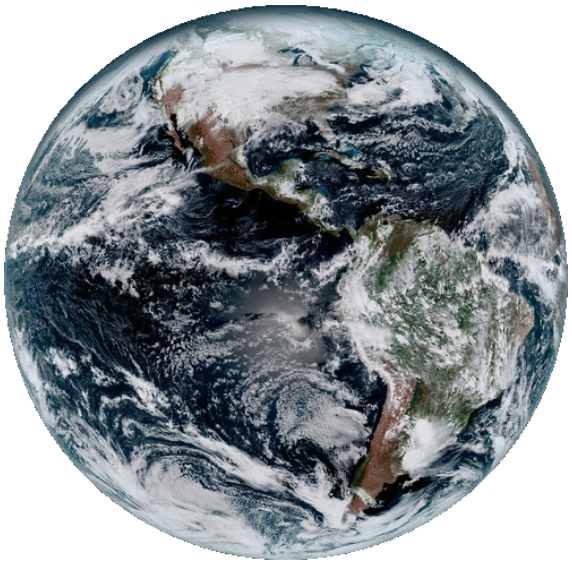
WATER CONSERVATION – Mindful Climate Action

Water – let's start with a few facts



1) Earth's surface is 71% water.
2) Less than 3% of water on Earth is fresh water, and two-thirds of that is frozen!
3) Water on Earth is finite, but the human population is heading toward 9 billion.
4) More than 1 billion people in developing countries do not have access to safe drinking water.
5) More people have cell phones than piped water, toilets, or water treatment plants.
6) The average American uses twice as many gallons of water per day as the average European.
7) Nearly 80% of the world's water use is for agriculture.

Changing household behaviors such as taking shorter showers or watering the lawn less often are usually the first things we think of when trying to conserve water. Taking steps to directly reduce water use is important, but not nearly as consequential as making changes to our daily diets or purchasing behaviors. Agriculture and the production of consumer goods require far more water than individuals or households.

The Amazing Water Molecule

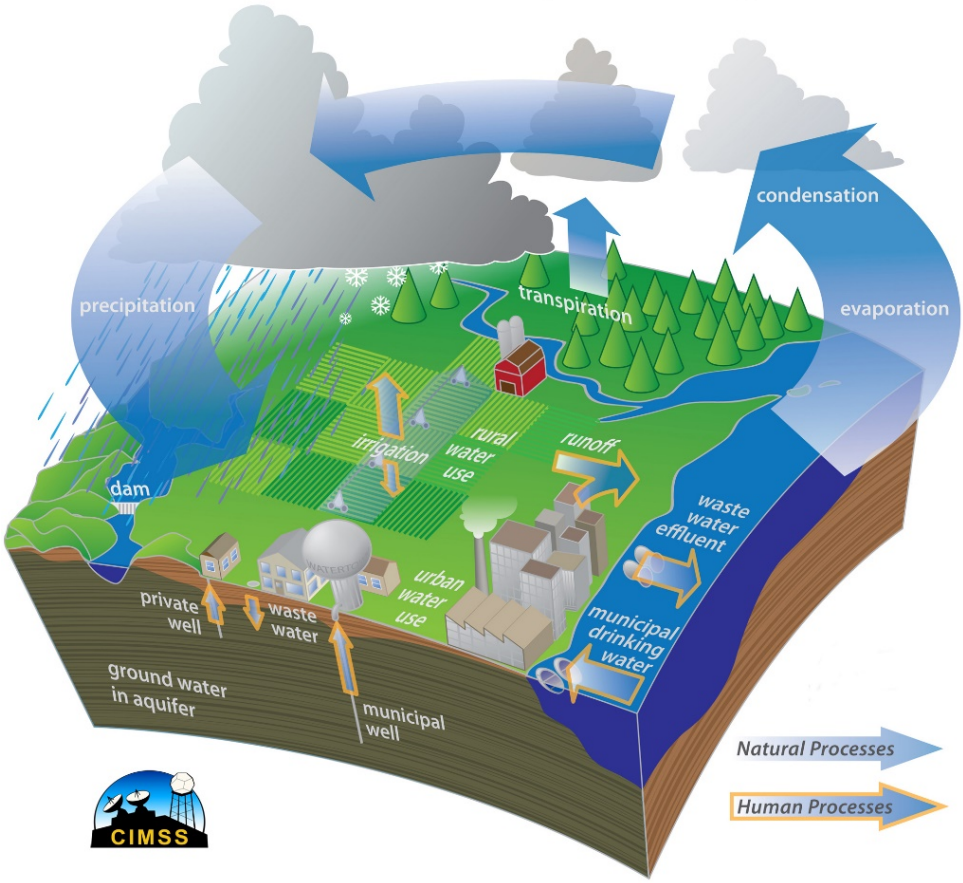
To most people, water is that amazing stuff in raindrops, lakes, and rivers. But to a chemist, water (H_2O) is a molecule composed of two hydrogen atoms bonded to an oxygen atom. This configuration results in attractions among neighboring water molecules.

