

Snohomish County Facilities Water Conservation Benchmark Report 2010-2013



Office of Energy & Sustainability
January 15, 2015

Executive Summary

Background on Water Conservation Benchmarking in County Buildings

Snohomish County owns and operates approximately 140 buildings, the majority of which consume water to meet a variety of needs, such as heating systems, showers, hand washing, toilet flushing, cleaning, irrigation, cooking, and more. One of the core functions of the Office of Energy and Sustainability (OES) is tracking, monitoring, and analyzing building utility data regularly, yet the central tracking system for utility data (particularly water) is relatively new. As a result, access to robust historic building water data is currently limited to 23 primary County facilities. OES continues to add historic and current building utility data to the central tracking system, and by mid-2015 expects to have historic water data for an additional 60 County facilities. As such, this water benchmark report lays the groundwork for comprehensive water tracking, monitoring, and benchmarking of County facilities.

Tracking, monitoring, and benchmarking utility data for County-owned buildings is important for several reasons, namely:

- Demonstrating progress in meeting County water conservation goals;
- Identifying potential opportunity for conservation in buildings with a higher than average rate of consumption;
- Reducing water consumption and costs through operational, maintenance, and other low or no cost adjustments;
- Highlighting future funding needs for cost-effective building investments to help reduce water consumption and water costs.

The following facilities were evaluated:

Courts	Cascade Courthouse County Courthouse (Everett) Evergreen Courthouse South District Court
Parks	Willis Tucker Paine Field Baseball Park McCollum Park Martha Lake Park
Fleet	Arlington Fleet Cathcart Fleet Cathcart Wash Building McDougall Fleet
Jails	New Jail Old Jail Denney Juvenile Justice Center
Offices	Admin West/Admin East/Courthouse Mission Public Works Administrative Office (Cathcart)
Other	Sheriff Gun Range Fair Maintenance Annex Carnegie Building

Summary of Water Consumption in County Buildings



The Facilities assessed fell short of Water Conservation Benchmark goals for 2013 by 8%



Annual water spending is up 12% or \$42,000 since 2010 in the Facilities assessed



9 of the 23 facilities assessed met or exceed their Water Conservation Benchmark goals



Water consumption is down 3.3% or 1.3 million gallons overall in the facilities assessed, since 2010.

Snohomish County Water Conservation Goals

This Water Conservation Benchmark Report analyzes water consumption trends across 23¹ facilities within the Snohomish County property portfolio. The purpose of the report is to determine how County facilities are performing with respect to the water conservation goal in the County's Sustainable Operations Action Plan.

The County's Sustainable Operations Action Plan (SOAP) was unanimously adopted by County Council on September 3, 2013 and Executive Lovick passed Executive Order 13-48A asking all departments and offices for their full assistance to carry-out the Plan goals. SOAP Objective 3M identifies **a goal of reducing potable water use in County facilities by 1.25% per year by 2017**. This report uses a 2010-2012 average as a baseline to determine if 2013 water consumption was reduced by 1.25% from those levels.

Water Consumption Trends

- Nine (9) of the 23 sites assessed met the County's 2013 water conservation benchmark goals.
- Overall, the facilities studied fell short of the water benchmark goal by 8.7%, or 3.1 million gallons.
- While the facilities studied did not meet the cumulative water conservation benchmark goal in 2013, Snohomish County reduced water consumption by over 1 million gallons, or about 3%, from 2010 levels by the end of 2013 in these facilities.
- As water consumption decreased, spending on water went up:
 - The cost of water went up by more than \$35,000 across these facilities in 2013 compared to 2010 as a result of rate changes.
 - The cost of wastewater/sewer related to disposal of water went up by \$5,000 over the same period; also as a result of rate changes.

Economic Conservation Opportunities

Water is a significant cost center for County operations, with total spending (water and wastewater) for the 23 buildings in this report totaling more than \$360,000 in 2013.

- With the average annual price escalation for water observed in this report (~4.3%), total spending for these facilities could be expected to be \$431,000 in 2017 for the same volume of water consumed in 2013.
- If Water Benchmark targets were achieved (a 1.25% reduction in water use until 2017) beginning in 2014, projected total spending would drop to \$410,000 in 2017, and over \$51,000 would be saved across the four year water conservation time-period from 2014 to the end of 2017.

Report Contents and Organization

The main body of this report is organized into the following three sections:

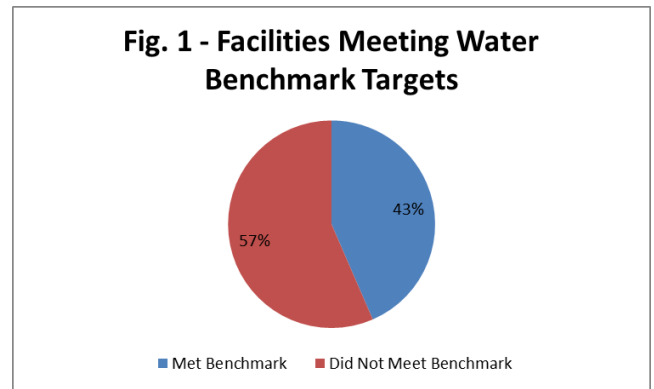
1. **The Big Picture:** Provides an overview of the trends in water consumption data for all of the 23 facilities analyzed between 2010-2013, and demonstrates the County's progress in meeting SOAP water conservation goals.
2. **Consumption by Building Cluster:** Groups similar building use types together and compares these facilities against each other as well as the County's water conservation benchmark goals.
3. **Summary of Findings and Next Steps:** Identifies specific buildings that need further investigation based on data analysis findings, and outlines common sense next steps for future water conservation and data tracking.

¹ Note: The SOAP identifies 30 County facilities for tracking and benchmarking energy, water, and waste consumption against a 2007-2009 average baseline. For a significant portion of those 30 County facilities, 2007-2009 consumption data is not available and therefore 2010-2012 is used as the baseline years. Similarly, the County looked at 23 facilities instead of 30 because seven of the buildings selected do not currently have complete water consumption data available. Water data is not weather-normalized as the majority of water consumption in buildings studied was indoor and unaffected by weather.

