United States Department of Agriculture

Soil Conservation Service

In cooperation with Illinois Agricultural Experiment Station

Soil Survey of Christian County, Illinois

How To Use This Soil Survey

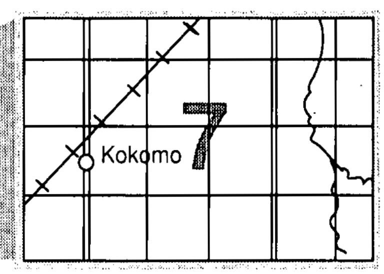
General Soil Map

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

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

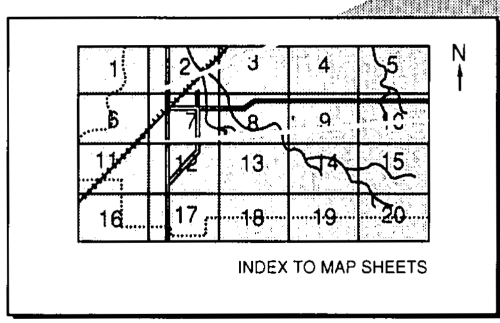
Detailed Soil Maps

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



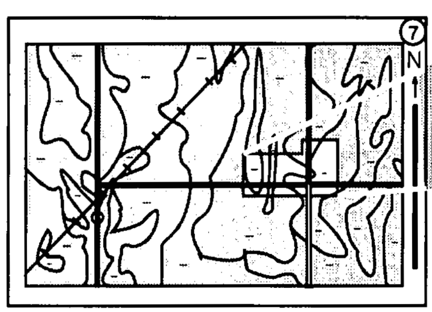
MAP SHEET

To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.

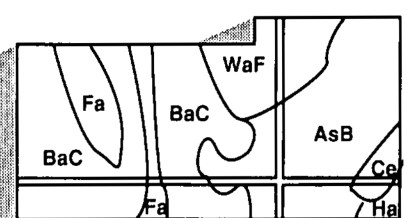


INDEX TO MAP SHEETS

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



MAP SHEET



AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

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

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. 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 1988. Soil names and descriptions were approved in 1988. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1988. This survey was made cooperatively by the Soil Conservation Service and the Illinois Agricultural Experiment Station. Financial assistance was provided by the Christian County Board and the Illinois Department of Agriculture. The survey is part of the technical assistance furnished to the Christian County Soil and Water Conservation District.

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

This soil survey is Illinois Agricultural Experiment Station Soil Report No. 143.

Cover: Corn planted on the contour in a terraced area of Hickory loam, 10 to 15 percent slopes, eroded.

Contents

Issued February 1994

Index to Map Units

Summary of Tables

Foreword

This soil survey contains information that can be used in land-planning programs in Christian County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

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

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

Charles Whitmore
State Conservationist
Soil Conservation Service

Soil Survey of Christian County, Illinois

By Gerald V. Berning, Soil Conservation Service

Fieldwork by Gerald V. Berning and Steven E. Suhl, Soil Conservation Service, and Robert J. Linder and Phillip L. Mansfield, Christian County

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

CHRISTIAN COUNTY is in the central part of Illinois (fig. 1). It has a total area of 458,340 acres, or about 716 square miles. In 1980, the population of the county was 36,446. The population of Taylorville, the county seat, was 11,386.

This soil survey updates the survey of Christian County published by the University of Illinois in 1950 *(4)*. It provides more information and has larger maps, which show the soils in greater detail.

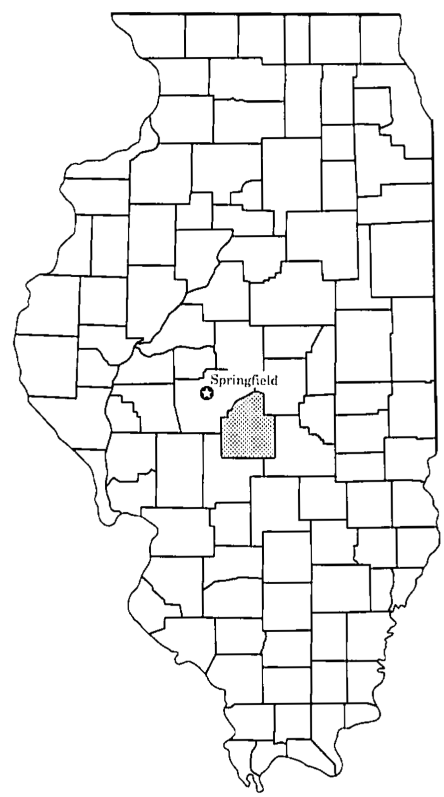


Figure 1.—Location of Christian County in Illinois.

General Nature of the County

This section gives general information about Christian County. It describes settlement and development, farming, physiography and drainage, and climate.

Settlement and Development

The area that is now Christian County at one time was part of the hunting grounds of the Kickapoo, Potawatomi, Sac, and Fox Tribes *(5)*. In 1818, settlers from Tennessee and Kentucky arrived in the survey area. The county was established in 1839 from parts of Sangamon, Montgomery, and Shelby Counties. Its original name, Dane County, was changed to Christian County in 1840. Taylorville was established in 1839.

The early settlers cleared and farmed the timbered areas. By 1830, metal plows were available and the settlers started plowing the prairie. At that time, about 75 percent of the county supported prairie grasses. By 1875, underground drain tiles were available. They were used to drain cultivated areas of the wet, nearly level soils.

The coal resource in Christian County is estimated at 4,415 million tons. Small active oil fields are in the northern and eastern parts of the county. Generally thin deposits of limestone are in scattered areas in the county. An active limestone quarry is in the southern part of the county.

The transportation network in the county consists mainly of two State highways, several railroad lines, one municipal airport, and numerous county roads.

Farming

The primary enterprise in the county is farming. Corn, soybeans, and wheat are the main crops. Grasses and legumes are grown in some areas, and some farms have livestock.

In 1982, Christian County had 1,161 farms, which made up 412,448 acres, or nearly 91 percent of the total land area *(10)*. A total of 382,955 acres is cropland. Of this total, about 347,700 acres is planted to corn and soybeans and about 11,600 acres to wheat *(6)*. In 1982, the county had 11,016 cattle and calves and 40,688 hogs and pigs *(10)*.

Physiography and Drainage

Most of Christian County is nearly level and gently sloping. A large part of the county is essentially on a flat till plain that is covered with loess. The plain is partially dissected by numerous streams and drainageways. Areas adjacent to the streams are more rolling.

The county has three somewhat separate rolling morainal areas. Several morainal ridges and hills, one of which is Mt. Auburn, are in the northern part of the county. In the east-central part of the county, a nearly continuous ridge extends from Taylorville northeastward to the county line east of Stonington. This ridge is relatively low near Taylorville but becomes more prominent farther to the northeast. It generally is less than three-quarters of a mile wide. In the southeastern part of the county, the most prominent ridge extends from the county line east of Pana to the county line southwest of Rosamond. In most areas this ridge is ½ mile to 1½ miles wide. Surface water in areas south of this ridge drains into the Kaskaskia River, and that in the rest of the county drains into the Sangamon River.

Extensive bottoms and terraces are along the Sangamon River, the South Fork of the Sangamon River, and Flat Branch.

The county has about 4,000 acres of impounded water. Sangchris Lake, the largest impoundment, makes up about 2,700 acres; Lake Taylorville, 1,148 acres; and Lake Pana, 211 acres.

Climate

Wayne Wendland, Illinois State Water Survey, helped prepare this section.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Decatur in the period 1951 to 1980. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 33.3 degrees F and the average daily minimum temperature is 24.5 degrees. The lowest temperature on record, which occurred at Decatur on January 7, 1977, is -23 degrees. In summer, the average temperature is 74.7 degrees and the average daily maximum temperature is 86.3 degrees. The highest recorded temperature, which occurred at Decatur on July 14, 1954, is 113 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is about 40 inches. Of this, about 23 inches, or more than 55 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 18.43 inches. The heaviest 1-day rainfall during the period of record was 4.76 inches.

The average seasonal snowfall is 20.4 inches. The greatest snow depth at any one time during the period of record was 22 inches. On the average, 32 days of the year have at least 1 inch of snow on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 64 percent. Humidity is higher at night, and the average at dawn is about 83 percent. The sun shines 70 percent of the time possible in summer and 43 percent in winter. The prevailing wind is from the south-southwest. Average windspeed is highest, 13.8 miles per hour, in March.

How This Survey Was Made

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

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

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

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

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

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

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

Map Unit Composition

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

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

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

General Soil Map Units

The general soil map at the back of this publication shows the soil associations in this survey area. Each association has a distinctive pattern of soils, relief, and drainage. Each is a unique natural landscape. Typically, an association consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one association can occur in another but in a different pattern.

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

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

The general soil map of Christian County joins with the general soil maps of Sangamon, Macon, Shelby, and Montgomery Counties. Some of the names of the associations in these counties do not agree with those in Christian County because of variations in the extent of the major soils or because of conceptual changes in the classification of the soils. The differences in the names of the associations do not significantly affect the use of the maps for general planning.

Soil Descriptions

1. Ipava-Sable-Tama Association

Nearly level and gently sloping, poorly drained to moderately well drained, silty soils formed in loess; on uplands in the northern part of the county

This association is on broad interstream divides that originally were covered dominantly by prairie grasses. Slope ranges from 0 to 5 percent.

This association makes up about 27 percent of the county. It is about 32 percent Ipava soils, 31 percent Sable soils, 17 percent Tama soils, and 20 percent soils of minor extent (fig. 2).

The nearly level Ipava soils are on broad rises. They are somewhat poorly drained. Typically, the surface layer is black, friable silt loam about 9 inches thick. The subsurface layer is very dark gray, friable silt loam about 9 inches thick. The subsoil is about 40 inches thick. The upper part is brown, grayish brown, and light brownish gray, mottled, friable silty clay loam, and the lower part is light brownish gray, mottled, friable silt loam. The underlying material to a depth of 62 inches also is light brownish gray, mottled, friable silt loam.

The nearly level Sable soils are in broad, low areas. They are poorly drained. Typically, the surface layer and subsurface layer are very dark gray, firm silty clay loam. The combined thickness of these layers is about 20 inches. The lower part of the subsurface layer is mottled. The subsoil is mottled, firm silty clay loam about 24 inches thick. The upper part is grayish brown, and the lower part is olive gray. The underlying material to a depth of 60 inches is light olive gray, mottled, calcareous, friable silt loam.

The gently sloping Tama soils are on convex ridgetops, knolls, and side slopes. They are moderately well drained. Typically, the surface layer is very dark grayish brown, friable silt loam about 9 inches thick. The subsurface layer is very dark grayish brown, friable silty clay loam about 5 inches thick. The subsoil is about 38 inches thick. The upper part is brown, friable silty clay loam; the next part is brown, mottled, friable silty clay loam; and the lower part is yellowish brown, mottled, friable silt loam. The underlying material to a depth of 60 inches also is yellowish brown, mottled, friable silt loam.

Minor in this association are Assumption, Denny, and Hartsburg soils. The moderately well drained Assumption soils are on side slopes. They formed in loess and in the underlying paleosol. The poorly drained Denny soils are in shallow depressions. Hartsburg soils are similar to Sable soils but have carbonates within a depth of 40 inches.

Most areas of this association are used for corn, soybeans, or small grain. Improving drainage and controlling water erosion are the main management concerns.

Some areas of this association are used as sites for

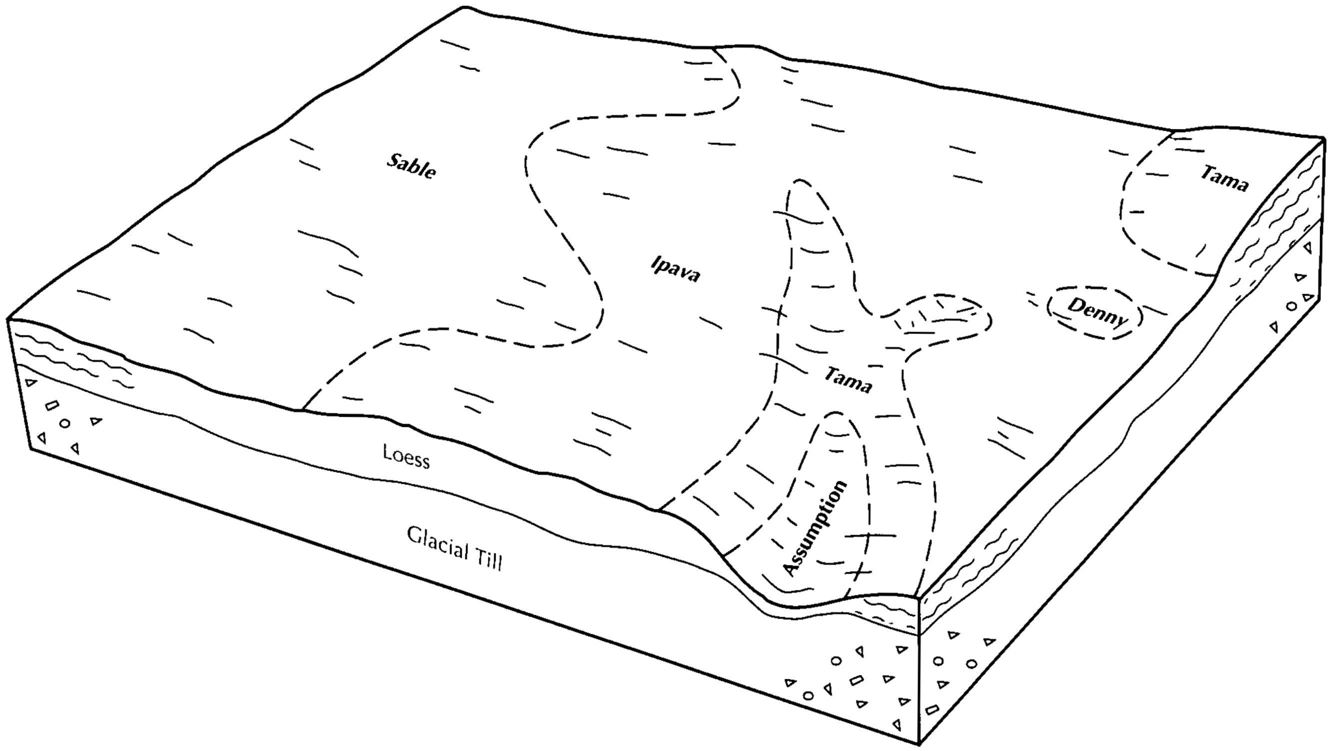


Figure 2.—Typical pattern of soils and parent material in the Ipava-Sable-Tama association.

dwellings and septic tank absorption fields. Seasonal wetness, the shrink-swell potential, and restricted permeability are the main management concerns in areas used for urban development.

2. Elburn-Drummer-Camden Association

Nearly level and gently sloping, somewhat poorly drained, poorly drained, and well drained, silty soils formed in loess and in the underlying loamy glacial outwash; on uplands

This association is on interstream divides that originally were covered dominantly by prairie grasses. Slope ranges from 0 to 5 percent.

This association makes up about 2 percent of the county. It is about 27 percent Elburn soils, 17 percent Drummer soils, 12 percent Camden soils, and 44 percent soils of minor extent (fig. 3).

The nearly level Elburn soils are on broad rises. They are somewhat poorly drained. Typically, the surface layer is very dark grayish brown, friable silt loam about 6 inches thick. The subsurface layer also is very dark grayish brown, friable silt loam. It is about 10 inches thick. The subsoil is about 42 inches thick. It is mottled. The upper part is brown, friable and firm silty clay loam; the next part is light olive brown and grayish brown, friable silty clay loam; and the lower part is grayish brown, friable, stratified silt loam, loam, and sandy loam. The underlying material to a depth of 60 inches is grayish brown, very friable, stratified sandy loam and loamy sand.

The nearly level Drummer soils are in broad, low areas. They are poorly drained. Typically, the surface layer is black, friable silty clay loam about 8 inches thick. The subsurface layer is very dark gray, mottled, firm silty clay loam about 8 inches thick. The subsoil extends to a depth of 60 inches or more. It is mottled. The upper part is dark grayish brown, grayish brown, light olive gray, and gray, firm silty clay loam, and the lower part is gray, friable, stratified loam, clay loam, and fine sandy loam.

The gently sloping Camden soils are on convex ridgetops and side slopes. They are well drained. Typically, the surface layer is brown, friable silt loam about 7 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part is dark yellowish brown, friable and firm silty clay loam; the next part is dark yellowish brown, friable silty clay loam; and the lower part is brown, friable loam that has strata of clay loam and sandy loam.

Minor in this association are Kendall, Plano, Sable, and Virden soils. The somewhat poorly drained Kendall soils are on broad rises. They have a dark surface layer that is less than 10 inches thick. The moderately well drained Plano soils are on convex ridgetops and side slopes. The poorly drained Sable and Virden soils are in broad, low areas. They formed entirely in loess.

Most areas of this association are used for corn, soybeans, or small grain. Improving drainage and controlling water erosion are the main management concerns.

Some areas of this association are used as sites for dwellings and septic tank absorption fields. Seasonal wetness, the shrink-swell potential, and restricted permeability are the main management concerns in areas used for urban development.

3. Ipava-Virden-Tama Association

Nearly level and gently sloping, poorly drained to moderately well drained, silty soils formed in loess; on uplands in the western part of the county

This association is on broad interstream divides that originally were covered dominantly by prairie grasses. Slope ranges from 0 to 5 percent.

This association makes up about 9 percent of the county. It is about 36 percent Ipava soils, 31 percent Virden soils, 12 percent Tama soils, and 21 percent soils of minor extent (fig. 4).

The nearly level Ipava soils are on broad rises. They are somewhat poorly drained. Typically, the surface layer is black, friable silt loam about 9 inches thick. The subsurface layer is very dark gray, friable silt loam about 3 inches thick. The subsoil is about 40 inches thick. The upper part is brown, grayish brown, and light brownish gray, mottled, friable silty clay loam, and the lower part is light brownish gray, mottled, friable silt loam. The underlying material to a depth of 60 inches also is light brownish gray, mottled, friable silt loam.

The nearly level Virden soils are in broad, low areas. They are poorly drained. Typically, the surface layer is very dark gray, firm silty clay loam about 9 inches thick. The subsurface layer also is very dark gray, firm silty clay loam. It is about 3 inches thick. The subsoil is mottled, firm silty clay loam about 40 inches thick. The upper part is very dark gray, the next part is dark grayish brown, and the lower part is olive gray. The underlying material to a depth of 60 inches is light olive gray, mottled, firm silt loam.

The gently sloping Tama soils are on convex

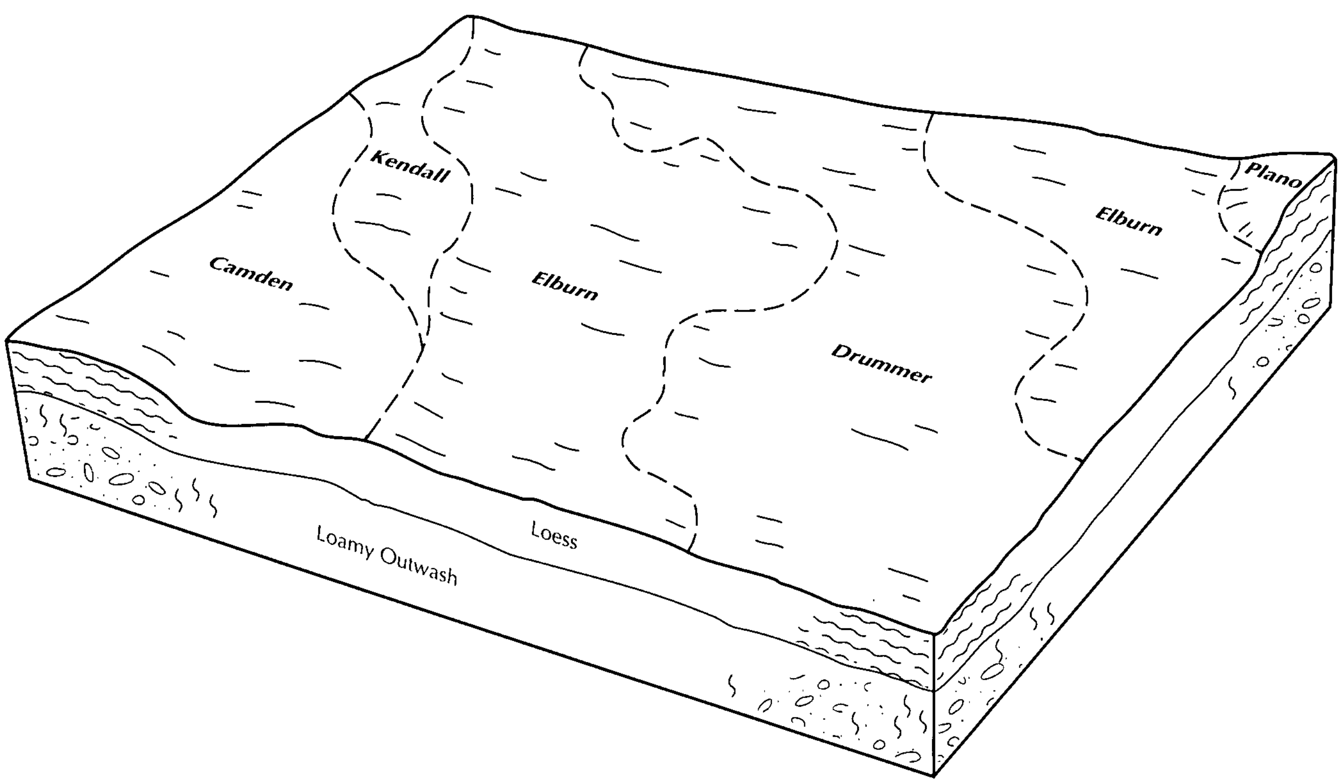


Figure 3.—Typical pattern of soils and parent material in the Elburn-Drummer-Camden association.

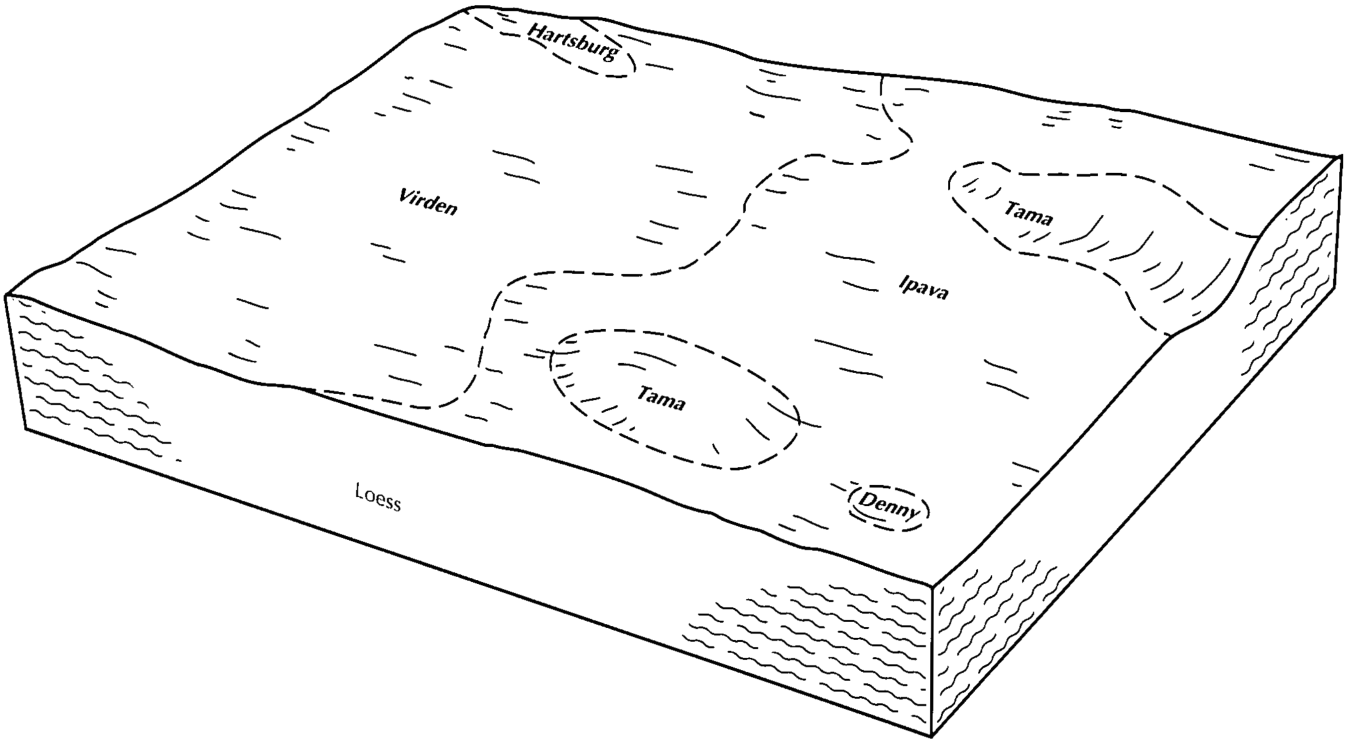


Figure 4.—Typical pattern of soils and parent material in the Ipava-Virden-Tama association.

ridgetops, knolls, and side slopes. They are moderately well drained. Typically, the surface layer is very dark grayish brown, friable silt loam about 9 inches thick. The subsurface layer is very dark grayish brown, friable silty clay loam about 5 inches thick. The subsoil is about 38 inches thick. The upper part is brown, friable silty clay loam; the next part is brown, mottled, friable silty clay loam; and the lower part is yellowish brown, mottled, friable silt loam. The underlying material to a depth of 60 inches also is yellowish brown, mottled, friable silt loam.

Minor in this association are Assumption, Denny, Downs, Edinburg, and Hartsburg soils. The moderately well drained Assumption soils are on side slopes in the uplands. They formed in loess and in the underlying paleosol. Denny soils are in depressions. The moderately well drained Downs soils are on convex ridgetops. They have a dark surface layer that is less than 10 inches thick. Edinburg and Hartsburg soils are in low areas.

Most areas of this association are used for corn, soybeans, or small grain. Improving drainage and controlling water erosion are the main management concerns.

Some areas of this association are used as sites for dwellings and septic tank absorption fields. Seasonal wetness, the shrink-swell potential, and restricted permeability are the main management concerns in areas used for urban development.

4. Herrick-Virden-Harrison Association

Nearly level and gently sloping, poorly drained to moderately well drained, silty soils formed in loess or in loess and the underlying glacial till; on uplands

This association is on broad interstream divides that originally were covered dominantly by prairie grasses. Slope ranges from 0 to 5 percent.

This association makes up about 43 percent of the county. It is about 37 percent Herrick soils, 31 percent Virden soils, 11 percent Harrison soils, and 21 percent soils of minor extent.

The nearly level Herrick soils are on broad rises. They are somewhat poorly drained. Typically, the surface layer is very dark grayish brown, friable silt loam about 11 inches thick. The subsurface layer also is very dark grayish brown, friable silt loam. It is about 4 inches thick. The subsoil is mottled silty clay loam about 43 inches thick. The upper part is dark grayish brown and brown and is friable and firm, and the lower part is yellowish brown and is very firm and firm. The underlying material to a depth of 60 inches is mottled yellowish brown and light brownish gray, friable silt loam.

The nearly level Virden soils are in broad, low areas. They are poorly drained. Typically, the surface layer is very dark gray, firm silty clay loam about 9 inches thick. The subsurface layer also is very dark gray, firm silty clay loam. It is about 3 inches thick. The subsoil is mottled, firm silty clay loam about 40 inches thick. The upper part is very dark gray, the next part is dark grayish brown, and the lower part is olive gray. The underlying material to a depth of 60 inches is light olive gray, mottled, firm silt loam.

The gently sloping Harrison soils are on convex ridgetops and side slopes. They are moderately well drained. Typically, the surface layer is very dark grayish brown, friable silt loam about 10 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part is very dark grayish brown and brown, mottled, friable silt loam; the next part is brown and yellowish brown, mottled, firm silty clay loam; and the lower part is grayish brown, mottled, firm silty clay loam.

Minor in this association are Cowden, Edinburg, and Oconee soils. Cowden and Oconee soils have a dark surface layer that is less than 10 inches thick. Cowden soils are in low areas, and Oconee soils are on rises. Edinburg soils are in shallow depressions. They are poorly drained.

Most areas of this association are used for corn, soybeans, or small grain. Improving drainage and controlling water erosion are the main management concerns.

Some areas of this association are used as sites for dwellings and septic tank absorption fields. Seasonal wetness, the shrink-swell potential, and restricted permeability are the main management concerns in areas used for urban development.

5. Oconee-Virden-Herrick Association

Nearly level, somewhat poorly drained and poorly drained, silty soils formed in loess; on uplands

This association is on interstream divides that originally were covered dominantly by prairie grasses. Slopes range from 0 to 2 percent.

This association makes up about 2 percent of the county. It is about 40 percent Oconee soils, 18 percent Virden soils, 16 percent Herrick soils, and 26 percent soils of minor extent (fig. 5).

The nearly level Oconee soils are on rises. They are somewhat poorly drained. Typically, the surface layer is very dark grayish brown, friable silt loam about 7 inches thick. The subsurface layer is grayish brown, mottled, friable silt loam about 8 inches thick. The subsoil is about 47 inches thick. It is mottled. The upper part is brown, firm silty clay loam and silty clay; the next part is grayish brown and light brownish gray, firm silty clay loam; and the lower part is light brownish gray, friable silt loam.

The nearly level Virden soils are in broad, low areas. They are poorly drained. Typically, the surface layer is very dark gray, firm silty clay loam about 9 inches thick. The subsurface layer also is very dark gray, firm silty clay loam. It is about 8 inches thick. The subsoil is mottled, firm silty clay loam about 40 inches thick. The upper part is very dark gray, the next part is dark grayish brown, and the lower part is olive gray. The underlying material to a depth of 60 inches is light olive gray, mottled, firm silt loam.

The nearly level Herrick soils are on broad rises. They are somewhat poorly drained. Typically, the surface layer is very dark grayish brown, friable silt loam about 11 inches thick. The subsurface layer also is very dark grayish brown, friable silt loam. It is about 4 inches thick. The subsoil is mottled silty clay loam about 43 inches thick. The upper part is dark grayish brown and brown and is friable and firm, and the lower part is yellowish brown and is very firm and firm. The underlying material to a depth of 60 inches is mottled yellowish brown and light brownish gray, friable silt loam.

Minor in this association are Cowden, Darmstadt, Edinburg, and Harrison soils. The poorly drained Cowden soils and the somewhat poorly drained Darmstadt soils have a dark surface layer that is less than 10 inches thick. Darmstadt soils have a high content of sodium in the subsoil. Cowden and Edinburg soils are in low areas. Darmstadt soils are on low, broad ridges. The moderately well drained Harrison soils are on convex ridgetops and side slopes.

Most areas of this association are used for corn, soybeans, or small grain. Improving drainage is the main management concern.

Some areas of this association are used as sites for dwellings and septic tank absorption fields. Seasonal wetness, the shrink-swell potential, and restricted permeability are the main management concerns in areas used for urban development.

6. Sawmill-Radford-Tice Association

Nearly level, poorly drained and somewhat poorly drained, silty soils formed in alluvium; on bottom land

This association is on bottom land that originally was covered by mixed deciduous trees, sedges, and grasses. Slope ranges from 0 to 2 percent.

This association makes up about 5 percent of the

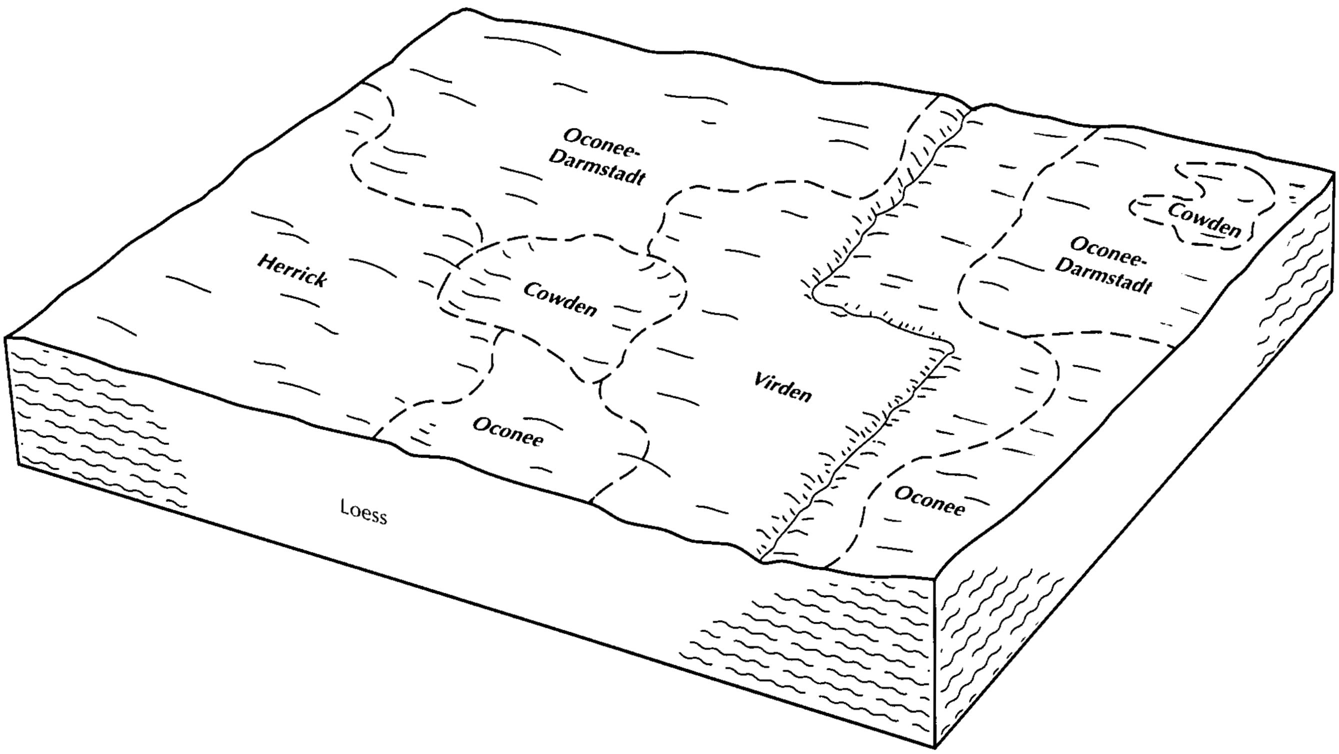


Figure 5.—Typical pattern of soils and parent material in the Oconee-Virden-Herrick association.

county. It is about 45 percent Sawmill soils, 24 percent Radford soils, 8 percent Tice soils, and 23 percent soils of minor extent (fig. 6).

The Sawmill soils are in low areas. They are poorly drained. Typically, the surface layer is very dark gray, friable silty clay loam about 7 inches thick. The subsurface layer is very dark gray, firm silty clay loam about 15 inches thick. The subsoil to a depth of 60 inches or more is firm silty clay loam. The upper part is very dark grayish brown, and the lower part is dark gray and mottled.

The Radford soils are on broad rises. They are somewhat poorly drained. Typically, the surface layer is very dark gray, friable silt loam about 8 inches thick. The subsurface layer is very dark grayish brown, mottled, friable silt loam about 2 inches thick. The upper part of the underlying material is stratified very dark grayish brown and dark grayish brown, friable silt loam. The lower part to a depth of 60 inches is very dark gray, firm silty clay loam.

The Tice soils are on broad rises. They are somewhat poorly drained. Typically, the surface layer is very dark grayish brown, firm silty clay loam about 8 inches thick. The subsurface layer is very dark grayish brown, mottled, firm silty clay loam about 6 inches thick. The subsoil to a depth of 60 inches or more is mottled, firm silty clay loam. The upper part is brown, and the lower part is grayish brown.

Minor in this association are Camden, Ross, and Thorp soils. Camden and Thorp soils formed in silty material and in the underlying stratified, loamy outwash. The well drained Camden soils are on convex ridgetops and side slopes. The poorly drained Thorp soils are in low areas. The well drained Ross soils are on flood plains.

Most areas of this association are used for corn or soybeans. Some areas are used for pasture, hay, or woodland. Improving drainage and controlling flooding are the main management concerns.

7. Middletown-Alvin-Broadwell Association

Gently sloping and moderately sloping, moderately well drained and well drained, silty and loamy soils formed in loess and the underlying sandy eolian material or in sandy eolian material; on uplands

This association is on interstream divides that originally were covered dominantly by prairie grasses. Slope ranges from 1 to 10 percent.

This association makes up about 2 percent of the county. It is about 26 percent Middletown soils, 15 percent Alvin soils, 13 percent Broadwell soils, and 46 percent soils of minor extent (fig. 7).

The gently sloping Middletown soils are on dunelike ridgetops and side slopes. They are moderately well drained. Typically, the surface layer is grayish brown, friable silt loam about 8 inches thick. The subsoil extends to a depth of 60 inches or more. It is yellowish brown. In sequence downward, it is firm silt loam and silty clay loam; mottled, firm and friable silty clay loam; mottled, friable clay loam and fine sandy loam; and very friable loamy fine sand.

The moderately sloping Alvin soils are on dunelike ridgetops and side slopes. They are well drained. Typically, the surface layer is mixed brown and yellowish brown, friable fine sandy loam about 7 inches thick. The subsoil extends to a depth of 60 inches or more. It is yellowish brown. The upper part is friable sandy clay loam, the next part is very friable fine sandy loam, and the lower part is very friable fine sand that has layers of loamy fine sand.

The gently sloping Broadwell soils are on dunelike ridgetops and side slopes. They are well drained. Typically, the surface layer and subsurface layer are very dark grayish brown, friable silt loam. The combined thickness of these layers is about 15 inches. The subsoil is about 40 inches thick. In sequence downward, it is dark brown, friable silty clay loam; brown and dark yellowish brown, firm silty clay loam; dark yellowish brown, friable silt loam; and dark yellowish brown, very friable loamy fine sand. The underlying material to a depth of 60 inches is yellowish brown, loose fine sand.

Minor in this association are Ipava, Sable, and Tama soils and the Kendall soils that have a sandy substratum. The somewhat poorly drained Ipava soils, the poorly drained Sable soils, and the moderately well drained Tama soils formed entirely in loess. Ipava soils are on broad rises. Sable soils are in low areas. Tama soils are on convex ridgetops. The somewhat poorly drained Kendall soils are on broad rises.

Most areas of this association are used for corn, soybeans, or small grain. Some areas are used for pasture, hay, small grain, or woodland. Controlling water erosion and improving fertility and the available water capacity are the main management concerns.

Some areas of this association are used as sites for dwellings and septic tank absorption fields. The

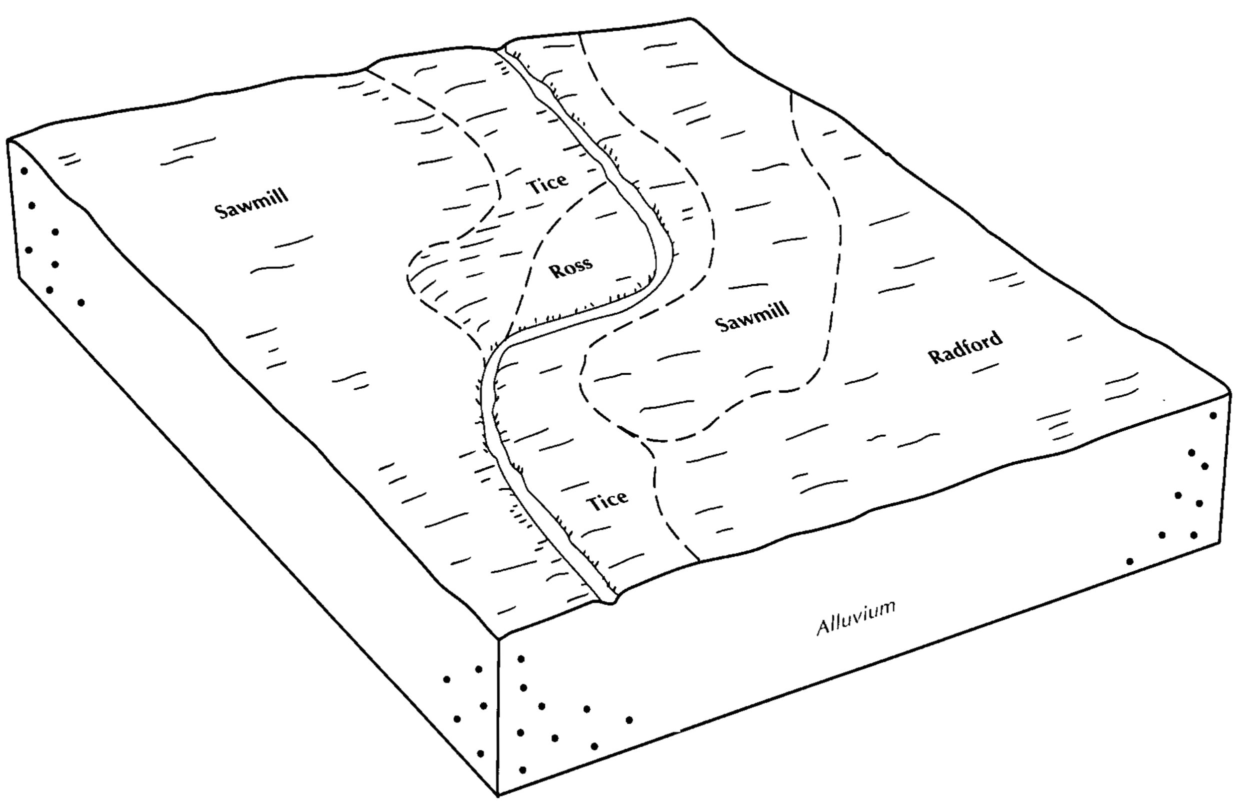


Figure 6.—Typical pattern of soils and parent material in the Sawmill-Radford-Tice association.

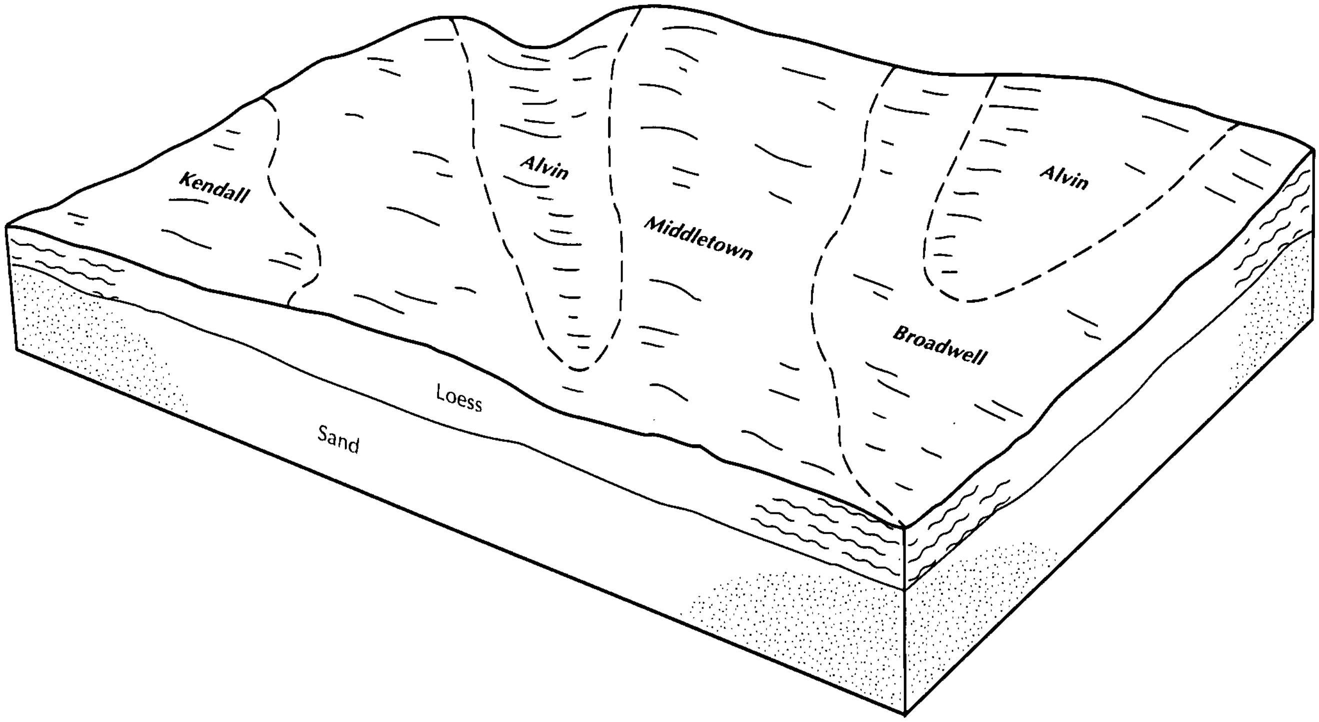


Figure 7.—Typical pattern of soils and parent material in the Middletown-Alvin-Broadwell association.

shrink-swell potential is the main management concern in areas used for urban development.

8. Rozetta-Hickory-Keomah Association

Nearly level to steep, somewhat poorly drained to well drained, silty and loamy soils formed in loess or glacial till; on uplands

This association is on interfluves that originally were covered dominantly by mixed deciduous trees. Slope ranges from 0 to 30 percent.

This association makes up about 8 percent of the county. It is about 28 percent Rozetta soils, 18 percent Hickory soils, 13 percent Keomah soils, and 41 percent soils of minor extent (fig. 8).

The gently level Rozetta soils are on ridgetops and side slopes. They are moderately well drained. Typically, the surface layer is dark grayish brown and brown, friable silt loam about 9 inches thick. The subsoil is firm silty clay loam about 44 inches thick. The upper part is brown, the next part is dark yellowish brown and mottled, and the lower part is brown and mottled. The underlying material to a depth of 60 inches is yellowish brown, mottled, friable silt loam.

The steep Hickory soils are on side slopes along drainageways. They are well drained. Typically, the surface layer is very dark grayish brown, friable loam about 3 inches thick. The subsurface layer is brown, friable loam about 6 inches thick. The subsoil to a depth of 60 inches or more is firm clay loam. The upper part is dark yellowish brown, the next part is dark yellowish brown and mottled, and the lower part is brown and mottled.

The nearly level Keomah soils are on broad rises. They are somewhat poorly drained. Typically, the surface layer is dark grayish brown and grayish brown, friable silt loam about 9 inches thick. The subsurface layer is grayish brown, mottled, friable silt loam about 4 inches thick. The subsoil is about 45 inches thick. It is mottled. The upper part is brown, friable silty clay loam; the next part is grayish brown, firm silty clay and silty clay loam; and the lower part is light brownish gray, friable silty clay loam. The underlying material to a depth of 60 inches is light brownish gray, mottled, friable silt loam.

Minor in this association are Atlas, Clarksdale, Elco, and Radford soils. The somewhat poorly drained Atlas soils and the moderately well drained Elco soils formed in loess and in the underlying paleosol. They are on side slopes along drainageways. The somewhat poorly drained Clarksdale soils formed in loess on low, broad ridges. The somewhat poorly drained Radford soils are on flood plains.

Most areas of this association are used for corn, soybeans, or small grain. Some areas are used for pasture, hay, or woodland. Improving drainage and controlling water erosion are the main management concerns.

Some areas of this association are used as sites for dwellings and septic tank absorption fields. Seasonal wetness, the shrink-swell potential, restricted permeability, and the slope are the main management concerns in areas used for urban development.

9. Oconee-Douglas-Harrison Association

Gently sloping and moderately sloping, somewhat poorly drained to well drained, silty soils formed in loess or in loess and the underlying glacial drift; on uplands

This association is in morainal areas that originally were covered dominantly by prairie grasses. Slope ranges from 2 to 10 percent.

This association makes up about 2 percent of the county. It is about 36 percent Oconee soils, 30 percent Douglas soils, 14 percent Harrison soils, and 20 percent soils of minor extent.

The gently sloping Oconee soils are on convex ridgetops and side slopes. They are somewhat poorly drained. Typically, the surface layer is very dark grayish brown, friable silt loam about 8 inches thick. The subsurface layer is dark gray, friable silt loam about 3 inches thick. The subsoil is brown, mottled, firm silty clay loam about 38 inches thick. The underlying material to a depth of 60 inches or more is light brownish gray and pale brown, mottled, firm silty clay loam.

The gently sloping and moderately sloping Douglas soils are on convex ridgetops and side slopes. They are well drained. Typically, the surface layer and subsurface layer are very dark grayish brown silt loam. The combined thickness of these layers is about 13 inches. The subsoil extends to a depth of 60 inches or more. The upper part is dark yellowish brown, friable silty clay loam; the next part is dark yellowish brown, mottled, friable silt loam; and the lower part is brown and dark brown, mottled, friable loam.

The gently sloping Harrison soils are on convex

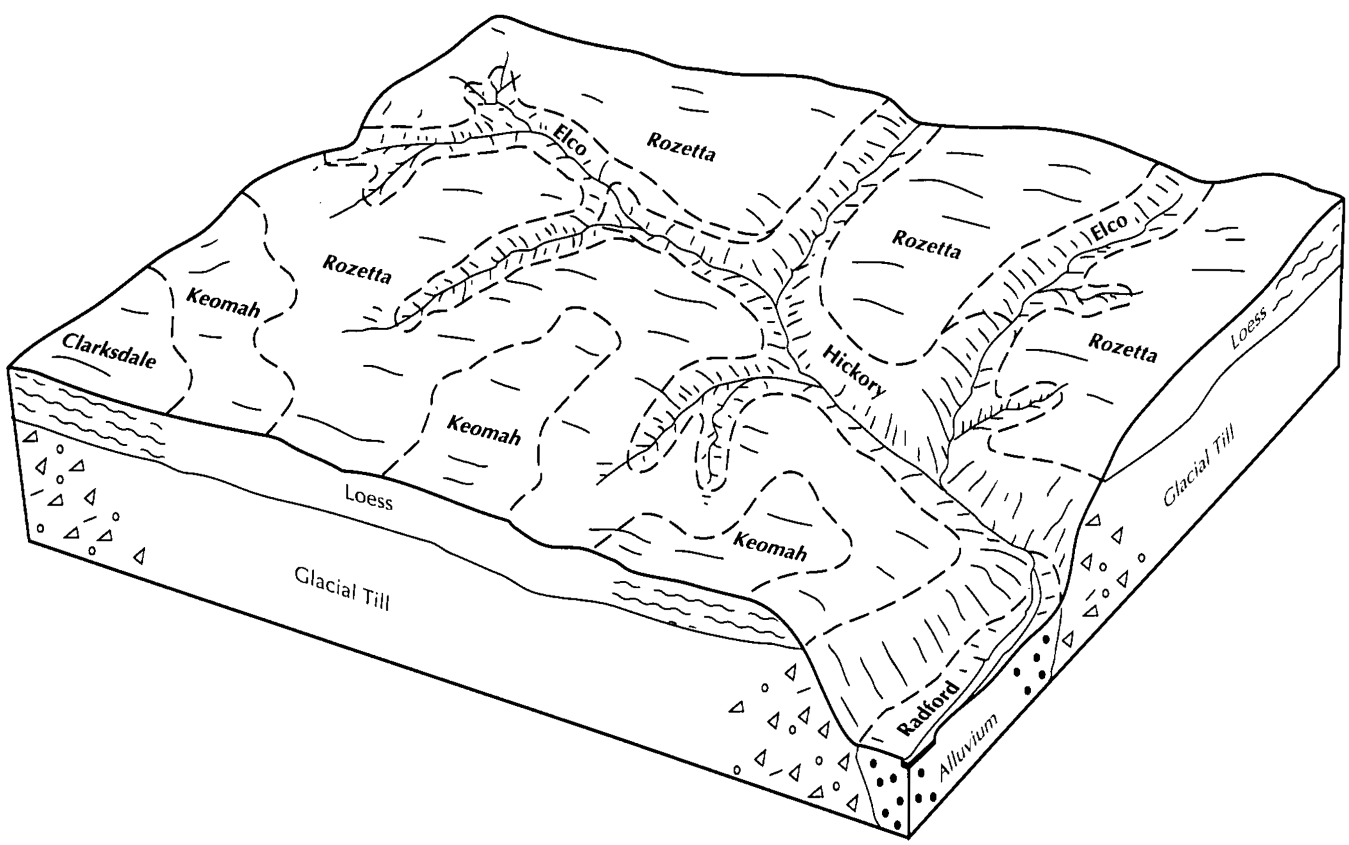


Figure 8.—Typical pattern of soils and parent material in the Rozetta-Hickory-Keomah association.

Figure 9.—Farmland in an area of the Herrick-Virden-Harrison association. An area of the Rozetta-Hickory-Keomah association is in the background.

ridgetops and side slopes. They are moderately well drained. Typically, the surface layer is very dark grayish brown, friable silt loam about 10 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part is very dark grayish brown and brown, mottled, friable silt loam; the next part is brown and yellowish brown, mottled, firm silty clay loam; and the lower part is grayish brown, mottled, firm silty clay loam.

Minor in this association are Cowden, Herrick, and Pana soils. The poorly drained Cowden soils are in low areas. The somewhat poorly drained Herrick soils are on the less sloping parts of the landscape. The well drained Pana soils are on narrow ridgetops and side slopes. They formed in glacial drift.

Most areas of this association are used for corn, soybeans, or small grain. Some areas are used for pasture or hay. Improving drainage and controlling erosion are the main management concerns.

Some areas of this association are used as sites for dwellings and septic tank absorption fields. Seasonal wetness, the shrink-swell potential, and restricted permeability are the main management concerns in areas used for urban development.

Broad Land Use Considerations

The soils in Christian County are used mainly for farming (fig. 9). Cultivated crops, pasture, and hay are the main agricultural uses. Other uses are woodland and urban development. The suitability of the soils for these uses varies significantly.

Cropland is the primary land use in all associations. The main cultivated crops are corn and soybeans. All associations, except for association 8, are either well suited or moderately suited to cultivated crops. The Hickory soils in association 8 are unsuited to cultivated crops because of the slope. The major soils are adequately drained for crop production. Controlling erosion is a management concern on the more sloping soils. Most areas in association 6 and some areas in association 8 are flooded briefly in winter and spring. The flooding may limit crop production.

A small acreage in the county is used for pasture and hay. Where the slope is less than 15 percent, association 8 is well suited to pasture and hay. The slope of the Hickory soils in this association is a limitation. Controlling erosion is a management concern on the more sloping soils.

A small acreage of the county is used as woodland. Most of the woodland is in associations 6, 7, and 8. Little of the woodland is managed for commercial timber production. These associations are moderately suited or well suited to woodland. Management concerns include controlling erosion and plant competition and limiting the use of equipment.

Association 6 is the only association in the county that is not used for building site development and sanitary facilities. It is unsuited to these uses because of flooding. In urban areas dwellings are generally connected to a sanitary sewage system. Associations 1, 3, 4, 5, and 9 are poorly suited or only moderately suited to building site development and septic tank absorption fields because of a seasonal high water table, restricted permeability, and the shrink-swell potential. Also, the slope is a limitation where it is more than 8 percent.

Because of flooding, some areas in association 8 are unsuited to building site development and septic tank absorption fields. The soils in this association that are not flooded are poorly suited, moderately suited, or well suited to these uses. Limitations include a seasonal high water table, the shrink-swell potential, restricted permeability, and the slope. Association 7 is moderately suited or well suited to building site development. The shrink-swell potential is a limitation. This association is well suited to septic tank absorption fields. Association 2 is poorly suited, moderately suited, or well suited to building site development and septic tank absorption fields. A seasonal high water table, the shrink-swell potential, and restricted permeability are the main limitations.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. Much information on each map unit, or soil, is given under "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

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

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Hickory loam, 10 to 15 percent slopes, eroded, is a phase of the Hickory series.

Some map units are made up of two major soils. These map units are called soil complexes. A *soil complex* consists of two soils, or one soil and a miscellaneous area, in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Ipava-Urban land complex is an example.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Pits, quarries, is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

In some areas the names of the map units on the detailed soil maps of Christian County do not agree with those on the maps of Macon, Montgomery, Sangamon, and Shelby Counties. Differences result from refinements in series concepts, variations in the extent of individual soils, and application of the latest soil classification system. These differences do not significantly affect the use and management of the soils. The soils in these units have similar properties and similar potentials for major land uses.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The "Glossary" defines many of the terms used in describing the soils.

Soil Descriptions

7C2—Atlas silt loam, 5 to 10 percent slopes, eroded. This moderately sloping, somewhat poorly drained soil is on side slopes along drainageways in the uplands. Individual areas are long and narrow or irregular in shape and range from 3 to 100 acres in size.

Typically, the surface layer is mixed dark grayish brown and brown silt loam about 5 inches thick. It has been thinned by erosion. The subsoil extends to a depth of 60 inches or more. It is mottled. The upper part is brown and grayish brown, firm silty clay loam; the next part is grayish brown and gray, firm clay; and the lower part is light gray, firm clay loam. In some places the surface soil is darker. In other places the surface layer is silty clay loam. In some areas the subsoil has less clay. In other areas it has less sand.

Included with this soil in mapping are small areas of the moderately well drained Elco and Rozetta soils and the well drained Hickory soils. Elco soils are in positions on the landscape similar to those of the Atlas soil. Rozetta soils are upslope from the Atlas soil, and Hickory soils are downslope. Hickory soils are on the steeper slopes. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Atlas soil at a very slow rate. In cultivated areas surface runoff is rapid. The seasonal high water table is perched at a depth of 1 to 2 feet during winter and spring. Available water capacity is moderate. Organic matter content is moderately low. This soil is seepy in many spots. The surface layer tends to crust and puddle after hard rains. The shrink-swell potential and the potential for frost action are high.

Most areas are used for cultivated crops. Some areas are used for pasture, hay, or woodland. A few small areas are used as sites for dwellings and septic tank absorption fields. This soil is moderately suited to cultivated crops and woodland. It is well suited to pasture and hay. It is poorly suited to dwellings and septic tank absorption fields.

In areas used for corn, soybeans, or small grain, further erosion is a hazard. A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, contour farming, terraces, or a combination of these can help to keep soil losses within tolerable limits. Hillside seeps are common. Because of these seeps, the soil dries slowly in the spring. Tile drains help to overcome this limitation. Returning crop residue to the soil and regularly adding other organic material help to prevent crusting and improve tilth and fertility.

Establishing pasture plants or hay helps to keep erosion within tolerable limits. Timely deferment of grazing helps to prevent overgrazing and thus also helps to prevent surface compaction, excessive runoff, and a greater susceptibility to erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

In the areas used as woodland, seedling mortality and windthrow are management concerns because of the high content of clay in the soil. Seedling mortality rates can be reduced by planting species that are tolerant of excessive wetness. The hazard of windthrow can be reduced by harvesting methods that do not isolate the remaining trees or leave them widely spaced. For example, only high-value trees should be removed from a strip 50 feet wide along the west and south edges of the woodland. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable, young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Installing either subsurface tile drains near the foundations or interceptor drains upslope from the buildings helps to overcome the wetness. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The seasonal high water table and the very slow permeability are limitations if this soil is used as a site for septic tank absorption fields. Alternative sewage disposal systems, including mound systems, may be needed.

The land capability classification is IIIe.

7C3—Atlas silty clay loam, 5 to 10 percent slopes, severely eroded. This moderately sloping, somewhat poorly drained soil is on side slopes along drainageways in the uplands. In most areas, nearly all of the original surface layer has been removed by erosion and the rest has been mixed with the upper part of the subsoil. Individual areas are long and narrow or irregular in shape and range from 3 to 30 acres in size.

