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Case Studies of

Water Efficiency in Thurston County

Thurston Regional Planning Council

December 2012

Summary

The Sustainable Thurston Task Force is considering strategies that could be implemented to sustain water resources as the region's population and climate changes in coming decades. State law requires water producers to adopt conservation practices to meet today's water needs without compromising the ability of future generations to meet their needs. This document analyzes water conservation and efficiency initiatives that Olympia, Lacey and Yelm have undertaken — including setting irrigation budgets, adjusting rates, installing meters and offering incentives to businesses and households.

State

The state Department of Health (DOH) adopted the Water Use Efficiency rule in 2007 in response to the state's municipal water law. The rule requires water suppliers to report publicly annual production, consumption and progress toward meeting measurable efficiency goals. At least one demand-side goal is required (e.g., cutting water consumption per capita). On the supply side, water suppliers must meet a standard of no more than 10 percent distribution system leakage on a rolling, three-year average. Leakage is water that cannot be accounted for (the gap between total production and authorized consumption). A 2012 survey shows that the top three measures Washington water suppliers use to promote efficiency with customers are public education, conservation rates and bills that show consumption history.[1] Eighty-eight percent of water suppliers have meters on all connections, and 74 percent have conservation rate structures.

Olympia

On July 11, 2007 the mercury rose to 99 degrees Fahrenheit and nary a drop of rain fell from the sky.[2] On this "peak" day, when folks used more water to beat the heat than any other day that year, Olympia's municipal utility produced 15.1 million gallons — enough to serve customers and fight a fire, if needed. Climate models project warmer winters with less snow and drier summers in the Pacific Northwest during the next century.[3] A warming, growing city will presumably consume more water — especially during summers — but Olympia has an aggressive conservation strategy to achieve its vision of a water supply that "sustains people in perpetuity while protecting the environment."

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[1] Partnership for Water Conservation. *Cooperative Conservation: A Report on the Implementation of Washington's Water Use Efficiency Rule*. 6 November 2012. Print.

[2] United States. Department of Commerce. National Oceanic and Atmospheric Administration. National Climate Data Center. *LCD Daily Form: 11 July 2006, Olympia Airport*. Washington, D.C. Online. Accessed 1 December 2012.

[3] Washington State. Department of Ecology. *Preparing for a Changing Climate: Washington State's Integrated Climate Response Strategy*. April 2012. Online. Accessed 17 December 2012.

Olympia's *2009-2014 Water System Plan* projects that peak summer demand for water will more than double to 37.7 million gallons per day (mgd) by 2058. If the City succeeds in reducing its water consumption by 5 percent every six years, savings during the next 50 years would be about 2.1 million gallons per day.

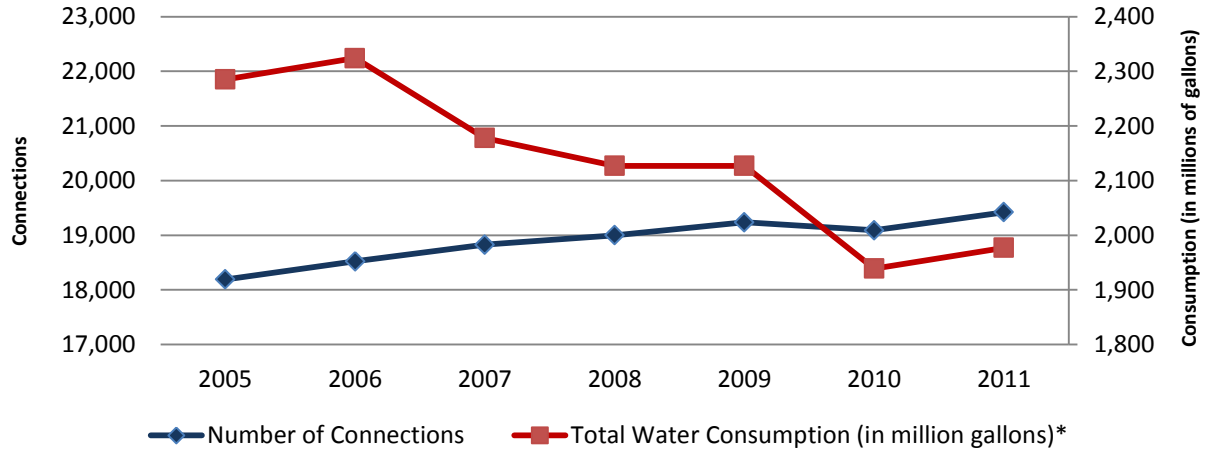
To achieve the plan's short-term goal of cutting water consumption by 5 percent by 2014, Olympia educates citizens about conservation, conducts water-loss accounting, repairs system leaks, and promotes the installation of efficient toilets that exceed code requirements. The City also offers households free water-saving kits and provides rebates for efficient washing machines and other technologies. If such initiatives are the carrot, then progressively hefty water bills are the stick.

