United States
Department of
Agriculture

Natural
Resources
Conservation
Service

In cooperation with
Illinois Agricultural
Experiment Station

Soil Survey of Moultrie County, Illinois

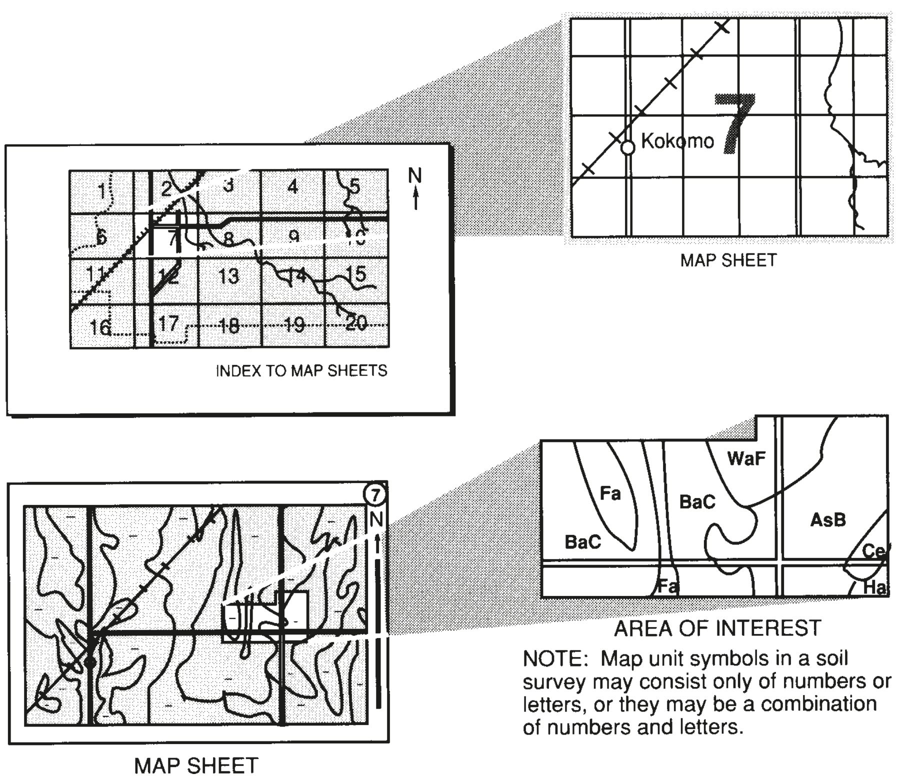
How To Use This Soil Survey

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

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

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

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



This soil survey 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 1992. Soil names and descriptions were approved in 2003. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 2003. This survey was made cooperatively by the Natural Resources Conservation Service and the Illinois Agricultural Experiment Station. Financial assistance was provided by the Moultrie County Board and the Illinois Department of Agriculture. The survey is part of the technical assistance furnished to the Moultrie County Soil and Water Conservation District.

Cover: Corn harvest on an Amish farm in an area of Drummer-Milford silty clay loams, 0 to 2 percent slopes.

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

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Issued 2004

Numerical Index to Map Units

Foreword

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

This soil survey is designed for many different users. 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.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. The information in this report is intended to identify soil properties that are used in making various land use or land treatment decisions. Statements made in this report are intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are 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. 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.

William J. Gradle
State Conservationist
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Soil Survey of
Moultrie County, Illinois

By Christopher C. Cochran, MLRA Project Leader, and Ronald D. Collman and Tonie J. Endres, Soil Scientists, Natural Resources Conservation Service

Original fieldwork by Kenneth A. Gotsch, Randall A. Leeper, and David E. Preloger, Soil Scientists, Natural Resources Conservation Service, and Keith A. Whitaker, Soil Scientist, Moultrie County Board

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

Moultrie County is in the east-central part of Illinois (fig. 1). It has an area of 220,255 acres, or about 345 square miles. The county is bordered on the north by Piatt County, on the east by Coles and Douglas Counties, on the south by Shelby County, and on the west by Macon and Shelby Counties. The estimated population of Moultrie County was 14,310 in 2002. This estimate shows an increase of about 2.7 percent over 1990. Sullivan, the county seat and largest town in the county, had a population of 4,362 (U.S. Department of Commerce, 2003).

This soil survey updates previous surveys of Moultrie County (Leeper and Gotsch, 1998; Hopkins and others, 1911). It provides additional information.

General Nature of the County

This section provides general information about Moultrie County. It describes history and development; physiography, relief, and drainage; natural resources; and climate.

History and Development

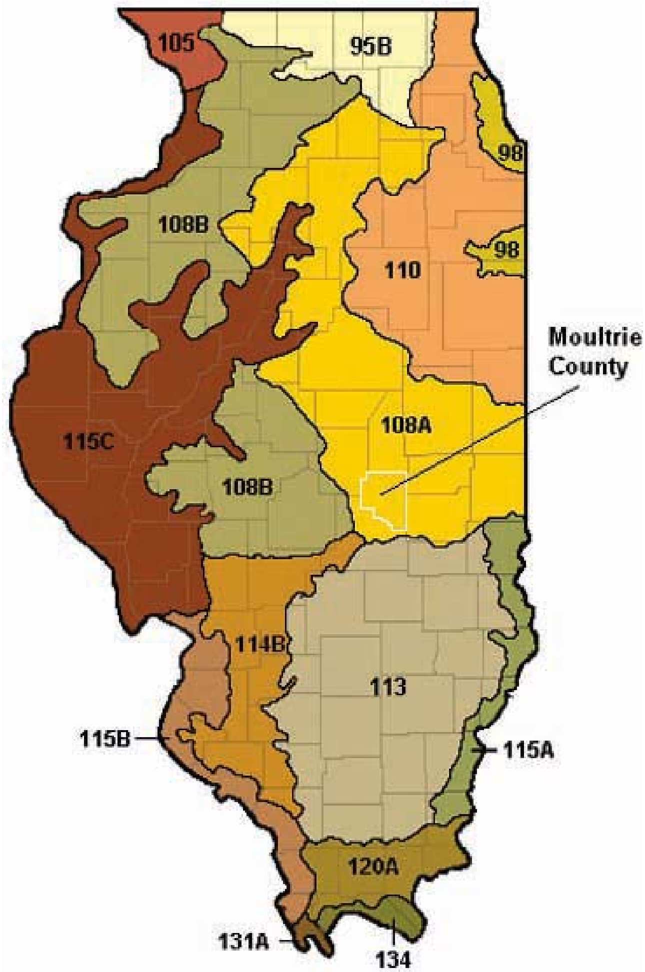
Indians known as Mound Builders were among the first people known to inhabit the survey area (Kehoe, 1981). The Kickapoo Indians inhabited the area just prior to the arrival of the first European settlers (Golden and Golden, 1990). By the time the settlers arrived, most of the Indians had moved westward across the Mississippi River.

The first permanent settlement in Moultrie County was established in 1826, in the area that is now Whitley Township. The early settlers used the rivers and creeks for fishing and for travel lanes. They also favored the timbered areas because of the availability of firewood, the abundance of game, the danger of prairie fires, and the belief that the prairie is in general infertile and unproductive. The prairie served mainly as open grazing land for the settlers' livestock. After the development of the moldboard plow and the organization of drainage districts in the late 1800s, grain farming became the major enterprise in the areas of prairie.

Created from portions of Macon and Shelby Counties, Moultrie County officially became a separate county in 1843. The county was named for William Moultrie, a general who fought in the Revolutionary War and who later became Governor of South Carolina (Golden and Golden, 1990).

The first Amish immigrants arrived in the county from Pennsylvania in 1865 (Miller, 1980). The previous year, Bishop Joel Beachy of Maryland and Moses Yoder of Pennsylvania started west to find a location where they could raise a crop without liming the soil. After exploring locations in several States, they selected an area near the present town of Arthur. The Amish are primarily farmers (fig. 2), but their industry includes canning, meat butchering, and carpentry.

Agriculture is the leading industry in Moultrie County. In 1997, the county had 464 farms, which



LEGEND

95B—Southern Wisconsin and Northern Illinois Drift Plain

98—Southern Michigan and Northern Indiana Drift Plain

105—Northern Mississippi Valley Loess Hills

108A and 108B—Illinois and Iowa Deep Loess and Drift

110—Northern Illinois and Indiana Heavy Till Plain

113—Central Claypan Area

114B—Southern Illinois and Indiana Thin Loess and Till Plain

115A, 115B, and 115C—Central Mississippi Valley Wooded Slopes

120A—Kentucky and Indiana Sandstone and Shale Hills and Valleys

131A—Southern Mississippi Valley Alluvium

134—Southern Mississippi Valley Silty Uplands

Figure 1.—Location of Moultrie County and the major land resource areas (MLRAs) in Illinois (USDA, 1981).

averaged about 372 acres in size and made up 172,657 acres (USDA, NASS 1997, 2003). The market value of agricultural products sold was about $56 million. Corn and soybeans were the main crops. Some areas were used for wheat or oats. Corn was grown on about 80,236 acres with an average yield of 137 bushels per acre. Soybeans were grown on about 75,962 acres with an average yield of 42 bushels per acre. Wheat was grown on about 1,433 acres with an average yield of 60 bushels per acre. Hay-alfalfa was grown on about 3,211 acres with an average yield of 2.9 tons per acre. Vegetables were grown on about 451 acres. About 98 percent of the planted acreage was harvested. The remaining acreage of farmland was devoted to livestock production. It included pasture, feedlots, areas of miscellaneous crops, and farm buildings, farm roads, and woodlots (USDA, NASS, 1997, 2003).

Some light manufacturing is located in the town of Sullivan. Products include candy and small automotive parts. 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 cities of Decatur and Mattoon also provide employment for Moultrie County residents.

The transportation systems in Moultrie County are well developed. They include Federal and State highways, county and township roads, railroads, and a small airport. State Routes 32, 121, 128, and 133 and U.S. Route 36 cross the county. Several county and township roads also provide important transportation links. Most of the township and county roads are paved. Two railroad lines provide service to Sullivan and most of the smaller towns.

The creation of the Lake Shelbyville Reservoir has had a substantial impact on the development and growth of Moultrie County. This area, which is owned by the U.S. Army Corps of Engineers, provides opportunities for recreation, habitat for wildlife, and opportunities for water management.

Figure 2.—Oat shocks are a familiar sight in the northeastern part of the county, where Amish farmers grow this crop in areas of Drummer, Milford, and Flanagan soils.

Physiography, Relief, and Drainage

Moultrie County lies entirely within the Bloomington Ridged Plain of the Central Lowland physiographic province (Leighton and others, 1948). The Bloomington Ridged Plain is part of the Wisconsinan till plain, which is characterized by a series of end moraines and ground moraines.

Moultrie County also lies entirely within the Illinois and Iowa Deep Loess and Drift major land resource area (MLRA 108A). MLRAs are geographic areas that are characterized by a particular pattern of soils, climate, water resources, and land uses (USDA, 1981). Each MLRA is designated by an Arabic number and identified by a descriptive geographic name.

Glaciers covered the survey area during the Pleistocene. Most of the present surface materials and landforms are the result of the glacial ice, running water, and windblown deposits from the most recent glacial stage, the Wisconsinan. The glaciers deposited 50 to more than 200 feet of drift throughout the county (Willman and Frye, 1970). In most areas the drift was covered with as much as 5 feet of windblown silt, or loess. The Cerro Gordo Moraine is a recessional end moraine that sweeps across the county from northwest to southeast (fig. 3). The Shelbyville and Paris Moraines are in the southeast corner of the county. The Shelbyville Moraine is a terminal moraine marking the farthest advance of the Wisconsinan Glaciation in Illinois. A small glacial lake deposit is directly north of Sullivan. It has a thick layer of well bedded silts and clays above the till (Johnson and others, 1971).

Relief in Moultrie County is low on the nearly level and gently sloping uplands. The greatest change in elevation is in areas along major drainageways, where erosion has caused as much as a 75-foot drop in elevation from the adjacent uplands. The highest elevation in the county is 775 feet above sea level in an area east of the village of Gays on the Shelbyville Moraine. The lowest elevation is 600 feet at Lake Shelbyville (fig. 4).

The Kaskaskia and West Okaw Rivers (fig. 5) drain most of the county. The Kaskaskia River ultimately

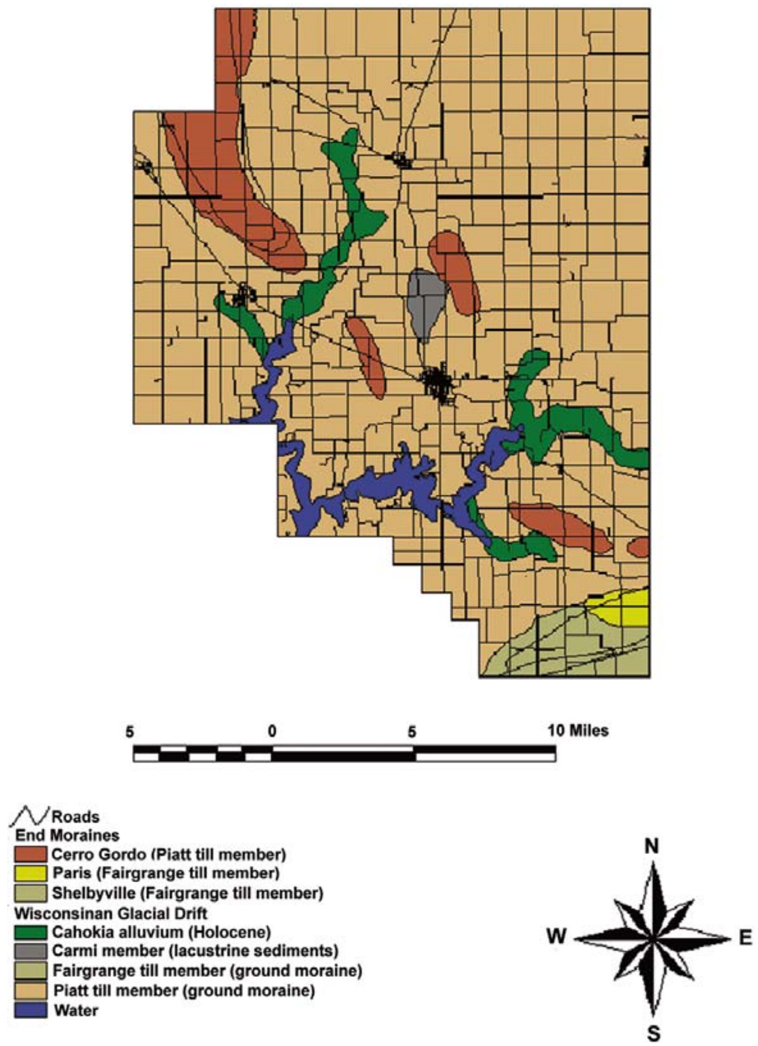


Figure 3.—Quaternary geology in Moultrie County, Illinois. Source: Illinois State Geological Survey.

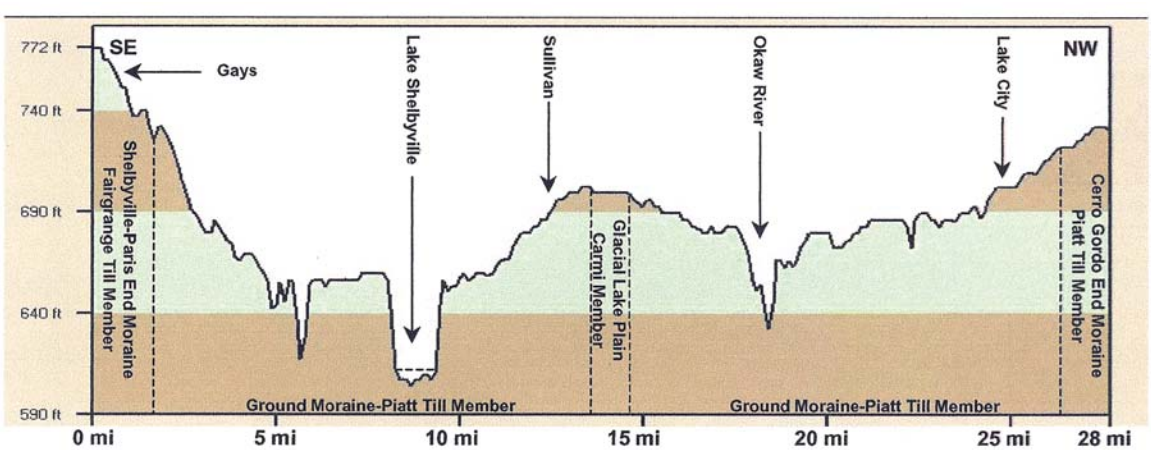


Figure 4.—Elevation cross-section of Moultrie County, Illinois. Source: 3-D TopoQuads Copyright © 1999 DeLorme Yarmouth, ME 04096; Datum NAD 27.

Figure 5.—A scenic view of the West Okaw River. Sawmill and Lawson soils are on the flood plain.

drains into the Mississippi River, south of St. Louis. The flood plains along these rivers and their tributaries generally are flooded yearly, and the soils in these areas have a seasonal high water table.

Most areas are sufficiently drained for the crops commonly grown in the county. Subsurface tile drains have been installed in fields across the county, and an extensive system of drainage ditches supplements the natural drainage, especially in the northeastern part of the county.

Natural Resources

Soil is the chief natural resource in Moultrie County. The early settlers who first worked it recognized the quality of the soil. The soils are basically well suited to cultivated crops, particularly corn and soybeans. Many of the soils are nearly level or gently sloping and formed in medium textured material under tall prairie grasses. Combined with a favorable climate, these factors result in highly productive farmland.

At the time of settlement, about 51,400 acres, or 23 percent of the county, was forestland (Iverson and others, 1989). In 1997, about 2,795 acres, or about 1 percent of the county, was forestland (USDA, NASS 1997, 2003). Most of the remaining forestland is along the major streams and their tributaries and along Lake Shelbyville. Most of this land is not tillable and is maintained as forestland for conservation reasons. It provides important areas of wildlife habitat.

The county has approximately 6,121 acres of impounded water. Lake Shelbyville makes up about 5,500 acres of this total. The rest of the impounded water is in farm ponds. The primary objective of the Lake Shelbyville Reservoir, which was completed in 1970, is to control flooding on the lower Kaskaskia and Mississippi Rivers.

The county has an abundant supply of ground water in the sand and gravel deposits in the fill of buried valleys and in areas where glacial drift is thick. The water supply for the city of Sullivan is obtained from beds of sand and gravel in the buried Kaskaskia

Valley south of town. Other municipalities and rural residents also depend on ground-water wells.

Climate

Prepared by the National Water and Climate Center, Natural Resources Conservation Service, Portland, Oregon.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Windsor in the period 1971 to 2000. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on the length of the growing season.

In winter, the average temperature is 30.3 degrees F and the average daily minimum temperature is 22.3 degrees. The lowest temperature on record, which occurred at Windsor on January 24, 1915, was -26 degrees. In summer, the average temperature is 74.6 degrees and the average daily maximum temperature is 85.5 degrees. The highest temperature, which occurred at Windsor on July 14, 1936, was 111 degrees.

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

The average annual total precipitation is 39.04 inches at Windsor. Of this, about 25.08 inches, or about 64 percent, usually falls in April through October. The growing season for most crops falls within this period. The heaviest 1-day rainfall on record was 5.52 inches at Windsor on June 27, 1957. Thunderstorms occur on about 48 days each year, and most occur between May and August.

The average seasonal snowfall is 21.1 inches. The greatest snow depth at any one time during the period of record was 17 inches on February 8, 1979. On the average, 28 days per year have at least 1 inch of snow on the ground. The heaviest 1-day snowfall on record was 14.0 inches on January 13, 1927.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 83 percent. The sun shines 67 percent of the time possible in summer and 46 percent in winter. The prevailing wind is from the south. Average windspeed is highest, between 11 and 12 miles per hour, from November to April.

How This Survey Was Made

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

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

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

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

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

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

The soil survey information in this report was based on a review of field notes, laboratory data, and other data collected during a previous survey of Moultrie County (Leeper and Gotsch, 1998). In addition, data from other soil surveys within MLRA 108A were reviewed. Some soils were re-sampled to greater depths. Reviewing data on a regional basis results in improved consistency in the identification, classification, and interpretations of soils on similar landscapes.

Aerial photographs used in this survey were taken in 1998 and 1999. Soil scientists also studied U.S. Geological Survey topographic maps enlarged to a scale of 1:12,000 and orthophotographs to relate land and image features. Specific soil boundaries were drawn on the orthophotographs. Adjustments of soil boundary lines were made to coincide with the U.S. Geological Survey topographic map contour lines and tonal patterns on aerial photographs.

Formation and Classification of the Soils

This section relates the soils in the survey area to the major factors of soil formation and describes the system of soil classification.

Formation of the Soils

Soil forms through processes that act on deposited or accumulated geologic material. The characteristics of the soil are determined by (1) the physical and mineralogical composition of the parent material; (2) the climate under which the soil formed; (3) the plant and animal life on and in the soil; (4) the relief, or lay of the land; and (5) the length of time that the forces of soil formation have acted on the parent material (Jenny, 1941).

Climate and plant and animal life are the active factors of soil formation. They act directly on the parent material, either in place or after it has been relocated by water, glaciers, or the wind. They slowly change the parent material to a natural body that has genetically related layers, or horizons. The effects of climate and plant and animal life on soil formation are modified by relief. In sloping areas, for example, erosion can inhibit the processes of soil formation. Wetness can slow these processes in level areas or depressions. Parent material affects the kind of soil profile that forms. Finally, time is needed for the transformation of the parent material into a soil that has clearly differentiated horizons.

The factors of soil formation are so closely interrelated in their effects on the soil that few generalizations can be made regarding the effects of any one factor unless the effects of the other factors are known. Many of the processes of soil formation are unknown.

Parent Material

Parent material is the unconsolidated geologic material in which a soil forms. It determines the chemical and mineralogical composition of the soil. Most of the parent material in Moultrie County is a direct result of the glaciers and sediments of the Wisconsinan Stage (Willman and Frye, 1970). Although the kinds of parent material are associated with glacial deposits, the properties vary greatly, mostly because of varying methods of deposition. The dominant kinds of parent material in Moultrie County are till, loess, lacustrine deposits, outwash, alluvium, and colluvium. These materials were deposited by wind, water, glaciers, or glacial meltwater. In some areas the materials were reworked by wind or water after they were deposited. Many of the soils in Moultrie County formed in more than one kind of parent material. For example, many formed in loess and in the underlying till (fig. 6).

Till is material deposited directly by glaciers. It consists of clay, silt, sand, gravel, and boulders, all of which are mixed together. The gravel has distinct edges and corners, indicating that they have not been subject to intensive washing by water. Unweathered till is generally alkaline, calcareous, and very dense. Through the processes of soil formation, the upper 1 to 2 meters of the till that is exposed to biological activity becomes less alkaline and less dense.

The till in Moultrie County was deposited during the Woodfordian Substage of the Wisconsinan Glaciation, the most recent glaciation (Willman and Frye, 1970). This deposition occurred 22,000 to 12,600 years ago. Most of the county is covered by a till deposit known as the Piatt till member of the Wedron Formation. The Cerro Gordo Moraine is the prominent end moraine composed of this till member. The Paris and Shelbyville Moraines are end moraines in the southeast corner of the county. They are composed of the Fairgrange till member of the Wedron Formation. The Shelbyville Moraine is a terminal moraine that marks the farthest advance of the Wisconsinan Glaciation in Illinois (fig. 3).

Soils that formed almost entirely in till are generally on strongly sloping to very steep side slopes. For example, Senachwine soils formed entirely in till. In most areas of the county, the till is overlain by loess of varying thickness. Dana, Flanagan, and Xenia soils formed in loess and in the underlying till.

Loess is material deposited by the wind. It consists of uniform, silt-sized particles that were typically calcareous before being acted upon by soil-forming

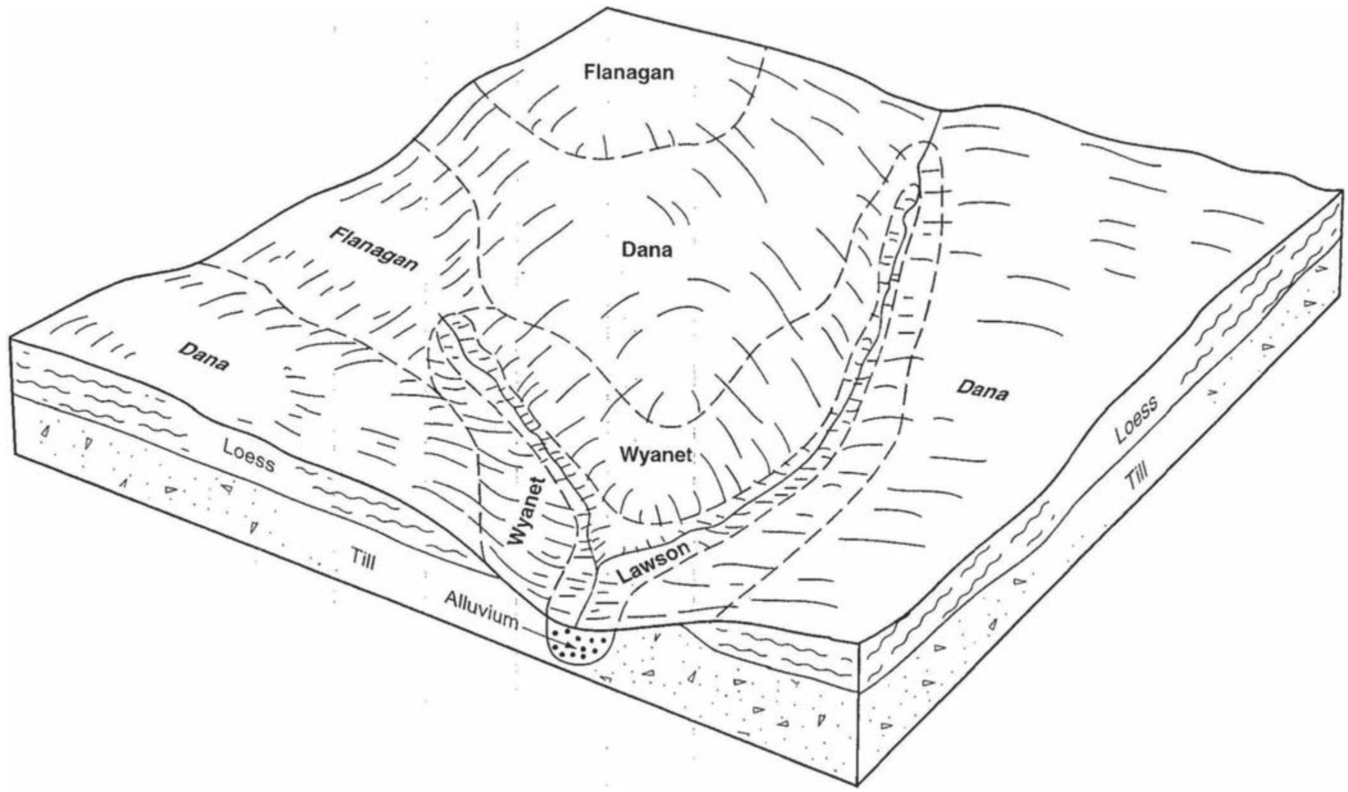


Figure 6.—Typical association of soils and parent material in Moultrie County, Illinois.

factors. The meltwater from the glaciers carried vast quantities of silt, which were deposited in the major river valleys. As these sediments were exposed when the meltwater subsided, the winds carried the silts and deposited them over much of the land. Most of the soils in the county formed at least partially in loess. The thickness of the loess ranges from virtually zero in areas where slopes are very steep to about 3 to 5 feet in the nearly level areas on uplands. Flanagan soils are in these latter areas. They formed in 40 to 60 inches of loess and in the underlying till.

Outwash is stratified material deposited by flowing glacial meltwater. The size of the particles that make up outwash varies, depending on the velocity of the moving water. Outwash generally is dominated by fine sand or coarser sand. The coarser material was deposited nearer to the ice or in rapidly moving glacial meltwater streams. Most of the outwash deposits were later covered by loess. In Moultrie County coarse textured outwash is in glacial valley areas now dominated by stream terraces. Rush soils are commonly on the stream terraces. In many low-lying swales or drainage areas of the Wisconsinan ground moraine, a layer of finer textured outwash is between the loess and the underlying till. Drummer soils are examples of soils that formed in loess and the underlying outwash on outwash plains in the county.

Lacustrine material consists largely of quiet-water glacial lake or shallow slack-water sediments. Unlike outwash, it is dominated by silt and some clay. A rather large body of lacustrine material is directly north of Sullivan. Thin, discontinuous lacustrine material is in areas throughout the county. Milford and Hartsburg soils are examples of soils that formed partly or entirely in lacustrine material.

Alluvium is material that was deposited by the floodwater of modern streams. Soils that formed in alluvium are generally stratified in both color and texture. The alluvial soils consist mostly of silty sediments, but in some areas the soils have thin layers of loamy and sandy material. Huntsville and Lawson soils formed in silty alluvium and have weakly developed horizons. The largest area of alluvial soils is along the Kaskaskia River and its tributaries.

Colluvium is material that is similar to alluvium in composition but was deposited by gravity in closed depressions at the base of slopes. The material is silty or clayey and generally is dark colored. Peotone soils formed in colluvium.

Climate

Moultrie County has a temperate, humid, continental climate that is essentially uniform throughout the county. Climatic differences within the county are too small to have caused any obvious differences among the soils. In some areas of the county, however, the effects of climate are modified locally by relief. The influence of climate becomes more obvious when comparisons are made on a broad regional basis.

Climate affects soil formation through its effects on weathering, plant and animal life, and erosion. Water from rains and melting snow seeps slowly downward through the soil and allows physical and chemical reactions to take place in the parent material. Where the water can move downward, it moves clay from the surface soil into the subsoil. Water also dissolves minerals and moves them downward through the soil. In areas of limy parent material, leaching has removed calcium carbonate from the upper part of the soils to a depth of more than 40 inches. As a result, other pedogenic processes act on the soils, causing the biochemical breakdown of minerals and the translocation of clay to take place. After the removal of bases, these soils tend to be strongly acid or very strongly acid in the upper part.

The temperature of the soil affects soil formation. When the soil is frozen, for example, many of the processes of soil formation are halted or restricted.

Climate also influences the kind and extent of plant and animal life. The climate in Moultrie County has favored tall prairie grasses and deciduous hardwoods. It also has favored the decomposition of plants and animals, which add humus to the soil.

Heavy, untimely rains can be destructive when they fall on soils that are bare of vegetation. The raindrops disperse the soil particles, thereby contributing to erosion and the formation of crusts. Early spring rains can cause extensive erosion when partial freezing of the soils increases the rate of surface runoff.

Plant and Animal Life

Soils are greatly affected by the type of vegetation under which they formed. The chief contribution of vegetation and biological processes to soil formation is the addition of organic material and nitrogen to the soil. The amount of organic material in the soil depends primarily on the kind of native plants on the soil. The remains of the plants accumulated on or below the surface, decayed, and eventually became soil organic matter or humus. The roots of the plants provided channels for the downward movement of water through the soil and added organic matter as they decayed.

The native vegetation in Moultrie County consisted primarily of tall prairie grasses and, to a lesser extent, deciduous hardwoods. At the time of early settlement, about 77 percent of the county supported prairie grasses (Iverson and others, 1989). These grasses have many fibrous roots that contributed large amounts of organic matter to the soil, especially where they were concentrated near the surface. Soils that formed under prairie vegetation have a thick, black or dark brown surface layer. They generally are in areas of low relief and/or poor or somewhat poor natural drainage. Dana, Drummer, and Flanagan soils are examples.

About 23 percent of the county supported timber at the time of early settlement (Iverson and others, 1989). The organic matter that deciduous hardwoods contributed to the soil was mainly leaf litter because the root systems of the hardwoods were less fibrous than those of grasses and generally were not so concentrated near the surface. The soils that formed under forest vegetation have a surface layer that is thinner and lighter colored than that of the prairie soils. Sabina, Senachwine, and Xenia soils formed under forest vegetation. They generally are on summits and on backslopes along drainageways (fig. 7).

Micro-organisms, earthworms, insects, and burrowing animals that live in or on the soil have affected soil formation. Bacteria and fungi help to decompose plant and animal remains and change them into humus. Burrowing animals, such as earthworms, cicadas, and ground squirrels, help to incorporate the humus into the soil and create small channels that influence soil aeration and the percolation of water. Humus is very important in the formation of soil structure and good tilth.

Human activities, such as installation of subsurface drains, construction of levees for flood protection, construction of buildings, and the clearing of native forests, have significantly altered the nature of the existing plant and animal communities. These activities have also contributed to the loss of soil material and organic material through accelerated erosion.

Relief

Relief, or local changes in elevation, has markedly affected the soils in Moultrie County through its effect on runoff, erosion, deposition, and natural drainage.

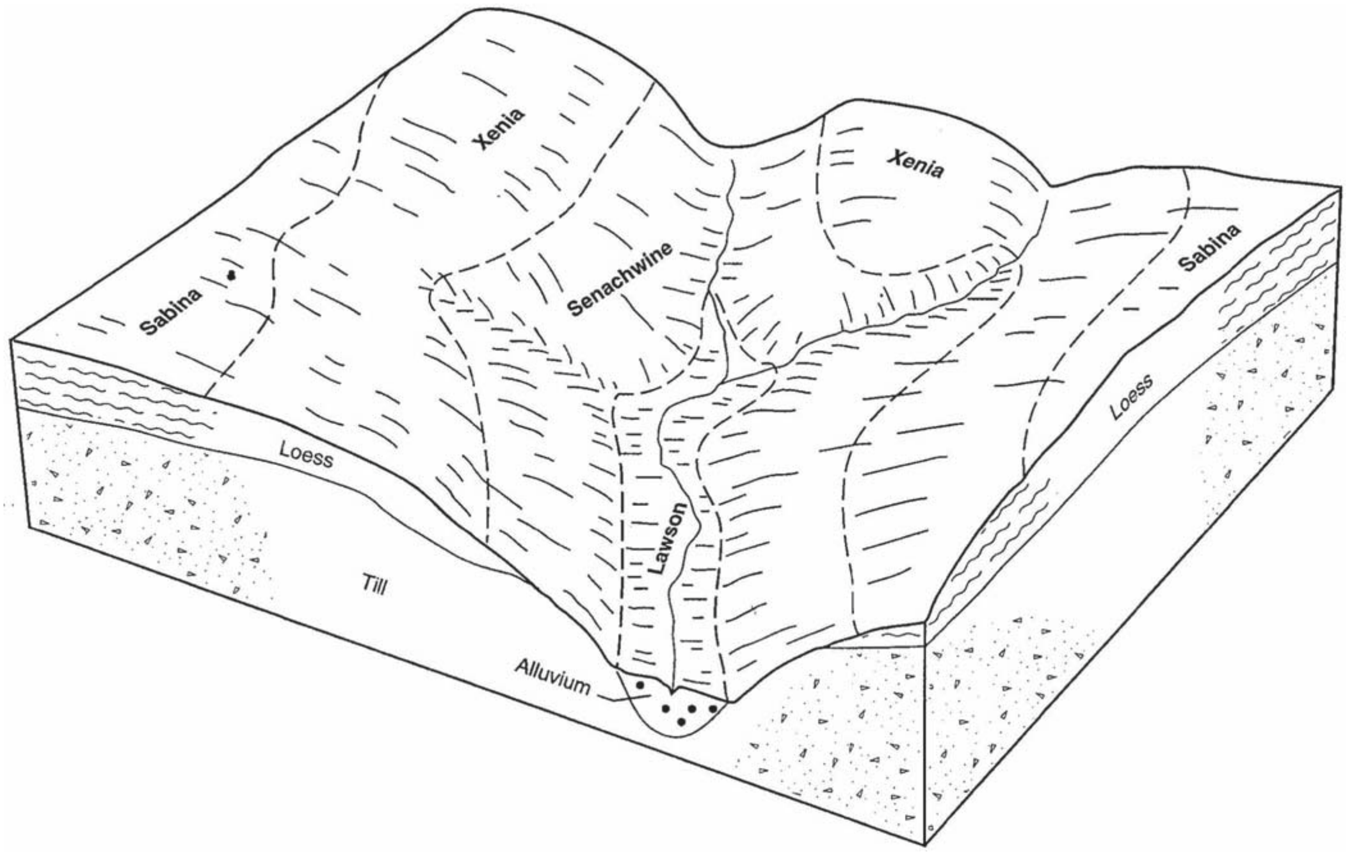


Figure 7.—Typical association of soils along major drainageways in the county.