1. The Big Picture

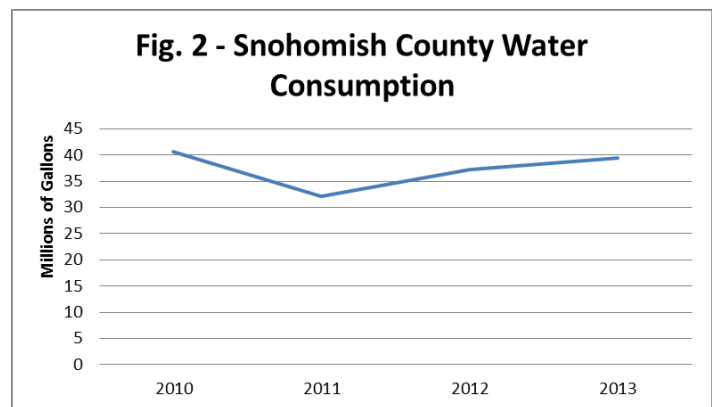
Total Consumption

In 2013, total water consumed by the 23 facilities analyzed in this report totaled 39 million gallons or the equivalent of about 65 Olympic sized swimming pools. While total water consumed in 2013 was about 1 million gallons less than in 2010 – the equivalent of two Olympic-sized swimming pools - the County is not yet meeting its total water reduction goal. Snohomish County has an annual water reduction goal of 1.25% based on a 2010-2012 average baseline. Of the 23 facilities assessed in this report, 9 (or 43%) are meeting 2013 water conservation benchmarks, and 13 (or 57%) have not reduced their water consumption below baseline levels (Fig. 1).



Total Costs and Consumption

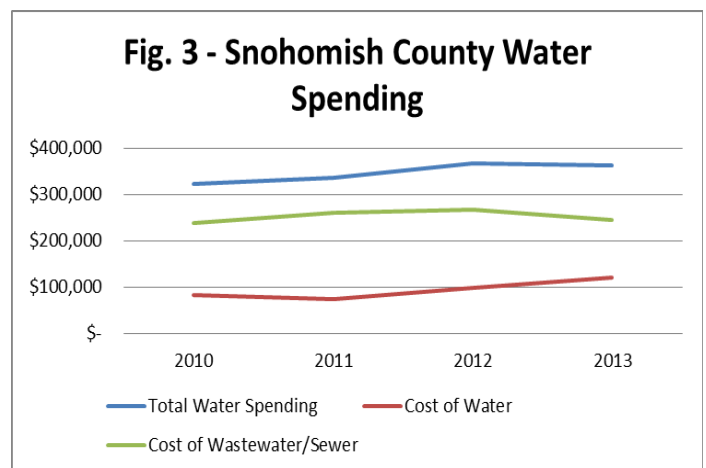
The 23 facilities in this report have consumed about 40 million gallons of water (Fig. 2) at an annual cost of over \$300,000. While total water consumption has decreased by approximately 4% since 2010, water costs continue to increase due to utility escalation rates. In 2010, water consumption for these facilities totaled \$322,454 dollars, compared with \$364,184 dollars in 2013 – an increase of 13 percent (Fig. 3).



The table below provides a detailed look at the distribution of water consumption spending described in the balance of this report. As evidenced in the Table 1, Jail water spending is a significant factor in the water spending of the portfolio of facilities assessed in this report.

Table 1. – Water Costs and Cost per Square Foot

Facility	2013 Cost	2013 Cost per sq Ft
CathcartWash Building	\$ 5,502.60	\$ 1.12
Evergreen Court	\$ 6,282.06	\$ 1.01
Cascade Courthouse	\$ 3,900.07	\$ 0.63
New Jail	\$ 155,968.42	\$ 0.61
Old Jail	\$ 64,766.18	\$ 0.56
South District Court	\$ 4,481.14	\$ 0.30
Carnegie Bldg	\$ 2,358.88	\$ 0.27
County Courthouse	\$ 25,853.37	\$ 0.22
Cathcart Heated Shop	\$ 6,756.24	\$ 0.21
Denney Juvenile Justice Center	\$ 18,701.33	\$ 0.15
Public Works Admin	\$ 3,646.05	\$ 0.13
Arlington Fleet	\$ 2,027.29	\$ 0.12
McDougall Fleet	\$ 2,096.43	\$ 0.10
SCSO - Gun Range	\$ 1,008.45	\$ 0.09
Mission	\$ 2,987.90	\$ 0.06
Fair - New Maintenance Annex	\$ 382.31	\$ 0.05
County Campus Offices	\$ 11,075.38	\$ 0.04
Cathcart Fleet Bldg	\$ 2,155.72	\$ 0.04
Willis Tucker Park	\$ 19,980.74	N/A
Paine Field Baseball Park	\$ 4,140.00	N/A
McCullum Park	\$ 14,291.00	N/A
Martha Lake Park	\$ 5,822.66	N/A



2. Water Consumption by Building Cluster

Water consumption was analyzed by grouping buildings into clusters based on primary building function. These clusters are: Corrections, Parks, Offices, Courts, and Fleet. As you can see by Figures 4 and 5 below, the correctional facilities consume the largest amount of water when compared with other building types. In fact, the County’s correctional facilities consume more than double all other clusters combined. While water consumption at Correctional facilities has fallen since 2010, most other clusters have had relatively flat consumption. More detail on water consumption data for each of these building clusters is provided in the subsections that follow.

Figure 4 below shows the relative size of each cluster in terms of water consumption.

