United States
Department of
Agriculture

Natural
Resources
Conservation
Service

In cooperation with
Illinois Agricultural
Experiment Station

Soil Survey of Shelby County, Illinois

How To Use This Soil Survey

General Soil Map

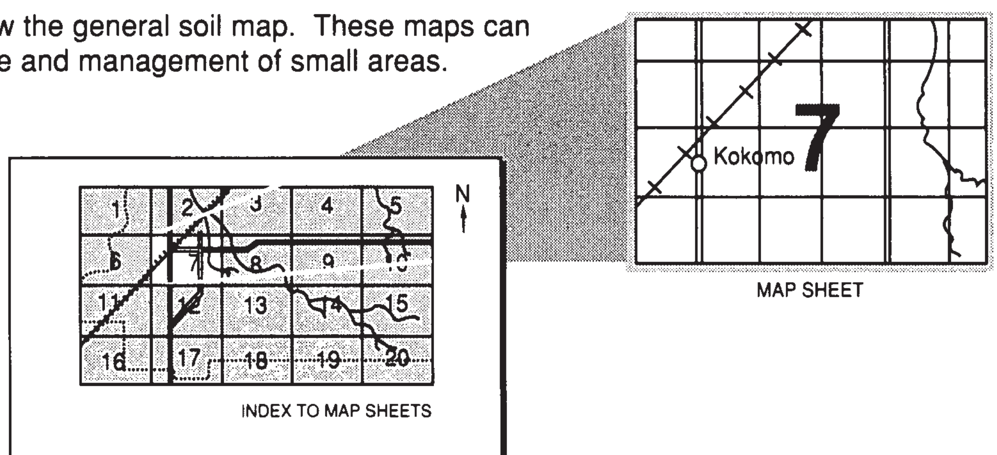
The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

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.

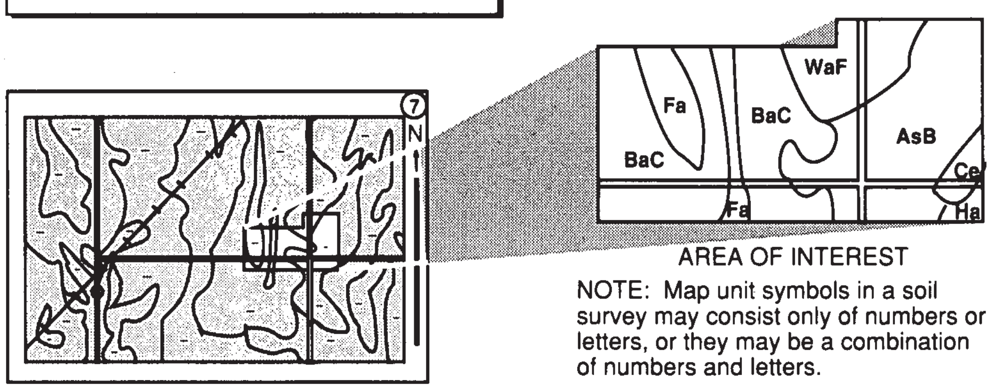
To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



MAP 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 Natural Resources Conservation Service (formerly 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 1990. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1988. This survey was made cooperatively by the Natural Resources Conservation Service and the Illinois Agricultural Experiment Station. It is part of the technical assistance furnished to the Shelby County Soil and Water Conservation District. Financial assistance was provided by the Shelby County Board of Supervisors and the Illinois Department of Agriculture.

This soil survey is Illinois Agricultural Experiment Station Soil Report 147.

Cover: The heavily forested Xenia and Miami soils enclose the upper reaches of Lake Shelbyville. In the background are areas of Xenia, Sabina, and Sunbury soils, which are the main soils near the lake that are used for cultivated crops.

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Issued September 1996

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Summary of Tables

Foreword

This soil survey contains information that can be used in land-planning programs in Shelby 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 to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this 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 Natural Resources Conservation Service or the Cooperative Extension Service.

Thomas W. Christenson
State Conservationist
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Soil Survey of
Shelby County, Illinois

By Kenneth A. Gotsch, Natural Resources Conservation Service

Soils surveyed by Kenneth A. Gotsch and James Witt, Natural Resources Conservation Service, and John F. Bowman and Dennis J. Landwehr, Shelby County

United States Department of Agriculture, Natural Resources Conservation Service,
in cooperation with
the Illinois Agricultural Experiment Station

SHELBY COUNTY is in the south-central part of Illinois (fig. 1). It has an area of 491,280 acres, or about 768 square miles. It is bordered on the north by Macon and Moultrie Counties, on the east by Coles and Cumberland Counties, on the south by Effingham and Fayette Counties, and on the west by Montgomery and Christian Counties. In 1980, the population of the county was 23,923. Shelbyville, the county seat and largest town, had a population of 5,267.

This soil survey updates the survey of Shelby County published in 1939 *(15)*. It provides more recent and more technical information about the soils and their capabilities and has larger maps, which show the soils in greater detail.

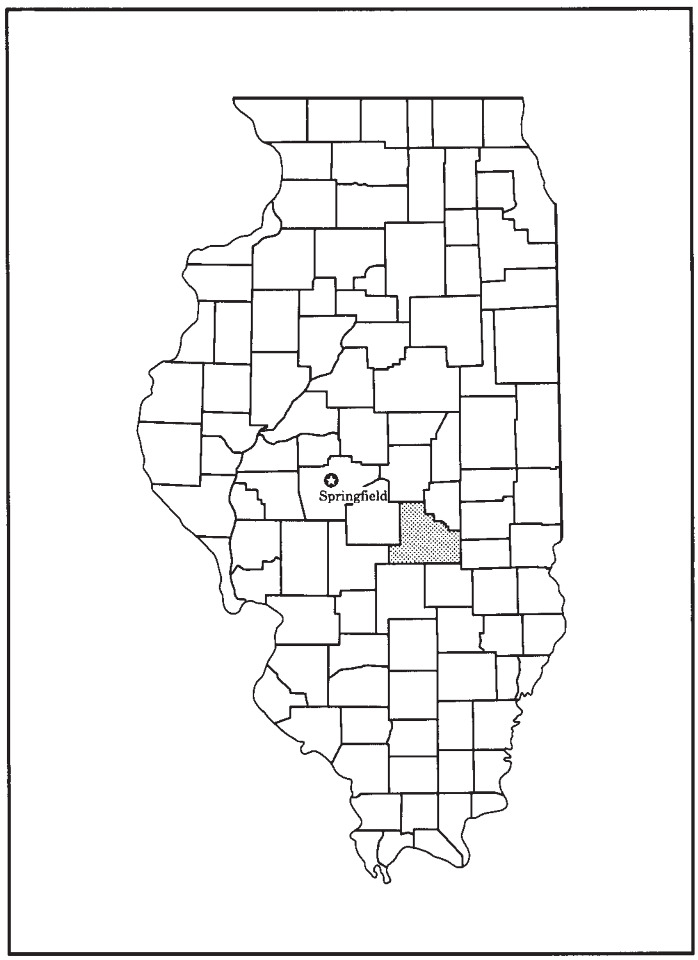

Figure 1.—Location of Shelby County in Illinois.

General Nature of the County

This section provides general information about Shelby County. It describes history and settlement; climate; physiography, relief, and drainage; economic development and transportation facilities; natural resources; and agriculture.

History and Settlement

Kickapoo Indians were the main inhabitants of the survey area until after the Black Hawk War. The first permanent settlement in Shelby County was made in Cold Spring Township by Charles Wakefield and his family in 1818 *(3)*. About 55 percent of the county was wooded at the time of settlement. The rest of the county was prairie. The first settlers farmed very little. They earned their livelihood mainly by hunting and fishing. They reported seeing heads and antlers of elk and buffalo lying in many places on the prairie. Black bear, wolves, deer, wild turkey, and other small game were abundant. Wildcats and wild hogs were also numerous.

Shelby County was established in 1827 from part of Fayette County. Shelbyville was chosen as the county seat that same year.

Climate

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

Table 1 gives data on temperature and precipitation for the survey area as recorded at Pana, Illinois, in the period 1961 to 1990. 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 29.4 degrees F and the average daily minimum temperature is 21.1 degrees. The lowest temperature on record, which occurred at Pana on January 7, 1912, is -25 degrees. In summer, the average temperature is 74.0 degrees and the average daily maximum temperature is 84.4 degrees. The highest recorded temperature, which occurred at Pana on July 14, 1954, is 115 degrees.

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

The total annual precipitation is 40.21 inches. Of this, 22.63 inches, or 56 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 15.99 inches.

The average seasonal snowfall is 20.4 inches. The greatest snow depth at any one time during the period of record was 18 inches. On the average, 25 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.

Physiography, Relief, and Drainage

The landscape of Shelby County is primarily influenced by two glacial periods. As the glaciers melted, they deposited thick layers of glacial drift, which form the present topography.

The Illinoian glacier, the earlier of the two ice sheets, once covered the entire county. As this glacier receded, it left a broad, gently undulating plain that has been deeply dissected by headward erosion and downcutting. Differences in topography are generally very pronounced. The nearly level uplands descend into steep-sided stream valleys. The flood plains generally are 50 to 60 feet below the upland flats. A series of contrasting topographic features made up of morainal hills, eskers, and kames extends from Dollville, south through Tower Hill, and into Cold Spring Township.

The most recent glacier, the Wisconsinan, covered about two-fifths of the survey area. As this glacier receded, it left a broad, prominent ridge known as the Shelbyville Moraine. This moraine marks the boundary between the Illinoian and Wisconsinan glaciers. The topography of the Wisconsinan deposits is characterized by undulating to rolling areas that are deeply dissected along major drainageways.

The relief in Shelby County is relatively low and descends from the northeast to the southwest. The highest feature in the county, Williamsburg Hill in Cold Spring Township, is 810 feet above sea level. It is about 200 feet above the mean elevation of the Illinoian glacial till plain and 110 feet higher than the crest of the Shelbyville Moraine. The lowest elevation, 500 feet above sea level, is on the flood plain along the Kaskaskia River where the river leaves the county.

Six major watersheds drain the county. These are the Kaskaskia, Little Wabash, Flat Branch, Becks, Robinson, and Mitchell watersheds. These watercourses drain primarily to the south and southwest. The central part of the county is drained by the Kaskaskia River and its tributaries. The Little Wabash River system drains the eastern and northwestern parts of the county and eventually flows into the Kaskaskia River.

Economic Development and Transportation Facilities

Shelby County is largely an agricultural area, but some light industry is in the town of Shelbyville. Manufactured products include steel fabricated parts, paper products, and automobile engine turbochargers. These industries, along with small businesses providing goods and services, account for the employment of a high percentage of the labor force in the county.

The transportation facilities available in Shelby County include Federal Routes 51 and 45, Interstate 57, several State highways, and numerous county and township roads. Most of the township and county roads are blacktopped. Three railroads offer freight service to Shelbyville and several smaller towns. Private and charter air service is available at the Shelby County Airport.

Natural Resources

The soils are the chief natural resource in Shelby County. They are generally well suited to the commonly grown crops. Corn and soybeans are the major crops. Most of the soils are nearly level and gently sloping and formed in medium textured material under tall prairie grasses. The favorable soil properties and the climate result in highly productive farmland.

About 42,800 acres, or 9 percent of the total acreage in the county, is woodland. Most of this acreage is unimproved land along the major drainageways. The major commercial use of timber is for structural lumber and firewood.

The two major mineral resources in Shelby County are coal and oil. Coal was mined in the county from 1890 to 1932. The Trowbridge and Shelbyville Coal Members contain an estimated 27 million tons of strippable coal reserves *(10)*. In 1976, Shelby County produced 46,271 barrels of crude oil from 49 wells in 6 oil fields *(7)*. Most of the producing wells are in the southern part of the county.

Sand and gravel are excavated mainly from alluvial deposits along the Kaskaskia and Little Wabash Rivers. Smaller amounts are taken from the outwash deposits in front of the Shelbyville Moraine.

Shelby County has an abundant supply of surface and subsurface water resources *(6)*. The largest body of water is Lake Shelbyville, a reservoir project of the U.S. Army Corps of Engineers. The lake has a normal pool area of about 11,100 acres, of which 5,500 acres is in Shelby County. The reservoir, which was completed in 1970, was created primarily to control flooding on the lower Kaskaskia and Mississippi Rivers. The reservoir also provides many recreational opportunities and excellent habitat for fish and wildlife.

The county has an abundant supply of ground water in the sand and gravel deposits in the preglacial valleys and in areas where glacial drift is thick. The water supply for Shelbyville is obtained from three wells in the sand and gravel deposits in the buried Kaskaskia River valley south of town *(4)*.

Agriculture

Agriculture is the main economic enterprise in Shelby County. In 1980, the value of farm products sold was more than $100 million. In 1982, farms made up about 85 percent of the county, or about 420,000 acres *(14)*. Most of the acreage is used for grain crops. In 1982, corn was grown on about 45 percent of the cropland, soybeans on 44 percent, and wheat on 9 percent. The rest of the farmland is used for other grain crops and for hay and pasture.

Beef cattle and hogs are the major livestock enterprises in the county. Dairy cattle, sheep, and horses are also raised. The value of livestock and livestock products sold in the county is less than one-fourth of the value of the total agricultural products sold.

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

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

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 soil survey of Shelby County joins the published soil surveys of Christian, Coles, Effingham, and Macon Counties. In some places the soil names on the general soil maps do not agree across county lines. The differences are mainly the result of differences in the extent of the soils in the survey areas.

Soil Descriptions

1. Drummer-Flanagan Association

Nearly level, poorly drained and somewhat poorly drained soils that formed in loess and in the underlying glacial outwash or glacial till; on the Wisconsinan glacial till plain

This association is characterized by broad, relatively flat areas of low relief. Slopes are long and gradual.

This association makes up about 17 percent of the county. It is about 51 percent Drummer soils, 44 percent Flanagan and similar soils, and 5 percent minor soils (fig. 2).

The poorly drained Drummer soils are on broad flats below the Flanagan soils. Typically, the surface layer is black, firm silty clay loam about 14 inches thick. It is mottled in the lower part. The subsoil is about 32 inches thick. It is mottled. The upper part is dark grayish brown and grayish brown, firm silty clay loam. The lower part is grayish brown silt loam. The underlying material to a depth of 60 inches or more is grayish brown, mottled, friable loam.

The somewhat poorly drained Flanagan soils are on low ridges and knolls above the Drummer soils. Typically, the surface layer is friable silt loam about 18 inches thick. The upper part is black, and the lower part is very dark gray. The subsoil is firm silty clay loam about 33 inches thick. It is mottled. The upper part is dark grayish brown, and the lower part is brown. The underlying material to a depth of 60 inches or more is brown, mottled, firm, calcareous loam.

Of minor extent in this association are Catlin, Dana, Parr, and Peotone soils. The moderately well drained Catlin and Dana soils and the well drained Parr soils are on side slopes and ridges above the major soils. The very poorly drained Peotone soils are in depressions surrounded by areas of the Drummer soils.

Most areas of this association are drained by subsurface tile and are used for cultivated crops. The soils are well suited to the cultivated crops commonly grown in the county. Corn and soybeans are the principal crops. Organic matter content is high in the major soils. The main management needs are measures that maintain the drainage system and maintain soil tilth and fertility. If these soils are used as sites for dwellings or for septic tank absorption fields, the seasonal high water table and the shrink-swell potential are limitations.

2. Drummer-Millbrook-Elburn Association

Nearly level, poorly drained and somewhat poorly drained soils that formed in loess and glacial outwash; on the Wisconsinan glacial outwash plain

This association is characterized by broad, relatively flat areas with numerous swales and ridges. Prominent drainageways and side slopes are in some areas.

This association makes up about 6 percent of the county. It is about 30 percent Drummer soils, 24 percent Millbrook and similar soils, 23 percent Elburn soils, and 23 percent minor soils (fig. 3).

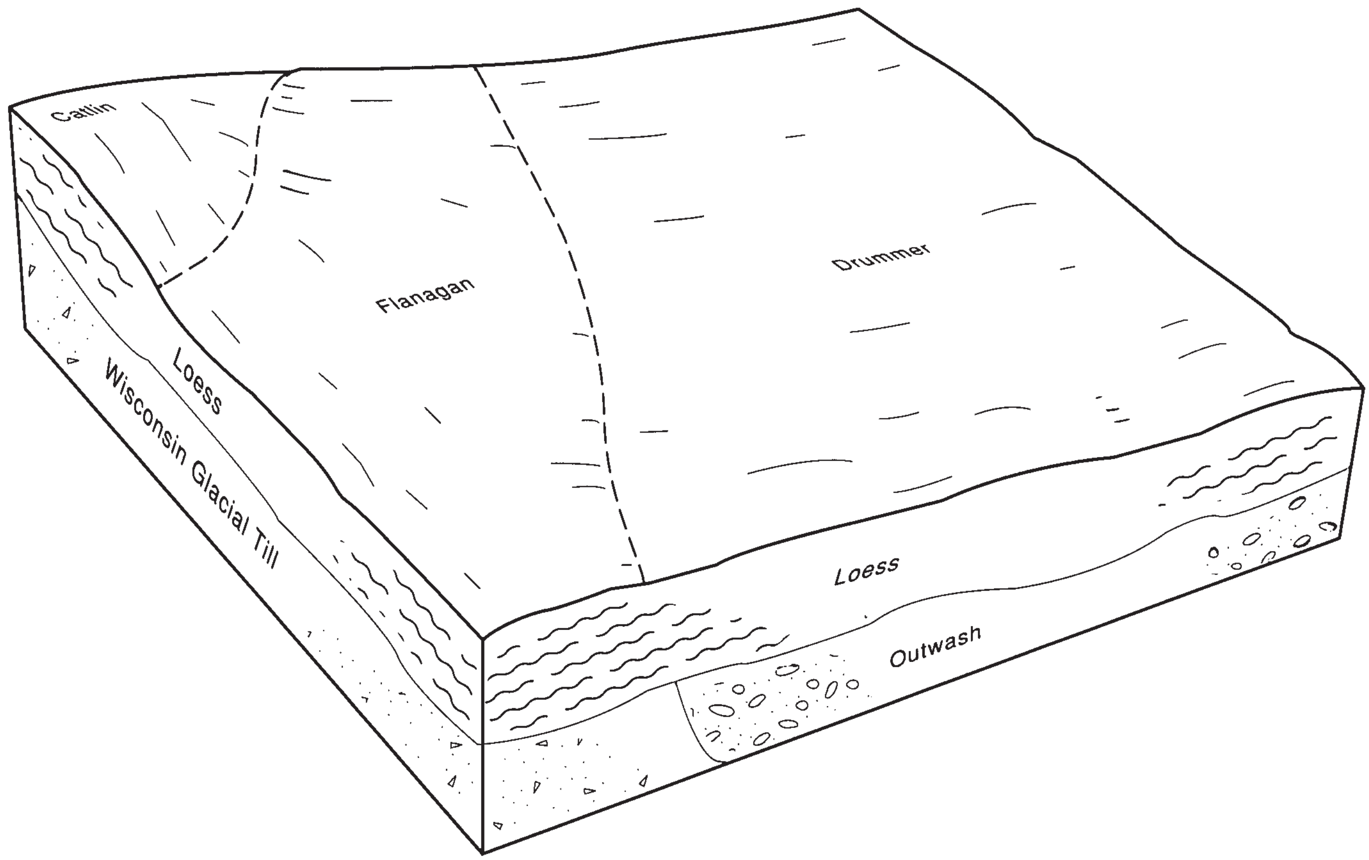

Figure 2.—Typical pattern of soils and parent material in the Drummer-Flanagan association.

The poorly drained Drummer soils are on broad flats below the Elburn soils. Typically, the surface layer is black, firm silty clay loam about 14 inches thick. It is mottled in the lower part. The subsoil is about 32 inches thick. It is mottled. The upper part is dark grayish brown and grayish brown, firm silty clay loam. The lower part is grayish brown, friable silt loam. The underlying material to a depth of 60 inches or more is grayish brown, mottled, friable loam.

The somewhat poorly drained Millbrook soils are on low ridges above the Drummer soils. Typically, the surface layer is dark brown, friable silt loam about 9 inches thick. The subsurface layer is dark grayish brown and grayish brown, mottled, friable silt loam about 7 inches thick. The subsoil is about 30 inches thick. It is mottled. The upper part is yellowish brown and brown, firm silty clay loam. The lower part is grayish brown, firm silty clay loam and clay loam. The underlying material to a depth of 60 inches or more is pale brown, mottled, stratified, friable loam, silt loam, and sandy loam.

The somewhat poorly drained Elburn soils are on low ridges above the Drummer soils. Typically, the surface soil is very dark grayish brown, friable silt loam about 13 inches thick. The subsoil is about 43 inches thick. The upper part is brown, friable silt loam; the next part is brown, mottled, firm silty clay loam; and the lower part is brown, mottled, friable sandy loam. The underlying material to a depth of 60 inches or more is light brownish gray, mottled, stratified, friable silt loam and fine sandy loam.

Of minor extent in this association are Camden, Proctor, and Starks soils. The well drained Camden soils are on side slopes and ridges above the major soils. The well drained Proctor soils generally are on knolls and ridges above the major soils. The somewhat poorly drained Starks soils are in landscape positions similar to those of the Millbrook soils.

Most areas of this association are drained by subsurface tile and are used for cultivated crops. The soils are well suited to the cultivated crops commonly grown in the county. Corn and soybeans are the principal crops. Organic matter content is high in the major soils. The main management needs are measures that maintain the drainage system and soil tilth. If these soils are used as sites for dwellings or for septic tank absorption fields, the seasonal high water table and the shrink-swell potential are limitations.

3. Oconee-Virden-Herrick Association

Nearly level, somewhat poorly drained and poorly drained soils that formed in loess; on the Illinoian glacial till plain

This association is characterized by broad, slightly undulating flats and ridges. Relief is generally gentle between the flats and the ridges or knolls. Slopes are long and gradual.

This association makes up about 15 percent of the county. It is about 36 percent Oconee soils, 26 percent Virden soils, 12 percent Herrick soils, and 26 percent minor soils (fig. 4).

The somewhat poorly drained Oconee soils are on ridges or knolls adjacent to the Herrick and Virden soils. 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 extends to a depth of 60 inches or more. It is mottled, firm silty clay loam. The upper part is brown, the next part is dark grayish brown, and the lower part is light brownish gray.

The poorly drained Virden soils are on broad flats below the Herrick and Oconee soils. Typically, the surface layer is black, firm silty clay loam about 7 inches thick. The subsurface layer is very dark gray, firm silty clay loam about 5 inches thick. The subsoil is about 32 inches thick. It is mottled, firm silty clay loam. The upper part is very dark grayish brown, the next part is dark grayish brown, and the lower part is gray. The underlying material to a depth of 60 inches or more is light gray, mottled, friable silt loam.

The somewhat poorly drained Herrick soils are on ridges or knolls above the Virden soils. Typically, the surface layer is very dark gray and very dark grayish brown, friable silt loam about 11 inches thick. The subsurface layer is very dark grayish brown, friable silt loam about 2 inches thick. The subsoil is firm silty clay loam about 42 inches thick. It is mottled. The upper part is dark grayish brown, the next part is brown, and the lower part is grayish brown. The underlying material to

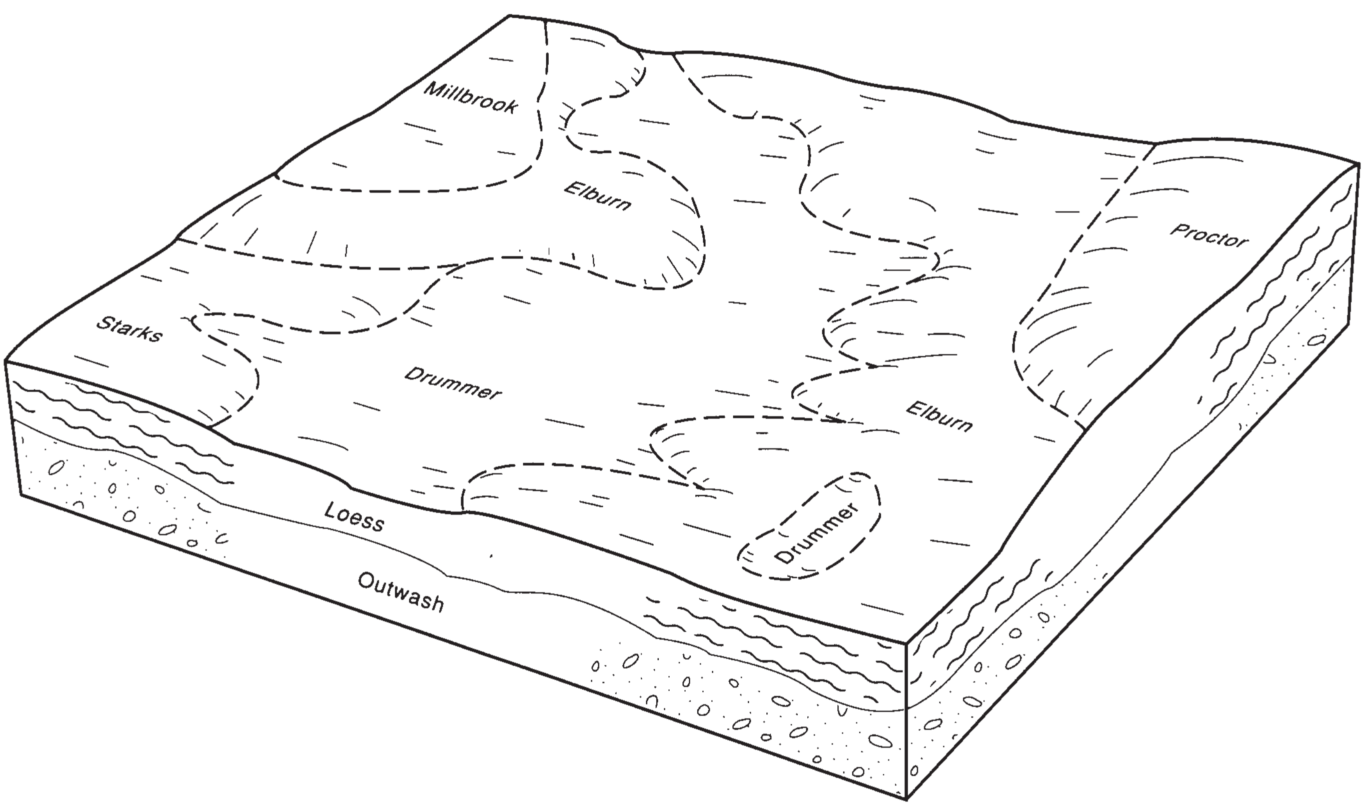

Figure 3.—Typical pattern of soils and parent material in the Drummer-Millbrook-Elburn association.

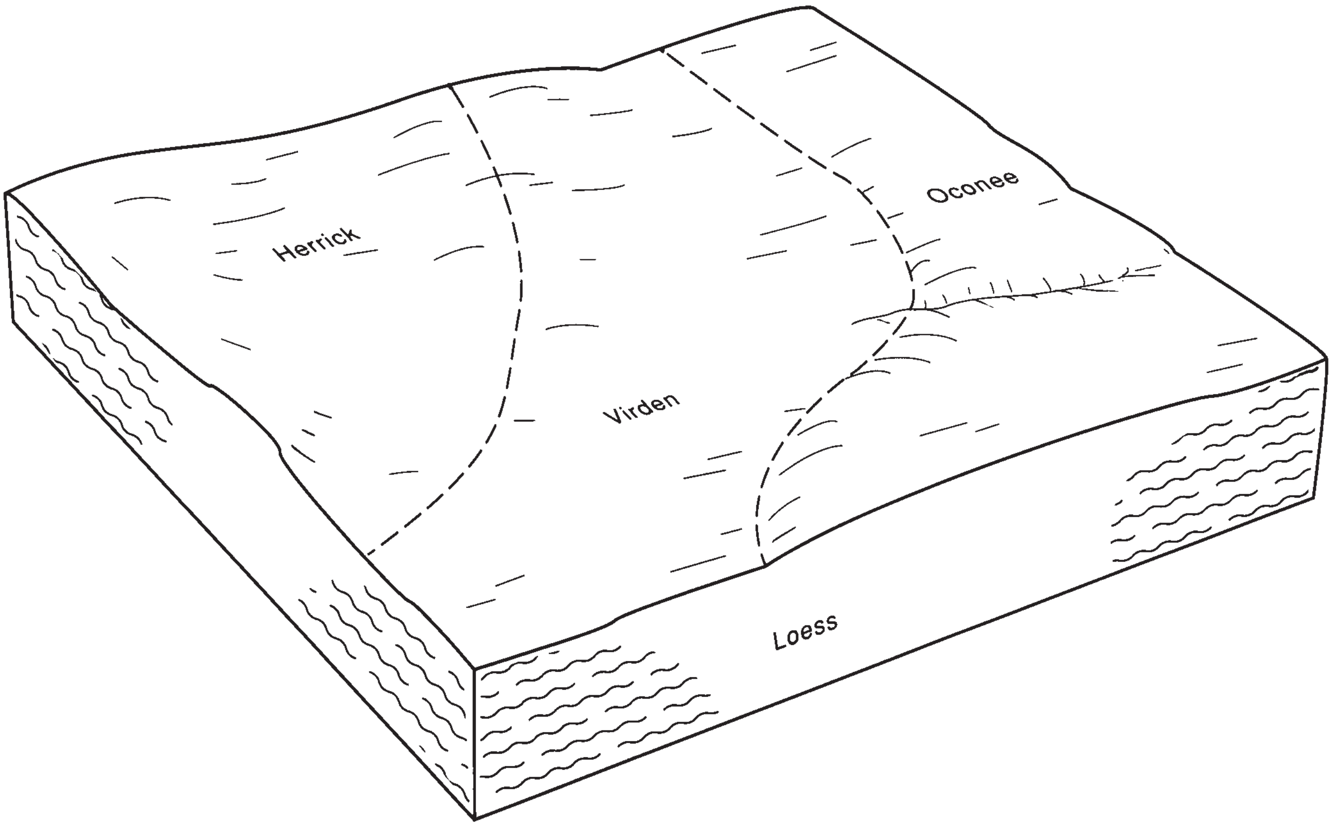

Figure 4.—Typical pattern of soils and parent material in the Oconee-Virden-Herrick association.

a depth of 60 inches or more is light brownish gray, mottled, friable silt loam.

Of minor extent in this association are Cowden, Darmstadt, Douglas, and Harrison soils. The poorly drained Cowden soils are in landscape positions similar to those of the Virden soils. The somewhat poorly drained Darmstadt soils are in areas closely intermingled with the Oconee soils. They have a high content of sodium in the subsoil. The well drained Douglas and moderately well drained Harrison soils are on prominent hills above the major soils.

Most areas of this association are used for cultivated crops. The soils are well suited to the cultivated crops commonly grown in the county. Corn and soybeans are the principal crops. Organic matter content is high in the Herrick and Virden soils and moderate in the Oconee soils. The main management needs are measures that maintain the drainage system and soil tilth. If these soils are used as sites for dwellings or for septic tank absorption fields, the seasonal high water table, the shrink-swell potential, and restricted permeability are limitations.

4. Bluford-Cisne-Hoyleton Association

Nearly level, somewhat poorly drained and poorly drained soils that formed in loess and loamy sediments; on the Illinoian glacial till plain

This association is characterized by broad flats and low, convex ridges on interstream divides.

This association makes up about 18 percent of the county. It is about 37 percent Bluford soils, 22 percent Cisne and similar soils, 14 percent Hoyleton soils, and 27 percent minor soils.

The somewhat poorly drained Bluford soils are on the slightly higher rises above the Cisne soils. Typically, the surface layer is brown, friable silt loam about 8 inches thick. The subsurface layer is pale brown, mottled, friable silt loam about 6 inches thick. The subsoil extends to a depth of 60 inches or more. It is mottled. The upper part is brown, friable silt loam, and the lower part is brown, firm, very slightly brittle silty clay loam.

The poorly drained Cisne soils are below the Bluford soils. Typically, the surface layer is dark brown, mottled, friable silt loam about 9 inches thick. The subsurface layer is grayish brown and light brownish gray, mottled, friable silt loam about 9 inches thick. The subsoil is firm silty clay loam about 37 inches thick. It is mottled. 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.

The somewhat poorly drained Hoyleton soils are in landscape positions similar to those of the Bluford soils. Typically, the surface layer is dark brown and very dark grayish brown, friable silt loam about 8 inches thick. The subsurface layer is brown, friable silt loam about 3 inches thick. The subsoil is about 28 inches thick. It is mottled. The upper part is brown, firm silty clay loam and silty clay. The lower part is pale brown, firm silty clay loam. The underlying material to a depth of 60 inches or more is mottled silt loam. The upper part is pale brown, and the lower part is brown.

Of minor extent in this association are Ava, Darmstadt, and Virden soils. The moderately well drained Ava soils are above the Bluford soils on ridges. The somewhat poorly drained Darmstadt soils are in landscape positions similar to those of the Bluford soils. They have a high content of sodium in the subsoil. The poorly drained Virden soils are in landscape positions similar to those of the Cisne soils. They have a darker surface layer than the Cisne soils.

Most areas of this association are used for cultivated crops. Some areas are used for pasture and hay. The soils are well suited or moderately suited to the crops commonly grown in the county. Corn, soybeans, small grain, and hay grow well. Organic matter content is moderately low in the major soils, and the available water capacity is high. The main management needs are measures that maintain the drainage system, tilth, and fertility. In the more sloping areas, measures that control erosion are needed. If these soils are used as sites for dwellings or for septic tank absorption fields, the seasonal high water table and the shrink-swell potential are limitations.

5. Dana-Raub-Parr Association

Nearly level to moderately sloping, well drained to somewhat poorly drained soils that formed in loess and glacial till or in glacial till; on Wisconsinan glacial moraines

This association is dominantly in areas of the Shelbyville Moraine. It is characterized by ridgetops and long, uneven side slopes.

This association makes up about 10 percent of the county. It is about 34 percent Dana soils, 19 percent Raub soils, 16 percent Parr and similar soils, and 31 percent minor soils (fig. 5).

The moderately well drained Dana soils formed in loess and glacial till. They are on ridgetops above the Parr soils and in positions on side slopes similar to those of the Parr soils. Typically, the surface layer is very dark gray and very dark grayish brown, friable silt loam about 11 inches thick. The subsoil is about 29 inches thick. The upper part is dark yellowish brown, firm silty clay loam. The lower part is yellowish brown, mottled, firm silt loam. The underlying material to a depth of 60 inches or more is yellowish brown and brown, mottled, very firm, calcareous loam.

The somewhat poorly drained Raub soils formed in loess and in the underlying loamy glacial till. They are on broad ridges on the till plain and moraines. Typically, the surface soil is very dark gray and very dark grayish brown, friable silt loam about 14 inches thick. The subsoil is about 42 inches thick. It is mottled. The upper part is brown, firm silty clay loam. The lower part is yellowish brown, firm silty clay loam and loam. The underlying material to a depth of 60 inches or more is brown, mottled, calcareous loam.

The well drained Parr soils formed in glacial till. They are on ridgetops and side slopes. Typically, the surface layer is very dark grayish brown, friable silt loam about 8 inches thick. It has been thinned by erosion. The subsoil is firm clay loam about 32 inches thick. The upper part is dark yellowish brown, and the lower part is brown. The underlying material to a depth of 60 inches or more is brown, firm, calcareous loam.

Of minor extent in this association are Catlin, Drummer, Radford, and Sawmill soils. The moderately well drained Catlin soils are in landscape positions similar to those of the Dana and Parr soils. Catlin soils have more than 40 inches of loess overlying the glacial till. The poorly drained Drummer soils are in nearly level areas below the major soils. Radford and Sawmill soils are in drainageways below the Parr soils.

Most areas of this association are used for cultivated crops. The soils are well suited or moderately suited to the cultivated crops commonly grown in the county. Corn and soybeans are the principal crops. Organic matter content is moderate in the major soils. The main management needs are measures that control erosion and that maintain tilth and fertility. If these soils are used as sites for dwellings or for septic tank absorption fields, the slope and restricted permeability are the main limitations.

6. Parke-Douglas-Oconee Association

Nearly level to strongly sloping, well drained and somewhat poorly drained soils that formed in loess or in loess and glacial drift; on the Illinoian glacial till plain

This association is characterized by prominent, oblong or oval hills and knolls ascending from the nearly level till plain.

This association makes up about 4 percent of the county. It is about 31 percent Parke and similar soils, 22 percent Douglas and similar soils, 21 percent Oconee soils, and 26 percent minor soils.

The well drained Parke soils are in positions on side slopes and hills similar to those of the Douglas soils. Typically, the surface layer is dark brown, friable silt loam about 7 inches thick. It has been thinned by erosion. The subsoil extends to a depth of more than 60 inches. The upper part is dark yellowish brown, firm silty clay loam. The next part is strong brown, firm silty clay loam and clay loam. The lower part is strong brown, friable sandy clay loam.

The well drained Douglas soils formed in loess and glacial drift. They are generally on the highest and most prominent ridges. Typically, the surface layer is very dark grayish brown, friable silt loam about 10 inches thick. The subsoil extends to a depth of more than 60 inches. The upper part is dark yellowish brown, friable silt loam and silty clay loam. The next part is yellowish brown, friable silty clay loam. The lower part is dark brown and strong brown, friable silt loam and loam.

The somewhat poorly drained Oconee soils are at the base of ridges below the Douglas and Parke soils. Typically, the surface layer is very dark grayish brown, friable silt loam about 9 inches thick. The subsurface layer is grayish brown, friable silt loam about 2 inches thick. The subsoil extends to a depth of more than 60 inches. It is mottled, firm silty clay loam. The upper part is brown, and the lower part is grayish brown.

Of minor extent in this association are Cowden, Harrison, Herrick, Pike, and Virden soils. The somewhat poorly drained Herrick soils and the poorly drained Cowden and Virden soils are in low areas below the major soils. The moderately well drained Harrison soils are in landscape positions slightly lower than those of the Douglas soils. The well drained Pike soils are on ridges and side slopes above the Parke soils.

Most areas of this association are used for cultivated crops. A few areas are used for pasture and hay. The soils are moderately suited to the cultivated crops commonly grown in the county. Corn, soybeans, small grain, and hay are the principal crops. The main management needs are measures that control erosion and that maintain soil tilth and fertility. If these soils are used as sites for dwellings or for septic tank absorption fields, the slope is the main limitation.

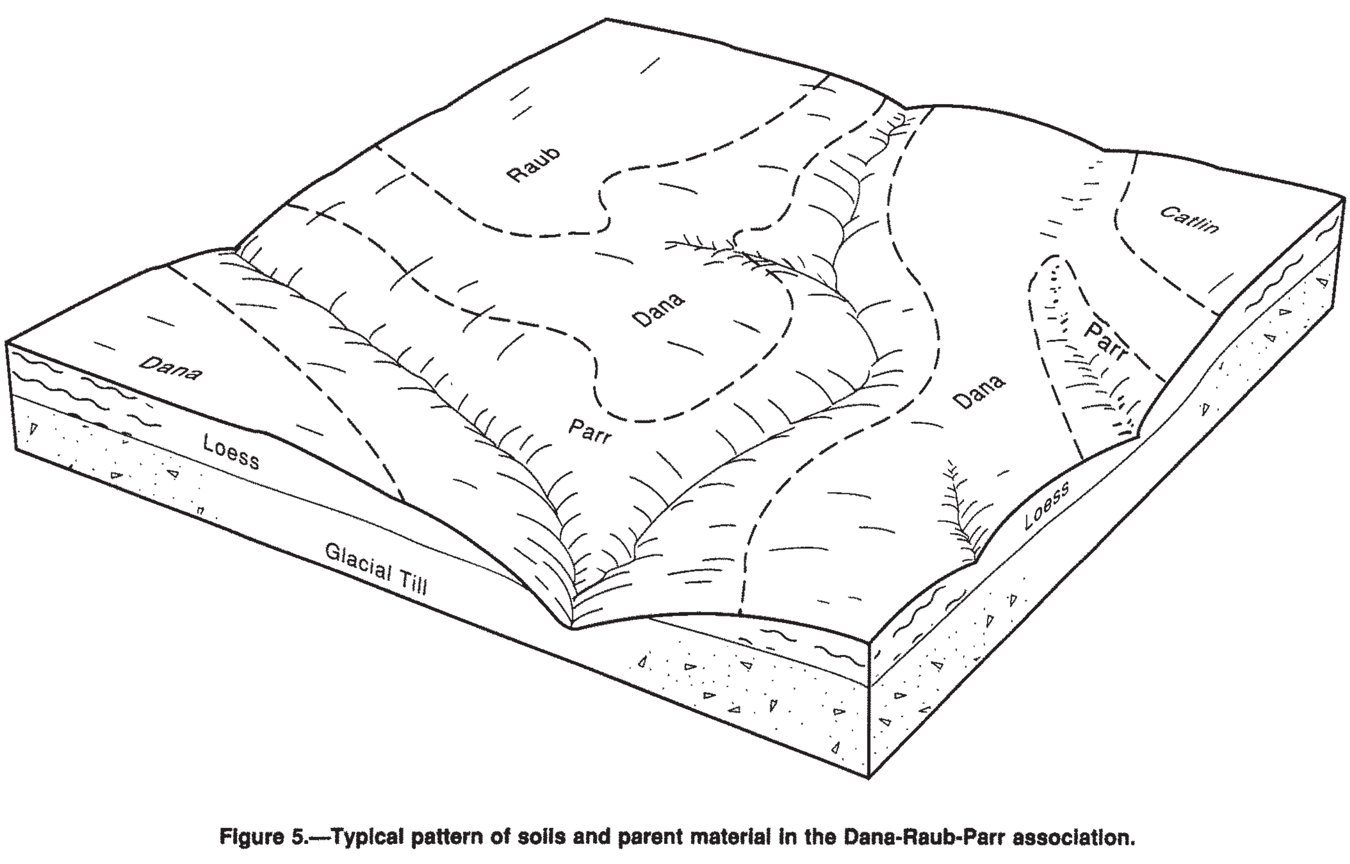

Figure 5.—Typical pattern of soils and parent material in the Dana-Raub-Parr association.

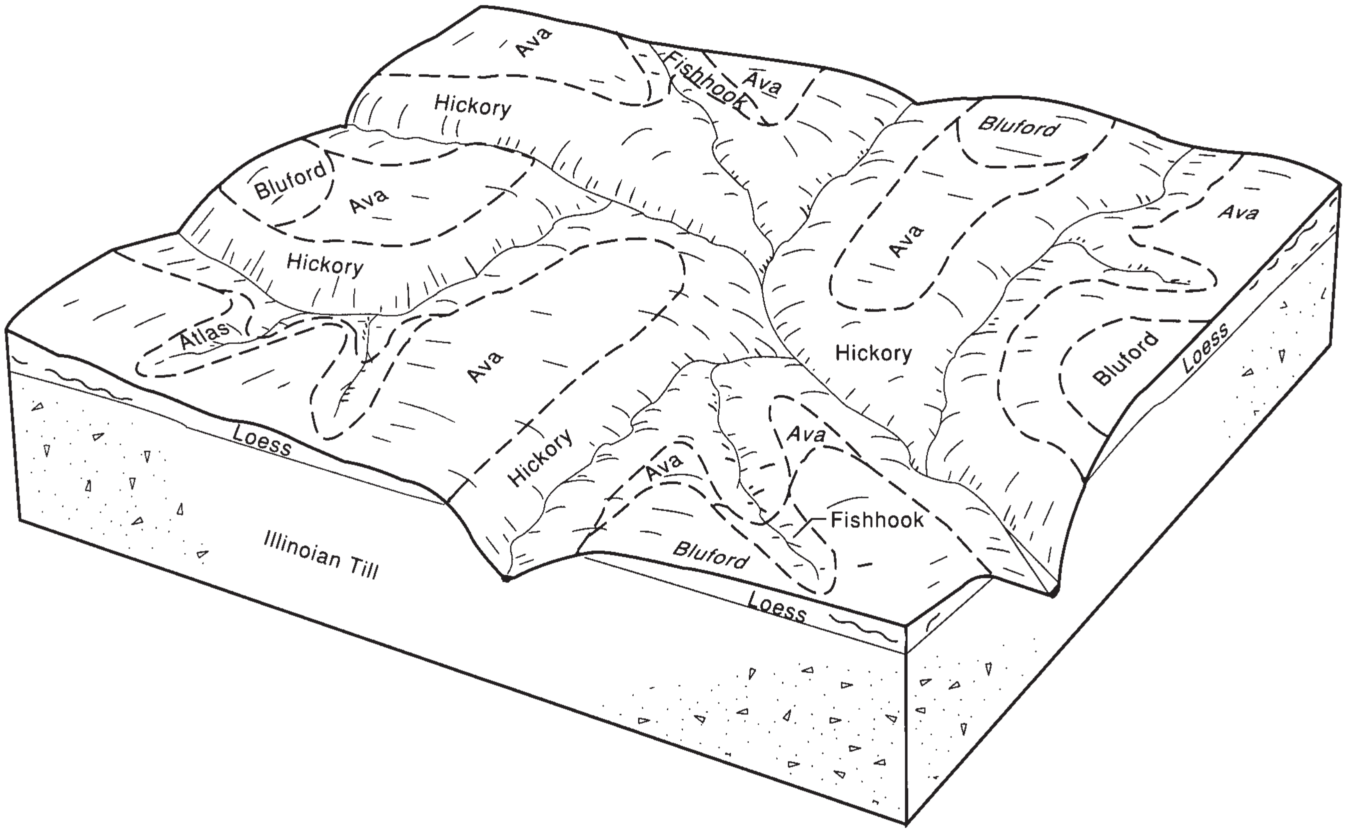

Figure 6.—Typical pattern of soils and parent material in the Hickory-Ava-Atlas association.

7. Hickory-Ava-Atlas Association

Gently sloping to very steep, well drained to somewhat poorly drained soils that formed in glacial till, in loess and glacial till, or in loess and loamy sediments; on the Illinoian glacial till plain

This association is characterized by sloping, convex ridgetops and the adjacent side slopes along deeply dissected drainageways.

This association makes up about 19 percent of the county. It is about 37 percent Hickory soils, 34 percent Ava and similar soils, 21 percent Atlas and similar soils, and 8 percent minor soils (fig. 6).

Hickory soils formed in glacial till. They are on steep slopes below the Ava soils. 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 firm clay loam about 44 inches thick. The upper part is dark yellowish brown. The lower part is yellowish brown and is mottled. The underlying material to a depth of 60 inches or more is yellowish brown, mottled, firm loam.

The moderately well drained Ava soils formed in loess and loamy sediments. They are on ridgetops and side slopes above the Hickory soils. Typically, the surface layer is dark grayish brown, friable silt loam about 7 inches thick. It has been thinned by erosion. The subsoil is yellowish brown silty clay loam about 43 inches thick. The upper part is friable, the next part is firm, and the lower part is very firm and slightly brittle. The underlying material to a depth of 60 inches or more is yellowish brown, firm silty clay loam.

The somewhat poorly drained Atlas soils are on side slopes above the Hickory soils. Typically, the surface layer is dark grayish 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. In sequence downward, it is brown, friable silt loam; grayish brown, firm silty clay loam; grayish brown, firm clay loam; and light brownish gray, firm clay loam.

Of minor extent in this association are Bluford, Fishhook, Wynoose, and Holton soils. The somewhat poorly drained Bluford and poorly drained Wynoose soils are on flats adjacent to the head of drainageways and at the upper ends of the drainageways. They are above the major soils. The somewhat poorly drained

Fishhook soils are on side slopes. The somewhat poorly drained Holton soils are on flood plains below the Hickory soils.

Most areas of this association are used for pasture, woodland, or wildlife habitat. Some areas are used for cultivated crops. The soils in the less sloping areas are generally moderately suited to cultivated crops. The soils in the steeper areas generally are unsuited to cultivated crops because of the slope and the hazard of erosion. The soils in the steeper areas are well suited to woodland and to habitat for openland and woodland wildlife. The hazard of erosion is the main management concern in cultivated areas. The slope and the hazard of erosion are management concerns in the wooded areas. If these soils are used as sites for dwellings or for septic tank absorption fields, the slope and restricted permeability are the main limitations.

8. Miami-Xenia Association

Gently sloping to very steep, well drained and moderately well drained soils that formed in glacial till or in loess and glacial till; on the Wisconsinan glacial till plain

This association is characterized by sloping, convex ridgetops and the adjacent side slopes along deeply dissected drainageways.

This association makes up about 7 percent of the county. It is about 51 percent Miami soils, 19 percent Xenia soils, and 30 percent minor soils.

The well drained Miami soils formed in glacial till. They are on side slopes below the Xenia soils. Typically, the surface layer is dark grayish brown, friable loam about 3 inches thick. The subsurface layer is brown, friable loam about 4 inches thick. The subsoil is dark yellowish brown, firm clay loam about 29 inches thick. The underlying material to a depth of 60 inches or more is brown, mottled, firm, calcareous loam.

The moderately well drained Xenia soils formed in loess and glacial till. They are on ridgetops above the Miami soils. Typically, the surface layer is brown, friable silt loam about 5 inches thick. The subsurface layer also is brown, friable silt loam. It is about 3 inches thick. The subsoil is about 49 inches thick. The upper part is yellowish brown, friable silt loam. The next part is yellowish brown, mottled, firm silty clay loam. The lower part is yellowish brown and dark yellowish brown, firm clay loam. The underlying material to a depth of 60 inches or more is yellowish brown, firm, calcareous loam.

Of minor extent in this association are Drummer, Flanagan, Sabina, and Sunbury soils. The somewhat poorly drained Flanagan, Sabina, and Sunbury soils are on low ridges and flats adjacent to the Xenia soils. The poorly drained Drummer soils are in low areas near the head of drainageways.

Most areas of this association are used as woodland or for wildlife habitat. Some areas are used for cultivated crops. The soils in the less sloping areas are well suited to cultivated crops. The soils in the steeper areas are generally unsuited to cultivated crops because of the slope and the hazard of erosion. The soils in the steeper areas are well suited to woodland and to habitat for openland and woodland wildlife. The hazard of erosion is the main management concern in cultivated areas. The slope and the hazard of erosion are management concerns in wooded areas. If these soils are used as sites for dwellings or for septic tank absorption fields, the slope and restricted permeability are the main limitations.

9. Holton-Huntsville-Wirt Association

Nearly level, somewhat poorly drained and well drained soils that formed in loamy or silty alluvium; on flood plains

This association is characterized by relatively flat or slightly undulating areas on flood plains. The flood plains range from ¼ mile to 1¾ miles in width. Terraces, old stream meanders, oxbows, and numerous sloughs are in some areas.

This association makes up about 4 percent of the county. It is about 35 percent Holton soils, 21 percent Huntsville soils, 16 percent Wirt soils, and 28 percent minor soils.

The somewhat poorly drained Holton soils are in nearly level areas below the Huntsville soils. Typically, the surface layer is brown silt loam about 11 inches thick. The subsoil is about 28 inches thick. It is mottled. The upper part is dark grayish brown, friable silt loam. The lower part is grayish brown, friable loam. The underlying material to a depth of 60 inches or more is grayish brown and brown, mottled, friable loam.

The well drained Huntsville soils are in areas above the Holton soils. Typically, the surface layer is very dark grayish brown, friable silt loam about 7 inches thick. The subsurface layer is friable silt loam about 48 inches thick. The upper part is very dark gray, and the lower part is dark brown. The underlying material to a depth of 60 inches or more is dark brown, friable silt loam.

The well drained Wirt soils are in areas above the Holton soils. Typically, the surface layer is dark brown, friable silt loam about 7 inches thick. The subsoil is friable loam about 33 inches thick. The upper part is dark brown, and the lower part is dark yellowish brown. The underlying material to a depth of 60 inches or more is dark brown and dark yellowish brown, friable loam.

Of minor extent in this association are Birds, Camden, and Sawmill soils. The well drained Camden soils are in areas adjacent to the upland slopes and are above the Huntsville soils. The poorly drained Birds and Sawmill soils are in low areas and sloughs below the major soils.

Most areas of this association are used for cultivated crops. A few areas are used for pasture or woodland. The major soils are well suited to cultivated crops, but flooding is a hazard. The soils are moderately suited to woodland. The seasonal high water table and the flooding are management concerns. The major soils generally are unsuited to use as sites for dwellings or for septic tank absorption fields because of the flooding.

Broad Land Use Considerations

The soils in Shelby County vary widely in their suitability for major land uses. About 71 percent of the land in the county is used for cultivated crops, mainly corn and soybeans. The cropland is largely concentrated in associations 1 through 6 and in association 9. The soils in associations 1, 2, 3, 4, and 9 generally are well suited to cultivated crops. Bluford, Drummer, Flanagan, Holton, and Oconee soils are the major soils in these associations. Wetness is the main limitation. The soils in association 9 are subject to flooding for brief periods in winter and early spring. The soils in associations 5 and 6 are moderately suited to cultivated crops. Erosion is the main hazard. Dana, Parr, and Parke soils are the major soils in these associations.

Areas used for pasture are common in associations 6, 7, and 8. The major soils in these associations are suitable for grasses and legumes. The main soils are Ava, Bluford, Hickory, Parke, and Miami soils.

Woodland makes up about 9 percent of the county. Most areas of woodland are in associations 7 and 8. The major soils in these associations generally are well suited to woodland. The slope is the main limitation.

The suitability of the soils for recreational uses ranges from good to poor, depending upon the intensity of the expected use. The soils in association 9 are poorly suited to many recreational uses because of flooding. The soils in all of the associations are suitable for some recreational uses, such as paths and trails for hiking or horseback riding.

The suitability for wildlife habitat generally is good throughout the county. The soils in associations 1 through 8 generally are well suited to habitat for openland and woodland wildlife. In associations 1, 2, 3, 4, and 9, scattered areas are suitable for use as habitat for wetland wildlife or for the development of this habitat.

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. More information on each map unit, or soil, is given under the heading "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, Miami loam, 5 to 10 percent slopes, eroded, is a phase of the Miami series.

Some map units are made up of two or more major soils. These map units are called soil complexes. A *soil complex* consists of two or more soils, or one or more soils 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. The map unit Oconee-Darmstadt silt loams 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, gravel, 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 the soil maps.

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

2—Cisne silt loam. This nearly level, poorly drained soil is on broad, loess-covered Illinoian glacial till plains. Individual areas are irregularly shaped or oval and range from 5 to 200 acres in size.

Typically, the surface layer is dark brown, mottled, friable silt loam about 9 inches thick. The subsurface layer is grayish brown and light brownish gray, mottled, friable silt loam about 9 inches thick. The subsoil is about 37 inches thick. It is mottled. The upper part is grayish brown, friable silt loam. The next part is grayish brown, firm silty clay loam. The lower part is light brownish gray, firm 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 soil is thicker. In other areas the surface layer is lighter in color. In places the subsoil contains less clay.

Included with this soil in mapping are small areas of the somewhat poorly drained Darmstadt and Hoyleton soils. These soils are on ridges above the Cisne soil. Darmstadt soils have a high content of sodium in the subsoil. Hoyleton soils are better drained than the Cisne soil. Included soils make up 5 to 15 percent of the unit.

Water and air move through the Cisne soil at a very slow rate. Surface runoff is slow. The seasonal high water table is within a depth of 2 feet during spring. Available water capacity is high. Organic matter content is moderately low. The surface layer is friable and can be easily tilled when moist. The shrink-swell potential and the potential for frost action are high.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops. It is poorly suited to use as a site for dwellings or for septic tank absorption fields.

This soil is sufficiently drained for corn, soybeans, or small grain. Measures that maintain the drainage system are needed. Additional drainage may be needed in some areas. A combination of surface ditches and land leveling reduces the wetness. Tilling when the soil is wet causes surface compaction and reduces the rate of water infiltration. Returning crop residue to the soil, adding other organic material, and minimizing tillage increase the rate of water infiltration and help to maintain soil tilth.

The seasonal high water table and the shrink-swell potential are limitations if this soil is used as a site for dwellings. Reinforcing 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. A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank are installed. Sewage lagoons or mounds are alternative methods of waste disposal.

The land capability classification is IIIw.

3A—Hoyleton silt loam, 0 to 2 percent slopes. This nearly level, somewhat poorly drained soil is on loess-covered Illinoian glacial till plains. Individual areas are irregularly shaped and range from 3 to 75 acres in size.

Typically, the surface layer is dark brown and very dark grayish brown, friable silt loam about 8 inches thick. The subsurface layer is brown, friable silt loam about 3 inches thick. The subsoil is about 28 inches thick. It is mottled. The upper part is brown, friable and firm silty clay loam and firm silty clay. The lower part is pale brown, firm silty clay loam. The underlying material to a depth of 60 inches or more is friable silt loam. The upper part is pale brown, and the lower part is brown. In some areas the surface layer is lighter in color. In other areas the surface layer is thicker. In places the subsurface layer and the subsoil are grayer.

Included with this soil in mapping are small, closely intermingled areas of Darmstadt soils that have a high content of sodium in the subsoil. Also included are areas of the poorly drained Cisne soils on the lower flats below the Hoyleton soil. Included soils make up 10 to 15 percent of the unit.

Water and air move through the Hoyleton soil at a slow rate. Surface runoff is slow. The seasonal high water table is at a depth of 1 to 3 feet during spring. Available water capacity is high. Organic matter content is moderately low. The surface layer is friable and can be easily tilled when moist. The shrink-swell potential and the potential for frost action are high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops. It is poorly suited to use as a site for dwellings or for septic tank absorption fields.

