United States Department of Agriculture

Natural Resources Conservation Service

In cooperation with Texas AgriLife Research and Texas Tech University

Soil Survey of Lynn County, Texas

How To Use This Soil Survey

General Soil Map

The general soil map, which is a color map, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

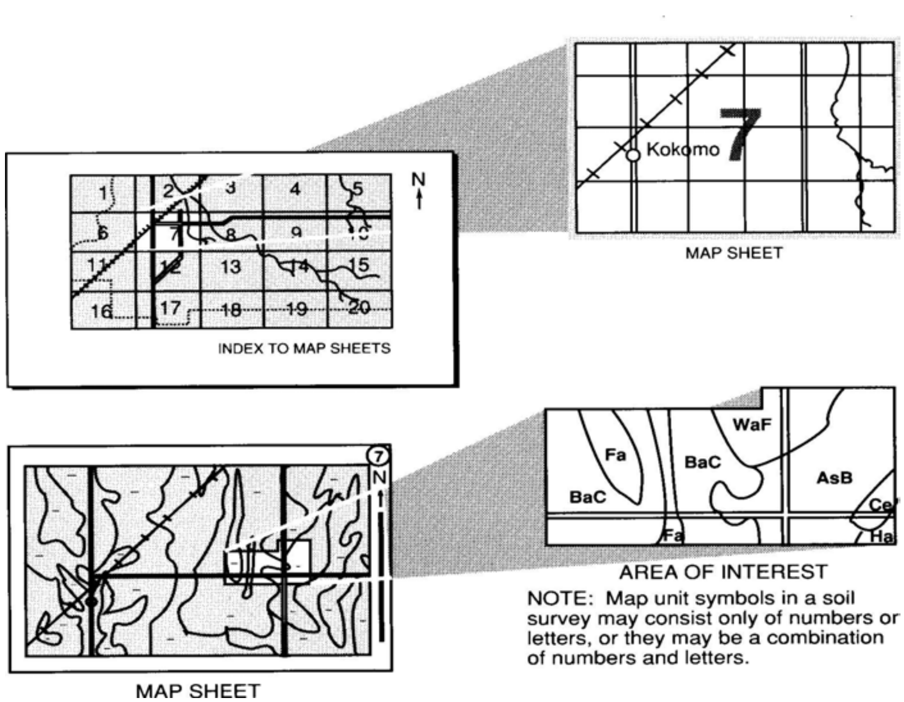
Detailed Soil Maps

The detailed soil maps can be useful in planning the use and management of small areas.

To find information about your area of interest, locate that area on the **Index to Map Sheets**.

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Go to the **Contents**, which lists the map units by symbol and name and shows the page where each map unit is described.

The **Contents** shows which table has data on a specific land use for each detailed soil map unit. Also see the **Contents** for sections of this publication that may address your specific needs.



This soil survey special report is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including Texas AgriLife Research (formerly Texas Agricultural Experiment Station), and local agencies. The Natural Resources Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey

Major fieldwork for this soil survey was completed in 1997. Soil names and descriptions were approved in 1999. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1999. This survey was made cooperatively by the Natural Resources Conservation Service, Texas AgriLife Research, and Texas Tech University. The survey is part of the technical assistance furnished to the Lynn County Soil and Water Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

Cover: An area of Water, intermittent, salt lake. Migratory wildlife, such as sandhill crane, makes limited use of these areas for water and cover after rainy periods.

Additional information about the Nation's natural resources is available on the Natural Resources Conservation Service homepage on the World Wide Web. The address is http://www.nrcs.usda.gov

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Issued 2008

Foreword

This soil survey contains information that affects land use planning in Lynn County. It contains predictions of soil behavior for selected land uses. The survey also highlights soil limitations, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Planners can use the report to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and modify or improve the environment.

The information in this report is intended to identify soil properties that are used in making various land use or land treatment decisions. Statements made in this report are intended to help users identify and reduce the effects of soil limitations on various land uses. The user is responsible for identifying and complying with existing laws and regulations.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this report. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the report is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or Texas AgriLife Extension Service.

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Soil Survey of Lynn County, Texas

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United States Department of Agriculture, Natural Resources Conservation Service,
in cooperation with
Texas AgriLife Research and Texas Tech University

This soil survey updates the soil survey of Lynn County published in 1959 (USDA SCS, 1959). It provides additional soils information and detail on soil properties and interpretations. It also has larger maps, which show the soils in greater detail.

Lynn County is in the northwestern part of Texas (fig. 1). It borders Lubbock County to the north, Dawson and Borden Counties to the south, Garza County to the east, and Terry County to the west.

Lynn County is about 30 miles square. It has an area of 893 square miles, or 571,392 acres. Tahoka is the county seat. Other towns in the county include O'Donnell and Wilson. In addition, several small communities have a population of less than 200. In the year 2000, the total resident population was 6,550 (Census 2000).

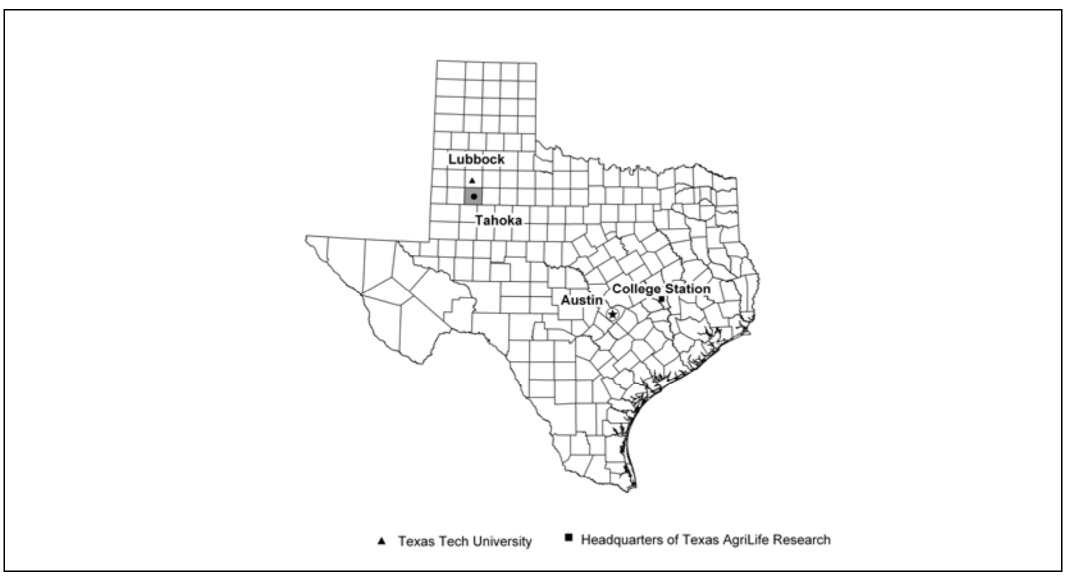

Figure 1.—Location of Lynn County in Texas.

Lynn County is in the Central Great Plains Land Resource Region. The greater part of the county lies in the Southern High Plains, Southern Part, Major Land Resource Area. A very small area in southeastern Lynn County lies in the Central Rolling Red Plains, Western Part, Major Land Resource Area (USDA NRCS, 2006). Elevations range from approximately 2,680 to 3,290 feet above sea level. With a general slope to the southeast of 10 to 15 feet per mile, relief in the county appears to be nearly level, except for a few low rises and numerous playa depressions (USDA, SCS 1959). A number of saline lake basins, which range from 10 to 750 acres in size and approximately 10 to 75 feet deep, occur in the county. The majority of the saline lakes are in the central and southwestern part of the county. The largest and most prominent are Tahoka Lake, Double Lakes, Manley Lake, Mound Lake, Twin Lakes, Guthrie Lake, Skeen Lake, Frost Lake, Gooch Lake, and Saleh Lake. Slopes around the lake basins range from gently sloping to steep; the floor of the lakes are nearly level. The floor of Guthrie Lake, located about 3 miles southwest of Tahoka consists of lacustrine sediments and outcroppings of Cretaceous limestone (Evans and Meade, 1945). The lakebed is near the water table and also receives runoff from local rainfall. The amount of surface water is variable on these lakes, but most are intermittently ponded at some time during most years. As the lakes evaporate, a white salty crust forms on the surface (fig 2).

The major drainage systems in Lynn County are the Double Mountain Fork of the Brazos River and Lost Draw. The small tributary of the Brazos River is located in Moore's Canyon on the southeastern edge of Lynn County and runs southeast into southern Garza County. Lost Draw is an intermittent watercourse that crosses the southwestern corner of Lynn County and drains southeasterly into a large unnamed basin along the Lynn and Dawson County line.

Figure 2.—Tahoka Lake is one of the many saline lakes that occur in Lynn County.

The major land uses in Lynn County are cropland and rangeland. In the year 2002, approximately 454,828 acres in the county were used as cropland, 104,580 acres as rangeland, 6,729 acres as pasture and hayland, and 5,055 acres as urban or built-up land. About 200 acres were used for orchards and vineyards (USDA NRCS 2002).

General Nature of the Survey Area

This section provides general information about the county. History, economic enterprises, natural resources, transportation facilities, and climate are described.

History

Lynn County was initially occupied by Plains Apaches, who were replaced by a more modern Apachean people around A.D. 1400-1500 (Abbe, 1974). During the eighteenth century the Comanches pushed into the Panhandle-Plains region of Texas and ousted the Apaches. The Comanches ruled the region until they were defeated by the United States Army during the Red River War of 1873-74 and subsequently withdrew from the plains. Small skirmishes occurred in Lynn County during the Indian Wars. Col. Ranald S. Mackenzie's Fourth United States Cavalry visited Tahoka Lake in 1872, and in November 1874 attacked a small encampment of Indians near Double Lakes and another at Tahoka Lake. In July, October, and November 1875, units of Col. William R. Shafter's Tenth United States Cavalry, the "buffalo soldiers," patrolled the South Plains. Indian raids on buffalo hunters during early 1877 led to another military expedition in the South Plains. Capt. Nicholas Nolan's Company A of the Tenth Cavalry left Fort Concho in July 1877 and proceeded to Double Lakes in Lynn County. They chased a band of Comanches northwest into New Mexico, where they lost the trail. After 86 hours with no replenishment of their water supply, Nolan's company straggled back to Double Lakes. This was the last appearance by the United States Cavalry in pursuit of Indians in Lynn County. The county was thus opened for settlement after 1877.

Between 1877 and the early 1880s buffalo hunters swarmed across Lynn County and the South Plains to exterminate the last great herds of buffalo (Abbe, 1987). In the early 1880s, ranchers began to appear in the county. Initially, only a miniscule economy developed. In 1880, the census taker found Ed Ryan and the A.C. McDonnill family raising sheep at Tahoka Lake, while John Porter ran a one-man ranching operation at Double Lakes. The situation changed as large-scale ranching spread into the county. In 1880 the Curry Comb Ranch of the Llano Cattle Company was established in Garza County and spilled over into northeastern Lynn County. In 1882 the Square and Compass Ranch was formed in Garza County and protruded into eastern and southeastern Lynn County. The county's only early surviving ranch, the T-Bar, was established in the central part of the county, around Double Lakes, in 1884. Other ranches appeared in the county after 1884, the only major one being C.C. Slaughter's Tahoka Lake Ranch, established in 1897.

The county remained sparsely settled ranching territory for two decades after 1880. It had no towns; the population was 9 in 1880, 24 in 1890, and 17 in 1900. However, after 1900, farmers began to encroach on the ranchers’ domain, especially after land appropriations for education were carried out. By 1903, enough people lived in Lynn County to call for its formal political organization. The county had been formed in 1876 and named for Alamo defender George Washington Lynn (or Linn), but it remained unorganized until 1903. In that year, a majority of its residents forced organization on the outnumbered ranchers. In an election held on April 7 the county was organized, with the new town of Tahoka as the county seat. Subsequently, Lynn County began to grow steadily as farmers pushed ranchers off most of the land. Between 1900 and 1910 the number of farms in the county grew from 5 to 201 and the number of cultivated acres from 246 to 20,108. Initially corn and other grains were the leading crops, but by 1910, cotton emerged as the premier farm product. By 1920, 23,085 acres was devoted to cotton production; the crop that year was 9,969 bales. In 1930, the acres had increased to 204,005, and production had risen to 27,179 bales.

As this cotton-growing industry emerged, the county prospered and grew; the population increased to 1,713 in 1910, 4,751 in 1920, and 12,372 in 1930. Numerous new towns were founded during the early years of the twentieth century. O'Donnell was established in 1910 as a speculative venture based on the opening up of new farmlands in southern Lynn and northern Dawson counties. Wilson, 13 miles northeast of Tahoka, was established in 1912 to attract farmers to the newly opened lands of the Dixie Ranch. Other small communities had evolved around rural schools and cotton gins, but most of them faded away by modern times. An exception, New Home, in the northern part of the county, grew into a small but stable town by the 1960s.

As Lynn County's cotton and cattle economy developed, a transportation network emerged. In 1909-1910, the Santa Fe Railroad extended a branch line from Lubbock to Tahoka and Lamesa via Slaton. This line gave rise to the new town of O'Donnell, and Wilson was established on the line in 1912. The Santa Fe line was abandoned in 1999. Graded, dirt roads were built to encourage wagon and automotive traffic. Roads were extended outward from Tahoka in all four directions; north to the Lubbock County line, east to the Garza County line, west to the Terry County line, and south to O'Donnell, on the Dawson County line. By 1938 the county had 45 miles of paved roads: 15 miles north to the Lubbock County line; 15 miles west to the Terry County line; and 15 miles south to O'Donnell. Ultimately, Lynn County developed a comprehensive network of highways and farm-to-market roads, with two major routes, U.S. highways 87 and 380, intersecting at Tahoka (Abbe, 1974).

Economic Enterprises

Agriculture, agribusiness, and oil production are the principal industries in Lynn County. Other industries include oil field service and retail trade. Cattle sales also provide agricultural revenue in the county.

Cotton sales are the largest source of agricultural revenue in the county. Other important agricultural products include grain sorghum, soybeans, peanuts, wheat, and sunflower.

Grape production in recent years has become an important source of income. There are several vineyards in Lynn County that provide a significant amount of grapes for wineries in the area.

Natural Resources

Soil is the most important natural resource in Lynn County. The production of crops, livestock, and forage, which are sources of livelihood for many people in the county, all depend on the soil.

Deposits of gravel, caliche, and sand are used for the construction of roads and building sites. Modest oil production is in the central and eastern part of Lynn County.

Water is another important resource. The Ogallala aquifer provides water for municipal, industrial, and agricultural uses.

Wildlife, especially waterfowl, is a valuable resource in Lynn County. Geese, ducks, and sandhill cranes migrate by the thousands to the High Plains during the winter months. Hundreds of playa lakes and several large saline lake basins provide food and nesting areas for several migratory waterfowl species. Deer and antelope are present in some parts of the county where adequate forage and cover are located. Also of importance are rabbits, dove, quail, turkey, and, in selected places, pheasant.

Transportation Facilities

U.S. Highway 87 crosses Lynn County from north to south through Tahoka and O'Donnell. U.S. Highway 380 crosses Lynn County from east to west through Tahoka. U.S. Highway 84 passes through the northeast corner of Lynn County. Farm Roads 179, 211, 212, 213, 400, 1054, 1313, 1328, 1730, 2053, 2192, 2956, and 3112 and many county roads provide ready access to agricultural markets.

The T-Bar Airport provides air service, which is limited to small aircraft. Currently there are not any operational railroads in Lynn County.

Climate

Table 1 provides data on temperature and precipitation for the survey area as recorded at Tahoka, Texas, in the period 1971 to 2000. 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 41.6 degrees F and the average daily minimum temperature is 27.1 degrees. The lowest temperature on record, which occurred at Tahoka on February 8, 1933, is -15 degrees. In summer, the average temperature is 77.8 degrees and the average daily maximum temperature is 90.8 degrees. The highest recorded temperature, which occurred at Tahoka on June 28, 1994, is 111 degrees.

Growing degree-days are shown in table 1. They are equivalent to "heat units." During the month, growing degree-days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is about 20.5 inches. Of this, 16.7 inches, or 81 percent, usually falls in April through October. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through October is less than 5.45 inches. The heaviest 1-day rainfall during the period of record was 8.32 inches at Tahoka on October 1, 1913. Thunderstorms occur on about 47 days each year, and most occur between May and August.

The average seasonal snowfall is about 9.5 inches. The greatest snow depth at any one time during the period of record was 11 inches recorded on March 16, 1969. On the average, 5 days of the year have at least 1 inch of snow on the ground. The number of such days varies greatly from year to year. The heaviest 1-day snowfall on record was 10.0 inches recorded on January 21, 1883.

The average relative humidity in mid-afternoon is about 40 percent. Humidity is higher at night, and the average at dawn is about 74 percent. The sun shines 77 percent of the time possible in summer and 66 percent in winter. The prevailing wind is from the south or southwest. Average wind speed is highest, between 14 and 15 miles per hour, between March and May.

Thunderstorm days, relative humidity, percent sunshine, and wind information are estimated from the weather station in Lubbock, Texas.

How This Survey Was Made

This survey was made to provide information about the soils and miscellaneous areas in the survey area. The information includes a description of the soils and miscellaneous areas and their location and a discussion of their suitability, limitations, and management for specified uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; 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 biological activity.

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

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-vegetation-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, reaction, 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. Soil taxonomy, 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 interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are 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 are 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 predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict 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.

The descriptions, names, and delineation’s of the soils in this survey area do not fully agree with those of the soils in adjacent survey areas. Differences are the result of a better knowledge of soils, modifications in series concepts, or variations in the intensity of mapping or in the extent of the soils in the survey areas.

Survey Procedures

Careful study of the original soil survey of Lynn County was made, along with many field observations, before major fieldwork for this soil survey began. From these field observations soil scientists were able to determine where map units in the original survey would remain unchanged, which map units should be eliminated, and which new map units should be added to the update of the Lynn County Soil Survey. Soil scientists studied U.S. Geological Survey topographic maps and aerial photographs, relating land and image features. Then the soil scientists made preliminary boundaries of slopes and landforms by stereoscopically plotting the boundaries on aerial photographs.

The soil scientists made traverses by truck on the existing network of roads and trails. Where there were no roads or trails, traverses were made on foot. Soil examinations along the traverses were made every 50 to 1,000 yards, depending on the landscape and soil pattern (Miller and others, 1979).

The soil was examined with the aid of a hand auger, spade, or power probe to a depth of 5 to 7 feet. Many typical pedons were observed and studied in small pits that were dug by hand. Observations of landforms, surface geology, vegetation, road-cuts, excavations, and animal burrows were made continuously without regard to spacing. Soil boundaries were determined based on soil examinations and photo interpretation.

The soil scientists transected some of the map units to determine their composition and recorded the vegetation. They chose at least three delineations of each transected map unit to be representative of the unit. At least 10 observations 50 to 100 feet apart were made for most transects.

Samples for some of the engineering index test data (table 37) were taken from the sites of typical pedons of the major soils in the county. The National Soil Survey Laboratory, Lincoln, Nebraska, performed the analyses.

After completion of the field mapping, map unit delineations were transferred by hand to high-altitude aerial photographs at a scale of 1:24,000. Surface drainage and cultural features were transferred from 7½-minute U.S. Geological Survey topographic maps and were recorded from visual observations in the field.

General Soil Map Units

The general soil map in this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, it consists of one or more major soils or miscellaneous areas and some minor soils or miscellaneous areas. It is named for the major soils or miscellaneous areas. The components of one map unit can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one-map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

1. Acuff-Amarillo

Nearly level and very gently sloping, loamy, moderately permeable soils

This map unit is very extensive and occurs in the eastern and northern parts of Lynn County on a broad plateau. Playa basins dot the otherwise smooth surface. The Acuff and Amarillo soils formed in loamy eolian deposits from the Blackwater Draw Formation of Pleistocene age. These soils are on plains and playa slopes.

This map unit makes up 223,802 acres, or about 39 percent of the county. It is about 68 percent Acuff soils, 11 percent Amarillo soils, and 21 percent soils of minor extent (fig. 3). Soils of minor extent are the Arvana, Estacado, Lofton, Olton, Portales, Posey, Potter, Ranco, Sharvana, Sparenberg, and Zita soils.

Typically, the Acuff soil has a brown loam surface layer. The upper part of the subsoil is brown or red sandy clay loam. The lower part of the subsoil is pink or yellow sandy clay loam with common to many concentrations of calcium carbonate. Reaction is neutral in the surface and becomes moderately alkaline with depth.

Typically, the Amarillo soil has a brown fine sandy loam surface layer. The upper part of the subsoil is brown sandy clay loam. The lower part of the subsoil is red and pink sandy clay loam with few to many concentrations of calcium carbonate. The soil is slightly alkaline at the surface and becomes moderately alkaline with depth.

The Acuff-Amarillo general soil map unit is extensively cultivated, and the major soils are primarily used for cropland. This unit is part of the largest continuous area of cropland in the United States. Generally, cotton and grain sorghum are the main crops. Corn and soybeans are also grown if adequate irrigation water is available. Minor crops include wheat, sunflowers, warm-season vegetables, and forage sorghum. These soils are suitable for both irrigated and nonirrigated crop production.

A few small areas of these soils are still in native rangeland or are used as pasture. Forage yields are medium to high, depending on management practices.

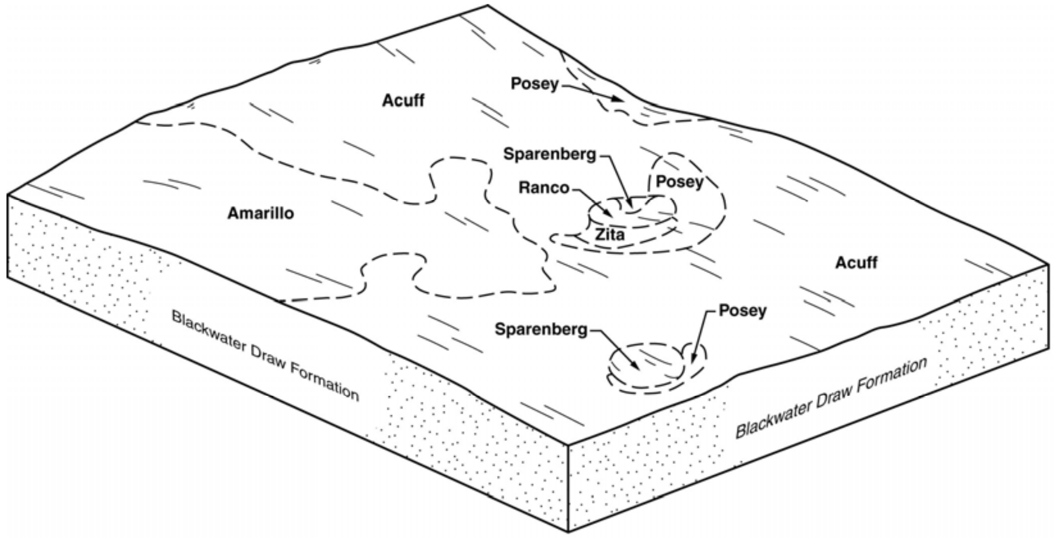

Figure 3.—Pattern of soils and underlying materials in the Acuff-Amarillo general soil map unit.

2. Amarillo-Acuff

Nearly level and very gently sloping, loamy, moderately permeable soils

This map unit is very extensive and occurs in the western half of Lynn County on a broad plateau. Playa basins dot the otherwise smooth surface. The Amarillo and Acuff soils formed in loamy eolian deposits from the Blackwater Draw Formation of Pleistocene age. These soils are on plains and playa slopes.

This map unit makes up 215,299 acres, or about 37 percent of the county. It is about 51 percent Amarillo soils, 18 percent Acuff soils, and 31 percent soils of minor extent. Soils of minor extent are the Arvana, Drake, Estacado, Midessa, Patricia, Pep, Portales, Posey, Sparenberg, and Zita soils.

Typically, the Amarillo soil has a brown fine sandy loam surface layer. The upper part of the subsoil is brown sandy clay loam. The lower part of the subsoil is red and pink sandy clay loam and has few to many concentrations of calcium carbonate. The soil is slightly alkaline at the surface and becomes moderately alkaline with depth.

Typically, the Acuff soil has a brown loam surface layer. The upper part of the subsoil is brown sandy clay loam. The lower part is pink or yellow sandy clay loam and has few to many concentrations of calcium carbonate. Reaction is neutral in the surface and becomes moderately alkaline with depth.

The Amarillo-Acuff map unit is extensively cultivated, and the major soils are primarily used for cropland. This unit is part of the largest continuous area of cropland in the United States. Generally, cotton and grain sorghum are the main crops. Peanuts and soybeans are also grown if adequate irrigation water is available. Minor crops include wheat, sunflowers, warm-season vegetables, and forage sorghum. These soils are suitable for both irrigated and nonirrigated crop production.

A few small areas of these soils are still in native rangeland or are used as pasture. Forage yields are medium or high, depending on management practices.

3. Midessa-Potter-Drake

Very gently sloping to moderately steep, loamy or gravelly, slowly permeable and moderately permeable soils

This map unit occurs mostly in the central and western parts of the county on a broad plateau or on breaks. The unit is associated with salt lakes and dune complexes. The Midessa soils formed in calcareous, loamy eolian and lacustrine deposits derived from the Tahoka and Blackwater Draw Formations of Pleistocene age. The Potter soils formed in calcareous, loamy alluvium from the Ogallala Formation of Miocene-Pliocene age. The Drake soils formed in calcareous loamy eolian deposits of Quaternary age. The Midessa soils are on plains, playa slopes, and draws. The Potter soils are on draws, valley sides, and escarpments. The Drake soils are on playa dunes.

This map unit makes up 37,795 acres or about 6 percent of the county. It is about 18 percent Midessa soils, 15 percent Potter soils, 13 percent Drake soils, and 54 percent soils of minor extent (fig. 4). Soils of minor extent are the Acuff, Arvana, Berda, Cedarlake, Estacado, Hindman, Lenorah, Portales, Posey, and Yellowhouse soils. Miscellaneous areas include Borrow pits; Rock outcrop; and Water, intermittent, salt lake. Typically, the Midessa soil has a brown fine sandy loam surface layer. The upper part of the subsoil is brown sandy clay loam that has few concentrations of calcium carbonate. The lower part of the subsoil is brown sandy clay loam with common to many concentrations of calcium carbonate. The soil is moderately alkaline throughout.

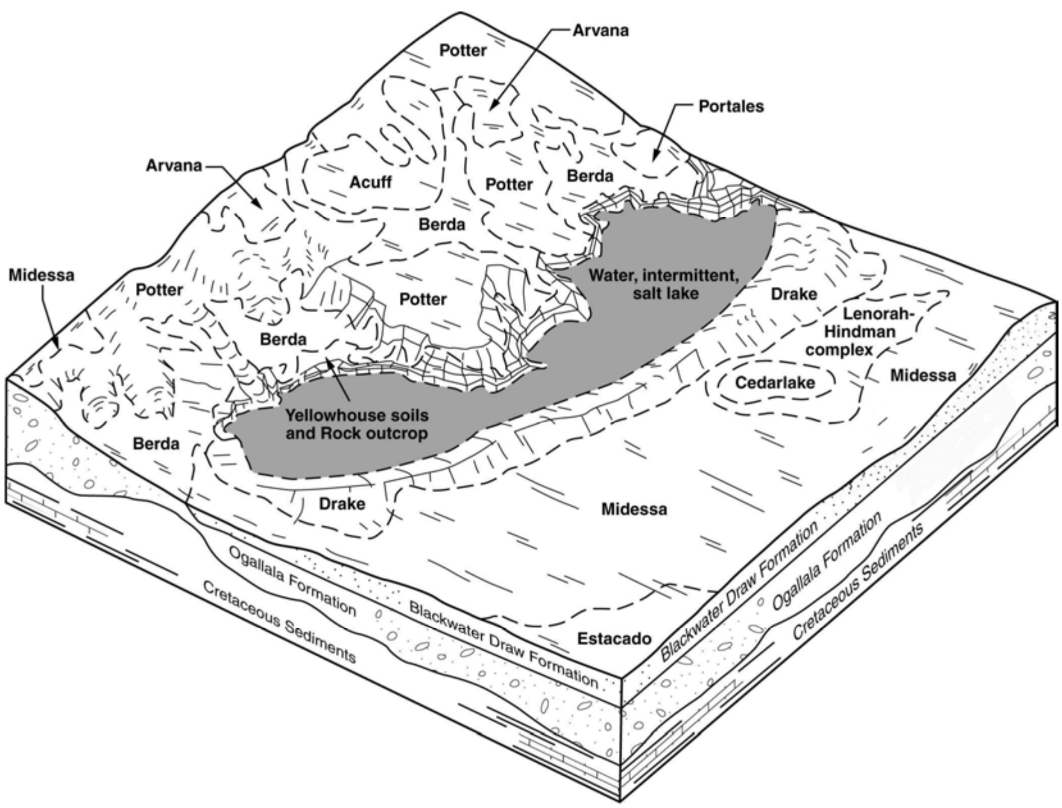

Figure 4.—Pattern of soils and underlying materials in the Midessa-Potter-Drake general soil map unit.

Typically, the Potter soil has a grayish brown gravelly loam surface layer. The next layer is brown extremely gravelly fine sandy loam. The subsoil is gray very gravelly fine sandy loam in the upper part and white extremely gravelly fine sandy loam in the lower part. It is moderately alkaline in the surface and becomes strongly alkaline with depth.

Typically, the Drake soil has a pale brown loam surface layer. It is gray fine sandy loam in the subsurface layer. The subsoil has few calcium carbonate concentrations and is gray sandy clay loam in the upper part, gray loam in the middle part, and brown fine sandy loam in the lower part. The soil is moderately alkaline throughout.

The major soils in the Midessa-Potter-Drake map unit are used primarily for native pasture, rangeland, or as wildlife habitat. Forage yields for these soils are low to medium, depending on management practices. In this map unit, the soil depth limits plant density, and vegetation is somewhat sparse in areas. The limey nature of the soils further restricts the species occupying the site, and large areas of bare ground are sometimes common. Palatability is lower on these soils because of the high lime, and it is not a preferred grazing area for livestock. This site is subject to severe erosion if overgrazed.

4. Patricia-Amarillo

Nearly level and very gently sloping, sandy, moderately permeable soils

This map unit occurs in the southwestern part of the county on a broad plateau. Playa basins dot the otherwise smooth surface. The Patricia and Amarillo soils formed in loamy eolian deposits from the Blackwater Draw Formation of Pleistocene age. These soils are on plains.

This map unit makes up 28,154 acres or about 5 percent of the county. It is about 45 percent Patricia soils, 38 percent Amarillo soils, and 17 percent soils of minor extent (fig. 5). Soils of minor extent are the Arvana, Brownfield, Lamesa, Midessa, Portales, Posey, Seagraves, and Tokio soils.

Typically, the Patricia soil has a yellowish red loamy fine sand surface layer. The upper part of the subsoil is red sandy clay loam. The lower part of the subsoil is red sandy clay loam with many concentrations of calcium carbonate. Soil reaction ranges from neutral to strongly alkaline.

Typically, the Amarillo soil has a brown loamy fine sand surface layer. The upper part of the subsoil is brown sandy clay loam. The lower part of the subsoil is red and pink sandy clay loam that has common to many concentrations of calcium carbonate. The soil is slightly alkaline in the surface and becomes moderately alkaline with depth.

The Patricia-Amarillo map unit is extensively cultivated, and the major soils are primarily used for cropland. This unit is part of the largest area of cropland in the United States. Generally, cotton and grain sorghum are the main crops. Peanuts and soybeans are also grown if adequate irrigation water is available. Minor crops include wheat, sunflowers, warm-season vegetables, and forage sorghum. These soils are suitable for both irrigated and nonirrigated crops.

A few small areas of these soils are still in native rangeland or are used as pasture. Forage yields are medium to high, depending on management practices.

5. Brownfield-Patricia-Amarillo

Nearly level and very gently sloping, sandy, moderately permeable soils

This map unit occurs in the central and far western parts of the county on a broad plateau. There are a few areas of very gently sloping to moderately sloping dunes that are irregularly shaped. Also occurring are blowouts, which are saucer- or trough-shaped depressions formed by wind erosion. In some areas dunes occur as narrow, discontinuous, elongated ridges along old fence rows. The Brownfield, Patricia, and

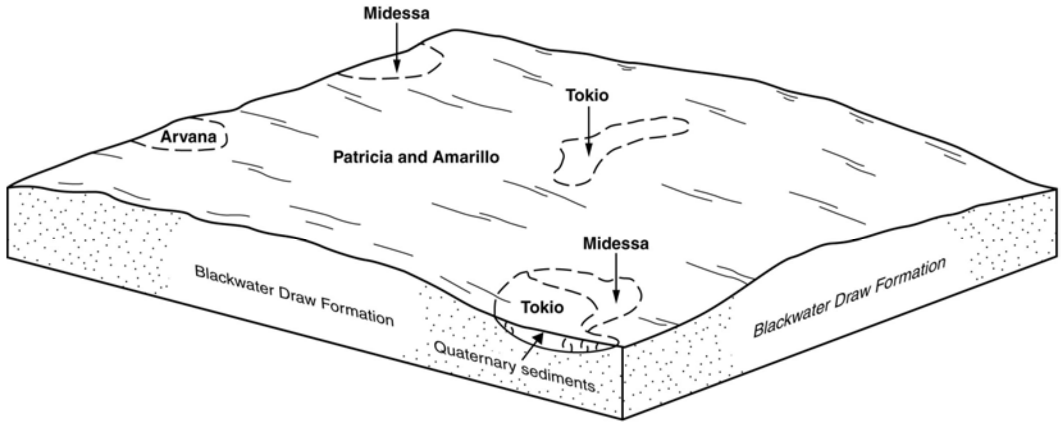

Figure 5.—Pattern of soils and underlying materials in the Patricia-Amarillo general soil map unit.

Amarillo soils formed in sandy and loamy eolian deposits from the Blackwater Draw Formation of Pleistocene age. These soils are on plains and playa slopes.

This map unit makes up 20,939 acres or 4 percent of the county. It is about 48 percent Brownfield soils, 22 percent Patricia soils, 20 percent Amarillo soils, and 10 percent soils of minor extent (fig. 6). Soils of minor extent are the Arvana, Midessa, and Posey soils.

Typically, the Brownfield soil has a brown fine sand surface layer. The subsurface layer is brown and red fine sand. The subsoil is red sandy clay loam. Soil reaction is neutral or slightly acid.

Typically, the Patricia soil has a yellowish red loamy fine sand surface layer. The upper part of the subsoil is red sandy clay loam. The lower part of the subsoil is red sandy clay loam that has many concentrations of calcium carbonate. The reaction is slightly alkaline to moderately alkaline in the surface layer. It is neutral in the upper part of the subsoil and strongly alkaline in the lower part.

Typically, the Amarillo soil has a brown loamy fine sand surface layer. The upper part of the subsoil is brown sandy clay loam. The lower part of the subsoil is red or pink sandy clay loam with common to many concentrations of calcium carbonate. The soil is slightly alkaline at the surface and becomes moderately alkaline with depth.

The Brownfield-Patricia-Amarillo map unit is dominantly used as native pasture, rangeland, or wildlife habitat. Forage yields are medium to high, depending on management practices. Proper management of rangeland can help produce a variety of grasses, legumes, and forbs. A low available water holding capacity in the Brownfield soils and the hazard of wind erosion for all the major soils in the map unit, are the main limitations. This site is subject to severe wind erosion if the soil surface is not protected by a vegetative cover.

6. Estacado-Pep

Nearly level, loamy, moderately permeable soils

This map unit occurs in the south-central part of Lynn County on a broad plateau. Playa basins dot the otherwise smooth surface. The Pep and Estacado soils formed in calcareous, loamy eolian sediments from the Blackwater Draw Formation of Pleistocene age. These soils are on plains.

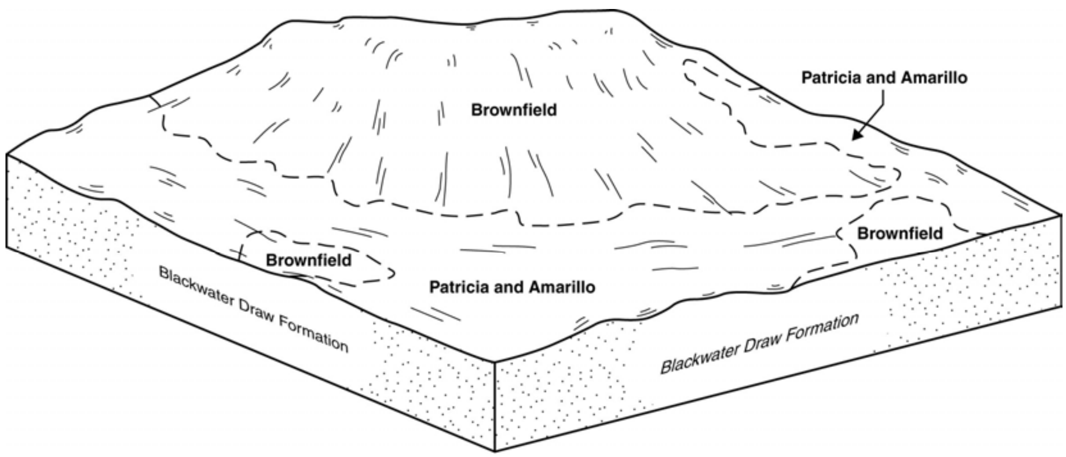

Figure 6.—Pattern of soils and underlying materials in the Brownfield-Patricio-Amarillo general soil map unit.

This map unit makes up 17,912 acres or about 3 percent of the county. It is about 46 percent Estacado soils, 37 percent Pep soils, and 17 percent soils of minor extent (fig. 7). Soils of minor extent are Acuff, Kimberson, Lofton, Midessa, Portales, Posey, Sparenberg, and Zita soils.

Typically, the Estacado soil has a dark grayish brown loam surface layer. The upper part of the subsoil is brown clay loam with few concentrations of calcium carbonate. The lower part of the subsoil is pink and white clay loam with many concentrations of calcium carbonate. The soil is moderately alkaline throughout.

Typically, the Pep soil has a reddish brown loam surface layer. The upper part of the subsoil is red and yellow clay loam with few concentrations of calcium carbonate. The lower part of the subsoil is yellow clay loam with many concentrations of calcium carbonate. Reaction is moderately alkaline throughout.

The Estacado-Pep map unit is extensively cultivated, and the major soils are primarily used for cropland. Generally, cotton and grain sorghum are the main crops. Corn and soybeans are also grown if adequate irrigation water is available. Minor crops include wheat, sunflowers, warm-season vegetables, and forage sorghum. These soils are suitable for both irrigated and nonirrigated crops.

A few small areas of this unit are still in native rangeland or are used as pasture. Forage yields are medium to high, depending on management practices.

7. Olton-Acuff

Nearly level, loamy, moderately slowly permeable and moderately permeable soils

This map unit occurs in the far northeast and southeast parts of Lynn County on a broad plateau. Playa basins dot the otherwise smooth surface. The Olton and Acuff soils formed in loamy eolian sediments of the Blackwater Draw Formation of Pleistocene age. Olton soils are on plains. Acuff soils are on playa slopes or plains.

This map unit makes up 10,204 acres or about 2 percent of the county. It is about 47 percent Olton soils, 39 percent Acuff soils, and 14 percent soils of minor extent. Soils of minor extent are the Estacado, Lofton, Portales, Posey, Ranco, Sparenberg, and Zita soils.

Typically, the Olton soil has a brown clay loam surface layer. The upper part of the subsoil is brown clay loam with a few concentrations of calcium carbonate. The lower part of the subsoil is brown, pink, and red clay loam with common to many concentrations of

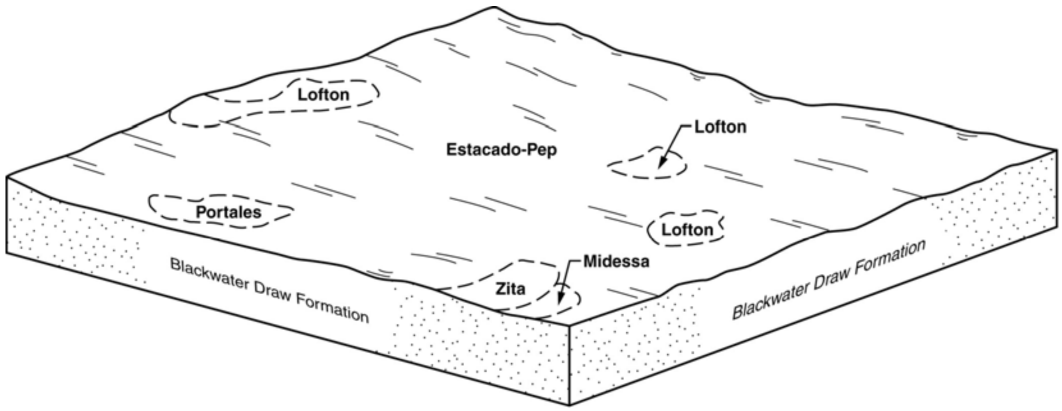

Figure 7.—Pattern of soils and underlying materials in the Estacado-Pep general soil map unit.

calcium carbonate. The soil is neutral in the surface layer and becomes moderately alkaline with depth.

Typically, the Acuff soil has a brown loam surface layer. The upper part of the subsoil is brown sandy clay loam. The lower part of the subsoil is red, pink, and yellow sandy clay loam that has few to many masses of calcium carbonate. The soil is neutral in the surface and becomes moderately alkaline with depth.

The Olton-Acuff map unit is extensively cultivated, and the major soils are primarily used for cropland. This unit is part of the largest continuous area of cropland in the United States. Generally, cotton and grain sorghum are the main crops. Corn and soybeans are also grown if adequate irrigation water is available. Minor crops include wheat, sunflowers, warm-season vegetables, and forage sorghum. These soils are suitable for both irrigated and nonirrigated crop production.

A few small areas of these soils are still in native rangeland or are used as pasture. Forage yields are medium to high, depending on management practices.

8. Potter-Obaro-Quinlan

Gently sloping to steep, loamy or gravelly, slowly permeable and moderately permeable soils

This map unit occurs in the southeastern part of Lynn County and is in the area of the headwaters of the Double Mountain Fork of the Brazos River. The soils are on the breaks along the edge of the High Plains. The Obaro and Quinlan soils are shallow to moderately deep and formed in loamy residuum weathered from calcareous sandstone and siltstone of Triassic or Permian age. The very deep Potter soils formed in calcareous, loamy alluvium from the Ogallala Formation of Miocene-Pliocene age. Geologic erosion is active in some areas with numerous small drainageways and gullies dissecting the unit. The Potter soils are on escarpments and valley sides. Obaro and Quinlan soils are on erosion remnants and valley sides.

This map unit makes up 6,914 acres or about 1 percent of the county. It is about 33 percent Potter soils, 13 percent Obaro soils, 8 percent Quinlan soils, and 46 percent soils of minor extent (fig. 8). Soils of minor extent are Acuff, Arvana, Berda, Kimberson, Mobeetie, Sparenberg, Veal, and Yellowhouse soils. Miscellaneous areas include Rock outcrop and Water.

Typically, the Potter soil has a grayish brown gravelly loam surface layer. The subsurface layer is brown extremely gravelly fine sandy loam. The subsoil is gray very gravelly fine sandy loam in the upper part and white extremely gravelly fine sandy loam in

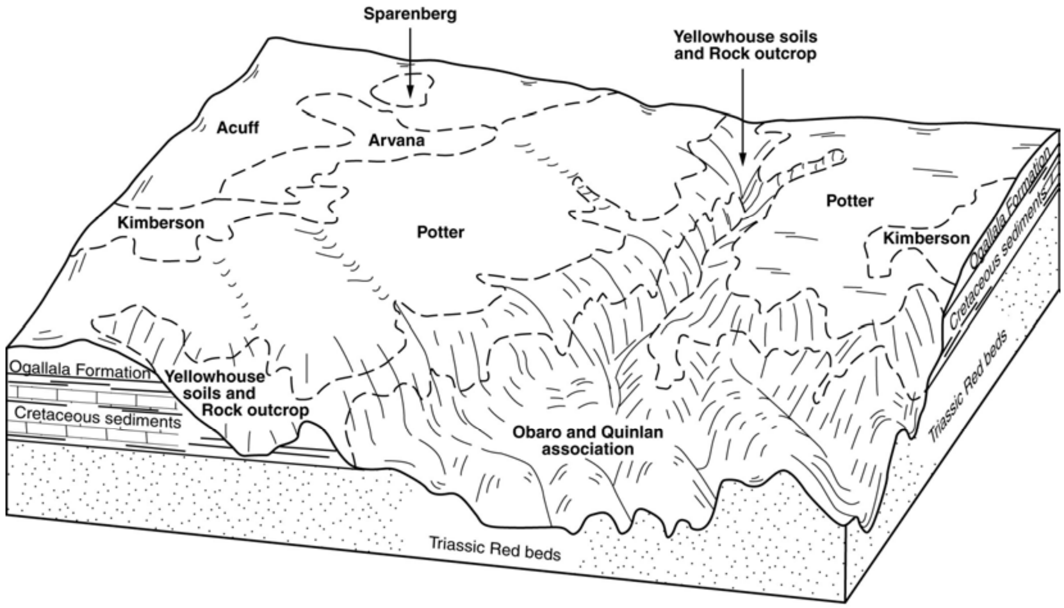

Figure 8.—Pattern of soils and underlying materials in the Potter-Obaro-Quinlin general soil map unit.

the lower part. Reaction is moderately alkaline in the surface layer and becomes strongly alkaline with depth.

Typically, the Obaro soil has a reddish brown loam surface layer. The subsoil is brown and red loam with few concentrations of calcium carbonate. The underlying layer is red soft bedrock.

Typically, the Quinlan soil has a reddish brown loam surface layer. The subsoil is red loam. The underlying material is red soft bedrock.

The major soils in the Potter-Obaro-Quinlan map unit are used primarily for native pasture, rangeland, or as wildlife habitat. Forage yields soils are low to medium, depending on management practices. In this map unit, the soil depth limits plant density, and vegetation is somewhat sparse except in higher moisture areas. This map unit has steep topography, which limits grazing distribution, and large areas of bare ground are sometimes common. The unit is not a preferred grazing area for livestock. Obaro and Quinlan soils are subject to significant water erosion if overgrazing occurs and plant cover becomes sparse.

9. Lenorah-Hindman-Arvana

Nearly level and very gently sloping, loamy and sandy, moderately permeable and moderately rapidly permeable soils

This map unit occurs in the southwestern part of Lynn County on a broad plateau in broad, shallow draws or valleys (relict) and associated salt lake basins. The Lenorah and Hindman soils formed in calcareous, loamy and sandy eolian deposits over sandy alluvium derived from the Tahoka Formation of Pleistocene age. The Arvana soils formed in loamy eolian deposits from the Blackwater Draw Formation of Pleistocene age. The Lenorah and Hindman soils are on valley flats and ancestral drainageways. Arvana soils are on plains or playa slopes.

This map unit makes up 6,323 acres or 1 percent of the county. It is about 22 percent Lenorah soils, 14 percent Hindman soils, 12 percent Arvana soils, and 52 percent soils of minor extent (fig. 9). Soils of minor extent are Amarillo, Arch, Drake, Kimberson, Midessa, Patricia, Posey, Potter, and Sharvana soils. Miscellaneous areas include Borrow pits and Water, intermittent, salt lake.

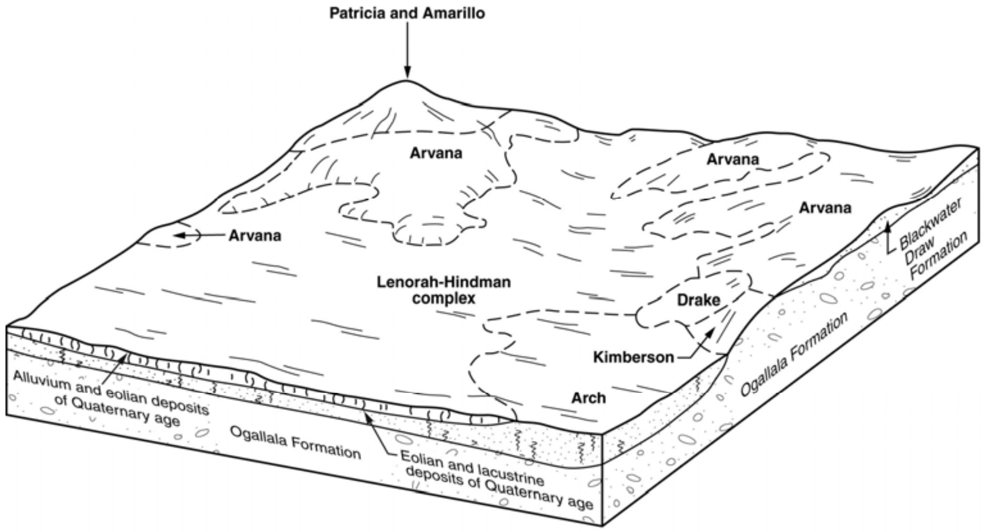

Figure 9.—Pattern of soils and underlying materials in the Lenorah-Hindman-Arvana general soil map unit.

Typically, the Lenorah soil has a pale brown fine sandy loam surface layer. The upper part of the subsoil is brown sandy clay loam that has few concentrations of calcium carbonate. The middle part of the subsoil is brown and gray sandy clay loam and fine sandy loam that has many concentrations of calcium carbonate. The lower part of the subsoil is brown loamy fine sand that has few concentrations of calcium carbonate. The underlying layer is light gray sand that has few concentrations of calcium carbonate. Reaction is strongly alkaline in the surface. It ranges from very strongly alkaline in the upper part of the subsoil to moderately alkaline in the lower part.

Typically, the Hindman soil has a light brown fine sand surface layer. The subsurface layer is brown loamy fine sand. The upper part of the subsoil is brown fine sandy loam that has few concentrations of calcium carbonate. The middle part of the subsoil is gray sandy clay loam that has many concentrations of calcium carbonate. The lower part of the subsoil is brown fine sand that has few concentrations of calcium carbonate. The underlying layer is very pale brown gravelly sand that has few concentrations of calcium carbonate. The soil is moderately alkaline in the surface and becomes strongly alkaline with depth.

Typically, the Arvana soil has a dark brown fine sandy loam surface layer. The upper part of the subsoil is brown sandy clay loam. The next layer is a white cemented layer of calcium carbonate. Below this is pink and yellow loam and clay loam that has many concentrations of calcium carbonate. The soil is moderately alkaline throughout.

The major crops for the Lenorah-Hindman-Arvana map unit are cotton and grain sorghum. Minor crops include wheat, sunflowers, and forage sorghum. These soils are suitable for both irrigated and nonirrigated crops.

In this map unit, Lenorah and Hindman soils are used primarily for native pasture, rangeland, or wildlife habitat. The natural plant community for these soils is a mixture of salt-tolerant shrubs, grasses, and forbs. The site is characterized by a relatively recently developed high water table. Consequently, the existing plant community is still evolving. A few areas of the Lenorah and Hindman soils are in cultivation. The saline and sodic properties of the Lenorah soil, low available water holding capacity, and the hazard of soil erosion for both soils are the main crop limitations. Arvana soils are primarily in cropland with a few areas used as native pasture or rangeland.

Forage yields in this map unit are medium to high, depending on management practices. Proper management of rangeland can help produce a variety of grasses, legumes, and forbs.

10. Arch

Nearly level, loamy, moderately permeable soils

This map unit occurs in the southeastern corner of Lynn County on a broad plateau in interdunal areas associated with ancient lakes. The Arch soils formed in calcareous, loamy eolian and lacustrine deposits of Quaternary age. These soils are on playa steps or interdunes.

This map unit makes up 2,612 acres, or about 1 percent of the county. It is about 66 percent Arch soils and 34 percent soils of minor extent (fig. 10). Soils of minor extent are Cedarlake, Chapel, Drake, Hindman, Lenorah, Midessa, Pep, and Portales soils.

Typically, the Arch soil has a brown loam surface layer. The subsoil is brown sandy clay loam that has common to many concentrations of calcium carbonate. Reaction is moderately alkaline and becomes strongly alkaline with depth.

The Arch map unit is primarily used for native pasture, rangeland, or wildlife habitat. A few small areas are in cultivation. Generally, cotton, grain sorghum, and wheat are the main crops. Minor crops include sunflowers and forage sorghum. These soils are poorly suited to nonirrigated crops and moderately suited to irrigated crops. Because of high calcium carbonate content and low available moisture holding capacity during the growing season, crop and range productivity is significantly reduced in these soils.

In rangeland, palatability of plants is lower on these soils, and the map unit is not usually a preferred grazing area because of the high lime content. If overgrazed for long periods, the site will exhibit large areas of bare ground and numerous annuals and will be subject to severe wind and water erosion. Forage yields are low to medium, depending on management practices.

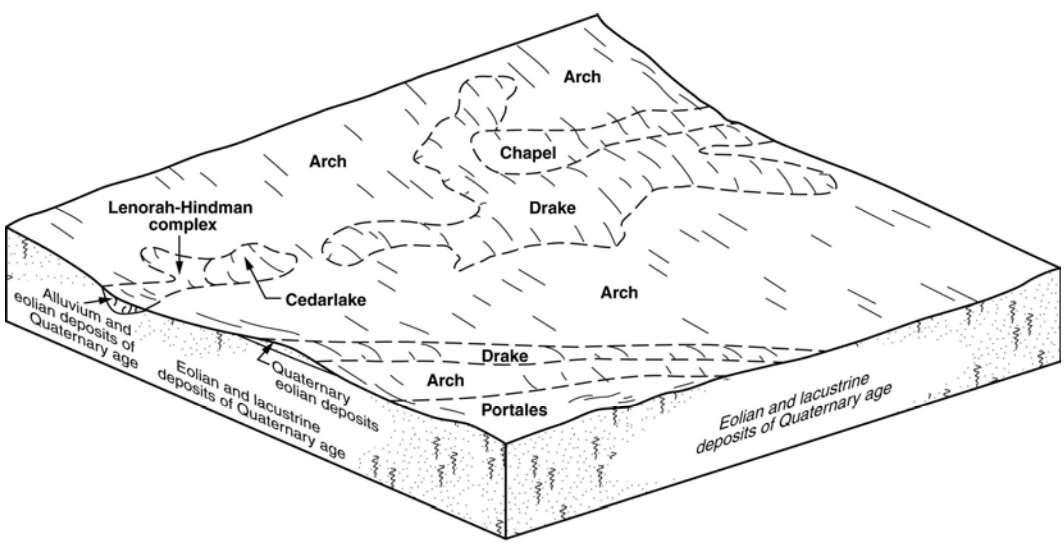

Figure 10.—Pattern of soils and underlying materials in the Arch general soil map unit.

11. Midessa-Lenorah-Hindman

Nearly level and very gently sloping, loamy, moderately permeable and moderately rapidly permeable soils

This map unit occurs in the southwestern corner of Lynn County on a broad plateau in broad, shallow draws or valleys (relict) and associated salt lake basins. The Midessa soils formed in calcareous, loamy eolian and lacustrine deposits derived from the Blackwater Draw Formations of Pleistocene age. The Lenorah and Hindman soils formed in calcareous, loamy and sandy alluvium and eolian deposits of Quaternary age. The Midessa soils are on plains, playa slopes, and draws. Lenorah and Hindman soils are on valley flats and ancestral drainageways.

This map unit makes up 1,438 acres or about 1 percent of the county. It is about 25 percent Midessa soils, 15 percent Lenorah soils, 10 percent Hindman soils, and 50 percent soils of minor extent (fig. 11). Soils of minor extent are the Amarillo, Arch, Chapel, Drake, Patricia, Portales, Posey, and Tokio soils. Also included are small miscellaneous areas of Water.

Typically, the Midessa soil has a brown fine sandy loam surface layer that has few concentrations of calcium carbonate. The upper part of the subsoil is brown sandy clay loam that has few concentrations of calcium carbonate. The lower part of the subsoil is brown sandy clay loam that has common to many concentrations of calcium carbonate. The soil is moderately alkaline throughout.

Typically, the Lenorah soil has a pale brown fine sandy loam surface layer. The upper part of the subsoil is brown sandy clay loam that has few concentrations of calcium carbonate. The middle part of the subsoil is brown and gray sandy clay loam and fine sandy loam that has many concentrations of calcium carbonate. The lower part of the subsoil is brown loamy fine sandy that has few concentrations of calcium carbonate. The underlying layer is gray sand that has few concentrations of calcium carbonate. The soil is strongly to very strongly alkaline in the upper layers and becomes moderately alkaline with depth.

Typically, the Hindman soil is light brown fine sand in the surface layer. In the subsurface layer it is brown loamy fine sand. The upper part of the subsoil is brown fine sandy loam that has few concentrations of calcium carbonate. The middle part of the subsoil is gray sandy clay loam that has many concentrations of calcium carbonate. The lower part is brown fine sand that has few concentrations of calcium carbonate. The underlying layer is brown gravelly sand that has few concentrations of calcium carbonate. The soil is moderately alkaline in the surface and becomes strongly alkaline with depth.

In the Midessa-Lenorah-Hindman map unit, the soils are primarily used for rangeland, native pasture, or wildlife habitat. A few small areas of the map unit are in cultivation. The major crops are cotton and grain sorghum. Minor crops include wheat, sunflowers, and forage sorghum. The natural plant community for the Lenorah and Hindman soils is a mixture of salt-tolerant shrubs, grasses, and forbs. The site is characterized by a relatively recently developed high water table. Consequently, the existing plant community is still evolving. Forage yields in this map unit are medium to high, depending on management practices. Proper management of rangeland can help produce a variety of grasses, legumes, and forbs.

The major limitations in this map unit are the saline and sodic properties of the Lenorah soils and the low available water holding capacity of the Lenorah and Hindman soils. In addition, the hazard of soil erosion is a limitation for all the major soils.

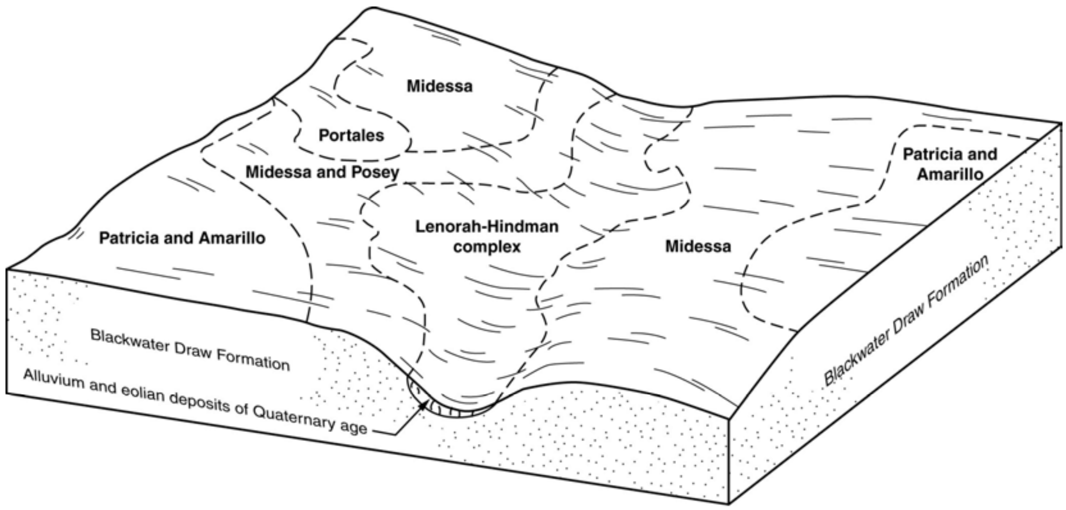

Figure 11.—Pattern of soils and underlying materials in the Midessa-Lenorah-Hindman general soil map unit.

Detailed Soil Map Units

The map units delineated on the detailed soil maps in this survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the maps, can be used to determine the suitability and potential of a unit for specific uses. They also can be used to plan the management needed for those uses.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. 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 other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties 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, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. The contrasting components are mentioned in the map unit descriptions. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

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

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. The soils of a given series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Amarillo fine sandy loam, 1 to 3 percent slopes, is a phase of the Amarillo series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Obaro and Quinlan association, 3 to 30 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Patricia and Amarillo loamy fine sands, 0 to 3 percent slopes, is an undifferentiated group in this survey area.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Water, intermittent, salt lake, is an example.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables give properties of the soils and the limitations, capabilities, and potentials for many uses. The “Glossary” defines many of the terms used in describing the soils or miscellaneous areas.

Additional information specific to the components of a map unit is available in the Tables section. A complete soil description with range in characteristics is at the following address: http://ortho.ftw.nrcs.usda.gov/cgi-bin/osd/osdname.cgi. Information about managing a map unit is available in the section on "Soil Properties" and the section on "Use and Management" which includes subsections on "Crops and Pasture," "Engineering," "Rangeland," "Recreation," and "Wildlife Habitat.

AcA—Acuff loam, 0 to 1 percent slopes

Setting

General location: Southern High Plains of western Texas and eastern New Mexico
Major land resource area: 77C—Southern High Plains, Southern Part
Landscape: Plateau
Elevation: 2,600 to 4,600 feet (792 to 1,402 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Acuff and similar soils: 90 percent
Contrasting soils: 10 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Acuff soil and similar soils make up 90 percent of the map unit, and contrasting soils make up 10 percent.

The soils similar to Acuff are the Estacado soils on a similar landscape position. Also included are Acuff soils that have a sandy clay loam surface layer and a similar soil that has a very fine sandy loam surface layer.

Contrasting soils are small areas of Amarillo, Arvana, Kimberson, Lofton, Pep, and Sparenberg soils. Amarillo, Arvana, Kimberson, and Pep soils occur in landscape positions similar to those of the Acuff soil. The Lofton and Sparenberg soils occur on lower landscape positions.

Soil Description

Acuff

Aspect(s): East to South
Position(s) on landform(s): Plain
Parent material: Loamy eolian deposits from the Blackwater Draw Formation of Pleistocene age

Typical Profile

Ap—0 to 12 inches; brown, neutral loam
Bt1—12 to 20 inches; reddish brown, slightly alkaline sandy clay loam
Bt2—20 to 28 inches; reddish brown, moderately alkaline sandy clay loam
Bt3—28 to 38 inches; yellowish red, moderately alkaline sandy clay loam; about 2 percent filaments, masses, and nodules of calcium carbonate; strongly effervescent
Btkk—38 to 58 inches; pink, moderately alkaline sandy clay loam; about 55 percent calcium carbonate by volume in the form of masses, nodules, and finely disseminated carbonates; violently effervescent
Btk—58 to 80 inches; reddish yellow, moderately alkaline sandy clay loam; about 20 percent calcium carbonate by volume in the form of masses, nodules, and finely disseminated carbonates; violently effervescent

Properties and Qualities

Slope: 0 to 1 percent
Percent of area covered by surface fragments: Unspecified
Depth to first restrictive layer: Not present
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 9.4 inches (High)
Natural drainage class: Well drained
Runoff: Negligible
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 3e
Land capability irrigated: 2e
Ecological site name: Deep Hardland PE 25-36
Ecological site number: R077CY022TX
Typical vegetation: The natural plant community for this site is shortgrass dominant with a few midgrasses and forbs. Very few shrubs or woody plants occur on this shortgrass prairie. The most prevalent grasses are blue grama and buffalograss with blue grama being dominant.

Use and Management

Major land uses: This soil is used extensively for cropland. A few small areas are used as improved pasture or rangeland.
Cropland: This soil is well suited to cropland. The most common crops grown are cotton and grain sorghum. Other crops include wheat, sunflowers, and forage sorghum. The

main concerns in management are conserving soil moisture and controlling soil erosion. Fertilizer applications, reduced tillage, high-residue cover crops, and crop residue management can help reduce the soil temperature, conserve moisture, and improve or maintain soil tilth and productivity. Terraces, contour farming, grassed waterways, and diversion terraces, where needed, can help control runoff and water erosion. Improved varieties of bermudagrass and bluestems are the major pasture grasses grown on these soils. Fertilizer applications, weed control, brush management, proper stocking rates, and controlled grazing can help conserve soil moisture and improve or maintain productivity.

Rangeland: Native plants are dominantly shortgrasses, which produce moderate amounts of forage. The main concerns in management are continuous overgrazing, fire suppression, and invasion of woody species and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.

Urban Development: This soil is well suited to most urban uses. It is very limited as a site for construction of roads and streets or use as road-fill material. The low soil strength is a major limitation. Stabilizing, strengthening, or replacing the base material can overcome these restrictions.

Recreational Development: This soil is well suited to recreational uses. Dustiness is somewhat limiting. Recreational areas may require water or special surfacing material during dry periods to prevent excessive dustiness caused by heavy foot traffic.

Wildlife Habitat: The moderately arid conditions, which can limit plant growth necessary for a good habitat, are a minor limitation.

AcB—Acuff loam, 1 to 3 percent slopes

Setting

General location: Southern High Plains of western Texas and eastern New Mexico
Major land resource area: 77C—Southern High Plains, Southern Part
Landscape: Plateau
Elevation: 2,600 to 4,600 feet (792 to 1,402 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Acuff and similar soils: 90 percent
Contrasting soils: 10 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Acuff soil and similar soils make up 90 percent of the map unit, and contrasting soils make up 10 percent.

The soils similar to Acuff are the Estacado soils. Also included are small areas of Acuff soils that have a sandy clay loam surface layer and a similar soil with a very fine sandy loam surface layer.

Contrasting soils are small areas of Amarillo, Arvana, Kimberson, and Pep soils that occur in similar landscape positions.

Soil Description

Acuff
Aspect(s): East to South
Position(s) on landform(s): Plain; Playa slope
Parent material: Loamy eolian deposits from the Blackwater Draw Formation of Pleistocene age

Typical Profile

Ap—0 to 10 inches; brown, neutral loam
Bt1—10 to 18 inches; reddish brown, slightly alkaline sandy clay loam
Bt2—18 to 26 inches; reddish brown, moderately alkaline sandy clay loam
Bt3—26 to 36 inches; yellowish red, moderately alkaline sandy clay loam; about 2 percent filaments, masses, and nodules of calcium carbonate; strongly effervescent
Btkk—36 to 56 inches; pink, moderately alkaline sandy clay loam; about 55 percent calcium carbonate by volume in the form of masses, nodules, and finely disseminated carbonates; violently effervescent
Btk—56 to 80 inches; reddish yellow, moderately alkaline sandy clay loam; about 20 percent calcium carbonate by volume in the form of masses, nodules, and finely disseminated carbonates; violently effervescent

Properties and Qualities

Slope: 1 to 3 percent
Percent of area covered by surface fragments: Unspecified
Depth to first restrictive layer: Not present
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 9.3 inches (High)
Natural drainage class: Well drained
Runoff: Low
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 3e
Land capability irrigated: 3e
Ecological site name: Deep Hardland PE 25-36
Ecological site number: R077CY022TX
Typical vegetation: The natural plant community for this site is shortgrass dominant with a few midgrasses and forbs. Very few shrubs or woody plants occur on this shortgrass prairie. The most prevalent grasses are blue grama and buffalograss with blue grama being dominant.

Use and Management

Major land uses: This soil is used extensively for cropland. A few small areas are used as improved pasture or rangeland.
Cropland: This soil is well suited to cropland. The most common crops grown are cotton and grain sorghum. Other crops include wheat, sunflowers, and forage sorghum. The main concerns in management are conserving soil moisture and controlling soil erosion. Fertilizer applications, reduced tillage, high-residue cover crops, and crop residue management can help reduce the soil temperature, conserve moisture, and improve or maintain soil tilth and productivity. Terraces, contour farming, grassed waterways, and diversion terraces, where needed, can help control runoff and water erosion. Improved varieties of bermudagrass and bluestems are the major pasture grasses grown on these soils. Fertilizer applications, weed control, brush

management, proper stocking rates, and controlled grazing can help conserve soil moisture and improve or maintain productivity.

Rangeland: Native plants are dominantly shortgrasses, which produce moderate amounts of forage. The main concerns in management are continuous overgrazing, fire suppression, and invasion of woody species and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.

Urban Development: This soil is well suited to most urban uses. It is very limited as a site for construction of roads and streets or use as road-fill material. The low soil strength is a major limitation. Stabilizing, strengthening, or replacing the base material can overcome these restrictions.

Recreational Development: This soil is well suited to recreational uses. Dustiness is somewhat limiting. Recreational areas may require water or special surfacing material during dry periods to prevent excessive dustiness caused by heavy foot traffic.

Wildlife Habitat: Moderately arid conditions can limit plant growth necessary for a good habitat and are a minor limitation.

AfA—Amarillo fine sandy loam, 0 to 1 percent slopes

Setting

General location: Southern High Plains of western Texas and eastern New Mexico
Major land resource area: 77C—Southern High Plains, Southern Part
Landscape: Plateau
Elevation: 2,600 to 4,600 feet (792 to 1,402 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Amarillo and similar soils: 90 percent
Contrasting soils: 10 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Amarillo soil and similar soils make up 90 percent of the map unit, and contrasting soils make up 10 percent.

The soils similar to Amarillo include Tokio soils. Also included are small areas of Amarillo soils with a loamy fine sand surface layer or slopes of 1 to 3 percent.

Contrasting soils are small areas of Acuff, Arvana, Midessa, Posey, Sharvana, and Sparenberg soils. Acuff, Arvana, Midessa, Posey, and Sharvana soils occur in landscape positions similar to those of the Amarillo soil. Sparenberg soils occur on lower landscape positions in depressions or small playas.

Soil Description

Amarillo
Aspect(s): East to South
Position(s) on landform(s): Plain
Parent material: Loamy eolian deposits from the Blackwater Draw Formation of Pleistocene age

Typical Profile

Ap—0 to 11 inches; brown, slightly alkaline fine sandy loam

Bt—11 to 27 inches; reddish brown, slightly alkaline sandy clay loam; slightly effervescent

Btk—27 to 39 inches; yellowish red, moderately alkaline sandy clay loam; about 5 percent calcium carbonate by volume in the form of films and filaments; violently effervescent
Btkk—39 to 56 inches; pink, moderately alkaline sandy clay loam; about 60 percent calcium carbonate by volume in the form of masses, nodules, and finely disseminated carbonates; violently effervescent
B'tk—56 to 80 inches; yellowish red, moderately alkaline sandy clay loam; about 20 percent calcium carbonate by volume in the form of masses and nodules; violently effervescent

Properties and Qualities

Slope: 0 to 1 percent
Percent of area covered by surface fragments: Unspecified
Depth to first restrictive layer: Not present
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 9.1 inches (High)
Natural drainage class: Well drained
Runoff: Negligible
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 3e
Land capability irrigated: 2e
Ecological site name: Sandy Loam PE 25-36
Ecological site number: R077CY036TX
Typical vegetation: The natural plant community is a mixture of short and midgrasses with a smaller tallgrass complement. Midgrasses tend to dominate over most of the site with sideoats grama being the most prevalent midgrass species. Blue grama is the dominant shortgrass species and little bluestem the dominant tallgrass species. There are small areas that may occur within the site where blue grama is more prevalent. Woody plants are few but include yucca, catclaw acacia, and sand sage.

Use and Management

Major land uses: This soil is used extensively for cropland. A few small areas are used as improved pasture or rangeland.
Cropland: This soil is well suited to cropland. The most common crops grown are cotton and grain sorghum. Other crops include peanuts, wheat, sunflowers, and forage sorghum. The hazard of wind erosion is severe. The main concerns in management are conserving soil moisture and controlling soil erosion. Fertilizer applications, reduced tillage, high-residue cover crops, and crop residue management can help reduce the soil temperature, conserve moisture, and improve or maintain soil tilth and productivity. Terraces, contour farming, grassed waterways, and diversion terraces, where needed, can help control runoff and water erosion. Improved varieties of bermudagrass and bluestems are the major pasture grasses grown on these soils. Fertilizer applications, weed control, brush management, proper stocking rates, and

controlled grazing can help conserve soil moisture and improve or maintain productivity.

Rangeland: Native plants yield high amounts of forage. The hazard of wind erosion is severe. The main concerns in management are continuous overgrazing, fire suppression, and invasion of woody species and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.

Urban Development: This soil is well suited to urban uses. It is somewhat limited as a site for septic tank absorption fields and sewage lagoons. The seepage and permeability are minor limitations.

Recreational Development: This soil is well suited to recreational uses.

Wildlife Habitat: The moderately arid conditions, which can limit plant growth necessary for a good habitat, are a minor limitation.

AfB—Amarillo fine sandy loam, 1 to 3 percent slopes

Setting

General location: Southern High Plains of western Texas and eastern New Mexico
Major land resource area: 77C—Southern High Plains, Southern Part
Landscape: Plateau
Elevation: 2,600 to 4,600 feet (792 to 1402 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Amarillo and similar soils: 90 percent
Contrasting soils: 10 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Amarillo soil and similar soils make up 90 percent of the map unit, and contrasting soils make up 10 percent.

The soils similar to Amarillo include Tokio soils. Also included are small areas of Amarillo soils that have a loamy fine sand surface layer or slopes of 3 to 5 percent.

Contrasting soils are small areas of Acuff, Arvana, Midessa, Posey, and Sharvana soils that occur in similar landscape positions.

Soil Description

Amarillo
Aspect(s): East to South
Position(s) on landform(s): Plain; Playa slope
Parent material: Loamy eolian deposits from the Blackwater Draw Formation of Pleistocene age

Typical Profile

Ap—0 to 10 inches; brown, slightly alkaline fine sandy loam

Bt—10 to 26 inches; reddish brown, slightly alkaline sandy clay loam; slightly effervescent

Btk—26 to 39 inches; yellowish red, moderately alkaline sandy clay loam; about 5 percent calcium carbonate by volume in the form of films and filaments; violently effervescent

Btkk—39 to 55 inches; pink, moderately alkaline sandy clay loam; about 60 percent calcium carbonate by volume in the form of masses, nodules, and finely disseminated carbonates; violently effervescent

B'tk—55 to 80 inches; yellowish red, moderately alkaline sandy clay loam; about 20 percent calcium carbonate by volume in the form of masses and nodules; violently effervescent

Properties and Qualities

Slope: 1 to 3 percent
Percent of area covered by surface fragments: Unspecified
Depth to first restrictive layer: Not present
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 9.1 inches (High)
Natural drainage class: Well drained
Runoff: Low
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 3e
Land capability irrigated: 3e
Ecological site name: Sandy Loam PE 25-36
Ecological site number: R077CY036TX
Typical vegetation: The natural plant community is a mixture of short and midgrasses with a smaller tallgrass complement. Midgrasses tend to dominate over most of the site with sideoats grama being the most prevalent midgrass species. Blue grama is the dominant shortgrass species and little bluestem the dominant tallgrass species. There are small areas that may occur within the site where blue grama is more prevalent. Woody plants are few but include yucca, catclaw acacia, and sand sage.

Use and Management

Major land uses: This soil is used extensively for cropland. A few small areas are used as improved pasture or rangeland.
Cropland: This soil is well suited to cropland. The most common crops grown are cotton and grain sorghum. Other crops include peanuts, wheat, sunflowers, and forage sorghum. The hazard of wind erosion is severe. The main concerns in management are conserving soil moisture and controlling soil erosion. Fertilizer applications, reduced tillage, high-residue cover crops, and crop residue management can help reduce the soil temperature, conserve moisture, and improve or maintain soil tilth and productivity. Terraces, contour farming, grassed waterways, and diversion terraces, where needed, can help control runoff and water erosion. Improved varieties of bermudagrass and bluestems are the major pasture grasses grown on these soils. Fertilizer applications, weed control, brush management, proper stocking rates, and controlled grazing can help conserve soil moisture and improve or maintain productivity.
Rangeland: Native plants yield high amounts of forage. The hazard of wind erosion is severe. The main concerns in management are continuous overgrazing, fire suppression, and invasion of woody species and early successional annual grasses

and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.

Urban Development: This soil is well suited to urban uses. It is somewhat limited as a site for septic tank absorption fields and sewage lagoons. The seepage and permeability are minor limitations.

Recreational Development: This soil is well suited to recreational uses.

Wildlife Habitat: Wind erosion is a potential hazard that can limit growth of grain and seed crops for food and cover. The moderately arid conditions, which can limit plant growth necessary for a good habitat, are a minor limitation.

ArA—Arch loam, 0 to 1 percent slopes

Setting

General location: Southern High Plains of western Texas and eastern New Mexico
Major land resource area: 77C—Southern High Plains, Southern Part
Landscape: Plateau
Elevation: 2,600 to 4,600 feet (792 to 1402 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Arch and similar soils: 90 percent
Contrasting soils: 10 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Arch soil and similar soils make up 90 percent of the map unit, and contrasting soils make up 10 percent.

The soils similar to Arch are small areas of Drake, Lenorah, Midessa, and Portales soils. Also included are small areas of Arch soils that have a surface layer of fine sandy loam or slopes of 1 to 3 percent.

The contrasting soils are small areas of Arvana, Cedarlake, or Chapel soils.

Soil Description

Arch
Aspect(s): East to South
Position(s) on landform(s): Interdune; Playa step
Parent material: Calcareous, loamy eolian and lacustrine deposits of Quaternary age

Typical Profile

A—0 to 5 inches; brown, moderately alkaline loam; violently effervescent

Bk—5 to 16 inches; pale brown, moderately alkaline sandy clay loam; about 18 percent calcium carbonate by volume in the form of masses and finely disseminated carbonates; violently effervescent

Bkk1—16 to 37 inches; very pale brown, moderately alkaline sandy clay loam; about 55 percent calcium carbonate by volume in the form of masses and finely disseminated carbonates; violently effervescent

Bkk2—37 to 80 inches; very pale brown, strongly alkaline sandy clay loam; about 50 percent calcium carbonate by volume in the form of masses and finely disseminated carbonates; violently effervescent

Properties and Qualities

Slope: 0 to 1 percent

Percent of area covered by surface fragments: About 1 percent subrounded medium and coarse gravel
Depth to first restrictive layer: Not present
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 7.5 inches (Moderate)
Natural drainage class: Well drained
Runoff: Negligible
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 4e
Land capability irrigated: 3e
Ecological site name: High Lime PE 25-36
Ecological site number: R077CY026TX
Typical vegetation: This is a mid and tallgrass site with a lesser shortgrass complement and a few woody plants. Forbs also occur but are not abundant. Grasses that are tolerant of the limey conditions dominate the site. Sideoats grama, blue grama, vine mesquite, western wheatgrass, and alkali sacaton are the more common species. Fourwing saltbush will often be present and a few cholla plants may also occur on parts of the site.

Use and Management

Major land uses: This soil is used primarily as rangeland and habitat for wildlife. This soil is not used extensively as cropland or improved pasture.
Cropland: This soil is moderately suited to cropland. The low natural fertility, moderate available water capacity, and high carbonate content of the soil are limitations. The hazard of wind erosion is severe. The most common crops grown are cotton and grain sorghum. Other crops include wheat and forage sorghum. The main concerns in management are conserving soil moisture and controlling soil erosion. Fertilizer applications, reduced tillage, high-residue cover crops, and crop residue management can help reduce the soil temperature, conserve moisture, and improve or maintain soil tilth and productivity. Terraces, contour farming, grassed waterways, and diversion terraces, where needed, can help control runoff and water erosion. Improved varieties of bermudagrass and bluestems are the major pasture grasses grown on these soils. Fertilizer applications, weed control, brush management, proper stocking rates, and controlled grazing can help conserve soil moisture and improve or maintain productivity.
Rangeland: Native plants yield low to moderate amounts of forage. The high carbonate content, moderate available water capacity, and low natural fertility of the soil are limitations. The hazard of wind erosion is severe. The main concerns in management are continuous overgrazing, fire suppression, and invasion of woody species and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.
Urban Development: This soil is moderately suited to urban uses. It is very limited as a site for lawns and landscaping and use as daily cover for landfills. The high carbonate

content, moderate available water capacity, and low natural fertility of the soil are major limitations. Pipelines, storage tanks, and other underground structures made of uncoated steel should be protected from the high corrosion potential of these soils. This can be overcome by providing cathodic protection or by using galvanized steel.

Recreational Development: This soil is moderately suited to most recreational uses. It is very limited as a site for golf course fairways. The high carbonate content, moderate available water capacity and low natural fertility of the soil are major limitations.

Wildlife Habitat: Wind erosion is a potential hazard for grain and seed crops used for food and cover. The moderately arid conditions, which can limit plant growth necessary for a good habitat, are a minor limitation.

AsA—Arch fine sandy loam, 0 to 1 percent slopes

Setting

General location: Southern High Plains of western Texas and eastern New Mexico
Major land resource area: 77C—Southern High Plains, Southern Part
Landscape: Plateau
Elevation: 2,600 to 4,600 feet (792 to 1,402 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Arch and similar soils: 90 percent
Contrasting soils: 10 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Arch soil and similar soils make up 90 percent of the map unit, and contrasting soils make up 10 percent.

The soils similar to Arch are small areas of Drake, Lenorah, Midessa, and Portales soils. Also included are small areas of Arch soils that have a loam surface layer or slopes of 1 to 3 percent.

The contrasting soils are small areas of Amarillo, Arvana, and Cedarlake soils.

Soil Description

Arch
Aspect(s): East to South
Position(s) on landform(s): Interdune; Playa step
Parent material: Calcareous, loamy eolian and lacustrine deposits of Quaternary age

Typical Profile

A—0 to 6 inches; brown, moderately alkaline fine sandy loam; violently effervescent

Bk—6 to 16 inches; pale brown, moderately alkaline sandy clay loam; about 18 percent calcium carbonate by volume in the form of masses and finely disseminated carbonates; violently effervescent

Bkk1—16 to 37 inches; very pale brown, moderately alkaline sandy clay loam; about 55 percent calcium carbonate by volume in the form of masses and finely disseminated carbonates; violently effervescent

Bkk2—37 to 80 inches; very pale brown, strongly alkaline sandy clay loam; about 50 percent calcium carbonate by volume in the form of masses and finely disseminated carbonates; violently effervescent

Properties and Qualities

Slope: 0 to 1 percent

Percent of area covered by surface fragments: About 1 percent subrounded medium and coarse gravel
Depth to first restrictive layer: Not present
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 7.3 inches (Moderate)
Natural drainage class: Well drained
Runoff: Negligible
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 4e
Land capability irrigated: 3e
Ecological site name: High Lime PE 25 - 36
Ecological site number: R077CY026TX
Typical vegetation: This is a mid and tallgrass site with a lesser shortgrass complement and a few woody plants. Forbs also occur but are not abundant. Grasses that are tolerant of the limey conditions dominate the site. Sideoats grama, blue grama, vine mesquite, western wheatgrass, and alkali sacaton are the more common species. Fourwing saltbush will often be present and a few cholla plants may also occur on parts of the site.

Use and Management

Major land uses: This soil is used primarily as rangeland and habitat for wildlife. These soils are not used extensively as cropland or improved pasture.
Cropland: This soil is moderately suited to cropland. The low natural fertility, moderate available water capacity, and high carbonate content of the soil are limitations. The hazard of wind erosion is severe. The most common crops grown are cotton and grain sorghum. Other crops include wheat and forage sorghum. The main concerns in management are conserving soil moisture and controlling soil erosion. Fertilizer applications, reduced tillage, high-residue cover crops, and crop residue management can help reduce the soil temperature, conserve moisture, and improve or maintain soil tilth and productivity. Terraces, contour farming, grassed waterways, and diversion terraces, where needed, can help control runoff and water erosion. Improved varieties of bermudagrass and bluestems are the major pasture grasses grown on these soils. Fertilizer applications, weed control, brush management, proper stocking rates, and controlled grazing can help conserve soil moisture and improve or maintain productivity.
Rangeland: Native plants yield low to moderate amounts of forage. The high carbonate content, moderate available water capacity and low natural fertility of the soil are limitations. The hazard of wind erosion is severe. The main concerns in management are continuous overgrazing, fire suppression, and invasion of woody species and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.
Urban Development: This soil is moderately suited to urban uses. It is very limited as a site for lawns and landscaping and use as daily cover for landfills. The high carbonate

content, moderate available water capacity, and low natural fertility of the soil are major limitations. Pipelines, storage tanks, and other underground structures made of uncoated steel should be protected from the high corrosion potential of these soils. This can be overcome by providing cathodic protection or by using galvanized steel.

Recreational Development: This soil is moderately suited to most recreational uses. It is very limited as a site for golf course fairways. The high carbonate content, moderate available water capacity, and low natural fertility of the soil are major limitations.

Wildlife Habitat: Wind erosion is a potential hazard that can limit growth of grain and seed crops for food and cover. The moderately arid conditions, which can limit plant growth necessary for a good habitat, are a minor limitation.

AvA—Arvana fine sandy loam, 0 to 1 percent slopes

Setting

General location: Southern High Plains of western Texas and eastern New Mexico
Major land resource area: 77C—Southern High Plains, Southern Part
Landscape: Plateau
Elevation: 2,600 to 4,600 feet (792 to 1402 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Arvana and similar soils: 85 percent
Contrasting soils: 15 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Arvana soil and similar soils make up 85 percent of the map unit, and contrasting soils make up 15 percent.

The soils similar to Arvana are the Sharvana soils. Also included are small areas of Arvana soils that have a surface layer of loamy fine sand or slopes of 1 to 3 percent.

The contrasting soils are small areas of Amarillo, Midessa, Posey, Tokio, and Zita soils.

Soil Description

Arvana
Aspect(s): East to South
Position(s) on landform(s): Plain
Parent material: Loamy eolian deposits from the Blackwater Draw Formation of Pleistocene age

Typical Profile

Ap—0 to 8 inches; brown, moderately alkaline fine sandy loam

Bt1—8 to 16 inches; reddish brown, moderately alkaline sandy clay loam

Bt2—16 to 28 inches; yellowish red, moderately alkaline sandy clay loam; few films and filaments of calcium carbonate in pores and on ped surfaces; slightly effervescent

Bkkm—28 to 38 inches; pinkish white, moderately alkaline indurated layer containing a few fractures; is laminar in the upper part with pisolitic structure below the laminae and becomes softer below the pisolitic layer; violently effervescent

BCkk—38 to 60 inches; pink, moderately alkaline loam; about 60 percent calcium carbonate by volume in the form of masses, nodules, and finely disseminated carbonates; violently effervescent

2Btk—60 to 80 inches; reddish yellow, moderately alkaline clay loam; about 30 percent calcium carbonate by volume in the form of films, filaments, and masses; violently effervescent

Properties and Qualities

Slope: 0 to 1 percent
Percent of area covered by surface fragments: About 2 percent angular channers, about 1 percent subrounded (shape or size unspecified)
Depth to first restrictive layer: Petrocalcic horizon at 20 to 40 inches
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: 0.001 to 0.06 in/hr (Very slow)
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 4.4 inches (Low)
Natural drainage class: Well drained
Runoff: Low
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 3e
Land capability irrigated: 2e
Ecological site name: Sandy Loam PE 25-36
Ecological site number: R077CY036TX
Typical vegetation: The natural plant community is a mixture of short and midgrasses with a smaller tallgrass complement. Midgrasses tend to dominate over most of the site with sideoats grama being the most prevalent midgrass species. Blue grama is the dominant shortgrass species and little bluestem the dominant tallgrass species. There are small areas that may occur within the site where blue grama is more prevalent. Woody plants are few but include yucca, catclaw acacia, and sand sage.

Use and Management

Major land uses: This soil is primarily used for cropland. A few areas are used as improved pasture or rangeland.
Cropland: This soil is moderately suited to cropland. The low available water capacity and depth to a cemented pan are major limitations. The hazard of wind erosion is severe. The most common crops grown are cotton and grain sorghum. Other crops include peanuts, wheat, sunflowers, and forage sorghum. The main concerns in management are conserving soil moisture and controlling soil erosion. Fertilizer applications, reduced tillage, high-residue cover crops, and crop residue management can help reduce the soil temperature, conserve moisture, and improve or maintain soil tilth and productivity. Terraces, contour farming, grassed waterways, and diversion terraces, where needed, can help control runoff and water erosion. Improved varieties of bermudagrass and bluestems are the major pasture grasses grown on these soils. Fertilizer applications, weed control, brush management, proper stocking rates, and controlled grazing can help conserve soil moisture and improve or maintain productivity.
Rangeland: Native plants yield moderate amounts of forage. The depth to a cemented pan and low available water capacity are limitations. The hazard of wind erosion is severe. The main concerns in management are continuous overgrazing, fire suppression, and invasion of woody species and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.

Urban Development: This soil is moderately suited to most urban uses. It is very limited as a site for sanitary facilities or lawns and landscaping. The depth to a cemented pan, carbonate content, and low available water capacity of the soil are major limitations.

Recreational Development: This soil is moderately suited to most recreational uses. It is very limited as a site for golf course fairways. The depth to a cemented pan, low available water capacity, and carbonate content of the soil are major limitations. Other recreational uses are somewhat limited because of depth to a cemented pan.

Wildlife Habitat: Wind erosion is a potential hazard that can limit growth of grain and seed crops for food and cover. The moderately arid conditions, which can limit plant growth necessary for good habitat, are a minor limitation.

AvB—Arvana fine sandy loam, 1 to 3 percent slopes

Setting

General location: Southern High Plains of western Texas and eastern New Mexico
Major land resource area: 77C—Southern High Plains, Southern Part
Landscape: Plateau
Elevation: 2,600 to 4,600 feet (792 to 1402 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 64 degrees F (14 to 17 degrees C)
Frost-free period: 180 to 220 days

Composition

Arvana and similar soils: 85 percent
Contrasting soils: 15 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Arvana soil and similar soils make up 85 percent of the map unit, and contrasting soils make up 15 percent.

The soils similar to Arvana are the Sharvana soils. Also included are small areas of Arvana soils that have a surface layer of loamy fine sand or slopes of 3 to 5 percent.

The contrasting soils are small areas of Amarillo, Midessa, Posey, and Tokio soils.

Soil Description

Arvana
Aspect(s): East to South
Position(s) on landform(s): Plain; Playa slope
Parent material: Loamy eolian deposits from the Blackwater Draw Formation of Pleistocene age

Typical Profile

Ap—0 to 6 inches; brown, moderately alkaline fine sandy loam

Bt1—6 to 14 inches; reddish brown, moderately alkaline sandy clay loam

Bt2—14 to 26 inches; yellowish red, moderately alkaline sandy clay loam; few films and filaments of calcium carbonate in pores and on ped surfaces; slightly effervescent

Bkkm—26 to 36 inches; pinkish white, moderately alkaline indurated layer containing a few fractures; is laminar in the upper part with pisolitic structure below the laminae and becomes softer below the pisolitic layer; violently effervescent

BCkk—36 to 58 inches; pink, moderately alkaline loam; about 60 percent calcium carbonate by volume in the form of masses, nodules, and finely disseminated carbonates; violently effervescent

2Btk—58 to 80 inches; reddish yellow, moderately alkaline clay loam; about 30 percent calcium carbonate by volume in the form of films, filaments, and masses; violently effervescent

Properties and Qualities

Slope: 1 to 3 percent
Percent of area covered by surface fragments: About 2 percent angular channers, about 2 percent subrounded (shape or size unspecified)
Depth to first restrictive layer: Petrocalcic horizon at 20 to 40 inches
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: 0.001 to 0.06 in/hr (Very slow)
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 4.1 inches (Low)
Natural drainage class: Well drained
Runoff: Medium
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 3e
Land capability irrigated: 3e
Ecological site name: Sandy Loam PE 25-36
Ecological site number: R077CY036TX
Typical vegetation: The natural plant community is a mixture of short and midgrasses with a smaller tallgrass complement. Midgrasses tend to dominate over most of the site with sideoats grama being the most prevalent midgrass species. Blue grama is the dominant shortgrass species and little bluestem the dominant tallgrass species. There are small areas that may occur within the site where blue grama is more prevalent. Woody plants are few but include yucca, catclaw acacia, and sand sage.

Use and Management

Major land uses: This soil is primarily used for cropland. A few areas are used as improved pasture or rangeland.
Cropland: This soil is moderately suited to cropland. The low available water capacity, depth to a cemented pan, and runoff are limitations. The hazard of wind erosion is severe. The most common crops grown are cotton and grain sorghum. Other crops include peanuts, wheat, sunflowers, and forage sorghum. The main concerns in management are conserving soil moisture and controlling soil erosion. Fertilizer applications, reduced tillage, high-residue cover crops, and crop residue management can help reduce the soil temperature, conserve moisture, and improve or maintain soil tilth and productivity. Terraces, contour farming, grassed waterways, and diversion terraces, where needed, can help control runoff and water erosion. Improved varieties of bermudagrass and bluestems are the major pasture grasses grown on these soils. Fertilizer applications, weed control, brush management, proper stocking rates, and controlled grazing can help conserve soil moisture and improve or maintain productivity.

Rangeland: Native plants yield moderate amounts of forage. The depth to a cemented pan and low available water capacity are limitations. The hazard of wind erosion is severe. The main concerns in management are continuous overgrazing, fire suppression, and invasion of woody species and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.

Urban Development: This soil is moderately suited to most urban uses. It is very limited as a site for sanitary facilities or lawns and landscaping. The depth to a cemented pan, carbonate content, and low available water capacity of the soil are major limitations.

Recreational Development: This soil is moderately suited to most recreational uses. It is very limited as a site for golf course fairways. The depth to a cemented pan, low available water capacity, and carbonate content of the soil are major limitations. Other recreational uses are somewhat limited because of depth to a cemented pan.

Wildlife Habitat: Wind erosion is a potential hazard that can limit growth of grain and seed crops for food and cover. The moderately arid conditions, which can limit plant growth necessary for good habitat, are a minor limitation.

BcA—Bippus clay loam, 0 to 2 percent slopes, occasionally flooded

Setting

General location: Southern High Plains, Breaks of western Texas and eastern New Mexico
Major land resource area: 77E—Southern High Plains, Breaks
Landscape: Breaks
Elevation: 2,200 to 3,750 feet (670 to 1,143 meters)
Mean annual precipitation: 17 to 22 inches (432 to 559 millimeters)
Mean annual air temperature: 59 to 63 degrees F (15 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Bippus and similar soils: 85 percent
Contrasting soils: 15 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Bippus soil and similar soils make up 85 percent of the map unit, and contrasting soils make up 15 percent.

The soils similar to Bippus are small areas of soils that have a dark colored surface layer less than 20 inches thick. Also included are small areas of Bippus soils that have a loam surface layer.

The contrasting soils are small areas of Berda, Creta, and Lofton soils. Berda and Creta soils occur in higher landscape positions. Lofton soils occur in landscape positions similar to those of the Bippus soil.

Soil Description

Bippus
Aspect(s): East to South
Position(s) on landform(s): Ephemeral stream on draw
Parent material: Loamy alluvium of Holocene age

Typical Profile

Ap1—0 to 8 inches; brown, moderately alkaline clay loam
Ap2—8 to 14 inches; dark grayish brown, moderately alkaline sandy clay loam

Bw1—14 to 26 inches; brown, moderately alkaline sandy clay loam
Bw2—26 to 49 inches; brown, moderately alkaline sandy clay loam
Bw3—49 to 65 inches; strong brown, moderately alkaline sandy clay loam; about 2 percent films, threads, and concretions of calcium carbonate; slightly effervescent
Bk—65 to 80 inches; light yellowish brown, moderately alkaline fine sandy loam; about 10 percent threads, masses, and concretions of calcium carbonate; violently effervescent

Properties and Qualities

Slope: 0 to 2 percent
Percent of area covered by surface fragments: Unspecified
Depth to first restrictive layer: Not present
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 9.4 inches (High)
Natural drainage class: Well drained
Runoff: Negligible
Flooding frequency: Occasional
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 2w
Land capability irrigated: 2w
Ecological site name: Draw PE 25-36
Ecological site number: R077EY052TX
Typical vegetation: The natural plant community is dominantly midgrasses with lesser amounts of both tall and shortgrass species. A few forbs occur along with a few woody plants. The dominant species are western wheatgrass, vine mesquite, and sideoats grama. Blue grama and buffalograss make up most of the shortgrass complement.

Use and Management

Major land uses: This soil is used primarily as rangeland and habitat for wildlife. A few small areas are used as improved pasture or cropland.
Cropland: This soil is not extensively used as cropland. Most areas are so narrow that use as cropland is limited and occasional flooding is a hazard. Improved varieties of bermudagrass and bluestems are the major pasture grasses grown on these soils. Fertilizer applications, weed control, brush management, proper stocking rates, and controlled grazing can help conserve soil moisture and improve or maintain productivity.
Rangeland: Native plants yield high amounts of forage. Occasional flooding is a minor limitation. The main concerns in management are continuous overgrazing, fire suppression, and invasion of woody species and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.
Urban Development: This soil is poorly suited to urban uses. They are very limited as a site for sanitary facilities and building site development. The low soil strength and

occasional flooding are major limitations. Overcoming these limitations is difficult and costly.

Recreational Development: This soil is moderately suited to most recreational uses. It is very limited as a site for camp areas unless protected from the hazard of flooding. The season, duration, and frequency of flooding should be considered in planning playgrounds and other recreational areas.

Wildlife Habitat: Occasional flooding is a minor limitation.