These attractions are the basis for the many unique properties of water such as the surface tension responsible for spherical raindrops, supercooled liquids, and the fact that ice is lighter than liquid water. Think about this last fact - if water didn't expand and become lighter when it froze into ice, lakes would likely freeze from the bottom up, killing all forms of life in northern lakes every winter. Unlike most substances however, water becomes less dense when it freezes because the water molecules align into an open crystalline form. If this expansion didn't occur, sea ice would sink in the oceans. Life on Earth would not be possible.

Water is the only substance that exists naturally on earth as a solid, liquid or gas. Water vapor is the most abundant greenhouse gas in Earth's atmosphere (although not the most powerful in terms of heat-trapping). When water changes phase, energy is exchanged. This energy exchange powers the water cycle.

Global warming intensifies this cycle because a warmer atmosphere holds more water vapor, contributing to an increase in extreme weather events worldwide.

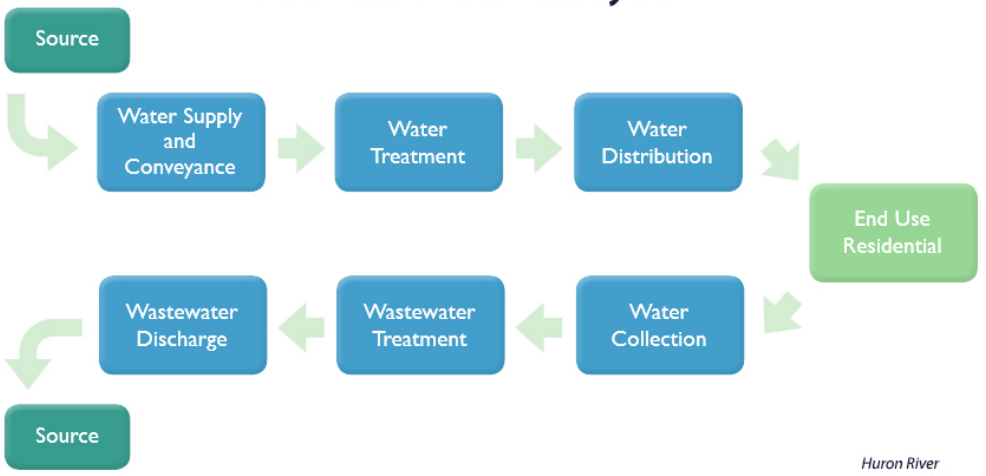
Great Lakes Water Cycle Diagram



Over time, human processes have altered the natural water cycle, resulting in global and local impacts.

Along with causing 'kinks' in the natural water cycle, human processes (outlined arrows) have another thing in common – they require energy. Water has a LARGE carbon footprint - energy is required to extract, treat and distribute water, AND to collect and treat wastewater.

