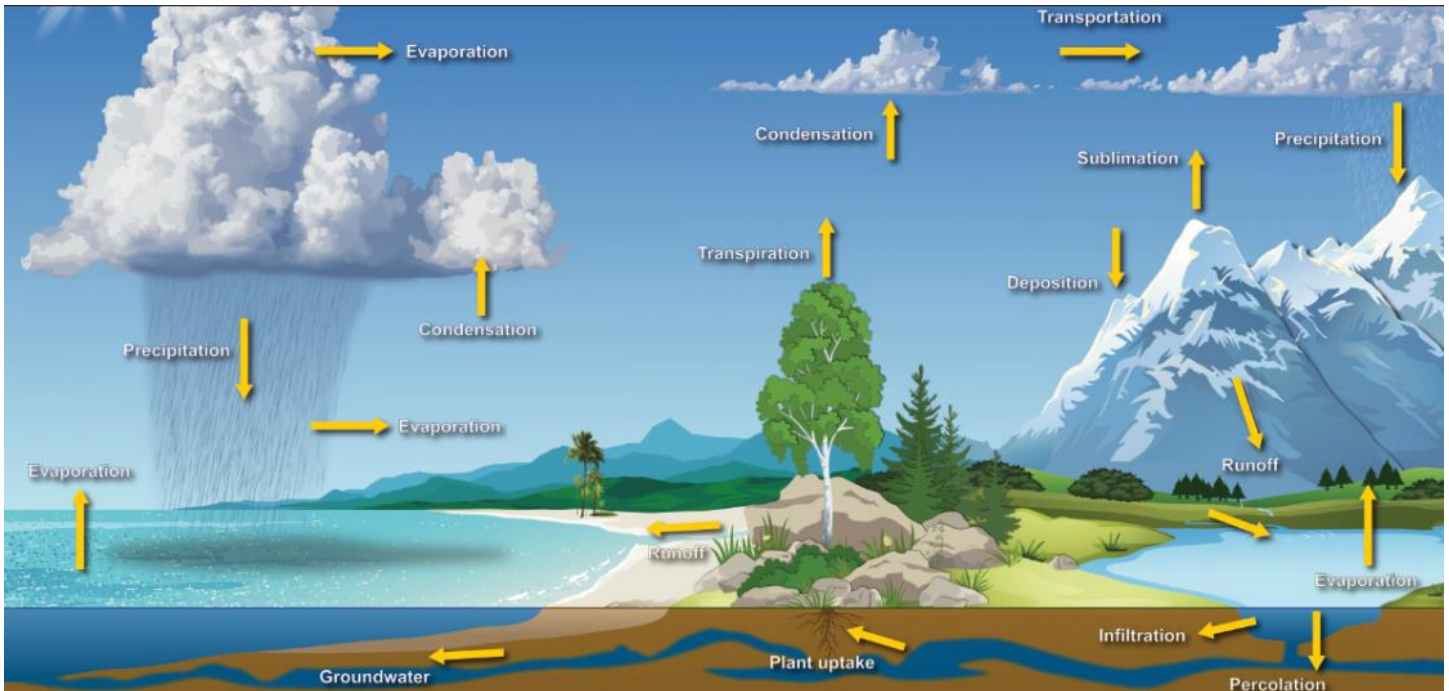


## The Human Water Cycle

In the Water Cycle module, the videos explored the natural water cycle. Here, we will explore how man impacts this process through human activity. We call this the **Human Water Cycle**. But first, let's quickly review the natural water cycle in the diagram below. It shows the components of the water cycle: evaporation, condensation and precipitation, etc.



The water cycle.

Credit: <https://www.noaa.gov/education/resource-collections/freshwater/water-cycle>, accessed February 27, 2021

But there is something missing from this diagram. That something is people... and the things people do. We manage water for many reasons. Just think about your life and the many ways you impact this precious resource every day. Use the list below to help.

