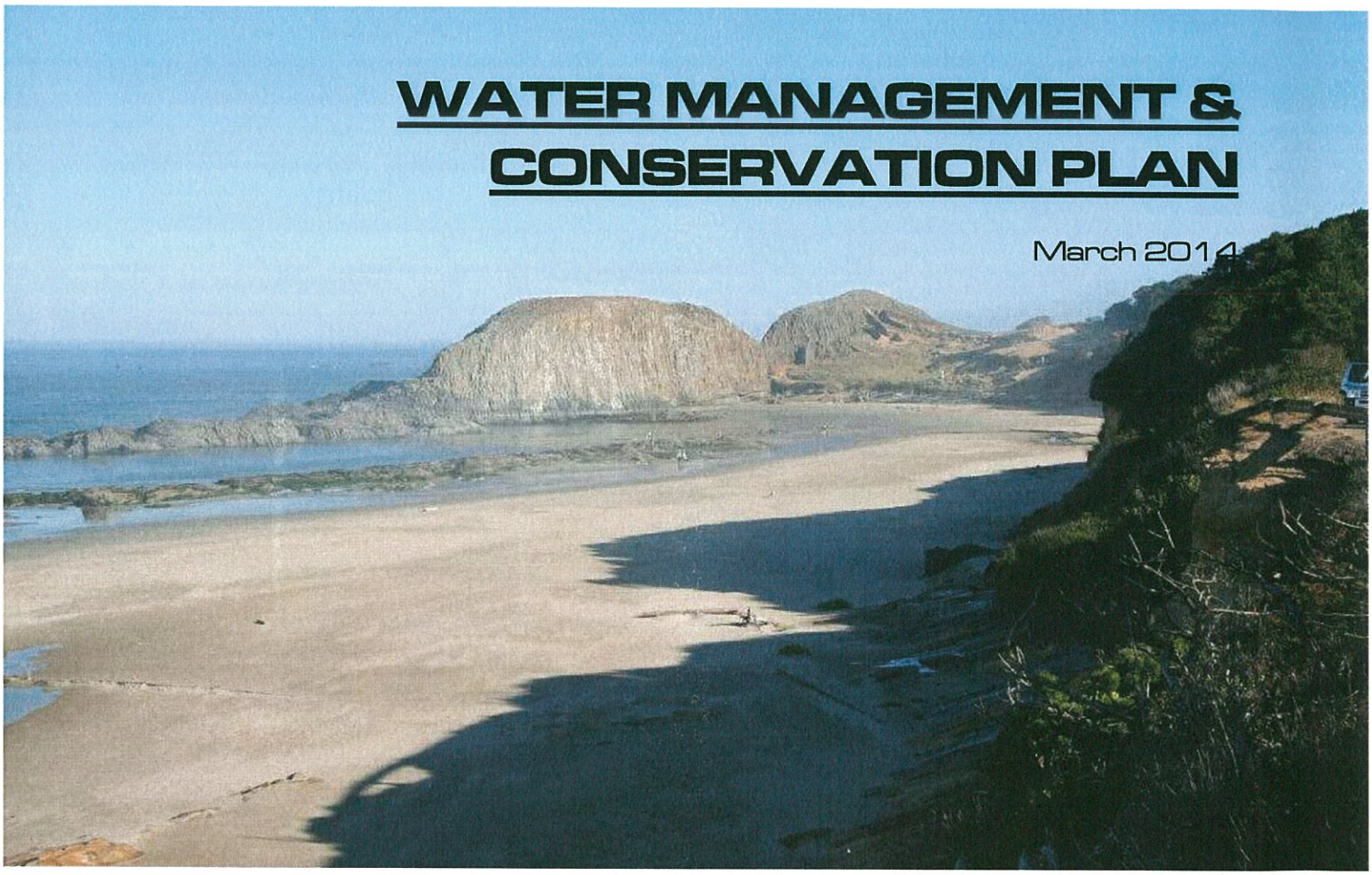
Seal Rock Water District

Lincoln County, Oregon

WATER MANAGEMENT & CONSERVATION PLAN

March 2014



Civil West

Engineering Services, Inc.

Civil West Engineering Services, Inc. • 486 E Street • Coos Bay, Oregon 97420
• 609 SW Hurbert Street • Newport, Oregon 97365

Table of Contents

List of Tables

List of Figures

Section 1

1.0 Water Management & Conservation Plan

1.1 Introduction

Water management consists of the prudent oversight by a water supplier to responsibly provide water resources for the benefit of users within its defined service area. Water conservation consists of any appropriate efforts toward a reduction in water losses, waste, or consumption. As water suppliers face growing demands upon their available resources, careful conservation planning is playing an increasingly important role in their management practices. In effect, conserved water increases the available supply without a commensurate increase in cost and effort to obtain that water.

Conservation measures can have the effect of enabling water suppliers to reduce, postpone, or even avoid water system expansion projects. Costs for operations and maintenance, as well as improvements, may be substantially reduced by diligently applying conservation practices within a water system. Further benefits for the environment within and surrounding the service area include restoring stream flows in order to support aquatic life, sustaining recreational opportunities, and preserving the natural beauty of water-based landscapes.

A *water management and conservation plan* (WMCP) is a schema prepared by a particular water supplier to document and describe its current and projected utilization, management, and conservation of water resources. Oregon Administrative Rules (OAR) 690-086 governs the requirements for the development of a WMCP. Portions of OAR 690-315 (Permit Extensions) also affect the content of a WMCP. The Oregon Water Resources Department (OWRD) is the state agency entrusted with the responsibility of ensuring that the requirements of OAR 690-086 and 690-315 are met.

In many instances approval of an application for (or an extension of) a water right permit is contingent upon the submission and acceptance of a current WMCP. The rules in OAR 690-086 and 690-315 provide a process to promote efficient use of the water resources and to facilitate water supply planning. A WMCP is the tool that the State utilizes to require water suppliers to implement water conservation measures and plan for future demands. A WMCP also assists the OWRD and other interested parties evaluate the efforts of a water supplier to properly manage and make beneficial use of water resources.

A WMCP generally involves a more comprehensive evaluation of water supply alternatives, including water conservation programs, than does a water system master plan (WMP), which is required by the Department of Human Services (DHS) of Oregon. A WMP is generally oriented more toward facilities and processes (especially as they relate to satisfying regulations associated with the Safe Water Drinking Act). However, both a WMCP and a WMP are tools utilized to assist water suppliers in systematically planning for the future.

It is important to point out that there is a difference between what the OWRD expects the District to submit as a WMCP and this study. This study should be viewed as a resource that includes recommendations for what a WMCP should include. The District must then put a plan together and put it into action before the OWRD considers it a functional “plan.”

The OWRD is more interested in what the District is actually doing and what successes they are having with conservation efforts and is less interested in a consultant’s opinions or recommendations about what activities are recommended to be undertaken. Therefore, the District should utilize the information provided in this study and begin taking action. It should track progress, report results, and review and repeat its efforts in order to truly enter into a water management and conservation planning effort.

1.2 Proposed Submittal of Plan Updates

The OWRD requires that each agency submit a progress report five years after the original submittal of the WMCP and an update of the Plan ten years after the original submittal. The District anticipates submitting the five-year progress report in 2018 and the ten-year update in 2023. If updates to the Seal Rock Water Master Plan coincide with updates to the WMCP, the two documents may be combined. Division 86 of the OAR allows the substitution of a water master plan for a WMCP if the WMP substantially satisfies the requirements of a WMCP.

1.3 Required Elements of a Plan

As outlined in OAR 690-086-0125(1)–(4), a water management and conservation plan shall include the following elements:

- A municipal water supplier description, as described under OAR 690-086-0140;
- A municipal water conservation element, as described under OAR 690-086-0150;
- A municipal water curtailment element, as described under OAR 690-086-0160;
- A municipal water supply element, as described under OAR 690-086-0170.

Among its other purposes, this study summarizes much of the information contained in the Seal Rock Water Master Plan and its two amendments and it includes data to support each of the elements listed above. Throughout this study, previously written documents are referenced for more detailed descriptions of certain topics. If further information is needed beyond the summary presented in this report, please consult the appropriate reference provided.

Section 2

2.0 Water Supplier Description (OAR 690-086-0140)

2.1 Existing Water System

The Seal Rock Water District (SRWD) is located in Lincoln County, Oregon, approximately in the center of the County coastline (44°29'56"N, 124°04'55"W) in Townships 11S, 12S, and 13S in Range 12W and 11W. The District boundary extends from the north side of Alsea Bay at Waldport 11.5 miles northward to Henderson Creek near the Newport Municipal Airport. The District serves the coastline between the cities of Waldport and Newport and at no point extends more than 1.5 miles inland from the beach. The current SRWD Boundary encompasses 6,505 acres, or 10.2 square miles.

The water service population includes approximately 2,400 residential meters and a full-time population of approximately 4,100 residents. In addition to the full-time population, the District is host to a significant and fluctuating part-time and tourist population, which increases the service population to approximately 5,175 during the summer months.

All customers in the SRWD are metered and several master meters exist to allow monitoring of use and to help detect leaks in distinct regions of the system. The District's water system contains several pump stations, two active storage tanks, and many miles of piping. Various piping and storage improvements have been completed in the District over the years, including significant telemetry upgrades to allow remote monitoring of various master meters and pump stations.

2.2 Raw and Treated Water Sources

In 1972, the SRWD and the City of Toledo coordinated to utilize the Siletz River as their mutual water source and to construct an intertie between the two communities with treatment occurring in Toledo. This long-range water supply plan was approved by the Lincoln County Board of Commissioners in 1974. The two communities then split the costs and constructed the Toledo water treatment plant, the Siletz River raw water piping, and the Seal Rock intertie pipeline and pumping station. The SRWD forfeited its water rights on smaller coastal streams in order to obtain water rights on the Siletz River.

The SRWD has a single water right on the Siletz River under Permit S40277, which has a priority date of 2/28/1973 and allows for withdrawal of up to 2.6 cfs (1,166 gpm) for municipal uses. No Claim of Beneficial Use has been made for the permit, thus it remains uncertificated at this time. The permit is junior to the instream water rights and therefore could be restricted during low streamflow periods. The point of diversion (POD) for the Siletz permit is located at the Toledo intake near river mile 40. The SRWD also has a water right on Hill Creek (Deer Creek) under certificate 32199, which has a priority date of 10/1/1959 and allows for withdrawal of up to 0.4 cfs for municipal uses. The Hill Creek water right is not used and no treatment provisions exist to allow use. The City of Toledo has water rights for 9.75 cfs at the same POD on the Siletz River with 5.75 cfs being senior to the instream water rights.

The District does not hold any groundwater rights. Although a hydrologic study of the area has not been performed, information regarding the yield of existing wells in the region indicates that groundwater is not a viable source for meeting the District's water needs.

2.3 Raw Water Storage

The District does not own or operate any reservoirs for raw water storage. The City of Toledo, from whom the District purchases finished water, possesses a storage certificate for Mill Creek Reservoir with a priority date of November 9, 1959. The dam is approximately 65 feet tall from the original stream

channel bottom and 265 feet long at the top. The permitted storage amount in the reservoir is 250 acre-feet (81.5 million gallons) with approximately 15 acres of surface area. According to the original permit, the depth averages 16.6 feet with a maximum of 55 feet.

Possibly due to the relatively shallow average water depth, algae problems are reported in summer months for water from the Mill Creek Reservoir, creating taste and odor issues. In addition, higher-than-desired iron and manganese levels are reported, creating more difficult treatment conditions. For these water quality reasons, Mill Creek water is used only in winter and spring months when water quality is high.

Even though certificated water rights on Mill Creek that can be withdrawn at the current dam POD total 15.0 cfs (9.7 mgd), the actual flow of water available is often substantially less than this amount. It is unlikely that the Mill Creek source alone could supply the City and the District for prolonged periods in the summer months without increasing the height of the dam.

2.4 System Capacity vs. Existing Water Rights

The District currently holds surface water rights of 3.0 cfs (1.9 MGD), only 2.6 cfs (1.7 MGD) of which are considered viable. The 0.4 cfs water right to Hill Creek is not used and no treatment provisions exist to allow use. No Claim of Beneficial Use has been made for the 2.6 cfs permit on the Siletz River; thus, it remains uncertificated at this time.

The Seal Rock Water District does not own or operate its own treatment facility. It purchases finished water from the City of Toledo. The City's water system is currently undergoing upgrades that will increase its capacity to 1,600 gpm (3.6 cfs). If the City were to use only the District's water rights on the Siletz River, the treatment plant would be more than adequate to utilize the full permitted withdrawal rate.

The City of Toledo holds surface water rights on both Mill Creek and the Siletz River, with 15.0 cfs and 5.75 cfs being senior to in-stream water rights, respectively. These values are both greater than the treatment plant capacity of 3.6 cfs, signifying that the plant would need to further increase its capacity to fully use the City of Toledo's water rights. Demand projections for the next 20 years indicate that increased capacity beyond the current upgrades will not be necessary.

2.5 Water Treatment Facility

Since the District currently purchases all of its water from the City of Toledo, all water treatment occurs at the Toledo Water Treatment Plant. The plant was constructed in 1976 with an original design capacity of 2,080 gpm. Today, flows required through the plant range from 850 to 1300 gpm.

The water treatment plant is a conventional surface water treatment plant. The plant, which consists of two side-by-side identical treatment trains, makes use of the following processes:

- Chemical coagulation and polymer addition
- Mechanical flocculators and sedimentation basins
- Up-flow contact clarification
- Gravity-driven, multi-media filtration
- Post-filtration chemical-injection station (for disinfection)
- Contact basin clearwell

In general, finished water quality is good and the plant functions properly. Even though current flows are lower than the original design flow, treatment standards today are much more stringent than those in 1976 during plant design and construction. Thus, the plant needs improvements in order to meet the projected 2030 demand. After the current upgrades, the City's water treatment will be capable of producing 1,600 gpm (3.6 cfs) of finished water. The treatment plant can thus treat only a portion of the available water, but is adequate for the 20-year design period.

2.6 Treated Water Storage

The Seal Rock Water District system contains two active storage tanks, the Lost Creek Storage Tank, constructed in 2005, and the Driftwood Storage Tank, constructed in 1981. A third tank, the Makai Storage Tank, is no longer in service. It is located at an elevation too low to properly serve the hydraulic requirements of the water system. The tank is also in poor condition.

The District currently has a total storage capacity of 2.3 million gallons when both functional tanks are full. The Lost Creek tank is filled by the Toledo Pump Station with “on/off” based on water depth signals sent via radio telemetry.

2.7 Interconnections with Other Systems

As described above, the SRWD obtains all system water through a single pipeline conveying water from the City of Toledo. A master meter records the quantity of water sent to and purchased by the SRWD. The quantity of water purchased by the SRWD typically represents half of the water sold by the City of Toledo.

An existing 8-inch waterline connects the Seal Rock Water District to the City of Newport, allowing the District to provide the City with water in case of an emergency. The second amendment to the Seal Rock Water District Water Master Plan discusses the possibility of a water sharing agreement with the City of Newport. A Memorandum of Understanding has been drafted to permit the City of Newport to utilize the Seal Rock Water District's water right on the Siletz River. The District is currently pursuing a FEMA grant to improve the connection by constructing a pressure reducing valve and booster pump station at the intertie.

