Soil Survey of Cherokee County, Kansas

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United States Department of Agriculture, Soil Conservation Service,
in cooperation with
the Kansas Agricultural Experiment Station

CHEROKEE COUNTY is in the southeast corner of Kansas (fig. 1). It has a total area of 378,675 acres, or 592 square miles. The population was 22,631 in 1981. Columbus, the county seat, has a population of 3,351. Baxter Springs has a population of 4,724, and Galena has one of 3,442. The county was organized in 1866.

Farming and related services are the most important enterprises in the county. Small industries also are important. The climate favors cash grain and livestock farming. The main crops are wheat, grain sorghum, soybeans, and tall fescue.

This survey updates the soil survey of Cherokee County published in 1914 (*6*). It provides additional information and larger maps, which show the soils in greater detail.

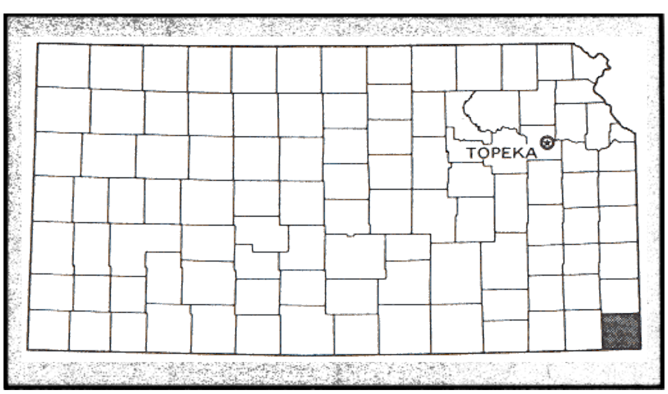

Figure 1.—Location of Cherokee County in Kansas.

General Nature of the County

This section gives general information concerning the county. It describes climate; physiography, drainage, and relief; water supply; and natural resources.

Climate

Prepared by Merle J. Brown, climatologist, Kansas Agricultural Experiment Station, Manhattan, Kansas.

The climate of Cherokee County is typical continental, as can be expected of a location in the interior of a large landmass in the middle latitudes. This climate is characterized by large daily and annual variations in temperature. Winters are cold because of frequent outbreaks of polar air. The cold temperatures prevail from December to February. Warm summer temperatures last for about 6 months every year. They provide a long growing season for the crops commonly grown in the county. Spring and fall are relatively short.

Cherokee County is in the path of a fairly dependable current of moisture-laden air from the Gulf of Mexico. Precipitation is heaviest late in spring and early in summer. Much of it falls during late-evening or nighttime thunderstorms. Although the total precipitation generally is adequate for any crop, its distribution may cause problems in some years. Prolonged dry periods of several weeks are not uncommon during the growing season. A surplus of precipitation often results in muddy fields, which delay planting and harvesting.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Columbus in the period 1941 to 1970. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 37.1 degrees F, and the average daily minimum temperature is 26.6 degrees. The lowest temperature on record, which occurred at Columbus on February 13, 1905, is -28 degrees. In summer the average temperature is 77.7 degrees, and the average daily maximum temperature is 89.3 degrees. The highest recorded temperature, which occurred at Columbus on July 14, 1954, is 117 degrees.

The total annual precipitation is 40.52 inches. Of this, 27.91 inches, or 69 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 22.68 inches. The heaviest 1-day rainfall during the period of record was 8.4 inches at Columbus on June 22, 1948.

Tornadoes and severe thunderstorms strike occasionally. These storms are usually local in extent and of short duration, so that the risk of damage is small. Hail falls during the warmer part of the year, but the hailstorms are infrequent and of local extent. They cause less crop damage than the hailstorms in western Kansas.

The average seasonal snowfall is 10.4 inches. The highest seasonal snowfall during the period of record was 34.7 inches. On the average, 11 days of the year have at least 1 inch of snow on the ground, but the snow cover generally does not last for over 7 days in succession.

The sun shines 69 percent of the time possible in summer and 55 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 11 miles per hour, in March and April.

Physiography, Drainage, and Relief

Most of Cherokee County is in the Cherokee Prairie land resource area. Generally, the upland landscape in this area includes broad flats, broad gently sloping areas, and low hills. A small part of the county generally east of the Spring River is in the Ozark Highland land resource area. The uplands in this area typically are hilly timberland.

The western part of the county is drained by the Neosho River and its tributaries and the eastern part by the Spring River and its tributaries (fig. 2). Both streams flow in a southerly direction. The highest elevation, in the southeastern part of the county, is about 1,000 feet above sea level. The lowest, along the Neosho River in the southwestern part, is about 760 feet.

Water Supply

The water supply in most of Cherokee County varies. A dependable supply of ground water is not available in many parts of the county. In most upland areas, obtaining wells that provide an adequate supply of good-quality water is difficult. Most successful wells are drilled in the alluvial deposits along drainageways. These are generally low-producing wells that do not provide enough water for domestic purposes.

