Springs & Groundwater

Early Warning Systems for Our Groundwater

Springs are natural wonders, mysterious, even mystical. How often people have paused to refresh and wonder—where does all this water come from? How did it get here? While our forefathers had an imperfect knowledge of karst hydrology, they did not question the absolute purity of spring water. How could a substance offered up in such bounty by Mother Earth be otherwise?

People in the Ozarks have depended on springs for many years. Mills were often built along spring branches where the constant flow of water provided power for the wheel. Before refrigerators, springs also served as natural refrigeration on homesteads. Because springs remain near the average annual temperature of an area (about 59F in the Ozarks), they would keep perishables cool—enhanced by building an enclosing structure, the spring house, which often reflected the distinctive architecture of the homestead.

Today, we understand a lot more about springs—their origins, how they work, and how easily they can be polluted—that the cold, crystal-clear water may harbor unseen pollutants, bacteria and chemicals that could make us sick.

Important Natural Resources

This factsheet is not intended to diminish our sense of wonder about springs. Instead, it is meant to increase our appreciation and understanding of them—to illustrate their values and explain why we need to protect them. Springs can tell us a lot about the health of our environment. They serve as sensitive indicators, telling us when our activities on the surface of the land pollute the groundwater below. Springs replenish and sustain Ozark streams and lakes during times that, without springs, such bodies of water would be bone dry. And springs are ultimately connected to the deeper groundwater system or aquifer, the one that thousands of Ozark residents depend on for their drinking water supplies.

Sander Spring, located near the Watershed Center at Valley Water Mill Park, visibly "boils" after a recent storm.

Karst & Groundwater

Karst, from a Slavic word, refers to regions of the world containing bedrock that will dissolve to form caves, springs, sinkholes and losing streams. Karst in the Ozarks forms in landscapes composed of limestone and dolomite bedrock.

Sinkholes are natural inlets for the underground drainage systems (see Watershed Committee "Sinkholes & Karst" factsheet). Vegetated "buffer" areas around sinkholes can help slow and filter runoff before it enters groundwater. Trash and other wastes should never be dumped into sinkholes.

Losing streams are surface streams that leak all or part of their flow directly into groundwater. As with sinkholes, any surface pollution entering a losing stream can transmit rapidly to groundwater.

Aquifer Recharge Area

The area of land that contributes flow to a spring or spring system is called the recharge area. This groundwater flow area does not necessarily correspond to surface watersheds. In fact, water often flows under a surface drainage divide to supply a spring in a different watershed.

The flow of springs is directly tied to precipitation in the recharge area. The amount of flow can even be used to estimate the size of the recharge area. Big springs have big recharge areas.

Dye Tracing

Any material small enough to pass through a spring's internal plumbing system can be used as a tracer. Normally, dyes are used (in small concentrations) to link injection points (for example, a sinkhole) where the dye is introduced, to the point of dye recovery, often a spring. When several injection points are linked to the same spring, we begin to get a picture of the size and shape of the spring's recharge area.

Springs as Indicators

Springs gather flow from relatively large land areas, which can concentrate the effects of pollution and human activity to a single point. Therefore, springs are sensitive indicators and efficient, inexpensive sites (compared to monitoring wells) for monitoring the health of the shallow groundwater. It is very important that we know what is happening to this shallow groundwater—because it can affect the deeper groundwater that most rural wells tap for their drinking water supplies.