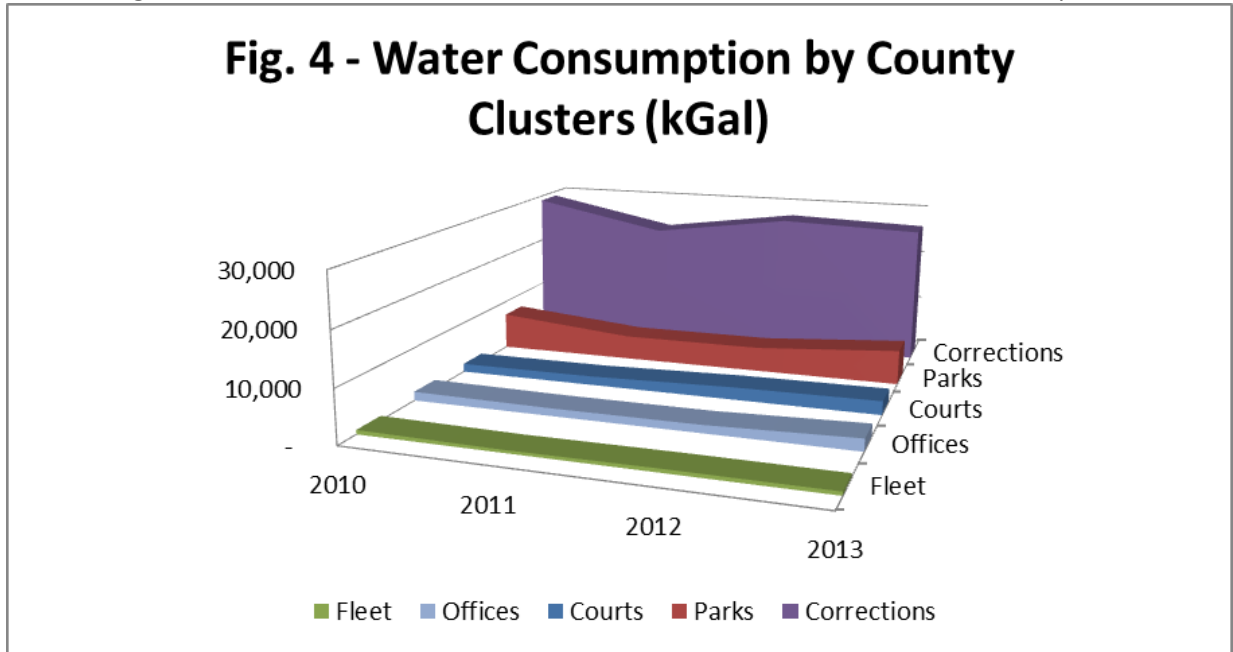
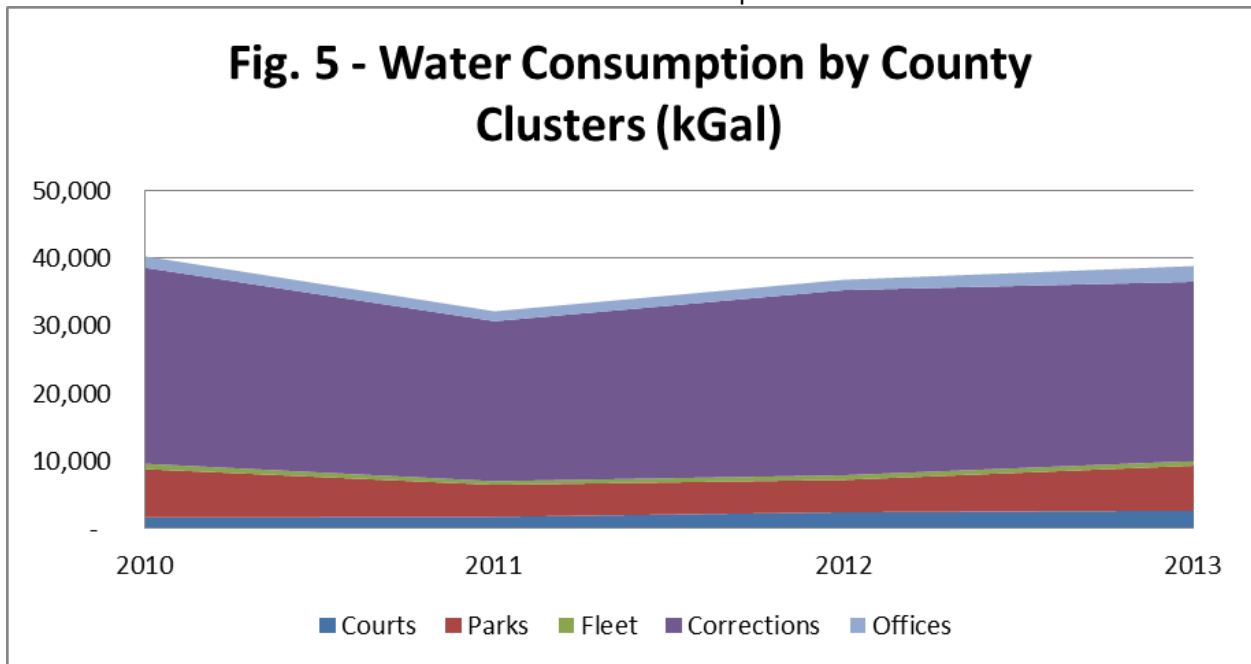


Figure 5 below shows how each cluster contributes to aggregate water consumption, and trends in total consumption over the 2010-2013 time period.



Corrections

Three County correctional facilities were analyzed for this report, including the New Jail, Old Jail, and Denney Juvenile Justice Center. These three facilities consumed 26 million gallons of water in 2013, representing 68% of water consumption for all 23 facilities studied in this report. Two of the three facilities met County 2013 water benchmark goals (the New and the Old Jail), and in aggregate Corrections met the overall goal of 1.25% annual reduction. The new and old jail facilities collectively reduced water consumption by over three million gallons in 2013 from 2010 levels.