2.8 System Schematic

Refer to Figure 2.8 on page 8 for a detailed schematic of the Seal Rock Water District’s existing water system. The schematic shows locations of storage facilities, distribution and transmission systems, and the service area supplied by the water system.

2.9 Existing Service Population

Since the Seal Rock Water District is an unincorporated community, detailed census data and other population figures are not available, making precise population estimates difficult to obtain. In such cases water meter installation records can prove valuable for population and growth projections when sufficient data is available. The SRWD has accurate records for the number of water meters in the system over time.

Using the County average of 1.65 persons per housing unit and 2,489 total housing units results in a current full-time population estimate of 4,107 persons. At any given time, a number of housing units will be vacant. In the SRWD, the number of occupied homes increases dramatically during summer months, as with other parts of the Oregon coast. If it is assumed that 90% of the total housing units are occupied

during the summer peak and that there is an average of 2.31 persons per occupied unit, the summer peak population would be 5,175 persons.

The best-fit model for average annual population increase from 1997-2007 indicated a growth rate of 1.5%. Since 2007, the average annual population increase has dropped to 0.22% per year. Demand projections in the Water Master Plan Amendment #2 and this plan will continue to use the 1.5% per year value as a conservative estimate of the volume of demand in the year 2035.

2.10 Existing and Historic Water Demand

The Seal Rock Water District provides treated water primarily to residential and small commercial consumers. Approximately 97.5% of total water sold goes to customers listed as "domestic" accounts while 2.5% goes to customers listed as "commercial" accounts. Residential water consumption is proportionately similar to that observed in many coastal communities. Because of the wet conditions and cool temperatures typical of the coastal environment, water usage for outdoor recreation and landscape irrigation is generally less than that for communities in more arid regions.

The SRWD obtains all system water through a single pipeline conveying water from the City of Toledo. A master meter records the quantity of water sent to and purchased by the SRWD. Average annual demand (AAD) over the years 2007-2012 is 119.2 million gallons. A record of annual water purchased and sold is shown in Figure 2.10.

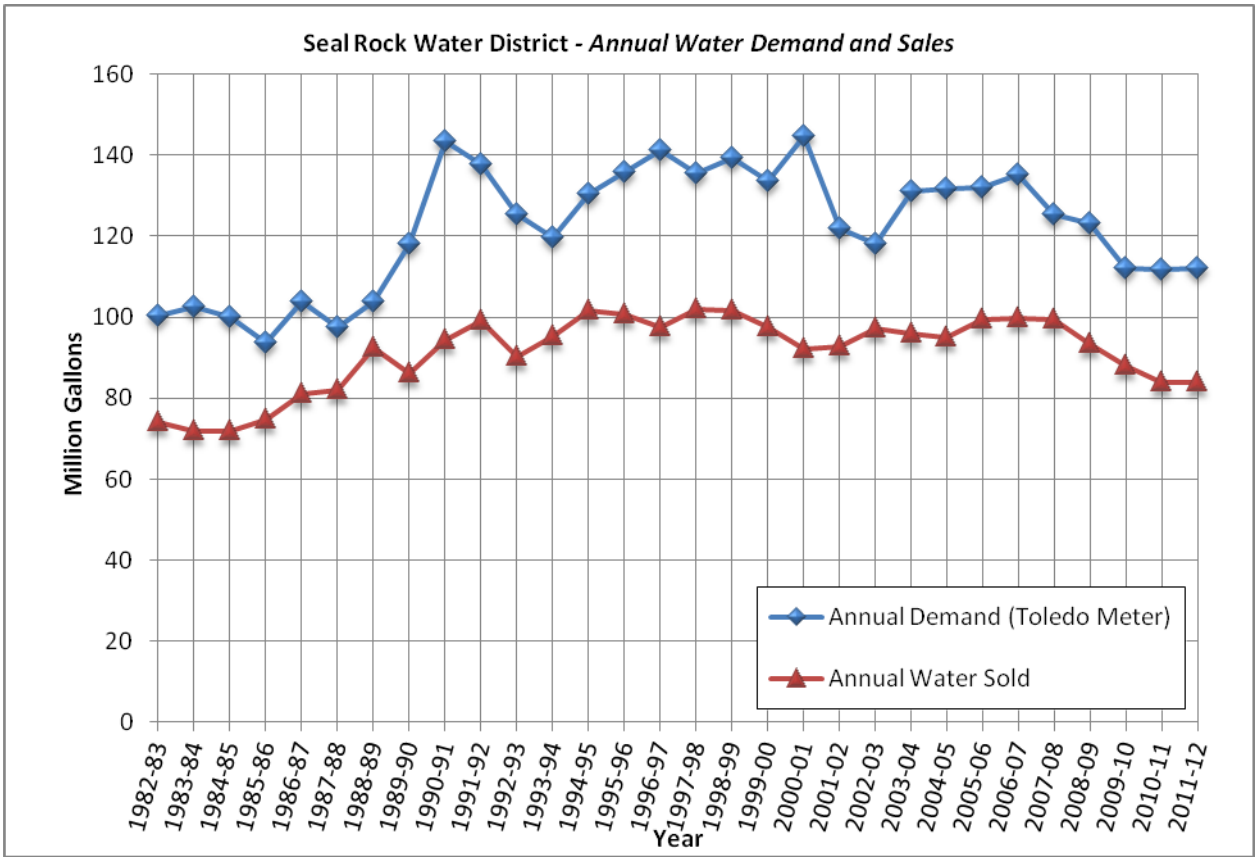


Figure 2.10 – Annual Water Demand and Use Records, 1982-2012

The quantity of water purchased by the District from Toledo typically represents about 50% of total water sales in Toledo.

Over the last 20 years, average daily demands (ADD) have ranged from 306,000 gpd to 396,000 gpd with an average of 351,000 gpd. The average ADD over the years 2007-2012 is 320,000 gpd.

Lowest monthly demands occur in February or March while the highest monthly demands occur in August or September. Expressed as an average in gallons per day, the maximum monthly demand (MMD) over the last three years is 419,000 gpd. The MMD has been 1.3 to 1.6 times the ADD. Average daily demands per months are shown for the last three years in Table 2.10 below.

Table 2.10 – Monthly Water Demand, 2009-2012

MONTH	Purchased 2011-2012	Purchased 2010-2011	Purchased 2009-2010
July	10,183,600	11,642,100	12,273,400
August	12,596,300	12,612,100	12,940,000
September	12,555,800	9,815,000	11,186,200
October	8,316,800	9,186,200	9,874,500
November	6,948,900	8,270,200	7,545,900
December	8,510,700	8,830,100	10,826,400
January	10,593,600	7,406,900	7,701,500
February	8,423,400	6,849,300	7,514,800
March	8,140,000	9,349,400	7,314,900
April	10,246,000	7,988,700	9,056,000
May	6,989,000	9,197,800	8,228,800
June	8,525,000	10,517,600	7,618,000
Total	**112,029,100**	**111,665,400**	**112,080,400**

2.11 Unaccounted Water

The difference between the quantity of water purchased from the City of Toledo and the quantity of water recorded by usage meters (i.e., water sold) is unaccounted water. The difference is the combined result of leakages, system flushing, fire fighting, or other non-metered usages (e.g., usage by district offices, parks, schools, libraries, etc.).

OAR 690-086 stipulates that a water supplier should strive to reduce the amount of unaccounted water to 15% of the water delivered to the distribution system. If it is determined that this objective can be readily achieved, then the water supplier should seek to attain an objective of 10% when feasible.

The Seal Rock Water District typically reads customer meters during the second week of the month. The process takes approximately two days. This data is recorded as water sold. The City of Toledo reads the master meter connecting it to the District toward the end of the month, and this value is recorded for water purchased. The 1-2 week discrepancy in meter reading accounts for a significant percentage of "lost" water. Recently the District began using in-house readings of the Toledo Master Meter taken at the same time as consumer meter readings in order to develop more accurate water loss figures. This more precise method of determining water lost indicates that the average percentage lost for July through September 2012 is 18.5%. The average lost water percentage for the 30 years preceding these values was 25.0%, showing an improvement in both water accounting and lost water reduction.

Figure 2.8 – Seal Rock Water District System Schematic
schematic of Seal Rock Water District's existing water system

Section 3

3.0 Water Conservation Discussion (OAR 690-086-0150)

3.1 Introduction

Water suppliers are in the business of producing and selling treated water. The sale of that water allows a supplier to pay for operations and maintenance expenses, retire debts for system development loans, and create an income stream for the financing of future system upgrades and facilities. Consequently, some suppliers may view conservation as an activity that is contrary to the financial survival of their system. However, nearly every water system should be capable of incorporating changes in its operations that would result in reducing "lost water" and thereby lower production costs. A balanced and coordinated conservation effort should also involve educating the public about the benefits of wise usage practices. The following quote by the Environmental Protection Agency (EPA) Office of Water, from its "Statement on Principles of Efficient Water Use" (December 2002), is especially poignant in this regard:

> *In order to meet the needs of existing and future populations and ensure the habitats and ecosystems are protected, the nation's water must be sustainable and renewable. Sound water resource management, which emphasizes careful efficient use of water, is essential in order to achieve these objectives.*
>
> *Efficient water use can have major environmental, public health, and economic benefits by helping to improve water quality, maintain aquatic ecosystems, and protect drinking water resources.*

The following sections are intended to provide the Seal Rock Water District with sufficient information and direction to develop an active and effective water conservation program that will result in lower water demands by consumers and more efficient utilization of water resources.

3.2 Evaluation of Conservation Measures

In the context of this study, a conservation measure is understood to be an action or procedure intended to reduce unnecessary water consumption. A number of specific conservation measures are available to encourage wise utilization of water resources in the Seal Rock water system. Some of these measures are directed at the management efforts of the water supplier, while others are intended to affect the usage habits and tendencies of water consumers. Appropriate conservation measures should be selected on the basis of their potential to achieve a reduction in consumption yet be reasonable to implement without placing undue hardship on the supplier or the consumers.

The first step in the selection process is to identify criteria for evaluating the conservation measures. The cost-effectiveness of the measures is one criterion, but other factors should be considered as well. The District is free to consider as many selection criteria as the Board believes appropriate, but the relevance of the criteria should be explained in the conservation plan.

In their evaluation of various conservation measure alternatives, water system managers should take into consideration the following issues or concerns:

- Program Costs
- Ease of Implementation
- Staff Resources
- Consumer Impacts

- Water Rights Issues
- Cost Effectiveness
- Budgetary Constraints
- Environmental Impacts/Justice
- Socio-Economic Issues
- Legal Issues or Constraints
- Permit Requirements
- Regulatory Approvals
- Timeliness of Savings
- Public Acceptance
- Consistency with Other Programs
- The ability of a program to sustain a conservation effect and whether or not there are lasting impacts from the conservation efforts.

For each selection criterion, the District should identify whether, how, and why the factor affects the feasibility of implementing one of more conservation measures. Some factors might be more important than others. Planners also may want to bear in mind that techniques can be used to mitigate adverse effects and improve acceptance of measures. A cost-effective conservation measure should not be dismissed without careful consideration of how barriers to implementation might be overcome.

3.3 EPA Conservation Guidelines

Not all conservation measures are suitable or effective for every water system. In order to assist water system managers in selecting appropriate measures, the EPA has assembled several guidelines, which include varying levels of activity.

The EPA guidelines suggest that water suppliers develop conservation programs whose activities are in proportion to the size of their individual water system. Alternatively stated, the larger the water system, the more measures should be implemented to conserve water resources. The categories and guidelines established by the EPA are presented below.

Table 3.3-1 – System-Size Category and Guideline Classifications

System-Size Category (SDWA)	Applicable Guidelines
Serves fewer than 3,300 people	Basic Guidelines or Capacity-Development Approach
Serves between 3,300 and 10,000 people	Basic Guidelines (up to 10,000 people served)
Serves more than 10,000 people	Intermediate Guidelines (up to 100,000 people) or Advanced Guidelines (more than 100,000 people)

Source: U.S. EPA Water Conservation Plan Guidelines (1998)

The Basic Guidelines provide water suppliers with simple tools for gathering information in order to conduct planning efforts. The intention of these guidelines is to avoid burdening suppliers (especially those with very small or resource-constrained systems) with unnecessary steps or details yet provide a straightforward approach to planning and implementing widely-accepted conservation practices.

The Intermediate and Advanced Guidelines introduce additional evaluative tools and conservation measures to enhance water conservation planning efforts. The Intermediate approach is substantially based upon the Basic approach but introduces more comprehensive planning concepts and conservation measures. The Advanced approach moves further in this direction and implicitly depends upon sufficient resources and support personnel (as are characteristic of much larger water suppliers). The guidelines associated with this approach recognize the need and allow for the development of models and methods that are more appropriate for water suppliers suited for this approach. The conservation measures recommended by the EPA for all three guideline classifications are summarized together in Table 3.3-2.

The EPA guidelines are further divided into three levels of activity. Each water supplier, regardless of the size of its water system, should consider the fundamental conservation principles outlined under Level 1. The measures displayed under Levels 2 and 3 are appropriate for systems with greater conservation needs along with the ability to provide sufficient resources and support personnel required in a more vigorous conservation program.

The Seal Rock Water District is interested in developing conservation measures in its community and is committed to increasing its efforts toward more efficient utilization of water resources in the future. However, it should be acknowledged that the recommended conservation measures do not explicitly guarantee a reduction in unaccounted water for a system.

The table below, Table 3.3-2, is an excerpt from the US EPA Water Conservation Plan Guidelines (1998). The table illustrates several potential conservation measures that can be followed depending on the level of commitment and aggressiveness that a community wishes to pursue conservation. The table illustrates:

1. Basic Guidelines – Conservation measures all systems should consider.
2. Intermediate Guidelines – Include more aggressive conservation efforts.
3. Advanced Guidelines – Includes the most aggressive conservation efforts that are focused on communities that have undertaken and found success with intermediate and basic efforts.

Which measures are actually adopted can depend upon a number of issues unique to a particular water system. In most systems, though, prudent conservation begins on the supply side (i.e. efforts made by the District). However, effectual conservation must invariably involve the consumers as well (demand side). Typically, a combination of efforts by the supplier and consumers is required for a successful conservation program.

