

Make Every Drop Count In The Home

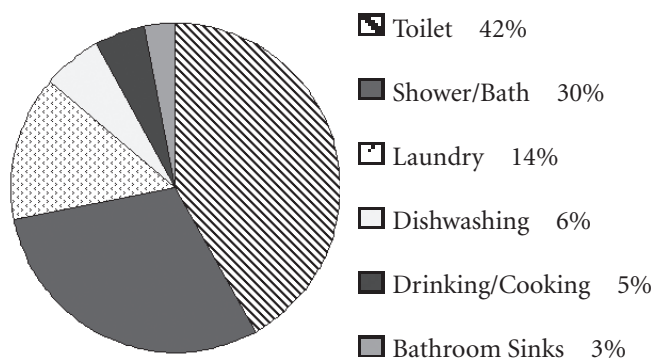
**Shirley M. Niemeyer, Extension Housing and Environment Specialist
Sharon O. Skipton, Extension Water Quality Educator**

This program will help residential renters and owners understand how water is used inside the home, why efficient use is needed and ways to use water more efficiently by changing water use practices and selecting efficient appliances and equipment.

Water Use in the Home

Water use in households will vary according to the household size, climate, water availability, equipment efficiency, water use practices and income. A recent evaluation in Lincoln, Neb. shows that a household of four uses on average 300 to 400 gallons of water each day.

**Indoor Water Use
Lincoln, Neb.**



Source: City of Lincoln, Public Works

A 1999 American Water Works Association (AWWA) study of 12 U.S. cities indicated an average daily residential in-house water use per person

of about 70 gallons. Although studies vary slightly in amounts used, they do indicate the primary water uses in homes are for flushing toilets, washing clothes, and showering.

People in U.S. cities use twice as much water per person as those in western European cities and seven times as much as is used in developing countries, according to the International Arid Lands Consortium. And the trend in the U.S. shows an increase in water use per person. From 1950 to 2000, the Environmental Protection Agency (EPA) indicated that the public demand for water increased 209%. Current averages for household use are about 100 gal./person/day.

Gallons* per person used in U.S. 525,000 gal./person/yr.

* Includes other water use in addition to household.

Gal./person used in other nations

Canada	424,525 gal./person/yr.
Germany	115,972 gal./person/yr.
Sweden	89,819 gal./person/yr.
Nicaragua	70,534 gal./person/yr.

Source: J. Chamie, International Arid Lands Consortium, 2003

In addition to household use, water is necessary for many industries and activities. Irrigation, power supply, mining, livestock, wildlife and recreation are a few examples. This program focuses on in-house use and what Nebraska citizens can personally do to be water-efficient users in their homes.

Water efficiency is important whether your water comes from a public water source or a private well. Our public water supply infrastructure is aging. The same is true for the public wastewa-

ter infrastructure by which used water is carried away, treated, and returned to the environment. In addition many private well and onsite wastewater treatment systems are aging, and some might not be in compliance with current standards designed to protect human health and the environment.

The EPA estimates that U.S. public water and wastewater infrastructure repair costs over the next 20 years may be as much as \$745 billion to \$1 trillion. As infrastructure replacement and repair costs increase, average water bills are expected to increase from the current average of 0.5 percent of the average household income to 0.9 percent (U.S. Congressional Budget Office, 2002). While those projected increases are still low, the figure is nearly double the existing percentage. While individuals with private drinking water and wastewater systems do not receive water bills, they are financially responsible for maintaining and operating their systems. Budgeting will need to include the cost of upgrading or replacing systems.

Water efficiency on a large scale can, in some cases, reduce the need for additional or new public water or wastewater infrastructures. Water efficiency may decrease the stress on existing systems and increase their life. The same is true for aging private water- and wastewater-treatment systems.

About 80 percent of Nebraska's population relies on groundwater for public or private household water. The remaining 20 percent obtains its water from surface water. Groundwater comes from natural underground layers, often of sand or gravel, that contain water. These formations are called aquifers. Nebraska is fortunate to have aquifers that contain a relatively plentiful supply of good-quality water. The Ogallala aquifer is the world's largest aquifer. Groundwater is a renewable resource, replenished mostly by precipitation. However, our groundwater resources are not limitless, and groundwater levels have declined when use has exceeded recharge. This has been especially true in areas of heavy use or during dry years.