Relief includes landform characteristics, such as position on the landform, slope gradient, slope shape, and slope aspect.

Variations in relief in the county reflect the variety of landforms. The most extensive landforms in the county are end moraines, ground moraines, stream terraces, and flood plains.

A series of end moraines in Moultrie County represents successive advances and retreats of the glacial ice front. The end moraines commonly are gently sloping to very steep. Senachwine and Wyanet soils are examples of soils on end moraines in the county.

Ground moraines of Wisconsinan age, which occur between the end moraines, generally consist of broad, nearly level and gently sloping interfluves. The relief on ground moraines varies less than the relief on end moraines, and the loess deposits are thicker. Sunbury and Flanagan soils are examples of soils on ground moraines.

The stream terraces in the county are primarily along the Kaskaskia River and its tributaries. They generally are nearly level and gently sloping areas that lie above the adjacent flood plains. Rush and Starks soils are on stream terraces in the county.

Where the parent material is relatively uniform, differences in natural drainage are closely related to landform positions, such as summits and toeslopes, and to slope gradient and slope shape. Drummer and Rush soils, for example, both formed in loess and in the underlying outwash. Drummer soils are on toeslopes that are nearly level and are commonly concave. Precipitation and runoff from the higher adjacent soils contribute to the ponding of surface water on the poorly drained Drummer soils. The water in the saturated soil pores restricts the circulation of air in the soils. Under these conditions, naturally occurring iron and manganese compounds are chemically reduced. The reduced form of iron and manganese is more soluble than the oxidized form and can be leached readily from the soils, leaving the subsoil with a grayish color.

Unlike Drummer soils, Rush soils are well drained and are on gently sloping summits and shoulders that are convex. The water table is lower in the Rush soils and some of the rainfall runs off the more sloping surface. The soil pores in the Rush soils contain less water and more air. The iron and manganese compounds are well oxidized, resulting in a brownish subsoil.

Relief also affects the susceptibility to and intensity of both geologic and recent accelerated erosion. The soils on the steeper slopes and on long slopes are more susceptible to erosion than soils that formed in nearly level or level areas or where slopes are short. Maintaining a cover of vegetation or plant residue on much or all of the surface can significantly reduce the hazard of erosion caused by relief. For example, Senachwine soils that have slopes of 18 to 60 percent generally support trees, herbaceous plants, and grasses. Because of the vegetative cover, these soils are susceptible to little or no erosion. Most areas of Senachwine soils that have slopes of 2 to 18 percent are cultivated. Failure to maintain erosion-control systems on these soils has resulted in moderate or severe accelerated erosion of the surface soil. The loss of surface soil material in one place results in deposition and accumulation in another place, affecting both the rate of soil formation and the development and thickness of soil horizons.

Time

To a great extent, time determines the degree of profile development in a soil. The amount of time available for profile development is strongly influenced by the degree and amount of erosion or deposition of material at any given point in the county.

The differences among soils resulting from the length of time that the parent material has been in place are commonly expressed in the degree of profile development. Lawson soils have a very weakly expressed profile because they are on low flood plains that periodically receive new alluvial sediments. They have not been in place long enough for the development of distinct horizons. Sabina soils, which are on ground moraines, are more strongly developed than the Lawson soils. They have distinct horizons because the loess and underlying till in which they formed have been in place a much longer time.

In most of the soils on uplands in the county, enough time has passed for the removal of calcium carbonate from the upper 40 or more inches of the profile through leaching. In sloping areas, however, geologic and modern erosion has kept pace with or has exceeded the rate of soil formation. Calcium carbonate typically occurs closer to the surface in these soils as the leached upper mantle is eroded away. The Senachwine, Wyanet, and other soils in these areas are calcareous within a depth of 40 inches.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (Soil Survey Staff, 1998 and 1999). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 4 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Twelve soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Alfisol.

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

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; type of saturation; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is 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 subgroup is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other taxonomic class. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *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, mineralogy class, cation-exchange activity class, soil temperature regime, soil depth, and reaction class. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed, active, mesic Typic Hapludalfs.

SERIES. The series consists of soils within a family that have horizons similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile.

Soil Series and Detailed Soil Map Units

In this section each soil series recognized in the survey area is described. Each series description is followed by detailed descriptions of the associated detailed soil map units.

Characteristics of the soil and the material in which it formed are identified for each soil series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. In some instances the typical pedon for the series is located outside Moultrie County. The selection of typical pedons is based on the range of characteristics of the series as it occurs throughout a particular major land resource area (MLRA). The Raub series, for example, is a common soil in MLRA 108A (Illinois and Iowa Deep Loess and Drift), which includes most of central and north-central Illinois. The typical pedon for the Raub series is located in Champaign County, Illinois. The soil properties of this pedon are representative of the Raub soils that occur not only in Champaign County but also in Moultrie County and other counties within MLRA 108A.

The detailed description of each soil horizon follows standards in the “Soil Survey Manual” (Soil Survey Division Staff, 1993). Many of the technical terms used in the descriptions are defined in “Soil Taxonomy” (Soil Survey Staff, 1999) and in “Keys to Soil Taxonomy” (Soil Survey Staff, 1998). 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 on the detailed soil maps in this survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the maps, can be used to determine the suitability and potential of a unit for specific uses. They also can be used to plan the management needed for those uses. More information about each map unit is given under the headings “Use and Management of the Soils” and “Soil Properties.”

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

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

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

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

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying layers, 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 layers. 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*. The name of a soil phase commonly indicates a feature that affects use or management. For example, Senachwine silt loam, 10 to 18 percent slopes, eroded, is a phase of the Senachwine series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes. A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Drummer-Milford silty clay loams, 0 to 2 percent slopes, is an example.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Landfills is an example.

Table 5 gives the acreage and proportionate extent of each map unit. Other tables give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils or miscellaneous areas.

Dana Series

Taxonomic classification: Fine-silty, mixed, superactive, mesic Oxyaquic Argiudolls

Typical Pedon

Dana silt loam, 0 to 2 percent slopes, in a cultivated field at an elevation of 611 feet above mean sea level; Moultrie County, Illinois; approximately 960 feet east and 295 feet south of the northwest corner of sec. 30, T. 14 N., R. 6 E.; USGS Lovington, Illinois, topographic quadrangle; lat. 39 degrees 38 minutes 10.6 seconds N. and long. 88 degrees 41 minutes 44.9 seconds W.; UTM Zone 16S 0354473 easting and 4388555 northing; NAD 27:

Ap—0 to 7 inches; very dark gray (10YR 3/1) silt loam, dark gray (10YR 4/1) dry; weak fine granular structure; friable; many very fine roots; slightly acid; abrupt smooth boundary.

A—7 to 12 inches; very dark gray (10YR 3/1) silt loam, dark gray (10YR 4/1) dry; weak medium granular structure; friable; many very fine roots; neutral; clear smooth boundary.

Bt1—12 to 16 inches; brown (10YR 4/3) silty clay loam; moderate fine subangular blocky structure; firm; common very fine roots; common distinct very dark grayish brown (10YR 3/2) organo-clay films on faces of peds; few fine rounded weakly cemented iron and manganese nodules throughout; neutral; clear smooth boundary.

Bt2—16 to 27 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak fine prismatic structure parting to moderate fine subangular blocky; firm; common very fine roots; common distinct very dark grayish brown (10YR 3/2) organo-clay films on faces of peds; few fine distinct yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; few fine rounded weakly cemented iron and manganese nodules throughout; slightly acid; clear smooth boundary.

Bt3—27 to 39 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium subangular blocky structure; firm; few very fine roots; common distinct very dark grayish brown (10YR 3/2) organo-clay films on faces of peds; few medium distinct grayish brown (10YR 5/2) iron depletions and common medium distinct yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; common fine rounded weakly cemented iron and manganese nodules throughout; neutral; clear smooth boundary.

2Bt4—39 to 49 inches; yellowish brown (10YR 5/4) clay loam; weak medium subangular blocky structure; firm; few very fine roots; few distinct very dark grayish brown (10YR 3/2) organo-clay films on faces of peds; few fine distinct grayish brown (10YR 5/2) iron depletions, common medium distinct yellowish brown (10YR 5/6) masses of iron accumulation, and common medium distinct dark yellowish brown (10YR 4/6) masses of iron and manganese accumulation in the matrix; common fine rounded weakly cemented iron and manganese nodules throughout; about 2 percent rock fragments; neutral; gradual smooth boundary.

2BCt—49 to 60 inches; brown (10YR 5/3) loam; weak medium angular blocky structure; firm; few distinct very dark grayish brown (10YR 3/2) organo-clay films on faces of peds; common fine faint grayish brown (10YR 5/2) iron depletions and common medium distinct yellowish brown (10YR 5/6) masses of iron accumulation in the matrix;

common fine rounded weakly cemented iron and manganese nodules throughout; about 4 percent rock fragments; slightly effervescent; slightly alkaline.

Range in Characteristics

Thickness of the mollic epipedon: 10 to 18 inches
Thickness of the loess: 22 to 40 inches
Depth to carbonates: 40 to 60 inches
Depth to the base of the argillic horizon: 32 to 60 inches

A horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam
Content of rock fragments—0 to 1 percent
Reaction—moderately acid to neutral

BA horizon (where present):
Hue—10YR
Value—4
Chroma—3
Texture—silt loam or silty clay loam
Content of rock fragments—0 to 1 percent
Reaction—moderately acid to neutral

Bt horizon:
Hue—10YR
Value—4 or 5
Chroma—3 to 6
Texture—silty clay loam
Content of rock fragments—0 to 1 percent
Reaction—strongly acid to neutral

2Bt horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—3 or 4
Texture—clay loam
Content of rock fragments—1 to 7 percent
Reaction—moderately acid to neutral

2BCt or 2BC horizon (where present):
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—3 or 4
Texture—loam or clay loam
Content of rock fragments—1 to 15 percent
Reaction—neutral to moderately alkaline

2C horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—3 to 6
Texture—loam or clay loam
Content of rock fragments—1 to 15 percent
Reaction—slightly alkaline or moderately alkaline

Taxadjunct Feature

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. The soil is classified as a fine-silty, mixed, superactive, mesic Oxyaquic Hapludalf.

56A—Dana silt loam, 0 to 2 percent slopes

Setting

Landform: Ground moraines
Position on landform: Summits

Map Unit Composition

Dana and similar soils: 94 percent
Dissimilar soils: 6 percent

Minor Components

Similar soils:
- Soils that have a thin surface layer
- Soils that have more than 40 inches of loess over the loamy till
- Soils that are somewhat poorly drained
- Soils that have slopes of more than 2 percent

Dissimilar soils:
- The poorly drained Drummer soils in swales

Properties and Qualities of the Dana Soil

Parent material: Silty loess over loamy till
Drainage class: Moderately well drained
Slowest permeability within a depth of 40 inches: Moderate
Permeability below a depth of 60 inches: Moderately slow
Available water capacity: About 10.1 inches to a depth of 60 inches
Content of organic matter in the surface layer: 3.0 to 5.0 percent
Shrink-swell potential: Moderate
Depth and months of the highest perched seasonal high water table: 2.0 feet, Feb.–Apr.
Flooding: None
Potential for frost action: High
Hazard of corrosion: High for steel and moderate for concrete
Surface runoff class: Low
Susceptibility to water erosion: Low

Susceptibility to wind erosion: Low

Interpretive Groups

Land capability classification: Dana—1
Prime farmland status: Dana—prime farmland in all areas
Hydric soil status: Dana—not hydric

56B2—Dana silt loam, 2 to 5 percent slopes, eroded

Setting

Landform: Ground moraines
Position on landform: Summits and backslopes

Map Unit Composition

Dana and similar soils: 94 percent
Dissimilar soils: 6 percent

Minor Components

Similar soils:
- Soils that are uneroded or only slightly eroded
- Soils that have a thick surface layer
- Soils that are well drained
- Soils that have less than 22 inches of loess over the till
- Soils that have slopes of less than 2 percent
- Soils that have slopes of more than 5 percent

Dissimilar soils:
- The poorly drained Drummer soils in swales

Properties and Qualities of the Dana Soil

Parent material: Silty loess over loamy till
Drainage class: Moderately well drained
Slowest permeability within a depth of 40 inches: Moderate
Permeability below a depth of 60 inches: Moderately slow
Available water capacity: About 9.8 inches to a depth of 60 inches
Content of organic matter in the surface layer: 1.5 to 3.5 percent
Shrink-swell potential: Moderate
Depth and months of the highest perched seasonal high water table: 2.0 feet, Feb.–Apr.
Flooding: None
Accelerated erosion: The surface layer has been thinned by erosion.
Potential for frost action: High
Hazard of corrosion: High for steel and moderate for concrete
Surface runoff class: Low
Susceptibility to water erosion: Moderate
Susceptibility to wind erosion: Low

Interpretive Groups

Land capability classification: Dana—2e
Prime farmland status: Dana—prime farmland in all areas
Hydric soil status: Dana—not hydric

Drummer Series

Taxonomic classification: Fine-silty, mixed, superactive, mesic Typic Endoaquolls

Typical Pedon

Drummer silty clay loam, 0 to 2 percent slopes, on a nearly level slope in a cultivated field at an elevation of 715 feet above mean sea level; Champaign County, Illinois; on the University of Illinois South Farm, 1 mile south of Urbana; 1,600 feet east and 300 feet north of the southwest corner of sec. 19, T. 19 N., R. 9 E.; USGS Urbana, Illinois, topographic quadrangle; lat. 40 degrees 05 minutes 04 seconds N. and long. 88 degrees 13 minutes 58 seconds W.; UTM Zone 16T 0394896 easting and 4437648 northing; NAD 27:

Ap—0 to 7 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak fine granular structure; friable; many fine roots; moderately acid; clear smooth boundary.
A—7 to 14 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine subangular blocky structure parting to weak fine granular; friable; many fine and medium roots; slightly acid; clear smooth boundary.
BA—14 to 19 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; moderate fine and medium subangular blocky structure; firm; many fine and medium roots; few fine faint very dark grayish brown (2.5Y 3/2) masses of iron and manganese accumulation in the matrix; slightly acid; gradual smooth boundary.
Bg—19 to 25 inches; dark gray (10YR 4/1) silty clay loam; moderate fine prismatic structure parting to moderate fine angular blocky; firm; many fine roots; common fine distinct and prominent yellowish brown (10YR 5/4 and 5/6) masses of iron accumulation in the matrix; many wormholes; neutral; gradual smooth boundary.
Btg1—25 to 32 inches; grayish brown (2.5Y 5/2) silty clay loam; weak fine and medium prismatic structure parting to moderate fine angular blocky; firm; many fine roots; common distinct dark gray

(N 4/0) clay films on faces of peds; many medium distinct yellowish brown (10YR 5/4) masses of iron and manganese accumulation in the matrix; neutral; gradual wavy boundary.

Btg2—32 to 41 inches; gray (N 5/0) silty clay loam; weak medium prismatic structure parting to weak medium angular blocky; firm; few fine roots; few distinct dark gray (N 4/0) clay films on faces of peds; many medium prominent yellowish brown (10YR 5/4) masses of iron and manganese accumulation in the matrix; neutral; clear wavy boundary.

2Btg3—41 to 47 inches; gray (N 5/0) loam; weak coarse subangular blocky structure; friable; few fine roots; few distinct dark gray (10YR 4/1) clay films on faces of peds; common medium prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; neutral; abrupt wavy boundary.

2Cg—47 to 60 inches; dark gray (10YR 4/1), stratified loam and sandy loam; massive; friable; many medium prominent olive brown (2.5Y 4/4) masses of iron and manganese accumulation in the matrix; many medium distinct gray (N 5/0) iron depletions in the matrix; slightly alkaline.

Range in Characteristics

Thickness of the mollic epipedon: 10 to 24 inches
Thickness of the loess: 40 to 60 inches
Depth to carbonates: 40 to 65 inches
Depth to the base of the cambic horizon: 40 to 65 inches

A horizon:
Hue—10YR, 2.5Y, 5Y, or N
Value—2 to 3
Chroma—0 to 2
Texture—silty clay loam or silt loam
Content of rock fragments—0 to 1 percent
Reaction—moderately acid to neutral

Bg and Btg horizons:
Hue—10YR, 2.5Y, 5Y, or N
Value—4 to 6
Chroma—0 to 4
Texture—silty clay loam or silt loam
Content of rock fragments—0 to 1 percent
Reaction—moderately acid to neutral

2Btg or 2BCg horizon:
Hue—7.5YR, 10YR, 2.5Y, 5Y, or N
Value—4 to 6
Chroma—0 to 2
Texture—loam or silt loam
Content of rock fragments—0 to 7 percent
Reaction—slightly acid to slightly alkaline

2Cg horizon:
Hue—7.5YR, 10YR, 2.5Y, 5Y, or N
Value—4 to 6
Chroma—0 to 8
Texture—loam, sandy loam, sandy clay loam, silt loam, silty clay loam, or clay loam; typically stratified
Content of rock fragments—0 to 15 percent
Reaction—neutral to moderately alkaline

722A—Drummer-Milford silty clay loams, 0 to 2 percent slopes

Setting

Landform: Drummer—outwash plains; Milford—glacial lake plains
Position on landform: Toeslopes

Map Unit Composition

Drummer and similar soils: 60 percent
Milford and similar soils: 35 percent
Dissimilar soils: 5 percent

Minor Components

Similar soils:
- Soils that have a limy surface layer
- Soils that have more than 15 percent sand in layers above 40 inches
- Soils that have a very thick dark surface layer
- Soils that have a limy subsoil within a depth of 40 inches

Dissimilar soils:
- Soils that are somewhat poorly drained and are on slight rises above the Drummer and Milford soils

Properties and Qualities of the Drummer Soil

Parent material: Silty loess over loamy outwash
Drainage class: Poorly drained
Slowest permeability within a depth of 40 inches: Moderate
Permeability below a depth of 60 inches: Moderate
Available water capacity: About 11.4 inches to a depth of 60 inches
Content of organic matter in the surface layer: 4.5 to 7.0 percent
Shrink-swell potential: Moderate
Depth and months of the highest apparent seasonal high water table: At the surface, Jan.–May
Ponding: Frequent, of brief duration, Jan.–May
Flooding: None
Potential for frost action: High
Hazard of corrosion: High for steel and moderate for concrete

Surface runoff class: Negligible
Susceptibility to water erosion: Low
Susceptibility to wind erosion: Very low

Properties and Qualities of the Milford Soil

Parent material: Silty and clayey lacustrine deposits
Drainage class: Poorly drained
Slowest permeability within a depth of 40 inches: Moderately slow
Permeability below a depth of 60 inches: Moderate
Available water capacity: About 9.4 inches to a depth of 60 inches
Content of organic matter in the surface layer: 4.5 to 6.0 percent
Shrink-swell potential: High
Depth and months of the highest apparent seasonal high water table: At the surface, Jan.–May
Ponding: Frequent, of brief duration, Jan.–May
Flooding: None
Potential for frost action: High
Hazard of corrosion: High for steel and moderate for concrete
Surface runoff class: Low
Susceptibility to water erosion: Low
Susceptibility to wind erosion: Moderate

Interpretive Groups

Land capability classification: Drummer and Milford—2w
Prime farmland status: Drummer and Milford—prime farmland in drained areas
Hydric soil status: Drummer and Milford—hydric

Flanagan Series

Taxonomic classification: Fine, smectitic, mesic Aquic Argiudolls

Typical Pedon

Flanagan silt loam, 0 to 2 percent slopes, on a 1 percent slope in a grass border of the University of Illinois experimental plots, at an elevation of 730 feet above mean sea level; Champaign County, Illinois; about 1 mile south of Champaign on the University of Illinois South Farm; 1,607 feet east and 1,405 feet north of the southwest corner of sec. 19, T. 19 N., R. 9 E.; USGS Urbana, Illinois, topographic quadrangle; lat. 40 degrees 05 minutes 14 seconds N. and long. 88 degrees 13 minutes 57 seconds W.; UTM Zone 16T 0394924 easting and 4437956 northing; NAD 27:

A1—0 to 8 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; moderate medium granular structure; friable; slightly acid; gradual smooth boundary.

A2—8 to 15 inches; very dark brown (10YR 2/2) silt loam, dark grayish brown (10YR 4/2) dry; moderate medium granular structure; friable; slightly acid; clear smooth boundary.

A3—15 to 18 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate medium granular structure; friable; slightly acid; clear smooth boundary.

Bt1—18 to 23 inches; dark grayish brown (10YR 4/2) silty clay loam; moderate fine subangular blocky structure; firm; many distinct very dark grayish brown (10YR 3/2) organo-clay films on faces of peds; few fine faint brown (10YR 4/3) masses of iron and manganese accumulation in the matrix; moderately acid; clear smooth boundary.

Bt2—23 to 32 inches; dark grayish brown (10YR 4/2) silty clay loam; moderate medium subangular blocky structure; firm; many distinct very dark grayish brown (10YR 3/2) organo-clay films on faces of peds; common fine faint brown (10YR 5/3 and 4/3) masses of iron and manganese accumulation in the matrix; moderately acid; clear smooth boundary.

Bt3—32 to 38 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium subangular blocky structure; firm; many distinct very dark grayish brown (10YR 3/2) organo-clay films on faces of peds; common fine faint light yellowish brown (10YR 6/4) masses of iron and manganese accumulation and common fine distinct yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; slightly acid; clear smooth boundary.

Bt4—38 to 45 inches; 40 percent yellowish brown (10YR 5/6), 30 percent light brownish gray (10YR 6/2), and 30 percent brown (10YR 5/3) silt loam; weak medium subangular blocky structure; friable; common distinct very dark grayish brown (10YR 3/2) organo-clay films on faces of peds; slightly acid; gradual smooth boundary.

2Bt5—45 to 49 inches; 35 percent yellowish brown (10YR 5/4), 35 percent light olive brown (2.5Y 5/4), and 30 percent light brownish gray (10YR 6/2) silt loam; weak coarse subangular blocky structure; firm; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; 5 percent fine gravel; neutral; abrupt smooth boundary.

2C—49 to 60 inches; yellowish brown (10YR 5/4) loam; massive; firm; common fine and medium distinct light brownish gray (10YR 6/2) iron depletions in the matrix; common medium prominent white (10YR 8/1) rounded weakly cemented calcium carbonate nodules throughout; 5 percent fine gravel; slightly effervescent; slightly alkaline.

Range in Characteristics

Thickness of the mollic epipedon: 10 to 24 inches
Thickness of the loess: 40 to 60 inches
Depth to carbonates: 45 to 65 inches
Depth to the base of the argillic horizon: 45 to 65 inches

A horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam or silty clay loam
Content of rock fragments—none
Reaction—moderately acid to neutral

Bt horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2 to 6
Texture—silty clay loam, silt loam, or silty clay
Content of rock fragments—none
Reaction—moderately acid to neutral

2Bt horizon:
Hue—7.5YR, 10YR, or 2.5Y
Value—4 to 6
Chroma—1 to 6
Texture—loam, clay loam, silt loam, or silty clay loam
Content of rock fragments—1 to 15 percent
Reaction—slightly acid to slightly alkaline

2BC and/or 2C horizon:
Hue—7.5YR, 10YR, or 2.5Y
Value—4 to 6
Chroma—2 to 6
Texture—loam or clay loam
Content of rock fragments—1 to 15 percent
Reaction—slightly alkaline or moderately alkaline

154A—Flanagan silt loam, 0 to 2 percent slopes

Setting

Landform: Ground moraines
Position on landform: Summits

Map Unit Composition

Flanagan and similar soils: 94 percent
Dissimilar soils: 6 percent

Minor Components

Similar soils:
- Soils that have a thin surface layer
- Soils that have less clay in the subsoil
- Soils that have less than 40 inches of loess over the till
- Soils that have stratified outwash in the substratum, below a depth of 60 inches
- Soils that are moderately well drained
- Soils that have slopes of more than 2 percent

Dissimilar soils:
- The poorly drained Drummer soils in swales

Properties and Qualities of the Flanagan Soil

Parent material: Silty loess over loamy till
Drainage class: Somewhat poorly drained
Slowest permeability within a depth of 40 inches: Moderately slow
Permeability below a depth of 60 inches: Moderately slow
Available water capacity: About 10.6 inches to a depth of 60 inches
Content of organic matter in the surface layer: 3.5 to 5.0 percent
Shrink-swell potential: High
Depth and months of the highest perched seasonal high water table: 1.0 foot, Jan.–May
Flooding: None
Potential for frost action: Moderate
Hazard of corrosion: High for steel and moderate for concrete
Surface runoff class: Low
Susceptibility to water erosion: Low
Susceptibility to wind erosion: Low

Interpretive Groups

Land capability classification: Flanagan—1
Prime farmland status: Flanagan—prime farmland in all areas
Hydric soil status: Flanagan—not hydric

Hartsburg Series

Taxonomic classification: Fine-silty, mixed, superactive, mesic Typic Endoaquolls

Typical Pedon

Hartsburg silty clay loam, 0 to 2 percent slopes, on a nearly level slope in a cultivated field at an elevation of 571 feet above mean sea level; Logan County, Illinois; about 4 miles southwest of Emden, Illinois; 660 feet west and 40 feet north of the southeast corner of sec. 23, T. 21 N., R. 4 W.; USGS New Holland, Illinois, topographic quadrangle; lat. 40 degrees 14 minutes 58 seconds N. and long. 89 degrees 31 minutes 28 seconds W.; UTM Zone 16T 0285283 easting and 4458291 northing; NAD 27:

Ap—0 to 7 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate medium granular structure; friable; slightly acid; abrupt smooth boundary.

A1—7 to 12 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate medium granular structure; friable; few very fine roots; slightly acid; clear smooth boundary.

A2—12 to 17 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; moderate medium granular structure; firm; few very fine roots; few fine faint dark grayish brown (2.5Y 4/2) iron depletions in the matrix; neutral; clear smooth boundary.

Bg—17 to 21 inches; dark grayish brown (2.5Y 4/2) silty clay loam; weak fine and medium subangular blocky structure; firm; few very fine roots; common distinct very dark gray (10YR 3/1) organic coatings on faces of peds; common fine prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; 10 percent krotovinas; neutral; clear smooth boundary.

Bkg—21 to 30 inches; gray (5Y 5/1) silty clay loam; moderate medium subangular blocky structure; firm; few very fine roots; continuous faint dark grayish brown (10YR 4/2 and 2.5Y 4/2) coatings on faces of peds and lining pores; few fine and medium prominent rounded light gray (10YR 7/1) weakly cemented calcium carbonate concretions throughout; common medium prominent yellowish brown (10YR 5/8) and strong brown (7.5YR 5/8) masses of iron accumulation in the matrix; 10 percent krotovinas; slightly effervescent; slightly alkaline; abrupt wavy boundary.

BCkg—30 to 34 inches; light brownish gray (2.5Y 6/2) silty clay loam; weak coarse subangular blocky structure; firm; few faint gray (N 5/0) and grayish brown (2.5Y 5/2) coatings on faces of peds; many distinct gray (N 5/0) and grayish brown (2.5Y 5/2) stains lining pores; few fine prominent rounded black (5YR 2.5/1) weakly cemented manganese concretions throughout; many medium and coarse faint rounded light gray (10YR 7/1) weakly cemented calcium carbonate concretions throughout; many medium prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; 10 percent krotovinas; violently effervescent among concretions, slightly effervescent in the fine earth; slightly alkaline; clear wavy boundary.

Cg—34 to 60 inches; light brownish gray (2.5Y 6/2) silt loam; massive; friable; few medium faint rounded light gray (10YR 7/1) weakly cemented calcium carbonate concretions throughout; many medium prominent strong brown (7.5YR 5/8) masses of iron accumulation throughout; 11 percent krotovinas; strongly effervescent; moderately alkaline.

Range in Characteristics

Thickness of the mollic epipedon: 10 to 20 inches
Thickness of the loess: More than 40 inches
Depth to carbonates: 15 to 35 inches
Depth to the base of the cambic horizon: 24 to 50 inches

A horizon:
Hue—10YR or N
Value—2 or 3
Chroma—0 to 2
Texture—silty clay loam
Content of rock fragments—typically none
Reaction—slightly acid to slightly alkaline

Bg and Bkg horizons:
Hue—10YR, 2.5Y, or 5Y
Value—3 to 5
Chroma—1 or 2
Texture—silty clay loam or silt loam
Content of rock fragments—typically none
Reaction—neutral to moderately alkaline

Cg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—5 or 6
Chroma—1 or 2
Texture—silt loam or loam
Content of rock fragments—0 to 7 percent
Reaction—slightly alkaline or moderately alkaline

244A—Hartsburg silty clay loam, 0 to 2 percent slopes

Setting

Landform: Glacial lake plains and ground moraines
Position on landform: Toeslopes

Map Unit Composition

Hartsburg and similar soils: 95 percent
Dissimilar soils: 5 percent

Minor Components

Similar soils:
- Soils that have a limy surface layer
- Soils that have more clay in the surface soil and subsoil

• Soils that have a very thick dark surface layer

Dissimilar soils:
• Soils that are somewhat poorly drained and are on slight rises above the Hartsburg soil

Properties and Qualities of the Hartsburg Soil

Parent material: Silty loess over silty lacustrine deposits
Drainage class: Poorly drained
Slowest permeability within a depth of 40 inches: Moderate
Permeability below a depth of 60 inches: Moderate
Available water capacity: About 12.7 inches to a depth of 60 inches
Content of organic matter in the surface layer: 4.5 to 6.0 percent
Shrink-swell potential: Moderate
Depth and months of the highest apparent seasonal high water table: At the surface, Jan.–May
Ponding: Frequent, of brief duration, Jan.–May
Flooding: None
Potential for frost action: High
Hazard of corrosion: High for steel and low for concrete
Surface runoff class: Negligible
Susceptibility to water erosion: Low
Susceptibility to wind erosion: Very low

Interpretive Groups

Land capability classification: Hartsburg—2w
Prime farmland status: Hartsburg—prime farmland in drained areas
Hydric soil status: Hartsburg—hydric

Huntsville Series

Taxonomic classification: Fine-silty, mixed, superactive, mesic Cumulic Hapludolls

Typical Pedon

Huntsville silt loam, 0 to 2 percent slopes, occasionally flooded, on a 2 percent slope in a cultivated field at an elevation of 667 feet above mean sea level; Knox County, Illinois; about 5 miles east and 2 miles north of Victoria; 2,475 feet east and 495 feet south of the northwest corner of sec. 1, T. 12 N., R. 4 E.; USGS Lafayette, Illinois, topographic quadrangle; lat. 41 degrees 03 minutes 37.8 seconds N. and long. 89 degrees 59 minutes 42.1 seconds W.; UTM Zone 16T 0248323 easting and 4549585 northing; NAD 27:

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine and medium subangular blocky structure; friable; slightly acid; clear smooth boundary.
A1—10 to 16 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; few faint very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.
A2—16 to 27 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; weak fine granular structure; friable; few faint very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.
AC—27 to 52 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak medium subangular blocky structure; friable; few faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; clear smooth boundary.
C1—52 to 65 inches; dark brown (10YR 3/3) silt loam; massive; friable; slightly acid; clear smooth boundary.
C2—65 to 80 inches; grayish brown (10YR 5/2) silt loam; massive; friable; few fine distinct yellowish brown (10YR 5/4) masses of iron and manganese accumulation in the matrix; few fine prominent yellowish brown (10YR 5/6) and few coarse prominent yellowish red (5YR 5/6) masses of iron accumulation in the matrix; few fine prominent black (N 2.5/0) masses of manganese accumulation throughout; neutral.

Range in Characteristics

Thickness of the mollic epipedon: 24 to 57 inches
Depth to carbonates: More than 60 inches

A horizon:
Hue—10YR
Value—2 or 3
Chroma—1 to 3
Texture—silt loam
Content of rock fragments—0 to 1 percent
Reaction—slightly acid to slightly alkaline

AC horizon:
Hue—10YR
Value—4 or 5
Chroma—3 or 4
Texture—silt loam
Content of rock fragments—0 to 1 percent
Reaction—slightly acid to slightly alkaline

C horizon:
Hue—10YR
Value—3 to 5
Chroma—2 to 4
Texture—silt loam or loam
Content of rock fragments—0 to 1 percent

Reaction—slightly acid to slightly alkaline

8077A—Huntsville silt loam, 0 to 2 percent slopes, occasionally flooded

Setting

Landform: Flood plains

Map Unit Composition

Huntsville and similar soils: 88 percent
Dissimilar soils: 12 percent

Minor Components

Similar soils:
- Soils that are moderately well drained
- Soils that have a thin surface layer
- Soils that are flooded more frequently than once every 2 years but are either artificially drained or are not wet for extended periods

Dissimilar soils:
- Soils that are not subject to flooding
- Soils that are lower on the flood plains and are somewhat poorly drained or poorly drained
- Soils that are frequently flooded and are undrained and/or wet for extended periods
- The poorly drained Sawmill soils in swales

Properties and Qualities of the Huntsville Soil

Parent material: Silty alluvium
Drainage class: Moderately well drained
Slowest permeability within a depth of 40 inches: Moderate
Permeability below a depth of 60 inches: Moderate
Available water capacity: About 13.1 inches to a depth of 60 inches
Content of organic matter in the surface layer: 2.5 to 4.0 percent
Shrink-swell potential: Low
Depth and months of the highest apparent seasonal high water table: 3.5 feet, Feb.–Apr.
Frequency and most likely period of flooding: Occasional, Nov.–June
Potential for frost action: High
Hazard of corrosion: Moderate for steel and low for concrete
Surface runoff class: Low
Susceptibility to water erosion: Low
Susceptibility to wind erosion: Low

Interpretive Groups

Land capability classification: Huntsville—2w
Prime farmland status: Huntsville—prime farmland in all areas
Hydric soil status: Huntsville—not hydric

830—Landfills

This map unit is in areas of garbage and other refuse. The surface typically is covered by a layer of compacted earth. Slopes range from 1 to 6 percent. Near the boundaries, this unit may include areas of natural soils, such as Xenia soils on the higher parts of the landscape and Drummer, Sabina, or Sawmill soils on the lower parts.

