Groundwater

A Reading A–Z Level S Leveled Book
Word Count: 1,059

Connections

Writing

Write an acrostic poem about groundwater. Use the word *groundwater* as the acrostic. Begin each line of your poem with the letters in the word.

Science and Social Studies

Write a public service announcement persuading members of your community to conserve water. Include why conserving water is important and what can be done to help.

Reading A–Z

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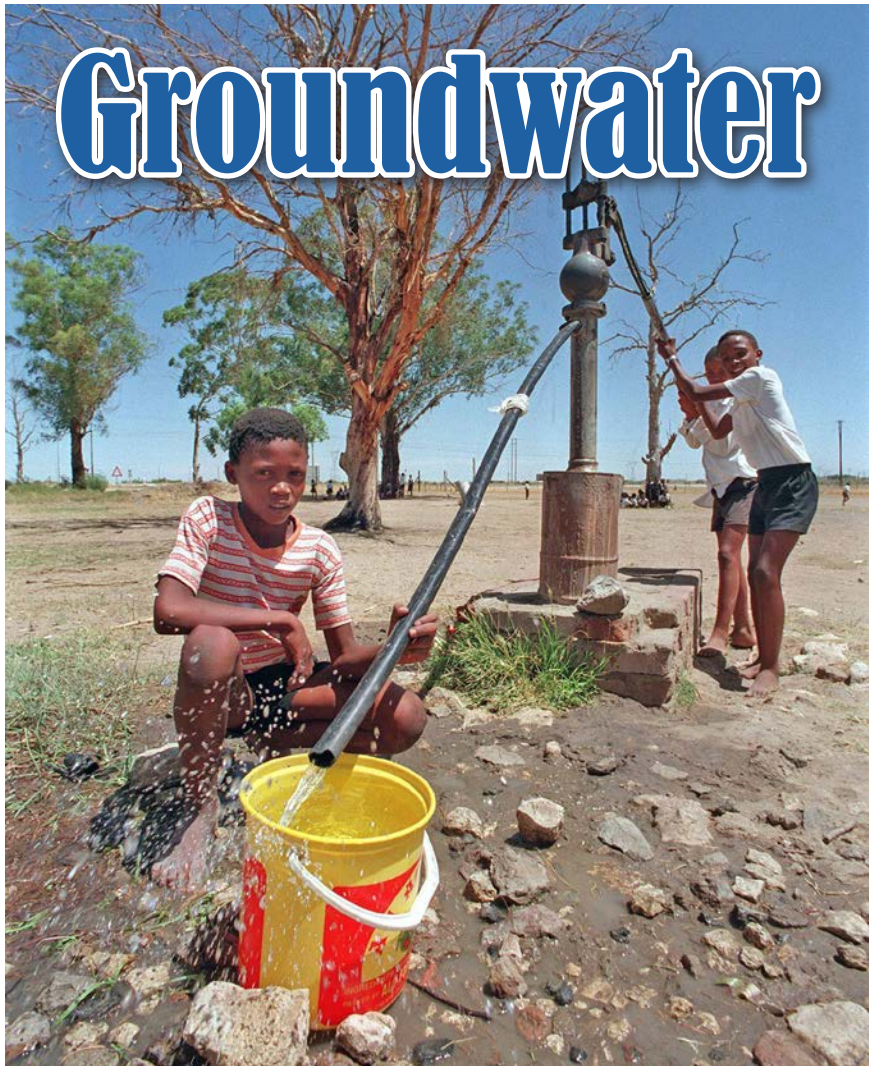
Groundwater



Written by Sean McCollum

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Focus Question

Why is groundwater important?

Words to Know

aquifers
climate change
conserve
crisis
drought
groundwater
irrigate
monitor
resource

Page 3: Ten days after her well dried up in August 2014, a California woman receives 300 gallons (1,136 L) of drinking water.

