

Water Conservation Analysis

Question: Does water conservation give us more water, or, stated differently, is conservation a source of water (or supply option)?

Answer: Yes! The following organizations and agencies agree that water conservation is a supply option:

- The State of California (California Water Plan Update 2005): “Water conservation has become a viable long-term **supply option** because it saves considerable capital and operating costs for utilities and consumers, avoids environmental degradation, and creates multiple benefits.”
- The State of California – Health and Human Services Agency: during discussion with City of Willits, November 2007
- The Local Government Commission (book: The Ahwahnee Water Principles – A Blueprint for Regional Sustainability): “Conservation, reclamation, the reuse of graywater and recycled water, and the treatment of contaminated groundwater supplies are all potentially viable **“supply” options** available to local communities. Developing these strategies can provide local and reliable sources of water that communities will need to meet California’s “show me the water” laws.”
- The Pacific Institute (publication: Waste Not, Want Not: The Potential for Urban Water Conservation in California (2003): “The largest, least expensive, and most environmentally sound **source of water** to meet California’s future needs is the water currently being wasted in every sector of our economy.”
- California Urban Water Conservation Council (strategic plan 2006-2010): “The dominant purposes for water conservation programs are to deliver cost-effective **water supply** and to reduce overall demand.”

Question: How much water will conservation give us?

Answer:

If water conservation is adopted as a water supply strategy and given priority and funding, significant amounts of water can be supplied. Based on information supplied by the Pacific Institute, the Local Government Commission and the California Urban Water Conservation Council, we estimate that the annual Willits metered water use can be reduced by 48% or 418 acre feet per year (AFY) to 463 AFY (metered water use was 881 AF in 2006) with existing technology and without any changes in lifestyle. We also estimate that unaccounted water losses can be reduced by 162 AFY to a 10% level promoted by the California Urban Water Conservation Council. The table below shows the details:

Categories of Water Use	metered usage in 2006 in units	metered usage in 2006 in AF	savings % - high estimate	savings % - low estimate	savings in AF high	savings in AF low
Outdoor Single-Family Residential	63,033	144.70	(1) 75%	40%	108.53	57.88
Indoor Multi-Family Residential	30,677	70.43	(2) 39%	39%	27.47	27.47
Outdoor Multi-Family Residential	12,343	28.33	(1) 75%	40%	21.25	11.33
Commercial/Institutional/Industrial	148,514	340.94	(2) 39%	39%	132.97	132.97
Indoor Single-Family Residential	129,043	296.24	43%	38%	128.11	111.84
			(4)	(4)	(4)	(4)
Total	383,610	880.65	47.5%	38.8%	418.32	341.49
Unaccounted for water (UAF) per West Yost report		213.00	(3) @10% UAF	@ 15% UAF	161.63	117.85

Sources:

- (1) California Urban Water Conservation Council. 2005. “Water Smart Landscapes for California: AB 2717 Landscaping Task Force Findings, Recommendations, and Actions.”
- (2) Pacific Institute. 2003. “Waste Not, Want Not: The Potential for Urban Water Conservation in California”

- (3) California Urban Water Conservation Council “Memorandum of Understanding Regarding Urban Water Conservation in California”
- (4) See table below

Question: How much does water conservation cost?

Answer:

The Pacific Institute states in their publication: Waste Not, Want Not: The Potential for Urban Water Conservation in California (2003) that in California, it is much cheaper to conserve water and encourage efficiency than to build new water supplies or even, in some cases, expand existing ones. More than half of the urban water conservation strategies can be achieved at \$200 per AF or less (\$0.46 per unit of water assuming a natural replacement of appliances at the end of their useful lives). More than 2 million AF in California (at least 85% of their conservatively estimated urban water savings of 33%) can be saved at costs below what it would cost to tap into new sources of supply.

