

## CONDUCTING A HOUSEHOLD WATER AUDIT

### WHAT IS A HOUSEHOLD WATER AUDIT?

A household water audit is an assessment of how much water is used and how much water can be saved in the home. Conducting a water audit involves calculating water use and identifying simple ways for saving water in the home.

### WHAT ARE THE BENEFITS OF CONDUCTING A WATER AUDIT?

Conducting a water audit can help you save money by reducing your home water bill (and sewer bill if you are connected to a public sewer system). Conducting a water audit will make you aware of how you use your water and help to identify ways you can minimize water use by implementing certain conservation measures. It is possible to cut your water usage by as much as 30 percent by implementing simple conservation measures and without drastically modifying your lifestyle.

### HOW DO I CALCULATE WATER USAGE IN MY HOME?

It is important to realize that water use throughout the year often varies with the season. Most people use more water in the warmer months for gardening, washing cars, and other outdoor uses. If you conduct your water audit in the winter or fall, you should still consider the additional water you use in the summer months. The American Water Works Association (AWWA) estimates that the average indoor water use per person is 94 gallons of water per day; this does not take into account outdoor water use (watering lawns, washing cars).

#### Calculating Water Use From Your Water Bill



If you obtain water from a community water system, you probably receive a water bill that tells you how much water you use. Many water utilities provide customers with bills that contain information regarding the amount of water consumed and average daily consumption during the billing period. If the average daily consumption is not provided, you can calculate it by dividing the total amount of water used by the number of days in the billing period. Determine whether your water is measured in cubic meters ( $m^3$ ), cubic feet ( $ft^3$ ), gallons (gal), or liters (L) and convert to gallons.

For converting into gallons, use the following conversion factors:

$$m^3 \times 264 = \text{gal}$$

$$ft^3 \times 7.48 = \text{gal}$$

$$L \times 0.264 = \text{gal}$$

There are several conversion tools available on the Internet that can be used to make your calculations easier. (<http://www.onlineconversion.com/volume.htm> or <http://www.mathconnect.com/volumel.htm>)

### **Calculating Water Use With A Meter**

If your water bill does not provide water consumption data, then you can read your water meter to obtain this information. Water meters measure the total amount of water used in your home and are usually located at the property line or on the house. The meter may measure in cubic meters, cubic feet, gallons, or liters. To obtain your water use over the course of a 24-hour day, read your meter at the same time on two consecutive days. You may want to measure water use for several days and then calculate a daily average.

### **Estimating Water Use Without A Meter**

If you do not have a water meter you can estimate your water use. It will be important to measure all water use, indoor and outdoor, to accurately estimate the quantity of water used. To determine how much you consume water in your home it is necessary to measure water flow from each fixture in your house:

- To calculate flow for faucets (indoor and outdoor) and showerheads, turn faucet to the normal flow rate that you use, and hold a container under the tap for 10 seconds and measure the quantity of water in the container. Multiply the measured quantity of water by 6 to calculate the gallons per minutes (gpm).
- To calculate flow for toilets, turn off the water supply to the toilet, mark the water line on the inside of the tank, flush, and then fill tank with water from tap. Measure the volume of water that is required to fill water back up to the water line mark on the tank and record this number. Turn water on to the toilet to resume normal use.
- If your appliances or fixtures are relatively new, you may be able to obtain the flow rate from the manufacturer's specifications. Otherwise, use the following averages:
  - Washing machine – 41 gal per use
  - Dishwashing machine – 9 gal per use

Next, measure how many times per day or how many minutes each day you use each fixture or appliance. Multiply the water flow per fixture by the minutes per day the fixture is used. Multiply the flow average for each appliance by the number of times the appliance is used each week. Don't forget to include the amount of time you use outdoor faucets each day. The [water audit spreadsheet](#) is a useful tool to evaluate water use in the home.

### **HOW DOES MY WATER USAGE RANK?**

The average Maryland citizen uses about 100 gallons of water per day. This includes indoor as well as outdoor water usage. To calculate the per person daily water usage rate, divide your daily water usage by the number of people in your home, and then look at the following chart to rate your water usage.

