

## **Appendix R**

### **Large Water Utility Interviews**



## **R.1 Introduction**

This appendix contains the results of interviews with five major water utilities in the central Puget Sound Region: Seattle Public Utilities (SPU), City of Everett, Tacoma Public Utilities (TPU), Cascade Water Alliance (Cascade), and Lakewood Water District (Lakewood). CDM selected these providers for face-to-face interviews based on the regional wholesale supply aspects of these utilities and their large number of customers.

Interviewees were asked to provide information relating to existing water supplies, future inventories, predicted climate change information, and their effects on water availability. The specific categories addressed include sources of supply, quantities, current limitations and demand, and future limitations, as reported below.

## **R.2 Seattle Public Utilities**

### **Sources**

Seattle has two surface water sources and a small groundwater source: the Cedar River system, the South Fork Tolt Reservoir, and the Seattle Well Fields. Deliveries from each supply source vary from year to year depending on the hydrologic conditions affecting each supply source. Additionally, the configuration of the transmission system allows flexibility in the use of the different sources thereby strengthening overall system reliability. On average, the Cedar River system provides 70 percent of SPU's total supply, the South Fork Tolt system delivers 29 percent, and the wellfields, used during emergencies or peak summer water use periods, deliver 1 percent.

### **Quantities**

SPU's annual water rights for its supply sources total 450 million gallons per day (mgd); the instantaneous capacity, however, is not defined in the utility's Cedar claim.

Water from the Cedar River is treated at the 180-mgd Cedar Treatment Facility, which is located at Lake Youngs and was completed in 2004. A maximum of 200 mgd can be delivered from the treatment facility to the regional system.

Deliveries from the South Fork Tolt system are treated at the Tolt Treatment Facility completed in 2001. Treatment capacity is 120 mgd, and the hydraulic capacity of the transmission system is 135 mgd.

SPU's well fields consist of the Riverton well field, which has two wells, and the Boulevard Park well field, which has one well. In total, the three wells can supply up to 10 mgd for approximately four months. The well fields are naturally recharged, but the wells can also be artificially recharged using a method known as aquifer storage and recovery (ASR), if needed. When used, ASR injects treated water from

the Cedar River into the production wells to supplement natural recharge into the aquifer. Operation of the well fields has been through temporary water rights permits; SPU applied for a reservoir permit in 2005 for the ASR project to replace these temporary permits.

### **Limitations and Demand**

Sustainable use of SPU's water supplies is constrained by the firm yield of the system. Calculation of the firm yield is based on the pattern of seasonal demand and the assumption that instream flow agreements and requirements for the Cedar and South Fork Tolt systems are met. Because of the tremendous variability in stream flows (and thus water availability) from year to year, firm yield is determined using a 98 percent reliability standard. Under this definition, the firm yield is the amount of water that could be delivered using all sources in 98 years out of 100, on average, based on historic records of streamflows, while maintaining minimum instream flows and without lowering reservoirs below minimum levels. Using this method, the annual firm yield for SPU is estimated to be 171 mgd. In most years, more water can be delivered.

Based on SPU's current 2007 demand of 126 mgd, the utility has ample supply to meet existing demands and legal obligations for instream flow and for their wholesale customers. SPU's history of water use shows a declining demand trend, while the population continues to increase.

### **Future Limitations**

SPU has recently worked with the Climate Change Technical Committee on a study to determine long-term impacts of climate change on the utility's water supply sources. The climate change study incorporated multiple model scenarios based on the intensity of climate change predicted by global climate change models. Results suggest that climate change may require SPU to make some facility improvements and alter existing management of its surface water reservoirs to maintain supply at current levels. SPU will approach their supply options in a tiered approach. Tier 1 options are those SPU considers the most effective and easiest to implement. These will be the first steps in managing climate change impacts to SPU's surface water reservoirs and include:

- Adding retention at the Chester Morse Lake while reducing seepage at the Masonry Pool
- Lowering Tolt Reservoir levels
- Including use of Lake Youngs storage in supply calculations

## R.3 City of Everett

### Source(s)

The City of Everett's main source of supply is surface water from the Sultan River. This source is retained in the Spada and Chaplain Reservoirs. Other sources include surface water diversions from lower Chaplain Creek and the Lower Snohomish River as well as a groundwater source tapped by nine wells within the City's service area for golf course and park irrigation.