BeD—Berda loam, 5 to 8 percent slopes

Setting

General location: Southern High Plains, Breaks of western Texas and eastern New Mexico
Major land resource area: 77E—Southern High Plains, Breaks
Landscape: Breaks
Elevation: 2,200 to 3,750 feet (670 to 1143 meters)
Mean annual precipitation: 17 to 22 inches (432 to 559 millimeters)
Mean annual air temperature: 59 to 63 degrees F (15 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Berda and similar soils: 85 percent
Contrasting soils: 15 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Berda soil and similar soils make up 85 percent of the map unit, and contrasting soils make up 15 percent.

The soils similar to Berda are small areas of Creta soils that occur in similar landscape positions. Also included are small areas of Berda soils that have slopes of 8 to 12 percent.

The contrasting soils are small areas of Mobeetie, Potter, and Veal soils.

Soil Description

Berda
Aspect(s): East to South
Position(s) on landform(s): Backslope on escarpment; Backslope on valley side
Parent material: Calcareous, loamy colluvium and slope alluvium derived from the Ogallala Formation of Miocene-Pliocene age

Typical Profile

A—0 to 6 inches; light brown, moderately alkaline loam; violently effervescent

Bw—6 to 20 inches; light brown, moderately alkaline loam; few fine filaments of calcium carbonate in pore linings; violently effervescent

Bk1—20 to 36 inches; light reddish brown, moderately alkaline clay loam; about 3 percent calcium carbonate by volume in the form of filaments and nodules; violently effervescent

Bk2—36 to 52 inches; light reddish brown, moderately alkaline clay loam; about 4 percent calcium carbonate by volume in the form of filaments and nodules; violently effervescent

Bk3—52 to 80 inches; light reddish brown, moderately alkaline sandy clay loam; about 5 percent calcium carbonate by volume in the form of filaments and nodules; violently effervescent

Properties and Qualities

Slope: 5 to 8 percent
Percent of area covered by surface fragments: About 2 percent subangular (shape or size unspecified), about 1 percent subrounded medium and coarse gravel
Depth to first restrictive layer: Not present
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 7.9 inches (Moderate)
Natural drainage class: Well drained
Runoff: Medium
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 6e
Land capability irrigated: None specified
Ecological site name: Hardland Slopes PE 25-36
Ecological site number: R077EY055TX
Typical vegetation: This is a transitional site dominated by shortgrass with a significant midgrass component. Blue grama is the dominant grass species. Buffalograss and sideoats grama are next in importance. Other midgrasses are vine mesquite and western wheatgrass. Yucca is the principal woody plant with relatively few forbs present.

Use and Management

Major land uses: This soil is primarily used for rangeland and wildlife habitat.
Cropland: This soil is poorly suited to cropland. The slope, runoff, and moderate available water capacity of the soil are major limitations. The hazard of erosion is severe.
Rangeland: Native plants are dominantly short and midgrasses, which produce moderate amounts of forage. Medium runoff and moderate available water capacity are limitations. The hazard of erosion is severe. The main concerns in management are continuous overgrazing, fire suppression, and invasion of woody species and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.
Urban Development: This soil is well suited for most urban uses. They are somewhat limited as a site for the construction of small commercial buildings, local roads and streets, sewage lagoons, or use as road-fill material. The slope and low soil strength are minor limitations.
Recreational Development: This soil is well suited to most recreational uses. Dustiness is somewhat limiting. Recreational areas may require water or special surfacing material during dry periods to prevent excessive dustiness caused by heavy foot traffic.
Wildlife Habitat: Wind erosion is a potential hazard for grain and seed crops used for food and cover. The moderately arid conditions, which can limit plant growth necessary for good habitat, are a minor limitation.

BHC—Brownfield soils, 1 to 8 percent slopes, hummocky

Setting

General location: Southern High Plains of western Texas and eastern New Mexico
Major land resource area: 77C—Southern High Plains, Southern Part
Landscape: Plateau
Elevation: 2,600 to 4,300 feet (792 to 1311 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Brownfield and similar soils: 65 percent
Contrasting soils: 35 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Brownfield soil and similar soils make up 65 percent of the map unit, and contrasting soils make up 35 percent. This soil is a depositional phase of the Brownfield series with recent wind-laid deposits of sand that have formed hummocks, blowouts, and small linear dunes in all or part of the map unit.

Similar soils are small areas of Amarillo and Patricia soils that occur on very gently sloping landscape positions. Also included in part of the map unit are Brownfield soils with 10 to 30 inches of additional fine sand deposited on the surface layer. A few small areas of the Brownfield soils have an eroded surface layer exposing the underlying clayey layer.

The contrasting soils include small areas of Arvana and Midessa. They occur on very gently sloping landscape positions.

Soil Description

Brownfield
Aspect(s): East to South
Position(s) on landform(s): Hummock on plain
Parent material: Sandy eolian deposits from the Blackwater Draw Formation of Pleistocene age

Typical Profile

A1—0 to 9 inches; reddish yellow, neutral fine sand
A2—9 to 19 inches; pink, neutral fine sand
A3—19 to 39 inches; pink, neutral fine sand
Bt1—39 to 62 inches; yellowish red, slightly acid sandy clay loam
Bt2—62 to 80 inches; yellowish red, neutral sandy clay loam

Properties and Qualities

Slope: 1 to 8 percent
Percent of area covered by surface fragments: Unspecified
Depth to first restrictive layer: Not present
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic

Representative total available water capacity to 60 inches: About 5.5 inches (Low)
Natural drainage class: Well drained
Runoff: Low
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 6e
Land capability irrigated: None specified
Ecological site name: Sandy PE 25-36
Ecological site number: R077CY035TX
Typical vegetation: This is a tallgrass climax site. Nearly half of the grass component is composed of tallgrasses such as little bluestem, sand bluestem, spike dropseed, and giant dropseed. The remainder is composed of mid and shortgrasses such as sideoats grama, sand dropseed, hooded windmillgrass, sand lovegrass, sand paspalum, fall witchgrass, hairy grama, needle and thread, and perennial threeawn. Sand sage, shinoak, and skunkbush make up the woody species.

Use and Management

Major land uses: This soil is used primarily for rangeland and wildlife habitat.
Cropland: This soil is poorly suited to cropland. The low available water capacity, droughtiness, slope, and low natural fertility of the soil are major limitations. The hazard of wind erosion is severe.
Rangeland: Native plants yield low to moderate amounts of forage. Areas of bare ground are common. The low available water capacity and droughtiness of the soil are major limitations. The hazard of wind erosion is severe. The main concerns in management are continuous overgrazing, fire suppression, and invasion of woody species and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.
Urban Development: This soil is poorly suited to most urban uses. It is very limited as a site for sanitary facilities and building site development. The high sand content, poor filtering capacity, seepage, droughtiness, low natural fertility, and low available water holding capacity are major limitations. Under certain conditions, trench sidewalls can become highly unstable in this soil. Trenches that have been excavated to more than a depth of 5 feet should be shored or the sidewall should be graded to an angle that ensures safe working conditions.
Recreational Development: This soil is poorly suited to most recreational uses. The high sand content, droughtiness, and low available water capacity are very limiting.
Wildlife Habitat: The sandy surface texture is a major limitation, and wind erosion is a potential hazard for grain and seed crops or wild herbaceous plants. Moderately arid conditions, which can limit plant growth necessary for good habitat, are a minor limitation.

BP—Borrow pits

Setting

General location: Southern High Plains of western Texas, Oklahoma, and eastern New Mexico
Major land resource area: 77C, 77E—Southern High Plains, Southern Part, Southern High Plains, Breaks
Landscape: Plateau
Elevation: 2,700 to 3,300 feet (823 to 1006 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)

Mean annual air temperature: 57 to 63 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Borrow pits and similar soils: 95 percent
Contrasting soils: 5 percent

Based on field observations of the map unit during the survey, the best estimate is that the Borrow pits make up 95 percent of the map unit, and other soils make up 5 percent.
Other soils include small areas of Arvana, Kimberson, Posey, Potter, and Sharvana soils.

Soil Description

Borrow Pits
Aspect(s): East to South
Position(s) on landform(s): Borrow pit
Parent material: Caliche mine spoil or earthy fill

Properties and Qualities

Slope: 0 to 45 percent
Percent of area covered by surface fragments: Unspecified
Depth to first restrictive layer: Not present
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.06 to 0.2 in/hr (Slow)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 2.4 inches (Very low)
Natural drainage class: Well drained
Runoff: Negligible
Flooding frequency: None
Ponding frequency: Occasional
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 8s
Land capability irrigated: None specified
Ecological site name: Not specified
Ecological site number: Not specified
Typical vegetation: Not specified

Use and Management

Major land uses: This map unit consists of caliche and gravel pits that have been excavated for use mainly as road material. Borrow pits have steep vertical sidewalls, are 10 to 15 feet deep, and range from 5 to 50 acres in size. The exposed soil material in the pits is mainly caliche, gravel, and calcareous soil material.
Cropland: These areas are poorly suited to cropland. The slope, droughtiness, very low available water capacity, high carbonate content, and low natural fertility are major limitations. The hazard of erosion is severe.
Rangeland: The steep slope, very high runoff, low available water capacity, high carbonate content, low natural fertility, and ponding are major limitations. The hazard of erosion is severe.

Urban Development: These areas are poorly suited to urban uses. They are very limited for use as sanitary facilities and building site development. The slope, ponding, restricted permeability, droughtiness, gravel, and carbonate content are major limitations.

Recreational Development: These areas are poorly suited to recreational uses. It is very limited because of the slope, droughtiness, gravel content, carbonate content, and hazard of ponding.

Wildlife Habitat: The low available water capacity, surface rock fragments, arid conditions, and ponding are major limitations that restrict plant growth necessary for good habitat. Occasionally these areas are used by transient wildlife that uses water here following rainy periods or for cover; however, since there is little or no vegetation, this use is very limited. These areas are severely limited for other uses.

BrB—Brownfield fine sand, 0 to 3 percent slopes

Setting

General location: Southern High Plains of western Texas and eastern New Mexico
Major land resource area: 77C—Southern High Plains, Southern Part
Landscape: Plateau
Elevation: 2,600 to 4,300 feet (792 to 1,311 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Brownfield and similar soils: 90 percent
Contrasting soils: 10 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Brownfield soil and similar soils make up 90 percent of the map unit, and contrasting soils make up 10 percent.

The soils similar to Brownfield are small areas of Amarillo and Patricia soils that have loamy fine sand surface layers. Also included are small areas of Brownfield soils, hummocky, or Brownfield soils that have slopes of 3 to 5 percent.

The contrasting soils are small areas of Arvana, Midessa, and Tokio soils. The Arvana, Midessa, and Tokio soils occur in landscape positions similar to those of the Brownfield soils.

Soil Description

Brownfield
Aspect(s): East to South
Position(s) on landform(s): Plain
Parent material: Sandy eolian deposits from the Blackwater Draw Formation of Pleistocene age

Typical Profile

A—0 to 6 inches; brown, neutral fine sand
E1—6 to 12 inches; light brown, neutral fine sand
E2—12 to 23 inches; yellowish red, neutral fine sand
E/Bt—23 to 28 inches; yellowish red, neutral loamy fine sand and red, neutral sandy clay loam
Bt1—28 to 55 inches; red, slightly acid sandy clay loam
Bt2—55 to 80 inches; red, neutral sandy clay loam

Properties and Qualities

Slope: 0 to 3 percent
Percent of area covered by surface fragments: Unspecified
Depth to first restrictive layer: Not present
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 6.8 inches (Moderate)
Natural drainage class: Well drained
Runoff: Very low
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 6e
Land capability irrigated: 4e
Ecological site name: Sandy PE 25-36
Ecological site number: R077CY035TX
Typical vegetation: This is a tallgrass climax site. Nearly half of the grass component is composed of tallgrasses such as little bluestem, sand bluestem, spike dropseed, and giant dropseed. The remainder is composed of mid and shortgrasses such as sideoats grama, sand dropseed, hooded windmillgrass, sand lovegrass, sand paspalum, fall witchgrass, hairy grama, needle and thread, and perennial threeawn. Sand sage, shinoak, and skunkbush make up the woody species.

Use and Management

Major land uses: This soil is used mainly as rangeland or habitat for wildlife. Some areas are used as improved pasture or cropland.
Cropland: This soil is poorly suited to cropland unless irrigated. The moderate available water capacity and droughtiness are major limitations. The hazard of wind erosion is severe. The most common crops grown are peanuts, grain sorghum, and forage sorghum. Other crops include wheat, cotton, and melons. The main concerns in management are conserving soil moisture and controlling soil erosion. Fertilizer applications, reduced tillage, high-residue cover crops, and crop residue management can help reduce the soil temperature, conserve moisture, and improve or maintain soil tilth and productivity. Terraces, contour farming, grassed waterways, and diversion terraces, where needed, can help control runoff and water erosion. Improved varieties of bermudagrass and bluestems are the major pasture grasses grown on these soils. Fertilizer applications, weed control, brush management, proper stocking rates, and controlled grazing can help conserve soil moisture and improve or maintain productivity.
Rangeland: Native plants yield moderate amounts of forage. Droughtiness and moderate available water capacity is a limitation. The hazard of wind erosion is severe. The main concerns in management are continuous overgrazing, fire suppression, and invasion of woody species and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.

Urban Development: This soil is poorly suited to most urban uses. It is very limited as a site for building site development or sanitary facilities. The high sand content, poor filtering capacity, seepage, droughtiness, and moderate available water capacity are major limitations. Under certain conditions, trench sidewalls can become highly unstable in this soil. Trenches that have been excavated to more than a depth of 5 feet should be shored or the sidewall should be graded to an angle that ensures safe working conditions.

Recreational Development: This soil is poorly suited to most recreational uses. The high sand content, droughtiness, and moderate available water capacity are very limiting.

Wildlife Habitat: The sandy surface texture is a major limitation, and wind erosion is a potential hazard for grain and seed crops or wild herbaceous plants. Moderately arid conditions, which can limit plant growth necessary for good habitat, are a minor limitation.

CdA—Cedarlake sandy clay loam, 0 to 1 percent slopes, frequently ponded

Setting

General location: Southern High Plains of western Texas and eastern New Mexico
Major land resource area: 77C—Southern High Plains, Southern Part
Landscape: Plateau
Elevation: 2,700 to 4,300 feet (823 to 1,311 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Cedarlake and similar soils: 95 percent
Contrasting soils: 5 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Cedarlake soil and similar soils make up 95 percent of the map unit, and contrasting soils make up 5 percent.

The soils similar to Cedarlake are small areas of Lamesa soils that occur in similar landscape positions.

The contrasting soils are small areas of Arch, Drake, Hindman, Lenorah, and Portales soils. Also included in mapping are small areas of miscellaneous water. The Arch, Hindman, Lenorah, and Portales soils occur in slightly higher landscape positions than those of the Cedarlake soils. Drake soils occur on dunes.

Soil Description

Cedarlake
Aspect(s): East to South
Position(s) on landform(s): Shallow, low-lying depressions within drainageways
Parent material: Loamy alluvium over clayey lacustrine deposits of Quaternary age

Typical Profile

Anz—0 to 10 inches; grayish brown, moderately alkaline sandy clay loam; about 1 percent nodules of calcium carbonate; strongly saline; moderately sodic; strongly effervescent

Bnz—10 to 22 inches; light brownish gray, moderately alkaline clay loam; few fine masses of gypsum; strongly saline; moderately sodic; violently effervescent

Bknz—22 to 45 inches; light gray, moderately alkaline clay; about 30 percent calcium carbonate by volume as films, filaments, and masses; few fine and medium masses of gypsum; moderately saline; moderately sodic; violently effervescent

Bk1—45 to 56 inches; light gray, moderately alkaline silty clay; about 35 percent calcium carbonate by volume as films, filaments, and masses; few fine masses of gypsum; slightly saline; slightly sodic; violently effervescent

Bk2—56 to 68 inches; light gray, moderately alkaline clay; about 35 percent calcium carbonate by volume as films, filaments, and masses; few fine masses of gypsum; slightly saline; slightly sodic; violently effervescent

2Bk3—68 to 80 inches; mottled light gray and pink, moderately alkaline silty clay; about 35 percent calcium carbonate by volume as films, filaments, and masses; few fine masses of gypsum; slightly saline; slightly sodic; violently effervescent

Properties and Qualities

Slope: 0 to 1 percent
Percent of area covered by surface fragments: Unspecified
Depth to first restrictive layer: Not present
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.001 to 0.06 in/hr (Very slow)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Saline
Salinity, maximum within 40 inches: Saline
Sodicity, representative within 40 inches: Sodic
Sodicity, maximum within 40 inches: Sodic
Representative total available water capacity to 60 inches: About 5.9 inches (Low)
Natural drainage class: Very poorly drained
Runoff: Negligible
Flooding frequency: None
Ponding frequency: Frequent
Depth to seasonal water table: Present within 80 inches

Interpretive Groups

Land capability nonirrigated: 7w
Land capability irrigated: None specified
Ecological site name: Wet Saline PE 25-36
Ecological site number: R077CY689TX
Typical vegetation: The natural plant community for this site is a mixture of salt-tolerant grasses and grasslike plants, forbs, and shrubs. The vegetation on most of the site is shrub dominant with saltcedar (tamarix) and baccharis being the two most prevalent species. In open areas and in the understory there are varying amounts of alkali sacaton, Texas dropseed, creeping muhly, jointtail, inland saltgrass, sedge and rushes, and occasionally some western wheatgrass. Forbs include portulaca species, kochia, smartweed, dock, and annual forbs. In areas of standing water cattails may be present. In extreme saline areas vegetation is sparse.

Use and Management

Major land uses: This soil is used primarily for wildlife habitat. A few areas are used as rangeland.
Cropland: This soil is poorly suited to cropland. The hazard of ponding, depth to a saturated zone, high sodium content, and high salinity are major limitations.
Rangeland: Native plants yield low amounts of forage. Frequent ponding, depth to a saturated zone, high sodium, and high salinity are major limitations that limit plant growth. Large areas of bare ground are common. The hazard of wind erosion is

severe. Proper stocking rates, brush management, and controlled grazing can help improve productivity.

Urban Development: This soil is poorly suited to urban uses. It is very limited as a site for sanitary facilities and building site development. The depth to a saturated zone, frequent ponding, restricted permeability, sodium content, salinity, low strength, and high shrink-swell potential are major limitations. Overcoming these limitations is difficult and costly. Pipelines, storage tanks, and other underground structures made of uncoated steel should be protected from the high corrosion potential of these soils. This can be overcome by providing cathodic protection or by using galvanized steel. Under certain conditions, trench sidewalls can become highly unstable in this soil. Trenches that have been excavated to more than a depth of 5 feet should be shored or the sidewall should be graded to an angle that ensures safe working conditions.

Recreational Development: This soil is poorly suited to recreational uses. The depth to a saturated zone, frequent ponding, high carbonate, salinity, and sodium content are very limiting.

Wildlife Habitat: The shallow water table, frequent ponding, high salinity, and high sodium content of the soil limit plant growth necessary for good habitat. Migratory wildlife, such as dove and the sandhill crane, make limited use of these areas for water and cover.

CeC—Creta loam, 1 to 5 percent slopes

Setting

General location: Southern High Plains Breaks of western Texas and eastern New Mexico

Major land resource area: 77E—Southern High Plains, Breaks

Landscape: Breaks

Elevation: 2,600 to 4,100 feet (792 to 1,250 meters)

Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)

Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)

Frost-free period: 185 to 220 days

Composition

Creta and similar soils: 85 percent

Contrasting soils: 15 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Creta soil and similar soils make up 85 percent of the map unit, and contrasting soils make up 15 percent.

The soils similar to Creta are small areas of Berda soils. Also included are small areas of Creta soils that have a surface layer of very fine sandy loam or slopes of 6 to 8 percent.

The contrasting soils are small areas of Potter, Veal, and Yellowhouse soils.

Soil Description

Creta

Aspect(s): East to South

Position(s) on landform(s): Backslope on escarpment; Footslope on valley side

Parent material: Calcareous, loamy colluvium from the Ogallala Formation of Miocene-Pliocene age over residuum weathered from limestone, sandstone, and shale of Cretaceous age

Typical Profile

A—0 to 8 inches; dark grayish brown, moderately alkaline loam; violently effervescent
Bw—8 to 16 inches; dark grayish brown, moderately alkaline gravelly sandy clay loam; violently effervescent
Bt—16 to 27 inches; brown, moderately alkaline sandy clay loam; few fine and medium nodules of calcium carbonate; violently effervescent
Btkn—27 to 44 inches; grayish brown, moderately alkaline sandy clay loam; about 8 percent calcium carbonate by volume as masses and nodules; moderately sodic; slightly saline; violently effervescent
2Btny—44 to 70 inches; grayish brown, moderately alkaline clay; about 8 percent by volume gypsum and salt crystals; moderately sodic; moderately saline; violently effervescent
2Cr—70 to 80 inches; pale olive and yellow interbedded soft siltstone and shale bedrock; about 10 percent by volume gypsum and salt crystals; moderately sodic; moderately saline; violently effervescent

Properties and Qualities

Slope: 1 to 5 percent
Percent of area covered by surface fragments: About 1 percent angular (shape or size unspecified), about 3 percent subangular (shape or size unspecified), about 1 percent subrounded calcium carbonate fragments and limestone
Depth to first restrictive layer:
Paralithic bedrock: 60 to 80 inches
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.06 to 0.2 in/hr (Slow)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Sodic
Representative total available water capacity to 60 inches: About 9.1 inches (High)
Natural drainage class: Well drained
Runoff: Low
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 4e
Land capability irrigated: None specified
Ecological site name: Hardland Slopes PE 25-36
Ecological site number: R077EY055TX
Typical vegetation: This is a transitional site dominated by shortgrass with a significant midgrass component. Blue grama is the dominant grass species. Buffalograss and sideoats grama are next in importance. Other midgrasses are vine mesquite and western wheatgrass. Yucca is the principal woody plant with relatively few forbs present.

Use and Management

Major land uses: This soil is primarily used for rangeland and wildlife habitat.
Cropland: This soil is poorly suited to cropland. The moderate sodium content of the soil is a major limitation. The hazard of wind erosion is severe.

Rangeland: Native plants are dominantly short and midgrasses, which produce moderate amounts of forage. The hazard of wind erosion is severe. The main concerns in management are continuous overgrazing, fire suppression, and invasion of woody species and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.

Urban Development: This soil is moderately suited for most urban uses. It is very limited as a site for lawns and landscaping or trench sanitary landfills. The moderate sodium content of the soil is a major limitation. Pipelines, storage tanks, and other underground structures made of uncoated steel should be protected from the high corrosion potential of Creta soils. This can be overcome by providing cathodic protection or by using galvanized steel.

Recreational Development: This soil is poorly suited to most recreational uses. The sodium content of the soil is a minor limitation.

Wildlife Habitat: Wind erosion is a potential hazard for grain and seed crops used for food and cover. The moderately arid conditions, which can limit plant growth necessary for good habitat, are a minor limitation.

ChA—Chapel clay, 0 to 1 percent slopes, occasionally ponded

Setting

General location: Southern High Plains of western Texas and eastern New Mexico
Major land resource area: 77C—Southern High Plains, Southern Part
Landscape: Plateau
Elevation: 2,700 to 4,300 feet (823 to 1,311 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Chapel and similar soils: 90 percent
Contrasting soils: 10 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Chapel soil and similar soils make up 90 percent of the map unit, and contrasting soils make up 10 percent.

The soils similar to Chapel are small areas of Ranco and Sparenberg soils. Also included are small areas of similar soils that have a surface layer of clay loam.

The contrasting soils are small areas of Arch, Lamesa, and Portales soils.

Soil Description

Chapel
Aspect(s): East to South
Position(s) on landform(s): Circular gilgai on playa floor
Parent material: Calcareous, clayey lacustrine deposits of Quaternary age

Typical Profile

A—0 to 5 inches; dark grayish brown, moderately alkaline clay; few iron-manganese concretions; slightly effervescent

Bw—5 to 14 inches; dark gray, moderately alkaline clay; few iron-manganese concretions; slightly effervescent

Bkss1—14 to 24 inches; gray, moderately alkaline clay; about 3 percent calcium carbonate nodules by volume; strongly effervescent

Bkss2—24 to 35 inches; grayish brown, moderately alkaline clay; about 4 percent calcium carbonate nodules by volume; strongly effervescent
2Bk1—35 to 59 inches; white, moderately alkaline clay; about 40 percent calcium carbonate by volume as masses and nodules; violently effervescent
2Bk2—59 to 80 inches; white, moderately alkaline clay loam; about 35 percent calcium carbonate by volume as masses and nodules; violently effervescent

Properties and Qualities

Slope: 0 to 1 percent
Percent of area covered by surface fragments: Unspecified
Depth to first restrictive layer: Not present
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.001 to 0.06 in/hr (Very slow)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 8.9 inches (Moderate)
Natural drainage class: Somewhat poorly drained
Runoff: Negligible
Flooding frequency: None
Ponding frequency: Occasional
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 4w
Land capability irrigated: None specified
Ecological site name: Playa PE 25-36
Ecological site number: R077CY027TX
Typical vegetation: The natural plant community of a playa is highly variable and dependent on the hydrology of the playa basin being considered. The dominance of hydrophytic plants or upland plants depends on the degree, frequency, and time of inundation. Vegetation varies according to the amount of water available during the growing season. On average years, the dominant plant community for this site is a mixture of upland grasses and forbs with highly variable amounts of hydrophytic plants present. Very few shrubs or woody plants occur on this site. The most common plants are western wheatgrass, vine mesquite, barnyard grass, buffalograss, bur ragweed, saltmarsh aster, sedges, coreopsis, lambs quarters, cocklebur, curly dock, Pennsylvania smartweed, and common spikerush.

Use and Management

Major land uses: This soil is used primarily as rangeland and habitat for wildlife. This soil is not used extensively as cropland.
Cropland: This soil is moderately suited to cropland. The clayey texture of the soil, which can restrict root development, and occasional ponding are limitations. The most common crops grown are cotton and grain sorghum. Other crops include wheat and forage sorghum. The main concerns in management are conserving soil moisture and controlling soil erosion. Fertilizer applications, reduced tillage, high-residue cover crops, and crop residue management can help reduce the soil temperature, conserve moisture, and improve or maintain soil tilth and productivity. Terraces, contour farming, grassed waterways, and diversion terraces, where needed, can help control runoff and water erosion. Improved varieties of bermudagrass and bluestems are the

major pasture grasses grown on these soils. Fertilizer applications, weed control, brush management, proper stocking rates, and controlled grazing can help conserve soil moisture and improve or maintain productivity.

Rangeland: High yields of forage can be obtained during favorable years. Occasional ponding and the high clay content of the soil are limitations that can restrict plant growth. Other concerns in management are continuous overgrazing, fire suppression, and invasion of woody species and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.

Urban Development: This soil is poorly suited to urban uses. It is very limited as a site for sanitary facilities and building site development. Occasional ponding, high clay content, restricted permeability, high shrink-swell potential, and low strength are major limitations. Overcoming many of these limitations is difficult and costly. Pipelines, storage tanks, and other underground structures made of uncoated steel should be protected from the high corrosion potential of these soils. This can be overcome by providing cathodic protection or by using galvanized steel. Under certain conditions, trench sidewalls can become highly unstable in this soil. Trenches that have been excavated to more than a depth of 5 feet should be shored or the sidewall should be graded to an angle that ensures safe working conditions.

Recreational Development: This soil is poorly suited to recreational uses. The high clay content of the soil and occasional ponding is very limiting.

Wildlife Habitat: The clayey surface texture is a major limitation that limits plant growth necessary for good habitat. Occasional ponding is a minor limitation. Waterfowl, such as ducks and geese, make limited use of this habitat for food and cover.

DRC—Drake soils, 1 to 8 percent slopes

Setting

General location: Southern High Plains of western Texas and eastern New Mexico
Major land resource area: 77C—Southern High Plains, Southern Part
Landscape: Plateau
Elevation: 2,600 to 4,600 feet (793 to 1,402 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Drake and similar soils: 90 percent
Contrasting soils: 10 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Drake soil and similar soils make up 90 percent of the map unit, and contrasting soils make up 10 percent.

The soils similar to Drake are small areas of Arch and Midessa soils. Also included are small areas of Drake soils that have slopes of 8 to 12 percent.

Contrasting soils are small areas of Amarillo, Portales, and Posey soils that occur in lower landscape positions.

Soil Description

Drake
Aspect(s): East to South
Position(s) on landform(s): Playa dune
Parent material: Calcareous, loamy eolian deposits of Quaternary age

Typical Profile

A1—0 to 5 inches; pale brown, moderately alkaline loam; strongly effervescent
A2—5 to 15 inches; light brownish gray, moderately alkaline fine sandy loam; few fine calcium carbonate nodules; strongly effervescent
Bk1—15 to 28 inches; light brownish gray, moderately alkaline sandy clay loam; about 3 percent calcium carbonate by volume as filaments and nodules; violently effervescent
Bk2—28 to 43 inches; light brownish gray, moderately alkaline loam; about 3 percent calcium carbonate by volume as filaments and nodules; violently effervescent
Bk3—43 to 69 inches; light brownish gray, moderately alkaline loam; about 3 percent calcium carbonate by volume as filaments and nodules; violently effervescent
Bk4—69 to 80 inches; light yellowish brown, moderately alkaline fine sandy loam; about 3 percent calcium carbonate by volume as filaments and nodules; violently effervescent

Properties and Qualities

Slope: 1 to 8 percent
Percent of area covered by surface fragments: Unspecified
Depth to first restrictive layer: Not present
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 7.5 inches (Moderate)
Natural drainage class: Well drained
Runoff: Medium
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 6e
Land capability irrigated: None specified
Ecological site name: High Lime PE 25-36
Ecological site number: R077CY026TX
Typical vegetation: This is a mid and tallgrass site with a lesser shortgrass complement and a few woody plants. Forbs also occur but are not abundant. Grasses that are tolerant of the limey conditions dominate the site. Sideoats grama, blue grama, vine mesquite, western wheatgrass, and alkali sacaton are the more common species. Fourwing saltbush will often be present and a few cholla plants may also occur on parts of the site.

Use and Management

Major land uses: This soil is used primarily as rangeland and habitat for wildlife. This soil is not used extensively as cropland or improved pasture.
Cropland: This soil is poorly suited to cropland. The moderate available water capacity, droughtiness, runoff, carbonate content, and low natural fertility of the soil are major limitations. The hazard of wind erosion is severe. Improved varieties of bermudagrass and bluestems are the major pasture grasses grown on these soils. Fertilizer applications, weed control, brush management, proper stocking rates, and controlled grazing can help conserve soil moisture and improve or maintain productivity.

Rangeland: Native plants yield moderate amounts of forage. The medium runoff, moderate available water capacity, carbonate content, and low natural fertility of the soil are limitations. The hazard of wind erosion is severe. The main concerns in management are continuous overgrazing, fire suppression, and invasion of woody species and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.

Urban Development: This soil is moderately suited to urban uses. The carbonate content, moderate available water capacity, medium runoff, and low natural fertility of the soil limit plant growth necessary for healthy lawns and landscaping. Pipelines, storage tanks, and other underground structures made of uncoated steel should be protected from the high corrosion potential of these soils. This can be overcome by providing cathodic protection or by using galvanized steel.

Recreational Development: This soil is moderately suited to most recreational uses. It is somewhat limited for use as camping areas, playgrounds, picnic areas, or paths and trails. The slope and dustiness are minor limitations. Applications of water or special surfacing material may be needed during dry periods to prevent excessive dustiness in areas that are subject to heavy foot traffic.

Wildlife Habitat: Wind erosion is a potential hazard for grain and seed crops used for food and cover. The moderately arid conditions, which can limit plant growth necessary for good habitat, are a minor limitation.

DRE—Drake soils, 8 to 20 percent slopes

Setting

General location: Southern High Plains of western Texas and eastern New Mexico
Major land resource area: 77C—Southern High Plains, Southern Part
Landscape: Plateau
Elevation: 2,600 to 4,600 feet (793 to 1,402 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Drake and similar soils: 90 percent
Contrasting soils: 10 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Drake soil and similar soils make up 90 percent of the map unit, and contrasting soils make up 10 percent.

The soils similar to Drake are small areas of the Arch and Midessa soils. The contrasting soils are small areas of Posey and Potter soils.

Soil Description

Drake
Aspect(s): East to South
Position(s) on landform(s): Playa dune
Parent material: Calcareous, loamy eolian deposits of Quaternary age

Typical Profile

A1—0 to 3 inches; pale brown, moderately alkaline loam; strongly effervescent

A2—3 to 11 inches; light brownish gray, moderately alkaline fine sandy loam; few fine calcium carbonate nodules; strongly effervescent

Bk1—11 to 25 inches; light brownish gray, moderately alkaline sandy clay loam; about 3 percent calcium carbonate by volume as filaments and nodules; violently effervescent
Bk2—25 to 38 inches; light brownish gray, moderately alkaline loam; about 3 percent calcium carbonate by volume as filaments and nodules; violently effervescent
Bk3—38 to 65 inches; light brownish gray, moderately alkaline loam; about 3 percent calcium carbonate by volume as filaments and nodules; violently effervescent
Bk4—65 to 80 inches; light yellowish brown, moderately alkaline fine sandy loam; about 3 percent calcium carbonate by volume as filaments and nodules; violently effervescent

Properties and Qualities

Slope: 8 to 20 percent
Percent of area covered by surface fragments: Unspecified
Depth to first restrictive layer: Not present
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 7.5 inches (Moderate)
Natural drainage class: Well drained
Runoff: Medium
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 6e
Land capability irrigated: None specified
Ecological site name: High Lime PE 25-36
Ecological site number: R077CY026TX
Typical vegetation: This is a mid and tallgrass site with a lesser shortgrass complement and a few woody plants. Forbs also occur but are not abundant. Grasses that are tolerant of the limey conditions dominate the site. Sideoats grama, blue grama, vine mesquite, western wheatgrass, and alkali sacaton are the more common species. Fourwing saltbush will often be present and a few cholla plants may also occur on parts of the site.

Use and Management

Major land uses: This soil is primarily used for rangeland and wildlife habitat.
Cropland: This soil is poorly suited to cropland. The moderate available water capacity, slope, runoff, carbonate content, droughtiness, and low natural fertility of the soil are major limitations. The hazard of wind erosion is severe.
Rangeland: Native plants yield moderate amounts of forage. The medium runoff, moderate available water capacity, carbonate content, and low natural fertility of the soil are limitations. The hazard of wind erosion is severe. The main concerns in management are continuous overgrazing, fire suppression, and invasion of woody species and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.
Urban Development: This soil is poorly suited to most urban uses. It is very limited as a site for small commercial buildings and sewage lagoons. The slope is a major

limitation. The moderate available water capacity, medium runoff, carbonate content, and low natural fertility of the soil limits plant growth necessary for healthy lawns and landscaping. Pipelines, storage tanks, and other underground structures made of uncoated steel should be protected from the high corrosion potential of these soils. This can be overcome by providing cathodic protection or by using galvanized steel.

Recreational Development: This soil is moderately suited to most recreational uses. It is somewhat limited for use as camping areas, playgrounds, picnic areas, or paths and trails. The slope and dustiness are minor limitations. Applications of water or special surfacing material may be needed during dry periods to prevent excessive dustiness in areas that are subject to heavy foot traffic. The moderate available water capacity, medium runoff, carbonate content, and low natural fertility of the soil can limit plant growth necessary for healthy golf course fairways and landscaping.

Wildlife Habitat: Erosion is a potential hazard for grain and seed crops and domestic grasses and legumes used for food and cover. The moderately arid conditions, which can limit plant growth necessary for good habitat, are a minor limitation.

EPA—Estacado and Pep loams, 0 to 1 percent slopes

Setting

General location: Southern High Plains of western Texas and eastern New Mexico
Major land resource area: 77C—Southern High Plains, Southern Part
Landscape: Plateau
Elevation: 2,700 to 4,700 feet (823 to 1,433 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Estacado and similar soils: 50 percent
Pep and similar soils: 40 percent
Contrasting soils: 10 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Estacado soil and similar soils make up 50 percent of the map unit, and the Pep soil and similar soils make up 40 percent of the map unit. The contrasting soils make up 10 percent.

The soils similar to Estacado are the Acuff soils. The soils similar to Pep are small areas of Portales and Zita soils. Also included are small areas of similar soils that have a surface layer of sandy clay loam or very fine sandy loam or slopes of 1 to 3 percent.

The contrasting soils are small areas of Amarillo, Arvana, Kimberson, and Posey soils.

Soil Description

Estacado
Aspect(s): East to South
Position(s) on landform(s): Plain
Parent material: Calcareous, loamy eolian deposits from the Blackwater Draw Formation of Pleistocene age

Typical Profile

Ap—0 to 6 inches; dark grayish brown, moderately alkaline loam; slightly effervescent

Bt1—6 to 19 inches; brown, moderately alkaline clay loam; few fine masses of calcium carbonate; strongly effervescent

Bt2—19 to 38 inches; brown, moderately alkaline clay loam; few fine nodules of calcium carbonate; strongly effervescent

Btk—38 to 50 inches; reddish yellow, moderately alkaline clay loam; about 40 percent calcium carbonate by volume as masses, nodules, and finely disseminated carbonates; violently effervescent

Btkk—50 to 80 inches; pinkish white, moderately alkaline clay loam; about 55 percent calcium carbonate by volume as masses, nodules, and finely disseminated carbonates; violently effervescent

Properties and Qualities

Slope: 0 to 1 percent
Percent of area covered by surface fragments: About 0 percent subrounded (shape or size unspecified)
Depth to first restrictive layer: Not present
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 9.1 inches (High)
Natural drainage class: Well drained
Runoff: Negligible
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 3e
Land capability irrigated: 2e
Ecological site name: Deep Hardland PE 25-36
Ecological site number: R077CY022TX
Typical vegetation: The natural plant community for this site is shortgrass dominant with a few midgrasses and forbs. Very few shrubs or woody plants occur on this shortgrass prairie. The most prevalent grasses are blue grama and buffalograss with blue grama being dominant.

Pep

Aspect(s): East to South
Position(s) on landform(s): Plain
Parent material: Calcareous, loamy eolian deposits from the Blackwater Draw Formation of Pleistocene age

Typical Profile

Ap—0 to 10 inches; reddish brown, moderately alkaline loam; strongly effervescent

Bw—10 to 16 inches; yellowish red, moderately alkaline clay loam; less than 2 percent visible calcium carbonate by volume as films, filaments, and finely disseminated carbonates; strongly effervescent

Bk—16 to 32 inches; reddish yellow, moderately alkaline clay loam; about 20 percent calcium carbonate by volume as filaments and finely disseminated carbonates; violently effervescent

Bkk—32 to 80 inches; reddish yellow, moderately alkaline clay loam; about 55 percent calcium carbonate by volume as masses, nodules, and finely disseminated carbonates; violently effervescent

Properties and Qualities

Slope: 0 to 1 percent
Percent of area covered by surface fragments: About 1 percent subrounded (shape or size unspecified)
Depth to first restrictive layer: Not present
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 7.9 inches (Moderate)
Natural drainage class: Well drained
Runoff: Negligible
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 3e
Land capability irrigated: 2e
Ecological site name: Limy Upland PE 25-36
Ecological site number: R077CY028TX
Typical vegetation: The natural plant community for this site is dominantly shortgrass and midgrasses and only a few woody species. The dominant grass species is usually blue grama. It resembles a clay loam range site except for the presence of more midgrasses such as sideoats grama, western wheatgrass, and vine mesquite. The site typifies a shortgrass/midgrass prairie.

Use and Management

Major land uses: These soils are primarily used for cropland. A few areas are used as improved pasture or rangeland.
Cropland: These soils are moderately suited to cropland. The high carbonate content and moderate available water capacity are limitations for the Pep soil. The hazard of wind erosion is severe. The most common crops grown are cotton and grain sorghum. Other crops include wheat, sunflowers, and forage sorghum. The main concerns in management are conserving soil moisture and controlling soil erosion. Fertilizer applications, reduced tillage, high-residue cover crops, and crop residue management can help reduce the soil temperature, conserve moisture, and improve or maintain soil tilth and productivity. Terraces, contour farming, grassed waterways, and diversion terraces, where needed, can help control runoff and water erosion. Improved varieties of bermudagrass and bluestems are the major pasture grasses grown on these soils. Fertilizer applications, weed control, brush management, proper stocking rates, and controlled grazing can help conserve soil moisture and improve or maintain productivity.
Rangeland: Native plants yield moderate amounts of forage. The high carbonate content and moderate available water capacity of Pep soils is a limitation. The hazard of wind erosion is severe. The main concerns in management are continuous overgrazing, fire suppression, and invasion of woody species and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.

Urban Development: These soils are moderately suited to most urban uses. Both soils are very limited as a site for the construction of road and streets or use as road-fill material. The low soil strength is a major limitation. Stabilizing, strengthening, or replacing the base material can overcome these restrictions. Pep soils are very limited as a site for lawns and landscaping or use as daily landfill cover. The high carbonate content and moderate available water capacity are major limitations. Pipelines, storage tanks, and other underground structures made of uncoated steel should be protected from the high corrosion potential of Pep soils. This can be overcome by providing cathodic protection or by using galvanized steel.

Recreational Development: These soils are moderately suited to most recreational uses. The high carbonate content and moderate available water holding capacity of Pep soils are very limiting for use as golf course fairways. Dustiness is somewhat limiting for both soils. Recreational areas may require water or special surfacing material during dry periods to prevent excessive dustiness caused by heavy foot traffic.

Wildlife Habitat: Wind erosion is a potential hazard for grain and seed crops used for food and cover. The moderately arid conditions, which can limit plant growth necessary for good habitat, are a minor limitation.

EsA—Estacado loam, 0 to 1 percent slopes

Setting

General location: Southern High Plains of western Texas and eastern New Mexico
Major land resource area: 77C—Southern High Plains, Southern Part
Landscape: Plateau
Elevation: 2,700 to 4,700 feet (823 to 1,433 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Estacado and similar soils: 90 percent
Contrasting soils: 10 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Estacado soil and similar soils make up 90 percent of the map unit, and contrasting soils make up 10 percent.

The soils similar to Estacado are the Acuff soils. Also included are small areas of similar soils that have a surface layer of sandy clay loam or very fine sandy loam or that have slopes of 1 to 3 percent.

The contrasting soils are small areas of Acuff, Kimberson, Pep, Portales, and Zita soils.

Soil Description

Estacado
Aspect(s): East to South
Position(s) on landform(s): Plain
Parent material: Calcareous, loamy eolian deposits from the Blackwater Draw Formation of Pleistocene age

Typical Profile

Ap—0 to 6 inches; dark grayish brown, moderately alkaline loam; slightly effervescent

Bt1—6 to 19 inches; brown, moderately alkaline clay loam; few fine masses of calcium carbonate; strongly effervescent

Bt2—19 to 38 inches; brown, moderately alkaline clay loam; few fine nodules of calcium carbonate; strongly effervescent

Btk—38 to 50 inches; reddish yellow, moderately alkaline clay loam; about 40 percent calcium carbonate by volume as masses, nodules, and finely disseminated carbonates; violently effervescent

Btkk—50 to 80 inches; pinkish white, moderately alkaline clay loam; about 55 percent calcium carbonate by volume as masses, nodules, and finely disseminated carbonates; violently effervescent

Properties and Qualities

Slope: 0 to 1 percent
Percent of area covered by surface fragments: About 0 percent subrounded (shape or size unspecified)
Depth to first restrictive layer: Not present
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 9.1 inches (High)
Natural drainage class: Well drained
Runoff: Negligible
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 3e
Land capability irrigated: 2e
Ecological site name: Deep Hardland PE 25-36
Ecological site number: R077CY022TX
Typical vegetation: The natural plant community for this site is shortgrass dominant with a few midgrasses and forbs. Very few shrubs or woody plants occur on this shortgrass prairie. The most prevalent grasses are blue grama and buffalograss with blue grama being dominant.

Use and Management

Major land uses: This soil is primarily used for cropland. A few areas are used as improved pasture or rangeland.

Cropland: This soil is well suited to cropland. The most common crops grown are cotton and grain sorghum. Other crops include wheat, sunflowers, and forage sorghum. The main concerns in management are conserving soil moisture and controlling soil erosion. Fertilizer applications, reduced tillage, high-residue cover crops, and crop residue management can help reduce the soil temperature, conserve moisture, and improve or maintain soil tilth and productivity. Terraces, contour farming, grassed waterways, and diversion terraces, where needed, can help control runoff and water erosion. Improved varieties of bermudagrass and bluestems are the major pasture grasses grown on these soils. Fertilizer applications, weed control, brush management, proper stocking rates, and controlled grazing can help conserve soil moisture and improve or maintain productivity.

Rangeland: Native plants are dominantly shortgrasses, which produce moderate amounts of forage. The main concerns in management are continuous overgrazing, fire suppression, and invasion of woody species and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.

Urban Development: This soil is well suited to most urban uses. It is very limited as a site for construction of roads and streets or use as road-fill material. The low soil strength is a major limitation. Stabilizing, strengthening, or replacing the base material can overcome these restrictions.

Recreational Development: This soil is well suited to recreational uses. Dustiness is somewhat limiting. Recreational areas may require water or special surfacing material during dry periods to prevent excessive dustiness caused by heavy foot traffic.

Wildlife Habitat: The moderately arid conditions, which can limit plant growth necessary for good habitat, are a minor limitation.

EsB—Estacado loam, 1 to 3 percent slopes

Setting

General location: Southern High Plains of western Texas and eastern New Mexico
Major land resource area: 77C—Southern High Plains, Southern Part
Landscape: Plateau
Elevation: 2,700 to 4,700 feet (823 to 1433 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Estacado and similar soils: 85 percent
Contrasting soils: 15 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Estacado soil and similar soils make up 85 percent of the map unit, and contrasting soils make up 15 percent.

The soils similar to Estacado are the Acuff soils. Also included are small areas of similar soils that have a surface layer of sandy clay loam or very fine sandy loam or slopes of 3 to 5 percent.

The contrasting soils are small areas of Acuff, Kimberson, Midessa, Pep, and Portales soils that occur in similar landscape positions.

Soil Description

Estacado
Aspect(s): East to South
Position(s) on landform(s): Plain; Playa slope
Parent material: Calcareous, loamy eolian deposits from the Blackwater Draw Formation of Pleistocene age

Typical Profile

Ap—0 to 4 inches; dark grayish brown, moderately alkaline loam; slightly effervescent

Bt1—4 to 17 inches; brown, moderately alkaline clay loam; few fine masses of calcium carbonate; strongly effervescent

Bt2—17 to 36 inches; brown, moderately alkaline clay loam; few fine nodules of calcium carbonate; strongly effervescent

Btk—36 to 48 inches; reddish yellow, moderately alkaline clay loam; about 40 percent calcium carbonate by volume as masses, nodules, and finely disseminated carbonates; violently effervescent

Btkk—48 to 80 inches; pinkish white, moderately alkaline clay loam; about 55 percent calcium carbonate by volume as masses, nodules, and finely disseminated carbonates; violently effervescent

Properties and Qualities

Slope: 1 to 3 percent
Percent of area covered by surface fragments: About 1 percent subrounded (shape or size unspecified)
Depth to first restrictive layer: Not present
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 9.1 inches (High)
Natural drainage class: Well drained
Runoff: Low
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 3e
Land capability irrigated: 3e
Ecological site name: Deep Hardland PE 25-36
Ecological site number: R077CY022TX
Typical vegetation: The natural plant community for this site is shortgrass dominant with a few midgrasses and forbs. Very few shrubs or woody plants occur on this shortgrass prairie. The most prevalent grasses are blue grama and buffalograss with blue grama being dominant.

Use and Management

Major land uses: This soil is primarily used for cropland. A few areas are used as improved pasture or rangeland.
Cropland: This soil is well suited to cropland. The most common crops grown are cotton and grain sorghum. Other crops include wheat, sunflowers, and forage sorghum. The main concerns in management are conserving soil moisture and controlling soil erosion. Fertilizer applications, reduced tillage, high-residue cover crops, and crop residue management can help reduce the soil temperature, conserve moisture, and improve or maintain soil tilth and productivity. Terraces, contour farming, grassed waterways, and diversion terraces, where needed, can help control runoff and water erosion. Improved varieties of bermudagrass and bluestems are the major pasture grasses grown on these soils. Fertilizer applications, weed control, brush management, proper stocking rates, and controlled grazing can help conserve soil moisture and improve or maintain productivity.
Rangeland: Native plants are dominantly shortgrasses, which produce moderate amounts of forage. The main concerns in management are continuous overgrazing, fire suppression, and invasion of woody species and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.

Urban Development: This soil is well suited to most urban uses. It is very limited as a site for construction of roads and streets or use as road-fill material. The low soil strength is a major limitation. Stabilizing, strengthening, or replacing the base material can overcome these restrictions.
Recreational Development: This soil is well suited to recreational uses. Dustiness is somewhat limiting. Recreational areas may require water or special surfacing material during dry periods to prevent excessive dustiness caused by heavy foot traffic.
Wildlife Habitat: The moderately arid conditions, which can limit plant growth necessary for good habitat, are a minor limitation.

KmB—Kimberson gravelly loam, 0 to 3 percent slopes

Setting

General location: Southern High Plains of western Texas and eastern New Mexico
Major land resource area: 77C—Southern High Plains, Southern Part
Landscape: Plateau
Elevation: 2,600 to 4,600 feet (792 to 1,402 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Kimberson and similar soils: 85 percent
Contrasting soils: 15 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Kimberson soil and similar soils make up 85 percent of the map unit, and contrasting soils make up 15 percent.
The soils similar to Kimberson are small areas of Potter and Sharvana soils. Also included are small areas of similar soils that have a surface layer of sandy clay loam or very fine sandy loam.
The contrasting soils are small areas of Acuff, Arvana, Estacado, and Pep soils that occur in similar landscape positions.

Soil Description

Kimberson
Aspect(s): East to South
Position(s) on landform(s): Plain
Parent material: Calcareous, loamy eolian deposits from the Blackwater Draw Formation of Pleistocene age over indurated caliche of Pliocene age

Typical Profile

A1—0 to 5 inches; dark grayish brown, moderately alkaline gravelly loam; 15 percent gravel and cobble-sized caliche fragments; strongly effervescent
A2—5 to 11 inches; dark grayish brown, moderately alkaline very cobbly loam; 40 percent gravel and cobble-size caliche fragments; violently effervescent
Bkkm—11 to 28 inches; white, moderately alkaline indurated, platy caliche containing a few fractures; is laminar in the upper part with thin to thick concentrically-banded pisolitic structure below the laminar layer; violently effervescent
Bkk—28 to 64 inches; white and light gray, moderately alkaline extremely cobbly sandy loam; 40 percent gravel-sized and 45 percent cobble-sized caliche fragments; violently effervescent
B'kkm—64 to 80 inches; white, moderately alkaline indurated platy caliche containing a few fractures; is laminar in the upper part; violently effervescent

Properties and Qualities

Slope: 0 to 3 percent
Percent of area covered by surface fragments: About 5 percent subrounded (shape or size unspecified), about 4 percent angular channers
Depth to first restrictive layer: Petrocalcic horizon at 11 inches; Petrocalcic horizon at 64 inches
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: 0.001 to 0.06 in/hr (Very slow)
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 1.3 inches (Very low)
Natural drainage class: Well drained
Runoff: High
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 7s
Land capability irrigated: None specified
Ecological site name: Very Shallow PE 25-36
Ecological site number: R077CY037TX
Typical vegetation: The natural plant community is a mixture of short and midgrasses with a few tallgrasses. A moderate amount of forbs and shrubs are also present. Major grass species are sideoats grama, little bluestem, hairy grama, blue grama, slim tridens, and buffalograss. The major forbs include black samson, dotted gayfeather, catclaw sensitivebriar, and annual forbs. Yucca, catclaw acacia, ephedra, skunkbush, and feather dalea are the major woody species.

Use and Management

Major land uses: These soils are used mainly as rangeland and wildlife habitat.
Cropland: This soil is poorly suited to cropland. The shallow rooting depth, very low available water capacity, and droughtiness are major limitations. The hazard of wind erosion is severe. Improved varieties of bermudagrass and bluestems are the major pasture grasses grown on these soils. Fertilizer applications, weed control, brush management, proper stocking rates, and controlled grazing can help conserve soil moisture and improve or maintain productivity.
Rangeland: Native plants yield low amounts of forage. The depth to a cemented pan, very low available water capacity, and high runoff are major limitations. The hazard of wind erosion is severe. The main concerns in management are continuous overgrazing, fire suppression, and invasion of woody species and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.
Urban Development: This soil is poorly suited to urban uses. It is very limited as a site for sanitary facilities and building site development. The depth to a cemented pan, carbonate content, and droughtiness are major limitations. Overcoming many of these limitations is difficult and costly. Under certain conditions, trench sidewalls can become highly unstable in this soil. Trenches that have been excavated to more than a depth of 5 feet should be shored or the sidewall should be graded to an angle that ensures safe working conditions.

Recreational Development: This soil is poorly suited to most recreational uses. It is very limited as a site for golf course fairways, playgrounds, camping areas, and picnic areas. The depth to a cemented pan, very low available water capacity, droughtiness, gravel content, and carbonate content of the soil are major limitations.

Wildlife Habitat: The low available water capacity and very slow permeability are major limitations that restrict plant growth necessary for good habitat. The potential for wind and water erosion is severe.

LhA—Lenorah-Hindman complex, 0 to 2 percent slopes

Setting

General location: Southern High Plains of western Texas and eastern New Mexico
Major land resource area: 77C—Southern High Plains, Southern Part
Landscape: Plateau
Elevation: 2,600 to 4,600 feet (792 to 1,402 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Lenorah and similar soils: 50 percent
Hindman and similar soils: 35 percent
Contrasting soils: 15 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Lenorah soil and similar soils make up 50 percent of the map unit, and the Hindman soil and similar soils make up 35 percent of the map unit. The contrasting soils make up 15 percent.

The soils similar to Lenorah are small areas of Arch and Midessa soils that occur in similar landscape positions.

The contrasting soils are small areas of Amarillo, Arvana, Portales, and Tokio soils. Amarillo and Arvana soils occur in higher landscape positions.

Portales and Tokio soils occur in similar landscape positions.

Soil Description

Lenorah
Aspect(s): East to South
Position(s) on landform(s): Ancestral drainageway; Valley flat
Parent material: Calcareous, loamy alluvium and eolian deposits of Quaternary age

Typical Profile

Ap—0 to 8 inches; pale brown, strongly alkaline fine sandy loam; strongly effervescent

Bnz—8 to 22 inches; pale brown, very strongly alkaline sandy clay loam; few fine masses of calcium carbonate; few fine distinct black (10YR 2/1) masses of iron manganese; strongly saline; moderately sodic; strongly effervescent

Bknz1—22 to 30 inches; pale brown, very strongly alkaline sandy clay loam; about 25 percent masses and nodules of calcium carbonate; strongly saline; moderately sodic; violently effervescent

Bknz2—30 to 47 inches; light gray, strongly alkaline fine sandy loam; about 30 percent masses and nodules of calcium carbonate; moderately saline; strongly sodic; violently effervescent

2Bnz—47 to 65 inches; very pale brown, moderately alkaline loamy fine sand; few fine masses of calcium carbonate; moderately saline; moderately sodic; strongly effervescent

2C—65 to 80 inches; light gray, moderately alkaline sand; few fine nodules of calcium carbonate; common very fine to medium fragments of snail shells; strongly effervescent

Properties and Qualities

Slope: 0 to 1 percent
Percent of area covered by surface fragments: Unspecified
Depth to first restrictive layer: Not present
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Saline
Sodicity, representative within 40 inches: Sodic
Sodicity, maximum within 40 inches: Sodic
Representative total available water capacity to 60 inches: About 5.9 inches (Low)
Natural drainage class: Moderately well drained
Runoff: Negligible
Flooding frequency: Very rare
Ponding frequency: None
Depth to seasonal water table: Present within 80 inches

Interpretive Groups

Land capability nonirrigated: 6s
Land capability irrigated: 4e
Ecological site name: Wet Saline PE 25-36
Ecological site number: R077CY689TX
Typical vegetation: The natural plant community for this site is a mixture of salt-tolerant grasses and grasslike plants, forbs, and shrubs. The vegetation on most of the site is shrub dominant with saltcedar (tamarix) and baccharis being the two most prevalent species. In open areas and in the understory there are varying amounts of alkali sacaton, Texas dropseed, creeping muhly, jointtail, inland saltgrass, sedge and rushes, and occasionally some western wheatgrass. Forbs include portulaca species, kochia, smartweed, dock, and annual forbs. In extreme saline areas vegetation is sparse. Occasionally there will be a few willows and cottonwoods present.

Hindman
Aspect(s): East to South
Position(s) on landform(s): Ancestral drainageway; Valley flat
Parent material: Calcareous, sandy alluvium and eolian deposits of Quaternary age

Typical Profile

A—0 to 23 inches; brown, moderately alkaline fine sand; slightly effervescent in the upper part and strongly effervescent in the lower part
Ab—23 to 38 inches; brown, moderately alkaline loamy fine sand; slightly sodic; slightly effervescent
Bwb—38 to 46 inches; very pale brown, moderately alkaline fine sandy loam; few films of calcium carbonate; slightly sodic; strongly effervescent
Bkb—46 to 60 inches; light gray, moderately alkaline sandy clay loam; about 25 percent fine and medium masses of calcium carbonate; slightly saline; slightly sodic; violently effervescent
2BCb—60 to 77 inches; very pale brown, strongly alkaline fine sand; few fine calcium carbonate nodules; few very fine and fine fragments of snail shells; slightly sodic; violently effervescent

2Cb—77 to 80 inches; very pale brown, strongly alkaline sand; few films of calcium carbonate; about 3 percent rounded limestone gravel; many very fine and fine fragments of snail shells; violently effervescent

Properties and Qualities

Slope: 0 to 2 percent
Percent of area covered by surface fragments: Unspecified
Depth to first restrictive layer: Not present
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 2.0 to 6.0 in/hr (Moderately rapid)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Sodic
Representative total available water capacity to 60 inches: About 5.7 inches (Low)
Natural drainage class: Well drained
Runoff: Negligible
Flooding frequency: Very rare
Ponding frequency: None
Depth to seasonal water table: Present within 80 inches

Interpretive Groups

Land capability nonirrigated: 6e
Land capability irrigated: 4e
Ecological site name: Wet Saline PE 25-36
Ecological site number: R077CY689TX
Typical vegetation: The natural plant community for this site is a mixture of salt-tolerant grasses and grasslike plants, forbs, and shrubs. The vegetation on most of the site is shrub dominant with saltcedar (tamarix) and baccharis being the two most prevalent species. In open areas and in the understory there are varying amounts of alkali sacaton, Texas dropseed, creeping muhly, jointtail, inland saltgrass, sedge and rushes, and occasionally some western wheatgrass. Forbs include portulaca species, kochia, smartweed, dock, and annual forbs. In extreme saline areas vegetation is sparse. Occasionally there will be a few willows and cottonwoods present.

Use and Management

Major land uses: These soils are used primarily as rangeland and habitat for wildlife. These soils are not used extensively as cropland or improved pasture.
Cropland: These soils are poorly suited to cropland. The low available water capacity, droughtiness, high carbonate, and high sodium content of the soil are limitations. The hazard of wind erosion is severe. The most common crops grown are cotton and grain sorghum. Other crops include wheat and forage sorghum. The main concerns in management are conserving soil moisture and controlling soil erosion. Fertilizer applications, reduced tillage, high-residue cover crops, and crop residue management can help reduce the soil temperature, conserve moisture, and improve or maintain soil tilth and productivity. Terraces, contour farming, grassed waterways, and diversion terraces, where needed, can help control runoff and water erosion. Improved varieties of bermudagrass and bluestems are the major pasture grasses grown on these soils. Fertilizer applications, weed control, brush management, proper stocking rates, and controlled grazing can help conserve soil moisture and improve or maintain productivity.

Rangeland: Native plants yield moderate amounts of forage. The low available water capacity, droughtiness, high carbonate, and sodium content of the soil are limitations. The hazard of wind erosion is severe. The main concerns in management are invasion of woody species and early successional annual grasses and annual forbs. Dense stands of saltcedar (tamarix) are common and severely degrade native plant communities by consuming available plant moisture and displacing native vegetation. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.

Urban Development: These soils are poorly suited to urban uses. They are very limited as a site for sanitary facilities and building site development. The depth to a saturated zone, seepage, high sodium, high salinity, poor filtering capacity, and very rare flooding events are major limitations. Overcoming many of these limitations is difficult and costly. The corrosion to steel and concrete is a severe limitation for Lenorah and Hindman soils. Pipelines, storage tanks, and other underground structures made of uncoated steel should be protected from the high corrosion potential of these soils. This can be overcome by providing cathodic protection or by using galvanized steel. Under certain conditions, trench sidewalls can become highly unstable in these soils. Trenches that have been excavated to more than a depth of 5 feet should be shored or the sidewall should be graded to an angle that ensures safe working conditions.

Recreational Development: These soils are poorly suited to most recreational uses. The high sand content of Hindman soils and the sodium content of both soils are very limiting. Flooding frequency is very rare, but areas should not be used as camping sites unless they are protected from flooding. The season, duration, and frequency of flooding should be considered in planning recreational areas.

Wildlife Habitat: The low available water capacity, high sodium, high salinity, and the sandy surface texture of Hindman soils are limitations. The potential for wind erosion is severe. Most of the habitat has been invaded by saltcedar (tamarix). This fire-adapted species has long taproots that allow them to intercept deep water tables. Large saltcedar plants can transpire over 200 gallons of water per plant each day and will often cause water tables, ponds, and streams to dry up. Saltcedar disrupts the structure and stability of native plant communities and degrades native wildlife habitat by out-competing and replacing native plant species and monopolizing limited sources of moisture. Saltcedar is tolerant of highly saline habitats, and it concentrates salts in its leaves. Over time, as leaf litter accumulates under saltcedar plants, the surface soil can become highly saline, thus impeding future germination of many native plant species. Although saltcedar provides some shelter, the foliage and flowers are of little food value to native wildlife species that depend on native plant resources.

LMA—Lamesa soils, 0 to 1 percent slopes, frequently ponded

Setting

General location: Southern High Plains of western Texas
Major land resource area: 77C—Southern High Plains, Southern Part
Landscape: Plateau
Elevation: 2,700 to 4,100 feet (823 to 1,250 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Lamesa and similar soils: 95 percent

Contrasting soils: 5 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Lamesa soil and similar soils make up 95 percent of the map unit, and contrasting soils make up 5 percent.

The soils similar to Lamesa are small areas of Ranco, Seagraves, and Sparenberg soils.

The contrasting soils are small areas of Lenorah, Midessa, and Tokio soils that occur in higher landscape positions.

Soil Description

Lamesa

Aspect(s): East to South

Position(s) on landform(s): Playa floor

Parent material: Recent sandy eolian deposits over loamy lacustrine deposits of Holocene and Pleistocene age

Typical Profile

A1—0 to 4 inches; brown, slightly alkaline sandy clay; about 2 inches of the surface has a partially decomposed layer of fibric organic matter; very slightly effervescent

A2—4 to 11 inches; brown, slightly alkaline sandy clay loam; very slightly effervescent

Bw—11 to 31 inches; brown, slightly alkaline sandy clay loam; slightly saline in the upper part and moderately saline in the lower part; very slightly effervescent

Ab—31 to 48 inches; brown, neutral very fine sandy loam; slightly saline

Bwb—48 to 58 inches; grayish brown, neutral fine sandy loam

Btgb—58 to 80 inches; gray, neutral sandy clay loam

Properties and Qualities

Slope: 0 to 1 percent

Percent of area covered by surface fragments: Unspecified

Depth to first restrictive layer: Not present

Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.06 to 0.2 in/hr (Slow)

Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer

Salinity, representative within 40 inches: Not saline

Salinity, maximum within 40 inches: Saline

Sodicity, representative within 40 inches: Not sodic

Sodicity, maximum within 40 inches: Not sodic

Representative total available water capacity to 60 inches: About 8.3 inches (Moderate)

Natural drainage class: Poorly drained

Runoff: Negligible

Flooding frequency: None

Ponding frequency: Frequent

Depth to seasonal water table: Present within 80 inches

Interpretive Groups

Land capability nonirrigated: 6w

Land capability irrigated: None specified

Ecological site name: Playa PE 25-36

Ecological site number: R077CY027TX

Typical vegetation: The natural plant community of a playa is highly variable and dependent on the hydrology of the playa basin being considered. The dominance of hydrophytic plants or upland plants depends on the degree, frequency, and time of inundation. Vegetation varies according to the amount of water available during the growing season. In average years, this site is usually inundated and saturated for long periods, and a high water table is present during part of the year. The natural plant community is dominantly a mixture of hydrophytic forbs, grasses, and grasslike plants. The most prevalent species on the site are soft stem bulrush, southern cattail, creeping spikerush, Pennsylvania smartweed, saltmarsh aster, bur ragweed, curly dock, bushy knotweed, sedges, knotgrass, and barnyard grass. Commonly trees and shrubs such as tamarix (saltcedar), willows, and cottonwoods are present around the periphery of the playa.

Use and Management

Major land uses: This soil is used primarily for wildlife habitat. A few areas are used as rangeland.
Cropland: This soil is poorly suited to cropland. The depth to a saturated zone and frequent ponding are major limitations.
Rangeland: Frequent ponding is a major limitation and prolonged periods of inundation decrease productivity. Large areas of bare ground are common after extended periods of ponding and require time to reestablish native vegetation. The dominant plant species on these soils yield poor quality forage for livestock use. Proper stocking rates, brush management, and controlled grazing can help improve productivity.
Urban Development: This soil is poorly suited to urban uses. It is very limited as a site for sanitary facilities and building site development. The depth to a saturated zone, frequent ponding, seepage, and low strength are major limitations. Overcoming these limitations is difficult and costly. Pipelines, storage tanks, and other underground structures made of uncoated steel should be protected from the high corrosion potential of these soils. This can be overcome by providing cathodic protection or by using galvanized steel. Under certain conditions, trench sidewalls can become highly unstable in this soil. Trenches that have been excavated to more than a depth of 5 feet should be shored or the sidewall should be graded to an angle that ensures safe working conditions.
Recreational Development: This soil is poorly suited to recreational uses. It is very limited because of depth to a saturated zone and frequent ponding.
Wildlife Habitat: Moderate salinity and frequent ponding are major limitations which affect plant growth necessary for good habitat. Dove, pheasant, and quail make limited use of this habitat for food and cover. When ponded, these soils are preferred sites for waterfowl, such as ducks and geese that use these areas for food, water, and cover.

LoA—Lofton clay loam, 0 to 1 percent slopes

Setting

General location: Southern High Plains of western Texas and eastern New Mexico
Major land resource area: 77C—Southern High Plains, Southern Part
Landscape: Plateau
Elevation: 2,900 to 4,600 feet (884 to 1,402 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Lofton and similar soils: 85 percent
Contrasting soils: 15 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Lofton soil and similar soils make up 85 percent of the map unit, and contrasting soils make up 15 percent.

The soils similar to Lofton are small areas of Sparenberg soils that occur on slightly lower landscape positions.

Contrasting soils are small areas of Acuff, Amarillo, Estacado, Olton, Portales, and Ranco soils. The Acuff, Amarillo, Estacado, and Olton soils occur in higher landscape positions. The Portales soils occur in similar or slightly higher landscape positions. Ranco soils occur in slightly lower landscape positions.

Soil Description

Lofton

Aspect(s): East to South

Position(s) on landform(s): Depression; Tread on playa step

Parent material: Clayey lacustrine deposits derived from the Blackwater Draw Formation of Pleistocene age

Typical Profile

Ap—0 to 9 inches; dark gray, slightly alkaline clay loam

Bt1—9 to 24 inches; dark grayish brown, slightly alkaline clay

Bt2—24 to 38 inches; grayish brown, moderately alkaline clay

Btk—38 to 52 inches; grayish brown, moderately alkaline clay; about 3 percent films and filaments of calcium carbonate; strongly effervescent

Bk—52 to 80 inches; grayish brown, moderately alkaline silty clay; about 25 percent calcium carbonate by volume in the form of filaments, masses, and nodules; violently effervescent

Properties and Qualities

Slope: 0 to 1 percent

Percent of area covered by surface fragments: Unspecified

Depth to first restrictive layer: Not present

Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.001 to 0.06 in/hr (Very slow)

Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer

Salinity, representative within 40 inches: Not saline

Salinity, maximum within 40 inches: Not saline

Sodicity, representative within 40 inches: Not sodic

Sodicity, maximum within 40 inches: Not sodic

Representative total available water capacity to 60 inches: About 9.4 inches (High)

Natural drainage class: Moderately well drained

Runoff: Negligible

Flooding frequency: None

Ponding frequency: Occasional

Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 3e

Land capability irrigated: 2s

Ecological site name: Deep Hardland PE 25-36

Ecological site number: R077CY022TX

Typical vegetation: The natural plant community for this site is shortgrass dominant with a few midgrasses and forbs. Very few shrubs or woody plants occur on this shortgrass prairie. The most prevalent grasses are blue grama and buffalograss with blue grama being dominant.

Use and Management

Major land uses: This soil is primarily used for cropland. A few areas are used as improved pasture or rangeland.

Cropland: This soil is moderately suited to cropland. The clayey texture of the soil, which can restrict root development, and occasional ponding are limitations. The most common crops grown on this soil are cotton and grain sorghum. Other crops include wheat and forage sorghum. The main concerns in management are conserving soil moisture and controlling soil erosion. Fertilizer applications, reduced tillage, high-residue cover crops, and crop residue management can help reduce the soil temperature, conserve moisture, and improve or maintain soil tilth and productivity. Terraces, contour farming, grassed waterways, and diversion terraces, where needed, can help control runoff and water erosion. Improved varieties of bermudagrass and bluestems are the major pasture grasses grown on these soils. Fertilizer applications, weed control, brush management, proper stocking rates, and controlled grazing can help conserve soil moisture and improve or maintain productivity.

Rangeland: Native plants are dominantly shortgrasses, which produce moderate amounts of forage. The main concerns in management are continuous overgrazing, fire suppression, and invasion of woody species and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.

Urban Development: This soil is poorly suited to most urban uses. It is very limited for use as sanitary facilities and building site development. The high clay content, restricted permeability, high shrink-swell potential, low strength, and occasional ponding are major limitations. Pipelines, storage tanks, and other underground structures made of uncoated steel should be protected from the high corrosion potential of these soils. This can be overcome by providing cathodic protection or by using galvanized steel.

Recreational Development: This soil is poorly suited to recreational uses. It is very limited for use because of occasional ponding. The season, frequency, and duration of ponding should be considered in planning recreational areas.

Wildlife Habitat: The very slow permeability of the soil is a major limitation for grain and seed crops and for domestic grasses and legumes used for food and cover. The moderately clayey surface texture is a minor limitation that affects plant growth necessary for good habitat.

M-W—Miscellaneous water

A small constructed pond or pit that is used for industrial, sanitary, or mining applications. It contains water most of the year and is typically 5 to 20 acres in size.

MdA—Midessa fine sandy loam, 0 to 1 percent slopes

Setting

General location: Southern High Plains of western Texas and eastern New Mexico
Major land resource area: 77C—Southern High Plains, Southern Part
Landscape: Plateau
Elevation: 2,600 to 4,600 feet (792 to 1,402 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Midessa and similar soils: 85 percent
Contrasting soils: 15 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Midessa soil and similar soils make up 85 percent of the map unit, and contrasting soils make up 15 percent.

The soils similar to Midessa are small areas of Arch and Lenorah soils in similar landscape positions. Also included are small areas of similar soils that have a surface layer of loamy fine sand or slopes of 1 to 3 percent.

The contrasting soils are small areas of Amarillo, Arvana, Portales, Posey, and Tokio soils that occur in similar landscape positions.

Soil Description

Midessa
Aspect(s): East to South
Position(s) on landform(s): Plain
Parent material: Calcareous, loamy eolian and lacustrine deposits derived from the Tahoka and Blackwater Draw Formations of Pleistocene age

Typical Profile

A—0 to 10 inches; brown, moderately alkaline fine sandy loam; few fine calcium carbonate nodules; violently effervescent

Bk—10 to 30 inches; pale brown, moderately alkaline sandy clay loam; about 8 percent calcium carbonate by volume in the form of filaments, nodules, and finely disseminated carbonates; violently effervescent

Bkk—30 to 60 inches; very pale brown, moderately alkaline sandy clay loam; about 52 percent calcium carbonate by volume in the form of masses, nodules, and finely disseminated carbonates; violently effervescent

B'k—60 to 80 inches; light brown, moderately alkaline sandy clay loam; about 35 percent calcium carbonate by volume in the form of masses, nodules, and finely disseminated carbonates; violently effervescent

Properties and Qualities

Slope: 0 to 1 percent
Percent of area covered by surface fragments: About 1 percent subrounded (shape or size unspecified)
Depth to first restrictive layer: Not present
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 7.6 inches (Moderate)
Natural drainage class: Well drained
Runoff: Negligible
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 3e
Land capability irrigated: 2e
Ecological site name: Limy Upland PE 25-36
Ecological site number: R077CY028TX
Typical vegetation: The natural plant community is a mixture of short and midgrasses with a smaller tallgrass complement. Midgrasses tend to dominate over most of the site with sideoats grama being the most prevalent midgrass species. Blue grama is the dominant shortgrass species and little bluestem the dominant tallgrass species. There are small areas that may occur within the site where blue grama is more prevalent. Woody plants include yucca, catclaw acacia, and sand sage.

Use and Management

Major land uses: This soil is primarily used for cropland. A few areas are used as improved pasture or rangeland.
Cropland: This soil is moderately suited to cropland. The moderate available water capacity and high carbonate content of the soil are limitations. The hazard of wind erosion is severe. The most common crops grown are cotton and grain sorghum. Other crops include peanuts, wheat, sunflowers, and forage sorghum. The main concerns in management are conserving soil moisture and controlling soil erosion. Fertilizer applications, reduced tillage, high-residue cover crops, and crop residue management can help reduce the soil temperature, conserve moisture, and improve or maintain soil tilth and productivity. Terraces, contour farming, grassed waterways, and diversion terraces, where needed, can help control runoff and water erosion. Improved varieties of bermudagrass and bluestems are the major pasture grasses grown on these soils. Fertilizer applications, weed control, brush management, proper stocking rates, and controlled grazing can help conserve soil moisture and improve or maintain productivity.
Rangeland: Native plants yield moderate amounts of forage. The high carbonate content and moderate available water capacity of the soil are limitations. The hazard of wind erosion is severe. The main concerns in management are continuous overgrazing, fire suppression, and invasion of woody species and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.
Urban Development: This soil is moderately suited to most urban uses. It is very limited as a site for lawns and landscaping or use as daily cover for landfills. The moderate available water capacity and high carbonate content of the soil are major limitations which can limit plant growth necessary for healthy lawns and landscaping. Pipelines, storage tanks, and other underground structures made of uncoated steel should be protected from the high corrosion potential of these soils. This can be overcome by providing cathodic protection or by using galvanized steel.
Recreational Development: This soil is moderately suited to most recreational uses. It is very limited as a site for golf course fairways. The moderate available water capacity and high carbonate content of the soil are major limitations that can restrict plant growth necessary for healthy landscaping and turf.
Wildlife Habitat: Wind erosion is a potential hazard for grain and seed crops used for food and cover. The moderately arid conditions, which can limit plant growth necessary for good habitat, are a minor limitation.

MdB—Midessa fine sandy loam, 1 to 3 percent slopes

Setting

General location: Southern High Plains of western Texas and eastern New Mexico
Major land resource area: 77C—Southern High Plains, Southern Part
Landscape: Plateau
Elevation: 2,600 to 4,600 feet (792 to 1,402 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Midessa and similar soils: 85 percent
Contrasting soils: 15 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Midessa soil and similar soils make up 85 percent of the map unit, and contrasting soils make up 15 percent.

Soils similar to Midessa are small areas of Arch, Drake, and Lenorah soils. Also included are small areas of similar soils that have a surface layer of loamy fine sand or slopes of 3 to 5 percent.

The contrasting soils are small areas of Amarillo, Arvana, Portales, Posey, and Tokio soils that occur in similar landscape positions.

Soil Description

Midessa
Aspect(s): East to South
Position(s) on landform(s): Plain; Playa slope
Parent material: Calcareous, loamy eolian and lacustrine deposits derived from the Tahoka and Blackwater Draw Formations of Pleistocene age

Typical Profile

A—0 to 8 inches; brown, moderately alkaline fine sandy loam; few fine calcium carbonate nodules; violently effervescent

Bk—8 to 28 inches; pale brown, moderately alkaline sandy clay loam; about 8 percent calcium carbonate by volume in the form of filaments, nodules, and finely disseminated carbonates; violently effervescent

Bkk—28 to 58 inches; very pale brown, moderately alkaline sandy clay loam; about 52 percent calcium carbonate by volume in the form of masses, nodules, and finely disseminated carbonates; violently effervescent

B'k—58 to 80 inches; light brown, moderately alkaline sandy clay loam; about 35 percent calcium carbonate by volume in the form of masses, nodules, and finely disseminated carbonates; violently effervescent

Properties and Qualities

Slope: 1 to 3 percent
Percent of area covered by surface fragments: About 1 percent subrounded (shape or size unspecified)
Depth to first restrictive layer: Not present
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline

Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 7.6 inches (Moderate)
Natural drainage class: Well drained
Runoff: Low
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 3e
Land capability irrigated: 3e
Ecological site name: Limy Upland PE 25-36
Ecological site number: R077CY028TX
Typical vegetation: The natural plant community is a mixture of short and midgrasses with a smaller tallgrass complement. Midgrasses tend to dominate over most of the site with sideoats grama being the most prevalent midgrass species. Blue grama is the dominant shortgrass species and little bluestem the dominant tallgrass species. There are small areas that may occur within the site where blue grama is more prevalent. Woody plants include yucca, catclaw acacia, and sand sage.

Use and Management

Major land uses: These soils are primarily used for cropland. A few areas are used as improved pasture or rangeland.
Cropland: This soil is moderately suited to cropland. The moderate available water capacity and high carbonate content of the soil are limitations. The hazard of wind erosion is severe. The most common crops grown are cotton and grain sorghum. Other crops include peanuts, wheat, sunflowers, and forage sorghum. The main concerns in management are conserving soil moisture and controlling soil erosion. Fertilizer applications, reduced tillage, high-residue cover crops, and crop residue management can help reduce the soil temperature, conserve moisture, and improve or maintain soil tilth and productivity. Terraces, contour farming, grassed waterways, and diversion terraces, where needed, can help control runoff and water erosion. Improved varieties of bermudagrass and bluestems are the major pasture grasses grown on these soils. Fertilizer applications, weed control, brush management, proper stocking rates, and controlled grazing can help conserve soil moisture and improve or maintain productivity.
Rangeland: Native plants yield moderate amounts of forage. The high carbonate content and moderate available water capacity of the soil are limitations. The hazard of wind erosion is severe. The main concerns in management are continuous overgrazing, fire suppression, and invasion of woody species and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.
Urban Development: This soil is moderately suited to most urban uses. It is very limited as a site for lawns and landscaping or use as daily cover for landfills. The moderate available water capacity and high carbonate content of the soil are major limitations which can limit plant growth necessary for healthy lawns and landscaping. Pipelines, storage tanks, and other underground structures made of uncoated steel should be protected from the high corrosion potential of these soils. This can be overcome by providing cathodic protection or by using galvanized steel.
Recreational Development: This soil is moderately suited to most recreational uses. It is very limited as a site for golf course fairways. The moderate available water capacity

and high carbonate content of the soil are major limitations that can restrict plant growth necessary for healthy landscaping and turf.

Wildlife Habitat: Wind erosion is a potential hazard for grain and seed crops used for food and cover. The moderately arid conditions, which can limit plant growth necessary for good habitat, are a minor limitation.

MdC—Midessa fine sandy loam, 3 to 8 percent slopes

Setting

General location: Southern High Plains of western Texas and eastern New Mexico
Major land resource area: 77C—Southern High Plains, Southern Part
Landscape: Plateau
Elevation: 2,600 to 4,600 feet (792 to 1,402 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Midessa and similar soils: 85 percent
Contrasting soils: 15 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Midessa soil and similar soils make up 85 percent of the map unit, and contrasting soils make up 15 percent.

Soils similar to Midessa are small areas of Drake soils.

The contrasting soils are small areas of Amarillo, Arvana, Posey, and Potter soils. Amarillo and Arvana soils occur adjacent to the Midessa soils in similar landscape positions. The Posey and Potter soils occur in similar landscape positions.

Soil Description

Midessa
Aspect(s): East to South
Position(s) on landform(s): Backslope on draw; Playa slope
Parent material: Calcareous, loamy eolian and lacustrine deposits derived from the Tahoka and Blackwater Draw Formations of Pleistocene age

Typical Profile

A—0 to 7 inches; brown, moderately alkaline fine sandy loam; few fine calcium carbonate nodules; violently effervescent

Bk—7 to 24 inches; pale brown, moderately alkaline sandy clay loam; about 8 percent calcium carbonate by volume in the form of filaments, nodules, and finely disseminated carbonates; violently effervescent

Bkk—24 to 56 inches; very pale brown, moderately alkaline sandy clay loam; about 52 percent calcium carbonate by volume in the form of masses, nodules, and finely disseminated carbonates; violently effervescent

B'k—56 to 80 inches; light brown, moderately alkaline sandy clay loam; about 35 percent calcium carbonate by volume in the form of masses, nodules, and finely disseminated carbonates; violently effervescent

Properties and Qualities

Slope: 3 to 8 percent
Percent of area covered by surface fragments: About 2 percent subrounded (shape or size unspecified)
Depth to first restrictive layer: Not present

Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 7.5 inches (Moderate)
Natural drainage class: Well drained
Runoff: Medium
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 6e
Land capability irrigated: None specified
Ecological site name: Limy Upland PE 25-36
Ecological site number: R077CY028TX
Typical vegetation: The natural plant community is a mixture of short and midgrasses with a smaller tallgrass complement. Midgrasses tend to dominate over most of the site with sideoats grama being the most prevalent midgrass species. Blue grama is the dominant shortgrass species and little bluestem the dominant tallgrass species. There are small areas that may occur within the site where blue grama is more prevalent. Woody plants include yucca, catclaw acacia, and sand sage.

Use and Management

Major land uses: This soil is used primarily as rangeland and habitat for wildlife. This soil is not used extensively as cropland or improved pasture.
Cropland: This soil is moderately suited to cropland. The moderate available water capacity, high carbonate content of the soil, and medium runoff are limitations. The hazard of wind erosion is severe. The most common crops grown are cotton and grain sorghum. Other crops include wheat, sunflowers, and forage sorghum. The main concerns in management are conserving soil moisture and controlling soil erosion. Fertilizer applications, reduced tillage, high-residue cover crops, and crop residue management can help reduce the soil temperature, conserve moisture, and improve or maintain soil tilth and productivity. Terraces, contour farming, grassed waterways, and diversion terraces, where needed, can help control runoff and water erosion. Improved varieties of bermudagrass and bluestems are the major pasture grasses grown on these soils. Fertilizer applications, weed control, brush management, proper stocking rates, and controlled grazing can help conserve soil moisture and improve or maintain productivity.
Rangeland: Native plants yield moderate amounts of forage. The high carbonate content, moderate available water capacity, and medium runoff of the soil are limitations. The hazard of wind erosion is severe. The main concerns in management are continuous overgrazing, fire suppression, invasion of woody species and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.
Urban Development: This soil is moderately suited to most urban uses. It is very limited as a site for lawns and landscaping or use as daily cover for landfills. The moderate available water capacity and high carbonate content of the soil are major limitations which can limit plant growth necessary for healthy lawns and landscaping. Pipelines, storage tanks, and other underground structures made of uncoated steel should be

protected from the high corrosion potential of these soils. This can be overcome by providing cathodic protection or by using galvanized steel.

Recreational Development: This soil is moderately suited to most recreational uses. It is very limited as a site for golf course fairways. The moderate available water capacity and high carbonate content of the soil are major limitations that can restrict plant growth necessary for healthy landscaping and turf.

Wildlife Habitat: Wind erosion is a potential hazard for grain and seed crops used for food and cover. The moderately arid conditions, which can limit plant growth necessary for good habitat, are a minor limitation.

MPC—Midessa and Posey fine sandy loams, 3 to 8 percent slopes

Setting

General location: Southern High Plains of western Texas and eastern New Mexico
Major land resource area: 77C—Southern High Plains, Southern Part
Landscape: Plateau
Elevation: 2,600 to 4,600 feet (792 to 1,402 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Midessa and similar soils: 50 percent
Posey and similar soils: 35 percent
Contrasting soils: 15 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Midessa soil and similar soils make up 50 percent of the map unit, and the Posey soil and similar soils make up 35 percent of the map unit. The contrasting soils make up 15 percent.

Included in mapping are small areas of similar soils that have a surface layer of loamy fine sand or that have slopes of 8 to 12 percent.

The contrasting soils are small areas of Amarillo, Arvana, Patricia, and Potter soils. Also included are borrow pits less than 3 acres in size or areas of narrow, linear sand dunes.

Soil Description

Midessa
Aspect(s): East to South
Position(s) on landform(s): Backslope on draw
Parent material: Calcareous, loamy eolian and lacustrine deposits derived from the Tahoka and Blackwater Draw Formations of Pleistocene age

Typical Profile

A—0 to 7 inches; brown, moderately alkaline fine sandy loam; few fine calcium carbonate nodules; violently effervescent

Bk—7 to 24 inches; pale brown, moderately alkaline sandy clay loam; about 8 percent calcium carbonate by volume in the form of filaments, nodules, and finely disseminated carbonates; violently effervescent

Bkk—24 to 56 inches; very pale brown, moderately alkaline sandy clay loam; about 52 percent calcium carbonate by volume in the form of masses, nodules, and finely disseminated carbonates; violently effervescent

B'k—56 to 80 inches; light brown, moderately alkaline sandy clay loam; about 35 percent calcium carbonate by volume in the form of masses, nodules, and finely disseminated carbonates; violently effervescent

Properties and Qualities

Slope: 3 to 8 percent
Percent of area covered by surface fragments: About 2 percent subrounded (shape or size unspecified)
Depth to first restrictive layer: Not present
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 7.5 inches (Moderate)
Natural drainage class: Well drained
Runoff: Medium
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 6e
Land capability irrigated: None specified
Ecological site name: Limy Upland PE 25-36
Ecological site number: R077CY028TX
Typical vegetation: The natural plant community is a mixture of short and midgrasses with a smaller tallgrass complement. Midgrasses tend to dominate over most of the site with sideoats grama being the most prevalent midgrass species. Blue grama is the dominant shortgrass species and little bluestem the dominant tallgrass species. There are small areas that may occur within the site where blue grama is more prevalent. Woody plants are yucca, catclaw acacia, and sand sage.

Posey
Aspect(s): East to South
Position(s) on landform(s): Backslope on draw
Parent material: Calcareous, loamy eolian deposits from the Blackwater Draw Formation of Pleistocene age

Typical Profile

Ap—0 to 8 inches; reddish brown, moderately alkaline fine sandy loam; few calcium carbonate nodules; violently effervescent
Btk—8 to 15 inches; reddish brown, moderately alkaline sandy clay loam; few films, filaments, and masses of calcium carbonate; violently effervescent
Btkk—15 to 35 inches; light reddish brown, moderately alkaline sandy clay loam; about 55 percent calcium carbonate by volume as masses, nodules, and finely disseminated carbonates; violently effervescent
B'tk—35 to 80 inches; reddish yellow, moderately alkaline sandy clay loam; about 20 percent calcium carbonate by volume as masses, nodules, and finely disseminated carbonates; violently effervescent

Properties and Qualities

Slope: 3 to 8 percent
Percent of area covered by surface fragments: About 3 percent subrounded (shape or size unspecified)
Depth to first restrictive layer: Not present
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 7.6 inches (Moderate)
Natural drainage class: Well drained
Runoff: Medium
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 6e
Land capability irrigated: None specified
Ecological site name: Limy Upland PE 25-36
Ecological site number: R077CY028TX
Typical vegetation: The natural plant community is a mixture of short and midgrasses with a smaller tallgrass complement. Midgrasses tend to dominate over most of the site with sideoats grama being the most prevalent midgrass species. Blue grama is the dominant shortgrass species and little bluestem the dominant midgrass species. There are small areas that may occur within the site where blue grama is more prevalent. Woody plants include yucca, catclaw acacia, and sand sage.

Use and Management

Major land uses: These soils are primarily used for rangeland and wildlife habitat. Some areas are used for improved pasture.
Cropland: These soils are poorly suited to cropland. The slope, droughtiness, moderate available water capacity, and high carbonate content of the soil are limitations. The hazard of wind erosion is severe. Improved varieties of bermudagrass and bluestems are the major pasture grasses grown on these soils. Fertilizer applications, weed control, brush management, proper stocking rates, and controlled grazing can help conserve soil moisture and improve or maintain productivity.
Rangeland: Native plants yield moderate amounts of forage. The high carbonate content, moderate available water capacity, and medium runoff of the soils is a limitation. The hazard of wind erosion is severe. The main concerns in management are continuous overgrazing, fire suppression, and invasion of woody species and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.
Urban Development: These soils are moderately suited to most urban uses. They are very limited as a site for lawns and landscaping or use as daily cover for landfills. The moderate available water capacity and high carbonate content of the soil are major limitations which can restrict plant growth necessary for healthy lawns and landscaping. Posey soils are very limited as a site for the construction of local roads and streets or use as road-fill material. Low soil strength is a limitation. Stabilizing, strengthening, or replacing the base material can overcome these restrictions.

Pipelines, storage tanks, and other underground structures made of uncoated steel should be protected from the high corrosion potential of these soils. This can be overcome by providing cathodic protection or by using galvanized steel.

Recreational Development: These soils are moderately suited to most recreational uses. They are very limited as a site for golf course fairways. The moderate available water capacity and high carbonate content of the soil are major limitations that can restrict plant growth necessary for healthy landscaping and turf.

Wildlife Habitat: Wind and water erosion is a potential hazard for grain and seed crops used for food and cover. The moderately arid conditions, which can limit plant growth necessary for good habitat, are a minor limitation.

MPP—Midessa, Potter, and Posey soils, 3 to 12 percent slopes

Setting

General location: Southern High Plains of western Texas and eastern New Mexico
Major land resource area: 77C—Southern High Plains, Southern Part
Landscape: Plateau
Elevation: 2,300 to 4,700 feet (701 to 1,433 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Midessa and similar soils: 40 percent
Potter and similar soils: 30 percent
Posey and similar soils: 20 percent
Contrasting soils: 10 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Midessa soil and similar soils make up 40 percent of the map unit, the Potter soil and similar soils make up 30 percent of the map unit, and the Posey soil and similar soils make up 20 percent of the map unit. The contrasting soils make up 10 percent.

Included in mapping are small areas of similar soils that have a surface layer of loamy fine sand or that have slopes of 13 to 15 percent.

The contrasting soils are small areas of Amarillo, Arvana, and Sharvana soils. Also included are borrow pits less than 3 acres in size and areas of narrow, linear sand dunes.

Soil Description

Midessa
Aspect(s): East to South
Position(s) on landform(s): Backslope on draw
Parent material: Calcareous, loamy eolian and lacustrine deposits derived from the Tahoka and Blackwater Draw Formations of Pleistocene age

Typical Profile

A—0 to 7 inches; brown, moderately alkaline fine sandy loam; few fine calcium carbonate nodules; violently effervescent

Bk—7 to 22 inches; pale brown, moderately alkaline sandy clay loam; about 8 percent calcium carbonate by volume in the form of filaments, nodules, and finely disseminated carbonates; violently effervescent

Bkk—22 to 55 inches; very pale brown, moderately alkaline sandy clay loam; about 52 percent calcium carbonate by volume in the form of masses, nodules, and finely disseminated carbonates; violently effervescent

B'k—55 to 80 inches; light brown, moderately alkaline sandy clay loam; about 35 percent calcium carbonate by volume in the form of masses, nodules, and finely disseminated carbonates; violently effervescent

Properties and Qualities

Slope: 3 to 12 percent

Percent of area covered by surface fragments: About 3 percent subrounded (shape or size unspecified)

Depth to first restrictive layer: Not present

Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)

Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer

Salinity, representative within 40 inches: Not saline

Salinity, maximum within 40 inches: Not saline

Sodicity, representative within 40 inches: Not sodic

Sodicity, maximum within 40 inches: Not sodic

Representative total available water capacity to 60 inches: About 7.5 inches (Moderate)

Natural drainage class: Well drained

Runoff: Medium

Flooding frequency: None

Ponding frequency: None

Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 6e

Land capability irrigated: None specified

Ecological site name: Limy Upland PE 25-36

Ecological site number: R077CY028TX

Typical vegetation: The natural plant community is a mixture of short and midgrasses with a smaller tallgrass complement. Midgrasses tend to dominate over most of the site with sideoats grama being the most prevalent midgrass species. Blue grama is the dominant shortgrass species and little bluestem the dominant tallgrass species. There are small areas that may occur within the site where blue grama is more prevalent. Woody plants include yucca, catclaw acacia, and sand sage.

Potter

Aspect(s): East to South

Position(s) on landform(s): Shoulder on draw

Parent material: Calcareous, loamy alluvium from the Ogallala Formation of Miocene-Pliocene age

Typical Profile

A1—0 to 2 inches; grayish brown, moderately alkaline gravelly loam; about 16 percent by volume of strongly cemented calcium carbonate nodules and indurated calcrete fragments; strongly effervescent

A2—2 to 6 inches; brown, moderately alkaline very gravelly fine sandy loam; about 48 percent by volume of strongly cemented calcium carbonate nodules and indurated calcrete fragments; violently effervescent

Bk—6 to 15 inches; light brownish gray and light gray, moderately alkaline very gravelly fine sandy loam; about 38 percent by volume of strongly cemented calcium carbonate nodules and indurated calcrete fragments; many medium and coarse masses of calcium carbonate; violently effervescent

BCkk1—15 to 29 inches; white, strongly alkaline very gravelly fine sandy loam; about 53 percent by volume of very strongly cemented, thin platy calcrete fragments and nodules that are 2.5 to 8 cm on the long axis, plates are fractured and undersides have about 2.5 to 6 mm long pendants of calcium carbonate; 32 percent of the volume is carbonate masses and loamy soil material; violently effervescent

BCkk2—29 to 55 inches; white, strongly alkaline extremely gravelly fine sandy loam; about 61 percent by volume of very strongly cemented, thick platy calcrete fragments and nodules that are 2.5 to 15 cm on the long axis, plates are fractured; 26 percent of the volume is carbonate masses and loamy soil material; violently effervescent

BCkk3—55 to 80 inches; white, strongly alkaline extremely gravelly fine sandy loam; about 63 percent by volume of very strongly cemented, thick platy calcrete fragments and nodules that are 2.5 to 15 cm on the long axis, plates are fractured; 23 percent of the volume is carbonate masses and loamy soil material; violently effervescent

Properties and Qualities

Slope: 3 to 12 percent

Percent of area covered by surface fragments: About 30 percent subangular (shape or size unspecified)

Depth to first restrictive layer: Not present

Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.06 to 0.2 in/hr (Slow)

Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer

Salinity, representative within 40 inches: Not saline

Salinity, maximum within 40 inches: Not saline

Sodicity, representative within 40 inches: Not sodic

Sodicity, maximum within 40 inches: Not sodic

Representative total available water capacity to 60 inches: About 3.8 inches (Low)

Natural drainage class: Well drained

Runoff: High

Flooding frequency: None

Ponding frequency: None

Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 7s

Land capability irrigated: None specified

Ecological site name: Very Shallow PE 25-36

Ecological site number: R077EY068TX

Typical vegetation: The natural plant community is a mixture of short and midgrasses with a few tallgrasses. A moderate amount of forbs and shrubs are also present. Major grass species are sideoats grama, little bluestem, hairy grama, blue grama, slim tridens, and buffalograss. The major forbs include black samson, dotted gayfeather, catclaw sensitivebriar, and annual forbs. Yucca, catclaw acacia, ephedra, skunkbush, and feather dalea are the major woody species.

Posey

Aspect(s): East to South

Position(s) on landform(s): Backslope on draw

Parent material: Calcareous, loamy eolian deposits from the Blackwater Draw Formation of Pleistocene age

Typical Profile

Ap—0 to 8 inches; reddish brown, moderately alkaline fine sandy loam; few calcium carbonate nodules; violently effervescent

Btk—8 to 15 inches; reddish brown, moderately alkaline sandy clay loam; few films, filaments, and masses of calcium carbonate; violently effervescent

Btkk—15 to 35 inches; light reddish brown, moderately alkaline sandy clay loam; about 55 percent calcium carbonate by volume as masses, nodules, and finely disseminated carbonates; violently effervescent

B'tk—35 to 80 inches; reddish yellow, moderately alkaline sandy clay loam; about 20 percent calcium carbonate by volume as masses, nodules, and finely disseminated carbonates; violently effervescent

Properties and Qualities

Slope: 3 to 12 percent

Percent of area covered by surface fragments: About 4 percent subrounded (shape or size unspecified)

Depth to first restrictive layer: Not present

Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)

Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer

Salinity, representative within 40 inches: Not saline

Salinity, maximum within 40 inches: Not saline

Sodicity, representative within 40 inches: Not sodic

Sodicity, maximum within 40 inches: Not sodic

Representative total available water capacity to 60 inches: About 7.6 inches (Moderate)

Natural drainage class: Well drained

Runoff: Medium

Flooding frequency: None

Ponding frequency: None

Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 6e

Land capability irrigated: None specified

Ecological site name: Limy Upland PE 25-36

Ecological site number: R077CY028TX

Typical vegetation: The natural plant community is a mixture of short and midgrasses with a smaller tallgrass complement. Midgrasses tend to dominate over most of the site with sideoats grama being the most prevalent midgrass species. Blue grama is the dominant shortgrass species and little bluestem the dominant tallgrass species. There are small areas that may occur within the site where blue grama is more prevalent. Woody plants include yucca, catclaw acacia, and sand sage.