Interpretive Groups

Land capability classification: Landfills—none assigned
Prime farmland status: Landfills—not prime farmland
Hydric soil status: Landfills—unranked

Lawson Series

Taxonomic classification: Fine-silty, mixed, superactive, mesic Aquic Cumulic Hapludolls

Typical Pedon

Lawson silt loam, 0 to 2 percent slopes, frequently flooded, at an elevation of about 638 feet above mean sea level; Whiteside County, Illinois; about 170 feet north and 1,190 feet east of the southwest corner of sec. 18, T. 21 N., R. 7 E.; USGS Sterling, Illinois, topographic quadrangle; lat. 41 degrees 46 minutes 29 seconds N. and long. 89 degrees 41 minutes 2 seconds W.; UTM Zone 16T 0276929 easting and 4628033 northing; NAD 27:

Ap—0 to 8 inches; very dark gray (10YR 3/1) silt loam, dark grayish brown (10YR 4/2) dry; moderate medium granular structure; friable; neutral; abrupt smooth boundary.

A1—8 to 17 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine subangular blocky structure parting to moderate fine granular; friable; many faint black (10YR 2/1) organic coatings on faces of peds; slightly acid; gradual smooth boundary.

A2—17 to 30 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine subangular blocky structure parting to moderate fine granular; friable; few faint black (10YR 2/1) organic coatings on faces of peds; few fine faint brown (10YR 4/3) masses of iron and manganese accumulation in the matrix; slightly acid; clear smooth boundary.

A3—30 to 35 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine subangular blocky structure; friable; few faint very dark gray (10YR 3/1) organic coatings on faces of peds; few fine faint dark grayish brown (10YR 4/2) iron depletions and few fine faint brown (10YR 4/3) masses of iron and manganese accumulation in the matrix; slightly acid; clear smooth boundary.

AC—35 to 44 inches; dark grayish brown (10YR 4/2) silt loam; weak medium subangular blocky structure; friable; many faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; few fine prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; slightly acid; clear smooth boundary.

Cg1—44 to 51 inches; grayish brown (2.5Y 5/2) silt loam; massive; friable; few fine faint gray (10YR 5/1) iron depletions in the matrix; few fine prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; neutral; clear smooth boundary.

Cg2—51 to 60 inches; grayish brown (10YR 5/2) and dark grayish brown (2.5Y 4/2) loam; massive; friable; few fine faint gray (10YR 5/1) iron depletions in the matrix; few fine prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; neutral.

Range in Characteristics

Thickness of the mollic epipedon: 24 to 36 inches
Thickness of the silty alluvium or loess: Typically more than 40 inches
Depth to carbonates: Typically more than 60 inches

A horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam
Content of rock fragments—0 to 1 percent
Reaction—slightly acid or neutral

AC horizon (where present):
Properties—a transition zone having properties of both the A and C horizons

C horizon:
Hue—10YR or 2.5Y
Value—3 to 6
Chroma—1 to 3
Texture—dominantly silt loam or loam; in some pedons thin strata of coarser textures
Content of rock fragments—0 to 3 percent
Reaction—neutral or slightly alkaline

3451A—Lawson silt loam, 0 to 2 percent slopes, frequently flooded

Setting

Landform: Flood plains

Map Unit Composition

Lawson and similar soils: 85 percent
Dissimilar soils: 15 percent

Minor Components

Similar soils:
- Soils that are moderately well drained
- Soils that have a thin surface layer
- Soils that are flooded less frequently than once every 2 years

Dissimilar soils:
- Soils that are not subject to flooding
- Soils that are well drained
- The poorly drained Sawmill soils in swales below the Lawson soil

Properties and Qualities of the Lawson Soil

Parent material: Silty alluvium
Drainage class: Somewhat poorly drained
Slowest permeability within a depth of 40 inches: Moderate
Permeability below a depth of 60 inches: Moderate
Available water capacity: About 12.2 inches to a depth of 60 inches
Content of organic matter in the surface layer: 3.5 to 7.0 percent
Shrink-swell potential: Low
Depth and months of the highest apparent seasonal high water table: 1.0 foot, Jan.–May
Frequency and most likely period of flooding: Frequent, Nov.–June
Potential for frost action: High
Hazard of corrosion: High for steel and low for concrete
Surface runoff class: Low
Susceptibility to water erosion: Low
Susceptibility to wind erosion: Low

Interpretive Groups

Land capability classification: Lawson—3w
Prime farmland status: Lawson—prime farmland where protected from flooding or not frequently flooded during the growing season
Hydric soil status: Lawson—not hydric

Milford Series

Taxonomic classification: Fine, mixed, superactive, mesic Typic Endoaquolls

Typical Pedon

Milford silty clay loam, in an area of Drummer-Milford silty clay loams, 0 to 2 percent slopes, in a cultivated field at an elevation of 646 feet above mean sea level; Moultrie County, Illinois; 1,170 feet north and 1,605 feet west of the southeast corner of sec. 20, T. 13 N., R. 6 E.; USGS Sullivan, Illinois, topographic quadrangle; lat. 39 degrees 33 minutes 10.7 seconds N. and long. 88 degrees 33 minutes 9.7 seconds W.; UTM Zone 16S 0366596 easting and 4379086 northing; NAD 27:

Ap—0 to 9 inches; black (2.5Y 2.5/1) silty clay loam; moderate fine subangular blocky structure parting to moderate fine granular; friable; common very fine and fine roots throughout; slightly acid; abrupt smooth boundary.

A—9 to 14 inches; very dark gray (2.5Y 3/1) silty clay loam; moderate fine and medium subangular blocky structure; firm; common very fine roots throughout; many distinct black (2.5Y 2.5/1) organo-clay films on vertical faces of peds; common fine and medium faint dark gray (2.5Y 4/1) iron depletions in the matrix; neutral; clear wavy boundary.

Btg1—14 to 25 inches; gray (10YR 5/1) silty clay; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; common very fine roots throughout; many distinct very dark gray (10YR 3/1) clay films on faces of peds; few fine and medium prominent yellowish brown (10YR 5/6) masses of iron accumulation and few medium distinct yellowish brown (10YR 5/4) masses of iron and manganese accumulation in the matrix; neutral; clear wavy boundary.

Btg2—25 to 45 inches; grayish brown (2.5Y 5/2) silty clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; common very fine roots throughout; many distinct gray (2.5Y 5/1) clay films, common distinct dark gray (10YR 4/1) clay films, and few distinct very dark gray (10YR 3/1) organo-clay films on faces of peds; many fine and medium prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; neutral; clear wavy boundary.

2Btg3—45 to 75 inches; 85 percent grayish brown (10YR 5/2) and 15 percent yellowish brown (10YR 5/6) silt loam; weak coarse prismatic structure; firm; few very fine and fine roots throughout; common distinct gray (10YR 5/1) clay films on faces of peds and few prominent black (2.5Y 2.5/1) organo-clay films lining root channels and pores; few fine prominent black (2.5Y 2.5/1) masses of manganese accumulation in the matrix; slightly alkaline; abrupt wavy boundary.

2BCg—75 to 93 inches; gray (2.5Y 6/1) silt loam; weak very coarse prismatic structure; firm; few very fine roots throughout; many prominent black (2.5Y 2.5/1) organo-clay films lining root channels and pores; slightly alkaline.

Range in Characteristics

Thickness of the mollic epipedon: 10 to 24 inches
Thickness of the loess: 40 to 60 inches
Depth to carbonates: More than 60 inches
Depth to the base of the cambic horizon: 36 to more than 60 inches

A horizon:
Hue—10YR or 2.5Y
Value—2 to 3
Chroma—0 to 2
Texture—silty clay loam
Content of rock fragments—0 to 1 percent
Reaction—moderately acid to neutral

Btg horizon:
Hue—10YR, 2.5Y, 5Y, or N
Value—4 to 6
Chroma—0 to 2
Texture—silty clay or silty clay loam
Content of rock fragments—0 to 1 percent
Reaction—slightly acid to slightly alkaline

2Btg and 2BCg horizons:
Hue—10YR, 2.5Y, 5Y, or N
Value—4 to 6
Chroma—0 to 2
Texture—silt loam or clay loam
Content of rock fragments—0 to 5 percent
Reaction—neutral to moderately alkaline

722A—Drummer-Milford silty clay loams, 0 to 2 percent slopes

Setting

Landform: Drummer—outwash plains; Milford—glacial lake plains
Position on landform: Toeslopes

Map Unit Composition

Drummer and similar soils: 60 percent
Milford and similar soils: 35 percent
Dissimilar soils: 5 percent

Minor Components

Similar soils:
- Soils that have a limy surface layer
- Soils that have more than 15 percent sand in layers above 40 inches
- Soils that have a very thick dark surface layer
- Soils that have a limy subsoil within a depth of 40 inches

Dissimilar soils:
- Soils that are somewhat poorly drained and are on slight rises above the Drummer and Milford soils

Properties and Qualities of the Drummer Soil

Parent material: Silty loess over loamy outwash
Drainage class: Poorly drained
Slowest permeability within a depth of 40 inches: Moderate
Permeability below a depth of 60 inches: Moderate
Available water capacity: About 11.4 inches to a depth of 60 inches
Content of organic matter in the surface layer: 4.5 to 7.0 percent
Shrink-swell potential: Moderate
Depth and months of the highest apparent seasonal high water table: At the surface, Jan.–May
Ponding: Frequent, of brief duration, Jan.–May
Flooding: None
Potential for frost action: High
Hazard of corrosion: High for steel and moderate for concrete
Surface runoff class: Negligible
Susceptibility to water erosion: Low
Susceptibility to wind erosion: Very low

Properties and Qualities of the Milford Soil

Parent material: Silty and clayey lacustrine deposits
Drainage class: Poorly drained
Slowest permeability within a depth of 40 inches: Moderately slow
Permeability below a depth of 60 inches: Moderate
Available water capacity: About 9.4 inches to a depth of 60 inches
Content of organic matter in the surface layer: 4.5 to 6.0 percent
Shrink-swell potential: High
Depth and months of the highest apparent seasonal high water table: At the surface, Jan.–May
Ponding: Frequent, of brief duration, Jan.–May
Flooding: None
Potential for frost action: High
Hazard of corrosion: High for steel and moderate for concrete
Surface runoff class: Low
Susceptibility to water erosion: Low
Susceptibility to wind erosion: Moderate

Interpretive Groups

Land capability classification: Drummer and Milford—2w
Prime farmland status: Drummer and Milford—prime farmland in drained areas
Hydric soil status: Drummer and Milford—hydric

802D—Orthents, loamy, 2 to 20 percent slopes

This map unit is in areas where soil material has been excavated and redeposited during sand and gravel mining operations, road construction, dam building, or other activities requiring mass disturbance of earthy material. Typically, the surface layer is clay loam about 10 inches thick. The underlying material to a depth of 60 inches is clay loam, silty clay loam, or loam.

Setting

Landform: Ground moraines or stream terraces
Position on landform: Backslopes

Map Unit Composition

Orthents, loamy, and similar soils: 90 percent
Dissimilar soils: 10 percent

Minor Components

Similar soils:
- The moderately well drained Rush soils in undisturbed areas

Dissimilar soils:
- The somewhat poorly drained Starks soils on toeslopes
- Ponded soils in pits and depressions
- The poorly drained Drummer soils in swales
- The poorly drained Sawmill soils on flood plains

Properties and Qualities of the Orthents

Parent material: Earthy cut and fill
Drainage class: Moderately well drained
Slowest permeability within a depth of 40 inches: Slow
Permeability below a depth of 60 inches: Slow to moderate
Available water capacity: About 10.9 inches to a depth of 60 inches
Content of organic matter in the surface layer: 0.5 to 2.0 percent
Shrink-swell potential: Moderate
Depth and months of the highest apparent seasonal high water table: 3.3 feet, Feb.–Apr.

Flooding: None
Potential for frost action: Moderate
Hazard of corrosion: High for steel and moderate for concrete
Surface runoff class: High
Susceptibility to water erosion: High
Susceptibility to wind erosion: Low

Interpretive Groups

Land capability classification: Orthents, loamy—4e
Prime farmland status: Orthents, loamy—not prime farmland
Hydric soil status: Orthents, loamy—not hydric

Peotone Series

Taxonomic classification: Fine, smectitic, mesic, Cumulic Vertic Endoaquolls

Typical Pedon

Peotone silty clay loam, 0 to 2 percent slopes, on a nearly level slope in a cultivated field at an elevation of 692 feet above mean sea level; Macon County, Illinois; 310 feet north and 2,435 feet west of the center of sec. 13, T. 14 N., R. 3 E.; USGS Dalton City, Illinois, topographic quadrangle; lat. 39 degrees 39 minutes 40.5 seconds N. and long. 88 degrees 49 minutes 43.3 seconds W.; UTM Zone 16T 0343125 easting and 4391552 northing; NAD 27:

Ap—0 to 6 inches; black (5Y 2.5/1) silty clay loam, dark gray (10YR 4/1) dry; moderate very fine subangular blocky structure; firm; neutral; clear smooth boundary.
A—6 to 14 inches; black (5Y 2.5/1) silty clay loam, dark gray (10YR 4/1) dry; moderate very fine subangular blocky structure; moderate medium angular blocky compaction zone in the upper 2 inches; firm; neutral; clear smooth boundary.
AB—14 to 22 inches; very dark gray (5Y 3/1) silty clay loam, gray (5Y 5/1) dry; moderate fine angular blocky structure; firm; many faint black (5Y 2.5/1) organic coatings on faces of peds; neutral; clear smooth boundary.
BA—22 to 28 inches; very dark gray (5Y 3/1) silty clay loam, gray (5Y 5/1) dry; moderate fine prismatic structure; firm; few medium rounded prominent black (7.5YR 2.5/1) very weakly cemented manganese nodules throughout; neutral; clear smooth boundary.
Bg1—28 to 36 inches; dark gray (5Y 4/1) silty clay loam; weak medium prismatic structure; firm; few fine faint gray (5Y 5/1) iron depletions in the matrix; few medium rounded prominent black (7.5YR 2.5/1) very weakly cemented manganese nodules throughout; neutral; clear smooth boundary.
Bg2—36 to 44 inches; gray (5Y 5/1) silty clay loam; weak medium prismatic structure; firm; common fine prominent light olive brown (2.5Y 5/4) masses of iron and manganese accumulation and yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; few fine and medium rounded prominent black (7.5YR 2.5/1) very weakly cemented manganese nodules throughout; neutral; gradual smooth boundary.
BCg—44 to 60 inches; gray (5Y 5/1) silty clay loam; weak medium prismatic structure; firm; common medium prominent strong brown (7.5YR 5/6) masses of iron accumulation and light yellowish brown (2.5Y 6/4) masses of iron and manganese accumulation in the matrix; 11 percent krotovinas; violently effervescent; slightly alkaline.

Range in Characteristics

Thickness of the mollic epipedon: 24 to 36 inches
Thickness of the loess or clayey colluvial sediment: More than 40 inches
Depth to carbonates: More than 38 inches
Depth to the base of the cambic horizon: More than 38 inches

A horizon:
Hue—10YR, 2.5Y, 5Y, or N
Value—2 to 3
Chroma—0 or 1
Texture—silty clay loam
Content of rock fragments—typically none
Reaction—moderately acid to slightly alkaline

Bg horizon:
Hue—10YR, 2.5Y, 5Y, or N
Value—2 to 6
Chroma—0 to 2
Texture—silty clay loam or silty clay
Content of rock fragments—0 to 1 percent
Reaction—slightly acid to slightly alkaline

BCg or Cg horizon:
Hue—10YR, 2.5Y, 5Y, or N
Value—4 to 6
Chroma—0 to 2
Texture—silt loam or silty clay loam
Content of rock fragments—0 to 1 percent
Reaction—neutral to moderately alkaline

330A—Peotone silty clay loam, 0 to 2 percent slopes

Setting

Landform: Closed depressions

Map Unit Composition

Peotone and similar soils: 93 percent
Dissimilar soils: 7 percent

Minor Components

Similar soils:
- Soils that have a limy surface layer
- Soils that have dense gray loam till in the substratum, within a depth of 80 inches
- Soils that have more than 15 percent sand in layers above 40 inches

Dissimilar soils:
- Soils that have a limy subsoil within a depth of 40 inches
- The poorly drained Drummer soils on slight rises
- Soils that are somewhat poorly drained and are on slight rises above Peotone soil

Properties and Qualities of the Peotone Soil

Parent material: Clayey colluvium
Drainage class: Very poorly drained
Slowest permeability within a depth of 40 inches: Moderately slow
Permeability below a depth of 60 inches: Moderately slow
Available water capacity: About 11.5 inches to a depth of 60 inches
Content of organic matter in the surface layer: 4.5 to 7.0 percent
Shrink-swell potential: High
Depth and months of the highest apparent seasonal high water table: At the surface, Jan.–June
Ponding: Frequent, of brief duration, Jan.–June
Flooding: None
Potential for frost action: High
Hazard of corrosion: High for steel and moderate for concrete
Surface runoff class: Negligible
Susceptibility to water erosion: Low
Susceptibility to wind erosion: Moderate

Interpretive Groups

Land capability classification: Peotone—3w
Prime farmland status: Peotone—prime farmland in drained areas
Hydric soil status: Peotone—hydric

Raub Series

Taxonomic classification: Fine-silty, mixed, superactive, mesic Aquic Argiudolls

Typical Pedon

Raub silt loam, 0 to 2 percent slopes, on a nearly level slope in a cultivated field at an elevation of 680 feet above mean sea level; Champaign County, Illinois; 2,550 feet north and 1,690 feet east of the southwest corner of sec. 19, T. 20 N., R. 14 W.; USGS Royal, Illinois, topographic quadrangle; lat. 40 degrees 10 minutes 40 seconds N. and long. 87 degrees 59 minutes 18 seconds W.; UTM Zone 16T 0415855 easting and 4447951 northing; NAD 27:

Ap—0 to 10 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; moderate fine and very fine subangular blocky structure; friable; slightly acid; clear smooth boundary.

A—10 to 18 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine subangular blocky structure; friable; slightly acid; clear smooth boundary.

Bt1—18 to 22 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine subangular blocky structure; friable; few distinct very dark gray (10YR 3/1) organo-clay films lining pores; many distinct grayish brown (10YR 4/2) clay films on faces of peds; few fine distinct and prominent yellowish brown (10YR 5/6 and 5/8) masses of iron accumulation in the matrix; moderately acid; abrupt smooth boundary.

Bt2—22 to 32 inches; yellowish brown (10YR 5/4) silty clay loam; strong fine and medium angular blocky structure; firm; many distinct brown (10YR 4/3) clay films on faces of peds; few fine distinct dark grayish brown (10YR 4/2) iron depletions, few fine faint brown (10YR 5/3) masses of iron and manganese accumulation, and common fine distinct yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; few fine rounded prominent black (7.5YR 2.5/1) very weakly cemented manganese nodules throughout; slightly acid; clear smooth boundary.

2Bt3—32 to 40 inches; yellowish brown (10YR 5/4) clay loam; weak medium subangular blocky structure; firm; common distinct black (10YR 2/1) organo-clay films lining root channels; few coarse prominent light olive gray (5Y 6/2) iron depletions and many fine distinct yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; many medium irregular prominent black (7.5YR 2.5/1) very weakly cemented manganese nodules throughout; 1 percent fine gravel; neutral; clear smooth boundary.

2BC—40 to 50 inches; yellowish brown (10YR 5/4) clay loam; weak medium and coarse subangular blocky structure; firm; many medium distinct gray (10YR 5/1) iron depletions and many medium distinct yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; common fine irregular prominent black (7.5YR 2.5/1) very weakly cemented manganese nodules throughout; 1 percent fine gravel; slightly effervescent; slightly alkaline; clear smooth boundary.

2C—50 to 60 inches; yellowish brown (10YR 5/4) and gray (5Y 6/1) loam; massive; firm; common fine distinct and prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; 5 percent fine gravel; strongly effervescent; moderately alkaline.

Range in Characteristics

Thickness of the mollic epipedon: 10 to 24 inches
Thickness of the loess: 22 to 40 inches
Depth to carbonates: 40 to 70 inches
Depth to the base of the argillic horizon: 40 to 70 inches

A horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam
Content of rock fragments—0 to 1 percent
Reaction—moderately acid to neutral

Bt horizon:
Hue—10YR or 2.5Y
Value—3 to 5
Chroma—3 to 6
Texture—silty clay loam or silt loam
Content of rock fragments—0 to 1 percent
Reaction—strongly acid to slightly acid

2Bt horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—3 to 6
Texture—clay loam, silty clay loam, or loam
Content of rock fragments—1 to 10 percent
Reaction—slightly acid or neutral

2BC horizon (where present):
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—3 to 6
Texture—clay loam or loam
Content of rock fragments—1 to 10 percent
Reaction—neutral or slightly alkaline

2C horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—1 to 4
Texture—clay loam or loam
Content of rock fragments—3 to 10 percent
Reaction—slightly alkaline or moderately alkaline

481A—Raub silt loam, 0 to 2 percent slopes

Setting

Landform: Ground moraines
Position on landform: Footslopes and summits

Map Unit Composition

Raub and similar soils: 94 percent
Dissimilar soils: 6 percent

Minor Components

Similar soils:
- Soils that have a thin surface layer
- Soils that have more clay in the subsoil
- Soils that have more than 40 inches of loess over the till
- Soils that have stratified outwash in the substratum, below a depth of 60 inches
- Soils that are moderately well drained
- Soils that have slopes of more than 2 percent

Dissimilar soils:
- The poorly drained Drummer soils in swales

Properties and Qualities of the Raub Soil

Parent material: Silty loess over loamy till
Drainage class: Somewhat poorly drained
Slowest permeability within a depth of 40 inches: Moderate
Permeability below a depth of 60 inches: Moderately slow
Available water capacity: About 10.2 inches to a depth of 60 inches
Content of organic matter in the surface layer: 3.5 to 5.0 percent
Shrink-swell potential: Moderate
Depth and months of the highest perched seasonal high water table: 1.0 foot, Jan.–May
Flooding: None
Potential for frost action: High
Hazard of corrosion: High for steel and moderate for concrete

Surface runoff class: Low
Susceptibility to water erosion: Low
Susceptibility to wind erosion: Low

Interpretive Groups

Land capability classification: Raub—1
Prime farmland status: Raub—prime farmland in all areas
Hydric soil status: Raub—not hydric

Rush Series

Taxonomic classification: Fine-silty, mixed, superactive, mesic Typic Hapludalfs

Typical Pedon

Rush silt loam, 0 to 2 percent slopes, on a 1 percent slope in a cultivated field at an elevation of 627 feet above mean sea level; Moultrie County, Illinois; 2,530 feet north and 1,420 feet east of the southwest corner of sec. 19, T. 13 N., R. 6 E.; USGS Sullivan, Illinois, topographic quadrangle; lat. 39 degrees 33 minutes 23.9 seconds N. and long. 88 degrees 34 minutes 48.8 seconds W.; UTM Zone 16S 0364237 easting and 4379535 northing; NAD 27:

Ap—0 to 10 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak fine granular structure; friable; common very fine and few fine roots throughout; moderately acid; abrupt smooth boundary.

Bt1—10 to 27 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine prismatic structure parting to moderate fine angular blocky; firm; few very fine roots throughout; common distinct brown (10YR 4/3) clay films on faces of peds; very strongly acid; clear smooth boundary.

Bt2—27 to 36 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium prismatic structure parting to moderate medium angular blocky; firm; few very fine roots throughout; common distinct brown (10YR 4/3) clay films on faces of peds; very strongly acid; clear smooth boundary.

2Bt3—36 to 47 inches; yellowish brown (10YR 5/6) clay loam; weak medium angular blocky structure; firm; few very fine roots; few distinct brown (10YR 4/3) clay films on faces of peds; very strongly acid; clear smooth boundary.

2Bt4—47 to 53 inches; yellowish brown (10YR 5/4) sandy loam; weak medium angular blocky structure; friable; common distinct dark yellowish brown (10YR 4/4) clay bridges between sand grains; very strongly acid; clear smooth boundary.

3Bt5—53 to 67 inches; yellowish brown (10YR 5/4) gravelly sandy clay loam; weak medium subangular blocky structure; firm; many prominent dark yellowish brown (10YR 3/4) clay bridges between sand grains and clay films lining pores; about 20 percent rock fragments, by volume; neutral; clear smooth boundary.

3C—67 to 80 inches; yellowish brown (10YR 5/4) gravelly sand, light yellowish brown (10YR 6/4) dry; single grain; loose; about 20 percent rock fragments, by volume; slightly effervescent; slightly alkaline.

Range in Characteristics

Thickness of the loess: 24 to 40 inches
Depth to carbonates: More than 40 inches
Depth to the base of the argillic horizon: 40 to 80 inches

A horizon:
Hue—10YR
Value—4 or 5
Chroma—2 or 3
Texture—silt loam
Content of rock fragments—0 to 1 percent
Reaction—strongly acid to neutral

Bt horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—4 to 6
Texture—silt loam or silty clay loam
Content of rock fragments—0 to 1 percent
Reaction—very strongly acid to slightly acid

2Bt horizon:
Hue—10YR, 7.5YR, or 5YR
Value—4 or 5
Chroma—3 to 6
Texture—loam, clay loam, or sandy clay loam
Content of rock fragments—0 to 15 percent
Reaction—very strongly acid to moderately acid

3Bt horizon:
Hue—10YR or 7.5YR
Value—4 or 5
Chroma—3 to 6
Texture—sandy loam, loam, or sandy clay loam
Content of rock fragments—15 to 35 percent
Reaction—slightly acid or neutral

3C horizon:
Hue—10YR
Value—5 or 6
Chroma—2 to 4
Texture—loamy sand, loamy coarse sand, sand, or coarse sand

Content of rock fragments—15 to 35 percent
Reaction—slightly alkaline or moderately alkaline

791A—Rush silt loam, 0 to 2 percent slopes

Setting

Landform: Outwash plains and stream terraces
Position on landform: Summits

Map Unit Composition

Rush and similar soils: 90 percent
Dissimilar soils: 10 percent

Minor Components

Similar soils:
- Soils that have a darker surface layer
- Soils that are moderately well drained
- Soils that have slopes of more than 2 percent
- Soils that have stratified, medium textured outwash in the substratum, below a depth of 60 inches
- Soils that have less sand and gravel in the substratum

Dissimilar soils:
- Soils that are somewhat poorly drained and are in slight swales below the Rush soil
- The poorly drained Sawmill soils on flood plains

Properties and Qualities of the Rush Soil

Parent material: Silty loess over sandy and gravelly outwash
Drainage class: Well drained
Slowest permeability within a depth of 40 inches: Moderate
Permeability below a depth of 60 inches: Moderate to rapid
Available water capacity: About 9.7 inches to a depth of 60 inches
Content of organic matter in the surface layer: 1.0 to 2.5 percent
Shrink-swell potential: Moderate
Flooding: None
Potential for frost action: High
Hazard of corrosion: Moderate for steel and high for concrete
Surface runoff class: Low
Susceptibility to water erosion: Low
Susceptibility to wind erosion: Low

Interpretive Groups

Land capability classification: Rush—1
Prime farmland status: Rush—prime farmland in all areas
Hydric soil status: Rush—not hydric

791B2—Rush silt loam, 2 to 5 percent slopes, eroded

Setting

Landform: Stream terraces
Position on landform: Shoulders

Map Unit Composition

Rush and similar soils: 95 percent
Dissimilar soils: 5 percent

Minor Components

Similar soils:
- Soils that have a dark surface layer
- Soils that are moderately well drained
- Soils that have slopes of less that 2 percent
- Soils that have slopes of more than 5 percent
- Soils that have stratified, medium textured outwash in the substratum, below a depth of 60 inches
- Soils that have less sand and gravel in the substratum

Dissimilar soils:
- Soils that are somewhat poorly drained and are in slight swales below the Rush soil
- The poorly drained Sawmill soils on flood plains

Properties and Qualities of the Rush Soil

Parent material: Silty loess over sandy and gravelly outwash
Drainage class: Well drained
Slowest permeability within a depth of 40 inches: Moderate
Permeability below a depth of 60 inches: Moderate to rapid
Available water capacity: About 9.4 inches to a depth of 60 inches
Content of organic matter in the surface layer: 1.0 to 2.5 percent
Shrink-swell potential: Moderate
Flooding: None
Accelerated erosion: The surface layer has been thinned by erosion.
Potential for frost action: High
Hazard of corrosion: Moderate for steel and high for concrete
Surface runoff class: Low
Susceptibility to water erosion: Moderate
Susceptibility to wind erosion: Low

Interpretive Groups

Land capability classification: Rush—2e
Prime farmland status: Rush—prime farmland in all areas
Hydric soil status: Rush—not hydric

Sabina Series

Taxonomic classification: Fine, smectitic, mesic Aeric Epiaqualfs

Taxadjunct Feature

The Sabina soils in this survey area are taxadjuncts to the series because they are slightly better drained than is defined for the series. This difference, however, does not significantly affect the use, management, or interpretations of the soils. The soils are classified as fine, smectitic, mesic Aquic Hapludalfs.

Typical Pedon

Sabina silt loam, 0 to 2 percent slopes, on a nearly level slope in a cultivated field at an elevation of 843 feet above mean sea level; McLean County, Illinois; 1,452 feet east and 231 feet north of the southwest corner of sec. 34, T. 23 N., R. 4 E.; USGS Arrowsmith, Illinois, topographic quadrangle; lat. 40 degrees 23 minutes 58.3 seconds N. and long. 88 degrees 44 minutes 24.1 seconds W.; UTM Zone 16T 0352333 easting and 4473346 northing; NAD 27:

Ap—0 to 7 inches; brown (10YR 4/3) and dark grayish brown (10YR 4/2) silt loam mixed with pockets of grayish brown (10YR 5/2) material from the subsurface layer; mostly weak fine and medium subangular blocky structure, some thin platy structure in the lower part; friable; slightly acid; abrupt smooth boundary.

E—7 to 14 inches; grayish brown (10YR 5/2) silt loam; moderate thick platy structure; friable; very few distinct light gray (10YR 7/1) and grayish brown (10YR 5/2) silt coatings on faces of peds; common fine prominent iron and manganese stains and concretions throughout; strongly acid; clear smooth boundary.

BE—14 to 18 inches; dark grayish brown (10YR 4/2) silt loam; moderate fine angular blocky and weak moderately thick platy structure; friable; few faint dark brown (10YR 3/3) organo-clay films and dark grayish brown (10YR 4/2) clay films on faces of peds; few faint light brownish gray (10YR 6/2) silt coatings on faces of peds; few fine faint gray (10YR 5/1) iron depletions and common fine prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; few fine prominent iron and manganese stains and concretions throughout; strongly acid; clear smooth boundary.

Bt1—18 to 30 inches; brown (10YR 4/3) silty clay loam; moderate medium prismatic structure parting to moderate fine and medium angular blocky; firm; common distinct brown (10YR 5/3) and grayish brown (10YR 5/2) clay films on faces of peds; few faint light brownish gray (10YR 6/2) silt coatings on faces of peds; few fine faint grayish brown (10YR 5/2) iron depletions and common fine and medium distinct yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; few fine prominent iron and manganese stains and concretions throughout; slightly acid; gradual wavy boundary.

Bt2—30 to 35 inches; brown (10YR 4/3) silty clay loam; weak medium prismatic structure parting to weak medium angular blocky; firm; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine and medium faint grayish brown (10YR 5/2) iron depletions and distinct yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; few fine prominent iron and manganese stains and concretions throughout; neutral; gradual wavy boundary.

Bt3—35 to 45 inches; brown (10YR 5/3) and yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; friable; few distinct dark gray (10YR 4/1) and dark grayish brown (10YR 4/2) clay films on faces of peds and in root channels; common fine and medium faint and distinct grayish brown (10YR 5/2) iron depletions and common medium distinct yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; few fine prominent iron and manganese stains and concretions throughout; neutral; abrupt smooth boundary.

2Bt4—45 to 51 inches; olive brown (2.5Y 4/4) loam; weak medium and coarse subangular blocky structure; firm; few faint dark grayish brown (10YR 4/2) clay films and light brownish gray (10YR 6/2) silt coatings lining root channels and pores; few fine and medium distinct grayish brown (10YR 5/2) iron depletions in the matrix; few fine prominent masses of calcium carbonate throughout; strongly effervescent; slightly alkaline; clear smooth boundary.

2C—51 to 60 inches; olive brown (2.5Y 4/4) loam; massive; firm; few medium distinct grayish brown (10YR 5/2) iron depletions in the matrix; violently effervescent; moderately alkaline.

Range in Characteristics

Thickness of the loess: 40 to 60 inches

Depth to carbonates: 40 to 75 inches
Depth to the base of the argillic horizon: 44 to 75 inches

A horizon:
Hue—10YR
Value—3 to 5
Chroma—2 or 3
Texture—silt loam
Content of rock fragments—none
Reaction—strongly acid to neutral

E horizon (where present):
Hue—10YR
Value—4 or 5
Chroma—1 to 3
Texture—silt loam
Content of rock fragments—none
Reaction—very strongly acid to neutral

BE horizon (where present):
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2 to 4
Texture—silty loam or silty clay loam
Content of rock fragments—none
Reaction—strongly acid or moderately acid

Bt horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2 to 4
Texture—silty clay or silty clay loam
Content of rock fragments—none
Reaction—very strongly acid to neutral

2Bt horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 or 5
Chroma—2 to 4
Texture—loam or clay loam
Content of rock fragments—1 to 5 percent
Reaction—neutral or slightly alkaline

2C horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 or 5
Chroma—2 to 4
Texture—loam, clay loam, or silt loam
Content of rock fragments—1 to 10 percent
Reaction—slightly alkaline or moderately alkaline

236A—Sabina silt loam, 0 to 2 percent slopes

Setting

Landform: Ground moraines
Position on landform: Footslopes and summits

Map Unit Composition

Sabina and similar soils: 92 percent
Dissimilar soils: 8 percent

Minor Components

Similar soils:
- Soils that have a dark surface layer
- Soils that have less clay in the subsoil
- Soils that have less than 40 inches of loess over the till
- Soils that have stratified outwash in the substratum, below a depth of 60 inches
- Soils that are moderately well drained

Dissimilar soils:
- The poorly drained Drummer soils in swales

Properties and Qualities of the Sabina Soil

Parent material: Silty loess over loamy till
Drainage class: Somewhat poorly drained
Slowest permeability within a depth of 40 inches: Moderately slow
Permeability below a depth of 60 inches: Moderately slow
Available water capacity: About 10.2 inches to a depth of 60 inches
Content of organic matter in the surface layer: 1.0 to 3.5 percent
Shrink-swell potential: High
Depth and months of the highest perched seasonal high water table: 1.0 foot, Jan.–May
Flooding: None
Potential for frost action: Moderate
Hazard of corrosion: High for steel and concrete
Surface runoff class: Medium
Susceptibility to water erosion: Low
Susceptibility to wind erosion: Low

Interpretive Groups

Land capability classification: Sabina—1
Prime farmland status: Sabina—prime farmland in all areas
Hydric soil status: Sabina—not hydric

Sawmill Series

Taxonomic classification: Fine-silty, mixed, superactive, mesic Cumulic Endoaquolls

Typical Pedon

Sawmill silty clay loam, 0 to 2 percent slopes, frequently flooded, on a nearly level slope in a cultivated field at an elevation of 535 feet above mean sea level; Sangamon County, Illinois; about 2 miles west of Rochester, Illinois, on the flood plain along the South Fork of the Sangamon River; 750 feet east and 300 feet south of the northwest corner of sec. 20, T. 15 N., R. 4 W.; USGS New City, Illinois, topographic quadrangle; lat. 39 degrees 44 minutes 34 seconds N. and long. 89 degrees 34 minutes 15 seconds W.; UTM Zone 16S 0279714 easting and 4402160 northing; NAD 27:

Ap—0 to 10 inches; very dark gray (10YR 3/1) and very dark grayish brown (10YR 3/2) silty clay loam, gray (10YR 5/1) dry; weak fine subangular blocky structure; firm; few fine roots; few subrounded pebbles 1 to 3 millimeters in diameter; slightly acid; clear smooth boundary.