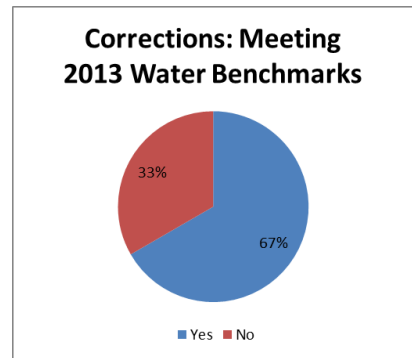


Figure 6 shows the individual benchmarks for each facility, and the combined performance. Denney Juvenile Justice Center is the only correctional facility not meeting water conservation benchmarks, and its water consumption has increased in each of the four years studied.

Consumption has dropped from a peak of over 29 million gallons of water in 2010, to just over 26 million gallons of water in 2013. The reductions are attributed largely to water conservation retrofits at the adult facilities (New and Old Jail) completed in 2013, although water consumption in jails is also strongly influenced by average daily jail visitors.

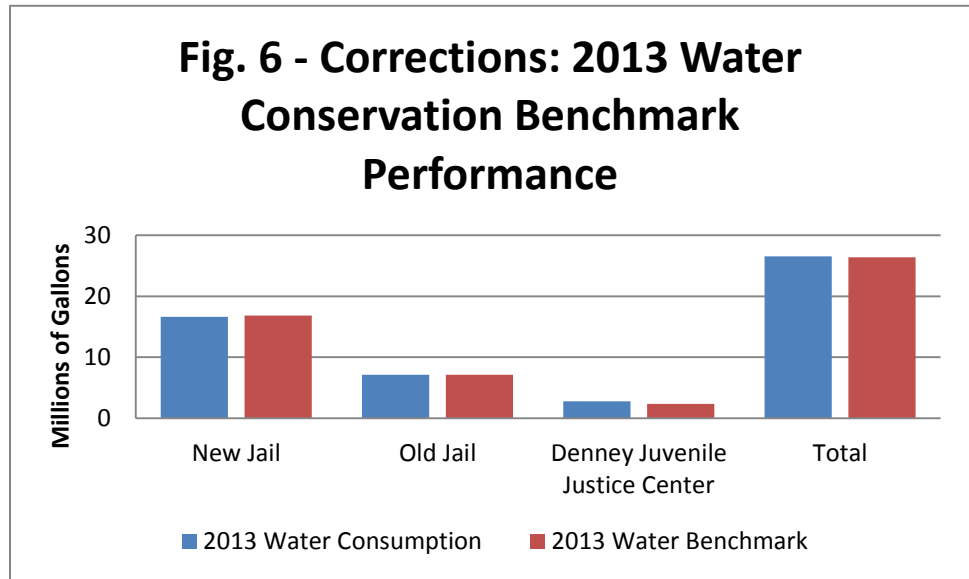
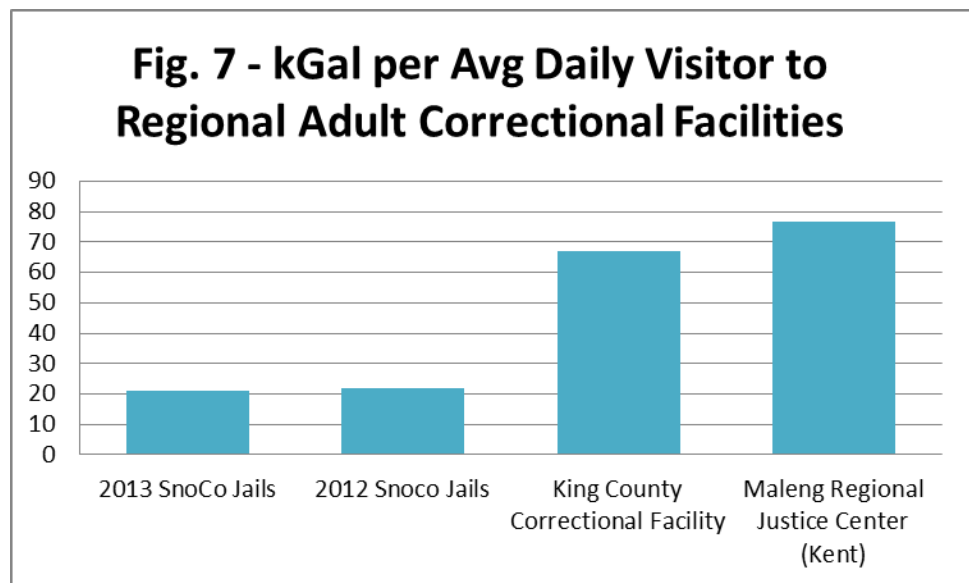


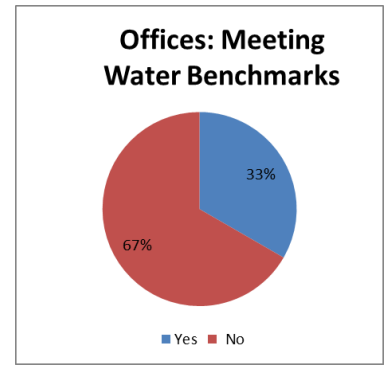
Figure 7 compares water consumption in the County jails with two regional peers, King County’s Maleng Regional Justice Center in Kent, and the King County Correctional Facility in Seattle. In order to normalize for differences in inmate population, the data presented is based on average daily visitors specific to each facility. Snohomish County jails are using about 1/3 as much water per visitor when compared King County peer facilities, which may be a result of water efficiency retrofits made to County toilets and laundry facilities during this time period.