Typically, the surface layer is brown silty clay loam about 6 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part is brown, firm clay; the next part is gray, very firm clay; and the lower part is gray, firm clay loam. In some areas the subsoil has less clay. In other areas it has less sand.

Included with this soil in mapping are small areas of the moderately well drained Elco and Rozetta soils and the well drained Hickory soils. Elco soils are in landscape positions similar to those of the Atlas soil. Rozetta soils are upslope from the Atlas soil, and Hickory soils are downslope. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Atlas soil at a very slow rate. In cultivated areas surface runoff is rapid. The seasonal high water table is perched at a depth of 1 to 2 feet during winter and spring. Available water capacity is moderate. Organic matter content is low. This soil is seepy in many spots. The surface layer is firm and sticky when wet and hard and cloddy when dry. It tends to crust and puddle after hard rains. The soil can be easily tilled only within a narrow range in moisture content. The shrink-swell potential and the potential for frost action are high.

Most areas are used for cultivated crops. Some areas are used for pasture, hay, or woodland. A few small areas are used as sites for dwellings and septic tank absorption fields. This soil is poorly suited to cultivated crops and to dwellings and septic tank absorption fields. It is moderately suited to pasture, hay, and woodland.

Unless the surface is protected, further erosion is a severe hazard in areas used for corn, soybeans, or small grain. It can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting, contour farming, terraces, and a crop rotation that is dominated by forage crops. Tilling when the soil is dry causes surface cloddiness. Tilling when it is wet causes surface compaction and crusting, resulting in excessive runoff and erosion. Hillside seeps are common. Because of these seeps, the soil dries slowly in spring. Tile drains help to overcome this limitation. Returning crop residue to the soil and regularly adding other organic material help to prevent compaction and crusting, improve tilth and fertility, and increase the rate of water intake.

Establishing pasture plants or hay helps to keep erosion within tolerable limits. Establishing a forage crop is difficult, however, on severely eroded slopes where the subsoil is exposed. Timely deferment of grazing helps to prevent overgrazing and thus also helps to prevent surface compaction, excessive runoff, and a greater susceptibility to erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control further erosion. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

In the areas used as woodland, seedling mortality and windthrow are management concerns because of the high content of clay in the soil. Seedling mortality rates can be reduced by planting species that are tolerant of excessive wetness. The hazard of windthrow can be reduced by harvesting methods that do not isolate the remaining trees or leave them widely spaced. For example, only high-value trees should be removed from a strip 50 feet wide along the west and south edges of the woodland. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Installing either subsurface tile drains near the foundations or interceptor drains upslope from the buildings helps to overcome the wetness. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The seasonal high water table and the very slow permeability are limitations if this soil is used as a site for septic tank absorption fields. Alternative sewage disposal systems, including mound systems, may be needed.

The land capability classification is IVe.

8D2—Hickory loam, 10 to 15 percent slopes, eroded. This strongly sloping, well drained soil is on side slopes along drainageways in the uplands. Individual areas are long and narrow and range from 5 to 90 acres in size.

Typically, the surface layer is pale brown, friable loam about 6 inches thick. It has been thinned by erosion. The subsoil extends to a depth of 60 inches or more. The upper part is yellowish brown, friable and firm clay loam; the next part is strong brown, mottled, firm clay loam; and the lower part is yellowish brown, mottled, friable loam. In some areas the surface layer is darker and thicker. In other areas it is clay loam or silty clay loam. In some places the slope is less than 10 percent. In other places the soil has more sand.

Included with this soil in mapping are small areas of the somewhat poorly drained Atlas and Radford soils and the moderately well drained Elco soils. Atlas and Elco soils have more clay in the subsoil than the Hickory soil. Also, they are higher on the landscape. Radford soils are on flood plains along narrow drainageways. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Hickory soil at a moderate rate. In cultivated areas surface runoff is rapid. Available water capacity is high. Organic matter content is moderately low. The surface layer tends to crust and puddle after hard rains. The shrink-swell potential and the potential for frost action are moderate.

Most areas are used for cultivated crops. Some areas are used for pasture, hay, or woodland. A few small areas are used as sites for dwellings and septic tank absorption fields. This soil is moderately suited to cultivated crops, pasture, and hay and to dwellings and septic tank absorption fields. It is well suited to woodland.

In areas used for corn, soybeans, or small grain, further erosion is a hazard. A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, contour farming, terraces, or a combination of

Figure 10.—Grassed ridge terraces reduce the length of slopes and thus help to control runoff and erosion on Hickory loam, 10 to 15 percent slopes, eroded.

these can help to keep soil losses within tolerable limits (fig. 10). Returning crop residue to the soil and regularly adding other organic material help to prevent crusting and improve tilth and fertility.

Establishing pasture plants or hay helps to keep erosion within tolerable limits. Timely deferment of grazing helps to prevent overgrazing and thus also helps to prevent surface compaction, excessive runoff, and a greater susceptibility to erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

In the areas used as woodland, plant competition is a management concern. It restricts the growth of desirable seedlings. The competition from undesirable vegetation in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings, the slope and the shrink-swell potential are limitations. Cutting and filling help to overcome the slope. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the moderate permeability and the slope are limitations. Increasing the size of the absorption field or adding more permeable fill material helps to overcome the moderate permeability. Installing the distribution lines on the contour helps to overcome the slope.

The land capability classification is IIIe.

8D3—Hickory clay loam, 10 to 15 percent slopes, severely eroded. This strongly sloping, well drained soil is on side slopes along drainageways in the uplands. In most areas, nearly all of the original surface layer has been removed by erosion and tillage has mixed the rest with the upper part of the subsoil. Individual areas are long and narrow and range from 4 to 40 acres in size.

Typically, the surface layer is mixed dark brown and dark yellowish brown, friable clay loam about 5 inches thick. The subsoil is mottled, firm clay loam about 56 inches thick. The upper part is dark yellowish brown, and the lower part is brown. The underlying material to a depth of 60 inches is brown, firm loam. In some places the surface layer is silty clay loam or loam. In other places the soil has more sand.

Included with this soil in mapping are small areas of the somewhat poorly drained Atlas and Radford soils. Atlas soils have more clay in the subsoil than the Hickory soil. Also, they are higher on the landscape. Radford soils are on flood plains along narrow drainageways. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Hickory soil at a moderate rate. In cultivated areas surface runoff is rapid. Available water capacity is high. Organic matter content is low. The surface layer is firm and sticky when wet and hard and cloddy when dry. It tends to crust and puddle after hard rains. This soil can be easily tilled only within a narrow range in moisture content. The shrink-swell potential and the potential for frost action are moderate.

Most areas are used for cultivated crops. Some areas are used for pasture, hay, or woodland. A few small areas are used as sites for dwellings and septic tank absorption fields. This soil is poorly suited to cultivated crops. It is moderately suited to pasture and hay and to dwellings and septic tank absorption fields. It is well suited to woodland.

Unless the surface is protected, further erosion is a severe hazard in areas used for soybeans, corn, or small grain. Erosion can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting, contour farming, terraces, and a crop rotation that is dominated by forage crops. Tilling when the soil is dry causes surface cloddiness. Tilling when the soil is wet causes surface compaction and crusting, resulting in excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material help to prevent compaction and crusting, improve tilth and fertility, and increase the rate of water intake.

Establishing pasture plants or hay helps to keep erosion within tolerable limits. Establishing a forage crop is difficult, however, on severely eroded slopes where the subsoil is exposed. Timely deferment of grazing helps to prevent overgrazing and thus also helps to prevent surface compaction, excessive runoff, and a greater susceptibility to erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control further erosion. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

In the areas used as woodland, plant competition is a management concern. It restricts the growth of desirable seedlings. The competition from undesirable vegetation in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings, the slope and the shrink-swell potential are limitations. Cutting and filling help to overcome the slope. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the moderate permeability and the slope are limitations. Increasing the size of the absorption field or adding more permeable fill material helps to overcome the moderate permeability. Installing the distribution lines on the contour helps to overcome the slope.

The land capability classification is IVe.

8F—Hickory loam, 15 to 30 percent slopes. This steep, well drained soil is on side slopes along drainageways in the uplands. Individual areas are long and narrow and range from 5 to 90 acres in size.

Typically, the surface layer is very dark grayish brown, friable loam about 3 inches thick. The subsurface layer is brown, friable loam about 6 inches thick. The subsoil to a depth of 60 inches or more is firm clay loam. The upper part is dark yellowish brown, the next part is dark yellowish brown and mottled, and the lower part is brown and mottled. In some areas the surface layer and subsoil have a higher content of sand and gravel. In other areas the slope is more than 30 percent or less than 15 percent. In some places the subsoil has free carbonates. In other places the surface layer is clay loam.

Included with this soil in mapping are small areas of the somewhat poorly drained Radford soils on flood plains along narrow drainageways. These included soils make up less than 8 percent of the unit.

Water and air move through the Hickory soil at a moderate rate. Surface runoff is rapid. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential and the potential for frost action are moderate.

Most areas are used as woodland. Some areas are used for cultivated crops, pasture, or hay. This soil is moderately suited to woodland. It is poorly suited to pasture and hay and to dwellings and septic tank absorption fields. It generally is unsuited to cultivated crops because of the slope.

In the areas used as woodland, the hazard of erosion and the equipment limitation are management concerns. They are caused by the slope. Plant competition also is a management concern. It restricts the growth of desirable seedlings. The competition from undesirable species in openings where timber has been harvested can be controlled by chemical or mechanical means. Laying out logging roads and skid trails on the contour and seeding bare logging areas to grass or to a grass-legume mixture help to control erosion. Skidding logs and trees uphill with a cable and winch helps to overcome the slope. Firebreaks should be the grass type. Machinery should be used only when the soil is firm enough to support the equipment. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

Establishing pasture plants or hay helps to control erosion. Overgrazing reduces forage yields and causes excessive runoff and erosion. Proper stocking rates and rotation grazing help to keep the pasture in good condition. A no-till method of pasture renovation or seeding helps to control erosion. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. The plants should not be grazed until they are sufficiently established.

If this soil is used as a site for dwellings, the slope and the shrink-swell potential are limitations. Cutting and filling help to overcome the slope. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The moderate permeability and the slope are limitations if this soil is used as a site for septic tank absorption fields. Increasing the size of the absorption field or adding more permeable fill material helps to overcome the moderate permeability. Installing the distribution lines on the contour or cutting and filling help to overcome the slope.

The land capability classification is VIe.

17—Keomah silt loam. This nearly level, somewhat poorly drained soil is on broad ridges in the uplands. Individual areas are irregular in shape and range from 3 to 175 acres in size.

Typically, the surface layer is dark grayish brown and grayish brown, friable silt loam about 9 inches thick. The subsurface layer is grayish brown, mottled, friable silt loam about 4 inches thick. The subsoil is about 45 inches thick. It is mottled. In sequence downward, it is brown, friable silty clay loam; grayish brown, firm silty clay; grayish brown, firm silty clay loam; and light brownish gray, friable silty clay loam. The underlying material to a depth of 60 inches or more is light brownish gray, mottled, friable silt loam. In some areas the surface layer is darker. In other areas the subsoil has less clay. In a few areas the seasonal high water table is within a depth of 2 feet. In places it is below a depth of 4 feet.

Included with this soil in mapping are small areas of the moderately well drained Rozetta soils. These soils contain less clay in the subsoil than the Keomah soil. Also, they are in the more sloping areas. They make up 2 to 5 percent of the unit.

Water and air move through the Keomah soil at a slow rate. In cultivated areas surface runoff is slow. The seasonal high water table is at a depth of 2 to 4 feet during winter and spring. Available water capacity is high. Organic content is moderately low. The surface layer tends to crust and puddle after hard rains. The shrink-swell potential and the potential for frost action are high.

Most areas are used for cultivated crops. Some areas are used for pasture, hay, or woodland. A few small areas are used as sites for dwellings and septic tank absorption fields. This soil is well suited to cultivated crops, pasture, and hay. It is moderately suited to woodland. It is poorly suited to dwellings and septic tank absorption fields.

Corn, soybeans, and small grain can be grown in most areas because a drainage system has been installed. Measures that maintain the drainage system are needed. Additional drainage measures may be needed. Subsurface tile drains are suitable if outlets are available. Keeping tillage to a minimum and leaving crop residue on the surface after planting help to maintain tilth and minimize crusting.

Suitable forage and hay plants grow well on this soil. Canarygrass and alsike clover are suitable. Overgrazing or grazing when the soil is too wet reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

In the areas used as woodland, plant competition is a management concern. It restricts the growth of desirable seedlings. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Installing subsurface tile drains near the foundations helps to overcome the wetness. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The seasonal high water table and the slow permeability are limitations if this soil is used as a site for septic tank absorption fields. Alternative disposal systems, including mound systems, may be needed.

The land capability classification is IIw.

27G—Miami loam, 30 to 60 percent slopes. This very steep, well drained soil is on side slopes along drainageways in the uplands. Individual areas are long and narrow and range from 3 to 40 acres in size.

Typically, the surface layer is very dark grayish brown, friable loam about 4 inches thick. The subsurface layer is brown, friable loam about 4 inches thick. The subsoil is about 32 inches thick. It is friable. The upper part is yellowish brown loam and clay loam, and the lower part is light yellowish brown, mottled loam. The underlying material to a depth of 60 inches or more is light yellowish brown, mottled, firm loam. In places the slope is less than 30 percent.

Included with this soil in mapping are small areas of the somewhat poorly drained Radford soils. These soils are on flood plains and along narrow drainageways. They make up 5 to 8 percent of the unit.

Water and air move through the Miami soil at a moderately slow rate. Surface runoff is rapid. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential and the potential for frost action are moderate.

Most areas are used as woodland. Some areas are used as pasture. This soil is well suited to woodland. It is generally unsuited to cultivated crops, pasture, and hay and to dwellings and septic tank absorption fields because of the slope.

In the areas used as woodland, the hazard of erosion and the equipment limitation are management concerns. They are caused by the slope. Plant competition also is a management concern. It restricts the growth of desirable seedlings. The competition from undesirable species in openings where timber has been harvested can be controlled by chemical or mechanical means. Laying out logging roads and skid trails on the contour and seeding bare logging areas to grass or to a grass-legume mixture help to control erosion. Skidding logs and trees uphill with a cable and winch helps to overcome the slope. Firebreaks should be the grass type. Machinery should be used only when the soil is firm enough to support the equipment. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

The land capability classification is VIIe.

36B—Tama silt loam, 1 to 5 percent slopes. This gently sloping, moderately well drained soil is on convex ridgetops, knolls, and side slopes in the uplands. Individual areas are oval or irregular in shape and range from 5 to 400 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 9 inches thick. The subsurface layer is very dark grayish brown, friable silty clay loam about 5 inches thick. The subsoil is about 38 inches thick. The upper part is brown, friable silty clay loam. The next part is brown, mottled, friable silty clay loam. The lower part is yellowish brown, mottled, friable silt loam. The underlying material to a depth of 60 inches or more also is yellowish brown, mottled, friable silt loam. In some areas the surface layer is lighter in color and is thinner. In other areas, the subsoil is thinner and free carbonates are within a depth of 40 inches. In places the seasonal high water table is within a depth of 4 feet. In a few areas the lower part of the subsoil has more clay or more sand.

Included with this soil in mapping are small areas of the very poorly drained Denny soils, the poorly drained Sable soils, and the somewhat poorly drained Ipava soils. Denny soils are in shallow depressions below the Tama soil. Ipava soils are on the less sloping parts of the landscape. Sable soils are in low areas below the Tama soil. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Tama soil at a moderate rate. In cultivated areas surface runoff is medium. The seasonal high water table is 4 to 6 feet below the surface during winter and spring. Available water capacity is very high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. A few small areas are used as sites for dwellings and septic tank absorption fields. This soil is well suited to cultivated crops. It is moderately suited to dwellings and septic tank absorption fields.

In areas used for corn, soybeans, or small grain, erosion is a hazard. It can be controlled by a conservation tillage system that leaves crop residue on the surface after planting, by contour farming, or by terraces. Returning crop residue to the soil and adding other organic material help to maintain tilth.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. The seasonal high water table also is a limitation on sites for dwellings with basements. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface tile drains near the foundations helps to lower the water table.

The seasonal high water table is a limitation if this soil is used as a site for septic tank absorption fields. Subsurface tile drains lower the water table.

The land capability classification is IIe.

43—Ipava silt loam. This nearly level, somewhat poorly drained soil is on broad ridges in the uplands. Individual areas are irregular in shape and range from 5 to more than 1,000 acres in size.

Typically, the surface layer is black, friable silt loam about 9 inches thick. The subsurface layer is very dark gray, friable silt loam about 9 inches thick. The subsoil is about 40 inches thick. It is mottled and friable. In sequence downward, it is brown silty clay loam, grayish brown silty clay loam, light brownish gray silty clay loam, and light brownish gray silt loam. The underlying material to a depth of 62 inches or more is light brownish gray, mottled, friable silt loam. In some areas, the surface layer is thinner and the subsurface layer is lighter in color. In other areas the subsoil has less clay. In some places depth to the seasonal high water table is more than 3 feet. In other places the subsoil contains more sand.

Included with this soil in mapping are small areas of the very poorly drained Denny soils, the poorly drained Sable and Virden soils, and the moderately well drained Tama soils. Denny soils are in shallow depressions below the Ipava soil. Sable and Virden soils are in low areas below the Ipava soil. Tama soils are on ridges above the Ipava soil. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Ipava soil at a moderately slow rate. In cultivated areas surface runoff is slow. The seasonal high water table is 1 to 3 feet below the surface during winter and spring. Available water capacity and organic matter content are high. The shrink-swell potential and the potential for frost action also are high.

Most areas are used for cultivated crops. A few areas are used as sites for dwellings and septic tank absorption fields. This soil is well suited to cultivated crops. It is poorly suited to dwellings and septic tank absorption fields.

No major limitations affect the use of this soil for corn, soybeans, or small grain. The seasonal high water table can delay planting in some years. Subsurface tile drains function satisfactorily if suitable outlets are available. A conservation tillage system that leaves crop residue on the surface after planting helps to maintain tilth and fertility.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Installing subsurface tile drains near the foundations helps to overcome the wetness. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The seasonal high water table and the moderately slow permeability are limitations if this soil is used as a site for septic tank absorption fields. Alternative sewage disposal systems, including mound systems, may be needed.

The land capability classification is I.

45—Denny silt loam. This nearly level, very poorly drained soil is in shallow depressions in the uplands. It is ponded for brief periods during winter and spring (fig. 11). Individual areas are oval or oblong and range from 3 to 160 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 9 inches thick. The subsurface layer is gray and light gray, mottled, friable silt loam about 14 inches thick. The subsoil is mottled, friable silty clay loam about 29 inches thick. The upper part is grayish brown, and the lower part is light brownish gray. The underlying material to a depth of 60 inches or more is light brownish gray, mottled, friable silt loam. In a few areas the subsoil contains less clay. In some areas the dark surface soil is thicker. In other areas the surface soil is lighter in color and is thinner.

Included with this soil in mapping are small areas of the somewhat poorly drained Ipava soils and the poorly drained Edinburg soils. Ipava soils are higher on the landscape than the Denny soil. Edinburg soils are in landscape positions similar to those of the Denny soil. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Denny soil at a slow rate. In cultivated areas surface runoff is slow or ponded. The seasonal high water table is 0.5 foot above to 2.0 feet below the surface during winter and spring. Available water capacity is high. Organic matter content is moderate. The surface layer tends to crust

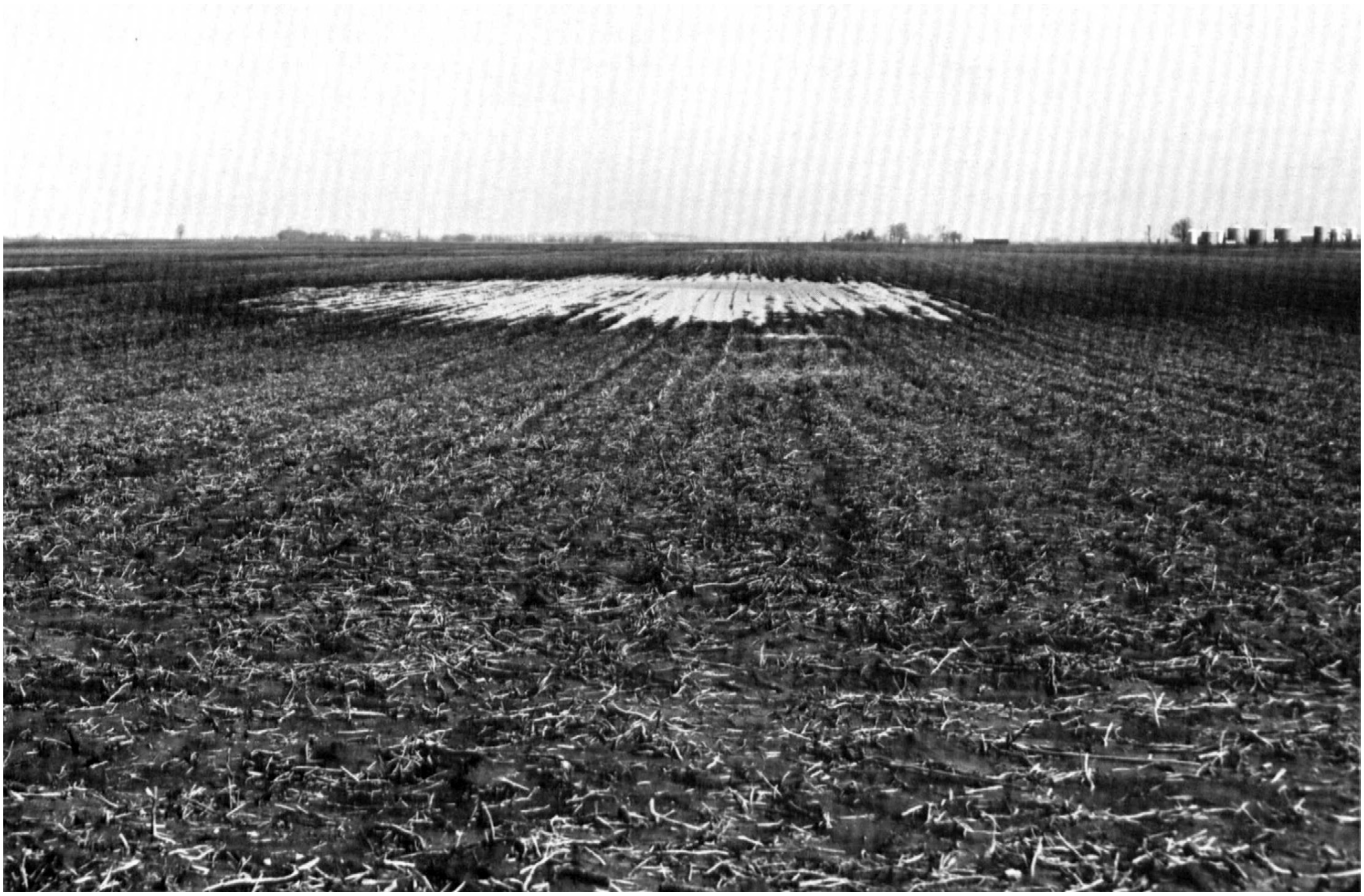


Figure 11.—Ponding in an area of Denny silt loam.

and puddle after hard rains. The shrink-swell potential and the potential for frost action are high.

Most areas are used for cultivated crops. A few small areas are used as sites for dwellings and septic tank absorption fields. This soil is well suited to cultivated crops. It is poorly suited to dwellings and septic tank absorption fields.

Corn, soybeans, and small grain can be grown in most areas because a drainage system has been installed. Measures that maintain or improve the drainage system are needed. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. Land grading helps to control ponding. Tilling when the soil is wet causes surface compaction, cloddiness, and crusting. Applying a conservation tillage system that leaves crop residue on the surface after planting and regularly adding other organic material help to prevent surface compaction and crusting, improve tilth and fertility, and increase the rate of water intake.

The seasonal high water table and the shrink-swell potential are limitations if this soil is used as a site for dwellings. Reinforcing the footings and foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface drains near the footings helps to lower the water table. Elevating the floor of dwellings without basements above the surrounding ground level, grading, and diverting surface water also help to overcome the wetness.

The seasonal high water table and the slow permeability are limitations if this soil is used as a site for septic tank absorption fields. Alternative sewage disposal systems, including mound systems, may be needed.

The land capability classification is IIIw.

46—Herrick silt loam. This nearly level, somewhat poorly drained soil is on broad, low ridges in the uplands. Individual areas are irregular in shape and range from 50 to more than 1,000 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 11 inches thick. The subsurface layer also is very dark grayish brown, friable silt loam. It is about 4 inches thick. The subsoil is mottled silty clay loam about 43 inches thick. The upper part is dark grayish brown and brown and is friable and firm, and the lower part is yellowish brown and is very firm and firm. The underlying material to a depth of 60 inches or more is yellowish brown and light brownish gray, mottled, friable silt loam. In some areas the subsoil has less clay. In other areas the seasonal high water table is at a depth of more than 3 feet. In some places the surface layer is thinner. In other places the upper part of the subsoil is dominantly gray.

Included with this soil in mapping are small areas of the moderately well drained Harrison soils and the poorly drained Cowden and Piasa soils. Harrison soils are on the more sloping parts of the landscape above the Herrick soil. Cowden and Piasa soils are in low areas below the Herrick soil. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Herrick soil at a moderately slow rate. In cultivated areas surface runoff is slow. The seasonal high water table is 1 to 3 feet below the surface during winter and spring. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential and the potential for frost action are high.

Most areas are used for cultivated crops. A few areas are used as sites for dwellings and septic tank absorption fields. This soil is well suited to cultivated crops. It is poorly suited to dwellings and septic tank absorption fields.

Corn, soybeans, and small grain can be grown in most areas because a drainage system has been installed. Measures that maintain or improve the drainage system are needed. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. Applying a conservation tillage system that leaves crop residue on the surface after planting and regularly adding other organic material help to maintain tilth and fertility and increase the rate of water intake.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Installing subsurface tile drains near the foundations helps to overcome the wetness. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The seasonal high water table and the moderately slow permeability are limitations if this soil is used as a site for septic tank absorption fields. Alternative sewage disposal systems, including mound systems, may be needed.

The land capability classification is IIw.

48—Ebbert silt loam. This nearly level, very poorly drained soil is in depressions in the uplands. It is ponded for brief periods during winter and spring. Individual areas are oval and range from 3 to 20 acres in size.

Typically, the surface layer is very dark gray, friable silt loam about 11 inches thick. The subsurface layer is dark gray, friable silt loam about 5 inches thick. The subsoil is mottled, friable and firm silty clay loam about 36 inches thick. It is gray in the upper part and light gray in the lower part. The underlying material to a depth of 60 inches or more is light gray, mottled, firm silt loam. In some areas the surface soil is thinner. In other areas the subsoil contains more clay.

Included with this soil in mapping are small areas of the somewhat poorly drained Herrick soils. These soils are higher on the landscape than the Ebbert soil. They make up 5 to 8 percent of the unit.

Water and air move through the Ebbert soil at a slow rate. In cultivated areas surface runoff is slow or ponded. The seasonal high water table is 0.5 foot above to 2.0 feet below the surface during winter and spring. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. A few small areas are used as sites for dwellings and septic tank absorption fields. This soil is well suited to cultivated crops. It is poorly suited to dwellings and septic tank absorption fields.

Corn, soybeans, and small grain can be grown in most areas because a drainage system has been installed. Measures that maintain or improve the drainage system are needed. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. Land grading helps to control ponding. Tilling when the soil is wet causes surface compaction, cloddiness, and crusting. Applying a conservation tillage system that leaves crop residue on the surface after planting and regularly adding other organic material help to prevent surface compaction and crusting, improve tilth and fertility, and increase the rate of water intake.

The seasonal high water table and the shrink-swell potential are limitations if this soil is used as a site for dwellings. Reinforcing the footings and foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface drains near the foundations helps to lower the water table. Elevating the floor of dwellings without basements above the surrounding ground level, grading, and diverting surface water also help to overcome the wetness.

The seasonal high water table and the slow permeability are limitations if this soil is used as a site for septic tank absorption fields. Alternative sewage disposal systems, including mound systems, may be needed.

The land capability classification is IIIw.

50—Virden silty clay loam. This nearly level, poorly drained soil is in broad, low areas in the uplands. It is ponded for brief periods during winter and spring. Individual areas are oval or irregular in shape and range from 5 to more than 1,000 acres in size.

Typically, the surface layer is very dark gray, firm silty clay loam about 9 inches thick. The subsurface layer also is very dark gray, firm silty clay loam. It is about 3 inches thick. The subsoil is mottled, firm silty clay loam about 40 inches thick. The upper part is very dark gray, the next part is dark grayish brown, and the lower part is olive gray. The underlying material to a depth of 60 inches or more is light olive gray, mottled, firm silt loam. In some areas the surface layer is silt loam. In other areas the subsoil has less clay. In some places the surface layer is thicker. In other places the upper part of the subsoil is less gray.

Included with this soil in mapping are small areas of the moderately well drained Harrison and Tama soils. These soils are in the more sloping areas. Also included are areas of the somewhat poorly drained Ipava soils and the poorly drained Piasa soils. Ipava soils are slightly higher on the landscape than the Virden soil. Piasa soils have a high content of sodium in the subsoil. They are in shallow depressions below the Virden soil. Included soils make up 10 to 15 percent of the unit.

Water and air move through the Virden soil at a moderately slow rate. In cultivated areas surface runoff is slow or ponded. The seasonal high water table is 0.5 foot above to 2.0 feet below the surface during winter and spring. Available water capacity is high. Organic matter content also is high. The surface layer is firm and sticky when wet and hard and cloddy when dry. The shrink-swell potential and the potential for frost action are high.

Most areas are used for cultivated crops. A few small areas are used as sites for dwellings and septic tank absorption fields. This soil is well suited to cultivated crops. It is poorly suited to dwellings and septic tank absorption fields.

Corn, soybeans, and small grain can be grown in most areas because a drainage system has been installed. Measures that maintain or improve the drainage system are needed. Surface drains and subsurface tile function satisfactorily if suitable outlets are available. Land grading helps to control ponding. Tilling when the soil is wet causes surface compaction, cloddiness, and crusting. Applying a conservation tillage system that leaves crop residue on the surface after planting and adding other organic material help to prevent surface compaction, cloddiness, and crusting, improve tilth, and increase the rate of water intake.

The seasonal high water table and the shrink-swell potential are limitations if this soil is used as a site for dwellings. Reinforcing the footings and foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface drains around the footings helps to lower the water table. Elevating the floor of dwellings without basements above the surrounding ground level, grading, and diverting surface water also help to overcome the wetness.

The seasonal high water table and the moderately slow permeability are limitations if this soil is used as a site for septic tank absorption fields. Alternative sewage disposal systems, including mound systems, may be needed.

The land capability classification is IIw.

67—Harpster silty clay loam. This nearly level, poorly drained soil is in shallow depressions in the uplands. It is ponded for brief periods during winter and spring. Individual areas are irregular in shape and range from 3 to 20 acres in size.

Typically, the surface layer is black, calcareous, friable silty clay loam about 8 inches thick. The subsurface layer is very dark gray, calcareous, friable silty clay loam about 9 inches thick. The subsoil is calcareous, mottled, friable silty clay loam about 40 inches thick. The upper part is olive gray, and the lower part is gray. The underlying material to a depth of 60 inches or more is gray, mottled, calcareous, friable silt loam. In some areas the surface layer does not have carbonates.

Included with this soil in mapping are small areas of the poorly drained Sable soils. These soils are not calcareous within a depth of 40 inches. They are slightly higher on the landscape than the Harpster soil. They make up 1 to 8 percent of the unit.

Water and air move through the Harpster soil at a moderate rate. In cultivated areas surface runoff is slow or ponded. The seasonal high water table is 0.5 foot above to 2.0 feet below the surface during winter and spring. Available water capacity is high. Organic matter content also is high. The surface layer is firm and sticky when wet and hard and cloddy when dry. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. A few small areas are used as sites for dwellings and septic tank absorption fields. This soil is well suited to cultivated crops. It is poorly suited to dwellings and septic tank absorption fields.

Corn, soybeans, and small grain can be grown in most areas because a drainage system has been installed. Measures that maintain or improve the drainage system are needed. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. Land grading helps to control ponding. The high content of lime decreases the availability of nutrients. As a result, applications of some nutrients may be needed. Tilling when the soil is wet causes surface compaction, cloddiness, and crusting. Applying a conservation tillage system that leaves crop residue on the surface after planting and regularly adding other organic material help to prevent surface compaction and crusting, improve tilth, and increase the rate of water intake.

The seasonal high water table and the shrink-swell potential are limitations if this soil is used as a site for dwellings. Reinforcing the footings and foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface drains near the foundations helps to lower the water table. Elevating the floor of dwellings without basements above the surrounding ground level, grading, and diverting surface water also help to overcome the wetness.

The seasonal high water table and the moderate permeability are limitations if this soil is used as a site for septic tank absorption fields. Alternative sewage disposal systems, including mound systems, may be needed.

The land capability classification is IIw.

68—Sable silty clay loam. This nearly level, poorly drained soil is on broad flats in the uplands. It is ponded for brief periods during winter and spring. Individual areas are irregular in shape and range from 5 to more than 1,000 acres in size.

Typically, the surface layer and subsurface layer are very dark gray, firm silty clay loam. The combined thickness of these layers is about 20 inches. The subsurface layer is mottled. The subsoil is mottled, firm silty clay loam about 24 inches thick. The upper part is grayish brown, and the lower part is olive gray. The underlying material to a depth of 60 inches or more is light olive gray, mottled, calcareous, friable silt loam. In some places free carbonates are within a depth of 40 inches. In other places the dark surface soil is more than 24 inches thick. In a few areas the subsoil has more clay. In some areas the lower part of the subsoil has more sand.

Included with this soil in mapping are small areas of the somewhat poorly drained Ipava soils and the moderately well drained Tama soils. Ipava soils are slightly higher on the landscape than the Sable soil. Tama soils are in the more sloping areas. Included soils make up 10 to 15 percent of the unit.

Water and air move through the Sable soil at a moderate rate. In cultivated areas surface runoff is slow or ponded. The seasonal high water table is 0.5 foot above to 2.0 feet below the surface during winter and spring. Available water capacity is very high. Organic matter content is high. The surface layer is firm and sticky when wet and hard and cloddy when dry. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. A few small areas are used as sites for dwellings and septic tank absorption fields. This soil is well suited to cultivated crops. It is poorly suited to dwellings and septic tank absorption fields.

Corn, soybeans, and small grain can be grown in most areas because a drainage system has been installed. Measures that maintain or improve the drainage system are needed. Surface drains and subsurface tile function satisfactorily if suitable outlets are available. Land grading helps to control ponding. Tilling when the soil is wet causes surface compaction, cloddiness, and crusting. Applying a conservation tillage system that leaves crop residue on the surface after planting and adding other organic material help to prevent surface compaction and crusting, improve tilth, and increase the rate of water intake.

The seasonal high water table and the shrink-swell potential are limitations if this soil is used as a site for dwellings. Reinforcing the footings and foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface drains near the footings helps to lower the water table. Elevating the floor of dwellings without basements above the surrounding ground level, grading, and diverting surface water also help to overcome the wetness.

The seasonal high water table and the moderate permeability are limitations if this soil is used as a site for septic tank absorption fields. Alternative sewage disposal systems, including mound systems, may be needed.

The land capability classification is IIw.

112—Cowden silt loam. This nearly level, poorly drained soil is on broad flats in the uplands. Individual areas are irregular in shape and range from 5 to 40 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 8 inches thick. The subsurface layer is dark grayish brown and light brownish gray, mottled, friable silt loam about 10 inches thick. The subsoil is about 33 inches thick. It is mottled. The upper part is gray, firm silty clay; the next part is olive gray, firm silty clay; and the lower part is gray, friable silty clay loam. The underlying material to a depth of 60 inches or more is olive gray, mottled, friable silt loam. In some areas the dark surface layer is more than 10 inches thick. In other areas the surface layer is lighter in color. In some places the subsoil has less clay. In other places the lower part of the subsoil has more sand.

Included with this soil in mapping are small areas of the somewhat poorly drained Oconee soils and the poorly drained Piasa soils. Oconee soils are on low ridges above the Cowden soil. Piasa soils have a high content of sodium in the subsoil. They are in shallow depressions below the Cowden soil. Included soils make up less than 5 percent of the unit.

Water and air move through the Cowden soil at a slow rate. In cultivated areas surface runoff is slow or ponded. The seasonal high water table is 0.5 foot above to 2.0 feet below the surface during winter and spring. Available water capacity is high. Organic matter content is moderate. The surface layer tends to crust and puddle after hard rains. The shrink-swell potential and the potential for frost action are high.

Most areas are used for cultivated crops. A few small areas are used as sites for dwellings and septic tank absorption fields. This soil is well suited to cultivated crops. It is poorly suited to dwellings and septic tank absorption fields.

Corn, soybeans, and small grain can be grown in most areas because a drainage system has been installed. Measures that maintain or improve the drainage system are needed. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. Land grading helps to control ponding. Tilling when the soil is wet causes surface compaction, cloddiness, and crusting. Applying a conservation tillage system that leaves crop residue on the surface after planting and adding other organic material help to prevent surface compaction and crusting, improve tilth, and increase the rate of water intake.

The seasonal high water table and the shrink-swell potential are limitations if this soil is used as a site for dwellings. Reinforcing the footings and foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface drains near the footings helps to lower the water table. Elevating the floor of dwellings without basements above the surrounding ground level, grading, and diverting surface water also help to overcome the wetness.

The seasonal high water table and the slow permeability are limitations if this soil is used as a site for septic tank absorption fields. Alternative sewage disposal systems, including mound systems, may be needed.

The land capability classification is IIw.

113A—Oconee silt loam, 0 to 2 percent slopes. This nearly level, somewhat poorly drained soil is on low ridges in the uplands. Individual areas are oblong or irregular in shape and range from 3 to 120 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 7 inches thick. The subsurface layer is grayish brown, friable silt loam about 8 inches thick. It is mottled in the lower part. The subsoil extends to a depth of 60 inches or more. It is mottled. The upper part is brown and grayish brown, firm silty clay loam and silty clay; the next part is grayish brown and light brownish gray, firm silty clay loam; and the lower part is light brownish gray, friable silt loam. In some areas the surface layer is lighter in color. In other areas the subsoil has less clay. In places the dark surface layer is thicker.

Included with this soil in mapping, in the southern part of the county, are small, closely intermingled areas of the somewhat poorly drained Darmstadt soils. These soils have a high content of sodium in the subsoil. Also included are small areas of the poorly drained Cowden soils on the lower parts of the landscape. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Oconee soil at a slow rate. In cultivated areas surface runoff is slow. The seasonal high water table is 1 to 3 feet below the surface during winter and spring. Available water capacity is high. Organic matter content is moderate. The surface layer tends to crust and puddle after hard rains. The shrink-swell potential and the potential for frost action are high.

Most areas are used for cultivated crops. A few small areas are used as sites for dwellings and septic tank absorption fields. This soil is well suited to cultivated crops. It is poorly suited to dwellings and septic tank absorption fields.

Corn, soybeans, and small grain can be grown in most areas because a drainage system has been installed. Measures that maintain or improve the drainage system are needed. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. Land grading helps to control ponding. Tilling when the soil is wet causes surface compaction, cloddiness, and crusting. Applying a conservation tillage system that leaves crop residue on the surface after planting and adding other organic material help to prevent surface compaction and crusting, improve tilth, and increase the rate of water intake.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Installing subsurface tile drains near the foundations helps to overcome the wetness. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The seasonal high water table and the slow permeability are limitations if this soil is used as a site for septic tank absorption fields. Alternative sewage disposal systems, including mound systems, may be needed.

The land capability classification is IIw.

113B—Oconee silt loam, 2 to 5 percent slopes. This gently sloping, somewhat poorly drained soil is on convex ridgetops and side slopes in the uplands. Individual areas are oval or irregular in shape and range from 5 to 250 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 8 inches thick. The subsurface layer is dark gray, friable silt loam about 3 inches thick. The subsoil is brown, mottled, firm silty clay loam about 38 inches thick. The underlying material to a depth of 60 inches or more is light brownish gray and pale brown, mottled, firm silt loam. In some areas the subsoil has less clay. In eroded areas the surface layer is thinner and has a higher content of clay.

Included with this soil in mapping, in the southern part of the county, are small, closely intermingled areas of the somewhat poorly drained Darmstadt soils. These soils are in the less sloping areas. They have a high content of sodium in the subsoil. Also included are small areas of the moderately well drained Harrison soils in landscape positions similar to those of the Oconee soil. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Oconee soil at a slow rate. In cultivated areas surface runoff is medium. The seasonal high water table is 1 to 3 feet below the surface during winter and spring. Available water capacity is high. Organic matter content is moderate. The surface layer tends to crust and puddle after hard rains. The shrink-swell potential and the potential for frost action are high.

Most areas are used for cultivated crops. A few small areas are used as sites for dwellings and septic tank absorption fields. This soil is well suited to cultivated crops. It is poorly suited to dwellings and septic tank absorption fields.

In areas used for corn, soybeans, or small grain, erosion is a hazard (fig. 12). Also, the wetness can delay planting in some years. It can be reduced by subsurface tile drains or surface ditches. Erosion can be controlled by a conservation tillage system that leaves crop residue on the surface after planting, by contour farming, or by terraces. Returning crop residue to the soil and regularly adding other organic material help to prevent crusting, improve tilth and fertility, and increase the rate of water intake.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Installing subsurface tile drains near the foundations helps to overcome the wetness. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The seasonal high water table and the slow permeability are limitations if this soil is used as a site for septic tank absorption fields. Alternative sewage disposal systems, including mound systems, may be needed.

The land capability classification is IIe.

119C2—Elco silt loam, 5 to 10 percent slopes, eroded. This moderately sloping, moderately well drained soil is on side slopes along drainageways in the uplands. Individual areas are long and narrow or irregular in shape and range from 3 to 75 acres in size.

Typically, the surface layer is mixed dark grayish brown and dark yellowish brown, friable silt loam about 6 inches thick. It has been thinned by erosion. The subsoil extends to a depth of 60 inches or more. It is mottled and firm. The upper part is dark yellowish brown silty clay loam, and the lower part is gray clay loam. In some areas the subsoil has more sand throughout or in the lower part. In the more eroded areas, the surface layer commonly is silty clay loam.

Included with this soil in mapping are small areas of the somewhat poorly drained Atlas soils, the well drained Hickory soils, and the moderately well drained Rozetta soils. Atlas soils are in landscape positions similar to those of the Elco soil. Hickory soils are downslope from the Elco soil. Rozetta soils have less sand in the subsoil than the Elco soil. Also, they are higher on the landscape. Included soils make up 3 to 10 percent of the unit.

Water and air move through the upper part of the Elco soil at a moderate rate and through the lower part

Figure 12.—A gully in an area of Oconee silt loam, 2 to 5 percent slopes.

at a slow rate. In cultivated areas surface runoff is medium. The seasonal high water table is perched at a depth of 2.5 to 4.5 feet during winter and spring. Available water capacity is high. Organic matter content is moderately low. The surface layer tends to crust and puddle after hard rains. This soil is seepy in many spots. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. Some areas are used for pasture, hay, or woodland. A few small areas are used as sites for dwellings and septic tank absorption fields. This soil is moderately suited to cultivated crops, woodland, and dwellings. It is well suited to pasture and hay. It is poorly suited to septic tank absorption fields.

In areas used for corn, soybeans, or small grain, further erosion is a hazard. A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, contour farming, terraces, or a combination of these can help to keep soil losses within tolerable limits. Hillside seeps are common. Because of these seeps, the soil dries slowly in the spring. Tile drains help to overcome this limitation. Returning crop residue to the soil and regularly adding other organic material help to prevent crusting and improve tilth and fertility.

Establishing pasture plants or hay helps to control erosion. Timely deferment of grazing helps to prevent overgrazing and thus also helps to prevent surface compaction, excessive runoff, and a greater susceptibility to erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

In the areas used as woodland, plant competition is a management concern. It restricts the growth of desirable seedlings. The competition from undesirable vegetation in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. The seasonal high water table is an additional limitation on sites for dwellings with basements. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling. Installing either subsurface tile drains near the foundations or interceptor drains upslope from the buildings helps to lower the water table on sites for dwellings with basements.

The seasonal high water table and the moderately slow permeability are limitations if this soil is used as a site for septic tank absorption fields. Alternative sewage disposal systems, including mound systems, may be needed.

The land capability classification is IIIe.

127B—Harrison silt loam, 2 to 5 percent slopes. This gently sloping, moderately well drained soil is on convex ridgetops, knolls, and side slopes in the uplands. Individual areas are oval or irregular in shape and range from 3 to 400 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 10 inches thick. The subsoil extends to a depth of 60 inches or more. In sequence downward, it is very dark brown and brown, mottled, friable silt loam; brown, mottled, firm silty clay loam; yellowish brown, mottled, firm silt loam; and grayish brown, mottled, firm silty clay loam and clay loam. In some areas the soil formed entirely in loess. In other areas the lower part of the subsoil has more sand. In some places the surface layer is thinner or lighter in color. In other places the water table is more than 6 feet below the surface.

Included with this soil in mapping are small areas of the somewhat poorly drained Herrick and Oconee soils and the poorly drained Virden soils. Herrick soils are on the less sloping parts of the landscape. Oconee soils are in landscape positions similar to those of the Harrison soil. Virden soils are in low areas below the Harrison soil. Included soils make up 8 to 12 percent of the unit.

Water and air move through the subsoil of the Harrison soil at a moderate rate and through the underlying material at a slow rate. In cultivated areas surface runoff is medium. The seasonal high water table is perched at a depth of 3 to 6 feet during winter and spring. Available water capacity is very high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops (fig. 13). A few areas are used as sites for dwellings and septic tank absorption fields. This soil is well suited to cultivated crops. It is moderately suited to dwellings and septic tank absorption fields.

In areas used for corn, soybeans, or small grain, erosion is a hazard. It can be controlled by a conservation tillage system that leaves crop residue on the surface after planting, by contour farming, or by terraces. Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and fertility.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. The seasonal high water table is an additional limitation on sites for dwellings with basements. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Figure 13.—Soybeans drilled into wheat stubble in an area of Harrison silt loam, 2 to 5 percent slopes. Coatsburg silt loam, 5 to 10 percent slopes, eroded, is on side slopes along the grassed waterway.

Installing subsurface tile drains near the foundations helps to lower the water table.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table is a limitation. Subsurface tile drains lower the water table.

The land capability classification is IIe.

128B—Douglas silt loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on convex ridgetops, knolls, and side slopes in the uplands. Individual areas are oval or irregular in shape and range from 5 to 100 acres in size.

Typically, the surface layer and subsurface layer are very dark grayish brown silt loam. The combined thickness of these layers is about 13 inches. The subsoil extends to a depth of 60 inches or more. The upper part is dark yellowish brown, friable silty clay loam; the next part is dark yellowish brown, mottled, friable silt loam; and the lower part is brown and dark brown, mottled, friable loam. In some areas the surface layer is lighter in color. In severely eroded areas it is silty clay loam. In places the water table is within a depth of 6 feet.

Included with this soil in mapping are small areas of the somewhat poorly drained Oconee soils. These soils are on ridges below the Douglas soil. They make up 5 to 10 percent of the unit.

Water and air move through the Douglas soil at a moderate rate. In cultivated areas surface runoff is medium. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. Some areas are used for pasture and hay. A few small areas are used as sites for dwellings and septic tank absorption fields. This soil is well suited to cultivated crops, pasture, hay, and septic tank absorption fields. It is moderately suited to dwellings.

In areas used for corn, soybeans, or small grain, erosion is a hazard. It can be controlled by a conservation tillage system that leaves crop residue on the surface after planting, by contour farming, or by terraces. Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and fertility.

Suitable forage and hay plants grow well on this soil. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIe.

128C2—Douglas silt loam, 5 to 10 percent slopes, eroded. This moderately sloping, well drained soil is on convex ridgetops, knolls, and side slopes in the uplands. Individual areas are oval or irregular in shape and range from 3 to 100 acres in size.

Typically, the surface layer is mixed very dark grayish brown and dark yellowish brown, friable silt loam about 8 inches thick. It has been thinned by erosion. The subsoil extends to a depth of 60 inches or more. It is friable. The upper part is dark yellowish brown silty clay loam, the next part is dark yellowish brown silt loam, and the lower part is brown clay loam. In some areas the soil is less sloping. In a few areas the upper part of the subsoil has more sand.

Included with this soil in mapping are small areas of the somewhat poorly drained Oconee soils. These soils are on foot slopes below the Douglas soil. They make up 5 to 10 percent of the unit.

Water and air move through the Douglas soil at a moderate rate. In cultivated areas surface runoff is medium. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. Some areas are used for pasture and hay. A few small areas are used as sites for dwellings and septic tank absorption fields. This soil is well suited to cultivated crops, pasture, hay, and septic tank absorption fields. It is moderately suited to dwellings.

In areas used for corn, soybeans, or small grain, further erosion is a hazard. A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, contour farming, terraces, or a combination of these can help to keep soil losses within tolerable limits (fig. 14). Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and fertility.

Establishing pasture plants or hay helps to keep erosion within tolerable limits. Timely deferment of grazing helps to prevent overgrazing and thus also helps to prevent surface compaction, excessive runoff, and a greater susceptibility to erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIIe.

131C2—Alvin fine sandy loam, 4 to 10 percent slopes, eroded. This moderately sloping, well drained soil is on dunelike ridgetops and side slopes in the uplands and on stream terraces. Individual areas are long and narrow or irregular in shape and range from 3 to 40 acres in size.

Typically, the surface layer is mixed brown and yellowish brown, friable fine sandy loam about 7 inches thick. It has been thinned by erosion. The subsoil extends to a depth of 60 inches or more. It is yellowish brown. The upper part is friable sandy clay loam, the next part is very friable fine sandy loam, and the lower part is very friable fine sand that has layers of loamy fine sand. In some places the soil contains less clay, and in other places it contains less sand.

Included with this soil in mapping are small areas of the well drained Camden soils, the moderately well drained Middletown soils, and the somewhat poorly drained Kendall soils. Camden and Middletown soils are in landscape positions similar to those of the Alvin soil. They have more clay and less sand in the upper part of

Figure 14.—Terraces help to control erosion in an area of Douglas silt loam, 5 to 10 percent slopes, eroded.

the subsoil than the Alvin soil. Kendall soils are in the less sloping areas. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Alvin soil at a moderate rate. In cultivated areas surface runoff is medium. Available water capacity is moderate. Organic matter content is low. The surface layer is subject to soil blowing when dry. The potential for frost action is moderate, and the shrink-swell potential is low.

Most areas are used for cultivated crops. Some areas are used for pasture, hay, or woodland. A few small areas are used as sites for dwellings and septic tank absorption fields. This soil is moderately suited to cultivated crops and woodland. It is well suited to pasture and hay and to dwellings and septic tank absorption fields.

In areas used for corn, soybeans, or small grain, further erosion and soil blowing are hazards. Also, the moderate available water capacity and the level of fertility are limitations. Erosion can be controlled and moisture conserved by a conservation tillage system that leaves crop residue on the surface after planting, by contour farming, by terraces, or by a combination of these. Field windbreaks and a tillage system that leaves the surface rough are effective in controlling soil blowing. Returning crop residue to the soil and regularly adding other organic material improve tilth and fertility.

Establishing pasture plants or hay helps to keep erosion within tolerable limits. Timely deferment of grazing helps to prevent overgrazing and thus also helps to prevent surface compaction, excessive runoff, and a greater susceptibility to erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

In the areas used as woodland, plant competition is a management concern. It restricts the growth of desirable seedlings. The competition from undesirable vegetation in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

The land capability classification is IIIe.

134B—Camden silt loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on convex ridgetops and side slopes in the uplands and on stream terraces. Individual areas are oblong or irregular in shape and range from 3 to 240 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 8 inches thick. The subsoil is about 49 inches thick. In sequence downward, it is yellowish brown and dark grayish brown, friable silt loam; dark yellowish brown and yellowish brown, friable and firm silty clay loam; yellowish brown, firm clay loam; and brown, friable, stratified loam, loamy sand, and sandy loam. The underlying material to a depth of 60 inches or more is brown, friable sandy loam. In some areas the lower part of the subsoil and the underlying material are not stratified and contain less sand. In other areas the upper part of the subsoil contains less silt and more sand.

Included with this soil in mapping are small areas of the somewhat poorly drained Kendall and poorly drained Thorp soils. These soils are on the less sloping parts of the landscape. They make up 2 to 10 percent of the unit.

Water and air move through the Camden soil at a moderate rate. In cultivated areas surface runoff is medium. Available water capacity is high. Organic matter content is moderately low. The surface layer tends to crust and puddle after hard rains. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. Some areas are used for pasture, hay, or woodland. A few small areas are used as sites for dwellings and septic tank absorption fields. This soil is well suited to cultivated crops, pasture, hay, woodland, dwellings with basements, and septic tank absorption fields. It is moderately suited to dwellings without basements.

In areas used for corn, soybeans, or small grain, erosion is a hazard. It can be controlled by a conservation tillage system that leaves crop residue on the surface after planting, by contour farming, or by terraces. Returning crop residue to the soil and regularly adding other organic material help to prevent crusting and improve tilth and fertility.

Suitable forage and hay plants grow well on this soil. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

In the areas used as woodland, plant competition is a management concern. It restricts the growth of desirable seedlings. The competition from undesirable vegetation in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings without basements, the shrink-swell potential is a limitation. Reinforcing the foundations or extending them below the subsoil helps to overcome this limitation.

The land capability classification is IIe.

134C2—Camden silt loam, 5 to 10 percent slopes, eroded. This moderately sloping, well drained soil is on convex ridgetops and side slopes in the uplands and on stream terraces. Individual areas are oval or irregular in shape and range from 3 to 40 acres in size.

Typically, the surface layer is brown, friable silt loam about 7 inches thick. It has been thinned by erosion. The subsoil extends to a depth of 60 inches or more. The upper part is dark yellowish brown, friable and firm silty clay loam; the next part is dark yellowish brown, friable silty clay loam; and the lower part is brown, friable loam that has strata of clay loam and sandy loam. In some areas the surface layer has more clay. In other areas the upper part of the subsoil has less silt and more sand. In places the surface layer is thicker or darker.

Included with this soil in mapping are small areas of the somewhat poorly drained Kendall soils. These soils are in the less sloping areas, generally on ridges above the Camden soil. They make up 2 to 10 percent of the unit.

Water and air move through the Camden soil at a moderate rate. In cultivated areas surface runoff is medium. Available water capacity is high. Organic matter content is moderately low. The surface layer tends to crust and puddle after hard rains. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. Some areas are used for pasture, hay, or woodland. A few small areas are used as sites for dwellings and septic tank absorption fields. This soil is moderately suited to cultivated crops and to dwellings without basements. It is well suited to pasture and hay, to woodland, to dwellings with basements, and to septic tank absorption fields.

In areas used for corn, soybeans, or small grain, further erosion is a hazard. A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, contour farming, terraces, or a combination of these can help to keep soil losses within tolerable limits. Returning crop residue to the soil and regularly adding other organic material help to prevent crusting and improve tilth and fertility.

Establishing pasture plants or hay helps to keep erosion within tolerable limits. Timely deferment of grazing helps to prevent overgrazing and thus also helps to prevent surface compaction, excessive runoff, and a greater susceptibility to erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

In the areas used as woodland, plant competition is a management concern. It restricts the growth of desirable seedlings. The competition from undesirable vegetation in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings without basements, the shrink-swell potential is a limitation. Reinforcing the foundations or extending them below the subsoil helps to overcome this limitation.

The land capability classification is IIIe.

136—Brooklyn silt loam. This nearly level, poorly drained soil is in shallow depressions in the uplands. It is ponded for brief periods during winter and spring. Individual areas are oval or oblong and range from 3 to 10 acres in size.

Typically, the surface layer is very dark gray, friable silt loam about 9 inches thick. The subsurface layer is grayish brown, mottled, friable silt loam about 10 inches thick. The subsoil is about 31 inches thick. It is grayish brown, mottled, and firm. The upper part is silty clay loam, and the lower part is stratified silty clay loam and clay loam. The underlying material to a depth of 60 inches or more is grayish brown, mottled, friable clay loam. In a few areas the subsoil contains less clay. In some areas the dark surface layer is thicker. In places the soil formed entirely in loess.

Included with this soil in mapping are small areas of the somewhat poorly drained Elburn soils and the poorly drained Drummer soils. Elburn soils are on low ridges above the Brooklyn soil. Drummer soils are on broad flats slightly above the Brooklyn soil. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Brooklyn soil at a slow rate. In cultivated areas surface runoff is slow or ponded. The seasonal high water table is 0.5 foot above to 2.0 feet below the surface during winter and spring. Available water capacity is high. Organic matter content is moderate. The surface layer tends to crust and puddle after hard rains. The shrink-swell potential and the potential for frost action are high.

Most areas are used for cultivated crops. A few small areas are used as sites for dwellings and septic tank absorption fields. This soil is well suited to cultivated crops. It is poorly suited to dwellings and septic tank absorption fields.

Corn, soybeans, and small grain can be grown in most areas because a drainage system has been installed. Measures that maintain or improve the drainage system are needed. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. Land grading helps to control ponding. Tilling when the soil is wet causes surface compaction, cloddiness, and crusting. Applying a conservation tillage system that leaves crop residue on the surface after planting and regularly adding other organic material help to prevent surface compaction and crusting, improve tilth and fertility, and increase the rate of water intake.

The seasonal high water table and the shrink-swell potential are limitations if this soil is used as a site for dwellings. Reinforcing the footings and foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface drains around the footings helps to lower the water table. Elevating the floor of dwellings without basements above the surrounding ground level, grading, and diverting surface water also help to overcome the wetness.

The seasonal high water table and the slow permeability are limitations if this soil is used as a site for septic tank absorption fields. Alternative sewage disposal systems, including mound systems, may be needed.

The land capability classification is IIw.

138—Shiloh silty clay loam. This nearly level, poorly drained soil is in broad, shallow depressions in the uplands. Individual areas are irregular in shape and range from 5 to 400 acres in size.

Typically, the surface layer and subsurface layer are black, firm silty clay loam. The combined thickness of these layers is about 15 inches. The subsoil extends to a depth of more than 60 inches. It is mottled. The upper part is black and olive gray, firm silty clay; the next part is olive gray, friable silty clay loam; and the lower part is olive gray, friable silt loam. In places the upper part of the subsoil is lighter in color. In some areas the subsoil contains less clay. In a few areas the underlying material is stratified with sandier textures.

Included with this soil in mapping are small areas of the somewhat poorly drained Elburn, Herrick, and Ipava soils on ridges above the Shiloh soil. These soils make up 2 to 10 percent of the unit.

Water and air move through the Shiloh soil at a moderately slow rate. In cultivated areas surface runoff is very slow or ponded. The seasonal high water table is 1 foot above to 2 feet below the surface during winter and spring. Available water capacity is high. Organic matter content also is high. The surface layer is firm and sticky when wet and hard and cloddy when dry. The shrink-swell potential and the potential for frost action are high.

Most areas are used for cultivated crops. A few small areas are used as sites for dwellings and septic tank absorption fields. This soil is well suited to cultivated crops. It is poorly suited to dwellings and septic tank absorption fields.

