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To this end, the committee has begun defining what "Sustainable Water" means to water suppliers in the Puget Sound Region and developing a clear understanding of the components which make up the complex cycle of water supply sustainability. This has included a thorough data review and consultation with experts at the University of Washington. Climate change, growth, land use, salmon habitat, and water supply must all be accounted for in an integrated fashion to account for the complex interrelationships that exist among them.

This committee is currently developing a concept paper and list of potential best management practices (BMPs) that apply to management of water supply. It is anticipated that these products can be used by utilities in the region to better manage their resources. Two committee members will participate in an AWWA conference session in May 2004 on the subject of "Sustainability and the Water Utility Industry."



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The Forum publishes WaterLink to keep you informed of our activities in the arena of water supply planning, environmental stewardship and legislative activities.

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# WaterLink

Winter 2003-04  
Your Link to Central Puget Sound Water Supply News

## A Hot, Dry Year Challenges Regional Water Managers

**INSIDE:**

- Challenges of 2003 Water Supply Conditions
- Forum Sustainability Committee



The 2003 water year provided challenges for regional water managers in the form of dry winter conditions followed by an exceptionally hot and dry summer. As early as December it was clear that snow pack and precipitation were far below normal (as much as 50% in some areas). Many water suppliers in the region began implementing water shortage plans including alternative operational and management strategies. Relatively normal precipitation in March provided some reprieve, but was followed by an extremely hot and dry summer, with no significant precipitation until mid-September. This issue of Water Link outlines how several water purveyors in the region weathered this challenging water year.

during this unusual condition.

**Everett Water Utility**

Everett provides water for almost 500,000 people in Snohomish County as well as a large volume of water for a pulp and paper mill. Water is supplied through Spada Reservoir (operated in partnership with the Snohomish PUD) in the headwaters of the Sultan River. Everett attributed its ability to successfully meet water needs this summer to its conservation program and beneficial management of its storage facility.

Summer water demands on the Everett system were higher than in recent years but still lower than predicted by demand forecasts based on population projections and historical per capita

**City of Auburn**

During the summer of 2003, the City of Auburn was impacted by both the unseasonably dry weather and by the effects of construction on the Lake Tapps reservoir. The City relies exclusively on groundwater collected through a system of wells and gravity collectors. In the spring of 2003, Puget Sound Energy, the manager of Lake Tapps, delayed refilling of the lake to allow for reconstruction of the Lake Tapps dike system. Consequently the lake levels that normally result in groundwater recharge to city water supplies were not available. Delay in refilling Lake Tapps, combined with unusually low spring and summer precipitation, resulted in low production from several of the City's water supplies.

The effects were particularly acute in the Lakeland Hills portion of the City's water service area. As a result, the City initiated a voluntary curtailment plan in that portion of the City's service area. The voluntary curtailment program resulted in an approximate 38% reduction in water use in that area. The curtailment, along with use of an emergency intertie with an adjoining utility, allowed the City to meet customer needs

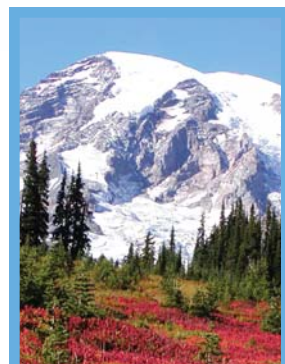


**The Forum**

- City of Everett
- City of Seattle
- City of Tacoma
- King County
- Pierce County
- Snohomish County
- Cascade Water Alliance
- Water Suppliers Association
- Everett Water Utility Committee
- North Snohomish County WUCC
- Pierce County Regional Water Association
- Snohomish River Regional Water Authority
- South King County Regional Water Association
- East King County Regional Water Association

The Forum has been working with stakeholders to help:

- Improve regional water resource decision making taking into account the needs of fish
- Remove impediments that prohibit the effective and efficient use of water
- Explore and facilitate future water projects that meet the needs of the region



Mt. Rainer

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consumption. This lower than projected demand is attributed to Everett's conservation program.