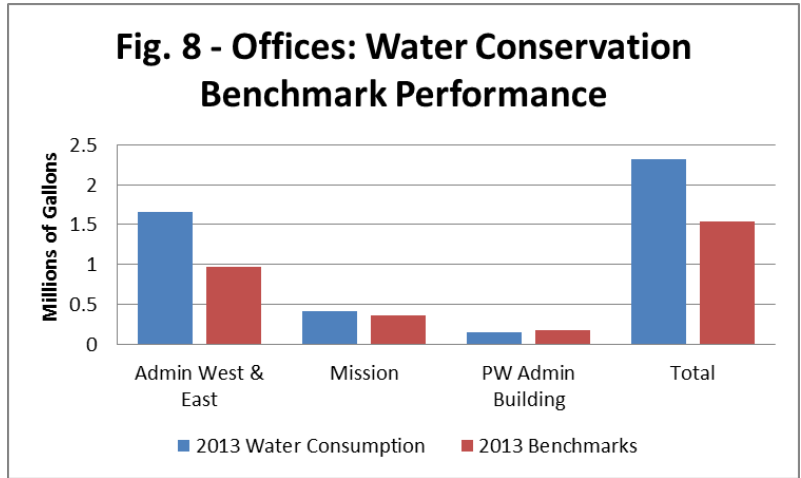
to

Offices

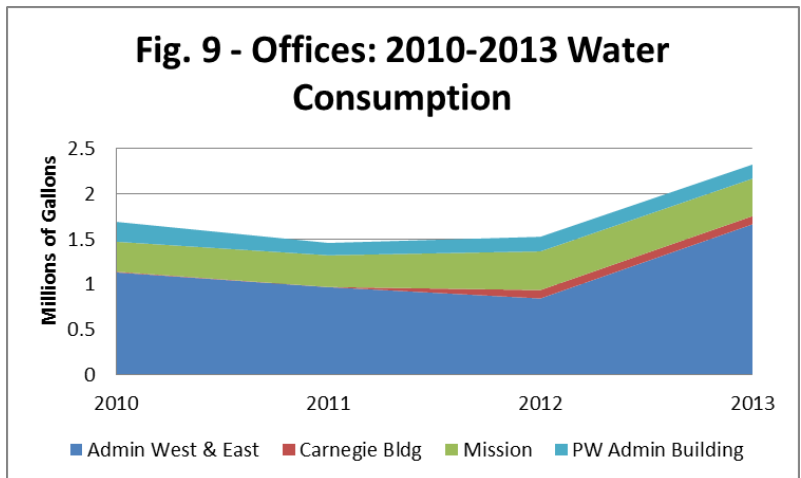
Five office buildings were analyzed in this report, including: Administration West, Administration East, Carnegie, Mission, and Public Works' Cathcart Administration. However, it is important to note that the Robert J. Drewel building, as well as the County campus café are all on a shared water meter with the Administration West building. As such, the consumption for these facilities was analyzed and is shown as a single heading as Admin East and West. The Carnegie building has been unoccupied for a number of years, and as a result has negligible water consumption. Therefore, the Carnegie building consumption data is not shown in most of the charts for this cluster.



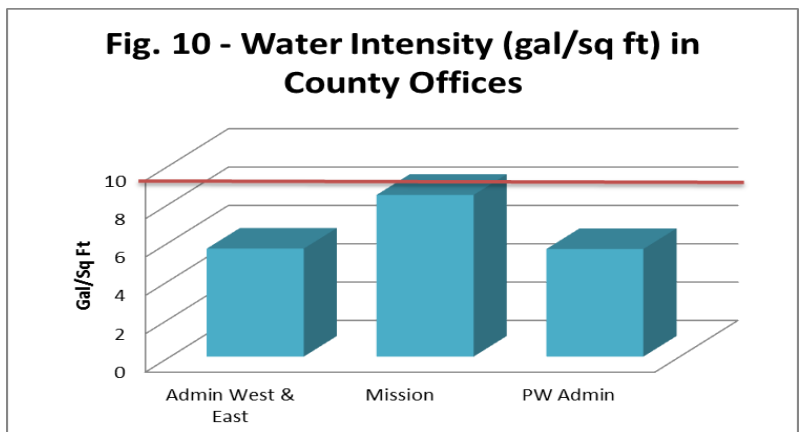
These office buildings consumed 2.3 million gallons of water in 2013, representing about 6% of total water consumption studied in this report. Two of the three primary offices studied (Admin East & West and the Mission Building) did not meet the County's 2013 water conservation benchmarks, nor did the group meet them as a whole. However, Public Works' Cathcart Administration building did meet 2013 County water benchmark standards and reduced water consumption by 30% from its 2010 peak. **Figure 8** shows 2013 water consumption in Offices compared with the 2013 benchmarks for water conservation. As a group, these County Office buildings consumed more than 750,000 gallons over the benchmark goal.



Prior to 2013, water consumption was generally below benchmark levels, and this rise in consumption was driven largely by increased consumption from the cluster of buildings that share the Administration West building's water meter (**Figure 9**). Further exploration of this increase is necessary to determine how this cluster might get back on track towards meeting benchmark standards.

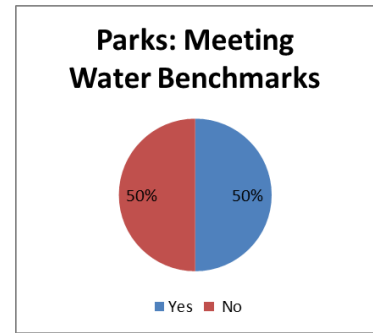


In comparison to office buildings around the Country, the County's office buildings are better than average. The national median water intensity in office buildings is 10 gallons per square foot, and the County's highest water consuming buildings are similar to, or outperform, the national median for water consumption (**Figure 10**). This is an indication that while water consumption in County office buildings is not necessarily decreasing, current levels are within a normal range for the building use.