Corn, soybeans, and small grain can be grown in most areas because a drainage system has been installed. Measures that maintain or improve the drainage system are needed. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. Land grading helps to control ponding. Tilling when the soil is wet causes surface compaction, cloddiness, and crusting. Applying a conservation tillage system that leaves crop residue on the surface after planting and adding other organic material help to prevent surface compaction and crusting, improve tilth, and increase the rate of water intake.

The seasonal high water table and the shrink-swell potential are limitations if this soil is used as a site for dwellings. Reinforcing the footings and foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface drains around the footings helps to lower the water table. Elevating the floor of dwellings without basements above the surrounding ground level, grading, and diverting surface water also help to overcome the wetness.

The seasonal high water table and the slow permeability are limitations if this soil is used as a site for septic tank absorption fields. Alternative sewage disposal systems, including mound systems, may be needed.

The land capability classification is IIw.

152—Drummer silty clay loam. This nearly level, poorly drained soil is on broad flats in the uplands. It is ponded for brief periods during winter and spring. Individual areas are irregular in shape and range from 5 to 400 acres in size.

Typically, the surface layer is black, friable silty clay loam about 8 inches thick. The subsurface layer is very dark gray, mottled, firm silty clay loam about 8 inches thick. The subsoil extends to a depth of 60 inches or more. It is mottled. It is dark grayish brown, grayish brown, light olive gray, and gray, firm silty clay loam in the upper part and gray, friable, stratified loam, clay loam, and fine sandy loam in the lower part. In some places the upper part of the subsoil is darker and contains more clay. In other places the lower part of the subsoil contains more sand.

Included with this soil in mapping are small areas of the somewhat poorly drained Elburn and moderately well drained Plano soils. These soils are on ridges above the Drummer soil. They make up 2 to 10 percent of the unit.

Water and air move through the Drummer soil at a moderate rate. In cultivated areas surface runoff is slow or ponded. The seasonal high water table is 0.5 foot above to 2.0 feet below the surface during winter and spring. Available water capacity is high. Organic matter content also is high. The surface layer is firm and sticky when wet and hard and cloddy when dry. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. A few small areas are used as sites for dwellings and septic tank absorption fields. This soil is well suited to cultivated crops. It is poorly suited to dwellings and septic tank absorption fields.

Corn, soybeans, and small grain can be grown in most areas because a drainage system has been installed. Measures that maintain or improve the drainage system are needed. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. Land grading helps to control ponding. Tilling when the soil is wet causes surface compaction, cloddiness, and crusting. Applying a conservation tillage system that leaves crop residue on the surface after planting and adding other organic material help to prevent surface compaction and crusting, improve tilth, and increase the rate of water intake.

The seasonal high water table and the shrink-swell potential are limitations if this soil is used as a site for dwellings. Reinforcing the footings and foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface drains around the footings helps to lower the water table. Elevating the floor of dwellings without basements above the surrounding ground level, grading, and diverting surface water also help to overcome the wetness.

The seasonal high water table and the moderate permeability are limitations if this soil is used as a site for septic tank absorption fields. Alternative sewage disposal systems, including mound systems, may be needed.

The land capability classification is IIw.

198—Elburn silt loam. This nearly level, somewhat poorly drained soil is on low, broad ridges in the uplands. Individual areas are irregular in shape and range from 5 to 500 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 6 inches thick. The subsurface layer also is very dark grayish brown, friable silt loam. It is about 10 inches thick. The subsoil is about 42 inches thick. It is mottled. The upper part is brown, friable and firm silty clay loam; the next part is light olive brown and grayish brown, friable silty clay loam; and the lower part is grayish brown, friable, stratified silt loam, loam, and sandy loam. The underlying material to a depth of 60 inches or more is grayish brown, very friable, stratified sandy loam and loamy sand. In some places the upper part of the subsoil contains more sand. In other places the dark surface soil is thinner. In some areas the soil formed entirely in loess.

Included with this soil in mapping are small areas of the poorly drained Brooklyn and Drummer soils and the moderately well drained Plano soils. Brooklyn and Drummer soils are in areas below the Elburn soil. Plano soils are on the more sloping ridges above the Elburn soil. Included soils make up less than 5 percent of the unit.

Water and air move through the Elburn soil at a moderate rate. In cultivated areas surface runoff is slow. The seasonal high water table is 1 to 3 feet below the surface during winter and spring. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. A few small areas are used as sites for dwellings and septic tank absorption fields. This soil is well suited to cultivated crops. It is poorly suited to dwellings and septic tank absorption fields.

No major limitations affect the use of this soil for corn, soybeans, or small grain. The seasonal high water table can delay planting in some years. Subsurface tile drains function satisfactorily if suitable outlets are available. A conservation tillage system that leaves crop residue on the surface after planting helps to maintain tilth and fertility.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Installing subsurface tile drains near the foundations helps to overcome the wetness. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The seasonal high water table and the moderate permeability are limitations if this soil is used as a site for septic tank absorption fields. Alternative sewage disposal systems, including mound systems, may be needed.

The land capability classification is I.

199B—Plano silt loam, 1 to 5 percent slopes. This gently sloping, moderately well drained soil is on convex ridgetops and side slopes in the uplands and on stream terraces. Individual areas are irregular in shape and range from 5 to 90 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 8 inches thick. The subsurface layer also is very dark grayish brown, friable silt loam. It is about 4 inches thick. The subsoil is about 42 inches thick. The upper part is dark yellowish brown, friable silty clay loam; the next part is dark yellowish brown and yellowish brown, mottled, friable silty clay loam and silt loam; and the lower part is yellowish brown, friable, stratified silt loam, loam, and sandy loam. The underlying material to a depth of 60 inches of more is yellowish brown, friable, stratified silt loam, loam, and sandy loam. In some areas the surface layer is thinner and lighter in color. In other areas part of the underlying material has as much as 10 percent gravel. In some places the upper part of the subsoil contains more sand. In other places the lower part of the subsoil and the underlying material contain less sand.

Included with this soil in mapping are small areas of the poorly drained Drummer and somewhat poorly drained Elburn soils. These soils are in the less sloping areas below the Plano soil. They make up 3 to 10 percent of the unit.

Water and air move through the Plano soil at a moderate rate. In cultivated areas surface runoff is medium. The seasonal high water table is at a depth of 3 to 6 feet during winter and spring. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. A few small areas are used as sites for dwellings and septic tank absorption fields. This soil is well suited to cultivated crops. It is moderately suited to dwellings and septic tank absorption fields.

In areas used for corn, soybeans, or small grain, erosion is a hazard. It can be controlled by a conservation tillage system that leaves crop residue on the surface after planting, by contour farming, or by terraces. Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and fertility.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. The seasonal high water table is an additional limitation on sites for dwellings with basements. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface tile drains near the foundations lowers the water table.

The seasonal high water table is a limitation if this soil is used as a site for septic tank absorption fields. Subsurface tile drains lower the water table.

The land capability classification is IIe.

242—Kendall silt loam. This nearly level, somewhat poorly drained soil is on low, broad ridges in the uplands. Individual areas are irregular in shape and range from 5 to 170 acres in size.

Typically, the surface layer is grayish brown, friable silt loam about 8 inches thick. The subsurface layer is brown and light brownish gray, mottled, friable silt loam about 3 inches thick. The subsoil extends to a depth of 60 inches or more. It is mottled. In sequence downward, it is yellowish brown, friable silty clay loam; yellowish brown, brown, and light brownish gray, firm silty clay loam; grayish brown, friable silt loam; and grayish brown and dark grayish brown, friable, stratified sandy loam and loam. In some places the surface layer is thicker and darker. In other places the lower part of the subsoil and the underlying material contain less sand.

Included with this soil in mapping are small areas of the well drained Camden soils and the poorly drained Brooklyn and Drummer soils. Camden soils are on side slopes below the Kendall soil. Brooklyn and Drummer soils are in low areas below the Kendall soil. Included soils make up 2 to 10 percent of the unit.

Water and air move through the Kendall soil at a moderate rate. In cultivated areas surface runoff is slow. The seasonal high water table is 1 to 3 feet below the surface during winter and spring. Available water capacity is high. Organic matter content is moderately low. The surface layer tends to crust and puddle after hard rains. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. Some areas are used for pasture, hay, or woodland. A few small areas are used as sites for dwellings and septic tank absorption fields. This soil is well suited to cultivated crops, pasture, and hay. It is moderately suited to woodland. It is poorly suited to dwellings and septic tank absorption fields.

Corn, soybeans, and small grain can be grown in most areas because a drainage system has been installed. Measures that maintain or improve the drainage system are needed. Surface drains and subsurface tile drains function satisfactorily if suitable outlets are available. Tilling when the soil is wet causes surface compaction, cloddiness, and crusting. Applying a conservation tillage system that leaves crop residue on the surface after planting and adding other organic material help to prevent surface compaction and crusting, improve tilth, and increase the rate of water intake.

Suitable forage and hay plants grow well on this soil. Subsurface tile drains can reduce the wetness if suitable outlets are available. Overgrazing or grazing when the soil is too wet reduces forage yields and causes surface compaction and excessive runoff. Proper stocking rates, pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

In the areas used as woodland, plant competition is a management concern. It restricts the growth of desirable seedlings. The competition from undesirable vegetation in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Installing subsurface tile drains near the foundations helps to overcome the wetness. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The seasonal high water table and the moderate permeability are limitations if this soil is used as a site for septic tank absorption fields. Alternative sewage disposal systems, including mound systems, may be needed.

The land capability classification is IIw.

244—Hartsburg silty clay loam. This nearly level, poorly drained soil is on broad flats in the uplands. It is ponded for brief periods during winter and spring. Individual areas are irregular in shape and range from 5 to 500 acres in size.

Typically, this surface layer is very dark gray, friable silty clay loam about 7 inches thick. The subsurface layer also is very dark gray, friable silty clay loam. It is about 13 inches thick. The subsoil is about 23 inches thick. It is mottled and friable. The upper part is dark grayish brown and olive gray silty clay loam, and the lower part is gray silt loam. The underlying material to a depth of 60 inches or more is gray, mottled, friable silt loam. In some areas the subsoil is more acid. In a few places the subsoil has more clay.

Included with this soil in mapping are small areas of the somewhat poorly drained Ipava soils and the poorly drained Harpster soils. Ipava soils are on ridges above the Hartsburg soil. Harpster soils are in shallow depressions below the Hartsburg soil. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Hartsburg soil at a moderate rate. In cultivated areas surface runoff is slow or ponded. The seasonal high water table is 0.5 foot above to 2.0 feet below the surface during winter and spring. Available water capacity is very high. Organic matter content is high. The surface layer is firm and sticky when wet and hard and cloddy when dry. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. A few small areas are used as sites for dwellings and septic tank absorption fields. This soil is well suited to cultivated crops. It is poorly suited to dwellings and septic tank absorption fields.

Corn, soybeans, and small grain can be grown in most areas because a drainage system has been installed. Measures that maintain or improve the drainage system are needed. Surface drains and subsurface tile drains function satisfactorily if suitable outlets are available. Land grading helps to control ponding. Tilling when the soil is wet causes surface compaction, cloddiness, and crusting. Applying a conservation tillage system that leaves crop residue on the surface after planting and adding other organic material help to prevent surface compaction and crusting, improve tilth, and increase the rate of water intake.

The seasonal high water table and the shrink-swell potential are limitations if this soil is used as a site for dwellings. Reinforcing the footings and foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface drains around the footings helps to lower the water table. Elevating the floor of dwellings without basements above the surrounding ground level, grading, and diverting surface water also help to overcome the wetness.

The seasonal high water table and the moderate permeability are limitations if this soil is used as a site for septic tank absorption fields. Alternative sewage disposal systems, including mound systems, may be needed.

The land capability classification is IIw.

249—Edinburg silty clay loam. This nearly level, very poorly drained soil is in shallow depressions in the uplands. It is ponded for brief periods during winter and spring. Individual areas are irregular in shape and range from 3 to 150 acres in size.

Typically, the surface layer and subsurface layer are very dark gray, firm silty clay loam. The combined thickness of these layers is about 12 inches. The subsoil is very dark gray, dark gray, and olive gray, firm silty clay loam about 40 inches thick. It is mottled in the lower part. The underlying material to a depth of 60 inches or more is light olive gray and gray, mottled, firm silty clay loam. In places the subsoil has less clay.

Included with this soil in mapping are small areas of the poorly drained Cowden soils. These soils have a dark surface layer that is thinner than that of the Edinburg soil. They are in landscape positions similar to those of the Edinburg soil. They make up 5 to 10 percent of the unit.

Water and air move through the Edinburg soil at a slow rate. In cultivated areas surface runoff is slow or ponded. The seasonal high water table is 1 foot above to 2 feet below the surface during winter and spring. Available water capacity is high. Organic matter content is moderate. The surface layer is firm and sticky when wet and hard and cloddy when dry. The shrink-swell potential and the potential for frost action are high.

Most areas are used for cultivated crops. A few small areas are used as sites for dwellings and septic tank absorption fields. This soil is well suited to cultivated crops. It is poorly suited to dwellings and septic tank absorption fields.

Corn, soybeans, and small grain can be grown in most areas because a drainage system has been installed. Measures that maintain or improve the drainage system are needed. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. Land grading helps to control ponding. Tilling when the soil is wet causes surface compaction, cloddiness, and crusting. Applying a conservation tillage system that leaves crop residue on the surface after planting and adding other organic material help to prevent surface compaction and crusting, improve tilth, and increase the rate of water intake.

The seasonal high water table and the shrink-swell potential are limitations if this soil is used as a site for dwellings. Reinforcing the footings and foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface drains around the footings helps to lower the water table. Elevating the floor of dwellings without basements above the surrounding ground level, grading, and diverting surface water also help to overcome the wetness.

The seasonal high water table and the slow permeability are limitations if this soil is used as a site for septic tank absorption fields. Alternative sewage disposal systems, including mound systems, may be needed.

The land capability classification is IIIw.

256C2—Pana loam, 5 to 10 percent slopes, eroded. This moderately sloping, well drained soil is on narrow ridgetops and side slopes on moraines in the uplands. Individual areas are oval or irregular in shape and range from 5 to 50 acres in size.

Typically, the surface layer is very dark grayish brown, friable loam about 9 inches thick. It has been thinned by erosion. The subsoil extends to a depth of more than 60 inches. It is dark brown and firm. The upper part is silt loam, and the lower part is loam. In some areas the surface layer is thicker. In other areas the subsoil contains more clay and more sand. In some places the slope is more than 10 percent. In other places the surface layer is clay loam.

Included with this soil in mapping are small areas of the somewhat poorly drained Oconee soils. These soils are in the less sloping areas at the base of slopes. They make up 5 to 10 percent of the unit.

Water and air move through the Pana soil at a moderately rapid rate. In cultivated areas surface runoff is medium. Available water capacity and organic matter content are moderate. The potential for frost action also is moderate, and the shrink-swell potential is low.

Most areas are used for cultivated crops. Some areas are used for pasture and hay. A few small areas are used as sites for dwellings and septic tank absorption fields. This soil is well suited to cultivated crops, pasture, and hay and to dwellings and septic tank absorption fields.

In areas used for corn, soybeans, or small grain, further erosion is a hazard. A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, contour farming, terraces, or a combination of these can help to keep soil losses within tolerable limits. Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and fertility.

Establishing pasture plants or hay helps to keep erosion within tolerable limits. Timely deferment of grazing helps to prevent overgrazing and thus also helps to prevent surface compaction, excessive runoff, and a greater susceptibility to erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

The land capability classification is IIIe.

257—Clarksdale silt loam. This nearly level, somewhat poorly drained soil is on low, broad ridges in the uplands. Individual areas are irregular in shape and range from 5 to 275 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 9 inches thick. The subsurface layer is gray, mottled, friable silt loam about 7 inches thick. The subsoil is about 39 inches thick. It is mottled and firm. The upper part is yellowish brown silty clay, and the lower part is light brownish gray silty clay loam. The underlying material to a depth of 60 inches is gray, friable silt loam. In some places the dark surface layer is thicker. In other places the subsoil has less clay. In a few areas the soil does not have a subsurface layer. In some areas the lower part of the subsoil formed in loamy outwash.

Included with this soil in mapping are small areas of the moderately well drained Rozetta soils and the very poorly drained Denny soils. Rozetta soils are on ridges above the Clarksdale soil. Denny soils are in shallow depressions and drainageways below the Clarksdale soil. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Clarksdale soil at a moderate rate. In cultivated areas surface runoff is slow. The seasonal high water table is 1 to 3 feet below the surface during winter and spring. Available water capacity is high. Organic matter content is moderate. The surface layer tends to crust and puddle after hard rains. The shrink-swell potential and the potential for frost action are high.

Most areas are used for cultivated crops. Some areas are used for pasture and hay. A few small areas are used as sites for dwellings and septic tank absorption fields. This soil is well suited to cultivated crops, pasture, and hay. It is poorly suited to dwellings and septic tank absorption fields.

No major limitations affect the use of this soil for corn, soybeans, or small grain. The seasonal high water table can delay planting in some years. Subsurface tile drains function satisfactorily if suitable outlets are available. A conservation tillage system that leaves crop residue on the surface after planting helps to maintain tilth and fertility.

Suitable forage and hay plants grow well on this soil. Subsurface tile drains can reduce the wetness if suitable outlets are available. Overgrazing or grazing when the soil is too wet reduces forage yields and causes surface compaction and excessive runoff. Proper stocking rates, pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Installing subsurface tile drains near the foundations helps to overcome the wetness. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The seasonal high water table and the moderately slow permeability are limitations if this soil is used as a site for septic tank absorption fields. Alternative sewage disposal systems, including mound systems, may be needed.

The land capability classification is I.

259C2—Assumption silt loam, 5 to 10 percent slopes, eroded. This moderately sloping, moderately well drained soil is on side slopes along drainageways in the uplands. Individual areas are long and narrow or irregular in shape and range from 5 to 225 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 9 inches thick. The subsoil extends to a depth of more than 60 inches. It is mottled and firm. The upper part is brown silty clay loam, the next part is grayish brown silty clay loam, and the lower part is grayish brown clay loam. In some areas the surface layer is thinner and lighter colored. In other areas, the subsoil contains less sand and carbonates are within a depth of 40 inches. In places the lower part of the subsoil contains less sand.

Included with this soil in mapping are small areas of the poorly drained, very slowly permeable Coatsburg soils. These soils are in positions on the landscape similar to those of the Assumption soil. They make up 5 to 10 percent of the unit.

Water and air move through the upper part of the Assumption soil at a moderate rate and through the lower part at a slow rate. In cultivated areas surface runoff is medium. The seasonal high water table is perched at a depth of 2.5 to 4.5 feet during winter and spring. Available water capacity is high. Organic matter content is moderate. This soil is seepy in many spots (fig. 15). The shrink-swell potential and the potential for frost action are high.

Most areas are used for cultivated crops. Some areas are used for pasture and hay. A few small areas are used as sites for dwellings and septic tank absorption fields. This soil is moderately suited to cultivated crops and to dwellings. It is well suited to pasture and hay. It is poorly suited to septic tank absorption fields.

In areas used for corn, soybeans, or small grain, further erosion is a hazard. A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, contour farming, terraces, grassed waterways, or a combination of these can help to keep soil losses within tolerable limits (fig. 16). Hillside seeps are common. Because of these seeps, the soil dries slowly in the spring. Tile drains help to overcome this limitation. Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and fertility.

Establishing pasture plants or hay helps to keep erosion within tolerable limits. Timely deferment of grazing helps to prevent overgrazing and thus also helps to prevent surface compaction, excessive runoff, and a greater susceptibility to erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. The seasonal high water table is an additional limitation on sites for dwellings with basements. Installing subsurface tile drains near foundations helps to overcome the wetness. Reinforcing the foundations or extending them below the subsoil helps to prevent the structural damage caused by shrinking and swelling.

The seasonal high water table and the moderately slow permeability are limitations if this soil is used as a site for septic tank absorption fields. Alternative sewage disposal systems, including mound systems, may be needed.

The land capability classification is IIIe.

264D2—El Dara sandy loam, 10 to 15 percent slopes, eroded. This strongly sloping, moderately well drained soil is on side slopes along drainageways in the

Figure 15.—A farm pond in an area of Assumption silt loam, 5 to 10 percent slopes, eroded. Harrison silt loam, 2 to 5 percent slopes, is in the foreground.

uplands. Individual areas are long and narrow and range from 5 to 75 acres in size.

Typically, the surface layer is mixed dark grayish brown and yellowish brown, very friable fine sandy loam about 10 inches thick. The subsoil is about 49 inches thick. It is yellowish brown. In sequence downward, it is friable sandy clay loam; mottled, friable sandy clay loam; mottled, friable fine sandy loam; and mottled, very friable, stratified fine sandy loam and loamy fine sand. The underlying material to a depth of 60 inches or more is pale brown, loose, stratified loamy fine sand and fine sand. In places the subsoil contains less sand and more gravel.

Included with this soil in mapping are small areas of the somewhat poorly drained Atlas and Radford soils and the moderately well drained Elco soils. Atlas and Elco soils have more clay in the subsoil than the El Dara soil. They are on side slopes above the El Dara soil. Radford soils are on flood plains along narrow drainageways below the El Dara soil. Included soils make up 5 to 10 percent of the unit.

Water and air move through the El Dara soil at a moderate rate. In cultivated areas surface runoff is rapid. Available water capacity is moderate. Organic matter content is moderately low. The potential for frost action is moderate, and the shrink-swell potential is low.

Most areas are used for cultivated crops. Some areas are used for pasture, hay, or woodland. A few small areas are used as sites for dwellings and septic tank absorption fields. This soil is moderately suited to cultivated crops, pasture, hay, woodland, dwellings, and septic tank absorption fields.

In areas used for corn, soybeans, or small grain, further erosion is a hazard. A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, contour farming, terraces, or a combination of these can help to keep soil losses within tolerable limits. Returning crop residue to the soil and regularly adding other organic material help to prevent crusting and improve tilth and fertility.

Establishing pasture plants or hay helps to keep erosion within tolerable limits. Timely deferment of grazing helps to prevent overgrazing and thus also helps to prevent surface compaction, excessive runoff, and a greater susceptibility to erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, timely deferment of grazing, and additions of fertilizer help to keep the pasture in good condition.

In the areas used as woodland, the hazard of erosion and the equipment limitation are management concerns because of the slope. Plant competition also is a management concern. It restricts the growth of desirable seedlings. The competition from undesirable species in openings where timber has been harvested can be controlled by chemical or mechanical means. Laying out logging roads and skid trails on the contour and seeding bare logging areas to grass or to a grass-legume mixture help to control erosion. Skidding logs and trees uphill with a cable and winch helps to overcome the slope. Firebreaks should be the grass type. Machinery should be used only when the soil is firm enough to support the equipment. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young

Figure 16.—A grassed waterway in an area of Assumption silt loam, 5 to 10 percent slopes, eroded.

trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings, the slope is a limitation. Cutting and filling help to overcome this limitation.

If this soil is used as a site for septic tank absorption fields, the moderate permeability and the slope are limitations. Increasing the size of the absorption field or adding more permeable fill material helps to overcome the moderate permeability. Installing the distribution lines on the contour helps to overcome the slope.

The land capability classification is IVe.

264F—El Dara loam, 15 to 30 percent slopes. This steep, well drained soil is on side slopes along drainageways in the uplands. Individual areas are long and narrow and range from 10 to 80 acres in size.

Typically, the surface layer is very dark grayish brown, friable loam about 5 inches thick. The subsurface layer is brown and very dark grayish brown, friable loam about 5 inches thick. The subsoil is about 42 inches thick. The upper part is dark yellowish brown, firm clay loam; the next part is dark yellowish brown, firm sandy clay loam; and the lower part is yellowish brown, mottled, firm sandy clay loam. The underlying material to a depth of 60 inches or more also is yellowish brown, mottled, firm sandy clay loam. In some places the soil has less sand throughout. In other places it has as much as 20 percent gravel throughout. In some areas the surface layer is thinner.

Included with this soil in mapping are small areas of the somewhat poorly drained Radford soils. These soils are on flood plains along narrow drainageways below the El Dara soil. They make up less than 8 percent of the unit.

Water and air move through the El Dara soil at a moderate rate. In pastured areas surface runoff is rapid. Available water capacity is moderate. Organic matter content is moderately low. The potential for frost action is moderate, and the shrink-swell potential is low.

Most areas are used as pasture. Some areas are used as woodland. A few small areas are used as sites for dwellings and septic tank absorption fields. This soil is poorly suited to pasture and hay. It is moderately suited to woodland. It generally is unsuited to cultivated crops because of the slope. It is poorly suited to dwellings and septic tank absorption fields.

Establishing pasture plants or hay helps to keep erosion within tolerable limits. Timely deferment of grazing helps to prevent overgrazing and thus also helps to prevent surface compaction, excessive runoff, and a greater susceptibility to erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

In the areas used as woodland, the hazard of erosion and the equipment limitation are management concerns because of the slope. Plant competition also is a management concern. It restricts the growth of desirable seedlings. The competition from undesirable species in openings where timber has been harvested can be controlled by chemical or mechanical means. Laying out logging roads and skid trails on the contour and seeding bare logging areas to grass or to a grass-legume mixture help to control erosion. Skidding logs and trees uphill with a cable and winch helps to overcome the slope. Firebreaks should be the grass type. Machinery should be used only when the soil is firm enough to support the equipment. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings, the slope is a limitation. Cutting and filling help to overcome this limitation.

If this soil is used as a site for septic tank absorption fields, the moderate permeability and the slope are limitations. Increasing the size of the absorption field or adding more permeable fill material helps to overcome the moderate permeability. Installing the distribution lines on the contour helps to overcome the slope.

The land capability classification is VIe.

279B—Rozetta silt loam, 2 to 5 percent slopes. This gently sloping, moderately well drained soil is on broad ridgetops and side slopes in the uplands. Individual areas are irregular in shape and range from 3 to 600 acres in size.

Typically, the surface layer is dark grayish brown and brown, friable silt loam about 9 inches thick. The subsoil is firm silty clay loam about 44 inches thick. The upper part is brown, the next part is dark yellowish brown and brown and is mottled, and the lower part is brown and mottled. The underlying material to a depth of 60 inches or more is yellowish brown, mottled, friable silt loam. In some places the surface layer is darker and thicker. In other places the depth to a seasonal high water table is more than 6 feet. In some areas the lower part of the subsoil has more sand.

Included with this soil in mapping are small areas of the somewhat poorly drained Keomah soils. These soils have more clay in the subsoil than the Rozetta soil.

Figure 17.—Cropland in an area of Rozetta silt loam, 2 to 5 percent slopes. Elco silt loam, 5 to 10 percent slopes, eroded, is in the background.

They are on the less sloping parts of the landscape. They make up 5 to 10 percent of the unit.

Water and air move through the Rozetta soil at a moderate rate. In cultivated areas surface runoff is medium. The seasonal high water table is 4 to 6 feet below the surface during winter and spring. Available water capacity is high. Organic matter content is moderately low. The surface layer tends to crust and puddle after hard rains. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops (fig. 17). Some areas are used for pasture, hay, or woodland. A few small areas are used as sites for dwellings and septic tank absorption fields. This soil is well suited to cultivated crops, pasture, and hay. It is moderately suited to woodland and to dwellings and septic tank absorption fields.

In areas used for corn, soybeans, or small grain, erosion is a hazard. It can be controlled by a conservation tillage system that leaves crop residue on the surface after planting, by contour farming, or by terraces. Returning crop residue to the soil and regularly adding other organic material help to prevent crusting and improve tilth and fertility.

Suitable forage and hay plants grow well on this soil. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

In the areas used as woodland, plant competition is a management concern. It restricts the growth of desirable seedlings. The competition from undesirable vegetation in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. The seasonal high water table is an additional limitation on sites for dwellings with basements. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface tile drains near the foundations lowers the water table.

The seasonal high water table is a limitation if this soil is used as a site for septic tank absorption fields. Subsurface tile drains lower the water table.

The land capability classification is IIe.

372—Kendall silt loam, sandy substratum. This nearly level, somewhat poorly drained soil is on low, broad ridges in the uplands. Individual areas are irregular in shape and range from 6 to 60 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 7 inches thick. The subsurface layer is grayish brown, friable silt loam about 5 inches thick. The subsoil is about 35 inches thick. It is mottled. The upper part is yellowish brown, friable and firm silty clay loam; the next part is brown and light brownish gray, firm and friable silty clay loam; and the lower part is light brownish gray, friable, stratified loam, silt loam, silty clay loam, and sandy loam. The underlying material to a depth of 60 inches or more is dark grayish brown, very friable, stratified loamy fine sand and fine sand. In places the surface layer is thicker and darker.

Included with this soil in mapping are small areas of the moderately well drained Middletown and well drained Alvin soils. These soils are higher on the landscape than the Kendall soil. They make up 5 to 10 percent of the unit.

Water and air move through the upper part of the Kendall soil at a moderate rate and through the lower part at a rapid rate. In cultivated areas surface runoff is slow. The seasonal high water table is 1 to 3 feet below the surface during winter and spring. Available water capacity is high. Organic matter content is moderately low. The surface layer tends to crust and puddle after hard rains. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. Some areas are used for pasture, hay, or woodland. A few small areas are used as sites for dwellings and septic tank absorption fields. This soil is well suited to cultivated crops, pasture, hay, and woodland. It is poorly suited to dwellings and septic tank absorption fields.

Corn, soybeans, and small grain can be grown in most areas because a drainage system has been installed. Measures that maintain or improve the drainage system are needed. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. Tilling when the soil is wet causes surface compaction, cloddiness, and crusting. Applying a conservation tillage system that leaves crop residue on the surface after planting and regularly adding other organic material help to prevent surface compaction and crusting, improve tilth, and increase the rate of water intake.

Suitable forage and hay plants grow well on this soil. Subsurface tile drains can reduce the wetness if suitable outlets are available. Overgrazing or grazing when the soil is too wet reduces forage yields and causes surface compaction and excessive runoff. Proper stocking rates, pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

In the areas used as woodland, plant competition is a management concern. It restricts the growth of desirable seedlings. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Installing subsurface tile drains near the foundations helps to overcome the wetness. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The seasonal high water table and the moderate permeability are limitations if this soil is used as a site for septic tank absorption fields. Also, a poor filtering capacity in the sandy underlying material can result in the pollution of ground water. Alternative disposal systems, including mound systems, may be needed.

The land capability classification is IIw.

386B—Downs silt loam, 2 to 5 percent slopes. This gently sloping, moderately well drained soil is on convex ridgetops and side slopes in the uplands. Individual areas are irregular in shape and range from 3 to 20 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 9 inches thick. The subsoil is silty clay loam about 40 inches thick. The upper part is dark yellowish brown and friable; the next part is dark yellowish brown, mottled, and firm; and the lower part is yellowish brown, mottled, and friable. The underlying material to a depth of 60 inches or more is yellowish brown, mottled, friable silt loam. In some areas the underlying material contains more sand. In a few areas the dark surface layer is thicker. In some places the surface layer is not so dark. In other places the soil is well drained.

Included with this soil in mapping are small areas of the somewhat poorly drained Clarksdale and Ipava soils. These soils are in the less sloping areas below the Downs soil. They make up 2 to 5 percent of the unit.

Water and air move through the Downs soil at a moderate rate. In cultivated areas surface runoff is medium. The seasonal high water table is 4 to 6 feet below the surface during winter and spring. Available water capacity is very high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. Some areas are used for pasture, hay, or woodland. A few small areas are used as sites for dwellings and septic tank absorption fields. This soil is well suited to cultivated crops, pasture, and hay. It is moderately suited to dwellings and septic tank absorption fields.

In areas used for corn, soybeans, or small grain, erosion is a hazard. It can be controlled by a conservation tillage system that leaves crop residue on the surface after planting, by contour farming, or by terraces. Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and fertility.

Suitable forage and hay plants grow well on this soil. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. The seasonal high water table is an additional limitation on sites for dwellings with basements. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface tile drains near the foundations lowers the water table.

The seasonal high water table is a limitation if this soil is used as a site for septic tank absorption fields. Subsurface tile drains lower the water table.

The land capability classification is IIe.

474—Piasa silt loam. This nearly level, poorly drained soil is in shallow depressions in the uplands. Individual areas are circular or irregular in shape and range from 3 to 15 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 9 inches thick. The subsurface layer is dark grayish brown, friable silt loam about 5 inches thick. The subsoil is about 39 inches thick. It is mottled. The upper part is dark grayish brown, friable and firm silty clay loam; the next part is grayish brown, firm silty clay loam; and the lower part is light brownish gray, friable silt loam. The underlying material to a depth of 60 inches or more also is light brownish gray, friable silt loam. In some areas the surface layer is lighter in color. In places the seasonal high water table is at a depth of more than 2 feet.

Included with this soil in mapping are small areas of the poorly drained Cowden and somewhat poorly drained Herrick soils. These soils do not have a high content of sodium in the subsoil. Herrick soils are slightly higher on the landscape than the Piasa soil. Cowden soils are in landscape positions similar to those of the Piasa soil. Included soils make up 3 to 10 percent of the unit.

Water and air move through the Piasa soil at a very slow rate. In cultivated areas surface runoff is slow or ponded. The perched seasonal high water table is 0.5 foot above to 2.0 feet below the surface during winter and spring. Available water capacity is moderate. Organic matter content also is moderate. The subsoil has a high content of sodium. The surface layer tends to crust and puddle after hard rains. The shrink-swell potential and the potential for frost action both are high.

Most areas are used for cultivated crops. A few small areas are used as sites for dwellings and septic tank absorption fields. This soil is moderately suited to cultivated crops. It is poorly suited to dwellings and septic tank absorption fields.

Corn, soybeans, and small grain can be grown in most areas because a drainage system has been installed. Measures that maintain or improve the drainage system are needed. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. Because of the high content of sodium in the subsoil, the tile lines may become clogged. The sodium limits the availability of water and thus causes moisture stress late in the growing season and excess moisture during wet periods. It also limits the availability and uptake of some plant nutrients. Applying a conservation tillage system that leaves crop residue on the surface after planting and regularly adding other organic material help to prevent surface crusting, improve tilth and fertility, and increase the rate of water intake.

The seasonal high water table and the shrink-swell potential are limitations if this soil is used as a site for dwellings. Reinforcing the footings and foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface drains around the footings helps to lower the water table. Elevating the floor of dwellings without basements above the surrounding ground level, grading, and diverting surface water also help to overcome the wetness.

The seasonal high water table and the very slow permeability are limitations if this soil is used as a site for septic tank absorption fields. Alternative sewage disposal systems, including mound systems, may be needed.

The land capability classification is IIIw.

533—Urban land. This map unit consists of nearly level and gently sloping areas covered by parking lots, streets, buildings, and other structures. Individual areas are generally square and range from 10 to 100 acres in size. Slope ranges from 0 to 5 percent.

Urban land consists mostly of shopping centers, industrial plants, other commercial sites, and streets and parking lots. These areas make up more than 85 percent of the unit. In most of the remaining open areas, cutting and filling has so altered the soils that identification of the soil series is not possible.

Included in this unit in mapping are small areas of Orthents. Orthents are areas that have been cut and filled with loamy soil material. They make up 5 to 10 percent of the unit.

Runoff is very rapid in areas of the Urban land. Most paved areas are designed so that runoff flows into a storm drainage system. Controlling runoff reduces the hazard of erosion in adjacent areas and helps to control local flooding.

This map unit has not been assigned a land capability classification.

567C2—Elkhart silt loam, 5 to 10 percent slopes, eroded. This moderately sloping, well drained soil is on side slopes along drainageways in the uplands. Individual areas are irregular in shape and range from 3 to 30 acres in size.

Typically, the surface layer is mixed very dark grayish brown and dark yellowish brown, friable silt loam about 8 inches thick. It has been thinned by erosion. The subsoil is about 21 inches thick. The upper part is dark yellowish brown, friable silt loam; the next part is dark yellowish brown, friable silty clay loam; and the lower part is brown, mottled, friable silt loam. The underlying material to a depth of 60 inches or more is light brownish gray, gray, and grayish brown, mottled, calcareous, friable silt loam. In places, the subsoil is thicker and the depth to carbonates is more than 40 inches. In some areas the surface layer is silty clay loam.

Included with this soil in mapping are small areas of the somewhat poorly drained Radford soils. These soils are in narrow drainageways below the Elkhart soil. They make up 3 to 7 percent of the unit.

Water and air move through the Elkhart soil at a moderate rate. In cultivated areas surface runoff is medium. Available water capacity is very high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. Some areas are used for pasture and hay. A few small areas are used as sites for dwellings and septic tank absorption fields. This soil is moderately suited to cultivated crops and to dwellings without basements. It is well suited to pasture and hay, to dwellings with basements, and to septic tank absorption fields.

In areas used for corn, soybeans, or small grain, further erosion is a hazard. A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, contour farming, terraces, or a combination of these can help to keep soil losses within tolerable limits. Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and fertility.

Establishing pasture plants or hay helps to keep erosion within tolerable limits. Timely deferment of grazing helps to prevent overgrazing and thus also helps to prevent surface compaction, excessive runoff, and a greater susceptibility to erosion. Tilling on the contour when a seedbed is prepared or when the pasture is renovated helps to control erosion. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIIe.

660C2—Coatsburg silt loam, 5 to 10 percent slopes, eroded. This moderately sloping, poorly drained soil is on side slopes along drainageways in the uplands. Individual areas are long and narrow and range from 3 to 200 acres in size.

Typically, the surface layer is mixed very dark grayish brown and grayish brown, friable silt loam about 8 inches thick. It has been thinned by erosion. The subsoil to a depth of more than 60 inches is mottled clay loam. The upper part is grayish brown and friable, and the lower part is gray and firm. In some areas the subsoil has less clay. In other areas it has less sand.

Included with this soil in mapping are small areas of the somewhat poorly drained Atlas soils and the moderately well drained Harrison soils. Atlas soils are in positions on the landscape similar to those of the Coatsburg soil. Harrison soils are upslope from the Coatsburg soil. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Coatsburg soil at a very slow rate. In cultivated areas surface runoff is medium. The seasonal high water table is perched within a depth of 1 foot during winter and spring. Available water capacity is moderate. Organic matter content also is moderate. The surface layer tends to crust and puddle after hard rains. The shrink-swell potential and the potential for frost action are high.

Most areas are used for cultivated crops. Some areas are used for pasture and hay. A few small areas are used as sites for dwellings and septic tank absorption fields. This soil is moderately suited to cultivated crops. It is well suited to pasture and hay. It is poorly suited to dwellings and septic tank absorption fields.

In areas used for corn, soybeans, or small grain, further erosion is a hazard. A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, contour farming, terraces, or a combination of these can help to keep soil losses within tolerable limits. Returning crop residue to the soil and regularly adding other organic material help to prevent crusting and improve tilth and fertility.

Establishing pasture plants or hay helps to keep erosion within tolerable limits. Timely deferment of grazing helps to prevent overgrazing and thus also helps to prevent surface compaction, excessive runoff, and a greater susceptibility to erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Installing either tile drains near the foundations or interceptor drains upslope from the buildings helps to lower the water table. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The seasonal high water table and the very slow permeability are limitations if this soil is used as a site for septic tank absorption fields. Alternative sewage disposal systems, including mound systems, may be needed.

The land capability classification is IIIe.

684B—Broadwell silt loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on dunelike ridgetops and side slopes in the uplands. Individual areas are rounded or irregular in shape and range from 5 to 250 acres in size.

Typically, the surface layer and subsurface layer are dark grayish brown, friable silt loam. The combined thickness of these layers is about 15 inches. The subsoil is about 40 inches thick. In sequence downward, it is dark brown, friable silty clay loam; brown and dark yellowish brown, firm silty clay loam; dark yellowish brown, friable silt loam; and dark yellowish brown, very friable loamy fine sand. The underlying material to a depth of 60 inches or more is yellowish brown, loose fine sand. In places the surface soil is thinner and lighter in color. In some areas the sandy material is closer to the surface. In other areas the upper part of the subsoil contains more sand.

Included with this soil in mapping are small areas of the poorly drained Drummer soils and the somewhat poorly drained Elburn soils. Drummer soils are in drainageways below the Broadwell soil. Elburn soils are in the less sloping areas. Included soils make up 3 to 10 percent of the unit.

Water and air move through the upper part of the Broadwell soil at a moderate rate and through the lower part at a rapid rate. In cultivated areas surface runoff is medium. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. A few small areas are used as sites for dwellings and septic tank absorption fields. This soil is well suited to cultivated crops and to septic tank absorption fields. It is moderately suited to dwellings.

In areas used for corn, soybeans, or small grain, erosion is a hazard. It can be controlled by a conservation tillage system that leaves crop residue on the surface after planting, by contour farming, or by terraces. Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and fertility.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, a poor filtering capacity in the lower part of the subsoil and in the underlying material can result in the pollution of ground water.

The land capability classification is IIe.

685B—Middletown silt loam, 2 to 5 percent slopes. This gently sloping, moderately well drained soil is on dunelike ridgetops and side slopes in the uplands. Individual areas are irregular in shape and range from 5 to 40 acres in size.

Typically, the surface layer is grayish brown, friable silt loam about 8 inches thick. The subsoil extends to a depth of more than 60 inches. It is yellowish brown. In sequence downward, it is firm silt loam and silty clay loam; mottled, firm and friable silty clay loam; mottled, friable clay loam and fine sandy loam; and very friable loamy fine sand. In places the surface layer is thicker and darker. In a few places the upper part of the subsoil contains more sand. In some areas the subsoil contains less sand. In other areas the soil is well drained.

Included with this soil in mapping are small areas of the well drained Alvin soils and the somewhat poorly drained Kendall soils. Alvin soils are on ridgetops upslope from the Middletown soil and on side slopes along drainageways below the Middletown soil. Kendall soils are lower on the landscape than the Middletown soil. Included soils make up 3 to 8 percent of the unit.

Water and air move through the upper part of the Middletown soil at a moderate rate and through the lower part at a rapid rate. In cultivated areas surface runoff is medium. Available water capacity is high. Organic matter content is moderately low. The surface layer tends to crust and puddle after hard rains. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. Some areas are used for pasture, hay, or woodland. A few small areas are used as sites for dwellings and septic tank absorption fields. This soil is well suited to cultivated crops, pasture, and hay and to septic tank absorption fields. It is moderately suited to woodland and to dwellings.

In areas used for corn, soybeans, or small grain, erosion is a hazard. It can be controlled by a conservation tillage system that leaves crop residue on the surface after planting, by contour farming, or by terraces. Returning crop residue to the soil and regularly adding other organic material help to prevent crusting and improve tilth and fertility.

Suitable forage and hay plants grow well on this soil. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

In the areas used as woodland, plant competition is a management concern. It restricts the growth of desirable seedlings. The competition from undesirable vegetation in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, a poor filtering capacity in the lower part of the subsoil can result in the pollution of ground water.

The land capability classification is IIe.

802B—Orthents, loamy, undulating. These nearly level and gently sloping, moderately well drained soils are in disturbed areas in the uplands. In some areas they were altered by cutting and mixing before fill was added. In other areas the fill was placed directly on natural soil. Individual areas are rectangular or irregular in shape and range from 4 to 20 acres in size. Slope generally ranges from 1 to 7 percent.

The mixed material is loamy sand to silt. It commonly is 36 to more than 60 inches thick. In some areas cinders, refuse, and other nonsoil material are incorporated into the soils. Some areas are sanitary landfills.

Included with these soils in mapping are small areas of Urban land and areas that are moderately sloping or strongly sloping. Also included are Ipava, Tama, and Sable soils in undisturbed areas. Included soils make up less than 15 percent of the unit.

Water and air move through the Orthents at varying rates because of the diverse soil textures. Surface runoff is slow or medium. Available water capacity is moderate or low. Organic matter content generally is low.

Most of the acreage of these soils is idle land. Onsite investigation is needed to determine the limitations or hazards affecting the development of specific areas.

This map unit has not been assigned a land capability classification.

804B—Orthents, acid, rolling. These somewhat poorly drained to well drained soils are on stream terraces and uplands that have been used as dump sites for coal mine spoil. Individual areas are rectangular or irregular in shape and range from 40 to 160 acres in size. Slope ranges from 2 to 8 percent.

The mixed soil material typically consists of a surface layer of silty clay loam and underlying material of silty clay loam, clay loam, and sandy clay loam. The soil material commonly is less than 3 feet thick. It is underlain by a mixture of coal dust, shale fragments, and clayey soil material.

Water and air move through these soils at varying rates because of compaction by equipment and because of the diverse soil material. Surface runoff is medium. Available water capacity varies. It generally is adequate for the growth of vegetation. Organic matter content is generally low. Erosion is a hazard in areas that are not protected by a plant cover.

Most of the acreage of these soils is idle land. The plant cover consists of various grasses and weeds. Onsite investigation is needed to determine the limitations or hazards affecting the development of specific areas.

This map unit has not been assigned a land capability classification.

864—Pits, quarries. This map unit consists of an excavation from which limestone has been removed and the piles of rock fragments and other spoil material surrounding the excavation. In places the soil material is thick enough to support vegetation. The unit consists of one rectangular area 225 acres in size.

Surface runoff is rapid in the more sloping areas and ponded on the bottom of the excavation. Grading, shaping, and covering barren areas with soil material increase the number of possible uses. The feasibility and extent of reclamation should be based on the desired alternative use and on individual site conditions.

This map unit has not been assigned a land capability classification.

865—Pits, gravel. This map unit consists of excavations from which sand and gravel have been or are being removed and the piles of sand, gravel, and spoil material surrounding the excavations. In places the soil material is thick enough to support vegetation. Individual areas are circular or irregular in shape and range from less than 2 acres to 10 acres in size.

Included in this unit in mapping are some small areas of natural soils on haulage roads or lanes.

Surface runoff is slow. Ponding occurs on the bottom of the excavations.

Most of the acreage of this unit currently is idle land. Grading, shaping, and filling the pits increases the number of possible uses. The feasibility and extent of reclamation should be based on the desired alternative uses and on individual site conditions.

This map unit has not been assigned a land capability classification.

916—Oconee-Darmstadt silt loams. These nearly level, somewhat poorly drained soils are on low, broad ridges in the uplands. Individual areas are irregular in shape and range from 5 to 100 acres in size. They are about 50 to 70 percent Oconee soil and 20 to 35 percent Darmstadt soil. The two soils occur as areas so closely intermingled that mapping them separately is not practical.

Typically, the Oconee soil has a surface layer of very dark grayish brown, friable silt loam about 8 inches thick. The subsurface layer is grayish brown, mottled, friable silt loam about 5 inches thick. The subsoil is mottled, friable silty clay loam about 37 inches thick. The upper part is yellowish brown, and the lower part is grayish brown. The underlying material to a depth of 60 inches is grayish brown, mottled, friable silt loam. In some areas the surface layer is lighter in color. In other areas the soil does not have a subsurface layer. In some places the lower part of the subsoil contains more sand. In other places the depth to a seasonal high water table is less than 1 foot. In some areas the slope is more than 2 percent.

Typically, the Darmstadt soil has a surface layer of dark grayish brown, friable silt loam about 7 inches thick. The subsurface layer is friable silt loam about 6 inches thick. The upper part is grayish brown and dark grayish brown, and the lower part is grayish brown and light brownish gray and is mottled. The subsoil is mottled, firm silty clay loam 41 inches thick. The upper part is brown and grayish brown, and the lower part is gray and light brownish gray. The underlying material to a depth of 60 inches or more is light brownish gray, mottled, friable silty clay loam. In some places the lower part of the subsoil contains more clay. In other places it contains more sand. In some areas the depth to a seasonal high water table is less than 1 foot. In other areas it is more than 3 feet.

Included with these soils in mapping are small areas of the poorly drained Cowden soils. These included soils are lower on the landscape than the Oconee and Darmstadt soils. They make up 2 to 10 percent of the unit.

Water and air move through the Oconee soil at a slow rate and through the Darmstadt soil at a very slow rate. In cultivated areas surface runoff is slow on both soils. The seasonal high water table is at a depth of 1 to 3 feet during winter and spring. Available water capacity is high in the Oconee soil and moderate in the Darmstadt soil. Organic matter content is moderate in the Oconee soil and moderately low in the Darmstadt soil. The surface layer of both soils tends to crust and puddle after hard rains. The shrink-swell potential is high in the Oconee soil and moderate in the Darmstadt soil. The potential for frost action is high in both soils.

Most areas are used for cultivated crops. Some areas are used for pasture and hay. A few small areas are used as sites for dwellings and septic tank absorption fields. These soils are moderately suited to cultivated crops, pasture, and hay. They are poorly suited to dwellings and septic tank absorption fields.

Corn, soybeans, and small grain can be grown in most areas because a drainage system has been installed. Measures that maintain or improve the drainage system are needed. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. Because of a high content of sodium in the Darmstadt soil, the tile lines may become clogged. The sodium limits the availability of water and thus causes moisture stress late in the growing season and excess moisture during wet periods. It also limits the availability and uptake of some plant nutrients. Applying a conservation tillage system that leaves crop residue on the surface after planting and regularly adding other organic material help to prevent surface crusting, improve tilth and fertility, and increase the rate of water intake.

The seasonal high water table and the shrink-swell potential are limitations if these soils are used as sites for dwellings. Reinforcing the footings and foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface drains around the footings helps to lower the water table.

The seasonal high water table and the slow or very slow permeability are limitations if these soils are used as sites for septic tank absorption fields. Alternative sewage disposal systems, including mound systems, may be needed.

The land capability classification is IIIw.

995—Herrick-Piasa silt loams. These nearly level soils are on broad ridges and in depressions in the uplands. The somewhat poorly drained Herrick soil is on the ridges. The poorly drained Piasa soil is in the depressions (fig. 18). Individual areas are irregular in shape and range from 10 to more than 100 acres in size. They are about 40 to 60 percent Herrick soil and 20 to 35 percent Piasa soil. The two soils occur as areas so closely intermingled that mapping them separately is not practical.

Typically, the Herrick soil has a surface layer of very dark gray, friable silt loam about 10 inches thick. The subsurface layer is very dark grayish brown, friable silt loam about 4 inches thick. The subsoil is brown, mottled silty clay loam about 36 inches thick. The upper part is friable, the next part is firm, and the lower part is friable. The underlying material to a depth of 60 inches or more is grayish brown, mottled, friable silt loam. In some areas the subsoil has less clay. In other areas the seasonal high water table is at a depth of more than 3 feet. In places the subsurface layer is darker.

Typically, the Piasa soil has a surface layer of very dark gray, friable silt loam about 7 inches thick. The subsurface layer is dark gray, friable silt loam about 5 inches thick. The subsoil to a depth of 60 inches or more is mottled silty clay loam. In sequence downward, it is dark grayish brown and friable, dark grayish brown and firm, olive gray and firm, and olive gray and friable. In some areas the soil has no subsurface layer. In other areas the surface layer is lighter in color. In places the depth to a seasonal high water table is more than 2 feet.

Included with these soils in mapping are small areas of the moderately well drained Harrison and poorly drained Cowden and Virden soils. These included soils do not have a high content of sodium in the subsoil. Cowden soils are in landscape positions similar to those of the Piasa soil. Virden soils are on broad flats below the Herrick soil. Harrison soils are on side slopes along drainageways. Included soils make up 3 to 10 percent of the unit.

Water and air move through the Herrick soil at a moderately slow rate and through the Piasa soil at a very slow rate. In cultivated areas surface runoff is slow on the Herrick soil and slow or ponded on the Piasa soil. In winter and spring the seasonal high water table is at a depth of 1.0 to 3.0 feet in the Herrick soil and is 0.5 foot above to 2.0 feet below the surface of the Piasa soil. Available water capacity is high in the Herrick soil and moderate in the Piasa soil. Organic matter content is moderate in both soils. The Piasa soil has a high content of sodium in the subsoil. The surface layer of this soil tends to crust and puddle after hard

Figure 18.—An area of Herrick-Piasa silt loams. The poorly drained Piasa soil is in depressions. It has a high content of sodium.

rains. The shrink-swell potential and the potential for frost action are high in both soils.

Most areas are used for cultivated crops. A few small areas are used as sites for dwellings and septic tank absorption fields. These soils are moderately suited to cultivated crops. They are poorly suited to dwellings and septic tank absorption fields.

Corn, soybeans, and small grain can be grown in most areas because a drainage system has been installed. Measures that maintain or improve the drainage system are needed. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. Because of the high content of sodium in the Piasa soil, the tile lines may become clogged. The sodium limits the availability of water and thus causes moisture stress late in the growing season and excess moisture during wet periods. It also limits the availability and uptake of some plant nutrients. Applying a conservation tillage system that leaves crop residue on the surface after planting and regularly adding other organic material help to prevent surface crusting, improve tilth and fertility, and increase the rate of water intake.

The seasonal high water table and the shrink-swell potential are limitations if these soils are used as sites for dwellings. Reinforcing the footings and foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface drains around the footings helps to lower the water table. Elevating the floor of dwellings without basements above the surrounding ground level, grading, and diverting surface water also help to overcome the wetness.

The seasonal high water table and the restricted permeability are limitations if these soils are used as sites for septic tank absorption fields. Alternative sewage disposal systems, including mound systems, may be needed.

The land capability classification is IIIw.

2036B—Tama-Urban land complex, 2 to 5 percent slopes. This map unit occurs as areas of a gently sloping, moderately well drained Tama soil intermingled with areas of Urban land. The unit is on convex ridgetops and side slopes. Individual areas are irregular in shape and range from 80 to 240 acres in size. They are 45 to 55 percent Tama soil and 30 to 40 percent Urban land. The Tama soil and Urban land occur as areas so intricately mixed that mapping them separately is not practical.

Typically, the Tama soil has a surface layer of black, friable silt loam about 3 inches thick. The subsurface layer is very dark grayish brown, friable silt loam about 13 inches thick. The subsoil is about 38 inches thick. The upper part is dark yellowish brown, friable silt loam and firm silty clay loam; the next part is yellowish brown, friable silty clay loam; and the lower part is yellowish brown, friable silt loam. The underlying material to a depth of 60 inches or more is brown, mottled, friable silt loam. Some areas have been altered by scraping and leveling or by filling during construction. In some places the surface layer is lighter in color. In other places a very firm, clayey buried soil is within a depth of 40 inches.

The Urban land is covered by streets, parking lots, buildings, and other structures that so obscure the soils that identification of the soil series is not practical.

Included in this unit in mapping are small areas of the somewhat poorly drained Ipava and poorly drained Sable soils. These soils are on low ridges and in drainageways below the Tama soil. They make up 5 to 10 percent of the unit.

Water and air move through the Tama soil at a moderate rate. Surface runoff is medium on the Tama soil and rapid on the Urban land. The seasonal high water table is 4 to 6 feet below the surface of the Tama soil during winter and spring. Available water capacity is very high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

The Tama soil is used as a site for dwellings and septic tank absorption fields. It is moderately suited to those uses.

If the Tama soil is used as a site for dwellings, the shrink-swell potential is a limitation. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling. The seasonal high water table is a limitation on sites for dwellings with basements. Installing tile drains near the foundations lowers the water table.

Most homes and buildings in areas of this unit are connected to a sanitary sewer system and treatment facility. If the Tama soil is used as a site for septic tank absorption fields, the seasonal high water table is a limitation. Subsurface tile can lower the water table.

This map unit has not been assigned a land capability classification.

2043—Ipava-Urban land complex. This map unit occurs as areas of a nearly level, somewhat poorly drained Ipava soil intermingled with areas of Urban land. The unit is on low, broad ridges in the uplands. Individual areas are irregular in shape and range from 10 to 300 acres in size. They are 55 to 65 percent Ipava soil and 35 to 45 percent Urban land. The Ipava soil and Urban land occur as areas so intricately mixed that mapping them separately is not practical.

Typically, the Ipava soil has a surface layer and subsurface layer of black, friable silt loam. The combined thickness of these layers is about 18 inches. The subsoil is mottled, firm silty clay loam about 25 inches thick. The upper part is brown, and the lower part is grayish brown. The underlying material to a depth of 60 inches or more is light brownish gray, mottled, friable silt loam. Some areas have been altered by scraping and leveling or by filling during construction. In places the depth to a seasonal high water table is more than 3 feet.

The Urban land is covered by streets, parking lots, buildings, and other structures that so obscure the soils that identification of the soil series is not practical.

Included in this unit in mapping are small areas of the poorly drained Sable soils and the moderately well drained Tama soils. Sable soils are in low areas. Tama soils are on the more sloping parts of the landscape. Included soils make up 10 to 15 percent of the unit.

Water and air move through the Ipava soil at a moderately slow rate. Surface runoff is slow on the Ipava soil and rapid on the Urban land. Most areas are drained through storm sewers, gutters, and subsurface drainage tile. Areas of the Ipava soil that have not been drained have a seasonal high water table 1 to 3 feet below the surface during winter and spring. Available water capacity and organic matter content are high. The shrink-swell potential and the potential for frost action also are high.

The Ipava soil is used as a site for dwellings and septic tank absorption fields. It is poorly suited to those uses.

If the Ipava soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Installing subsurface tile drains near the foundations helps to overcome the wetness. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Most homes and buildings in areas of this unit are connected to a sanitary sewer system and treatment facility. If the Ipava soil is used as a site for septic tank absorption fields, the seasonal high water table and the moderately slow permeability are limitations. Alternative sewage disposal systems, including mound systems, may be needed.

This map unit has not been assigned a land capability classification.

2046—Herrick-Urban land complex. This map unit occurs as areas of a nearly level, somewhat poorly drained Herrick soil intermingled with areas of Urban land. The unit is on low ridges in the uplands. Individual areas are irregular in shape and range from 10 to 200 acres in size. They are 50 to 60 percent Herrick soil and 30 to 40 percent Urban land. The Herrick soil and Urban land occur as areas so intricately mixed that mapping them separately is not practical.

Typically, the Herrick soil has a surface layer of very dark gray, friable silt loam about 11 inches thick. The subsurface layer is very dark grayish brown, friable silt loam about 3 inches thick. The subsoil is mottled silty clay loam about 40 inches thick. The upper part is dark grayish brown and dark brown and is friable and firm; the next part is brown and firm; and the lower part is brown and light brownish gray and is firm. The underlying material to a depth of 60 inches is brown and light brownish gray silt loam. In some places the subsoil has less clay. In other places the surface layer is thinner. Some areas have been altered by scraping and leveling or by filling during construction.

The Urban land is covered by streets, parking lots, buildings, and other structures that so obscure the soils that identification of the soil series is not possible.

Included in this unit in mapping are small areas of the moderately well drained Harrison soils. These soils are on side slopes and convex ridgetops. They make up 3 to 8 percent of the unit.

Water and air move through the Herrick soil at a moderately slow rate. Surface runoff is slow on the Herrick soil and rapid on the Urban land. Most areas are drained through storm sewers, gutters, and subsurface drainage tile. Areas of the Herrick soil that have not been drained have a seasonal high water table 1 to 3 feet below the surface during winter and spring. Available water capacity and organic matter content are high. The shrink-swell potential and the potential for frost action also are high.

The Herrick soil is used as a site for dwellings and septic tank absorption fields. It is poorly suited to those uses.

If the Herrick soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Installing subsurface tile drains near the foundations helps to overcome the wetness. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Most homes and buildings in areas of this unit are connected to a sanitary sewer system and treatment facility. If the Herrick soil is used as a site for septic tank absorption fields, the seasonal high water table and the moderately slow permeability are limitations. Alternative sewage disposal systems, including mound systems, may be needed.

This map unit has not been assigned a land capability classification.

2050—Virden-Urban land complex. This map unit occurs as areas of a nearly level, poorly drained Virden soil intermingled with areas of Urban land. The unit is on broad flats in the uplands. It is occasionally ponded for brief periods. Individual areas are irregular in shape and range from 2 to more than 640 acres in size. They are 50 to 65 percent Virden soil and 35 to 50 percent Urban land. The Virden soil and Urban land occur as areas so intricately mixed that mapping them separately is not practical.