The Domestic Water Use Cycle

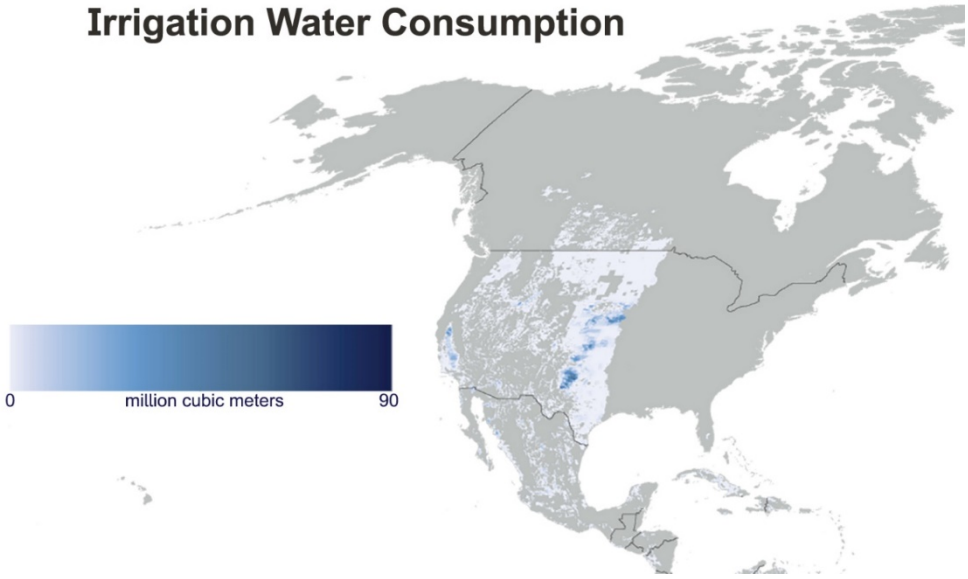


Huron River Watershed Council

Water issues in the United States vary by region, with locations west of the Mississippi River increasingly dealing with drought and those east of the Mississippi River dealing with heavy rains and flooding. But regardless of whether you live in a water-rich region or drought-prone area, conserving water makes sense because it reduces energy use and carbon pollution, which in turn help slow climate change.

Across the planet, water demands are increasing, but our water resources are not. Water is a limited resource. Food production, electricity production and manufacturing all require water. Agriculture alone accounts for over 80 percent of the freshwater footprint of humanity.

Different kinds of food require different amounts of water. Meat, especially from livestock with long life cycles, requires much more water per serving than plant-based foods. Furthermore, the amount of irrigation water consumed to produce a particular food depends greatly on where it's grown.



For example, a cow living in California typically eats hay grown with irrigation water, whereas a cow living in Wisconsin subsists primarily on rain-fed grass. And a grass-fed cow raised on rain-fed grass from a local sustainable farm has a significantly lower carbon footprint than a cow fed irrigated hay, especially if the hay and the beef both are transported many miles for consumption.

Clearly, we can reduce our water and carbon footprints through the food we choose to eat. This table provides examples to illustrate this important point:

Average Water Footprint of a Few Common Foods

Food Item	Serving Size	Water Footprint
Steak (beef)	6 ounces	674 gallons
Ham (pork)	3 ounces	135 gallons
Coffee	1 cup	34 gallons
Salad	1 (tomato, lettuce & cucumbers)	21 gallons
Eggs	1	52 gallons

Data from The Water Footprint Network.

