How water reaches an aquifer

The water stored in the aquifer is replenished, or recharged, by rainfall. On average, Florida receives 50 inches of rain each year. However, not all of the rain reaches the aquifer. About 37 inches evaporates or runs off the land into surface waters, like lakes, rivers and streams, before it has a chance to soak into the ground. This leaves, on average, 13 inches annually to recharge the aquifer in limited areas.

Scientists have determined — or "age dated" — the water in the Floridan aquifer as being between 17 to 26,000 years old. The age of the water varies because of the time it takes water to seep vertically and move horizontally through different types of soil. Sandy soils are most suited to allowing water to seep into the ground, while soils such as clay are more difficult to penetrate.

Other water sources

Besides practicing water conservation, another way to make sure that high-quality drinking water is available in an aquifer when it is needed, is for people to lessen their dependence on groundwater. Alternative sources to groundwater include reclaimed water and removing salt from brackish (slightly salty) surface water and seawater.

On the cover
Striped bass take shelter in Silver Glen Springs, in the Ocala National Forest near Salt Springs, Fla., in this photograph by John Moran.

St. Johns River
Water Management District

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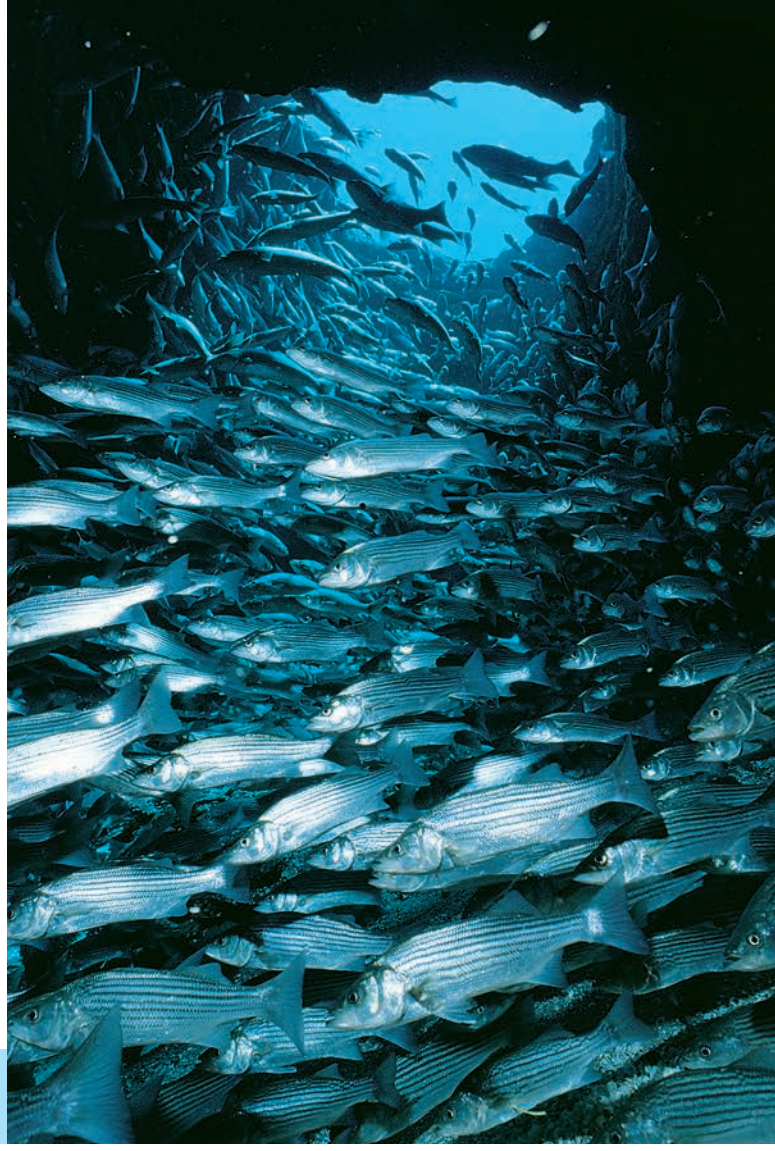
St. Johns River
Water Management District

