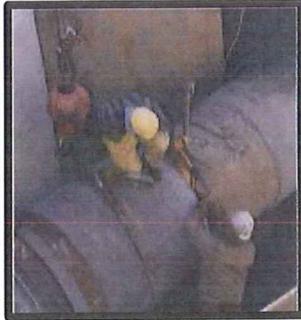


Attachment 1



**2013 Water System Plan**  
*Our Water. Our Future.*



**Volume I**  
**July 2012**

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# Seattle Public Utilities

## Seattle Public Utilities 2013 Water System Plan

July 2012

**VOLUME I**



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## Acknowledgements

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The following have contributed to the preparation of this *2013 Water System Plan*:

### Seattle Public Utilities Executive Directors

Ray Hoffman	Melina Thung	Rick Scott
Kimberly Collier	Susan Sánchez	Nancy Ahern
Martin Baker	Linda DeBoldt	

### Seattle Public Utilities Contributing Technical Staff

Joan Kersnar, Project Manager	Bruce Flory	Lynn Kirby
Clayton Antieau	Jon Ford	Brent Lackey
Lori Arima	Tom Fox	Lilin Li
Julie Burman	Judi Gladstone	Rand Little
Cheryl Capron	Terri Gregg	Charlie Madden
Regina Carpenter	Rich Gustav	Jalaine Madura
Alex Chen	Steve Hamai	Eugene Mantchev
Alan Chinn	Paul Hanna	Jim McNerney
Sherri Crawford	Wylie Harper	Sue Meyer
Tracy DeLaTorre-Evans	Ulysses Hillard	Jim Nilson
Al Dietemann	Dave Hilmoe	Craig Omoto
Sebastian Ezenwoye	Keith Hinman	Ward Pavel
Liz Fikejs	Cyndy Holtz	Bill Wells
Suzy Flagor	Miale Jose	Rick Woyak
Paul Fleming	Liz Kelly	Veronica Vong

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## Certification

### Seattle Public Utilities 2013 Water System Plan

This 2013 Water System Plan for Seattle Public Utilities has been prepared under the direction of the following Registered Professional Engineers:



EXPIRES 12/2/2012

Joan M. Kersnar, P.E.  
Drinking Water Planning Manager  
Water System Plan Project Manager



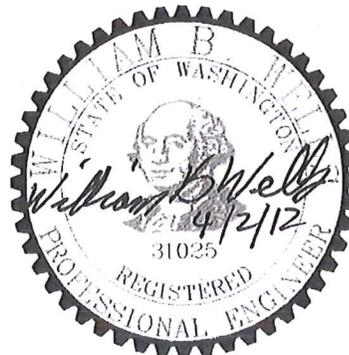
EXPIRES 5/24/2013

David J. Hilmo, P.E., BCEE  
Director, Drinking Water Division



EXPIRES 3/5/2014

Tom Fox, P.E.  
Business Area Manager  
Water Resources



EXPIRES 12/1/2012

Bill Wells, P.E.  
Business Area Manager  
Water Quality and Treatment



Certification, Continued



EXPIRES 4/10/2013

Tracy Evans, P.E.  
Business Area Manager  
Distribution System



EXPIRES 9/3/2012

Eugene Mantchev, P.E.  
Business Area Manager  
Transmission, Meters, and Transportation

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## Abbreviations

AMC	Asset Management Committee
AMR	Automated Meter Reading equipment
ASR	Aquifer Storage and Recovery
AWWA	American Water Works Association
BPA	Bonneville Power Administration
CCF	hundred cubic feet
CCL	Contaminant Candidate List
CCP	Concrete cylinder pipe
CCR	Consumer Confidence Report
cfs	Cubic feet per second
CFP	Capital Facilities Plan
CI	cast iron
CIP	Capital Improvement Program
COEHHA	California Office of Environmental Health Hazard Assessment
CRPL	Cedar River Pipeline
CUE	Conjunctive Use Evaluation
CWSP	Coordinated Water System Plan
DBP	Disinfection By-Products
DI	ductile iron
DNS	Determination of Nonsignificance
DSL	Distribution System Leakage
EDC	Endocrine Disrupting Compounds
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act
F	Fahrenheit
FCF	Flow Control Facilities
FERC	Federal Energy Regulatory Commission
FWP	Finished Water Pipeline
GIS	Geographic Information System
GMA	Growth Management Act
HCP	Habitat Conservation Plan
HISB	High Impact Shutdown Block
I-63 SO	Initiative 63 Settlement Ordinance (Seattle Ordinance 120532)
IDSE	Initial Distribution System Evaluation
IFA	Instream Flow Agreement
IWA	International Water Association
LAF	Limited Alternative to Filtration
LEED	Leadership in Energy and Environmental Design
LIMS	Laboratory Information System



LT2ESWTR	Long Term 2 Enhanced Surface Water Treatment Rule
LT2SWTR	Long Term 2 Surface Water Treatment Rule
MAC	Mycobacterium Avium Complex
MCL	Maximum Contaminant Level
MDL	Minimum Detection Limit
mgd	million gallons per day
MIT	Muckleshoot Indian Tribe
MTBE	methyl tertiary butyl ether
MWL	Municipal Water Law
NZMS	New Zealand mud snail
O&M	Operation and Maintenance
OFM	Washington State Office of Financial Management
PHSKC	Public Health Seattle and King County
PPCP	Pharmaceuticals and Personal Care Products
PRV	Pressure regulating valve
psi	pounds per square inch
PSRC	Puget Sound Regional Council
PUMA	Piloting Utility Modeling Applications
RCM	Reliability Centered Maintenance
RWSP	Regional Wastewater Services Plan
SAMP	Strategic Asset Management Plan
SBS	Standby Storage
SCADA	Supervisory Control and Data Acquisition
SDOT	Seattle Department of Transportation
SFD	Seattle Fire Department
SPU	Seattle Public Utilities
SRES	Special Report on Emission Scenarios
SWTR	Surface Water Treatment Rule
TESS	Tolt Eastside Supply
TESSL	Tolt Eastside Supply Line
TPL	Tolt Pipeline
UCMR	Unregulated Contaminant Monitoring Rule
UV	Ultraviolet
UW-CIG	University of Washington Climate Impacts Group
VOC	Volatile Organic Compounds
WAC	Washington Administrative Code
W.D.	Water District
WDOH	Washington State Department of Health
WSDOT	Washington Department of Transportation
WSP	Water System Plan
WTF	Water Treatment Facility
WUE	Water Use Efficiency

# 2013 Water System Plan Plan Summary

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Seattle Public Utilities (SPU) manages and operates the water system serving Seattle retail customers and wholesale customers in nearby cities and water districts. This *2013 Water System Plan* describes how SPU meets current and future water demands, ensures high quality drinking water, and invests in and maintains its water system at the lowest life-cycle cost. While the plan focuses on the 2013-2018 time period, longer term outlooks to 2040 and beyond are also discussed.

SPU prepared the plan under regulations adopted by the Washington State Department of Health (WDOH) for public drinking water suppliers. The plan is also consistent with the WDOH Water Use Efficiency Rule, requirements of the Growth Management Act, and local and regional land use plans.

Key findings and implementation actions are highlighted below, with more detail provided in the chapters that correspond to the headings.