In areas used for corn, soybeans, or small grain, the wetness delays planting in most years. It can be reduced by surface ditches or subsurface drains. Erosion is a hazard in areas where slopes are very long. It can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting. Tilling when the soil is wet causes surface compaction, reduces the rate of water infiltration, and causes excessive runoff. Returning crop residue to the soil and regularly adding other organic material increase the infiltration rate and improve tilth.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Reinforcing 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 permeability are limitations if this soil is used as a site for septic tank absorption fields. A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank are installed.

The land capability classification is IIw.

3B—Hoyleton silt loam, 2 to 5 percent slopes. This gently sloping, somewhat poorly drained soil is along drainageways and ridges on loess-covered Illinoian glacial till plains. Individual areas are irregularly shaped and range from 5 to 30 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 8 inches thick. The subsurface layer is yellowish brown, friable silt loam about 4 inches thick. The subsoil is about 29 inches thick. It is mottled. In sequence downward, it is yellowish brown, friable silty clay loam; grayish brown, firm silty clay loam; brown and pale brown, firm silty clay loam; and grayish brown, friable silt loam. The underlying material to a depth of 60 inches or more is brown, friable loam. In some areas the surface layer is lighter in color. In other areas the surface layer has been thinned by erosion and is silty clay loam.

Included with this soil in mapping are the somewhat poorly drained Darmstadt soils that have a high content of sodium in the subsoil. Also included are areas of the poorly drained Cisne soils on broad flats. Included soils make up 10 to 15 percent of the unit.

Water and air move through the Hoyleton soil at a slow rate. Surface runoff is medium. The seasonal high water table is at a depth of 1 to 3 feet during spring. Available water capacity is high. Organic matter content is moderately low. The surface layer is friable and can be easily tilled when moist. The shrink-swell potential and the potential for frost action are high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops. It is poorly suited to use as a site for dwellings or for septic tank absorption fields.

In areas used for corn, soybeans, or small grain, erosion is a hazard. Also, the wetness delays planting in some years. Erosion can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting or by contour farming. The wetness can be reduced by surface ditches or subsurface drains. Tilling when the soil is wet causes surface compaction, reduces the rate of water infiltration, and causes excessive runoff. Returning crop residue to the soil and regularly adding other organic material increase the infiltration rate and improve tilth.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Reinforcing 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 permeability are limitations if this soil is used as a site for septic tank absorption fields. A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank are installed.

The land capability classification is IIe.

6B2—Fishhook silt loam, 2 to 5 percent slopes, eroded. This gently sloping, somewhat poorly drained soil is on side slopes along drainageways and ridges on the Illinoian glacial till plain in the uplands. Individual areas are irregularly shaped and range from 5 to 40 acres in size.

Typically, the surface layer is brown, friable silt loam about 8 inches thick. It has been thinned by erosion and contains fragments of subsoil material. The subsoil extends to a depth of 60 inches or more. The upper part is yellowish brown, firm silty clay loam. The next part is grayish brown, firm silty clay loam. The lower part is gray, firm clay loam. In some areas the upper part of the subsoil contains more sand. In other areas the surface layer is severely eroded and is silty clay loam. In places the slope is more than 5 percent.

Included with this soil in mapping are small areas of the somewhat poorly drained Darmstadt and poorly drained Wynoose soils. Darmstadt soils have a high content of sodium in the subsoil. They are in landscape positions similar to those of the Fishhook soil. Wynoose soils are in depressions at the head of drainageways. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Fishhook soil at a slow rate. Surface runoff is medium. The seasonal high water table is at a depth of 1 to 3 feet during spring. Available water capacity is high. Organic matter content is moderately low. The surface layer is friable and can be easily tilled when moist, but it tends to crust and puddle after hard rains, especially in cultivated areas where it contains subsoil material. The shrink-swell potential and the potential for frost action are high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops. It is poorly suited to use as a site for septic tank absorption fields or for dwellings.

This soil is sufficiently drained for corn, soybeans, and small grain, but the wetness delays planting in most years. It can be reduced by surface ditches or subsurface drains. Also, further erosion is a hazard. It can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting and by contour farming or terraces. Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. 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 slow permeability and the seasonal high water table are limitations if this soil is used as a site for septic tank absorption fields. Tile drains help to lower the water table. Enlarging the absorption area helps to overcome the slow permeability. A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank are installed.

The land capability classification is IIe.

7C2—Atlas silt loam, 5 to 10 percent slopes, eroded. This moderately sloping, somewhat poorly drained soil is on side slopes on the Illinoian glacial till plain in the uplands. Individual areas are irregularly shaped and range from 10 to 25 acres in size.

Typically, the surface layer is dark grayish 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. In sequence downward, it is brown, friable silt loam; grayish brown, firm silty clay loam; grayish brown, firm clay loam; and light brownish gray, firm clay loam. In some areas the silty loess mantle is more than 20 inches thick. In other areas the surface layer is clay loam because cultivation has mixed it with the upper part of the subsoil. In places the upper part of the subsoil is browner.

Included with this soil in mapping are small areas of the well drained Hickory and moderately well drained Ava soils. Hickory soils are on side slopes below the Atlas soil. Ava soils are on ridges above the Atlas soil. Included soils make up 5 to 10 percent of the unit.

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

Most areas are used for cultivated crops. Other areas are used for pasture and hay. This soil is moderately suited to cultivated crops. It is well suited to pasture and hay. It is poorly suited to use as a site for dwellings or for septic tank absorption fields.

Measures that control erosion are needed in the areas used for corn, soybeans, or small grain. Erosion-control measures include a system of conservation tillage that leaves crop residue on the surface after planting, terraces, contour farming, and a crop rotation that includes 1 or more years of forage crops. Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and help to maintain tilth.

Establishing pasture and hay crops helps to keep soil losses within tolerable limits. Bromegrass, tall fescue, and alfalfa are suitable species. Seedbed preparation is difficult on side slopes where the subsoil is exposed. A no-till method of seeding or pasture renovation helps in establishing forage species and in controlling erosion. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and prevent surface compaction and excessive runoff.

If this soil is used as a site for dwellings with basements, the seasonal high water table and the shrink-swell potential are limitations. The shrink-swell potential is also a limitation on sites for dwellings without basements. 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 slope is a limitation where it is more than 8 percent. Land shaping by cutting and filling helps to overcome the slope.

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. Installing subsurface interceptor tile drains higher on the side slopes than the absorption field helps to lower the water table. Specially designed systems, such as sand filters with disinfection tanks, are needed to overcome the restricted permeability.

The land capability classification is IIIe.

7D2—Atlas silt loam, 10 to 15 percent slopes, eroded. This strongly sloping, somewhat poorly drained soil is on side slopes on the Illinoian glacial till plain in the uplands. Individual areas are long and narrow and range from 3 to 60 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 4 inches thick. It has been thinned by erosion. The subsoil is mottled, firm clay loam about 51 inches thick. The upper part is brown, and the lower part is light gray. The underlying material to a depth of 60 inches or more is yellowish brown, mottled, firm loam. In some places the surface layer has more sand. In other places the upper part of the subsoil is browner.

Included with this soil in mapping are small areas of the well drained Hickory soils. These soils have less clay and more sand and gravel in the subsoil than the Atlas soil. They are on side slopes below the Atlas soil. They make up 5 to 10 percent of the unit.

Water and air move through the Atlas soil at a very slow rate. Surface runoff is rapid in cultivated areas. The seasonal high water table is perched at a depth of 1 to 2 feet during spring. Available water capacity is moderate. Organic matter content is low. This soil is seepy in many spots and dries more slowly in the spring than the adjacent soils. It tends to be droughty late in the growing season. The shrink-swell potential and the potential for frost action are high.

Most areas are used for pasture and hay. A few areas are used as cropland. This soil is moderately suited to pasture and hay. It is poorly suited to cultivated crops because of the slope and a severe hazard of erosion. It is also poorly suited to use as a site for dwellings or for septic tank absorption fields.

Establishing pasture and hay crops helps to control erosion. Seedbed preparation is difficult on side slopes where the subsoil is exposed. A no-till method of seeding or pasture renovation helps in establishing forage species and in controlling erosion. The plants should not be grazed or clipped until they are sufficiently established. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable species. Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and prevent surface compaction and excessive runoff.

This soil is suited to grain and seed crops, wild herbaceous plants, and hardwood trees, all of which are important elements of woodland wildlife habitat. Food plots of grain or seed crops should be established only in the less steep areas. Also, the crops should be planted on the contour. Measures that protect the habitat from fire and grazing are needed.

If this soil is used as a site for dwellings with basements, the seasonal high water table, the slope, and the shrink-swell potential are limitations. The shrink-swell potential and the slope also are limitations on sites for dwellings without basements. Installing subsurface tile drains near the foundations helps to overcome the wetness. Land shaping by cutting and filling helps to overcome the slope. Extending the footings below the subsoil or reinforcing the foundation 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. Installing subsurface tile drains higher on the side slope than the absorption field helps to overcome the wetness. A specially designed system that includes sand filters helps to overcome the restricted permeability.

The land capability classification is IVe.

8D2—Hickory loam, 10 to 18 percent slopes, eroded. This strongly sloping, well drained soil is on side slopes of Illinoian glacial till in the uplands. Individual areas are irregularly shaped or long and narrow and range from 5 to 30 acres in size.

Typically, the surface layer is brown, friable loam about 6 inches thick. It has been thinned by erosion. The subsoil is firm clay loam about 43 inches thick. It is mottled below a depth of 11 inches. The upper part is dark yellowish brown, the next part is yellowish brown, and the lower part is brown. The underlying material to a depth of 60 inches or more is brown, mottled, firm, calcareous loam. In some areas the soil formed completely in loess. In other areas the slope is less than 10 percent. In some places the surface layer is clay loam because cultivation has mixed it with the upper part of the subsoil.

Included with this soil in mapping are small areas of the somewhat poorly drained Atlas soils. These soils have more clay in the subsoil than the Hickory soil. They are on side slopes at the head of drainageways and on shoulder slopes above the Hickory soil. They make up 5 to 10 percent of the unit.

Water and air move through the Hickory soil at a moderate rate. Surface runoff is rapid in cultivated areas. 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 for pasture and hay. A few areas are used as woodland. This soil is moderately suited to pasture and hay. It is poorly suited to use as a site for dwellings or for septic tank absorption fields. It is well suited to woodland. It generally is unsuited to cultivated crops because of the slope and a severe hazard of erosion.

Establishing pasture and hay crops helps to control erosion. Seedbed preparation is difficult on side slopes where the subsoil is exposed. A no-till method of seeding or pasture renovation helps in establishing forage species and in controlling erosion. The plants should not be grazed or clipped until they are sufficiently established. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable species. Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and prevent surface compaction and excessive runoff.

In areas used as woodland, the slope limits the use of equipment and increases the hazard of erosion. Plant competition is also a management concern. Measures that help to control erosion include placing logging roads and skid trails on or near the contour, skidding logs or trees uphill with a cable and winch in the steeper areas, using grass firebreaks, and seeding bare areas to grass or to a grass-legume mixture after logging activities have been completed. The use of machinery is limited to periods when the soil is firm. In openings where timber has been harvested, competition from undesirable species 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. Protection from fire also is needed.

This soil is suited to grain and seed crops, wild herbaceous plants, and hardwood trees, all of which are important elements of woodland wildlife habitat. Food plots of grain or seed crops should be established only in the less steep areas. Also, the crops should be planted on the contour. Measures that protect the habitat from fire and grazing are needed.

If this soil is used as a site for dwellings, the slope and the shrink-swell potential are limitations. Land shaping by cutting and filling helps to overcome the slope. Extending the footings below the subsoil or reinforcing the foundation 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 filter field or replacing the soil with more permeable material helps to overcome the moderate permeability. Installing the filter lines on the contour and land shaping by cutting and filling help to overcome the slope.

The land capability classification is IVe.

8F—Hickory loam, 18 to 35 percent slopes. This steep, well drained soil is on side slopes of Illinoian glacial till in the uplands. Individual areas are long and narrow or irregularly shaped and range from 15 to 130 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 firm clay loam about 44 inches thick. The upper part is dark yellowish brown, and the lower part is yellowish brown and is mottled. The underlying material to a depth of 60 inches or more is yellowish brown, mottled, firm loam. In some areas the surface layer and the subsoil are sandy. In some places the slope is more than 35 percent. In other places the surface layer is clay loam because cultivation has mixed it with the subsoil.

Included with this soil in mapping are small areas of the gently sloping Ava soils on ridgetops and the somewhat poorly drained Holton soils on bottom land. Also included, on side slopes below the Hickory soil, are soils that formed in residuum derived from shale and sandstone. Included soils make up about 15 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 low. The shrink-swell potential and the potential for frost action are moderate.

Most areas are used as woodland. Some areas are used for pasture. This soil is well suited to woodland and poorly suited to pasture. It is generally unsuited to use as a site for dwellings or for septic tank absorption fields because of the slope.

Erosion control is needed when grasses and legumes are established in the pastured areas. Bromegrass, tall fescue, and alfalfa are suitable species. In areas where the pasture is established, interseeding legumes using a no-till system of seeding and seeding on the contour improve forage quality and help to control erosion. A permanent cover of pasture plants helps to control erosion and maintains tilth. The use of machinery is limited on the steeper slopes. Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition.

In areas used as woodland, the slope limits the use of equipment and increases the hazard of erosion. Plant competition also is a management concern. Erosion-control practices include placing logging roads and skid trails on or near the contour, skidding logs or trees uphill with a cable and winch in the steeper areas, using grass firebreaks, and seeding bare areas to grass or to a grass-legume mixture after logging activities have been completed. The use of machinery is limited to periods when the soil is firm. In openings where timber has been harvested, competition from undesirable species 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. Protection from fire also is needed.

The dense stands of timber provide good habitat for woodland wildlife. This soil is suited to grain and seed crops, wild herbaceous plants, and hardwood trees, all of which are important elements of woodland wildlife habitat. Measures that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts that provide food and cover for wildlife.

The land capability classification is VIe.

8G—Hickory loam, 35 to 60 percent slopes. This very steep, well drained soil is on side slopes of Illinoian glacial till in the uplands. Individual areas are long and narrow and range from 30 to 150 acres in size.

Typically, the surface layer is dark brown, friable loam about 3 inches thick. The subsurface layer is yellowish brown, friable loam about 4 inches thick. The subsoil is about 35 inches thick. The upper part is dark yellowish brown, friable loam; the next part is dark yellowish brown, firm clay loam; and the lower part is dark yellowish brown, mottled, friable loam. The underlying material to a depth of 60 inches or more is yellowish brown, mottled, calcareous, friable loam. In some places the subsoil has less clay and is calcareous within a depth of 20 inches. In other places the surface layer is thicker and darker. In some areas the surface layer and the subsoil are sandy.

Included with this soil in mapping are small areas of the gently sloping Ava soils on ridgetops above the Hickory soil and the somewhat poorly drained Holton soils on flood plains below the Hickory soil. Also included, on side slopes below the Hickory soil, are soils that formed in residuum derived from shale and sandstone. Included soils make up 10 to 15 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 or as habitat for woodland wildlife. This soil is well suited to woodland and to habitat for woodland wildlife. It generally is unsuited to use as a site for dwellings or for septic tank absorption fields because of the slope.

In areas used as woodland, the slope limits the use of equipment and increases the hazard of erosion. Plant competition also is a management concern. Erosion-control practices include placing logging roads and skid trails on or near the contour, skidding logs or trees uphill with a cable and winch in the steeper areas, using grass firebreaks, and seeding bare areas to grass or to a grass-legume mixture after logging activities have been completed. The use of machinery is limited to periods when the soil is firm. In openings where timber has been harvested, competition from undesirable species 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. Protection from fire also is needed.

The dense stands of timber provide good habitat for woodland wildlife. This soil is suited to grain and seed crops, wild herbaceous plants, and hardwood trees, all of which are important elements of woodland wildlife habitat. Measures that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts that provide food and cover for wildlife.

The land capability classification is VIIe.

12—Wynoose silt loam. This nearly level or slightly depressional, poorly drained soil is on broad, loess-covered Illinoian glacial till plains. Individual areas are irregularly shaped or oval and range from 5 to 200 acres in size.

Typically, the surface layer is dark grayish brown, mottled, friable silt loam about 8 inches thick. The subsurface layer is light brownish gray, mottled, friable silt loam about 8 inches thick. The subsoil extends to a depth of 60 inches or more. It is mottled, firm silty clay loam and silty clay. The upper part is light brownish gray, and the lower part is grayish brown. In some areas the surface layer is darker. In other areas the subsoil has less clay. In places the lower part of the subsoil and the underlying material have less sand.

Included with this soil in mapping are small areas of the somewhat poorly drained Bluford and Darmstadt soils and the poorly drained Huey soils. Bluford and Darmstadt soils are on broad ridges and knolls above the Wynoose soil. Huey soils are in landscape positions similar to those of the Wynoose soil. Darmstadt and Huey soils have a high content of sodium in the subsoil. Included soils make up 10 to 15 percent of the unit.

Water and air move through the Wynoose soil at a very slow rate. Surface runoff is slow. The seasonal high water table is within a depth of 2 feet during spring. Available water capacity is high. Organic matter content is low. The surface layer is friable and can be easily tilled when moist, but it tends to crust or puddle after hard rains. The shrink-swell potential and the potential for frost action are high.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops. It is poorly suited to use as a site for dwellings or for septic tank absorption fields.

This soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain the drainage system are needed. Additional drainage may be needed in some areas. A combination of surface ditches and land leveling reduces the wetness. Tilling when the soil is wet causes surface compaction and reduces the rate of water infiltration. Returning crop residue to the soil, adding other organic material, and minimizing tillage increase the rate of water infiltration and help to maintain soil tilth.

The seasonal high water table and the shrink-swell potential are limitations if this soil is used as a site for dwellings. Reinforcing 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. A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank are installed. Sewage lagoons or mounds are alternative methods of waste disposal.

The land capability classification is IIIw.

13A—Bluford silt loam, 0 to 2 percent slopes. This nearly level, somewhat poorly drained soil is on broad flats and ridges on the Illinoian glacial till plain in the uplands. Individual areas are irregularly shaped and range from 5 to 100 acres in size.

Typically, the surface layer is brown, friable silt loam about 8 inches thick. The subsurface layer is pale brown, mottled, friable silt loam about 6 inches thick. The subsoil extends to a depth of 60 inches or more. It is mottled. The upper part is brown, friable silt loam, and the lower part is brown, firm, very slightly brittle silty clay loam. In some areas the lower part of the subsoil and the underlying material have less sand. In other areas the subsoil has less clay. In some places the lower part of the subsoil is not brittle.

Included with this soil in mapping are small areas of the moderately well drained Ava and poorly drained Wynoose soils. Ava soils are on the higher ridges and knolls above the Bluford soil. Wynoose soils are on flats and in depressions below the Bluford soil. Included soils make up 10 to 15 percent of the unit.

Water and air move through the Bluford soil at a slow rate. Surface runoff is slow. The seasonal high water table is at a depth of 1 to 3 feet during spring. Available water capacity is high. Organic matter content is moderately low. The surface layer is friable and can be easily tilled when moist, but it 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. This soil is well suited to cultivated crops. It is poorly suited to use as a site for dwellings or for septic tank absorption fields.

In areas used for corn, soybeans, or small grain, the wetness delays planting in most years. It can be reduced by surface ditches or subsurface drains. Erosion is a hazard in areas where slopes are very long. It can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting. Tilling when the soil is wet causes surface compaction, reduces the rate of water infiltration, and causes excessive runoff. Returning crop residue to the soil and regularly adding other organic material increase the infiltration rate and improve tilth.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Reinforcing 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 slow permeability and the seasonal high water table are limitations if this soil is used as a site for septic tank absorption fields. Tile drains help to lower the water table. Enlarging the absorption area helps to overcome the restricted permeability. A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank are installed.

The land capability classification is IIw.

13B—Bluford silt loam, 2 to 5 percent slopes. This gently sloping, somewhat poorly drained soil is on side slopes along drainageways and ridges on the Illinoian glacial till plain in the uplands. Individual areas are irregularly shaped and range from 5 to 50 acres in size.

Typically, the surface layer is brown, friable silt loam about 8 inches thick. The subsoil is firm silty clay loam about 43 inches thick. The upper part is yellowish brown, and the lower part is light brownish gray and is very slightly brittle. The underlying material to a depth of 60 inches or more is grayish brown, firm silt loam and silty clay loam. In some areas the lower part of the subsoil and the underlying material contain less sand. In other areas the subsoil has more sand and gravel. In some places the upper part of the subsoil is browner. In other places the lower part of the subsoil is not brittle.

Included with this soil in mapping are small areas of the somewhat poorly drained Darmstadt and poorly drained Wynoose soils. Darmstadt soils have a high content of sodium in the subsoil. They are in landscape positions similar to those of the Bluford soil. Wynoose soils are in depressions at the head of drainageways. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Bluford soil at a slow rate. Surface runoff is medium. The seasonal high water table is at a depth of 1 to 3 feet during spring. Available water capacity is high. Organic matter content is moderately low. The surface layer is friable and can be easily tilled when moist, but it tends to crust and puddle after hard rains, especially in cultivated areas where it contains subsoil material. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops. It is poorly suited to use as a site for dwellings or for septic tank absorption fields.

This soil is sufficiently drained for corn, soybeans, and small grain, but the wetness delays planting in most years. It can be reduced by surface ditches or subsurface drains. Also, further erosion is a hazard. It can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting and by contour farming or terraces. Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Reinforcing 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 slow permeability and the seasonal high water table are limitations if this soil is used as a site for septic tank absorption fields. Tile drains help to lower the water table. Enlarging the absorption area helps to overcome the restricted permeability. A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank are installed.

The land capability classification is IIe.

14B—Ava silt loam, 2 to 5 percent slopes. This gently sloping, moderately well drained soil is on convex ridgetops and side slopes on the Illinoian glacial till plain in the uplands. Individual areas are irregularly shaped and range from 5 to 30 acres in size.

Typically, the surface layer is brown, friable silt loam about 8 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part is dark yellowish brown, friable silt loam. The next part is yellowish brown, mottled, firm and very firm silty clay loam. The lower part is strong brown, mottled, firm, slightly brittle loam. In some areas the lower part of the subsoil and the underlying material have less sand. In other areas the lower part of the subsoil is not brittle.

Included with this soil in mapping are small areas of the somewhat poorly drained Bluford soils. These soils are in the less sloping areas below the Ava soil. They make up less than 10 percent of the unit.

Water and air move through the upper part of the Ava soil at a moderately slow rate and through the lower part at a very slow rate. Surface runoff is medium. The seasonal high water table is perched at a depth of 2 to 4 feet during spring. Available water capacity is moderate. Organic matter content is moderately low. The surface layer is friable and can be easily tilled when moist, but it 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. Other areas are used for pasture and hay. This soil is well suited to cultivated crops. It is moderately suited to use as a site for dwellings without basements. It is poorly suited to use as a site for dwellings with basements or for septic tank absorption fields.

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

Maintaining a cover of grasses and legumes improves tilth and helps to control erosion. Selection of suitable species for planting, proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable species.

The seasonal high water table and the shrink-swell potential are limitations if this soil is used as a site for dwellings. The wetness is a more severe limitation on sites for dwellings with basements than on sites for dwellings without basements. Reinforcing footings and foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface drains around the foundations lowers the water table.

The seasonal high water table and the restricted permeability are limitations if this soil is used as a site for septic tank absorption fields. A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank are installed. Sewage lagoons function satisfactorily if the site is leveled.

The land capability classification is IIe.

14C2—Ava silt loam, 5 to 10 percent slopes, eroded. This moderately sloping, moderately well drained soil is on the toe slopes of ridgetops and on some side slopes along drainageways on the Illinoian glacial till plain in the uplands. Individual areas are irregularly shaped and range from 3 to 20 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 7 inches thick. It has been thinned by erosion. The subsoil is yellowish brown, mottled, silty clay loam about 43 inches thick. The upper part is friable, the next part is firm, and the lower part is very firm and is slightly brittle. The underlying material to a depth of 60 inches or more is yellowish brown, mottled, firm silty clay loam. In some places the surface layer is silty clay loam because cultivation has mixed it with the upper part of subsoil. In other places the slope is more than 10 percent. In some areas the lower part of the subsoil is not brittle.

Included with this soil in mapping are the somewhat poorly drained Atlas soils. These soils are on side slopes below the Ava soil. They are seepy and contain more clay in the subsoil than the Ava soil. They make up 5 to 10 percent of the unit.

Water and air move through the upper part of the Ava soil at a moderately slow rate and through the lower part at a very slow rate. Surface runoff is medium. The seasonal high water table is perched at a depth of 1.5 to 3.5 feet during spring. Available water capacity is moderate. Organic matter content is moderately low. The surface layer is friable and can be easily tilled when moist, but it tends to crust and puddle after hard rains, especially in cultivated areas where it contains subsoil material. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. A few areas are used for pasture. This soil is moderately suited to cultivated crops, pasture, and hay and to use as a site for dwellings without basements. It is poorly suited to use as a site for dwellings with basements or for septic tank absorption fields.

Measures that control erosion are needed in the areas used for corn, soybeans, or small grain. Erosion-control measures include a system of conservation tillage that leaves crop residue on the surface after planting, terraces, contour farming, and a crop rotation that includes 1 or more years of forage crops. Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and help to maintain tilth.

Maintaining a cover of grasses and legumes improves tilth and helps to control erosion. Selection of suitable species for planting, proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable species.

If this soil is used as a site for dwellings with basements, the seasonal high water table and the shrink-swell potential are limitations. The shrink-swell potential also is a limitation on sites for dwellings without basements. 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 slope is a limitation where it is more than 8 percent. Land shaping by cutting and filling helps to overcome the slope.

The seasonal high water table and the restricted permeability are limitations if this soil is used as a site for septic tank absorption fields. Installing subsurface interceptor tile drains higher on the side slopes than the absorption field helps to lower the water table. Specially designed systems, such as sand filters with disinfection tanks, are needed to overcome the restricted permeability.

The land capability classification is IIIe.

15C2—Parke silt loam, 5 to 10 percent slopes, eroded. This moderately sloping, well drained soil is on ridges and on the side slopes of ridges on the Illinoian glacial till plain in the uplands. Individual areas are elongated or oval and range from 5 to 50 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, firm silty clay loam. The next part is strong brown, firm silty clay loam and clay loam. The lower part is strong brown, mottled, friable gravelly sandy clay loam. In some areas the surface layer is silty clay loam because cultivation has mixed it with the upper part of the subsoil. In other areas the subsoil has less sand and gravel. In places the lower part of the subsoil is firm and brittle.

Included with this soil in mapping are small areas of the somewhat poorly drained Bluford soils. These soils are in gently sloping areas below the Parke soil. They make up 5 to 10 percent of the unit.

Water and air move through the Parke soil at a moderate rate. Surface runoff is medium. Available water capacity is moderate. Organic matter content is low. The surface layer is friable and can be easily tilled when moist, but it tends to crust and puddle after hard rains, especially in areas where it has been mixed with part of the subsoil. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. A few areas are used for pasture and hay. This soil is moderately suited to cultivated crops and to use as a site for dwellings without basements. It is well suited to pasture and hay and to use as a site for septic tank absorption fields or for dwellings with basements.

Measures that control erosion are needed in the areas used for corn, soybeans, or small grain. Erosion-control measures include a system of conservation tillage that leaves crop residue on the surface after planting, terraces, contour farming, and a crop rotation that includes 1 or more years of forage crops. Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and help to maintain tilth.

Establishing pasture and hay crops helps to keep soil losses within tolerable limits. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable species. Seedbed preparation is difficult on side slopes where the subsoil is exposed. A no-till method of seeding or pasture renovation helps in establishing forage species and in controlling erosion. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and prevent surface compaction and excessive runoff.

If this soil is used as a site for dwellings without basements, 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.

15D2—Parke silt loam, 10 to 15 percent slopes, eroded. This strongly sloping, well drained soil is on the side slopes of convex ridges on the Illinoian glacial till plain in the uplands. Individual areas are oval or irregularly shaped and range from 10 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 yellowish brown, friable silty clay loam. The next part is dark yellowish brown, friable silty clay loam. The lower part is brown, friable clay loam. In some areas the surface layer is silty clay loam because cultivation has mixed it with the upper part of the subsoil. In other areas the subsoil has less sand and gravel.

Included with this soil in mapping are small areas of the somewhat poorly drained Bluford soils. These soils are in gently sloping areas below the Parke soil. They make up 5 to 10 percent of the unit.

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

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

Erosion control is needed when grasses and legumes are established in pastured areas. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable species. Deferred grazing helps to prevent overgrazing and thus helps to prevent surface compaction and excessive runoff and reduces the hazard of erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. Also, using a no-till system of seeding helps to control erosion. Applications of fertilizer are needed. The plants should not be grazed or clipped until they are sufficiently established.

If this soil is used as a site for dwellings, the slope is a limitation. The shrink-swell potential also is a limitation on sites for dwellings without basements. Land shaping by cutting and filling helps to overcome the slope. Reinforcing the foundation or extending the footings below the subsoil helps to prevent the structural damage caused by shrinking and swelling.

The slope is a limitation if this soil is used as a site for septic tank absorption fields. Installing the filter lines on the contour and cutting and filling help to overcome the slope.

The land capability classification is IVe.

27B2—Miami silt loam, 2 to 5 percent slopes, eroded. This gently sloping, well drained soil is on side slopes on the Wisconsinan glacial till plain in the uplands. Individual areas are irregularly shaped and range from 5 to 30 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 8 inches thick. It has been thinned by erosion. The subsoil is about 22 inches thick. The upper part is yellowish brown, friable silty clay loam. The next part is yellowish brown, firm clay loam. The lower part is yellowish brown, firm loam. The underlying material to a depth of 60 inches or more is light yellowish brown and pale brown, mottled, firm, calcareous loam. In some areas the surface layer is darker. In other areas the surface layer is clay loam because cultivation has mixed it with the upper part of the subsoil. In some places the subsoil has less sand and gravel. In other places the subsoil is thinner.

Included with this soil in mapping are small areas of the poorly drained Drummer soils. These soils are in shallow depressions and drainageways below the Miami soil. They make up 1 to 5 percent of the unit.

Water and air move through the subsoil of the Miami soil at a moderate rate and through the underlying material at a slow rate. Surface runoff is medium. Available water capacity is moderate. Organic matter content is moderately low. The surface layer is friable and can be easily tilled when moist, but it tends to crust and puddle after hard rains, especially in areas where it has been mixed with part of the subsoil. The shrink-swell potential and the potential for frost action are moderate.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops. It is moderately suited to use as a site for dwellings and poorly suited to use as a site for septic tank absorption fields.

Measures that help to prevent further erosion are needed in the areas used for corn, soybeans, or small grain. Erosion-control measures include a system of conservation tillage that leaves crop residue on the surface after planting, terraces, and contour farming. Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. 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.

The restricted permeability is a limitation if this soil is used as a site for septic tank absorption fields. Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome this limitation.

The land capability classification is IIe.

27C2—Miami loam, 5 to 10 percent slopes, eroded. This moderately sloping, well drained soil is on short, uneven side slopes on the Wisconsinan glacial till plain in the uplands. Individual areas are irregularly shaped and range from 3 to 30 acres in size.

Typically, the surface layer is brown, friable loam about 5 inches thick. It has been thinned by erosion. The subsoil is about 30 inches thick. The upper part is yellowish brown, friable loam. The lower part is yellowish brown, mottled, firm clay loam. The underlying material to a depth of 60 inches or more is yellowish brown, mottled, firm, calcareous loam. In some areas the surface layer is clay loam because cultivation has mixed it with the upper part of the subsoil. In other areas the subsoil is thinner. In places the subsoil has less sand and gravel.

Included with this soil in mapping are small areas of the poorly drained Drummer soils. These soils are in drainageways below the Miami soil. They make up 1 to 5 percent of the unit.

Water and air move through the subsoil of the Miami soil at a moderate rate and through the underlying material at a slow rate. Surface runoff is medium. Available water capacity is moderate. Organic matter content is moderately low. The surface layer is friable and can be easily tilled when moist, but it tends to crust and puddle after hard rains, especially where it has been mixed with part of the subsoil. The shrink-swell potential and the potential for frost action are moderate.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops, pasture, and hay. It is moderately suited to use as a site for dwellings and poorly suited to use as a site for septic tank absorption fields.

Measures that control erosion are needed in the areas used for corn, soybeans, or small grain. Erosion-control measures include a system of conservation tillage that leaves crop residue on the surface after planting, terraces, contour farming, and a crop rotation that includes 1 or more years of forage crops. Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and help to maintain tilth.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Also, the slope is a limitation where it is more than 8 percent. Reinforcing the foundation or extending the footings below the subsoil help to prevent the structural damage caused by shrinking and swelling. Land shaping by cutting and filling helps to overcome the slope.

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

The land capability classification is IIIe.

27D—Miami loam, 10 to 18 percent slopes. This strongly sloping, well drained soil is on short, uneven side slopes in the Wisconsinan glaciated uplands. Individual areas are irregularly shaped or long and narrow and range from 4 to 60 acres in size.

Typically, the surface layer is dark grayish brown, friable loam about 4 inches thick. The subsurface layer is brown, friable loam about 4 inches thick. The subsoil is about 23 inches thick. The upper part is yellowish brown, friable loam. The lower part is brown, mottled, firm clay loam. The underlying material to a depth of 60 inches or more is brown, mottled, firm, calcareous loam. In some places the subsoil is thinner. In other places the subsoil has less clay. A few areas are eroded.

Included with this soil in mapping are small areas of the gently sloping Xenia soils. These soils are on narrow ridges above the Miami soil. They make up 1 to 5 percent of the unit.

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

Most areas are used for pasture and hay. A few areas are used as woodland. This soil is moderately suited to pasture and hay and to use as a site for dwellings. It is poorly suited to use as a site for septic tank absorption fields. It is well suited to woodland.

Erosion control is needed when grasses and legumes are established in the pastured areas. Bromegrass, tall fescue, and alfalfa are suitable species. Deferred grazing helps to prevent overgrazing and thus helps to prevent surface compaction and excessive runoff and reduces the hazard of erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. Also, using a no-till system of seeding helps to control erosion. Applications of fertilizer are needed. The plants should not be grazed or clipped until they are sufficiently established.

If this soil is used as woodland, plant competition is a management concern. It affects the seedlings of desirable species. In openings where timber has been harvested, competition from undesirable species 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. Land shaping by cutting and filling helps 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 permeability and the slope are limitations if this soil is used as a site for septic tank absorption fields. Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the restricted permeability. Installing the filter lines on the contour and cutting and filling help to overcome the slope.

The land capability classification is IVe.

27F—Miami loam, 18 to 30 percent slopes. This steep, well drained soil is on side slopes in the Wisconsinan glaciated uplands. Individual areas are long and narrow or irregularly shaped and range from 10 to 200 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 3 inches thick. The subsoil is about 29 inches thick. The upper part is brown, friable loam. The next part is dark yellowish brown, firm clay loam. The lower part is dark yellowish brown, firm, calcareous clay loam. The underlying material to a depth of 60 inches or more is light yellowish brown, very firm, calcareous clay loam. In some areas the subsoil is thinner. In other areas the slope is less than 18 percent.

Included with this soil in mapping are small areas of the gently sloping Xenia and somewhat poorly drained Radford soils. Xenia soils are on ridges above the Miami soil. Radford soils are on narrow flood plains below the Miami soil. Included soils make up 5 to 10 percent of the unit.

Water and air move through the subsoil of the Miami soil at a moderate rate and through the underlying material at a slow rate. Surface runoff is rapid. Available water capacity is moderate. 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 pasture and hay. This soil is well suited to woodland and to habitat for woodland wildlife. It is moderately suited to nature paths and trails. It is generally unsuited to use as a site for dwellings or for septic tank absorption fields because of the slope.

Erosion control is needed when grasses and legumes are established in the pastured areas. Bromegrass, tall fescue, and alfalfa are suitable species. In areas where the pasture is established, interseeding legumes using a no-till system of seeding and seeding on the contour improve forage quality and help to control erosion. A permanent cover of pasture plants helps to control erosion and maintains tilth. The use of machinery is limited on the steeper slopes. Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition.

In areas used as woodland, the slope limits the use of equipment and increases the hazard of erosion. Plant competition also is a management concern. Erosion-control practices include placing logging roads and skid trails on or near the contour, skidding logs or trees uphill with a cable and winch in the steeper areas, using grass firebreaks, and seeding bare areas to grass or to a grass-legume mixture after logging activities have been completed. The use of machinery is limited to periods when the soil is firm. In openings where timber has been harvested, competition from undesirable species 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. Protection from fire also is needed.

The dense stands of timber provide good habitat for woodland wildlife. This soil is suited to grain and seed crops, wild herbaceous plants, and hardwood trees, all of which are important elements of woodland wildlife habitat. Measures that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts that provide food and cover for wildlife.

The land capability classification is VIe.

27G—Miami loam, 30 to 60 percent slopes. This very steep, well drained soil is on side slopes in the Wisconsinan glaciated uplands. Individual areas are long and narrow and range from 10 to 40 acres in size.

Typically, the surface layer is dark grayish brown, friable loam about 3 inches thick. The subsurface layer is brown, friable loam about 4 inches thick. The subsoil is dark yellowish brown, firm clay loam about 26 inches thick. The underlying material to a depth of 60 inches or more is brown, firm, calcareous loam. In some places the subsoil is thinner. Some areas are less sloping.

Included with this soil in mapping are small areas of the somewhat poorly drained Radford soils. These soils are on flood plains below the Miami soil. They make up 2 to 5 percent of the unit.

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

Most areas are used as woodland. This soil is well suited to woodland and to habitat for woodland wildlife. Because of the slope, it generally is unsuited to cultivated crops, pasture, and hay and to use as a site for dwellings or for septic tank absorption fields.

In areas used as woodland, the slope limits the use of equipment and increases the hazard of erosion. Plant competition also is a management concern. Erosion-control practices include placing logging roads and skid trails on or near the contour, skidding logs or trees uphill with a cable and winch in the steeper areas, using grass firebreaks, and seeding bare areas to grass or to a grass-legume mixture after logging activities have been completed. The use of machinery is limited to periods when the soil is firm. In openings where timber has been harvested, competition from undesirable species 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. Protection from fire also is needed.

The dense stands of timber provide good habitat for woodland wildlife. This soil is suited to grain and seed crops, wild herbaceous plants, and hardwood trees, all of which are important elements of woodland wildlife habitat. Measures that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts that provide food and cover for wildlife.

The land capability classification is VIIe.

46—Herrick silt loam. This nearly level, somewhat poorly drained soil is on low, broad ridges on loess-covered Illinoian glacial till plains in the uplands. Individual areas are irregular in shape and range from 10 to 250 acres in size.

Typically, the surface layer is very dark gray and very dark grayish brown, friable silt loam about 11 inches thick. The subsurface layer is very dark grayish brown, friable silt loam about 2 inches thick. The subsoil is mottled, firm silty clay loam about 42 inches thick. The upper part is dark grayish brown, the next 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. In some areas the surface soil is thinner or lighter in color. In other areas the subsoil contains less clay.

Included with this soil in mapping are small areas of the poorly drained Cowden and Virden soils. These soils are in lower landscape positions than those of the Herrick soil. Virden soils are subject to ponding. Included soils make up 5 to 15 percent of the unit.

Water and air move through the Herrick soil at a moderately slow rate. Surface runoff is slow. The seasonal high water table is at a depth of 1 to 3 feet during 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. This soil is well suited to cultivated crops. It is poorly suited to use as a site for dwellings or for septic tank absorption fields.

In areas used for corn, soybeans, or small grain, the wetness delays planting in most years. It can be reduced by surface ditches or subsurface drains. Erosion is a hazard in areas where slopes are very long. It can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting. Tilling when the soil is wet causes surface compaction, reduces the rate of water infiltration, and causes excessive runoff. Returning crop residue to the soil and regularly adding other organic material increase the infiltration rate and improve tilth.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Reinforcing 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 restricted permeability and the seasonal high water table are limitations if this soil is used as a site for septic tank absorption fields. Tile drains help to lower the water table. Enlarging the absorption area helps to overcome the restricted permeability. A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank are installed.

The land capability classification is IIw.

50—Virden silty clay loam. This nearly level, poorly drained soil is on broad flats on the loess-covered Illinoian glacial till plain. It is subject to ponding for brief periods in early spring. Individual areas are irregular in shape and range from 10 to 300 acres in size.

Typically, the surface layer is black, firm silty clay loam about 7 inches thick. The subsurface layer is very dark gray, firm silty clay loam about 5 inches thick. The subsoil is silty clay loam about 32 inches thick. It is mottled. The upper part is very dark grayish brown and is firm, the middle part is dark grayish brown and is firm, and the lower part is gray and is friable. The underlying material to a depth of 60 inches or more is light gray, mottled, friable silt loam. In some areas the surface layer is silt loam. In other areas it is lighter in color. In some places the surface soil is more than 24 inches thick. In other places the subsoil contains less clay.

Included with this soil in mapping are small areas of the somewhat poorly drained Herrick soils. These soils are not subject to ponding. They are on low ridges above the Virden soil. They make up 10 to 15 percent of the unit.

Water and air move through the Virden soil at a moderately slow rate. Surface runoff is slow to ponded. The seasonal high water table is 0.5 foot above to 2.0 feet below the surface during spring. Available water capacity is high. Organic matter content also is high. The surface layer becomes compact and cloddy if tilled when too wet. The shrink-swell potential and the potential for frost action are high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops. It is generally unsuited to use as a site for dwellings or for septic tank absorption fields because of the ponding.

If drained, this soil can be used for corn, soybeans, or small grain. A drainage system has been installed in most areas. Measures that maintain the drainage system are needed. Additional drainage may be needed in some areas. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. Land grading helps to control the ponding. Applying a conservation tillage system that leaves crop residue on the surface after planting and returning crop residue to the soil improve soil tilth, minimize surface compaction, and increase the rate of water infiltration.

The land capability classification is IIw.

56A—Dana silt loam, 0 to 2 percent slopes. This nearly level, moderately well drained soil is on broad ridges on the loess-covered Wisconsinan glacial till plain and moraines. Individual areas are irregularly shaped and range from 3 to 50 acres in size.

Typically, the surface soil is very dark gray and very dark grayish brown, friable silt loam about 11 inches thick. The subsoil is about 29 inches thick. The upper part is dark yellowish brown, firm silty clay loam. The lower part is yellowish brown and dark yellowish brown, mottled, firm clay loam. The underlying material to a depth of 60 inches or more is yellowish brown and brown, mottled, firm and very firm, calcareous loam. In places the surface soil is thinner or lighter in color. In a few areas, stratified loamy outwash overlies the loam till. Some areas are somewhat poorly drained.

Included with this soil in mapping are small areas of the poorly drained Drummer soils. These soils are in drainageways below the Dana soil. They make up 2 to 5 percent of the unit.

Water and air move through the Dana soil at a moderately slow rate. Surface runoff is slow. The seasonal high water table is at a depth of 3 to 6 feet during 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. This soil is well suited to cultivated crops. It is moderately suited to use as a site for dwellings. It is poorly suited to use as a site for septic tank absorption fields.

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.

If this soil is used as a site for dwellings with basements, the seasonal high water table and the shrink-swell potential are limitations. The shrink-swell potential also is a limitation on sites for dwellings without basements. 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.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the restricted permeability are limitations. Subsurface tile drains help to lower the water table. Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the restricted permeability.

The land capability classification is I.

56B2—Dana silt loam, 2 to 5 percent slopes, eroded. This gently sloping, moderately well drained soil is on convex ridgetops and broad, uneven side slopes on loess-covered Wisconsinan glacial till plains and moraines. Individual areas are irregularly shaped and range from 3 to 50 acres in size.

Typically, the surface layer is very dark gray, friable silt loam about 8 inches thick. It has been thinned by erosion. The subsoil is about 41 inches thick. The upper part is dark yellowish brown, friable silty clay loam. The next part is dark yellowish brown, mottled, firm silty clay loam. The lower part is yellowish brown, mottled, firm clay loam. The underlying material to a depth of 60 inches or more is yellowish brown and brown, mottled, firm, calcareous loam. In places the surface layer is thinner or lighter in color. In a few areas, stratified loamy outwash overlies the loam till. Some areas are somewhat poorly drained.

Included with this soil in mapping are small areas of the poorly drained Drummer soils. These soils are in drainageways below the Dana soil. They make up 2 to 5 percent of the unit.

Water and air move through the Dana soil at a moderately slow rate. Surface runoff is medium. The seasonal high water table is at a depth of 3 to 6 feet during 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. This soil is well suited to cultivated crops, pasture, and hay. It is moderately suited to use as a site for dwellings. It is poorly suited to use as a site for 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 improve soil tilth.

If this soil is used as a site for dwellings with basements, the seasonal high water table and the shrink-swell potential are limitations. The shrink-swell potential also is a limitation on sites for dwellings without basements. 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.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the moderately slow permeability are limitations. Subsurface tile drains help to lower the water table. Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the restricted permeability.

The land capability classification is IIe.

112—Cowden silt loam. This nearly level, poorly drained soil is on broad flats on loess-covered Illinoian glacial till plains. Individual areas are irregularly shaped and range from 5 to 30 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 8 inches thick. The subsurface layer is mottled, gray, friable silt loam about 4 inches thick. The subsoil is mottled, firm silty clay loam about 40 inches thick. The upper part is dark grayish brown, the next part is grayish brown, and the lower part is gray. The underlying material to a depth of 60 inches or more is mottled, light gray, 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 contains less clay.

Included with this soil in mapping are small, closely intermingled areas of Piasa soils and the somewhat poorly drained Herrick soils. Piasa soils have a high content of sodium in the subsoil. They are in landscape positions similar to those of the Cowden soil. Herrick soils are on slight rises above the Cowden soil. Included soils make up 10 to 15 percent of the unit.

Water and air move through the Cowden soil at a slow rate. Surface runoff is slow. The seasonal high water table is within a depth of 2 feet during spring. Available water capacity is high. Organic matter content is moderate. The surface layer is friable and can be easily tilled when moist. The shrink-swell potential and the potential for frost action are high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops. It is poorly suited to use as a site for dwellings or for septic tank absorption fields.

If drained, this soil can be used for corn, soybeans, or small grain. A drainage system has been installed in most areas. Measures that maintain the drainage system are needed. Additional drainage may be needed in some areas. Surface drains 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 returning crop residue to the soil improve soil tilth, minimize surface compaction and crusting, and increase the rate of water infiltration.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Reinforcing 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 permeability are limitations if this soil is used as a site for septic tank absorption fields. A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank are installed. Sewage lagoons function satisfactorily if the site is leveled.

The land capability classification is IIw.

113A—Oconee silt loam, 0 to 2 percent slopes. This nearly level, somewhat poorly drained soil is on broad flats on loess-covered Illinoian glacial till plains. Individual areas are irregularly shaped and range from 5 to 200 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 extends to a depth of

60 inches or more. It is mottled, firm silty clay loam. The upper part is brown, the next part is dark grayish brown, and the lower part is light brownish gray. In some areas the surface layer is lighter in color. In other areas the subsoil has less clay.

Included with this soil in mapping are small, closely intermingled areas of Darmstadt soils and the poorly drained Cowden and Virden soils. Cowden and Virden soils are below the Oconee soil on the landscape. Darmstadt soils have a high content of sodium in the subsoil. They are in landscape positions similar to those of the Oconee soil. Included soils make up 5 to 15 percent of the unit.

Water and air move through the Oconee soil at a slow rate. Surface runoff is slow. The seasonal high water table is at a depth of 1 to 3 feet during 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. This soil is well suited to cultivated crops. It is poorly suited to use as a site for dwellings or for septic tank absorption fields.

In areas used for corn, soybeans, or small grain, the wetness delays planting in most years. It can be reduced by surface ditches or subsurface drains. Erosion is a hazard in areas where slopes are very long. It can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting. Tilling when the soil is wet causes surface compaction, reduces the rate of water infiltration, and causes excessive runoff. Returning crop residue to the soil and regularly adding other organic material increase the infiltration rate and improve tilth.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Reinforcing 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 permeability are limitations if this soil is used as a site for septic tank absorption fields. A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank are installed. Sewage lagoons function satisfactorily if the site is leveled.

The land capability classification is IIw.

113B—Oconee silt loam, 2 to 5 percent slopes. This gently sloping, somewhat poorly drained soil is on ridges and the side slopes of drainageways on the Illinoian glacial till plain in the uplands. Individual areas are irregularly shaped and range from 10 to 40 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 9 inches thick. The subsurface layer is grayish brown, friable silt loam about 2 inches thick. The subsoil extends to a depth of 60 inches or more. It is mottled, firm silty clay loam. The upper part is brown, and the lower part is grayish brown. In some areas the surface layer is lighter in color. In other areas it is thinner because of erosion. In places the subsoil contains less clay.

Included with this soil in mapping are small, closely intermingled areas of Darmstadt soils and small areas of the poorly drained Cowden and Virden soils. Cowden and Virden soils are below the Oconee soil on the landscape. Darmstadt soils have a high content of sodium in the subsoil. They are in landscape positions similar to those of the Oconee soil. Included soils make up 5 to 15 percent of the unit.

Water and air move through the Oconee soil at a slow rate. Surface runoff is medium. The seasonal high water table is at a depth of 1 to 3 feet during 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. This soil is well suited to cultivated crops. It is poorly suited to use as a site for dwellings or for septic tank absorption fields.

This soil is sufficiently drained for corn, soybeans, and small grain, but the wetness delays planting in most years. The wetness can be reduced by surface ditches or subsurface drains. Erosion is a hazard. It can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting and by contour farming or terraces. Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Reinforcing 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 permeability are limitations if this soil is used as a site for septic tank absorption fields. A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank are installed. Sewage lagoons function satisfactorily if the site is leveled.

The land capability classification is IIe.

120—Huey silt loam. This nearly level, poorly drained soil is on loess-covered Illinoian glacial till plains. The subsoil has a high content of sodium. Individual areas are irregularly shaped and range from 4 to 25 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 7 inches thick. The subsurface layer is mottled, grayish brown, friable silt loam about 3 inches thick. The subsoil is mottled, firm silty clay loam about 37 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 gray, mottled, firm loam. In some areas the surface layer is darker. In other areas the subsoil has a higher content of clay. In places the zone of high sodium content is lower in the profile.

Included with this soil in mapping are small, closely intermingled areas of Cisne soils. These soils do not have a high content of sodium in the subsoil. They make up 5 to 10 percent of the unit.

Water and air move through the Huey soil at a very slow rate. Surface runoff is slow to ponded. The seasonal high water table is perched 0.5 foot above to 2.0 feet below the surface in spring. Available water capacity is moderate. The subsoil has a high content of sodium. Organic matter content is moderately low. The surface layer is friable and can be easily tilled when moist, but it 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. Because of the ponding, this soil is poorly suited to cultivated crops and is generally unsuited to use as a site for dwellings or for septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, the seasonal high water table and the high content of sodium in the subsoil are limitations. Random subsurface drains with surface inlets and shallow ditches reduce the wetness. The high content of sodium in the subsoil results in plant stress during dry periods and excess moisture during wet periods. Also, the content of sodium restricts the availability and uptake of some plant nutrients. Tilling when the soil is wet causes surface cloddiness and compaction and reduces the rate of water infiltration. Minimizing tillage, returning crop residue to the soil, and regularly adding other organic material increase the infiltration rate and improve tilth and fertility.

The land capability classification is IVw.

127B2—Harrison silt loam, 2 to 5 percent slopes, eroded. This gently sloping, moderately well drained soil is on convex ridges and knolls on Illinoian glaciated uplands. Individual areas are oval and range from 3 to 20 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 10 inches thick. The subsurface layer is brown, friable silt loam about 5 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part is mottled, yellowish brown, friable and firm silty clay loam. The lower part is mottled, brown and dark brown, friable silt loam. In some areas the lower part of the subsoil and the underlying material have less sand. In other areas the surface layer is thinner or lighter in color.

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

Water and air move through the Harrison soil at a moderate rate. Surface runoff is medium. The seasonal high water table is at a depth of 3 to 6 feet during spring. Available water capacity is high. Organic matter content is moderate. The surface layer is friable and can be easily tilled when moist, but it 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. This soil is well suited to cultivated crops. It is moderately suited to use as a site for dwellings and poorly suited to use as a site for septic tank absorption fields.

In areas used for corn, soybeans, or small grain, further 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 improve soil tilth.

If this soil is used as a site for dwellings with basements, the seasonal high water table and the shrink-swell potential are limitations. The shrink-swell potential also is a limitation on sites for dwellings without basements. 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.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the moderate permeability are limitations. Subsurface tile drains help to lower the water table. Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the restricted permeability.

The land capability classification is IIe.

128B—Douglas silt loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on prominent, convex ridges on Illinoian glaciated uplands. Individual areas are oval or oblong and range from 5 to 30 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. The upper part is dark yellowish brown, friable silt loam and silty clay loam. The next part is yellowish brown, friable silty clay loam. The lower part is dark brown and strong brown, friable silt loam and loam. In some areas the surface layer is lighter in color. In other areas the subsoil has more sand and gravel.

Included with this soil in mapping are small areas of the somewhat poorly drained Oconee and Herrick soils. These soils are in the less sloping areas 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. 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. This soil is well suited to cultivated crops, pasture, and hay. It is moderately suited to use as a site for dwellings or for 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 improve soil tilth.

Adapted forage and hay plants grow well on this soil Bromegrass, tall fescue, and alfalfa are suitable species. Proper stocking rates, rotation grazing, deferred 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 moderate permeability is a limitation if this soil is used as a site for septic tank absorption fields. Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome this limitation.

The land capability classification is IIe.

128C2—Douglas silt loam, 5 to 10 percent slopes, eroded. This moderately sloping, well drained soil is on the side slopes of prominent, convex ridges on Illinoian glaciated uplands. Individual areas are oval and range from 10 to 60 acres in size.

Typically, the surface layer is dark 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. The upper part is dark yellowish brown, firm silty clay loam. The next part is brown, friable silt loam. The lower part is brown, friable loam. In some areas the soil has more sand and gravel throughout. In other areas the surface layer is silty clay loam because cultivation has mixed it with the upper part of the subsoil.

Included with this soil in mapping are small areas of the somewhat poorly drained Oconee and Herrick soils. These soils are below the Douglas soil on the landscape. 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. 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 is moderately suited to use as a site for dwellings or for 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, terraces, and contour farming help to control erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain productivity and tilth.

Adapted forage and hay plants grow well on this soil. Bromegrass, tall fescue, and alfalfa are suitable species. Deferred grazing helps to prevent overgrazing and thus helps to prevent surface compaction and excessive runoff and reduces the hazard of erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. Using a no-till system of seeding also helps to control erosion. Applications of fertilizer are needed. The plants should not be grazed or clipped until they are sufficiently established.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Also, the slope is a limitation in some areas. Reinforcing the foundation or extending the footings below the subsoil helps to prevent the structural damage caused by shrinking and swelling. Land shaping by cutting and filling helps to overcome the slope.

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 filter field or replacing the soil with more permeable material helps to overcome the restricted permeability. Installing the filter lines on the contour and cutting and filling help to overcome the slope.

The land capability classification is IIIe.

131C—Alvin fine sandy loam, 5 to 10 percent slopes. This moderately sloping, well drained soil is on narrow ridges in the uplands. Individual areas are elongated and range from 5 to 20 acres in size.

Typically, the surface layer is brown, friable fine sandy loam about 6 inches thick. The subsurface layer is yellowish brown, friable fine sandy loam about 2 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part is dark yellowish brown, friable fine sandy loam. The next part is strong brown, firm sandy loam. The lower part consists of alternating layers of strong brown, friable fine sandy loam and yellowish brown, loose loamy fine sand. In some areas the surface layer and the upper part of the subsoil have less sand. In other areas the slope is less than 5 percent.

Included with this soil in mapping are small areas of the somewhat poorly drained Bluford soils. These soils have less sand than the Alvin soil. They are on the less sloping ridges below the Alvin soil. They make up 2 to 5 percent of the unit.

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

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops. It is well suited to use as a site for dwellings or for septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, erosion and soil blowing are hazards. Also, the moderate available water capacity and the level of fertility are limitations. A system of conservation tillage that leaves crop residue on the surface after planting, terraces, and contour farming help to control erosion and conserve moisture. Field windbreaks and a tillage system that leaves the surface rough are effective in controlling soil blowing.

The land capability classification is IIIe.

132—Starks silt loam. This nearly level, somewhat poorly drained soil is on low, broad ridges on Wisconsinan glacial outwash plains and stream terraces. Individual areas are irregularly shaped and range from 5 to 40 acres in size.

Typically, the surface layer is brown, friable silt loam about 10 inches thick. The subsurface layer is brown, mottled, friable silt loam about 2 inches thick. The subsoil is about 37 inches thick. It is mottled. The upper part is brown, friable and firm silty clay loam. The next part is grayish brown, firm silty clay loam. The lower part is grayish brown, firm sandy loam. The underlying material to a depth of 60 inches or more is brown and dark yellowish brown, mottled, friable sandy loam that has thin strata of loamy sand and silt loam. In some areas the subsoil contains more clay. In a few areas the surface layer is darker and thicker. In places the loamy stratified outwash is lower in the profile.

Included with this soil in mapping are small areas of the well drained Camden and poorly drained Drummer soils. Camden soils are on the crests of ridges and on terraces above the Starks soil. Drummer soils are in drainageways and in nearly level or slightly depressional areas below the Starks soil. Included soils make up 2 to 10 percent of the unit.