A1—10 to 17 inches; black (10YR 2/1) and very dark grayish brown (10YR 3/2) silty clay loam, dark gray (10YR 4/1) dry; moderate fine subangular blocky structure; firm; few fine roots; few subrounded pebbles 1 to 3 millimeters in diameter; few fine faint rounded black (7.5YR 2.5/1) weakly cemented manganese concretions with diffuse boundaries lining root channels and pores; few fine prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; neutral; clear smooth boundary.

A2—17 to 25 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine and medium angular blocky structure; firm; few fine roots; few fine faint rounded black (7.5YR 2.5/1) weakly cemented manganese concretions with diffuse boundaries lining root channels and pores; few fine prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; neutral; clear smooth boundary.

AB—25 to 32 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; weak medium prismatic structure parting to moderate fine subangular blocky; firm; few fine roots; few fine faint rounded black (7.5YR 2.5/1) weakly cemented manganese concretions with diffuse boundaries lining root channels and pores; few fine prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; neutral; clear smooth boundary.

Bg—32 to 40 inches; dark gray (10YR 4/1) silty clay loam; weak medium prismatic structure parting to moderate fine and medium angular blocky; firm; few fine roots; common faint discontinuous very dark gray (10YR 3/1) organic coatings on faces of peds; few fine faint rounded black (7.5YR 2.5/1) weakly cemented manganese concretions with diffuse boundaries lining root channels and pores; few fine prominent strong brown (7.5YR 5/6) masses of iron accumulation in the matrix; slightly alkaline; clear smooth boundary.

Btg1—40 to 49 inches; grayish brown (10YR 5/2) silty clay loam; moderate medium prismatic structure parting to weak medium angular blocky; firm; common distinct dark gray (10YR 4/1) clay films on faces of peds; few fine distinct rounded black (7.5YR 2.5/1) weakly cemented manganese concretions with diffuse boundaries lining root channels and pores; few fine prominent strong brown (7.5YR 5/6) masses of iron accumulation and common fine distinct yellowish brown (10YR 5/4) masses of iron and manganese accumulation in the matrix; slightly alkaline; clear smooth boundary.

Btg2—49 to 58 inches; grayish brown (2.5Y 5/2) silty clay loam; moderate medium prismatic structure; firm; thin continuous gray (10YR 5/1) clay films on faces of peds; few fine prominent rounded black (7.5YR 2.5/1) weakly cemented manganese concretions with diffuse boundaries lining pores; few fine prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; slightly alkaline; clear smooth boundary.

Cg—58 to 65 inches; grayish brown (2.5Y 5/2) silty clay loam; massive; firm; very dark gray (10YR 3/1) channel linings and fillings; many medium prominent yellowish brown (10YR 5/6) masses of iaccumulation ron lining pores; slightly alkaline.

Range in Characteristics

Thickness of the mollic epipedon: 24 to 36 inches
Depth to carbonates: More than 40 inches
Depth to the base of the cambic horizon: 36 to 60 inches

A and AB horizons:
Hue—10YR, 2.5Y, 5Y, or N
Value—2 to 3
Chroma—0 to 2
Texture—silty clay loam
Content of rock fragments—0 to 2 percent
Reaction—slightly acid to slightly alkaline

Bg and Btg horizons:
Hue—10YR, 2.5Y, or 5Y
Value—3 to 6
Chroma—1 or 2
Texture—silty clay loam
Content of rock fragments—0 to 2 percent
Reaction—slightly acid to slightly alkaline

Cg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—3 to 6
Chroma—1 or 2

Texture—dominantly silty clay loam or clay loam; stratified with other textures in some pedons
Content of rock fragments—0 to 2 percent
Reaction—slightly acid to slightly alkaline

1107A—Sawmill silty clay loam, undrained, 0 to 2 percent slopes, frequently flooded

Setting

Landform: Flood plains

Map Unit Composition

Sawmill and similar soils: 90 percent
Dissimilar soils: 10 percent

Minor Components

Similar soils:
- Soils in which the dark surface soil and subsoil layers have a combined thickness of more than 36 inches
- Soils that have more than 15 percent sand in all layers above 40 inches
- Soils that are artificially drained
- Soils that are flooded less frequently than once every 2 years

Dissimilar soils:
- Soils that are somewhat poorly drained or moderately well drained and are on slight rises and terraces above the Sawmill soil

Properties and Qualities of the Sawmill Soil

Parent material: Silty alluvium
Drainage class: Poorly drained
Slowest permeability within a depth of 40 inches: Moderate
Permeability below a depth of 60 inches: Moderate
Available water capacity: About 11.6 inches to a depth of 60 inches
Content of organic matter in the surface layer: 4.5 to 7.0 percent
Shrink-swell potential: Moderate
Depth and months of the highest apparent seasonal high water table: At the surface, Nov.–June
Ponding: Frequent, of long duration, Nov.–June
Frequency and most likely period of flooding: Frequent, Nov.–June
Potential for frost action: High
Hazard of corrosion: High for steel and low for concrete
Surface runoff class: Negligible
Susceptibility to water erosion: Low
Susceptibility to wind erosion: Very low

Interpretive Groups

Land capability classification: Sawmill—5w
Prime farmland status: Sawmill—not prime farmland
Hydric soil status: Sawmill—hydric

3107A—Sawmill silty clay loam, 0 to 2 percent slopes, frequently flooded

Setting

Landform: Flood plains

Map Unit Composition

Sawmill and similar soils: 92 percent
Dissimilar soils: 8 percent

Minor Components

Similar soils:
- Soils in which the dark surface soil and subsoil layers have a combined thickness of more than 36 inches
- Soils that have more than 15 percent sand in all layers above 40 inches
- Soils that remain wet or ponded for extended periods
- Soils that are flooded less frequently than once every 2 years

Dissimilar soils:
- Soils that are somewhat poorly drained or moderately well drained and are on slight rises and terraces above the Sawmill soil

Properties and Qualities of the Sawmill Soil

Parent material: Silty alluvium
Drainage class: Poorly drained
Slowest permeability within a depth of 40 inches: Moderate
Permeability below a depth of 60 inches: Moderate
Available water capacity: About 11.7 inches to a depth of 60 inches
Content of organic matter in the surface layer: 4.5 to 7.0 percent
Shrink-swell potential: Moderate
Depth and months of the highest apparent seasonal high water table: At the surface, Jan.–May
Ponding: Frequent, of brief duration, Jan.–May
Frequency and most likely period of flooding: Frequent, Nov.–June
Potential for frost action: High
Hazard of corrosion: High for steel and low for concrete
Surface runoff class: Negligible
Susceptibility to water erosion: Low

Susceptibility to wind erosion: Very low

Interpretive Groups

Land capability classification: Sawmill—3w
Prime farmland status: Sawmill—prime farmland where drained and either protected from flooding or not frequently flooded during the growing season
Hydric soil status: Sawmill—hydric

Senachwine Series

Taxonomic classification: Fine-loamy, mixed, active, mesic Typic Hapludalfs

Typical Pedon

Senachwine silt loam, 10 to 18 percent slopes, eroded, at an elevation of 856 feet above mean sea level; Bureau County, Illinois; about 1,040 feet west and 1,345 feet south of the northeast corner of sec. 21, T. 15 N., R. 8 E.; USGS Wyanet, Illinois, topographic quadrangle; lat. 41 degrees 16 minutes 25.4 seconds N. and long. 89 degrees 34 minutes 18 seconds W.; UTM Zone 16T 0284602 easting and 4572121 northing; NAD 27:

Ap—0 to 6 inches; mixed brown (10YR 4/3) and yellowish brown (10YR 5/4) silt loam, pale brown (10YR 6/3) dry; moderate fine granular structure; friable; common fine roots; neutral; abrupt smooth boundary.
Bt1—6 to 15 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine subangular blocky structure; friable; few fine roots; common faint dark yellowish brown (10YR 4/4) clay films on faces of peds; moderately acid; clear smooth boundary.
2Bt2—15 to 28 inches; brown (7.5YR 5/4) clay loam; moderate medium subangular blocky structure; firm; few fine roots; many faint brown (7.5YR 4/4) clay films on faces of peds; few fine prominent rounded black (N 2.5/0) weakly cemented manganese concretions throughout; neutral; clear smooth boundary.
2BCt—28 to 34 inches; brown (7.5YR 5/4) loam; weak coarse prismatic structure; firm; few fine roots; common faint brown (7.5YR 4/4) clay films on faces of peds; 5 percent rock fragments; slightly effervescent; slightly alkaline; clear smooth boundary.
2C—34 to 60 inches; brown (7.5YR 5/4) loam; massive; firm; 5 percent rock fragments; violently effervescent; moderately alkaline.

Range in Characteristics

Thickness of the loess: 0 to 18 inches
Depth to carbonates: 20 to 40 inches
Depth to the base of the argillic horizon: 24 to 40 inches

A horizon:
Hue—10YR
Value—3 to 5
Chroma—2 to 4
Texture—silt loam; clay loam in severely eroded areas
Content of rock fragments—0 to 3 percent
Reaction—moderately acid to neutral

E horizon (where present):
Hue—10YR
Value—4 or 5
Chroma—2 to 4
Texture—silt loam
Content of rock fragments—0 to 3 percent
Reaction—moderately acid to neutral

Bt and 2Bt horizons:
Hue—7.5YR, 10YR, or 2.5Y
Value—4 to 6
Chroma—3 to 6
Texture—silty clay loam, clay loam, or loam
Content of rock fragments—1 to 10 percent
Reaction—strongly acid to neutral

BC or 2BC horizon (where present):
Properties—colors similar to those of the B horizon and texture and reaction similar to those of the C horizon

C or 2C horizon:
Hue—7.5YR, 10YR, or 2.5Y
Value—5 or 6
Chroma—3 or 4
Texture—clay loam or loam
Content of rock fragments—1 to 10 percent
Reaction—slightly alkaline or moderately alkaline

618B2—Senachwine silt loam, 2 to 5 percent slopes, eroded

Setting

Landform: End moraines and ground moraines
Position on landform: Backslopes

Map Unit Composition

Senachwine and similar soils: 90 percent
Dissimilar soils: 10 percent

Minor Components

Similar soils:
- Soils that have a dark surface layer
- Soils that have more than 18 inches of loess over the till
- Soils that are moderately well drained
- Soils that have slopes of less than 2 percent
- Soils that have slopes of more than 5 percent
- Soils that are uneroded or only slightly eroded
- Soils that have stratified outwash in the substratum, below a depth of 40 inches

Dissimilar soils:
- Soils that are somewhat poorly drained and are in slight swales below the Senachwine soil
- The poorly drained Drummer soils in swales

Properties and Qualities of the Senachwine Soil

Parent material: Loamy till
Drainage class: Well drained
Slowest permeability within a depth of 40 inches: Moderately slow
Permeability below a depth of 60 inches: Moderately slow
Available water capacity: About 7.3 inches to a depth of 60 inches
Content of organic matter in the surface layer: 1.0 to 2.5 percent
Shrink-swell potential: Moderate
Flooding: None
Accelerated erosion: The surface layer has been thinned by erosion.
Potential for frost action: Moderate
Hazard of corrosion: Moderate for steel and concrete
Surface runoff class: Low
Susceptibility to water erosion: Moderate
Susceptibility to wind erosion: Low

Interpretive Groups

Land capability classification: Senachwine—2e
Prime farmland status: Senachwine—prime farmland in all areas
Hydric soil status: Senachwine—not hydric

618C2—Senachwine silt loam, 5 to 10 percent slopes, eroded

Setting

Landform: Ground moraines and end moraines
Position on landform: Backslopes

Map Unit Composition

Senachwine and similar soils: 95 percent
Dissimilar soils: 5 percent

Minor Components

Similar soils:
- Soils that have a dark surface layer
- Soils that have more than 18 inches of loess over the till
- Soils that are moderately well drained
- Soils that have slopes of less than 5 percent
- Soils that have slopes of more than 10 percent
- Soils that have stratified outwash in the substratum, below a depth of 40 inches

Dissimilar soils:
- Soils that are somewhat poorly drained and are in slight swales below the Senachwine soil
- The poorly drained Drummer soils in swales
- The poorly drained Sawmill soils on flood plains

Properties and Qualities of the Senachwine Soil

Parent material: Loamy till
Drainage class: Well drained
Slowest permeability within a depth of 40 inches: Moderately slow
Permeability below a depth of 60 inches: Moderately slow
Available water capacity: About 7.3 inches to a depth of 60 inches
Content of organic matter in the surface layer: 1.0 to 2.5 percent
Shrink-swell potential: Moderate
Flooding: None
Accelerated erosion: The surface layer has been thinned by erosion.
Potential for frost action: Moderate
Hazard of corrosion: Moderate for steel and concrete
Surface runoff class: Medium
Susceptibility to water erosion: High
Susceptibility to wind erosion: Low

Interpretive Groups

Land capability classification: Senachwine—3e
Prime farmland status: Senachwine—not prime farmland
Hydric soil status: Senachwine—not hydric

618C3—Senachwine clay loam, 5 to 10 percent slopes, severely eroded

Setting

Landform: End moraines and ground moraines

Position on landform: Backslopes

Map Unit Composition

Senachwine and similar soils: 90 percent
Dissimilar soils: 10 percent

Minor Components

Similar soils:
- Soils that have a surface layer of silt loam
- Soils that have more than 18 inches of loess over the till
- Soils that are moderately well drained
- Soils that have slopes of less than 5 percent
- Soils that have slopes of more than 10 percent
- Soils that have stratified outwash in the substratum, below a depth of 40 inches

Dissimilar soils:
- Soils that are somewhat poorly drained and are in slight swales below the Senachwine soil
- The poorly drained Drummer soils in swales

Properties and Qualities of the Senachwine Soil

Parent material: Loamy till
Drainage class: Well drained
Slowest permeability within a depth of 40 inches: Moderately slow
Permeability below a depth of 60 inches: Moderately slow
Available water capacity: About 7.5 inches to a depth of 60 inches
Content of organic matter in the surface layer: 0.5 to 1.0 percent
Shrink-swell potential: Moderate
Flooding: None
Accelerated erosion: The surface layer is mostly subsoil material.
Potential for frost action: Moderate
Hazard of corrosion: Moderate for steel and concrete
Surface runoff class: Medium
Susceptibility to water erosion: Moderate
Susceptibility to wind erosion: Low

Interpretive Groups

Land capability classification: Senachwine—4e
Prime farmland status: Senachwine—not prime farmland
Hydric soil status: Senachwine—not hydric

618D2—Senachwine silt loam, 10 to 18 percent slopes, eroded

Setting

Landform: End moraines
Position on landform: Backslopes

Map Unit Composition

Senachwine and similar soils: 92 percent
Dissimilar soils: 8 percent

Minor Components

Similar soils:
- Soils that have a dark surface layer
- Soils that have more than 18 inches of loess over the till
- Soils that are moderately well drained
- Soils that have slopes of less than 10 percent
- Soils that have slopes of more than 18 percent
- Soils that have stratified outwash in the substratum, below a depth of 40 inches

Dissimilar soils:
- Soils that are somewhat poorly drained and are in slight swales below the Senachwine soil
- The poorly drained Sawmill soils on flood plains
- The poorly drained Drummer soils in swales

Properties and Qualities of the Senachwine Soil

Parent material: Loamy till
Drainage class: Well drained
Slowest permeability within a depth of 40 inches: Moderately slow
Permeability below a depth of 60 inches: Moderately slow
Available water capacity: About 7.5 inches to a depth of 60 inches
Content of organic matter in the surface layer: 1.0 to 2.5 percent
Shrink-swell potential: Moderate
Flooding: None
Accelerated erosion: The surface layer has been thinned by erosion.
Potential for frost action: Moderate
Hazard of corrosion: Moderate for steel and concrete
Surface runoff class: Medium
Susceptibility to water erosion: High
Susceptibility to wind erosion: Low

Interpretive Groups

Land capability classification: Senachwine—4e
Prime farmland status: Senachwine—not prime farmland
Hydric soil status: Senachwine—not hydric

618D3—Senachwine clay loam, 10 to 18 percent slopes, severely eroded

Setting

Landform: End moraines
Position on landform: Backslopes

Map Unit Composition

Senachwine and similar soils: 95 percent
Dissimilar soils: 5 percent

Minor Components

Similar soils:
- Soils that have a surface layer of silt loam
- Soils that have more than 18 inches of loess over the till
- Soils that are moderately well drained
- Soils that have slopes of less than 10 percent
- Soils that have slopes of more than 18 percent
- Soils that have stratified outwash in the substratum, below a depth of 40 inches

Dissimilar soils:
- Soils that are somewhat poorly drained and are in slight swales below the Senachwine soil
- The poorly drained Drummer soils in swales

Properties and Qualities of the Senachwine Soil

Parent material: Loamy till
Drainage class: Well drained
Slowest permeability within a depth of 40 inches: Moderately slow
Permeability below a depth of 60 inches: Moderately slow
Available water capacity: About 7.0 inches to a depth of 60 inches
Content of organic matter in the surface layer: 0.5 to 1.0 percent
Shrink-swell potential: Moderate
Flooding: None
Accelerated erosion: The surface layer is mostly subsoil material.
Potential for frost action: Moderate
Hazard of corrosion: Moderate for steel and concrete
Surface runoff class: Medium
Susceptibility to water erosion: High
Susceptibility to wind erosion: Low

Interpretive Groups

Land capability classification: Senachwine—6e
Prime farmland status: Senachwine—not prime farmland
Hydric soil status: Senachwine—not hydric

618F—Senachwine silt loam, 18 to 35 percent slopes

Setting

Landform: End moraines
Position on landform: Backslopes

Map Unit Composition

Senachwine and similar soils: 95 percent
Dissimilar soils: 5 percent

Minor Components

Similar soils:
- Soils that have a dark surface layer
- Soils that have more than 18 inches of loess over the till
- Soils that are moderately well drained
- Soils that have slopes of less than 18 percent
- Soils that have slopes of more than 35 percent
- Soils that are moderately eroded or severely eroded or are gullied
- Soils that have stratified outwash in the substratum, below a depth of 40 inches

Dissimilar soils:
- Soils that are somewhat poorly drained and are in slight swales below the Senachwine soil
- The poorly drained Sawmill soils on flood plains

Properties and Qualities of the Senachwine Soil

Parent material: Loamy till
Drainage class: Well drained
Slowest permeability within a depth of 40 inches: Moderate
Permeability below a depth of 60 inches: Moderately slow
Available water capacity: About 8.0 inches to a depth of 60 inches
Content of organic matter in the surface layer: 1.0 to 2.5 percent
Shrink-swell potential: Moderate
Flooding: None
Potential for frost action: Moderate
Hazard of corrosion: Moderate for steel and concrete
Surface runoff class: High

Susceptibility to water erosion: High
Susceptibility to wind erosion: Low

Interpretive Groups

Land capability classification: Senachwine—6e
Prime farmland status: Senachwine—not prime farmland
Hydric soil status: Senachwine—not hydric

618G—Senachwine silt loam, 35 to 60 percent slopes

Setting

Landform: End moraines
Position on landform: Backslopes

Map Unit Composition

Senachwine and similar soils: 92 percent
Dissimilar soils: 8 percent

Minor Components

Similar soils:
- Soils that have a surface layer of loam
- Soils that have more than 18 inches of loess over the till
- Soils that are moderately well drained
- Soils that have slopes of less than 35 percent
- Soils that have slopes of more than 60 percent
- Soils that are gullied
- Soils that have stratified outwash in the substratum, below a depth of 40 inches

Dissimilar soils:
- Soils that are somewhat poorly drained and are in slight swales below the Senachwine soil
- The poorly drained Sawmill soils on flood plains

Properties and Qualities of the Senachwine Soil

Parent material: Loamy till
Drainage class: Well drained
Slowest permeability within a depth of 40 inches: Moderately slow
Permeability below a depth of 60 inches: Moderately slow
Available water capacity: About 7.9 inches to a depth of 60 inches
Content of organic matter in the surface layer: 1.0 to 2.5 percent
Shrink-swell potential: Moderate
Flooding: None
Potential for frost action: Moderate
Hazard of corrosion: Moderate for steel and concrete
Surface runoff class: High
Susceptibility to water erosion: High
Susceptibility to wind erosion: Low

Interpretive Groups

Land capability classification: Senachwine—7e
Prime farmland status: Senachwine—not prime farmland
Hydric soil status: Senachwine—not hydric

Starks Series

Taxonomic classification: Fine-silty, mixed, superactive, mesic Aeric Endoaqualfs

Typical Pedon

Starks silt loam, 0 to 2 percent slopes, frequently flooded, at an elevation of about 611 feet above mean sea level; Moultrie County, Illinois; about 1,930 feet north and 102 feet west of the southeast corner of sec. 24, T. 13 N., R. 5 E.; USGS Sullivan, Illinois, topographic quadrangle; lat. 39 degrees 33 minutes 18.7 seconds N. and long. 88 degrees 35 minutes 8.3 seconds W.; UTM Zone 16S, 0363769 easting and 4379382 northing; NAD 27:

A—0 to 5 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; moderate fine angular blocky structure parting to weak very fine granular; friable; many very fine and common fine roots; few fine faint irregular black (7.5YR 2.5/1) very weakly cemented manganese nodules throughout; neutral; abrupt wavy boundary.

E—5 to 10 inches; grayish brown (10YR 5/2) silt loam, light gray (10YR 7/2) dry; strong medium platy structure parting to moderate fine granular; friable; common very fine and fine roots; few distinct light brownish gray (10YR 6/2 dry) silt coatings on faces of peds; few fine prominent strong brown (7.5YR 4/6) masses of iron accumulation in the matrix; common fine distinct irregular black (7.5YR 2.5/1) very weakly cemented manganese nodules throughout; neutral; abrupt wavy boundary.

BE—10 to 16 inches; brown (10YR 5/3) silt loam, very pale brown (10YR 7/3) dry; moderate medium platy structure parting to moderate very fine subangular blocky; friable; few very fine and fine roots; common distinct light gray (10YR 7/2 dry) silt coatings on faces of peds; few fine faint grayish brown (10YR 5/2) iron depletions in the matrix; few fine faint yellowish brown (10YR 5/4) masses of iron and manganese accumulation in the matrix;

common fine distinct irregular black (7.5YR 2.5/1) very weakly cemented manganese nodules throughout; slightly acid; clear wavy boundary.

Btg1—16 to 28 inches; 60 percent grayish brown (10YR 5/2), 30 percent brown (10YR 5/3), and 10 percent yellowish brown (10YR 5/4) silty clay loam; moderate fine prismatic structure parting to moderate fine subangular blocky; firm; few very fine and fine roots; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few distinct light gray (10YR 7/2 dry) silt coatings on faces of peds; common fine distinct irregular black (7.5YR 2.5/1) very weakly cemented manganese nodules throughout; moderately acid; gradual smooth boundary.

Btg2—28 to 37 inches; 45 percent grayish brown (10YR 5/2), 35 percent light olive brown (2.5Y 5/3), and 20 percent yellowish brown (10YR 5/4) silty clay loam; moderate fine prismatic structure parting to moderate medium subangular blocky; firm; few very fine and fine roots; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine and medium prominent strong brown (7.5YR 5/8) masses of iron accumulation in the matrix; common fine and medium distinct irregular black (7.5YR 2.5/1) very weakly cemented manganese nodules throughout; moderately acid; clear wavy boundary.

2Btg3—37 to 43 inches; grayish brown (10YR 5/2) clay loam; weak fine prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few prominent very dark gray (10YR 3/1) organo-clay films in root channels; common fine and medium prominent strong brown (7.5YR 5/8) and few fine prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; common fine distinct irregular black (7.5YR 2.5/1) very weakly cemented manganese nodules throughout; moderately acid; clear smooth boundary.

2Bt—43 to 47 inches; yellowish brown (10YR 5/4) clay loam; weak fine prismatic structure; firm; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine distinct grayish brown (10YR 5/2) iron depletions in the matrix; common fine prominent strong brown (7.5YR 5/8) masses of iron accumulation in the matrix; few fine prominent irregular black (7.5YR 2.5/1) very weakly cemented manganese nodules throughout; slightly acid; clear wavy boundary.

2BC—47 to 67 inches; brown (10YR 5/3) loam; massive; friable; few fine faint grayish brown (10YR 5/2) iron depletions in the matrix; common fine distinct yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; few fine distinct irregular black (7.5YR 2.5/1) very weakly cemented manganese nodules throughout; slightly acid; abrupt smooth boundary.

3C—67 to 80 inches; yellowish brown (10YR 5/4), stratified sand; single grain; loose; 5 percent rock fragments; slightly effervescent; slightly alkaline.

Range in Characteristics

Thickness of the loess: 24 to 40 inches
Depth to carbonates: 40 to 70 inches
Depth to the base of the argillic horizon: 35 to more than 60 inches

A horizon:
Hue—10YR
Value—4 or 5; 2 or 3 in A horizons less than 7 inches thick
Chroma—1 to 3
Texture—silt loam
Content of rock fragments—none
Reaction—strongly acid to neutral

E horizon:
Hue—10YR
Value—5 or 6
Chroma—2 or 3
Texture—silt loam
Content of rock fragments—none
Reaction—strongly acid to neutral

BE horizon:
Hue—10YR
Value—4 to 6
Chroma—2 or 3
Texture—silt loam or silty clay loam
Content of rock fragments—none
Reaction—strongly acid to neutral

Btg or Bt horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—1 to 4
Texture—silty clay loam
Content of rock fragments—none
Reaction—strongly acid to slightly acid

2Btg, 2Bt, or 2BC horizon:
Hue—10YR, 2.5Y, or 7.5YR
Value—4 to 6
Chroma—1 to 6
Texture—loam, clay loam, silt loam, or sandy loam
Content of rock fragments—0 to 5 percent

Reaction—strongly acid to neutral

3C horizon:
Hue—10YR, 2.5Y, or 7.5YR
Value—4 to 6
Chroma—1 to 6
Texture—stratified sandy loam, loam, sand, or loamy sand
Content of rock fragments—0 to 15 percent
Reaction—neutral to moderately alkaline

3132A—Starks silt loam, 0 to 2 percent slopes, frequently flooded

Setting

Landform: Stream terraces that are in the valley of the Kaskaskia River, near the head of Lake Shelbyville; are inundated by water as the lake level rises and floodwater is stored; and were not subject to flooding prior to the construction of Lake Shelbyville
Position on landform: Summits

Map Unit Composition

Starks and similar soils: 90 percent
Dissimilar soils: 10 percent

Minor Components

Similar soils:
- Soils that are moderately well drained
- Soils that are flooded less frequently than once every 2 years

Dissimilar soils:
- Soils that are not subject to flooding
- Soils that are well drained
- The poorly drained Sawmill soils on flood plains

Properties and Qualities of the Starks Soil

Parent material: Silty loess over sandy to silty outwash
Drainage class: Somewhat poorly drained
Slowest permeability within a depth of 40 inches: Moderate
Permeability below a depth of 60 inches: Moderate to rapid
Available water capacity: About 10.4 inches to a depth of 60 inches
Content of organic matter in the surface layer: 1.0 to 3.0 percent
Shrink-swell potential: Moderate
Depth and months of the highest apparent seasonal high water table: 0.5 foot, Jan.–May
Frequency and most likely period of flooding: Frequent, Nov.–June
Potential for frost action: High
Hazard of corrosion: High for steel and moderate for concrete
Surface runoff class: Negligible
Susceptibility to water erosion: Low
Susceptibility to wind erosion: Low

Interpretive Groups

Land capability classification: Starks—3w
Prime farmland status: Starks—prime farmland where drained and either protected from flooding or not frequently flooded during the growing season
Hydric soil status: Starks—not hydric

Sunbury Series

Taxonomic classification: Fine, smectitic, mesic Aquollic Hapludalfs

Typical Pedon

Sunbury silt loam, 0 to 2 percent slopes, at an elevation of about 680 feet above mean sea level; Douglas County, Illinois; about 1,270 feet north and 1,410 feet east of the southwest corner of sec. 19, T. 16 N., R. 7 E.; USGS Atwood, Illinois, topographic quadrangle; lat. 39 degrees 49 minutes 27.4 seconds N. and long. 88 degrees 27 minutes 25.6 seconds W.; UTM Zone 16S 0375298 easting and 4409059 northing; NAD 27:

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

E—8 to 12 inches; brown (10YR 5/3) silt loam; moderate thin and medium platy structure parting to moderate fine granular; friable; common very fine roots throughout; moderately acid; clear smooth boundary.

BE—12 to 15 inches; brown (10YR 4/3) silty clay loam; moderate fine subangular blocky structure; firm; common very fine and fine roots throughout; many distinct light gray (10YR 7/2 dry) clay depletions on faces of peds; moderately acid; clear smooth boundary.

Bt1—15 to 25 inches; brown (10YR 5/3) silty clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; common very fine and fine roots between peds; many distinct very dark grayish brown (10YR 3/2) organo-clay films on faces of peds; few medium distinct irregular black (7.5YR 2.5/1) weakly cemented manganese nodules throughout; common fine faint dark grayish brown (10YR 4/2) iron depletions in the matrix; few fine distinct yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; moderately acid; clear smooth boundary.

Bt2—25 to 36 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium prismatic structure parting to moderate medium and coarse subangular blocky; firm; common fine roots between peds; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common distinct very dark gray (10YR 3/1) organo-clay films on faces of peds; few medium prominent irregular black (7.5YR 2.5/1) weakly cemented manganese nodules throughout; few medium distinct dark gray (10YR 4/1) iron depletions in the matrix; common medium distinct yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; slightly acid; clear smooth boundary.

Bt3—36 to 43 inches; brown (10YR 5/3) silty clay loam; moderate medium prismatic structure parting to weak coarse subangular blocky; friable; few very fine and fine roots between peds; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common distinct very dark gray (10YR 3/1) organo-clay films on faces of peds and in pores; common medium distinct rounded and irregular black (7.5YR 2.5/1) manganese nodules throughout; common medium faint light brownish gray (10YR 6/2) iron depletions in the matrix; many medium distinct yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; slightly alkaline; clear smooth boundary.

2Btg—43 to 47 inches; grayish brown (10YR 5/2) loam; weak coarse subangular blocky structure; firm; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few distinct very dark gray (10YR 3/1) organo-clay films on faces of peds and in pores; few fine and medium distinct irregular black (7.5YR 2.5/1) weakly cemented manganese nodules throughout; many medium prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; 1 percent fine gravel; slightly alkaline; abrupt smooth boundary.

2C—47 to 72 inches; 50 percent grayish brown (10YR 5/2) and 50 percent yellowish brown (10YR 5/6) loam; massive; firm; common fine and medium prominent rounded white (10YR 8/1) weakly cemented calcium carbonate nodules throughout; few fine and medium distinct irregular black (7.5YR 2.5/1) weakly cemented manganese nodules throughout; 3 percent fine gravel; strongly effervescent; moderately alkaline.

Range in Characteristics

Thickness of the mollic epipedon: 7 to 10 inches
Thickness of the loess: 40 to 60 inches
Depth to carbonates: 45 to 60 inches
Depth to the base of the argillic horizon: 45 to 65 inches

A horizon:
Hue—10YR or 2.5Y
Value—2 to 3
Chroma—1 or 2
Texture—silt loam
Content of rock fragments—none
Reaction—moderately acid to neutral

E horizon:
Hue—10YR
Value—3 to 5
Chroma—2 or 3
Texture—silt loam
Content of rock fragments—none
Reaction—moderately acid to neutral

BE horizon:
Hue—10YR
Value—4 or 5
Chroma—3 or 4
Texture—silt loam or silty clay loam
Content of rock fragments—none
Reaction—moderately acid or slightly acid

Bt horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 4
Texture—silty clay loam or silty clay
Content of rock fragments—none
Reaction—moderately acid to slightly alkaline

2Btg or 2Bt horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 6
Texture—loam, clay loam, or silt loam
Content of rock fragments—0 to 5 percent
Reaction—slightly acid to slightly alkaline

2C horizon:
Hue—10YR or 2.5Y
Value—5 or 6
Chroma—1 to 8
Texture—loam

Content of rock fragments—0 to 5 percent
Reaction—slightly alkaline or moderately alkaline

234A—Sunbury silt loam, 0 to 2 percent slopes

Setting

Landform: Ground moraines
Position on landform: Summits and footslopes

Map Unit Composition

Sunbury and similar soils: 94 percent
Dissimilar soils: 6 percent

Minor Components

Similar soils:
- Soils that have a thicker dark surface layer
- Soils that have a lighter colored surface layer
- Soils that have less than 40 inches of loess over the till
- Soils that are moderately well drained and are on slight rises above the Sunbury soil
- Soils that have slopes of more than 2 percent

Dissimilar soils:
- The poorly drained Drummer soils in swales

Properties and Qualities of the Sunbury Soil

Parent material: Silty loess over loamy till
Drainage class: Somewhat poorly drained
Slowest permeability within a depth of 40 inches: Moderately slow
Permeability below a depth of 60 inches: Moderately slow
Available water capacity: About 10.3 inches to a depth of 60 inches
Content of organic matter in the surface layer: 2.0 to 4.0 percent
Shrink-swell potential: High
Depth and months of the highest perched seasonal high water table: 1.0 foot, Jan.–May
Flooding: None
Potential for frost action: Moderate
Hazard of corrosion: High for steel and moderate for concrete
Surface runoff class: Low
Susceptibility to water erosion: Low
Susceptibility to wind erosion: Low

Interpretive Groups

Land capability classification: Sunbury—1
Prime farmland status: Sunbury—prime farmland in all areas
Hydric soil status: Sunbury—not hydric

Tice Series

Taxonomic classification: Fine-silty, mixed, superactive, mesic Fluvaquentic Hapludolls

Typical Pedon

Tice silty clay loam, 0 to 2 percent slopes, frequently flooded, at an elevation of about 580 feet above mean sea level; Macon County, Illinois; about 325 feet south and 960 feet east of the center of sec. 22, T. 16 N., R. 1 W.; USGS Niantic, Illinois, topographic quadrangle; lat. 39 degrees 49 minutes 18.1 seconds N. and long. 89 degrees 11 minutes 8.4 seconds W.; UTM Zone 16S 0312934 easting and 4410044 northing; NAD 27:

Ap—0 to 6 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine granular and moderate medium angular blocky structure; friable; slightly acid; abrupt smooth boundary.