## DRINKING WATER SYSTEM

- SPU provides drinking water to a service area population of 1.3 million within the greater Seattle metropolitan region of King County and portions of southern Snohomish County. See map of SPU's service area on page S-9.
- Recent surveys of residential and commercial customers indicate that SPU's retail customers continue to be very satisfied with water system reliability and drinking water quality.

## WATER RESOURCES

SPU's water supply system consists of surface water reservoirs on the Cedar River and South Fork Tolt River and two wellfields providing groundwater. The system is operated primarily for water supply and protection of instream flows, but also used for hydroelectric power generation and flood management.

## Water Use

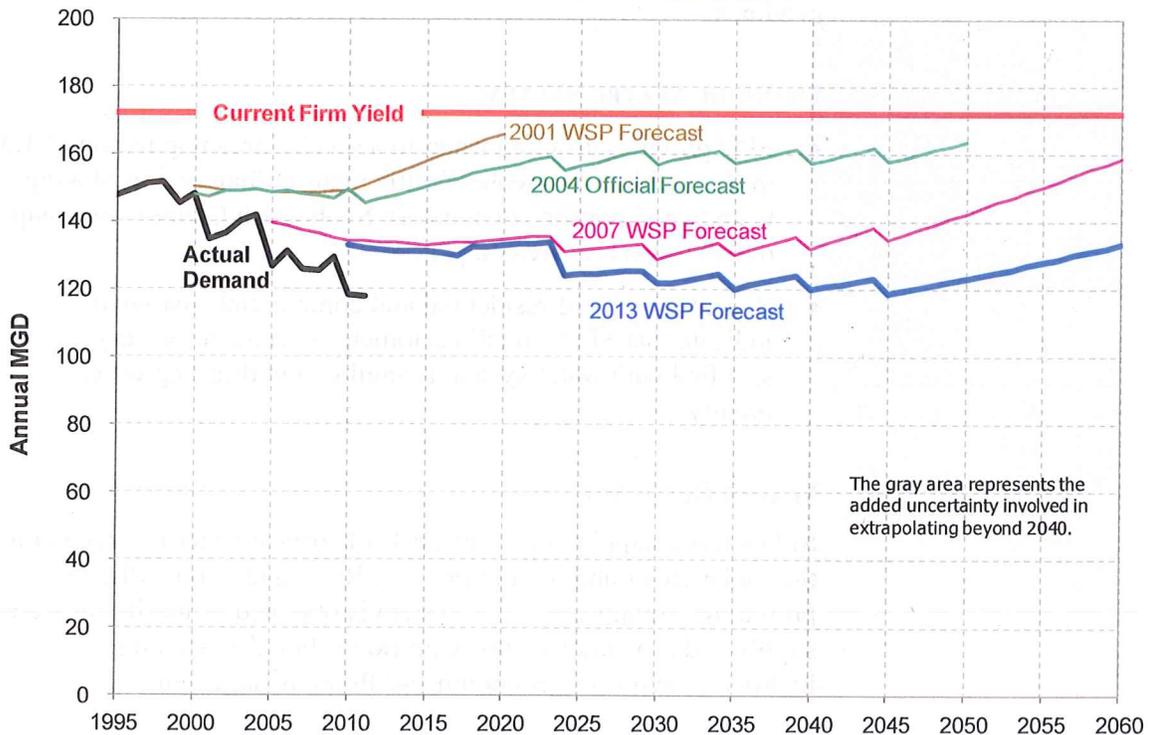
- Approximately one-half of SPU's water is used by SPU's retail customers and one-half is sold through wholesale contracts to 19 municipalities and special purpose districts, plus Cascade



Water Alliance, who in turn provide the water to their own retail customers.

- Since 1990, consumption has decreased about 30 percent while population has increased by 15 percent.
- From 2010 to 2040, population is forecast to increase by 21 percent in SPU’s retail service area and by 25 percent in the service area of SPU’s full and partial wholesale water contract holders. Employment is forecast to grow by 54 and 46 percent, respectively, over the same period.
- Total average annual demand is forecast to remain at or below current levels of approximately 133 million gallons per day through 2060, significantly lower than what was forecasted in the 2007 Water System Plan. See graph below.
- The primary factors that influence the demand forecast consist of the declining block contract with Cascade Water Alliance and continued reductions in water use by customers.

SPU’s Official Water Demand Forecast



### **Conservation**

- SPU achieved a greater than 30 million gallons per day (mgd), or 20 percent, reduction in water use on an average annual basis from 2000 through 2010 from the combined effect of the Regional 1% Conservation Program, SPU's "Everyone Can Conserve" Program, system operation improvements, and other changes in water use by customers due to rates and codes.
- This plan sets a goal to reduce per capita water use from current levels so that total average annual retail water use of members of the Saving Water Partnership<sup>1</sup> is less than 105 mgd from 2013 through 2018 despite forecasted population growth.

### **Water Supply**

- The current firm yield estimate for SPU's water supply system is 172 mgd, which is an increase of one mgd reflecting recent demand patterns and a recently approved higher refill level in Chester Morse Lake.
- Through this plan, SPU is modifying its service area for its water rights place of use so as to clarify that the service area includes small areas in Snohomish County currently served by Northshore Utility District, the City of Woodinville, and the City of Bothell, as well as potential service area additions proposed by Water District 119. For these areas, see the map on page S-9.
- Given the new demand forecast and current firm yield estimate for SPU's existing supply resources, no new source of supply is needed before 2060.

### **Climate Change and Future Supply Outlook**

- Updated analyses indicate that under the warmest climate change scenario analyzed, available supply is estimated to be reduced by as much as 4 percent in 2025, 6 percent in 2050, and 13 percent in 2075. Even so, the reduced supply would exceed climate-impacted demands for all years except 2075, in which demand would exceed supply by approximately 3 percent. Low or no cost system modifications could be made to meet demands in this case.

---

<sup>1</sup> Members of the Saving Water Partnership include Seattle, Northshore Utility District and SPU's 17 full and partial wholesale water contract holders.



### **Planned Infrastructure and Operational Improvements**

- SPU identified infrastructure improvement needs for the water supply system that include Morse Lake Pump Plant, Overflow Dike Replacement, and Landsburg Dam Flood Passage Improvements projects.
- SPU plans to complete investigations that support water resources operations including refill of Chester Morse Lake to elevation 1566 feet, potential impact on water quality that could be caused by failure of Lake Youngs Cascades Dam, and potential additional drawdown of South Fork Tolt Reservoir.

### **WATER QUALITY AND TREATMENT**

SPU's water system includes state-of-the-art water treatment facilities for the Cedar and South Fork Tolt source waters, in-town disinfection facilities at reservoirs and well sites, and a state-certified water quality laboratory.

#### **Drinking Water Quality**

- SPU continues to meet drinking water quality regulations and other aesthetic criteria (i.e., taste and odor).
- SPU's source protection practices, water treatment facilities, and distribution system practices have provided excellent quality water that ensures compliance with current and future regulations.
- Results of testing in 2008 for pharmaceuticals and personal care products (PPCPs) and endocrine disrupting compounds (EDCs) in SPU's source water confirms the absence of these emerging contaminants of concern.
- SPU plans to review distribution system flushing practices and the level of resources allocated to flushing of the distribution system through fire hydrants.
- SPU will conduct a risk-cost analysis of public access on the Kerriston Road to determine if additional land acquisition is the preferred approach for mitigating the risk of impairing Cedar source water quality.
- SPU will continue to monitor and characterize limnological conditions in Lake Youngs as it affects Cedar supply operations and treated water quality.
- SPU will operate the water supply system to bypass Lake Youngs to avoid problematic algae from entering the water system.

