- - Ground Water "Buried Treasure" - -

Ground Water
GWPC
Protection Council

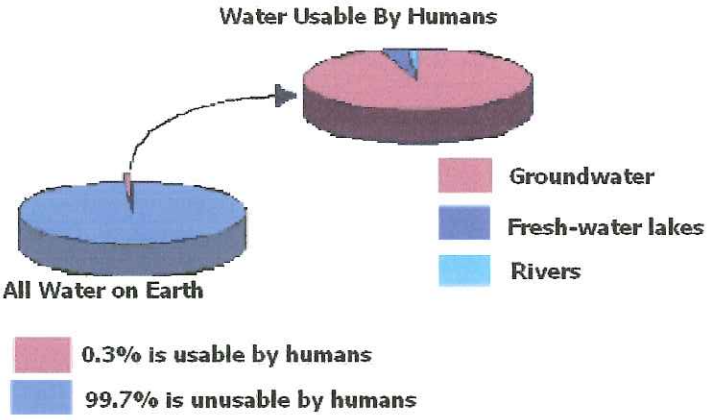
The Ground Water Protection Council is a national association of state regulatory agencies.

Our mission is to promote the protection and conservation of ground water resources for all beneficial uses, recognizing ground water as a critical component of the ecosystem.

The Basics

Water is always in motion. When rain falls to the ground, some of it flows along the surface to streams or lakes, some of it is used by plants, some evaporates and returns to the atmosphere, and some sinks into the ground. Where does the water go then? Imagine pouring a glass of water onto a pile of sand. The water moves into the spaces between the particles of sand. This is ground water.

Ground water is used for drinking water by more than 50 percent of the people in the United States, including almost everyone who lives in rural areas.



Ground water is stored in--and moves slowly through--layers of soil, sand and rock called aquifers. Aquifers typically consist of gravel, sand, sandstone, or fractured rock, like limestone. These materials are permeable because they have large connected spaces that allow water to flow through. The speed at which ground water flows depends on the size of the spaces in the soil or rock and how well the spaces are connected.

Ground water can be found almost everywhere. The area where water fills the aquifer is called the saturated zone (or saturation zone). The top of this zone is called the water table. The water table may be located only a foot below the ground's surface or it can sit hundreds of feet down. It can rise or fall depending on many factors. Heavy rains or melting snow can cause the water table to rise; over pumping or drought can cause the water table to fall.

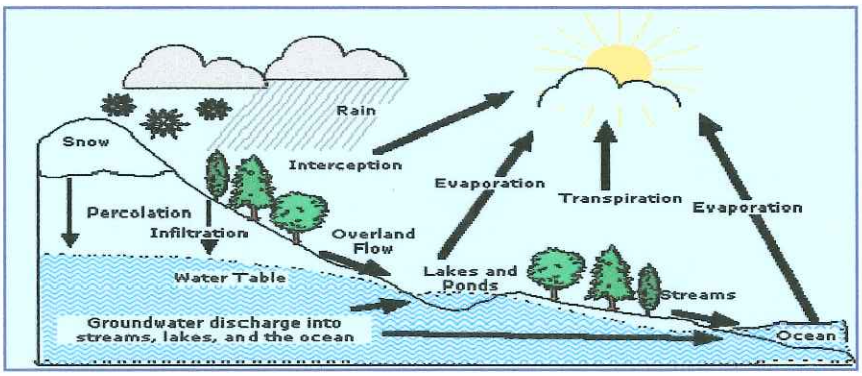
Water in aquifers may be brought to the surface naturally through a spring or can be discharged into lakes and streams. Ground water can also be extracted through a well drilled into the aquifer. All of these cause ground water to interact with the other waters of the hydrologic cycle.

Ground water supplies are replenished, or recharged, by rain and snow melt. In some areas of the world, people face serious water shortages because ground water is used faster than it is naturally replenished. In other areas ground water is polluted by human activities. For more information on ground water, visit www.groundwater.org.

"When the well's dry, we know the worth of water." - **Benjamin Franklin**

The Hydrologic Cycle

The idea of separate water bodies on this earth (oceans, lakes, streams, underground and atmospheric) is a myth. In truth, all water is related in what is called the hydrologic cycle, in which constant interaction exists between all sources. Contaminating one water source leads to the contamination of others.