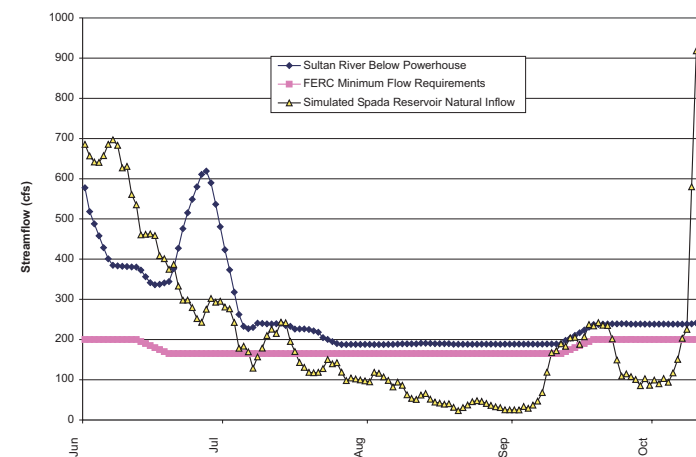
The benefits of available storage in Spada Reservoir were evident during this past summer. The Reservoir provided storage to:

- meet customer demands,
- provide flows for fish in excess of minimum instream flow requirements, and
- protect against flooding.

The reservoir was full in spring, initiating the summer season at normal, pool elevation. High summer demand and releases for instream flows left the water level 21% below normal at end of the summer.

The FERC operating license for this facility requires a minimum instream flow of 165 cfs during the summer months. The actual flow provided from the reservoir this summer was in excess of 185 cfs. Without Spada Reservoir, computer models predicted that natural river flows would have averaged well below 100 cfs for over a month. This additional water provided significant fish habitat for various anadromous and resident fish present in the Sultan River. This demonstrates the benefits of storage for augmentation of instream flows during dry conditions.

Spada reservoir operations have also been helpful in mitigating potential flood impacts. During the extreme rain event on October 20<sup>th</sup> the reservoir captured much of the precipitation run-off that otherwise would have flooded downstream areas. Reservoir levels increased by 40 feet from that single event.

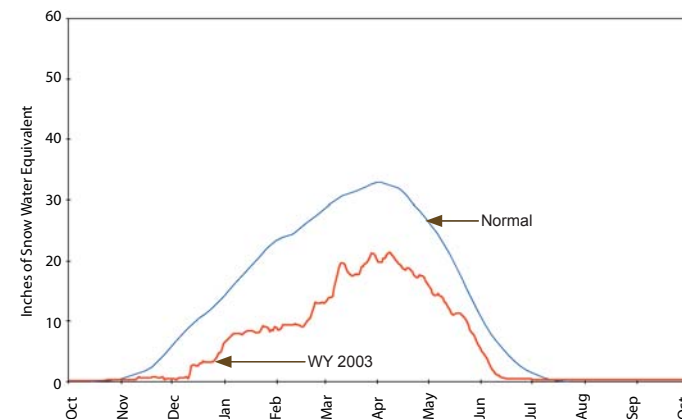


Comparison of the predicted natural flows in the Sultan River (as determined with a computer model) and the actual flows that were released from Spada Reservoir into the Sultan River.

## Seattle Public Utilities

Seattle Public Utilities (SPU) supplies drinking water to more than 1.3 million people in the Seattle - King County area. Water is supplied by two primary sources; the Cedar and Tolt Rivers, with supplemental groundwater available from the Highline well field.

SPU utilized several tools to identify the extent of dry conditions and determine water management strategies, including the substantial Snotel network that measures snowpack, an in-house water supply forecast model (SEAFM), and steelhead redd surveys. Ultimately, open communications with the public and environmental groups, beneficial reservoir operations and improved facilities resulted in SPU successfully meeting all of its commitments.



Cumulative Snowpack for 2003 versus Normal Conditions in the Cedar/Tolt Watershed

In mid-winter, SPU water managers recognized that poor snowpack and the dry state of the watershed posed imminent problems. Inflows to the reservoirs were dramatically lower than normal between April and October. In fact, many long-standing records were shattered for daily low streamflow above the SPU dams in the Cedar and Tolt Watersheds. Therefore SPU began devising a reservoir refill strategy for both the Cedar and Tolt Reservoirs that took into account spawning steelhead and subsequent incubation of eggs while ensuring reservoir refill for ensuing summer water demands. The success of this strategy was evident by the early refill of Chester Morse Lake, and the fact that the South Fork Tolt Reservoir came within 3 feet or 95% of its full capacity.

The Tolt Treatment Facility, completed in 2000, increased available water for SPU's use during this critical time. This facility allowed SPU to utilize 38% more storage of the South Fork Tolt Reservoir than has been used previously. "We pulled hard on the Tolt supply," stated George Schneider, "Normally we draft the reservoir about 20 feet (equivalent of 21,000 acre-feet) each summer prior to the return of fall rains. This year, we used over 50 feet of reservoir storage (equivalent of 39,000 acre-feet), drawing it down to the lowest elevation ever." This additional water was partially used to augment stream flows, keeping Tolt River flow at or above the

new prescribed normal minimum flows and well above levels that would have occurred naturally. SPU also activated its 3 rarely used groundwater wells to augment water supply and reduce demand on the surface water sources.