- SPU will continue efforts to prevent aquatic nuisance and invasive species from being introduced into SPU's drinking water supplies.

#### **Reservoir Covering/Burying**

- SPU has covered eight of the ten reservoirs that were previously uncovered, with six of these buried to increase security and create new public open space opportunities.
- The plan for the remaining two open reservoirs is to test-decommission Roosevelt Reservoir and Volunteer Reservoir.
- In about 2020, the floating covers on Bitter Lake and Lake Forest Park Reservoirs will be evaluated for their remaining service life and possible replacement.

#### **Water Treatment Facilities**

- SPU will be evaluating contract extension options for the Tolt and Cedar Water Treatment Facilities that are in long-term Design-Build-Operate (DBO) contracts.
- SPU plans to replace the existing gas chlorine feed system at Landsburg with sodium hypochlorite to reduce safety risks.

#### **WATER TRANSMISSION SYSTEM**

The regional and sub-regional water transmission systems include approximately 193 miles of pipeline, seven covered reservoirs, 15 pump stations, six elevated tanks and standpipes, and 129 wholesale customer taps with meters.

#### **Transmission Infrastructure**

- SPU has met the wholesale contract requirements for pressure and flow, and there have been no unplanned outages of the transmission pipelines that have exceeded SPU's service level for maximum outage durations.
- SPU plans to mitigate the risk of pipe failure in the slide area between the Regulating Basin and Tolt Water Treatment Facility through continued slope monitoring, additional geotechnical data collection, periodic internal inspections, biannual leak testing, and by taking such actions as acquiring ownership of the land in the slide area and implementing pipeline stress relief measures when necessary.
- SPU will implement cost-effective cathodic protection projects as needed for the concrete cylinder and steel transmission



pipelines to protect these from corrosion and extend their service lives.

### **System Storage Level of Reliability**

- SPU has defined its system storage level of reliability that is based on outage scenarios of major system components and of power supply. These scenarios form the basis for downsizing or retiring certain treated water reservoirs, for decommissioning certain tanks and standpipes, and for making targeted improvements to pump stations.

### **WATER DISTRIBUTION SYSTEM**

The distribution system contains more than 1,680 miles of watermains, two open reservoirs, six covered reservoirs, 16 pump stations, six elevated tanks and standpipes, 21,000 valves, and 18,920 fire hydrants, as well as more than 188,000 service lines and meters serving individual residential and non-residential properties in the retail service area.

### **Service Delivery**

- Since completion of the pressure improvement projects in early 2009, pressures at all retail service connections are greater than 20 pounds per square inch during normal operations.
- SPU consistently responded to reported distribution system problems within one hour more than 90 percent of the time.
- While SPU's distribution system leakage has increased from less than 3 percent in 2006 and 2007 to more than 6 percent in 2010 and 2011, the 3-year rolling average has remained below the WDOH standard of 10 percent.
- The rate of watermain leaks and breaks remains low, averaging less than 10 reported leaks or breaks per 100 miles per year in the distribution system.
- From 2006 through 2010, fewer than 2 percent of all retail customers experienced water service delivery outages of more than 4 hours per year from all planned and unplanned events.

### **Distribution Infrastructure**

- SPU plans to assess, in a pilot effort, the condition of a portion of the most critical watermain segments and, if needed and supported by analysis, to repair, rehabilitate or replace the pipe prior to anticipated failure.

- SPU will improve operational response and customer service by using information from the watermain shutdown block analysis for project and emergency shutdown plans.
- SPU plans to complete the remaining seismic backbone upgrades in the Duwamish River Valley.
- SPU will consider the use of cleaning and cement-mortar lining as an alternative to replacement of deteriorated unlined, cast iron pipe to address pipeline life, fire flow, water quality, and pressure issues in the distribution system.
- SPU will continue to work with the Seattle Fire Department to improve fire hydrant maintenance and testing practices, to better coordinate communication between SFD and SPU's water system control center and emergency crews just prior to and during fire fighting, and to prioritize and implement fire flow improvement projects.
- SPU plans to use SPU's Watermain Replacement Opportunity Model to determine whether to protect or replace existing watermains impacted by transportation projects.
- SPU will continue working with developers where watermain replacements or upgrades in redevelopment areas are required to meet current fire flow requirements and watermain standards.

#### **PLAN IMPLEMENTATION**

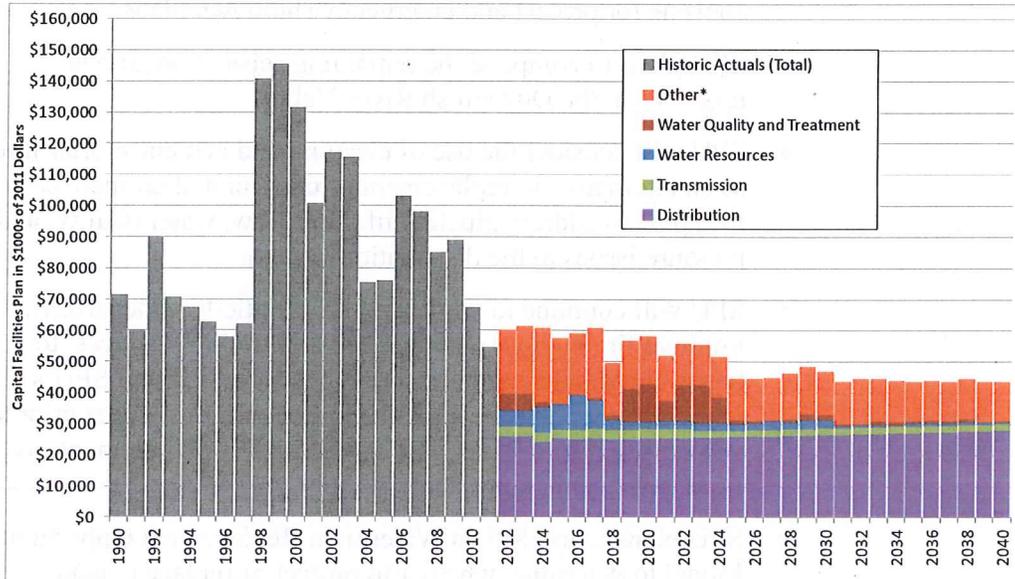
Implementation of this plan requires completion of capital projects, programs, and operations and maintenance (O&M) activities.

#### **Capital Facilities Budget**

- Over the past decades, SPU has invested in several major new capital projects, including the two new water treatment facilities and Tolt Pipeline 2.
- SPU anticipates its capital improvement budget needs to be much lower than in the past decades, and will decline from \$62 million in 2013 to less than \$45 million by 2025, and remain at approximately that level through 2040 (in 2011 dollars). See the graph on page S-8 for historic and proposed capital expenditures.
- SPU's draft Capital Facilities Plan totals to \$1.4 billion from 2013 through 2040, which is 64 percent of what was spent in the previous 28-year period (in 2011 dollars).