### Quantities

Water rights for the Sultan, Lower Snohomish<sup>1</sup>, and groundwater sources total an instantaneous availability of 426.1 cubic feet per second (cfs) and an annual quantity of 168,244 acre-feet. This equals a maximum production rate of 275 mgd and an annual average production volume of 150 mgd. A pending application with a priority date of 1954 is on file with the state for an additional appropriation of the Sultan River. Pending approval, this water right would add another 130 mgd to the City's supply capacity.

The City relies on four transmission lines from the Spada/Chaplain system to feed its service area. This transmission network is a gravity system, so pumping costs are little to none and there is a high reliability to most of their customers during periods of extended power outages. One of these transmission lines is an unfiltered/untreated line that supplies the City's largest industrial water user—Kimberly-Clark, which currently uses 30 mgd.

### Limitations and Demand

The City manages its system to meet both municipal and industrial water customer demands and power generation agreements with Snohomish County Public Utility District (PUD). The City's safe annual average day yield for the Sultan River and Chaplain Reservoir, currently limited by its water right, is 137.5 mgd. The City's current use of its supply sources equals an average day demand of 88.4 mgd. With current demands and an available buffer for growth into its existing sustainable supply capacity, the City of Everett is well positioned to meet the projected water needs of its customers (direct and wholesale) and meet supply/power agreements through 2040.

### Future Limitations

The City of Everett and the Climate Change Impacts Group have completed their climate change impact evaluation on Everett's future surface water supply. The study incorporated three global climate change models of low (optimistic), average,

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<sup>1</sup> Everett's Lower Snohomish water right, equivalent to 10 mgd annual average and 15 mgd maximum day, comes from the Snohomish River Regional Water Authority water right of 23.7 mgd (annual) and 36 mgd (instantaneous), which is shared with Woodinville Water District and Northshore Utility District.

and high (pessimistic) rates of warming, coupled with Everett's various levels of supply constraints. Under the City's operational scenario, which is constrained by transmission rather than hydropower commitments, the pessimistic forecast of safe yield exceeds existing water rights in 2055 and the optimistic forecast exceeds it in 2070. All other lower constraint simulations show forecasted safe yields remain above existing water rights for Everett's surface water sources.

To manage the forecasted drop in safe yield, the City will evaluate seasonal operational changes in filling its reservoirs, continue to implement enhanced conservation, and encourage the conservation efforts taken by its wholesale customers. The City foresees a 3 to 4 percent savings over the next decade of water demand from these conservation actions. A large part of Everett's conservation efforts includes an agreement with Kimberly-Clark that now provides the mill with additional reclaimed water from the City's wastewater treatment plant. In addition, Everett will continue to investigate the development of an intertie with SPU for short-term emergency conditions and work with Snohomish River Regional Water Authority (SRRWA) to apply beneficial uses of the Weyerhaeuser water right.

## **R.4 Tacoma Public Utilities**

### **Source(s)**

Tacoma Public Utilities' existing sources of supply include the Green River and 24 wells located within the City of Tacoma's service area. The City's surface water supply from the Green River consists of two diversion water rights. The first diversion water right is senior to state-established in-stream flow requirements; however, TPU limits diversion to protect in-stream flows under an agreement with the Muckleshoot Indian Tribe. The second diversion is shared with regional supply partners Kent, Covington, and Lakewood. Although the City owns the water right and supply facilities, the three supply partners have an ownership interest in the water supply coming from the second diversion. The second diversion is also subject to instream flow requirements that make water available only from storage during drier periods of the year. TPU has developed additional reservoir storage to make this seasonal diversion available in the summer and fall.

### **Quantities**

Tacoma's annual water right for these sources is 123.9 mgd and the total maximum instantaneous water right is 188 mgd. The City's total yield from surface diversions is 83.3 mgd and Tacoma's wells, which currently meet about 17 percent of the total annual water requirements, yield about 22.3 mgd on an average day annual basis.

