

Encyclopedic Entry

water table

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A **water table** describes the **boundary** between water-saturated ground and unsaturated ground. Below the water table, rocks and soil are full of water. Pockets of water existing below the water table are called **aquifers**.

An area's water table can **fluctuate** as water **seeps** downward from the surface. It filters through **soil**, **sediment**, and **rocks**. This water includes **precipitation**, such as rain and snow. **Irrigation** from crops and other plants may also contribute to a rising water table.

This seeping process is called **saturation**. Sediment or rocks that are full of water are **saturated**. The water table sits on top of what experts call the **zone of saturation**, or phreatic zone. The area above the water table is called the **vadose zone**.

Unlike the tables you'd find in your house, a water table usually isn't flat, or horizontal. Water tables often (but not always) follow the **topography**, or upward and downward tilts, of the land above them.

Sometimes, a water table runs intersects with the land surface. A **spring** or an **oasis** might be the water table intersecting with the surface. A **canyon**, **cliff**, or sloping **hillside** may expose an underground river or lake sitting at the area's water table.

In addition to topography, water tables are influenced by many factors, including geology, weather, ground cover, and land use.

Geology is often responsible for how much water **filters** below the zone of saturation, making the water table easy to measure. Light, **porous** rocks can hold more water than heavy, **dense** rocks. An area underlain with **pumice**, a very light and porous rock, is more likely to hold a fuller aquifer and provide a clearer measurement for a water table. The water table of an area underlain with hard **granite** or **marble** may be much more difficult to **assess**.

Water tables are also influenced by **weather**. They will be usually be higher in **rainy seasons** or in the early spring, as snowmelt filters below the zone of saturation.

Ground cover can contribute to an area's water table. The spongy, absorbent vegetation in **swamps**, for instance, are saturated at least part of every year. Water tables in swamps are nearly level or even higher than the surface.

Land use can also influence an area's water table. **Urban areas** often have **impervious surfaces**, such as parking lots, for instance. Impervious surfaces prevent water from seeping into the ground below. Instead of entering the area's zone of saturation, water becomes **runoff**. The water table dips.

Aquifers

Water tables are useful tools for measuring aquifers, saturated areas beneath the water table. Aquifers are used to extract water for people, plants and every organism living on the surface of the Earth.

Some water tables are dropping very quickly, as people drain aquifers for **industry**, **agriculture**, and private use. Scientists call this process "**aquifer depletion**."

In regions such as North Africa, people are using the water in aquifers faster than it can be replaced by rain or snow. People and businesses in North Africa are *not* using more water than people in other areas, but their aquifers, beneath the Sahara Desert, are much shallower than aquifers in North America or Australia. Parts of North Africa are experiencing aquifer depletion.

Even the enormous aquifers in North America can be threatened with aquifer depletion. The Oglalla Aquifer stretches more than 450,000 square kilometers (174,000 square miles) through parts of the U.S. states of South Dakota, Wyoming, Nebraska, Colorado, Kansas, New Mexico, Oklahoma, and Texas. The Oglalla Aquifer holds more than 3,000 cubic kilometers (2.4 billion acre-feet) of [groundwater](#).

The Oglalla Aquifer is one the most important source of water for irrigation, drinking, industry, and [hygiene](#) in the U.S. However, aquifer depletion became a threat in the 20th century, as industrial agriculture and development drained the aquifer faster than it could naturally replenish itself.

Although the water table varies throughout the Oglalla Aquifer, it is generally 15 to 90 meters (50 to 300 feet) below the land surface. Industrial agriculture and development in the 1940s and 1950s contributed to lowering the water table by more than a meter (3.5 feet) year. In parts of the Texas Panhandle, where the water table was lowest, the aquifer was nearly drained.

Improved irrigation practices have slowed the rate of aquifer depletion, and some water tables in the Oglalla Aquifer have risen.