Efficient water use can help preserve water resources now and for future generations and the increasing population. For example, if all U.S. households decreased their water use by installing water-saving items, a projected water decrease of 30 percent could be expected. The result would be a savings of 5.4 billion gallons a day, \$11.3 million per

day in costs, equaling more than \$4 billion a year (Chamie, 2003).

Becoming a More Efficient Water User

The top three water users in the home are the toilet, shower/bath, and washing machine, followed by faucets and dishwashers. Adopting water-use efficiency practices for these areas can provide significant benefits. Within the two categories of physical change and practice change, you can choose from many different water-use efficiency practices. Physical changes include modifications in plumbing or fixtures. Practice changes include behaviors that change water use habits. Consider your home structure, your family's lifestyle, cost-benefit analysis, and values to select the physical or practice changes you are committed to making.

■ Toilet

The number one water user in the home is the toilet. At 3.5 gallons per flush, toilets account for nearly 40 percent of indoor residential water use. More than 4.8 billion gallons of water are flushed down toilets each day in the U.S. The average person in the U.S. uses about 9,000 gallons of water to flush 230 gallons of waste down the toilet per year (EPA, 2007).

Physical Changes

Install low-flush toilets. Older conventional toilets use 3.5 to 5 gallons or more of water per flush. Effective January 1, 1994, the Energy Policy Act of 1992 requires that all new toilets produced for home use must operate on 1.6 gallons per flush or less. Pressure- and vacuum-assisted and jet-action toilets have been designed to improve waste removal. Dual-flush toilets available in some stores or through special order use a half-flush (0.8 to 1 gallon) and full-flush (1.6 gallons). A half-flush is used for liquids only since liquids require less water to flush than solids. For more consumer information on water efficiency, operation and toilet models, go to www.epa.gov/watersense/ and to *High-Efficiency Toilets*. There are also studies about water-efficient equipment reported in consumer magazines.

Practice Changes

Plastic containers (such as plastic milk jugs) can be filled with water or pebbles and placed in a toilet

tank to reduce the amount of water used per flush. Containers must be placed to avoid interfering with the flushing mechanisms or the flow of water. Containers can typically result in a savings of up to 1 gallon of water per flush. A toilet dam, which holds back a reservoir of water when the toilet is flushed, can be used instead of a plastic container. Toilet dams typically result in a savings of 1 to 2 gallons of water per flush. About 3 gallons of water per flush should be maintained for adequate flushing in older toilets. Do not use bricks or other objects that can release particles of soil, stone, or corrosive materials into the tank.

Toilets should be used only to carry away sanitary waste. Dispose of facial tissues, dead insects, and other waste in a trash can rather than a toilet.

It is estimated that about 20 percent of toilets leak. A leaky toilet can waste an average of about 22 gallons of water every day and up to 8,000 gallons per year (U.S. Geological Survey, 2005). To tell if a toilet has a leak, place a drop of food coloring in the tank; if the color shows in the bowl after a few minutes without flushing, there is a leak. Fix leaks by changing the flapper valve. Install the correct flapper for the model or the toilet may not operate properly. New developments include a flapperless toilet to reduce leaks.

■ **Washing Machines**

Clothes washers are typically the second biggest water user in the home. Energy-saving models use 35 to 50 percent less water and require about 50 percent less energy per load.

Physical Changes

Install a high-efficiency washer. The average washing machine uses 40 gallons of water per load. High-efficiency washing machines use 18 to 25 gallons of water per load. Some washers sense the load size and soil of water and fabric and adjust the water level accordingly. High-pressure rinses to spray clothes during the rinse cycle reduce water consumption. Adjustable water-level settings allow you to choose the level for the load. When comparing models, look for the Energy Star label and compare the amount of water use for the same tub capacity. Comparisons of models and water efficiency can be found on the Internet at www.energystar.gov under *Clothes Washers* and *Product List*.

Practice Changes

Wash only full loads of laundry if possible. Washing fewer full loads will use less water than washing several small loads. When small loads must be washed, adjust the water level or use the appropriate load size selection on the washing machine.