Typically, the Virden soil has a surface layer of very dark gray, firm silty clay loam about 9 inches thick. The subsurface layer also is very dark gray, firm silty clay loam. It is about 3 inches thick. The subsoil is mottled, firm silty clay loam about 40 inches thick. The upper part is very dark gray, the next part is dark grayish brown, and the lower part is olive gray. The underlying material to a depth of 60 inches or more is light olive gray, mottled, firm silt loam. Some of the lower areas have been filled or leveled during construction. Some small areas have been cut, built up, or smoothed.

The Urban land is covered by streets, parking lots, buildings, and other structures that so obscure the soils that identification of the soil series is not practical.

Included in this unit in mapping are small areas of the very poorly drained Denny soils, the somewhat poorly drained Ipava soils, and the moderately well drained Tama soils. Denny soils have a dark surface layer that is thinner than that of the Virden soil. They are in shallow depressions. Ipava soils are slightly higher on the landscape than the Virden soil. Tama soils are on the more sloping parts of the landscape. Included soils make up 10 to 25 percent of the unit.

Water and air move through the Virden soil at a moderately slow rate. Surface runoff is slow or ponded on the Virden soil and rapid on the Urban land. Most areas are drained through storm sewers, gutters, and subsurface drainage tile. Areas of the Virden soil that have not been drained have a seasonal high water table 0.5 foot above to 2.0 feet below the surface during winter and spring. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate, and the potential for frost action is high.

The Virden soil is used as a site for dwellings and septic tank absorption fields. It is poorly suited to those uses.

The seasonal high water table and the shrink-swell potential are limitations if the Virden soil is used as a site for dwellings. Reinforcing the footings and foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface drains around the footings helps to lower the water table. Elevating the floor of dwellings without basements above the surrounding ground level, grading, and diverting surface water also help to overcome the wetness.

Most homes and other buildings in areas of this unit are connected to a sanitary sewer system and treatment facility. The seasonal high water table and the moderately slow permeability are limitations if the Virden soil is used as a site for septic tank absorption fields. Alternative sewage disposal systems, including mound systems, may be needed.

This map unit has not been assigned a land capability classification.

2068—Sable-Urban land complex. This map unit occurs as areas of a nearly level, poorly drained Sable soil intermingled with areas of Urban land. The unit is on broad flats in the uplands. It is occasionally ponded for brief periods. Individual areas are irregular in shape and range from 2 to more than 640 acres in size. They are 50 to 65 percent Sable soil and 35 to 50 percent Urban land. The Sable soil and Urban land occur as areas so intricately mixed that mapping them separately is not practical.

Typically, the Sable soil has a surface layer of black, friable silty clay loam about 8 inches thick. The subsurface layer is very dark gray, friable silty clay loam about 5 inches thick. The subsoil is about 38 inches thick. The upper part is very grayish brown, mottled, friable silty clay loam; the next part is grayish brown, mottled, friable silty clay loam; and the lower part is light brownish gray, mottled, friable silt loam. The underlying material to a depth of 60 inches or more also is light brownish gray, mottled, friable silt loam. Some of the lower areas have been filled or leveled during construction. Some small areas have been cut, built up, or smoothed.

The Urban land is covered by streets, parking lots, buildings, and other structures that so obscure the soils that identification of the soil series is not practical.

Included in this unit in mapping are small areas of the very poorly drained Denny soils, the somewhat poorly drained Ipava soils, and the moderately well drained Tama soils. Denny soils have a dark surface layer that is thinner than that of the Sable soil. They are in shallow depressions. Ipava soils are slightly higher on the landscape than the Sable soil. Tama soils are on the more sloping parts of the landscape. Included soils make up 10 to 25 percent of the unit.

Water and air move through the Sable soil at a moderate rate. Surface runoff is slow or ponded on the Sable soil and rapid on the Urban land. Most areas are drained through storm sewers, gutters, and subsurface drainage tile. Areas of the Sable soil that have not been drained have a seasonal high water table 0.5 foot above to 2.0 feet below the surface during winter and spring. Available water capacity is very high. Organic matter content is high. The shrink-swell potential is moderate, and the potential for frost action is high.

The Sable soil is used as a site for dwellings and septic tank absorption fields. It is poorly suited to those uses.

The seasonal high water table and the shrink-swell potential are limitations if the Sable soil is used as a site for dwellings. Reinforcing the footings and foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface drains around the footings helps to lower the water table. Elevating the floor of dwellings without basements above the surrounding ground level, grading, and diverting surface water also help to overcome the wetness.

Most homes and other buildings in areas of this unit are connected to a sanitary sewer system and treatment facility. The seasonal high water table and the moderate permeability are limitations if the Sable soil is used as a site for septic tank absorption fields. Alternative sewage disposal systems, including mound systems, may be needed.

This map unit has not been assigned a land capability classification.

2128C—Douglas-Urban land complex, 5 to 10 percent slopes. This map unit occurs as areas of a moderately sloping, well drained Douglas soil intermingled with areas of Urban land. The unit is on narrow ridges and side slopes in the uplands. Individual areas are circular or irregular in shape and range from 10 to 60 acres in size. They are 40 to 65 percent

Douglas soil and 35 to 45 percent Urban land. The Douglas soil and Urban land occur as areas so intricately mixed that mapping them separately is not practical.

Typically, the Douglas soil has a surface layer of very dark grayish brown, friable silt loam about 15 inches thick. The subsoil extends to a depth 60 inches or more. The upper part is dark yellowish brown, friable silt loam and firm silty clay loam; the next part is dark yellowish brown, friable silt loam; and the lower part is brown, friable silt loam and loam. In some areas the surface layer is thinner and lighter in color. Some areas have been altered by scraping and leveling or by filling during construction. In places the subsoil contains more sand.

The Urban land is covered by streets, parking lots, buildings, and other structures that so obscure the soils that identification of the soil series is not practical.

Included in this unit in mapping are small areas of the somewhat poorly drained Oconee soils. These soils are on foot slopes downslope from the Douglas soil. They make up 5 to 10 percent of the unit.

Water and air move through the Douglas soil at a moderate rate. Surface runoff is medium on the Douglas soil and rapid on the Urban land. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

The Douglas soil is used as a site for dwellings and septic tank absorption fields. It is moderately suited to dwellings and well suited to septic tank absorption fields.

If the Douglas soil is used as a site for dwellings, the shrink-swell potential is a limitation. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

This map unit has not been assigned a land capability classification.

3073—Ross silty clay loam, frequently flooded. This nearly level, well drained soil in on flood plains. It is frequently flooded for brief periods during winter and spring. Individual areas are irregular in shape and range from 10 to 100 acres in size.

Typically, the surface layer is very dark gray, friable silty clay loam about 10 inches thick. The subsurface layer is very dark grayish brown, friable silt loam about 5 inches thick. The subsoil is about 30 inches thick. It is friable. The upper part is very dark grayish brown loam that has strata of dark brown and brown fine sandy loam, and the lower part is brown, mottled loam that has strata of fine sandy loam. The underlying material to a depth of 60 inches or more is stratified brown and very dark grayish brown, mottled, friable loam and fine sandy loam. In some areas the surface layer is thinner or lighter in color. In other areas the soil contains more sand. In places the depth to a seasonal high water table is less than 4 feet.

Included with this soil in mapping are small areas of the somewhat poorly drained Tice and poorly drained Sawmill soils. These soils are slightly lower on the flood plains than the Ross soil. They make up less than 10 percent of the unit.

Water and air move through the Ross soil at a moderate rate. In cultivated areas surface runoff is slow. The seasonal high water table is 4 to 6 feet below the surface during winter and spring. Available water capacity is moderate. Organic matter content is high. The shrink-swell potential and the potential for frost action are moderate.

Most areas are cultivated. This soil is well suited to cultivated crops. It is generally unsuited to dwellings and septic tank absorption fields because of the flooding.

In areas used for corn or soybeans, the flooding is a hazard. Dikes or diversions can reduce the extent of the crop damage caused by floodwater. Selecting crop varieties adapted to shorter growing seasons and wetter conditions also reduces the extent of crop damage. A conservation tillage system that leaves crop residue on the surface after planting helps to maintain tilth and fertility.

The land capability classification is IIw.

3074—Radford silt loam, frequently flooded. This nearly level, somewhat poorly drained soil in on low, broad rises on flood plains. It is frequently flooded for brief periods during winter and spring. Individual areas are long and narrow and range from 3 to 400 acres in size.

Typically, the surface layer is very dark gray, friable silt loam about 8 inches thick. The subsurface layer is very dark grayish brown, mottled, friable silt loam about 3 inches thick. The upper part of the underlying material is stratified very dark grayish brown and dark grayish brown, friable silt loam. The lower part to a depth of more than 60 inches is very dark gray, firm silty clay loam. In some places the underlying material is silt loam to a depth of more than 40 inches. In other places the dark surface layer is thicker.

Included with this soil in mapping are small areas of the poorly drained Sawmill soils. These soils are slightly lower on the flood plains than the Radford soil. They make up 5 to 10 percent of the unit.

Water and air move through the Radford soil at a moderate rate. In cultivated areas surface runoff is slow. The seasonal high water table is 1 to 3 feet below the surface during winter and spring. Available water capacity is very high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. Some areas are used for pasture and hay. This soil is well suited to cultivated crops. It is moderately suited to pasture and hay. It generally is unsuited to dwellings and septic tank absorption fields because of the flooding.

Corn, soybeans, and small grain can be grown in most areas because a drainage system has been installed. Measures that maintain or improve the drainage system are needed. Surface drains and subsurface tile function satisfactorily if suitable outlets are available. Flooding is a hazard. It occurs during the growing season more often than once every 2 years. Dikes or diversions can reduce the extent of the crop damage caused by floodwater. Applying a conservation tillage system that leaves crop residue on the surface after planting and regularly adding other organic material improve tilth and fertility and increase the rate of water intake.

If this soil is used for pasture or hay, the flooding is a hazard and the seasonal wetness is a limitation. Dikes and diversions help to control the flooding, and subsurface tile drains lower the water table. Overgrazing causes surface compaction and poor tilth. Proper stocking rates, rotation grazing, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition. The flooding delays harvesting of hay in some years.

The land capability classification is IIIw.

3107—Sawmill silty clay loam, frequently flooded. This nearly level, poorly drained soil is in low areas on flood plains. It is frequently flooded for brief periods during winter and spring (fig. 19). Individual areas are irregular in shape and range from 5 to more than 1,000 acres in size.

Typically, the surface layer is very dark gray, friable silty clay loam about 7 inches thick. The subsurface layer is very dark gray, firm silty clay loam about 15 inches thick. The subsoil to a depth of 60 inches or more is firm silty clay loam. The upper part is very dark grayish brown, and the lower part is dark gray and mottled. In some areas the surface layer is thinner. In some places the lower part of the subsoil has more sand. In other places the subsoil has more clay.

Included with this soil in mapping are small areas of the well drained Ross soils. These soils are higher on the landscape than the Sawmill soil. They make up 5 to 10 percent of the unit.

Water and air move through the Sawmill soil at a moderate rate. In cultivated areas surface runoff is slow. The seasonal high water table is within 2 feet of the surface during winter and spring. Available water capacity is high. Organic matter content also is high. The surface layer is firm and sticky when wet and hard and cloddy when dry. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. Some areas are used for pasture and hay. A few small areas are used as woodland. This soil is well suited to cultivated crops and poorly suited to pasture and hay. It is moderately suited to woodland. It generally is unsuited to dwellings and septic tank absorption fields because of the flooding.

Corn and soybeans can be grown in most areas because a drainage system has been installed. Measures that maintain or improve the drainage system are needed. Surface drains and subsurface tile function satisfactorily if suitable outlets are available. Flooding is a hazard. It occurs during the growing season more often than once every 2 years. Dikes or diversions can reduce the extent of the crop damage caused by floodwater. Tilling when the soil is wet causes surface compaction, cloddiness, and crusting. Applying a conservation tillage system that leaves crop residue on the surface after planting and regularly adding other organic material help to prevent surface compaction and crusting, improve tilth and fertility, and increase the rate of water intake.

If this soil is used for pasture or hay, the flooding is a hazard and the seasonal wetness is a limitation. Dikes and diversions help to control the flooding, and subsurface tile drains lower the water table. Overgrazing causes surface compaction and poor tilth. Proper stocking rates, rotation grazing, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition. The flooding delays harvesting of hay in some years.

In the areas used as woodland, the equipment limitation, seedling mortality, and windthrow are management concerns. They are caused by the wetness. Plant competition also is a management concern. It restricts the growth of desirable seedlings. Machinery should be used only when the soil is firm enough to support the equipment. The seedling mortality rate can be reduced by planting on ridges, by selecting planting stock that is older and larger than is typical, or by mulching. Some replanting may be needed. Harvesting methods that do not isolate the remaining trees or leave them widely spaced reduce the windthrow hazard. For example, only high-value trees should be removed from a strip 50 feet wide along the west and south edges of the woodland. Plant competition can be controlled by chemical or

Figure 19.—Flooding in an area of Sawmill silty clay loam, frequently flooded.

mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

The land capability classification is IIIw.

3284—Tice silty clay loam, frequently flooded. This nearly level, somewhat poorly drained soil is on broad rises on flood plains. It is frequently flooded for brief periods during winter and spring. Individual areas are irregular in shape and range from 5 to 400 acres in size.

Typically, the surface layer is very dark grayish brown, firm silty clay loam about 8 inches thick. The subsurface layer is very dark grayish brown, mottled, firm silty clay loam about 6 inches thick. The subsoil to a depth of more than 60 inches is mottled, firm silty clay loam. The upper part is brown, and the lower part is grayish brown. In some areas the surface soil is thicker. In a few areas the lower part of the subsoil contains more sand. In places the upper part of the soil is grayer.

Included with this soil in mapping are small areas of the well drained Ross soils. These soils are slightly higher on the landscape than the Tice soil. They make up 5 to 8 percent of the unit.

Water and air move through the Tice soil at a moderate rate. In cultivated areas surface runoff is slow. The seasonal high water table is 1.5 to 3.0 feet below the surface during winter and spring. Available water capacity is high. Organic matter content is moderate. The surface layer is firm and sticky when wet and hard and cloddy when dry. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. Some areas are used for pasture, hay, or woodland. This soil is well suited to cultivated crops, pasture, hay, and woodland. It is generally unsuited to dwellings and septic tank absorption fields because of the flooding.

Corn and soybeans can be grown in most areas because a drainage system has been installed. Measures that maintain or improve the drainage system are needed. Surface drains and subsurface tile function satisfactorily if suitable outlets are available. Flooding is a hazard. It occurs more often than once every 2 years during the growing season. Dikes or diversions can reduce the extent of the crop damage caused by floodwater. Tilling when the soil is wet causes surface compaction, cloddiness, and crusting. Applying a conservation tillage system that leaves crop residue on the surface after planting and regularly adding other organic material help to prevent surface compaction and crusting, improve tilth and fertility, and increase the rate of water intake.

If this soil is used for pasture or hay, the flooding is a hazard and the seasonal wetness is a limitation. Dikes and diversions help to control the flooding, and subsurface tile drains lower the water table. Overgrazing causes surface compaction and poor tilth. Proper stocking rates, rotation grazing, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition. The flooding delays harvesting of hay in some years.

In the areas used as woodland, plant competition is a management concern. It restricts the growth of desirable seedlings. The competition from undesirable vegetation in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

The land capability classification is IIIw.

7148—Proctor silt loam, rarely flooded. This nearly level, moderately well drained soil is on low stream terraces. It is subject to rare flooding. Individual areas are irregular in shape and range from 5 to 50 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 10 inches thick. The subsurface layer is dark brown, friable silt loam about 6 inches thick. The subsoil is about 37 inches thick. The upper part is brown, firm silty clay loam and clay loam; the next part is strong brown, friable, stratified clay loam and loam; and the lower part is brown, friable sandy loam. The underlying material to a depth of 60 inches is brown, very friable loamy sand. In some areas the subsoil has more sand.

Included with this soil in mapping are small areas of the somewhat poorly drained Kendall soils. These soils are lower on the landscape than the Proctor soil. They make up 3 to 7 percent of the unit.

Water and air move through the Proctor soil at a moderate rate. In cultivated areas surface runoff is slow. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. Some areas are used for pasture and hay. This soil is well suited to cultivated crops, pasture, and hay. It generally is unsuited to dwellings and septic tank absorption fields because of the flooding.

No major limitations affect the use of this soil for corn, soybeans, or small grain. A conservation tillage system that leaves crop residue on the surface after planting helps to maintain tilth and fertility.

Suitable forage and hay plants grow well on this soil. Overgrazing reduces forage yields and causes surface compaction and excessive runoff. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

The land capability classification is I.

7242—Kendall silt loam, rarely flooded. This nearly level, somewhat poorly drained soil is on low stream terraces. It is subject to rare flooding. Individual areas are irregular in shape and range from 3 to 25 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 9 inches thick. The subsurface layer is grayish brown, friable silt loam about 4 inches thick. The subsoil is about 44 inches thick. It is mottled and friable. The upper part is dark yellowish brown and yellowish brown silty clay loam, and the lower part is grayish brown silt loam. The underlying material to a depth of 60 inches or more also is grayish brown silt loam. In places the surface layer is thicker and darker.

Included with this soil in mapping are small areas of the moderately well drained Proctor soils and the poorly drained Thorp soils. Proctor soils are on the slightly higher parts of the landscape, and Thorp soils are on the lower parts. Included soils make up 2 to 10 percent of the unit.

Water and air move through the Kendall soil at a moderate rate. In cultivated areas surface runoff is slow. The seasonal high water table is 1 to 3 feet below the surface during winter and spring. Available water capacity is high. Organic matter content is moderately low. The surface layer tends to crust and puddle after hard rains. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. Some areas are used for pasture, hay, or woodland. This soil is well suited to cultivated crops, pasture, and hay. It is moderately suited to woodland. It is generally unsuited to dwellings and septic tank absorption fields because of the flooding.

Corn, soybeans, and small grain can be grown in most areas because a drainage system has been installed. Measures that maintain or improve the drainage system are needed. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. Land grading helps to control ponding. Tilling when the soil is wet causes surface compaction, cloddiness, and crusting. Applying a conservation tillage system that leaves crop residue on the surface after planting and adding other organic material help to prevent surface compaction and crusting, improve tilth, and increase the rate of water intake.

Suitable forage and hay plants grow well on this soil. Subsurface tile drains can reduce the wetness if suitable outlets are available. Overgrazing or grazing when the soil is too wet reduces forage yields and causes surface compaction and excessive runoff. Proper stocking rates, pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

In the areas used as woodland, plant competition is a management concern. It restricts the growth of desirable seedlings. The competition from undesirable vegetation in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

The land capability classification is IIw.

8206—Thorp silt loam, occasionally flooded. This nearly level, poorly drained soil is in low areas on stream terraces. It is occasionally flooded for brief periods during winter and spring. Individual areas are oval or oblong and range from 3 to 40 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 10 inches thick. The subsurface layer is gray, mottled, friable silt loam about 13 inches thick. The subsoil extends to a depth of more than 60 inches. It is mottled and friable. The upper part is gray silty clay loam, the next part is grayish brown silty clay loam, and the lower part is grayish brown, stratified clay loam, loam, sandy loam, and loamy sand. In some areas the subsoil contains more clay. In a few areas, the surface layer contains more clay and the subsurface layer is darker. In places the surface layer is lighter in color.

Included with this soil in mapping are small areas of the somewhat poorly drained Elburn and Kendall soils, the well drained Camden soils, and the poorly drained Sawmill soils. Elburn, Kendall, and Camden soils are slightly higher on the landscape than the Thorp soil. Sawmill soils have a dark surface layer that is thicker than that of the Thorp soil. They are on flood plains below the Thorp soil. Included soils make up 2 to 10 percent of the unit.

Water and air move through the upper part of the Thorp soil at a slow rate and through the lower part at a moderately rapid rate. In cultivated areas surface runoff is slow or ponded. The seasonal high water table is within a depth of 2 feet during winter and spring. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops. It generally is unsuited to dwellings and septic tank absorption fields because of the flooding.

Corn, soybeans, and small grain can be grown in most areas because a drainage system has been installed. Measures that maintain or improve the drainage system are needed. Surface drains and subsurface tile function satisfactorily if suitable outlets are available. Flooding is a hazard. It occurs less often than once every 2 years during the growing season. Dikes or diversions can reduce the extent of the crop damage caused by floodwater. Tilling when the soil is wet causes surface compaction, cloddiness, and crusting. Applying a conservation tillage system that leaves crop residue on the surface after planting and regularly adding other organic material help to prevent surface compaction and crusting, improve tilth and fertility, and increase the rate of water intake.

If this soil is used for pasture or hay, the flooding is a hazard and the seasonal wetness is a limitation. Dikes and diversions help to control the flooding, and subsurface tile drains lower the water table. Overgrazing causes surface compaction and poor tilth. Proper stocking rates, rotation grazing, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition. The flooding delays harvesting of hay in some years.

The land capability classification is IIw.

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short-and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is the land that is best suited to food, feed, forage, fiber, and oilseed crops. It may be cultivated land, pasture, woodland, or other land, but it is not urban or built-up land or water areas. It either is used for food or fiber crops or is available for those crops. The soil qualities, growing season, and moisture supply are those needed for a well managed soil to produce a sustained high yield of crops in an economic matter. Prime farmland produces the highest yields with minimal expenditure of energy and economic resources, and farming it results in the least damage to the environment.

Prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The level of acidity or alkalinity is acceptable. Prime farmland has few or no rocks and is permeable to water and air. It is not excessively erodible or saturated with water for long periods and is not frequently flooded during the growing season. The slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Soil Conservation Service.

About 407,250 acres in Christian County, or nearly 89 percent of the total acreage, meets the requirements for prime farmland. This land generally is used for crops, mainly corn and soybeans, which account for most of the local farm income each year.

The map units in Christian County that are considered prime farmland are listed in table 5. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

Some soils that have a seasonal high water table and all soils that are frequently flooded during the growing season qualify as prime farmland only in areas where these limitations have been overcome by drainage measures or flood control. The need for these measures is indicated after the map unit name in table 5. Onsite evaluation is needed to determine whether or not these limitations have been overcome by corrective measures. An adequate drainage system has been installed in most of the naturally wet soils in Christian County.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and for wildlife habitat. It can be used to identify the limitations of each soil for specific land uses and to help to prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

Approximately 382,955 acres in Christian County was used as farmland in 1982 *(10)*. About 13,000 acres of this farmland was used for pasture and hay. The acreage used for pasture and hay has been decreasing because livestock confinement systems have been increasing in number and more land is being used for row crops. Corn and soybeans, the main row crops, are grown on about 350,000 acres in the county. About 12,000 acres is used for winter wheat, the most common close-growing crop. Forage crops include smooth bromegrass, alfalfa, and red clover.

The concerns in managing the cropland and pasture in the county are water erosion, soil blowing, wetness, flooding, fertility, tilth, and limited soil moisture.

Water erosion is a major management concern on about 26 percent of the land in the county. Where the slope is more than 2 percent, erosion is a hazard. Tama, Harrison, Rozetta, and Elco are examples of erodible soils that are used for crops and pasture in the county.

Loss of the surface layer through erosion is damaging for two reasons. First, productivity is reduced as the surface layer is lost and part of the subsoil is incorporated into the plow layer. Loss of the surface layer is especially damaging on soils having a subsoil that is unfavorable for plant growth, such as Atlas and Coatsburg soils, and on soils that tend to be droughty, such as Alvin soils. Second, erosion on farmland results in sedimentation in streams and other bodies of water. Control of erosion minimizes this pollution and improves the quality of water available for municipal and recreational uses and for fish and wildlife.

Preparing a good seedbed and tilling are difficult on clayey spots in many fields because the original friable surface layer has been lost through erosion. Such spots are common in areas of Atlas and Hickory soils.

Measures that control erosion provide a protective plant cover, increase the rate of water infiltration, and reduce the runoff rate. A cropping system that keeps plants on the surface for extended periods reduces the susceptibility to erosion and preserves the productive capacity of soils. On livestock farms, where pasture and hay are needed, including forage crops of grasses and legumes in the cropping sequence helps to control erosion in the more sloping areas. Legumes also provide nitrogen and improve tilth for the following crop.

Terraces reduce the susceptibility to erosion by reducing the length of slopes and controlling runoff. If a tile outlet terrace is used, the water that collects behind the terrace is removed by the tile at a slow, controlled rate. Contour farming helps to control erosion through the formation of small ridges perpendicular to the slope of the land. The ridges greatly reduce the velocity and volume of the water moving down the slope.

A conservation tillage system that leaves crop residue on the surface after planting is very effective in controlling erosion. In areas where this system has been applied, the surface is rough and is partly covered with crop residue. The crop residue increases the rate of water infiltration by improving tilth, protects the surface from the beating action of raindrops, helps to prevent surface crusting, and generally provides a more friable seedbed for good germination. Two types of conservation tillage used in Christian County are chisel-tillage and no-till. In areas where a no-till system is applied, all of the residue from previous crop is left on the surface. In areas where a chisel-tillage system is applied, 30 percent or more of the surface is covered with crop residue at planting time.

Erosion-control measures are effective alone or in combination on most of the farmland in the county. The combination used and its effectiveness depend on soil characteristics and topography. Information about the design of erosion-control measures for each kind of soil is provided in the Technical Guide, available in the local office of the Soil Conservation Service.

Soil blowing is a hazard in areas where Alvin and El Dara soils are used for cultivated crops. Alvin soils have a surface layer of fine sandy loam, and El Dara soils have one of sandy loam or loam. Maintaining a plant cover or a surface mulch or keeping the surface rough through proper tillage minimizes soil blowing. Field windbreaks also are effective in controlling soil blowing.

Wetness is a management concern on much of the acreage used for crops and pasture in the county. Most of the soils are already drained by tile, but many drainage systems are old and in need of repair if maximum efficiency is to be achieved.

Some soils are naturally so wet that the production of crops generally would not be possible without a drainage system. These are Cowden, Denny, Ebbert, Edinburg, Harpster, and other poorly drained or very poorly drained soils. Most of these soils have been drained. Unless a drainage system is installed, the wetness of Clarksdale, Oconee, Herrick, Keomah, and other somewhat poorly drained soils can delay planting during some years.

Assumption, Atlas, Coatsburg, and Elco soils generally are not wet, but they have a firm or very firm, clayey paleosol that restricts the downward movement of water. The water tends to perch on the clayey layer. As a result, seepage is a problem in areas on side slopes where the paleosol is exposed. The wetness of these seepy areas occasionally delays planting or harvesting.

Wetness is a particular problem in Piasa and Darmstadt soils. These soils have an excessive amount of sodium, which restricts the movement of water and the availability and uptake of some plant nutrients.

The design of surface and subsurface drainage systems varies with the kind of soil and the availability of drainage outlets. In some areas of the poorly drained soils in depressions, a combination of surface drains and tile drains is needed. The tile should be more closely spaced in the more slowly permeable soils than in the more rapidly permeable soils. Further information about drainage systems is provided in the Technical Guide, available in the local office of the Soil Conservation Service.

Flooding is a hazard in some areas of the county. Some soils are flooded by stream overflow almost yearly. Some are flooded during the growing season less frequently than once every 2 years. Others are flooded only on rare occasions. The flood-prone soils are better suited to the crop varieties that require a relatively short growing season than to other varieties. Also, they are better suited to the less intensive land uses than to the more intensive uses.

Fertility varies in the soils on uplands in Christian County. The light colored soils, such as Keomah and Rozetta soils, are more acid in the subsoil and less fertile than the dark Tama, Ipava, and Herrick soils. Radford and Sawmill soils on flood plains are neutral to moderately alkaline throughout and are naturally high in content of plant nutrients. Soils that are severely eroded have lost nearly all of their nutrient-rich topsoil. The severely eroded Atlas and Hickory soils are examples. They are much less fertile than the less eroded Atlas and Hickory soils.

Most of the light colored soils on uplands are naturally acid. Periodic applications of lime are needed on these soils. They also are needed on some dark soils that have a low pH.

Natural phosphorus levels in the soils on loess-covered uplands are high. On all soils, the kind and amount of lime and fertilizer to be applied should be based on the results of soil tests, the needs of the crop, and the desired level of yields. The Cooperative Extension Service can help in determining the kind and amount needed.

Tilth affects the germination of seeds and the rate of water infiltration. Some of the soils in Christian County have a surface layer of silt loam that is low in content of organic matter. Generally, tillage has weakened the structure of these soils. A crust forms on the surface during periods of intensive rainfall. The crust is hard when dry and is nearly impervious to water. It reduces the infiltration rate and increases the runoff rate and the susceptibility to erosion. Regular additions of crop residue, manure, and other organic material improve soil structure and help to prevent crusting. A conservation tillage system that leaves crop residue on the surface after planting also helps to prevent crusting.

Deterioration of tilth can be a problem in the dark, very poorly drained Edinburg soils and the poorly drained Harpster, Hartsburg, Sable, Sawmill, and Virden soils. These soils have a surface layer of silty clay loam. They stay wet until late in the spring. If they are tilled when wet, they tend to become very cloddy as they dry. Because of the cloddiness, preparing a good seedbed is difficult.

A surface layer of silt loam or silty clay loam commonly has a plowsole, or plowpan, in the lower part. This pan reduces the rate of water infiltration and increases the runoff rate and thus the susceptibility to erosion.

The need for an adequate amount of soil moisture during dry years is a management concern in soils that have a root-restricting subsoil. These soils have a moderate or low available water capacity. Examples are Alvin, Atlas, and El Dara soils.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of each map unit also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents *(3)*. Available yield data from nearby counties and results of field trials and demonstrations also are considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management *(8)*. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and units. Only class and subclass are used in this survey.

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. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

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

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

Class IV soils have very severe limitations that reduce the choice of plants or that 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.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

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 hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c,* used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

The acreage of soils in the capability class and subclass is shown in table 7. The capability classification of each map unit is given in the section "Detailed Soil Map Units" and in the yields table.

Woodland Management and Productivity

Woodland is of minor extent in Christian County. In 1982, about 8,170 acres of farmland in the county was used for timber *(10).* Since early settlement, much of the woodland has been cleared and used for row crops. Most of the woodland is adjacent to rivers and streams, in areas that are too steep, too wet, or too remote and isolated for cropping. The timber on bottom land generally includes soft maple, cottonwood, sycamore, and willow. The timber on uplands generally consists of various mixtures of white oak, black oak, other oaks, hickories, and other species.

Table 8 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol,* a number, indicates the potential productivity of the soils for an indicator tree species. The number indicates the volume, in cubic meters per hectare per year, which the indicator species can produce. The number 1 indicates low potential productivity; 2 and 3, moderate; 4 and 5, moderately high; 6 to 8, high; 9 to 11, very high; and 12 to 39, extremely high. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *R* indicates steep slopes; *X,* stoniness or rockiness; *W,* excessive water in or on the soil; *T,* toxic substances in the soil; *D,* restricted rooting depth; *C,* clay in the upper part of the soil; *S,* sandy texture; and *F,* high content of rock fragments in the soil. The letter *A* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: R, X, W, T, D, C, S, and F.

In table 8, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Erosion hazard is the probability that damage will occur as a result of site preparation and cutting where the soil is exposed along roads, skid trails, and fire lanes and in log-handling areas. Forests that have been burned or overgrazed also are subject to erosion. Ratings of the erosion hazard are based on the percent of the slope. A rating of *slight* indicates that no particular prevention measures are needed under ordinary conditions. A rating of *moderate* indicates that erosion-control measures are needed in certain silvicultural activities. A rating of *severe* indicates that special precautions are needed to control erosion in most silvicultural activities.

Equipment limitation reflects the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. The chief characteristics and conditions considered in the ratings are slope, stones on the surface, rock outcrops, soil wetness, and texture of the surface layer. A rating of *slight* indicates that under normal conditions the kind of equipment and season of use are not significantly restricted by soil factors. Soil wetness can restrict equipment use, but the wet period does not exceed 1 month. A rating of *moderate* indicates that equipment use is moderately restricted because of one or more soil factors. If the soil is wet, the wetness restricts equipment use for a period of 1 to 3 months. A rating of *severe* indicates that equipment use is severely restricted either as to the kind of equipment that can be used or the season of use. If the soil is wet, the wetness restricts equipment use for more than 3 months.

Seedling mortality refers to the death of naturally occurring or planted tree seedlings, as influenced by the kinds of soil, soil wetness, or topographic conditions. The factors used in rating the soils for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, effective rooting depth, and slope aspect. A rating of *slight* indicates that seedling mortality is not likely to be a problem under normal conditions. Expected mortality is less than 25 percent. A rating of *moderate* indicates that some problems from seedling mortality can be expected. Extra precautions are advisable. Expected mortality is 25 to 50 percent. A rating of *severe* indicates that seedling mortality is a serious problem. Extra precautions are important. Replanting may be necessary. Expected mortality is more than 50 percent.

Windthrow hazard is the likelihood that trees will be uprooted by the wind because the soil is not deep enough to give adequate root anchorage. The main restrictions that affect rooting are a seasonal high water table and the depth to bedrock, a fragipan, or other limiting layers. A rating of *slight* indicates that under normal conditions no trees are blown down by the wind. Strong winds may damage trees, but they do not uproot them. A rating of *moderate* indicates that some trees can be blown down during periods when the soil is wet and winds are moderate or strong. A rating of *severe* indicates that many trees can be blown down during these periods.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index* and as a *productivity class*. The site index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

The *productivity class*, a number, is the yield likely to be produced by the most important trees. This number, expressed as cubic meters per hectare per year, indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand.

The first species listed under *common trees* for a soil is the indicator species for that soil. It generally is the most common species on the soil and is the one that determines the ordination class.

Trees to plant are those that are suitable for commercial wood production.

Windbreaks and Environmental Plantings

Windbreaks protect livestock, buildings, and yards from wind and snow. They also protect fruit trees and gardens, and they furnish habitat for wildlife. Several rows of low- and high-growing broadleaf and coniferous trees and shrubs provide the most protection.

Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field. The interval depends on the erodibility of the soil. Field windbreaks protect cropland and crops from wind, help to keep snow on the fields, and provide food and cover for wildlife.

Environmental plantings help to beautify and screen houses and other buildings and to abate noise. The plants, mostly evergreen shrubs and trees, are closely spaced. To ensure plant survival, a healthy planting stock of suitable species should be planted properly on a well prepared site and maintained in good condition.

Table 9 shows the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates in table 9 are based on measurements and observation of established plantings that have been given adequate care. They can be used as a guide in planning windbreaks and screens. Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from local offices of the Soil Conservation Service or the Cooperative Extension Service or from a commercial nursery.

Recreation

Christian County offers opportunities for a variety of recreational activities. Sangchris Lake State Park provides opportunities for picnicking, camping, hiking, fishing, and boating. Lake Taylorville and the Sangamon River provide opportunities for boating, fishing, camping, and other recreational activities. The scenic areas in the county have good potential for the development of recreational facilities.

The soils of the survey area are rated in table 10 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation also are important. Soils subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 10, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 10 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 13 and interpretations for dwellings without basements and for local roads and streets in table 12.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 11, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, and flooding. Soil temperature and soil moisture also are considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, flooding, and slope. Soil temperature and soil moisture also are considerations. Examples of grasses and legumes are fescue, lovegrass, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, and flooding. Soil temperature and soil moisture also are considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, wheatgrass, and grama.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwoods and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, and blackberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian-olive, autumn-olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, cedar, and juniper.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, and slope. Examples of wetland plants are smartweed, wild millet, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, pheasant, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, and deer.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Estimates were made for erodibility, permeability, corrosivity, the shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the "Glossary."

Building Site Development

Table 12 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrinking and swelling, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. The depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), the shrink-swell potential, frost action potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 13 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 13 also shows the suitability of the soils for use as daily cover for landfill. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, and flooding affect absorption of the effluent. Large stones interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 13 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation should be considered.

The ratings in table 13 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during the wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 14 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and the shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet and have a water table at a depth of less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 14, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is as much as 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 15 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability in the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and the potential for frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to help to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of soil blowing or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of soil blowing, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 19.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 16 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under the heading "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the "Glossary."

Classification of the soils is determined according to the Unified soil classification system *(2)* and the system adopted by the American Association of State Highway and Transportation Officials *(1)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested, with sample numbers, is given in table 19.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 17 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated content of clay in each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to absorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at ⅓-bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The classes are *low*, a change of less than 3 percent;

moderate, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to soil blowing in cultivated areas. The groups indicate the susceptibility to soil blowing. Soils are grouped according to the following distinctions:

1. Coarse sands, sands, fine sands, and very fine sands. These soils are generally not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.

2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, and sapric soil material. These soils are very highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

4L. Calcareous loams, silt loams, clay loams, and silty clay loams. These soils are erodible. Crops can be grown if intensive measures to control soil blowing are used.

4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control soil blowing are used.

5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material. These soils are slightly erodible. Crops can be grown if measures to control soil blowing are used.

6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay. These soils are very slightly erodible. Crops can be grown if ordinary measures to control soil blowing are used.

7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material. These soils are very slightly erodible. Crops can be grown if ordinary measures to control soil blowing are used.

8. Soils that are not subject to soil blowing because of coarse fragments on the surface or because of surface wetness.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 17, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 18 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to two hydrologic groups in table 18, the first letter is for drained areas and the second is for undrained areas.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes.

Table 18 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); and *frequent* that it occurs often under normal weather conditions (the chance of flooding is more than 50 percent in any year). Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 18 are the depth to the seasonal high water table; the kind of water table—that is, perched or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 18.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion also is expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Engineering Index Test Data

Table 19 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are representative of the series described in the section "Soil Series and Their Morphology." The soil samples were tested by the Illinois Department of Transportation.

The testing methods generally are those of the

American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).

The tests and methods are AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO), D 422 (ASTM), D 2217 (ASTM); Liquid limit—T 89 (AASHTO), D 4318 (ASTM); Plasticity index—T 90 (AASHTO), D 4318 (ASTM); and Moisture density—T 99 (AASHTO), D 698 (ASTM).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(9).* Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 20 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol.* An example is Mollisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquoll *(Aqu,* meaning water, plus *oll,* from Mollisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Haplaquolls *(Hapl,* meaning minimal horizonation, plus *aquoll,* the suborder of the Mollisols that has an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Haplaquolls.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-silty, mixed, mesic Typic Haplaquolls.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the underlying material can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" *(7).* Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" *(9).* Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Alvin Series

The Alvin series consists of well drained, moderately permeable soils on ridgetops and side slopes in the uplands. These soils formed in loamy and sandy material. Slope ranges from 4 to 10 percent.

Typical pedon of Alvin fine sandy loam, 4 to 10 percent slopes, eroded, 1,900 feet north and 200 feet west of the southeast corner of sec. 29, T. 16 N., R. 1 W.

Ap—0 to 7 inches; mixed brown (10YR 4/3) and yellowish brown (10YR 5/4) fine sandy loam; weak very fine granular structure; very friable; common fine roots; very strongly acid; abrupt smooth boundary.

Bt1—7 to 13 inches; yellowish brown (10YR 5/4) sandy clay loam; moderate fine subangular blocky structure; friable; few very fine roots; common distinct brown (10YR 4/3) clay films on faces of peds; very strongly acid; clear smooth boundary.

Bt2—13 to 24 inches; yellowish brown (10YR 5/6) fine sandy loam; moderate medium subangular blocky structure; very friable; few very fine roots; common distinct yellowish brown (10YR 5/4) clay films on faces of peds; few distinct brown (10YR 4/3) clay films lining pores; few fine concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

Bt3—24 to 31 inches; yellowish brown (10YR 5/6) fine sandy loam; moderate medium subangular blocky structure; very friable; few very fine roots; common distinct yellowish brown (10YR 5/4) clay films on faces of peds; few distinct brown (10YR 4/3) clay films lining pores; few fine concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

Bt4—31 to 42 inches; yellowish brown (10YR 5/6) fine sandy loam; weak medium subangular blocky structure; very friable; few very fine roots; common distinct yellowish brown (10YR 5/4) clay films on faces of peds; few fine concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

E&Bt—42 to 60 inches; yellowish brown (10YR 5/6) fine sand (E part); weak medium subangular blocky structure; very friable; few lamellae of dark yellowish brown (10YR 4/4) loamy fine sand (Bt part); strongly acid.

The solum ranges from 40 to more than 60 inches in thickness. The Ap horizon has chroma of 2 or 3. Some pedons have an E horizon, which has value of 4 or 5 and chroma of 3 or 4. The Bt horizon has hue of 10YR or 7.5YR and value and chroma of 4 to 6. It is very fine sandy loam, loam, or sandy loam. The content of clay in the control section ranges from 15 to 18 percent.

Assumption Series

The Assumption series consists of moderately well drained soils on side slopes in the uplands. These soils formed in loess and in the underlying paleosol, which formed in Illinoian till. They are moderately permeable in the upper part of the solum and slowly permeable in the paleosol. Slope ranges from 5 to 10 percent.

The Assumption soils in this survey area have a dark surface layer that is thinner than is definitive for the series. This difference, however, does not significantly affect the use and management of the soils.

Typical pedon of Assumption silt loam, 5 to 10 percent slopes, eroded, 2,400 feet west and 920 feet north of the southeast corner of sec. 18, T. 13 N., R. 1 E.

Ap—0 to 8 inches; mixed very dark grayish brown (10YR 3/2) and brown (10YR 5/3) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; common very fine roots; neutral; abrupt smooth boundary.

Bt1—8 to 18 inches; brown (10YR 5/3) silty clay loam; moderate fine subangular blocky structure; firm; common very fine roots; few faint very dark grayish brown (10YR 3/2) clay films on faces of peds and in root channels; few fine concretions of iron and manganese oxide; neutral; clear smooth boundary.

Bt2—18 to 28 inches; brown (10YR 5/3) silty clay loam; common fine and medium distinct yellowish brown (10YR 5/6) mottles; moderate fine and medium subangular blocky structure; firm; few very fine roots; few faint brown (10YR 5/3) clay films on faces of peds and in root channels; few fine concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

2Btg1—28 to 34 inches; grayish brown (10YR 5/2) silty clay loam; common fine distinct yellowish brown (10YR 5/6) mottles; moderate fine and medium subangular blocky structure; firm; few very fine roots; few faint dark grayish brown (10YR 4/2) clay films on faces of peds and lining pores; few fine concretions of iron and manganese oxide; few very fine roots; about 5 percent sand; slightly acid; clear smooth boundary.

3Btg2—34 to 42 inches; grayish brown (10YR 5/2) clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium and coarse subangular blocky structure; firm; few faint brown (10YR 5/3) and dark grayish brown (10YR 4/2) clay films on faces of peds and lining pores; few fine concretions of iron and manganese oxide; few small pebbles; slightly acid; clear smooth boundary.

3Btg3—42 to 60 inches; grayish brown (10YR 5/2) clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; few faint brown (10YR 5/3) and dark grayish brown (10YR 4/2) clay films on faces of peds and lining pores; few fine concretions of iron and manganese oxide; few small pebbles; slightly acid.

The solum ranges from 48 to more than 60 inches in thickness. The A horizon is 6 to 10 inches thick. The loess ranges from 20 to 40 inches in thickness.

The Ap horizon has chroma of 2 or 3. The Bt horizon has value of 4 or 5 and chroma of 3 to 5. The 2Bt and 3Bt horizons have chroma of 1 or 2. The content of clay in the Bt and 2Bt horizons ranges from 25 to 35 percent.

Atlas Series

The Atlas series consists of somewhat poorly drained, very slowly permeable soils on side slopes in the uplands. These soils formed in loess and in the underlying paleosol, which formed in Illinoian till. Slope ranges from 5 to 10 percent.

Typical pedon of Atlas silt loam, 5 to 10 percent slopes, eroded, 2,244 feet north and 231 feet east of the southwest corner of sec. 24, T. 12 N., R. 2 W.

Ap—0 to 5 inches; mixed dark grayish brown (10YR 4/2) and brown (10YR 5/3) silt loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; friable; common very fine and few fine roots; strongly acid; abrupt smooth boundary.

Bt—5 to 10 inches; brown (10YR 5/3) silty clay loam; common fine distinct dark yellowish brown (10YR 4/6) and many fine prominent yellowish brown (10YR 5/8) mottles; moderate fine and medium subangular blocky structure; firm; few very fine and few fine roots; few faint dark grayish brown (10YR 4/2) clay films lining pores; few fine rounded concretions of iron and manganese oxide; medium acid; clear smooth boundary.

Btg1—10 to 17 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine prominent dark yellowish brown (10YR 4/6) and common fine distinct yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; firm; few very fine roots; few faint dark grayish brown (2.5Y 4/2) clay films on faces of peds; few fine rounded concretions of iron and manganese oxide; medium acid; clear smooth boundary.

Btg2—17 to 27 inches; grayish brown (2.5Y 5/2) clay; common fine prominent dark yellowish brown (10YR 4/6) and few fine distinct olive brown (2.5Y 5/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; very firm; few very fine roots; common faint dark grayish brown (2.5Y 4/2) clay films on faces of peds and few distinct gray (5Y 4/1) clay films lining pores; few fine rounded concretions of iron and manganese oxide; medium acid; clear smooth boundary.

Btg3—27 to 44 inches; gray (5Y 5/1) clay; few fine faint light gray (5Y 6/1), few fine prominent olive (5Y 5/6), and common fine prominent dark yellowish brown (10YR 4/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; few faint dark gray (5Y 4/1) and common faint olive gray (5Y 4/2) clay films on faces of peds; few fine rounded concretions of iron and manganese oxide; medium acid; clear smooth boundary.

Btg4—44 to 51 inches; gray (5Y 5/1) clay; few fine faint light gray (5Y 6/1), few fine prominent yellowish brown (10YR 5/8), and common fine prominent dark yellowish brown (10YR 4/6) mottles; moderate medium and coarse subangular blocky structure; very firm; many faint dark gray (5Y 4/1) and few faint olive gray (5Y 4/2) clay films on faces of peds; few fine rounded concretions of iron and manganese oxide; medium acid; clear smooth boundary.

Btg5—51 to 60 inches; light gray (5Y 6/1) clay loam; few fine prominent dark yellowish brown (10YR 4/6) and common medium prominent yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; very firm; few faint gray (5Y 5/1) and dark gray (5Y 4/1) clay films lining pores; few fine and medium rounded concretions of iron and manganese oxide; medium acid.

The solum is more than 60 inches thick. The loess is less than 20 inches thick.

The Ap horizon has value of 3 or 4 and chroma of 2 or 3. It is silt loam or silty clay loam. The Bt horizon has value of 4 to 6. It is clay loam, silty clay, clay, or silty clay loam. The content of clay in the control section ranges from 35 to 45 percent.

Broadwell Series

The Broadwell series consists of well drained soils on the tops of ridges in the uplands. These soils formed in 40 to 60 inches of loess and in the underlying sandy material. They are moderately permeable in the upper part and rapidly permeable in the lower part. Slope ranges from 2 to 5 percent.

Typical pedon of Broadwell silt loam, 2 to 5 percent slopes, 2,540 feet north and 460 feet west of the center of sec. 11, T. 15 N., R. 2 W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; weak fine granular structure; friable; common very fine and few fine roots; medium acid; clear smooth boundary.

A—9 to 15 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; moderate fine granular structure; friable; few very fine and fine roots; slightly acid; clear smooth boundary.

Bt1—15 to 18 inches; dark brown (10YR 3/3) silty clay loam, yellowish brown (10YR 5/4) dry; weak very fine and fine subangular blocky structure; friable; few very fine and fine roots; many faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bt2—18 to 25 inches; brown (10YR 4/3) silty clay loam; moderate fine subangular blocky structure; firm; few very fine and fine roots; common faint very dark grayish brown (10YR 3/2) clay films on faces of peds; medium acid; clear smooth boundary.

Bt3—25 to 31 inches; brown (10YR 4/3) silty clay loam; moderate fine subangular blocky structure; firm; few very fine and fine roots; common faint very dark grayish brown (10YR 3/2) clay films lining pores and brown (10YR 4/3) clay films on faces of peds; medium acid; clear smooth boundary.

Bt4—31 to 41 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular blocky structure; firm; few very fine and fine roots; few distinct very dark grayish brown (10YR 3/2) clay films lining pores and common faint brown (10YR 4/3) clay films on faces of peds; medium acid; clear smooth boundary.

2Bt5—41 to 51 inches; dark yellowish brown (10YR 4/4) silt loam; few fine faint brown (10YR 5/3) mottles; weak medium and coarse subangular blocky structure; friable; few very fine roots; common faint brown (10YR 4/3) clay films on faces of peds; 15 to 20 percent sand; medium acid; abrupt smooth boundary.

2BC—51 to 55 inches; dark yellowish brown (10YR 4/4) loamy fine sand; weak coarse subangular blocky structure; very friable; slightly acid; clear smooth boundary.

2C—55 to 60 inches; yellowish brown (10YR 5/4) fine sand; single grain; loose; neutral.

The solum ranges from 45 to more than 60 inches in thickness. The mollic epipedon is 10 to 18 inches thick. The loess ranges from 40 to 60 inches in thickness.

The Ap and A horizons have value of 2 or 3 and chroma of 1 to 3. The Bt horizon has value of 4 or 5 and chroma of 3 to 5. The 2BC horizon has value of 4 or 5. The content of clay in the control section ranges from 27 to 35 percent.

Brooklyn Series

The Brooklyn series consists of poorly drained, slowly permeable soils in depressions in the uplands. These soils formed in loess and in the underlying stratified, loamy outwash. Slope is less than 1 percent.

Typical pedon of Brooklyn silt loam, 174 feet east and 2,544 feet north of the southwest corner of sec. 17, T. 15 N., R. 2 W.

Ap—0 to 9 inches; very dark gray (10YR 3/2) silt loam, gray (10YR 5/1) dry; weak very fine granular structure; friable; few very fine roots; common fine concretions of iron and manganese oxide; medium acid; abrupt smooth boundary.

Eg—9 to 19 inches; grayish brown (10YR 5/2) silt loam; common fine prominent strong brown (7.5YR 5/6) mottles; weak thin platy structure parting to moderate fine granular; friable; few very fine roots; common fine and medium concretions of iron and manganese oxide; very strongly acid; abrupt smooth boundary.

Btg1—19 to 29 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine prominent strong brown (7.5YR 5/6) mottles; moderate fine and medium subangular blocky structure; firm; few very fine roots; many distinct gray (10YR 5/1) clay films on faces of peds; common fine concretions of iron and manganese oxide; very strongly acid; clear smooth boundary.

Btg2—29 to 36 inches; grayish brown (2.5Y 5/2) silty clay loam; many fine prominent strong brown (7.5YR 5/6) mottles; moderate fine and medium subangular blocky structure; firm; few very fine roots; many prominent gray (10YR 5/1) and dark gray (10YR 4/1) clay films on faces of peds; many medium concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

Btg3—36 to 41 inches; grayish brown (2.5Y 5/2) silty clay loam; many fine prominent strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm; few very fine roots; many distinct gray (10YR 5/1) clay films on faces of peds; common fine concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

2Btg4—41 to 50 inches; grayish brown (2.5Y 5/2), stratified silty clay loam and clay loam; common medium prominent strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm; common distinct gray (10YR 5/1) clay films on faces of peds; common fine concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

2Cg—50 to 60 inches; grayish brown (10YR 5/2) clay loam; common medium prominent strong brown (7.5YR 5/6) mottles; massive; friable; few faint gray (10YR 5/1) clay films lining pores; common fine concretions of iron and manganese oxide; strongly acid.

The solum ranges from 45 to 55 inches in thickness. The loess ranges from 36 to 60 inches in thickness.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. The Eg horizon has value of 4 or 5 and chroma of 1 or 2. The Btg and 2Btg horizons have hue of 10YR, 2.5Y, or 5Y, value of 4 or 5, and chroma of 1 or 2. The Btg horizon is silty clay loam or silty clay. The 2Btg horizon is silt loam, loam, silty clay loam, or clay loam. The 2Cg horizon has value of 4 or 5 and chroma of 1 or 2. The content of clay in the control section ranges from 35 to 45 percent.

Camden Series

The Camden series consists of well drained, moderately permeable soils on ridges and side slopes in the uplands. These soils formed in loess and in the underlying stratified, loamy outwash. Slope ranges from 2 to 10 percent.

Typical pedon of Camden silt loam, 2 to 5 percent slopes, 1,600 feet east and 300 feet south of the northwest corner of sec. 30, T. 16 N., R. 1 W.

Ap—0 to 8 inches; dark grayish brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak fine granular structure; friable; common very fine roots; few fine concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

BE—8 to 14 inches; mixed yellowish brown (10YR 5/4) and dark grayish brown (10YR 4/2) silt loam; moderate fine and medium subangular blocky structure; friable; few very fine roots; few distinct white (10YR 8/2 dry) silt coatings on faces of peds; few fine concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

Bt1—14 to 23 inches; dark yellowish brown (10YR 4/6) silty clay loam; moderate medium subangular blocky structure; friable; few very fine roots; common distinct dark yellowish brown (10YR 4/4) clay films and few distinct white (10YR 8/2 dry) silt coatings on faces of peds; medium acid; clear smooth boundary.

Bt2—23 to 31 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; firm; few very fine roots; common prominent brown (7.5YR 4/4) clay films and common distinct white (10YR 8/2 dry) silt coatings on faces of peds; few fine concretions of iron and manganese oxide; medium acid; clear smooth boundary.

Bt3—31 to 37 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; firm; few very fine roots; common prominent brown (7.5YR 4/4) clay films on faces of peds; few fine concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

2Bt4—37 to 40 inches; yellowish brown (10YR 5/4) clay loam; few fine faint pale brown (10YR 6/3) mottles; moderate medium subangular blocky structure; firm; few very fine roots; common distinct brown (7.5YR 4/4) clay films on faces of peds; few fine concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

2Bt5—40 to 57 inches; brown (7.5YR 4/4), stratified loam, loamy sand, and sandy loam; weak medium subangular blocky structure; friable; few very fine roots; few faint brown (7.5YR 4/4) clay films on faces of peds; few fine concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

2C—57 to 60 inches; brown (7.5YR 4/4) sandy loam; massive; friable; medium acid.

The solum ranges from 50 to more than 60 inches in thickness. Depth to the stratified outwash ranges from 24 to 40 inches.

The Ap horizon has chroma of 2 or 3. Some pedons have an E horizon, which has value of 4 or 5 and chroma of 2. The Bt and 2Bt horizons have hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. The 2Bt horizon is dominantly clay loam or loam, but it commonly has strata of sandier textures. The 2C horizon is sandy loam or loam. The content of clay in the control section ranges from 22 to 35 percent.

Clarksdale Series

The Clarksdale series consists of somewhat poorly drained, moderately slowly permeable soils on low, broad ridges in the uplands. These soils formed in loess. Slope ranges from 0 to 2 percent.

Typical pedon of Clarksdale silt loam, 140 feet west and 2,140 feet south of the northeast corner of sec. 8, T. 13 N., R. 1 W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; few fragments of gray (10YR 5/1) silt loam; weak fine granular structure; friable; few fine roots; few fine concretions of iron and manganese oxide; slightly acid; abrupt smooth boundary.

E—9 to 16 inches; gray (10YR 5/1) silt loam; few fine prominent yellowish brown (10YR 5/6) mottles; weak medium platy structure; friable; few fine roots; few fine concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

Bt—16 to 25 inches; yellowish brown (10YR 5/4) silty clay; few fine distinct yellowish brown (10YR 5/8) and light brownish gray (10YR 6/2) mottles; moderate fine subangular blocky structure; firm; few fine roots; many distinct dark gray (10YR 4/1) and very dark grayish brown (10YR 3/2) clay films on faces of peds; many distinct light brownish gray (10YR 6/2 dry) silt coatings on faces of peds in the upper part; few fine concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

Btg1—25 to 35 inches; light brownish gray (10YR 6/2) silty clay loam; common fine prominent yellowish brown (10YR 5/8) and many fine distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; few fine roots; common faint dark gray (10YR 4/1) clay films on faces of peds; common distinct very dark gray (10YR 3/1) clay films lining pores; many medium concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

Btg2—35 to 43 inches; light brownish gray (10YR 6/2) silty clay loam; common fine prominent yellowish brown (10YR 5/8) and common medium distinct yellowish brown (10YR 5/6) mottles; moderate coarse subangular blocky structure; firm; few fine roots; common distinct very dark gray (10YR 3/1) clay films lining pores; few fine concretions of iron and manganese oxide; medium acid; clear smooth boundary.

Btg3—43 to 55 inches; light brownish gray (10YR 6/2) silty clay loam; common fine prominent yellowish brown (10YR 5/8) and common medium distinct yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; firm; common distinct very dark gray (10YR 3/1) clay films lining pores; few fine concretions and many tubular accumulations of iron and manganese oxide; slightly acid; clear smooth boundary.

Cg—55 to 60 inches; gray (10YR 6/1) silt loam; many coarse prominent yellowish brown (10YR 5/8) mottles; massive; friable; few distinct very dark gray (10YR 3/1) clay films lining pores; few fine concretions and common tubular accumulations of iron and manganese oxide; neutral.

The solum ranges from 45 to more than 60 inches in thickness. The Ap horizon has chroma of 1 or 2. The E horizon has value of 4 or 5 and chroma of 1 or 2. The Bt and Btg horizons have hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 3. They are silty clay loam or silty clay. The content of clay in the control section ranges from 35 to 45 percent.

Coatsburg Series

The Coatsburg series consists of poorly drained, very slowly permeable soils on side slopes in the uplands. These soils formed in less than 20 inches of loess and in the underlying paleosol, which formed in Illinoian till. Slope ranges from 5 to 10 percent.

The Coatsburg soils in this survey area have a dark surface soil that is thinner than is definitive for the series. This difference, however, does not significantly affect the use and management of the soils.

Typical pedon of Coatsburg silt loam, 5 to 10 percent slopes, eroded, 2,240 feet north and 200 feet east of the southwest corner of sec. 20, T. 12 N., R. 2 W.

Ap—0 to 8 inches; mixed very dark grayish brown (10YR 3/2) and grayish brown (2.5Y 5/2) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; common very fine roots; few fine concretions of iron and manganese oxide; about 1 percent gravel; slightly acid; abrupt smooth boundary.

Btg1—8 to 12 inches; grayish brown (2.5Y 5/2) clay loam; common fine distinct brown (10YR 4/3) and common fine prominent yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; friable; few very fine roots; many prominent very dark grayish brown (10YR 3/2) clay films on faces of peds; few fine concretions of iron and manganese oxide; about 2 percent gravel; slightly acid; clear smooth boundary.

2Btg2—12 to 20 inches; grayish brown (2.5Y 5/2) clay loam; many fine prominent yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; few very fine roots; few prominent very dark grayish brown (10YR 3/2) and many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine concretions of iron and manganese oxide; about 5 percent gravel; slightly acid; clear smooth boundary.

2Btg3—20 to 29 inches; gray (5Y 5/1) clay loam; common fine prominent yellowish brown (10YR 5/6) and few fine prominent light olive brown (2.5Y 5/4) mottles; firm; few very fine roots; many distinct dark gray (10YR 4/1) clay films on faces of peds; few fine concretions of iron and manganese oxide;

about 5 percent gravel; slightly acid; clear smooth boundary.