> ***"The Utility sees itself as a steward of the water resource and therefore takes a broad view of the entire hydrologic cycle, rather than focusing narrowly on system infrastructure."***
>
> — **City of Olympia, 2009-2014 Water System Plan**

In 1997, Olympia introduced a three-tier rate structure for its single-family residential water customers, and the City added a fourth tier in 2005 to provide a stronger price signal. The "inclining block rate" structure means that the cost of water goes up along with usage (non-residential and multifamily customers are charged a seasonal water rate). Olympia is in the process of automating its system to enable officials to monitor meters remotely and fix leaks faster.

The conservation measures, along with recent summer weather patterns (people use less water during rainy summers), appear to be affecting consumer behavior, officials contend. The City is on pace to surpass its 2009-2014 conservation goal: Water consumption declined by more than 13 percent between the start of 2005 and end of 2011 as water connections increased almost 7 percent (Figure 1). Distribution system leakage in 2011 was 6.1 percent, down from 8.8 percent in 2007.[4] During the 2009-2011 period, the leakage average was 7.2 percent; water consumption declined 7 percent.

Figure 1: Olympia Conservation Versus Connections, 2005-2011



*Includes commercial and residential customers; does not include historical PUD consumption
Source: City of Olympia Public Works Department

[4] Washington State. Department of Health. *Water Use Efficiency Performance Report (Olympia, 2007 & 2011)*. Online. Accessed 1 Dec. 2012.

Olympia's water conservation efforts were highlighted in an article by the HarvestH20.com, an online publication dedicated to sustainable water-management practices.[5] The article noted several "lessons learned" from the efforts:

- Repeat rationale for conservation in as many venues as possible;
- Target different programs to different audiences;
- Partner with others in the community who share your conservation vision.

Lacey

In 2006, fast-growing Lacey adopted a resolution that prohibits new water connections within its urban growth area unless the property owner or developer has sufficient water rights and transfers them to the City. Six years later, Lacey is considering lifting the resolution's restraints as part of changes to the City's draft *Water Comprehensive Plan*. The move comes after the state Department of Ecology in July 2012 issued Lacey water permits for 6.6 million gallons a day to meet anticipated demand from building out its service area to planned densities that are required by the state Growth Management Act.

To help balance growth and consumption going forward, Lacey has the region's broadest array of water-conservation measures. Lacey offers each residential customer an indoor water-saving kit that includes toilet leak-detection tablets, faucet aerators and a high-efficiency showerhead. Residential customers are also eligible for a free high-efficiency toilet and shower timer, as well as a cash rebate for buying a high-efficiency washing machine.

To save water outside, the City offers residential customers a free kit with hose screens, repair ends and an adjustable spray nozzle. Other giveaways to households include a soil moisture sensor and timer that shuts off hose sprinklers. Commercial customers are eligible for a free irrigation audit and rebates for implementing system upgrades recommended in the audit. Commercial customers that have received an audit — most of whom are homeowner associations (HOAs) — are saving about 25 percent more water, on average.

All Lacey water customers must follow an outdoor irrigation schedule to reduce summer peak demand. Addresses ending with an odd number may water yards on Saturdays, Mondays and Wednesdays; addresses ending with an even number may water outdoors on Sundays, Tuesdays and Thursdays. Exceptions include watering plants in pots and greenhouses, as well as washing vehicles.