Compare the Difference	
Normal Clothes Washer	More Water-Efficient Clothes Washer
6 loads/wk. x 40 gal./load = 240 total gal./wk.	6 loads/wk. x 20 gal./load = 120 total gal./wk.
Total gal./wk. 240 x 52 weeks = 12,480 gal./yr.	Total gal./wk. 120 x 52 weeks = 6,240 gal./yr.

■ **Shower/Bath**

Showers account for about 20 percent of total indoor water use. A quick shower usually uses less water than a bath.

Physical Changes

Install low-flow showerheads. Older showerheads can use 6 to 8 gallons per minute. Shower heads made since 1994 use no more than 2.5 gallons per minute. Properly designed low-flow showerheads can provide a flow rate acceptable to most consumers. A quick shut-off switch allows for shower interruption without adjusting the temperature again.

Practice Changes

Individuals can use water efficiently by taking shorter showers. Additional water can be conserved by shutting off the flow of water while soaping or shampooing. If using a bath, use lower bathtub levels. Close the drain stopper immediately when filling the tub and adjust the water temperature as the tub fills.

■ **Faucets**

Physical Changes

Install efficient faucets or aerators. Standard faucets use 3 to 5 gallons per minute. More efficient kitchen and bathroom faucets that use only 2 gallons of water per minute are available. Faucet heads may indicate the gallons per minute of water. Aerators

installed on existing faucets break the flowing water into fine droplets and entrain air. They can reduce the faucet water use by as much as 60 percent while maintaining wetting effectiveness.

Practice Changes

Water can be saved by shutting off the flow while lathering up, brushing teeth, shaving, or completing other similar tasks.

Keep a pitcher of water in the refrigerator for a refreshing cold drink instead of running tap water to get it cold.

A slow drip or leak can waste more than 100 gallons of water a week. To check for leaks, read your water meter before and after a two-hour period when no water is being used, including automatic ice makers, and other such devices. If the meter reading has changed, you probably have a leak. Fix leaks by replacing faucet washers as needed.

Using a garbage disposal can use about 11.5 gallons of water per day. Try composting organic wastes instead. For more information, see NebGuide G810 *Garden Compost* at www.ianr.unl.edu/pubs/.

■ Dishwashers

Physical Changes

Install a water-efficient dishwasher. Older dishwashers use about 14 gallons of water per load. Newer, water-efficient models average 6 to 7 gallons per load. When replacing a dishwasher, look for features to control wash cycle selections for light washes or energy-saving settings that use less water. For more information on water and rated efficiency, go to www.energystar.gov/ and then to *Dishwashers* and *Product List*.

Practice Changes

Wash full loads of dishes in the dishwasher. If small loads must be run, adjust the control setting for the level of soil. Dishwashers should be able to clean the load without pre-rinsing items. Scrape off excess food before loading. If the dishwasher is not cleaning effectively, read the instructions for correct loading and detergent types.

When washing dishes by hand, do not use a continuous running faucet for rinsing. Use a spray attachment and rinse as needed.

Efficient Water Use

Efficient water use can help preserve water resources, reduce impacts on the water and wastewater infrastructure and the environment and may reduce household water and wastewater costs. By addressing the top water users, including the toilet, washing machine, shower/bath, faucets and dishwashers, total household water use can be reduced. Adopting water-use efficiency practices for these areas can provide significant benefits. Choose the equipment or practice changes you are committed to making and that fit your household.

Resources

American Water Works Research Foundation, (1999)

J. Chamie, (2003). International Arid Lands Consortium. Available at <http://ag.arizona.edu/OALS/IALC/press-releases/waterfacs.pdf>

U.S. Geological Survey, Department of the Interior/USGS, (2005). *Water Use at Home*. Available at <http://ga.water.usgs.gov/edu/qahome.html>

U.S. Environmental Protection Agency, (2007). *How to Conserve Water and Use It Effectively*. Available at <http://www.epa.gov/OWOW/nps/chap3.html>

High-Efficiency Toilets. Available at <http://www.epa.gov/watersense/pubs/het.htm>

Acknowledgments

Lorene Bartos, Susan Hansen, Cheryl Tickner and Carroll Welte, Extension Educators; Kim Todd, Extension Landscape Architecture Specialist; and Tadd Barrows, Water Resource Specialist.