2Btg4—29 to 45 inches; gray (5Y 5/1) clay loam; few fine prominent yellowish brown (10YR 5/6) and common fine prominent light olive brown (2.5Y 5/4) mottles; firm; few very fine roots; many distinct dark gray (10YR 4/1) clay films on faces of peds; few fine concretions of iron and manganese oxide; about 5 percent gravel; slightly acid; clear smooth boundary.

2Btg5—45 to 55 inches; gray (5Y 5/1) clay loam; few fine prominent yellowish brown (10YR 5/4) and common fine prominent light olive brown (2.5Y 5/4) mottles; moderate medium subangular blocky structure; firm; common distinct dark gray (10YR 4/1) clay films on faces of peds; few fine concretions of iron and manganese oxide; about 5 percent gravel; slightly acid; clear smooth boundary.

2Btg6—55 to 65 inches; gray (10YR 6/1) clay loam; common fine prominent yellowish brown (10YR 5/6) and common fine distinct pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; firm; common faint dark gray (10YR 4/1) clay films lining pores; few fine concretions of iron and manganese oxide; about 8 percent gravel; slightly acid.

The solum is more than 60 inches thick. The loess is less than 20 inches thick.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. The 2Btg horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 2. It is silty clay loam, silty clay, or clay. The content of clay in the control section ranges from 35 to 45 percent.

Cowden Series

The Cowden series consists of poorly drained, slowly permeable soils on broad flats in the uplands. These soils formed in loess. Slope ranges from 0 to 2 percent.

Typical pedon of Cowden silt loam, 1,047 feet east and 438 feet south of the center of sec. 1, T. 11 N., R. 1 E.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; few very fine roots; few fine concretions of iron and manganese oxide; neutral; abrupt smooth boundary.

Eg1—8 to 13 inches; dark grayish brown (10YR 4/2) silt loam; common fine prominent yellowish brown (10YR 5/8) mottles; moderate thin platy structure; friable; few very fine roots; common faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; few fine concretions of iron and manganese oxide; medium acid; clear smooth boundary.

Eg2—13 to 18 inches; light brownish gray (10YR 6/2) silt loam; common fine prominent yellowish brown (10YR 5/8) mottles; moderate thin platy structure; friable; few very fine roots; common distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; few fine concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

Btg1—18 to 23 inches; gray (10YR 5/1) silty clay; common fine prominent yellowish brown (10YR 5/8) mottles; moderate fine subangular blocky structure; firm; few very fine roots; many faint dark gray (10YR 4/1) clay films on faces of peds; common fine and medium concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

Btg2—23 to 31 inches; olive gray (5Y 5/2) silty clay; common fine prominent yellowish brown (10YR 5/8) and common fine faint grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; firm; few very fine roots; many distinct dark gray (10YR 4/1) clay films on faces of peds; common fine and medium concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

Btg3—31 to 41 inches; gray (5Y 5/1) silty clay loam; common fine prominent light olive brown (2.5Y 5/4) and few fine prominent yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; friable; few very fine roots; many distinct dark gray (10YR 4/1) clay films on faces of peds; common fine and medium concretions of iron and manganese oxide; very dark gray (10YR 3/1) krotovinas; strongly acid; clear smooth boundary.

Btg4—41 to 51 inches; gray (5Y 6/1) silty clay loam; common fine prominent yellowish brown (10YR 5/6) and olive brown (2.5Y 5/4) mottles; weak medium subangular blocky structure; friable; few very fine roots; common prominent dark gray (10YR 4/1) clay films on faces of peds; common fine concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

Cg—51 to 60 inches; olive gray (5Y 5/2) silt loam; common fine prominent yellowish brown (10YR 5/8) and common fine faint gray (5Y 5/1) mottles; massive; friable; few fine roots; few fine concretions of iron and manganese oxide; slightly acid.

The solum ranges from 40 to more than 60 inches in thickness. The Ap horizon has value of 2 or 3 and chroma of 1 or 2. The E horizon has value of 4 to 6 and chroma of 1 or 2. The Btg and Cg horizons have hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 or 2. The Btg horizon is silty clay loam or silty clay. The Cg horizon is silty clay loam or silt loam. The content of clay in the control section ranges from 35 to 42 percent.

Darmstadt Series

The Darmstadt series consists of somewhat poorly drained, very slowly permeable soils on the broad tops of ridges in the uplands. These soils formed in loess. Slope ranges from 0 to 2 percent.

Typical pedon of Darmstadt silt loam, in an area of Oconee-Darmstadt silt loams, 1,020 feet west and 1,398 feet south of the northeast corner of sec. 26, T. 11 N., R. 1 E.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; friable; common very fine roots; neutral; abrupt smooth boundary.

E1—7 to 9 inches; grayish brown (10YR 5/2) and dark grayish brown (10YR 4/2) silt loam; weak medium platy structure; friable; few very fine roots; few fine concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

E2—9 to 13 inches; grayish brown (10YR 5/2) and light brownish gray (10YR 6/2) silt loam; few fine faint brown (10YR 5/3) mottles; weak medium platy structure; friable; few very fine roots; common fine concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

Bt—13 to 19 inches; brown (10YR 5/3) silty clay loam; common fine faint light brownish gray (10YR 6/2) and common fine distinct dark yellowish brown (10YR 4/6) and yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; firm; few very fine roots; common distinct dark grayish brown (10YR 4/2) and dark gray (10YR 4/1) clay films on faces of peds; common fine concretions of iron and manganese oxide; neutral; clear smooth boundary.

Btg1—19 to 26 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine prominent dark yellowish brown (10YR 4/6) and yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; common distinct dark grayish brown (10YR 4/2) and dark gray (10YR 4/1) clay films on faces of peds; common fine concretions of iron and manganese oxide; mildly alkaline; clear smooth boundary.

Btg2—26 to 34 inches; mottled grayish brown (10YR 5/2), light brownish gray (2.5Y 6/2), yellowish brown (10YR 5/6), and dark yellowish brown (10YR 4/6) silty clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds and many distinct dark gray (10YR 4/1) clay films lining pores; few fine and medium concretions of iron and manganese oxide; moderately alkaline; clear smooth boundary.

Btg3—34 to 43 inches; light brownish gray (2.5Y 6/2) silty clay loam; common fine prominent dark yellowish brown (10YR 4/6) and yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; few distinct gray (10YR 5/1) and dark gray (10YR 4/1) clay films on faces of peds; few fine and medium concretions of iron and manganese oxide; strongly alkaline; clear smooth boundary.

BCg—43 to 54 inches; light brownish gray (2.5Y 6/2) silty clay loam; common fine prominent yellowish brown (10YR 5/8) and dark yellowish brown (10YR 4/6) mottles; weak medium prismatic structure parting to weak coarse subangular blocky; firm; few distinct gray (10YR 5/1) clay films on faces of peds; few prominent dark gray (10YR 4/1) clay films lining pores; few fine and medium concretions of iron and manganese oxide; strongly alkaline; clear smooth boundary.

2Cg—54 to 60 inches; light brownish gray (2.5Y 6/2) silty clay loam; common fine prominent dark yellowish brown (10YR 4/6) and yellowish brown (10YR 5/6) mottles; massive; friable; common fine concretions of iron and manganese oxide; about 10 percent sand; moderately alkaline.

The solum ranges from 35 to more than 60 inches in thickness. Depth to the natric horizon ranges from 8 to 16 inches.

The Ap horizon has value of 3 to 5 and chroma of 2 or 3. The E horizon has value of 5 or 6. The Bt and Btg horizons have hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4. The 2Cg horizon has value of 6 or 7 and chroma of 1 or 2. It is silty clay loam or silt loam.

Denny Series

The Denny series consists of very poorly drained, slowly permeable soils in depressions in the uplands. These soils formed in loess. Slope ranges from 0 to 2 percent.

Typical pedon of Denny silt loam, 1,320 feet north and 264 feet west of the southeast corner of sec. 20, T. 15 N., R. 3 W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; few very fine roots; few fine concretions of iron and manganese oxide; medium acid; abrupt smooth boundary.

Eg1—9 to 13 inches; gray (10YR 5/1) silt loam; common fine prominent dark yellowish brown (10YR 4/6) mottles; moderate thin platy structure; friable; few very fine roots; common faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; few fine concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

Eg2—13 to 23 inches; light gray (10YR 6/1) silt loam; common fine prominent yellowish brown (10YR 5/6) mottles; moderate thin platy structure; friable; few very fine roots; few distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; common fine and medium concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

Btg1—23 to 28 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine prominent dark yellowish brown (10YR 4/6) mottles; moderate fine subangular blocky structure; friable; few very fine roots; many distinct gray (10YR 5/1) clay films and common distinct white (10YR 8/1 dry) silt coatings on faces of peds; common fine and medium concretions of iron and manganese oxide; very strongly acid; clear smooth boundary.

Btg2—28 to 39 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine prominent dark yellowish brown (10YR 4/6) mottles; moderate medium subangular blocky structure; friable; few very fine roots; many distinct gray (10YR 5/1) clay films on faces of peds; very strongly acid; clear smooth boundary.

Btg3—39 to 52 inches; light brownish gray (2.5Y 6/2) silty clay loam; common fine prominent yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; friable; few very fine roots; common distinct gray (10YR 5/1) clay films on faces of peds; strongly acid; clear smooth boundary.

Cg—52 to 60 inches; light brownish gray (10YR 6/2) silt loam; common fine distinct yellowish brown (10YR 5/8) and common fine faint brown (10YR 5/3) mottles; massive; friable; common fine concretions of iron and manganese oxide; medium acid.

The solum ranges from 50 to more than 60 inches in thickness. The Ap horizon has value of 2 or 3 and chroma of 1 or 2. The E horizon has value of 4 to 6 and chroma of 1 or 2. The Btg and Cg horizons have hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 or 2. The Btg horizon is silty clay loam or silty clay. The content of clay in the control section ranges from 35 to 45 percent.

Douglas Series

The Douglas series consists of well drained, moderately permeable soils on ridgetops and side slopes in the uplands. These soils formed in loess and in the underlying glacial drift. Slope ranges from 2 to 10 percent.

Typical pedon of Douglas silt loam, 2 to 5 percent slopes, 1,320 feet west and 700 feet north of the southeast corner of sec. 10, T. 11 N., R. 1 W.

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; weak fine granular structure; friable; few very fine roots; slightly acid; abrupt smooth boundary.

A—7 to 13 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; moderate fine granular structure; friable; few very fine roots; medium acid; clear smooth boundary.

Bt1—13 to 18 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; friable; few very fine roots; many distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; medium acid; clear smooth boundary.

Bt2—18 to 28 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable; few very fine roots; many distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; few fine concretions of iron and manganese oxide; medium acid; clear smooth boundary.

Bt3—28 to 34 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable; few very fine roots; common faint brown (10YR 4/3) clay films on faces of peds; few fine concretions of iron and manganese oxide; medium acid; clear smooth boundary.

Bt4—34 to 43 inches; dark yellowish brown (10YR 4/4) silt loam; few fine distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; few very fine roots; common faint brown (10YR 4/3) clay films on faces of peds; few fine concretions of iron and manganese oxide; medium acid; clear smooth boundary.

2Bt5—43 to 46 inches; brown (7.5YR 5/4) loam; few fine prominent yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; friable; few very fine roots; common faint dark brown (7.5YR 4/4) clay films on faces of peds; few fine concretions of iron and manganese oxide; about 2 percent gravel; medium acid; clear smooth boundary.

2BC—46 to 60 inches; dark brown (7.5YR 4/4) loam; common medium faint brown (7.5YR 5/4) mottles; moderate medium subangular blocky structure; friable; few very fine roots; few faint reddish brown (5YR 4/3) clay films on faces of peds; few fine concretions of iron and manganese oxide; about 5 percent gravel; medium acid.

The solum ranges from 60 to more than 70 inches in thickness. Depth to the Illinoian drift ranges from 40 to 60 inches. The mollic epipedon ranges from 10 to 16 inches in thickness.

The Ap horizon has chroma of 2 or 3. The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. It is silty clay loam or silt loam. The 2Bt horizon is loam or clay loam. The content of clay in the control section ranges from 25 to 35 percent.

Douglas silt loam, 5 to 10 percent slopes, eroded, has a dark surface layer that is thinner than is definitive for the series. This difference, however, does not significantly affect the use and management of the soil.

Downs Series

The Downs series consists of moderately well drained, moderately permeable soils on convex ridgetops and side slopes in the uplands. These soils formed in loess. Slope ranges from 2 to 5 percent.

Typical pedon of Downs silt loam, 2 to 5 percent slopes, 2,516 feet west and 258 feet south of the northeast corner of sec. 24, T. 15 N., R. 1 W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; weak fine granular structure; friable; few very fine roots; strongly acid; abrupt smooth boundary.

Bt1—9 to 16 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak fine subangular blocky structure; friable; few very fine roots; many distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; few faint pale brown (10YR 6/3 dry) silt coatings on faces of peds in the upper part; strongly acid; clear smooth boundary.

Bt2—16 to 21 inches; dark yellowish brown (10YR 4/4) silty clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; firm; few very fine roots; many faint dark brown (10YR 3/3) clay films on faces of peds; few fine concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

Bt3—21 to 31 inches; dark yellowish brown (10YR 4/4) silty clay loam; common fine distinct yellowish brown (10YR 5/8) mottles; moderate fine and medium subangular blocky structure; firm; few very fine roots; common faint brown (10YR 4/3) clay films on faces of peds; few fine concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

Bt4—31 to 42 inches; dark yellowish brown (10YR 4/4) silty clay loam; common fine distinct light brownish gray (10YR 6/2) and yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; firm; few very fine roots; common faint dark yellowish brown (10YR 4/4) clay films on faces of peds; common fine concretions of iron and manganese oxide; very strongly acid; clear smooth boundary.

BC—42 to 49 inches; yellowish brown (10YR 5/4) silty clay loam; common fine distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable; few very fine roots; common faint dark yellowish brown (10YR 4/4) clay films on faces of peds; few fine concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

C—49 to 60 inches; yellowish brown (10YR 5/4) silt loam; many fine distinct light brownish gray (10YR 6/2) and common medium distinct yellowish brown (10YR 5/8) mottles; massive; friable; few very fine roots; common faint dark yellowish brown (10YR 4/4) clay films lining pores; few fine concretions of iron and manganese oxide; medium acid.

The solum ranges from 42 to 60 inches in thickness. The Ap horizon has chroma of 1 or 2. The Bt horizon has value of 4 or 5 and chroma of 3 to 6. The content of clay in the control section ranges from 27 to 35 percent.

Drummer Series

The Drummer series consists of poorly drained, moderately permeable soils on broad flats in the uplands. These soils formed in loess and in the underlying stratified, loamy outwash. Slope ranges from 0 to 2 percent.

Typical pedon of Drummer silty clay loam, 600 feet west and 1,600 feet north of the southeast corner of sec. 1, T. 13 N., R. 1 E.

Ap—0 to 8 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak fine granular structure; friable; many fine roots; few fine concretions of iron and manganese oxide; medium acid; clear smooth boundary.

A—8 to 16 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; common fine prominent light olive brown (2.5Y 5/4) mottles; weak fine granular structure; firm; common fine roots; few fine concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

Bg1—16 to 20 inches; dark grayish brown (2.5Y 4/2) silty clay loam; common fine distinct light olive brown (2.5Y 5/4) and few fine distinct light olive brown (2.5Y 5/6) mottles; weak fine subangular blocky structure; firm; few fine roots; common distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few medium concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

Bg2—20 to 25 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine distinct light olive brown (2.5Y 5/6) mottles; weak fine subangular blocky structure; firm; few fine roots; common prominent very dark gray (10YR 3/1) organic coatings on faces of peds; few fine concretions of iron and manganese oxide; neutral; clear smooth boundary.

Bg3—25 to 32 inches; grayish brown (2.5Y 5/2) silty clay loam; many medium prominent yellowish brown (10YR 5/8) mottles; moderate fine subangular blocky structure; firm; few fine roots; common prominent very dark gray (10YR 3/1) organic coatings on faces of peds; few fine concretions of iron and manganese oxide; very dark gray (10YR 3/1) krotovinas; neutral; clear smooth boundary.

Bg4—32 to 40 inches; light olive gray (5Y 6/2) silty clay loam; common medium prominent yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; firm; few fine roots; common prominent very dark gray (10YR 3/1) organic coatings on faces of peds; few fine concretions of iron and manganese oxide; very dark gray (10YR 3/1) krotovinas; neutral; clear smooth boundary.

Bg5—40 to 49 inches; gray (5Y 6/1) silty clay loam; many medium prominent yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; firm; few fine roots; common prominent very dark gray (10YR 3/1) clay films lining pores; few fine concretions of iron and manganese oxide; very dark gray (10YR 3/1) krotovinas; neutral; clear smooth boundary.

2Bg6—49 to 60 inches; gray (5Y 5/1), stratified loam, clay loam, and fine sandy loam; common medium prominent yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable; few fine roots; few prominent very dark gray (10YR 3/1) clay films lining pores; few fine concretions of iron and manganese oxide; approximately 3 percent gravel; neutral.

The solum ranges from 42 to more than 60 inches in thickness. The mollic epipedon is 10 to 20 inches thick. Depth to the stratified outwash ranges from 40 to 60 inches.

The Ap horizon has hue of 10YR or 2.5Y or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 2. The Bg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 or 2. The 2Bg horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 2. It is stratified silt loam, loam, clay loam, or fine sandy loam. The content of clay in the control section ranges from 20 to 35 percent.

Ebbert Series

The Ebbert series consists of very poorly drained, slowly permeable soils in depressions in the uplands. These soils formed in loess. Slope ranges from 0 to 2 percent.

Typical pedon of Ebbert silt loam, 660 feet south and 198 feet west of the center of sec. 31, T. 11 N., R. 3 W.

Ap—0 to 8 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; weak fine granular structure; friable; few fine and very fine roots; medium acid; clear smooth boundary.

A—8 to 11 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; weak very fine subangular blocky structure; friable; few fine and few very fine roots; slightly acid; abrupt smooth boundary.

Eg—11 to 16 inches; dark gray (10YR 4/1) silt loam; few fine distinct brown (10YR 5/3) and few fine prominent dark yellowish brown (10YR 4/6) mottles; weak medium platy structure parting to weak medium granular; friable; few very fine roots; common faint very dark gray (10YR 3/1) organic coatings on faces of peds and lining pores; few distinct light gray (10YR 7/1 dry) silt coatings on faces of peds; medium acid; clear smooth boundary.

Btg1—16 to 18 inches; gray (10YR 5/1) silty clay loam; few fine distinct grayish brown (2.5Y 5/2), common fine prominent dark yellowish brown (10YR 4/6), and common fine prominent yellowish brown (10YR 5/8) mottles; weak fine subangular blocky structure; friable; few very fine roots; few faint very dark gray (10YR 3/1) clay films lining pores; few faint dark gray (10YR 4/1) clay films on faces of peds; few fine accumulations of iron and manganese oxide; slightly acid; clear smooth boundary.

Btg2—18 to 28 inches; gray (10YR 5/1) silty clay loam; few fine distinct grayish brown (2.5Y 5/2), few fine prominent dark yellowish brown (10YR 4/6), and many fine prominent yellowish brown (10YR 5/8) mottles; moderate fine and medium subangular blocky structure; firm; few very fine roots; few faint very dark gray (10YR 3/1) clay films lining pores; many faint dark gray (10YR 4/1) clay films on faces of peds; few fine accumulations of iron and manganese oxide; slightly acid; clear smooth boundary.

Btg3—28 to 40 inches; gray (5Y 5/1) silty clay loam; many fine prominent yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; firm; few faint dark olive gray (5Y 3/1) clay films lining pores; few faint dark gray (5Y 4/1) clay films on faces of peds; few fine accumulations of iron and manganese oxide; neutral; clear smooth boundary.

Btg4—40 to 52 inches; light gray (5Y 6/1) silty clay loam; common fine and medium prominent yellowish brown (10YR 5/8) mottles; moderate medium and coarse subangular blocky structure; firm; few distinct dark olive gray (5Y 3/1) clay films lining pores; few faint dark gray (5Y 4/1) clay films on faces of peds; few fine accumulations of iron and manganese oxide; neutral; clear smooth boundary.

Cg—52 to 60 inches; light gray (5Y 6/1) silt loam; common medium prominent yellowish brown (10YR 5/8) mottles; massive; firm; few faint dark gray (5Y 4/1) clay films lining pores; few fine accumulations of iron and manganese oxide; neutral.

The solum ranges from 40 to more than 60 inches in thickness. The mollic epipedon is 10 to 18 inches thick. The loess ranges from 45 to more than 60 inches in thickness.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. The Eg horizon has value of 4 or 5 and chroma of 1 or 2. The Btg horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. The upper part of this horizon has value of 3 to 5. The lower part has value of 4 to 6 and chroma of 0 to 2. The Cg horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 2. It is silty clay loam or silt loam. The content of clay in the control section ranges from 24 to 35 percent.

Edinburg Series

The Edinburg series consists of very poorly drained, slowly permeable soils in depressions in the uplands. These soils formed in loess. Slope is 0 to 1 percent.

Typical pedon of Edinburg silty clay loam, 2,550 feet east and 384 feet south of the northwest corner of sec. 9, T. 12 N., R. 3 W.

Ap—0 to 8 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine and medium granular structure; firm; few very fine roots; neutral; clear smooth boundary.

A—8 to 12 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; moderate very fine and fine angular blocky structure; firm; few very fine roots; few fine concretions of iron and manganese oxide; neutral; abrupt smooth boundary.

BE—12 to 20 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; weak medium granular structure; firm; few very fine roots; very few distinct gray (10YR 6/1 dry) silt coatings on faces of peds; few fine concretions of iron and manganese oxide; neutral; abrupt smooth boundary.

Btg1—20 to 25 inches; dark gray (5Y 4/1) silty clay loam; weak fine prismatic structure parting to moderate fine angular blocky; firm; few very fine roots; very few prominent gray (10YR 6/1 dry) silt coatings on faces of peds; common prominent very dark gray (10YR 3/1) clay films on faces of peds; few fine concretions of iron and manganese oxide; neutral; clear smooth boundary.

Btg2—25 to 31 inches; dark gray (5Y 4/1) silty clay loam; few fine prominent dark yellowish brown (10YR 4/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; few distinct very dark gray (N 3/0) clay films on faces of peds; few fine concretions of iron and manganese oxide; neutral; clear smooth boundary.

Btg3—31 to 38 inches; olive gray (5Y 5/2) silty clay loam; few fine prominent dark yellowish brown (10YR 4/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; common faint dark gray (5Y 4/1) and few distinct very dark gray (N 3/0) clay films on faces of peds; few fine concretions of iron and manganese oxide; neutral; clear smooth boundary.

BCg—38 to 52 inches; olive gray (5Y 5/2) silty clay loam; common fine prominent dark yellowish brown (10YR 4/6) mottles; weak medium prismatic structure parting to moderate coarse subangular blocky; firm; few faint dark gray (5Y 4/1) clay films on faces of peds; few prominent very dark gray (N 3/0) clay films lining pores; few fine concretions of iron and manganese oxide; dark gray (5Y 4/1) krotovinas; neutral; clear smooth boundary.

Cg—52 to 60 inches; light olive gray (5Y 6/2) and gray (5Y 5/1) silty clay loam; common fine prominent dark yellowish brown (10YR 4/6) mottles; massive; firm; few distinct dark gray (5Y 4/1) clay films lining pores; few fine concretions of iron and manganese oxide; neutral.

The solum ranges from 40 to more than 60 inches in thickness. The mollic epipedon ranges from 15 to 24 inches in thickness.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. The Btg horizon has hue of 10YR, 2.5YR, or 5Y, value of 3 to 5, and chroma of 1 or 2. It is silty clay loam or silty clay. The Cg horizon has hue of 10YR, 2.5Y, or 5Y, value of 5 or 6, and chroma of 1 or 2. The content of clay in the control section ranges from 35 to 46 percent.

Elburn Series

The Elburn series consists of somewhat poorly drained, moderately permeable soils on broad ridges in the uplands. These soils formed in loess and in the underlying stratified, loamy outwash. Slope ranges from 0 to 2 percent.

Typical pedon of Elburn silt loam, 2,716 feet north and 1,300 feet west of the southeast corner of sec. 36, T. 14 N., R. 1 E.

Ap—0 to 6 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; many very dark gray (10YR 3/1) organic coatings; few very fine roots; slightly acid; abrupt smooth boundary.

A—6 to 16 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; many very dark gray (10YR 3/1) organic coatings; few very fine roots; neutral; clear smooth boundary.

Bt1—16 to 21 inches; brown (10YR 4/3) silty clay loam; few fine prominent yellowish brown (10YR 5/8) and few fine faint brown (10YR 5/3) mottles; moderate fine subangular blocky structure; friable; few very fine roots; many distinct very dark gray (10YR 3/1) and dark gray (10YR 4/1) clay films on faces of peds; few fine concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

Bt2—21 to 28 inches; brown (10YR 5/3) silty clay loam; few fine faint grayish brown (10YR 5/2) and few fine distinct yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; firm; few very fine roots; common distinct very dark gray (10YR 3/1) and common faint dark grayish brown (10YR 4/2) clay films on faces of peds; few fine concretions of iron and manganese oxide; neutral; clear smooth boundary.

Bt3—28 to 36 inches; brown (10YR 5/3) silty clay loam; common fine faint grayish brown (10YR 5/2) and common fine distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; few very fine roots; common distinct very dark gray (10YR 3/1) and dark gray (10YR 4/1) clay films on faces of peds; few fine concretions of iron and manganese oxide; neutral; clear smooth boundary.

Bt4—36 to 43 inches; light olive brown (2.5Y 5/4) silty clay loam; common medium prominent yellowish brown (10YR 5/6) and common medium prominent brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; friable; few very fine roots; few distinct brown (10YR 5/3) and few prominent very dark gray (10YR 3/1) clay films on faces of peds; few fine concretions of iron and manganese oxide; mildly alkaline; clear smooth boundary.

Btg1—43 to 49 inches; grayish brown (2.5Y 5/2) silty clay loam; many medium prominent brownish yellow (10YR 6/8) and few fine prominent yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; friable; few very fine roots; few distinct very dark gray (10YR 3/1) and dark grayish brown (10YR 4/2) clay films on faces of peds; few fine concretions of iron and manganese oxide; mildly alkaline; clear smooth boundary.

2Btg2—49 to 58 inches; grayish brown (2.5Y 5/2), stratified silt loam, loam, and sandy loam; common medium prominent brownish yellow (10YR 6/8) and few fine prominent yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; friable; few very fine roots; few distinct very dark grayish brown (10YR 3/2) and dark grayish brown (10YR 4/2) clay films lining pores; few very fine concretions of iron and manganese oxide; mildly alkaline; clear smooth boundary.

2Cg—58 to 62 inches; grayish brown (2.5Y 5/2), stratified sandy loam and loamy sand; common medium prominent yellowish brown (10YR 5/8) and common medium prominent brownish yellow (10YR 6/8) mottles; single grain; very friable; mildly alkaline.

The solum ranges from 50 to more than 60 inches in thickness. The mollic epipedon is 10 to 18 inches thick. Depth to the stratified outwash ranges from 40 to 60 inches.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. The Bt horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4. The 2Btg and 2Cg horizons have hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4. They are stratified sandy loam, loam, silt loam, or loamy sand. The content of clay in the control section ranges from 25 to 35 percent.

Elco Series

The Elco series consists of moderately well drained soils on side slopes in the uplands. These soils formed in loess and in the underlying paleosol, which formed in Illinoian till. They are moderately permeable in the upper part and slowly permeable in the paleosol. Slope ranges from 5 to 10 percent.

Typical pedon of Elco silt loam, 5 to 10 percent slopes, eroded, 1,200 feet west and 420 feet north of the southeast corner of sec. 12, T. 13 N., R. 3 W.

Ap—0 to 6 inches; mixed dark grayish brown (10YR 4/2) and dark yellowish brown (10YR 4/4) silt loam, pale brown (10YR 6/3) dry; moderate fine granular structure; friable; few very fine roots; medium acid; abrupt smooth boundary.

Bt1—6 to 17 inches; dark yellowish brown (10YR 4/4) silty clay loam; few fine distinct dark yellowish brown (10YR 4/6) and few fine distinct yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; firm; few very fine roots; common faint brown (10YR 4/3) clay films on faces of peds; few fine concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

Bt2—17 to 22 inches; dark yellowish brown (10YR 4/4) silty clay loam; common fine distinct yellowish brown (10YR 5/6) mottles; moderate fine and medium subangular blocky structure; firm; few very fine roots; common faint brown (10YR 4/3) clay films on faces of peds; few fine concretions of iron and manganese oxide; medium acid; clear smooth boundary.

Bt3—22 to 28 inches; dark yellowish brown (10YR 4/4) silty clay loam; common fine faint yellowish brown (10YR 5/4) and few fine distinct grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; firm; few very fine roots; common faint brown (10YR 4/3) clay films on faces of peds; few fine concretions of iron and manganese oxide; medium acid; abrupt smooth boundary.

Btg1—28 to 38 inches; gray (5Y 5/1) clay loam; common fine prominent yellowish brown (10YR 5/6) and few fine prominent light olive brown (2.5Y 5/4) mottles; moderate medium subangular blocky structure; few very fine roots; common distinct dark grayish brown (2.5Y 4/2) clay films and few prominent light gray (10YR 7/1 dry) silt coatings on faces of peds; few fine concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

2Btg2—38 to 50 inches; gray (5Y 5/1) clay loam; few fine prominent yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; common prominent dark grayish brown (2.5Y 4/2) clay films and few prominent light gray (10YR 7/1 dry) silt coatings on faces of peds; medium acid; clear smooth boundary.

2Btg3—50 to 60 inches; gray (5Y 5/1) clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; moderate medium and coarse subangular blocky structure; firm; few distinct light gray (10YR 7/1 dry) silt coatings on faces of peds; neutral.

The solum is more than 60 inches thick. The loess ranges from 20 to 40 inches in thickness.

The Ap horizon has value of 3 or 4 and chroma of 2 or 3. The Bt horizon has value of 4 or 5 and chroma of 3 to 6. The 2Btg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 to 4. It is clay loam, silty clay loam, or silty clay. The content of clay in the control section ranges from 23 to 45 percent.

El Dara Series

The El Dara series consists of well drained and moderately well drained, moderately permeable soils on side slopes in the uplands. These soils formed in outwash. Slope ranges from 10 to 30 percent.

Typical pedon of El Dara sandy loam, 10 to 15 percent slopes, eroded, 46 feet south and 1,600 feet west of the northeast corner of sec. 17, T. 12 N., R. 2 W.

Ap—0 to 10 inches; mixed dark grayish brown (10YR 4/2) and yellowish brown (10YR 5/6) sandy loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; very friable; common very fine roots; strongly acid; abrupt smooth boundary.

Bt1—10 to 17 inches; yellowish brown (10YR 5/6) sandy clay loam; moderate fine subangular blocky structure; friable; few very fine roots; many distinct brown (10YR 4/3) and dark yellowish brown (10YR 4/4) clay films on faces of peds; medium acid; clear smooth boundary.

Bt2—17 to 26 inches; yellowish brown (10YR 5/6) sandy clay loam; moderate medium subangular blocky structure; friable; few very fine roots; many distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; strongly acid; clear smooth boundary.

Bt3—26 to 34 inches; yellowish brown (10YR 5/4) sandy clay loam; few fine distinct light brownish gray (2.5Y 6/2) and common fine distinct yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; friable; few very fine roots; many faint dark yellowish brown (10YR 4/4) clay films on faces of peds; few fine concretions of iron and manganese oxide; very strongly acid; clear smooth boundary.

Bt4—34 to 44 inches; yellowish brown (10YR 5/4) fine sandy loam; few fine distinct light brownish gray (2.5Y 6/2) and common fine distinct yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; friable; few very fine roots; few faint dark yellowish brown (10YR 4/4) clay films on faces of peds; few fine concretions of iron and manganese oxide; very strongly acid; clear smooth boundary.

BC—44 to 59 inches; yellowish brown (10YR 5/6), stratified fine sandy loam and loamy fine sand; common medium distinct light yellowish brown (10YR 6/4) mottles; weak medium subangular blocky structure; very friable; few distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; few fine concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

C—59 to 63 inches; pale brown (10YR 6/3), stratified loamy fine sand and fine sand; few thin yellowish brown strata; single grain; loose; few very fine roots; strongly acid.

The solum ranges from 45 to 60 inches in thickness. The Ap or A horizon has value of 3 or 4 and chroma of 2 or 3. It is fine sandy loam, loam, or silt loam. Some pedons have an E horizon. This horizon has value of 4 to 6 and chroma of 3 to 6. It is fine sandy loam or loam. The Bt horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. It is sandy clay loam, clay loam, or fine sandy loam. The C horizon has hue of 7.5YR or 10YR, value of 4 to 7, and chroma of 1 to 6. It is stratified sandy loam, loamy fine sand, or fine sand. The control section has 18 to 35 percent clay and more than 15 percent fine sand or coarser sand.

Elkhart Series

The Elkhart series consists of well drained, moderately permeable soils on side slopes in the uplands. These soils formed in calcareous loess. Slope ranges from 5 to 10 percent.

The Elkhart soils in this survey area have a dark surface layer that is thinner than is definitive for the series. This difference, however, does not significantly affect the use and management of the soils.

Typical pedon of Elkhart silt loam, 5 to 10 percent slopes, eroded, 1,640 feet north and 288 feet west of the southeast corner of sec. 27, T. 16 N., R. 1 W.

Ap—0 to 8 inches; mixed very dark grayish brown (10YR 3/2) and dark yellowish brown (10YR 4/4) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; few very fine roots; medium acid; abrupt smooth boundary.

Bt1—8 to 12 inches; dark yellowish brown (10YR 4/4) silt loam; weak very fine subangular blocky structure; friable; few very fine roots; many faint brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—12 to 21 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; friable; few very fine roots; many faint brown (10YR 4/3) clay films on faces of peds; few fine concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

Bt3—21 to 26 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak medium subangular blocky structure; friable; few very fine roots; common faint brown (10YR 4/3) clay films on faces of peds; few fine concretions of iron and manganese oxide; neutral; clear smooth boundary.

BC—26 to 29 inches; brown (10YR 5/3) silt loam; few fine distinct dark yellowish brown (10YR 4/6) mottles; weak medium subangular blocky structure; friable; few fine roots; few faint brown (10YR 4/3) clay films on faces of peds; few fine concretions of iron and manganese oxide; mildly alkaline; clear smooth boundary.

C1—29 to 53 inches; light brownish gray (10YR 6/2) silt loam; common fine distinct dark yellowish brown (10YR 4/6) and common medium faint brown (10YR 5/3) mottles; massive; friable; common fine concretions of iron and manganese oxide; few fine concretions of carbonate; slight effervescence; moderately alkaline; clear smooth boundary.

C2—53 to 60 inches; gray (10YR 5/1) and grayish brown (10YR 5/2) silt loam; few fine distinct dark yellowish brown (10YR 4/6) mottles; massive; friable; few fine concretions of iron and manganese oxide; slight effervescence; moderately alkaline.

The thickness of the solum and the depth to carbonates range from 20 to 40 inches. The Ap horizon has chroma of 2 or 3. The Bt horizon has value of 4 or 5 and chroma of 4 to 6. The C horizon has value of 4 to 6 and chroma of 1 to 4. The content of clay in the control section ranges from 25 to 35 percent.

Harpster Series

The Harpster series consists of poorly drained, moderately permeable soils on broad flats in the uplands. These soils formed in loess. Slope ranges from 0 to 2 percent.

Typical pedon of Harpster silty clay loam, 200 feet north and 1,100 feet east of the southwest corner of sec. 31, T. 14 N., R. 1 W.

Akp—0 to 8 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak fine granular structure; friable; few fine roots; few fine dark concretions of iron and manganese oxide; few fine concretions of calcium carbonate; few snail shells; strong effervescence; moderately alkaline; clear smooth boundary.

Ak—8 to 17 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; weak fine subangular blocky structure; friable; few fine roots; few fine concretions of iron and manganese oxide; common medium concretions of calcium carbonate; few snail shells; strong effervescence; moderately alkaline; clear smooth boundary.

Bkg1—17 to 23 inches; olive gray (5Y 5/2) silty clay loam; few fine prominent yellowish brown (10YR 5/4) mottles; moderate fine subangular blocky structure; friable; few fine roots; common faint very dark gray (10YR 3/1) organic coatings on faces of peds; few fine concretions of iron and manganese oxide; common fine and medium concretions of calcium carbonate; few snail shells; slight effervescence; moderately alkaline; clear smooth boundary.

Bkg2—23 to 30 inches; gray (5Y 5/1) silty clay loam; few fine prominent yellowish brown (10YR 5/8) mottles; moderate fine subangular blocky structure; friable; few fine roots; few fine concretions of iron and manganese oxide; common fine and medium concretions of calcium carbonate; few snail shells; slight effervescence; moderately alkaline; clear smooth boundary.

Bkg3—30 to 40 inches; gray (5Y 5/1) silty clay loam; common fine prominent yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; friable; few fine roots; few fine concretions of iron and manganese oxide; common fine and medium concretions of calcium carbonate; slight effervescence; moderately alkaline; clear smooth boundary.

Bkg4—40 to 48 inches; gray (5Y 6/1) silty clay loam; common fine prominent yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; few fine roots; few fine concretions of iron and manganese oxide; common fine and medium concretions of calcium carbonate; slight effervescence; moderately alkaline; clear smooth boundary.

Bkg5—48 to 57 inches; gray (5Y 6/1) silty clay loam; common medium prominent yellowish brown (10YR 5/6) and brownish yellow (10YR 6/8) mottles; weak coarse subangular blocky structure; friable; few fine roots; common fine and medium concretions of calcium carbonate; slight effervescence; moderately alkaline; clear smooth boundary.

Cg—57 to 61 inches; gray (10YR 6/1) silt loam; common medium prominent brownish yellow (10YR 6/8) mottles; massive; friable; few fine and medium concretions of calcium carbonate; slight effervescence; moderately alkaline.

The mollic epipedon ranges from 10 to 24 inches in thickness. The Akp horizon has value of 2 or 3 and chroma of 0 or 1. The Bgk horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 or 2. The Cg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 to 3. The content of clay in the control section ranges from 27 to 35 percent.

Harrison Series

The Harrison series consists of moderately well drained soils on ridges and side slopes in the uplands. These soils formed in moderately permeable loess and in the underlying pedisediments or paleosol, which formed in slowly permeable Illinoian till. Slope ranges from 2 to 5 percent.

Typical pedon of Harrison silt loam, 2 to 5 percent slopes, 228 feet north and 1,350 feet west of the southeast corner of sec. 24, T. 12 N., R. 2 W.

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; common very fine and few fine roots; slightly acid; abrupt smooth boundary.

BA—10 to 14 inches; very dark brown (10YR 4/3) silt loam; weak very fine and fine subangular blocky structure; friable; few very fine roots; many distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; medium acid; clear smooth boundary.

Bt1—14 to 20 inches; brown (10YR 4/3) silt loam; few fine faint dark yellowish brown (10YR 4/4) mottles; moderate fine subangular blocky structure; friable; few very fine roots; common faint very dark grayish brown (10YR 3/2) and few distinct very dark gray (10YR 3/1) clay films on faces of peds; few fine accumulations of iron and manganese oxide; medium acid; clear smooth boundary.

Bt2—20 to 27 inches; brown (10YR 4/3) silty clay loam; few fine distinct dark brown (7.5YR 4/4) and few fine faint brown (10YR 5/3) and dark yellowish brown (10YR 4/4) mottles; weak fine prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; common faint very dark grayish brown (10YR 3/2) clay films on faces of peds; few fine accumulations of iron and manganese oxide; medium acid; clear smooth boundary.

Bt3—27 to 35 inches; brown (10YR 5/3) silty clay loam; many fine faint dark yellowish brown (10YR 4/4) and few fine distinct dark brown (7.5YR 4/4) mottles; moderate medium subangular blocky structure; firm; few very fine roots; few faint dark grayish brown (10YR 4/2) clay films on faces of peds; few fine accumulations of iron and manganese oxide; medium acid; clear smooth boundary.

Bt4—35 to 45 inches; yellowish brown (10YR 5/4) silt loam; many fine distinct grayish brown (10YR 5/2), common fine distinct dark yellowish brown (10YR 4/4), few fine distinct dark brown (7.5YR 4/4), and few faint yellowish brown (10YR 5/4) mottles; weak medium and coarse subangular blocky structure; firm; few very fine roots; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine accumulations of iron and manganese oxide; medium acid; clear smooth boundary.

2Bt5—45 to 65 inches; grayish brown (10YR 5/2) silty clay loam; few fine faint brown (10YR 5/3), common fine and medium distinct dark yellowish brown (10YR 4/4), and few fine prominent dark brown (7.5YR 4/4) mottles; weak medium and coarse subangular blocky structure; firm; few distinct gray (10YR 5/1) clay films on faces of peds; few fine accumulations of iron and manganese oxide; about 15 percent sand; few pebbles; slightly acid; abrupt smooth boundary.

3Btgb—65 to 70 inches; grayish brown (2.5Y 5/2) clay loam; common medium prominent yellowish brown (10YR 5/4) mottles; moderate coarse subangular blocky structure; firm; common distinct olive gray (5Y 4/2) clay films on faces of peds; few fine accumulations of iron and manganese oxide; about 5 percent pebbles; neutral.

The solum ranges from 45 to more than 60 inches in thickness. The mollic epipedon ranges from 10 to 20 inches in thickness. Depth to the pedisediments ranges from 40 to 60 inches.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. The Bt horizon has value of 4 or 5 and chroma of 2 to 6. It is silt loam or silty clay loam. The 2Bt horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 6. The content of clay in the control section ranges from 25 to 35 percent.

Hartsburg Series

The Hartsburg series consists of poorly drained, moderately permeable soils on broad flats in the uplands. These soils formed in loess. Slope ranges from 0 to 2 percent.

Typical pedon of Hartsburg silty clay loam, 1,720 feet west and 114 feet north of the southeast corner of sec. 1, T. 15 N., R. 1 W.

Ap—0 to 7 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; weak fine granular structure; friable; few very fine roots; neutral; abrupt smooth boundary.

A1—7 to 14 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; moderate medium granular structure; firm; few very fine roots; few fine and medium concretions of iron and manganese oxide; neutral; clear smooth boundary.

A2—14 to 20 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; few fine distinct dark grayish brown (2.5Y 4/2) mottles; moderate medium granular structure; friable; few very fine roots; few fine and medium concretions of iron and manganese oxide; neutral; clear smooth boundary.

Bg1—20 to 26 inches; dark grayish brown (2.5Y 4/2) silty clay loam; few fine prominent yellowish brown (10YR 5/6) mottles; moderate medium granular structure; friable; few very fine roots; many distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few fine and medium concretions of iron and manganese oxide; neutral; clear smooth boundary.

Bg2—26 to 31 inches; olive gray (5Y 5/2) silty clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; few very fine roots; common distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few fine and medium concretions of iron and manganese oxide; mildly alkaline; clear smooth boundary.

Bkg1—31 to 38 inches; gray (5Y 5/1) silt loam; many fine prominent brownish yellow (10YR 6/6) and yellowish brown (10YR 5/8) and common fine distinct olive (5Y 5/3) mottles; moderate medium subangular blocky structure; friable; few very fine roots; few faint very dark gray (5Y 3/1) organic coatings on faces of peds; many fine and medium concretions and accumulations of calcium carbonate; few fine concretions of iron and manganese oxide; violent effervescence; mildly alkaline; clear smooth boundary.

Bkg2—38 to 43 inches; gray (5Y 6/1) silt loam; common medium prominent brownish yellow (10YR 6/6) and yellowish brown (10YR 5/6) and few fine distinct olive (5Y 5/4) mottles; weak coarse subangular blocky structure; friable; few very fine roots; few distinct very dark gray (5Y 3/1) organic coatings lining root channels; many fine and medium concretions and accumulations of calcium carbonate; few fine concretions of iron and manganese oxide; violent effervescence; moderately alkaline; clear smooth boundary.

Cg—43 to 60 inches; gray (5Y 6/1) silt loam; common medium prominent strong brown (7.5YR 5/8) and brownish yellow (10YR 6/6) mottles; massive; friable; few very fine roots; few fine and medium concretions of iron and manganese oxide; slight effervescence; mildly alkaline.

The solum ranges from 30 to 49 inches in thickness. The mollic epipedon ranges from 10 to 20 inches in thickness. The depth to free carbonates ranges from 15 to 35 inches.

The Ap horizon has value of 2 or 3 and chroma of 0 to 2. The Bg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 or 5, and chroma of 1 or 2. It is silty clay loam or silt loam. The Cg horizon has hue of 2.5Y or 5Y, value of 5 or 6, and chroma of 1 or 2. The content of clay in the control section ranges from 27 to 35 percent.

Herrick Series

The Herrick series consists of somewhat poorly drained, moderately slowly permeable soils on broad, low ridges in the uplands. These soils formed in loess. Slope ranges from 0 to 2 percent.

Typical pedon of Herrick silt loam, 1,260 feet south and 60 feet west of the northeast corner of sec. 1, T. 11 N., R. 3 W.

Ap1—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate very fine granular structure; very friable; common fine and very fine roots; common wormcasts and worm channels; very dark gray (10YR 3/1) organic coatings on faces of peds and lining channels; light brownish gray (10YR 6/2 dry) silt coatings and common very fine concretions of iron and manganese oxide on the surface; slightly acid; clear wavy boundary.

Ap2—7 to 11 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak coarse subangular blocky structure parting to weak fine granular; very friable; few fine and medium roots; common wormcasts and worm channels; few faint very dark gray (10YR 3/1) organic coatings lining channels; few very fine accumulations of iron and manganese oxide; slightly acid; abrupt smooth boundary.

E—11 to 15 inches; very dark grayish brown (10YR 3/2) silt loam, gray (10YR 5/1) dry; discontinuous weak thick platy structure parting to weak medium granular; friable; few fine roots; few medium worm channels; continuous grayish brown (10YR 5/2) silt coatings on faces of all peds, light gray (10YR 7/1) dry; few fine concretions of iron and manganese oxide and common soft yellowish brown accumulations that streak with tools on cut faces; medium acid; clear smooth boundary.

Bt1—15 to 19 inches; dark grayish brown (10YR 4/2) silty clay loam; few very fine distinct faint yellowish brown (10YR 5/4) mottles; weak very fine and fine prismatic structure parting to moderate fine and medium subangular blocky; friable; few fine roots; thin discontinuous very dark grayish brown (10YR 3/2) clay and organic films on horizontal and vertical faces of peds; continuous light gray (10YR 7/1 dry) silt coatings on faces of all peds; few fine concretions and stains of iron and manganese oxide; medium acid; clear smooth boundary.

Bt2—19 to 25 inches; brown (10YR 5/3) silty clay loam; common fine distinct yellowish brown (10YR 5/6) and brown (7.5YR 4/4) and few fine faint grayish brown (10YR 5/2) mottles; moderate medium prismatic structure parting to moderate medium subangular and angular blocky; firm; few fine and very fine roots, dominantly in the cracks between peds; thin continuous very dark grayish brown (10YR 3/2) and dark brown (10YR 4/3) clay films on vertical and horizontal faces of peds; nearly continuous very dark gray (10YR 3/1) organic coatings on faces of peds; few fine concretions of iron and manganese oxide; medium acid; gradual smooth boundary.

Bt3—25 to 35 inches; yellowish brown (10YR 5/6) silty clay loam; common medium prominent and distinct brown (7.5YR 4/4) and few fine distinct grayish brown (10YR 5/2) mottles; moderate medium and coarse prismatic structure parting to weak coarse subangular blocky; very firm; few fine and very fine roots, dominantly in the cracks between peds; medium continuous very dark gray (10YR 3/1) clay and organic films on vertical and horizontal faces of peds; few concretions of iron and manganese oxide; medium acid; gradual smooth boundary.

Bt4—35 to 47 inches; yellowish brown (10YR 5/6) silty clay loam; common fine prominent and distinct grayish brown (2.5Y 5/2) mottles; moderate coarse prismatic structure parting to weak coarse subangular blocky; firm; few very fine roots; few very fine continuous vertical tubular pores; thin very dark grayish brown (10YR 3/2) clay films, which are continuous on vertical faces of peds and in pores and are discontinuous on horizontal faces of peds; slightly acid; gradual wavy boundary.

Bt5—47 to 58 inches; yellowish brown (10YR 5/4) silty clay loam; many medium distinct yellowish brown and common medium prominent light brownish gray (2.5Y 6/2) mottles; weak very coarse prismatic structure; firm; few very fine roots; many very fine continuous vertical tubular pores; thin very dark grayish brown (10YR 3/2) clay and organic films on vertical faces of peds and lining channels; slightly acid; gradual smooth boundary.

C—58 to 62 inches; mottled yellowish brown (10YR 5/6) and light brownish gray (2.5Y 6/2) silt loam; massive; friable; few very fine and fine continuous vertical tubular pores; very dark grayish brown clay lining pores; few accumulations and stains of iron and manganese oxide; an increase in the content of coarse silt and very fine sand; neutral.

The solum ranges from 45 to more than 62 inches in thickness. The mollic epipedon ranges from 10 to 18 inches in thickness.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. The E horizon has value of 3 or 4 and chroma of 1 or 2. The Bt horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 6. It is silty clay loam or silty clay. The content of clay in the control section ranges from 35 to 42 percent.

Hickory Series

The Hickory series consists of well drained, moderately permeable soils on side slopes in the uplands. These soils formed in glacial till. Slope ranges from 10 to 30 percent.

Typical pedon of Hickory loam, 15 to 30 percent slopes, 330 feet north and 3 feet east of the center of sec. 25, T. 13 N., R. 3 W.

A—0 to 3 inches; mixed very dark grayish brown (10YR 3/2) and less than 5 percent dark yellowish brown (10YR 4/4) loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; many very fine roots; few fine pebbles; strongly acid; clear smooth boundary.

E—3 to 9 inches; brown (10YR 4/3) loam; weak thick platy structure parting to weak fine and medium granular; friable; common very fine and few fine roots; many distinct very dark grayish brown (10YR 3/2) organic coatings lining pores; few fine pebbles; strongly acid; clear smooth boundary.

Bt1—9 to 15 inches; dark yellowish brown (10YR 4/4) clay loam; moderate fine subangular blocky structure; firm; few very fine and few fine roots; few faint brown (10YR 4/3) clay films on faces of peds and common distinct very dark grayish brown (10YR 3/2) organic coatings lining pores; medium acid; few fine pebbles; clear smooth boundary.

Bt2—15 to 23 inches; dark yellowish brown (10YR 4/4) clay loam; moderate medium subangular blocky structure; firm; few very fine roots; few distinct brown (7.5YR 4/4) clay films on faces of peds and few distinct very dark grayish brown (10YR 3/2) organic coatings lining pores; medium acid; few fine pebbles; clear smooth boundary.

Bt3—23 to 30 inches; dark yellowish brown (10YR 4/4) clay loam; moderate medium subangular blocky structure; firm; few very fine roots; few distinct brown (7.5YR 4/4) clay films on faces of peds; approximately 5 percent gravel; medium acid; clear smooth boundary.

Bt4—30 to 38 inches; dark yellowish brown (10YR 4/4) clay loam; common fine faint brown (10YR 5/3) and few fine distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; few very fine roots; few faint brown (10YR 4/3) clay films on faces of peds; few fine concretions of iron and manganese oxide; approximately 2 percent gravel; medium acid; clear smooth boundary.

Bt5—38 to 49 inches; dark yellowish brown (10YR 4/4) clay loam; few fine faint brown (10YR 5/3) and few fine distinct yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; firm; few very fine roots; very few faint brown (10YR 4/3) clay films on faces of peds; few fine concretions of iron and manganese oxide; approximately 4 percent gravel; strongly acid; clear smooth boundary.

BC—49 to 60 inches; brown (10YR 5/3) clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; firm; few very fine roots; very few distinct brown (10YR 4/3) clay films on faces of peds; few fine concretions of iron and manganese oxide; approximately 4 percent gravel; strongly acid.

The solum ranges from 40 to more than 60 inches in thickness. The Ap or A horizon has value of 2 to 4 and chroma of 2 or 3. Pedons in some cultivated areas do not have an E horizon. The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. It is clay loam, silty clay loam, or loam. The BC horizon has value of 5 or 6 and chroma of 2 to 4. It is loam or clay loam. The content of clay in the control section ranges from 27 to 35 percent.

Ipava Series

The Ipava series consists of somewhat poorly drained, moderately slowly permeable soils on low, broad ridges in the uplands. These soils formed in loess. Slope ranges from 0 to 2 percent.

Typical pedon of Ipava silt loam, 2,140 feet west and 186 feet south of the northeast corner of sec. 19, T. 14 N., R. 1 E.

Ap—0 to 9 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; few very fine roots; medium acid; abrupt smooth boundary.

A—9 to 18 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; moderate fine granular structure; friable; few very fine roots; common distinct black (10YR 2/1) organic coatings on faces of peds; medium acid; clear smooth boundary.

Bt1—18 to 24 inches; brown (10YR 5/3) silty clay loam; many fine distinct yellowish brown (10YR 5/6), few fine faint dark grayish brown (10YR 4/2), and few fine distinct light olive brown (2.5Y 5/4) mottles; moderate medium subangular blocky structure; friable; few very fine roots; common distinct very dark gray (10YR 3/1) clay films on faces of peds; medium acid; clear smooth boundary.

Bt2—24 to 32 inches; grayish brown (10YR 5/2) silty clay loam; many fine distinct yellowish brown (10YR 5/6) and common fine distinct light brownish gray (2.5Y 6/2) mottles; moderate medium subangular blocky structure; friable; few very fine roots; common faint very dark gray (10YR 3/1) and many faint dark grayish brown (10YR 4/2) clay films on faces of peds; few fine concretions of iron and manganese oxide; medium acid; clear smooth boundary.

Btg1—32 to 42 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine faint light brownish gray (2.5Y 6/2) and common medium prominent yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; few very fine roots; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine concretions of iron and manganese oxide; medium acid; clear smooth boundary.

Btg2—42 to 50 inches; light brownish gray (2.5Y 6/2) silty clay loam; common medium prominent yellowish brown (10YR 5/6) and common medium prominent strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; friable; few very fine roots; few distinct dark grayish brown (10YR 4/2) and very dark gray (10YR 3/1) clay films lining root channels; few fine concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

BCg—50 to 58 inches; light brownish gray (2.5Y 6/2) silt loam; common medium prominent strong brown (7.5YR 5/8) and common medium prominent yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few very fine roots; few prominent dark grayish brown (10YR 4/2) clay films lining root channels; few fine concretions of iron and manganese oxide; neutral; clear smooth boundary.

Cg—58 to 62 inches; light brownish gray (2.5Y 6/2) silt loam; many medium prominent strong brown (7.5Y 5/8) and common medium prominent yellowish brown (10YR 5/6) mottles; massive; friable; few very fine roots; few prominent dark grayish brown (10YR 4/2) clay films lining root channels; few fine concretions of iron and manganese oxide; moderately alkaline.

The solum ranges from 40 to more than 62 inches in thickness. The mollic epipedon ranges from 14 to 20 inches in thickness.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. The Bt and Btg horizons have value of 4 to 6 and chroma of 2 to 4. The Cg horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 to 4. The content of clay in the control section ranges from 35 to 43 percent.

Kendall Series

The Kendall series consists of somewhat poorly drained, moderately permeable soils on ridges on stream terraces and in the uplands. These soils formed in loess or silty material and in the underlying stratified, loamy outwash. Slope ranges from 0 to 2 percent.

Typical pedon of Kendall silt loam, 620 feet south and 120 feet west of the northeast corner of sec. 35, T. 14 N., R. 1 E.

Ap—0 to 8 inches; grayish brown (10YR 5/2) silt loam, light gray (10YR 7/2) dry; moderate fine granular structure; friable; few very fine roots; medium acid; clear smooth boundary.

E—8 to 11 inches; brown (10YR 5/3) and light brownish gray (10YR 6/2) silt loam; few fine faint yellowish brown (10YR 5/4) mottles; weak medium platy structure; friable; few very fine roots; few fine concretions of iron and manganese oxide; medium acid; clear smooth boundary.

BE—11 to 16 inches; yellowish brown (10YR 5/3) silty clay loam; few fine distinct dark yellowish brown (10YR 4/6) and common fine faint light brownish gray (10YR 6/2) mottles; moderate fine subangular blocky structure; friable; few very fine roots; common distinct white (10YR 8/1 dry) silt coatings and many faint grayish brown (10YR 5/2) clay films on faces of peds; few fine concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

Bt—16 to 26 inches; yellowish brown (10YR 5/4) silty clay loam; few fine distinct yellowish brown (10YR 5/8) and few fine distinct light brownish gray (10YR 6/2) mottles; moderate fine subangular blocky structure; firm; few very fine roots; few distinct white (10YR 8/1 dry) silt coatings and many distinct grayish brown (10YR 5/2) clay films on faces of peds; few fine concretions of iron and manganese oxide; very strongly acid; clear smooth boundary.

Btg1—26 to 36 inches; brown (10YR 5/2) silty clay loam; common medium distinct yellowish brown (10YR 5/8) and common fine distinct light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; firm; few very fine roots; common faint grayish brown (10YR 5/2) clay films on faces of peds; few fine concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

Btg2—36 to 48 inches; light brownish gray (10YR 6/2) silty clay loam; common medium distinct yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; firm; few very fine roots; common faint grayish brown (10YR 5/2) clay films on faces of peds; few fine concretions of iron and manganese oxide; medium acid; clear smooth boundary.

2Btg3—48 to 54 inches; grayish brown (10YR 5/2) silt loam; common medium prominent yellowish brown (10YR 5/8) mottles; moderate coarse subangular blocky structure; friable; few very fine roots; few faint grayish brown (10YR 5/2) clay films on faces of peds; few fine concretions of iron and manganese oxide; about 20 percent sand; neutral; clear smooth boundary.

2Btg4—54 to 60 inches; grayish brown (10YR 5/2) and dark grayish brown (10YR 4/2), stratified sandy loam and loam; common medium prominent yellowish brown (10YR 5/8) and few fine distinct light brownish gray (10YR 6/2) mottles; weak coarse subangular blocky structure; friable; few fine concretions of iron and manganese oxide; neutral.

The solum ranges from 45 to more than 60 inches in thickness. Depth to the stratified outwash ranges from 40 to 60 inches.

The Ap horizon has value of 4 or 5 and chroma of 1 to 3. The E horizon has value of 4 to 6 and chroma of 2 or 3. The Bt and Btg horizons have hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4. The 2Btg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 4. It is loam, sandy loam, or silt loam. The content of clay in the control section ranges from 27 to 35 percent.

Keomah Series

The Keomah series consists of somewhat poorly drained, slowly permeable soils on broad, flat ridges in the uplands. These soils formed in loess. Slope ranges from 0 to 2 percent.

Typical pedon of Keomah silt loam, 2,470 feet south and 830 feet west of the northeast corner of sec. 19, T. 14 N., R. 3 W.

Ap—0 to 9 inches; mixed dark grayish brown (10YR 4/2) and grayish brown (10YR 5/2) silt loam, light brownish gray (10YR 6/2) dry; moderate fine granular structure; friable; few very fine roots; neutral; abrupt smooth boundary.

E—9 to 13 inches; grayish brown (10YR 5/2) silt loam; few fine distinct yellowish brown (10YR 5/6) and common fine faint light brownish gray (10YR 6/2) mottles; weak thin platy structure; friable; few very fine roots; few fine concretions of iron and manganese oxide; neutral; clear smooth boundary.

