

The following elements will be new requirements for WSPs and SWSMPs:

- Documentation that goals are set in accordance with WAC 246-290-840.
- An estimate of projected water savings from selected measures.
- A description of how the water use efficiency program will be evaluated for effectiveness.
- A description of how customers will be educated.

The following requirements are for water systems serving 1,000 or more connections:

- An estimate of water saved over the previous six years.
- A cost-effectiveness evaluation done in accordance with methodology prescribed in WAC 246-290-810(4)(c).

Distribution System Leakage Standard – WAC 246-290-820

New Section

This new section defines the methodology municipal water suppliers are to use to calculate distribution system leakage and describes actions that must be taken if leakage exceeds the distribution system leakage standard.

Analysis

Under current requirements, water systems completing WSPs are required to assess total unaccounted-for water and provide a plan to decrease it if over 20 percent. These requirements are based upon existing state and DOH authorities related to water system operations.

Under new requirements, municipal water suppliers will be required to calculate distribution system leakage and report the findings in their annual performance report developed under WAC 246-290-840 and water use efficiency programs developed under WAC 246-290-810. They will also be required to develop a Water Loss Control Action Plan if the average leakage rate for three consecutive years exceeds the standard. Distribution system leakage is one component of total water loss, previously referred to as unaccounted-for water.

Water Use Efficiency Goal Setting – WAC 246-290-830

New Section

This new section defines procedural requirements for establishing water use efficiency goals. Municipal water suppliers with 1,000 or more service connections will be required to establish water use efficiency goals within one year of the effective date of the rule and every six years thereafter. Municipal water suppliers with fewer than 1,000 service connections will be required to establish water use efficiency goals within two years of the effective date of the rule and every six years thereafter. Goals must be established by the elected governing board or the governing body of each water system, in a public forum. The rule specifies basic requirements for the public forum and would require that certain background materials related to the goals be made available to the public.

Analysis

The entire goal-setting process constitutes new requirements for municipal water suppliers. Previous rules only required that goals be set informally through planning processes. The basic requirement that goals be set by the elected governing board or governing body in a public forum

directly implements provisions of state law. For the purposes of this analysis, the following provisions should be considered new requirements as they represent regulatory decisions that DOH considered necessary to ensure fair and reasonable implementation of the new law.

- 14-day public notice for the public forum.
- Requirements that the elected governing board or governing body consider comments from the public.
- Requirements associated with background materials.

Water Use Efficiency Performance Reporting – WAC 246-290-840

New Section

The new section defines water use efficiency performance reporting requirements for municipal water suppliers. New state law required DOH to include this as part of its water use efficiency rule. Water systems serving 1,000 connections or more will be required to submit annual performance reports beginning July 1, 2008. Smaller water systems will be required to begin on July 1, 2009. All water systems must include the following in their reports:

- Total annual production.
- Distribution system leakage or status of becoming fully metered.
- A description of their water use efficiency goals.
- Progress toward achieving their goals.

Analysis

The provision is generally required by state law; however, all aspects were defined by DOH. This entire section should be viewed as new requirements for the purposes of this analysis.

Metering Requirements – WAC 246-290-496

New Section

The new section requires production meters for all Group A water systems and service meters for all municipal water suppliers that serve water. Municipal water suppliers are given 10 years from the effective date of this rule to retrofit existing connections with service meters. All new connections are to have service meters when they are activated. Service meters are not required for certain types of connections identified in this rule. If water systems are not fully metered, municipal water suppliers must submit a schedule describing how they will achieve full metering. They must also implement measures to minimize leakage.

Analysis

The production meter requirement clarifies existing authority. This provision is not considered a new requirement. The service meter requirements are new.

Appendix F: Water Use Efficiency Rule Planning and Process Costs

Many of the costs associated with this rule are for activities associated with plan development or carrying out required procedures. Cost estimates were developed by HDR Engineering Inc. in consultation with Department of Health (DOH) staff. The results of this analysis are provided in three tables. Table I – Water Use Efficiency Elements of Water System Plans WAC 246-290-810 and Amendments to WAC 246-290-100 lists costs for water systems required to develop a Water System Plan (WSP). Table II – Water Use Efficiency Elements of Small Water System Management Program WAC 246-290-820 and Amendments to WAC 246-290-105 lists costs for water systems that develop a Small Water System Management Program (SWSMP). Table III – Additional Costs for Water Loss Control Action Plan provides costs associated with development of a Water Loss Control Action Plan (WLCAP). WLCAP costs were separated from other planning costs because only water systems that exceed the leakage standard will be required to develop a WLCAP.

The cost estimates presented in Tables I, II, and III are based on assumed labor hours needed to comply with a specific rule provision. The cost estimates reflect only the increase in costs over current requirements. The notes listed below provide more information about the assumptions used to develop the cost estimates.

Another common method for estimating costs is to conduct a survey of regulated entities. DOH used that method for the cost-benefit analysis conducted for the 1999 revisions of WAC 246-290. A rough comparison of similar requirements was conducted to assess the accuracy of the estimates used for this analysis. For example, the 1999 revisions included a new requirement for source of supply analysis in WSPs. The new work required for that provision is similar to the new work being required now to provide a more complete source description in WSPs. The 1999 analysis developed the following costs for the sources of supply analysis.

1999 Estimate for Source of Supply Analysis

Water System Size	Cost per Connection
< = 250	$8.09
251 – 1,000	$0.80
1,001 – 10,000	$0.01
> 10,000	$0.04

This analysis estimated the cost of new source description requirements in terms of a range of costs for water systems in different size categories.

2006 Estimate for Source Description

Size Category	Range of Costs
Very Small (< 100 Connections)	$176 – $528
Small (100 – 999 Connections)	$490 – $1,176
Medium (1,000 – 9,999 Connections)	$784 – $1,196
Large (> 9,999 Connections)	$1,176 – $2,940

The estimates can be compared by looking at the estimated costs for a hypothetical water system in each size category.

	Water System Size (Number of Connections)	50	500	5,000	25,000
2006 Estimate	**Range of Total Costs**	$176 – $528	$490 – $1,176	$784 – $1,196	$1,176 – $2,940
	Range of per Connection Costs	$3.52 – $10.56	$0.98 – $2.35	$0.16 – $2.39	$0.04 – $0.12
1999 Estimate	**Total Costs**	$445	$400	$500	$10,000
	Per Connection Costs	$8.09	$0.80	$0.01	$0.04

The 2006 estimates, which were based on assumptions developed by DOH and HDR, appear to be similar to those developed in 1999, which were based on a survey of utilities. The 1999 estimate indicates a much higher cost for very large water systems. This is probably not accurate since it does not account for the economy of scale associated with water systems in this size category. The 2006 method is more likely to represent an accurate assessment of costs.