Our calculations estimate that an investment of \$419,109 can save 112 AF each year for indoor water usage in single-family residential households by replacing all inefficient toilets and showerheads, installing aerators in faucets, and fixing leaks at the consumer level today. Based on the expected life of these devices (10-25 years), this cost is only \$0.50 per unit of water saved! This very favorably compares to \$2.30 per each incremental unit of water currently charged by the City of Willits. In this analysis, we used specific information given in the Pacific Institute publication on water savings for replacement of toilets, showerheads, washing machines, installation of aerators in faucets, and fixing leaks at the consumer level as well as specific prices for such water-savings devices obtained from internet retailers. The table below shows specifics:

Indoor Single-Family Residential Appliance Replacement

	# units replaced	unit cost	total cost to replace	life years	cost/yr	annual savings in units/water	annual savings in AF	cost/unit water saved
toilets	2,945	\$ 100.00	\$ 294,500	25	\$ 11,780	22,129.27	50.80	\$ 0.53
shower heads	2,650	\$ 20.00	\$ 53,000	10	\$ 5,300	10,627.60	24.40	\$ 0.50
faucets	5,890	\$ 2.50	\$ 14,725	10	\$ 1,473	3,574.70	8.21	\$ 0.41
washing machines	1,472	\$ 480.00	\$ 706,560	12	\$ 58,880	7,084.00	16.26	\$ 8.31
leakage	1,636	\$ 34.77	\$ 56,884	10	\$ 5,688	12,387.25	28.44	\$ 0.46
Total			\$ 1,125,669		\$ 83,121	55,802.82	128.11	\$ 1.49
Total without washing machines			\$ 419,109		\$ 24,241	48,718.82	111.84	\$ 0.50

A lot of information is available as to indoor water usage for single-family homes. In addition to information from the Pacific Institute report, the data used in the table above on the number of units to be replaced was calculated based on information from the 2006 report “Public Water Systems Statistics” prepared by City of Willits Water Department and from the 2000 census. We have not found reliable **specific** data to determine the cost to conserve a unit of water for outdoor usage, multi-family homes and hook-ups, commercial, institutional, industrial use and unaccounted for water. However, we refer the reader to the information in the first paragraph of this answer to reiterate that water conservation is economical.

Question: How difficult is conservation to implement?

Answer:

As noted above, significant water supply can be achieved by conservation with no change in lifestyle of the water customers of the City of Willits. The Pacific Institute has the following insights:

Three steps are required to move toward a more water-efficient world:

The first is identifying the potential for improving water-use efficiency and allocation. The second is identifying the institutional, economic, and technological barriers that impede these improvements. The third is implementing appropriate economic, educational, and regulatory policies needed to remove the barriers and capture the available savings. While all of these steps require some discussion, the third one tends to cause the most consternation. Present water policymakers tend to portray conservation and efficiency as “uneconomic,” argue that it will lead to an unacceptable change in lifestyle, or assume that it is unable to compete without restrictive regulatory requirements or wholly new technology. Yet when such approaches are proposed they are rejected as government intrusion in the market or social engineering. At the same time, traditional water developments are backed by powerful constituencies that have benefited from vast government subsidies, weak environmental laws, and past federal largess. Rational discussion requires that all of these factors be considered and analyzed. While changing outdated water policies will not be easy, failing to change them will be worse.

To achieve significant supplies of water from conservation, we propose that the City of Willits implement the following steps:

- Actively pursue water conservation as the most significant water supply strategy, and supply associated funding
- Modify the water pricing structure to encourage conservation, from the current price structure that discourages conservation (see separate proposal for water pricing structure)
- Implement replacement of inefficient toilets and showerheads, installation of faucet aerators, and repair of leaks at residential sites
- Hire a water conservation coordinator (and additional staff as needed), as directed by the City council in early 2007, to work with individual high-usage institutional, commercial, and industrial water customers to achieve significant savings
- Meter and bill all water usage by residential, commercial, industrial, and institutional users and meter all water usage by the City of Willits
- Reduce unaccounted for water losses to acceptable levels by monitoring the City’s water mains (for reference, the City of New York has saved 54,887 AFY by fixing 66 breaks and 671 leaks in their 57,000 miles of water mains in fiscal 1990/91 and by rescanning the system every 3 years – the survey leading to this savings required a modest effort of 26 people and \$1.5M)