Bt—13 to 17 inches; brown (10YR 5/3) silty clay loam; few fine distinct yellowish brown (10YR 5/6) and few fine faint grayish brown (10YR 5/2) mottles; moderate fine subangular blocky structure; friable; few very fine roots; many faint grayish brown (10YR 5/2) clay films and few distinct white (10YR 8/1 dry) silt coatings on faces of peds; few fine concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

Btg1—17 to 23 inches; grayish brown (10YR 5/2) silty clay; few fine distinct yellowish brown (10YR 5/6) and common fine faint brown (10YR 5/3) mottles; moderate fine and medium subangular blocky structure; firm; few very fine roots; common faint grayish brown (10YR 5/2) clay films and few distinct white (10YR 8/2 dry) silt coatings on faces of peds; few fine concretions of iron and manganese oxide; very strongly acid; clear smooth boundary.

Btg2—23 to 29 inches; grayish brown (10YR 5/2) silty clay; common fine prominent yellowish brown (10YR 5/8) and few fine faint brown (10YR 5/3) and light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; firm; few very fine roots; few faint dark grayish brown (10YR 4/2) and grayish brown (10YR 5/2) clay films on faces of peds; few fine concretions of iron and manganese oxide; very strongly acid; clear smooth boundary.

Btg3—29 to 39 inches; grayish brown (10YR 5/2) silty clay loam; many medium prominent yellowish brown (10YR 5/8) and few fine faint light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; firm; few very fine roots; few faint dark grayish brown (10YR 4/2) and grayish brown (10YR 5/2) clay films on faces of peds; few fine concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

Btg4—39 to 48 inches; light brownish gray (2.5Y 6/2) silty clay loam; few medium distinct yellowish brown (10YR 5/8) and few fine distinct grayish brown (10YR 5/2) mottles; moderate coarse subangular blocky structure; firm; few distinct grayish brown (10YR 5/2) clay films on faces of peds and few distinct very dark grayish brown (10YR 3/2) clay films lining pores; few fine concretions of iron and manganese oxide; neutral; clear smooth boundary.

BCg—48 to 58 inches; light brownish gray (2.5Y 6/2) silty clay loam; few medium prominent yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable; few distinct dark grayish brown (10YR 5/2) clay films on faces of peds and few distinct very dark grayish brown (10YR 3/2) clay films lining pores; few fine concretions of iron and manganese oxide; neutral; clear smooth boundary.

Cg—58 to 60 inches; light brownish gray (2.5Y 6/2) silt loam; few fine prominent yellowish brown (10YR 5/8) mottles; massive; friable; few distinct very dark grayish brown (10YR 3/2) clay films lining pores; few fine concretions of iron and manganese oxide; neutral.

The solum ranges from 40 to 60 inches in thickness. The Ap horizon has chroma of 1 or 2. The E horizon has value of 4 or 5 and chroma of 1 to 3. The Bt and Btg horizons have value of 4 to 6 and chroma of 2 to 4. They are silty clay loam or silty clay. The Cg horizon has hue of 2.5Y or 10YR, value of 4 to 6, and chroma of 2 to 4. The content of clay in the control section ranges from 27 to 42 percent.

Miami Series

The Miami series consists of well drained, moderately slowly permeable soils on side slopes in the uplands. These soils formed in Wisconsinan glacial till. Slope ranges from 30 to 60 percent.

Typical pedon of Miami loam, 30 to 60 percent slopes, 1,200 feet west and 2,640 feet south of the northeast corner of sec. 21, T. 14 N., R. 3 W.

A—0 to 4 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; few very fine roots; slightly acid; clear smooth boundary.

E—4 to 8 inches; brown (10YR 4/3) loam; weak thin platy structure; friable; few very fine roots; medium acid; clear smooth boundary.

Bt1—8 to 11 inches; yellowish brown (10YR 5/4) loam; moderate fine subangular blocky structure; friable; few very fine roots; many faint dark yellowish brown (10YR 4/4) clay films on faces of peds; medium acid; clear smooth boundary.

Bt2—11 to 27 inches; yellowish brown (10YR 5/4) clay loam; moderate medium subangular blocky structure; friable; few very fine roots; many faint dark yellowish brown (10YR 4/4) clay films on faces of peds; medium acid; clear smooth boundary.

BC—27 to 40 inches; light yellowish brown (10YR 6/4) loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; friable; few distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; about 5 percent gravel; few very pale brown (10YR 7/3 dry) accumulations of calcium carbonate; strong effervescence; moderately alkaline; gradual smooth boundary.

C—40 to 60 inches; light yellowish brown (10YR 6/4) loam; few fine distinct yellowish brown (10YR 5/6) and few fine faint pale brown (10YR 6/3) mottles; massive; firm; about 5 percent gravel; few very pale brown (10YR 7/3 dry) accumulations of calcium carbonate; strong effervescence; moderately alkaline.

The solum ranges from 24 to 40 inches in thickness. The mantle of loess is less than 18 inches thick. The depth to free carbonates ranges from 20 to 40 inches.

The A and E horizons have value of 3 to 5 and chroma of 2 to 4. The Bt horizon has value of 4 or 5 and chroma of 3 or 4. The C horizon has value of 5 or 6 and chroma of 3 or 4. The content of clay in the control section ranges from 27 to 35 percent.

Middletown Series

The Middletown series consists of moderately well drained soils on ridgetops and side slopes in the uplands. These soils formed in loess and in the underlying eolian material. Permeability is moderate in the upper part of the profile and rapid in the lower part. Slope ranges from 2 to 5 percent.

Typical pedon of Middletown silt loam, 2 to 5 percent slopes, 400 feet north and 160 feet east of the southwest corner of sec. 29, T. 16 N., R. 1 W.

Ap—0 to 8 inches; grayish brown (10YR 5/2) silt loam, pale brown (10YR 6/3) dry; weak very fine granular structure; friable; common very fine roots; few fine concretions of iron and manganese oxide; slightly acid; abrupt smooth boundary.

Bt1—8 to 12 inches; yellowish brown (10YR 5/4) silt loam; moderate very fine subangular blocky structure; firm; few very fine roots; common faint brown (10YR 4/3) clay films and few distinct light gray (10YR 7/2 dry) silt coatings on faces of peds; common fine concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

Bt2—12 to 17 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine subangular blocky structure; firm; few very fine roots; common faint brown (10YR 4/3) clay films on faces of peds; common fine concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

Bt3—17 to 25 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine and medium subangular blocky structure; firm; few very fine roots; common faint dark yellowish brown (10YR 4/4) clay films on faces of peds; common fine concretions of iron and manganese oxide; very strongly acid; clear smooth boundary.

Bt4—25 to 33 inches; yellowish brown (10YR 5/4) silty clay loam; few fine distinct light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; firm; few very fine roots; few faint dark yellowish brown (10YR 4/4) clay films on faces of peds; common fine concretions of iron and manganese oxide; very strongly acid; clear smooth boundary.

Bt5—33 to 44 inches; yellowish brown (10YR 5/4) silty clay loam; few fine distinct light brownish gray (10YR 6/2) and common fine distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; few very fine roots; few faint brown (10YR 5/3) clay films on faces of peds; common fine concretions of iron and manganese oxide; very strongly acid; clear smooth boundary.

2Bt6—44 to 47 inches; yellowish brown (10YR 5/4) clay loam; few fine distinct light brownish gray (10YR 6/2) and few fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few very fine roots; few faint dark yellowish brown (10YR 4/4) clay films and common distinct white (10YR 8/2 dry) silt coatings on faces of peds; few fine concretions of iron and manganese oxide; very strongly acid; abrupt smooth boundary.

2Bt7—47 to 56 inches; yellowish brown (10YR 5/4) fine sandy loam; few fine distinct grayish brown (10YR 5/2) and few fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few very fine roots; few faint dark yellowish brown (10YR 4/4) clay films on faces of peds; few fine concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

2BC—56 to 60 inches; yellowish brown (10YR 5/6) loamy fine sand; weak medium subangular blocky structure; very friable; strongly acid.

The solum ranges from 45 to more than 60 inches in thickness. The loess ranges from 40 to 60 inches in thickness.

The Ap horizon has value of 4 or 5 and chroma of 2 or 3. The Bt and 2Bt horizons have value of 4 or 5 and chroma of 4 to 6. The Bt horizon is silty clay loam or clay loam. The 2Bt horizon is fine sandy loam or loamy fine sand. The content of clay in the control section ranges from 20 to 35 percent.

Oconee Series

The Oconee series consists of somewhat poorly drained, slowly permeable soils on ridges and knolls in the uplands. These soils formed in loess. Slope ranges from 0 to 5 percent.

Typical pedon of Oconee silt loam, 0 to 2 percent slopes, 700 feet west and 168 feet south of the northeast corner of sec. 36, T. 12 N., R. 1 E.

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; weak fine granular structure; friable; few very fine roots; neutral; abrupt smooth boundary.

E1—7 to 11 inches; grayish brown (10YR 5/2) silt loam mixed with some very dark grayish brown (10YR 3/2) silt loam; moderate thin and medium platy structure; friable; few very fine roots; few fine concretions of iron and manganese oxide; neutral; clear smooth boundary.

E2—11 to 15 inches; grayish brown (10YR 5/2) silt loam; few fine distinct dark yellowish brown (10YR 4/4) mottles; weak thin platy structure parting to weak fine subangular blocky; friable; few very fine roots; common fine concretions of iron and manganese oxide; medium acid; clear smooth boundary.

Bt1—15 to 20 inches; brown (10YR 5/3) silty clay loam; common fine distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; few very fine roots; many faint dark grayish brown (10YR 4/2) clay films on faces of peds and few faint very dark grayish brown (10YR 3/2) clay films lining root channels; common fine concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

Bt2—20 to 32 inches; grayish brown (10YR 5/2) silty clay; common fine distinct yellowish brown (10YR 5/6) and common fine faint grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; firm; few very fine roots; common faint dark grayish brown (10YR 4/2) clay films on faces of peds and few faint very dark grayish brown (10YR 3/2) clay films lining root channels; common fine concretions of iron and manganese oxide; very strongly acid; clear smooth boundary.

Btg1—32 to 44 inches; grayish brown (10YR 5/2) silty clay loam; common fine faint brown (10YR 5/3) and common fine distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; few very fine roots; common faint dark grayish brown (10YR 4/2) clay films on faces of peds and few faint very dark grayish brown (10YR 3/2) clay films lining root channels; common fine concretions of iron and manganese oxide; very strongly acid; clear smooth boundary.

Btg2—44 to 54 inches; light brownish gray (10YR 6/2) silty clay loam; common fine distinct yellowish brown (10YR 5/6) and few fine distinct brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; firm; few very fine roots; common faint dark grayish brown (10YR 4/2) and grayish brown (10YR 5/2) clay films on faces of peds and few distinct very dark grayish brown (10YR 3/2) clay films lining root channels; common fine concretions of iron and manganese oxide; very strongly acid; clear smooth boundary.

BC—54 to 62 inches; light brownish gray (10YR 6/2) silt loam; common fine prominent yellowish brown (10YR 5/8) and common fine distinct brownish yellow (10YR 6/6) mottles; weak medium subangular blocky structure; friable; few very fine roots; few faint dark grayish brown (10YR 4/2) clay films on faces of peds and few distinct very dark grayish brown (10YR 3/2) clay films lining root channels; few fine concretions of iron and manganese oxide; strongly acid.

The solum ranges from 40 to more than 60 inches in thickness. The Ap horizon has value of 2 or 3 and chroma of 1 or 2. The E horizon has value of 4 to 6 and chroma of 1 or 2. The Bt horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4. It is silty clay loam or silty clay. The content of clay in the control section ranges from 35 to 42 percent.

Pana Series

The Pana series consists of well drained, moderately rapidly permeable soils on narrow ridgetops and side slopes in the uplands. These soils formed in glacial drift. Slope ranges from 5 to 10 percent.

The Pana soils in this survey area have a dark surface soil that is thinner than is definitive for the series. This difference, however, does not significantly affect the use and management of the soils.

Typical pedon of Pana loam, 5 to 10 percent slopes, eroded, 1,815 feet east and 1,089 feet north of the southwest corner of sec. 27, T. 11 N., R. 1 W.

Ap—0 to 9 inches; mixed very dark grayish brown (10YR 3/2) and dark brown (7.5YR 4/4) loam, brown (10YR 5/3) dry; weak fine granular structure; friable; common very fine and few fine roots; strongly acid; gravel covering about 5 percent of the surface; abrupt smooth boundary.

Bt1—9 to 15 inches; dark brown (7.5YR 4/4) silt loam; moderate very fine and fine subangular blocky structure; firm; few very fine roots; many distinct dark brown (10YR 4/3) clay films and few distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; strongly acid; clear smooth boundary.

Bt2—15 to 25 inches; dark brown (7.5YR 4/4) silt loam; moderate fine subangular blocky structure; firm; few very fine roots; common distinct dark brown (10YR 4/3 and 3/3) clay films on faces of peds; strongly acid; clear smooth boundary.

Bt3—25 to 32 inches; dark brown (7.5YR 4/4) silt loam; moderate medium subangular blocky structure; firm; few very fine roots; common distinct dark brown (10YR 4/3) and very few distinct dark brown (10YR 3/3) clay films on faces of peds; strongly acid; clear smooth boundary.

Bt4—32 to 49 inches; dark brown (7.5YR 4/4) loam; moderate medium and coarse subangular blocky structure; firm; few very fine roots; few distinct dark brown (10YR 3/3) clay films lining pores; strongly acid; clear smooth boundary.

BC—49 to 60 inches; dark brown (7.5YR 4/4) loam; weak coarse subangular blocky structure; firm; strongly acid.

The solum ranges from 50 to more than 60 inches in thickness. The Ap horizon has value and chroma of 2 or 3. It is loam or clay loam. The Bt horizon has hue of 7.5YR or 5YR, value of 3 to 6, and chroma of 2 to 5. It is silt loam, clay loam, or gravelly clay loam. The content of clay in the control section ranges from 18 to 33 percent.

Piasa Series

The Piasa series consists of poorly drained, very slowly permeable soils on broad flats in the uplands. These soils formed in loess. Slope ranges from 0 to 2 percent.

Typical pedon of Piasa silt loam, 1,782 feet east and 132 feet north of the center of sec. 22, T. 11 N., R. 1 W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, gray (10YR 5/1) dry; weak fine subangular blocky structure parting to weak fine granular; friable; few very fine roots; neutral; abrupt smooth boundary.

E—9 to 14 inches; dark grayish brown (10YR 4/2) silt loam; weak medium platy structure parting to weak fine subangular blocky; friable; few very fine roots; common faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; mildly alkaline; clear smooth boundary.

Btg1—14 to 26 inches; dark grayish brown (2.5Y 4/2) silty clay loam; few fine distinct dark yellowish brown (10YR 4/4) mottles; weak coarse prismatic structure; friable; few very fine roots; common distinct very dark gray (10YR 3/1) and dark gray (10YR 4/1) clay films on faces of peds; few fine rounded concretions of iron and manganese oxide; common coarse concretions of calcium carbonate; moderately alkaline; gradual smooth boundary.

Btg2—26 to 36 inches; dark grayish brown (2.5Y 4/2) silty clay loam; few fine faint grayish brown (2.5Y 5/2) and few fine distinct dark yellowish brown (10YR 4/4) mottles; weak coarse prismatic structure parting to weak fine subangular blocky; firm; few very fine roots; common distinct dark gray (10YR 4/1) clay films on faces of peds; few fine rounded concretions of iron and manganese oxide; common coarse concretions of calcium carbonate; strongly alkaline; clear smooth boundary.

Btg3—36 to 41 inches; grayish brown (2.5Y 5/2) silty clay loam; few fine distinct dark yellowish brown (10YR 4/4) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; firm; few very fine roots; common distinct dark gray (10YR 4/1) clay films on faces of peds; few fine rounded concretions of iron and manganese oxide; strongly alkaline; gradual smooth boundary.

BCg—41 to 53 inches; light brownish gray (2.5Y 6/2) silt loam; common medium prominent yellowish brown (10YR 5/8) mottles; weak coarse prismatic structure; friable; few very fine roots; few distinct dark gray (10YR 4/1) clay films on faces of peds; few fine rounded concretions of iron and manganese oxide; strongly alkaline; clear smooth boundary.

Cg—53 to 60 inches; light brownish gray (2.5Y 6/2) silt loam; few fine prominent yellowish brown (10YR 5/8) mottles; massive; friable; few fine rounded concretions of iron and manganese oxide; moderately alkaline.

The solum ranges from 40 to more than 60 inches in thickness. Depth to the natric horizon ranges from 12 to 20 inches.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. The E horizon has value of 4 or 5 and chroma of 1 or 2. The Btg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 or 2. It is silty clay loam or silty clay. The Cg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 or 2. The content of clay in the control section ranges from 35 to 43 percent.

Plano Series

The Plano series consists of moderately well drained, moderately permeable soils on convex ridgetops and side slopes in the uplands. These soils formed in loess and in the underlying stratified, loamy outwash. Slope ranges from 1 to 5 percent.

Typical pedon of Plano silt loam, 1 to 5 percent slopes, 840 feet west and 2,600 feet north of the southeast corner of sec. 25, T. 14 N., R. 1 E.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; common very fine roots; neutral; abrupt smooth boundary.

A—8 to 12 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; few very fine roots; neutral; clear smooth boundary.

Bt1—12 to 18 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; friable; few very fine roots; many distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—18 to 29 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable; few very fine roots; many faint dark brown (10YR 3/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt3—29 to 37 inches; dark yellowish brown (10YR 4/4) silty clay loam; few fine distinct yellowish brown (10YR 5/6) and few fine distinct pale brown (10YR 6/3) mottles; moderate medium subangular blocky structure; friable; few very fine roots; many faint dark brown (10YR 4/3) clay films on faces of peds; few fine concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

Bt4—37 to 44 inches; yellowish brown (10YR 5/4) silt loam; common fine distinct yellowish brown (10YR 5/8) and light brownish gray (2.5Y 6/2) mottles; moderate medium subangular blocky structure; friable; few very fine roots; common faint dark brown (10YR 4/3) clay films on faces of peds; few fine concretions of iron and manganese oxide; medium acid; clear smooth boundary.

2Bt5—44 to 54 inches; yellowish brown (10YR 5/4), stratified silt loam, loam, and sandy loam; common fine distinct yellowish brown (10YR 5/8) and light brownish gray (2.5Y 6/2) mottles; moderate medium subangular blocky structure; friable; few very fine roots; few faint dark brown (10YR 4/3) clay films on faces of peds; few fine concretions of iron and manganese oxide; medium acid; clear smooth boundary.

2C—54 to 60 inches; yellowish brown (10YR 5/4), stratified silt loam, loam, and sandy loam; common fine distinct yellowish brown (10YR 5/8) and light brownish gray (2.5Y 6/2) mottles; massive; friable; few very fine roots; few fine concretions of iron and manganese oxide; medium acid.

The solum ranges from 48 to more than 60 inches in thickness. The mollic epipedon is 10 to 20 inches thick. Depth to the stratified outwash ranges from 40 to 60 inches.

The Ap horizon has value and chroma of 2 or 3. The Bt horizon has value of 4 or 5 and chroma of 3 or 4. It is dominantly silty clay loam, but the lower part grades to silt loam in some pedons. The 2Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 4. It is stratified silt loam, loam, and sandy loam. The C horizon has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 3 or 4. It is stratified loam, sandy loam, and silt loam. The content of clay in the control section ranges from 25 to 35 percent.

Proctor Series

The Proctor series consists of moderately well drained, moderately permeable soils on stream terraces. These soils formed in loess and in the underlying stratified, loamy outwash. Slope ranges from 0 to 2 percent.

Typical pedon of Proctor silt loam, rarely flooded, 620 feet south and 140 feet east of the northwest corner of sec. 18, T. 15 N., R. 2 W.

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; common very fine roots; very strongly acid; clear smooth boundary.

AB—10 to 16 inches; dark brown (10YR 3/3) silt loam, grayish brown (10YR 5/2) dry; weak very fine and fine subangular blocky structure; friable; common very fine roots; many distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; medium acid; clear smooth boundary.

Bt1—16 to 22 inches; brown (10YR 4/3) silty clay loam; moderate fine subangular blocky structure; firm; common very fine roots; common faint very dark grayish brown (10YR 3/2) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—22 to 34 inches; brown (10YR 4/3) silty clay loam; moderate fine subangular blocky structure; firm; few very fine roots; common faint dark brown (10YR 3/3) clay films on faces of peds; few fine rounded concretions of iron and manganese oxide; medium acid; clear smooth boundary.

2Bt3—34 to 38 inches; brown (7.5YR 4/4) clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; firm; few very fine roots; few distinct brown (10YR 4/3) clay films on faces of peds; few fine rounded concretions of iron and manganese oxide; medium acid; clear smooth boundary.

2Bt4—38 to 47 inches; strong brown (7.5YR 4/6), stratified clay loam and loam; few fine distinct yellowish brown (10YR 5/4) mottles; weak medium subangular blocky structure; friable; few very fine roots; few prominent brown (10YR 4/3) clay films on faces of peds; few fine rounded concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

2Bt5—47 to 53 inches; brown (7.5YR 4/4) sandy loam; weak medium subangular blocky structure; friable; common distinct brown (10YR 4/3) clay films on faces of peds; neutral; clear smooth boundary.

2C—53 to 60 inches; brown (10YR 4/3) loamy sand; single grain; very friable; about 3 percent medium and coarse gravel; neutral.

The solum ranges from 40 to more than 60 inches in thickness. The mollic epipedon ranges from 10 to 20 inches in thickness. Depth to the stratified outwash ranges from 20 to 40 inches.

The Ap horizon has value of 2 or 3. The Bt horizon has value of 3 or 4. The 2Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 6. It is clay loam, sandy clay loam, or sandy loam. The 2C horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. It is loamy sand, sandy loam, or loam. The content of clay in the control section ranges from 22 to 35 percent.

Radford Series

The Radford series consists of somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in silty alluvium overlying an older, buried soil. Slope ranges from 0 to 2 percent.

Typical pedon of Radford silt loam, frequently flooded, 2,178 feet west and 1,155 feet north of the southeast corner of sec. 8, T. 12 N., R. 2 W.

Ap—0 to 8 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; very dark grayish brown (10YR 3/2) spots; weak fine granular structure; friable; common fine concretions of iron and manganese oxide; few very fine roots; mildly alkaline; clear smooth boundary.

A—8 to 11 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; few fine faint dark grayish brown (10YR 4/2) mottles; weak fine granular structure; friable; common fine concretions of iron and manganese oxide; few very fine roots; mildly alkaline; clear smooth boundary.

C—11 to 24 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; thin, parallel, platy layers of dark grayish brown (10YR 4/2) material; weak fine granular structure; friable; common fine concretions of iron and manganese oxide; few very fine roots; neutral; clear smooth boundary.

Ab1—24 to 35 inches; very dark gray (10YR 3/1) silty clay loam; moderate very fine and fine subangular blocky structure; firm; accumulations of iron and manganese oxide occurring as linings in root channels; common fine concretions of iron and manganese oxide; few very fine roots; slightly acid; clear smooth boundary.

Ab2—35 to 42 inches; very dark gray (N 3/0) silty clay loam; very dark gray (10YR 3/1) spots; moderate fine and medium subangular blocky structure; firm; accumulations of iron and manganese oxide occurring as linings in root channels; common fine concretions of iron and manganese oxide; few very fine roots; slightly acid; clear smooth boundary.

Ab3—42 to 60 inches; very dark gray (N 3/0) silty clay loam; moderate medium subangular blocky structure; firm; few fine concretions of iron and manganese oxide; slightly acid.

The solum and the mollic epipedon range from 10 to 24 inches in thickness. Depth to the buried soil ranges from 20 to 40 inches.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. The C horizon has value of 2 to 4 and chroma of 1 or 2. The Ab horizon has value of 2 to 5 and chroma 0 or 1. The content of clay in the control section ranges from 18 to 35 percent.

Ross Series

The Ross series consists of well drained, moderately permeable soils on flood plains. These soils formed in alluvium. Slope ranges from 0 to 2 percent.

Typical pedon of Ross silty clay loam, frequently flooded, 840 feet north and 400 feet west of the southeast corner of sec. 19, T. 16 N., R. 1 W.

Ap—0 to 10 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; few very fine roots; neutral; abrupt smooth boundary.

AB—10 to 15 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; moderate medium subangular blocky structure; friable; few very fine roots; mildly alkaline; clear smooth boundary.

Bw1—15 to 26 inches; very dark grayish brown (10YR 3/2) loam, brown (10YR 5/3) dry; few thin strata of dark brown (10YR 3/3) fine sandy loam; moderate medium subangular blocky structure; friable; few very fine roots; mildly alkaline; clear smooth boundary.

Bw2—26 to 38 inches; very dark grayish brown (10YR 3/2) loam, brown (10YR 5/3) dry; few thin strata of brown (10YR 5/3) fine sandy loam; moderate medium subangular blocky structure; friable; few very fine roots; mildly alkaline; clear smooth boundary.

BC—38 to 45 inches; brown (10YR 4/3), stratified loam and fine sandy loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; many distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; few fine concretions of iron and manganese oxide; slight effervescence; moderately alkaline; clear smooth boundary.

C—45 to 60 inches; stratified brown (10YR 4/3) and very dark grayish brown (10YR 3/2) loam and fine sandy loam; common fine faint dark grayish brown (10YR 4/2) and few fine distinct yellowish brown (10YR 5/6) mottles; massive; friable; few fine concretions of iron and manganese oxide; slight effervescence; moderately alkaline.

The solum ranges from 30 to 45 inches in thickness.

The mollic epipedon ranges from 24 to 40 inches in thickness.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. The Bw horizon has value of 3 to 5 and chroma of 2 to 4. The C horizon has value of 4 to 6 and chroma of 2 to 4. It is stratified loam and fine sandy loam. The content of clay in the control section ranges from 18 to 32 percent.

Rozetta Series

The Rozetta series consists of moderately well drained, moderately permeable soils on ridges and side slopes in the uplands. These soils formed in loess. Slope ranges from 2 to 5 percent.

Typical pedon of Rozetta silt loam, 2 to 5 percent slopes, 495 feet west and 528 feet south of the northeast corner of sec. 9, T. 14 N., R. 3 W.

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) and brown (10YR 4/3) silt loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; friable; common very fine roots; few fine rounded concretions of iron and manganese oxide; medium acid; clear smooth boundary.

Bt1—9 to 15 inches; brown (10YR 4/3) silty clay loam; moderate fine subangular blocky structure; firm; few very fine roots; many faint dark brown (10YR 4/3) clay films on faces of peds; few fine rounded concretions of iron and manganese oxide; medium acid; clear smooth boundary.

Bt2—15 to 22 inches; dark yellowish brown (10YR 4/4) silty clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; few very fine roots; common faint brown (10YR 4/3) clay films and few distinct light gray (10YR 7/2 dry) silt coatings on faces of peds; common fine accumulations of iron and manganese oxide; medium acid; clear smooth boundary.

Bt3—22 to 34 inches; brown (10YR 5/3) silty clay loam; many fine distinct yellowish brown (10YR 5/6), few fine distinct dark yellowish brown (10YR 4/6), and common fine faint grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; firm; few very fine roots; common faint brown (10YR 4/3) clay films on faces of peds; common fine accumulations of iron and manganese oxide; medium acid; clear smooth boundary.

Bt4—34 to 53 inches; brown (10YR 5/3) silty clay loam; common fine faint light brownish gray (10YR 6/2), many fine and medium distinct yellowish brown (10YR 5/6), and few fine distinct dark yellowish brown (10YR 4/6) mottles; moderate coarse subangular blocky structure; firm; few very fine roots; few faint brown (10YR 4/3) clay films on faces of peds and common faint dark grayish brown (10YR 4/2) clay films lining pores; strongly acid; clear smooth boundary.

C—53 to 60 inches; yellowish brown (10YR 5/4) silt loam; many fine and medium distinct yellowish brown (10YR 5/6), few fine distinct dark yellowish brown (10YR 4/6), and few fine distinct light brownish gray (10YR 6/2) mottles; massive; friable; common fine accumulations of iron and manganese oxide; medium acid.

The solum ranges from 40 to more than 60 inches in thickness. The Ap horizon has value of 4 or 5 and chroma of 2 or 3. The Bt horizon has value of 4 or 5 and chroma of 3 or 4. The C horizon has value of 4 or 5 and chroma of 2 to 4. The content of clay in the control section ranges from 27 to 35 percent.

Sable Series

The Sable series consists of poorly drained, moderately permeable soils on broad flats in the uplands. These soils formed in loess. Slope ranges from 0 to 2 percent.

Typical pedon of Sable silty clay loam, 1,089 feet east and 132 feet north of the southwest corner of sec. 35, T. 16 N., R. 1 W.

Ap—0 to 8 inches; very dark gray (N 3/0) silty clay loam, very dark grayish brown (10YR 3/2) dry; moderate fine and medium granular structure; firm; common very fine roots; neutral; clear smooth boundary.

A1—8 to 11 inches; very dark gray (N 3/0) silty clay loam, very dark grayish brown (10YR 3/2) dry; moderate very fine and fine subangular blocky structure; firm; few very fine roots; few fine concretions of iron and manganese oxide; neutral; clear smooth boundary.

A2—11 to 15 inches; very dark gray (5Y 3/1) silty clay loam, very dark grayish brown (10YR 3/2) dry; moderate fine subangular blocky structure; firm; few very fine roots; many distinct very dark gray (N 3/0) organic coatings on faces of peds; few fine rounded concretions of iron and manganese oxide; neutral; clear smooth boundary.

AB—15 to 20 inches; very dark gray (5Y 3/1) silty clay loam, very dark grayish brown (10YR 3/2) dry; few fine prominent olive brown (2.5Y 4/4) mottles; moderate fine and medium subangular blocky structure; firm; few very fine roots; common distinct very dark gray (N 3/0) organic coatings on faces of peds; few fine rounded concretions of iron and manganese oxide; neutral; clear smooth boundary.

Btg1—20 to 26 inches; grayish brown (2.5Y 5/2) silty clay loam; few fine prominent dark yellowish brown (10YR 4/6) and common fine distinct olive brown (2.5Y 5/4) mottles; weak fine prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; common distinct very dark gray (5Y 3/1) organic coatings on faces of peds; few fine rounded concretions of iron and manganese oxide; clear smooth boundary.

Btg2—26 to 36 inches; grayish brown (2.5Y 5/2) silty clay loam; many fine distinct olive brown (2.5Y 5/4) and few fine prominent dark yellowish brown (10YR 4/6) mottles; weak fine prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; few distinct olive gray (5Y 4/2) and very few distinct very dark gray (5Y 3/1) clay films on faces of peds; common fine rounded concretions of iron and manganese oxide; neutral; clear smooth boundary.

BCg—36 to 44 inches; olive gray (5Y 5/2) silty clay loam; many fine prominent olive brown (2.5Y 4/4) and common fine prominent dark yellowish brown (10YR 4/6) mottles; moderate coarse subangular blocky structure; firm; few very fine roots; few distinct olive gray (5Y 4/2) and very few distinct very dark gray (5Y 3/1) clay films on faces of peds; common distinct fine concretions of iron and manganese oxide; mildly alkaline; clear smooth boundary.

Cg—44 to 60 inches; light olive gray (5Y 6/2) silt loam; common fine prominent light olive brown (2.5Y 5/6) and few fine prominent dark yellowish brown (10YR 4/6) mottles; massive; friable; very few faint gray (5Y 5/1) clay films lining pores; few fine concretions of iron and manganese oxide; slight effervescence; moderately alkaline.

The solum ranges from 35 to 60 inches in thickness. The mollic epipedon ranges from 12 to 24 inches in thickness.

The Ap horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 2 or 3 and chroma of 0 or 1. The Btg and Cg horizons have hue of 10YR, 2.5Y, or 5Y or are neutral in hue. They have value of 4 to 6 and chroma of 0 to 2. The content of clay in the control section ranges from 24 to 35 percent.

Sawmill Series

The Sawmill series consists of poorly drained, moderately permeable soils on flood plains. These soils formed in alluvium. Slope ranges from 0 to 2 percent.

Typical pedon of Sawmill silty clay loam, frequently flooded, 66 feet east and 495 feet north of the center of sec. 30, T. 16 N., R. 1 W.

Ap—0 to 7 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; weak fine granular structure; friable; few very fine roots; slightly acid; abrupt smooth boundary.

A1—7 to 15 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; weak fine and very fine subangular blocky structure; firm; few very fine roots; few fine concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

A2—15 to 22 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine subangular blocky structure; firm; few very fine roots; few fine concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

BA—22 to 29 inches; very dark grayish brown (2.5Y 3/2) silty clay loam, grayish brown (10YR 5/2) dry; moderate medium subangular blocky structure; firm; few very fine roots; many distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few fine concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

Bg1—29 to 39 inches; dark gray (5Y 4/1) silty clay loam; few fine prominent olive brown (2.5Y 4/4) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; common distinct very dark gray (N 3/0) and common faint very dark gray (5Y 3/1) pressure faces on peds; few fine concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

Bg2—39 to 50 inches; dark gray (5Y 4/1) silty clay loam; common fine distinct olive brown (2.5Y 4/4) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; few distinct very dark gray (N 3/0) and common faint very dark gray (5Y 3/1) pressure faces on peds; few fine concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

Bg3—50 to 60 inches; dark gray (5Y 4/1) silty clay loam; common fine and medium distinct olive brown (2.5Y 4/4) and common medium prominent yellowish brown (10YR 5/8) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; few distinct very dark gray (N 3/0) and few faint very dark gray (5Y 3/1) pressure faces on peds; few fine concretions of iron and manganese oxide; neutral.

The solum ranges from 40 to more than 60 inches in thickness. The mollic epipedon is 24 to 36 inches thick.

The Ap horizon has hue of 10YR or 2.5Y or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 2. The Bg horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 4 or 5 and chroma of 0 to 2. The content of clay in the control section ranges from 27 to 35 percent.

Shiloh Series

The Shiloh series consists of poorly drained, moderately slowly permeable soils in depressions in the uplands. These soils formed in loess. Slope ranges from 0 to 2 percent.

Typical pedon of Shiloh silty clay loam, 2,600 feet east and 132 feet south of the northwest corner of sec. 34, T. 16 N., R. 1 W.

Ap—0 to 7 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine granular structure; firm; few very fine roots; few fine concretions of iron and manganese oxide; slightly acid; abrupt smooth boundary.

A—7 to 15 inches; black (N 2/0) silty clay loam, very dark gray (10YR 3/1) dry; moderate very fine subangular blocky structure; firm; few very fine roots; few fine concretions of iron and manganese oxide; neutral; clear smooth boundary.

Bg1—15 to 27 inches; black (N 2/0) silty clay, very dark gray (10YR 3/1) dry; moderate very fine angular blocky structure; firm; few very fine roots; few fine concretions of iron and manganese oxide; neutral; clear smooth boundary.

Bg2—27 to 32 inches; olive gray (5Y 5/2) silty clay; few fine prominent yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; firm; few very fine roots; many prominent very dark gray (10YR 3/1) pressure faces on peds; neutral; clear smooth boundary.

Bg3—32 to 39 inches; olive gray (5Y 5/2) silty clay loam; many fine prominent yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; few very fine roots; many distinct dark grayish brown (10YR 4/2) pressure faces on peds; few prominent very dark gray (10YR 3/1) organic coatings lining pores; few fine concretions of iron and manganese oxide; neutral; clear smooth boundary.

Bg4—39 to 52 inches; olive gray (5Y 5/2) silty clay loam; many medium prominent yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; few fine roots; few prominent very dark gray (10YR 3/1) organic coatings lining pores; few fine concretions of iron and manganese oxide; neutral; clear smooth boundary.

BCg—52 to 60 inches; olive gray (5Y 5/2) silt loam; many medium prominent yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few very fine roots; few prominent very dark gray (10YR 3/1) organic coatings lining pores; neutral.

The solum ranges from 45 to more than 60 inches in thickness. The mollic epipedon is 24 to 36 inches thick.

The Ap and A horizons have hue of 10YR or 2.5Y or are neutral in hue. They have value of 2 or 3 and chroma of 0 to 2. They are silty clay loam or silty clay. The Bg horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 2 to 6 and chroma of 0 to 2. It is silty clay or silty clay loam. The content of clay in the control section ranges from 35 to 45 percent.

Tama Series

The Tama series consists of moderately well drained, moderately permeable soils on ridges and side slopes in the uplands. These soils formed in loess. Slope ranges from 1 to 5 percent.

Typical pedon of Tama silt loam, 1 to 5 percent slopes, 2,445 feet west and 300 feet south of the northeast corner of sec. 34, T. 16 N., R. 1 W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine subangular blocky structure parting to weak fine granular; friable; few very fine roots; slightly acid; abrupt smooth boundary.

AB—9 to 14 inches; very dark grayish brown (10YR 3/2) silty clay loam, very dark grayish brown (10YR 3/2) dry; moderate fine and medium subangular blocky structure; friable; few very fine roots; slightly acid; clear smooth boundary.

Bt1—14 to 21 inches; brown (10YR 4/3) silty clay loam; moderate fine subangular blocky structure; friable; few very fine roots; many distinct very dark gray (10YR 3/1) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—21 to 29 inches; brown (10YR 4/3) silty clay loam; few fine distinct yellowish brown (10YR 5/6) and few fine faint brown (10YR 5/3) mottles; moderate medium and coarse subangular blocky structure; friable; few very fine roots; many faint very dark grayish brown (10YR 3/2) clay films on faces of peds; few fine concretions of iron and manganese oxide; slightly acid; gradual smooth boundary.

Bt3—29 to 41 inches; brown (10YR 4/3) silty clay loam; few fine distinct yellowish brown (10YR 5/6) and common fine faint brown (10YR 5/3) mottles; weak medium prismatic structure parting to weak medium subangular blocky; friable; few very fine roots; common faint very dark grayish brown (10YR 3/2) clay films on faces of peds; few fine concretions of iron and manganese oxide; neutral; clear smooth boundary.

BC—41 to 52 inches; yellowish brown (10YR 5/4) silt loam; few medium distinct yellowish brown (10YR 5/6) and common fine distinct grayish brown (10YR 5/2) mottles; weak coarse subangular blocky structure; friable; few very fine roots; few fine concretions of iron and manganese oxide; neutral; clear smooth boundary.

C—52 to 60 inches; yellowish brown (10YR 5/4) silt loam; few medium distinct yellowish brown (10YR 5/6) and common fine distinct grayish brown (10YR 5/2) mottles; massive; friable; few very fine roots; few fine concretions of iron and manganese oxide; mildly alkaline.

The solum ranges from 36 to more than 60 inches in thickness. The mollic epipedon ranges from 10 to 20 inches in thickness. The Ap horizon has chroma of 1 or 2. The content of clay in the control section ranges from 27 to 35 percent.

Thorp Series

The Thorp series consists of poorly drained soils on stream terraces. These soils formed in silty material and in the underlying stratified, loamy outwash. Permeability is slow in the upper part of the profile and moderately rapid in the lower part. Slope ranges from 0 to 2 percent.

Typical pedon of Thorp silt loam, occasionally flooded, 1,720 feet west and 520 feet south of the northeast corner of sec. 25, T. 13 N., R. 2 W.

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; few fine concretions of iron and manganese oxide; few very fine roots; slightly acid; abrupt smooth boundary.

Eg1—10 to 15 inches; gray (10YR 5/1) silt loam; common fine distinct light brownish gray (2.5Y 6/2) and common fine prominent yellowish brown (10YR 5/6) mottles; moderate thin platy structure; friable; few very fine roots; few fine and medium concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

Eg2—15 to 23 inches; gray (5Y 6/1) silt loam; common fine faint gray (5Y 5/1) and few fine prominent yellowish brown (10YR 5/6) mottles; moderate thin platy structure; friable; few very fine roots; few fine and medium concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

Btg1—23 to 30 inches; gray (5Y 5/1) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; few very fine roots; common distinct dark gray (10YR 4/1) clay films on faces of peds; common fine concretions of iron and manganese oxide; neutral; clear smooth boundary.

Btg2—30 to 41 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; few very fine roots; common distinct dark gray (5Y 4/1) clay films on faces of peds; neutral; clear smooth boundary.

Btg3—41 to 54 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; few very fine roots; few distinct dark gray (5Y 4/1) clay films on faces of peds; common medium and large concretions of iron and manganese oxide; neutral; clear smooth boundary.

2Btg4—54 to 60 inches; grayish brown (2.5Y 5/2), stratified clay loam, loam, sandy loam, and loamy sand; common fine prominent yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few very fine roots; few distinct dark gray (5Y 4/1) clay films on faces of peds; few fine concretions of iron and manganese oxide; neutral.

The solum ranges from 40 to more than 60 inches in thickness. The mollic epipedon is 10 to 14 inches thick. Depth to the stratified outwash ranges from 40 to 54 inches.

The Ap horizon has value of 2 or 3 and chroma of 1 to 3. The Eg and Btg horizons have hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 or 2. The 2Btg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 to 3. It is stratified clay loam, loam, sandy loam, and loamy sand. The content of clay in the control section ranges from 27 to 35 percent.

Tice Series

The Tice series consists of somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in alluvium. Slope ranges from 0 to 2 percent.

Typical pedon of Tice silty clay loam, frequently flooded, 2,475 feet west and 990 north of the southeast corner of sec. 19, T. 16 W., R. 1 W.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; weak fine granular structure; firm; few very fine roots; few fine concretions of iron and manganese oxide; slightly acid; abrupt smooth boundary.

A—8 to 14 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; few fine faint brown (10YR 4/3) mottles; weak fine and medium granular structure; firm; few very fine roots; few distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few fine concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

BA—14 to 19 inches; brown (10YR 4/3) silty clay loam; common fine distinct yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; firm; few very fine roots; few distinct very dark gray (10YR 3/1) organic coatings lining pores and common faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; few fine concretions of iron and manganese oxide; medium acid; clear smooth boundary.

Bw1—19 to 27 inches; grayish brown (10YR 5/2) silty clay loam; common fine prominent yellowish brown (10YR 5/8) and few fine distinct dark yellowish brown (10YR 4/6) mottles; moderate fine and medium subangular blocky structure; firm; few very fine roots; common faint dark grayish brown (10YR 4/2) clay films on faces of peds and few faint very dark grayish brown (10YR 3/2) organic coatings lining pores; few fine concretions of iron and manganese oxide; medium acid; clear smooth boundary.

Bw2—27 to 39 inches; grayish brown (10YR 5/2) silty clay loam; many medium prominent yellowish brown (10YR 5/8) and common fine distinct dark yellowish brown (10YR 4/6) mottles; moderate medium subangular blocky structure; firm; few fine roots; common faint dark grayish brown (10YR 4/2) clay films on faces of peds and very few faint very dark gray (10YR 3/1) organic coatings lining pores; common fine and few medium concretions of iron and manganese oxide; medium acid; clear smooth boundary.

Bw3—39 to 52 inches; grayish brown (10YR 5/2) silty clay loam; many fine prominent yellowish brown (10YR 5/8) and many fine distinct dark yellowish brown (10YR 4/4) mottles; moderate medium and coarse subangular blocky structure; firm; common faint grayish brown (10YR 5/2) and few faint dark grayish brown (10YR 4/2) clay films and few distinct light gray (10YR 7/1 dry) silt coatings on faces of peds; common fine and medium concretions of iron and manganese oxide; medium acid; clear smooth boundary.

BCg—52 to 60 inches; grayish brown (10YR 5/2) silty clay loam; many medium prominent yellowish brown (10YR 5/8) and many medium distinct dark yellowish brown (10YR 4/4) mottles; weak coarse subangular blocky structure; firm; very few distinct light gray (10YR 7/1 dry) silt coatings and few faint dark grayish brown (10YR 4/2) clay films on faces of peds; common fine and medium concretions of iron and manganese oxide; about 15 percent sand; slightly acid.

The solum ranges from 30 to more than 60 inches in thickness. The mollic epipedon is 10 to 20 inches thick.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. The Bw horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 or 3. The content of clay in the control section ranges from 22 to 35 percent.

Virden Series

The Virden series consists of deep, poorly drained, moderately slowly permeable soils on broad flats in the uplands. These soils formed in loess. Slope ranges from 0 to 2 percent.

Typical pedon of Virden silty clay loam, 318 feet south and 108 feet east of the northwest corner of sec. 7, T. 11 N., R. 2 W.

Ap—0 to 9 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; weak fine granular structure; firm; common very fine and few fine roots; neutral; abrupt smooth boundary.

A—9 to 12 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; weak very fine and fine subangular blocky structure; firm; common very fine and few fine roots; few fine accumulations of iron and manganese oxide; neutral; clear smooth boundary.

Btg1—12 to 16 inches; very dark gray (2.5Y 3/1) silty clay loam, dark gray (10YR 4/1) dry; few fine distinct light olive brown (2.5Y 5/4) mottles; moderate fine subangular blocky structure; firm; few very fine and fine roots; common faint very dark gray (2.5Y 3/1) clay films on faces of peds; few fine accumulations of iron and manganese oxide; neutral; clear smooth boundary.

Btg2—16 to 21 inches; very dark gray (2.5Y 3/1) silty clay loam, dark gray (10YR 4/1) dry; few fine distinct light olive brown (2.5Y 5/4) mottles; weak fine prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; common faint very dark gray (2.5Y 3/1) clay films on faces of peds; few fine accumulations and rounded concretions of iron and manganese oxide; neutral; clear smooth boundary.

Btg3—21 to 29 inches; dark grayish brown (2.5Y 4/2) silty clay loam; common fine distinct light olive brown (2.5Y 5/4) mottles; weak fine prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; common distinct very dark gray (5Y 3/1) and common faint very dark gray (2.5Y 3/1) clay films on faces of peds; few fine and medium rounded concretions of iron and manganese oxide; neutral; clear smooth boundary.

Btg4—29 to 40 inches; olive gray (5Y 4/2) silty clay loam; common fine prominent light olive brown (2.5Y 5/4) and few fine prominent dark yellowish brown (10YR 4/6) mottles; weak fine prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; common faint very dark gray (5Y 3/1) and dark gray (5Y 4/1) clay films on faces of peds; few fine accumulations and rounded concretions of iron and manganese oxide; neutral; clear smooth boundary.

BCg—40 to 52 inches; olive gray (5Y 5/2) silty clay loam; common fine prominent dark yellowish brown (10YR 4/6) and few fine prominent light olive brown (2.5Y 5/4) mottles; weak coarse subangular blocky structure; firm; few very fine roots; few faint dark gray (5Y 4/1) clay films on faces of peds; few fine accumulations of iron and manganese oxide; neutral; clear smooth boundary.

Cg—52 to 60 inches; light olive gray (5Y 6/2) silt loam; few fine prominent dark yellowish brown (10YR 4/6) and common medium prominent light olive brown (2.5Y 5/4) mottles; massive; firm; few very fine roots; very few faint dark gray (5Y 4/1) clay films lining pores; few fine accumulations of iron and manganese oxide; neutral.

The solum ranges from 40 to more than 60 inches in thickness. The mollic epipedon ranges from 12 to 24 inches in thickness.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. The Btg and Cg horizons have hue of 10YR, 2.5Y, or 5Y or are neutral in hue. The Btg horizon has value of 3 to 5 and chroma of 0 to 2. The Cg horizon has value of 4 to 6 and chroma of 0 to 2. It is silt loam or silty clay loam. The content of clay in the control section ranges from 35 to 42 percent.

Formation of the Soils

Soil characteristics are determined by the physical and mineralogical composition of the parent material; the climate under which the soil formed; the plant and animal life on and in the soil; the relief, or lay of the land; and the length of time that the forces of soil formation have acted on the parent material.

Climate and plant and animal life are the active factors of soil formation. They act on the parent material and slowly change it into a natural body that has genetically related horizons. The factors of soil formation are so closely interrelated in their effects on the soil that few generalizations can be made regarding the effects of any one factor unless the effects of the other factors are understood.

Parent Material

Parent material is the geologic material in which a soil forms. Most of the parent material in Christian County is a direct result of the Illinoian and Wisconsinan Glaciations *(11)*. The properties of the parent material vary greatly, depending on the method of deposition. The dominant kinds of parent material in the county are glacial till, glacial outwash, loess, sandy eolian material, and alluvium.

Glacial till is material that was deposited directly by glaciers. It consists of mixed particles of different sizes. Soils that formed in glacial till of Illinoian age generally are on strongly sloping to steep side slopes. An example is Hickory soils.

In some areas a very firm layer that is high in content of clay is in the upper part of the glacial till. This layer is a paleosol that formed when the glacial till was the surface deposit. Loess deposits buried the paleosol. Atlas soils are an example of soils that formed in a thin layer of loess and in the underlying till that has a paleosol.

Glacial outwash was deposited by running water from melting glaciers. The size of the particles in the outwash varies, depending on the speed of the streams that carried them. As the water slowed down, the coarser textured material was deposited first and the smaller particles were carried a greater distance. The outwash in Christian County generally occurs as layers of sandy loam and loam. In most areas it is covered with loess. Camden, Kendall, and Plano are examples of soils that formed in loess and in the underlying outwash. These soils are on stream terraces and uplands along the Sangamon River and its major tributaries.

Loess was deposited directly by the wind. It consists of very uniform, silt-sized particles. In Christian County the major sources of loess were the valleys of the Illinois and Mississippi Rivers. Predominantly southwesterly winds picked up the loess from the river valleys and transported it many miles. The thickness of the loess on nearly level uplands ranges from about 10 feet in the northern part of the county to about 4 feet in the southeastern part. Most of the soils on uplands in the county formed in loess. Examples are Ipava, Tama, Sable, and Herrick soils.

In some areas along the Sangamon River and its major tributaries, Alvin and other soils formed in sandy eolian material. In some areas loess has covered the windblown sandy material. Middletown and Broadwell are examples of soils that formed in loess and in the underlying windblown sandy material in these areas.

Alluvial sediments were deposited mainly during periods of stream overflow. The source of these sediments is material eroded from the uplands. Most of the soils on bottom land are still receiving sediments. Radford, Ross, and Sawmill are examples of soils that formed in alluvial sediments.

Climate

Climate affects soil formation through its effects on weathering, plant and animal life, and erosion. Water from rains and melting snow seeps slowly downward through the soil and causes physical and chemical changes. As the water moves downward, clay is moved from the surface soil to the subsoil, where it accumulates. The water dissolves minerals and moves them downward through the soil. The temperature of the soil also is important. Many of the processes of soil formation are halted when the soil is frozen.

Climate influences the kind and extent of plant and animal life on and in the soil. The temperate, humid, continental climate of Christian County has favored tall prairie grasses and deciduous hardwood forests. It also has favored the accumulation of organic matter in most of the soils.

Plant and Animal Life

Living organisms are important to soil formation. Vegetation is generally responsible for the amount of organic matter and nutrients in the soil and for the color of the surface soil. Animals, such as earthworms, cicadas, and burrowing mammals, help to keep the soil open and porous. Bacteria decomposes the vegetation and helps to release plant nutrients. The role of animals in supplying the soil with organic matter is secondary to that of plants, but animals are important in many places.

The soils that formed under prairie grasses in the county are dark, are high in content of organic matter, and have a granular surface soil. Tama, Ipava, and Virden soils are examples. The soils that formed under trees are more acid than the soils that formed under prairie grasses, have a lighter colored surface soil, and are lower in content of organic matter. Rozetta, Elco, and Keomah soils are examples.

Relief

Relief, or local differences in elevation, has markedly affected the soils in Christian County through its effect on runoff, infiltration, erosion, and natural drainage.

To a large extent, relief determines how much water enters the soil and how much runs off the surface. Runoff is most rapid and the infiltration rate slowest on the steeper slopes. In general, the runoff rate decreases as the slope decreases. In low areas water is temporarily ponded by runoff from the adjacent slopes.

Relief affects natural drainage, or the depth to a seasonal high water table. Through its effect on aeration of the soil, natural drainage determines the color of the subsoil. The poorly drained Edinburg soils are in depressions and have a water table above the surface or close to the surface much of the year. The soil pores contain much water, which restricts the circulation of air in the soils. Under these conditions, naturally occurring iron and manganese compounds are chemically reduced. As a result, the subsoil is dull gray and mottled. In the more sloping, well drained Hickory soils, the water table is lower and most of the rainfall runs off the surface. The soil pores contain less water and much more air. The iron and manganese compounds are well oxidized. As a result, the subsoil is brown and bright in color.

Nearly level, poorly drained soils, such as Virden soils, are less well developed than gently sloping, moderately well drained soils, such as Harrison soils. Virden soils have a high water table much of the year. The wetness inhibits the removal of weathered products. In contrast, Harrison soils are deeper to a water table. As a result, weathered products are translocated downward to a greater extent.

Local relief directly determines the intensity of erosion. Some erosion occurs on all sloping soils, but the hazard of erosion is more severe as the slope and the runoff rate increase.

Time

To a great extent, time determines the degree of profile development in a soil. Erosion, deposition of material, and local relief, however, can modify the influence of time.

The differences among soils resulting from the length of time that the parent material has been in place are expressed in the degree of profile development. Ross soils have a very weakly expressed profile because they are on flood plains that periodically receive new alluvial sediments. They have not been in place long enough for the development of distinct horizons. Rozetta soils are more strongly developed and have distinct horizons because the loess in which they formed has been in place a much longer time.

References

(1) American Association of State Highway and Transportation Officials. 1986. Standard specifications for highway materials and methods of sampling and testing. Ed. 14, 2 vols.

(2) American Society for Testing and Materials. 1993. Standard classification of soils for engineering purposes. ASTM Stand. D 2487.

(3) Fehrenbacher, J.B., R.A. Pope, I.J. Jansen, J.D. Alexander, and B.W. Ray. 1978. Soil productivity in Illinois. Univ. of Ill., Coll. of Agric., Coop. Ext. Serv. Circ. 1156.

(4) Fehrenbacher, J.B., R.S. Smith, and R.T. Odell. 1950. Christian County soils. Univ. of Ill., Agric. Exp. Stn. Soil Rep. 73.

(5) Gardner, Thelma B., Dorothy D. Drennan, and Helen B. Broverman, eds. 1968. Illinois sesquicentennial edition of Christian County history. (Originally published in 1880)

(6) Illinois Department of Agriculture. 1986. Illinois agricultural statistics annual summary. Agric. Stat. Serv. Bull. 86-1.

(7) United States Department of Agriculture. 1951. Soil survey manual. U.S. Dep. Agric. Handb. 18.

(8) United States Department of Agriculture. 1961. Land capability classification. U.S. Dep. Agric. Handb. 210.

(9) United States Department of Agriculture. 1975. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. Soil Conserv. Serv., U.S. Dep. Agric. Handb. 436.

(10) United States Department of Commerce, Bureau of the Census. 1983. 1982 census of agriculture—preliminary report, Christian County, Illinois.

(11) Willman, H.B., and J.C. Frye. 1970. Pleistocene stratigraphy of Illinois. Ill. Geol. Surv. Bull. 94.

Glossary

ABC soil. A soil having an A, a B, and a C horizon.

Ablation till. Loose, permeable till deposited during the final downwasting of glacial ice. Lenses of crudely sorted sand and gravel are common.

AC soil. A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep, rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali (sodic) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Argillic horizon. A subsoil horizon characterized by an accumulation of clay.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Basal till. Compact glacial till deposited beneath the ice.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedding system. A drainage system made by plowing, grading, or otherwise shaping the surface of a flat field. It consists of a series of low ridges separated by shallow, parallel dead furrows.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on the contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Blowout. A shallow depression from which all or most of the soil material has been removed by the wind. A blowout has a flat or irregular floor formed by a resistant layer or by an accumulation of pebbles or cobbles. In some blowouts the water table is exposed.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. 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.

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; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, 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 classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

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 water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, for example, fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, or clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flood plain. A nearly level alluvial plain that borders a

stream and is subject to flooding unless protected artificially.
Foot slope. The inclined surface at the base of a hill.
Forb. Any herbaceous plant not a grass or a sedge.
Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.
Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.
Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.
Glacial drift (geology). Pulverized and other rock material transported by glacial ice and then deposited. Also, the sorted and unsorted material deposited by streams flowing from glaciers.
Glacial outwash (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.
Glacial till (geology). Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.
Glaciofluvial deposits (geology). Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.
Glaciolacustrine deposits. Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are interbedded or laminated.
Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.
Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.
Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.
Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.
Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.
Ground water (geology). Water filling all the unblocked pores of the material below the water table.
Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.
Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.
Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. The major horizons are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, any plowed or disturbed surface layer.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) granular, prismatic, or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Hard, consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Krotovinas. Irregular, tubular streaks in a soil horizon that are created when tunnels made by a burrowing animal are filled with material from another horizon.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by the wind.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Mollic epipedon. A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

Moraine (geology). An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded 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 of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Natric horizon. A special kind of argillic horizon that contains enough exchangeable sodium to have an adverse effect on the physical condition of the subsoil.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it is generally low in relief.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil, adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer; also called a plowsole.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slick spot. A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil is generally silty or clayey, is slippery when wet, and is low in productivity.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Sodicity. The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium adsorption ratio (SAR) of a saturation extract, or the ratio of Na^{+} to Ca^{++} + Mg^{++}. The degrees of sodicity and their respective ratios are:

Slight	less than 13:1
Moderate	13-30:1
Strong	more than 30:1

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to soil blowing and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from soil blowing and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from about 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons. It includes all subdivisions of these horizons.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material that is too thin for the specified use.