Table I. Water Use Efficiency Elements of Water System Plans WAC 246-290-810 & Amendments to WAC 246-290-100

		15 - 99 Connections						100 – 999 Connections					
		Labor Hours (1)				Labor Costs (2)		Labor Hours (1)				Labor Costs (2)	
		Low		High				Low		High			
Provision	Costs	Non-Prof	Prof (3)	Non-Prof	Prof (3)	Low	High	Non-Prof	Prof	Non-Prof	Prof	Low	High
Source Description													
Annual Costs	N/A	0	0	0	0	$0	$0	0	0	0	0	$0	$0
	Subtotal, annual costs	0	0	0	0	$0	$0	0	0	0	0	$0	$0
6-year Costs	Research required information on sources of supply (4)	2	0	12	0	$44	$264	0	4	0	12	$196	$588
	Coordinate with DOH & Ecology	2	0	6	0	$44	$132	0	2	0	6	$98	$294
	Document source description in WSP	4	0	6	0	$88	$132	0	4	0	6	$196	$294
	Subtotal, 6-year costs	8	0	24	0	$176	$528	0	10	0	24	$490	$1,176
Subtotal Annual + 6-year Costs (Annualized) (12)		**1**	**0**	**4**	**0**	**$29**	**$88**	**0**	**2**	**0**	**4**	**$82**	**$196**
Data Collection and Analysis (water systems with existing metering and billing system)													
Annual Costs	Visit sources & record production data (5)	0	0	6	0	$0	$132	0	0	12	4	$0	$460
	Analyze production data	0	0	4	0	$0	$88	0	0	0	4	$0	$196
	Subtotal, annual costs	0	0	10	0	$0	$220	0	0	12	8	$0	$656
6-year Costs	Extract & analyze consumption data	0	0	16	0	$0	$352	0	0	24	20	$0	$1,508
	Estimate consumption by customer class	0	0	4	0	$0	$88	0	0	8	8	$0	$568
	Estimate seasonal variation in consumption	0	0	4	0	$0	$88	0	0	8	8	$0	$568
	Subtotal, 6-year costs	0	0	24	0	$0	$528	0	0	40	36	$0	$2,644
Subtotal Annual + 6-year Costs (Annualized)		**0**	**0**	**14**	**0**	**$0**	**$308**	**0**	**0**	**19**	**14**	**$0**	**$1,097**

Table I. Water Use Efficiency Elements of Water System Plans WAC 246-290-810 & Amendments to WAC 246-290-100 (cont)

Provision	Costs	15 - 99 Connections						100 – 999 Connections					
		Labor Hours (1)				Labor Costs (2)		Labor Hours (1)				Labor Costs (2)	
		Low		High				Low		High			
		Non-Prof	Prof (3)	Non-Prof	Prof (3)	Low	High	Non-Prof	Prof	Non-Prof	Prof	Low	High
Data Collection and Analysis (water systems without existing metering and billing system)													
Annual Costs	Visit sources & record production data (5)	0	0	6	0	$0	$132	0	0	12	4	$0	$460
	Analyze production data	0	0	10	0	$0	$220	0	0	0	8	$0	$392
	Subtotal, annual costs	0	0	16	0	$0	$352	0	0	12	12	$0	$852
6-year Costs	Extract & analyze consumption data (6)	0	0	4	0	$0	$88	0	0	8	8	$0	$568
	Estimate consumption by customer class	0	0	4	0	$0	$88	0	0	8	4	$0	$372
	Estimate seasonal variation in consumption	0	0	4	0	$0	$88	0	0	8	4	$0	$372
	Subtotal, 6-year costs	0	0	12	0	$0	$264	0	0	24	16	$0	$1,312
Subtotal Annual + 6-year Costs (Annualized)		**0**	**0**	**18**	**0**	**$0**	**$396**	**0**	**0**	**16**	**15**	**$0**	**$1,071**
Demand Forecast													
Annual Costs	N/A	0	0	0	0	$0	$0	0	0	0	0	$0	$0
	Subtotal, annual costs	0	0	0	0	$0	$0	0	0	0	0	$0	$0
6-year Costs	Adjusting forecast for cons. savings (7)	0	0	8	0	$0	$176	0	0	0	16	$0	$784
	Subtotal, 6-year costs	0	0	8	0	$0	$176	0	0	0	16	$0	$784
Subtotal Annual + 6-year Costs (Annualized)		**0**	**0**	**1**	**0**	**$0**	**$29**	**0**	**0**	**0**	**3**	**$0**	**$131**
Water Use Efficiency Program Development & Reporting – Informational													
Annual Costs	Assess compliance with goal setting	2	0	4	0	$44	$88	0	4	0	6	$196	$294
	Prepare & distribute performance report (15)	6	0	8	0	$132	$176	4	4	6	6	$284	$426
	Subtotal, annual costs	8	0	12	0	$176	$264	4	8	6	12	$480	$720

Table I. Water Use Efficiency Elements of Water System Plans WAC 246-290-810 & Amendments to WAC 246-290-100 (cont)

Provision	Costs	15 - 99 Connections						100 – 999 Connections					
		Labor Hours (1)				Labor Costs (2)		Labor Hours (1)				Labor Costs (2)	
		Low		High				Low		High			
		Non-Prof	Prof (3)	Non-Prof	Prof (3)	Low	High	Non-Prof	Prof	Non-Prof	Prof	Low	High
Water Use Efficiency Program Development & Reporting – Informational – Continued													
6-year Costs	Evaluate cost-effectiveness of cons. measures (9)	0	0	8	0	$0	$176	0	0	4	8	$0	$480
	Define proposed goals & options (6)(10)	8	0	16	0	$176	$352	0	8	0	8	$392	$392
	Hold meeting & determine goals	8	0	16	0	$176	$352	0	16	0	16	$784	$784
	Subtotal, 6-year Costs	16	0	40	0	$352	$880	0	24	4	32	$1,176	$1,656
Subtotal Annual + 6-year Costs (Annualized)		**11**	**0**	**19**	**0**	**$235**	**$411**	**4**	**12**	**7**	**17**	**$676**	**$996**
Evaluate Distribution System Leakage													
Annual Costs	Extract & analyze data (11)	12	0	16	0	$264	$352	12	4	16	8	$460	$744
	Report results	6	0	8	0	$132	$176	0	6	0	8	$294	$392
	Subtotal, Annual Costs	18	0	24	0	$396	$528	12	10	16	16	$754	$1,136
6-year Costs	N/A	0	0	0	0	$0	$0	0	0	0	0	$0	$0
	Subtotal, 6-year Costs	0	0	0	0	$0	$0	0	0	0	0	$0	$0
Subtotal Annual + 6-year Costs (Annualized)		**18**	**0**	**24**	**0**	**$396**	**$528**	**12**	**10**	**16**	**16**	**$754**	**$1,136**
Total Annual Cost of All Annual Items-1 Water System		**26**	**0**	**46**	**0**	**$572**	**$1,012**	**16**	**18**	**34**	**36**	**$1,234**	**$2,512**
Total Additional Cost Each 6th Year-1 Water System		**24**	**0**	**96**	**0**	**$582**	**$2,112**	**0**	**34**	**44**	**108**	**$1,666**	**$6,260**
Total Annualized Cost-1 Water System (12)		**30**	**0**	**62**	**0**	**$660**	**$1,364**	**16**	**24**	**41**	**54**	**$1,512**	**$3,555**

Table I. Water Use Efficiency Elements of Water System Plans WAC 246-290-810 & Amendments to WAC 246-290-100 (cont)

