

Water Supply: Groundwater

by Sophia



WHAT'S COVERED

In this lesson, we will cover the topic of water supply. We will discuss the global water supply and its sources, focusing primarily on groundwater, where our drinking water comes from. We will also discuss dams and their impacts and explore why some people are working toward removing them. Specifically, this lesson will cover the following:

1. Sources of Water

Only 3% of all the water on Earth is freshwater, and only 1% of that is accessible by humans. This 1% comes from lakes, streams, and aquifers. Aquifers are underground sources of water. As human population increases, competition for that 1% of accessible freshwater will increase as well.

1%
Freshwater
available



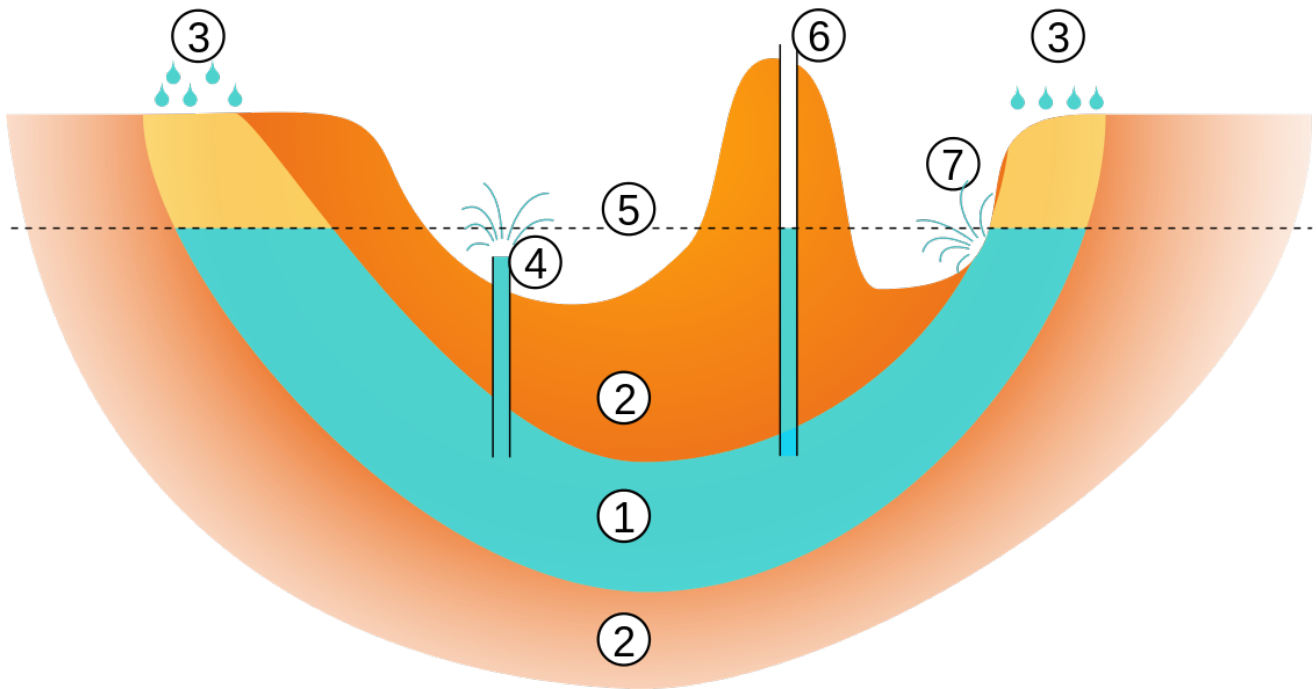
2%
Freshwater
frozen /
unavailable



2. Groundwater

Pockets of groundwater can be found in aquifers underground. Groundwater makes up only 1% of the water on Earth, yet it provides the majority of our drinking water and also a portion of water needed for agricultural and industrial use.

Commonly, wells are drilled or dug down to access the groundwater (see diagram below).



Usually, such wells are lined to keep out contaminants, both biological and chemical. However, if they're not, various microorganisms and chemicals can seep in and contaminate the water.

Over time, if the rate of water consumption exceeds the rate at which rainfall can recharge the groundwater, it could result in soil drying out. This can be problematic for local vegetation.

In some cases, so much groundwater has been removed that topography can sink and change because it isn't supported by water underneath anymore. Saltwater can also leak into freshwater aquifers as groundwater sources are depleted.

With population growth, groundwater resources are declining, and they are expected to continue to decline in size. It is possible for groundwater to recharge through rainfall, but humans have built impermeable surfaces, such as roads and buildings, that don't allow water to soak into the earth, and instead divert it far away. In addition, human activities have contaminated groundwater resources, primarily through fertilizer runoff.

3. Dams and Their Impacts

While groundwater provides the majority of drinking water, we do utilize rivers, lakes, and streams. We have built dams, like this small one shown below, to manipulate water flow so that we can use it when we need to and release its flow when we don't.



The upstream body of water created by blocking water in a dam is called a reservoir. Reservoirs provide us with water for drinking, agriculture, hydroelectric power, and recreation.

IN CONTEXT

Dams like the Three Gorges Dam, which is the largest dam in the world located in China, can have many negative environmental impacts.

Below is a photograph of the upstream side of the Three Gorges Dam. It's so large that boats look tiny in comparison. Can you see the boat in the background?



On the upstream side of things, dams like Three Gorges can cause a lot of problems when operating, such as flooding during construction or negative impacts for humans and ecosystems

nearby. Whole villages had to be moved for the creation of the Three Gorges Dam.

Because dams disturb the natural flow of rivers and streams, they disrupt natural flood cycles that add nutrients to flood plains. The stagnant water on the upstream side also encourages disease, because insects like mosquitoes thrive in it.

Below is a photograph of the downstream side of the dam. Dams like Three Gorges affect aquatic species, especially migratory ones, because they prevent mobility by fragmenting and altering their habitats.



➞ EXAMPLE Salmon are an aquatic species negatively impacted by dams. In the United States, many dams have impacted salmon migration because they prevent the salmon from swimming upstream.

4. Dam Removal

As a result of negative impacts, there are growing attempts to remove dams from rivers and streams. There are a number of benefits of removing dams, such as the following:

- The natural flow of the river is restored.
- The structural collapse of the dam which could cause catastrophic flooding is prevented.
- The habitats of native aquatic species are improved.
- Mobility for migratory fish species is restored.
- The biodiversity of the area is improved.

- Natural land habitats in the area are restored.
- Nutrients are restored to natural floodplains.



Dam Removal



SUMMARY

In this lesson, we learned about the world's water supply and **sources** of water. We learned that we can use only 1% of the 3% of freshwater on the planet. We learned about **groundwater** resources and aquifers, our primary source of drinking water, and how these sources are declining and becoming contaminated. We discussed **dams and their impacts**, as well as the benefits of **dam removal**.

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