SECTION 4
CONSERVATION AND REUSE

4.1 INTRODUCTION

Water districts and other public resource purveyors around the country have experienced great rates of return on investments from water conservation. Investing hundreds or even thousands of dollars in thoughtful conservation programs can forestall hundreds of thousands or even millions of dollars for new wells and new treatment plants.

In the case of Water District 19, there is no choice but to pursue a vigorous program of increasing conservation. The wellfield, despite the investment of hundreds of thousands of dollars in new wells and well re-development, cannot sustainably produce as much water as we would like and as we are legally permitted. Likewise, the surface water treatment plant is ultimately limited during the dry summer months (when we need the water the most) by the flows of Beall and Ellis Creeks, which recent measurements reveal to be well below the amount of water we would otherwise be permitted by the State to use. Even with prospective new water from the recently obtained Beall Water right, the District must encourage ongoing conservation if it is to adequately meet the ongoing needs of its present customers, let alone provide water for even a few customers on the waiting list for new connections.

Conservation is not only is common sense—it's the law. Under Washington State Law Water District 19 is required to have and promote water conservation programs as a means of protecting finite water resources and maximize water use efficiency

While the terms conservation and water use efficiency go hand in hand, they are separate in the context of Municipal Water Law implementation in Washington State. Water District 19 has had a conservation program in effect for several years and that program was launched under the guidance established in the publication "Conservation Planning Requirements" which was jointly published in 1994 by the State of Washington Departments of Health and Ecology and the Washington Water Utilities Council.

Water use efficiency is a relatively new term established under the Municipal Water Law of 2003 and was recently enacted as the "Water Use Efficiency Rule". Water use efficiency is commonly used as a term to describe quantitative measures and requirements associated with water conservation. On January 22, 2007 the Water Use Efficiency Rule became effective. In March of 2007, the Department of Health published guidelines for water utilities to use in implementing the Rule. While some of the measures associated with the Rule are currently being addressed by Water District 19 (such as collection of consumption data by

customer class and production data by source), additional requirements are forthcoming. Implementation of these additional measures is discussed in greater detail later in this Section. While no planning documents are required to address the Water Use Efficiency Rule until January 22, 2008, the District includes some general discussion of its implementation strategy herein.

Water reuse is also an emerging requirement for water utilities. Potential opportunities for water reuse are evaluated later in this section. Currently, the Vashon Wastewater Treatment Plant is not fitted with the necessary infrastructure to convey a discharge suitable for reuse. Beyond this hurdle, the necessity to establish a dedicated distribution system for a handful of users in predominantly rural Vashon Island would render the effort problematic.

4.2 Water Conservation Plan

Water District 19 recognizes the importance of water resources stewardship on Vashon Island due to the limited nature of available water supply.. The single source aquifer is a precious resource to the residents of the Island and conservation of that resource is critical to future generations. The following sections document the District's existing conservation program. The District is particularly interested in producing ongoing, systematic and structural conservation, not merely short-term and reversible behavioral conservation. In other words, the District is implementing programs that result in changed water distribution and use systems (such as replacing old washing machines with more efficient, water saving machines, and old toilets with new, conserving ultra low-flush types performing landscape irrigation audits for high-use residences and the Vashon School District, and steepening the rate structure to encourage conservation behavior by high-use residential customers).

Encouraging a conservation ethic (such as watering less, turning off the faucet while brushing, etc.) is also part of the program, but these kinds of behavior can and often do change over time, or with the demographic transition from one customer to the next. The District cannot rely on such conservation behavior to persist over time, and certainly cannot plan an extension of service to new connections based on such reversible behavior patterns.

The District's long-range conservation program is intended to be utilized in daily operations and activities and should serve as a guideline for reducing the overall water demand within the District. This water conservation plan is not intended to be used as a response to a water shortage emergency. A separate Water Shortage Contingency Plan has been created to handle emergency situations and is on file with the District

Water District 19 maintains a conservation program based on a variety of factors presented in the "Water Conservation Planning Handbook for Public Water Systems". Those factors include:

- Size of district--between 1,000 and 10,000 connections.
- Vashon Island is designated a Critical Water Supply Area.
- Source capacity is limited on Vashon Island

Based on King County Zoning, growth projections put forth by the Puget Sound Regional Council and limited available source capacity, conservation is critical to maintaining a sustainable source of supply.

Key objectives of Water District 19's water conservation program are:

- Reduce water consumption by 2% per ERU during the summer months;
- Encourage and educate conservation ethic in customers;
- Respond to citizen concerns regarding effective resource use;
- Educate citizens about water supply issues;
- Defer future capital costs for new supply and treatment facilities;
- Protect natural resources; and
- Comply with state guidelines.