		1,000 – 9,999 Connections						> 9,999 Connections					
		Labor Hours (1)				Labor Costs (2)		Labor Hours (1)				Labor Costs (2)	
		Low		High				Low		High			
Provision	Costs	Non-Prof	Prof	Non-Prof	Prof	Low	High	Non-Prof	Prof	Non-Prof	Prof	Low	High
Source Description													
Annual Costs	N/A	0	0	0	0	$0	$0	0	0	0	0	$0	$0
	Subtotal, annual costs	0	0	0	0	$0	$0	0	0	0	0	$0	$0
6-year Costs	Research required information on sources of supply (4)	0	4	0	16	$196	$784	0	6	0	24	$294	$1,176
	Coordinate with DOH & Ecology	0	4	0	8	$196	$392	0	6	0	12	$294	$588
	Document source description in WSP	0	8	0	16	$392	$784	0	12	0	24	$588	$1,176
	Subtotal, 6-year costs	0	16	0	40	$784	$1,960	0	24	0	60	$1,176	$2,940
Subtotal Annual + 6-year Costs (Annualized) (12)		**0**	**3**	**0**	**7**	**$131**	**$327**	**0**	**4**	**0**	**10**	**$196**	**$490**
Data Collection and Analysis (water systems with existing metering and billing system)													
Annual Costs	Visit sources & record production data (5)	0	0	24	8	$0	$1,088	0	0	0	0	$0	$0
	Analyze production data	0	0	0	8	$0	$392	0	0	8	12	$0	$820
	Subtotal, annual costs	0	0	24	16	$0	$1,480	0	0	8	12	$0	$820
6-year Costs	Extract & analyze consumption data	0	0	40	20	$0	$2,140	0	0	40	20	$0	$2,140
	Estimate consumption by customer class	0	0	16	16	$0	$1,248	0	0	16	16	$0	$1,248
	Estimate seasonal variation in consumption	0	0	16	16	$0	$1,248	0	0	16	16	$0	$1,248
	Subtotal, 6-year costs	0	0	72	52	$0	$4,636	0	0	72	52	$0	$4,636
Subtotal Annual + 6-year Costs (Annualized)		**0**	**0**	**36**	**25**	**$0**	**$2,253**	**0**	**0**	**20**	**21**	**$0**	**$1,593**

Table I. Water Use Efficiency Elements of Water System Plans WAC 246-290-810 & Amendments to WAC 246-290-100 (cont)

		1,000 – 9,999 Connections						> 9,999 Connections					
		Labor Hours (1)				Labor Costs (2)		Labor Hours (1)				Labor Costs (2)	
		Low		High				Low		High			
Provision	Costs	Non-Prof	Prof (3)	Non-Prof	Prof (3)	Low	High	Non-Prof	Prof	Non-Prof	Prof	Low	High
Data Collection and Analysis (water systems without existing metering and billing system)													
Annual Costs	Visit sources & record production data (5)	0	0	24	4	$0	$892	0	0	0	0	$0	$0
	Analyze production data	0	0	0	12	$0	$588	0	0	0	20	$0	$980
	Subtotal, annual costs	0	0	24	16	$0	$1,480	0	0	0	20	$0	$980
6-year Costs	Extract & analyze consumption data (6)	0	0	8	16	$0	$1,016	0	0	8	16	$0	$1,016
	Estimate consumption by customer class	0	0	8	8	$0	$624	0	0	8	8	$0	$624
	Estimate seasonal variation in consumption	0	0	8	8	$0	$624	0	0	8	8	$0	$624
	Subtotal, 6-year costs	0	0	24	32	$0	$2,264	0	0	24	32	$0	$2,264
Subtotal Annual + 6-year Costs (Annualized)		**0**	**0**	**28**	**21**	**$0**	**$1,857**	**0**	**0**	**4**	**25**	**$0**	**$1,357**
Demand Forecast													
Annual Costs	N/A	0	0	0	0	$0	$0	0	0	0	0	$0	$0
	Subtotal, annual costs	0	0	0	0	$0	$0	0	0	0	0	$0	$0
6-year Costs	Adjusting forecast for cons. savings (7)	0	0	0	24	$0	$1,176	0	0	0	24	$0	$1,176
	Subtotal, 6-year costs	0	0	0	24	$0	$1,176	0	0	0	24	$0	$1,176
Subtotal Annual + 6-year Costs (Annualized)		**0**	**0**	**0**	**4**	**$0**	**$196**	**0**	**0**	**0**	**4**	**$0**	**$196**
Water Use Efficiency Program Development & Reporting – Informational													
Annual Costs	Assess compliance with goal setting	0	6	0	8	$294	$392	0	10	0	12	$490	$588
	Prepare & distribute performance report (15)	4	4	16	8	$312	$856	6	6	20	12	$468	$1,168
	Subtotal, annual costs	4	10	16	16	$606	$1,248	6	16	20	24	$958	$1,756

Table I. Water Use Efficiency Elements of Water System Plans WAC 246-290-810 & Amendments to WAC 246-290-100 (cont)

		1,000 – 9,999 Connections						> 9,999 Connections					
		Labor Hours (1)				Labor Costs (2)		Labor Hours (1)				Labor Costs (2)	
		Low		High				Low		High			
Provision	Costs	Non-Prof	Prof (3)	Non-Prof	Prof (3)	Low	High	Non-Prof	Prof	Non-Prof	Prof	Low	High
Water Use Efficiency Program Development & Reporting – Informational – Continued													
6-year Costs	Evaluate cost-effectiveness of cons. measures (9)	0	0	12	30	$0	$1,818	0	0	16	30	$0	$1,934
	Estimate savings past 6 years	8	8	16	16	$624	$1,248	8	8	16	16	$624	$1,248
	Assess maximum possible water savings from all cost-effective measures	24	24	48	72	$1,872	$4,920	24	24	48	72	$1,872	$4,920
	Define proposed goals & options (6)(10)	0	12	0	24	$588	$1,176	0	12	0	24	$588	$1,176
	Hold meeting & determine goals	0	8	0	24	$392	$1,176	0	18	0	24	$392	$1,176
	Subtotal, 6-year Costs	32	52	76	166	$3,476	$10,338	32	52	80	166	$3,476	$10,454
Subtotal Annual + 6-year Costs (Annualized)		**9**	**19**	**29**	**44**	**$1,185**	**$2,971**	**11**	**25**	**33**	**52**	**$1,537**	**$3,498**
Evaluate Distribution System Leakage													
Annual Costs	Extract & analyze data (11)	12	8	16	16	$740	$1,248	12	12	20	20	$936	$1,560
	Report results	0	8	0	10	$392	$490	0	12	0	16	$936	$784
	Subtotal, Annual Costs	12	16	16	26	$1,132	$1,738	12	24	20	36	$1,524	$2,344
6-year Costs	N/A	0	0	0	0	$0	$0	0	0	0	0	$0	$0
	Subtotal, 6-year Costs	0	0	0	0	$0	$0	0	0	0	0	$0	$0
Subtotal Annual + 6-year Costs (Annualized)		**12**	**16**	**16**	**26**	**$1,132**	**$1,738**	**12**	**24**	**20**	**36**	**$1,524**	**$2,344**
Total Annual Cost of All Annual Items-1 Water System		**16**	**26**	**56**	**58**	**$1,738**	**$4,466**	**18**	**40**	**48**	**72**	**$2,482**	**$4,920**
Total Additional Cost Each 6th Year-1 Water System		**32**	**68**	**148**	**282**	**$4,260**	**$18,110**	**32**	**76**	**152**	**302**	**$4,652**	**$19,206**
Total Annualized Cost-1 Water System (12)		**21**	**37**	**81**	**105**	**$2,448**	**$7,484**	**23**	**53**	**73**	**122**	**$3,257**	**$8,121**

Table II. Water Use Efficiency Elements of Small Water System Management Program WAC 246-290-820 & Amendments to WAC 246-290-105

		15 - 99 Connections						100 – 999 Connections					
		Labor Hours (1)				Labor Costs (2)		Labor Hours (1)				Labor Costs (2)	
		Low		High				Low		High			
		Non-Prof	Prof (3)	Non-Prof	Prof (3)	Low	High	Non-Prof	Prof	Non-Prof	Prof	Low	High
Source Description (N/A) (16)		0	0	0	0	$0	$0	0	0	0	0	$0	$0
Data Collection and Reporting													
Annual Costs	Extract and report production data (13)	0	0	16	0	$0	$352	0	0	16	0	$0	$352
	Subtotal, annual costs	0	0	16	0	$0	$352	0	0	16	0	$0	$352
6-year Costs	N/A	0	0	0	0	$0	$0	0	0	0	0	$0	$0
	Subtotal, 6-year costs	0	0	0	0	$0	$0	0	0	0	0	$0	$0
Subtotal Annual + 6-year Costs (Annualized)		**0**	**0**	**16**	**0**	**$0**	**$352**	**0**	**0**	**16**	**0**	**$0**	**$352**
Demand Forecast													
Annual Costs	N/A	0	0	0	0	$0	$0	0	0	0	0	$0	$0
	Subtotal, annual costs	0	0	0	0	$0	$0	0	0	0	0	$0	$0
6-year Costs	Demand forecast, beyond current requirements	0	0	4	0	$0	$88	0	0	4	0	$0	$88
	Subtotal, 6-year costs	0	0	4	0	$0	$88	0	0	4	0	$0	$88
Subtotal Annual + 6-year Costs (Annualized)		**0**	**0**	**1**	**0**	**$0**	**$15**	**0**	**0**	**1**	**0**	**$0**	**$15**

