

## SPRINGS

Springs have long been one of Florida's most valued natural and scenic resources. In 1513 the Spanish explorer Ponce de León came to Florida seeking a spring called the Fountain of Youth. Native Floridians used springs for water supply and fished in the streams formed by the springs. Many of Florida's springs are now tourist attractions. Several springs have been developed commercially, including Silver and Rainbow, while others have been incorporated into state parks, including Manatee, Homosassa, Wakulla, and Ichetucknee.

Numerous springs probably occur off the coast of Florida, but most are difficult to detect. Submarine springs sometimes can be detected by the appearance of a "boil" at the water surface. Many of these submarine springs are located near the coast, but a few are up to 20 miles offshore.

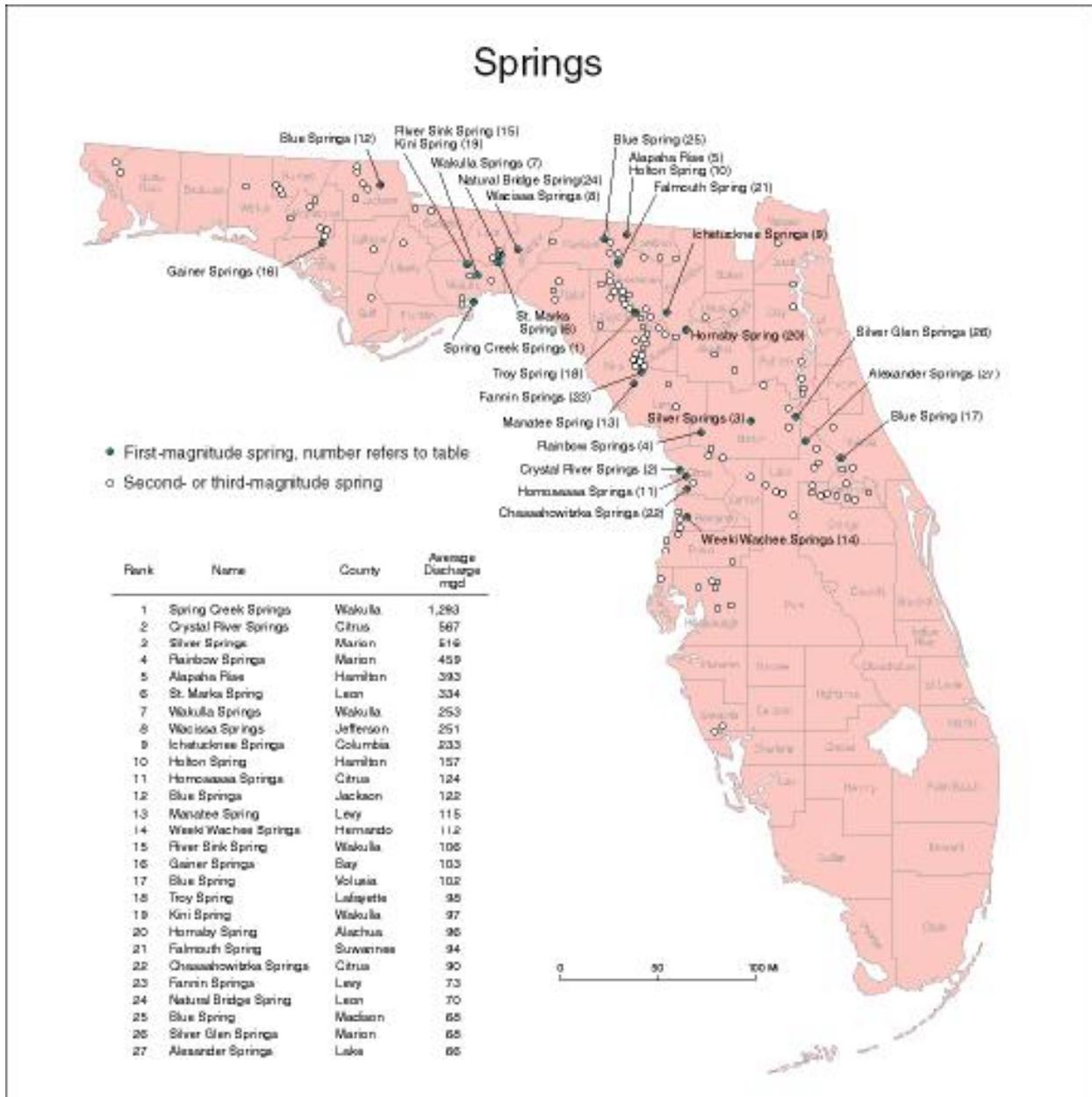
Springs are common in karst areas and are places where groundwater discharges through natural openings in the ground. Florida has about 320 known springs. The outflows from the springs range from less than 1 gallon per minute to 1.3 billion gallons per day at Spring Creek Springs, a group of submarine spring vents off the coast of Wakulla County. The known springs have a combined outflow of nearly 8 billion gallons of water per day. Florida has 27 first-magnitude springs or groups of springs (with flow greater than 64.6 million gallons per day) out of a total of 78 in the nation. All of the springs issue from the Upper Floridan aquifer, and nearly all of them are located in areas where the confining unit above the Upper Floridan aquifer is absent or is less than 100 feet thick. The distribution of large springs discharging from the Upper Floridan aquifer is the direct result of dissolution of carbonate rocks, which results in the development of large conduits and caves. Many of these conduits channel the groundwater to the land surface where they become the orifices of major springs.