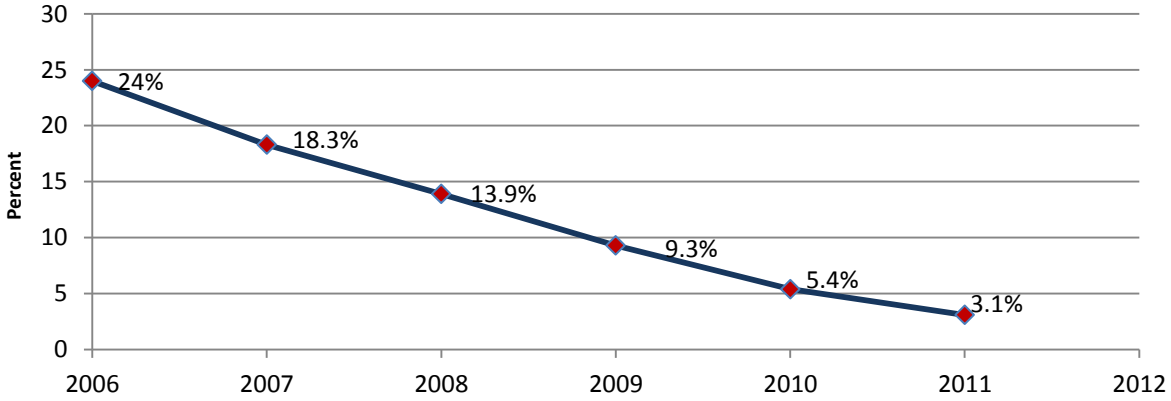
Lacey implemented a four-tier rate structure for water customers in 2007. The City also adopted a 6.5 percent water rate increase annually through 2017 — part of the water plan's strategy to reduce water use by 690,000 gallons a day by 2015. The strategy also includes reducing and maintaining the distribution system leakage to less than 10 percent, as well as reducing annual equivalent residential unit water demand for all accounts by 1 percent each year through 2014, to a value of 199 gallons a day.

Lacey's water use is forecast to grow from 9.2 mgd in 2015 to 11.6 mgd in 2029; peak demand would grow from 20.3 mgd in 2015 to 25.5 mgd in 2029.

[5] Pushard, Doug. "Local Heros: City of Olympia Water Conservation Program Covers All Bases." *HarvestH$_2$0*. May 2005. Online. Accessed 1 Dec. 2012.

Lacey is already achieving the plan's goals. The City has slashed system leakage to about 3 percent by reducing water theft and automating meters, as well as by implementing state-of-the-art leak-detection and line-replacement programs (Figure 2). Officials read automated meters twice a day remotely and are able to detect and fix leaks faster. Officials have also placed roughly 300 locks on hydrants at schools, construction sites and spots hidden from public view; developers are now provided hydrant meters rather than charged a flat rate for water use at dusty construction sites.

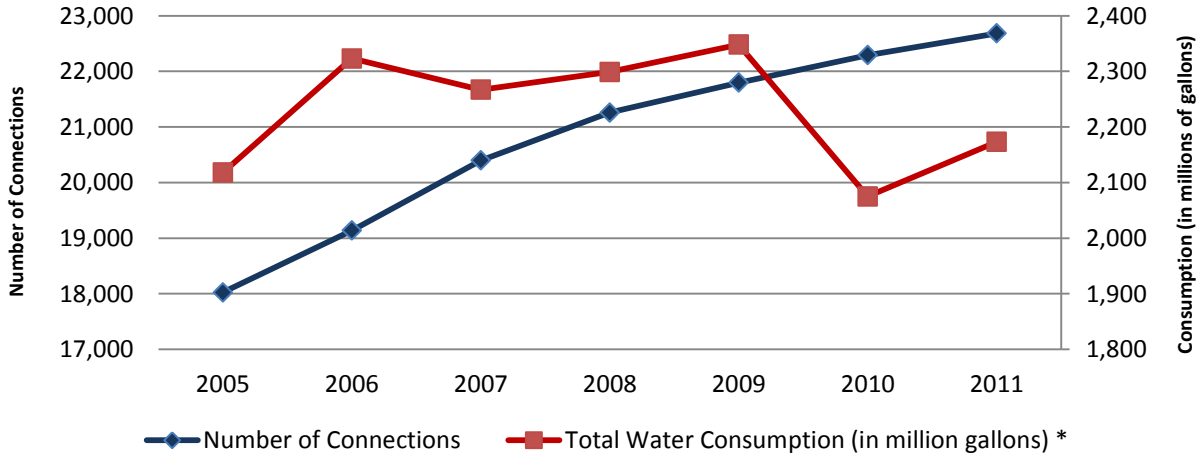
Figure 2: Lacey Distribution System Leakage (Unaccounted for Water), 2006-2011