Table II. Water Use Efficiency Elements of Small Water System Management Program WAC 246-290-820 & Amendments to WAC 246-290-105 (cont)

		15 - 99 Connections						100 – 999 Connections					
		Labor Hours (1)				Labor Costs (2)		Labor Hours (1)				Labor Costs (2)	
		Low		High				Low		High			
		Non-Prof	Prof (3)	Non-Prof	Prof (3)	Low	High	Non-Prof	Prof	Non-Prof	Prof	Low	High
Water Use Efficiency Program Development – Informational (14)													
Annual Costs	Report compliance with goal-setting	4	0	4	0	$88	$88	0	6	0	6	$294	$294
	Subtotal, annual costs	4	0	4	0	$88	$88	0	6	0	6	$294	$294
6-year Costs	Description of municipal water suppliers past and future water use efficiency program	4	0	12	0	$88	$264	0	6	0	16	$294	$784
	Define proposed goals and options	8	0	8	0	$176	$176	0	8	0	8	$392	$392
	Hold meeting and determine goals	6	0	12	0	$132	$264	0	8	0	16	$392	$784
	Cost-effectiveness analysis of conservation	0	0	10	0	$0	$220	0	0	4	8	$0	$480
	Selection of conservation measures to implement	4	0	16	0	$88	$352	0	4	0	20	$196	$980
	Implementation schedule and funding	4	0	8	0	$88	$176	0	4	0	8	$196	$392

Table II. Water Use Efficiency Elements of Small Water System Management Program WAC 246-290-820 & Amendments to WAC 246-290-105 (cont)

		15 - 99 Connections						100 – 999 Connections					
		Labor Hours (1)				Labor Costs (2)		Labor Hours (1)				Labor Costs (2)	
		Low		High				Low		High			
		Non-Prof	Prof (3)	Non-Prof	Prof (3)	Low	High	Non-Prof	Prof	Non-Prof	Prof	Low	High
Water Use Efficiency Program Development – Informational (14) – Continued													
6-year Cost – continued	Est. projected water savings	4	0	8	0	$88	$176	0	4	0	8	$196	$392
	Subtotal, 6-year Costs	30	0	74	0	$660	$1,628	0	34	4	84	$1,666	$4,204
Subtotal Annual + 6-year Costs (Annualized)		**9**	**0**	**16**	**0**	**$198**	**$359**	**0**	**12**	**1**	**20**	**$572**	**$995**
Evaluate Distribution System Leakage													
Annual Costs	Extracting and analyzing data	12	0	16	0	$264	$352	12	4	16	8	$460	$744
	Reporting results	6	0	8	0	$132	$176	0	6	0	8	$294	$392
	Subtotal, Annual Costs	18	0	24	0	$396	$528	12	10	16	16	$754	$1,136
6-year Costs	N/A	0	0	0	0	$0	$0	0	0	0	0	$0	$0
	Subtotal, 6-year Costs	0	0	0	0	$0	$0	0	0	0	0	$0	$0
Subtotal Annual + 6-year Costs (Annualized)		**18**	**0**	**24**	**0**	**$396**	**$528**	**12**	**10**	**16**	**16**	**$754**	**$1,136**
Total Annual Cost of All Annual Items-1 Water System		**22**	**0**	**44**	**0**	**$484**	**$968**	**12**	**16**	**32**	**22**	**$1,048**	**$1,782**
Total Additional Cost Each 6th Year-1 Water System		**30**	**0**	**78**	**0**	**$660**	**$1,716**	**0**	**34**	**8**	**84**	**$1,666**	**$4,292**
Total Annualized Cost-1 Water System		**27**	**0**	**57**	**0**	**$594**	**$1,254**	**12**	**22**	**33**	**36**	**$1,326**	**$2,497**

Labor Cost Assumptions	**> 1,000 Connections**	**< 1,000 Connections**
Non-professional Staff (salary plus benefits	$29 hourly	$22 hourly
Professional Staff (salary plus benefits)	$49 hourly	$49 hourly

Table III. Additional Costs for Water Loss Control Action Plans

Water Systems Needed To Prepare a Water System Plan [1]

		15 – 99 Connections						100 – 999 Connections					
		Labor Hours (1)				Labor Costs (2)		Labor Hours (1)				Labor Costs (2)	
		Low		High				Low		High			
Component	Costs	Non-Prof	Prof (9)	Non-Prof	Prof (9)	Low	High	Non-Prof	Prof	Non-Prof	Prof	Low	High
Annual Costs	N/A	0	0	0	0	0	0					$0	$0
	Subtotal, Annual Costs	0	0	0	0	0	0	0	0	0	0	$0	$0
6-year Costs (6)	Diagnose source of leakage	8	0	40	0	232	1,160	12	8	40	8	$740	$1,552
	Design solutions	8	0	20	0	232	580	12	6	20	16	$642	$1,364
	Prepare WLCAP	4	0	6	0	116	174	0	6	0	10	$294	$490
	Discuss plan with DOH and modify as needed	4		6		116	174	0	6	0	10	$294	$490
	Subtotal, 6-year Costs	24	0	72	0	696	2,088	24	26	60	44	$1,970	$3,896
Subtotal Annual + 6-year Costs (Annualized)		**4**	**0**	**12**	**0**	**116**	**348**	**4**	**4**	**10**	**7**	**$328**	**$649**

[1] Applicable only to those systems whose leakage exceeds the leakage standard.

Table III – Additional Costs for Water Loss Control Action Plan (cont)

Water Systems Needing To Prepare a Small Water System Management Program [1]

		15 – 99 Connections						100 – 999 Connections					
		Labor Hours (1)				Labor Costs (2)		Labor Hours (1)				Labor Costs (2)	
		Low		High				Low		High			
Component	Costs	Non-Prof	Prof (9)	Non-Prof	Prof (9)	Low	High	Non-Prof	Prof	Non-Prof	Prof	Low	High
Annual Costs	N/A	0	0	0	0	0	0	0	0	0	0	$0	$0
	Subtotal, Annual Costs	0	0	0	0	0	0	0	0	0	0	$0	0
6-year Costs (6)	Diagnose source of leakage	8	0	40	0	176	880	12	8	40	8	$656	$1,272
	Design solutions	8	0	20	0	176	440	12	6	20	16	$558	$1,124
	Prepare WLCAP	4	0	6	0	88	132	0	6	0	10	$294	$490
	Discuss plan with DOH and modify as needed	4		6		88	132	0	6	0	10	$294	$490
	Subtotal, 6-year Costs	24	0	72	0	528	1,584	24	26	60	44	$1,802	$3,476
Subtotal Annual + 6-year Costs (Annualized)		**4**	**0**	**12**	**0**	**88**	**264**	**4**	**4**	**10**	**7**	**$300**	**$579**

[1] Applicable only to those systems whose leakage exceeds the leakage standard.