A—6 to 21 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; moderate fine subangular blocky structure; friable; neutral; clear smooth boundary.

Bt1—21 to 34 inches; dark grayish brown (10YR 4/2) silty clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; many faint dark grayish brown (10YR 4/2) clay films on faces of peds; few fine prominent strong brown (7.5YR 5/8) masses of iron accumulation in the matrix; neutral; clear smooth boundary.

Bt2—34 to 46 inches; dark grayish brown (10YR 4/2) silty clay loam; moderate fine and medium prismatic structure parting to moderate medium subangular blocky; firm; many distinct dark gray (10YR 4/1) clay films on faces of peds; many fine prominent strong brown (7.5YR 5/8 and 4/6) masses of iron accumulation in the matrix; neutral; clear smooth boundary.

Bt3—46 to 58 inches; dark grayish brown (10YR 4/2) silty clay loam; weak medium prismatic structure; firm; common distinct dark gray (10YR 4/1) clay films on faces of peds; many medium prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; common fine faint rounded black (7.5YR 2.5/1) very weakly cemented manganese nodules throughout; neutral; clear smooth boundary.

Btg—58 to 66 inches; grayish brown (10YR 5/2) silty clay loam; weak coarse prismatic structure; firm; few faint gray (10YR 5/1) clay films on faces of peds; many medium prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; common fine distinct rounded black (7.5YR

2.5/1) very weakly cemented manganese nodules throughout; neutral; gradual wavy boundary.

BCg—66 to 80 inches; 70 percent grayish brown (2.5Y 5/2) and 30 percent light olive brown (2.5Y 5/3) silt loam; massive; very friable; few distinct dark grayish brown (10YR 4/2) clay films lining pores; common fine tubular pores; many medium faint light brownish gray (10YR 6/2) iron depletions, many medium prominent yellowish brown (10YR 5/8) iron accumulations, and few medium distinct black (2.5Y 2.5/1) manganese accumulations in the matrix; slightly alkaline.

Range in Characteristics

Thickness of the mollic epipedon: 10 to 24 inches
Depth to carbonates: More than 60 inches
Depth to the base of the cambic horizon: 30 to more than 80 inches

A horizon:
Hue—10YR
Value—2 or 3
Chroma—1 to 3
Texture—silty clay loam
Content of rock fragments—none
Reaction—slightly acid or neutral

Bt and Btg horizon(s):
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—1 to 4
Texture—silty clay loam or silt loam
Content of rock fragments—none
Reaction—moderately acid to neutral

BCg and/or Cg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—1 to 3
Texture—dominantly silty clay loam or silt loam; stratified with thin layers clay loam, loam, or sandy loam in some pedons
Rock fragments—none
Reaction—neutral or slightly alkaline

3284A—Tice silty clay loam, 0 to 2 percent slopes, frequently flooded

Setting

Landform: Flood plains

Map Unit Composition

Tice and similar soils: 87 percent
Dissimilar soils: 13 percent

Minor Components

Similar soils:
- Soils that are moderately well drained
- Soils that have a very thick dark surface layer
- Soils that are flooded less frequently than once every 2 years

Dissimilar soils:
- Soils that are not subject to flooding
- Soils that are well drained
- The poorly drained Sawmill soils in swales below the Tice soil

Properties and Qualities of the Tice Soil

Parent material: Silty alluvium
Drainage class: Somewhat poorly drained
Slowest permeability within a depth of 40 inches: Moderate
Permeability below a depth of 60 inches: Moderate
Available water capacity: About 11.4 inches to a depth of 60 inches
Content of organic matter in the surface layer: 2.0 to 4.0 percent
Shrink-swell potential: Moderate
Depth and months of the highest apparent seasonal high water table: 1.0 foot, Jan.–May
Frequency and most likely period of flooding: Frequent, Nov.–June
Potential for frost action: High
Hazard of corrosion: High for steel and moderate for concrete
Surface runoff class: Low
Susceptibility to water erosion: Low
Susceptibility to wind erosion: Very low

Interpretive Groups

Land capability classification: Tice—3w
Prime farmland status: Tice—prime farmland where protected from flooding or not frequently flooded during the growing season
Hydric soil status: Tice—not hydric

W—Water

This map unit consists of natural bodies of water, such as ponds, lakes, and rivers.

Wyanet Series

Taxonomic classification: Fine-loamy, mixed, active, mesic Typic Argiudolls

Taxadjunct Feature

The Wyanet soils in this survey area are taxadjuncts to the series because their surface layer is thinner than is defined as the range for the series. This difference, however, does not significantly affect the use, management, or interpretations of the soils. The soils are classified as fine-loamy, mixed, active, mesic Mollic Hapludalfs.

Typical Pedon

Wyanet silt loam, 2 to 5 percent slopes, eroded, on a 3 percent slope in a cultivated field at an elevation of 820 feet above mean sea level; Bureau County, Illinois; 440 feet south and 560 feet east of the northwest corner of sec. 7, T. 17 N., R. 8 E.; USGS Buda Northeast, Illinois, topographic quadrangle; lat. 41 degrees 28 minutes 49.9 seconds N. and long. 89 degrees 37 minutes 26.1 seconds W.; UTM Zone 16T 0280920 easting and 4595215 northing; NAD 27:

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, dark grayish brown (10YR 4/2) dry; moderate medium granular structure; friable; few fine roots; slightly acid; abrupt smooth boundary.

Bt1—8 to 16 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium subangular blocky structure; friable; few fine roots; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; slightly acid; clear smooth boundary.

2Bt2—16 to 24 inches; brown (7.5YR 5/4) clay loam; moderate medium subangular blocky structure; friable; few fine roots; common distinct brown (7.5YR 4/4) clay films on faces of peds; 1 percent fine gravel; slightly acid; clear smooth boundary.

2BC—24 to 32 inches; brown (7.5YR 5/4) loam; weak medium subangular blocky structure; firm; 1 percent fine gravel; slightly alkaline; clear smooth boundary.

2C—32 to 60 inches; brown (7.5YR 5/4) loam; massive; firm; 1 percent fine gravel; violently effervescent; moderately alkaline.

Range in Characteristics

Thickness of the mollic epipedon: 8 to 15 inches
Thickness of the loess: 0 to 18 inches
Depth to carbonates: 20 to 40 inches
Depth to the base of the argillic horizon: 24 to 40 inches

A horizon:
Hue—10YR
Value—2 or 3
Chroma—1 to 3
Texture—silt loam or silty clay loam
Content of rock fragments—0 to 4 percent
Reaction—moderately acid to neutral

Bt and 2Bt horizons:
Hue—7.5YR, 10YR, or 2.5Y
Value—4 or 5
Chroma—4 to 6
Texture—silty clay loam, clay loam, or loam
Content of rock fragments—0 to 10 percent
Reaction—moderately acid to neutral

BC or 2BC horizon and C or 2C horizon:
Hue—7.5YR, 10YR, or 2.5Y
Value—4 to 7
Chroma—3 or 4
Texture—loam
Content of rock fragments—0 to 10 percent
Reaction—slightly alkaline or moderately alkaline

622B2—Wyanet silt loam, 2 to 5 percent slopes, eroded

Setting

Landform: Ground moraines and end moraines
Position on landform: Backslopes

Map Unit Composition

Wyanet and similar soils: 93 percent
Dissimilar soils: 7 percent

Minor Components

Similar soils:
- Soils that have a thinner or lighter colored surface layer
- Soils that have more than 18 inches of loess over the till
- Soils that are moderately well drained
- Soils that have slopes of less than 2 percent
- Soils that have slopes of more than 5 percent

Dissimilar soils:
- Soils that are somewhat poorly drained and are in slight swales below the Wyanet soil
- The poorly drained Drummer soils in swales

Properties and Qualities of the Wyanet Soil

Parent material: Loamy till
Drainage class: Well drained
Slowest permeability within a depth of 40 inches: Moderately slow
Permeability below a depth of 60 inches: Moderately slow
Available water capacity: About 7.1 inches to a depth of 60 inches

Content of organic matter in the surface layer: 1.5 to 3.5 percent
Shrink-swell potential: Moderate
Flooding: None
Accelerated erosion: The surface layer has been thinned by erosion.
Potential for frost action: Moderate
Hazard of corrosion: Moderate for steel and concrete
Surface runoff class: Low
Susceptibility to water erosion: Low
Susceptibility to wind erosion: Low

Interpretive Groups

Land capability classification: Wyanet—2e
Prime farmland status: Wyanet—prime farmland in all areas
Hydric soil status: Wyanet—not hydric

622C2—Wyanet silt loam, 5 to 10 percent slopes, eroded

Setting

Landform: Ground moraines and end moraines
Position on landform: Backslopes

Map Unit Composition

Wyanet and similar soils: 93 percent
Dissimilar soils: 7 percent

Minor Components

Similar soils:
- Soils that have a thicker dark surface layer
- Soils that have more than 18 inches of loess over the till
- Soils that are moderately well drained
- Soils that have slopes of less than 5 percent
- Soils that have slopes of more than 10 percent

Dissimilar soils:
- Soils that are somewhat poorly drained and are in slight swales below the Wyanet soil
- The poorly drained Drummer soils in swales

Properties and Qualities of the Wyanet Soil

Parent material: Loamy till
Drainage class: Well drained
Slowest permeability within a depth of 40 inches: Moderately slow
Permeability below a depth of 60 inches: Moderately slow
Available water capacity: About 7.1 inches to a depth of 60 inches
Content of organic matter in the surface layer: 1.5 to 3.5 percent
Shrink-swell potential: Moderate
Flooding: None
Accelerated erosion: The surface layer has been thinned by erosion.
Potential for frost action: Moderate
Hazard of corrosion: Moderate for steel and concrete
Surface runoff class: Medium
Susceptibility to water erosion: Moderate
Susceptibility to wind erosion: Low

Interpretive Groups

Land capability classification: Wyanet—3e
Prime farmland status: Wyanet—not prime farmland
Hydric soil status: Wyanet—not hydric

Xenia Series

Taxonomic classification: Fine-silty, mixed, superactive, mesic Aquic Hapludalfs

Typical Pedon

Xenia silt loam, 2 to 5 percent slopes, at an elevation of about 705 feet above mean sea level; Champaign County, Illinois; about 390 feet north and 860 feet west of the southeast corner of sec. 34, T. 20 N., R. 9 E.; USGS Thomasboro, Illinois, topographic quadrangle; lat. 40 degrees 8 minutes 35.5 seconds N. and long. 88 degrees 9 minutes 57.1 seconds W.; UTM Zone 16T, 0400688 easting and 4444090 northing; NAD 27:

A—0 to 4 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate very fine and fine granular structure; friable; neutral; abrupt smooth boundary.

E—4 to 10 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate medium platy structure; friable; many faint light brownish gray (10YR 6/2) clay depletions on faces of peds; moderately acid; clear smooth boundary.

BEt—10 to 16 inches; brown (10YR 4/3) silt loam; weak fine subangular blocky structure; friable; common faint dark grayish brown (10YR 4/2) clay films on faces of peds; common distinct light brownish gray (10YR 6/2) silt coatings on faces of peds; moderately acid; clear smooth boundary.

Bt1—16 to 23 inches; brown (10YR 4/3) silty clay loam; moderate fine and medium subangular blocky structure; friable; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common distinct light brownish gray (10YR 6/2) silt coatings on faces of peds; few fine faint grayish brown (10YR 5/2) iron depletions in the matrix; moderately acid; clear smooth boundary.

Bt2—23 to 37 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium and coarse subangular blocky structure; firm; common distinct dark brown (10YR 3/3) organo-clay films on faces of peds; many distinct grayish brown (10YR 5/2) clay depletions on faces of peds; few medium distinct grayish brown (10YR 5/2) and few medium faint brown (10YR 5/3) iron depletions in the matrix; moderately acid; clear smooth boundary.

2Bt3—37 and 48 inches; brown (10YR 5/3) and light olive brown (2.5Y 5/4) clay loam; weak coarse subangular blocky structure; firm; few distinct brown (10YR 4/3) clay films on faces of peds; moderately acid; gradual smooth boundary.

2Bt4—48 to 57 inches; brown (10YR 5/3) and light olive brown (2.5Y 5/4) loam; weak coarse prismatic structure; firm; few distinct dark brown (10YR 3/3) organo-clay films on faces of peds; slightly acid; clear smooth boundary.

2C—57 to 72 inches; light olive brown (2.5Y 5/4) loam; massive; firm; strongly effervescent; moderately alkaline.

Range in Characteristics

Thickness of the loess: 22 to 40 inches
Depth to carbonates: 40 to 60 inches
Depth to the base of the argillic horizon: 40 to 60 inches

A horizon:
Hue—10YR
Value—3 or 4
Chroma—2 to 4
Texture—silt loam
Content of rock fragments—0 to 1 percent
Reaction—moderately acid to neutral

E and/or BE horizon:
Hue—10YR
Value—4 or 5
Chroma—2 to 4
Texture—silt loam
Content of rock fragments—0 to 1 percent
Reaction—moderately acid to neutral

Bt horizon:
Hue—10YR
Value—4 to 6
Chroma—3 to 6
Texture—silty clay loam
Content of rock fragments—0 to 1 percent
Reaction—strongly acid to neutral

2Bt horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—3 to 6
Texture—loam or clay loam
Content of rock fragments—2 to 8 percent
Reaction—moderately acid to neutral

2BC horizon (where present):
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—3 or 4
Texture—loam or clay loam
Content of rock fragments—2 to 8 percent
Reaction—neutral or slightly alkaline

2C horizon:
Hue—10YR or 2.5Y
Value—5 or 6
Chroma—3 or 4
Texture—loam
Content of rock fragments—2 to 8 percent
Reaction—slightly alkaline or moderately alkaline

291A—Xenia silt loam, 0 to 2 percent slopes

Setting

Landform: Ground moraines
Position on landform: Summits

Map Unit Composition

Xenia and similar soils: 95 percent
Dissimilar soils: 5 percent

Minor Components

Similar soils:
- Soils that have more than 40 inches of loess over the till
- Soils that are somewhat poorly drained
- Soils that have slopes of more than 2 percent
- Soils that have stratified outwash in the substratum, below a depth of 40 inches
- Soils that have a dark surface layer

Dissimilar soils:
- The poorly drained Drummer soils in swales

Properties and Qualities of the Xenia Soil

Parent material: Silty loess over loamy till
Drainage class: Moderately well drained
Slowest permeability within a depth of 40 inches: Moderate
Permeability below a depth of 60 inches: Moderately slow

Available water capacity: About 10.0 inches to a depth of 60 inches
Content of organic matter in the surface layer: 1.0 to 3.0 percent
Shrink-swell potential: Moderate
Depth and months of the highest perched seasonal high water table: 1.5 feet, Jan.–May
Flooding: None
Potential for frost action: High
Hazard of corrosion: High for steel and moderate for concrete
Surface runoff class: Low
Susceptibility to water erosion: Low
Susceptibility to wind erosion: Low

Interpretive Groups

Land capability classification: Xenia—1
Prime farmland status: Xenia—prime farmland in all areas
Hydric soil status: Xenia—not hydric

291B—Xenia silt loam, 2 to 5 percent slopes

Setting

Landform: Ground moraines and end moraines
Position on landform: Summits and backslopes

Map Unit Composition

Xenia and similar soils: 94 percent
Dissimilar soils: 6 percent

Minor Components

Similar soils:
- Soils that are somewhat poorly drained
- Soils that have slopes of less than 2 percent
- Soils that have slopes of more than 5 percent
- Soils that are eroded
- Soils that have stratified outwash in the substratum, below a depth of 40 inches

Dissimilar soils:
- The poorly drained Drummer soils in swales

Properties and Qualities of the Xenia Soil

Parent material: Silty loess over loamy till
Drainage class: Moderately well drained
Slowest permeability within a depth of 40 inches: Moderate
Permeability below a depth of 60 inches: Moderately slow
Available water capacity: About 10.4 inches to a depth of 60 inches
Content of organic matter in the surface layer: 1.0 to 3.0 percent
Shrink-swell potential: Moderate
Depth and months of the highest perched seasonal high water table: 1.5 feet, Jan.–May
Flooding: None
Potential for frost action: High
Hazard of corrosion: High for steel and moderate for concrete
Surface runoff class: Low
Susceptibility to water erosion: Moderate
Susceptibility to wind erosion: Low

Interpretive Groups

Land capability classification: Xenia—2e
Prime farmland status: Xenia—prime farmland in all areas
Hydric soil status: Xenia—not hydric

291B2—Xenia silt loam, 2 to 5 percent slopes, eroded

Setting

Landform: End moraines and ground moraines
Position on landform: Backslopes and summits

Map Unit Composition

Xenia and similar soils: 95 percent
Dissimilar soils: 5 percent

Minor Components

Similar soils:
- Soils that are somewhat poorly drained
- Soils that have slopes of less than 2 percent
- Soils that have slopes of more than 5 percent
- Soils that are uneroded or only slightly eroded
- Soils that have stratified outwash in the substratum, below a depth of 40 inches

Dissimilar soils:
- The poorly drained Drummer soils in swales

Properties and Qualities of the Xenia Soil

Parent material: Silty loess over loamy till
Drainage class: Moderately well drained
Slowest permeability within a depth of 40 inches: Moderate
Permeability below a depth of 60 inches: Moderately slow
Available water capacity: About 9.6 inches to a depth of 60 inches
Content of organic matter in the surface layer: 1.0 to 3.0 percent

Shrink-swell potential: Moderate
Depth and months of the highest perched seasonal high water table: 1.5 feet, Jan.–May
Flooding: None
Accelerated erosion: The surface layer has been thinned by erosion.
Potential for frost action: High
Hazard of corrosion: High for steel and moderate for concrete
Surface runoff class: Low
Susceptibility to water erosion: Moderate
Susceptibility to wind erosion: Low

Interpretive Groups

Land capability classification: Xenia—2e
Prime farmland status: Xenia—prime farmland in all areas
Hydric soil status: Xenia—not hydric

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 forestland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and as wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

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

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

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

Interpretive Ratings

The interpretive tables in this survey rate the soils in the survey area for various uses. Many of the tables identify the limitations that affect specified uses and indicate the severity of those limitations. The ratings in these tables are both verbal and numerical.

Rating Class Terms

Rating classes are expressed in the tables in terms that indicate the extent to which the soils are limited by all of the soil features that affect a specified use or in terms that indicate the suitability of the soils for the use. Thus, the tables may show limitation classes or suitability classes. Terms for the limitation classes are *not limited, somewhat limited,* and *very limited*. The suitability ratings are expressed as *well suited, moderately suited, poorly suited,* and *unsuited* or as *good, fair,* and *poor*.

Numerical Ratings

Numerical ratings in the tables indicate the relative severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use and the point at which the soil feature is not a limitation. The limitations appear in order from the most limiting to the least limiting. Thus, if more than one limitation is identified, the most severe limitation is listed first and the least severe one is listed last.

Crops and Pasture

General management needed for crops and pasture is suggested in this section. The estimated yields of the main crops and pasture plants are listed, the system of land capability classification used by the Natural Resources Conservation Service is explained, and prime farmland is described.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading “Soil Series and 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 1997, approximately 164,858 acres in Moultrie County was used as cropland and 4,693 acres was used as pasture. Corn was grown on 80,236 acres, soybeans on 75,962 acres, wheat on 1,433 acres, hay-alfalfa on 3,211 acres, and vegetables on 451 acres. About 98 percent of the planted acreage was harvested (USDA, NASS, 1997, 2003).

The soils in Moultrie County have excellent potential for continued crop production, particularly if the latest crop production technology is applied. This soil survey can be used as a guide in applying the latest technology.

Management Considerations on Cropland

The main concerns in managing the cropland in Moultrie County are shown in table 6. They are crusting, flooding, ponding, poor tilth, restricted permeability, water erosion, and wetness.

Crusting occurs in areas where the average content of organic matter in the surface layer is 2.5 percent or less and the content of clay ranges from more than 20 percent to 35 percent. Crusting occurs when flowing water or raindrops break down soil structural units, moving clay downward and leaving a concentration of sand and silt particles on the soil surface. Crusts can reduce the rate of water infiltration, increase the runoff rate, and inhibit seedling emergence, plant growth, and oxygen diffusion to seedlings. Generally, the structure of the surface layer is weak, and a crust forms on the surface during periods of intensive rainfall. Rush, Xenia, Senachwine, and Sabina soils are examples of soils that have a low content of organic matter in the surface layer.

Measures that minimize surface crusting and improve tilth are those that protect the surface from the impact of raindrops and from flowing water. Incorporating green manure crops, manure, or crop residue into the soil and applying a system of conservation tillage improve tilth.

Flooding is a hazard on approximately 7,766 acres in Moultrie County. Most of the affected soils are frequently flooded by stream overflow or are part of the Lake Shelbyville flood pool. In these areas flooding is likely to occur often under normal weather conditions; the chance of flooding is more than 50 percent in any year but is less than 50 percent in all months in any year. Flooding typically occurs in winter and spring. Flooding occurs in unprotected areas along the major rivers and their tributaries. Lawson, Sawmill, Starks, and Tice soils are examples of soils that are frequently flooded for brief periods. In some areas the poorly drained Sawmill soils are frequently flooded for long periods. The moderately well drained Huntsville soils are on flood plains and are occasionally flooded.

Flooding damages crops, particularly small grain winter crops, in some years (fig. 8). The flood-prone soils are better suited to crop varieties that require a relatively short growing season than to other varieties. Planting crops that are adapted to a shorter growing season and wetter conditions and constructing dikes or diversions and reduce the extent of the crop damage caused by floodwater. Diverting runoff from the higher areas in the watershed helps to reduce the frequency and severity of flooding. Changing land use from cropland to pasture or forestland can minimize the risk of economic damage.

Ponding is a hazard in areas where the seasonal high water table is above the surface. It lasts for very brief, brief, long, or very long periods. The standing water is removed only by deep percolation or evaporation. Ponding decreases aeration and increases nutrient losses. Drummer, Hartsburg, Milford, Peotone, and Sawmill soils are subject to ponding.

Land grading helps to control ponding. Surface ditches and surface inlet tile also can help to remove the excess water if suitable outlets are available. Management of drainage in conformance with wetland regulations may require special permits and extra planning.

Poor tilth is a limitation in areas where the surface layer has 27 to 35 percent clay and less than 4 percent organic matter or where it has a clay content

Figure 8.—Late spring flooding can cause crop damage on Sawmill soils.

of 35 percent or more. Poor tilth can occur in areas where the surface soil has been thinned by erosion. In these areas part of the subsoil is incorporated into the plow layer. The incorporation of subsoil material into the plow layer decreases the amount of organic matter and increases the content of clay in the surface soil. During periods of intensive rainfall, a crust commonly forms on the surface. Poor tilth also occurs in poorly drained soils with a high content of clay, regardless of content of organic matter, and in soils that have been excessively tilled. Soils with poor tilth generally have a surface layer that is sticky when wet and hard and cloddy when dry. They can be tilled only within a narrow range of moisture content. As a result, seedbed preparation is difficult. Poor tilth and surface crusting inhibit seedling germination and emergence, increase the risks of runoff and erosion, and reduce the rate of water infiltration. Sloping fields commonly have clayey spots where the subsoil is exposed. Preparing a good seedbed and tilling are difficult in these areas because the original friable surface layer has been lost through erosion.

Soils with good tilth are granular and porous and have a high content of organic matter in the surface layer. Soils with poor tilth generally have more clay, less organic matter, and weaker soil structure in the surface layer. Tilth is poor in Milford, Peotone, and Tice soils and in the severely eroded Senachwine soils. If these soils are plowed when too wet, they become cloddy.

Measures that reduce the extent of surface crusting and improve tilth are those that protect the surface from the impact of raindrops and from flowing water. Incorporating green manure crops, manure, or crop residue into the soil and applying a system of conservation tillage improve tilth. Returning crop residue to the soil or regularly adding other organic material, minimizing tillage, and applying conservation tillage systems during periods of nearly optimal soil moisture conditions improve tilth. Surface cloddiness can be controlled by avoiding tillage when the soil is too wet or by no-till farming.

Restricted permeability is a limitation where the soil has a very slowly permeable or slowly permeable layer within 40 inches of the surface. Permeability (the quality that enables water or air to move through the soil) is less than 0.2 inch per hour. It affects irrigation and drainage systems, conservation management structures, and plantings. Soils that have slowly permeable or very slowly permeable layers, such as Orthents, loamy, have a higher potential for surface runoff and drain more slowly than more permeable soils.

Water erosion is a hazard where the Kw factor multiplied by the slope is more than 0.8 and the slope is 3 percent or more. Water erosion can occur when the surface soil is not protected against the impact of raindrops. Erosion reduces the stability of soil aggregates and thus reduces the rate of water infiltration and increases the rate of surface runoff (Brady, 1984). Soils on long or steep slopes are more susceptible to water erosion than soils on short slopes or in the less sloping areas. Sheet and rill erosion is a hazard in areas where slopes are more than 2 percent and in areas where slopes are long or are subject to concentrated flow. Excessive runoff decreases the quality of surface water through sedimentation and contamination by agricultural chemicals attached to soil particles in the sediment. The sediment enters streams, rivers, water impoundments, and road ditches. Water erosion is a hazard on about 14 percent of the total land area in the county. Dana, Senachwine, Wyanet, and Xenia soils are examples of soils that are susceptible to water erosion.

Wetness is a limitation where the seasonal high water table is at a depth of 1.5 feet or less. Wetness is a management concern on about 72 percent the acreage used for crops and pasture in Moultrie County. Some soils are naturally so wet that the production of crops generally is not possible unless a drainage system is installed. The poorly drained Drummer, Hartsburg, Milford, Peotone, and Sawmill soils are examples of soils that are limited by wetness. Seasonal wetness in areas of somewhat poorly drained soils, such as Flanagan, Lawson, Raub, Sabina, Starks, Sunbury, and Tice soils, can delay planting in wet years.

Erosion Control

Generally, a combination of several practices is needed to control erosion. Conservation tillage systems, including chisel tillage and no-till farming, are common in Moultrie County. Contour stripcropping, contour farming, conservation cropping systems, crop residue management, terraces, diversions, buffer strips, riparian areas, and grassed waterways also help to prevent excessive soil loss.

Loss of the surface layer through erosion is damaging in two ways. First, productivity is reduced as the surface layer is lost and part of the subsoil is incorporated into the plow layer. The subsoil generally has a lower content of plant nutrients, a lower content of organic matter, and a higher content of clay than the surface layer. As the content of organic matter in the tilled layer decreases and the content of clay increases, soil tilth deteriorates. This deterioration increases the likelihood that a crust will form on the surface and reduces the rate of water infiltration. The higher content of clay increases the likelihood that the surface layer will become cloddy when it is tilled, especially if tilled when wet. Because of the cloddiness, preparing a seedbed becomes very difficult. The soil tends to puddle after hard rains and crust as it dries. The crusting increases the runoff rate. Loss of the surface layer is especially damaging on soils having a clayey subsoil, such as Sabina soils; on soils that tend to be droughty; and on moderately eroded soils, such as Wyanet soils.

Second, erosion on farmland results in the sedimentation and pollution of streams. Controlling erosion minimizes this pollution and improves the quality of water for municipal and recreational uses and for fish and other wildlife.

Most of the cropland in Moultrie County can be protected from erosion by a conservation tillage system. Conservation tillage includes any noninversion tillage practice that keeps a protective amount of crop residue on the surface throughout the year. The crop residue increases the rate of water infiltration by improving tilth (fig. 9). It also protects the surface from the beating action of raindrops, helps to prevent surface crusting, and generally provides a more friable seedbed for good germination.

Chisel tillage is a common system of conservation tillage used in Moultrie County. When this system is applied, crop residue covers 20 to 60 percent of the surface. The extent of the coverage depends on the type of chisel plow used, the speed with which the equipment moves through the field, and the kind of crop planted. Chisel tillage often follows stalk chopping in the fall, but it can also be used immediately prior to planting in the spring.

Figure 9.—Corn residue on this Dana soil improves tilth and the nutrient-holding capacity.

Figure 10.—No-till farming provides almost complete protection from the impact of raindrops.

No-till farming is being used on an increasing acreage in the county. When this system is applied, a grain crop is planted directly in a cover crop, sod, or the crop residue from the previous year. A special planter that disturbs only the row area is used. Herbicides are used to control competing vegetation. The nearly complete ground cover protects the soil from the impact of raindrops (fig. 10) and helps to control the erosion caused by runoff.

Erosion-control measures provide a protective plant cover, increase the rate of water infiltration, and reduce the runoff rate. A cropping system that keeps plants on the surface for extended periods reduces the hazard of erosion and preserves the productive capacity of the soils. Including forage crops, such as grasses and legumes, in the cropping sequence helps to control erosion in the more sloping areas. It also provides nitrogen and improves tilth for the next crop.

Terraces reduce the hazard of erosion by shortening the slopes and by controlling runoff. If a tile outlet terrace is used, the water that collects behind the terrace is removed by tile at a slow, controlled rate. Grassed waterways reduce the hazard of erosion by providing a stable channel for surface runoff on sloping land (fig. 11).

Conservation buffer strips and riparian areas can help to maintain stream channels and slow runoff. A stream channel without trees can slump, whereas a protected riparian area helps to maintain the stream channel.

Contour farming involves conducting tillage or other fieldwork along the contour rather than up and down the slope. This practice helps to control erosion

Figure 11.—A grassed waterway slows runoff.

because it results in the formation of small ridges perpendicular to the slope of the land. The ridges greatly reduce the velocity of the water moving down the hills.

Stripcropping, although not used widely in the county, is an effective erosion-control measure if used in combination with other measures. It involves alternating rows or strips of one crop with rows of another crop that has a different rate of maturity and a different canopy cover. The rows are planted on the contour. The protective vegetative cover that is maintained as a result of this practice helps to control erosion by protecting the surface from the impact of raindrops.

Erosion-control management through tillage and cropping systems is effective alone or in combination on most of the farmland in the county. The combination used and its effectiveness depend on soil characteristics and topography. Information about the design of erosion-control practices for each kind of soil is provided in the Technical Guide, which is available in the local office of the Natural Resources Conservation Service

Drainage Systems

Drainage systems consisting of subsurface tile drains, surface inlets, open ditches, or a combination of these have been installed in most areas of the poorly drained and somewhat poorly drained soils in the county (fig. 12). As a result, these soils generally are adequately drained for the crops commonly grown in the county. Many drainage systems are old, however, and should be replaced if maximum efficiency is to be achieved. Some areas of poorly drained soils require surface tile inlets or shallow surface ditches to remove ponded water. Unless a drainage system is installed, some areas of somewhat poorly drained soils are wet long enough for productivity to be reduced in some years. Subsurface drains can help to lower the seasonal high water table

Figure 12.—A 10-inch main tile outlet into a surface ditch in an area of Drummer soils.

if suitable outlets are available. In soils with a high content of clay and restricted permeability, a subsurface drainage system may not be practical. In these soils surface ditches can reduce the wetness. Management of drainage in conformance with wetland regulations may require special permits and extra planning.

The design of surface and subsurface drainage systems varies with the kind of soil and the availability of drainage outlets. In some areas of poorly drained soils in depressions, a combination of surface drains and tile drains is needed. The tile should be more closely spaced in the more slowly permeable soils than in the more rapidly permeable soils. Manipulating drainage can allow the producer to conserve moisture, manage weeds and insects, and limit the leaching of nutrients and chemicals.

Further information about drainage systems is provided in the Technical Guide, which is available in local offices of the Natural Resources Conservation Service.

Management Considerations on Pasture

Growing legumes, cool-season grasses, and warm-season grasses that are suited to the soils and climate of Moultrie County helps to maintain a productive stand of pasture plants.

Suitable pasture and hay plants include several legumes, cool-season grasses, and native warm-season grasses. The legumes commonly grown in the county include alfalfa, red clover, alsike clover, and ladino clover. Alfalfa grows best suited on well drained soils, such as Rush and Senachwine soils, and on moderately well drained soils, such as Dana and Xenia soils. It also can be grown on some of the somewhat poorly drained soils, such as Flanagan, Raub, and Sunbury soils. Some legumes, such as alsike clover, red clover, and ladino clover, are more tolerant of wetter conditions. These legumes are grow best on poorly drained soils, such as Drummer, Milford, and Hartsburg soils, and on some of the somewhat poorly drained soils, such as Sunbury and Sabina soils.

The cool-season grasses commonly grown in the county include smooth bromegrass, orchardgrass, and tall fescue. These grasses can be planted alone or in mixtures with legumes. Native warm-season grasses, such as indiangrass, big bluestem, and switchgrass, grow very well in the summer. They are managed in a different manner than cool-season grasses.

Proper grazing is essential for the production of high-quality forage, stand survival, and erosion control. Proper grazing helps plants to maintain sufficient and generally vigorous top growth during the growing season. Brush control is essential in many areas, and weed control generally is needed. Rotation grazing, deferred grazing when the soil is wet, and applications of lime and fertilizer as needed also are important management practices.

The main concerns in managing the areas of pasture in Moultrie County are shown in table 6. They are equipment limitations, flooding, frost heave, low fertility, low pH, ponding, poor tilth, water erosion, and wetness.

Equipment limitations occur where the slope is more than 18 percent. They can cause rapid wear of equipment and can inhibit fertilization, harvest, pasture renovation, and seedbed preparation. The use of equipment is limited by the slope of the moderately steep and steep Senachwine soils.

Flooding is a hazard where the soil is occasionally flooded or frequently flooded. Flooding occurs in unprotected areas along the major rivers and their tributaries. It damages pasture plants in some years. Huntsville, Lawson, Sawmill, Starks, and Tice soils are subject to flooding.

Surface drainage ditches can help to remove floodwater where suitable outlets are available. Selecting forage and hay varieties adapted to a shorter growing season and wetter conditions and constructing dikes and diversions can help to minimize the extent of the damage caused by flooding. Restricted use during wet periods helps to keep the pasture in good condition. Management of drainage in conformance with regulations may require special permits and extra planning.

