SOIL SURVEY OF

Taylor County, Texas

United States Department of Agriculture
Soil Conservation Service
In cooperation with
Texas Agricultural Experiment Station

This is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and agencies of the States, usually the Agricultural Experiment Stations. In some surveys, other Federal and local agencies also contribute. The Soil Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in the period 1958-70. Soil names and descriptions were approved in 1971. Unless otherwise indicated, statements in the publication refer to conditions in the county in 1971. This survey was made cooperatively by the Soil Conservation Service and the Texas Agricultural Experiment Station. It is part of the technical assistance furnished to the Middle Clear Fork Soil and Water Conservation District.

HOW TO USE THIS SOIL SURVEY

THIS SOIL SURVEY contains information that can be applied in managing farms and ranches; in selecting sites for roads, ponds, buildings, and other structures; and in judging the suitability of tracts of land for farming, industry, and recreation.

Locating Soils

All the soils of Taylor County are shown on the detailed map at the back of this publication. This map consists of many sheets made from aerial photographs. Each sheet is numbered to correspond with a number on the Index to Map Sheets.

On each sheet of the detailed map, soil areas are outlined and are identified by symbols. All areas marked with the same symbol are the same kind of soil. The soil symbol is inside the area if there is enough room; otherwise, it is outside and a pointer shows where the symbol belongs.

Finding and Using Information

The "Guide to Mapping Units" can be used to find information. This guide lists all the soils of the county in alphabetic order by map symbol and shows the capability classification of each. It also shows the page where each soil is described and the page for the range site in which the soil has been placed.

Individual colored maps that show the relative suitability or degree of limitation of soils for many specific purposes can be developed by using the soil map and the information in the text. Translucent material can be used as an overlay over the soil map and colored to show soils that have the same limitation or suitability. For example, soils that have a slight limitation for a given use can be colored green, those that have a moderate limitation can be colored yellow, and those that have a severe limitation can be colored red.

Farmers and those who work with farmers can learn about use and management of the soils from the soil descriptions and from the discussions of the capability units and range sites.

Game managers, sportsmen, and others can find information about soils and wildlife in the section "Use of the Soils for Wildlife."

Ranchers and others can find, under "Use of the Soils for Range," groupings of the soils according to their suitability for range and, also, the names of many of the plants that grow on each range site.

Community planners and others can read about soil properties that affect the choice of sites for dwellings, industrial buildings, and recreation areas in the sections "Engineering Interpretations" and "Use of the Soils for Recreation."

Engineers and builders can find, under "Engineering Uses of the Soils," tables that contain test data, estimates of soil properties, and information about soil features that affect engineering practices.

Scientists and others can read about how the soils formed and how they are classified in the section "Formation and Classification of the Soils."

Newcomers in Taylor County may be especially interested in the section "General Soil Map," where broad patterns of soils are described. They may also be interested in the information about the county given at the beginning of the publication and in the section "General Nature of the County."

Cover: **Upper Pecan Bayou site 4A flood-control structure provides water for livestock and recreation as well as flood protection. Rioconcho soils are the main soils of the flood plain.**

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SOIL SURVEY OF TAYLOR COUNTY, TEXAS

BY NATHANIEL R. CONNER, SOIL CONSERVATION SERVICE

FIELDWORK BY CHARLES L. GIRDNER AND LONNIE WATSON[1]

UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE,
IN COOPERATION WITH THE TEXAS AGRICULTURAL EXPERIMENT STATION

TAYLOR COUNTY is in north-central Texas (fig. 1). It has a total area of 586,240 acres, or 916 square miles, of which 1,856 acres is water.

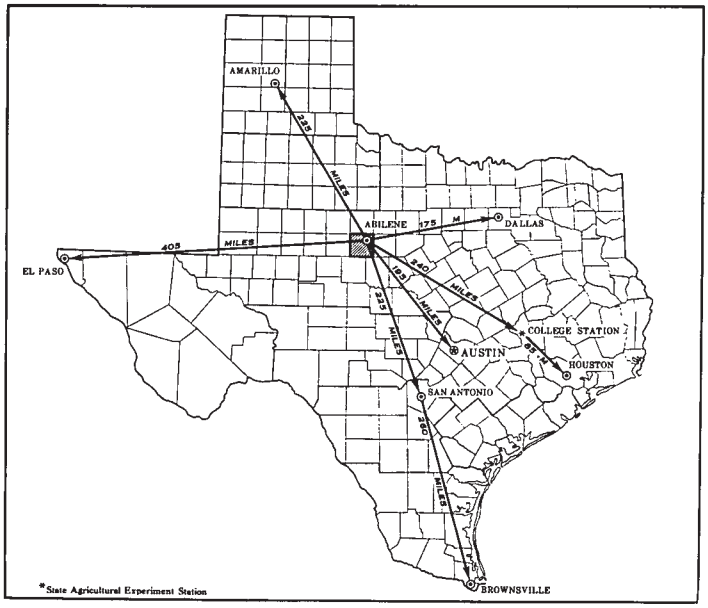

Figure 1.—Location of Taylor County in Texas.

About 75 percent of the acreage of the county lies in the Central Rolling Red Plains Resource Area, and about 25 percent is in the Edwards Plateau Resource Area.[2]

The Central Rolling Red Plains area consists of smooth plains that are dissected by numerous streams and creeks. Soils in this area formed in outwash sediment and Permian sandstone, clay, and shale. The streams and creeks have narrow, alluvial soils that were deposited by water.

The Edwards Plateau is the most conspicuous feature of the surface terrain in Taylor County. It is 200 to 700 feet above the general level of the Central Rolling Red Plains. It extends from east to west across the central part of the county and is outlined in most areas by steep escarpments. The Edwards Plateau serves as a divide between the Clear Fork of the Brazos River and the Colorado River. The plateau soils are mostly shallow or moderately deep over limestone or marl.

The main employment in Taylor County is derived from farming. Cotton, grain sorghum, and wheat are the main cash crops. Cattle and sheep are the major kinds of livestock grown in the county.

How This Survey Was Made

Soil scientists made this survey to learn what kinds of soil are in Taylor County, where they are located, and how they can be used. The soil scientists went into the county knowing they likely would find many soils they had already seen and perhaps some they had not. They observed the steepness, length, and shape of slopes; the size and speed of streams; the kinds of native plants or crops; the kinds of rock; and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material that has not been changed much by leaching or by the action of plant roots.

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in counties nearby and in places more distant. They classified and named the soils according to nationwide, uniform procedures. The *soil series* and the *soil phase* are the categories of soil classification most used in a local survey.

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, all the soils of one series have major horizons that are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Cobb and Cosh, for example, are the names of two soil series. All the soils in the United States that have the same series name are essentially alike in those characteristics that affect their behavior in the undisturbed landscape.

Soils of one series can differ in texture of the surface layer and in slope, stoniness, or some other characteristic that affects use of the soils by man. On the basis of such

[1] Others who contributed to the fieldwork for this survey are RALPH L. SCHWARTZ and O. A. HAY, Soil Conservation Service.

[2] Austin, Morris E. Land resource regions and major land resource areas of the United States. U.S. Dept. Agr. Handbook 296, 82 pp. 1965.

differences, a soil series is divided into phases. The name of a soil phase indicates a feature that affects management. For example, Hamby fine sandy loam, 0 to 1 percent slopes, is one of several phases in the Hamby series.

After a guide for classifying and naming the soils had been worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodlands, buildings, field borders, trees, and other details that help in drawing boundaries accurately. The soil map at the back of this publication was prepared from aerial photographs.

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning the management of farms and fields, a mapping unit is nearly equivalent to a soil phase. It is not exactly equivalent, because it is not practical to show on such a map all the small, scattered bits of soil of some kind that have been seen within an area that is dominantly of a recognized soil phase.

Some mapping units are made up of soils of different series or of different phases within one series. Three such kinds of mapping units are shown on the soil map of Taylor County: soil complexes, soil associations, and undifferentiated groups.

A soil complex consists of areas of two or more soils, so intricately mixed or so small in size that they cannot be shown separately on the soil map. Each area of a complex contains some of each of the two or more dominant soils, and the pattern and relative proportions are about the same in all areas. Generally, the name of a soil complex consists of the names of the dominant soils, joined by a hyphen. Pitzer-Weymouth complex, 1 to 5 percent slopes, is an example.

A soil association is made up of adjacent soils that occur as areas large enough to be shown individually on the soil map but are shown as one unit because the time and effort of delineating them separately cannot be justified. There is a considerable degree of uniformity in pattern and relative extent of the dominant soils, but the soils may differ greatly one from another. The name of an association consists of the names of the dominant soils, joined by a hyphen. Tarrant-Kavett association, undulating, is an example.

An undifferentiated group is made up of two or more soils that could be delineated individually but are shown as one unit because, for the purpose of the soil survey, there is little value in separating them. The pattern and proportion of soils are not uniform. An area shown on the map may be made up of only one of the dominant soils or of two or more. Tarrant and Vernon soils, undulating, is an undifferentiated soil group in this county.

In most areas surveyed there are places where the soil material is so rocky, so shallow, so severely eroded, or so variable that it has not been classified by soil series. These places are shown on the soil map and are described in the survey, but they are called land types and are given descriptive names. Badland is a land type in this county.

While a soil survey is in progress, soil scientists take soil samples needed for laboratory measurements and for engineering tests. Laboratory data from the same kind of soil in other places are also assembled. Data on yields of crops under defined practices are assembled from farm records and from field or plot experiments on the same kind of soil. Yields under defined management are estimated for all the soils.

Soil scientists observe how soils behave when used as a growing place for native and cultivated plants and as material for structures, foundation for structures, or covering for structures. They relate this behavior to properties of the soils. For example, they observe that filter fields for onsite disposal of sewage fail on a given kind of soil, and they relate this to the slow permeability of the soil or a high water table. They see that streets, road pavements, and foundations for houses are cracked on a named kind of soil, and they relate this failure to the high shrink-swell potential of the soil material. Thus, they use observation and knowledge of soil properties, together with available research data, to predict limitations or suitability of soils for present and potential uses.

After data have been collected and tested for the key, or benchmark, soils in a survey area, the soil scientists set up trial groups of soils. They test these groups by further study and by consultation with farmers, agronomists, engineers, and others. They then adjust the groups according to the results of their studies and consultation. Thus, the groups that are finally evolved reflect up-to-date knowledge of the soils and their behavior under current methods of use and management.

General Soil Map

The general soil map at the back of this survey shows, in color, the soil associations in Taylor County. A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil, and it is named for the major soils. The soils in one association may occur in another, but in a different pattern.

A map that shows soil associations is useful to people who want a general idea of the soils in a county, who want to compare different parts of a county, or who want to know the location of large tracts that are suitable for a certain kind of land use. Such a map is a useful general guide in managing a watershed, a wooded tract, or a wildlife area or in planning engineering works, recreational facilities, and community developments. It is not a suitable map for planning the management of a farm or field or for selecting the exact location of a road, building, or similar structure, because the soils in any one association ordinarily differ in slope, depth, stoniness, drainage, and other characteristics that affect their management.

Soil associations and delineations on the general soil map in this survey do not fully agree with those of the general soil maps in adjacent counties published at a different date. Differences in the maps are mostly the result of improvements in the classification of soils, particularly modifications or refinements in soil series concepts. Also, more precise and detailed maps have become necessary because the uses of general soil maps have expanded in recent years. More modern maps help to meet this need. Still another factor is the different range in slope that is permitted within associations in different surveys.

The soil associations in Taylor County are described in the following pages.

The terms for texture used in the title of the associations apply to texture of the surface layer. For example, in the

title of association 1, the words "clay loams" refer to texture of the surface layer.

1. Sagerton-Rowena-Rotan Association

Deep, noncalcareous to calcareous clay loams

This association consists of nearly level to gently sloping soils on uplands. It makes up about 45 percent of the county. About 49 percent of the association is Sagerton soils, about 10 percent is Rowena soils, and about 8 percent is Rotan soils. The other 33 percent is minor soils. These are mostly Clairemont, Gageby, Mangum, Shep, and Tobosa soils.

Sagerton soils are on uplands that have convex surfaces. These soils have a surface layer of reddish-brown clay loam about 11 inches thick. The next layer is clay about 22 inches thick that is reddish brown in the upper part and red in the lower part. The underlying material is clay loam that is pink in the upper part and red in the lower part. This layer begins at a depth of 33 inches and extends to a depth of 80 inches or more.

Rowena soils are on uplands that have concave surfaces. These soils have a surface layer of dark grayish-brown clay loam about 6 inches thick. The next layer is clay about 18 inches thick that is dark grayish brown in the upper part and dark brown in the lower part. The underlying material is reddish-yellow clay that begins at a depth of about 24 inches and extends to a depth of 64 inches.

Rotan soils are also on uplands that have concave surfaces. These soils have a surface layer of dark-brown clay loam about 6 inches thick. The next layer is dark grayish-brown clay loam about 8 inches thick. Underlying this is about 34 inches of clay that is dark grayish brown in the upper part and dark brown in the lower part. The underlying material is reddish-yellow clay loam that extends to a depth of about 80 inches.

The soils of this association are used mostly for crops. A few areas are used for range. The soils are also suitable for community development, but in such areas consideration should be given to the factors of shrink-swell potential and corrosion of uncoated steel. Under normal conditions these soils are not subject to flooding.

2. Tarrant-Tobosa Association

Very shallow to deep, calcareous, cobbly clays and clays

This association consists of nearly level to gently sloping and undulating to steep soils on uplands. It makes up about 29 percent of the county. About 44 percent of the association is Tarrant soils, and about 14 percent is Tobosa soils. The other 42 percent is minor soils. These are mostly Quanah, Kavett, Valera, Rioconcho, Speck, and Mereta soils and Rock outcrop.

Tarrant soils are undulating to steep. These soils have a surface layer of dark grayish-brown cobbly clay about 8 inches thick. The next layer is dark grayish-brown very cobbly clay about 7 inches thick. This layer rests abruptly on fractured limestone.

Tobosa soils are nearly level to gently sloping. These soils have a surface layer of dark-brown clay about 10 inches thick. The next layer is brown clay about 48 inches thick. The underlying material is pink silty clay that begins at a depth of 58 inches and extends to a depth of 72 inches.

The soils of this association are used mostly for range. A few areas are used for crops. This association provides some of the most extensive areas of grazing land in the county. The Tobosa soils are suited to crops, but the Tarrant soils are not because of their shallow depth. This association has potential for wildlife development. If the soils are used for wildlife development, the Tarrant soils are suited to wild herbaceous upland plants, hardwood trees, shrubs, and vines; and the Tobosa soils are suited to grain, seed crops, and grasses and legumes. The Tarrant soils are suited as habitat for brushland wildlife, and the Tobosa soils are suited as habitat for open-land and brushland wildlife.

3. Tillman-Vernon Association

Deep and moderately deep, noncalcareous to calcareous clay loams to clays

This association consists of nearly level to strongly sloping soils on broad plains and low, smooth, convex ridges that are dissected by intermittent drainageways and creeks. The association makes up about 12 percent of the county. About 40 percent of the association is Tillman soils, and about 29 percent is Vernon soils. The other 31 percent is minor soils. These are mostly Tobosa, Weymouth, Owens, Mangum, and Stamford soils and Badland.

Tillman soils are nearly level to gently sloping and are on uplands that have convex and concave surfaces. These soils have a surface layer of reddish-brown clay loam about 10 inches thick. The next layer is reddish-brown clay about 54 inches thick. The underlying material is red silty clay loam that begins at a depth of about 64 inches and extends to a depth of 72 inches.

Vernon soils are gently sloping to strongly sloping and are on the convex ridges. These soils have a surface layer of red clay about 6 inches thick. The next layer is red silty clay about 24 inches thick. The underlying material is weak-red shale fragments and clayey shale that begins at a depth of about 30 inches and extends to a depth of 60 inches.

The soils of this association are used mostly for crops. A few areas are used for range. The Tillman soils are suited to crops, but the Vernon soils are poorly suited to crops. This association has potential for community development, but in such areas consideration should be given to the factors of shrink-swell potential and corrosion of uncoated steel. Under normal conditions these soils are not subject to flooding.

4. Hamby-Miles-Colorado Association

Deep, noncalcareous to calcareous fine sandy loams to loams

This association consists of nearly level to gently sloping and undulating soils on uplands and nearly level soils on benches above creek channels. It makes up about 9 percent of the county. About 35 percent of the association is Hamby soils, about 25 percent is Miles soils, and about 25 percent is Colorado soils. The other 15 percent is minor soils. These are mostly Shep and Rotan soils.

Hamby and Miles soils are on uplands. The Hamby soils have a surface layer of reddish-brown fine sandy loam about 10 inches thick. The next layer is red clay

about 56 inches thick. The underlying material is light-red clay loam that begins at a depth of 66 inches and extends to a depth of 83 inches. The Miles soils have a surface layer of reddish-brown fine sandy loam about 9 inches thick. The next layer is reddish-brown sandy clay loam about 53 inches thick. The underlying material is yellowish-red sandy clay loam that begins at a depth of 62 inches and extends to a depth of 80 inches.

Colorado soils are on smooth benches above creek channels. These soils have a surface layer of light-brown loam about 6 inches thick. The next layer is reddish-brown loam about 54 inches thick that is stratified in ⅛- to ¼-inch layers of silt loam, fine sandy loam, and clay loam.

The soils of this association are used mostly for crops. A few areas are used for range. The Hamby and Miles soils are suited to crops, but the Colorado soils are not suitable for crops because flooding is a hazard. This association has potential for wildlife and recreational development. The major soils are well suited as habitat for open-land wildlife. If the soils are used for recreational development, such as camp areas, picnic areas, playgrounds, and paths and trails, care should be taken to overcome the hazard of flooding on the Colorado soils.

5. Pitzer-Mereta Association

Very shallow or shallow, calcareous, gravelly loams to clay loams

This association consists of nearly level to sloping soils on ridges and knolls. It makes up about 5 percent of the county. About 45 percent of the association is Pitzer soils, and about 30 percent is Mereta soils. The other 25 percent is minor soils. These are mostly Weymouth, Vernon, and Shep soils.

Pitzer and Mereta soils are nearly level to gently sloping and are on ridges and knolls. The Pitzer soils generally are on the higher areas above the Mereta soils. The Pitzer soils have a surface layer of dark grayish-brown gravelly loam about 6 inches thick. This layer rests abruptly on pinkish-white indurated caliche about 14 inches thick. The next layer is reddish-yellow very gravelly sandy loam about 56 inches thick. The underlying material is red clayey shale that begins at a depth of 76 inches and extends to a depth of 80 inches. The Mereta soils have a surface layer of very dark grayish brown clay loam about 6 inches thick. The next layer is dark-brown clay loam about 12 inches thick. This is underlain by strongly cemented pinkish-gray caliche about 4 inches thick. The underlying material is pink, limy clay loam that begins at a depth of 22 inches and extends to a depth of 30 inches.

The soils of this association are used for range. The Mereta soils are suited to crops. The Pitzer soils are not suitable for crops because they are shallow. This association has potential for wildlife development. The major soils are well suited as habitat for open-land wildlife, and the Mereta soils are well suited to wild herbaceous upland plants. If the soils are used for recreational development, such as camp areas, picnic areas, playgrounds, and paths and trails, care should be taken to remove the stones on the surface.

Descriptions of the Soils

This section describes the soil series and mapping units in Taylor County. Each soil series is described in detail, and then, briefly, each mapping unit in that series. Unless specifically mentioned otherwise, it is to be assumed that what is stated about the soil series holds true for the mapping units in that series. Thus, to get full information about any one mapping unit, it is necessary to read both the description of the mapping unit and the description of the soil series to which it belongs.

An important part of the description of each soil series is the soil profile; that is, the sequence of layers from the surface downward to rock or other underlying material. Each series contains two descriptions of this profile. The first is brief and in terms familiar to the layman. The second is much more detailed and is for those who need to make thorough and precise studies of soils. The profile described in the series is representative of mapping units in that series. If the profile of a given mapping unit is different from the one described for the series, these differences are stated in describing the mapping unit, or they are differences that are apparent in the name of the mapping unit. Color terms are for dry soil unless otherwise stated.

As mentioned in the section "How This Survey Was Made," not all mapping units are members of a soil series. Urban land, for example, does not belong to a soil series but, nevertheless, is listed in alphabetic order along with the soil series.

Following the name of each mapping unit is a symbol in parentheses. This symbol identifies the mapping unit on the detailed soil map. Listed at the end of each description of a mapping unit are the capability unit and range site in which the mapping unit has been placed. The page for the description of each capability unit and range site can be learned by referring to the "Guide to Mapping Units" at the back of this survey.

The acreage and proportionate extent of each mapping unit are shown in table 1. Many of the terms used in describing soils can be found in the Glossary, and more detailed information about the terminology and methods of soil mapping can be obtained from the Soil Survey Manual.[3]

Badland

Badland consists of barren areas of exposed, redbed shaly clay. These areas are on and below escarpments (fig. 2). The areas below escarpments are severely eroded. In a few places the redbeds are covered by as much as 4 inches of soil. In these places the soil material is gently sloping to strongly sloping. The topography is convex and dissected by many small gullies. Thin strata of sandstone and limestone are between the thick strata of clay and shale.

Badland has little or no value for farming. It is not suitable for cultivation and does not have enough vegetation for grazing. This land type is mapped only with Owens soils.

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[3] United States Department of Agriculture. Soil survey manual. U.S. Dept. Agr. Handbook 18, 503 pp., illus. 1951.

TABLE 1.—*Approximate acreage and proportionate extent of the soils*

Soil	Acres	Percent	Soil	Acres	Percent
Clairemont silty clay loam	7,920	1.4	Rowena clay loam, 0 to 1 percent slopes	21,640	3.7
Clairemont-Urban land complex	3,210	.5	Rowena clay loam, 1 to 3 percent slopes	5,220	.9
Cobb fine sandy loam, 1 to 3 percent slopes	4,220	.7	Rowena-Urban land complex, 0 to 1 percent slopes	800	.1
Colorado soils, frequently flooded	18,180	3.1	Sagerton clay loam, 0 to 1 percent slopes	62,900	10.7
Cosh fine sandy loam, 1 to 3 percent slopes	710	.1	Sagerton clay loam, 1 to 3 percent slopes	64,200	11.0
Demona fine sand, alkaline subsoil variant, 0 to 3 percent slopes	1,150	.2	Sagerton-Urban land complex, 0 to 3 percent slopes	6,080	1.0
Gageby clay loam	14,600	2.5	Shep loam, 1 to 3 percent slopes	10,160	1.7
Hamby loamy fine sand, 0 to 3 percent slopes	2,120	.4	Shep loam, 3 to 5 percent slopes	12,030	2.1
Hamby fine sandy loam, 0 to 1 percent slopes	5,320	.9	Shep loam, 5 to 8 percent slopes	1,630	.3
Hamby fine sandy loam, 1 to 3 percent slopes	10,800	1.8	Speck clay loam, 0 to 1 percent slopes	1,250	.2
Hamby fine sandy loam, 3 to 5 percent slopes	1,340	.2	Speck clay loam, 1 to 3 percent slopes	3,780	.6
Hamby-Urban land complex, 0 to 3 percent slopes	2,390	.4	Stamford clay, 1 to 3 percent slopes	2,560	.4
Kavett clay, 0 to 1 percent slopes	1,540	.3	Tarrant association, undulating	45,272	7.8
Kavett clay, 1 to 3 percent slopes	4,810	.8	Tarrant-Kavett association, undulating	21,510	3.7
Mangum silty clay loam	10,010	1.7	Tarrant-Rock outcrop association, hilly	12,400	2.1
Mangum-Urban land complex	1,400	.2	Tarrant-Rock outcrop association, steep	16,620	2.8
Mangum soils, frequently flooded	4,400	.8	Tarrant and Vernon soils, undulating	5,620	1.0
Mereta clay loam, 0 to 1 percent slopes	1,470	.3	Tillman clay loam, 0 to 1 percent slopes	9,590	1.6
Mereta clay loam, 1 to 3 percent slopes	7,580	1.4	Tillman clay loam, 1 to 3 percent slopes	18,840	3.2
Mereta clay loam, 3 to 5 percent slopes	1,000	.2	Tobosa clay, 0 to 1 percent slopes	19,090	3.3
Miles fine sandy loam, 0 to 1 percent slopes	3,460	.6	Tobosa clay, 1 to 3 percent slopes	10,030	1.7
Miles fine sandy loam, 1 to 3 percent slopes	9,120	1.6	Tobosa-Urban land complex, 0 to 3 percent slopes	1,030	.2
Miles fine sandy loam, 3 to 5 percent slopes	780	.1	Urban land	1,010	.2
Owens-Badland complex, 3 to 12 percent slopes	9,980	1.7	Ustochrepts and Rock outcrop, hilly	7,270	1.3
Pitzer gravelly loam, 1 to 8 percent slopes	8,930	1.5	Valera clay, 0 to 1 percent slopes	1,330	.2
Pitzer-Urban land complex, 1 to 8 percent slopes	250	(1)	Valera clay, 1 to 3 percent slopes	3,290	.6
Pitzer-Weymouth complex, 1 to 5 percent slopes	12,220	2.1	Vernon clay, 1 to 3 percent slopes	6,640	1.1
Quanah clay loam, 1 to 3 percent slopes	5,140	.9	Vernon clay, 3 to 12 percent slopes	13,970	2.4
Quanah clay loam, 3 to 5 percent slopes	3,070	.5	Weymouth clay loam, 1 to 3 percent slopes	7,550	1.3
Randall clay	490	(1)	Weymouth clay loam, 3 to 5 percent slopes	1,962	.3
Rioconcho clay loam	3,710	.6	Weymouth-Urban land complex, 1 to 8 percent slopes	420	(1)
Rioconcho soils, frequently flooded	3,800	.6	Water	1,856	.3
Rotan clay loam, 0 to 1 percent slopes	19,690	3.4	Total	586,240	100.0
Rotan clay loam, 1 to 3 percent slopes	3,880	.7			

[1] Less than 0.05 percent.

Clairemont Series

The Clairemont series consists of deep, nearly level, well-drained, loamy soils on bottom lands. These soils formed in calcareous alluvium.

In a representative profile the surface layer is reddish-brown, calcareous silty clay loam about 12 inches thick. The next layer is light-red, calcareous silty clay loam about 18 inches thick. Underlying this is light-red, calcareous silt loam that extends to a depth of about 60 inches.

Permeability is moderate in these soils. Internal drainage is medium. The hazard of soil blowing is slight. These soils are subject to flooding.

The Clairemont soils are used for crops, range, and pasture.

Representative profile of Clairemont silty clay loam in a cultivated field, 2.1 miles west on Farm Road 707 from junction with Farm Road 89 and 100 feet south:

Ap—0 to 5 inches, reddish-brown (5YR 5/4) silty clay loam, reddish brown (5YR 4/4) moist; massive; very hard, friable; common very fine to fine pores; calcareous; moderately alkaline; gradual, smooth boundary.

A1—5 to 12 inches, reddish-brown (2.5YR 4/4) silty clay loam, dark reddish brown (2.5YR 3/4) moist; weak, fine, granular structure; slightly hard, friable; common fine pores and worm casts; calcareous; moderately alkaline; gradual, smooth boundary.

C1—12 to 30 inches, light-red (2.5YR 6/6) silty clay loam, red (2.5YR 4/6) moist; massive; hard, friable; common fine pores; few concretions of calcium carbonate; few thin strata of contrasting textures; common worm casts; calcareous; moderately alkaline; gradual, smooth boundary.

C2—30 to 60 inches, light-red (2.5YR 6/6) silt loam, red (2.5YR 4/6) moist; massive; very hard, friable; calcareous; moderately alkaline.

The A horizon ranges from 5 to 14 inches in thickness. It is yellowish-red, light-red, red, reddish-brown, or brown silty clay loam to silt loam. Reaction is mildly alkaline to moderately alkaline.

The C horizon is light-red, reddish-brown, light-brown, or red silty clay loam and silt loam to very fine sandy loam.

Clairemont silty clay loam (Ca).—This soil is on smooth bottom lands that are adjacent to stream channels. Areas are irregular and broad to narrow in shape, range from 50 to 1,000 acres in size, and extend for several miles in places. Slopes are 0 to 1 percent. This soil has the profile described as representative of the series.

Included with this soil in mapping are small areas of Colorado, Gageby, and Mangum soils. These included

Figure 2.—An area of Badland that shows effects of erosion.

soils make up less than 15 percent of the mapped acreage of this soil.

Most areas of this soil are used for crops, range, and pasture. The hazard of water erosion is slight, but the soil erodes if it is not protected. These soils flood one or more times in a 4- to 10-year period. Capability unit IIc-2; Loamy Bottomland range site.

Clairemont-Urban land complex (Cn).—This complex is on nearly level bottom lands above creeks and drainageways within the built-up areas of the city of Abilene. About 50 percent of the complex is Clairemont soils, 45 percent is Urban land, and the other 5 percent is included soils of the Gageby, Mangum, and Rioconcho series.

Clairemont soils have a surface layer of yellowish-red, friable silty clay loam about 14 inches thick. Below this is reddish-brown, friable silty clay loam that extends to a depth of 60 inches or more.

Urban land is used for works and structures, such as streets, sidewalks, buildings, driveways, and patios. Much of the soil in areas of Urban land has been altered by excavations or coverings of contrasting soil material. Most of the structures are single-unit dwellings and have been built on top of 6 to 12 inches of fill material. The percentage of the total area of this complex that is covered by works and structures ranges from 25 to 75 percent.

Some of the hazards in urban developments on this complex are flooding of streets and low-cost roads and flood damage to light types of industries and buildings. Areas that are adjacent to creeks are subject to flooding of short duration. The floodwaters are generally less than 1 foot deep, and flooding lasts less than 36 hours. Recreational development of camp and picnic areas is limited by the hazard of flooding. Some areas of this complex have not been subject to damage by flooding since the early 1930's.

If the soils of this complex are used for landscaping and gardening, they develop a crusty surface layer when dry that restricts water infiltration. Also, chlorosis, or leaf yellowing, takes place in some plants that are sensitive to high concentrations of lime. The lime limits availability of iron to the plants and thus causes the yellowing of the leaves. Not assigned to a capability unit and range site.

Cobb Series

The Cobb series consists of moderately deep, gently sloping, well-drained, loamy soils on uplands. These soils formed in loamy sediment over red sandstone.

In a representative profile the surface layer is reddish-brown fine sandy loam about 7 inches thick. The subsoil is reddish-brown, friable sandy clay loam about 26 inches thick. This layer rests abruptly on red weakly cemented sandstone that extends to a depth of 42 inches.

Permeability is moderate in these soils. Internal drainage is medium. The hazard of soil blowing is moderate.

The Cobb soils are used for crops and range.

Representative profile of Cobb fine sandy loam, 1 to 3 percent slopes, in a cultivated field, 1 mile west on Farm Road 1085 from junction with Farm Road 126, 0.25 mile south on county road, and 250 feet east:

Ap—0 to 7 inches, reddish-brown (5YR 5/4) fine sandy loam, reddish brown (5YR 4/4) moist; single grained; slightly hard, friable, nonsticky; neutral; abrupt, smooth boundary.

B21t—7 to 26 inches, reddish-brown (2.5YR 5/4) sandy clay loam, dark reddish brown (2.5YR 3/4) moist; moderate, very coarse, prismatic structure parting to moderate, medium, subangular blocky; hard, friable, slightly sticky; few clay films; common very fine worm casts; neutral; gradual, smooth boundary.

B22t—26 to 33 inches, reddish-brown (2.5YR 5/4) sandy clay loam, dark reddish brown (2.5YR 3/4) moist; moderate, very coarse, prismatic structure parting to moderate, medium, subangular blocky; hard, friable, slightly sticky; few clay films; common very fine worm casts; 15 percent, by volume, sandstone fragments coated with clay films; neutral; abrupt, wavy boundary.

C—33 to 42 inches, red (2.5YR 4/8) weakly cemented sandstone.

The A horizon ranges from 6 to 10 inches in thickness. It is brown or reddish brown. Reaction is slightly acid to neutral.

The B2t horizon ranges from 14 to 30 inches in thickness. It is reddish brown or red. Reaction is slightly acid to neutral.

Depth to the C horizon ranges from 20 to 40 inches. This horizon is red sandstone that in places is interbedded with calcareous clay and shale. Reaction is slightly acid to mildly alkaline.

Cobb fine sandy loam, 1 to 3 percent slopes (CoB).—This gently sloping soil is on slightly convex upland ridges and plains. Areas are irregular in shape and range from 10 to 250 acres in size.

Included with this soil in mapping are small areas of Cosh, Miles, and Sagerton soils and a few areas where slopes are slightly more than 3 percent. Also included are a few areas that have gullies 400 to 700 feet apart, 4 feet deep, and 10 to 20 feet wide. These included areas make up less than 15 percent of the mapped acreage of this soil.

Most areas of this soil are cultivated. Capability unit IIIe-4; Sandy Loam range site.

Colorado Series

The Colorado series consists of deep, nearly level, well-drained, loamy soils on bottom lands. These soils formed in calcareous alluvial sediment.

In a representative profile the surface layer is light-brown, calcareous loam about 6 inches thick. The underlying material is reddish-brown, calcareous loam that extends to a depth of about 60 inches.

Permeability is moderate in these soils. Internal drainage is medium. These soils are subject to flooding. The hazard of soil blowing is slight.

The Colorado soils are used for range.

Representative profile of Colorado soils, frequently flooded, in range, 3.2 miles south and west of intersection of Farm Road 126 and Interstate 20 in Merkel, 7 miles south on county road from junction with Farm Road 126 and 50 feet west:

A1—0 to 6 inches, light-brown (7.5YR 6/4) loam, dark brown (7.5YR 4/4) moist; weak granular structure; slightly hard, friable, sticky; common very fine worm casts; discontinuous stratification evident; calcareous; moderately alkaline; clear, smooth boundary.

C—6 to 60 inches, reddish-brown (5YR 5/4) loam, reddish brown (5YR 4/4) moist; weak granular and thin platy structure, related to evident bedding planes; slightly hard, friable, sticky; stratified (⅛ to ¼ inch thick) with silt loam, fine sandy loam, and clay loam; some strata grade to hue of 7.5YR; common very fine worm casts; calcareous; moderately alkaline.

The A horizon ranges from 4 to 10 inches in thickness. It is brown, light-brown, or reddish-brown loam to clay loam.

The C horizon is reddish-brown or reddish-yellow loam, clay loam, and sandy clay loam to fine sandy loam. Individual strata in this horizon range from loamy fine sand to light clay. A few films and threads of calcium carbonate are below a depth of 10 inches.

Colorado soils, frequently flooded (Cr).—These nearly level soils are on smooth benches above creek channels. Areas are narrow and long in shape, range from 20 to 400 acres in size, and extend for several miles. Slopes are 0 to 1 percent.

Included with these soils in mapping are small areas of Clairemont, Mangum, and Rowena soils and areas of a soil that is similar to these Colorado soils but has a darker surface layer. Also included are a few saline areas that are 1 acre to 10 acres in size. These included areas make up less than 15 percent of the mapped acreage of this soil.

These soils are used for range, pasture, and wildlife habitat. They flood one or more times in a 4- to 10-year period. Capability unit Vw-1; Loamy Bottomland range site.

Cosh Series

The Cosh series consists of shallow, gently sloping, well-drained, loamy soils on uplands. These soils formed in loamy sediment over red sandstone.

In a representative profile the surface layer is reddish-brown fine sandy loam about 7 inches thick. The subsoil is red, friable sandy clay loam about 11 inches thick. This layer rests abruptly on red, weakly cemented sandstone.

Permeability is moderate in these soils. Internal drainage is medium. The hazard of soil blowing is moderate.

The Cosh soils are used for crops and range.

Representative profile of Cosh fine sandy loam, 1 to 3 percent slopes, in range, 1 mile west on Farm Road 1085 from junction with Farm Road 126, 0.5 mile south and 0.5 mile west on county road, and 200 feet south:

A1—0 to 7 inches, reddish-brown (5YR 5/4) fine sandy loam, dark reddish brown (5YR 3/4) moist; weak granular structure; slightly hard, very friable, nonsticky; common very fine roots; neutral; clear, smooth boundary.

B21t—7 to 12 inches, red (2.5YR 4/6) sandy clay loam, dark red (2.5YR 3/6) moist; weak, coarse, prismatic structure parting to medium and fine subangular blocky; hard, friable, slightly sticky; common very fine worm casts; few clay films; neutral; mildly alkaline; gradual, wavy boundary.

B22t—12 to 18 inches, red (2.5YR 4/6) sandy clay loam, dark red (2.5YR 3/6) moist; weak prismatic structure parting to

moderate, medium and fine, subangular blocky; hard, friable, slightly sticky; few clay films; common very fine worm casts; neutral; mildly alkaline; abrupt, smooth boundary.

C—18 to 30 inches, red (2.5YR 4/8), weakly cemented, noncalcareous sandstone.

The A horizon ranges from 4 to 9 inches in thickness. It is reddish brown or brown. Reaction is neutral to slightly acid.

The B2t horizon ranges from 7 to 11 inches in thickness. It is red or reddish brown. Reaction is neutral to mildly alkaline.

Depth to the C horizon ranges from 12 to 20 inches. This horizon is red sandstone that in places is interbedded with calcareous clay and shale.

Cosh fine sandy loam, 1 to 3 percent slopes (CsB).—This gently sloping soil is on convex upland ridges and knolls. Areas are irregular to oval in shape and range from 10 to 50 acres in size.

Included with this soil in mapping are small areas of Cobb soils and areas of a soil that is similar to this Cosh soil but has less clay throughout the profile and is underlain by sandstone at a depth of 10 to 20 inches in some places and 20 to 40 inches in others. Also included are areas of a soil that is similar to this Cosh soil but has more clay in the subsoil, and a few areas where slopes are more than 3 percent. These included areas make up less than 15 percent of the mapped acreage of this soil.

Most areas of this soil are used for crops. Capability unit IIIe-5; Sandy Loam range site.

Demona Variant

The Demona variant consists of deep, nearly level to gently sloping, well-drained, sandy soils on uplands. These soils formed in loamy sediment.

In a representative profile the surface layer is brown fine sand about 8 inches thick. The subsurface layer is light-brown, loose fine sand about 14 inches thick. The upper 30 inches of the subsoil is brown, firm sandy clay that has red and reddish-brown mottles. The lower part of the subsoil is pale-brown, firm sandy clay loam that has olive-yellow mottles and extends to a depth of about 80 inches.

Permeability is moderately slow in these soils. Internal drainage is slow. The hazard of soil blowing is severe.

The Demona soils are used for crops, range, and pasture.