Table III – Additional Costs for Water Loss Control Action Plan (cont)

Water Systems Needed To Prepare a Water System Plan [1]

		1,000 – 9,999 Connections						10,000 or More Connections					
		Labor Hours (1)				Labor Costs (2)		Labor Hours (1)				Labor Costs (2)	
		Low		High				Low		High			
Component	Costs	Non-Prof	Prof (9)	Non-Prof	Prof (9)	Low	High	Non-Prof	Prof	Non-Prof	Prof	Low	High
Annual Costs	N/A	0	0	0	0	0	0	0	0	0	0	$0	$0
	Subtotal, Annual Costs	0	0	0	0	0	0	0	0	0	0	$0	$0
6-year Costs (6)	Diagnose source of leakage	20	8	60	16	972	2,524	30	12	72	24	$1,458	$3,264
	Design solutions	10	10	20	20	780	1,560	16	16	30	30	$1,248	$2,340
	Prepare WLCAP	0	8	0	16	392	784	4	16	4	24	$900	$1,292
	Discuss plan with DOH and modify as needed	0	8	0	8	392	392	0	12	0	12	$588	$588
	Subtotal, 6-year Costs	30	34	80	60	2,536	5,260	50	56	106	90	$4,194	$7,484
Subtotal Annual + 6-year Costs (Annualized)		**5**	**6**	**13**	**10**	**423**	**877**	**8**	**9**	**18**	**15**	**$699**	**$1,247**

[1] Applicable only to those systems whose leakage exceeds the leakage standard.

Notes for Tables I, II, and III

- The costs represent new costs to water systems resulting from the water use efficiency rule only. For example, current state law requires water systems completing a WSP to evaluate the feasibility of implementing conservation-oriented rates. That requirement is also captured in the rule. Associated costs are not included in this analysis.
- Some potential costs associated with the rule are related to provisions taken directly from statute. The Administrative Procedures Act does not require analysis of these costs so they are not included in estimates. These include the requirement to evaluate the feasibility of rates that encourage water conservation in SWSMPs and evaluation of opportunities for reclaimed water required in WSPs.
- Costs are expressed as a range of costs for water systems in each size category. The range reflects on the low end of a water system that is already substantially in compliance with the rule and, on the high end of water systems that are starting with very limited water use efficiency programs that meet only the minimum requirements listed on Attached 4: Current Conservation Planning Requirements for Water System Plans in the DOH's document *Municipal Water Law: Interim Planning Guidance for Water System Plan / Small Water System Management Program Approvals*, DOH PUB 331-256.
- The range of costs associated with cost-effectiveness evaluations reflect, on the low end, a water system that implement measures in all categories and chooses to include no cost-effectiveness evaluation in its WSPs, and on the high end, a water system that chooses to include an evaluation of the maximum number of measures required by the rule. Costs do not include the cost of implementing conservation programs or installing, reading, and maintaining meters.
- Costs associated with the source description element are based on the assumption that the Department of Health and Department of Ecology will provide the water system with information related to any legal conditions that affect their source of water (instream flow limit, Endangered Species Act listings, etc).
- For water systems in the 100 to 999 connection size category that are only required to develop a SWSMP the range of costs reflect, on the low end, a water system that is already substantially in compliance with the rule and, on the high end, water systems that are starting from very limited water use efficiency programs that meet only the minimum requirements contained in the DOH *Small Water System Management Program Guide* (DOH PUB 331-134).
- For water systems in the 15 to 99 connection size category that are only required to develop a SWSMP the range of costs is based on the assumption that the water system has only a very limited water use efficiency program that meets only the minimum requirements contained in the DOH *Small Water System Management Program Guide*, (DOH PUB 331-134). These costs do not include the cost of implementing conservation programs or installing, reading, and maintaining meters. This task is focused entirely on the development costs of the water use efficiency element for SWSMPs.

Notes for Tables I, II, and III

The notes below apply to specific items in Tables I, II, and III. The notes are referenced on the table by a number in parenthesis.

1. Labor estimates are averages within each size class. They do not represent the extreme high and low needs of the size class. Low end of cost range is additional cost to an average water system that is already in substantial compliance with the new requirements. High end of cost range is new cost to an average water system that will have to gear up to meet the requirements.

2. The following average labor costs are based on statistics published by the Washington State Department of Labor and Industries and Employment Security (Appendix J: Labor Costs).

   - Non-professional staff – hourly cost (salary plus benefits): $22 to $29
   - Professional staff – hourly cost (salary plus benefits): $49

   In the non-professional category, the lowest figure is used for water systems with 15 to 999 connections, reflecting the assumption that they have lower paid employees compared with water systems serving 1,000 or more connections.

3. Water systems with < 100 connections typically do not have "professional" staff so all numbers are calculated for non-professional labor category. This may be high since many water systems in this size category can be expected to use volunteer labor or employees that make much less than the state average.

4. The following assumptions were used to estimate the cost of developing source descriptions.

   - Water systems with fewer than 1,000 connections draw from only one water resource (*e.g.* a single aquifer or surface water body).
   - Water systems with 1,000 or 9,999 connections average 1.5 sources (50 percent have one; 50 percent have two).
   - Water systems > 10,000 connections average 2.5 sources (50 percent have two; 50 percent have three). A single aquifer counts as one source, even if multiple wells are used. However some water systems use multiple aquifers. Assume "high" cost of coordination with agencies requires a meeting.

5. The following assumptions were used to estimate the cost of collecting source meter data.

   - Water systems up to 99 connections require 0.5 hour per month to visit sources and check production.
   - Water systems up to 999 connections require one hour per month.
   - Water systems up to 9,999 connections require two hours per month.
   - Labor costs for checking sources were multiplied by 12 months, then added to the cost of processing the data collected. "Low" cost is zero because this is defined as cost to water systems already substantially in compliance with the rule. This implies they are already recording production data. For water systems > 10,000 connections it is assumed they already collect this data. Therefore the "high" cost is not applicable.

6. Extracting and reporting consumption data is simplified for a water system with no metering and/or billing system, because it is an estimation process rather than a data extraction and analysis process. This scenario is provided for information only. The calculation of total costs used the more expensive scenario.

7. Demand forecasting is already required for all water systems completing a WSP, regardless of size. A requirement to prepare a demand forecast both with and without conservation is considered new. The cost is simply calculating water savings at each major year of demand forecast (*e.g.* six and twenty years) and subtracting from demand forecast already required (demand without conservation).

8. Requirement to evaluate rates in WSPs is not new. Therefore, no new costs result from the rule.

9. Cost-effectiveness evaluation needed only by those municipal water suppliers not implementing the required number of measures in each category. Therefore, "low" cost is zero. High cost is based on an assumption that even at the high end, half of the water systems will choose to implement measures rather than perform evaluation. Therefore, the average water system incurs only half the estimated cost of preparing the cost-effectiveness evaluation and estimating resulting water saving.

10. Labor hours needed for goal setting assume the other informational requirements are also being met. This reduces cost, compared to if goal-setting were done in isolation.

11. Includes annual extraction of sales data. Apart from this requirement, annual extraction would not be required.

12. Total annualized cost is the annual cost plus 1/6 of the additional cost each sixth year.

13. Existing rules require annual source data; they do not definitely require monthly data. Therefore, "high" cost is for water systems not currently collecting monthly production data. Assumes recording one source, once per month, for total of 12 hours per year; plus four hours to compile and report data.

14. Water systems that are only required to develop a SWSMP are not required to develop a new water use efficiency program every six years. For the purposes of estimating costs, it is assumed that they will re-evaluate their programs every six years when they re-evaluate their goals.

15. Distribution of performance reports may be a stand-alone document in some cases, but many municipal water suppliers can likely incorporate performance reports for distribution to consumers via other existing public-information publications, such as the Consumer Confidence Report or quarterly newsletter.