Frost heave is a limitation where the potential for frost action is moderate or high and the soil is poorly drained or very poorly drained. Frost heave occurs in soils when ice lenses or bands develop into or push an ice wedge between two layers of soil near the surface layer. The ice wedges heave the overlying soil layer upward, snapping the roots. Soils with a texture low in content of sand have small pores that hold water and enable ice lenses to form. Drummer, Hartsburg, Milford, Peotone, and Sawmill soils are among the soils that are susceptible to frost heave.

Selecting adapted forage and hay varieties reduces the effects of frost heave. Timely rotation of grazing maintains a protective cover that insulates the soil and thus minimizes frost heave. Leaving stubble, 4 to 6 inches high, on the pasture in winter and planting grass-legume mixtures also minimize frost heave.

Low fertility is a limitation where the average content of organic matter in the surface layer is less than 1 percent or the cation-exchange capacity (CEC) is 7 milliequivalents or less per 100 grams of soil. A low content of organic matter and a low cation-exchange capacity result in a limited capacity of the soil to retain nutrients for plant growth. The severely eroded Senachwine soils are examples of soils with low fertility.

Frequent applications of small amounts of fertilizer help to prevent excessive loss of plant nutrients through leaching. When used as part of a seeding mixture, legumes can provide nitrogen to the grass varieties. Timely deferment of grazing helps to retain a plant cover and maintain the content of organic matter, a source of nutrients in the soil.

Low pH is a limitation where the pH within a depth of 40 inches 5.5 or less. This limitation can result in toxicity or decrease the availability of nutrients and thus affect the health and vigor of the plants. Many of the soils in Moultrie County have a pH of 5.5 or less within a depth of 40 inches. Dana, Sabina, and Xenia soils are examples.

Selecting adapted forage and hay varieties and applying lime according to the results of soil tests help to overcome low pH. Such species red clover or alsike clover are more tolerant of acidic conditions than other species and improve the quantity and quality of livestock forage.

Ponding is a hazard where the upper limit of the seasonal high water table is above the surface. Ponding affects aeration and increases nutrient losses. Drummer, Hartsburg, Milford, Peotone, and Sawmill soils are subject to ponding.

Land grading helps to control ponding. Surface ditches and surface inlet tile also can help to remove the excess water if suitable outlets are available. Management of drainage in conformance with wetland regulations may require special permits and extra planning. Selecting forage and hay varieties adapted to wet conditions improves forage production. Restricted use during wet periods helps to keep the pasture in good condition.

Poor tilth is a limitation in areas where the surface layer has 27 to 35 percent clay and less than 4 percent organic matter or where it has a clay content of 35 percent or more. Poor tilth can occur in soils when part of the subsoil is incorporated into the plow layer because of erosion. Incorporation of subsoil material decreases the amount of organic matter and increases the content of clay in the surface soil. Intensive rainfall often causes surface crusting. Poor tilth also occurs in poorly drained soils with a high content of clay, regardless of the content of organic matter, and in soils that have been excessively tilled.

Poor tilth decreases the rate of water infiltration and increases the runoff rate and the susceptibility to erosion on the more sloping soils. Soils with poor tilth generally have a surface layer that is sticky when wet and hard and cloddy when dry. They can be tilled only within a narrow range of moisture content. As a result, seedbed preparation is difficult.

When pastures are established or renovated, minimizing tillage and applying conservation tillage operations during periods when soil moisture conditions are optimal or nearly optimal can improve tilth.

Water erosion is a hazard where the Kw factor multiplied by the slope is more than 1.0 and the slope is 3 percent or more. Water erosion can occur in overgrazed areas or during periods of pasture establishment and renovation when the surface is not protected against the impact of raindrops. The impact of raindrops causes poor tilth, which reduces the rate of water infiltration and increases the runoff rate. Water erosion reduces the productivity of the soil and causes sediments, livestock manure, and added nutrients to enter streams, rivers, water impoundments, and road ditches. Soils with long or steep slopes are more susceptible to water erosion than other soils. Dana, Senachwine, Xenia, and Wyanet soils are examples of soils that are subject to water erosion.

Rotation grazing, which prevents overgrazing and thus prevents surface compaction and excessive runoff, helps to control erosion. Tilling on the contour, using a no-till system of seeding when a seedbed is prepared or the pasture is renovated, and selecting adapted forage and hay varieties also help to control erosion.

Wetness is a limitation where the seasonal high water table is within a depth of 1.5 feet. Seasonal wetness is a management concern on much of the acreage used for pasture in Moultrie County. The poorly drained Drummer, Hartsburg, Milford, Peotone, and Sawmill soils are examples of soils that are limited by wetness. Also, somewhat poorly drained soils, such as Flanagan, Lawson, Raub, Sabina, Sunbury, Starks, and Tice soils, may be limited in wet years.

Most of the soils that require a drainage system are already drained by tile, but many drainage systems are old and should be replaced if maximum efficiency is to be achieved. Subsurface drains can help to lower the seasonal high water table if suitable outlets are available. In soils with a high content of clay and restricted permeability, a subsurface drainage system may not be practical. In these soils surface ditches can help to reduce the wetness. Management of drainage in conformance with wetland regulations may require special permits and extra planning.

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 7. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of map units in the survey area also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents (Fehrenbacher and others, 1978). Available yield data from nearby counties and results of field trials and demonstrations also are considered.

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

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

Crops other than those shown in table 7 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, including corn, small grain, and hay. 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 (USDA, 1961). Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by the numbers 1 through 8. The numbers indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class 1 soils have slight limitations that restrict their use.

Class 2 soils have moderate limitations that restrict the choice of plants or that require moderate conservation practices.

Class 3 soils have severe limitations that restrict the choice of plants or that require special conservation practices, or both.

Class 4 soils have very severe limitations that restrict the choice of plants or that require very careful management, or both.

Class 5 soils are subject to little or no erosion but have other limitations, impractical to remove, that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

Class 6 soils have severe limitations that make them generally unsuitable for cultivation and that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

Class 7 soils have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, forestland, or wildlife habitat.

Class 8 soils and miscellaneous areas have limitations that preclude commercial plant production and that restrict their use to recreational purposes, wildlife habitat, watershed, or esthetic purposes.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, 2e. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c,* used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class 1 there are no subclasses because the soils of this class have few limitations. Class 5 contains only the subclasses indicated by *w, s,* or *c* because the soils in class 5 are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, forestland, wildlife habitat, or recreation.

The capability classification of map units in this survey area is given in the section "Soil Series and Detailed Soil Map Units" and in table 7.

Prime Farmland

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

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. The soil qualities, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. It is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

About 198,069 acres in Moultrie County, or nearly 90 percent of the total acreage, meets the soil requirement for prime farmland. This land generally is used for cultivated crops, mainly corn and soybeans. It is throughout the county. The largest contiguous acreage is in the northern and eastern parts.

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, less productive, and cannot be easily cultivated.

The map units in the survey area that are considered prime farmland are listed in table 8. This list does not constitute a recommendation for a particular land use. On some soils included in the list, measures that overcome a hazard or limitation, such as flooding and wetness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures. The extent of each listed map unit is shown in table 5. The location is shown on the detailed soil maps. The soil qualities that affect use and management are described under the heading "Soil Series and Detailed Soil Map Units."

Hydric Soils

In this section, hydric soils are defined and described and the hydric soils in the survey area are listed.

The three essential characteristics of wetlands are hydrophytic vegetation, hydric soils, and wetland hydrology (Cowardin and others, 1979; U.S. Army Corps of Engineers, 1987; National Research Council, 1995; Tiner, 1985). Criteria for each of the characteristics must be met for areas to be identified as wetlands. Undrained hydric soils that have natural vegetation should support a dominant population of ecological wetland plant species. Hydric soils that have been converted to other uses should be capable of being restored to wetlands.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). These soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 1995). These criteria are used to identify a phase of a soil series that normally is associated with wetlands. The criteria used are selected estimated soil properties that are described in “Soil Taxonomy” (Soil Survey Staff, 1999), “Keys to Soil Taxonomy” (Soil Survey Staff, 1998), and the “Soil Survey Manual” (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils in this survey area are specified in “Field Indicators of Hydric Soils in the United States” (Hurt and others, 1998).

Hydric soils are identified by examining and describing the soil to a depth of about 20 inches. This depth may be greater if determination of an appropriate indicator so requires. It is always recommended that soils be excavated and described to the depth necessary for an understanding of the redoximorphic processes. Then, using the completed soil descriptions, soil scientists can compare the soil features required by each indicator and specify which indicators have been matched with the conditions observed in the soil. The soil can be identified as a hydric soil if at least one of the approved indicators is present.

Map units that are made up mainly of hydric soils may have small areas, or inclusions, of nonhydric soils in the higher positions on the landform, and map units made up mainly of nonhydric soils may have inclusions of hydric soils in the lower positions on the landform. Table 9 indicates the hydric and nonhydric soils identified in the names of the detailed map units in the county. The table also identifies the included soils that are considered hydric. Onsite investigation is recommended to determine whether hydric soils occur and the location of the included hydric soils.

Windbreaks and Environmental Plantings

Windbreaks are needed in areas where the soils in Moultrie County are subject to wind erosion. Wind erosion is a moderate hazard on about 12.5 percent of the acreage in the county. The soils that are susceptible to wind erosion have a surface layer of very fine sandy loam or sandy loam, have a high content of finely divided calcium carbonate, or have a high content of clay in the surface layer. Areas of Hartsburg soils have included soils that have a high content of calcium carbonate in the surface layer. Milford and Peotone soils have a high content of clay in the surface layer.

Windbreaks protect livestock, buildings, yards, fruit trees, gardens, and cropland from wind and snow; help to keep snow on fields; and provide food and cover for wildlife.

Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field. The interval depends on the erodibility of the soil.

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 10 shows the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates in table 10 are based on measurements and observation of established plantings that have been given adequate care. They can be used as a guide in planning windbreaks and screens. Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from the local office of the Natural Resources Conservation Service or of the Cooperative Extension Service or from a commercial nursery.

Woodland

When the first settlers arrived, forests covered about 23 percent of the land in Moultrie County (Iverson and others, 1989). Since then, most of the trees have been cleared from the areas best suited to cultivation.

By 1997, only 2,795 acres, or about 1 percent of the acreage in the county, was forestland (USDA, NASS, 1997, 2003). The remaining forestland is dominantly in areas that are too steep, too wet, or too isolated for cultivation. Most of these areas are along the shores of Lake Shelbyville or along the drainageways of the Kaskaskia and West Okaw Rivers. If properly managed, the soils in these areas are generally well suited to high-quality trees. Most of the forestland is privately owned.

The most common trees in the uplands are white oak, black oak, northern red oak, shagbark hickory, white ash, green ash, sugar maple, silver maple, boxelder, black walnut, black cherry, and American elm. The most common trees on flood plains are cottonwood, sycamore, willow, bur oak, pin oak, swamp white oak, hackberry, and silver maple.

The productivity of many of the remaining forestland stands could be improved by proper management. The most common management practices needed in these stands are exclusion of livestock; protection from fire, insects, and diseases; proper logging methods; and proven silvicultural methods that enhance growth and regeneration.

Forest Productivity

In table 11, the *potential productivity* of merchantable or *common trees* on a soil is expressed as a site index and as a volume number. 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 forest managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability. More detailed information regarding site index is available in the "National Forestry Manual" (USDA, 1998), which is available in local offices of the Natural Resources Conservation Service or on the Internet.

The *volume of wood fiber*, a number, is the yield likely to be produced by the most important tree species. This number, expressed as cubic feet per acre per year and calculated at the age of culmination of the mean annual increment (CMAI), indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand.

Suggested trees to plant are those that are preferred for planting, seeding, or natural regeneration and those that remain in the stand after thinning or partial harvest.

Recreation

The demand for recreational facilities is increasing throughout Moultrie County. The construction of Lake Shelbyville has greatly enhanced the recreational opportunities in the county (fig. 13). Other recreational areas are throughout the county. They include playgrounds, athletic fields, golf courses, fishing ponds, camping and picnic areas, hunting areas, and facilities for target shooting. The potential for further recreational development is good throughout the county. The soils having the best potential for such development are in the uplands along the Kaskaskia and West Okaw Rivers and near Lake Shelbyville. These soils are in areas of hilly terrain, wooded slopes, and numerous streams.

The soils of the survey area are rated in tables 12a and 12b according to limitations that affect their suitability for recreation. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the recreational uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as

Figure 13.—Camping on Senachwine silt loam, 2 to 5 percent slopes, eroded, along Lake Shelbyville.

decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

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

The information in tables 12a and 12b can be supplemented by other information in this survey, for example, interpretations for building site development, construction materials, sanitary facilities, and water management.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The ratings are based on the soil properties that affect the ease of developing camp areas and the performance of the areas after development. Slope, stoniness, and depth to bedrock or a cemented pan are the main concerns affecting the development of camp areas. The soil properties that affect the performance of the areas after development are those that influence trafficability and promote the growth of vegetation, especially in heavily used areas. For good trafficability, the surface of camp areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The ratings are based on the soil properties that affect the ease of developing picnic areas and that influence trafficability and the growth of vegetation after development. Slope and stoniness are the main concerns affecting the development of picnic areas. For good trafficability, the surface of picnic areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Playgrounds require soils that are nearly level, are free of stones, and can withstand intensive foot traffic. The ratings are based on the soil properties that affect the ease of developing playgrounds and that influence trafficability and the growth of vegetation after development. Slope and stoniness are the main concerns affecting the development of playgrounds. For good trafficability, the surface of the playgrounds should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Paths and trails for hiking and horseback riding should require little or no slope modification through cutting and filling. The ratings are based on the soil properties that affect trafficability and erodibility. These properties are stoniness, depth to a water table, ponding, flooding, slope, and texture of the surface layer.

Off-road motorcycle trails require little or no site preparation. They are not covered with surfacing material or vegetation. Considerable compaction of the soil material is likely. The ratings are based on the soil properties that influence erodibility, trafficability, dustiness, and the ease of revegetation. These properties are stoniness, slope, depth to a water table, ponding, flooding, and texture of the surface layer.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. Irrigation is not considered in the ratings. The ratings are based on the soil properties that affect plant growth and trafficability after vegetation is established. The properties that affect plant growth are reaction; depth to a water table; ponding; depth to bedrock or a cemented pan; the available water capacity in the upper 40 inches; the content of salts, sodium, or calcium carbonate; and sulfidic materials. The properties that affect trafficability are flooding, depth to a water table, ponding, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer. The suitability of the soil for traps, tees, roughs, and greens is not considered in the ratings.

Wildlife Habitat

Originally, much of Moultrie County was part of a broad tall-grass prairie that included wet meadows, marshes, and areas of open water. The county is near the southern limit of the Midwestern prairie pothole region that traditionally provided valuable nesting and stop-over habitat for migratory waterfowl as well as habitat for other wetland and openland wildlife. Although some areas were wooded, especially those along creeks and in moderately steep to very steep areas, the native plant communities were dominated by tall prairie grasses.

As the county was settled, conversion of land to agricultural uses and urbanization altered the natural communities and the wildlife species associated with them. The landscape in the county is now a mosaic of urban development, cropland, pasture, isolated areas of forestland, wetlands, and waterways that support wildlife species adapted to the human-altered landscape. These species include whitetail deer, fox, coyotes, mourning doves, pheasants, squirrels, cardinals, and raccoons.

The largest areas managed for wildlife in Moultrie County are in the West Okaw Wildlife Area and the Shelbyville Management Area. These areas make up about 7,126 acres and are managed by the Illinois Department of Conservation.

Other areas that are used as wildlife habitat in the county are not necessarily set aside for this purpose. Wildlife habitat is commonly a secondary use in areas used for other purposes, such as farming. For example, the large areas of nearly level and gently sloping soils used for cultivated crops and pasture also are generally well suited to habitat for openland wildlife. In most areas of the county, the habitat can be improved by measures that provide needed food, cover, and water.

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

In table 13, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

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

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

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flooding. Soil temperature and soil moisture also are considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are lovegrass, 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 also are considerations. Examples of wild herbaceous plants are bluestem, goldenrod, ragweed, wildrye, and Illinois bundleflower.

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, hickory, sycamore, cottonwood, elm, sassafras, serviceberry, gray dogwood, flowering dogwood, hazelnut, sumac, and raspberry. If species are planted for wildlife on soils rated *good*, it is best to select native plants, such as hazelnut, gray dogwood, silky dogwood, oak, and hickory. Table 11 shows some of the trees recommended for planting on the soils in the county.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are white pine, Norway spruce, balsam fir, red cedar, and juniper. Table 10 shows some of the trees recommended for planting on the soils in the county.

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, wild millet, wildrice, saltgrass, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, pheasant, meadowlark, field sparrow, cottontail, and red fox.

The habitat for openland wildlife can be improved by seeding roadsides, fence rows, and wildlife travel lanes to perennial plants and legumes, such as smooth bromegrass, timothy, redtop, bluegrass, alfalfa, red clover, ladino clover, and alsike clover; enhancing grassy areas with perennial native prairie grasses, such as big bluestem, little bluestem, switchgrass, and indiangrass; protecting nesting cover from fire, traffic, grazing, mowing, or other disturbances until after the nesting season; establishing hedgerows and windbreaks having trees and shrubs that provide food and roosting areas; building brush piles for cover along fence rows and in odd-shaped areas that are inconvenient for cultivation; leaving crop residue on the surface after harvest; leaving waste grain in the fields; and leaving unharvested areas next to wildlife cover. Warm-season grasses grow best under periodic prescribed burning. Any existing woody cover should be protected from fire and grazing.

Habitat for woodland wildlife consists of areas of deciduous and/or coniferous plants and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, and deer.

The habitat for woodland wildlife can be improved protecting native trees, shrubs, and prairie plants from grazing by livestock and uncontrolled fire, which can destroy the leaf mulch and desirable young trees, shrubs, and sprouts that provide food and cover. Establishing hedgerows, farm windbreaks, brush piles, food plots, and strips of grass or grass-legume mixtures provides additional food and cover. Establishing and maintaining plants that provide food and cover may be difficult in more sloping areas because of the slope and the hazard of erosion. Because of the hazard of erosion, food plots of grain or seed crops should be established in the less sloping areas and should be planted on the contour. Leaving dead trees to provide den sites for raccoons, woodpeckers, opossum, and other cavity-dwelling species also improves the habitat.

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, frogs, snakes, and turtles.

The habitat for wetland wildlife can be improved by delaying or limiting the cultivation and planting of commodity crops in shallow depressions that are subject to ponding; protecting areas of smartweeds, bulrushes, burreeds, and barnyard grasses; planting Japanese millet, milo, and short corn varieties; and establishing shallow ponds and marshes by blocking natural channels and man-made drainage systems. If pits dug in poorly drained or very poorly drained soils are at least 30 feet in diameter and 2 to 3 feet deep, they provide open water through the spring and early summer and thus encourage nesting by ducks. These areas should be protected from grazing.

Shallow water areas can commonly be included in the design of ponds and lakes by utilization of the naturally shallow end of the impoundment. Wetland areas also can be established by installing water-control valves on field drainage tiles, allowing flooding of fields at times not necessary for the production of crops, such as after fall harvest. The valves can be opened to allow fields to be drained for spring planting, while permitting soil moisture to remain high enough for good productivity. Islands, wood duck boxes, and an even mixture of open water and aquatic plants help to provide optimum wetland wildlife habitat.

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 data in the tables described under the heading “Soil Properties.”

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil between the surface and a depth of 5 to 7 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about particle-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 7 feet of the surface, soil wetness, depth to a water table, ponding, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

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

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

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

Building Site Development

Soil properties influence the development of building sites, including the selection of the site, the design of the structure, construction, performance after construction, and maintenance. Tables 14a and 14b show the degree and kind of soil limitations that affect dwellings with and without basements, small commercial buildings, local roads and streets, shallow excavations, and lawns and landscaping.

The ratings in the tables are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect building site development. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Dwellings are single-family houses of three stories or less. For dwellings without basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. For dwellings with basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of about 7 feet. The ratings for dwellings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility. Compressibility is inferred from the Unified classification. The properties that affect the ease and amount of excavation include depth to a water table, ponding, flooding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Small commercial buildings are structures that are less than three stories high and do not have basements. The foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. The ratings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility (which is inferred from the Unified classification). The properties that affect the ease and amount of excavation include flooding, depth to a water table, ponding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or soil material stabilized by lime or cement; and a surface of flexible material (asphalt), rigid material (concrete), or gravel with a binder. The ratings are based on the soil properties that affect the ease of excavation and grading and the traffic-supporting capacity. The properties that affect the ease of excavation and grading are depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, depth to a water table, ponding, flooding, the amount of large stones, and slope. The properties that affect the traffic-supporting capacity are soil strength (as inferred from the AASHTO group index number), subsidence, linear extensibility (shrink-swell potential), the potential for frost action, depth to a water table, and ponding.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for graves, utility lines, open ditches, or other purposes. The ratings are based on the soil properties that influence the ease of digging and the resistance to sloughing. Depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, the amount of large stones, and dense layers influence the ease of digging, filling, and compacting. Depth to the seasonal high water table, flooding, and ponding may restrict the period when excavations can be made. Slope influences the ease of using machinery. Soil texture, depth to the water table, and linear extensibility (shrink-swell potential) influence the resistance to sloughing.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. Irrigation is not considered in the ratings. The ratings are based on the soil properties that affect plant growth and trafficability after vegetation is established. The properties that affect plant growth are reaction; depth to a water table; ponding; depth to bedrock or a cemented pan; the available water capacity in the upper 40 inches; the content of salts, sodium, or calcium carbonate; and sulfidic materials. The properties that affect trafficability are flooding, depth to a water table, ponding, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer.

Sanitary Facilities

Tables 15a and 15b show the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, sanitary landfills, and daily cover for landfill. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 60 inches is evaluated. The ratings are based on the soil properties that affect absorption of the effluent, construction and maintenance of the system, and public health. Permeability, depth to a water table, ponding, depth to bedrock or a cemented pan, and flooding affect absorption of the effluent. Stones and boulders, ice, and bedrock or a cemented pan interfere with installation. Subsidence interferes with installation and maintenance. Excessive slope may cause lateral seepage and surfacing of the effluent in downslope areas.

Some soils are underlain by loose sand and gravel or fractured bedrock at a depth of less than 4 feet below the distribution lines. In these soils the absorption field may not adequately filter the effluent, particularly when the system is new. As a result, the ground water may become contaminated.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Considered in the ratings are slope, permeability, depth to a water table, ponding, depth to bedrock or a cemented pan, flooding, large stones, and content of organic matter.

Soil permeability is a critical property affecting the suitability for sewage lagoons. Most porous soils eventually become sealed when they are used as sites for sewage lagoons. Until sealing occurs, however, the hazard of pollution is severe. Soils that have a permeability rate of more than 2 inches per hour are too porous for the proper functioning of sewage lagoons. In these soils, seepage of the effluent can result in contamination of the ground water. Ground-water contamination is also a hazard if fractured bedrock is within a depth of 40 inches, if the water table is high enough to raise the level of sewage in the lagoon, or if floodwater overtops the lagoon.

A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor. If the lagoon is to be uniformly deep throughout, the slope must be gentle enough and the soil material must be thick enough over bedrock or a cemented pan to make land smoothing practical.

A *trench sanitary landfill* is an area where solid waste is placed in successive layers in an excavated trench. The waste is spread, compacted, and covered daily with a thin layer of soil excavated at the site. When the trench is full, a final cover of soil material at least 2 feet thick is placed over the landfill. The ratings in table 15b are based on the soil properties that affect the risk of pollution, the ease of excavation, trafficability, and revegetation. These properties include permeability, depth to bedrock or a cemented pan, depth to a water table, ponding, slope, flooding, texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, onsite investigation may be needed.

Hard, nonrippable bedrock, creviced bedrock, or highly permeable strata in or directly below the proposed trench bottom can affect the ease of excavation and the hazard of ground-water pollution. Slope affects construction of the trenches and the movement of surface water around the landfill. It also affects the construction and performance of roads in areas of the landfill.

Soil texture and consistence affect the ease with which the trench is dug and the ease with which the soil can be used as daily or final cover. They determine the workability of the soil when dry and when wet. Soils that are plastic and sticky when wet are difficult to excavate, grade, or compact and are difficult to place as a uniformly thick cover over a layer of refuse.

The soil material used as the final cover for a trench landfill should be suitable for plants. It should not have excess sodium or salts and should not be too acid. The surface layer generally has the best workability, the highest content of organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

In an *area sanitary landfill*, solid waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site. A final cover of soil material at least 2 feet thick is placed over the completed landfill. The ratings in table 15b are based on the soil properties that affect trafficability and the risk of pollution. These properties include flooding, permeability, depth to a water table, ponding, slope, and depth to bedrock or a cemented pan.

Flooding is a serious problem because it can result in pollution in areas downstream from the landfill. If permeability is too rapid or if fractured bedrock, a fractured cemented pan, or the water table is close to the surface, the leachate can contaminate the water supply. Slope is a consideration because of the extra grading required to maintain roads in the steeper areas of the landfill. Also, leachate may flow along the surface of the soils in the steeper areas and cause difficult seepage problems.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste. The ratings in table 15b also apply to the final cover for a landfill. They are based on the soil properties that affect workability, the ease of digging, and the ease of moving and spreading the material over the refuse daily during wet and dry periods. These properties include soil texture, depth to a water table, ponding, rock fragments, slope, depth to bedrock or a cemented pan, reaction, and content of salts, sodium, or lime.

Loamy or silty soils that are free of large stones and excess gravel are the best cover for a landfill. Clayey soils may be sticky and difficult to spread; sandy soils are subject to wind erosion.

Slope affects the ease of excavation and of moving the cover material. Also, it can influence runoff, erosion, and reclamation of the borrow area.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as the final cover for a landfill should be suitable for plants. It should not have excess sodium, salts, or lime and should not be too acid.

Construction Materials

Table 16 gives information about the soils as potential sources of reclamation material, roadfill, topsoil, and sand. Normal compaction, minor processing, and other standard construction practices are assumed.

The soils are rated *good, fair,* or *poor* as potential sources of reclamation material, roadfill, and topsoil. The features that limit the soils as sources of these materials are specified in the tables. The numerical ratings given after the specified features indicate the degree to which the features limit the soils as sources of reclamation material, roadfill, or topsoil. The lower the number, the greater the limitation.

Reclamation material is used in areas that have been drastically disturbed by surface mining or similar activities. When these areas are reclaimed, layers of soil material or unconsolidated geological material, or both, are replaced in a vertical sequence. The reconstructed soil favors plant growth. The ratings in the table do not apply to quarries and other mined areas that require an offsite source of reconstruction material. The ratings are based on the soil properties that affect erosion and stability of the surface and the productive potential of the reconstructed soil. These properties include the content of sodium, salts, and calcium carbonate; reaction; available water capacity; erodibility; texture; content of rock fragments; and content of organic matter and other features that affect fertility.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the whole soil, from the surface to a depth of about 5 feet. It is assumed that soil layers will be mixed when the soil material is excavated and spread.

The ratings are based on the amount of suitable material and on soil properties that affect the ease of excavation and the performance of the material after it is in place. The thickness of the suitable material is a major consideration. The ease of excavation is affected by large stones, depth to a water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the AASHTO classification of the soil) and linear extensibility (shrink-swell potential).

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area. The ratings are based on the soil properties that affect plant growth; the ease of excavating, loading, and spreading the material; and reclamation of the borrow area. Toxic substances, soil reaction, and the properties that are inferred from soil texture, such as available water capacity and fertility, affect plant growth. The ease of excavating, loading, and spreading is affected by rock fragments, slope, depth to a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, depth to a water table, rock fragments, depth to bedrock or a cemented pan, and toxic material.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Sand is used in many kinds of construction with a minimum of processing. In table 16, only the likelihood 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 are gradation of grain sizes (as indicated by the Unified classification of the soil), the thickness of suitable material, and the content of rock fragments. If the bottom layer of the soil contains sand, the soil is considered a likely source regardless of thickness. The assumption is that the sand layer below the depth of observation exceeds the minimum thickness.

The soils are rated *good, fair,* or *poor* as potential sources of sand. A rating of *good* or *fair* means that the source material is likely to be in or below the soil. The bottom layer and the thickest layer of the soils are assigned numerical ratings. These ratings indicate the likelihood that the layer is a source of sand. The number 0.00 indicates that the layer is a poor source. The number 1.00 indicates that the layer is a good source. A number between 0.00 and 1.00 indicates the degree to which the layer is a likely source.

Water Management

Tables 17a and 17b give information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; aquifer-fed excavated ponds; grassed waterways and surface drains; terraces and diversions; and tile drains and underground outlets. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Pond reservoir areas hold water behind a dam or embankment (fig. 14). Soils best suited to this use have low seepage potential in the upper 60 inches.

Figure 14.—One of more than 200 small ponds in scattered areas throughout Moultrie County.

The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. Embankments that have zoned construction (core and shell) are not considered. In table 17a, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

Grassed waterways and surface drains 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 a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts and sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

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 a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind erosion or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Tile drains and underground outlets remove excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock or 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, 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.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey.

Soil properties are ascertained by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine moisture density, percentage passing sieves, liquid limit, plasticity index, and the AASHTO and Unified engineering classifications. These results are reported in table 23.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties are shown in tables. They include engineering index properties, physical and chemical properties, and pertinent soil and water features.

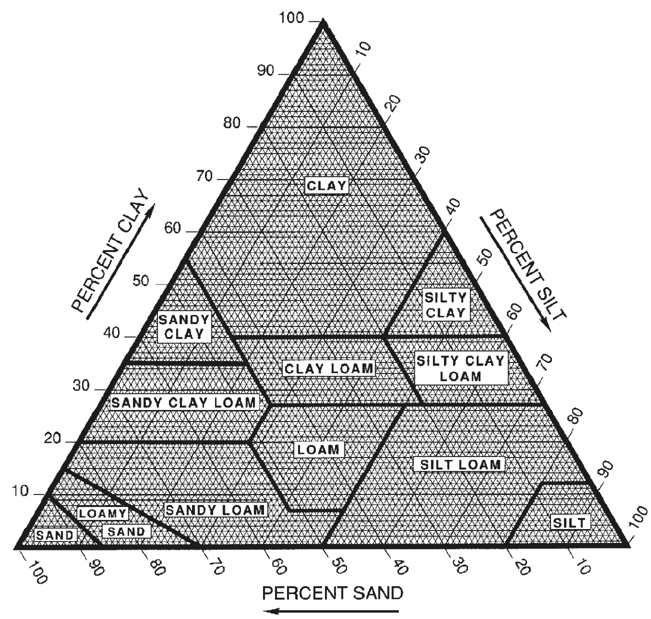


Figure 15.—Percentages of clay, silt, and sand in the basic USDA soil texture classes.

Engineering Index Properties

Table 18 gives the engineering classifications and the range of index properties for the layers of each soil in the survey area.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter (fig. 15). “Loam,” for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, “gravelly.” Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (ASTM, 2001) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2000).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 23.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of particle-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is generally omitted in the tables.

Physical Properties

Table 19 shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes, each with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller. In table 19, the estimated sand, silt and clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter.

Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

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

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at $^1/_3$- or $^1/_{10}$-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability (K_{sat}) refers to the ability of a soil to transmit water or air. The term “permeability,” as used in soil surveys, indicates saturated hydraulic conductivity (K_{sat}). The estimates in the table indicate the rate of water movement, in inches per hour, when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at $^{1}/_{3}$- or $^{1}/_{10}$-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. The amount and type of clay minerals in the soil influence volume change.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 19, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained by returning crop residue to the soil. Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in table 19 as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of several factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and permeability. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are described in the “National Soil Survey Handbook” (USDA, NRCS, NSSH).

Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Chemical Properties

Table 20 shows estimates of some chemical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Soil reaction is a measure of acidity or alkalinity. The pH of each soil horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Cation-exchange capacity is the total amount of extractable bases that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. Soils having a low cation-exchange capacity hold fewer cations and may require more frequent applications of fertilizer than soils having a high cation-exchange capacity. The ability to retain cations reduces the hazard of ground-water pollution.

Calcium carbonate equivalent is the percent of carbonates, by weight, in the fraction of the soil less than 2 millimeters in size. The availability of plant nutrients is influenced by the amount of carbonates in the soil. High concentrations of bicarbonate can interfere with the normal uptake of ions by plants thereby being detrimental to optimum plant growth. Iron, manganese, zinc and phosphorus become less available and molybdenum availability increases as carbonates in the soil increase.

Water Features

Table 21 gives estimates of various water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, 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 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 a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas.

The *months* in the table indicate the portion of the year in which the feature is most likely to be a concern.

Water table refers to a saturated zone in the soil. Table 21 indicates, by month, depth to the top (*upper limit*) and base (*lower limit*) of the saturated zone in most years. Estimates of the upper and lower limits are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

Ponding is standing water in a closed depression. Unless a drainage system is installed, only percolation, transpiration, or evaporation removes the water. Table 21 indicates *surface water depth* and the *duration* and *frequency* of ponding. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, rare, occasional, and frequent. *None* means that ponding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of ponding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs, on the average, once or less in 2 years (the chance of ponding is 5 to 50 percent in any year); and *frequent* that it occurs, on the average, more than once in 2 years (the chance of ponding is more than 50 percent in any year).

Flooding is the temporary inundation of an area caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

Duration and *frequency* are estimated. Duration is expressed as *extremely brief* if 0.1 hour to 4 hours, *very brief* if 4 hours to 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, very rare, rare, occasional, frequent, and very frequent. *None* means that flooding is not probable; *very rare* that it is very unlikely but possible under extremely unusual weather conditions (the chance of flooding is less than 1 percent in any year); *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is 1 to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); *frequent* that it is likely to occur often under normal weather conditions (the chance of flooding is more than 50 percent in any year but is less than 50 percent in all months in any year); and *very frequent* that it is likely to occur very often under normal weather conditions (the chance of flooding is more than 50 percent in all months of any year).

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered is local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

Soil Features

Table 22 gives estimates of soil features. The estimates are used in land use planning that involves engineering considerations.

Potential for frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel or concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel or concrete in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate,* or *high,* is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion also is expressed as *low, moderate,* or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Engineering Index Test Data

Table 23 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 Detailed Soil Map Units.” The Illinois Department of Transportation, Springfield, Illinois, tested the soil samples.

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 2487-00 (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).

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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.

Alluvial fan. The fanlike deposit of a stream where it issues from a gorge upon a plain or of a tributary stream near or at its junction with its main stream.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Alpha,alpha-dipyridyl. A dye that when dissolved in 1N ammonium acetate is used to detect the presence of reduced iron (Fe II) in the soil. A positive reaction indicates a type of redoximorphic feature.

Animal unit month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Aquic conditions. Current soil wetness characterized by saturation, reduction, and redoximorphic features.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Aspect. The direction in which a slope faces.

Association, soil. A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Backslope. The position that forms the steepest and generally linear, middle portion of a hillslope. In profile, backslopes are commonly bounded by a convex shoulder above and a concave footslope below.

Basal till. Compact till deposited beneath the ice.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Base slope. A geomorphic component of hills consisting of the concave to linear (perpendicular to the contour) slope that, regardless of the lateral shape, forms an apron or wedge at the bottom of a hillside dominated by colluvium and slope-wash sediments (for example, slope alluvium).