Representative profile of Demona fine sand, alkaline subsoil variant, 0 to 3 percent slopes, in range, 2.2 miles west on Farm Road 613 from its intersection with U.S. Highway 83 in Tuscola, 3.5 miles south on county road from junction with Farm Road 613, 1.4 miles west, and 25 feet north:

A1—0 to 8 inches, brown (7.5YR 5/4) fine sand, dark brown (7.5YR 4/4) moist; single grained; loose, nearly loose, nonsticky; common fine roots; slightly acid; clear, smooth boundary.

A2—8 to 22 inches, light-brown (7.5YR 6/4) fine sand, brown (7.5YR 5/4) moist; single grained; loose, nearly loose, nonsticky; common fine roots; slightly acid; abrupt, wavy boundary.

B21t—22 to 32 inches, brown (7.5YR 5/2) sandy clay, dark brown (7.5YR 4/2) moist; red mottles; moderate, medium, blocky structure; very hard, firm, sticky; slightly acid; gradual, wavy boundary.

B22t—32 to 52 inches, brown (7.5YR 5/2) sandy clay, dark brown (7.5YR 4/2) moist; reddish-brown mottles; moderate, medium, blocky structure; very hard, firm, sticky; few soft masses of calcium carbonate; calcareous; moderately alkaline; gradual, smooth boundary.

B23t—52 to 80 inches, pale-brown (10YR 6/3) sandy clay loam, brown (10YR 5/3) moist; olive-yellow mottles; moderate, medium, blocky structure; very hard, firm, sticky; few pockets of calcium carbonate; calcareous; moderately alkaline.

The A horizon ranges from 20 to 40 inches in thickness. It is brown, light brown, or grayish brown. Reaction is neutral or slightly acid.

The B2t horizon is brown, pale-brown, brownish-yellow, or red clay to sandy clay loam. Reaction ranges from neutral to medium acid in the upper part and from moderately alkaline to slightly acid in the lower part. This horizon is mottled with olive, yellow, brown, gray, and red.

Demona soils in Taylor County are outside the range defined for the series. They have concretions and soft masses of calcium carbonate at a depth of 42 to 52 inches in about 60 percent of the profiles and the B22t horizon is moderately alkaline.

Demona fine sand, alkaline subsoil variant, 0 to 3 percent slopes (DeB).—This nearly level to gently sloping soil is on uplands and concave foot slopes. Areas are irregular in shape and range from 30 to 200 acres in size.

Included with this soil in mapping are small areas of Hamby soils and areas of a soil that is similar to this Demona soil but has less clay in the upper 20 inches of the subsoil. Also included in the more sloping areas are areas of a soil that is similar to this Demona soil, but the content of clay in the lower layers decreases by more than 20 percent from the maximum in the upper part of the subsoil. These included areas make up less than 15 percent of the mapped acreage of this soil.

About half the acreage of these soils is used for range. The other half has been cultivated, but most of these areas have reverted to native pasture. The soil has a seasonal high water table at a depth of 4 to 6 feet. Capability unit IIIe-6; Sandy range site.

Gageby Series

The Gageby series consists of deep, nearly level, well-drained, loamy soils on bottom lands. These soils formed in alluvial sediment.

In a representative profile the upper 7 inches of the surface layer is dark-brown clay loam. The next 17 inches of the surface layer is dark-brown, friable sandy clay loam. The next layer is yellowish-red sandy clay loam about 35 inches thick. The underlying material is yellowish-red, massive sandy clay loam that extends to a depth of about 80 inches and contains a few films and threads of calcium carbonate.

Permeability is moderate in these soils. Internal drainage is medium. These soils are subject to flooding. The hazard of soil blowing is slight.

The Gageby soils are used for crops and range.

Representative profile of Gageby clay loam in a cultivated area, 1.25 miles south on Farm Road 89 from junction with Farm Road 707, 0.8 mile west on county road, and 250 feet north:

Ap—0 to 7 inches, dark-brown (7.5YR 4/2) clay loam, dark brown (7.5YR 3/2) moist; weak, fine, subangular blocky structure; slightly hard, friable, sticky; calcareous; moderately alkaline; abrupt, smooth boundary.

A1—7 to 24 inches, dark-brown (7.5YR 4/2) sandy clay loam, dark brown (7.5YR 3/2) moist; weak, fine, subangular blocky structure; slightly hard, friable, slightly sticky; common worm casts; calcareous; moderately alkaline; clear, smooth boundary.

B21—24 to 42 inches, yellowish-red (5YR 5/6) sandy clay loam, yellowish red (5YR 4/6) moist; moderate, fine, granular and subangular blocky structure; hard, friable, slightly sticky; common worm casts; discontinuous thin strata of

silty, clayey, and sandy sediment; calcareous; moderately alkaline; gradual, wavy boundary.

B22—42 to 59 inches, yellowish-red (5YR 5/6) sandy clay loam, yellowish red (5YR 4/6) moist; moderate, fine, granular and subangular blocky structure; hard, firm, slightly sticky; common worm casts; discontinuous thin strata of silty, clayey, and sandy sediment; calcareous; moderately alkaline; gradual, wavy boundary.

C—59 to 80 inches, yellowish-red (5YR 5/6) sandy clay loam, yellowish red (5YR 4/6) moist; massive; few films and threads of calcium carbonate; hard, friable, slightly sticky; calcareous; moderately alkaline.

The A horizon ranges from 10 to 30 inches in thickness. It is dark brown or dark grayish brown. Reaction is mildly alkaline or moderately alkaline.

The B2 horizon ranges from 15 to 35 inches in thickness. It is yellowish-red, reddish-brown, or dark grayish-brown sandy clay loam and clay loam to silty clay loam.

Depth to the C horizon ranges from 25 to 60 inches. This horizon ranges from fine sandy loam to clay.

Gageby soils in Taylor County are outside the range defined for the series in that about 75 percent of the profiles are redder in the horizon below the dark-colored layer. This difference does not affect the usefulness or behavior of the soils.

Gageby clay loam (Ga).—This nearly level soil is on bottom lands that are intermittent flood plains. Areas are irregularly shaped and range from 30 to 200 acres in size. Slopes are 0 to 1 percent.

Included with this soil in mapping are small areas of Clairemont, Mangum, and Rotan soils. These included soils make up less than 15 percent of the mapped acreage of this soil.

Most areas of this soil are used for crops. These soils flood one or more times in a 4- to 10-year period, but the flooding normally does not destroy crops. Capability unit IIc-1; Loamy Bottomland range site.

Hamby Series

The Hamby series consists of deep, nearly level to gently sloping, well-drained, loamy and sandy soils on uplands. These soils formed in calcareous clayey sediment.

In a representative profile the surface layer is reddish-brown fine sandy loam about 10 inches thick. The upper part of the subsoil is red, firm clay about 56 inches thick. The lower part is light-red, friable clay loam that extends to a depth of about 83 inches.

Permeability is moderately slow in these soils. Internal drainage is slow. The hazard of soil blowing is moderate.

The Hamby soils are used for range and crops.

Representative profile of Hamby fine sandy loam, 1 to 3 percent slopes, in range, 2.1 miles southeast on Farm Road 89 from junction with U.S. Highway 277, 0.3 mile east on county road, and 100 feet north:

A11—0 to 6 inches, reddish-brown (5YR 5/3) fine sandy loam, reddish brown (5YR 4/3) moist; weak, fine, subangular blocky structure; slightly hard, friable, nonsticky; common fine roots; neutral; clear, smooth boundary.

A12—6 to 10 inches, reddish-brown (5YR 5/4) fine sandy loam, reddish brown (5YR 4/4) moist; weak, fine, subangular blocky structure; slightly hard, friable, nonsticky; common fine roots; neutral; abrupt, smooth boundary.

B21t—10 to 30 inches, red (2.5YR 4/6) clay, dark red (2.5YR 3/6) moist; moderate, coarse, prismatic structure parting to moderate, medium, subangular blocky; hard, firm, sticky; clay films on prisms and ped faces; few fine roots; common fine pores; neutral; gradual, smooth boundary.

B22t—30 to 48 inches, red (2.5YR 5/6) clay, red (2.5YR 4/6) moist; moderate, coarse, prismatic structure parting to moderate, medium, subangular blocky; hard, firm, sticky; clay films on prisms and ped faces; few fine roots; common fine pores; neutral; gradual, smooth boundary.

B23t—48 to 66 inches, red (2.5YR 5/8) clay, red (2.5YR 4/8) moist; moderate, coarse, prismatic structure parting to moderate, medium, subangular blocky; hard, firm, sticky; clay films on ped faces; few fine pores; mildly alkaline; gradual, smooth boundary.

B24t—66 to 83 inches, light-red (2.5YR 6/8) clay loam, red (2.5YR 5/8) moist; moderate, coarse, prismatic structure parting to moderate, medium, subangular blocky; slightly hard, friable, slightly sticky; few clay films on ped faces; few fine pores; mildly alkaline.

The A horizon ranges from 7 to 18 inches in thickness. It is reddish-brown, brown, or pale-brown fine sandy loam to loamy fine sand.

The Bt horizon ranges from 50 to more than 70 inches in thickness. It is reddish-brown, red, light-red, or dark reddish-brown clay, clay loam, sandy clay loam, or sandy clay. Reaction is neutral or slightly acid in the upper part and neutral to moderately alkaline in the lower part.

Depth to the C horizon ranges from 60 to 90 inches.

Hamby loamy fine sand, 0 to 3 percent slopes (HaB).—This soil is on nearly level to gently undulating uplands. Areas are irregular in shape and range from 25 to 400 acres in size.

This soil has a surface layer of reddish-brown loamy fine sand about 12 inches thick. The next layer extends to a depth of about 23 inches. It is reddish-brown, firm sandy clay in the upper part and red, firm sandy clay in the lower part. The next 46 inches is red, friable sandy clay loam in the upper part and light-red, friable sandy clay loam in the lower part. The underlying material is light-red, massive sandy clay loam that contains streaks of sandy clay and grayish mottles and extends to a depth of about 100 inches.

Included with this soil in mapping are small areas of Demona and Miles soils. Also included are some areas of soils that have gullies 2 to 4 feet deep, 8 to 30 feet wide, and 600 to 800 feet apart. These included soils make up less than 15 percent of the mapped acreage of this soil.

Most areas of this soil are used for range and pasture. Capability unit IIIe-6; Sandy range site.

Hamby fine sandy loam, 0 to 1 percent slopes (HbA).—This nearly level soil is on slightly convex uplands. Areas are irregular in shape and range from 20 to 200 acres in size.

This soil has a surface layer of reddish-brown fine sandy loam about 9 inches thick. The next layer is reddish-brown, firm sandy clay about 59 inches thick. The underlying material is red sandy clay loam that extends to a depth of about 80 inches.

Included with this soil in mapping are small areas of Demona and Miles soils. Also included are small areas, less than 50 feet in diameter, where the surface layer has been removed by erosion. These included areas make up less than 15 percent of the mapped acreage of this soil.

Most areas of this soil are cultivated. Capability unit IIe-3; Sandy Loam range site.

Hamby fine sandy loam, 1 to 3 percent slopes (HbB).—This gently sloping soil is on uplands. Areas are irregular in shape and range from 20 to 250 acres in size. This soil has the profile described as representative of the series.

Included with this soil in mapping are small areas of Demona and Miles soils. Also included are small areas, less than 100 feet in diameter, where the surface layer has

been removed by erosion. These included areas make up less than 15 percent of the mapped acreage of this soil.

Most areas of these soils are cultivated. Capability unit IIIe-4; Sandy Loam range site.

Hamby fine sandy loam, 3 to 5 percent slopes (HbC).—This gently undulating soil is on upland knolls and foot slopes. Areas are irregular in shape and range from 20 to 100 acres in size.

This soil has a surface layer of reddish-brown fine sandy loam about 9 inches thick. The next layer is red, firm sandy clay about 29 inches thick. The next 36 inches is red, firm sandy clay loam in the upper part and friable fine sandy loam in the lower part. The underlying material is light-red, friable fine sandy loam that is about 30 percent coarse fragments of calcareous pebbles and sandstone and extends to a depth of about 92 inches.

Included with this soil in mapping are small areas of Miles and Shep soils. Also included are small areas, less than 150 feet in diameter, where the surface layer has been removed by erosion.. These included soils make up less than 15 percent of the mapped acreage of this soil.

Most areas of this soil are used for range and pasture. Capability unit IIIe-4; Sandy Loam range site.

Hamby-Urban land complex, 0 to 3 percent slopes (HuB).—This complex is on nearly level to gently sloping built-up areas that are within the metropolitan areas of Abilene and the Dyess Air Force Base. About 50 percent of the complex is Hamby fine sandy loam, 40 percent is Urban land, and 10 percent is included soils of the Miles, Sagerton, and Tillman series.

Hamby soils have a surface layer of reddish-brown, friable fine sandy loam about 8 inches thick. The next layer is red, firm sandy clay about 59 inches thick. The underlying material is red, friable sandy clay loam that extends to a depth of about 80 inches.

Urban land consists of such works and structures as streets, sidewalks, buildings, driveways, and patios; most of these structures are single-unit dwellings. Much of the soil has been altered by excavations or has been covered with contrasting soil material. The more sloping parts of the complex are cut or filled to a depth that ranges from a few inches to as much as 3 feet, depending on slope.

Some of the hazards in urban development on this complex are cracking and shifting of structures because of the shrink-swell potential of the soils, failure of uncoated steel pipes because of corrosivity, and failure of septic tank filter fields caused by moderately slow permeability.

The soils of this complex are suitable for recreational development, such as picnic areas, paths, and trails, but they are limited for playgrounds and camp areas. If these soils are used for landscaping and gardening, yearly applications of nitrogen and phosphorus fertilizers are needed. Not assigned to a capability unit and range site.

Kavett Series

The Kavett series consists of shallow, nearly level to gently sloping, well-drained, clayey soils on uplands. These soils formed in clayey sediment over limestone.

In a representative profile the upper 7 inches of the surface layer is dark grayish-brown clay. The next 8 inches of the surface layer is dark-brown clay. This layer rests abruptly on fractured limestone that is coated with secondary calcium carbonate.

Permeability is moderately slow in these soils. Internal drainage is slow. The hazard of soil blowing is slight.

These soils are used for range.

Representative profile of Kavett clay, 1 to 3 percent slopes, in range, 2.2 miles south on Farm Road 382 from south junction with Farm Road 604 and 50 feet east:

A11—0 to 7 inches, dark grayish-brown (10YR 4/2) clay, very dark grayish brown (10YR 3/2) moist; weak, fine, subangular blocky and granular structure; very hard, very firm, sticky; few fragments of limestone; calcareous; moderately alkaline; gradual, smooth boundary.

A12—7 to 15 inches, dark-brown (10YR 4/3) clay, dark brown (10YR 3/3) moist; moderate, fine, subangular and angular blocky structure; very hard, very firm, sticky; few fragments of limestone; calcareous; moderately alkaline; abrupt, wavy boundary.

Rca—15 to 20 inches, fractured limestone plates 5 inches thick and 12 inches wide; cemented secondary calcium carbonate in fractures of limestone and on bottoms of limestone plates.

The A horizon ranges from 12 to 20 inches in thickness. It is dark grayish brown, very dark grayish brown, or dark brown.

Depth to the Rca layer ranges from 12 to 20 inches. This horizon is fractured limestone coated with calcium carbonate.

Kavett clay, 0 to 1 percent slopes (KaA).—This nearly level soil is on slightly concave uplands. Areas are irregular in shape and range from 25 to 150 acres in size.

This soil has a surface layer of dark grayish-brown clay about 6 inches thick. The next layer is dark-brown, firm clay about 10 inches thick. This layer rests abruptly on fractured limestone.

Included with this soil in mapping are small areas of Mereta, Tarrant, and Valera soils. These included soils make up less than 15 percent of the mapped acreage of this soil.

Most areas of this soil are used for range. Capability unit IIIs-2; Shallow range site.

Kavett clay, 1 to 3 percent slopes (KaB).—This gently sloping soil is on convex uplands. Areas are irregular in shape and range from 25 to 300 acres in size. This soil has the profile described as representative of the series.

Included with this soil in mapping are small areas of Mereta, Tarrant, and Valera soils. These included soils make up less than 15 percent of the mapped acreage of this soil.

Most areas of this soil are used for range. Capability unit IIIe-7; Shallow range site.

Mangum Series

The Mangum series consists of deep, nearly level, well drained to moderately well drained, clayey soils on flood plains. These soils formed in clayey alluvium.

In a representative profile the surface layer is reddish-brown silty clay loam about 9 inches thick. The next layer is reddish-brown, friable silty clay about 45 inches thick. Underlying this is firm, red clay that extends to a depth of 81 inches and contains films and threads of calcium carbonate.

Permeability is very slow in these soils. Internal drainage is slow, but water enters rapidly through cracks when the soil is dry. These soils are subject to flooding. The hazard of soil blowing is slight.

The Mangum soils are used for crops, range, and pasture.

Representative profile of Mangum silty clay loam in a

cultivated field, 0.6 mile east on Industrial Boulevard from junction with Business U.S. 83 and 0.7 mile north:

Ap—0 to 9 inches, reddish-brown (2.5YR 5/4) silty clay loam, reddish brown (2.5YR 4/4) moist; weak subangular blocky and granular structure; hard, friable, sticky; calcareous; moderately alkaline; abrupt, smooth boundary.

C1—9 to 54 inches, reddish-brown (2.5YR 5/4) silty clay, reddish brown (2.5YR 4/4) moist; massive; very hard, friable, sticky; thinly stratified (1/16 to 1/2 inch thick); common films and threads of calcium carbonate; few worm casts and fine pores; calcareous; moderately alkaline; gradual, smooth boundary.

C2—54 to 81 inches, red (2.5YR 4/6) clay, dark red (2.5YR 3/6) moist; massive; thinly stratified (1/16 to 1/2 inch thick) with loamy and gravelly material; very hard, firm, sticky; few worm casts; common films and threads of calcium carbonate; calcareous; moderately alkaline.

The A horizon ranges from 6 to 10 inches in thickness. It is red, reddish-brown, or brown silty clay loam, silt loam, silty clay, or clay.

The C horizon is reddish-brown, red, or yellowish-red silty clay, clay, or silty clay loam. This horizon contains 5 to 10 percent films and threads of calcium carbonate.

Mangum silty clay loam (Ma).—This nearly level soil is on slightly concave flood plains of the major creeks. Areas are irregular in shape and range from 50 to 250 acres in size. Slopes are 0 to 1 percent. This soil has the profile described as representative of the series.

Included with this soil in mapping are small areas of Clairemont, Colorado, Gageby, Rioconcho, Stamford, and Tillman soils. These included soils make up less than 15 percent of the mapped acreage of this soil.

Most areas of this soil are used for crops. These soils flood one or more times in a 4- to 10-year period, but flooding may occur only once in 15 to 30 years for less than 36 hours. The flooding, however, does little damage to crops. Capability unit IIIw-1; Clayey Bottomland range site.

Mangum-Urban land complex (Mb).—This complex is on nearly level bottom lands above creeks and drainageways within the built-up areas of the city of Abilene. About 50 percent of the complex is Mangum soils, 45 percent is Urban land, and the other 5 percent is included soils of the Clairemont, Rioconcho, and Sagerton series.

Mangum soils have a surface layer of reddish-brown silty clay loam about 6 inches thick. Below this is reddish-brown, firm clay about 22 inches thick. The next layer is yellowish-red, firm silty clay loam about 10 inches thick. Underlying this is yellowish-red silty clay that extends to a depth of 62 inches.

Some of the hazards in urban development on this complex are cracking and shifting of structures because of the shrink-swell potential of the soils, failure of uncoated steel pipes because of corrosivity, failure of septic tank filter fields caused by permeability, and flooding of streets and low-cost roads and light types of industry and buildings. These soils flood once in 15 to 30 years for a period of less than 36 hours. Recreational development for playgrounds, paths and trails, and camp and picnic areas is limited by flooding.

If the soils of this complex are used for landscaping and gardening, the main hazards are the clayey surface layer and chlorosis, or leaf yellowing, in plants that are sensitive to high concentrations of lime. The lime limits availability of iron to the plants and thus causes the yellowing of the leaves. Not assigned to a capability unit and range site.

Mangum soils, frequently flooded (Mf).—These soils are on slightly concave benches and backwater areas of the major creeks. Areas are narrow and oblong shaped and range from 50 to 250 acres in size. Slopes are 0 to 1 percent.

These soils have a surface layer of reddish-brown clay, silty clay, silt loam, or silty clay loam about 8 inches thick. The next layer is reddish-brown, firm clay that extends to a depth of 72 inches and is stratified with loamy and gravelly material. Areas of these Mangum soils are cut by winding stream channels. They contain potholes that hold water for extended periods after flooding. Several inches of sandy, loamy, and clayey sediments may be deposited during flooding.

Included with these soils in mapping are small areas of Clairemont, Gageby, and Sagerton soils. These included soils make up less than 15 percent of the mapped acreage of this soil.

Most areas of these soils are used for range, pasture, and wildlife. These soils flood one or more times in 1 year out of 4 by swift-moving currents during periods of heavy rainfall and for short periods after these rains. Capability unit Vw-1; Clayey Bottomland range site.

Mereta Series

The Mereta series consists of nearly level to gently undulating, well-drained, loamy soils on uplands. These soils formed in loamy sediment and are shallow over strongly cemented caliche.

In a representative profile the upper 6 inches of the surface layer is very dark grayish-brown clay loam. The next 12 inches of the surface layer is dark-brown, friable clay loam. This layer rests abruptly on pinkish-gray strongly cemented caliche about 4 inches thick. The underlying material is pink limy clay loam that contains calcium carbonate and extends to a depth of about 30 inches.

Permeability is slow in the cemented layer of these soils. Internal drainage is medium (fig. 3). The hazard of soil blowing is slight.

The Mereta soils are used for crops and range.

Representative profile of Mereta clay loam, 1 to 3 percent slopes, in range, 4.4 miles southwest on U.S. Highway 277 from junction with Farm Road 89, 0.9 mile southeast on private road, and 100 feet east:

Ap—0 to 6 inches, very dark grayish-brown (10YR 3/2) clay loam, very dark brown (10YR 2/2) moist; moderate, fine, granular structure; hard, friable, slightly sticky; many, fine and very fine, hard, caliche fragments; calcareous; moderately alkaline; abrupt, smooth boundary.

A1—6 to 18 inches, dark-brown (10YR 4/3) clay loam, dark brown (10YR 3/3) moist; moderate, fine, granular structure; hard, friable, slightly sticky; common worm casts; common fine and very fine concretions of calcium carbonate; few fine quartzite pebbles; calcareous; moderately alkaline; abrupt, wavy boundary.

Ccam—18 to 22 inches, pinkish-gray (7.5YR 7/2) strongly cemented caliche, pinkish gray (7.5YR 6/2) moist; this horizon consists of a mass of large (1 inch to 3 inches in diameter) nodular concretions that are weakly cemented; calcareous; moderately alkaline; gradual, wavy boundary.

Cca—22 to 30 inches, pink (7.5YR 8/4) limy clay loam, light brown (7.5YR 6/4) moist; massive; 20 percent or more calcium carbonate; calcareous; moderately alkaline.

The A horizon ranges from 14 to 20 inches in thickness. It is very dark grayish brown, dark brown, or brown.

The Ccam horizon ranges from 3 to 7 inches in thickness. It is weakly cemented to indurated and ranges from large nodular concretions to platy caliche.

Depth to the Cca horizon ranges from 17 to 27 inches. This horizon is pink, brown, or reddish-yellow clay loam, clay, and silty clay to loam.

Figure 3.—**Profile of Mereta clay loam. Strongly cemented caliche is below a depth of 18 inches.**

Mereta clay loam, 0 to 1 percent slopes (MrA).—This nearly level soil is on slightly convex upland ridges and knolls. Areas are irregular in shape and range from 10 acres to 150 acres in size.

This soil has a surface layer of dark grayish-brown clay loam about 9 inches thick. The next layer is dark-brown, friable clay loam about 9 inches thick. This layer rests abruptly on strongly cemented caliche about 3 inches thick. The underlying material is brown, limy silty clay loam that extends to a depth of about 45 inches.

Included with this soil in mapping are small areas of Kavett, Pitzer, Rowena, Tarrant, and Weymouth soils. Also included are areas of a soil that is similar to this Mereta soil but has a surface layer of loam. These included soils make up less than 15 percent of the mapped acreage of this soil.

Most areas of these soils are used for crops. Capability unit IIIs-2; Shallow range site.

Mereta clay loam, 1 to 3 percent slopes (MrB).—This gently sloping soil is on slightly convex upland ridges and knolls. Areas are irregular in shape and range from 10 to 150 acres in size. This soil has the profile described as representative of the series.

Included with this soil in mapping are small areas of Kavett, Tarrant, Valera, and Weymouth soils. Also included are areas of a soil that is similar to this Mereta soil but has a surface layer of loam. These included soils make up less than 15 percent of the mapped acreage of this soil.

Most areas of these soils are used for range. Capability unit IIIe-7; Shallow range site.

Mereta clay loam, 3 to 5 percent slopes (MrC).—This gently undulating soil is on slightly convex upland ridges and knolls. Areas are irregular in shape and range from 15 to 50 acres in size.

This soil has a surface layer of dark-brown clay loam about 10 inches thick. The next layer is brown, friable clay loam about 10 inches thick. This layer rests abruptly on strongly cemented caliche about 7 inches thick. The underlying material is reddish-yellow, friable clay loam that extends to a depth of about 70 inches. Yellow marly earth of about silty clay loam texture is at a depth of 80 inches.

Included with this soil in mapping are small areas of Kavett, Pitzer, Speck, and Tarrant soils. These included soils make up less than 15 percent of the mapped acreage of this soil.

Most areas of this soil are used for range. Capability unit IVe-1; Shallow range site.

Miles Series

The Miles series consists of deep, nearly level to gently undulating, well-drained, loamy soils on uplands. These soils formed in loamy sediment.

In a representative profile (fig. 4) the surface layer is reddish-brown fine sandy loam about 9 inches thick. The upper part of the subsoil is reddish-brown, friable sandy clay loam about 53 inches thick. The lower part is yellowish-red sandy clay loam that contains soft masses of calcium carbonate and extends to a depth of about 80 inches.

Permeability is moderate in these soils. Internal drainage is medium. The hazard of soil blowing is moderate.

The Miles soils are used for crops and range.

Representative profile of Miles fine sandy loam, 0 to 1 percent slopes, in a cultivated field, 0.3 mile northeast on Farm Road 126 from junction with Santa Fe Railroad and 100 feet south:

Ap—0 to 9 inches, reddish-brown (5YR 4/4) fine sandy loam, dark reddish brown (5YR 3/4) moist; weak, fine, blocky structure; slightly hard, friable; nonsticky; few fine roots; neutral; abrupt, smooth boundary.

B21t—9 to 32 inches, reddish-brown (5YR 4/4) sandy clay loam, dark reddish brown (5YR 3/4) moist; moderate, coarse, prismatic structure parting to moderate, medium and fine, subangular blocky; very hard, friable, slightly sticky; few clay films on vertical surfaces of peds; few fine chert and quartzite fragments of pebble size; neutral; gradual, smooth boundary.

B22t—32 to 62 inches, reddish-brown (5YR 5/4) sandy clay loam, reddish brown (5YR 4/4) moist; moderate, coarse, prismatic structure parting to moderate, medium and fine, subangular blocky; very hard, friable, slightly sticky; few clay films on vertical surfaces of peds; few very fine chert fragments; neutral; gradual, wavy boundary.

Figure 4.—**Profile of Miles fine sandy loam.**

B3ca—62 to 80 inches, yellowish-red (5YR 5/6) sandy clay loam, yellowish red (5YR 4/6) moist; weak, very fine, subangular blocky structure; very hard, friable, slightly sticky; few fine chert fragments; about 5 percent soft masses of calcium carbonate; calcareous; moderately alkaline.

The A horizon ranges from 7 to 12 inches in thickness. It is reddish brown or light brown. Fine to medium quartzitic fragments of pebble size are on the surface in some areas.

The Bt horizon ranges from 50 to more than 100 inches in thickness. The Bt horizon is reddish brown, yellowish red, or red. Reaction is neutral to moderately alkaline.

The Bca horizon is yellowish red, reddish yellow, red, or reddish brown. It is 5 to 15 percent, by volume, films, threads, and masses of calcium carbonate.

Miles fine sandy loam, 0 to 1 percent slopes (MsA).—This nearly level soil is on uplands. Areas are irregular in shape and range from 25 to 300 acres in size. This soil has the profile described as representative of the series.

Included with this soil in mapping are small areas of Cobb, Rotan, and Sagerton soils. Also included are areas of soils that have a surface layer of loamy fine sand. These included soils make up less than 15 percent of the mapped acreage of this soil.

Most areas of these soils are used for crops. Capability unit IIe-3; Sandy Loam range site.

Miles fine sandy loam, 1 to 3 percent slopes (MsB).—This gently sloping soil is on convex uplands. Areas are irregular in shape and range from 50 to 200 acres in size.

This soil has a surface layer of reddish-brown fine sandy loam about 7 inches thick. The next layer is friable sandy clay loam about 54 inches thick that is reddish brown in the upper part and yellowish red in the lower part. The underlying material is reddish-yellow sandy clay loam that contains about 10 percent soft masses of calcium carbonate and extends to a depth of about 80 inches.

Included with this soil in mapping are small areas of Cobb and Sagerton soils and a few areas of soils that have a surface layer of loamy fine sand. Also included are some areas of soils that have gullies 1 foot to 3 feet deep, 10 to 24 feet wide, and 300 to 700 feet apart. These included soils make up less than 15 percent of the mapped acreage of this soil.

Most areas of these soils are used for crops. Capability unit IIIe-1; Sandy Loam range site.

Miles fine sandy loam, 3 to 5 percent slopes (MsC).—This gently undulating soil is on ridges and foot slopes. Areas are irregular in shape and range from 20 to 50 acres in size.

This soil has a surface layer of reddish-brown fine sandy loam about 9 inches thick. The next layer is friable sandy clay loam about 34 inches thick that is reddish brown in the upper part and red in the lower part. The underlying material is red sandy clay loam that contains about 10 percent soft masses of calcium carbonate and extends to a depth of about 80 inches.

Included with this soil in mapping are small areas of Cobb, Hamby, and Shep soils and a few areas where the surface layer is loamy fine sand. Also included are some areas of soils that have gullies 1 foot to 3 feet deep, 8 to 20 feet wide, and 300 to 700 feet apart. These included soils make up less than 15 percent of the mapped acreage of this soil.

Most areas of these soils are used for crops and range. Capability unit IIIe-4; Sandy Loam range site.

Owens Series

The Owens series consists of shallow, gently sloping to strongly sloping, well-drained, clayey soils on uplands. These soils formed in clayey shale.

In a representative profile the surface layer is reddish-brown clay about 7 inches thick. The next layer is reddish-brown, firm clay about 9 inches thick. The underlying material is weak-red shaly clay that contains common bluish spots and streaks and extends to a depth of about 24 inches.

Permeability is very slow in these soils. Internal drainage is slow. The hazard of water erosion is severe, and the hazard of soil blowing is slight.

The Owens soils are used for range.

Representative profile of Owens clay in an area of Owens-Badland complex, 3 to 12 percent slopes, in range, 1.4 miles north on Farm Road 707 from junction with Interstate 20 and 0.4 mile east:

A1—0 to 7 inches, reddish-brown (2.5YR 5/4) clay, reddish brown (2.5YR 4/4) moist; weak granular structure; hard, friable, sticky; few fine roots; calcareous; moderately alkaline; clear, smooth boundary.

Bca—7 to 16 inches, reddish-brown (2.5YR 4/4) clay, reddish brown (2.5YR 4/4) moist; moderate, fine, blocky structure; very hard, firm, sticky; few worm casts; few soft and hard segregations of calcium carbonate; calcareous; moderately alkaline; gradual, smooth boundary.

C—16 to 24 inches, weak-red (10R 5/3) shaly clay, weak red (10R 4/3) moist; common bluish spots and streaks; calcareous; moderately alkaline.

The A horizon ranges from 6 to 10 inches in thickness. It is reddish-brown, red, or olive-brown clay, silty clay, or silty clay loam.

The Bca horizon ranges from 6 to 10 inches in thickness. It is reddish-brown, red, or olive-brown clay, silty clay, or silty clay loam.

Depth to the C horizon ranges from 12 to 20 inches.

Owens-Badland complex, 3 to 12 percent slopes (ObE).—This complex is on gently sloping to strongly sloping areas of short escarpments, steep knolls, and ridges that contain small plateaus or buttes. Areas are irregular in shape and range from 10 to 200 acres in size. About 42 percent of the complex is Owens clay, 33 percent is Badland, and 25 percent is included soils of the Vernon, Mangum, Tillman, and Stamford series. These included soils are at the lower elevations where slopes range from 0 to 5 percent.

Owens soils dominate the complex. They are on steep knolls and ridges. Areas of Badland are on escarpments and severely eroded areas below escarpments.

The soils of this complex are used for range and wildlife habitat. They are subject to severe water erosion. Capability unit VIIs-1; Owens soil in Shallow Clay range site; Badland not assigned to a range site.

Pitzer Series

The Pitzer series consists of very shallow or shallow, gently sloping to sloping, well-drained, loamy soils on uplands. These soils formed in loamy sediment over indurated caliche.

In a representative profile the surface layer is dark grayish-brown gravelly loam about 6 inches thick. This layer rests abruptly on pinkish-white indurated caliche about 14 inches thick that is platy in the upper part. The next layer is reddish-yellow very gravelly sandy loam about 56 inches thick that is 50 percent, by volume, caliche-coated siliceous and limestone fragments of pebble size. The underlying material is red clayey shale that extends to a depth of about 80 inches.

Permeability is slow in the indurated caliche of these soils. Internal drainage is medium. The hazard of soil blowing is moderate.

The Pitzer soils are used for range.

Representative profile of Pitzer gravelly loam, 1 to 8 percent slopes, in range, 3.2 miles south on Farm Road 707 from junction with Interstate 20, 0.9 mile west on paved county road, and 225 feet south:

A1—0 to 6 inches, dark grayish-brown (10YR 4/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak, fine, granular structure; slightly hard, friable; about 20 percent caliche fragments of pebble size; common siliceous fragments of pebble size; calcareous; moderately alkaline; abrupt, smooth boundary.

C1cam—6 to 11 inches, pinkish-white (7.5YR 8/2) indurated caliche; fractured plates 5 to 24 inches wide and 1 inch to 4 inches thick; hardness about 3 on Mohs' scale; common siliceous fragments of pebble size embedded in matrix; gradual, smooth boundary.

C2cam—11 to 20 inches, pinkish-white (7.5YR 8/2) indurated massive caliche; hardness about 2 on Mohs' scale; common siliceous fragments of pebble size embedded in matrix; gradual, wavy boundary.

Cca—20 to 76 inches, reddish-yellow (5YR 6/6) very gravelly sandy loam, yellowish red (5YR 5/6) moist; about 50 percent, by volume, caliche-coated siliceous and limestone fragments of pebble size in a weakly cemented porous mass; calcareous; moderately alkaline; clear, smooth boundary.

IIC—76 to 80 inches, red (2.5YR 5/6) clayey shale, red (2.5YR 5/6) moist; few splotches and strata of greenish gray; calcareous; moderately alkaline.

The A horizon ranges from 4 to 14 inches in thickness. It is dark grayish-brown, brown, grayish-brown, dark-brown, dark reddish-gray, or reddish-brown gravelly loam, loam, and clay loam to gravelly clay loam. It is 5 to 30 percent, by volume, coarse caliche and siliceous fragments of pebble size.

Depth to the Ccam horizon ranges from 4 to 14 inches. This horizon is indurated to strongly cemented.

The C horizon is pink, pinkish white, or reddish yellow.

Depth to the IIC horizon ranges from 40 to more than 80 inches. This horizon is clayey shale.

Pitzer gravelly loam, 1 to 8 percent slopes (PtD).—This gently sloping to sloping soil is on convex upland ridges and knolls. Areas are irregular in shape and range from 20 to 50 acres in size. This soil has the profile described as representative of the series.

Included with this soil in mapping are small areas of Vernon and Weymouth soils. These included soils make up less than 15 percent of the mapped acreage of this soil.

Most areas of these soils are used for range. Capability unit VIs-1; Very Shallow range site.

Pitzer-Urban land complex, 1 to 8 percent slopes (PuD).—This complex is on gently sloping to sloping upland ridges and knolls within metropolitan areas. About 50 percent of the complex is Pitzer soils, 45 percent is Urban land, and 5 percent is included soils of the Sagerton, Vernon, and Weymouth series.

Pitzer soils have a surface layer of dark grayish-brown loam about 5 inches thick. The next layer is dark-brown, friable gravelly loam about 5 inches thick. This layer rests abruptly on pinkish-white indurated caliche about 8 inches thick that is platy in the upper part. The next layer is reddish-yellow gravelly fine sandy loam that is 35 percent, by volume, caliche-coated siliceous and limestone fragments of pebble size and extends to a depth of 40 inches or more.

Urban land is used for works and structures such as streets, sidewalks, buildings, driveways, and patios. Most of the structures are single-unit dwellings. Much of the soil in areas of Urban land has been altered by excavations or has been covered by contrasting soil material. The more sloping parts of this unit are cut or filled to a depth of 2 to 8 feet, depending on slope.

Two of the limitations in urban developments on this complex are finding a suitable location for septic tank filter fields and choosing a site for dwelling foundations because of shallow depth.

If the soils of this complex are used for landscaping and gardening, they respond well to yearly applications of nitrogen and phosphorus fertilizer. Adding loamy soil material over the surface increases the rooting depth. Chlorosis, or leaf yellowing, occurs in plants that are sensitive to high concentrations of lime. The lime limits availability of iron to the plants and thus causes the yellowing of the leaves. Not assigned to a capability unit and range site.

Pitzer-Weymouth complex, 1 to 5 percent slopes (PwC).—This complex is on gently sloping upland ridges and knolls. Areas are irregular in shape and range from 25 to 200 acres in size. About 44 percent of this complex (fig. 5) is Pitzer gravelly loam, 30 percent is Weymouth clay loam, and 26 percent is included soils of the Sagerton and

Figure 5.—**Profile of Pitzer and Weymouth soils. Pitzer soils are 4 to 14 inches deep over indurated caliche. Weymouth soils are 20 to 30 inches deep over softer materials.**

Vernon series. The Sagerton soils are at the lower elevations where slopes range from 0 to 3 percent. The Vernon soils are on the sloping areas below the Pitzer soils, generally in the same position as the Weymouth soils.