**Historic and Proposed Capital Facilities Plan Spending through 2040  
(2012-2017 Adopted CIP, plus 2018-2040 Estimates, in thousands of 2011 dollars)**



\* Other includes Major Watersheds, Fleets, Facilities, Security, Information Technology, SCADA and other miscellaneous projects.

**CONCLUSION**

SPU has been making, and continues to make, significant investments to protect public health, comply with federal and state regulations, and replace aging infrastructure. While SPU has invested in major regional facilities in the past decades, the need is now shifting to significant capital investments to rehabilitate and improve the distribution system. Implementation of this water system plan will help to ensure that SPU meets its mission to provide reliable, efficient and environmentally conscious water utility services to enhance the quality of life and livability in all communities we serve.

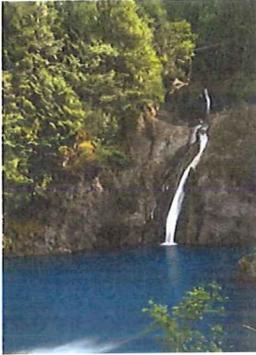
# SPU 2013 Water System Plan



The entire *2013 Water System Plan* may be found at:  
[www.seattle.gov/util/WaterSystemPlan](http://www.seattle.gov/util/WaterSystemPlan)

## Part I: Direction for Business Areas

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Part I of this *2013 Water System Plan* presents SPU's water system capital facilities and operation and maintenance "roadmap" for the next 20 years and beyond. After an introductory chapter to establish context for this updated plan, the balance of Part I presents the substance of that roadmap for each business area of SPU's water line of business. Part II focuses on the anticipated costs of implementing that roadmap over the next six years and through 2040.

Part I: Direction for Business Areas

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# Chapter 1 Introduction

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Seattle Public Utilities (SPU) provides drinking water to a service area population of 1.3 million within the greater Seattle metropolitan region of King County and portions of southern Snohomish County. This *2013 Water System Plan* describes the near- and long-term plans for the regional water system in accordance with Washington State Department of Health (WDOH) requirements. The focus of this plan is on updates to the water system and programs since completion of the *2007 Water System Plan*. To provide context for this plan, this introductory chapter includes a brief history and description of the existing water system and of five core business areas that comprise SPU's water line of business.

In addition, this chapter presents an overview of SPU's policies that guide activities for the water system. A summary is provided of SPU's customer service levels for the water system. Also provided are the results of recent customer surveys regarding their views on the quality of services provided by SPU. The chapter also contains a description of the current planning environment, including how this plan is consistent with other relevant planning efforts. Finally, the introduction summarizes the organization of this plan and describes how it meets the requirements of the Washington Administrative Code (WAC).

## 1.1 SPU'S DRINKING WATER LINE OF BUSINESS

***SPU's mission is to provide reliable, efficient and environmentally conscious utility services to enhance the quality of life and livability in all communities we serve.***

The overarching mission for SPU is to provide reliable, efficient and environmentally conscious utility services to enhance the quality of life and livability in all communities we serve. In addition to operating Seattle's regional drinking water system, SPU also provides surface water drainage, wastewater, solid waste, and engineering services to residents of Seattle. This plan covers SPU's drinking water line of business. This section provides background on the water system and the water utility's organizational structure.

### 1.1.1 History of Water Business

Since 1901, the Cedar River has provided water for Seattle. Initially, there was a diversion dam and transmission pipeline on the lower Cedar River at Landsburg and a timber crib dam at Cedar Lake—later renamed Chester Morse Lake. In 1914, a higher



masonry dam was constructed to create storage for Seattle's water supply. Additional pipelines were added between 1909 and 1954 to meet growing demands for water. Today, the Cedar River supplies 60 to 70 percent of SPU's customer demand for water.

In the late 1950s, several King County suburban communities began to look to Seattle as a source of their drinking water. In response, Seattle began selling water wholesale to these communities, who, in turn, supply it to their own customers.

Although the City began developing its water rights on the Tolt River in 1936, the source was first put to use in 1964. The first phase of the Tolt development was on the South Fork Tolt River, where a reservoir and pipelines were built to increase Seattle's water supply. The South Fork Tolt now provides approximately 30 to 40 percent of the City's water supply.

In 1987, the City began development of two well fields near the Highline area, subsequently renamed the "Seattle Well Fields". These well fields are available to supplement Seattle's surface water supplies, especially during the summer peak demand season and emergencies.

### **1.1.2 System Description**

Today, SPU's regional water system is the largest in Washington State. SPU serves 664,000 people in its retail service area and provides water to 20 wholesale customers, including Cascade Water Alliance, who together deliver SPU water to an additional residential population of over 629,000. The water from the Cedar and South Fork Tolt Rivers is treated by ozonation/ultraviolet light and ozonation/filtration respectively. The Seattle Well Fields are available to supplement the South Fork Tolt and Cedar supply sources during peak demand seasons and during emergencies. SPU's water is delivered to Seattle retail service connections and to SPU wholesale customers through a network of approximately 1,880 miles of transmission and distribution system pipelines. SPU also provides untreated water from the Cedar River Watershed to North Bend to mitigate streamflow impacts to their water supplies. SPU is not a Satellite System Management Agency, and will not operate nor be responsible for Group A water systems owned by other parties, even if these are within the City of Seattle. Figure 1-1 shows the major components of the Seattle Regional Water Supply System and the areas currently served by SPU and its wholesale customers.

