PENNSTATE

College of Agricultural Sciences • Cooperative Extension

School of Forest Resources

Water Facts #8
Water Conservation—How Much Water and Money Can You Save?

The average person in Pennsylvania uses about 62 gallons of water in their home each day. This fact sheet will help you determine how much water you currently use and the amount of water and money you could save by installing water-conserving devices. These worksheets are educational exercises, and the numbers used to calculate use and energy savings are only averages. Your actual results could vary significantly.

How Much Water Do My Appliances Use?
The amount of water an appliance uses is generally related to the year it was manufactured. The tables below give the typical consumption of different household devices. Use these figures for Worksheet 1 to estimate your current water consumption. You can find more accurate values of the amount of water your appliances use from the original owner's manuals.

Toilets (The average person flushes the toilet about five times daily.)

Pre-1950	7.0 gallons per flush (gpf)
1950–1980	5.0 gpf
1980–1994	3.5–4.5 gpf
After 1994	1.6 gpf

Showerheads (The average person showers about 5 minutes each day.)

Pre-1980	4.3 gallons per minute (gpm)
1980–1994	3.0 gpm
After 1994	2.5 gpm
Low-flow	2.0 gpm

Faucets (The average person uses faucets for about 8 minutes each day.)

Pre-1994	3.0 gpm
After 1994	2.5 gpm
Low-flow	1.5 gpm

Clothes Washer (The average home washes about seven loads of laundry per week.)

Pre-1980	56 gallons per load (gpl)
1980–1990	51 gpl
1990–present	43 gpl
Front-loading	27 gpl

Dishwasher (The average home uses a dishwasher about five times per week.)

1980–1990	14 gpl
1990–1995	11 gpl
1995–present	4.5 gpl (water efficient), 7–10 gpl (typical)

(If you hand-wash your dishes, assume 2.5 gallons of water each time.)

Worksheet 1: Your Family's Current Daily Water Use

1. Fill in the number of household members in your home and the number of laundry and dishwasher loads (or meals that require dishwashing if you don't have a dishwasher) you do each week in the first space of each line.
2. Fill in the water consumed by each appliance on the second space of each line using the values from page 1 or the device's owners manual.
3. Multiply these numbers to calculate the total gallons of water the appliances in your home typically use each day (gal/day).

Toilet
_____ household members **X** 5 flushes per person per day **X** _____ gallons per flush = _____ gal/day

Shower
_____ household members **X** 5 minutes per person per day **X** _____ gallons per minute = _____ gal/day

Faucets
_____ household members **X** 8 minutes per person per day **X** _____ gallons per minute = _____ gal/day

Clothes Washer
_____ loads of laundry per week **X** _____ gallons per load (now divide by 7 to get daily use) = _____ gal/day

Dishwasher
_____ loads of dishes per week **X** _____ gallons per load (now divide by 7 to get daily use) = _____ gal/day

OR

Hand-Washed Dishes
_____ meals per day that require dishwashing **X** 2.5 gallons of water per meal = _____ gal/day

Miscellaneous Water Use

Think about the ways you consume water in your home that are not mentioned above. For example, you might use water to fill humidifiers, fish tanks, hot tubs, or swimming pools. You might also water gardens, landscape, or wash vehicles. This outdoor consumption can be significant, especially during droughts. To estimate this use, consider that a typical 1/2-inch-diameter garden hose emits about 5 gallons per minute. Think about these chores and estimate the amount of water they consume.

Estimated miscellaneous water use = _____ gal/day

4. Add the values in the far right column to get the total daily water use of the appliances in your home.

   Toilet + shower + faucets + clothes washer + dishwashing + other uses = _____ gal/day

5. Divide this value by the number of household members to get the total amount of water consumed by each person. Is this value greater or less than the 62 gallons per person state average?

   _____ gal/day divided by _____ household members = _____ gallons per person per day

Worksheet 2: How Much Water Can You Save with Water-Conserving Devices?

This worksheet estimates the potential benefits of water-efficient appliances. In this case, the water use values are given. You need to calculate the following information:

1. Fill in the number of household members or loads of laundry or dishes, as you did for Worksheet 1, in the first space of each line.
2. Multiply these numbers by the water use values given in each row to calculate the daily water consumption for each of the water-saving devices.

Toilet
_____ household members **X** 5 flushes per person per day **X** **1.6** gallons per flush = _____ gal/day

Shower
_____ household members **X** 5 minutes per person per day **X** **2.0** gallons per minute = _____ gal/day

Faucets
_____ household members **X** 8 minutes per person per day **X** **1.5** gallons per minute = _____ gal/day

Clothes Washer
_____ loads of laundry per week **X** **27** gallons per load (now divide by 7 to get daily use) = _____ gal/day

Dishwasher
_____ loads of dishes per week **X** **4.5** gallons per load (now divide by 7 to get daily use) = _____ gal/day

OR

Hand-Washed Dishes
_____ meals per day that require dishwashing **X** 2.5 gallons of water per meal = _____ gal/day

Miscellaneous Water Use

Think about how you could reduce your miscellaneous water consumption from Worksheet 1. For example, rain barrels can catch roof runoff for your gardening and landscaping needs or you could wash your vehicles less often. Estimate the new value that these changes would bring.

Estimated miscellaneous water use = _____ gal/day

3. Add the numbers in the far right column to project the new total daily water use of the appliances in your home with these water-saving features.

   Toilet + shower + faucets + clothes washer + dishwashing + other uses = _____ gal/day

4. How does your per person water use compare to the state average now? Divide the total gal/day from number 3 above by the number of people in your house to get the water use per person. Is it greater or less than the 62 gallon per person average?