- Energy production
- Agriculture (both crops and animals)
- Manufacture and transportation of goods (Everything we make uses water at some point in its production.)
- Recreation
- Drinking water
- Wastewater management

Imagine your life without any one of these services and you begin to see how important the human water cycle is. To do these things, we take water from one location and move it to another. **Our capture, management, use and disposal of water are all parts of the human water cycle.** So, while the diagram above is correct, it is not complete because it does not tell the whole story.

The image below illustrates a few parts of the human water cycle. We dam rivers and lakes for recreation and to make electricity (energy production). We divert the direction of rivers to irrigate crops and water our lawns (agriculture). We pump it out of the ground to drink and for water balloon fights.



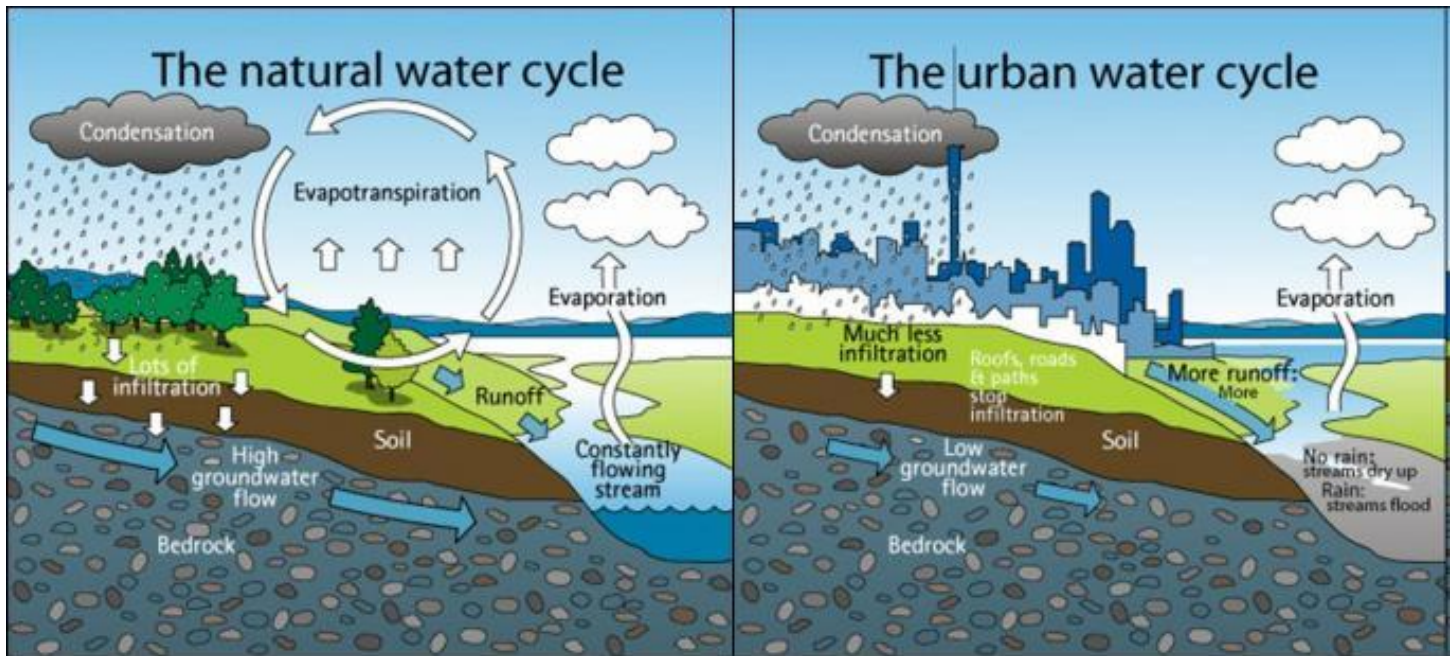
The human water cycle.

Credit: <https://thewatercycle7.weebly.com/>; accessed 18 February 2021.

We all contribute to and benefit from the human water cycle every single day. Think about your home. Where does that water come from? How does it reach your faucet? How do you know it is safe to drink? When you wash out a paint brush or flush the toilet, where does that water go? What happens to the water after it leaves your home?