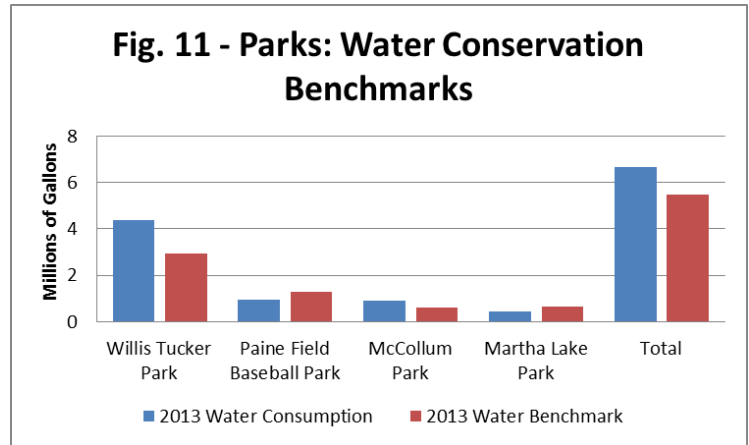
Parks

Four County Parks were analyzed for this report, including Willis Tucker Park, Paine Field Baseball Park, McCollum Park, and Martha Lake Park. Collectively, these four Parks represent 17% of the water consumption studied in this report. The four facilities studied represent roughly 7% of the Parks portfolio of 59 park facilities. Additional Park facilities will be included in future benchmarking reports once OES has collected water data from the various water providers servicing Parks facilities.

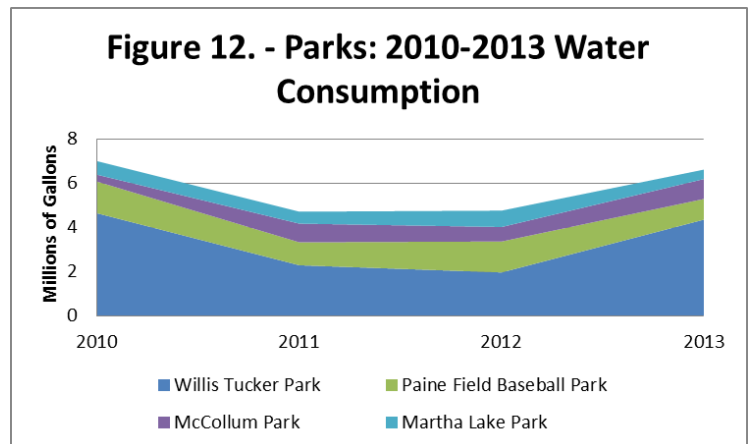


Paine Field Baseball Park and Martha Lake Park were the only two facilities that met the County’s water benchmarks goal of a 1.25% annual reduction from 2010 consumption levels (Figure 11). While the four Parks facilities overall did not meet Benchmark targets, three of the four facilities reduced water consumption from 2010 levels, with McCollum Park being the exception.

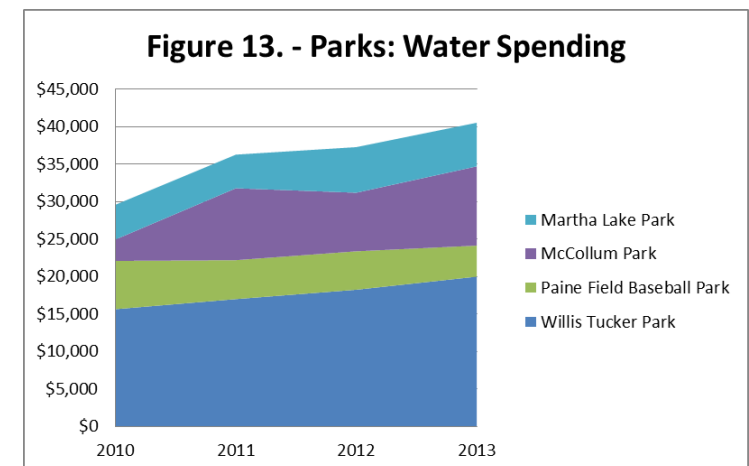
Water consumption at the Parks studied decreased by 7% from 2010 to 2013 (Figure 12). Willis Tucker had a period of decreased water use in 2011-2012 believed to be related to irrigation that returned below 2010 levels in 2013. Paine Field Baseball Park is also of note, having reduced its water consumption by 53% from 2010 to 2013.



Parks water spending in the facilities studied has increased by 32% in the four year period, a function of water rate and wastewater rate increases that is also apparent in other building clusters, although much of Parks water consumption occurs on differently structured irrigation rate schedules (Figure 13). The increase in water costs occurred despite a 7% reduction in water consumption. The estimated value of the 7% water conservation savings in 2013 is \$2,863.

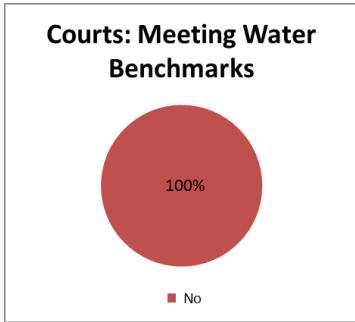


Parks have unique water requirements to keep their grounds looking their best. For example, 1” of irrigation applied to a grass field the size of an acre, would require 27,000 gallons of water. A general rule of thumb is that grass ball fields perform well with 1.5” of irrigation per week. In wet months, much of this needed water is supplied naturally, but once average rainfall received in our region of Western Washington is subtracted, an annual requirement of 26 inches of irrigation per acre, or 704,000 gallons per acre remains. Paine Field Park is roughly 14 acres, roughly 10 of which is grass field, and as such, more than 7 million gallons would be required to provide 1.5” of weekly irrigation. Parks however, uses about 1 million gallons per year on the field – roughly 85% less than the rule of thumb. This is demonstrative of broader trends of Parks using less water to deliver a high quality Park amenity to the public.