   _____ gal/day divided by _____ household members = _____ gallons per person per day

How Much Water Could You Save?
You can calculate your daily water savings by comparing your daily water use with and without water-efficient devices (the last line of Worksheets 1 and 2).

Daily household water use from last line of Worksheet 1 = _____ gallons per person per day
Daily household water use from last line of Worksheet 2 above = _____ gallons per person per day
Subtract these values to get your daily water savings = _____ gallons per person per day

Your annual household water savings can be calculated by multiplying your daily savings (last line from previous page) by 365 days per year and the number of people living in your house.

_____ gallons per person per day **X** _____ household members **X** 365 days per year = _____ gallons saved per year for household

Leak Repairs: You can conserve even more water by fixing leaks. The average American home loses about 9.5 gallons of water per person every day. Most of these leaks are from toilet tanks. A faucet that drips once every second wastes about 10 gallons in one day! If your home has a water meter, you can easily check for leaks by shutting off all faucets and appliances. If your meter continues to turn, you have a leak. You can determine if a toilet is to blame by putting food coloring in the toilet tank. If the food coloring appears in the toilet bowl, the toilet is leaking and should be repaired.

Worksheet 3: Potential Dollar Savings From Water Conservation

Water-efficient appliances can save money, as well as water. The following worksheet estimates the money you could save by installing these devices. These values are based on assumptions about energy costs and the approximate water savings you calculated in Worksheet 2. They do not include the purchase price of each appliance. Your actual savings could vary significantly.

Water Bill Savings

If your home is served by a public water supply, you probably pay for each gallon of water you use. In this case, conserving water also means saving money. Multiply your total annual household water savings (last line above) by the price you pay for each gallon of water. If you don't know what this amount is, assume $5 per 1,000 gallons or about half a cent per gallon ($0.005/gallon).

_____ gallons saved per year for household X $ _____ per gallon = $ _____ saved annually

Annual Energy Savings

Any device that conserves hot water, such as efficient dishwashers, clothes washers, showerheads, and faucets, will also save money through reduced energy. The calculations below estimate how much money you could save on your energy bill with water conservation. These calculations assume you have an electric water heater with an average electricity charge of 8 cents per kilowatt-hour ($0.08/kWh). If you use a gas water heater, your savings will be slightly different.

Compute your savings by comparing the current water use of each appliance from Worksheet 1 to the reduced consumption from Worksheet 2.

Shower

Shower use without water-saving device (Worksheet 1) = _____ gal/day
Shower use with water-saving device (Worksheet 2) = _____ gal/day
Shower water savings (subtract second line from first line) = _____ gal/day

_____ gal/day of water saved **X** 365 days **X** 0.13 kWh/gal **X** $0.08/kWh = $ _____saved each year

Note: The 0.13 kWh/gal figure assumes that water temperature when showering is 106ºF.

Replacing an old showerhead with a low-flow showerhead will cost about $4 to $8.

Dishwasher

Dishwasher use without water-saving device (Worksheet 1) = _____ gal/day
Dishwasher use with water-saving device (Worksheet 2) = _____ gal/day
Dishwasher water savings (subtract second line from first line) = _____ gal/day

_____ gal/day of water saved **X** 365 days **X** 0.20 kWh/gal **X** $0.08/kWh = $_____ saved each year

Note: The 0.20 kWh/gal estimate assumes that the dishwasher uses water heated to approximately 140ºF.

Replacing your dishwasher with a water-efficient model will cost about $300 to $700.

Clothes Washer

Clothes washer use (top-loading) (Worksheet 1) = _____ gal/day
Clothes washer use (front-loading) (Worksheet 2) = _____ gal/day
Clothes washer savings (subtract line 2 from line 1) = _____ gal/day

_____ gal/day of water saved **X** 365 days **X** 0.076 kWh/gal **X** $0.08/kWh = $____ saved each year

Note: The 0.076 kWh/gallon value assumes that warm water is used for normal-sized loads.

Replacing your top-loading washer with a front-loading unit will cost $600 to $1,000.

Faucets

Standard faucet use without low-flow aerator (Worksheet 1) = _____ gal/day
Low-flow faucet use or installation of low-flow aerator (Worksheet 2) = _____ gal/day
Faucet water savings (subtract line 2 from line 1) = _____ gal/day

_____ gal/day of water saved **X** 365 days **X** 0.057 kWh/gal **X** $0.08/kWh = $____ saved each year

Note: The 0.057 kWh/gallon estimate assumes the average water temperature is 80ºF.

A low-flow aerator installed on existing faucets will cost $0.50 to $3. Purchasing a low-flow faucet would cost $50 to $250 for the kitchen and $40 to $150 for the bathroom.

Annual Money Savings

Your annual money savings are the sum of the energy conserved with each appliance as well as the lowered water bill (if you use a public supply). Add up each of the dollar savings above to get your total.

Water bill savings + shower savings + dishwasher savings + washer savings + faucet savings = $_____ total saved per year

Sewer and Septic Savings

Water conservation also decreases wastewater discharges. Although sewer bills are typically flat fees, this reduction provides community benefits. If your home has an on-lot septic system, water conservation will lessen the load on your system, which lowers your pumping frequency and reduces malfunctions.

Source of Information

Water and energy use estimates in this fact sheet are based on information published in: Vickers, A. 2001. *Handbook of Water Use and Conservation.* WaterPlow Press, Amherst, MA.

Additional Resources

For further information on water conservation visit our Web page at:

www.sfr.cas.psu.edu/water

or contact your local cooperative extension office. More details on water system planning and sizing can be found in *Private Water Systems Handbook* (MWPS-14), which can be ordered for $7 from the Natural Resource, Agriculture, and Engineering Service at www.nraes.org or 607-255-7654.

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