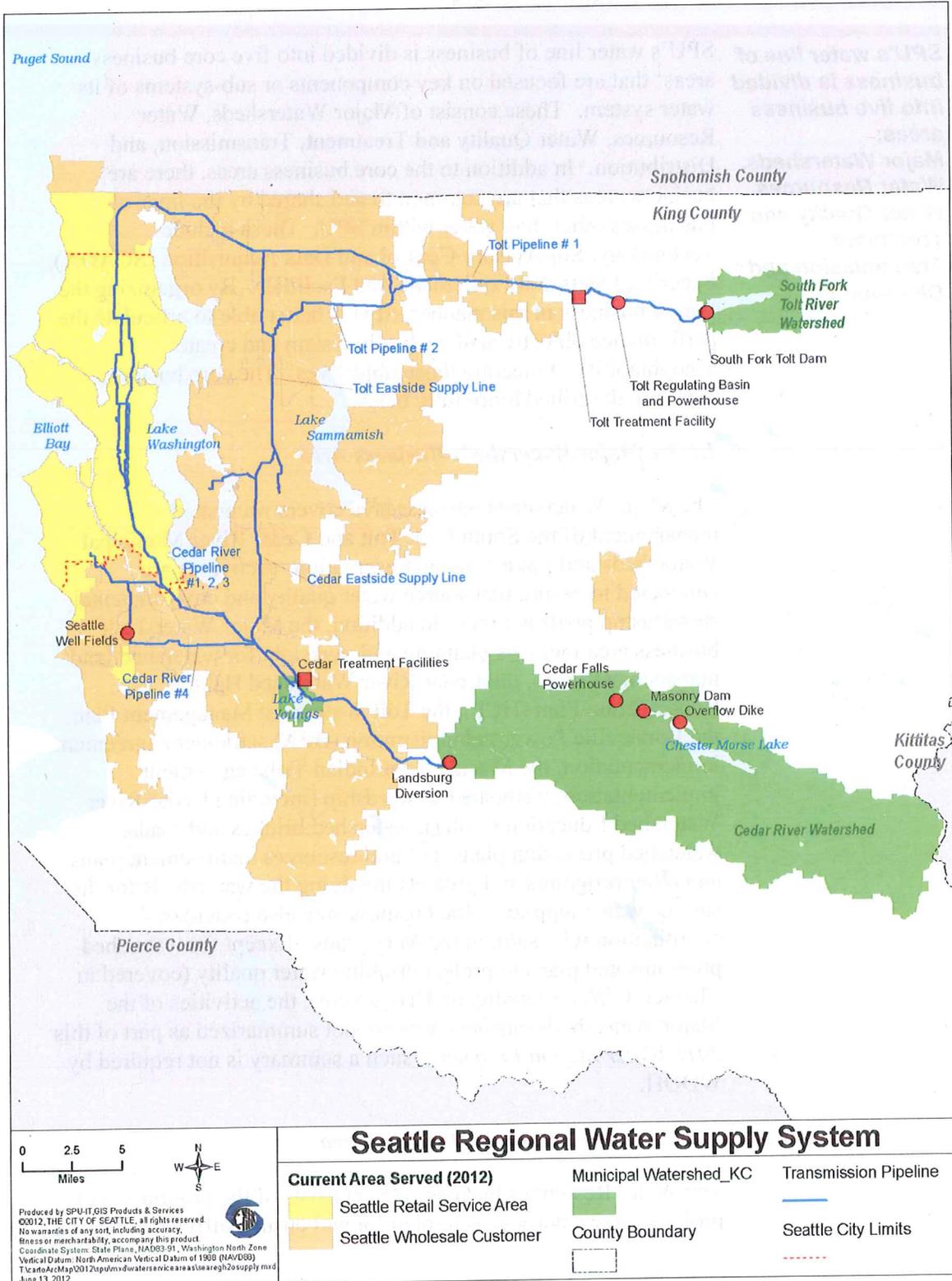


Figure 1-1. Seattle Regional Water Supply System



### 1.1.3 Business Areas

***SPU's water line of business is divided into five business areas: Major Watersheds, Water Resources, Water Quality and Treatment, Transmission and Distribution.***

SPU's water line of business is divided into five core business areas<sup>1</sup> that are focused on key components or sub-systems of its water system. These consist of Major Watersheds, Water Resources, Water Quality and Treatment, Transmission, and Distribution. In addition to the core business areas, there are business areas that are common to and shared by the lines of businesses other than water within SPU. These include Technology, Supervisory Control and Data Acquisition (SCADA), Security, Fleets and Equipment, and Facilities. By organizing the line of business in this manner, SPU is better able to articulate the performance objectives of each sub-system and create accountability in meeting those objectives. The core business areas are described more fully below.

#### ***1.1.3.1 Major Watersheds Business Area***

The Major Watersheds business area covers watershed management of the South Fork Tolt and Cedar River Municipal Watersheds and Lake Youngs Reservation. Activities are conducted to ensure that source water quality and environmental stewardship goals are met. In addition, the Major Watersheds business area includes planning and oversight for watershed land management plans, the Cedar River Watershed Habitat Conservation Plan (HCP), the Tolt Watershed Management Plan, the Bonneville Power Administration (BPA) settlement agreement implementation, the Muckleshoot Indian Tribe agreement implementation, watershed stewardship (including Cedar River Watershed Education Center), watershed bridges and roads, watershed protection plans, cultural resources management plans, and other programs and projects involving the watersheds for the surface water supplies. The business area also provides coordination with salmon recovery plans. Except for watershed programs and plans to protect drinking water quality (covered in Chapter 3, Water Quality and Treatment), the activities of the Major Watersheds business area are not summarized as part of this *2013 Water System Plan* since such a summary is not required by WDOH.

#### ***1.1.3.2 Water Resources Business Area***

The Water Resources business area consists of the programs and projects whose purpose is to plan for and ensure sufficient water is

<sup>1</sup> The *2007 Water System Plan* listed four business areas, but the Transmission and Distribution business areas has been split in two since then.

available to meet anticipated demands. One critical function of this business area is real-time management and operation of mountain reservoir and river facilities for water supply, instream resource protection, and flood management, as well as hydropower generation. The programs of the Water Resources business area include instream resource management, water conservation, dam safety, and water rights. The Water Resources business area also performs water supply and demand forecasting, conservation potential assessments, reclaimed water/water reuse analysis, development of new sources of supply when needed, and infrastructure planning for water supplies.

#### ***1.1.3.3 Water Quality and Treatment Business Area***

The Water Quality and Treatment business area covers SPU's drinking water quality and treatment programs, projects, services, and capital assets from the source to customer taps. Key functions of this business area include managing SPU's drinking water regulatory compliance, oversight of the Tolt and Cedar Water Treatment Facilities and their contract operations, and overseeing water quality and treatment programs and capital projects. Critical water quality monitoring and regulatory compliance services are provided to the Water Quality and Treatment business area by SPU Laboratory Services Division. Infrastructure in this business area includes the Tolt and Cedar Water Treatment Facilities and ancillary facilities, Landsburg treatment and intake screening facilities, and in-town water treatment facilities at reservoirs and well sites. Key Operations Programs in the Water Quality and Treatment business area include water treatment facility operations, cross-connection control, and storage facility cleaning.

#### ***1.1.3.4 Transmission Business Area***

The Transmission business area is comprised of programs and projects affecting the regional and sub-regional transmission systems, which serve both SPU and its wholesale customers. Business area activities include policy development, planning and oversight for transmission pipelines, and operation and maintenance of the transmission headworks and pipelines, storage facilities, pump stations, wholesale customer taps, and appurtenances. The Transmission business area provides oversight for and coordination with related programs, such as seismic analysis and cathodic protection. Billing meter and transportation-related projects that impact both the water transmission and distribution systems are overseen by the Transmission business area manager.



**1.1.3.5 Distribution Business Area**

The Distribution business area is comprised of programs and projects affecting the distribution system, which serves SPU’s own retail customers within and outside the City of Seattle. Business area activities include policy development, planning and oversight for distribution pipelines, and operation and maintenance of distribution pipelines, storage facilities, pump stations, hydrants, valves, services and miscellaneous appurtenances.

**1.2 GUIDING POLICIES**

Revised and updated policies for SPU’s water business areas were developed and adopted for the *2007 Water System Plan*, and are being carried forward in this plan. These policies are summarized in the table below.