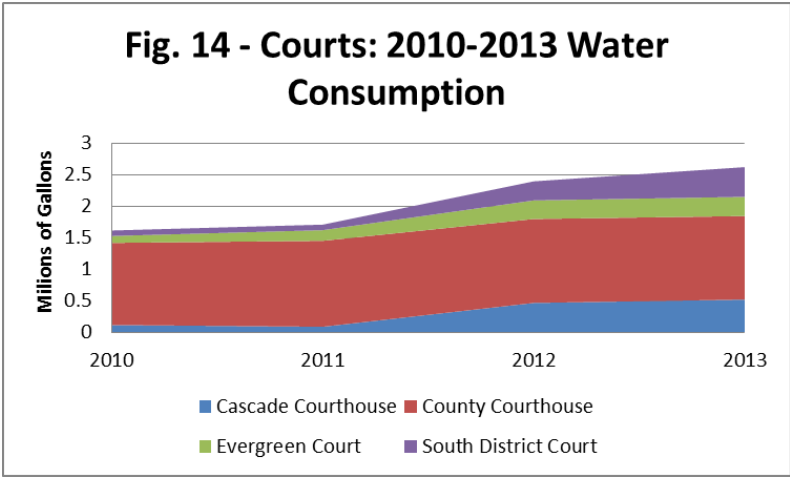


Courts

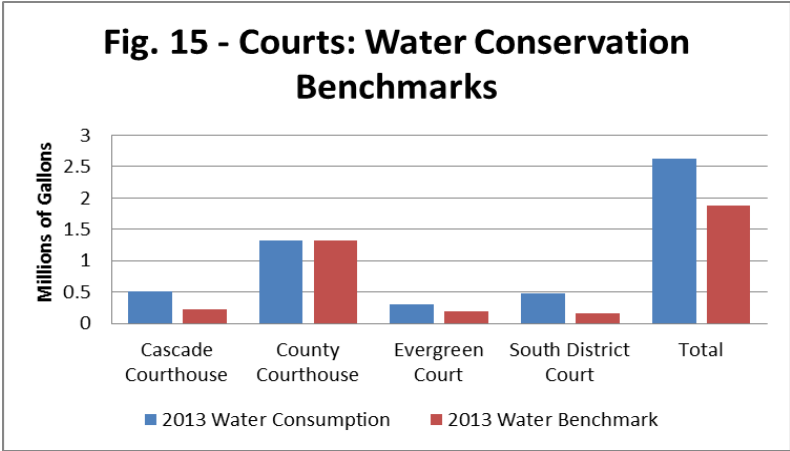
Four County Courts were analyzed for this report, including the County’s largest Courthouse at the Everett Campus, as well as three satellite Courts – Cascade, Evergreen, and South District Court. As a group, these four Court facilities represent 7% of the water consumed across the 23 facilities studied. None of the Court facilities met the County’s 2013 water benchmark goal, nor is the group as a whole meeting the water benchmark reductions. The Court facilities also represent one of the few areas where facility consumption is significantly higher than the national or regional norms for this building type.



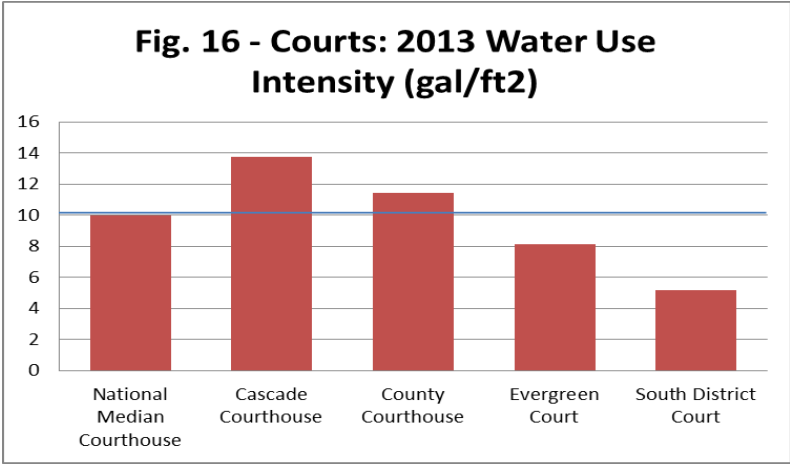
Water consumption in these four Courthouse facilities has increased significantly over the past three years, which means that none of these facilities are in a position to meet County water benchmark goals (Figure 14). In fact, total 2013 water consumption in these four Courts was almost 800,000 gallons over the 2013 water conservation benchmark (Figure 15). This significant increase in water consumption at County courthouses warrants further investigation.



Between 2010 and 2013, water consumption increased by 63% (Figure 14). This increase was primarily driven by a significant rise in consumption at the three district Courts: Cascade Courthouse (353%), South District Court (441%), and Evergreen Court (176%). Water Consumption at the County Courthouse facility in Everett did not significantly change.



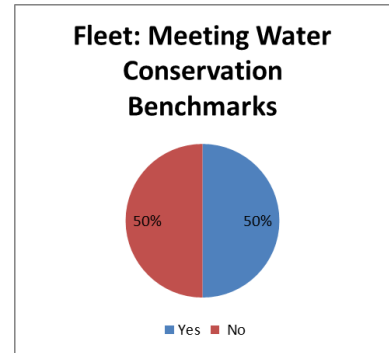
While water consumption is rising in Snohomish County courthouses, consumption is still in line with median consumption of other courthouses across the country (Figure 16). The national median for courthouse water consumption is 10 gallons per square foot, and Cascade and the County Courthouse are moderately underperforming this standard. This may be partially attributable to changes in visitor counts, but may also point to an opportunity for further water conservation efforts here.



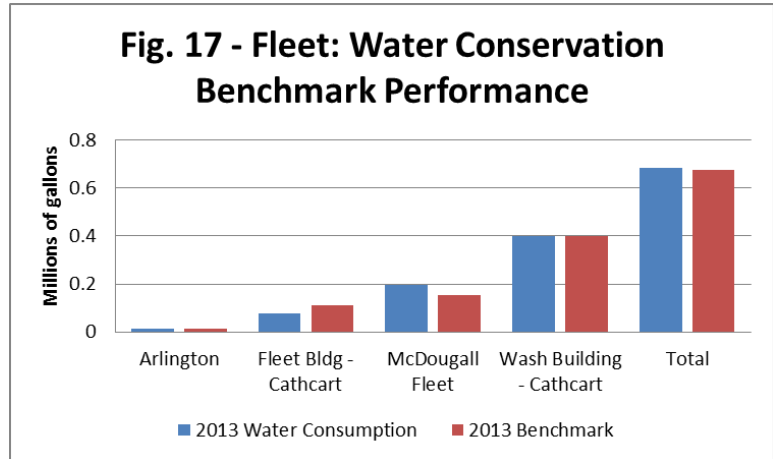
Water spending for all courts was about \$40,000 in 2013, led by the County Courthouse (\$26,000), with the three District Courts each costing around \$5,000.