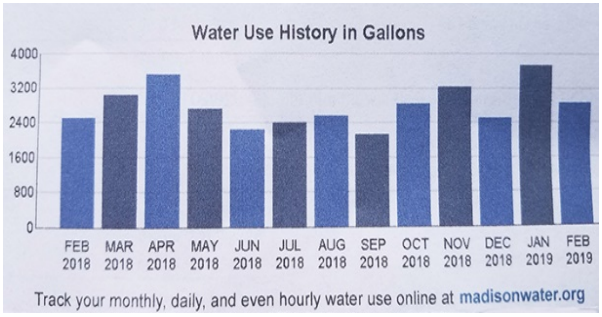
A network of scientists from around the world has collaborated to create "Project Drawdown," ranking the 100 most substantive solutions to addressing climate change. In this list, diet ranks higher than water conservation, largely because shifting diets to more plant-based foods will waste less energy and water, needed to produce the plant foods that are fed to animals. Below is a chart showing how the outcomes prioritized by the Mindful Climate Action project align with Project Drawdown's list.

MCA	Project Drawdown
Dietary Consumption	#4 Plant-Rich Diet #3 Food Waste
Water Conservation	#46 Water Saving - Home
Reducing automobile transport	#75 Ridesharing #69 Electric Bikes
Increasing Active Transport	#54 Walkable Cities #59 Bike Infrastructure
Reducing Household Energy use	#55 Household Recycling #57 Smart Thermostats

Individuals can have a profound impact on conserving water by making changes in their everyday lives.

Mindful Climate Action (MCA) participants will track their household water consumption. Simply check your water bill, and keep track of your usage. In many cities, you can monitor your water usage on-line. When you obtain your monthly bill, pay attention to the number of gallons of water used, and start to identify ways to trim usage:

- shorter showers (perhaps alternate days),
- turning off tap water while washing dishes or brushing teeth,
- opting to wear clothing longer before washing,



While practicing ways to use less water, look for ways to waste less water, such as fixing leaks, flushing toilets less often, or landscaping your yard to reduce the grass lawn and increase drought-friendly plants. Better yet, plant a rain garden and help replenish our aquifers!

Share your insights with household members and neighbors.

You can check your next water bill to see how much water you conserved. By the way, saving money is a co-benefit of using and wasting less water. By reducing household water use you can 1) save money, 2) reduce carbon pollution, and 3) slow climate change.

Water is essential to good health and water conservation never refers to personal consumption.

However, an important way to reduce water and carbon footprint is to **stop using bottled water and single-use plastics**. A considerable amount of energy (and carbon pollution) is required to produce plastic bottles and transport bottled water. In fact, the amount of water used to produce the bottle is nearly three times higher than the actual water in the bottle!

Vast quantities of single-use plastic are ending up in our oceans. In fact, approximately 80% of the pollution is our oceans is from plastics. And more than 22 million pounds of plastic flow into the Great Lakes every year. While most of it washes up along the shores, the rest breaks down into smaller and smaller pieces known as "microplastics." Researchers have found high amounts of microplastics in all five of the Great Lakes, in our drinking water, in fish and even in beer.

Plastics not only pollute the oceans or the Great Lakes, but also they pollute our atmosphere due to the burning of fossil fuels. Producing just 1 pound of polyethylene plastic produces 3 pounds of carbon pollution. Transporting used plastics to landfills or recycling centers generates even more carbon emissions. Addressing the plastic issue is 'low-hanging-fruit' toward mitigating climate change. Simply avoid single-use plastics, reuse unavoidable plastic products, and support plastic bans where you live.

Be mindful of plastics in your life and make incremental steps to reduce it.

Finally, be purposeful and mindfully proactive about protecting lakes, streams & aquifers. Rain gardens are one way to accomplish this. Keeping leaves and grass clippings out of the street helps too. In addition, many communities have volunteer opportunities to care for our lakeshores in the company of like-minded citizens.

It's all connected, we're all connected, and every action we take to ease stresses on water resources and reduce carbon pollution helps protect our environment for future generations.

Experts agree that climate change is real, human-caused, and harmful to humans - but there's hope because we as humans can modify our behaviors to tread more lightly on our planet.

The first step is becoming mindful of our actions and making daily choices that are better for us and better for the environment.

FOR MORE INFORMATION, PLEASE VISIT https://www.fammed.wisc.edu/mca/

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