**Table 1-1. Policies to Guide SPU’s Water System Activities**

Policy	Policy Statement
Asset Management	Use Asset Management principles to guide all capital and O&M financial decisions to deliver services effectively and efficiently.
Environmental Stewardship	Protect and enhance the environment affected by the utility as it carries out its responsibilities to provide drinking water.
Security and Emergency Preparedness	Institute and maintain appropriate safeguards to protect against security risks and sustain emergency response readiness to ensure the continuity of drinking water services, including fire protection service.
Meeting Customer Expectations	Provide retail and wholesale drinking water service that responds to changing customer expectations centered on providing reliable, high-quality water, and guided by asset management principles.
Service Area	Continue providing service within the service area boundary as defined in the most recent <i>Water System Plan</i> , allowing for new wholesale customers within that area at SPU’s discretion.
Regional Role and Partnerships	Be a leader in seeking regional cooperation and efficiencies that benefit the customers of SPU, other water utilities, and the environment.
Planning for Uncertainty	Base supply investment strategies on future outlooks for supply and demand that incorporate an evaluation of uncertainties using the best available analytical tools.
Supply Reliability	Plan to meet full water demands of “people and fish” under all but the most extreme or unusual conditions, when demands can only be partially met.
Resource Selection	In planning to meet future customer demand, select new sources of supply from all viable options, including conservation programs, improvements to system efficiencies, use of reclaimed water, and conventional supply sources, based on triple-bottom-line analysis.
High-Quality Drinking Water Provision	Manage drinking water quality from the water source to the customer taps in coordination with wholesale customers to protect public health, comply with drinking water quality regulations, and maintain and improve public confidence in the drinking water quality.
Watershed Protection	Control human activity and be prepared to respond to emergencies in the municipal watersheds to maximize protection of drinking water source quality.
Transmission System Redundancy	Consider redundancy in the transmission system on a case-by-case basis, with decisions based on an evaluation of net present value.
Access to Seattle Regional Water System	Evaluate requests for access to the Seattle regional water system using the <i>Access to Seattle Water System Guidelines</i> , based on the unique characteristics of the water that would be moved through the system.
Distribution System Redundancy	Consider redundancy for the distribution system on a case-by-case basis, with decisions based on an evaluation of net present value.

## 1.3 CUSTOMER SERVICE LEVELS AND SURVEY RESULTS

SPU first documented its service levels objectives and targets in its *2007 Water System Plan*. Since then, SPU has tracked its performance relative to those targets. These efforts are part of SPU's asset management initiative as outlined in the *2007 Water System Plan*.

In addition, SPU has completed a series of surveys of its residential and commercial customers to get feedback on the services SPU provides.

### 1.3.1 Service Levels

***SPU also participates in benchmarking studies in which it compares its performance with that of other utilities around the world.***

Service levels are statements of desired performance outcome that are high priority to SPU's customers or required by regulators. Often these service levels go beyond minimum regulatory requirements. Service levels are largely within the control of SPU and have performance level data that can be accurately and consistently collected and audited. SPU utilizes service level objectives – broad statements of intent – to establish the direction of each of its business areas while using service level targets to establish annual or longer term goals which can be measured through performance outcomes. Service levels are used by SPU to manage its assets, including making decisions on renewal/replacement and O&M practices.

The *2007 Water System Plan* provided levels of service targets to achieve the following objectives:

- Meet the environmental requirements of our water rights and water supply operations.
- Meet water use efficiency goals to ensure wise use and demonstrate good stewardship of limited resource.
- Promote a high level of public health protection and customer satisfaction with drinking water quality.
- Provide agreed-upon service to wholesale customers.
- Provide adequate pressure for drinking water supplies.
- Respond quickly and effectively to water distribution system problems.



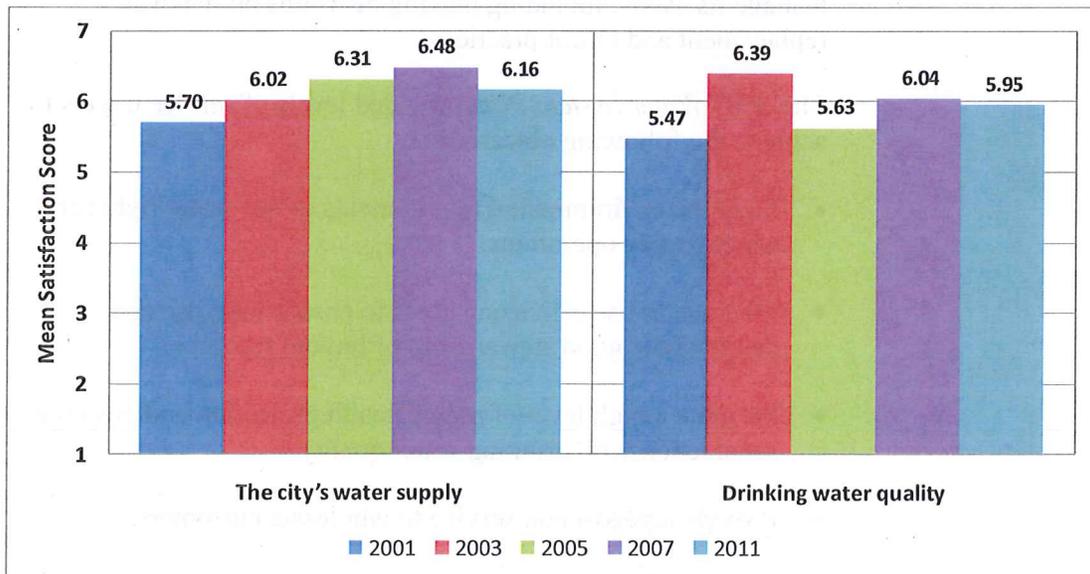
For the most part, SPU has been meeting the service level targets since 2006. More information is provided in the chapters that follow.

### 1.3.2 Customer Surveys

**Survey results indicate that SPU's customers are very satisfied with water system reliability and drinking water quality.**

SPU conducts periodic surveys of its residential and business customers to gather their opinions and views of the utility services it provides within the City of Seattle. These surveys provide performance measurements which are used as part of SPU's performance management program. They also provide information on how well the utility is meeting customers' utility needs and on special topics of particular relevance in the survey year.

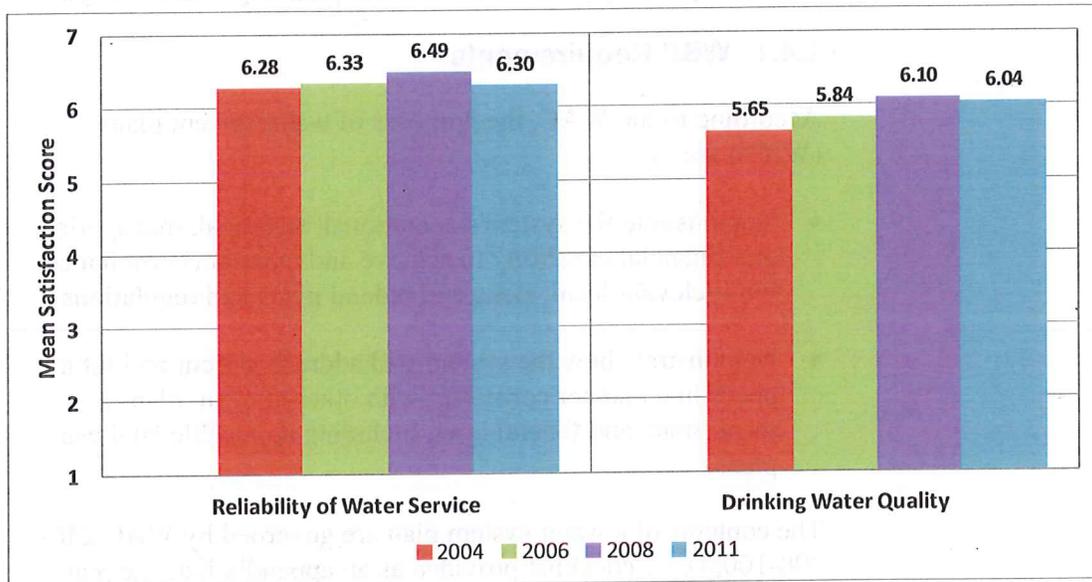
SPU surveyed residential customers within the City in 2001, 2003, 2005, 2007 and 2011. In these surveys, a random sampling of residential customers was selected to represent the City's residential demographic profile. These customers were asked to rate their level of satisfaction with the City's water supply and with drinking water quality on a seven-point scale, where "1" means "not at all satisfied" and "7" means "very satisfied." Most respondents rated these services as "6" or "7 - very satisfied." The mean satisfaction scores for each year are shown in Figure 1-2 and indicate a high and generally increasing level of satisfaction with both of these utility services.