Look at the image on the next page. The left side shows the natural water cycle. Notice that most of the rain soaks or infiltrates into the ground. That's because the ground is permeable. Permeable ground has spaces between the pieces of soil which allow the water to sink into and pass through it. When this happens there is very little runoff. Runoff is also called stormwater runoff, which is water that travels over or runs off the surface of the ground.

The image on the right depicts a city built on that same location. Compare what is happening in both images and ask yourself why they are different. What has changed? Why does the water behave differently in each picture? (Hint: big arrows mean more water moving, small arrows mean less water.)



Side-by-side comparison of the water cycle and the human water cycle.

Credit: The Water Cycle | SSWM <http://www.sswm.info/category/concept/water-cycle>; accessed 07 March 2015.

When people change the natural landscape of meadows, forests, marshes, etc. to make shopping centers, towns and industrial areas for example, it changes how the natural water cycle works, sometimes in ways even the experts did not foresee. How does a town or city change where water goes? Buildings, roofs, sidewalks, roads, parking lots and compacted soil are all impermeable surfaces. An impermeable surface does not allow water to sink into it or flow through it. Impermeable surfaces can be a good thing. We want a roof to be impermeable to keep us dry and warm. But if there are too many impermeable surfaces, that can cause problems. When water cannot sink into the ground, it will flow over the surface as stormwater runoff. If water stays at the surface of the ground, it is not sinking into the ground to refill aquifers we use for drinking water. Instead, this runoff picks up loose soil and chemicals and moves them to new places. **Stormwater runoff is the number one source of water pollution in New Hampshire.**

A 10-year old lawn has compacted soil and is considered to be an impermeable surface. It cannot soak up water as well as natural, undisturbed ground.

When precipitation falls to the ground, water moves the chemicals that we use outdoors. As you've just learned, stormwater runoff moves over the surface of the land picking up contaminants then flows into streams, rivers and eventually, the ocean. But water that sinks into the ground can also carry contaminants with it as gravity pulls it underground into aquifers. Water can be contaminated by many every-day things, for example:

- on a farm or a lawn around a house – fertilizers, herbicides, pesticides and loose soil.
- on roads and parking lots – salt, automotive fluids like gas and oil, and small bits of tires that wear off as we drive have many toxic chemicals.

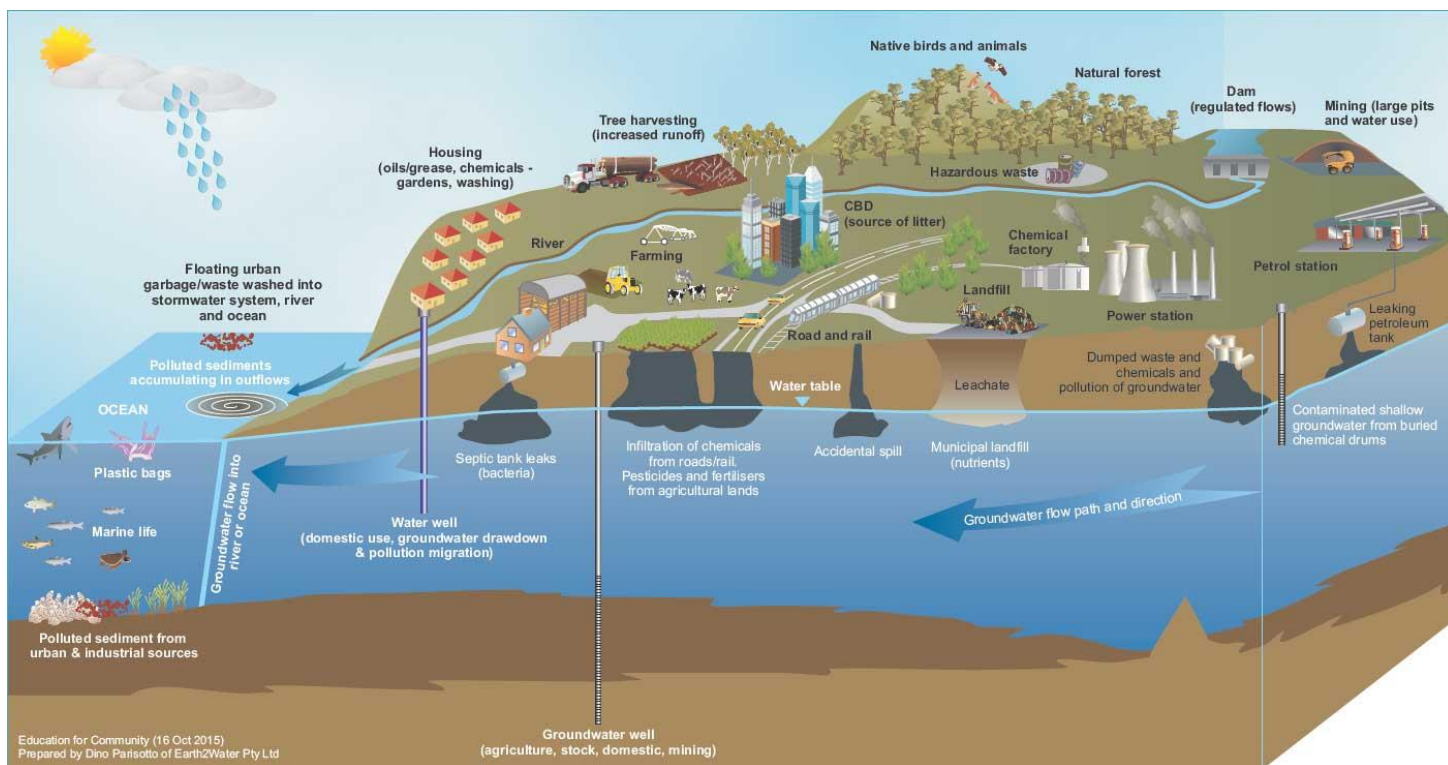
**Aquifer** – a body of porous rock and/or sediment (soil) that holds groundwater.