The principal source of water for livestock is surface water impounded by dams on intermitted streams. The smaller streams and the ground water discharged by seeps and springs are sources of water, but they can dry up during prolonged periods of low rainfall.

The water for farm uses is drawn from rural water district supply lines or ponds. The water for the towns is supplied mostly by the larger streams, by lakes, and by deep wells.

Natural Resources

Soil is the most important natural resource in the county. Also important are native range, timber, wild game and fish, and minerals. Coal, lead, zinc, and shale are the most common minerals. Coal and shale are mined for commercial uses.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biologic activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, the landforms, relief, climate, and the natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with considerable accuracy the kind of soil at a specific location on the landscape.

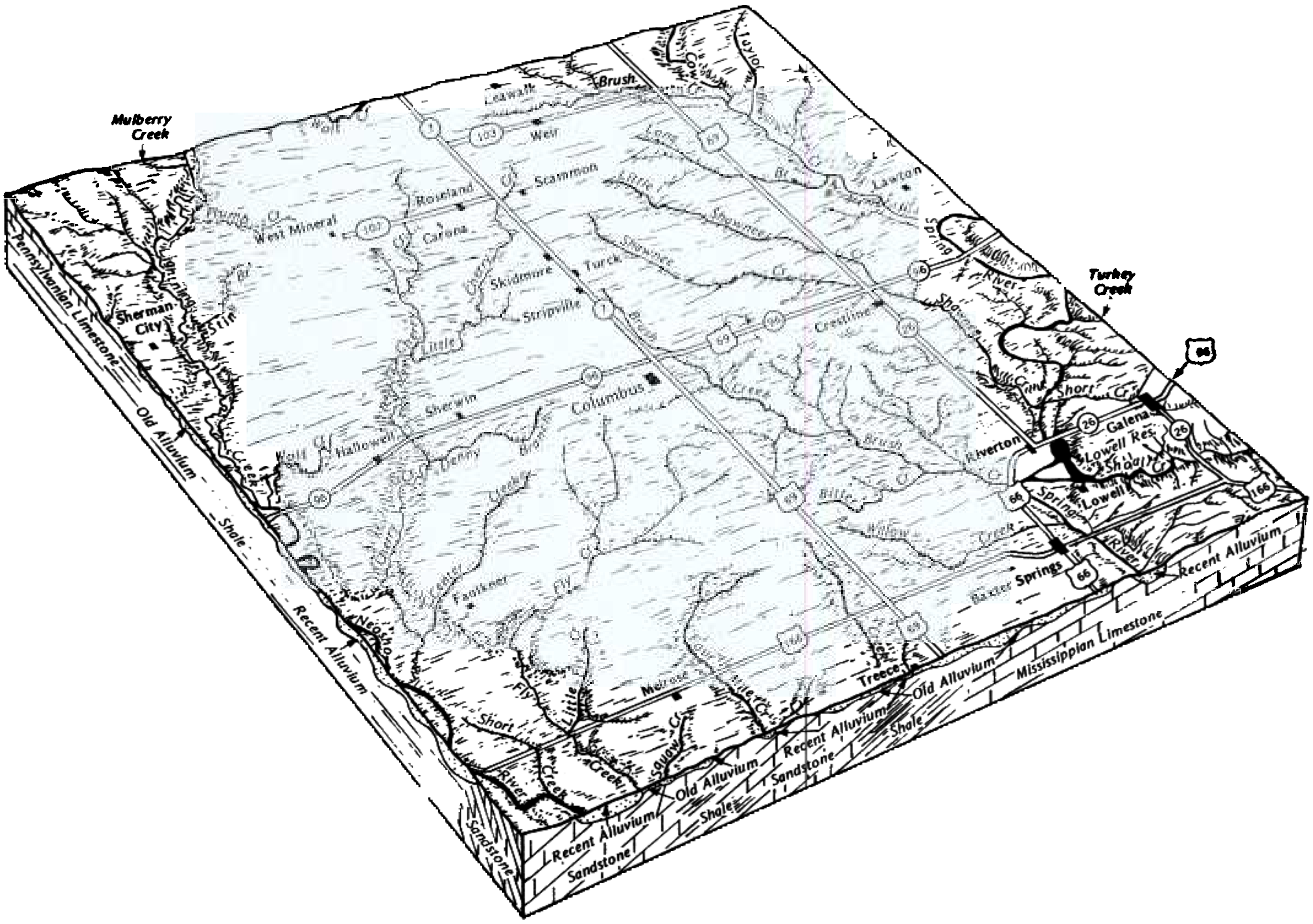

Figure 2.—Drainage and geologic material in Cherokee County.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, acidity, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpreted the data from these analyses and tests as well as the field-observed characteristics and the soil properties in terms of expected behavior of the soils under different uses. Interpretations for all of the soils were field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and new interpretations sometimes are developed to meet local needs. Data were assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management were assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can state with a fairly high degree of probability that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by several kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. These latter soils are called inclusions or included soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soil on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.