Water and air move through the Starks soil at a moderate rate. Surface runoff is slow. The seasonal high water table is at a depth of 1 to 3 feet during spring. Available water capacity is high. Organic matter content is moderately low. The surface layer is friable and can be easily tilled when moist, but it 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. This soil is well suited to cultivated crops. It is poorly suited to use as a site for dwellings or for septic tank absorption fields.

In areas used for corn, soybeans, or small grain, the wetness delays planting in most years. It can be reduced by surface ditches or subsurface drains. Erosion is a hazard in areas where slopes are very long. It can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting. Tilling when the soil is wet causes surface compaction, reduces the rate of water infiltration, and causes excessive runoff. Returning crop residue to the soil and regularly adding other organic material increase the infiltration rate and improve tilth.

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.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the moderate permeability are limitations. Subsurface tile drains help to lower the water table. Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the restricted permeability.

The land capability classification is IIw.

134A—Camden silt loam, 0 to 2 percent slopes. This nearly level, well drained soil is on flat ridges above the flood plains and on Wisconsinan glacial outwash plains. Individual areas are irregular in shape and range from 5 to 25 acres in size.

Typically, the surface layer is brown, friable silt loam about 8 inches thick. The subsurface layer is yellowish brown, friable silt loam about 3 inches thick. The subsoil is about 32 inches thick. The upper part is yellowish brown, friable silt loam; the next part is yellowish brown, firm silty clay loam; and the lower part is dark yellowish brown, firm sandy clay loam. The underlying material to a depth of 60 inches or more is dark yellowish brown, friable loamy sand and sandy loam. In some places the upper part of the subsoil has more gravel. In other places the upper part of the subsoil has more sand. In some areas the depth to the underlying material is greater.

Included with this soil in mapping are small areas of the somewhat poorly drained Millbrook and Starks soils. These soils are below the Camden soil on the landscape. They make up 5 to 10 percent of the unit.

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

Most areas are cultivated. This soil is well suited to cultivated crops and to use as a site for dwellings with basements. It is moderately suited to use as a site for dwellings without basements or for septic tank absorption fields.

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.

If this soil is used as a site for dwellings without basements, the shrink-swell potential is a limitation. Reinforcing the foundation or extending the footings below the subsoil helps to prevent the structural damage caused by shrinking and swelling.

The moderate permeability is a limitation if this soil is used as a site for septic tank absorption fields. Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome this limitation.

The land capability classification is I.

134B—Camden silt loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on convex ridges on Wisconsinan glacial outwash plains and stream terraces. Individual areas are irregularly shaped and range from 5 to 50 acres in size.

Typically, the surface layer is brown, friable silt loam about 7 inches thick. The subsurface layer is dark yellowish brown, friable silt loam about 3 inches thick. The subsoil is about 43 inches thick. The upper part is dark yellowish brown, friable silty clay loam. The next part is dark yellowish brown, friable loam. The lower part is dark yellowish brown and strong brown, friable sandy loam. The underlying material to a depth of 60 inches or more is strong brown, stratified sandy loam and loamy sand. In some places the surface layer has more sand. In other places the surface layer and the subsoil have more gravel. In some areas the loamy and sandy stratified outwash is lower in the profile.

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

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

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to use as a site for dwellings with basements. It is moderately suited to use as a site for dwellings without basements or for septic tank absorption fields.

In areas used for corn, soybeans, or small grain, erosion is a hazard. It can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting, terraces, and contour farming. Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. 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 without basements, 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 moderate permeability is a limitation if this soil is used as a site for septic tank absorption fields. Increasing the size of the absorption field or replacing the soil with more permeable material 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 the side slopes of convex ridges on Wisconsinan glacial outwash plains and stream terraces. Individual areas are irregularly shaped and range from 3 to 15 acres in size.

Typically, the surface layer is brown, friable silt loam about 7 inches thick. It has been thinned by erosion. The subsoil is about 40 inches thick. The upper part is dark yellowish brown, friable silty clay loam. The next part is yellowish brown, firm silty clay loam. The lower part is yellowish brown, firm loam and friable sandy loam. The underlying material to a depth of 60 inches or more is yellowish brown, friable sandy loam and loam. In places the surface layer contains more clay. In some areas the soil does not have loamy or sandy material in the lower part. In other areas the surface layer is thicker or darker.

Included with this soil in mapping are small areas of the somewhat poorly drained Millbrook soils. These soils are in nearly level areas below the Camden soil. They make up 2 to 8 percent of the unit.

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

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops and to use as a site for dwellings without basements or for septic tank absorption fields. It is well suited to pasture and hay and to use as a site for dwellings with basements.

Measures that control erosion are needed in the areas used for corn, soybeans, or small grain. Erosion-control measures include a system of conservation tillage that leaves crop residue on the surface after planting, terraces, contour farming, and a crop rotation that includes 1 or more years of forage crops. Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and help to maintain tilth.

If this soil is used as a site for dwellings, the slope is a limitation where it is more than 8 percent. Land shaping by cutting and filling helps to overcome the slope. On sites for dwellings without basements, 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 moderate permeability is a limitation if this soil is used as a site for septic tank absorption fields. Also, the slope is a limitation where it is more than 8 percent. Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome the restricted permeability. Installing the filter lines on the contour and cutting and filling help to overcome the slope.

The land capability classification is IIIe.

148A—Proctor silt loam, 0 to 2 percent slopes. This nearly level, moderately well drained soil is on low ridges on Wisconsinan glacial outwash plains. Individual areas are oval or elongated and range from 5 to 20 acres in size.

Typically, the surface soil is very dark gray and very dark grayish brown, friable silt loam about 11 inches thick. The subsoil is about 26 inches thick. The upper part is dark yellowish brown and yellowish brown, friable silty clay loam. The next part is dark yellowish brown and yellowish brown, firm silty clay loam and is mottled. The lower part is dark yellowish brown and yellowish brown, friable sandy loam and is mottled. The underlying material to a depth of 60 inches or more is dark yellowish brown and yellowish brown, friable, stratified sandy loam and loamy sand. In places the surface soil is thinner and lighter in color. In some areas the loamy and sandy stratified outwash is lower in the profile. In other areas the underlying material contains less sand.

Included with this soil in mapping are small areas of the poorly drained Drummer and somewhat poorly drained Millbrook soils. Drummer soils are in the lower areas and in drainageways below the Proctor soil. Millbrook soils are on the lower part of ridges below the Proctor soil. Included soils make up 5 to 12 percent of the unit.

Water and air move through the Proctor soil at a moderate rate. Surface runoff is slow. The seasonal high water table is at a depth of 2.5 to 6.0 feet during 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. This soil is well suited to cultivated crops. It is moderately suited to use as a site for dwellings and poorly suited to use as a site for septic tank absorption fields.

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.

If this soil is used as a site for dwellings with basements, the seasonal high water table and the shrink-swell potential are limitations. The shrink-swell potential also is a limitation on sites for dwellings without basements. 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.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the moderate permeability are limitations. Subsurface tile drains help to lower the water table. Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the restricted permeability.

The land capability classification is I.

148B—Proctor silt loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on convex ridges on Wisconsinan glacial outwash plains and high stream terraces. Individual areas are oblong or irregularly shaped and range from 3 to 50 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 10 inches thick. The subsoil is about 36 inches thick. The upper part is dark yellowish brown, friable and firm silty clay loam. The lower part is dark yellowish brown, friable loam. The underlying material to a depth of 60 inches or more is dark yellowish brown, friable, stratified sandy loam and loamy sand. In some places the surface layer is thinner and lighter in color. In other places the underlying material is calcareous loam till. In some areas the surface layer and the upper part of the subsoil have more sand.

Included with this soil in mapping are small areas of the somewhat poorly drained Elburn and poorly drained Drummer soils. These soils are in drainageways and shallow depressions below the Proctor soil. They make up 3 to 12 percent of the unit.

Water and air move through the Proctor soil at a moderate rate. 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. This soil is well suited to cultivated crops and to use as a site for dwellings with basements. It is moderately suited to use as a site for dwellings without basements or for 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 improve soil tilth.

If this soil is used as a site for dwellings without basements, 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 moderate permeability is a limitation if this soil is used as a site for septic tank absorption fields. Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome this limitation.

The land capability classification is IIe.

152—Drummer silty clay loam. This nearly level, poorly drained soil is in low areas on broad, loess-covered Wisconsinan glacial till plains and outwash plains. It is subject to ponding in the spring. Individual areas are irregularly shaped and range from 3 to more than 500 acres in size.

Typically, the surface soil is black, firm silty clay loam about 14 inches thick. The subsoil is about 32 inches thick. It is dark grayish brown and grayish brown and is mottled. The upper part is firm silty clay loam, and the lower part is friable silt loam. The underlying material to a depth of 60 inches or more is grayish brown, mottled, friable loam. In a few places the surface soil is thicker and contains more clay. In some areas the underlying material is loam or clay loam glacial till. In a few areas carbonates are within a depth of 35 inches.

Included with this soil in mapping are small areas of the somewhat poorly drained Elburn and Flanagan soils and the moderately well drained Catlin and Dana soils. These soils are on knobs and rises 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. Surface runoff is slow to ponded. The seasonal high water table is 0.5 foot above to 2.0 feet below the surface during spring. Available water capacity is very high. Organic matter content is high. The surface layer becomes compacted and cloddy if it is plowed when too wet. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops. It is generally unsuited to use as a site for dwellings or for septic tank absorption fields because of the ponding.

If drained, this soil can be used for corn, soybeans, or small grain. A drainage system has been installed in most areas. Measures that maintain the drainage system are needed. Additional drainage may be needed in some areas. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. Land grading helps to control the ponding. Applying a conservation tillage system that leaves crop residue on the surface after planting and returning crop residue to the soil improve soil tilth, minimize surface compaction, and increase the rate of water infiltration.

The land capability classification is IIw.

154—Flanagan silt loam. This nearly level, somewhat poorly drained soil is on low ridges and knolls on loess-covered Wisconsinan glacial till plains in the uplands. Individual areas are irregularly shaped and range from 3 to more than 500 acres in size.

Typically, the surface soil is friable silt loam about 18 inches thick. The upper part is black, and the lower part is very dark gray. The subsoil is firm silty clay loam about 33 inches thick. It is mottled. The upper part is dark grayish brown, and the lower part is brown. The underlying material to a depth of 60 inches or more is brown, mottled, firm, calcareous loam. In some areas the subsoil has less clay. In other areas the underlying material has thin layers of sandy loam, loamy sand, or sand.

Included with this soil in mapping are small areas of the moderately well drained Catlin and Dana soils and the poorly drained Drummer soils. Catlin and Dana soils are on slight rises above the Flanagan soil. Drummer soils are in broad, flat areas below the Flanagan soil. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Flanagan soil at a moderately slow rate. Surface runoff is slow. The seasonal high water table is at a depth of 1.5 to 3.5 feet during 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. This soil is well suited to cultivated crops. It is poorly suited to use as a site for dwellings or for 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 with basements, the seasonal high water table and the shrink-swell potential are limitations. The shrink-swell potential also is a limitation on sites for dwellings without basements. 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.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the moderately slow permeability are limitations. Subsurface tile drains help to lower the water table. Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the restricted permeability.

The land capability classification is I.

171B—Catlin silt loam, 2 to 5 percent slopes. This gently sloping, moderately well drained soil is on ridgetops and side slopes in the Wisconsinan glaciated uplands. Individual areas are irregularly shaped and range from 3 to 80 acres in size.

Typically, the surface soil is very dark grayish brown and dark brown, friable silt loam about 12 inches thick. The subsoil is about 42 inches thick. The upper part is dark yellowish brown and yellowish brown, friable silt loam. The next part is dark yellowish brown and yellowish brown, mottled, friable and firm silty clay loam. The lower part is dark yellowish brown and yellowish brown, mottled, friable silt loam. The underlying material to a depth of 60 inches or more is yellowish brown, mottled, firm, calcareous loam. In some areas the surface layer is thinner and lighter in color. In other areas the underlying material has thin layers of loamy and sandy outwash. In a few places, the subsoil is thinner and glacial till is within a depth of 40 inches.

Included with this soil in mapping are small areas of the somewhat poorly drained Flanagan and poorly drained Drummer soils. These soils are below the Catlin soil on the landscape. They make up 5 to 15 percent of the unit.

Water and air move through the Catlin soil at a moderate rate. Surface runoff is medium. The seasonal high water table is at a depth of 3.5 to 6.0 feet during 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. This soil is well suited to cultivated crops. It is moderately suited to use as a site for dwellings and poorly suited to use as a site for 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 improve soil tilth.

If this soil is used as a site for dwellings with basements, the seasonal high water table and the shrink-swell potential are limitations. The shrink-swell potential also is a limitation on sites for dwellings without basements. 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.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the moderate permeability are limitations. Subsurface tile drains help to lower the water table. Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the restricted permeability.

The land capability classification is IIe.

198—Elburn silt loam. This nearly level, somewhat poorly drained soil is on low, broad ridges on Wisconsinan glacial outwash plains in the uplands. Individual areas are irregularly shaped and range from 3 to 100 acres in size.

Typically, the surface soil is very dark grayish brown, friable silt loam about 13 inches thick. The subsoil is about 43 inches thick. The upper part is brown, friable silt loam. The next part is brown, mottled, friable and firm silty clay loam. The lower part is brown, mottled, friable sandy loam. The underlying material to a depth of 60 inches or more is light brownish gray, mottled, stratified friable silt loam and fine sandy loam. In some areas the upper part of the subsoil has more sand. In other areas the soil is better drained.

Included with this soil in mapping are small areas of the poorly drained Drummer soils. These soils are below the Elburn soil on the landscape. They make up 5 to 10 percent of the unit.

Water and air move through the Elburn soil at a moderate rate. Surface runoff is slow. The seasonal high water table is at a depth of 1 to 3 feet during 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. This soil is well suited to cultivated crops. It is poorly suited to use as a site for dwellings or for 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.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the moderate permeability are limitations. Subsurface tile drains help to lower the water table. Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the restricted permeability.

The land capability classification is I.

212B—Thebes silt loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on ridges in the uplands. Individual areas are irregularly shaped and range from 5 to 25 acres in size.

Typically, the surface layer is brown, friable silt loam about 7 inches thick. The subsurface layer also is brown, friable silt loam. It is about 3 inches thick. The subsoil is about 39 inches thick. The upper part is dark yellowish brown, firm silty clay loam. The lower part is dark yellowish brown, friable sandy loam. The underlying material to a depth of 60 inches or more is dark yellowish brown, loose loamy sand that has thin layers of dark yellowish brown, friable sandy loam. In some places the surface layer and the upper part of the subsoil have more sand. In other places the depth to sandy material is more than 60 inches.

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

Water and air move through the subsoil of the Thebes soil at a moderate rate and through the underlying material at a rapid rate. Surface runoff is medium. Available water capacity is high. Organic matter content is moderately low. 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. This soil is well suited to cultivated crops, pasture, and hay. It is moderately suited to use as a site for dwellings without basements. It is poorly suited to use as a site for septic tank absorption fields.

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

Maintaining a cover of grasses and legumes improves tilth and helps to control erosion. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable species. Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition.

If this soil is used as a site for dwellings without basements, the shrink-swell potential is a limitation. Reinforcing the foundations or extending the footings below the subsoil 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 rapid permeability of the subsoil is a limitation. The rapid permeability may allow seepage of inadequately treated sewage into the ground water. A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank are installed.

The land capability classification is IIe.

219—Millbrook silt loam. This nearly level, somewhat poorly drained soil is on broad ridges on the Wisconsinan glacial outwash plain. Individual areas are irregularly shaped and range from 2 to 50 acres in size.

Typically, the surface layer is dark brown, friable silt loam about 9 inches thick. The subsurface layer is dark grayish brown and grayish brown, mottled, friable silt loam about 7 inches thick. The subsoil is about 30 inches thick. It is mottled. The upper part is yellowish brown and brown, firm silty clay loam. The lower part is grayish brown, firm silty clay loam and clay loam. The underlying material to a depth of 60 inches or more is pale brown, mottled, stratified, friable loam, silt loam, and sandy loam. In places the surface layer is thinner and lighter in color. In some areas the subsoil has more sand.

Included with this soil in mapping are small areas of the well drained Camden and poorly drained Drummer soils. Camden soils are on gently sloping rises above the Millbrook soil. Drummer soils are in swales and drainageways below the Millbrook soil. Included soils make up 2 to 10 percent of the unit.

Water and air move through the Millbrook soil at a moderate rate. Surface runoff is slow. The seasonal high water table is at a depth of 1 to 3 feet during 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. This soil is well suited to cultivated crops. It is poorly suited to use as a site for dwellings or for 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.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the moderate permeability are limitations. Subsurface tile drains help to lower the water table. Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the restricted permeability.

The land capability classification is I.

221B2—Parr silt loam, 2 to 5 percent slopes, eroded. This gently sloping, well drained soil is on side slopes on loess-covered Wisconsinan glacial till plains and moraines. Individual areas are irregularly shaped and range from 3 to 40 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 9 inches thick. It has been thinned by erosion. The subsoil is dark yellowish brown and yellowish brown, firm clay loam about 25 inches thick. It is calcareous in the lower part. The underlying material to a depth of 60 inches or more is brown and yellowish brown, mottled, firm, calcareous loam. In places the surface layer is clay loam because cultivation has mixed it with the upper part of the subsoil. In some areas the depth to the underlying material is less than 24 inches.

Included with this soil in mapping are small areas of the poorly drained Drummer and somewhat poorly drained Raub soils. Drummer soils are in drainageways below the Parr soil. Raub soils are in nearly level areas above the Parr soil. Included soils make up 2 to 8 percent of the unit.

Water and air move through the subsoil of the Parr soil at a moderate rate and through the underlying material at a slow rate. Surface runoff is medium. Available water capacity and organic matter content are moderate. The shrink-swell potential and the potential for frost action also are moderate.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops, pasture, and hay. It is moderately suited to use as a site for dwellings and poorly suited to use as a site for 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 improve soil tilth.

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 restricted permeability is a limitation if this soil is used as a site for septic tank absorption fields. Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome this limitation.

The land capability classification is IIe.

221C2—Parr silt loam, 5 to 10 percent slopes, eroded. This moderately sloping, well drained soil is on short, uneven side slopes on loess-covered Wisconsinan glacial till plains and moraines in the uplands. Individual areas are irregularly shaped and range from 5 to 80 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 8 inches thick. It has been thinned by erosion. The subsoil is firm clay loam about 20 inches thick. The upper part is dark yellowish brown, and the lower part is brown. The underlying material to a depth of 60 inches or more is brown, firm, calcareous loam. In places the surface layer is clay loam because cultivation has mixed it with the upper part of the subsoil. In some areas the depth to the underlying material is less than 24 inches. In other areas the slope is more than 10 percent.

Included with this soil in mapping are small areas of the poorly drained Drummer and somewhat poorly drained Raub soils. Drummer soils are in drainageways below the Parr soil. Raub soils are in nearly level areas above the Parr soil. Included soils make up 5 to 10 percent of the unit.

Water and air move through the subsoil of the Parr soil at a moderate rate and through the underlying material at a slow rate. Surface runoff is medium. Available water capacity and organic matter content are moderate. The shrink-swell potential and the potential for frost action also are moderate.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops. It is moderately suited to use as a site for dwellings and poorly suited to use as a site for 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, terraces, and contour farming help to control erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain productivity and tilth.

If this soil is used as a site for dwellings without basements, the shrink-swell potential is a limitation. Also, the slope is a limitation in some areas. Reinforcing the foundations or extending the footings below the subsoil helps to prevent the structural damage caused by shrinking and swelling. Land shaping by cutting and filling helps to overcome the slope.

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

The land capability classification is IIIe.

234—Sunbury silt loam. This nearly level, somewhat poorly drained soil is on broad, loess-covered Wisconsinan glacial till plains. Individual areas are irregularly shaped and range from 3 to 80 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, mottled, friable silt loam about 3 inches thick. The subsoil is about 43 inches thick. It is mottled. The upper part is brown and yellowish brown, firm silty clay loam. The next part is dark grayish brown, firm silty clay loam. The lower part is yellowish brown, firm clay loam. The underlying material to a depth of 60 inches or more is yellowish brown, mottled, very firm loam. In some areas the surface layer is thicker. In other areas the surface layer is lighter in color.

Included with this soil in mapping are small areas of the poorly drained Drummer soils. These soils are in drainageways and depressions below the Sunbury soil. They make up 2 to 10 percent of the unit.

Water and air move through the Sunbury soil at a moderately slow rate. Surface runoff is slow. The seasonal high water table is at a depth of 1.5 to 3.5 feet 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. This soil is well suited to cultivated crops. It is poorly suited to use as a site for dwellings or for 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 with basements, the seasonal high water table and the shrink-swell potential are limitations. The shrink-swell potential also is a limitation on sites for dwellings without basements. 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.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the moderately slow permeability are limitations. Subsurface tile drains help to lower the water table. Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the restricted permeability.

The land capability classification is I.

236—Sabina silt loam. This nearly level, somewhat poorly drained soil is on broad ridges near major drainageways on loess-covered Wisconsinan glacial till plains. Individual areas are irregularly shaped and range from 5 to 100 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 8 inches thick. The subsurface layer is grayish brown, mottled, friable silt loam about 4 inches thick. The subsoil extends to a depth of 60 inches or more. It is mottled. In sequence downward, it is brown, friable silty clay loam; dark grayish brown, firm silty clay loam; brown, friable and firm silty clay loam; and grayish brown, firm clay loam. In some areas the surface layer is darker. In other areas the subsoil has less clay.

Included with this soil in mapping are small areas of the poorly drained Drummer and moderately well drained Xenia soils. Drummer soils are in depressions and drainageways below the Sabina soil. Xenia soils are on rises above the Sabina soil. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Sabina soil at a moderately slow rate. Surface runoff is slow. The seasonal high water table is at a depth of 1.5 to 3.5 feet during spring. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential and the potential for frost action are high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops. It is poorly suited to use as a site for dwellings or for septic tank absorption fields.

In areas used for corn, soybeans, or small grain, the wetness delays planting in most years. The wetness can be reduced by surface ditches or subsurface drains. Erosion is a hazard in areas where slopes are very long. It can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting. Tilling when the soil is wet causes surface compaction, reduces the rate of water infiltration, and causes excessive runoff. Returning crop residue to the soil and regularly adding other organic material increase the infiltration rate and improve tilth.

If this soil is used as a site for dwellings with basements, the seasonal high water table and the shrink-swell potential are limitations. The shrink-swell potential also is a limitation on sites for dwellings without basements. 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 moderately slow permeability and the seasonal high water table are limitations if this soil is used as a site for septic tank absorption fields. Tile drains help to lower the water table. Enlarging the absorption area helps to overcome the restricted permeability. A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank are installed.

The land capability classification is IIw.

256C2—Pana silt loam, 5 to 10 percent slopes, eroded. This moderately sloping, well drained soil is on the side slopes of prominent ridges in the Illinoian glaciated uplands. Individual areas are oval and range from 3 to 40 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 9 inches thick. It has been thinned by erosion. The subsoil extends to a depth of 60 inches or more. The upper part is brown, friable loam. The next part is strong brown, friable clay loam. The lower part is strong brown, friable gravelly clay loam. In some areas the subsoil contains less sand and gravel. In other areas the subsoil and the underlying material contain coarser sand and gravel. In some places the surface layer is lighter in color. In other places the slope is more than 10 percent.

Included with this soil in mapping are small areas of the somewhat poorly drained Oconee soils. These soils are at the base of slopes below the Pana soil. They make up 2 to 5 percent of the unit.

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

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 and to use as a site for dwellings or for 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, terraces, and contour farming help to control erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain productivity and tilth.

Adapted forage and hay plants grow well on this soil. Bromegrass, tall fescue, and alfalfa are suitable species. Deferred grazing helps to prevent overgrazing and thus helps to prevent surface compaction and excessive runoff and reduces the hazard of erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. Using a no-till system of seeding also helps to control erosion. Applications of fertilizer are needed. The plants should not be grazed or clipped until they are sufficiently established.

The land capability classification is IIIe.

291B—Xenia silt loam, 2 to 5 percent slopes. This gently sloping, moderately well drained soil is on convex ridgetops and on side slopes in the Wisconsinan glaciated uplands. Individual areas are irregularly shaped and range from 3 to 40 acres in size.

Typically, the surface layer is brown, friable silt loam about 5 inches thick. The subsurface layer also is brown, friable silt loam. It is about 3 inches thick. The subsoil is about 49 inches thick. The upper part is yellowish brown, friable silt loam. The next part is yellowish brown, mottled, firm silty clay loam. The lower part is yellowish brown and dark yellowish brown, mottled, firm clay loam. The underlying material to a depth of 60 inches or more is yellowish brown, mottled, firm, calcareous loam. In some areas the soil is well drained. In other areas the depth to loamy glacial till is greater.

Included with this soil in mapping are small areas of the somewhat poorly drained Sabina and Sunbury soils. These soils are in the less sloping positions below the Xenia soil. They make up 5 to 10 percent of the unit.

Water and air move through the Xenia soil at a moderately slow rate. Surface runoff is medium. The seasonal high water table is at a depth of 2.0 to 3.5 feet during spring. Available water capacity is high. Organic matter content is moderately low. The surface layer is friable and can be easily tilled when moist, but it 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. This soil is well suited to cultivated crops, pasture, hay, and woodland. It is moderately suited to use as a site for dwellings without basements. It is poorly suited to use as a site for septic tank absorption fields or for dwellings with basements.

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

If this soil is used as woodland, plant competition is a management concern. It affects the seedlings of desirable species. In openings where timber has been harvested, competition from undesirable species 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 seasonal high water table and the shrink-swell potential are limitations if this soil is used as a site for dwellings. The wetness is a more severe limitation on sites for dwellings with basements than on sites for dwellings without basements. Reinforcing footings and foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface drains around the foundations lowers the water table.

The moderately slow permeability and the seasonal high water table are limitations if this soil is used as a site for septic tank absorption fields. Tile drains help to lower the water table. Enlarging the absorption area helps to overcome the restricted permeability. A septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank are installed.

The land capability classification is IIe.

330—Peotone silty clay loam. This nearly level, very poorly drained soil is in depressions on loess-covered Wisconsinan glacial till plains. It is occasionally ponded for brief periods from midwinter through midsummer. Individual areas are round or oval and range from 2 to 20 acres in size.

Typically, the surface soil is black, firm silty clay loam about 10 inches thick. The subsurface layer is black, mottled, firm silty clay about 7 inches thick. The subsoil is about 36 inches thick. It is mottled. The upper part is very dark gray, firm silty clay. The lower part is olive gray, friable and firm silty clay loam. The underlying material to a depth of 60 inches or more is light olive gray, mottled, friable silty clay loam. In some places, the surface soil is thinner and the subsoil contains less 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 Flanagan soils. These soils are on slight rises above the Peotone soil. They are not ponded. They make up 2 to 5 percent of the unit.

Water and air move through the Peotone soil at a moderately slow rate. Surface runoff is very slow or ponded. The seasonal high water table is 0.5 foot above to 1.0 foot below the surface during winter and spring. Available water capacity is high. Organic matter content also is high. The surface layer becomes compacted and cloddy if it is plowed when too wet. The shrink-swell potential and the potential for frost action are high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops. It generally is unsuited to use as a site for dwellings or for septic tank absorption fields because of the ponding.

If drained, this soil can be used for corn, soybeans, or small grain. A drainage system has been installed in most areas. Measures that maintain the drainage system are needed. Additional drainage may be needed in some areas. Surface drains and surface inlet tile function satisfactorily if suitable outlets are available. Land grading helps to control the ponding. Applying a conservation tillage system that leaves crop residue on the surface after planting and returning crop residue to the soil improve tilth, help to prevent surface compaction and crusting, and increase the rate of water infiltration.

The land capability classification is IIw.

474—Piasa silt loam. This nearly level, poorly drained soil is on broad flats and in depressions on loess-covered Illinoian glacial till plains. It is subject to ponding. The subsoil has a high content of sodium. Individual areas are irregularly shaped and range from 5 to 80 acres in size.

Typically, the surface layer is very dark gray, friable silt loam about 8 inches thick. The subsurface layer is dark grayish brown and grayish brown, friable silt loam about 7 inches thick. The subsoil is silty clay loam about 35 inches thick. It is mottled. The upper part is dark grayish brown and is friable and firm. The lower part is light brownish gray and is firm. The underlying material extends to a depth of 60 inches or more. It is light brownish gray, mottled, friable silt loam in the upper part and gray, mottled, firm loam in the lower part. In some areas the surface layer is lighter in color. In other areas the zone of high sodium content is lower in the profile.

Included with this soil in mapping are small, closely intermingled areas of Cowden and Virden soils. Also included are some areas of the somewhat poorly drained Herrick and Oconee soils on the higher parts of the till plains. These included soils have a low content of sodium in the subsoil. They make up 10 to 15 percent of the unit.

Water and air move through the Piasa soil at a very slow rate. Surface runoff is slow to ponded. The seasonal high water table is perched 0.5 foot above to 2.0 feet below the surface during spring. Available water capacity is moderate. The subsoil has a high content of sodium. Organic matter content is moderate. The surface layer is friable and can be easily tilled when moist, but it 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 hay and pasture. This soil is moderately suited to cultivated crops and is well suited to hay and pasture. It is unsuited to use as a site for dwellings or for septic tank absorption fields because of the ponding.

In the areas used for corn, soybeans, or small grain, the seasonal high water table and the high content of sodium in the subsoil are limitations. Random subsurface drains with surface inlets and shallow ditches reduce the wetness. The high content of sodium in the subsoil results in plant stress during dry periods and excess moisture during wet periods. Also, the content of sodium restricts the availability and uptake of some plant nutrients. Soil blowing is a hazard. It can be controlled by leaving crop residue on the surface and by establishing field windbreaks. Tilling when the soil is wet causes surface cloddiness and compaction and reduces the rate of water infiltration. Minimizing tillage, returning crop residue to the soil, and regularly adding other organic material increase the infiltration rate and improve tilth and fertility.

Maintaining a cover of grasses and legumes improves tilth and helps to control soil blowing. Cool-season grasses, such as Kentucky bluegrass and tall fescue, and shallow-rooted legumes, such as ladino clover and alsike clover, are suitable species. Rotation grazing, proper stocking rates, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition.

The land capability classification is IIIw.

481—Raub silt loam. This nearly level, somewhat poorly drained soil is on broad ridges on moraines in the Wisconsinan glaciated uplands. Individual areas are irregularly shaped and range from 10 to 200 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 31 inches thick. It is mottled. The upper part is brown, firm silty clay loam. The lower part is brown, firm loam. The underlying material to a depth of 60 inches or more is grayish brown, mottled, firm, calcareous loam. In places the surface layer is thinner and lighter in color. In some areas the silty clay loam subsoil is thicker.

Included with this soil in mapping are small areas of the moderately well drained Dana, poorly drained Drummer, and well drained Parr soils. Dana and Parr soils are on ridges and side slopes above the Raub soil. Drummer soils are on broad till plains below the Raub soil. Included soils make up 2 to 6 percent of the unit.

Water and air move through the Raub soil at a moderately slow rate. Surface runoff is slow. The seasonal high water table is at a depth of 1 to 3 feet during 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. This soil is well suited to cultivated crops. It is poorly suited to use as a site for dwellings or for septic tank absorption fields.

In areas used for corn, soybeans, or small grain, the wetness delays 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.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the moderately slow permeability are limitations. Subsurface tile drains lower the water table. Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the restricted permeability.

The land capability classification is IIw.

583B—Pike silt loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on convex ridgetops and side slopes in the Illinoian glaciated uplands. Individual areas are oval or are irregularly shaped and range from 10 to 40 acres in size.

Typically, the surface layer is brown, friable silt loam about 8 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part is dark yellowish brown, firm silt loam. The next part is dark yellowish brown, firm silty clay loam. The lower part is dark yellowish brown and strong brown, firm silt loam. In some areas the subsoil has more sand and gravel.

Included with this soil in mapping are small areas of the somewhat poorly drained Bluford soils. These soils are in nearly level and gently sloping areas below the Pike soil. They make up 5 to 10 percent of the unit.

Water and air move through the Pike soil at a moderate rate. Surface runoff is medium. Available water capacity is high. Organic matter content is moderately low. The surface layer is friable and can be easily tilled when moist, but it tends to crust and puddle after hard rains. The shrink-swell potential is low, and the potential for frost action is high.

Most areas are used for cultivated crops. Some areas are used for hay and pasture. This soil is moderately suited to cultivated crops. It is well suited to hay and pasture and to use as a site for dwellings or for septic tank absorption fields.

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

Establishing pasture and hay crops helps to keep soil losses within tolerable limits. Seedbed preparation is difficult on side slopes where the subsoil is exposed. A no-till method of seeding or pasture renovation helps in establishing forage species and in controlling 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 and prevent surface compaction and excessive runoff.

The land capability classification is IIe.

585C2—Negley loam, 5 to 10 percent slopes, eroded. This moderately sloping, well drained soil is on the crest and sides of mounds in the Illinoian glaciated uplands. Individual areas are elongated and range from 5 to 40 acres in size.

Typically, the surface layer is brown, friable loam about 8 inches thick. It has been thinned by erosion. The subsoil extends to a depth of 60 inches or more. The upper part is strong brown, friable loam. The lower part is strong brown, friable clay loam. In some areas the upper part of the subsoil contains less gravel and sand. In other areas the surface layer is clay loam because tillage has mixed it with the upper part of the subsoil.

Included with this soil in mapping are small areas of the somewhat poorly drained Bluford soils. These soils are on slopes below the Negley soil. They make up 5 to 15 percent of the unit.

Water and air move through the Negley soil at a moderately rapid rate. Surface runoff is medium. Available water capacity is moderate. Organic matter content is moderately low. The surface layer is friable and can be easily tilled when moist, but it tends to crust and puddle after hard rains, especially in cultivated areas where it contains subsoil material. The shrink-swell potential is low, and the potential for frost action is moderate.

Most areas are used for cultivated crops. Some areas are used for pasture and hay. This soil is moderately suited to cultivated crops, pasture, and hay. It is well suited to use as a site for dwellings or for septic tank absorption fields.

Measures that control erosion are needed in the areas used for soybeans, corn, or small grain. Erosion-control measures include a system of conservation tillage that leaves crop residue on the surface after planting, terraces, contour farming, and a crop rotation that includes 1 or more years of forage crops. Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and help to maintain tilth.

Establishing pasture and hay crops helps to control erosion. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable species. Seedbed preparation is difficult on side slopes where the subsoil is exposed. A no-till method of seeding or pasture renovation helps in establishing forage species and in controlling 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 and prevent surface compaction and excessive runoff.

The land capability classification is IIIe.

585D2—Negley loam, 10 to 15 percent slopes, eroded. This strongly sloping, well drained soil is on the crest and sides of mounds in the Illinoian glaciated uplands. Individual areas are oval or elongated and range from 5 to 40 acres in size.

Typically, the surface layer is brown, friable loam about 9 inches thick. It has been thinned by erosion. The subsoil extends to a depth of 60 inches or more. The upper part is strong brown, firm clay loam. The next part is strong brown, firm gravelly clay loam and gravelly sandy clay loam. The lower part is strong brown, firm gravelly sandy loam. In some areas the upper part of the subsoil contains less gravel and sand. In other areas the slope is more than 15 percent.

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

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

Most areas are used for cultivated crops or for pasture and hay. Some areas are used as woodland. This soil is poorly suited to cultivated crops. It is moderately suited to pasture and hay and to use as a site for dwellings or for septic tank absorption fields. It is well suited to woodland.

In the areas used for corn, soybeans, or small grain, further erosion is a severe hazard. It can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting, by contour farming, and by crop rotations that are dominated by forage crops. Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and help to maintain tilth.

Adapted forage and hay crops grow well on this soil. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable species. Deferred grazing helps to prevent overgrazing and thus helps to prevent surface compaction and excessive runoff and reduces the hazard of erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. Also, using a no-till system of seeding helps to control erosion. Applications of fertilizer are needed. The plants should not be grazed or clipped until they are sufficiently established.

If this soil is used as woodland, plant competition is a management concern. It affects the seedlings of desirable species. In openings where timber has been harvested, competition from undesirable species 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 or septic tank absorption fields, the slope is a limitation. Land shaping by cutting and filling helps to overcome the slope. Installing the filter lines on the contour also helps to overcome this limitation.

The land capability classification is IVe.

620A—Darmstadt silt loam, 0 to 2 percent slopes. This nearly level, somewhat poorly drained soil is on broad, loess-covered Illinoian glacial till plains. The subsoil has a high content of sodium. Individual areas are irregularly shaped and range from 5 to 100 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 9 inches thick. The subsurface layer is light brownish gray, mottled, friable silt loam about 2 inches thick. The subsoil is about 45 inches thick. It is mottled. The upper part is pale brown, friable silt loam. The next part is yellowish brown, firm silty clay loam. The lower part is light brownish gray, firm silty clay loam. The underlying material to a depth of 60 inches or more is light gray, mottled, firm silty clay loam. In some areas the subsoil contains more clay. In other areas the zone of high sodium content is lower in the profile.

Included with this soil in mapping are small areas of the poorly drained Wynoose soils and the somewhat poorly drained Bluford and Oconee soils. Wynoose soils are on flats below the Darmstadt soil. Bluford and Oconee soils are in areas closely intermingled with the Darmstadt soil. The included soils have a low content of sodium in the subsoil. They make up 5 to 15 percent of the unit.

Water and air move through the Darmstadt soil at a very slow rate. Surface runoff is slow. The seasonal high water table is perched at a depth of 1 to 3 feet during spring. Available water capacity is moderate. The subsoil has a high content of sodium. Organic matter content is moderately low. The surface layer is friable and can be easily tilled when moist, but it 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 hay and pasture. This soil is moderately suited to cultivated crops and is well suited to hay and pasture. It is poorly suited to use as a site for dwellings or for septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, the seasonal high water table and the high content of sodium in the subsoil are limitations. Random subsurface drains with surface inlets and shallow ditches reduce the wetness. The high content of sodium in the subsoil results in plant stress during dry periods and excess moisture during wet periods. Also, the content of sodium restricts the availability and uptake of some plant nutrients. Soil blowing is a hazard. It can be controlled by leaving crop residue on the surface and by establishing field windbreaks. Tilling when the soil is wet causes surface cloddiness and compaction and reduces the rate of water infiltration. Minimizing tillage, returning crop residue to the soil, and regularly adding other organic material increase the infiltration rate and improve tilth and fertility.

Maintaining a cover of grasses and legumes improves tilth and helps to control soil blowing. Cool-season grasses, such as Kentucky bluegrass and tall fescue, and shallow-rooted legumes, such as ladino clover and alsike clover, are suitable species. Rotation grazing, proper stocking rates, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition.

The seasonal high water table and the shrink-swell potential are limitations if this soil is used as a site for dwellings. Backfilling with sand and gravel and reinforcing footings and foundations help to prevent the structural damage caused by shrinking and swelling. Installing subsurface drains around the footings lowers the water table. Elevating the floor of dwellings without basements above the surrounding ground level, grading, and diverting surface water from the site help to overcome the wetness. Establishing or maintaining lawns and shrubs is difficult because of the high content of sodium in the subsoil. Frequent watering during dry periods helps to maintain the lawn and shrubs.

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. Also, the high content of sodium causes the soil to disperse, which results in clogged distribution lines. A septic tank system can function satisfactorily if a sealed sand filter with a disinfection tank or aeration tank is installed. Sewage lagoons function very well in areas of this soil.

The land capability classification is IIIw.

620B2—Darmstadt silt loam, 2 to 5 percent slopes, eroded. This gently sloping, somewhat poorly drained soil is on the side slopes of drainageways and on low ridges in the Illinoian glaciated uplands. It has a high content of sodium in the subsoil. Individual areas are irregularly shaped and range from 5 to 30 acres in size.

Typically, the surface layer is yellowish brown, friable silt loam about 6 inches thick. It has been thinned by erosion. The subsoil is about 40 inches thick. The upper part is strong brown and yellowish brown, firm silty clay. The next part is brown and yellowish brown, mottled, firm and friable silty clay loam. The lower part is grayish brown and light brownish gray, mottled, friable silty clay loam. The substratum to a depth of 60 inches or more is brown, mottled, friable silt loam. In some areas the subsoil is grayer in the upper part. In other areas the depth to sodium-affected layers is greater.

Included with this soil in mapping are small areas of the somewhat poorly drained Bluford soils. These soils do not have a high content of sodium in the subsoil. They are in landscape positions similar to those of the Darmstadt soil. They make up 5 to 10 percent of the unit.

Air and water move through the Darmstadt soil at a very slow rate. Surface runoff is medium. The seasonal high water table is at a depth of 1 to 3 feet during spring. Available water capacity is moderate. Organic matter content is low. The subsoil has a high content of sodium. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops, pasture, or hay. This soil is moderately suited to cultivated crops. It is well suited to hay and pasture. It is poorly suited to use as a site for dwellings or for septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, further erosion is a severe hazard and the high sodium content is a limitation. A system of conservation tillage that leaves crop residue on the surface after planting, terraces, and contour farming help to control erosion. The high content of sodium in the subsoil results in plant stress during dry periods and in excess moisture during wet periods. Also, the sodium restricts the availability and uptake of some plant nutrients. Yields of wheat and soybeans are less affected by the high sodium content than yields of corn.

In the areas used for hay and pasture, erosion is a hazard when pastures are being established or renovated. Planting nurse crops helps to control erosion. Using a no-till seeding method also helps to control erosion during pasture renovation. Cool-season grasses, such as Kentucky bluegrass and tall fescue, and deep-rooted legumes, such as alfalfa and red clover, are suitable species. Timely harvesting and grazing and proper applications of fertilizer help to keep the pasture in good condition and help to control erosion.

The seasonal high water table and the shrink-swell potential are limitations if this soil is used as a site for dwellings. Backfilling with sand and gravel and reinforcing footings and foundations help to prevent the structural damage caused by shrinking and swelling. Installing subsurface drains around the footings lowers the water table. Elevating the floor of dwellings without basements above the surrounding ground level, grading, and diverting surface water from the site help to overcome the wetness. Establishing or maintaining lawns and shrubs is difficult because of the high content of sodium in the subsoil. Frequent watering during dry periods helps to maintain the lawn and shrubs.

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. Also, the high content of sodium causes the soil to disperse, which results in clogged distribution lines. A septic tank system can function satisfactorily if a sealed sand filter with a disinfection tank or aeration tank is installed.

The land capability classification is IIIe.

802D—Orthents, loamy, 7 to 20 percent slopes. These moderately well drained soils have been modified by filling and leveling. Individual areas are rectangular or are irregularly shaped and range from 5 to 30 acres in size.

These soils are along county road bridges, railroad beds, and borrow pits and in fill areas. Typically, the surface layer is mixed brown and light yellowish brown, friable clay loam about 3 inches thick. The underlying material to a depth of 60 inches or more consists of layers of brown, mottled, firm clay loam and loam.

Included with these soils in mapping are road surfaces and gravel pits. These areas make up 10 to 20 percent of the unit.

Generally, air and water move through the Orthents at a moderate rate. Surface runoff is medium or rapid. Available water capacity is moderate or high. Organic matter content and fertility generally are low.

Most areas are idle and are vegetated. Ornamental shrubs and trees have been planted in areas along county road bridges for erosion control. Other areas are covered naturally with trees, shrubs, herbaceous plants, and grasses. Unless the surface is protected by a good plant cover, the hazard of erosion is severe. Special management is needed for the establishment and maintenance of a proper vegetative cover. Onsite investigation is needed to determine the limitations or hazards affecting the development of these soils for specific uses.

No land capability classification is assigned.

864—Pits, quarries. This map unit consists of excavations and spoil piles where limestone has been mined for use in road construction and for agricultural and industrial uses. The quarries consist mainly of nearly level and gently sloping basins and the accompanying nearly vertical sidewalls. Individual areas are rectangular and range from 20 to 100 acres in size.

The basins and sidewalls are mainly exposed limestone bedrock. Undisturbed areas of Hickory, Bluford, and Ava soils are along the top of the sidewalls, and, in places, a talus slope is along the base of the sidewalls. Included in mapping are roads used in hauling the quarried material, stockpiles of crushed limestone, and soil material.

This map unit is poorly suited to most uses. Areas no longer used for mining can be used for recreation and wildlife habitat. Plants generally do not grow well because the spoil material is shallow, rocky, and limy. The feasibility of reclamation depends on the conditions at the site and the desired use.

No land capability classification is assigned.

865—Pits, gravel. This map unit consists of open excavations from which gravel and sand have been removed. The excavations commonly are 10 to 30 feet deep. Slopes range from 15 to more than 60 percent. Individual areas generally are blocky and range from 3 to 100 acres in size.

Typically, the soil material is gravelly and has been mixed or compacted during excavation. In some areas loamy material from the surface soil and the subsoil has been mixed with the gravelly underlying material. In some pits the soil material supports vegetation, such as trees, shrubs, weeds, and grasses. Undisturbed areas of Negley, Parke, or Pike soils are along the top of sidewalls.

Permeability varies because of differences in texture and in the degree of compaction, but it generally is moderately rapid. Surface runoff is medium to very rapid. Available water capacity varies but commonly is low or very low. Organic matter content and fertility commonly are low.

Areas of this unit that are not currently being excavated are idle land. Unless major reclamation efforts are applied, gravel pits generally are poorly suited to most uses. Some areas can be used as a source of gravel and sand, for landfills, or for recreation. Establishment of vegetation may require special preparation, such as land smoothing and leveling and topdressing with surface soil material. The feasibility of the reclamation depends on the conditions at the site and the proposed use.

No land capability classification is assigned.

916—Oconee-Darmstadt silt loams. These nearly level, somewhat poorly drained soils are on low, broad ridges in the Illinoian glaciated uplands. Individual areas are irregularly shaped and range from 5 to 200 acres in size. They are 40 to 60 percent Oconee soil and 30 to 50 percent Darmstadt soil. The Darmstadt soil has a high content of sodium in the subsoil. In areas that have been recently tilled, the Darmstadt soil appears as the lighter colored areas.

Typically, the surface layer of the Oconee soil is very dark grayish brown, friable silt loam about 9 inches thick. The subsurface layer is brown, mottled, friable silt loam about 5 inches thick. The subsoil is silty clay loam about 35 inches thick. It is mottled. The upper part is brown and friable, and the lower part is grayish brown and firm. The underlying material to a depth of 60 inches or more is gray, mottled, friable silt loam. In some areas the surface layer is lighter in color. In other areas the lower part of the subsoil has a high content of sodium.

Typically, the surface layer of the Darmstadt soil is very dark grayish brown, friable silt loam about 9 inches thick. The subsurface layer is brown, mottled, friable silt loam about 5 inches thick. The subsoil is silty clay loam about 41 inches thick. It is mottled. The upper part is brown and friable, the next part is grayish brown and firm, and the lower part is light brownish gray and friable. 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 contains more clay. In places the subsoil has a lower content of sodium.

Included with these soils in mapping are small areas of the poorly drained Cowden, Piasa, and Virden soils. These included soils are on broad flats or are in depressions and shallow drainageways below the Oconee and Darmstadt soils. They make up 5 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. Surface runoff is slow on both soils. The seasonal high water table is at a depth of 1 to 3 feet during 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 subsoil of the Darmstadt soil has a high content of sodium. The surface layer of both soils is friable and can be easily tilled when moist, but it tends to crust and puddle after hard rains, especially in areas of the Darmstadt soil. 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. These soils are moderately suited to cultivated crops. They are poorly suited to use as sites for dwellings or for septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, the seasonal high water table in both soils and the high content of sodium in the subsoil of the Darmstadt soil are limitations. Random subsurface drains with surface inlets and shallow ditches reduce the wetness. The high content of sodium in the subsoil of the Darmstadt soil results in plant stress during dry periods and excess moisture during wet periods. Also, the sodium restricts the availability and uptake of some plant nutrients. Soil blowing is a hazard. It can be controlled by leaving crop residue on the surface and by establishing field windbreaks. Tilling when the soils are wet causes surface cloddiness and compaction and reduces the rate of water infiltration. Minimizing tillage, returning crop residue to the soils, and regularly adding other organic material increase the infiltration rate and improve tilth and fertility.

The seasonal high water table and the shrink-swell potential are limitations if these soils are used as sites for dwellings. Backfilling with sand and gravel and reinforcing footings and foundations help to prevent the structural damage caused by shrinking and swelling. Installing subsurface drains around the footings lowers the water table. Elevating the floor of dwellings without basements above the surrounding ground level, grading, and diverting surface water from the site help to overcome the wetness. Establishing or maintaining lawns and shrubs is difficult because of the high content of sodium in the Darmstadt soil. Frequent watering during dry periods helps to maintain the lawn and shrubs.

The seasonal high water table and the restricted permeability are limitations if these soils are used as sites for septic tank absorption fields. Also, the high content of sodium in the Darmstadt soil causes the soil to disperse, which results in clogged distribution lines. A septic tank system can function satisfactorily if a sealed sand filter with a disinfection tank or aeration tank is installed. Sewage lagoons function very well in areas of these soils.

The land capability classification is IIIw.

3074—Radford silt loam, frequently flooded. This nearly level, somewhat poorly drained soil is on flood plains. It is frequently flooded for brief periods during spring and winter, but the flooding generally does not occur during the growing season. Individual areas are long and narrow and range from 5 to 30 acres in size.

Typically, the surface soil is black and very dark gray, friable silt loam about 13 inches thick. The underlying material is very dark gray, mottled, friable silt loam about 17 inches thick and has thin strata of dark grayish brown silt loam. Below this to a depth of 60 inches or more is a buried soil of black, mottled, firm silty clay loam. In some areas the surface soil has a light-colored, silt loam overwash. In some places the soil has a higher content of sand throughout.

Included with this soil in mapping are small areas of the poorly drained Sawmill soils. These soils are in depressions and swales below the Radford soil. They make up 5 to 15 percent of the unit.

Water and air move through the Radford soil at a moderate rate. Surface runoff is slow. The seasonal high water table is at a depth of 1 to 3 feet during winter and spring. Available water capacity is high. Organic matter content is moderate. The surface layer is friable and can be easily tilled when moist. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops. It generally is unsuited to use as a site for dwellings or for septic tank absorption fields because of the flooding.

This soil is sufficiently drained for corn, soybeans, or small grain. The flooding does not occur during the growing season in most years, but the wetness or the flooding can delay planting. The wetness can be reduced by surface ditches or subsurface drains. Returning crop residue to the soil and minimizing tillage help to maintain good tilth and increase the rate of water infiltration.

The land capability classification is IIIw.

3077A—Huntsville silt loam, 0 to 3 percent slopes, frequently flooded. This nearly level, well drained soil is on flood plains near streams. It is frequently flooded for brief periods in winter and spring, but the flooding generally does not occur during the growing season. Individual areas are long and narrow and range from 5 to 300 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 7 inches thick. The subsurface layer is friable silt loam about 48 inches thick. The upper part is very dark gray, and the lower part is dark brown and brown. The underlying material to a depth of 60 inches or more is brown, friable silt loam. In some places the surface soil is thinner. In other places the soil contains more sand.

Included with this soil in mapping are small areas of the somewhat poorly drained Tice and poorly drained Sawmill soils. These soils are in lower landscape positions than those of the Huntsville soil. They make up 5 to 10 percent of the unit.

Water and air move through the Huntsville soil at a moderate rate. Surface runoff is slow. Available water capacity is very high. Organic matter content is moderate. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops. It generally is unsuited to use as a site for dwellings or for septic tank absorption fields because of the flooding.

In the areas used as cropland, erosion or scouring during periods of flooding is a hazard. As a result, the soil should not be cultivated in the fall. Also, strips of grass are needed in critical areas. Minimizing tillage and returning crop residue to the soil help to maintain soil tilth and increase the rate of water infiltration.

The land capability classification is IIw.

3107—Sawmill silty clay loam, frequently flooded. This nearly level, poorly drained soil is in the lower areas and in sloughs on flood plains. It is frequently flooded for brief periods during spring and winter, but the flooding generally does not occur during the growing season. Individual areas are irregular in shape and range from 10 to 150 acres in size.

Typically, the surface soil is very dark gray and very dark grayish brown, mottled, firm silty clay loam about 20 inches thick. The subsoil is mottled, firm silty clay loam about 31 inches thick. The upper part is very dark gray, and the lower part is gray. The underlying material to a depth of 60 inches or more is light brownish gray, mottled, firm silty clay loam. In some places the surface soil and the subsoil contain more clay. In other places the subsoil and the underlying material have more sand.

Included with this soil in mapping are small areas of the somewhat poorly drained Tice soils. These soils are in the slightly higher positions on the landscape. They make up 2 to 8 percent of the unit.

Water and air move through the Sawmill soil at a moderate rate. Surface runoff is slow. The seasonal high water table is within a depth of 2 feet during spring. Available water capacity is very high. Organic matter content is high. The surface layer becomes compact and cloddy if it is tilled when too wet. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops. It generally is unsuited to use as a site for dwellings or for septic tank absorption fields because of the flooding.

In areas used for corn and soybeans, the seasonal high water table and the flooding may delay planting. The flooding does not occur during the growing season in most years. Surface ditches help to remove excess water. Keeping tillage to a minimum and returning crop residue to the soil help to maintain soil tilth and fertility and increase the rate of water infiltration.

The land capability classification is IIIw.

3225—Holton silt loam, frequently flooded. This nearly level, somewhat poorly drained soil is in the lower areas on the flood plains. It is frequently flooded for brief periods in winter and spring, but the flooding generally does not occur during the growing season. Individual areas commonly are long and narrow and range from 10 to 200 acres in size.

Typically, the surface layer is brown silt loam about 11 inches thick. The subsoil is about 28 inches thick. It is mottled. The upper part is dark grayish brown, friable silt loam. The lower part is grayish brown, friable loam. The underlying material to a depth of 60 inches or more is grayish brown and brown, mottled, friable loam. In some places the subsoil has less sand. In other places a dark buried soil is below a depth of 40 inches.

Included with this soil in mapping are small areas of the poorly drained Birds and Sawmill soils. These soils are below the Holton soil on the landscape. They make up 5 to 10 percent of the unit.

Water and air move through the Holton soil at a moderate rate. Surface runoff is slow. The seasonal high water table is at a depth of 1 to 3 feet during winter and spring. Available water capacity is very high. Organic matter content is low. The surface layer is friable and can be easily tilled when moist, but it tends to crust and puddle after hard rains. The potential for frost action is high, and the shrink-swell potential is moderate.

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

This soil is sufficiently drained for corn, soybeans, or small grain. The flooding does not occur during the growing season in most years, but the wetness or the flooding can delay planting. The wetness can be reduced by surface ditches or subsurface drains. Returning crop residue to the soil and minimizing tillage help to maintain good tilth and increase the rate of water infiltration.

If this soil is used for pasture, the flooding is a hazard and the seasonal high water table is a limitation. Dikes and diversions help to control the flooding, and subsurface tile drains help to lower the water table. Bromegrass, tall fescue, and alfalfa are suitable species. 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 land capability classification is IIIw.

3226—Wirt silt loam, frequently flooded. This nearly level, well drained soil is in the higher areas on the flood plains. It is frequently flooded for brief periods in spring and winter, but the flooding generally does not occur during the growing season. Individual areas are irregularly shaped and range from 5 to 200 acres in size.

Typically, the surface layer is brown, friable silt loam about 7 inches thick. The subsoil is friable loam about 33 inches thick. The upper part is brown, and the lower part is dark yellowish brown. The underlying material to a depth of 60 inches or more is brown and dark yellowish brown, friable loam that has strata of sandy loam and loamy sand. In some areas the surface layer is darker. In other areas a dark buried soil is within a depth of 60 inches.

Included with this soil in mapping are small areas of recent deposits of sandy overwash near stream channels. Included areas make up 2 to 8 percent of the unit.

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

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

In the areas used as cropland, erosion or scouring during periods of flooding is a hazard. As a result, the soil should not be cultivated in the fall. Also, strips of grass are needed in critical areas. Minimizing tillage and returning crop residue to the soil help to maintain soil tilth and increase the rate of water infiltration.

If this soil is used for pasture, the flooding is a hazard. Overgrazing causes surface compaction and poor tilth. Bromegrass, tall fescue, and alfalfa are suitable species. Proper stocking rates, rotation grazing, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition.

The land capability classification is IIw.

3284—Tice silty clay loam, frequently flooded. This nearly level, somewhat poorly drained soil is in low swales on flood plains. It is frequently flooded for brief periods in winter and spring, but the flooding generally does not occur during the growing season. Individual areas are long and narrow and range from 5 to 100 acres in size.

Typically, the surface soil is very dark grayish brown, firm silty clay loam about 19 inches thick. The subsoil extends to a depth of 60 inches or more. It is dark grayish brown, mottled, firm silty clay loam. In some areas the surface soil is thicker. In a few areas the lower part of the subsoil is more sandy.

Included with this soil in mapping are small areas of the well drained Huntsville and poorly drained Sawmill soils. Huntsville soils are in higher landscape positions than those of the Tice soil. Sawmill soils are in areas below the Tice soil. Included soils make up 10 to 15 percent of the unit.

Water and air move through the Tice soil at a moderate rate. Surface runoff is slow. The seasonal high water table is at a depth of 1.5 to 3.0 feet during 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. This soil is moderately suited to cultivated crops. Because of the flooding, it generally is unsuited to use as a site for dwellings or for septic tank absorption fields.

This soil is sufficiently drained for corn, soybeans, or small grain. The flooding does not occur during the growing season in most years, but the wetness or the flooding can delay planting. The wetness can be reduced by surface ditches or subsurface drains. Returning crop residue to the soil and minimizing tillage help to maintain good tilth and increase the rate of water infiltration.