**Groundwater** – water that has sunk deep into the soil and/or rock and collected in empty spaces underground.

**Porous** – a material (soil/rock) with small spaces, holes or cracks through which liquid or air may pass.

**Soil compaction** – the increase in density or decrease in air spaces between soil particles. Without air spaces, water cannot seep into the ground. Soil compaction can be caused in many ways, for example by lawn mowers, cars, construction machinery and by walking on ground (think of compacted walking paths).

Below is an image showing some human water cycle activities that can pollute water. Look closely and you will see many of the activities discussed in this article. **What we do on the land directly impacts the purity of our groundwater, our lakes, rivers and the ocean.**



Contaminants that pollute water. Please note: There is no underground river or lake in New Hampshire as this image shows. Despite that, pollutants can travel through the ground as depicted.

Credit: <https://www.earth2water.com.au/restoration-model-the-water-cycle-and-human-influences/>; accessed 18 February 2021

These problems are pretty daunting. But people are learning new, safer ways to meet human needs and protect water at the same time. And you too can make a difference today and in the future. The better we understand how we impact water quality and quantity, the smarter we can work to keep it clean and flowing for us all.

The natural water cycle is only half of water’s amazing story. To truly understand water, we must also think about the human water cycle too. The human water cycle is complex. It is made up of many different systems designed to meet a wide variety of needs and it allows us to do wonderful things. But the human water cycle also requires constant attention to keep it working properly and regulations to ensure that what happens higher in the watershed does not injure people and nature downstream. Understanding both the natural water cycle and the human water cycle is an important step in protecting our precious water.

There’s a lot more to this story! Visit the Human Water Cycle videos to learn more!

Apply what you’ve just learned by completing the activity below.

### Human Water Cycle Activity

- 1) In pencil, draw a picture showing BOTH the natural water cycle and the human water cycle combined. The goal is to create a more accurate way to think about the whole water cycle! Use the pictures above and information you learn from the other videos from the Water Festival to draw your picture. Add to your drawing as you learn more. (Example: Draw your neighborhood or your town and how water moves through it.)

- 2) What should this more accurate water cycle be called? Create a title for this new way of understanding how water moves. Put your title at the top of the page.
- 3) Once your drawing is complete, color it and put your name on it.