The main components of Water District 19's future water conservation plan include:

- Continuation of the rebate program for replacing high-use washing machines with water saving machines;
- Continuation of the rebate program for replacing high-use toilets with ultra low-flush toilets;
- Continuation of the rebate program for purchase of rain-barrels for landscape irrigation;
- Continuation of the stepped water rate structure to encourage conservation by the highest users;
- Continuation and expansion of publicity programs such as customer newsletters, public information seminars, and newspaper op-eds and articles to encourage a conservation ethic;
- Working with the State Department of Ecology to permit de minimus rainwater harvesting through the use of cisterns;

4.2.1 *CONSIDERATION OF A REBATE PROGRAM TO ENCOURAGE THE PURCHASE AND INSTALLATION OF CISTERNS FOR RESIDENTIAL AND COMMERCIAL LANDSCAPE IRRIGATION.* ***WATER USE DATA COLLECTION***

A summary of the District's water use data collection for each of the required data types of the Conservation Planning Requirements (1994) is presented in Table 4-1.

TABLE 4-1

DOH WATER USE DATA COLLECTION REQUIREMENTS FOR KCWD No. 19

Water Use Data	Requirement	District's Status
Source of Supply Meter Readings [1]	Read Daily but Report Only Monthly and Annual Totals	District Telemetry Monitors Daily Master Meter Readings. Data Reported Monthly.
Service Meter Readings	Collect Monthly Totals	Monthly Totals are Collected by the District
Unaccounted for Water (nonrevenue) [2]	Collect Annual Total	Compiled Annually
Accounted for Water (non-revenue)[2]	Collect Annual Total	Estimated on Annual Basis
Peak Day/Peak Month	Collect Each Year's Peak Day and Peak Month Totals	Available
Population Served	Estimate Annual Total	Estimated Annually
Single Family Service Meter Readings	Monthly	Information from District's Billing Records
Multi-Family Service Meter Readings	Monthly	Information from District's Billing Records
Commercial Service Meter Readings	Monthly	Information from District's Billing Records
Economic Data	Existing Water Rates	Water Rates Established
Conservation Data	Collect Once Per Year	Evaluated periodically [3]

Source: DOE/DOH Conservation Planning Requirements, March 1994.

Notes:

[1] Those systems which do not have source meters will be required to estimate source production.

[2] Unaccounted for water is that which is lost through leaks, evaporation, or use that is not recorded and/or accounted for. Non-revenue water that is accounted for, such as fire protection can be estimated and should not be included in the unaccounted for estimated.

[3] Conservation data is an estimate of the actual reduction in water use from the District's conservation efforts. The District evaluates program effectiveness based on the other data reported in this table.

4.2.2 DEMAND FORECASTING

The forecast strategy mandated by DOH conservation publications for systems with 10,000 or fewer service connections indicates that, at a minimum, forecasts will be based on "...projected population, land zoning use, conservation, documented per capita water use and other non-residential water use, and other factors determined to be appropriate by the public water system..." This procedure was used in Section 2 to figure the future water demands under conservation and non-conservation conditions. By providing water demands without the assumption of conservation, the District is able to look at a worst case scenario for the sole purpose of sizing facilities. The District's demand forecasts are reported in Section 2 (See Table 2-5)

4.2.3 CONSERVATION MANAGEMENT STRATEGIES

There are two sides to conservation. One involves the supply side of the water system; the other the demand side. Supply side conservation efforts involve programs which can be undertaken by the water system with or without the cooperation of the water user. There are four supply side programs that can be utilized in the conservation plan:

- Metering
- Leak Detection and Repair
- Pressure Reduction
- Watershed Management

Demand side conservation steps require interaction with and the cooperation of the water user if they are to be successful. There are four demand side programs that can be implemented in the conservation plan:

- Pricing
- Regulation
- Education
- Water-saving Incentive Programs

Table 4-2 provides a guide from DOH of the recommended conservation elements for systems with 1,000 to 25,000 services.