The land capability classification is IIIw.

3334—Birds silt loam, frequently flooded. This nearly level, poorly drained soil is on flood plains. It is subject to frequent flooding for brief periods in spring and winter, but the flooding generally does not occur during the growing season. Individual areas are irregularly shaped and range from 10 to 100 acres in size.

Typically, the surface soil is dark grayish brown, mottled, friable silt loam about 14 inches thick. The underlying material to a depth of 60 inches or more is mottled, stratified, friable silt loam. The upper part is dark gray, and the lower part is gray. In some areas the surface layer is darker. In other areas a dark buried soil is within a depth of 40 inches. In some places the soil has more sand or more clay throughout.

Water and air move through this soil at a moderately slow rate. Surface runoff is slow to ponded. The seasonal high water table is 0.5 foot above to 1.0 foot below the surface during spring. Available water capacity is very high. Organic matter content is moderately low. The surface layer is friable and can be easily tilled when moist, but it tends to crust and puddle after hard rains. The shrink-swell potential is low, and the potential for frost action is high.

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

This soil is sufficiently drained for corn, soybeans, or small grain. The flooding does not occur during the growing season in most years, but the wetness or the flooding can delay planting. The wetness can be reduced by surface ditches or subsurface drains. Returning crop residue to the soil and minimizing tillage help to maintain good tilth and increase the rate of water infiltration.

If this soil is used for pasture, the flooding is a hazard and the seasonal high water table is a limitation. Dikes and diversions help to control the flooding, and subsurface tile drains lower the water table. Reed canarygrass, alsike clover, and ladino clover are suitable species. 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 land capability classification is IIIw.

7682A—Medway loam, 0 to 3 percent slopes, rarely flooded. This nearly level, moderately well drained soil is on terraces adjacent to the uplands. It is subject to rare flooding. Individual areas are long and narrow and range from 5 to 30 acres in size.

Typically, the surface soil is black and very dark gray, friable loam about 18 inches thick. The subsoil is about 26 inches thick. The upper part is brown, friable loam. The lower part is dark yellowish brown, mottled, friable sandy loam. The underlying material to a depth of 60 inches or more is dark yellowish brown, mottled, friable gravelly sandy loam, loam, and sandy loam. In some areas the surface soil is thicker. In other areas the underlying material has less sand. In places the surface layer is lighter in color and has more gravel.

Included with this soil in mapping are small areas of the somewhat poorly drained Tice soils. These soils are on flood plains below the Medway soil. They make up 5 to 10 percent of the unit.

Water and air move through the Medway soil at a moderate rate. Surface runoff is slow. The seasonal high water table is at a depth of 1.5 to 3.0 feet in winter and spring. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential is low, and the potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops. It generally is unsuited to use as a site for dwellings or for septic tank absorption fields because of the flooding.

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.

The land capability classification is I.

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 manner. 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 Natural Resources Conservation Service.

About 360,088 acres in Shelby County, or nearly 73 percent of the total acreage, meets the requirements for prime farmland. This land is throughout the county, but it is mainly in associations 1, 2, 3, and 4, which are described under the heading "General Soil Map Units."

A recent trend in land use in some parts of the county has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

The map units in Shelby 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. In Shelby County most of the naturally wet soils have been adequately drained.

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 potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

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

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

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

Crops and Pasture

Ed Ballard, Shelby County extension advisor, helped prepare this section.

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 Natural Resources 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 Natural Resources Conservation Service or the Cooperative Extension Service.

In 1982, about 343,000 acres in Shelby County was used for crops *(14)*. This total included about 154,500 acres of corn, 151,500 acres of soybeans, and 30,000 acres of wheat. About 33,000 acres was used for pasture, including woodland pasture. The acreage used for corn and soybeans is increasing, and that used for small grain and forage crops is decreasing.

The main management concerns affecting cropland and pasture in Shelby County are water erosion, drainage, soil fertility, and soil tilth. Additional concerns include soil blowing on cropland and brush and weed control and stand maintenance in areas used for pasture.

Water erosion is a major management concern in Shelby County. Unless proper conservation measures are applied, sloping areas of cropland and pastureland are subject to excessive soil loss. About 45 percent of the cropland and 80 percent of the pastureland are subject to water erosion. Water erosion is mainly a hazard on soils where slopes are more than 2 percent, but areas that have slopes of less than 2 percent can also be subject to erosion if the slopes are long.

Erosion is most damaging on soils that have unfavorable properties in the subsoil, such as high exchangeable sodium or a restricted rooting depth. Darmstadt soils have a subsoil that is high in exchangeable sodium, and Ava soils have a very firm subsoil, which restricts rooting depth. Soil productivity is reduced when the surface layer is lost and part of the subsoil is incorporated into the plow layer. In eroded areas, tilth is poor and preparing a good seedbed is difficult because the surface soil tends to be cloddy if it is worked when wet.

Erosion also results in the sedimentation of road ditches, streams, and lakes. Controlling erosion minimizes this pollution and improves the quality of water available for municipal and recreational uses and for fish and other wildlife.

About 45 percent of the cropland and 80 percent of the pastureland in Shelby County is considered highly erodible. The soil-loss tolerance for most soils in the county is 3 to 5 tons per acre per year. Conservation practices in use in Shelby County include conservation tillage systems, terraces, and contour farming. In many areas a combination of these practices is needed.

In a conservation tillage system, about 30 percent of the surface is covered by crop residue after planting. Such systems are used on much of the cropland in Shelby County that is subject to erosion. They help to control erosion, promote good soil structure, minimize soil compaction, prevent the formation of tillage pans, and improve aeration, water infiltration, and soil tilth.

Terraces are effective in controlling erosion in areas where slopes are less than about 10 percent. They help to control erosion by intercepting surface runoff and conducting it to a stable outlet at a nonerosive rate. Terraces have been constructed on only a small part of the cropland in the county. Soils that have short, uneven slopes, such as Dana soils, and soils that have a high content of sodium in the subsoil, such as Darmstadt soils, generally are not suitable for terraces. Examples of soils that are well suited to terraces are Douglas, Parke, and Pike soils.

Contour farming, or planting and tilling on the contour, is commonly practiced throughout the county. It is most effective in controlling water erosion in areas where slopes are 7 percent or less. It commonly is used in combination with terraces. Ava and Bluford soils are examples of soils that are suitable for contour farming.

In areas where slopes are more than about 10 percent, a crop rotation that includes 1 or more years of small grain or meadow crops is needed. In some areas, maintaining a permanent cover of pasture and hay may be necessary to control erosion. Grasses and legumes that grow well on the soils in Shelby County include smooth bromegrass, tall fescue, timothy, alfalfa, and clover.

Drainage is a major management concern on about 40 percent of the cropland and 20 percent of the pastureland in Shelby County. Wetness can damage crops or delay planting early in spring. On poorly drained soils, such as Cowden and Virden soils, some form of drainage system is needed for crop production. A drainage system is also beneficial if cultivated crops are grown in areas of somewhat poorly drained soils, such as Herrick soils. In areas of somewhat poorly drained soils that are used for pasture, such as Atlas and Bluford soils, overgrazing or grazing when the soil is wet reduces productivity and causes surface compaction and excessive runoff and erosion. Most of the poorly drained and somewhat poorly drained soils in the county are sufficiently drained for the production of cultivated crops, pasture, and hay. Maintenance of the drainage systems is needed, and in some areas additional drainage may be needed.

The design of a drainage system varies with the kind of soil. Tile drains alone are generally sufficient for most upland soils if properly spaced. In areas of soils that have moderate or moderately slow permeability, such as Herrick and Drummer soils, tile drainage is adequate if suitable outlets are available. Field drainage ditches are needed in areas of slowly permeable and very slowly permeable soils, such as Cowden and Wynoose soils. Troublesome hillside seeps are common in areas of Atlas soils. A drainage system is needed in these areas.

The natural fertility level of the soils in Shelby County varies widely. Hickory, Ava, and other soils that formed under forest vegetation are low in natural fertility. Soils that formed under prairie vegetation, such as Herrick and Drummer soils, have high fertility. The differences in natural fertility levels are mainly a result of the content of organic matter. Organic matter is important because of its effect on the release of important soil nutrients, especially nitrogen. Organic matter also affects soil tilth and soil structure. Good tilth and structure are needed for maximum root proliferation and thus for maximum uptake of nutrients from the soil. About 60 percent of the soils in the county have a high or moderate content of organic matter, and about 40 percent have a moderately low or low content. Many of the soils used for pasture, such as Ava, Bluford, and Hickory soils, have a moderately low content of organic matter. Good fertility programs help to ensure high forage yields, help to establish and maintain good stands of pasture plants, and help to control weeds. Control of small brush and broadleaf weeds should also be a part of pasture management. Mowing or grazing at timely intervals helps to maintain growth.

Most of the woodland soils in the county are slightly acid to strongly acid. Bluford and Wynoose soils benefit from applications of ground limestone. 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 expected level of yields. The Cooperative Extension Service can help in determining the rate and amount of lime and fertilizer to apply.

Most of the soils in the county that are used for crops have a friable surface layer of silt loam and can be tilled throughout a wide range in moisture content. Soils low in organic matter content generally have weak structure. In unprotected areas, hard rains cause a crust to form on the surface of these soils. When it dries, the crust becomes hard and nearly impervious to water. Regular additions of crop residue, manure, and other organic material improve soil structure and minimize crusting. Poor tilth also is a problem in areas where the surface layer is silty clay loam. The poorly drained Wynoose soils are examples. If tilled when too wet, these soils tend to form clods. The cloddiness makes preparing a good seedbed difficult. These soils often stay wet until late in spring, which limits the opportunity for primary tillage. If these soils are tilled in the fall, leaving a sufficient amount of crop residue on the surface helps to prevent sheet erosion.

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 also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents *(5)*. Available yield data from nearby counties and results of field trials and demonstrations are also 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 Natural Resources 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. 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 or for engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit *(11)*. 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, rangeland, woodland, wildlife habitat, or recreation.

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

Dale Donahoo, district forester, Illinois Department of Conservation, helped prepare this section.

Originally, deciduous hardwood trees covered more than half of the survey area. As the demand for agricultural land increased, the forests were cleared to provide more land for crops and pasture. About 42,800 acres, or 9 percent of the county, is woodland. The woodland is primarily in areas that are not suitable for cultivation, such as steeply sloping, poorly drained, isolated or small, irregularly shaped, or severely eroded areas.

In 1982, Shelby County had about 31,900 acres of privately owned woodland, 9,775 acres of federally owned woodland bordering Lake Shelbyville, and 1,129 acres of state-owned woodland at Hidden Springs State Forest. About 3,600 acres of the Federal lands is leased to the Illinois Department of Conservation for the Eagle Creek and Wolf Creek State Recreation Areas. The majority of the private woodland areas in the county are along the drainageways of the Kaskaskia and Little Wabash Rivers and Robinson, Flat Branch, Becks, and Mitchell Creeks.

Red oak, black oak, white oak, shingle oak, hickory, and ash are the common trees in the uplands. Boxelder, silver maple, cottonwood, sycamore, ash, and hackberry are the common trees on the bottom land. Most of the woodland is in areas of Hickory, Ava, and Bluford soils in the uplands and Holton and Wirt soils on the bottom land. These soils have fair to good potential for producing trees of high quality if the woodland is properly managed. The limiting factors that affect woodland production in the uplands are the erosion hazard and a claypan in the subsoil. In the bottom-land areas, seasonal wetness and flooding are management concerns.

Much of the woodland has the potential for high productivity if good timber management practices are applied. Many areas can be improved by harvesting mature trees, removing undesirable trees, excluding livestock, and controlling erosion and fire.

In the past much of the harvested timber was used for veneer, cooperage, railroad ties, and mine props, but in the last several decades the demand for these products has declined. As a result, most of the timber is used for structural lumber, veneer, and firewood. The production of Christmas trees has increased dramatically since 1970. Christmas tree plantations range from 5 to 30 acres in size, and approximately 500 to 1,000 trees are harvested each year. The majority of these trees are sold locally.

Assistance with woodland management can be obtained from the district forester of the Natural Resources Conservation Service and from the county extension agent.

Table 7 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*, excess 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; *F*, a high content of rock fragments in the soil; and *N*, snowpack. 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, F, and N.

In table 7, *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 are also 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 for 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 8 shows the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates in table 8 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 Natural Resources Conservation Service or the Cooperative Extension Service or from a commercial nursery.

Recreation

Lake Shelbyville, in the heart of the Kaskaskia River Valley, provides excellent recreational opportunities. The lake covers about 11,100 acres. Along the lake in Shelby County are seven recreational areas, including Eagle Creek and Wolf Creek State Parks. Forest Park, a 120-acre city park, and Hidden Springs, a State forest south of Shelbyville, also provide recreational opportunities. These areas provide opportunities for fishing, hunting, boating, skiing, swimming, camping, picnicking, hiking, and other recreational uses in a natural environment. Forested lands, areas of rugged, hilly terrain, open spaces, and bottom lands provide beautiful backdrops for these recreational activities.

Knowledge of soils helps in planning, developing, and maintaining areas used for recreation. The potential for additional development of recreational facilities in Shelby County is good. Areas that have the greatest potential are in associations 7, 8, and 9, which are described in the section "General Soil Map Units." These associations are characterized by hilly terrain, wooded slopes, and many small streams that provide a variety of possibilities for outdoor recreation.

The soils of the survey area are rated in table 9 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 are also 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 9, 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 9 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 12 and interpretations for dwellings without basements and for local roads and streets in table 11.

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 (fig. 7).

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

Stephen J. Brady, wildlife biologist, Natural Resources Conservation Service, helped prepare this section.

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

Figure 7.—A picnic shelter in an area of Xenia silt loam, 2 to 5 percent slopes.

vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 10, 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 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, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, soybeans, wheat, and oats.

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, surface stoniness, flooding, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, orchardgrass, 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, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, ragweed, foxtail, and smartweed.

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 hardwood trees 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, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian-olive, autumn-olive, and crabapple.

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, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, cattail, 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, 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.

The soils in Shelby County support habitat for a variety of wildlife species, including rabbit, quail, pheasant, squirrel, deer, dove, duck, beaver, muskrat, raccoon, mink, opossum, and fox as well as many important nongame species. The streams and lakes support fish species, such as largemouth bass, white bass, crappie, walleye, channel catfish, black bullhead, and sunfish.

Most areas in the county can be improved for wildlife habitat. The soil associations described in the section "General Soil Map Units" are grouped into three wildlife areas.

Wildlife area 1 includes the Drummer-Flanagan, Drummer-Millbrook-Elburn, Oconee-Virden-Herrick, and Bluford-Cisne-Hoyleton associations. These soils are nearly level and gently sloping and are somewhat poorly drained or poorly drained. This wildlife area is mainly cropland that is used for continuous row cropping of corn and soybeans. Wildlife habitat is generally poor because of a lack of crop residue, herbaceous nesting and roosting cover, woody cover, and travel lanes or hedgerows. Wildlife in this area include ring-necked pheasant, mourning dove, raccoon, rabbit, fox, and nongame species, such as horned lark, dickcissel, meadowlark, and others adapted to prairie or open habitats. Practices that improve the habitat in this area include delaying mowing of grassy cover along roadsides, ditch banks, and waterways until after the nesting season; seeding terrace ridges or back slopes to smooth bromegrass or other desirable grasses; protecting the existing woody cover; establishing hedgerows and windbreaks; and using a system of conservation tillage that leaves crop residue and waste grain on the surface.

Wildlife area 2 includes the Dana-Raub-Parr, Parke-Douglas-Oconee, Hickory-Ava-Atlas, and Miami-Xenia associations. These soils are gently sloping to strongly sloping and are moderately well drained or well drained. This wildlife area generally borders the major streams in the county and is much more diversified than wildlife area 1. It includes areas of cropland, pasture, and woodland and thus provides habitat that is favorable for

Figure 8.—This wildlife food plot has been established in an area of Xenia silt loam, 2 to 5 percent slopes.

a greater variety of wildlife. Major game species are ring-necked pheasant, white-tailed deer, mourning dove, bobwhite quail, fox, squirrel, raccoon, and rabbit. Nongame species include horned lark, dickcissel, meadowlark, and other species that inhabit areas of brushy cover and woodlands. Properly managing pastures, protecting the woodlands from livestock grazing, managing crop residue, delaying mowing of grassy cover, establishing field and farmstead windbreaks, hedgerows, and brushy fence rows, and establishing wildlife food plots (fig. 8) can improve the habitat in this area.

Wildlife area 3 consists of the Holton-Huntsville-Wirt association. These soils are nearly level and are somewhat poorly drained. This area is on the flood plains along the major streams in the county and includes both cropland and woodland. Wildlife in this area include white-tailed deer, raccoon, mink, beaver, muskrat, ducks, and various nongame species. Practices that improve the habitat in this area include delaying mowing of grassy cover along roadsides, ditch banks, and waterways until after the nesting season; seeding terrace ridges or back slopes to smooth bromegrass or other desirable grasses; protecting the existing woody cover; establishing hedgerows and windbreaks; and using a system of conservation tillage that leaves crop residue and waste grain on the surface.

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. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 11 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 the 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. 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), 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 12 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 12 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, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan 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 or fractured bedrock 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 12 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, bedrock, and cemented pans 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 12 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 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 the 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 13 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 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 13, 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 up to 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 14 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 are 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 increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, 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 of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. 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, and sulfur. Availability of drainage outlets is not considered in the ratings.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of soil blowing or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

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 18.

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 15 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 group index numbers in parentheses, is given in table 18.

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 16 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 clay content of 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 adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 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 16, 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 17 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 17, 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 17 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, *long* if 7 days to 1 month, and *very long* if more than 1 month. 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 17 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 17.

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 in the range 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 results in a severe hazard of corrosion. 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 is also 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 18 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 *(12)*. 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 19 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 Alfisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udalf (*Ud*, meaning moist, plus *alf*, from Alfisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; 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 Hapludalfs (*Hapl*, meaning minimal horizonation, plus *udalf*, the suborder of the Alfisols that has a udic 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 Hapludalfs.

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 Hapludalfs.

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. The soil is compared with similar soils and with nearby soils of other 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" *(13)*. Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" *(12)*. 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 rapidly permeable soils on narrow, elongated ridges in the uplands. These soils formed in loamy and sandy eolian deposits. Slopes range from 5 to 10 percent.

Alvin soils are similar to Thebes soils and commonly are adjacent to Ava and Thebes soils. Ava and Thebes soils are on ridges below the Alvin soils. Ava soils formed in loess and in the underlying silty or loamy deposits. Thebes soils formed in loess and sandy sediments.

Typical pedon of Alvin fine sandy loam, 5 to 10 percent slopes, 800 feet north and 2,150 feet west of the southeast corner of sec. 19, T. 10 N., R. 4 E.

Ap—0 to 6 inches; brown (10YR 4/3) fine sandy loam, light yellowish brown (10YR 6/4) dry; weak fine granular structure; friable; few very fine roots; medium acid; abrupt smooth boundary.

BE—6 to 8 inches; yellowish brown (10YR 5/4) fine sandy loam; weak medium platy structure; friable; few very fine roots; common prominent light gray (10YR 7/2) silt coatings on faces of peds; medium acid; clear smooth boundary.

Bt1—8 to 13 inches; dark yellowish brown (10YR 4/6) fine sandy loam; weak medium subangular blocky structure; friable; few very fine roots; common distinct dark brown (7.5YR 5/4) clay films on faces of peds; medium acid; clear smooth boundary.

Bt2—13 to 18 inches; strong brown (7.5YR 4/6) fine sandy loam; weak medium subangular blocky structure; firm; few very fine roots; common distinct dark brown (7.5YR 4/4) clay films on faces of peds; medium acid; clear smooth boundary.

Bt3—18 to 36 inches; strong brown (7.5YR 5/6) fine sandy loam; weak coarse subangular blocky structure; firm; few very fine roots; common distinct dark brown (7.5YR 4/4) clay films on faces of peds; medium acid; clear smooth boundary.

E&Bt—36 to 60 inches; yellowish brown (10YR 5/6) loamy fine sand (E); single grained; loose; strong brown (7.5YR 5/6) fine sandy loam (Bt); weak coarse subangular blocky structure; friable; common distinct dark brown (7.5YR 4/4) clay films on faces of peds; strongly acid.

The solum ranges from 36 to more than 60 inches in thickness.

The Ap horizon has chroma of 2 or 3. It is very fine sandy loam, fine sandy loam, or sandy loam. The Bt horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. The E part of the E&Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 6. It is sandy loam, fine sandy loam, loamy sand, or sand. The Bt part of the E&Bt horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. It occurs as lamellae of variable thickness and is fine sandy loam, sandy loam, loamy fine sand, or loam.

Atlas Series

The Atlas series consists of somewhat poorly drained, very slowly permeable soils on side slopes on the Illinoian glacial till plain in the uplands. These soils formed in less than 20 inches of loess and in the underlying paleosol formed in Illinoian glacial till. Slopes range from 5 to 15 percent.

Atlas soils are similar to Fishhook soils and commonly are adjacent to Fishhook and Hickory soils. Fishhook soils have thicker loess over the paleosol than the Atlas soils. They are in landscape positions similar to those of the Atlas soils. The well drained Hickory soils are on the steeper side slopes below the Atlas soils. They formed entirely in Illinoian glacial till.

Typical pedon of Atlas silt loam, 5 to 10 percent slopes, eroded, 1,536 feet west and 245 feet south of the northeast corner of sec. 27, T. 12 N., R. 2 E.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam, pale brown (10YR 6/3) and grayish brown (10YR 5/2) dry; few fine prominent yellowish brown (10YR 5/6) mottles; weak fine granular structure; friable; many very fine roots; many distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; few medium rounded concretions of iron and manganese oxides; slightly acid; abrupt smooth boundary.

BE—6 to 13 inches; brown (10YR 5/3) silt loam; common fine prominent strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; common very fine roots; few faint dark grayish brown (10YR 4/2) clay films on faces of peds; slightly acid; clear smooth boundary.

Btg1—13 to 22 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; firm; common very fine roots; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; strongly acid; clear smooth boundary.

Btg2—22 to 28 inches; grayish brown (2.5Y 5/2) clay loam; few fine faint light brownish gray (2.5Y 6/2) and common fine prominent yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; few very fine roots; common distinct dark gray (10YR 4/1) clay films on faces of peds; 1 percent fine gravel; strongly acid; clear smooth boundary.

Btg3—28 to 37 inches; grayish brown (2.5Y 5/2) clay loam; common fine faint light brownish gray (2.5Y 6/2) and common fine prominent yellowish brown (10YR 5/6) and strong brown (7.5YR 5/8) 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 prominent dark gray (10YR 4/1) and very dark gray (10YR 3/1) clay films in channels and pores; few medium rounded concretions of iron and manganese oxides; 1 percent fine gravel; strongly acid; gradual smooth boundary.

Btg4—37 to 60 inches; light brownish gray (2.5Y 6/2) clay loam; many medium prominent dark yellowish brown (10YR 4/6) and strong brown (7.5YR 5/8) mottles; moderate medium prismatic structure; firm; few very fine roots; few prominent dark grayish brown (10YR 4/2) clay films on faces of peds; few prominent gray (10YR 5/1) and very dark gray (10YR 3/1) clay films in channels and pores; few fine rounded concretions of iron and manganese oxides; 2 percent fine gravel; strongly acid.

The solum is more than 60 inches thick. The loess ranges from 0 to 20 inches in thickness.

The Ap horizon has value of 4 or 5 and chroma of 2 or 3. It is commonly silt loam, but in some pedons it is loam. Some pedons have an E horizon. The BE horizon has value of 4 to 6 and chroma of 2 to 4. The Btg 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 clay loam or silty clay loam.

Ava Series

The Ava series consists of moderately well drained soils on convex ridgetops and on side slopes on the Illinoian glacial till plain in the uplands. These soils are moderately slowly permeable in the upper part and very slowly permeable in the lower part. They formed in loess and in the underlying silty or loamy sediments at the surface of the Illinoian glacial till. Slopes range from 2 to 10 percent.

Ava soils are similar to Pike soils and commonly are adjacent to Bluford and Hickory soils. The somewhat poorly drained Bluford soils are in nearly level and gently sloping areas. Hickory soils formed in glacial till. They are on side slopes below the Ava soils.

Typical pedon of Ava silt loam, 5 to 10 percent slopes, eroded, 1,140 feet north and 101 feet east of the southwest corner of sec. 7, T. 10 N., R. 2 E.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam, pale brown (10YR 6/3) dry; common fragments of yellowish brown (10YR 5/4) subsoil material in the lower part; weak fine granular structure; friable; common very fine roots; neutral; abrupt smooth boundary.

Bt—7 to 16 inches; yellowish brown (10YR 5/4) silty clay loam; weak fine subangular blocky structure; friable; common very fine roots; common distinct brown (10YR 5/3) clay films and very few prominent light gray (10YR 7/2 dry) silt coatings on faces of peds; strongly acid; clear smooth boundary.

B/E—16 to 22 inches; yellowish brown (10YR 5/4) silty clay loam; few fine distinct yellowish brown (10YR 5/8) mottles; weak fine prismatic structure parting to moderate medium subangular blocky; firm; common very fine roots; common distinct brown (10YR 5/3) clay films and common prominent light gray (10YR 7/2 dry) silt coatings on faces of peds; common fine rounded concretions of iron and manganese oxides; strongly acid; clear smooth boundary.

B't—22 to 31 inches; yellowish brown (10YR 5/4) silty clay loam; common medium distinct yellowish brown (10YR 5/8) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; common distinct brown (10YR 4/3) clay films and many prominent white (10YR 8/1 dry) silt coatings on faces of peds and in vertical cracks; common fine and few medium rounded concretions of iron and manganese oxides; strongly acid; clear smooth boundary.

2Btx1—31 to 39 inches; yellowish brown (10YR 5/4) silty clay loam; common medium distinct yellowish brown (10YR 5/8) and common medium faint brown (10YR 5/3) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; very firm and slightly brittle; few fine roots; common distinct brown (10YR 4/3) clay films and few prominent white (10YR 8/1 dry) silt coatings on faces of peds and in vertical cracks; common fine rounded concretions of iron and manganese oxides; about 15 percent fine sand; strongly acid; clear smooth boundary.

2Btx2—39 to 50 inches; yellowish brown (10YR 5/4) silty clay loam; common medium distinct yellowish brown (10YR 5/8) and common medium faint brown (10YR 5/3) mottles; weak very coarse prismatic structure; very firm and slightly brittle; few fine roots; common faint brown (10YR 4/3) clay films on faces of peds; few prominent white (10YR 8/1 dry) silt coatings in vertical cracks; common fine rounded concretions of iron and manganese oxides; strongly acid; clear smooth boundary.

2C—50 to 60 inches; yellowish brown (10YR 5/4) silty clay loam; common medium faint brown (10YR 5/3), common coarse distinct yellowish brown (10YR 5/8), and few coarse distinct grayish brown (10YR 5/2) mottles; massive; firm; common fine and few medium rounded concretions of iron and manganese oxides; about 15 percent fine sand; strongly acid.

The solum ranges from 40 to more than 60 inches in thickness. The depth to the Btx horizon ranges from 25 to 38 inches. The loess ranges from 30 to 45 inches in thickness.

The Ap or A horizon has value of 4 or 5 and chroma of 2 or 3. Some pedons have an E horizon. The Bt horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. It is silt loam or silty clay loam. The 2Btx horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 2 to 8. It is silt loam, silty clay loam, loam, or clay loam.

Ava silt loam, 2 to 5 percent slopes, has a dense horizon that is deeper than is definitive for the series. This difference, however, does not significantly affect the use or behavior of the soil.

Birds Series

The Birds series consists of poorly drained, moderately slowly permeable soils on flood plains. These soils formed in silty alluvium. Slopes range from 0 to 2 percent.

Birds soils are similar to and commonly are adjacent to Holton soils. The somewhat poorly drained Holton soils are in higher positions on the flood plain than the Birds soils.

Typical pedon of Birds silt loam, frequently flooded, 860 feet south and 1,980 feet east of the northwest corner of sec. 8, T. 10 N., R. 2 E.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; common fine prominent strong brown (7.5YR 4/6) mottles; weak fine granular structure; friable; common very fine and few fine roots; few medium rounded concretions of iron and manganese oxides; neutral; abrupt smooth boundary.

ACg—6 to 14 inches; dark grayish brown (10YR 4/2) silt loam; common medium prominent strong brown (7.5YR 4/6) and common fine faint dark gray (10YR 4/1) mottles; weak fine granular structure; friable; common very fine roots; few fine rounded concretions of iron and manganese oxides; neutral; clear smooth boundary.

Cg1—14 to 30 inches; dark gray (10YR 4/1) silt loam; common medium prominent strong brown (7.5YR 4/6) mottles; massive; friable; common very fine roots; few fine rounded concretions; neutral; clear smooth boundary.

Cg2—30 to 60 inches; gray (10YR 5/1) silt loam; common medium prominent strong brown (7.5YR 4/6) and yellowish brown (10YR 5/6) mottles; massive; friable; few very fine roots; few fine rounded concretions of iron and manganese oxides; few pebbles; slightly acid.

The solum ranges from 5 to 30 inches in thickness.

The Ap and ACg horizons have value of 4 or 5 and chroma of 1 or 2. The Cg horizon has value of 4 to 7 and chroma of 1 or 2. Some pedons have value of 3 or 4 in thin strata or in buried horizons below a depth of 40 inches. The Cg horizon is dominantly silt loam, but in some pedons it has strata of sandy loam.

Bluford Series

The Bluford series consists of somewhat poorly drained, slowly permeable soils on broad flats and ridges on the Illinoian glacial till plain in the uplands. These soils formed in loess and in the underlying silty or loamy sediments at the surface of the Illinoian glacial till. Slopes range from 0 to 5 percent.

Bluford soils are similar to Darmstadt soils and commonly are adjacent to Ava and Wynoose soils. The moderately well drained Ava soils are on ridges above the Bluford soils. Darmstadt soils have a natric horizon. They are in landscape positions similar to those of the Bluford soils. The poorly drained Wynoose soils are in the lower positions on the landscape.

Typical pedon of Bluford silt loam, 0 to 2 percent slopes, 2,400 feet south and 1,060 feet east of the northwest corner of sec. 18, T. 10 N., R. 2 E.

Ap—0 to 8 inches; brown (10YR 5/3) silt loam, pale brown (10YR 6/3) dry; weak fine granular structure; friable; common very fine roots; few fine and medium rounded concretions of iron and manganese oxides; neutral; abrupt smooth boundary.

E—8 to 14 inches; pale brown (10YR 6/3) silt loam; few fine distinct dark yellowish brown (10YR 4/6) mottles; moderate thin platy structure; friable; few very fine roots; few fine and medium rounded concretions of iron and manganese oxides; strongly acid; abrupt smooth boundary.

BE—14 to 18 inches; brown (10YR 5/3) silt loam; few fine distinct dark yellowish brown (10YR 4/6) mottles; moderate fine subangular blocky structure; friable; common very fine roots; few distinct grayish brown (10YR 5/2) clay films and common prominent light gray (10YR 7/2 dry) silt coatings on faces of peds; few fine rounded concretions of iron and manganese oxides; very strongly acid; clear smooth boundary.

Bt1—18 to 22 inches; brown (10YR 5/3) silty clay loam; few fine and medium distinct dark yellowish brown (10YR 4/6) mottles; moderate medium subangular blocky structure; firm; common very fine and fine roots; many distinct grayish brown (10YR 5/2) clay films and common prominent light gray (10YR 7/2 dry) silt coatings on faces of peds; few fine rounded concretions of iron and manganese oxides; very strongly acid; clear smooth boundary.

Bt2—22 to 36 inches; brown (10YR 5/3) silty clay loam; common medium and coarse distinct dark yellowish brown (10YR 4/6) mottles; weak medium prismatic structure parting to moderate medium angular blocky; firm; common very fine roots; many distinct grayish brown (10YR 5/2) clay films and very few prominent light gray (10YR 7/2 dry) silt coatings on faces of peds; few fine rounded concretions of iron and manganese oxides; very strongly acid; gradual smooth boundary.

2Btx1—36 to 44 inches; brown (10YR 5/3) silty clay loam; few fine prominent strong brown (7.5YR 5/6) and common coarse distinct dark yellowish brown (10YR 4/6) mottles; weak coarse prismatic structure parting to weak medium angular blocky; firm and very slightly brittle; few very fine roots; few faint brown (10YR 5/2) clay films on faces of peds; few fine rounded concretions of iron and manganese oxides; about 10 percent fine sand; very strongly acid; gradual smooth boundary.

2Btx2—44 to 60 inches; brown (10YR 5/3) silty clay loam; common coarse distinct dark yellowish brown (10YR 4/6) mottles; weak coarse prismatic structure; firm and very slightly brittle; few faint grayish brown (10YR 5/2) clay films and few prominent light gray (10YR 7/2) silt coatings on faces of peds; few fine rounded concretions of iron and manganese oxides; about 15 percent fine sand; very strongly acid.

The solum ranges from 40 to 70 inches in thickness. The loess ranges from 35 to 45 inches in thickness.

The Ap horizon has value of 4 or 5 and chroma of 2 or 3. The E horizon has value of 4 to 6 and chroma of 2 to 4. The Bt horizon has value of 4 to 6 and chroma of 2 to 6. The 2Btx horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 8. It is silt loam, silty clay loam, or clay loam.

Camden Series

The Camden series consists of well drained, moderately permeable soils on ridges and on side slopes of ridges on outwash plains and stream terraces. These soils formed in loess and in the underlying stratified loamy and sandy outwash. Slopes range from 0 to 10 percent.

Camden soils are similar to Proctor soils and commonly are adjacent to Starks and Millbrook soils. The somewhat poorly drained Starks and Millbrook soils are in the less sloping areas below the Camden soils. Proctor soils have a mollic epipedon.

Typical pedon of Camden silt loam, 2 to 5 percent slopes, 195 feet east and 2,400 feet south of the northwest corner of sec. 4, T. 13 N., R. 2 E.

Ap—0 to 7 inches; brown (10YR 4/3) silt loam, brown (10YR 5/3) dry; weak fine granular structure; friable; common very fine roots; neutral; clear smooth boundary.

E—7 to 10 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium platy structure; friable; common very fine roots; neutral; clear smooth boundary.

Bt1—10 to 14 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; friable; few very fine roots; common faint brown (10YR 4/3) clay films on faces of peds; neutral; clear smooth boundary.

Bt2—14 to 20 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; neutral; clear smooth boundary.

Bt3—20 to 29 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) and few distinct brown (7.5YR 4/4) clay films on faces of peds; few fine rounded concretions of iron and manganese oxides; neutral; clear smooth boundary.

2Bt4—29 to 35 inches; dark yellowish brown (10YR 4/4) loam; moderate medium subangular blocky structure; friable; few very fine roots; common distinct brown (7.5YR 4/4) and common faint dark yellowish brown (10YR 4/4) clay films on faces of peds; medium acid; clear smooth boundary.

2Bt5—35 to 45 inches; dark yellowish brown (10YR 4/4) sandy loam; weak medium subangular blocky structure; friable; few very fine roots; few distinct brown (7.5YR 4/4) clay films on faces of peds; 2 percent fine gravel; medium acid; clear smooth boundary.

2BC—45 to 53 inches; strong brown (10YR 4/6) sandy loam; weak fine subangular blocky structure; friable; few very fine roots; few faint brown (7.5YR 4/4) clay films on faces of peds; 5 percent fine gravel; medium acid; clear smooth boundary.

2C—53 to 60 inches; strong brown (10YR 4/6), stratified sandy loam and loamy sand; massive; friable; few very fine roots; 5 percent fine gravel; medium acid.

The solum ranges from 40 to 60 inches in thickness. The loess ranges from 24 to 40 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 to 6 and chroma of 3 to 6. The 2Bt and 2BC horizons have hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. They are loam, sandy loam, clay loam, or sandy clay loam. The

2C horizon has colors similar to those of the 2Bt and 2BC horizons. It commonly is stratified sandy loam and loamy sand, but the range includes loam and silt loam that have thin strata of sand.

Catlin Series

The Catlin series consists of moderately well drained, moderately permeable soils on ridges and side slopes on the Wisconsinan glacial till plain in the uplands. These soils formed in loess and in the underlying loamy Wisconsinan glacial till. Slopes range from 2 to 5 percent.

Catlin soils are similar to Dana soils and commonly are adjacent to Flanagan soils. Dana soils formed in a thinner mantle of loess than the Catlin soils. The somewhat poorly drained Flanagan soils are on low ridges below the Catlin soils.

Typical pedon of Catlin silt loam, 2 to 5 percent slopes, 1,520 feet west and 800 feet north of the southeast corner of sec. 5, T. 13 N., R. 3 E.

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; common fine roots; slightly acid; abrupt smooth boundary.

A—9 to 12 inches; dark brown (10YR 3/3) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; common fine roots; common distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bt1—12 to 15 inches; dark yellowish brown (10YR 4/4) silt loam; moderate fine subangular blocky structure; friable; few very fine roots; common distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bt2—15 to 23 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular blocky structure; firm; few very fine roots; common distinct brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt3—23 to 29 inches; dark yellowish brown (10YR 4/4) silty clay loam; few fine prominent yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; firm; few very fine roots; common distinct brown (10YR 4/3) clay films on faces of peds; common fine rounded concretions of iron and manganese oxides; neutral; clear smooth boundary.

Bt4—29 to 41 inches; dark yellowish brown (10YR 4/4) silty clay loam; common medium prominent yellowish brown (10YR 5/8) and few medium distinct pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; friable; few very fine roots; common distinct brown (10YR 4/3) clay films on faces of peds; very dark grayish brown (10YR 3/2) root channel linings; common fine rounded concretions of iron and manganese oxides; neutral; clear smooth boundary.

2BC—41 to 54 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct yellowish brown (10YR 5/8) and common coarse distinct light brownish gray (10YR 6/2) mottles; weak coarse subangular blocky structure; friable; common distinct dark gray (10YR 4/1) root channel linings; common fine rounded concretions of iron and manganese oxides; 1 percent fine gravel; about 10 percent fine sand; neutral; clear smooth boundary.

2C—54 to 60 inches; yellowish brown (10YR 5/4) loam; common fine distinct yellowish brown (10YR 5/6) mottles; massive; firm; common very fine rounded concretions of iron and manganese oxides; 5 percent fine gravel; strongly effervescent; moderately alkaline.

The solum ranges from 45 to 60 inches in thickness. The mollic epipedon ranges from 11 to 15 inches in thickness. The loess ranges from 40 to 60 inches in thickness.

The A horizon has value of 2 or 3 and chroma of 1 to 3. The Bt horizon has value of 4 or 5 and chroma of 3 or 4. The 2Bt or 2BC horizon has value of 4 or 5 and chroma of 2 to 8. It is clay loam, loam, silty clay loam, or silt loam. The 2C horizon has colors and textures similar to those of the 2Bt and 2BC horizons.

Cisne Series

The Cisne series consists of poorly drained, very slowly permeable soils on broad flats on the loess-covered Illinoian glacial till plain. These soils formed in loess and in the underlying silty or loamy sediments at the surface of the Illinoian glacial till. Slopes range from 0 to 2 percent.

Cisne soils are similar to Wynoose soils and commonly are adjacent to Bluford and Hoyleton soils. The somewhat poorly drained Bluford and Hoyleton soils are on low ridges above the Cisne soils. Wynoose soils have a lighter colored surface layer than the Cisne soils.

Typical pedon of Cisne silt loam, 1,780 feet south and 150 feet east of the northwest corner of sec. 15, T. 9 N., R. 5 E.

Ap—0 to 9 inches; dark brown (10YR 3/3) silt loam, grayish brown (10YR 5/2) dry; few fine distinct dark yellowish brown (10YR 4/6) mottles; weak fine granular structure; friable; common very fine roots; few fine and medium rounded concretions of iron and manganese oxides; slightly acid; abrupt smooth boundary.

Eg1—9 to 13 inches; grayish brown (10YR 5/2) and dark grayish brown (10YR 4/2) silt loam; common fine distinct yellowish brown (10YR 5/4) and few fine prominent dark yellowish brown (10YR 4/6) mottles; weak thin platy structure; friable; few very fine roots; common fine rounded concretions of iron and manganese oxides; strongly acid; clear smooth boundary.

Eg2—13 to 18 inches; light brownish gray (10YR 6/2) and grayish brown (10YR 5/2) silt loam; common medium distinct yellowish brown (10YR 5/4) and few fine prominent dark yellowish brown (10YR 4/6) mottles; moderate thick platy structure; friable; few very fine roots; common prominent white (10YR 8/1 dry) silt coatings on faces of peds; common fine rounded concretions of iron and manganese oxides; very strongly acid; abrupt smooth boundary.

B/Eg—18 to 21 inches; grayish brown (10YR 5/2) silt loam; common fine prominent dark yellowish brown (10YR 4/6) and yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; friable; few very fine roots; common distinct grayish brown (10YR 5/2) clay films and many prominent white (10YR 8/1 dry) silt coatings on faces of peds; common fine and medium rounded concretions of iron and manganese oxides; very strongly acid; clear smooth boundary.

Btg1—21 to 25 inches; grayish brown (10YR 5/2) silty clay loam; common fine prominent dark yellowish brown (10YR 4/6) and common fine distinct yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; common distinct grayish brown (10YR 5/2) clay films and common prominent white (10YR 8/1 dry) silt coatings on faces of peds; common fine rounded concretions of iron and manganese oxides; very strongly acid; clear smooth boundary.

Btg2—25 to 35 inches; grayish brown (10YR 5/2) silty clay loam; common medium prominent dark yellowish brown (10YR 4/6) and few medium distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine rounded concretions of iron and manganese oxides; strongly acid; clear smooth boundary.

Btg3—35 to 44 inches; light brownish gray (10YR 6/2) silty clay loam; common medium prominent dark yellowish brown (10YR 4/6), few medium prominent yellowish brown (10YR 5/6), and common fine distinct brown (10YR 5/3) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; common distinct grayish brown (10YR 5/2) clay films on faces of peds; common very fine and few fine rounded concretions of iron and manganese oxides; strongly acid; gradual smooth boundary.

2Btg4—44 to 55 inches; light brownish gray (10YR 6/2) silty clay loam; common medium prominent yellowish brown (10YR 4/6 and 5/8) mottles; weak coarse subangular blocky structure; firm; few distinct grayish brown (10YR 5/2) clay films on faces of peds; common fine rounded concretions of iron and manganese oxides; about 10 percent fine sand; medium acid; clear smooth boundary.

2Cg—55 to 60 inches; light brownish gray (2.5Y 6/2) silt loam; common medium prominent strong brown (7.5YR 5/6) mottles; massive; friable; few distinct grayish brown (10YR 5/2) root channel linings; few fine rounded concretions of iron and manganese oxides; about 10 percent fine sand; slightly acid.

The solum ranges from 40 to 60 inches in thickness. The loess ranges from 40 to 55 inches in thickness.

The Ap horizon has value of 2 or 3 and chroma of 1 to 3. The Eg horizon has value of 5 or 6 and chroma of 1 or 2. The B/E horizon has value of 5 or 6 and chroma of 1 or 2. It is silt loam or silty clay loam. The Btg and 2Btg horizons have hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. The Btg horizon is silty clay loam or silty clay. The 2Btg horizon is silty clay loam, clay loam, or loam. The 2Cg horizon is silty clay loam, clay loam, or silt loam.

Cowden Series

The Cowden series consists of poorly drained, slowly permeable soils on broad flats on the loess-covered Illinoian glacial till plain. These soils formed in loess. Slopes range from 0 to 2 percent.

Cowden soils are similar to Cisne and Piasa soils and commonly are adjacent to Herrick and Virden soils. Cisne soils formed in loess and in the underlying silty or loamy sediments. Piasa soils have a natric horizon. The somewhat poorly drained Herrick soils are above the Cowden soils on the landscape. The poorly drained Virden soils are in landscape positions similar to those of the Cowden soils. Herrick and Virden soils have a mollic epipedon.

Typical pedon of Cowden silt loam, 1,200 feet east and 1,540 feet south of the northwest corner of sec. 2, T. 10 N., R. 4 E.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, gray (10YR 5/1) dry; weak medium granular structure; friable; common fine roots; slightly acid; abrupt smooth boundary.

E—8 to 12 inches; gray (10YR 5/1) silt loam; common fine prominent yellowish brown (10YR 5/6) and few fine distinct dark yellowish brown (10YR 3/4) mottles; moderate medium platy structure; friable; few fine roots; common distinct dark grayish brown (10YR 4/2) and very dark grayish brown (10YR 3/2) organic coatings on faces of peds; medium acid; clear smooth boundary.

Btg1—12 to 19 inches; dark grayish brown (10YR 4/2) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; strong medium subangular blocky structure; firm; few very fine roots; many distinct black (10YR 2/1) organic coatings on faces of peds; few fine rounded concretions of iron and manganese oxides; medium acid; clear smooth boundary.

Btg2—19 to 24 inches; dark grayish brown (10YR 4/2) silty clay loam; common fine prominent yellowish brown (10YR 5/6) and few fine distinct dark yellowish brown (10YR 3/4) mottles; moderate medium subangular blocky structure; firm; few fine roots; common distinct very dark grayish brown (10YR 3/2) organic coatings and common faint dark grayish brown (10YR 4/2) clay films on faces of peds; few fine rounded concretions of iron and manganese oxides; slightly acid; clear smooth boundary.

Btg3—24 to 33 inches; grayish brown (10YR 5/2) silty clay loam; common fine distinct yellowish brown (10YR 5/6) and few fine distinct dark yellowish brown (10YR 3/4) mottles; moderate medium subangular blocky structure; firm; few fine roots; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common medium rounded concretions of iron and manganese oxides; neutral; clear smooth boundary.

Btg4—33 to 44 inches; grayish brown (10YR 5/2) silty clay loam; common medium distinct yellowish brown (10YR 5/6) and few fine prominent dark yellowish brown (10YR 4/6) mottles; weak medium subangular blocky structure; firm; few fine roots; common distinct dark gray (10YR 4/1) and dark grayish brown (10YR 4/2) clay films on faces of peds; common distinct black (10YR 2/1) root channel linings; few fine rounded concretions of iron and manganese oxides; neutral; clear smooth boundary.

BC—44 to 52 inches; grayish brown (10YR 5/2) silty clay loam; many coarse prominent light olive brown (2.5Y 5/6) mottles; weak coarse subangular blocky structure; firm; few fine roots; few faint dark grayish brown (10YR 4/2) clay films on faces of peds; common distinct dark gray (10YR 4/1) root channel linings; neutral; clear smooth boundary.

C—52 to 60 inches; light gray (10YR 6/1) silt loam; common medium prominent dark yellowish brown (10YR 4/4 and 4/6) mottles; massive; friable; neutral.

The solum ranges from 45 to 60 inches in thickness. The Ap horizon is 6 to 9 inches thick.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. The Eg horizon has value of 4 to 6 and chroma of 1 or 2. The Btg horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 or 2. It is dominantly silty clay loam, but in some subhorizons it is silty clay.

Dana Series

The Dana series consists of moderately well drained, moderately slowly permeable soils on ridges and side slopes on the Wisconsinan glacial moraines and till plain. These soils formed in loess and in the underlying loamy glacial till. Slopes range from 0 to 5 percent.

Dana soils are similar to Parr soils and commonly are adjacent to Parr and Raub soils. Parr soils formed mainly in glacial till and are fine-loamy. They are in landscape positions similar to those of the Dana soils. The somewhat poorly drained Raub soils are in the slightly lower landscape positions.

Typical pedon of Dana silt loam, 0 to 2 percent slopes, 2,550 feet north and 690 feet west of the southeast corner of sec. 30, T. 13 N., R. 3 E.

Ap—0 to 7 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; weak fine granular structure; friable; common very fine roots; slightly acid; abrupt smooth boundary.

A—7 to 11 inches; very dark grayish brown (10YR 3/2) silt loam, dark grayish brown (10YR 4/2) dry; weak very fine subangular blocky structure; friable; common very fine roots; common distinct black (10YR 2/1) organic coatings on faces of peds; slightly acid; abrupt smooth boundary.

Bt1—11 to 17 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; firm; common very fine roots; common distinct very dark gray (10YR 3/1) organic coatings and common faint dark brown (10YR 3/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—17 to 28 inches; dark yellowish brown (10YR 4/4) silty clay loam; few fine prominent yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; firm; common very fine roots; common distinct brown (10YR 4/3) clay films on faces of peds; common fine rounded concretions of iron and manganese oxides; neutral; gradual smooth boundary.

2Bt3—28 to 36 inches; dark yellowish brown (10YR 4/4) clay loam; common fine distinct dark yellowish brown (10YR 4/6) mottles; weak medium subangular blocky structure; firm; few very fine roots; few distinct brown (10YR 4/3) clay films on faces of peds; few distinct very dark grayish brown (10YR 3/2) clay films lining pores and root channels; few medium rounded concretions of iron and manganese oxides; 7 percent fine gravel; neutral; clear smooth boundary.

2BC—36 to 40 inches; yellowish brown (10YR 5/4) clay loam; common fine distinct dark yellowish brown (10YR 4/6) and few fine distinct yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; firm; few faint brown (10YR 4/3) clay films on faces of peds; few distinct very dark grayish brown (10YR 3/2) clay films in pores and root channels; common fine rounded concretions of iron and manganese oxides; 3 percent fine gravel; few coarse pebbles; mildly alkaline; clear smooth boundary.

2C1—40 to 48 inches; yellowish brown (10YR 5/4) loam; few medium distinct dark yellowish brown (10YR 4/6) and few fine distinct grayish brown (10YR 5/2) mottles; massive; firm; few distinct very dark grayish brown (10YR 3/2) clay films in pores and root channels; common fine rounded concretions of iron and manganese oxides; 3 percent fine gravel; strongly effervescent; mildly alkaline; clear smooth boundary.

2C2—48 to 60 inches; brown (10YR 5/3) loam; common medium distinct yellowish brown (10YR 5/6) mottles; massive; very firm; few distinct very dark gray (10YR 3/1) and dark grayish brown (10YR 4/2) clay films in pores and root channels; common fine and coarse light gray (10YR 6/1) disseminated lime; common fine rounded concretions of iron and manganese oxides; 3 percent fine gravel; strong effervescence; moderately alkaline.

The solum ranges from 36 to 55 inches in thickness. The mollic epipedon ranges from 10 to 12 inches in thickness.

The Ap and A horizons have value of 2 or 3 and chroma of 1 or 2. The Bt horizon has value of 4 or 5 and chroma of 3 or 4. The 2C horizon has value and chroma similar to those of the 2Bt horizon.

Dana silt loam, 2 to 5 percent slopes, eroded, has a thinner dark surface layer than is defined as the range for the series. This difference, however, does not significantly affect the use or behavior of the soil.

Darmstadt Series

The Darmstadt series consists of somewhat poorly drained, very slowly permeable soils on broad ridges and side slopes on the loess-covered Illinoian glacial till plain in the uplands. These soils formed in loess. Slopes range from 0 to 5 percent.

Darmstadt soils are similar to Bluford soils and commonly are adjacent to Bluford, Cisne, and Hoyleton soils. The adjacent soils do not have a natric horizon. The poorly drained Cisne soils are in broad areas below the Darmstadt soils. Bluford and Hoyleton soils are in landscape positions similar to those of the Darmstadt soils.

Typical pedon of Darmstadt silt loam, 0 to 2 percent slopes, 2,780 feet east and 47 feet north of the southwest corner of sec. 27, T. 10 N., R. 3 E.

Ap—0 to 9 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.

E—9 to 11 inches; light brownish gray (10YR 6/2) silt loam; common medium faint pale brown (10YR 6/3) and few medium distinct yellowish brown (10YR 5/4) and dark yellowish brown (10YR 3/6) mottles; moderate thin platy structure; friable; few very fine roots; common distinct grayish brown coatings in pores and on faces of peds; neutral; abrupt smooth boundary.

BE—11 to 13 inches; pale brown (10YR 6/3) silt loam; common fine distinct yellowish brown (10YR 5/4 and 5/8) mottles; weak fine subangular blocky structure; friable; few very fine roots; common distinct grayish brown (10YR 5/2) coatings on faces of peds; neutral; clear smooth boundary.

Bt—13 to 22 inches; yellowish brown (10YR 5/4) silty clay loam; common fine distinct yellowish brown (10YR 5/8) and few fine distinct light brownish gray (10YR 6/2) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; many faint dark grayish brown (10YR 4/2) clay films on faces of peds and few distinct dark gray (10YR 4/1) clay films in root channels; few fine rounded concretions of iron and manganese oxides; mildly alkaline; clear smooth boundary.

Btg1—22 to 33 inches; light brownish gray (10YR 6/2) silty clay loam; common medium prominent yellowish brown (10YR 5/8) and few medium faint light gray (10YR 6/1) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots;

common faint grayish brown (10YR 5/2) clay films on faces of peds and few distinct dark gray (10YR 4/1) clay films in root channels; common medium and few coarse rounded concretions of iron and manganese oxides; mildly alkaline; gradual smooth boundary.

Btg2—33 to 43 inches; light brownish gray (10YR 6/2) silty clay loam; common coarse prominent yellowish brown (10YR 5/8) mottles; moderate coarse subangular blocky structure; firm; few very fine roots; common faint grayish brown (10YR 5/2) clay films on faces of peds and few distinct gray (10YR 5/1) clay films in root channels; common fine and few coarse rounded concretions of iron and manganese oxides; moderately alkaline; clear smooth boundary.

BCg—43 to 56 inches; light brownish gray (10YR 6/2) silty clay loam; common medium prominent yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; firm; few very fine roots; few faint grayish brown (10YR 5/2) clay films on faces of peds and few distinct gray (10YR 5/1) clay films in root channels; common medium and few coarse rounded concretions of iron and manganese oxides; moderately alkaline; clear smooth boundary.

Cg—56 to 60 inches; light gray (10YR 6/1) silty clay loam; many medium prominent yellowish brown (10YR 5/8) mottles; massive; firm; common fine rounded concretions of iron and manganese oxides; mildly alkaline.

The solum ranges from 40 to 60 inches in thickness. Depth to the natric horizon ranges from 10 to 20 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 horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 2 to 6. Some pedons have a 2Bt or 2BC horizon below a depth of 40 inches.

Douglas Series

The Douglas series consists of well drained, moderately permeable soils on prominent convex ridges on the Illinoian glacial till plain in the uplands. These soils formed in loess and in the underlying silty and loamy sediments. Slopes range from 2 to 10 percent.

Douglas soils are similar to Harrison soils and commonly are adjacent to Herrick and Oconee soils. The somewhat poorly drained Herrick and Oconee soils are on ridges below the Douglas soils. Harrison soils are moderately well drained and are on the lower ridges.

Typical pedon of Douglas silt loam, 2 to 5 percent slopes, 2,100 feet east and 60 feet north of the southwest corner of sec. 21, T. 12 N., R. 2 E.

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak medium granular structure; friable; common very fine roots; neutral; clear smooth boundary.

BA—10 to 14 inches; dark yellowish brown (10YR 4/4) silt loam; moderate medium subangular blocky structure parting to weak medium granular; friable; few very fine roots; many distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bt1—14 to 25 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine and medium subangular blocky structure; friable; few very fine roots; common distinct dark brown (10YR 3/3) organic coatings and few fine faint brown (10YR 4/3) clay films on faces of peds; medium acid; clear smooth boundary.

Bt2—25 to 35 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; friable; few very fine roots; common distinct dark brown (10YR 3/3) organic coatings in root channels and common faint brown (10YR 4/3) clay films on faces of peds; strongly acid; clear smooth boundary.

Bt3—35 to 47 inches; yellowish brown (10YR 5/6) silty clay loam; weak medium subangular blocky structure; friable; few very fine roots; few faint brown (10YR 4/3) clay films on faces of peds; medium acid; clear smooth boundary.

2Bt4—47 to 57 inches; dark brown (7.5YR 4/4) silt loam; moderate medium prismatic structure; friable; few very fine roots; few faint strong brown (7.5YR 4/6) clay films on faces of peds; more than 15 percent sand; medium acid; clear smooth boundary.

2BC—57 to 60 inches; strong brown (7.5YR 4/6) loam; weak medium prismatic structure; friable; medium acid.

The solum ranges from 60 to more than 80 inches in thickness. The loess ranges from 40 to 60 inches in thickness. The mollic epipedon ranges from 10 to 16 inches in thickness.

The Ap horizon has value and chroma of 2 or 3. The BA and Bt horizons have hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. They are silt loam or silty clay loam. The 2Bt horizon is silt loam, loam, sandy loam, clay loam, or sandy clay loam.

Douglas silt loam, 5 to 10 percent slopes, eroded, has a thinner dark surface layer than is defined as the range for the series. This difference, however, does not significantly affect the use or behavior of the soil.

Drummer Series

The Drummer series consists of poorly drained, moderately permeable soils in low areas on broad, loess-covered Wisconsinan glacial till plains and outwash plains. These soils formed in loess and in the underlying stratified loamy outwash. Slopes range from 0 to 2 percent.

Drummer soils are similar to Peotone soils and commonly are adjacent to Elburn, Flanagan, and Raub soils. The somewhat poorly drained Elburn, Flanagan, and Raub soils are in slightly higher landscape positions than those of the Drummer soils. The very poorly drained Peotone soils are cumulic and have a higher content of clay in the subsoil than the Drummer soils.

Typical pedon of Drummer silty clay loam, 2,900 west and 143 feet north of the southeast corner of sec. 22, T. 14 N., R. 3 E.