Table 3.3-2 – EPA Guidelines and Associated Water Conservation Measures

Measures	▼ ▼ ▼Advanced Guidelines▼ ▼ ▼		
	▼ ▼Intermediate Guidelines▼ ▼		
	▼Basic Guidelines▼		
Level 1 Measures			
Universal Metering	• Source-Water Metering • Service-Connection Metering and Reading • Meter Public-Use Water	• Fixed-Interval Meter Reading • Meter-Accuracy Analysis	• Test, Calibrate, Repair, or Replace Meters
Water Accounting and Loss Control	• Account for Water • Repair Known Leaks	• Analyze Unaccounted Water • Water System	• Loss-Prevention Program

Measures	▼ ▼ ▼Advanced Guidelines▼ ▼ ▼		
	▼ ▼Intermediate Guidelines▼ ▼		
	▼Basic Guidelines▼		
		Audit • Leak Detection and Repair Strategy • Automated Sensors and/or Telemetry	
Costing and Pricing	• Cost-of-Service Accounting • Consumer Charges • Metered Rates	• Cost Analysis • Non-Promotional Rates	• Advanced Pricing Methods
Information and Education	• Understandable Water Bill • Information Availability and/or Accessibility	• Informative Water Bill • Water-Bill Inserts • Public School and Education Programs	• Workshops • Advisory Committee
Level 2 Measures			
Water-Use Audits		• Audits of Large-Volume Consumers • Large-Landscape Audits	• Selective End-Use Audits
Retrofits		• Retrofit-Kit Availability	• Distribution of Retrofit Kits • Targeted Programs
Pressure Management		• System-Wide Pressure Management	• Selective Use of Pressure-Reducing Valves
Landscape Efficiency		• Promotion of Landscape Efficiency • Selective Irrigation Submetering	• Landscape Planning and Renovation • Irrigation Management
Level 3 Measures			
Replacements and Promotions			• Rebates and Incentives (Non-Residential) • Rebates and Incentives (Residential) • Promotion of New Technologies
Reuse and Recycling			• Industrial Applications • Large-Volume Irrigation Applications • Selective Residential Applications
Water-Use Regulation			• Water-Use Standards and Regulations

Measures	▼ ▼ ▼Advanced Guidelines▼ ▼ ▼		
	▼ ▼Intermediate Guidelines▼ ▼		
	▼Basic Guidelines▼		
			• Requirements for New Developments
Integrated Resource Management			• Supply-Side Technologies • Demand-Side Technologies

Source: U.S. EPA Water Conservation Plan Guidelines (1998)

3.4 Water Conservation Progress Report

It is common for a water supplier to develop a WMCP, submit that plan to the Oregon WRD for review and approval, implement the plan over a certain period of time, evaluate the effectiveness of the plan at the end of this period of time, and then resubmit an updated plan to the Oregon WRD for further review and feedback. Typically, the time period between plan submittals is at least five years.

Optimally, a WMCP should be developed in coordination with district public works officials and board members, along with appropriate input from stakeholders (e.g., residential, commercial, and industrial consumers). Since the supply issues, consumer characteristics, budgetary constraints, and operational practices of each water system are unique, an effective WMCP must be designed especially for that particular system.

As described in Section 4.0 below, the Seal Rock Water District is already engaged in operational practices that contribute to water conversation efforts, and it should be commended for the careful oversight of its water system.

Section 4

4.0 Current Conservation Efforts

4.1 Introduction

The District currently utilizes several conservation measures within its regular operating strategy. Because the District serves between 4,100 and 5,175 customers throughout the year, it should implement the Basic Guidelines in the EPA Water Conservation Plan table of guidelines. The District, in an aggressive attempt to curtail water loss, has gone beyond the Basic Guidelines and has implemented some Intermediate and even Advanced Guidelines.

The mandatory conservation measures are described in Section 5.0. The District's efforts to achieve each mandatory measure are summarized after each measure description. Water conservation efforts beyond the mandatory measures and their associated EPA category, if applicable, are listed below.

4.2 Source-water Metering (Basic)

4.2.1 Introduction

The Seal Rock Water District receives all its water from the City of Toledo. The City of Toledo obtains raw water either from the Siletz River or from the Mill Creek Reservoir, depending on the time of year, and treats it before sending a portion to Seal Rock via a single six-mile-long pipeline.

It is important to meter source water to determine the volume of water entering the system. The amount sold subtracted from the source amount gives the volume of lost water for a given period.

4.2.2 Schedule & Budget

A meter located near the Seal Rock end of the pipeline records the amount of water purchased by the District. District staff read this meter weekly. These weekly readings are compared with the monthly readings generated by the City of Toledo. The District's weekly source-water metering allows it to perform frequent water audits and calculate a true percentage of lost water.

The District is also connected to the City of Newport. The connection is currently set up so that the District can supply the City with water in emergencies. Because the District water system has a higher hydraulic grade line, the City cannot supply it with water. The two agencies are collaborating to improve the connection so both can benefit from emergency water sharing. This connection is metered and, though not used frequently, the meter is read monthly. The cost estimates in Table 4.2.2 below assume replacing the meters once every ten years.

Table 4.2.2 – Estimated Schedule and Budget for Source-water Metering

Task	Frequency	Proposed Start Date	Annual Cost
Meter water from Toledo	Ongoing	Current practice	$100
Read/record Toledo meter	Weekly	Current practice	$2,500
Meter water to/from Newport	Ongoing	Current practice	$100
Read/record Newport meter	Monthly	Current practice	$100
		Existing Annual Cost	**$2,800**

4.3 Meter Public-use Water (Basic)

4.3.1 Introduction

If only the source-water meters and the customer meters are used in determining the volume of water lost, the value will be incorrect. Metering public-use water is essential for accurate water audits and calculating the true percentage of lost water. Public-use water, such as public restrooms and fire hydrants, can account for a significant percentage of water that appears to be lost. Since public-use is considered a beneficial use of water, it is important to record it.

4.3.2 Schedule & Budget

All public-use water is metered in the Seal Rock water system. The meters used for public accounts are read monthly along with all other meters in the system. The cost to read the meters is reflected in Section 4.4 below. Replacement of the meters is anticipated once every ten years, as is reflected in Table 4.3.2.

Table 4.3.2 – Estimated Schedule and Budget for Metering Public-use Water

Task	Frequency	Proposed Start Date	Annual Cost
Meter public-use water	Ongoing	Current practice	$250
		Existing Annual Cost	**$250**

4.4 Fixed-interval Meter Reading (Intermediate)

4.4.1 Introduction

Completing all the meter readings on a fixed interval provides two primary benefits. First, it provides consumers with consistent water bills. Second, it presents an opportunity for District staff to notice irregular water usage–a sign of a water leak.

4.4.2 Schedule & Budget

The District reads customer and public-use meters during the second week of each month. Readings takes approximately two days to complete. The District reads the source-water meter during this same time period. Table 4.4.2 estimates the cost associated with compensating employees for time spent reading meters each month.

Table 4.4.2 – Estimated Schedule and Budget for Fixed-interval Meter Reading

Task	Frequency	Proposed Start Date	Annual Cost
Read meters on a fixed interval	Monthly	Current practice	$4,000
		Existing Annual Cost	**$4,000**

4.5 Meter-accuracy Analysis (Intermediate)

4.5.1 Introduction

A conscientious water supplier will attempt to ensure the accuracy of its system meters. There are a few methods to monitor meter performance. The most common is a typical meter test. In addition to these regular and random tests, the District uses two other methods to check meter accuracy.

First, District staff perform daily in-house audits with a SCADA system. The system is divided into grids that can be isolated and watched for possible leaks or inaccurate meters, which are then evaluated in the field and fixed if necessary. For example, any meter that reads zero is double-checked for accuracy. Second, when all meters are read each month, District staff monitor changes in usage and check for meter inaccuracies when irregularities are found.

The District's efforts to maintain meter accuracy demonstrate compliance with the mandatory conservation measure, "Meter Testing and Maintenance Program," discussed in Section 5.4.

4.5.2 Schedule & Budget

The District is currently practicing meter accuracy analysis. Since the District replaced all system meters over ten years old in the 2012/2013 year, it should begin randomly testing five meters monthly in 2018.

The in-house SCADA audits are mentioned again in Section 5.5. The District should note that the listed annual expense of $6,000 satisfies both conservation measures. Similarly, monthly testing of five meters in also included in Section 5.4.

Table 4.5.2 – Estimated Schedule and Budget for Meter-accuracy Analysis

Task	Frequency	Proposed Start Date	Annual Cost
In-house SCADA audits	Daily	Current practice	$6,000
Monitor usage for consistency	Monthly	Current practice	$250
Randomly inspect 5 meters	Monthly	2018	$750
		Existing Annual Cost	**$7,000**

4.6 Automatic Check Valves

4.6.1 Introduction

Breaks in the transmission line between the City of Toledo and the Seal Rock Water District currently cause water to flow out of Lost Creek Reservoir at high volumes for a considerable amount of time before manual valves can be accessed and closed. Unfortunately, breaks in the asbestos concrete transmission line are common due to landslides, the age and location of the line, and the material that was used to construct the pipeline. While automatic check valves are not a conservation measure listed in the EPA Table of Guidelines, the District has determined that the valves are a necessary addition to the distribution system.

This potential loss is proposed to be mitigated by a series of valves and flow meters tied into the SCADA system, prompting automatic pump shut off and pipe isolation. The project will save both the City of Toledo and the Seal Rock Water District from losing water from their reservoirs following a pipeline breakage in the transmission line between the two agencies.

4.6.2 Schedule & Budget

Table 4.6.2 – Estimated Schedule and Budget for Automatic Check Valve System

Task	Frequency	Proposed Start Date	One-Time Cost
Install automatic check valves	One-time	2013	$225,000
		Existing One-time Cost	**$225,000**

4.7 Projects in Capital Improvement Plan

The Seal Rock Water District's current Capital Improvement Plan demonstrates a considerable effort toward limiting water loss in the distribution system. Twenty-five of the thirty-three projects in the current plan replace existing distribution piping to decrease water loss.

Table 4.7– Seal Rock Water District Capital Improvement Plan, March 2013

Project #	Project Name	Final Cost
Phase 1 - Under Construction or Completed		
1	Distribution Piping - NW Lotus Lake Drive	$243,836
2	Distribution Piping - NW Orcas Dr.	$107,959
3	Distribution Piping - Quail Street, Old Coast Rd, Seagull Way Loop	$392,875
4	Distribution Piping - Pacific Shores	$304,849
5	Distribution Piping - Powe Drive (Silver Sands)	$0
6	Distribution Piping - Parker Way	$20,745
7	Distribution Piping - Marsh Street	$3,973
8	Distribution Piping - SW 100th Court	$14,019
9	Distribution Piping - SE 118th St.	$9,458
10	Distribution Piping - SE 145th Street	$22,707
11	Toledo Pump Station Upgrade	$8,000
Phase 2 - About to Bid		
12	Beaver Creek Pump Station Bypass/Abandonment	$13,729
13	York Pump Station Upgrade	$108,604
14	Distribution Piping - East Piping to North End	$1,173,432
Future Projects		
30	Beaver Creek Supply Feasibility Study	$300,000
15	Distribution Piping - HDD at Beaver Creek	$730,324
16	Distribution Piping - SE 116th St. to SE 98th St.	$1,151,770
17	Standard Pressure-Reducing Valves	$213,070
18	Distribution Piping - Valley View Heights	$677,578
19	Distribution Piping - HDD at South Bayshore	$187,442
20	Distribution Piping - Entrance to Surfland off Hwy. 101	$238,773
21	Newport Intertie - PRV/Booster Station	$443,100
22	Distribution Piping - Seagull Way, Bittern, Cross St. Loop	$245,478
23	Distribution Piping - Art Street, Park View Street, Line Street Loop	$647,033
24	Distribution Piping - Huckleberry and Blackberry Street	$230,950
25	Distribution Piping - NW Kona Street and Pali Street	$447,745
26	Distribution Piping - SE Chittum Dr.	$173,958
27	Distribution Piping - SW Brandt, SW Abalone St.	$300,980
28	Distribution Piping - SE Cedar Street	$227,598
29	Distribution Piping - SE Birch Street	$232,440
31	Other 2-Inch Piping Replacements	$3,600,000
32	Cross Street Storage Tank (Water Surface 305')	$902,568
33	Add Chlorine Booster to Newport Intertie	$186,250

By recognizing locations of water loss and endeavoring to repair them as soon as possible, the District has demonstrated a genuine desire to ensure the beneficial use of its water. Project 16, a recent addition to the CIP, is suspected to account for a significant portion of the water loss the District is currently experiencing. After this section of pipeline has been repaired, the District anticipates its lost water percentage will at least dip below 15%, if not lower.

Section 5

5.0 Mandatory Measures (OAR 690-086-0150)

5.1 Introduction

Many different kinds of conservation measures are available for the promotion of efficient utilization of water resources within a water system. A discussion on recommended conservation measures is included in Section 3.0. Additionally, a summary of measures already being utilized by the District is included in Section 4.0. Section 6.0 presents more potential conservation measures that may be appropriate for the District. Each of these measures will vary in complexity, feasibility, appropriateness, and effectiveness. However, in order to achieve success in water conservation it will be necessary to incorporate some of these measures (and perhaps others not listed) into any responsible conservation plan.

While the water supplier has the freedom to create a conservation plan that fits the unique characteristics of its system, OAR 690-086-0150 does require the supplier to undertake certain mandatory conservation activities. The following sections provide a description of each such measure, how each measure is currently being implemented, a proposed schedule and budget for each measure, and other details if necessary.

5.2 Annual Water Audit

5.2.1 Introduction

The purpose of an annual water audit is to determine the overall input-output accountability of the system, monitor the usage levels of qualitatively different consumers, gauge the effectiveness of conservation measures already being implemented, and gather other system performance data. Furthermore, the Oregon Administrative Rules require an assessment of the extent of water loss as systems seek to achieve an efficiency objective of 85 percent or greater. If a system reaches or exceeds the 85-percent goal, then the agency should strive to achieve an efficiency objective of 90 percent or greater.

The Seal Rock Water District has an audit system in place and recent results are summarized in Tables 5.2.1-1 and 5.2.1-2. The 5-year average accounted water is currently 76.7%. Recent audits including previously unaccounted-for water show that the average water loss from July-September 2012 is 18.5%. During the previous year, the July through September period had an average water loss of 20.7%, showing a marked improvement in the fiscal year 2012/2013. The District is approaching the goal of only 15% unaccounted water.

Table 5.2.1-1 – Water Audit for Seal Rock Water District, 2007-2012

Year	Total Purchased (MG)	Total Sales (MG)	Unaccounted Water (MG)	Unaccounted Water (%)
2007-2008	125.430	99.546	25.884	20.636%
2008-2009	123.314	93.352	29.962	24.297%
2009-2010	112.080	87.872	24.209	21.600%
2010-2011	111.665	83.954	27.712	24.817%
2011-2012	112.029	84.007	28.023	25.014%
5-Year Average (2007-2012)				**23.27%**

Table 5.2.1-2 – Water Audit for SRWD, July-September 2012 (Fiscal Year 2012-2013)

Month	Total Purchased (MG)	Total Sales (MG)	Unaccounted Water (MG)	Unaccounted Water (%)
July 2012	9.542	7.813	1.701	17.8%
August 2012	13.363	11.055	2.307	17.3%
Sept. 2012	10.233	8.123	2.100	20.5%
			Average	**18.54%**

5.2.2 Schedule & Budget

Water audits are not required more than once a year but are often conducted to maintain accountability levels. These audits are especially useful for the recognition of irregular usage patterns and may serve to identify leaks, malfunctions, or other system problems. The District performs daily in-house audits with the SCADA system in addition to annual system-wide audits. By conducting such audits, the District receives fast feedback concerning the performance of its supply system and is kept apprised of supply issues in a timely manner. These audits also provide the data underlying the annual water audits.

In the last few years, the District has engaged in an aggressive attempt to curtail water loss in its system. Daily in-house audits, keen field inspections, and other management practices have enabled the District to fix leaks promptly and drastically reduce the amount of water lost.