The natural flow, water quality, and water temperature of large artesian springs remain relatively stable over long periods. Springs can serve as indicators of trends in hydrologic conditions. Records of spring flow are generally more representative of the character of a large part of an aquifer than are records of well flow. Although spring flow is relatively stable over a long period, it does reflect long- and short-term variations in recharge from rainfall as well as changes in water quantity and quality brought about by human activities. Silver Springs, about 5 miles northeast of Ocala and the largest noncoastal spring in Florida, shows a remarkable long-term consistency in flow with short-term variations. The average flow since 1906 has been 530 million gallons per day (mgd), essentially the same as the earliest recorded flow of 531 mgd in 1898. Flow, however, has ranged from 348 to 833 mgd, reflecting variations in amount of rainfall (Heath and Conover 1981).

Large withdrawals of water from wells near a spring can reduce pressure in the aquifer to a level below the spring orifice and thus stop the flow. The only large spring in Florida known to have ceased flowing is Kissengen Spring, about 4 miles southeast of Bartow. The average discharge of the spring, was about 19 mgd. As withdrawals from wells in the area increased, the decline in artesian pressure caused the spring to cease flowing in February 1950 (Peek 1951).

Water quality of Florida's freshwater springs is relatively constant. For example, the water quality of Wakulla Springs remains essentially the same as it was half a century ago. Although groundwater issuing from springs is usually clear, under certain conditions spring water can be turbid or contain brown organic matter, which is typical of many surface waters in Florida. Where turbid water recharges an aquifer near a spring, the water can move quickly, and minimally altered in quality, through solution channels and emerge at the spring. This is common

for some springs in Florida, especially following heavy rainfall. The temperature of springs varies only about 4°C (7.2°F) and averages about 29°C (84°F) in southern Florida and 21°C (70°F) in northern Florida.



## References

- Health, R.C., and C.S. Conover. 1981. Hydrologic Almanac of Florida. U.S. Geological Survey Open-File Report 81-1107. Tallahassee, Florida.
- Peek, H.M. 1951. Cessation of Flow of Kissengen Spring in Polk County. Florida Bureau of Geology Report of Investigations 7, Part 3. Tallahassee, Florida.

## Study Questions

1. Define a "spring."
2. What is a first-magnitude spring? How many does Florida have?
3. Where are most of the springs located in Florida?
4. How does the location of the springs compare to the location of the karst areas? Why is this true?