Water Efficiency

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Fact Sheet

Why conserve water?

Although most of the earth is covered with water, only 1% of that water is actually drinkable. In spite of its importance, drinkable water is often taken for granted. For many people, fresh water is as close as their faucets. This accessibility can give the illusion that the supply of drinkable water is unlimited. It also makes it easy for people to be unconcerned with all of the necessary treatment water undergoes prior to reaching their faucets.

With the growing shortage of fresh water supplies in many parts of the U.S., particularly in cases of drought, it has become essential to find ways to conserve water and use it efficiently. Wasteful habits can deplete water reserves quicker than it is possible to replenish them. Water resource management has traditionally focused on developing new water supplies and expanding treatment facilities while giving little thought to how efficiently existing water is used.

Water conservation also has an effect on how much wastewater is produced, thereby having a direct impact on the performance and life of the wastewater system. This extends the life of onsite systems, improves performance of treatment plants that have flows near design capacity, and reduces operating costs of treatment plants. Communities faced with having to build new wastewater facilities may be able to delay or reduce the size of those facilities with a comprehensive water program.

Thus, a reduction in the amount of wastewater due to water conservation practices can be extremely beneficial to an onsite or community wastewater system. In addition, water efficiency measures can also lower the water, sewer, and energy bills of the homeowner, thus reducing the water utility operating cost.

Water efficiency programs should be tailored to the local conditions, taking into account various factors to determine the proper mix of efficiency measures and the priority of the program. Any program that is implemented should include the local utility and the user.

Although there are different types of offstream water users, the focus of this fact sheet will be on domestic (residential) uses only. Domestic water use includes everyday uses such as drinking, cooking, bathing, toilet flushing, washing clothes and dishes, watering lawns and gardens, maintaining swimming pools, washing cars, etc. Discussed in the following sections are various utility-based measures, as well as engineering and behavioral water efficiency options for residential users.

What utility-based measures exist for efficient use of water?

These are some first steps a utility can take toward conserving water for residential use.

Rate structures and metering are ways to encourage customers to use less water and not to waste the resource. It creates an awareness as to how much water is used, which would be evident by the customer's bill.

Table 1: Water-Saving Fixtures and Their Capacity

Fixture (a)	*Fixture Capacity (b)*
Toilets	
Low-flow	1.6 gallons/flush
Conventional	3.5 gallons/flush
Conventional	5.5 gallons/flush
Conventional	7.0 gallons/flush
Showerheads	
Low-flow	2.5 (1.7) gpm
Conventional	3.0 to 5.0 (2.6) gpm
Conventional	5.0 to 8.0 (3.4) gpm
Faucets	
Low-flow	2.5 (1.7) gpm
Conventional	3.0 (2.0) gpm
Conventional	3.0 to 7.0 (3.3) gpm

gpm = gallons per minute

(a) Low-flow = post-1994
Conventional = pre-1980 to 1994

(b) For showerheads and faucets: maximum rated fixture capacity (measured fixture capacity). Measured fixture capacity equals about two-thirds of the maximum.

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This fact sheet was developed by Clement Solomon, Peter Casey, Colleen Mackne, and Andrew Lake.

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A General Overview

More recently, communities have started revising the billing rates to signal that future supply would cost more than the present supply.

Despite high initial costs, programs for finding and repairing leaking water mains and laterals can be very cost-effective. These programs are very effective in communities that have large, old, and deteriorating systems.

Many water systems deliver water at a pressure higher than what customers need, thus, resulting in inefficient water use. Although installing pressure-reducing valves is cost-effective, it should be noted that, in some cases, they might have a negative impact on some homes with systems already designed and installed. Care should be taken to ensure adequate fire flow is maintained.

What engineering practices are there for residential users?

Installing water-saving devices (see Table 1 on page 1) and repairing leaky pipes, faucets, and toilets could save thousands of gallons of water per person each year. An engineering practice for individual residential water users is the installation of indoor plumbing fixtures that save water or the replacement of existing equipment with those that use less water. Low-flow plumbing fixtures and retrofit programs are one-time conservation measures for new construction or for replacing conventional fixtures in an existing structure. The low-flow plumbing fixtures can be implemented with little or no additional cost over their lifetime. Listed below are some of the options for reducing water use.

- *Low-flush toilets:* Ultra low-flush toilets use only 1.6 gallons of water or less, while conventional toilets use 3.5 to 5 gallons or more of water per flush.
- *Toilet dams and displacement devices:* These reduce the amount of water used per flush. There are also several commercially available retrofit devices that are inexpensive and eliminate the need to replace old toilets.
- *Low-flow showerheads:* A low-flow showerhead is basically a conventional showerhead where the surge of water is restricted.
- *Faucet aerators:* This inexpensive device can be installed in sinks to break the flowing water into fine droplets and introduce air without compromising quality.
- *Pressure reduction:* The maximum water flow from a fixture operating on a fixed setting can be reduced if the water pressure is reduced, since flow rate is related to pressure. The reduction in pressure can reduce the likelihood of leaking water pipes, leaking water heaters, and dripping faucets.
- *Washing machines:* Water use can be reduced (as much as 40%) at the laundry room by using front-loading washing machines rather than the top-loading ones.
- *Graywater:* Graywater is all domestic wastewater comprised of wash water from kitchen sinks and tubs, clothes washers, and laundry tubs. Reusing graywater can conserve drinkable water and lower water bills.

What else can I do to use water more efficiently?

In addition to using water-saving devices, there are many personal habits that an individual can practice to use water more efficiently, some of which are listed in the following section.

- Dishes can be scraped with used paper napkins to clean off food without using water.
- Soak heavily soiled dishes overnight instead of running water continuously over them.
- For heavy cleaning of pots and dishes, use recycled water followed by a clean rinse. It is best if the least possible soap or cleaning agent is used.
- Defrost without using water by planning ahead to thaw frozen foods in the refrigerator.
- To maximize the water that is used, water lawns and gardens slowly, thoroughly, and as infrequently as possible. Watering at night can lessen the amount of water that is lost to evaporation.
- Choose plants that are native to the region in which you live, since they would need less water than plants that are not acclimated to that particular climate.
- Cover the backyard pool when it is not in use to reduce water evaporation.
- Fix any leaky faucets or showerheads.
- Discourage restaurant servers from bringing you water unless you request it or from automatically refilling your empty water glass.
- When washing a car, clean the car in sections and rinse in short spurts with a hose. Try to wash the car in a spot where shrubs or hedges are close by so that they may receive some of the water.

How do I stay informed about water efficiency methods?

For more information on water efficiency or a list of other fact sheets, contact the National Small Flows Clearinghouse (NSFC) at West Virginia University, P.O. Box 6064, Morgantown, WV 26506-6064. Phone: (800) 624-8301 or (304) 293-4191. Fax: (304) 293-3161. World Wide Web site: *http://www.nsfc.wvu.edu*.

The NSFC provides free and low-cost informational services and products to help homeowners and small communities address their wastewater needs. Also, information about manufacturers, consultants, regulations, and facilities can be obtained from the NSFC's databases.

References

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