Ap—0 to 9 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak fine granular structure; firm; common very fine roots; common fine rounded concretions of iron and manganese oxides; slightly acid; abrupt smooth boundary.

A—9 to 14 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; few fine distinct dark yellowish brown (10YR 4/4) mottles; moderate medium granular structure; firm; common very fine roots; common medium rounded concretions of iron and manganese oxides; slightly acid; clear smooth boundary.

Btg1—14 to 19 inches; dark grayish brown (10YR 4/2) silty clay loam; few fine distinct dark yellowish brown (10YR 4/4) and few fine prominent 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 few faint dark gray (10YR 4/1) clay films on faces of peds; common medium rounded concretions of iron and manganese oxides; slightly acid; clear smooth boundary.

Btg2—19 to 32 inches; grayish brown (10YR 5/2) silty clay loam; 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) organic coatings in root channels and common faint dark grayish brown (10YR 4/2) clay films on faces of peds; common fine and medium rounded concretions of iron and manganese oxides; very dark gray (10YR 3/1) krotovina; neutral; clear smooth boundary.

Btg3—32 to 40 inches; grayish brown (10YR 5/2) silty clay loam; common medium prominent yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; firm; few very fine roots; common faint dark gray (10YR 4/1) clay films and common distinct very dark gray (10YR 3/1) organic coatings on faces of peds and in root channels; common medium rounded concretions of iron and manganese oxides; very dark gray (10YR 3/1) krotovina; mildly alkaline; clear smooth boundary.

2BCg—40 to 46 inches; grayish brown (10YR 5/2) silt loam; common coarse prominent yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; friable; common faint dark gray (10YR 4/1) clay films on faces of peds and in root channels; few fine rounded concretions of iron and manganese oxides; more than 10 percent sand; less than 1 percent fine gravel; moderately alkaline; clear smooth boundary.

2Cg—46 to 60 inches; grayish brown (10YR 5/2) loam; many coarse prominent yellowish brown (10YR 5/8) mottles; massive; friable; common distinct dark gray (10YR 4/1) coatings in root channels; very dark gray (10YR 3/1) krotovina; less than 1 percent fine gravel; moderately alkaline.

The solum ranges from 45 to 60 inches in thickness. The loess ranges from 40 to 60 inches in thickness. The depth to free carbonates ranges from 40 to 65 inches. The mollic epipedon ranges from 10 to 24 inches in thickness.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The Btg horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 to 4. The 2BCg 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 loam or silt loam. The 2C horizon is stratified loam, sandy loam, or silt loam.

Elburn Series

The Elburn series consists of somewhat poorly drained, moderately permeable soils on low, broad ridges on Wisconsinan glacial outwash plains. These soils formed in loess and in the underlying stratified loamy outwash. Slopes range from 0 to 2 percent.

Elburn soils are similar to Millbrook soils and commonly are adjacent to Drummer and Starks soils. The poorly drained Drummer soils are below the Elburn soils on the landscape. Millbrook and Starks soils do not have a mollic epipedon. They are in landscape positions similar to those of the Elburn soils.

Typical pedon of Elburn silt loam, 2,250 feet east and 690 feet north of the southwest corner of sec. 4, T. 13 N., R. 2 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; slightly acid; abrupt smooth boundary.

A—8 to 13 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine subangular blocky structure; friable; few very fine roots; slightly acid; clear smooth boundary.

BA—13 to 18 inches; brown (10YR 4/3) silt loam; moderate fine and medium subangular blocky structure; friable; few very fine roots; many distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bt1—18 to 22 inches; brown (10YR 4/3) silty clay loam; few fine faint grayish brown (10YR 5/3) and few fine distinct dark yellowish brown (10YR 4/6) mottles; moderate fine and medium subangular blocky structure; friable; few very fine roots; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine rounded concretions of iron and manganese oxides; slightly acid; clear smooth boundary.

Bt2—22 to 37 inches; brown (10YR 5/3) silty clay loam; common medium faint grayish brown (10YR 5/2) and few fine distinct dark yellowish brown (10YR 4/6) mottles; moderate medium prismatic structure; firm; few very fine roots; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common very dark grayish brown (10YR 3/2) organic coatings in root channels; few medium rounded concretions of iron and manganese oxides; neutral; gradual smooth boundary.

Bt3—37 to 47 inches; brown (10YR 5/3) silty clay loam; few medium faint light brownish gray (10YR 6/2) and many medium prominent yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; firm; few very fine roots; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common very dark grayish brown (10YR 3/2) organic coatings in root channels; common medium rounded concretions of iron and manganese oxides; neutral; clear smooth boundary.

2BC—47 to 56 inches; stratified brown (10YR 4/3 and 5/3) sandy loam; few fine prominent dark yellowish brown (10YR 4/6) mottles; weak coarse subangular blocky structure; friable; few very fine roots; common very dark grayish brown (10YR 3/2) organic coatings in root channels; neutral; clear smooth boundary.

2C—56 to 60 inches; light brownish gray (2.5Y 6/2), stratified silt loam and fine sandy loam; few fine distinct dark yellowish brown (10YR 4/6) and few medium prominent yellowish brown (10YR 5/8) mottles; massive; friable; few very fine roots; few very dark grayish brown (10YR 3/2) organic coatings in root channels; neutral.

The solum ranges from 45 to 60 inches in thickness. 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 or 2. The Bt horizon has value of 4 or 5 and chroma of 2 to 4. The 2BC horizon has value of 4 to 6 and chroma of 2 to 8. It is sandy loam, clay loam, loam, or silt loam. The 2C horizon is stratified loam, silt loam, and sandy loam.

Fishhook Series

The Fishhook series consists of somewhat poorly drained, slowly permeable soils on side slopes on the Illinoian glacial till plain in the uplands. These soils formed in 20 to 40 inches of loess and in the underlying paleosol formed in the Illinoian glacial till. Slopes range from 2 to 5 percent.

Fishhook soils are similar to Atlas soils and commonly are adjacent to Atlas and Bluford soils. Atlas soils have a thinner mantle of loess than the Fishhook soils. Bluford soils formed in loess and in the underlying silty or loamy sediments. They are on broad flats and ridges adjacent to the Fishhook soils.

Typical pedon of Fishhook silt loam, 2 to 5 percent slopes, eroded, 1,400 feet east and 200 feet north of the southwest corner of sec. 24, T. 11 N., R. 3 E.

Ap—0 to 8 inches; brown (10YR 4/3) silt loam, light brownish gray (10YR 6/2) dry; few fragments of yellowish brown (10YR 5/4) subsoil material; weak fine granular structure; friable; many fine roots; common distinct dark grayish brown (10YR 4/2) coatings; few fine rounded concretions of iron and manganese oxides; neutral; abrupt smooth boundary.

Bt1—8 to 15 inches; yellowish brown (10YR 5/4) silty clay loam; few fine distinct yellowish brown (10YR 5/6) and light brownish gray (10YR 6/2) mottles; moderate fine subangular blocky structure; firm; common fine roots; common distinct brown (10YR 5/3) clay films on faces of peds; common medium rounded concretions of iron and manganese oxides; neutral; clear smooth boundary.

Bt2—15 to 22 inches; yellowish brown (10YR 5/4) silty clay loam; common medium distinct yellowish brown (10YR 5/6) and common fine distinct light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; firm; common fine roots; common distinct brown (10YR 5/3) clay films and common prominent white (10YR 8/2) silt coatings on faces of peds; common medium rounded concretions of iron and manganese oxides; strongly acid; clear smooth boundary.

Bt3—22 to 28 inches; grayish brown (10YR 5/2) silty clay loam; common medium distinct yellowish brown (10YR 5/6) and common fine faint light brownish gray (10YR 6/2) mottles; moderate medium prismatic structure parting to weak medium subangular blocky; firm; few fine roots; common distinct brown (10YR 5/3) clay films on faces of peds; common medium rounded concretions of iron and manganese oxides; medium acid; clear smooth boundary.

2Bt4—28 to 40 inches; gray (10YR 5/1) clay loam; common fine and medium distinct dark yellowish brown (10YR 3/4) and few medium prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure; firm; few fine roots; many distinct dark gray (10YR 4/1) clay films on faces of peds; common medium rounded concretions of iron and manganese oxides; 1 percent fine gravel; medium acid; gradual smooth boundary.

2Bt5—40 to 51 inches; gray (10YR 5/1) clay loam; common medium distinct dark yellowish brown (10YR 3/4) mottles; moderate medium prismatic structure; firm; many distinct dark gray (10YR 4/1) clay films on faces of peds; common coarse rounded concretions of iron and manganese oxides; 1 percent fine gravel; neutral; gradual smooth boundary.

2Bt6—51 to 60 inches; gray (10YR 5/1) clay loam; common coarse prominent dark yellowish brown (10YR 4/6) and common medium distinct dark yellowish brown (10YR 3/4) mottles; moderate medium prismatic structure; firm; few distinct dark gray (10YR 4/1) clay films on faces of peds; common coarse rounded concretions of iron and manganese oxides; 1 percent fine gravel; 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 to 5 and chroma of 2 or 3. The Bt horizon has value of 4 to 6 and chroma of 1 to 4. The 2Bt horizon has hue of 10YR, 2.5Y, or 5Y, value of 2 to 7, and chroma of 1 or 2. It is clay loam or silty clay loam.

Flanagan Series

The Flanagan series consists of somewhat poorly drained, moderately slowly permeable soils on low ridges and knolls on the loess-covered Wisconsinan glacial till plain in the uplands. These soils formed in loess and in the underlying loamy glacial till. Slopes range from 0 to 2 percent.

Flanagan soils are similar to Raub soils and commonly are adjacent to Catlin and Drummer soils. Raub soils formed in a thinner mantle of loess than the Flanagan soils. The moderately well drained Catlin soils are on ridges above the Flanagan soils. The poorly drained Drummer soils are in low areas below the Flanagan soils.

Typical pedon of Flanagan silt loam, 1,300 feet north and 95 feet west of the southeast corner of sec. 31, T. 13 N., R. 4 E.

Ap—0 to 9 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; weak fine granular structure; friable; common fine roots; neutral; abrupt smooth boundary.

A—9 to 18 inches; very dark gray (10YR 3/1) silt loam, dark gray (10YR 4/1) dry; weak medium granular structure; friable; common fine roots; many distinct black (10YR 2/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bt1—18 to 27 inches; dark grayish brown (10YR 4/2) silty clay loam; common medium distinct dark yellowish brown (10YR 4/4) mottles; moderate fine subangular blocky structure; firm; few very fine roots; many distinct very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bt2—27 to 33 inches; dark grayish brown (10YR 4/2) silty clay loam; common medium prominent yellowish brown (10YR 5/6) and few medium distinct dark yellowish brown (10YR 4/4) mottles; strong medium subangular blocky structure; firm; common very fine roots; common distinct very dark gray (10YR 3/1) clay films on faces of peds; common fine rounded concretions of iron and manganese oxides; neutral; clear smooth boundary.

Bt3—33 to 42 inches; dark grayish brown (10YR 4/2) silty clay loam; few medium faint grayish brown (10YR 5/2), common medium prominent yellowish brown (10YR 5/6), and common fine distinct dark yellowish brown (10YR 4/4) mottles; weak fine prismatic structure parting to strong medium subangular blocky; firm; common very fine roots; common distinct very dark gray (10YR 3/1) clay films on faces of peds; common fine rounded concretions of iron and manganese oxides; neutral; clear smooth boundary.

2BC—42 to 51 inches; brown (10YR 5/3) silty clay loam; common medium faint grayish brown (10YR 5/2) and many medium distinct dark yellowish brown (10YR 4/6) and yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; firm; few very fine roots; few distinct very dark gray (10YR 3/1) clay films on faces of peds; common fine rounded concretions of iron and manganese oxides; about 15 percent fine sand and 1 percent fine gravel; moderately alkaline; clear smooth boundary.

2C—51 to 60 inches; brown (10YR 5/3) loam; many coarse prominent yellowish brown (10YR 5/6) mottles; massive; firm; few very fine roots; common distinct very dark gray (10YR 3/1) root channel linings; common fine rounded concretions of iron and manganese oxides; about 1 percent fine gravel; mildly alkaline.

The solum ranges from 45 to 55 inches in thickness. The loess ranges from 40 to 60 inches in thickness. The mollic epipedon is 11 to 15 inches thick.

The Ap and A horizons have 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 4. The 2C horizon is silt loam or loam.

Harrison Series

The Harrison series consists of moderately well drained, moderately permeable soils on convex ridges and knolls in the uplands. These soils formed in loess and in the underlying silty or loamy sediments. Slopes range from 2 to 5 percent.

Harrison soils are similar to Douglas soils and commonly are adjacent to Herrick and Oconee soils. The somewhat poorly drained Herrick and Oconee soils formed entirely in loess. They are on broad ridges below the Harrison soils. Douglas soils are well drained.

Typical pedon of Harrison silt loam, 2 to 5 percent slopes, eroded, 900 feet south and 100 feet east of the northwest corner of sec. 20, T. 12 N., R. 2 E.

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) silt loam, dark grayish brown (10YR 4/2) dry; weak fine granular structure; friable; few very fine roots; slightly acid; abrupt smooth boundary.

BA—10 to 15 inches; brown (10YR 4/3) silt loam; moderate fine subangular blocky structure; friable; few very fine roots; many distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bt1—15 to 26 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine and medium subangular blocky structure; firm; common very fine roots; many distinct brown (10YR 4/3) clay films on faces of peds; common fine rounded concretions of iron and manganese oxides; slightly acid; clear smooth boundary.

Bt2—26 to 32 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium subangular blocky structure; firm; common very fine roots; common distinct brown (10YR 4/3) clay films on faces of peds; common fine rounded concretions of iron and manganese oxides; medium acid; clear smooth boundary.

Bt3—32 to 48 inches; yellowish brown (10YR 5/4) silty clay loam; common medium faint yellowish brown (10YR 5/6) and common fine distinct light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable; few very fine roots; common distinct brown (10YR 5/3) clay films on faces of peds; common fine rounded concretions of iron and manganese oxides; medium acid; clear smooth boundary.

Bt4—48 to 56 inches; brown (10YR 5/3) silt loam; few fine distinct light brownish gray (10YR 6/2) and common medium distinct strong brown (7.5YR 5/6 and 5/8) mottles; weak coarse subangular blocky structure; friable; few very fine roots; few distinct dark brown (7.5YR 4/2) clay films on faces of peds and in root channels; few fine rounded concretions of iron and manganese oxides; medium acid; clear smooth boundary.

2Bt5—56 to 60 inches; dark brown (7.5YR 4/4) silt loam; few fine distinct grayish brown (10YR 5/2) mottles; weak coarse subangular blocky structure; friable; few very fine roots; few faint dark brown (7.5YR 4/2) clay films on faces of peds and in root channels; few fine rounded concretions of iron and manganese oxides; approximately 15 percent fine sand; slightly acid.

The solum ranges from 60 to more than 70 inches in thickness. The loess ranges from 40 to 60 inches in thickness. The thickness of the mollic epipedon ranges from 10 to 16 inches.

The Ap horizon has value of 2 or 3 and chroma of 1 to 3. The Bt horizon has value of 4 or 5 and chroma of 3 or 4. It is silt loam or silty clay loam. The 2Bt horizon is silty clay loam, silt loam, loam, or clay loam. It has a higher content of sand than the overlying loess.

Herrick Series

The Herrick series consists of somewhat poorly drained, moderately slowly permeable soils on low, broad ridges on loess-covered till plains. Slopes range from 0 to 2 percent.

Herrick soils are similar to Virden soils and commonly are adjacent to Oconee and Virden soils. Oconee soils have a thinner dark surface soil than the Herrick soils. They are in landscape positions similar to those of the Herrick soils. The poorly drained Virden soils are on broad flats below the Herrick soils.

Typical pedon of Herrick silt loam, 1,600 feet east and 54 feet north of the southwest corner of sec. 17, T. 12 N., R. 2 E.

Ap—0 to 9 inches; very dark gray (10YR 3/1) silt loam, dark gray (10YR 4/1) dry; weak fine granular structure; friable; common very fine roots; neutral; abrupt smooth boundary.

A—9 to 11 inches; very dark grayish brown (10YR 3/2) silt loam, dark gray (10YR 4/1) dry; weak fine granular structure; friable; common fine roots; neutral; clear smooth boundary.

E—11 to 13 inches; very dark grayish brown (10YR 3/2) silt loam, dark grayish brown (10YR 4/2) dry; weak medium platy structure; friable; common fine roots; many distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few fine rounded concretions of iron and manganese oxides; neutral; clear smooth boundary.

Bt1—13 to 18 inches; dark grayish brown (10YR 4/2) silty clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; firm; common fine roots; common distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; few fine rounded concretions of iron and manganese oxides; medium acid; clear smooth boundary.

Bt2—18 to 23 inches; dark grayish brown (10YR 4/2) silty clay loam; common medium distinct dark yellowish brown (10YR 4/6) and yellowish brown (10YR 5/6) mottles; strong fine subangular blocky structure; firm; common fine roots; few distinct very dark grayish brown (10YR 3/2) organic coatings; common faint dark grayish brown (10YR 4/2) clay films on faces of peds; common medium rounded concretions of iron and manganese oxides; medium acid; clear smooth boundary.

Bt3—23 to 33 inches; brown (10YR 5/3) silty clay loam; common medium distinct yellowish brown (10YR 5/6) and dark yellowish brown (10YR 4/6) mottles; moderate medium subangular blocky structure; firm; few fine roots; common distinct very dark grayish brown (10YR 3/2) organic coatings and clay films on faces of peds; common medium rounded concretions of iron and manganese oxides; medium acid; clear smooth boundary.

Bt4—33 to 42 inches; grayish brown (10YR 5/2) silty clay loam; many medium distinct yellowish brown (10YR 5/6) and dark yellowish brown (10YR 4/6) mottles; moderate coarse subangular blocky structure; firm; common fine rounded concretions of iron and manganese oxides; slightly acid; clear smooth boundary.

BC—42 to 55 inches; grayish brown (10YR 5/2) silty clay loam; common medium distinct yellowish brown (10YR 5/6) and dark yellowish brown (10YR 4/6) mottles; weak coarse subangular blocky structure; firm; few fine roots; few distinct dark gray (10YR 4/1) clay films on faces of peds and common distinct very dark grayish brown (10YR 3/2) coatings in root channels; common fine rounded concretions of iron and manganese oxides; neutral; clear smooth boundary.

C—55 to 60 inches; light brownish gray (10YR 6/2) silt loam; common coarse distinct yellowish brown (10YR 5/8) mottles; massive; friable; few fine roots; common distinct dark gray (10YR 4/1) coatings in root channels and pores; common fine rounded concretions of iron and manganese oxides; neutral.

The solum ranges from 40 to 65 inches in thickness. The mollic epipedon is 10 to 14 inches thick.

The Ap and A horizons have value of 2 or 3 and chroma of 1 or 2. The Bt horizon has value of 4 or 5 and chroma of 2 or 3.

Hickory Series

The Hickory series consists of well drained, moderately permeable soils on side slopes in strongly dissected areas in the uplands. These soils formed in Illinoian glacial till. Slopes range from 10 to 60 percent.

Hickory soils are similar to Miami soils and commonly are adjacent to Atlas and Ava soils. Miami soils are less acid in the subsoil than the Hickory soils and have a thinner solum. They formed in Wisconsinan glacial till. The somewhat poorly drained Atlas soils are on side slopes, and the moderately well drained Ava soils are on ridges above the Hickory soils.

Typical pedon of Hickory loam, 35 to 60 percent slopes, 400 feet north and 100 feet east of the southwest corner of sec. 19, T. 10 N., R. 2 E.

A—0 to 3 inches; dark brown (10YR 3/3) loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; many medium roots; less than 1 percent fine gravel; medium acid; abrupt smooth boundary.

E—3 to 7 inches; yellowish brown (10YR 5/4) loam; weak thin platy structure; friable; common medium roots; less than 1 percent fine gravel; medium acid; clear smooth boundary.

BE—7 to 11 inches; dark yellowish brown (10YR 4/4) loam; weak fine subangular blocky structure; friable; common medium roots; less than 1 percent fine gravel; strongly acid; clear smooth boundary.

Bt1—11 to 17 inches; dark yellowish brown (10YR 4/6) clay loam; weak medium subangular blocky structure; firm; common fine roots; few distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; 2 percent fine gravel; strongly acid; clear smooth boundary.

Bt2—17 to 28 inches; dark yellowish brown (10YR 4/6) clay loam; moderate medium subangular blocky structure; firm; common fine roots; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; 2 percent fine gravel; strongly acid; clear smooth boundary.

BC—28 to 42 inches; dark yellowish brown (10YR 4/6) loam; common coarse distinct yellowish brown (10YR 5/4) and common medium distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; firm; few medium roots; common faint dark yellowish brown (10YR 4/4) clay films on faces of peds; few fine rounded concretions of iron and manganese oxides; 2 percent fine gravel; medium acid; clear smooth boundary.

C—42 to 60 inches; yellowish brown (10YR 5/4) loam; common medium distinct yellowish brown (10YR 5/8) mottles; massive; friable; 5 percent fine gravel; few medium soft accumulations of calcium carbonate; strong effervescence; moderately alkaline.

The thickness of the solum and the depth to free carbonates range from 40 to 60 inches.

The A or Ap horizon has value of 2 to 5 and chroma of 2 to 4. It is loam or silt loam. The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6.

Holton Series

The Holton series consists of somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in loamy alluvium. Slopes range from 0 to 2 percent.

Holton soils are similar to Wirt soils and commonly are adjacent to Birds and Wirt soils. The poorly drained Birds soils are in low areas below the Holton soils. The well drained Wirt soils are nearer to the stream channel than the Holton soils and are in the slightly higher positions on the landscape.

Typical pedon of Holton silt loam, frequently flooded, 1,400 feet west and 167 feet south of the northeast corner of sec. 27, T. 10 N., R. 4 E.

Ap—0 to 11 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; few fine distinct light brownish gray (10YR 6/2) and dark yellowish brown (10YR 4/6) mottles; weak fine granular structure; friable; common fine roots; mildly alkaline; clear smooth boundary.

Bw1—11 to 18 inches; dark grayish brown (10YR 4/2) silt loam; common medium distinct gray (10YR 5/1), common fine distinct dark brown (7.5YR 3/4), and few fine distinct dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; friable; common fine roots; few medium rounded concretions of iron and manganese oxides; about 20 percent sand; neutral; gradual smooth boundary.

Bw2—18 to 29 inches; dark grayish brown (10YR 4/2) silt loam; common fine distinct dark brown (7.5YR 3/4) and dark yellowish brown (10YR 4/6) and few fine distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; friable; few fine roots; few medium rounded concretions of iron and manganese oxides; about 25 percent fine sand; neutral; gradual smooth boundary.

Bw3—29 to 39 inches; grayish brown (10YR 5/2) loam; common fine distinct yellowish brown (10YR 5/8) and few fine distinct dark yellowish brown (10YR 3/4) mottles; weak coarse subangular blocky structure; friable; few very fine roots; few medium rounded concretions of iron and manganese oxides; neutral; gradual smooth boundary.

C1—39 to 47 inches; grayish brown (10YR 5/2) loam; common medium distinct dark yellowish brown (10YR 3/6) and common fine distinct yellowish brown (10YR 5/8) mottles; massive; friable; few medium rounded concretions of iron and manganese oxides; neutral; gradual smooth boundary.

C2—47 to 60 inches; grayish brown (10YR 5/2) and brown (10YR 5/3) loam; common fine distinct dark yellowish brown (10YR 3/6) and few fine faint gray (10YR 5/1) mottles; massive; friable; few medium rounded concretions of iron and manganese oxides; neutral.

The solum ranges from 24 to 40 inches in thickness.

The Ap horizon has value of 4 or 5 and chroma of 2 or 3. It is silt loam or loam. The Bw horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 to 8. It is silt loam, loam, fine sandy loam, or sandy loam. The C horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 to 6. It is sandy loam, loam, loamy sand, or loamy fine sand.

Hoyleton Series

The Hoyleton series consists of somewhat poorly drained, slowly permeable soils on broad ridges and side slopes on loess-covered till plains. These soils formed in loess and in the underlying loamy sediments. Slopes range from 0 to 5 percent.

Hoyleton soils are similar to Oconee soils and commonly are adjacent to Cisne and Darmstadt soils.

The poorly drained Cisne soils are in lower landscape positions than those of the Hoyleton soils. Darmstadt soils have a natric horizon. They are in landscape positions similar to those of the Hoyleton soils. Oconee soils formed entirely in loess.

Typical pedon of Hoyleton silt loam, 0 to 2 percent slopes, 2,160 feet east and 295 feet south of the northwest corner of sec. 15, T. 9 N., R. 5 E.

Ap—0 to 8 inches; dark brown (10YR 3/3) and very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; many very fine roots; few fine rounded concretions of iron and manganese oxides; medium acid; abrupt smooth boundary.

E—8 to 11 inches; brown (10YR 5/3) silt loam; weak thin platy structure; friable; common very fine and few fine roots; few faint brown (10YR 5/3) coatings on faces of peds; dark grayish brown (10YR 4/2) root channel linings and wormcasts; few fine rounded concretions and stains of iron and manganese oxides; strongly acid; clear smooth boundary.

BE—11 to 14 inches; brown (10YR 5/3) silty clay loam; few fine faint yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; friable; few very fine roots; few faint grayish brown (10YR 5/2) clay films and few distinct very pale brown (10YR 7/3) silt coatings on faces of peds; few fine rounded concretions of iron and manganese oxides; strongly acid; clear smooth boundary.

Bt1—14 to 20 inches; brown (10YR 5/3) silty clay loam; common medium prominent yellowish red (5YR 5/6 and 5/8) mottles; strong fine subangular blocky structure; firm; few very fine roots; many distinct grayish brown (10YR 5/2) clay films and many prominent white (10YR 8/2) silt coatings on faces of peds; common fine rounded concretions of iron and manganese oxides; strongly acid; clear smooth boundary.

Bt2—20 to 33 inches; brown (10YR 5/3) silty clay; common fine prominent yellowish red (5YR 5/8) and common medium distinct light brownish gray (2.5Y 6/2) mottles; moderate medium subangular blocky structure; firm; few fine and very fine roots; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few distinct dark gray (10YR 4/1) clay films lining root channels and pores; common fine rounded concretions of iron and manganese oxides; strongly acid; gradual smooth boundary.

2BC—33 to 39 inches; pale brown (10YR 6/3) silty clay loam; many medium prominent yellowish brown (10YR 5/8) and common medium distinct light brownish gray (2.5Y 6/2) mottles; weak coarse subangular blocky structure; firm; few fine and very fine roots; few faint grayish brown (10YR 5/2) clay films on faces of peds; few faint very dark grayish brown (10YR 3/2) clay films lining root channels and pores; common fine rounded concretions of iron and manganese oxides; about 10 percent fine sand; strongly acid; gradual smooth boundary.

2C1—39 to 50 inches; pale brown (10YR 6/3) silt loam; common medium and few fine distinct yellowish brown (10YR 5/8 and 5/4) and common medium distinct grayish brown (2.5Y 5/2) mottles; massive; friable; few very fine roots; few faint very dark gray (10YR 4/1) clay films lining root channels and pores; common fine rounded concretions of iron and manganese oxides; about 15 percent fine sand; slightly acid; gradual smooth boundary.

2C2—50 to 60 inches; brown (7.5YR 5/2) silt loam; many medium distinct strong brown (7.5YR 4/6) and many medium distinct dark brown (7.5YR 4/4) mottles; massive; friable; few fine rounded concretions of iron and manganese oxides; about 25 percent fine sand; slightly acid.

The solum ranges from 36 to 60 inches in thickness. The loess ranges from 30 to 45 inches in thickness.

The Ap horizon has value of 2 or 3 and chroma of 1 to 3. The E horizon has value of 4 to 6 and chroma of 3 or 4. Some pedons do not have an E horizon. The Bt horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 4. It is silty clay loam or silty clay. The 2BC and 2C horizons are silt loam, loam, or clay loam.

Hoyleton silt loam, 2 to 5 percent slopes, has less clay in the subsoil and redder hue in the 2C horizon than are definitive for the series. These differences, however, do not significantly affect the use or behavior of the soil.

Huey Series

The Huey series consists of poorly drained, very slowly permeable soils on loess-covered till plains. These soils formed in loess and in the underlying Illinoian glacial till. Slopes range from 0 to 2 percent.

Huey soils are similar to Piasa soils and commonly are adjacent to Darmstadt soils. Piasa soils have a darker surface layer than the Huey soils. They are in landscape positions similar to those of the Huey soils. The somewhat poorly drained Darmstadt soils are on low ridges above the Huey soils.

Typical pedon of Huey silt loam, 990 feet west and 400 feet north of the southeast corner of sec. 17, T. 9 N., R. 3 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.

E—7 to 10 inches; grayish brown (10YR 5/2) silt loam; few fine faint yellowish brown (10YR 5/6) mottles; moderate medium and thick platy structure; friable; few very fine roots; mildly alkaline; abrupt smooth boundary.

Btg1—10 to 22 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to weak medium subangular blocky; firm; few very fine roots; few distinct gray (10YR 5/1) clay films on faces of peds and few distinct dark gray (10YR 4/1) clay films lining root channels; few fine rounded concretions of iron and manganese oxides; moderately alkaline; clear smooth boundary.

Btg2—22 to 29 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to weak medium subangular blocky; firm; few very fine roots; many distinct gray (10YR 5/1) clay films on faces of peds and lining root channels; few medium irregular accumulations and concretions of iron and manganese oxides; moderately alkaline; clear smooth boundary.

Btg3—29 to 37 inches; grayish brown (2.5Y 5/2) silty clay loam; many medium and coarse prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to weak medium subangular blocky; firm; few very fine roots; common distinct gray (10YR 5/1) clay films on faces of peds and lining root channels; few medium accumulations and few medium irregular concretions of iron and manganese oxides; moderately alkaline; clear smooth boundary.

BCg—37 to 47 inches; light brownish gray (2.5Y 6/2) silty clay loam; many medium and coarse prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to weak medium subangular blocky; firm; few very fine roots; few faint gray (10YR 5/1) clay films on faces of peds and lining root channels; few medium accumulations and few medium irregular concretions of iron and manganese oxides; moderately alkaline; clear smooth boundary.

Cg—47 to 60 inches; gray (5Y 5/1) loam; common medium prominent yellowish brown (10YR 5/8) mottles; massive; firm; few very fine roots; few medium accumulations and few fine rounded concretions of iron and manganese oxides; 1 percent fine and medium gravel; moderately alkaline.

The solum ranges from 36 to 60 inches in thickness. The thickness of the loess ranges from 50 to more than 60 inches. Depth to the natric horizon ranges from 10 to 16 inches.

The Ap horizon has value of 4 or 5 and chroma of 1 or 2. The E horizon has value of 5 to 7. The Btg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 or 2. The 2Cg horizon is silt loam, loam, or silty clay loam.

Huntsville Series

The Huntsville series consists of well drained, moderately permeable soils on flood plains. These soils formed in silty alluvium. Slopes range from 0 to 3 percent.

Huntsville soils are similar to Wirt soils and commonly are adjacent to Tice soils. The somewhat poorly drained Tice soils are lower on the flood plains than the Huntsville soils. Wirt soils have a light-colored surface layer.

Typical pedon of Huntsville silt loam, 0 to 3 percent slopes, frequently flooded, 1,700 feet east and 2,560 feet north of the southwest corner of sec. 2, T. 10 N., R. 3 E.

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam, dark grayish brown (10YR 4/2) dry; weak fine granular structure; friable; common very fine roots; neutral; abrupt smooth boundary.

A1—7 to 21 inches; very dark gray (10YR 3/1) silt loam, dark grayish brown (10YR 4/2) dry; weak fine subangular blocky structure parting to weak medium granular; friable; common very fine roots; common faint very dark grayish brown (10YR 3/2) coatings on faces of peds; neutral; clear smooth boundary.

A2—21 to 30 inches; dark brown (10YR 3/3) silt loam, brown (10YR 4/3) dry; weak medium subangular blocky structure parting to weak medium granular; friable; common very fine roots; common faint very dark grayish brown (10YR 3/2) coatings on faces of peds; neutral; clear smooth boundary.

AC—30 to 55 inches; dark brown (10YR 4/3) silt loam; weak medium subangular blocky structure parting to weak medium granular; friable; few very fine roots; common faint dark brown (10YR 3/3) coatings on faces of peds; neutral; gradual smooth boundary.

C—55 to 60 inches; dark brown (10YR 4/3) silt loam; massive; friable; about 25 percent fine sand; neutral.

The solum and the mollic epipedon range from 24 to 50 inches in thickness.

The Ap and A horizons have value of 2 or 3 and chroma of 1 to 3. The soils are silt loam to a depth of at least 40 inches. Below a depth of 40 inches, some pedons have subhorizons that are silt loam, loam, or fine sandy loam.

Medway Series

The Medway series consists of moderately well drained, moderately permeable soils on flood plains. These soils formed in loamy alluvium. Slopes range from 0 to 3 percent.

Medway soils are similar to Proctor soils and commonly are adjacent to Sawmill and Tice soils. The poorly drained Sawmill soils are lower on the flood plains than the Medway soils. The somewhat poorly drained Tice soils formed in silty alluvium. Proctor soils are well drained and are on outwash plains.

Typical pedon of Medway loam, 0 to 3 percent slopes, rarely flooded, 940 feet north and 1,100 feet west of the southeast corner of sec. 35, T. 10 N., R. 3 E.

Ap—0 to 7 inches; black (10YR 2/1) loam, dark grayish brown (10YR 4/2) dry; weak fine granular structure; friable; common very fine and fine roots; neutral; abrupt smooth boundary.

A—7 to 18 inches; very dark gray (10YR 3/1) loam, dark grayish brown (10YR 4/2) dry; moderate fine granular structure; friable; common fine and very fine roots; many distinct black (10YR 2/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bw1—18 to 22 inches; brown (10YR 4/3) loam; few fine faint grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; friable; common very fine roots; common distinct very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bw2—22 to 33 inches; brown (10YR 4/3) loam; few fine faint grayish brown (10YR 5/2), common fine distinct dark yellowish brown (10YR 4/6), and few fine distinct dark yellowish brown (10YR 3/4) mottles; weak coarse subangular blocky structure; friable; common very fine roots; common faint dark brown (10YR 3/3) coatings on vertical faces of peds; common medium and few coarse rounded concretions of iron and manganese oxides; neutral; clear smooth boundary.

Bw3—33 to 44 inches; dark yellowish brown (10YR 4/4) sandy loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; friable; few very fine roots; common faint brown (10YR 4/3) coatings on vertical faces of peds; common medium and few coarse rounded concretions of iron and manganese oxides; 2 percent fine gravel; neutral; clear smooth boundary.

C1—44 to 56 inches; dark yellowish brown (10YR 4/4) gravelly sandy loam; few fine distinct dark yellowish brown (10YR 4/6) mottles; massive; friable; common faint brown (10YR 4/3) coatings on cleavage planes; common medium rounded concretions of iron and manganese oxides; neutral; clear smooth boundary.

C2—56 to 60 inches; dark yellowish brown (10YR 4/4) loam that has thin strata of sandy loam; common medium distinct grayish brown (10YR 5/2) and dark yellowish brown (10YR 4/6) and common fine distinct dark yellowish brown (10YR 3/6) mottles; massive; friable; common faint brown (10YR 4/3) coatings on cleavage planes; few fine and medium rounded concretions of iron and manganese oxides; 2 percent fine gravel; mildly alkaline.

The thickness of the solum ranges from 28 to 50 inches. Free carbonates are in the lower part of the solum in some pedons.

The Ap horizon has value of 2 or 3 and chroma of 1 to 3. The Bw horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 3 to 5, and chroma of 2 to 4. It is loam or sandy loam. The C horizon is loam or sandy loam and gravelly sandy loam.

Miami Series

The Miami series consists of well drained, moderately permeable soils on side slopes in the uplands. These soils formed in Wisconsinan glacial till. Slopes range from 2 to 60 percent.

Miami soils are similar to Hickory soils and commonly are adjacent to Sabina and Xenia soils. Hickory soils have a thicker solum than the Miami soils and are more acid. They formed in Illinoian glacial till. The somewhat poorly drained Sabina and moderately well drained Xenia soils formed in loess and glacial till. They are on the less sloping ridges above the Miami soils.

Typical pedon of Miami loam, 30 to 60 percent slopes, 1,920 feet west and 510 feet south of the northeast corner of sec. 18, T. 12 N., R. 5 E.

A—0 to 3 inches; very dark grayish brown (10YR 4/2) loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; friable; many very fine roots; 1 percent fine gravel; neutral; abrupt smooth boundary.

E—3 to 7 inches; brown (10YR 5/3) loam; weak medium subangular blocky structure; friable; common very fine and few fine roots; 1 percent fine gravel; medium acid; abrupt smooth boundary.

Bt1—7 to 13 inches; dark yellowish brown (10YR 4/4) clay loam; weak fine subangular blocky structure; firm; common very fine roots; few distinct brown

(10YR 4/3) clay films on faces of peds; 1 percent fine gravel; medium acid; clear smooth boundary.

Bt2—13 to 25 inches; dark yellowish brown (10YR 4/4) clay loam; moderate medium subangular blocky structure; firm; few very fine, fine, medium, and coarse roots; many distinct brown (10YR 4/3) clay films on faces of peds; few very dark grayish brown (10YR 3/2) root channel linings; 3 percent fine gravel; neutral; clear smooth boundary.

BC—25 to 33 inches; dark yellowish brown (10YR 4/4) clay loam; weak medium prismatic structure; firm; few very fine and fine roots; common distinct yellowish brown (10YR 5/4) clay films on faces of peds; 3 percent fine gravel; slightly effervescent; neutral; clear smooth boundary.

C—33 to 60 inches; brown (10YR 5/3) loam; massive; firm; few very fine, fine, and medium roots; 4 percent fine gravel; mildly alkaline; strongly effervescent.

The solum ranges from 24 to 40 inches in thickness. Free carbonates are within a depth of 40 inches.

In uncultivated areas the A horizon has value of 3 or 4 and chroma of 1 or 2. In cultivated areas the Ap horizon has value of 4 or 5 and chroma of 2 or 3. The A or Ap horizon is loam or silt loam. The Bt horizon is loam, clay loam, or silty clay loam. In some pedons the BC horizon is loam. The C horizon has high-chroma mottles in some pedons.

Millbrook Series

The Millbrook series consists of somewhat poorly drained, moderately permeable soils on broad ridges on outwash plains. These soils formed in loess and in the underlying stratified loamy sediments. Slopes range from 0 to 2 percent.

Millbrook soils are similar to Starks soils and commonly are adjacent to Elburn and Starks soils. Starks soils have a lighter colored surface layer than the Millbrook soils. They are on the slightly higher ridges. Elburn soils have a mollic epipedon. They are in landscape positions slightly lower than those of the Millbrook soils.

Typical pedon of Millbrook silt loam, 1,563 feet south and 1,118 feet west of the northeast corner of sec. 13, T. 11 N., R. 6 E.

Ap—0 to 9 inches; dark brown (10YR 3/3) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; few fine roots; few fine rounded concretions of iron and manganese oxides; slightly acid; abrupt smooth boundary.

E1—9 to 13 inches; dark grayish brown (10YR 4/2) silt loam; common fine distinct yellowish brown (10YR 5/6) and common fine faint grayish brown (10YR 5/2) mottles; weak medium platy structure; friable; few fine roots; few distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds and in root channels; few fine rounded concretions of iron and manganese oxides; slightly acid; clear smooth boundary.

E2—13 to 16 inches; grayish brown (10YR 5/2) silt loam; common fine distinct yellowish brown (10YR 5/6) mottles; weak medium platy structure; friable; few fine roots; many prominent white (10YR 8/1 dry) silt coatings on faces of peds; few fine rounded concretions of iron and manganese oxides; slightly acid; clear smooth boundary.

Bt1—16 to 25 inches; yellowish brown (10YR 5/4) silty clay loam; many medium distinct yellowish brown (10YR 5/6), common medium faint dark yellowish brown (10YR 4/4), and few fine faint grayish brown (10YR 5/2) mottles; moderate fine and medium subangular blocky structure; firm; few very fine roots; many faint dark grayish brown (10YR 4/2) clay films on faces of peds; common fine rounded concretions of iron and manganese oxides; neutral; clear smooth boundary.

Bt2—25 to 32 inches; brown (10YR 5/3) silty clay loam; common medium and coarse prominent yellowish brown (10YR 5/6 and 5/8) and common medium prominent dark yellowish brown (10YR 4/6) 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; common fine rounded concretions of iron and manganese oxides; neutral; clear smooth boundary.

2Btg—32 to 39 inches; grayish brown (10YR 5/2) silty clay loam; common coarse prominent yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; firm; few very fine roots; few faint dark grayish brown (10YR 4/2) clay films on faces of peds; common fine rounded concretions of iron and manganese oxides; 15 percent fine sand; neutral; clear smooth boundary.

2BCg—39 to 46 inches; grayish brown (10YR 5/2) clay loam; common coarse prominent yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; firm; few very fine roots; few faint dark grayish brown (10YR 4/2) clay films on faces of peds; common medium rounded concretions of iron and manganese oxides; neutral; clear smooth boundary.

2C—46 to 60 inches; pale brown (10YR 6/3), stratified loam, silt loam, and sandy loam; common coarse prominent yellowish brown (10YR 5/8) and light olive brown (2.5Y 5/6) mottles; massive; friable; few very fine roots; common fine and few medium rounded concretions of iron and manganese oxides; neutral.

The solum ranges from 40 to 60 inches in thickness. The depth to outwash ranges from 24 to 40 inches.

The Ap horizon has value of 2 or 3 and chroma of 1 to 3. The E horizon has value of 4 to 6. The Bt horizon has value of 3 to 6 and chroma of 1 or 2. The 2Bt horizon is silty clay loam, sandy loam, sandy clay loam, loam, or clay loam. In some pedons it has thin strata of sand or silt loam. The 2C horizon is dominantly stratified loam, silt loam, or sandy loam. It has thin strata of loamy sand or sand in some pedons.

Negley Series

The Negley series consists of well drained, moderately permeable soils on side slopes of ridges in the uplands. These soils formed in loamy Illinoian glacial drift. Slopes range from 5 to 18 percent.

Negley soils are similar to Parke soils and commonly are adjacent to Parke and Pike soils. Parke and Pike soils formed in loess and glacial drift. They are on the less sloping ridgetops and side slopes above the Negley soils.

Typical pedon of Negley loam, 5 to 10 percent slopes, eroded, 400 feet east and 1,450 feet north of the southwest corner of sec. 2, T. 10 N., R. 2 E.

Ap—0 to 8 inches; dark brown (10YR 4/3) loam, pale brown (10YR 6/3) dry; common fragments of strong brown (7.5YR 4/6) subsoil material in the lower part; weak fine granular structure; friable; common very fine roots; 5 percent fine gravel; few medium pebbles; medium acid; abrupt smooth boundary.

Bt1—8 to 13 inches; strong brown (7.5YR 4/6) loam; weak fine subangular blocky structure; friable; few very fine roots; common distinct dark brown (10YR 4/3 and 7.5YR 4/4) clay films on faces of peds; 5 percent fine gravel; few medium pebbles; medium acid; abrupt smooth boundary.

Bt2—13 to 25 inches; strong brown (7.5YR 4/6) clay loam; moderate medium subangular blocky structure; friable; few very fine roots; few distinct dark brown (7.5YR 3/4) organic coatings in root channels and common distinct dark brown (7.5YR 4/4) clay films on faces of peds; 5 percent fine gravel; few medium pebbles; medium acid; clear smooth boundary.

Bt3—25 to 34 inches; strong brown (7.5YR 4/6) clay loam; weak medium and coarse subangular blocky structure; friable; few very fine roots; few distinct dark brown (7.5YR 3/4) organic coatings in root channels and common distinct dark brown (7.5YR 4/4) clay films on faces of peds; few medium rounded concretions of iron and manganese oxides; 5 percent fine gravel; few medium and coarse pebbles; medium acid; clear smooth boundary.

Bt4—34 to 48 inches; strong brown (7.5YR 4/6) clay loam; weak coarse subangular blocky structure; friable; few very fine roots; few distinct dark brown (7.5YR 4/4) clay films on faces of peds; few medium rounded concretions of iron and manganese oxides; 5 percent fine gravel; few medium and coarse pebbles; medium acid; gradual smooth boundary.

Bt5—48 to 60 inches; strong brown (7.5YR 4/6) clay loam; weak coarse subangular blocky structure; friable; few distinct dark brown (7.5YR 4/4) clay films on faces of peds; few fine rounded concretions of iron and manganese oxides; 5 percent fine gravel; few medium pebbles; medium acid.

The thickness of the solum and the depth to carbonates are more than 80 inches. The content of coarse fragments in the solum ranges from 5 to 35 percent.

The Ap horizon has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 2 to 4. It is dominantly loam, but in some pedons it is gravelly loam. Some pedons have an E horizon. The Bt horizon has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 3 to 6. It is clay loam or sandy clay loam.

Negley loam, 10 to 15 percent slopes, eroded, has a decreasing clay content in the subsoil with increasing depth. The amount of the decrease is more than is defined as the range for the series. This difference, however, does not affect the use or behavior of the soil.

Oconee Series

The Oconee series consists of somewhat poorly drained, slowly permeable soils on broad flats and ridges on loess-covered till plains. These soils formed in loess. Slopes range from 0 to 5 percent.

Oconee soils are similar to Cowden soils and commonly are adjacent to Cowden, Herrick, and Virden soils. The poorly drained Cowden and Virden soils are in low areas below the Oconee soils. Herrick soils have a mollic epipedon. They are in landscape positions similar to those of the Oconee soils.

The Oconee soils in this survey area are less acid in the lower part of the Bt horizon than is defined as the range for the series. This difference, however, does not significantly affect the use or behavior of the soils.

Typical pedon of Oconee silt loam, 0 to 2 percent slopes, 1,800 feet south and 70 feet west of the northeast corner of sec. 19, T. 12 N., R. 2 E.

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; common fine roots; neutral; abrupt smooth boundary.

E—9 to 14 inches; dark grayish brown (10YR 4/2) silt loam; weak medium platy structure; friable; common fine roots; common distinct dark gray (10YR 4/1) and very dark gray (10YR 3/1) coatings and common prominent white (10YR 8/1 dry) silt coatings on faces of peds; few fine rounded concretions of iron and manganese oxides; medium acid; clear smooth boundary.

B/E—14 to 18 inches; brown (10YR 4/3) silty clay loam; few fine prominent dark yellowish brown (10YR 4/6) mottles; weak fine subangular blocky structure; friable; common fine roots; many faint dark grayish brown (10YR 4/2) clay films and many prominent white (10YR 8/1 dry) silt coatings on faces of peds; few fine rounded concretions of iron and manganese oxides; medium acid; clear smooth boundary.

Btg1—18 to 29 inches; dark grayish brown (10YR 4/2) silty clay loam; many medium distinct yellowish brown (10YR 5/6) and dark yellowish brown (10YR 4/6) mottles; moderate medium subangular blocky structure; firm; common fine roots; many distinct very dark gray (10YR 3/1) organic coatings on faces of peds; common fine rounded concretions of iron and manganese oxides; strongly acid; clear smooth boundary.

Btg2—29 to 35 inches; dark grayish brown (10YR 4/2) silty clay loam; common medium distinct yellowish brown (10YR 5/6) and dark yellowish brown (10YR 4/6) mottles; moderate medium subangular blocky structure; firm; common fine roots; common distinct dark grayish brown (10YR 4/2) clay films and few distinct very dark gray (10YR 3/1) organic coatings on faces of peds; common fine rounded concretions of iron and manganese oxides; slightly acid; clear smooth boundary.

Btg3—35 to 41 inches; dark grayish brown (10YR 4/2) silty clay loam; common medium distinct dark yellowish brown (10YR 4/6) mottles; weak medium subangular blocky structure; firm; few fine roots; common distinct dark grayish brown (10YR 4/2) clay films and few medium rounded concretions of iron and manganese oxides; slightly acid; clear smooth boundary.

BCg—41 to 60 inches; light brownish gray (10YR 6/2) silty clay loam; few coarse prominent yellowish brown (10YR 5/8) and few medium distinct dark yellowish brown (10YR 4/4) mottles; weak coarse subangular blocky structure; firm; few very fine roots; few faint grayish brown (10YR 5/2) clay films on faces of peds and few distinct very dark gray (10YR 3/1) organic coatings in root channels; common fine and few medium rounded concretions of iron and manganese oxides; neutral.

The solum ranges from 40 to 60 inches in thickness.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. It ranges from 6 to 9 inches in thickness. The E horizon has value of 4 to 6 and chroma of 1 or 2. The Btg horizon has hue of 10YR in the upper part and 10YR or 2.5Y in the lower part. It has value of 4 to 6 and chroma of 2 to 4.

Pana Series

The Pana series consists of well drained, moderately rapidly permeable soils on side slopes of prominent ridges on the Illinoian glacial till plain in the uplands. These soils formed in loamy Illinoian glacial drift. Slopes range from 5 to 10 percent.

Pana soils are similar to Negley soils and commonly are adjacent to Douglas soils. Negley soils have a light-colored surface layer. Douglas soils formed in loess and in the underlying silty or loamy sediments. They are in landscape positions similar to those of the Pana soils.

The Pana soils in this survey area have a thinner dark surface soil than is defined as the range for the series. This difference, however, does not significantly affect the use or behavior of the soils.

Typical pedon of Pana silt loam, 5 to 10 percent slopes, eroded, 2,595 feet north and 200 feet west of the southeast corner of sec. 9, T. 11 N., R. 2 E.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; few fragments of brown (7.5YR 4/4) subsoil material in the lower part; weak fine granular structure; friable; common very fine and few fine roots; 3 percent fine gravel; neutral; abrupt smooth boundary.

Bt1—9 to 15 inches; brown (7.5YR 4/4) loam; weak fine subangular blocky structure; friable; few very fine roots; few distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; common distinct very dark grayish brown (10YR 3/2) organic coatings in root channels and on faces of peds; 5 percent fine gravel; few coarse pebbles; slightly acid; clear smooth boundary.

Bt2—15 to 23 inches; strong brown (7.5YR 4/6) clay loam; moderate fine and medium subangular blocky structure; friable; few very fine roots; common distinct brown (7.5YR 4/4) clay films on faces of peds; 5 percent fine and medium gravel; medium acid; clear smooth boundary.

Bt3—23 to 37 inches; strong brown (7.5YR 4/6) clay loam; weak coarse subangular blocky structure; friable; few fine and very fine roots; few distinct brown (7.5YR 4/4) clay films on faces of peds; 7 percent fine gravel; few coarse pebbles; medium acid; clear smooth boundary.

Bt4—37 to 60 inches; strong brown (7.5YR 4/6) gravelly clay loam; weak coarse subangular blocky structure; friable; few very fine roots; few distinct brown (7.5YR 4/4) clay films on faces of peds; 15 percent fine gravel; few coarse pebbles; medium acid.

The solum ranges from 45 to 60 inches in thickness. The Ap horizon has value of 2 or 3 and chroma of 1 to 3. The Bt horizon has hue of 7.5YR or 5YR, value of 3 to 6, and chroma of 2 to 5. It is sandy loam, sandy clay loam, loam, clay loam, or the gravelly analogs of these textures. Some pedons have a C horizon.

Parke Series

The Parke series consists of well drained, moderately permeable soils on side slopes of prominent convex ridges on the Illinoian glacial till plain in the uplands. These soils formed in loess and in the underlying Illinoian glacial drift. Slopes range from 5 to 15 percent.

Parke soils are similar to Negley soils and commonly are adjacent to Negley and Pike soils. Pike soils have a thicker mantle of loess than the Parke soils. They are on ridges above the Parke soils. Negley soils formed in loamy glacial drift. They are in landscape positions similar to those of the Parke soils.

Typical pedon of Parke silt loam, 5 to 10 percent slopes, eroded, 2,500 feet north and 1,400 feet east of the southwest corner of sec. 22, T. 10 N., R. 2 E.

Ap—0 to 7 inches; dark brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak fine granular structure; friable; common fine roots; slightly acid; abrupt smooth boundary.

Bt1—7 to 15 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; firm; common fine and few medium roots; common distinct brown (10YR 4/3) clay films on faces of peds; medium acid; clear smooth boundary.

Bt2—15 to 22 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular blocky structure; firm; common fine and few coarse roots; common distinct brown (10YR 4/3) clay films on faces of peds; medium acid; clear smooth boundary.

Bt3—22 to 34 inches; strong brown (7.5YR 4/6) silty clay loam; moderate medium and coarse subangular blocky structure; friable; common fine and medium roots; common distinct brown (7.5YR 4/4) and few prominent dark brown (7.5YR 3/2) clay films on faces of peds and lining root channels; strongly acid; clear smooth boundary.

2Bt4—34 to 45 inches; strong brown (7.5YR 4/6) clay loam; weak coarse subangular blocky structure; firm; few fine and medium roots; common distinct brown (7.5YR 4/4) and few distinct dark brown (7.5YR 3/2) clay films on faces of peds and lining root channels; few fine rounded concretions of iron and manganese oxides; about 5 percent fine gravel; strongly acid; clear smooth boundary.

2Bt5—45 to 57 inches; strong brown (7.5YR 4/6) clay loam; weak coarse subangular blocky structure; friable; few fine roots; few distinct strong brown (7.5YR 4/6) clay films on faces of peds and few distinct dark brown (7.5YR 3/2) clay films lining root channels and pores; few fine rounded concretions of iron and manganese oxides; about 5 percent fine gravel; strongly acid; clear smooth boundary.

2Bt6—57 to 60 inches; strong brown (7.5YR 4/6) gravelly sandy clay loam; few medium distinct brown (10YR 5/3) mottles; weak coarse subangular blocky structure; friable; common distinct brown (7.5YR 4/4) clay films in pores; few fine rounded concretions of iron and manganese oxides; about 10 percent fine gravel; strongly acid.

The solum ranges from 48 to 60 inches in thickness. The thickness of the loess ranges from 20 to 40 inches.

The Ap horizon has value of 4 or 5 and chroma of 2 to 6. The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. It is silty clay loam or silt loam. The 2Bt horizon has hue of 7.5YR or 5YR, value of 3 to 5, and chroma of 3 to 6. It is sandy clay loam, clay loam, or loam and may contain up to 10 percent gravel.

Parr Series

The Parr series consists of well drained soils on side slopes and moraines on the Wisconsinan glacial till plain. These soils are moderately permeable in the upper part and slowly permeable in the lower part. They formed dominantly in loamy glacial till. Slopes range from 2 to 10 percent.

Parr soils are similar to Dana soils and commonly are adjacent to Dana and Flanagan soils. Dana and Flanagan soils have a thicker mantle of loess than the Parr soils. Dana soils are in landscape positions similar to those of the Parr soils. Flanagan soils are on broad, low ridges above or below the Parr soils.

The Parr soils in this survey area have a thinner dark surface layer than is defined as the range for the series. This difference, however, does not significantly affect the use or behavior of the soils.

Typical pedon of Parr silt loam, 5 to 10 percent slopes, eroded, 1,560 feet south and 1,200 feet east of the northwest corner of sec. 29, T. 13 N., R. 3 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; many very fine roots; 1 percent pebbles; neutral; abrupt smooth boundary.

Bt1—8 to 20 inches; dark yellowish brown (10YR 4/4) clay loam; moderate medium subangular blocky structure; firm; common very fine roots; few distinct very dark grayish brown (10YR 3/2) organic coatings and many distinct brown (10YR 4/3) clay films on faces of peds; few very dark grayish brown (10YR 3/2) wormcasts; 2 percent fine gravel; medium acid; clear smooth boundary.

Bt2—20 to 28 inches; dark yellowish brown (10YR 4/4) clay loam; moderate medium subangular blocky structure; firm; common very fine roots; common distinct brown (10YR 4/3) clay films on faces of peds; 2 percent fine gravel; neutral; clear smooth boundary.

Bt3—28 to 35 inches; brown (10YR 5/3) clay loam; weak coarse subangular blocky structure; firm; few very fine roots; few distinct brown (10YR 4/3) clay films on faces of peds; few very dark grayish brown (10YR 3/2) clay films lining channels; 3 percent fine gravel; slightly effervescent; mildly alkaline; clear smooth boundary.

BC—35 to 40 inches; brown (10YR 5/3) clay loam; weak coarse subangular blocky structure; firm; few very fine roots; few faint brown (10YR 4/3) clay films on faces of peds; 3 percent fine gravel; strongly effervescent; mildly alkaline; clear smooth boundary.

C—40 to 60 inches; brown (10YR 5/3) loam; massive; firm; common filaments of calcium carbonate; 4 percent fine gravel; strongly effervescent; moderately alkaline.

The solum ranges from 24 to 40 inches in thickness.

The Ap horizon has value of 2 or 3 and chroma of 1 to 3. It is commonly loam, but in severely eroded areas it is clay loam. The Bt horizon has value of 3 to 5 and chroma of 3 to 6. It is clay loam or loam.

Parr silt loam, 2 to 5 percent slopes, eroded, is less acid in the upper part of the Bt horizon than is defined as the range for the series. This difference, however, does not significantly affect the use or behavior of the soil.

Peotone Series

The Peotone series consists of very poorly drained, moderately slowly permeable soils in depressions on the loess-covered Wisconsinan glacial till plain. These soils formed in loess. Slopes range from 0 to 2 percent.

