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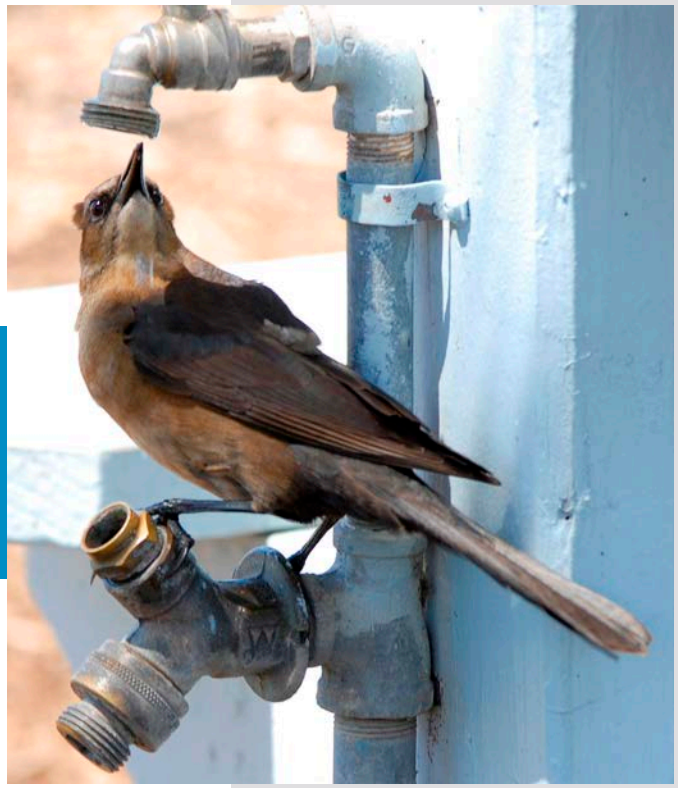
Water Conservation



A female grackle waits for a drop of water to appear from a faucet in a park along the coast of the Gulf of Mexico. She and other grackles were taking turns at the faucet waiting for single drops of water, illustrating that even with all the water in the Gulf nearby, wildlife still needs fresh water, which can be hard to come by.

Credit: Andrea Westmoreland from DeLand, United States, via Wikimedia Commons

Only one ten thousandth of Earth's total water supply is fresh water on the surface, to keep billions of humans and other animals alive. Good reason to conserve it—which also saves energy and money.

Water is heavy, so it takes energy to move it. The farther it's pumped in pipelines or carried in trucks, the more it costs the user. Water purification systems also require energy, adding to the price.

Sending more water down the drain increases the volume that must be processed to use again, increasing energy and cost.

But small changes in personal habits can save surprisingly large amounts of water.

Turning off the tap while you brush your teeth can save 4 gallons a day.

Fixing a leaky toilet saves 200 gallons a day—about the same as 100 flushes. Over 70,000 gallons a year.

Washing dishes by hand, if you leave the water running, consumes more than a dishwasher. Instead, scrape the food into the trash, fill the machine and have it do the work.

Letting the hose run while you wash the car wastes 100 gallons. Professional car washes use a third the volume and may recycle their water.

Sprinkler systems can use thousands of gallons per hour. Run them sparingly and early in the morning when temperatures are low, humidity is high, and more water gets to your plants.

All it really takes is to be aware: if the water is running and you're not using it, turn it off!

Bureau of Economic Geology

Background: Water Conservation

Synopsis: It seems like the "blue planet" has a lot of water, but only a tiny fraction of it (1% of 1%) is easily accessible fresh water in lakes and rivers, sustaining much of life on the planet. With increasing frequency of heatwaves and drought on our warming planet, the need to conserve fresh water is obvious. Conserving water is easy and includes common sense actions that individuals can do to make a difference. It even saves money and energy. Here are a few ways you can help every day!

- Earth may have 70% of its surface covered with water but only about 1% of that is liquid fresh water on the surface and underground (ED-001).
  - More than 97.5% is salt water and 1.5% is frozen in glaciers.
  - Of the remaining 1% that is liquid fresh water, 99% of that is groundwater in aquifers, which must be accessed from springs or wells.
  - That leaves only about 1% of 1% of Earth's water in easily accessible freshwater surface lakes, rivers and streams for use by animals.
  - Earth recycles and purifies its fresh water (ED-047 and ED-119).
- Earth's fresh water must be shared among a growing population of around eight billion people, as well as hundreds of billions of other organisms.
  - After the oceans, Earth's most common habitat is arid land, encompassing 35% of the world's exposed land surface, with one billion human residents.
  - Heatwaves and droughts are always occurring somewhere on Earth, threatening food supply, public health and the environment.
  - Limited quantities of water in high population areas often result in poor quality polluted water that spreads diseases, further reducing clean water availability.
  - Since the 1950s, Earth's population has doubled, but fresh water demand has gone up six times with increased agricultural and industrial demands.
  - Conservation of clean drinking water can be essential for survival.
- While water must be conserved during drought, it is also important to conserve fresh water whenever possible. It is a practical and constructive way to share Earth's water.