Table 5.2.2 – Proposed Schedule and Budget for Annual Water Audit

Task	Frequency	Proposed Start Date	Annual Cost
Comprehensive Water Audit	Annually	Current practice	$250
		Existing Annual Cost	**$250**
		Additional Annual Cost	**$0**

5.3 System Metering Program

5.3.1 Introduction

A number of companies that produce water meters offer equipment that is capable of extremely accurate measurement over a long service life. In addition to improved accuracy, newer meters can be supplemented with automatic meter reading (AMR) technology, which improves the efficiency and reliability of acquiring usage data from meters.

A number of communities in Oregon have undertaken complete meter replacement initiatives, installing new meters with AMR technology and updating the billing process system as well. Considering the revenue lost due to the inaccuracies of older meters, many such initiatives realize a payback period that ranges from just a few years to ten years, depending upon the amount of additional revenue captured by means of the newer meters.

5.3.2 Schedule & Budget

All connections in the SRWD are metered and several master meters exist to allow monitoring of use and to help detect leaks in distinct regions of the system. The District utilizes a spreadsheet to track the amount of water purchased from the City of Toledo and the amount of water sold each month. The spreadsheet calculates the amount, percentage, and cost per thousand gallons of lost water each month.

Nearly all of the meters in the system are touch-read each month. Approximately 100 of the 2,500 meters can be read with drive-by equipment. The District has found that it discovers more leaks by manually reading the meters, because it gives District staff an opportunity to walk the system, observe conditions and notice inconsistencies at the time each meter is read. Leaks or meter errors can then be addressed more quickly than if the District were using an automatic reading system.

Though the District has experienced a clear advantage using manual-read meters, it is worth examining whether or not replacing the majority of system meters with AMR technology would result in overall benefit to the District. Should the District choose to convert to AMR technology, a proposed schedule and budget is shown in Table 5.3.2 below. The table also includes the existing practice of ensuring that all system connections are metered. Customers wanting to establish a new connection must pay for the associated meter, so the cost to meter all system connections is listed as $0. Source-water metering and metering public-use water have been discussed in Sections 4.2 and 4.3, respectively.

Because the District already has some automatic read meters, it also has the necessary software and equipment for this type of system. The only cost to the District will be to add radios to existing meters. Approximately 400 of the 2,400 manual-read meters are eligible for dual-port radios, meaning that two meters are close enough to share one radio. The other meters would require individual, single-port radios.

Each dual-port radio costs approximately $155 and each single-port radio costs approximately $130. Because the District already has the necessary software and hardware and it can continue with its current system, it can convert meters at any rate it chooses. The cost estimate below assumes converting the meters over a five-year period. The estimate also includes an approximation for the additional labor required to complete the conversion; labor is calculated using a rate of $20 per hour.

Table 5.3.2 – Proposed Schedule and Budget for System Metering Program

Task	Frequency	Proposed Start Date	Annual or One-Time Cost
Meter all system connections	Ongoing	Current practice	$0
		Existing Annual Cost	**$0**
Install 40 dual-port radios	Annually, for 5 years	2015	$6,500
Install 400 single-port radios	Annually, for 5 years	2015	$52,000
Add'l labor for field installation	Annually, for 5 years	2015	$2,000
Add'l labor for billing update	Annually, for 5 years	2015	$1,000
		Additional One-time Cost	**$0**
		Additional Annual Cost	**$61,500**
		Total Cost	**$307,500**

5.4 Meter Testing and Maintenance Program

5.4.1 Introduction

Older or poor-quality water meters are often found to be inaccurate. Typically, these inaccuracies are on the order of ten to fifty percent of the actual volume of water that flows through the meters. The amount of water that passes undetected through the meter directly contributes to the overall amount of unaccounted water. In a larger water system, inaccurate meters can lead to hundreds of thousands of dollars in lost revenue each year.

Many meter manufacturers offer programs for the testing and calibration of existing meters. Some communities have shown significant benefits by replacing the meters within an entire system with one style/make of meter. The additional revenue generated by more accurate metering and subsequent billing usually will cover the cost of such a replacement endeavor.

5.4.2 Schedule & Budget

Due to fouling electronics, the District is in the process of replacing approximately 500 meters in the system. By the end of fiscal year 2012/2013, all the meters in the system will be less than ten years old. The District has installed Sensus© meters throughout the system for consistency and standardization.

After the first five years of the meters' service life, a program of testing the entire system of meters should be initiated by randomly inspecting five meters every month. Of course, faulty meters needing immediate attention would be identified by irregular performance as noticed by the consumer or meter reader. Note that the monthly random inspection of five meters is also listed in Section 4.5.

Table 5.4.2 – Proposed Schedule and Budget for Meter Testing and Maintenance

Task	Frequency	Proposed Start Date	Annual Cost
Replace meters older than 10 years	Every 5 years	Current practice	$30,000
		Existing Annual Cost	**$30,000**
Randomly inspect 5 meters	Monthly	2018	$750
Replace faulty meters	As necessary	2018	$3,000
		Additional One-time Cost	**$0**
		Additional Annual Cost	**$3,750**

5.5 Leak Detection and Repair Program

5.5.1 Introduction

A leak detection and repair program may include periodic on-site testing by means of computer-assisted leak detection equipment, sonic leak-detection surveys, or other accepted methods for detecting leaks along water transmission and distribution lines ("mains"), valves, connections, and meters. The program should also include occasional inspections of water tanks and supply reservoirs.

Water leakage affects not only the amount of unaccounted water assessed but also impacts costs required to store and distribute water to consumers; "lost" water generates no revenue for the supplier and wastes an increasingly precious resource. Repairing leaks can result in significant savings of operational costs and create additional revenue for the water system. Even when (what could be argued to be) acceptable levels of system leakage are achieved, on-going leak-detection activities are evidence of a vigilant and conscientious approach to water system management.

The initial goal of a system-wide leak detection program should be to reduce the amount of unaccounted water to 15% of the total amount of treated water purchased. If the reduction to 15% is determined to be feasible and appropriate, then the water supplier should endeavor to achieve a reduction to 10% or less. It should be understood that system leakage differs from unaccounted water, in that system leakage does not include unmetered or inaccurately metered water. The objective of a leak detection and repair program is to reduce the amount of water that leaves the system conduits and appurtenances via exit points that do not correspond to a designated connection point for the system.

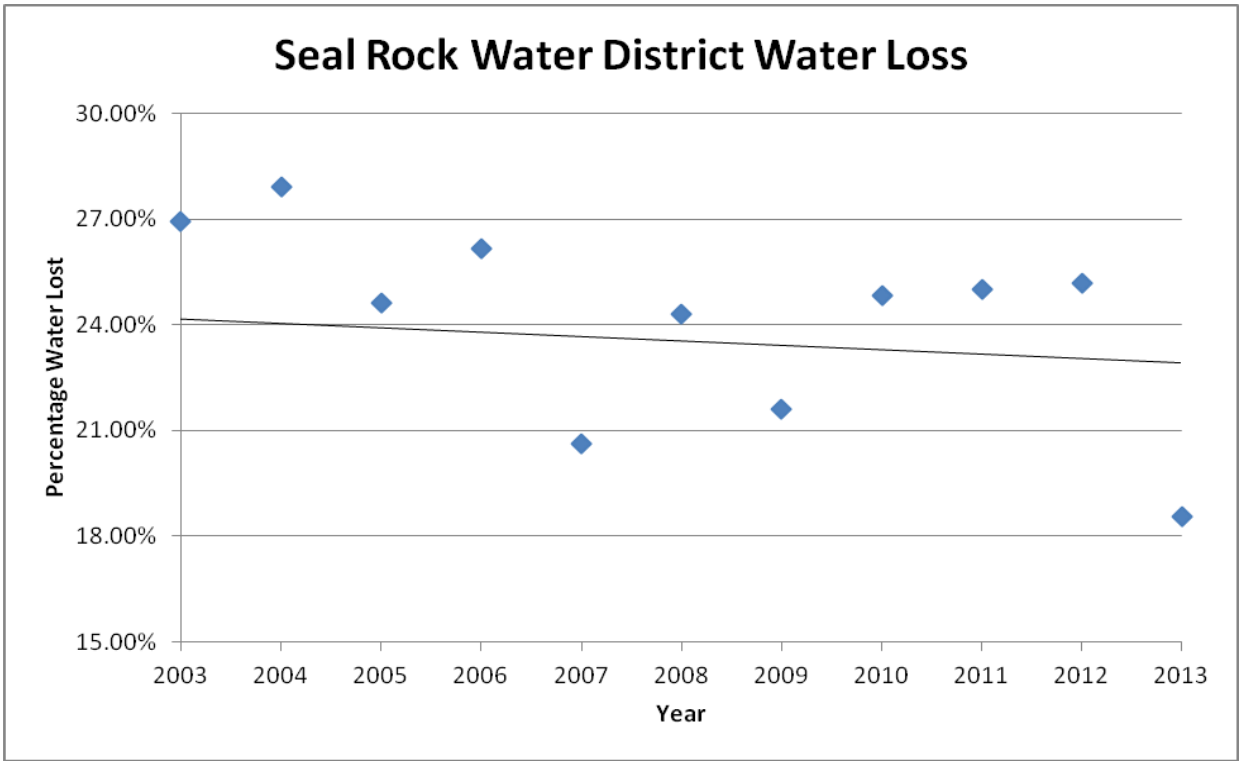
5.5.2 Schedule & Budget

District staff members have put significant energy into detecting and repairing leaks in the system. In January 2012, the District contracted with American Leak Detection to complete a leak detection survey. The survey identified five significant system leaks estimated at a total of 17-25 gallons per minute. The District has made an effort to fix these leaks, as well as the ones found by internal audits, as quickly as possible.

Miles of pipe have been added to the CIP to be repaired as funds become available; many of these improvements are already underway. Project #16 in the CIP, a stretch of 8-inch pipe along Highway 101, has been singled out by District staff as a likely source of considerable water loss, based on meter readings.

The five-year average production efficiency of the Seal Rock water system from 2007-2012 was 76.7%. The first three months of the 2012/2013 fiscal year averaged 81.5% production efficiency. These levels of performance are an improvement over the previous decade and show progress by the District, but still suggest that continued action should be taken to investigate and mitigate sources or causes of unaccounted water. A graph of water loss over the last 10 years is shown in Figure 5.5.2.

Figure 5.5.2 – Annual Water Loss as a Percentage of Demand, 2003-2013



The 2013 percentage represents the months July through September 2012, the data available at the time this report was written. The average water lost in July through September of 2011 was 20.7%, showing a definite improvement.

The District anticipates that the repair of the pipelines listed in the CIP will decrease the amount of water lost, possibly enough to satisfy the goal of less than 15% unaccounted water. Once this goal has been reached, the District can aim for an objective of 10% unaccounted water.

Table 5.5.2 – Proposed Schedule and Budget for Leak Detection and Repair

Task	Frequency	Proposed Start Date	Annual Cost
In-house SCADA audits	Daily	Current practice	$6,000
Comprehensive water audit	Annually	Current practice	$250
Inspect water tanks	Biannually	Current practice	$1,000
Replace leaking pipelines (CIP)	Ongoing until 2022	Current practice	$120,000
		Estimated Existing Annual Cost	**$127,250**
Replace leaking pipelines (new)	As necessary	2022	$200,000
Leak Detection Survey	Every 10 years	2022	$1,000
		Additional One-time Cost	**$0**
		Additional Annual Cost	**$201,000**

5.6 Public Education Program

5.6.1 Introduction

Surprisingly, most consumers have almost no knowledge of their water source, supply capacity and/or availability, and the necessary costs associated with treatment and distribution of water. The diligent efforts that occur behind the scenes are (for the most part) unnoticed and unappreciated by consumers. However, this situation can be changed by an engaging and informative public education program.

The goal of a public education program is to cultivate an awareness of limitations on water resources and to develop a conservation ethic concerning water consumption. Such a program directly influences both usage practices and patterns. An informed community will be more likely to support changes in the water system rate structure and management policies when people feel included. Public education can occur in the form of mailers/pamphlets, community seminars, school programs, or dedicated web pages.

Public education programs can inform consumers regarding such issues as:

- efficient bathroom, kitchen, and laundry fixtures/appliances
- availability/installation of retrofit kits
- maintenance of bathroom, kitchen, and laundry fixtures/appliances
- consequences of excessive/unattended operation of faucets
- best practices for washing equipment, vehicles, pavement, or other facilities
- efficient landscape design and irrigation practices
- discounts, credits, rebates, or other conservation incentives
- potential curtailment advisories/activities
- reporting suspected or observed system leaks

Significant amounts of educational materials concerning water conservation have been developed and are available to water suppliers at little to no cost. Information is available on a variety of topics and materials can be obtained for practically any purpose or demographic group.

The success of public education programs in terms of the extent of conservation realized is difficult to predict. During periods of shortage or drought, when public awareness and participation is typically high, a significant reduction in consumption usually occurs. During periods of adequate supply, such a reduction greatly depends upon how well the program engages and convinces the consumers. Studies

have suggested that a reduction in consumption of four to five percent occurs with a comprehensive and informative public education program.

5.6.2 Schedule & Budget

The District offers information for public education in a variety of ways both in its main office and in its mailings. Dye strips are available free to customers to check their toilets for leaks. Flyers and brochures on water usage and conservation are readily available. Seasonal information, like summer water conservation, is added to water bills. An annual Consumer Confidence Report is mailed to customers, as well as information on chlorine byproducts and cross-connections.

As described in Section 5.6.1, there is a variety of methods of public education. The six actions listed in Table 5.6.2 are recommended for the Seal Rock Water District. The first four of them have already been implemented by the District, and the listed annual cost is an estimate of the amount already being spent by the District.

One action left for the District to pursue is to create a dedicated web page on the District's website. This page can feature EPA's WaterSense® program, which is discussed in Section 5.9. The page can also include links to online versions of brochures and other educational materials the District has available to customers in print format. A web page is often more effective than print materials because it allows customers to access information at any time from anywhere.

Community seminars are a useful tool to educate and interact with water district customers. Meetings such as seminars offer the opportunity for customers to not only learn more about water conservation but also express opinions and become involved in the District's water conservation efforts. When customers develop ownership over District policies, they are more likely to comply. The Seal Rock Water District has the advantage of being close in proximity to the Cities of Newport and Waldport. Coordination with these agencies may be useful and cost-effective when planning community activities.

An additional $500 per year plus a one-time cost of $500 can bolster the public education program, increasing the percentage of customers reached.

Table 5.6.2 – Proposed Schedule and Budget for Public Education

Task	Frequency	Proposed Start Date	Annual or One-Time Cost
Provide flyers/brochures at District office	Ongoing	Currently available	$250
Offer free dye strips at District office	Ongoing	Currently available	$100
Send summer conservation info with bills	Annually	Current practice	$250
Mail CCR to customers	Annually	Current practice	$1,500
Estimated Existing Annual Cost			**$2,100**
Create a dedicated web page	One-time	January 2014	$500
Conduct community seminars	Every 2 years	May 2014	$500
Additional One-time Cost			**$500**
Additional Annual Cost			**$500**

5.7 Rate Structure Adopted for Water Consumption

5.7.1 Introduction

As a water supplier, the Seal Rock Water District charges its customers for their water consumption based upon a base fee plus a block rate for the volume of usage. The rate structure is an increasing block type, which tends to encourage water conservation. The existing rate structure, which was adopted in July 2010, is summarized below in Tables 5.7-1 and 5.7-2.