TABLE 4-2
DOH RECOMMENDED WATER CONSERVATION ELEMENTS FOR SYSTEMS WITH 1,000 TO 25,000 SERVICES

Element	Recommendation/Objective	KCWD No. 19 Policy
Program Promotion	Publicize the need for water conservation through television and radio public service announcements, news articles, public water system bill inserts, or other means. This includes promoting efficient indoor and outdoor water usage, distribution of Ecology/Health conservation brochures or other printed material, informing customers, builders and contractors of new plumbing code regulations requiring efficient plumbing fixtures, and other efforts.	The District provides brochures with the water bills. District personnel visit schools within the District to promote conservation. The District has a rebate incentive program for water-saving washing machines and ultra low-flush toilets. Articles are published in local newspapers (example: Beachcomber Apr 4, 2007)
Purveyor Assistance	Assistance from wholesale suppliers to aid wholesale customers in developing and implementing conservation programs tailored to their needs, and in carrying out the wholesale suppliers conservation program.	Not applicable. The District is not a wholesale supplier.
Customer Assistance	Provide assistance and information to customers which facilitates water conservation.	Conservation brochures providing general conservation information and types of water saving devices are available.
Bill Showing Consumption History	Billings would show percentage increase/decrease in water use over the same period from the previous year.	*Bar graph added to statements in April 2007 showing previous years consumption)*
Source Meters	Install master source meters for all sources. Maintain periodic meter testing and repair program.	Source meters are installed and maintained by the District.
Service Meters	Install individual service meters for all water users. Maintain periodic meter testing and repair program.	All water users are metered. Meters are maintained by the District.
Unaccounted Water/Leak Detection	Conduct a regular and systematic program of finding and repairing leaks in system mains and laterals. This includes on-site testing using computer-assisted leak detection equipment on water distribution mains, valves, services, and meters.	The District operations personnel monitor the system for leaks. Leak detection surveys have been initiated.
Single Family/ Multi-Family Kits	Distribute kits containing easily installed water saving devices to single-family residential homes and the owners and managers of apartment buildings and condominiums. Devices in kits could include shower flow restrictors, toilet tank water displacement devices, leak detection dye tablets, informational brochures, and other materials.	Not provided by District but available through Puget Sound Energy (see below)

Element	Recommendation/Objective	KCWD No. 19 Policy
Nurseries / Agriculture	Encourage and/or require the application of current technology to water use practices of large agriculture/irrigation operations. Examples include nurseries and commercial agriculture. Moisture sensors, flow timers, low volume sprinklers, drip irrigation, weather monitoring, and other practices to increase irrigation efficiency could be installed.	No action at this time
Landscape Management/ Playfields Xeriscaping	Promote low water demand landscaping in all retail customer classes (private, public, commercial, industrial, etc.). Work with local nurseries to ensure the availability of plants that achieve this objective.	The District coordinates efforts with retail customer landscaping and water usage restrictions. The District provides landscape irrigation audits to its highest summer residential landscape irrigators.
Conservation Pricing	Implement rate design techniques to provide economic incentives to conserve water.	***Steepened rate structure encourages conservation by higher users (see Table 4-3).***

Source: DOE/DOH Conservation Planning Requirements, March 1994.

4.2.4 CONSERVATION PLAN ELEMENTS

The minimum conservation measures specified in Conservation Planning Requirements (1994) include source meter installation and program promotion. The District's program will address these two measures and others appropriate for a moderate conservation plan. The program guidelines are broken into four categories:

- Public Education and Promotion
- Technical and Administrative Program
- System Measures
- Incentives/Other Measures.

4.2.5 CONSERVATION PLAN ACTIVITIES

The following paragraphs discuss the District's present conservation activities, along with potential future programs.

Public Education and Promotion

Educating water customers about the needs and methods for water conservation is one of the important steps in an effective program. The use of all media, ,, newspaper, and other publications to advertise the conservation program will increase the public's awareness of water conservation techniques and needs. The

necessity for water conservation will dictate the degree of media used. The community newspapers and streetside signs are the most effective way of notifying the public of impending or current water resource shortages and system failures.

Cooperation with surrounding purveyors may provide the District with an opportunity to present a better program while maximizing the investment by the District.

The majority of public education will come through program promotion. The District needs to make the public aware of the benefits that increased conservation may provide. This program must illustrate to the public that it is in their interest to have a successful conservation program. This program will hopefully delay or prevent the development of costly new sources. The District will prepare and distribute a newsletter to all water customers (twice a year). The newsletter may address other topics but will have conservation as the main theme. Topics that will be addressed are:

- Residential leak detection and repair
- Retrofitting with low water use fixtures for indoor use
- The cost of excessive water use
- Low water use plants
- Lawn watering guides

Beginning the Public Education and Promotion program now and continuing it through the future will result in a higher level of public awareness and participation. If the time does come for a much greater degree of conservation due to a long-term decline in water reserves, the public will be more informed about what can and needs to be done in order to conserve their resources.