Peotone soils are similar to and commonly are adjacent to Drummer soils. Drummer soils have a thinner mollic epipedon than the Peotone soils and have less clay in the subsoil. They are in areas surrounding the Peotone soils.

Typical pedon of Peotone silty clay loam, 1,600 feet north and 320 feet east of the southwest corner of sec. 11, T. 11 N., R. 5 E.

Ap—0 to 6 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; weak fine granular structure; firm; common fine roots; medium acid; abrupt smooth boundary.

A—6 to 10 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; moderate medium granular structure; firm; common fine roots; slightly acid; clear smooth boundary.

AB—10 to 17 inches; black (10YR 2/1) silty clay, very dark gray (10YR 3/1) dry; few fine prominent dark yellowish brown (10YR 4/6) mottles; moderate fine subangular blocky structure; firm; common fine roots; few fine rounded concretions of iron and manganese oxides; neutral; clear smooth boundary.

Bg1—17 to 26 inches; very dark gray (10YR 3/1) silty clay, dark gray (10YR 4/1) dry; common fine prominent and distinct dark yellowish brown (10YR 4/6 and 4/4) mottles; moderate medium prismatic structure parting to strong medium subangular blocky; firm; common fine roots; many distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few medium rounded concretions of iron and manganese oxides; mildly alkaline; clear smooth boundary.

Bg2—26 to 31 inches; olive gray (5Y 4/2) silty clay loam; common fine prominent dark yellowish brown (10YR 4/6) and few fine prominent yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; common fine roots; black (10YR 2/1) krotovinas; common distinct very dark gray (10YR 3/1) organic coatings and common distinct dark gray (5Y 4/1) clay films on faces of peds; few medium rounded concretions of iron and manganese oxides; mildly alkaline; gradual smooth boundary.

Bg3—31 to 43 inches; olive gray (5Y 4/2) silty clay loam; common medium prominent yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; firm; few fine roots; common distinct dark gray (5Y 4/1) clay films on faces of peds; few medium rounded concretions of iron and manganese oxides; mildly alkaline; gradual wavy boundary.

BCg—43 to 53 inches; olive gray (5Y 5/2) silty clay loam; many medium and coarse prominent yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; friable; few very fine roots; few distinct dark gray (5Y 4/1) clay films on faces of peds; few fine rounded concretions of iron and manganese oxides; mildly alkaline; gradual smooth boundary.

Cg—53 to 60 inches; light olive gray (5Y 6/2) silty clay loam; common medium prominent yellowish brown (10YR 5/8) mottles; massive; friable; few very fine roots; black (10YR 2/1) krotovinas; few fine rounded concretions of iron and manganese oxides; slight effervescence; moderately alkaline.

The solum ranges from 40 to 60 inches in thickness. The mollic epipedon ranges from 24 to 36 inches in thickness.

The Ap and A horizons have hue of 10YR or 5Y or are neutral in hue. They have value of 2 or 3 and chroma of 0 or 1. The Bg 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.

Piasa Series

The Piasa series consists of poorly drained, very slowly permeable soils in depressions and on broad flats on the loess-covered Illinoian glacial till plain. These soils formed in loess. Slopes range from 0 to 2 percent.

Piasa soils are similar to Huey soils and commonly are adjacent to the poorly drained Cowden and Virden soils. Cowden and Virden soils do not have a natric horizon. They are in landscape positions similar to those of the Piasa soils. Virden soils have a mollic epipedon, and Huey soils have a light-colored surface layer.

Typical pedon of Piasa silt loam, 1,680 feet east and 2,000 feet north of the southwest corner of sec. 20, T. 10 N., R. 1 E.

Ap—0 to 8 inches; very dark gray (10YR 3/1) silt loam, grayish brown (10YR 5/2) dry; few fine prominent dark yellowish brown (10YR 4/6) mottles; weak fine granular structure; friable; few fine roots; neutral; abrupt smooth boundary.

E1—8 to 11 inches; dark grayish brown (10YR 4/2) silt loam; few fine distinct dark yellowish brown (10YR 4/6) mottles; weak thick platy structure; friable; few very fine roots; common distinct very dark gray (10YR 3/1) organic coatings and few prominent light gray (10YR 7/1 dry) silt coatings on faces of peds; neutral; clear smooth boundary.

E2—11 to 15 inches; grayish brown (10YR 5/2) silt loam; few fine faint brown (10YR 5/3) and common fine distinct yellowish brown (10YR 5/6) mottles; moderate medium platy structure; friable; few very fine roots; common distinct dark gray (10YR 4/1) and very dark gray (10YR 3/1) organic coatings in root channels and on faces of peds; many prominent light gray (10YR 7/1 dry) silt coatings on faces of peds; neutral; clear smooth boundary.

BE—15 to 18 inches; dark grayish brown (10YR 4/2) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; friable; few very fine roots; common distinct very dark gray (10YR 3/1) organic coatings in root channels and many prominent light gray (10YR 7/1 dry) silt coatings on faces of peds; few fine rounded concretions of iron and manganese oxides; neutral; clear smooth boundary.

Btg1—18 to 25 inches; dark grayish brown (10YR 4/2) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; many distinct dark gray (10YR 4/1) clay films on faces of peds; common fine rounded concretions of iron and manganese oxides; mildly alkaline; clear smooth boundary.

Btg2—25 to 35 inches; dark grayish brown (10YR 4/2) silty clay loam; common medium prominent dark yellowish brown (10YR 4/6) and common fine distinct yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; common distinct dark gray (10YR 4/1) clay films on faces of peds and in root channels; common medium rounded concretions of iron and manganese oxides and few medium rounded concretions of calcium carbonate; moderately alkaline; clear smooth boundary.

BCg—35 to 50 inches; light brownish gray (10YR 6/2) silty clay loam; common medium prominent dark yellowish brown (10YR 4/6) and yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; firm; few distinct grayish brown (10YR 5/2) clay films on faces of peds and dark gray (10YR 4/1) clay films lining root channels; common medium rounded concretions of iron and manganese oxides; moderately alkaline; clear smooth boundary.

Cg1—50 to 57 inches; light brownish gray (10YR 6/2) silt loam; common fine and medium prominent yellowish brown (10YR 5/6) mottles; massive; friable; common distinct dark gray (10YR 4/1) clay films lining pores; common fine rounded concretions of iron and manganese oxides; moderately alkaline; clear smooth boundary.

Cg2—57 to 60 inches; gray (10YR 5/1) loam; common medium and coarse prominent dark yellowish brown (10YR 4/6) and few fine prominent yellowish brown (10YR 5/6) mottles; massive; firm; common distinct dark gray (10YR 4/1) clay films lining pores; common fine rounded concretions of iron and manganese oxides; moderately alkaline.

The thickness of the solum and the thickness of the loess range from 40 to more than 60 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.

Pike Series

The Pike series consists of well drained, moderately permeable soils on prominent ridgetops and side slopes on the Illinoian glacial till plain in the uplands. These soils formed in loess and in the underlying loamy or silty Illinoian glacial drift. Slopes range from 2 to 5 percent.

Pike soils are similar to Ava soils and commonly are adjacent to Negley and Parke soils. Negley soils formed entirely in glacial till. They are on side slopes below the Pike soils. Parke soils formed in thinner deposits of loess than the Pike soils. They are on side slopes below the Pike soils. Ava soils are moderately well drained.

Typical pedon of Pike silt loam, 2 to 5 percent slopes, 180 feet south and 650 feet east of the northwest corner of sec. 1, T. 9 N., R. 2 E.

Ap—0 to 8 inches; brown (10YR 4/3) silt loam; common fragments of dark yellowish brown (10YR 4/4) subsoil material in the lower part; weak fine granular structure; friable; common very fine and few fine roots; neutral; abrupt smooth boundary.

Bt1—8 to 14 inches; dark yellowish brown (10YR 4/4) silt loam; moderate fine and medium subangular blocky structure; firm; few fine and very fine roots; common faint brown (10YR 4/3) clay films on faces of peds; few fine rounded concretions of iron and manganese oxides; slightly acid; clear smooth boundary.

Bt2—14 to 23 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular blocky structure; firm; few very fine roots; many distinct brown (10YR 4/3) clay films on faces of peds; few fine rounded concretions of iron and manganese oxides; strongly acid; clear smooth boundary.

Bt3—23 to 32 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular blocky structure; firm; few very fine roots; common distinct brown (10YR 4/3) clay films on faces of peds; few fine rounded concretions of iron and manganese oxides; strongly acid; clear smooth boundary.

Bt4—32 to 40 inches; dark yellowish brown (10YR 4/6) silty clay loam; moderate medium subangular blocky structure; firm; few very fine roots; common distinct brown (10YR 4/3) clay films and few distinct light gray (10YR 7/2) silt coatings on faces of peds; few fine rounded concretions of iron and manganese oxides; strongly acid; clear smooth boundary.

Bt5—40 to 48 inches; dark yellowish brown (10YR 4/6) silt loam; weak medium and coarse subangular blocky structure; firm; few very fine roots; few distinct brown (10YR 4/3) clay films and few distinct light gray (10YR 7/2) silt coatings on faces of peds; few fine rounded concretions of iron and manganese oxides; strongly acid; clear smooth boundary.

2Bt6—48 to 60 inches; strong brown (7.5YR 4/6) silt loam; weak coarse subangular blocky structure; firm; few very fine roots; few distinct dark brown (7.5YR 3/4 and 4/4) clay films and few distinct light gray (10YR 7/2) silt coatings on faces of peds; few fine rounded concretions of iron and manganese oxides; few medium pebbles; about 15 percent sand; strongly acid.

The solum ranges from 60 to 90 inches in thickness.

The Ap horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. Some pedons have an E horizon. This horizon has hue of 10YR or 7.5YR and value and chroma of 4 to 6. The Bt horizon has hue of 5YR, 7.5YR, or 10YR, value of 4 or 5, and chroma of 4 to 6. The 2Bt horizon has colors similar to those of the Bt horizon. It is loam, silt loam, or sandy clay loam.

Proctor Series

The Proctor series consists of well drained and moderately well drained, moderately permeable soils on low ridges on the Wisconsinan glacial outwash plain. These soils formed in loess and in the underlying stratified loamy and sandy outwash. Slopes range from 0 to 5 percent.

Proctor soils are similar to Camden soils and commonly are adjacent to Elburn soils. Camden soils have a light-colored surface layer. The somewhat poorly drained Elburn soils are on broad ridges below the Proctor soils.

Typical pedon of Proctor silt loam, 2 to 5 percent slopes, 1,875 feet south and 780 feet east of the northwest corner of sec. 19, T. 14 N., R. 2 E.

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; weak fine granular structure; friable; common very fine roots; medium acid; abrupt smooth boundary.

BA—10 to 15 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; friable; common very fine roots; many distinct very dark grayish brown (10YR 3/2) organic coatings and few distinct brown (10YR 4/3) clay films on faces of peds; medium acid; clear smooth boundary.

Bt1—15 to 22 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular blocky structure; firm; common very fine roots; many distinct brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—22 to 33 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular blocky structure; firm; common very fine roots; common distinct brown (10YR 4/3) clay films on faces of peds; medium acid; clear smooth boundary.

2Bt3—33 to 46 inches; dark yellowish brown (10YR 4/4) loam; weak coarse subangular blocky structure; friable; few very fine roots; few distinct brown (10YR 4/3) clay films on faces of peds; medium acid; clear smooth boundary.

2C—46 to 60 inches; dark yellowish brown (10YR 4/4) sandy loam that has thin strata of loamy sand; few fine distinct brown (10YR 5/3) mottles; massive; friable; few very fine roots; slightly acid.

The solum ranges from 40 to 50 inches in thickness. The loess ranges from 24 to 40 inches in thickness.

The Ap horizon has 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 6. The 2Bt horizon has value of 4 to 6 and chroma of 2 to 6. It is sandy loam, clay loam, or loam. The 2C horizon is stratified sandy loam or loam. In some pedons it has strata of loamy sand.

Radford Series

The Radford series consists of somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in silty alluvium. Slopes range from 0 to 2 percent.

Radford soils are similar to Tice soils and commonly are adjacent to Sawmill soils. The poorly drained Sawmill soils are lower on the flood plains than the Radford soils. Tice soils have a thicker solum than the Radford soils and do not have a dark buried soil.

Typical pedon of Radford silt loam, frequently flooded, 780 feet north and 200 feet east of the southwest corner of sec. 23, T. 13 N., R. 2 E.

Ap—0 to 13 inches; mixed black (10YR 2/1) and very dark gray (10YR 3/1) silt loam, dark gray (10YR 4/1) dry; weak fine granular structure; friable; common very fine roots; mildly alkaline; abrupt smooth boundary.

C—13 to 30 inches; very dark gray (10YR 3/1) silt loam that has thin strata of dark grayish brown (10YR 4/2); few fine prominent yellowish brown (10YR 5/6) and distinct dark yellowish brown (10YR 3/4) mottles; massive; friable; few fine roots; mildly alkaline; clear smooth boundary.

Ab1—30 to 40 inches; black (10YR 2/1) silty clay loam; few fine distinct dark yellowish brown (10YR 3/4) mottles; moderate medium subangular blocky structure; firm; few fine roots; mildly alkaline; gradual smooth boundary.

Ab2—40 to 60 inches; black (10YR 2/1) silty clay loam; few fine distinct (10YR 3/4) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; firm; mildly alkaline.

The solum ranges from 10 to 24 inches in thickness. The depth to the dark 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 6 and chroma of 1 or 2. The Ab horizon has hue of 10YR or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 2. It is silty clay loam, silt loam, clay loam, or loam.

Raub Series

The Raub series consists of somewhat poorly drained, moderately slowly permeable soils on broad ridges on the loess-covered Wisconsinan glacial till plain and on moraines. These soils formed in loess and in the underlying loamy glacial till. Slopes range from 0 to 2 percent.

Raub soils are similar to Flanagan soils and commonly are adjacent to Dana and Parr soils. Flanagan soils formed in thicker deposits of loess than the Raub soils. The moderately well drained Dana and well drained Parr soils are on the more sloping ridges and side slopes.

Typical pedon of Raub silt loam, 85 feet east and 70 feet south of the northwest corner of sec. 36, T. 12 N., R. 3 E.

Ap—0 to 9 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; weak fine granular structure; friable; common medium and coarse roots; neutral; abrupt smooth boundary.

A—9 to 18 inches; very dark gray (10YR 3/1) silt loam, dark gray (10YR 4/1) dry; moderate medium granular structure; friable; common fine roots; common distinct very dark grayish brown (10YR

3/2) organic coatings on faces of peds; neutral; clear smooth boundary.

Bt1—18 to 27 inches; brown (10YR 4/3) silty clay loam; common medium prominent yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few fine and medium roots; many distinct very dark gray (10YR 3/1) organic coatings and clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—27 to 36 inches; brown (10YR 4/3) silty clay loam; common medium prominent yellowish brown (10YR 5/8) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; common fine roots; common distinct dark grayish brown (10YR 4/2) clay films and common distinct very dark gray (10YR 3/1) organic coatings on faces of peds; common fine rounded concretions of iron and manganese oxides; neutral; clear smooth boundary.

2Bt3—36 to 49 inches; brown (10YR 5/3) loam; common medium prominent yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; firm; few fine roots; common faint dark grayish brown (10YR 4/2) clay films on faces of peds and common distinct very dark gray (10YR 3/1) organic coatings in root channels; many fine and medium rounded concretions of iron and manganese oxides; less than 1 percent fine gravel; mildly alkaline; clear smooth boundary.

2C—49 to 60 inches; grayish brown (10YR 5/2) loam; common medium distinct yellowish brown (10YR 5/6) mottles; massive; firm; few distinct very dark gray (10YR 3/1) and dark gray (10YR 4/1) root channels; common fine and medium concretions of iron and manganese oxides; less than 1 percent fine gravel; slightly effervescent; moderately alkaline.

The solum ranges from 45 to 60 inches in thickness. The thickness of the loess ranges from 22 to 40 inches. The mollic epipedon ranges from 10 to 14 inches in thickness.

The Ap and A horizons have value of 2 or 3 and chroma of 1 or 2. The Bt and 2Bt horizons have value of 3 to 5 and chroma of 3 to 6. The 2Bt horizon is silty clay loam, loam, or clay loam.

Sabina Series

The Sabina series consists of somewhat poorly drained, moderately slowly permeable soils on broad ridges on the loess-covered Wisconsinan glacial till plain in the uplands. These soils formed in loess and in the underlying loamy Wisconsinan glacial till. Slopes range from 0 to 2 percent.

Sabina soils are similar to Sunbury soils and commonly are adjacent to Sunbury and Xenia soils. Sunbury soils have a darker surface layer than the Sabina soils. They are in landscape positions similar to those of the Sabina soils. The moderately well drained Xenia soils are on ridges and knolls above the Sabina soils.

Typical pedon of Sabina silt loam, 20 feet west and 295 feet south of the northeast corner of sec. 28, T. 12 N., R. 4 E.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; friable; common fine and very fine roots; neutral; abrupt smooth boundary.

E—8 to 12 inches; grayish brown (10YR 5/2) silt loam; few fine distinct dark yellowish brown (10YR 4/4) mottles; moderate medium platy structure; friable; common fine and very fine roots; few faint dark grayish brown (10YR 4/2) organic coatings on faces of peds; common fine rounded concretions of iron and manganese oxides; slightly acid; clear smooth boundary.

BE—12 to 17 inches; brown (10YR 5/3) silty clay loam; few fine distinct dark yellowish brown (10YR 4/6) mottles; moderate fine subangular blocky structure; friable; common fine and very fine roots; common faint dark grayish brown (10YR 4/2) clay films and common faint light brownish gray (10YR 8/1) silt coatings on faces of peds; few fine rounded concretions of iron and manganese oxides; medium acid; clear smooth boundary.

Bt1—17 to 25 inches; dark grayish brown (10YR 4/2) silty clay loam; few fine prominent yellowish brown (10YR 5/6) mottles; moderate medium angular blocky structure; firm; few very fine roots; common distinct very dark grayish brown (10YR 3/2) and very dark gray (10YR 3/1) clay films on faces of peds; common fine rounded concretions of iron and manganese oxides; slightly acid; clear smooth boundary.

Bt2—25 to 46 inches; brown (10YR 5/3) silty clay loam; common medium distinct yellowish brown (10YR 5/6 and 6/6) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; firm; few very fine roots; many distinct dark grayish brown (10YR 4/2) and common distinct very dark gray (10YR 3/1) clay films on faces of peds; common fine rounded concretions of iron and manganese oxides; neutral; clear smooth boundary.

Bt3—46 to 56 inches; brown (10YR 5/3) silty clay loam; common fine faint yellowish brown (10YR 5/4) and common medium distinct yellowish brown (10YR 5/6) 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; few distinct very dark gray (10YR 3/1) clay films lining root channels; neutral; clear smooth boundary.

2BC—56 to 60 inches; grayish brown (10YR 5/2) clay loam; many medium prominent strong brown (7.5YR 4/6) mottles; weak coarse subangular blocky structure; firm; few faint gray (10YR 5/1) clay films on faces of peds; few distinct very dark gray (10YR 3/1) and dark gray (10YR 4/1) clay films lining root channels; few fine irregular concretions of iron and manganese oxides; 2 percent fine gravel; mildly alkaline.

The solum ranges from 45 to 60 inches in thickness. The thickness of the loess ranges from 40 to 60 inches.

The Ap horizon has value of 4 or 5 and chroma of 2 or 3. The E horizon has value of 4 or 5. The Bt horizon has value of 4 or 5 and chroma of 2 to 4. Some pedons have a 2Bt horizon. The 2BC horizon is silty clay loam, loam, or clay loam.

Sawmill Series

The Sawmill series consists of poorly drained, moderately permeable soils on flood plains. These soils formed in silty alluvium. Slopes range from 0 to 2 percent.

Sawmill soils are similar to and are commonly adjacent to Tice soils. Tice soils are somewhat poorly drained and are in slightly higher landscape positions than the Sawmill soils.

Typical pedon of Sawmill silty clay loam, frequently flooded, 145 feet west and 1,400 feet north of the southeast corner of sec. 14, T. 10 N., R. 3 E.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silty clay loam, dark grayish brown (10YR 4/2) dry; weak fine granular structure; firm; common fine and very fine roots; neutral; abrupt smooth boundary.

A1—9 to 15 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; few fine prominent dark yellowish brown (10YR 4/6) mottles; moderate fine subangular blocky structure; firm; few very fine roots; many distinct black (10YR 2/1) organic coatings on faces of peds; neutral; clear smooth boundary.

A2—15 to 20 inches; very dark gray (10YR 3/1) silty clay loam; common fine prominent and distinct dark yellowish brown (10YR 4/6 and 3/4) mottles; moderate fine prismatic structure parting to moderate medium subangular blocky; firm; few fine and very fine roots; many distinct black (10YR 2/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bg1—20 to 36 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; common fine prominent and distinct dark yellowish brown (10YR 4/6 and 3/4) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few fine and very fine roots; common fine rounded concretions of iron and manganese oxides; neutral; clear smooth boundary.

Bg2—36 to 51 inches; gray (10YR 5/1) silty clay loam; common medium prominent yellowish brown (10YR 5/6) and dark yellowish brown (10YR 4/6) mottles; weak medium prismatic structure parting to weak medium subangular blocky; firm; few very fine roots; common distinct dark gray (10YR 4/1) coatings on faces of peds; common medium rounded concretions of iron and manganese oxides; neutral; clear smooth boundary.

Cg—51 to 60 inches; light brownish gray (10YR 6/2) silty clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; massive; firm; common medium rounded concretions of iron and manganese oxides; 15 percent fine sand; mildly alkaline.

The solum ranges from 36 to 60 inches in thickness. The thickness of the mollic epipedon ranges from 24 to 36 inches.

The Ap and A horizons have value of 2 or 3 and chroma of 1 or 2. The Bg horizon has hue of 10YR, 2.5Y, or 5Y and value of 4 to 6. It is clay loam in some subhorizons. In some pedons the Cg horizon includes strata of silt loam or sandy loam.

Starks Series

The Starks series consists of somewhat poorly drained, moderately permeable soils on low ridges on Wisconsinan glacial outwash plains and stream terraces. These soils formed in loess and in the underlying loamy outwash. Slopes range from 0 to 2 percent.

Starks soils are similar to Millbrook soils and commonly are adjacent to Camden and Millbrook soils. The well drained Camden soils are on the higher ridges above the Starks soils. Millbrook soils have a darker surface layer than the Starks soils. They are on uplands in landscape positions similar to those of the Starks soils.

Typical pedon of Starks silt loam, 1,840 feet east and 1,400 feet north of the southwest corner of sec. 12, T. 11 N., R. 6 E.

Ap—0 to 10 inches; 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 oxides; medium acid; abrupt smooth boundary.

E—10 to 12 inches; brown (10YR 5/3) silt loam; common fine prominent yellowish brown (10YR 5/6 and 5/8) mottles; moderate medium platy structure; friable; common fine roots; common prominent dark grayish brown (10YR 4/2) coatings in root channels; common fine rounded concretions of iron and manganese oxides; medium acid; clear smooth boundary.

Bt1—12 to 16 inches; brown (10YR 5/3) silty clay loam; common fine prominent yellowish brown (10YR 5/6 and 5/8) mottles; weak fine subangular blocky structure; friable; common fine roots; few faint grayish brown (10YR 5/2) clay films and many prominent white (10YR 8/1 dry) silt coatings on faces of peds; common fine rounded concretions of iron and manganese oxides; medium acid; clear smooth boundary.

Bt2—16 to 22 inches; brown (10YR 5/3) silty clay loam; common fine prominent yellowish brown (10YR 5/8) mottles; moderate fine and medium subangular blocky structure; firm; common fine roots; many distinct grayish brown (10YR 5/2) clay films and many prominent white (10YR 8/1 dry) silt coatings on faces of peds; common medium rounded concretions of iron and manganese oxides; medium acid; clear smooth boundary.

Bt3—22 to 32 inches; brown (10YR 5/3) silty clay loam; common medium prominent yellowish brown (10YR 5/6 and 5/8) and common fine faint grayish brown (10YR 5/2) mottles; weak medium prismatic structure; firm; few fine roots; common prominent dark grayish brown (10YR 4/2) clay films on faces of peds; common medium rounded concretions of iron and manganese oxides; medium acid; clear smooth boundary.

2Btg—32 to 43 inches; grayish brown (10YR 5/2) silty clay loam; common medium prominent yellowish brown (10YR 5/6 and 5/8) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; few prominent dark grayish brown (10YR 4/2) clay films on faces of peds; few prominent very dark grayish brown (10YR 3/2) root channels; more than 15 percent fine sand; common medium rounded concretions of iron and manganese oxides; neutral; clear smooth boundary.

2BCg—43 to 49 inches; grayish brown (10YR 5/2) sandy loam; common medium prominent dark yellowish brown (10YR 4/6) mottles; weak coarse subangular blocky structure; firm; few fine accumulations of iron and manganese oxides; mildly alkaline; clear smooth boundary.

2C—49 to 60 inches; brown (10YR 4/3) and dark yellowish brown (10YR 4/4) sandy loam that has thin strata of loamy sand and silt loam; few medium distinct yellowish brown (10YR 5/6) mottles; massive; friable; few fine accumulations of iron and manganese oxides; mildly alkaline.

The solum ranges from 45 to 60 inches in thickness. The depth to loamy outwash ranges from 30 to 40 inches.

The Ap horizon has value of 4 or 5 and chroma of 2 or 3. The E horizon has value of 5 or 6 and chroma of 2 or 3. The Bt horizon has value of 4 or 5 and chroma of 2 or 3. The 2Bt horizon commonly is silty clay loam that has more than 15 percent sand, but in some pedons it is clay loam or sandy clay loam. The 2C horizon is sandy loam that has strata of silt loam or loamy sand.

Sunbury Series

The Sunbury series consists of somewhat poorly drained, moderately slowly permeable soils on low ridges on the loess-covered Wisconsinan glacial till plain in the uplands. These soils formed in loess and in the underlying Wisconsinan glacial till.

Sunbury soils are similar to Sabina soils and commonly are adjacent to Sabina and Xenia soils. Sabina soils have a lighter colored surface layer than the Sunbury soils. They are in landscape positions similar to those of the Sunbury soils. The moderately well drained Xenia soils are on ridges above the Sunbury soils.

Typical pedon of Sunbury silt loam, 2,540 feet east and 63 feet north of the southwest corner of sec. 8, T. 12 N., R. 5 E.

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; common fine roots; slightly acid; abrupt smooth boundary.

E—9 to 12 inches; dark grayish brown (10YR 4/2) silt loam; common medium faint brown (10YR 4/3) mottles; moderate medium platy structure; friable; common fine roots; few distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; few distinct yellowish brown (10YR 5/6) iron stains in pores and root channels; slightly acid; clear smooth boundary.

BE—12 to 16 inches; brown (10YR 4/3) silty clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; firm; common fine roots; few distinct very dark grayish brown (10YR 3/2) and dark grayish brown (10YR

4/2) clay films on faces of peds; many prominent light gray (10YR 7/2 dry) silt coatings on faces of peds; slightly acid; clear smooth boundary.

Bt1—16 to 27 inches; brown (10YR 4/3) silty clay loam; common fine distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; common very fine roots; many distinct dark grayish brown (10YR 4/2) and few distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; common fine rounded concretions of iron and manganese oxides; slightly acid; clear smooth boundary.

Bt2—27 to 34 inches; yellowish brown (10YR 5/4) silty clay loam; common fine faint yellowish brown (10YR 5/6) and few fine distinct light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; firm; common fine and few coarse roots; common distinct dark grayish brown (10YR 4/2) and very dark grayish brown (10YR 3/2) clay films on faces of peds; common fine rounded concretions of iron and manganese oxides; neutral; clear smooth boundary.

Bt3—34 to 44 inches; dark grayish brown (2.5Y 5/2) silty clay loam; common coarse faint brown (10YR 5/3) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; common fine roots; common distinct dark grayish brown (10YR 4/2) and very dark grayish brown (10YR 3/2) clay films on faces of peds; fine rounded concretions of iron and manganese oxides; mildly alkaline; clear smooth boundary.

2BC—44 to 55 inches; yellowish brown (10YR 5/4) clay loam; common coarse faint yellowish brown (10YR 5/6) and common fine distinct light brownish gray (10YR 6/1) mottles; weak coarse subangular blocky structure; firm; common fine roots; common distinct dark grayish brown (10YR 4/2) and very dark grayish brown (10YR 3/2) clay films on faces of peds; few fine rounded concretions of iron and manganese oxides; 3 percent fine gravel; slightly effervescent; mildly alkaline; clear smooth boundary.

2C—55 to 60 inches; yellowish brown (10YR 5/4) loam; common medium faint yellowish brown (10YR 5/6) and common fine distinct gray (10YR 6/1) mottles; massive; very firm; few fine rounded concretions of iron and manganese oxides; 3 percent fine gravel; slightly effervescent; mildly alkaline.

The solum ranges from 45 to 60 inches in thickness. The thickness of the loess ranges from 40 to 60 inches.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. The E horizon has value of 3 to 5 and chroma of 2 or 3. The Bt horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4. The 2BC and 2C horizons have value of 5 or 6 and chroma of 1 to 8. They are loam, clay loam, or silt loam.

Thebes Series

The Thebes series consists of well drained soils on ridges in the uplands. These soils are moderately permeable in the upper part and rapidly permeable in the lower part. They formed in loess and in the underlying sandy sediments. Slopes range from 2 to 5 percent.

Thebes soils are similar to Alvin soils and commonly are adjacent to Alvin and Bluford soils. Alvin soils formed entirely in loamy and sandy sediments. They are on elongated ridges. The somewhat poorly drained Bluford soils are on broad flats.

The Thebes soils in this survey area have less sand in the subsoil than is defined as the range for the series. This difference, however, does not significantly affect the use or behavior of the soils.

Typical pedon of Thebes silt loam, 2 to 5 percent slopes, 2,540 feet west and 2,040 feet north of the southeast corner of sec. 28, T. 11 N., R. 6 E.

Ap—0 to 7 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak fine granular structure; friable; common fine roots; slightly acid; abrupt smooth boundary.

E—7 to 10 inches; brown (10YR 4/3) silt loam; weak medium platy structure; friable; few fine roots; slightly acid; clear smooth boundary.

Bt1—10 to 16 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak fine subangular blocky structure; firm; few very fine roots; few distinct brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—16 to 21 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; firm; few very fine roots; common distinct brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt3—21 to 32 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium coarse subangular blocky structure; firm; few very fine roots; common distinct brown (10YR 4/3) clay films on faces of peds; common fine rounded concretions of iron and manganese oxides; strongly acid; clear smooth boundary.

2Bt4—32 to 49 inches; dark yellowish brown (10YR 4/6) sandy loam; weak medium subangular blocky structure; friable; few distinct brown (10YR 4/3) clay films on faces of peds; strongly acid; clear smooth boundary.

2C—49 to 60 inches; dark yellowish brown (10YR 4/6) loamy sand; thin bands of dark yellowish brown (10YR 4/4) sandy loam; single grained; loose; strongly acid.

The solum ranges from 24 to 40 inches in thickness. The thickness of the loess or silty material ranges from 20 to 40 inches.

The Ap horizon has chroma of 2 to 4. The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. The 2Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. It is loam, sandy loam, sandy clay loam, or clay loam. The 2C horizon is loamy sand, fine sand, loamy fine sand, or sand.

Tice Series

The Tice series consists of somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in silty alluvium. Slopes range from 0 to 2 percent.

Tice soils are similar to Radford soils and commonly are adjacent to Huntsville soils. Radford soils have a dark buried soil. The well drained Huntsville soils are in the higher areas on the flood plains.

Typical pedon of Tice silty clay loam, frequently flooded, 1,425 feet south and 1,200 feet west of the northeast corner of sec. 25, T. 10 N., R. 3 E.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; weak medium angular blocky structure parting to weak fine granular; firm; few very fine roots; few fine rounded concretions of iron and manganese oxides; neutral; abrupt smooth boundary.

A—8 to 19 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; weak medium prismatic structure parting to weak medium granular; firm; few very fine roots; common distinct very dark gray (10YR 3/1) organic coatings on faces of peds; common fine rounded concretions of iron and manganese oxides; neutral; clear smooth boundary.

Bw1—19 to 29 inches; dark grayish brown (10YR 4/2) silty clay loam; few fine prominent dark yellowish brown (10YR 3/6) and yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine and fine roots; common distinct very dark gray (10YR 3/1) organic coatings on faces of peds; common fine rounded concretions of iron and manganese oxides; neutral; gradual smooth boundary.

Bw2—29 to 44 inches; dark grayish brown (10YR 4/2) silty clay loam; common fine distinct dark yellowish brown (10YR 4/6) mottles; moderate medium subangular blocky structure; firm; few very fine roots; many distinct dark gray (10YR 4/1) and few distinct very dark gray (10YR 3/1) organic coatings on faces of peds; common medium and few fine rounded concretions of iron and manganese oxides; neutral; clear smooth boundary.

BC—44 to 60 inches; dark grayish brown (10YR 4/2) silty clay loam; common fine distinct dark yellowish brown (10YR 4/4) mottles; weak coarse subangular blocky structure; firm; common distinct dark gray (10YR 4/1) and few distinct very dark gray (10YR 3/1) organic coatings on faces of peds; common medium rounded concretions of iron and manganese oxides; very dark gray (10YR 3/1) krotovina in the lower 3 inches; neutral.

The solum ranges from 40 to 60 inches in thickness. The thickness of the mollic epipedon ranges from 10 to 20 inches.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. It is dominantly silty clay loam, but in some pedons it is silt loam. The Bw horizon has value of 4 or 5 and chroma of 2 to 4. In some pedons the lower part of the Bw horizon has strata of silt loam, loam, clay loam, or sandy loam. Some pedons have a C horizon.

Virden Series

The Virden series consists of poorly drained, moderately slowly permeable soils in broad, low areas on the loess-covered Illinoian glacial till plain in the uplands. These soils formed in loess. Slopes range from 0 to 2 percent.

Virden soils are similar to Herrick soils and commonly are adjacent to Cowden, Oconee, and Herrick soils. The somewhat poorly drained Herrick and Oconee soils are on ridges above the Virden soils. Cowden soils have a thinner dark surface layer than the Virden soils. They are in landscape positions similar to those of the Virden soils.

Typical pedon of Virden silty clay loam, 2,100 feet west and 125 feet south of the northeast corner of sec. 20, T. 12 N., R. 2 E.

Ap—0 to 7 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak fine granular structure; firm; many very fine roots; neutral; abrupt smooth boundary.

A—7 to 12 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; few fine prominent dark yellowish brown (10YR 4/6) mottles; weak fine subangular blocky structure; firm; many very fine roots; common distinct black (10YR 2/1) organic coatings on faces of peds; few fine rounded concretions of iron and manganese oxides; neutral; clear smooth boundary.

Bt—12 to 21 inches; very dark grayish brown (10YR 3/2) silty clay loam, dark gray (10YR 4/1) dry; few fine prominent dark yellowish brown (10YR 4/6) mottles; moderate medium subangular blocky structure; firm; common fine roots; common distinct very dark gray (10YR 3/1) organic coatings and clay films on faces of peds; few medium rounded concretions of iron and manganese oxides; neutral; gradual smooth boundary.

Btg1—21 to 27 inches; dark grayish brown (10YR 4/2) silty clay loam; common fine distinct dark yellowish brown (10YR 4/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; common fine roots; many distinct dark gray (10YR 4/1) clay films on faces of peds; few fine rounded concretions of iron and manganese oxides; neutral; clear smooth boundary.

Btg2—27 to 36 inches; dark grayish brown (10YR 4/2) silty clay loam; common medium prominent yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; firm; common distinct dark gray (10YR 4/1) clay films on faces of peds; very dark grayish brown (10YR 3/2) krotovina; common fine rounded concretions of iron and manganese oxides; neutral; clear smooth boundary.

BCg—36 to 44 inches; gray (10YR 5/1) silty clay loam; many coarse prominent yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable; few distinct dark gray (10YR 4/1) clay films on faces of peds and lining channels; many fine rounded concretions of iron and manganese oxides; neutral; clear smooth boundary.

Cg—44 to 60 inches; light gray (10YR 6/1) silt loam; many medium prominent yellowish brown (10YR 5/8) mottles; massive; friable; few distinct dark gray (10YR 4/1) root channels; common fine rounded concretions of iron and manganese oxides; neutral.

The solum ranges from 40 to 50 inches in thickness. The mollic epipedon is 12 to 24 inches thick.

The A horizon has value of 2 or 3 and chroma of 1 or 2. It is dominantly silty clay loam, but in some pedons it is silt loam. The Bt and Btg horizons have hue of 10YR or 2.5Y or are neutral in hue. They have value of 2 to 5 and chroma of 0 to 2.

Wirt Series

The Wirt series consists of well drained, moderately permeable soils on flood plains. These soils formed in loamy alluvium. Slopes range from 0 to 2 percent.

Wirt soils are similar to Huntsville soils and commonly are adjacent to Holton soils. The somewhat poorly drained Holton soils are in the lower areas on the flood plains. Huntsville soils have a mollic epipedon.

Typical pedon of Wirt silt loam, frequently flooded, 200 feet west and 600 feet south of the northeast corner of sec. 33, T. 10 N., R. 4 E.

Ap—0 to 7 inches; brown (10YR 4/3) silt loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; friable; common very fine roots; common faint dark brown (10YR 3/3) coatings on faces of peds; slightly acid; abrupt smooth boundary.

Bw1—7 to 16 inches; brown (10YR 4/3) loam; weak fine subangular blocky structure; friable; few very fine roots; common faint dark brown (10YR 3/3) coatings on faces of peds; slightly acid; gradual smooth boundary.

Bw2—16 to 27 inches; dark yellowish brown (10YR 4/4) loam; weak medium and coarse subangular blocky structure; friable; few fine roots; common distinct dark brown (10YR 3/3) coatings on faces of peds; neutral; gradual smooth boundary.

Bw3—27 to 40 inches; dark yellowish brown (10YR 4/4) loam; weak coarse subangular blocky structure; friable; few fine roots; many distinct dark brown (10YR 3/3) coatings on faces of peds; neutral; gradual smooth boundary.

C1—40 to 52 inches; brown (10YR 4/3) and dark yellowish brown (10YR 4/4) loam; thin strata of sandy loam; massive; friable; common distinct dark brown (10YR 3/3) coatings on cleavage planes; neutral; gradual smooth boundary.

C2—52 to 60 inches; brown (10YR 4/3) and dark yellowish brown (10YR 4/4) loam; thin strata of loamy sand; massive; friable; neutral.

The solum ranges from 24 to 40 inches in thickness.

The Ap horizon has value of 3 to 5 and chroma of 2 to 4. The Bw and C horizons have value of 3 to 5 and chroma of 3 to 6. They are loam, silt loam, sandy loam, fine sandy loam, or very fine sandy loam.

Wynoose Series

The Wynoose series consists of poorly drained, very slowly permeable soils in broad, low areas on the loess-covered Illinoian glacial till plain in the uplands. These soils formed in loess and in the underlying sediments at the surface of the Illinoian glacial till. Slopes range from 0 to 2 percent.

Wynoose soils are similar to Cisne soils and commonly are adjacent to Bluford and Oconee soils. The somewhat poorly drained Bluford and Oconee soils are on slight rises above the Wynoose soils. Cisne soils have a slightly darker surface layer than the Wynoose soils.

Typical pedon of Wynoose silt loam, 182 feet north and 1,740 feet east of the southwest corner of sec. 26, T. 10 N., R. 4 E.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam, light gray (10YR 7/2) dry; few fine prominent yellowish brown (10YR 5/6) mottles; weak fine granular structure; friable; common very fine and few fine roots; few fine rounded concretions of iron and manganese oxides; neutral; abrupt smooth boundary.

Eg1—8 to 13 inches; light brownish gray (10YR 6/2) silt loam; common medium prominent yellowish brown (10YR 5/8) mottles; weak medium platy structure; friable; few very fine roots; few fine rounded concretions of iron and manganese oxides; few dark grayish brown (10YR 4/2) wormcasts; slightly acid; abrupt smooth boundary.

Eg2—13 to 16 inches; light brownish gray (10YR 6/2) silt loam; few medium prominent yellowish brown (10YR 5/6) mottles; weak thick platy structure parting to weak fine subangular blocky; friable; few very fine roots; few prominent white (10YR 8/1 dry) silt coatings on faces of peds; few fine rounded concretions of iron and manganese oxides; strongly acid; abrupt smooth boundary.

B/Eg—16 to 19 inches; light brownish gray (10YR 6/2) silty clay loam; common medium prominent strong brown (7.5YR 5/6) mottles; moderate medium prismatic structure; firm; few very fine roots; many prominent white (10YR 8/1 dry) silt coatings and few faint grayish brown (10YR 5/2) clay films on faces of peds; few fine rounded concretions of iron and manganese oxides; very strongly acid; abrupt smooth boundary.

Btg1—19 to 30 inches; light brownish gray (10YR 6/2) silty clay; common medium prominent strong brown (7.5YR 5/6) mottles; moderate medium prismatic structure; firm; few very fine roots; common distinct grayish brown (10YR 5/2) clay films on faces of peds; few fine rounded concretions of iron and manganese oxides; very strongly acid; clear smooth boundary.

Btg2—30 to 38 inches; light brownish gray (2.5Y 6/2) silty clay; common medium prominent strong brown (7.5YR 5/6) mottles; weak medium prismatic structure; firm; common distinct grayish brown (2.5Y 5/2) clay films on faces of peds; few prominent white (10YR 8/1) silt coatings in the upper part; few fine and medium rounded concretions of iron and manganese oxides; very strongly acid; gradual smooth boundary.

2Btg3—38 to 54 inches; light brownish gray (2.5Y 6/2) silty clay loam; many coarse prominent strong brown (7.5YR 5/6) mottles; weak coarse subangular blocky structure; firm; few distinct grayish brown (2.5Y 5/2) clay films on faces of peds; about 10 percent sand; common coarse rounded concretions of iron and manganese oxides; strongly acid; clear smooth boundary.

2BCg—54 to 60 inches; grayish brown (2.5Y 5/2) silty clay loam; common medium prominent strong brown (7.5YR 5/6) and few medium prominent strong brown (7.5YR 4/6) mottles; weak coarse subangular blocky structure; firm; few faint grayish brown (2.5Y 5/2) clay films on faces of peds; few medium rounded concretions of iron and manganese oxides; about 10 percent sand; 1 percent fine gravel; medium acid.

The solum ranges from 40 to more than 60 inches in thickness. The thickness of the loess ranges from 30 to 55 inches.

The Ap horizon has value of 4 or 5. The Eg horizon has value of 4 to 6 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 to 3. The 2Btg and 2BCg horizons are silty clay loam, clay loam, silt loam, or loam.

Xenia Series

The Xenia series consists of moderately well drained, moderately slowly permeable soils on ridges and side slopes on the Wisconsinan glacial till plain in the uplands. These soils formed in loess and in the underlying Wisconsinan glacial till. Slopes range from 2 to 5 percent.

Xenia soils are similar to Sabina soils and commonly are adjacent to Sabina and Miami soils. The somewhat poorly drained Sabina soils have a thicker mantle of loess than the Xenia soils. They are in the lower positions on the landscape. The well drained Miami soils formed in glacial till. They are on side slopes below the Xenia soils.

Typical pedon of Xenia silt loam, 2 to 5 percent slopes, 1,400 feet south and 560 feet east of the northwest corner of sec. 27, T. 12 N., R. 5 E.

Ap—0 to 5 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak fine granular structure; friable; neutral; abrupt smooth boundary.

E—5 to 8 inches; brown (10YR 4/3) silt loam; moderate medium platy structure; friable; common distinct dark grayish brown (10YR 4/2) stains on faces of peds; neutral; clear smooth boundary.

Bt1—8 to 12 inches; yellowish brown (10YR 5/4) silt loam; weak fine subangular blocky structure; friable; few distinct brown (10YR 4/3) clay films on faces of peds; common fine rounded concretions of iron and manganese oxides; slightly acid; clear smooth boundary.

Bt2—12 to 25 inches; yellowish brown (10YR 5/4) silty clay loam; common fine faint yellowish brown (10YR 5/6) and few fine faint grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; firm; common distinct brown (10YR 4/3) clay films on faces of peds; common fine rounded concretions of iron and manganese oxides; medium acid; clear smooth boundary.

2Bt3—25 to 34 inches; yellowish brown (10YR 5/4) silty clay loam; common medium faint grayish brown (10YR 5/2), common medium faint yellowish brown (10YR 5/6), and common medium distinct dark yellowish brown (10YR 4/6) mottles; weak fine prismatic structure parting to moderate medium subangular blocky; firm; common distinct brown (10YR 4/3) clay films on faces of peds; common fine rounded concretions and few medium accumulations of iron and manganese oxides; about 15 percent fine sand; medium acid; clear smooth boundary.

2Bt4—34 to 40 inches; yellowish brown (10YR 5/4) clay loam; common medium distinct dark yellowish brown (10YR 4/6) and faint yellowish brown (10YR 5/6) and few medium faint grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; firm; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common medium rounded concretions and accumulations of iron and manganese oxides; about 3 percent fine gravel; slightly acid; clear smooth boundary.

2Bt5—40 to 49 inches; dark yellowish brown (10YR 4/4) clay loam; few fine faint dark yellowish brown (10YR 4/6) and few fine distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine rounded concretions of iron and manganese oxides; about 3 percent fine gravel; neutral; clear smooth boundary.

2BC—49 to 57 inches; yellowish brown (10YR 5/4) clay loam; common medium distinct dark yellowish brown (10YR 4/6) mottles; weak coarse subangular blocky structure; firm; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine rounded concretions of iron and manganese oxides; about 4 percent fine gravel; neutral; clear smooth boundary.

2C—57 to 60 inches; yellowish brown (10YR 5/4) loam; common coarse faint yellowish brown (10YR 5/6) and grayish brown (10YR 5/2) mottles; massive; firm; about 4 percent fine gravel; slightly effervescent; mildly alkaline.

The solum ranges from 40 to 60 inches in thickness. The thickness of the loess ranges from 22 to 40 inches.

The Ap horizon has value of 3 or 4 and chroma of 2 to 4. The Bt horizon has value of 4 to 6 and chroma of 3 to 6. The 2Bt and 2BC horizons have value of 4 or 5 and chroma of 3 to 6. The 2Bt horizon is silty clay loam or clay loam. The 2BC horizon is clay loam or loam.

Formation of the Soils

Leon Follmer, geologist, Illinois State Geological Survey, helped prepare this section.

Soil forms as a result of the actions of various soil-forming processes on material deposited or accumulated by geologic processes. Soil, a fundamental part of the ecosystem, exists in balance with the other elements of the environment. Environmental processes are responsible for the continual formation and evolution of soils. These processes include the effects of climate and biological activity on parent material, as conditioned by relief over periods of time.

Climate

Climate has a strong influence on soil formation. It largely determines the type and degree of weathering of minerals. The humid, temperate climate of Shelby County has favored a relatively rapid weathering of soil material and the formation and movement of clay from the upper part of the soil profile into the B horizon. As a result of this process, the B horizon of most of the upland soils in the survey area contains more clay than the A and E horizons. Climate also affects the activity of micro-organisms, the kind and amount of vegetation, and the amount of water movement through the soil.

Biological Activity

Organisms living in and on the soil, such as plants, animals, bacteria, and fungi, affect soil formation. These organisms, particularly plants, are responsible for the amount of organic matter and nutrients in the soil. Soils that formed under prairie grasses have a thick surface layer and generally are highly productive because of a high content of organic matter. Drummer and Flanagan soils are examples of soils that formed under prairie vegetation. These soils make up large areas of northeastern Shelby County. Soils that formed under forest vegetation have a lighter colored surface soil and are generally less productive because they have a lower content of organic matter. Ava and Bluford soils are examples. These soils are mainly in the southwestern part of the county.

Parent Material

In this section the various landforms in Shelby County are related to the parent material of the soils.

Wisconsinan Till Plain

As glacial ice sheets move forward, they push and carry great masses of unconsolidated material and rock debris. The material that was deposited on the land surface as the glaciers melted is collectively called glacial drift. Glacial drift includes glacial till, which is material deposited directly by the ice sheet, and glacial outwash, which is material deposited by the glacial meltwaters. The survey area was covered by three major glacial advances. The last two advances, the Illinoian and the Wisconsinan, have strongly influenced the topography and the soils in the area.

The Wisconsinan glacier began its advance into Illinois from the Lake Michigan Basin about 25,000 years ago. It continued southward and covered approximately 40 percent of the survey area. During this glacial event, extreme climatic factors created conditions similar to those during the Dust Bowl of the 1930's. Cold temperatures, low rainfall, and strong winds caused silts to be picked up from major river valleys and to be blown across the area. This eolian silt, called loess, covers most of the survey area and is the primary parent material. On broad uplands, the loess varies in thickness from less than 40 inches in the southern part of the county to more than 75 inches in the northwestern part. The topography of the Wisconsinan till plain in Shelby County is primarily the result of the deposition of drift. It is characterized by a broad, relatively level area having little relief. The few streams on the Wisconsinan till plain flow in narrow, shallow valleys, and thus the removal of surface water is generally slow.

Soils on the Wisconsinan till plain are considered mature in age because they have formed distinct horizons. Slopes typically range from 0 to 5 percent. Soils in these areas formed in 40 to 60 inches of loess. Catlin and Flanagan soils are examples. Soils on the more sloping parts of the till plain, such as Dana and

Parr soils, have loess that is less than 40 inches thick. The underlying Wisconsinan drift ranges from 25 to 100 feet in thickness. The till is generally loamy, is less compact, is lighter in color, and is less weathered than the older Illinoian glacial deposits *(8)*. Soils that formed partly or entirely in the Wisconsinan glacial till make up about 40 percent of the county.

Shelbyville Moraine

The Shelbyville Moraine is one of the most prominent moraines in Illinois. It is an end moraine and marks the line of maximum advance of the Wisconsinan glacier in the area. The communities of Charleston, Shelbyville, and Peoria in central Illinois are all located on this moraine. End moraines are characterized by the accumulation of drift at the ice margin when the rate of advance and the rate of melting were essentially in balance. As more and more rock debris was brought to the edge of the glacier, it accumulated to form a ridge. In Shelby County the moraine is a series of complex ridges that range from 1 to 2 miles in width. It formed approximately 20,000 years ago *(8)*. The topography on the moraine in the Shelby County area is rolling. Slopes generally range from 2 to 10 percent. The moraine has an average local relief of about 70 feet. The soils on the moraine formed in 20 to 60 inches of loess over 20 to 100 feet of glacial drift. Examples of soils on the moraine are Raub and Dana soils. The preglacial river valley of the Kaskaskia River interrupts the continuity of the Shelbyville Moraine. The side slopes along this major drainageway are strongly dissected and have slopes as steep as 60 percent. Most of the soils along the valley, such as Miami soils, have little or no loess and formed entirely in Wisconsinan glacial till.

Wisconsinan Outwash Plain

As the Wisconsinan glacier melted, unconsolidated drift was washed out by the meltwaters. As the velocity of the flow decreased, sediments were deposited. Coarse textured outwash material was deposited near the moraine. Gradually, as the distance from the moraine increased, finer textured material was deposited. The areas where the outwash material formed deposits in front of the moraine are referred to as outwash plains *(18)*. The Wisconsinan outwash plain, south and west of the Shelbyville Moraine, formed during the period approximately 18,000 to 21,000 years ago. The topography of the outwash plain consists of low ridges and broad swales. Slope is generally less than 2 percent, but it ranges to 5 percent. In most places the outwash is stratified and consists of layers of various textured material. Loess covers the outwash with approximately 20 to 60 inches of silty material. Thickness of the underlying outwash varies from 5 to 30 feet. Soils on the outwash plain are considered mature in their development because they have formed distinct horizons. Soils on the outwash plain include Drummer, Elburn, and Millbrook soils.

Illinoian Till Plain

The Illinoian glaciation of the Midwest was the most extensive of all the glacial periods. The flow of ice into Illinois and Indiana originated from an area in eastern Canada. Two lobes invaded Illinois, one from the Lake Michigan Basin and another from the basins of Lake Huron and Lake Erie. The junction of these two lobes is marked by a distinctive belt of ridged drifts called the "interlobate complex" (see the "Illinois Ridged Drift" section). When this glacial period ended, nearly 90 percent of Illinois was blanketed with glacial drift. All of the area that is now Shelby County was covered by this glacier between 300,000 and 125,000 years ago *(16, 17)*. However, the more recent Wisconsinan glacier advanced over the northern and eastern parts of the county and covers the Illinoian drift in that area.

Soils on the Illinoian till plain, such as Cowden, Herrick, and Virden soils, have more strongly developed horizons than the soils on the Wisconsinan till plain. Many have a subsoil of silty clay loam, called a claypan. Wynoose soils have a claypan resulting from the continuous weathering and eluviation of clays from the surface layer into a lower layer.

There is a distinct difference in the topography between the Illinoian till plain and the Wisconsinan till plain. Since the Illinoian till plain is geologically much older, it is characterized by a broader, more gently undulating ground surface. Surface water is drained by many streams in a well integrated drainage system. The valleys are considerably wider and deeper than those on the Wisconsinan till plain. The relief of the bedrock surface has had a considerable influence on the surface topography in places. Slopes on the Illinoian till plain range from 0 to 5 percent in the undissected areas and from 0 to more than 60 percent in strongly dissected areas.

Loess that was deposited during the Wisconsinan glacial stage covers most of the Illinoian till plain and is considered the primary parent material for most of the upland soils in the county. The thickness of the loess ranges from 20 to 75 inches.

On many of the steeper side slopes in the strongly dissected areas, Illinoian glacial till is the major parent material. The till appears to be much more compact than the Wisconsinan till deposits. Small beds of sand and gravel are common in the Illinoian deposits. Illinoian till is dense and loamy and is brownish gray or dark gray. It ranges from 10 feet to 100 feet in thickness *(9)*. Hickory soils formed in Illinoian glacial till. Before the Wisconsinan glaciation, strongly weathered soils had formed at the surface of the Illinoian till plain. This ancient soil and other old soils that developed in the early loess deposits are called paleosols. Examples of modern soils that contain these paleosols are Atlas and Fishhook soils.

Illinoian Ridged Drift

Numerous mounds and ridges rising 60 to 80 feet above the level of the Illinoian till plain are in the west-central part of Shelby County. Some of these mounds and ridges are called kames and consist entirely of sand and gravel. Others consist of till or mixtures of till and outwash. The ridges are elongated and are generally well defined. The upper 5 to 10 feet of these deposits were strongly weathered before the Wisconsinan glaciation. Douglas, Pana, Parke, Pike, and Negley soils are in these areas. Douglas, Parke, and Pike soils have a mantle of loess over the loamy sediments. Pana and Negley soils do not have a mantle of loess. They formed in the weathered, coarse textured glacial drift.

One possible explanation of the origin of the Illinoian ridged drift is that the ridges are kames and crevasse fillings related to stagnant ice conditions of the Huron-Erie lobe. The crevasses may have formed as channels for the meltwaters that were released during stagnation of the glacial ice sheet. A second possible explanation is that the ridges constitute an interlobate, morainic system marking the junction between the Lake Michigan lobe and the Lake Huron and Lake Erie lobes of the Illinoian glacier *(18)*.

Flood Plains

Wide, nearly level flood plains are along the Kaskaskia and Little Wabash Rivers and along the smaller streams in the survey area. These flood plains formed in geologically recent time (less than 12,000 years ago). Holton and Wirt soils, which formed on the flood plains, have weakly developed horizons and are considered young. The sources of sediments are the result of streams eroding the loess-covered uplands and the underlying glacial deposits. These alluvial deposits are referred to as Cahokia alluvium *(17)*. They consist of stratified sediments that have a wide range of colors, textures, and mineralogy. Most of these loamy and silty deposits overlie well sorted coarser textured materials. Thickness of the alluvial deposits commonly ranges from 5 to 10 feet. Thickness of the underlying outwash ranges from 10 to 40 feet. Accumulations of this alluvium continue today because of erosion and flooding. Soils on flood plains are very productive, but they are subject to flooding unless flood-control measures have been installed.

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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.

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 illuvial 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

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.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Bottom land. The normal flood plain of a stream, subject to flooding.

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.

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.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

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 or rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil 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.

Excess sodium (in tables). Excess exchangeable sodium in the soil. The resulting poor physical properties restrict the growth of plants.

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.

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 up to 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, up to 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.

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.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

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.

Kame (geology). An irregular, short ridge or hill of stratified glacial drift.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

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, such as 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.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

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.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

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.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

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.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

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.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

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.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

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.

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* *grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from 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.

Terminal moraine. A belt of thick glacial drift that generally marks the termination of important glacial advances.