Use and Management

Major land uses: These soils are primarily used for rangeland and wildlife habitat. Some areas are used for improved pasture.

Cropland: These soils are poorly suited to cropland. The slope, droughtiness, low to moderate available water capacity, and the high carbonate content of the soils are major limitations. The hazard of wind erosion is severe. Improved varieties of bermudagrass and bluestems are the major pasture grasses grown on these soils. Fertilizer applications, weed control, brush management, proper stocking rates, and controlled grazing can help conserve soil moisture and improve or maintain productivity.

Rangeland: Native plants yield low to moderate amounts of forage. The high carbonate content, low to moderate available water capacity, and medium to very high runoff is a major limitation. The hazard of wind erosion is severe. The main concerns in management are continuous overgrazing, fire suppression, and invasion of woody species and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.

Urban Development: These soils are poorly suited to most urban uses. The slope, low soil strength, droughtiness, high carbonate content, and high gravel content are major limitations. Under certain conditions, trench sidewalls can become highly unstable in this soil. Trenches that have been excavated to more than a depth of 5 feet should be shored or the sidewall should be graded to an angle that ensures safe working conditions. Pipelines, storage tanks, and other underground structures made of uncoated steel should be protected from the high corrosion potential of these soils. This can be overcome by providing cathodic protection or by using galvanized steel.

Recreational Development: These soils are poorly suited to most recreational uses. They are very limited as sites for golf course fairways and playgrounds. The slope, droughtiness, low available water capacity, high carbonate content, and gravel content of the soil are major limitations.

Wildlife Habitat:. Wind and water erosion is a potential hazard for grain and seed crops or domestic grasses and legumes used for food and cover. The arid conditions, which can limit plant growth necessary for good habitat, are a major limitation.

MVE—Mobeetie-Veal-Potter association, 5 to 20 percent slopes

Setting

General location: Southern High Plains Breaks of western Texas and eastern New Mexico
Major land resource area: 77E—Southern High Plains, Breaks
Landscape: Breaks
Elevation: 2,300 to 4,700 feet (701 to 1,433 meters)
Mean annual precipitation: 17 to 23 inches (432 to 559 millimeters)
Mean annual air temperature: 57 to 63 degrees F (15 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Mobeetie and similar soils: 50 percent
Veal and similar soils: 25 percent
Potter and similar soils: 15 percent
Contrasting soils: 10 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Mobeetie soil and similar soils make up 50 percent of the map unit, the Veal soil and similar soils make up 25 percent of the map unit, and the Potter soil and similar soils make up 15 percent of the map unit. The contrasting soils make up 10 percent.

The soils similar to Mobeetie are small areas of Midessa soils. The soils similar to Veal are small areas of Posey soils. The soils similar to Potter are small areas of Kimberson and Yellowhouse soils.

The contrasting soils are small areas of Arvana, Berda, Obaro, Pep, and Quinlan soils. Also included in mapping are borrow pits less than 3 acres in size.

Soil Description

Mobeetie
Aspect(s): East to South
Position(s) on landform(s): Backslope on valley side; Footslope on escarpment
Parent material: Calcareous, sandy colluvium and slope alluvium derived from the Ogallala Formation of Miocene-Pliocene age

Typical Profile

A—0 to 8 inches; grayish brown, moderately alkaline fine sandy loam; few calcium carbonate nodules; strongly effervescent
Bw—8 to 25 inches; light brown, moderately alkaline fine sandy loam; less than 2 percent by volume of calcium carbonate as films, filaments, and nodules; few siliceous gravels; few 1 cm in diameter pararock fragments of moderately cemented calcium carbonate; violently effervescent
Bk—25 to 41 inches; pink, moderately alkaline fine sandy loam; about 4 percent by volume of calcium carbonate as films, filaments, and nodules; few siliceous gravel; few 1 cm in diameter pararock fragments of moderately cemented calcium carbonate; violently effervescent
BCk—41 to 80 inches; pink, moderately alkaline fine sandy loam; about 3 percent by volume of calcium carbonate as films, filaments, and nodules; few siliceous gravels; violently effervescent

Properties and Qualities

Slope: 5 to 20 percent
Percent of area covered by surface fragments: About 1 percent subrounded (shape or size unspecified)
Depth to first restrictive layer: Not present
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 2.0 to 6.0 in/hr (Moderately rapid)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 6.4 inches (Moderate)
Natural drainage class: Well drained
Runoff: Low
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 6e
Land capability irrigated: None specified
Ecological site name: Mixedland Slopes PE 25-36
Ecological site number: R077EY061TX
Typical vegetation: This is a mid and tallgrass site with a large variety of forbs and a smaller woody plant component. Major grass species are little bluestem, sideoats grama, sand bluestem, and blue grama. This site differs from a sandy loam site because the limey topsoil promotes an increased growth of sideoats grama and little bluestem. Sand sagebrush is the major woody species along with yucca and skunkbush.

Veal
Aspect(s): East to South
Position(s) on landform(s): Backslope on escarpment; Footslope on valley side
Parent material: Calcareous, loamy colluvium over slope alluvium derived from the Ogallala Formation of Miocene-Pliocene age

Typical Profile

A—0 to 3 inches; brown, slightly alkaline loam; about 2 percent by volume of strongly cemented calcium carbonate nodules less than 20 mm in diameter; strongly effervescent
Bk—3 to 13 inches; brown, moderately alkaline gravelly fine sandy loam; about 40 percent of the soil volume is calcium carbonate in the form of masses, nodules, and finely disseminated carbonates; 25 percent by volume of strongly cemented calcium carbonate nodules less than 50 mm in diameter; violently effervescent
Bkk1—13 to 53 inches; pink, moderately alkaline gravelly loam; about 58 percent of the soil volume is calcium carbonate in the form of masses, nodules, and finely disseminated carbonates; 45 percent by volume of strongly cemented calcium carbonate nodules less than 50 mm in diameter; violently effervescent
Bkk2—53 to 80 inches; light brown, moderately alkaline gravelly loam; about 52 percent of the soil volume is calcium carbonate in the form of masses, nodules, and finely disseminated carbonates; 24 percent by volume of strongly cemented calcium carbonate nodules less than 50 mm in diameter; violently effervescent

Properties and Qualities

Slope: 5 to 20 percent
Percent of area covered by surface fragments: About 2 percent subangular medium and coarse gravel, about 1 percent very angular medium and coarse gravel, about 1 percent subrounded medium and coarse gravel
Depth to first restrictive layer: Not present
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 6.2 inches (Moderate)
Natural drainage class: Well drained
Runoff: Medium
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 6e
Land capability irrigated: None specified
Ecological site name: Limy Upland PE 25-36
Ecological site number: R077EY057TX
Typical vegetation: Climax vegetation is mainly mid and short grasses and includes blue grama, sideoats grama, and buffalograss, with lesser amounts of vine-mesquite, western wheatgrass, galleta or tobosa, silver bluestem, wild alfalfa, and prairieclover. A few woody species such as hackberry, cholla, and yucca occur with a light to moderate overstory of mesquite.

Potter

Aspect(s): East to South
Position(s) on landform(s): Footslope on escarpment; Backslope on valley side
Parent material: Calcareous, loamy alluvium from the Ogallala Formation of Miocene-Pliocene age

Typical Profile

A1—0 to 2 inches; grayish brown, moderately alkaline gravelly loam; about 16 percent by volume of strongly cemented calcium carbonate nodules and indurated calcrete fragments; strongly effervescent
A2—2 to 6 inches; brown, moderately alkaline very gravelly fine sandy loam; about 48 percent by volume of strongly cemented calcium carbonate nodules and indurated calcrete fragments; violently effervescent
Bk—6 to 15 inches; light brownish gray and light gray, moderately alkaline very gravelly fine sandy loam; about 38 percent by volume of strongly cemented calcium carbonate nodules and indurated calcrete fragments; many medium and coarse masses of calcium carbonate; violently effervescent
BCkk1—15 to 29 inches; white, strongly alkaline very gravelly fine sandy loam; about 53 percent by volume of very strongly cemented, thin platy calcrete fragments and nodules that are 2.5 to 8 cm on the long axis, plates are fractured and undersides have about 2.5 to 6 mm long pendants of calcium carbonate; 32 percent of the volume is carbonate masses and loamy soil material; violently effervescent
BCkk2—29 to 55 inches; white, strongly alkaline extremely gravelly fine sandy loam about 61 percent by volume of very strongly cemented, thick platy calcrete fragments and nodules that are 2.5 to 15 cm on the long axis, plates are fractured; 26 percent of the volume is carbonate masses and loamy soil material; violently effervescent
BCkk3—55 to 80 inches; white, strongly alkaline extremely gravelly fine sandy loam; about 63 percent by volume of very strongly cemented, thick platy calcrete fragments and nodules that are 2.5 to 15 cm on the long axis, plates are fractured; 23 percent of the volume is carbonate masses and loamy soil material; violently effervescent

Properties and Qualities

Slope: 5 to 20 percent
Percent of area covered by surface fragments: About 30 percent subangular (shape or size unspecified)
Depth to first restrictive layer: Not present
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.06 to 0.2 in/hr (Slow)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 3.8 inches (Low)
Natural drainage class: Well drained
Runoff: High
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 7s
Land capability irrigated: None specified

Ecological site name: Very Shallow PE 25-36
Ecological site number: R077EY068TX
Typical vegetation: The natural plant community is a mixture of short and midgrasses. A moderate amount of forbs and shrubs are also present. Major grass species are sideoats grama, little bluestem, hairy grama, blue grama, slim tridens, and buffalograss. The major forbs include black samson, dotted gayfeather, catclaw sensitivebriar, and annual forbs. Yucca, catclaw acacia, ephedra, skunkbush, and feather dalea are the major woody species.

Use and Management

Major land uses: These soils are primarily used for rangeland and wildlife habitat.
Cropland: These soils are poorly suited to cropland. The slope, low to moderate available water capacity, medium to high runoff, high carbonate content, and high gravel content of the soils are major limitations.
Rangeland: Native plants yield moderate amounts of forage. The high carbonate content and medium to high runoff are major limitations for Veal and Potter soils. Droughtiness and available water capacity is a limitation for all of these soils. The hazard of erosion is severe. The main concerns in management are continuous overgrazing, fire suppression, and invasion of woody species and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.
Urban Development: These soils are poorly suited to most urban uses. The slope, carbonate content, gravel content, seepage, and low to moderate available water capacity are major limitations. Under certain conditions, trench sidewalls can become highly unstable in this soil. Trenches that have been excavated to more than a depth of 5 feet should be shored or the sidewall should be graded to an angle that ensures safe working conditions.
Recreational Development: These soils are poorly suited to most recreational uses. They are very limited as a site for camp areas, picnic areas, playgrounds, and golf course fairways. The slope, droughtiness, gravel content, and high carbonate content of the soil are major limitations.
Wildlife Habitat: Wind and water erosion is a potential hazard for grain and seed crops or domestic grasses and legumes used for food and cover. The arid conditions, which can limit plant growth necessary for good habitat, are a major limitation.

OBG—Obaro and Quinlan association, 3 to 30 percent slopes

Setting

General location: Central Rolling Red Plains of Texas and Oklahoma
Major land resource area: 77B - Southern High Plains, Northwestern Part
Landscape: Breaks
Elevation: 1,800 to 3,000 feet (549 to 914 meters)
Mean annual precipitation: 20 to 24 inches (508 to 610 millimeters)
Mean annual air temperature: 59 to 63 degrees F (15 to 17 degrees C)
Frost-free period: 185 to 230 days

Composition

Obaro and similar soils: 55 percent
Quinlan and similar soils: 30 percent
Contrasting soils: 15 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Obaro soil and similar soils make up 55 percent of the map unit. The Quinlan soil and similar soils make up 30 percent of the map unit, and the contrasting soils make up 15 percent.

The soils similar to Obaro and Quinlan are small areas of soils that have a solum less than 10 inches thick, or soils that have more than 35 percent clay in the particle-size control section.

The contrasting soils are small areas of Berda, Potter, and Yellowhouse soils. Also included in mapping are small areas of rock outcrop.

Soil Description

Obaro

Aspect(s): East to South

Position(s) on landform(s): Shoulder on erosion remnant; Backslope on valley side

Parent material: Loamy residuum weathered from calcareous sandstone and siltstone primarily of Triassic age

Typical Profile

A—0 to 8 inches; reddish brown, moderately alkaline loam; strongly effervescent

Bw—8 to 18 inches; reddish brown, moderately alkaline loam; about 2 percent films and threads of calcium carbonate; violently effervescent

Bk—18 to 30 inches; light red, moderately alkaline loam; about 5 percent films, masses, and coatings on sandstone fragments of calcium carbonate; violently effervescent

Cr—30 to 60 inches; red weakly cemented sandstone bedrock

Properties and Qualities

Slope: 3 to 15 percent

Percent of area covered by surface fragments: About 1 percent subangular gravel, about 2 percent subrounded medium and coarse gravel

Depth to first restrictive layer: Paralithic bedrock at 20 to 30 inches

Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)

Slowest permeability to 60 inches, within and below first cemented restrictive layer: 0.001 to 0.06 in/hr (Very slow)

Salinity, representative within 40 inches: Not saline

Salinity, maximum within 40 inches: Not saline

Sodicity, representative within 40 inches: Not sodic

Sodicity, maximum within 40 inches: Not sodic

Representative total available water capacity to 60 inches: About 4.6 inches (Low)

Natural drainage class: Well drained

Runoff: High

Flooding frequency: None

Ponding frequency: None

Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 6e

Land capability irrigated: None specified

Ecological site name: Loamy Prairie PE 25-36

Ecological site number: R078BY081TX

Typical vegetation: The natural plant community is a mixture of short and midgrasses. Major grass species include blue grama, buffalograss, sideoats grama, plains bristlegrass, and little bluestem. Saltbush, ephedra, mesquite, juniper, and catclaw acacia are the major woody species.

Quinlan

Aspect(s): East to South

Position(s) on landform(s): Shoulder on erosion remnant; Backslope on valley side
Parent material: Loamy residuum weathered from calcareous sandstone and siltstone of Triassic or Permian age

Typical Profile

A—0 to 8 inches; reddish brown, moderately alkaline loam; slightly effervescent
Bw—8 to 13 inches; red, moderately alkaline loam; strongly effervescent
Cd—13 to 64 inches; red, noncemented sandstone bedrock; strongly effervescent

Properties and Qualities

Slope: 3 to 30 percent
Percent of area covered by surface fragments: About 1 percent subangular medium and coarse gravel, about 3 percent subrounded medium and coarse gravel
Depth to first restrictive layer: Densic bedrock at 10 to 20 inches
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: 0.001 to 0.06 in/hr (Very slow)
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 2.0 inches (Very low)
Natural drainage class: Well drained
Runoff: Very high
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 7e
Land capability irrigated: None specified
Ecological site name: Loamy Prairie PE 25-36
Ecological site number: R078BY081TX
Typical vegetation: The natural plant community is a mixture of short and midgrasses. Major grass species include blue grama, buffalograss, sideoats grama, plains bristlegrass, and little bluestem. Saltbush, ephedra, mesquite, juniper, and catclaw acacia are the major woody species.

Use and Management

Major land uses: These soils are primarily used for rangeland and wildlife habitat.
Cropland: These soils are poorly suited to cropland. The slope, depth to bedrock, low and very low available water capacity, droughtiness, and very high runoff are major limitations. The hazard of water erosion is severe.
Rangeland: Native plants yield moderate amounts of forage. The shallow depth to bedrock is a major limitation for Quinlan soils. Low and very low available water capacity and high and very high runoff are major limitations for both soils. The hazard of erosion is severe. The main concerns in management are continuous overgrazing, fire suppression, and invasion of woody species and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.
Urban Development: These soils are poorly suited to most urban uses. They are very limited as a site for sanitary facilities and building site development. The slope, depth

to bedrock, low soil strength, and seepage are major limitations. Overcoming many of these limitations is difficult and costly.

Recreational Development: These soils are poorly suited to most recreational uses. The slope, depth to bedrock, droughtiness, and the hazard of water erosion are major limitations.

Wildlife Habitat: The low and very low available water capacity, very slow permeability, and shallow rooting depth are major limitations that restrict plant growth necessary for good habitat. The potential for wind and water erosion is severe.

OcA—Olton clay loam, 0 to 1 percent slopes

Setting

General location: Southern High Plains of western Texas and eastern New Mexico
Major land resource area: 77C—Southern High Plains, Southern Part
Landscape: Plateau
Elevation: 2,800 to 4,600 feet (853 to 1,402 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Olton and similar soils: 85 percent
Contrasting soils: 15 percent

Based on 7 transects with 70 observations in MLRA-77, and other field observations of the map unit during the survey, the best estimate is that the Olton soil and similar soils make up 85 percent of the map unit, and contrasting soils make up 15 percent.

The soils similar to Olton are small areas of Acuff, Estacado, and Lofton soils. Also included are small areas of Olton soils that have a surface layer of loam or slopes of 1 to 3 percent.

The contrasting soils are small areas of Pep and Portales soils. Included in mapping are a few very small depressional areas of Sparenberg soils.

Soil Description

Olton
Aspect(s): East to South
Position(s) on landform(s): Plain
Parent material: Loamy eolian deposits from the Blackwater Draw Formation of Pleistocene age

Typical Profile

Ap—0 to 8 inches; brown, neutral clay loam

Bt1—8 to 15 inches; brown, slightly alkaline clay loam

Bt2—15 to 31 inches; reddish brown, moderately alkaline clay loam; slightly effervescent

Btk1—31 to 48 inches; reddish brown, moderately alkaline clay loam; about 5 percent calcium carbonate by volume as films and filaments; violently effervescent

Btk2—48 to 75 inches; pink, moderately alkaline clay loam; about 35 percent calcium carbonate by volume as masses and nodules; violently effervescent

Btk3—75 to 80 inches; red, moderately alkaline clay loam; about 5 percent calcium carbonate by volume as films; strongly effervescent

Properties and Qualities

Slope: 0 to 1 percent
Percent of area covered by surface fragments: Unspecified

Depth to first restrictive layer: Not present
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.2 to 0.6 in/hr (Moderately slow)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 9.4 inches (High)
Natural drainage class: Well drained
Runoff: Low
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 3e
Land capability irrigated: 2e
Ecological site name: Deep Hardland PE 25-36
Ecological site number: R077CY022TX
Typical vegetation: The natural plant community for this site is shortgrass dominant with a few midgrasses and forbs. Very few shrubs or woody plants occur on this shortgrass prairie. The most prevalent grasses are blue grama and buffalograss with blue grama being dominant.

Use and Management

Major land uses: This soil is primarily used for cropland. A few areas are used as improved pasture or rangeland.
Cropland: This soil is well suited to cropland. The most common crops grown on this soil are cotton and grain sorghum. Other crops include wheat and forage sorghum. The main concerns in management are conserving soil moisture and controlling soil erosion. Fertilizer applications, reduced tillage, high-residue cover crops, and crop residue management can help reduce the soil temperature, conserve moisture, and improve or maintain soil tilth and productivity. Terraces, contour farming, grassed waterways, and diversion terraces, where needed, can help control runoff and water erosion. Improved varieties of bermudagrass and bluestems are the major pasture grasses grown on these soils. Fertilizer applications, weed control, brush management, proper stocking rates, and controlled grazing can help conserve soil moisture and improve or maintain productivity.
Rangeland: Native plants are dominantly shortgrasses, which produce moderate amounts of forage. The main concerns in management are continuous overgrazing, fire suppression, and invasion of woody species and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.
Urban Development: This soil is moderately suited to most urban uses. It is very limited as a site for septic tank absorption fields and for local roads and streets. The low soil strength and restricted permeability are major limitations. Because of low soil strength, special treatment is necessary to increase the stability of road sub-grades. The moderately slow permeability may cause failure of septic tank absorption systems, especially during prolonged wet periods. This limitation can be overcome by properly designing the absorption field and by increasing the size of the absorption area. The shrink-swell potential is somewhat limiting for dwellings or small commercial buildings. The shrink-swell can cause cracking of building foundations,

brick walls, road surfaces, sidewalks, and pipelines. Adding sand or other non-expansive material can minimize the structural damage caused by shrinking and swelling of the soils.
Recreational Development: This soil is well suited to recreational uses.
Wildlife Habitat: The moderately arid conditions, which can limit plant growth necessary for good habitat, are a minor limitation.

PAB—Patricia and Amarillo loamy fine sands, 0 to 3 percent slopes

Setting

General location: Southern High Plains of western Texas and eastern New Mexico
Major land resource area: 77C—Southern High Plains, Southern Part
Landscape: Plateau
Elevation: 2,600 to 4,600 feet (792 to 1,402 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Patricia and similar soils: 50 percent
Amarillo and similar soils: 45 percent
Contrasting soils: 5 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Patricia soil and similar soils make up 50 percent of the map unit. The Amarillo soil and similar soils make up 45 percent of the map unit, and the contrasting soils make up 5 percent.

Soils similar to Patricia and Amarillo are small areas of Brownfield and Tokio soils. Also included in mapping are small areas of Amarillo soils that have a fine sandy loam surface layer, areas of Patricia soils that have a fine sand surface layer, and areas of these soils with slopes of 3 to 5 percent.

Contrasting soils are small areas of Arvana, Midessa, Posey, and Seagraves soils. Arvana, Midessa, and Posey soils occur in landscape positions similar to those of the Patricia and Amarillo soils. The Seagraves soils occur on lower landscape positions in depressions.

Soil Description

Patricia
Aspect(s): East to South
Position(s) on landform(s): Plain
Parent material: Loamy eolian deposits from the Blackwater Draw Formation of Pleistocene age

Typical Profile

Ap—0 to 12 inches; yellowish red, slightly alkaline loamy fine sand
Bt1—12 to 27 inches; red, neutral sandy clay loam
Bt2—27 to 40 inches; red, neutral sandy clay loam
Bt3—40 to 78 inches; red, slightly alkaline sandy clay loam; very slightly effervescent
Btk—78 to 80 inches; red, strongly alkaline sandy clay loam; about 40 percent calcium carbonate by volume in the form of masses, films, and nodules; violently effervescent

Properties and Qualities

Slope: 0 to 3 percent
Percent of area covered by surface fragments: Unspecified
Depth to first restrictive layer: Not present
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 8.9 inches (Moderate)
Natural drainage class: Well drained
Runoff: Low
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 4e
Land capability irrigated: 3e
Ecological site name: Sandy PE 25-36
Ecological site number: R077CY035TX
Typical vegetation: This is a tallgrass climax site. Nearly half of the grass component is composed of tallgrasses such as little bluestem, sand bluestem, spike dropseed, and giant dropseed. The remainder is composed of mid and shortgrasses such as sideoats grama, sand dropseed, hooded windmillgrass, sand lovegrass, sand paspalum, fall witchgrass, hairy grama, needle and thread, and perennial threeawn. Sand sage, shinoak, and skunkbush make up the woody species.

Amarillo
Aspect(s): East to South
Position(s) on landform(s): Plain
Parent material: Loamy eolian deposits from the Blackwater Draw Formation of Pleistocene age

Typical Profile

Ap—0 to 10 inches; brown, slightly alkaline loamy fine sand
Bt—10 to 27 inches; reddish brown, slightly alkaline sandy clay loam; slightly effervescent
Btk—27 to 38 inches; yellowish red, moderately alkaline sandy clay loam; about 5 percent calcium carbonate by volume in the form of films and filaments on surfaces of peds; violently effervescent
Btkk—38 to 56 inches; pink, moderately alkaline sandy clay loam; about 60 percent calcium carbonate by volume as masses, nodules, and finely disseminated carbonates; violently effervescent
B’tk—56 to 80 inches; yellowish red, moderately alkaline sandy clay loam; about 20 percent calcium carbonate by volume in the form of masses and nodules concentrated mainly along surfaces of prisms; violently effervescent

Properties and Qualities

Slope: 0 to 3 percent
Percent of area covered by surface fragments: Unspecified

Depth to first restrictive layer: Not present
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 8.6 inches (Moderate)
Natural drainage class: Well drained
Runoff: Low
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 4e
Land capability irrigated: 3e
Ecological site name: Sandy PE 25-36
Ecological site number: R077CY035TX
Typical vegetation: This is a tallgrass climax site. Nearly half of the grass component is composed of tallgrasses such as little bluestem, sand bluestem, spike dropseed, and giant dropseed. The remainder is composed of mid and shortgrasses such as sideoats grama, sand dropseed, hooded windmillgrass, sand lovegrass, sand paspalum, fall witchgrass, hairy grama, needle and thread, and perennial threeawn. Sand sage, shinoak, and skunkbush make up the woody species.

Use and Management

Major land uses: These soils are used extensively for cropland. A few small areas are used as improved pasture or rangeland.
Cropland: These soils are well suited to cropland. The most common crops grown are cotton, grain sorghum, and peanuts. Other crops include wheat, sunflowers, and forage sorghum. The hazard of wind erosion is severe. The main concerns in management are conserving soil moisture and controlling soil erosion. Fertilizer applications, reduced tillage, high-residue cover crops, and crop residue management can help reduce the soil temperature, conserve moisture, and improve or maintain soil tilth and productivity. Terraces, contour farming, grassed waterways, and diversion terraces, where needed, can help control runoff and water erosion. Improved varieties of bermudagrass and bluestems are the major pasture grasses grown on these soils. Fertilizer applications, weed control, brush management, proper stocking rates, and controlled grazing can help conserve soil moisture and improve or maintain productivity.
Rangeland: Native plants yield high amounts of forage. The hazard of wind erosion is severe. The main concerns in management are continuous overgrazing, fire suppression, and invasion of woody species and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.
Urban Development: These soils are well suited to most urban uses. Patricia soils are very limited as a site for sewage lagoons. Seepage is the major limitation, which can contaminate aquifers, wells, and streams. Lining the floor and sides of the sewage lagoon with relatively impervious material can minimize the potential for contamination.

Recreational Development: These soils are moderately suited to recreational uses. The high sand content of the soil is somewhat limiting for use as recreational areas.
Wildlife Habitat: Wind erosion is a potential hazard for grain and seed crops used for food and cover. The moderately arid conditions, which can limit plant growth necessary for good habitat, are a minor limitation.

PeA—Pep loam, 0 to 1 percent slopes

Setting

General location: Southern High Plains of western Texas and eastern New Mexico
Major land resource area: 77C—Southern High Plains, Southern Part
Landscape: Plateau
Elevation: 2,700 to 4,700 feet (823 to 1,433 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Pep and similar soils: 85 percent
Contrasting soils: 15 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Pep soil and similar soils make up 85 percent of the map unit, and contrasting soils make up 15 percent.
The soils similar to Pep are small areas of Portales and Zita soils. Also included are a few small areas of similar soils that have a surface layer of sandy clay loam or very fine sandy loam or that have slopes of 1 to 3 percent.
The contrasting soils are small areas of Acuff, Amarillo, Arvana, Estacado, Kimberson, Midessa, and Posey soils.

Soil Description

Pep
Aspect(s): East to South
Position(s) on landform(s): Plain
Parent material: Calcareous, loamy eolian deposits from the Blackwater Draw Formation of Pleistocene age

Typical Profile

Ap—0 to 10 inches; reddish brown, moderately alkaline loam; strongly effervescent
Bw—10 to 16 inches; yellowish red, moderately alkaline clay loam; less than 2 percent visible calcium carbonate by volume as films, filaments, and finely disseminated carbonates; strongly effervescent
Bk—16 to 32 inches; reddish yellow, moderately alkaline clay loam; about 20 percent calcium carbonate by volume as filaments and finely disseminated carbonates; violently effervescent
Bkk—32 to 80 inches; reddish yellow, moderately alkaline clay loam; about 55 percent calcium carbonate by volume as masses, nodules, and finely disseminated carbonates; violently effervescent

Properties and Qualities

Slope: 0 to 1 percent
Percent of area covered by surface fragments: About 1 percent subrounded (shape or size unspecified)
Depth to first restrictive layer: Not present

Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 7.9 inches (Moderate)
Natural drainage class: Well drained
Runoff: Negligible
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 3e
Land capability irrigated: 2e
Ecological site name: Limy Upland PE 25-36
Ecological site number: R077CY028TX
Typical vegetation: The natural plant community for this site is dominantly shortgrass and midgrass with only a few woody species. The dominant grass species is usually blue grama. It resembles a clay loam range site except for the presence of more midgrasses such as sideoats grama, western wheatgrass, and vine mesquite. The site typifies a shortgrass/midgrass prairie.

Use and Management

Major land uses: This soil is primarily used for cropland. A few areas are used as improved pasture or rangeland.
Cropland: This soil is moderately suited to cropland. The moderate available water capacity and high carbonate content of the soil are limitations. The hazard of wind erosion is severe. The most common crops grown are cotton and grain sorghum. Other crops include wheat, sunflowers, and forage sorghum. The main concerns in management are conserving soil moisture and controlling soil erosion. Fertilizer applications, reduced tillage, high-residue cover crops, and crop residue management can help reduce the soil temperature, conserve moisture, and improve or maintain soil tilth and productivity. Terraces, contour farming, grassed waterways, and diversion terraces, where needed, can help control runoff and water erosion. Improved varieties of bermudagrass and bluestems are the major pasture grasses grown on these soils. Fertilizer applications, weed control, brush management, proper stocking rates, and controlled grazing can help conserve soil moisture and improve or maintain productivity.
Rangeland: Native plants yield moderate amounts of forage. The high carbonate content and moderate available water capacity of the soil are limitations. The hazard of wind erosion is severe. The main concerns in management are continuous overgrazing, fire suppression, invasion of woody species, and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.
Urban Development: This soil is moderately suited to most urban uses. It is very limited for use as daily cover for landfills, lawns and landscaping, road-fill material, or the construction of roads and streets. The high carbonate content, moderate available water capacity, and low soil strength are major limitations. Because of low soil strength, special treatment is necessary to increase the stability of road sub-grades. Pipelines, storage tanks, and other underground structures made of uncoated steel

should be protected from the high corrosion potential of these soils. This can be overcome by providing cathodic protection or by using galvanized steel.

Recreational Development: This soil is moderately suited to most recreational uses. It is very limited as a site for golf course fairways. The moderate available water capacity and high carbonate content of the soil are major limitations. Other recreational use is somewhat limited because of dustiness. Applications of water or special surfacing material may be needed during dry periods to prevent excessive dustiness in areas that are subject to heavy foot traffic.

Wildlife Habitat: Wind erosion is a potential hazard for grain and seed crops used for food and cover. The moderately arid conditions, which can limit plant growth necessary for good habitat, are a minor limitation.

PeB—Pep loam, 1 to 3 percent slopes

Setting

General location: Southern High Plains of western Texas and eastern New Mexico
Major land resource area: 77C—Southern High Plains, Southern Part
Landscape: Plateau
Elevation: 2,700 to 4,700 feet (823 to 1,433 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Pep and similar soils: 85 percent
Contrasting soils: 15 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Pep soil and similar soils make up 85 percent of the map unit, and contrasting soils make up 15 percent.

The soils similar to Pep are small areas of Portales and Zita soils. Also included are a few small areas of similar soils that have a surface layer of sandy clay loam or very fine sandy loam or that have slopes of 3 to 5 percent.

The contrasting soils are small areas of Acuff, Amarillo, Arvana, Estacado, Kimberson, Midessa, and Posey soils.

Soil Description

Pep
Aspect(s): East to South
Position(s) on landform(s): Plain; Playa slope
Parent material: Calcareous, loamy eolian deposits from the Blackwater Draw Formation of Pleistocene age

Typical Profile

Ap—0 to 9 inches; reddish brown, moderately alkaline loam; strongly effervescent

Bw—9 to 15 inches; yellowish red, moderately alkaline clay loam; less than 2 percent visible calcium carbonate by volume as films, filaments, and finely disseminated carbonates; strongly effervescent

Bk—15 to 30 inches; reddish yellow, moderately alkaline clay loam; about 20 percent calcium carbonate by volume as filaments and finely disseminated carbonates; violently effervescent

Bkk—30 to 80 inches; reddish yellow, moderately alkaline clay loam; about 55 percent calcium carbonate by volume as masses, nodules, and finely disseminated carbonates; violently effervescent

Properties and Qualities

Slope: 1 to 3 percent
Percent of area covered by surface fragments: About 2 percent subrounded (shape or size unspecified)
Depth to first restrictive layer: Not present
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 7.9 inches (Moderate)
Natural drainage class: Well drained
Runoff: Low
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 4e
Land capability irrigated: 3e
Ecological site name: Limy Upland PE 25-36
Ecological site number: R077CY028TX
Typical vegetation: The natural plant community for this site is dominantly shortgrass and midgrass with only a few woody species. The dominant grass species is usually blue grama. It resembles a clay loam range site except for the presence of more midgrasses such as sideoats grama, western wheatgrass, and vine mesquite. The site typifies a shortgrass/midgrass prairie.

Use and Management

Major land uses: This soil is primarily used for cropland. A few areas are used as improved pasture or rangeland.
Cropland: This soil is moderately suited to cropland. The moderate available water capacity and high carbonate content of the soil are limitations. The hazard of wind erosion is severe. The most common crops grown are cotton and grain sorghum. Other crops include wheat, sunflowers, and forage sorghum. The main concerns in management are conserving soil moisture and controlling soil erosion. Fertilizer applications, reduced tillage, high-residue cover crops, and crop residue management can help reduce the soil temperature, conserve moisture, and improve or maintain soil tilth and productivity. Terraces, contour farming, grassed waterways, and diversion terraces, where needed, can help control runoff and water erosion. Improved varieties of bermudagrass and bluestems are the major pasture grasses grown on these soils. Fertilizer applications, weed control, brush management, proper stocking rates, and controlled grazing can help conserve soil moisture and improve or maintain productivity.
Rangeland: Native plants yield moderate amounts of forage. The high carbonate content and moderate available water capacity of the soil are limitations. The hazard of wind erosion is severe. The main concerns in management are continuous overgrazing, fire suppression, invasion of woody species, and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.

Urban Development: This soil is moderately suited to most urban uses. It is very limited for use as daily cover for landfills, lawns and landscaping, road-fill material, or the construction of roads and streets. The high carbonate content, moderate available water capacity, and low soil strength are major limitations. Because of low soil strength, special treatment is necessary to increase the stability of road sub-grades. Pipelines, storage tanks, and other underground structures made of uncoated steel should be protected from the high corrosion potential of these soils. This can be overcome by providing cathodic protection or by using galvanized steel.

Recreational Development: This soil is moderately suited to most recreational uses. It is very limited as a site for golf course fairways. The moderate available water capacity and high carbonate content of the soil are major limitations. Other recreational use is somewhat limited because of dustiness. Applications of water or special surfacing material may be needed during dry periods to prevent excessive dustiness in areas that are subject to heavy foot traffic.

Wildlife Habitat: Wind erosion is a potential hazard for grain and seed crops used for food and cover. The moderately arid conditions, which can limit plant growth necessary for good habitat, are a minor limitation.

PGE—Potter soils, 3 to 20 percent slopes

Setting

General location: Southern High Plains, Breaks of western Texas and eastern New Mexico

Major land resource area: 77E—Southern High Plains, Breaks

Landscape: Breaks

Elevation: 2,300 to 4,700 feet (701 to 1,433 meters)

Mean annual precipitation: 17 to 23 inches (432 to 559 millimeters)

Mean annual air temperature: 59 to 63 degrees F (15 to 17 degrees C)

Frost-free period: 185 to 220 days

Composition

Potter and similar soils: 80 percent

Contrasting soils: 20 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Potter soil and similar soils make up 80 percent of the map unit, and contrasting soils make up 20 percent.

The soils similar to Potter are small areas of Kimberson, Sharvana, and Yellowhouse soils. Also included are small areas of Potter soils that have slopes of 1 to 3 percent.

The contrasting soils are small areas of Acuff, Amarillo, Arvana, Berda, Midessa, Mobeetie, Pep, and Veal soils.

Soil Description

Potter

Aspect(s): East to South

Position(s) on landform(s): Shoulder on draw; Shoulder on escarpment

Parent material: Calcareous, loamy alluvium from the Ogallala Formation of Miocene-Pliocene age

Typical Profile

A1—0 to 2 inches; grayish brown, moderately alkaline gravelly loam; about 16 percent by volume of strongly cemented calcium carbonate nodules and indurated calcrete fragments; strongly effervescent

A2—2 to 6 inches; brown, moderately alkaline very gravelly fine sandy loam; about 48 percent by volume of strongly cemented calcium carbonate nodules and indurated calcrete fragments; violently effervescent

Bk—6 to 15 inches; light brownish gray and light gray, moderately alkaline very gravelly fine sandy loam; about 38 percent by volume of strongly cemented calcium carbonate nodules and indurated calcrete fragments; many medium and coarse masses of calcium carbonate; violently effervescent

BCkk1—15 to 29 inches; white, strongly alkaline very gravelly fine sandy loam about 53 percent by volume of very strongly cemented, thin platy calcrete fragments and nodules that are 2.5 to 8 cm on the long axis, plates are fractured and undersides have about 2.5 to 6 mm long pendants of calcium carbonate; 32 percent of the volume is carbonate masses and loamy soil material; violently effervescent

BCkk2—29 to 55 inches; white, strongly alkaline extremely gravelly fine sandy loam; about 61 percent by volume of very strongly cemented, thick platy calcrete fragments and nodules that are 2.5 to 15 cm on the long axis, plates are fractured; 26 percent of the volume is carbonate masses and loamy soil material; violently effervescent

BCkk3—55 to 80 inches; white, strongly alkaline extremely gravelly fine sandy loam; about 63 percent by volume of very strongly cemented, thick platy calcrete fragments and nodules that are 2.5 to 15 cm on the long axis, plates are fractured; 23 percent of the volume is carbonate masses and loamy soil material; violently effervescent

Properties and Qualities

Slope: 3 to 20 percent

Percent of area covered by surface fragments: About 30 percent subangular (shape or size unspecified)

Depth to first restrictive layer: Not present

Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.06 to 0.2 in/hr (Slow)

Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer

Salinity, representative within 40 inches: Not saline

Salinity, maximum within 40 inches: Not saline

Sodicity, representative within 40 inches: Not sodic

Sodicity, maximum within 40 inches: Not sodic

Representative total available water capacity to 60 inches: About 3.8 inches (Low)

Natural drainage class: Well drained

Runoff: High

Flooding frequency: None

Ponding frequency: None

Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 7s

Land capability irrigated: None specified

Ecological site name: Very Shallow PE 25-36

Ecological site number: R077EY068TX

Typical vegetation: The natural plant community is a mixture of shortgrass and midgrass with a few tallgrass species. A moderate amount of forbs and shrubs are also present. Major grass species are sideoats grama, little bluestem, hairy grama, blue grama, slim tridens, and buffalograss. The major forbs include black samson, dotted gayfeather, catclaw sensitivebriar, and annual forbs. Yucca, catclaw acacia, ephedra, skunkbush, and feather dalea are the major woody species.

Use and Management

Major land uses: This soil is used mainly as rangeland and wildlife habitat.
Cropland: This soil is not used as cropland. The low available water capacity, carbonate content, droughtiness, slope, shallow rooting depth, and high runoff are major limitations.
Rangeland: Native plants yield low amounts of forage. The high carbonate content of the soil, low available water capacity, slope, and high runoff are major limitations. The main concerns in management are continuous overgrazing, fire suppression, invasion of woody species, and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.
Urban Development: This soil is poorly suited to urban uses. It is very limited for use as sanitary facilities and building site development. The slope, droughtiness, gravel, and carbonate content are major limitations. Overcoming many of these limitations is difficult and costly. Under certain conditions, trench sidewalls can become highly unstable in this soil. Trenches that have been excavated to more than a depth of 5 feet should be shored or the sidewall should be graded to an angle that ensures safe working conditions.
Recreational Development: This soil is poorly suited to most recreational uses. It is very limited as a site for golf course fairways and playgrounds. The gravel content, slope, low available water capacity, and carbonate content of the soil are major limitations. Other recreational use is somewhat limited because of the slope and dustiness.
Wildlife Habitat: The low available water capacity and arid conditions are major limitations that restrict plant growth necessary for good habitat. The potential for water erosion is severe.

PoA—Portales loam, 0 to 1 percent slopes

Setting

General location: Southern High Plains of western Texas and eastern New Mexico
Major land resource area: 77C—Southern High Plains, Southern Part
Landscape: Plateau
Elevation: 2,700 to 4,900 feet (823 to 1,493 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Portales and similar soils: 90 percent
Contrasting soils: 10 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Portales soil and similar soils make up 90 percent of the map unit, and contrasting soils make up 10 percent.
The soils similar to Portales are small areas of Pep and Zita soils. Included are small areas of similar soils that have a surface layer of sandy clay loam or very fine sandy loam or soils that have slopes of 1 to 3 percent.
The contrasting soils are small areas of Acuff, Arch, Estacado, Lofton, Lenorah, Midessa, and Sparenberg soils. Acuff, Arch, Estacado, Lenorah, and Midessa soils occur in similar landscape positions. Lofton and Sparenberg soils occur in slightly lower landscape positions.

Soil Description

Portales
Aspect(s): East to South
Position(s) on landform(s): Interdune; Plain; Playa step
Parent material: Calcareous, loamy lacustrine deposits of Quaternary age

Typical Profile

A—0 to 15 inches; dark grayish brown, moderately alkaline loam; few fine masses of calcium carbonate; violently effervescent
Bk1—15 to 35 inches; grayish brown, moderately alkaline clay loam; about 8 percent calcium carbonate by volume as masses and finely disseminated carbonates; violently effervescent
Bk2—35 to 43 inches; light brownish gray, moderately alkaline loam; about 25 percent calcium carbonate by volume as masses and finely disseminated carbonates; violently effervescent
Bkk1—43 to 60 inches; light gray, moderately alkaline clay loam; about 50 percent calcium carbonate by volume as masses, nodules, and finely disseminated carbonates; violently effervescent
Bkk2—60 to 80 inches; very pale brown, moderately alkaline clay loam; about 60 percent calcium carbonate by volume as masses, nodules, and finely disseminated carbonates; violently effervescent

Properties and Qualities

Slope: 0 to 1 percent
Percent of area covered by surface fragments: About 1 percent subrounded (shape or size unspecified)
Depth to first restrictive layer: Not present
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 7.9 inches (Moderate)
Natural drainage class: Well drained
Runoff: Negligible
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 3e
Land capability irrigated: 2e
Ecological site name: Limy Upland PE 25-36
Ecological site number: R077CY028TX
Typical vegetation: The natural plant community for this site is dominantly shortgrass and midgrass with only a few woody species. The dominant grass species is usually blue grama. It resembles a clay loam range site except for the presence of more midgrasses such as sideoats grama, western wheatgrass, and vine mesquite. The site typifies a shortgrass/midgrass prairie.

Use and Management

Major land uses: This soil is primarily used for cropland. A few areas are used as improved pasture or rangeland.

Cropland: This soil is moderately suited to cropland. The moderate available water capacity and high carbonate content of the soil are limitations. The hazard of wind erosion is severe. The most common crops grown are cotton and grain sorghum. Other crops include wheat, sunflowers, and forage sorghum. The main concerns in management are conserving soil moisture and controlling soil erosion. Fertilizer applications, reduced tillage, high-residue cover crops, and crop residue management can help reduce the soil temperature, conserve moisture, and improve or maintain soil tilth and productivity. Terraces, contour farming, grassed waterways, and diversion terraces, where needed, can help control runoff and water erosion. Improved varieties of bermudagrass and bluestems are the major pasture grasses grown on these soils. Fertilizer applications, weed control, brush management, proper stocking rates, and controlled grazing can help conserve soil moisture and improve or maintain productivity.

Rangeland: Native plants yield moderate amounts of forage. The high carbonate content and moderate available water capacity of the soil are limitations. The hazard of wind erosion is severe. The main concerns in management are continuous overgrazing, fire suppression, invasion of woody species, and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.

Urban Development: This soil is moderately suited to most urban uses. It is very limited as a site for lawns and landscaping or use as daily cover for landfills. The moderate available water capacity and high carbonate content of the soil are major limitations which can limit plant growth necessary for healthy lawns and landscaping. Low soil strength is a major limitation for the construction of local roads and streets or use as road-fill material. Stabilizing, strengthening, or replacing the base material can overcome many of these restrictions. Pipelines, storage tanks, and other underground structures made of uncoated steel should be protected from the high corrosion potential of these soils. This can be overcome by providing cathodic protection or by using galvanized steel.

Recreational Development: This soil is moderately suited to most recreational uses. It is very limited as a site for golf course fairways. The moderate available water capacity and high carbonate content of the soil are major limitations that can restrict plant growth necessary for healthy landscaping and turf. Other recreational use is somewhat limited because of dustiness. Applications of water or special surfacing material may be needed during dry periods to prevent excessive dustiness in areas that are subject to heavy foot traffic.

Wildlife Habitat: Wind erosion is a potential hazard for grain and seed crops used for food and cover. The moderately arid conditions, which can limit plant growth necessary for good habitat, are a minor limitation.

PoB—Portales loam, 1 to 3 percent slopes

Setting

General location: Southern High Plains of western Texas and eastern New Mexico
Major land resource area: 77C—Southern High Plains, Southern Part
Landscape: Plateau
Elevation: 2,700 to 4,900 feet (823 to 1,493 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Portales and similar soils: 90 percent
Contrasting soils: 10 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Portales soil and similar soils make up 90 percent of the map unit, and contrasting soils make up 10 percent.

The soils similar to Portales are small areas of Pep and Zita soils. Included are small areas of similar soils that have a surface layer of sandy clay loam or very fine sandy loam or soils that have slopes of 3 to 5 percent.

The contrasting soils are small areas of Acuff, Arch, Estacado, Kimberson, Lenorah, and Midessa soils that occur in similar landscape positions.

Soil Description

Portales

Aspect(s): East to South
Position(s) on landform(s): Interdune; Plain; Playa slope
Parent material: Calcareous, loamy lacustrine deposits of Quaternary age

Typical Profile

A—0 to 13 inches; dark grayish brown, moderately alkaline loam; few fine masses of calcium carbonate; violently effervescent

Bk1—13 to 33 inches; grayish brown, moderately alkaline clay loam; about 8 percent calcium carbonate by volume as masses and finely disseminated carbonates; violently effervescent

Bk2—33 to 41 inches; light brownish gray, moderately alkaline loam; about 25 percent calcium carbonate by volume as masses and finely disseminated carbonates; violently effervescent

Bkk1—41 to 58 inches; light gray, moderately alkaline clay loam; about 50 percent calcium carbonate by volume as masses, nodules, and finely disseminated carbonates; violently effervescent

Bkk2—58 to 80 inches; very pale brown, moderately alkaline clay loam; about 60 percent calcium carbonate by volume as masses, nodules, and finely disseminated carbonates; violently effervescent

Properties and Qualities

Slope: 1 to 3 percent
Percent of area covered by surface fragments: About 2 percent subrounded (shape or size unspecified)
Depth to first restrictive layer: Not present
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 7.8 inches (Moderate)
Natural drainage class: Well drained
Runoff: Low
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 4e
Land capability irrigated: 3e
Ecological site name: Limy Upland PE 25-36
Ecological site number: R077CY028TX
Typical vegetation: The natural plant community for this site is dominantly shortgrass and midgrass with only a few woody species. The dominant grass species is usually blue grama. It resembles a clay loam range site except for the presence of more midgrasses such as sideoats grama, western wheatgrass, and vine mesquite. The site typifies a shortgrass/midgrass prairie.

Use and Management

Major land uses: This soil is primarily used for cropland. A few areas are used as improved pasture or rangeland.
Cropland: This soil is moderately suited to cropland. The moderate available water capacity and high carbonate content of the soil are limitations. The hazard of wind erosion is severe. The most common crops grown are cotton and grain sorghum. Other crops include wheat, sunflowers, and forage sorghum. The main concerns in management are conserving soil moisture and controlling soil erosion. Fertilizer applications, reduced tillage, high-residue cover crops, and crop residue management can help reduce the soil temperature, conserve moisture, and improve or maintain soil tilth and productivity. Terraces, contour farming, grassed waterways, and diversion terraces, where needed, can help control runoff and water erosion. Improved varieties of bermudagrass and bluestems are the major pasture grasses grown on these soils. Fertilizer applications, weed control, brush management, proper stocking rates, and controlled grazing can help conserve soil moisture and improve or maintain productivity.
Rangeland: Native plants yield moderate amounts of forage. The high carbonate content and moderate available water capacity of the soil are limitations. The hazard of wind erosion is severe. The main concerns in management are continuous overgrazing, fire suppression, invasion of woody species, and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.
Urban Development: This soil is moderately suited to most urban uses. It is very limited as a site for lawns and landscaping or use as daily cover for landfills. The moderate available water capacity and high carbonate content of the soil are major limitations which can limit plant growth necessary for healthy lawns and landscaping. Low soil strength is a major limitation for the construction of local roads and streets or use as road-fill material. Stabilizing, strengthening, or replacing the base material can overcome many of these restrictions. Pipelines, storage tanks, and other underground structures made of uncoated steel should be protected from the high corrosion potential of these soils. This can be overcome by providing cathodic protection or by using galvanized steel.
Recreational Development: This soil is moderately suited to most recreational uses. It is very limited as a site for golf course fairways. The moderate available water capacity and high carbonate content of the soil are major limitations that can restrict plant growth necessary for healthy landscaping and turf. Other recreational use is somewhat limited because of dustiness. Applications of water or special surfacing material may be needed during dry periods to prevent excessive dustiness in areas that are subject to heavy foot traffic.
Wildlife Habitat: Wind erosion is a potential hazard for grain and seed crops used for food and cover. The moderately arid conditions, which can limit plant growth necessary for good habitat, are a minor limitation.

PsA—Posey fine sandy loam, 0 to 1 percent slopes

Setting

General location: Southern High Plains of western Texas and eastern New Mexico
Major land resource area: 77C—Southern High Plains, Southern Part
Landscape: Plateau
Elevation: 2,600 to 4,600 feet (792 to 1,402 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Posey and similar soils: 85 percent
Contrasting soils: 15 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Posey soil and similar soils make up 85 percent of the map unit, and contrasting soils make up 15 percent.

The soils similar to Posey are areas of Midessa soils. Also included are small areas of Posey soils with slopes of 1 to 3 percent.

The contrasting soils are small areas of Amarillo, Arvana, Patricia, Pep, and Tokio soils that occur in similar landscape positions.

Soil Description

Posey
Aspect(s): East to South
Position(s) on landform(s): Plain
Parent material: Calcareous, loamy eolian deposits from the Blackwater Draw Formation of Pleistocene age

Typical Profile

Ap—0 to 10 inches; reddish brown, moderately alkaline fine sandy loam; few calcium carbonate nodules; violently effervescent

Btk—10 to 18 inches; reddish brown, moderately alkaline sandy clay loam; few films, filaments, and masses of calcium carbonate; violently effervescent

Btkk—18 to 39 inches; light reddish brown, moderately alkaline sandy clay loam; about 55 percent calcium carbonate by volume as masses, nodules, and finely disseminated carbonates; violently effervescent

B'tk—39 to 80 inches; reddish yellow, moderately alkaline sandy clay loam; about 20 percent calcium carbonate by volume as masses, nodules, and finely disseminated carbonates; violently effervescent

Properties and Qualities

Slope: 0 to 1 percent
Percent of area covered by surface fragments: About 2 percent subrounded (shape or size unspecified)
Depth to first restrictive layer: Not present
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic

Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 7.7 inches (Moderate)
Natural drainage class: Well drained
Runoff: Negligible
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 3e
Land capability irrigated: 2e
Ecological site name: Limy Upland PE 25-36
Ecological site number: R077CY028TX
Typical vegetation: The natural plant community is a mixture of short and midgrasses with a smaller tallgrass complement. Midgrasses tend to dominate over most of the site with sideoats grama being the most prevalent midgrass species. Blue grama is the dominant shortgrass species and little bluestem the dominant tallgrass species. There are small areas that may occur within the site where blue grama is more prevalent. Woody plants are few but include yucca, catclaw acacia, and sand sage.

Use and Management

Major land uses: This soil is primarily used for cropland. A few areas are used as improved pasture or rangeland.
Cropland: This soil is moderately suited to cropland. The moderate available water capacity and high carbonate content of the soil are limitations. The hazard of wind erosion is severe. The most common crops grown are cotton and grain sorghum. Other crops include wheat, peanuts, sunflowers, and forage sorghum. The main concerns in management are conserving soil moisture and controlling soil erosion. Fertilizer applications, reduced tillage, high-residue cover crops, and crop residue management can help reduce the soil temperature, conserve moisture, and improve or maintain soil tilth and productivity. Terraces, contour farming, grassed waterways, and diversion terraces, where needed, can help control runoff and water erosion. Improved varieties of bermudagrass and bluestems are the major pasture grasses grown on these soils. Fertilizer applications, weed control, brush management, proper stocking rates, and controlled grazing can help conserve soil moisture and improve or maintain productivity.
Rangeland: Native plants yield moderate amounts of forage. The high carbonate content and moderate available water capacity of the soil are limitations. The hazard of wind erosion is severe. The main concerns in management are continuous overgrazing, fire suppression, invasion of woody species, and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.
Urban Development: This soil is moderately suited to most urban uses. It is very limited as a site for lawns and landscaping or use as daily cover for landfills. The moderate available water capacity and high carbonate content of the soil are major limitations which can limit plant growth necessary for healthy lawns and landscaping. Low soil strength is a major limitation for the construction of local roads and streets or use as road-fill material. Stabilizing, strengthening, or replacing the base material can overcome many of these restrictions. Pipelines, storage tanks, and other underground structures made of uncoated steel should be protected from the high corrosion potential of these soils. This can be overcome by providing cathodic protection or by using galvanized steel.
Recreational Development: This soil is moderately suited to most recreational uses. It is very limited as a site for golf course fairways. The moderate available water capacity

and high carbonate content of the soil are major limitations that can restrict plant growth necessary for healthy landscaping and turf.

Wildlife Habitat: Wind erosion is a potential hazard for grain and seed crops used for food and cover. The moderately arid conditions, which can limit plant growth necessary for good habitat, are a minor limitation.

PsB—Posey fine sandy loam, 1 to 3 percent slopes

Setting

General location: Southern High Plains of western Texas and eastern New Mexico
Major land resource area: 77C—Southern High Plains, Southern Part
Landscape: Plateau
Elevation: 2,600 to 4,600 feet (792 to 1,402 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Posey and similar soils: 85 percent
Contrasting soils: 15 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Posey soil and similar soils make up 85 percent of the map unit, and contrasting soils make up 15 percent.

The soils similar to Posey are areas of Midessa soils. Also included are small areas of Posey soils with slopes of 3 to 5 percent.

The contrasting soils are small areas of Amarillo, Arvana, Patricia, Pep, and Sharvana soils that occur in similar landscape positions.

Soil Description

Posey
Aspect(s): East to South
Position(s) on landform(s): Plain; Playa slope
Parent material: Calcareous, loamy eolian deposits from the Blackwater Draw Formation of Pleistocene age

Typical Profile

Ap—0 to 9 inches; reddish brown, moderately alkaline fine sandy loam; few calcium carbonate nodules; violently effervescent

Btk—9 to 15 inches; reddish brown, moderately alkaline sandy clay loam; few films, filaments, and masses of calcium carbonate; violently effervescent

Btkk—15 to 37 inches; light reddish brown, moderately alkaline sandy clay loam; about 55 percent calcium carbonate by volume as masses, nodules, and finely disseminated carbonates; violently effervescent

B'tk—37 to 80 inches; reddish yellow, moderately alkaline sandy clay loam about 20 percent calcium carbonate by volume as masses, nodules, and finely disseminated carbonates; violently effervescent

Properties and Qualities

Slope: 1 to 3 percent
Percent of area covered by surface fragments: About 3 percent subrounded (shape or size unspecified)
Depth to first restrictive layer: Not present

Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 7.6 inches (Moderate)
Natural drainage class: Well drained
Runoff: Low
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 3e
Land capability irrigated: 3e
Ecological site name: Limy Upland PE 25-36
Ecological site number: R077CY028TX
Typical vegetation: The natural plant community is a mixture of short and midgrasses with a smaller tallgrass complement. Midgrasses tend to dominate over most of the site with sideoats grama being the most prevalent midgrass species. Blue grama is the dominant shortgrass species and little bluestem the dominant tallgrass species. There are small areas that may occur within the site where blue grama is more prevalent. Woody plants are few but include yucca, catclaw acacia, and sand sage.

Use and Management

Major land uses: This soil is primarily used for cropland. A few areas are used as improved pasture or rangeland.
Cropland: This soil is moderately suited to cropland. The moderate available water capacity and high carbonate content of the soil are limitations. The hazard of wind erosion is severe. The most common crops grown are cotton and grain sorghum. Other crops include wheat, peanuts, sunflowers, and forage sorghum. The main concerns in management are conserving soil moisture and controlling soil erosion. Fertilizer applications, reduced tillage, high-residue cover crops, and crop residue management can help reduce the soil temperature, conserve moisture, and improve or maintain soil tilth and productivity. Terraces, contour farming, grassed waterways, and diversion terraces, where needed, can help control runoff and water erosion. Improved varieties of bermudagrass and bluestems are the major pasture grasses grown on these soils. Fertilizer applications, weed control, brush management, proper stocking rates, and controlled grazing can help conserve soil moisture and improve or maintain productivity.
Rangeland: Native plants yield moderate amounts of forage. The high carbonate content and moderate available water capacity of the soil are limitations. The hazard of wind erosion is severe. The main concerns in management are continuous overgrazing, fire suppression, invasion of woody species, and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.
Urban Development: This soil is moderately suited to most urban uses. It is very limited as a site for lawns and landscaping or use as daily cover for landfills. The moderate available water capacity and high carbonate content of the soil are major limitations which can limit plant growth necessary for healthy lawns and landscaping. Low soil strength is a major limitation for the construction of local roads and streets or use as

road-fill material. Stabilizing, strengthening, or replacing the base material can overcome many of these restrictions. Pipelines, storage tanks, and other underground structures made of uncoated steel should be protected from the high corrosion potential of these soils. This can be overcome by providing cathodic protection or by using galvanized steel.

Recreational Development: This soil is moderately suited to most recreational uses. It is very limited as a site for golf course fairways. The moderate available water capacity and high carbonate content of the soil are major limitations that can restrict plant growth necessary for healthy landscaping and turf.

Wildlife Habitat: Wind erosion is a potential hazard for grain and seed crops used for food and cover. The moderately arid conditions, which can limit plant growth necessary for good habitat, are a minor limitation.

RcA—Ranco clay, 0 to 1 percent slopes, frequently ponded

Setting

General location: Southern High Plains of western Texas and eastern New Mexico
Major land resource area: 77C—Southern High Plains, Southern Part
Landscape: Plateau
Elevation: 2,600 to 4,600 feet (792 to 1,402 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Ranco and similar soils: 90 percent
Contrasting soils: 10 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Ranco soil and similar soils make up 90 percent of the map unit, and contrasting soils make up 10 percent.

The soils similar to Ranco are small areas of Lamesa and Sparenberg soils. Also included are areas of similar soils with an overburden of loamy soil material that has eroded from surrounding upland soils.

The contrasting soils are small areas of Lofton, Pep, Portales, and Seagraves soils. Lofton and Seagraves soils occur in similar landscape positions. Pep and Portales soils occur in slightly higher landscape positions.

Soil Description

Ranco
Aspect(s): East to South
Position(s) on landform(s): Circular gilgai on playa floor
Parent material: Clayey lacustrine deposits of Quaternary age

Typical Profile

A1—0 to 2 inches; very dark brown, slightly alkaline clay; slightly effervescent
A2—2 to 9 inches; very dark brown, slightly alkaline clay
Bw—9 to 25 inches; very dark gray, moderately alkaline clay
Bss1—25 to 35 inches; dark gray, moderately alkaline clay; about 2 percent nodules of calcium carbonate; strongly effervescent
Bss2—35 to 61 inches; dark gray, moderately alkaline clay; about 2 percent nodules of calcium carbonate; strongly effervescent
Bss3—61 to 80 inches; dark gray, moderately alkaline clay; about 3 percent nodules of calcium carbonate; strongly effervescent

Properties and Qualities

Slope: 0 to 1 percent
Percent of area covered by surface fragments: Unspecified
Depth to first restrictive layer: Not present
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.001 to 0.06 in/hr (Very slow)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 9.1 inches (High)
Natural drainage class: Poorly drained
Runoff: Negligible
Flooding frequency: None
Ponding frequency: Frequent
Depth to seasonal water table: Present within 80 inches

Interpretive Groups

Land capability nonirrigated: 6w
Land capability irrigated: None specified
Ecological site name: Playa PE 25-36
Ecological site number: R077CY027TX
Typical vegetation: The natural plant community of a playa is highly variable and dependent on the hydrology of the playa basin being considered. The dominance of hydrophytic plants or upland plants depends on the degree, frequency, and time of inundation. Vegetation varies according to the amount of water available during the growing season. In average years, this site is usually inundated and saturated for long periods. The natural plant community is dominantly a mixture of hydrophytic forbs, grasses, and grasslike plants. The most prevalent species on the site are creeping spikerush, Pennsylvania smartweed, saltmarsh aster, bur ragweed, curly dock, bushy knotweed, and sedges. Varying amounts of grasses are present and include knotgrass, barnyard grass, and western wheatgrass. In areas of standing water, southern cattail, soft stem bulrush, and spiked arrowhead may be present. Occasionally there will be a few willows and cottonwoods present around the periphery of the playa.

Use and Management

Major land uses: This soil is used primarily for wildlife habitat. A few areas are used as rangeland.
Cropland: This soil is poorly suited to cropland. The frequent ponding, wetness, depth to the saturated zone, and clayey texture of the soil, which can restrict root development, are major limitations.
Rangeland: Frequent ponding is a major limitation and prolonged periods of inundation decrease productivity. Large areas of bare ground are common after extended periods of ponding and require time to reestablish native vegetation. The dominant plant species on these soils yield poor quality forage for livestock use. Proper stocking rates, brush management, and controlled grazing can help improve productivity.
Urban Development: This soil is poorly suited to urban uses. It is very limited as a site for sanitary facilities and building site development. The depth to a saturated zone, frequent ponding, high clay content, restricted permeability, high shrink-swell potential, and low strength are major limitations. Overcoming these limitations is

difficult and costly. Pipelines, storage tanks, and other underground structures made of uncoated steel should be protected from the high corrosion potential of these soils. This can be overcome by providing cathodic protection or by using galvanized steel. Under certain conditions, trench sidewalls can become highly unstable in this soil. Trenches that have been excavated to more than a depth of 5 feet should be shored or the sidewall should be graded to an angle that ensures safe working conditions.

Recreational Development: This soil is poorly suited to recreational uses. The depth to a saturated zone, frequent ponding, and high clay content of the soil is very limiting.

Wildlife Habitat: The clayey surface texture, shallow water table, and frequent ponding are major limitations that affect plant growth necessary for good habitat. Dove, pheasant, and quail make limited use of this habitat for food and cover. When ponded, these soils are preferred sites for waterfowl, such as ducks and geese that use these areas for food, water, and cover.

SgA—Seagraves fine sandy loam, 0 to 1 percent slopes

Setting

General location: Southern High Plains of western Texas and eastern New Mexico
Major land resource area: 77C—Southern High Plains, Southern Part
Landscape: Plateau
Elevation: 2,600 to 4,600 feet (792 to 1,402 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Seagraves and similar soils: 90 percent
Contrasting soils: 10 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Seagraves soil and similar soils make up 90 percent of the map unit, and contrasting soils make up 10 percent.

The soils similar to Seagraves are small areas of Amarillo, Lamesa, and Tokio soils.

The contrasting soils are small areas of Acuff, Midessa, Patricia, Portales, Ranco, and Sparenberg soils. The Acuff, Midessa, Patricia, and Portales soils occur in slightly higher landscape positions. Ranco and Sparenberg soils occur in similar landscape positions.

Soil Description

Seagraves
Aspect(s): East to South
Position(s) on landform(s): Playa floor
Parent material: Recent sandy eolian deposits over loamy lacustrine deposits of Holocene and Pleistocene age

Typical Profile

Ap—0 to 25 inches; light brown, slightly alkaline fine sandy loam
Ab—25 to 39 inches; brown, slightly alkaline loamy fine sand
Btb1—39 to 47 inches; brown, slightly alkaline sandy clay loam
Btb2—47 to 57 inches; brown, slightly alkaline sandy clay loam
Btkb1—57 to 67 inches; light brownish gray, moderately alkaline sandy clay loam; about 20 percent masses and nodules of calcium carbonate; violently effervescent
Btkb2—67 to 80 inches; light brownish gray, moderately alkaline clay; about 25 percent masses and nodules of calcium carbonate; violently effervescent

Properties and Qualities

Slope: 0 to 1 percent
Percent of area covered by surface fragments: Unspecified
Depth to first restrictive layer: Not present
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 7.5 inches (Moderate)
Natural drainage class: Somewhat poorly drained
Runoff: Negligible
Flooding frequency: None
Ponding frequency: Occasional
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 4e
Land capability irrigated: 3e
Ecological site name: Sandy Loam PE 25-36
Ecological site number: R077CY036TX
Typical vegetation: The natural plant community is a mixture of short and midgrasses with a smaller tallgrass complement. Midgrasses tend to dominate over most of the site with sideoats grama being the most prevalent midgrass species. Blue grama is the dominant shortgrass species and little bluestem the dominant tallgrass species. There are small areas that may occur within the site where blue grama is more prevalent. Woody plants include yucca, catclaw acacia, and sand sage.

Use and Management

Major land uses: This soil is used mainly as cropland and habitat for wildlife. Some areas are used as rangeland.
Cropland: This soil is moderately suited to cropland. The moderate available water capacity and occasional ponding are limitations. The hazard of wind erosion is severe. The most common crops grown are cotton and grain sorghum. Other crops include wheat, sunflowers, and forage sorghum. The main concerns in management are conserving soil moisture and controlling soil erosion. Fertilizer applications, reduced tillage, high-residue cover crops, and crop residue management can help reduce the soil temperature, conserve moisture, and improve or maintain soil tilth and productivity. Terraces, contour farming, grassed waterways, and diversion terraces, where needed, can help control runoff and water erosion. Improved varieties of bermudagrass and bluestems are the major pasture grasses grown on these soils. Fertilizer applications, weed control, brush management, proper stocking rates, and controlled grazing can help conserve soil moisture and improve or maintain productivity.
Rangeland: Native plants yield high amounts of forage. The hazard of wind erosion is severe. The main concerns in management are continuous overgrazing, fire suppression, invasion of woody species, and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.
Urban Development: This soil is poorly suited to urban uses. It is very limited as a site for sanitary facilities and building site development. The restricted permeability, seepage,

and occasional ponding are major limitations. Overcoming many of these limitations is difficult and costly. Under certain conditions, trench sidewalls can become highly unstable in this soil. Trenches that have been excavated to more than a depth of 5 feet should be shored or the sidewall should be graded to an angle that ensures safe working conditions.

Recreational Development: This soil is poorly suited to most recreational uses. Occasional ponding is very limiting. The season, frequency, and duration of ponding should be considered in planning recreational areas.

Wildlife Habitat: Wind erosion is a potential hazard for grain and seed crops used for food and cover. The moderately arid conditions, which can limit plant growth necessary for good habitat, are a minor limitation.

ShB—Sharvana fine sandy loam, 0 to 3 percent slopes

Setting

General location: Southern High Plains of western Texas and eastern New Mexico
Major land resource area: 77C—Southern High Plains, Southern Part
Landscape: Plateau
Elevation: 2,600 to 4,600 feet (792 to 1,402 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Sharvana and similar soils: 85 percent
Contrasting soils: 15 percent

Based on field observations of the map unit during the survey, the best estimate is that the Sharvana soil and similar soils make up 85 percent of the map unit, and contrasting soils make up 15 percent.

The soils similar to Sharvana are small areas of Arvana, Kimberson, and Potter soils. Also included are small areas of Sharvana soils that have a surface layer of loamy fine sand. The contrasting soils are small areas of Amarillo, Acuff, Patricia, Pep, Posey, and Tokio soils that occur in similar landscape positions.

Soil Description

Sharvana
Aspect(s): East to South
Position(s) on landform(s): Plain
Parent material: Calcareous, loamy eolian deposits from the Blackwater Draw Formation of Pleistocene age

Typical Profile

A—0 to 6 inches; brown, neutral fine sandy loam

Bt—6 to 16 inches; dark reddish brown, slightly alkaline sandy clay loam

Bkkm—16 to 36 inches; pink indurated platy caliche that is laminar in the upper 2 inches; undersides of plates have small pendants of calcium carbonate; violently effervescent

Bkk—36 to 80 inches; pink, moderately alkaline extremely gravelly sandy loam; about 62 percent by volume gravel size calcium carbonate nodules that are strongly cemented; about 75 percent calcium carbonate by total volume as masses, nodules, and finely disseminated carbonates; violently effervescent

Properties and Qualities

Slope: 0 to 3 percent
Percent of area covered by surface fragments: About 6 percent subrounded (shape or size unspecified), about 5 percent angular channers
Depth to first restrictive layer: Petrocalcic horizon at 16 inches
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: 0.001 to 0.06 in/hr (Very slow)
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 2.1 inches (Very low)
Natural drainage class: Well drained
Runoff: High
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 6s
Land capability irrigated: 4s
Ecological site name: Very Shallow PE 25-36
Ecological site number: R077CY037TX
Typical vegetation: The natural plant community is a mixture of short and midgrasses. A moderate amount of forbs and shrubs are also present. Major grass species are sideoats grama, little bluestem, hairy grama, blue grama, slim tridens, and buffalograss. The major forbs include black samson, dotted gayfeather, catclaw sensitivebriar, and annual forbs. Yucca, catclaw acacia, ephedra, skunkbush, and feather dalea are the major woody species.

Use and Management

Major land uses: This soil is used primarily as rangeland and habitat for wildlife. This soil is not used extensively as cropland or improved pasture.
Cropland: This soil is poorly suited to cropland. The shallow rooting depth, very low available water capacity, droughtiness, and high runoff are severe limitations. The hazard of wind erosion is severe. The most common crops grown are wheat and forage sorghum. Other crops include cotton and grain sorghum. The main concerns in management are conserving soil moisture and controlling soil erosion. Fertilizer applications, reduced tillage, high-residue cover crops, and crop residue management can help reduce the soil temperature, conserve moisture, and improve or maintain soil tilth and productivity. Terraces, contour farming, grassed waterways, and diversion terraces, where needed, can help control runoff and water erosion. Improved varieties of bermudagrass and bluestems are the major pasture grasses grown on these soils. Fertilizer applications, weed control, brush management, proper stocking rates, and controlled grazing can help conserve soil moisture and improve or maintain productivity.
Rangeland: Native plants yield low amounts of forage. The depth to a cemented pan, very low available water capacity, and high runoff are major limitations. The hazard of wind erosion is severe. The main concerns in management are continuous overgrazing, fire suppression, invasion of woody species, and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.

Urban Development: This soil is poorly suited to urban uses. It is very limited as a site for sanitary facilities and building site development. The depth to a cemented pan, carbonate content, and droughtiness are major limitations. Overcoming many of these limitations is difficult and costly.
Recreational Development: This soil is poorly suited to recreational uses. The shallow rooting depth, carbonate content, and very low available water capacity of the soil are very limiting.
Wildlife Habitat: The shallow rooting depth, very low available water capacity, and arid conditions are major limitations that restrict plant growth necessary for good habitat. The potential for wind and water erosion is severe.

SL—Water, intermittent, salt lake

Setting

General location: Southern High Plains, Breaks of western Texas and eastern New Mexico
Major land resource area: 77E—Southern High Plains, Breaks
Landscape: Plateau
Elevation: 2,700 to 3,300 feet (823 to 1,006 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Water, intermittent, salt lake and similar soils: 100 percent

Composition is based on observations, descriptions, and or transects of the map unit

Soil Description

Water, intermittent, salt lake
Aspect(s): East to South
Position(s) on landform(s): Pluvial lake (relict) on basin floor
Parent material: Calcareous, loamy lacustrine deposits

Properties and Qualities

Slope: 0 to 1 percent
Percent of area covered by surface fragments: Unspecified
Depth to first restrictive layer: Not present
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.2 to 0.6 in/hr (Moderately slow)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Saline
Salinity, maximum within 40 inches: Saline
Sodicity, representative within 40 inches: Sodic
Sodicity, maximum within 40 inches: Sodic
Representative total available water capacity to 60 inches: About 2.4 inches (Very low)
Natural drainage class: Very poorly drained
Runoff: Negligible
Flooding frequency: Not flooded
Ponding frequency: Frequent
Depth to seasonal water table: Present within 80 inches

Interpretive Groups

Land capability nonirrigated: 7w
Land capability irrigated: None specified
Ecological site name: Not specified
Ecological site number: Not specified
Typical vegetation: Barren land

Use and Management

Major land uses: This map unit is occasionally used by migratory waterfowl and other transient wildlife that water here following rainy periods or for cover; however, since there is little or no vegetation, this use is very limited. These areas are severely limited for other uses.
Cropland: These areas are poorly suited to cropland. The frequent ponding, depth to a saturated zone, high salinity, and high sodium content are major limitations. The hazard of erosion is severe.
Rangeland: Frequent and prolonged ponding, depth to a saturated zone, very high sodium, and very high salinity are major limitations. Dominantly the ground is bare and does not support plant growth. The hazard of wind erosion is severe.
Urban Development: These areas are poorly suited to urban uses. They are very limited as a site for sanitary facilities or building site development. The depth to a saturated zone, frequent ponding, high shrink-swell, low strength, restricted permeability, high sodium, and high salinity are major limitations. Pipelines, storage tanks, and other underground structures made of uncoated steel should be protected from the high corrosion potential of these areas. This can be overcome by providing cathodic protection or by using galvanized steel.
Recreational Development: These areas are poorly suited to recreational uses. The depth to a saturated zone, frequent ponding, high sodium content, clay content, and salinity are very limiting.
Wildlife Habitat: The shallow water table, frequent ponding, very high salinity, and very high sodium content are major limitations. These areas do not support plant growth and are barren. Migratory wildlife, such as sandhill crane, make limited use of these areas for water and cover.

SpA—Sparenberg clay, 0 to 1 percent slopes, occasionally ponded

Setting

General location: Southern High Plains of western Texas and eastern New Mexico
Major land resource area: 77C—Southern High Plains, Southern Part
Landscape: Plateau
Elevation: 2,600 to 4,600 feet (792 to 1402 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Sparenberg and similar soils: 90 percent
Contrasting soils: 10 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Sparenberg soil and similar soils make up 90 percent of the map unit, and contrasting soils make up 10 percent.
The soils similar to Sparenberg are small areas of Lamesa and Ranco soils.

Also included are soils that are shallow to a calcic horizon or that have an overburden of loamy soil material that has eroded from surrounding upland soils.

The contrasting soils are small areas of Arch, Lofton, Pep, Portales, Seagraves, and Zita soils. Seagraves soils occur in similar landscape positions. Arch, Lofton, Pep, Portales, and Zita soils occur in slightly higher landscape positions.

Soil Description

Sparenberg
Aspect(s): East to South
Position(s) on landform(s): Circular gilgai on playa floor
Parent material: Clayey lacustrine deposits of Quaternary age

Typical Profile

Ap—0 to 4 inches; dark grayish brown, moderately alkaline clay
Bw—4 to 10 inches; dark gray, moderately alkaline clay
Bss1—10 to 17 inches; dark gray, moderately alkaline clay
Bss2—17 to 47 inches; dark gray, moderately alkaline clay
Bss3—47 to 61 inches; gray, moderately alkaline clay
Bkss—61 to 80 inches; grayish brown, moderately alkaline clay; about 5 percent masses and nodules of calcium carbonate; slightly effervescent

Properties and Qualities

Slope: 0 to 1 percent
Percent of area covered by surface fragments: Unspecified
Depth to first restrictive layer: Not present
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.001 to 0.06 in/hr (Very slow)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 9.1 inches (High)
Natural drainage class: Somewhat poorly drained
Runoff: Negligible
Flooding frequency: None
Ponding frequency: Occasional
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 4w
Land capability irrigated: None specified
Ecological site name: Playa PE 25-36
Ecological site number: R077CY027TX
Typical vegetation: The natural plant community of a playa is highly variable and dependent on the hydrology of the playa basin being considered. The dominance of hydrophytic plants or upland plants depends on the degree, frequency, and time of inundation. Vegetation varies according to the amount of water available during the growing season. In average years, the dominant plant community for this site is a mixture of upland grasses and forbs with highly variable amounts of hydrophytic plants present. Very few shrubs or woody plants occur on this site. The most common plants are western wheatgrass, vine mesquite, barnyard grass, buffalograss, bur

ragweed, saltmarsh aster, sedges, coreopsis, lambs quarters, cocklebur, curly dock, Pennsylvania smartweed, and common spikerush.

Use and Management

Major land uses: This soil is used primarily as rangeland and habitat for wildlife. This soil is not used extensively as cropland.

Cropland: This soil is moderately suited to cropland. The clayey texture of the soil, which can restrict root development, and occasional ponding are limitations. The most common crops grown are cotton and grain sorghum. Other crops include wheat and forage sorghum. The main concerns in management are conserving soil moisture and controlling soil erosion. Fertilizer applications, reduced tillage, high-residue cover crops, and crop residue management can help reduce the soil temperature, conserve moisture, and improve or maintain soil tilth and productivity. Terraces, contour farming, grassed waterways, and diversion terraces, where needed, can help control runoff and water erosion. Improved varieties of bermudagrass and bluestems are the major pasture grasses grown on these soils. Fertilizer applications, weed control, brush management, proper stocking rates, and controlled grazing can help conserve soil moisture and improve or maintain productivity.

Rangeland: High yields of forage can be obtained during favorable years. Occasional ponding and the high clay content of the soil are limitations that can restrict plant growth. Other concerns in management are continuous overgrazing, fire suppression, invasion of woody species, and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.

Urban Development: This soil is poorly suited to urban uses. It is very limited as a site for sanitary facilities and building site development. Occasional ponding, high clay content, restricted permeability, high shrink-swell potential, and low strength are major limitations. Overcoming many of these limitations is difficult and costly. Pipelines, storage tanks, and other underground structures made of uncoated steel should be protected from the high corrosion potential of these soils. This can be overcome by providing cathodic protection or by using galvanized steel. Under certain conditions, trench sidewalls can become highly unstable in this soil. Trenches that have been excavated to more than a depth of 5 feet should be shored or the sidewall should be graded to an angle that ensures safe working conditions.

Recreational Development: This soil is poorly suited to recreational uses. The high clay content of the soil and occasional ponding are very limiting.

Wildlife Habitat: The clayey surface texture is a major limitation that affects plant growth necessary for good habitat. Occasional ponding is a minor limitation. Waterfowl, such as ducks and geese, make limited use of this habitat for food and cover.

TkA—Tokio fine sandy loam, 0 to 1 percent slopes

Setting

General location: Southern High Plains of western Texas and eastern New Mexico
Major land resource area: 77C—Southern High Plains, Southern Part
Landscape: Plateau
Elevation: 2,700 to 4,300 feet (823 to 1,311 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Tokio and similar soils: 90 percent
Contrasting soils: 10 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Tokio soil and similar soils make up 90 percent of the map unit, and contrasting soils make up 10 percent.

The soils similar to Tokio are small areas of Amarillo and Seagraves soils. Also included are small areas of Tokio soils that have a loamy fine sand surface layer or slopes of 1 to 3 percent.

The contrasting soils are small areas of Arvana, Lamesa, Lenorah, Midessa, Patricia, Posey, and Zita soils. The Arvana, Midessa, Patricia, and Posey soils occur in higher landscape positions. Lenorah and Zita soils occur in similar landscape positions. Lamesa soils occur in lower landscape positions.

Soil Description

Tokio
Aspect(s): East to South
Position(s) on landform(s): Plain
Parent material: Loamy lacustrine and eolian deposits of Quaternary age

Typical Profile

Ap—0 to 12 inches; light brown, moderately alkaline fine sandy loam
Ab—12 to 24 inches; brown, moderately alkaline fine sandy loam
Btb—24 to 34 inches; pale brown, moderately alkaline sandy clay loam
Btkb—34 to 57 inches; light gray, moderately alkaline clay loam; about 30 percent calcium carbonate by volume in the form of masses; 37 percent calcium carbonate equivalent; violently effervescent
2Bkb1—57 to 71 inches; very pale brown, strongly alkaline fine sandy loam; about 8 percent calcium carbonate by volume in the form of masses and nodules; violently effervescent
2Bkb2—71 to 80 inches; light gray, strongly alkaline clay loam; about 10 percent calcium carbonate by volume in the form of masses; violently effervescent

Properties and Qualities

Slope: 0 to 1 percent
Percent of area covered by surface fragments: Unspecified
Depth to first restrictive layer: Not present
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 8.8 inches (Moderate)
Natural drainage class: Well drained
Runoff: Negligible
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 3e
Land capability irrigated: 2e
Ecological site name: Sandy Loam PE 25-36
Ecological site number: R077CY036TX
Typical vegetation: The natural plant community is a mixture of short and midgrasses with a smaller tallgrass complement. Midgrasses tend to dominate over most of the site with sideoats grama being the most prevalent midgrass species. Blue grama is the dominant shortgrass species and little bluestem the dominant tallgrass species. There are small areas that may occur within the site where blue grama is more prevalent. Woody plants are few but include yucca, catclaw acacia, and sand sage.

Use and Management

Major land uses: This soil is used extensively for cropland. A few small areas are used as improved pasture or rangeland.
Cropland: This soil is well suited to cropland. The moderate available water capacity is a limitation. The hazard of wind erosion is severe. The most common crops grown are cotton and grain sorghum. Other crops include peanuts, wheat, sunflowers, and forage sorghum. The main concerns in management are conserving soil moisture and controlling soil erosion. Fertilizer applications, reduced tillage, high-residue cover crops, and crop residue management can help reduce the soil temperature, conserve moisture, and improve or maintain soil tilth and productivity. Terraces, contour farming, grassed waterways, and diversion terraces, where needed, can help control runoff and water erosion. Improved varieties of bermudagrass and bluestems are the major pasture grasses grown on these soils. Fertilizer applications, weed control, brush management, proper stocking rates, and controlled grazing can help conserve soil moisture and improve or maintain productivity.
Rangeland: Native plants yield high amounts of forage. The moderate available water capacity of the soil is a minor limitation. The hazard of wind erosion is severe. The main concerns in management are continuous overgrazing, fire suppression, invasion of woody species, and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.
Urban Development: This soil is well suited to most urban uses. It is very limited as a site for sewage lagoons and area sanitary landfills. The hazard of seepage, which can contaminate aquifers, wells, and streams are major limitations. Lining the floor and sides of the sewage lagoon or sanitary landfill with relatively impervious material can minimize the potential for contamination.
Recreational Development: This soil is well suited to recreational uses.
Wildlife Habitat: Wind erosion is a potential hazard for grain and seed crops used for food and cover. The moderately arid conditions, which can limit plant growth necessary for good habitat, are a minor limitation.

TkB—Tokio loamy fine sand, 0 to 2 percent slopes

Setting

General location: Southern High Plains of western Texas and eastern New Mexico
Major land resource area: 77C—Southern High Plains, Southern Part
Landscape: Plateau
Elevation: 2,700 to 4,300 feet (823 to 1,311 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Tokio and similar soils: 90 percent
Contrasting soils: 10 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Tokio soil and similar soils make up 90 percent of the map unit, and contrasting soils make up 10 percent.

The soils similar to Tokio are small areas of Amarillo, Patricia, and Seagraves soils. Also included are small areas of Tokio soils that have a fine sandy loam surface layer.

The contrasting soils are small areas of Arvana, Hindman, Lamesa, and Midessa soils. The Arvana and Midessa soils occur in higher landscape positions. Hindman soils occur in similar landscape positions. Lamesa soils occur in lower landscape positions.

Soil Description

Tokio
Aspect(s): East to South
Position(s) on landform(s): Plain
Parent material: Loamy lacustrine and eolian deposits of Quaternary age

Typical Profile

Ap—0 to 11 inches; light brown, moderately alkaline loamy fine sand

Ab—11 to 26 inches; brown, moderately alkaline fine sandy loam

Btb—26 to 35 inches; pale brown, moderately alkaline sandy clay loam

Btkb—35 to 57 inches; light gray, moderately alkaline clay loam; about 30 percent calcium carbonate by volume in the form of masses; violently effervescent

2Bkb1—57 to 71 inches; very pale brown, strongly alkaline fine sandy loam; about 8 percent calcium carbonate by volume in the form of masses and nodules; violently effervescent

2Bkb2—71 to 80 inches; light gray, strongly alkaline sandy clay loam; about 10 percent calcium carbonate by volume in the form of masses; 21 percent calcium carbonate equivalent; violently effervescent

Properties and Qualities

Slope: 0 to 2 percent
Percent of area covered by surface fragments: Unspecified
Depth to first restrictive layer: Not present
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 8.1 inches (Moderate)
Natural drainage class: Well drained
Runoff: Very low
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 4e
Land capability irrigated: 3e

Ecological site name: Sandy PE 25-36
Ecological site number: R077CY035TX
Typical vegetation: This is a tallgrass climax site. Nearly half of the grass component is composed of tallgrasses such as little bluestem, sand bluestem, spike dropseed, and giant dropseed. The remainder is composed of mid and shortgrasses such as sideoats grama, sand dropseed, hooded windmillgrass, sand lovegrass, sand paspalum, fall witchgrass, hairy grama, needle and thread, and perennial threeawn. Sand sage, shinoak, and skunkbush make up the woody species.

Use and Management

Major land uses: This soil is primarily used for cropland. A few small areas are used as improved pasture or rangeland.
Cropland: This soil is moderately suited to cropland. The moderate available water capacity and droughtiness of the soil are limitations. The hazard of wind erosion is severe. The most common crops grown are cotton, grain sorghum, and peanuts. Other crops include wheat, sunflowers, and forage sorghum. The main concerns in management are conserving soil moisture and controlling soil erosion. Fertilizer applications, reduced tillage, high-residue cover crops, and crop residue management can help reduce the soil temperature, conserve moisture, and improve or maintain soil tilth and productivity. Terraces, contour farming, grassed waterways, and diversion terraces, where needed, can help control runoff and water erosion. Improved varieties of bermudagrass and bluestems are the major pasture grasses grown on these soils. Fertilizer applications, weed control, brush management, proper stocking rates, and controlled grazing can help conserve soil moisture and improve or maintain productivity.
Rangeland: Native plants yield moderate to high amounts of forage. Droughtiness and moderate available water capacity of the soil are limitations. The hazard of wind erosion is severe. The main concerns in management are continuous overgrazing, fire suppression, invasion of woody species, and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.
Urban Development: This soil is well suited to most urban uses. It is very limited as a site for sewage lagoons and area sanitary landfills. The hazard of seepage, which can contaminate aquifers, wells, and streams are major limitations. Lining the floor and sides of the sewage lagoon or sanitary landfill with relatively impervious material can minimize the potential for contamination.
Recreational Development: This soil is moderately suited to recreational uses. The moderate available water capacity and high sand content of the soil are minor limitations.
Wildlife Habitat: Wind erosion is a potential hazard for grain and seed crops used for food and cover. The moderately arid conditions, which can limit plant growth necessary for good habitat, are a minor limitation.

W—Water

A small, natural or constructed lake, pond, or pit that contains water most of the year. It is typically 5 to 40 acres in size and used mainly for livestock water, migratory waterfowl, and other wildlife.

YRG—Yellowhouse soils and Rock outcrop, 3 to 45 percent slopes

Setting

General location: Southern High Plains Breaks of western Texas
Major land resource area: 77E—Southern High Plains, Breaks
Landscape: Breaks
Elevation: 2,600 to 4,600 feet (792 to 1,402 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Yellowhouse and similar soils: 75 percent
Rock outcrop and similar soils: 10 percent
Contrasting soils: 15 percent

Based on transect data and other field observations of the map unit during the survey, the best estimate is that the Yellowhouse soil and similar soils make up 75 percent of the map unit. Rock outcrop makes up 10 percent of the map unit, and the contrasting soils make up 15 percent.

The soils similar to Yellowhouse are small areas of Potter soils on slightly higher landscape positions. Also included are similar soils that have a paralithic contact at depths less than 20 inches.

The contrasting soils are small areas of Berda, Creta, Mobeetie, and Veal soils. Mobeetie, Berda, and Veal soils occur on slightly higher landscape positions. The Creta soils occur in slightly lower landscape positions.

Soil Description

Yellowhouse
Aspect(s): East to South
Position(s) on landform(s): Backslope on valley side; Footslope on escarpment; Backslope on valley side
Parent material: Calcareous, loamy colluvium from the Ogallala Formation of Miocene-Pliocene age over residuum weathered from limestone, sandstone, and shale of Cretaceous age

Typical Profile

A—0 to 5 inches; pale yellow, moderately alkaline gravelly clay loam; about 25 percent 1 to 2 inches in diameter fragments of moderately cemented calcium carbonate and limestone; violently effervescent

Bw1—5 to 10 inches; pale yellow, moderately alkaline clay loam; about 14 percent 1 to 2 inches in diameter fragments of moderately cemented calcium carbonate and limestone violently effervescent

Bw2—10 to 17 inches; light yellowish brown, strongly alkaline clay; about 9 percent 1 to 2 inches in diameter fragments of moderately cemented calcium carbonate and limestone; violently effervescent

Bw3—17 to 22 inches; light yellowish brown, strongly alkaline gravelly clay; about 18 percent 1 to 2 inches in diameter fragments of moderately cemented calcium carbonate and limestone; violently effervescent

BC—22 to 27 inches; light yellowish brown, moderately alkaline gravelly clay; about 23 percent 1 to 2 inches in diameter fragments of moderately cemented calcium carbonate and limestone; violently effervescent

Cr—27 to 80 inches; light brownish gray, moderately alkaline soft, interbedded siltstone and shale bedrock; slightly saline; slightly effervescent

Properties and Qualities

Slope: 3 to 45 percent
Percent of area covered by surface fragments: About 8 percent (shape or size unspecified), about 10 percent subrounded (shape or size unspecified), about 1 percent subrounded (shape or size unspecified)
Depth to first restrictive layer: Paralithic bedrock at 20 to 40 inches
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.06 to 0.2 in/hr (Slow)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: 0.001 to 0.06 in/hr (Very slow)
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Sodic
Representative total available water capacity to 60 inches: About 3.2 inches (Low)
Natural drainage class: Well drained
Runoff: 3 to 5 percent slopes, medium; 5 to 20 percent slopes, high; 20 to 45 percent slopes, very high
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 7s
Land capability irrigated: None specified
Ecological site name: Very Shallow PE 25-36
Ecological site number: R077EY068TX
Typical vegetation: The natural plant community is a mixture of short and midgrasses with a few tallgrasses. A moderate amount of forbs and shrubs are also present. Major grass species are sideoats grama, little bluestem, hairy grama, blue grama, slim tridens, and buffalograss. The major forbs include black samson, dotted gayfeather, catclaw sensitivebriar, and annual forbs. Yucca, catclaw acacia, ephedra, skunkbush, and feather dalea are the major woody species.

Rock outcrop
Aspect(s): East to South
Position(s) on landform(s): Backslope on escarpment; Footslope on valley side; Shoulder on escarpment
Parent material: Limestone (dominantly) and sandstone

Properties and Qualities

Slope: 8 to 45 percent
Percent of area covered by surface fragments: Unspecified
Depth to first restrictive layer: Lithic bedrock at 0 inches
Slowest permeability to 60 inches, within and below first cemented restrictive layer: 0.0 to 0.001 in/hr (Almost impermeable)
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 0.0 inches (Very low)
Runoff: Very high

Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 8s
Land capability irrigated: None specified
Ecological site name: Not specified
Ecological site number: Not specified
Typical vegetation: Barren land

Use and Management

Major land uses: This soil is used primarily for wildlife habitat. A few areas are used as rangeland.
Cropland: This soil is not used as cropland. The steep slope, very high runoff, low available water capacity, and gravel content of the soil are major limitations.
Rangeland: Native plants yield low amounts of forage. The steep slope, depth to bedrock, very high runoff, and low available water capacity of the soil are major limitations. The main concerns in management are continuous overgrazing, fire suppression, invasion of woody species, and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.
Urban Development: This soil is poorly suited to urban uses. It is very limited as a site for sanitary facilities and building site development. The depth to bedrock, steep slope, shrink-swell potential, restricted permeability, low soil strength, gravel, and carbonate content are major limitations. Pipelines, storage tanks, and other underground structures made of uncoated steel should be protected from the high corrosion potential of these soils. This can be overcome by providing cathodic protection or by using galvanized steel. Under certain conditions, trench sidewalls can become highly unstable in this soil. Trenches that have been excavated to more than a depth of 5 feet should be shored or the sidewall should be graded to an angle that ensures safe working conditions.
Recreational Development: This soil is poorly suited to recreational uses. The steep slope, gravel content, and carbonate content of the soil are major limitations.
Wildlife Habitat: The low available water capacity and slow percolation are major limitations that restrict plant growth necessary for good habitat. The potential for water erosion is severe.

ZfA—Zita fine sandy loam, 0 to 1 percent slopes

Setting

General location: Southern High Plains of western Texas and eastern New Mexico
Major land resource area: 77C—Southern High Plains, Southern Part
Landscape: Plateau
Elevation: 2,700 to 4,700 feet (823 to 1,433 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Zita and similar soils: 90 percent
Contrasting soils: 10 percent

Based on field observations of the map unit during the survey, the best estimate is that the Zita soil and similar soils make up 90 percent of the map unit, and contrasting soils make up 10 percent.

The soils similar to Zita are small areas of Pep and Portales soils. Also included are small areas of similar soils that have a surface layer of sandy clay loam (these were green when I got this, is something in question here?) or slopes of 2 to 3 percent.

The contrasting soils are small areas of Acuff, Amarillo, Arvana (same question as above), Estacado, Lofton, Midessa, and Tokio soils.

Soil Description

Zita

Aspect(s): East to South

Position(s) on landform(s): Plain

Parent material: Calcareous, loamy eolian deposits from the Blackwater Draw Formation of Pleistocene age

Typical Profile

Ap—0 to 7 inches; dark grayish brown, slightly alkaline fine sandy loam

A—7 to 18 inches; dark grayish brown, moderately alkaline loam

Bw—18 to 24 inches; light brownish gray, moderately alkaline clay loam; less than 2 percent calcium carbonate by volume as nodules; strongly effervescent

Bkk1—24 to 35 inches; white, moderately alkaline clay loam; about 50 percent calcium carbonate by volume in the form of masses, nodules, and finely disseminated carbonates; violently effervescent

Bkk2—35 to 80 inches; very pale brown, moderately alkaline clay loam; about 60 percent calcium carbonate by volume in the form of masses, nodules, and finely disseminated carbonates; violently effervescent

Properties and Qualities

Slope: 0 to 1 percent

Percent of area covered by surface fragments: Unspecified

Depth to first restrictive layer: Not present

Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)

Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer

Salinity, representative within 40 inches: Not saline

Salinity, maximum within 40 inches: Not saline

Sodicity, representative within 40 inches: Not sodic

Sodicity, maximum within 40 inches: Not sodic

Representative total available water capacity to 60 inches: About 8.1 inches (Moderate)

Natural drainage class: Well drained

Runoff: Negligible

Flooding frequency: None

Ponding frequency: None

Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 3e

Land capability irrigated: 2e

Ecological site name: Sandy Loam PE 25-36

Ecological site number: R077CY036TX

Typical vegetation: The natural plant community is a mixture of short and midgrasses with a smaller tallgrass complement. Midgrasses tend to dominate over most of the site with sideoats grama being the most prevalent midgrass species. Blue grama is the dominant shortgrass species and little bluestem the dominant tallgrass species. There are small areas that may occur within the site where blue grama is more prevalent. Woody plants are few but include yucca, catclaw acacia, and sand sage.

Use and Management

Major land uses: This soil is primarily used for cropland. A few areas are used as improved pasture or rangeland.