Source: City of Lacey Public Works Department

In 2011, Lacey water customers consumed an average of 169 gallons a day, per equivalent residential unit (the City's new measuring stick for water consumption); this figure marked a 20 percent decrease from the baseline of 210 gpd.[6] Water consumption rose roughly 3 percent between the start 2005 and end of 2011 as water connections increased 26 percent (Figure 3). Officials attributed the sharp decline between 2009 and 2010 to the implementation of a fourth tier of water rates, a very mild summer, and the purchase of calibration equipment at all of Lacey's 19 source meters; the new equipment indicated that the meters were over-reporting water use historically. Each meter is now calibrated on a regular basis, resulting in more accurate reporting.

Figure 3: Lacey Conservation Versus Connections, 2005-2011



*Includes total meter sales for commercial and residential customers; does not include distribution system leakage.
Source: City of Lacey Public Works Department

[6] Washington State. Department of Health. *Water Use Efficiency Performance Report (Lacey, 2011)*. Online. Accessed 1 Dec. 2012.

Yelm

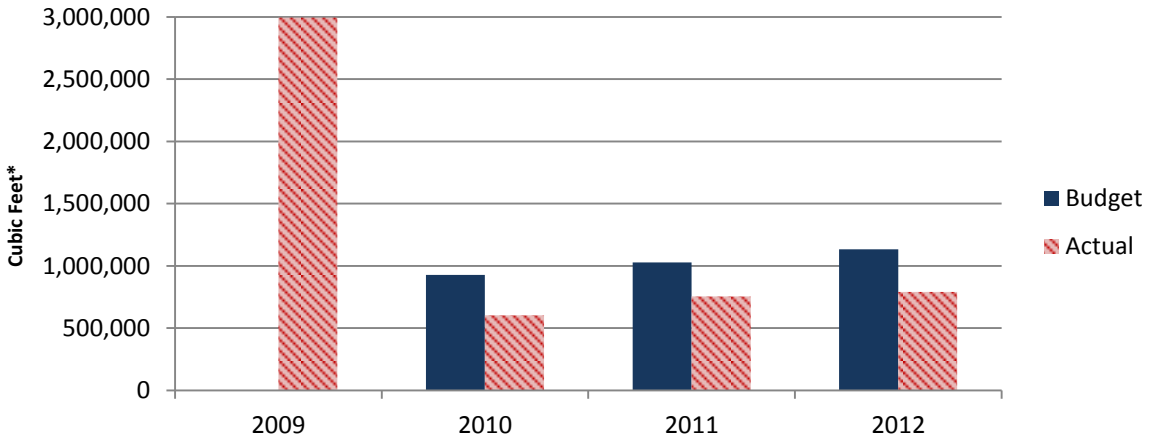
In April 2010, the Yelm City Council adopted a conservation program that established a water budget for businesses and homeowners associations with an irrigation meter. The 2010 irrigation budget was based on either the commercial customers' irrigation volume in 2009 or what the Washington Irrigation Guide (WIG) notes is needed for healthy and productive landscaping in Yelm (11.53 inches of irrigation water per season for trees/shrubs) — whichever was less. The goal was to cut in half the growing city's 2009 irrigation volume — nearly 3 million cubic feet (about 22.4 million gallons).

Here's how the irrigation budget worked for two of Yelm's biggest water consumers: WalMart and the Yelm Terra Homeowners Association, which represents the neighborhood immediately south of downtown. The WalMart Superstore near the intersection of State Routes 507 and 510 has about 52,300 square feet of landscaping and consumed about 204,600 cf of water for irrigation in 2009. Applying the WIG formula, Yelm calculated that the superstore's landscaping requires roughly 50,200 cf (390,000 gallons) of water — about a quarter of the water consumed in 2009 — to be healthy and productive. Thus, the 2010 budget slashed WalMart's consumption by about 154,600 cf (1.2 million gallons). The city saved another 47,000 cf (352,000 gallons) of water by applying the WIG formula to the Yelm Terra HOA.