Pitzer soils dominate this complex and are on the crests of ridges and knolls. Weymouth soils are on the slopes and lower areas below the Pitzer soils. The Pitzer soils have a surface layer of dark grayish-brown gravelly loam about 9 inches thick. This layer rests abruptly on indurated caliche about 3 inches thick. The next layer is pink caliche about 46 inches thick that is about 50 percent caliche-coated siliceous fragments of pebble size. The underlying material is red clayey shale that extends to a depth of about 84 inches.

The Weymouth soils have a surface layer of brown clay loam about 6 inches thick. The next layer is reddish-brown clay loam about 8 inches thick. The next layer is yellowish-red clay loam about 13 inches thick that is about 15 percent, by volume, calcium carbonate. The underlying material is shaly clay that extends to a depth of about 36 inches.

Most areas of this complex are used for range. Capability unit VIs-1; Pitzer soil in Very Shallow range site; Weymouth soil in Clay Loam range site.

Quanah Series

The Quanah series consists of deep, gently sloping, well-drained, loamy soils on uplands. These soils formed in calcareous loamy sediment.

In a representative profile the surface layer is dark grayish-brown clay loam about 17 inches thick. The next layer is brown, friable clay loam about 15 inches thick. The next 28 inches is light yellowish-brown, friable sandy clay loam that contains common films and threads of calcium carbonate. The underlying material, which extends to a depth of about 72 inches, is light reddish-brown stratified loamy sediment that contains an estimated 10 to 12 percent visible concretions of calcium carbonate and fragments of limestone.

Permeability is moderate in these soils. Internal drainage is medium. The hazard of soil blowing is slight.

The Quanah soils are used for range and crops.

Representative profile of Quanah clay loam, 1 to 3 percent slopes, in a cultivated field, 4.9 miles south on Farm Road 126 from junction with Farm Road 1085, 2 miles south on county road, and 0.6 mile southwest:

Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; weak, fine, subangular blocky structure parting to moderate, very fine, granular; slightly hard, friable, slightly sticky; about 20 percent, by volume, worm casts; common fine to medium fragments of limestone and concretions of calcium carbonate; calcareous; moderately alkaline; abrupt, smooth boundary.

A1—8 to 17 inches, dark grayish-brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; weak, fine, subangular blocky structure parting to moderate, very fine, granular; slightly hard, friable, slightly sticky; about 20 percent, by volume, worm casts; common fine to medium fragments of limestone and concretions of calcium carbonate; few films and threads of calcium carbonate; calcareous; moderately alkaline; gradual, smooth boundary.

B2—17 to 32 inches, brown (10YR 5/3) clay loam, dark brown (10YR 4/3) moist; weak, fine, subangular blocky structure parting to moderate, very fine, granular; slightly hard,

friable, slightly sticky; about 6 percent visible concretions of calcium carbonate and fragments of limestone; common films and threads of calcium carbonate; calcareous; moderately alkaline; clear, wavy boundary.

B2ca—32 to 60 inches, light yellowish-brown (10YR 6/4) sandy clay loam, dark grayish brown (10YR 4/2) moist; moderate, fine, granular structure; slightly hard, friable, slightly sticky; common films and threads of calcium carbonate; 24 percent calcium carbonate equivalent; calcareous; moderately alkaline; diffuse, wavy boundary.

Cca—60 to 72 inches, light reddish-brown (5YR 6/4) stratified loamy sediment, reddish brown (5YR 5/4) moist; massive; slightly hard, friable; about 10 to 12 percent visible concretions of calcium carbonate and fragments of limestone; calcareous; moderately alkaline.

The A horizon ranges from 11 to 20 inches in thickness. It is very dark grayish brown, dark grayish brown, or dark brown.

The B2 horizon ranges from 15 to 24 inches in thickness. It is brown, dark grayish-brown, or yellowish-brown clay loam and loam to silty clay loam.

Depth to the Bca horizon ranges from 26 to 44 inches. This horizon is light yellowish brown, reddish brown, very pale brown, or reddish yellow.

Depth to the Cca horizon ranges from 33 to 60 inches. This horizon is light reddish brown, reddish brown, brown, or reddish yellow. It contains 10 to 12 percent calcium carbonate.

Quanah soils in Taylor County are outside the range defined for the series in that the content of calcium carbonate and particles coarser than very fine sand is slightly higher. This difference does not alter the usefulness or behavior of the soils.

Quanah clay loam, 1 to 3 percent slopes (QaB).—This gently sloping soil is on upland foot slopes. Areas are irregular in shape and range from 25 to 100 acres in size. This soil has the profile described as representative of the series.

Included with this soil in mapping are small areas of Gageby, Rioconcho, Rotan, Rowena, and Shep soils. Also included are a few areas of soils that have gullies 1 foot to 5 feet deep, 10 to 30 feet wide, and 300 to 700 feet apart. The gullies are caused by water erosion. These included soils make up less than 15 percent of the mapped acreage of this soil.

This soil is used for range and crops. Capability unit IIe-2; Clay Loam range site.

Quanah clay loam, 3 to 5 percent slopes (QaC).—This gently sloping soil is on upland foot slopes. Areas are irregular in shape and range from 25 to 150 acres in size.

This soil has a surface layer of dark grayish-brown clay loam about 7 inches thick. The next layer is dark-brown, friable clay loam about 9 inches thick. The next layer is brown, friable clay loam about 16 inches thick. The underlying material is very pale brown, friable clay loam that contains about 40 percent calcium carbonate and extends to a depth of about 72 inches.

Included with this soil in mapping are small areas of Potter and Shep soils and a soil that is similar to this Quanah soil but has more clay throughout the profile. Also included are a few areas of soils that have gullies 1 foot to 5 feet deep, 5 to 20 feet wide, and 300 to 700 feet apart. The gullies are caused by water erosion. These included soils make up less than 15 percent of the mapped acreage of this soil.

Most areas of this soil are used for range. Capability unit IVe-1; Clay Loam range site.

Randall Series

The Randall series consists of deep, nearly level, somewhat poorly drained soils in the bottom of enclosed depressions and intermittent lakes, or playas. These soils formed in calcareous clayey sediment.

In a representative profile the surface layer is dark-gray clay about 13 inches thick. The next layer is gray, extremely firm clay about 39 inches thick. The underlying material is massive, light-gray clay that extends to a depth of 90 inches.

Permeability is very slow in these soils. Internal drainage is very slow. Water enters rapidly through cracks in the soils if they are dry. These soils are subject to flooding. The hazard of soil blowing is slight.

The Randall soils are used for range.

Representative profile of Randall clay in a formerly cultivated field, 1.25 miles south on Loop 312 from junction with U.S. Highway 84 and 1.1 miles west:

Ap—0 to 13 inches, dark-gray (10YR 4/1) clay, very dark gray (10YR 3/1) moist; moderate, very fine, granular structure; extremely hard, extremely firm, sticky; few fine roots; neutral; abrupt, smooth boundary.

AC—13 to 52 inches, gray (10YR 5/1) clay, dark gray (10YR 4/1) moist; moderate, very fine, irregular blocky structure; extremely hard, extremely firm, sticky; evident slickensides, parallelepipeds, few fine concretions of calcium carbonate; matrix noncalcareous, but calcareous in spots; mildly alkaline; gradual, wavy boundary.

C—52 to 90 inches, light-gray (10YR 6/1) clay, dark gray (10YR 4/1) moist; massive; extremely hard, extremely firm, sticky; calcareous; moderately alkaline.

The A horizon ranges from 12 to 18 inches in thickness. It is gray, dark gray, or dark grayish brown. Reaction is neutral to moderately alkaline.

The AC horizon ranges from 10 to 40 inches in thickness. It is gray, dark gray, or light gray.

Depth to the C horizon ranges from 40 to 60 inches. This horizon contains some mottles of olive or pale yellow.

Limestone in places is below a depth of 50 inches.

Randall clay (Ra).—This nearly level soil is in weakly concave playas. These depressions are rounded or oval in shape and range from 5 to 50 feet in size. Slopes are 0 to 1 percent.

Included with this soil in mapping are small areas of Tobosa and Valera soils on the outer perimeter of the depressions. These included soils make up less than 15 percent of the mapped acreage of this soil.

Most areas of this soil are used for range and wildlife habitat. The soil floods one or more times in 1 year out of 4. Capability unit VIw-1; included in surrounding range site.

Rioconcho Series

The Rioconcho series consists of deep, nearly level, moderately well drained, loamy soils on bottom lands. These soils formed in clayey alluvial sediment.

In a representative profile the upper 8 inches of the surface layer is dark grayish-brown clay loam. The next 22 inches of the surface layer is friable clay loam that is dark grayish brown in the upper part and yellowish brown in the lower part. The underlying material is brown, friable clay loam that is stratified with very fine sandy loam, silt loam, and clay and extends to a depth of about 80 inches.

Permeability is slow in these soils. Internal drainage is slow. These soils are subject to flooding. The hazard of soil blowing is slight.

The Rioconcho soils are used for range and crops.

Representative profile of Rioconcho clay loam in a cultivated field, 0.8 mile southeast on Interstate 20 from junc-

tion with Texas Highway 351 and 200 feet south:

Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; weak, fine, granular structure; slightly hard, friable, slightly sticky; calcareous; moderately alkaline; abrupt, smooth boundary.

A11—8 to 21 inches, dark grayish-brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate, very fine, subangular blocky structure parting to fine granular; hard, friable, sticky; calcareous; moderately alkaline; clear, wavy boundary.

A12—21 to 30 inches, yellowish-brown (10YR 5/4) clay loam, dark yellowish brown (10YR 4/4) moist; moderate, fine, subangular blocky structure; very hard, friable, sticky; calcareous; moderately alkaline; gradual, wavy boundary.

C—30 to 80 inches, brown (7.5YR 5/4) clay loam stratified with very fine sandy loam, silt loam, and clay and coarse-textured strata 2 to 20 millimeters thick, dark brown (7.5YR 4/4) moist; hard, friable, sticky; few soft masses of calcium carbonate; calcareous; moderately alkaline.

The A11 and A12 horizons range from 20 to 50 inches in thickness. They are dark grayish-brown, yellowish-brown, dark-brown, or brown clay loam, silty clay, silty clay loam, or clay. Reaction is mildly alkaline or moderately alkaline.

Depth to the C horizon ranges from 24 to 50 inches. Below a depth of 40 inches in a few places this horizon contains strata of gravelly, clayey, or sandy material and in some places contains limestone, quartz, and indurated caliche fragments of pebble and stone size.

If these soils are dry, they have cracks ¾ inch to 1½ inches wide that extend to a depth of 30 inches or more.

Rioconcho clay loam (Rc).—This nearly level soil is in slightly concave bottom lands. Areas are irregular in shape and range from 50 to 100 acres in size. Slopes are 0 to 1 percent. This soil has the profile described as representative of the series.

Included with this soil in mapping are small areas of Colorado and Gageby soils. These included soils make up less than 15 percent of the mapped acreage of this soil.

Areas of this soil are used for range and crops. These soils flood one or more times in a 4- to 10-year period, but they may flood with 6 to 18 inches of water only once in 15 to 30 years for less than 36 hours. The flooding, however, generally does not cause crop failure. Capability unit IIc-1; Loamy Bottomland range site.

Rioconcho soils, frequently flooded (Rf).—This nearly level soil is in concave benches of creeks and drainageways. Areas are long and narrow in shape and range from 20 to 50 acres in size. Slopes are 0 to 1 percent.

These soils have a surface layer of dark-brown silty clay loam, clay loam, silty clay, or clay about 12 inches thick. The next layer, about 12 inches thick, is dark-brown, friable clay loam. The underlying material is dark grayish-brown, firm clay that is stratified with fine sandy loam, quartz gravel, and fragments of limestone and extends to a depth of about 60 inches.

Included with these soils in mapping are small areas of Colorado and Gageby soils. These included soils make up less than 15 percent of the mapped acreage of these soils.

Areas of these soils are used for range, pasture, and wildlife habitat. The soils flood one or more times in 1 year out of 4. They flood each year for 24 to 72 hours after heavy rain. Some areas have an intermittent high water table below a depth of 6 feet. Capability unit Vw-1; Loamy Bottomland range site.

Rock Outcrop

Rock outcrop consists of exposures of limestone and sandstone bedrock that are partly covered by boulders, stones, cobbles, and pebbles.

This land type consists of hilly to steep, rough and broken areas that are mostly along escarpments. The escarpments have an elevation change of 200 to 700 feet over a horizontal distance of 200 to 1,000 feet. Rock covers 10 to 40 percent of the land surface.

Rock outcrop has little value for farming because the rock limits the use of farm equipment. Also, the vegetation on some areas is too sparse for grazing.

Rock outcrop is mapped only with Tarrant soils and Ustochrepts.

Rotan Series

The Rotan series consists of deep, nearly level to gently sloping, well-drained, clayey soils on uplands. These soils formed in calcareous clayey sediment.

In a representative profile the surface layer is dark-brown clay loam about 6 inches thick. The subsoil extends to a depth of about 80 inches. The upper 8 inches of the subsoil is dark grayish-brown, friable clay loam. The next 34 inches is firm clay that is dark grayish brown in the upper part and dark brown in the lower part. The lower part of the subsoil is reddish-yellow clay loam that extends to a depth of about 80 inches.

Permeability is moderately slow in these soils. Internal drainage is slow. The hazard of soil blowing is slight.

The Rotan soils are used for crops.

Representative profile of Rotan clay loam, 0 to 1 percent slopes, in a cultivated field, from the northern edge of Tye, at the intersection of Interstate 20 and Farm Road 707, 1 mile east along northern access road to Interstate 20, 1 mile north on county road, 0.2 mile east, and 100 feet north:

Ap—0 to 6 inches, dark-brown (10YR 4/3) clay loam, dark brown (10YR 3/3) moist; weak, fine, granular structure; hard, friable; mildly alkaline; abrupt, smooth boundary.

B1t—6 to 14 inches, dark grayish-brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate, fine and medium, subangular blocky structure; hard, friable, sticky; common fine and very fine pores; few clay films on peds; mildly alkaline; clear, wavy boundary.

B21t—14 to 25 inches, dark grayish-brown (10YR 4/2) clay, very dark grayish brown (10YR 3/2) moist; moderate, fine and medium, subangular blocky structure; very hard, firm, very sticky; common fine and very fine pores; nearly continuous clay films on peds; few films of calcium carbonate on peds; calcareous; moderately alkaline; clear, wavy boundary.

B22t—25 to 48 inches, dark-brown (7.5YR 4/4) clay, dark brown (7.5YR 3/4) moist; moderate, medium, blocky structure; very hard, firm, very sticky; few very fine pores; nearly continuous clay films on peds; common films and threads of calcium carbonate; calcareous; moderately alkaline; gradual, wavy boundary.

B23tca—48 to 68 inches, reddish-yellow (7.5YR 8/6) clay loam, reddish yellow (7.5YR 6/6) moist; weak, medium, blocky structure; very hard, friable, sticky; about 25 percent visible soft masses and concretions of calcium carbonate; calcareous; moderately alkaline; gradual, smooth boundary.

B24t—68 to 80 inches, reddish-yellow (5YR 7/6) clay loam, yellowish red (5YR 5/6) moist; weak, medium, blocky structure; hard, firm, sticky; about 5 percent visible soft masses and concretions of calcium carbonate; few siliceous fragments of pebble size; few clay films on peds; calcareous; moderately alkaline.

The A horizon ranges from 6 to 10 inches in thickness. It is dark grayish brown, dark brown, or brown. Reaction is mildly alkaline or moderately alkaline.

The Bt horizon that is above the Bca horizon ranges from 20 to 42 inches in thickness. It is dark grayish-brown, dark-brown, or brown clay and silty clay loam to clay loam that is 35 to 45 percent clay. Reaction is mildly alkaline in the upper part and moderately alkaline in the lower part.

Depth to the Bca horizon ranges from 30 to 60 inches. This horizon is reddish yellow or pink. It is 15 to 45 percent, by volume, soft masses of calcium carbonate.

The Bt horizon that is below the Bca horizon is reddish yellow, light red, red, yellowish red, or strong brown.

Rotan clay loam, 0 to 1 percent slopes (RnA).—This nearly level soil is on broad uplands. Areas are irregular in shape and range from 30 to 700 acres in size. This soil has the profile described as representative of the series.

Included with this soil in mapping are small areas of Randall soils in depressions, or playas, and Rowena and Sagerton soils. Also included are areas of Clairemont, Gageby, and Mangum soils in the narrow drainageways that dissect these areas. These included soils make up less than 15 percent of the mapped acreage of this soil.

Most areas of these soils are used for crops, but a few areas are used for range. Capability unit IIc-1; Clay Loam range site.

Rotan clay loam, 1 to 3 percent slopes (RnB).—This gently sloping soil is on convex uplands. Areas are irregular in shape and range from 50 to 150 acres in size.

This soil has a surface layer of dark grayish-brown clay loam about 9 inches thick. The next layer, about 21 inches thick, is dark grayish-brown, friable clay loam in the upper part and dark-brown, firm clay loam in the lower part. The underlying material is strong-brown, firm clay loam that contains about 40 percent soft masses and concretions of calcium carbonate and extends to a depth of about 80 inches.

Included with this soil in mapping are small areas of Quanah, Rowena, and Sagerton soils. These included soils make up less than 15 percent of the mapped acreage of this soil.

Most areas of these soils are used for crops, but a few areas are used for range. Capability unit IIe-1; Clay Loam range site.

Rowena Series

The Rowena series consists of deep, nearly level to gently sloping, well-drained, loamy soils. These soils formed in calcareous clayey to loamy sediment.

In a representative profile the surface layer is dark grayish-brown clay loam about 6 inches thick. The next layer is about 8 inches of dark grayish-brown, firm clay; 10 inches of dark-brown, firm clay; and 34 inches of reddish-yellow, friable clay that contains fine and coarse soft lumps of calcium carbonate. The underlying material, which extends to a depth of about 64 inches, is reddish-yellow clay that contains fine concretions of calcium carbonate.

Permeability is moderately slow in these soils. Internal drainage is slow. The hazard of soil blowing is slight.

The Rowena soils are used for crops.

Representative profile of Rowena clay loam, 0 to 1 percent slopes, in a cultivated field, 3.2 miles south on Farm Road 707 from junction with Interstate 20, 2.1 miles west on county road, and 50 feet north:

Ap—0 to 6 inches, dark grayish-brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; weak, very fine, subangular blocky and fine granular structure; hard, friable, slightly sticky; calcareous; moderately alkaline; abrupt, smooth boundary.

B21—6 to 14 inches, dark grayish-brown (10YR 4/2) clay, very dark grayish brown (10YR 3/2) moist; weak, medium, prismatic structure parting to moderate, very fine, subangular blocky; very hard, firm, sticky; calcareous; moderately alkaline; clear, smooth boundary.

B22—14 to 24 inches, dark-brown (10YR 4/3) clay, dark brown (10YR 3/3) moist; weak to moderate, fine and very fine, blocky structure; very hard, firm, sticky; shiny pressure faces on peds; calcareous; moderately alkaline; clear, smooth boundary.

B23ca—24 to 58 inches, reddish-yellow (7.5YR 7/6) clay, reddish yellow (7.5YR 6/6) moist; weak, very fine, subangular blocky structure; very hard, friable, sticky; about 15 percent fine and coarse soft lumps of calcium carbonate; calcareous; moderately alkaline; gradual, wavy boundary.

Cca—58 to 64 inches, reddish-yellow (5YR 7/6) clay, reddish yellow (5YR 6/6) moist; massive; few very fine concretions of calcium carbonate; 10 to 15 percent, by volume, segregated calcium carbonate; calcareous; moderately alkaline.

The A horizon ranges from 5 to 12 inches in thickness. It is dark grayish brown, grayish brown, or brown.

The B2 horizon ranges from 14 to 34 inches in thickness. It is dark-brown, dark grayish-brown, reddish-brown, or brown clay and silty clay to clay loam that is 35 to 42 percent clay.

Depth to the Bca horizon ranges from 20 to 40 inches. This horizon is reddish-yellow, pink, or light-brown clay, silty clay loam, or clay loam. It is 15 to 40 percent, by volume, calcium carbonate.

Rowena clay loam, 0 to 1 percent slopes (RoA).—This nearly level soil is on broad uplands. Areas are irregular in shape and range from 100 to 500 acres in size. This soil has the profile described as representative of the series.

Included with this soil in mapping are small areas of Rotan and Tobosa soils. These included soils make up less than 15 percent of the mapped acreage of this soil.

Most areas of this soil are used for crops, but a few areas are used for range. Capability unit IIc-1; Clay Loam range site.

Rowena clay loam, 1 to 3 percent slopes (RoB).—This gently sloping soil is on uplands. Areas are irregular in shape and range from 50 to 300 acres in size.

This soil has a surface layer of dark grayish-brown clay loam about 9 inches thick. The next layer is dark-brown, firm clay about 29 inches thick. The underlying material, which extends to a depth of about 64 inches, is friable silty clay loam that is light brown in the upper part and reddish yellow in the lower part and contains about 35 percent calcium carbonate.

Included with this soil in mapping are small areas of Rotan and Tobosa soils. These included soils make up less than 15 percent of the mapped acreage of this soil.

Most areas of this soil are used for crops, but a few areas are used for range. Capability unit IIe-1; Clay Loam range site.

Rowena-Urban land complex, 0 to 1 percent slopes (RuA).—This complex is on nearly level built-up areas within metropolitan areas of Taylor County. About 60 percent of the complex is Rowena clay loam, 35 percent is Urban land, and 5 percent is included soils of the Rotan, Sagerton, and Tobosa series.

Rowena soils have a surface layer of dark grayish-brown clay loam about 8 inches thick. The next layer is firm clay about 30 inches thick that is dark grayish brown in the upper part and dark brown in the lower part. The underlying material, which extends to a depth of about 60 inches, is firm clay that is light brown in the upper part and reddish yellow in the lower part and contains about 30 percent calcium carbonate.

Urban land is used for works and structures such as streets, sidewalks, buildings, driveways, and patios. Most

of these structures are single-unit dwellings. Much of the soil in areas of Urban land has been altered by excavations. Some areas have been covered with contrasting soil material that is 6 inches to 1 foot deep.

Some of the hazards in urban development on this complex are cracking and shifting of structures because of the shrink-swell potential of the soils, failure of uncoated steel pipes because of corrosivity, failure of septic tank filter fields caused by moderately slow permeability, and failure of local roads and streets because of poor traffic-supporting capacity.

If the soils of this complex are used for landscaping and gardening, they respond well to yearly applications of nitrogen and phosphorus fertilizer. Chlorosis, or leaf yellowing, may occur in plants that are sensitive to high concentrations of lime. The lime limits availability of iron to the plants and thus causes the yellowing of the leaves. Not assigned to a capability unit and range site.

Sagerton Series

The Sagerton series consists of deep, nearly level to gently sloping, well-drained, loamy soils. These soils formed in calcareous loamy sediment.

In a representative profile the surface layer is reddish-brown clay loam about 11 inches thick. The subsoil extends to a depth of about 80 inches. The upper 22 inches of the subsoil is firm clay that is reddish brown in the upper part and red in the lower part. The middle 14 inches is pink, friable clay loam that contains calcium carbonate. The lower 33 inches of the subsoil is red, friable clay loam that contains calcium carbonate.

Permeability is moderately slow in these soils. Internal drainage is slow. The hazard of soil blowing is slight.

The Sagerton soils are used for crops.

Representative profile of Sagerton clay loam, 0 to 1 percent slopes, in a cultivated field, 1 mile south on U.S. Highway 84 from junction with Farm Road 614, 1.25 miles east on county road, and 100 feet south:

Ap—0 to 11 inches, reddish-brown (5YR 4/3) clay loam, dark reddish brown (5YR 3/3) moist; weak granular structure; hard, friable; neutral; mildly alkaline; abrupt, smooth boundary.

B21t—11 to 22 inches, reddish-brown (5YR 4/4) clay, dark reddish brown (5YR 3/4) moist; moderate, medium and fine, blocky structure; very hard, firm, sticky; common clay films; neutral; mildly alkaline; gradual, smooth boundary.

B22t—22 to 33 inches, red (2.5YR 4/6) clay, dark red (2.5YR 3/6) moist; moderate, medium and fine, blocky structure; very hard, firm, sticky; common clay films; calcareous; moderately alkaline; gradual, smooth boundary.

B23tca—33 to 47 inches, pink (5YR 7/4) clay loam, reddish brown (5YR 5/4) moist; weak to moderate, fine, subangular blocky structure; slightly hard, friable, sticky; few clay films; 26 percent calcium carbonate equivalent; calcareous; moderately alkaline; gradual, smooth boundary.

B3ca—47 to 80 inches, red (2.5YR 5/6) clay loam, red (2.5YR 4/6) moist; weak subangular blocky structure; slightly hard, friable, sticky; few clay films; 17 percent calcium carbonate equivalent; few concretions of calcium carbonate; calcareous; moderately alkaline.

The A horizon ranges from 5 to 11 inches in thickness. It is reddish brown, dark brown, or brown. Reaction is neutral or mildly alkaline.

The Bt horizon that is above the Bca horizon ranges from 20 to 45 inches in thickness. It is reddish-brown, red, or yellowish-red clay to clay loam that is 35 to 45 percent clay. Reaction is mildly alkaline in the upper part and moderately alkaline in the lower part.

Depth to the Bca horizon ranges from 30 to 60 inches. This horizon is red, strong-brown, reddish-brown, brown, or pink clay loam to clay. It is 15 to 40 percent calcium carbonate.

Sagerton clay loam, 0 to 1 percent slopes (SaA).—This nearly level soil is on broad uplands. Areas are irregular in shape and range from 100 to 500 acres in size. This soil has the profile described as representative of the series.

Included with this soil in mapping are small areas of Miles and Rotan soils. These included soils make up less than 15 percent of the mapped acreage of this soil.

Most areas of this soil are used for crops, but a few areas are used for range. Capability unit IIc-1; Clay Loam range site.

Sagerton clay loam, 1 to 3 percent slopes (SaB).—This gently sloping soil is on convex uplands. Areas are irregular in shape and range from 75 to 200 acres in size.

This soil has a surface layer of reddish-brown clay loam about 11 inches thick. The next layer is firm clay loam about 31 inches thick that is reddish brown in the upper part and red in the lower part. The underlying material, which extends to a depth of about 80 inches, is strong-brown, firm clay loam that contains about 17 percent soft masses of calcium carbonate.

Included with this soil in mapping are small areas of Hamby, Miles, and Rotan soils. Also included are areas of a soil that is similar to this Sagerton soil, but the surface layer is lighter in color.

Most areas of this soil are used for crops, but a few areas are used for range. Capability unit IIe-1; Clay Loam range site.

Sagerton-Urban land complex, 0 to 3 percent slopes (SeB).—This complex is on nearly level to gently sloping built-up areas within metropolitan areas of Taylor County. About 65 percent of the complex is Sagerton clay loam, 20 percent is Urban land, and 15 percent is included soils of the Rotan, Rowena, Tillman, Tobosa, and Weymouth series.

Sagerton soils have a surface layer of dark-brown clay loam about 11 inches thick. The next layer is firm clay about 29 inches thick that is reddish brown in the upper part and yellowish red in the lower part. The underlying material, which extends to a depth of about 60 inches, is reddish-brown, friable clay loam that contains about 15 percent soft masses of calcium carbonate.

Urban land is used for works and structures such as streets, sidewalks, buildings, driveways, and patios. Most of these structures are single-unit dwellings. Much of the soil in areas of Urban land has been altered by excavations or has been covered with contrasting soil material. The more sloping parts of this complex are cut or filled to a depth of 1 foot to 3 feet, depending on slope.

Some of the hazards in urban development are cracking and shifting of structures because of the shrink-swell potential of the soils, failure of uncoated steel pipes because of corrosivity, and failure of septic tank filter fields caused by moderately slow permeability.

If the soils of this complex are used for landscaping and gardening, they respond well to yearly applications of nitrogen and phosphorus fertilizer. Not assigned to a capability unit and range site.

Shep Series

The Shep series consists of deep, gently sloping to sloping, well-drained, loamy soils on uplands. These soils formed in loamy colluvial material.

In a representative profile the surface layer is brown loam about 8 inches thick. The next layer is reddish-brown, friable loam about 17 inches thick. The underlying material, which extends to a depth of about 80 inches, is light reddish-brown, friable sandy clay loam that contains concretions, films, and threads of calcium carbonate.

Permeability is moderate in these soils. Internal drainage is medium. The hazard of soil blowing is moderate.

The Shep soils are used for range and crops.

Representative profile of Shep loam, 1 to 3 percent slopes, in range, 3 miles south-southwest on Farm Road 126 from junction with Interstate 20, 6.1 miles south on unnumbered county road, and 250 feet east:

A1—0 to 8 inches, brown (7.5YR 5/2) loam, dark brown (7.5YR 4/2) moist; weak, fine, granular structure; slightly hard, friable, slightly sticky; calcareous; moderately alkaline; abrupt, smooth boundary.

B2—8 to 25 inches, reddish-brown (5YR 5/4) loam, reddish brown (5YR 4/4) moist; weak, coarse, prismatic structure parting to weak, fine, granular; slightly hard, friable, slightly sticky; common very fine worm casts; common nodular concretions of calcium carbonate; calcareous; moderately alkaline; gradual, wavy boundary.

C1ca—25 to 36 inches, light reddish-brown (5YR 6/4) sandy clay loam, reddish brown (5YR 5/4) moist; massive; slightly hard, friable; few worm casts; 10 to 15 percent nodular concretions of calcium carbonate; common films and threads of calcium carbonate; calcareous; moderately alkaline; diffuse, wavy boundary.

C2ca—36 to 80 inches, light reddish-brown (5YR 6/4) sandy clay loam, reddish brown (5YR 4/4) moist; massive; slightly hard, friable; 5 to 10 percent concretions of calcium carbonate; common coated quartz and limestone fragments ½ to 1 inch in diameter; calcareous; moderately alkaline.

The A horizon ranges from 4 to 12 inches in thickness. It is brown, grayish brown, pale brown, or reddish brown.

The B2 horizon ranges from 12 to 30 inches in thickness. It is reddish-brown, brown, pink, or yellowish-brown loam and clay loam to sandy clay loam.

Depth to the Cca horizon ranges from 22 to 40 inches. This horizon is light reddish-brown, brown, or reddish-yellow loam, clay loam, or sandy clay loam. It is 10 to 15 percent concretions and films and threads of calcium carbonate.

Shep loam, 1 to 3 percent slopes (ShB).—This gently sloping soil is on convex foot slopes. Areas are irregular in shape and range from 25 to 100 acres in size. This soil has the profile described as representative of the series.

Included with this soil in mapping are small areas of Quanah soils and a soil that is similar to this Shep soil but has less clay in the upper 24 inches of the profile. Also included are a few areas of soils that have gullies 1 foot to 5 feet deep, 10 to 30 feet wide, and 300 to 1,000 feet apart. These included soils make up less than 15 percent of the mapped acreage of this soil.

Most areas of this soil are used for range, but a few areas are used for crops. Capability unit IIIe-2; Sandy Loam range site.

Shep loam, 3 to 5 percent slopes (ShC).—This gently sloping soil is on convex foot slopes. Areas are irregular in shape and range from 25 to 75 acres in size.

This soil has a surface layer of brown loam about 7 inches thick. The next layer is brown, friable sandy clay loam about 25 inches thick. The underlying material is brown, friable sandy clay loam that contains about 12 percent calcium carbonate and extends to a depth of about 60 inches.

Included with this soil in mapping are small areas of Quanah and Vernon soils and a soil that is similar to this Shep soil but has less clay in the lower layers. Also included are a few areas of soils that have gullies 1 foot to 6 feet deep, 10 to 30 feet wide, and 30 to 1,000 feet apart. These included soils make up less than 15 percent of the mapped acreage of this soil.

Most areas of this soil are used for range. A few areas are used for crops. Capability unit IVe-1; Sandy Loam range site.

Shep loam, 5 to 8 percent slopes (ShD).—This sloping soil is on convex foot slopes. Areas are irregular in shape and range from 25 to 50 acres in size.

This soil has a surface layer of brown loam about 6 inches thick. The next layer is brown, friable loam about 24 inches thick. The underlying material is brown, friable loam that contains about 15 percent calcium carbonate and extends to a depth of about 60 inches.

Included with this soil in mapping are small areas of Pitzer, Quanah, and Vernon soils. Also included are a few areas of soils that have gullies 1 foot to 6 feet deep, 1 foot to 12 feet wide, and 100 to 400 feet apart. These included soils make up less than 15 percent of the mapped acreage of this soil.

These soils are used for range. Capability unit VIe-2; Sandy Loam range site.

Speck Series

The Speck series consists of shallow, nearly level to gently sloping, well-drained, loamy soils on uplands. These soils formed in loamy to clayey sediment underlain by limestone.

In a representative profile the surface layer is reddish-brown clay loam about 7 inches thick. The subsoil is reddish-brown, firm clay about 12 inches thick. This layer rests abruptly on fractured limestone.

Permeability is slow in these soils. Internal drainage is slow. The hazard of soil blowing is slight.

The Speck soils are used for crops and range.

Representative profile of Speck clay loam, 1 to 3 percent slopes, in range, 4.5 miles south on State Highway 36 from junction with Farm Road 18 and 300 feet east:

Ap—0 to 7 inches, reddish-brown (5YR 4/3) clay loam, dark reddish brown (5YR 3/3) moist; weak granular structure; hard, friable, sticky; few fine pores; about 10 percent worm casts; mildly alkaline; abrupt, smooth boundary.

B21t—7 to 12 inches, reddish-brown (5YR 4/3) clay, dark reddish brown (5YR 3/3) moist; moderate, medium, subangular blocky structure parting to moderate, very fine, blocky; very hard, firm, sticky; few worm casts; common clay films; mildly alkaline; gradual, smooth boundary.

B22t—12 to 19 inches, reddish-brown (5YR 4/4) clay, dark reddish brown (5YR 3/4) moist; moderate, medium, blocky structure; very hard, firm, sticky; common clay films; mildly alkaline; abrupt, wavy boundary.

R—19 to 24 inches, indurated fractured limestone; few coatings of calcium carbonate in fractures.

The A horizon ranges from 7 to 9 inches in thickness. It is reddish brown or brown. Reaction is slightly acid or mildly alkaline.

The Bt horizon ranges from 6 to 14 inches in thickness. It is reddish-brown or brown clay that is 45 to 65 percent clay.

Depth to the R layer ranges from 14 to 20 inches. This horizon consists of fractured limestone plates.

Speck clay loam, 0 to 1 percent slopes (SpA).—This nearly level soil is on the crests of uplands. Areas are irregular to oval in shape and range from 15 to 50 acres in size.

This soil has a surface layer of brown clay loam about 8 inches thick. The next layer is reddish-brown, firm clay about 12 inches thick. This layer rests abruptly on fractured limestone.

Included with this soil in mapping are small areas of Kavett, Mereta, and Sagerton soils and a few areas of soils that have limestone fragments, 10 to 20 inches in diameter, on the surface. These included soils make up less than 15 percent of the mapped acreage of this soil.

These soils are used for range and crops. Capability unit IIIs-2; Redland range site.

Speck clay loam, 1 to 3 percent slopes (SpB).—This gently sloping soil is on the crests of upland ridges and knolls. Areas are irregular to oval in shape and range from 25 to 75 acres in size. This soil has the profile described as representative of the series.

Included with this soil in mapping are small areas of Kavett, Sagerton, and Tarrant soils. These included soils make up less than 15 percent of the mapped acreage of this soil.

These soils are used for range. Capability unit IIIe-7; Redland range site.

Stamford Series

The Stamford series consists of deep, gently sloping, well-drained, clayey soils. These soils formed in calcareous clayey sediment.

In a representative profile the surface layer is reddish-brown clay about 13 inches thick. The next layer is reddish-brown, very firm silty clay about 35 inches thick. The underlying material, which extends to a depth of about 100 inches, is weak-red clayey shale.

Permeability is very slow in these soils. Internal drainage is slow. Water enters rapidly through cracks in the soils when they are dry. The hazard of soil blowing is slight.

The Stamford soils are used for range and crops.

Representative profile of Stamford clay, 1 to 3 percent slopes, in a cultivated field, 1.1 miles east on Interstate 20 from junction with U.S. Highway 84 and 0.15 mile south:

Ap—0 to 10 inches, reddish-brown (5YR 4/4) clay, dark reddish brown (5YR 3/4) moist; weak, fine, granular structure; hard, firm, sticky; calcareous; moderately alkaline; abrupt, smooth boundary.

A1—10 to 13 inches, reddish-brown (5YR 4/4) clay, dark reddish brown (5YR 3/4) moist; weak, coarse, blocky structure parting to moderate, very fine, blocky; very hard, very firm, sticky; prominent intersecting slickensides; calcareous; moderately alkaline; gradual, smooth boundary.

AC—13 to 48 inches, reddish-brown (2.5YR 4/4) silty clay, dark reddish brown (2.5YR 3/4) moist; weak, coarse, blocky structure parting to moderate, very fine, blocky; extremely hard, very firm, sticky and plastic; prominent intersecting slickensides; structural aggregates are tilted 30 to 40 degrees from the horizontal plane; calcareous; moderately alkaline; gradual, smooth boundary.

C—48 to 100 inches, weak-red (10R 4/4) clayey shale, weak red (10R 4/4) moist; massive; upper 6 inches is about 5 percent fine earth in parting, has some shale fragments that are tilted and displaced with reference to bedding planes, and contains a few roots; few segregations of calcium carbonate and scattered fine gypsum crystals.

The A horizon ranges from 6 to 15 inches in thickness. It is reddish brown, red, or reddish gray.

The AC horizon ranges from 30 to 36 inches in thickness. It is reddish-brown or weak-red silty clay to clay.

Depth to the C horizon ranges from 32 to 50 inches. The horizon is clayey shale or partly weathered clayey or silty redbeds. It is weak red, red, or reddish brown.

Stamford clay, 1 to 3 percent slopes (StB).—This gently sloping soil is on smooth, concave foot slopes. Areas are irregular in shape and range from 30 to 100 acres in size.

Included with this soil in mapping are small areas of Mangum, Tillman, and Vernon soils. These included soils make up less than 15 percent of the mapped acreage of this soil.

These soils are used for range and crops. Capability unit IIe-1; Clay Flat range site.

Tarrant Series

The Tarrant series consists of very shallow to shallow, undulating to steep, well-drained soils on uplands. These soils formed in calcareous clayey sediment.

In a representative profile the upper 8 inches of the surface layer is dark grayish-brown cobbly clay that is about 35 percent limestone fragments of cobble, stone, and pebble size. The next 7 inches of the surface layer is dark grayish-brown very cobbly clay that is about 70 percent limestone fragments of cobble, stone, and pebble size. This layer rests abruptly on fractured limestone (fig. 6).