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). A layer of 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.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

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 1961-90 at Pana, 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	2	1.99	0.61	3.11	4	5.5
February	39.4	22.0	30.7	67	-6	5	2.15	1.05	3.10	5	4.9
March	52.1	32.6	42.3	80	8	52	3.68	2.12	5.07	7	3.5
April	65.2	43.0	54.1	86	23	188	3.71	1.99	5.23	7	.3
May	74.5	52.8	63.6	90	33	426	4.05	2.03	5.82	7	.0
June	83.1	61.6	72.4	95	45	672	3.94	2.01	5.63	6	.0
July	86.3	65.6	76.0	98	51	805	4.29	2.50	5.89	6	.0
August	83.8	63.3	73.6	97	48	730	3.38	1.63	4.89	5	.0
September	78.0	56.4	67.2	93	37	517	3.26	1.45	4.81	5	.0
October	66.4	45.1	55.7	86	26	221	2.86	1.45	4.09	5	.1
November	52.5	34.9	43.7	76	13	54	3.36	1.56	4.91	6	1.4
December	39.0	23.5	31.3	66	-7	7	3.54	1.46	5.30	5	4.7
Yearly:											
Average	62.9	43.2	53.1	---	---	---	---	---	---	---	---
Extreme	115	-25	---	99	-15	---	---	---	---	---	---
Total	---	---	---	---	---	3,678	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 (50 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1961-90 at Pana, 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 1961-90 at Pana, 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	193	182	159
8 years in 10	201	190	168
5 years in 10	218	206	185
2 years in 10	235	221	202
1 year in 10	243	229	210

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
2	Cisne silt loam	10,125	2.1
3A	Hoyleton silt loam, 0 to 2 percent slopes	13,990	2.8
3B	Hoyleton silt loam, 2 to 5 percent slopes	801	0.2
6B2	Fishhook silt loam, 2 to 5 percent slopes, eroded	13,162	2.7
7C2	Atlas silt loam, 5 to 10 percent slopes, eroded	12,028	2.4
7D2	Atlas silt loam, 10 to 15 percent slopes, eroded	1,407	0.3
8D2	Hickory loam, 10 to 18 percent slopes, eroded	7,398	1.5
8F	Hickory loam, 18 to 35 percent slopes	19,180	3.9
8G	Hickory loam, 35 to 60 percent slopes	8,011	1.6
12	Wynoose silt loam	6,238	1.3
13A	Bluford silt loam, 0 to 2 percent slopes	34,850	7.1
13B	Bluford silt loam, 2 to 5 percent slopes	7,617	1.6
14B	Ava silt loam, 2 to 5 percent slopes	26,956	5.5
14C2	Ava silt loam, 5 to 10 percent slopes, eroded	4,612	0.9
15C2	Parke silt loam, 5 to 10 percent slopes, eroded	3,710	0.8
15D2	Parke silt loam, 10 to 15 percent slopes, eroded	769	0.2
27B2	Miami silt loam, 2 to 5 percent slopes, eroded	1,425	0.3
27C2	Miami loam, 5 to 10 percent slopes, eroded	4,749	1.0
27D	Miami loam, 10 to 18 percent slopes	3,185	0.6
27F	Miami loam, 18 to 30 percent slopes	5,130	1.0
27G	Miami loam, 30 to 60 percent slopes	4,154	0.8
46	Herrick silt loam	8,790	1.8
50	Virden silty clay loam	20,167	4.1
56A	Dana silt loam, 0 to 2 percent slopes	1,726	0.4
56B2	Dana silt loam, 2 to 5 percent slopes, eroded	17,565	3.6
112	Cowden silt loam	8,739	1.8
113A	Oconee silt loam, 0 to 2 percent slopes	22,881	4.7
113B	Oconee silt loam, 2 to 5 percent slopes	7,113	1.4
120	Huey silt loam	357	0.1
127B2	Harrison silt loam, 2 to 5 percent slopes, eroded	2,292	0.5
128B	Douglas silt loam, 2 to 5 percent slopes	1,143	0.2
128C2	Douglas silt loam, 5 to 10 percent slopes, eroded	2,013	0.4
131C	Alvin fine sandy loam, 5 to 10 percent slopes	253	0.1
132	Starks silt loam	2,411	0.5
134A	Camden silt loam, 0 to 2 percent slopes	704	0.1
134B	Camden silt loam, 2 to 5 percent slopes	4,081	0.8
134C2	Camden silt loam, 5 to 10 percent slopes, eroded	1,255	0.3
148A	Proctor silt loam, 0 to 2 percent slopes	612	0.1
148B	Proctor silt loam, 2 to 5 percent slopes	1,461	0.3
152	Drummer silty clay loam	52,912	10.8
154	Flanagan silt loam	35,448	7.2
171B	Catlin silt loam, 2 to 5 percent slopes	1,834	0.4
198	Elburn silt loam	6,961	1.4
212B	Thebes silt loam, 2 to 5 percent slopes	579	0.1
219	Millbrook silt loam	4,635	0.9
221B2	Parr silt loam, 2 to 5 percent slopes, eroded	2,906	0.6
221C2	Parr silt loam, 5 to 10 percent slopes, eroded	4,094	0.8
234	Sunbury silt loam	3,716	0.8
236	Sabina silt loam	5,880	1.2
256C2	Pana silt loam, 5 to 10 percent slopes, eroded	207	*
291B	Xenia silt loam, 2 to 5 percent slopes	8,387	1.7
330	Peotone silty clay loam	409	0.1
474	Piasa silt loam	1,680	0.3
481	Raub silt loam	10,678	2.2
583B	Pike silt loam, 2 to 5 percent slopes	1,597	0.3
585C2	Negley loam, 5 to 10 percent slopes, eroded	537	0.1
585D2	Negley loam, 10 to 15 percent slopes, eroded	584	0.1
620A	Darmstadt silt loam, 0 to 2 percent slopes	9,502	1.9
620B2	Darmstadt silt loam, 2 to 5 percent slopes, eroded	2,101	0.4
802D	Orthents, loamy, 7 to 20 percent slopes	210	*
864	Pits, quarries	110	*
865	Pits, gravel	114	*
916	Oconee-Darmstadt silt loams	8,556	1.7

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
3074	Radford silt loam, frequently flooded	6,843	1.4
3077A	Huntsville silt loam, 0 to 3 percent slopes, frequently flooded	4,352	0.9
3107	Sawmill silty clay loam, frequently flooded	3,643	0.7
3225	Holton silt loam, frequently flooded	7,944	1.6
3226	Wirt silt loam, frequently flooded	3,209	0.7
3284	Tice silty clay loam, frequently flooded	937	0.2
3334	Birds silt loam, frequently flooded	978	0.2
7682A	Medway loam, 0 to 3 percent slopes, rarely flooded	538	0.1
	Water	6,139	1.2
	Total	491,280	100.0

* Less than 0.05 percent. The combined extent of the soils assigned an asterisk in the "Percent" column is about 0.2 percent of the survey area.

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
2	Cisne silt loam (where drained)
3A	Hoyleton silt loam, 0 to 2 percent slopes
3B	Hoyleton silt loam, 2 to 5 percent slopes
13A	Bluford silt loam, 0 to 2 percent slopes (where drained)
13B	Bluford silt loam, 2 to 5 percent slopes
14B	Ava silt loam, 2 to 5 percent slopes
27B2	Miami silt loam, 2 to 5 percent slopes, eroded
46	Herrick silt loam
50	Virden silty clay loam (where drained)
56A	Dana silt loam, 0 to 2 percent slopes
56B2	Dana silt loam, 2 to 5 percent slopes, eroded
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
127B2	Harrison silt loam, 2 to 5 percent slopes, eroded
128B	Douglas silt loam, 2 to 5 percent slopes
131C	Alvin fine sandy loam, 5 to 10 percent slopes
132	Starks silt loam (where drained)
134A	Camden silt loam, 0 to 2 percent slopes
134B	Camden silt loam, 2 to 5 percent slopes
148A	Proctor silt loam, 0 to 2 percent slopes
148B	Proctor silt loam, 2 to 5 percent slopes
152	Drummer silty clay loam (where drained)
154	Flanagan silt loam
171B	Catlin silt loam, 2 to 5 percent slopes
198	Elburn silt loam
212B	Thebes silt loam, 2 to 5 percent slopes
219	Millbrook silt loam (where drained)
221B2	Parr silt loam, 2 to 5 percent slopes, eroded
234	Sunbury silt loam
236	Sabina silt loam (where drained)
291B	Xenia silt loam, 2 to 5 percent slopes
330	Peotone silty clay loam (where drained)
481	Raub silt loam
583B	Pike silt loam, 2 to 5 percent slopes
3074	Radford silt loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
3077A	Huntsville silt loam, 0 to 3 percent slopes, 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)
3225	Holton silt loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
3226	Wirt silt loam, frequently flooded (where 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)
3334	Birds silt loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
7682A	Medway loam, 0 to 3 percent slopes, rarely flooded

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*
2: Cisne	IIIw	115	35	52	---	4.5	---
3A: Hoyleton	IIw	116	34	53	---	4.7	7.5
3B: Hoyleton	IIe	111	33	51	---	4.5	7.2
6B2: Fishhook	IIe	71	21	23	43	2.4	4.0
7C2: Atlas	IIIe	52	---	19	44	---	---
7D2: Atlas	IVe	---	---	18	41	---	---
8D2: Hickory	IVe	67	---	---	46	2.5	4.2
8F: Hickory	VIe	---	---	---	---	2.4	4.0
8G: Hickory	VIIe	---	---	---	---	---	3.0
12: Wynoose	IIIw	96	33	46	---	---	---
13A: Bluford	IIw	103	33	49	---	4.1	---
13B: Bluford	IIe	102	33	49	---	4.1	---
14B: Ava	IIe	97	33	48	---	4.3	---
14C2: Ava	IIIe	89	30	44	---	3.9	---
15C2: Parke	IIIe	105	37	42	---	3.4	---
15D2: Parke	IVe	90	32	36	---	3.0	---
27B2: Miami	IIe	105	37	47	---	3.4	---
27C2: Miami	IIIe	95	33	43	---	3.1	---
27D: Miami	IVe	85	30	38	---	2.8	---

See footnote 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*
27F------------- Miami	VIe	---	---	---	---	---	---
27G------------- Miami	VIIe	---	---	---	---	---	---
46-------------- Herrick	IIw	141	45	61	---	5.5	9.2
50-------------- Virden	IIw	138	46	57	72	---	---
56A------------- Dana	I	130	46	52	---	---	---
56B2------------ Dana	IIe	125	44	50	---	---	---
112------------- Cowden	IIw	120	37	53	---	---	---
113A------------ Oconee	IIw	120	36	54	---	5.0	---
113B------------ Oconee	IIe	119	36	53	---	4.9	---
120------------- Huey	IVw	64	23	33	---	2.6	---
127B2----------- Harrison	IIe	131	40	57	73	---	8.2
128B------------ Douglas	IIe	134	42	58	75	5.2	8.7
128C2----------- Douglas	IIIe	127	39	55	71	5.0	8.3
131C------------ Alvin	IIIe	92	31	45	---	4.0	6.7
132------------- Starks	IIw	129	40	55	72	5.1	---
134A------------ Camden	I	125	39	55	72	5.0	8.3
134B------------ Camden	IIe	124	39	54	71	5.0	8.2
134C2----------- Camden	IIIe	117	37	52	68	4.7	7.8
148A------------ Proctor	I	144	44	59	88	5.5	9.2
148B------------ Proctor	IIe	143	44	58	87	5.4	9.1

See footnote 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*
152------------- Drummer	IIw	154	51	61	83	---	9.2
154------------- Flanagan	I	162	52	67	92	6.1	10.2
171B------------ Catlin	IIe	149	46	60	86	5.7	9.6
198------------- Elburn	I	161	50	63	94	6.1	10.2
212B------------ Thebes	IIe	99	35	46	72	4.0	6.6
219------------- Millbrook	I	144	43	59	81	5.4	9.0
221B2----------- Parr	IIe	115	40	52	---	3.8	---
221C2----------- Parr	IIIe	105	37	47	---	3.4	---
234------------- Sunbury	I	149	45	62	84	---	8.1
236------------- Sabina	IIw	133	42	56	75	5.2	8.7
256C2----------- Pana	IIIe	102	33	42	58	3.9	6.6
291B------------ Xenia	IIe	120	42	48	---	4.0	---
330------------- Peotone	IIw	123	42	43	58	---	---
474------------- Piasa	IIIw	77	28	37	48	---	5.2
481------------- Raub	IIw	140	49	56	---	4.6	---
583B------------ Pike	IIe	120	42	48	---	4.0	---
585C2----------- Negley	IIIe	85	25	35	---	4.2	---
585D2----------- Negley	IVe	70	10	30	---	3.8	---
620A------------ Darmstadt	IIIw	69	26	36	---	3.0	5.0
620B2----------- Darmstadt	IIIe	65	24	34	---	2.8	4.7

See footnote 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*
802D. Orthents							
864, 865. Pits							
916 Oconee-Darmstadt	IIIw	97	31	46	---	4.1	---
3074 Radford	IIIw	100	32	---	59	---	6.5
3077A Huntsville	IIw	106	34	45	60	4.1	6.8
3107 Sawmill	IIIw	132	42	---	---	---	---
3225 Holton	IIIw	75	26	32	---	---	---
3226 Wirt	IIw	95	32	42	---	4.0	---
3284 Tice	IIIw	110	34	---	---	4.1	6.9
3334 Birds	IIIw	111	38	47	---	---	---
7682A Medway	I	130	50	50	---	5.5	---

* 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.

TABLE 7.--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	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
8D2, 8F Hickory	5R	Moderate	Moderate	Slight	Slight	White oak	85	5	Eastern white pine, red pine, yellow-poplar, sugar maple, white oak, black walnut.
						Northern red oak	85	5	
						Black oak	---	---	
						Green ash	---	---	
						Bitternut hickory	---	---	
						Yellow-poplar	95	7	
8G Hickory	5R	Severe	Severe	Slight	Slight	White oak	85	5	Eastern white pine, red pine, yellow-poplar, sugar maple, white oak, black walnut.
						Northern red oak	85	5	
						Black oak	---	---	
						Green ash	---	---	
						Bitternut hickory	---	---	
						Yellow-poplar	95	7	
27D Miami	5A	Slight	Slight	Slight	Slight	White oak	90	5	Eastern white pine, red pine, white ash, yellow-poplar, black walnut.
						Yellow-poplar	98	7	
						Sweetgum	76	5	
27F Miami	5R	Moderate	Moderate	Slight	Slight	White oak	90	5	Eastern white pine, red pine, white ash, yellow-poplar, black walnut.
						Yellow-poplar	98	7	
						Sweetgum	76	5	
27G Miami	5R	Severe	Severe	Slight	Slight	White oak	90	5	Eastern white pine, red pine, white ash, yellow-poplar, black walnut.
						Yellow-poplar	98	7	
						Sweetgum	76	5	
291B Xenia	5A	Slight	Slight	Slight	Slight	White oak	90	5	Eastern white pine, red pine, black walnut, white ash, yellow-poplar.
						Yellow-poplar	98	7	
						Sweetgum	76	5	
585D2 Negley	5A	Slight	Slight	Slight	Slight	Northern red oak	94	5	Eastern white pine, black walnut, yellow-poplar, red pine, white ash, white oak, northern red oak.
						Yellow-poplar	99	7	
						White oak	---	---	
						Black walnut	---	---	
						Black cherry	---	---	
						Sugar maple	---	---	
						White ash	---	---	

* 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 8.--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
2 Cisne	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.
3A, 3B Hoyleton	Eastern redcedar, Washington hawthorn, Amur privet, arrowwood, Amur honeysuckle, American cranberrybush.	Austrian pine, green ash, Osage-orange.	Eastern white pine, pin oak.	---
6B2 Fishhook	American cranberrybush, Amur honeysuckle, arrowwood, Amur privet, Washington hawthorn, eastern redcedar.	Osage-orange, green ash, Austrian pine.	Pin oak, eastern white pine.	---
7C2, 7D2 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, 8F, 8G 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.
12 Wynoose	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.
13A, 13B Bluford	Eastern redcedar, Washington hawthorn, Amur privet, arrowwood, Amur honeysuckle, American cranberrybush.	Austrian pine, green ash, Osage-orange.	Eastern white pine, pin oak.	---
14B, 14C2 Ava	Washington hawthorn, Amur privet, eastern redcedar, silky dogwood, arrowwood, Amur honeysuckle, American cranberrybush.	Austrian pine, green ash, Osage-orange.	Eastern white pine, pin oak.	---

TABLE 8.--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
15C2, 15D2: Parke	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.
27B2, 27C2, 27D, 27F, 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.
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.
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.
56A, 56B2: Dana	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	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.	---
120: Huey	Eastern redcedar, Russian-olive, silky dogwood.	Siberian elm, green ash.	---	---
127B2: 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.
131C: 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.	---

TABLE 8.--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
132. Starks	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.
134A, 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.
148A, 148B. Proctor	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Pin oak, eastern white pine.
152. Drummer	American cranberrybush, Amur privet, Amur honeysuckle, silky dogwood.	White fir, blue spruce, northern whitecedar, Norway spruce, Washington hawthorn.	---	Pin oak, eastern white pine.
154. Flanagan	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.
171B. Catlin	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.
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.
212B. Thebes	Amur honeysuckle, lilac, autumn-olive, eastern redcedar, radiant crabapple, Washington hawthorn.	Eastern white pine, Austrian pine, red pine, jack pine.	---	---
219. Millbrook	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
221B2, 221C2. Parr	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.

TABLE 8.--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
234 Sunbury	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.
236 Sabina	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Pin oak, eastern white pine.
256C2 Pana	Amur honeysuckle, autumn-olive, silky dogwood.	Eastern redcedar, Russian-olive.	Norway spruce, eastern white pine, Douglas-fir.	American sycamore, eastern cottonwood.
291B Xenia	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
330 Peotone	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.
474 Piasa	Eastern redcedar, Russian-olive.	Siberian elm, green ash.	---	---
481 Raub	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
583B Pike	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.
585C2, 585D2 Negley	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.
620A, 620B2 Darmstadt	Eastern redcedar, Russian-olive.	Siberian elm, green ash.	---	---
802D. Orthents				

TABLE 8.--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
864, 865. Pits				
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.	---	---
3074 Radford	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	White fir, blue spruce, northern whitecedar, Austrian pine, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
3077A Huntsville	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.
3225 Holton	Amur honeysuckle, Amur privet, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Austrian pine, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
3226 Wirt	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	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.
3334 Birds	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
7682A Medway	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine.

TABLE 9.--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
2 Cisne	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
3A, 3B Hoyleton	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
6B2 Fishhook	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Severe: erodes easily.	Moderate: wetness.
7C2 Atlas	Severe: wetness, percs slowly.	Severe: percs slowly.	Severe: slope, wetness, percs slowly.	Severe: erodes easily.	Moderate: wetness, droughty.
7D2 Atlas	Severe: wetness, percs slowly.	Severe: percs slowly.	Severe: slope, wetness, percs slowly.	Severe: erodes easily.	Moderate: wetness, droughty, slope.
8D2 Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
8F, 8G Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
12 Wynoose	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
13A, 13B Bluford	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
14B Ava	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Severe: erodes easily.	Moderate: wetness.
14C2 Ava	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.	Moderate: wetness.
15C2 Parke	Slight	Slight	Severe: slope.	Slight	Slight.
15D2 Parke	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
27B2 Miami	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight	Slight.
27C2 Miami	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope.	Slight	Slight.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
27D------------------- Miami	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
27F------------------- Miami	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
27G------------------- Miami	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
46-------------------- Herrick	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
50-------------------- Virden	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
56A------------------- Dana	Slight----------	Slight----------	Slight----------	Slight----------	Slight.
56B2------------------ Dana	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
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.
120------------------- Huey	Severe: ponding, percs slowly, excess sodium.	Severe: ponding, excess sodium, percs slowly.	Severe: ponding, percs slowly, excess sodium.	Severe: ponding.	Severe: excess sodium, ponding.
127B2----------------- Harrison	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
128B------------------ Douglas	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
128C2----------------- Douglas	Slight----------	Slight----------	Severe: slope.	Slight----------	Slight.
131C------------------ Alvin	Slight----------	Slight----------	Severe: slope.	Slight----------	Slight.
132------------------- Starks	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
134A------------------ Camden	Slight----------	Slight----------	Slight----------	Severe: erodes easily.	Slight.
134B------------------ Camden	Slight----------	Slight----------	Moderate: slope.	Severe: erodes easily.	Slight.
134C2----------------- Camden	Slight----------	Slight----------	Severe: slope.	Severe: erodes easily.	Slight.
148A------------------ Proctor	Slight----------	Slight----------	Slight----------	Slight----------	Slight.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
148B: Proctor	Slight	Slight	Moderate: slope.	Slight	Slight.
152: Drummer	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
154: Flanagan	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
171B: Catlin	Slight	Slight	Moderate: slope.	Slight	Slight.
198: Elburn	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
212B: Thebes	Slight	Slight	Moderate: slope.	Slight	Slight.
219: Millbrook	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
221B2: Parr	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight	Slight.
221C2: Parr	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope.	Slight	Slight.
234: Sunbury	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
236: Sabina	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
256C2: Pana	Slight	Slight	Severe: slope.	Slight	Slight.
291B: Xenia	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: erodes easily.	Slight.
330: Peotone	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
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.
481: Raub	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
583B: Pike	Slight	Slight	Moderate: slope.	Slight	Slight.
585C2: Negley	Slight	Slight	Severe: slope.	Slight	Slight.
585D2: Negley	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
620A, 620B2: Darmstadt	Severe: wetness, percs slowly, excess sodium.	Severe: excess sodium, percs slowly.	Severe: wetness, percs slowly.	Moderate: wetness.	Severe: excess sodium.
802D: Orthents	Moderate: percs slowly, slope.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
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.	Moderate: wetness.	Severe: excess sodium.
3074: Radford	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: wetness, flooding.	Moderate: wetness, flooding.	Severe: flooding.
3077A: Huntsville	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
3107: Sawmill	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
3225: Holton	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: wetness, flooding.	Moderate: wetness, flooding.	Severe: flooding.
3226: Wirt	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
3284: Tice	Severe: flooding.	Moderate: flooding, wetness.	Severe: flooding.	Moderate: wetness, flooding.	Severe: flooding.
3334: Birds	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
7682A: Medway	Severe: flooding.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.

TABLE 10.--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 herba- ceous plants	Hardwood trees	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
2-------------------- Cisne	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
3A------------------ Hoyleton	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
3B------------------ Hoyleton	Fair	Good	Good	Good	Fair	Poor	Good	Good	Poor.
6B2----------------- Fishhook	Fair	Good	Good	Good	Fair	Poor	Good	Good	Poor.
7C2, 7D2------------ Atlas	Fair	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
8D2----------------- Hickory	Poor	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
8F, 8G-------------- Hickory	Very poor.	Poor	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
12------------------ Wynoose	Poor	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
13A----------------- Bluford	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
13B----------------- Bluford	Fair	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
14B, 14C2----------- Ava	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
15C2---------------- Parke	Fair	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
15D2---------------- Parke	Poor	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
27B2---------------- Miami	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
27C2---------------- Miami	Fair	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
27D, 27F------------ Miami	Poor	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
27G----------------- Miami	Very poor.	Poor	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
46------------------ Herrick	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
50------------------ Virden	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.

TABLE 10.--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	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
56A, 56B2 Dana	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
112 Cowden	Poor	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
113A Oconee	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
113B Oconee	Fair	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
120 Huey	Poor	Poor	Poor	Fair	Good	Good	Poor	Fair	Good.
127B2 Harrison	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
128B Douglas	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
128C2 Douglas	Fair	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
131C Alvin	Fair	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
132 Starks	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
134A, 134B Camden	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
134C2 Camden	Fair	Good	Good	Good	Poor	Very poor.	Good	Good	Poor.
148A, 148B Proctor	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
152 Drummer	Fair	Good	Good	Fair	Good	Good	Good	Fair	Good.
154 Flanagan	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
171B Catlin	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
198 Elburn	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
212B Thebes	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
219 Millbrook	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
221B2 Parr	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
221C2 Parr	Fair	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

TABLE 10.--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	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
234 Sunbury	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
236 Sabina	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
256C2 Pana	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
291B Xenia	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
330 Peotone	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
474 Piasa	Poor	Fair	Fair	Poor	Good	Good	Poor	Poor	Good.
481 Raub	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
583B Pike	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
585C2 Negley	Fair	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
585D2 Negley	Poor	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
620A Darmstadt	Fair	Good	Poor	Good	Fair	Fair	Fair	Good	Fair.
620B2 Darmstadt	Fair	Good	Poor	Good	Fair	Poor	Fair	Good	Poor.
802D Orthents	Fair	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
864, 865. Pits									
916:									
Oconee	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Darmstadt	Fair	Good	Poor	Good	Fair	Fair	Fair	Good	Fair.
3074 Radford	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
3077A Huntsville	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
3107 Sawmill	Poor	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
3225 Holton	Poor	Fair	Fair	Good	Fair	Fair	Fair	Good	Fair.

TABLE 10.--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	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
3226---------------- Wirt	Poor	Fair	Fair	Good	Poor	Very poor.	Fair	Good	Very poor.
3284---------------- Tice	Poor	Fair	Fair	Good	Fair	Fair	Fair	Good	Fair.
3334---------------- Birds	Good	Fair	Good	Good	Good	Good	Good	Good	Good.
7682A--------------- Medway	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.

TABLE 11.--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
2----------------- Cisne	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength, wetness.	Severe: wetness.
3A, 3B------------ Hoyleton	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, frost action, shrink-swell.	Moderate: wetness.
6B2--------------- Fishhook	Severe: wetness.	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
7C2--------------- Atlas	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength.	Moderate: wetness, droughty.
7D2--------------- Atlas	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell, slope.	Severe: shrink-swell, low strength.	Moderate: wetness, droughty, slope.
8D2, 8F, 8G------- Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
12---------------- Wynoose	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength, wetness.	Severe: wetness.
13A, 13B---------- Bluford	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
14B--------------- Ava	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: low strength, frost action.	Moderate: wetness.
14C2-------------- Ava	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: low strength, frost action.	Moderate: wetness.
15C2-------------- Parke	Slight---------	Moderate: shrink-swell.	Slight---------	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
15D2-------------- Parke	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
27B2-------------- Miami	Moderate: dense layer.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Slight.

TABLE 11.--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
27C2: Miami	Moderate: dense layer.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: slope, shrink-swell.	Severe: low strength.	Slight.
27D: Miami	Moderate: slope, dense layer.	Moderate: slope, shrink-swell.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
27F, 27G: Miami	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
46: Herrick	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: low strength, frost action, shrink-swell.	Moderate: wetness.
50: Virden	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: low strength, ponding, shrink-swell.	Severe: ponding.
56A, 56B2: Dana	Moderate: dense layer, wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
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.
120: Huey	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: excess sodium, ponding.
127B2: 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.
131C: Alvin	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Moderate: frost action.	Slight.
132: Starks	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
134A, 134B: Camden	Slight	Moderate: shrink-swell.	Slight	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.

TABLE 11.--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
134C2 Camden	Slight	Moderate: shrink-swell.	Slight	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
148A Proctor	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
148B Proctor	Severe: cutbanks cave.	Moderate: shrink-swell.	Slight	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
152 Drummer	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
154 Flanagan	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell.	Severe: low strength, frost action, shrink-swell.	Moderate: wetness.
171B Catlin	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
198 Elburn	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
212B Thebes	Severe: cutbanks cave.	Moderate: shrink-swell.	Slight	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
219 Millbrook	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
221B2 Parr	Moderate: dense layer.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, low strength.	Slight.
221C2 Parr	Moderate: dense layer.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, low strength.	Slight.
234 Sunbury	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell.	Severe: low strength, frost action, shrink-swell.	Moderate: wetness.
236 Sabina	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength, frost action.	Moderate: wetness.
256C2 Pana	Slight	Slight	Slight	Moderate: slope.	Moderate: frost action.	Slight.
291B Xenia	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: low strength, frost action.	Slight.

TABLE 11.--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
330---------------- Peotone	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: shrink-swell, low strength, ponding.	Severe: ponding.
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.
481---------------- Raub	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
583B--------------- Pike	Slight----------	Slight----------	Slight----------	Slight----------	Severe: low strength, frost action.	Slight.
585C2-------------- Negley	Slight----------	Slight----------	Slight----------	Moderate: slope.	Moderate: frost action.	Slight.
585D2-------------- Negley	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
620A, 620B2-------- Darmstadt	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Severe: excess sodium.
802D--------------- Orthents	Moderate: dense layer, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
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.
3074--------------- Radford	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, flooding, frost action.	Severe: flooding.
3077A-------------- Huntsville	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	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.

TABLE 11.--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
3225-------------- Holton	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, frost action.	Severe: flooding.
3226-------------- Wirt	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
3284-------------- Tice	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: low strength, flooding, frost action.	Severe: flooding.
3334-------------- Birds	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding, flooding.	Severe: ponding, flooding.
7682A------------- Medway	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: frost action, low strength.	Moderate: wetness.

TABLE 12.--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
2 Cisne	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness.
3A Hoyleton	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
3B Hoyleton	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
6B2 Fishhook	Severe: wetness, percs slowly.	Moderate: slope, seepage.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.
7C2, 7D2 Atlas	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.
8D2, 8F, 8G Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
12 Wynoose	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness.
13A Bluford	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness.
13B Bluford	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Poor: wetness.
14B Ava	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey, wetness.
14C2 Ava	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey, wetness.
15C2 Parke	Slight	Severe: slope.	Slight	Slight	Good.
15D2 Parke	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
27B2 Miami	Severe: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Good.
27C2 Miami	Severe: percs slowly.	Severe: slope.	Slight	Slight	Good.

TABLE 12.--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
27D: Miami	Severe: percs slowly.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
27F, 27G: Miami	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
46: Herrick	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
50: Virden	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
56A, 56B2: Dana	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: wetness, too clayey.	Slight	Fair: too clayey, wetness.
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.
120: Huey	Severe: ponding, percs slowly.	Slight	Severe: ponding, too clayey, excess sodium.	Severe: ponding.	Poor: too clayey, ponding, excess sodium.
127B2: Harrison	Severe: wetness.	Severe: wetness.	Moderate: wetness, too clayey.	Slight	Fair: too clayey, wetness.
128B: Douglas	Moderate: percs slowly.	Severe: seepage.	Severe: seepage.	Slight	Fair: too clayey.
128C2: Douglas	Moderate: percs slowly.	Severe: seepage, slope.	Severe: seepage.	Slight	Fair: too clayey.
131C: Alvin	Slight	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage.
132: Starks	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
134A: Camden	Moderate: percs slowly.	Moderate: seepage.	Severe: seepage.	Slight	Fair: too clayey.

TABLE 12.--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
134B----------------- Camden	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: seepage.	Slight-----------	Fair: too clayey.
134C2---------------- Camden	Moderate: percs slowly.	Severe: slope.	Severe: seepage.	Slight-----------	Fair: too clayey.
148A----------------- Proctor	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Fair: too clayey, wetness.
148B----------------- Proctor	Moderate: percs slowly.	Severe: seepage.	Severe: seepage, too sandy.	Slight-----------	Poor: too sandy.
152------------------ Drummer	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
154------------------ Flanagan	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: hard to pack.
171B----------------- Catlin	Severe: wetness.	Moderate: seepage, slope, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
198------------------ Elburn	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Poor: wetness.
212B----------------- Thebes	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
219------------------ Millbrook	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
221B2---------------- Parr	Severe: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey.
221C2---------------- Parr	Severe: percs slowly.	Severe: slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey.
234------------------ Sunbury	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
236------------------ Sabina	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.
256C2---------------- Pana	Slight-----------	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: small stones.
291B----------------- Xenia	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.

TABLE 12.--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
330 Peotone	Severe: ponding, percs slowly.	Slight	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
474 Piasa	Severe: ponding, percs slowly.	Slight	Severe: ponding, too clayey, excess sodium.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
481 Raub	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: hard to pack, wetness.
583B Pike	Slight	Moderate: seepage, slope.	Severe: seepage.	Slight	Fair: too clayey.
585C2 Negley	Slight	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: too clayey, small stones.
585D2 Negley	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: too clayey, small stones, slope.
620A Darmstadt	Severe: wetness, percs slowly.	Slight	Severe: wetness, excess sodium.	Severe: wetness.	Poor: wetness, excess sodium.
620B2 Darmstadt	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, excess sodium.	Severe: wetness.	Poor: wetness, excess sodium.
802D Orthents	Severe: percs slowly.	Severe: slope.	Moderate: slope.	Slight	Fair: too clayey, slope.
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.
3074 Radford	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
3077A Huntsville	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Good.
3107 Sawmill	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.

TABLE 12.--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
3225---------------- Holton	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: large stones, wetness.
3226---------------- Wirt	Severe: flooding.	Severe: seepage, flooding.	Severe: seepage, flooding.	Severe: flooding, seepage.	Good.
3284---------------- Tice	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: hard to pack.
3334---------------- Birds	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: ponding.
7682A--------------- Medway	Severe: wetness.	Severe: wetness, seepage.	Severe: seepage, wetness.	Severe: wetness, seepage.	Fair: wetness.

TABLE 13.--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
2------------------------ Cisne	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
3A, 3B------------------ Hoyleton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
6B2--------------------- Fishhook	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, thin layer.
7C2, 7D2---------------- Atlas	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
8D2--------------------- Hickory	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
8F, 8G------------------ Hickory	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
12---------------------- Wynoose	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
13A, 13B---------------- Bluford	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
14B, 14C2--------------- Ava	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
15C2-------------------- Parke	Good.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
15D2-------------------- Parke	Good.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
27B2, 27C2-------------- Miami	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, too clayey.
27D--------------------- Miami	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, slope, too clayey.
27F--------------------- Miami	Fair: slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
27G--------------------- Miami	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
46---------------------- Herrick	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
50 Virden	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.
56A, 56B2 Dana	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
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.
120 Huey	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, excess sodium.
127B2 Harrison	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
128B, 128C2 Douglas	Fair: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
131C Alvin	Good	Probable	Improbable: too sandy.	Poor: too sandy.
132 Starks	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
134A, 134B, 134C2 Camden	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
148A Proctor	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
148B Proctor	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
152 Drummer	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
154 Flanagan	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
171B Catlin	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
198 Elburn	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
212B Thebes	Good	Probable	Improbable: too sandy.	Fair: area reclaim, too clayey.
219 Millbrook	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
221B2, 221C2 Parr	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, too clayey.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
234 Sunbury	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
236 Sabina	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
256C2 Pana	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
291B Xenia	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
330 Peotone	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
474 Piasa	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, excess sodium.
481 Raub	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
583B Pike	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
585C2, 585D2 Negley	Good	Probable	Probable	Poor: small stones.
620A, 620B2 Darmstadt	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, excess sodium.
802D 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.
3074 Radford	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
3077A Huntsville	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
3107 Sawmill	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
3225 Holton	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, area reclaim.
3226 Wirt	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
3284 Tice	Fair: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
3334 Birds	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
7682A Medway	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.

TABLE 14.--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	Terraces and diversions	Grassed waterways
2 Cisne	Slight	Severe: wetness.	Percs slowly, frost action.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
3A Hoyleton	Slight	Severe: wetness.	Percs slowly, frost action.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
3B Hoyleton	Moderate: slope.	Severe: wetness.	Percs slowly, frost action, slope.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
6B2 Fishhook	Moderate: seepage, slope.	Moderate: hard to pack, wetness.	Percs slowly, frost action, slope.	Erodes easily, wetness.	Wetness, erodes easily.
7C2 Atlas	Moderate: slope.	Severe: hard to pack.	Percs slowly, frost action, slope.	Erodes easily, wetness.	Wetness, erodes easily.
7D2 Atlas	Severe: slope.	Severe: hard to pack.	Percs slowly, frost action, slope.	Slope, erodes easily, wetness.	Wetness, slope, erodes easily.
8D2, 8F, 8G Hickory	Severe: slope.	Moderate: thin layer.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
12 Wynoose	Slight	Severe: wetness.	Percs slowly, frost action.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
13A Bluford	Slight	Severe: piping.	Percs slowly, frost action.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
13B Bluford	Moderate: slope.	Severe: piping.	Percs slowly, frost action, slope.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
14B, 14C2 Ava	Moderate: seepage, slope.	Severe: piping.	Percs slowly, frost action, slope.	Erodes easily, wetness.	Erodes easily, rooting depth.
15C2 Parke	Moderate: seepage, slope.	Moderate: piping.	Deep to water	Erodes easily	Erodes easily.
15D2 Parke	Severe: slope.	Moderate: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
27B2, 27C2 Miami	Moderate: seepage, slope.	Severe: piping.	Deep to water	Erodes easily	Erodes easily, rooting depth.
27D, 27F, 27G Miami	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily, rooting depth.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
46----------------Herrick	Slight---------	Severe: wetness.	Frost action---	Erodes easily, wetness.	Wetness, erodes easily.
50----------------Virden	Slight---------	Severe: hard to pack, ponding.	Ponding, frost action.	Ponding--------	Wetness.
56A---------------Dana	Moderate: seepage.	Moderate: thin layer.	Deep to water	Erodes easily	Erodes easily.
56B2--------------Dana	Moderate: seepage, slope.	Moderate: thin layer.	Deep to water	Erodes easily	Erodes easily.
112---------------Cowden	Slight---------	Severe: wetness.	Percs slowly, frost action.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
113A--------------Oconee	Slight---------	Severe: hard to pack, wetness.	Percs slowly, frost action.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
113B--------------Oconee	Moderate: slope.	Severe: hard to pack, wetness.	Percs slowly, frost action, slope.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
120---------------Huey	Slight---------	Severe: ponding, excess sodium.	Ponding, percs slowly, frost action.	Erodes easily, ponding, percs slowly.	Wetness, excess sodium, erodes easily.
127B2-------------Harrison	Moderate: seepage, slope.	Moderate: piping.	Deep to water	Erodes easily	Erodes easily.
128B, 128C2-------Douglas	Severe: seepage.	Moderate: thin layer, piping.	Deep to water	Erodes easily	Erodes easily.
131C--------------Alvin	Severe: seepage.	Severe: seepage, piping.	Deep to water	Soil blowing---	Favorable.
132---------------Starks	Moderate: seepage.	Severe: thin layer, wetness.	Frost action---	Erodes easily, wetness.	Wetness, erodes easily.
134A--------------Camden	Moderate: seepage.	Severe: piping.	Deep to water	Erodes easily	Erodes easily.
134B, 134C2-------Camden	Moderate: seepage, slope.	Severe: piping.	Deep to water	Erodes easily	Erodes easily.
148A--------------Proctor	Severe: seepage.	Moderate: thin layer, piping, wetness.	Frost action---	Erodes easily, wetness.	Erodes easily.
148B--------------Proctor	Severe: seepage.	Severe: piping.	Deep to water	Erodes easily, too sandy.	Erodes easily.
152---------------Drummer	Moderate: seepage.	Severe: ponding.	Ponding, frost action.	Ponding--------	Wetness.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
154 Flanagan	Moderate: seepage.	Severe: wetness.	Frost action	Erodes easily, wetness.	Erodes easily.
171B Catlin	Moderate: seepage, slope.	Moderate: piping, wetness.	Deep to water	Erodes easily	Erodes easily.
198 Elburn	Moderate: seepage.	Severe: wetness.	Frost action	Erodes easily, wetness.	Wetness, erodes easily.
212B Thebes	Severe: seepage.	Severe: seepage, piping.	Deep to water	Erodes easily, too sandy.	Erodes easily, rooting depth.
219 Millbrook	Moderate: seepage.	Severe: wetness.	Frost action	Erodes easily, wetness.	Wetness, erodes easily.
221B2, 221C2 Parr	Moderate: seepage, slope.	Severe: thin layer.	Deep to water	Favorable	Rooting depth, percs slowly.
234 Sunbury	Moderate: seepage.	Severe: wetness.	Frost action	Erodes easily, wetness.	Erodes easily.
236 Sabina	Slight	Severe: wetness.	Frost action	Erodes easily, wetness.	Erodes easily.
256C2 Pana	Severe: seepage.	Severe: piping.	Deep to water	Favorable	Favorable.
291B Xenia	Moderate: seepage, slope.	Moderate: thin layer, wetness.	Frost action, slope.	Erodes easily, wetness.	Erodes easily.
330 Peotone	Slight	Severe: ponding.	Ponding, frost action.	Ponding	Wetness.
474 Piasa	Slight	Severe: hard to pack, ponding, excess sodium.	Ponding, percs slowly, frost action.	Erodes easily, ponding, percs slowly.	Wetness, excess sodium, erodes easily.
481 Raub	Slight	Severe: wetness.	Frost action	Erodes easily, wetness.	Wetness, erodes easily.
583B Pike	Moderate: seepage, slope.	Moderate: piping.	Deep to water	Erodes easily	Erodes easily.
585C2 Negley	Severe: seepage.	Moderate: thin layer.	Deep to water	Favorable	Favorable.
585D2 Negley	Severe: seepage, slope.	Moderate: thin layer.	Deep to water	Slope	Slope.
620A Darmstadt	Slight	Severe: excess sodium.	Percs slowly, frost action.	Erodes easily, wetness.	Wetness, excess sodium.
620B2 Darmstadt	Moderate: slope.	Severe: excess sodium.	Percs slowly, frost action, slope.	Erodes easily, wetness.	Wetness, excess sodium.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
802D----------------- Orthents	Moderate: seepage, slope.	Slight---------	Deep to water	Favorable------	Favorable.
864, 865. Pits					
916:					
Oconee-----------	Slight---------	Severe: hard to pack, wetness.	Percs slowly, frost action.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
Darmstadt--------	Slight---------	Severe: excess sodium.	Percs slowly, frost action.	Erodes easily, wetness.	Wetness, excess sodium.
3074-------------- Radford	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Wetness--------	Wetness.
3077A------------- Huntsville	Moderate: seepage.	Moderate: thin layer, piping.	Deep to water	Favorable------	Favorable.
3107-------------- Sawmill	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Wetness--------	Wetness.
3225-------------- Holton	Moderate: seepage.	Severe: piping, wetness.	Flooding, large stones, frost action.	Large stones, erodes easily, wetness.	Large stones, wetness, erodes easily.
3226-------------- Wirt	Severe: seepage.	Severe: piping.	Deep to water	Erodes easily	Erodes easily.
3284-------------- Tice	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Wetness--------	Favorable.
3334-------------- Birds	Slight---------	Severe: ponding.	Ponding, flooding, frost action.	Erodes easily, ponding.	Wetness, erodes easily.
7682A------------- Medway	Severe: seepage.	Severe: piping, wetness.	Frost action---	Wetness--------	Favorable.

TABLE 15.--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	
2------------- Cisne	0-9	Silt loam-----	CL, CL-ML, ML	A-4	0	0	100	100	90-100	90-100	25-35	5-10
	9-18	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	95-100	90-100	25-35	5-15
	18-44	Silty clay loam, silty clay.	CH, CL	A-7	0	0	100	100	90-100	90-100	45-60	20-35
	44-55	Silty clay loam, clay loam, loam.	CL	A-6, A-7	0	0-5	100	90-100	70-95	50-90	30-50	15-30
	55-60	Silt loam, silty clay loam.	CL	A-6	0	0-5	100	90-100	70-95	50-90	25-40	10-25
3A------------ Hoyleton	0-11	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	95-100	85-100	25-35	5-15
	11-33	Silty clay loam, silty clay.	CL, CH	A-7	0	0	100	100	95-100	85-100	40-55	20-30
	33-60	Silt loam, loam, silty clay loam.	CL, CL-ML	A-6, A-7, A-4	0	0	100	95-100	90-100	70-95	20-45	5-25
3B------------ Hoyleton	0-12	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	95-100	85-100	25-35	5-15
	12-30	Silty clay loam, silty clay.	CL, CH	A-7	0	0	100	100	95-100	85-100	40-55	20-30
	30-60	Silt loam, loam, clay loam.	CL, CL-ML	A-6, A-7, A-4	0	0	100	95-100	90-100	70-95	20-45	5-25
6B2----------- Fishhook	0-8	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	85-100	25-40	5-15
	8-28	Silty clay loam.	CL, ML	A-6, A-7	0	0	100	100	95-100	90-100	35-50	10-25
	28-60	Clay loam, clay, silty clay loam.	CH, CL	A-7	0-1	0-5	95-100	90-100	80-90	75-85	40-60	20-35
7C2----------- Atlas	0-13	Silt loam-----	CL, CL-ML	A-6, A-4	0	0	100	100	95-100	75-95	25-35	5-15
	13-22	Silty clay loam, clay, clay loam.	CH	A-7	0	0	100	95-100	95-100	75-95	50-70	30-45
	22-60	Silty clay loam, clay, clay loam.	CH	A-7	0	0	100	95-100	95-100	75-95	50-70	30-45
7D2----------- Atlas	0-4	Silt loam-----	CL	A-6, A-4	0	0	100	100	90-100	75-95	20-35	8-15
	4-32	Silty clay loam, clay, clay loam.	CH	A-7	0	0	100	95-100	95-100	75-95	50-70	30-45
	32-44	Silty clay loam, clay, clay loam.	CH	A-7	0	0	100	95-100	95-100	75-95	50-70	30-45
	44-60	Clay loam, clay, loam.	CH, CL	A-6, A-7	0	0	95-100	90-100	90-100	65-95	35-55	20-30

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments >10 inches	Fragments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
8D2: Hickory	0-6	Loam	CL	A-6, A-4	---	0-5	95-100	90-100	90-100	75-95	20-35	8-15
	6-49	Clay loam, silty clay loam, gravelly clay loam.	CL	A-6, A-7	---	0-5	95-100	75-100	70-95	65-80	30-50	15-30
	49-60	Sandy loam, loam, clay loam.	CL-ML, CL	A-4, A-6	---	0-5	85-100	75-95	70-95	60-80	20-40	5-20
8F: Hickory	0-8	Loam	CL, ML, CL-ML	A-6, A-4	---	0-5	95-100	90-100	90-100	75-95	20-35	3-15
	8-52	Clay loam, silty clay loam, gravelly clay loam.	CL	A-6, A-7	---	0-5	95-100	75-100	70-95	65-80	30-50	15-30
	52-60	Sandy loam, loam, clay loam.	CL-ML, CL	A-4, A-6	---	0-5	85-100	75-95	70-95	60-80	20-40	5-20
8G: Hickory	0-11	Loam	CL, ML, CL-ML	A-6, A-4	---	0-5	95-100	90-100	90-100	75-95	20-35	3-15
	11-42	Clay loam, silty clay loam, loam.	CL	A-6, A-7	---	0-5	95-100	75-100	70-95	65-80	30-50	15-30
	42-60	Sandy loam, loam, clay loam.	CL-ML, CL	A-4, A-6	---	0-5	85-100	75-95	70-95	60-80	20-40	5-20
12: Wynoose	0-8	Silt loam	CL-ML, CL	A-4, A-6	0	0	100	100	95-100	85-95	20-35	5-15
	8-16	Silt loam	CL, ML, CL-ML	A-4, A-6	0	0	100	100	95-100	85-95	15-30	2-15
	16-38	Silty clay, silty clay loam.	CL, CH	A-7	0	0	100	100	95-100	85-95	40-55	20-35
	38-60	Silt loam, clay loam, silty clay loam.	CL	A-6, A-7	0	0	100	95-100	90-100	70-90	30-45	15-25
13A: Bluford	0-8	Silt loam	CL, CL-ML	A-6, A-4	0	0	100	95-100	95-100	90-100	20-35	5-15
	8-18	Silt loam	ML, CL-ML, CL	A-4	0	0	100	95-100	95-100	90-100	20-30	NP-10
	18-36	Silty clay loam, silty clay.	CL	A-7, A-6	0	0	100	95-100	95-100	90-100	35-50	15-30
	36-60	Silt loam, silty clay loam.	CL-ML, CL	A-6, A-4	---	0-5	100	95-100	90-100	70-90	25-40	5-20

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments >10 inches	Fragments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
13B-----------	0-8	Silt loam-----	CL, CL-ML	A-6, A-4	0	0	100	95-100	95-100	90-100	20-35	5-15
Bluford	8-12	Silt loam-----	ML, CL-ML, CL	A-4	0	0	100	95-100	95-100	90-100	20-30	NP-10
	12-32	Silty clay loam, silty clay.	CL	A-7, A-6	0	0	100	95-100	95-100	90-100	35-50	15-30
	32-60	Silt loam, loam, clay loam.	CL-ML, CL	A-6, A-4	---	0-5	100	95-100	90-100	70-90	25-40	5-20
14B-----------	0-8	Silt loam-----	CL, ML, CL-ML	A-6, A-4	0	0	100	100	95-100	90-100	25-35	5-15
Ava	8-20	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	25-45	10-20
	20-36	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	25-45	10-20
	36-60	Silty clay loam, loam, clay loam.	CL, CL-ML, ML	A-4, A-6, A-7	0	0	100	95-100	90-100	80-90	20-45	5-20
14C2----------	0-7	Silt loam-----	CL, ML, CL-ML	A-6, A-4	0	0	100	100	95-100	90-100	25-35	5-15
Ava	7-16	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	25-45	10-20
	16-31	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	25-45	10-20
	31-60	Silty clay loam, loam, clay loam.	CL, CL-ML, ML	A-4, A-6, A-7	0	0	100	95-100	90-100	80-90	20-45	5-20
15C2----------	0-7	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	90-100	70-100	20-35	7-15
Parke	7-34	Silty clay loam, silt loam.	CL	A-6, A-4	0	0	95-100	95-100	90-100	80-100	25-40	7-15
	34-60	Sandy clay loam, clay loam, sandy loam.	SC, CL	A-2, A-6, A-4	---	0-3	90-100	85-95	55-90	30-60	25-35	7-15
15D2----------	0-7	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	90-100	70-100	20-35	7-15
Parke	7-31	Silty clay loam, silt loam.	CL	A-6, A-4	0	0	95-100	95-100	90-100	80-100	25-40	7-15
	31-60	Sandy clay loam, clay loam, sandy loam.	SC, CL	A-2, A-6, A-4	---	0-3	90-100	85-95	55-90	30-60	25-35	7-15
27B2----------	0-8	Silt loam-----	CL, CL-ML, ML	A-4	0	0	100	95-100	80-100	50-90	15-30	3-10
Miami	8-22	Clay loam, silty clay loam.	CL, SC	A-6	0	0	90-100	85-100	70-95	40-95	30-40	15-25
	22-30	Loam, clay loam.	CL, SC	A-4, A-6	---	0-3	85-100	85-100	70-90	40-90	25-35	8-15
	30-60	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

TABLE 15.--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	
27C2----------- Miami	0-8	Loam----------	CL, CL-ML, ML	A-4	0	0	100	95-100	80-100	50-90	15-30	3-10
	8-35	Clay loam, silty clay loam.	CL, SC	A-6	0	0	90-100	85-100	70-95	40-95	30-40	15-25
	35-60	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
27D----------- Miami	0-11	Loam----------	CL, CL-ML, ML	A-4	0	0	100	95-100	80-100	50-90	15-30	3-10
	11-31	Clay loam, silty clay loam.	CL, SC	A-6	0	0	90-100	85-100	70-95	40-95	30-40	15-25
	31-60	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
27F----------- Miami	0-7	Loam----------	CL, CL-ML, ML	A-4	0	0	100	95-100	80-100	50-90	15-30	3-10
	7-35	Clay loam, silty clay loam.	CL, SC	A-6	0	0	90-100	85-100	70-95	40-95	30-40	15-25
	35-60	Loam, clay 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
27G----------- Miami	0-7	Loam----------	CL, CL-ML, ML	A-4	0	0	100	95-100	80-100	50-90	15-30	3-10
	7-33	Clay loam, silty clay loam.	CL, SC	A-6	0	0	90-100	85-100	70-95	40-95	30-40	15-25
	33-60	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
46------------ Herrick	0-13	Silt loam-----	CL, ML	A-4, A-6	0	0	100	100	95-100	90-100	30-40	5-15
	13-33	Silty clay loam, silty clay.	CH, CL	A-7-6	0	0	100	100	95-100	90-100	45-60	25-40
	33-55	Silty clay loam, silt loam.	CL	A-6, A-7-6	0	0	100	100	95-100	90-100	35-50	20-35
	55-60	Silt loam, loam, clay loam.	CL	A-6	0	0	100	100	90-100	80-100	30-40	10-20
50------------ Virden	0-12	Silty clay loam.	CL	A-7, A-6	0	0	100	100	95-100	95-100	30-45	10-25
	12-44	Silty clay, silty clay loam.	CH, CL, MH, ML	A-7-6	0	0	100	100	95-100	95-100	40-55	15-30
	44-60	Silty clay loam, silt loam.	CL	A-7, A-6	0	0	100	100	95-100	90-100	30-45	10-20
56A----------- Dana	0-11	Silt loam-----	CL	A-6, A-4	0	0	100	100	95-100	85-95	30-35	8-12
	11-28	Silty clay loam.	CL	A-6, A-7	0	0	100	100	95-100	85-98	38-50	20-32
	28-40	Clay loam-----	CL	A-6, A-7	0	0	90-100	90-95	80-90	65-75	37-50	17-30
	40-60	Loam----------	CL, ML, CL-ML	A-4, A-6	---	0-3	85-95	80-90	75-85	50-65	17-30	2-14

TABLE 15.--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	
56B2---------- Dana	0-8	Silt loam-----	CL	A-6, A-4	0	0	100	100	95-100	85-95	30-35	8-12
	8-32	Silty clay loam.	CL	A-6, A-7	0	0	100	100	95-100	85-98	38-50	20-32
	32-49	Clay loam-----	CL	A-6, A-7	0	0	90-100	90-95	80-90	65-75	37-50	17-30
	49-60	Loam----------	CL, ML, CL-ML	A-4, A-6	---	0-3	85-95	80-90	75-85	50-65	17-30	2-14
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
	8-12	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	95-100	90-100	25-35	5-15
	12-52	Silty clay loam, silty clay.	CH, CL	A-7-6	0	0	100	100	95-100	95-100	45-60	20-32
	52-60	Silt loam-----	CL	A-6, A-7-6	0	0	100	100	95-100	95-100	30-45	10-20
113A---------- Oconee	0-9	Silt loam-----	CL, ML, CL-ML	A-6, A-4	0	0	100	100	95-100	90-100	20-40	3-20
	9-14	Silt loam-----	CL	A-4, A-6	0	0	100	100	95-100	90-100	20-35	8-20
	14-29	Silty clay loam, silty clay.	CL, CH	A-7	0	0	100	100	95-100	90-100	40-65	20-45
	29-60	Silt loam, silty clay loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	30-50	10-25
113B---------- Oconee	0-9	Silt loam-----	CL, ML, CL-ML	A-6, A-4	0	0	100	100	95-100	90-100	20-40	3-20
	9-11	Silt loam-----	CL	A-4, A-6	0	0	100	100	95-100	90-100	20-35	8-20
	11-27	Silty clay loam, silty clay.	CL, CH	A-7	0	0	100	100	95-100	90-100	40-65	20-45
	27-60	Silt loam, silty clay loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	30-50	10-25
120----------- Huey	0-7	Silt loam-----	CL, CL-ML, ML	A-4, A-6	0	0	100	100	90-100	85-95	20-35	3-15
	7-10	Silt, silt loam.	CL, ML, CL-ML	A-6, A-4	0	0	100	100	90-100	85-95	15-30	3-15
	10-22	Silt loam, silty clay loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	25-45	10-25
	22-47	Silt loam, silty clay loam, silty clay.	CL	A-6, A-7	0	0	100	100	95-100	90-100	30-50	15-30
	47-60	Loam, silt loam, silty clay loam.	CL	A-6	0	0	95-100	90-100	80-95	65-90	20-35	10-20
127B2--------- Harrison	0-10	Silt loam-----	CL	A-4, A-6	0	0	100	100	100	95-100	30-40	8-15
	10-56	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	100	95-100	30-45	10-20
	56-60	Silty clay loam, clay loam, silt loam.	CL	A-6, A-7	---	0-5	95-100	85-100	80-85	70-80	30-50	10-25

TABLE 15.--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	
128B----------Douglas	0-10	Silt loam-----	CL	A-4, A-6	0	0	100	100	100	100	25-35	7-15
	10-47	Silty clay loam, silt loam.	CL	A-7, A-6	0	0	100	100	100	100	30-45	10-20
	47-60	Silt loam, clay loam, loam, 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
128C2---------Douglas	0-8	Silt loam-----	CL	A-4, A-6	0	0	100	100	100	100	25-35	7-15
	8-40	Silty clay loam, silt loam.	CL	A-7, A-6	0	0	100	100	100	100	30-45	10-20
	40-60	Silt loam, clay loam, loam, 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
131C----------Alvin	0-8	Fine sandy loam.	SM	A-2	0	0	100	100	50-75	15-30	<20	NP-4
	8-36	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
	36-60	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
132-----------Starks	0-12	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	70-100	20-35	4-15
	12-32	Silty clay loam.	CL	A-6, A-7	0	0	100	100	90-100	80-100	35-45	15-25
	32-49	Loam, silty clay loam, sandy loam.	CL, SC, CL-ML, SC-SM	A-4, A-6	0	0	95-100	90-100	80-95	40-80	25-40	6-17
	49-60	Stratified loamy sand to silt loam.	SM, SC, ML, CL	A-2, A-4, A-6	---	0-5	90-100	80-95	40-90	30-60	<30	NP-15
134A----------Camden	0-11	Silt loam-----	CL, ML, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	20-35	3-15
	11-35	Silt loam, silty clay loam.	CL	A-6	0	0	100	100	95-100	90-100	25-40	15-25
	35-43	Clay loam, sandy clay 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
	43-60	Stratified sandy loam to loamy sand.	SM, SC, ML, CL	A-2, A-4	0	0-5	90-100	80-100	50-80	20-60	<25	3-10
134B----------Camden	0-10	Silt loam-----	CL, ML, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	20-35	3-15
	10-29	Silt loam, silty clay loam.	CL	A-6	0	0	100	100	95-100	90-100	25-40	15-25
	29-53	Clay loam, sandy loam, 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
	53-60	Stratified sandy loam to loamy sand.	SM, SC, ML, CL	A-2, A-4	0	0-5	90-100	80-100	50-80	20-60	<25	3-10