Bedding planes. Fine strata, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediment.

Bedding system. A drainage system made by plowing, grading, or otherwise shaping the surface of a flat field. It consists of a series of low ridges separated by shallow, parallel dead furrows.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Blowout. A shallow depression from which all or most of the soil material has been removed by the wind. A blowout has a flat or irregular floor formed by a resistant layer or by an accumulation of pebbles or cobbles. In some blowouts the water table is exposed.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Breaks. The steep and very steep broken land at the border of an upland summit that is dissected by ravines.

Breast height. An average height of 4.5 feet above the ground surface; the point on a tree where diameter measurements are ordinarily taken.

Brush management. Use of mechanical, chemical, or biological methods to make conditions favorable for reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Cahokia alluvium (geology). Deposits in areas of flood plains and channels in modern rivers and streams. Mostly poorly sorted sand, silt, or clay containing local deposits of sandy gravel. See Quaternary.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Canopy. The leafy crown of trees or shrubs. (See Crown.)

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.

Carmi member (geology). Largely quiet-water lake sediments dominated by well bedded silt and some clay. See Quaternary.

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.

Channery soil material. Soil material that has, by volume, 15 to 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a channer.

Chemical treatment. Control of unwanted vegetation through the use of chemicals.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay depletions. Low-chroma zones having a low content of iron, manganese, and clay because of the chemical reduction of iron and manganese and the removal of iron, manganese, and clay. A type of redoximorphic depletion.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Climax plant community. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse textured soil. Sand or loamy sand.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material. Material that has 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.

COLE (coefficient of linear extensibility). See Linear extensibility.

Colluvium. Soil material or rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping.

The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Concretions. Cemented bodies with crude internal symmetry organized around a point, a line, or a plane. They typically take the form of concentric layers visible to the naked eye. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up concretions. If formed in place, concretions of iron oxide or manganese oxide are generally considered a type of redoximorphic concentration.

Congeliturbate. Soil material disturbed by frost action.

Conglomerate. A coarse grained, clastic rock composed of rounded or subangular rock fragments more than 2 millimeters in diameter. It commonly has a matrix of sand and finer textured material. Conglomerate is the consolidated equivalent of gravel.

Conservation cropping system. Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the “Soil Survey Manual.”

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Coprogenous earth (sedimentary peat). Fecal material deposited in water by aquatic organisms.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cropping system. Growing crops according to a planned system of rotation and management practices.

Cross-slope farming. Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

Crown. The upper part of a tree or shrub, including the living branches and their foliage.

Culmination of the mean annual increment (CMAI). The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called the culmination of the mean annual increment.

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.

Delta. A body of alluvium having a surface that is nearly flat and fan shaped; deposited at or near the mouth of a river or stream where it enters a body of relatively quiet water, generally a sea or lake.

Depth, soil. Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Divided-slope farming. A form of field stripcropping in which crops are grown in a systematic arrangement of two strips, or bands, across the slope to reduce the hazard of water erosion. One strip is in a close-growing crop that provides protection from erosion, and the other strip is in a crop that provides less protection from erosion. This practice is used where slopes are not long enough to permit a full stripcropping pattern to be used.

Drainage class (natural). Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained,* and *very poorly drained*. These classes are defined in the "Soil Survey Manual."

Drainage, surface. Runoff, or surface flow of water, from an area.

Drumlin. A low, smooth, elongated oval hill, mound, or ridge of compact till. The longer axis is parallel to the path of the glacier and commonly has a blunt nose pointing in the direction from which the ice approached.

Duff. A generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

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.

End moraine. A ridgelike accumulation that is being or was produced at the outer margin of an actively flowing glacier at any given time.

Endosaturation. A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Synonym: scarp.

Esker. A narrow, winding ridge of stratified gravelly and sandy drift deposited by a stream flowing in a tunnel beneath a glacier.

Fairgrange till member (geology). Pink, reddish brown, and brownish gray sandy till in east-central Illinois. See Wedron Formation.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grain is grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity*.

Fill slope. A sloping surface consisting of excavated soil material from a road cut. It commonly is on the downhill side of the road.

Fine textured soil. Sandy clay, silty clay, or clay.

Firebreak. Area cleared of flammable material to stop or help control creeping or running fires. It also serves as a line from which to work and to facilitate the movement of firefighters and equipment. Designated roads also serve as firebreaks.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flaggy soil material. Material that has, by volume, 15 to 35 percent flagstones. Very flaggy soil material has 35 to 60 percent flagstones, and extremely flaggy soil material has more than 60 percent flagstones.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Fluvial. Of or pertaining to rivers; produced by river action, as a fluvial plain.

Footslope. The position that forms the inner, gently inclined surface at the base of a hillslope. In profile, footslopes are commonly concave. A footslope is a transition zone between upslope sites of erosion and transport (shoulders and backslopes) and downslope sites of deposition (toeslopes).

Forb. Any herbaceous plant not a grass or a sedge.

Forest cover. All trees and other woody plants (underbrush) covering the ground in a forest.

Forest type. A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

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.

Gilgai. Commonly, a succession of microbasins and microknolls in nearly level areas or of microvalleys and microridges parallel with the slope. Typically, the microrelief of clayey soils that shrink and swell considerably with changes in moisture content.

Glacial (geology). Term embraces both the processes and results of erosion and deposition arising from the presence of an ice mass (glacier) on a landscape.

Glacial drift. 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 lake (relict). An area formerly occupied by a glacial lake. See Glaciolacustrine deposits.

Glacial outwash. Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Glaciofluvial deposits. Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

Glaciolacustrine deposits. Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are interbedded or laminated.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that has 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground moraine. An extensive, fairly even layer of till having an uneven or undulating surface.

Ground water. Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Hard to reclaim (in tables). Reclamation is difficult after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Head slope. A geomorphic component of hills consisting of a laterally concave area of a hillside, especially at the head of a drainageway. The overland waterflow is converging.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.

High-residue crops. Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

Hill. A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline; hillsides generally have slopes of more than 15 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

Holocene (geology). Post-glacial stage or time period (interglacial). About 0 to 12,600 years before present. See Quaternary.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Igneous rock. Rock formed by solidification from a molten or partially molten state. Major varieties include plutonic and volcanic rock. Examples are andesite, basalt, and granite.

Illinoian (geology). In Illinois, the glacial stage of ice advance preceding the Wisconsinan stage and following the Kansan stage during the Pleistocene. This glaciation covered nearly all of the Illinois, except for small areas in the western and southern parts of the State. See Pleistocene.

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.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Interfluve. An elevated area between two drainageways that sheds water to those drainageways.

Interglacial (geology). A period between major glacial stages. See Holocene and Sangamonian.

Intermittent stream. A stream, or reach of a stream, that flows for prolonged periods only when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Iron depletions. Low-chroma zones having a low content of iron and manganese oxide because of chemical reduction and removal, but having a clay content similar to that of the adjacent matrix. A type of redoximorphic depletion.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Kame. An irregular, short ridge or hill of stratified glacial drift.

Kansan (geology). In Illinois, the oldest glacial stage of ice advance during the Pleistocene. Glacial deposits from this glaciation are exposed in western Illinois. See Pleistocene.

Knoll. A small, low, rounded hill rising above adjacent landforms.

K_{sat}. Saturated hydraulic conductivity. (See Permeability.)

Lacustrine deposit. Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Landscape. A collection of related natural landforms; generally the land surface which the eye can comprehend in a single view.

Leaching. The removal of soluble material from soil or other material by percolating water.

Linear extensibility. Refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. Linear extensibility is used to determine the shrink-swell potential of soils. It is an expression of the volume change between the water content of the clod at $^1/_3$- or $^1/_{10}$-bar tension (33kPa or 10kPa tension) and oven dryness. Volume change is influenced by the amount and type of clay minerals in the soil. The volume change is the percent change for the whole soil. If it is expressed as a fraction, the resulting value is COLE, coefficient of linear extensibility.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

Low-residue crops. Such crops as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

Major land resource area (MLRA). Geographically associated land resource areas. The areas are designated by Arabic numbers and identified by a descriptive geographic name.

Masses. Concentrations of substances in the soil matrix that do not have a clearly defined boundary with the surrounding soil material and cannot be removed as a discrete unit. Common compounds making up masses are calcium carbonate, gypsum or other soluble salts, iron oxide, and manganese oxide. Masses consisting of iron oxide or manganese oxide generally are considered a type of redoximorphic concentration.

Mechanical treatment. Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

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. 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. <p>Irregular spots of different colors that vary in number and size. Descriptive terms are as follows: abundance=*few* (less than 2 percent), c*ommon* (2 to 20 percent), and *many* (more than 20 percent); 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 2 millimeters (about 0.08 inch); *medium*, 2 to 5 millimeters (about 0.08 to 0.2 inch); coarse, 5 to 20 millimeters (about 0.2 to 0.8 inch); *very coarse*, 20 to 76 millimeters (about 0.8 to 3.0 inches); and *extremely coarse*, more than 76 millimeters.

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Natric horizon. A special kind of argillic horizon that contains enough exchangeable sodium to have an adverse effect on the physical condition of the subsoil.

Neutral soil. A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nodules. Cemented bodies lacking visible internal structure. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up nodules. If formed in place, nodules of iron oxide or manganese oxide are considered types of redoximorphic concentrations.

Nose slope. A geomorphic component of hills consisting of the projecting end (laterally convex area) of a hillside. The overland waterflow is predominantly divergent.

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Very low	less than 0.5 percent
Low	0.5 to 1.0 percent
Moderately low	1.0 to 2.0 percent
Moderate	2.0 to 4.0 percent
High	4.0 to 8.0 percent
Very high	more than 8.0 percent

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it generally is low in relief.

Paleoterrace. An erosional remnant of a terrace that retains the surface form and alluvial deposits of its origin but was not emplaced by, and commonly does not grade to, a present-day stream or drainage network.

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.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedisediment. A thin layer of alluvial material that mantles an erosion surface and has been transported to its present position from higher lying areas of the erosion surface.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The movement of water through the soil.

Permeability. The quality of the soil that enables water or air to move downward through the profile. The rate at which a saturated soil transmits water is accepted as a measure of this quality. In soil physics, the rate is referred to as "saturated hydraulic conductivity," which is defined in the "Soil Survey Manual." In line with conventional usage in the engineering profession and with traditional usage in published soil surveys, this rate of flow continues to be expressed as "permeability." Terms describing permeability, measured in inches per hour, are as follows:

Impermeable	less than 0.0015 inch
Very slow	0.0015 to 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

Piatt till member (geology). Sandy and silty, gray till that oxidizes to olive brown. See Wedron Formation.

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.

Pleistocene (geology). The period in a geologic time series that represents glacial and interglacial stages. Includes the Holocene, Wisconsinan, Sangamonian, Illinoian, Kansan, and earlier stages. The period covered is about 0 to 2 million years before present.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other dilutents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

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.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Potential native plant community. See Climax plant community.

Potential rooting depth (effective rooting depth). Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Prescribed burning. Deliberately burning an area for specific management purposes, under the appropriate conditions of weather and soil moisture and at the proper time of day.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use. Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This practice increases the vigor and reproduction capacity of the key plants and promotes the accumulation of litter and mulch necessary to conserve soil and water.

Quaternary (geology). The latest period in the stratigraphic column, about 0 to 2 million years before present, represented by local accumulations of glacial (Pleistocene) and post-glacial (Holocene) deposits. Artificial division of time used to separate pre-human from post-human sedimentation.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid .... less than 3.5
Extremely acid .... 3.5 to 4.4
Very strongly acid .... 4.5 to 5.0
Strongly acid .... 5.1 to 5.5
Moderately acid.. 5.6 to 6.0
Slightly acid .... 6.1 to 6.5
Neutral .... 6.6 to 7.3
Slightly alkaline .... 7.4 to 7.8
Moderately alkaline .... 7.9 to 8.4
Strongly alkaline .... 8.5 to 9.0
Very strongly alkaline .... 9.1 and higher

Redoximorphic concentrations. Nodules, concretions, soft masses, pore linings, and other features resulting from the accumulation of iron or manganese oxide. An indication of chemical reduction and oxidation resulting from saturation.

Redoximorphic depletions. Low-chroma zones from which iron and manganese oxide or a combination of iron and manganese oxide and clay has been removed. These zones are indications of the chemical reduction of iron resulting from saturation.

Redoximorphic features. Redoximorphic concentrations, redoximorphic depletions, reduced matrices, a positive reaction to alpha,alpha-dipyridyl, and other features indicating the chemical reduction and oxidation of iron and manganese compounds resulting from saturation. See Mottles, soil for descriptive terms for abundance and size measurements.

Reduced matrix. A soil matrix that has low chroma in situ because of chemically reduced iron (Fe II). The chemical reduction results from nearly continuous wetness. The matrix undergoes a change in hue or chroma within 30 minutes after exposure to air as the iron is oxidized (Fe III). A type of redoximorphic feature.

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill generally is a few inches deep and not wide enough to be an obstacle to farm machinery.

Road cut. A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

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.

Saline soil. A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

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. A soil that is 85 percent or more sand and not more than 10 percent clay is considered to be in the sand texture class.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sangamonian (geology). In Illinois, an interglacial stage between the Illinoian and Wisconsinan glacial stages during the Pleistocene. See Pleistocene.

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.

Saturation. Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

Scarification. The act of abrading, scratching, loosening, crushing, or modifying the surface to increase water absorption or to provide a more tillable soil.

Second bottom. The first terrace above the normal flood plain (or first bottom) of a river.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer. 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.

Shoulder. The position that forms the uppermost inclined surface near the top of a hillslope. It is a transition from backslope to summit. The surface is dominantly convex in profile and erosional in origin.

Shrink-swell (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Side slope. A geomorphic component of hills consisting of a laterally planar area of a hillside. The overland waterflow is predominantly parallel.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio. The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). Soil that is 80 percent or more silt and less than 12 percent clay is considered to be in the silt textural class.

Silt coatings. See Clay depletions.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

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.

Slick spot. A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil generally is silty or clayey, is slippery when wet, and is low in productivity.

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.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. In this survey, classes for simple slopes are as follows:

Nearly level	0 to 2 percent
Gently sloping	2 to 5 percent
Strongly sloping	5 to 10 percent
Moderately steep	10 to 18 percent
Steep	18 to 35 percent
Very steep	35 percent and higher

Sloughed till. Water-saturated till that has flowed slowly downhill from its original place of deposit by glacial ice. It may rest on other till, on glacial outwash, or on a glaciolacustrine deposit.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Soft bedrock. Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 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 material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stream terrace. One of a series of platforms in a stream valley, flanking and more or less parallel to the stream channel, originally formed near the level of the stream, and representing the dissected remnants of an abandoned flood plain, streambed, or valley floor produced during a former state of erosion or deposition.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Summer fallow. The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

Summit. The topographically highest position of a hillslope. It has a nearly level (planar or only slightly convex) surface.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the “plow layer,” or the “Ap horizon.”

Surface soil. The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior. Soils are recognized as taxadjuncts only when one or more of their characteristics are slightly outside the range defined for the family of the series for which the soils are named.

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. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying “coarse,” “fine,” or “very fine.”

Till. Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Till plain. An extensive area of nearly level to undulating soils underlain by till.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toeslope. The position that forms the gently inclined surface at the base of a hillslope. Toeslopes in profile are commonly gentle and linear and are constructional surfaces forming the lower part of a hillslope continuum that grades to valley or closed-depression floors.

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.

Tuff. A compacted deposit that is 50 percent or more volcanic ash and dust.

Upland. Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial meltwater. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve. A sedimentary layer or a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

Water bars. Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Wedron Formation (geology). Mostly till of the Wisconsinan Glaciation. See Wisconsinan.

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.

Windthrow. The uprooting and tipping over of trees by the wind.

Wisconsinan (geology). In Illinois, the last glacial stage of ice advance during the Pleistocene. Follows the Sangamonian interglacial stage. See Pleistocene.

Tables

Table 1.--Temperature and Precipitation

(Recorded in the period 1971-2000 at Windsor, Illinois)

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	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-----	34.8	18.9	26.8	63	-13	3	2.00	0.84	3.03	4	7.7
February----	41.0	23.7	32.3	69	-8	7	1.83	.76	2.70	4	3.8
March-------	52.6	33.1	42.9	80	8	56	3.30	1.74	4.74	7	2.8
April-------	65.1	42.8	54.0	84	22	183	3.70	1.92	5.44	7	.2
May---------	75.4	53.2	64.3	90	34	446	3.99	2.04	5.77	7	.0
June--------	83.9	61.9	72.9	96	45	682	4.04	1.88	6.07	6	.0
July--------	87.2	65.6	76.4	98	51	818	4.00	1.93	5.76	6	.0
August------	85.5	63.4	74.5	97	47	756	3.27	1.22	5.36	5	.0
September---	79.9	56.2	68.0	95	36	542	3.01	1.23	4.70	4	.0
October-----	68.0	45.2	56.6	87	26	242	3.07	1.66	4.30	5	.0
November----	52.2	34.8	43.5	76	13	55	3.85	1.71	5.75	6	1.3
December----	39.5	24.3	31.9	65	-6	8	2.98	1.26	4.60	5	5.3
Yearly:											
Average---	63.8	43.6	53.7	---	---	---	---	---	---	---	---
Extreme---	102	-22	---	99	-16	---	---	---	---	---	---
Total-----	---	---	---	---	---	3,798	39.04	32.99	44.51	66	21.1

* 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 1971-2000 at Windsor, 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-----	April 12	April 15	May 3
2 years in 10 later than-----	April 6	April 11	April 27
5 years in 10 later than-----	March 27	April 3	April 17
First freezing temperature in fall:			
1 year in 10 earlier than---	Oct. 28	Oct. 14	Oct. 1
2 years in 10 earlier than---	Nov. 3	Oct. 19	Oct. 7
5 years in 10 earlier than---	Nov. 14	Oct. 29	Oct. 19

Table 3.--Growing Season

(Recorded in the period 1971-2000 at Windsor, 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	208	188	160
8 years in 10	216	195	168
5 years in 10	232	208	184
2 years in 10	248	220	199
1 year in 10	256	227	208

Table 4.--Classification of the Soils

(An asterisk in the first column indicates a taxadjunct to the series. See text for a description of those characteristics that are outside the range of the series.)

Soil name	Family or higher taxonomic class
Dana	Fine-silty, mixed, superactive, mesic Oxyaquic Argiudolls
*Dana	Fine-silty, mixed, superactive, mesic Oxyaquic Hapludalfs
Drummer	Fine-silty, mixed, superactive, mesic Typic Endoaquolls
Flanagan	Fine, smectitic, mesic Aquic Argiudolls
Hartsburg	Fine-silty, mixed, superactive, mesic Typic Endoaquolls
Huntsville	Fine-silty, mixed, superactive, mesic Cumulic Hapludolls
Lawson	Fine-silty, mixed, superactive, mesic Aquic Cumulic Hapludolls
Milford	Fine, mixed, superactive, mesic Typic Endoaquolls
Orthents, loamy	Loamy, mesic Udorthents
Peotone	Fine, smectitic, mesic Cumulic Vertic Endoaquolls
Raub	Fine-silty, mixed, superactive, mesic Aquic Argiudolls
Rush	Fine-silty, mixed, superactive, mesic Typic Hapludalfs
*Sabina	Fine, smectitic, mesic Aquic Hapludalfs
Sawmill	Fine-silty, mixed, superactive, mesic Cumulic Endoaquolls
Senachwine	Fine-loamy, mixed, active, mesic Typic Hapludalfs
Starks	Fine-silty, mixed, superactive, mesic Aeric Endoaqualfs
Sunbury	Fine, smectitic, mesic Aquollic Hapludalfs
Tice	Fine-silty, mixed, superactive, mesic Fluvaquentic Hapludolls
*Wyanet	Fine-loamy, mixed, active, mesic Mollic Hapludalfs
Xenia	Fine-silty, mixed, superactive, mesic Aquic Hapludalfs

Table 5.--Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
56A	Dana silt loam, 0 to 2 percent slopes	12,170	5.5
56B2	Dana silt loam, 2 to 5 percent slopes, eroded	9,163	4.2
154A	Flanagan silt loam, 0 to 2 percent slopes	67,000	30.4
234A	Sunbury silt loam, 0 to 2 percent slopes	3,015	1.4
236A	Sabina silt loam, 0 to 2 percent slopes	2,702	1.2
244A	Hartsburg silty clay loam, 0 to 2 percent slopes	994	0.5
291A	Xenia silt loam, 0 to 2 percent slopes	4,679	2.1
291B	Xenia silt loam, 2 to 5 percent slopes	320	0.1
291B2	Xenia silt loam, 2 to 5 percent slopes, eroded	9,490	4.3
330A	Peotone silty clay loam, 0 to 2 percent slopes	336	0.2
481A	Raub silt loam, 0 to 2 percent slopes	461	0.2
618B2	Senachwine silt loam, 2 to 5 percent slopes, eroded	286	0.1
618C2	Senachwine silt loam, 5 to 10 percent slopes, eroded	3,436	1.6
618C3	Senachwine clay loam, 5 to 10 percent slopes, severely eroded	261	0.1
618D2	Senachwine silt loam, 10 to 18 percent slopes, eroded	3,429	1.6
618D3	Senachwine clay loam, 10 to 18 percent slopes, severely eroded	482	0.2
618F	Senachwine silt loam, 18 to 35 percent slopes	3,923	1.8
618G	Senachwine silt loam, 35 to 60 percent slopes	1,379	0.6
622B2	Wyanet silt loam, 2 to 5 percent slopes, eroded	1,088	0.5
622C2	Wyanet silt loam, 5 to 10 percent slopes, eroded	1,859	0.8
722A	Drummer-Milford silty clay loams, 0 to 2 percent slopes	78,249	35.5
791A	Rush silt loam, 0 to 2 percent slopes	653	0.3
791B2	Rush silt loam, 2 to 5 percent slopes, eroded	856	0.4
802D	Orthents, loamy, 2 to 20 percent slopes	106	*
830	Landfills	31	*
1107A	Sawmill silty clay loam, undrained, 0 to 2 percent slopes, frequently flooded	1,190	0.5
3107A	Sawmill silty clay loam, 0 to 2 percent slopes, frequently flooded	2,426	1.1
3132A	Starks silt loam, 0 to 2 percent slopes, frequently flooded	417	0.2
3284A	Tice silty clay loam, 0 to 2 percent slopes, frequently flooded	785	0.4
3451A	Lawson silt loam, 0 to 2 percent slopes, frequently flooded	2,698	1.2
8077A	Huntsville silt loam, 0 to 2 percent slopes, occasionally flooded	250	0.1
W	Water	6,121	2.8
	Total	220,255	100.0

* Less than 0.1 percent.

Table 6.--Limitations and Hazards Affecting Cropland and Pasture

(See text for a description of the limitations and hazards listed in this table. Miscellaneous map units are excluded from the table. Dashes indicate that the map unit is generally unsuited to crops or pasture.)

Soil name and map symbol	Limitations and hazards affecting cropland	Limitations and hazards affecting pasture
56A:		
Dana	None*	Low pH
56B2:		
Dana	Crusting, water erosion	Low pH, water erosion
154A:		
Flanagan	Wetness	Wetness
234A:		
Sunbury	Wetness	Wetness
236A:		
Sabina	Wetness, crusting	Wetness, low pH
244A:		
Hartsburg	Ponding, wetness	Ponding, wetness, frost heave
291A:		
Xenia	Crusting	Low pH
291B, 291B2:		
Xenia	Crusting, water erosion	Low pH, water erosion
330A:		
Peotone	Ponding, poor tilth, wetness	Ponding, wetness, frost heave
481A:		
Raub	Wetness	Wetness, low pH
618B2:		
Senachwine	Crusting, water erosion	Low pH, water erosion
618C2:		
Senachwine	Crusting, water erosion	Low pH, water erosion
618C3:		
Senachwine	Crusting, poor tilth, water erosion	Low pH, low fertility, poor tilth, water erosion
618D2:		
Senachwine	Crusting, water erosion	Low pH, water erosion
618D3:		
Senachwine	---	Low pH, low fertility, poor tilth, water erosion
618F:		
Senachwine	---	Equipment limitation, low pH, water erosion
618G:		
Senachwine	---	---
622B2:		
Wyanet	Water erosion	None**

See footnotes at end of table.

Table 6.--Limitations and Hazards Affecting Cropland and Pasture--Continued

Soil name and map symbol	Limitations and hazards affecting cropland	Limitations and hazards affecting pasture
622C2:		
Wyanet	Crusting, water erosion	Water erosion
722A:		
Drummer	Ponding, wetness	Ponding, wetness, frost heave
Milford	Ponding, poor tilth, wetness	Ponding, wetness, frost heave
791A:		
Rush	Crusting	Low pH
791B2:		
Rush	Crusting, water erosion	Low pH, water erosion
802D:		
Orthents, loamy	Poor tilth, crusting, water erosion, restricted permeability	Water erosion, poor tilth
1107A:		
Sawmill	---	Flooding, ponding, frost heave, wetness
3107A:		
Sawmill	Flooding, ponding, wetness	Flooding, ponding, frost heave, wetness
3132A:		
Starks	Flooding, wetness, crusting	Wetness, flooding, low pH
3284A:		
Tice	Flooding, wetness, poor tilth	Wetness, flooding, poor tilth
3451A:		
Lawson	Flooding, wetness	Wetness, flooding
8077A:		
Huntsville	Flooding	Flooding

* This soil is well suited to crops.
** This soil is well suited to pasture.

Table 7.--Land Capability and Yields per Acre of Crops and Pasture

(Yields are those that can be expected under a high level of management. They are for nonirrigated areas. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil.)

Map symbol and soil name	Land capability	Corn	Soybeans	Winter wheat	Oats	Grass-legume hay	Grass-legume pasture
		Bu	*Bu*	*Bu*	*Bu*	*Tons*	*AUM*
56A:							
Dana	1	143	45	60	85	5.5	9.2
56B2:							
Dana	2e	137	43	58	82	5.3	8.8
154A:							
Flanagan	1	162	52	67	92	6.1	10.2
234A:							
Sunbury	1	147	45	62	84	5.6	9.3
236A:							
Sabina	1	133	42	56	75	5.2	8.7
244A:							
Hartsburg	2w	145	47	56	79	5.3	8.8
291A:							
Xenia	1	126	41	55	72	4.8	8.0
291B:							
Xenia	2e	125	41	54	71	4.8	8.7
291B2:							
Xenia	2e	121	39	53	69	4.6	7.7
330A:							
Peotone	3w	123	42	43	58	4.2	7.0
481A:							
Raub	1	155	51	63	92	6.1	10.2
618B2:							
Senachwine	2e	116	38	49	65	4.6	7.7
618C2:							
Senachwine	3e	114	38	48	64	4.5	7.5
618C3:							
Senachwine	4e	105	35	44	59	4.2	7.0
618D2:							
Senachwine	4e	108	36	45	61	4.3	7.1
618D3:							
Senachwine	6e	---	---	---	---	3.9	---
618F:							
Senachwine	6e	---	---	---	---	3.5	5.8
618G:							
Senachwine	7e	---	---	---	---	---	3.0
622B2:							
Wyanet	2e	124	42	55	75	5.1	8.5

Table 7.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Corn	Soybeans	Winter wheat	Oats	Grass-legume hay	Grass-legume pasture
		Bu	*Bu*	*Bu*	*Bu*	*Tons*	*AUM*
622C2:							
Wyanet	3e	121	41	54	73	5.0	8.3
722A:							
Milford-Drummer	2w	145	49	59	82	5.4	9.0
791A:							
Rush	1	132	42	57	77	5.5	9.1
791B2:							
Rush	2e	127	40	55	74	5.3	8.8
802D:							
Orthents, loamy	4e	---	---	---	---	4.1	6.8
830:							
Landfills.							
1107A:							
Sawmill	5w	---	---	---	---	---	---
3107A:							
Sawmill	3w	132	42	49	68	5.0	8.3
3132A:							
Starks	3w	116	36	50	65	4.6	7.7
3284A:							
Tice	3w	138	42	55	76	5.1	8.6
3451A:							
Lawson	3w	145	43	56	77	5.1	8.6
8077A:							
Huntsville	2w	147	47	62	83	5.6	9.4
W:							
Water.							

Table 8.--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
56A	Dana silt loam, 0 to 2 percent slopes
56B2	Dana silt loam, 2 to 5 percent slopes, eroded
154A	Flanagan silt loam, 0 to 2 percent slopes
234A	Sunbury silt loam, 0 to 2 percent slopes
236A	Sabina silt loam, 0 to 2 percent slopes
244A	Hartsburg silty clay loam, 0 to 2 percent slopes (where drained)
291A	Xenia silt loam, 0 to 2 percent slopes
291B	Xenia silt loam, 2 to 5 percent slopes
291B2	Xenia silt loam, 2 to 5 percent slopes, eroded
330A	Peotone silty clay loam, 0 to 2 percent slopes (where drained)
481A	Raub silt loam, 0 to 2 percent slopes
618B2	Senachwine silt loam, 2 to 5 percent slopes, eroded
622B2	Wyanet silt loam, 2 to 5 percent slopes, eroded
722A	Drummer-Milford silty clay loams, 0 to 2 percent slopes (where drained)
791A	Rush silt loam, 0 to 2 percent slopes
791B2	Rush silt loam, 2 to 5 percent slopes, eroded
3107A	Sawmill silty clay loam, 0 to 2 percent slopes, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
3132A	Starks silt loam, 0 to 2 percent slopes, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
3284A	Tice silty clay loam, 0 to 2 percent slopes, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
3451A	Lawson silt loam, 0 to 2 percent slopes, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
8077A	Huntsville silt loam, 0 to 2 percent slopes, occasionally flooded

Table 9.--Hydric Soils

Map symbol and map unit name	Component	Hydric	Local landform
56A:			
Dana silt loam, 0 to 2 percent slopes	Dana	No	Ground moraines
	Drummer	Yes	Swales
56B2:			
Dana silt loam, 2 to 5 percent slopes, eroded	Dana	No	Ground moraines
	Drummer	Yes	Swales
154A:			
Flanagan silt loam, 0 to 2 percent slopes	Flanagan	No	Ground moraines
	Drummer	Yes	Swales
234A:			
Sunbury silt loam, 0 to 2 percent slopes	Sunbury	No	Ground moraines
	Drummer	Yes	Swales
236A:			
Sabina silt loam, 0 to 2 percent slopes	Sabina	No	Ground moraines
	Drummer	Yes	Swales
244A:			
Hartsburg silty clay loam, 0 to 2 percent slopes	Hartsburg	Yes	Outwash plains, ground moraines
291A:			
Xenia silt loam, 0 to 2 percent slopes	Xenia	No	Ground moraines
	Drummer	Yes	Swales
291B:			
Xenia silt loam, 2 to 5 percent slopes	Xenia	No	Ground moraines, end moraines
	Drummer	Yes	Swales
291B2:			
Xenia silt loam, 2 to 5 percent slopes, eroded	Xenia	No	Ground moraines, end moraines
	Drummer	Yes	Swales
330A:			
Peotone silty clay loam, 0 to 2 percent slopes	Peotone	Yes	Closed depressions
	Drummer	Yes	Rises
481A:			
Raub silt loam, 0 to 2 percent slopes	Raub	No	Ground moraines
	Drummer	Yes	Swales
618B2:			
Senachwine silt loam, 2 to 5 percent slopes, eroded	Senachwine	No	Ground moraines, end moraines
	Drummer	Yes	Swales
618C2:			
Senachwine silt loam, 5 to 10 percent slopes, eroded	Senachwine	No	Ground moraines, end moraines
	Drummer	Yes	Swales
	Sawmill	Yes	Food plains
618C3:			
Senachwine clay loam, 5 to 10 percent slopes, severely eroded	Senachwine	No	Ground moraines, end moraines
	Drummer	Yes	Swales

Table 9.--Hydric Soils--Continued

Map symbol and map unit name	Component	Hydric	Local landform
618D2:			
Senachwine silt loam, 10 to 18 percent slopes, eroded	Senachwine	No	End moraines
	Drummer	Yes	Swales
	Sawmill	Yes	Flood plains, backswamps
618D3:			
Senachwine clay loam, 10 to 18 percent slopes, severely eroded	Senachwine	No	End moraines
	Drummer	Yes	Swales
618F:			
Senachwine silt loam, 18 to 35 percent slopes	Senachwine	No	End moraines
	Sawmill	Yes	backswamps, flood plains
618G:			
Senachwine silt loam, 35 to 60 percent slopes	Senachwine	No	End moraines
	Sawmill	Yes	backswamps, flood plains
622B2:			
Wyanet silt loam, 2 to 5 percent slopes, eroded	Wyanet	No	Ground moraines, end moraines,
	Drummer	Yes	Swales
622C2:			
Wyanet silt loam, 5 to 10 percent slopes, eroded	Wyanet	No	Ground moraines, end moraines
	Drummer	Yes	Swales
722A:			
Drummer-Milford silty clay loams, 0 to 2 percent slopes	Drummer	Yes	Outwash plains
	Milford	Yes	Lake plains
791A:			
Rush silt loam, 0 to 2 percent slopes	Rush	No	Stream terraces, outwash plains
	Sawmill	Yes	Backswamps, flood plains
791B2:			
Rush silt loam, 2 to 5 percent slopes, eroded	Rush	No	Stream terraces
	Sawmill	Yes	Backswamps, flood plains
802D:			
Orthents, loamy 2 to 20 percent slopes	Orthents	No	---
	Sawmill	Yes	Backswamps flood plains
	Drummer	Yes	Swales
830:			
Landfills	Landfills	Unranked	---
1107A:			
Sawmill silty clay loam, undrained, 0 to 2 percent slopes, frequently flooded	Sawmill	Yes	Flood plains

Table 9.--Hydric Soils--Continued

Map symbol and map unit name	Component	Hydric	Local landform
3107A:			
Sawmill silty clay loam, 0 to 2 percent slopes, frequently flooded	Sawmill	Yes	Flood plains, backswamps
3132A:			
Starks silt loam, 0 to 2 percent slopes, frequently flooded	Starks	No	Stream terraces
	Sawmill	Yes	Backswamps, flood plains
3284A:			
Tice silty clay loam, 0 to 2 percent slopes, frequently flooded	Tice	No	Flood plains
	Sawmill	Yes	Backswamps, flood plains
3451A:			
Lawson silt loam, 0 to 2 percent slopes, frequently flooded	Lawson	No	Flood plains
	Sawmill	Yes	Backswamps, flood plains
8077A:			
Huntsville silt loam, 0 to 2 percent slopes, occasionally flooded	Huntsville	No	Flood plains
	Sawmill	Yes	Swales
W:			
Water.			

Table 10.--Windbreaks and Environmental Plantings

(Absence of an entry indicates that trees generally do not grow to the given height on the soil.)