**Figure 1-2. Residential Customer Survey Results for Water Supply and Quality**

Surveys of SPU's business customers within the City – both small and large – were conducted in 2004, 2006, 2008 and 2011. These

customers were asked to rate their satisfaction with the reliability of water service and drinking water quality, using the same seven-point scale as residential customers. The mean satisfaction scores for each year are shown in Figure 1-3 and indicate a high and generally increasing level of satisfaction with both of these utility services.



**Figure 1-3. Business Customer Survey Results for Water Supply and Quality**

In 2011, residential customers were also asked a series of questions regarding the taste of Seattle’s drinking water and their water drinking habits. Fifty-two percent of all respondents report their tap water tastes “excellent” or “very good,” and only five percent reported it tastes “poor.” For those who drink tap water that they do not filter in their home, most (44 percent of all respondents) rate the taste of their tap water even higher: 63 percent rated their water as “excellent” or “very good,” and only one percent as “poor.”

These survey results indicate that SPU’s customers are very satisfied with water system reliability and drinking water quality.

#### 1.4 PLANNING REQUIREMENTS

The SPU regional water system is categorized as a Group A community water system with 1,000 or more services and must prepare a water system plan for Washington State Department of Health review and approval per Chapter 246-290-100 of the Washington Administrative Code (WAC). These plans must be updated and submitted every six years. This section describes the



planning requirements, as well as how this plan is consistent with other plans.

Note that this water system plan does not cover the Group A water system at Seattle's Cedar Falls Headquarters. That system, as well as other water systems serving outlying SPU facilities, has a separate operating permit and different planning requirements.

#### 1.4.1 WSP Requirements

According to the WAC, the purposes of water system plans (WSPs) are to:

- Demonstrate the system's operational, technical, managerial, and financial capability to achieve and maintain compliance with relevant local, state, and federal plans and regulations.
- Demonstrate how the system will address present and future needs in a manner consistent with other relevant plans and local, state, and federal laws, including applicable land use plans.

The contents of a water system plan are governed by WAC 246-290-100(4). A checklist provided as an appendix lists the plan contents required by the WAC and identifies the specific chapters or appendices of this plan where that required information can be found.

The WAC also provides for a "document submittal exception" process that allows a purveyor to proceed with new distribution mains without submitting construction documents to WDOH for review. This process requires a WDOH-approved water system plan that includes standard construction specifications for these types of projects. SPU is requesting such an exception for new distribution mains. Information needed to support this request is provided in the appendices, including SPU's design and construction guidelines.

WAC 246-290-108 requires that this *Water System Plan* be consistent with local plans and regulations. Consistency review and certification have been obtained from those local governments with jurisdiction over areas where SPU provides retail water service, which includes the cities of Seattle, Shoreline, Lake Forest Park and Burien (see appendix). This consistency review covers:

- (a) Land use and zoning within the applicable service area;
- (b) Six-year growth projections used in the demand forecast;

- (c) Utility service extension ordinances of a city or town when water service is provided by the water utility of the city or town;
- (d) Provisions of water service for new service connections; and
- (e) Other relevant elements related to water supply planning as determined by WDOH.

King County has its own consistency review process.

#### **1.4.2 Consistency with Other Plans**

***SPU is committed to working together with other water providers and regional jurisdictions to address water issues.***

In planning to meet future demand, it is necessary to coordinate with other planning efforts to ensure consistency. WDOH has determined that plans that may contain elements requiring local government consistency review include Coordinated Water System plans, Regional Wastewater Plans, Reclaimed Water Plans, Groundwater Area Management Plans, and Capital Facilities Elements of Comprehensive Plans. Other plans that SPU coordinates with include the water system plans of SPU's wholesale customers and adjacent water purveyors, watershed plans and salmon recovery plans. Each of these plans and their relevance to SPU's water resources and water system planning is described below.

##### ***1.4.2.1 Coordinated Water System Plans***

Three of the four coordinated water system plans (CWSPs) in King County are for areas served by the SPU regional water system, including east King County, south King County, and Skyway/Bryn Mawr. (The fourth CWSP is for Vashon.) A small portion of SPU's retail service area lies within the Skyway/Bryn Mawr Critical Water Service Area. SPU worked with the regional water associations responsible for developing those plans to ensure coordination with SPU planning. SPU participates in the development and updates of these plans to varying degrees, depending on the extent to which SPU's service area overlaps with the CWSP area. SPU staff also maintains regular contact with regional water associations on issues related to SPU's water system plan.

##### ***1.4.2.2 Wholesale Customers' Individual Water System Plans***

As SPU's wholesale customers update their water system plans for their own water supply and distribution systems, SPU staff coordinates with them so that their water system plans maintain consistency with SPU's *Water System Plan*. For most customers,



this includes SPU review of their draft plans in the following key areas:

- Assumptions about the quantities and pressures available from SPU transmission lines.
- Demand forecasts to ensure consistency of population forecasts among Seattle and its wholesale customers.
- Responsibilities that the customer shares with SPU, such as distribution system water quality monitoring.
- Conservation programs.

SPU does not comment on water system plan demand forecast and conservation elements for wholesale customers now purchasing water through the Cascade Water Alliance because SPU is not involved with Cascade planning in these areas.

Since the *2007 Water System Plan*, SPU has reviewed or provided input and comments on water system plans from Bothell, Cedar River, Duvall, Edmonds, Highline, North Bend, Northshore, Olympic View, Redmond, Shoreline Water District, Woodinville, and Water Districts 20, 45, 49, 90, and 125. SPU will continue working closely with wholesale customers to coordinate regional water supply planning activities.

#### ***1.4.2.3 King County Comprehensive Plan***

Most of SPU's service area is within incorporated areas of King County. A very small part of its retail service area is in unincorporated King County. These areas are located south of the City of Seattle boundary and form portions of the North Highline and West Hill Potential Annexation Areas. In total, fewer than 4,800 customers are located in unincorporated King County.

SPU's *2013 Water System Plan* aims to be consistent with the *King County Comprehensive Plan (KCCP)* to be sure that growth targets within the SPU service area match the availability of water supply to serve related demand. In addition, SPU's *2013 Water System Plan* is consistent with the policies in the *KCCP* relevant to water supply.

#### ***1.4.2.4 City of Seattle's Comprehensive Plan***

Seattle's *Comprehensive Plan* relates to this water system plan in regard to water distribution issues. Planned population increases

and changes in land uses are important to how SPU conveys water throughout the distribution system.