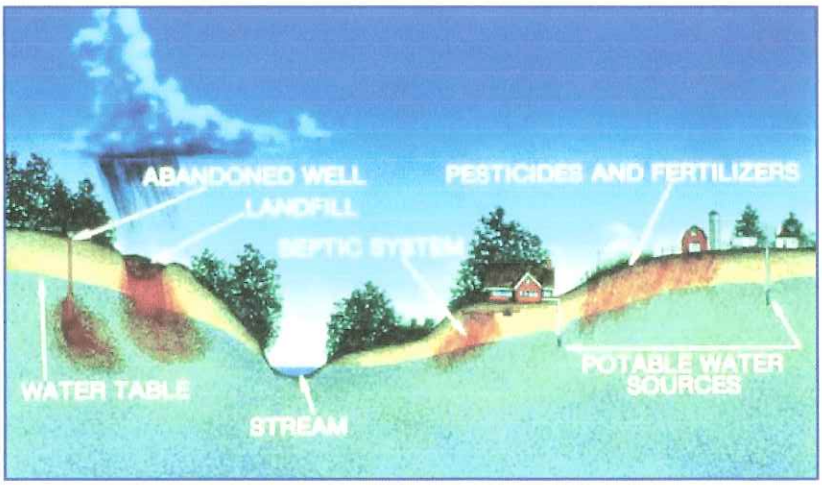


The hydrologic cycle begins when the process of evaporation releases water vapor into the atmosphere. The vapor condenses as it forms into clouds. This water returns to the ground through precipitation – rain. Water runoff soaks into the soil, penetrating deep into the ground until it becomes ground water, which is found in aquifers below the surface. We come into contact with ground water when it is pumped for uses such as irrigation and drinking water or when it discharges into a lake or stream. From there, the cycle begins again.

Threats to Ground Water

There is no doubt that ground water is an important and valuable resource, as it provides half of all drinking water supplies in the United States. But many threats exist to both the quantity and quality of ground water. And remember, contamination of ground water affects the quality of other waters in the hydrologic cycle. Here are some of the threats to ground water quality and quantity:

Use – Simply put, we use a lot of ground water. Although many think of it as an abundant resource, it is limited. There are many uses of ground water including municipal and rural use for drinking water and sewage systems, agricultural use for irrigation and livestock, and many industrial uses. Overuse of ground water can obviously result in quantity issues, but over use can also cause problems with water quality because it limits interaction with surface waters and can cause them to be more vulnerable to pollution.



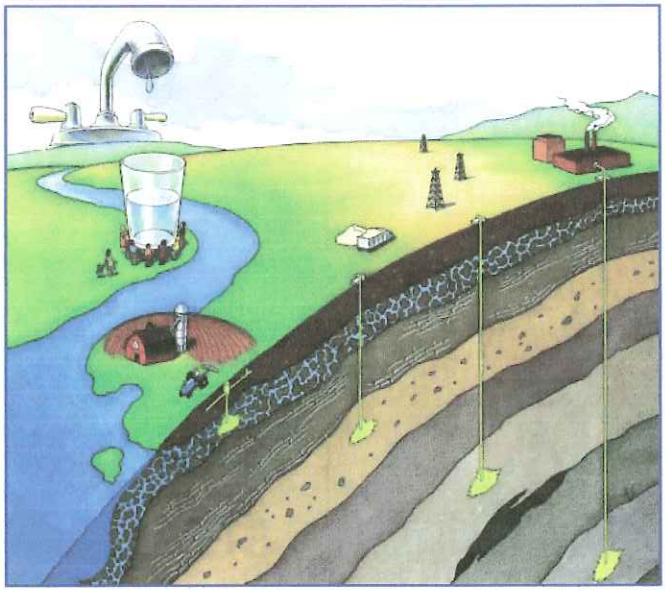
Storm Water – Rainfall in urban areas can threaten ground water by carrying contaminants into the ground water. There are three main types of storm water pollution: **litter**, such as cigarette butts, cans, paper or plastic bags, **chemical pollution**, such as detergents, oil or fertilizers, **'natural' pollution**, such as leaves, garden clippings or animal droppings. This pollution ends up discharging into waterways as sediment, sludge and solids. The most effective way to reduce this problem is to prevent pollution entering the storm water system.

Onsite Wastewater Treatment Systems – Sewage systems dispose of waste from homes and businesses. Proper maintenance, construction and use can protect ground water resources. However, improper use and poor maintenance can lead to contamination of water supplies from bacteria, viruses, and other pollutants.

Abandoned Mines – A major problem resulting from abandoned mines is acid mine drainage (AMD). Streams are adversely affected by surface run-off and ground water discharges associated with abandoned underground mine pools. Acid mine drainage can also contaminates aquifers and impact private water supplies.