Spring Pollution

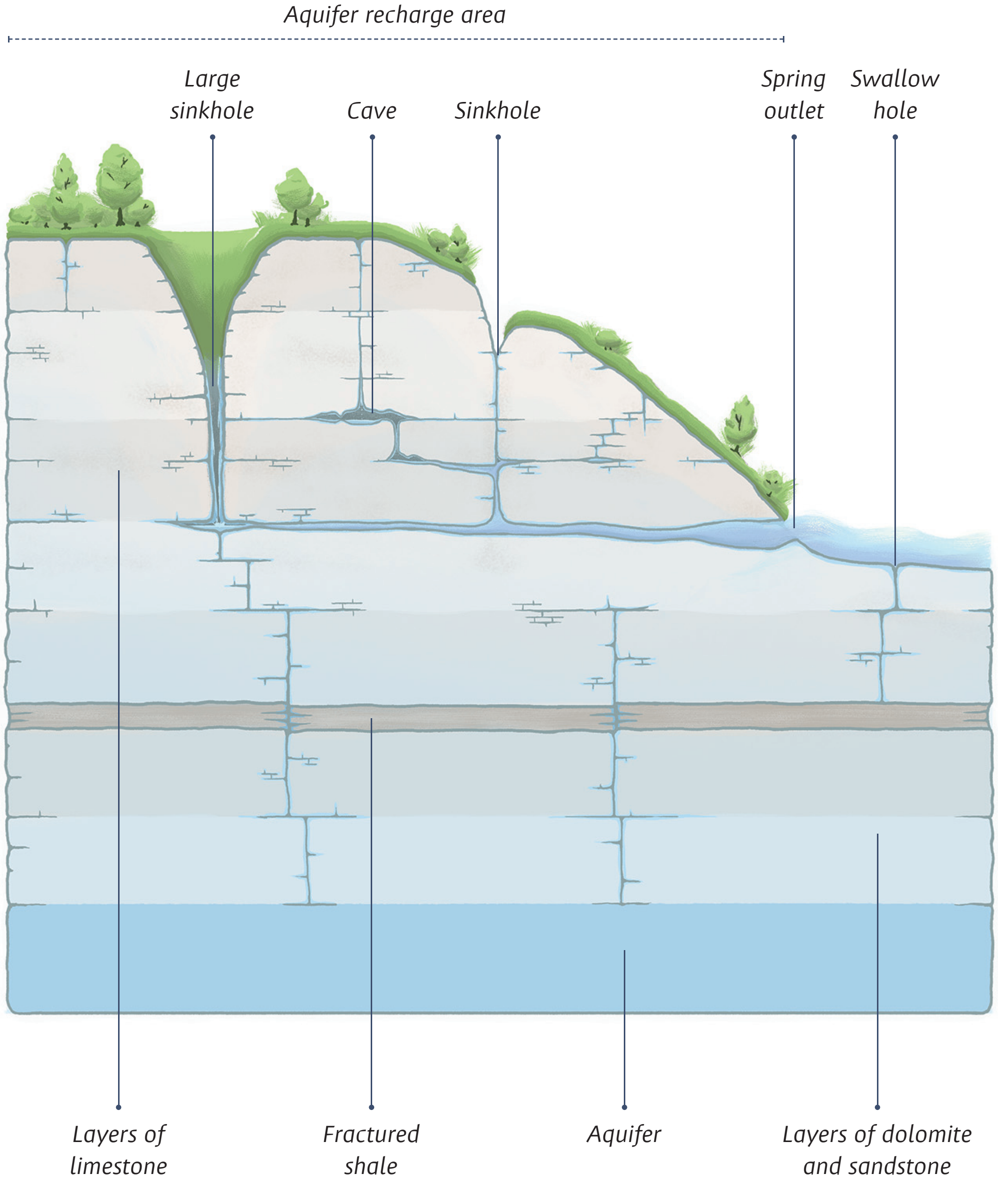
Because of the "open" nature of spring recharge areas, it is easy for surface pollution to find its way into springs. Any pollution that is dumped or drains into a sinkhole, for example, can directly impact water quality at springs. Septic tanks in poor, rocky soil of the Ozarks can leak untreated sewage into the shallow groundwater leading to springs. Spills of gasoline or other chemicals can flow into surface streams, sink into groundwater in losing sections of the stream, and reappear at a spring, even urban runoff flowing into sinkholes can negatively impact shallow groundwater quality.

Drinking Water Supplies

Because springs are so vulnerable to pollution, health departments recommend against their use as drinking water sources without treatment. It is especially important that treatment methods kill bacteria and human pathogens.

Anatomy of a Spring System

Karst geology provides highly connected bedrock passages recharging groundwater. It is important to remember that anything on the surface of the ground can get into our groundwater. The water quality of springs can be an indicator of the quality of the groundwater.



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Sustaining and improving the water resources of Springfield and Greene County through education and effective management of our region's watersheds