The structure results in a monthly bill of $80.97 for a residential customer inside the District with a standard ¾-inch meter using 7,500 gallons of water in one month. Customers outside the District boundary are charged a base rate $12.80 higher than customers inside the boundary but pay the same rate per 1,000 gallons of use. For the average year-round use of 2,871 gallons per month per EDU, the charge for a domestic customer inside the District is $44.28 per month.

The District is currently in the process of negotiating a new contract with the City of Toledo. The rate that the District will have to pay for water from the City will increase slightly. This increase may result in an increase to Seal Rock ratepayers.

Table 5.7.1-1 – Existing Rate Structure for Residential Water Service within District Boundary

Meter Size	3/4"	1"
Base Fee	$25.60	$45.25
Number of Gallons	**Cost per 1,000 Gallons**	
First 1,000	$5.21	
Next 3,000	$7.20	
Next 3,000	$7.96	
Next 6,000	$9.36	
Next 4,000	$11.58	
Next 3,000	$17.37	
Above 20,000	$18.60	

Commercial customers have a different rate schedule than domestic customers. In addition to the rates shown in Table 5.7.1-2, there are increasing base rates for meters up to six inches.

Table 5.7.1-2 – Existing Rate Structure for Commercial Water Service Inside District Boundary

Meter Size	3/4"	1"	1 1/2"	2"	3"	4"	6"
Base Fee	$42.35	$77.75	$99.00	$151.95	$255.95	$309.00	$465.00
Number of Gallons	**Cost per 1,000 Gallons**						
First 1000	$4.15						
Next 6,000	$5.91						
Next 5,000	$6.78						
Next 4,000	$8.25						
Above 16,000	$9.82						

Water suppliers should develop a rate structure that supports and encourages water conservation. The Seal Rock Water District rate structure already includes an inverted block rate for further usage, which

encourages water conservation. The District might consider further encouraging water conservation by implementing seasonal price differentials.

5.7.2 Schedule & Budget

There are three primary tasks involved in updating—and keeping current—the District's rate structure in order to promote water conservation. The first is to implement seasonal price differentials. Coupled with the existing inverted block rate, seasonal price differentials will help consumers become aware of increased water use during drier months. A brief review of the existing District rate structure and seasonal price differentials implemented by similar communities will help the District determine the most applicable seasonal rate structure adjustments. The cost for this analysis, estimated at $1,250, will be a one-time cost for the District. The new seasonal rates will be evaluated and attuned in annual internal reviews or in the larger study prepared every ten years.

Second, the District should internally review its rate structure each year. Changes in the CIP, inflation, and rising costs may require rate adjustments from year to year. The expense of internal reviews will likely be incidental; $250 has been included in the budget below.

The third task is to complete a comprehensive rate study every ten years, or whenever the CIP changes significantly. This rate study needs to be performed by a qualified professional firm. Because the existing rate structure was created based on recommendations in the Water Master Plan (Civil West, 2010), the next extensive rate study is due in 2020. At approximately $25,000, the cost for the rate study can be divided into $2,500 per year.

Table 5.7.2 – Proposed Schedule and Budget to Update Rate Structure

Task	Frequency	Proposed Start Date	Annual or One-Time Cost
Engineering Rate Study	Every 10 years	2020	$2,500
		Estimated Existing Annual Cost	**$2,500**
Determine Seasonal Price Differential	One-time	July 2013	$1,250
Internal Rate Analysis	Annually	June 2014	$250
		Additional One-time Cost	**$1,250**
		Additional Annual Cost	**$1,250**

5.8 Water Reuse and Recycling Opportunities

5.8.1 Introduction

It is the policy of the Oregon Environmental Quality Commission to encourage the use of recycled water for domestic, agricultural, industrial, recreational, and other beneficial purposes in a manner that protects public health and the environment of the State. The use of recycled water for beneficial purposes will improve water quality by reducing discharge of treated effluent to surface waters, reduce the demand on drinking water sources for uses not requiring potable water, and may conserve stream flows by reducing withdrawal for out-of-stream use.

Several supply-side water reuse practices exist, offering both potable water treatment plants and wastewater treatment plants the opportunity to minimize their use of treated water during operations of the facility. Because the District does not operate either type of treatment plant, these practices cannot be utilized by the District directly. The District can encourage its supplier, the City of Toledo, to examine the possibility of instituting reuse practices.

Demand-side water reuse (for residences) usually involves the reclamation of "gray water," which can consist of any household wastewater not containing human waste, such as water from sink, bathtub, shower, or roof drains. The Department of Environmental Quality (DEQ) of Oregon does not currently permit reclamation of gray water for reuse in residential environments. Oregon Administrative Rule (OAR) 340-055 governs the limitations on recycled water use in the State.

5.8.2 Schedule & Budget

Although the District cannot implement water reuse and recycling at this time, it may be able to do so in the future. Therefore, on a regular basis the District should reexamine the possibility of incorporating this conservation measure into its plan. A brief, in-house analysis of the feasibility of water reuse and recycling within the District should take place every five years.

The in-house analysis might include research on efforts by other communities, presentations to the Board by District staff, or other information that will help the Board decide if it needs to take steps toward water reuse and recycling. The District may request a consultant's analysis; this professional analysis has been estimated at $5,000.

Table 5.3.2 – Proposed Schedule and Budget for Water Reuse & Recycling

Task	Frequency	Proposed Start Date	Annual Cost
Reevaluate water reuse/recycling possibilities	Every 5 years	2018	$250
Professional analysis of possibilities	Every 5 years	2018	$1,000
		Additional One-time Cost	**$0**
		Additional Annual Cost	**$1,250**

5.9 EPA WaterSense® Program

5.9.1 Introduction

In 2006, the EPA has launched the WaterSense® program, a partnership endeavor directed at utilities, state and local governments, and other organizations that desire to share information about the program and the water-efficient products and practices that it endorses. The program also seeks to stimulate innovation in and availability of such products in the marketplace, and it provides resources to water suppliers in order to enhance the overall promotion of water conservation.

The Seal Rock Water District should consider becoming a partner in the WaterSense® program in order to assist its efforts toward water conservation and to take advantage of the resources that the program can offer (http://www.epa.gov/watersense/partners/join/index.htm). By partnering with WaterSense®, the District agrees to:

- Promote the value of water efficiency and WaterSense®-labeled products, new homes, and programs.
- Adhere to the Program Guidelines and the Program Mark Guidelines.
- Feature WaterSense® on website and related promotional materials.
- Abide by the general terms and disclaimers outlined on the partnership agreement.
- Encourage eligible constituents to participate in WaterSense®.
- Provide a brief annual update about promotional activities involving water efficiency.

5.9.2 Schedule & Budget

The EPA WaterSense® program is free to join. Throughout the year, WaterSense® hosts an informational webinar named "WaterSense 101." The webinar provides information about the program and the benefits of partnering with WaterSense®. It would be useful to the District for staff to participate in a webinar before the District embarks on the schedule proposed below. For this reason, the start date is not until March 2014, giving the District a year to gather enough information about WaterSense® to make the most of the resources offered.

Very few costs will be incurred by joining the EPA WaterSense® program. Promotion of the program can be verbal, on the website, or through printed material. Printing promotional material costs can be estimated at $250 per year.

Each year the WaterSense® program hosts Fix a Leak Week and other national outreach campaigns. As a partner, the District can participate in these events. Costs incurred by the District during these events might include printing and mailing promotional materials. Assuming that promotional materials are mailed with monthly bills, thus avoiding additional postage costs, this expense can be estimated at $250.

The fee to hire a web designer to create a dedicated page featuring the WaterSense® program is estimated at $500. This cost was included in the Public Education Program in Section 5.6 and should be disregarded in the cost estimate below if the District chooses to participate in both measures.

WaterSense® partners are requested to submit an annual update on their activities related to the WaterSense® program. It is anticipated that this report will not add more than $100 to the annual budget.

Table 5.9.2 – Proposed Schedule and Budget to Join EPA WaterSense®

Task	Frequency	Proposed Start Date	Annual Cost
Join WaterSense® as promotional partner	One-time	March 2014	$0
Promote WaterSense®	Ongoing	April 2014	$250
Feature WaterSense® on website	Ongoing	May 2014	$500
Participate in national outreach campaigns	Annually	March 2014	$250
Provide update on promotional activities	Annually	March 2015	$100
		Additional One-time Cost	**$0**
		Additional Annual Cost	**$1,100**

Section 6

6.0 Additional Potential Measures

6.1 Introduction

In addition to the mandatory conservation measures in Section 5.0 and the EPA table of guidelines in Section 3.3, the Seal Rock Water District can employ supplementary conservation measures to maximize the beneficial use of water in its system. The District should evaluate a variety of measures for appropriateness and cost-effectiveness; a list of potential conservation tactics is included below. These measures are included in this Plan because they have the potential to be effective for the District.

6.2 Conservation Coordinator

6.2.1 Introduction

Selecting a conservation coordinator should be one of the first actions the District takes toward complying with OAR 690-086. Depending on the workload of current staff members, the District may be able to add this task to an existing job description instead of hiring a new staff member. The responsibilities of the water conservation program manager are, initially, to develop the long-range efficiency plan and then organize and direct the various measures that the recommended program comprises.

This begins with preparing a work plan that defines the schedule and budget for each task identified to implement the plan. Table 6.2.2 shows an example of a schedule and budget for this measure; schedules and budgets developed by the conservation coordinator would provide considerably more detail.

Early on in the conservation program's progress, the manager should focus on obtaining necessary funding and establishing clear lines of communication between the Board and the staff involved in implementing the conservation program. The coordinator's duties are expected to be part-time, and the coordinator will be responsible for carrying out many of the conservation tasks.

A single designated coordinator maintains consistency in the information given to the public and provides information-seekers a known place to inquire. When it is easy for consumers to gather information about a program, they are more likely to participate.

Another benefit of designating a coordinator is the associated accountability. If conservation measures are not completed or are not implemented as intended, the Board can hold the coordinator accountable. Intended measures are less likely to be forgotten or overlooked when a coordinator exists to oversee the conservation program.

6.2.2 Schedule & Budget

If the program coordinator is running the program satisfactorily, that person can remain the coordinator as long as he or she is employed by the Seal Rock Water District. A progress report regarding the conservation program should be submitted to the OWRD every five years; the evaluation leading up to the progress report would be an appropriate time to evaluate the conservation coordinator and select a new one if necessary. In-house employee reviews of the conservation coordinator should be conducted on the same timeframe as other employee reviews.

Because the duties associated with the coordinator position are anticipated to increase the designated staff member's current workload by about 15%, a commensurate increase in salary is recommended. The salary increase would coincide with the start of the coordinator's additional workload, which is proposed for

early 2014. While it is up to the District to decide if and how much to increase salary, an amount of $7,500 has been included below for budgetary and analysis purposes.

The time spent documenting the change in duties for the current staff member will incur some minor costs from the District. This cost has been estimated at $250 every five years.

Table 6.2.2 – Proposed Schedule and Budget for Conservation Coordinator

Task	Frequency	Proposed Start Date	Annual Cost
Designate/review conservation manager	Every 5 years	2013	$50
Increase salary to conservation manager	Annually	2014	$7,500
		Additional One-time Cost	**$0**
		Additional Annual Cost	**$7,550**

6.3 Water Survey Program

6.3.1 Introduction

The District may benefit from surveying residential customers regarding their knowledge about water conservation and their willingness to comply with conservation programs. Customers that feel informed and involved are more likely to participate in conservation efforts. Thus, these surveys will help the District implement effective programs.

It is anticipated that only a portion of District customers will respond to a survey. This portion has been estimated at 20% for professional surveys and 10% for in-house surveys.

6.3.2 Schedule & Budget

The District can choose to hire a professional survey company to conduct a survey in the District, or it can conduct a survey in-house. A professional survey–estimated at $10,000–completed every five years will require the District to budget $2,000 each year.

The cost of an in-house survey can be absorbed into overhead or included in a staff member's salary. If the District designates a conservation coordinator (see Section 6.2), the cost shown in Table 6.3.2-2 is already accounted for in the salary increase budget. It is shown below to compensate other staff members for additional hours in case the District does not designate a conservation coordinator. An in-house phone survey is expected to take approximately 400 hours every three years. At an expense of $20 per hour, the survey creates an additional $8,000 in costs. This translates to a budgetary requirement of $2,700 per year.

Table 6.3.2-1 – Proposed Schedule and Budget for Water Survey Program–Professional Survey

Task	Frequency	Proposed Start Date	Annual Cost
Professional survey (20% success rate)	Every 5 years	2015	$2,000
		Additional One-time Cost	**$0**
		Additional Annual Cost	**$2,000**

Table 6.3.2-2 – Proposed Schedule and Budget for Water Survey Program–In-house Survey

Task	Frequency	Proposed Start Date	Annual Cost
In-house survey (10% success rate)	Every 3 years	2015	$2,700
		Additional One-time Cost	**$0**
		Additional Annual Cost	**$2,700***

*If the district elects to appoint a conservation coordinator this amount is included in their commensurate salary raise.

6.4 Residential Plumbing Retrofit

6.4.1 Introduction

Homes built prior to 1992 often do not have low-flow showerheads, aerators, toilet displacement devices and toilet flappers. Installing these water-saving devices in older homes will promote the beneficial use of water on the demand side. Providing an avenue for residence participation in the water conservation effort will also serve as a public education tool.

During an audit or through direct mail solicitation, the District can provide free retrofit kits to existing older single-family residences. The kit would contain a variety of water-saving appurtenances that help reduce water consumption by 75% in toilets and 40% in showers. The kit would also include a pamphlet on how to conserve water.

6.4.2 Schedule & Budget

Retrofit kits vary in price and contents, and the District can choose kits ranging from $15 to $50. The estimate below assumes a retrofit kit cost of $30. Less expensive kits may not include showerheads, which are vital for significant water conservation. An example of such a kit from Niagara Conservation Corporation can be found at:

http://www.itseasybeinggreen.com/index.php/water-ecokit.html

This example kit includes a showerhead, leak detection tablets, a kitchen swivel aerator, two bathroom aerators, a flow meter bag, a toilet tank bank, a toilet water saver, and plumber's tape.

If approximately five percent of residences receive retrofit kits each year and each kit costs the District thirty dollars, then the annual cost for the Seal Rock Water District would be $3,500. It is anticipated that only a portion of District residents will eventually participate in the program. With an estimated 60% participation rate, the District can expect to run the program at the estimated cost for 12 years. After that, the annual cost will diminish, as fewer rebate kits will be needed each year.

Table 6.4.2 – Proposed Schedule and Budget for Residential Plumbing Retrofit

Task	Frequency	Proposed Start Date	Annual Cost
Distribute retrofit kits	Ongoing	2014	$3,500
		Additional One-time Cost	**$0**
		Additional Annual Cost	**$3,500**
		Total Cost	**$42,000**

6.5 Residential Toilet Replacement Program

6.5.1 Introduction

Similar to the residential plumbing retrofit, this program aims to replace older toilets for residential customers. In 1992, the state of Oregon began requiring that stores sell only toilets using at most 1.6 gallons per flush. According to the American Community Survey (ACS) most recent 5-year estimate, approximately 74.4% of housing units in Lincoln County were built before 1992. Out of the District's 2,400 residential connections, about 1,790 were theoretically built before 1992 and therefore may be eligible for the toilet replacement program.

