Estimating Water Use and Savings in Your Home

Bryan R. Swistock, Extension Associate, School of Forest Resources
William E. Sharpe, Professor of Forest Hydrology, School of Forest Resources

The average Pennsylvanian uses about 62 gallons of water in their home each day. This fact sheet will help you determine how much 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 consumption. You can find more accurate values of the amount of water your appliances use from the original manuals.

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

<table>
<thead>
<tr>
<th>Year Interval</th>
<th>Gallons per Flush (gpf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-1950</td>
<td>7.0 gpf</td>
</tr>
<tr>
<td>1950–1980</td>
<td>5.0 gpf</td>
</tr>
<tr>
<td>1980–1994</td>
<td>3.5–4.5 gpf</td>
</tr>
<tr>
<td>After 1994</td>
<td>1.6 gpf</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Year Interval</th>
<th>Gallons per Minute (gpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-1980</td>
<td>4.3 gpm</td>
</tr>
<tr>
<td>1980–1994</td>
<td>3.0 gpm</td>
</tr>
<tr>
<td>After 1994</td>
<td>2.5 gpm</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Year Interval</th>
<th>Gallons per Minute (gpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-1994</td>
<td>3.0 gpm</td>
</tr>
<tr>
<td>After 1994</td>
<td>2.5 gpm</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Year Interval</th>
<th>Gallons per Load (gpl)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-1980</td>
<td>56 gpl</td>
</tr>
<tr>
<td>1980–90</td>
<td>51 gpl</td>
</tr>
<tr>
<td>1990–present</td>
<td>43 gpl</td>
</tr>
<tr>
<td>Front-loading</td>
<td>27 gpl</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Year Interval</th>
<th>Gallons per Load (gpl)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980–90</td>
<td>14 gpl</td>
</tr>
<tr>
<td>1990–1995</td>
<td>11 gpl</td>
</tr>
<tr>
<td>1995–present</td>
<td>7.0 (water efficient)–10.5 gpl (typical)</td>
</tr>
</tbody>
</table>

(If you hand-wash your dishes, assume 2 1/2 gallons of water each time.)
Worksheet 1: Your Family’s Current Daily Water Use

1) Fill in the number of household members, or the information requested, in the first column.
2) Fill in the water consumed by each appliance based on its age, using the values from the previous page or the device’s manual.
3) Multiply these numbers to calculate the total gallons of water the appliances in your home typically use each day.

**Toilet**
- household members X 5 flushes/person X [gpf] = [gal/day]

**Shower**
- household members X 5 min/person X [gpm] = [gal/day]

**Faucets**
- household members X 8 min/day X [gpm] = [gal/day]

**Clothes Washer**
- loads of laundry/wk X [gpl] ? 7 days = [gal/day]

**Dishwasher**
- loads of dishes/wk X [gpl] ? 7 days = [gal/day]

**OR**

**Hand-washed Dishes**
- meals/day that require dish washing X 2 1/2 gal of water/meal = [gal/day]

**Miscellaneous Water Use**
Think about the ways that 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 or landscaping 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 five 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 + dish washing + 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 average?

_______ gal per person per day
Worksheet 2: Daily Domestic Use with Water-saving Appliances

This worksheet estimates the potential benefits of water-efficient appliances. In this case, the water use values are given.

1) Fill in the number of household members or loads of laundry or dishes, as you did for Worksheet 1.
2) Multiply the numbers in each row to calculate the daily consumption of each water-saving device.

**Toilet**

\[
\text{household members} \times 5 \text{ flushes/person} \times 1.6 \text{ gpf} = \text{gal/day}
\]

**Shower**

\[
\text{household members} \times 5 \text{ min/person} \times 2.0 \text{ gpm} = \text{gal/day}
\]

**Faucets**

\[
\text{household members} \times 8 \text{ min/day} \times 1.5 \text{ gpm} = \text{gal/day}
\]

**Clothes Washer**

\[
\text{loads of laundry/wk} \times 27 \text{ gpl} \times 7 \text{ days} = \text{gal/day}
\]

**Dishwasher**

\[
\text{loads of dishes/wk} \times 7 \text{ gpl} \times 7 \text{ days} = \text{gal/day}
\]

**OR**

**Hand-washed Dishes**

\[
\text{meals/day that require dish washing} \times 2.5 \text{ gal of water/meal} = \text{gal/day}
\]

**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. Estimate the new value that these changes would bring.

\[
\text{Estimated miscellaneous water use} = \text{gal/day}
\]

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.

\[
\text{Toilet + shower + faucets + clothes washer + dish washing + other uses} = \text{gal/day}
\]