Florida's Aquifers

Our most precious water resource



Florida's aquifers

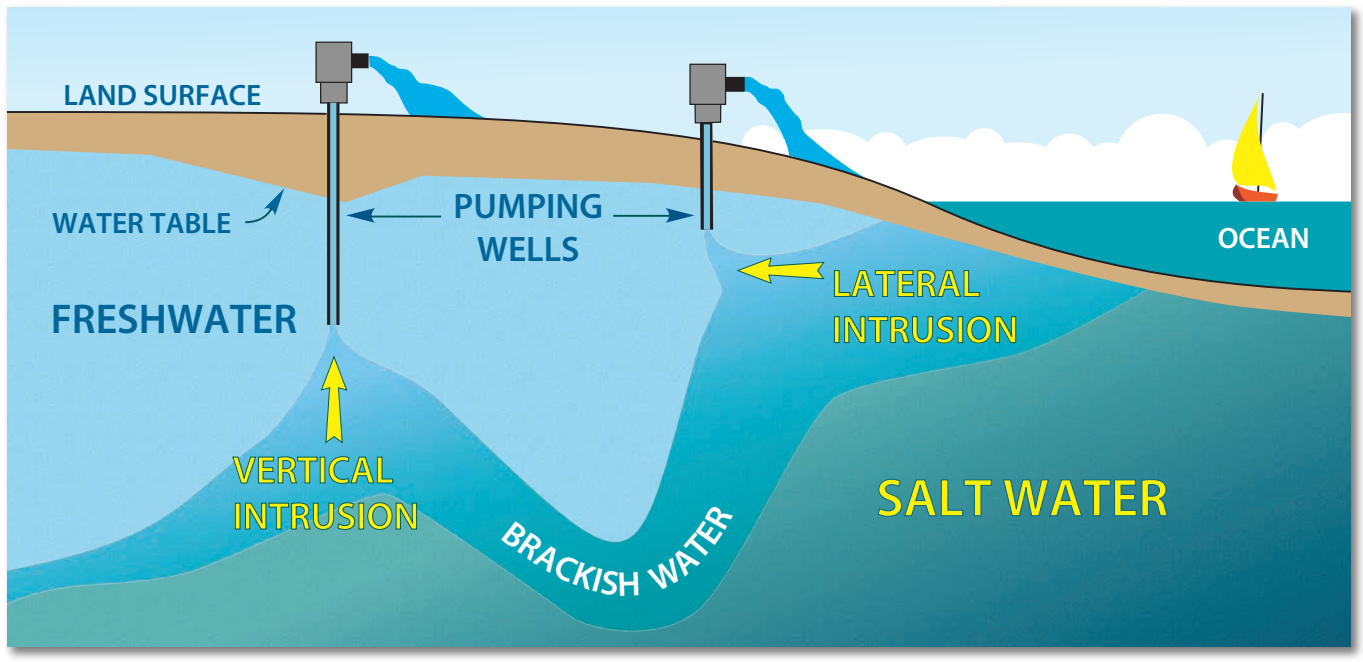
Turning on a faucet to get a drink of water or to take a shower is something many people in Florida do without thinking about where the water comes from.

Since the time when indoor plumbing became common, individuals, industries and utilities supplying water to the public have drilled wells into the underground water source — called an aquifer — to pump freshwater to the earth's surface for a variety of uses. More than 90 percent of people in northeast and east-central Florida use groundwater, which comes from an aquifer, as their water supply. The largest aquifer in the southeastern United States is the Floridan.

What is an aquifer?

Aquifers can be thought of as vast underground, porous rocks that hold water and allow water to move through the holes within the rock. Aquifers can be composed of different types of earthen materials, such as sand, shell and limestone. Fresh and salt water fill the various sized holes in the rock. Freshwater generally fills the uppermost part of aquifers while salt water is present at greater depths.

In some areas, water in an aquifer is confined or overlain by a thick layer of clay and then by more sandy soil extending up to the land's surface. Where water in an aquifer is confined, the water is under pressure. The pressure allows water to rise in a well above the top of the aquifer and, in some places, water rises above the land's surface without a pump, creating an artesian free-flowing well.