The District can distribute conservation information in a variety of ways: Inserts in utility bill mailings, displays at local public facilities (i.e. libraries, schools, post offices, etc.), educational programs in public schools, community speaking engagements, and reminder items (i.e. posters, bumper stickers, hose tags, etc.). It is also essential for the District to provide this conservation information with each new meter installation or new customer to allow exposure to the District's conservation plan as soon as possible.

The District currently sends one of its employees out into the elementary school approximately twice a year to give a short presentation regarding conservation. Coloring books and workbooks related to conservation will be distributed at these presentations.

The District currently has rain gauges, leak detection dye and print`ed literature to distribute to young students and walk-ins who wish to measure the amount of precipitation they receive at their home, find leaks, or learn more.

Technical and Administrative Program

Technical assistance includes any of the following activities: customer assistance, technical studies and bills showing consumptive history. Any customer may receive technical assistance, upon request, from one of the qualified District staff. This might include leak detection assistance or general advice on water conservation, drought resistant plantings, etc. Consumption history is provided on all bills. This was initiated in 2000 and updated in 2007 providing customers with relevant information to gauge water use inconsistencies. District staff also notifies customers of significant increases in apparent water use and investigates for leaks if necessary.

System Measures

Measures currently in use to promote conservation include source meters, service meters and unaccounted for water/leak detection.

Pressure reducing valves are in place to control high pressures and limit unnecessary water use at lower elevations. By controlling pressures, the impact of any potential leaks in the system are mitigated.

Source and System Meters The District currently has master source meters at each source and at the treatment plant. All District customers are metered and the District has a meter replacement program. Periodic calibration of the source meters will take place in order to assure the accuracy of the meter reading.

Unaccounted for Water/Leak Detection Unaccounted for water within the District is monitored continuously and averaged 4.8 percent from 2002 through 2006. The District is monitoring the entire system for leaks, from source pumps through distribution. A faulty treatment plant finish water meter was replaced in late 2006. The District currently fixes or replaces all leaks as soon as they are detected.

Incentives/Other Measures

There are several other ways in which the District promotes water conservation by all customers of the District. A brief summary of incentives and other measures are listed below:

The District is considering a program to distribute Single-Family/Multi-Family Household Water Conservation Kits. While the District does not now provide kits as a part of its conservation plan, PSE (formerly Puget Power) provided everyone on the island free low-flow shower heads and low-flow controllers for their bathroom and kitchen sinks in the later 1980's and early 1990's. The District can still promote PSE's existing program, which provides an energy conservation kit and advice to customers of their utility. PSE offers a toll free information hotline (1-800-562-1482) available to the public for conservation information. For electric utility customers using electric energy for hot water heating, the kits are provided at no charge to the customer of Puget Power.

Nurseries/Landscape Management/Playfields The District will encourage the application, development, and management of low-water demand landscaping. Regulation of landscaping based on water demand may become necessary in the future to better manage the available water resources. Cooperation with local nurseries is essential to ensure drought-resistant landscaping products are available for purchase. The District will work with these nurseries to identify and tag plants with low summer water needs.

The District now offers free landscape irrigation audits to selected high summer use customers. We will consider extending this program into the future, perhaps evolving the program into a larger number of partially subsidized audits.

The District may also encourage the use of voluntary alternate day water use during the summer months to cut consumption during peak periods. The District may designate use by street address.

The District maintains an agreement with the Vashon School District No. 402 regarding restrictions on irrigation usage during summer months when school is not in session. This agreement is included in Appendix A.

Conservation Pricing. Pricing to encourage water savings has been an effective conservation strategy. With consumption higher during the summer, the District uses conservation pricing to help reduce peak demand. While the District in 2006 made summer and winter rates uniform in an effort to increase revenues, the District has recently made its residential usage rates even steeper, significantly increasing the rates for users of especially large volumes of water.

The current conservation rates for the summer months are in Table 4.3

TABLE 4-3 Conservation Rates		
Usage (cubic feet per month)	**Residential Rates Per 100 cf**	**Commercial Rates Per 100cf**
0 to 1000	$1.58	$1.76
1,001 to 2,000	$1.79	$1.94
2,001 to 4,000	$2.15	$2.10
4,001 to 6,000	$3.00	$2.74
over 6,001	$4.13	$3.61

Recycling/Reuse As described in Chapter 8, the District investigated the feasibility of aquifer recharge in a 1999 study by AGI. The District intends to discuss possibilities for reuse with the Vashon Sewer District and with potential users.