16. The requirement for water systems preparing a SWSMP to include a source description is not new. Therefore there are no costs assigned.

Appendix G: 2005 Water Use Efficiency Survey

Background

During the summer of 2005, the Department of Health's (DOH) Office of Drinking Water conducted a survey to assess the performance of Washington's water systems in the area of water use efficiency. The question that provided the framework for the survey was the following:

> To what extent are public water systems in the state of Washington already meeting the requirements of DOH's proposed water use efficiency rule?

This audit was intended to supplement information previously collected by Office of Drinking Water staff and documented in Appendix H: Technical Assistance Survey. That survey assessed performance by comparing documented performance with guidance contained in DOH's, *Conservation Planning Requirements* (DOH PUB 331-008).

Survey Method

A list of water systems was generated from the Office of Drinking Water's Sentry data system. The list contained all water systems that obtained approval of a water system plan (WSP) or small water system management program (SWSMP) from DOH during the period from June 2003 through August 2005. These provided a representative sample that was geographically distributed across the state and included water systems from all size categories listed below.

Profile of Water Systems Surveyed

Water System Size/Planning Document

In addition to water system size, water use efficiency requirements vary depending on the type of planning document that the water system is required to prepare. In general, non-expanding water systems with fewer than 1,000 total connections prepare a SWSMP. Large and expanding water systems must develop a WSP. The table below shows the number of water systems in each size category that was included in the survey.

Size Category	Number of Connections	Number of Water Systems Surveyed
Very Small (SWSMP)	< 100	4
Very Small (WSP)	< 100	19
Small (SWSMP)	100 – 999	4
Small (WSP)	100 – 999	38
Medium	1,000 – 9,999	20
Large	> 9,999	5
Total Surveyed		**90**

While the number of SWSMPs appears small, this reflects the fact that only a very few SWSMPs must be submitted to DOH for approval. While the majority of very small water systems are required to develop and implement a SWSMP, only those that meet certain criteria must be submitted to DOH for approval. There are only five large water systems included in the survey, which reflects the relatively small number of large water systems statewide.

Region

The Office of Drinking Water maintains three regional offices. Each regional office provides regulatory oversight over water systems located in specific counties. The counties covered by each regional office are listed below.

> **Eastern** – Adams, Asotin, Benton, Chelan, Columbia, Douglas, Ferry, Franklin, Garfield, Grant, Kittitas, Klickitat, Lincoln, Pend Oreille, Okanogan, Spokane, Stevens, Walla Walla, Whitman, Yakima
>
> **Northwest** – Island, King, Pierce, San Juan, Skagit, Snohomish, Whatcom
>
> **Southwest** – Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Kitsap, Lewis, Mason, Pacific, Skamania, Thurston, Wahkiakum

Region	Number of Water Systems Surveyed
Eastern	35
Northwest	29
Southwest	26
Total	**90**

Consumption Patterns

Basic water production and consumption data (average day demand, maximum day demand, and peaking factor) were obtained from the planning documents. This data was used to conduct an analysis of current consumption patterns to establish a basis for assumptions about the potential water that could be saved through water use efficiency measures.

Water Use Efficiency Planning

Selection and Implementation of Water Use Efficiency Measures

The rule would require municipal water suppliers to implement a water use efficiency program, which would need to be described in their WSP or SWSMP. These are new regulatory provisions. They are, however, based on existing guidance and many water systems already implement water use efficiency programs. Planning documents were reviewed to determine if existing water use efficiency programs would meet new regulatory requirements. To make these determinations, the following questions were asked:

- Does the planning document contain a water use efficiency element?
- Does that water use efficiency element contain a cost-effectiveness evaluation for individual measures?

Another provision of the rule would require water systems to evaluate measures in categories based on size. Since this is a new approach to water use efficiency planning, this was not explored during review of the planning documents. As a general observation, water systems that did conduct a cost-effectiveness evaluation tended to evaluate a comprehensive list of measures. All but one of the planning documents reviewed contained a water use efficiency element. SWSMPs are prepared in accordance with guidance. That guidance does not provide direction for cost-effectiveness evaluations.

	Cost-effectiveness Evaluation Included in Planning Document	
Size Category	**Number**	**%**
Very Small/Small (< 100 – 999 Connections) (SWSMP)*	0	0%
Very Small (< 100 Connections) (WSP)	1	5%
Small (100 – 999 Connections) (WSP)	1	2%
Medium (1,000 – 9,999 Connections)	2	10%
Large (> 9,999 Connections)	3	60%
Total	**7**	**8%**

* Due to the very small number of SWSMPs contained in the data set, the small and very small categories were combined.

Evaluation of Rates

The rule will require all planning documents to evaluate the feasibility of adopting rate structures that encourage water use efficiency. Current rules require this evaluation for water systems developing WSPs. This is a new requirement for water systems developing SWSMPs. Current rules only require this evaluation for water systems developing WSPs.

	Evaluation of Rates Included in Planning Document	
Size Category	**Number**	**%**
Very Small/Small (< 100 – 999 Connections) (SWSMP)*	2	25%
Very Small (< 100 Connections) (WSP)	6	32%
Small (100 – 999 Connections) (WSP)	29	76%
Medium (1,000 – 9,999 Connections)	17	85%
Large (> 9,999 Connections)	4	80%
Total	**58**	**64%**

* Due to the very small number of SWSMPs contained in the data set, the small and very small categories were combined.

Evaluation of Distribution System Leakage

The rule would require an evaluation of water system leakage within the water systems WSP. Current compliance with this provision is addressed under distribution system leakage below.

Data Collection

The rule outlines a data collection and reporting protocol for WSPs and SWSMPs. Current rules pertaining to planning, design and water facility inventory forms currently require similar data as that included in the rule. The primary shift is in the frequency of data collection and the requirements to describe seasonal variability. The following questions were explored in this analysis:

1. Did the water system use actual data, as opposed to estimates?
2. Is the water system fully metered?

If the answer to both questions is yes, then it is assumed that the water system has the equipment and procedures necessary to comply with the rule.

	Actual Data Used		Source Meters		Service Meters		All Three Elements	
Size Category	**Number**	**%**	**Number**	**%**	**Number**	**%**	**Number**	**%**
Very Small/Small (< 100 – 999 Connections) (SWSMP)*	6	75%	7	88%	3	38%	1	13%
Very Small (< 100 Connections) (WSP)	14	74%	19	100%	16	84%	13	68%
Small (100 – 999 Connections) (WSP)	29	76%	36	95%	34	89%	26	68%
Medium (1,000 – 9,999 Connections)	15	75%	20	100%	19	95%	15	75%
Large (> 9,999 Connections)	5	100%	5	100%	5	100%	5	100%
Total	**69**	**77%**	**87**	**97%**	**77**	**86%**	**60**	**67%**

*Due to the very small number of SWSMPs contained in the data set, the small and very small categories were combined.

Demand Forecasts

The rule would require that municipal water suppliers provide a demand forecast. Current rules related to water system design and planning are fundamentally similar to the new requirements.

A significant change to existing requirements is that demand forecasts be included in SWSMPs. Since water systems completing SWSMPs are non-expanding, demand forecasts are not required for water system design under current rules. For this reason, this represents an entirely new requirement for all water systems developing SWSMPs.

For water systems completing WSPs, the new regulatory requirement will be that demand forecasts be prepared for scenarios that assume no additional water use efficiency, as well as scenarios that assume that water use efficiency goals are achieved. This was part of current

guidance but not a regulatory requirement. To determine if water systems are currently in compliance with the rule, WSP's were reviewed to determine if "with and without" conservation scenarios were both included in the demand forecasts.

