



Conservation Starts at Home

Saves Water and Money

By Natalie Eddy
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A century ago, the average American used only 10 gallons of water each day to drink, cook, clean, and bathe. Today, a typical American uses 100 gallons of water a day and there are three times as many of us. Add to this the facts that many western states are already struggling with a multi-year drought and that the amount of available water remains the same, and it's no surprise that conservation methods are being implemented more frequently.

"The population is increasing," says John Flowers, water efficiency program director with the U.S. Environmental Protection Agency (EPA). "Worldwide, I think you're seeing some degradation of water supplies. In the U.S., there are conflicts developing because of stress on water supplies and stress on a failing water infrastructure. There are lots of areas where there's basically not enough water to share."

More than \$1 trillion has been spent on drinking water treatment and wastewater treatment and disposal since World War II. However, the infrastructure built during this time will reach the end of its useful life in the next 20 to 40 years, according to EPA.

Saving money is an attractive incentive for conservation, but there is another more basic reason—need. The growing demand for water and increasing population translate into water shortages. In fact, the total demand on the nation's water supply system nearly tripled from 1950 to 1995.

"There is more demand on the aquifers today," Flowers says. "If the demand can be decreased, it helps to conserve that water. If conservation is practiced widely by homeowners within a community, you have sustained reductions in demand at the water treatment facility and lowered flows at the wastewater treatment facility. Then, not only is the consumer reducing their costs, but the town may be able to defer the investment of a new plant."

The average national cost of water is approximately two dollars per 1,000 gallons, according to EPA. Although that may sound inexpensive to some, the typical American family spends about \$474 each year on water and sewage charges.

"Conservation efforts have increased dramatically across the board in the last 10 years," says Flowers. "I've only been involved in water efficiency for about 15

Editor's Note:

In the fall 2005 *On Tap*, Natalie Eddy wrote about ways that drinking water systems can conserve water. In this issue, she turns her attention to what consumers can do and what systems can do to promote responsible water use. These efforts are critical to the success of water conservation plans.

History of Conservation

years, but in that time, I've seen an exponential rise in conservation through the amount of correspondence I receive and the number of conferences where this has become an issue. There are now new utilities and new areas of the country where this has become an issue where it wasn't before."

Water Waste Is Serious Business

Some states have water waste laws, particularly those in the west where water shortages are prevalent. In Albuquerque, New Mexico, for example, the city has several programs to encourage water conservation. In March 1995, the city enacted an ordinance that made water waste, defined as "any water, other than natural precipitation, that flows from a property to the public right-of-way or adjacent private property," illegal.

Typical water waste includes landscape irrigation, car washing, and leaks. The city will fine a customer \$20 for a first violation, escalating up to a \$1,000 fine for an eight-time repeat offender. After the ninth violation, a flow restriction device will be placed on the offending party's meter and will not be removed by the utility until the person demonstrates to the city that violations have ceased.

In South Lake Tahoe, California, a water ordinance is designed to educate rather than punish. South shore customers at even-numbered addresses can only water on Monday, Wednesday, and Friday, while odd-numbered addresses can only water on Sunday, Tuesday, and Thursday. First-time violators receive a brochure explaining the rules. Second-time violators are cited, but no fine is imposed. A third violation results in a \$100 fine to residents and a \$500 fine to businesses.

Where to Begin

The most important tip for homeowners who want to save water is to install a low-flow toilet, according to Flowers. He estimated that a family of three, replacing a five-gal-

lon per flush toilet with a standard 1.6-gallon per flush model, would save 18,600 gallons per year.

"If you have a water and sewer rate of say five dollars per thousand gallons, then that's about a \$90 savings per year. If you're replacing a toilet like that, the monetary factor gets pretty attractive," says Flowers.

If your home was built before 1992 and the toilet is original, chances are you do not have a 1.6-gallon per flush toilet.

Undetected toilet leaks are often the main culprit in big bills. Accurate water consumption measurements are imperative for detecting leaks. Fixing a toilet that silently leaks 500 gallons of water per day could save as much as \$1,000 over a year.