## **Limitations and Demand**

Limitations to TPU's surface supply diversions from the Green River include meeting instream flows as directed in the HCP, seasonal limitations on the use of the second diversion water right, and high turbidity events. The North Fork wellfield along the upper Green River allows seasonal withdrawals of groundwater in this area to overcome high turbidity events in the City's surface water source.

Limitations to TPU's City area groundwater supply are less defined; however, there is concern that sustained pumping in the City's South Tacoma wellfield may draw known pollution in the shallow aquifer toward the wells. Based on these limitations TPU's safe annual average day yield is currently about 105 mgd.

Existing annual average day demand for TPU's system was 58.9 mgd in 2005; peak day was 93.6 for the same year. This demand is projected to increase to 88 mgd (average day) and 124 mgd (peak day) by 2020.

## **Future Limitations**

TPU's recent worst-case drought occurred in 1987. Since that time the utility has increased storage in Howard Hanson Dam and developed the second supply treatment and transmission project, both of which have increased peak supply capacity. Additionally, TPU's conservation program is expected to effectively reduce demand by 5.6 mgd in 2010 and 7.4 mgd in 2020.

Increased storage in Howard Hanson Reservoir has substantially increased groundwater seeps that have recently affected TPU water quality. This includes increased iron and manganese levels as a result of lower dissolved oxygen levels in the deeper portions of the lake where the intake to the source water is located. However, this water quality impact is temporary and will likely be resolved when the Army Corps of Engineers completes construction of a fish passage and the City can select the elevation where water is diverted for supply.

TPU has recently worked with the Climate Change Impacts Group to evaluate impacts to the Green River watershed. Results show the watershed is susceptible to reduced snow pack due to warmer winters and the reservoir's low elevation. A warming climate scenario shows higher winter flows in the Green River and less sustained flow from the wet to dry season. The additional storage at Howard Hanson and TPU's available groundwater supply allows the utility to manage resources with minimal to no impacts in the next 20 years as a result of climate change. Further into the future, when climate change impacts show more influence to its system, TPU will address operational adjustments such as filling Howard Hanson earlier in the year to capture the predicted increase in fall and winter rain. TPU will also continue to investigate aquifer storage/recovery (ASR) projects (such as Lakehaven Utility District's OASIS project) and possibly revisit ASR pilot testing in the South Tacoma wellfield as aquifer water levels decline and more storage becomes available.

## R.5 Cascade Water Alliance

### Source(s)

Cascade Water Alliance, a relatively new entity in the central Puget Sound Region's large potable water suppliers, began delivering water to its members in 2004. Cascade is formed through inter-local agreements with existing public water systems and currently has eight members, all located in King County, including:

- City of Bellevue
- Covington Water District
- City of Issaquah
- City of Kirkland
- City of Redmond
- Sammamish Plateau Water and Sewer District
- City of Tukwila
- Skyway Water and Sewer District

Cascade currently obtains its source of water from a declining wholesale water block agreement with SPU. Other sources include the members' existing groundwater sources and Covington's surface water supply from TPU's second supply source agreement. Cascade's future supply source is Lake Tapps and the Alliance is currently working with the State Department of Ecology, Puyallup Tribe of Indians, and the Muckleshoot Indian Tribe to secure the rights to develop Lake Tapps (formerly used for power generation) as a source of supply.

### Quantities

Cascade's agreement with SPU allows the Alliance to purchase 30.3 mgd through 2024, then declining 5 mgd every 5 years through 2045, with an option to extend. An additional supply of 10 mgd is provided from the Alliance members' existing groundwater supplies, Cascade's purchase of wholesale water from non-member water purveyors, and a small amount of reclaimed water. The Lake Tapps source is needed to satisfy Cascade's agreement with SPU to reduce demand on SPU's supply starting in 2024. Based on the demand forecast, the Lake Tapps supply would offer sufficient capacity to meet Cascade's demand of 75 mgd (average day) to 2050.

Cascade also has an agreement with Tacoma Public Utilities to obtain a large block of water (equivalent up to 15 mgd<sup>2</sup>) from the Second Supply Project. Cascade anticipates beginning construction of a transmission pipeline for the Second Supply Project source in 2008 and bringing this supply online in 2010.