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Correlation

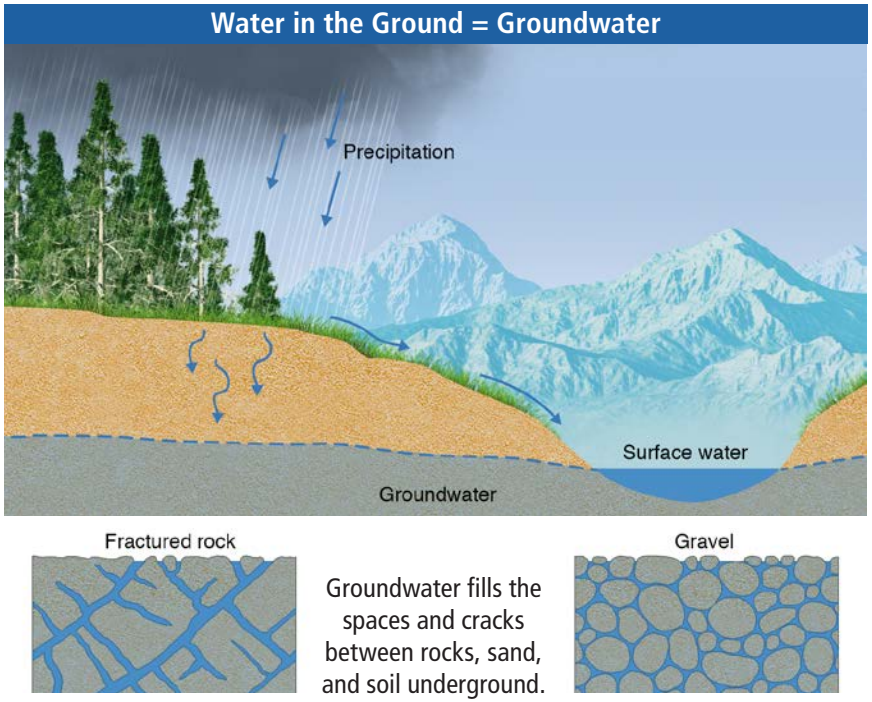
LEVEL S	
Fountas & Pinnell	O
Reading Recovery	34
DRA	43

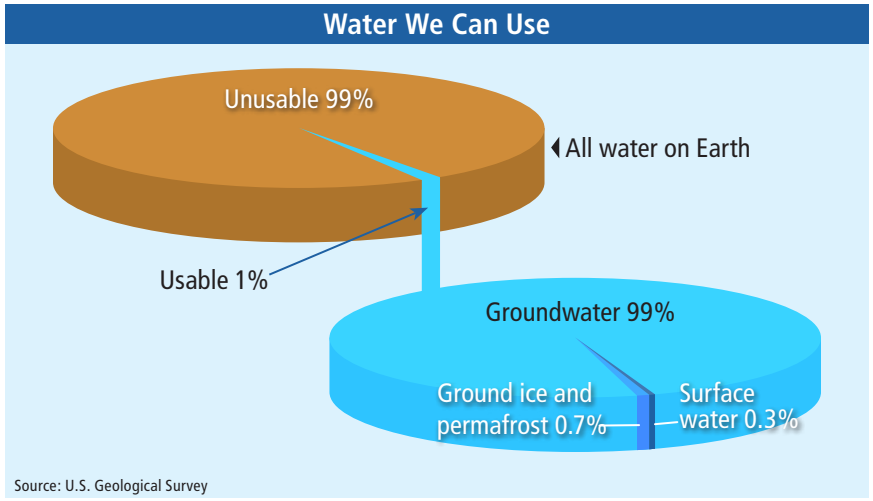
Table of Contents

When the Water Runs Out

Picture getting up one morning, turning on the faucet, and getting nothing but a gurgle. This happened in a part of California that is famous for its fruits and vegetables. Years of **drought** there meant little rain. To **irrigate** their crops, farmers pumped huge amounts of **groundwater** from under the land.