Permeability is moderately slow in these soils. Internal drainage is slow. The hazard of soil blowing is slight.

The Tarrant soils are used for range.

Figure 6.—**Profile of Tarrant cobbly clay showing underlying fractured limestone.**

Representative profile of Tarrant cobbly clay in range, in an area of Tarrant association, undulating, 0.9 mile south on Farm Road 1085 from junction with Santa Fe Railroad, 1.5 miles west-southwest on ranch road to television tower, and 1 mile west and 0.25 mile north:

A11—0 to 8 inches, dark grayish-brown (10YR 4/2) cobbly clay, very dark brown (10YR 2/2) moist; moderate, very fine and fine, granular structure and moderate, very fine, subangular blocky; hard, firm, sticky; about 20 percent limestone fragments of cobble size, 10 percent stone size, and 5 percent pebble size; calcareous; moderately alkaline; clear, irregular boundary.

A12—8 to 15 inches, dark grayish-brown (10YR 4/2) very cobbly clay, very dark brown (10YR 2/2) moist; moderate, very fine and fine, granular structure and moderate, very fine, subangular blocky; hard, firm, sticky; about 55 percent limestone fragments of cobble size, 10 percent stone size, and 5 percent pebble size; calcareous; moderately alkaline; abrupt, wavy boundary.

R—15 to 21 inches, limestone that is fractured at intervals of 6 to 24 inches and has coatings of secondary calcium carbonate; fractures mostly less than ¼ inch thick and filled with dark grayish-brown clay and roots; less than 5 percent of this horizon is soil material.

The A11 horizon ranges from 4 to 10 inches in thickness. It is dark grayish-brown, very dark grayish-brown, dark-brown, or brown cobbly to very cobbly clay or silty clay. Coarse fragments more than 3 inches in diameter make up 15 to 50 percent of this horizon.

The A12 horizon ranges from 2 to 10 inches in thickness. It is dark grayish-brown, very dark grayish-brown, dark-brown, or brown very cobbly clay to very cobbly silty clay. Coarse fragments more than 3 inches in diameter make up 35 to 95 percent of this horizon.

Depth to the R layer ranges from 6 to 20 inches. This layer consists of limestone that in places is interbedded with whitish marl or clayey shale.

Tarrant association, undulating (TAD).—The soils of this association formed over limestone and caliche (fig. 7) on undulating relief. Slopes are complex. They are mainly about 5 percent but range from 1 to 8 percent. Areas of the association are oblong to irregular in shape, and in places are in strips 150 to 1,000 feet wide that extend for several miles. Within the strips are areas of Tarrant soils that are separated by "steps," or bands of Rock outcrop, or soils thinner than 4 inches. These steps are 6 to 18 inches high and 100 to 350 feet wide. The Tarrant soils of this association include the soil that has the profile described as representative of the Tarrant series.

This mapping unit is more variable than most others in the county. Mapping has been controlled well enough, however, for anticipated uses of these areas.

This association is 40 to 80 percent, but generally 69 percent, Tarrant soil. About 31 percent is other soils and soil material. Of this 15 to 50 percent, but generally about 25 percent, consists of soils that are similar to the Tarrant soil but are less than 4 inches deep over limestone. From 1 to 45 percent, but generally about 6 percent, consists of soils that are deeper than Tarrant soils or of Rock outcrop. Also included with the Tarrant soil in mapping are areas of a soil that is similar to the Tarrant soil but has a less indurated layer of bedrock.

The soils of this association are used for range. Capability unit VIIs-3; Low Stony Hills range site.

Figure 7.—**View of Tarrant association, undulating, that shows outcrops of limestone.**

Tarrant-Kavett association, undulating (TED).—The soils of this association formed over limestone and marl on undulating relief. Slopes are complex. Slopes on Tarrant soils are mainly about 5 percent but range from 1 to 8 percent. Kavett soils have slopes of less than 3 percent. Areas of this association are long, narrow, and irregularly shaped. They follow contours of the soil slope and are 25 to 300 acres in size.

This mapping unit is more variable than most others in the county, but mapping has been controlled well enough that the variation does not affect anticipated uses.

This association is about 54 percent Tarrant soil, 29 percent Kavett soil, and 17 percent included soils. The Tarrant soil in this association has a surface layer of dark grayish-brown cobbly clay about 6 inches thick. This layer is about 25 percent limestone fragments of cobble size, 5 percent stone size, and 5 percent pebble size. The next layer is dark-brown, firm very cobbly clay about 7 inches thick. It is about 50 percent limestone fragments of cobble size, 5 percent stone size, and 5 percent pebble size. This layer rests abruptly on fractured limestone. The Kavett soil in this association has a surface layer of very dark grayish-brown clay about 8 inches thick. A few stones are on the surface. The next layer is dark-brown, firm clay about 10 inches thick. This layer rests abruptly on fractured limestone that is coated with secondary calcium carbonate.

Included with these soils in mapping are areas of Mereta, Rowena, and Valera soils. Mereta soils are at the higher elevations, mostly on ridges and knolls. Rowena and Valera soils are at lower elevations, mainly in drainageways. Also included are areas of a soil similar to this Tarrant soil but underlain by hardened caliche.

The soils of this association are used for range. Tarrant soil in capability unit VIIs-3 and Low Stony Hills range site; Kavett soil in capability unit VIs-2 and Shallow range site.

Tarrant-Rock outcrop association, hilly (TFF).—The soils of this association formed over limestone and marl on hilly relief. Slopes are complex. They are mainly about 15 percent but range from 10 to 30 percent. Areas of this association are long and narrow and are 50 to 700 acres in size.

This mapping unit is more variable than most others in the county, but mapping has been controlled well enough that the variation does not affect anticipated uses.

This association is about 70 percent Tarrant soil, 15 percent Rock outcrop, and 15 percent included soils of the Mereta series on narrow ridges. The Tarrant soil in this association has a surface layer of very dark grayish-brown cobbly clay about 6 inches thick. This layer is about 30 percent limestone fragments of cobble size, 5 percent stone size, and 5 percent pebble size. The next layer is dark grayish-brown, firm very cobbly clay about 6 inches thick that is about 40 percent limestone fragments of cobble size, 10 percent stone size, and 5 percent pebble size. This layer rests abruptly on fractured limestone. The Rock outcrop part of this mapping unit consists of exposures of limestone bedrock that are partly covered by cobbles, stones, and pebbles. These coarse fragments are mainly on ridgetops but are present throughout the association.

The soils of this association are used for range. Tarrant soil in capability unit VIIs-3 and Low Stony Hills range site; Rock outcrop not assigned to a capability unit or range site.

Tarrant-Rock outcrop association, steep (TFG).—The soils of this association formed over limestone and caliche. Slopes range from 20 to 45 percent. Areas are long and irregularly shaped and are along escarpments. The escarpments have changes in elevation of 200 to 700 feet, which occur over horizontal distances of 200 to 1,000 feet (fig. 8).

This mapping unit is more variable than most others in the county, but mapping has been controlled well enough that the variation does not affect anticipated uses.

This association is about 40 percent Tarrant soil, 25 percent Rock outcrop, and 35 percent included soils. The Tarrant soil in this association has a surface layer of very dark grayish-brown cobbly clay about 4 inches thick. It is about 30 percent limestone fragments of cobble size, 10 percent stone size, and 5 percent pebble size. The next layer is dark grayish-brown, firm very cobbly clay about 6 inches thick. This layer is about 40 percent limestone fragments of cobble size, 20 percent stone size, and 5 percent pebble size. This layer rests abrúptly on fractured limestone. The Rock outcrop part of this mapping unit consists of limestone bedrock exposures that are partly covered by boulders, stones, and pebbles. These outcrops are mostly at the higher elevations, but some are present throughout the association.

Included with these soils in mapping are areas of Kavett and Shep soils and areas of a sandy soil that formed over sandstone, a loamy soil that formed over caliche, and a gravelly soil that formed over limestone. Kavett soils are at the higher elevations. Shep soils are on foot slopes. The soil that formed over sandstone is just above the foot slopes. It has a surface layer of fine sandy loam that rests abruptly over sandstone. The soil that formed over caliche is at the higher elevations along with Kavett soils. It has a surface layer of clay loam and is underlain by clay. The gravelly soil that formed over limestone also is at the higher elevations. It has a surface layer of gravelly clay loam and a lower layer, also gravelly clay loam, that rests abruptly on strongly cemented caliche.

The soils of this association are used for range. Tarrant soil in capability unit VIIs-2, Rock outcrop not assigned to a capability unit; both soils in Steep Rocky range site.

Tarrant and Vernon soils, undulating (TLD).—The soils of this mapping unit are in long, narrow areas that are 25 to 500 acres in size. The areas are separated by steplike exposures of limestone. Slopes are complex. They are mainly about 5 percent but range from 1 to 8 percent.

This mapping unit is more variable than others in the county, but mapping has been controlled well enough that the variation does not affect anticipated uses.

This mapping unit is 15 to 80 percent, but generally 46 percent, Tarrant soil. This is the dominant soil and is present in all areas. It is at the higher elevations. From 10 to 40 percent, but generally 23 percent, of the mapping unit is Vernon soil. This soil is at the lower elevations. Other soils make up 0 to 31 percent, but generally 31 percent, of the mapping unit.

The Tarrant soil in this association has a surface layer of dark-brown cobbly clay about 4 inches thick. The next layer is brown, firm very cobbly clay about 6 inches thick. It is about 45 percent limestone fragments of cobble size and 5 percent caliche fragments. This layer rests abruptly on fractured limestone. The Vernon soil has a surface layer of reddish-brown clay about 6 inches thick. The next layer is reddish-brown, firm clay loam about 16 inches

Figure 8.—**Typical area of Tarrant-Rock outcrop association, steep, in background; deeper Shep soils in foreground.**

thick. It has a few calcium carbonate concretions. The underlying material is red and olive clay and shale that extends to a depth of about 36 inches.

Included with these soils in mapping are areas of Kavett, Owens, and Pitzer soils. Owens and Pitzer soils are on ridgetops, and Kavett soils are at lower elevations below the ridgetops.

The soils of this mapping unit are used for range. Tarrant soil in capability unit VIIs-3 and Low Stony Hills range site; Vernon soil in capability unit VIe-1 and Shallow Clay range site.

Tillman Series

The Tillman series consists of deep, nearly level to gently sloping, well-drained, clayey soils on uplands. These soils formed in calcareous clayey shale.

In a representative profile the surface layer is reddish-brown clay loam about 7 inches thick. The upper 3 inches of the subsoil is reddish-brown, firm clay loam. The lower 54 inches is reddish-brown, extremely firm clay. The underlying material is red silty clay that extends to a depth of about 72 inches and contains concretions of calcium carbonate.

Permeability is slow in these soils. Internal drainage is slow. The hazard of soil blowing is slight.

The Tillman soils are used for crops and range.

Representative profile of Tillman clay loam, 1 to 3 percent slopes, in a cultivated field, 1.7 miles south-southeast on Farm Road 1235 from junction with Loop 39 and 50 feet west:

Ap—0 to 7 inches, reddish-brown (5YR 4/3) clay loam, dark reddish brown (5YR 3/3) moist; weak granular structure; hard, friable, slightly sticky; mildly alkaline; abrupt, smooth boundary.

B1—7 to 10 inches, reddish-brown (5YR 4/3) clay loam, dark reddish brown (5YR 3/3) moist; moderate, fine and medium, subangular blocky structure; very hard, firm, sticky; few clay films; mildly alkaline; clear, smooth boundary.

B21t—10 to 28 inches, reddish-brown (5YR 4/4) clay, dark reddish brown (5YR 3/4) moist; moderate, medium and very fine, blocky structure; extremely hard, extremely firm, sticky; common clay films; calcareous; moderately alkaline; gradual, smooth boundary.

B22t—28 to 64 inches, reddish-brown (5YR 5/4) clay, reddish brown (5YR 4/4) moist; moderate, medium and very fine, blocky structure; extremely hard, extremely firm, sticky; common clay films; few very fine concretions of calcium carbonate; calcareous; moderately alkaline; gradual, wavy boundary.

B3&C—64 to 72 inches, red (2.5YR 5/6) silty clay, red (2.5YR 4/6) moist; mostly rock structure; extremely hard, extremely

firm, sticky; common clay films; 5 to 10 percent concretions of calcium carbonate; calcareous; moderately alkaline.

The A and B1 horizons range from 5 to 10 inches in thickness. They are reddish brown, brown, or dark brown.

The Bt horizon ranges from 40 to 60 inches in thickness. It is reddish-brown, red, yellowish-red, or dark-red clay to clay loam that is 35 to 50 percent clay.

Depth to the B3&C horizon ranges from 40 to 70 inches or more. This horizon is red, brown, or gray silty clay and silty clay loam to clay. In places it is shaly clay or weakly consolidated shale.

Tillman clay loam, 0 to 1 percent slopes (TmA).—This nearly level soil is on slightly concave uplands. Areas are irregular in shape and range from 100 to 500 acres in size.

This soil has a surface layer of reddish-brown clay loam about 10 inches thick. The next layer is reddish-brown, firm clay about 28 inches thick. The next layer is yellowish-red, firm clay loam about 30 inches thick that contains about 5 percent calcium carbonate. The underlying material, which extends to a depth of about 92 inches, is red clay stratified with greenish-gray shale.

Included with this soil in mapping are small areas of Sagerton, Stamford, Tobosa, and Vernon soils. These included soils make up less than 15 percent of the mapped acreage of this soil.

Most areas of this soil are used for crops. A few areas are used for range. Capability unit IIs-1; Clay Loam range site.

Tillman clay loam, 1 to 3 percent slopes (TmB).—This gently sloping soil is on slightly convex uplands. Areas are irregular in shape and range from 100 acres to 300 acres in size. This soil has the profile described as representative of the series.

Included with this soil in mapping are small areas of Sagerton, Stamford, Tobosa, and Vernon soils. Also included are areas of a soil that is similar to this Tillman soil but is calcareous throughout the profile. These included soils make up less than 15 percent of the mapped acreage of this soil.

Most areas of this soil are used for crops. A few areas are used for range. Capability unit IIe-1; Clay Loam range site.

Tobosa Series

The Tobosa series consists of deep, nearly level to gently sloping, well-drained, clayey soils on uplands. These soils formed in calcareous clayey sediment.

In a representative profile the upper 10 inches of the surface layer is dark-brown clay. The next 26 inches of the surface layer is brown, firm clay. The next layer is brown, very firm clay about 22 inches thick. The underlying material is pink silty clay that extends to a depth of about 72 inches and contains calcium carbonate.

Permeability is very slow in these soils. Internal drainage is very slow. Water enters rapidly through cracks in the soils when they are dry. The hazard of soil blowing is slight.

The Tobosa soils are used for crops and range.

Representative profile of Tobosa clay, 0 to 1 percent slopes, in a cultivated field, 1.7 miles north on Farm Road 1750 from junction with Farm Road 707 and 528 feet west:

Ap—0 to 10 inches, dark-brown (10YR 4/3) clay, dark brown (10YR 3/3) moist; weak, fine, granular structure; hard, friable, sticky; calcareous; moderately alkaline; abrupt, smooth boundary.

A1—10 to 36 inches, brown (10YR 5/3) clay, dark brown (10YR 3/3) moist; evident slickensides and moderate, very fine, angular blocky structure; hard, firm, sticky; few fine roots; calcareous; moderately alkaline; gradual, smooth boundary.

AC—36 to 58 inches, brown (10YR 5/3) clay, dark brown (10YR 4/3) moist; evident slickensides and moderate, very fine, blocky structure; very hard, very firm, sticky; about 2 to 5 percent soft and hard segregations of calcium carbonate; calcareous; moderately alkaline; gradual, wavy boundary.

Cca—58 to 72 inches, pink (7.5YR 8/4) silty clay, reddish yellow (7.5YR 7/6) moist; massive; very hard, very firm; sticky; about 50 percent, by volume, calcium carbonate; calcareous; moderately alkaline.

The A horizon ranges from 10 to 40 inches in thickness. It is dark brown, dark grayish brown, or brown. This horizon is noncalcareous to calcareous and mildly alkaline to moderately alkaline.

The AC horizon ranges from 10 to 40 inches in thickness. It is brown, dark-brown, or light-brown clay or silty clay that is 45 to 55 percent clay.

Depth to the Cca horizon ranges from 40 to 60 inches or more. This horizon is reddish-yellow, pink, white, or pale-brown silty clay or clay.

Tobosa clay, 0 to 1 percent slopes (ToA).—This nearly level soil is in slightly concave areas in the uplands. Areas are irregular in shape and range from 25 to 1,000 acres in size. This soil has the profile described as representative of the series.

Included with this soil in mapping are small areas of Rotan, Rowena, Tillman, and Valera soils. A few areas are dissected by shallow creeks or drainageways less than 40 feet wide. These included soils make up less than 15 percent of the mapped acreage of this soil.

About half the acreage of this soil is used for crops and pasture. The rest is used for range. Capability unit IIIs-1; Clay Flat range site.

Tobosa clay, 1 to 3 percent slopes (ToB).—This gently sloping soil is in slightly concave areas in the uplands. Areas are irregular in shape and range from 25 to 200 acres in size.

This soil has a surface layer of dark grayish-brown clay about 6 inches thick. The next layer is dark-brown, firm clay about 9 inches thick. The next layer is dark-brown, firm clay about 40 inches thick. The underlying material is pale-brown, firm clay that contains about 8 percent segregated lumps of calcium carbonate and extends to a depth of about 72 inches.

Included with this soil in mapping are small areas of Kavett, Rotan, Rowena, and Valera soils. Also included are a few areas that are dissected by shallow creeks or drainageways less than 40 feet wide. These included soils make up less than 15 percent of the mapped acreage of this soil.

About half the acreage of this soil is used for crops and pasture. The rest is used for range. Capability unit IIIe-3; Clay Flat range site.

Tobosa-Urban land complex, 0 to 3 percent slopes (TuB).—This complex is on nearly level to gently sloping uplands within the metropolitan areas of Abilene and the Dyess Air Force Base. About 50 percent of the complex is Tobosa clay, 35 percent is Urban land, and 15 percent is included soils of the Mereta, Rotan, and Valera series.

Tobosa soils have a surface layer of dark grayish-brown clay about 6 inches thick. The next layer is dark grayish-brown, firm clay about 16 inches thick. The next layer is brown, firm clay about 28 inches thick. The underlying

material is pale-brown, firm clay that contains about 10 percent segregated lumps of calcium carbonate and extends to a depth of about 70 inches.

Urban land consists of works and structures, such as streets, sidewalks, buildings, driveways, and patios. Most of these structures are single-unit dwellings. Much of the soil has been altered by excavations or has been covered with contrasting soil material. The more sloping parts of this unit are cut or filled to a depth of 1 foot to 3 feet, depending on slope.

Some of the hazards in urban development on this complex are cracking and shifting of structures because of the shrink-swell potential, failure of uncoated steel pipes because of corrosivity, and failure of local road and streets caused by shrink-swell potential. Recreational development for playgrounds, paths and trails, and camp and picnic areas is limited by very slow permeability and by texture of the surface layer.

If the soils of this complex are used for landscaping and gardening, they respond well to yearly applications of nitrogen and phosphorus fertilizer. Chlorosis, or leaf yellowing, in places occurs in plants that are sensitive to high concentrations of lime. The lime limits availability of iron to the plants and thus causes the yellowing of the leaves. Not assigned to a capability unit and range site.

Urban Land

Urban land (Ub) occupies the central business district and areas near large shopping centers in Abilene and areas within the Dyess Air Force Base. About 75 to 100 percent of the area is covered with works and structures, such as the Federal buildings, civic center, churches, city hall, hotels, railroad station, office buildings, hospital, parking lots, streets, and sidewalks.

Much of the banking, sales, service, educational, entertainment, professional, and governmental function of the city is concentrated in these areas.

Installation of works and structures has so altered and obscured soil features that they do not resemble those described in the various series. The original soil material formed in alluvium and clayey sediment, shale, caliche, and limestone. Not assigned to a capability unit and range site.

Ustochrepts

Soils designated as Ustochrepts are well-drained, loamy soils that are too variable to classify at the series level. These soils are correlated at the subgroup level rather than as a miscellaneous land type because of the added information for interpretations. They formed in calcareous colluvial sediment.

These soils have a surface layer of pale-brown or brown fine sandy loam 6 to 7 inches thick. The next layer is light yellowish-brown or pale-brown sandy clay loam, loam, or fine sandy loam 29 to 40 inches thick. The underlying material is brownish-yellow, friable sandy clay loam or yellowish weakly cemented sandstone that extends to a depth of about 52 to 80 inches.

Permeability is moderate to moderately rapid. Internal drainage is medium to rapid. The hazard of soil blowing is moderate.

Ustochrepts are used for range.

Ustochrepts and Rock outcrop, hilly (URF).—This mapping unit is in irregularly shaped areas that are 50 to 800 acres in size. The areas consist of rough and gullied side slopes of intermittent drainageways. Gullies are 300 to 500 feet apart, 1 to 15 feet deep, and steep walled. The Rock outcrop part of this mapping unit consists of areas of sandstone that ranges from weakly cemented to indurated. It is on benches or is steep. Slopes are complex. They range from 10 to 30 percent but average about 15 percent. Some soils in rough broken areas have slopes near 100 percent, and some on small benches have slopes of about 5 percent.

This mapping unit is more variable than others in the county, but mapping has been controlled well enough that the variation does not affect the anticipated uses.

This mapping unit is 20 to 75 percent, but generally 36 percent, Ustochrepts. This is the dominant soil and is present in all areas of the mapping unit. It is on side slopes below ridges of Rock outcrop. The Rock outcrop part of the mapping unit makes up 5 to 35 percent, but generally 20 percent. Other soils range from 35 to 49 percent, but generally 44 percent, of the acreage.

The Rock outcrop part of this mapping unit consists of sandstone bedrock exposures that are partly covered by boulders, stones, and pebbles. They are more prominent at higher elevations but occur throughout the mapping unit.

Included with these soils in mapping are areas of Cobb, Hamby, and Miles soils and a sandy soil that is 10 to 20 inches deep over sandstone in places and 20 to 40 inches in others. Cobb soils and the sandy soil are on small benches, knolls, and ridges. The Hamby and Miles soils are on side slopes below the knolls and ridges.

The soils of this mapping unit are used for range. Ustochrepts in capability unit VIe-2; Sandy Loam range site. Rock outcrop is not assigned a capability unit or range site.

Valera Series

The Valera series consists of moderately deep, nearly level to gently sloping, well-drained, clayey soils on uplands. These soils formed in calcareous clayey sediment over limestone.

In a representative profile the surface layer is dark grayish-brown clay about 22 inches thick. The next layer is grayish-brown, firm clay about 8 inches thick. The next lower 4 inches is brown, firm silty clay that contains visible calcium carbonate. This layer rests abruptly on fractured limestone.

Permeability is moderately slow in these soils. Internal drainage is slow. The hazard of soil blowing is slight.

The Valera soils are used for range and crops.

Representative profile of Valera clay, 1 to 3 percent slopes, in range, 3.6 miles west-northwest on Farm Road 89 from junction with U.S. Highway 277, 0.1 mile east, and 400 feet north:

A—0 to 22 inches, dark grayish-brown (10YR 4/2) clay, very dark grayish brown (10YR 3/2) moist; weak, fine, granular and subangular blocky structure in the upper part grading to moderate, medium, subangular blocky in the lower part; very hard, firm, sticky; calcareous; moderately alkaline; gradual, wavy boundary.

B2—22 to 30 inches, grayish-brown (10YR 5/2) clay, dark grayish brown (10YR 4/2) moist; moderate, medium and fine, subangular blocky structure; very hard, firm, sticky; calcareous; moderately alkaline; gradual, wavy boundary.

B2ca—30 to 34 inches, brown (10YR 5/3) silty clay, dark brown (10YR 4/3) moist; weak, fine and medium, subangular

blocky structure; very hard, firm, sticky; about 15 percent visible calcium carbonate; calcareous; moderately alkaline; abrupt, wavy boundary.

R—34 to 35 inches, fractured indurated limestone that has a thin laminar coating of hard caliche.

The A horizon ranges from 15 to 36 inches in thickness. It is dark grayish-brown, very dark grayish-brown, brown, to dark-brown clay, silty clay, silty clay loam, or clay loam.

The B2 horizon ranges from 4 to 18 inches in thickness. It is very pale brown, grayish-brown, dark-brown, or brown clay or silty clay. A zone of calcium carbonate occurs in the lower 5 inches of the B2 horizon. It is brown, pale brown, dark brown, or white and contains 15 to 50 percent visible calcium carbonate.

Depth to the R layer ranges from 20 to 40 inches or more. The calcium carbonate that coats the limestone in this horizon is hard and cannot be dug with a spade. The calcium carbonate coatings range from 2 millimeters to 20 millimeters in thickness.

Valera clay, 0 to 1 percent slopes (VaA).—This nearly level soil is on slightly convex uplands. Areas are irregular in shape and range from 10 to 200 acres in size.

This soil has a surface layer of dark grayish-brown clay about 30 inches thick. The next layer is very pale brown, firm silty clay about 4 inches thick that contains about 20 percent calcium carbonate. This layer rests abruptly on fractured limestone.

Included with this soil in mapping are small areas of Kavett, Rowena, and Tobosa soils. Also included are a few areas of soils that are noncalcareous in the upper part. These included soils make up less than 15 percent of the mapped acreage of this soil.

Most areas of this soil are used for range. A few are used for crops. Capability unit IIs-1; Clay Loam range site.

Valera clay, 1 to 3 percent slopes (VaB).—This gently sloping soil is on slightly concave and convex uplands. Areas are irregular in shape and range from 10 to 200 acres in size. This soil has the profile described as representative of the series.

Included with this soil in mapping are small areas of Kavett, Rowena, and Tobosa soils. These included soils make up less than 15 percent of the mapped acreage of this soil.

Most areas of this soil are used for range. A few areas are used for crops. Capability unit IIe-1; Clay Loam range site.

Vernon Series

The Vernon series consists of moderately deep, gently sloping to strongly sloping, well-drained, clayey soils on uplands. These soils formed in calcareous clayey shale.

In a representative profile the surface layer is red clay about 6 inches thick. The next layer is red, extremely firm silty clay about 24 inches thick that contains soft masses and concretions of calcium carbonate in the lower part. The underlying material, which extends to a depth of about 60 inches, is weak-red shale fragments and redbed clay shale that has light-gray mottles and thin strata of light gray.

Permeability is very slow in these soils. Internal drainage is very slow. The hazard of soil blowing is slight.

The Vernon soils are used for range.

Representative profile of Vernon clay, 3 to 12 percent slopes, in range, 1.4 miles north on Farm Road 707 from junction with Interstate 20 and 300 feet east:

A1—0 to 6 inches, red (2.5YR 4/6) clay, dark red (2.5YR 3/6) moist; weak, medium, blocky structure parting to fine subangular blocky and granular; very hard, firm, sticky; few worm casts; few siliceous pebbles, about 2 to 5 millimeters in diameter; calcareous; moderately alkaline; clear, smooth boundary.

B2—6 to 30 inches, red (2.5YR 5/6) silty clay, red (2.5YR 4/6) moist; weak, medium, blocky structure parting to moderate, very fine, subangular blocky; extremely hard, extremely firm, sticky; few worm casts; common fine roots; few siliceous pebbles; about 3 percent fine to medium soft masses and concretions of segregated calcium carbonate, mostly at a depth of 24 to 30 inches; calcareous; moderately alkaline; gradual, wavy boundary.

C1—30 to 34 inches, weak-red (10R 4/4) shale fragments and about 5 percent fine earth in partings; shale fragments tilted and displaced with reference to bedding planes; few roots; calcareous; moderately alkaline; gradual, wavy boundary.

C2—34 to 60 inches, weak-red (10R 4/4) redbed clay shale that has evident bedding planes; a few mottles and thin strata of light-gray (7.5YR 7/0), few thin strata are noncalcareous; calcareous; moderately alkaline; shale can be dug with spade only with difficulty when dry.

The A horizon ranges from 4 to 12 inches in thickness. It is red, reddish-brown, brown, or yellowish-red clay or silty clay to clay loam.

The B2 horizon ranges from 14 to 26 inches in thickness. It is red, reddish-brown, or yellowish-red silty clay or clay that is 35 to 50 percent clay.

Depth to the C horizon ranges from 20 to 36 inches. This horizon is weak-red, red, yellowish-red, olive, or reddish-brown shale fragments and clayey shale.

Vernon clay, 1 to 3 percent slopes (VeB).—This gently sloping soil is on convex upland ridges. Areas are irregular in shape and range from 15 to 50 acres in size.

This soil has a surface layer of reddish-brown clay about 6 inches thick. The next layer is red, firm clay about 24 inches thick that contains a few fine to medium concretions of calcium carbonate. The underlying material, which extends to a depth of about 60 inches, is weak-red clayey sediment that has bluish streaks.

Included with this soil in mapping are small areas of Owens, Pitzer, Stamford, and Weymouth soils. These included soils make up less than 15 percent of the mapped acreage of this soil.

These soils are used mostly for range. A few areas are used for crops. Capability unit IVe-1; Shallow Clay range site.

Vernon clay, 3 to 12 percent slopes (VeE).—This gently sloping to strongly sloping soil is on uplands, knolls, and ridges. Areas are irregular in shape and range from 20 to 200 acres in size. Slopes are complex. They average about 10 percent. This soil has the profile described as representative of the series.

Included with this soil in mapping are small areas of Owens, Pitzer, Stamford, and Weymouth soils. These included soils make up less than 15 percent of the mapped acreage of this soil.

Most areas of this soil are used for range. A few areas are used for crops. Capability unit VIe-1; Shallow Clay range site.

Weymouth Series

The Weymouth series consists of moderately deep, gently sloping to sloping, well-drained soils on uplands. These soils formed in calcareous loamy material over clayey shale.

In a representative profile the surface layer is reddish-brown clay loam about 6 inches thick. The subsoil is reddish-brown, friable clay loam about 17 inches thick that

contains fine to medium masses and concretions of calcium carbonate in the lower part. The underlying material is about 13 inches of yellowish-red, friable clay loam that contains concretions of calcium carbonate and 6 inches of weak-red clayey shale.

Permeability is moderate in these soils. Internal drainage is medium. The hazard of soil blowing is slight.

The Weymouth soils are used for range and crops.

Representative profile of Weymouth clay loam, 1 to 3 percent slopes, in a cultivated field, 1.4 miles west on county road from junction with Farm Road 1235 and U.S. Highway 277 and 0.1 mile north:

Ap—0 to 6 inches, reddish-brown (5YR 4/4) clay loam, dark reddish brown (5YR 3/4) moist; weak granular structure; slightly hard, friable, slightly sticky; calcareous; moderately alkaline; abrupt, smooth boundary.

B21—6 to 14 inches, reddish-brown (5YR 4/4) clay loam, dark reddish brown (5YR 3/4) moist; moderate, medium, prismatic structure parting to moderate, fine and medium, granular; slightly hard, friable, slightly sticky; 30 percent, by volume, worm casts; calcareous; moderately alkaline; gradual, smooth boundary.

B22ca—14 to 23 inches, reddish-brown (5YR 5/4) clay loam, reddish brown (5YR 4/4) moist; moderate, fine, granular structure; slightly hard, friable, slightly sticky; 20 percent, by volume, worm casts; 20 percent, by volume, fine to medium masses and concretions of calcium carbonate; calcareous; moderately alkaline; gradual, wavy boundary.

Cca—23 to 36 inches, yellowish-red (5YR 5/6) clay loam, yellowish red (5YR 4/6) moist; massive; slightly hard, friable, slightly sticky; 20 to 25 percent concretions of calcium carbonate; calcareous; moderately alkaline; gradual, wavy boundary.

IIC—36 to 42 inches, weak-red (10R 4/4) clayey shale, dusky red (10R 3/4) moist; calcareous; moderately alkaline.

The A horizon ranges from 5 to 12 inches in thickness. It is reddish-brown or brown clay loam, loam, or sandy clay loam. This horizon is noncalcareous to calcareous and mildly alkaline to moderately alkaline.

The B2 horizon ranges from 8 to 25 inches in thickness. It is reddish-brown, brown, red, or yellowish-red clay loam, loam, or sandy clay loam.

Depth to the Cca horizon ranges from 20 to 30 inches. This horizon contains 8 to 40 percent visible calcium carbonate.

Depth to the C horizon ranges from 25 to 36 inches. This horizon is calcareous clayey shale.

Weymouth clay loam, 1 to 3 percent slopes (WeB).—This gently sloping soil is on convex upland ridges and knobs. Areas are irregular in shape and range from 10 to 50 acres in size. This soil has the profile described as representative of the series.

Included with this soil in mapping are small areas of Pitzer, Sagerton, and Vernon soils. Also included are areas of a soil that is similar to this Weymouth soil but is 35 to 40 percent clay throughout the profile. These included soils make up less than 15 percent of the mapped acreage of this soil.

Most areas of this soil are used for range. A few areas are used for crops. Capability unit IVe-1; Clay Loam range site.

Weymouth clay loam, 3 to 5 percent slopes (WeC).—This gently sloping soil is on convex sides of ridges and knobs on uplands. Areas are irregular in shape and range from 10 to 50 acres in size.

This soil has a surface layer of reddish-brown clay loam about 6 inches thick. The next layer is reddish-brown, friable clay loam about 19 inches thick that is 8 percent, by volume, segregated calcium carbonate. The underlying material, which extends to a depth of about 42 inches, is weak-red clayey shale that has bluish and greenish spots.

Included with this soil in mapping are small areas of Pitzer and Vernon soils. Also included are areas of a soil that is similar to this Weymouth soil but is 35 to 40 percent clay throughout the profile. These included soils make up less than 15 percent of the mapped acreage of this soil.

Most areas of this soil are used for range. A few areas are used for crops. Capability unit IVe-1; Clay Loam range site.

Weymouth-Urban land complex, 1 to 8 percent slopes (WuD).—This complex is on gently sloping to sloping convex upland ridges and knolls within metropolitan areas of Abilene and the Dyess Air Force Base. About 50 percent of the complex is Weymouth soils, 40 percent is Urban land, and 10 percent is included soils of the Mereta, Sagerton, Tillman, and Vernon series.

Weymouth soils have a surface layer of reddish-brown clay loam about 10 inches thick. The next layer is reddish-brown, friable clay loam about 12 inches thick. The next layer is yellowish-red, friable clay loam about 8 inches thick that is 10 percent, by volume, calcium carbonate. The underlying material extends to a depth of about 46 inches. The upper part is yellowish-red, friable clay loam that contains 15 percent concretions of calcium carbonate, and the lower part is weak-red clayey shale.

Urban land is used for works and structures such as streets, sidewalks, buildings, driveways, and patios; most of these structures are single-unit dwellings. Much of the soil in areas of Urban land has been altered by excavations or has been covered with contrasting soil material. The more sloping parts of this complex are cut or filled to a depth of 1 foot to 8 feet, depending on slope.

Some of the hazards in urban development on this complex are cracking and shifting of structures because of the shrink-swell potential of the soil, failure of uncoated steel pipes because of corrosivity, and failure of septic tank filter fields caused by permeability. Local roads and streets have fair traffic-supporting capacity on these soils. Recreational development for playgrounds, paths and trails, and camp and picnic areas is limited by texture of the surface layer.

If the soils of this complex are used for landscaping and gardening, they respond well to yearly applications of nitrogen and phosphorus fertilizer. The addition of loamy soil material over the surface improves these soils for lawns and gardens. Chlorosis, or leaf yellowing, is a hazard in plants that are sensitive to high concentrations of lime. The lime limits availability of iron to the plants and thus causes the yellowing of the leaves. Not assigned to a capability unit and range site.

Use and Management of the Soils

This section explains use of the soils for crops, the capability grouping of soils, irrigation, and predicted yields. It also has information on use of the soils for range, wildlife habitat, recreation, and engineering.

Use of the Soils for Crops

Taylor County lies on the boundary between the humid climate of East Texas and the semiarid climate of West Texas. It is subject to scattered thunderstorms of high

intensity and short duration, and a general rain for the area is not common. Approximately 75 percent of the precipitation falls during the months of April through October. May, June, and October receive the most, and August receives the least.

Approximately 36 percent of the county is in crops. Cotton, sorghum, and small grain are among the crops suited to both the soils and climate of Taylor County.

On soils that are used for cultivated crops in this county, management is needed to prevent crusting and loss of surface soil structure, prevent compaction below the tillage zone by tillage implements, increase the movement of water and air through the clayey subsoil, prevent water erosion on sloping areas, and prevent soil blowing on sandy soils.

The end result of good management is to maintain and improve the natural fertility and structure of the soils and to protect them from erosion and keep them in good tilth.

Capability grouping

Capability grouping shows, in a general way, the suitability of soils for most kinds of field crops. The soils are grouped according to their limitations when used for field crops, the risk of damage when they are so used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to rice, cranberries, horticultural crops, or other crops that require special management.

Those familiar with the capability classification can infer from it much about the behavior of soils when used for other purposes, but this classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for range, forest trees, or engineering.

In the capability system, the kinds of soil are grouped at three levels: the capability class, the subclass, and the unit. These groups are described in the following paragraphs.

CAPABILITY CLASSES, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use, defined as follows:

Class I soils have few limitations that restrict their use (none in Taylor County).

Class II soils have moderate limitations that reduce the choice of plants or require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants, require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants, require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use largely to pasture, range, woodland, or wildlife habitat.

Class VI soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture, range, woodland, or wildlife habitat.

Class VII soils have very severe limitations that make them unsuited to cultivation and restrict their use largely to pasture, range, woodland, or wildlife habitat.

Class VIII soils and landforms have limitations that preclude their use for commercial plants and restrict their use to recreation, wildlife habitat, water supply, or esthetic purposes (none in Taylor County).

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, IIe. The letter *e* shows that the main limitation is 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 too cold to too dry.

In class I there are no subclasses, because the soils of this class have few limitations. Class V can contain, at the most, only the subclasses indicated by *w, s,* and *c,* because the soils in class V are subject to little or no erosion, although they have other limitations that restrict their use largely to pasture, range, woodland, wildlife habitat, or recreation.

CAPABILITY UNITS are soil groups within the subclass. The soils in one capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping for making many statements about management of soils. Capability units are generally designated by adding an Arabic numeral to the subclass symbol; for example, IIe-3 or IIIe-6. Thus, in one symbol, the Roman numeral designates the capability class, or degree of limitation; the small letter indicates the subclass, or kind of limitation, as defined in the foregoing paragraphs; and the Arabic numeral specifically identifies the capability unit within each subclass.