VOCABULARY

Term	Part of Speech	Definition
agriculture	<i>noun</i>	the art and science of cultivating the land for growing crops (farming) or raising livestock (ranching).
aquifer	<i>noun</i>	an underground layer of rock or earth which holds groundwater.
aquifer depletion	<i>noun</i>	process by which people pump more water out of aquifers than can be replaced by rain or snow.
assess	<i>verb</i>	to evaluate or determine the amount of.
boundary	<i>noun</i>	line separating geographical areas.
canyon	<i>noun</i>	deep, narrow valley with steep sides.
cliff	<i>noun</i>	steep wall of rock, earth, or ice.
crop	<i>noun</i>	agricultural produce.
dense	<i>adjective</i>	having parts or molecules that are packed closely together.
filter	<i>verb</i>	to remove particles from a substance by passing the substance through a screen or other material that catches larger particles and lets the rest of the substance pass through.
fluctuate	<i>verb</i>	to constantly change back and forth.
geology	<i>noun</i>	study of the physical history of the Earth, its composition, its structure, and the processes that form and change it.
granite	<i>noun</i>	type of hard, igneous rock.
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ground cover	<i>noun</i>	grasses, shrubs, and other vegetation covering a surface of the Earth.
groundwater	<i>noun</i>	water found in an aquifer.
hill	<i>noun</i>	land that rises above its surroundings and has a rounded summit, usually less than 300 meters (1,000 feet).
hygiene	<i>noun</i>	science and methods of keeping clean and healthy.
impervious surface	<i>noun</i>	boundary that does not allow water to penetrate it.
industry	<i>noun</i>	activity that produces goods and services.
intersect	<i>verb</i>	to cross paths with.
irrigation	<i>noun</i>	watering land, usually for agriculture, by artificial means.
land use	<i>noun</i>	range of purposes people put to the earth.
marble	<i>noun</i>	type of metamorphic rock.
oasis	<i>noun</i>	area made fertile by a source of fresh water in an otherwise arid region.
phreatic zone	<i>noun</i>	area below a water table, where groundwater saturates the rocks and soil. Also called a zone of saturation.
plant	<i>noun</i>	organism that produces its own food through photosynthesis and whose cells have walls.
porous	<i>adjective</i>	full of tiny holes, or able to be permeated by water.
precipitation	<i>noun</i>	all forms in which water falls to Earth from the atmosphere.
pumice	<i>noun</i>	type of igneous rock with many pores.
rainy season	<i>noun</i>	time of year when most of the rain in a region falls.
replenish	<i>verb</i>	to supply or refill.
rock	<i>noun</i>	natural substance composed of solid mineral matter.
runoff	<i>noun</i>	overflow of fluid from a farm or industrial factory.
saturate	<i>verb</i>	to fill one substance with as much of another substance as it can take.
saturation	<i>noun</i>	process by which one substance, such as sand, is filled with another substance, such as water.
season	<i>noun</i>	period of the year distinguished by special climatic conditions.
sediment	<i>noun</i>	solid material transported and deposited by water, ice, and wind.
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seep	<i>verb</i>	to slowly flow through a border.
soil	<i>noun</i>	top layer of the Earth's surface where plants can grow.
spring	<i>noun</i>	small flow of water flowing naturally from an underground water source.
swamp	<i>noun</i>	land permanently saturated with water and sometimes covered with it.
topography	<i>noun</i>	study of the shape of the surface features of an area.

urban area	<i>noun</i>	developed, densely populated area where most inhabitants have nonagricultural jobs.
vadose zone	<i>noun</i>	area above an region's water table.
water table	<i>noun</i>	underground area where the Earth's surface is saturated with water. Also called water level.
weather	<i>noun</i>	state of the atmosphere, including temperature, atmospheric pressure, wind, humidity, precipitation, and cloudiness.
zone of saturation	<i>noun</i>	area below a water table, where groundwater saturates the rocks and soil.

For Further Exploration

Websites

- National Geographic Environment: Water Pressure
- National Geographic Environment: Freshwater
- USGS: Water Science for Schools—Earth's Water: Groundwater



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