Although minor changes have occurred more often, the last major update to the *Comprehensive Plan* was in 2004, as a result of the 10-year review required by the Growth Management Act. The *Comprehensive Plan* is undergoing a major review to reflect a 20-year vision for the Seattle community. Part of the review will be to ensure that Seattle's *Comprehensive Plan* remains consistent with the regional growth management strategy (Vision 2040) and the King County Countywide Planning Policies which were recently revised. As with the *KCCP*, SPU has closely monitored development of the Seattle's *Comprehensive Plan* to ensure that this water system plan will be consistent with it.

#### ***1.4.2.5 Adjacent Purveyors***

A number of water purveyors within SPU's water service area and adjacent to existing SPU wholesale customers are not themselves current SPU customers. These include Water District No. 54, Lakehaven Utility District, City of Kent, City of Auburn, Water District No. 111, Mirrormont, Northeast Sammamish Water District, Union Hill, Ames Lake, Carnation, Fall City, and several other smaller purveyors. When water system plans for these systems are received, SPU reviews them for compatibility and consistency in areas such as assumptions about water demand forecasts, transmission needs, and water quality issues. None have been received since 2006.

#### ***1.4.2.6 Purveyors Beyond the Boundaries of SPU's Service Area***

As a regional water supplier, SPU was an active participant in the *2009 Water Supply Outlook*, produced by the Water Supply Forum for the three-county region of Snohomish, King, and Pierce Counties. SPU continues to be an active member on the Forum, which helps ensure coordinated water supply planning throughout the region and between the three major utilities in central Puget Sound: Everett, Tacoma, and Seattle. It also highlights opportunities for efficiencies that can help to reduce impacts from utilities.

#### ***1.4.2.7 Regional Wastewater and Reclaimed Water Plans***

In 2004, King County published an update to its *Regional Wastewater Services Plan (RWSP)*. The *RWSP* contains proposals for disposal of the region's wastewater, including using reclaimed water as a new source of water supply. Several possible uses for



reclaimed water to offset demand for potable water are identified in the *RWSP*. SPU participated in the development of the *RWSP* and has been actively involved in the development of the King County Reclaimed Water Comprehensive Plan.

King County has indicated that completion of their Reclaimed Water Checklist suffices to meet consistency with these plans. This checklist is included in the appendices.

#### ***1.4.2.8 Groundwater Area Management Plans***

The Seattle Well Fields and a portion of SPU's retail service area lie within the South King County Groundwater Management Area. However, there are no approved groundwater area management plans applicable to SPU.

#### ***1.4.2.9 Watershed Plans***

***SPU is dedicated to being a leader in protection of the environment.***

Watershed plans in the SPU retail service area are the Chinook Salmon Conservation Plans for the Cedar River/Lake Washington/Lake Sammamish Watershed (WRIA 8) and the Green/Duwamish and Central Puget Sound Watershed (WRIA 9), which were adopted as part of the Puget Sound Salmon Recovery Plan, approved by the federal government in 2007. This watershed planning occurred within the framework of RCW 77.85, Salmon Recovery. This is not one of the types of plans for which a water system plan must meet WDOH consistency requirements.

The 50-year Cedar River Watershed HCP that SPU developed was agreed to by federal and state resource agencies in 2000 and is now being implemented. SPU continues to be in compliance with the HCP.

#### ***1.4.2.10 Salmon Recovery Plans***

Seattle participates in salmon recovery processes conducted under the framework of RCW 77.85 in the Water Resource Inventory Areas (WRIA) associated with its water supply and service area: WRIAs 7 (Snohomish River Basin), 8 (Cedar River/Lake Washington Basin), and 9 (Green River/Duwamish Basin). The WRIA 7, 8, and 9 salmon recovery plans recognize that salmon recovery is a long-term effort and include a scientific framework, lists of priority actions, comprehensive action lists, adaptive management approaches, and funding strategies. The City of Seattle has supported salmon recovery through primary sponsorship and implementation of significant habitat restoration and protection projects, and has also addressed salmon habitat

protection through its land use and public outreach policies and programs.

As part of WRIA 7, 8, and 9 salmon recovery efforts, Seattle has been a leader in implementing a number of actions. Examples of these efforts include:

- Lower Cedar River habitat acquisition and restoration projects.
- Shoreline and wetland restoration projects along the south shoreline of Lake Washington.
- Development and distribution of a Green Shorelines Guidebook for Lake Washington property owners.
- Receipt of an EPA grant in 2010 to develop Green Shorelines Incentives.
- Receipt of an EPA grant in 2010, partnering with Cascade Land Conservancy and Friends of Cedar River Watershed to eradicate knotweed and replant native plants on public and private property in lower Cedar River; and conduct community outreach and education on river and stream restoration.
- Purchase and restoration of the Salmon Bay Natural Area downstream of the Locks for habitat benefits.
- Participation in many research efforts with the goal of ensuring effectiveness of restoration projects in Lake Washington and on the Duwamish River.
- Acquisition of habitat lands on the Tolt River by Seattle City Light.
- Implementation and primary fiscal sponsorship of the Tolt River Floodplain Reconnection Project, in partnership with King County and multiple grant funders.
- Funding over several years to Tulalip Tribes for juvenile salmon research on the Snoqualmie River.
- Protective land management practices in the Seattle-owned, Cedar River Municipal Watershed to preserve water quality and the natural ecological processes that promote healthy river conditions throughout the Cedar River Basin.



- Fish passage facilities at the Landsburg Dam that reopen over 20 miles of stream habitat for salmon in the protected Cedar River Municipal Watershed.
- Protective stream flow management practices that provide beneficial stream flows for all salmon and steelhead life stages in the Cedar and South Fork Tolt rivers.
- Implementation of the new Cedar River Sockeye Salmon Hatchery Program and associated Adaptive Management Plan guided by oversight bodies composed of representatives from federal, state, tribal and local natural resource agencies, academic experts and citizen stakeholders.

The Cedar River Watershed HCP covers many of the costs for the projects recommended in the WRIA 8 plan for the Upper and Lower Cedar River. Staff has successfully leveraged other funding so more can be accomplished. The HCP also provided funding for improving fish passage at the Hiram Chittendon Locks.

## 1.5 PLAN ORGANIZATION

SPU has organized its water utility into the five business areas described previously. This plan is organized similar to the *2007 Water System Plan*, with the remaining chapters of Part I focused on each of those business areas. Since most of the Major Watersheds business area activities are not required to appear in water system plans, it does not have its own chapter. Each of the chapters in Part I are divided into the following sections:

- A section summarizing SPU's accomplishments since completion of the *2007 Water System Plan*.
- A service level section that describes SPU's performance in meeting the service levels for that business area.
- A description of the facilities that the business area manages, and the practices it follows in operating and maintaining those facilities. This section focuses on changes since the *2007 Water System Plan*.
- A summary of needs, gaps, and issues that face that business area in the next 20 years and beyond, but with a focus on the 2013-2018 planning period.

- A summary of the plans and actions the business area will be undertaking or continuing as it moves forward to address the needs, gaps, and issues in the next 20 years and beyond.

Part II describes the plan for implementing the actions described in Part I, including details on the costs and financing approach for plan implementation.

Appendices to this plan are contained in a separate volume as listed in the Table of Contents and should be considered part of this *2013 Water System Plan*.



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