In the following pages the capability units in Taylor County are described, and suggestions for the use and management of the soils are given. To learn the capability classification for any mapping unit in the county, refer to that unit in the section "Descriptions of the Soils" or to the "Guide to Mapping Units" at the back of this survey.

CAPABILITY UNIT IIe-1

This unit consists of deep to moderately deep, moderately slowly permeable to very slowly permeable clays and clay loams. Available water capacity is medium to high.

These soils are used for crops and range. Cotton, grain sorghum, and wheat are the main crops.

A suitable cropping system on these soils is one that includes wheat, grain sorghum, or a similar high-residue crop. Crop residue left on or near the surface helps conserve moisture and maintain good tilth. Terraces and contour farming help prevent water erosion and conserve moisture. Grassed waterways are needed where flow of water concentrates.

CAPABILITY UNIT IIe-2

Quanah clay loam, 1 to 3 percent slopes, the only soil in this unit, is a deep, moderately permeable soil. Available water capacity is high.

This soil is used for crops and range. Cotton, grain sorghum, and wheat are the main crops.

A suitable cropping system on this soil is one that includes wheat, grain sorghum, or a similar high-residue crop. Crop residue left on or near the surface helps conserve moisture and prevent soil blowing. Terraces and contour farming help reduce runoff and conserve moisture. Diversion terraces are needed in places to protect the soils from runoff from higher areas. Grassed waterways are needed where flow of water concentrates.

CAPABILITY UNIT IIe-3

This unit consists of deep, moderately permeable to moderately slowly permeable fine sandy loams. Available water capacity is medium to high.

These soils are used for crops and range. Cotton, grain sorghum, and wheat are the main crops.

A suitable cropping system on these soils is one that includes wheat, grain sorghum, or a similar high-residue crop. Crop residue left on or near the surface helps conserve moisture, maintain good tilth, and prevent soil blowing. Terraces help reduce runoff and conserve moisture. If crop residue is not available, emergency tillage helps control soil blowing.

CAPABILITY UNIT IIs-1

This unit consists of deep to moderately deep, slowly permeable to very slowly permeable clays and clay loams. Available water capacity is medium to high.

These soils are used for crops and range. Cotton, grain sorghum, and wheat are the main crops.

A suitable cropping system on these soils is one that includes grain sorghum, wheat, or a similar high-residue crop. Crop residue left on or near the surface helps conserve moisture and improve tilth. Terraces help reduce runoff and conserve moisture. Diversion terraces are needed in places to protect the soils from runoff from higher areas.

CAPABILITY UNIT IIc-1

This unit consists of deep, moderately permeable to slowly permeable clay loams. Available water capacity is high to very high.

These soils are used for crops and range. Cotton, grain sorghum, and wheat are the main crops.

A suitable cropping system on these soils is one that includes grain sorghum, wheat, or a similar high-residue crop. Crop residue left on or near the surface helps conserve moisture and maintain good tilth. Terraces help reduce runoff and conserve moisture. Diversion terraces are needed in places to protect the soils from runoff from adjacent areas.

CAPABILITY UNIT IIc-2

Clairemont silty clay loam, the only soil in this unit, is a deep, moderately permeable soil. Available water capacity is high.

This soil is used for crops and range. Cotton, grain sorghum, and wheat are the main crops.

A suitable cropping system on this soil is one that includes wheat, grain sorghum, or a similar high-residue crop. Crop residue left on or near the surface helps prevent soil blowing, conserve moisture, and maintain good tilth. Diversion terraces are needed in some areas to protect the soils from runoff from higher areas.

CAPABILITY UNIT IIIe-1

Miles fine sandy loam, 1 to 3 percent slopes, the only soil in this unit, is a deep, moderately permeable soil. Available water capacity is medium.

This soil is used for crops and range. Cotton, grain sorghum, and wheat are the main crops.

A suitable cropping system on this soil is one that includes wheat, grain sorghum, or a similar high-residue crop. Crop residue left on or near the surface helps conserve moisture, prevent soil blowing, and maintain good tilth. Terraces and contour farming help prevent water erosion and conserve moisture. If crop residue is not available, emergency tillage helps control soil blowing. Grassed waterways are needed where flow of water concentrates.

CAPABILITY UNIT IIIe-2

Shep loam, 1 to 3 percent slopes, the only soil in this unit, is a deep, moderately permeable soil. Available water capacity is high.

This soil is used for crops and range. Cotton, grain sorghum, and wheat are the main crops.

A suitable cropping system on this soil is one that includes wheat, grain sorghum, or a similar high-residue crop. Crop residue left on or near the surface helps conserve moisture, prevent soil blowing, and maintain good tilth. Terraces and contour farming help prevent water erosion and conserve moisture. If crop residue is not available, emergency tillage helps control soil blowing. Grassed waterways are needed where flow of water concentrates.

CAPABILITY UNIT IIIe-3

Tobosa clay, 1 to 3 percent slopes, the only soil in this unit, is a deep, very slowly permeable soil. Available water capacity is high.

This soil is used for crops and range. Cotton, grain sorghum, and wheat are the main crops.

A suitable cropping system on this soil is one that includes wheat, grain sorghum, or a similar high-residue crop. Crop residue left on or near the surface helps conserve moisture, prevent soil blowing, and maintain good tilth. Terraces and contour farming help prevent water erosion and conserve moisture. Grassed waterways are needed where flow of water concentrates.

CAPABILITY UNIT IIIe-4

This unit consists of deep to moderately deep, moderately permeable to moderately slowly permeable fine sandy loams. Available water capacity is medium to high.

These soils are used for crops and range. Cotton, grain sorghum, and wheat are the main crops.

A suitable cropping system on these soils is one that includes grain sorghum, wheat, or a similar high-residue crop. Crop residue left on or near the surface helps conserve moisture and maintain good tilth. Terraces and contour farming help prevent water erosion and reduce runoff. If crop residue is not available, emergency tillage helps control soil blowing. Grassed waterways are needed where flow of water concentrates.

CAPABILITY UNIT IIIe-5

Cosh fine sandy loam, 1 to 3 percent slopes, the only soil in this unit, is a shallow, moderately permeable soil. Available water capacity is low.

This soil is used for crops and range. Cotton, grain sorghum, and wheat are the main crops.

A suitable cropping system on this soil is one that includes wheat, grain sorghum, or a similar high-residue crop. Crop residue left on or near the surface helps prevent soil blowing, conserve moisture, and maintain good tilth. Terraces and contour farming help reduce runoff and conserve moisture. Grassed waterways are needed where flow of water concentrates.

CAPABILITY UNIT IIIe-6

This unit consists of deep, moderately slowly permeable fine sands and loamy fine sands. Available water capacity is medium to high.

These soils are used for crops and range. Cotton, grain sorghum, and wheat are the main crops.

A suitable cropping system on these soils is one that includes grain sorghum, wheat, or a similar high-residue crop. Crop residue left on or near the surface helps conserve moisture and prevent soil blowing. If crop residue is not available, emergency tillage helps control soil blowing. Terraces and contour farming help reduce runoff and conserve moisture. Grassed waterways are needed where flow of water concentrates.

CAPABILITY UNIT IIIe-7

This unit consists of moderately deep to shallow, moderately permeable to slowly permeable clays and clay loams. Available water capacity is medium to low.

These soils are used for crops and range. Cotton, grain sorghum, and wheat are the main crops.

A suitable cropping system on these soils is one that includes grain sorghum or a similar high-residue crop. Crop residue left on or near the surface helps conserve moisture and improve tilth. Terraces and contour farming help reduce runoff and conserve moisture. Grassed waterways are needed where flow of water concentrates.

CAPABILITY UNIT IIIw-1

Mangum silty clay loam, the only soil in this unit, is a deep, very slowly permeable soil. Available water capacity is high.

This soil is used for crops and range. Cotton, grain sorghum, and wheat are the main crops.

A suitable cropping system on this soil is one that includes wheat, grain sorghum, or a similar high-residue crop. Crop residue left on or near the surface helps conserve moisture, prevent soil blowing, and maintain good tilth. Terraces help reduce runoff and conserve moisture. Diversion terraces are needed in places to protect the soils from runoff from higher areas.

CAPABILITY UNIT IIIs-1

Tobosa clay, 0 to 1 percent slopes, the only soil in this unit, is a deep, very slowly permeable soil. Available water capacity is high.

This soil is used for crops and range. Cotton, grain sorghum, and wheat are the main crops.

A suitable cropping system on this soil is one that includes wheat, grain sorghum, or a similar high-residue crop. Crop residue left on or near the surface helps conserve moisture, prevent soil blowing, and maintain good tilth. Terraces and contour farming help prevent water erosion and conserve moisture. Grassed waterways are needed where flow of water concentrates.

CAPABILITY UNIT IIIs-2

This unit consists of shallow, moderately slowly permeable to slowly permeable clays and clay loams. Available water capacity is low.

These soils are used for crops and range. Cotton, grain sorghum, and wheat are the main crops.

A suitable cropping system on these soils is one that includes grain sorghum or a similar high-residue crop. Crop residue left on or near the surface helps conserve moisture and maintain good tilth. Terraces and contour farming help prevent water erosion and conserve moisture. Grassed waterways are needed where flow of water concentrates.

CAPABILITY UNIT IVe-1

This unit consists of deep to shallow, moderately permeable to very slowly permeable clays, clay loams, and loams. Available water capacity is low to high.

These soils are used for crops and range. Cotton, grain sorghum, and wheat are the main crops.

A suitable cropping system on these soils is one that includes grain sorghum, wheat, or a similar high-residue crop. Crop residue left on or near the surface helps conserve moisture and maintain tilth. Terraces and contour farming help reduce runoff and conserve moisture. Grassed waterways are needed where flow of water concentrates.

CAPABILITY UNIT Vw-1

This unit consists of deep, moderately permeable to very slowly permeable soils that are frequently flooded. Available water capacity is high.

These soils are better suited to range and wildlife habitat than to row crops. Flooding prevents cultivation. Most areas are cut by meandering stream channels.

CAPABILITY UNIT VIe-1

This unit consists of moderately deep, very slowly permeable clays. Available water capacity is medium.

These soils are better suited to range and wildlife habitat than to row crops. They are too shallow or too steep for cultivation.

CAPABILITY UNIT VIe-2

This unit consists of deep to moderately deep, moderately permeable to moderately rapidly permeable loams and fine sandy loams. Available water capacity is high.

These soils are better suited to range and wildlife habitat than to row crops. They are too steep or too rocky for cultivation.

CAPABILITY UNIT VIw-1

Randall clay, the only soil in this unit, is a deep, very slowly permeable clay. Available water capacity is high.

This soil is better suited to range and wildlife habitat than to row crops. It is periodically inundated by excess

water from adjacent land, and it swells when wet and cracks when dry. Water stands on the surface for several months during most years.

CAPABILITY UNIT VIs-1

This unit consists of moderately deep to very shallow, moderately permeable to slowly permeable gravelly loams and clay loams. Available water capacity is very low to medium.

These soils are better suited to range and wildlife habitat than to row crops. They are too shallow, too gravelly, or too steep for cultivation.

CAPABILITY UNIT VIs-2

The Kavett part of Tarrant-Kavett association, undulating, is the only soil in this unit. It is a shallow, moderately slowly permeable clay. Available water capacity is low.

This soil is better suited to range and wildlife habitat than to row crops. It is too shallow or too stony for cultivation.

CAPABILITY UNIT VIIs-1

Owens-Badland complex, 3 to 12 percent slopes, is the only mapping unit in this capability unit. These are shallow, very slowly permeable clays. Available water capacity is low.

These soils are better suited to range and wildlife habitat than to row crops. They are too shallow and too steep for cultivation.

CAPABILITY UNIT VIIs-2

The Tarrant part of Tarrant-Rock outcrop association, steep, is the only soil in this unit. It is a very shallow to shallow, moderately slowly permeable cobbly clay. Available water capacity is low.

This soil is better suited to range and wildlife habitat than to row crops. It is too steep, too rocky, and too shallow for cultivation.

CAPABILITY UNIT VIIs-3

This unit consists of shallow to very shallow, moderately slowly permeable cobbly clays. Available water capacity is low.

These soils are better suited to range and wildlife habitat than to row crops. They are too rocky, too shallow, or too hilly for cultivation.

Irrigation

Irrigation in Taylor County is of minor importance. Approximately 1,300 acres was irrigated at the time of this survey. Most of the irrigated areas in the county are near Lawn, Merkel, Tuscola, and Happy Valley.

All water used for irrigation comes from wells 50 to 100 feet deep. In many areas of the county where the soils are suitable for irrigation, water is not available. Water to be used for irrigation should be tested for harmful salts, such as sodium chloride, sodium sulfate, magnesium sulfate, and sodium bicarbonate. Such salts as calcium carbonate and calcium sulfate may be present but are not harmful.

Two types of irrigation systems are used in the county, row and sprinkler. Row irrigation requires nearly level land. Sprinkler irrigation works satisfactorily on most slopes in the county and is generally used on the more sandy soils.

Yields under irrigation can be expected to be higher than those under nonirrigated farming. More information about irrigation can be obtained from representatives of the Soil Conservation Service who serve the Middle Clear Fork Soil and Water Conservation District.

Estimated yields

Table 2 lists estimated yields of the principal crops grown in Taylor County. The estimates are based on predictions made by farmers, soil scientists, and others who have knowledge of yields in the county and on information taken from research data. The estimated yields are average yields per acre that can be expected by good commercial farmers at the level of management that tends to produce the highest economic return.

The yields are given only for dryland. Not included in the table are soils that are used only for range or recreational purposes.

Crops other than those shown in table 2 are grown in the county, but their estimated yields are not included because their acreage is small or reliable data on yields are not available.

The estimated yields in table 2 are those that can be expected if the following management practices are used: rainfall is effectively used and conserved; surface drainage, subsurface drainage, or both are installed; crop residue is managed to maintain soil tilth; minimum but timely tillage is used; insect, disease, and weed control measures are consistently used; fertilizer is applied according to the results of soil tests and the needs of the crops; and suitable crop varieties are used at recommended seeding rates.

If the soils are irrigated, the following additional practices are needed: suitable quality of irrigation water is used, irrigation is timed to meet the needs of the soil and the crop, and irrigation systems are properly designed and efficiently used.

Use of the Soils for Range[4]

Native grasslands cover some 290,000 acres, or about 50 percent of Taylor County. These grasslands are used mainly for beef, wool, and mohair production. Two distinct types of grassland exist: the undulating to steep rocky slopes characterized by soils underlain by limestone rock in the southern part of the county and the soils underlain by redbed clay material in the northern part of the county.

The limestone country produces mid and tall grasses interspersed with an abundant variety of forbs and shrubs. These soils range from loam and clay loam to clay. Deer, turkey, and quail are plentiful in this area. The rough, picturesque countryside and the bountiful wildlife increase the demand in this area for land purchased by urbanites.

The rest of the county is open prairie of short to mid grasses. Native shrubs and trees grow along the watercourses. Forbs are plentiful.

Taylor County has two other types of plant communities

[4] JON DARROW, range conservationist, Soil Conservation Service, prepared this section.

TABLE 2.—*Estimated average yields per acre of principal crops grown under a high level of management*

[Absence of data indicates that the crop is not suited to the specified soil or is not grown on it]

Soil	Cotton lint	Grain sorghum	Wheat
	Lb	*Lb*	*Bu*
Clairemont silty clay loam	350	2,500	25
Cobb fine sandy loam, 1 to 3 percent slopes	200	1,400	20
Cosh fine sandy loam, 1 to 3 percent slopes	150	1,000	10
Demona fine sand, alkaline subsoil variant, 0 to 3 percent slopes		2,000	
Gageby clay loam	300	2,000	25
Hamby loamy fine sand, 0 to 3 percent slopes	300	2,000	20
Hamby fine sandy loam, 0 to 1 percent slopes	300	2,000	20
Hamby fine sandy loam, 1 to 3 percent slopes	250	1,750	20
Hamby fine sandy loam, 3 to 5 percent slopes	200	1,750	20
Kavett clay, 0 to 1 percent slopes	175	1,250	15
Kavett clay, 1 to 3 percent slopes	150	1,000	15
Mangum silty clay loam	150	1,000	15
Mereta clay loam, 0 to 1 percent slopes	200	1,500	20
Mereta clay loam, 1 to 3 percent slopes	150	1,250	15
Mereta clay loam, 3 to 5 percent slopes		1,000	10
Miles fine sandy loam, 0 to 1 percent slopes	300	2,000	20
Miles fine sandy loam, 1 to 3 percent slopes	250	1,500	20
Miles fine sandy loam, 3 to 5 percent slopes	200	1,400	15
Quanah clay loam, 1 to 3 percent slopes	150	1,000	15
Quanah clay loam, 3 to 5 percent slopes		1,000	10
Rioconcho clay loam	250	2,000	25
Rotan clay loam, 0 to 1 percent slopes	300	2,000	25
Rotan clay loam, 1 to 3 percent slopes	225	1,600	20
Rowena clay loam, 0 to 1 percent slopes	300	2,250	25
Rowena clay loam, 1 to 3 percent slopes	225	1,600	20
Sagerton clay loam, 0 to 1 percent slopes	300	2,000	25
Sagerton clay loam, 1 to 3 percent slopes	225	1,600	20
Shep loam, 1 to 3 percent slopes	200	1,750	15
Shep loam, 3 to 5 percent slopes	125	1,000	10
Speck clay loam, 0 to 1 percent slopes	175	1,250	15
Speck clay loam, 1 to 3 percent slopes	150	1,000	15
Stamford clay, 1 to 3 percent slopes	150	1,250	15
Tillman clay loam, 0 to 1 percent slopes	200	1,500	20
Tillman clay loam, 1 to 3 percent slopes	200	1,250	20
Tobosa clay, 0 to 1 percent slopes	225	1,750	20
Tobosa clay, 1 to 3 percent slopes	200	1,500	20
Valera clay, 0 to 1 percent slopes	200	1,800	20
Valera clay, 1 to 3 percent slopes	200	1,600	15
Vernon clay, 1 to 3 percent slopes	100	1,000	10
Weymouth clay loam, 1 to 3 percent slopes	150	1,000	15
Weymouth clay loam, 3 to 5 percent slopes	100	1,000	10

of lesser extent. These areas occur in the southeastern part of the county. One represents the westernmost extension of a belt of sandy soils that grow mid and tall grasses and a few post oak. The other area consists of a large pocket of soils that grow scattered live oak and an understory of midgrasses.

Range sites and condition classes

Different kinds of soil vary in their capacity to produce grass and other plants for grazing. Soils that produce about the same kinds and amounts of forage, if the range is in similar condition, make up a range site.

Range sites are kinds of rangeland that differ in their ability to produce vegetation. The soils of any one range site produce about the same kind of climax vegetation. Climax vegetation is the stabilized plant community; it reproduces itself and does not change, so long as the environment remains unchanged. Throughout the prairie and the plains, the climax vegetation consists of the plants that were growing there when the region was first settled. If cultivated crops are not grown, the most productive combination of forage plants on a range site is generally the climax vegetation.

Decreasers are plants in the climax vegetation that tend to decrease in relative amount if they are closely grazed. They generally are the tallest and most productive perennial grasses and forbs and the most palatable to livestock.

Increasers are plants in the climax plant community that increase in relative amount as the more desirable decreaser plants are reduced by close grazing. They are commonly shorter than decreasers and are generally less palatable to livestock.

Invaders are plants that cannot compete with plants in the climax plant community for moisture, nutrients, and light. Hence, invaders come in and grow along with increasers after the climax vegetation has been reduced by grazing. Many invaders are annual weeds and some are shrubs that have some grazing value, but others have little value for grazing.

Four range condition classes are used to indicate the degree of departure from the potential, or climax, vegetation brought about by grazing or other uses. These classes show the present condition of the native vegetation on a range site in relation to the native vegetation that could grow there.

A range is in *excellent* condition if 76 to 100 percent of the vegetation is of the same kind as that in the climax stand. It is in *good* condition if the percentage is 51 to 75; in *fair* condition if the percentage is 26 to 50; and in *poor* condition if the percentage is less than 25.

Range condition is judged by standards that apply to the particular range site. It expresses the present kind and amount of vegetation in relation to the climax plant community for that site.

Potential forage production depends on the range site. Current forage production depends on the range condition and the moisture available to plants during their growing season.

One of the main objectives of good range management is to keep rangeland in excellent or good condition. If this is done, water is conserved, yields are improved, and the soils are protected. The main concern of management is to recognize important changes in the kind of cover on a range site. These changes take place gradually and can be misinterpreted or overlooked. Growth encouraged by heavy rainfall may lead to the conclusion that the range is in good condition, when actually the cover is weedy and the long-term trend is toward lower production. On the other hand, some rangeland that has been closely grazed for short periods, under the supervision of a careful

manager, may have a degraded appearance that temporarily conceals its quality and ability to recover.

Descriptions of range sites

In the following pages the range sites of Taylor County are described, and the climax plants and principal invaders on the sites are named. The descriptions also contain an estimate of the potential annual yield of air-dry herbage for each site when it is in excellent condition.

The soils in each site can be determined by referring to the units in the section "Descriptions of the Soils" or to the "Guide to Mapping Units" at the back of this survey.

CLAYEY BOTTOMLAND RANGE SITE

This range site consists of deep silty clay loams. These soils are nearly level and are on concave topography.

Permeability is very slow. The hazard of soil blowing is slight. The soils are subject to flooding. They receive additional water as runoff or overflow from adjacent areas.

The climax plant community on this site consists of mid grasses and some trees and shrubs.

Where this site is in excellent condition, the vegetation is, by weight, about 20 percent vine-mesquite; 15 percent side-oats grama; 10 percent western wheatgrass; 5 percent each of alkali sacaton, blue grama, plains bristlegrass, Arizona cottontop, Texas wintergrass, tobosa, white tridens, meadow dropseed, and silver bluestem; and 5 percent each of woody species and forbs.

Continued heavy grazing of this site results in a decrease of side-oats grama, vine-mesquite, and western wheatgrass and an increase in Texas wintergrass, buffalograss, white tridens, and meadow dropseed. Further deterioration results in a plant community of buffalograss and some annual grasses and weeds. Mesquite invades this site profusely.

If this site is in excellent condition, it produces about 1,000 to 2,000 pounds of air-dry herbage per acre annually, depending on rainfall.

CLAY FLAT RANGE SITE

This range site consists of deep clays. These soils crack when they are dry and swell when they are wet.

Permeability is very slow. The hazard of soil blowing is slight.

The climax plant community on this site consists of mid grasses.

Where this site is in excellent condition, the vegetation is, by weight, about 30 percent tobosa; 20 percent vine-mesquite; 10 percent each of side-oats grama, buffalograss, and blue grama; 5 percent each of white tridens, western wheatgrass, alkali sacaton, and purple and wright three-awn; and only a small amount of woody species and forbs.

Continued heavy grazing on this site results in a decrease in side-oats grama, vine-mesquite, western wheatgrass, and blue grama and an increase in tobosa and buffalograss. Further deterioration results in a plant community of prickly pear, mesquite, and condalia species. The mesquite is multistemmed and stunted because of the heavy soils of the site.

If this site is in excellent condition, it produces about 1,000 to 2,000 pounds of air-dry herbage per acre annually, depending on rainfall.

CLAY LOAM RANGE SITE

This range site consists of deep to moderately deep clay loams and clays.

Permeability is moderately slow to slow. The hazard of soil blowing is slight. If the vegetative stand deteriorates, surface crusting becomes a problem.

The climax plant community on this site consists of short and mid grasses (fig. 9).

Where this site is in excellent condition, the vegetation is, by weight, about 25 percent side-oats grama; 15 percent each of vine-mesquite and Arizona cottontop; 10 percent buffalograss; and 5 percent each of western wheatgrass, tobosa, blue grama, Texas wintergrass, silver bluestem, sand dropseed, purple and wright three-awn, and forbs.

Continued heavy grazing of this site results in a decrease of side-oats grama, Arizona cottontop, vine-mesquite, and western wheatgrass. Further deterioration results in a plant community of buffalograss and woody species of mesquite, condalia, and prickly pear. Mesquite infests this site to such an extent that brush control and reseeding are necessary in restoring the production of the site.

If this site is in excellent condition, it produces about 1,200 to 2,500 pounds of air-dry herbage per acre annually, depending on rainfall.

LOAMY BOTTOMLAND RANGE SITE

This range site consists of deep clay loams and silty clay loams that receive runoff water from adjacent lands as well as the overflow from the watercourse itself.

Permeability is moderate to slow. The hazard of soil blowing is slight. These soils are subject to flooding.

The climax plant community on this site consists of tall and mid grasses and numerous woody species. Among the woody plants are American elm, hackberry, pecan, ash, cottonwood, western soapberry, bumelia, and greenbrier. Cool-season grasses are significant on this site.

Where this site is in excellent condition, the vegetation is, by weight, 15 percent each of indiangrass and big bluestem; 10 percent each of vine-mesquite, switchgrass, little bluestem, and forbs; 5 percent each of Canada wildrye, Texas wintergrass, western wheatgrass, and side-oats grama; and 15 percent woody species.

Continued heavy grazing of this site results in a decrease of the tall grasses and an increase in mid and short grasses, such as Texas wintergrass, buffalograss, sand dropseed, and three-awn. Severe deterioration results in a plant community of annual grasses and forbs and a browse line on the woody species.

If this site is in excellent condition, it produces about 2,000 to 4,000 pounds of air-dry herbage per acre annually, depending on rainfall.

LOW STONY HILLS RANGE SITE

This range site consists of shallow to very shallow cobbly clays.

Permeability is moderately slow. The hazard of soil blowing is slight.

The climax plant community on this site consists of mid and tall grasses and scattered woody species.

Where this site is in excellent condition, the vegetation is, by weight, about 15 percent each of side-oats grama and big bluestem; 10 percent each of indiangrass and little bluestem; 5 percent each of switchgrass, tall dropseed,

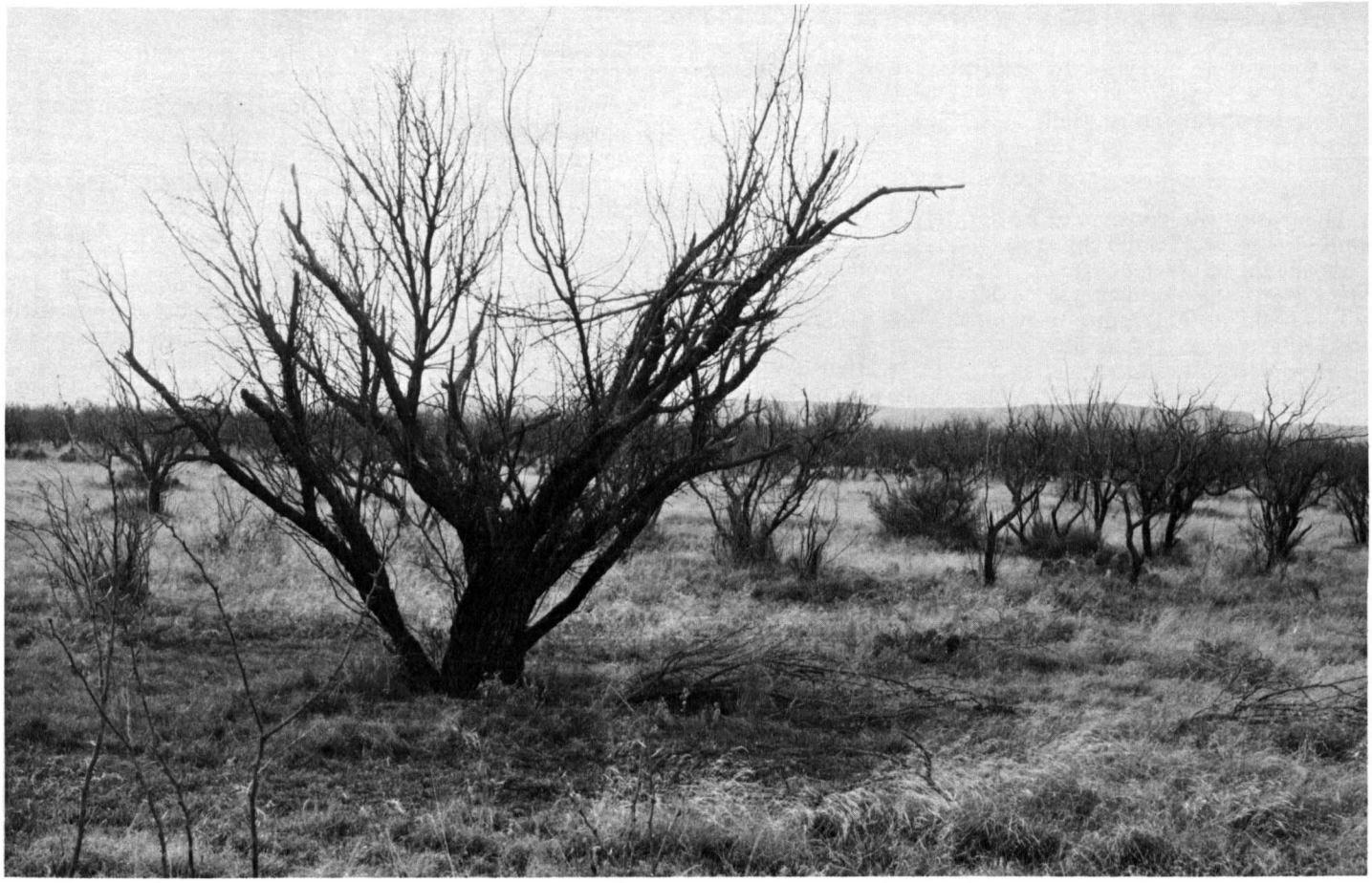

Figure 9.—**Area of Clay Loam range site. The soil is Sagerton clay loam, 0 to 1 percent slopes.**

Arizona cottontop, vine-mesquite, Texas wintergrass, Texas cupgrass, and forbs; and 15 percent woody species.

Continued heavy grazing of this site results in a decrease of the tall grasses and an increase in side-oats grama, little bluestem, buffalograss, Texas wintergrass, hairy tridens, and slim tridens. Redberry juniper, tasajillo, and condalia species are woody invaders.

If this site is in excellent condition, it produces about 900 to 1,700 pounds of air-dry herbage per acre annually, depending on rainfall.

REDLAND RANGE SITE

This range site consists of shallow clay loams.

Permeability is slow. The hazard of soil blowing is slight.

The climax plant community on this site consists of a live oak savannah, scattered post oak, and an understory of tall and mild grasses.

Where this site is in excellent condition, the vegetation is, by weight, about 20 percent little bluestem; 15 percent indiangrass; 10 percent each of big bluestem, side-oats grama, and cane and silver bluestem; 5 percent each of hairy dropseed, Texas wintergrass, buffalograss, curly mesquite, and forbs; and 10 percent woody species.

Continued heavy grazing of this site results in a decrease of the tall grasses and an increase in side-oats grama, Texas wintergrass, meadow dropseed, and buffalograss. Further deterioration results in a woody overstory of oaks and an understory of Texas wintergrass, buffalograss, and annuals.

If this site is in excellent condition, it produces about 2,000 to 3,500 pounds of air-dry herbage per acre annually, depending on rainfall.

SANDY RANGE SITE

This range site consists of deep fine sands and loamy fine sands.

Permeability is moderately slow. The hazard of soil blowing is moderate to severe.

The climax plant community on this site consists of a savannah of post oak and blackjack oak. Post oak is the dominant woody species.

Where this site is in excellent condition, the vegetation is, by weight, about 25 percent little bluestem; 10 percent each big bluestem and indiangrass; 5 percent each sand lovegrass, purpletop tridens, tall dropseed, silver bluestem, hairy grama, Scribner's panicum, and forbs; and 20 percent woody species.

Continued heavy grazing of this site results in a decrease of big bluestem, little bluestem, and indiangrass. Silver bluestem, tall dropseed, and numerous annuals invade the site. In many places post oak and blackjack oak increase

to such a density that only shade-tolerant plants survive in the understory.

If this site is in excellent condition, it produces about 2,000 to 4,000 pounds of air-dry herbage per acre annually, depending on rainfall.

SANDY LOAM RANGE SITE

This range site consists of moderately deep to deep fine sandy loams and loams (fig. 10).

Permeability is moderately rapid to moderately slow. The hazard of soil blowing is moderate.

The climax plant community on this site consists of mid and tall grass-oak savannah.

Where this site is in excellent condition, the vegetation is, by weight, 30 percent little bluestem; 20 percent side-oats grama; 10 percent each of indiangrass and plains bristlegrass; 5 percent each of Arizona cottontop, sand bluestem, purple and wright three-awn, and forbs; and 10 percent woody species.

Continued heavy grazing of this site results in a decrease of the tall and mid grasses and an increase in buffalograss, hairy grama, fall witchgrass, and hooded windmillgrass. The woody species increase until the site becomes dominated by post oak, skunkbush sumac, greenbrier, shin oak, and lotebush. A few shin oak and redberry juniper may dominate the heavily grazed site rather than the oaks.

If this site is in excellent condition, it produces about 1,500 to 3,000 pounds of air-dry herbage per acre annually, depending on rainfall.

SHALLOW RANGE SITE

This range site consists of shallow clays and clay loams (fig. 11).

Permeability is slow to moderately slow. The hazard of soil blowing is slight.

The climax plant community on this site consists of an open prairie of mid grasses and scattered hackberry, skunkbush sumac, bumelia, and catclaw.

Where this site is in excellent condition, the vegetation is, by weight, about 20 percent side-oats grama; 15 percent vine-mesquite; 10 percent each of Texas wintergrass and forbs; and 5 percent each of Arizona cottontop, little bluestem, silver bluestem, big bluestem, indiangrass, blue grama, Texas cupgrass, buffalograss, and woody species.

Continued heavy grazing of this site results in a decrease of side-oats grama and an increase in Texas wintergrass and buffalograss. The scattered tall grasses die out. Further deterioration results in a plant community of buffalograss, mesquite, pricklypear, tasajillo, condalia, hairy grama, hairy tridens, Texas grama, and red grama.

If this site is in excellent condition, it produces about 2,000 to 3,500 pounds of air-dry herbage per acre annually, depending on rainfall.

The soils of this site have enough limestone cobbles on the surface of the soil to protect the more desirable grasses so that range seeding is seldom needed.

SHALLOW CLAY RANGE SITE

This range site consists of shallow to moderately deep clays.

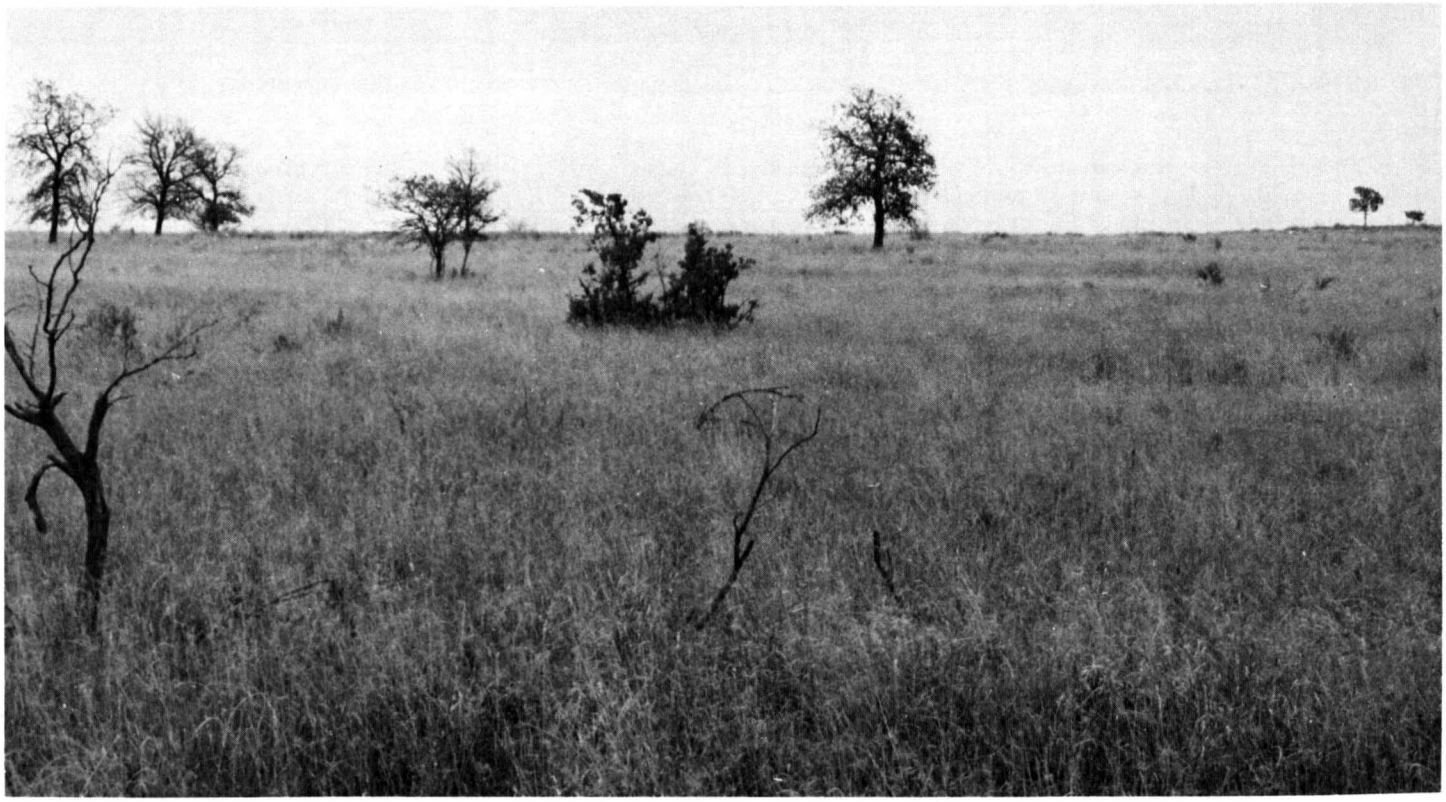

Figure 10.—**Area of Sandy Loam range site. The soil is Miles fine sandy loam, 1 to 3 percent slopes.**

Figure 11.—**Area of Shallow range site. The soil is Kavett clay, 0 to 1 percent slopes.**

Permeability is very slow. The hazard of soil blowing is slight.

The climax plant community on this site consists of short and mid grasses.

Where this site is in excellent condition, the vegetation is, by weight, about 40 percent side-oats grama; 10 percent each of buffalograss, vine-mesquite, and Arizona cottontop; and 5 percent each of Texas wintergrass, silver bluestem, rough tridens, blue grama, woody species, and forbs.