4) How does your per person water use compare to the state average now? Divide the total from #3 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?

\[
\text{_________ gallons per person per day}
\]

**How Much Water Could You Save?**

You can calculate your daily and yearly water savings by comparing your daily use with and without water-efficient devices (the last box of Worksheet 1 and 2).

\[
\text{Daily household water use from Worksheet 1} = \text{gal/day}
\]

\[
\text{Daily household water use from Worksheet 2} = \text{gal/day}
\]

\[
\text{Subtract these values to get your daily water savings} = \text{gal/day}
\]

\[
\text{Multiply this value by 365 to get your annual water savings} = \text{gal/yr}
\]
**Leak Repairs:** You can conserve even more water by fixing leaks. The average American home loses about 9 1/2 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 its tank. If the food coloring appears in the toilet bowl, you should repair it.

**Worksheet 3: Potential Dollar Savings**

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 you use. In this case, conserving water also means saving money.

1) What was your total water savings (last box on Worksheet 2) = gal/yr

2) Multiply this number by the price you pay for each gallon of water. If you don’t know what this amount is, assume $5/1000 gal or $0.005/gal.

Water bill savings = gal/yr X $/gal = $

### 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 your energy bill could lower, if you have an electric water heater. They assume that the average charge for electricity is 8 cents per kilowatt-hour (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 (worksheet 1 – worksheet 2) = gal/day

gal of water saved X 365 days X 0.13 kWh/gal X $0.08/ kWh = $

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

A low-flow showerhead will cost about four to eight dollars.
**Dishwasher**

Dishwasher use without water-saving device (worksheet 1) = \[ \text{gal/day} \]

Dishwasher use with water-saving device (worksheet 2) = \[ \text{gal/day} \]

Dishwasher water savings (worksheet 1 – worksheet 2) = \[ \text{gal/day} \]

\[ \text{gal of water saved X 365 days X 0.20 kWh/gal X $0.08/kWh} = \] \[ \text{$_{\text{---}}$} \]

*Note: The 0.20 kWh per gallon estimate assumes that the dishwasher uses water heated to approximately 140ºF.*

A water efficient model will cost about $300 to $700.

**Clothes Washer**

Clothes washer use without water-saving device (worksheet 1) = \[ \text{gal/day} \]

Clothes washer use with water-saving device (worksheet 2) = \[ \text{gal/day} \]

Clothes washer savings (worksheet 1 – worksheet 2) = \[ \text{gal/day} \]

\[ \text{gal of water saved daily X 365 days X 0.076 kWh/gal X $0.08/kWh} = \] \[ \text{$_{\text{---}}$} \]

*Note: The 0.076 kWh per gallon value assumes that warm water is used in normal loads.*

A water-efficient clothes washer will cost $600 to $1000.

**Faucets**

Faucet use without water-saving device (worksheet 1) = \[ \text{gal/day} \]

Faucet use with water-saving device (worksheet 2) = \[ \text{gal/day} \]

Faucet water savings (worksheet 1 – worksheet 2) = \[ \text{gal/day} \]

\[ \text{gal of water saved X 365 days X 0.057 kWh/gal X $0.08/kWh} = \] \[ \text{$_{\text{---}}$} \]

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

A low-flow aerator installed on existing faucets costs $0.50 to $3. Purchasing a low-flow faucet for the kitchen would cost $50 to $250 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).

Shower energy savings + dishwasher energy savings + clothes washer energy savings + faucet energy savings + water bill savings

\[ = \text{$_{\text{---}}$} /\text{yr} \]

**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:

Penn State College of Agricultural Sciences research, extension, and resident education programs are funded in part by Pennsylvania counties, the Commonwealth of Pennsylvania, and the U.S. Department of Agriculture.


This publication is available in alternative media on request.

The Pennsylvania State University is committed to the policy that all persons shall have equal access to programs, facilities, admission, and employment without regard to personal characteristics not related to ability, performance, or qualifications as determined by University policy or by state or federal authorities. It is the policy of the University to maintain an academic and work environment free of discrimination, including harassment. The Pennsylvania State University prohibits discrimination and harassment against any person because of age, ancestry, color, disability or handicap, national origin, race, religious creed, sex, sexual orientation, or veteran status. Discrimination or harassment against faculty, staff, or students will not be tolerated at The Pennsylvania State University. Direct all inquiries regarding the nondiscrimination policy to the Affirmative Action Director, The Pennsylvania State University, 328 Boucke Building, University Park, PA 16802-5901, Tel 814-865-4700/V, 814-863-1150/TTY.