Fleet Cluster

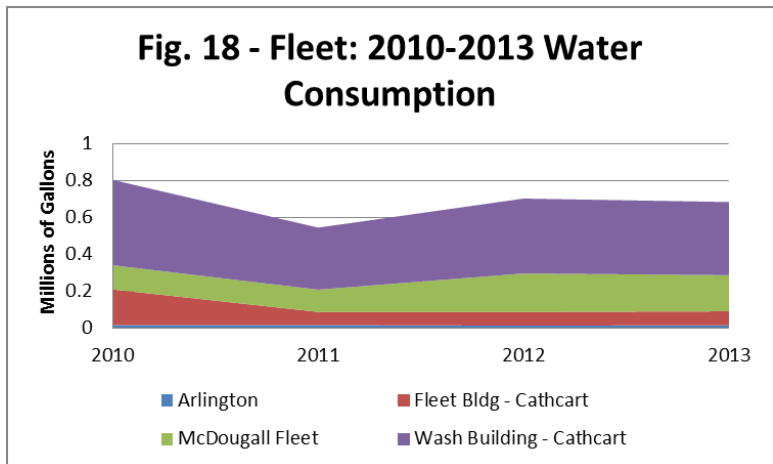
Four County fleet buildings were analyzed for this report, including the Arlington facility, McDougall facility in Everett, Cathcart facility in Snohomish, and the vehicle Wash Building at Cathcart. It is important to know that the vehicle wash building is just that – a facility for washing a variety of County vehicles, whereas the other three fleet facilities are primarily maintenance shops for vehicle repair, yet all three have basic amenities for vehicle washing. The Fleet cluster represents the smallest portion of the consumption studied at 2%. Two of the four Fleet facilities are meeting water conservation benchmarks, and the group is meeting benchmark goals as a whole. Water consumption within the cluster has decreased by 15% since 2010.



As a group, the four Fleet buildings have only slightly exceeded the County’s water conservation benchmark goals (**Figure 17**). The Cathcart Fleet Building led all Fleet buildings in conservation, reducing consumption by 60% over 2010 levels in 2013 (**Figure 18**). The Wash Building at Cathcart is down 40% from 2010 levels. The McDougall Fleet building is the only fleet building with water consumption increases over the time period, with an increase of about 40%.



Fleet buildings are unique in that their water consumption is driven largely by trends in Fleet usage. The more vehicles and equipment are used, and associated preventative maintenance work is performed, the more Fleet buildings consume water to wash them during service. For this reason, unexpected interventions could have an effect on Fleet building water use, such as increased carpooling within the vehicle fleet (would decrease water use), increased phone and video conferencing in lieu of in-person meetings (would decrease water use).



Water spending within Fleet Buildings was \$11,000 in 2013, led by the Cathcart Wash Building (\$6,000), with each of the other facilities spending about \$2,000 per year. There was a major water meter failure at the Cathcart Wash Building in 2012 which resulted in erroneously high meter readings and water bills that were several thousand dollars over what should have occurred. Those bills were resolved and the meters were corrected (the data presented is based on corrected meter readings). For this reason, it may be advantageous to request meter calibration at McDougall Fleet and Arlington Fleet, where total consumption (McDougall) and total water costs (Arlington) are above what might be expected from facilities with secondary vehicle and equipment washing roles.

3. Summary of Findings and Next Steps

Findings

This Water Benchmarking Report reveals three primary findings of 23 facilities studied:

1. In the last three years, overall water consumption has decreased and is generally trending downward;
2. Water spending has increased dramatically, a result of increasing utility rates; and
3. About half of 23 facilities achieved the County's annual 1.25% water reduction goal since 2010.

Recommendations

Based on the findings of this report, the following next steps are recommended to more effectively meet County water conservation goals:

1. **Further investigate data anomalies for specific buildings.** The Office of Energy and Sustainability will work with facilities staff across various departments to investigate the significant data anomalies highlighted in this report, including:
 - a. Charge per CCF of water at Arlington Fleet
 - b. Cascade Court water use (50% above national median for courts)
 - c. McDougall Fleet water use (up 40% from 2010)
 - d. Willis Tucker water billing (high year-to-year variability in metered consumption and billing)
 - e. Admin East and West water use (only office with significant water use increases)
2. **Expand number of facilities monitored.** Currently the Office of Energy and Sustainability monitors the energy use in 73 County facilities in Energy Star's Portfolio Manager; a free online utility management tool. Energy Star Portfolio Manager also has the capacity to track water consumption in these same facilities, however OES is only able to benchmark 23 of these facilities due to data availability. OES continues to collect historic and current water utility data for the remaining facilities into Energy Star Portfolio Manager. OES has prioritized the following facilities for tracking in Portfolio Manager:
 - a. **Parks Facilities.** Starting with the most visited sites to include at least:
 - i. Kayak Point Park
 - ii. Wenberg Park
 - iii. River Meadows Park
 - iv. Flowing Lake Park
 - v. Lake Stevens Community County Park
 - b. **Airport Facilities**
 - i. Admin Building
 - ii. Fire Station
 - iii. Maintenance Shop
3. **Create a County-wide sustainable system for tracking water consumption.** There is currently not a centralized method for tracking water billing data across county departments. The Office of Energy and Sustainability plans to work with County departments that manage facilities to establish an easy and efficient system for tracking water consumption and costs at County facilities.
4. **Finalize and publish an internal resource conservation plan for County facilities.**