This historic water tower north of Austin, Texas, in the town of Round Rock was built in 1935 as a Works Progress Administration project to store water and provide water pressure for the community. Now the site of a public park, it is no longer operational.

Credit: Larry D. Moore, via Wikimedia Commons

  - The best way to avert water shortages is to conserve, reuse and recycle water.
  - As water makes its way to the ocean, it supplies communities along the way, so the water you don't use becomes available for people in other communities, as well as for agriculture and ecosystems.
  - Conserved water can be banked for the future when it is stored in water towers, reservoirs and aquifers.

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References: Water Conservation

WaterSense for Kids | EPA
Water Conservation Tips | National Geographic
10 of The Biggest Water-Wasters | Conserve Energy
Water Footprint Calculator | Watercalculator.org
To Make a Burger, First You Need 660 Gallons of Water ... | LATimes

Contributors: Juli Hennings, Harry Lynch

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Background: Water Conservation

- Water conservation does more than save water: it saves energy and money!
  - Water is heavy, so it takes energy to transport it. The farther it is moved in pipelines or trucks, the more it costs the user.
  - Water well pumps and purification systems require energy, adding to the price of water supply.
  - To reign in excessive use, many water utilities charge progressively for water, meaning they increase the cost per gallon in tiers as the total volume supplied to customers per month passes specific thresholds.
  - Heating water in hot water heaters consumes energy, so hot water is more costly than cold water.
  - Disposing of water that goes down the drain increases the volume of sewage that must be processed, increasing energy use and cost.

Here are some easy ways that YOU can make a difference—every little bit adds up!

- Indoors, pay attention to water faucets and leaks that waste water.
  - In the United States, the Environmental Protection Agency's WaterSense program limits flow rates for new water efficient fixtures, but that doesn't mean less water pressure.
    - New fixtures use aeration to split the water stream into smaller streams with higher pressure, reducing flow while retaining an invigorating stream. Screw on aerators can turn an old faucet into a WaterSense faucet.
    - Low flow showerheads are limited to 2.5 gallons per minute, bathroom sink faucets are limited to 1.5 gallons per minute, and kitchen faucets cannot exceed 2.2 gallons per minute.
    - The estimates that follow use WaterSense flow rates to illustrate conservation opportunities.
    - Keep in mind that older faucets may flow at more than twice these rates, increasing the opportunity to save water.
  - With the tap fully open, faucets in your household flow between 1.5–2.5 gallons per minute. Imagine that in terms of water jugs.
  - Changing a couple personal hygiene habits that use household water faucets is easy and can save a lot of water.
    - Turning off the tap while you brush your teeth can save around 4 gallons of water a day—that's 240 gallons per month if you brush twice daily.
    - When you wash your hands, close the tap while you lather up.
    - After use, turn off the tap tightly to avoid wasteful drips that can add up over time.
    - A drippy faucet that needs repair can waste up to 30 gallons per month while annoying you with its dripping sound. Call the plumber!

A one gallon water jug holds 3.78 liters of liquid.

Credit: Juli Hennings

  - A 10-minute shower uses up to 25 gallons with a water efficient showerhead, but bathtubs use three to four times that much because they can hold 70–110 gallons.
    - Challenge yourself to take shorter showers and even turn the water off while washing your hair or lathering up to save more water.
    - To avoid wasting water while waiting for the shower to warm up, collect that cooler water in a pail and use it to water your garden or houseplants, recycling 200–300 gallons of water per month.