The toilet replacement program would provide a rebate for the retrofit of a 6/3 dual flush, 4-liter, or equivalent very low water use toilet. A new toilet with installation will cost the customer between $175 and $650, depending on the type of toilet and current installation costs. A possible rebate program might offer a $50 rebate for purchasing and installing a qualified toilet that replaces an older, high water-use toilet. The District can opt to put limits on the number of rebates per household.

6.5.2 Schedule & Budget

If five percent of eligible homes replace one toilet each year and the District offers a $50 per toilet rebate, the annual cost can be estimated at $6,000. The District can adjust the cost by offering a different rebate. It is unknown how many District residents will take advantage of the rebate program, so participation (and therefore cost) could vary greatly.

It is anticipated that only a portion of District customers will choose to participate in the program. A participation rate of 50% has been assumed for the cost estimate below. In this scenario, 5% of homes will participate each year for ten years. At that point, most eligible toilets that customers intend to replace will have been replaced. The cost will then decrease dramatically as only a handful of rebates will be requested each year.

Table 6.5.2 – Proposed Schedule and Budget for Residential Toilet Replacement Program

Task	Frequency	Proposed Start Date	Annual Cost
Provide toilet replacement rebates	Ongoing	2015	$4,500
		Additional One-time Cost	**$0**
		Additional Annual Cost	**$4,500**
		Total Cost	**$45,000**

6.6 Install Low-consumption Fixtures at Time of Sale

6.6.1 Introduction

The time of sale of a residence is an opportune time to examine fixtures and install ones that are more efficient if possible. The District can work with the real estate industry to require that a certificate of compliance be submitted. The certificate would verify that a plumber has inspected the property and efficient fixtures either were already in place or were installed at the time of sale. The District may need to establish an ordinance in order to enforce compliance.

6.6.2 Schedule & Budget

Because the owner will be obliged to comply in order to sell the home, it is not recommended that the District offer a rebate for fixtures installed under this measure. Costs associated with this measure for the District include developing an ordinance and overseeing compliance. Section 6.2 discusses designating a Conservation Coordinator who would manage all the conservation measures implemented by the District.

Creating an ordinance incurs legal fees and engineering fees to ensure that the ordinance is appropriate and effective. This one-time cost is estimated at $2,500. Coordination with the local real estate industry will generate primarily incidental costs, such as per diem costs. For the purpose of the budget presented below, these coordination costs have been estimated at $500.

If a District staff member spends 5 hours per month on enforcement and is compensated at $20 per hour, the District can expect to spend about $1,500 each year to enforce the ordinance.

Table 6.6.2 – Proposed Schedule and Budget for Required Time-of-sale Upgrades

Task	Frequency	Proposed Start Date	Annual or One-Time Cost
Coordinate with real estate industry	One-time	2015	$500
Develop appropriate ordinance	One-time	2016	$2,500
Enforce ordinance	Ongoing	2016	$1,500
		Additional One-time Cost	**$3,000**
		Additional Annual Cost	**$1,500**

*If the district elects to appoint a conservation coordinator (see section 6.2) these costs are included in their commensurate salary raise.

6.7 High-efficiency Washing Machine and Dishwasher Rebates

6.7.1 Introduction

Because 97% of District customers are residential, a rebate program to install high-efficiency washing machines and dishwashers could be very successful at reducing water waste in the District. By providing cost-effective customer incentives, such as rebates, the District can increase water conservation on the consumer side.

If possible, the District should collaborate with local energy companies to maximize the rebate offered to customers for the purchase of high-efficiency appliances. Combined with public education, the rebates could be very effective at increasing the use of these machines, which require 40% less water per load.

6.7.2 Schedule & Budget

Rebates sponsored by utility companies in Oregon range from $20-$100 per clothes washer. The District could offer a similar rebate for clothes washers and dish washers that meet certain requirements. If the District offers $50 per high-efficiency appliance and 5% of District residents install a new appliance each year, the District can expect to spend around $6,000 per year. It is unknown how many District residents will take advantage of the rebate program, so participation could vary greatly. Like the residential toilet replacement program, a 50% participation rate is assumed. Given this rate, the program would continue for ten years at the budget proposed below and then decrease to occasional rebates.

Table 6.7.2 – Proposed Schedule and Budget for High-efficiency Appliance Rebates

Task	Frequency	Proposed Start Date	Annual Cost
Provide appliance replacement rebates	Ongoing	2015	$6,000
		Additional One-time Cost	**$0**
		Additional Annual Cost	**$6,000**
		Total Cost	**$60,000**

6.8 New Development Requirements

6.8.1 Introduction

In order to set a District-wide standard of water conservation, the District should establish requirements for new developments. These requirements could include, for example:

- low-flow showerheads
- faucet aerators
- 6/3 dual flush, 4-liter, or equivalent very low water use toilet
- high-efficiency washing machines
- high-efficiency dish washers

As the District considers implementing requirements for new developments, it should communicate directly with developers. New requirements need to be cost-effective for the developers and not burdensome to fulfill. A close working relationship with developers will help ensure compliance. The joint effort will further conserve water in the Seal Rock Water District.

6.8.2 Schedule & Budget

Because the developer will install water-efficient fixtures at the time of construction, the District does not need to contribute financially to the added cost of these fixtures. Instead, the District may elect to offer an SDC credit to developers to offset the added cost of high-efficiency fixtures.

Establishing requirements for new developments will require the Board to develop an ordinance to permit the enforcement of those standards. Legal fees and other costs associated with developing an ordinance, as well as extra costs incurred by close coordination with local developers, have been estimated at $3,500.

If a District staff member spends 5 hours per month on enforcement and is compensated at $20 per hour, the District can expect to spend about $1,500 each year to enforce the ordinance.

Table 6.8.2 – Proposed Schedule and Budget for New Development Requirements

Task	Frequency	Proposed Start Date	Annual or One-Time Cost
Establish new development requirements	One-time	2016	$3,500
Enforce requirements	Ongoing	2016	$1,500
		Additional One-time Cost	**$3,500**
		Additional Annual Cost	**$1,500**

*If the district elects to appoint a conservation coordinator (see section 6.2) these costs are included in their commensurate salary raise.

6.9 Landscape Conservation Program

6.9.1 Introduction

While coastal communities such as Seal Rock generally use less water for landscaping than communities in more arid climates, landscaping is still an area where conservation measures could make a difference in beneficial water use. Landscaping surveys or informational pamphlets sent to customers using large volumes of water for irrigation can encourage consumers to reduce water waste and design outdoor features with limited water needs.
The District can also elect to offer rebates for irrigation system upgrades, mulch and soil amendments, new plant materials, turf reduction, landscape design, and the use of soaker hoses. Landscape design that requires little to no water benefits the customer by decreasing the water bill and benefits the community be increasing the percent of water going toward beneficial use.

6.9.2 Schedule & Budget

If the District offers rebates of up to $50 to residential customers making conservation changes as described above and five percent of District customers participate, the District can expect to spend about $6,000 per year on rebates. With an estimated 40% of residences participating in the landscape conservation program, the District would distribute approximately $48,000 in rebates over eight years.

Table 6.9.2 – Proposed Schedule and Budget for Landscape Conservation Program

Task	Frequency	Proposed Start Date	Annual Cost
Include material in water bills	Annually	2014	$250
Provide landscaping rebates	Ongoing	2014	$6,000
		Additional One-time Cost	**$0**
		Additional Annual Cost	**$6,250**

6.10 Water Waste Prohibition

6.10.1 Introduction

In association with increased public education, the District can adopt water waste ordinances to further encourage the beneficial use of finished water. Involving District customers in the ordinance-writing process will further educate and encourage compliance.

Practices such as gutter flooding, single-pass cooling systems in new connections, and non-recycling decorative water fountains would be prohibited by a water waste ordinance.

6.10.2 Schedule & Budget

Creating an ordinance incurs legal fees and engineering fees to ensure that the ordinance is appropriate and effective. This one-time cost is estimated at $2,500.

If a District staff member spends 5 hours per month on enforcement and is compensated at $20 per hour, the District can expect to spend about $1,500 each year to enforce the ordinance.

Table 6.10.2 – Proposed Schedule and Budget for Water Waste Prohibition

Task	Frequency	Proposed Start Date	Annual or One-Time Cost
Develop water waste ordinance(s)	One-time	2015	$2,500
Enforce ordinance(s)	Ongoing	2015	$1,500
		Additional One-time Cost	**$2,500**
		Additional Annual Cost	**$1,500**

*If the district elects to appoint a conservation coordinator (see section 6.2) these costs are included in their commensurate salary raise.

Section 7

7.0 Water Curtailment Plan (OAR 690-086-0160)

7.1 Introduction

A water curtailment plan consists of an "interim" mandatory program intended to substantially (or even drastically) reduce water consumption, usually the consequence of a water supply/service emergency or interruption. In accordance with OAR 690-086-0160, each water supplier must develop a curtailment plan with specific event triggers, operating guidelines for various event stages, and measures to reduce consumption, which would be enforced under such circumstances.

Most water systems have critical elements that, if damaged or destroyed, would restrict or prevent the delivery of treated water to consumers. In such a situation, the supply/service interruption could last from a few hours to several days. As part of a complete WMCP, a curtailment plan would provide the Seal Rock Water District with a "roadmap" for navigating and managing such an event. The following sections provide information for the development of a water curtailment plan.

7.2 Historical Deficiencies

A water supplier should be prepared for supply-deficiency events. The formation and adoption of policies, ordinances, and other measures should occur well before an actual reduction or interruption in the water supply. Knowledge of past events, along with information about both the causes and indicators of potential supply crises, will assist the water supplier in providing a consistent and reliable product to its customers.

The Seal Rock Water District has experienced some reductions in water supply in the past. In 1992, the District experienced a temporary water supply shortage severe enough to motivate a water conservation ordinance (Ordinance No. 010992-3). In addition, at times the treated water supply from the City of Toledo has been restricted. Because Toledo serves its customers before sending water to the District, occasional unexpected high demand in Toledo limits the water available for Seal Rock.

7.3 Source Water Supply Evaluation

An examination of the projected supply needs for the communities of Toledo and Seal Rock over the current planning period indicates that the water supply rights available for diversion are sufficient, provided that the sources (Mill Creek and the Siletz River) maintain their normal stream flows.

However, should another cause of an unexpected supply reduction or interruption occur, a curtailment plan will be an essential tool for the District to properly respond to such an event. Reduced supply from the City of Toledo and breaks in the main transmission line are examples of events that could necessitate curtailment action.

7.4 Alert Stages for Water Curtailment

A water curtailment plan should contain at least three stages of alert for potential events associated with a reduction in or an interruption of water service. These stages would range from a mild level of concern to a serious level of concern to a critical level of concern. Each stage involves predetermined indicators that identify when that stage has been reached along with an associated set of actions and measures.

The following four alert stages are recommended for the Seal Rock Water District water curtailment plan.

Alert Stage No. 1 – Water System Advisory Status

- Prudent to inform community of potential water supply or service difficulties.
- Difficulties do not require mandatory conservation but suggest voluntary conservation.
- Prepare community mindset for possible reduction in or interruption of water service.

Alert Stage No. 2 – Water System Warning Status

- Necessary to inform community of actual (typically, gradual) water supply or service problem.
- Necessary to impose initial levels of mandatory conservation in a temporary time frame.
- Supplier response would likely involve maintenance/repair activities, construction activities, or preparations to avert a potentially sustained supply or service problem.

Alert Stage No. 3 – Water System Emergency Status

- Necessary to inform community of actual (typically, sudden) water supply or service problem.
- Necessary to impose escalated levels of mandatory conservation in a protracted time frame.
- Supplier response would certainly involve maintenance/repair activities, construction activities, or other efforts to avert a potentially sustained supply or service problem.

Alert Stage No. 4 – Critical Water-Availability Status

- Necessary to inform community of threatened or nonexistent water availability.
- Possibility exists to impose periodic or sustained termination of water service.
- Conditions warrant possible water rationing at emergency distribution centers.

7.5 Indicators for Alert Stages

As mentioned above, each stage of alert involves predetermined indicators, or event triggers, that identify when that stage has been reached along with an associated set of actions and measures.

7.5.1 Planned Maintenance/Repair or Sudden Failure of Components

On occasion, it is likely to be necessary to suspend or shutdown the operation of a water system for such reasons as maintenance, repair, or upgrade. Whenever possible, such activities should be carefully planned and scheduled in order to minimize impact upon water consumers. However, though relatively rare, it is usually unavoidable for a water system to prevent all unplanned events that severely limit or terminate the delivery of water to certain consumers within the service area. A list of possible events that could lead to such conditions and would constitute entering a stage of alert is provided below:

- Indefinite interruption of electric-power supply
- Severe contamination of source-water supply
- Compromise or destruction of intake structure or system piping
- Failure or collapse of storage reservoir or tank
- Failure or breakdown of crucial pumps, valves, or connectors

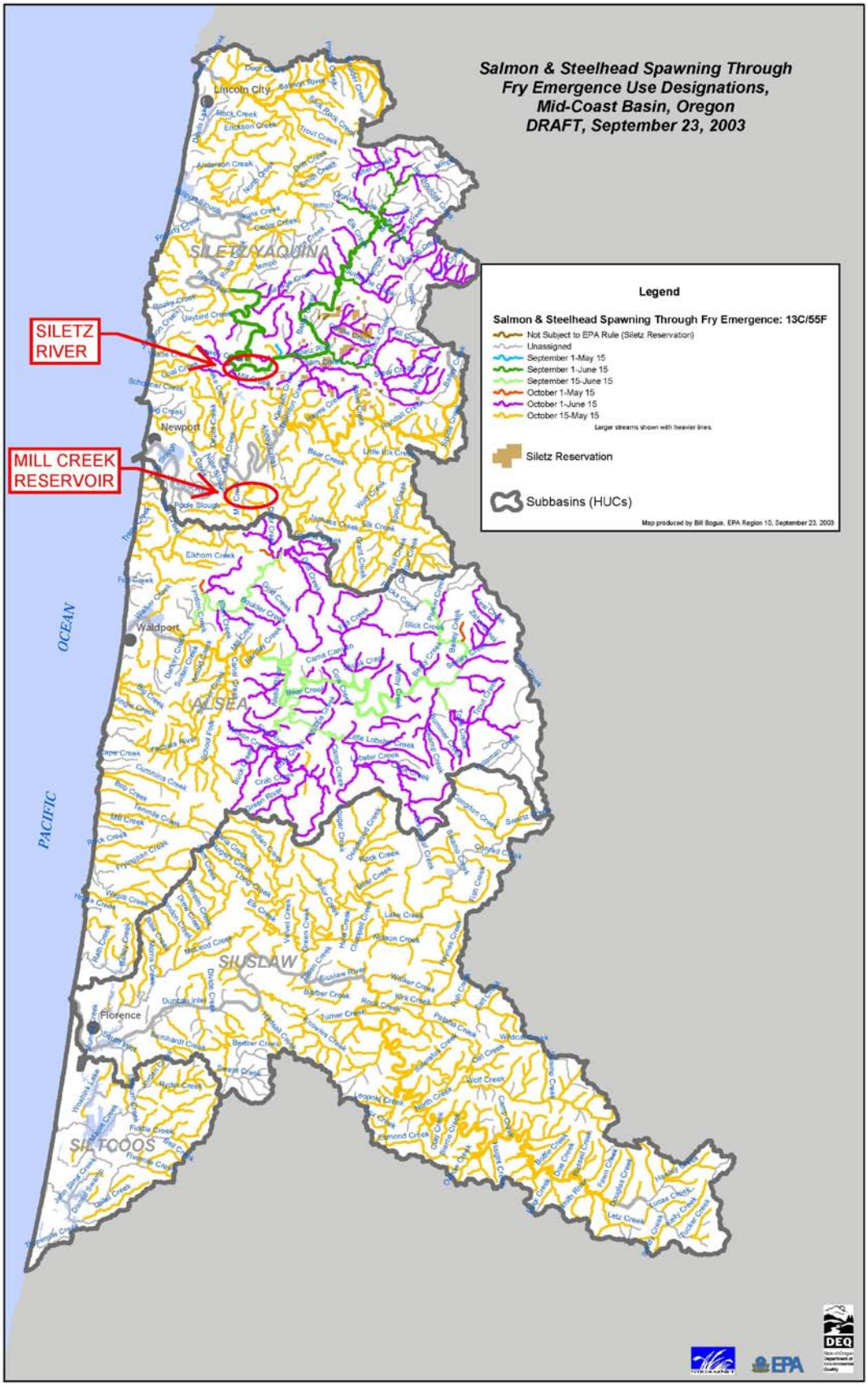
Typically, these events would be precipitated by natural disasters, environmental catastrophes, or other emergency conditions that are generally beyond the control of water system managers.