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<sup>2</sup> This includes TPU interim and permanent supply blocks, with the interim supply block ending when Lake Tapps supply is online and serving members around 2027.

## Limitations and Demand

Cascade is currently limited by its members existing supply sources and the block contract of 30.3 mgd with SPU. Many limitations are pending with Cascade's Lake Tapps source water development as the final decision on water rights to this source has not been issued. However, based on its estimated average day demand of 75 mgd for the year 2050, Cascade will have sufficient supply to meet the demand—assuming a suitable supply is available from the Lake Tapps source.

Cascade currently provides a regional water conservation program to its members, who also have their own conservation programs. Cascade's conservation program includes public education, technical assistance, and a variety of incentives, such as rebates for water-efficient equipment. Conservation programs of both Cascade and its members are estimated to save 2.1 mgd of the forecasted average daily demand. Cascade has also identified potential use of about 2.6 mgd of reclaimed water by 2023 that will be a supply source available to its members to meet demands.

## Future Limitations

Cascade is working with the Climate Change Impacts Group to determine long-term climate impacts to future Lake Tapps supply and optimize reservoir management. In addition, due to existing recreational uses and the large number of homes on septic systems surrounding Lake Tapps, Cascade is conducting a comprehensive water quality study of the lake and its tributaries to assess and develop proper technologies to treat the lake's existing and potential contaminant.

## R.6 Lakewood Water District

### Source(s)

The Lakewood Water District is a major water purveyor in Pierce County. The District's supply is developed from four aquifer units at successive depths that are comprised of permeable glacial sediments and tapped by Lakewood's network of 29 active wells. Lakewood is the lead wholesaler for the Pierce County Co-op (Co-op) members, many of whom augment Lakewood's source water with their own groundwater sources. Co-op members include:

- Parkland
- Summit
- Fife
- Sumner
- Puyallup
- Fruitland Water Mutual
- Milton
- Mt. View Edgewood
- Spanaway

- Rainier View
- Valley Water
- Steilacoom
- Bonney Lake

## **Quantities**

Lakewood's existing annual water rights total 18.7 mgd and its instantaneous water rights currently equal 66.1 mgd. A second water right from the former Abitibi Mill in Chambers Creek Canyon (Abitibi Phase 2) is currently pending approval and would add 1.4 mgd to Lakewood's annual water right.

## **Limitations and Demand**

Lakewood currently can beneficially use all of the available annual water right, but its instantaneous use is limited by infrastructure to 46 mgd. To achieve its current instantaneous water right, Lakewood would need to increase the capacity of its pumps and lower the intakes to accommodate the increased water level drawdown in the aquifer.

Lakewood's production in 2006 equaled 10.6 mgd on an annual average day basis; its maximum recorded peak production of 19.4 mgd occurred in July 2004. Lakewood has an active conservation program with goals to reduce per capita demand by 7 percent over the next decade. Based on Lakewood's estimated average day demand of 10 mgd, its active conservation program, and available supply of 18 mgd, the District appears to have sufficient supply to meet the demand of its direct and wholesale customers through 2050.

## **Future Limitations**

Lakewood implements a comprehensive aquifer management program that involves careful monitoring of the District's production well water levels. With this information, Lakewood proactively manages the well network to utilize shallow to deep well systems based on seasonal water level fluctuations.

Lakewood has started to evaluate how climate change may affect its groundwater sources; initial findings suggest that forecasted wetter winters may benefit the District's aquifers with additional recharge. However, studies by the Climate Change Impacts Group conclude that more modeling is needed to strengthen precipitation forecasts and more research and data are needed to determine impacts and/or benefits to local groundwater systems.

Lakewood's low treatment costs and recent implementation of stricter surface water treatment regulations have made the District's wholesale groundwater appealing to existing and potential Co-Op members currently using groundwater sources. Lakewood is moving forward with construction of a transmission line to tie into other current Pierce County Co-op members (such as Summit Water) and

negotiating with Bonney Lake to extend this transmission to its service area. Acquisition of new members to the Co-Op may present challenges, in terms of treatment costs (examples include: compliance with surface water treatment and disinfection & disinfectant by-product rules), if a potential member currently uses surface water and becomes connected to the 100% groundwater system.