Clothes washer replacement is another big money and energy saver and the second biggest water user in the home. "In addition to washing full loads and paying attention to water levels, you can save a lot of water and energy when the time comes to replace your washer," Flowers notes. Energy saving models use 35 to 50 percent less water and, as an added bonus, require 50 percent less energy per load.

The idea of water conservation probably dates to the origins of humanity, when the thought of carving out a container to hold the life-saving liquid first occurred to people. Throughout history, the proximity to water dictated where our ancestors would settle.

With a history dating back more than 6,000 years, China was a water conservation pioneer. The Beijing-Hangzhou Grand Canal, constructed in 486 B.C., is one remnant of the country's early conservation efforts. Today, a water conservation museum is being built in Hangzhou, the capital of Zhejiang Province and called the "water home of China."

The first national conservation movement in the U.S. occurred in 1933 with the establishment of the Soil Erosion Service (later the Soil Conservation Service and now the Natural Resource Conservation Service). As the 1930s Dust Bowl swept across the Great Plains, dust storms rendered much of the land useless and accentuated the need for conserving water. During the 1950s, the Great Plains and southwestern U.S. suffered a five-year drought with conditions stretching from coast to coast in three of those years.



Source: American Water Works Association



Water Conservation at Home

A typical U.S. household uses approximately 260 gallons of water per day. If all households installed water-efficient fixtures and appliances, water use would decrease by 30 percent, saving an estimated 5.4 billion gallons per day.

The following are some helpful conservation efforts in addition to changing fixtures and appliances:

- ◆ Don't use the toilet as a wastebasket.
- ◆ Reduce the water level per flush by installing a toilet displacement device, such as a plastic bottle weighted with pebbles and water, in older toilets.
- ◆ Check toilets for leaks by putting a few drops of food coloring in your toilet tank. If the color begins to appear in the bowl without flushing, you have a leak.
- ◆ Don't let the sink run while brushing teeth. On average, you will save more than five gallons of water. Instead of running water, clean razors in a small pool of water or a glass of water.
- ◆ Take shorter showers. A quick shower rather than a bath can save an average of 20 gallons of water. A three- to five-minute shower is recommended.
- ◆ Use both sides of the sink when washing dishes: one side to wash and the other to rinse. Don't wash dishes with the water running.
- ◆ Garbage disposals use approximately 11.5 gallons of water per day. Try composting organic wastes instead.
- ◆ Keep a bottle of water in the refrigerator instead of waiting for the tap water to get cold.
- ◆ Use dishwasher and washer only when you have full loads.
- ◆ Install flow restrictors in faucets.
- ◆ Insulate water pipes to avoid letting water run until it gets hot.
- ◆ Install covers on pools and spas and check for leaks around pumps.
- ◆ When cleaning a fish tank, use the drained water on plants. The water is rich in nitrogen and phosphorus, a healthy treat for plants.
- ◆ Direct downspouts and other runoff toward shrubs, trees, and gardens.
- ◆ Never pour water down the drain when there may be another use for it such as watering a plant or cleaning around your home.
- ◆ Repair dripping faucets by replacing washers. One drop per second can add up to 2,700 gallons per year.
- ◆ Encourage your school system and local government to help develop and promote a water conservation program among children and adults.



A Utility's Role

Utilities should play an important role in educating consumers, according to Flowers. Utilities should make an effort to provide their customers with water-saving tips, reducing costs to homeowners and treatment plants alike.

Many utilities offer rebate or retrofit programs to consumers, such as low-flow showerhead or low-flow toilet changeovers.

Most states have conservation criteria in their drinking water or clean water state revolving loan fund (DWSRF and CWSRF). "SRFs can also make water conservation measures eligible for funding. If a state approved eligibility, a utility could borrow SRF money to set up a rebate program, for example, and pay it back over time," he added.

The eligible cost of the conservation in this case would be the administrative costs and the rebates, but many other conservation measures could be eligible if the state elects. These conservation measures could also be passed on to consumers.

The CWSRF program can fund projects that reuse wastewater for public purposes, while the DWSRF program can fund projects to create dual distribution systems for drinking water and water for other uses, such as lawn watering. Both programs can be used to fund nonstructural measures that accurately track water usage and water efficient devices, such as plumbing fixtures and appliances.