Continued heavy grazing of this site results in a decrease of side-oats grama and an increase in buffalograss. Further deterioration results in a decrease of buffalograss and an increase in hairy tridens, sandy muhly, Texas grama, pricklypear, mesquite, juniper, and condalia.

If this site is in excellent condition, it produces about 800 to 1,700 pounds of air-dry herbage per acre annually, depending on rainfall.

Revegetation is difficult as a result because the soils are shallow and droughty.

STEEP ROCKY RANGE SITE

This range site consists of very shallow to shallow cobbly clays. These soils are steep (fig. 12).

Permeability is moderately slow. The hazard of soil blowing is slight.

The climax plant community on this site consists of mid and tall grasses and many kinds of woody plants. Among the woody plants are shin oak, littleleaf sumac, skunkbush sumac, hackberry, bumelia, smilax, ephedra, catclaw, elbow-bush, plum, and redbud. The north slopes of this site produce denser stands of vegetation because they receive less direct sunlight.

Where this site is in excellent condition, the vegetation is, by weight, about 15 percent side-oats grama; 10 percent each of big bluestem, indiangrass, little bluestem, and switchgrass; 5 percent each of green sprangletop, vine-mesquite, Arizona cottontop, Texas wintergrass, Texas cupgrass, and forbs; and 15 percent woody species.

Continued heavy grazing of this site results in a decrease of the tall grasses and an increase in little bluestem, side-oats grama, and cane bluestem. Further deterioration results in a plant community of buffalograss, Texas wintergrass, slim tridens, hairy grama, and three-awn.

If this site is in excellent condition, it produces about 900 to 1,700 pounds of air-dry herbage per acre annually, depending on rainfall.

Cattle use this site very little because the soils are steep. Deer and other wildlife species frequently use the site for cover.

VERY SHALLOW RANGE SITE

This range site consists of very shallow to shallow gravelly loams.

Permeability is slow. The hazard of soil blowing is moderate.

The climax plant community on this site consists of short, mid, and tall grasses.

Where this site is in excellent condition, the vegetation is, by weight, about 30 percent side-oats grama; 15 percent little bluestem and forbs; and 5 percent each of Texas wintergrass, buffalograss, hairy grama, silver bluestem, rough

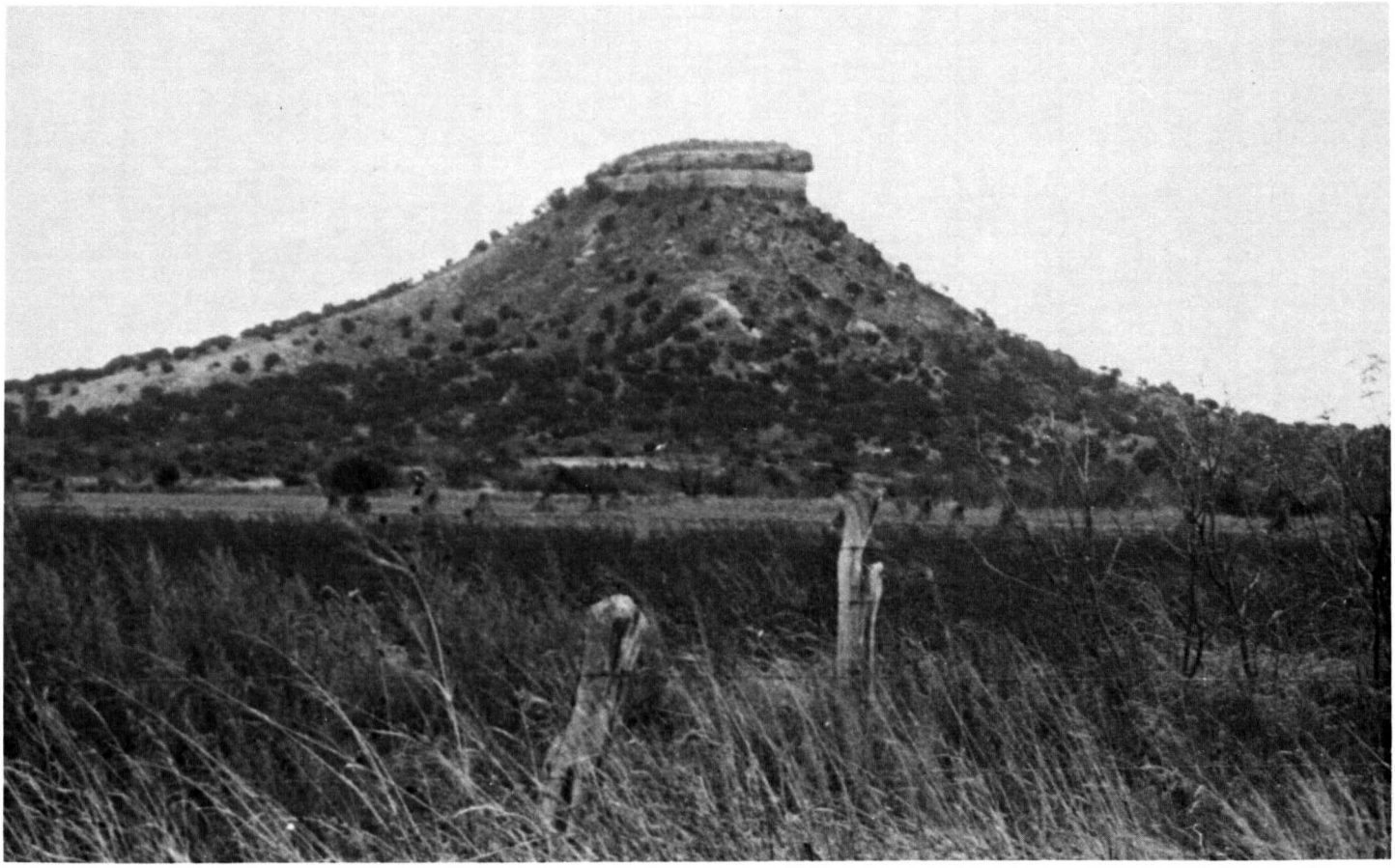

Figure 12.—**Area of Steep Rocky range site. Tarrant-Rock outcrop association, steep, is in the background.**

tridens, indiangrass and big bluestem, purple and wright three-awn, and woody species.

Continued heavy grazing of this site results in a decrease of side-oats grama, little bluestem, indiangrass, and big bluestem and an increase in buffalograss. Further deterioration results in invasion by hairy grama, hairy tridens, red grama, mesquite, redberry juniper, catsclaw, and annual grasses.

If this site is in excellent condition, it produces about 400 to 900 pounds of air-dry herbage per acre annually, depending on rainfall.

Use of the Soils for Wildlife[5]

Wildlife is an important source of recreation and income in some areas of Taylor County. Many farm-ranch enterprises lease hunting rights to persons and organizations.

The wildlife in Taylor County can be divided into three categories: small game, big game, and waterfowl.

Small game includes turkey, quail, dove, cottontail rabbit, raccoon, and squirrel. Big game is limited to white-tailed deer. The best habitat for deer is in the Edward Plateau area. Waterfowl consists of ducks, which utilize the lakes and ponds found throughout the county. The common predators in Taylor County are coyotes, bobcats, and foxes.

Taylor County is well known for its excellent fishing in private lakes, public lakes, and farm ponds. Because of climate, only warm-water species are found in the county. Lakes and farms ponds are normally stocked with channel catfish, black bass, and sunfish. Lake Abilene attracts fishermen from many areas.

Most wildlife habitats are managed by planting suitable vegetation; by manipulating existing vegetation so as to bring about the natural establishment, increase, or improvement of desired plants; or by combinations of such measures. The influence of a soil on the growth of plants is known for many kinds, and it can be inferred for others from a knowledge about the characteristics and behavior of the soil. In addition, water areas can be created or natural ones improved as wildlife habitat. Soil information is useful for these purposes also.

Soil interpretations for wildlife habitat serve a variety of purposes. They are an aid in selecting the more suitable sites for various kinds of management. They serve as indicators of the level of management intensity needed to achieve satisfactory results. They also serve as a means of showing why it may not be generally feasible to manage a particular area for a given kind of wildlife.

The interpretations may also serve in broad-scale planning of wildlife management areas, parks, and nature areas or in acquiring wildlife lands.

[5] JAMES HENSON, biologist, Soil Conservation Service, prepared this section.

Successful management of wildlife on any tract of land requires, among other things, that food, cover, and water be available in a suitable combination. Lack of any one of these necessities, an unfavorable balance among them, or inadequate distribution of them may severely limit or account for the absence of desired wildlife species. Information about the soil provides a valuable tool in creating, improving, or maintaining suitable food, cover, and water for wildlife.

Soils directly influence the kinds and amounts of vegetation and the amount of water available and, in this way, indirectly influence the kinds of wildlife that can live in an area. Soil properties that affect the growth of wildlife habitat are thickness of soil useful to crops, texture of the surface layer, available water capacity to a depth of 40 inches, wetness, surface stoniness or rockiness, hazard of flooding, slope, and permeability of the soil to air and water.

In table 3 soils of this county are rated for producing four elements of wildlife habitat and for two groups, or kinds, of wildlife. The ratings indicate relative suitability for various elements.

The levels of suitability are expressed by an adjective rating, as follows:

Good.—Habitat is easily improved, maintained, or created. There are few or no soil limitations in habitat management, and satisfactory results can be expected.

Fair.—Habitat can be improved, maintained, or created on these soils, but moderate soil limitations affect habitat management or development. A moderate intensity of management and fairly frequent attention may be required to ensure satisfactory results.

Poor.—Habitat can be improved, maintained, or created on these soils, but soil limitations are severe. Habitat management may be difficult and expensive and require intensive effort. Results are questionable.

Very poor.—Under the prevailing soil conditions, it is impractical to attempt to improve, maintain, or create habitat. Unsatisfactory results are probable.

The significance of each subheading in table 3 under "Elements of wildlife habitat" and "Kinds of wildlife" is given in the following paragraphs.

Each soil is rated in table 3 according to its suitability for producing various kinds of plants and other elements that make up wildlife habitat. The ratings mainly take into account the characteristics of the soils and closely related natural factors of the environment. They do not take into account climate, present use of the soils, or the present distribution of wildlife and people. For this reason, selection of a site for development as habitat for wildlife requires inspection at the site.

Grain and seed crops are annual grain-producing plants, such as corn, sorghum, millet, and soybeans.

Grasses and legumes are domestic grasses and legumes that are established by planting. They provide food and cover for wildlife. Grasses include ryegrass and panicgrass; legumes include annual lespedeza and other clovers.

Wild herbaceous upland plants are native or introduced perennial grasses, forbs, and weeds that provide food and cover for upland wildlife. Beggarweed, perennial lespedeza, wild bean, pokeweed, and cheatgrass are typical examples. On rangeland, typical plants are bluestem, grama, perennial forbs, and legumes.

Shrubs are plants that produce wildlife food in the form of twigs, bark, buds, or foliage. Such plants commonly grow in their natural environment, but they may be planted and developed through wildlife management programs. Typical species are bitterbrush, snowberry, sagebrush, mesquite, catsclaw, gray oak, and whitebrush.

Three other elements of wildlife habitat, coniferous woody plants, wetland food and cover plants, and shallow-water developments, are not covered in the table. All the soils in Taylor County are poor or very poor for coniferous woody plants except Kavett and Tarrant soils, which are fair; and Pitzer soils, which are good. All the soils are very poor for wetland food and cover plants except Randall soils, which are fair. All the soils are very poor for shallow-water developments except Randall soils, which are good.

Table 3 also rates the soils according to their suitability as habitat for the two kinds of wildlife in the county—openland and rangeland wildlife. These ratings are related to ratings made for the elements of habitat.

Openland wildlife are birds and mammals that normally live in meadows, pastures, and open areas where grasses, herbs, and shrubby plants grow. Quail, doves, meadowlarks, field sparrows, cottontail rabbits, and foxes are typical examples of openland wildlife.

Rangeland wildlife are birds and mammals that normally live in areas of natural rangelands. Scaled quail, meadowlark, coyotes, javelina, antelope, white-tailed deer, and jackrabbit are typical examples of rangeland wildlife.

Wetland wildlife is not covered in the table. All the soils of Taylor County are very poor for wetland wildlife except Randall soils, which are good.

Engineering Uses of the Soils[6]

This section is useful to those who need information about soils used as structural material or as foundation upon which structures are built. Among those who can benefit from this section are planning commissions, town and city managers, land developers, engineers, contractors, and farmers.

Among properties of soils highly important in engineering are permeability, compressibility, shear strength, compaction characteristics, soil drainage condition, shrink-swell potential, grain size, plasticity, and soil reaction. Also important are depth to the water table, depth to bedrock, and soil slope. These properties, in various degrees and combinations, affect the construction and maintenance of roads, airports, and pipelines; foundations for small buildings; irrigation systems; ponds and small dams; and systems for disposal of sewage and refuse.

Information in this section of the soil survey can be helpful to those who—

1. Select potential residential, industrial, commercial, and recreational areas.
2. Evaluate alternate routes for roads, highways, pipelines, and underground cables.
3. Seek sources of gravel, sand, or clay.
4. Plan farm drainage systems, irrigation systems, ponds, terraces, and other structures for controlling water and conserving soil.
5. Correlate performance of structures already built with properties of the kinds of soil on which they

[6] By ROBERT L. GRAY, area engineer, Soil Conservation Service.

TABLE 3.—*Suitability of soils for elements of wildlife habitat and kinds of wildlife*

Soil series and map symbols	Elements of wildlife habitat				Kinds of wildlife	
	Grain and seed crops	Grasses and legumes	Wild herbaceous upland plants	Shrubs	Openland	Rangeland
Badland Mapped only in a complex with Owens soils.	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor.
Clairemont: Ca, Cn For Urban land part of Cn, see Urban land.	Good	Good	Good	Fair	Good	Fair.
Cobb: CoB	Fair	Good	Good	Fair	Good	Fair.
Colorado: Cr	Poor	Fair	Fair	Fair	Fair	Fair.
Cosh: CsB	Poor	Poor	Fair	Poor	Poor	Poor.
Demona variant: DeB	Fair	Fair	Good	Fair	Fair	Fair.
Gageby: Ga	Good	Good	Good	Fair	Good	Fair.
Hamby:						
HaB	Fair	Good	Good	Good	Good	Good.
HbA, HbB, HbC, HuB For Urban land part of HuB, see Urban land.	Good	Good	Good	Good	Good	Good.
Kavett: KaA, KaB	Poor	Poor	Fair	Fair	Poor	Fair.
Mangum:						
Ma, Mb For Urban land part of Mb, see Urban land.	Fair	Fair	Fair	Good	Fair	Fair.
Mf	Poor	Fair	Fair	Good	Fair	Fair.
Mereta: MrA, MrB, MrC	Fair	Fair	Fair	Fair	Fair	Fair.
Miles: MsA, MsB, MsC	Good	Good	Good	Good	Good	Good.
Owens: ObE For Badland part, see Badland.	Poor	Poor	Fair	Very poor	Poor	Poor.
Pitzer: PtD, PuD, PwC For Weymouth part of PwC, see Weymouth series. For Urban land part of PuD, see Urban land.	Very poor	Poor	Poor	Poor	Poor	Poor.
Quanah:						
QaB	Good	Fair	Good	Good	Good	Good.
QaC	Fair	Fair	Good	Good	Fair	Good.
Randall: Ra	Poor	Fair	Fair	Fair	Fair	Fair.
Rioconcho:						
Rc	Good	Good	Fair	Fair	Good	Fair.
Rf	Poor	Fair	Fair	Fair	Fair	Fair.
Rock outcrop Mapped only in an undifferentiated unit with Ustochrepts and in associations with Tarrant soils.	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor.
Rotan: RnA, RnB	Good	Good	Good	Fair	Good	Fair.
Rowena: RoA, RoB, RuA For Urban land part of RuA, see Urban land.	Good	Good	Good	Fair	Good	Fair.

TABLE 3.—*Suitability of soils for elements of wildlife habitat and kinds of wildlife*—Continued

Soil series and map symbols	Elements of wildlife habitat				Kinds of wildlife	
	Grain and seed crops	Grasses and legumes	Wild herbaceous upland plants	Shrubs	Openland	Rangeland
Sagerton: SaA, SaB, SeB. For Urban land part of SeB, see Urban land.	Good	Good	Good	Fair	Good	Fair.
Shep: ShB, ShC, ShD	Fair	Good	Good	Good	Good	Good.
Speck: SpA, SpB	Poor	Poor	Fair	Fair	Poor	Fair.
Stamford: StB	Fair	Fair	Fair	Fair	Fair	Fair.
Tarrant: TAD, TED, TFF, TFG, TLD. For Kavett part of TED, see Kavett series. For Rock outcrop part of TFF and TFG, see Rock outcrop. For Vernon part of TLD, see Vernon series.	Very poor	Very poor	Poor	Fair	Very poor	Poor.
Tillman: TmA, TmB	Good	Good	Good	Poor	Good	Fair.
Tobosa: ToA, ToB, TuB. For Urban land part of TuB, see Urban land.	Fair	Fair	Fair	Fair	Fair	Fair.
Urban land: Ub	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor.
Ustochrepts: URF. For Rock outcrop part, see Rock outcrop.	Fair	Good	Good	Fair	Good	Fair.
Valera: VaA, VaB	Fair	Fair	Fair	Fair	Fair	Fair.
Vernon: VeB, VeE	Fair	Fair	Fair	Fair	Fair	Fair.
Weymouth: WeB, WeC, WuD. For Urban land part of WuD, see Urban land.	Fair	Good	Good	Good	Good	Good.

are built, for the purpose of predicting performance of structures on the same or similar kinds of soil in other locations.

6. Predict the trafficability of soils for cross-country movement of vehicles and construction equipment.
7. Develop preliminary estimates pertinent to construction in a particular area.

Most of the information in this section is presented in tables 4, 5, and 6, which show, respectively, several estimated soil properties significant in engineering; interpretations for various engineering uses; and results of engineering laboratory tests on soil samples.

This information, along with the soil map and other parts of this publication, can be used to make interpretations in addition to those in tables 4, 5, and 6, and it can also be used to make other useful maps.

This information, however, does not eliminate the need for further investigations at sites selected for engineering works, especially works that involve heavy loads or that require excavations to depths greater than those shown in the tables, generally depths of more than 6 feet. Also, inspection of sites, especially the small ones, is needed because many delineated areas of a given soil mapping unit may contain small areas of other kinds of soil that have strongly contrasting properties and different suitabilities or limitations for soil engineering.

Some of the terms used in this soil survey have special meaning to soil scientists that is not known to all engineers. The Glossary defines many of these terms as they are commonly used in soil science.

Engineering soil classification systems

The two systems most commonly used in classifying samples of soils for engineering are the Unified system[7] used by the Soil Conservation Service, Department of Defense, and other agencies, and the AASHO system[8]

[7] United States Department of Defense. Unified soil classification system for roads, airfields, embankments and foundations. MIL-STD-619B, 30 pp., illus. 1968.

[8] American Association of State Highway Officials. Standard specifications for highway materials and methods of sampling and testing. Ed. 8, 2 v., illus. 1961.

TABLE 4.—*Estimated soil properties*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil. The soils in such other series that appear in the first column of this table. The

Soil series and map symbols	Hydrologic soil group	Depth to bedrock	Depth from surface (typical profile)	USDA texture	Classification		Coarse fraction greater than 3 inches
					Unified	AASHO	
		Inches	*Inches*				
Badland. Too variable to be rated. Mapped only in a complex with Owens soils.							
*Clairemont: Ca, Cn. For Urban land part of Cn, see Urban land.	B	>60	0–30	Silty clay loam	CL	A-6, A-7	
			30–60	Silt loam	CL	A-6, A-7	
Cobb: CoB	B	20–40	0–7	Fine sandy loam	SM, SM-SC	A-2, A-4	
			7–33	Sandy clay loam	SC or CL	A-6	
			33	Weakly cemented sandstone.			
Colorado: Cr	B	>60	0–60	Loam, clay loam	ML or CL, ML-CL	A-4, A-6	
Cosh: CsB	C	12–20	0–7	Fine sandy loam	SM, SM-SC	A-4	
			7–18	Sandy clay loam	SC or CL	A-6	
			18	Weakly cemented sandstone.			
Demona variant: DeB	C	>80	0–22	Fine sand	SM	A-2-4	
			22–52	Sandy clay	CL, CH	A-7	
			52–80	Sandy clay loam	SC	A-6, A-4	
Gageby: Ga	B	>80	0–7	Clay loam	CL	A-6	
			7–80	Sandy clay loam	CL	A-6, A-4	
*Hamby: HaB, HbA, HbB, HbC, HuB. For Urban land part of HuB, see Urban land.	C	>83	0–10	Fine sandy loam and loamy fine sand.	SM, SM-SC	A-4, A-2	
			10–66	Clay	CL, SC	A-7, A-6	
			66–83	Clay loam	CL, SC	A-6, A-7	
Kavett: KaA, KaB	D	12–20	0–15	Clay	CH	A-7	
			15	Fractured limestone plates.			
*Mangum: Ma, Mb, Mf. For Urban land part of Mb, see Urban land.	D	>81	0–9	Silt loam, silty clay, silty clay loam, clay.	CL	A-7-6, A-6	
			9–54	Silty clay	CH, CL	A-7-6	
			54–81	Clay	CH, CL	A-7	
Mereta: MrA, MrB, MrC	C	14–20	0–18	Clay loam	CL	A-6 or A-7-6	
			18–22	Strongly cemented caliche.			
			22–30	Clay loam	CL	A-6, A-7	
Miles: MsA, MsB, MsC	B	>80	0–9	Fine sandy loam	SM, SM-SC	A-2 or A-4	
			9–80	Sandy clay loam	SC or CL	A-6	
*Owens: ObE. For Badland part, see Badland.	D	12–20	0–16	Clay	CH, CL	A-7-6	
			16–24	Shaly clay.			
*Pitzer: PtD, PuD, PwC. For Urban land part of PuD, see Urban land. For Weymouth part of PwC, see Weymouth series.	C	4–14	0–6	Gravelly loam	CL, ML-CL	A-4, A-6	0–3
			6–20	Indurated caliche			
			20–76	Very gravelly sandy loam.	GM-GC, GC, GW-GC	A-1-b, A-2	0–10
			76–80	Clayey shale.			

significant to engineering

mapping units may have different properties and limitations, and for this reason it is necessary to follow carefully the instructions for referring to symbol > means more than, and the symbol < means less than]

Percentage less than 3 inches passing sieve—				Liquid limit	Plasticity index	Permeability	Available water capacity	Reaction	Shrink-swell potential	Corrosivity to—	
No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)							Uncoated steel	Concrete
						Inches per hour	*Inches per inch of soil*	*pH*			
100	100	100	85–98	30–45	11–25	0.6–2.0	0.16–0.19	7.4–8.4	Low	Low	Low.
100	100	100	85–98	30–45	11–25	0.6–2.0	0.16–0.18	7.9–8.4	Low	Low	Low.
100	98–100	75–90	30–50	18–25	1–5	2.0–6.0	0.11–0.14	6.1–7.3	Low	Low	Low.
95–100	90–99	90–98	40–60	25–36	12–20	0.6–2.0	0.12–0.16	6.1–7.3	Low	Low	Low.
100	100	100	85–98	20–40	5–20	0.6–2.0	0.16–0.20	7.9–8.4	Low	High	Low.
95–100	90–100	70–85	40–50	18–25	1–5	2.0–6.0	0.11–0.13	6.1–7.3	Very low	Low	Low.
90–98	90–98	90–98	40–55	25–36	12–20	0.6–2.0	0.12–0.15	6.1–7.8	Low	Low	Low.
100	100	65–80	20–30	<20	[1] NP–3	2.0–6.0	0.05–0.08	6.1–7.3	Very low	Low	Low.
100	100	90–100	51–85	42–65	20–40	0.2–0.6	0.15–0.18	5.6–7.3	Moderate	High	Moderate.
100	100	90–100	36–50	25–40	8–20	0.6–2.0	0.14–0.17	6.1–8.4	Low	High	Moderate.
100	100	95–98	80–90	30–40	12–20	0.6–2.0	0.16–0.20	7.4–8.4	Low	Moderate	Low.
100	100	95–98	65–80	25–35	8–15	0.6–2.0	0.16–0.20	7.9–8.4	Low	Moderate	Low.
100	95–100	70–90	30–50	17–25	1–7	2.0–6.0	0.12–0.15	6.6–7.3	Low	Low	Low.
100	95–100	90–100	45–85	35–50	15–31	0.2–0.6	0.14–0.18	6.1–7.3	Moderate	High	Low.
98–100	95–100	85–100	45–85	30–50	15–31	0.2–0.6	0.15–0.20	6.6–8.4	Low	High	Low.
90–100	90–100	85–100	80–95	51–60	25–35	0.2–0.6	0.15–0.18	7.9–8.4	High	High	Low.
100	100	100	95–100	35–50	15–28	0.2–0.6	0.15–0.18	7.9–8.4	Moderate	High	Low.
100	100	100	90–100	51–70	25–40	<0.06	0.15–0.19	7.9–8.4	High	High	Low.
100	100	100	90–100	41–70	22–45	<0.06	0.14–0.18	7.9–8.4	High	High	Low.
95–100	90–100	80–90	65–80	35–50	19–27	0.2–0.6 0.06–0.20	0.15–0.20	7.9–8.4	Moderate	High	Low.
90–100	90–100	80–90	65–85	35–45	15–25	0.2–0.6	0.10–0.15	7.9–8.4	Low	High	Low.
100	100	80–95	30–50	18–25	2–6	2.0–6.0	0.11–0.14	6.6–7.3	Low	Low	Low.
100	100	90–95	36–55	25–36	12–21	0.6–2.0	0.13–0.17	6.6–8.4	Low	Low	Low.
100	100	90–100	80–95	45–55	20–30	<0.06	0.13–0.17	7.9–8.4	High	High	Low.
65–95	60–88	55–80	51–70	20–35	5–15	0.6–2.0 0.06–0.20	0.10–0.15	7.9–8.4	Low	Low	Low.
20–65	15–50	10–45	5–35	20–35	4–15	0.6–2.0	0.07–0.10	7.9–8.4	Very low	Low	Low.

TABLE 4.—*Estimated soil properties*

Soil series and map symbols	Hydrologic soil group	Depth to bedrock	Depth from surface (typical profile)	USDA texture	Classification		Coarse fraction greater than 3 inches
					Unified	AASHO	
		Inches	*Inches*				
Quanah: QaB, QaC	B	>72	0–32	Clay loam	CL	A-6	
			32–60	Sandy clay loam	CL	A-6, A-4	
			60–72	Stratified loamy sediments.			
Randall: Ra	D	>90	0–90	Clay	CH, CL	A-7-6	
Rioconcho: Rc, Rf	C	>80	0–80	Clay loam, clay, silty clay loam, silty clay.	CL	A-6 or A-7	0–10
Rock outcrop. Too variable to be rated. Extensive onsite examination required. Mapped in an undifferentiated unit with Ustochrepts and in associations with Tarrant soils.							
Rotan: RnA, RnB	C	>80	0–14	Clay loam	CL	A-6, A-4	
			14–48	Clay	CL, CH	A-7-6	
			48–80	Clay loam	CL	A-7-6, A-6	
*Rowena: RoA, RoB, RuA. For Urban land part of RuA, see Urban land.	C	>64	0–6	Clay loam	CL	A-7, A-6	
			6–24	Clay	CH or CL	A-7, A-6	
			24–64	Clay	CH or CL	A-7, A-6	
*Sagerton: SaA, SaB, SeB. For Urban land part of SeB, see Urban land.	C	>80	0–11	Clay loam	CL	A-6, A-4	
			11–33	Clay	CL	A-6 or A-7	
			33–80	Clay loam	CL	A-6	
Shep: ShB, ShC, ShD	B	>80	0–25	Loam	CL or SC, SM, ML	A-4 or A-6	
			25–80	Sandy clay loam	CL or SC, SM, ML	A-4 or A-6	
Speck: SpA, SpB	D	14–20	0–7	Clay loam	CL	A-6 or A-7-6	
			7–19	Clay	CL or CH	A-7-6	
			19	Indurated fractured limestone.			
Stamford: StB	D	>100	0–13	Clay	CH	A-7-6	
			13–48	Silty clay	CH	A-7-6	
			48–100	Clayey shale.			
*Tarrant: TAD, TED, TFF, TFG, TLD. For Kavett part of TED, see Kavett series. For Rock outcrop part of TFF and TFG, see Rock outcrop. For Vernon part of TLD, see Vernon series.	D	6–20	0–15	Cobbly clay, very cobbly clay.	CH or MH	A-7-5 or A-7-6	15–50
			15	Fractured limestone.			
Tillman: TmA, TmB	C	>72	0–10	Clay loam	CL	A-6 or A-7-6	
			10–64	Clay	CH, CL	A-7-6	
			64–72	Silty clay	CL or CH	A-6, A-7-6	0–5
*Tobosa: ToA, ToB, TuB. For Urban land part of TuB, see Urban land.	D	>72	0–58	Clay	CH	A-7-6	0–5
			58–72	Silty clay	CH, CL	A-7-6	0–5
Urban land: Ub. Too variable to be rated.							
*Ustochrepts: URF. Too variable to be rated. For Rock outcrop part, see Rock outcrop.							

significant to engineering—Continued

Percentage less than 3 inches passing sieve—				Liquid limit	Plasticity index	Permeability	Available water capacity	Reaction	Shrink-swell potential	Corrosivity to—	
No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)							Uncoated steel	Concrete
						Inches per hour	*Inches per inch of soil*	*pH*			
100	95–100	95–98	85–95	30–40	12–18	0.6–2.0	0.15–0.18	7.9–8.4	Low	Moderate	Low.
100	90–95	85–90	75–85	25–35	8–15	0.6–2.0	0.13–0.16	7.9–8.4	Low	Moderate	Low.
100	100	96–100	60–98	41–65	20–40	<0.06	0.14–0.18	7.4–8.4	High	Very high	Low.
95–100	95–100	75–100	70–95	35–50	15–30	0.06–0.20	0.15–0.20	7.4–8.4	High	High	Low.
100	100	95–99	70–85	20–30	8–12	0.6–2.0	0.15–0.19	7.4–8.4	Moderate	Moderate	Low.
100	95–100	95–99	80–95	45–55	20–31	0.2–0.6	0.14–0.18	7.4–8.4	High	High	Low.
85–100	80–100	74–95	54–92	35–50	15–30	0.2–0.6	0.12–0.15	7.4–8.4	Moderate	Moderate	Low.
100	100	85–100	70–80	35–50	15–30	0.2–0.6	0.15–0.20	7.9–8.4	Moderate	Moderate	Low.
95–100	95–100	90–100	75–95	38–55	21–35	0.2–0.6	0.14–0.18	7.9–8.4	High	High	Low.
95–100	95–100	90–100	68–80	34–55	15–30	0.2–0.6	0.12–0.15	7.9–8.4	High	High	Low.
95–100	95–100	90–100	60–90	25–35	8–17	0.2–0.6	0.15–0.20	6.6–7.8	Low	Moderate	Low.
100	100	90–100	85–90	35–50	20–30	0.2–0.6	0.15–0.18	7.4–8.4	Moderate	High	Low.
100	100	75–90	70–75	25–40	12–25	0.2–0.6	0.10–0.15	7.9–8.4	Low	Moderate	Low.
85–100	85–100	75–95	40–75	25–35	8–15	0.6–2.0	0.15–0.19	7.9–8.4	Low	High	Low.
85–100	80–100	75–95	40–75	25–35	8–20	0.6–2.0	0.13–0.17	7.9–8.4	Low	High	Low.
90–100	90–100	80–95	75–90	30–45	15–25	0.2–0.6	0.15–0.20	6.1–7.8	Low	Moderate	Low.
75–95	75–95	75–95	60–95	45–55	25–35	0.06–0.20	0.15–0.18	7.4–7.8	Moderate	High	Low.
100	100	95–100	80–95	51–80	30–50	<0.06	0.14–0.17	7.9–8.4	Very high	High	Low.
100	100	95–100	90–95	51–70	30–44	<0.06	0.15–0.17	7.9–8.4	High	High	Low.
80–100	80–100	70–90	70–95	55–70	30–40	0.2–0.6	0.15–0.17	7.9–8.4	High	High	Low.
100	100	90–98	70–80	35–48	15–30	0.2–0.6	0.16–0.20	7.4–7.8	Moderate	Moderate	Low.
100	100	90–98	75–95	41–55	20–30	0.06–0.20	0.14–0.18	7.9–8.4	High	High	Low.
90–100	85–100	80–90	60–95	35–52	15–30	0.06–0.20	0.13–0.17	7.9–8.4	Moderate	High	Low.
98–100	95–100	90–100	75–95	51–70	30–45	<0.06	0.12–0.18	7.4–8.4	Very high	High	Low.
98–100	85–100	80–100	70–95	41–60	20–36	<0.06	0.14–0.16	7.9–8.4	High	High	Low.

TABLE 4.—*Estimated soil properties*

Soil series and map symbols	Hydrologic soil group	Depth to bedrock	Depth from surface (typical profile)	USDA texture	Classification		Coarse fraction greater than 3 inches
					Unified	AASHO	
		Inches	*Inches*				
Valera: VaA, VaB	C	20–40	0–30	Clay	CL or CH	A-7-6	
			30–34	Silty clay	CL or CH	A-7-6	
			34	Fractured indurated limestone.			
Vernon: VeB, VeE	D	20–36	0–6	Clay	CH, CL	A-7-6	
			6–30	Silty clay	CL or CH	A-7-6	
			30–60	Shale, clay shale.			
*Weymouth: WeB, WeC, WuD— For Urban land part of WuD, see Urban land.	B	>42	0–14	Clay loam	CL	A-6	
			14–36	Clay loam	CL	A-6	
			36–42	Clayey shale.			

[1] Nonplastic to plasticity index of 3.

adopted by the American Association of State Highway Officials.

In the Unified Soil Classification System soils are classified according to particle-size distribution, plasticity index, liquid limit, and organic-matter content. Soils are grouped in 15 classes. There are eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt. Soils on the borderline between two classes are designated by symbols for both classes; for example, ML-CL.

The AASHO system is used to classify soils according to those properties that affect use in highway construction and maintenance. In this system a soil is placed in one of seven basic groups that range from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. In group A-1 are gravelly soils of high shear strength, or the best soils for subgrade (foundation). At the other extreme, in group A-7, are clay soils that have low strength when wet and that are the poorest soils for subgrade. Where laboratory data are available to justify a further breakdown, the A-1, A-2, and A-7 groups are divided as follows: A-1-a, A-1-b; A-2-4, A-2-5, A-2-6, A-2-7; and A-7-5 and A-7-6. As additional refinement, the engineering value of a soil material can be indicated by a group index number. Group indexes range from 0 for the best material to 20 or more for the poorest. The AASHO classification for tested soils, with group index numbers in parentheses, is shown in table 7; the estimated classification, without group index numbers, is shown in table 5 for all soils mapped in the county.

Soil properties significant in engineering

Several estimated soil properties significant in engineering are shown in table 4. These estimates are made for typical soil profiles, by layers sufficiently different to have different significance in soil engineering. The estimates are based on field observation made in the course of mapping, on test data for these and similar soils, and on experience with the same kinds of soil in other counties. Following are explanations of some of the columns in table 4.

Depth to bedrock is distance from the surface of the soil to the upper surface of the rock layer.

Soil texture is described in table 4 in the standard terms used by the Department of Agriculture. These terms take into account the relative percentages of sand, silt, and clay in soil material that is less than 2 millimeters in diameter. "Loam," for example, is soil material that contains 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the soil contains gravel or other particles coarser than sand, an appropriate modifier is added; for example, "gravelly loamy sand." "Sand," "silt," "clay," and some of the other terms used in USDA textural classification are defined in the Glossary at the back of this soil survey.

Liquid limit and plasticity index indicate the effect of water on the strength and consistence of soil material. As the moisture content of a clayey soil is increased from a moist state, the material changes from a semisolid to a plastic state. If the moisture content is further increased, the material changes from a plastic to a liquid state. The plastic limit is the moisture content at which the soil material changes from the semisolid to the plastic state; and the liquid limit, from a plastic to a liquid state. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which a soil material is plastic. Liquid limit and plasticity index are estimated in table 4, but in table 6 the data on liquid limit and plasticity index are based on tests of soil samples.

Permeability is that quality of a soil that enables it to transmit water or air. It is estimated on the basis of soil characteristics observed in the field, particularly structure and texture. The estimates in table 4 do not take into ac-

significant to engineering—Continued

Percentage less than 3 inches passing sieve—				Liquid limit	Plasticity index	Permeability	Available water capacity	Reaction	Shrink-swell potential	Corrosivity to—	
No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)							Uncoated steel	Concrete
						Inches per hour	*Inches per inch of soil*				
98–100	95–100	85–95	80–90	50–61	28–35	0.2–0.6	0.15–0.20	7.9–8.4	High	High	Low.
95–100	95–100	85–95	80–90	41–55	20–32	0.2–0.6	0.15–0.18	7.9–8.4	High	High	Low.
100	100	90–100	80–95	41–60	20–36	<0.06	0.13–0.17	7.9–8.4	High	High	Low.
95–100	95–100	90–95	80–90	48–60	25–35	0.2–0.6	0.14–0.17	7.9–8.4	High	High	Low.
100	95–100	90–100	70–85	30–40	15–25	0.6–2.0	0.16–0.20	7.4–8.4	Low	Moderate	Low.
90–100	95–100	85–95	70–90	30–40	15–25	0.6–2.0	0.13–0.17	7.9–8.4	Low	Moderate	Low.

count lateral seepage or such transient soil features as plowpans and surface crusts.

Available water capacity is the ability of soils to hold water for use by most plants. It is commonly defined as the difference between the amount of water in the soil at field capacity and the amount at the wilting point of most crop plants.

Reaction is the degree of acidity or alkalinity of a soil, expressed in a pH value. The pH value and terms used to describe soil reaction are explained in the Glossary.

Shrink-swell potential is the relative change in volume to be expected of soil material with changes in moisture content; that is, the extent to which the soil shrinks as it dries out or swells when it gets wet. Extent of shrinking and swelling is influenced by the amount and kind of clay in the soil. Shrinking and swelling of soils cause much damage to building foundations, roads, and other structures. A *high* shrink-swell potential indicates a hazard to maintenance of structures built in, on, or with material that has this rating.