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- Older standard toilets may take 6 gallons of water to flush, but WaterSense toilets have been reengineered use 1.5 gallons per flush with streamlined gravity flow. If you sell or remodel your home, you may need to replace older toilets with water efficient models to pass inspections.
  - Leaking toilets can waste more than 200 gallons of water a day on average—about the same as flushing an empty toilet 100 times! That's around 6,000 gallons per month.
  - You can check for this by placing food coloring in the back tank. If it shows up in the bowl, there is a leak you need to fix.
- Water efficient kitchen faucets deliver water at the maximum rate of 2.2 gallons per minute, while modern dishwashers use about 10 gallons of water for an entire load. Older kitchen faucets may flow at twice that rate.
  - Washing and rinsing dishes by hand consumes more water than using a dishwashing machine if the tap flows for more than five minutes.
  - When you do need to wash by hand, dilute your dish detergent to reduce the time it takes to rinse pots and pans.
  - Fill the sink or a tub for cleaning vegetables or soaking soiled dishes instead of continuously running a stream of tap water.
  - To have the most impact, don't rinse the dishes on the way into the dishwasher. Just scrape them into the trash and let the machine do its job.
  - Run the dishwasher when it is full to maximize water efficiency.
  - Use nontoxic cleaning products like baking soda and vinegar.
- Older washing machines used up to 45 gallons of water per load, but newer Energy Star machines use just 14 gallons per load.
  - Newer machines spin more efficiently, so clothes take less time in the dryer, decreasing energy costs and reducing wear so fabrics last longer.
  - Avoid running partial washer loads to maximize water conservation. Some newer machines match water level to volume of clothing sensed.
- If you don't drink all the water in your water bottle, pour it into a plant.
  - Plants also love melting ice that drips at just the right rate for their roots.
  - Keep a pitcher of cold water in the refrigerator to fill water bottles so you don't need to run the tap waiting for the water to cool down. This can save 200–300 gallons per month.
  - Nutrient rich aquarium water can be recycled into your household or garden plants.

- Outside, evaporation and water hoses can be the biggest water wasters.
  - Just like faucets indoors, running hoses while doing outside chores wastes a lot of water very quickly.
    - Outdoor faucets typically run at 6 gallons per minute, so if you let the hose run while washing your car for 15 minutes that is 90 gallons of water running into your landscaping or to your city sewer plant for processing.
    - Turn hoses off while you soap up with a bucket and sponge.
    - Carwashes typically use about 35 gallons of water per car, and many treat and recycle their used wash water, so they may be a waterwise alternative.
  - The amount of water used by lawn and garden sprinkler systems varies depending on the number of sprinkler heads and the water pressure.
    - A typical single sprinkler head delivers 5 gallons per minute, or 300 gallons per hour, while others deliver more than double that amount. Lawn sprinkler systems can use thousands of gallons of water per month.
    - Water early in the morning when temperatures are at their coolest and humidity is high. This decreases evaporation to ensure the largest proportion of the water applied gets to your plants.
    - Don't water when it is windy; breezes cause additional evaporation.
    - Overwatering makes plants vulnerable to disease and insect damage.

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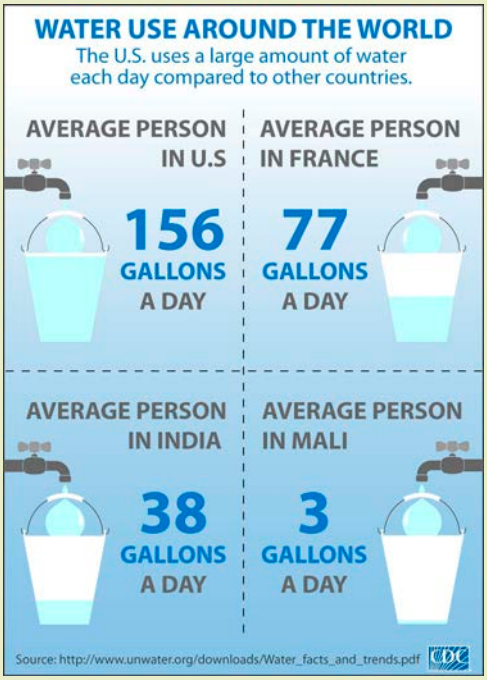
- Hand watering your garden with a hose or water can is the most efficient way to ensure your plants get the right amount of water.
- Native plants require less water and fertilizer to create beautiful gardens.
- Avoid using harmful chemicals that can percolate into aquifers or run into lakes, feeding algal blooms.
- Use your water more than once. Some regions encourage the use of gray water from washers and showers to water garden beds.

- Household water use in the United States is much higher than in other countries on a per person basis.
  - To calculate your personal water footprint and get additional ideas about how to conserve this precious resource, use the Water Footprint Calculator.
  - Indirect water use for production of food and our "stuff" will be a shockingly large part of your water footprint.
    - A single pound of beef takes 1,799 gallons of water to produce, including irrigation of cattle feed and water for drinking and processing.
    - An apple takes just 18 gallons to produce.



Water use around the world.

Credit: CDC

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