Stream flows were maintained at or above normal guaranteed minimum levels throughout the spring, summer and early fall in the Cedar and South Fork Tolt rivers. SPU worked closely with the Cedar River Instream Flow Commission (IFC) to allocate water based on actual hydrologic conditions, forecasts, and biological priorities. During the summer, the IFC agreed to withhold allocation of a block of supplemental water from the Cedar River based on real-time monitoring data that indicated that all steelhead redds would be fully protected. In early fall, dry watershed conditions persisted, but reservoir storage conditions on the Cedar River were sufficient to support the normal fall flow augmentation for returning salmon from mid-September through the second week of October when significant rainfall improved natural watershed conditions.

Very moderate consumption by SPU customers was another key factor in successfully meeting summer demands. This was attributed to consistent communication between SPU and the news media regarding the state of the water supply, the effect of reductions in water consumption, and the resulting water supply reservoir levels. Total system peak season demand averaged 185 mgd between May 16 and September 15. This is only 2 mgd higher than the 1994-2000 average, despite a consistently warm and extremely dry summer in which a new record was set for the number of consecutive days with high temperatures of 70° or more.

Dry conditions also had an affect on aesthetic water quality of the Cedar supply. Strong taste and odor problems developed due to the presence of relatively unusual algae in the reservoirs. The mitigation strategy for the algae included an increased chlorine dose, partial bypass of Lake Youngs, and delivering more Tolt water. Tests indicate that the new treatment facility, on line next summer, will improve the taste of the Cedar supply during future algae blooms.

## City of Tacoma

The City of Tacoma managed their water supply without adverse impact to consumers during the hot and dry conditions of this past water year. This was only possible as a result of groundwater supplies that Tacoma uses to supplement its surface water supply from the Green River when river flows are not adequate to meet demands. Natural flows on the Green River, Tacoma's primary water source, were highly impacted by climatic conditions, and exhibited record low flows. In order to improve these conditions, Tacoma agreed to reduce use of its first diversion water right claim on the Green



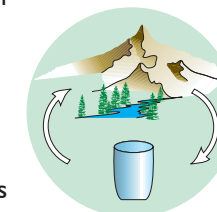
Howard Hanson Dam in Tacoma's Green River Watershed

River and rely heavily on groundwater to meet customer demands. Tacoma agreed to forego the use of 6500 acre feet of its first diversion claim, but fall rains arrived before the full amount was used for instream flows. Tacoma ultimately donated about 3300 acre feet of water to Green River instream flows in October.

Tacoma participates each year in the Howard Hanson Dam Refill Committee that advises the Corps of Engineers on the most environmentally appropriate way to fill the

conservation pool behind the dam in the spring. In dry years this committee has evolved into a drought management committee with the primary goal of protecting Green River fisheries. This year, as in many years in the past, Tacoma chose to forego some use of its water rights on the Green River and instead utilize groundwater supplies located primarily in the South Tacoma area. The Corps of Engineers carefully monitored meteorological conditions and adjusted reservoir outflows to take best advantage of the limited water available. Fisheries professionals from the Muckleshoot Tribe and WDFW provided guidance throughout the drought period. This year brought the most extreme low flow conditions since the refill committee has been in operation, and the close coordination among the Corps of Engineers, Muckleshoot Tribe, Washington Department of Fish and Wildlife, and the City of Tacoma helped to minimize the adverse effects of the event.

Despite efforts to manage the water resource on the Green River in 2003, stream flows fell well below minimum flows set by the State. Completion of Tacoma's Second Supply Project including additional storage at Howard Hanson Dam will provide greater flexibility for water resource management in the future. This is reflected in Tacoma's Habitat Conservation Plan for Green River Operations and in Tacoma's 1995 settlement agreement with the Muckleshoot Tribe. It is expected that all elements of the Second Supply Project will be completed by 2007 at which time many of the flow management strategies that were applied informally this year will be formally in effect.



## Ongoing Regional Forum Efforts

Members of the Forum are currently working as part of a self-formed sustainability committee. This committee's goal is "to provide, or participate in providing, an adequate reliable supply of water to sustain existing and future populations and to manage water resources to ensure sustainable levels of water to meet the needs of healthy populations of fish."

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