7.5.2 Reduced Reservoir Levels or Stream Flows

As mentioned above, the Seal Rock Water District obtains all its water from the City of Toledo. Both the SRWD and the City possess water rights to the Siletz River, from which the City withdraws water during the summer months, typically May through October. The SRWD holds a 2.6 cfs water use permit, which is junior to instream water rights. The City's three water use permits have different priority dates, with a total of 5.75 cfs being senior to instream water rights (ISWR). Summer flows in the Siletz River can often drop below the 100 cfs ISWR, thereby potentially causing a restriction in use for water rights junior to ISWR. The current combined MDD for the City of Toledo and the SRWD is approximately 1.84 MGD, or 2.85 cfs. The projected combined MDD in the year 2035 is 2.44 MGD, or 3.78 cfs. The two agencies' water supply will not be limited by ISWR at least for the current planning period.

Figure 7.5.2 shows the various streams and rivers in the nearby drainage basins and illustrates the sensitive fish (anadramous and other) habitat that can be found in the vicinity. The intake sites for the District's water sources are circled in red. Salmon and steelhead spawning streams are located throughout the local drainage basins. These sensitive fish habitats create the need for in-stream water rights and, in turn, make it difficult for municipalities to obtain new water rights on these streams during periods of below-normal flow. When water levels are low, in-stream rights and human water needs must be carefully managed and coordinated.

Figure 7.5.2 – Salmon and Steelhead Spawning through Fry Emergence



7.5.3 Palmer Hydrological Drought Index

The Palmer Hydrological Drought Index (PHDI) is a widely-utilized measure for assessing the extent of drought conditions throughout the continental United States. The PHDI is based upon long-term records of temperature and precipitation, and it is tabulated by the NOAA Satellite and Information Service on a weekly basis. PHDI values are determined for about 350 climate divisions within the continental United States and are available on both the NOAA and National Weather Service websites.

Normal weather is assigned an index value of zero in all seasons in any region of climate; droughts will have negative index values, whereas wet periods will have positive index values. Negative index values occurring over several consecutive weeks can provide initial warning of an impending drought. Long-term negative index values can assist the District in judging the severity of a drought condition.

For the purposes of a water curtailment plan, the District would be interested in the negative PHDI regime, which is already conveniently divided into three drought-indicative intervals: a *moderate drought*, with values from −2 to −3; a *severe drought*, with values from −3 to −4; and an *extreme drought*, with values of −4 or less.

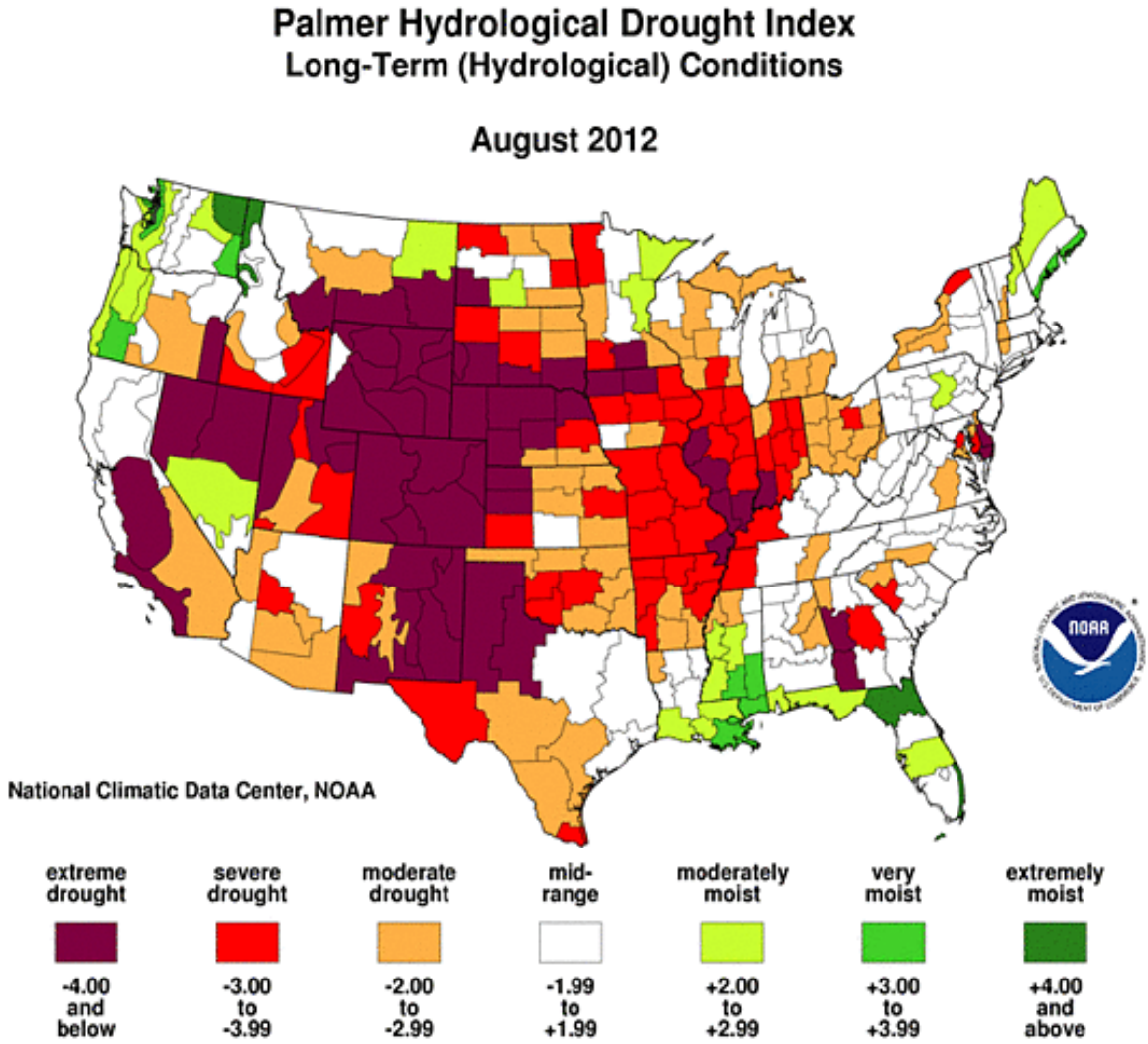


Figure 7.5.3 – Palmer Hydrological Drought Index, August 2012

Figure 7.5.3 shows the continental United States superimposed with PHDI values for various regions. As may be identified, Seal Rock lies within the light green band along the Oregon coast. The index value for this area (as of August 2012) corresponds to a moderately moist environment, indicating slightly wet-period conditions for this area. Eastern (especially, southeastern) portions of Oregon are seen to be experiencing moderate drought conditions. Large portions of the United States experienced severe to extreme drought the months leading up to and including the month the PHDI values are shown, indicating an atypical year.

Although not directly supply-specific, the PHDI can serve as a valuable indicator for assessing potential source-water supply issues, and it can be tied to triggers for alert stages within a water curtailment plan. The PHDI format discussed herein is updated monthly and can be accessed at the following website:

http://lwf.ncdc.noaa.gov/oa/climate/research/prelim/drought/phdiimage.html

7.5.4 Surface Water Supply Index

With similarities to the PHDI, the Surface Water Supply Index (SWSI) is another measure for assessing the extent of drought conditions, but it is directly correlated with availability of water resources within designated regions. Tabulated monthly by the USDA National Resource Conservation Service for the major drainage basins within each state, the SWSI can be utilized to identify which basins possess water supplies that are either above, at, or below normal levels.

A map of the State of Oregon superimposed with SWSI values for the major drainage basins is displayed in Figure 7.5.4-1. Seal Rock lies within the blue region that corresponds to the North and Mid-Coastal basins. The index value for this region (as of August 1, 2012) is 1.8, signifying a slightly high amount of available surface water supply. The scale for the SWSI is comparable to that for the PHDI in terms of the extent of drought conditions (though the precise meanings of the two indices are different).

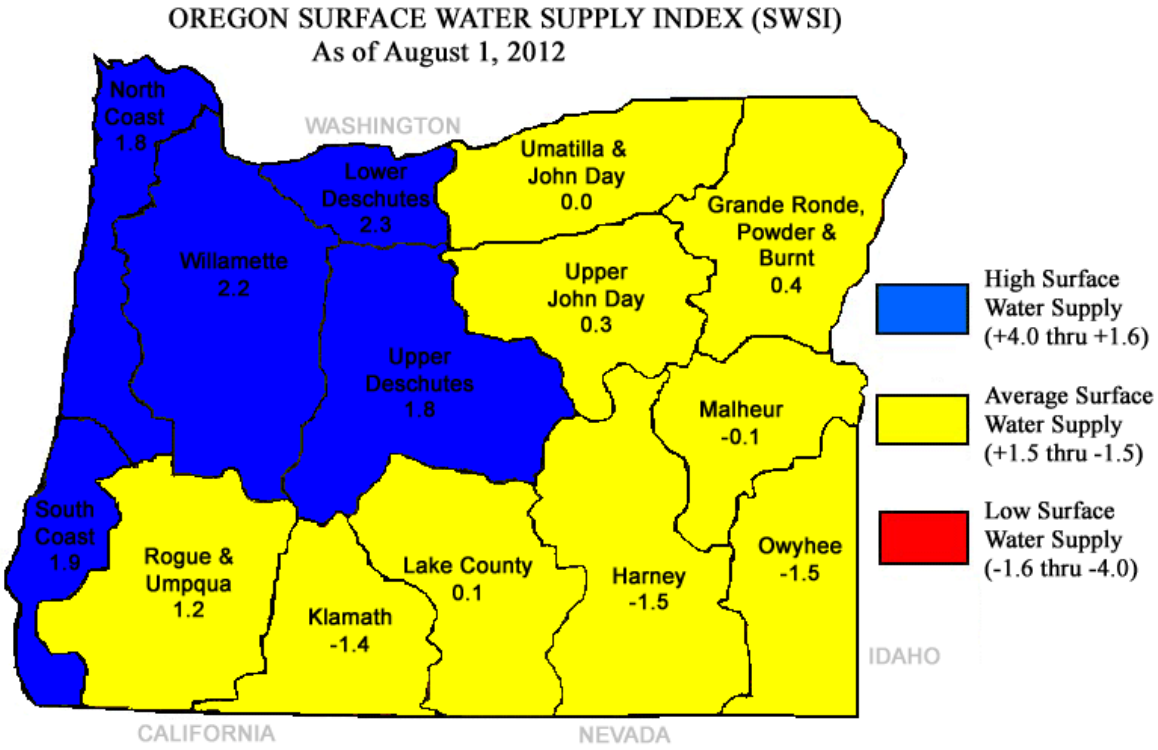


Figure 7.5.4-1 – Oregon Surface Water Supply Index, August 1, 2012

Like the PHDI, the SWSI can serve as a valuable indicator for assessing potential source-water supply issues, and it can be tied to triggers for alert stages within a water curtailment plan. The SWSI format discussed herein is updated monthly and can be accessed at the following website:

http://www.or.nrcs.usda.gov/snow/watersupply/swsi.html

In addition to monthly SWSI data, substantial historical data is available from this website to indicate both the frequency and intervals of reoccurrence of various levels of supply that might be expected. Figure 7.5.4-2 summarizes the SWSI data over the past three years. Data extending further back in time is also available from this website.

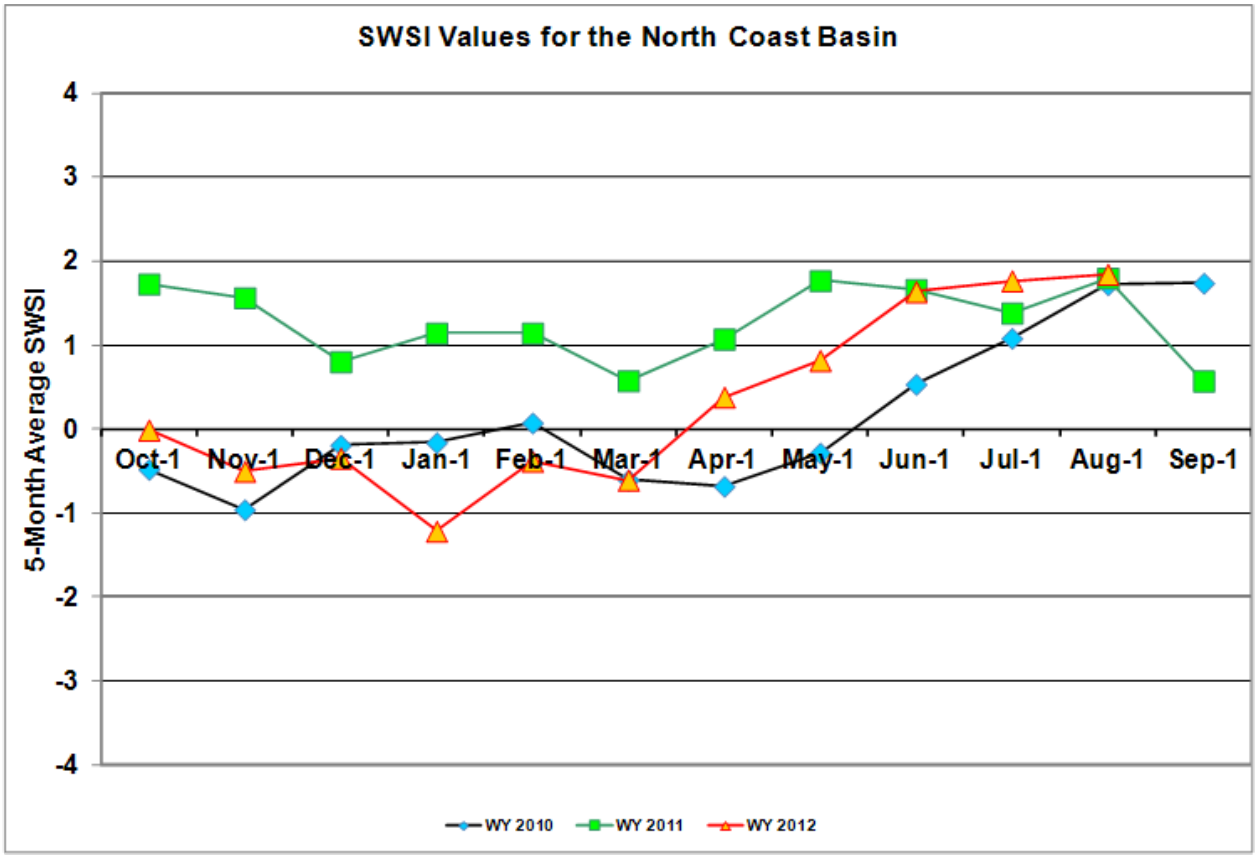


Figure 7.5.4-2 – SWSI Values for the North Coast Basin, Oct. 2010 – Sept. 2012

7.5.5 Assessment by System Managers

As part of any informed and coordinated water curtailment plan, the participation of system managers will be crucial in order to accurately assess and effectively respond to potential or actual crisis situations that relate to water supply and service. Given their extensive knowledge and experience concerning the conditions and operations of the water system, these managers should have the latitude to invoke, in conjunction with other indicators, appropriate alert stages for water curtailment when deemed necessary. This trigger is especially important for planning the maintenance and repair of critical system components or responding to a sudden deterioration in source water quality.