SRF loans average 2.2 percent compared to market rates currently running about 4.8 percent. A project funded at the SRF rate compared to the market rate would cost one-fifth less to complete.

"These programs have been a very effective way of helping to reduce water use and wastewater generation in a service area, particularly in the West and in coastal regions where there is high growth and limited water availability," says Flowers.

Sources: U.S. Environmental Protection Agency, American Water Works Association.



Other Important Water-Saving Tips

In addition to replacing your toilet and clothes washer, another important water-saving tip is stopping faucet and other leaks in and around the home. Amy Vickers, author of the *Handbook of Water Use and Conservation*, encourages homeowners to regularly look for leaks. "On average, about nine gallons of water is lost per person/per day in the home due to leakage. That's a lot. That's about 15 percent of all water use in the home. It's a simple thing that can be reduced," she says.

To detect a leak in water lines, homeowners should read their water meter before and after a two-hour period when no water is being used. If the meter does not read exactly the same, there is probably a leak in a line.

Another important conservation tip is to monitor your landscape practices, including planting the right plants with proper landscape design and irrigation and watering only what your plants need.

The U.S. Geological Survey estimates that of the 26 billion gallons of water consumed daily in America, some 7.8 billion gallons, or 30 percent, are devoted to outdoor uses with the majority of uses going toward landscaping.

Homeowners should select plants that are appropriate for their local climate conditions. For example, having a lawn with 100 percent turf in a dry desert climate is an excessive use of water.

For more information about selecting appropriate plants for your region, see the special issue of *On Tap* devoted to conservation on the NESCS Web site at www.nesc.wvu.edu.

Irrigation equipment should have a rain shutoff device and timers. "In some areas of the country, landscaping can be the largest share of water use at home," says Flowers. "Homeowners need to take a real good look at equipment that will regulate irrigation properly and not allow water to be wasted."

Vickers recommends minimizing outdoor water use to the greatest extent possible. "It's important to look at water usages first in terms of reducing demand," she says. "I think number one for homeowners is assessing your outdoor water use needs and wants. There's a growing problem of excessive lawn watering in the country, and there are many benefits to having a natural lawn that relies primarily on rainfall for irrigation and uses no chemicals, such as fertilizers, to stay healthy," said Vickers.

"Homeowners need to remember that grass naturally grows dormant in the summer months, and it wants to go brown," Vickers continues. "When you apply excessive amounts of water throughout the growing season, you're actually over-riding one of the lawn's natural cycles. Grass needs to rest. When we constantly over-pump water and chemicals into the lawn, that's when we start getting problems like fungus, turf disease, and insect problems."

Vickers added that if homeowners "get more in tune with the natural cycles of nature, allowing a lawn to rely on natural rainfall with maybe a little bit of sprinkling once in awhile, but no chemicals, we can have a much healthier environment."

In her book, Vickers estimates that the typical suburban lawn consumes 10,000 gallons of water above and beyond rainfall each year.

In the End

According to EPA, water reduction could also lead to a wide variety of energy and pollution reduction benefits. Currently, approximately eight percent of the country's energy demand is used to treat, pump, and heat water. By using less water, Americans can lower energy demand, resulting in less pollutants being released from power plants.

With skyrocketing gas and oil prices, home heating costs are forecasted to exceed previous limits this winter. Water heating accounts for 19 percent of home

energy use. If 20 percent of U.S. homes used high-efficiency clothes washers, the energy savings nationally would be enough to supply the needs of more than one million homes, EPA estimates.

Efficient water use can save consumers hundreds of dollars per year, help water supplies withstand droughts, reduce pollutants, and lower energy costs. "I think that from the ecological perspective, when it comes to water conservation, it's increasingly important, and there's a relationship between how we use water and the chemicals and other pollutants in our lives," says Vickers. "I think that we need to pay more attention to the impact on our personal health and our local environment when it comes to water use."

For more information, visit the following Web sites: www.awwa.org (American Water Works Association), www.conservewater.utah.gov (Utah Division of Water Resources), and www.epa.gov (U.S. Environmental Protection Agency). Additional Web resources for conservation may be found on pages 12 and 13 of this *On Tap*.

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