Cropland: This soil is well suited to cropland. The moderate available water capacity of the soil is a minor limitation. The most common crops grown are cotton and grain sorghum. Other crops include wheat, sunflowers, and forage sorghum. The main concerns in management are conserving soil moisture and controlling soil erosion. Fertilizer applications, reduced tillage, high-residue cover crops, and crop residue management can help reduce the soil temperature, conserve moisture, and improve or maintain soil tilth and productivity. Terraces, contour farming, grassed waterways, and diversion terraces, where needed, can help control runoff and water erosion. Improved varieties of bermudagrass and bluestems are the major pasture grasses grown on these soils. Fertilizer applications, weed control, brush management, proper stocking rates, and controlled grazing can help conserve soil moisture and improve or maintain productivity.

Rangeland: Native plants yield high amounts of forage. The moderate available water capacity of the soil is a minor limitation. The hazard of wind erosion is severe. The main concerns in management are continuous overgrazing, fire suppression, invasion of woody species, and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.

Urban Development: This soil is moderately suited to urban uses. It is very limited as a site for the construction of roads and streets, lawns and landscaping, or use as road-fill material and daily cover for landfills. The low soil strength and high carbonate content are major limitations. Because of low soil strength, special treatment is necessary to increase the stability of road sub-grades. Pipelines, storage tanks, and other underground structures made of uncoated steel should be protected from the high corrosion potential of these soils. This can be overcome by providing cathodic protection or by using galvanized steel.

Recreational Development: This soil is moderately suited to most recreational uses. It is very limited as a site for golf course fairways. The high carbonate content of the soil is a major limitation.

Wildlife Habitat: The moderately arid conditions, which can limit plant growth necessary for good habitat, are a minor limitation.

ZfB—Zita fine sandy loam, 1 to 3 percent slopes

Setting

General location: Southern High Plains of western Texas and eastern New Mexico
Major land resource area: 77C—Southern High Plains, Southern Part
Landscape: Plateau
Elevation: 2,700 to 4,700 feet (823 to 1,433 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Zita and similar soils: 90 percent
Contrasting soils: 10 percent

Based on field observations of the map unit during the survey, the best estimate is that the Zita soil and similar soils make up 90 percent of the map unit, and contrasting soils make up 10 percent.

The soils similar to Zita are small areas of Pep and Portales soils. Also included are small areas of similar soils that have a surface layer of sandy clay loam or slopes of 4 to 5 percent.

The contrasting soils are small areas of Acuff, Amarillo, Arvana, Estacado, Midessa, and Tokio soils.

Soil Description

Zita

Aspect(s): East to South

Position(s) on landform(s): Plain

Parent material: Calcareous, loamy eolian deposits from the Blackwater Draw Formation of Pleistocene age

Typical Profile

Ap—0 to 6 inches; dark grayish brown, slightly alkaline fine sandy loam

A—6 to 17 inches; dark grayish brown, moderately alkaline loam

Bw—17 to 23 inches; brownish gray, moderately alkaline clay loam; less than 2 percent calcium carbonate by volume as nodules; strongly effervescent

Bkk1—23 to 34 inches; white, moderately alkaline clay loam; about 50 percent calcium carbonate by volume in the form of masses, nodules, and finely disseminated carbonates; violently effervescent

Bkk2—34 to 80 inches; very pale brown, moderately alkaline clay loam; about 60 percent calcium carbonate by volume in the form of masses, nodules, and finely disseminated carbonates; violently effervescent

Properties and Qualities

Slope: 1 to 3 percent

Percent of area covered by surface fragments: About 1 percent subrounded (shape or size unspecified)

Depth to first restrictive layer: Not present

Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)

Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer

Salinity, representative within 40 inches: Not saline

Salinity, maximum within 40 inches: Not saline

Sodicity, representative within 40 inches: Not sodic

Sodicity, maximum within 40 inches: Not sodic

Representative total available water capacity to 60 inches: About 8.1 inches (Moderate)

Natural drainage class: Well drained

Runoff: Low

Flooding frequency: None

Ponding frequency: None

Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 3e

Land capability irrigated: 3e

Ecological site name: Sandy Loam PE 25-36

Ecological site number: R077CY036TX

Typical vegetation: The natural plant community is a mixture of short and midgrasses with a smaller tallgrass complement. Midgrasses tend to dominate over most of the site with sideoats grama being the most prevalent midgrass species. Blue grama is the dominant shortgrass species and little bluestem the dominant tallgrass species. There are small areas that may occur within the site where blue grama is more prevalent. Woody plants are few but include yucca, catclaw acacia, and sand sage.

Use and Management

Major land uses: This soil is primarily used for cropland. A few areas are used as improved pasture or rangeland.

Cropland: This soil is well suited to cropland. The moderate available water capacity of the soil is a minor limitation. The most common crops grown are cotton and grain sorghum. Other crops include wheat, sunflowers, and forage sorghum. The main concerns in management are conserving soil moisture and controlling soil erosion. Fertilizer applications, reduced tillage, high-residue cover crops, and crop residue management can help reduce the soil temperature, conserve moisture, and improve or maintain soil tilth and productivity. Terraces, contour farming, grassed waterways, and diversion terraces, where needed, can help control runoff and water erosion. Improved varieties of bermudagrass and bluestems are the major pasture grasses grown on these soils. Fertilizer applications, weed control, brush management, proper stocking rates, and controlled grazing can help conserve soil moisture and improve or maintain productivity.

Rangeland: Native plants yield high amounts of forage. The moderate available water capacity of the soil is a minor limitation. The hazard of wind erosion is severe. The main concerns in management are continuous overgrazing, fire suppression, invasion of woody species, and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.

Urban Development: This soil is moderately suited to urban uses. It is very limited as a site for the construction of roads and streets, lawns and landscaping, or use as road-fill material and daily cover for landfills. The low soil strength and high carbonate content are major limitations. Because of low soil strength, special treatment is necessary to increase the stability of road sub-grades. Pipelines, storage tanks, and other underground structures made of uncoated steel should be protected from the high corrosion potential of these soils. This can be overcome by providing cathodic protection or by using galvanized steel.

Recreational Development: This soil is moderately suited to most recreational uses. It is very limited as a site for golf course fairways. The high carbonate content of the soil is a major limitation.

Wildlife Habitat: The moderately arid conditions, which can limit plant growth necessary for good habitat, are a minor limitation.

ZmA—Zita loam, 0 to 1 percent slopes

Setting

General location: Southern High Plains of western Texas and eastern New Mexico
Major land resource area: 77C—Southern High Plains, Southern Part
Landscape: Plateau
Elevation: 2,700 to 4,700 feet (823 to 1,433 meters)
Mean annual precipitation: 17 to 21 inches (432 to 533 millimeters)
Mean annual air temperature: 57 to 62 degrees F (14 to 17 degrees C)
Frost-free period: 185 to 220 days

Composition

Zita and similar soils: 90 percent
Contrasting soils: 10 percent

Based on field observations of the map unit during the survey, the best estimate is that the Zita soil and similar soils make up 90 percent of the map unit, and contrasting soils make up 10 percent.
The soils similar to Zita are small areas of Pep and Portales soils. Also included are small areas of similar soils that have a surface layer of sandy clay loam or very fine sandy loam and Zita soils that have slopes of 1 to 3 percent.
The contrasting soils are small areas of Acuff, Estacado, Lofton, Midessa, and Tokio soils.

Soil Description

Zita
Aspect(s): East to South
Position(s) on landform(s): Plain
Parent material: Calcareous, loamy eolian deposits from the Blackwater Draw Formation of Pleistocene age

Typical Profile

Ap—0 to 7 inches; dark grayish brown, slightly alkaline loam
A—7 to 18 inches; dark grayish brown, moderately alkaline loam
Bw—18 to 24 inches; light brownish gray, moderately alkaline clay loam; less than 2 percent calcium carbonate by volume as nodules; strongly effervescent
Bkk1—24 to 35 inches; white, moderately alkaline clay loam; about 50 percent calcium carbonate by volume in the form of masses, nodules, and finely disseminated carbonates; violently effervescent
Bkk2—35 to 80 inches; very pale brown, moderately alkaline clay loam; about 60 percent calcium carbonate by volume in the form of masses, nodules, and finely disseminated carbonates; violently effervescent

Properties and Qualities

Slope: 0 to 1 percent
Percent of area covered by surface fragments: Unspecified
Depth to first restrictive layer: Not present
Slowest soil permeability to 60 inches, above first cemented restrictive layer: 0.6 to 2.0 in/hr (Moderate)
Slowest permeability to 60 inches, within and below first cemented restrictive layer: No restrictive layer
Salinity, representative within 40 inches: Not saline
Salinity, maximum within 40 inches: Not saline
Sodicity, representative within 40 inches: Not sodic
Sodicity, maximum within 40 inches: Not sodic
Representative total available water capacity to 60 inches: About 8.2 inches (Moderate)
Natural drainage class: Well drained
Runoff: Negligible
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within 80 inches

Interpretive Groups

Land capability nonirrigated: 3e
Land capability irrigated: 2e

Ecological site name: Deep Hardland PE 25-36
Ecological site number: R077CY022TX
Typical vegetation: The natural plant community for this site is shortgrass dominant with a few midgrasses and forbs. Very few shrubs or woody plants occur on this shortgrass prairie. The most prevalent grasses are blue grama and buffalograss with blue grama being dominant.

Use and Management

Major land uses: This soil is primarily used for cropland. A few areas are used as improved pasture or rangeland.
Cropland: This soil is well suited to cropland. The moderate available water capacity of the soil is a minor limitation. The most common crops grown are cotton and grain sorghum. Other crops include wheat, sunflowers, and forage sorghum. The main concerns in management are conserving soil moisture and controlling soil erosion. Fertilizer applications, reduced tillage, high-residue cover crops, and crop residue management can help reduce the soil temperature, conserve moisture, and improve or maintain soil tilth and productivity. Terraces, contour farming, grassed waterways, and diversion terraces, where needed, can help control runoff and water erosion. Improved varieties of bermudagrass and bluestems are the major pasture grasses grown on these soils. Fertilizer applications, weed control, brush management, proper stocking rates, and controlled grazing can help conserve soil moisture and improve or maintain productivity.
Rangeland: Native plants are dominantly shortgrasses, which produce moderate amounts of forage. The main concerns in management are continuous overgrazing, fire suppression, invasion of woody species, and early successional annual grasses and annual forbs. Proper stocking rates, brush management, and controlled grazing can help improve or maintain productivity.
Urban Development: This soil is moderately suited to urban uses. It is very limited as a site for the construction of roads and streets, lawns and landscaping, or use as road-fill material and daily cover for landfills. The low soil strength and high carbonate content are major limitations. Because of low soil strength, special treatment is necessary to increase the stability of road sub-grades. Pipelines, storage tanks, and other underground structures made of uncoated steel should be protected from the high corrosion potential of these soils. This can be overcome by providing cathodic protection or by using galvanized steel.
Recreational Development: This soil is moderately suited to most recreational uses. It is very limited as a site for golf course fairways. The high carbonate content of the soil is a major limitation. Other recreational use is somewhat limited because of dustiness. Applications of water or special surfacing material may be needed during dry periods to prevent excessive dustiness in areas that are subject to heavy foot traffic.
Wildlife Habitat: The moderately arid conditions, which can limit plant growth necessary for good habitat, are a minor limitation.

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. The soil qualities, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. It is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 5 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

About 229,088 acres in the survey area, or nearly 40 percent of the total acreage, meets the soil requirements for prime farmland. Scattered areas of this land are throughout the county, but most are in the eastern part, mainly in general soil map units 1, 2, and 3, which are described under the heading "General Soil Map Units." About 200,000 acres of this prime farmland is used for crops. The crops grown on this land, mainly cotton and grain sorghum, account for an estimated two-thirds of the county's total agricultural income each year.

A recent trend in land use in some parts of the survey area has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

The map units in the survey area that are considered prime farmland are listed at the end of this section. This list does not constitute a recommendation for a particular land use. On some soils included in the list, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

The map units that meet the requirements for prime farmland are:

AcA Acuff loam, 0 to 1 percent slopes
AcB Acuff loam, 1 to 3 percent slopes
BcA Bippus clay loam, 0 to 2 percent slopes, occasionally flooded (Prime farmland if protected from flooding or not frequently flooded during the growing season)
EsA Estacado loam, 0 to 1 percent slopes
EsB Estacado loam, 1 to 3 percent slopes
LoA Lofton clay loam, 0 to 1 percent slopes
OcA Olton clay loam, 0 to 1 percent slopes
ZmA Zita loam, 0 to 1 percent slopes

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as rangeland and forestland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; for agricultural waste management; and as wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Interpretive Ratings

The interpretive tables in this survey rate the soils in the survey area for various uses. Many of the tables identify the limitations that affect specified uses and indicate the severity of those limitations.

Rating Class Terms

Rating classes are expressed in the tables in terms that indicate the extent to which the soils are limited by all of the soil features that affect a specified use or in terms that indicate the suitability of the soils for the use. Thus, the tables may show limitation classes or suitability classes. Terms for the limitation classes are *not limited, slightly limited, somewhat limited,* and *very limited*. The suitability ratings are expressed as *well suited, moderately well suited, poorly suited*, and *unsuited* or as *good, fair*, and *poor*.

Numerical Ratings

Numerical ratings in the tables indicate the relative severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use and the point at which the soil feature is not a limitation. The limitations appear in order from the most limiting to the least limiting. Thus, if more than one limitation is identified, the most severe limitation is listed first and the least severe one is listed last.

Crops and Pasture

General management needed for crops and pasture is suggested in this section. The estimated yields of the main crops and pasture plants are listed, and the system of land capability classification used by the Natural Resources Conservation Service is also explained.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading "Detailed Soil Map Units." Specific information can be obtained from the local office of the Natural Resources Conservation Service or the Texas AgriLife Extension Service.

Management of Cropland

About 442,213 acres in the county is in cropland. About 100,857 acres is irrigated each year. The rest of the cropland is nonirrigated.

The major nonirrigated crops include cotton, grain sorghum, wheat, sunflowers, and forage sorghum. The major irrigated crops are also cotton and grain sorghum, and, in addition, there are a few areas of peanuts and soybeans. Cotton is the most important of the cash crops grown in irrigated areas. In the sandier locations of Lynn County, peanuts are also an important irrigated cash crop.

Irrigation water is drawn from wells in the Ogallala Aquifer. Both surface and sprinkler irrigation systems are used. Most of the surface systems are on nearly level cropland areas and are used less commonly than sprinkler systems. Sprinkler systems throughout the county include center-pivot systems and lateral-move systems. Center-pivot systems are the most common (fig. 12).

Irrigation water management is important because of the high cost of pumping water and the need to conserve the water in the Ogallala Aquifer. Irrigation water should be applied at the proper times and in the amounts required by the crop. The timing of irrigation can be determined by the feel and appearance method; by moisture monitoring devices, such as gypsum blocks and tensiometers; and by the moisture accounting method. Crop needs for various growth stages can be determined from consumptive use curves.

Figure 12.—Center-pivot irrigation system on peanuts.

Irrigation water should be distributed evenly to all parts of the field. Annual or biennial evaluations of surface and sprinkler irrigation systems are recommended in order to locate inefficiencies in distribution. Where surface systems are used, land leveling, land grading, shortening of irrigation runs, surge irrigation systems, and cutback head irrigation systems can increase the efficiency of water distribution. Replacing worn nozzles can increase the efficiency of sprinkler systems. In addition, operating the systems at the pressures recommended by manufacturers or distributors can ensure a high degree of efficiency.

In all areas of cropland, soil and water conservation are important management concerns. Crop residue management and other measures, such as furrow diking, contour stripcropping, field stripcropping, wind stripcropping, cover cropping, contour farming, and terracing, help to control wind erosion and water erosion, conserve moisture, and maintain or improve tilth. Measures that conserve moisture generally result in higher crop yields.

Crop residue management includes crop residue use, delayed seedbed preparation, and conservation tillage. Leaving crop residue on the surface helps to protect the soil against wind erosion (fig. 13); minimizes soil crusting and the detachment of soil particles, and thus helps to control runoff and water erosion; reduces the rate at which soil moisture evaporates; improves tilth in the surface layer; and minimizes compaction by farm machinery.

Figure 13.—Sand dunes on a fence row adjacent to a cotton field are the result of wind erosion. The cotton is in an area of Patricia and Amarillo loamy fine sands, 0 to 3 percent slopes.

Tillage should be sufficient to prepare a good seedbed and to control weeds without damaging the structure of the soil. Heavy traffic on the soil, especially during wet periods, can cause the formation of a compaction pan by destroying soil structure. Compaction reduces soil porosity and restricts root growth into and through the compacted layer. It limits the ability of the root system of a crop to take up moisture and nutrients. It also increases the amount of moisture and nutrients lost through runoff and erosion. Deep chiseling and controlled traffic patterns can minimize compaction. Roughening the surface through emergency tillage helps to control wind erosion.

Properly applied fertilizer is needed on all cultivated soils. Soil analysis and knowledge of the history of fertilizer application on a field can help in making accurate estimates of the kind and amount of nutrients needed to produce a specific yield. An annual soil analysis can detect a buildup or depletion of required nutrients for each crop. In addition, plant analyses can be used to determine nutrient deficiencies in a growing crop.

Management of Pasture and Hayland

Pasture and hayland make up about 7,751 acres in the county. About 466 acres is irrigated each year and the remainder is nonirrigated.

Management of pasture and hayland includes selecting plants that are suited to the soil, applying fertilizer, managing grazing heights for maximum productivity, rotating pastures, and controlling weeds and brush. Efficient water management is important in areas where pasture or hayland is irrigated.

Many highly productive grasses are suitable for improved pasture. The most widely used grasses are kleingrass and improved bermudagrass. Improved bermudagrasses are the most widely grown grasses in areas of irrigated pasture.

Applying fertilizer or planting soil-improving leguminous crops is essential for economical forage production in areas of irrigated pasture and hay. In areas of nonirrigated pasture, fertilizer should be applied when the moisture supply is adequate. All fertilizer should be applied according to the results of soil or plant analysis.

Rotating pastures for proper grazing use is an important management practice. Timely rotation allows for the maximum production of improved grasses. Weeds can be controlled by mowing, by prescribed burning, or by applying approved herbicides.

Management of Orchards and Vineyards

About 200 acres in the county is used for orchards and vineyards. Grapes and pecans are the major crops. A number of soils in the county are well suited to irrigated orchard crops. Most of the soils used for irrigated row crops are suited to orchard crops.

The management measures needed in orchards are similar to those needed in areas of other irrigated crops. They include proper tillage, management of crop residue, use of cover crops, applications of fertilizer, timely disease and insect control, weed control, and management of irrigation water.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of map units in the survey area also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations also are considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

For yields of irrigated crops, it is assumed that the irrigation system is adapted to the soils and to the crops grown, that good-quality irrigation water is uniformly applied as needed, and that tillage is kept to a minimum.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or of the Texas AgriLife Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for forestland, or for engineering purposes.

In the capability system (USDA SCS, 1961), soils are generally grouped at three levels—capability class, subclass, and unit.

Capability classes, the broadest groups, are designated by the numbers 1 through 8. The numbers indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class 1 soils have slight limitations that restrict their use.

Class 2 soils have moderate limitations that restrict the choice of plants or that require moderate conservation practices.

Class 3 soils have severe limitations that restrict the choice of plants or that require special conservation practices, or both.

Class 4 soils have very severe limitations that restrict the choice of plants or that require very careful management, or both.

Class 5 soils are subject to little or no erosion but have other limitations, impractical to remove, that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

Class 6 soils have severe limitations that make them generally unsuitable for cultivation and that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

Class 7 soils have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, forestland, or wildlife habitat.

Class 8 soils and miscellaneous areas have limitations that preclude commercial plant production and that restrict their use to recreational purposes, wildlife habitat, watershed, or esthetic purposes.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s*, or *c,* to the class numeral, for example, 2e. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class 1 there are no subclasses because the soils of this class have few limitations. Class 5 contains only the subclasses indicated by *w, s,* or *c* because the soils in class 5 are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, forestland, wildlife habitat, or recreation.

Capability units are soil groups within a subclass. The soils in a capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, 2e-4 and 3e-6. These units are not given in all soil surveys.

The capability classification of map units in this survey area is given in the section "Detailed Soil Map Units" and in the table 5.

Agricultural Waste Management

Soil properties are important considerations in areas where soils are used as sites for the treatment and disposal of organic waste and wastewater. Selection of soils with properties that favor waste management can help to prevent environmental damage.

Table 6, table 7, and table 8 show the degree and kind of soil limitations affecting the treatment of agricultural waste, including municipal and food-processing wastewater and effluent from lagoons or storage ponds. Municipal wastewater is the waste stream from a municipality. It contains domestic waste and may contain industrial waste. It may have received primary or secondary treatment. It is rarely untreated sewage. Food-processing wastewater results from the preparation of fruits, vegetables, milk, cheese, and meats for public consumption. In places it is high in content of sodium and chloride. In the context of these tables, the effluent in lagoons and storage ponds is from facilities used to treat or store food-processing wastewater or domestic or animal waste. Domestic and food-processing wastewater is very dilute, and the effluent from the facilities that treat or store it commonly is very low in content of carbonaceous and nitrogenous material; the content of nitrogen commonly ranges from 10 to 30 milligrams per liter. The wastewater from animal waste treatment lagoons or storage ponds, however, has much higher concentrations of these materials, mainly because the manure has not been diluted as much as the domestic waste. The content of nitrogen in this wastewater generally ranges from 50 to 2,000 milligrams per liter. When wastewater is applied, checks should be made to ensure that nitrogen, heavy metals, and salts are not added in excessive amounts.

The ratings in the tables are for waste management systems that not only dispose of and treat organic waste or wastewater but also are beneficial to crops (application of manure and food-processing waste, application of sewage sludge, and disposal of wastewater by irrigation) and for waste management systems that are designed only for the purpose of wastewater disposal and treatment (overland flow of wastewater, rapid infiltration of wastewater, and slow rate treatment of wastewater).

Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect agricultural waste management. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Slightly limited* indicates that the soil has features that are generally favorable for the specified use. The limitations are minor and can be easily overcome. Good performance and low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation.

Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Application of manure and food-processing waste not only disposes of waste material but also can improve crop production by increasing the supply of nutrients in the soils where the material is applied. Manure is the excrement of livestock and poultry, and food-processing waste is damaged fruit and vegetables and the peelings, stems, leaves, pits, and soil particles removed in food preparation. The manure and food-processing waste are solid, slurry, or liquid. Their nitrogen content varies. A high content of nitrogen limits the application rate. Toxic or otherwise dangerous wastes, such as those mixed with the lye used in food processing, are not considered in the ratings.

The ratings in the tables are based on the soil properties that affect absorption, plant growth, microbial activity, erodibility, the rate at which the waste is applied, and the method by which the waste is applied. The properties that affect absorption include permeability, depth to a water table, ponding, the sodium adsorption ratio, depth to bedrock or a cemented pan, and available water capacity. The properties that affect plant growth and microbial activity include reaction, the sodium adsorption ratio, salinity, and bulk density. The wind erodibility group, the soil erodibility factor K, and slope are considered in estimating the likelihood that wind erosion or water erosion will transport the waste material from the application site. Stones, cobbles, a water table, ponding, and flooding can hinder the application of waste. Permanently frozen soils are unsuitable for waste treatment.

Application of sewage sludge not only disposes of waste material but also can improve crop production by increasing the supply of nutrients in the soils where the material is applied. In the context of this table, sewage sludge is the residual product of the treatment of municipal sewage. The solid component consists mainly of cell mass, primarily bacteria cells that developed during secondary treatment and have incorporated soluble organics into their own bodies. The sludge has small amounts of sand, silt, and other solid debris. The content of nitrogen varies. Some sludge has constituents that are toxic to plants or hazardous to the food chain, such as heavy metals and exotic organic compounds, and should be analyzed chemically prior to use.

The content of water in the sludge ranges from about 98 percent to less than 40 percent. The sludge is considered liquid if it is more than about 90 percent water, slurry if it is about 50 to 90 percent water, and solid if it is less than about 50 percent water.

The ratings in the table are based on the soil properties that affect absorption, plant growth, microbial activity, erodibility, the rate at which the sludge is applied, and the method by which the sludge is applied. The properties that affect absorption, plant growth, and microbial activity include permeability, depth to a water table, ponding, the sodium adsorption ratio, depth to bedrock or a cemented pan, available water capacity, reaction, salinity, and bulk density. The wind erodibility group, the soil erodibility factor K, and slope are considered in estimating the likelihood that wind erosion or water erosion will transport the waste material from the application site. Stones, cobbles, a water table, ponding, and flooding can hinder the application of sludge. Permanently frozen soils are unsuitable for waste treatment.

Disposal of wastewater by irrigation not only disposes of municipal wastewater and wastewater from food-processing plants, lagoons, and storage ponds but also can improve crop production by increasing the amount of water available to crops. The ratings in the table are based on the soil properties that affect the design, construction, management, and performance of the irrigation system. The properties that affect design and management include the sodium adsorption ratio, depth to a water table, ponding, available water capacity, permeability, slope, and flooding. The properties that affect construction include stones, cobbles, depth to bedrock, or a cemented pan, depth to a water table, and ponding. The properties that affect performance include depth to bedrock or a cemented pan, bulk density, the sodium adsorption ratio, salinity, reaction, and the cation-exchange capacity, which is used to estimate the capacity of a soil to adsorb heavy metals. Permanently frozen soils are not suitable for disposal of wastewater by irrigation.

Overland flow of wastewater is a process in which wastewater is applied to the upper reaches of sloped land and allowed to flow across vegetated surfaces, sometimes called terraces, to runoff-collection ditches. The length of the run generally is 150 to 300 feet. The application rate ranges from 2.5 to 16.0 inches per week. It commonly exceeds the rate needed for irrigation of cropland. The wastewater leaves solids and nutrients on the vegetated surfaces as it flows downslope in a thin film. Most of the water reaches the collection ditch, some is lost through evapotranspiration, and a small amount may percolate to the ground water.

The ratings in the table are based on the soil properties that affect absorption, plant growth, microbial activity, and the design and construction of the system. Reaction and the cation-exchange capacity affect absorption. Reaction, salinity, and the sodium adsorption ratio affect plant growth and microbial activity. Slope, permeability, depth to a water table, ponding, flooding, depth to bedrock or a cemented pan, stones, and cobbles affect design and construction. Permanently frozen soils are unsuitable for waste treatment.

Rapid infiltration of wastewater is a process in which wastewater applied in a level basin at a rate of 4 to 120 inches per week percolates through the soil. The wastewater may eventually reach the ground water. The application rate commonly exceeds the rate needed for irrigation of cropland. Vegetation is not a necessary part of the treatment; hence, the basins may or may not be vegetated. The thickness of the soil material needed for proper treatment of the wastewater is more than 72 inches. As a result, geologic and hydrologic investigation is needed to ensure proper design and performance and to determine the risk of ground-water pollution.

The ratings in the table are based on the soil properties that affect the risk of pollution and the design, construction, and performance of the system. Depth to a water table, ponding, flooding, and depth to bedrock or a cemented pan affect the risk of pollution and the design and construction of the system. Slope, stones, and cobbles also affect design and construction. Permeability and reaction affect performance. Permanently frozen soils are unsuitable for waste treatment.

Slow rate treatment of wastewater is a process in which wastewater is applied to land at a rate normally between 0.5 inch and 4.0 inches per week. The application rate commonly exceeds the rate needed for irrigation of cropland. The applied wastewater is treated as it moves through the soil. Much of the treated water may percolate to the ground water, and some enters the atmosphere through evapotranspiration. The applied water generally is not allowed to run off the surface. Waterlogging is prevented either through control of the application rate or through the use of tile drains, or both.

The ratings in the table are based on the soil properties that affect absorption, plant growth, microbial activity, erodibility, and the application of waste. The properties that affect absorption include the sodium adsorption ratio, depth to a water table, ponding, available water capacity, permeability, depth to bedrock or a cemented pan, reaction, the cation-exchange capacity, and slope. Reaction, the sodium adsorption ratio, salinity, and bulk density affect plant growth and microbial activity. The wind erodibility group, the soil erodibility factor K, and slope are considered in estimating the likelihood of wind erosion or water erosion. Stones, cobbles, a water table, ponding, and flooding can hinder the application of waste. Permanently frozen soils are unsuitable for waste treatment.

Large Animal Carcass Disposal

Table 9 shows the degree and kind of limitations that affect the disposal of large animal carcasses by the pit or trench method. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected of a properly designed and installed system. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of the individual limitations. The ratings are shown in decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Large animal disposal, pit and large animal disposal, trench, are methods of disposing of dead animals by placing the carcasses in successive layers in an excavated pit or trench. The soil is evaluated from the surface to a depth of 79 inches. Onsite investigation to a greater depth will be needed for final site acceptance. The ratings are based on the soil properties that affect attenuation of suspended, soil solution, and gaseous decomposition products and microorganisms; construction and maintenance of the site; and public health. Improper site selection, design, or installation may cause contamination of ground water, seepage, and contamination of stream systems from surface drainage or floodwater.

The soil properties that influence the risk of pollution, the ease of excavation, trafficability, and revegetation are the major considerations. Pollution is a hazard on soils that are subject to flooding or have a water table within the depth of excavation. These soils cannot be easily excavated. Soils that have high saturated hydraulic conductivity (K-sat) or are shallow to bedrock, ice, a cemented pan, or stones and boulders are limited because these features interfere with the installation, performance, and maintenance of the system. Slope affects road construction, performance of the roads, and the control of surface water around the trench. Also, it can cause difficulty in construction where the trench or pit bottom must be kept level and oriented to follow the contour of the land.

The ease with which the trench or pit is dug and with which a soil can be used as daily and final cover is based largely on soil texture and consistence, which affect workability both when the soil is dry and when it is wet. Soils that are plastic and sticky when wet are difficult to excavate, grade, or compact and difficult to place as a uniformly thick cover over a layer of carcasses. The uppermost part of the final cover should be soil material that favors the growth of plants. It should not contain excess sodium or salts and should not be too acid. In comparison with other horizons, the surface layer in most soils has the best workability and the highest content of organic matter. Thus, it may be desirable to stockpile the surface layer for use in the final blanketing of the fill.

Rangeland

J.R. Bell, Rangeland Management Specialist, Amarillo, Texas, prepared this section.

Rangeland is land on which the potential natural vegetation is predominantly grasses, grass-like plants, forbs, or shrubs suitable for grazing or browsing. This includes rangelands in their native state and rangelands that may have been restored by the reseeding of native plants and are being managed now as native rangelands. Plant communities on rangelands are closely related to the kind of soils present. In order to understand and to effectively manage rangeland ecosystems, there must be a good understanding of the interaction between soils, plants, grazing animals, and water.

In the detailed map unit descriptions, the potential natural plant community (also referred to as historic climax) that grows on each map unit is described. A potential natural plant community is an association of plants that are best adapted to the environmental factors of soil, topography, and climate present on a particular site. These plants developed over centuries and have reached equilibrium in relation to the other factors. These communities are fairly stable with some minor variations due to yearly growing conditions. The historic climax is not static, but the fluctuations are not drastic. In general, the potential natural plant community in the same major land resource area on the same soil will be very similar.

A term used to characterize distinctive kinds of rangeland is the “ecological site” (sometimes called range site). These “sites” produce different natural plant communities than do other “sites.” There will be differences in species, amounts, and proportions of plants from site to site. There are generally a few major species, which characterize a particular site. These are listed under the map unit descriptions. Not every soil is a different ecological site; similar soils will often be in the same site.

As a part of the preparation of a complete resource inventory, it is useful to know if the plant community has undergone changes over time. Many years of livestock grazing, the absence of natural fires, invasion of plants not originally present in pristine times, and climatic events such as major droughts have all interacted to effect changes in vegetation on our native rangelands. While some of our rangelands have remained very productive and very similar to what they were two hundred years ago, most of the range has declined from its original potential.

How a range is managed will affect the nature of the vegetation as to production, species composition, plant health, and its potential to protect the soil. If grazing is too severe for an extended period, the vigor of individual plants will decline and overall productive capacity will be reduced. Often the more palatable vegetation receives undue pressure and these species begin to disappear. Less desirable species will fill the void and the appearance of the range changes, as well as its capacity to sustain a certain level of stocking. Strong, perennial species may be replaced by weaker perennials or annual species. Stability is affected and the plant community is unable to withstand the extreme climatic variations. Opportunistic brushy and weedy plants often make an appearance. Generally, this process takes place gradually over many years, and the degradation process may take more than one pathway. This is because no two sites are going to respond exactly the same way. Site resilience is different and climatic factors influence the process in ways difficult to predict. Soil deterioration may be accelerated as the plant community declines in stability and in its ability to protect the soil surface. Erosion is increased, lowering productivity even more.

However, many degraded rangelands can be restored through good grazing management practices alone. Prescribed grazing, that is, using an appropriate stocking rate of animals for a specific time period followed by a recovery period or “rest,” is the most needed practice on all native rangelands. The sequence of graze-rest may need adjusting from year to year. In addition, stocking rates need to remain flexible since production of the range is variable. There are other practices used to sustain or improve rangeland productivity. The more common ones are brush management, where woody plants have increased to problem densities and are threatening the overall balance of the site; livestock watering systems, to better distribute grazing or browsing; cross-fencing, to more efficiently graze larger units of rangeland; and rangeland re-seeding, where natural plant communities have deteriorated and an insufficient seed source remains. All these practices should be applied as a part of an overall resource management plan. The planning process consists of planning, monitoring, and re-planning constantly on a year to year basis.

In areas that have similar climate and topography, differences in the kind and amount of rangeland vegetation are closely related to the kind of soil. Effective management is based on the relationship between the soils and vegetation and water.

Table 10 shows, for each soil that supports rangeland vegetation, the ecological site and the potential annual production of vegetation in favorable, normal, and unfavorable years. An explanation of the column headings in the table follows.

An *ecological site* is the product of all the environmental factors responsible for its development. It has characteristic soils that have developed over time throughout the soil development process; a characteristic hydrology, particularly infiltration and runoff, that has developed over time; and a characteristic plant community (kind and amount of vegetation). The hydrology of the site is influenced by development of the soil and plant community. The vegetation, soils, and hydrology are all interrelated. Each is influenced by the others and influences the development of the others. The plant community on an ecological site is typified by an association of species that differs from that of other ecological sites in the kind and/or proportion of species or in total production. Descriptions of ecological sites are available on line at http://www.nrcs.usda.gov/technical/efotg/ or in the local offices of the Natural Resources Conservation Service.

Total dry-weight production is the amount of vegetation that can be expected to grow annually in a well managed area that is supporting the potential natural plant community. It includes all vegetation, whether or not it is palatable to grazing animals. It includes the current year's growth of leaves, twigs, and fruits of woody plants. It does not include the increase in stem diameter of trees and shrubs. It is expressed in pounds per acre of air-dry vegetation for favorable, normal, and unfavorable years. In a favorable year, the amount and distribution of precipitation and the temperatures make growing conditions substantially better than average. In a normal year, growing conditions are about average. In an unfavorable year, growing conditions are well below average, generally because of low available soil moisture. Yields are adjusted to a common percent of air-dry moisture content.

Range management requires a knowledge of the kinds of soil and of the potential natural plant community. It also requires an evaluation of the present range similarity index and rangeland trend. Range similarity index is determined by comparing the present plant community with the potential natural plant community on a particular rangeland ecological site. The more closely the existing community resembles the potential community, the higher the range similarity index. Rangeland trend is defined as the direction of change in an existing plant community relative to the potential natural plant community. Further information about the range similarity index and rangeland trend is available in chapter 4 of the "National Range and Pasture Handbook," which is available on the internet at http://www.glti.nrcs.usda.gov or in the local office of the Natural Resources Conservation Service.

The objective in range management is to control grazing so that the plants growing on a site are about the same in kind and amount as the potential natural plant community for that site. Such management generally results in the optimum production of vegetation, control of undesirable brush species, conservation of water, and control of erosion. Sometimes, however, an area with a range similarity index somewhat below the potential meets grazing needs, provides wildlife habitat, and protects soil and water resources.

Importance of Rangeland

The rangeland livestock industry is very important to west Texas agriculture. Native rangelands serve as the foundation of the industry. Not only do rangelands support livestock grazing; they also provide valuable wildlife habitat, recreational opportunities, and watersheds for our lakes, rivers, and streams. This survey area contains about 571,392 acres of which 19.5 percent or 111,309 acres is range or other grazing lands. The size of range units varies from small to very large. Both cow-calf and stocker operations are common. The region, including the Texas Panhandle and South Plains, is part of the largest cattle feeding area in the United States. Locally grown grain crops help sustain this industry, enhancing the area's cropland-agriculture enterprises. Many stocker cattle are pastured on small grain during fall and winter months and are then put in feedlots or grass pastures.

The climate of the region is generally well suited to ranching. In the winter months, cold fronts are frequent in which temperatures drop into the teens or occasionally lower. These fronts may bring snow and ice; however, these periods do not last long. Feeding of hay and supplement in the winter months is necessary. The common supplementation is protein in the form of cottonseed cake or grain cubes. Mineral blocks are often left out year-round. There is little cool-season grass production, and most of the production on the native rangeland occurs from May through October.

A typical growth curve for native vegetation representing the percentage of total growth occurring each month would be:

Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1	2	3	7	20	30	15	5	10	4	2	1

Ecological Sites

The county has 12 ecological sites. These are Deep Hardland, Draw, Hardland Slopes, High Lime, Limy Upland, Loamy Prairie, Mixedland Slopes, Playa, Sandy, Sandy Loam, Very Shallow, and Wet Saline.

Deep Hardland Ecological Site. The Acuff, Estacado, Lofton, Olton, and Zita soils in map units AcA, AcB, EPA, EsA, EsB, LoA, OcA, and ZmA are in this site (fig. 14).

The composition, by weight, is about 88 percent grasses, 8 percent forbs, and 2 percent cryptogams, and 2 percent shrubs.

The natural plant community for this site is dominated by short grasses with few midgrasses and forbs. Almost no shrubs or woody plants occur. It is a shortgrass prairie. The most prevalent grasses are blue grama and buffalograss with blue grama being

Figure 14.—Deep Hardland ecological site in an area of Acuff loam, 0 to 1 percent slopes.

dominant. In excellent condition, the short grasses make up 65 to 80 percent of the total plant community. The midgrass component will be less than 20 percent of the total and will consist mainly of western wheatgrass or vine mesquite. On the more loamy soils of this site, sideoats grama will likely also occur. Other species will occur in smaller amounts, and will together comprise 10 percent or less of the total production. These are sand dropseed, tumble windmillgrass, sand muhly, silver bluestem, tobosagrass, and galleta. Forbs are moisture dependent and are most abundant in above-average rainfall years. The forbs will make up 5 percent or less of total production.

Under heavy grazing, sideoats grama, western wheatgrass, and vine mesquite will decline and will eventually disappear from the site. The blue grama will take on a sod-bound appearance to escape grazing pressure. Buffalograss will increase and a generally low vigor-low production situation will prevail. Eventually with prolonged abuse the site will deteriorate to stunted buffalograss, perennial threeawn, sand muhly, sand dropseed, and a variety of weedy grasses and annual forbs.

Draw Ecological Site. Bippus soils in map unit BcA are in this site. The composition, by weight, is about 90 percent grasses, 5 percent forbs, 1 percent cryptogams, and 4 percent shrubs.

The natural plant community is dominantly midgrasses with lesser amounts of both tall and shortgrass species. A few forbs occur along with a few woody plants. These sites catch runoff from surrounding shortgrass sites. The dominant species are western wheatgrass, vine mesquite, and sideoats grama. Blue grama and buffalograss always make up the most of the shortgrass complement. In general, midgrasses make up 50 percent of the total herbage with shortgrasses making up from 15 to 25 percent. In instances where soil and moisture conditions are more favorable, tall grasses will be found such as switchgrass and indiangrass. These are usually less than 15 percent of the total site composition. There are a few forbs present but they tend to be obscured by the thick grass growth. Shrubs and trees are relatively few and occur intermittently.

Under heavy grazing, tall grass species disappear and the western wheatgrass and vine mesquite eventually give way to increased amounts of blue grama and buffalograss. Continued abuse will finally lead to a short grass dominated site with weedy invasion and low vigor production. Prickly pear will often invade along with mesquite and other undesirable woody plants if seed sources are present.

Hardland Slopes Ecological Site. Berda and Creta soils in map units BeD and CeC are in this site.

The composition, by weight, is about 81 percent grasses, 8 percent forbs, 3 percent cryptogams, and 8 percent shrubs (fig. 15).

This is a transitional site dominated by shortgrass with a significant midgrass component. Blue grama is the dominant grass making up 50 percent or more of the total production. Buffalograss and sideoats grama is next in importance. Other midgrasses are vine mesquite and western wheatgrass that occur in microlows where moisture collects. This site is very productive if runoff can be minimized. When heavily grazed, cover is not sufficient to retard runoff and the slopes carry it away rapidly. Yucca is the principal woody plant with relatively few forbs being present. This site is subject to gully erosion when cover is poor.

Under heavy grazing, on a sustained basis, this site will become completely dominated by short grasses. This will result in a sod-bound blue grama and buffalograss condition. In later stages of degradation an invasion of weedy species such as broom snakeweed and annual grasses such as little barley occurs. Prickly pear may also invade along with mesquite in certain locations where a seed source is available.

High Lime Ecological Site. Arch and Drake soils in map units ArA, AsA, DRC, and DRE are in this site (fig. 16).

The composition, by weight, is about 84 percent grasses, 5 percent forbs, and 1 percent cryptogams, and 10 percent shrubs.

Figure 15.—Hardland Slopes ecological site in an area of Berda loam, 5 to 8 percent slopes.

Figure 16.—High Lime ecological site with typical area of Drake soils, 1 to 8 percent slopes.

This is a mid and tall grass site with a lesser short grass complement and a few woody plants. Forbs also occur but are not abundant. Grasses that are tolerant of the limey conditions dominate the site. Sideoats grama, blue grama, vine mesquite, western wheatgrass, and alkali sacaton are the more common species. Fourwing saltbush will often be present and a few cholla plants may also occur on parts of the site. This site is not usually a preferred grazing area because of the high lime content in the soil. Palatability is lower on this site because of the limey soil. If overgrazed, the blue grama and sideoats grama will decrease and alkali sacaton and inland saltgrass will increase. If abused long term, the site will exhibit large patches of bare ground, numerous annuals, and broom snakeweed. Prickly pear and shrubby mesquite may also invade the site if abuse is prolonged.

Limy Upland ecological site. Midessa, Pep, Portales, Posey, and Veal soils in map units EPA, MdA, MdB, MdC, MPC, MPP, MVE, PeA, PeB, PoA, PoB, PsA, and PsB are in this site.

The composition, by weight, is about 81 percent grasses, 8 percent forbs, 3 percent cryptogams, and 8 percent shrubs.

The natural plant community for this site is dominantly shortgrass and midgrass and only a few woody species. It resembles a clay loam site except for the presence of more midgrasses such as sideoats grama, western wheatgrass, and vine mesquite. The dominant grass is generally blue grama. The site typifies a shortgrass and midgrass prairie. Short grasses make up 60 percent or more of the grass complement with midgrasses making up 20 to 25 percent. Forbs will comprise as much as 8 percent of the total community and shrubs will make up about 5 percent.

Under heavy grazing, the midgrasses will decline and eventually disappear. Blue grama will become more sod-bound and buffalograss will increase. Production will decline dramatically with continued abuse and low-vigor plants will result.

Loamy Prairie ecological site. Obaro and Quinlan soils in map unit OBG are in this site.

The composition, by weight, is about 80 percent grasses, 8 percent forbs, 9 percent shrubs, and 3 percent cryptogams.

Major grass species are blue grama, buffalograss, sideoats grama, plains bristlegrass, and little bluestem. Saltbush, ephedra, mesquite, juniper, and catclaw are the major woody species.

The productive potential declines rapidly as the range condition deteriorates. Buffalograss will increase and sideoats grama and little bluestem will decrease with long term grazing pressure. Mesquite and juniper will often form significant canopies. This site is subject to significant water erosion when vegetative cover is poor. The site is generally on sloping topography that limits grazing distribution. Severe abuse will lead to large bare areas and annual weeds will become a large part of the total plant composition.

Mixedland Slopes ecological site. Mobeetie soils in map unit MVE are in this site.

The composition, by weight, is about 78 percent grasses, 10 percent forbs, 10 percent shrubs, and 2 percent cryptogams (fig. 17).

This is a mid and tall grass site with a good variety of forbs and a smaller woody plant component. Major grass species are little bluestem, sideoats grama, sand bluestem, and blue grama. This site differs from the sandy loam site in that the limey topsoil promotes an increased growth of sideoats grama and little bluestem. Sand sagebrush is the major woody species along with yucca and skunkbush.

Under heavy grazing, the tall grasses disappear and blue grama increases along with sand sagebrush. Further deterioration will see midgrasses declining and sagebrush forming 20 percent or more of the canopy. In poor condition, perennial threeawn, buffalograss, annuals, and ragweed typify the vegetation along with a moderate canopy of sagebrush. The productive potential declines rapidly as range condition deteriorates.

Playa ecological site. Chapel, Lamesa, Ranco, and Sparenberg soils in map units ChA, LMA, RcA, and SpA are in this site.

Figure 17.—Mixedland Slopes ecological site in an area of Mobeetie-Veal-Potter association, 5 to 20 percent slopes.

The composition, by weight, is about 49 percent grasses, 50 percent forbs, and 1 percent shrubs.

The natural plant community is highly variable depending on the hydrology of the playa. There is usually a mixture of hydrophytic plants and upland plants but this depends on the degree and frequency of inundation. The larger, deeper playa basins that receive more runoff are usually inundated for longer periods and are dominated by hydrophytic plants such as rushes, spike sedges, spike rushes, smartweed, arrowhead, and curly dock. The small, shallow playas and areas adjacent to the deeper playa basins may be dominantly grass vegetation such as western wheatgrass, vine mesquite, and buffalograss with a few forbs such as asters, coreopsis, bur ragweed, lambs quarters, and annual forbs. The degree of diversity is highly variable from one playa to another. It is difficult to describe a true climax community as the periods of inundation vary in frequency and longevity, and this site is in a constant state of change. This site has very few shrubs, and these generally occur around the periphery of the wetter playa basins. If playas are inundated through the growing season and then are dry in the fall and bare during the following winter and early spring; they are then subject to wind erosion until plants emerge in the summer.

Under heavy grazing, the more productive grasses and grass-like species will decrease and bursage, blueweed and other unpalatable species will increase. Smartweed is quite palatable and may decrease if heavy grazing persists. Normally the amount and frequency of inundation affects the plant community more than grazing.

Sandy ecological site. Amarillo, Brownfield, Patricia, and Tokio soils in map units BHC, BrB, PAB, and TkB are in this site.

The composition, by weight, is about 60 percent grasses, 12 percent forbs, and 28 percent shrubs (fig 18).

This is a tall grass climax. Nearly half of the grass component is composed of tall grasses such as little and sand bluestem along with taller dropseed species. The

Figure 18.—Sandy ecological site in an area of Brownfield fine sand, 0 to 3 percent slopes.

remainder of grass vegetation is mid and short grasses such as sideoats grama, sand dropseed, hooded windmillgrass, sand lovegrass, sand paspalum, fall witchgrass, hairy grama, needle and thread, and perennial threeawn. Forbs make up from 8 to 12 percent of the total herbaceous vegetation. Woody shrubs, namely sand sage, shinnery oak, and skunkbush, make up 20 to 30 percent of the plant community.

Under heavy grazing, the tall grass species decline with brush and midgrasses filling the void. With further abuse, weedy species such as western ragweed, camphorweed, and annuals make up more than half of the yearly production. In some cases the sand sagebrush, shinnery oak, and skunkbush can form more than a 50 percent canopy.

Sandy Loam ecological site. The Amarillo, Arvana, Seagraves, Tokio, and Zita soils in map units AfA, AfB, AvA, AvB, SgA, TkA, ZfA, and ZfB are in this site.

The composition, by weight, is about 83 percent grasses, 8 percent forbs, 2 percent cryptogams, and 7 percent shrubs.

The natural plant community is a mixture of short and midgrasses with a smaller tall grass complement. Midgrasses tend to dominate over most of the site with sideoats grama being the dominant midgrass. Little bluestem is the dominant tall grass species. Small areas occur within the site where blue grama may be dominant. Forbs make up 5 percent or less of total production. Shrubs are few with yucca, catclaw, and sand sage occurring in amounts of 5 percent or less.

Under heavy grazing, the tall and midgrasses decline and the shorter grasses increase. If abuse is prolonged it will revert to a short grass dominated site. Blue grama acts as a strong increaser under heavy grazing. Further degradation will allow an invasion of threeawns and annuals. Sand sagebrush and yucca will usually increase.

Very Shallow ecological site. Kimberson, Potter, Sharvana, and Yellowhouse soils in map units KmB, MPP, MVE, PGE, ShB, and YRG are in this site (fig. 19).

The composition, by weight, is about 80 percent grasses, 10 percent forbs, 2 percent cryptogams, and 8 percent shrubs.

Figure 19.—Very Shallow ecological site with typical area of Potter soils, 3 to 20 percent slopes.

The natural plant community is a mixture of short and midgrasses with a few tall grasses. A moderate amount of forbs and shrubs are also present. Major grass species are sideoats grama, little bluestem, hairy grama, blue grama, slim tridens, and buffalograss. The major forbs include black samson, dotted gayfeather, catclaw sensitivebriar, and annual forbs. Yucca, catclaw acacia, and feather dalea are the major woody species along with ephedra and skunkbush. Vegetation is somewhat sparse except in higher moisture areas. Soil depth limits density. Large areas of bare ground are common. The limey nature of the soil further narrows the species occupying the site. This is not a preferred site by livestock. Production is low and palatability of forage is less than on sites with stronger soil resources.

Under heavy grazing, the more palatable grasses are reduced and bare ground increases. When cover is reduced, the danger of erosion increases. If the climax grasses and forbs are removed from this site, it will revert to broom snakeweed, threeawns, and annuals.

Wet Saline ecological site. Cedarlake, Hindman, and Lenorah soils in map units CDA and LHA are in this site (fig. 20).

The composition, by weight, is about 80 percent grasses, 10 percent forbs, and 10 percent shrubs.

The natural plant community for this site is a mixture of salt-tolerant grasses and grass-like plants, forbs, and shrubs. This site is characterized by a high water table that historically did not exist until recent years, so the natural plant community is still in a state of development. At this time, it is not known if the present high water table and saline conditions will remain over an extended period of time. It is assumed that they will and that the plant community that has been established will remain with some minor fluctuations due mainly to the degree of salinity and the hydrology. The vegetation on most of the site is a shrub dominant type with saltcedar (tamarix) and baccharis being the two most prevalent species. In open areas and in the understory there are varying amounts of alkali sacaton, Texas dropseed, creeping muhly, jointtail, sedge and rushes, inland saltgrass, and occasionally some western wheatgrass. Forbs include portulaca species, kochia, smartweed, dock, and annual forbs. Occasionally a few willows and

Figure 20.—Typical area of the Wet Saline ecological site. Lenorah and Hindman complex, 0 to 2 percent slopes. Shrubs are dominantly saltcedar and baccharis.

cottonwoods are present. In areas where the water table is nearer the soil surface and in standing water, cattails may be present. Sedges, rushes, and cattails may dominate low depressions. In extremely saline areas, vegetation is sparse.

Windbreaks and Environmental Plantings

Charles Coffman, Wildlife Biologist, Natural Resources Conservation Service, Lubbock, Texas, prepared this section.

Windbreaks protect livestock, buildings, roads, yards, fruit trees, gardens, and cropland from wind and snow; help to keep snow on fields; and provide food and cover for wildlife. Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field. The interval depends on the erodibility of the soil. Living snow fences are plantings of mostly evergreen species that protect against drifting snow on private and public roads. Livestock protection plantings are generally narrow evergreen plantings that are shaped to provide protection from harsh winter conditions.

Environmental plantings (farmstead windbreaks) help to beautify and screen houses and other buildings, abate noise, and reduce wind. The plants, mostly evergreen shrubs and trees, are closely spaced. To ensure plant survival, a healthy planting stock of suitable species should be planted properly on a well-prepared site and maintained in good condition.

Table 11 shows the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates in the table are based on measurements and observation of established plantings that have been given adequate care. They can be used as a guide in planning windbreaks and screens. Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from the local office of the Natural Resources Conservation Service, the Texas Forest Service, the Texas AgriLife Extension Service, or from a commercial nursery.

Recreation

The soils of the survey area are rated in table 12 and table 13 according to limitations that affect their suitability for recreation. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the recreational uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Slightly limited* indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Good performance and low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The ratings in the tables are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation also are important. Soils that are subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

The information in the tables can be supplemented by other information in this survey, for example, interpretations for building site development, construction materials, sanitary facilities, and water management.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The ratings are based on the soil properties that affect the ease of developing camp areas and the performance of the areas after development. Slope, stoniness, and depth to bedrock or a cemented pan are the main concerns affecting the development of camp areas.

The soil properties that affect the performance of the areas after development are those that influence trafficability and promote the growth of vegetation, especially in heavily used areas. For good trafficability, the surface of camp areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The ratings are based on the soil properties that affect the ease of developing picnic areas and that influence trafficability and the growth of vegetation after development. Slope and stoniness are the main concerns affecting the development of picnic areas. For good trafficability, the surface of picnic areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Playgrounds require soils that are nearly level, are free of stones, and can withstand intensive foot traffic. The ratings are based on the soil properties that affect the ease of developing playgrounds and that influence trafficability and the growth of vegetation after development. Slope and stoniness are the main concerns affecting the development of playgrounds. For good trafficability, the surface of the playgrounds should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Paths and trails for hiking and horseback riding should require little or no slope modification through cutting and filling. The ratings are based on the soil properties that affect trafficability and erodibility. These properties are stoniness, depth to a water table, ponding, flooding, slope, and texture of the surface layer.

Off-road motorcycle trails require little or no site preparation. They are not covered with surfacing material or vegetation. Considerable compaction of the soil material is likely. The ratings are based on the soil properties that influence erodibility, trafficability, dustiness, and the ease of revegetation. These properties are stoniness, slope, depth to a water table, ponding, flooding, and texture of the surface layer.

Golf course fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. Irrigation is not considered in the ratings. The ratings are based on the soil properties that affect plant growth and trafficability after vegetation is established. The properties that affect plant growth are reaction; depth to a water table; ponding; depth to bedrock or a cemented pan; the available water capacity in the upper 40 inches; the content of salts, sodium, or calcium carbonate; and sulfidic materials. The properties that affect trafficability are flooding, depth to a water table, ponding, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer. The suitability of the soil for traps, tees, roughs, and greens is not considered in the ratings.

Wildlife Habitat

Charles Coffman, Wildlife Biologist, Natural Resources Conservation Service, Lubbock, Texas, prepared this section.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining and manipulating the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 14, table 15, table 16, table 17, and table 18, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. The degree and kind of soil limitation are given for grain and seed crop for food and cover; domestic grasses and legumes for food and cover; upland wild herbaceous plants; upland shrubs and vines; and freshwater wetland plants. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect wildlife habitat. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Slightly limited* indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Good performance and low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The elements of wildlife habitat are described in the following paragraphs.

Ratings for *grain and seed crops* for wildlife use as food and cover provide guidelines in the selection of sites that reflect soil properties and plant species necessary to sustain wildlife habitat and not to reflect commercial agronomic production. Soil properties and features that affect the growth of grain and seed crops are soil texture, organic mater content, the amount of rock fragments on or near the soil surface, available water capacity, depth to bedrock or pan, soil moisture and temperature regime, depth to high water table, soil moisture and temperature regime, ponding and flooding, permeability into the soil surface, slope, presence of excess salts, susceptibility of the soil surface to water and wind erosion. Examples of grain and seed crops are corn, wheat, oats, grain sorghum, and millet.

Ratings for *domestic grasses and legumes* for use as wildlife food and cover provide guidelines in the selection of sites that reflect soil properties and plant species necessary to sustain wildlife habitat and not to reflect commercial agronomic production. Soil properties and features that affect the growth of grasses and legumes are soil texture, organic mater content, the amount of rock fragments on or near the soil surface, available water capacity, depth to bedrock or pan, soil moisture and temperature regime, depth to high water table, soil moisture and temperature regime, ponding and flooding, permeability into the soil surface, slope, presence of excess salts, susceptibility of the soil surface to water and wind erosion. Examples of grasses and legumes are old world bluestem, lovegrass, kleingrass, clover, alfalfa, and Illinois bundleflower.

Ratings for *upland wild herbaceous plants* provide guidelines for determining soil quality as a medium for growing a diverse upland herbaceous plant community which is adapted to soil conditions that are drier than those common in the moist riparian and wetland zones but that are not s dry as in the upland desert areas. Soil properties and features that affect the ability of these species to thrive include soil texture, available water capacity, the presence of excess salts in the soil, soil moisture and temperature regimes, depth to high water table, the presence of rock fragments at the soil surface. Examples of upland wild herbaceous plants are little bluestem, switchgrass, western ragweed, croton and sideoats grama.

Ratings for *upland shrubs and vines* provide guidelines for determining soil quality as a medium for growing a diverse upland shrub and vine community which is adapted to soil conditions that are drier than those common in the moist riparian and wetland zones but that are not as dry as those in the upland desert area. Soil properties and features that affect the ability of these species to thrive include soil texture, soil organic matter, available water capacity, depth to bedrock or pan, the presence of excess salts in the soil, soil temperature and moisture regime, depth to high water table, and the presence of rock fragments at the soil surface. Examples of upland shrubs and vines are four-wing saltbush, shinnery oak, and flameleaf sumac.

Ratings for *freshwater wetland plants* provide guidelines for determining soil quality as a medium for growing plants which are adapted to wet soil conditions. The soils suitable for this habitat generally occur along marshes, depressions, bottom lands, backwater areas of flood plains, drainages adjacent to streams, springs and seeps or any other landscape position that are not directly affected by moving floodwaters but may have ponded water in some parts of the year. The soil properties and features that affect the ability of freshwater wetland plants to persist include soil texture, soil organic matter content, depth to high water table, ponding, the presence of excess salts in the soil, and soil reaction (pH). Examples of freshwater wetland plants are smartweed, saltgrass, bulrush, knotgrass, cattail, rushes, and sedges.

Hydric Soils

In this section, hydric soils are defined and described.

The three essential characteristics of wetlands are hydrophytic vegetation, hydric soils, and wetland hydrology (Cowardin and others, 1979; U.S. Army Corps of Engineers, 1987; National Research Council, 1995; Tiner, 1985). Criteria for each of the characteristics must be met for areas to be identified as wetlands.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). These soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 1995). The criteria are used to identify a phase of a soil series that normally is also a hydric soil. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2003) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period to be considered hydric, they generally exhibit certain properties that can be observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils in this survey area are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and others, 1998).

Additional information on hydric soils is available in the local office of the Natural Resources Conservation Service or on line at http://soildatamart.nrcs.usda.gov/.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil between the surface and a depth of 5 to 7 feet. Because *of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.*

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about particle-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 7 feet of the surface, soil wetness, depth to a water table, ponding, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Soil properties influence the development of building sites, including the selection of the site, the design of the structure, construction, performance after construction, and maintenance. Table 19 and table 20 show the degree and kind of soil limitations that affect dwellings with and without basements, small commercial buildings, local roads and streets, shallow excavations, and lawns and landscaping.

Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect building site development. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Slightly limited* indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Good performance and low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Dwellings are single-family houses of three stories or less. For dwellings without basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. For dwellings with basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of about 7 feet. The ratings for dwellings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility. Compressibility is inferred from the Unified classification. The properties that affect the ease and amount of excavation include depth to a water table, ponding, flooding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Small commercial buildings are structures that are less than three stories high and do not have basements. The foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. The ratings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility (which is inferred from the Unified classification). The properties that affect the ease and amount of excavation include flooding, depth to a water table, ponding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or soil material stabilized by lime or cement; and a surface of flexible material (asphalt), rigid material (concrete), or gravel with a binder. The ratings are based on the soil properties that affect the ease of excavation and grading and the traffic-supporting capacity. The properties that affect the ease of excavation and grading are depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, depth to a water table, ponding, flooding, the amount of large stones, and slope. The properties that affect the traffic-supporting capacity are soil strength (as inferred from the AASHTO group index number), subsidence, linear extensibility (shrink-swell potential), the potential for frost action, depth to a water table, and ponding.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for graves, utility lines, open ditches, or other purposes. The ratings are based on the soil properties that influence the ease of digging and the resistance to sloughing. Depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, the amount of large stones, and dense layers influence the ease of digging, filling, and compacting. Depth to the seasonal high water table, flooding, and ponding may restrict the period when excavations can be made. Slope influences the ease of using machinery. Soil texture, depth to the water table, and linear extensibility (shrink-swell potential) influence the resistance to sloughing.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. Irrigation is not considered in the ratings. The ratings are based on the soil properties that affect plant growth and trafficability after vegetation is established. The properties that affect plant growth are reaction; depth to a water table; ponding; depth to bedrock or a cemented pan; the available water capacity in the upper 40 inches; the content of salts, sodium, or calcium carbonate; and sulfidic materials. The properties that affect trafficability are flooding, depth to a water table, ponding, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer.

Sanitary Facilities

Table 21 and table 22 show the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, sanitary landfills, and daily cover for landfill. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Slightly limited* indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Good performance and low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 60 inches is evaluated. The ratings are based on the soil properties that affect absorption of the effluent, construction and maintenance of the system, and public health. Permeability, depth to a water table, ponding, depth to bedrock or a cemented pan, and flooding affect absorption of the effluent. Stones and boulders, ice, and bedrock or a cemented pan interfere with installation. Subsidence interferes with installation and maintenance. Excessive slope may cause lateral seepage and surfacing of the effluent in downslope areas.

Some soils are underlain by loose sand and gravel or fractured bedrock at a depth of less than 4 feet below the distribution lines. In these soils the absorption field may not adequately filter the effluent, particularly when the system is new. As a result, the ground water may become contaminated.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Considered in the ratings are slope, permeability, depth to a water table, ponding, depth to bedrock or a cemented pan, flooding, large stones, and content of organic matter.

Soil permeability is a critical property affecting the suitability for sewage lagoons. Most porous soils eventually become sealed when they are used as sites for sewage lagoons. Until sealing occurs, however, the hazard of pollution is severe. Soils that have a permeability rate of more than 2 inches per hour are too porous for the proper functioning of sewage lagoons. In these soils, seepage of the effluent can result in contamination of the ground water. Ground-water contamination is also a hazard if fractured bedrock is within a depth of 40 inches, if the water table is high enough to raise the level of sewage in the lagoon, or if floodwater overtops the lagoon.

A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor. If the lagoon is to be uniformly deep throughout, the slope must be gentle enough and the soil material must be thick enough over bedrock or a cemented pan to make land smoothing practical.

A *trench sanitary landfill* is an area where solid waste is placed in successive layers in an excavated trench. The waste is spread, compacted, and covered daily with a thin layer of soil excavated at the site. When the trench is full, a final cover of soil material at least 2 feet thick is placed over the landfill. The ratings in the table are based on the soil properties that affect the risk of pollution, the ease of excavation, trafficability, and revegetation. These properties include permeability, depth to bedrock or a cemented pan, depth to a water table, ponding, slope, flooding, texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, onsite investigation may be needed.

Hard, nonrippable bedrock, creviced bedrock, or highly permeable strata in or directly below the proposed trench bottom can affect the ease of excavation and the hazard of ground-water pollution. Slope affects construction of the trenches and the movement of surface water around the landfill. It also affects the construction and performance of roads in areas of the landfill.

Soil texture and consistence affect the ease with which the trench is dug and the ease with which the soil can be used as daily or final cover. They determine the workability of the soil when dry and when wet. Soils that are plastic and sticky when wet are difficult to excavate, grade, or compact and are difficult to place as a uniformly thick cover over a layer of refuse.

The soil material used as the final cover for a trench landfill should be suitable for plants. It should not have excess sodium or salts and should not be too acid. The surface layer generally has the best workability, the highest content of organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

In an *area sanitary landfill*, solid waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site. A final cover of soil material at least 2 feet thick is placed over the completed landfill. The ratings in the table are based on the soil properties that affect trafficability and the risk of pollution. These properties include flooding, permeability, depth to a water table, ponding, slope, and depth to bedrock or a cemented pan.

Flooding is a serious problem because it can result in pollution in areas downstream from the landfill. If permeability is too rapid or if fractured bedrock, a fractured cemented pan, or the water table is close to the surface, the leachate can contaminate the water supply. Slope is a consideration because of the extra grading required to maintain roads in the steeper areas of the landfill. Also, leachate may flow along the surface of the soils in the steeper areas and cause difficult seepage problems.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste. The ratings in the table also apply to the final cover for a landfill. They are based on the soil properties that affect workability, the ease of digging, and the ease of moving and spreading the material over the refuse daily during wet and dry periods. These properties include soil texture, depth to a water table, ponding, rock fragments, slope, depth to bedrock or a cemented pan, reaction, and content of salts, sodium, or lime.

Loamy or silty soils that are free of large stones and excess gravel are the best cover for a landfill. Clayey soils may be sticky and difficult to spread; sandy soils are subject to wind erosion.

Slope affects the ease of excavation and of moving the cover material. Also, it can influence runoff, erosion, and reclamation of the borrow area.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as the final cover for a landfill should be suitable for plants. It should not have excess sodium, salts, or lime and should not be too acid.

Construction Materials

Table 23 and table 24 show information about the soils as potential sources of gravel, sand, topsoil, reclamation material, and roadfill. Normal compaction, minor processing, and other standard construction practices are assumed.

The soils are rated *good, fair,* or *poor* as potential sources of topsoil, reclamation material, and roadfill. The features that limit the soils as sources of these materials are specified in the tables. The numerical ratings given after the specified features indicate the degree to which the features limit the soils as sources of topsoil, reclamation material, or roadfill. The lower the number, the greater the limitation.

The soils are rated as a *probable* or *improbable* source of sand and gravel. A rating of *probable* means that the source material is likely to be in or below the soil. The numerical ratings in these columns indicate the degree of probability. The number 0.00 indicates that the soil is an improbable source. A number between 0.00 and 1.00 indicates the degree to which the soil is a probable source of sand or gravel.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 23, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material. The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the Unified classification of the soil), the thickness of suitable material, and the content of rock fragments. If the lowest layer of the soil contains sand or gravel, the soil is rated as a probable source regardless of thickness. The assumption is that the sand or gravel layer below the depth of observation exceeds the minimum thickness.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area. The ratings are based on the soil properties that affect plant growth; the ease of excavating, loading, and spreading the material; and reclamation of the borrow area. Toxic substances, soil reaction, and the properties that are inferred from soil texture, such as available water capacity and fertility, affect plant growth. The ease of excavating, loading, and spreading is affected by rock fragments, slope, depth to a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, depth to a water table, rock fragments, depth to bedrock or a cemented pan, and toxic material.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Reclamation material is used in areas that have been drastically disturbed by surface mining or similar activities. When these areas are reclaimed, layers of soil material or unconsolidated geological material, or both, are replaced in a vertical sequence. The reconstructed soil favors plant growth. The ratings in the table do not apply to quarries and other mined areas that require an offsite source of reconstruction material. The ratings are based on the soil properties that affect erosion and stability of the surface and the productive potential of the reconstructed soil. These properties include the content of sodium, salts, and calcium carbonate; reaction; available water capacity; erodibility; texture; content of rock fragments; and content of organic matter and other features that affect fertility.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the whole soil, from the surface to a depth of about 5 feet. It is assumed that soil layers will be mixed when the soil material is excavated and spread.

The ratings are based on the amount of suitable material and on soil properties that affect the ease of excavation and the performance of the material after it is in place. The thickness of the suitable material is a major consideration. The ease of excavation is affected by large stones, depth to a water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the AASHTO classification of the soil) and linear extensibility (shrink-swell potential).

Water Management

Table 25, table 26, and table 27 provide information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; aquifer-fed excavated ponds; constructing grassed waterways and surface drains; constructing terraces and diversions; and tile drains and underground outlets. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. Embankments that have zoned construction (core and shell) are not considered. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

Constructing grassed waterways and surface drains. Grassed waterways and surface drains are natural or constructed channels, generally broad and shallow, that permit otherwise restricted infiltration to occur and will conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts and sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Constructing terraces and diversions. Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of soil blowing or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Tile drains and underground outlets. Tile drains and underground outlets require installation of subterranean plumbing or other outlet devices that would allow proper drainage of excess water within the soil which might otherwise cause management problems, such as buildup of salts from evaporation or a shallow water table. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect installation of tile drains and underground outlets. A restricted rooting depth, toxic substances such as salts and sodium, a severe hazard of soil blowing or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Soil interpretations for *irrigation all application methods* evaluate a soil's limitation(s) for irrigation practices. The ratings are for soils in their natural condition and do not consider present land use. The irrigation interpretations are not designed or intended to be used in a regulatory manner.

Irrigation practices are used to provide supplemental water to crops, orchards, vineyards, and vegetables in areas where natural precipitation will not support the production of the crops being grown.

The soil properties and qualities important in design and management of an irrigation practice are sodium adsorption ratio, depth to a seasonal high water table, available water capacity, air and water permeability, wind erodibility, erosion factor, slope, and flooding. The soil properties and qualities that influence installation and tillage are stones, depth to bedrock or cemented pan, and depth to a seasonal high water table. The properties and qualities that affect performance of the irrigation system are depth to bedrock or cemented pan, bulk density, the sodium adsorption ratio, salinity, and soil reaction.

Soil interpretations for *sprinkler irrigation* evaluate a soil's limitation(s) for sprinkler irrigation systems. The ratings are for soils in their natural condition and do not consider present land use. The irrigation interpretations are not designed or intended to be used in a regulatory manner.

Sprinkler irrigation systems apply irrigation water to a crop through a series of pipes and nozzles and can be either solid set or mobile. Generally, this type of irrigation system is suitable for small grains, row crops, vegetables, and orchards.

The soil properties and qualities important in the design and management of sprinkler irrigation systems are depth, available water holding capacity, sodium adsorption ratio, surface coarse fragments, air and water permeability, salinity, slope, wetness, and flooding. The features that affect performance of the system and plant growth are surface texture and rocks, salinity, sodium adsorption ratio, wetness, erosion potential, and available water holding capacity.

Soil interpretations for *drip or trickle irrigation* evaluate a soil's limitation(s) for surface drip irrigation of crops. This type of irrigation system applies water at a very slow rate near the plants. The ratings are for soils in their natural condition and do not consider present land use. The irrigation interpretations are not designed or intended to be used in a regulatory manner.

Drip or trickle irrigation systems are irrigation systems that supply water to the plant very slowly. Generally, drip irrigation systems are very efficient irrigation technologies in terms of both water and energy use and are suitable for use in some crops.

The soil properties and qualities important in the design and management of drip irrigation systems are depth, wetness, ponding, internal drainage, and flooding. The soil properties and qualities that influence installation are depth, flooding, and ponding. The features that affect performance of the system and plant growth are the amount of salts, lime, gypsum, or sodium.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey.

Soil properties are ascertained by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine particle-size distribution, plasticity, and compaction characteristics. Some of these results are reported in table 37.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties are shown in tables. They include engineering index properties, physical and chemical properties, and pertinent soil and water features.

Engineering Soil Properties

Table 28 gives the engineering classifications and the range of index properties for the layers of each soil in the survey area.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (ASTM, 1998) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 1998).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 28.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of particle-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is generally omitted in the table.

Physical Soil Properties

Table 29 shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In table 29, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In table 29, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In table 29, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3- or 1/10-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability (K-sat) refers to the ability of a soil to transmit water or air. The term "permeability," as used in soil surveys, indicates saturated hydraulic conductivity (K-sat). The estimates in the table indicate the rate of water movement, in inches per hour, when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at 1/3- or 1/10-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. Volume change is influenced by the amount and type of clay minerals in the soil.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 29, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained by returning crop residue to the soil. Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in table 29 as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of several factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and permeability. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are as follows:

1. Coarse sands, sands, fine sands, and very fine sands.

2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, ash material, and sapric soil material.

3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams.

4L. Calcareous loams, silt loams, clay loams, and silty clay loams.

4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay.

5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material.

6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay.

7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material.

8. Soils that are not subject to wind erosion because of coarse fragments on the surface or because of surface wetness.

Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Chemical Soil Properties

Table 30 shows estimates of some chemical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Cation-exchange capacity is the total amount of extractable bases that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. Soils having a low cation-exchange capacity hold fewer cations and may require more frequent applications of fertilizer than soils having a high cation-exchange capacity. The ability to retain cations reduces the hazard of ground-water pollution.

Effective cation-exchange capacity refers to the sum of extractable bases plus aluminum expressed in terms of milliequivalents per 100 grams of soil. It is determined for soils that have pH of less than 5.5.

Soil reaction is a measure of acidity or alkalinity. The pH of each soil horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Calcium carbonate equivalent is the percent of carbonates, by weight, in the fraction of the soil less than 2 millimeters in size. The availability of plant nutrients is influenced by the amount of carbonates in the soil. Incorporating nitrogen fertilizer into calcareous soils helps to prevent nitrite accumulation and ammonium-N volatilization.

Gypsum is expressed as a percent, by weight, of hydrated calcium sulfates in the fraction of the soil less than 20 millimeters in size. Gypsum is partially soluble in water. Soils that have a high content of gypsum may collapse if the gypsum is removed by percolating water.

Salinity is a measure of soluble salts in the soil at saturation. It is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of nonirrigated soils. The salinity of irrigated soils is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in the table. Salinity affects the suitability of a soil for crop production, the stability of soil if used as construction material, and the potential of the soil to corrode metal and concrete.

Sodium adsorption ratio (SAR) is a measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration. Soils that have SAR values of 13 or more may be characterized by an increased dispersion of organic matter and clay particles, reduced permeability and aeration, and a general degradation of soil structure.

Water Features

Table 31 gives estimates of various water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep and very deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep to very deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Surface runoff refers to the loss of water from an area by flow over the land surface. Surface runoff classes are based on slope, climate, and vegetative cover. It is assumed that the surface of the soil is bare and that the retention of surface water resulting from irregularities in the ground surface is minimal. The classes are negligible, very low, low, medium, high, and very high.

The *months* in the table indicate the portion of the year in which the feature is most likely to be a concern.

Water table refers to a saturated zone in the soil. The table indicates, by month, depth to the top (*upper limit*) and base (*lower limit*) of the saturated zone in most years. Estimates of the upper and lower limits are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely gray colors or mottles (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

Ponding is standing water in a closed depression. Unless a drainage system is installed, the water is removed only by percolation, transpiration, or evaporation. The table indicates *surface water depth* and the *duration* and *frequency of ponding*. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, rare, occasional, and frequent. *None* means that ponding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of ponding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs, on the average, once or less in 2 years (the chance of ponding is 5 to 50 percent in any year); and *frequent* that it occurs, on the average, more than once in 2 years (the chance of ponding is more than 50 percent in any year).

Flooding is the temporary inundation of an area caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

Duration and *frequency* are estimated. Duration is expressed as *extremely brief* if 0.1 hour to 4 hours, *very brief* if 4 hours to 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, very rare, rare, occasional, frequent, and very frequent. *None* means that flooding is not probable; *very rare* that it is very unlikely but possible under extremely unusual weather conditions (the chance of flooding is less than 1 percent in any year); *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is 1 to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); *frequent* that it is likely to occur often under normal weather conditions (the chance of flooding is more than 50 percent in any year but is less than 50 percent in all months in any year); and *very frequent* that it is likely to occur very often under normal weather conditions (the chance of flooding is more than 50 percent in all months of any year).

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

Soil Features

Table 32 gives estimates of various soil features. The estimates are used in land use planning that involves engineering considerations.

A *restrictive layer* is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers. The table indicates the hardness and thickness of the restrictive layer, both of which significantly affect the ease of excavation. *Depth* to top is the vertical distance from the soil surface to the upper boundary of the restrictive layer.

Subsidence is the settlement of organic soils or of saturated mineral soils of very low density. Subsidence generally results from either desiccation and shrinkage or oxidation of organic material, or both, following drainage. Subsidence takes place gradually, usually over a period of several years. The table shows the expected initial subsidence, which usually is a result of drainage, and total subsidence, which results from a combination of factors.

Potential for frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action.

Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel or concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel or concrete in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate,* or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion also is expressed as *low, moderate,* or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Physical and Chemical Analyses of Selected Soils

The results of physical analysis of several typical pedons in the survey area are given in table 33 and the results of chemical analysis in table 34. The results of clay mineralogy analysis are in table 35. The results of optical grain counts for selected soils are in table 36. The data are for soils sampled at carefully selected sites. Unless otherwise indicated, the pedons are typical of the series. They are described in the section "Soil Series and Their Morphology." Soil samples were analyzed by the National Soil Survey Laboratory, Natural Resources Conservation Service, Lincoln, Nebraska, and the Soil Characterization Laboratory, Texas Tech University, Lubbock, Texas.

Most determinations, except those for grain-size analysis and bulk density, were made on soil material smaller than 2 millimeters in diameter. Measurements reported as percent or quantity of unit weight were calculated on an ovendry basis. The methods used in obtaining the data are indicated in the list that follows. The codes in parentheses refer to published methods (USDA NRCS, 1996).

Sand—(0.05-2.0 mm fraction) weight percentages of material less than 2 mm (3A1).

Coarse materials—(2-75 mm fraction) weight estimates of the percentages of all material less than 75 mm (3B1).

Coarse materials—(2-250 mm fraction) volume estimates of the percentages of all material greater than 2 mm (3B2).

Silt—(0.002-0.05 mm fraction) pipette extraction, weight percentages of all material less than 2 mm (3A1).

Clay—(fraction less than 0.002 mm) pipette extraction, weight percentages of material less than 2 mm (3A1).

Water retained—pressure extraction, percentage of ovendry weight of less than 2 mm material; 1/3 or 1/10 bar (4B1), 15 bars (4B2).

Water-retention difference—between 1/3 bar and 15 bars for whole soil (4C1).

Bulk density—of less than 2 mm material, saran-coated clods field moist (4A1a), 1/3 bar (4A1d), ovendry (4A1h).

Linear extensibility—change in clod dimension based on whole soil (4D).

Organic carbon—wet combustion. Walkley-Black modified acid-dichromate, ferric sulfate titration (6A1c).

Organic carbon—dry combustion (6A2d).

Extractable cations—ammonium acetate pH 7.0, ICP; calcium (6N2i), magnesium (6O2h), sodium (6P2f), potassium (6Q2f).

Cation-exchange capacity—ammonium acetate, pH 7.0, steam distillation (5A8b).

Base saturation—ammonium acetate, pH 7.0 (5C1).

Reaction (pH)—1:1 water dilution (8C1f).
Carbonate as calcium carbonate—(fraction less than 2 mm [80 mesh]) manometric (6E1h).
Electrical conductivity—saturation extract (8A3a).
Sodium adsorption ratio (5E).
Clay mineralogy (7a2i).

Engineering Index Test Data

Table 37 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are representative of the series described in the section "Soil Series and Their Morphology." The soil samples were tested by the National Soil Survey Laboratory, Natural Resources Conservation Service, Lincoln, Nebraska.

The testing methods generally are those of the American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM) (AASHTO, 1998 and ASTM, 1998).

The tests and methods are AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO), D 422 (ASTM), D 2217 (ASTM); Liquid limit—T 89 (AASHTO), D 4318 (ASTM); Plasticity index—T 90 (AASHTO), D 4318 (ASTM).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (USDA NRCS, 1998 and 1999). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 38 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Twelve soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Alfisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Ustalf (*Ust*, meaning burnt, plus *alf*, from Alfisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; type of saturation; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Paleustalfs (*Pale*, meaning old development, plus *ustalf*, the suborder of the Alfisols that has a ustic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic subgroup is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other taxonomic class. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Aridic* identifies the subgroup that typifies the great group. An example is Aridic Paleustalfs.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle size, mineral content, soil temperature regime, soil depth, and reaction. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed, superactive, thermic Aridic Paleustalfs.

SERIES. The series consists of soils within a family that have horizons similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile.

Soil Series and Their Morphology

The Official Soil Series Description, including the range of important characteristics of the soils for the series in this survey area, are available at the local Natural Resources Conservation Service office or online at http://soils.usda.gov/technical/classification/osd/. The “survey area” as defined is part of a Major Land Resource Area (MLRA). Major Land Resource Areas are geographically associated land resource units. The dominant physical characteristics of an MLRA are land use, elevation and topography, climate, water, soils, and potential natural vegetation. The boundaries of Lynn County lie within two MLRAs. These are the Southern High Plains, Southern Part, MLRA-77C; and the Central Rolling Red Plains, Western Part, MLRA-78B.

Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil that is typical of the series is described. Most of the Official Series Descriptions are not exclusively located within the boundaries of Lynn County but are located in the MLRA survey areas of which Lynn County is a part.

The detailed description of each soil horizon follows standards in the "Soil Survey Manual" (USDA, 1993). Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" (USDA, 1999) and in "Keys to Soil Taxonomy" (USDA, 1998). Unless otherwise indicated, colors in the descriptions are for dry soil. Following the pedon description is the range of important characteristics of the soils in the series.

It should be noted that a few of the Official Series Descriptions have a different surface layer texture phase or different soil properties than what are described in some of the map units for Lynn County. Although the map unit surface texture phase or soil properties may be different from that of the typical pedon for the series, the map unit description falls within the range of characteristics for the series. All soil interpretations in the Lynn County soil survey are based on the map unit descriptions for the county.

The following is a list of all the soil series in Lynn County:

Formation of the Soils

In this section, the factors of soil formation, which have affected the soils of Lynn County, are discussed.

Factors of Soil Formation

Soils are three-dimensional bodies on the Earth's surface that are capable of supporting plants. Soil properties result from the parent material and from additions, removals, transfers, and transformations to the soil caused by climate, living organisms, topography, and time. Human activities may also be important.

The interaction of the five soil-forming factors results in differences among the soils. Climate and living organisms (plants and animals) are the active factors. They act on the parent material by influencing the weathering of rocks and through subsequent transportation of the material by water and wind. They slowly change the parent material into a natural body with genetically related horizons. The effects of climate and living organisms are influenced by the topography. Soils on flood plains, for example, are quite different from those on well-drained plains. The parent material also affects the kind of soil profile that can form and sometimes determines it almost entirely. Finally, time is needed to change parent material into soil. Generally, thousands of years are needed for distinct horizons to form.

Climate

Lynn County has a steppe climate and mild winters. The average rainfall is about 19 inches, but the amount varies greatly from year to year. The climate is uniform throughout the county, but its effects on soils have been modified locally by relief and runoff. The differences generally are not measurably affected by climate.

Because rainfall is low and there are long dry periods, soil development has been slow. Soils are seldom wet below the root zone, and consequently, most of the soils have a horizon of calcium carbonate accumulation. In Acuff, Amarillo, and Olton soils, the carbonates are leached from the surface and upper subsoil layers. Most soils have the layer of calcium carbonate, or caliche, at a depth of 12 to 60 inches. In Arch, Midessa, Posey, and Potter soils free calcium carbonate is present throughout the profile. In sandier soils and soils within depressions, such as Brownfield, Patricia, and Randall, usually the carbonates have been leached to below a depth of 60 inches.

Winds have played an important role in the development of the soils of Lynn County. Most of the parent sediments were deposited by wind during past geologic periods. Even today, high winds remove and deposit soil particles. Winds also are effective in recharging the soils with calcium carbonate as dust particles, thereby keeping the pH of the soils high. Locally, high winds deposited soil materials on the eastern and southern sides of some larger playas. Drake soils have formed in these sediments.

Warm temperatures have restricted the accumulation of organic matter in most of the soils, although they formed under prairie vegetation. Oxidation tends to accelerate the decomposition of organic matter. Sandy soils, such as Brownfield, Hindman, and Patricia, are low in organic matter. Acuff, Lofton, Olton, Ranco, and Sparenberg soils are relatively high in organic matter.

Living Organisms

Plants, animals, earthworms, and microorganisms are important in the formation of soils. The type and amount of plant growth is related to the climate, relief, and parent material. The native vegetation in Lynn County is mostly grass; some shrubs and a few small trees are also present. The type of grasses that grow on a particular kind of soil depends partly on the parent material. Short grasses grow on Olton and similar soils that have high clay content. Tall grasses grow on Brownfield and other sandy soils.

Prairie-type vegetation contributes relatively large amounts of organic matter to soils. Grass leaves and stems fall on the soil surface and decay. Roots decompose and distribute organic matter throughout the profile and provide abundant food for microorganisms. Insect casts and voids formed from decaying plant roots add greatly to the movement of air and water through the profile.

Prairie dogs affect soil development by their burrowing activities. The animals churn and mix the soil material. Krotovinas, or soil-filled animal burrows, are common in the subsoil of most of the soils in the county. Such calcareous soils as Arch, Drake, and Midessa have more krotovinas than do most other soils.

Topography

Topography, or lay of the land, influences the formation of soils through its effect on drainage, runoff, and erosion. The topography of Lynn County ranges from nearly level, flat areas to steep, dissected areas.

If other factors of soil formation are equal, the degree of profile development depends largely on the moisture that enters the soil system. Steep soils absorb less moisture and are more susceptible to erosion than soils in more level areas. Therefore, most steep soils have thinner, less developed profiles.

Nearly level to gently sloping soils, such as Acuff, Amarillo, and Olton, permit most of the rainfall to infiltrate; therefore, they are well developed. Mobeetie, Veal, Potter, Quinlan, and Yellowhouse soils are steeper, and runoff and geologic erosion have been high. Therefore, they are only weakly to moderately developed.

Soils in low, concave areas also show the influence of relief upon their development. Bippus, Lofton, and Zita soils are darker in color and higher in organic matter than soils in higher areas because extra water has produced more vegetation in these low areas. Soils in poorly drained areas, such as Ranco and Sparenberg soils in playas show the influence of excess water on soil development and profile morphology.

Time

Usually thousands of years are required for the formation of distinct horizons in soils. Differences in the length of time that parent material has been in place are generally reflected in the degree of development of the soil profile. The soils in Lynn County range from weakly developed to well developed. The weakly developed soils have little horizon development. Conversely, the well-developed soils have well expressed soil horizons. Berda, Drake, and Mobeetie soils are weakly developed soils as reflected in their weak horizonation. Silicate clay accumulation in the B horizons is not perceptible. Acuff, Amarillo, and Olton soils are well developed. These soils have well-expressed horizons, and silicate clay has been translocated from the surface horizon into the subsoil.

Parent Material

The kind of soil that forms in any given area depends greatly on the kind of parent material in that area. Parent material is the unconsolidated mass from which a soil is formed. It determines the chemical and mineralogical composition of a soil to a considerable extent.

The soils in Lynn County developed mostly in a thick eolian mantle, which comprises the Blackwater Draw Formation that blankets most of the county. This mantle was formerly referred to collectively as “cover sands” (Frye and Byron, 1957).

Acuff, Amarillo, Estacado, Olton, and Patricia soils developed in the eolian mantle. In areas that have more caliche, or where caliche layers are closer to the surface, Pep and Posey soils have developed. Arch, Midessa, Portales, and Tokio soils formed in loamy, calcareous sediments generally associated with playa or salt lake basins. Ranco and Sparenberg soils formed in clayey sediments on the floor of playas. On the eastern and southern side of saline lake basins and many playa basins, a dune of relatively recent loamy, calcareous material occurs. Drake soils have formed in these dunes in Holocene time.

Parts of Lynn County where ancient valleys and stream channels once occupied the landscape are now partially buried by wind-blown sediments. Some of these areas have an intermittent high water table, resulting in small saline lakes. The Cedarlake, Hindman, and Lenorah soils developed in these calcareous, alluvial, and eolian sediments.

The top of the Ogallala Formation is the thick layer of indurated caliche, or “caprock,” that is prominent along the margin of the High Plains and the edge of larger drainageways (Evans and Meade, 1945). Potter soils have developed in the degrading indurated caliche. Areas of Ogallala below the exposed caliche are on an erosional surface where alluvial and colluvial sediments have formed Berda, Mobeetie, and Veal soils.

On the western side of saline lake basins and below the “caprock” in some areas, a narrow band of Cretaceous sediments are exposed (anonymous, 1992) The Creta and Yellowhouse soils formed from limestone and shale of this age.

Areas of Triassic sediments, primarily the Dockum Group (USDA SCS, 1959), are exposed in Moore’s Canyon in the southeast part of the county. Obaro and Quinlan soils formed in material weathered from Triassic sandstone and shale.

Processes of Soil Formation

The soil forming factors produce a succession of layers, or horizons, in the soil profile. The horizons differ in one or more properties, such as thickness, color, texture, structure, consistence, porosity, and reaction.

Most profiles have three major horizons. These are the A, B, and C horizons. Several processes are involved in the formation of these horizons. In Lynn County, the main processes are the leaching of calcium carbonate and other salts and bases, the accumulation of organic matter, and the formation and translocation of silicate clay minerals. In most of the soils, more than one of these processes have been active in the development of the horizons.

The A horizon is the surface layer. It is the horizon that has the maximum accumulation of organic matter. The soils in Lynn County range from low to high in organic matter content. Various dissolved or suspended materials, such as calcium carbonate, organic matter, salt, and clay, may have been translocated out of the A horizon into the B horizon.

The B horizon lies directly below the A horizon. It is the horizon that has the maximum accumulation of materials moved in solution or suspension, or it is an altered horizon with distinct structure. A Bk horizon has an accumulation of calcium carbonate, which is commonly called caliche. Most of the soils have a Bk horizon. A Bkm horizon indicates continuous or nearly continuous cementation of calcium carbonate that is physically root-restrictive. Arvana, Kimberson, and Sharvana have a Bkm horizon. A Bt horizon has a significant accumulation of silicate clay. Acuff, Amarillo, and Olton soils have a Bt horizon. Subsoil layers that have a distinct structure and little evidence of accumulation of dissolved or suspended materials are designated as Bw horizons. Bippus and Berda soils have a Bw horizon. Subsoil layers that have slickensides, which are a direct result from the shrinking and swelling of clay minerals and shear failure, commonly at angles of 20 to 60 degrees above horizontal are designated as Bss horizons. Ranco and Sparenberg soils have Bss horizons.

The C horizon is little affected by soil-forming processes. It consists mainly of unconsolidated sediments or weathered or soft bedrock that can be dug with a spade when moist. Lenorah soils have a C horizon. A Cr layer is weathered or soft bedrock, such as shale, siltstone, sandstone, or weakly cemented bedrock. Creta and Yellowhouse soils have a Cr layer.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well-aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali (sodic) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvial fan. The fanlike deposit of a stream where it issues from a gorge upon a plain or of a tributary stream near or at its junction with its main stream.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Alpha,alpha-dipyridyl. A dye that when dissolved in 1N ammonium acetate is used to detect the presence of reduced iron (Fe II) in the soil. A positive reaction indicates a type of redoximorphic feature.

Animal unit month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Aquic conditions. Current soil wetness characterized by saturation, reduction, and redoximorphic features.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control is extremely difficult.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Association, soil. A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Backslope. The position that forms the steepest and generally linear, middle portion of a hillslope. In profile, backslopes are commonly bounded by a convex shoulder above and a concave footslope below.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Base slope. A geomorphic component of hills consisting of the concave to linear (perpendicular to the contour) slope that, regardless of the lateral shape, forms an apron or wedge at the bottom of a hillside dominated by colluvium and slope-wash sediments (for example, slope alluvium).

Bedding planes. Fine strata, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediment.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Blowout. A shallow depression from which all or most of the soil material has been removed by the wind. A blowout has a flat or irregular floor formed by a resistant layer or by an accumulation of pebbles or cobbles. In some blowouts the water table is exposed.

Bottom land. The normal flood plain of a stream, subject to flooding.

Breaks. The steep and very steep broken land at the border of an upland summit that is dissected by ravines.

Brush management. Use of mechanical, chemical, or biological methods to make conditions favorable for reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Caliche. A more or less cemented deposit of calcium carbonate in soils of warm-temperate, subhumid to arid areas. Caliche occurs as soft, thin layers in the soil or as hard, thick beds directly beneath the solum, or it is exposed at the surface by erosion.

California bearing ratio (CBR). The load-supporting capacity of a soil as compared to that of standard crushed limestone, expressed as a ratio. First standardized in California. A soil having a CBR of 16 supports 16 percent of the load that would be supported by standard crushed limestone, per unit area, with the same degree of distortion.

Canyon. A long, deep, narrow, very steep sided valley with high, precipitous walls in an area of high local relief.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Catsteps. Very small, irregular terraces on steep hillsides, especially in pasture, formed by the trampling of cattle or the slippage of saturated soil.

Channery soil material. Soil material that has, by volume, 15 to 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a channer.

Chemical treatment. Control of unwanted vegetation through the use of chemicals.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay depletions. Low-chroma zones having a low content of iron, manganese, and clay because of the chemical reduction of iron and manganese and the removal of iron, manganese, and clay. A type of redoximorphic depletion.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Climax plant community. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse textured soil. Sand or loamy sand.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material. Material that has 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.

COLE (coefficient of linear extensibility). See Linear extensibility.

Colluvium. Soil material or rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Concretions. Cemented bodies with crude internal symmetry organized around a point, a line, or a plane. They typically take the form of concentric layers visible to the naked eye. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up concretions. If formed in place, concretions of iron oxide or manganese oxide are generally considered a type of redoximorphic concentration.

Congeliturbate. Soil material disturbed by frost action.

Conglomerate. A coarse grained, clastic rock composed of rounded or subangular rock fragments more than 2 millimeters in diameter. It commonly has a matrix of sand and finer textured material. Conglomerate is the consolidated equivalent of gravel.

Conservation cropping system. Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the "Soil Survey Manual."

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cropping system. Growing crops according to a planned system of rotation and management practices.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cross-slope farming. Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

Cryptogams. Plants in the group of mosses, lichens, and ferns.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Decreasers. The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Depth, soil. Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

Dip slope. A slope of the land surface, roughly determined by and approximately conforming to the dip of the underlying bedrock.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Divided-slope farming. A form of field stripcropping in which crops are grown in a systematic arrangement of two strips, or bands, across the slope to reduce the hazard of water erosion. One strip is in a close-growing crop that provides protection from erosion, and the other strip is in a crop that provides less protection from erosion. This practice is used where slopes are not long enough to permit a full stripcropping pattern to be used.

Drainage class (natural). Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained,* and *very poorly drained*. These classes are defined in the "Soil Survey Manual."

Drainage, surface. Runoff, or surface flow of water, from an area.

Draw. A small stream valley that generally is more open and has broader bottom land than a ravine or gulch.

Ecological site. An area where climate, soil, and relief are sufficiently uniform to produce a distinct potential natural plant community. An ecological site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other ecological sites in kind and/or proportion of species or in total production.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Endosaturation. A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Ephemeral stream. A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Episaturation. A type of saturation indicating a perched water table in a soil in which saturated layers are underlain by one or more unsaturated layers within 2 meters of the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Erosion pavement. A layer of gravel or stones that remains on the surface after fine particles are removed by sheet or rill erosion.

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Synonym: scarp.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Excess lime (in tables). Excess carbonates in the soil that restrict the growth of some plants.

Excess salts (in tables). Excess water-soluble salts in the soil that restrict the growth of most plants.

Excess sodium (in tables). Excess exchangeable sodium in the soil. The resulting poor physical properties restrict the growth of plants.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grain is grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fan terrace. A relict alluvial fan, no longer a site of active deposition, incised by younger and lower alluvial surfaces.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity*.

Fill slope. A sloping surface consisting of excavated soil material from a road cut. It commonly is on the downhill side of the road.

Fine textured soil. Sandy clay, silty clay, or clay.

Firebreak. Area cleared of flammable material to stop or help control creeping or running fires. It also serves as a line from which to work and to facilitate the movement of firefighters and equipment. Designated roads also serve as firebreaks.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flaggy soil material. Material that has, by volume, 15 to 35 percent flagstones. Very flaggy soil material has 35 to 60 percent flagstones, and extremely flaggy soil material has more than 60 percent flagstones.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Fluvial. Of or pertaining to rivers; produced by river action, as a fluvial plain.

Foothill. A steeply sloping upland that has relief of as much as 1,000 feet (300 meters) and fringes a mountain range or high-plateau escarpment.

Footslope. The position that forms the inner, gently inclined surface at the base of a hillslope. In profile, footslopes are commonly concave. A footslope is a transition zone between upslope sites of erosion and transport (shoulders and backslopes) and downslope sites of deposition (toeslopes).

Forb. Any herbaceous plant not a grass or a sedge.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gilgai. Commonly, a succession of microbasins and microknolls in nearly level areas or of microvalleys and microridges parallel with the slope. Typically, the microrelief of clayey soils that shrink and swell considerably with changes in moisture content.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that has 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water. Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Head out. To form a flower head.

Head slope. A geomorphic component of hills consisting of a laterally concave area of a hillside, especially at the head of a drainageway. The overland waterflow is converging.

High-residue crops. Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

Hill. A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline; hillsides generally have slopes of more than 15 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Igneous rock. Rock formed by solidification from a molten or partially molten state. Major varieties include plutonic and volcanic rock. Examples are andesite, basalt, and granite.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Increasers. Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasers commonly are the shorter plants and the less palatable to livestock.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Interfluve. An elevated area between two drainageways that sheds water to those drainageways.