USTs - An underground storage tank system (UST) is a tank and any underground piping connected to the tank that has at least 10 percent of its combined volume underground. About 680,000 underground storage tank systems nationwide store petroleum or hazardous substances that can harm the environment and human health if the contents escape or are released.

Who Protects Your Ground Water?



So far we've covered what ground water is, how it interacts with other components of the hydrologic cycle, its importance as a resource, and some of the many threats to its quality and quantity. But who's in charge? Who protects our ground water from contaminants? Who oversees remediation for contaminated ground water? Who ensures that industry and private uses to do not threaten this resource as a common good? The answer: **state and local government.**

Currently there is no federal program to oversee ground water protection. However, each state government has an agency or multiple agencies that are charged with protecting a piece of the ground water "pie." State agencies protect ground water in a variety of ways through several programs including:

- **Public water supply**
  By regulating the quality of the water we drink
- **Wellhead protection**
  By preventing pollution of underground sources of drinking water
- **Source Water Protection**
  By protecting water from streams, rivers, lakes, or underground aquifers which is used to supply private wells and public drinking water
- **Underground Injection Programs**
  By regulating the disposal of waste streams in a way that ensures the protection of ground water
- **UST Programs**
  By detecting and preventing releases from underground storage tanks
- **Ground Water Monitoring**
  By monitoring for changes in ground water quantity and quality
- **Resource Management**
  By regulating oil, gas, and mineral recovery to ensure the protection of ground water.

State programs do an excellent job of running these programs. However, funding is an issue. Because of the multiple demands on government, state agencies do not always have adequate funding or staff to implement all of these important ground water protection efforts.

What can I Do?

Although programs exist to help protect our sources of drinking water, including ground water, we the users are the most important actors in protecting these resources. In order to ensure continued resources we must rise above being mere users and become stewards. Here are some things you can do to help protect **your** ground water.

1 - Be aware – Do you know where the tap water in your house comes from? Is it ground water or surface water? Does it come from a spring, lake or other public water supply?

2 - Be mindful – Protect your ground water from household pollutants. Do you use household chemicals and dispose of them down the drain? Instead, try organic gardening and natural fertilizers and pesticides. Cut down on household chemical use and learn to dispose of chemicals properly.

3 - Use Less – What are the main uses of water in your household? How can you cut back on use and waste? Is the shower running for five minutes before you climb in? That's 25 gallons. Didn't finish that glass of water? Don't pour it down the drain, water a plant. Do you use drought tolerant landscaping specific to your region? If not, try terrascaping.

4 – Get involved – Get involved in your community's land use planning and zoning decisions. Are you aware of changes in your watershed that may pose potential threats to your water supply? Stay involved and speak up.

Here are 10 more ways you can help protect and conserve ground water:

- Dispose of chemicals properly.
- Take used motor oil to a recycling center.
- Limit the amount of fertilizer used on plants.
- Take shorter showers.
- Shut off water while brushing teeth.
- Run full loads of dishes and laundry.
- Check for leaky faucets and have them fixed.
- Water plants only when necessary.
- Keep a pitcher of drinking water in the refrigerator.
- Get involved in water education.
- Volunteer with a ground water monitoring program ⇨⇨⇨⇨⇨⇨⇨⇨⇨⇨

This fall the Ground Water Protection Council will produce a national report on ground water. It will outline the importance of ground water as a resource, sustainable only with our help.

Ground Water "By the Numbers"

- **97%** of the earth's water is salt water, only 3 % is fresh water.
- Of the fresh water:
  - **77%** is frozen in ice and glaciers
  - **22%** is ground water
  - And **less than 1%** is found in lakes, marshes, rivers, and streams.
- About **27 trillion** gallons of ground water are withdrawn for use in the U.S. each year.
- Ground water contributes about **30%** of stream flow in the U.S.
- Rainfall is the main source of fresh ground water. About **25%** of rainfall in the United States becomes ground water. That is equal to about **300 trillion** gallons per year.
- Ground water is constantly moving. The rate of movement may be as fast as **50 feet** per day or as slow as **50 feet** per 500 years.
- The two major ground water problems are overdraft (withdrawing more water than is being naturally replenished), and unnatural contamination.
- Since water will dissolve more things than any other substance it is very susceptible to contamination.
- It takes **several hundred to several thousand years** for polluted ground water to be cleansed by natural recycling.

For more information on ground water, visit:
www.gwpc.org - www.groundwater.org - www.groundwater.com.