Size Category	Demand Forecast Meets Rule	
	Number	%
Very Small (< 100 Connections) (WSP)	7	36%
Small (100 – 999 Connections) (WSP)	17	45%
Medium (1,000 – 9,999 Connections)	10	50%
Large (> 9,999 Connections)	2	40%
Total	**36**	**40%**

Distribution System Leakage

Water Loss

The rule requires municipal water suppliers to determine distribution system leakage. This requirement differs from the common practice of determining total water loss (commonly referred to as unaccounted-for water) for the water system. The rule allows water systems to determine total water loss, and if that is less than 10 percent, no further calculation is necessary. If that exceeds 10 percent, the water system may use an alternate calculation to separate physical loss (leakage) from other types of losses.

To determine if water systems currently meet new requirements, three questions were examined.

- Did the water system determine water loss (unaccounted-for water)?
- Is water loss below 10 percent?
- Did the water system determine physical loss (leakage)?

Another question is, if the water systems determined physical loss was it less than 10 percent? This question was not explored because the vast majority of planning documents reviewed did not determine physical loss. Of the four that did, only two estimated leakage below 10 percent of production.

Size Category	Water Loss Determined?		Water Loss less Than 10%		Physical Loss Determined	
	Number	%	Number	%	Number	%
Very Small/Small (< 100 – 999 Connections) (SWSMP)*	2	25%	1	13%	0	0%
Very Small (< 100 Connections) (WSP)	10	52%	4	21%	0	0%
Small (100 – 999 Connections) (WSP)	26	68%	7	18%	2	5%
Medium (1,000 – 9,999 Connections)	17	85%	8	40%	2	5%
Large (> 9,999 Connections)	2	40%	1	20%	0	0%
Total	**57**	**63%**	**21**	**23%**	**4**	**4%**

*Due to the very small number of SWSMPs contained in the data set, the small and very small categories were combined.

Water Loss Control Action Plans

The rule requires municipal water suppliers to prepare a water loss control action plan if leakage exceeds 10 percent. While water systems that have very high leakage rates did address the issue in their planning document, this should be considered a new requirement in the rule. For this reason, no evaluation of current levels of performance was conducted as part of this survey.

Goal Setting and Performance Reports

Establishment of Goals

The rule requires municipal water suppliers to establish water use efficiency goals. The process and rule outlines requirements for process, content, and documentation of the goals. The process and documentation provisions are new requirements and for the purposes of this analysis it is assumed that no water systems currently meet these new requirements. It is noted, however, that municipalities, public utility districts, and special purpose districts already have existing pubic processes that may be used to meet the process requirements of the rule.

In regard to goal content, water systems, in accordance with DOH guidance, typically establish conservation goals. Planning documents were reviewed to determine if goals were set and whether or not the goals were stated in terms of amount of water that would be saved.

Size Category	Goals Established that Meet Rule	
	Number	%
Very Small/Small (< 100 – 999 Connections) (SWSMP)*	2	25%
Very Small (< 100 Connections) (WSP)	15	79%
Small (100 – 999 Connections) (WSP)	20	53%
Medium (1,000 – 9,999 Connections)	9	45%
Large (> 9,999 Connections)	3	60%
Total	**49**	**54%**

*Due to the very small number of SWSMP's contained in the data set, the small and very small categories were combined.

Metering Provisions

Source Meters

Planning documents were reviewed to determine how many water systems currently have source meters. Only two water systems did not have source meters, a small water system serving 239 connections and a very small water system serving 79 connections.

Service Meters

Planning documents were reviewed to determine how many water systems currently have service meters on all services. Since the rule allows service meters to be installed over a period of 10 years, the table below also shows water systems that have scheduled meter installations.

Size Category	Service Meters Installed		Service Meters Installed or Scheduled	
	Number	%	Number	%
Very Small/Small (< 100 – 999 Connections) (SWSMP)*	3	38%	6	75%
Very Small (< 100 Connections) (WSP)	16	85%	18	95%
Small (100 – 999 Connections) (WSP)	37	97%	38	100%
Medium (1,000 – 9,999 Connections)	19	95%	19	95%
Large (> 9,999 Connections)	5	100%	5	100%
Total	**80**	**89%**	**86**	**95%**

*Due to the very small number of SWSMP's contained in the data set, the small and very small categories were combined.

Appendix H: Technical Assistance Survey

Background

In 1997, the Washington State Legislature allocated funding to the Department of Health (DOH) to provide technical assistance to water systems in the area of water conservation. DOH's Office of Drinking Water established one position in each of our three regional offices and one coordinator to implement this technical assistance program. This group determined that it was necessary to develop a consistent method for prioritizing their efforts. A survey of water system plans (WSP) was conducted to establish a record of water conservation performance by water systems. The data collected for that effort were not analyzed or otherwise documented in the form of a report. The database of information collected for that effort contains information useful for understanding consumption patterns and water use efficiency performance in the state of Washington.

Survey Method

Data were extracted from the database developed by the water conservation technical assistance group. These data were collected from planning documents submitted to the Office of Drinking Water for review and approval during a period from 2001 through 2003. The data were then assessed to estimate the number of water systems whose existing water use efficiency programs are likely to be in compliance with the water use efficiency rule.

Profile of Water Systems Surveyed

System Size

The size categories used for this survey correspond to the size categories used in the rule. The number of water systems in each size category is listed in the table below.

Size Category	Number of Connections	Number
Very Small	< 100	33
Small	100 – 999	103
Medium	1,000 – 9,999	77
Large	> 9,999	13
Total		**226**

Region

ODW maintains three regional offices. Each regional office provides regulatory oversight over water systems located in specific counties. The counties covered by each regional office are listed below.

> **Eastern** – Adams, Asotin, Benton, Chelan, Columbia, Douglas, Ferry, Franklin, Garfield, Grant, Kittitas, Klickitat, Lincoln, Pend Oreille, Okanogan, Spokane, Stevens, Walla Walla, Whitman, Yakima
>
> **Northwest** – Island, King, Pierce, San Juan, Skagit, Snohomish, Whatcom
>
> **Southwest** – Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Kitsap, Lewis, Mason, Pacific, Skamania, Thurston, Wahkiakum

Region	Number of Water Systems Surveyed
Eastern	115
Northwest	62
Southwest	49
Total	**226**

Consumption Patterns

Basic water production and consumption data was obtained from the planning documents. These data were used to conduct an analysis of current consumption patterns and to establish a basis for assumptions about the potential water that can be saved through water use efficiency measures. The results of that analysis are provided in Appendix B: Water System Consumption in Washington State.

Water Use Efficiency Planning

Selection and Implementation of Water Use Efficiency Measures

The rule would require municipal water suppliers to implement a water use efficiency program. The program must be described in accordance with the rule in the municipal water supplier's WSP or small water system management program (SWSMP). These would be new regulatory provisions. They are, however, based upon existing guidance and many water systems already implement water use efficiency programs. Another provision of the rule is that water systems evaluate measures in categories determined appropriate to their size.

The data collected for the Water Conservation Technical Assistance Survey addressed the water system's water use efficiency program by determining what measures the water system was either implementing, had scheduled for implementation or had previously implemented. This information was reviewed in light of the rule. It is assumed that a water system is currently in compliance with the new requirements if it serves less that 1,000 connections, has implemented at least one educational measure, and one other measure, or two other measures if the water system serves 1,000 connections or more.

The data did not provide any information about measures that were evaluated but not implemented. In many cases, the water system evaluates more measures than it implements.