Gallons Per Person Per Day	Rank	Comments
<80 gal/day	Excellent	Wow! You use water wisely. Please share your conservation techniques with friends and neighbors.
80 – 100 gal/day	Good	Good Job! You use less water than the average Maryland citizen. Look at the conservation tips below to learn how you can conserve even more water.
101 – 120 gal/day	Fair	You use more water than the average Maryland citizen. Read the conservation tips below to learn how you can conserve water.
>120 gal/day	Poor	You use a lot of water. Read the conservation tips below to learn how to conserve water in the home.

## HOW CAN I CONSERVE WATER?

### Check for Leaks

An average of about 14 percent of residential water is lost through leaking fixtures or pipes. You still pay for this water!



An easy way to check whether you have leaks in your house is to read your water meter. Turn off all water fixtures inside and outside your home, and check the reading on your water meter. Wait one hour, ensuring that no one uses any water, and then check the meter again. If the meter reading has changed, you have a leak somewhere in your home.

### *Pipes*

A leaky pipe is usually pretty obvious. Visually inspect all pipes in your home and look for telltale watermarks on walls or ceilings. In the yard, the ground above the water line may stay wet continuously or water may actually flow on the surface. If a pipe is leaking, repair or replace it.

### *Toilets*

Leaking toilets are common and can be large sources of water loss. A leaking toilet can waste anywhere from several gallons to more than 100 gallons per day (that's over a quarter million gallons per year!). Leaking toilets are not as easily identifiable as leaking faucets. The following are clues that you may have a leak:

- If you have to jiggle the handle to make a toilet stop running;
- If you regularly hear sounds from a toilet that is not being used; or
- If a toilet periodically turns the water on (“runs”) for 15 seconds or so without anyone touching the handle.

Even if your toilet does not display any of the above symptoms, it could still be leaking. These “silent leaks” can go undetected for long periods of time, potentially wasting thousands of gallons of water.

To check your toilet for silent leaks, do the following:

- Remove the cover on the toilet tank and set it aside;
- Remove any “in-tank” bowl cleaners and flush so that water in the bowl and tank are clear;
- Add dye to the tank (You can use dye capsules or tablets from the hardware store, but food coloring or powdered fruit drink mixes work well). Use enough dye so that the water has a deep hue;
- Wait for 30 minutes (Do not use toilet during this time period);
- If after 30 minutes the water in the bowl contains dye, then the toilet is leaking (A properly operating toilet will store water in the tank indefinitely without any water running into the bowl).

There are two possible culprits when a toilet leaks, the flush valve or the refill valve. To determine which valve is responsible for the leak, draw a pencil line on the inside of the tank at the water line. Turn the water supply for the toilet off (located behind the toilet) and wait for 20 to 30 minutes. If the water level remains the same, it means the leak is occurring at the refill valve (unit in the left side of the tank). If the water level falls below the pencil mark, the flush valve (unit located in the center of the tank) is leaking.

Most homeowners are capable of making their own toilet repairs. Visit your local home improvement or hardware store, purchase the parts, turn off the water supply to the toilet, and follow the directions. With a little effort, you can conserve many gallons of water and reduce your water bill at the same time.

### ***Faucets***

A leaking faucet is easily identified, but do you know how much water can be wasted from what seems like an insignificant drip?

To find out, count the number of drips per minute. You can use the following chart to estimate the amount of water waste, or you can use WaterWiser’s© [drip calculator](#).

<b>Estimated Water Loss Through Leaks</b>		
<b>Drips per minute</b>	<b>Water Wasted per Month</b>	<b>Water Wasted per Year</b>
10	43 gallons	526 gallons
30	130 gallons	1,577 gallons
60	259 gallons	3,153 gallons
120	518 gallons	6,307 gallons
300	1,296 gallons	15,768 gallons

Drips can usually be eliminated by replacing worn washers, or by tightening or repacking the faucet. Replacement washers or repair kits for washerless faucets are available at hardware or home improvement stores.