The result was some two thousand dry wells in 2014. Unfortunately, California isn't the only place with a water **crisis**.





What and Where Is Groundwater?

Many of us look at a globe and think the planet holds plenty of water for all our needs. Most of Earth's water is in our oceans, however, and full of salt.

Freshwater keeps us alive, yet very little of Earth's water is fresh. Of that small amount, most is frozen. Scientists say that 99 percent of Earth's usable water is in the ground.

Most groundwater is stored beneath land in **aquifers**. These are underground layers of rock, gravel, and sand that hold groundwater like huge sponges. Rain and melting snow flow very slowly into the surface soil and rock to feed the aquifers.

Aquifers can reach down thousands of feet and extend for thousands of miles. They feed our rivers, lakes, and wetlands. Their freshwater also irrigates the best farming areas in the world. For more than a century, people have been pumping billions of gallons of water from underground to drink, grow crops, and meet other needs. Even during a drought, communities and farms above aquifers can draw groundwater. It keeps many of us from going hungry and thirsty.

The trouble is that groundwater levels are falling fast. People near and far must **conserve** this life-giving **resource**.

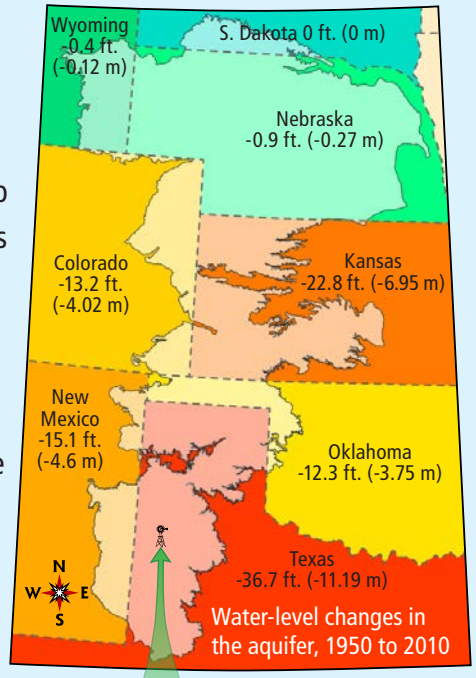
Center-pivot irrigation makes farming possible in many dry regions.

Too Many Straws

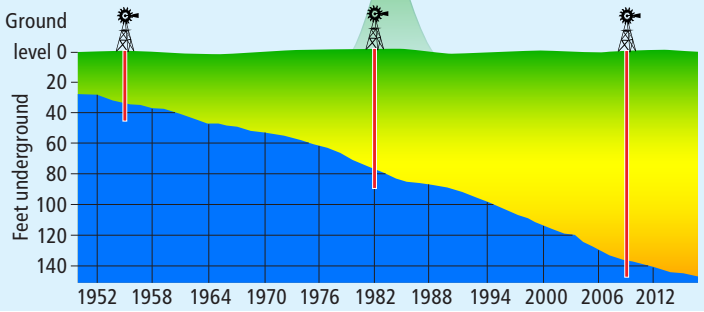
We are pumping groundwater faster than nature can replace it, experts say. Since 1995, water levels have dropped in almost two-thirds of the wells across the United States.

Ups and (Mostly) Downs: The Ogallala Aquifer

The Ogallala Aquifer waters the wheat fields of America—but that water can't last forever. This map shows water-level changes in the aquifer over a span of about sixty years. In some places, water levels are largely unchanged today. In others, they have crashed.



The water level in one Texas well has sunk more than 120 feet (36.6 m).