Corrosivity, as used in table 4, pertains to potential soil-induced chemical action that dissolves or weakens uncoated steel or concrete. Rate of corrosion of uncoated steel is related to such soil properties as drainage, texture, total acidity, and electrical conductivity of the soil material. Corrosivity for concrete is influenced mainly by the content of sodium or magnesium sulfate, but also by soil texture and acidity. Installations of uncoated steel that intersect soil boundaries or soil horizons are more susceptible to corrosion than installations made entirely in one kind of soil or in one soil horizon. A corrosivity rating of *low* means that there is a low probability of soil-induced corrosion damage. A rating of *high* means that there is a high probability of damage, so that protective measures for steel and more resistant concrete should be used to avoid or minimize damage.

The soils are placed in hydrologic groups in table 4. These groupings are based on estimates of the intake of water during the latter part of a storm of long duration. The estimates are of the intake of water in a soil without protective vegetation after the soil profile is wet and has swelled. The groups range from tight clays (highest runoff potential—group D) to open sands (lowest runoff potential—group A).

Soils in group A have a high infiltration rate, even when they are thoroughly wet. They have a high rate of water transmission and low runoff potential. The soils of this group are deep and well drained or excessively drained, and they are mainly sand, gravel, or both.

Soils in group B have a moderate infiltration rate when they are thoroughly wet. They have a moderate rate of water transmission and moderate runoff potential. These soils are moderately deep or deep, moderately well drained or well drained, and fine textured to moderately coarse textured.

Soils in group C have a slow infiltration rate when they are thoroughly wet. They have a slow rate of water transmission and high runoff potential. These soils are moderately fine textured to fine textured and in most places have a layer that impedes the downward movement of water.

Soils in group D have a very slow infiltration rate when they are thoroughly wet. They have a very slow rate of water transmission and very high runoff potential. The soils in this group are mainly clays that have high shrink-swell potential. Most of them have a permanent high water table and a claypan or clay layer at or near the surface. Many are shallow over nearly impervious material.

Depth to seasonal high water table is distance from the surface of the soil to the highest level that ground water reaches in the soil in most years. High water table is not a concern in most soils of the county except the Demona soils, which have a water table at a depth of 48 to 72 inches.

TABLE 5.—*Engineering*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil. The soils in such other series that appear in

Soil series and map symbols	Suitability as a source of—		Degree and kind of limitation for—			
	Topsoil	Road fill	Septic tank absorption fields	Sewage lagoons	Shallow excavations	Dwellings without basements
Badland. Too variable to be rated. Mapped only in a complex with Owens soils.						
*Clairemont: Ca, Cn. For Urban land part of Cn, see Urban land.	Fair: silty clay loam.	Fair: fair traffic-supporting capacity.	Severe: flood hazard.	Severe: flood hazard.	Severe: flood hazard.	Severe: flood hazard.
Cobb: CoB	Fair: fine sandy loam, 6 to 10 inches thick.	Fair: fair traffic-supporting capacity.	Severe: bedrock at depth of 20 to 40 inches.	Severe: bedrock at depth of 20 to 40 inches.	Severe: bedrock at depth of 20 to 40 inches.	Severe: bedrock at depth of 20 to 40 inches.
Colorado: Cr	Good	Fair: fair traffic-supporting capacity.	Severe: flood hazard.	Severe: flood hazard.	Severe: flood hazard.	Severe: flood hazard.
Cosh: CsB	Poor: fine sandy loam, 4 to 9 inches thick.	Poor: bedrock at depth of 12 to 20 inches.	Severe: bedrock at depth of 12 to 20 inches.	Severe: bedrock at depth of 12 to 20 inches.	Severe: bedrock at depth of 12 to 20 inches.	Moderate: bedrock at depth of 12 to 20 inches.
Demona variant: DeB	Poor: fine sand.	Fair: fair traffic-supporting capacity.	Severe: moderately slow permeability.	Severe: permeable surface layer; seasonal water table at depth of 48 to 72 inches.	Moderate: seasonal water table at depth of 48 to 72 inches.	Moderate: seasonal water table at depth of 48 to 72 inches.
Gageby: Ga	Fair: clay loam.	Fair: fair traffic-supporting capacity.	Severe: flood hazard.	Severe: flood hazard.	Severe: flood hazard.	Severe: flood hazard.
*Hamby: HbA, HbB, HuB. For Urban land part of HuB, see Urban land.	Fair: fine sandy loam, 7 to 18 inches thick.	Fair: moderate shrink-swell potential.	Severe: moderately slow permeability.	Slight	Severe: clayey texture.	Moderate: moderate shrink-swell potential.
HaB	Poor: loamy fine sand.	Fair: moderate shrink-swell potential.	Severe: moderately slow permeability.	Slight	Severe: clayey texture.	Moderate: moderate shrink-swell potential.
HbC	Fair: fine sandy loam, 7 to 18 inches. thick.	Fair: moderate shrink-swell potential.	Severe: moderately slow permeability.	Moderate: slope.	Severe: clayey texture.	Moderate: moderate shrink-swell potential.

interpretations

mapping units may have different properties and limitations, and for this reason it is necessary to follow carefully the instructions for referring to the first column of this table]

Degree and kind of limitation for—Continued				Soil features affecting—		
Sanitary landfill[1]	Local roads and streets	Farm ponds		Irrigation	Terraces and diversions	Waterways
		Reservoir areas	Embankments			
Severe: flood hazard.	Severe: flood hazard.	Moderate: moderate permeability.	Moderate: fair resistance to piping and erosion.	Subject to flooding.	Subject to flooding.	Subject to flooding.
Severe: bedrock at depth of 20 to 40 inches.	Moderate: bedrock at depth of 20 to 40 inches.	Severe: bedrock at depth of 20 to 40 inches.	Moderate: fair resistance to piping and erosion.	Bedrock at depth of 20 to 40 inches.	Bedrock at depth of 20 to 40 inches.	Bedrock at depth of 20 to 40 inches.
Severe: flood hazard.	Severe: flood hazard.	Moderate: moderate permeability.	Moderate: fair resistance to piping and erosion.	Subject to flooding; surface drainage needed.	Subject to flooding.	Subject to flooding.
Severe: bedrock at depth of 12 to 20 inches.	Moderate: bedrock at depth of 12 to 20 inches.	Severe: bedrock at depth of 12 to 20 inches.	Severe: bedrock at depth of 12 to 20 inches.	Bedrock at depth of 12 to 20 inches.	Bedrock at depth of 12 to 20 inches.	Bedrock at depth of 12 to 20 inches.
Severe: seasonal water table at depth of 48 to 72 inches.	Moderate: moderate shrink-swell potential; loose sand on surface hinders excavation.	Moderate: moderately slow permeability.	Moderate: poor resistance to piping and erosion.	Sandy surface layer; erodible.	Hazard of soil blowing and siltation; surface layer of fine sand.	Erodible; hazard of soil blowing and siltation.
Severe: flood hazard.	Severe: flood hazard.	Moderate: moderate permeability.	Moderate: fair resistance to piping and erosion.	Subject to flooding.	Subject to flooding.	Subject to flooding.
Severe: clayey texture.	Moderate: moderate shrink-swell potential.	Moderate: moderately slow permeability.	Slight	High intake rate in surface layer; moderately slow permeability in subsoil.	Ponding hazard on level terraces.	Cuts expose clay in places.
Severe: clayey texture.	Moderate: moderate shrink-swell potential.	Moderate: moderately slow permeability.	Slight	Very high intake rate in surface layer; moderately slow permeability in subsoil; slope.	Slope; ponding hazard on level terraces; siltation hazard.	Cuts expose clay in places; slope; siltation hazard.
Severe: clayey texture.	Moderate: moderate shrink-swell potential.	Moderate: moderately slow permeability.	Slight	High intake rate in surface layer; moderately slow permeability in subsoil; slope.	Slope; ponding hazard on level terraces.	Cuts expose clay in places.

TABLE 5.—*Engineering*

Soil series and map symbols	Suitability as a source of—		Degree and kind of limitation for—			
	Topsoil	Road fill	Septic tank absorption fields	Sewage lagoons	Shallow excavations	Dwellings without basements
Kavett: KaA, KaB	Poor: clayey texture.	Poor: high shrink-swell potential.	Severe: bedrock at depth of 12 to 20 inches.	Severe: bedrock at depth of 12 to 20 inches.	Severe: bedrock at depth of 12 to 20 inches.	Severe: high shrink-swell potential; bedrock at depth of 12 to 20 inches.
*Mangum: Ma, Mb, Mf. For Urban land part of Mb, see Urban land.	Fair: silty clay loam, 6 to 10 inches thick.	Poor: high shrink-swell potential.	Severe: very slow permeability; flood hazard.	Severe: flood hazard.	Severe: flood hazard; clayey texture.	Severe: high shrink-swell potential; flood hazard.
Mereta: MrA, MrB, MrC.	Fair: clay loam.	Fair: moderate shrink-swell potential.	Severe: slow permeability; strongly cemented caliche at depth of 14 to 20 inches.	Severe: strongly cemented caliche at depth of 14 to 20 inches.	Moderate: clay loam texture; strongly cemented caliche at depth of 14 to 20 inches.	Moderate: moderate shrink-swell potential.
Miles: MsA, MsB, MsC.	Fair: fine sandy loam, 7 to 12 inches thick.	Fair: fair traffic-supporting capacity.	Slight	Moderate: moderate permeability.	Slight	Slight
*Owens: ObE. For Badland part, see Badland.	Poor: clayey texture.	Poor: high shrink-swell potential.	Severe: very slow permeability.	Severe: slope	Severe: clayey texture.	Severe: high shrink-swell potential.
*Pitzer: PtD, PuD, PwC. For Urban land part of PuD, see Urban land. For Weymouth part of PwC, see Weymouth series.	Poor: 4 to 14 inches of material; 5 to 30 percent coarse fragments.	Good	Severe: indurated caliche at depth of 4 to 14 inches.	Severe: indurated caliche at depth of 4 to 14 inches.	Severe: indurated caliche at depth of 4 to 14 inches.	Moderate: indurated caliche at depth of 4 to 14 inches.
Quanah: QaB, QaC	Fair: clay loam.	Fair: fair traffic-supporting capacity.	Slight	Moderate: moderate permeability.	Moderate: clay loam.	Moderate: low strength.
Randall: Ra	Poor: clayey texture.	Poor: very high shrink-swell potential.	Severe: very slow permeability; flood hazard.	Slight	Severe: somewhat poorly drained; flood hazard.	Severe: very high shrink-swell potential; flood hazard.
Rioconcho: Rc, Rf	Fair: clay loam.	Poor: high shrink-swell potential.	Severe: flood hazard.	Severe: flood hazard.	Severe: flood hazard.	Severe: flood hazard.
Rock outcrop. Too variable to be rated. Mapped in an undifferentiated unit with Ustochrepts and in association with Tarrant soils.						

interpretations—Continued

Degree and kind of limitation for—Continued				Soil features affecting—		
Sanitary landfill[1]	Local roads and streets	Farm ponds		Irrigation	Terraces and diversions	Waterways
		Reservoir areas	Embankments			
Severe: bedrock at depth of 12 to 20 inches.	Severe: high shrink-swell potential; bedrock at depth of 12 to 20 inches.	Severe: bedrock at depth of 12 to 20 inches.	Severe: bedrock at depth of 12 to 20 inches.	Bedrock at depth of 12 to 20 inches.	Bedrock at depth of 12 to 20 inches.	Bedrock at depth of 12 to 20 inches.
Severe: flood hazard; clayey texture.	Severe: high shrink-swell potential; flood hazard.	Slight	Moderate: fair slope stability.	Very slow permeability; subject to flooding.	Subject to flooding.	Cuts expose clayey material in places; subject to flooding.
Moderate: strongly cemented caliche at depth of 14 to 20 inches.	Moderate: moderate shrink-swell potential.	Severe: seepage hazard.	Severe: bedrock at depth of 14 to 20 inches.	Strongly cemented caliche at depth of 14 to 20 inches.	Strongly cemented caliche at depth of 14 to 20 inches.	Strongly cemented caliche at depth of 14 to 20 inches.
Slight	Moderate: fair traffic-supporting capacity	Moderate: moderate permeability.	Moderate: medium compressibility; fair stability; poor resistance to piping and erosion.	Slope	All features favorable.	All features favorable.
Severe: clayey texture.	Severe: high shrink-swell potential; poor traffic-supporting capacity.	Slight	Moderate: fair stability; erodible on slopes; high compressibility.	Slope	Cuts expose clay in places.	Cuts expose clay in places.
Severe: indurated caliche at depth of 4 to 14 inches.	Slight	Severe: indurated caliche at depth of 4 to 14 inches.	Moderate: fair stability; poor resistance to piping and erosion.	Indurated caliche at depth of 4 to 14 inches.	Indurated caliche at depth of 4 to 14 inches.	Indurated caliche at depth of 4 to 14 inches.
Moderate: clay loam.	Moderate: fair traffic-supporting capacity.	Moderate: moderate permeability.	Moderate: fair slope stability.	Moderate permeability; slope.	All features favorable.	All features favorable.
Severe: clayey texture; flood hazard.	Severe: very high shrink-swell potential; flood hazard.	Slight	Moderate: fair slope stability; high compressibility.	Very slow intake rate; subject to flooding.	Subject to flooding.	Subject to floodig.
Severe: flood hazard.	Severe: flood hazard.	Moderate: calcareous permeable substratum.	Moderate: fair resistance to piping and erosion.	Slow intake rate; subject to flooding.	Subject to flooding.	Subject to flooding.

TABLE 5.—*Engineering*

Soil series and map symbols	Suitability as a source of—		Degree and kind of limitation for—			
	Topsoil	Road fill	Septic tank absorption fields	Sewage lagoons	Shallow excavations	Dwellings without basements
Rotan: RnA, RnB	Fair: clay loam.	Poor: high shrink-swell potential.	Severe: moderately slow permeability.	Slight	Severe: clayey texture.	Severe: high shrink-swell potential.
*Rowena: RoA, RoB, RuA. For Urban land part of RuA, see Urban land.	Fair: clay loam.	Poor: high shrink-swell potential.	Severe: moderately slow permeability.	Slight	Severe: clayey texture.	Severe: high shrink-swell potential.
*Sagerton: SaA, SaB, SeB. For Urban land part of SeB, see Urban land.	Fair: clay loam.	Fair: moderate shrink-swell potential.	Severe: moderately slow permeability.	Slight	Severe: clayey texture.	Moderate: moderate shrink-swell potential.
Shep: ShB, ShC, ShD	Fair: calcareous.	Fair: fair traffic-supporting capacity.	Slight	Severe: excessive seepage.	Slight	Slight
Speck: SpA, SpB	Fair: clay loam.	Poor: bedrock at depth of 14 to 20 inches.	Severe: slow permeability; bedrock at depth of 14 to 20 inches.	Severe: bedrock at depth of 14 to 20 inches.	Severe: bedrock at depth of 14 to 20 inches.	Severe: bedrock at depth of 14 to 20 inches.
Stamford: StB	Poor: clayey texture.	Poor: very high shrink-swell potential; poor traffic-supporting capacity.	Severe: very slow permeability.	Slight	Severe: clayey texture.	Severe: very high shrink-swell potential.
*Tarrant: TAD, TED, TFF, TFG, TLD. For Kavett part of TED and Vernon part of TLD, see their respective series. For Rock outcrop part of TFF and TFG, see Rock outcrop.	Poor: clayey texture.	Poor: high shrink-swell potential.	Severe: bedrock at depth of 6 to 20 inches.	Severe: bedrock at depth of 6 to 20 inches.	Severe: bedrock at depth of 6 to 20 inches.	Severe: bedrock at depth of 6 to 20 inches.
Tillman: TmA, TmB	Fair: clay loam.	Poor: high shrink-swell potential.	Severe: slow permeability.	Slight	Severe: clayey texture.	Severe: high shrink-swell potential.
*Tobosa: ToA, ToB, TuB. For Urban land part of TuB, see Urban land.	Poor: clayey texture.	Poor: very high shrink-swell potential.	Severe: very slow permeability.	Slight	Severe: clayey texture.	Severe: very high shrink-swell potential.
Urban land: Ub. Too variable to be rated.						

interpretations—Continued

Degree and kind of limitation for—Continued				Soil features affecting—		
Sanitary landfill[1]	Local roads and streets	Farm ponds		Irrigation	Terraces and diversions	Waterways
		Reservoir areas	Embankments			
Severe: clayey texture.	Severe: high shrink-swell potential.	Moderate: moderately slow permeability.	Moderate: fair resistance to piping and erosion.	Moderately slow intake rate.	All features favorable.	All features favorable.
Severe: clayey texture.	Severe: high shrink-swell potential.	Moderate: moderately slow permeability.	Moderate: high compressibility; fair resistance to piping and erosion.	Moderately slow intake rate.	Ponding hazard on level terraces.	Cuts expose clay in places.
Severe: clayey texture.	Moderate: moderate shrink-swell potential; fair traffic-supporting capacity.	Moderate: moderately slow permeability.	Moderate: fair resistance to piping and erosion.	Moderately slow intake rate.	Ponding hazard on level terraces.	Cuts expose clay in places.
Slight	Fair: fair traffic-supporting capacity.	Severe: excessive seepage.	Moderate: fair resistance to piping and erosion.	Slope	Slope	Slope.
Severe: bedrock at depth of 14 to 20 inches.	Severe: bedrock at depth of 14 to 20 inches.	Severe: bedrock at depth of 14 to 20 inches.	Severe: bedrock at depth of 14 to 20 inches.	Slow intake rate; bedrock at depth of 14 to 20 inches.	Bedrock at depth of 14 to 20 inches.	Bedrock at depth of 14 to 20 inches.
Severe: clayey texture.	Severe: very high shrink-swell potential; poor traffic-supporting capacity.	Slight	Moderate: high compressibility; fair stability.	Very slow intake rate.	Ponding hazard on level terraces.	Erodible.
Severe: bedrock at depth of 6 to 20 inches.	Severe: bedrock at depth of 6 to 20 inches.	Severe: bedrock at depth of 6 to 20 inches.	Severe: bedrock at depth of 6 to 20 inches.	Bedrock at depth of 6 to 20 inches.	Bedrock at depth of 6 to 20 inches.	Bedrock at depth of 6 to 20 inches.
Severe: clayey texture.	Severe: high shrink-swell potential; poor traffic-supporting capacity.	Slight	Moderate: medium to high compressibility; fair slope stability.	Slow intake rate	All features favorable.	All features favorable.
Severe: clayey texture.	Severe: very high shrink-swell potential; poor traffic-supporting capacity.	Slight	Moderate: high compressibility; fair slope stability.	Very slow intake rate.	Ponding hazard on level terraces.	Erodible.

TABLE 5.—*Engineering*

Soil series and map symbols	Suitability as a source of—		Degree and kind of limitation for—			
	Topsoil	Road fill	Septic tank absorption fields	Sewage lagoons	Shallow excavations	Dwellings without basements
*Ustochrepts: URF. Too variable to be rated. For Rock outcrop part, see Rock outcrop.						
Valera: VaA, VaB	Poor: clayey texture.	Poor: high shrink-swell potential.	Severe: moderately slow permeability; bedrock at depth of 20 to 40 inches.	Severe: bedrock at depth of 20 to 40 inches.	Severe: clayey texture; bedrock at depth of 20 to 40 inches.	Severe: high shrink-swell potential; bedrock at depth of 20 to 40 inches.
Vernon: VeB	Poor: clayey texture.	Poor: high shrink-swell potential.	Severe: very slow permeability.	Slight	Severe: clayey texture.	Severe: high shrink-swell potential.
VeE	Poor: clayey texture.	Poor: high shrink-swell potential.	Severe: very slow permeability.	Severe: slope	Severe: clayey texture.	Severe: high shrink-swell potential.
*Weymouth: WeB, WeC, WuD. For Urban land part of WuD, see Urban land.	Fair: clay loam.	Fair: fair traffic-supporting capacity.	Moderate: moderate permeability.	Moderate: moderate permeability; slope.	Moderate: clay loam.	Moderate: low strength.

[1] Onsite deep studies of the underlying strata, water tables, and hazards of aquifer pollution and drainage into ground water need to be made for landfills deeper than 5 or 6 feet.

Salinity refers to the amount of soluble salts in the soil. It is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25°C. Salinity affects the suitability of a soil for production of crops, its stability when used as construction material, and its corrosiveness to metals and concrete. Salinity was not rated in this survey because salinity is not a hazard in the soils of Taylor County.

Engineering interpretations

The estimated interpretations in table 5 are based on the engineering properties of soils shown in table 4, on test data for soils in this survey area and others nearby or adjoining, and on the experience of engineers and soil scientists with the soils of Taylor County. In table 5, ratings are used to summarize the limitation or suitability of the soils for all listed purposes other than for irrigation, terraces and diversions, and waterways. For these particular uses, table 5 lists those soil features not to be overlooked in planning, installation, and maintenance.

Soil limitations are indicated by the ratings slight, moderate, and severe. *Slight* means that soil properties are generally favorable for the rated use; or, in other words, limitations are minor and easily overcome or modified by special planning and design. *Moderate* means that soil properties are favorable for the rated use. Limitations can be overcome or modified with planning, design, or special maintenance, and some of the limitations can be tolerated. *Severe* means soil properties are so unfavorable and so difficult to correct or overcome as to require major reclamation, special design, or intensive maintenance.

Soil suitability is rated by the terms *good, fair,* and *poor,* which have, respectively, meanings approximately parallel to the terms slight, moderate, and severe.

Following are explanations of some of the columns in table 5:

Topsoil is used for topdressing an area where vegetation is to be established and maintained. Suitability is affected mainly by ease of working and spreading the soil material, as for preparing a seedbed; natural fertility of the ma-

interpretations—Continued

Degree and kind of limitation for—Continued				Soil features affecting—		
Sanitary landfill[1]	Local roads and streets	Farm ponds		Irrigation	Terraces and diversions	Waterways
		Reservoir areas	Embankments			
Severe: clayey texture; bedrock at depth of 20 to 40 inches.	Severe: high shrink-swell potential; poor traffic-supporting capacity; bedrock at depth of 20 to 40 inches.	Severe: bedrock at depth of 20 to 40 inches.	Moderate: high compressibility; bedrock at depth of 20 to 40 inches.	Moderately slow intake rate; bedrock at depth of 20 to 40 inches.	Bedrock at depth of 20 to 40 inches.	Bedrock at depth of 20 to 40 inches.
Severe: clayey texture.	Severe: high shrink-swell potential; poor traffic-supporting capacity.	Slight	Moderate: high compressibility; fair slope stability.	Very slow intake rate; clay shale at depth of 20 to 36 inches.	Ponding hazard on level terraces.	Cuts expose dense clay shale in places.
Severe: clayey texture.	Severe: high shrink-swell potential; poor traffic-supporting capacity.	Slight	Moderate: high compressibility; fair slope stability.	Very slow intake rate; slope.	Slope	Slope.
Moderate: clay loam.	Moderate: fair traffic-supporting capacity.	Moderate: moderate permeability.	Moderate: poor resistance to piping and erosion.	Slope	All features favorable.	All features favorable.

terial, or the response of plants when fertilizer is applied; and absence of substances toxic to plants. Texture of the soil material and its content of stone fragments are characteristics that affect suitability. Also considered in the ratings is damage that results at the area from which topsoil is taken.

Road fill is soil material used in embankments for roads. The suitability ratings reflect the predicted performance of soil after it has been placed in an embankment that has been properly compacted and provided with adequate drainage and the relative ease of excavating the material at borrow areas.

Septic tank absorption fields are subsurface systems of tile or perforated pipe that distribute effluent from a septic tank into natural soil. The soil material from a depth of 18 inches to 6 feet is evaluated. The soil properties considered are those that affect both absorption of effluent and construction and operation of the system. Properties that affect absorption are permeability, depth to water table or rock, and susceptibility to flooding. Slope is a soil property that affects difficulty of layout and construction and also the risk of soil erosion, lateral seepage, and downslope flow of effluent. Large rocks or boulders increase construction costs.

Sewage lagoons are shallow ponds constructed to hold sewage within a depth of 2 to 5 feet long enough for bacteria to decompose the solids. A lagoon has a nearly level floor and sides, or embankments, of compacted soil material. The assumption is made that the embankment is compacted to medium density and the pond is protected from flooding. Properties are considered that affect the pond floor and the embankment. Those that affect the pond floor are permeability, organic matter, and slope; if the floor needs to be leveled, depth to bedrock becomes important. The soil properties that affect the embankment are the engineering properties of the embankment material as interpreted from the Unified soil classification and the amount of stones, if any, that influence the ease of excavation and compaction of the embankment material.

Shallow excavations are those that require digging or

TABLE 6.—*Engineering*

[Tests performed by the Texas Highway Department in accordance with standard

Soil name and location	Parent material	Texas report No.	Depth from surface	Shrinkage		
				Limit	Lineal	Ratio
			Inches	*Percent*	*Percent*	*Percent*
Hamby fine sandy loam: 0.45 mile S. from NE. entrance to Dyess Air Force Base on unpaved road bordering the base along E. side, and 100 feet E. into cultivated field. (Modal)	Calcareous sandy outwash sediment.	69-650-R 69-651-R	9–28 60–80	17 13	11.3 16.9	1.84 2.07
Mereta clay loam: About 7.5 miles N. from intersection of U.S. Highway 277 and Farm Road 1086 on U.S. Highway 277, 0.85 mile S. on private ranch road, and 200 feet E. (Modal)	Marly sediment of the Edwards Plateau.	69-658-R	9–20	19	11.4	1.7
Rotan clay loam: 1 mile E. and 1 mile N. of intersection of Farm Road 707 and Interstate 20 in Tye, 0.2 mile E. on county road, and 100 feet N. (Modal)	Calcareous, moderately fine textured sediment.	69-645-R 69-646-R 69-647-R	14–25 48–68 68–80	11 16 13	18.9 11.4 12.7	1.99 1.89 1.99
Rowena clay loam: 4.5 miles N. on Farm Road 1235 from intersection of Farm Road 1235 and U.S. Highway 277 in View, 0.4 mile E. on county road, and 75 feet N. (Modal)	Calcareous, moderately fine textured sediment.	69-660-R 69-661-R	10–35 35–48	14 .3	12.2 10.8	1.93 1.99
Shep loam: About 6 miles S. of Merkel, 300 feet N. and 200 feet E. of SW. corner, sec. 4, Block 9, S.P.R.R. Co. Survey. (Modal)	Calcareous, loamy slope alluvium.	69-652-R 69-653-R	6–30 30–60	15 14	6.3 8.3	1.92 1.98

[1] Mechanical analysis according to AASHO designation T88-57. Results by this procedure may differ somewhat from results obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHO procedure, the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all material, including that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method and the material coarser than 2 millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical analysis data used in this table are not suitable for use in naming textural classes for soils.

trenching to a depth of less than 6 feet; for example, excavations for pipelines, sewerlines, phone and power transmission lines, basements, open ditches, and cemeteries. Desirable soil properties are good workability, moderate resistance to sloughing, gentle slopes, absence of rock outcrops or big stones, and freedom from flooding or a high water table.

Dwellings, as rated in table 5, are no more than three stories high and are supported by foundation footings placed in undisturbed soil. The features that affect the rating of a soil for dwellings are those that relate to capacity to support load and resist settlement under load and those that relate to ease of excavation. Soil properties that affect capacity to support load are wetness, susceptibility to flooding, density, plasticity, texture, and shrink-swell potential. Those that affect excavation are wetness, slope, depth to bedrock, and content of stones and rocks.

Sanitary landfill is a method of disposing of refuse in dug trenches. The waste is spread in thin layers, compacted, and covered with soil throughout the disposal period. Landfill areas are subject to heavy vehicular traffic. Some soil properties that affect suitability for landfill are ease of excavation, hazard of polluting ground water, and trafficability. The best soils have moderately slow permeability, withstand heavy traffic, and are friable and easy to excavate. Unless otherwise stated, the ratings in table 6 apply only to a depth of about 6 feet; and, therefore, limitation ratings of *slight* or *moderate* may not be valid if trenches are to be much deeper than that. For some soils, reliable predictions can be made to a depth of 10 or 15 feet; but regardless of that, every site should be investigated before it is selected.

Local roads and streets, as rated in table 5, have an all-weather surface expected to carry automobile traffic all year. They have a subgrade of underlying soil material; a base consisting of gravel, crushed rock, or soil material stabilized with lime or cement; and a flexible or rigid surface, commonly asphalt or concrete. These roads are graded to shed water and have ordinary provisions for drainage. They are built mainly from soil at hand, and most cuts and fills are less than 6 feet deep.

Soil properties that most affect design and construction

test data

procedures of the American Association of State Highway Officials (AASHO)]

Mechanical analysis[1]										Liquid limit	Plasticity index	Classification	
Percentage less than 3 inches passing sieve—								Percentage smaller than—					
1½ in	1 in	¾ in	⅜ in	No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)	0.05 mm	0.005 mm	0.002 mm			AASHO[2]	Unified[3]
											Percent			
				100	99	96	45	43	37	34	40	23	A-6(6)	SC
			100	98	97	96	77	72	47	38	47	31	A-7-6(17)	CL
98	98	98	98	96	93	88	77	70	36	26	43	19	A-7-6(12)	CL
				100	99	98	83	77	50	40	55	31	A-7-6(19)	CH
			100	99	96	92	81	77	58	40	39	22	A-6(13)	CL
100	98	97	93	86	81	74	54	51	34	25	38	23	A-6(9)	CL
			100	99	98	95	78	62	45	37	38	21	A-6(12)	CL
			100	99	99	98	68	64	43	34	34	19	A-6(10)	CL
	100	97	94	90	86	79	45	42	23	17	26	12	A-6(3)	SC
	100	99	95	90	86	79	48	42	26	19	28	17	A-6(5)	SC

[2] Based on AASHO Designation M 145-49.
[3] Based on the Unified Soil Classification System.

of roads and streets are load-supporting capacity and stability of the subgrade and the workability and quantity of cut and fill material available. The AASHO and Unified classifications of the soil material and also the shrink-swell potential, indicate its load-supporting capacity. Wetness and flooding affect stability of the material. Slope, depth to hard rock, content of stones and rocks, and wetness affect ease of excavation and amount of cut and fill needed to reach an even grade.

Pond reservoir areas hold water behind a dam or embankment. Soils suitable for pond reservoir areas have low seepage, which is related to their permeability and depth to fractured or permeable bedrock or other permeable material.

Pond embankments are raised structures of soil material constructed across drainageways in order to impound water. These embankments are generally less than 20 feet high and are constructed of homogeneous soil material and compacted to medium density. Embankments of the core and shell type of construction are not rated in this table. Embankment foundation, reservoir area, and slope are assumed to be suitable for pond construction. Soil properties are considered that affect the embankment and the availability of borrow material. The best soils have good slope stability, low permeability, good shear strength, slight compressibility under load, and good resistance to piping and erosion. The best borrow material is free of stones or rocks and thick enough for easy excavation.

Irrigation of a soil is affected by such features as slope; susceptibility to stream overflow, water erosion, and soil blowing; soil texture; content of stones; accumulations of salts and alkali; depth of root zone; rate of water intake at the surface; permeability in soil layers below the surface layer and in fragipans or other layers that restrict movement of water; amount of water held available to plants; and need for drainage, or depth to water table or bedrock.

Terraces and diversions are embankments, or ridges, constructed across the slope to intercept runoff so that it soaks into the soil or flows slowly to a prepared outlet. Features that affect suitability of a soil for terraces are uniformity and steepness of slope; depth to bedrock or

other unfavorable material; presence of stones; permeability; and resistance to water erosion, soil slipping, and soil blowing. A soil suitable for these terraces and diversions provides outlets for runoff and is not difficult to vegetate.

Waterways are either natural or shaped channels seeded with grass to carry runoff water without causing erosion. The suitability of a soil for grassed waterways is determined by the hazard of erosion; the amount of shaping that can be done, which, in turn, depends on slope, stoniness, and depth to bedrock; and the difficulty in establishing vegetation.

Soils were not rated as a source of sand and gravel in table 5. Most soils in Taylor County are not suitable as a source of sand and gravel. The Demona soil is a source of sand, and the Pitzer soil is a source of gravel.

Drainage was not rated because the soils of Taylor County generally do not require artificial drainage.

Engineering test data

Table 6 contains engineering test data for some of the major soil series in Taylor County. These tests were made to help evaluate the soils for engineering purposes. The engineering classifications shown are based on data obtained by mechanical analyses and by tests to determine liquid limit and plastic limit. The mechanical analyses were made by the combined sieve and hydrometer method.

Shrinkage limit is the percentage of moisture at which shrinkage of the soil material stops.

Lineal shrinkage is the decrease in one dimension, expressed as a percentage of the original dimension, of the soil mass when the moisture content is reduced from the given value to the shrinkage limit.

Shrinkage ratio is the relation of change in volume of the soil material to the water content of the soil material when at the shrinkage limit. The change in volume is expressed as a percentage of the air-dry volume of the soil material, and the water content is expressed as a percentage of the weight of the soil material when oven-dry.

Tests to determine liquid limit and plasticity index measure the effect of water on the consistence of soil material, as has been explained for table 6.

Use of the Soils for Recreation

Knowledge of soils is necessary in planning, developing, and maintaining areas used for recreation. In table 7 the soils of Taylor County are rated according to limitations that affect their suitability for camp areas, picnic areas, playgrounds, and paths and trails.

In table 7 the soils are rated as having slight, moderate, or severe limitations for the specified uses. For all of these ratings, it is assumed that a good cover of vegetation can be established and maintained. A limitation of *slight* means that soil properties are generally favorable and limitations are so minor that they easily can be overcome. A *moderate* limitation can be overcome or modified by planning, design, or special maintenance. A *severe* limitation means that costly soil reclamation, special design, intense maintenance, or a combination of these is required.

Camp areas are used intensively for tents and small camp trailers and the accompanying activities of outdoor living. Little preparation of the site is required other than shaping and leveling for tent and parking areas. Camp areas are subject to heavy foot traffic and limited vehicular traffic. The best soils have mild slopes, good drainage, a surface free of rocks and coarse fragments, freedom from flooding during periods of heavy use, and a surface that is firm after rain but not dusty when dry.

Picnic areas are attractive natural or landscaped tracts used mainly for preparing meals and eating outdoors. These areas are subject to heavy foot traffic. Most of the vehicular traffic, however, is confined to access roads. The best soils are firm when wet but not dusty when dry, are free of flooding during the season of use, and do not have slopes or stones that greatly increase the cost of leveling sites or of building access roads.

Playgrounds are areas used intensively for baseball, football, badminton, and similar organized games. Soils suitable for this use need to withstand intensive foot traffic. The best soils have a nearly level surface free of coarse fragments and rock outcrops, good drainage, freedom from flooding during periods of heavy use, and a surface that is firm after rain but not dusty when dry. If grading and leveling are required, depth to rock is important.

Paths and trails are used for local and cross-country travel by foot or on horseback. Design and layout should require little or no cutting and filling. The best soils are at least moderately well drained, are firm when wet but not dusty when dry, are flooded no more than once during the season of use, have slopes of less than 15 percent, and have few or no rocks or stones on the surface.

Formation and Classification of the Soils

This section describes the five factors of soil formation and their effects on the soils in Taylor County. Following this is information on the processes of soil horizon differentiation. Also, the current system of soil classification is explained, and the soils in the county are placed in some categories of the system.

Factors of Soil Formation

Soil is produced by the action of soil-forming processes on material deposited or accumulated by geologic agencies. The characteristics of the soil at any given point are determined by the physical and mineral composition of the parent material; the climate under which the soil material has accumulated and existed since accumulation; the plant and animal life on and in the soil; the relief, or lay of the land; and the length of time the forces of soil formation have acted on the soil material.

Climate and vegetation are active factors of soil genesis. They act on the parent material that has accumulated through the weathering of rocks and slowly change it into a natural body that has genetically related horizons. The effects of climate and vegetation are conditioned by relief. The parent material also affects the kind of profile that can be formed and, in extreme cases, determines it almost

TABLE 7.—*Degree and kind of soil limitation for major types of recreational development*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil. The soils in such mapping units may have different properties and limitations, and for this reason it is necessary to follow carefully the instructions for referring to other series that appear in the first column of this table]

Soil series and map symbols	Camp areas	Picnic areas	Playgrounds	Paths and trails
Badland. Too variable to be rated. Mapped only in a complex with Owens soils.				
*Clairemont: Ca, Cn. For Urban land part of Cn, see Urban land.	Severe: flood hazard	Moderate: flood hazard	Severe: flood hazard	Slight.
Cobb: CoB	Slight	Slight	Slight	Slight.
Colorado: Cr	Severe: flood hazard	Moderate: flood hazard	Moderate: flood hazard	Slight.
Cosh: CsB	Slight	Slight	Severe: bedrock at a depth of 12 to 20 inches.	Slight.
Demona variant: DeB	Moderate: sandy texture.	Moderate: sandy texture.	Severe: sandy texture	Moderate: sandy texture.
Gageby: Ga	Severe: flood hazard	Moderate: clay loam	Moderate: clay loam	Moderate: clay loam.
*Hamby: HbA, HbB, HbC, HuB. For Urban land part of HuB, see Urban land.	Moderate: moderately slow permeability.	Slight	Moderate: moderately slow permeability.	Slight.
HaB	Moderate: moderately slow permeability.	Moderate: loamy fine sand.	Severe: loamy fine sand.	Moderate: loamy fine sand.
Kavett: KaA, KaB	Severe: clay	Severe: clay	Severe: clay	Severe: clay.
*Mangum: Ma, Mb. For Urban land part of Mb, see Urban land	Severe: very slow permeability.	Moderate: silty clay loam.	Severe: very slow permeability.	Moderate: silty clay loam.
Mf	Severe: flood hazard	Severe: flood hazard	Severe: flood hazard	Severe: flood hazard.
Mereta: MrA, MrB, MrC	Moderate: clay loam	Moderate: clay loam	Severe: strongly cemented caliche at a depth of 14 to 20 inches.	Moderate: clay loam.
Miles: MsA	Slight	Slight	Slight	Slight.
MsB, MsC	Slight	Slight	Moderate: slope	Slight.
*Owens: ObE. For Badland part of ObE, see Badland.	Severe: clay	Severe: clay	Severe: clay	Severe: clay.
*Pitzer: PtD, PuD, PwC. For Urban land part of PuD, see Urban land. For Weymouth part of PwC, see Weymouth series.	Moderate: slow permeability.	Slight	Severe: indurated caliche at a depth of 4 to 14 inches.	Slight.
Quanah: QaB, QaC	Moderate: clay loam	Moderate: clay loam	Moderate: clay loam	Moderate: clay loam.
Randall: Ra	Severe: clay	Severe: clay	Severe: clay	Severe: clay.
Rioconcho: Rc, Rf	Moderate: clay loam	Moderate: clay loam	Moderate: clay loam	Moderate: clay loam.
Rock outcrop. Too variable to be rated. Mapped only in undifferentiated unit with Ustochrepts and in associations with Tarrant soils.				