Size Category	Education		Other (1)		Other (2)		Likely to Meet the Rule	
	Number	%	Number	%	Number	%	Number	%
< 100 Connections	28	85%	15	45%	0	0%	6	18%
100 – 999 Connections	85	83%	21	20%	2	2%	44	43%
1,000 – 9,999 Connections	73	95%	52	68%	25	32%	48	62%
> 9,999 Connections	12	92%	11	85%	9	69%	11	85%
Total	**198**	**88%**	**99**	**44%**	**36**	**16%**	**109**	**48%**

Evaluation of Rates

The rule requires all planning documents to evaluate the feasibility of adopting rate structures that encourage water use efficiency. Current rules require this evaluation for water systems developing WSPs. This is a new requirement for water systems developing SWSMPs.

The data collected for the Water Conservation Technical Assistance Survey listed those utilities that have implemented or plan to implement rate structures that encourage water conservation. There are no data indicating whether the utility conducted a feasibility evaluation if it did not implement or plan to implement these rate structures.

Size Category	Conservation Rates Implemented or Planned for Implementation	
	Number	%
< 100 Connections	18	55%
100 – 999 Connections	60	58%
1,000 – 9,999 Connections	53	69%
> 9,999 Connections	10	77%
Total	**141**	**62%**

Evaluation of Distribution System Leakage

The rule would require an evaluation of water system leakage under WSPs. Current compliance with this provision is addressed under distribution system leakage below.

Data Collection

The rule outlines a data collection and reporting protocol for WSPs and SWSMPs. Current rules pertaining to planning, design and water facility inventory forms currently require similar data to that included in the rule. The primary shift is in frequency of data collection and the requirements to describe seasonal variability. The data collected for the Water Conservation Technical Assistance Survey do not provide a basis for evaluating current performance in this area.

Demand Forecasts

The rule requires that municipal water suppliers provide a demand forecast. The current rule related to planning and design is fundamentally similar to the new requirements. A significant change to existing requirements is that demand forecasts be included in SWSMPs. Since water systems completing SWSMPs are non-expanding, demand forecasts are not required for water system design under current rules. For this reason, this would represent a new requirement for all water systems developing SWSMPs.

For water systems completing WSPs, the new regulatory requirement would be that demand forecasts be prepared for scenarios that assume no additional water use efficiency, as well as scenarios that assume that water use efficiency goals are achieved. This was part of current guidance but not a regulatory requirement. To determine if water systems are currently in compliance with the rule, WSPs were reviewed to determine if the "with and without" conservation scenarios were both included in the demand forecasts. The data collected for the Water Conservation Technical Assistance Survey do not provide a basis for evaluating current performance in this area.

Distribution System Leakage

Water Loss

The rule requires municipal water suppliers to determine distribution system leakage. This requirement differs from the common practice of determining total water loss (commonly referred to as unaccounted-for water) for the water system. The rule allows water systems to determine total water loss, and if that is less than 10 percent, no further calculation is necessary. If that exceeds 10 percent, the water system may use an alternate calculation to separate physical loss (leakage) from other types of losses. To determine if water systems currently meet the requirements of the rule, three questions were examined.

- Did the water system determine water loss (unaccounted-for water)?
- Is water loss below 10 percent?
- Did the water system determine physical loss (leakage)?

In regard to the last question, the data collected for the Water Conservation Technical Assistance Survey does not address whether or not the water system determined physical loss.

	Water Loss Determined?		**Water Loss Less Than 10%**	
Size Category	**Number**	**%**	**Number**	**%**
Very Small (<100 Connections)	13	39%	8	24%
Small (100 – 999 Connections)	53	51%	19	18%
Medium (1,000 – 9,999 Connections)	61	79%	30	39%
Large (> 9,999 Connections)	11	85%	7	54%
Total	**138**	**61%**	**64**	**28%**

Water Loss Control Action Plans

The rule requires municipal water suppliers to prepare a Water Loss Control Action Plan if leakage exceeds 10 percent. This requirement will only apply if leakage exceeds the 10 percent threshold. Although this is a new requirement, many water systems have ongoing programs to minimize leakage.

The data collected for the Water Conservation Technical Assistance Survey provided information about water systems that have conducted or have ongoing leak detection and repair programs.

	Implementing Efforts to Minimize Leakage	
Size Category	**Number**	**%**
Very Small (< 100 Connections)	15	45%
Small (100 – 999 Connections)	60	58%
Medium (1,000 – 9,999 Connections)	57	74%
Large (> 9,999 Connections)	12	92%
Total	**144**	**64%**

Goal Setting and Performance Reports

Establishment of Goals

The rule requires municipal water suppliers to establish water use efficiency goals. The rule outlines requirements for process, content, and documentation of the goals. The process and documentation provisions are potential requirements, and for the purposes of this analysis, it is assumed that no water systems currently meet these new requirements. It is noted, however, that municipalities, public utility districts and special purpose districts already have existing public processes that may be used to meet the process requirements of the rule.

With regard to goal content, water systems, in accordance with DOH guidance, typically establish conservation goals. The data collected for the Water Conservation Technical Assistance Survey indicated whether water systems had established numerical goals.

	Goals Established that Meet Rule Requirements	
Size Category	**Number**	**%**
Very Small (< 100 Connections)	17	52%
Small (100 – 999 Connections)	41	40%
Medium (1,000 – 9,999 Connections)	35	45%
Large (> 9,999 Connections)	5	38%
Total	**98**	**43%**

Metering Provisions

Source Meters

The data collected for the Water Conservation Technical Assistance Survey indicated whether the water system had installed or planned to install source meters.

Size Category	Source Meters Installed or Scheduled	
	Number	%
Very Small (< 100 Connections)	33	100%
Small (100 – 999 Connections)	89	86%
Medium (1,000 – 9,999 Connections)	76	99%
Large (> 9,999 Connections)	12	92%
Total	**210**	**93%**

Service Meters

The data collected for the Water Conservation Technical Assistance Survey indicated whether the water system had installed or planned to install service meters.

Size Category	Service Meters Installed or Scheduled	
	Number	Percent
Very Small (< 100 Connections)	27	82%
Small (100 – 999 Connections)	90	87%
Medium (1,000 – 9,999 Connections)	72	94%
Large (> 9,999 Connections)	12	92%
Total	**201**	**89%**

Appendix I: Labor Costs

Many of the cost estimates developed for the water use efficiency rule are based on assumptions about labor hours and labor costs. Labor cost assumptions are based on wage information compiled by the Washington State Department of Employment Security. The complete data set can be found at http://www.workforceexplorer.com.

For planning activities, three categories of labor were used: professional, non-professional high level, and non-professional low level.

Professional level planning labor estimates were based on the mean hourly wage for the following occupational categories:

Occupation	**Mean Hourly Wage**
Urban and Regional Planner	$31.24
Utility Civil Engineer	$31.25
Utility Environmental Engineer	$47.42
Utility Manager	$40.51
AVERAGE	$37.60
Plus 30% for benefits	**$48.89**

Non-professional high level planning labor estimates were based on the mean hourly wage for the following occupational categories.

Occupation	**Mean Hourly Wage**
Environmental Science Technician	$20.50
Utility Civil Engineer Technician	$22.69
Utility Environmental Engineer Technician	$24.17
AVERAGE	$22.45
Plus 30% for benefits	**$29.18**

The non-professional low level estimate was used for very small water systems where it is assumed that planning work will be compensated at a much lower level. The same occupational categories were used, but the cost is assumed to be 30 percent lower. The hourly labor cost therefore is estimated to be **$22.45.**

For field labor, estimates were based on the mean hourly wage for the following occupational categories:

Occupation	**Mean Hourly Wage**
Utility Construction Laborer	$18.94
Utility Meter Reader	$19.02
Utility Pipe Layer	$19.26
AVERAGE	$19.07
Plus 30% for benefits	**$24.79**