Intermittent stream. A stream, or reach of a stream, that flows for prolonged periods only when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Invaders. On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, plants invade following disturbance of the surface.

Iron depletions. Low-chroma zones having a low content of iron and manganese oxide because of chemical reduction and removal, but having a clay content similar to that of the adjacent matrix. A type of redoximorphic depletion.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Knoll. A small, low, rounded hill rising above adjacent landforms.

K-sat. Saturated hydraulic conductivity. (See Permeability.)

Lacustrine deposit. Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Leeward. The side or slope sheltered or located away from the wind; downwind.

Linear extensibility. Refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. Linear extensibility is used to determine the shrink-swell potential of soils. It is an expression of the volume change between the water content of the clod at 1/3- or 1/10-bar tension (33kPa or 10kPa tension) and oven dryness. Volume change is influenced by the amount and type of clay minerals in the soil. The volume change is the percent change for the whole soil. If it is expressed as a fraction, the resulting value is COLE, coefficient of linear extensibility.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low-residue crops. Such crops as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

Low strength. The soil is not strong enough to support loads.

Masses. Concentrations of substances in the soil matrix that do not have a clearly defined boundary with the surrounding soil material and cannot be removed as a discrete unit. Common compounds making up masses are calcium carbonate, gypsum or other soluble salts, iron oxide, and manganese oxide. Masses consisting of iron oxide or manganese oxide generally are considered a type of redoximorphic concentration.

Mechanical treatment. Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mesa. A broad, nearly flat topped and commonly isolated upland mass characterized by summit widths that are more than the heights of bounding erosional scarps.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Mollic epipedon. A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Descriptive terms are as follows: abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine indicates less than 5 millimeters (about 0.2 inch); medium, from 5 to 15 millimeters (about 0.2 to 0.6 inch);* and *coarse, more than 15 millimeters (about 0.6 inch)*.

Mudstone. Sedimentary rock formed by induration of silt and clay in approximately equal amounts.

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Natric horizon. A special kind of argillic horizon that contains enough exchangeable sodium to have an adverse effect on the physical condition of the subsoil.

Neutral soil. A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nodules. Cemented bodies lacking visible internal structure. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up nodules. If formed in place, nodules of iron oxide or manganese oxide are considered types of redoximorphic concentrations.

Nose slope. A geomorphic component of hills consisting of the projecting end (laterally convex area) of a hillside. The overland waterflow is predominantly divergent.

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Very low	less than 0.5 percent
Low	0.5 to 1.0 percent
Moderately low	1.0 to 2.0 percent
Moderate	2.0 to 4.0 percent
High	4.0 to 8.0 percent
Very high	more than 8.0 percent

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Parna. A term used, especially in southeast Australia and the southwestern USA, for silt and sand-sized aggregrates of eolian clay occurring as sheets.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedisediment. A thin layer of alluvial material that mantles an erosion surface and has been transported to its present position from higher lying areas of the erosion surface.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permafrost. Layers of soil, or even bedrock, occurring in arctic or subarctic regions, in which a temperature below freezing has existed continuously for a long time.

Permeability. The quality of the soil that enables water or air to move downward through the profile. The rate at which a saturated soil transmits water is accepted as a measure of this quality. In soil physics, the rate is referred to as "saturated hydraulic conductivity," which is defined in the "Soil Survey Manual." In line with conventional usage in the engineering profession and with traditional usage in published soil surveys, this rate of flow continues to be expressed as "permeability." Terms describing permeability, measured in inches per hour, are as follows:

Extremely slow	0.0 to 0.01 inch
Very slow	0.01 to 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plateau. An extensive upland mass with relatively flat summit area that is considerably elevated (more than 100 meters) above adjacent lowlands and separated from them on one or more sides by escarpments.

Playa. The generally dry and nearly level lake plain that occupies the lowest parts of closed depressional areas, such as those on intermontane basin floors. Temporary flooding occurs primarily in response to precipitation and runoff.

Playa dune. A linear or curvilinear ridge of windblown, granular material (generally sand or parna) removed from the adjacent basin by wind erosion (deflation), and deposited on the leeward (prevailing downwind) margin of a playa, playa basin, or salina basin. The dune may be barren or vegetated.

Playa floor. The lowest extensive, flat to slightly concave surface within a playa basin, consisting of a dry lake bed or lake plain underlain by stratified clay, silt, or sand, and commonly by soluble salts.

Playa lake. A shallow, intermittent lake in an arid or semiarid region, covering or occupying a playa in the wet season but subsequently drying up; an *ephemeral lake* that upon evaporation leaves or forms a playa. Syn: *playa*

Playa rim. The convex, upper margin (shoulder) of a playa basin where the playa slope intersects the surrounding terrain.

Playa slope. The generally concave to slightly convex area within a playa basin that lies between the relatively level playa floor below (or playa step, if present) and the convex playa rim above. Overland flow is typically parallel down slope.

Playa step. The relatively level or gently inclined “terrace-like” bench or toeslope within a large playa basin flanking and topographically higher than the playa floor and below the playa slope; a bench or step-like surface within a playa basin that breaks the continuity of the playa slope and is modified by erosion and/or deposition. Temporary ponding may occur in response to precipitation/runoff events.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid or very rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Potential native plant community. See Climax plant community.

Potential rooting depth (effective rooting depth). Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Prescribed burning. Deliberately burning an area for specific management purposes, under the appropriate conditions of weather and soil moisture and at the proper time of day.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use. Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This practice increases the vigor and reproduction capacity of the key plants and promotes the accumulation of litter and mulch necessary to conserve soil and water.

Rangeland. Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid	less than 3.5
Extremely acid	3.5 to 4.4
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Slightly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Red beds. Sedimentary strata that are mainly red and are made up largely of sandstone and shale.

Redoximorphic concentrations. Nodules, concretions, soft masses, pore linings, and other features resulting from the accumulation of iron or manganese oxide. An indication of chemical reduction and oxidation resulting from saturation.

Redoximorphic depletions. Low-chroma zones from which iron and manganese oxide or a combination of iron and manganese oxide and clay has been removed. These zones are indications of the chemical reduction of iron resulting from saturation.

Redoximorphic features. Redoximorphic concentrations, redoximorphic depletions, reduced matrices, a positive reaction to alpha,alpha-dipyridyl, and other features indicating the chemical reduction and oxidation of iron and manganese compounds resulting from saturation.

Reduced matrix. A soil matrix that has low chroma in situ because of chemically reduced iron (Fe II). The chemical reduction results from nearly continuous wetness. The matrix undergoes a change in hue or chroma within 30 minutes after exposure to air as the iron is oxidized (Fe III). A type of redoximorphic feature.

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.
Relief. The elevations or inequalities of a land surface, considered collectively.
Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.
Rill. A steep-sided channel resulting from accelerated erosion. A rill generally is a few inches deep and not wide enough to be an obstacle to farm machinery.
Road cut. A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.
Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.
Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.
Root zone. The part of the soil that can be penetrated by plant roots.
Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.
Salina. (a) A place where crystalline salt deposits are formed or found, such as a salt flat or pan, a salada, or a salt lick; esp. a salt-encrusted playa or a *wet playa*. (b) A body of saline water, such as a salt pond, lake, well, or spring, or a playa lake, that has a high concentration of salts.
Saline lake. An inland body of water situated in an arid or semiarid region, having no outlet to the sea, and containing a high concentration of dissolved salts (principally sodium chloride). See also: *Salina*
Saline soil. A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.
Saline-Sodic Soil. A soil containing sufficient exchangeable sodium to interfere with the growth of most crop plants and containing appreciable quantities of soluble salts. The exchangeable sodium ratio is greater than 0.15, conductivity of the soil solution, at saturated water content, of >4dSm-1 (at 25º C.) and the pH is usually 8.5 or less in the saturated soil.
Salty water (in tables). Water that is too salty for consumption by livestock.
Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.
Sandstone. Sedimentary rock containing dominantly sand-sized particles.
Saturation. Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.
Scarification. The act of abrading, scratching, loosening, crushing, or modifying the surface to increase water absorption or to provide a more tillable soil.
Second bottom. The first terrace above the normal flood plain (or first bottom) of a river.
Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.
Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.
Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike All the soils of a given series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shoulder. The position that forms the uppermost inclined surface near the top of a hillslope. It is a transition from backslope to summit. The surface is dominantly convex in profile and erosional in origin.

Shrink-swell (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Side slope. A geomorphic component of hills consisting of a laterally planar area of a hillside. The overland waterflow is predominantly parallel.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio. The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slippage (in tables). Soil mass susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. In this survey, classes for simple slopes are as follows:

Nearly level	0 to 1 percent
Very gently sloping	1 to 3 percent
Gently sloping	3 to 5 percent
Moderately sloping	5 to 8 percent
Strongly sloping	8 to 12 percent
Moderately steep	12 to 20 percent
Steep	20 to 45 percent
Very steep	45 percent and higher

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Sodic (alkali) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Sodicity. The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium adsorption ratio (SAR) of a saturation extract, or the ratio of Na+ to Ca ++ + Mg++. The degrees of sodicity and their respective ratios are:

Slight	less than 13:1
Moderate	13-30:1
Strong	more than 30:1

Sodium adsorption ratio (SAR). A measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration.

Soft bedrock. Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 mm in equivalent diameter and ranging between specified size limits. The names and sizes, in mm, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy (laminated)*, *prismatic (vertical axis of aggregates longer than horizontal)*, *columnar (prisms with rounded tops)*, *blocky (angular or subangular)*, and *granular. Structureless soils are either single grained (each grain by itself, as in dune sand)* or *massive (the particles adhering without any regular cleavage, as in many hardpans)*.

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Summer fallow. The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

Summit. The topographically highest position of a hillslope. It has a nearly level (planar or only slightly convex) surface.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

Talus. Fragments of rock and other soil material accumulated by gravity at the foot of cliffs or steep slopes.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior. Soils are recognized as taxadjuncts only when one or more of their characteristics are slightly outside the range defined for the family of the series for which the soils are named.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material that is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toeslope. The position that forms the gently inclined surface at the base of a hillslope. Toeslopes in profile are commonly gentle and linear and are constructional surfaces forming the lower part of a hillslope continuum that grades to valley or closed-depression floors.

Too arid (in tables). The soil is dry most of the time, and vegetation is difficult to establish.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland. Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial meltwater. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Water bars. Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windward. The side located toward the direction from which the wind is blowing; facing the wind.

Tables

Table 1.--Temperature and Precipitation

(Recorded in the period 1971-2000 at Tahoka, Texas)

Month	Temperature (Degrees F): Average daily maximum	Average daily minimum	Average	2 years in 10 will have: Maximum temperature higher than	2 years in 10 will have: Minimum temperature less than	Average number of growing degree days*	Precipitation (Inches): Average	2 years in 10 will have: less than	2 years in 10 will have: more than	Average number of days w/0.1 or more	Average Snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January	53.4	25.1	39.2	79	5	13	0.66	0.27	1.22	1	3.1
February	59.4	28.9	44.2	84	7	46	0.79	0.19	1.37	2	2.4
March	67.7	35.2	51.4	90	15	140	0.71	0.16	1.19	1	0.4
April	75.9	44.2	60.1	95	26	322	1.48	0.35	2.55	2	0.3
May	83.4	54.6	69.0	102	39	584	2.74	1.31	3.97	4	0.0
June	90.0	63.1	76.5	105	51	794	3.22	1.26	5.07	4	0.0
July	92.0	66.5	79.3	104	59	901	2.61	0.81	4.08	4	0.0
August	90.3	65.0	77.6	102	57	852	2.23	0.55	3.56	4	0.0
September	84.0	58.2	71.1	99	39	630	2.65	0.91	4.42	4	0.0
October	75.7	47.3	61.5	94	29	369	1.73	0.26	2.94	3	0.1
November	63.3	35.0	49.2	85	16	106	0.85	0.30	1.47	2	1.1
December	55.4	27.3	41.3	78	7	22	0.83	0.22	1.42	2	2.0
Yearly:											
Average	74.2	45.9	60.0	---	---	---	----	----	----	---	---
Extreme	111	-3	---	106	2	---	----	----	----	---	---
Total	---	---	---	---	---	4,779	20.50	16.86	23.81	33	9.5

Average number of days per year with at least 1 inch of snow on the ground: 5

*A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (threshold: 50.0 degrees F).

Table 2.--Freeze Dates in Spring and Fall

(Recorded in the period 1971-2000 at Tahoka, Texas)

Probability	Temperature: 24°F or lower	Temperature: 28°F or lower	Temperature: 32°F or lower
Last freezing Temperature in spring:			
1 year in 10 later than--	April 7	April 7	April 16
2 years in 10 later than--	March 29	April 3	April 12
5 years in 10 later than--	March 12	March 26	April 3
First freezing temperature in fall:			
1 year in 10 earlier than--	November 4	October 29	October 16
2 years in 10 earlier than--	November 11	November 3	October 23
5 years in 10 earlier than--	November 24	November 13	November 3

Table 3.--Growing Season

(Recorded for the period 1971-2000 at Tahoka, Texas)

Probability	Daily Minimum Temperature: Number of days higher than 24°F	Daily Minimum Temperature: Number of days higher than 28°F	Daily Minimum Temperature: Number of days higher than 32°F
	Days	Days	Days
9 years in 10	224	211	193
8 years in 10	235	218	200
5 years in 10	256	231	214
2 years in 10	277	245	228
1 year in 10	287	252	235

Table 4.--Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
AcA	Acuff loam, 0 to 1 percent slopes	156,176	27.3
AcB	Acuff loam, 1 to 3 percent slopes	40,455	7.1
AfA	Amarillo fine sandy loam, 0 to 1 percent slopes	75,160	13.2
AfB	Amarillo fine sandy loam, 1 to 3 percent slopes	62,167	10.9
ArA	Arch loam, 0 to 1 percent slopes	2,279	0.4
AsA	Arch fine sandy loam, 0 to 1 percent slopes	883	0.2
AvA	Arvana fine sandy loam, 0 to 1 percent slopes	2,734	0.5
AvB	Arvana fine sandy loam, 1 to 3 percent slopes	6,741	1.2
BcA	Bippus clay loam, 0 to 2 percent slopes, occasionally flooded	888	0.2
BeD	Berda loam, 5 to 8 percent slopes	3,635	0.6
BHC	Brownfield soils, 1 to 8 percent slopes, hummocky	3,237	0.6
BP	Borrow pits	273	*
BrB	Brownfield fine sand, 0 to 3 percent slopes	6,834	1.2
CdA	Cedarlake sandy clay loam, 0 to 1 percent slopes, frequently ponded	628	0.1
CeC	Creta loam, 1 to 5 percent slopes	962	0.2
ChA	Chapel clay, 0 to 1 percent slopes, occasionally ponded	1,340	0.2
DRC	Drake soils, 1 to 8 percent slopes	9,035	1.6
DRE	Drake soils, 8 to 20 percent slopes	1,791	0.3
EPA	Estacado and Pep loams, 0 to 1 percent slopes	22,518	3.9
EsA	Estacado loam, 0 to 1 percent slopes	9,134	1.6
EsB	Estacado loam, 1 to 3 percent slopes	5,841	1.0
KmB	Kimberson gravelly loam, 0 to 3 percent slopes	876	0.2
LhA	Lenorah-Hindman complex, 0 to 2 percent slopes	4,984	0.9
LMA	Lamesa soils, 0 to 1 percent slopes, frequently ponded	455	*
LoA	Lofton clay loam, 0 to 1 percent slopes	4,213	0.7
M-W	Miscellaneous water	193	*
MdA	Midessa fine sandy loam, 0 to 1 percent slopes	5,747	1.0
MdB	Midessa fine sandy loam, 1 to 3 percent slopes	11,381	2.0
MdC	Midessa fine sandy loam, 3 to 8 percent slopes	458	*
MPC	Midessa and Posey fine sandy loams, 3 to 8 percent slopes	844	0.1
MPP	Midessa, Potter, and Posey soils, 3 to 12 percent slopes	639	0.1
MVE	Mobeetie-Veal-Potter association, 5 to 20 percent slopes	1,607	0.3
OBG	Obaro and Quinlan association, 3 to 30 percent slopes	1,448	0.3
OcA	Olton clay loam, 0 to 1 percent slopes	7,336	1.3
PAB	Patricia and Amarillo loamy fine sands, 0 to 3 percent slopes	33,019	5.8
PeA	Pep loam, 0 to 1 percent slopes	1,552	0.3
PeB	Pep loam, 1 to 3 percent slopes	2,401	0.4
PGE	Potter soils, 3 to 20 percent slopes	11,353	2.0
PoA	Portales loam, 0 to 1 percent slopes	6,600	1.2
PoB	Portales loam, 1 to 3 percent slopes	9,112	1.6
PsA	Posey fine sandy loam, 0 to 1 percent slopes	2,700	0.5
PsB	Posey fine sandy loam, 1 to 3 percent slopes	16,949	3.0
RcA	Ranco clay, 0 to 1 percent slopes, frequently ponded	2,029	0.4
SgA	Seagraves fine sandy loam, 0 to 1 percent slopes	597	0.1
ShB	Sharvana fine sandy loam, 0 to 3 percent slopes	3,477	0.6
SL	Water, intermittent, salt lake	3,382	0.6
SpA	Sparenberg clay, 0 to 1 percent slopes, occasionally ponded	7,027	1.2
TkA	Tokio fine sandy loam, 0 to 1 percent slopes	3,122	0.5
TkB	Tokio loamy fine sand, 0 to 2 percent slopes	748	0.1
W	Water	610	0.1
YRG	Yellowhouse soils and Rock outcrop, 3 to 45 percent slopes	1,674	0.3
ZfA	Zita fine sandy loam, 0 to 1 percent slopes	6,254	1.1
ZfB	Zita fine sandy loam, 1 to 3 percent slopes	849	0.1
ZmA	Zita loam, 0 to 1 percent slopes	5,045	0.9
	Total	571,392	100.0

* Less than 0.1 percent.

Table 5.--Irrigated and Nonirrigated Yields by Map Unit Component

(Yields in the "N" columns are for nonirrigated areas; those in the "I" columns are for irrigated areas. Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil.)

Map symbol and soil name	Land capability		Cotton lint		Grain sorghum		Peanuts		Wheat	
	N	I	N	I	N	I	N	I	N	I
			Lbs	Lbs	Bu	Bu	Lbs	Lbs	Bu	Bu
AcA:										
Acuff------------	3e	2e	375.00	1,100.00	30.00	120.00	---	---	20.00	60.00
AcB:										
Acuff------------	3e	3e	350.00	1,000.00	25.00	110.00	---	---	18.00	55.00
AfA:										
Amarillo---------	3e	2e	400.00	1,200.00	25.00	110.00	---	5,500.00	18.00	55.00
AfB:										
Amarillo---------	3e	3e	350.00	1,100.00	22.00	100.00	---	5,000.00	16.00	50.00
ArA:										
Arch-------------	4e	3e	200.00	600.00	16.00	45.00	---	---	14.00	35.00
AsA:										
Arch-------------	4e	3e	200.00	600.00	16.00	45.00	---	---	14.00	35.00
AvA:										
Arvana-----------	3e	2e	325.00	900.00	22.00	90.00	---	---	16.00	50.00
AvB:										
Arvana-----------	3e	3e	300.00	800.00	20.00	80.00	---	---	14.00	45.00
BcA:										
Bippus-----------	2w	2w	375.00	1,100.00	30.00	120.00	---	---	25.00	65.00
BeD:										
Berda------------	6e	---	---	---	---	---	---	---	---	---
BHC:										
Brownfield-------	6e	---	---	---	---	---	---	---	---	---
BP:										
Borrow pits------	8s	---	---	---	---	---	---	---	---	---
BrB:										
Brownfield-------	6e	4e	---	---	---	65.00	---	4,500.00	---	40.00

Table 5.--Irrigated and Nonirrigated Yields by Map Unit Component--Continued

Map symbol and soil name	Land capability		Cotton lint		Grain sorghum		Peanuts		Wheat	
	N	I	N	I	N	I	N	I	N	I
			Lbs	Lbs	Bu	Bu	Lbs	Lbs	Bu	Bu
CdA:										
Cedarlake	7w	---	---	---	---	---	---	---	---	---
CeC:										
Creta	4e	---	---	---	---	---	---	---	---	---
ChA:										
Chapel	4w	---	250.00	750.00	25.00	100.00	---	---	14.00	45.00
DRC:										
Drake	6e	---	---	---	25.00	---	---	---	16.00	---
DRE:										
Drake	6e	---	---	---	---	---	---	---	---	---
EPA:										
Estacado	3e	2e	300.00	1,000.00	25.00	110.00	---	---	16.00	55.00
Pep	3e	2e	250.00	800.00	18.00	60.00	---	---	12.00	40.00
EsA:										
Estacado	3e	2e	350.00	1,000.00	28.00	110.00	---	---	18.00	55.00
EsB:										
Estacado	3e	3e	300.00	900.00	25.00	100.00	---	---	16.00	50.00
KmB:										
Kimberson	7s	---	---	---	---	---	---	---	---	---
LhA:										
Lenorah	6s	4e	250.00	700.00	16.00	45.00	---	---	14.00	35.00
Hindman	6e	4e	200.00	600.00	14.00	40.00	---	---	12.00	30.00
LMA:										
Lamesa	6w	---	---	---	---	---	---	---	---	---
LoA:										
Lofton	3e	2s	250.00	1,050.00	25.00	110.00	---	---	18.00	55.00

Table 5.--Irrigated and Nonirrigated Yields by Map Unit Component--Continued

Map symbol and soil name	Land capability		Cotton lint		Grain sorghum		Peanuts		Wheat	
	N	I	N	I	N	I	N	I	N	I
			Lbs	Lbs	Bu	Bu	Lbs	Lbs	Bu	Bu
M-W:										
Miscellaneous water	---	---	---	---	---	---	---	---	---	---
MdA:										
Midessa	3e	2e	275.00	800.00	16.00	50.00	---	---	15.00	40.00
MdB:										
Midessa	3e	3e	225.00	700.00	14.00	50.00	---	---	12.00	35.00
MdC:										
Midessa	6e	---	200.00	600.00	12.00	45.00	---	---	10.00	30.00
MPC:										
Midessa	6e	---	200.00	600.00	12.00	45.00	---	---	10.00	30.00
Posey	6e	---	200.00	600.00	12.00	45.00	---	---	10.00	30.00
MPP:										
Midessa	6e	---	---	---	---	---	---	---	---	---
Potter	7s	---	---	---	---	---	---	---	---	---
Posey	6e	---	---	---	---	---	---	---	---	---
MVE:										
Mobeetie	6e	---	---	---	---	---	---	---	---	---
Veal	6e	---	---	---	---	---	---	---	---	---
Potter	7s	---	---	---	---	---	---	---	---	---
OBG:										
Obaro	6e	---	---	---	---	---	---	---	---	---
Quinlan	7e	---	---	---	---	---	---	---	---	---
OcA:										
Olton	3e	2e	300.00	1,000.00	28.00	110.00	---	---	18.00	55.00

Table 5.--Irrigated and Nonirrigated Yields by Map Unit Component--Continued

Map symbol and soil name	Land capability		Cotton lint		Grain sorghum		Peanuts		Wheat	
	N	I	N	I	N	I	N	I	N	I
			Lbs	Lbs	Bu	Bu	Lbs	Lbs	Bu	Bu
PAB:										
Patricia----------	4e	3e	350.00	1,050.00	22.00	100.00	---	6,000.00	18.00	50.00
Amarillo----------	4e	3e	325.00	1,000.00	20.00	100.00	---	6,000.00	16.00	45.00
PeA:										
Pep---------------	3e	2e	250.00	800.00	18.00	60.00	---	---	16.00	40.00
PeB:										
Pep---------------	4e	3e	225.00	700.00	16.00	55.00	---	---	14.00	35.00
PGE:										
Potter------------	7s	---	---	---	---	---	---	---	---	---
PoA:										
Portales----------	3e	2e	250.00	800.00	18.00	60.00	---	---	16.00	40.00
PoB:										
Portales----------	4e	3e	225.00	700.00	16.00	55.00	---	---	14.00	35.00
PsA:										
Posey-------------	3e	2e	250.00	800.00	16.00	50.00	---	---	14.00	35.00
PsB:										
Posey-------------	3e	3e	225.00	700.00	14.00	45.00	---	---	12.00	30.00
RcA:										
Ranco-------------	6w	---	---	---	---	---	---	---	---	---
SgA:										
Seagraves---------	4e	3e	300.00	800.00	20.00	100.00	---	---	16.00	45.00
ShB:										
Sharvana----------	6s	4s	---	---	---	---	---	---	---	---
SL:										
Water, intermittent, salt lake--------	7w	---	---	---	---	---	---	---	---	---
SpA:										
Sparenberg--------	4w	---	250.00	800.00	25.00	110.00	---	---	18.00	50.00

Table 5.--Irrigated and Nonirrigated Yields by Map Unit Component--Continued

Map symbol and soil name	Land capability		Cotton lint		Grain sorghum		Peanuts		Wheat	
	N	I	N	I	N	I	N	I	N	I
			Lbs	Lbs	Bu	Bu	Lbs	Lbs	Bu	Bu
TkA:										
Tokio	3e	2e	350.00	1,000.00	20.00	100.00	---	5,000.00	18.00	55.00
TkB:										
Tokio	4e	3e	300.00	900.00	18.00	90.00	---	4,500.00	16.00	45.00
W:										
Water										
YRG:										
Yellowhouse	7s	---	---	---	---	---	---	---	---	---
Rock outcrop	8s	---	---	---	---	---	---	---	---	---
ZfA:										
Zita	3e	2e	325.00	1,000.00	20.00	100.00	---	---	18.00	50.00
ZfB:										
Zita	3e	3e	300.00	900.00	18.00	90.00	---	---	16.00	45.00
ZmA:										
Zita	3e	2e	300.00	900.00	22.00	110.00	---	---	18.00	50.00

Table 6.--Agricultural Disposal of Manure, Food-Processing Waste, and Sewage Sludge

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste: Rating class and limiting features	Value	Application of sewage sludge: Rating class and limiting features	Value
AcA:					
Acuff	90	Not limited		Not limited	
AcB:					
Acuff	90	Not limited		Not limited	
AfA:					
Amarillo	90	Not limited		Not limited	
AfB:					
Amarillo	90	Not limited		Not limited	
ArA:					
Arch	90	Not limited		Not limited	
AsA:					
Arch	90	Not limited		Not limited	
AvA:					
Arvana	85	Somewhat limited		Somewhat limited	
		Depth to cemented pan	0.64	Depth to cemented pan	0.64
		Droughty	0.52	Droughty	0.52
AvB:					
Arvana	85	Somewhat limited		Somewhat limited	
		Depth to cemented pan	0.79	Depth to cemented pan	0.79
		Droughty	0.70	Droughty	0.70
BcA:					
Bippus	85	Somewhat limited		Very limited	
		Flooding	0.60	Flooding	1.00
BeD:					
Berda	85	Not limited		Not limited	
BHC:					
Brownfield	65	Very limited		Very limited	
		Filtering capacity	0.99	Filtering capacity	0.99
		Leaching	0.45		
BP:					
Borrow pits	95	Very limited		Very limited	
		Ponding	1.00	Ponding	1.00
		Slope	1.00	Slow water movement	1.00
		Slow water movement	1.00	Slope	1.00
		Droughty	0.99	Droughty	0.99
		Runoff	0.40		

Table 6.--Agricultural Disposal of Manure, Food-Processing Waste, and Sewage Sludge--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste: Rating class and limiting features	Value	Application of sewage sludge: Rating class and limiting features	Value
BrB:					
Brownfield	90	Very limited		Very limited	
		Filtering capacity	0.99	Filtering capacity	0.99
		Leaching	0.45		
CdA:					
Cedarlake	95	Very limited		Very limited	
		Slow water movement	1.00	Ponding	1.00
		Ponding	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Salinity	1.00
		Salinity	1.00	Sodium content	1.00
		Sodium content	1.00	Slow water movement	1.00
CeC:					
Creta	85	Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00
		Sodium content	0.68	Sodium content	0.68
ChA:					
Chapel	90	Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00
		Ponding	1.00	Ponding	1.00
		Runoff	0.40		
DRC:					
Drake	90	Somewhat limited		Somewhat limited	
		Sodium content	0.32	Sodium content	0.32
DRE:					
Drake	90	Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63
		Sodium content	0.32	Sodium content	0.32
EPA:					
Estacado	50	Not limited		Not limited	
Pep	40	Not limited		Not limited	
EsA:					
Estacado	90	Not limited		Not limited	
EsB:					
Estacado	85	Not limited		Not limited	
KmB:					
Kimberson	85	Very limited		Very limited	
		Depth to cemented pan	1.00	Droughty	1.00
		Droughty	1.00	Depth to cemented pan	1.00
		Runoff	0.40		

Table 6.--Agricultural Disposal of Manure, Food-Processing Waste, and Sewage Sludge--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste: Rating class and limiting features	Value	Application of sewage sludge: Rating class and limiting features	Value
LhA:					
Lenorah	50	Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00
		Salinity	1.00	Depth to saturated zone	0.86
		Depth to saturated zone	0.86	Flooding	0.20
Hindman	35	Not limited		Somewhat limited	
				Flooding	0.20
LMA:					
Lamesa	95	Very limited		Very limited	
		Slow water movement	1.00	Ponding	1.00
		Ponding	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Slow water movement	1.00
		Runoff	0.40		
		Salinity	0.14		
LoA:					
Lofton	85	Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00
		Ponding	1.00	Ponding	1.00
		Runoff	0.40		
M-W:					
Miscellaneous water	100	Not rated		Not rated	
MdA:					
Midessa	85	Not limited		Not limited	
MdB:					
Midessa	85	Not limited		Not limited	
MdC:					
Midessa	85	Not limited		Not limited	
MPC:					
Midessa	50	Not limited		Not limited	
Posey	35	Not limited		Not limited	
MPP:					
Midessa	40	Somewhat limited		Somewhat limited	
		Slope	0.01	Slope	0.01
Potter	30	Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00
		Droughty	0.40	Droughty	0.40
		Slope	0.01	Slope	0.01
Posey	20	Somewhat limited		Somewhat limited	
		Slope	0.01	Slope	0.01

Table 6.--Agricultural Disposal of Manure, Food-Processing Waste, and Sewage Sludge--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste: Rating class and limiting features	Value	Application of sewage sludge: Rating class and limiting features	Value
MVE:					
Mobeetie	50	Very limited		Very limited	
		Slope	1.00	Slope	1.00
Veal	25	Very limited		Very limited	
		Slope	1.00	Slope	1.00
Potter	15	Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00
		Slope	0.63	Slope	0.63
		Droughty	0.40	Droughty	0.40
OBG:					
Obaro	55	Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63
		Depth to bedrock	0.46	Depth to bedrock	0.46
		Droughty	0.41	Droughty	0.41
Quinlan	30	Very limited		Very limited	
		Slow water movement	1.00	Droughty	1.00
		Droughty	1.00	Slow water movement	1.00
		Shallow to densic materials	1.00	Shallow to densic materials	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00
		Slope	1.00	Slope	1.00
OcA:					
Olton	85	Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00
PAB:					
Patricia	50	Very limited		Very limited	
		Filtering capacity	0.99	Filtering capacity	0.99
Amarillo	45	Very limited		Very limited	
		Filtering capacity	0.99	Filtering capacity	0.99
PeA:					
Pep	85	Not limited		Not limited	
PeB:					
Pep	85	Not limited		Not limited	
PGE:					
Potter	80	Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00
		Droughty	0.40	Droughty	0.40
		Slope	0.01	Slope	0.01

Table 6.--Agricultural Disposal of Manure, Food-Processing Waste, and Sewage Sludge--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste: Rating class and limiting features	Value	Application of sewage sludge: Rating class and limiting features	Value
PoA:					
Portales	90	Not limited		Not limited	
PoB:					
Portales	90	Not limited		Not limited	
PsA:					
Posey	85	Not limited		Not limited	
PsB:					
Posey	85	Not limited		Not limited	
RcA:					
Ranco	90	Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00
		Ponding	1.00	Ponding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Runoff	0.40		
SgA:					
Seagraves	90	Very limited		Very limited	
		Ponding	1.00	Ponding	1.00
		Slow water movement	0.50	Slow water movement	0.37
ShB:					
Sharvana	85	Very limited		Very limited	
		Depth to cemented pan	1.00	Droughty	1.00
		Droughty	1.00	Depth to cemented pan	1.00
SL:					
Water, intermittent, salt lake	100	Not rated		Not rated	
SpA:					
Sparenberg	90	Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00
		Ponding	1.00	Ponding	1.00
		Runoff	0.40		
TkA:					
Tokio	90	Not limited		Not limited	
TkB:					
Tokio	90	Not limited		Not limited	
W:					
Water	100	Not rated		Not rated	

Table 6.--Agricultural Disposal of Manure, Food-Processing Waste, and Sewage Sludge--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste: Rating class and limiting features	Value	Application of sewage sludge: Rating class and limiting features	Value
YRG:					
Yellowhouse---------	75	Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00
		Slope	1.00	Slope	1.00
		Droughty	0.99	Droughty	0.99
		Depth to bedrock	0.71	Depth to bedrock	0.71
		Runoff	0.40		
Rock outcrop--------	10	Not rated		Not rated	
ZfA:					
Zita----------------	90	Not limited		Not limited	
ZfB:					
Zita----------------	90	Not limited		Not limited	
ZmA:					
Zita----------------	90	Not limited		Not limited	

Table 7.--Agricultural Disposal of Wastewater by Irrigation and Overland Flow

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation: Rating class and limiting features	Value	Overland flow of wastewater: Rating class and limiting features	Value
AcA:					
Acuff	90	Not limited		Very limited	
				Seepage	1.00
				Too level	0.50
AcB:					
Acuff	90	Not limited		Very limited	
				Seepage	1.00
AfA:					
Amarillo	90	Not limited		Very limited	
				Seepage	1.00
				Too level	0.50
AfB:					
Amarillo	90	Not limited		Very limited	
				Seepage	1.00
ArA:					
Arch	90	Not limited		Very limited	
				Seepage	1.00
				Too level	0.50
AsA:					
Arch	90	Not limited		Very limited	
				Seepage	1.00
				Too level	0.50
AvA:					
Arvana	85	Somewhat limited		Very limited	
		Depth to cemented pan	0.64	Seepage	1.00
		Droughty	0.52	Depth to cemented pan	1.00
				Too level	0.50
AvB:					
Arvana	85	Somewhat limited		Very limited	
		Depth to cemented pan	0.79	Seepage	1.00
		Droughty	0.70	Depth to cemented pan	1.00
BcA:					
Bippus	85	Somewhat limited		Very limited	
		Flooding	0.60	Flooding	1.00
				Seepage	1.00
				Too level	0.50

Table 7.--Agricultural Disposal of Wastewater by Irrigation and Overland Flow--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation: Rating class and limiting features	Value	Overland flow of wastewater: Rating class and limiting features	Value
BeD:					
Berda	85	Somewhat limited		Very limited	
		Too steep for surface application	0.68	Seepage	1.00
BHC:					
Brownfield	65	Very limited		Very limited	
		Filtering capacity	0.99	Seepage	1.00
		Too steep for surface application	0.32		
BP:					
Borrow pits	95	Very limited		Very limited	
		Ponding	1.00	Ponding	1.00
		Slow water movement	1.00	Too steep for surface application	1.00
		Too steep for surface application	1.00		
		Too steep for sprinkler application	1.00		
		Droughty	0.99		
BrB:					
Brownfield	90	Very limited		Very limited	
		Filtering capacity	0.99	Seepage	1.00
CdA:					
Cedarlake	95	Very limited		Very limited	
		Ponding	1.00	Ponding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Salinity	1.00	Sodium content	1.00
		Sodium content	1.00	Salinity	1.00
		Slow water movement	1.00	Seepage	1.00
CeC:					
Creta	85	Very limited		Very limited	
		Slow water movement	1.00	Seepage	1.00
		Sodium content	0.68	Sodium content	0.68
ChA:					
Chapel	90	Very limited		Very limited	
		Slow water movement	1.00	Ponding	1.00
		Ponding	1.00	Too level	0.50

Table 7.--Agricultural Disposal of Wastewater by Irrigation and Overland Flow--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation: Rating class and limiting features	Value	Overland flow of wastewater: Rating class and limiting features	Value
DRC:					
Drake	90	Somewhat limited		Very limited	
		Too steep for surface application	0.32	Seepage	1.00
		Sodium content	0.32	Sodium content	0.32
DRE:					
Drake	90	Very limited		Very limited	
		Too steep for surface application	1.00	Seepage	1.00
		Too steep for sprinkler application	0.78	Too steep for surface application	1.00
		Sodium content	0.32	Sodium content	0.32
EPA:					
Estacado	50	Not limited		Very limited	
				Seepage	1.00
				Too level	0.50
Pep	40	Not limited		Very limited	
				Seepage	1.00
				Too level	0.50
EsA:					
Estacado	90	Not limited		Very limited	
				Seepage	1.00
				Too level	0.50
EsB:					
Estacado	85	Not limited		Very limited	
				Seepage	1.00
KmB:					
Kimberson	85	Very limited		Very limited	
		Droughty	1.00	Depth to cemented pan	1.00
		Depth to cemented pan	1.00	Seepage	1.00
LhA:					
Lenorah	50	Very limited		Very limited	
		Sodium content	1.00	Seepage	1.00
		Depth to saturated zone	0.86	Sodium content	1.00
				Depth to saturated zone	0.86
				Too level	0.50
				Flooding	0.20
Hindman	35	Not limited		Very limited	
				Seepage	1.00
				Flooding	0.20

Table 7.--Agricultural Disposal of Wastewater by Irrigation and Overland Flow--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation: Rating class and limiting features	Value	Overland flow of wastewater: Rating class and limiting features	Value
LMA:					
Lamesa	95	Very limited		Very limited	
		Ponding	1.00	Ponding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slow water movement	1.00	Too level	0.82
				Seepage	0.67
LoA:					
Lofton	85	Very limited		Very limited	
		Slow water movement	1.00	Ponding	1.00
		Ponding	1.00	Too level	0.68
				Seepage	0.62
M-W:					
Miscellaneous water	100	Not rated		Not rated	
MdA:					
Midessa	85	Not limited		Very limited	
				Seepage	1.00
				Too level	0.50
MdB:					
Midessa	85	Not limited		Very limited	
				Seepage	1.00
MdC:					
Midessa	85	Somewhat limited		Very limited	
		Too steep for surface application	0.32	Seepage	1.00
MPC:					
Midessa	50	Somewhat limited		Very limited	
		Too steep for surface application	0.32	Seepage	1.00
Posey	35	Somewhat limited		Very limited	
		Too steep for surface application	0.32	Seepage	1.00
MPP:					
Midessa	40	Very limited		Very limited	
		Too steep for surface application	1.00	Seepage	1.00
		Too steep for sprinkler application	0.10	Too steep for surface application	0.22

Table 7.--Agricultural Disposal of Wastewater by Irrigation and Overland Flow--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation: Rating class and limiting features	Value	Overland flow of wastewater: Rating class and limiting features	Value
Potter	30	Very limited		Very limited	
		Slow water movement	1.00	Seepage	1.00
		Too steep for surface application	1.00	Too steep for surface application	0.22
		Droughty	0.40		
		Too steep for sprinkler application	0.10		
Posey	20	Very limited		Very limited	
		Too steep for surface application	1.00	Seepage	1.00
		Too steep for sprinkler application	0.10	Too steep for surface application	0.22
MVE:					
Mobeetie	50	Very limited		Very limited	
		Too steep for surface application	1.00	Seepage	1.00
		Too steep for sprinkler application	1.00	Too steep for surface application	1.00
Veal	25	Very limited		Very limited	
		Too steep for surface application	1.00	Seepage	1.00
		Too steep for sprinkler application	1.00	Too steep for surface application	1.00
Potter	15	Very limited		Very limited	
		Slow water movement	1.00	Seepage	1.00
		Too steep for surface application	1.00	Too steep for surface application	1.00
		Too steep for sprinkler application	0.78		
		Droughty	0.40		
OBG:					
Obaro	55	Very limited		Very limited	
		Too steep for surface application	1.00	Seepage	1.00
		Too steep for sprinkler application	0.78	Depth to bedrock	1.00

Table 7.--Agricultural Disposal of Wastewater by Irrigation and Overland Flow--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation: Rating class and limiting features	Value	Overland flow of wastewater: Rating class and limiting features	Value
		Depth to bedrock	0.46	Too steep for surface application	1.00
		Droughty	0.41		
Quinlan	30	Very limited		Very limited	
		Droughty	1.00	Depth to bedrock	1.00
		Slow water movement	1.00	Seepage	1.00
		Depth to bedrock	1.00	Too steep for surface application	1.00
		Too steep for surface application	1.00		
		Too steep for sprinkler application	1.00		
OcA:					
Olton	85	Very limited		Somewhat limited	
		Slow water movement	1.00	Too level	0.68
				Seepage	0.62
PAB:					
Patricia	50	Very limited		Very limited	
		Filtering capacity	0.99	Seepage	1.00
Amarillo	45	Very limited		Very limited	
		Filtering capacity	0.99	Seepage	1.00
PeA:					
Pep	85	Not limited		Very limited	
				Seepage	1.00
				Too level	0.50
PeB:					
Pep	85	Not limited		Very limited	
				Seepage	1.00
PGE:					
Potter	80	Very limited		Very limited	
		Slow water movement	1.00	Seepage	1.00
		Too steep for surface application	1.00	Too steep for surface application	0.22
		Droughty	0.40		
		Too steep for sprinkler application	0.10		

Table 7.--Agricultural Disposal of Wastewater by Irrigation and Overland Flow--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation: Rating class and limiting features	Value	Overland flow of wastewater: Rating class and limiting features	Value
PoA:					
Portales	90	Not limited		Very limited	
				Seepage	1.00
				Too level	0.50
PoB:					
Portales	90	Not limited		Very limited	
				Seepage	1.00
PsA:					
Posey	85	Not limited		Very limited	
				Seepage	1.00
				Too level	0.50
PsB:					
Posey	85	Not limited		Very limited	
				Seepage	1.00
RcA:					
Ranco	90	Very limited		Very limited	
		Slow water movement	1.00	Ponding	1.00
		Ponding	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Too level	0.82
SgA:					
Seagraves	90	Very limited		Very limited	
		Ponding	1.00	Seepage	1.00
		Slow water movement	0.37	Ponding	1.00
				Too level	0.50
ShB:					
Sharvana	85	Very limited		Very limited	
		Droughty	1.00	Seepage	1.00
		Depth to cemented pan	1.00	Depth to cemented pan	1.00
SL:					
Water, intermittent, salt lake	100	Not rated		Not rated	
SpA:					
Sparenberg	90	Very limited		Very limited	
		Slow water movement	1.00	Ponding	1.00
		Ponding	1.00	Too level	0.82
TkA:					
Tokio	90	Not limited		Very limited	
				Seepage	1.00
				Too level	0.50

Table 7.--Agricultural Disposal of Wastewater by Irrigation and Overland Flow--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation		Overland flow of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
TkB:					
Tokio	90	Not limited		Very limited	
				Seepage	1.00
W:					
Water	100	Not rated		Not rated	
YRG:					
Yellowhouse	75	Very limited		Very limited	
		Slow water movement	1.00	Depth to bedrock	1.00
		Too steep for surface application	1.00	Too steep for surface application	1.00
		Too steep for sprinkler application	1.00	Seepage	0.56
		Droughty	0.99		
		Depth to bedrock	0.71		
Rock outcrop	10	Not rated		Not rated	
ZfA:					
Zita	90	Not limited		Very limited	
				Seepage	1.00
				Too level	0.68
ZfB:					
Zita	90	Not limited		Very limited	
				Seepage	1.00
ZmA:					
Zita	90	Not limited		Very limited	
				Seepage	1.00
				Too level	0.68

Table 8.--Agricultural Disposal of Wastewater by Rapid Infiltration and Slow Rate Treatment

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater: Rating class and limiting features	Value	Slow rate treatment of wastewater: Rating class and limiting features	Value
AcA:					
Acuff	90	Very limited		Not limited	
		Slow water movement	1.00		
AcB:					
Acuff	90	Very limited		Not limited	
		Slow water movement	1.00		
AfA:					
Amarillo	90	Very limited		Not limited	
		Slow water movement	1.00		
AfB:					
Amarillo	90	Very limited		Not limited	
		Slow water movement	1.00		
ArA:					
Arch	90	Very limited		Not limited	
		Slow water movement	1.00		
AsA:					
Arch	90	Very limited		Not limited	
		Slow water movement	1.00		
AvA:					
Arvana	85	Very limited		Very limited	
		Depth to cemented pan	1.00	Depth to cemented pan	1.00
		Slow water movement	1.00		
AvB:					
Arvana	85	Very limited		Very limited	
		Depth to cemented pan	1.00	Depth to cemented pan	1.00
		Slow water movement	1.00		
BcA:					
Bippus	85	Very limited		Somewhat limited	
		Slow water movement	1.00	Flooding	0.60
		Flooding	0.60		

Table 8.--Agricultural Disposal of Wastewater by Rapid Infiltration and Slow Rate Treatment--Continued

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater: Rating class and limiting features	Value	Slow rate treatment of wastewater: Rating class and limiting features	Value
BeD:					
Berda	85	Very limited		Somewhat limited	
		Slow water movement	1.00	Too steep for surface application	0.68
		Slope	0.50		
BHC:					
Brownfield	65	Very limited		Very limited	
		Slow water movement	1.00	Filtering capacity	0.99
		Slope	0.12	Too steep for surface application	0.32
BP:					
Borrow pits	95	Very limited		Very limited	
		Ponding	1.00	Ponding	1.00
		Slow water movement	1.00	Too steep for surface application	1.00
		Slope	1.00	Too steep for sprinkler irrigation	1.00
				Slow water movement	0.96
BrB:					
Brownfield	90	Very limited		Very limited	
		Slow water movement	1.00	Filtering capacity	0.99
CdA:					
Cedarlake	95	Very limited		Very limited	
		Ponding	1.00	Ponding	1.00
		Slow water movement	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Salinity	1.00
				Sodium content	1.00
				Slow water movement	1.00
CeC:					
Creta	85	Very limited		Somewhat limited	
		Slow water movement	1.00	Slow water movement	0.96
		Depth to bedrock	1.00	Sodium content	0.68
ChA:					
Chapel	90	Very limited		Very limited	
		Ponding	1.00	Ponding	1.00
		Slow water movement	1.00	Slow water movement	1.00

Table 8.--Agricultural Disposal of Wastewater by Rapid Infiltration and Slow Rate Treatment--Continued

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater: Rating class and limiting features	Value	Slow rate treatment of wastewater: Rating class and limiting features	Value
DRC:					
Drake	90	Very limited		Somewhat limited	
		Slow water movement	1.00	Too steep for surface application	0.32
		Slope	0.12	Sodium content	0.32
DRE:					
Drake	90	Very limited		Very limited	
		Slope	1.00	Too steep for surface application	1.00
		Slow water movement	1.00	Too steep for sprinkler irrigation	1.00
				Sodium content	0.32
EPA:					
Estacado	50	Very limited		Not limited	
		Slow water movement	1.00		
Pep	40	Very limited		Not limited	
		Slow water movement	1.00		
EsA:					
Estacado	90	Very limited		Not limited	
		Slow water movement	1.00		
EsB:					
Estacado	85	Very limited		Not limited	
		Slow water movement	1.00		
KmB:					
Kimberson	85	Very limited		Very limited	
		Depth to cemented pan	1.00	Depth to cemented pan	1.00
		Slow water movement	1.00		
LhA:					
Lenorah	50	Very limited		Very limited	
		Depth to saturated zone	1.00	Sodium content	1.00
		Slow water movement	1.00	Depth to saturated zone	0.86
Hindman	35	Very limited		Not limited	
		Depth to saturated zone	1.00		
		Slow water movement	0.32		

Table 8.--Agricultural Disposal of Wastewater by Rapid Infiltration and Slow Rate Treatment--Continued

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater: Rating class and limiting features	Value	Slow rate treatment of wastewater: Rating class and limiting features	Value
LMA:					
Lamesa	95	Very limited		Very limited	
		Ponding	1.00	Ponding	1.00
		Slow water movement	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Slow water movement	0.99
LoA:					
Lofton	85	Very limited		Very limited	
		Ponding	1.00	Ponding	1.00
		Slow water movement	1.00	Slow water movement	1.00
M-W:					
Miscellaneous water	100	Not rated		Not rated	
MdA:					
Midessa	85	Very limited		Not limited	
		Slow water movement	1.00		
MdB:					
Midessa	85	Very limited		Not limited	
		Slow water movement	1.00		
MdC:					
Midessa	85	Very limited		Somewhat limited	
		Slow water movement	1.00	Too steep for surface application	0.32
		Slope	0.12		
MPC:					
Midessa	50	Very limited		Somewhat limited	
		Slow water movement	1.00	Too steep for surface application	0.32
		Slope	0.12		
Posey	35	Very limited		Somewhat limited	
		Slow water movement	1.00	Too steep for surface application	0.32
		Slope	0.12		
MPP:					
Midessa	40	Very limited		Very limited	
		Slow water movement	1.00	Too steep for surface application	1.00
		Slope	1.00	Too steep for sprinkler irrigation	0.22

Table 8.--Agricultural Disposal of Wastewater by Rapid Infiltration and Slow Rate Treatment--Continued

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater: Rating class and limiting features	Value	Slow rate treatment of wastewater: Rating class and limiting features	Value
Potter	30	Very limited		Very limited	
		Slow water movement	1.00	Too steep for surface application	1.00
		Slope	1.00	Slow water movement	0.96
				Too steep for sprinkler irrigation	0.22
Posey	20	Very limited		Very limited	
		Slow water movement	1.00	Too steep for surface application	1.00
		Slope	1.00	Too steep for sprinkler irrigation	0.22
MVE:					
Mobeetie	50	Very limited		Very limited	
		Slope	1.00	Too steep for surface application	1.00
		Slow water movement	0.32	Too steep for sprinkler irrigation	1.00
Veal	25	Very limited		Very limited	
		Slow water movement	1.00	Too steep for surface application	1.00
		Slope	1.00	Too steep for sprinkler irrigation	1.00
Potter	15	Very limited		Very limited	
		Slow water movement	1.00	Too steep for surface application	1.00
		Slope	1.00	Too steep for sprinkler irrigation	1.00
				Slow water movement	0.96
OBG:					
Obaro	55	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00
		Slow water movement	1.00	Too steep for surface application	1.00
		Slope	1.00	Too steep for sprinkler irrigation	1.00

Table 8.--Agricultural Disposal of Wastewater by Rapid Infiltration and Slow Rate Treatment--Continued

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater: Rating class and limiting features	Value	Slow rate treatment of wastewater: Rating class and limiting features	Value
Quinlan	30	Very limited		Very limited	
		Slow water movement	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Slow water movement	1.00
		Slope	1.00	Too steep for surface application	1.00
				Too steep for sprinkler irrigation	1.00
OcA:					
Olton	85	Very limited		Somewhat limited	
		Slow water movement	1.00	Slow water movement	0.99
PAB:					
Patricia	50	Very limited		Very limited	
		Slow water movement	1.00	Filtering capacity	0.99
Amarillo	45	Very limited		Very limited	
		Slow water movement	1.00	Filtering capacity	0.99
PeA:					
Pep	85	Very limited		Not limited	
		Slow water movement	1.00		
PeB:					
Pep	85	Very limited		Not limited	
		Slow water movement	1.00		
PGE:					
Potter	80	Very limited		Very limited	
		Slow water movement	1.00	Too steep for surface application	1.00
		Slope	1.00	Slow water movement	0.96
				Too steep for sprinkler irrigation	0.22
PoA:					
Portales	90	Very limited		Not limited	
		Slow water movement	1.00		
PoB:					
Portales	90	Very limited		Not limited	
		Slow water movement	1.00		

Table 8.--Agricultural Disposal of Wastewater by Rapid Infiltration and Slow Rate Treatment--Continued

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater: Rating class and limiting features	Value	Slow rate treatment of wastewater: Rating class and limiting features	Value
PsA:					
Posey	85	Very limited		Not limited	
		Slow water movement	1.00		
PsB:					
Posey	85	Very limited		Not limited	
		Slow water movement	1.00		
RcA:					
Ranco	90	Very limited		Very limited	
		Ponding	1.00	Ponding	1.00
		Slow water movement	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Slow water movement	1.00
SgA:					
Seagraves	90	Very limited		Very limited	
		Ponding	1.00	Ponding	1.00
		Slow water movement	1.00	Slow water movement	0.26
ShB:					
Sharvana	85	Very limited		Very limited	
		Depth to cemented pan	1.00	Depth to cemented pan	1.00
		Slow water movement	1.00		
SL:					
Water, intermittent, salt lake	100	Not rated		Not rated	
SpA:					
Sparenberg	90	Very limited		Very limited	
		Ponding	1.00	Ponding	1.00
		Slow water movement	1.00	Slow water movement	1.00
TkA:					
Tokio	90	Very limited		Not limited	
		Slow water movement	1.00		
TkB:					
Tokio	90	Very limited		Not limited	
		Slow water movement	1.00		
W:					
Water	100	Not rated		Not rated	

Table 8.--Agricultural Disposal of Wastewater by Rapid Infiltration and Slow Rate Treatment--Continued

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater		Slow rate treatment of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
YRG:					
Yellowhouse	75	Very limited		Very limited	
		Slow water movement	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Too steep for surface application	1.00
		Slope	1.00	Too steep for sprinkler irrigation	1.00
				Slow water movement	0.99
Rock outcrop	10	Not rated		Not rated	
ZfA:					
Zita	90	Very limited		Not limited	
		Slow water movement	1.00		
ZfB:					
Zita	90	Very limited		Not limited	
		Slow water movement	1.00		
ZmA:					
Zita	90	Very limited		Not limited	
		Slow water movement	1.00		

Table 9.--Large Animal Disposal

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Animal Disposal Pit: Rating class and limiting features	Animal Disposal Pit: Value	Animal Disposal Trench: Rating class and limiting features	Animal Disposal Trench: Value
AcA:					
Acuff	90	Somewhat limited		Somewhat limited	
		Water gathering	0.10	Water gathering	0.10
		Cutbanks cave	0.01	Cutbanks cave	0.01
AcB:					
Acuff	90	Somewhat limited		Somewhat limited	
		Water gathering	0.10	Water gathering	0.10
		Cutbanks cave	0.01	Cutbanks cave	0.01
AfA:					
Amarillo	90	Somewhat limited		Somewhat limited	
		Water gathering	0.10	Water gathering	0.10
		Cutbanks cave	0.01	Cutbanks cave	0.01
AfB:					
Amarillo	90	Somewhat limited		Somewhat limited	
		Water gathering	0.10	Water gathering	0.10
		Cutbanks cave	0.01	Cutbanks cave	0.01
ArA:					
Arch	90	Somewhat limited		Somewhat limited	
		Water gathering	0.10	Water gathering	0.10
		Cutbanks cave	0.01	Cutbanks cave	0.01
AsA:					
Arch	90	Somewhat limited		Somewhat limited	
		Water gathering	0.10	Water gathering	0.10
		Cutbanks cave	0.01	Cutbanks cave	0.01
AvA:					
Arvana	85	Somewhat limited		Somewhat limited	
		Depth to thin cemented pan	0.50	Depth to thin cemented pan	0.50
		Water gathering	0.10	Water gathering	0.10
		Cutbanks cave	0.01	Cutbanks cave	0.01
AvB:					
Arvana	85	Somewhat limited		Somewhat limited	
		Depth to thin cemented pan	0.50	Depth to thin cemented pan	0.50
		Water gathering	0.10	Water gathering	0.10
		Cutbanks cave	0.01	Cutbanks cave	0.01
BcA:					
Bippus	85	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Water gathering	0.20	Water gathering	0.20
		Cutbanks cave	0.01	Cutbanks cave	0.01

Table 9.--Large Animal Disposal--Continued

Map symbol and soil name	Pct. of map unit	Animal Disposal Pit: Rating class and limiting features	Value	Animal Disposal Trench: Rating class and limiting features	Value
BeD:					
Berda	85	Somewhat limited		Somewhat limited	
		Water gathering	0.10	Water gathering	0.10
		Slope	0.04	Cutbanks cave	0.01
		Cutbanks cave	0.01	Clay content	0.01
BHC:					
Brownfield	65	Somewhat limited		Somewhat limited	
		Cutbanks cave	0.16	Cutbanks cave	0.16
BP:					
Borrow pits	95	Very limited		Very limited	
		Ponding	1.00	Ponding	1.00
		Slope	1.00	Slope	1.00
		Cutbanks cave	0.09	Cutbanks cave	0.09
BrB:					
Brownfield	90	Somewhat limited		Somewhat limited	
		Water gathering	0.10	Water gathering	0.10
		Cutbanks cave	0.01	Cutbanks cave	0.01
CdA:					
Cedarlake	95	Very limited		Very limited	
		Wetness	1.00	Wetness	1.00
		Ponding	1.00	Ponding	1.00
		Too clayey	1.00	Too clayey	1.00
CeC:					
Creta	85	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00
		Cutbanks cave	0.50	Cutbanks cave	0.50
		Seepage, porous bedrock	0.50	Seepage, porous bedrock	0.50
ChA:					
Chapel	90	Very limited		Very limited	
		Ponding	1.00	Ponding	1.00
		Cutbanks cave	0.55	Cutbanks cave	0.55
		Clay content	0.50	Clay content	0.50
DRC:					
Drake	90	Somewhat limited		Somewhat limited	
		Water gathering	0.10	Water gathering	0.10
		Cutbanks cave	0.01	Cutbanks cave	0.01
DRE:					
Drake	90	Very limited		Somewhat limited	
		Slope	1.00	Slope	0.63
		Water gathering	0.10	Water gathering	0.10
		Cutbanks cave	0.01	Cutbanks cave	0.01
EPA:					
Estacado	50	Somewhat limited		Somewhat limited	
		Water gathering	0.10	Water gathering	0.10
		Cutbanks cave	0.01	Cutbanks cave	0.01
		Clay content	0.01	Clay content	0.01

Table 9.--Large Animal Disposal--Continued

Map symbol and soil name	Pct. of map unit	Animal Disposal Pit: Rating class and limiting features	Value	Animal Disposal Trench: Rating class and limiting features	Value
Pep	40	Somewhat limited		Somewhat limited	
		Water gathering	0.10	Water gathering	0.10
		Cutbanks cave	0.01	Cutbanks cave	0.01
EsA:					
Estacado	90	Somewhat limited		Somewhat limited	
		Water gathering	0.10	Water gathering	0.10
		Cutbanks cave	0.01	Cutbanks cave	0.01
		Clay content	0.01	Clay content	0.01
EsB:					
Estacado	85	Somewhat limited		Somewhat limited	
		Water gathering	0.10	Water gathering	0.10
		Cutbanks cave	0.01	Cutbanks cave	0.01
		Clay content	0.01	Clay content	0.01
KmB:					
Kimberson	85	Somewhat limited		Somewhat limited	
		Cutbanks cave	0.93	Cutbanks cave	0.93
		Depth to thin cemented pan	0.50	Depth to thin cemented pan	0.50
		Adsorption	0.25	Adsorption	0.25
LhA:					
Lenorah	50	Very limited		Very limited	
		Wetness	1.00	Wetness	1.00
		Seepage	1.00	Seepage	1.00
		Excess sodium	1.00	Excess sodium	1.00
Hindman	35	Very limited		Very limited	
		Wetness	1.00	Wetness	1.00
		Seepage	1.00	Seepage	1.00
		Excess sodium	1.00	Excess sodium	1.00
LMA:					
Lamesa	95	Very limited		Very limited	
		Wetness	1.00	Wetness	1.00
		Ponding	1.00	Ponding	1.00
		Water gathering	0.50	Water gathering	0.50
LoA:					
Lofton	85	Very limited		Very limited	
		Ponding	1.00	Ponding	1.00
		Clay content	0.44	Clay content	0.44
		Water gathering	0.10	Water gathering	0.10
M-W:					
Miscellaneous water	100	Not rated		Not rated	
MdA:					
Midessa	85	Somewhat limited		Somewhat limited	
		Water gathering	0.10	Water gathering	0.10
		Cutbanks cave	0.01	Cutbanks cave	0.01

Table 9.--Large Animal Disposal--Continued

Map symbol and soil name	Pct. of map unit	Animal Disposal Pit: Rating class and limiting features	Value	Animal Disposal Trench: Rating class and limiting features	Value
MdB:					
Midessa	85	Somewhat limited		Somewhat limited	
		Water gathering	0.10	Water gathering	0.10
		Cutbanks cave	0.01	Cutbanks cave	0.01
MdC:					
Midessa	85	Somewhat limited		Somewhat limited	
		Water gathering	0.20	Water gathering	0.20
		Cutbanks cave	0.01	Cutbanks cave	0.01
MPC:					
Midessa	50	Somewhat limited		Somewhat limited	
		Water gathering	0.20	Water gathering	0.20
		Cutbanks cave	0.01	Cutbanks cave	0.01
Posey	35	Somewhat limited		Somewhat limited	
		Water gathering	0.20	Water gathering	0.20
		Cutbanks cave	0.01	Cutbanks cave	0.01
MPP:					
Midessa	40	Somewhat limited		Somewhat limited	
		Slope	0.37	Water gathering	0.20
		Water gathering	0.20	Cutbanks cave	0.01
		Cutbanks cave	0.01	Slope	0.01
Potter	30	Somewhat limited		Somewhat limited	
		Slope	0.37	Water gathering	0.07
		Water gathering	0.07	Cutbanks cave	0.01
		Cutbanks cave	0.01	Slope	0.01
Posey	20	Somewhat limited		Somewhat limited	
		Slope	0.37	Water gathering	0.20
		Water gathering	0.20	Cutbanks cave	0.01
		Cutbanks cave	0.01	Slope	0.01
MVE:					
Mobeetie	50	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Water gathering	0.10	Water gathering	0.10
		Cutbanks cave	0.01	Cutbanks cave	0.01
Veal	25	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Water gathering	0.10	Water gathering	0.10
		Cutbanks cave	0.01	Cutbanks cave	0.01
Potter	15	Very limited		Somewhat limited	
		Slope	1.00	Slope	0.63
		Cutbanks cave	0.01	Cutbanks cave	0.01
OBG:					
Obaro	55	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00
		Slope	1.00	Slope	0.63
		Cutbanks cave	0.01	Cutbanks cave	0.01

Table 9.--Large Animal Disposal--Continued

Map symbol and soil name	Pct. of map unit	Animal Disposal Pit: Rating class and limiting features	Animal Disposal Pit: Value	Animal Disposal Trench: Rating class and limiting features	Animal Disposal Trench: Value
Quinlan	30	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00
		Slope	1.00	Slope	1.00
		Adsorption	0.25	Adsorption	0.25
OcA:					
Olton	85	Somewhat limited		Somewhat limited	
		Clay content	0.20	Clay content	0.20
		Water gathering	0.10	Water gathering	0.10
		Cutbanks cave	0.01	Cutbanks cave	0.01
PAB:					
Patricia	50	Somewhat limited		Somewhat limited	
		Water gathering	0.10	Water gathering	0.10
		Cutbanks cave	0.01	Cutbanks cave	0.01
Amarillo	45	Somewhat limited		Somewhat limited	
		Water gathering	0.10	Water gathering	0.10
		Cutbanks cave	0.01	Cutbanks cave	0.01
PeA:					
Pep	85	Somewhat limited		Somewhat limited	
		Water gathering	0.10	Water gathering	0.10
		Cutbanks cave	0.01	Cutbanks cave	0.01
PeB:					
Pep	85	Somewhat limited		Somewhat limited	
		Water gathering	0.10	Water gathering	0.10
		Cutbanks cave	0.01	Cutbanks cave	0.01
PGE:					
Potter	80	Somewhat limited		Somewhat limited	
		Slope	0.37	Water gathering	0.03
		Water gathering	0.03	Cutbanks cave	0.01
		Cutbanks cave	0.01	Slope	0.01
PoA:					
Portales	90	Somewhat limited		Somewhat limited	
		Water gathering	0.20	Water gathering	0.20
		Cutbanks cave	0.01	Cutbanks cave	0.01
PoB:					
Portales	90	Somewhat limited		Somewhat limited	
		Water gathering	0.10	Water gathering	0.10
		Cutbanks cave	0.01	Cutbanks cave	0.01
PsA:					
Posey	85	Somewhat limited		Somewhat limited	
		Water gathering	0.10	Water gathering	0.10
		Cutbanks cave	0.01	Cutbanks cave	0.01
PsB:					
Posey	85	Somewhat limited		Somewhat limited	
		Water gathering	0.10	Water gathering	0.10
		Cutbanks cave	0.01	Cutbanks cave	0.01

Table 9.--Large Animal Disposal--Continued

Map symbol and soil name	Pct. of map unit	Animal Disposal Pit		Animal Disposal Trench	
		Rating class and limiting features	Value	Rating class and limiting features	Value
RcA:					
Ranco	90	Very limited		Very limited	
		Wetness	1.00	Wetness	1.00
		Ponding	1.00	Ponding	1.00
		Too clayey	1.00	Too clayey	1.00
SgA:					
Seagraves	90	Very limited		Very limited	
		Ponding	1.00	Ponding	1.00
		Water gathering	0.30	Water gathering	0.30
		Sand content	0.10	Sand content	0.10
ShB:					
Sharvana	85	Very limited		Very limited	
		Depth to thick cemented pan	1.00	Depth to thick cemented pan	1.00
		Water gathering	0.10	Water gathering	0.10
		Cutbanks cave	0.01	Cutbanks cave	0.01
SL:					
Water, intermittent, salt lake	100	Not rated		Not rated	
SpA:					
Sparenberg	90	Very limited		Very limited	
		Ponding	1.00	Ponding	1.00
		Cutbanks cave	1.00	Cutbanks cave	1.00
		Clay content	0.50	Clay content	0.50
TkA:					
Tokio	90	Somewhat limited		Somewhat limited	
		Water gathering	0.20	Water gathering	0.20
		Cutbanks cave	0.01	Cutbanks cave	0.01
TkB:					
Tokio	90	Somewhat limited		Somewhat limited	
		Water gathering	0.20	Water gathering	0.20
		Cutbanks cave	0.01	Cutbanks cave	0.01
W:					
Water	100	Not rated		Not rated	
YRG:					
Yellowhouse	75	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00
		Slope	1.00	Slope	1.00
		Seepage, porous bedrock	0.50	Seepage, porous bedrock	0.50
Rock outcrop	10	Not rated		Not rated	
ZfA:					
Zita	90	Somewhat limited		Somewhat limited	
		Water gathering	0.20	Water gathering	0.20
		Cutbanks cave	0.01	Cutbanks cave	0.01

Table 9.--Large Animal Disposal--Continued

Map symbol and soil name	Pct. of map unit	Animal Disposal Pit		Animal Disposal Trench	
		Rating class and limiting features	Value	Rating class and limiting features	Value
ZfB:					
Zita	90	Somewhat limited		Somewhat limited	
		Water gathering	0.30	Water gathering	0.30
		Cutbanks cave	0.01	Cutbanks cave	0.01
ZmA:					
Zita	90	Somewhat limited		Somewhat limited	
		Water gathering	0.20	Water gathering	0.20
		Cutbanks cave	0.01	Cutbanks cave	0.01

Table 10.--Rangeland Productivity

(Only the soils that support rangeland vegetation suitable for grazing are rated.)

Map symbol and soil name	Ecological site	Total dry-weight production		
		Favorable year	Normal year	Unfavorable year
		Lb/acre	Lb/acre	Lb/acre
AcA:				
Acuff	Deep Hardland Pe 25-36	2,500	1,800	1,100
AcB:				
Acuff	Deep Hardland Pe 25-36	2,500	1,800	1,100
AfA:				
Amarillo	Sandy Loam Pe 25-36	2,800	2,100	1,400
AfB:				
Amarillo	Sandy Loam Pe 25-36	2,800	2,100	1,400
ArA:				
Arch	High Lime Pe 25 - 36	1,500	1,200	800
AsA:				
Arch	High Lime Pe 25 - 36	1,600	1,300	900
AvA:				
Arvana	Sandy Loam Pe 25-36	2,100	1,600	1,000
AvB:				
Arvana	Sandy Loam Pe 25-36	2,100	1,600	1,000
BcA:				
Bippus	Draw Pe 25-36	3,000	2,400	1,800
BeD:				
Berda	Hardland Slopes Pe 25 - 36	2,500	1,800	1,100
BHC:				
Brownfield	Sandy Pe 25-36	1,800	1,300	800
BP:				
Borrow pits	---	---	---	---
BrB:				
Brownfield	Sandy Pe 25-36	2,200	1,800	1,000
CdA:				
Cedarlake	Wet Saline Pe 25-36	1,800	1,000	500
CeC:				
Creta	Hardland Slopes Pe 25 - 36	2,300	1,600	900
ChA:				
Chapel	Playa Pe 25-36	2,800	1,300	600
DRC:				
Drake	High Lime Pe 25 - 36	1,800	1,300	900
DRE:				
Drake	High Lime Pe 25 - 36	1,700	1,200	800
EPA:				
Estacado	Deep Hardland Pe 25-36	2,300	1,600	1,000
Pep	Limy Upland Pe 25-36	2,000	1,300	800

Table 10.--Rangeland Productivity--Continued

Map symbol and soil name	Ecological site	Total dry-weight production: Favorable year	Normal year	Unfavorable year
		Lb/acre	Lb/acre	Lb/acre
EsA:				
Estacado	Deep Hardland Pe 25-36	2,300	1,600	1,000
EsB:				
Estacado	Deep Hardland Pe 25-36	2,300	1,600	1,000
KmB:				
Kimberson	Very Shallow Pe 25-36	1,000	700	400
LhA:				
Lenorah	Wet Saline Pe 25-36	2,000	1,200	700
Hindman	Wet Saline Pe 25-36	1,900	1,100	600
LMA:				
Lamesa	Playa Pe 25-36	3,000	2,200	1,200
LoA:				
Lofton	Deep Hardland Pe 25-36	2,000	1,800	1,100
M-W:				
Miscellaneous water	---	---	---	---
MdA:				
Midessa	Limy Upland Pe 25-36	2,400	1,700	1,000
MdB:				
Midessa	Limy Upland Pe 25-36	2,400	1,700	1,000
MdC:				
Midessa	Limy Upland Pe 25-36	2,400	1,700	1,000
MPC:				
Midessa	Limy Upland Pe 25-36	2,400	1,700	1,000
Posey	Limy Upland Pe 25-36	2,400	1,700	1,000
MPP:				
Midessa	Limy Upland Pe 25-36	2,400	1,700	1,000
Potter	Very Shallow Pe 25-36	1,000	800	500
Posey	Limy Upland Pe 25-36	2,400	1,700	1,000
MVE:				
Mobeetie	Mixedland Slopes Pe 25-36	2,500	1,900	1,100
Veal	Limy Upland Pe 25-36	2,100	1,600	1,000
Potter	Very Shallow Pe 25-36	1,000	800	500
OBG:				
Obaro	Loamy Prairie Pe 25-36	1,700	1,300	900
Quinlan	Loamy Prairie Pe 25-36	1,500	1,100	700
OcA:				
Olton	Deep Hardland Pe 25-36	2,300	1,600	900
PAB:				
Patricia	Sandy Pe 25-36	2,700	2,000	1,300

Table 10.--Rangeland Productivity--Continued

Map symbol and soil name	Ecological site	Total dry-weight production: Favorable year	Normal year	Unfavorable year
		Lb/acre	Lb/acre	Lb/acre
Amarillo	Sandy Pe 25-36	2,600	1,900	1,200
PeA:				
Pep	Limy Upland Pe 25-36	2,000	1,300	800
PeB:				
Pep	Limy Upland Pe 25-36	2,000	1,300	800
PGE:				
Potter	Very Shallow Pe 25-36	1,000	800	500
PoA:				
Portales	Limy Upland Pe 25-36	2,000	1,300	800
PoB:				
Portales	Limy Upland Pe 25-36	2,000	1,300	800
PsA:				
Posey	Limy Upland Pe 25-36	2,400	1,700	1,000
PsB:				
Posey	Limy Upland Pe 25-36	2,400	1,700	1,000
RcA:				
Ranco	Playa Pe 25-36	3,000	1,500	800
SgA:				
Seagraves	Sandy Loam Pe 25-36	2,800	2,000	1,000
ShB:				
Sharvana	Very Shallow Pe 25-36	1,100	800	500
SL:				
Water, intermittent, salt lake	---	---	---	---
SpA:				
Sparenberg	Playa Pe 25-36	2,800	1,300	600
TkA:				
Tokio	Sandy Loam Pe 25-36	2,500	1,800	1,100
TkB:				
Tokio	Sandy Pe 25-36	2,400	1,700	1,000
W:				
Water	---	---	---	---
YRG:				
Yellowhouse	Very Shallow Pe 25-36	1,100	800	500
Rock outcrop	---	---	---	---
ZfA:				
Zita	Sandy Loam Pe 25-36	2,500	1,800	1,100
ZfB:				
Zita	Sandy Loam Pe 25-36	2,500	1,800	1,100
ZmA:				
Zita	Deep Hardland Pe 25-36	2,200	1,700	1,100

Table 11.--Windbreaks and Environmental Plantings

(Absence of an entry indicates that trees generally do not grow to the given height.)

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
AcA:					
Acuff	honeysuckle; Nanking cherry; skunkbush sumac; cotoneaster	redbud; desert willow; winterberry euonymus	little walnut; Rocky Mountain juniper; eastern redcedar; osageorange; Austrian pine; Scotch pine; oriental arborvitae	American sycamore; pecan; hackberry; green ash; honeylocust; mulberry; ponderosa pine; bur oak; shumard oak; Afghan pine; lacebark elm	Siberian elm
AcB:					
Acuff	honeysuckle; Nanking cherry; skunkbush sumac; cotoneaster	redbud; desert willow; winterberry euonymus	little walnut; Rocky Mountain juniper; eastern redcedar; osageorange; Austrian pine; Scotch pine; oriental arborvitae	American sycamore; pecan; hackberry; green ash; honeylocust; mulberry; ponderosa pine; bur oak; shumard oak; Afghan pine; lacebark elm	Siberian elm
AfA:					
Amarillo	skunkbush sumac; lilac; honeysuckle	desert willow; redbud; Chickasaw plum	Rocky Mountain juniper; eastern redcedar; oriental arborvitae; osageorange	Austrian pine; ponderosa pine; bur oak; green ash; hackberry; honeylocust; mulberry; Afghan pine; lacebark elm	Siberian elm
AfB:					
Amarillo	skunkbush sumac; lilac; honeysuckle	desert willow; redbud; Chickasaw plum	Rocky Mountain juniper; eastern redcedar; oriental arborvitae; osageorange	Austrian pine; ponderosa pine; bur oak; green ash; hackberry; honeylocust; mulberry; Afghan pine; lacebark elm	Siberian elm
ArA:					
Arch	fourwing saltbush	---	eastern redcedar	Siberian elm	---
AsA:					
Arch	fourwing saltbush	---	eastern redcedar	Siberian elm	---

Table 11.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
AvA:					
Arvana	skunkbush sumac; fourwing saltbush	Rocky Mountain juniper; redbud; desert willow	eastern redcedar; lacebark elm; osageorange; oriental arborvitae; hackberry	Siberian elm	---
AvB:					
Arvana	skunkbush sumac; fourwing saltbush	Rocky Mountain juniper; redbud; desert willow	eastern redcedar; lacebark elm; osageorange; oriental arborvitae; hackberry	Siberian elm	---
BcA:					
Bippus	honeysuckle; Nanking cherry; skunkbush sumac; cotoneaster	redbud; desert willow; winterberry euonymus	little walnut; Rocky Mountain juniper; eastern redcedar; osageorange; Austrian pine; Scotch pine; oriental arborvitae	American sycamore; pecan; hackberry; green ash; honeylocust; mulberry; ponderosa pine; bur oak; shumard oak; lacebark elm; Afghan pine	Siberian elm
BeD:					
Berda	fourwing saltbush	---	eastern redcedar	Siberian elm	---
BHC:					
Brownfield	skunkbush sumac; lilac; honeysuckle	desert willow; redbud; Chickasaw plum	Rocky Mountain juniper; eastern redcedar; oriental arborvitae; osageorange	Austrian pine; ponderosa pine; bur oak; green ash; hackberry; honeylocust; mulberry; Afghan pine; lacebark elm	Siberian elm
BP:					
Borrow pits	---	---	---	---	---

Table 11.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
BrB:					
Brownfield	skunkbush sumac; lilac; honeysuckle	desert willow; redbud; Chickasaw plum	Rocky Mountain juniper; eastern redcedar; oriental arborvitae; osageorange	Austrian pine; ponderosa pine; bur oak; green ash; hackberry; honeylocust; mulberry; Afghan pine; lacebark elm	Siberian elm
CdA:					
Cedarlake	---	---	---	---	---
CeC:					
Creta	honeysuckle; Nanking cherry; skunkbush sumac; cotoneaster	redbud; desert willow; winterberry euonymus	little walnut; Rocky Mountain juniper; eastern redcedar; osageorange; Austrian pine; Scotch pine; oriental arborvitae	American sycamore; pecan; hackberry; green ash; honeylocust; mulberry; ponderosa pine; bur oak; shumard oak; lacebark elm; Afghan pine	Siberian elm
ChA:					
Chapel	---	---	---	---	---
DRC:					
Drake	fourwing saltbush	---	eastern redcedar	Siberian elm	---
DRE:					
Drake	fourwing saltbush	---	eastern redcedar	Siberian elm	---
EPA:					
Estacado	honeysuckle; Nanking cherry; skunkbush sumac; cotoneaster	redbud; desert willow; winterberry euonymus	little walnut; Rocky Mountain juniper; eastern redcedar; osageorange; Austrian pine; Scotch pine; oriental arborvitae	American sycamore; pecan; hackberry; green ash; honeylocust; mulberry; ponderosa pine; bur oak; shumard oak; lacebark elm; Afghan pine	Siberian elm
Pep	fourwing saltbush	---	eastern redcedar	Siberian elm	---

Table 11.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
EsA: Estacado	honeysuckle; Nanking cherry; skunkbush sumac; cotoneaster	redbud; desert willow; winterberry euonymus	little walnut; Rocky Mountain juniper; eastern redcedar; osageorange; Austrian pine; Scotch pine; oriental arborvitae	American sycamore; pecan; hackberry; green ash; honeylocust; mulberry; ponderosa pine; bur oak; shumard oak; lacebark elm; Afghan pine	Siberian elm
EsB: Estacado	honeysuckle; Nanking cherry; skunkbush sumac; cotoneaster	redbud; desert willow; winterberry euonymus	little walnut; Rocky Mountain juniper; eastern redcedar; osageorange; Austrian pine; Scotch pine; oriental arborvitae	American sycamore; pecan; hackberry; green ash; honeylocust; mulberry; ponderosa pine; bur oak; shumard oak; lacebark elm; Afghan pine	Siberian elm
KmB: Kimberson	---	---	---	---	---
LhA: Lenorah	fourwing saltbush	---	eastern redcedar	Siberian elm	---
Hindman	skunkbush sumac; lilac; honeysuckle	desert willow; redbud; Chickasaw plum	Rocky Mountain juniper; eastern redcedar; oriental arborvitae; osageorange	Austrian pine; ponderosa pine; bur oak; green ash; hackberry; honeylocust; mulberry; lacebark elm	Siberian elm
LMA: Lamesa	---	---	---	---	---
LoA: Lofton	skunkbush sumac; Nanking cherry; lilac	Rocky Mountain juniper; redbud	eastern redcedar; oriental arborvitae; osageorange	ponderosa pine; bur oak; Siberian elm; hackberry; lacebark elm	---
M-W: Miscellaneous water	---	---	---	---	---

Table 11.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
MdA:					
Midessa	fourwing saltbush	---	eastern redcedar	Siberian elm	---
MdB:					
Midessa	fourwing saltbush	---	eastern redcedar	Siberian elm	---
MdC:					
Midessa	fourwing saltbush	---	eastern redcedar	Siberian elm	---
MPC:					
Midessa	fourwing saltbush	---	eastern redcedar	Siberian elm	---
Posey	fourwing saltbush	---	eastern redcedar	Siberian elm	---
MPP:					
Midessa	fourwing saltbush	---	eastern redcedar	Siberian elm	---
Potter	---	---	---	---	---
Posey	fourwing saltbush	---	eastern redcedar	Siberian elm	---
MVE:					
Mobeetie	fourwing saltbush	---	eastern redcedar	Siberian elm	---
Veal	fourwing saltbush	---	eastern redcedar	Siberian elm	---
Potter	---	---	---	---	---
OBG:					
Obaro	honeysuckle; Nanking cherry; skunkbush sumac; cotoneaster	redbud; desert willow; winterberry euonymus	little walnut; Rocky Mountain juniper; eastern redcedar; osageorange; Austrian pine; Scotch pine; oriental arborvitae	American sycamore; pecan; hackberry; green ash; honeylocust; mulberry; ponderosa pine; bur oak; shumard oak; lacebark elm; Afghan pine	Siberian elm
Quinlan	Amur honeysuckle; common lilac; skunkbush sumac	redbud	eastern redcedar; oriental arborvitae; osageorange; Rocky Mountain juniper	---	---

Table 11.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
OcA:					
Olton	honeysuckle; Nanking cherry; skunkbush sumac; cotoneaster	redbud; desert willow; winterberry euonymus	little walnut; Rocky Mountain juniper; eastern redcedar; osageorange; Austrian pine; Scotch pine; oriental arborvitae	American sycamore; pecan; hackberry; green ash; honeylocust; mulberry; ponderosa pine; bur oak; shumard oak; lacebark elm; Afghan pine	Siberian elm
PAB:					
Patricia	skunkbush sumac; lilac; honeysuckle	desert willow; redbud; Chickasaw plum	Rocky Mountain juniper; eastern redcedar; oriental arborvitae; osageorange	Austrian pine; ponderosa pine; bur oak; green ash; hackberry; honeylocust; mulberry; Afghan pine; lacebark elm	Siberian elm
Amarillo	skunkbush sumac; lilac; honeysuckle	desert willow; redbud; Chickasaw plum	Rocky Mountain juniper; eastern redcedar; oriental arborvitae; osageorange	Austrian pine; ponderosa pine; bur oak; green ash; hackberry; honeylocust; mulberry; Afghan pine; lacebark elm	Siberian elm
PeA:					
Pep	fourwing saltbush	---	eastern redcedar	Siberian elm	---
PeB:					
Pep	fourwing saltbush	---	eastern redcedar	Siberian elm	---
PGE:					
Potter	---	---	---	---	---
PoA:					
Portales	fourwing saltbush	---	eastern redcedar	Siberian elm	---
PoB:					
Portales	fourwing saltbush	---	eastern redcedar	Siberian elm	---
PsA:					
Posey	fourwing saltbush	---	eastern redcedar	Siberian elm	---

Table 11.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
PsB: Posey	fourwing saltbush	---	eastern redcedar	Siberian elm	---
RcA: Ranco	---	---	---	---	---
SgA: Seagraves	skunkbush sumac; lilac; honeysuckle	desert willow; redbud; Chickasaw plum	Rocky Mountain juniper; eastern redcedar; oriental arborvitae; osageorange	Austrian pine; ponderosa pine; bur oak; green ash; hackberry; honeylocust; mulberry; Afghan pine; lacebark elm	Siberian elm
ShB: Sharvana	---	---	---	---	---
SL: Water, intermittent, salt lake	---	---	---	---	---
SpA: Sparenberg	---	---	---	---	---
TkA: Tokio	skunkbush sumac; lilac; honeysuckle	desert willow; redbud; Chickasaw plum	Rocky Mountain juniper; eastern redcedar; oriental arborvitae; osageorange	Austrian pine; ponderosa pine; bur oak; green ash; hackberry; honeylocust; mulberry; Afghan pine; lacebark elm	Siberian elm
TkB: Tokio	skunkbush sumac; lilac; honeysuckle	desert willow; redbud; Chickasaw plum	Rocky Mountain juniper; eastern redcedar; oriental arborvitae; osageorange	Austrian pine; ponderosa pine; bur oak; green ash; hackberry; honeylocust; mulberry; Afghan pine; lacebark elm	Siberian elm
W: Water	---	---	---	---	---

Table 11.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
YRG:					
Yellowhouse	---	---	---	---	---
Rock outcrop	---	---	---	---	---
ZfA:					
Zita	honeysuckle; Nanking cherry; skunkbush sumac; cotoneaster	redbud; desert willow; winterberry euonymus	little walnut; Rocky Mountain juniper; eastern redcedar; osageorange; Austrian pine; Scotch pine; oriental arborvitae	American sycamore; pecan; hackberry; green ash; honeylocust; mulberry; ponderosa pine; bur oak; shumard oak; lacebark elm	Siberian elm
ZfB:					
Zita	honeysuckle; Nanking cherry; skunkbush sumac; cotoneaster	redbud; desert willow; winterberry euonymus	little walnut; Rocky Mountain juniper; eastern redcedar; osageorange; Austrian pine; Scotch pine; oriental arborvitae	American sycamore; pecan; hackberry; green ash; honeylocust; mulberry; ponderosa pine; bur oak; shumard oak; lacebark elm	Siberian elm
ZmA:					
Zita	honeysuckle; Nanking cherry; skunkbush sumac; cotoneaster	redbud; desert willow; winterberry euonymus	little walnut; Rocky Mountain juniper; eastern redcedar; osageorange; Austrian pine; Scotch pine; oriental arborvitae	American sycamore; pecan; hackberry; green ash; honeylocust; mulberry; ponderosa pine; bur oak; shumard oak; lacebark elm	Siberian elm

Table 12.--Camp Areas, Picnic Areas, and Playgrounds

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Camp areas: Rating class and limiting features	Camp areas: Value	Picnic areas: Rating class and limiting features	Picnic areas: Value	Playgrounds: Rating class and limiting features	Playgrounds: Value
AcA:							
Acuff	90	Somewhat limited		Somewhat limited		Somewhat limited	
		Dusty	0.50	Dusty	0.50	Dusty	0.50
AcB:							
Acuff	90	Somewhat limited		Somewhat limited		Somewhat limited	
		Dusty	0.50	Dusty	0.50	Dusty	0.50
AfA:							
Amarillo	90	Not limited		Not limited		Not limited	
AfB:							
Amarillo	90	Not limited		Not limited		Not limited	
ArA:							
Arch	90	Somewhat limited		Somewhat limited		Somewhat limited	
		Dusty	0.50	Dusty	0.50	Dusty	0.50
AsA:							
Arch	90	Not limited		Not limited		Not limited	
AvA:							
Arvana	85	Somewhat limited		Somewhat limited		Not limited	
		Depth to cemented pan	0.65	Depth to cemented pan	0.65		
AvB:							
Arvana	85	Somewhat limited		Somewhat limited		Not limited	
		Depth to cemented pan	0.80	Depth to cemented pan	0.80		
BcA:							
Bippus	85	Very limited		Not limited		Somewhat limited	
		Flooding	1.00			Flooding	0.60
BeD:							
Berda	85	Somewhat limited		Somewhat limited		Very limited	
		Dusty	0.50	Dusty	0.50	Slope	1.00
						Dusty	0.50
BHC:							
Brownfield	65	Very limited		Very limited		Very limited	
		Too sandy	1.00	Too sandy	1.00	Too sandy	1.00
						Slope	0.88
BP:							
Borrow pits	95	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Slope	1.00	Slope	1.00	Gravel content	1.00
		Gravel content	1.00	Gravel content	1.00	Slope	1.00
		Slow water movement	0.96	Slow water movement	0.96	Slow water movement	0.96

Table 12.--Camp Areas, Picnic Areas, and Playgrounds--Continued

Map symbol and soil name	Pct. of map unit	Camp areas: Rating class and limiting features	Camp areas: Value	Picnic areas: Rating class and limiting features	Picnic areas: Value	Playgrounds: Rating class and limiting features	Playgrounds: Value
BrB:							
Brownfield----------	90	Very limited		Very limited		Very limited	
		Too sandy	1.00	Too sandy	1.00	Too sandy	1.00
CdA:							
Cedarlake-----------	95	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Ponding	1.00	Depth to saturated zone	1.00
		Sodium content	1.00	Depth to saturated zone	1.00	Sodium content	1.00
		Salinity	1.00	Sodium content	1.00	Salinity	1.00
		Ponding	1.00	Salinity	1.00	Ponding	1.00
		Slow water movement	0.26	Slow water movement	0.26	Slow water movement	0.26
CeC:							
Creta---------------	85	Very limited		Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Dusty	0.50	Dusty	0.50	Dusty	0.50
						Slope	0.12
						Gravel content	0.01
ChA:							
Chapel--------------	90	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Too clayey	0.50	Too clayey	0.50	Too clayey	0.50
		Slow water movement	0.45	Slow water movement	0.45	Slow water movement	0.45
DRC:							
Drake---------------	90	Somewhat limited		Somewhat limited		Somewhat limited	
		Dusty	0.50	Dusty	0.50	Slope	0.88
						Dusty	0.50
DRE:							
Drake---------------	90	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
		Dusty	0.50	Dusty	0.50	Dusty	0.50
EPA:							
Estacado------------	50	Somewhat limited		Somewhat limited		Somewhat limited	
		Dusty	0.50	Dusty	0.50	Dusty	0.50
Pep-----------------	40	Somewhat limited		Somewhat limited		Somewhat limited	
		Dusty	0.50	Dusty	0.50	Dusty	0.50
EsA:							
Estacado------------	90	Somewhat limited		Somewhat limited		Somewhat limited	
		Dusty	0.50	Dusty	0.50	Dusty	0.50
EsB:							
Estacado------------	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Dusty	0.50	Dusty	0.50	Dusty	0.50
KmB:							
Kimberson-----------	85	Very limited		Very limited		Very limited	
		Depth to cemented pan	1.00	Depth to cemented pan	1.00	Depth to cemented pan	1.00
						Gravel content	0.92

Table 12.--Camp Areas, Picnic Areas, and Playgrounds--Continued

Map symbol and soil name	Pct. of map unit	Camp areas: Rating class and limiting features	Camp areas: Value	Picnic areas: Rating class and limiting features	Picnic areas: Value	Playgrounds: Rating class and limiting features	Playgrounds: Value
LhA:							
Lenorah-------------	50	Very limited		Very limited		Very limited	
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Flooding	1.00				
Hindman-------------	35	Very limited		Very limited		Very limited	
		Flooding	1.00	Too sandy	1.00	Too sandy	1.00
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Too sandy	1.00				
LMA:							
Lamesa--------------	95	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Ponding	1.00	Depth to saturated zone	1.00
		Ponding	1.00	Depth to saturated zone	0.99	Ponding	1.00
		Slow water movement	0.99	Slow water movement	0.99	Slow water movement	0.99
LoA:							
Lofton--------------	85	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Slow water movement	0.45	Slow water movement	0.45	Slow water movement	0.45
M-W:							
Miscellaneous water	100	Not rated		Not rated		Not rated	
MdA:							
Midessa-------------	85	Not limited		Not limited		Not limited	
MdB:							
Midessa-------------	85	Not limited		Not limited		Not limited	
MdC:							
Midessa-------------	85	Not limited		Not limited		Somewhat limited	
						Slope	0.88
MPC:							
Midessa-------------	50	Not limited		Not limited		Somewhat limited	
						Slope	0.88
Posey---------------	35	Not limited		Not limited		Somewhat limited	
						Slope	0.88
MPP:							
Midessa-------------	40	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.01	Slope	0.01	Slope	1.00
Potter--------------	30	Somewhat limited		Somewhat limited		Very limited	
		Slow water movement	0.96	Slow water movement	0.96	Slope	1.00
		Dusty	0.50	Dusty	0.50	Slow water movement	0.96
		Slope	0.01	Slope	0.01	Gravel content	0.92
						Dusty	0.50
Posey---------------	20	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.01	Slope	0.01	Slope	1.00

Table 12.--Camp Areas, Picnic Areas, and Playgrounds--Continued

Map symbol and soil name	Pct. of map unit	Camp areas: Rating class and limiting features	Camp areas: Value	Picnic areas: Rating class and limiting features	Picnic areas: Value	Playgrounds: Rating class and limiting features	Playgrounds: Value
MVE:							
Mobeetie	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Veal	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Dusty	0.50	Dusty	0.50	Dusty	0.50
Potter	15	Somewhat limited		Somewhat limited		Very limited	
		Slow water movement	0.96	Slow water movement	0.96	Slope	1.00
		Slope	0.63	Slope	0.63	Slow water movement	0.96
		Dusty	0.50	Dusty	0.50	Gravel content	0.92
						Dusty	0.50
OBG:							
Obaro	55	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
						Depth to bedrock	0.46
Quinlan	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
OcA:							
Olton	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Slow water movement	0.44	Slow water movement	0.44	Slow water movement	0.44
PAB:							
Patricia	50	Somewhat limited		Somewhat limited		Somewhat limited	
		Too sandy	0.92	Too sandy	0.92	Too sandy	0.92
Amarillo	45	Somewhat limited		Somewhat limited		Somewhat limited	
		Too sandy	0.85	Too sandy	0.85	Too sandy	0.85
PeA:							
Pep	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Dusty	0.50	Dusty	0.50	Dusty	0.50
PeB:							
Pep	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Dusty	0.50	Dusty	0.50	Dusty	0.50
PGE:							
Potter	80	Somewhat limited		Somewhat limited		Very limited	
		Slow water movement	0.96	Slow water movement	0.96	Slope	1.00
		Dusty	0.50	Dusty	0.50	Slow water movement	0.96
		Slope	0.01	Slope	0.01	Gravel content	0.92
						Dusty	0.50
PoA:							
Portales	90	Somewhat limited		Somewhat limited		Somewhat limited	
		Dusty	0.50	Dusty	0.50	Dusty	0.50

Table 12.--Camp Areas, Picnic Areas, and Playgrounds--Continued

Map symbol and soil name	Pct. of map unit	Camp areas: Rating class and limiting features	Camp areas: Value	Picnic areas: Rating class and limiting features	Picnic areas: Value	Playgrounds: Rating class and limiting features	Playgrounds: Value
PoB:							
Portales	90	Somewhat limited		Somewhat limited		Somewhat limited	
		Dusty	0.50	Dusty	0.50	Dusty	0.50
PsA:							
Posey	85	Not limited		Not limited		Not limited	
PsB:							
Posey	85	Not limited		Not limited		Not limited	
RcA:							
Ranco	90	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Ponding	1.00	Depth to saturated zone	1.00
		Ponding	1.00	Depth to saturated zone	1.00	Ponding	1.00
		Too clayey	0.50	Too clayey	0.50	Too clayey	0.50
		Slow water movement	0.45	Slow water movement	0.45	Slow water movement	0.45
SgA:							
Seagraves	90	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Too sandy	0.42	Too sandy	0.42	Too sandy	0.42
ShB:							
Sharvana	85	Very limited		Very limited		Very limited	
		Depth to cemented pan	1.00	Depth to cemented pan	1.00	Depth to cemented pan	1.00
SL:							
Water, intermittent, salt lake	100	Not rated		Not rated		Not rated	
SpA:							
Sparenberg	90	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Too clayey	0.50	Too clayey	0.50	Too clayey	0.50
		Slow water movement	0.45	Slow water movement	0.45	Slow water movement	0.45
TkA:							
Tokio	90	Not limited		Not limited		Not limited	
TkB:							
Tokio	90	Somewhat limited		Somewhat limited		Somewhat limited	
		Too sandy	0.99	Too sandy	0.99	Too sandy	0.99
W:							
Water	100	Not rated		Not rated		Not rated	

Table 12.--Camp Areas, Picnic Areas, and Playgrounds--Continued

Map symbol and soil name	Pct. of map unit	Camp areas: Rating class and limiting features	Camp areas: Value	Picnic areas: Rating class and limiting features	Picnic areas: Value	Playgrounds: Rating class and limiting features	Playgrounds: Value
YRG:							
Yellowhouse	75	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Gravel content	0.54	Gravel content	0.54	Gravel content	1.00
		Slow water movement	0.44	Slow water movement	0.44	Depth to bedrock	0.71
						Slow water movement	0.44
Rock outcrop	10	Not rated		Not rated		Not rated	
ZfA:							
Zita	90	Not limited		Not limited		Not limited	
ZfB:							
Zita	90	Not limited		Not limited		Not limited	
ZmA:							
Zita	90	Somewhat limited		Somewhat limited		Somewhat limited	
		Dusty	0.50	Dusty	0.50	Dusty	0.50