TABLE 7.—*Degree and kind of soil limitation for major types of recreational development*—Continued

Soil series and map symbols	Camp areas	Picnic areas	Playgrounds	Paths and trails
Rotan: RnA, RnB	Moderate: clay loam	Moderate: clay loam	Moderate: clay loam	Moderate: clay loam.
*Rowena: RoA, RoB, RuA. For Urban land part of RuA, see Urban land.	Moderate: clay loam	Moderate: clay loam	Moderate: clay loam	Moderate: clay loam.
*Sagerton: SaA, SaB, SeB. For Urban land part of SeB, see Urban land.	Moderate: clay loam	Moderate: clay loam	Moderate: clay loam	Moderate: clay loam.
Shep: ShB, ShC	Slight	Slight	Moderate: slope	Slight.
ShD	Slight	Slight	Severe: slope	Slight.
Speck: SpA, SpB	Moderate: clay loam	Moderate: clay loam	Severe: depth to bedrock.	Moderate: clay loam.
Stamford: StB	Severe: clay	Severe: clay	Severe: clay	Severe: clay.
*Tarrant: TAD, TED, TFF, TFG, TLD. For Kavett part of TED and Vernon part of TLD, see their respective series. For Rock outcrop part of TFF and TFG, see Rock outcrop.	Severe: clay	Severe: clay	Severe: clay	Severe: clay.
Tillman: TmA, TmB	Moderate: clay loam	Moderate: clay loam	Moderate: clay loam	Moderate: clay loam.
*Tobosa: ToA, ToB, TuB. For Urban land part of TuB, see Urban land.	Severe: clay	Severe: clay	Severe: clay	Severe: clay.
Urban land: Ub. Too variable to be rated.				
*Ustochrepts: URF. Too variable to be rated. For Rock outcrop part, see Rock outcrop.				
Valera: VaA, VaB	Severe: clay	Severe: clay	Severe: clay	Severe: clay.
Vernon: VeB, VeE	Severe: clay	Severe: clay	Severe: clay	Severe: clay.
*Weymouth: WeB, WeC WuD. For Urban land part of WuD, see Urban land.	Moderate: clay loam	Moderate: clay loam	Moderate: clay loam	Moderate: clay loam.

entirely. Finally, time is needed for the changing of the parent material into a soil profile. It may be much or little, but some time is always required for horizon differentiation. Usually, a long time is required for the development of distinct horizons.

The factors of soil genesis are so closely interrelated in their effects on the soil that few generalizations can be made regarding the effect of any one unless conditions are specified for the other four.

Parent material

Parent material refers to the unconsolidated mass from which the soil forms. Parent material in Taylor County consists of Permian shale and clay, Permian sandstone, recent deposits of alluvium, outwash from Cretaceous formations, and clayey sediment over limestone.

Vernon and Tillman soils are examples of those that formed in Permian shale and clay. Cobb and Cosh soils formed in Permian sandstone. Gageby soils formed in recent deposits of alluvium. Hamby and Miles soils are examples of soils that formed in outwash derived from cretaceous formations. Kavett and Speck soils formed in clayey sediment underlain by limestone.

Climate

Taylor County lies roughly on the boundary between the humid climate of east Texas and the semiarid climate of the west and north.

Such soils as those of the Rowena and Shep series have accumulated a horizon of calcium carbonate caused by water leaching the soluble material to a certain depth. These soils also contain free lime throughout the profile, because not enough water passes through them to leach out all of the free lime.

Taylor County has mild winters and hot summers, which contributes to the continuous decomposition of residue from plants and animals by micro-organisms. Some soils, such as those of the Sagerton and Rotan series, have a high organic-matter content.

Plants and animals

Plants, animals, insects, bacteria, and fungi are important in the formation of soils. Living organisms affect gains or losses in organic matter and plant nutrients. Structure and porosity are also affected by living organisms.

In Taylor County vegetation has an effect on soil formation. The soils in Taylor County are low or high in content of organic matter because of the amount of vegetation. Organic matter is formed from decaying leaves and stems; hence, where the vegetation is limited, such soils as those in the Hamby and Miles series are low in organic-matter content. Insects, such as earthworms and termites, increase soil porosity by their activities of burrowing channels throughout the soil profile, along with the vegetation and its root system.

Relief

Relief, or slope, affects soil formation through its influence on runoff and drainage. Taylor County ranges from nearly level to steep.

The Pitzer soils are gently sloping to sloping. These soils are very shallow to shallow over indurated caliche. The soil material is removed from these slopes by water erosion about as fast as the soil-forming processes develop the soil. Well-drained, nearly level soils have a thicker Bt horizon.

The kind and amount of vegetation is affected by relief. Soils that have north-facing slopes receive less sunlight than those that have south-facing slopes and, consequently, lose less moisture through evaporation. As a result, soils on north-facing slopes have more dense vegetation and generally are the more strongly developed.

Time

Time is an intricate and important phase of soil formation. The length of time that the parent material has been in place is reflected in the degree of development of the soil profile.

Soils that have little development in the profile are young soils, such as those of the Clairemont series. Soils that have well-defined soil horizons and structure are older, such as Miles and Cobb soils. Other soils have developed distinct structure and heavy texture in the subsoil. These soils have had an even greater length of time for development. Examples are Rotan and Sagerton soils.

Processes of Horizon Differentiation

The effects of the soil-forming factors on the soil of Taylor County are recorded in the soil profile—a succession of layers, or horizons, from the surface down to rock. The horizons differ in one or more properties, such as color, texture, structure, consistence, porosity, and reaction. They may be thick or thin.

Most soil profiles contain three major horizons, called A, B, and C. In some soils a B horizon has not formed.

The A horizon is the surface layer. It can be either the horizon of maximum organic matter, called the A1 horizon; or the horizon of maximum leaching of dissolved or suspended materials, called the A2 horizon. It is a horizon of maximum accumulation of dissolved or suspended materials, such as iron and clay. The B horizon may be firmer than those horizons immediately above and below it, and it may have blocky structure.

Next is the C horizon, which is little affected by the soil-forming process but can be material modifed by weathering.

Several processes were involved in the formation of horizons in the soils of Taylor County. Among the more important processes in horizon differentiation in the soils of Taylor County are the accumulation of organic matter, the leaching and accumulation of carbonates and bases, and the formation and translocation of silicate clays.

Accumulation of organic matter has occurred to some extent in the upper part of the profile. This has influenced the formation of an A1 horizon, which is the surface layer of soils in the county. The organic matter coats mineral particles and darkens the A1 horizon. Rotan and Tarrant soils in Taylor County have an A horizon that has been darkened by the accumulation of organic matter.

Leaching of carbonates and bases has occurred in many of the soils in the county. Some are moderately leached, which contributed to the development of a Cca horizon. Thick beds of soft caliche are under some of the soils of Taylor County. Rowena soils are underlain by this deposit of calcium carbonate. Under many soils that are shallow to moderately deep and sometimes more permeable, the upper part of this caliche has become cemented or indurated. Mereta and Pitzer soils are underlain by an indurated or strongly cemented layer.

In some soils of Taylor County, the translocation of clay minerals has contributed to horizon development. The B horizon of some soils has an accumulation of clay (clay films) in pores and on ped surfaces. These horizons are designated as "B2t" or "Bt" horizons. The Tillman, Miles, and Sagerton soils are examples of soils that have an accumulation of translocated silicate clays in the form of clay films in the B horizon.

Classification of the Soils

Classification consists of an orderly grouping of soils according to a system designed to make it easier to remember soil characteristics and interrelationships. Classification is useful in organizing and applying the results of experience and research. Soils are placed in narrow classes for discussion in detailed soil surveys and for application of knowledge within farms and fields. The many thousands of narrow classes are then grouped into progressively fewer and broader classes in successively higher categories, so that information can be applied to large geographic areas, such as countries and continents.

Two systems of classifying soils have been used in the

United States in recent years. The older system was adopted in 1938 and later revised. The system currently used by the National Cooperative Soil Survey was developed in the early sixties and was adopted in 1965.[9] It is under continual study.[10]

The current system of classification has six categories. Beginning with the most inclusive, these categories are the order, the suborder, the great group, the subgroup, the family, and the series. The criteria for classification are soil properties that are observable or measurable, but the properties are selected so that soils of similar genesis are grouped together. The placement of some soil series in the current system of classification, particularly in families, may change as more precise information becomes available.

Table 8 shows the classification of each soil series of Taylor County by family, subgroup, and order, according to the current system.

General Nature of the County

In this section the history and topography of Taylor County are described. Detailed information is also given about climate, farming, and water supply in the county.

[9] United States Department of Agriculture. Soil classification, a comprehensive system, 7th approximation. U.S. Dept. Agr., Soil Conservation Service. 265 pp., illus. 1960.

[10] Simonson, Roy W. Soil classification in the United States. Science 137: 1027-1034. 1962.

History

Taylor County was named for the Taylor brothers, Edward, James, and George, who were heroes at the Alamo. The county was created in 1858 and organized in 1878, from land that was part of Bexar and Travis Counties.

The major city in Taylor County is Abilene, which had a population of 89,653 in 1972. Abilene is the State's 15th largest city. Other towns include Tye, Impact, Buffalo Gap, Lawn, Tuscola, Merkel, and Trent. Dyess Air Force Base is located in the county. The county has two colleges and one university.

Topography

Relief in Taylor County consists of nearly level to sloping plains and steep escarpments. These escarpments separate the Rolling Plains from the Edward Plateau. The south part of the county drains into the Colorado River Basin, and the northern part drains into the Brazos River Basin.

Climate[11]

Taylor County lies roughly on the boundary between the humid climate of east Texas and the semiarid climate to

[11] By Robert B. Orton, climatologist for Texas, National Weather Service, U.S. Department of Commerce.

TABLE 8.—*Classification of soil series*

Series	Family	Subgroup	Order
Clairemont	Fine-silty, mixed (calcareous), thermic	Typic Ustifluvents	Entisols.
Cobb	Fine-loamy, mixed, thermic	Udic Haplustalfs	Alfisols.
Colorado	Fine-loamy, mixed (calcareous), thermic	Typic Ustifluvents	Entisols.
Cosh	Loamy, mixed, thermic, shallow	Udic Rhodustalfs	Alfisols.
Demona (variant)	Clayey, mixed, thermic	Aquic Arenic Paleustalfs	Alfisols.
Gageby[1]	Fine-loamy, mixed, thermic	Cumulic Haplustolls	Mollisols.
Hamby	Fine, mixed, thermic	Udic Paleustalfs	Alfisols.
Kavett	Clayey, montmorillonitic, thermic, shallow	Petrocalcic Calciustolls	Mollisols.
Mangum	Fine, mixed (calcareous), thermic	Vertic Ustifluvents	Entisols.
Mereta	Clayey, mixed, thermic, shallow	Petrocalcic Calciustolls	Mollisols.
Miles	Fine-loamy, mixed, thermic	Udic Paleustalfs	Alfisols.
Owens	Clayey, mixed, thermic, shallow	Typic Ustochrepts	Inceptisols.
Pitzer	Loamy, mixed, thermic, shallow	Petrocalcic Calciustolls	Mollisols.
Quanah[2]	Fine-silty, mixed, thermic	Typic Calciustolls	Mollisols.
Randall	Fine, montmorillonitic, thermic	Udic Pellusterts	Vertisols.
Rioconcho	Fine, mixed, thermic	Vertic Haplustolls	Mollisols.
Rotan	Fine, mixed, thermic	Pachic Paleustolls	Mollisols.
Rowena	Fine, mixed, thermic	Vertic Calciustolls	Mollisols.
Sagerton	Fine, mixed, thermic	Typic Paleustolls	Mollisols.
Shep	Fine-loamy, mixed, thermic	Typic Ustochrepts	Inceptisols.
Speck	Clayey, mixed, thermic	Lithic Argiustolls	Mollisols.
Stamford	Fine, montmorillonitic, thermic	Typic Chromusterts	Vertisols.
Tarrant	Clayey-skeletal, montmorillonitic, thermic	Lithic Calciustolls	Mollisols.
Tillman	Fine, mixed, thermic	Typic Paleustolls	Mollisols.
Tobosa	Fine, montmorillonitic, thermic	Typic Chromusterts	Vertisols.
Valera	Fine, montmorillonitic, thermic	Petrocalcic Calciustolls	Mollisols.
Vernon	Fine, mixed, thermic	Typic Ustochrepts	Inceptisols.
Weymouth	Fine-loamy, mixed, thermic	Typic Ustochrepts	Inceptisols.

[1] Soils correlated in the Gageby series are taxadjuncts to the series. About 75 percent of these soils in Taylor County have hue of 5YR in the horizon below the mollic epipedon and within the central section and are outside the range in characteristics for the series. This difference does not alter the usefulness and behavior of these soils.

[2] Soils correlated in the Quanah series are taxadjuncts to the series. These soils in Taylor County contain more calcium carbonate and more particles coarser than very fine sand than the range defined for the series. These differences do not alter the usefulness and behavior of these soils.

the west and north. The normal annual rainfall is about 23 inches. The rainfall pattern is typical of the Great Plains: the largest amount falls during the spring months of April, May, and June and during September and October in fall. A large part of the rainfall is the result of thunderstorm activity, and wide variations occur from year to year. The range in precipitation has been from 9.78 inches in 1956 to 48.77 inches in 1941.

The wide range between maximum and minimum temperatures characteristic of the Great Plains extends into the area of Taylor County. Periods of very cold weather are short, however, so that even in January fair, mild weather is frequent. High daytime temperatures prevail for a long period in summer but are broken by thunderstorm activity on an average of five times a month. Taylor County has an average of 41 days a year when thunderstorms occur, but severe storms and tornadoes are infrequent. Rapid cooling occurs after nightfall, however, and most nights are pleasant, having minimum temperatures in the upper 60's or lower 70's throughout the summer.

Rapid changes in temperature occur in winter as cold, dry, polar air replaces warm, moist, tropical air over the area. The temperature sometimes falls as much as 20 to 30 degrees in an hour. A strong outbreak of polar air in January 1947 brought an extreme minimum temperature of —9° F to Abilene in the northeastern part of the county. At the other extreme, 111° was recorded in August 1943.

The high temperatures of summer are generally associated with fair skies, southwesterly wind, and dry air. The low humidity, however, is conducive to personal comfort because of rapid evaporation, which has a cooling effect.

The average last date of 32° freeze in spring is March 30, and in fall November 10. This gives an average growing season of 225 days.

The region receives an average of about 80 percent of the possible sunshine in summer and about 70 percent for the year. The prevailing wind direction is southerly, and winds from this direction are frequently high and persistant for several days. The strongest winds are from a northerly direction and result from the passage of cold fronts, or "northers." Dusty conditions are infrequent and occur only with northwest winds. The frequency and intensity of duststorms are dependent mainly on soil conditions in the Texas Panhandle, Oklahoma, and Kansas.

Table 9 summarizes the climate for Taylor County.

Farming

The principal farming enterprises in Taylor County are dryland and irrigated farming and cattle, sheep, and goat ranching.

Approximately 200,000 acres is used for dryland farming in Taylor County. The major crops are cotton, grain sorghum, and wheat. Approximately 1,300 acres of irrigated cropland in the county, consists of cotton, grain sorghum, and hay-pasture operations.

Approximately 36,000 sheep and 31,000 goats are in the county. Sheep and goat ranching enterprises are confined to the southern parts of the county.

Livestock operations are primarily cow-calf. Preferred calving dates for this area are November, December, and January. Although calving begins in October and continues through May, supplemental feeding may be required during winter when forage is low.

Water Supply

Irrigation, municipal, and industrial water comes from both surface and ground water sources. Taylor County has a limited amount of irrigation water. This water is obtained from Quarternary alluvium deposits in scattered areas throughout the county. These deposits are mainly sands, gravels, silt, and clay that occur as channel fillings of old streams, stream terraces, and flood plains; sheets of windblown material; and sand dunes.

Water for municipal and industrial use is supplied by Lake Fort Phantom and Lake Abilene.

Glossary

ABC soil. A soil that has a complete profile, including an A, B, and C horizon.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates such as crumbs, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali soil. Generally, a highly alkaline soil. Specifically, an alkali soil has 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 the growth of most crop plants is low from this cause.

Alluvium. Soil material, such as sand, silt, or clay, that has been deposited on land by streams.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern.

Available water capacity (also termed 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 capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil.

Badlands. Areas of rough, irregular land where most of the surface is occupied by ridges, gullies, and deep channels. Land hard to traverse.

Calcareous soil. A soil containing enough calcium carbonate (often with magnesium carbonate) to effervesce (fizz) visibly when treated with cold, dilute hydrochloric acid.

Caliche. A more or less cemented deposit of calcium carbonate in many soils of warm-temperate areas, as in the Southwestern States. The material may consist of soft, thin layers in the soil or of hard, thick beds just beneath the solum, or it may be exposed at the surface by erosion.

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 film. A thin coating of clay on the surface of a soil aggregate. Synonyms: clay coat, clay skin.

Climax vegetation. The stabilized plant community on a particular site; it reproduces itself and does not change so long as the environment does not change.

Colluvium. Soil material, rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex, soil. A mapping unit consisting of different kinds of soils that occur in such small individual areas or in such an intricate pattern that they cannot be shown separately on a publishable soil map.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrations of compounds, or of soil grains cemented together. The composition of some concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are examples of material commonly found in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

TABLE 9.—*Temperature*

[Based on records kept at Abilene, Texas (ground

Month	Temperature					Precipitation			
	Mean daily maximum[1]	Mean monthly highest maximum[2]	Mean daily minimum[1]	Mean monthly lowest minimum[2]	Mean total[1]	Probability of receiving selected amount during month			
						0 or trace	0.50 inch or more	1.00 inch or more	2.00 inches or more
	°F	°F	°F	°F	In	Pct	Pct	Pct	Pct
January	56.4	78.3	32.8	12.6	0.88	1	60	39	10
February	60.5	80.7	36.3	19.5	1.09	1	60	40	18
March	68.4	86.9	41.6	23.1	1.04	1	66	40	10
April	77.2	93.4	51.3	35.4	2.27	<1	90	75	45
May	83.4	97.2	60.0	46.1	4.33	<1	98	94	79
June	91.7	100.4	68.9	58.6	2.67	<1	80	66	48
July	94.3	102.0	72.1	65.0	2.28	4	80	60	40
August	94.1	103.1	71.9	63.3	1.47	5	68	49	28
September	87.4	98.4	64.4	50.7	2.07	4	78	60	40
October	78.6	91.7	53.8	38.1	2.85	3	84	84	50
November	65.3	83.6	40.7	25.9	1.11	10	65	40	19
December	58.0	77.4	34.2	18.3	1.26	4	65	40	20
Year	76.3	----------	52.3	----------	23.32	----------	----------	----------	----------

[1] Climatological standard normals for the period 1931–60.
[2] For the period 1949–70.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material, and tends to stretch somewhat and pull apart, rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard and brittle; little affected by moistening.

Decreaser. Any of the climax range plants most heavily grazed. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deferred grazing. The practice of delaying grazing until range plants have reached a definite stage of growth, in order to increase the vigor of the forage and to allow the desirable plants to produce seed. Contrasts with continuous grazing and rotation grazing.

Diversion, or diversion terrace. A ridge of earth, generally a terrace, that is built to divert runoff from its natural course and, thus, to protect areas downslope from the effects of such runoff.

Drainage class (natural). Refers to the conditions of frequency and duration of periods of saturation of partial saturation that existed during the development of the soil, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven different classes of natural soil drainage are recognized.

Excessively drained soils are commonly very porous and rapidly permeable and have a low water-holding capacity.

Somewhat excessively drained soils are also very permeable and are free from mottling throughout their profile.

Well-drained soils are nearly free from mottling and are commonly of intermediate texture.

Moderately well drained soils commonly have a slowly permeable layer in or immediately beneath the solum. They have uniform color in the A and upper B horizons and mottling in the lower B and the C horizons.

Somewhat poorly drained soils are wet for significant periods but not all the time, and some soils commonly have mottling at a depth below 6 to 16 inches.

Poorly drained soils are wet for long periods and are light gray and generally mottled from the surface downward, although mottling may be absent or nearly so in some soils.

Very poorly drained soils are wet nearly all the time. They have a dark-gray or black surface layer and are gray or light gray, with or without mottling, in the deeper parts of the profile.

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.

Erosion. The wearing away of the land surface by wind (sand-blast), running water, and other geological agents.

Erosion pavement. A layer of gravel or stones on the ground surface that remains after the fine particles are removed by wind or water. Desert pavements result from exposure to dry winds.

Fallow. Cropland left idle in order to restore productivity, mainly through accumulation of water, nutrients, or both. Summer fallow is a common stage before cereal grain in regions of limited rainfall. The soil is tilled for at least one growing season to control weeds, to aid decomposition of plant residue, and to encourage the storage of moisture for the succeeding grain crop.

Flood plain. Nearly level land, consisting of stream sediment, that borders a stream and is subject to flooding unless protected artificially.

Genesis, soil. The manner in which a soil originates. Refers especially to the processes initiated by climate and organisms that are responsible for the development of the solum, or true soil, from the unconsolidated parent material, as conditioned by relief and age of landform.

Gilgai. Typically, the microrelief of Vertisols—clayey soils that have a high coefficient of expansion and contraction with changes in moisture; usually a succession of microbasins and microknolls, in nearly level areas, or of microvalleys and microridges that run with the slope.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rains. The distinction between gully and rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by normal tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage. V-shaped gullies result if the material is more difficult to erode with depth; whereas U-shaped gullies result if the lower material is more easily eroded than that above it.

Gypsum. Calcium sulphate.

Horizon, soil. A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes. These are the major horizons:

O horizon.—The layer of organic matter on the surface of a mineral soil. This layer consists of decaying plant residue.

and precipitation data

elevation 1,762 feet). The symbol < means less than]

Precipitation—Continued									
Probability of receiving selected amounts during month—Continued				Mean number of days with—			Snow, sleet		
3.00 inches or more	4.00 inches or more	5.00 inches or more	6.00 inches or more	0.10 inch or more	0.50 inch or more	1.00 inch or more	Mean total	Maximum monthly	Greatest depth
Pct	*Pct*	*Pct*	*Pct*				*In*	*In*	*In*
5	1	<1	<1	2	1	([3])	1.4	6.6	3
5	3	1	<1	3	1	([3])	1.1	8.4	4
4	3	<1	<1	2	1	([3])	.9	7.3	6
25	10	5	2	4	2	1	([4])	([4])	----------
60	40	30	10	5	3	1	----------	0	----------
30	20	11	10	4	2	1	----------	0	----------
23	15	10	5	3	1	1	----------	0	----------
15	8	5	3	3	1	1	----------	0	----------
29	19	10	8	4	2	1	----------	0	----------
30	20	11	10	3	1	1	([4])	([4])	----------
9	4	1	<1	3	1	1	.4	8.1	3
8	4	2	<1	2	1	([3])	.5	4.3	4
----------	----------	----------	----------	38	17	8	4.3	8.4	6

[3] Less than one-half day.
[4] Trace.

A horizon.—The mineral horizon at the surface or just below an O horizon. This horizon is the one in which living organisms are most active and therefore is marked by the accumulation of humus. The horizon may have lost one or more of soluble salts, clay, and sesquioxides (iron and aluminum oxides).

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or some combination of these; (2) by prismatic or blocky structure; (3) by redder or stronger colors than the A horizon; or (4) by some combination of these. Combined A and B horizons are usually called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The weathered rock material immediately beneath the solum. In most soils this material is presumed to be like that from which the overlying horizons were formed. If the material is known to be different from that in the solum, a Roman numeral precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock usually underlies a C horizon but may be immediately beneath an A or B horizon.

Humus. The well-decomposed, more or less stable part of the organic matter in mineral soils.

Increasers. Species in the climax vegetation that increase in relative amount as the more desirable plants are reduced by close grazing; increasers commonly are shorter than decreasers, and some are less palatable to livestock.

Invaders. On range, plants that come in and grow after the climax vegetation has been reduced by grazing. Generally, invader plants are those that follow disturbance of the surface. (Most weeds are "invaders.")

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state. In engineering, a high liquid limit indicates that the soil has a high content of clay and a low capacity for supporting loads.

Miscellaneous land type. A mapping unit for areas of land that have little or no natural soil; or that are too nearly inaccessible for orderly examination; or that occur where, for other reasons, it is not feasible to classify the soil.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical mineralogical, and biological properties of the various horizons, and their thickness and arrangement in the soil profile.

Mottling, soil. Irregularly marked with spots of different colors that vary in number and size. Mottling in soils usually indicates poor aeration and lack of drainage. 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 these: *fine,* less than 5 millimeters (about 0.2 inch) in diameter along the greatest dimension; *medium,* ranging from 5 millimeters to 15 millimeters (about 0.2 to 0.6 inch) in diameter along the greatest dimension; and *coarse,* more than 15 millimeters (about 0.6 inch) in diameter along the greatest dimension.

Munsell notation. A system for designating color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with a hue of 10YR, a value of 6, and a chroma of 4.

Parent material. Disintegrated and partly weathered rock from which soil has formed.

Ped. An individual natural soil aggregate, such as a crumb, a prism, or a block, in contrast to a clod.

Permeability. The quality that enables the soil to transmit water or air. Terms used to describe permeability are as follows: *very slow, slow, moderately slow, moderate, moderately rapid, rapid,* and *very rapid.*

Phase, soil. A subdivision of a soil, series, or other unit in the soil classification system made because of differences in the soil that affect its management but do not affect its classification in the natural landscape. A soil series, for example, may be divided into phases because of differences in slope, stoniness, thickness, or some other characteristic that affects its management but not its behavior in the natural landscape.

pH value. A numerical means for designating acidity and alkalinity in soils. A pH value of 7.0 indicates precise neutrality; a higher value, alkalinity; and a lower value, acidity.

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 a semisolid to a plastic state.

Profile, soil. A vertical section of the soil through all its horizons and extending into the parent material.

Range condition. The state of health or productivity of both soil and forage in a given range, in terms of what productivity could or should be under normal climate and the best practical management. Condition classes generally recognized are—*excellent, good, fair,* and *poor.*

The classification is based on the percentage of original, or climax, vegetation on the site, as compared to what ought to grow on it if management were good.

Range site. An area of range where climate, soil, and relief are sufficiently uniform to produce a distinct kind of climax vegetation.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is precisely neutral in reaction because it is neither acid nor alkaline. An acid, or "sour," soil is one that gives an acid reaction; an alkaline soil is one that is alkaline in reaction. In words, the degrees of acidity or alkalinity are expressed thus:

	pH		*pH*
Extremely acid	Below 4.5	Neutral	6.6 to 7.3
Very strongly acid	4.5 to 5.0	Mildly alkaline	7.4 to 7.8
Strongly acid	5.1 to 5.5	Moderately alkaline	7.9 to 8.4
Medium acid	5.6 to 6.0	Strongly alkaline	8.5 to 9.0
Slightly acid	6.1 to 6.5	Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock. Only the upper part of this, modified by organisms and other soil-building forces, is regarded by soil scientists as soil. Most American engineers speak of the whole regolith, even to great depths, as "soil."

Relief. The elevations or inequalities of a land surface, considered collectively.

Rill. A steep-sided channel resulting from accelerated erosion. A rill normally is a few inches in depth and width and is not large enough to be an obstacle to farm machinery.

Saline soil. A soil that contains soluble salts in amounts that impair growth of plants but that does not contain excess exchangeable sodium.

Sand. Individual rock or mineral fragments in a soil that range in diameter from 0.05 to 2.0 millimeters. Most sand grains consist of quartz, but they may be of any mineral composition. The textural class name of any soil that contains 85 percent or more sand and not more than 10 percent clay.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. If two sequa are present in a single soil profile, it is said to have a bisequum.

Series, soil. A group of soils developed from a particular type of parent material and having genetic horizons that, except for texture of the surface layer, are similar in differentiating characteristics and in arrangement in the profile.

Silica. Silica is a combination of silicon and oxygen. The mineral form is called quartz.

Silt. Individual mineral particles in a soil that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). Soil of the silt textural class is 80 percent or more silt and less than 12 percent clay.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on relatively steep slopes and in swelling clays, where there is marked change in moisture content.

Soil. A natural, three-dimensional body on the earth's surface that supports plants and that 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 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows: *Very coarse sand* (2.0 to 1.0 millimeter); *coarse sand* (1.0 to 0.5 millimeter); *medium sand* (0.5 to 0.25 millimeter); *fine sand* (0.25 to 0.10 millimeter); *very fine sand* (0.10 to 0.05 millimeter); *silt* (0.05 to 0.002 millimeter); and *clay* (less than 0.002 millimeter). The separates recognized by the International Society of Soil Science are as follows: I (2.0 to 0.2 millimeter); II (0.2 to 0.02 millimeter); III (0.02 to 0.002 millimeter); IV (less than 0.002 millimeter).

Solum. The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in mature soil includes the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristic of the soil are largely confined to the solum.

Structure, soil. The arrangement of primary soil particles into compound particles or clusters that are separated from adjoining aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles. 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 together without any regular cleavage, as in many claypans and hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. Technically, the part of the soil below the solum.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, about 5 to 8 inches in thickness. The plowed layer.

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 it may soak into the soil or flow slowly to a prepared outlet without harm. Terraces in fields are generally built so they can be farmed. Terraces intended mainly for drainage have a deep channel that is maintained in permanent sod.

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."

Tilth, soil. The condition of the soil in relation to the growth of plants, especially soil structure. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable, granular structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Topsoil. A presumed fertile soil or soil material, or one that responds to fertilization, ordinarily rich in organic matter, used to topdress roadbanks, lawns, and gardens.

Variant, soil. A soil having properties sufficiently different from those of other known soils to suggest establishing a new soil series, but a soil of such limited known area that creation of a new series is not believed to be justified.

Water table. The highest part of the soil or underlying rock material that is wholly saturated with water. In some places an upper, or perched, water table may be separated from a lower one by a dry zone.

Weathering. All physical and chemical changes produced in rocks at or near the earth's surface by atmospheric agents. These changes result in more or less complete disintegration and decomposition of the rock.

Well-graded soil. A soil or soil material consisting of particles that are well distributed over a wide range in size or diameter. Such a 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 oven-dry basis, at which plants (specifically sunflower) wilt so much that they do not recover when placed in a dark, humid atmosphere.

GUIDE TO MAPPING UNITS

For a full description of a mapping unit, read both the description of the mapping unit and that of the soil series to which the mapping unit belongs. Other information is given in tables as follows:

Acreage and extent, table 1, page 5.
Estimated yields, table 2, page 33.
Wildlife, table 3, page 40.
Engineering, tables 4, 5, and 6, pages 42, 48, and 56.

Map symbol	Mapping unit	Page	Capability unit		Range site	
			Symbol	Page	Name	Page
Ca	Clairemont silty clay loam	5	IIc-2	30	Loamy Bottomland	34
Cn	Clairemont-Urban land complex	6	-----	--	--------	--
CoB	Cobb fine sandy loam, 1 to 3 percent slopes	7	IIIe-4	30	Sandy Loam	36
Cr	Colorado soils, frequently flooded	7	Vw-1	31	Loamy Bottomland	34
CsB	Cosh fine sandy loam, 1 to 3 percent slopes	8	IIIe-5	31	Sandy Loam	36
DeB	Demona fine sand, alkaline subsoil variant, 0 to 3 percent slopes	8	IIIe-6	31	Sandy	35
Ga	Gageby clay loam	9	IIc-1	30	Loamy Bottomland	34
HaB	Hamby loamy fine sand, 0 to 3 percent slopes	9	IIIe-6	31	Sandy	35
HbA	Hamby fine sandy loam, 0 to 1 percent slopes	9	IIe-3	30	Sandy Loam	36
HbB	Hamby fine sandy loam, 1 to 3 percent slopes	9	IIIe-4	30	Sandy Loam	36
HbC	Hamby fine sandy loam, 3 to 5 percent slopes	10	IIIe-4	30	Sandy Loam	36
HuB	Hamby-Urban land complex, 0 to 3 percent slopes	10	-----	--	--------	--
KaA	Kavett clay, 0 to 1 percent slopes	10	IIIs-2	31	Shallow	36
KaB	Kavett clay, 1 to 3 percent slopes	10	IIIe-7	31	Shallow	36
Ma	Mangum silty clay loam	11	IIIw-1	31	Clayey Bottomland	34
Mb	Mangum-Urban land complex	11	-----	--	--------	--
Mf	Mangum soils, frequently flooded	11	Vw-1	31	Clayey Bottomland	34
MrA	Mereta clay loam, 0 to 1 percent slopes	12	IIIs-2	31	Shallow	36
MrB	Mereta clay loam, 1 to 3 percent slopes	12	IIIe-7	31	Shallow	36
MrC	Mereta clay loam, 3 to 5 percent slopes	12	IVe-1	31	Shallow	36
MsA	Miles fine sandy loam, 0 to 1 percent slopes	13	IIe-3	30	Sandy Loam	36
MsB	Miles fine sandy loam, 1 to 3 percent slopes	13	IIIe-1	30	Sandy Loam	36
MsC	Miles fine sandy loam, 3 to 5 percent slopes	13	IIIe-4	30	Sandy Loam	36
ObE	Owens-Badland complex, 3 to 12 percent slopes	14	VIIs-1	32	--------	--
	Owens part	--	-----	--	Shallow Clay	36
	Badland part	--	-----	--	--------	--
PtD	Pitzer gravelly loam, 1 to 8 percent slopes	14	VIs-1	32	Very Shallow	37
PuD	Pitzer-Urban land complex, 1 to 8 percent slopes	14	-----	--	--------	--
PwC	Pitzer-Weymouth complex, 1 to 5 percent slopes	14	VIs-1	32	--------	--
	Pitzer part	--	-----	--	Very Shallow	37
	Weymouth part	--	-----	--	Clay Loam	34
QaB	Quanah clay loam, 1 to 3 percent slopes	16	IIe-2	29	Clay Loam	34
QaC	Quanah clay loam, 3 to 5 percent slopes	16	IVe-1	31	Clay Loam	34
Ra	Randall clay	16	VIw-1	31	(1/)	--
Rc	Rioconcho clay loam	17	IIc-1	30	Loamy Bottomland	34
Rf	Rioconcho soils, frequently flooded	17	Vw-1	31	Loamy Bottomland	34
RnA	Rotan clay loam, 0 to 1 percent slopes	18	IIc-1	30	Clay Loam	34
RnB	Rotan clay loam, 1 to 3 percent slopes	18	IIe-1	29	Clay Loam	34
RoA	Rowena clay loam, 0 to 1 percent slopes	18	IIc-1	30	Clay Loam	34
RoB	Rowena clay loam, 1 to 3 percent slopes	18	IIe-1	29	Clay Loam	34
RuA	Rowena-Urban land complex, 0 to 1 percent slopes	18	-----	--	--------	--
SaA	Sagerton clay loam, 0 to 1 percent slopes	19	IIc-1	30	Clay Loam	34
SaB	Sagerton clay loam, 1 to 3 percent slopes	19	IIe-1	29	Clay Loam	34
SeB	Sagerton-Urban land complex, 0 to 3 percent slopes	19	-----	--	--------	--
ShB	Shep loam, 1 to 3 percent slopes	20	IIIe-2	30	Sandy Loam	36
ShC	Shep loam, 3 to 5 percent slopes	20	IVe-1	31	Sandy Loam	36
ShD	Shep loam, 5 to 8 percent slopes	20	VIe-2	31	Sandy Loam	36

GUIDE TO MAPPING UNITS--Continued

Map symbol	Mapping unit	Page	Capability unit Symbol	Capability unit Page	Range site Name	Range site Page
SpA	Speck clay loam, 0 to 1 percent slopes	21	IIIs-2	31	Redland	35
SpB	Speck clay loam, 1 to 3 percent slopes	21	IIIe-7	31	Redland	35
StB	Stamford clay, 1 to 3 percent slopes	21	IIe-1	29	Clay Flat	34
TAD	Tarrant association, undulating	22	VIIs-3	32	Low Stony Hills	34
TED	Tarrant-Kavett association, undulating	23	-----	--	--------	--
	Tarrant part	--	VIIs-3	32	Low Stony Hills	34
	Kavett part	--	VIs-2	32	Shallow	36
TFF	Tarrant-Rock outcrop association, hilly	23	-----	--	--------	--
	Tarrant part	--	VIIs-3	32	Low Stony Hills	34
	Rock outcrop part	--	-----	--	--------	--
TFG	Tarrant-Rock outcrop association, steep	23	-----	--	Steep Rocky	37
	Tarrant part	--	VIIs-2	32	--------	--
	Rock outcrop part	--	-----	--	--------	--
TLD	Tarrant and Vernon soils, undulating	23	-----	--	--------	--
	Tarrant part	--	VIIs-3	32	Low Stony Hills	34
	Vernon part	--	VIe-1	31	Shallow Clay	36
TmA	Tillman clay loam, 0 to 1 percent slopes	25	IIs-1	30	Clay Loam	34
TmB	Tillman clay loam, 1 to 3 percent slopes	25	IIe-1	29	Clay Loam	34
ToA	Tobosa clay, 0 to 1 percent slopes	25	IIIs-1	31	Clay Flat	34
ToB	Tobosa clay, 1 to 3 percent slopes	25	IIIe-3	30	Clay Flat	34
TuB	Tobosa-Urban land complex, 0 to 3 percent slopes	25	-----	--	--------	--
Ub	Urban land	26	-----	--	--------	--
URF	Ustochrepts and Rock outcrop, hilly	26	-----	--	--------	--
	Ustochrepts part	--	VIe-2	31	Sandy Loam	36
	Rock outcrop part	--	-----	--	--------	--
VaA	Valera clay, 0 to 1 percent slopes	27	IIs-1	30	Clay Loam	34
VaB	Valera clay, 1 to 3 percent slopes	27	IIe-1	29	Clay Loam	34
VeB	Vernon clay, 1 to 3 percent slopes	27	IVe-1	31	Shallow Clay	36
VeE	Vernon clay, 3 to 12 percent slopes	27	VIe-1	31	Shallow Clay	36
WeB	Weymouth clay loam, 1 to 3 percent slopes	28	IVe-1	31	Clay Loam	34
WeC	Weymouth clay loam, 3 to 5 percent slopes	28	IVe-1	31	Clay Loam	34
WuD	Weymouth-Urban land complex, 1 to 8 percent slopes	28	-----	--	--------	--

1/ Included with surrounding range sites.

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