USDA Natural Resources Conservation Service
U.S. DEPARTMENT OF AGRICULTURE

Soil and Plant Science Division

Technical Soil Services

North Central Soil Survey Region

Osborne County, Kansas, Pit Pond Site Investigations

Hays, Kansas, Major Land Resource Area (MLRA) Soil Survey Office

Purpose

On Monday, July 7, 2025, Hays, Kansas, MLRA SSO Leader Ryan Still and Soil Scientist Lucas Scott responded to a request from NRCS District Conservationist Roxton Brown from the Osborne, Kansas, NRCS Field Office. Brown asked Still and Scott to investigate two sites in rangeland for two different landowners to determine if these sites were suitable for the excavation of pit ponds that would provide water for livestock.

Background

A pond is a water impoundment made by constructing an embankment, by excavating a dugout or pit, or by a combination of both. When determining suitability, conservationists consider drainage area, erosion potential, groundwater flow, storm and surface runoff, topography, and water quality. Evaluating the soil is vital as well because the soil affects or interacts with all other considerations. Problem soils include, but are not limited to, dispersive clays, collapsible soils, soft clays, expansive clays, low internal erosion resistance soils, loose coarse-grained soils, high soluble content soils, and caliche soils.

For a pond, the soil's clay content needs to be sufficiently high enough to seal up and prevent water seepage. To evaluate the soil at the sites, Still and Scott cored down to bedrock recording properties of each layer encountered, such as the amount of clay and gravel present (fig. 1). By texturing the soil materials, they determined that there was a suitable amount of clay present to create a liner and seal a pit pond at both sites.

Key Outcomes

Still and Scott provided site investigation reports detailing the soil properties and layers. With this information, Brown will be able to determine the best pond design to use for each site. Interactions like this highlight how NRCS conservationists and soil scientists work together to provide landowners with high quality, science-based information they can use when making land-management decisions.

Figure 1.—Still and Scott used a pickup mounted hydraulic soil probe to collect a soil core sample approximately 17-feet long and then determined and recorded the properties of the soil.

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