Till plain. An extensive area of nearly level to undulating soils underlain by glacial till.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1951-80 at Decatur, Illinois)

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days*	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January-----	34.4	17.8	26.1	63	-14	18	1.99	0.61	3.11	4	5.5
February----	39.4	22.0	30.7	67	-6	34	2.15	1.05	3.10	5	4.9
March-------	52.1	32.6	42.4	80	8	171	3.68	2.12	5.07	7	3.5
April-------	65.2	43.0	54.1	86	23	432	3.71	1.99	5.23	7	.3
May---------	74.5	52.8	63.6	90	33	735	4.05	2.03	5.82	7	.0
June--------	83.1	61.6	72.4	95	45	970	3.94	2.01	5.63	6	.0
July--------	86.3	65.6	76.0	98	51	1,115	4.29	2.50	5.89	6	.0
August------	83.8	63.3	73.6	97	48	1,039	3.38	1.63	4.89	5	.0
September---	78.0	56.4	67.2	93	37	812	3.26	1.45	4.81	5	.0
October-----	66.4	45.1	55.7	86	26	489	2.86	1.45	4.09	5	.1
November----	52.6	34.9	43.8	77	13	180	3.36	1.56	4.91	6	1.4
December----	39.0	23.5	31.3	66	-7	42	3.54	1.46	5.30	5	4.7
Yearly:											
Average---	62.9	43.2	53.1	---	---	---	---	---	---	---	---
Extreme---	104.0	-21.0	---	99	-15	---	---	---	---	---	---
Total-----	---	---	---	---	---	6,037	40.21	34.31	45.89	68	20.4

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1951-80 at Decatur, Illinois)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 10	Apr. 20	May 1
2 years in 10 later than--	Apr. 5	Apr. 15	Apr. 26
5 years in 10 later than--	Mar. 26	Apr. 5	Apr. 16
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 26	Oct. 18	Oct. 2
2 years in 10 earlier than--	Oct. 31	Oct. 23	Oct. 8
5 years in 10 earlier than--	Nov. 10	Nov. 2	Oct. 19

TABLE 3.--GROWING SEASON

(Recorded in the period 1951-80 at Decatur, Illinois)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	194	183	159
8 years in 10	202	191	168
5 years in 10	219	207	185
2 years in 10	235	222	202
1 year in 10	244	230	211

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
7C2	Atlas silt loam, 5 to 10 percent slopes, eroded	4,925	1.1
7C3	Atlas silty clay loam, 5 to 10 percent slopes, severely eroded	205	*
8D2	Hickory loam, 10 to 15 percent slopes, eroded	6,495	1.4
8D3	Hickory clay loam, 10 to 15 percent slopes, severely eroded	390	0.1
8F	Hickory loam, 15 to 30 percent slopes	3,115	0.7
17	Keomah silt loam	5,020	1.1
27G	Miami loam, 30 to 60 percent slopes	410	0.1
36B	Tama silt loam, 1 to 5 percent slopes	26,505	5.8
43	Ipava silt loam	55,480	12.1
45	Denny silt loam	2,710	0.6
46	Herrick silt loam	74,420	16.2
48	Ebbert silt loam	230	0.1
50	Virden silty clay loam	76,830	16.8
67	Harpster silty clay loam	205	*
68	Sable silty clay loam	40,220	8.8
112	Cowden silt loam	5,165	1.1
113A	Oconee silt loam, 0 to 2 percent slopes	11,450	2.5
113B	Oconee silt loam, 2 to 5 percent slopes	6,910	1.5
119C2	Elco silt loam, 5 to 10 percent slopes, eroded	6,445	1.4
127B	Harrison silt loam, 2 to 5 percent slopes	24,585	5.4
128B	Douglas silt loam, 2 to 5 percent slopes	2,135	0.5
128C2	Douglas silt loam, 5 to 10 percent slopes, eroded	1,380	0.3
131C2	Alvin fine sandy loam, 4 to 10 percent slopes, eroded	1,595	0.3
134B	Camden silt loam, 2 to 5 percent slopes	2,850	0.6
134C2	Camden silt loam, 5 to 10 percent slopes, eroded	755	0.2
136	Brooklyn silt loam	335	0.1
138	Shiloh silty clay loam	635	0.1
152	Drummer silty clay loam	1,650	0.4
198	Elburn silt loam	2,560	0.6
199B	Plano silt loam, 1 to 5 percent slopes	1,445	0.3
242	Kendall silt loam	1,900	0.4
244	Hartsburg silty clay loam	8,180	1.8
249	Edinburg silty clay loam	5,200	1.1
256C2	Pana loam, 5 to 10 percent slopes, eroded	670	0.1
257	Clarksdale silt loam	1,765	0.4
259C2	Assumption silt loam, 5 to 10 percent slopes, eroded	3,485	0.8
264D2	El Dara sandy loam, 10 to 15 percent slopes, eroded	820	0.2
264F	El Dara loam, 15 to 30 percent slopes	645	0.1
279B	Rozetta silt loam, 2 to 5 percent slopes	12,875	2.8
372	Kendall silt loam, sandy substratum	635	0.1
386B	Downs silt loam, 2 to 5 percent slopes	4,085	0.9
474	Piasa silt loam	455	0.1
533	Urban land	240	0.1
567C2	Elkhart silt loam, 5 to 10 percent slopes, eroded	210	*
660C2	Coatsburg silt loam, 5 to 10 percent slopes, eroded	1,935	0.4
684B	Broadwell silt loam, 2 to 5 percent slopes	1,255	0.3
685B	Middletown silt loam, 2 to 5 percent slopes	2,460	0.5
802B	Orthents, loamy, undulating	1,110	0.2
804B	Orthents, acid, rolling	880	0.2
864	Pits, quarries	225	*
865	Pits, gravel	45	*
916	Oconee-Darmstadt silt loams	6,065	1.3
995	Herrick-Piasa silt loams	1,065	0.2
2036B	Tama-Urban land complex, 2 to 5 percent slopes	980	0.2
2043	Ipava-Urban land complex	1,320	0.3
2046	Herrick-Urban land complex	1,235	0.3
2050	Virden-Urban land complex	320	0.1
2068	Sable-Urban land complex	705	0.2
2128C	Douglas-Urban land complex, 5 to 10 percent slopes	260	0.1
3073	Ross silty clay loam, frequently flooded	365	0.1
3074	Radford silt loam, frequently flooded	10,825	2.4
3107	Sawmill silty clay loam, frequently flooded	10,995	2.4
3284	Tice silty clay loam, frequently flooded	1,930	0.4

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
7148	Proctor silt loam, rarely flooded	580	0.1
7242	Kendall silt loam, rarely flooded	340	0.1
8206	Thorp silt loam, occasionally flooded	925	0.2
	Water	4,300	0.9
	Total	458,340	100.0

* Less than 0.1 percent.

TABLE 5.--PRIME FARMLAND

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name)

Map symbol	Soil name
17	Keomah silt loam (where drained)
36B	Tama silt loam, 1 to 5 percent slopes
43	Ipava silt loam
45	Denny silt loam (where drained)
46	Herrick silt loam
48	Ebbert silt loam (where drained)
50	Virden silty clay loam (where drained)
67	Harpster silty clay loam (where drained)
68	Sable silty clay loam (where drained)
112	Cowden silt loam (where drained)
113A	Oconee silt loam, 0 to 2 percent slopes (where drained)
113B	Oconee silt loam, 2 to 5 percent slopes (where drained)
127B	Harrison silt loam, 2 to 5 percent slopes
128B	Douglas silt loam, 2 to 5 percent slopes
131C2	Alvin fine sandy loam, 4 to 10 percent slopes, eroded
134B	Camden silt loam, 2 to 5 percent slopes
136	Brooklyn silt loam (where drained)
138	Shiloh silty clay loam (where drained)
152	Drummer silty clay loam (where drained)
198	Elburn silt loam
199B	Plano silt loam, 1 to 5 percent slopes
242	Kendall silt loam (where drained)
244	Hartsburg silty clay loam (where drained)
249	Edinburg silty clay loam (where drained)
257	Clarksdale silt loam (where drained)
279B	Rozetta silt loam, 2 to 5 percent slopes
372	Kendall silt loam, sandy substratum (where drained)
386B	Downs silt loam, 2 to 5 percent slopes
684B	Broadwell silt loam, 2 to 5 percent slopes
685B	Middletown silt loam, 2 to 5 percent slopes
3073	Ross silty clay loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
3074	Radford silt loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
3107	Sawmill silty clay loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
3284	Tice silty clay loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
7148	Proctor silt loam, rarely flooded
7242	Kendall silt loam, rarely flooded (where drained)
8206	Thorp silt loam, occasionally flooded (where drained)

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
7C2------------- Atlas	IIIe	52	16	19	44	2.2	3.6
7C3------------- Atlas	IVe	43	14	16	36	1.8	3.0
8D2------------- Hickory	IIIe	72	23	26	50	2.7	4.5
8D3------------- Hickory	IVe	66	22	24	---	2.5	4.1
8F-------------- Hickory	VIe	---	---	---	---	2.4	4.0
17-------------- Keomah	IIw	129	39	52	72	5.2	8.8
27G------------- Miami	VIIe	---	---	---	---	---	---
36B------------- Tama	IIe	153	46	61	88	5.8	9.7
43-------------- Ipava	I	163	52	66	91	6.1	10.1
45-------------- Denny	IIIw	113	37	47	62	---	---
46-------------- Herrick	IIw	141	45	61	---	5.5	9.2
48-------------- Ebbert	IIIw	130	42	54	---	---	---
50-------------- Virden	IIw	138	46	57	72	---	---
67-------------- Harpster	IIw	136	44	52	74	---	---
68-------------- Sable	IIw	156	51	61	85	---	---
112------------- Cowden	IIw	120	37	53	---	---	---
113A------------ Oconee	IIw	120	36	54	---	5.0	8.3
113B------------ Oconee	IIe	119	36	53	---	4.9	8.2
119C2----------- Elco	IIIe	105	35	44	60	4.1	6.6

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
127B------------ Harrison	IIe	135	42	58	75	---	8.7
128B------------ Douglas	IIe	134	42	58	75	5.2	8.7
128C2----------- Douglas	IIIe	127	39	55	71	5.0	8.3
131C2----------- Alvin	IIIe	90	35	44	---	3.6	6.6
134B------------ Camden	IIe	124	39	54	71	5.0	8.2
134C2----------- Camden	IIIe	117	37	52	68	4.7	7.8
136------------- Brooklyn	IIw	108	35	44	58	---	---
138------------- Shiloh	IIw	139	46	56	70	---	---
152------------- Drummer	IIw	154	51	61	83	---	9.2
198------------- Elburn	I	161	50	63	94	6.1	10.2
199B------------ Plano	IIe	150	45	59	89	---	9.6
242------------- Kendall	IIw	135	41	55	75	---	8.7
244------------- Hartsburg	IIw	145	47	56	79	---	---
249------------- Edinburg	IIIw	132	43	55	72	---	---
256C2----------- Pana	IIIe	102	33	42	58	3.9	6.6
257------------- Clarksdale	I	140	43	57	79	5.3	8.5
259C2----------- Assumption	IIIe	120	37	52	72	4.7	7.8
264D2----------- El Dara	IVe	78	28	36	50	3.2	5.2
264F------------ El Dara	VIe	---	---	---	---	---	4.8
279B------------ Rozetta	IIe	130	40	53	72	5.1	8.6

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
372------------- Kendall	IIw	135	41	55	75	---	8.7
386B------------ Downs	IIe	147	43	58	82	---	9.2
474------------- Piasa	IIIw	77	28	37	48	---	5.2
533**. Urban land							
567C2----------- Elkhart	IIIe	123	37	49	68	4.7	7.9
660C2----------- Coatsburg	IIIe	73	23	25	40	2.9	4.8
684B------------ Broadwell	IIe	144	44	58	83	5.5	9.2
685B------------ Middletown	IIe	116	34	52	71	4.7	7.7
802B. Orthents							
804B. Orthents							
864**, 865**. Pits							
916**----------- Oconee-Darmstadt	IIIw	99	32	47	---	4.1	6.7
995**----------- Herrick-Piasa	IIIw	115	38	51	---	4.4	---
2036B**. Tama-Urban land							
2043**. Ipava-Urban land							
2046**. Herrick-Urban land							
2050**. Virden-Urban land							
2068**. Sable-Urban land							

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
2128C**. Douglas-Urban land							
3073------------ Ross	IIw	120	38	---	---	---	---
3074------------ Radford	IIIw	100	32	---	59	---	6.5
3107------------ Sawmill	IIIw	102	33	---	---	---	---
3284------------ Tice	IIIw	138	42	---	---	4.1	6.9
7148------------ Proctor	I	140	42	57	88	5.3	9.0
7242------------ Kendall	IIw	135	41	55	75	---	8.7
8206------------ Thorp	IIw	113	38	---	60	---	---

* Animal unit month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--CAPABILITY CLASSES AND SUBCLASSES

(Miscellaneous areas are excluded. Absence of an entry indicates no acreage)

Class	Total acreage	Major management concerns (Subclass)		
		Erosion (e)	Wetness (w)	Soil problem (s)
		Acres	Acres	Acres
I	60,385	---	---	---
II	321,734	87,355	234,379	---
III	62,788	28,038	34,750	---
IV	1,415	1,415	---	---
V	---	---	---	---
VI	3,760	3,760	---	---
VII	410	410	---	---
VIII	---	---	---	---

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
7C2, 7C3 Atlas	4C	Slight	Slight	Moderate	Moderate	White oak	70	4	Green ash, pin oak, red maple, Austrian pine.
						Northern red oak	70	4	
						Bur oak	70	4	
						Green ash	---	---	
8D2, 8D3 Hickory	5A	Slight	Slight	Slight	Slight	White oak	85	5	White oak, yellow-poplar, eastern white pine, red pine, sugar maple, black walnut.
						Northern red oak	85	5	
						Black oak	---	---	
						Green ash	---	---	
						Bitternut hickory	---	---	
						Yellow-poplar	95	7	
8F Hickory	5R	Moderate	Moderate	Slight	Slight	White oak	85	5	White oak, yellow-poplar, eastern white pine, red pine, sugar maple, black walnut.
						Northern red oak	85	5	
						Black oak	---	---	
						Green ash	---	---	
						Bitternut hickory	---	---	
						Yellow-poplar	95	7	
17 Keomah	3A	Slight	Slight	Slight	Slight	White oak	65	3	Eastern white pine, white oak, red pine, northern red oak, black walnut, sugar maple.
						Northern red oak	70	4	
27G Miami	5R	Severe	Severe	Slight	Slight	White oak	90	5	Yellow-poplar, eastern white pine, red pine, white ash, black walnut.
						Yellow-poplar	98	7	
						Sweetgum	76	5	
119C2 Elco	4A	Slight	Slight	Slight	Slight	White oak	80	4	White oak, northern red oak, black walnut, green ash, eastern white pine, white ash.
						Northern red oak	---	---	
						Black walnut	---	---	
131C2 Alvin	4A	Slight	Slight	Slight	Slight	White oak	80	4	Green ash, black walnut, yellow-poplar, white oak, eastern white pine, American sycamore, sugar maple.
						Northern red oak	80	4	
						Black walnut	---	---	
						Yellow-poplar	90	6	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
134B, 134C2----- Camden	7A	Slight	Slight	Slight	Slight	Yellow-poplar-------	95	7	Yellow-poplar, white oak, green ash, black walnut, eastern white pine, red pine, black locust, white ash.
						White oak-----------	85	5	
						Northern red oak----	85	5	
						Sweetgum------------	80	6	
						Green ash-----------	76	5	
242------------- Kendall	4A	Slight	Slight	Slight	Slight	White oak-----------	80	4	White oak, black walnut, northern red oak, green ash, eastern white pine, red pine.
						Northern red oak----	80	4	
						Yellow-poplar-------	90	6	
						Black walnut--------	---	---	
264D2----------- El Dara	4A	Slight	Slight	Slight	Slight	White oak-----------	80	4	Eastern white pine, black walnut, red pine, yellow-poplar, green ash.
						Northern red oak----	80	4	
						Yellow-poplar-------	90	6	
						Black walnut--------	---	---	
264F------------ El Dara	4R	Moderate	Moderate	Slight	Slight	White oak-----------	80	4	Eastern white pine, black walnut, red pine, yellow-poplar, green ash.
						Northern red oak----	80	4	
						Yellow-poplar-------	90	6	
						Black walnut--------	---	---	
279B------------ Rozetta	4A	Slight	Slight	Slight	Slight	White oak-----------	80	4	Eastern white pine, northern red oak, green ash, Scotch pine, yellow-poplar.
						Northern red oak----	80	4	
						Yellow-poplar-------	90	6	
						Black walnut--------	---	---	
372------------- Kendall	4A	Slight	Slight	Slight	Slight	White oak-----------	80	4	White oak, black walnut, northern red oak, green ash, eastern white pine, red pine.
						Northern red oak----	80	4	
						Yellow-poplar-------	90	6	
						Black walnut--------	---	---	
685B------------ Middletown	4A	Slight	Slight	Slight	Slight	White oak-----------	80	4	White oak, northern red oak, black walnut, green ash, sugar maple, eastern white pine, red pine, Scotch pine.
						Northern red oak----	80	4	
						Black walnut--------	---	---	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
804B------------ Orthents	---	---	---	---	---	---	---	---	Black walnut, white oak, northern red oak, yellow-poplar.
3073------------ Ross	5A	Slight	Slight	Slight	Slight	Northern red oak----	86	5	Eastern white pine, black walnut, white ash, Norway spruce, yellow-poplar.
						Yellow-poplar-------	96	7	
						Sugar maple---------	85	4	
						White oak-----------	---	---	
						Black walnut--------	---	---	
						Black cherry--------	---	---	
						White ash-----------	---	---	
3107------------ Sawmill	5W	Slight	Moderate	Moderate	Moderate	Pin oak-------------	90	5	American sycamore, black spruce, hackberry, European larch, green ash, pin oak, red maple, swamp white oak.
						Eastern cottonwood--	---	---	
						Sweetgum------------	---	---	
						Cherrybark oak------	---	---	
						American sycamore---	---	---	
3284------------ Tice	5A	Slight	Slight	Slight	Slight	Pin oak-------------	96	5	Yellow-poplar, eastern cottonwood, American sycamore, green ash, red maple, cherrybark oak.
						Sweetgum------------	86	7	
						Yellow-poplar-------	90	6	
						Virginia pine-------	90	9	
						Eastern cottonwood--	---	---	
						White ash-----------	---	---	
7242------------ Kendall	4A	Slight	Slight	Slight	Slight	White oak-----------	80	4	White oak, black walnut, northern red oak, green ash, eastern white pine, red pine.
						Northern red oak----	80	4	
						Yellow-poplar-------	90	6	
						Black walnut--------	---	---	

* Productivity class is the yield in cubic meters per hectare per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

TABLE 9.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS

(The symbol < means less than; > means more than. Absence of an entry indicates that trees generally do not grow to the given height on that soil)

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--			
	8-15	16-25	26-35	>35
7C2, 7C3 Atlas	American cranberrybush, silky dogwood, Amur honeysuckle, arrowwood, Amur privet, Washington hawthorn, eastern redcedar.	Osage-orange, green ash, Austrian pine.	Pin oak, eastern white pine.	---
8D2, 8D3, 8F Hickory	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
17 Keomah	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
27G Miami	Amur honeysuckle, Amur privet, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
36B Tama	American cranberrybush, Amur honeysuckle, Amur privet, silky dogwood.	Blue spruce, northern whitecedar, Washington hawthorn, white fir.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
43 Ipava	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
45 Denny	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Austrian pine, northern whitecedar, Norway spruce, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
46 Herrick	Amur honeysuckle, silky dogwood, Amur privet, American cranberrybush.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
48 Ebbert	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
50 Virden	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.

TABLE 9.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- 8-15	16-25	26-35	>35
67---------------- Harpster	Nannyberry viburnum, Washington hawthorn.	White spruce, northern whitecedar, eastern redcedar, green ash, Osage-orange.	Black willow----------	---
68---------------- Sable	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine----	Pin oak.
112--------------- Cowden	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Austrian pine, northern whitecedar, blue spruce, Norway spruce, white fir, Washington hawthorn.	Eastern white pine----	Pin oak.
113A, 113B-------- Oconee	Eastern redcedar, Washington hawthorn, Amur privet, arrowwood, Amur honeysuckle, American cranberrybush.	Austrian pine, green ash, Osage-orange, northern whitecedar.	Eastern white pine, pin oak.	---
119C2------------- Elco	Silky dogwood, honeysuckle, Amur privet, American cranberrybush.	Northern whitecedar, Washington hawthorn, blue spruce, white fir.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
127B-------------- Harrison	American cranberrybush, Amur honeysuckle, autumn-olive, silky dogwood.	Blue spruce, northern whitecedar, Washington hawthorn, white fir.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
128B, 128C2------- Douglas	American cranberrybush, Amur honeysuckle, autumn-olive, silky dogwood.	Blue spruce, northern whitecedar, Washington hawthorn, white fir.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
131C2------------- Alvin	Amur privet, Washington hawthorn, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, northern whitecedar, Osage-orange, eastern redcedar.	Eastern white pine, red pine, Norway spruce.	---
134B, 134C2------- Camden	Amur honeysuckle, Amur privet, silky dogwood, American cranberrybush.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
136--------------- Brooklyn	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine----	---

TABLE 9.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- 8-15	16-25	26-35	>35
138 Shiloh	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
152 Drummer	American cranberrybush, Amur honeysuckle, silky dogwood, Amur privet.	Norway spruce, Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine.	Eastern white pine	Pin oak.
198 Elburn	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Austrian pine, white fir, northern whitecedar, Washington hawthorn, blue spruce.	Norway spruce	Eastern white pine, pin oak.
199B Plano	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, northern whitecedar, blue spruce, white fir.	Austrian pine, Norway spruce.	Pin oak, eastern white pine.
242 Kendall	Amur privet, silky dogwood, Amur honeysuckle, American cranberrybush.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
244 Hartsburg	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
249 Edinburg	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
256C2 Pana	Amur honeysuckle, autumn-olive, silky dogwood.	Eastern redcedar, Russian-olive.	Norway spruce, eastern white pine, Douglas fir.	American sycamore, eastern cottonwood.
257 Clarksdale	American cranberrybush, Amur honeysuckle, silky dogwood, Amur privet.	Washington hawthorn, northern whitecedar, blue spruce, white fir, Austrian pine.	Norway spruce	Eastern white pine, pin oak.
259C2 Assumption	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
264D2, 264F El Dara	Amur privet, Washington hawthorn, Amur honeysuckle, American cranberrybush.	Austrian pine, northern whitecedar, Osage-orange, eastern redcedar.	Norway spruce, eastern white pine, red pine.	---

TABLE 9.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--			
	8-15	16-25	26-35	>35
279B Rozetta	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
372 Kendall	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, northern whitecedar, blue spruce, white fir, Austrian pine.	Norway spruce	Pin oak, eastern white pine.
386B Downs	American cranberrybush, Amur honeysuckle, autumn-olive, silky dogwood.	Blue spruce, northern whitecedar, Washington hawthorn, white fir.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
474 Piasa	Eastern redcedar, Russian-olive.	Siberian elm, green ash.	---	---
533*. Urban land				
567C2 Elkhart	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
660C2 Coatsburg	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
684B Broadwell	Amur honeysuckle, silky dogwood, Amur privet, American cranberrybush.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Pin oak, eastern white pine.
685B Middletown	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, northern whitecedar, blue spruce, white fir.	Austrian pine, Norway spruce.	Pin oak, eastern white pine.
802B. Orthents				
804B Orthents	American cranberrybush, Amur privet, silky dogwood, Amur honeysuckle.	Blue spruce, northern whitecedar, white fir, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
864*, 865*. Pits				

See footnote at end of table.

TABLE 9.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- 8-15	16-25	26-35	>35
916*:				
Oconee	Eastern redcedar, Washington hawthorn, Amur privet, arrowwood, Amur honeysuckle, American cranberrybush.	Austrian pine, green ash, Osage-orange, northern whitecedar.	Eastern white pine, pin oak.	---
Darmstadt	Eastern redcedar, Russian-olive.	Siberian elm, green ash.	---	---
995*:				
Herrick	Amur honeysuckle, silky dogwood, Amur privet, American cranberrybush.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
Piasa	Eastern redcedar, Russian-olive.	Siberian elm, green ash.	---	---
2036B*:				
Tama	American cranberrybush, Amur honeysuckle, Amur privet, silky dogwood.	Blue spruce, northern whitecedar, Washington hawthorn, white fir.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
Urban land.				
2043*:				
Ipava	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
Urban land.				
2046*:				
Herrick	Amur honeysuckle, silky dogwood, Amur privet, American cranberrybush.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
Urban land.				
2050*:				
Virden	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
Urban land.				
2068*:				
Sable	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.

See footnote at end of table.

TABLE 9.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- 8-15	16-25	26-35	>35
2068*:				
Urban land.				
2128C*:				
Douglas	American cranberrybush, Amur honeysuckle, autumn-olive, silky dogwood.	Blue spruce, northern whitecedar, Washington hawthorn, white fir.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
Urban land.				
3073 Ross	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, northern whitecedar, blue spruce, white fir, Austrian pine.	Norway spruce	Pin oak, eastern white pine.
3074 Radford	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
3107 Sawmill	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
3284 Tice	Silky dogwood, Amur privet, American cranberrybush, Amur honeysuckle.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
7148 Proctor	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
7242 Kendall	Amur privet, silky dogwood, Amur honeysuckle, American cranberrybush.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
8206 Thorp	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
7C2, 7C3: Atlas	Severe: wetness, percs slowly.	Severe: percs slowly.	Severe: slope, wetness, percs slowly.	Severe: erodes easily.	Moderate: wetness, droughty.
8D2, 8D3: Hickory	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
8F: Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
17: Keomah	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Slight	Slight.
27G: Miami	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
36B: Tama	Slight	Slight	Moderate: slope.	Slight	Slight.
43: Ipava	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
45: Denny	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
46: Herrick	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
48: Ebbert	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
50: Virden	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
67: Harpster	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
68: Sable	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
112: Cowden	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
113A, 113B: Oconee	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
119C2: Elco	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope.	Severe: erodes easily.	Slight.
127B: Harrison	Slight	Slight	Moderate: slope.	Slight	Slight.

TABLE 10.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
128B Douglas	Slight	Slight	Moderate: slope.	Slight	Slight.
128C2 Douglas	Slight	Slight	Severe: slope.	Slight	Slight.
131C2 Alvin	Slight	Slight	Severe: slope.	Slight	Slight.
134B Camden	Slight	Slight	Moderate: slope.	Severe: erodes easily.	Slight.
134C2 Camden	Slight	Slight	Severe: slope.	Severe: erodes easily.	Slight.
136 Brooklyn	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
138 Shiloh	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
152 Drummer	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
198 Elburn	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
199B Plano	Slight	Slight	Moderate: slope.	Slight	Slight.
242 Kendall	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
244 Hartsburg	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
249 Edinburg	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
256C2 Pana	Slight	Slight	Severe: slope.	Slight	Slight.
257 Clarksdale	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
259C2 Assumption	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope.	Slight	Slight.
264D2 El Dara	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
264F El Dara	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
279B Rozetta	Slight	Slight	Moderate: slope.	Slight	Slight.
372 Kendall	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.

TABLE 10.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
386B: Downs	Slight	Slight	Moderate: slope.	Slight	Slight.
474: Piasa	Severe: ponding, percs slowly, excess sodium.	Severe: ponding, excess sodium, percs slowly.	Severe: ponding, percs slowly, excess sodium.	Severe: ponding.	Severe: excess sodium, ponding.
533*. Urban land					
567C2: Elkhart	Slight	Slight	Severe: slope.	Slight	Slight.
660C2: Coatsburg	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: slope, wetness, percs slowly.	Severe: wetness, erodes easily.	Severe: wetness.
684B: Broadwell	Slight	Slight	Moderate: slope.	Slight	Slight.
685B: Middletown	Slight	Slight	Moderate: slope.	Slight	Slight.
802B: Orthents	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope.	Slight	Slight.
804B: Orthents	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight	Slight.
864*, 865*. Pits					
916*:					
Oconee	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Darmstadt	Severe: wetness, percs slowly, excess sodium.	Severe: excess sodium, percs slowly.	Severe: wetness, percs slowly.	Severe: erodes easily.	Severe: excess sodium.
995*:					
Herrick	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Piasa	Severe: ponding, percs slowly, excess sodium.	Severe: ponding, excess sodium, percs slowly.	Severe: ponding, percs slowly, excess sodium.	Severe: ponding.	Severe: excess sodium, ponding.
2036B*:					
Tama	Slight	Slight	Moderate: slope.	Slight	Slight.
Urban land.					

See footnote at end of table.

TABLE 10.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
2043*:					
Ipava	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Urban land.					
2046*:					
Herrick	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Urban land.					
2050*:					
Virden	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
Urban land.					
2068*:					
Sable	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
Urban land.					
2128C*:					
Douglas	Slight	Slight	Severe: slope.	Slight	Slight.
Urban land.					
3073 Ross	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
3074 Radford	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: wetness, flooding.	Moderate: wetness, flooding.	Severe: flooding.
3107 Sawmill	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
3284 Tice	Severe: flooding.	Moderate: flooding, wetness.	Severe: flooding.	Moderate: wetness, flooding.	Severe: flooding.
7148 Proctor	Severe: flooding.	Slight	Slight	Slight	Slight.
7242 Kendall	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
8206 Thorp	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
7C2, 7C3 Atlas	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
8D2, 8D3 Hickory	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
8F Hickory	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
17 Keomah	Good	Good	Fair	Fair	Fair	Fair	Fair	Good	Fair	Fair.
27G Miami	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
36B Tama	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
43 Ipava	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
45 Denny	Poor	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
46 Herrick	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
48 Ebbert	Poor	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
50 Virden	Fair	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
67 Harpster	Fair	Fair	Good	Fair	Fair	Good	Fair	Fair	Fair	Fair.
68 Sable	Fair	Good	Good	Fair	Fair	Good	Good	Good	Fair	Good.
112 Cowden	Poor	Fair	Fair	Fair	Poor	Good	Good	Fair	Fair	Good.
113A Oconee	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
113B Oconee	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
119C2 Elco	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
127B Harrison	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
128B Douglas	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

TABLE 11.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba-ceous plants	Hardwood trees	Conif-erous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
128C2 Douglas	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
131C2 Alvin	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
134B Camden	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
134C2 Camden	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Poor.
136 Brooklyn	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
138 Shiloh	Fair	Fair	Fair	Fair	Poor	Good	Good	Fair	Fair	Good.
152 Drummer	Fair	Good	Good	Fair	Fair	Good	Good	Good	Fair	Good.
198 Elburn	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
199B Plano	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
242 Kendall	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
244 Hartsburg	Fair	Fair	Good	Fair	Fair	Good	Good	Fair	Fair	Good.
249 Edinburg	Poor	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
256C2 Pana	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
257 Clarksdale	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
259C2 Assumption	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
264D2 El Dara	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
264F El Dara	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
279B Rozetta	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
372 Kendall	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
386B Downs	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
474 Piasa	Poor	Fair	Fair	Poor	Poor	Good	Good	Poor	Poor	Good.

TABLE 11.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
533*. Urban land										
567C2 Elkhart	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
660C2 Coatsburg	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
684B Broadwell	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
685B Middletown	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
802B. Orthents										
804B Orthents	Good	Fair	Good	Good	Good	Poor	Poor	Good	Good	Poor.
864*, 865*. Pits										
916*:										
Oconee	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Darmstadt	Fair	Good	Poor	Good	Good	Fair	Fair	Fair	Good	Fair.
995*:										
Herrick	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Piasa	Poor	Fair	Fair	Poor	Poor	Good	Good	Poor	Poor	Good.
2036B*:										
Tama	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Urban land.										
2043*:										
Ipava	Good	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
Urban land.										
2046*:										
Herrick	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Urban land.										
2050*:										
Virden	Fair	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
Urban land.										
2068*:										
Sable	Fair	Good	Good	Fair	Fair	Good	Good	Good	Fair	Good.
Urban land.										

See footnote at end of table.

TABLE 11.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
2128C*:										
Douglas	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Urban land.										
3073 Ross	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
3074 Radford	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
3107 Sawmill	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
3284 Tice	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
7148 Proctor	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
7242 Kendall	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
8206 Thorp	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
7C2, 7C3---------- Atlas	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength.	Moderate: wetness, droughty.
8D2, 8D3---------- Hickory	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
8F---------------- Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
17---------------- Keomah	Severe: wetness.	Severe: shrink-swell.	Severe: wetness.	Severe: shrink-swell.	Severe: shrink-swell, low strength, frost action.	Slight.
27G--------------- Miami	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
36B--------------- Tama	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
43---------------- Ipava	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength, frost action.	Moderate: wetness.
45---------------- Denny	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: shrink-swell, low strength, ponding.	Severe: ponding.
46---------------- Herrick	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength, frost action.	Moderate: wetness.
48---------------- Ebbert	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
50---------------- Virden	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: low strength, ponding, shrink-swell.	Severe: ponding.
67---------------- Harpster	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.

TABLE 12.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
68 Sable	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
112 Cowden	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength, wetness.	Severe: wetness.
113A, 113B Oconee	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, frost action, shrink-swell.	Moderate: wetness.
119C2 Elco	Moderate: too clayey, wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
127B Harrison	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
128B Douglas	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
128C2 Douglas	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
131C2 Alvin	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Moderate: frost action.	Slight.
134B Camden	Slight	Moderate: shrink-swell.	Slight	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
134C2 Camden	Slight	Moderate: shrink-swell.	Slight	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
136 Brooklyn	Severe: ponding.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: shrink-swell, low strength, ponding.	Severe: ponding.
138 Shiloh	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: shrink-swell, low strength, ponding.	Severe: ponding.
152 Drummer	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
198 Elburn	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.

TABLE 12.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
199B-------------- Plano	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: frost action, low strength.	Slight.
242--------------- Kendall	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
244--------------- Hartsburg	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
249--------------- Edinburg	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: shrink-swell, low strength, ponding.	Severe: ponding.
256C2------------- Pana	Slight---------	Slight---------	Slight---------	Moderate: slope.	Moderate: frost action.	Slight.
257--------------- Clarksdale	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength, frost action.	Moderate: wetness.
259C2------------- Assumption	Moderate: too clayey, wetness.	Moderate: shrink-swell.	Severe: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
264D2------------- El Dara	Severe: cutbanks cave.	Moderate: slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
264F-------------- El Dara	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
279B-------------- Rozetta	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
372--------------- Kendall	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
386B-------------- Downs	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
474--------------- Piasa	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: shrink-swell, low strength, ponding.	Severe: excess sodium, ponding.
533*. Urban land						
567C2------------- Elkhart	Slight---------	Moderate: shrink-swell.	Slight---------	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.

See footnote at end of table.

TABLE 12.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
660C2 Coatsburg	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength, wetness.	Severe: wetness.
684B Broadwell	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
685B Middletown	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
802B Orthents	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: shrink-swell.	Slight.
804B Orthents	Moderate: dense layer, wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
864*, 865*. Pits						
916*:						
Oconee	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, frost action, shrink-swell.	Moderate: wetness.
Darmstadt	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Severe: excess sodium.
995*:						
Herrick	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength, frost action.	Moderate: wetness.
Piasa	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: shrink-swell, low strength, ponding.	Severe: excess sodium, ponding.
2036B*:						
Tama	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
Urban land.						
2043*:						
Ipava	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength, frost action.	Moderate: wetness.
Urban land.						

See footnote at end of table.

TABLE 12.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
2046*:						
Herrick	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength, frost action.	Moderate: wetness.
Urban land.						
2050*:						
Virden	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: low strength, ponding, shrink-swell.	Severe: ponding.
Urban land.						
2068*:						
Sable	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
Urban land.						
2128C*:						
Douglas	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
Urban land.						
3073 Ross	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
3074 Radford	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, flooding, frost action.	Severe: flooding.
3107 Sawmill	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
3284 Tice	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: low strength, flooding, frost action.	Severe: flooding.
7148 Proctor	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, frost action.	Slight.
7242 Kendall	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, frost action.	Moderate: wetness.

See footnote at end of table.

TABLE 12.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
8206-------------- Thorp	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
7C2, 7C3------------ Atlas	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.
8D2, 8D3------------ Hickory	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, small stones, slope.
8F------------------ Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
17------------------ Keomah	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
27G----------------- Miami	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
36B----------------- Tama	Moderate: wetness, percs slowly.	Moderate: seepage, slope, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
43------------------ Ipava	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
45------------------ Denny	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
46------------------ Herrick	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
48------------------ Ebbert	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: hard to pack, ponding.
50------------------ Virden	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
67------------------ Harpster	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
68------------------ Sable	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: hard to pack, ponding.

TABLE 13.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
112----------------- Cowden	Severe: wetness, percs slowly.	Slight-----------	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
113A---------------- Oconee	Severe: wetness, percs slowly.	Slight-----------	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
113B---------------- Oconee	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
119C2--------------- Elco	Severe: wetness, percs slowly.	Severe: slope, wetness.	Moderate: wetness, too clayey.	Moderate: wetness.	Fair: too clayey, wetness.
127B---------------- Harrison	Severe: wetness.	Severe: wetness.	Moderate: wetness, too clayey.	Slight-----------	Fair: too clayey, wetness.
128B---------------- Douglas	Slight-----------	Severe: seepage.	Severe: seepage.	Slight-----------	Fair: too clayey.
128C2--------------- Douglas	Slight-----------	Severe: seepage, slope.	Severe: seepage.	Slight-----------	Fair: too clayey.
131C2--------------- Alvin	Slight-----------	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage.
134B---------------- Camden	Slight-----------	Moderate: seepage, slope.	Severe: seepage.	Slight-----------	Fair: too clayey.
134C2--------------- Camden	Slight-----------	Severe: slope.	Severe: seepage.	Slight-----------	Fair: too clayey.
136----------------- Brooklyn	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
138----------------- Shiloh	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
152----------------- Drummer	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
198----------------- Elburn	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Poor: wetness.
199B---------------- Plano	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.

TABLE 13.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
242 Kendall	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
244 Hartsburg	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
249 Edinburg	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
256C2 Pana	Slight	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: small stones.
257 Clarksdale	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
259C2 Assumption	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: too clayey.	Moderate: wetness.	Poor: too clayey.
264D2 El Dara	Moderate: wetness, percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope, thin layer.
264F El Dara	Severe: slope.	Severe: slope.	Severe: slope, too sandy.	Severe: slope.	Poor: seepage, too sandy, slope.
279B Rozetta	Moderate: wetness.	Moderate: seepage, slope, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
372 Kendall	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Poor: wetness.
386B Downs	Moderate: wetness, percs slowly.	Moderate: seepage, slope, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
474 Piasa	Severe: ponding, percs slowly.	Slight	Severe: ponding, too clayey, excess sodium.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
533*. Urban land					
567C2 Elkhart	Slight	Severe: slope.	Slight	Slight	Good.

See footnote at end of table.

TABLE 13.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
660C2 Coatsburg	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.
684B Broadwell	Slight	Severe: seepage.	Severe: seepage.	Slight	Fair: too clayey, thin layer.
685B Middletown	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Fair: too clayey, wetness, thin layer.
802B Orthents	Severe: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
804B Orthents	Severe: percs slowly.	Moderate: slope, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
864*, 865*. Pits					
916*:					
Oconee	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Darmstadt	Severe: wetness, percs slowly.	Slight	Severe: wetness, excess sodium.	Severe: wetness.	Poor: wetness, excess sodium.
995*:					
Herrick	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Piasa	Severe: ponding, percs slowly.	Slight	Severe: ponding, too clayey, excess sodium.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
2036B*:					
Tama	Moderate: wetness, percs slowly.	Moderate: seepage, slope, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
Urban land.					
2043*:					
Ipava	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Urban land.					

See footnote at end of table.

TABLE 13.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
2046*:					
Herrick	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Urban land.					
2050*:					
Virden	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
Urban land.					
2068*:					
Sable	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: hard to pack, ponding.
Urban land.					
2128C*:					
Douglas	Slight	Severe: seepage, slope.	Severe: seepage.	Slight	Fair: too clayey.
Urban land.					
3073 Ross	Severe: flooding.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage.	Good.
3074 Radford	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
3107 Sawmill	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
3284 Tice	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: hard to pack.
7148 Proctor	Moderate: flooding, percs slowly.	Severe: seepage.	Severe: seepage.	Moderate: flooding.	Fair: too clayey.
7242 Kendall	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
8206 Thorp	Severe: flooding, wetness, percs slowly.	Severe: flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Poor: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
7C2, 7C3-------------- Atlas	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
8D2, 8D3-------------- Hickory	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
8F-------------------- Hickory	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
17-------------------- Keomah	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
27G------------------- Miami	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
36B------------------- Tama	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
43-------------------- Ipava	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
45-------------------- Denny	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
46-------------------- Herrick	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
48-------------------- Ebbert	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
50-------------------- Virden	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.
67-------------------- Harpster	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
68-------------------- Sable	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
112------------------- Cowden	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
113A, 113B------------ Oconee	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
119C2----------------- Elco	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
127B------------------ Harrison	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.

TABLE 14.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
128B, 128C2 Douglas	Fair: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
131C2 Alvin	Good	Probable	Improbable: too sandy.	Poor: too sandy.
134B, 134C2 Camden	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
136 Brooklyn	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
138 Shiloh	Poor: shrink-swell, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
152 Drummer	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
198 Elburn	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
199B Plano	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
242 Kendall	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
244 Hartsburg	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
249 Edinburg	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
256C2 Pana	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
257 Clarksdale	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
259C2 Assumption	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, thin layer.
264D2 El Dara	Good	Probable	Improbable: too sandy.	Fair: too clayey, slope.
264F El Dara	Fair: slope.	Probable	Improbable: too sandy.	Poor: slope.
279B Rozetta	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
372 Kendall	Fair: wetness.	Probable	Improbable: too sandy.	Fair: too clayey.

TABLE 14.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
386B------------------ Downs	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
474------------------- Piasa	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, excess sodium.
533*. Urban land				
567C2----------------- Elkhart	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
660C2----------------- Coatsburg	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
684B------------------ Broadwell	Good-----------------	Probable-------------	Improbable: too sandy.	Good.
685B------------------ Middletown	Good-----------------	Probable-------------	Improbable: too sandy.	Fair: too clayey.
802B------------------ Orthents	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
804B------------------ Orthents	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
864*, 865*. Pits				
916*:				
Oconee---------------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Darmstadt------------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, excess sodium.
995*:				
Herrick--------------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Piasa----------------	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, excess sodium.
2036B*:				
Tama-----------------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Urban land.				
2043*:				
Ipava----------------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Urban land.				

See footnote at end of table.

TABLE 14.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
2046*:				
Herrick	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Urban land.				
2050*:				
Virden	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.
Urban land.				
2068*:				
Sable	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Urban land.				
2128C*:				
Douglas	Fair: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Urban land.				
3073 Ross	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
3074 Radford	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
3107 Sawmill	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
3284 Tice	Fair: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
7148 Proctor	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
7242 Kendall	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
8206 Thorp	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
7C2, 7C3---------- Atlas	Moderate: slope.	Severe: hard to pack.	Percs slowly, frost action, slope.	Slope, wetness, droughty.	Erodes easily, wetness.	Wetness, erodes easily.
8D2, 8D3, 8F------ Hickory	Severe: slope.	Moderate: thin layer.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
17---------------- Keomah	Slight---------	Moderate: wetness.	Percs slowly, frost action.	Wetness, percs slowly.	Erodes easily, wetness.	Erodes easily, percs slowly.
27G--------------- Miami	Severe: slope.	Severe: piping.	Deep to water	Slope, percs slowly.	Slope, erodes easily.	Slope, erodes easily, rooting depth.
36B--------------- Tama	Moderate: seepage, slope.	Slight---------	Deep to water	Slope----------	Erodes easily	Erodes easily.
43---------------- Ipava	Slight---------	Severe: wetness.	Frost action---	Wetness--------	Erodes easily, wetness.	Wetness, erodes easily.
45---------------- Denny	Slight---------	Severe: ponding.	Ponding, percs slowly, frost action.	Ponding, percs slowly, erodes easily.	Erodes easily, ponding.	Wetness, erodes easily, percs slowly.
46---------------- Herrick	Slight---------	Severe: wetness.	Frost action---	Wetness--------	Erodes easily, wetness.	Wetness, erodes easily.
48---------------- Ebbert	Slight---------	Severe: ponding.	Ponding, percs slowly, frost action.	Ponding, percs slowly.	Erodes easily, ponding, percs slowly.	Wetness, erodes easily, percs slowly.
50---------------- Virden	Slight---------	Severe: hard to pack, ponding.	Ponding, frost action.	Ponding--------	Ponding--------	Wetness.
67---------------- Harpster	Moderate: seepage.	Severe: piping, ponding.	Ponding, frost action.	Ponding--------	Ponding--------	Wetness.
68---------------- Sable	Moderate: seepage.	Severe: ponding.	Ponding, frost action.	Ponding--------	Ponding--------	Wetness.
112--------------- Cowden	Slight---------	Severe: wetness.	Percs slowly, frost action.	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
113A-------------- Oconee	Slight---------	Severe: hard to pack, wetness.	Percs slowly, frost action.	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
113B-------------- Oconee	Moderate: slope.	Severe: hard to pack, wetness.	Percs slowly, frost action, slope.	Wetness, percs slowly, slope.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.

TABLE 15.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
119C2: Elco	Moderate: seepage, slope.	Moderate: piping, wetness.	Frost action, slope.	Slope, wetness, percs slowly.	Erodes easily, wetness.	Erodes easily.
127B: Harrison	Moderate: seepage, slope.	Moderate: piping.	Deep to water	Slope	Erodes easily	Erodes easily.
128B, 128C2: Douglas	Severe: seepage.	Moderate: thin layer, piping.	Deep to water	Slope	Erodes easily	Erodes easily.
131C2: Alvin	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope, soil blowing.	Soil blowing	Favorable.
134B, 134C2: Camden	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
136: Brooklyn	Slight	Severe: thin layer, ponding.	Ponding, percs slowly, frost action.	Ponding, percs slowly, erodes easily.	Erodes easily, ponding, percs slowly.	Wetness, erodes easily, percs slowly.
138: Shiloh	Slight	Severe: ponding.	Ponding, frost action.	Ponding	Ponding	Wetness.
152: Drummer	Moderate: seepage.	Severe: ponding.	Ponding, frost action.	Ponding	Ponding	Wetness.
198: Elburn	Severe: seepage.	Severe: wetness.	Frost action	Wetness	Erodes easily, wetness.	Wetness, erodes easily.
199B: Plano	Moderate: seepage, slope.	Moderate: thin layer, piping, wetness.	Deep to water	Slope	Erodes easily	Erodes easily.
242: Kendall	Moderate: seepage.	Severe: wetness.	Frost action	Wetness, erodes easily.	Erodes easily, wetness.	Wetness, erodes easily.
244: Hartsburg	Moderate: seepage.	Severe: ponding.	Ponding, frost action.	Ponding	Ponding	Wetness.
249: Edinburg	Moderate: seepage.	Severe: hard to pack, ponding.	Ponding, percs slowly, frost action.	Ponding, percs slowly, erodes easily.	Erodes easily, ponding, percs slowly.	Wetness, erodes easily, percs slowly.
256C2: Pana	Severe: seepage.	Severe: piping.	Deep to water	Slope	Favorable	Favorable.
257: Clarksdale	Slight	Severe: wetness.	Frost action	Wetness, erodes easily.	Erodes easily, wetness.	Wetness, erodes easily.
259C2: Assumption	Moderate: seepage, slope.	Moderate: wetness.	Percs slowly, frost action, slope.	Slope, wetness, percs slowly.	Erodes easily, wetness.	Erodes easily, percs slowly.
264D2: El Dara	Severe: slope.	Moderate: thin layer, piping.	Deep to water	Slope, soil blowing.	Slope, soil blowing.	Slope.

TABLE 15.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
264F: El Dara	Severe: slope.	Severe: seepage, piping.	Deep to water	Slope, rooting depth.	Slope, too sandy.	Slope, rooting depth.
279B: Rozetta	Moderate: seepage, slope.	Slight	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
372: Kendall	Severe: seepage.	Severe: wetness.	Frost action	Wetness, erodes easily.	Erodes easily, wetness.	Wetness, erodes easily.
386B: Downs	Moderate: seepage, slope.	Slight	Deep to water	Slope	Erodes easily	Erodes easily.
474: Piasa	Slight	Severe: hard to pack, ponding, excess sodium.	Ponding, percs slowly, frost action.	Ponding, percs slowly, erodes easily.	Erodes easily, ponding, percs slowly.	Wetness, excess sodium, erodes easily.
533*. Urban land						
567C2: Elkhart	Moderate: seepage, slope.	Moderate: piping.	Deep to water	Slope	Erodes easily	Erodes easily.
660C2: Coatsburg	Moderate: slope.	Severe: hard to pack, wetness.	Percs slowly, frost action, slope.	Slope, wetness.	Erodes easily, wetness.	Wetness, erodes easily.
684B: Broadwell	Severe: seepage.	Moderate: thin layer, piping.	Deep to water	Slope	Erodes easily	Erodes easily.
685B: Middletown	Severe: seepage.	Moderate: thin layer, piping, wetness.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
802B: Orthents	Moderate: seepage, slope.	Slight	Deep to water	Slope	Favorable	Favorable.
804B: Orthents	Moderate: slope.	Moderate: piping.	Deep to water	Rooting depth, slope, erodes easily.	Erodes easily	Erodes easily, rooting depth.
864*, 865*. Pits						
916*: Oconee	Slight	Severe: hard to pack, wetness.	Percs slowly, frost action.	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
Darmstadt	Slight	Severe: excess sodium.	Percs slowly, frost action.	Wetness, percs slowly.	Erodes easily, wetness.	Wetness, excess sodium.

See footnote at end of table.

TABLE 15.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
995*:						
Herrick	Slight	Severe: wetness.	Frost action	Wetness	Erodes easily, wetness.	Wetness, erodes easily.
Piasa	Slight	Severe: hard to pack, ponding, excess sodium.	Ponding, percs slowly, frost action.	Ponding, percs slowly, erodes easily.	Erodes easily, ponding, percs slowly.	Wetness, excess sodium, erodes easily.
2036B*:						
Tama	Moderate: seepage, slope.	Slight	Deep to water	Slope	Erodes easily	Erodes easily.
Urban land.						
2043*:						
Ipava	Moderate: slope.	Severe: wetness.	Frost action, slope.	Slope, wetness.	Erodes easily, wetness.	Wetness, erodes easily.
Urban land.						
2046*:						
Herrick	Slight	Severe: wetness.	Frost action	Wetness	Erodes easily, wetness.	Wetness, erodes easily.
Urban land.						
2050*:						
Virden	Slight	Severe: hard to pack, ponding.	Ponding, frost action.	Ponding	Ponding	Wetness.
Urban land.						
2068*:						
Sable	Moderate: seepage.	Severe: ponding.	Ponding, frost action.	Ponding	Ponding	Wetness.
Urban land.						
2128C*:						
Douglas	Severe: seepage.	Moderate: thin layer, piping.	Deep to water	Slope	Erodes easily	Erodes easily.
Urban land.						
3073 Ross	Severe: seepage.	Severe: piping.	Deep to water	Flooding	Favorable	Favorable.
3074 Radford	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Wetness, flooding.	Wetness	Wetness.
3107 Sawmill	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Wetness, flooding.	Wetness	Wetness.
3284 Tice	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Wetness	Wetness	Favorable.

See footnote at end of table.

TABLE 15.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
7148-------------- Proctor	Severe: seepage.	Severe: piping.	Deep to water	Favorable------	Erodes easily	Erodes easily.
7242-------------- Kendall	Moderate: seepage.	Severe: thin layer, wetness.	Frost action---	Wetness, erodes easily.	Erodes easily, wetness.	Wetness, erodes easily.
8206-------------- Thorp	Slight---------	Severe: wetness.	Percs slowly, flooding, frost action.	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >10 inches	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
7C2----------- Atlas	0-5	Silt loam-----	CL, CL-ML	A-6, A-4	0	0	100	100	95-100	75-95	25-35	5-15
	5-51	Silty clay loam, clay, clay loam.	CH	A-7	0	0	100	95-100	95-100	75-95	50-70	30-45
	51-60	Clay loam, clay, loam.	CH, CL	A-6, A-7	0	0	95-100	90-100	90-100	65-95	35-55	20-30
7C3----------- Atlas	0-6	Silty clay loam.	CH, CL	A-7	0	0	100	100	95-100	75-100	40-60	25-40
	6-60	Silty clay loam, clay, clay loam.	CH	A-7	0	0	100	95-100	95-100	75-95	50-70	30-45
8D2----------- Hickory	0-6	Loam----------	CL	A-6, A-4	0	0-5	95-100	90-100	90-100	75-95	20-35	8-15
	6-49	Clay loam, gravelly clay loam.	CL	A-6, A-7	0-1	0-5	95-100	75-100	70-95	65-80	30-50	15-30
	49-60	Sandy loam, loam, gravelly clay loam.	CL-ML, CL	A-4, A-6	0-1	0-5	85-100	75-95	70-95	60-80	20-40	5-20
8D3----------- Hickory	0-5	Clay loam-----	CL	A-6, A-7	0	0-5	95-100	90-100	80-95	70-85	30-50	15-30
	5-47	Clay loam, silty clay loam, gravelly clay loam.	CL	A-6, A-7	0-1	0-5	95-100	75-100	70-95	65-80	30-50	15-30
	47-60	Sandy loam, loam, gravelly clay loam.	CL-ML, CL	A-4, A-6	0-1	0-5	85-100	75-95	70-95	60-80	20-40	5-20
8F------------ Hickory	0-9	Loam----------	CL, ML, CL-ML	A-6, A-4	0	0-5	95-100	90-100	90-100	75-95	20-35	3-15
	9-49	Clay loam, silty clay loam, gravelly clay loam.	CL	A-6, A-7	0-1	0-5	95-100	75-100	70-95	65-80	30-50	15-30
	49-60	Clay loam, loam, gravelly clay loam.	CL-ML, CL	A-4, A-6	0-1	0-5	85-100	75-95	70-95	60-80	20-40	5-20
17------------ Keomah	0-13	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	100	95-100	25-35	5-15
	13-29	Silty clay, silty clay loam.	CH	A-7	0	0	100	100	100	95-100	45-60	30-45
	29-60	Silty clay loam, silt loam.	CL	A-7, A-6	0	0	100	100	100	95-100	35-50	15-30

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >10 inches	Frag- ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
27G----------- Miami	0-8	Loam----------	CL, CL-ML, ML	A-4	0	0	100	95-100	80-100	50-90	15-30	3-10
	8-27	Clay loam, silty clay loam.	CL, SC	A-6	0	0	90-100	85-100	70-95	40-95	30-40	15-25
	27-40	Loam----------	CL, SC	A-4, A-6	---	0-3	85-100	85-100	70-90	40-90	25-35	8-15
	40-60	Loam----------	CL, CL-ML, SC, SC-SM	A-4, A-6	---	0-3	85-100	85-100	70-90	45-70	20-40	5-20
36B----------- Tama	0-9	Silt loam-----	ML, CL	A-6, A-7	0	0	100	100	100	95-100	35-45	10-20
	9-41	Silty clay loam.	CL	A-7	0	0	100	100	100	95-100	40-50	15-25
	41-60	Silt loam, silty clay loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
43------------ Ipava	0-18	Silt loam-----	CL	A-6	0	0	100	100	95-100	90-100	25-40	10-20
	18-50	Silty clay loam, silty clay.	CH, CL	A-7	0	0	100	100	95-100	90-100	45-70	25-40
	50-62	Silt loam, silty clay loam.	CL, CL-ML	A-6, A-4	0	0	100	100	95-100	90-100	25-40	5-20
45------------ Denny	0-9	Silt loam-----	CL	A-6, A-4	0	0	100	100	95-100	95-100	30-40	8-15
	9-23	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	95-100	95-100	25-40	5-15
	23-52	Silty clay loam, silty clay.	CL, CH	A-7, A-6	0	0	100	100	95-100	95-100	35-60	15-35
	52-60	Silt loam, silty clay loam.	CL	A-6	0	0	100	100	95-100	95-100	25-40	11-20
46------------ Herrick	0-15	Silt loam-----	CL, ML	A-4, A-6	0	0	100	100	95-100	90-100	30-40	5-15
	15-35	Silty clay loam, silty clay.	CH, CL	A-7-6	0	0	100	100	95-100	90-100	45-60	25-40
	35-58	Silty clay loam, silt loam.	CL	A-6, A-7-6	0	0	100	100	95-100	90-100	35-50	20-35
	58-62	Silt loam, loam, clay loam.	CL	A-6	0	0	100	100	90-100	80-100	30-40	10-20
48------------ Ebbert	0-11	Silt loam-----	CL	A-6	0	0	100	100	95-100	85-100	30-40	10-15
	11-16	Silt loam-----	CL	A-4, A-6	0	0	100	100	95-100	85-100	25-35	7-15
	16-52	Silty clay loam, silt loam.	CL, CH	A-7	0	0	100	100	95-100	85-100	40-55	25-35
	52-60	Silty clay loam, clay loam, silt loam.	CL	A-7, A-6	0	0	100	95-100	95-100	80-100	30-50	10-30
50------------ Virden	0-12	Silty clay loam.	CL	A-7, A-6	0	0	100	100	95-100	95-100	30-45	10-25
	12-52	Silty clay, silty clay loam.	CH, CL, MH, ML	A-7-6	0	0	100	100	95-100	95-100	40-55	15-30
	52-60	Silty clay loam, silt loam.	CL	A-7, A-6	0	0	100	100	95-100	90-100	30-45	10-20

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >10 inches	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
67------------ Harpster	0-17	Silty clay loam.	CL, CH	A-7	0	0	100	95-100	95-100	90-100	45-60	20-35
	17-48	Silty clay loam.	CL, CH	A-7	0	0	100	95-100	95-100	85-100	40-60	20-35
	48-57	Silty clay loam, silt loam, loam.	CL, CH	A-6, A-7	0	0	100	95-100	95-100	70-100	35-55	20-35
	57-61	Stratified sandy loam to clay loam.	CL, CL-ML, SC, SC-SM	A-4, A-6, A-7	0	0	100	95-100	95-100	45-95	20-50	5-25
68------------ Sable	0-15	Silty clay loam.	CL, CH, ML, MH	A-7	0	0	100	100	95-100	95-100	41-65	15-35
	15-44	Silty clay loam, silt loam.	CL, CH	A-7	0	0	100	100	95-100	95-100	40-55	20-35
	44-60	Silt loam, silty clay loam.	CL	A-6	0	0	100	100	95-100	95-100	30-40	10-20
112----------- Cowden	0-8	Silt loam-----	CL-ML, CL, ML	A-4, A-6	0	0	100	100	95-100	90-100	25-40	3-15
	8-18	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	95-100	90-100	25-35	5-15
	18-51	Silty clay loam, silty clay.	CH, CL	A-7-6	0	0	100	100	95-100	95-100	45-60	20-32
	51-60	Silt loam-----	CL	A-6, A-7-6	0	0	100	100	95-100	95-100	30-45	10-20
113A---------- Oconee	0-7	Silt loam-----	CL, ML, CL-ML	A-6, A-4	0	0	100	100	95-100	90-100	20-40	3-20
	7-15	Silt loam-----	CL	A-4, A-6	0	0	100	100	95-100	90-100	20-35	8-20
	15-54	Silty clay loam, silty clay.	CL, CH	A-7	0	0	100	100	95-100	90-100	40-65	20-45
	54-62	Silt loam, silty clay loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	30-50	10-25
113B---------- Oconee	0-8	Silt loam-----	CL, ML, CL-ML	A-6, A-4	0	0	100	100	95-100	90-100	20-40	3-20
	8-11	Silt loam-----	CL	A-4, A-6	0	0	100	100	95-100	90-100	20-35	8-20
	11-49	Silty clay loam, silty clay.	CL, CH	A-7	0	0	100	100	95-100	90-100	40-65	20-45
	49-60	Silt loam-----	CL	A-4, A-6, A-7-6	0	0	100	100	90-100	85-100	20-45	8-25
119C2--------- Elco	0-6	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	95-100	90-100	25-40	5-15
	6-28	Silty clay loam, silt loam.	CL	A-7, A-6	0	0	100	100	95-100	85-100	25-45	10-30
	28-60	Silty clay loam, loam, clay.	CL	A-7, A-6	0	0	100	90-100	80-100	60-95	25-50	10-30

