K-STATE Research and Extension | Wildcat District

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Southeast Kansas Private Water Wells: Possibilities and Risks

Private water wells can be a safe and effective source of water for households, livestock, gardens, and greenhouses. Although eastern Kansas relies heavily on municipal water systems and surface-water sources such as rivers and lakes, private wells remain useful when public water is unavailable or demand is especially high.

A properly located, constructed, and maintained well can provide dependable water. However, southeast Kansas has complex geology, and well depth, water yield, and water quality can vary greatly from one location to another. This article focuses on household and other small private wells. Large irrigation wells involve a different scale of construction, permitting, and regulation.

Licensed water-well contractors are required to submit a Water Well Completion Record, or WWC-5, to the Kansas Department of Health and Environment. These records are available through a searchable database maintained by the Kansas Geological Survey. The database allows users to find nearby registered wells and review information such as their use, depth, and reported yield. Most available WWC-5 records date from the mid-1970s to the present. Many older wells, including hand-dug wells constructed before modern municipal water systems became common, may not appear in the database.

Aquifers and Wells of Southeast Kansas

Southeast Kansas receives more rainfall than western Kansas, making ponds a more dependable source of livestock water. However, the region lacks aquifers as large or extensive as those in other parts of the state. According to the Kansas Geological Survey database, Neosho County has fewer than 100 registered domestic wells, while some counties outside southeast Kansas have more than 1,000. This does not mean additional wells could not be developed, but it illustrates how much less common they are in this region.

A household well should ideally produce at least 6 gallons per minute, with 10 gallons per minute preferred. The actual yield depends on the well's connection to an aquifer or another water-bearing geological feature. In some parts of southeast Kansas, exceeding 6 gallons per minute can be difficult.

Aquifers are not underground lakes. They are more like wet sponges made of water-bearing rock, sand, or gravel. Their size can range from a few acres to several states.

Many aquifers in southeast Kansas are unconfined or alluvial. Alluvial aquifers are found in sand and gravel deposits along rivers and streams. Wells drawing from these aquifers may be relatively shallow and are often located within a river's floodplain.

A sand-point well is a simple type of shallow well made from perforated pipe with a hardened drive point. The pipe is driven into sandy or gravelly soil until it reaches groundwater. In other cases, even a shallow alluvial well may need to be professionally drilled.

Outside alluvial areas, drilled wells in southeast Kansas may range from approximately 60 to 150 feet deep. One well may produce plenty of water, while another nearby well may yield less than 1 gallon per minute. Low-yield wells may require a storage tank to collect water over time and keep it available during periods of high demand.

A newly constructed well is normally developed by the driller to remove fine sediment and improve water movement into the well. However, well yield can change and decline due to drought, mineral buildup, clogging, or changing groundwater conditions.

Local Drilling Challenges

Southeast Kansas contains layers of limestone, sandstone, shale, and coal, along with deposits of salt, gas, oil, and metals. These materials make the region a complex place to drill.

Local drillers report that many household wells remain shallower than 100 feet because deeper formations may contain saltwater. In some locations, usable groundwater may be drawn from relatively shallow limestone layers, while the lower portion of the well casing provides storage.

Because underground rock layers can change over short distances, two wells located only 100 feet apart may have very different depths, yields, or water quality. Nearby well records and the experience of a licensed local well driller are valuable when evaluating a possible well location.

Scientific studies have not shown that dowsing rods, sometimes called “witching” sticks, are a reliable method for locating groundwater. Local geological information and nearby well records provide a much stronger basis for choosing where to drill.

Household Well Safety and Testing

Proper construction and maintenance are essential for protecting the safety of private well water. Potential contaminants include E. coli, coliform bacteria, nitrate, and, in some cases, metals such as lead, arsenic, and selenium. Salt and sulfur may also affect the taste, odor, or usefulness of water, though they are not always a health concern.

Wells should be located as far as practicable from potential contamination sources, including septic systems, feedlots, fuel storage areas, chemical storage areas, and other structures. Required or recommended setback distances vary by source type and local regulations. In many cases, recommended distances range from 100 to 400 feet.

The well casing should extend at least 1 foot above the ground surface or above the highest expected flood level. It should be protected by a secure, watertight sanitary well cap or seal. The surrounding ground should slope away from the well for at least 15 feet in all directions so surface water does not collect around the casing.

New household wells should be tested three or four times during the first year after construction. After that, the Kansas Department of Health and Environment recommends testing for bacteria and nitrate at least annually. Testing for minerals and other common contaminants may be conducted every one to three years.

Additional testing should be completed if the water’s taste, odor, color, or clarity changes, or after flooding, repairs, damage to the casing, or possible contamination. A cracked casing or surface-water intrusion can make well water unsafe very quickly.

Water-testing kits are available from many local K-State Extension offices.

Kansas generally does not regulate the water quality of private household wells. Well owners are responsible for testing their water and ensuring it is safe. However, the state regulates water-well

construction and contractor licensing, and some cities and counties have additional requirements for permits, location, inspection, or testing.

Cost and Long-Term Value

K-State Extension does not endorse specific businesses, but several well-drilling companies serve southeast Kansas. Local estimates suggest that drilling may cost approximately $45 per foot before adding a pump, pressure tank, electrical work, treatment equipment, or other components. Actual costs vary by location, depth, geology, and contractor.

A private well may not be cost-effective for every household. However, it may be a worthwhile long-term investment for properties using large amounts of water for livestock, greenhouses, gardens, landscaping, or other operations. Properly constructed well casings can last for decades with appropriate maintenance.

For questions about private well safety and water testing, contact your local K-State Extension office.

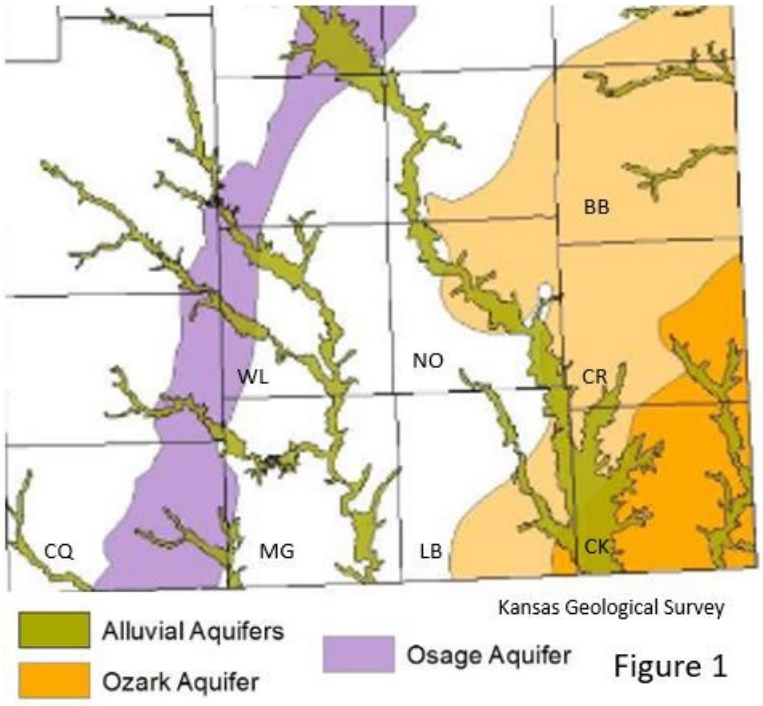

Figure 1

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