Table 13.--Paths, Trails, and Golf Course Fairways

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf course fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
AcA:							
Acuff	90	Somewhat limited		Somewhat limited		Not limited	
		Dusty	0.50	Dusty	0.50		
AcB:							
Acuff	90	Somewhat limited		Somewhat limited		Not limited	
		Dusty	0.50	Dusty	0.50		
AfA:							
Amarillo	90	Not limited		Not limited		Not limited	
AfB:							
Amarillo	90	Not limited		Not limited		Not limited	
ArA:							
Arch	90	Somewhat limited		Somewhat limited		Very limited	
		Dusty	0.50	Dusty	0.50	Carbonate content	1.00
AsA:							
Arch	90	Not limited		Not limited		Very limited	
						Carbonate content	1.00
AvA:							
Arvana	85	Not limited		Not limited		Very limited	
						Carbonate content	1.00
						Depth to cemented pan	0.64
AvB:							
Arvana	85	Not limited		Not limited		Very limited	
						Carbonate content	1.00
						Depth to cemented pan	0.79
BcA:							
Bippus	85	Not limited		Not limited		Somewhat limited	
						Flooding	0.60
BeD:							
Berda	85	Somewhat limited		Somewhat limited		Not limited	
		Dusty	0.50	Dusty	0.50		
BHC:							
Brownfield	65	Very limited		Very limited		Somewhat limited	
		Too sandy	1.00	Too sandy	1.00	Droughty	0.91
BP:							
Borrow pits	95	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Slope	0.92			Droughty	1.00
						Slope	1.00
						Gravel content	1.00
						Carbonate content	1.00

Table 13.--Paths, Trails, and Golf Course Fairways--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails: Rating class and limiting features	Value	Off-road motorcycle trails: Rating class and limiting features	Value	Golf course fairways: Rating class and limiting features	Value
BrB:							
Brownfield	90	Very limited		Very limited		Somewhat limited	
		Too sandy	1.00	Too sandy	1.00	Droughty	0.05
CdA:							
Cedarlake	95	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Ponding	1.00
		Ponding	1.00	Ponding	1.00	Salinity	1.00
						Sodium content	1.00
						Depth to saturated zone	1.00
						Carbonate content	1.00
CeC:							
Creta	85	Somewhat limited		Somewhat limited		Very limited	
		Dusty	0.50	Dusty	0.50	Sodium content	1.00
ChA:							
Chapel	90	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Too clayey	0.50	Too clayey	0.50	Too clayey	1.00
DRC:							
Drake	90	Somewhat limited		Somewhat limited		Not limited	
		Dusty	0.50	Dusty	0.50		
DRE:							
Drake	90	Somewhat limited		Somewhat limited		Somewhat limited	
		Dusty	0.50	Dusty	0.50	Slope	0.63
EPA:							
Estacado	50	Somewhat limited		Somewhat limited		Not limited	
		Dusty	0.50	Dusty	0.50		
Pep	40	Somewhat limited		Somewhat limited		Very limited	
		Dusty	0.50	Dusty	0.50	Carbonate content	1.00
EsA:							
Estacado	90	Somewhat limited		Somewhat limited		Not limited	
		Dusty	0.50	Dusty	0.50		
EsB:							
Estacado	85	Somewhat limited		Somewhat limited		Not limited	
		Dusty	0.50	Dusty	0.50		
KmB:							
Kimberson	85	Not limited		Not limited		Very limited	
						Depth to cemented pan	1.00
						Carbonate content	1.00
						Droughty	1.00
LhA:							
Lenorah	50	Not limited		Not limited		Very limited	
						Sodium content	1.00
						Droughty	0.01

Table 13.--Paths, Trails, and Golf Course Fairways--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf course fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Hindman	35	Very limited		Very limited		Very limited	
		Too sandy	1.00	Too sandy	1.00	Sodium content	1.00
						Droughty	0.36
LMA:							
Lamesa	95	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Depth to saturated zone	0.99	Depth to saturated zone	0.99	Depth to saturated zone	0.99
LoA:							
Lofton	85	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
M-W:							
Miscellaneous water	100	Not rated		Not rated		Not rated	
MdA:							
Midessa	85	Not limited		Not limited		Very limited	
						Carbonate content	1.00
MdB:							
Midessa	85	Not limited		Not limited		Very limited	
						Carbonate content	1.00
MdC:							
Midessa	85	Not limited		Not limited		Very limited	
						Carbonate content	1.00
MPC:							
Midessa	50	Not limited		Not limited		Very limited	
						Carbonate content	1.00
Posey	35	Not limited		Not limited		Very limited	
						Carbonate content	1.00
MPP:							
Midessa	40	Not limited		Not limited		Very limited	
						Carbonate content	1.00
						Slope	0.01
Potter	30	Somewhat limited		Somewhat limited		Very limited	
		Dusty	0.50	Dusty	0.50	Carbonate content	1.00
						Droughty	0.51
						Slope	0.01
Posey	20	Not limited		Not limited		Very limited	
						Carbonate content	1.00
						Slope	0.01
MVE:							
Mobeetie	50	Not limited		Not limited		Very limited	
						Slope	1.00
Veal	25	Very limited		Very limited		Very limited	
		Water erosion	1.00	Water erosion	1.00	Slope	1.00
		Dusty	0.50	Dusty	0.50	Carbonate content	1.00

Table 13.--Paths, Trails, and Golf Course Fairways--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails: Rating class and limiting features	Value	Off-road motorcycle trails: Rating class and limiting features	Value	Golf course fairways: Rating class and limiting features	Value
Potter	15	Somewhat limited		Somewhat limited		Very limited	
		Dusty	0.50	Dusty	0.50	Carbonate content	1.00
						Slope	0.63
						Droughty	0.51
OBG:							
Obaro	55	Very limited		Very limited		Somewhat limited	
		Water erosion	1.00	Water erosion	1.00	Slope	0.63
						Depth to bedrock	0.46
Quinlan	30	Very limited		Very limited		Very limited	
		Water erosion	1.00	Water erosion	1.00	Depth to bedrock	1.00
		Slope	0.50			Slope	1.00
						Droughty	0.99
OcA:							
Olton	85	Not limited		Not limited		Not limited	
PAB:							
Patricia	50	Somewhat limited		Somewhat limited		Not limited	
		Too sandy	0.92	Too sandy	0.92		
Amarillo	45	Somewhat limited		Somewhat limited		Not limited	
		Too sandy	0.85	Too sandy	0.85		
PeA:							
Pep	85	Somewhat limited		Somewhat limited		Very limited	
		Dusty	0.50	Dusty	0.50	Carbonate content	1.00
PeB:							
Pep	85	Somewhat limited		Somewhat limited		Very limited	
		Dusty	0.50	Dusty	0.50	Carbonate content	1.00
PGE:							
Potter	80	Somewhat limited		Somewhat limited		Very limited	
		Dusty	0.50	Dusty	0.50	Carbonate content	1.00
						Droughty	0.51
						Slope	0.01
PoA:							
Portales	90	Somewhat limited		Somewhat limited		Very limited	
		Dusty	0.50	Dusty	0.50	Carbonate content	1.00
PoB:							
Portales	90	Somewhat limited		Somewhat limited		Very limited	
		Dusty	0.50	Dusty	0.50	Carbonate content	1.00
PsA:							
Posey	85	Not limited		Not limited		Very limited	
						Carbonate content	1.00
PsB:							
Posey	85	Not limited		Not limited		Very limited	
						Carbonate content	1.00

Table 13.--Paths, Trails, and Golf Course Fairways--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf course fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
RcA:							
Ranco----------------	90	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Ponding	1.00
		Ponding	1.00	Ponding	1.00	Depth to saturated zone	1.00
		Too clayey	0.50	Too clayey	0.50	Too clayey	1.00
SgA:							
Seagraves-----------	90	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Too sandy	0.42	Too sandy	0.42		
ShB:							
Sharvana------------	85	Not limited		Not limited		Very limited	
						Depth to cemented pan	1.00
						Carbonate content	1.00
						Droughty	0.99
SL:							
Water, intermittent, salt lake----------	100	Not rated		Not rated		Not rated	
SpA:							
Sparenberg----------	90	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Too clayey	0.50	Too clayey	0.50	Too clayey	1.00
TkA:							
Tokio---------------	90	Not limited		Not limited		Not limited	
TkB:							
Tokio---------------	90	Somewhat limited		Somewhat limited		Not limited	
		Too sandy	0.99	Too sandy	0.99		
W:							
Water---------------	100	Not rated		Not rated		Not rated	
YRG:							
Yellowhouse---------	75	Somewhat limited		Not limited		Very limited	
		Slope	0.50			Slope	1.00
						Carbonate content	1.00
						Depth to bedrock	0.71
						Gravel content	0.54
						Droughty	0.29
Rock outcrop--------	10	Not rated		Not rated		Not rated	
ZfA:							
Zita----------------	90	Not limited		Not limited		Very limited	
						Carbonate content	1.00
ZfB:							
Zita----------------	90	Not limited		Not limited		Very limited	
						Carbonate content	1.00

Table 13.--Paths, Trails, and Golf Course Fairways--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf course fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
ZmA:							
Zita	90	Somewhat limited		Somewhat limited		Very limited	
		Dusty	0.50	Dusty	0.50	Carbonate content	1.00

Table 14.--Grain and Seed Crops for Food and Cover for Wildlife Habitat

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Grain and seed crops for food and cover: Rating class and limiting features	Value
AcA:			
Acuff	90	Somewhat limited	
		Too arid	0.50
AcB:			
Acuff	90	Somewhat limited	
		Too arid	0.50
AfA:			
Amarillo	90	Very limited	
		HEL wind	1.00
		Too arid	0.50
AfB:			
Amarillo	90	Very limited	
		HEL wind	1.00
		Too arid	0.50
ArA:			
Arch	90	Very limited	
		HEL wind	1.00
		Too arid	0.50
		Droughty	0.43
AsA:			
Arch	90	Very limited	
		HEL wind	1.00
		Droughty	0.59
		Too arid	0.50
AvA:			
Arvana	85	Very limited	
		HEL wind	1.00
		Cemented pan	0.91
		Droughty	0.89
AvB:			
Arvana	85	Very limited	
		HEL wind	1.00
		Droughty	0.99
		Cemented pan	0.95
BcA:			
Bippus	85	Somewhat limited	
		Flooding	0.50
		Too clayey	0.02

Table 14.--Grain and Seed Crops for Food and Cover for Wildlife Habitat--Continued

Map symbol and soil name	Pct. of map unit	Grain and seed crops for food and cover: Rating class and limiting features	Value
BeD:			
Berda	85	Very limited	
		HEL wind	1.00
		Potentially or highly erodible	1.00
		Too arid	0.50
		Droughty	0.18
BHC:			
Brownfield	65	Very limited	
		HEL wind	1.00
		Too sandy	1.00
		Droughty	1.00
		Too arid	0.50
BP:			
Borrow pits	95	Not rated	
BrB:			
Brownfield	90	Very limited	
		HEL wind	1.00
		Too sandy	1.00
		Droughty	1.00
		Too arid	0.50
CdA:			
Cedarlake	95	Very limited	
		Ponding	1.00
		Excess salt	1.00
		Wetness	1.00
		HEL wind	1.00
		Droughty	1.00
CeC:			
Creta	85	Very limited	
		HEL wind	1.00
		Potentially or highly erodible	1.00
		Too arid	0.50
ChA:			
Chapel	90	Very limited	
		Too clayey	1.00
		Ponding	0.50
		Percs slowly	0.50
DRC:			
Drake	90	Very limited	
		HEL wind	1.00
		Potentially or highly erodible	1.00
		Droughty	0.58
		Too arid	0.50

Table 14.--Grain and Seed Crops for Food and Cover for Wildlife Habitat--Continued

Map symbol and soil name	Pct. of map unit	Grain and seed crops for food and cover: Rating class and limiting features	Value
DRE:			
Drake	90	Very limited	
		HEL wind	1.00
		Potentially or highly erodible	1.00
		Droughty	0.57
		Too arid	0.50
EPA:			
Estacado	50	Very limited	
		HEL wind	1.00
		Too arid	0.50
Pep	40	Very limited	
		HEL wind	1.00
		Too arid	0.50
		Droughty	0.10
EsA:			
Estacado	90	Somewhat limited	
		Too arid	0.50
EsB:			
Estacado	85	Somewhat limited	
		Too arid	0.50
KmB:			
Kimberson	85	Very limited	
		Droughty	1.00
		HEL wind	1.00
		Potentially or highly erodible	1.00
LhA:			
Lenorah	50	Very limited	
		Excess salt	1.00
		HEL wind	1.00
		Droughty	1.00
		Excess Sodium	0.56
		Wetness	0.19
Hindman	35	Very limited	
		HEL wind	1.00
		Too sandy	1.00
		Droughty	1.00
		Too arid	0.50
LMA:			
Lamesa	95	Very limited	
		Ponding	1.00
		Wetness	1.00
		Excess salt	0.92
		Percs slowly	0.84
		Too clayey	0.81

Table 14.--Grain and Seed Crops for Food and Cover for Wildlife Habitat--Continued

Map symbol and soil name	Pct. of map unit	Grain and seed crops for food and cover: Rating class and limiting features	Value
LoA:			
Lofton--------------	85	Very limited	
		Percs slowly	1.00
		Too clayey	0.70
		Ponding	0.50
M-W:			
Miscellaneous water	100	Not rated	
MdA:			
Midessa-------------	85	Very limited	
		HEL wind	1.00
		Too arid	0.50
		Droughty	0.31
MdB:			
Midessa-------------	85	Very limited	
		HEL wind	1.00
		Too arid	0.50
		Droughty	0.31
MdC:			
Midessa-------------	85	Very limited	
		HEL wind	1.00
		Potentially or highly erodible	1.00
		Too arid	0.50
		Droughty	0.37
MPC:			
Midessa-------------	50	Very limited	
		HEL wind	1.00
		Potentially or highly erodible	1.00
		Too arid	0.50
		Droughty	0.37
Posey---------------	35	Very limited	
		HEL wind	1.00
		Potentially or highly erodible	1.00
		Droughty	0.30
MPP:			
Midessa-------------	40	Very limited	
		HEL wind	1.00
		Potentially or highly erodible	1.00
		Too arid	0.50
		Droughty	0.40

Table 14.--Grain and Seed Crops for Food and Cover for Wildlife Habitat--Continued

Map symbol and soil name	Pct. of map unit	Grain and seed crops for food and cover: Rating class and limiting features	Value
Potter	30	Very limited	
		HEL wind	1.00
		Potentially or highly erodible	1.00
		Too arid	1.00
		Droughty	1.00
		Percs slowly	0.52
Posey	20	Very limited	
		HEL wind	1.00
		Potentially or highly erodible	1.00
		Droughty	0.30
MVE:			
Mobeetie	50	Very limited	
		HEL wind	1.00
		Potentially or highly erodible	1.00
		Droughty	0.91
		Too arid	0.50
Veal	25	Very limited	
		HEL wind	1.00
		Potentially or highly erodible	1.00
		Droughty	0.98
		Too arid	0.50
Potter	15	Very limited	
		HEL wind	1.00
		Potentially or highly erodible	1.00
		Too arid	1.00
		Droughty	1.00
		Percs slowly	0.52
OBG:			
Obaro	55	Very limited	
		HEL wind	1.00
		Potentially or highly erodible	1.00
		Droughty	0.80
		Bedrock	0.46

Table 14.--Grain and Seed Crops for Food and Cover for Wildlife Habitat--Continued

Map symbol and soil name	Pct. of map unit	Grain and seed crops for food and cover: Rating class and limiting features	Value
Quinlan	30	Very limited	
		Droughty	1.00
		HEL wind	1.00
		Bedrock	1.00
		Potentially or highly erodible	1.00
		Percs slowly	1.00
OcA:			
Olton	85	Somewhat limited	
		Percs slowly	0.93
		Too arid	0.50
		Too clayey	0.05
PAB:			
Patricia	50	Very limited	
		HEL wind	1.00
		Too sandy	0.50
		Too arid	0.50
		Droughty	0.06
Amarillo	45	Very limited	
		HEL wind	1.00
		Too sandy	0.50
		Too arid	0.50
		Droughty	0.03
PeA:			
Pep	85	Very limited	
		HEL wind	1.00
		Too arid	0.50
		Droughty	0.10
PeB:			
Pep	85	Very limited	
		HEL wind	1.00
		Too arid	0.50
		Droughty	0.13
PGE:			
Potter	80	Very limited	
		Potentially or highly erodible	1.00
		Too arid	1.00
		Droughty	1.00
		Percs slowly	0.52
PoA:			
Portales	90	Very limited	
		HEL wind	1.00
		Too arid	0.50
		Droughty	0.06

Table 14.--Grain and Seed Crops for Food and Cover for Wildlife Habitat--Continued

Map symbol and soil name	Pct. of map unit	Grain and seed crops for food and cover: Rating class and limiting features	Valuee
PoB:			
Portales	90	Very limited	
		HEL wind	1.00
		Too arid	0.50
		Droughty	0.08
PsA:			
Posey	85	Very limited	
		HEL wind	1.00
		Droughty	0.26
PsB:			
Posey	85	Very limited	
		HEL wind	1.00
		Droughty	0.29
RcA:			
Ranco	90	Very limited	
		Ponding	1.00
		Wetness	1.00
		Too clayey	1.00
		Percs slowly	0.50
SgA:			
Seagraves	90	Very limited	
		HEL wind	1.00
		Droughty	0.79
		Ponding	0.50
ShB:			
Sharvana	85	Very limited	
		Droughty	1.00
		HEL wind	1.00
		Potentially or highly erodible	1.00
		Too arid	0.50
SL:			
Water, intermittent, salt lake	100	Not rated	
SpA:			
Sparenberg	90	Very limited	
		Too clayey	1.00
		Ponding	0.50
		Percs slowly	0.50
TkA:			
Tokio	90	Very limited	
		HEL wind	1.00
TkB:			
Tokio	90	Very limited	
		HEL wind	1.00
		Too sandy	0.50
		Droughty	0.15

Table 14.--Grain and Seed Crops for Food and Cover for Wildlife Habitat--Continued

Map symbol and soil name	Pct. of map unit	Grain and seed crops for food and cover: Rating class and limiting features	Value
W:			
Water	100	Not rated	
YRG:			
Yellowhouse	75	Very limited	
		Potentially or highly erodible	1.00
		Droughty	1.00
		Percs slowly	0.93
		Bedrock	0.71
		Too gravelly, cobbly, or stony	0.54
Rock outcrop	10	Not rated	
ZfA:			
Zita	90	Very limited	
		HEL wind	1.00
		Too arid	0.50
		Droughty	0.04
ZfB:			
Zita	90	Very limited	
		HEL wind	1.00
		Too arid	0.50
		Droughty	0.06
ZmA:			
Zita	90	Somewhat limited	
		Too arid	0.50
		Droughty	0.02

Table 15.--Domestic Grasses and Legumes for Food and Cover for Wildlife Habitat

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Domestic grasses and legumes for food and cover: Rating class and limiting features	Value
AcA:			
Acuff	90	Somewhat limited	
		Too arid	0.50
AcB:			
Acuff	90	Somewhat limited	
		Too arid	0.50
AfA:			
Amarillo	90	Somewhat limited	
		Too arid	0.50
AfB:			
Amarillo	90	Somewhat limited	
		Too arid	0.50
ArA:			
Arch	90	Somewhat limited	
		Too arid	0.50
AsA:			
Arch	90	Somewhat limited	
		Too arid	0.50
AvA:			
Arvana	85	Somewhat limited	
		Cemented pan	0.91
AvB:			
Arvana	85	Somewhat limited	
		Cemented pan	0.95
BcA:			
Bippus	85	Somewhat limited	
		Flooding	0.50
		Too clayey	0.02

Table 15.--Domestic Grasses and Legumes for Food and Cover for Wildlife Habitat--Continued

Map symbol and soil name	Pct. of map unit	Domestic grasses and legumes for food and cover: Rating class and limiting features	Value
BeD:			
Berda	85	Very limited	
		Potentially or highly erodible	1.00
		Too arid	0.50
BHC:			
Brownfield	65	Somewhat limited	
		Droughty	0.90
		Too sandy	0.50
		Too arid	0.50
BP:			
Borrow pits	95	Not rated	
BrB:			
Brownfield	90	Somewhat limited	
		Too sandy	0.50
		Too arid	0.50
		Droughty	0.04
CdA:			
Cedarlake	95	Very limited	
		Ponding	1.00
		Excess salt	1.00
		Excess sodium	1.00
		Wetness	1.00
		Droughty	0.19
CeC:			
Creta	85	Very limited	
		Potentially or highly erodible	1.00
		Too arid	0.50
		Excess sodium	0.08
ChA:			
Chapel	90	Very limited	
		Too clayey	1.00
		Ponding	0.50
		Percs slowly	0.50
DRC:			
Drake	90	Very limited	
		Potentially or highly erodible	1.00
		Too arid	0.50

Table 15.--Domestic Grasses and Legumes for Food and Cover for Wildlife Habitat--Continued

Map symbol and soil name	Pct. of map unit	Domestic grasses and legumes for food and cover: Rating class and limiting features	Value
DRE:			
Drake	90	Very limited	
		Potentially or highly erodible	1.00
		Too arid	0.50
EPA:			
Estacado	50	Somewhat limited	
		Too arid	0.50
Pep	40	Somewhat limited	
		Too arid	0.50
EsA:			
Estacado	90	Somewhat limited	
		Too arid	0.50
EsB:			
Estacado	85	Somewhat limited	
		Too arid	0.50
KmB:			
Kimberson	85	Very limited	
		Potentially or highly erodible	1.00
		Droughty	1.00
LhA:			
Lenorah	50	Very limited	
		Excess salt	1.00
		Excess sodium	1.00
		Wetness	0.19
		Droughty	0.01
Hindman	35	Somewhat limited	
		Too sandy	0.50
		Too arid	0.50
		Droughty	0.34
LMA:			
Lamesa	95	Very limited	
		Ponding	1.00
		Wetness	1.00
		Excess salt	0.92
		Percs slowly	0.84
		Too clayey	0.81

Table 15.--Domestic Grasses and Legumes for Food and Cover for Wildlife Habitat--Continued

Map symbol and soil name	Pct. of map unit	Domestic grasses and legumes for food and cover: Rating class and limiting features	Value
LoA:			
Lofton	85	Very limited	
		Percs slowly	1.00
		Too clayey	0.70
		Ponding	0.50
M-W:			
Miscellaneous water	100	Not rated	
MdA:			
Midessa	85	Somewhat limited	
		Too arid	0.50
MdB:			
Midessa	85	Somewhat limited	
		Too arid	0.50
MdC:			
Midessa	85	Very limited	
		Potentially or highly erodible	1.00
		Too arid	0.50
MPC:			
Midessa	50	Very limited	
		Potentially or highly erodible	1.00
		Too arid	0.50
Posey	35	Very limited	
		Potentially or highly erodible	1.00
MPP:			
Midessa	40	Very limited	
		Potentially or highly erodible	1.00
		Too arid	0.50

Table 15.--Domestic Grasses and Legumes for Food and Cover for Wildlife Habitat--Continued

Map symbol and soil name	Pct. of map unit	Domestic grasses and legumes for food and cover: Rating class and limiting features	Value
Potter	30	Very limited	
		Potentially or highly erodible	1.00
		Too arid	1.00
		Percs slowly	0.52
		Droughty	0.49
Posey	20	Very limited	
		Potentially or highly erodible	1.00
MVE:			
Mobeetie	50	Very limited	
		Potentially or highly erodible	1.00
		Too arid	0.50
Veal	25	Very limited	
		Potentially or highly erodible	1.00
		Too arid	0.50
Potter	15	Very limited	
		Potentially or highly erodible	1.00
		Too arid	1.00
		Percs slowly	0.52
		Droughty	0.49
OBG:			
Obaro	55	Very limited	
		Potentially or highly erodible	1.00
		Bedrock	0.46

Table 15.--Domestic Grasses and Legumes for Food and Cover for Wildlife Habitat--Continued

Map symbol and soil name	Pct. of map unit	Domestic grasses and legumes for food and cover: Rating class and limiting features	Value
Quinlan	30	Very limited	
		Potentially or highly erodible	1.00
		Bedrock	1.00
		Percs slowly	1.00
		Droughty	0.99
		Slope	0.22
OcA:			
Olton	85	Somewhat limited	
		Percs slowly	0.93
		Too arid	0.50
		Too clayey	0.05
PAB:			
Patricia	50	Somewhat limited	
		Too sandy	0.50
		Too arid	0.50
Amarillo	45	Somewhat limited	
		Too sandy	0.50
		Too arid	0.50
PeA:			
Pep	85	Somewhat limited	
		Too arid	0.50
PeB:			
Pep	85	Somewhat limited	
		Too arid	0.50
PGE:			
Potter	80	Very limited	
		Potentially or highly erodible	1.00
		Too arid	1.00
		Percs slowly	0.52
		Droughty	0.49
PoA:			
Portales	90	Somewhat limited	
		Too arid	0.50

Table 15.--Domestic Grasses and Legumes for Food and Cover for Wildlife Habitat--Continued

Map symbol and soil name	Pct. of map unit	Domestic grasses and legumes for food and cover: Rating class and limiting features	Value
PoB:			
Portales	90	Somewhat limited	
		Too arid	0.50
PsA:			
Posey	85	Not limited	
PsB:			
Posey	85	Not limited	
RcA:			
Ranco	90	Very limited	
		Ponding	1.00
		Wetness	1.00
		Too clayey	1.00
		Percs slowly	0.50
SgA:			
Seagraves	90	Somewhat limited	
		Ponding	0.50
ShB:			
Sharvana	85	Very limited	
		Potentially or highly erodible	1.00
		Droughty	0.99
		Too arid	0.50
SL:			
Water, intermittent, salt lake	100	Not rated	
SpA:			
Sparenberg	90	Very limited	
		Too clayey	1.00
		Ponding	0.50
		Percs slowly	0.50
TkA:			
Tokio	90	Not limited	
TkB:			
Tokio	90	Somewhat limited	
		Too sandy	0.50

Table 15.--Domestic Grasses and Legumes for Food and Cover for Wildlife Habitat--Continued

Map symbol and soil name	Pct. of map unit	Domestic grasses and legumes for food and cover: Rating class and limiting features	Value
W:			
Water	100	Not rated	
YRG:			
Yellowhouse	75	Very limited	
		Potentially or highly erodible	1.00
		Percs slowly	0.93
		Bedrock	0.71
		Too gravelly, cobbly, or stony	0.54
		Too arid	0.50
Rock outcrop	10	Not rated	
ZfA:			
Zita	90	Somewhat limited	
		Too arid	0.50
ZfB:			
Zita	90	Somewhat limited	
		Too arid	0.50
ZmA:			
Zita	90	Somewhat limited	
		Too arid	0.50

Table 16.--Upland Wild Herbaceous Plants for Wildlife Habitat

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Upland wild herbaceous plants: Rating class and limiting features	Value
AcA:			
Acuff	90	Somewhat limited	
		Too arid	0.50
AcB:			
Acuff	90	Somewhat limited	
		Too arid	0.50
AfA:			
Amarillo	90	Somewhat limited	
		Too arid	0.50
AfB:			
Amarillo	90	Somewhat limited	
		Too arid	0.50
ArA:			
Arch	90	Somewhat limited	
		Too arid	0.50
AsA:			
Arch	90	Somewhat limited	
		Too arid	0.50
AvA:			
Arvana	85	Not limited	
AvB:			
Arvana	85	Not limited	
BcA:			
Bippus	85	Somewhat limited	
		Too clayey	0.02
BeD:			
Berda	85	Somewhat limited	
		Too arid	0.50
BHC:			
Brownfield	65	Very limited	
		Too sandy	1.00
		Droughty	0.90
		Too arid	0.50
BP:			
Borrow pits	95	Not rated	

Table 16.--Upland Wild Herbaceous Plants for Wildlife Habitat--Continued

Map symbol and soil name	Pct. of map unit	Upland wild herbaceous plants: Rating class and limiting features	Value
BrB:			
Brownfield----------	90	Very limited	
		Too sandy	1.00
		Too arid	0.50
		Droughty	0.04
CdA:			
Cedarlake-----------	95	Very limited	
		Excess salt	1.00
		Excess sodium	1.00
		Wetness	1.00
		Droughty	0.19
CeC:			
Creta---------------	85	Somewhat limited	
		Too arid	0.50
		Excess sodium	0.08
ChA:			
Chapel--------------	90	Very limited	
		Too clayey	1.00
DRC:			
Drake---------------	90	Somewhat limited	
		Too arid	0.50
DRE:			
Drake---------------	90	Somewhat limited	
		Too arid	0.50
EPA:			
Estacado------------	50	Somewhat limited	
		Too arid	0.50
Pep-----------------	40	Somewhat limited	
		Too arid	0.50
EsA:			
Estacado------------	90	Somewhat limited	
		Too arid	0.50
EsB:			
Estacado------------	85	Somewhat limited	
		Too arid	0.50
KmB:			
Kimberson-----------	85	Very limited	
		Droughty	1.00

Table 16.--Upland Wild Herbaceous Plants for Wildlife Habitat--Continued

Map symbol and soil name	Pct. of map unit	Upland wild herbaceous plants: Rating class and limiting features	Value
LhA:			
Lenorah	50	Very limited	
		Excess salt	1.00
		Excess sodium	1.00
		Wetness	0.19
		Droughty	0.01
Hindman	35	Very limited	
		Too sandy	1.00
		Too arid	0.50
		Droughty	0.34
LMA:			
Lamesa	95	Very limited	
		Wetness	1.00
		Excess salt	0.92
		Too clayey	0.81
LoA:			
Lofton	85	Somewhat limited	
		Too clayey	0.70
M-W:			
Miscellaneous water	100	Not rated	
MdA:			
Midessa	85	Somewhat limited	
		Too arid	0.50
MdB:			
Midessa	85	Somewhat limited	
		Too arid	0.50
MdC:			
Midessa	85	Somewhat limited	
		Too arid	0.50
MPC:			
Midessa	50	Somewhat limited	
		Too arid	0.50
Posey	35	Not limited	
MPP:			
Midessa	40	Somewhat limited	
		Too arid	0.50
Potter	30	Very limited	
		Too arid	1.00
		Droughty	0.49

Table 16.--Upland Wild Herbaceous Plants for Wildlife Habitat--Continued

Map symbol and soil name	Pct. of map unit	Upland wild herbaceous plants: Rating class and limiting features	Value
Posey	20	Not limited	
MVE:			
Mobeetie	50	Somewhat limited	
		Too arid	0.50
Veal	25	Somewhat limited	
		Too arid	0.50
Potter	15	Very limited	
		Too arid	1.00
		Droughty	0.49
OBG:			
Obaro	55	Not limited	
Quinlan	30	Somewhat limited	
		Droughty	0.99
OcA:			
Olton	85	Somewhat limited	
		Too arid	0.50
		Too clayey	0.05
PAB:			
Patricia	50	Somewhat limited	
		Too sandy	0.50
		Too arid	0.50
Amarillo	45	Somewhat limited	
		Too sandy	0.50
		Too arid	0.50
PeA:			
Pep	85	Somewhat limited	
		Too arid	0.50
PeB:			
Pep	85	Somewhat limited	
		Too arid	0.50
PGE:			
Potter	80	Very limited	
		Too arid	1.00
		Droughty	0.49
PoA:			
Portales	90	Somewhat limited	
		Too arid	0.50
PoB:			
Portales	90	Somewhat limited	
		Too arid	0.50

Table 16.--Upland Wild Herbaceous Plants for Wildlife Habitat--Continued

Map symbol and soil name	Pct. of map unit	Upland wild herbaceous plants: Rating class and limiting features	Value
PsA:			
Posey	85	Not limited	
PsB:			
Posey	85	Not limited	
RcA:			
Ranco	90	Very limited	
		Wetness	1.00
		Too clayey	1.00
SgA:			
Seagraves	90	Not limited	
ShB:			
Sharvana	85	Somewhat limited	
		Droughty	0.99
		Too arid	0.50
SL:			
Water, intermittent, salt lake	100	Not rated	
SpA:			
Sparenberg	90	Very limited	
		Too clayey	1.00
TkA:			
Tokio	90	Not limited	
TkB:			
Tokio	90	Somewhat limited	
		Too sandy	0.50
W:			
Water	100	Not rated	
YRG:			
Yellowhouse	75	Somewhat limited	
		Too arid	0.50
		Too clayey	0.44
		Droughty	0.28
Rock outcrop	10	Not rated	

Table 16.--Upland Wild Herbaceous Plants for Wildlife Habitat--Continued

Map symbol and soil name	Pct. of map unit	Upland wild herbaceous plants: Rating class and limiting features	Value
ZfA:			
Zita	90	Somewhat limited	
		Too arid	0.50
ZfB:			
Zita	90	Somewhat limited	
		Too arid	0.50
ZmA:			
Zita	90	Somewhat limited	
		Too arid	0.50

Table 17.--Upland Shrubs and Vines for Wildlife Habitat

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Upland shrubs and vines: Rating class and limiting features	Upland shrubs and vines: Value
AcA:			
Acuff	90	Somewhat limited	
		Too arid	0.50
AcB:			
Acuff	90	Somewhat limited	
		Too arid	0.50
AfA:			
Amarillo	90	Somewhat limited	
		Too arid	0.50
AfB:			
Amarillo	90	Somewhat limited	
		Too arid	0.50
ArA:			
Arch	90	Somewhat limited	
		Too arid	0.50
AsA:			
Arch	90	Somewhat limited	
		Too arid	0.50
AvA:			
Arvana	85	Somewhat limited	
		Cemented pan	0.91
AvB:			
Arvana	85	Somewhat limited	
		Cemented pan	0.95
BcA:			
Bippus	85	Somewhat limited	
		Too clayey	0.02
BeD:			
Berda	85	Somewhat limited	
		Too arid	0.50
BHC:			
Brownfield	65	Somewhat limited	
		Droughty	0.90
		Too sandy	0.50
		Too arid	0.50
BP:			
Borrow pits	95	Not rated	

Table 17.--Upland Shrubs and Vines for Wildlife Habitat--Continued

Map symbol and soil name	Pct. of map unit	Upland shrubs and vines: Rating class and limiting features	Value
BrB:			
Brownfield	90	Somewhat limited	
		Too sandy	0.50
		Too arid	0.50
		Droughty	0.04
CdA:			
Cedarlake	95	Very limited	
		Excess salt	1.00
		Wetness	1.00
		Excess Sodium	0.97
		Droughty	0.19
CeC:			
Creta	85	Somewhat limited	
		Too arid	0.50
ChA:			
Chapel	90	Very limited	
		Too clayey	1.00
DRC:			
Drake	90	Somewhat limited	
		Too arid	0.50
DRE:			
Drake	90	Somewhat limited	
		Too arid	0.50
EPA:			
Estacado	50	Somewhat limited	
		Too arid	0.50
Pep	40	Somewhat limited	
		Too arid	0.50
EsA:			
Estacado	90	Somewhat limited	
		Too arid	0.50
EsB:			
Estacado	85	Somewhat limited	
		Too arid	0.50
KmB:			
Kimberson	85	Very limited	
		Droughty	1.00

Table 17.--Upland Shrubs and Vines for Wildlife Habitat--Continued

Map symbol and soil name	Pct. of map unit	Upland shrubs and vines: Rating class and limiting features	Value
LhA:			
Lenorah	50	Very limited	
		Excess salt	1.00
		Excess Sodium	0.56
		Wetness	0.19
		Droughty	0.01
Hindman	35	Somewhat limited	
		Too sandy	0.50
		Too arid	0.50
		Droughty	0.34
LMA:			
Lamesa	95	Very limited	
		Wetness	1.00
		Excess salt	0.92
		Too clayey	0.81
LoA:			
Lofton	85	Somewhat limited	
		Too clayey	0.70
M-W:			
Miscellaneous water	100	Not rated	
MdA:			
Midessa	85	Somewhat limited	
		Too arid	0.50
MdB:			
Midessa	85	Somewhat limited	
		Too arid	0.50
MdC:			
Midessa	85	Somewhat limited	
		Too arid	0.50
MPC:			
Midessa	50	Somewhat limited	
		Too arid	0.50
Posey	35	Not limited	
MPP:			
Midessa	40	Somewhat limited	
		Too arid	0.50
Potter	30	Very limited	
		Too arid	1.00
		Droughty	0.49

Table 17.--Upland Shrubs and Vines for Wildlife Habitat--Continued

Map symbol and soil name	Pct. of map unit	Upland shrubs and vines: Rating class and limiting features	Value
Posey	20	Not limited	
MVE:			
Mobeetie	50	Somewhat limited	
		Too arid	0.50
Veal	25	Somewhat limited	
		Too arid	0.50
Potter	15	Very limited	
		Too arid	1.00
		Droughty	0.49
OBG:			
Obaro	55	Somewhat limited	
		Bedrock	0.46
Quinlan	30	Very limited	
		Bedrock	1.00
		Droughty	0.99
OcA:			
Olton	85	Somewhat limited	
		Too arid	0.50
		Too clayey	0.05
PAB:			
Patricia	50	Somewhat limited	
		Too arid	0.50
Amarillo	45	Somewhat limited	
		Too arid	0.50
PeA:			
Pep	85	Somewhat limited	
		Too arid	0.50
PeB:			
Pep	85	Somewhat limited	
		Too arid	0.50
PGE:			
Potter	80	Very limited	
		Too arid	1.00
		Droughty	0.49
PoA:			
Portales	90	Somewhat limited	
		Too arid	0.50
PoB:			
Portales	90	Somewhat limited	
		Too arid	0.50

Table 17.--Upland Shrubs and Vines for Wildlife Habitat--Continued

Map symbol and soil name	Pct. of map unit	Upland shrubs and vines: Rating class and limiting features	Value
PsA:			
Posey	85	Not limited	
PsB:			
Posey	85	Not limited	
RcA:			
Ranco	90	Very limited	
		Too clayey	1.00
		Wetness	1.00
SgA:			
Seagraves	90	Not limited	
ShB:			
Sharvana	85	Somewhat limited	
		Droughty	0.99
		Too arid	0.50
SL:			
Water, intermittent, salt lake	100	Not rated	
SpA:			
Sparenberg	90	Very limited	
		Too clayey	1.00
TkA:			
Tokio	90	Not limited	
TkB:			
Tokio	90	Not limited	
W:			
Water	100	Not rated	
YRG:			
Yellowhouse	75	Somewhat limited	
		Bedrock	0.71
		Too arid	0.50
		Too clayey	0.44
		Droughty	0.28
Rock outcrop	10	Not rated	

Table 17.--Upland Shrubs and Vines for Wildlife Habitat--Continued

Map symbol and soil name	Pct. of map unit	Upland shrubs and vines: Rating class and limiting features	Upland shrubs and vines: Value
ZfA:			
Zita	90	Somewhat limited	
		Too arid	0.50
ZfB:			
Zita	90	Somewhat limited	
		Too arid	0.50
ZmA:			
Zita	90	Somewhat limited	
		Too arid	0.50

Table 18.--Freshwater Wetland Plants for Wildlife Habitat

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in his table.)

Map symbol and soil name	Pct. of map unit	Freshwater wetland plants: Rating class and limiting features	Value
AcA:			
Acuff	90	Very limited	
		Too dry	1.00
AcB:			
Acuff	90	Very limited	
		Too dry	1.00
AfA:			
Amarillo	90	Very limited	
		Too dry	1.00
AfB:			
Amarillo	90	Very limited	
		Too dry	1.00
ArA:			
Arch	90	Very limited	
		Too dry	1.00
		Too alkaline	1.00
AsA:			
Arch	90	Very limited	
		Too dry	1.00
		Too alkaline	1.00
AvA:			
Arvana	85	Very limited	
		Too dry	1.00
AvB:			
Arvana	85	Very limited	
		Too dry	1.00

Table 18.--Freshwater Wetland Plants for Wildlife Habitat--Continued

Map symbol and soil name	Pct. of map unit	Freshwater wetland plants: Rating class and limiting features	Value
BcA:			
Bippus	85	Very limited	
		Too dry	1.00
BeD:			
Berda	85	Very limited	
		Too dry	1.00
BHC:			
Brownfield	65	Very limited	
		Too dry	1.00
		Too sandy	0.50
BP:			
Borrow pits	95	Very limited	
		Too dry	1.00
BrB:			
Brownfield	90	Very limited	
		Too dry	1.00
		Too sandy	0.50
CdA:			
Cedarlake	95	Very limited	
		Excess salt	1.00
		Excess sodium	1.00
		Ponding	0.50
CeC:			
Creta	85	Very limited	
		Too dry	1.00
ChA:			
Chapel	90	Very limited	
		Too dry	1.00
DRC:			
Drake	90	Very limited	
		Too dry	1.00
		Excess salt	0.01

Table 18.--Freshwater Wetland Plants for Wildlife Habitat--Continued

Map symbol and soil name	Pct. of map unit	Freshwater wetland plants: Rating class and limiting features	Value
DRE:			
Drake	90	Very limited	
		Too dry	1.00
		Excess salt	0.01
EPA:			
Estacado	50	Very limited	
		Too dry	1.00
Pep	40	Very limited	
		Too dry	1.00
EsA:			
Estacado	90	Very limited	
		Too dry	1.00
EsB:			
Estacado	85	Very limited	
		Too dry	1.00
KmB:			
Kimberson	85	Very limited	
		Too dry	1.00
LhA:			
Lenorah	50	Very limited	
		Too alkaline	1.00
		Too dry	0.89
		Excess salt	0.01
Hindman	35	Very limited	
		Too dry	1.00
		Too sandy	0.50
LMA:			
Lamesa	95	Somewhat limited	
		Too dry	0.01

Table 18.--Freshwater Wetland Plants for Wildlife Habitat--Continued

Map symbol and soil name	Pct. of map unit	Freshwater wetland plants: Rating class and limiting features	Value
LoA:			
Lofton	85	Very limited	
		Too dry	1.00
M-W:			
Miscellaneous water	100	Not rated	
MdA:			
Midessa	85	Very limited	
		Too dry	1.00
MdB:			
Midessa	85	Very limited	
		Too dry	1.00
MdC:			
Midessa	85	Very limited	
		Too dry	1.00
MPC:			
Midessa	50	Very limited	
		Too dry	1.00
Posey	35	Very limited	
		Too dry	1.00
MPP:			
Midessa	40	Very limited	
		Too dry	1.00
Potter	30	Very limited	
		Too dry	1.00
		Too alkaline	1.00
Posey	20	Very limited	
		Too dry	1.00

Table 18.--Freshwater Wetland Plants for Wildlife Habitat--Continued

Map symbol and soil name	Pct. of map unit	Freshwater wetland plants: Rating class and limiting features	Value
MVE:			
Mobeetie	50	Very limited	
		Too dry	1.00
Veal	25	Very limited	
		Too dry	1.00
Potter	15	Very limited	
		Too dry	1.00
		Too alkaline	1.00
OBG:			
Obaro	55	Very limited	
		Too dry	1.00
Quinlan	30	Very limited	
		Too dry	1.00
OcA:			
Olton	85	Very limited	
		Too dry	1.00
PAB:			
Patricia	50	Very limited	
		Too dry	1.00
Amarillo	45	Very limited	
		Too dry	1.00
PeA:			
Pep	85	Very limited	
		Too dry	1.00
PeB:			
Pep	85	Very limited	
		Too dry	1.00

Table 18.--Freshwater Wetland Plants for Wildlife Habitat--Continued

Map symbol and soil name	Pct. of map unit	Freshwater wetland plants: Rating class and limiting features	Value
PGE:			
Potter	80	Very limited	
		Too dry	1.00
		Too alkaline	1.00
PoA:			
Portales	90	Very limited	
		Too dry	1.00
PoB:			
Portales	90	Very limited	
		Too dry	1.00
PsA:			
Posey	85	Very limited	
		Too dry	1.00
PsB:			
Posey	85	Very limited	
		Too dry	1.00
RcA:			
Ranco	90	Not limited	
SgA:			
Seagraves	90	Very limited	
		Too dry	1.00
ShB:			
Sharvana	85	Very limited	
		Too dry	1.00
SL:			
Water, intermittent, salt lake	100	Very limited	
		Excess salt	1.00
		Excess sodium	1.00
		Ponding	0.50

Table 18.--Freshwater Wetland Plants for Wildlife Habitat--Continued

Map symbol and soil name	Pct. of map unit	Freshwater wetland plants: Rating class and limiting features	Value
SpA:			
Sparenberg	90	Very limited	
		Too dry	1.00
TkA:			
Tokio	90	Very limited	
		Too dry	1.00
TkB:			
Tokio	90	Very limited	
		Too dry	1.00
W:			
Water	100	Not rated	
YRG:			
Yellowhouse	75	Very limited	
		Too dry	1.00
		Too alkaline	1.00
Rock outcrop	10	Not rated	
ZfA:			
Zita	90	Very limited	
		Too dry	1.00
ZfB:			
Zita	90	Very limited	
		Too dry	1.00
ZmA:			
Zita	90	Very limited	
		Too dry	1.00

Table 19.--Dwellings and Small Commercial Buildings

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
AcA:							
Acuff	90	Not limited		Not limited		Not limited	
AcB:							
Acuff	90	Not limited		Not limited		Not limited	
AfA:							
Amarillo	90	Not limited		Not limited		Not limited	
AfB:							
Amarillo	90	Not limited		Not limited		Not limited	
ArA:							
Arch	90	Not limited		Not limited		Not limited	
AsA:							
Arch	90	Not limited		Not limited		Not limited	
AvA:							
Arvana	85	Not limited		Somewhat limited		Not limited	
				Depth to thin cemented pan	0.65		
AvB:							
Arvana	85	Not limited		Somewhat limited		Not limited	
				Depth to thin cemented pan	0.79		
BcA:							
Bippus	85	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
BeD:							
Berda	85	Not limited		Not limited		Somewhat limited	
						Slope	0.50
BHC:							
Brownfield	65	Not limited		Not limited		Somewhat limited	
						Slope	0.12
BP:							
Borrow pits	95	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
BrB:							
Brownfield	90	Not limited		Not limited		Not limited	

Table 19.--Dwellings and Small Commercial Buildings--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
CdA:							
Cedarlake	95	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
CeC:							
Creta	85	Somewhat limited		Very limited		Somewhat limited	
		Shrink-swell	0.78	Shrink-swell	1.00	Shrink-swell	0.78
ChA:							
Chapel	90	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
DRC:							
Drake	90	Not limited		Not limited		Somewhat limited	
						Slope	0.12
DRE:							
Drake	90	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
EPA:							
Estacado	50	Not limited		Not limited		Not limited	
Pep	40	Not limited		Not limited		Not limited	
EsA:							
Estacado	90	Not limited		Not limited		Not limited	
EsB:							
Estacado	85	Not limited		Not limited		Not limited	
KmB:							
Kimberson	85	Somewhat limited		Very limited		Somewhat limited	
		Depth to thin cemented pan	0.50	Depth to thin cemented pan	1.00	Depth to thin cemented pan	1.00
LhA:							
Lenorah	50	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
				Depth to saturated zone	0.99		
Hindman	35	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
				Depth to saturated zone	0.60		
LMA:							
Lamesa	95	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Shrink-swell	0.02	Shrink-swell	0.02	Shrink-swell	0.02

Table 19.--Dwellings and Small Commercial Buildings--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
LoA:							
Lofton	85	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Shrink-swell	1.00	Shrink-swell	0.50	Shrink-swell	1.00
M-W:							
Miscellaneous water	100	Not rated		Not rated		Not rated	
MdA:							
Midessa	85	Not limited		Not limited		Not limited	
MdB:							
Midessa	85	Not limited		Not limited		Not limited	
MdC:							
Midessa	85	Not limited		Not limited		Somewhat limited	
						Slope	0.12
MPC:							
Midessa	50	Not limited		Not limited		Somewhat limited	
						Slope	0.12
Posey	35	Not limited		Not limited		Somewhat limited	
						Slope	0.12
MPP:							
Midessa	40	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.01	Slope	0.01	Slope	1.00
Potter	30	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.01	Slope	0.01	Slope	1.00
Posey	20	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.01	Slope	0.01	Slope	1.00
MVE:							
Mobeetie	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Veal	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Potter	15	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
OBG:							
Obaro	55	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
				Depth to soft bedrock	0.46		
Quinlan	30	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00	Depth to soft bedrock	1.00
		Depth to soft bedrock	0.50	Slope	1.00	Slope	1.00

Table 19.--Dwellings and Small Commercial Buildings--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
OcA:							
Olton	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
PAB:							
Patricia	50	Not limited		Not limited		Not limited	
Amarillo	45	Not limited		Not limited		Not limited	
PeA:							
Pep	85	Not limited		Not limited		Not limited	
PeB:							
Pep	85	Not limited		Not limited		Not limited	
PGE:							
Potter	80	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.01	Slope	0.01	Slope	1.00
PoA:							
Portales	90	Not limited		Not limited		Not limited	
PoB:							
Portales	90	Not limited		Not limited		Not limited	
PsA:							
Posey	85	Not limited		Not limited		Not limited	
PsB:							
Posey	85	Not limited		Not limited		Not limited	
RcA:							
Ranco	90	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
SgA:							
Seagraves	90	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Shrink-swell	0.62	Shrink-swell	0.62	Shrink-swell	0.62
ShB:							
Sharvana	85	Very limited		Very limited		Very limited	
		Depth to thick cemented pan	1.00	Depth to thick cemented pan	1.00	Depth to thick cemented pan	1.00
		Shrink-swell	0.06	Shrink-swell	0.06	Shrink-swell	0.06
SL:							
Water, intermittent, salt lake	100	Not rated		Not rated		Not rated	
SpA:							
Sparenberg	90	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00

Table 19.--Dwellings and Small Commercial Buildings--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
TkA:							
Tokio	90	Not limited		Somewhat limited		Not limited	
				Shrink-swell	0.56		
TkB:							
Tokio	90	Not limited		Somewhat limited		Not limited	
				Shrink-swell	0.56		
W:							
Water	100	Not rated		Not rated		Not rated	
YRG:							
Yellowhouse	75	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.71		
Rock outcrop	10	Not rated		Not rated		Not rated	
ZfA:							
Zita	90	Not limited		Not limited		Not limited	
ZfB:							
Zita	90	Not limited		Not limited		Not limited	
ZmA:							
Zita	90	Not limited		Not limited		Not limited	

Table 20.--Roads and Streets, Shallow Excavations, and Lawns and Landscaping

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
AcA:							
Acuff----------------	90	Very limited		Somewhat limited		Not limited	
		Low strength	1.00	Cutbanks cave	0.10		
AcB:							
Acuff----------------	90	Very limited		Somewhat limited		Not limited	
		Low strength	1.00	Cutbanks cave	0.10		
AfA:							
Amarillo-------------	90	Somewhat limited		Somewhat limited		Not limited	
		Low strength	0.22	Cutbanks cave	0.10		
AfB:							
Amarillo-------------	90	Somewhat limited		Somewhat limited		Not limited	
		Low strength	0.22	Cutbanks cave	0.10		
ArA:							
Arch-----------------	90	Not limited		Somewhat limited		Very limited	
				Cutbanks cave	0.10	Carbonate content	1.00
AsA:							
Arch-----------------	90	Not limited		Somewhat limited		Very limited	
				Cutbanks cave	0.10	Carbonate content	1.00
AvA:							
Arvana---------------	85	Not limited		Somewhat limited		Very limited	
				Depth to thin cemented pan	0.65	Carbonate content	1.00
				Cutbanks cave	0.10	Depth to cemented pan	0.64
AvB:							
Arvana---------------	85	Not limited		Somewhat limited		Very limited	
				Depth to thin cemented pan	0.79	Carbonate content	1.00
				Cutbanks cave	0.10	Depth to cemented pan	0.79
BcA:							
Bippus---------------	85	Very limited		Somewhat limited		Somewhat limited	
		Flooding	1.00	Flooding	0.60	Flooding	0.60
		Low strength	0.22	Cutbanks cave	0.10		
BeD:							
Berda----------------	85	Very limited		Somewhat limited		Not limited	
		Low strength	1.00	Cutbanks cave	0.10		
BHC:							
Brownfield-----------	65	Not limited		Very limited		Somewhat limited	
				Cutbanks cave	1.00	Droughty	0.91

Table 20.--Roads and Streets, Shallow Excavations, and Lawns and Landscaping--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
BP:							
Borrow pits	95	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Slope	1.00	Slope	1.00	Droughty	1.00
						Slope	1.00
						Gravel content	1.00
						Carbonate content	1.00
BrB:							
Brownfield	90	Not limited		Very limited		Somewhat limited	
				Cutbanks cave	1.00	Droughty	0.05
CdA:							
Cedarlake	95	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Salinity	1.00
		Low strength	1.00	Too clayey	0.97	Sodium content	1.00
		Shrink-swell	1.00	Cutbanks cave	0.10	Depth to saturated zone	1.00
						Carbonate content	1.00
CeC:							
Creta	85	Very limited		Somewhat limited		Very limited	
		Low strength	1.00	Too clayey	0.83	Sodium content	1.00
		Shrink-swell	0.78	Cutbanks cave	0.10		
ChA:							
Chapel	90	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Low strength	1.00	Cutbanks cave	1.00	Too clayey	1.00
		Shrink-swell	1.00	Too clayey	0.64		
DRC:							
Drake	90	Somewhat limited		Somewhat limited		Not limited	
		Low strength	0.78	Cutbanks cave	0.10		
DRE:							
Drake	90	Somewhat limited		Somewhat limited		Somewhat limited	
		Low strength	0.78	Slope	0.63	Slope	0.63
		Slope	0.63	Cutbanks cave	0.10		
EPA:							
Estacado	50	Very limited		Somewhat limited		Not limited	
		Low strength	1.00	Cutbanks cave	0.10		
Pep	40	Very limited		Somewhat limited		Very limited	
		Low strength	1.00	Cutbanks cave	0.10	Carbonate content	1.00
EsA:							
Estacado	90	Very limited		Somewhat limited		Not limited	
		Low strength	1.00	Cutbanks cave	0.10		
EsB:							
Estacado	85	Very limited		Somewhat limited		Not limited	
		Low strength	1.00	Cutbanks cave	0.10		

Table 20.--Roads and Streets, Shallow Excavations, and Lawns and Landscaping--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
KmB:							
Kimberson	85	Somewhat limited		Very limited		Very limited	
		Depth to thin cemented pan	1.00	Depth to thin cemented pan	1.00	Depth to cemented pan	1.00
				Cutbanks cave	1.00	Carbonate content	1.00
						Droughty	1.00
LhA:							
Lenorah	50	Somewhat limited		Very limited		Very limited	
		Flooding	0.20	Cutbanks cave	1.00	Sodium content	1.00
				Depth to saturated zone	0.99	Droughty	0.01
Hindman	35	Somewhat limited		Very limited		Very limited	
		Flooding	0.20	Cutbanks cave	1.00	Sodium content	1.00
				Depth to saturated zone	0.60	Droughty	0.36
LMA:							
Lamesa	95	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Low strength	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.99
		Depth to saturated zone	0.99	Cutbanks cave	0.10		
		Shrink-swell	0.02				
LoA:							
Lofton	85	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Low strength	1.00	Too clayey	0.12		
		Shrink-swell	1.00	Cutbanks cave	0.10		
M-W:							
Miscellaneous water	100	Not rated		Not rated		Not rated	
MdA:							
Midessa	85	Not limited		Somewhat limited		Very limited	
				Cutbanks cave	0.10	Carbonate content	1.00
MdB:							
Midessa	85	Not limited		Somewhat limited		Very limited	
				Cutbanks cave	0.10	Carbonate content	1.00
MdC:							
Midessa	85	Not limited		Somewhat limited		Very limited	
				Cutbanks cave	0.10	Carbonate content	1.00
MPC:							
Midessa	50	Not limited		Somewhat limited		Very limited	
				Cutbanks cave	0.10	Carbonate content	1.00
Posey	35	Not limited		Somewhat limited		Very limited	
				Cutbanks cave	0.10	Carbonate content	1.00

Table 20.--Roads and Streets, Shallow Excavations, and Lawns and Landscaping--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
MPP:							
Midessa	40	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.01	Cutbanks cave	0.10	Carbonate content	1.00
				Slope	0.01	Slope	0.01
Potter	30	Somewhat limited		Very limited		Very limited	
		Slope	0.01	Cutbanks cave	1.00	Carbonate content	1.00
				Slope	0.01	Droughty	0.51
						Slope	0.01
Posey	20	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.01	Cutbanks cave	0.10	Carbonate content	1.00
				Slope	0.01	Slope	0.01
MVE:							
Mobeetie	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Cutbanks cave	0.10		
Veal	25	Very limited		Very limited		Very limited	
		Slope	1.00	Cutbanks cave	1.00	Slope	1.00
				Slope	1.00	Carbonate content	1.00
Potter	15	Somewhat limited		Very limited		Very limited	
		Slope	0.63	Cutbanks cave	1.00	Carbonate content	1.00
				Slope	0.63	Slope	0.63
						Droughty	0.51
OBG:							
Obaro	55	Very limited		Somewhat limited		Somewhat limited	
		Low strength	1.00	Slope	0.63	Slope	0.63
		Slope	0.63	Depth to soft bedrock	0.46	Depth to bedrock	0.46
				Cutbanks cave	0.10		
Quinlan	30	Very limited		Very limited		Very limited	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Depth to bedrock	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
						Droughty	0.99
OcA:							
Olton	85	Very limited		Somewhat limited		Not limited	
		Low strength	1.00	Cutbanks cave	0.10		
		Shrink-swell	0.50				
PAB:							
Patricia	50	Not limited		Somewhat limited		Not limited	
				Cutbanks cave	0.10		
Amarillo	45	Somewhat limited		Somewhat limited		Not limited	
		Low strength	0.22	Cutbanks cave	0.10		
PeA:							
Pep	85	Very limited		Somewhat limited		Very limited	
		Low strength	1.00	Cutbanks cave	0.10	Carbonate content	1.00

Table 20.--Roads and Streets, Shallow Excavations, and Lawns and Landscaping--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
PeB:							
Pep	85	Very limited		Somewhat limited		Very limited	
		Low strength	1.00	Cutbanks cave	0.10	Carbonate content	1.00
PGE:							
Potter	80	Somewhat limited		Very limited		Very limited	
		Slope	0.01	Cutbanks cave	1.00	Carbonate content	1.00
				Slope	0.01	Droughty	0.51
						Slope	0.01
PoA:							
Portales	90	Very limited		Somewhat limited		Very limited	
		Low strength	1.00	Cutbanks cave	0.10	Carbonate content	1.00
PoB:							
Portales	90	Very limited		Somewhat limited		Very limited	
		Low strength	1.00	Cutbanks cave	0.10	Carbonate content	1.00
PsA:							
Posey	85	Not limited		Somewhat limited		Very limited	
				Cutbanks cave	0.10	Carbonate content	1.00
PsB:							
Posey	85	Not limited		Somewhat limited		Very limited	
				Cutbanks cave	0.10	Carbonate content	1.00
RcA:							
Ranco	90	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Ponding	1.00	Ponding	1.00
		Ponding	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Cutbanks cave	1.00	Too clayey	1.00
		Low strength	1.00	Too clayey	0.61		
SgA:							
Seagraves	90	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Shrink-swell	0.62	Cutbanks cave	1.00		
				Too clayey	0.01		
ShB:							
Sharvana	85	Very limited		Very limited		Very limited	
		Depth to thick cemented pan	1.00	Depth to thick cemented pan	1.00	Depth to cemented pan	1.00
		Shrink-swell	0.06	Cutbanks cave	1.00	Carbonate content	1.00
						Droughty	0.99
SL:							
Water, intermittent, salt lake	100	Not rated		Not rated		Not rated	
SpA:							
Sparenberg	90	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Ponding	1.00	Ponding	1.00
		Ponding	1.00	Cutbanks cave	1.00	Too clayey	1.00
		Low strength	1.00	Too clayey	0.50		

Table 20.--Roads and Streets, Shallow Excavations, and Lawns and Landscaping--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
TkA:							
Tokio	90	Not limited		Somewhat limited		Not limited	
				Cutbanks cave	0.10		
TkB:							
Tokio	90	Not limited		Somewhat limited		Not limited	
				Cutbanks cave	0.10		
W:							
Water	100	Not rated		Not rated		Not rated	
YRG:							
Yellowhouse	75	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Cutbanks cave	1.00	Slope	1.00
		Slope	1.00	Slope	1.00	Carbonate content	1.00
		Low strength	1.00	Too clayey	0.95	Depth to bedrock	0.71
				Depth to soft bedrock	0.71	Gravel content	0.54
						Droughty	0.29
Rock outcrop	10	Not rated		Not rated		Not rated	
ZfA:							
Zita	90	Somewhat limited		Somewhat limited		Very limited	
		Low strength	0.22	Cutbanks cave	0.10	Carbonate content	1.00
ZfB:							
Zita	90	Somewhat limited		Somewhat limited		Very limited	
		Low strength	0.22	Cutbanks cave	0.10	Carbonate content	1.00
ZmA:							
Zita	90	Somewhat limited		Somewhat limited		Very limited	
		Low strength	0.22	Cutbanks cave	0.10	Carbonate content	1.00

Table 21.--Sewage Disposal

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
AcA:					
Acuff	90	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Seepage	0.50
AcB:					
Acuff	90	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Seepage	0.50
AfA:					
Amarillo	90	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Seepage	0.50
AfB:					
Amarillo	90	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Seepage	0.50
ArA:					
Arch	90	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Seepage	0.50
AsA:					
Arch	90	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Seepage	0.50
AvA:					
Arvana	85	Very limited		Very limited	
		Depth to cemented pan	1.00	Depth to cemented pan	1.00
		Slow water movement	0.50	Seepage	0.50
AvB:					
Arvana	85	Very limited		Very limited	
		Depth to cemented pan	1.00	Depth to cemented pan	1.00
		Slow water movement	0.50	Seepage	0.50
BcA:					
Bippus	85	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Slow water movement	0.50	Seepage	0.50

Table 21.--Sewage Disposal--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
BeD:					
Berda	85	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Slope	0.92
				Seepage	0.50
BHC:					
Brownfield	65	Somewhat limited		Very limited	
		Slow water movement	0.50	Seepage	1.00
				Slope	0.68
BP:					
Borrow pits	95	Very limited		Very limited	
		Ponding	1.00	Ponding	1.00
		Slow water movement	1.00	Slope	1.00
		Slope	1.00		
BrB:					
Brownfield	90	Somewhat limited		Very limited	
		Slow water movement	0.50	Seepage	1.00
CdA:					
Cedarlake	95	Very limited		Very limited	
		Slow water movement	1.00	Ponding	1.00
		Ponding	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Seepage	0.50
CeC:					
Creta	85	Very limited		Somewhat limited	
		Slow water movement	1.00	Seepage	0.50
		Depth to bedrock	0.01	Slope	0.08
ChA:					
Chapel	90	Very limited		Very limited	
		Slow water movement	1.00	Ponding	1.00
		Ponding	1.00		
DRC:					
Drake	90	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Slope	0.68
				Seepage	0.50
DRE:					
Drake	90	Somewhat limited		Very limited	
		Slope	0.63	Slope	1.00
		Slow water movement	0.50	Seepage	0.50

Table 21.--Sewage Disposal--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
EPA:					
Estacado	50	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Seepage	0.50
Pep	40	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Seepage	0.50
EsA:					
Estacado	90	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Seepage	0.50
EsB:					
Estacado	85	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Seepage	0.50
KmB:					
Kimberson	85	Very limited		Very limited	
		Depth to cemented pan	1.00	Depth to cemented pan	1.00
				Seepage	0.27
LhA:					
Lenorah	50	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Slow water movement	0.50	Flooding	0.20
		Flooding	0.20		
Hindman	35	Very limited		Very limited	
		Seepage, bottom layer	1.00	Seepage	1.00
		Depth to saturated zone	0.99	Depth to saturated zone	0.68
		Flooding	0.20	Flooding	0.20
LMA:					
Lamesa	95	Very limited		Very limited	
		Slow water movement	1.00	Ponding	1.00
		Ponding	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Seepage	0.50
LoA:					
Lofton	85	Very limited		Very limited	
		Slow water movement	1.00	Ponding	1.00
		Ponding	1.00		

Table 21.--Sewage Disposal--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
M-W:					
Miscellaneous water	100	Not rated		Not rated	
MdA:					
Midessa	85	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Seepage	0.50
MdB:					
Midessa	85	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Seepage	0.50
MdC:					
Midessa	85	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Slope	0.68
				Seepage	0.50
MPC:					
Midessa	50	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Slope	0.68
				Seepage	0.50
Posey	35	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Slope	0.68
				Seepage	0.50
MPP:					
Midessa	40	Somewhat limited		Very limited	
		Slow water movement	0.50	Slope	1.00
		Slope	0.01	Seepage	0.50
Potter	30	Very limited		Very limited	
		Slow water movement	1.00	Slope	1.00
		Slope	0.01	Seepage	0.50
Posey	20	Somewhat limited		Very limited	
		Slow water movement	0.50	Slope	1.00
		Slope	0.01	Seepage	0.50
MVE:					
Mobeetie	50	Very limited		Very limited	
		Slope	1.00	Seepage	1.00
				Slope	1.00
Veal	25	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Slow water movement	0.50	Seepage	0.50

Table 21.--Sewage Disposal--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
Potter	15	Very limited		Very limited	
		Slow water movement	1.00	Slope	1.00
		Slope	0.63	Seepage	0.50
OBG:					
Obaro	55	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	0.63	Slope	1.00
		Slow water movement	0.50	Seepage	0.50
Quinlan	30	Very limited		Very limited	
		Slow water movement	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Slope	1.00	Seepage	1.00
		Seepage, bottom layer	1.00		
OcA:					
Olton	85	Very limited		Not limited	
		Slow water movement	1.00		
PAB:					
Patricia	50	Somewhat limited		Very limited	
		Slow water movement	0.50	Seepage	1.00
Amarillo	45	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Seepage	0.50
PeA:					
Pep	85	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Seepage	0.50
PeB:					
Pep	85	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Seepage	0.50
PGE:					
Potter	80	Very limited		Very limited	
		Slow water movement	1.00	Slope	1.00
		Slope	0.01	Seepage	0.50
PoA:					
Portales	90	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Seepage	0.50

Table 21.--Sewage Disposal--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
PoB:					
Portales	90	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Seepage	0.50
PsA:					
Posey	85	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Seepage	0.50
PsB:					
Posey	85	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Seepage	0.50
RcA:					
Ranco	90	Very limited		Very limited	
		Slow water movement	1.00	Ponding	1.00
		Ponding	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00		
SgA:					
Seagraves	90	Very limited		Very limited	
		Ponding	1.00	Ponding	1.00
		Slow water movement	1.00	Seepage	1.00
ShB:					
Sharvana	85	Very limited		Very limited	
		Depth to cemented pan	1.00	Depth to cemented pan	1.00
				Seepage	0.50
SL:					
Water, intermittent, salt lake	100	Not rated		Not rated	
SpA:					
Sparenberg	90	Very limited		Very limited	
		Slow water movement	1.00	Ponding	1.00
		Ponding	1.00		
TkA:					
Tokio	90	Somewhat limited		Very limited	
		Slow water movement	0.50	Seepage	1.00
TkB:					
Tokio	90	Somewhat limited		Very limited	
		Slow water movement	0.50	Seepage	1.00
W:					
Water	100	Not rated		Not rated	

Table 21.--Sewage Disposal--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
YRG:					
Yellowhouse---------	75	Very limited		Very limited	
		Slow water movement	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Slope	1.00		
Rock outcrop--------	10	Not rated		Not rated	
ZfA:					
Zita----------------	90	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Seepage	0.50
ZfB:					
Zita----------------	90	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Seepage	0.50
ZmA:					
Zita----------------	90	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Seepage	0.50

Table 22.--Landfills

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill: Rating class and limiting features	Trench sanitary landfill: Value	Area sanitary landfill: Rating class and limiting features	Area sanitary landfill: Value	Daily cover for landfill: Rating class and limiting features	Daily cover for landfill: Value
AcA:							
Acuff----------------	90	Not limited		Not limited		Not limited	
AcB:							
Acuff----------------	90	Not limited		Not limited		Not limited	
AfA:							
Amarillo------------	90	Not limited		Not limited		Not limited	
AfB:							
Amarillo------------	90	Not limited		Not limited		Not limited	
ArA:							
Arch-----------------	90	Not limited		Not limited		Very limited	
						Carbonate content	1.00
AsA:							
Arch-----------------	90	Not limited		Not limited		Very limited	
						Carbonate content	1.00
AvA:							
Arvana--------------	85	Somewhat limited		Very limited		Very limited	
		Depth to thin cemented pan	0.50	Depth to cemented pan	1.00	Depth to cemented pan	1.00
AvB:							
Arvana--------------	85	Somewhat limited		Very limited		Very limited	
		Depth to thin cemented pan	0.50	Depth to cemented pan	1.00	Depth to cemented pan	1.00
BcA:							
Bippus--------------	85	Very limited		Very limited		Not limited	
		Flooding	1.00	Flooding	1.00		
BeD:							
Berda---------------	85	Not limited		Not limited		Not limited	
BHC:							
Brownfield----------	65	Not limited		Not limited		Not limited	
BP:							
Borrow pits---------	95	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Slope	1.00	Slope	1.00	Gravel content	1.00
						Slope	1.00
						Carbonate content	1.00
BrB:							
Brownfield----------	90	Not limited		Not limited		Not limited	

Table 22.--Landfills--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill: Rating class and limiting features	Value	Area sanitary landfill: Rating class and limiting features	Value	Daily cover for landfill: Rating class and limiting features	Value
CdA:							
Cedarlake	95	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Ponding	1.00	Ponding	1.00
		Ponding	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Too clayey	1.00			Too clayey	1.00
		Excess sodium	1.00			Hard to compact	1.00
		Excess salt	1.00			Salinity	1.00
CeC:							
Creta	85	Very limited		Not limited		Very limited	
		Depth to bedrock	1.00			Hard to compact	1.00
ChA:							
Chapel	90	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Too clayey	1.00			Too clayey	1.00
						Hard to compact	1.00
DRC:							
Drake	90	Not limited		Not limited		Not limited	
DRE:							
Drake	90	Somewhat limited		Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63	Slope	0.63
EPA:							
Estacado	50	Not limited		Not limited		Very limited	
						Carbonate content	1.00
Pep	40	Not limited		Not limited		Very limited	
						Carbonate content	1.00
EsA:							
Estacado	90	Not limited		Not limited		Very limited	
						Carbonate content	1.00
EsB:							
Estacado	85	Not limited		Not limited		Very limited	
						Carbonate content	1.00
KmB:							
Kimberson	85	Somewhat limited		Very limited		Very limited	
		Depth to thin cemented pan	0.50	Depth to cemented pan	1.00	Depth to cemented pan	1.00
						Gravel content	0.46
LhA:							
Lenorah	50	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Salinity	1.00
		Excess sodium	1.00	Flooding	0.20	Sodium content	1.00
		Excess salt	1.00			Too sandy	0.50
		Too sandy	0.50			Depth to saturated zone	0.47

Table 22.--Landfills--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill: Rating class and limiting features	Value	Area sanitary landfill: Rating class and limiting features	Value	Daily cover for landfill: Rating class and limiting features	Value
Hindman	35	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Sodium content	1.00
		Excess sodium	1.00	Flooding	0.20	Too sandy	0.50
		Too sandy	0.50				
		Flooding	0.20				
LMA:							
Lamesa	95	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Ponding	1.00	Ponding	1.00
		Ponding	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
LoA:							
Lofton	85	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Too clayey	1.00			Too clayey	1.00
M-W:							
Miscellaneous water	100	Not rated		Not rated		Not rated	
MdA:							
Midessa	85	Not limited		Not limited		Very limited	
						Carbonate content	1.00
MdB:							
Midessa	85	Not limited		Not limited		Very limited	
						Carbonate content	1.00
MdC:							
Midessa	85	Not limited		Not limited		Very limited	
						Carbonate content	1.00
MPC:							
Midessa	50	Not limited		Not limited		Very limited	
						Carbonate content	1.00
Posey	35	Not limited		Not limited		Not limited	
MPP:							
Midessa	40	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.01	Slope	0.01	Carbonate content	1.00
						Slope	0.01
Potter	30	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.01	Slope	0.01	Gravel content	1.00
						Carbonate content	1.00
						Slope	0.01
Posey	20	Somewhat limited		Somewhat limited		Somewhat limited	
		Slope	0.01	Slope	0.01	Slope	0.01

Table 22.--Landfills--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill: Rating class and limiting features	Trench sanitary landfill: Value	Area sanitary landfill: Rating class and limiting features	Area sanitary landfill: Value	Daily cover for landfill: Rating class and limiting features	Daily cover for landfill: Value
MVE:							
Mobeetie	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
						Seepage	0.50
Veal	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
						Carbonate content	1.00
						Gravel content	0.28
Potter	15	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Gravel content	1.00
						Carbonate content	1.00
						Slope	0.63
OBG:							
Obaro	55	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Slope	0.63	Slope	0.63	Slope	0.63
Quinlan	30	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00				
OcA:							
Olton	85	Not limited		Not limited		Not limited	
PAB:							
Patricia	50	Not limited		Not limited		Not limited	
Amarillo	45	Not limited		Not limited		Not limited	
PeA:							
Pep	85	Not limited		Not limited		Very limited	
						Carbonate content	1.00
PeB:							
Pep	85	Not limited		Not limited		Very limited	
						Carbonate content	1.00
PGE:							
Potter	80	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.01	Slope	0.01	Gravel content	1.00
						Carbonate content	1.00
						Slope	0.01
PoA:							
Portales	90	Not limited		Not limited		Very limited	
						Carbonate content	1.00
PoB:							
Portales	90	Not limited		Not limited		Very limited	
						Carbonate content	1.00
PsA:							
Posey	85	Not limited		Not limited		Not limited	

Table 22.--Landfills--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill: Rating class and limiting features	Value	Area sanitary landfill: Rating class and limiting features	Value	Daily cover for landfill: Rating class and limiting features	Value
PsB:							
Posey	85	Not limited		Not limited		Not limited	
RcA:							
Ranco	90	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Ponding	1.00	Ponding	1.00
		Ponding	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Too clayey	1.00			Too clayey	1.00
						Hard to compact	1.00
SgA:							
Seagraves	90	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
				Seepage	1.00	Seepage	0.50
ShB:							
Sharvana	85	Very limited		Not limited		Very limited	
		Depth to thick cemented pan	1.00			Depth to cemented pan	1.00
SL:							
Water, intermittent, salt lake	100	Not rated		Very limited		Not rated	
				Ponding	1.00		
				Depth to saturated zone	1.00		
SpA:							
Sparenberg	90	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Too clayey	1.00			Too clayey	1.00
						Hard to compact	1.00
TkA:							
Tokio	90	Somewhat limited		Very limited		Somewhat limited	
		Too clayey	0.50	Seepage	1.00	Too clayey	0.50
TkB:							
Tokio	90	Somewhat limited		Very limited		Somewhat limited	
		Too clayey	0.50	Seepage	1.00	Too clayey	0.50
W:							
Water	100	Not rated		Not rated		Not rated	
YRG:							
Yellowhouse	75	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Slope	1.00	Depth to bedrock	1.00
		Slope	1.00			Hard to compact	1.00
						Slope	1.00
						Gravel content	0.02
Rock outcrop	10	Not rated		Very limited		Not rated	
				Depth to bedrock	1.00		
				Slope	1.00		

Table 22.--Landfills--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
ZfA:							
Zita-----------------	90	Not limited		Not limited		Very limited	
						Carbonate content	1.00
ZfB:							
Zita-----------------	90	Not limited		Not limited		Very limited	
						Carbonate content	1.00
ZmA:							
Zita-----------------	90	Not limited		Not limited		Very limited	
						Carbonate content	1.00

Table 23.--Source of Gravel and Sand

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The ratings given for the thickest layer are for the thickest layer above and excluding the bottom layer. The numbers in the value columns range from 0.00 to 0.99. The greater the value, the greater the likelihood that the bottom layer or thickest layer of the soil is a source of sand or gravel. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
AcA:					
Acuff	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
AcB:					
Acuff	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
AfA:					
Amarillo	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
AfB:					
Amarillo	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
ArA:					
Arch	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
AsA:					
Arch	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
AvA:					
Arvana	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
AvB:					
Arvana	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
BcA:					
Bippus	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
BeD:					
Berda	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00

Table 23.--Source of Gravel and Sand--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel: Rating class	Value	Potential source of sand: Rating class	Value
BHC:					
Brownfield	65	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.03
		Thickest layer	0.00	Thickest layer	0.03
BP:					
Borrow pits	95	Fair		Poor	
		Bottom layer	0.03	Bottom layer	0.00
		Thickest layer	0.03	Thickest layer	0.00
BrB:					
Brownfield	90	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.03
		Thickest layer	0.00	Thickest layer	0.03
CdA:					
Cedarlake	95	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
CeC:					
Creta	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
ChA:					
Chapel	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
DRC:					
Drake	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
DRE:					
Drake	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
EPA:					
Estacado	50	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Pep	40	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
EsA:					
Estacado	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
EsB:					
Estacado	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00

Table 23.--Source of Gravel and Sand--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel: Rating class	Value	Potential source of sand: Rating class	Value
KmB:					
Kimberson	85	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
LhA:					
Lenorah	50	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.07
		Thickest layer	0.00	Bottom layer	0.82
Hindman	35	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.10
		Thickest layer	0.00	Bottom layer	0.34
LMA:					
Lamesa	95	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
LoA:					
Lofton	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
M-W:					
Miscellaneous water	100	Not rated		Not rated	
MdA:					
Midessa	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
MdB:					
Midessa	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
MdC:					
Midessa	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
MPC:					
Midessa	50	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Posey	35	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
MPP:					
Midessa	40	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00

Table 23.--Source of Gravel and Sand--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel: Rating class	Value	Potential source of sand: Rating class	Value
Potter	30	Fair		Fair	
		Thickest layer	0.38	Thickest layer	0.00
		Bottom layer	0.68	Bottom layer	0.04
Posey	20	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
MVE:					
Mobeetie	50	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Veal	25	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Potter	15	Fair		Fair	
		Thickest layer	0.38	Thickest layer	0.00
		Bottom layer	0.68	Bottom layer	0.04
OBG:					
Obaro	55	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Quinlan	30	Poor		Not rated	
		Bottom layer	0.00		
		Thickest layer	0.00		
OcA:					
Olton	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
PAB:					
Patricia	50	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Amarillo	45	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
PeA:					
Pep	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
PeB:					
Pep	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
PGE:					
Potter	80	Fair		Fair	
		Thickest layer	0.38	Thickest layer	0.00
		Bottom layer	0.68	Bottom layer	0.04

Table 23.--Source of Gravel and Sand--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel: Rating class	Value	Potential source of sand: Rating class	Value
PoA:					
Portales	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
PoB:					
Portales	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
PsA:					
Posey	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
PsB:					
Posey	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
RcA:					
Ranco	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
SgA:					
Seagraves	90	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.06
ShB:					
Sharvana	85	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.05
SL:					
Water, intermittent, salt lake	100	Not rated		Not rated	
SpA:					
Sparenberg	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
TkA:					
Tokio	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
TkB:					
Tokio	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
W:					
Water	100	Not rated		Not rated	

Table 23.--Source of Gravel and Sand--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel: Rating class	Value	Potential source of sand: Rating class	Value
YRG:					
Yellowhouse	75	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Rock outcrop	10	Not rated		Not rated	
ZfA:					
Zita	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
ZfB:					
Zita	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
ZmA:					
Zita	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00

Table 24.--Source of Reclamation Material, Roadfill, and Topsoil

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.00 to 0.99. The smaller the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
AcA:							
Acuff----------------	90	Poor		Fair		Good	
		Carbonate content	0.00	Low strength	0.78		
		Organic matter content low	0.10				
AcB:							
Acuff----------------	90	Poor		Fair		Good	
		Carbonate content	0.00	Low strength	0.22		
		Organic matter content low	0.10				
AfA:							
Amarillo------------	90	Poor		Good		Good	
		Carbonate content	0.00				
		Organic matter content low	0.18				
AfB:							
Amarillo------------	90	Poor		Good		Good	
		Carbonate content	0.00				
		Organic matter content low	0.18				
ArA:							
Arch-----------------	90	Poor		Good		Fair	
		Carbonate content	0.00			Carbonate content	0.04
		Too alkaline	0.00			Rock fragments	0.82
		Organic matter content low	0.14				
		Water erosion	0.99				
AsA:							
Arch-----------------	90	Poor		Good		Fair	
		Carbonate content	0.00			Carbonate content	0.05
		Too alkaline	0.00			Rock fragments	0.82
		Organic matter content low	0.14				
AvA:							
Arvana---------------	85	Poor		Poor		Fair	
		Carbonate content	0.00	Depth to cemented pan	0.00	Depth to cemented pan	0.36
		Depth to cemented pan	0.36				
		Droughty	0.48				
		Organic matter content low	0.50				

Table 24.--Source of Reclamation Material, Roadfill, and Topsoil--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
AvB:							
Arvana	85	Poor		Poor		Fair	
		Carbonate content	0.00	Depth to cemented pan	0.00	Depth to cemented pan	0.21
		Depth to cemented pan	0.21				
		Droughty	0.30				
		Organic matter content low	0.50				
BcA:							
Bippus	85	Fair		Fair		Good	
		Organic matter content low	0.60	Low strength	0.78		
BeD:							
Berda	85	Fair		Good		Fair	
		Organic matter content low	0.18			Too clayey	0.30
		Too clayey	0.50				
		Water erosion	0.99				
BHC:							
Brownfield	65	Poor		Good		Poor	
		Too sandy	0.00			Too sandy	0.00
		Wind erosion	0.00				
		Organic matter content low	0.07				
BP:							
Borrow pits	95	Poor		Fair		Poor	
		Carbonate content	0.00	Slope	0.08	Carbonate content	0.00
		Droughty	0.01			Slope	0.00
		Organic matter content low	0.08			Hard to reclaim (rock fragments)	0.00
						Rock fragments	0.00
BrB:							
Brownfield	90	Poor		Good		Good	
		Wind erosion	0.00				
		Organic matter content low	0.07				
		Too acid	0.99				
CdA:							
Cedarlake	95	Poor		Poor		Poor	
		Too clayey	0.00	Wetness depth	0.00	Too clayey	0.00
		Carbonate content	0.00	Low strength	0.00	Wetness depth	0.00
		Salinity	0.00	Shrink-swell	0.00	Salinity	0.00
		Sodium content	0.00			Sodium content	0.00
		Organic matter content low	0.12			Carbonate content	0.66

Table 24.--Source of Reclamation Material, Roadfill, and Topsoil--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
CeC:							
Creta----------------	85	Fair		Poor		Poor	
		Organic matter content low	0.24	Low strength	0.00	Sodium content	0.00
		Sodium content	0.40	Shrink-swell	0.39	Salinity	0.28
		Carbonate content	0.97				
ChA:							
Chapel---------------	90	Poor		Poor		Poor	
		Too clayey	0.00	Shrink-swell	0.00	Too clayey	0.00
		Carbonate content	0.00	Low strength	0.00		
		Organic matter content low	0.02				
		Water erosion	0.99				
DRC:							
Drake----------------	90	Fair		Poor		Fair	
		Organic matter content low	0.18	Low strength	0.00	Sodium content	0.78
		Sodium content	0.78				
		Carbonate content	0.95				
DRE:							
Drake----------------	90	Fair		Poor		Fair	
		Organic matter content low	0.18	Low strength	0.00	Slope	0.37
		Sodium content	0.78			Sodium content	0.78
		Carbonate content	0.95				
EPA:							
Estacado-------------	50	Poor		Fair		Fair	
		Carbonate content	0.00	Low strength	0.22	Too clayey	0.30
		Organic matter content low	0.18				
		Too clayey	0.50				
Pep------------------	40	Poor		Fair		Fair	
		Carbonate content	0.00	Low strength	0.22	Too clayey	0.61
		Organic matter content low	0.18				
		Too clayey	0.98				
		Water erosion	0.99				
EsA:							
Estacado-------------	90	Poor		Fair		Fair	
		Carbonate content	0.00	Low strength	0.22	Too clayey	0.30
		Organic matter content low	0.18				
		Too clayey	0.50				
EsB:							
Estacado-------------	85	Poor		Fair		Fair	
		Carbonate content	0.00	Low strength	0.22	Too clayey	0.30
		Organic matter content low	0.18				
		Too clayey	0.50				

Table 24.--Source of Reclamation Material, Roadfill, and Topsoil--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
KmB:							
Kimberson	85	Poor		Poor		Poor	
		Droughty	0.00	Depth to cemented pan	0.00	Rock fragments	0.00
		Carbonate content	0.00			Depth to cemented pan	0.00
		Depth to cemented pan	0.00				
		Too alkaline	0.00				
LhA:							
Lenorah	50	Poor		Fair		Poor	
		Sodium content	0.00	Wetness depth	0.89	Sodium content	0.00
		Too alkaline	0.00			Salinity	0.00
		Salinity	0.00			Wetness depth	0.89
		Carbonate content	0.08			Carbonate content	0.97
		Organic matter content low	0.12				
Hindman	35	Poor		Good		Poor	
		Wind erosion	0.00			Too sandy	0.00
		Too sandy	0.00				
		Organic matter content low	0.52				
		Carbonate content	0.92				
LMA:							
Lamesa	95	Fair		Poor		Poor	
		Organic matter content low	0.52	Low strength	0.00	Wetness depth	0.00
				Wetness depth	0.00	Salinity	0.08
				Shrink-swell	0.99		
LoA:							
Lofton	85	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Organic matter content low	0.18	Shrink-swell	0.43		
		Carbonate content	0.92				
M-W:							
Miscellaneous water	100	Not rated		Not rated		Not rated	
MdA:							
Midessa	85	Poor		Good		Good	
		Carbonate content	0.00				
		Organic matter content low	0.18				
MdB:							
Midessa	85	Poor		Good		Fair	
		Carbonate content	0.00				
		Organic matter content low	0.18				

Table 24.--Source of Reclamation Material, Roadfill, and Topsoil--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
MdC:							
Midessa	85	Poor		Good		Fair	
		Carbonate content	0.00			Carbonate content	0.93
		Organic matter content low	0.18				
MPC:							
Midessa	50	Poor		Good		Fair	
		Carbonate content	0.00			Carbonate content	0.93
		Organic matter content low	0.18				
Posey	35	Poor		Good		Fair	
		Carbonate content	0.00			Carbonate content	0.53
		Organic matter content low	0.18			Too clayey	0.54
		Too clayey	0.91			Rock fragments	0.76
MPP:							
Midessa	40	Poor		Good		Fair	
		Carbonate content	0.00			Carbonate content	0.85
		Organic matter content low	0.18			Rock fragments	0.92
Potter	30	Poor		Good		Poor	
		Carbonate content	0.00			Rock fragments	0.00
		Organic matter content low	0.08			Carbonate content	0.00
		Droughty	0.60			Hard to reclaim (rock fragments)	0.00
Posey	20	Poor		Good		Fair	
		Carbonate content	0.00			Carbonate content	0.53
		Organic matter content low	0.18			Too clayey	0.54
		Too clayey	0.91			Rock fragments	0.76
MVE:							
Mobeetie	50	Fair		Good		Poor	
		Organic matter content low	0.18			Slope	0.00
Veal	25	Poor		Good		Poor	
		Carbonate content	0.00			Rock fragments	0.00
		Organic matter content low	0.18			Slope	0.00
		Water erosion	0.99			Carbonate content	0.00
Potter	15	Poor		Good		Poor	
		Carbonate content	0.00			Rock fragments	0.00
		Organic matter content low	0.08			Carbonate content	0.00
		Droughty	0.60			Hard to reclaim (rock fragments)	0.00
						Slope	0.37

Table 24.--Source of Reclamation Material, Roadfill, and Topsoil--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
OBG:							
Obaro----------------	55	Fair		Poor		Fair	
		Depth to bedrock	0.54	Depth to bedrock	0.00	Slope	0.37
		Droughty	0.59	Low strength	0.00	Depth to bedrock	0.54
		Organic matter content low	0.60				
		Water erosion	0.90				
Quinlan-------------	30	Not rated		Poor		Not rated	
				Depth to bedrock	0.00		
				Slope	0.50		
OcA:							
Olton----------------	85	Poor		Poor		Fair	
		Carbonate content	0.00	Low strength	0.00	Too clayey	0.17
		Organic matter content low	0.18	Shrink-swell	0.87		
		Too clayey	0.23				
PAB:							
Patricia------------	50	Poor		Good		Good	
		Wind erosion	0.00				
		Carbonate content	0.08				
		Organic matter content low	0.18				
Amarillo------------	45	Poor		Good		Good	
		Wind erosion	0.00				
		Carbonate content	0.00				
		Organic matter content low	0.18				
PeA:							
Pep------------------	85	Poor		Fair		Fair	
		Carbonate content	0.00	Low strength	0.22	Too clayey	0.61
		Organic matter content low	0.18				
		Too clayey	0.98				
		Water erosion	0.99				
PeB:							
Pep------------------	85	Poor		Fair		Fair	
		Carbonate content	0.00	Low strength	0.22	Too clayey	0.61
		Organic matter content low	0.18				
		Too clayey	0.98				
		Water erosion	0.99				
PGE:							
Potter--------------	80	Poor		Good		Poor	
		Carbonate content	0.00			Rock fragments	0.00
		Organic matter content low	0.08			Carbonate content	0.00
		Droughty	0.60			Hard to reclaim (rock fragments)	0.00

Table 24.--Source of Reclamation Material, Roadfill, and Topsoil--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
PoA:							
Portales	90	Poor		Fair		Good	
		Carbonate content	0.00	Low strength	0.78		
		Water erosion	0.99				
PoB:							
Portales	90	Poor		Fair		Fair	
		Carbonate content	0.00	Low strength	0.78		
		Water erosion	0.99				
PsA:							
Posey	85	Poor		Good		Fair	
		Carbonate content	0.00			Carbonate content	0.45
		Organic matter content low	0.18			Too clayey	0.54
		Too clayey	0.91			Rock fragments	0.76
PsB:							
Posey	85	Poor		Good		Fair	
		Carbonate content	0.00			Carbonate content	0.41
		Organic matter content low	0.18			Too clayey	0.54
		Too clayey	0.91			Rock fragments	0.76
RcA:							
Ranco	90	Poor		Poor		Poor	
		Too clayey	0.00	Wetness depth	0.00	Too clayey	0.00
		Organic matter content low	0.32	Low strength	0.00	Wetness depth	0.00
				Shrink-swell	0.00		
SgA:							
Seagraves	90	Fair		Fair		Fair	
		Organic matter content low	0.52	Shrink-swell	0.96	Too sandy	0.99
		Carbonate content	0.99				
		Too sandy	0.99				
ShB:							
Sharvana	85	Poor		Poor		Poor	
		Droughty	0.00	Depth to cemented pan	0.00	Depth to cemented pan	0.00
		Carbonate content	0.00	Shrink-swell	0.99		
		Depth to cemented pan	0.00				
		Organic matter content low	0.75				
SL:							
Water, intermittent, salt lake	100	Not rated		Not rated		Not rated	
SpA:							
Sparenberg	90	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Organic matter content low	0.98	Shrink-swell	0.00		

Table 24.--Source of Reclamation Material, Roadfill, and Topsoil--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
TkA:							
Tokio----------------	90	Fair		Poor		Good	
		Carbonate content	0.03	Low strength	0.00		
		Organic matter content low	0.29	Shrink-swell	0.99		
TkB:							
Tokio----------------	90	Poor		Poor		Fair	
		Wind erosion	0.00	Low strength	0.00	Too sandy	0.65
		Carbonate content	0.01	Shrink-swell	0.99		
		Organic matter content low	0.29				
		Too sandy	0.65				
W:							
Water----------------	100	Not rated		Not rated		Not rated	
YRG:							
Yellowhouse---------	75	Poor		Poor		Poor	
		Carbonate content	0.00	Depth to bedrock	0.00	Slope	0.00
		Too alkaline	0.00	Low strength	0.00	Too clayey	0.00
		Too clayey	0.00	Shrink-swell	0.34	Carbonate content	0.03
		Droughty	0.01	Slope	0.50	Depth to bedrock	0.29
		Depth to bedrock	0.29			Rock fragments	0.82
		Organic matter content low	0.73				
Rock outcrop--------	10	Not rated		Not rated		Not rated	
ZfA:							
Zita-----------------	90	Poor		Fair		Good	
		Carbonate content	0.00	Low strength	0.78		
		Organic matter content low	0.18				
ZfB:							
Zita-----------------	90	Poor		Fair		Fair	
		Carbonate content	0.00	Low strength	0.78	Rock fragments	0.76
		Organic matter content low	0.18				
ZmA:							
Zita-----------------	90	Poor		Fair		Fair	
		Carbonate content	0.00	Low strength	0.78	Rock fragments	0.76
		Organic matter content low	0.18				

Table 25.--Ponds and Embankments

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
AcA:							
Acuff	90	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.70	Piping	0.29	Depth to water	1.00
AcB:							
Acuff	90	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.70	Piping	0.28	Depth to water	1.00
AfA:							
Amarillo	90	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.70	Piping	0.80	Depth to water	1.00
AfB:							
Amarillo	90	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.70	Piping	0.79	Depth to water	1.00
ArA:							
Arch	90	Somewhat limited		Not limited		Very limited	
		Seepage	0.70			Depth to water	1.00
AsA:							
Arch	90	Somewhat limited		Not limited		Very limited	
		Seepage	0.70			Depth to water	1.00
AvA:							
Arvana	85	Somewhat limited		Somewhat limited		Very limited	
		Depth to cemented pan	0.91	Thin layer	0.91	Depth to water	1.00
		Seepage	0.70				
AvB:							
Arvana	85	Somewhat limited		Somewhat limited		Very limited	
		Depth to cemented pan	0.95	Thin layer	0.95	Depth to water	1.00
		Seepage	0.70				
BcA:							
Bippus	85	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.70	Piping	0.29	Depth to water	1.00
BeD:							
Berda	85	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.70	Piping	0.05	Depth to water	1.00
		Slope	0.68				
BHC:							
Brownfield	65	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.03	Depth to water	1.00
		Slope	0.32				

Table 25.--Ponds and Embankments--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas: Rating class and limiting features	Value	Embankments, dikes, and levees: Rating class and limiting features	Value	Aquifer-fed excavated ponds: Rating class and limiting features	Value
BP:							
Borrow pits	95	Very limited		Very limited		Very limited	
		Slope	1.00	Ponding	1.00	Depth to water	1.00
				Seepage	0.03		
BrB:							
Brownfield	90	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.03	Depth to water	1.00
CdA:							
Cedarlake	95	Somewhat limited		Very limited		Very limited	
		Seepage	0.70	Ponding	1.00	Depth to water	1.00
				Depth to saturated zone	1.00		
				Salinity	1.00		
				Hard to pack	1.00		
CeC:							
Creta	85	Somewhat limited		Very limited		Very limited	
		Seepage	0.70	Piping	1.00	Depth to water	1.00
ChA:							
Chapel	90	Somewhat limited		Very limited		Very limited	
		Seepage	0.01	Ponding	1.00	Depth to water	1.00
				Hard to pack	0.35		
DRC:							
Drake	90	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.70	Piping	0.84	Depth to water	1.00
		Slope	0.32				
DRE:							
Drake	90	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Piping	0.85	Depth to water	1.00
		Seepage	0.70				
EPA:							
Estacado	50	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.70	Piping	0.16	Depth to water	1.00
Pep	40	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.70	Piping	0.36	Depth to water	1.00
EsA:							
Estacado	90	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.70	Piping	0.16	Depth to water	1.00
EsB:							
Estacado	85	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.70	Piping	0.16	Depth to water	1.00
KmB:							
Kimberson	85	Very limited		Very limited		Very limited	
		Depth to cemented pan	1.00	Thin layer	1.00	Depth to water	1.00
		Seepage	0.53				

Table 25.--Ponds and Embankments--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas: Rating class and limiting features	Value	Embankments, dikes, and levees: Rating class and limiting features	Value	Aquifer-fed excavated ponds: Rating class and limiting features	Value
LhA:							
Lenorah	50	Very limited		Very limited		Very limited	
		Seepage	1.00	Piping	1.00	Cutbanks cave	1.00
				Salinity	1.00	Salinity and saturated zone	1.00
				Depth to saturated zone	0.86	Depth to saturated zone	0.06
				Seepage	0.82		
Hindman	35	Very limited		Very limited		Very limited	
		Seepage	1.00	Piping	1.00	Cutbanks cave	1.00
				Seepage	0.34	Depth to saturated zone	0.82
						Salinity and saturated zone	0.22
LMA:							
Lamesa	95	Somewhat limited		Very limited		Very limited	
		Seepage	0.70	Ponding	1.00	Slow refill	1.00
				Depth to saturated zone	1.00	Depth to saturated zone	0.81
				Piping	0.10	Salinity and saturated zone	0.14
						Cutbanks cave	0.10
LoA:							
Lofton	85	Not limited		Very limited		Very limited	
				Ponding	1.00	Depth to water	1.00
				Hard to pack	0.39		
M-W:							
Miscellaneous water	100	Not rated		Not rated		Not rated	
MdA:							
Midessa	85	Somewhat limited		Not limited		Very limited	
		Seepage	0.70			Depth to water	1.00
MdB:							
Midessa	85	Somewhat limited		Not limited		Very limited	
		Seepage	0.70			Depth to water	1.00
MdC:							
Midessa	85	Somewhat limited		Not limited		Very limited	
		Seepage	0.70			Depth to water	1.00
		Slope	0.32				
MPC:							
Midessa	50	Somewhat limited		Not limited		Very limited	
		Seepage	0.70			Depth to water	1.00
		Slope	0.32				
Posey	35	Somewhat limited		Not limited		Very limited	
		Seepage	0.70			Depth to water	1.00
		Slope	0.32				