7.6 Recommended Curtailment Stages, Triggers, and Actions

7.6.1 Introduction

Besides the specific triggers required for their inception, each alert stage should include a description of the conservation measures and other necessary actions that would be appropriate for that stage during a water curtailment event. These measures and actions are provided below and are intended to serve as guidelines for the actual efforts and activities that would be implemented. The Seal Rock Water District should draft its own formal water curtailment plan along with appropriate ordinances to legally enforce that plan. Guidelines for a water curtailment ordinance are covered in Section 7.7.

In certain instances of the recommended measures and actions for the various stages of alert, it would be necessary for the District to approve resolutions to support those measures and actions.

7.6.2 Alert Stages and Triggers

Alert Stage No. 1 – Water System Advisory Status

This alert stage is intended to provide preliminary and precautionary information to the community about potential water supply/service difficulties.

Objective: 5% Reduction in Overall Consumption

Triggers

- PHDI value in the range of −2 to −3
- SWSI value in the range of −1.50 to −2.50
- Levels/Flows of primary supply sources drop below specified levels (to be assessed)
- Scheduled maintenance/repairs or construction activities that significantly but temporarily affect the treatment plant or storage and distribution system operations
- Water-system-management discretionary decision

Measures and Actions

- Inform community via water system status signs, public announcements in communications media, and possibly water billing statements.
- Strongly encourage effective water conservation practices. Possibly distribute conservation kits.
- Request voluntary reduction in water consumption. Possibly restrict irrigation of lawns, gardens, and landscaping to the hours from 9:00 PM to 7:00 AM on each day.
- Discourage outdoor washing of equipment, vehicles, pavement, or other facilities.
- Discourage draining or filling pools and ponds.
- Reduce operation of public-display fountains and waterfalls and irrigation of public lands.
- Reduce scheduled flushing of water lines and fire-fighting drills involving water consumption.

Alert Stage No. 2 – Water System Warning Status

This alert stage is intended to provide information to the community about actual water supply or service difficulties that are anticipated to be of a short-term nature.

Objective: 10% Reduction in Overall Consumption

Triggers

- PHDI value in the range of −3 to −4
- SWSI value in the range of −2.50 to −3.25
- Levels/Flows of primary supply sources drop further below specified levels (to be assessed)
- Unplanned maintenance/repairs or construction activities that significantly affect the treatment plant or storage and distribution system operations in a short-term manner
- Water-system-management discretionary decision

Measures and Actions

- Continue dissemination of information to community by means described for Alert Stage No. 1. The elevated level of concern over water availability should be emphasized.
- Provide assistance for retrofit and/or replacement of inefficient fixtures/appliances. Begin a campaign for such modifications, supported by rebates or other incentives (if appropriate). This measure may not be, comparatively, short term in nature.
- Implement (if necessary) water-curtailment usage rates or supply-shortage surcharges as financial incentives for achieving overall consumption objective.
- Report violations of mandatory conservation measures, resulting in possible fines.
- Enforce mandatory reduction in water consumption. Restrict irrigation of lawns, gardens, and landscaping to selected hours on specified days (e.g., evening hours on even/odd days).
- Prohibit outdoor washing of equipment, vehicles, pavement, or other facilities (unless required for public health or safety).
- Prohibit draining or filling pools and ponds (except when aquatic life will be critically affected).
- Discontinue operation of public-display fountains and waterfalls and irrigation of public lands.
- Discontinue scheduled flushing of water lines and fire-fighting drills involving water consumption.
- Require high-volume consumers (e.g., restaurants, hotels/motels, recreation centers) to post notices about mandatory conservation measures; drinking water served to customers only upon request.
- Suspend any planned expansions of water system, including the addition of new connections.

Alert Stage No. 3 – Water System Emergency Status

This alert stage is intended to provide information to the community about actual water supply or service difficulties that are anticipated to be of a longer-term nature.

Objective: 20% Reduction in Overall Consumption

Triggers

- PHDI value in the range of −4 or less
- SWSI value in the range of −3.25 to −4.00
- Levels/Flows of primary supply sources drop further below specified levels (to be assessed)
- Unplanned maintenance/repairs or construction activities that significantly affect the treatment plant or storage and distribution system operations in a longer-term manner

- Water-system-management discretionary decision

Measures and Actions

- Continue dissemination of information to community by means described for Alert Stage No. 1. The serious level of concern over water availability should be emphasized.
- Continue implementation of all mandatory conservation measures required in previous stages.
- Report violations of mandatory conservation measures, resulting in possible disconnection.
- Impose usage limits for residential consumers, possibly based upon number of persons actually residing in household (e.g., 50 gpcd).
- Impose usage limits for commercial and industrial consumers, possibly based upon month of minimum usage (e.g., February) from the previous year.
- Prohibit water usage for all outdoor purposes (unless gray water is utilized).

Alert Stage No. 4 – Critical Water-Availability Status

This exceedingly rare alert stage is intended to inform the community of threatened or nonexistent water availability via the normal delivery means. It would coincide with the direst circumstances, usually associated with natural disasters, environmental catastrophes, or other extreme-emergency conditions.

Objective: Meet Consumption Needs of Community for Life Sustenance

Triggers

- Shutdown of treatment plant and/or inability to deliver water to storage and distribution system
- Delivery disruption anticipated to exceed a four-day duration, while storage reserves constitute a supply for just over four days of typical consumption
- Supply disruption or compromise of primary sources of raw water
- Water-system-management discretionary decision

Measures and Actions

- Continue dissemination of information to community by means described for Alert Stage No. 1. The critical level of concern over water availability should be emphasized.
- Continue implementation of all mandatory conservation measures required in previous stages.
- Eliminate all non-essential consumption of water until further notice.
- If available and deliverable, treated water may be rationed to consumers by periodic operation of the distribution system during designated hours on specified days.
- Otherwise, another supply of treated water would be arranged, most likely requiring water to be shipped to the community by vehicles and made available at emergency distribution centers.
- Seek immediate state and/or federal assistance for a rapid restoration of the normal water supply and delivery system for the community.

7.7 Water Curtailment Ordinance

In 1992, the Seal Rock Water District developed a water conservation ordinance. The ordinance limits irrigation and nonessential water uses and prohibits new water services during a water shortage. As the District drafts its own formal water curtailment plan, it should review and update the ordinance and other tools to legally enforce that plan.

It is presumed that the development of the water curtailment plan will be largely based upon the results of this study. A summary of the recommended curtailment plan is provided in Section 7.4.

Section 8

8.0 Long-Range Water Supply Plan (OAR 690-086-0170)

8.1 Introduction

The Seal Rock Water District Water Master Plan (Civil West, 2010) used a growth rate of 1.5%, based on average annual population increase, to project demand through the year 2030. From 2008 through 2012, the average annual population increase was only 0.22% per year. It is expected that the District will continue to grow at a similar reduced rate. If the growth rate changes, the new rate can be included in the 2018 Water Management and Conservation Plan Progress Report.

8.2 Long-Range Water Demand

The capacity and sizing of a water supply system are based upon the levels of water demand predicted to be realized over the planning period. Water demand is the actual amount of water transferred from the supply source and delivered into the distribution system over a designated interval of time (e.g., hourly, daily, or monthly). Projections of future water demand are utilized to judge the adequacy of the existing facilities and to determine the capabilities necessary for the proposed improvements. These projections are also used to evaluate the sufficiency of existing water rights and the capability and reliability of sources that supply those rights. The existing water demand in Seal Rock was reported in Section 2.10.

The objective of projecting demands into the future is not to necessarily construct larger facilities to support excessive water consumption, but rather to:

- Assess existing facility capabilities
- Identify any immediate deficiencies
- Recommend performance improvements
- "Size" new or upgraded facilities for anticipated (but reasonable) future water demands

The design values for the normalized water demand measures (gpcd and gpd/EDU) are reasonable in comparison to the values indicated for per capita water usage in Oregon, as assessed by the U.S. Department of the Interior and documented in the 2000 U.S. Geological Survey Circular 1268, entitled "Estimated Usage of Water in the United States in 2000." By projecting the residential population, total system EDU-value, and system water demand measures at the same average annual growth rate (AAGR), these normalized water demand measures are preserved.

Assuming a 1.5% AAGR for the planning period, the Seal Rock population is estimated to reach 7,624 people by the year 2035. If the proportions of total water usage for the residential and various non-residential consumer groups remain constant over this period of time, then the EDU values will increase at the same growth rate. It is possible that EDU values could grow faster than the population if significant commercial/industrial development occurs. This is an unlikely situation for the District. It is also possible that population growth will not return to or maintain a 1.5% AAGR over this time period. For these reasons, the total system EDU value at any time is always the best indicator of water needs at that time.

8.3 Projected Demand vs. System Capacity

The estimated maximum day demand (MDD) for Seal Rock at the end of the planning period is 1.17 MGD. This value is equivalent to 1.82 cfs (815 gpm). The MDD for Toledo is 1.27 MGD, or 1.97 cfs and 882 gpm. Thus, the projected combined MDD in the year 2035 is 2.44 MGD, or 3.8 cfs.

The Seal Rock Water District does not own or operate its own treatment facility. It purchases finished water from the City of Toledo. The City's water treatment plant is currently undergoing upgrades that will increase its capacity to 1,600 gpm (3.6 cfs), adequate for the design period ending in 2030. At that time, plant components will be 20 years old or older, and many will need replacement or improvement. The next Water Master Plan for the City of Toledo will look another 20 years into the future and design plant improvements to match projected demand.

8.4 Development of New Sources—Long Term Planning

8.4.1 Adequacy of Current Source

The District currently obtains all its finished water from the City of Toledo. The City of Toledo withdraws water from the Siletz River during the summer months and the Mill Creek Reservoir during the winter months. The Seal Rock Water District does not have infrastructure in place to obtain its own raw water.

The Toledo water rights are adequate to supply the projected MDD for both the City of Toledo and the Seal Rock Water District over the planning period. Assuming that consumer demand remains bounded by the projections determined in the SRWD Water Master Plan and the City of Toledo Water Master Plan, it will not be necessary to acquire new sources over the current 20-year planning period.

Long-range planning beyond the current planning period may require the District or the City of Toledo to develop new water reserves. Eventually the combined demand from these two agencies may exceed the existing water rights. Conscientious agencies will monitor demand and conservation efforts to ensure that they have enough water for the foreseeable future at all times. Successful water conservation efforts will extend the agencies' ability to be supplied by their current sources.

In an effort to ensure the best use of the District's resources and prepare for a variety of situations, the District evaluated five possibilities for alternative and emergency water sources in the Water Master Plan Amendment #2 (Civil West, 2012).

The purpose of the Amendment was to create a menu of alternative water supply options for scenarios the District could face in the near future. The scenarios included emergency supply and long-term water supply sources.

8.4.2 Emergency Water Sources

In addition to the water curtailment plan developed in Section 7.0, the District desires an established connection to serve as an emergency water source. The frequency of mudslides and the possibility of earthquakes and tsunamis make it prudent for the District to thoroughly evaluate how it will best serve its customers in the case of these natural disasters.

The District currently has a connection to the City of Newport. At the present time, this connection allows the Seal Rock Water District to provide Newport with water in emergency situations. Because the connection is not hydraulically adequate for Newport to provide Seal Rock with emergency water, the District is planning improvements, including a booster pump station and PRV, which will allow mutually beneficial use of the existing connection.

The Amendment evaluated the potential for a connection to the City of Waldport to the south. Waldport is connected to other agencies south of the District, creating a network of regional connectivity that provides multiple agencies with backup water in case of emergency. Though this intertie could not provide the

District with water on a long-term basis, it would serve as another avenue to mitigate risks to the District in case of a water supply shortage.

8.4.3 Long-term Supply Sources

The Seal Rock Water District obtains all its water from the City of Toledo. The District buys finished water via a six-mile-long pipeline connecting the two agencies. The City's two raw water sources–Mill Creek and the Siletz River–have sufficient flows to provide for both the City and the District for the currently planning period and beyond.

The Amendment described above evaluated potential long-term water sources for the District. Two sources of particular interest due to their ability to provide the District with water beyond the current planning period are the Rocky Creek Regional Supply Project and the Beaver Creek Supply.

The Rocky Creek Regional Supply Project has long been the subject of discussion as a potential location for a dam and reservoir that could benefit a regional area as a drinking water supply. Early estimates suggest that the storage volume of the new reservoir could be over 2.9 billion gallons. This large storage volume would be capable to providing water for a significant population on the Oregon coast. To develop this water supply, a relatively large dam would be constructed to impound Rocky Creek.

For the Rocky Creek Regional Water Supply Project to move forward, multiple Coastal communities would need to be involved, particularly larger communities like Newport and Lincoln City. At this time, however, there does not appear to be significant interest of buy-in to the Rocky Creek issue.

Another water supply alternative for the Seal Rock Water District is the Beaver Creek Supply. Beaver Creek has a 34-square-mile watershed that generates an annual average theoretical outflow of 113 MGD. The Creek generally has high-quality water. Constructing streamside collection infrastructure and a water treatment plant approximately four miles west of Highway 101 would theoretically supply the District with enough water year-round for the current planning period and beyond.

The District has recently requested that Civil West Engineering, Inc., prepare an in-depth feasibility study for the Beaver Creek Supply. This study will include geotechnical investigation, surveying, environmental reports, water rights studies, and an engineering evaluation. Once the study is complete, the District can choose how to proceed with respect to developing the Beaver Creek Supply.

8.4.3 Water Resource Planning Recommendations

The following recommendations are made with regard to water resource planning:

1. Carefully manage the current water reserves and maximize existing storage reservoir volumes in order to ensure adequate water supplies through much of the current planning period.
2. Continue working toward planning and development of additional reserves for water needs beyond the current planning period.
3. Develop and maintain an active conservation plan that will seek to help the District make the most effective use of the water it has.