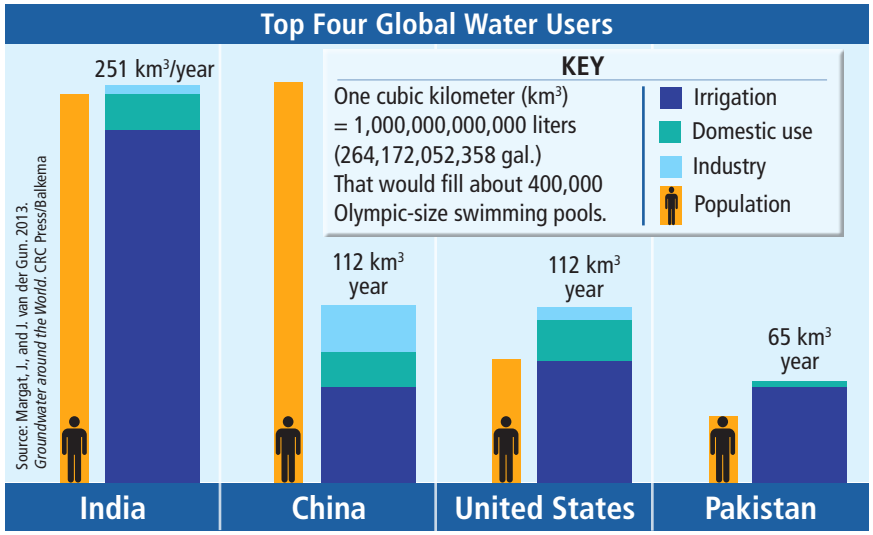
Source: U.S. Geological Survey

Sonoma Valley in California is famous for its fields of grapes.

Competition for groundwater is causing conflict in some farming areas. In Northern California, for example, winemakers grow fields of grapes, which need large amounts of water. Many of these winemakers have drilled deep wells to make sure they can get the groundwater they need. Without it, they might go out of business.

Many smaller farmers and homeowners nearby, though, blame winemakers for sucking up too much of the groundwater they all share. In many cases, these smaller property owners cannot afford to drill deeper wells for themselves. As a result, their shallower wells go dry. It's as if everyone has their straws in the same drink, but some farms and businesses can pay for more and longer straws.

This problem raises big questions: Who owns groundwater? What is fair?



Compare China's population to the United States'. Now compare their water use. Per person, which country is using more water?

Water Fights

Halfway around the world, Pakistan's water supply has dropped by almost 75 percent in the last sixty years. Many in Pakistan blame India, their neighbor to the south. They accuse India of building dams that block river water that would normally flow to them. They say this has forced farmers in Pakistan to pump more groundwater.

India says Pakistan has only itself to blame. It says Pakistan has managed its water poorly. Today, both countries—countries that have fought four wars against each other in the past—face water shortages and growing competition for freshwater.

Experts predict such battles over water will grow worse. If nothing changes, they estimate the world will fall 40 percent short of its water needs by the year 2030. Nearly two billion people worldwide could face severe water shortages, leading to food shortages and famine.

A Syrian girl flees war in 2013.

In time, shortages like these can even lead to war, experts warn. In some places, lack of water has already done just that. In Syria, for example, drought may have helped start a civil war in 2011. As a result, many Syrians have died.

In many places, groundwater is that important—the difference between green farms or dusty fields, life or death.

Staying Out of Trouble

There is an old saying: "It is easier to stay out of trouble than get out of trouble." This is true about groundwater. Fixing this crisis now will be much easier than waiting until aquifers run dry. We have to plan ahead, however.

Drought in California led to many wildfires in 2015.

One growing threat to our groundwater supply is **climate change**. Almost all scientists who study the Earth now agree that it's getting hotter. Climate change may also mean less rain for some areas, and freshwater may be harder to come by.

Another huge challenge is Earth's growing population. More than seven billion people live on our planet now. That figure is expected to reach eleven billion by the year 2100. All of us will need water to drink and grow our food. We must manage our groundwater now, and we can.

Farming Smarter

Our best hope is finding ways to use less water and keep more groundwater in the ground. Experts estimate that about 65 percent of the fresh groundwater Americans pump to the surface is used to irrigate crops. Yet many forms of irrigation waste water. They spray and sprinkle water on the surface, where much of it is lost to evaporation.