TABLE 15.--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	
134C2---------- Camden	0-7	Silt loam-----	CL, ML, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	20-35	3-15
	7-36	Silt loam, silty clay loam.	CL	A-6	0	0	100	100	95-100	90-100	25-40	15-25
	36-47	Clay loam, sandy loam, 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
	47-60	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
148A---------- Proctor	0-11	Silt loam-----	CL	A-6	0	0	100	100	95-100	85-100	25-40	10-20
	11-32	Silty clay loam.	CL	A-7, A-6	0	0	95-100	90-100	85-100	85-100	25-50	10-25
	32-37	Clay loam, sandy loam, silty clay loam.	CL, SC, CL-ML, SC-SM	A-6, A-7, A-4, A-2	0	0	90-100	85-100	75-100	30-80	20-45	5-25
	37-60	Stratified sand to sandy loam.	SC, CL, SC-SM, CL-ML	A-2, A-4, A-6	0	0	85-100	80-100	50-100	25-80	20-40	5-20
148B---------- Proctor	0-10	Silt loam-----	CL	A-6	0	0	100	100	95-100	85-100	25-40	10-20
	10-33	Silty clay loam.	CL	A-7, A-6	0	0	95-100	90-100	85-100	85-100	25-50	10-25
	33-46	Clay loam, sandy loam, loam.	CL, SC, CL-ML, SC-SM	A-6, A-7, A-4, A-2	0	0	90-100	85-100	75-100	30-80	20-45	5-25
	46-60	Stratified loam to sand.	SC, CL, SC-SM, CL-ML	A-2, A-4, A-6	0	0	85-100	80-100	50-100	25-80	20-40	5-20
152----------- Drummer	0-14	Silty clay loam.	CL	A-6, A-7	0	0	100	95-100	95-100	85-95	30-50	15-30
	14-40	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	95-100	95-100	85-95	30-50	15-30
	40-46	Loam, silt loam, clay loam.	CL	A-6, A-7	---	0-5	95-100	90-100	75-95	60-85	30-50	15-30
	46-60	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
154----------- Flanagan	0-18	Silt loam-----	CL	A-7, A-6	0	0	100	100	95-100	85-100	35-50	15-30
	18-42	Silty clay loam.	CL, CH	A-7	0	0	100	100	95-100	85-100	40-60	15-30
	42-60	Loam, clay loam, silty clay loam.	CL, CL-ML	A-4, A-6, A-7	0	0	85-100	80-100	70-95	50-85	20-45	5-30
171B---------- Catlin	0-12	Silt loam-----	ML, CL, CL-ML	A-6, A-7, A-4	0	0	100	100	95-100	85-100	25-45	5-20
	12-41	Silty clay loam, silt loam.	CL, ML	A-7, A-6	0	0	100	90-100	90-100	80-100	30-50	15-30
	41-60	Loam, clay loam, silt loam.	CL	A-6, A-7	0	0-3	90-100	90-100	85-100	60-100	25-45	10-20

TABLE 15.--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	
198----------- Elburn	0-13	Silt loam-----	CL	A-6	0	0	100	100	95-100	90-100	25-40	10-25
	13-47	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	100	75-90	30-50	15-35
	47-60	Loam, sandy loam, silt 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
212B---------- Thebes	0-10	Silt loam-----	CL	A-4, A-6	0	0	100	100	100	90-100	25-40	8-20
	10-32	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	100	90-100	30-45	15-30
	32-49	Loam, sandy loam, sandy clay loam.	SM, SC, CL, ML	A-4, A-6	0	0	100	100	90-100	40-70	15-30	NP-13
	49-60	Fine sand, loamy fine sand, loamy sand.	SP, SM, SP-SM	A-2, A-3	0	0	100	90-100	75-95	4-35	<20	NP-4
219----------- Millbrook	0-16	Silt loam-----	CL, CL-ML, ML	A-6, A-4	0	0	100	100	95-100	85-100	20-35	3-15
	16-39	Silty clay loam, silt loam.	CL	A-6, A-7-6	0	0	100	100	95-100	85-100	30-45	10-25
	39-46	Clay loam, loam, sandy loam.	SC, CL	A-6, A-7	---	0-5	95-100	90-100	70-90	40-80	25-50	10-25
	46-60	Stratified loamy sand to clay loam.	SM, SC, CL, ML	A-4, A-6, A-2	---	0-5	95-100	90-100	70-95	30-80	<30	NP-15
221B2--------- Parr	0-9	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	95-100	95-100	80-100	50-90	15-30	4-15
	9-34	Clay loam, loam, silty clay loam.	CL	A-6, A-4	0	0	90-100	90-100	75-100	50-95	25-35	9-15
	34-60	Loam----------	CL, ML, CL-ML	A-4	---	0-3	85-95	85-95	75-85	50-65	<25	3-8
221C2--------- Parr	0-8	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	95-100	95-100	80-100	50-90	15-30	4-15
	8-40	Clay loam, loam, silty clay loam.	CL	A-6, A-4	0	0	90-100	90-100	75-100	50-95	25-35	9-15
	40-60	Loam----------	CL, ML, CL-ML	A-4	---	0-3	85-95	85-95	75-85	50-65	<25	3-8
234----------- Sunbury	0-12	Silt loam-----	ML, CL	A-4, A-6, A-7	0	0	100	100	95-100	90-100	30-45	8-15
	12-44	Silty clay loam, silty clay.	CL, CH	A-7, A-6	0	0	100	100	95-100	85-100	35-60	20-35
	44-60	Loam, silt loam, silty clay loam.	CL, CL-ML	A-4, A-6, A-7	0	0	98-100	95-100	90-100	50-95	20-45	5-30

TABLE 15.--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	
236----------- Sabina	0-12	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	25-40	5-15
	12-56	Silty clay loam, silty clay.	CL, CH	A-7	0	0	100	100	95-100	85-100	40-60	20-40
	56-60	Clay loam, silty clay loam, loam.	CL, CL-ML	A-4, A-6, A-7	0-1	0-5	95-100	85-100	70-100	55-75	20-50	5-30
256C2--------- Pana	0-9	Silt 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, loam, clay 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
291B---------- Xenia	0-12	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	70-90	20-35	5-15
	12-34	Silty clay loam.	CL	A-6, A-7	0	0	100	100	95-100	85-95	35-45	15-25
	34-57	Clay loam, loam.	CL	A-6, A-7	---	0-5	90-100	85-95	70-95	50-80	30-45	10-25
	57-60	Loam----------	CL, CL-ML	A-4, A-6	---	0-5	90-95	85-95	65-95	50-75	20-30	5-15
330----------- Peotone	0-10	Silty clay loam.	CH, CL	A-7	0	0	100	95-100	95-100	80-100	40-65	15-35
	10-31	Silty clay loam, silty clay.	CH, CL	A-7	---	0-5	100	95-100	90-100	85-100	40-70	15-40
	31-60	Silty clay loam, silt loam, silty clay.	CL, CH, ML, MH	A-7, A-6	---	0-5	95-100	95-100	90-100	75-98	30-60	15-30
474----------- Piasa	0-8	Silt loam-----	CL, ML	A-6, A-7	0	0	100	100	95-100	90-100	30-45	10-20
	8-15	Silt loam-----	CL	A-4, A-6	0	0	100	100	95-100	90-100	25-40	8-20
	15-35	Silty clay, silty clay loam.	CL, ML, MH, CH	A-7	0	0	100	100	95-100	95-100	40-55	15-25
	35-60	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	30-45	10-25
481----------- Raub	0-18	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	75-95	25-35	5-15
	18-36	Silty clay loam.	CL, CH	A-6, A-7	0	0	100	100	95-100	80-95	35-55	20-35
	36-60	Loam, clay loam.	CL, ML, SC, SM	A-4, A-6	---	0-5	85-95	80-90	70-85	40-65	15-30	NP-15
583B---------- Pike	0-14	Silt loam-----	CL	A-4, A-6	0	0	100	100	90-100	80-95	25-35	8-15
	14-48	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	95-100	85-100	80-90	30-45	10-25
	48-60	Silty clay loam, silt loam, sandy clay loam.	CL, SC	A-6, A-2-6	0	0	80-90	70-90	60-90	30-80	20-35	10-20
585C2--------- Negley	0-8	Loam----------	ML, CL-ML, CL	A-4, A-6	0	0	85-100	75-100	70-90	55-85	25-40	4-15
	8-60	Loam, clay loam, gravelly sandy loam.	SM, ML	A-4, A-2, A-6, A-7	---	0-5	70-95	50-90	35-80	20-60	25-45	3-17

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments >10 inches	Fragments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
585D2--------- Negley	0-9	Loam----------	ML, CL-ML, CL	A-4, A-6	0	0	85-100	75-100	70-90	55-85	25-40	4-15
	9-12	Loam, clay loam, gravelly sandy loam.	SM, ML	A-4, A-2, A-6, A-7	---	0-5	70-95	50-90	35-80	20-60	25-45	3-17
	12-33	Gravelly sandy clay loam, gravelly clay loam, sandy clay.	SC-SM, SC	A-2, A-4, A-7, A-6	---	0-5	70-95	50-90	40-80	25-50	20-50	5-24
	33-60	Coarse sandy loam, gravelly sandy loam, gravelly clay loam.	ML, CL, SM, SC	A-2, A-1-b, A-4, A-6	---	0-5	65-90	50-90	35-80	15-65	15-35	NP-15
620A---------- 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
	13-22	Silty clay loam, silty clay.	CL, CH	A-7	0	0	100	95-100	95-100	90-100	40-65	20-40
	22-43	Silty clay loam, silty clay.	CL, CH	A-7	0	0	100	95-100	95-100	90-100	40-65	20-40
	43-60	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
620B2--------- Darmstadt	0-9	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
	9-21	Silty clay loam, silty clay.	CL, CH	A-7	0	0	100	95-100	95-100	90-100	40-65	20-40
	21-36	Silty clay loam, silty clay.	CL, CH	A-7	0	0	100	95-100	95-100	90-100	40-65	20-40
	36-60	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
802D---------- Orthents	0-60	Clay loam, loam.	CL	A-6	0	0-5	95-100	90-100	85-95	60-90	20-40	10-20
864, 865. Pits												
916: Oconee-------	0-9	Silt loam-----	CL, ML, CL-ML	A-6, A-4	0	0	100	100	95-100	90-100	20-40	3-20
	9-14	Silt loam-----	CL	A-4, A-6	0	0	100	100	95-100	90-100	20-35	8-20
	14-36	Silty clay loam, silty clay.	CL, CH	A-7	0	0	100	100	95-100	90-100	40-65	20-45
	36-49	Silt loam, silty clay loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	30-50	10-25
	49-60	Silt loam-----	CL	A-4, A-6, A-7-6	0	0	100	100	90-100	85-100	20-45	8-25

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

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	
916: Darmstadt----	0-14	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
	14-28	Silty clay loam, silty clay.	CL, CH	A-7	0	0	100	95-100	95-100	90-100	40-65	20-40
	28-55	Silty clay loam, silty clay.	CL, CH	A-7	0	0	100	95-100	95-100	90-100	40-65	20-40
	55-60	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
3074---------- Radford	0-13	Silt loam-----	ML, CL	A-4, A-6	0	0	100	100	95-100	80-100	30-40	5-15
	13-30	Silt loam-----	CL, ML	A-4, A-6	0	0	100	100	95-100	80-100	25-35	5-15
	30-60	Silt loam, silty clay loam, clay loam.	CL	A-6, A-7	0	0	100	100	95-100	80-95	35-50	15-25
3077A--------- Huntsville	0-30	Silt loam-----	CL	A-6	0	0	100	95-100	90-100	85-100	25-40	10-20
	30-55	Silt loam-----	CL	A-6	0	0	100	95-100	90-100	85-100	20-35	10-20
	55-60	Silt loam, loam, very fine sandy loam.	CL-ML, CL, SC-SM, SC	A-4, A-6, A-2	0	0	95-100	90-100	85-95	30-85	20-35	5-20
3107---------- Sawmill	0-15	Silty clay loam.	CL	A-6, A-7	0	0	100	100	95-100	85-100	30-50	15-30
	15-36	Silty clay loam.	CL	A-6, A-7	0	0	100	100	95-100	85-100	30-50	15-30
	36-51	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
	51-60	Silty clay loam, clay loam, silt loam.	CL	A-4, A-6, A-7	0	0	100	100	75-100	65-95	20-50	8-30
3225---------- Holton	0-11	Silt loam-----	CL, CL-ML, ML	A-4	---	0-20	90-100	85-100	80-100	60-90	<25	2-10
	11-39	Fine sandy loam, loam, silt loam.	CL-ML, CL, SC-SM, SC	A-4, A-2, A-6	---	0-20	90-100	85-100	60-95	30-75	<25	4-12
	39-60	Stratified loamy fine sand to sandy clay loam.	SC, SC-SM, CL, CL-ML	A-4, A-2, A-6	---	0-40	75-100	60-100	55-90	30-55	<25	2-14
3226---------- Wirt	0-7	Silt loam-----	CL-ML, ML	A-4	0	0	95-100	80-100	80-100	65-90	<25	3-7
	7-40	Silt loam, loam.	CL-ML, ML	A-4	0	0	95-100	80-100	75-100	55-90	<25	3-7
	40-60	Sandy loam, loam, fine sandy loam.	SM, SC-SM, ML, CL-ML	A-4, A-2, A-1-b	---	0-5	85-95	50-85	40-75	20-55	<25	NP-7

TABLE 15.--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	
3284---------- Tice	0-19	Silty clay loam.	CL	A-6, A-7	0	0	100	100	90-100	80-95	30-45	10-20
	19-60	Silty clay loam, silt loam.	CL, CH	A-7	0	0	100	100	95-100	85-95	40-55	15-30
3334---------- Birds	0-6	Silt loam-----	CL	A-4, A-6	0	0	100	95-100	90-100	80-100	24-34	8-15
	6-60	Silt loam-----	CL	A-4, A-6	0	0	100	95-100	90-100	80-100	24-34	8-15
7682A--------- Medway	0-18	Loam----------	ML, CL, CL-ML	A-4, A-6	0	0	100	100	85-100	70-90	20-40	3-15
	18-33	Loam, silt loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0	0	95-100	80-95	75-90	70-90	20-45	4-20
	33-44	Stratified sandy loam to silty clay loam.	ML, CL, SC-SM, SM	A-4, A-2, A-6	0	0	90-100	75-100	45-95	25-75	15-30	NP-15
	44-60	Stratified gravelly sandy loam to silty clay loam.	ML, CL, SM, SC	A-2, A-4, A-6, A-1-b	---	0-5	80-100	50-100	30-95	15-75	15-30	NP-15

TABLE 16.--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
2----------------	0-9	15-27	1.30-1.50	0.6-2.0	0.22-0.24	4.5-7.8	Low----------	0.37	3	6	1-3
Cisne	9-18	15-27	1.25-1.45	0.06-0.6	0.18-0.20	4.5-6.0	Low----------	0.37			
	18-44	35-45	1.40-1.60	<0.06	0.09-0.15	4.5-6.0	High---------	0.37			
	44-55	25-37	1.50-1.70	<0.06	0.08-0.14	5.1-6.5	Moderate-----	0.37			
	55-60	22-30	1.60-1.80	<0.06	0.14-0.22	5.6-7.3	Moderate-----	0.37			
3A---------------	0-11	20-27	1.30-1.50	0.6-2.0	0.22-0.24	4.5-7.3	Moderate-----	0.32	3	6	1-3
Hoyleton	11-33	35-45	1.40-1.65	0.06-0.2	0.13-0.20	4.5-6.0	High---------	0.43			
	33-60	15-33	1.35-1.70	0.06-0.2	0.17-0.22	5.1-7.3	Moderate-----	0.43			
3B---------------	0-12	20-27	1.30-1.50	0.6-2.0	0.22-0.24	4.5-7.3	Moderate-----	0.32	3	6	1-3
Hoyleton	12-30	35-45	1.40-1.65	0.06-0.2	0.13-0.20	4.5-6.0	High---------	0.43			
	30-60	15-33	1.35-1.70	0.06-0.2	0.17-0.22	5.1-7.3	Moderate-----	0.43			
6B2--------------	0-8	20-27	1.30-1.50	0.6-2.0	0.22-0.24	5.1-7.3	Low----------	0.37	4	6	1-3
Fishhook	8-28	27-35	1.40-1.60	0.6-2.0	0.18-0.20	4.5-7.3	Moderate-----	0.37			
	28-60	35-45	1.55-1.75	0.06-0.2	0.09-0.16	4.5-7.8	High---------	0.37			
7C2--------------	0-13	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	13-22	35-45	1.35-1.55	<0.06	0.07-0.19	4.5-7.3	High---------	0.32			
	22-60	30-45	1.35-1.55	<0.06	0.07-0.19	4.5-7.8	High---------	0.32			
7D2--------------	0-4	19-25	1.30-1.50	0.2-0.6	0.20-0.22	4.5-7.3	Low----------	0.43	3	6	1-3
Atlas	4-32	35-45	1.35-1.55	<0.06	0.07-0.19	4.5-7.3	High---------	0.32			
	32-44	30-45	1.35-1.55	<0.06	0.07-0.19	4.5-7.8	High---------	0.32			
	44-60	20-30	1.35-1.60	0.06-0.2	0.07-0.18	6.1-7.8	Moderate-----	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-----	0.37			
	49-60	15-32	1.50-1.70	0.6-2.0	0.11-0.19	5.1-8.4	Low----------	0.37			
8F---------------	0-8	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	8-52	27-35	1.45-1.65	0.6-2.0	0.15-0.19	4.5-6.0	Moderate-----	0.37			
	52-60	15-32	1.50-1.70	0.6-2.0	0.11-0.19	5.1-8.4	Low----------	0.37			
8G---------------	0-11	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	11-42	27-35	1.45-1.65	0.6-2.0	0.15-0.19	4.5-6.0	Moderate-----	0.37			
	42-60	15-32	1.50-1.70	0.6-2.0	0.11-0.19	5.1-8.4	Low----------	0.37			
12---------------	0-8	15-25	1.25-1.45	0.6-2.0	0.22-0.24	4.5-7.8	Low----------	0.43	3	6	.5-2
Wynoose	8-16	12-18	1.30-1.50	0.06-0.2	0.18-0.20	3.6-7.3	Low----------	0.43			
	16-38	35-42	1.40-1.60	<0.06	0.09-0.13	3.6-6.0	High---------	0.43			
	38-60	25-37	1.50-1.70	0.06-0.2	0.11-0.15	3.6-6.0	Moderate-----	0.43			
13A--------------	0-8	20-27	1.30-1.50	0.6-2.0	0.22-0.24	4.5-7.3	Low----------	0.43	3	6	1-3
Bluford	8-18	15-25	1.40-1.60	0.2-0.6	0.18-0.20	3.6-6.0	Low----------	0.43			
	18-36	35-42	1.45-1.65	0.06-0.6	0.11-0.20	3.6-5.5	Moderate-----	0.43			
	36-60	22-35	1.60-1.70	0.06-0.2	0.11-0.16	3.6-6.0	Moderate-----	0.43			
13B--------------	0-8	20-27	1.30-1.50	0.6-2.0	0.22-0.24	4.5-7.3	Low----------	0.43	3	6	1-3
Bluford	8-12	15-25	1.40-1.60	0.2-0.6	0.18-0.20	3.6-6.0	Low----------	0.43			
	12-32	35-42	1.45-1.65	0.06-0.6	0.11-0.20	3.6-5.5	Moderate-----	0.43			
	32-60	22-35	1.60-1.70	0.06-0.2	0.11-0.16	3.6-6.0	Moderate-----	0.43			
14B--------------	0-8	20-27	1.40-1.60	0.6-2.0	0.21-0.24	4.5-7.3	Low----------	0.43	4	6	.5-2
Ava	8-20	22-33	1.40-1.60	0.6-2.0	0.18-0.21	4.5-5.5	Moderate-----	0.43			
	20-36	24-35	1.50-1.70	0.2-0.6	0.18-0.21	4.5-5.5	Moderate-----	0.43			
	36-60	20-30	1.55-1.80	<0.06	0.09-0.11	4.5-5.5	Low----------	0.43			

TABLE 16.--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 erodi-bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
14C2------------- Ava	0-7	20-27	1.40-1.60	0.6-2.0	0.21-0.24	4.5-7.3	Low-----------	0.43	4	6	.5-2
	7-16	22-33	1.40-1.60	0.6-2.0	0.18-0.21	4.5-5.5	Moderate-----	0.43			
	16-31	24-35	1.50-1.70	0.2-0.6	0.18-0.21	4.5-5.5	Moderate-----	0.43			
	31-60	20-30	1.55-1.80	<0.06	0.09-0.11	4.5-5.5	Low-----------	0.43			
15C2------------- Parke	0-7	18-27	1.25-1.40	0.6-2.0	0.22-0.24	5.1-6.5	Low-----------	0.37	5	6	.5-2
	7-34	22-35	1.30-1.45	0.6-2.0	0.18-0.20	4.5-6.0	Moderate-----	0.37			
	34-60	18-30	1.55-1.65	0.6-2.0	0.16-0.18	4.5-5.5	Low-----------	0.28			
15D2------------- Parke	0-7	18-27	1.25-1.40	0.6-2.0	0.22-0.24	5.1-6.5	Low-----------	0.37	5	6	.5-2
	7-31	22-35	1.30-1.45	0.6-2.0	0.18-0.20	4.5-6.0	Moderate-----	0.37			
	31-60	18-30	1.55-1.65	0.6-2.0	0.16-0.18	4.5-5.5	Low-----------	0.28			
27B2------------- Miami	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
	8-22	27-35	1.45-1.65	0.6-2.0	0.15-0.20	5.1-6.0	Moderate-----	0.37			
	22-30	20-27	1.50-1.70	0.2-0.6	0.14-0.19	6.6-7.8	Low-----------	0.37			
	30-60	15-25	1.70-1.90	0.06-0.2	0.05-0.10	7.4-8.4	Moderate-----	0.37			
27C2------------- Miami	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
	8-35	27-35	1.45-1.65	0.6-2.0	0.15-0.20	5.1-6.0	Moderate-----	0.37			
	35-60	15-25	1.70-1.90	0.06-0.2	0.05-0.10	7.4-8.4	Moderate-----	0.37			
27D-------------- Miami	0-11	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
	11-31	27-35	1.45-1.65	0.6-2.0	0.15-0.20	5.1-6.0	Moderate-----	0.37			
	31-60	15-25	1.70-1.90	0.06-0.2	0.05-0.10	7.4-8.4	Moderate-----	0.37			
27F-------------- Miami	0-7	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
	7-35	27-35	1.45-1.65	0.6-2.0	0.15-0.20	5.1-6.0	Moderate-----	0.37			
	35-60	15-25	1.70-1.90	0.06-0.2	0.05-0.10	7.4-8.4	Moderate-----	0.37			
27G-------------- Miami	0-7	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
	7-33	27-35	1.45-1.65	0.6-2.0	0.15-0.20	5.1-7.3	Moderate-----	0.37			
	33-60	15-25	1.70-1.90	0.06-0.2	0.05-0.10	7.4-8.4	Moderate-----	0.37			
46--------------- Herrick	0-13	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
	13-33	35-42	1.20-1.40	0.2-0.6	0.12-0.17	4.5-6.0	High----------	0.43			
	33-55	25-40	1.20-1.40	0.2-0.6	0.16-0.20	5.6-7.3	Moderate-----	0.43			
	55-60	20-30	1.30-1.50	0.2-0.6	0.16-0.21	5.6-8.4	Moderate-----	0.43			
50--------------- 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
	12-44	35-42	1.20-1.45	0.2-0.6	0.11-0.20	5.6-7.8	High----------	0.28			
	44-60	25-33	1.25-1.55	0.2-0.6	0.18-0.22	6.1-8.4	Moderate-----	0.28			
56A-------------- Dana	0-11	11-22	1.40-1.55	0.6-2.0	0.22-0.24	5.6-7.3	Low-----------	0.32	5	5	3-5
	11-28	27-35	1.45-1.65	0.6-2.0	0.18-0.20	5.1-7.3	Moderate-----	0.43			
	28-40	27-35	1.45-1.65	0.6-2.0	0.15-0.19	6.1-7.3	Moderate-----	0.43			
	40-60	15-22	1.70-1.90	0.2-0.6	0.05-0.10	6.6-8.4	Low-----------	0.43			
56B2------------- Dana	0-8	11-22	1.40-1.55	0.6-2.0	0.22-0.24	5.6-7.3	Low-----------	0.32	5	5	3-5
	8-32	27-35	1.45-1.65	0.6-2.0	0.18-0.20	5.1-6.0	Moderate-----	0.43			
	32-49	27-35	1.45-1.65	0.6-2.0	0.15-0.19	6.1-7.3	Moderate-----	0.43			
	49-60	15-22	1.70-1.90	0.2-0.6	0.05-0.10	6.6-8.4	Low-----------	0.43			
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
	8-12	17-27	1.25-1.45	0.06-0.2	0.18-0.20	4.5-6.0	Low-----------	0.37			
	12-52	35-42	1.35-1.60	0.06-0.2	0.12-0.20	4.5-7.3	High----------	0.37			
	52-60	20-27	1.50-1.70	0.2-0.6	0.17-0.22	5.6-7.8	Moderate-----	0.37			
113A------------- Oconee	0-9	20-27	1.20-1.30	0.6-2.0	0.22-0.24	5.6-7.8	Moderate-----	0.32	3	6	2-3
	9-14	18-27	1.30-1.45	0.06-0.2	0.20-0.22	4.5-7.3	Moderate-----	0.43			
	14-29	35-42	1.30-1.50	0.06-0.2	0.11-0.17	4.5-6.0	High----------	0.43			
	29-60	20-35	1.40-1.60	0.06-0.2	0.16-0.21	5.1-7.3	Moderate-----	0.43			

TABLE 16.--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 erodi-bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
113B------------- Oconee	0-9	20-27	1.20-1.30	0.6-2.0	0.22-0.24	5.6-7.8	Moderate-----	0.32	3	6	2-3
	9-11	18-27	1.30-1.45	0.06-0.2	0.20-0.22	4.5-7.3	Moderate-----	0.43			
	11-27	35-42	1.30-1.50	0.06-0.2	0.11-0.17	4.5-6.0	High---------	0.43			
	27-60	20-35	1.40-1.60	0.06-0.2	0.16-0.21	5.1-6.5	Moderate-----	0.43			
120-------------- Huey	0-7	15-27	1.35-1.50	0.2-0.6	0.22-0.24	5.1-7.8	Low----------	0.43	3	6	1-3
	7-10	11-25	1.40-1.55	0.06-0.2	0.20-0.22	5.1-7.8	Low----------	0.43			
	10-22	20-35	1.40-1.60	0.06-0.2	0.10-0.18	5.6-8.4	Moderate-----	0.43			
	22-47	25-35	1.45-1.65	<0.06	0.05-0.08	7.4-9.0	Moderate-----	0.43			
	47-60	18-35	1.55-1.75	0.06-0.2	0.10-0.15	6.6-8.4	Moderate-----	0.43			
127B2------------ 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
	10-56	25-35	1.25-1.40	0.6-2.0	0.18-0.22	5.1-6.5	Moderate-----	0.43			
	56-60	20-35	1.30-1.45	0.6-2.0	0.14-0.20	5.6-7.3	Moderate-----	0.43			
128B------------- Douglas	0-10	14-27	1.20-1.30	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.32	5	5	2-4
	10-47	25-35	1.25-1.40	0.6-2.0	0.18-0.22	5.1-6.5	Moderate-----	0.43			
	47-60	10-30	1.45-1.70	0.6-6.0	0.11-0.22	5.6-7.3	Moderate-----	0.43			
128C2------------ Douglas	0-8	14-27	1.20-1.30	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.32	5	5	2-4
	8-40	25-35	1.25-1.40	0.6-2.0	0.18-0.22	5.1-6.5	Moderate-----	0.43			
	40-60	10-30	1.45-1.70	0.6-6.0	0.11-0.22	5.6-7.3	Moderate-----	0.43			
131C------------- Alvin	0-8	5-10	1.45-1.65	6.0-20	0.09-0.12	4.5-7.3	Low----------	0.17	5	2	.5-1
	8-36	15-18	1.40-1.65	0.6-6.0	0.14-0.18	4.5-6.0	Low----------	0.24			
	36-60	3-10	1.45-1.65	2.0-6.0	0.10-0.15	5.1-8.4	Low----------	0.24			
132-------------- Starks	0-12	18-27	1.15-1.35	0.6-2.0	0.22-0.24	5.1-7.3	Low----------	0.37	5	6	1-3
	12-32	27-35	1.35-1.55	0.6-2.0	0.18-0.20	5.1-6.5	Moderate-----	0.37			
	32-49	18-30	1.45-1.65	0.6-2.0	0.16-0.19	5.1-7.8	Moderate-----	0.37			
	49-60	5-20	1.55-1.75	0.6-2.0	0.08-0.18	5.1-7.8	Low----------	0.37			
134A------------- Camden	0-11	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
	11-35	22-35	1.40-1.60	0.6-2.0	0.14-0.24	5.1-7.3	Moderate-----	0.37			
	35-43	18-30	1.45-1.65	0.6-2.0	0.11-0.22	5.1-7.3	Low----------	0.37			
	43-60	5-20	1.40-1.70	0.6-6.0	0.12-0.22	5.6-8.4	Low----------	0.37			
134B------------- Camden	0-10	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
	10-29	22-35	1.40-1.60	0.6-2.0	0.14-0.24	5.1-7.3	Moderate-----	0.37			
	29-53	18-30	1.45-1.65	0.6-2.0	0.11-0.22	5.1-7.3	Low----------	0.37			
	53-60	5-20	1.40-1.70	0.6-6.0	0.12-0.22	5.6-8.4	Low----------	0.37			
134C2------------ Camden	0-7	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
	7-36	22-35	1.40-1.60	0.6-2.0	0.14-0.24	5.1-7.3	Moderate-----	0.37			
	36-47	18-30	1.45-1.65	0.6-2.0	0.11-0.22	5.1-7.3	Low----------	0.37			
	47-60	5-20	1.40-1.70	0.6-6.0	0.12-0.22	5.6-8.4	Low----------	0.37			
148A------------- Proctor	0-11	18-27	1.10-1.30	0.6-2.0	0.22-0.24	5.1-7.8	Low----------	0.32	5	6	3-4
	11-32	25-35	1.20-1.45	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.43			
	32-37	15-32	1.30-1.55	0.6-6.0	0.13-0.19	5.6-7.3	Moderate-----	0.43			
	37-60	15-32	1.40-1.70	0.6-6.0	0.07-0.19	5.6-7.8	Low----------	0.43			
148B------------- Proctor	0-10	18-27	1.10-1.30	0.6-2.0	0.22-0.24	5.1-7.8	Low----------	0.32	5	6	3-4
	10-33	25-35	1.20-1.45	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.43			
	33-46	22-35	1.30-1.55	0.6-6.0	0.13-0.16	5.6-7.3	Moderate-----	0.43			
	46-60	15-32	1.40-1.70	0.6-6.0	0.07-0.19	6.1-7.8	Low----------	0.43			
152-------------- Drummer	0-14	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
	14-40	20-35	1.20-1.45	0.6-2.0	0.21-0.24	5.6-7.8	Moderate-----	0.28			
	40-46	22-33	1.30-1.55	0.6-2.0	0.17-0.20	6.1-8.4	Moderate-----	0.28			
	46-60	15-32	1.40-1.70	0.6-2.0	0.11-0.19	6.6-8.4	Low----------	0.28			

TABLE 16.--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
154	0-18	20-27	1.20-1.40	0.6-2.0	0.22-0.24	5.1-7.3	Moderate	0.28	5	6	4-5
Flanagan	18-42	35-42	1.25-1.45	0.6-2.0	0.15-0.22	5.6-7.3	High	0.43			
	42-60	20-30	1.45-1.70	0.2-0.6	0.15-0.22	6.1-8.4	Low	0.43			
171B	0-12	18-27	1.25-1.45	0.6-2.0	0.23-0.26	5.1-7.3	Low	0.32	5	6	3-4
Catlin	12-41	27-35	1.25-1.55	0.6-2.0	0.18-0.20	5.1-7.3	Moderate	0.43			
	41-60	20-30	1.40-1.70	0.6-2.0	0.07-0.11	6.1-8.4	Low	0.43			
198	0-13	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
Elburn	13-47	25-35	1.20-1.40	0.6-2.0	0.18-0.20	5.6-7.8	Moderate	0.43			
	47-60	15-25	1.50-1.70	0.6-6.0	0.12-0.18	6.1-8.4	Low	0.43			
212B	0-10	18-27	1.15-1.35	0.6-2.0	0.22-0.24	5.6-6.5	Low	0.37	4	6	1-2
Thebes	10-32	25-35	1.30-1.50	0.6-2.0	0.18-0.20	4.5-6.5	Moderate	0.37			
	32-49	15-30	1.35-1.55	0.6-2.0	0.12-0.19	4.5-6.5	Low	0.37			
	49-60	3-10	1.80-2.00	6.0-20	0.05-0.10	5.1-6.5	Low	0.15			
219	0-16	18-27	1.40-1.60	0.6-2.0	0.22-0.24	5.1-7.8	Low	0.32	5	6	2-4
Millbrook	16-39	25-35	1.45-1.65	0.6-2.0	0.18-0.20	5.1-7.3	Moderate	0.43			
	39-46	18-35	1.45-1.70	0.6-2.0	0.12-0.19	5.1-7.3	Moderate	0.32			
	46-60	10-25	1.50-1.75	0.6-2.0	0.11-0.19	5.6-8.4	Low	0.32			
221B2	0-9	12-22	1.30-1.45	0.6-2.0	0.20-0.24	5.6-7.3	Low	0.32	4	5	2-4
Parr	9-34	22-32	1.40-1.55	0.6-2.0	0.15-0.19	5.6-7.8	Moderate	0.32			
	34-60	10-20	1.70-1.90	0.06-0.2	0.05-0.10	7.4-8.4	Low	0.32			
221C2	0-8	12-22	1.30-1.45	0.6-2.0	0.20-0.24	5.6-7.3	Low	0.32	4	5	2-4
Parr	8-40	22-32	1.40-1.55	0.6-2.0	0.15-0.19	5.6-7.8	Moderate	0.32			
	40-60	10-20	1.70-1.90	0.06-0.2	0.05-0.10	7.4-8.4	Low	0.32			
234	0-12	20-27	1.20-1.40	0.6-2.0	0.22-0.24	5.6-7.3	Low	0.32	5	6	2-4
Sunbury	12-44	35-45	1.35-1.55	0.6-2.0	0.18-0.20	5.6-7.8	High	0.43			
	44-60	20-30	1.40-1.60	0.2-0.6	0.07-0.11	6.6-8.4	Low	0.43			
236	0-12	20-27	1.25-1.45	0.6-2.0	0.22-0.24	5.1-7.3	Low	0.37	5	6	1-3
Sabina	12-56	35-42	1.35-1.55	0.2-0.6	0.11-0.20	5.6-7.3	High	0.37			
	56-60	20-35	1.50-1.75	0.2-0.6	0.11-0.18	6.6-7.8	Low	0.37			
256C2	0-9	15-24	1.20-1.40	2.0-6.0	0.20-0.24	5.1-7.3	Low	0.32	5	5	2-4
Pana	9-60	18-33	1.40-1.60	2.0-6.0	0.10-0.15	5.1-6.5	Low	0.24			
291B	0-12	11-22	1.30-1.50	0.6-2.0	0.22-0.24	5.6-7.3	Low	0.37	5	5	1-3
Xenia	12-34	27-35	1.45-1.65	0.6-2.0	0.18-0.20	5.1-7.3	Moderate	0.37			
	34-57	24-35	1.45-1.65	0.2-0.6	0.15-0.19	5.6-7.3	Moderate	0.37			
	57-60	12-20	1.70-1.90	0.2-0.6	0.05-0.10	7.4-8.4	Low	0.37			
330	0-10	33-40	1.20-1.40	0.2-0.6	0.21-0.23	5.6-7.8	High	0.28	5	4	5-7
Peotone	10-31	35-45	1.30-1.60	0.2-0.6	0.11-0.20	6.1-7.8	High	0.28			
	31-60	25-42	1.40-1.65	0.2-0.6	0.18-0.20	6.6-8.4	High	0.28			
474	0-8	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
Piasa	8-15	18-27	1.30-1.50	0.06-0.2	0.18-0.20	5.6-7.8	Moderate	0.37			
	15-35	35-43	1.35-1.55	<0.06	0.09-0.10	6.1-9.0	High	0.37			
	35-60	20-35	1.50-1.70	0.06-0.2	0.10-0.12	7.4-9.0	Moderate	0.37			
481	0-18	20-27	1.30-1.50	0.6-2.0	0.22-0.24	5.6-7.3	Low	0.28	5	6	2-4
Raub	18-36	27-35	1.50-1.70	0.2-0.6	0.18-0.20	5.1-7.3	Moderate	0.37			
	36-60	20-32	1.50-1.70	0.2-0.6	0.05-0.19	7.4-8.4	Low	0.37			

TABLE 16.--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
583B------------- Pike	0-14	18-27	1.25-1.40	0.6-2.0	0.22-0.24	5.1-7.3	Low----------	0.37	5	6	.5-2
	14-48	22-35	1.30-1.45	0.6-2.0	0.18-0.22	4.5-5.5	Low----------	0.37			
	48-60	18-35	1.30-1.45	0.6-2.0	0.12-0.18	4.5-5.5	Low----------	0.37			
585C2------------ Negley	0-8	12-27	1.30-1.50	2.0-6.0	0.16-0.22	4.5-7.3	Low----------	0.32	5	5	1-3
	8-60	18-35	1.30-1.60	0.6-6.0	0.10-0.16	4.5-6.5	Low----------	0.32			
585D2------------ Negley	0-9	12-27	1.30-1.50	2.0-6.0	0.16-0.22	4.5-7.3	Low----------	0.32	5	5	1-3
	9-12	18-35	1.30-1.60	0.6-6.0	0.10-0.16	4.5-6.5	Low----------	0.32			
	12-33	22-35	1.20-1.60	0.6-6.0	0.06-0.14	4.5-6.0	Low----------	0.32			
	33-60	2-30	1.30-1.60	6.0-20	0.06-0.10	5.1-7.3	Low----------	0.32			
620A------------- 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
	13-22	27-35	1.40-1.65	0.06-0.2	0.11-0.20	4.5-7.8	Moderate-----	0.43			
	22-43	27-35	1.40-1.65	<0.06	0.09-0.10	6.6-9.0	Moderate-----	0.43			
	43-60	15-30	1.50-1.70	<0.06	0.10-0.15	7.4-9.0	Low----------	0.43			
620B2------------ Darmstadt	0-9	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
	9-21	27-35	1.40-1.65	0.06-0.2	0.11-0.20	4.5-7.8	Moderate-----	0.43			
	21-36	27-35	1.40-1.65	<0.06	0.09-0.10	6.6-9.0	Moderate-----	0.43			
	36-60	15-30	1.50-1.70	<0.06	0.10-0.15	7.4-9.0	Low----------	0.43			
802D------------- Orthents	0-60	22-30	1.70-1.80	0.2-0.6	0.08-0.14	5.6-7.3	Moderate-----	0.43	5	4	.5-1
864, 865. Pits											
916:											
Oconee----------	0-9	20-27	1.20-1.30	0.6-2.0	0.22-0.24	5.6-7.8	Moderate-----	0.32	3	6	2-3
	9-14	18-27	1.30-1,45	0.06-0.2	0.20-0.22	4.5-7.3	Moderate-----	0.43			
	14-36	35-42	1.30-1.50	0.06-0.2	0.11-0.17	4.5-6.0	High---------	0.43			
	36-49	20-35	1.40-1.60	0.06-0.2	0.16-0.21	5.1-6.5	Moderate-----	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			
Darmstadt-------	0-14	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
	14-28	27-35	1.40-1.65	0.06-0.2	0.11-0.20	4.5-7.8	Moderate-----	0.43			
	28-55	27-35	1.40-1.65	<0.06	0.09-0.10	6.6-9.0	Moderate-----	0.43			
	55-60	15-30	1.50-1.70	<0.06	0.10-0.15	7.4-9.0	Low----------	0.43			
3074------------- Radford	0-13	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
	13-30	18-27	1.40-1.60	0.6-2.0	0.20-0.22	6.1-7.8	Low----------	0.28			
	30-60	24-35	1.35-1.55	0.6-2.0	0.18-0.20	6.6-7.8	Moderate-----	0.28			
3077A------------ Huntsville	0-30	18-27	1.15-1.35	0.6-2.0	0.22-0.24	5.6-7.8	Moderate-----	0.28	5	6	3-4
	30-55	18-27	1.20-1.40	0.6-2.0	0.20-0.22	5.6-7.8	Moderate-----	0.28			
	55-60	10-25	1.20-1.50	0.6-2.0	0.17-0.21	5.6-7.8	Low----------	0.28			
3107------------- Sawmill	0-15	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
	15-36	27-35	1.20-1.40	0.6-2.0	0.21-0.23	6.1-7.8	Moderate-----	0.28			
	36-51	25-35	1.30-1.45	0.6-2.0	0.17-0.20	6.1-7.8	Moderate-----	0.28			
	51-60	18-35	1.35-1.50	0.6-2.0	0.15-0.19	6.1-8.4	Moderate-----	0.28			
3225------------- Holton	0-11	5-18	1.20-1.45	0.6-2.0	0.15-0.20	5.6-7.8	Low----------	0.37	5	5	1-3
	11-39	5-18	1.25-1.45	0.6-2.0	0.13-0.17	5.6-7.3	Low----------	0.24			
	39-60	5-20	1.25-1.45	0.6-2.0	0.07-0.16	5.6-7.3	Low----------	0.24			
3226------------- Wirt	0-7	10-18	1.30-1.45	0.6-2.0	0.17-0.20	5.6-7.3	Low----------	0.37	5	5	.5-3
	7-40	10-18	1.40-1.55	0.6-2.0	0.15-0.20	5.6-7.3	Low----------	0.24			
	40-60	8-18	1.45-1.60	2.0-6.0	0.07-0.17	5.6-7.3	Low----------	0.24			

TABLE 16.--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		Wind erodi-bility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
3284------------- Tice	0-19	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
	19-60	27-35	1.30-1.50	0.6-2.0	0.18-0.20	5.6-7.8	Moderate-----	0.32			
3334------------- Birds	0-6	15-25	1.30-1.50	0.2-0.6	0.21-0.25	5.6-7.8	Low----------	0.43	5	6	1-3
	6-60	18-27	1.40-1.60	0.2-0.6	0.20-0.22	5.1-7.8	Low----------	0.43			
7682A------------ Medway	0-18	18-27	1.20-1.45	0.6-2.0	0.20-0.24	6.1-7.8	Low----------	0.28	5	6	3-6
	18-33	18-32	1.20-1.50	0.6-2.0	0.14-0.18	6.1-8.4	Low----------	0.32			
	33-44	5-30	1.20-1.60	0.6-6.0	0.11-0.15	6.1-8.4	Low----------	0.32			
	44-60	5-30	1.20-1.60	0.6-6.0	0.08-0.15	6.1-8.4	Low----------	0.32			

TABLE 17.--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			Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months		Uncoated steel	Concrete
					Ft					
2: Cisne	D	None	---	---	0-2.0	Perched	Feb-Jun	High	High	Moderate.
3A, 3B: Hoyleton	C	None	---	---	1.0-3.0	Apparent	Mar-Jun	High	High	High.
6B2: Fishhook	D	None	---	---	1.0-3.0	Perched	Mar-Jun	High	High	High.
7C2, 7D2: Atlas	D	None	---	---	1.0-2.0	Perched	Apr-Jun	High	High	Moderate.
8D2, 8F, 8G: Hickory	C	None	---	---	>6.0	---	---	Moderate	Moderate	Moderate.
12: Wynoose	D	None	---	---	0-2.0	Perched	Mar-Jun	High	High	High.
13A, 13B: Bluford	C	None	---	---	1.0-3.0	Perched	Mar-Jun	High	High	High.
14B, 14C2: Ava	C	None	---	---	1.5-3.5	Perched	Mar-Jun	High	Moderate	High.
15C2, 15D2: Parke	B	None	---	---	>6.0	---	---	High	Moderate	High.
27B2, 27C2, 27D, 27F, 27G: Miami	B	None	---	---	>6.0	---	---	Moderate	Moderate	Moderate.
46: Herrick	B	None	---	---	1.0-3.0	Apparent	Mar-Jun	High	High	High.
50: Virden	B/D	None	---	---	+.5-2.0	Apparent	Mar-Jun	High	High	Moderate.
56A, 56B2: Dana	B	None	---	---	3.0-6.0	Perched	Mar-Apr	High	Moderate	Moderate.
112: Cowden	D	None	---	---	0-2.0	Apparent	Mar-Jun	High	High	Moderate.
113A, 113B: Oconee	C	None	---	---	1.0-3.0	Apparent	Mar-Jun	High	High	High.
120: Huey	D	None	---	---	+.5-2.0	Perched	Mar-Jun	High	High	Low.
127B2: Harrison	B	None	---	---	3.0-6.0	Perched	Feb-May	High	High	Moderate.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months		Uncoated steel	Concrete
					Ft					
128B, 128C2 Douglas	B	None	---	---	>6.0	---	---	High	Moderate	Moderate.
131C Alvin	B	None	---	---	>6.0	---	---	Moderate	Low	High.
132 Starks	C	None	---	---	1.0-3.0	Apparent	Mar-Jun	High	High	Moderate.
134A, 134B, 134C2 Camden	B	None	---	---	>6.0	---	---	High	Low	Moderate.
148A Proctor	B	None	---	---	2.5-6.0	Apparent	Jan-May	High	Moderate	Moderate.
148B Proctor	B	None	---	---	>6.0	---	---	High	Moderate	Moderate.
152 Drummer	B/D	None	---	---	+.5-2.0	Apparent	Mar-Jun	High	High	Moderate.
154 Flanagan	B	None	---	---	1.5-3.5	Apparent	Mar-Jun	High	High	Moderate.
171B Catlin	B	None	---	---	3.5-6.0	Apparent	Feb-May	High	High	Moderate.
198 Elburn	B	None	---	---	1.0-3.0	Apparent	Jan-May	High	High	Moderate.
212B Thebes	B	None	---	---	>6.0	---	---	High	Moderate	High.
219 Millbrook	B	None	---	---	1.0-3.0	Apparent	Mar-Jun	High	High	Moderate.
221B2, 221C2 Parr	B	None	---	---	>6.0	---	---	Moderate	High	Moderate.
234 Sunbury	B	None	---	---	1.5-3.5	Apparent	Mar-Jun	High	High	Moderate.
236 Sabina	C	None	---	---	1.5-3.5	Apparent	Mar-Jun	High	High	Moderate.
256C2 Pana	B	None	---	---	>6.0	---	---	Moderate	Low	High.
291B Xenia	B	None	---	---	2.0-3.5	Apparent	Dec-Apr	High	High	Moderate.
330 Peotone	B/D	None	---	---	+.5-1.0	Apparent	Feb-Jul	High	High	Moderate.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months		Uncoated steel	Concrete
					Ft					
474------------- Piasa	D	None---------	---	---	+.5-2.0	Perched	Feb-May	High-----	High-----	Low.
481------------- Raub	C	None---------	---	---	1.0-3.0	Apparent	Jan-Apr	High-----	High-----	Moderate.
583B------------ Pike	B	None---------	---	---	>6.0	---	---	High-----	Low------	High.
585C2, 585D2---- Negley	B	None---------	---	---	>6.0	---	---	Moderate	Low------	High.
620A, 620B2----- Darmstadt	D	None---------	---	---	1.0-3.0	Perched	Feb-May	High-----	High-----	High.
802D------------ Orthents	---	None---------	---	---	>6.0	---	---	---	---	---
864, 865. Pits										
916:										
Oconee----------	C	None---------	---	---	1.0-3.0	Apparent	Mar-Jun	High-----	High-----	High.
Darmstadt-------	D	None---------	---	---	1.0-3.0	Perched	Feb-May	High-----	High-----	High.
3074------------ Radford	B	Frequent----	Brief-----	Mar-Jun	1.0-3.0	Apparent	Mar-Jun	High-----	High-----	Low.
3077A----------- Huntsville	B	Frequent----	Very brief or brief.	Jan-Jun	>6.0	---	---	High-----	Low------	Low.
3107------------ Sawmill	B/D	Frequent----	Brief or long.	Mar-Jun	0-2.0	Apparent	Mar-Jun	High-----	High-----	Low.
3225------------ Holton	C	Frequent----	Brief-----	Nov-Jun	1.0-3.0	Apparent	Nov-Jun	High-----	Moderate	High.
3226------------ Wirt	B	Frequent----	Brief-----	Nov-Jun	>6.0	---	---	Moderate	Low------	Moderate.
3284------------ Tice	B	Frequent----	Very brief to long.	Jan-Jun	1.5-3.0	Apparent	Mar-Jun	High-----	High-----	Low.
3334------------ Birds	C/D	Frequent----	Brief or long.	Mar-Jun	+.5-1.0	Apparent	Mar-Jun	High-----	High-----	Moderate.
7682A----------- Medway	B	Rare---------	---	---	1.5-3.0	Apparent	Jan-Apr	High-----	High-----	Low.

TABLE 18.--ENGINEERING INDEX TEST DATA

(A blank indicates that a determination was not made. 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		Percentage passing sieve--				LL	PI	Classification	
				MAX	OPT	No. 4	No. 10	No. 40	No. 200			AASHTO	UN
			In	Lb/ cu ft	Pct					Pct			
Ava silt loam---------	85IL-173-22-1	Ap	0-8	104.7	17.3	100.0	99.9	99.0	95.8	28.4	12.0	A-6(10)	CL
	22-3	Bt2	12-50	106.6	18.9		100.0	99.7	98.8	38.8	17.5	A-6(19)	CL
	22-7	2Btx2	43-47	110.3	17.0	100.0	99.6	97.9	89.6	35.1	18.1	A-6(16)	CL
	22-8	2Btx3	47-60	119.0	13.2	98.4	96.5	91.6	72.2	25.3	11.0	A-6(5)	CL
Camden silt loam------	85IL-173-2-1	Ap	0-7	111.4	15.0	99.9	99.8	93.9	80.2	25.1	4.2	A-4(2)	ML
	2-5	Bt3	20-29	106.4	18.8		100.0	97.8	91.3	44.3	25.5	A-7-6(4)	CL
	2-7	2Bt5	35-45	120.8	17.6		100.0	83.6	33.6	22.8	10.2	A-6(0)	CL
Dana silt loam--------	84IL-173-49-1	Ap	0-9	108.4	16.6	100.0	99.9	97.7	89.1	29.2	7.6	A-4(14)	CL
	49-3	Bt2	16-23	103.5	19.8	99.9	99.9	94.2	78.6	41.8	22.8	A-7-6(27)	CL
	49-5	2Bt4	30-44	110.1	15.6	97.8	92.4	84.8	58.4	37.8	23.3	A-6(10)	CL
	49-7	2C	48-60	123.7	12.4	96.0	92.7	85.1	71.0	25.7	12.8	A-6(6)	CL
Douglas silt loam-----	84IL-173-40-1	Ap	0-10	108.4	16.6	100.0	99.9	99.5	98.3	30.0	9.3	A-4(9)	CL
	40-4	Bt2	25-35	103.3	19.8		100.0	99.9	99.6	41.7	21.2	A-7-6(23)	CL
	40-6	2Bt4	47-57	110.1	15.6	99.9	99.8	97.7	82.7	27.5	11.3	A-6(13)	CL
Elburn silt loam------	85IL-173-4-1	Ap	0-8	105.8	17.6	100.0	99.8	98.2	89.9	32.7	10.6	A-6(9)	CL
	4-5	Btg2	17-30	101.1	21.6		100.0	98.3	90.2	43.6	23.2	A-7-6(22)	CL
	4-7	2BC	47-56	122.9	11.6	100.0	99.9	96.0	54.3	20.9	6.9	A-4(1)	CL-ML
Hickory silt loam-----	84IL-173-20-1	Ap	0-10	106.0	16.8	100.0	99.4	96.8	92.7	31.4	7.7	A-4(7)	ML
	20-4	Bt2	17-28	100.0	21.8	100.0	98.3	94.4	92.1	47.4	24.1	A-7-6(24)	CL
	20-7	C	49-60	111.0	17.0	100.0	99.4	98.8	94.2	31.2	17.1	A-6(16)	CL
Lawson silt loam------	85IL-173-57-1	Ap	0-9	106.5	17.8	100.0	99.8	98.9	86.5	35.0	13.0	A-6(11)	CL
	57-3	A2	20-30	101.8	20.0	99.6	99.5	97.3	76.0	40.3	19.2	A-7-6(14)	CL
	57-5	C1	41-49	113.8	15.5	99.6	98.9	96.4	73.7	32.8	17.3	A-6(11)	CL
Oconee silt loam------	84IL-173-21-1	Ap	0-8	106.1	16.0	100.0	99.5	97.8	94.7	25.7	3.3	A-4(2)	ML
	21-2	E	8-14	106.5	17.8	100.0	99.0	95.4	92.1	24.7	2.1	A-4(1)	ML
	21-4	Btg3	17-30	101.3	22.8		100.0	99.3	98.3	58.2	31.9	A-7(37)	CH
	21-8	Cg	47-60	113.5	15.1	100.0	99.7	99.0	98.0	34.5	14.9	A-6(15)	CL
Raub silt loam--------	84IL-173-51-1	Ap	0-8	104.9	18.4	100.0	99.7	96.4	88.7	34.5	11.0	A-6(10)	CL
	51-4	Bt2	20-32	97.0	23.3	99.9	99.7	98.3	93.4	52.2	28.8	A-7-6(30)	CH
	51-5	2Bt3	32-39	101.9	21.5	99.7	98.8	96.3	85.5	45.2	27.7	A-7-6(24)	CL
	51-7	2C	56-60	117.0	14.1	97.8	95.8	90.7	71.6	29.2	6.7	A-4(3)	CL-ML

TABLE 19.--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
Atlas	Fine, montmorillonitic, mesic, sloping Aeric Ochraqualfs
Ava	Fine-silty, mixed, mesic Typic Fragiudalfs
Birds	Fine-silty, mixed, nonacid, mesic Typic Fluvaquents
Bluford	Fine, montmorillonitic, mesic Aeric Ochraqualfs
Camden	Fine-silty, mixed, mesic Typic Hapludalfs
Catlin	Fine-silty, mixed, mesic Typic Argiudolls
Cisne	Fine, montmorillonitic, mesic Mollic Albaqualfs
Cowden	Fine, montmorillonitic, mesic Mollic Albaqualfs
Dana	Fine-silty, mixed, mesic Typic Argiudolls
Darmstadt	Fine-silty, mixed, mesic Albic Natraqualfs
Douglas	Fine-silty, mixed, mesic Typic Argiudolls
Drummer	Fine-silty, mixed, mesic Typic Haplaquolls
Elburn	Fine-silty, mixed, mesic Aquic Argiudolls
Fishhook	Fine-silty, mixed, mesic Aquic Hapludalfs
Flanagan	Fine, montmorillonitic, mesic Aquic Argiudolls
Harrison	Fine-silty, mixed, mesic Typic Argiudolls
Herrick	Fine, montmorillonitic, mesic Aquic Argiudolls
Hickory	Fine-loamy, mixed, mesic Typic Hapludalfs
Holton	Coarse-loamy, mixed, nonacid, mesic Aeric Fluvaquents
Hoyleton	Fine, montmorillonitic, mesic Aquollic Hapludalfs
Huey	Fine-silty, mixed, mesic Typic Natraqualfs
Huntsville	Fine-silty, mixed, mesic Cumulic Hapludolls
Medway	Fine-loamy, mixed, mesic Fluvaquentic Hapludolls
Miami	Fine-loamy, mixed, mesic Typic Hapludalfs
Millbrook	Fine-silty, mixed, mesic Udollic Ochraqualfs
Negley	Fine-loamy, mixed, mesic Typic Paleudalfs
Oconee	Fine, montmorillonitic, mesic Udollic Ochraqualfs
Orthents	Orthents
*Pana	Fine-loamy, mixed, mesic Typic Argiudolls
Parke	Fine-silty, mixed, mesic Ultic Hapludalfs
*Parr	Fine-loamy, mixed, mesic Typic Argiudolls
Peotone	Fine, montmorillonitic, mesic Cumulic Haplaquolls
Piasa	Fine, montmorillonitic, mesic Mollic Natraqualfs
Pike	Fine-silty, mixed, mesic Ultic Hapludalfs
Proctor	Fine-silty, mixed, mesic Typic Argiudolls
Radford	Fine-silty, mixed, mesic Fluvaquentic Hapludolls
Raub	Fine-silty, mixed, mesic Aquic Argiudolls
Sabina	Fine, montmorillonitic, mesic Aeric Ochraqualfs
Sawmill	Fine-silty, mixed, mesic Cumulic Haplaquolls
Starks	Fine-silty, mixed, mesic Aeric Ochraqualfs
Sunbury	Fine, montmorillonitic, mesic Aquollic Hapludalfs
*Thebes	Fine-silty over sandy or sandy-skeletal, mixed, mesic Typic Hapludalfs
Tice	Fine-silty, mixed, mesic Fluvaquentic Hapludolls
Virden	Fine, montmorillonitic, mesic Typic Argiaquolls
Wirt	Coarse-loamy, mixed, nonacid, mesic Typic Udifluvents
Wynoose	Fine, montmorillonitic, mesic Typic Albaqualfs
Xenia	Fine-silty, mixed, mesic Aquic Hapludalfs

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