Table 25.--Ponds and Embankments--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas: Rating class and limiting features	Value	Embankments, dikes, and levees: Rating class and limiting features	Value	Aquifer-fed excavated ponds: Rating class and limiting features	Value
MPP:							
Midessa	40	Very limited		Not limited		Very limited	
		Slope	1.00			Depth to water	1.00
		Seepage	0.70				
Potter	30	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Seepage	0.68	Depth to water	1.00
Posey	20	Very limited		Not limited		Very limited	
		Slope	1.00			Depth to water	1.00
		Seepage	0.70				
MVE:							
Mobeetie	50	Very limited		Not limited		Very limited	
		Seepage	1.00			Depth to water	1.00
		Slope	1.00				
Veal	25	Very limited		Not limited		Very limited	
		Slope	1.00			Depth to water	1.00
		Seepage	0.70				
Potter	15	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Seepage	0.68	Depth to water	1.00
OBG:							
Obaro	55	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Thin layer	0.86	Depth to water	1.00
		Seepage	0.70	Piping	0.50		
		Depth to bedrock	0.11				
Quinlan	30	Very limited		Not limited		Very limited	
		Slope	1.00			Depth to water	1.00
		Depth to bedrock	0.74				
OcA:							
Olton	85	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.03	Piping	0.01	Depth to water	1.00
PAB:							
Patricia	50	Somewhat limited		Not limited		Very limited	
		Seepage	0.70			Depth to water	1.00
Amarillo	45	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.70	Piping	0.82	Depth to water	1.00
PeA:							
Pep	85	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.70	Piping	0.36	Depth to water	1.00
PeB:							
Pep	85	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.70	Piping	0.37	Depth to water	1.00
PGE:							
Potter	80	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Seepage	0.68	Depth to water	1.00

Table 25.--Ponds and Embankments--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas: Rating class and limiting features	Value	Embankments, dikes, and levees: Rating class and limiting features	Value	Aquifer-fed excavated ponds: Rating class and limiting features	Value
PoA:							
Portales	90	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.70	Piping	0.85	Depth to water	1.00
PoB:							
Portales	90	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.70	Piping	0.84	Depth to water	1.00
PsA:							
Posey	85	Somewhat limited		Not limited		Very limited	
		Seepage	0.70			Depth to water	1.00
PsB:							
Posey	85	Somewhat limited		Not limited		Very limited	
		Seepage	0.70			Depth to water	1.00
RcA:							
Ranco	90	Not limited		Very limited		Very limited	
				Ponding	1.00	Slow refill	1.00
				Depth to saturated zone	1.00	Cutbanks cave	0.10
				Hard to pack	0.74		
SgA:							
Seagraves	90	Very limited		Very limited		Very limited	
		Seepage	1.00	Ponding	1.00	Depth to water	1.00
				Seepage	0.06		
ShB:							
Sharvana	85	Very limited		Very limited		Very limited	
		Depth to cemented pan	1.00	Thin layer	1.00	Depth to water	1.00
		Seepage	0.70	Seepage	0.40		
SL:							
Water, intermittent, salt lake	100	Somewhat limited		Not rated		Not rated	
		Seepage	0.01				
SpA:							
Sparenberg	90	Not limited		Very limited		Very limited	
				Ponding	1.00	Depth to water	1.00
				Hard to pack	0.92		
TkA:							
Tokio	90	Very limited		Not limited		Very limited	
		Seepage	1.00			Depth to water	1.00
TkB:							
Tokio	90	Very limited		Not limited		Very limited	
		Seepage	1.00			Depth to water	1.00
W:							
Water	100	Not rated		Not rated		Not rated	

Table 25.--Ponds and Embankments--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas: Rating class and limiting features	Value	Embankments, dikes, and levees: Rating class and limiting features	Value	Aquifer-fed excavated ponds: Rating class and limiting features	Value
YRG:							
Yellowhouse---------	75	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Thin layer	0.93	Depth to water	1.00
		Depth to bedrock	0.19	Hard to pack	0.50		
Rock outcrop--------	10	Very limited		Not rated		Not rated	
		Slope	1.00				
		Depth to bedrock	1.00				
ZfA:							
Zita-----------------	90	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.70	Piping	0.51	Depth to water	1.00
ZfB:							
Zita-----------------	90	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.70	Piping	0.50	Depth to water	1.00
ZmA:							
Zita-----------------	90	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.70	Piping	0.42	Depth to water	1.00

Table 26.--Water Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Constructing grassed waterways and surface drains: Rating class and limiting features	Value	Constructing terraces and diversions: Rating class and limiting features	Value	Tile drains and underground outlets: Rating class and limiting features	Value
AcA:							
Acuff	90	Not limited		Somewhat limited		Not limited	
				K factor	0.88		
AcB:							
Acuff	90	Somewhat limited		Somewhat limited		Not limited	
		Slope	0.04	K factor	0.88		
				Slope	0.04		
AfA:							
Amarillo	90	Not limited		Very limited		Not limited	
				HEL wind	1.00		
				K factor	0.88		
AfB:							
Amarillo	90	Somewhat limited		Very limited		Not limited	
		Slope	0.04	HEL wind	1.00		
				K factor	0.88		
				Slope	0.04		
ArA:							
Arch	90	Not limited		Very limited		Not limited	
				K factor	1.00		
				HEL wind	1.00		
AsA:							
Arch	90	Not limited		Very limited		Not limited	
				HEL wind	1.00		
				K factor	0.88		
AvA:							
Arvana	85	Somewhat limited		Very limited		Somewhat limited	
		Thin cemented pan	0.65	HEL wind	1.00	Thin cemented pan	0.65
				K factor	0.88		
				Thin cemented pan	0.65		
AvB:							
Arvana	85	Somewhat limited		Very limited		Somewhat limited	
		Thin cemented pan	0.80	HEL wind	1.00	Thin cemented pan	0.80
		Slope	0.04	K factor	0.88		
				Thin cemented pan	0.80		
				Slope	0.04		
BcA:							
Bippus	85	Not limited		Somewhat limited		Somewhat limited	
				K factor	0.88	Occasional flooding	0.40

Table 26.--Water Management--Continued

Map symbol and soil name	Pct. of map unit	Constructing grassed waterways and surface drains: Rating class and limiting features	Value	Constructing terraces and diversions: Rating class and limiting features	Value	Tile drains and underground outlets: Rating class and limiting features	Value
BeD:							
Berda	85	Somewhat limited		Very limited		Not limited	
		Slope	0.84	K factor	1.00		
				HEL wind	1.00		
				Slope	0.84		
BHC:							
Brownfield	65	Somewhat limited		Very limited		Very limited	
		Slope	0.63	HEL wind	1.00	Expect caving	1.00
				Slope	0.63		
BP:							
Borrow pits	95	Very limited		Very limited		Not rated	
		Slope	1.00	Ponding	1.00		
				Slope	1.00		
BrB:							
Brownfield	90	Somewhat limited		Very limited		Very limited	
		Slope	0.01	HEL wind	1.00	Expect caving	1.00
				Slope	0.01		
CdA:							
Cedarlake	95	Not limited		Very limited		Very limited	
				Ponding	1.00	Ponding	1.00
				HEL wind	1.00	Depth to saturated zone	1.00
				Depth to saturated zone	1.00	Too clayey	0.97
				K factor	0.88		
CeC:							
Creta	85	Somewhat limited		Very limited		Somewhat limited	
		Slope	0.16	HEL wind	1.00	Too clayey	0.83
				K factor	0.88		
				Slope	0.16		
ChA:							
Chapel	90	Not limited		Very limited		Very limited	
				Ponding	1.00	Ponding	1.00
				K factor	0.88	Expect caving	1.00
						Too clayey	0.64
DRC:							
Drake	90	Somewhat limited		Very limited		Not limited	
		Slope	0.63	HEL wind	1.00		
				K factor	0.88		
				Slope	0.63		
DRE:							
Drake	90	Very limited		Very limited		Somewhat limited	
		Slope	1.00	Slope	1.00	Slope	0.63
				HEL wind	1.00		
				K factor	0.88		
EPA:							
Estacado	50	Not limited		Very limited		Not limited	
				HEL wind	1.00		
				K factor	0.88		

Table 26.--Water Management--Continued

Map symbol and soil name	Pct. of map unit	Constructing grassed waterways and surface drains: Rating class and limiting features	Value	Constructing terraces and diversions: Rating class and limiting features	Value	Tile drains and underground outlets: Rating class and limiting features	Value
Pep	40	Not limited		Very limited		Not limited	
				K factor	1.00		
				HEL wind	1.00		
EsA:							
Estacado	90	Not limited		Somewhat limited		Not limited	
				K factor	0.88		
EsB:							
Estacado	85	Somewhat limited		Somewhat limited		Not limited	
		Slope	0.04	K factor	0.88		
				Slope	0.04		
KmB:							
Kimberson	85	Very limited		Very limited		Very limited	
		Thin cemented pan	1.00	Thin cemented pan	1.00	Thin cemented pan	1.00
		Slope	0.01	HEL wind	1.00	Expect caving	1.00
				Slope	0.01		
LhA:							
Lenorah	50	Not limited		Very limited		Very limited	
				HEL wind	1.00	Expect caving	1.00
				Depth to saturated zone	1.00	Depth to saturated zone	0.99
				K factor	0.50		
Hindman	35	Not limited		Very limited		Very limited	
				HEL wind	1.00	Expect caving	1.00
				K factor	0.12	Depth to saturated zone	0.58
LMA:							
Lamesa	95	Not limited		Very limited		Very limited	
				Ponding	1.00	Ponding	1.00
				Depth to saturated zone	1.00	Depth to saturated zone	1.00
				K factor	0.88		
LoA:							
Lofton	85	Not limited		Somewhat limited		Very limited	
				K factor	0.88	Ponding	1.00
						Too clayey	0.12
M-W:							
Miscellaneous water	100	Not rated		Not rated		Not rated	
MdA:							
Midessa	85	Not limited		Very limited		Not limited	
				HEL wind	1.00		
				K factor	0.50		
MdB:							
Midessa	85	Somewhat limited		Very limited		Not limited	
		Slope	0.04	HEL wind	1.00		
				K factor	0.50		
				Slope	0.04		

Table 26.--Water Management--Continued

Map symbol and soil name	Pct. of map unit	Constructing grassed waterways and surface drains: Rating class and limiting features	Value	Constructing terraces and diversions: Rating class and limiting features	Value	Tile drains and underground outlets: Rating class and limiting features	Value
MdC:							
Midessa	85	Somewhat limited		Very limited		Not limited	
		Slope	0.63	HEL wind	1.00		
				Slope	0.63		
				K factor	0.50		
MPC:							
Midessa	50	Somewhat limited		Very limited		Not limited	
		Slope	0.63	HEL wind	1.00		
				Slope	0.63		
				K factor	0.50		
Posey	35	Somewhat limited		Very limited		Not limited	
		Slope	0.63	HEL wind	1.00		
				K factor	0.88		
				Slope	0.63		
MPP:							
Midessa	40	Very limited		Very limited		Not limited	
		Slope	1.00	HEL wind	1.00		
				Slope	1.00		
				K factor	0.50		
Potter	30	Very limited		Very limited		Very limited	
		Slope	1.00	HEL wind	1.00	Expect caving	1.00
				Slope	1.00		
Posey	20	Very limited		Very limited		Not limited	
		Slope	1.00	HEL wind	1.00		
				Slope	1.00		
				K factor	0.88		
MVE:							
Mobeetie	50	Very limited		Very limited		Very limited	
		Slope	1.00	HEL wind	1.00	Slope	1.00
				Slope	1.00		
				K factor	0.12		
Veal	25	Very limited		Very limited		Very limited	
		Slope	1.00	K factor	1.00	Expect caving	1.00
				HEL wind	1.00	Slope	1.00
				Slope	1.00		
Potter	15	Very limited		Very limited		Very limited	
		Slope	1.00	HEL wind	1.00	Expect caving	1.00
				Slope	1.00	Slope	0.63
OBG:							
Obaro	55	Very limited		Very limited		Somewhat limited	
		Slope	1.00	K factor	1.00	Slope	0.63
		Depth to soft bedrock	0.46	HEL wind	1.00	Depth to soft bedrock	0.46
				Slope	1.00		
				Depth to soft bedrock	0.46		

Table 26.--Water Management--Continued

Map symbol and soil name	Pct. of map unit	Constructing grassed waterways and surface drains: Rating class and limiting features	Value	Constructing terraces and diversions: Rating class and limiting features	Value	Tile drains and underground outlets: Rating class and limiting features	Value
Quinlan	30	Very limited		Very limited		Very limited	
		Depth to soft bedrock	1.00	K factor	1.00	Depth to soft bedrock	1.00
		Slope	1.00	Depth to soft bedrock	1.00	Slope	1.00
				HEL wind	1.00		
				Slope	1.00		
OcA:							
Olton	85	Not limited		Somewhat limited		Not limited	
				K factor	0.88		
PAB:							
Patricia	50	Not limited		Very limited		Not limited	
				HEL wind	1.00		
				K factor	0.12		
Amarillo	45	Not limited		Very limited		Not limited	
				HEL wind	1.00		
				K factor	0.88		
PeA:							
Pep	85	Not limited		Very limited		Not limited	
				K factor	1.00		
				HEL wind	1.00		
PeB:							
Pep	85	Somewhat limited		Very limited		Not limited	
		Slope	0.04	K factor	1.00		
				HEL wind	1.00		
				Slope	0.04		
PGE:							
Potter	80	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Expect caving	1.00
PoA:							
Portales	90	Not limited		Very limited		Not limited	
				K factor	1.00		
				HEL wind	1.00		
PoB:							
Portales	90	Somewhat limited		Very limited		Not limited	
		Slope	0.04	K factor	1.00		
				HEL wind	1.00		
				Slope	0.04		
PsA:							
Posey	85	Not limited		Very limited		Not limited	
				HEL wind	1.00		
				K factor	0.88		
PsB:							
Posey	85	Somewhat limited		Very limited		Not limited	
		Slope	0.04	HEL wind	1.00		
				K factor	0.88		
				Slope	0.04		

Table 26.--Water Management--Continued

Map symbol and soil name	Pct. of map unit	Constructing grassed waterways and surface drains: Rating class and limiting features	Value	Constructing terraces and diversions: Rating class and limiting features	Value	Tile drains and underground outlets: Rating class and limiting features	Value
RcA:							
Ranco	90	Not limited		Very limited		Very limited	
				Ponding	1.00	Ponding	1.00
				Depth to saturated zone	1.00	Depth to saturated zone	1.00
				K factor	0.88	Expect caving	1.00
						Too clayey	0.61
SgA:							
Seagraves	90	Not limited		Very limited		Very limited	
				HEL wind	1.00	Ponding	1.00
				K factor	0.12	Expect caving	1.00
						Too clayey	0.01
ShB:							
Sharvana	85	Very limited		Very limited		Very limited	
		Thick cemented pan less	1.00	Thick cemented pan less	1.00	Thick cemented pan less	1.00
		Slope	0.01	HEL wind	1.00	Expect caving	1.00
				K factor	0.88		
				Slope	0.01		
SL:							
Water, intermittent, salt lake	100	Not rated		Not rated		Not rated	
SpA:							
Sparenberg	90	Not limited		Very limited		Very limited	
				Ponding	1.00	Ponding	1.00
				K factor	0.88	Expect caving	1.00
						Too clayey	0.50
TkA:							
Tokio	90	Not limited		Very limited		Not limited	
				HEL wind	1.00		
				K factor	0.50		
TkB:							
Tokio	90	Not limited		Very limited		Not limited	
				HEL wind	1.00		
				K factor	0.50		
W:							
Water	100	Not rated		Not rated		Not rated	
YRG:							
Yellowhouse	75	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Expect caving	1.00
		Depth to soft bedrock	0.71	K factor	0.88	Slope	1.00
				Depth to soft bedrock	0.71	Too clayey	0.95
						Depth to soft bedrock	0.71
Rock outcrop	10	Not rated		Not rated		Not rated	

Table 26.--Water Management--Continued

Map symbol and soil name	Pct. of map unit	Constructing grassed waterways and surface drains: Rating class and limiting features	Value	Constructing terraces and diversions: Rating class and limiting features	Value	Tile drains and underground outlets: Rating class and limiting features	Value
ZfA:							
Zita	90	Not limited		Very limited		Not limited	
				HEL wind	1.00		
				K factor	0.88		
ZfB:							
Zita	90	Somewhat limited		Very limited		Not limited	
		Slope	0.04	HEL wind	1.00		
				K factor	0.88		
				Slope	0.04		
ZmA:							
Zita	90	Not limited		Somewhat limited		Not limited	
				K factor	0.88		

Table 27.--Irrigation Systems Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Irrigation all application methods		Sprinkler irrigation		Drip or trickle irrigation	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
AcA:							
Acuff	90	Not limited		Not limited		Not limited	
AcB:							
Acuff	90	Not limited		Not limited		Not limited	
AfA:							
Amarillo	90	Not limited		Not limited		Not limited	
AfB:							
Amarillo	90	Not limited		Not limited		Not limited	
ArA:							
Arch	90	Not limited		Somewhat limited		Not limited	
				Calcium carbonate	0.50		
AsA:							
Arch	90	Not limited		Somewhat limited		Not limited	
				Calcium carbonate	0.50		
AvA:							
Arvana	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Cemented pan	0.91	Cemented pan	0.65	Cemented pan	0.91
		Droughty	0.59	Low water holding capacity	0.03		
AvB:							
Arvana	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Cemented pan	0.95	Cemented pan	0.80	Cemented pan	0.95
		Droughty	0.76	Low water holding capacity	0.10		
BcA:							
Bippus	85	Somewhat limited		Somewhat limited		Not limited	
		Occasional flooding	0.40	Occasional flooding	0.40		
BeD:							
Berda	85	Somewhat limited		Not limited		Not limited	
		Slope	0.68				
BHC:							
Brownfield	65	Somewhat limited		Somewhat limited		Not limited	
		Slope	0.32	Low water holding capacity	0.95		

Table 27.--Irrigation Systems Management--Continued

Map symbol and soil name	Pct. of map unit	Irrigation all application methods: Rating class and limiting features	Value	Sprinkler irrigation: Rating class and limiting features	Value	Drip or trickle irrigation: Rating class and limiting features	Value
BP:							
Borrow pits	95	Not rated		Very limited		Not Rated	
				Low water holding capacity	1.00		
				Slopes, sprinkler irrigation	1.00		
				Drains slowly	0.31		
BrB:							
Brownfield	90	Not limited		Somewhat limited		Not limited	
				Low water holding capacity	0.29		
CdA:							
Cedarlake	95	Very limited		Very limited		Very limited	
		Excess Sodium	1.00	Ponding	1.00	Excess Sodium	1.00
		Ponding	1.00	Depth to saturated zone	1.00	Ponding	1.00
		Depth to saturated zone	1.00	Excess Sodium	1.00	Wetness	1.00
		Excess salt	1.00	Low water holding capacity	0.52	Excess salt	1.00
		Percs slowly	0.38	Excess Salt	0.50		
CeC:							
Creta	85	Very limited		Somewhat limited		Very limited	
		Excess Sodium	1.00	Excess Sodium	0.74	Excess Sodium	1.00
				Excess Salt	0.50	Excess salt	0.88
ChA:							
Chapel	90	Very limited		Somewhat limited		Very limited	
		Percs slowly	1.00	Drains slowly	0.99	Ponding	1.00
		Ponding	1.00	Surface clay	0.61		
				Ponding	0.50		
DRC:							
Drake	90	Somewhat limited		Somewhat limited		Somewhat limited	
		Excess Sodium	0.32	Excess Sodium	0.01	Excess Sodium	0.78
		Slope	0.32				
DRE:							
Drake	90	Very limited		Somewhat limited		Somewhat limited	
		Slope	1.00	Slopes, sprinkler irrigation	0.78	Excess Sodium	0.78
		Slopes, sprinkler irrigation	0.78	Excess Sodium	0.01		
		Excess Sodium	0.32				
EPA:							
Estacado	50	Not limited		Not limited		Not limited	
Pep	40	Not limited		Not limited		Not limited	
EsA:							
Estacado	90	Not limited		Not limited		Not limited	
EsB:							
Estacado	85	Not limited		Not limited		Not limited	

Table 27.--Irrigation Systems Management--Continued

Map symbol and soil name	Pct. of map unit	Irrigation all application methods: Rating class and limiting features	Value	Sprinkler irrigation: Rating class and limiting features	Value	Drip or trickle irrigation: Rating class and limiting features	Value
KmB:							
Kimberson	85	Very limited		Very limited		Not limited	
		Droughty	1.00	Low water holding capacity	1.00		
LhA:							
Lenorah	50	Very limited		Very limited		Very limited	
		Excess Sodium	1.00	Excess Sodium	1.00	Excess Sodium	1.00
		Depth to saturated zone	0.86	Excess Salt	0.50	Excess salt	1.00
				Too alkaline	0.50		
				Depth to saturated zone	0.44		
				Low water holding capacity	0.17		
Hindman	35	Very limited		Somewhat limited		Very limited	
		Excess Sodium	1.00	Low water holding capacity	0.65	Excess Sodium	1.00
				Excess Sodium	0.50	Excess salt	1.00
				Excess Salt	0.50		
LMA:							
Lamesa	95	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Wetness	1.00
		Percs slowly	1.00	Drains slowly	0.60	Excess salt	0.92
				Excess Salt	0.50		
LoA:							
Lofton	85	Very limited		Somewhat limited		Very limited	
		Percs slowly	1.00	Drains slowly	0.99	Ponding	1.00
		Ponding	1.00	Ponding	0.50		
M-W:							
Miscellaneous water	100	Not rated		Not Rated		Not Rated	
MdA:							
Midessa	85	Not limited		Not limited		Not limited	
MdB:							
Midessa	85	Not limited		Not limited		Not limited	
MdC:							
Midessa	85	Somewhat limited		Not limited		Not limited	
		Slope	0.32				
MPC:							
Midessa	50	Somewhat limited		Not limited		Not limited	
		Slope	0.32				
Posey	35	Somewhat limited		Not limited		Not limited	
		Slope	0.32				

Table 27.--Irrigation Systems Management--Continued

Map symbol and soil name	Pct. of map unit	Irrigation all application methods: Rating class and limiting features	Value	Sprinkler irrigation: Rating class and limiting features	Value	Drip or trickle irrigation: Rating class and limiting features	Value
MPP:							
Midessa	40	Very limited		Somewhat limited		Not limited	
		Slope	1.00	Slopes, sprinkler irrigation	0.10		
		Slopes, sprinkler irrigation	0.10				
Potter	30	Very limited		Somewhat limited		Not limited	
		Percs slowly	1.00	Low water holding capacity	0.74		
		Slope	1.00	Calcium carbonate	0.50		
		Droughty	0.46	Drains slowly	0.31		
		Slopes, sprinkler irrigation	0.10	Slopes, sprinkler irrigation	0.10		
Posey	20	Very limited		Somewhat limited		Not limited	
		Slope	1.00	Slopes, sprinkler irrigation	0.10		
		Slopes, sprinkler irrigation	0.10				
MVE:							
Mobeetie	50	Very limited		Very limited		Not limited	
		Slope	1.00	Slopes, sprinkler irrigation	1.00		
		Slopes, sprinkler irrigation	1.00	Low water holding capacity	0.04		
Veal	25	Very limited		Very limited		Not limited	
		Slope	1.00	Slopes, sprinkler irrigation	1.00		
		Slopes, sprinkler irrigation	1.00	Low water holding capacity	0.09		
Potter	15	Very limited		Somewhat limited		Not limited	
		Percs slowly	1.00	Slopes, sprinkler irrigation	0.78		
		Slope	1.00	Low water holding capacity	0.74		
		Slopes, sprinkler irrigation	0.78	Calcium carbonate	0.50		
		Droughty	0.46	Drains slowly	0.31		
OBG:							
Obaro	55	Very limited		Somewhat limited		Not limited	
		Slope	1.00	Slopes, sprinkler irrigation	0.78		
		Slopes, sprinkler irrigation	0.78	Depth to soft bedrock	0.46		
		Droughty	0.47	Low water holding capacity	0.01		
		Bedrock	0.46				

Table 27.--Irrigation Systems Management--Continued

Map symbol and soil name	Pct. of map unit	Irrigation all application methods: Rating class and limiting features	Value	Sprinkler irrigation: Rating class and limiting features	Value	Drip or trickle irrigation: Rating class and limiting features	Value
Quinlan	30	Very limited		Very limited		Very limited	
		Percs slowly	1.00	Depth to soft bedrock	1.00	Depth to bedrock	1.00
		Bedrock	1.00	Drains slowly	1.00		
		Droughty	1.00	Slopes, sprinkler irrigation	1.00		
		Slopes, sprinkler irrigation	1.00	Low water holding capacity	0.99		
		Slope	1.00				
OcA:							
Olton	85	Very limited		Somewhat limited		Not limited	
		Percs slowly	1.00	Drains slowly	0.73		
PAB:							
Patricia	50	Not limited		Not limited		Not limited	
Amarillo	45	Not limited		Not limited		Not limited	
PeA:							
Pep	85	Not limited		Not limited		Not limited	
PeB:							
Pep	85	Not limited		Not limited		Not limited	
PGE:							
Potter	80	Very limited		Somewhat limited		Not limited	
		Percs slowly	1.00	Low water holding capacity	0.74		
		Slope	1.00	Calcium carbonate	0.50		
		Droughty	0.46	Drains slowly	0.31		
		Slopes, sprinkler irrigation	0.10	Slopes, sprinkler irrigation	0.10		
PoA:							
Portales	90	Not limited		Not limited		Not limited	
PoB:							
Portales	90	Not limited		Not limited		Not limited	
PsA:							
Posey	85	Not limited		Not limited		Not limited	
PsB:							
Posey	85	Not limited		Not limited		Not limited	
RcA:							
Ranco	90	Very limited		Very limited		Very limited	
		Percs slowly	1.00	Ponding	1.00	Ponding	1.00
		Ponding	1.00	Depth to saturated zone	1.00	Wetness	1.00
		Depth to saturated zone	1.00	Drains slowly	0.99	Wetness	1.00
				Surface clay	0.88		

Table 27.--Irrigation Systems Management--Continued

Map symbol and soil name	Pct. of map unit	Irrigation all application methods: Rating class and limiting features	Value	Sprinkler irrigation: Rating class and limiting features	Value	Drip or trickle irrigation: Rating class and limiting features	Value
SgA:							
Seagraves	90	Very limited		Somewhat limited		Very limited	
		Ponding	1.00	Ponding	0.50	Ponding	1.00
				Low water holding capacity	0.01		
ShB:							
Sharvana	85	Very limited		Somewhat limited		Somewhat limited	
		Droughty	1.00	Low water holding capacity	0.99	Excess Sodium	0.10
SL:							
Water, intermittent, salt lake	100	Not rated		Not Rated		Not Rated	
SpA:							
Sparenberg	90	Very limited		Somewhat limited		Very limited	
		Percs slowly	1.00	Drains slowly	0.99	Ponding	1.00
		Ponding	1.00	Surface clay	0.55		
				Ponding	0.50		
TkA:							
Tokio	90	Not limited		Not limited		Not limited	
TkB:							
Tokio	90	Not limited		Not limited		Not limited	
W:							
Water	100	Not rated		Not Rated		Not Rated	
YRG:							
Yellowhouse	75	Very limited		Very limited		Somewhat limited	
		Percs slowly	1.00	Slopes, sprinkler irrigation	1.00	Excess Sodium	0.22
		Slopes, sprinkler irrigation	1.00	Drains slowly	0.73		
		Slope	1.00	Depth to soft bedrock	0.71		
		Droughty	0.99	Low water holding capacity	0.60		
		Bedrock	0.71	Calcium carbonate	0.50		
Rock outcrop	10	Not rated		Not Rated		Not Rated	
ZfA:							
Zita	90	Not limited		Somewhat limited		Not limited	
				Calcium carbonate	0.50		
ZfB:							
Zita	90	Not limited		Somewhat limited		Not limited	
				Calcium carbonate	0.50		
ZmA:							
Zita	90	Not limited		Somewhat limited		Not limited	
				Calcium carbonate	0.50		

Table 28.--Engineering Soil Properties

(Absence of an entry indicates that the data were not estimated.)

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
AcA:												
Acuff-----------	0-12	Loam	CL, SC-SM	A-6	0	0	100	100	92-100	57-71	25-41	8-19
	12-20	Sandy clay loam, clay loam, loam	CL, SC-SM	A-6, A-7-6	0	0	100	100	89-100	51-66	30-45	13-25
	20-28	Sandy clay loam, loam, clay loam	CL, SC-SM	A-6, A-7-6	0	0	100	100	88-100	53-68	30-45	13-25
	28-38	Sandy clay loam, clay loam, loam	CL, SC-SM	A-6, A-7-6	0	0	100	100	91-100	51-66	29-44	13-25
	38-58	Sandy clay loam, clay loam	CL, SC-SM	A-6, A-7-6	0	0	93-99	87-98	76-98	44-64	29-44	13-25
	58-80	Sandy clay loam, clay loam	CL, SC-SM	A-6, A-7-6	0	0	93-99	87-98	77-98	46-67	29-44	13-25
AcB:												
Acuff-----------	0-10	Loam	CL, SC-SM	A-6	0	0	100	100	92-100	57-71	25-41	8-19
	10-18	Sandy clay loam, clay loam, loam	CL, SC-SM	A-6, A-7-6	0	0	100	100	89-100	51-66	30-45	13-25
	18-26	Sandy clay loam, clay loam, loam	CL, SC-SM	A-6, A-7-6	0	0	100	100	88-100	53-68	30-45	13-25
	26-36	Sandy clay loam, clay loam, loam	CL, SC-SM	A-6, A-7-6	0	0	100	100	91-100	51-66	29-44	13-25
	36-56	Sandy clay loam, clay loam	CL, SC-SM	A-6, A-7-6	0	0	100	100	87-100	50-65	29-44	13-25
	56-80	Sandy clay loam, clay loam	CL, SC-SM	A-6, A-7-6	0	0	100	100	89-100	54-69	29-44	13-25
AfA:												
Amarillo--------	0-11	Fine sandy loam	SC, SC-SM	A-4	0	0	100	100	94-100	44-52	21-31	6-12
	11-27	Sandy clay loam, clay loam	CL, SC, SC-SM	A-6, A-7-6	0	0	100	100	93-100	49-64	29-44	13-25
	27-39	Sandy clay loam, clay loam	CL, SC-SM	A-6, A-7-6	0	0	100	100	95-100	51-66	29-44	13-25
	39-56	Sandy clay loam, clay loam	SC, SC-SM, CL	A-6, A-4, A-7-6	0	0	93-98	87-97	83-97	44-63	29-44	10-25
	56-80	Sandy clay loam, clay loam	CL, SC, SC-SM	A-6, A-7-6	0	0	93-100	87-100	80-100	49-71	29-44	11-25

Table 28.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
AfB:												
Amarillo--------	0-10	Fine sandy loam	SC, SC-SM	A-4	0	0	100	100	94-100	44-52	21-31	6-12
	10-26	Sandy clay loam, clay loam	CL, SC, SC-SM	A-6, A-7-6	0	0	100	100	93-100	49-64	29-44	13-25
	26-39	Sandy clay loam, clay loam	CL, SC-SM	A-6, A-7-6	0	0	100	100	95-100	51-66	29-44	13-25
	39-55	Sandy clay loam, clay loam	SC, SC-SM, CL	A-6, A-4, A-7-6	0	0	93-98	87-97	83-97	44-63	29-44	10-25
	55-80	Sandy clay loam, clay loam	CL, SC, SC-SM	A-6, A-7-6	0	0	93-100	87-100	80-100	49-71	29-44	11-25
ArA:												
Arch------------	0-5	Loam	CL, SC-SM	A-4	0	0	97-100	94-100	82-97	58-71	25-39	9-17
	5-16	Sandy clay loam, loam, clay loam, fine sandy loam	SC, CL	A-4, A-6	0	0	95-99	90-98	68-98	31-58	20-47	6-25
	16-37	Sandy clay loam, fine sandy loam, loam, clay loam	SC, CL	A-4, A-6	0	0	89-96	77-92	54-87	29-58	20-47	6-25
	37-80	Sandy clay loam, fine sandy loam, loam, clay loam	SC, CL	A-4, A-6	0	0	89-96	77-92	55-89	30-58	20-47	6-25
AsA:												
Arch------------	0-6	Fine sandy loam	SC, SC-SM	A-6	0	0	97-100	95-100	87-97	41-48	25-33	9-13
	6-16	Sandy clay loam, clay loam, loam, fine sandy loam	SC, CL	A-4, A-6	0	0	95-99	90-98	68-98	31-58	20-47	6-25
	16-37	Sandy clay loam, loam, clay loam, fine sandy loam	SC, CL	A-4, A-6	0	0	89-96	77-92	54-87	29-58	20-47	6-25
	37-80	Sandy clay loam, loam, clay loam, fine sandy loam	SC, CL	A-4, A-6	0	0	89-96	77-92	55-89	30-58	20-47	6-25
AvA:												
Arvana----------	0-8	Fine sandy loam, loamy fine sand	SC, SC-SM	A-4	0	0	97-100	97-100	95-99	45-50	21-28	6-10
	8-16	Sandy clay loam, loam	SC, SC-SM	A-4, A-6	0	0	96-100	96-100	82-86	40-45	26-45	9-25
	16-28	Sandy clay loam, loam	SC, SC-SM, CL	A-4, A-6	0	0	96-99	95-99	80-99	37-58	25-44	9-23
	28-38	Cemented material			---	---	---	---	---	---	---	---
	38-60	Loam, sandy clay loam, clay loam	CL, SC-SM	A-6, A-7-6	0	0	75-93	72-92	63-92	41-68	27-43	12-22
	60-80	Clay loam, sandy clay loam	CL, SC-SM	A-7-6, A-6	0	0	75-92	72-91	57-85	39-62	29-43	13-22

Table 28.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
AvB:												
Arvana----------	0-6	Fine sandy loam, loamy fine sand	SC, SC-SM	A-4	0	0	97-100	97-100	95-99	45-50	21-28	6-10
	6-14	Sandy clay loam, loam	SC, SC-SM	A-4, A-6	0	0	96-100	96-100	82-86	40-45	26-45	9-25
	14-26	Sandy clay loam, loam	SC, SC-SM, CL	A-4, A-6	0	0	96-99	95-99	80-99	37-58	25-44	9-23
	26-36	Cemented material			---	---	---	---	---	---	---	---
	36-58	Loam, sandy clay loam, clay loam	CL, SC-SM	A-6, A-7-6	0	0	75-93	72-92	63-92	41-68	27-43	12-22
	58-80	Clay loam, sandy clay loam	CL, SC-SM	A-7-6, A-6	0	0	75-92	72-91	57-85	39-62	29-43	13-22
BcA:												
Bippus----------	0-8	Clay loam	CL, SC-SM	A-6	0	0	100	100	78-98	55-75	27-48	9-23
	8-14	Sandy clay loam, loam, clay loam	CL, SC, SC-SM	A-6, A-7-6	0	0	100	100	75-95	43-63	26-46	9-23
	14-26	Sandy clay loam, clay loam, loam	CL, SC-SM, SC	A-6, A-7-6	0	0	100	100	78-93	47-62	30-44	13-23
	26-49	Sandy clay loam, clay loam, loam	CL, SC, SC-SM	A-6, A-7-6	0	0	100	100	80-95	48-63	31-45	13-23
	49-65	Sandy clay loam, loam, clay loam	CL, SC-SM, SC	A-6, A-7-6	0	0	100	100	78-93	48-63	31-45	13-23
	65-80	Fine sandy loam, clay loam, loam, sandy clay loam	CL, CL-ML, SC-SM, SC	A-4, A-6	0	0	93-100	87-100	73-100	40-71	21-42	5-21
BeD:												
Berda-----------	0-6	Loam	CL, SC-SM	A-6	0	0	79-98	77-98	65-94	41-64	24-37	9-16
	6-20	Loam, sandy clay loam, clay loam	CL, SC-SM	A-6, A-7-6	0	0	80-100	78-100	69-100	45-75	27-43	11-22
	20-36	Clay loam, loam, sandy clay loam	CL, SC, SC-SM	A-7-6, A-6	0	0	80-98	78-98	59-91	38-65	27-43	11-23
	36-52	Clay loam, loam, sandy clay loam	CL, SC-SM, SC	A-7-6, A-6	0	0	80-98	78-98	60-92	39-66	27-43	11-23
	52-80	Sandy clay loam, clay loam, loam	SC, SC-SM, CL	A-6, A-7-6	0	0	80-95	78-95	56-84	32-55	27-43	11-21
BHC:												
Brownfield------	0-9	Fine sand	SM, SC-SM	A-2-4	0	0	100	100	94-100	19-28	0-22	NP-6
	9-19	Fine sand, loamy fine sand	SM, SC-SM	A-2-4	0	0	100	100	96-100	13-22	0-22	NP-6
	19-39	Fine sand, loamy fine sand	SM, SC-SM	A-2-4	0	0	100	100	97-100	14-21	0-23	NP-6
	39-62	Sandy clay loam	SC-SM, SC	A-6, A-2-6	0	0	100	100	91-100	31-46	29-44	13-25
	62-80	Sandy clay loam	SC-SM, SC	A-6, A-2-6	0	0	100	100	94-100	35-50	29-44	13-25

Table 28.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
BP:												
Borrow pits	0-20	Paragravel, very gravelly loam, very gravelly fine sandy loam, gravelly loam, gravelly fine sandy loam	GC, GC-GM, SC-SM, SC	A-2-4, A-2-6	0	0	40-95	11-91	8-89	4-56	25-44	7-25
	20-80	Paragravel, gravelly fine sandy loam, gravelly loam, very gravelly fine sandy loam, very gravelly loam	GC, GC-GM, SC-SM, SC	A-2-4, A-2-6	0	0	40-95	11-91	8-89	4-56	25-44	7-25
BrB:												
Brownfield	0-6	Fine sand	SM, SC-SM	A-2-4	0	0	100	100	96-100	21-28	0-23	NP-6
	6-12	Fine sand, loamy fine sand	SM, SC-SM	A-2-4	0	0	100	100	96-100	13-22	0-22	NP-6
	12-23	Fine sand, loamy fine sand	SM, SC-SM	A-2-4	0	0	100	100	97-100	14-21	0-22	NP-6
	23-28	Loamy fine sand, fine sandy loam, sandy clay loam	SC-SM, SC	A-2-4, A-2-6, A-6	0	0	100	100	91-100	14-36	0-36	NP-17
	28-55	Sandy clay loam	SC-SM, SC	A-6, A-2-6	0	0	100	100	91-100	31-46	29-44	13-25
	55-80	Sandy clay loam	SC-SM, SC	A-6, A-2-6	0	0	100	100	94-100	35-50	29-44	13-25
CdA:												
Cedarlake	0-10	Sandy clay loam	CL, SC-SM	A-6, A-7	0	0	100	100	95-100	60-75	31-44	13-20
	10-22	Clay loam, sandy clay loam	CL, SC-SM	A-6, A-7	0	0	100	100	89-100	58-76	30-45	11-20
	22-45	Clay, silty clay	CH, CL	A-7-6, A-7-5	0	0	100	100	82-100	73-93	48-64	26-33
	45-56	Silty clay, clay	CH, CL	A-7-6, A-7-5	0	0	100	100	94-100	89-100	48-66	23-33
	56-68	Clay, silty clay	MH, CH, CL	A-7-5, A-7-6	0	0	100	100	84-100	81-100	48-63	26-30
	68-80	Silty clay, clay, clay loam	CH, CL, MH	A-7-6, A-7-5	0	0	100	100	89-100	86-100	44-64	22-32
CeC:												
Creta	0-8	Loam	CL, SC-SM	A-6	0	0	77-98	74-98	62-98	44-77	25-40	8-17
	8-16	Gravelly sandy clay loam, clay loam, sandy clay loam	CL, SC	A-6, A-7-6	0	0	73-94	71-94	61-94	34-64	26-43	9-20
	16-27	Sandy clay loam, clay loam	CL, SC	A-6, A-7-6	0	0	83-98	82-98	71-98	40-69	27-45	10-20
	27-44	Sandy clay loam, clay loam	CL, SC-SM	A-6, A-7-6	0	0	84-98	83-98	72-98	44-72	34-47	16-20
	44-70	Clay, silty clay	CH, CL	A-7-6	0	0	83-99	81-99	73-98	60-89	49-68	27-39
	70-80	Bedrock			---	---	---	---	---	---	---	---

Table 28.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
ChA:												
Chapel	0-5	Clay	CH	A-7-6	0	0	100	100	92-100	74-94	51-73	29-43
	5-14	Clay	CH	A-7-6	0	0	100	100	92-100	73-93	50-72	29-43
	14-24	Clay	CH	A-7-6	0	0	100	100	92-100	74-94	49-69	28-41
	24-35	Clay	CH	A-7-6	0	0	100	100	92-100	77-97	49-67	27-37
	35-59	Clay, loam, clay loam	CH, CL	A-6, A-7-6	0	0	92-100	90-100	78-100	61-93	23-52	5-26
	59-80	Clay loam, clay, loam	CL, CH	A-6, A-7-6	0	0	94-100	91-100	75-100	49-81	24-50	7-21
DRC:												
Drake	0-5	Loam, fine sandy loam, sandy clay loam	CL, SC-SM	A-6, A-4	0	0	100	100	87-100	50-70	21-37	5-14
	5-15	Fine sandy loam, loam, sandy clay loam, loamy fine sand, clay loam	SC, SM, SC-SM, CL	A-6, A-4, A-7	0	0	100	100	87-100	37-61	21-43	5-20
	15-28	Sandy clay loam, fine sandy loam, loam, clay loam	CL, SC-SM, SC, SM	A-6, A-7, A-4	0	0	100	100	87-100	48-72	25-45	9-21
	28-43	Loam, fine sandy loam, clay loam, sandy clay loam	CL, SC-SM	A-6, A-7, A-4	0	0	100	100	87-100	55-80	25-45	9-21
	43-69	Loam, clay loam, fine sandy loam, sandy clay loam	CL, SC-SM	A-6, A-7, A-4	0	0	100	100	87-100	54-78	25-45	9-21
	69-80	Fine sandy loam, clay loam, sandy clay loam, loam	CL, SM, SC, SC-SM	A-6, A-7, A-4	0	0	100	100	87-100	44-72	25-45	9-21
DRE:												
Drake	0-3	Loam, fine sandy loam, sandy clay loam	CL, SC-SM	A-6, A-4	0	0	100	100	87-100	50-70	21-37	5-14
	3-11	Fine sandy loam, loam, sandy clay loam, loamy fine sand, clay loam	SC, SM, SC-SM, CL	A-6, A-4, A-7	0	0	100	100	87-100	37-61	21-43	5-20
	11-25	Sandy clay loam, loam, clay loam, fine sandy loam	CL, SC-SM, SC, SM	A-6, A-7, A-4	0	0	100	100	87-100	48-72	25-45	9-21
	25-38	Loam, fine sandy loam, clay loam, sandy clay loam	CL, SC-SM	A-6, A-7, A-4	0	0	100	100	87-100	55-80	25-45	9-21
	38-65	Loam, clay loam, fine sandy loam, sandy clay loam	CL, SC-SM	A-6, A-7, A-4	0	0	100	100	87-100	54-78	25-45	9-21
	65-80	Fine sandy loam, sandy clay loam, loam, clay loam	CL, SM, SC, SC-SM	A-6, A-7, A-4	0	0	100	100	87-100	44-72	25-45	9-21

Table 28.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
EPA:												
Estacado--------	0-6	Loam	CL, SC-SM	A-6, A-4	0	0	100	100	84-98	59-73	25-45	8-19
	6-19	Clay loam, sandy clay loam	CL, SC-SM	A-7-6, A-6	0	0	100	100	76-96	58-78	30-51	13-29
	19-38	Clay loam, sandy clay loam	CL, SC-SM	A-7-6, A-6	0	0	100	100	77-97	57-77	29-50	13-29
	38-50	Clay loam, sandy clay loam	CL, SC-SM	A-6, A-7-6	0	0	90-100	87-100	66-97	50-77	29-50	13-29
	50-80	Clay loam, sandy clay loam	CL, SC-SM	A-6, A-7-6	0	0	90-99	87-98	67-96	50-77	29-50	13-29
Pep-------------	0-10	Loam	CL, SC-SM	A-6	0	0	100	100	88-100	61-73	28-44	11-19
	10-16	Clay loam, sandy clay loam, loam	CL, SC-SM	A-6, A-7-6	0	0	100	100	78-95	58-75	28-45	11-21
	16-32	Clay loam, loam, sandy clay loam	CL, SC-SM	A-6, A-7-6	0	0	100	100	78-95	58-75	27-44	11-21
	32-80	Clay loam, loam, sandy clay loam	CL, SC-SM	A-6, A-7-6, A-4	0	0	88-96	84-95	68-93	51-74	26-41	9-16
EsA:												
Estacado--------	0-6	Loam	CL, SC-SM	A-6, A-4	0	0	100	100	84-98	59-73	25-45	8-19
	6-19	Clay loam, sandy clay loam	CL, SC-SM	A-7-6, A-6	0	0	100	100	76-96	58-78	30-51	13-29
	19-38	Clay loam, sandy clay loam	CL, SC-SM	A-7-6, A-6	0	0	100	100	77-97	57-77	29-50	13-29
	38-50	Clay loam, sandy clay loam	CL, SC-SM	A-6, A-7-6	0	0	90-100	87-100	66-97	50-77	29-50	13-29
	50-80	Clay loam, sandy clay loam	CL, SC-SM	A-6, A-7-6	0	0	90-99	87-98	67-96	50-77	29-50	13-29
EsB:												
Estacado--------	0-4	Loam	CL, SC-SM	A-6, A-4	0	0	100	100	84-98	59-73	25-45	8-19
	4-17	Clay loam, sandy clay loam	CL, SC-SM	A-7-6, A-6	0	0	100	100	76-96	58-78	30-51	13-29
	17-36	Clay loam, sandy clay loam	CL, SC-SM	A-7-6, A-6	0	0	100	100	77-97	57-77	29-50	13-29
	36-48	Clay loam, sandy clay loam	CL, SC-SM	A-6, A-7-6	0	0	90-100	87-100	66-97	50-77	29-50	13-29
	48-80	Clay loam, sandy clay loam	CL, SC-SM	A-6, A-7-6	0	0	90-99	87-98	67-96	50-77	29-50	13-29

Table 28.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
KmB:												
Kimberson	0-5	Gravelly loam	CL, GC-GM	A-6, A-4	0	0	62-89	58-88	55-88	39-64	27-35	9-14
	5-11	Very gravelly loam, gravelly loam, gravelly fine sandy loam	GC, GC-GM, SC-SM	A-2-6, A-4	0	0	48-72	43-69	36-69	23-49	21-40	4-14
	11-28	Cemented material			---	---	---	---	---	---	---	---
	28-64	Extremely gravelly fine sandy loam, extremely gravelly loam, very gravelly fine sandy loam, very gravelly loam	GP-GM, GC-GM, GM, GC	A-1-a, A-2-4	0	0	14-49	9-45	7-43	3-24	19-31	2-8
	64-80	Cemented material			---	---	---	---	---	---	---	---
LhA:												
Lenorah	0-7	Fine sandy loam	SC, SC-SM	A-4	0	0	98-100	98-100	85-100	39-58	21-33	5-11
	7-22	Sandy clay loam, loam, fine sandy loam	SC, SC-SM	A-6, A-4	0	0	98-100	98-100	78-100	40-63	25-41	8-19
	22-30	Sandy clay loam, loam, fine sandy loam	SC, SC-SM	A-6, A-4	0	0	94-100	93-100	73-100	40-65	27-40	9-17
	30-47	Fine sandy loam, loam, sandy clay loam	SC-SM, SC, CL-ML	A-4, A-6	0	0	94-100	93-100	79-100	33-60	20-38	4-15
	47-65	Loamy fine sand, fine sandy loam	SM, SC-SM	A-2-4	0	0	97-100	97-100	81-100	19-36	16-29	1-9
	65-80	Sand, loamy fine sand	SP-SM, SC-SM, SM	A-3	0	0	97-100	97-100	68-89	7-20	0-24	NP-7
Hindman	0-23	Fine sand	SM, SC-SM	A-2-4	0	0	100	100	97-100	21-34	0-28	NP-9
	23-38	Loamy fine sand, fine sandy loam	SC-SM, SM	A-2-4, A-4	0	0	100	100	94-100	22-47	17-41	2-20
	38-46	Fine sandy loam	SC, SC-SM	A-4	0	0	100	100	90-100	35-55	20-40	5-18
	46-60	Sandy clay loam, fine sandy loam, loam	CL, SC-SM, SC	A-6, A-4	0	0	96-100	95-100	84-100	39-61	21-37	5-16
	60-77	Fine sand, loamy fine sand	SM, SC-SM	A-2-4	0	0	100	100	97-100	20-31	15-25	1-7
	77-80	Sand, loamy sand	SM, SC-SM	A-2-4	0	0	100	100	83-93	13-23	0-21	NP-3

Table 28.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
LMA:												
Lamesa----------	0-4	Sandy clay, fine sandy loam, sandy clay loam	SC, SC-SM, CL	A-7-6, A-6, A-4	0	0	100	100	86-100	42-65	24-55	6-27
	4-11	Sandy clay loam, sandy clay, fine sandy loam	CL, SC, SC-SM, CL-ML	A-7-6, A-6, A-4	0	0	100	100	86-100	40-62	22-51	6-27
	11-31	Sandy clay loam, fine sandy loam	CL, SC-SM, SC	A-6, A-4	0	0	100	100	88-100	43-62	27-43	10-22
	31-48	Very fine sandy loam, fine sandy loam	SC, SC-SM	A-4	0	0	100	100	88-100	31-48	20-32	4-13
	48-58	Fine sandy loam, sandy clay loam	SC, SC-SM	A-6, A-4	0	0	100	100	89-100	40-61	26-44	10-24
	58-80	Sandy clay loam, clay loam, clay	CL, SC, CH	A-7-6, A-6	0	0	100	100	89-100	45-67	31-59	13-34
LoA:												
Lofton----------	0-9	Clay loam	CL	A-7-6	0	0	100	100	95-100	72-82	41-55	21-28
	9-24	Clay, silty clay	CH	A-7-6	0	0	100	100	95-100	77-87	50-60	29-34
	24-38	Clay, silty clay	CH	A-7-6	0	0	100	100	95-100	77-87	50-60	29-34
	38-52	Clay, clay loam, silty clay	CH, CL	A-7-6, A-6	0	0	100	91-100	86-100	68-88	39-55	20-30
	52-80	Silty clay, clay, clay loam	CL, CH	A-7-6, A-6	0	0	93-100	91-100	79-100	70-97	38-55	19-29
M-W:												
Miscellaneous water----------	---	---	---	---	---	---	---	---	---	---	---	---
MdA:												
Midessa---------	0-10	Fine sandy loam	SC, SC-SM	A-4	0	0	100	100	88-98	39-49	20-32	6-12
	10-30	Sandy clay loam	CL, SC-SM, SC	A-6	0	0	100	100	79-94	44-59	29-43	13-22
	30-60	Sandy clay loam, clay loam	SC, SC-SM, CL	A-6, A-7-6	0	0	85-97	80-96	64-91	35-57	28-41	11-18
	60-80	Sandy clay loam, clay loam	SC, SC-SM, CL	A-6, A-7-6	0	0	87-97	83-96	66-91	36-57	28-41	11-18
MdB:												
Midessa---------	0-8	Fine sandy loam	SC, SC-SM	A-4	0	0	100	100	88-98	39-49	20-32	6-12
	8-28	Sandy clay loam	CL, SC-SM, SC	A-6	0	0	100	100	79-94	44-59	29-43	13-22
	28-58	Sandy clay loam, clay loam	SC, SC-SM, CL	A-6, A-7-6	0	0	85-97	80-96	64-91	35-57	28-41	11-18
	58-80	Sandy clay loam, clay loam	SC, SC-SM, CL	A-6, A-7-6	0	0	87-97	83-96	66-91	36-57	28-41	11-18

Table 28.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
MdC:												
Midessa---------	0-7	Fine sandy loam	SC, SC-SM	A-4	0	0	100	100	88-98	39-49	20-32	6-12
	7-24	Sandy clay loam	CL, SC-SM, SC	A-6	0	0	100	100	79-94	44-59	29-43	13-22
	24-56	Sandy clay loam, clay loam	SC, SC-SM, CL	A-6, A-7-6	0	0	85-97	80-96	64-91	35-57	28-41	11-18
	56-80	Sandy clay loam, clay loam	SC, SC-SM, CL	A-6, A-7-6	0	0	87-97	83-96	66-91	36-57	28-41	11-18
MPC:												
Midessa---------	0-7	Fine sandy loam	SC, SC-SM	A-4	0	0	100	100	88-98	39-49	20-32	6-12
	7-24	Sandy clay loam	CL, SC-SM, SC	A-6	0	0	100	100	79-94	44-59	29-43	13-22
	24-56	Sandy clay loam, clay loam	SC, SC-SM, CL	A-6, A-7-6	0	0	85-97	80-96	64-91	35-57	28-41	11-18
	56-80	Sandy clay loam, clay loam	SC, SC-SM, CL	A-6, A-7-6	0	0	87-97	83-96	66-91	36-57	28-41	11-18
Posey-----------	0-8	Fine sandy loam	CL, SC-SM	A-4	0	0	99-100	98-100	81-95	40-54	17-31	2-12
	8-15	Sandy clay loam, clay loam	CL, SC, SC-SM	A-6, A-7-6	0	0	94-100	91-100	66-87	36-55	29-44	13-25
	15-35	Sandy clay loam, clay loam	SC, SC-SM, CL	A-6, A-7-6	0	0	82-94	76-91	56-81	33-53	29-44	13-25
	35-80	Sandy clay loam, clay loam	CL, SC, SC-SM	A-6, A-7-6	0	0	88-97	84-97	62-86	37-57	29-44	13-25
MPP:												
Midessa---------	0-7	Fine sandy loam	SC, SC-SM	A-4	0	0	100	100	88-98	39-49	20-32	6-12
	7-22	Sandy clay loam	CL, SC-SM, SC	A-6	0	0	100	100	79-94	44-59	29-43	13-22
	22-55	Sandy clay loam, clay loam	SC, SC-SM, CL	A-6, A-7-6	0	0	85-97	80-96	64-91	35-57	28-41	11-18
	55-80	Sandy clay loam, clay loam	SC, SC-SM, CL	A-6, A-7-6	0	0	87-97	83-96	66-91	36-57	28-41	11-18

Table 28.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
Potter----------	0-2	Gravelly loam, gravelly fine sandy loam	ML, GM, SC-SM	A-6	0	0	68-88	64-87	58-87	40-70	31-54	11-24
	2-6	Very gravelly fine sandy loam, very gravelly loam	GM, SC-SM, SM	A-2-4, A-2-6	0	0	45-62	37-57	28-56	17-38	27-52	9-24
	6-15	Very gravelly fine sandy loam, very gravelly loam	GC, GC-GM, SC-SM, SC	A-2-4, A-2-6	0	0	46-63	39-58	27-53	18-39	25-45	7-25
	15-29	Very gravelly fine sandy loam, very gravelly loam, extremely gravelly fine sandy loam, extremely gravelly loam	GC, GC-GM	A-2-4, A-2-6	0	0	19-64	13-60	9-54	6-39	25-44	7-25
	29-55	Extremely gravelly fine sandy loam, extremely gravelly loam, very gravelly fine sandy loam, very gravelly loam	GP-GC, GC-GM, GC	A-2-4, A-2-6	0	0	19-64	13-60	11-59	6-37	25-44	7-25
	55-80	Extremely gravelly fine sandy loam, extremely gravelly loam, very gravelly fine sandy loam, very gravelly loam	GP-GC, GC-GM	A-2-4, A-2-6	0	0	19-64	13-60	11-60	5-34	25-44	7-25
Posey-----------	0-8	Fine sandy loam	CL, SC-SM	A-4	0	0	99-100	98-100	81-95	40-54	17-31	2-12
	8-15	Sandy clay loam, clay loam	CL, SC, SC-SM	A-6, A-7-6	0	0	94-100	91-100	66-87	36-55	29-44	13-25
	15-35	Sandy clay loam, clay loam	SC, SC-SM, CL	A-6, A-7-6	0	0	82-94	76-91	56-81	33-53	29-44	13-25
	35-80	Sandy clay loam, clay loam	CL, SC, SC-SM	A-6, A-7-6	0	0	88-97	84-97	62-86	37-57	29-44	13-25
MVE:												
Mobeetie--------	0-8	Fine sandy loam	SC, SC-SM	A-4	0	0	98-100	97-100	86-97	38-47	21-30	6-10
	8-25	Fine sandy loam, loam	SC-SM, SC	A-4	0	0	98-100	97-100	86-97	38-47	20-28	5-9
	25-41	Fine sandy loam, loam	SC-SM, SC	A-4, A-2-4	0	0	92-100	90-100	80-97	35-47	20-28	5-9
	41-80	Fine sandy loam, loam	SC-SM, SC	A-4	0	0	98-100	97-100	86-97	38-47	20-28	5-9

Table 28.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
Veal-------------	0-3	Loam	CL, SC	A-6	0	0	86-100	85-100	76-100	46-69	22-39	6-15
	3-13	Gravelly fine sandy loam, gravelly loam, gravelly sandy clay loam	SC, SC-SM	A-4, A-6	0	0	66-81	65-80	59-80	28-49	22-38	6-15
	13-54	Very gravelly loam, very gravelly fine sandy loam, very gravelly sandy clay loam	GC, CL	A-2-4, A-4	0	0	43-82	41-81	36-81	21-57	22-37	6-15
	54-80	Gravelly loam, gravelly fine sandy loam, gravelly sandy clay loam	SC, CL	A-6, A-4	0	0	43-82	41-81	35-81	21-55	22-37	6-15
Potter-----------	0-2	Gravelly loam, gravelly fine sandy loam	ML, GM, SC-SM	A-6	0	0	68-88	64-87	58-87	40-70	31-54	11-24
	2-6	Very gravelly fine sandy loam, very gravelly loam	GM, SC-SM, SM	A-2-4, A-2-6	0	0	45-62	37-57	28-56	17-38	27-52	9-24
	6-15	Very gravelly fine sandy loam, very gravelly loam	GC, GC-GM, SC-SM, SC	A-2-4, A-2-6	0	0	46-63	39-58	27-53	18-39	25-45	7-25
	15-29	Very gravelly fine sandy loam, very gravelly loam, extremely gravelly fine sandy loam, extremely gravelly loam	GC, GC-GM	A-2-4, A-2-6	0	0	19-64	13-60	9-54	6-39	25-44	7-25
	29-55	Extremely gravelly fine sandy loam, extremely gravelly loam, very gravelly fine sandy loam, very gravelly loam	GP-GC, GC-GM, GC	A-2-4, A-2-6	0	0	19-64	13-60	11-59	6-37	25-44	7-25
	55-80	Extremely gravelly fine sandy loam, extremely gravelly loam, very gravelly fine sandy loam, very gravelly loam	GP-GC, GC-GM	A-2-4, A-2-6	0	0	19-64	13-60	11-60	5-34	25-44	7-25

Table 28.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
OBG:												
Obaro-----------	0-8	Loam	CL, SC-SM	A-6	0	0	100	100	93-100	74-83	27-36	12-16
	8-18	Loam, silty clay loam, silt loam, clay loam, very fine sandy loam	CL, SC-SM	A-6, A-4	0	0	100	100	90-100	71-91	25-43	9-20
	18-30	Loam, silty clay loam, silt loam, clay loam, very fine sandy loam	CL, SC-SM	A-6, A-4	0	0	100	100	90-100	71-91	25-43	9-20
	30-60	Bedrock			---	---	---	---	---	---	---	---
Quinlan---------	0-8	Loam	CL, SC-SM	A-4, A-6	0	0	100	100	87-99	61-73	26-39	9-19
	8-13	Loam, fine sandy loam, very fine sandy loam	CL, SC-SM, CL-ML	A-4, A-6	0	0	100	100	83-98	58-73	21-37	6-17
	13-64	Bedrock			---	---	---	---	---	---	---	---
OcA:												
Olton-----------	0-8	Clay loam	CL	A-7-6	0	0	100	100	98-100	70-83	33-49	15-25
	8-15	Clay loam, clay	CL, CH	A-7-6, A-6	0	0	100	100	98-100	71-88	38-56	19-32
	15-31	Clay loam, clay	CL, CH	A-7-6, A-6	0	0	100	100	93-100	72-92	40-60	21-36
	31-48	Clay loam, silty clay loam	CL, CH	A-7-6, A-6	0	0	95-100	93-100	88-100	70-86	40-51	20-29
	48-75	Clay loam, silty clay loam	CL, CH	A-6, A-7-6	0	0	85-97	81-97	75-97	62-84	39-50	15-29
	75-80	Clay loam, silty clay loam	CL, CH	A-6, A-7-6	0	0	90-99	87-98	83-98	59-80	37-50	13-29
PAB:												
Patricia--------	0-12	Loamy fine sand	SC-SM, SM	A-2-4	0	0	100	100	90-99	23-32	0-25	NP-7
	12-27	Sandy clay loam	CL, SC-SM, SC	A-6, A-7-6	0	0	100	100	87-100	46-61	29-43	13-23
	27-40	Sandy clay loam	CL, SC-SM, SC	A-6, A-7-6	0	0	100	100	87-100	46-61	29-43	13-23
	40-78	Sandy clay loam	CL, SC-SM, SC	A-6, A-7-6	0	0	100	100	87-100	46-61	29-42	13-21
	78-80	Sandy clay loam	SC, SC-SM	A-6	0	0	88-99	84-98	73-98	39-60	28-40	12-18
Amarillo--------	0-10	Loamy fine sand	SM, SC-SM	A-2-4	0	0	100	100	96-100	29-36	16-25	2-7
	10-27	Sandy clay loam, clay loam	CL, SC, SC-SM	A-6, A-7-6	0	0	100	100	93-100	49-64	29-44	13-25
	27-38	Sandy clay loam, clay loam	CL, SC-SM	A-6, A-7-6	0	0	100	100	94-100	50-65	29-44	13-25
	38-56	Sandy clay loam, clay loam	SC, SC-SM, CL	A-6, A-7-6	0	0	90-97	87-97	81-97	42-61	29-44	13-25
	56-80	Sandy clay loam, clay loam	CL, SC, SC-SM	A-6, A-7-6	0	0	90-100	87-100	80-100	49-71	29-44	11-25

Table 28.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
PeA:												
Pep	0-10	Loam	CL, SC-SM	A-6	0	0	100	100	88-100	61-73	28-44	11-19
	10-16	Clay loam, sandy clay loam, loam	CL, SC-SM	A-6, A-7-6	0	0	100	100	78-95	58-75	28-45	11-21
	16-32	Clay loam, sandy clay loam, loam	CL, SC-SM	A-6, A-7-6	0	0	100	100	78-95	58-75	27-44	11-21
	32-80	Clay loam, sandy clay loam, loam	CL, SC-SM	A-6, A-7-6, A-4	0	0	88-96	84-95	68-93	51-74	26-41	9-16
PeB:												
Pep	0-9	Loam	CL, SC-SM	A-6	0	0	100	100	88-100	61-73	28-44	11-19
	9-15	Clay loam, sandy clay loam, loam	CL, SC-SM	A-6, A-7-6	0	0	100	100	78-95	58-75	28-45	11-21
	15-30	Clay loam, sandy clay loam, loam	CL, SC-SM	A-6, A-7-6	0	0	100	100	78-95	58-75	27-44	11-21
	30-80	Clay loam, loam, sandy clay loam	CL, SC-SM	A-6, A-7-6, A-4	0	0	88-96	84-95	68-93	51-74	26-41	9-16
PGE:												
Potter	0-2	Gravelly loam, gravelly fine sandy loam	ML, GM, SC-SM	A-6	0	0	68-88	64-87	58-87	40-70	31-54	11-24
	2-6	Very gravelly fine sandy loam, very gravelly loam	GM, SC-SM, SM	A-2-4, A-2-6	0	0	45-62	37-57	28-56	17-38	27-52	9-24
	6-15	Very gravelly fine sandy loam, very gravelly loam	GC, GC-GM, SC-SM, SC	A-2-4, A-2-6	0	0	46-63	39-58	27-53	18-39	25-45	7-25
	15-29	Very gravelly fine sandy loam, very gravelly loam, extremely gravelly fine sandy loam, extremely gravelly loam	GC, GC-GM	A-2-4, A-2-6	0	0	19-64	13-60	9-54	6-39	25-44	7-25
	29-55	Extremely gravelly fine sandy loam, extremely gravelly loam, very gravelly fine sandy loam, very gravelly loam	GP-GC, GC-GM, GC	A-2-4, A-2-6	0	0	19-64	13-60	11-59	6-37	25-44	7-25
	55-80	Extremely gravelly fine sandy loam, extremely gravelly loam, very gravelly fine sandy loam, very gravelly loam	GP-GC, GC-GM	A-2-4, A-2-6	0	0	19-64	13-60	11-60	5-34	25-44	7-25

Table 28.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
PoA:												
Portales--------	0-15	Loam	CL, SC-SM	A-4	0	0	100	100	84-94	60-70	27-41	9-17
	15-35	Clay loam, loam	CL, SC-SM	A-6, A-7-6	0	0	100	100	81-98	62-79	29-49	12-25
	35-43	Loam, clay loam	CL, SC-SM	A-4, A-6, A-7-6	0	0	87-97	83-96	70-96	51-76	27-46	8-25
	43-60	Clay loam, loam	CL, SC-SM	A-6, A-4, A-7-6	0	0	85-96	80-95	65-93	49-74	27-46	10-25
	60-80	Clay loam, loam	CL, SC-SM	A-6, A-7-6	0	0	87-97	83-96	68-95	51-76	27-46	13-25
PoB:												
Portales--------	0-13	Loam	CL, SC-SM	A-4	0	0	100	100	84-94	60-70	27-41	9-17
	13-33	Clay loam, loam	CL, SC-SM	A-6, A-7-6	0	0	100	100	81-98	62-79	29-49	12-25
	33-41	Loam, clay loam	CL, SC-SM	A-4, A-6, A-7-6	0	0	87-97	83-96	70-96	51-76	27-46	8-25
	41-58	Clay loam, loam	CL, SC-SM	A-6, A-4, A-7-6	0	0	85-96	80-95	65-93	49-74	27-46	10-25
	58-80	Clay loam, loam	CL, SC-SM	A-6, A-7-6	0	0	87-97	83-96	68-95	51-76	27-46	13-25
PsA:												
Posey-----------	0-10	Fine sandy loam	CL, SC-SM	A-4	0	0	99-100	98-100	81-95	40-54	17-31	2-12
	10-18	Sandy clay loam, clay loam	CL, SC, SC-SM	A-6, A-7-6	0	0	94-100	91-100	66-87	36-55	29-44	13-25
	18-39	Sandy clay loam, clay loam	SC, SC-SM, CL	A-6, A-7-6	0	0	82-94	76-91	56-81	33-53	29-44	13-25
	39-80	Sandy clay loam, clay loam	CL, SC, SC-SM	A-6, A-7-6	0	0	88-97	84-97	62-86	37-57	29-44	13-25
PsB:												
Posey-----------	0-9	Fine sandy loam	CL, SC-SM	A-4	0	0	99-100	98-100	81-95	40-54	17-31	2-12
	9-15	Sandy clay loam, clay loam	CL, SC, SC-SM	A-6, A-7-6	0	0	94-100	91-100	66-87	36-55	29-44	13-25
	15-37	Sandy clay loam, clay loam	SC, SC-SM, CL	A-6, A-7-6	0	0	82-94	76-91	56-81	33-53	29-44	13-25
	37-80	Sandy clay loam, clay loam	CL, SC, SC-SM	A-6, A-7-6	0	0	88-97	84-97	62-86	37-57	29-44	13-25
RcA:												
Ranco-----------	0-2	Clay	CH	A-7-6, A-8	0	0	100	100	85-100	71-91	53-77	29-43
	2-9	Clay	CH	A-7-6, A-8	0	0	100	100	91-100	73-83	51-66	29-35
	9-25	Clay	CH	A-7-6, A-8	0	0	100	100	91-100	70-80	51-64	29-34
	25-35	Clay	CH	A-7-6, A-8	0	0	100	100	93-100	70-80	51-63	29-34
	35-61	Clay	CH	A-7-6, A-8	0	0	100	100	92-100	70-80	51-63	29-34
	61-80	Clay	CH	A-7-6, A-8	0	0	100	100	88-100	69-84	51-67	29-36

Table 28.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
SgA:												
Seagraves-------	0-25	Fine sandy loam, loamy fine sand	SC, SC-SM	A-2-4, A-4	0	0	100	100	80-97	20-37	16-34	1-14
	25-39	Loamy fine sand, fine sandy loam	SC-SM, SM	A-2-4, A-4	0	0	100	100	89-100	25-42	0-32	NP-13
	39-47	Sandy clay loam, clay, clay loam	SC, CL, CH	A-6, A-7-6	0	0	100	100	79-100	41-66	31-54	13-32
	47-57	Sandy clay loam, clay, clay loam	SC, CL, CH	A-6, A-7-6	0	0	100	100	78-100	40-65	31-55	13-32
	57-67	Sandy clay loam, clay, clay loam	CL, SC, CH	A-7-6, A-6	0	0	93-100	91-100	71-98	42-66	35-53	17-30
	67-80	Clay, sandy clay loam, clay loam	CH, CL	A-7-6, A-6	0	0	93-100	91-100	68-100	45-75	35-57	17-32
ShB:												
Sharvana--------	0-6	Fine sandy loam	SC, SC-SM	A-6	0	0	91-100	90-100	76-99	24-41	18-33	3-13
	6-16	Sandy clay loam	SC, SC-SM	A-6	0	0	91-100	90-100	78-100	34-54	28-45	12-24
	16-36	Cemented material			---	---	---	---	---	---	---	---
	36-80	Extremely gravelly sandy loam, extremely gravelly loam, sandy loam, loam	GP-GM, SC-SM, GC-GM	A-1-a	0	0	10-90	10-90	7-83	3-44	19-31	2-8
SL:												
Water, intermittent, salt lake------	0-80	Variable			---	---	---	---	---	---	---	---
SpA:												
Sparenberg------	0-4	Clay	CH	A-7-6, A-8	0	0	100	100	89-100	78-93	52-74	29-41
	4-10	Clay	CH	A-7-6, A-8	0	0	100	100	90-100	76-91	52-72	29-41
	10-17	Clay	CH	A-7-6, A-8	0	0	100	100	89-100	75-90	52-71	29-41
	17-47	Clay	CH	A-7-6, A-8	0	0	100	100	91-100	78-93	52-71	29-41
	47-61	Clay	CH	A-7-6, A-8	0	0	100	100	90-100	77-92	51-70	29-41
	61-80	Clay	CH	A-7-6, A-8	0	0	100	100	90-100	79-94	51-68	29-40

Table 28.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
TkA:												
Tokio-----------	0-12	Fine sandy loam	SC-SM, SC	A-4	0	0	100	100	81-100	33-55	16-30	2-11
	12-24	Fine sandy loam, sandy clay loam	SC, SC-SM, CL	A-4, A-6	0	0	100	100	82-100	33-61	17-46	2-24
	24-34	Sandy clay loam, clay loam	SC, SC-SM, CL	A-6, A-7-6	0	0	100	100	89-100	40-63	30-45	13-24
	34-57	Clay loam, clay, sandy clay loam	CL, SC, SC-SM	A-6, A-7-6	0	0	91-98	82-96	73-96	44-77	30-52	13-28
	57-71	Fine sandy loam, loamy fine sand, sandy clay loam, clay loam	SC, SC-SM, CL-ML, CL	A-2-4, A-2-6, A-4, A-6	0	0	97-100	94-100	76-100	26-57	20-43	5-20
	71-80	Clay loam, fine sandy loam, sandy clay loam, loamy fine sand	CL, SC, SC-SM, CL-ML	A-6, A-4	0	0	94-99	87-98	76-98	44-77	21-40	5-17
TkB:												
Tokio-----------	0-11	Loamy fine sand	SC-SM, SM	A-2-4	0	0	100	100	86-100	19-34	17-25	2-7
	11-26	Fine sandy loam, sandy clay loam	SC, SC-SM, CL	A-2-4, A-4, A-6	0	0	100	100	86-100	26-52	16-45	2-24
	26-35	Sandy clay loam, clay loam	SC, SC-SM, CL	A-6, A-7-6	0	0	100	100	89-100	40-63	30-45	13-24
	35-57	Clay loam, sandy clay loam, clay	CL, SC, SC-SM	A-6, A-7-6	0	0	91-98	82-96	73-96	44-77	30-52	13-28
	57-71	Fine sandy loam, clay loam, sandy clay loam, loamy fine sand	SC, SC-SM, CL-ML, CL	A-2-4, A-2-6, A-4, A-6	0	0	97-100	94-100	77-100	27-57	20-43	5-20
	71-80	Sandy clay loam, clay loam, fine sandy loam, loamy fine sand	CL, SC, SC-SM, CL-ML	A-6, A-4	0	0	94-99	87-98	76-98	45-77	21-40	5-17
W:												
Water-----------												

Table 28.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
YRG:												
Yellowhouse-----	0-5	Gravelly clay loam, very gravelly clay loam	CL, GC, GM	A-7-6, A-6	0	0	55-95	40-90	30-85	20-75	39-54	19-26
	5-10	Clay loam, gravelly clay loam, clay, gravelly clay	CL, CH, GC, GM	A-7-6, A-6	0	0	75-99	60-90	50-85	40-75	38-59	19-31
	10-17	Clay, gravelly clay, clay loam, gravelly clay loam	CH, CL, GC, GC-GM	A-7-6, A-7	0	0	84-99	60-90	50-85	40-75	42-63	21-35
	17-22	Gravelly clay, gravelly clay loam, clay, clay loam	CH, CL, GC, GC-GM	A-7-6, A-6	0	0	79-99	60-90	50-85	40-75	40-63	21-36
	22-27	Gravelly clay, very gravelly clay, gravelly clay loam	CH, CL, GC, GC-GM	A-7-6, A-8	0	0	71-99	50-90	40-85	40-75	49-72	29-45
	27-80	Bedrock			---	---	---	---	---	---	---	---
Rock outcrop----	0-80	Bedrock			---	---	---	---	---	---	---	---
ZfA:												
Zita------------	0-7	Fine sandy loam	SC, SC-SM	A-4	0	0	100	100	92-100	42-50	24-35	7-13
	7-18	Loam, clay loam, fine sandy loam	CL, SC-SM, CL-ML	A-4, A-6	0	0	100	100	75-100	53-78	21-49	6-25
	18-24	Clay loam, loam, silty clay loam	CL, SC-SM	A-6, A-7-6	0	0	100	100	81-100	62-82	28-48	12-25
	24-35	Clay loam, loam, silty clay loam	CL, SC-SM	A-6, A-4	0	0	89-96	79-91	64-91	49-75	27-45	10-20
	35-80	Clay loam, loam, silty clay loam	CL, SC-SM	A-6, A-4	0	0	88-95	76-90	62-90	47-74	27-45	10-20
ZfB:												
Zita------------	0-6	Fine sandy loam	SC, SC-SM	A-4	0	0	100	100	92-100	42-50	24-35	7-13
	6-17	Loam, clay loam, fine sandy loam	CL, SC-SM, CL-ML	A-4, A-6	0	0	100	100	75-100	53-78	21-49	6-25
	17-23	Clay loam, loam, silty clay loam	CL, SC-SM	A-6, A-7-6	0	0	100	100	81-100	62-82	28-48	12-25
	23-34	Clay loam, silty clay loam, loam	CL, SC-SM	A-6, A-4	0	0	89-96	79-91	64-91	49-75	27-45	10-20
	34-80	Clay loam, silty clay loam, loam	CL, SC-SM	A-6, A-4	0	0	88-95	76-90	62-90	47-74	27-45	10-20

Table 28.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
ZmA:												
Zita------------	0-7	Loam	CL, SC-SM	A-6	0	0	100	100	88-100	63-78	31-47	13-24
	7-18	Loam	CL, SC-SM, CL-ML	A-4, A-6	0	0	100	100	75-100	53-78	21-47	6-24
	18-23	Clay loam, silty clay loam, loam	CL, SC-SM	A-6, A-7-6	0	0	100	100	81-100	62-82	28-48	12-25
	23-34	Clay loam, silty clay loam, loam	CL, SC-SM	A-6, A-4	0	0	89-96	79-91	64-91	49-75	27-45	10-20
	34-80	Clay loam, silty clay loam, loam	CL, SC-SM	A-6, A-4	0	0	88-95	76-90	62-90	47-74	27-45	10-20

Table 29.--Physical Soil Properties

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Wind erodibility index" apply only to the surface layer. Absence of an entry indicates that data were not estimated.)

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permeability (K-sat)	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct					
AcA:														
Acuff----------------	0-12	30-65	10-45	13-27	1.30-1.55	0.6-2	0.12-0.20	0.0-2.9	1.5-3.0	.28	.28	5	6	48
	12-20	25-65	10-45	20-35	1.40-1.60	0.6-2	0.12-0.18	0.0-2.9	0.5-1.0	.32	.32			
	20-28	25-65	10-45	20-35	1.40-1.60	0.6-2	0.12-0.18	0.0-2.9	0.5-1.0	.32	.32			
	28-38	25-65	10-45	20-35	1.40-1.60	0.6-2	0.12-0.18	0.0-2.9	0.1-0.5	.32	.32			
	38-58	25-65	10-45	20-35	1.35-1.60	0.6-2	0.10-0.17	0.0-2.9	0.1-0.5	.32	.32			
	58-80	25-65	10-45	20-35	1.35-1.60	0.6-2	0.10-0.18	0.0-2.9	0.1-0.5	.32	.32			
AcB:														
Acuff----------------	0-10	30-65	10-45	13-27	1.30-1.55	0.6-2	0.12-0.20	0.0-2.9	1.5-3.0	.28	.28	5	6	48
	10-18	25-65	10-45	20-35	1.40-1.60	0.6-2	0.12-0.18	0.0-2.9	0.5-1.0	.32	.32			
	18-26	25-65	10-45	20-35	1.40-1.60	0.6-2	0.12-0.18	0.0-2.9	0.5-1.0	.32	.32			
	26-36	25-65	10-45	20-35	1.40-1.60	0.6-2	0.12-0.18	0.0-2.9	0.1-0.5	.32	.32			
	36-56	25-65	10-45	20-35	1.35-1.60	0.6-2	0.10-0.17	0.0-2.9	0.1-0.5	.32	.32			
	56-80	25-65	10-45	20-35	1.35-1.60	0.6-2	0.10-0.18	0.0-2.9	0.1-0.5	.32	.32			
AfA:														
Amarillo-------------	0-11	55-85	5-30	10-18	1.30-1.60	2-6	0.11-0.16	0.0-2.9	0.5-1.0	.24	.24	5	3	86
	11-27	25-70	10-40	20-35	1.40-1.65	0.6-2	0.12-0.17	0.0-2.9	0.1-0.5	.32	.32			
	27-39	25-70	10-40	20-35	1.40-1.65	0.6-2	0.12-0.17	0.0-2.9	0.1-0.5	.32	.32			
	39-56	25-70	10-40	20-35	1.40-1.65	0.6-2	0.10-0.16	0.0-2.9	0.1-0.5	.32	.32			
	56-80	25-70	10-40	20-35	1.40-1.65	0.6-2	0.10-0.16	0.0-2.9	0.1-0.5	.32	.32			
AfB:														
Amarillo-------------	0-10	55-85	5-30	10-18	1.30-1.60	2-6	0.11-0.16	0.0-2.9	0.5-1.0	.24	.24	5	3	86
	10-26	25-70	10-40	20-35	1.40-1.65	0.6-2	0.12-0.17	0.0-2.9	0.1-0.5	.32	.32			
	26-39	25-70	10-40	20-35	1.40-1.65	0.6-2	0.12-0.17	0.0-2.9	0.1-0.5	.32	.32			
	39-55	25-70	10-40	20-35	1.40-1.65	0.6-2	0.10-0.16	0.0-2.9	0.1-0.5	.32	.32			
	55-80	25-70	10-40	20-35	1.40-1.65	0.6-2	0.10-0.16	0.0-2.9	0.1-0.5	.32	.32			
ArA:														
Arch-----------------	0-5	35-85	15-45	15-25	1.30-1.55	0.6-2	0.10-0.16	0.0-5.9	0.1-1.0	.37	.49	3	4L	86
	5-16	25-75	5-45	10-35	1.40-1.70	0.6-2	0.10-0.16	0.0-5.9	0.1-1.0	.32	.32			
	16-37	25-75	5-45	10-35	1.40-1.70	0.6-2	0.09-0.15	0.0-5.9	0.1-1.0	.32	.32			
	37-80	25-75	5-45	10-35	1.40-1.70	0.6-2	0.09-0.15	0.0-5.9	0.1-1.0	.32	.32			
AsA:														
Arch-----------------	0-6	35-85	2-45	15-20	1.30-1.60	2-6	0.10-0.16	0.0-2.9	0.1-1.0	.28	.28	3	3	86
	6-16	25-75	5-45	10-35	1.40-1.70	0.6-2	0.10-0.16	0.0-5.9	0.1-1.0	.32	.32			
	16-37	25-75	5-45	10-35	1.40-1.70	0.6-2	0.09-0.15	0.0-5.9	0.1-1.0	.32	.32			
	37-80	25-75	5-45	10-35	1.40-1.70	0.6-2	0.09-0.15	0.0-5.9	0.1-1.0	.32	.32			

Table 29.--Physical Soil Properties--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permea-bility (K-sat)	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct					
AvA:														
Arvana---------------	0-8	55-85	5-30	10-15	1.30-1.60	2-6	0.11-0.16	0.0-2.9	0.5-1.0	.24	.24	2	3	86
	8-16	35-75	5-40	15-35	1.45-1.65	0.6-2	0.12-0.18	0.0-2.9	0.5-1.0	.32	.32			
	16-28	35-70	5-40	15-35	1.45-1.65	0.6-2	0.12-0.18	0.0-2.9	0.1-0.5	.32	.32			
	28-38	---	---	---	---	0.00-0.1	0.00-0.00	---	---	---	---			
	38-60	25-70	10-45	18-35	1.50-1.70	0.6-2	0.08-0.17	0.0-2.9	0.1-0.5	.32	.32			
	60-80	25-70	10-45	20-35	1.50-1.70	0.6-2	0.08-0.17	0.0-2.9	0.1-0.5	.32	.32			
AvB:														
Arvana---------------	0-6	55-85	5-30	10-15	1.30-1.60	2-6	0.11-0.16	0.0-2.9	0.5-1.0	.24	.24	2	3	86
	6-14	35-75	5-40	15-35	1.45-1.65	0.6-2	0.12-0.18	0.0-2.9	0.5-1.0	.32	.32			
	14-26	35-70	5-40	15-35	1.45-1.65	0.6-2	0.12-0.18	0.0-2.9	0.1-0.5	.32	.32			
	26-36	---	---	---	---	0.00-0.1	0.00-0.00	---	---	---	---			
	36-58	25-70	10-45	18-35	1.50-1.70	0.6-2	0.08-0.17	0.0-2.9	0.1-0.5	.32	.32			
	58-80	25-70	10-45	20-35	1.50-1.70	0.6-2	0.08-0.17	0.0-2.9	0.1-0.5	.32	.32			
BcA:														
Bippus---------------	0-8	25-70	10-45	15-35	1.40-1.60	0.6-2	0.14-0.20	0.5-2.0	1.0-3.0	.28	.28	5	6	48
	8-14	25-70	10-45	15-35	1.40-1.60	0.6-2	0.12-0.20	0.5-2.0	0.5-2.0	.32	.32			
	14-26	25-70	10-45	20-35	1.40-1.65	0.6-2	0.12-0.20	1.0-3.0	0.5-1.0	.32	.32			
	26-49	25-70	10-45	20-35	1.40-1.65	0.6-2	0.12-0.20	1.5-4.0	0.5-1.0	.32	.32			
	49-65	25-70	10-45	20-35	1.40-1.65	0.6-2	0.12-0.20	1.5-4.0	0.5-1.0	.32	.32			
	65-80	25-80	10-45	10-35	1.40-1.65	0.6-2	0.10-0.18	1.0-2.0	0.1-0.5	.24	.24			
BeD:														
Berda----------------	0-6	25-55	20-45	15-27	1.35-1.50	0.6-2	0.10-0.17	0.0-2.9	0.1-1.0	.28	.28	5	4L	86
	6-20	25-70	10-45	18-35	1.40-1.55	0.6-2	0.10-0.17	0.0-2.9	0.1-0.5	.37	.37			
	20-36	25-70	10-45	18-35	1.40-1.55	0.6-2	0.08-0.17	0.0-2.9	0.1-0.5	.32	.32			
	36-52	25-70	10-45	18-35	1.40-1.55	0.6-2	0.08-0.17	0.0-2.9	0.1-0.5	.32	.32			
	52-80	25-70	10-45	18-35	1.40-1.55	0.6-2	0.08-0.17	0.0-2.9	0.1-0.5	.32	.32			
BHC:														
Brownfield-----------	0-9	85-98	0-10	1-10	1.40-1.70	6-20	0.04-0.09	0.0-1.0	0.1-0.5	.15	.15	5	1	250
	9-19	75-98	0-10	1-10	1.40-1.70	6-20	0.04-0.11	0.0-1.0	0.1-0.5	.15	.15			
	19-39	75-98	0-10	3-10	1.50-1.70	6-20	0.04-0.11	0.0-1.0	0.2-0.9	.15	.15			
	39-62	50-70	3-25	20-35	1.55-1.70	0.6-2	0.11-0.17	0.0-2.9	0.1-0.5	.32	.32			
	62-80	50-75	5-25	20-35	1.60-1.80	0.6-2	0.11-0.17	0.0-2.9	0.1-0.5	.32	.32			
BP:														
Borrow pits----------	0-20	30-75	10-40	15-35	1.40-1.65	0.06-2	0.03-0.09	0.0-2.9	0.1-0.4	.10	.32	1	8	0
	20-80	30-75	10-40	15-35	1.40-1.65	0.06-2	0.03-0.09	0.0-2.9	0.1-0.4	.10	.32			

Table 29.--Physical Soil Properties--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permea-bility (K-sat)	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct					
BrB:														
Brownfield	0-6	85-98	0-10	3-10	1.50-1.65	6-20	0.04-0.09	0.0-1.0	0.1-1.0	.15	.15	5	1	250
	6-12	75-98	0-10	1-10	1.50-1.65	6-20	0.04-0.11	0.0-1.0	0.1-0.5	.15	.15			
	12-23	75-98	0-10	3-10	1.50-1.65	6-20	0.04-0.11	0.0-1.0	0.1-0.5	.15	.15			
	23-28	75-95	1-10	3-25	1.55-1.70	0.6-2	0.04-0.11	0.0-2.9	0.1-0.5	.15	.15			
	28-55	50-70	3-25	20-35	1.55-1.70	0.6-2	0.11-0.17	0.0-2.9	0.1-0.5	.32	.32			
	55-80	50-75	5-25	20-35	1.55-1.70	0.6-2	0.11-0.17	0.0-2.9	0.1-0.5	.32	.32			
CdA:														
Cedarlake	0-10	40-65	10-30	20-35	1.25-1.60	0.6-2	0.04-0.12	3.0-4.0	0.5-1.5	.32	.32	5	4L	86
	10-22	20-65	10-50	20-38	1.20-1.60	0.6-2	0.04-0.12	3.0-5.0	0.2-1.5	.32	.32			
	22-45	5-45	25-50	40-60	1.20-1.60	0.2-0.6	0.04-0.12	6.0-10.0	0.1-1.0	.32	.32			
	45-56	5-20	30-60	40-60	1.20-1.60	0.00-0.2	0.06-0.14	6.0-12.0	0.1-1.0	.32	.32			
	56-68	2-45	30-50	40-60	1.20-1.60	0.00-0.2	0.06-0.15	6.0-12.0	0.1-0.5	.32	.32			
	68-80	2-25	30-60	35-60	1.20-1.60	0.00-0.2	0.06-0.15	6.0-11.0	0.1-0.5	.32	.32			
CeC:														
Creta	0-8	28-52	30-48	13-27	1.30-1.55	0.6-2	0.10-0.20	0.5-2.9	1.0-2.0	.32	.37	3	4L	86
	8-16	35-70	5-28	15-35	1.20-1.70	0.6-2	0.08-0.18	0.5-2.9	0.5-1.0	.24	.32			
	16-27	35-65	5-28	15-35	1.20-1.70	0.6-2	0.10-0.18	2.0-5.9	0.5-1.0	.24	.32			
	27-44	35-65	5-28	25-40	1.20-1.70	0.6-2	0.08-0.17	3.0-9.0	0.1-0.5	.28	.32			
	44-70	10-30	5-40	40-60	1.00-1.50	0.06-0.2	0.08-0.17	6.0-13.0	0.1-0.5	.32	.32			
	70-80	---	---	---	---	0.00-0.06	0.00-0.00	---	---	---	---			
ChA:														
Chapel	0-5	15-30	15-40	40-60	1.20-1.40	0.00-0.06	0.11-0.18	6.0-10.0	1.0-2.0	.32	.32	5	7	38
	5-14	15-30	15-40	40-60	1.10-1.30	0.00-0.06	0.11-0.18	6.0-12.0	0.5-1.0	.32	.32			
	14-24	15-30	15-40	40-60	1.10-1.30	0.00-0.06	0.11-0.18	6.0-12.0	0.1-0.5	.32	.32			
	24-35	15-30	15-40	40-60	1.00-1.30	0.00-0.06	0.11-0.18	6.0-12.0	0.1-0.5	.32	.32			
	35-59	20-45	20-50	15-50	1.10-1.40	0.00-0.6	0.11-0.18	1.0-11.0	0.1-0.5	.37	.37			
	59-80	20-50	20-50	15-50	1.40-1.80	0.00-0.6	0.11-0.18	1.0-8.0	0.1-0.5	.37	.37			
DRC:														
Drake	0-5	25-85	10-40	10-27	1.30-1.55	0.6-2	0.07-0.16	0.0-2.9	0.5-1.5	.28	.28	4	4L	86
	5-15	25-85	10-40	10-35	1.60-1.65	0.6-2	0.10-0.16	0.0-3.0	0.5-1.0	.32	.32			
	15-28	30-65	10-48	15-40	1.60-1.65	0.6-2	0.10-0.16	1.0-3.0	0.1-0.5	.32	.32			
	28-43	30-65	10-48	15-40	1.60-1.65	0.6-2	0.10-0.16	1.0-3.0	0.1-0.5	.32	.32			
	43-69	30-65	10-48	15-40	1.60-1.65	0.6-2	0.10-0.16	1.0-3.0	0.1-0.5	.32	.32			
	69-80	30-65	10-48	15-40	1.60-1.65	0.6-2	0.10-0.16	1.0-3.0	0.1-0.5	.32	.32			
DRE:														
Drake	0-3	25-85	10-40	10-27	1.30-1.55	0.6-2	0.07-0.16	0.0-2.9	0.5-1.5	.28	.28	4	4L	86
	3-11	25-85	10-40	10-35	1.60-1.65	0.6-2	0.10-0.16	0.0-3.0	0.5-1.0	.32	.32			
	11-25	30-65	10-48	15-40	1.60-1.65	0.6-2	0.10-0.16	1.0-3.0	0.1-0.5	.32	.32			
	25-38	30-65	10-48	15-40	1.60-1.65	0.6-2	0.10-0.16	1.0-3.0	0.1-0.5	.32	.32			
	38-65	30-65	10-48	15-40	1.60-1.65	0.6-2	0.10-0.16	1.0-3.0	0.1-0.5	.32	.32			
	65-80	30-65	10-48	15-40	1.60-1.65	0.6-2	0.10-0.16	1.0-3.0	0.1-0.5	.32	.32			

Table 29.--Physical Soil Properties--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permea- bility (K-sat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi- bility group	Wind erodi- bility index
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct					
EPA:														
Estacado------------	0-6	30-50	10-45	13-27	1.35-1.50	0.6-2	0.12-0.18	0.0-5.9	1.5-3.0	.28	.28	5	5	56
	6-19	25-65	10-45	20-40	1.35-1.55	0.6-2	0.11-0.18	0.0-5.9	0.5-1.0	.32	.32			
	19-38	25-65	10-45	20-40	1.35-1.55	0.6-2	0.11-0.18	0.0-5.9	0.1-0.5	.32	.32			
	38-50	25-65	10-45	20-40	1.40-1.60	0.6-2	0.10-0.17	0.0-5.9	0.1-0.5	.32	.32			
	50-80	25-65	10-45	20-40	1.40-1.60	0.6-2	0.10-0.17	0.0-5.9	0.1-0.5	.32	.32			
Pep-----------------	0-10	25-45	25-45	18-30	1.30-1.55	0.6-2	0.12-0.18	0.0-5.9	1.0-2.5	.37	.37	4	4L	86
	10-16	20-65	25-60	18-35	1.40-1.70	0.6-2	0.11-0.18	0.0-5.9	0.5-1.0	.32	.32			
	16-32	20-65	25-60	18-35	1.40-1.70	0.6-2	0.10-0.17	0.0-5.9	0.1-0.5	.32	.32			
	32-80	20-65	25-60	18-35	1.40-1.70	0.6-2	0.10-0.15	0.0-5.9	0.1-0.5	.32	.32			
EsA:														
Estacado------------	0-6	30-50	10-45	13-27	1.35-1.50	0.6-2	0.12-0.18	0.0-5.9	1.5-3.0	.28	.28	5	5	56
	6-19	25-65	10-45	20-40	1.35-1.55	0.6-2	0.11-0.18	0.0-5.9	0.5-1.0	.32	.32			
	19-38	25-65	10-45	20-40	1.35-1.55	0.6-2	0.11-0.18	0.0-5.9	0.1-0.5	.32	.32			
	38-50	25-65	10-45	20-40	1.40-1.60	0.6-2	0.10-0.17	0.0-5.9	0.1-0.5	.32	.32			
	50-80	25-65	10-45	20-40	1.40-1.60	0.6-2	0.10-0.17	0.0-5.9	0.1-0.5	.32	.32			
EsB:														
Estacado------------	0-4	30-50	10-45	13-27	1.35-1.50	0.6-2	0.12-0.18	0.0-5.9	1.5-3.0	.28	.28	5	5	56
	4-17	25-65	10-45	20-40	1.35-1.55	0.6-2	0.11-0.18	0.0-5.9	0.5-1.0	.32	.32			
	17-36	25-65	10-45	20-40	1.35-1.55	0.6-2	0.11-0.18	0.0-5.9	0.1-0.5	.32	.32			
	36-48	25-65	10-45	20-40	1.40-1.60	0.6-2	0.10-0.17	0.0-5.9	0.1-0.5	.32	.32			
	48-80	25-65	10-45	20-40	1.40-1.60	0.6-2	0.10-0.17	0.0-5.9	0.1-0.5	.32	.32			
KmB:														
Kimberson-----------	0-5	35-70	20-45	15-20	1.35-1.45	0.6-2	0.08-0.18	0.0-2.9	1.0-3.0	.20	.37	1	5	56
	5-11	35-75	20-45	10-27	1.35-1.45	0.6-2	0.07-0.18	0.0-2.9	1.0-3.0	.10	.37			
	11-28	---	---	---	---	0.00-0.01	---	---	---	---	---			
	28-64	35-75	15-45	10-25	1.35-1.45	0.2-2	0.05-0.11	0.0-2.9	0.1-0.8	.02	.32			
	64-80	---	---	---	---	0.00-0.01	---	---	---	---	---			
LhA:														
Lenorah-------------	0-7	55-85	10-35	10-20	1.35-1.60	2-6	0.10-0.15	0.0-2.9	0.5-2.0	.24	.24	3	3	86
	7-22	35-85	10-50	15-32	1.20-1.65	0.6-2	0.04-0.14	0.0-4.0	0.5-1.0	.28	.28			
	22-30	35-75	10-50	18-32	1.20-1.65	0.6-2	0.04-0.14	0.0-4.0	0.5-1.0	.28	.28			
	30-47	35-85	10-50	10-32	1.25-1.65	0.6-6	0.04-0.15	0.0-3.5	0.1-0.5	.28	.28			
	47-65	75-90	3-20	5-20	1.45-1.70	2-20	0.04-0.14	0.0-3.5	0.1-0.5	.17	.17			
	65-80	80-96	1-20	1-12	1.45-1.70	6-20	0.02-0.10	0.0-3.0	0.1-0.5	.15	.15			