### **Retrofit/Replace Fixtures and Appliances**

Once you have repaired any leaks in your home, the next step is to evaluate the efficiency of your current fixtures and appliances. Often simple retrofits can conserve a lot of water. The following table provides average water use for conventional and low-flow appliances.

<b>Fixture/Fitting/Appliance</b>	<b>Water Use In Gallon Per</b>
Vintage Toilet*	4-6 flush
Conventional Toilet**	3.5 flush
Low Consumption Toilet***	1.6 flush
Conventional Showerhead*	3-10 min
Low-Flow Showerhead	2-2.5 min.
Faucet Aerator*	3-6 min.
Flow Regulating Aerator	0.5-2.5 min.
Top-Loading Washer	40-55 load
Front-Loading Washer	22-25 load
Dishwasher	8-12 load
* Manufactured before 1978	
** Manufactured from 1978 to 1993	
*** Manufactured since January 1, 1994	

### ***Faucets***

Retrofitting your faucet with an aerator will help save water in your home. A faucet aerator is a small circular screen that is screwed into the faucet. It reduces flow by adding air to the water, giving the sensation of more water with less volume. An aerator can reduce the flow to about 1 to 2 gpm, reducing your water use by half. Aerators are inexpensive and easy to install.

Check to see if aerators are installed on any faucets. Even if aerators have been installed, they may be older and less efficient. If the flow from your faucet exceeds 2.5 gpm, you should install a new aerator. Some older faucets may not be able to accommodate an aerator. If this is the case or if for any other reason you need to install a new faucet, you should purchase and install a faucet that uses less than 2.5 gpm.

### ***Toilets***

The best way to improve toilet efficiency is to replace an old inefficient toilet with a new toilet. Toilets made before 1993 use between 3.5 gallons per flush (gpf) and 8 gpf. New high efficiency toilets use 1.6 gpf or less. Depending on how inefficient your old toilet is, you could



reduce your water use by up to 75 percent by installing a new efficient toilet. There are other alternative toilets available, including waterless toilets and composting toilets. Fixtures must comply with Code of Maryland Regulations (your certified plumber is aware of these regulations).

You can reduce water use in older toilets easily and inexpensively by simply installing a displacement device. You can save a half-gallon per flush, which equates to, on average, 12 gallons per day per household. These devices work by displacing water in the tank, thereby reducing the water used per flush. Hardware stores sell plastic or rubber bags that can be filled with water and hung from the side of the tank, or you can place some pebbles in an empty half-gallon milk jug, or other durable container, and fill it with water. Toilet dams work in a similar fashion, by blocking off an area of the toilet tank to decrease the amount of water per flush. Another device that can be used is an early closure device that causes the flapper to close early, releasing a reduced amount of water per flush. Do not place bricks in your toilet tank as they can dissolve and cause future plumbing problems.

### ***Showerheads***

Low-volume showerheads use 2.5 gpm or less (older ones use as much as 5 gpm or more), resulting in a water savings as great as 50 percent (on average, about 38 gallons per day per household saved). Low-volume showerheads conserve water through mixing air and water and using different spray patterns to give the sensation of a higher-volume shower. Some showerheads also feature temporary shut-off valves that allow the user to turn off the water while shampooing or washing while maintaining the desired temperature the same. Conserving water in the shower will also lead to substantial energy savings, since showers use hot as well as cold water.



### ***Appliances***

On average about 22 percent of indoor residential water is used to wash clothes. The best way to improve clothes washer efficiency is to replace an old inefficient machine with a new high efficiency washer. Traditional clothes washers use approximately 41 gallons per load (gpl) and high efficiency models use a little more than half that, about 23 gpl.

Dishwashers account for only about 1.5 percent of indoor residential water use; however, more efficient models will reduce water use by about 50 percent. It is usually more efficient to wash a full load of dishes in the dishwasher rather than hand washing the same dishes in the sink.