Almond trees in bloom

More farmers are using new ways to make sure every drop counts. New meters **monitor** moisture in the soil and turn the irrigation on and off to waste less water. Many fruit and nut orchards now bury irrigation pipes to waste less water, too.

Wheat is one crop that uses less water than corn.

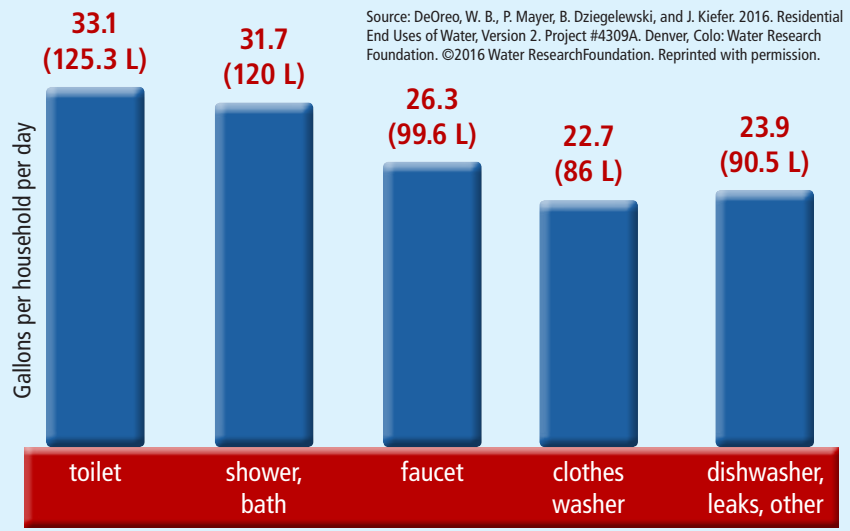
Planting different crops can also help conserve groundwater. In states such as Kansas and Iowa, some farms are switching from corn to other crops, since corn requires a lot of water.

Farmers need new ways to farm. If they do not choose to conserve water, empty aquifers will force them to.

Future Focus

Record drought forced California to conserve water. In just six months, people there went from using as much as 140 gallons (530 L) per person to just 67 gallons (254 L) a day, on average. Across the United States, small changes in water use can save hundreds of gallons in the average American home each week.

The Trouble with Toilets



Did you know that toilets use more water than anything else in your house? They do, according to a 2016 study of water use inside 23,749 homes spread throughout the United States—but not as much as they did in a similar 1999 study. Newer, more efficient toilets help send less water into the sewer. Some families also practice *selective flushing*. That means they don't flush the toilet each time they use it.

By installing low-flush toilets and taking shorter showers, we can use less groundwater. Another small effort that can save gallons is running only full loads in washing machines and dishwashers. Some people are also saving water by replacing thirsty grass in their yards with plants that need less water.

Saving our groundwater isn't easy. People need to drink. Farmers need to irrigate crops to grow our food. Still, we can be smarter about how we use this resource, both now and far into the future.

Some Los Angeles homeowners swapped grass for other plants in the dry summer of 2014.

Glossary

aquifers *(n.)* underground layers of rock, sand, and other material that can hold and absorb groundwater (p. 5)

climate change *(n.)* the long-term, lasting changes in Earth's weather patterns or the weather patterns of a region (p. 11)

conserve *(v.)* to protect a natural place or resource so it will last longer (p. 6)

crisis *(n.)* a dangerous or unstable time or situation that demands attention (p. 4)

drought *(n.)* a long dry spell with little or no rainfall (p. 4)

groundwater *(n.)* water held underground in soil or rock, often feeding springs and wells (p. 4)

irrigate *(v.)* to supply land with water, especially to help crops grow (p. 4)

monitor *(v.)* to observe the progress of something (p. 12)

resource *(n.)* a supply of something valuable or very useful (p. 6)