Table 29.--Physical Soil Properties--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permeability (K-sat)	Available water capacity	Linear extensibility	Organic matter	Erosion factors Kw	Kf	T	Wind erodibility group	Wind erodibility index
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct					
Hindman-------------	0-23	85-98	1-10	2-15	1.35-1.60	2-20	0.04-0.11	0.5-2.9	0.1-1.0	.15	.15	4	1	250
	23-38	80-95	3-15	5-30	1.35-1.55	2-6	0.07-0.15	1.0-2.9	0.1-1.0	.24	.24			
	38-46	45-70	10-40	10-30	1.30-1.45	2-6	0.08-0.15	0.5-2.9	0.1-1.0	.24	.24			
	46-60	45-70	10-40	10-30	1.30-1.45	2-6	0.08-0.17	1.0-2.9	0.1-0.5	.32	.32			
	60-77	85-98	2-10	4-15	1.35-1.50	2-20	0.04-0.10	0.1-1.0	0.1-0.5	.28	.28			
	77-80	85-98	2-10	2-12	1.40-1.60	6-101	0.02-0.09	0.1-1.0	0.1-0.5	.28	.28			
LMA:														
Lamesa--------------	0-4	50-75	5-20	10-40	1.00-1.50	0.2-6	0.10-0.18	3.0-7.0	1.0-3.0	.32	.32	5	5	56
	4-11	50-75	5-20	10-40	1.25-1.45	0.2-6	0.10-0.18	2.0-7.0	0.5-1.0	.32	.32			
	11-31	50-75	5-25	15-32	1.35-1.50	0.6-6	0.10-0.17	2.0-4.0	0.5-1.0	.32	.32			
	31-48	55-80	5-20	8-20	1.35-1.50	0.06-0.2	0.10-0.18	2.0-4.0	0.1-0.5	.24	.24			
	48-58	50-75	5-25	15-35	1.35-1.60	0.06-0.2	0.10-0.17	2.0-4.0	0.1-0.5	.24	.24			
	58-80	25-70	5-20	20-50	1.35-1.60	0.06-0.2	0.10-0.18	3.0-9.0	0.1-0.5	.32	.32			
LoA:														
Lofton--------------	0-9	15-40	20-50	30-40	1.20-1.40	0.2-0.6	0.14-0.20	3.0-5.9	1.0-3.0	.32	.32	5	6	48
	9-24	15-35	20-50	40-50	1.25-1.45	0.00-0.06	0.12-0.18	6.0-8.9	0.5-1.0	.32	.32			
	24-38	15-35	20-50	40-50	1.25-1.45	0.00-0.06	0.12-0.18	6.0-8.9	0.5-1.0	.32	.32			
	38-52	15-35	20-50	30-50	1.30-1.50	0.06-0.2	0.12-0.18	3.0-5.9	0.1-0.5	.32	.32			
	52-80	5-25	30-55	30-50	1.30-1.50	0.06-0.2	0.10-0.16	3.0-5.9	0.1-0.5	.32	.32			
M-W:														
Miscellaneous water-	---	---	---	---	---	---	---	---	---	---	---	-	---	---
MdA:														
Midessa-------------	0-10	60-75	15-20	10-20	1.35-1.55	2-6	0.10-0.15	0.0-2.9	0.1-1.0	.24	.24	4	3	86
	10-30	50-65	10-28	20-35	1.30-1.50	0.6-2	0.11-0.17	0.0-2.9	0.1-0.5	.28	.28			
	30-60	35-65	10-35	20-35	1.35-1.55	0.6-2	0.10-0.16	0.0-2.9	0.1-0.5	.28	.28			
	60-80	35-65	10-35	20-35	1.35-1.55	0.6-2	0.09-0.16	0.0-2.9	0.1-0.5	.28	.28			
MdB:														
Midessa-------------	0-8	60-75	15-20	10-20	1.35-1.55	2-6	0.10-0.15	0.0-2.9	0.1-1.0	.24	.24	4	3	86
	8-28	50-65	10-28	20-35	1.30-1.50	0.6-2	0.11-0.17	0.0-2.9	0.1-0.5	.28	.28			
	28-58	35-65	10-35	20-35	1.35-1.55	0.6-2	0.10-0.16	0.0-2.9	0.1-0.5	.28	.28			
	58-80	35-65	10-35	20-35	1.35-1.55	0.6-2	0.09-0.16	0.0-2.9	0.1-0.5	.28	.28			
MdC:														
Midessa-------------	0-7	60-75	15-20	10-20	1.35-1.55	2-6	0.10-0.15	0.0-2.9	0.1-1.0	.24	.24	4	3	86
	7-24	50-65	10-28	20-35	1.30-1.50	0.6-2	0.11-0.17	0.0-2.9	0.1-0.5	.28	.28			
	24-56	35-65	10-35	20-35	1.35-1.55	0.6-2	0.10-0.16	0.0-2.9	0.1-0.5	.28	.28			
	56-80	35-65	10-35	20-35	1.35-1.55	0.6-2	0.09-0.16	0.0-2.9	0.1-0.5	.28	.28			

Table 29.--Physical Soil Properties--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permea- bility (K-sat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Erosion factors Kf	Erosion factors T	Wind erodi- bility group	Wind erodi- bility index
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct					
MPC:														
Midessa--------------	0-7	60-75	15-20	10-20	1.35-1.55	2-6	0.10-0.15	0.0-2.9	0.1-1.0	.24	.24	4	3	86
	7-24	50-65	10-28	20-35	1.30-1.50	0.6-2	0.11-0.17	0.0-2.9	0.1-0.5	.28	.28			
	24-56	35-65	10-35	20-35	1.35-1.55	0.6-2	0.10-0.16	0.0-2.9	0.1-0.5	.28	.28			
	56-80	35-65	10-35	20-35	1.35-1.55	0.6-2	0.09-0.16	0.0-2.9	0.1-0.5	.28	.28			
Posey----------------	0-8	50-75	15-30	5-18	1.40-1.55	2-6	0.10-0.15	0.0-2.9	0.5-1.0	.24	.24	3	3	86
	8-15	30-65	10-25	20-35	1.40-1.55	0.6-2	0.11-0.17	0.0-2.9	0.1-0.5	.32	.32			
	15-35	30-65	10-25	20-35	1.40-1.55	0.6-2	0.09-0.16	0.0-2.9	0.1-0.5	.32	.32			
	35-80	30-65	10-25	20-35	1.45-1.60	0.6-2	0.09-0.16	0.0-2.9	0.1-0.5	.32	.32			
MPP:														
Midessa--------------	0-7	60-75	15-20	10-20	1.35-1.55	2-6	0.10-0.15	0.0-2.9	0.1-1.0	.24	.24	4	3	86
	7-22	50-65	10-28	20-35	1.30-1.50	0.6-2	0.11-0.17	0.0-2.9	0.1-0.5	.28	.28			
	22-55	35-65	10-35	20-35	1.35-1.55	0.6-2	0.10-0.16	0.0-2.9	0.1-0.5	.28	.28			
	55-80	35-65	10-35	20-35	1.35-1.55	0.6-2	0.09-0.16	0.0-2.9	0.1-0.5	.28	.28			
Potter---------------	0-2	30-75	10-40	18-35	1.35-1.60	0.6-2	0.08-0.17	0.0-2.9	2.0-5.0	.15	.32	1	8	0
	2-6	30-75	10-40	15-35	1.35-1.60	0.6-2	0.04-0.16	0.0-2.9	1.0-4.0	.15	.32			
	6-15	30-75	10-40	15-35	1.40-1.65	0.6-2	0.04-0.15	0.0-2.9	0.4-1.0	.10	.32			
	15-29	30-75	10-40	15-35	1.40-1.65	0.06-0.2	0.03-0.09	0.0-2.9	0.1-0.4	.10	.32			
	29-55	30-75	10-40	15-35	1.40-1.65	0.06-0.2	0.03-0.09	0.0-2.9	0.1-0.4	.10	.32			
	55-80	30-75	10-40	15-35	1.40-1.65	0.06-0.2	0.03-0.09	0.0-2.9	0.1-0.4	.10	.32			
Posey----------------	0-8	50-75	15-30	5-18	1.40-1.55	2-6	0.10-0.15	0.0-2.9	0.5-1.0	.24	.24	3	3	86
	8-15	30-65	10-25	20-35	1.40-1.55	0.6-2	0.11-0.17	0.0-2.9	0.1-0.5	.32	.32			
	15-35	30-65	10-25	20-35	1.40-1.55	0.6-2	0.09-0.16	0.0-2.9	0.1-0.5	.32	.32			
	35-80	30-65	10-25	20-35	1.45-1.60	0.6-2	0.09-0.16	0.0-2.9	0.1-0.5	.32	.32			
MVE:														
Mobeetie-------------	0-8	45-75	15-35	10-18	1.35-1.50	2-6	0.10-0.17	0.0-2.9	0.5-1.0	.24	.24	3	3	86
	8-25	45-75	15-35	10-18	1.35-1.50	2-6	0.10-0.15	0.0-2.9	0.1-0.5	.24	.24			
	25-41	45-75	15-35	10-18	1.35-1.50	2-6	0.09-0.15	0.0-2.9	0.1-0.5	.24	.24			
	41-80	45-75	15-35	10-18	1.40-1.55	2-6	0.09-0.15	0.0-2.9	0.1-0.5	.24	.24			
Veal-----------------	0-3	35-75	15-35	10-25	1.15-1.50	0.6-2	0.10-0.15	1.5-4.8	0.5-2.0	.37	.37	3	3	86
	3-13	35-75	15-35	12-30	1.05-1.50	0.6-2	0.10-0.13	1.5-2.9	0.1-1.0	.15	.28			
	13-54	35-75	15-35	12-30	1.15-1.50	0.6-2	0.08-0.11	1.5-2.9	0.1-0.5	.15	.37			
	54-80	35-75	15-35	12-30	1.15-1.50	0.6-2	0.08-0.11	1.5-2.9	0.1-0.5	.15	.37			
Potter---------------	0-2	30-75	10-40	18-35	1.35-1.60	0.6-2	0.08-0.17	0.0-2.9	2.0-5.0	.15	.32	1	8	0
	2-6	30-75	10-40	15-35	1.35-1.60	0.6-2	0.04-0.16	0.0-2.9	1.0-4.0	.15	.32			
	6-15	30-75	10-40	15-35	1.40-1.65	0.6-2	0.04-0.15	0.0-2.9	0.4-1.0	.10	.32			
	15-29	30-75	10-40	15-35	1.40-1.65	0.06-0.2	0.03-0.09	0.0-2.9	0.1-0.4	.10	.32			
	29-55	30-75	10-40	15-35	1.40-1.65	0.06-0.2	0.03-0.09	0.0-2.9	0.1-0.4	.10	.32			
	55-80	30-75	10-40	15-35	1.40-1.65	0.06-0.2	0.03-0.09	0.0-2.9	0.1-0.4	.10	.32			

Table 29.--Physical Soil Properties--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permea- bility (K-sat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi- bility group	Wind erodi- bility index
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct					
OBG:														
Obaro----------------	0-8	10-65	35-80	18-27	1.25-1.40	0.6-2	0.12-0.20	0.0-2.9	0.1-1.0	.43	.43	3	4L	86
	8-18	10-65	35-80	15-35	1.25-1.40	0.6-2	0.12-0.20	0.0-2.9	0.1-1.0	.43	.43			
	18-30	10-65	35-80	15-35	1.25-1.40	0.6-2	0.11-0.18	0.0-2.9	0.1-1.0	.43	.43			
	30-60	---	---	---	---	0.00-0.1	---	---	---	---	---			
Quinlan--------------	0-8	35-70	30-45	15-27	1.30-1.55	0.6-2	0.11-0.18	0.0-2.9	0.5-1.0	.37	.37	2	5	56
	8-13	35-70	30-45	10-25	1.30-1.70	0.6-6	0.11-0.17	0.0-2.9	0.5-1.0	.37	.37			
	13-64	---	---	---	---	0.00-0.1	---	---	---	---	---			
OcA:														
Olton----------------	0-8	25-45	25-45	22-35	1.25-1.55	0.2-0.6	0.14-0.20	3.0-5.9	1.5-3.0	.32	.32	5	6	48
	8-15	25-45	25-45	28-45	1.25-1.55	0.2-0.6	0.11-0.18	3.0-5.9	0.5-1.0	.32	.32			
	15-31	25-45	25-45	30-50	1.25-1.55	0.01-0.1	0.11-0.18	3.0-5.9	0.5-1.0	.32	.32			
	31-48	10-45	25-60	30-40	1.25-1.55	0.01-0.1	0.12-0.18	3.0-5.9	0.5-1.0	.32	.32			
	48-75	10-45	25-60	30-40	1.35-1.65	0.2-0.6	0.10-0.18	3.0-5.9	0.1-0.5	.32	.32			
	75-80	10-45	25-60	27-40	1.35-1.65	0.2-0.6	0.10-0.18	3.0-5.9	0.1-0.5	.32	.32			
PAB:														
Patricia------------	0-12	70-90	5-18	3-12	1.50-1.65	6-20	0.06-0.15	0.0-1.5	0.1-0.9	.17	.17	5	2	134
	12-27	50-70	10-25	20-35	1.45-1.65	0.6-2	0.11-0.17	0.0-2.9	0.1-0.5	.24	.24			
	27-40	50-70	10-25	20-35	1.45-1.65	0.6-2	0.11-0.17	0.0-2.9	0.1-0.5	.24	.24			
	40-78	50-70	10-25	20-35	1.45-1.65	0.6-2	0.11-0.17	0.0-2.9	0.1-0.5	.24	.24			
	78-80	50-70	10-25	20-35	1.45-1.65	0.6-2	0.10-0.15	0.0-2.9	0.1-0.5	.24	.24			
Amarillo------------	0-10	55-85	5-30	5-12	1.30-1.60	6-20	0.06-0.15	0.0-1.5	0.1-0.9	.15	.15	5	2	134
	10-27	25-70	10-40	20-35	1.40-1.65	0.6-2	0.12-0.17	0.0-2.9	0.1-0.5	.32	.32			
	27-38	25-70	10-40	20-35	1.40-1.65	0.6-2	0.12-0.17	0.0-2.9	0.1-0.5	.32	.32			
	38-56	25-70	10-40	20-35	1.40-1.65	0.6-2	0.10-0.16	0.0-2.9	0.1-0.5	.32	.32			
	56-80	25-70	10-40	20-35	1.40-1.65	0.6-2	0.10-0.16	0.0-2.9	0.1-0.5	.32	.32			
PeA:														
Pep------------------	0-10	25-45	25-45	18-30	1.30-1.55	0.6-2	0.12-0.18	0.0-5.9	1.0-2.5	.37	.37	4	4L	86
	10-16	20-65	25-60	18-35	1.40-1.70	0.6-2	0.11-0.18	0.0-5.9	0.5-1.0	.32	.32			
	16-32	20-65	25-60	18-35	1.40-1.70	0.6-2	0.10-0.17	0.0-5.9	0.1-0.5	.32	.32			
	32-80	20-65	25-60	18-35	1.40-1.70	0.6-2	0.10-0.15	0.0-5.9	0.1-0.5	.32	.32			
PeB:														
Pep------------------	0-9	25-45	25-45	18-30	1.30-1.55	0.6-2	0.12-0.18	0.0-5.9	1.0-2.5	.37	.37	4	4L	86
	9-15	20-65	25-60	18-35	1.40-1.70	0.6-2	0.11-0.18	0.0-5.9	0.5-1.0	.32	.32			
	15-30	20-65	25-60	18-35	1.40-1.70	0.6-2	0.10-0.17	0.0-5.9	0.1-0.5	.32	.32			
	30-80	20-65	25-60	18-35	1.40-1.70	0.6-2	0.10-0.15	0.0-5.9	0.1-0.5	.32	.32			

Table 29.--Physical Soil Properties--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permea- bility (K-sat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi- bility group	Wind erodi- bility index
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct					
PGE:														
Potter---------------	0-2	30-75	10-40	18-35	1.35-1.60	0.6-2	0.08-0.17	0.0-2.9	2.0-5.0	.15	.32	1	8	0
	2-6	30-75	10-40	15-35	1.35-1.60	0.6-2	0.04-0.16	0.0-2.9	1.0-4.0	.15	.32			
	6-15	30-75	10-40	15-35	1.40-1.65	0.6-2	0.04-0.15	0.0-2.9	0.4-1.0	.10	.32			
	15-29	30-75	10-40	15-35	1.40-1.65	0.06-0.2	0.03-0.09	0.0-2.9	0.1-0.4	.10	.32			
	29-55	30-75	10-40	15-35	1.40-1.65	0.06-0.2	0.03-0.09	0.0-2.9	0.1-0.4	.10	.32			
	55-80	30-75	10-40	15-35	1.40-1.65	0.06-0.2	0.03-0.09	0.0-2.9	0.1-0.4	.10	.32			
PoA:														
Portales------------	0-15	30-65	25-45	15-25	1.30-1.55	0.6-2	0.12-0.18	0.0-5.9	1.0-2.5	.37	.37	4	4L	86
	15-35	30-45	25-40	18-35	1.40-1.50	0.6-2	0.11-0.18	0.0-5.9	1.0-2.0	.32	.32			
	35-43	30-45	25-40	18-35	1.40-1.50	0.6-2	0.10-0.17	0.0-5.9	0.1-0.3	.37	.37			
	43-60	30-45	25-40	18-35	1.40-1.50	0.6-2	0.10-0.15	0.0-5.9	0.1-0.3	.32	.32			
	60-80	30-45	25-40	18-35	1.40-1.50	0.6-2	0.10-0.15	0.0-5.9	0.1-0.3	.32	.32			
PoB:														
Portales------------	0-13	30-65	25-45	15-25	1.30-1.55	0.6-2	0.12-0.18	0.0-5.9	1.0-2.5	.37	.37	4	4L	86
	13-33	30-45	25-40	18-35	1.40-1.50	0.6-2	0.11-0.18	0.0-5.9	1.0-2.0	.32	.32			
	33-41	30-45	25-40	18-35	1.40-1.50	0.6-2	0.10-0.17	0.0-5.9	0.1-0.3	.37	.37			
	41-58	30-45	25-40	18-35	1.40-1.50	0.6-2	0.10-0.15	0.0-5.9	0.1-0.3	.32	.32			
	58-80	30-45	25-40	18-35	1.40-1.50	0.6-2	0.10-0.15	0.0-5.9	0.1-0.3	.32	.32			
PsA:														
Posey---------------	0-10	50-75	15-30	5-18	1.40-1.55	2-6	0.10-0.15	0.0-2.9	0.5-1.0	.24	.24	3	3	86
	10-18	30-65	10-25	20-35	1.40-1.55	0.6-2	0.11-0.17	0.0-2.9	0.1-0.5	.32	.32			
	18-39	30-65	10-25	20-35	1.40-1.55	0.6-2	0.09-0.16	0.0-2.9	0.1-0.5	.32	.32			
	39-80	30-65	10-25	20-35	1.45-1.60	0.6-2	0.09-0.16	0.0-2.9	0.1-0.5	.32	.32			
PsB:														
Posey---------------	0-9	50-75	15-30	5-18	1.40-1.55	2-6	0.10-0.15	0.0-2.9	0.5-1.0	.24	.24	3	3	86
	9-15	30-65	10-25	20-35	1.40-1.55	0.6-2	0.11-0.17	0.0-2.9	0.1-0.5	.32	.32			
	15-37	30-65	10-25	20-35	1.40-1.55	0.6-2	0.09-0.16	0.0-2.9	0.1-0.5	.32	.32			
	37-80	30-65	10-25	20-35	1.45-1.60	0.6-2	0.09-0.16	0.0-2.9	0.1-0.5	.32	.32			
RcA:														
Ranco---------------	0-2	10-40	10-40	40-60	1.00-1.25	0.00-0.06	0.12-0.18	8.0-15.0	1.5-3.0	.32	.32	5	7	38
	2-9	10-40	10-40	40-50	1.10-1.35	0.00-0.06	0.12-0.18	7.0-15.0	0.5-2.0	.32	.32			
	9-25	10-40	10-40	40-50	1.10-1.35	0.00-0.06	0.11-0.18	8.0-15.0	0.2-1.0	.32	.32			
	25-35	10-40	10-40	40-50	1.20-1.45	0.00-0.06	0.11-0.18	8.0-15.0	0.2-0.8	.32	.32			
	35-61	10-40	10-40	40-50	1.20-1.45	0.00-0.06	0.11-0.18	8.0-15.0	0.1-0.8	.32	.32			
	61-80	10-40	10-40	40-55	1.20-1.45	0.00-0.06	0.11-0.17	8.0-15.0	0.1-0.8	.32	.32			

Table 29.--Physical Soil Properties--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permea- bility (K-sat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi- bility group	Wind erodi- bility index
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct					
SgA:														
Seagraves-----------	0-25	55-88	5-25	3-20	1.35-1.60	2-6	0.07-0.15	3.0-5.0	0.1-1.0	.24	.24	5	3	86
	25-39	55-88	5-25	3-20	1.35-1.60	2-6	0.07-0.15	0.0-2.0	0.1-1.0	.17	.17			
	39-47	25-75	10-40	20-45	1.35-1.60	0.2-2	0.11-0.18	3.0-5.0	0.1-0.5	.32	.32			
	47-57	25-75	10-40	20-45	1.35-1.60	0.2-2	0.11-0.18	3.0-5.9	0.1-0.5	.32	.32			
	57-67	25-75	10-40	25-45	1.30-1.55	0.2-2	0.11-0.18	3.0-5.9	0.1-0.5	.32	.32			
	67-80	25-75	10-40	25-50	1.30-1.55	0.2-2	0.11-0.18	3.0-5.9	0.1-0.5	.32	.32			
ShB:														
Sharvana------------	0-6	55-85	5-30	6-20	1.35-1.55	2-6	0.09-0.15	0.0-2.9	0.5-1.0	.24	.24	1	3	86
	6-16	50-70	8-20	18-35	1.30-1.60	0.6-2	0.11-0.17	0.0-3.9	0.5-0.9	.32	.32			
	16-36	---	---	---	---	0.00-0.01	---	---	---	---	---			
	36-80	30-80	10-30	8-25	1.30-1.50	0.6-2	0.05-0.15	0.0-2.9	0.2-0.7	.17	.32			
SL:														
Water, intermittent, salt lake----------	0-80	---	---	---	---	0.00-2	0.02-0.06	---	---	---	---	-	---	---
SpA:														
Sparenberg----------	0-4	10-40	10-40	40-55	1.10-1.30	0.00-0.06	0.12-0.18	7.0-15.0	1.5-3.0	.32	.32	5	7	38
	4-10	10-40	10-40	40-55	1.10-1.30	0.00-0.06	0.12-0.18	8.0-15.0	0.5-2.0	.32	.32			
	10-17	10-40	10-40	40-55	1.10-1.30	0.00-0.06	0.11-0.18	9.0-18.0	0.5-1.0	.32	.32			
	17-47	10-40	10-40	40-55	1.10-1.30	0.00-0.06	0.11-0.18	9.0-18.0	0.5-1.0	.32	.32			
	47-61	10-40	10-40	40-55	1.10-1.30	0.00-0.06	0.11-0.18	8.0-15.0	0.1-1.0	.32	.32			
	61-80	10-40	10-40	40-55	1.10-1.30	0.00-0.06	0.11-0.17	8.0-15.0	0.1-0.5	.32	.32			
TkA:														
Tokio---------------	0-12	55-80	2-30	5-18	1.30-1.60	2-6	0.11-0.16	0.0-2.0	0.2-0.8	.24	.24	5	3	86
	12-24	55-80	2-30	5-35	1.30-1.60	2-6	0.11-0.18	1.0-4.0	0.2-1.0	.28	.28			
	24-34	25-75	6-40	20-35	1.30-1.54	0.6-2	0.12-0.18	2.0-5.0	0.1-0.5	.32	.32			
	34-57	20-75	8-40	20-45	1.10-1.41	0.6-2	0.11-0.17	2.0-5.9	0.1-0.5	.32	.32			
	57-71	20-85	3-45	10-35	1.40-1.68	0.6-6	0.07-0.17	1.0-5.0	0.1-0.5	.28	.28			
	71-80	20-85	5-45	10-35	1.40-1.67	0.6-6	0.07-0.17	1.8-5.0	0.1-0.5	.32	.32			
TkB:														
Tokio---------------	0-11	70-90	2-15	5-12	1.50-1.70	2-20	0.07-0.11	0.0-2.0	0.5-1.0	.17	.17	5	2	134
	11-26	55-85	2-25	5-35	1.40-1.67	2-6	0.11-0.17	0.0-4.0	0.1-0.5	.28	.28			
	26-35	25-75	6-40	20-35	1.30-1.54	0.6-2	0.12-0.18	2.0-5.0	0.1-0.5	.32	.32			
	35-57	20-75	8-40	20-45	1.10-1.41	0.6-2	0.11-0.17	2.0-5.9	0.1-0.5	.32	.32			
	57-71	20-85	6-45	10-35	1.40-1.68	0.6-6	0.07-0.17	1.0-5.0	0.1-0.5	.28	.28			
	71-80	20-85	10-45	10-35	1.40-1.67	0.6-6	0.07-0.17	1.8-5.0	0.1-0.5	.32	.32			
W:														
Water---------------	---	---	---	---	---	---	---	---	---	---	---	-	---	---

Table 29.--Physical Soil Properties--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permea- bility (K-sat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi- bility group	Wind erodi- bility index
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct					
YRG:														
Yellowhouse---------	0-5	20-40	25-50	28-40	1.30-1.50	0.2-0.6	0.09-0.17	2.5-6.0	1.0-3.0	.15	.32	3	8	0
	5-10	10-40	25-50	28-50	1.30-1.50	0.06-0.6	0.09-0.17	3.0-6.0	0.5-2.0	.32	.32			
	10-17	10-40	25-50	30-55	1.30-1.50	0.01-0.6	0.09-0.17	6.0-8.9	0.5-1.0	.32	.32			
	17-22	10-40	25-50	30-55	1.30-1.50	0.01-0.6	0.07-0.16	4.0-8.9	0.1-0.5	.32	.32			
	22-27	5-30	20-40	35-65	1.30-1.50	0.01-0.1	0.07-0.16	5.0-8.9	0.1-0.5	.32	.32			
	27-80	---	---	---	---	0.00-0.1	---	---	---	---	---			
Rock outcrop--------	0-80	---	---	---	---	0.00-0.06	0.00-0.00	---	---	---	---	-	---	---
ZfA:														
Zita----------------	0-7	25-75	10-45	12-20	1.30-1.60	2-6	0.11-0.18	0.0-2.9	1.5-2.5	.24	.24	5	3	86
	7-18	25-70	25-45	10-35	1.30-1.55	0.6-2	0.11-0.18	0.0-5.9	0.5-2.0	.28	.28			
	18-24	10-50	25-60	20-40	1.35-1.50	0.6-2	0.14-0.20	0.0-5.9	0.1-0.5	.32	.32			
	24-35	10-50	25-60	20-40	1.40-1.55	0.6-2	0.10-0.18	0.0-5.9	0.1-0.5	.32	.32			
	35-80	10-50	25-60	20-40	1.40-1.55	0.6-2	0.10-0.17	0.0-5.9	0.1-0.5	.32	.32			
ZfB:														
Zita----------------	0-6	25-75	10-45	12-20	1.30-1.60	2-6	0.11-0.18	0.0-2.9	1.5-2.5	.24	.24	5	3	86
	6-17	25-70	25-45	10-35	1.30-1.55	0.6-2	0.11-0.18	0.0-5.9	0.5-2.0	.28	.28			
	17-23	10-50	25-60	20-40	1.35-1.50	0.6-2	0.14-0.20	0.0-5.9	0.1-0.5	.32	.32			
	23-34	10-50	25-60	20-40	1.40-1.55	0.6-2	0.10-0.18	0.0-5.9	0.1-0.5	.32	.32			
	34-80	10-50	25-60	20-40	1.40-1.55	0.6-2	0.10-0.17	0.0-5.9	0.1-0.5	.32	.32			
ZmA:														
Zita----------------	0-7	25-70	25-45	20-35	1.30-1.55	0.6-2	0.11-0.18	0.0-2.9	1.5-2.5	.28	.28	5	5	56
	7-18	25-70	25-45	10-35	1.30-1.55	0.6-2	0.11-0.18	0.0-2.9	0.5-2.0	.28	.28			
	18-23	10-50	25-60	20-40	1.35-1.50	0.6-2	0.14-0.20	0.0-5.9	0.1-0.5	.32	.32			
	23-34	10-50	25-60	20-40	1.40-1.55	0.6-2	0.10-0.18	0.0-5.9	0.1-0.5	.32	.32			
	34-80	10-50	25-60	20-40	1.40-1.55	0.6-2	0.10-0.17	0.0-5.9	0.1-0.5	.32	.32			

Table 30.--Chemical Soil Properties

(Absence of an entry indicates that data were not estimated.)

Map symbol and soil name	Depth	Cation exchange capacity	Effective cation exchange capacity	Soil reaction	Calcium carbon- ate	Gypsum	Salinity	Sodium adsorp- tion ratio
	Inches	meq/100 g	meq/100 g	pH	Pct	Pct	mmhos/cm	
AcA:								
Acuff	0-12	11-22	---	6.6-7.8	0	0	0	0
	12-20	16-27	---	6.6-7.8	0-5	0	0	0
	20-28	16-27	---	6.6-8.0	0-5	0	0	0
	28-38	15-27	---	7.4-8.1	0-8	0	0	0
	38-58	11-27	---	7.9-8.4	15-60	0	0	0
	58-80	12-27	---	7.9-8.4	10-60	0	0	0
AcB:								
Acuff	0-10	11-22	---	6.6-7.8	0	0	0	0
	10-18	16-27	---	6.6-7.8	0-5	0	0	0
	18-26	16-27	---	6.6-8.0	0-5	0	0	0
	26-36	15-27	---	7.4-8.1	0-8	0	0	0
	36-56	11-27	---	7.9-8.4	15-60	0	0	0
	56-80	12-27	---	7.9-8.4	10-60	0	0	0
AfA:								
Amarillo	0-11	8.6-15	---	6.6-8.4	0	0	0.0-2.0	0
	11-27	15-27	---	7.4-8.4	0	0	0.0-2.0	0
	27-39	15-27	---	7.9-8.4	3-20	0	0.0-2.0	0
	39-56	10-27	---	7.9-8.4	30-60	0	0.0-2.0	0
	56-80	10-27	---	7.9-8.4	5-60	0	0.0-2.0	0
AfB:								
Amarillo	0-10	8.6-15	---	6.6-8.4	0	0	0.0-2.0	0
	10-26	15-27	---	7.4-8.4	0	0	0.0-2.0	0
	26-39	15-27	---	7.9-8.4	3-20	0	0.0-2.0	0
	39-55	10-27	---	7.9-8.4	30-60	0	0.0-2.0	0
	55-80	10-27	---	7.9-8.4	5-60	0	0.0-2.0	0
ArA:								
Arch	0-5	6.3-17	---	7.9-8.4	3-20	0	0.0-2.0	0
	5-16	4.5-23	---	7.9-8.4	5-30	0	0.0-2.0	0
	16-37	4.5-23	---	7.9-8.4	40-60	0	0.0-2.0	0
	37-80	4.5-23	---	8.5-9.0	40-60	0	0.0-2.0	0
AsA:								
Arch	0-6	6.3-14	---	7.9-8.4	3-20	0	0.0-2.0	0
	6-16	4.5-23	---	7.9-8.4	5-30	0	0.0-2.0	0
	16-37	4.5-23	---	7.9-8.4	40-60	0	0.0-2.0	0
	37-80	4.5-23	---	8.5-9.0	40-60	0	0.0-2.0	0
AvA:								
Arvana	0-8	8.6-13	---	6.6-8.4	0-2	0	0.0-2.0	0
	8-16	12-27	---	6.6-8.4	0-5	0	0	0
	16-28	12-25	---	6.6-8.4	0-5	0	0	0
	28-38	---	---	7.9-8.4	50-80	0	0	0
	38-60	14-23	---	7.9-8.4	40-70	0	0	0
	60-80	15-24	---	7.9-8.4	10-40	0	0	0
AvB:								
Arvana	0-6	8.6-13	---	6.6-8.4	0-2	0	0.0-2.0	0
	6-14	12-28	---	6.6-8.4	0-5	0	0	0
	14-26	12-25	---	6.6-8.4	0-5	0	0	0
	26-36	---	---	7.9-8.4	50-80	0	0	0
	36-58	14-23	---	7.9-8.4	40-70	0	0	0
	58-80	15-24	---	7.9-8.4	10-40	0	0	0

Table 30.--Chemical Soil Properties--Continued

Map symbol and soil name	Depth	Cation exchange capacity	Effective cation exchange capacity	Soil reaction	Calcium carbon- ate	Gypsum	Salinity	Sodium adsorp- tion ratio
	Inches	meq/100 g	meq/100 g	pH	Pct	Pct	mmhos/cm	
BcA:								
Bippus	0-8	13-27	---	6.6-8.4	0-2	0	0.0-2.0	0
	8-14	12-27	---	7.4-8.4	0-2	0	0.0-2.0	0
	14-26	16-25	---	7.9-8.4	0-5	0	0.0-2.0	0
	26-49	16-25	---	7.9-8.4	0-5	0	0.0-2.0	0
	49-65	16-25	---	7.9-8.4	0-5	0	0.0-2.0	0
	65-80	7.4-21	---	7.9-8.4	3-15	0	0.0-2.0	0
BeD:								
Berda	0-6	11-17	---	6.6-8.4	2-10	0	0.0-2.0	0
	6-20	12-23	---	7.4-8.4	2-10	0	0.0-2.0	0
	20-36	12-23	---	7.9-8.4	2-15	0	0.0-2.0	0
	36-52	12-22	---	7.9-8.4	5-15	0	0.0-2.0	0
	52-80	12-22	---	7.9-8.4	5-15	0	0.0-2.0	0
BHC:								
Brownfield	0-9	1.0-8.6	---	6.6-7.8	0	0	0.0-2.0	0
	9-19	1.0-8.6	---	6.6-7.8	0	0	0.0-2.0	0
	19-39	2.8-8.8	---	6.1-7.8	0	0	0.0-2.0	0
	39-62	15-27	---	6.1-7.8	0	0	0.0-2.0	0
	62-80	15-27	---	6.1-7.8	0	0	0.0-2.0	0
BP:								
Borrow pits	0-20	---	---	7.9-8.4	20-80	0	0.0-2.0	0
	20-80	---	---	7.9-8.4	20-80	0	0.0-2.0	0
BrB:								
Brownfield	0-6	2.7-8.9	---	6.6-7.8	0	0	0.0-2.0	0
	6-12	1.0-8.6	---	6.6-7.8	0	0	0.0-2.0	0
	12-23	2.7-8.6	---	6.1-7.8	0	0	0.0-2.0	0
	23-28	2.7-20	---	6.1-7.8	0	0	0.0-2.0	0
	28-55	15-27	---	6.1-7.8	0	0	0.0-2.0	0
	55-80	15-27	---	6.1-7.8	0	0	0.0-2.0	0
CdA:								
Cedarlake	0-10	15-21	---	7.4-8.4	5-20	0-5	16.0-32.0	13-40
	10-22	12-20	---	7.9-9.0	10-20	0-5	16.0-32.0	13-40
	22-45	25-27	---	7.9-9.0	40-60	0-5	10.0-20.0	10-30
	45-56	18-27	---	7.9-9.0	40-60	0-5	4.0-8.0	10-13
	56-68	20-25	---	7.9-9.0	40-60	0-5	4.0-8.0	10-13
	68-80	17-27	---	7.9-9.0	40-60	0-5	4.0-8.0	10-13
CeC:								
Creta	0-8	7.0-13	---	7.4-8.4	0-15	0	0.0-2.0	0-2
	8-16	8.0-13	---	7.9-8.4	2-20	0	0.0-2.0	0-5
	16-27	8.0-13	---	7.9-8.4	2-20	0	0.0-2.0	0-13
	27-44	11-13	---	7.4-9.0	15-25	0	4.0-16.0	3-25
	44-70	19-26	---	7.4-9.0	1-15	1-25	4.0-16.0	5-30
	70-80	---	---	---	---	---	---	---
ChA:								
Chapel	0-5	30-43	---	7.4-8.4	0-10	0	0.0-2.0	0-2
	5-14	29-41	---	7.4-8.4	0-10	0	0.0-2.0	0-2
	14-24	27-37	---	7.4-8.4	5-20	0	0.0-2.0	0-2
	24-35	26-35	---	7.9-8.4	5-40	0	0.0-2.0	0-2
	35-59	4.7-22	---	7.9-9.0	15-60	0	0.0-2.0	0-2
	59-80	8.5-20	---	7.9-9.0	15-60	0	0.0-2.0	0-2

Table 30.--Chemical Soil Properties--Continued

Map symbol and soil name	Depth	Cation exchange capacity	Effective cation exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	Inches	meq/100 g	meq/100 g	pH	Pct	Pct	mmhos/cm	
DRC:								
Drake-----------------	0-5	7.1-17	---	7.4-8.4	5-15	0-2	0.0-4.0	0-13
	5-15	7.1-20	---	7.4-8.4	5-15	0-2	0.0-4.0	0-13
	15-28	10-20	---	7.9-9.0	10-30	0-4	0.0-4.0	0-13
	28-43	10-20	---	7.9-9.0	10-30	0-4	0.0-4.0	0-13
	43-69	10-20	---	7.9-9.0	10-30	0-4	0.0-4.0	0-13
	69-80	10-20	---	7.9-9.0	10-30	0-4	0.0-4.0	0-13
DRE:								
Drake-----------------	0-3	7.1-17	---	7.4-8.4	5-15	0-2	0.0-4.0	0-13
	3-11	7.1-20	---	7.4-8.4	5-15	0-2	0.0-4.0	0-13
	11-25	10-20	---	7.9-9.0	10-30	0-4	0.0-4.0	0-13
	25-38	10-20	---	7.9-9.0	10-30	0-4	0.0-4.0	0-13
	38-65	10-20	---	7.9-9.0	10-30	0-4	0.0-4.0	0-13
	65-80	10-20	---	7.9-9.0	10-30	0-4	0.0-4.0	0-13
EPA:								
Estacado-------------	0-6	11-23	---	7.4-8.4	0-2	0	0.0-2.0	0
	6-19	16-31	---	7.4-8.4	0-5	0	0.0-2.0	0
	19-38	15-30	---	7.4-8.4	0-8	0	0.0-2.0	0
	38-50	9.7-30	---	7.9-8.4	3-40	0	0.0-2.0	0
	50-80	7.5-30	---	7.9-8.4	40-60	0	0.0-2.0	0
Pep-------------------	0-10	14-21	---	7.4-8.4	2-8	0	0.0-2.0	0
	10-16	14-21	---	7.4-8.4	2-10	0	0.0-2.0	0
	16-32	13-20	---	7.4-8.4	3-40	0	0.0-2.0	0
	32-80	10-14	---	7.8-8.4	40-60	0	0.0-2.0	0
EsA:								
Estacado-------------	0-6	11-23	---	7.4-8.4	0-2	0	0.0-2.0	0
	6-19	16-31	---	7.4-8.4	0-5	0	0.0-2.0	0
	19-38	15-30	---	7.4-8.4	0-8	0	0.0-2.0	0
	38-50	9.7-30	---	7.9-8.4	3-40	0	0.0-2.0	0
	50-80	7.5-30	---	7.9-8.4	40-60	0	0.0-2.0	0
EsB:								
Estacado-------------	0-4	11-23	---	7.4-8.4	0-2	0	0.0-2.0	0
	4-17	16-31	---	7.4-8.4	0-5	0	0.0-2.0	0
	17-36	15-30	---	7.4-8.4	0-8	0	0.0-2.0	0
	36-48	9.7-30	---	7.9-8.4	3-40	0	0.0-2.0	0
	48-80	7.5-30	---	7.9-8.4	40-60	0	0.0-2.0	0
KmB:								
Kimberson------------	0-5	10-20	---	7.4-8.4	0-20	0	0.0-1.0	0
	5-11	5.6-15	---	7.9-8.4	0-30	0	0.0-1.0	0
	11-28	---	---	7.9-8.4	60-90	0	0	0
	28-64	3.9-5.1	---	7.9-8.4	40-80	0	0.0-1.0	0
	64-80	---	---	7.9-9.0	60-90	0	0	0
LhA:								
Lenorah--------------	0-7	7.9-13	---	7.9-9.0	3-10	0	0.0-4.0	0-2
	7-22	11-20	---	7.9-10.0	5-20	0	8.0-32.0	13-30
	22-30	11-16	---	7.9-10.0	15-40	0	8.0-32.0	13-30
	30-47	5.9-14	---	7.9-10.0	15-40	0	8.0-32.0	13-40
	47-65	3.6-8.6	---	7.9-9.0	10-30	0	8.0-32.0	5-30
	65-80	1.0-8.6	---	7.9-9.0	3-20	0	2.0-16.0	5-20

Table 30.--Chemical Soil Properties--Continued

Map symbol and soil name	Depth	Cation exchange capacity	Effective cation exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	Inches	meq/100 g	meq/100 g	pH	Pct	Pct	mmhos/cm	
Hindman	0-23	1.9-12	---	7.4-8.4	0-8	0	0.0-2.0	0
	23-38	4.3-23	---	7.4-8.4	0-8	0	0.0-2.0	0-4
	38-46	7.4-20	---	7.4-8.4	5-18	0	2.0-6.0	4-20
	46-60	7.4-16	---	7.9-9.0	15-40	0-1	2.0-16.0	4-20
	60-77	2.7-7.9	---	7.9-9.0	3-20	0-1	2.0-6.0	4-20
	77-80	1.0-3.8	---	7.9-9.0	5-20	0-1	2.0-6.0	4-20
LMA:								
Lamesa	0-4	8.9-30	---	7.4-8.4	0-5	0	0.0-2.0	0-2
	4-11	8.6-29	---	7.4-8.4	0-5	0	0.0-2.0	0-2
	11-31	12-24	---	6.6-7.8	0-2	0	4.0-16.0	0-3
	31-48	6.6-15	---	6.6-7.8	0-2	0	0.0-8.0	0-3
	48-58	12-25	---	6.6-7.8	0-3	0	0.0-8.0	0-2
	58-80	15-34	---	6.6-7.8	0-25	0	0.0-8.0	0-1
LoA:								
Lofton	0-9	24-32	---	6.6-8.4	0	0	0	0
	9-24	30-34	---	7.4-8.4	0-5	0	0	0
	24-38	30-34	---	7.4-8.4	0-5	0	0	0
	38-52	21-31	---	7.9-8.4	5-30	0	0	0
	52-80	19-27	---	7.9-8.4	5-40	0	0	0
M-W:								
Miscellaneous water	---	---	---	---	---	---	---	---
MdA:								
Midessa	0-10	8.1-14	---	7.9-8.4	0-5	0	0.0-2.0	0
	10-30	15-23	---	7.9-8.4	2-15	0	0.0-2.0	0
	30-60	12-18	---	7.9-8.4	40-55	0	0.0-2.0	0
	60-80	12-18	---	7.9-8.4	15-40	0	0.0-2.0	0
MdB:								
Midessa	0-8	8.1-14	---	7.9-8.4	0-5	0	0.0-2.0	0
	8-28	15-23	---	7.9-8.4	2-15	0	0.0-2.0	0
	28-58	12-18	---	7.9-8.4	40-55	0	0.0-2.0	0
	58-80	12-18	---	7.9-8.4	15-40	0	0.0-2.0	0
MdC:								
Midessa	0-7	8.1-14	---	7.9-8.4	0-5	0	0.0-2.0	0
	7-24	15-23	---	7.9-8.4	2-15	0	0.0-2.0	0
	24-56	12-18	---	7.9-8.4	40-55	0	0.0-2.0	0
	56-80	12-18	---	7.9-8.4	15-40	0	0.0-2.0	0
MPC:								
Midessa	0-7	8.1-14	---	7.9-8.4	0-5	0	0.0-2.0	0
	7-24	15-23	---	7.9-8.4	2-15	0	0.0-2.0	0
	24-56	12-18	---	7.9-8.4	40-55	0	0.0-2.0	0
	56-80	12-18	---	7.9-8.4	15-40	0	0.0-2.0	0
Posey	0-8	4.6-15	---	7.9-8.4	2-10	0	0.0-2.0	0
	8-15	15-27	---	7.9-8.4	3-35	0	0.0-2.0	0
	15-35	15-27	---	7.9-8.4	40-60	0	0.0-2.0	0
	35-80	15-27	---	7.9-8.4	3-35	0	0.0-2.0	0
MPP:								
Midessa	0-7	8.1-14	---	7.9-8.4	0-5	0	0.0-2.0	0
	7-22	15-23	---	7.9-8.4	2-15	0	0.0-2.0	0
	22-55	12-18	---	7.9-8.4	40-55	0	0.0-2.0	0
	55-80	12-18	---	7.9-8.4	15-40	0	0.0-2.0	0

Table 30.--Chemical Soil Properties--Continued

Map symbol and soil name	Depth	Cation exchange capacity	Effective cation exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	Inches	meq/100 g	meq/100 g	pH	Pct	Pct	mmhos/cm	
Potter	0-2	16-34	---	7.4-8.4	10-40	0	0.0-2.0	0
	2-6	11-32	---	7.9-8.4	25-55	0	0.0-2.0	0
	6-15	6.3-23	---	7.9-8.4	40-80	0	0.0-2.0	0
	15-29	5.9-18	---	7.9-9.0	40-80	0	0.0-2.0	0
	29-55	5.1-18	---	7.9-9.0	40-60	0	0.0-2.0	0
	55-80	5.9-18	---	7.9-9.0	20-50	0	0.0-2.0	0
Posey	0-8	4.6-15	---	7.9-8.4	2-10	0	0.0-2.0	0
	8-15	15-27	---	7.9-8.4	3-35	0	0.0-2.0	0
	15-35	15-27	---	7.9-8.4	40-60	0	0.0-2.0	0
	35-80	15-27	---	7.9-8.4	3-35	0	0.0-2.0	0
MVE:								
Mobeetie	0-8	8.6-12	---	7.9-8.4	1-10	0	0	0
	8-25	6.6-10	---	7.9-8.4	2-10	0	0	0
	25-41	6.6-10	---	7.9-8.4	4-15	0	0	0
	41-80	6.6-10	---	7.9-8.4	4-15	0	0	0
Veal	0-3	6.8-17	---	6.6-8.4	5-15	0	0.0-2.0	0
	3-13	4.1-13	---	7.9-9.0	15-60	0	0.0-2.0	0
	13-54	4.1-11	---	7.9-9.0	15-60	0	0.0-2.0	0
	54-80	4.1-11	---	7.9-9.0	15-60	0	0.0-2.0	0
Potter	0-2	16-34	---	7.4-8.4	10-40	0	0.0-2.0	0
	2-6	11-32	---	7.9-8.4	25-55	0	0.0-2.0	0
	6-15	6.3-23	---	7.9-8.4	40-80	0	0.0-2.0	0
	15-29	5.9-18	---	7.9-9.0	40-80	0	0.0-2.0	0
	29-55	5.1-18	---	7.9-9.0	40-60	0	0.0-2.0	0
	55-80	5.9-18	---	7.9-9.0	20-50	0	0.0-2.0	0
OBG:								
Obaro	0-8	14-17	---	7.4-8.4	0-15	0	0.0-2.0	0
	8-18	12-21	---	7.4-8.4	0-15	0	0.0-2.0	0
	18-30	12-21	---	7.4-8.4	2-35	0	0.0-2.0	0
	30-60	---	---	---	---	---	---	---
Quinlan	0-8	12-22	---	7.4-8.4	0-10	0	0	0
	8-13	8.6-20	---	7.4-8.4	0-15	0-2	0	0
	13-64	---	---	---	---	---	---	---
OcA:								
Olton	0-8	18-28	---	6.6-8.4	0	0	0.0-1.0	0
	8-15	22-34	---	7.4-8.4	0-5	0	0.0-1.0	0-1
	15-31	23-38	---	7.4-8.4	0-5	0	0.0-1.0	0-1
	31-48	20-31	---	7.9-8.4	1-40	0	0.0-1.0	0-1
	48-75	12-30	---	7.9-8.4	5-60	0	0.0-1.0	0-1
	75-80	11-30	---	7.9-8.4	5-60	0	0.0-1.0	0-1
PAB:								
Patricia	0-12	2.7-10	---	6.6-8.4	0	0	0.0-2.0	0
	12-27	15-24	---	6.6-8.4	0-1	0	0.0-2.0	0
	27-40	15-24	---	6.6-8.4	0-1	0	0.0-2.0	0
	40-78	15-21	---	6.6-8.4	0-1	0	0.0-2.0	0
	78-80	10-16	---	7.4-9.0	15-50	0	0.0-2.0	0
Amarillo	0-10	4.3-10	---	6.6-8.4	0	0	0.0-2.0	0
	10-27	15-27	---	7.4-8.4	0-1	0	0.0-2.0	0
	27-38	15-27	---	7.9-8.4	0-3	0	0.0-2.0	0
	38-56	12-27	---	7.9-8.4	15-60	0	0.0-2.0	0
	56-80	10-27	---	7.9-8.4	1-15	0	0.0-2.0	0

Table 30.--Chemical Soil Properties--Continued

Map symbol and soil name	Depth	Cation exchange capacity	Effective cation exchange capacity	Soil reaction	Calcium carbon- ate	Gypsum	Salinity	Sodium adsorp- tion ratio
	Inches	meq/100 g	meq/100 g	pH	Pct	Pct	mmhos/cm	
PeA:								
Pep	0-10	14-21	---	7.4-8.4	2-8	0	0.0-2.0	0
	10-16	14-21	---	7.4-8.4	2-10	0	0.0-2.0	0
	16-32	13-20	---	7.4-8.4	3-40	0	0.0-2.0	0
	32-80	10-14	---	7.8-8.4	40-60	0	0.0-2.0	0
PeB:								
Pep	0-9	14-21	---	7.4-8.4	2-8	0	0.0-2.0	0
	9-15	14-21	---	7.4-8.4	2-10	0	0.0-2.0	0
	15-30	13-20	---	7.4-8.4	3-40	0	0.0-2.0	0
	30-80	10-14	---	7.8-8.4	40-60	0	0.0-2.0	0
PGE:								
Potter	0-2	16-34	---	7.4-8.4	10-40	0	0.0-2.0	0
	2-6	11-32	---	7.9-8.4	25-55	0	0.0-2.0	0
	6-15	6.3-23	---	7.9-8.4	40-80	0	0.0-2.0	0
	15-29	5.9-18	---	7.9-9.0	40-80	0	0.0-2.0	0
	29-55	5.1-18	---	7.9-9.0	40-60	0	0.0-2.0	0
	55-80	5.9-18	---	7.9-9.0	20-50	0	0.0-2.0	0
PoA:								
Portales	0-15	13-21	---	7.9-8.4	1-5	0	0.0-1.0	0
	15-35	15-28	---	7.4-8.4	2-40	0	0.0-1.0	0
	35-43	5.4-26	---	7.4-8.4	15-50	0	0.0-1.0	0
	43-60	7.0-26	---	7.4-8.4	15-60	0	0.0-1.0	0
	60-80	13-26	---	7.4-8.4	15-60	0	0.0-1.0	0
PoB:								
Portales	0-13	13-21	---	7.9-8.4	1-5	0	0.0-1.0	0
	13-33	15-28	---	7.4-8.4	2-40	0	0.0-1.0	0
	33-41	5.4-26	---	7.4-8.4	15-50	0	0.0-1.0	0
	41-58	7.0-26	---	7.4-8.4	15-60	0	0.0-1.0	0
	58-80	13-26	---	7.4-8.4	15-60	0	0.0-1.0	0
PsA:								
Posey	0-10	4.6-15	---	7.9-8.4	2-10	0	0.0-2.0	0
	10-18	15-27	---	7.9-8.4	3-35	0	0.0-2.0	0
	18-39	15-27	---	7.9-8.4	40-60	0	0.0-2.0	0
	39-80	15-27	---	7.9-8.4	3-35	0	0.0-2.0	0
PsB:								
Posey	0-9	4.6-15	---	7.9-8.4	2-10	0	0.0-2.0	0
	9-15	15-27	---	7.9-8.4	3-35	0	0.0-2.0	0
	15-37	15-27	---	7.9-8.4	40-60	0	0.0-2.0	0
	37-80	15-27	---	7.9-8.4	3-35	0	0.0-2.0	0
RcA:								
Ranco	0-2	30-43	---	7.4-8.4	0-5	0	0.0-2.0	0
	2-9	29-35	---	7.4-8.4	0-5	0	0.0-2.0	0
	9-25	29-33	---	7.4-8.4	0-14	0	0.0-2.0	0
	25-35	29-31	---	7.9-8.4	0-14	0	0.0-2.0	0
	35-61	28-31	---	7.9-8.4	1-14	0	0.0-2.0	0
	61-80	28-33	---	7.9-8.4	1-14	0	0.0-2.0	0
SgA:								
Seagraves	0-25	2.7-17	---	6.6-7.8	0-3	0	0.0-2.0	0
	25-39	2.7-17	---	6.6-7.8	0-3	0	0.0-2.0	0
	39-47	15-34	---	6.6-7.8	0-3	0	0.0-2.0	0
	47-57	15-34	---	6.6-7.8	0-3	0	0.0-2.0	0-3
	57-67	19-30	---	7.4-8.4	10-30	0	0.0-2.0	0-3
	67-80	19-32	---	7.4-8.4	10-30	0	0.0-2.0	0-3

Table 30.--Chemical Soil Properties--Continued

Map symbol and soil name	Depth	Cation exchange capacity	Effective cation exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	Inches	meq/100 g	meq/100 g	pH	Pct	Pct	mmhos/cm	
ShB:								
Sharvana	0-6	5.5-17	---	6.6-8.4	0-3	0	0.0-1.0	0
	6-16	15-26	---	6.6-8.4	0-3	0	0.0-1.0	0
	16-36	---	---	---	60-90	0	0	0
	36-80	1.0-6.8	---	7.9-9.0	40-80	0	0.0-2.0	0-5
SL:								
Water, intermittent, salt lake	0-80	---	---	---	---	---	8.0-32.0	13-50
SpA:								
Sparenberg	0-4	30-41	---	5.6-8.4	0-2	0	0	0
	4-10	29-40	---	7.4-8.4	0-2	0	0	0
	10-17	29-40	---	6.6-8.4	0-5	0	0	0
	17-47	29-40	---	6.6-8.4	0-5	0	0	0
	47-61	28-40	---	6.6-8.4	0-5	0	0	0
	61-80	28-37	---	6.6-8.4	0-10	0	0	0
TkA:								
Tokio	0-12	2.7-9.1	---	6.6-8.4	0	0	0	0
	12-24	2.7-18	---	7.4-8.4	0-1	0	0	0
	24-34	10-18	---	7.4-8.4	0-1	0	0	0
	34-57	9.9-18	---	7.9-9.0	10-50	0	0.0-2.0	0-3
	57-71	4.2-13	---	7.9-9.0	5-30	0	0.0-2.0	0-3
	71-80	4.2-11	---	7.9-9.0	5-30	0	0.0-2.0	0-3
TkB:								
Tokio	0-11	2.7-5.9	---	6.6-8.4	0	0	0	0
	11-26	2.6-18	---	7.4-8.4	0-1	0	0	0
	26-35	10-18	---	7.4-8.4	0-1	0	0	0
	35-57	9.9-18	---	7.9-9.0	10-50	0	0	0
	57-71	4.2-13	---	7.9-9.0	5-30	0	0	0
	71-80	4.2-11	---	7.9-9.0	5-30	0	0	0
W:								
Water	---	---	---	---	---	---	---	---
YRG:								
Yellowhouse	0-5	15-19	---	7.9-9.0	20-55	0	0.0-1.0	0
	5-10	14-21	---	7.9-9.0	20-60	0	0.0-2.0	0-5
	10-17	15-24	---	7.9-9.0	10-40	0	0.0-2.0	0-5
	17-22	15-25	---	7.9-9.0	10-35	0	0.0-2.0	0-5
	22-27	21-31	---	7.9-9.0	5-20	0	0.0-8.0	0-13
	27-80	---	---	---	---	---	---	---
Rock outcrop	0-80	---	---	---	---	---	---	---
ZfA:								
Zita	0-7	10-17	---	7.4-8.4	0	0	0	0
	7-18	8.6-28	---	7.4-8.4	0	0	0	0
	18-24	13-25	---	7.9-8.4	0-5	0	0	0
	24-35	11-17	---	7.9-8.4	30-60	0	0.0-2.0	0
	35-80	11-17	---	7.9-8.4	30-60	0	0.0-2.0	0
ZfB:								
Zita	0-6	10-17	---	7.4-8.4	0	0	0	0
	6-17	8.6-28	---	7.4-8.4	0	0	0	0
	17-23	13-25	---	7.9-8.4	0-5	0	0	0
	23-34	11-17	---	7.9-8.4	30-60	0	0.0-2.0	0
	34-80	11-17	---	7.9-8.4	30-60	0	0.0-2.0	0

Table 30.--Chemical Soil Properties--Continued

Map symbol and soil name	Depth	Cation exchange capacity	Effective cation exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	Inches	meq/100 g	meq/100 g	pH	Pct	Pct	mmhos/cm	
ZmA:								
Zita-----------------	0-7	17-28	---	7.4-8.4	0	0	0	0
	7-18	8.6-28	---	7.4-8.4	0	0	0	0
	18-23	13-25	---	7.9-8.4	0-5	0	0	0
	23-34	11-17	---	7.9-8.4	30-60	0	0.0-2.0	0
	34-80	11-17	---	7.9-8.4	30-60	0	0.0-2.0	0

Table 31.--Water Features

(Depths of layers are in feet. See text for definitions of terms used in this table. Estimates of the frequency of ponding and flooding apply to the whole year rather than to individual months. Absence of an entry indicates that the feature is not a concern or that data were not estimated.)

Map symbol and soil name	Hydrologic group	Surface runoff	Month	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
				Ft	Ft	Ft				
AcA:										
Acuff	B	Negligible	Jan-Dec	---	---	---	---	None	---	None
AcB:										
Acuff	B	Low	Jan-Dec	---	---	---	---	None	---	None
AfA:										
Amarillo	B	Negligible	Jan-Dec	---	---	---	---	None	---	None
AfB:										
Amarillo	B	Low	Jan-Dec	---	---	---	---	None	---	None
ArA:										
Arch	B	Negligible	Jan-Dec	---	---	---	---	None	---	None
AsA:										
Arch	B	Negligible	Jan-Dec	---	---	---	---	None	---	None
AvA:										
Arvana	C	Low	Jan-Dec	---	---	---	---	None	---	None
AvB:										
Arvana	C	Medium	Jan-Dec	---	---	---	---	None	---	None
BcA:										
Bippus	B	Negligible	Jan-Mar	---	---	---	---	None	---	
			Apr-Oct	---	---	---	---	None	Very brief	Occasional
			Nov-Dec	---	---	---	---	None	---	
BeD:										
Berda	B	Medium	Jan-Dec	---	---	---	---	None	---	None
BHC:										
Brownfield	A	Low	Jan-Dec	---	---	---	---	None	---	None

Table 31.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Surface runoff	Month	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
				Ft	Ft	Ft				
BP:										
Borrow pits	D	Negligible	Jan-Mar	---	---	---	---	---	---	None
			Apr	---	---	0.0-0.5	Long	Occasional	---	None
			May-Sept	---	---	0.0-2.0	Long	Occasional	---	None
			Oct	---	---	0.0-0.5	Long	Occasional	---	None
			Nov-Dec	---	---	---	---	---	---	None
BrB:										
Brownfield	A	Very low	Jan-Dec	---	---	---	---	None	---	None
CdA:										
Cedarlake	D	Negligible	Jan-Mar	0.2-2.0	>6.0	---	---	---	---	None
			Apr-Jun	0.0-1.0	>6.0	0.0-3.0	Very long	Frequent	---	None
			Jul-Aug	0.2-2.0	>6.0	0.0-3.0	Very long	Frequent	---	None
			Sept-Oct	0.0-1.0	>6.0	0.0-3.0	Very long	Frequent	---	None
			Nov-Dec	0.2-2.0	>6.0	---	---	---	---	None
CeC:										
Creta	B	Low	Jan-Dec	---	---	---	---	None	---	None
ChA:										
Chapel	D	Negligible	Jan-Mar	---	---	---	---	---	---	None
			April	---	---	0.0-0.6	Brief	Occasional	---	None
			May-Sept	---	---	0.0-1.0	Brief	Occasional	---	None
			Oct	---	---	0.0-0.6	Brief	Occasional	---	None
			Nov-Dec	---	---	---	---	---	---	None
DRC:										
Drake	B	Medium	Jan-Dec	---	---	---	---	None	---	None
DRE:										
Drake	B	Medium	Jan-Dec	---	---	---	---	None	---	None
EPA:										
Estacado	B	Negligible	Jan-Dec	---	---	---	---	None	---	None
Pep	B	Negligible	Jan-Dec	---	---	---	---	None	---	None
EsA:										
Estacado	B	Negligible	Jan-Dec	---	---	---	---	None	---	None

Table 31.--Water Features--Continued

Map symbol and soil name	Hydrologic group	Surface runoff	Month	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
				Ft	Ft	Ft				
EsB:										
Estacado	B	Low	Jan-Dec	---	---	---	---	None	---	None
KmB:										
Kimberson	D	High	Jan-Dec	---	---	---	---	None	---	None
LhA:										
Lenorah	C	Negligible	Jan-Mar	---	---	---	---	None	---	
			April	3.0-5.8	>6.0	---	---	None	---	
			May-Oct	2.0-5.0	>6.0	---	---	None	---	Very rare
			Nov-Dec	3.0-5.8	>6.0	---	---	None	---	
Hindman	B	Negligible	Jan-Apr	---	---	---	---	None	---	
			May-Oct	3.0-5.0	>6.0	---	---	None	---	Very rare
			Nov-Dec	---	---	---	---	None	---	
LMA:										
Lamesa	D	Negligible	Jan-Mar	---	---	---	---	None	---	None
			April	0.0-5.5	>6.0	0.2-3.0	Long	Frequent	---	None
			May-Jun	0.0-2.0	>6.0	0.2-3.0	Long	Frequent	---	None
			Jul-Aug	---	---	0.2-3.0	Long	Frequent	---	None
			Sept-Oct	0.0-3.0	>6.0	0.2-3.0	Long	Frequent	---	None
			Nov	0.0-5.5	>6.0	---	---	---	---	None
			Dec	---	---	---	---	---	---	None
LoA:										
Lofton	D	Negligible	Jan-Apr	---	---	---	---	None	---	None
			May-Sept	---	---	0.2-1.0	Very brief	Rare	---	None
			Oct-Dec	---	---	---	---	---	---	None
M-W:										
Miscellaneous water	---	---	Jan-Dec	---	---	---	---	None	---	None
MdA:										
Midessa	B	Negligible	Jan-Dec	---	---	---	---	None	---	None
MdB:										
Midessa	B	Low	Jan-Dec	---	---	---	---	None	---	None
MdC:										
Midessa	B	Medium	Jan-Dec	---	---	---	---	None	---	None

Table 31.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Surface runoff	Month	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
				Ft	Ft	Ft				
MPC:										
Midessa	B	Medium	Jan-Dec	---	---	---	---	None	---	None
Posey	B	Medium	Jan-Dec	---	---	---	---	None	---	None
MPP:										
Midessa	B	Medium	Jan-Dec	---	---	---	---	None	---	None
Potter	C	High	Jan-Dec	---	---	---	---	None	---	None
Posey	B	Medium	Jan-Dec	---	---	---	---	None	---	None
MVE:										
Mobeetie	B	Low	Jan-Dec	---	---	---	---	None	---	None
Veal	B	Medium	Jan-Dec	---	---	---	---	None	---	None
Potter	C	High	Jan-Dec	---	---	---	---	None	---	None
OBG:										
Obaro	B	High	Jan-Dec	---	---	---	---	None	---	None
Quinlan	C	Very high	Jan-Dec	---	---	---	---	None	---	None
OcA:										
Olton	C	Low	Jan-Dec	---	---	---	---	None	---	None
PAB:										
Patricia	B	Low	Jan-Dec	---	---	---	---	None	---	None
Amarillo	B	Low	Jan-Dec	---	---	---	---	None	---	None
PeA:										
Pep	B	Negligible	Jan-Dec	---	---	---	---	None	---	None
PeB:										
Pep	B	Low	Jan-Dec	---	---	---	---	None	---	None
PGE:										
Potter	C	High	Jan-Dec	---	---	---	---	None	---	None

Table 31.--Water Features--Continued

Map symbol and soil name	Hydrologic group	Surface runoff	Month	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
				Ft	Ft	Ft				
PoA:										
Portales	B	Negligible	Jan-Dec	---	---	---	---	None	---	None
PoB:										
Portales	B	Low	Jan-Dec	---	---	---	---	None	---	None
PsA:										
Posey	B	Negligible	Jan-Dec	---	---	---	---	None	---	None
PsB:										
Posey	B	Low	Jan-Dec	---	---	---	---	None	---	None
RcA:										
Ranco	D	Negligible	Jan-Mar	---	---	---	---	None	---	None
			April	1.0-1.5	2.0-3.0	0.0-3.0	Long	Frequent	---	None
			May-Jun	0.0-0.5	2.0-3.0	0.0-3.0	Long	Frequent	---	None
			Jul-Aug	---	---	0.0-3.0	Long	Frequent	---	None
			Sept-Oct	0.0-0.5	2.0-3.0	0.0-3.0	Long	Frequent	---	None
			Nov	1.0-1.5	2.0-3.0	---	---	---	---	None
			Dec	---	---	---	---	---	---	None
SgA:										
Seagraves	B	Negligible	Jan-Mar	---	---	---	---	---	---	None
			Apr-Oct	---	---	0.2-1.0	Very brief	Occasional	---	None
			Nov-Dec	---	---	---	---	---	---	None
ShB:										
Sharvana	C	High	Jan-Dec	---	---	---	---	None	---	None
SL:										
Water, intermittent, salt lake	D	Negligible	Jan-Feb	0.1-0.5	>6.0	---	---	---	---	---
			Mar	0.0	>6.0	---	---	---	---	---
			Apr-Jun	0.0	>6.0	0.5-4.0	Very long	Frequent	---	---
			Jul-Aug	0.1-0.5	>6.0	0.5-4.0	Very long	Frequent	---	---
			Sept-Oct	0.0	>6.0	0.5-4.0	Very long	Frequent	---	---
			Nov	0.0	>6.0	---	---	---	---	---
			Dec	0.1-0.5	>6.0	---	---	---	---	---

Table 31.--Water Features--Continued

Map symbol and soil name	Hydrologic group	Surface runoff	Month	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
				Ft	Ft	Ft				
SpA:										
Sparenberg	D	Negligible	Jan-Mar	---	---	---	---	---	---	None
			April	---	---	0.0-0.6	Brief	Occasional	---	None
			May-Sept	---	---	0.0-1.0	Brief	Occasional	---	None
			Oct	---	---	0.0-0.6	Brief	Occasional	---	None
			Nov-Dec	---	---	---	---	---	---	None
TkA:										
Tokio	B	Negligible	Jan-Dec	---	---	---	---	None	---	None
TkB:										
Tokio	B	Very low	Jan-Dec	---	---	---	---	None	---	None
W:										
Water	---	---	Jan-Dec	---	---	---	---	None	---	None
YRG:										
Yellowhouse	D	High	Jan-Dec	---	---	---	---	None	---	None
Rock outcrop	D	Very high	Jan-Dec	---	---	---	---	None	---	None
ZfA:										
Zita	B	Negligible	Jan-Dec	---	---	---	---	None	---	None
ZfB:										
Zita	B	Low	Jan-Dec	---	---	---	---	None	---	None
ZmA:										
Zita	B	Negligible	Jan-Dec	---	---	---	---	None	---	None

Table 32.--Soil Features

(See text for definitions of terms used in this table. Absence of an entry indicates that the feature is not a concern or that data were not estimated.)

Map symbol and soil name	Restrictive layer: Kind	Restrictive layer: Depth to top	Restrictive layer: Thickness	Restrictive layer: Hardness	Subsidence: Initial	Subsidence: Total	Potential for frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
		In	In		In	In			
AcA:									
Acuff	---	---	---	---	0	---	None	Moderate	Low
AcB:									
Acuff	---	---	---	---	0	---	None	Moderate	Low
AfA:									
Amarillo	---	---	---	---	0	---	None	Moderate	Low
AfB:									
Amarillo	---	---	---	---	0	---	None	Moderate	Low
ArA:									
Arch	---	---	---	---	0	---	None	High	Moderate
AsA:									
Arch	---	---	---	---	0	---	None	High	Moderate
AvA:									
Arvana	Petrocalcic	20-40	4-20	Indurated	0	---	None	Moderate	Low
AvB:									
Arvana	Petrocalcic	20-40	4-20	Indurated	0	---	None	Moderate	Low
BcA:									
Bippus	---	---	---	---	0	---	None	Moderate	Low
BeD:									
Berda	---	---	---	---	0	---	None	Moderate	Low
BHC:									
Brownfield	---	---	---	---	0	---	None	Moderate	Low
BP:									
Borrow pits	---	---	---	---	0	---	None	High	Low
BrB:									
Brownfield	---	---	---	---	0	---	None	Moderate	Low

Table 32.--Soil Features--Continued

Map symbol and soil name	Restrictive layer: Kind	Restrictive layer: Depth to top	Restrictive layer: Thickness	Restrictive layer: Hardness	Subsidence: Initial	Subsidence: Total	Potential for frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
		In	In		In	In			
CdA:									
Cedarlake	---	---	---	---	0	---	None	High	High
CeC:									
Creta	Paralithic bedrock	60-80	2-21	Moderately cemented	0	0	None	High	Low
ChA:									
Chapel	---	---	---	---	0	---	None	High	Low
DRC:									
Drake	---	---	---	---	0	---	None	High	Low
DRE:									
Drake	---	---	---	---	0	---	Low	High	Low
EPA:									
Estacado	---	---	---	---	0	---	None	Moderate	Low
Pep	---	---	---	---	0	---	None	High	Low
EsA:									
Estacado	---	---	---	---	0	---	None	Moderate	Low
EsB:									
Estacado	---	---	---	---	0	---	None	Moderate	Low
KmB:									
Kimberson	Petrocalcic	---	---	Indurated	---	---	None	Moderate	Low
	Petrocalcic	---	---	Indurated					
LhA:									
Lenorah	---	---	---	---	0	---	None	High	High
Hindman	---	---	---	---	0	---	None	High	High
LMA:									
Lamesa	---	---	---	---	0	---	None	High	Low
LoA:									
Lofton	---	---	---	---	---	---	None	High	Low

Table 32.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		In	In		In	In			
M-W:									
Miscellaneous water	---	---	---	---	---	---	---	---	---
MdA:									
Midessa	---	---	---	---	---	---	None	High	High
MdB:									
Midessa	---	---	---	---	---	---	None	High	High
MdC:									
Midessa	---	---	---	---	---	---	None	High	High
MPC:									
Midessa	---	---	---	---	---	---	None	High	High
Posey	---	---	---	---	0	---	None	High	High
MPP:									
Midessa	---	---	---	---	---	---	None	High	High
Potter	---	---	---	---	0	---	None	Moderate	Low
Posey	---	---	---	---	0	---	None	High	High
MVE:									
Mobeetie	---	---	---	---	---	---	None	Low	Low
Veal	---	---	---	---	0	---	None	Moderate	Low
Potter	---	---	---	---	0	---	None	Moderate	Low
OBG:									
Obaro	Paralithic bedrock	20-40	40-60	Weakly cemented	0	---	None	Low	Low
Quinlan	Densic bedrock	10-20	60-70	Noncemented	0	---	None	Moderate	Low
OcA:									
Olton	---	---	---	---	0	---	None	Moderate	Low

Table 32.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		In	In		In	In			
PAB:									
Patricia	---	---	---	---	---	---	None	Moderate	Low
Amarillo	---	---	---	---	0	---	None	Moderate	Low
PeA:									
Pep	---	---	---	---	0	---	None	High	Low
PeB:									
Pep	---	---	---	---	0	---	None	High	Low
PGE:									
Potter	---	---	---	---	0	---	None	Moderate	Low
PoA:									
Portales	---	---	---	---	0	---	None	High	Low
PoB:									
Portales	---	---	---	---	0	---	None	High	Low
PsA:									
Posey	---	---	---	---	0	---	None	High	High
PsB:									
Posey	---	---	---	---	0	---	None	High	High
RcA:									
Ranco	---	---	---	---	0	---	None	High	Low
SgA:									
Seagraves	---	---	---	---	0	---	None	Low	Low
ShB:									
Sharvana	Petrocalcic	---	---	Indurated	0	---	None	Low	Low
SL:									
Water, intermittent, salt lake	---	---	---	---	---	---	---	High	High
SpA:									
Sparenberg	---	---	---	---	0	---	None	High	Low

Table 32.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		In	In		In	In			
TkA:									
Tokio	---	---	---	---	0	---	None	Moderate	Low
TkB:									
Tokio	---	---	---	---	0	---	None	Moderate	Low
W:									
Water	---	---	---	---	0	---	---	---	---
YRG:									
Yellowhouse	Paralithic bedrock	20-39	40-60	Weakly cemented	0	---	None	High	Low
Rock outcrop	Lithic bedrock	0-0	80-80	Indurated	0	---	None	---	---
ZfA:									
Zita	---	---	---	---	---	---	None	Moderate	Low
ZfB:									
Zita	---	---	---	---	---	---	None	Moderate	Low
ZmA:									
Zita	---	---	---	---	---	---	None	Moderate	Low

Table 33.--Physical Analyses of Selected Soils

(The abbreviation "COLE" means coefficient of linear extensibility. Dashes indicate that data were not available.)

Soil name and sample number	Depth	Horizon	Particle-size distribution: Sand: Very coarse (2.0-1.0mm)	Coarse (1.0-0.5mm)	Medium (0.5-0.25mm)	Fine (0.25-0.1mm)	Very fine (0.1-0.05mm)	Total (2.0-0.05mm)	Fine Silt (0.02-0.002mm)	Total Silt	Fine Clay <0.0002 mm	Total Clay	COLE	Bulk Density: 1/3-bar	Oven Dry	Water Content 1/3-bar
	In		(by weight)										cm/cm	g/cc	g/cc	Wt %
Amarillo (1)	0-13	Ap	---	0.1	8.5	53.0	20.5	82.1	1.5	7.5	8.9	10.4	0.012	1.62	1.68	12.4
(95TX305-044)	13-21	Bt1	---	0.1	7.6	44.9	19.8	72.4	3.2	10.6	13.7	17.0	0.025	1.57	1.69	16.8
	21-28	Bt2	tr	0.1	7.1	39.3	18.3	64.8	3.3	12.0	16.0	23.2	0.027	1.42	1.54	16.0
	28-42	Btk	0.1	0.1	7.5	39.8	17.5	65.0	3.6	11.6	14.4	23.4	0.029	1.45	1.58	16.9
	42-54	Bk	0.8	1.2	6.8	30.0	12.5	51.3	16.8	23.0	9.2	25.7	0.011	1.53	1.58	22.9
	54-74	2Btk1	1.5	1.7	6.8	29.9	13.9	53.8	15.1	21.9	10.4	24.3	---	---	---	---
	74-80	2Btk2	0.6	0.9	6.2	31.1	14.1	52.9	14.8	23.8	10.7	23.3	---	---	---	---
Olton (2,3)	0-5	Ap	tr	0.1	2.2	11.2	16.8	30.3	13.9	37.9	22.5	31.8	0.062	1.27	1.52	25.0
(06TX069-003)	5-11	Bt1	---	0.1	2.1	11.5	16.8	30.5	14.5	36.8	25.1	32.7	0.072	1.39	1.71	25.6
	11-19	Bt2	---	tr	1.9	11.4	13.8	27.1	13.8	33.9	28.8	39.0	0.076	1.39	1.73	26.9
	19-39	Btk	0.2	0.2	2.7	12.3	14.7	30.1	11.9	33.0	16.0	36.9	0.055	1.48	1.74	22.8
	39-49	Btkk1	0.1	0.2	2.0	7.9	10.4	20.6	25.4	38.1	9.4	41.3	0.016	1.43	1.50	22.8
	49-80	Btkk2	0.2	0.3	1.7	8.4	10.8	21.4	26.7	40.3	9.7	38.3	0.028	1.50	1.63	18.8
Portales (4)	0-12	A	0.1	0.3	3.1	19.3	23.2	46.0	9.6	27.2	---	26.8	---	---	---	---
(95TX305-002)	12-18	Bw	tr	0.1	2.5	17.2	22.3	42.1	10.4	26.5	16.1	31.4	---	---	---	---
	18-24	Bk1	tr	0.1	1.7	13.9	21.0	36.7	13.5	28.7	16.8	34.6	---	---	---	---
	24-41	Bk2	0.1	0.2	2.3	14.7	22.3	39.6	12.3	26.2	---	34.2	---	---	---	---
	41-84	Bk3	0.1	0.4	2.7	15.4	16.0	34.6	13.7	25.6	---	39.8	---	---	---	---
Ranco (5)	0-8	Ap1	tr	0.1	0.9	8.1	11.3	20.4	15.3	24.4	---	55.2	0.092	1.16	1.51	37.4
(96TX305-003)	8-12	Ap2	tr	0.1	1.7	10.9	11.7	24.4	15.5	26.8	---	48.8	0.077	1.25	1.56	33.5
	12-23	Bw	0.1	0.2	2.4	14.3	11.8	28.8	14.8	23.6	---	47.6	0.085	1.26	1.61	33.3
	23-40	Bss1	0.2	0.2	2.6	15.5	12.0	30.5	15.1	23.5	---	46.0	0.087	1.33	1.71	31.8
	40-55	Bss2	tr	0.3	2.6	15.0	11.9	29.8	14.0	23.0	---	47.2	0.095	1.31	1.72	33.4
	55-65	Bss3	0.1	0.3	2.2	12.3	10.2	25.1	15.2	23.7	---	51.2	0.096	1.30	1.71	33.3
	65-74	Bss4	0.2	0.2	1.8	11.1	9.8	23.1	16.2	25.0	---	51.9	0.105	1.26	1.70	35.9
Sparenberg (6)	0-4	Ap	0.1	0.2	0.4	4.8	12.7	18.2	18.2	31.3	23.5	50.5	0.086	1.21	1.55	36.2
(S94TX305-001)	4-11	Bw	0.2	0.1	0.6	6.6	14.4	21.9	17.2	28.3	31.3	49.8	0.100	1.21	1.61	37.2
	11-17	Bss1	0.1	0.1	0.6	7.5	14.9	23.2	16.5	26.2	31.0	50.6	0.115	1.22	1.69	36.6
	17-28	Bss2	0.1	0.1	0.7	7.1	14.5	22.5	17.9	29.3	33.2	48.2	0.112	1.28	1.76	32.6
	28-47	Bss3	0.1	0.1	0.6	7.5	15.2	23.5	17.8	28.0	32.1	48.5	0.106	1.30	1.76	32.9
	47-61	Bss4	0.1	0.1	0.6	6.4	12.8	20.0	19.2	30.0	22.7	50.0	0.107	1.23	1.67	35.6
	61-80	Bkss	0.3	0.3	0.5	5.3	12.0	18.4	21.5	32.0	19.1	49.6	0.105	1.20	1.62	37.1

Footnotes

1 Location of pedon sample; west of Tahoka, from the intersection of U.S. Highway 380 and FM 179, 3 miles east on U.S. Highway 380, 2.3 miles south on county road, and 88 feet west in cultivated field.

2 This pedon is slightly outside the range of characteristics of the Olton series because the COLE of 0.06 is slightly above the range.

3 Location of pedon sample; in Castro County, Texas, south of Hart, from the intersection of Texas Highway 168 and Texas Highway 145, about 3.7 miles west on Texas Highway 145, 2.0 miles south on county road, and 530 feet southwest in cropland.

4 Location of pedon sample; in Tahoka, from the intersection of U.S. Highwway 380 and U.S. Highway 87, about 4.8 miles west on U.S. Highway 380, 2.7 miles south on county road, 1.6 miles east in rangeland.

5 Location of pedon sample; in Tahoka, from the intersection of U.S. Highwway 380 and U.S. Highway 87, about 7.4 miles east on U.S. Highway 380, 1.0 mile south on FM 1054, 0.7 mile east on county road, 0.1 mile south in playa basin.

6 Location of pedon sample is the same as that given in the series as described in the section "Soil Series and Their Morphology."

Table 34.--Chemical Analyses of Selected Soils

(Dashes indicate that analyses were not made)

Soil name and sample number	Depth	Horizon	Organic carbon	pH 1:1 (soil: water)	Extractable bases				Sum of Bases	Total Acid-ity	Cation Exchange capacity (pH 7)	Base Satur-ation (Sum)	Exchange-able sodium (ESP)	Ratio CEC to Clay
					Ca	Mg	K	Na						
	In		Pct	pH	Meq/100gm							Pct	Pct	
Amarillo (1)	0-13	Ap	0.11	7.8	6.1*	1.1	0.8	0.1	8.1	0.5	7.2	94	1	0.69
(95TX305-044)	13-21	Bt1	0.32	8.1	10.1*	1.4	0.6	0.1	12.2	3.8	11.2	76	1	0.66
	21-28	Bt2	0.21	7.9	29.2*	1.8	0.7	tr	31.7	---	13.8	100	---	0.59
	28-42	Btk	0.20	8.1	47.4*	2.6	1.6	tr	51.6	---	12.2	100	---	0.52
	42-54	Bk	0.16	8.6	45.9*	2.7	0.6	tr	49.2	---	7.7	100	---	0.30
	54-74	2Btk1	0.05	8.6	45.3*	5.1	1.0	0.5	51.9	---	9.7	100	5	0.40
	74-80	2Btk2	0.07	8.8	41.9*	6.3	1.0	0.4	49.6	---	10.9	100	4	0.47
Olton (2,3)	0-5	Ap	---	7.1	13.0*	6.3	1.9	---	21.2	3.2	19.6	100	---	0.62
(06TX069-003)	5-11	Bt1	---	7.6	14.6*	5.9	1.1	---	21.6	2.4	20.4	100	---	0.62
	11-19	Bt2	---	7.8	18.6*	7.0	0.9	0.1	26.6	2.4	23.7	100	---	0.61
	19-39	Btk	---	8.2	50.2*	6.9	0.8	0.2	58.1	---	20.7	100	---	0.56
	39-49	Btkk1	---	8.5	45.6*	3.7	0.4	0.3	50.0	---	7.2	100	---	0.17
	49-80	Btkk2	---	8.3	46.4*	3.1	0.5	0.3	50.3	---	8.1	100	---	0.21
Portales (4)	0-12	A	1.22	7.2	15.3*	3.7	2.1	0.3	21.4	1.5	19.4	93	1	0.72
(95TX305-002)	12-18	Bw	0.70	7.7	31.2*	4.5	0.8	0.3	36.8	---	18.0	100	1	0.57
	18-24	Bk1	0.40	7.1	41.9*	5.1	1.4	---	48.4	---	14.8	100	---	0.43
	24-41	Bk2	0.35	8.3	43.4*	5.8	1.3	---	50.5	---	9.6	100	---	0.28
	41-84	Bk3	0.23	8.3	29.9*	9.1	0.5	---	39.5	---	10.4	100	---	0.26
Ranco (5)	0-8	Ap1	1.28	7.8	36.9*	3.5	2.9	0.1	43.4	3.1	37.9	93	tr	0.69
(96TX305-003)	8-12	Ap2	0.82	8.0	60.8*	3.9	2.0	0.3	67.0	---	30.1	100	1	0.62
	12-23	Bw	0.49	8.2	57.8*	5.3	1.8	0.2	65.1	---	26.8	100	1	0.56
	23-40	Bss1	0.38	8.2	56.5*	7.4	1.6	0.2	65.7	---	25.3	100	1	0.55
	40-55	Bss2	0.38	8.2	56.3*	9.2	1.5	0.5	67.5	---	25.9	100	2	0.55
	55-65	Bss3	0.38	8.2	58.2*	10.9	1.5	0.2	70.8	---	26.4	100	1	0.52
	65-74	Bss4	0.37	8.2	57.7*	11.9	1.4	0.2	71.2	---	27.0	100	1	0.52
Sparenberg (6)	0-4	Ap	1.33	7.8	26.2*	3.5	2.4	0.2	32.7	3.0	32.5	92	1	0.71
(S94TX305-001)	4-11	Bw	0.74	7.7	23.4*	3.7	1.9	0.2	29.2	2.6	29.3	92	1	0.64
	11-17	Bss1	0.61	7.6	21.4	4.4	1.6	0.2	27.6	2.7	27.9	91	1	0.60
	17-28	Bss2	0.55	7.3	20.3	4.8	1.5	0.2	26.6	4.5	27.5	86	1	0.65
	28-47	Bss3	0.48	7.5	21.0*	5.1	1.5	0.2	27.8	3.2	27.8	90	1	0.64
	47-61	Bss4	0.35	8.0	25.9*	5.3	1.4	0.3	32.9	2.9	29.7	92	1	0.72
	61-80	Bkss	0.30	8.3	33.3*	5.7	1.5	0.3	40.8	1.1	29.7	97	1	0.84

Footnotes

* Extractable calcium may contain calcium from calcium carbonate or gypsum, CEC7 base saturatation set to 100.

1 Location of pedon sample; west of Tahoka, from the intersection of U.S. Highway 380 and FM 179, 3 miles east on U.S. Highway 380, 2.3 miles south on county road, and 88 feet west in cultivated field.

2 This pedon is slightly outside the range of characteristics of the Olton series because the COLE of 0.06 is slightly above the range.

3 Location of pedon sample; in Castro County, Texas, south of Hart, from the intersection of Texas Highway 168 and Texas Highway 145, about 3.7 miles west on Texas Highway 145, 2.0 miles south on county road, and 530 feet southwest in cropland.

4 Location of pedon sample; in Tahoka, from the intersection of U.S. Highwway 380 and U.S. Highway 87, about 4.8 miles west on U.S. Highway 380, 2.7 miles south on county road, 1.6 miles east in rangeland.

5 Location of pedon sample; in Tahoka, from the intersection of U.S. Highwway 380 and U.S. Highway 87, about 7.4 miles east on U.S. Highway 380, 1.0 mile south on FM 1054, 0.7 mile east on county road, 0.1 mile south in playa basin.

6 Location of pedon sample is the same as that given in the series as described in the section "Soil Series and Their Morphology."

Table 35.--Clay Mineralogy of Selected Soils

(Analysis by National Soil Survey Laboratory, USDA-NRCS, Lincoln, Nebraska. Relative Peak Size; 5-Very large; 4-Large; 3-Medium; 2-Small; 1-Very small. Dashes indicate that none of the mineral was detected).

Soil name and sample number	Depth	Horizon	Peak Size					
			Montmor-illonite	Mica	Kaolinite	Montmor-illonite -Mica	Quartz	Calcite
	In							
Amarillo (1)	0-13	Ap	2	3	2	2	2	
(S95TX305-044)	21-28	Bt2	2	3	2		1	
	42-54	Bk	2	2	1	1		4
	74-80	2Btk2	3	2	2			3
Olton (2,3)	0-5	Ap		3	2		1	
(S06TX069-003)	11-19	Bt2			2		1	
	49-80	Btkk2		1	1			3
Portales (4)	24-41	Bk2	2	2	1	2		3
(95TX305-002)								
Sparenberg (5)	0-4	Ap	3	3	2	2	1	
(S94TX305-001)	17-28	Bss2	3	2	2	2	1	

Footnotes

1 Location of pedon sample; west of Tahoka, from the intersection of U.S. Highway 380 and FM 179, 3 miles east on U.S. Highway 380, 2.3 miles south on county road, and 88 feet west in cultivated field.

2 This pedon is slightly outside the range of characteristics of the Olton series because the COLE of 0.06 is slightly above the range.

3 Location of pedon sample; in Castro County, TX, south of Hart, from the intersection of Texas Highway 168 and Texas Highway 145, about 3.7 miles west on Texas Highway 145, 2.0 miles south on county road, and 530 feet southwest in cropland.

4 Location of pedon sample; in Tahoka, from the intersection of U.S. Highwway 380 and U.S. Highway 87, about 4.8 miles west on U.S. Highway 380, 2.7 miles south on county road, 1.6 miles east in rangeland.

5 Location of pedon sample is the same as that given in the series as described in the section "Soil Series and Their Morphology."

Table 36.--Optical Grain Counts for Selected Soils

(Dashes indicate that the material was not detected)

Soil sample and Laboratory number	Depth	Horizon	Dominant Mineral (1)																		
			QZ	OT	FK	FP	FE	CD	CB	OP	GS	PR	HN	GN	PO	ZR	AR	TM	MS	BT	BY
Amarillo (2,4)	0-13	Ap	---	99	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
(S95TX305-044)	13-21	Bt1	---	99	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	21-28	Bt2	---	99	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	28-42	Btk	---	99	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	42-54	Bk	---	99	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	54-74	2Btk1	---	99	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	74-80	2Btk2	---	99	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Olton (2,5,6)	5-11	Bt1	83		8	tr	1	3	tr	2	tr	2	tr	tr	tr	tr	tr	tr	tr	tr	tr
(S06TX069-003)																					
Portales (7)	12-18	Bw (2)		99																	
(95TX305-002)	12-18	Bw (3)		99																	
	24-41	Bk2 (2)		99																	
	24-41	Bk2 (3)		99																	

Footnotes

1 QZ-Quartz; OT-Other; FK-Feldspar; FP-Plagioclase Feldspar; FE-Iron Oxides (Goethite); CD-Chert (Chalcedony); CB-Carbonate Aggregates; OP-Opagues; GS-Glass; AR-Weatherable aggregates; PR-Pyroxene; HN-Hornblende; GN-Garnet; PO-Plant Opal; ZR-Zircon; TM-Tourmaline; MS-Muscovite; BT-Biotite; BY-Beryl

2 Coarse silt fraction

3 Very fine sand fraction

4 Location of pedon sample; west of Tahoka, from the intersection of U.S. Highway 380 and FM 179, 3 miles east on U.S. Highway 380, 2.3 miles south on county road, and 88 feet west in cultivated field.

5 This pedon is slightly outside the range of characteristics of the Olton series because the COLE of 0.06 is slightly above the range.

6 Location of pedon sample; in Castro County, TX, south of Hart, from the intersection of Texas Highway 168 and 145, about 3.7 miles west on Texas Highway 145, 2.0 miles south on county road, and 530 feet southwest in cropland.

7 Location of pedon sample; in Tahoka, from the intersection of U.S. Highwway 380 and U.S. Highway 87, about 4.8 miles west on U.S. Highway 380, 2.7 miles south on county road, and 1.6 miles east in rangeland.

Table 37.--Engineering Index Properties of Selected Soils

Soil name and Sample Number	Depth	Horizon	Grain Size Distribution						
			Percentage Passing Sieve						
			4	10	40	200	20	5	2
	In		-----------Number----------				-----Microns ---		
Amarillo (1)	0-13	Ap	100	100	98	27	12	11	10
(95TX305-044)	13-21	Bt1	100	100	98	37	20	18	17
	21-28	Bt2	100	100	98	44	27	25	23
	28-42	Btk	100	100	98	44	27	25	23
	42-54	Bk	100	100	96	56	43	32	26
	54-74	2Btk1	99	99	94	54	39	30	24
	74-80	2Btk2	99	99	96	55	38	29	23
Olton (2,3)	0-5	Ap	100	100	99	80	46	37	32
(06TX069-003)	5-11	Bt1	100	100	99	80	47	38	33
	11-19	Bt2	100	100	100	81	53	44	39
	19-39	Btk	100	99	98	77	48	41	37
	39-49	Btkk1	98	96	95	82	64	49	40
	49-80	Btkk2	98	97	96	82	63	47	37
Portales (4)	0-12	A	100	100	99	68	36	31	27
(95TX305-002)	12-18	Bw	100	100	99	72	42	36	31
	18-24	Bk1	100	100	99	76	48	40	35
	24-41	Bk2	100	100	99	74	47	39	34
	41-84	Bk3	100	100	99	75	54	45	40
Ranco (5)	0-8	Ap1	100	100	100	86	71	61	55
(96TX305-003)	8-12	Ap2	100	100	99	82	64	55	49
	12-23	Bw	100	100	99	78	62	53	48
	23-40	Bss1	100	100	99	76	61	52	46
	40-55	Bss2	100	100	99	77	61	53	47
	55-65	Bss3	100	100	99	81	66	57	51
	65-74	Bss4	100	100	99	82	68	58	52
Sparenberg (6)	0-4	Ap	100	100	100	89	69	58	51
(S94TX305-001)	4-11	Bw	100	100	100	86	67	57	50
	11-17	Bss1	100	100	100	85	67	57	51
	17-28	Bss2	100	100	100	86	66	55	48
	28-47	Bss3	100	100	100	86	66	56	49
	47-61	Bss4	100	100	100	87	69	58	50
	61-80	Bkss	100	100	99	88	71	58	50

Footnotes

1 Location of pedon sample; west of Tahoka, from the intersection of U.S. Highway 380 and FM 179, 3 miles east on U.S. Highway 380, 2.3 miles south on county road, and 88 feet west in cultivated field.

2 This pedon is slightly outside the range of characteristics of the Olton series because the COLE of 0.06 is slightly above the range.

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4 Location of pedon sample; in Tahoka, from the intersection of U.S. Highwway 380 and U.S. Highway 87, about 4.8 miles west on U.S. Highway 380, 2.7 miles south on county road, and 1.6 miles east in rangeland.

5 Location of pedon sample; in Tahoka, from the intersection of U.S. Highwway 380 and U.S. Highway 87, about 7.4 miles east on U.S. Highway 380, 1.0 mile south on FM 1054, 0.7 mile east on county road, and 0.1 mile south in playa basin.

6 Location of pedon sample is the same as that given in the series as described in the section "Soil Series and Their Morphology."

Table 38.--Taxonomic Classification of the Soils

(An asterisk in the first column indicates a taxadjunct to the series. See text for a description of those characteristics that are outside the range of the series.)

Soil name	Family or higher taxonomic class
Acuff	Fine-loamy, mixed, superactive, thermic Aridic Paleustolls
Amarillo	Fine-loamy, mixed, superactive, thermic Aridic Paleustalfs
Arch	Fine-loamy, carbonatic, thermic Aridic Calciustepts
Arvana	Fine-loamy, mixed, superactive, thermic Petrocalcic Paleustalfs
Berda	Fine-loamy, mixed, superactive, thermic Aridic Haplustepts
Bippus	Fine-loamy, mixed, superactive, thermic Cumulic Haplustolls
Brownfield	Loamy, mixed, superactive, thermic Arenic Aridic Paleustalfs
Cedarlake	Fine-loamy, mixed, superactive, calcareous, thermic Vertic Halaquepts
Chapel	Fine, smectitic, thermic Udic Calciusterts
Creta	Fine-loamy, mixed, superactive, thermic Aridic Argiustolls
Drake	Fine-loamy, mixed, superactive, thermic Aridic Calciustepts
Estacado	Fine-loamy, mixed, superactive, thermic Aridic Paleustolls
Hindman	Coarse-loamy, mixed, superactive, thermic Torrifluventic Haplustepts
Kimberson	Loamy, mixed, superactive, thermic, shallow Petrocalcic Calciustolls
Lamesa	Fine-loamy, mixed, superactive, thermic Aeric Endoaqualfs
Lenorah	Fine-loamy, mixed, superactive, calcareous, thermic Aeric Halaquepts
Lofton	Fine, mixed, superactive, thermic Vertic Argiustolls
Midessa	Fine-loamy, mixed, superactive, thermic Aridic Calciustepts
Mobeetie	Coarse-loamy, mixed, superactive, thermic Aridic Haplustepts
Obaro	Fine-silty, mixed, superactive, thermic Typic Haplustepts
Olton	Fine, mixed, superactive, thermic Aridic Paleustolls
Patricia	Fine-loamy, mixed, superactive, thermic Aridic Paleustalfs
Pep	Fine-loamy, mixed, superactive, thermic Aridic Calciustolls
Portales	Fine-loamy, mixed, superactive, thermic Aridic Calciustolls
Posey	Fine-loamy, mixed, superactive, thermic Calcidic Paleustalfs
Potter	Loamy-skeletal, carbonatic, thermic, shallow Petronodic Ustic Haplocalcids
Quinlan	Loamy, mixed, superactive, thermic, shallow Typic Haplustepts
Ranco	Fine, smectitic, thermic Ustic Epiaquerts
Seagraves	Coarse-loamy, mixed, superactive, nonacid, thermic Typic Ustorthents
Sharvana	Loamy, mixed, superactive, thermic, shallow Aridic Paleustalfs
Sparenberg	Fine, smectitic, thermic Udic Haplusterts
Tokio	Fine-loamy, mixed, active, thermic Calcidic Haplustalfs
Veal	Loamy-skeletal, carbonatic, thermic Aridic Calciustepts
Yellowhouse	Fine, mixed, active, thermic Aridic Haplustepts
Zita	Fine-loamy, mixed, superactive, thermic Aridic Haplustolls

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