Yelm has cut its irrigation volume by roughly a third while growing its population by a third since 2009.

Citywide, Yelm's water use for commercial irrigation — about 602,700 cf (4.5 million gallons) — was 35 percent below its 2010 budget of roughly about 926,700 cf (6.9 million gallons).[7] Water use for commercial irrigation was 27 percent below budget in 2011 and 30 percent below budget in 2012 (Figure 4). The commercial landscape figures above do not include storm ponds and planter strips in the public right-of-way.

Figure 4: Yelm Commercial Irrigation Budget and Consumption, 2009-2012



* 1 cubic foot equals 7.5 gallons

Source: City of Yelm Community Development Department

City officials read commercial customers' meters weekly during the irrigation season (mid-April thru mid-October) and provide notice of usage. A customer's irrigation meter is locked when the annual water budget is reached. Planting strips in the public right-of-way are irrigated with reclaimed water. The water budgets have made businesses and HOAs more mindful that every drop counts — especially in Thurston County's fastest-growing city.

[7] Beck, Grant. "Irrigation." Message to author. 4 Dec. 2012. E-mail.

Yelm and its urban growth area are projected to add roughly 18,000 people and 7,200 housing units between 2010 and 2035.[8] In addition to issuing Lacey water permits last summer, the state Department of Ecology approved a permit that allows Yelm to receive rights to an additional 840,000 gallons of water a day. The permit is under appeal to the Washington State Pollution Control Hearings Board, which is anticipated to issue a decision in January 2013. If the permit is upheld, it would provide water sufficient for anticipated growth during the next two decades and avoid the need for a building moratorium.

Like the other communities, Yelm has achieved its goal of reducing residential water consumption — in the latter city's case, to no more than 200 gallons a day. In 2011, the typical single-family home in Yelm used 170 gallons a day, down 3 percent from 2010.[9] Demand-side conservation measures include public education and incentives — including providing tablets that detect toilet leaks.

As Yelm has raised commercial and residential water efficiency, the City's distribution system leakage rate remains stubbornly high. Yelm has set a goal of limiting its leakage rate to 6 percent on a rolling, three-year average. Yelm's average for the 2009-2011 period was 20.9 percent — more than twice the state standard. To identify and halt water losses, Yelm has expanded its leak-detection program, installed hydrant locks, performed annual meter calibration programs, conducted a system audit, and completed a water loss control action plan in accordance with state law.

Conclusion

Olympia, Lacey and Yelm have significantly increased their water use efficiency with a diverse portfolio of water rates, incentives and budgets. Some of the water-saving devices and rebates were made possible by the LOTT Clean Water Alliance, which has invested about $7 million during the past 15 years to promote conservation in the communities of Lacey, Olympia, Tumwater and Thurston County.[10] LOTT's investment has reduced pressure on water supplies and postponed the need to build additional sewer capacity. Lacey and Olympia's tiered rate structures send powerful price signals to households and spur less consumption. Yelm's irrigation budget enforces efficient water use and enables new development within the urban growth area. Such sustainability strategies are a critical and replicable form of climate change adaptation — which The World Bank defines as "a process by which measures and behaviors to prevent, moderate, cope with and take advantage of the consequences of climate events are planned, enhanced, developed and implemented."[11] Indeed, a recent state Department of Ecology report on climate change recommends that local governments improve water management by promoting integrated conservation and efficiency approaches that consider future water supply and address competing water demands.[12]

Water use efficiency is an important hedge against climate change.

[8] Thurston Regional Planning Council. *Population Forecast Allocations for Thurston County (draft)*. September 2012.
[9] Washington State. Department of Health. *Water Use Efficiency Performance Report (Lacey, 2011)*. Online. Accessed 1 Dec. 2012.
[10] Dodge, John. "LOTT water conservation reduces pressure on Olympia drinking-water supplies." *The Olympian*. 7 August 2012. Online. Accessed 4 Dec. 2012.
[11] The World Bank. *Climate Change: Adaptation Guidance Notes — Key Words and Definitions*. Online. Accessed 4 Dec. 2012.
[12] Washington State. Department of Ecology. *Preparing for a Changing Climate: Washington State's Integrated Climate Response Strategy*. April 2012. Online. Accessed 17 December 2012.