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments >10 inches	Frag- ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
127B---------- Harrison	0-10	Silt loam-----	CL	A-4, A-6	0	0	100	100	100	95-100	30-40	8-15
	10-45	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	100	95-100	30-45	10-20
	45-65	Silty clay loam, clay loam, silt loam.	CL	A-6, A-7	0	0-5	95-100	85-100	80-85	70-80	30-50	10-25
	65-70	Clay loam, clay, silty clay loam.	CL, CH	A-6, A-7	0-1	0-5	95-100	85-100	80-95	70-90	35-55	15-30
128B, 128C2--- Douglas	0-13	Silt loam-----	CL	A-4, A-6	0	0	100	100	100	100	25-35	7-15
	13-43	Silty clay loam, silt loam.	CL	A-7, A-6	0	0	100	100	100	100	30-45	10-20
	43-60	Silt loam, clay loam, gravelly sandy loam.	CL-ML, SC-SM, CL, SC	A-4, A-6, A-7	0	0	95-100	80-100	50-90	35-85	20-45	5-25
131C2--------- Alvin	0-7	Fine sandy loam.	SM, ML	A-4, A-2	0	0	100	100	80-95	30-60	<25	NP-4
	7-42	Very fine sandy loam, sandy loam, loam.	SM, SC, CL, ML	A-2, A-4, A-6	0	0	100	100	70-100	20-80	15-40	NP-15
	42-60	Very fine sand, fine sandy loam, loamy fine sand.	SP, SP-SM, SM	A-2, A-3, A-1	0	0	95-100	90-100	45-95	4-35	<20	NP-4
134B, 134C2--- Camden	0-14	Silt loam-----	CL, ML, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	20-35	3-15
	14-37	Silt loam, silty clay loam.	CL	A-6	0	0	100	100	95-100	90-100	25-40	15-25
	37-57	Clay loam, sandy loam, silt loam.	ML, SC, SM, CL	A-2, A-4, A-6	0	0-5	90-100	85-100	60-100	30-70	20-40	3-15
	57-60	Stratified sandy loam to silt loam.	SM, SC, ML, CL	A-2, A-4	0	0-5	90-100	80-100	50-80	20-60	<25	3-10
136----------- Brooklyn	0-9	Silt loam-----	CL, CL-ML	A-6, A-4	0	0	100	100	95-100	90-100	25-35	5-15
	9-19	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	25-35	5-15
	19-41	Silty clay, silty clay loam.	CH, CL	A-7	0	0	100	100	95-100	95-100	45-60	25-40
	41-60	Stratified sandy loam to gravelly clay loam.	CL, CL-ML, SC-SM, SC	A-4, A-2, A-6	0-1	0-5	75-100	65-90	60-90	30-70	15-38	5-20

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >10 inches	Frag- ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
138----------- Shiloh	0-15	Silty clay loam.	CL	A-7	0	0	100	100	95-100	90-100	40-50	15-25
	15-52	Silty clay, silty clay loam.	CL, CH	A-7	0	0	100	100	95-100	90-100	40-65	15-40
	52-62	Silty clay loam, silty clay, silt loam.	CL	A-7, A-6	0	0	100	100	95-100	90-100	30-50	15-30
152----------- Drummer	0-16	Silty clay loam.	CL	A-6, A-7	0	0	100	95-100	95-100	85-95	30-50	15-30
	16-49	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	95-100	95-100	85-95	30-50	15-30
	49-62	Stratified loamy sand to silty clay loam.	SC, CL	A-4, A-6	---	0-5	95-100	85-95	75-95	45-80	20-35	7-20
198----------- Elburn	0-16	Silt loam-----	CL	A-6	0	0	100	100	95-100	90-100	25-40	10-25
	16-49	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	100	75-90	30-50	15-35
	49-62	Loam, sandy loam, clay loam.	CL, CL-ML, SC, SC-SM	A-6, A-4, A-2	0	0	90-100	80-100	60-90	25-80	20-40	5-20
199B---------- Plano	0-12	Silt loam-----	CL-ML, CL, ML	A-4, A-6	0	0	100	100	95-100	95-100	20-30	5-15
	12-44	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	95-100	95-100	25-45	10-25
	44-60	Stratified sandy loam to silt loam.	ML, SM, CL, SC	A-4, A-2	---	0-5	90-100	85-95	60-90	30-70	<25	NP-10
242----------- Kendall	0-11	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	95-100	90-100	20-35	5-15
	11-48	Silty clay loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	30-45	10-20
	48-60	Stratified sandy loam to silt loam.	CL, CL-ML, SC-SM, SC	A-2, A-4	0	0-5	90-100	80-95	60-90	30-70	<25	4-10
244----------- Hartsburg	0-20	Silty clay loam.	CL, ML	A-7, A-6	0	0	100	100	100	95-100	35-50	10-25
	20-31	Silty clay loam.	CL, CH	A-7	0	0	100	100	95-100	95-100	40-55	20-30
	31-62	Silt loam, loam.	CL	A-6	0	0	95-100	90-100	90-100	70-100	25-40	11-20
249----------- Edinburg	0-12	Silty clay loam.	CL	A-7, A-6	0	0	100	100	95-100	90-100	35-50	16-25
	12-52	Silty clay loam, silty clay.	CH, CL	A-7	0	0	100	100	95-100	90-100	45-70	25-45
	52-60	Silt loam, silty clay loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	35-45	15-20

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >10 inches	Frag- ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
256C2--------- Pana	0-9	Loam----------	ML, CL-ML	A-4	0	0	85-100	80-90	65-85	60-75	25-35	4-10
	9-60	Gravelly clay loam, gravelly loam, sandy loam.	CL, SC, ML, SM	A-2, A-4, A-6	---	0-5	60-95	50-90	40-70	25-65	25-40	3-15
257----------- Clarksdale	0-9	Silt loam-----	CL	A-6	0	0	100	100	95-100	90-100	25-40	10-20
	9-16	Silt loam-----	CL	A-6, A-4	0	0	100	100	95-100	90-100	20-35	8-18
	16-55	Silty clay loam, silty clay.	CL, CH	A-7	0	0	100	100	95-100	90-100	40-65	25-40
	55-60	Silt loam, silty clay loam.	CL	A-6	0	0	95-100	95-100	95-100	90-100	25-40	10-25
259C2--------- Assumption	0-8	Silt loam-----	CL, ML	A-6, A-4	0	0	100	100	95-100	90-100	25-40	8-20
	8-28	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	30-50	10-30
	28-34	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	90-100	85-95	75-90	30-50	10-30
	34-60	Clay loam, silty clay loam, clay.	CL	A-6, A-7	---	0-5	100	95-100	90-100	70-90	35-50	20-35
264D2--------- El Dara	0-10	Sandy loam----	CL, SM, SC, ML	A-4	0	0	100	100	95-100	35-55	15-25	NP-10
	10-44	Sandy clay loam, clay loam, loam.	SC, CL	A-6, A-2-6	0	0	95-100	95-100	90-100	30-60	20-35	10-20
	44-63	Stratified sandy clay loam to sand.	SM, SC-SM, SC, SP-SM	A-2	0	0	100	95-100	95-100	10-30	<20	NP-10
264F---------- El Dara	0-5	Loam----------	CL, ML, CL-ML	A-4	0	0	100	100	95-100	50-60	<25	NP-10
	5-10	Fine sandy loam, loam, silt loam.	SM, SC, SC-SM	A-4, A-2	0	0	100	95-100	95-100	30-50	<20	NP-10
	10-52	Sandy clay loam, clay loam, sandy loam.	SC, CL	A-6, A-2-6	0	0	95-100	95-100	95-100	30-60	20-35	10-20
	52-60	Sandy loam, loamy sand, sand.	SM, SC-SM, SC, SP-SM	A-2	0	0	100	95-100	95-100	10-30	<20	NP-10
279B---------- Rozetta	0-9	Silt loam-----	CL	A-4, A-6	0	0	100	100	95-100	95-100	24-35	8-15
	9-53	Silty clay loam.	CL	A-7, A-6	0	0	100	100	95-100	95-100	35-50	15-30
	53-60	Silt loam-----	CL	A-6, A-4	0	0	100	100	95-100	85-100	25-40	7-20

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag-ments >10 inches	Frag-ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct	Pct					Pct	
372----------- Kendall	0-12	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	20-35	5-15
	12-41	Silty clay loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	30-45	10-20
	41-47	Sandy clay loam, sandy loam, clay loam.	SC, SC-SM	A-6, A-4	0	0	95-100	95-100	80-90	35-50	20-40	5-15
	47-60	Stratified loamy sand to silt loam.	SM, SP-SM	A-2, A-1-b	0	0-5	75-95	50-75	20-50	5-30	---	NP
386B---------- Downs	0-9	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	100	95-100	25-35	5-15
	9-49	Silty clay loam, silt loam.	CL	A-7, A-6	0	0	100	100	100	95-100	35-45	15-25
	49-60	Silt loam-----	CL	A-6	0	0	100	100	100	95-100	30-40	11-20
474----------- Piasa	0-9	Silt loam-----	CL, ML	A-6, A-7	0	0	100	100	95-100	90-100	30-45	10-20
	9-14	Silt loam-----	CL	A-4, A-6	0	0	100	100	95-100	90-100	25-40	8-20
	14-53	Silty clay, silty clay loam.	CL, ML, MH, CH	A-7	0	0	100	100	95-100	95-100	40-55	15-25
	53-62	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	30-45	10-25
533*. Urban land												
567C2--------- Elkhart	0-12	Silt loam-----	CL	A-4, A-6	0	0	100	100	100	95-100	25-35	8-15
	12-29	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-50	18-30
	29-60	Silt loam, silt.	CL	A-6, A-4	0	0	100	100	95-100	95-100	20-37	8-20
660C2--------- Coatsburg	0-8	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	25-40	5-15
	8-55	Silty clay, clay, clay loam.	CH	A-7	0	0	100	95-100	75-90	65-85	50-70	35-55
	55-65	Loam, clay loam.	CL, CH	A-6, A-7	0	0-5	100	95-100	70-100	60-80	35-55	15-30
684B---------- Broadwell	0-15	Silt loam-----	ML, CL	A-6, A-7, A-4	0	0	100	100	90-100	85-100	30-45	5-20
	15-51	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	30-45	10-25
	51-60	Loamy fine sand, fine sand, sand.	SM, SP-SM, SP, SC-SM	A-3, A-2	0	0	100	100	75-95	4-35	<20	NP-5

See footnote at end of table.

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification Unified	Classification AASHTO	Frag- ments >10 inches	Frag- ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
685B---------- Middletown	0-8	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	100	90-100	25-35	5-15
	8-44	Silty clay loam, silt loam.	CL	A-6	0	0	100	100	100	95-100	25-40	10-20
	44-56	Clay loam, loam, fine sandy loam.	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	90-100	20-35	4-15
	56-60	Loamy fine sand, fine sand, loamy sand.	SM, SP-SM	A-2, A-4	0	0	100	90-100	75-95	10-45	<20	NP
802B---------- Orthents	0-60	Clay loam-----	---	---	---	---	---	---	---	---	---	15-30
	60-80	Variable------	---	---	---	---	---	---	---	---	---	---
804B---------- Orthents	0-6	Silt loam-----	CL	A-6	---	0-5	95-100	90-100	85-95	60-90	20-40	10-20
	6-60	Loam, silt loam, clay loam.	CL	A-6	---	0-5	95-100	90-100	85-95	60-90	20-40	10-20
864*, 865*. Pits												
916*:												
Oconee-------	0-7	Silt loam-----	CL, ML, CL-ML	A-6, A-4	0	0	100	100	95-100	90-100	20-40	3-20
	7-15	Silt loam-----	CL	A-4, A-6	0	0	100	100	95-100	90-100	20-35	8-20
	15-54	Silty clay loam, silty clay.	CL, CH	A-7	0	0	100	100	95-100	90-100	40-65	20-45
	54-60	Silt loam, silty clay loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	30-50	10-25
Darmstadt----	0-13	Silt loam-----	CL, CL-ML	A-6, A-7, A-4	0	0	95-100	95-100	95-100	75-100	25-45	5-20
	13-26	Silty clay loam, silty clay.	CL, CH	A-7	0	0	100	95-100	95-100	90-100	40-65	20-40
	26-54	Silty clay loam, silty clay.	CL, CH	A-7	0	0	100	95-100	95-100	90-100	40-65	20-40
	54-60	Silt loam, silty clay loam, loam.	CL	A-6, A-7, A-4	0	0	95-100	95-100	90-100	75-100	20-50	7-30
995*:												
Herrick------	0-15	Silt loam-----	CL, ML	A-4, A-6	0	0	100	100	95-100	90-100	30-40	5-15
	15-35	Silty clay loam, silty clay.	CH, CL	A-7-6	0	0	100	100	95-100	90-100	45-60	25-40
	35-58	Silty clay loam, silt loam.	CL	A-6, A-7-6	0	0	100	100	95-100	90-100	35-50	20-35
	58-60	Silt loam, loam, clay loam.	CL	A-6	0	0	100	100	90-100	80-100	30-40	10-20

See footnote at end of table.

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >10 inches	Frag- ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
995*:												
Piasa--------	0-9	Silt loam-----	CL, ML	A-6, A-7	0	0	100	100	95-100	90-100	30-45	10-20
	9-14	Silt loam-----	CL	A-4, A-6	0	0	100	100	95-100	90-100	25-40	8-20
	14-53	Silty clay, silty clay loam.	CL, ML, MH, CH	A-7	0	0	100	100	95-100	95-100	40-55	15-25
	53-62	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	30-45	10-25
2036B*:												
Tama---------	0-14	Silt loam-----	ML, CL	A-6, A-7	0	0	100	100	100	95-100	35-45	10-20
	14-52	Silty clay loam.	CL	A-7	0	0	100	100	100	95-100	40-50	15-25
	52-60	Silt loam, silty clay loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
Urban land.												
2043*:												
Ipava--------	0-18	Silt loam-----	CL	A-6	0	0	100	100	95-100	90-100	25-40	10-20
	18-50	Silty clay loam, silty clay.	CH, CL	A-7	0	0	100	100	95-100	90-100	45-70	25-40
	50-60	Silt loam, silty clay loam.	CL, CL-ML	A-6, A-4	0	0	100	100	95-100	90-100	25-40	5-20
Urban land.												
2046*:												
Herrick------	0-15	Silt loam-----	CL, ML	A-4, A-6	0	0	100	100	95-100	90-100	30-40	5-15
	15-35	Silty clay loam, silty clay.	CH, CL	A-7-6	0	0	100	100	95-100	90-100	45-60	25-40
	35-58	Silty clay loam, silt loam.	CL	A-6, A-7-6	0	0	100	100	95-100	90-100	35-50	20-35
	58-60	Silt loam, loam, clay loam.	CL	A-6	0	0	100	100	90-100	80-100	30-40	10-20
Urban land.												
2050*:												
Virden-------	0-12	Silty clay loam.	CL	A-7, A-6	0	0	100	100	95-100	95-100	30-45	10-25
	12-52	Silty clay, silty clay loam.	CH, CL, MH, ML	A-7-6	0	0	100	100	95-100	95-100	40-55	15-30
	52-60	Silty clay loam, silt loam.	CL	A-7, A-6	0	0	100	100	95-100	90-100	30-45	10-20
Urban land.												

See footnote at end of table.

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >10 inches	Frag- ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
2068*:												
Sable--------	0-15	Silt loam-----	CL	A-6, A-7	0	0	100	100	95-100	95-100	30-45	10-20
	15-44	Silty clay loam, silt loam.	CL, CH	A-7	0	0	100	100	95-100	95-100	40-55	20-35
	44-60	Silt loam, silty clay loam.	CL	A-6	0	0	100	100	95-100	95-100	30-40	10-20
Urban land.												
2128C*:												
Douglas------	0-13	Silt loam-----	CL	A-4, A-6	0	0	100	100	100	100	25-35	7-15
	13-43	Silty clay loam, silt loam.	CL	A-7, A-6	0	0	100	100	100	100	30-45	10-20
	43-60	Silt loam, clay loam, gravelly sandy loam.	CL-ML, SC-SM, CL, SC	A-4, A-6, A-7	0	0	95-100	80-100	50-90	35-85	20-45	5-25
Urban land.												
3073---------- Ross	0-15	Silty clay loam.	CL	A-6, A-7	0	0	90-100	90-100	80-100	65-95	35-45	12-20
	15-45	Loam, silt loam, silty clay loam.	ML, CL, CL-ML	A-6, A-4, A-7	0	0	90-100	85-100	70-100	55-95	22-45	3-20
	45-62	Stratified gravelly sandy loam to silt loam.	CL, ML, SM, GM	A-6, A-4, A-2	---	0-5	65-100	45-100	30-100	25-80	<30	NP-12
3074---------- Radford	0-11	Silt loam-----	ML, CL	A-4, A-6	0	0	100	100	95-100	80-100	30-40	5-15
	11-24	Silt loam-----	CL, ML	A-4, A-6	0	0	100	100	95-100	80-100	25-35	5-15
	24-60	Silt loam, silty clay loam, clay loam.	CL	A-6, A-7	0	0	100	100	95-100	80-95	35-50	15-25
3107---------- Sawmill	0-22	Silty clay loam.	CL	A-6, A-7	0	0	100	100	95-100	85-100	30-50	15-30
	22-29	Silty clay loam.	CL	A-6, A-7	0	0	100	100	95-100	85-100	30-50	15-30
	29-60	Silty clay loam, clay loam, loam.	CL	A-6, A-7, A-4	0	0	100	100	85-100	70-95	25-50	8-25
3284---------- Tice	0-14	Silty clay loam.	CL	A-6, A-7	0	0	100	100	90-100	80-95	30-45	10-20
	14-52	Silty clay loam, silt loam.	CL, CH	A-7	0	0	100	100	95-100	85-95	40-55	15-30
	52-60	Stratified silty clay loam to loam.	CL-ML, CL	A-4, A-6, A-7	0	0	100	100	60-95	55-80	25-45	5-20

See footnote at end of table.

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >10 inches	Frag- ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
7148---------- Proctor	0-16	Silt loam-----	CL	A-6	0	0	100	100	95-100	90-100	25-40	10-20
	16-34	Silty clay loam.	CL	A-7, A-6	0	0	100	95-100	85-100	85-100	25-50	10-25
	34-53	Clay loam, loam, sandy loam.	CL, CL-ML, SC, SC-SM	A-7, A-6, A-4, A-2	0	0	90-100	85-100	75-100	30-80	20-45	5-25
	53-60	Loamy sand, sandy loam.	SC, SC-SM, SM	A-2, A-4	0	0	85-100	80-100	50-100	25-50	<25	NP-10
7242---------- Kendall	0-9	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	95-100	85-95	20-35	5-15
	9-13	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	95-100	85-95	15-30	5-15
	13-57	Silty clay loam.	CL	A-6, A-7	0	0	100	100	95-100	85-95	30-45	10-20
	57-60	Stratified sandy loam to silt loam.	CL-ML, SC-SM, CL, SC	A-2, A-4	0	0-5	98-100	80-90	60-90	30-70	15-25	4-10
8206---------- Thorp	0-23	Silt loam-----	CL	A-6, A-4	0	0	100	100	95-100	85-95	25-40	8-20
	23-54	Silty clay loam.	CL	A-7, A-6	0	0	100	100	95-100	85-95	30-50	10-25
	54-60	Stratified loam to loamy very fine sand.	ML, CL, SM, SC	A-2, A-4, A-6	0	0	85-100	75-95	65-85	20-60	<25	NP-15

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
7C2	0-5	20-27	1.30-1.50	0.2-0.6	0.20-0.25	4.5-7.3	Moderate	0.43	3	6	1-3
Atlas	5-51	35-45	1.35-1.55	<0.06	0.07-0.19	4.5-7.3	High	0.32			
	51-60	20-30	1.35-1.60	0.06-0.2	0.07-0.18	5.6-7.8	Moderate	0.32			
7C3	0-6	30-40	1.35-1.55	0.06-0.2	0.14-0.19	4.5-7.3	High	0.43	2	7	.5-1
Atlas	6-60	35-45	1.35-1.55	<0.06	0.07-0.19	4.5-7.3	High	0.32			
8D2	0-6	19-25	1.30-1.50	0.6-2.0	0.20-0.22	4.5-7.3	Low	0.37	5	6	1-2
Hickory	6-49	27-35	1.45-1.65	0.6-2.0	0.15-0.19	4.5-6.0	Moderate	0.28			
	49-60	15-32	1.50-1.70	0.6-2.0	0.11-0.19	5.1-8.4	Low	0.28			
8D3	0-5	27-35	1.40-1.65	0.6-2.0	0.17-0.19	4.5-7.3	Moderate	0.37	4	6	.5-1
Hickory	5-47	27-35	1.45-1.65	0.6-2.0	0.15-0.19	4.5-6.0	Moderate	0.28			
	47-60	15-32	1.50-1.70	0.6-2.0	0.11-0.19	5.1-8.4	Low	0.28			
8F	0-9	19-25	1.30-1.50	0.6-2.0	0.20-0.22	4.5-7.3	Low	0.37	5	6	1-2
Hickory	9-49	27-35	1.45-1.65	0.6-2.0	0.15-0.19	4.5-6.0	Moderate	0.28			
	49-60	15-32	1.50-1.70	0.6-2.0	0.11-0.19	5.1-8.4	Low	0.28			
17	0-13	16-26	1.30-1.40	0.6-2.0	0.22-0.24	4.5-7.3	Low	0.37	3	6	1-3
Keomah	13-29	35-42	1.30-1.45	0.06-0.2	0.18-0.20	4.5-5.5	High	0.37			
	29-60	24-38	1.40-1.55	0.2-0.6	0.18-0.20	5.1-7.3	Moderate	0.37			
27G	0-8	11-22	1.30-1.45	0.6-2.0	0.20-0.24	5.6-7.3	Low	0.37	4	5	.5-3
Miami	8-27	27-35	1.45-1.65	0.2-1.6	0.15-0.20	5.1-6.0	Moderate	0.37			
	27-40	20-27	1.50-1.70	0.2-0.6	0.14-0.19	6.6-7.8	Low	0.37			
	40-60	15-25	1.70-1.90	0.06-0.2	0.05-0.10	7.4-8.4	Moderate	0.37			
36B	0-9	20-26	1.25-1.30	0.6-2.0	0.22-0.24	5.1-7.3	Moderate	0.28	5	6	3-4
Tama	9-41	27-35	1.30-1.35	0.6-2.0	0.18-0.20	5.1-7.3	Moderate	0.43			
	41-60	20-30	1.35-1.40	0.6-2.0	0.18-0.20	5.6-7.8	Moderate	0.43			
43	0-18	20-27	1.15-1.35	0.6-2.0	0.22-0.24	5.6-7.3	Moderate	0.28	5	6	4-5
Ipava	18-50	35-43	1.25-1.50	0.2-0.6	0.11-0.20	5.6-7.8	High	0.43			
	50-62	20-30	1.30-1.55	0.2-0.6	0.20-0.22	6.1-8.4	Moderate	0.43			
45	0-9	20-27	1.25-1.45	0.6-2.0	0.22-0.24	5.6-7.3	Low	0.37	3	6	3-4
Denny	9-23	15-22	1.25-1.45	0.2-0.6	0.18-0.20	5.1-6.5	Low	0.37			
	23-52	35-45	1.20-1.40	0.06-0.2	0.11-0.22	4.5-6.5	High	0.37			
	52-60	25-35	1.40-1.60	0.2-0.6	0.20-0.22	5.1-7.8	Moderate	0.37			
46	0-15	20-27	1.15-1.30	0.6-2.0	0.22-0.24	5.1-7.3	Moderate	0.28	5	6	3-4
Herrick	15-35	35-42	1.20-1.40	0.2-0.6	0.12-0.17	4.5-6.0	High	0.43			
	35-58	25-40	1.20-1.40	0.2-0.6	0.16-0.20	5.6-7.3	Moderate	0.43			
	58-62	20-30	1.30-1.50	0.2-0.6	0.16-0.21	5.6-8.4	Moderate	0.43			
48	0-11	20-27	1.20-1.40	0.2-0.6	0.22-0.24	5.1-7.3	Low	0.32	5	6	2-3
Ebbert	11-16	18-25	1.30-1.50	0.2-0.6	0.20-0.22	5.1-6.0	Low	0.43			
	16-52	24-35	1.35-1.55	0.06-0.2	0.18-0.20	4.5-7.3	Moderate	0.43			
	52-60	22-33	1.50-1.70	0.06-0.2	0.14-0.20	5.6-7.3	Moderate	0.43			
50	0-12	27-30	1.20-1.40	0.6-2.0	0.21-0.24	5.6-7.8	Moderate	0.28	5	7	4-6
Virden	12-52	35-42	1.20-1.45	0.2-0.6	0.11-0.20	5.6-7.8	High	0.28			
	52-60	25-33	1.25-1.55	0.2-0.6	0.18-0.22	6.1-8.4	Moderate	0.28			

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
67--------------- Harpster	0-17	27-35	1.05-1.25	0.6-2.0	0.21-0.24	7.4-8.4	Moderate-----	0.28	5	4L	5-6
	17-48	27-35	1.20-1.50	0.6-2.0	0.18-0.22	7.4-8.4	Moderate-----	0.28			
	48-57	22-35	1.25-1.55	0.6-2.0	0.17-0.22	7.4-8.4	Moderate-----	0.28			
	57-61	15-30	1.40-1.60	0.6-2.0	0.11-0.22	7.4-8.4	Low----------	0.28			
68--------------- Sable	0-15	27-35	1.15-1.35	0.6-2.0	0.21-0.23	5.6-7.3	Moderate-----	0.28	5	7	5-6
	15-44	24-35	1.30-1.50	0.6-2.0	0.18-0.20	5.6-7.8	Moderate-----	0.28			
	44-60	20-28	1.30-1.50	0.6-2.0	0.20-0.22	6.6-8.4	Low----------	0.28			
112-------------- Cowden	0-8	17-27	1.30-1.50	0.6-2.0	0.22-0.25	5.6-7.3	Low----------	0.37	3	6	2-3
	8-18	17-27	1.25-1.45	0.06-0.2	0.18-0.20	4.5-6.0	Low----------	0.37			
	18-51	35-42	1.35-1.60	0.06-0.2	0.12-0.20	4.5-7.3	High---------	0.37			
	51-60	20-27	1.50-1.70	0.2-0.6	0.17-0.22	5.6-7.8	Moderate-----	0.37			
113A------------- Oconee	0-7	20-27	1.20-1.30	0.6-2.0	0.22-0.24	5.6-7.8	Moderate-----	0.32	3-2	6	2-3
	7-15	18-27	1.30-1.45	0.06-0.2	0.20-0.22	4.5-7.3	Moderate-----	0.43			
	15-54	35-42	1.30-1.50	0.06-0.2	0.11-0.17	4.5-6.0	High---------	0.43			
	54-62	20-35	1.40-1.60	0.06-0.2	0.16-0.21	5.1-6.5	Moderate-----	0.43			
113B------------- Oconee	0-8	20-27	1.20-1.30	0.6-2.0	0.22-0.24	5.6-7.8	Moderate-----	0.32	3-2	6	2-3
	8-11	18-27	1.30-1.45	0.06-0.2	0.20-0.22	4.5-7.3	Moderate-----	0.43			
	11-49	35-42	1.30-1.50	0.06-0.2	0.11-0.17	4.5-6.0	High---------	0.43			
	49-60	17-27	1.40-1.60	0.06-0.2	0.20-0.22	5.6-8.4	Moderate-----	0.43			
119C2------------ Elco	0-6	20-27	1.20-1.35	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.37	5	6	1-3
	6-28	23-35	1.25-1.45	0.6-2.0	0.18-0.21	5.1-7.8	Moderate-----	0.37			
	28-60	25-45	1.45-1.70	0.06-0.6	0.14-0.20	5.1-7.8	High---------	0.37			
127B------------- Harrison	0-10	20-27	1.15-1.30	0.6-2.0	0.22-0.24	6.1-7.3	Low----------	0.32	5	6	2-4
	10-45	25-35	1.25-1.40	0.6-2.0	0.18-0.22	5.1-6.5	Moderate-----	0.43			
	45-65	20-35	1.30-1.45	0.6-2.0	0.14-0.20	5.6-7.3	Moderate-----	0.43			
	65-70	30-50	1.50-1.70	0.06-0.2	0.10-0.19	5.1-7.8	High---------	0.43			
128B, 128C2------ Douglas	0-13	14-27	1.20-1.30	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.32	5-4	5	2-4
	13-43	25-35	1.25-1.40	0.6-2.0	0.18-0.22	5.1-6.5	Moderate-----	0.43			
	43-60	10-30	1.45-1.70	0.6-6.0	0.11-0.22	5.6-7.3	Moderate-----	0.43			
131C2------------ Alvin	0-7	10-15	1.45-1.65	2.0-6.0	0.14-0.17	4.5-7.3	Low----------	0.24	5	3	.5-1
	7-42	15-18	1.40-1.65	0.6-6.0	0.14-0.18	4.5-6.0	Low----------	0.24			
	42-60	3-10	1.45-1.65	2.0-6.0	0.10-0.15	5.1-8.4	Low----------	0.24			
134B, 134C2------ Camden	0-14	14-27	1.35-1.55	0.6-2.0	0.21-0.25	5.1-7.3	Low----------	0.37	5	6	1-2
	14-37	22-35	1.40-1.60	0.6-2.0	0.14-0.24	5.1-7.3	Moderate-----	0.37			
	37-57	18-30	1.45-1.65	0.6-2.0	0.11-0.22	5.1-7.3	Low----------	0.32			
	57-60	5-20	1.40-1.70	0.6-6.0	0.12-0.22	5.6-8.4	Low----------	0.32			
136-------------- Brooklyn	0-9	20-27	1.20-1.40	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.37	3	6	3-4
	9-19	14-22	1.25-1.40	0.6-2.0	0.20-0.22	4.5-6.5	Low----------	0.37			
	19-41	35-45	1.35-1.55	0.06-0.2	0.11-0.20	4.5-7.8	High---------	0.37			
	41-60	10-30	1.40-1.70	0.2-0.6	0.11-0.19	5.1-7.8	Low----------	0.24			
138-------------- Shiloh	0-15	35-40	1.30-1.50	0.2-0.6	0.18-0.21	6.1-7.3	High---------	0.28	5	7	4-6
	15-52	35-45	1.35-1.55	0.2-0.6	0.09-0.18	6.1-7.8	High---------	0.28			
	52-62	25-45	1.30-1.50	0.2-0.6	0.18-0.20	6.1-8.4	High---------	0.28			
152-------------- Drummer	0-16	27-35	1.10-1.30	0.6-2.0	0.21-0.23	5.6-7.8	Moderate-----	0.28	5	7	5-7
	16-49	20-35	1.20-1.45	0.6-2.0	0.21-0.24	5.6-7.8	Moderate-----	0.28			
	49-62	15-32	1.40-1.70	0.6-2.0	0.11-0.19	6.6-8.4	Low----------	0.28			
198-------------- Elburn	0-16	22-27	1.10-1.30	0.6-2.0	0.22-0.24	5.6-7.8	Low----------	0.28	5	6	4-5
	16-49	25-35	1.20-1.40	0.6-2.0	0.18-0.20	5.6-7.8	Moderate-----	0.43			
	49-62	15-25	1.50-1.70	0.6-6.0	0.12-0.18	6.1-8.4	Low----------	0.43			

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
199B------------- Plano	0-12	18-27	1.10-1.30	0.6-2.0	0.22-0.24	6.1-7.3	Low----------	0.32	5	6	3-5
	12-44	25-35	1.20-1.40	0.6-2.0	0.18-0.20	5.1-7.3	Moderate-----	0.43			
	44-60	10-20	1.50-1.70	0.6-2.0	0.11-0.22	5.6-8.4	Low----------	0.43			
242-------------- Kendall	0-11	20-27	1.15-1.30	0.6-2.0	0.22-0.24	5.1-7.3	Low----------	0.37	5	6	1-3
	11-48	27-35	1.30-1.50	0.6-2.0	0.18-0.20	4.5-7.3	Moderate-----	0.37			
	48-60	10-25	1.55-1.70	0.6-2.0	0.11-0.22	5.6-8.4	Low----------	0.37			
244-------------- Hartsburg	0-20	27-33	1.15-1.35	0.6-2.0	0.21-0.24	6.1-7.8	Moderate-----	0.28	5	7	3-5
	20-31	27-35	1.20-1.50	0.6-2.0	0.18-0.20	6.6-8.4	Moderate-----	0.28			
	31-62	20-27	1.30-1.55	0.6-2.0	0.20-0.22	7.4-8.4	Low----------	0.28			
249-------------- Edinburg	0-12	27-35	1.10-1.30	0.6-2.0	0.21-0.24	5.6-7.8	High---------	0.37	3	7	3-4
	12-52	35-46	1.20-1.40	0.06-0.2	0.13-0.20	5.6-7.3	High---------	0.37			
	52-60	22-30	1.30-1.50	0.2-2.0	0.18-0.22	6.6-7.8	Moderate-----	0.37			
256C2------------ Pana	0-9	15-24	1.20-1.40	2.0-6.0	0.20-0.24	5.1-6.0	Low----------	0.32	5	5	2-4
	9-60	18-33	1.40-1.60	2.0-6.0	0.10-0.15	5.1-6.0	Low----------	0.24			
257-------------- Clarksdale	0-9	20-27	1.30-1.50	0.6-2.0	0.22-0.25	5.1-7.3	Moderate-----	0.37	5	6	2-3
	9-16	15-27	1.25-1.50	0.2-0.6	0.20-0.22	5.1-6.5	Low----------	0.37			
	16-55	35-45	1.30-1.50	0.2-0.6	0.11-0.20	5.1-7.3	High---------	0.37			
	55-60	20-30	1.40-1.60	0.2-0.6	0.20-0.22	6.1-8.4	Moderate-----	0.37			
259C2------------ Assumption	0-8	20-27	1.25-1.45	0.6-2.0	0.23-0.26	5.6-7.3	Low----------	0.28	5	6	3-4
	8-28	25-35	1.20-1.40	0.6-2.0	0.18-0.22	5.1-7.3	Moderate-----	0.43			
	28-34	25-35	1.40-1.60	0.2-0.6	0.16-0.20	5.1-7.3	Moderate-----	0.43			
	34-60	30-45	1.45-1.65	0.06-0.6	0.14-0.20	5.1-7.3	High---------	0.43			
264D2------------ El Dara	0-10	10-20	1.30-1.50	0.6-2.0	0.13-0.18	4.5-7.8	Low----------	0.24	5-4	3	1-3
	10-44	18-35	1.35-1.60	0.6-2.0	0.12-0.19	4.5-7.3	Low----------	0.32			
	44-63	5-25	1.50-1.80	0.6-2.0	0.11-0.19	4.5-6.0	Low----------	0.24			
264F------------- El Dara	0-5	10-25	1.30-1.50	0.6-2.0	0.18-0.22	4.5-7.8	Low----------	0.32	5	5	1-3
	5-10	5-20	1.35-1.55	0.6-2.0	0.10-0.18	4.5-7.3	Low----------	0.24			
	10-52	18-35	1.35-1.60	0.6-2.0	0.12-0.19	4.5-7.3	Low----------	0.32			
	52-60	5-25	1.50-1.80	0.6-2.0	0.11-0.19	4.5-6.0	Low----------	0.24			
279B------------- Rozetta	0-9	15-27	1.20-1.40	0.6-2.0	0.22-0.24	5.1-7.3	Low----------	0.37	5	6	1-3
	9-53	27-35	1.35-1.55	0.6-2.0	0.18-0.22	4.5-6.0	Moderate-----	0.37			
	53-60	20-27	1.40-1.60	0.6-2.0	0.20-0.22	5.6-7.8	Low----------	0.37			
372-------------- Kendall	0-12	20-27	1.15-1.30	0.6-2.0	0.22-0.24	5.1-7.3	Low----------	0.37	5	6	1-3
	12-41	27-35	1.30-1.50	0.6-2.0	0.18-0.20	5.1-7.3	Moderate-----	0.37			
	41-47	20-27	1.35-1.55	0.6-2.0	0.16-0.18	5.6-7.3	Low----------	0.37			
	47-60	1-5	1.55-1.80	6.0-20	0.05-0.07	6.1-8.4	Low----------	0.17			
386B------------- Downs	0-9	15-25	1.25-1.30	2.0-6.0	0.21-0.23	5.1-7.3	Low----------	0.32	5	6	2-3
	9-49	26-35	1.30-1.35	0.6-2.0	0.18-0.20	5.1-7.3	Moderate-----	0.43			
	49-60	18-27	1.35-1.45	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.43			
474-------------- Piasa	0-9	18-27	1.25-1.45	0.2-0.6	0.22-0.24	5.1-7.8	Moderate-----	0.37	3	6	2-4
	9-14	18-27	1.30-1.50	0.06-0.2	0.18-0.20	5.6-7.8	Moderate-----	0.37			
	14-53	35-43	1.35-1.55	<0.06	0.09-0.10	6.1-9.0	High---------	0.37			
	53-62	20-35	1.50-1.70	0.06-0.2	0.10-0.12	7.4-9.0	Moderate-----	0.37			
533* Urban land											

See footnote at end of table.

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
567C2------------ Elkhart	0-12	20-27	1.15-1.35	0.6-2.0	0.22-0.24	5.6-7.8	Low----------	0.32	5	6	2-4
	12-29	25-35	1.25-1.45	0.6-2.0	0.18-0.20	5.6-8.4	Moderate-----	0.43			
	29-60	20-27	1.35-1.55	0.6-2.0	0.20-0.22	7.4-8.4	Low----------	0.43			
660C2------------ Coatsburg	0-8	20-27	1.20-1.40	0.2-0.6	0.22-0.26	5.1-7.8	Moderate-----	0.37	3	6	3-5
	8-55	35-45	1.50-1.70	<0.06	0.09-0.13	5.1-6.5	High---------	0.37			
	55-65	20-35	1.55-1.75	0.06-0.2	0.15-0.19	5.6-7.8	Moderate-----	0.37			
684B------------- Broadwell	0-15	20-27	1.25-1.45	0.6-2.0	0.23-0.26	5.6-7.3	Low----------	0.32	5	6	3-5
	15-51	24-35	1.35-1.60	0.6-2.0	0.14-0.24	5.6-7.3	Moderate-----	0.43			
	51-60	3-10	1.55-1.75	6.0-20	0.08-0.11	5.6-7.3	Low----------	0.15			
685B------------- Middletown	0-8	20-27	1.20-1.40	0.6-2.0	0.22-0.24	6.1-7.3	Low----------	0.37	5	6	1-2
	8-44	20-35	1.25-1.45	0.6-2.0	0.18-0.22	4.5-6.5	Moderate-----	0.37			
	44-56	15-30	1.35-1.60	0.6-2.0	0.15-0.19	4.5-7.3	Low----------	0.32			
	56-60	3-12	1.45-1.70	6.0-20	0.08-0.10	5.1-7.3	Low----------	0.17			
802B------------- Orthents	0-60	18-35	1.45-1.65	0.06-2.0	0.12-0.18	---	Moderate-----	0.32	5	6	---
	60-80	---	---	0.06-2.0	---	---	-------------	----			
804B------------- Orthents	0-6	22-30	1.70-1.75	0.2-0.6	0.18-0.22	5.6-7.3	Moderate-----	0.43	5	4	.5-1
	6-60	22-30	1.70-1.80	0.2-0.6	0.16-0.20	5.6-7.3	Moderate-----	0.43			
864*, 865* Pits											
916*:											
Oconee----------	0-7	20-27	1.20-1.30	0.6-2.0	0.22-0.24	5.6-7.8	Moderate-----	0.32	3-2	6	2-3
	7-15	18-27	1.30-1.45	0.06-0.2	0.20-0.22	4.5-7.3	Moderate-----	0.43			
	15-54	35-42	1.30-1.50	0.06-0.2	0.11-0.17	4.5-6.0	High---------	0.43			
	54-60	20-35	1.40-1.60	0.06-0.2	0.16-0.21	5.1-6.5	Moderate-----	0.43			
Darmstadt-------	0-13	10-27	1.30-1.50	0.06-0.2	0.22-0.24	5.1-7.3	Low----------	0.43	3	6	.5-2
	13-26	27-35	1.40-1.65	0.06-0.2	0.11-0.20	4.5-7.8	Moderate-----	0.43			
	26-54	27-35	1.40-1.65	<0.06	0.09-0.10	6.6-9.0	Moderate-----	0.43			
	54-60	15-30	1.50-1.70	<0.06	0.10-0.15	7.4-9.0	Low----------	0.43			
995*:											
Herrick---------	0-15	20-27	1.15-1.30	0.6-2.0	0.22-0.24	5.1-7.3	Moderate-----	0.28	5	6	3-4
	15-35	35-42	1.20-1.40	0.2-0.6	0.12-0.17	4.5-6.0	High---------	0.43			
	35-58	25-40	1.20-1.40	0.2-0.6	0.16-0.20	5.6-7.3	Moderate-----	0.43			
	58-60	20-30	1.30-1.50	0.2-0.6	0.16-0.21	5.6-8.4	Moderate-----	0.43			
Piasa-----------	0-9	18-27	1.25-1.45	0.2-0.6	0.22-0.24	5.1-7.8	Moderate-----	0.37	3	6	2-4
	9-14	18-27	1.30-1.50	0.06-0.2	0.18-0.20	5.6-7.8	Moderate-----	0.37			
	14-53	35-43	1.35-1.55	<0.06	0.09-0.10	6.1-9.0	High---------	0.37			
	53-62	20-35	1.50-1.70	0.06-0.2	0.10-0.12	7.4-9.0	Moderate-----	0.37			
2036B*:											
Tama------------	0-14	20-26	1.25-1.30	0.6-2.0	0.22-0.24	5.1-7.3	Moderate-----	0.28	5	6	3-4
	14-52	27-35	1.30-1.35	0.6-2.0	0.18-0.20	5.1-6.5	Moderate-----	0.43			
	52-60	20-30	1.35-1.40	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.43			
Urban land.											
2043*:											
Ipava-----------	0-18	20-27	1.15-1.35	0.6-2.0	0.22-0.24	5.6-7.3	Moderate-----	0.28	5	6	4-5
	18-50	35-43	1.25-1.50	0.2-0.6	0.11-0.20	5.6-7.8	High---------	0.43			
	50-60	20-30	1.30-1.55	0.2-0.6	0.20-0.22	6.1-8.4	Moderate-----	0.43			
Urban land.											

See footnote at end of table.

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
2046*:											
Herrick---------	0-15	20-27	1.15-1.30	0.6-2.0	0.22-0.24	5.1-7.3	Moderate-----	0.28	5	6	3-4
	15-35	35-42	1.20-1.40	0.2-0.6	0.12-0.17	4.5-6.0	High---------	0.43			
	35-58	25-40	1.20-1.40	0.2-0.6	0.16-0.20	5.6-7.3	Moderate-----	0.43			
	58-60	20-30	1.30-1.50	0.2-0.6	0.16-0.21	5.6-8.4	Moderate-----	0.43			
Urban land.											
2050*:											
Virden----------	0-12	27-30	1.20-1.40	0.6-2.0	0.21-0.24	5.6-7.8	Moderate-----	0.28	5	7	4-6
	12-52	35-42	1.20-1.45	0.2-0.6	0.11-0.20	5.6-7.8	High---------	0.28			
	52-60	25-33	1.25-1.55	0.2-0.6	0.18-0.22	6.1-8.4	Moderate-----	0.28			
Urban land.											
2068*:											
Sable-----------	0-15	20-27	1.20-1.40	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.28	5	6	2-4
	15-44	24-35	1.30-1.50	0.6-2.0	0.18-0.20	5.6-7.8	Moderate-----	0.28			
	44-60	20-28	1.30-1.50	0.6-2.0	0.20-0.22	6.6-8.4	Low----------	0.28			
Urban land.											
2128C*:											
Douglas---------	0-13	14-27	1.20-1.30	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.32	5-4	5	2-4
	13-43	25-35	1.25-1.40	0.6-2.0	0.18-0.22	5.1-6.5	Moderate-----	0.43			
	43-60	10-30	1.45-1.70	0.6-6.0	0.11-0.22	5.6-7.3	Moderate-----	0.43			
Urban land.											
3073------------- Ross	0-15	27-32	1.25-1.50	0.6-2.0	0.18-0.22	6.1-7.8	Moderate-----	0.32	5	7	3-5
	15-45	18-32	1.20-1.50	0.6-2.0	0.16-0.22	6.1-8.4	Low----------	0.32			
	45-62	5-25	1.35-1.60	0.6-6.0	0.05-0.18	6.1-8.4	Low----------	0.32			
3074------------- Radford	0-11	18-27	1.40-1.60	0.6-2.0	0.22-0.24	5.6-7.8	Low----------	0.28	5	6	2-4
	11-24	18-27	1.40-1.60	0.6-2.0	0.20-0.22	6.1-7.8	Low----------	0.28			
	24-60	24-35	1.35-1.55	0.6-2.0	0.18-0.20	6.6-7.8	Moderate-----	0.28			
3107------------- Sawmill	0-22	27-35	1.20-1.40	0.6-2.0	0.21-0.23	6.1-7.8	Moderate-----	0.28	5	7	4-5
	22-29	27-35	1.20-1.40	0.6-2.0	0.21-0.23	6.1-7.8	Moderate-----	0.28			
	29-60	25-35	1.30-1.45	0.6-2.0	0.17-0.20	6.1-7.8	Moderate-----	0.28			
3284------------- Tice	0-14	27-35	1.25-1.45	0.6-2.0	0.21-0.24	6.1-7.8	Moderate-----	0.32	5	7	2-3
	14-52	27-35	1.30-1.50	0.6-2.0	0.18-0.20	5.6-7.8	Moderate-----	0.32			
	52-60	15-30	1.40-1.60	0.6-2.0	0.11-0.18	5.6-7.8	Moderate-----	0.32			
7148------------- Proctor	0-16	18-27	1.10-1.30	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.28	5	6	3-4
	16-34	27-35	1.20-1.45	0.6-2.0	0.18-0.20	5.6-6.5	Moderate-----	0.43			
	34-53	15-35	1.30-1.55	0.6-2.0	0.13-0.16	5.6-7.3	Moderate-----	0.32			
	53-60	5-10	1.40-1.70	2.0-6.0	0.08-0.10	6.1-7.3	Low----------	0.17			
7242------------- Kendall	0-9	20-27	1.15-1.30	0.6-2.0	0.22-0.24	5.1-7.3	Low----------	0.37	5	6	1-2
	9-13	18-25	1.25-1.45	0.6-2.0	0.20-0.22	5.1-7.3	Low----------	0.37			
	13-57	27-35	1.30-1.50	0.6-2.0	0.18-0.20	4.5-7.3	Moderate-----	0.37			
	57-60	10-25	1.55-1.70	0.6-2.0	0.11-0.20	5.6-8.4	Low----------	0.37			
8206------------- Thorp	0-23	18-27	1.30-1.50	0.2-0.6	0.22-0.24	5.1-7.3	Low----------	0.37	5	6	3-5
	23-54	27-35	1.35-1.55	0.06-0.2	0.18-0.20	5.6-6.5	Moderate-----	0.37			
	54-60	5-20	1.50-1.70	2.0-6.0	0.08-0.19	7.4-8.4	Low----------	0.37			

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 18.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Uncoated steel	Concrete
					Ft				
7C2, 7C3 Atlas	D	None	---	---	1.0-2.0	Perched	Apr-Jun	High	Moderate.
8D2, 8D3, 8F Hickory	C	None	---	---	>6.0	---	---	Moderate	Moderate.
17 Keomah	C	None	---	---	2.0-4.0	Apparent	Nov-Jul	High	Moderate.
27G Miami	B	None	---	---	>6.0	---	---	Moderate	Moderate.
36B Tama	B	None	---	---	4.0-6.0	Apparent	Nov-Jun	Moderate	Moderate.
43 Ipava	B	None	---	---	1.0-3.0	Apparent	Mar-Jun	High	Moderate.
45 Denny	D	None	---	---	+1-2.0	Apparent	Mar-Jun	High	Moderate.
46 Herrick	B	None	---	---	1.0-3.0	Apparent	Mar-Jun	High	High.
48 Ebbert	C/D	None	---	---	+1-2.0	Apparent	Apr-Jul	High	Moderate.
50 Virden	B/D	None	---	---	+.5-2.0	Apparent	Mar-Jun	High	Moderate.
67 Harpster	B/D	None	---	---	+.5-2.0	Apparent	Feb-Jun	High	Low.
68 Sable	B/D	None	---	---	+.5-2.0	Apparent	Mar-Jun	High	Low.
112 Cowden	D	None	---	---	0-2.0	Apparent	Mar-Jun	High	Moderate.
113A, 113B Oconee	C	None	---	---	1.0-3.0	Apparent	Mar-Jun	High	High.
119C2 Elco	B	None	---	---	2.5-4.5	Perched	Mar-May	High	Moderate.
127B Harrison	B	None	---	---	3.0-6.0	Perched	Feb-May	High	Moderate.
128B, 128C2 Douglas	B	None	---	---	>6.0	---	---	Moderate	Moderate.
131C2 Alvin	B	None	---	---	>6.0	---	---	Low	High.
134B, 134C2 Camden	B	None	---	---	>6.0	---	---	Low	Moderate.

TABLE 18.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Uncoated steel	Concrete
					Ft				
136----------------Brooklyn	C/D	Rare---------	---	---	+.5-2.0	Apparent	Mar-Jun	High-----	Moderate.
138----------------Shiloh	B/D	None---------	---	---	+1-2.0	Apparent	Mar-Jun	High-----	Low.
152----------------Drummer	B/D	None---------	---	---	+.5-2.0	Apparent	Mar-Jun	High-----	Moderate.
198----------------Elburn	B	None---------	---	---	1.0-3.0	Apparent	Jan-May	High-----	Moderate.
199B---------------Plano	B	None---------	---	---	3.0-6.0	Apparent	Mar-May	Moderate	Low.
242----------------Kendall	B	None---------	---	---	1.0-3.0	Apparent	Mar-Jun	High-----	Moderate.
244----------------Hartsburg	B/D	None---------	---	---	+.5-2.0	Apparent	Mar-Jun	High-----	Low.
249----------------Edinburg	C/D	None---------	---	---	+1-2.0	Apparent	Mar-Jun	High-----	Moderate.
256C2--------------Pana	B	None---------	---	---	>6.0	---	---	Low------	High.
257----------------Clarksdale	C	None---------	---	---	1.0-3.0	Apparent	Mar-Jun	High-----	Moderate.
259C2--------------Assumption	B	None---------	---	---	2.5-4.5	Perched	Feb-May	High-----	Moderate.
264D2--------------El Dara	B	None---------	---	---	4.0-6.0	Perched	Apr-May	Low------	High.
264F---------------El Dara	B	None---------	---	---	>6.0	---	---	Moderate	Moderate.
279B---------------Rozetta	B	None---------	---	---	4.0-6.0	Apparent	Mar-Jun	Moderate	Moderate.
372----------------Kendall	B	None---------	---	---	1.0-3.0	Apparent	Mar-Jun	High-----	Moderate.
386B---------------Downs	B	None---------	---	---	4.0-6.0	Apparent	Mar-Jun	Moderate	Moderate.
474----------------Piasa	D	None---------	---	---	+.5-2.0	Perched	Feb-May	High-----	Low.
533*. Urban land									
567C2--------------Elkhart	B	None---------	---	---	>6.0	---	---	Moderate	Moderate.
660C2--------------Coatsburg	D	None---------	---	---	0-1.0	Perched	Apr-Jun	High-----	Moderate.

See footnote at end of table.

TABLE 18.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Uncoated steel	Concrete
					Ft				
684B-------------- Broadwell	B	None--------	---	---	>6.0	---	---	Moderate	Moderate.
685B-------------- Middletown	B	None--------	---	---	3.0-6.0	Apparent	Mar-Jun	High-----	High.
802B-------------- Orthents	---	None--------	---	---	>6.0	---	---	---	---
804B-------------- Orthents	B	None--------	---	---	4.0-6.0	Apparent	Mar-May	Moderate	Moderate.
864*, 865*. Pits									
916*:									
Oconee-----------	C	None--------	---	---	1.0-3.0	Apparent	Mar-Jun	High-----	High.
Darmstadt--------	D	None--------	---	---	1.0-3.0	Perched	Feb-May	High-----	High.
995*:									
Herrick----------	B	None--------	---	---	1.0-3.0	Apparent	Mar-Jun	High-----	High.
Piasa------------	D	None--------	---	---	+.5-2.0	Perched	Feb-May	High-----	Low.
2036B*:									
Tama-------------	B	None--------	---	---	4.0-6.0	Apparent	Nov-Jun	Moderate	Moderate.
Urban land.									
2043*:									
Ipava------------	B	None--------	---	---	1.0-3.0	Apparent	Mar-Jun	High-----	Moderate.
Urban land.									
2046*:									
Herrick----------	B	None--------	---	---	1.0-3.0	Apparent	Mar-Jun	High-----	High.
Urban land.									
2050*:									
Virden-----------	B/D	None--------	---	---	+.5-2.0	Apparent	Mar-Jun	High-----	Moderate.
Urban land.									
2068*:									
Sable------------	B/D	None--------	---	---	+.5-2.0	Apparent	Mar-Jun	High-----	Low.
Urban land.									
2128C*:									
Douglas----------	B	None--------	---	---	>6.0	---	---	Moderate	Moderate.
Urban land.									
3073-------------- Ross	B	Frequent----	Very brief or brief.	Nov-Jun	4.0-6.0	Apparent	Feb-Apr	Low------	Low.
3074-------------- Radford	B	Frequent----	Brief-----	Mar-Jun	1.0-3.0	Apparent	Mar-Jun	High-----	Low.

See footnote at end of table.

TABLE 18.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Uncoated steel	Concrete
					Ft				
3107-------------- Sawmill	B/D	Frequent----	Brief to long.	Mar-Jun	0-2.0	Apparent	Mar-Jun	High-----	Low.
3284-------------- Tice	B	Frequent----	Very brief to long.	Jan-Jun	1.5-3.0	Apparent	Mar-Jun	High-----	Low.
7148-------------- Proctor	B	Rare--------	---	---	>6.0	---	---	Moderate	Moderate.
7242-------------- Kendall	B	Rare--------	---	---	1.0-3.0	Apparent	Mar-Jun	High-----	Moderate.
8206-------------- Thorp	C/D	Occasional	Brief-----	Mar-Jun	0-2.0	Apparent	Feb-Jun	High-----	Moderate.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 19.--ENGINEERING INDEX TEST DATA

(Dashes indicate that data were not available. MAX means maximum dry density; OPT, optimum moisture; LL, liquid limit; PI, plasticity index; and UN, Unified)

Soil name	Sample number	Horizon	Depth	Moisture density MAX	Moisture density OPT	Percentage passing sieve number-- 4	10	40	200	LL	PI	Classification AASHTO	Classification UN
			In	Lb/ cu ft	Pct					Pct			
Cowden	85IL-021-40-1	Ap	0-8	105.0	17.3	100.0	99.2	96.2	91.1	30.1	4.8	A-4(4)	ML
	40-2	Eg1	8-13	106.8	18.4	100.0	99.9	97.6	88.3	34.0	11.8	A-6(11)	CL
	40-5	Btg2	23-31	97.2	23.6	100.0	99.3	97.4	95.6	47.8	27.1	A-7-6(28)	CL
Douglas	84IL-021-51-1	Ap	0-7	103.3	19.6	100.0	99.8	99.1	97.1	35.3	12.2	A-6(13)	ML
	51-4	Bt2	18-28	101.9	21.2	100.0	99.9	99.2	97.7	40.6	18.3	A-6(20)	CL
	51-8	2BC	46-60	115.4	14.2	99.3	98.3	93.3	79.0	25.2	6.7	A-4(3)	CL-ML
Harrison	83IL-021-24-1	Ap	0-10	105.8	17.8	100.0	99.8	98.4	95.6	32.4	8.5	A-4(9)	ML
	24-4	Bt2	20-27	102.7	17.4	100.0	99.1	97.5	95.1	36.8	14.6	A-6(15)	CL
	24-7	2Bt5	45-65	111.1	16.6	100.0	99.4	96.3	81.2	32.0	15.8	A-6(11))	CL
Pana	85IL-021-18-1	Ap	0-7	118.7	12.6	95.6	94.3	83.7	47.4	23.9	8.6	A-4(1)	SC
	18-4	Bt3	29-39	116.3	15.7	86.5	80.0	67.4	34.8	26.5	12.6	A-2-6(0)	SC
Sawmill	85IL-021-8-1	Ap	0-7	99.8	22.3	100.0	99.7	97.9	93.2	43.4	24.0	A-7-6(24)	CL
	8-5	Bg1	29-39	107.5	18.0	100.0	99.7	97.9	92.8	44.0	26.4	A-7-6(25)	CL
	8-7	Bg3	50-60	110.2	17.4	100.0	99.2	96.0	90.4	46.6	31.8	A-7-6(29)	CL

TABLE 20.--CLASSIFICATION OF THE SOILS

(An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series)

Soil name	Family or higher taxonomic class
Alvin	Coarse-loamy, mixed, mesic Typic Hapludalfs
*Assumption	Fine-silty, mixed, mesic Typic Argiudolls
Atlas	Fine, montmorillonitic, mesic, sloping Aeric Ochraqualfs
Broadwell	Fine-silty, mixed, mesic Typic Argiudolls
Brooklyn	Fine, montmorillonitic, mesic Mollic Albaqualfs
Camden	Fine-silty, mixed, mesic Typic Hapludalfs
Clarksdale	Fine, montmorillonitic, mesic Udollic Ochraqualfs
*Coatsburg	Fine, montmorillonitic, mesic, sloping Typic Argiaquolls
Cowden	Fine, montmorillonitic, mesic Mollic Albaqualfs
Darmstadt	Fine-silty, mixed, mesic Albic Natraqualfs
Denny	Fine, montmorillonitic, mesic Mollic Albaqualfs
Douglas	Fine-silty, mixed, mesic Typic Argiudolls
Downs	Fine-silty, mixed, mesic Mollic Hapludalfs
Drummer	Fine-silty, mixed, mesic Typic Haplaquolls
Ebbert	Fine-silty, mixed, mesic Argiaquic Argialbolls
Edinburg	Fine, montmorillonitic, mesic Typic Argiaquolls
Elburn	Fine-silty, mixed, mesic Aquic Argiudolls
Elco	Fine-silty, mixed, mesic Typic Hapludalfs
El Dara	Fine-loamy, mixed, mesic Typic Hapludalfs
*Elkhart	Fine-silty, mixed, mesic Typic Argiudolls
Harpster	Fine-silty, mesic Typic Calciaquolls
Harrison	Fine-silty, mixed, mesic Typic Argiudolls
Hartsburg	Fine-silty, mixed, mesic Typic Haplaquolls
Herrick	Fine, montmorillonitic, mesic Aquic Argiudolls
Hickory	Fine-loamy, mixed, mesic Typic Hapludalfs
Ipava	Fine, montmorillonitic, mesic Aquic Argiudolls
Kendall	Fine-silty, mixed, mesic Aeric Ochraqualfs
Keomah	Fine, montmorillonitic, mesic Aeric Ochraqualfs
Miami	Fine-loamy, mixed, mesic Typic Hapludalfs
Middletown	Fine-silty, mixed, mesic Typic Hapludalfs
Oconee	Fine, montmorillonitic, mesic Udollic Ochraqualfs
Orthents	Orthents
*Pana	Fine-loamy, mixed, mesic Typic Argiudolls
Piasa	Fine, montmorillonitic, mesic Mollic Natraqualfs
Plano	Fine-silty, mixed, mesic Typic Argiudolls
Proctor	Fine-silty, mixed, mesic Typic Argiudolls
Radford	Fine-silty, mixed, mesic Fluvaquentic Hapludolls
Ross	Fine-loamy, mixed, mesic Cumulic Hapludolls
Rozetta	Fine-silty, mixed, mesic Typic Hapludalfs
Sable	Fine-silty, mixed, mesic Typic Haplaquolls
Sawmill	Fine-silty, mixed, mesic Cumulic Haplaquolls
Shiloh	Fine, montmorillonitic, mesic Cumulic Haplaquolls
Tama	Fine-silty, mixed, mesic Typic Argiudolls
Thorp	Fine-silty, mixed, mesic Argiaquic Argialbolls
Tice	Fine-silty, mixed, mesic Fluvaquentic Hapludolls
Virden	Fine, montmorillonitic, mesic Typic Argiaquolls

NRCS Accessibility Statement