Ft. Morgan MLRA Soil Survey Office, Colorado

On-Site Soils Investigation for an Irrigation-Regulating Reservoir Through an EQIP Contract

Purpose
A local producer in eastern Colorado recently purchased a piece of farmland to add to their current farm operation. The producer could see the excessive erosion from the field through years of flood irrigation. The producer applied for an Environmental Quality Incentive Program (EQIP) contract that will help cost-share on converting the current flood irrigation system to center pivot irrigation. The conversion will be part of implementing Irrigation Water Management to enhance water efficiency and savings. The producer also plans to build soil health with the use of cover crops, no-till farming, livestock grazing, and diversified crop rotations. There also are plans to plant trees around the border of the property and add pollinator plots in the pivot corners. The goal is to improve the soil health and water use and efficiency on the farm.

The farm receives their irrigation water through a system of ditches that come from a large irrigation reservoir. The typical process of converting from flood irrigation to center pivot irrigation is to either pipe water from the source to the center pivot, or to build a small irrigation-regulating reservoir near the center of the pivot to store the water that is then pumped through the pivot. Both methods were viable options for this particular contract, and the producer chose to build an irrigation-regulating reservoir.

The design and building of the irrigation-regulating reservoir has specific requirements. Based on these requirements, an on-site soils investigation typically is necessary to verify the suitability of the soil to build the reservoir. In eastern Colorado the limiting factors to the suitability of the soil for constructing the reservoir are the amount of clay in the soil, the depth to groundwater, or depth to bedrock. The local NRCS Field Office (FO) working with the producer enlisted the Fort Morgan MLRA Soil Survey Office (SSO) to visit the site and perform the soils investigation. The soil survey data for the area showed no immediate concerns or limitations for being a suitable site.

The Giddings hydraulic soil probe was used to dig two test holes within the proposed site. These test holes showed that there are concerns with both a water table and depth to bedrock in this area. Soft sandstone bedrock was encountered at 24 to 44 inches from the soil surface, with a water table perched on top of the bedrock.

Key Outcomes
The soils data and interpretations provided on-site by the Fort Morgan MLRA SSO helped the producer and NRCS FO to decide on the second option of installing a pipeline to get the water to the pivot.

Performing the on-site investigation also saved the producer time and money that would have been wasted had construction of the reservoir started, only to discover that the site was not suitable.
Photo 1.—Soil material from test hole 001, with the surface at the top of the photo (green markers show the breaks between the different soil horizons).

Photo 2.—Soft sandstone bedrock from test hole 001. Orange/rust-colored areas are masses of oxidized iron; areas of gray colors are where iron was reduced, indicating the presence of a water table.

Photo 3.—Concrete ditch that supplies irrigation water to the field.