The aquifer system is threatened by overpumping, or the removal of too much freshwater, which allows salt water to move into areas where freshwater used to be. This process is known as salt water intrusion.

Water quality varies

In some areas, water in the Floridan aquifer is not suitable for drinking without some type of chemical treatment because it contains various minerals or salts.

Salt water, which is heavier than freshwater, can seep into drinking water wells — a process known as saltwater intrusion — making the water too salty to drink.

Though salt water is present everywhere in the aquifer deep below the freshwater, saltwater intrusion occurs when wells are drilled too deep or when too much freshwater is pumped from the aquifer, allowing salt water to replace freshwater.

Threats to the aquifer

The aquifer systems in northeast and east-central Florida are impacted daily by people's activities. Changes in the landscape and land use, such as paved roads, parking lots, shopping centers, and housing developments and other buildings, tend to alter the quality and quantity of water that seeps into an aquifer.

An aquifer's water quality is increasingly vulnerable to sources of pollutants — such as nutrients in lawn fertilizers, pesticides and other chemicals, and by animal wastes — that run off of backyards or other developed areas and seep into the ground.

Water for many uses

Besides supplying drinking water to many of the millions of Florida residents and the state's visitors, recreational opportunities are found in water that escapes from aquifers. Springs from the aquifer system are found in many places, including the Atlantic Ocean, lakes and rivers.

In these unique places where the aquifer's waters can escape their deep holding places — known as springs — the water gushes forcefully toward the earth's surface.

Springs can be seen without having to use scuba or snorkeling gear at attractions like Silver Springs in Marion County, where visitors only have to look through the glass bottom boats.

A glass bottom boat moves over the "boil," or outlet, of Silver Springs.

In other areas, children of all ages find delight in hot summer months as they jump into the cool spring waters that form or flow into lakes and streams. Such springs are Alexander Springs (Lake County), Salt Springs (Marion County) and Silver Glen Springs (Marion County).

Water for the future

Though there appears to be a vast supply of water today in the aquifer system, we must maintain a balance with nature. People draw water out of aquifers for drinking and for agricultural and industrial uses. The rain that fills aquifers is also needed in lakes, rivers, estuaries and wetlands to meet nature's needs.

The St. Johns River Water Management District works daily to help maintain a balance between people's needs and nature's needs by coordinating regional water supply planning and evaluating applications for large uses of water, by educating the public on ways to conserve water, and by protecting, restoring and enhancing water bodies for the wildlife and people who use them.

One way each person can assist in protecting water resources is by using water wisely and only using the amount necessary. Overwatering lawns and landscapes is a wasteful use of water, and watering restrictions help ensure the efficient use of water. Watering wisely promotes healthier lawns and landscapes, and conserves our precious water resources. To learn more about watering restrictions in effect in your area, visit *floridaswater.com/wateringrestrictions*.

Aquifer facts

- The largest aquifer in the southeastern United States is the Floridan. The Floridan aquifer is found beneath all of Florida and portions of Alabama, Georgia and South Carolina, and extends into the Gulf of Mexico and the Atlantic Ocean.
- The Floridan aquifer averages 1,000 feet thick, and freshwater can extend to a depth of 2,000 feet below land surface. Freshwater is thickest in the central portions of the state and rapidly thins toward the coast and the south.
- People who live in areas where the Floridan aquifer is not suitable for drinking without treatment get their drinking water primarily from surface water or shallow aquifers. One such shallow aquifer is the Biscayne, which lies under Dade, Broward and Palm Beach counties. Another type of shallow (or surficial) aquifer — known as a sand and gravel aquifer — is in Pensacola. The surficial aquifer is the source of drinking water in St. Johns, Flagler and Indian River counties, and in the Titusville and Palm Bay areas.
- In general, the water that comes from deeper aquifers is considered better than the water that comes from shallow aquifers because deeper aquifers are less susceptible to contamination.

About the photographs
Left to right: One of the boils of Salt Springs in Marion County; a swimmer explores the crevasses of Salt Springs while snorkeling; water towers store treated groundwater for consumption; a scuba diver photographs the wildlife in the depths of Ginnie Springs in Alachua County.