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
56A, 56B2: Dana	American hazelnut, black chokeberry, common elderberry, common juniper, common ninebark, common winterberry, coralberry, mapleleaf viburnum, redosier dogwood, silky dogwood	American plum, American witchhazel, blackhaw, common chokecherry, common serviceberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood	Washington hawthorn, arborvitae, blue spruce, common persimmon, eastern redcedar, nannyberry, pecan, white oak	Douglas fir, Norway spruce, black walnut, blackgum, common hackberry, green ash, northern red oak, pin oak, tuliptree	Carolina poplar, eastern cottonwood, eastern white pine
154A: Flanagan	American cranberrybush, Canada yew, black chokeberry, common elderberry, common juniper, common ninebark, common winterberry, northern spicebush, redosier dogwood, silky dogwood	Blackhaw, cockspur hawthorn, common pawpaw, common serviceberry, prairie crabapple, roughleaf dogwood, rusty blackhaw, southern arrowwood, witchhazel	Austrian pine, Douglas fir, arborvitae, blue spruce, common persimmon, eastern redcedar, green hawthorn, nannyberry, pecan, shingle oak	Norway spruce, blackgum, common hackberry, green ash, red maple, swamp white oak, sweetgum	Carolina poplar, eastern cottonwood, pin oak
234A: Sunbury	American cranberrybush, Canada yew, black chokeberry, common elderberry, common juniper, common ninebark, common winterberry, northern spicebush, redosier dogwood, silky dogwood	Blackhaw, cockspur hawthorn, common pawpaw, common serviceberry, prairie crabapple, roughleaf dogwood, rusty blackhaw, southern arrowwood, witchhazel	Austrian pine, Douglas fir, arborvitae, blue spruce, common persimmon, eastern redcedar, green hawthorn, nannyberry, pecan, shingle oak	Norway spruce, blackgum, common hackberry, green ash, red maple, swamp white oak, sweetgum	Carolina poplar, eastern cottonwood, pin oak
236A: Sabina	American cranberrybush, Canada yew, black chokeberry, common elderberry, common juniper, common ninebark, common winterberry, northern spicebush, redosier dogwood, silky dogwood	Blackhaw, cockspur hawthorn, common pawpaw, common serviceberry, prairie crabapple, roughleaf dogwood, rusty blackhaw, southern arrowwood, witchhazel	Austrian pine, Douglas fir, arborvitae, blue spruce, common persimmon, eastern redcedar, green hawthorn, nannyberry, pecan, shingle oak	Norway spruce, blackgum, common hackberry, green ash, red maple, swamp white oak, sweetgum	Carolina poplar, eastern cottonwood, pin oak
244A: Hartsburg	Common winterberry, gray dogwood, redosier dogwood	Common pawpaw, nannyberry, roughleaf dogwood, silky dogwood	Arborvitae, bur oak, common hackberry, eastern redcedar, green hawthorn	Carolina poplar, eastern cottonwood, green ash	---

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
291A, 291B, 291B2: Xenia	American hazelnut, black chokeberry, common elderberry, common juniper, common ninebark, common winterberry, coralberry, mapleleaf viburnum, redosier dogwood, silky dogwood	American plum, American witchhazel, blackhaw, common chokecherry, common serviceberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood	Washington hawthorn, arborvitae, blue spruce, common persimmon, eastern redcedar, nannyberry, pecan, white oak	Douglas fir, Norway spruce, black walnut, blackgum, common hackberry, green ash, northern red oak, pin oak, tuliptree	Carolina poplar, eastern cottonwood, eastern white pine
330A: Peotone	American cranberrybush, black chokeberry, buttonbush, common elderberry, common ninebark, common winterberry, gray dogwood, highbush blueberry, northern spicebush, redosier dogwood, silky dogwood	Cockspur hawthorn, hazel alder, nannyberry, roughleaf dogwood	Arborvitae, blackgum, common hackberry, green hawthorn, northern whitecedar, shingle oak	Green ash, red maple, river birch, swamp white oak, sweetgum	Carolina poplar, eastern cottonwood, pin oak
481A: Raub	American cranberrybush, Canada yew, black chokeberry, common elderberry, common juniper, common ninebark, common winterberry, northern spicebush, redosier dogwood, silky dogwood	Blackhaw, cockspur hawthorn, common pawpaw, common serviceberry, prairie crabapple, roughleaf dogwood, rusty blackhaw, southern arrowwood, witchhazel	Austrian pine, Douglas fir, arborvitae, blue spruce, common persimmon, eastern redcedar, green hawthorn, nannyberry, pecan, shingle oak	Norway spruce, blackgum, common hackberry, green ash, red maple, swamp white oak, sweetgum	Carolina poplar, eastern cottonwood, pin oak
618B2, 618C2, 618C3, 618D2, 618D3, 618F, 618G: Senachwine	American hazelnut, black chokeberry, common winterberry, coralberry, gray dogwood, mapleleaf viburnum	American plum, American witchhazel, Arnold hawthorn, blackhaw, common chokecherry, common serviceberry, prairie crabapple	Douglas fir, arborvitae, black walnut, blackgum, blue spruce, bur oak, eastern redcedar, green ash, pecan	Norway spruce, common hackberry, pin oak, tuliptree	Carolina poplar, eastern white pine
622B2, 622C2: Wyanet	American hazelnut, black chokeberry, common winterberry, coralberry, gray dogwood, mapleleaf viburnum	American plum, American witchhazel, Arnold hawthorn, blackhaw, common chokecherry, common serviceberry, prairie crabapple	Douglas fir, arborvitae, black walnut, blackgum, blue spruce, bur oak, eastern redcedar, green ash, pecan	Norway spruce, common hackberry, pin oak, tuliptree	Carolina poplar, eastern white pine

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
722A:					
Drummer	American cranberrybush, black chokeberry, buttonbush, common elderberry, common ninebark, common winterberry, gray dogwood, highbush blueberry, northern spicebush, redosier dogwood, silky dogwood	Cockspur hawthorn, hazel alder, nannyberry, roughleaf dogwood	Arborvitae, blackgum, common hackberry, green hawthorn, northern whitecedar, shingle oak	Green ash, red maple, river birch, swamp white oak, sweetgum	Carolina poplar, eastern cottonwood, pin oak
Milford	American cranberrybush, black chokeberry, buttonbush, common elderberry, common ninebark, common winterberry, gray dogwood, highbush blueberry, northern spicebush, redosier dogwood, silky dogwood	Cockspur hawthorn, hazel alder, nannyberry, roughleaf dogwood	Arborvitae, blackgum, common hackberry, green hawthorn, northern whitecedar, shingle oak	Green ash, red maple, river birch, swamp white oak, sweetgum	Carolina poplar, eastern cottonwood, pin oak
791A, 791B2:					
Rush	American hazelnut, black chokeberry, common elderberry, common juniper, common ninebark, common winterberry, coralberry, mapleleaf viburnum, redosier dogwood, silky dogwood	American plum, American witchhazel, blackhaw, common chokecherry, common serviceberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood	Washington hawthorn, arborvitae, blue spruce, common persimmon, eastern redcedar, nannyberry, pecan, white oak	Douglas fir, Norway spruce, black walnut, blackgum, common hackberry, green ash, northern red oak, pin oak, tuliptree	Carolina poplar, eastern cottonwood, eastern white pine
802D:					
Orthents	American hazelnut, black chokeberry, common winterberry, coralberry, gray dogwood, mapleleaf viburnum	American plum, American witchhazel, Arnold hawthorn, blackhaw, common chokecherry, common serviceberry, prairie crabapple	Douglas fir, arborvitae, black walnut, blackgum, blue spruce, bur oak, eastern redcedar, green ash, pecan	Norway spruce, common hackberry, pin oak, tuliptree	Carolina poplar, eastern white pine
830:					
Landfills.					

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
1107A, 3107A: Sawmill	American cranberrybush, black chokeberry, buttonbush, common elderberry, common ninebark, common winterberry, gray dogwood, highbush blueberry, northern spicebush, redosier dogwood, silky dogwood	Cockspur hawthorn, hazel alder, nannyberry, roughleaf dogwood	Arborvitae, blackgum, common hackberry, green hawthorn, northern whitecedar, shingle oak	Green ash, red maple, river birch, swamp white oak, sweetgum	Carolina poplar, eastern cottonwood, pin oak
3132A: Starks	American cranberrybush, Canada yew, black chokeberry, common elderberry, common juniper, common ninebark, common winterberry, northern spicebush, redosier dogwood, silky dogwood	Blackhaw, cockspur hawthorn, common pawpaw, common serviceberry, prairie crabapple, roughleaf dogwood, rusty blackhaw, southern arrowwood, witchhazel	Austrian pine, Douglas fir, arborvitae, blue spruce, common persimmon, eastern redcedar, green hawthorn, nannyberry, pecan, shingle oak	Norway spruce, blackgum, common hackberry, green ash, red maple, swamp white oak, sweetgum	Carolina poplar, eastern cottonwood, pin oak
3284A: Tice	American cranberrybush, Canada yew, black chokeberry, common elderberry, common juniper, common ninebark, common winterberry, northern spicebush, redosier dogwood, silky dogwood	Blackhaw, cockspur hawthorn, common pawpaw, common serviceberry, prairie crabapple, roughleaf dogwood, rusty blackhaw, southern arrowwood, witchhazel	Austrian pine, Douglas fir, arborvitae, blue spruce, common persimmon, eastern redcedar, green hawthorn, nannyberry, pecan, shingle oak	Norway spruce, blackgum, common hackberry, green ash, red maple, swamp white oak, sweetgum	Carolina poplar, eastern cottonwood, pin oak
3451A: Lawson	American cranberrybush, Canada yew, black chokeberry, common elderberry, common juniper, common ninebark, common winterberry, northern spicebush, redosier dogwood, silky dogwood	blackhaw, cockspur hawthorn, common pawpaw, common serviceberry, prairie crabapple, roughleaf dogwood, rusty blackhaw, southern arrowwood, witchhazel	Austrian pine, Douglas fir, arborvitae, blue spruce, common persimmon, eastern redcedar, green hawthorn, nannyberry, pecan, shingle oak	Norway spruce, blackgum, common hackberry, green ash, red maple, swamp white oak, sweetgum	Carolina poplar, eastern cottonwood, pin oak

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
8077A:					
Huntsville----	American hazelnut, black chokeberry, common elderberry, common juniper, common ninebark, common winterberry, coralberry, mapleleaf viburnum, redosier dogwood, silky dogwood	American plum, American witchhazel, blackhaw, common chokecherry, common serviceberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood	Washington hawthorn, arborvitae, blue spruce, common persimmon, eastern redcedar, nannyberry, pecan, white oak	Douglas fir, Norway spruce, black walnut, blackgum, common hackberry, green ash, northern red oak, pin oak, tuliptree	Carolina poplar, eastern cottonwood, eastern white pine
W:					
Water.					

Table 11.--Forestland Productivity

(Only the soils suitable for the production of commercial trees are listed.)

Map symbol and soil name	Potential productivity: Common trees	Site index	Volume of wood fiber	Suggested trees to plant
236A:				
Sabina	White oak	80	57	Common hackberry, common persimmon, eastern cottonwood, green ash, pecan, pin oak, swamp white oak
	Black walnut	---	---	
	Northern red oak	80	57	
291A, 291B, 291B2:				
Xenia	White oak	90	72	Black walnut, eastern cottonwood, eastern white pine, green ash, northern red oak, pecan, pin oak, tuliptree, white oak
	Sweetgum	76	72	
	Tuliptree	98	100	
618B2, 618C2, 618C3, 618D2, 618D3, 618F, 618G:				
Senachwine	White oak	90	72	Black walnut, bur oak, eastern white pine, pecan, pin oak, tuliptree
	Sweetgum	76	72	
	Tuliptree	98	100	
791A, 791B2:				
Rush	Northern red oak	90	72	Black walnut, eastern cottonwood, eastern white pine, green ash, northern red oak, pecan, pin oak, tuliptree, white oak
	Shagbark hickory	---	---	
	Sugar maple	---	---	
	White oak	90	72	
1107A, 3107A:				
Sawmill	Pin oak	90	72	Common hackberry, eastern cottonwood, green ash, pin oak, river birch, swamp white oak, sweetgum
	American sycamore	---	---	
	Eastern cottonwood	---	---	
	Sweetgum	---	---	
3132A:				
Starks	White oak	80	57	Common hackberry, common persimmon, eastern cottonwood, green ash, pecan, pin oak, swamp white oak
	Northern red oak	80	57	
	Tuliptree	90	86	
3284A:				
Tice	Pin oak	96	72	Common hackberry, common persimmon, eastern cottonwood, green ash, pecan, pin oak, swamp white oak
	Eastern cottonwood	---	---	
	Sweetgum	86	100	
	Tuliptree	90	86	
	White ash	---	---	
3451A:				
Lawson	White ash	---	---	Common hackberry, common persimmon, eastern cottonwood, green ash, pecan, pin oak, swamp white oak
	Red maple	---	---	
	Silver maple	70	29	

Table 11.--Forestland Productivity--Continued

Map symbol and soil name	Potential productivity			Suggested trees to plant
	Common trees	Site index	Volume of wood fiber	
8077A:				
Huntsville---------	American sycamore---	---	---	Black walnut, eastern cottonwood, eastern white pine, green ash, northern red oak, pecan, pin oak, tuliptree, white oak
	Cherrybark oak------	---	---	
	Eastern cottonwood--	110	157	
	Green ash-----------	---	---	
	Sweetgum------------	---	---	
	Tuliptree-----------	98	100	

Table 12a.--Recreation

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Camp areas		Picnic areas		Playgrounds	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
56A:						
Dana	Somewhat limited		Somewhat limited		Somewhat limited	
	Depth to saturated zone	0.07	Depth to saturated zone	0.03	Depth to saturated zone	0.07
56B2:						
Dana	Somewhat limited		Somewhat limited		Somewhat limited	
	Depth to saturated zone	0.39	Depth to saturated zone	0.19	Slope	0.50
					Depth to saturated zone	0.39
154A:						
Flanagan	Somewhat limited		Somewhat limited		Somewhat limited	
	Depth to saturated zone	0.98	Depth to saturated zone	0.75	Depth to saturated zone	0.98
	Restricted permeability	0.21	Restricted permeability	0.21	Restricted permeability	0.21
234A:						
Sunbury	Very limited		Somewhat limited		Very limited	
	Depth to saturated zone	1.00	Depth to saturated zone	0.94	Depth to saturated zone	1.00
	Restricted permeability	0.21	Restricted permeability	0.21	Restricted permeability	0.21
236A:						
Sabina	Very limited		Somewhat limited		Very limited	
	Depth to saturated zone	1.00	Depth to saturated zone	0.96	Depth to saturated zone	1.00
	Restricted permeability	0.21	Restricted permeability	0.21	Restricted permeability	0.21
244A:						
Hartsburg	Very limited		Very limited		Very limited	
	Depth to saturated zone	1.00	Ponding	1.00	Depth to saturated zone	1.00
	Ponding	1.00	Depth to saturated zone	1.00	Ponding	1.00
291A:						
Xenia	Somewhat limited		Somewhat limited		Somewhat limited	
	Depth to saturated zone	0.98	Depth to saturated zone	0.75	Depth to saturated zone	0.98
291B, 291B2:						
Xenia	Somewhat limited		Somewhat limited		Somewhat limited	
	Depth to saturated zone	0.98	Depth to saturated zone	0.75	Depth to saturated zone	0.98
					Slope	0.50
330A:						
Peotone	Very limited		Very limited		Very limited	
	Depth to saturated zone	1.00	Ponding	1.00	Depth to saturated zone	1.00
	Ponding	1.00	Depth to saturated zone	1.00	Ponding	1.00
	Restricted permeability	0.21	Restricted permeability	0.21	Restricted permeability	0.21

Table 12a.--Recreation--Continued

Map symbol and soil name	Camp areas		Picnic areas		Playgrounds	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
481A:						
Raub	Somewhat limited		Somewhat limited		Somewhat limited	
	Depth to saturated zone	0.98	Depth to saturated zone	0.75	Depth to saturated zone	0.98
618B2:						
Senachwine	Somewhat limited		Somewhat limited		Somewhat limited	
	Restricted permeability	0.21	Restricted permeability	0.21	Slope	0.50
					Restricted permeability	0.21
618C2, 618C3:						
Senachwine	Somewhat limited		Somewhat limited		Very limited	
	Restricted permeability	0.21	Restricted permeability	0.21	Slope	1.00
					Restricted permeability	0.21
618D2, 618D3:						
Senachwine	Somewhat limited		Somewhat limited		Very limited	
	Slope	0.96	Slope	0.96	Slope	1.00
	Restricted permeability	0.21	Restricted permeability	0.21	Restricted permeability	0.21
618F, 618G:						
Senachwine	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
622B2:						
Wyanet	Somewhat limited		Somewhat limited		Somewhat limited	
	Restricted permeability	0.21	Restricted permeability	0.21	Slope	0.28
					Restricted permeability	0.21
622C2:						
Wyanet	Somewhat limited		Somewhat limited		Very limited	
	Restricted permeability	0.21	Restricted permeability	0.21	Slope	1.00
					Restricted permeability	0.21
722A:						
Drummer	Very limited		Very limited		Very limited	
	Depth to saturated zone	1.00	Ponding	1.00	Depth to saturated zone	1.00
	Ponding	1.00	Depth to saturated zone	1.00	Ponding	1.00
Milford	Very limited		Very limited		Very limited	
	Depth to saturated zone	1.00	Ponding	1.00	Depth to saturated zone	1.00
	Ponding	1.00	Depth to saturated zone	1.00	Ponding	1.00
	Restricted permeability	0.21	Restricted permeability	0.21	Restricted permeability	0.21
791A:						
Rush	Not limited		Not limited		Not limited	
791B2:						
Rush	Not limited		Not limited		Somewhat limited	
					Slope	0.50

Table 12a.--Recreation--Continued

Map symbol and soil name	Camp areas		Picnic areas		Playgrounds	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
802D:						
Orthents, loamy-----	Somewhat limited		Somewhat limited		Very limited	
	Slope	0.37	Slope	0.37	Slope	1.00
	Restricted permeability	0.21	Restricted permeability	0.21	Restricted permeability	0.21
830:						
Landfills-----------	Not rated		Not rated		Not rated	
1107A:						
Sawmill-------------	Very limited		Very limited		Very limited	
	Depth to saturated zone	1.00	Ponding	1.00	Depth to saturated zone	1.00
	Flooding	1.00	Depth to saturated zone	1.00	Flooding	1.00
	Ponding	1.00	Flooding	0.40	Ponding	1.00
3107A:						
Sawmill-------------	Very limited		Very limited		Very limited	
	Depth to saturated zone	1.00	Ponding	1.00	Depth to saturated zone	1.00
	Flooding	1.00	Depth to saturated zone	1.00	Flooding	1.00
	Ponding	1.00	Flooding	0.40	Ponding	1.00
3132A:						
Starks--------------	Very limited		Somewhat limited		Very limited	
	Depth to saturated zone	1.00	Depth to saturated zone	0.88	Depth to saturated zone	1.00
	Flooding	1.00	Flooding	0.40	Flooding	1.00
3284A:						
Tice----------------	Very limited		Somewhat limited		Very limited	
	Flooding	1.00	Depth to saturated zone	0.48	Flooding	1.00
	Depth to saturated zone	0.81	Flooding	0.40	Depth to saturated zone	0.81
3451A:						
Lawson--------------	Very limited		Somewhat limited		Very limited	
	Flooding	1.00	Flooding	0.40	Flooding	1.00
8077A:						
Huntsville----------	Very limited		Not limited		Somewhat limited	
	Flooding	1.00			Flooding	0.60
W:						
Water.						

Table 12b.--Recreation

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Paths and trails		Off-road motorcycle trails		Golf fairways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
56A:						
Dana	Not limited		Not limited		Somewhat limited	
					Depth to saturated zone	0.03
56B2:						
Dana	Not limited		Not limited		Somewhat limited	
					Depth to saturated zone	0.19
154A:						
Flanagan	Somewhat limited		Somewhat limited		Somewhat limited	
	Depth to saturated zone	0.44	Depth to saturated zone	0.44	Depth to saturated zone	0.75
234A:						
Sunbury	Somewhat limited		Somewhat limited		Somewhat limited	
	Depth to saturated zone	0.86	Depth to saturated zone	0.86	Depth to saturated zone	0.94
236A:						
Sabina	Somewhat limited		Somewhat limited		Somewhat limited	
	Depth to saturated zone	0.92	Depth to saturated zone	0.92	Depth to saturated zone	0.96
244A:						
Hartsburg	Very limited		Very limited		Very limited	
	Depth to saturated zone	1.00	Depth to saturated zone	1.00	Ponding	1.00
	Ponding	1.00	Ponding	1.00	Depth to saturated zone	1.00
291A:						
Xenia	Somewhat limited		Somewhat limited		Somewhat limited	
	Depth to saturated zone	0.44	Depth to saturated zone	0.44	Depth to saturated zone	0.75
291B, 291B2:						
Xenia	Somewhat limited		Somewhat limited		Somewhat limited	
	Depth to saturated zone	0.44	Depth to saturated zone	0.44	Depth to saturated zone	0.75
330A:						
Peotone	Very limited		Very limited		Very limited	
	Depth to saturated zone	1.00	Depth to saturated zone	1.00	Ponding	1.00
	Ponding	1.00	Ponding	1.00	Depth to saturated zone	1.00
481A:						
Raub	Somewhat limited		Somewhat limited		Somewhat limited	
	Depth to saturated zone	0.44	Depth to saturated zone	0.44	Depth to saturated zone	0.75
618B2, 618C2, 618C3:						
Senachwine	Not limited		Not limited		Not limited	

Table 12b.--Recreation--Continued

Map symbol and soil name	Paths and trails		Off-road motorcycle trails		Golf fairways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
618D2, 618D3:						
Senachwine-----	Very limited		Very limited		Somewhat limited	
	Water erosion	1.00	Water erosion	1.00	Slope	0.96
618F:						
Senachwine-----	Very limited		Very limited		Very limited	
	Water erosion	1.00	Water erosion	1.00	Slope	1.00
	Slope	1.00	Slope	0.04		
618G:						
Senachwine-----	Very limited		Very limited		Very limited	
	Slope	1.00	Water erosion	1.00	Slope	1.00
	Water erosion	1.00	Slope	1.00		
622B2, 622C2:						
Wyanet---------	Not limited		Not limited		Not limited	
722A:						
Drummer--------	Very limited		Very limited		Very limited	
	Depth to saturated zone	1.00	Depth to saturated zone	1.00	Ponding	1.00
	Ponding	1.00	Ponding	1.00	Depth to saturated zone	1.00
Milford--------	Very limited		Very limited		Very limited	
	Depth to saturated zone	1.00	Depth to saturated zone	1.00	Ponding	1.00
	Ponding	1.00	Ponding	1.00	Depth to saturated zone	1.00
791A, 791B2:						
Rush-----------	Not limited		Not limited		Not limited	
802D:						
Orthents, loamy	Very limited		Very limited		Somewhat limited	
	Water erosion	1.00	Water erosion	1.00	Slope	0.37
830:						
Landfills------	Not rated		Not rated		Not rated	
1107A:						
Sawmill--------	Very limited		Very limited		Very limited	
	Depth to saturated zone	1.00	Depth to saturated zone	1.00	Ponding	1.00
	Ponding	1.00	Ponding	1.00	Flooding	1.00
	Flooding	0.40	Flooding	0.40	Depth to saturated zone	1.00
3107A:						
Sawmill--------	Very limited		Very limited		Very limited	
	Depth to saturated zone	1.00	Depth to saturated zone	1.00	Ponding	1.00
	Ponding	1.00	Ponding	1.00	Flooding	1.00
	Flooding	0.40	Flooding	0.40	Depth to saturated zone	1.00
3132A:						
Starks---------	Somewhat limited		Somewhat limited		Very limited	
	Depth to saturated zone	0.73	Depth to saturated zone	0.73	Flooding	1.00
	Flooding	0.40	Flooding	0.40	Depth to saturated zone	0.88

Table 12b.--Recreation--Continued

Map symbol and soil name	Paths and trails		Off-road motorcycle trails		Golf fairways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
3284A:						
Tice-----------	Somewhat limited		Somewhat limited		Very limited	
	Flooding	0.40	Flooding	0.40	Flooding	1.00
	Depth to saturated zone	0.11	Depth to saturated zone	0.11	Depth to saturated zone	0.48
3451A:						
Lawson---------	Somewhat limited		Somewhat limited		Very limited	
	Flooding	0.40	Flooding	0.40	Flooding	1.00
8077A:						
Huntsville-----	Not limited		Not limited		Somewhat limited	
					Flooding	0.60
W:						
Water----------	Not rated		Not rated		Not rated	

Table 13.--Wildlife Habitat

(See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable.)

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
56A: Dana	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
56B2: Dana	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
154A: Flanagan	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
234A: Sunbury	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
236A: Sabina	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
244A: Hartsburg	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
291A: Xenia	Fair	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
291B, 291B2: Xenia	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
330A: Peotone	Poor	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
481A: Raub	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
618B2: Senachwine	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
618C2, 618C3: Senachwine	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
618D2, 618D3: Senachwine	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
618F: Senachwine	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
618G: Senachwine	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
622B2, 622C2: Wyanet	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
722A: Drummer	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.

Table 13.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
722A:										
Milford	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
791A, 719B2:										
Rush	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
802D:										
Orthents, loamy.										
830:										
Landfills.										
1107A:										
Sawmill	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
3107A:										
Sawmill	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
3132A:										
Starks	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
3284A:										
Tice	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
3451A:										
Lawson	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
8077A:										
Huntsville	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
W:										
Water.										

Table 14a.--Building Site Development

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Small commercial buildings	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
56A:						
Dana--------	Somewhat limited		Very limited		Somewhat limited	
	Shrink-swell	0.50	Depth to saturated zone	1.00	Shrink-swell	0.50
	Depth to saturated zone	0.07	Shrink-swell	0.50	Depth to saturated zone	0.07
56B2:						
Dana--------	Somewhat limited		Very limited		Somewhat limited	
	Shrink-swell	0.50	Depth to saturated zone	1.00	Shrink-swell	0.50
	Depth to saturated zone	0.39	Shrink-swell	0.50	Depth to saturated zone	0.39
154A:						
Flanagan----	Very limited		Very limited		Very limited	
	Shrink-swell	1.00	Depth to saturated zone	1.00	Shrink-swell	1.00
	Depth to saturated zone	0.98	Shrink-swell	1.00	Depth to saturated zone	0.98
234A:						
Sunbury-----	Very limited		Very limited		Very limited	
	Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
	Shrink-swell	1.00			Shrink-swell	1.00
236A:						
Sabina------	Very limited		Very limited		Very limited	
	Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
	Shrink-swell	1.00	Shrink-swell	0.50	Shrink-swell	1.00
244A:						
Hartsburg---	Very limited		Very limited		Very limited	
	Ponding	1.00	Ponding	1.00	Ponding	1.00
	Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
	Shrink-swell	0.50			Shrink-swell	0.50
291A:						
Xenia-------	Somewhat limited		Very limited		Somewhat limited	
	Depth to saturated zone	0.98	Depth to saturated zone	1.00	Depth to saturated zone	0.98
	Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
291B, 291B2:						
Xenia-------	Somewhat limited		Very limited		Somewhat limited	
	Depth to saturated zone	0.98	Depth to saturated zone	1.00	Depth to saturated zone	0.98
	Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
330A:						
Peotone-----	Very limited		Very limited		Very limited	
	Ponding	1.00	Ponding	1.00	Ponding	1.00
	Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
	Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00

Table 14a.--Building Site Development--Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Small commercial buildings	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
481A:						
Raub--------	Somewhat limited		Very limited		Somewhat limited	
	Depth to saturated zone	0.98	Depth to saturated zone	1.00	Depth to saturated zone	0.98
	Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
618B2:						
Senachwine--	Not limited		Not limited		Not limited	
618C2, 618C3:						
Senachwine--	Somewhat limited		Not limited		Very limited	
	Shrink-swell	0.50			Slope	1.00
					Shrink-swell	0.50
618D2, 618D3:						
Senachwine--	Somewhat limited		Somewhat limited		Very limited	
	Slope	0.96	Slope	0.96	Slope	1.00
	Shrink-swell	0.50			Shrink-swell	0.50
618F, 618G:						
Senachwine--	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Shrink-swell	0.50			Shrink-swell	0.50
622B2:						
Wyanet------	Somewhat limited		Not limited		Somewhat limited	
	Shrink-swell	0.50			Shrink-swell	0.50
622C2:						
Wyanet------	Somewhat limited		Not limited		Somewhat limited	
	Shrink-swell	0.50			Slope	0.97
					Shrink-swell	0.50
722A:						
Drummer-----	Very limited		Very limited		Very limited	
	Ponding	1.00	Ponding	1.00	Ponding	1.00
	Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
	Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
Milford-----	Very limited		Very limited		Very limited	
	Ponding	1.00	Ponding	1.00	Ponding	1.00
	Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
	Shrink-swell	0.50			Shrink-swell	0.50
791A:						
Rush--------	Somewhat limited		Somewhat limited		Somewhat limited	
	Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
791B2:						
Rush--------	Somewhat limited		Somewhat limited		Somewhat limited	
	Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
802D:						
Orthents----	Somewhat limited		Somewhat limited		Very limited	
	Shrink-swell	0.50	Shrink-swell	0.50	Slope	1.00
	Slope	0.37	Depth to saturated zone	0.47	Shrink-swell	0.50
			Slope	0.37		

Table 14a.--Building Site Development--Continued

Map symbol and soil name	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
830:						
Landfills	Not rated		Not rated		Not rated	
1107A:						
Sawmill	Very limited		Very limited		Very limited	
	Ponding	1.00	Ponding	1.00	Ponding	1.00
	Flooding	1.00	Flooding	1.00	Flooding	1.00
	Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
	Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
3107A:						
Sawmill	Very limited		Very limited		Very limited	
	Ponding	1.00	Ponding	1.00	Ponding	1.00
	Flooding	1.00	Flooding	1.00	Flooding	1.00
	Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
	Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
3132A:						
Starks	Very limited		Very limited		Very limited	
	Flooding	1.00	Flooding	1.00	Flooding	1.00
	Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
	Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
3284A:						
Tice	Very limited		Very limited		Very limited	
	Flooding	1.00	Flooding	1.00	Flooding	1.00
	Depth to saturated zone	0.81	Depth to saturated zone	1.00	Depth to saturated zone	0.81
	Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
3451A:						
Lawson	Very limited		Very limited		Very limited	
	Flooding	1.00	Flooding	1.00	Flooding	1.00
			Depth to saturated zone	1.00		
8077A:						
Huntsville	Very limited		Very limited		Very limited	
	Flooding	1.00	Flooding	1.00	Flooding	1.00
			Depth to saturated zone	0.05		
W:						
Water	Not rated		Not rated		Not rated	

Table 14b.--Building Site Development

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Local roads and streets		Shallow excavations		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
56A:						
Dana	Very limited		Very limited		Somewhat limited	
	Frost action	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.03
	Low strength	1.00	Cutbanks cave	0.10		
	Shrink-swell	0.50				
	Depth to saturated zone	0.03				
56B2:						
Dana	Very limited		Very limited		Somewhat limited	
	Frost action	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.19
	Low strength	1.00	Cutbanks cave	0.10		
	Shrink-swell	0.50				
	Depth to saturated zone	0.19				
154A:						
Flanagan	Very limited		Very limited		Somewhat limited	
	Low strength	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.75
	Shrink-swell	1.00	Cutbanks cave	0.10		
	Depth to saturated zone	0.75				
	Frost action	0.50				
234A:						
Sunbury	Very limited		Very limited		Somewhat limited	
	Low strength	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.94
	Shrink-swell	1.00	Cutbanks cave	0.10		
	Depth to saturated zone	0.94				
	Frost action	0.50				
236A:						
Sabina	Very limited		Very limited		Somewhat limited	
	Low strength	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.96
	Shrink-swell	1.00	Cutbanks cave	0.10		
	Depth to saturated zone	0.96				
	Frost action	0.50				
244A:						
Hartsburg	Very limited		Very limited		Very limited	
	Ponding	1.00	Ponding	1.00	Ponding	1.00
	Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
	Frost action	1.00	Cutbanks cave	0.10		
	Low strength	1.00				
	Shrink-swell	0.50				

Table 14b.--Building Site Development--Continued

Map symbol and soil name	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
291A:						
Xenia-------	Very limited		Very limited		Somewhat limited	
	Frost action	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.75
	Low strength	1.00	Cutbanks cave	0.10		
	Depth to saturated zone	0.75				
	Shrink-swell	0.50				
291B, 291B2:						
Xenia-------	Very limited		Very limited		Somewhat limited	
	Frost action	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.75
	Low strength	1.00	Depth to dense layer	0.50		
	Depth to saturated zone	0.75	Cutbanks cave	0.10		
	Shrink-swell	0.50				
330A:						
Peotone-----	Very limited		Very limited		Very limited	
	Ponding	1.00	Ponding	1.00	Ponding	1.00
	Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
	Frost action	1.00	Cutbanks cave	0.10		
	Low strength	1.00				
	Shrink-swell	1.00				
481A:						
Raub--------	Very limited		Very limited		Somewhat limited	
	Frost action	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.75
	Low strength	1.00	Cutbanks cave	0.10		
	Depth to saturated zone	0.75				
	Shrink-swell	0.50				
618B2:						
Senachwine--	Somewhat limited		Somewhat limited		Not limited	
	Frost action	0.50	Cutbanks cave	0.10		
618C2, 618C3:						
Senachwine--	Very limited		Somewhat limited		Not limited	
	Low strength	1.00	Cutbanks cave	0.10		
	Shrink-swell	0.50				
	Frost action	0.50				
618D2, 618D3:						
Senachwine--	Very limited		Somewhat limited		Somewhat limited	
	Low strength	1.00	Slope	0.96	Slope	0.96
	Slope	0.96	Cutbanks cave	0.10		
	Shrink-swell	0.50				
	Frost action	0.50				
618F, 618G:						
Senachwine--	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Low strength	1.00	Cutbanks cave	0.10		
	Shrink-swell	0.50				
	Frost action	0.50				

Table 14b.--Building Site Development--Continued

Map symbol and soil name	Local roads and streets		Shallow excavations		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
622B2:						
Wyanet------	Very limited		Somewhat limited		Not limited	
	Low strength	1.00	Cutbanks cave	0.10		
	Shrink-swell	0.50				
	Frost action	0.50				
622C2:						
Wyanet------	Very limited		Somewhat limited		Not limited	
	Low strength	1.00	Cutbanks cave	0.10		
	Shrink-swell	0.50				
	Frost action	0.50				
722A:						
Drummer-----	Very limited		Very limited		Very limited	
	Ponding	1.00	Ponding	1.00	Ponding	1.00
	Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
	Frost action	1.00	Cutbanks cave	0.10		
	Low strength	1.00				
	Shrink-swell	0.50				
Milford-----	Very limited		Very limited		Very limited	
	Ponding	1.00	Ponding	1.00	Ponding	1.00
	Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
	Frost action	1.00	Cutbanks cave	0.10		
	Low strength	1.00	Too clayey	0.02		
	Shrink-swell	0.50				
791A:						
Rush--------	Very limited		Very limited		Not limited	
	Frost action	1.00	Cutbanks cave	1.00		
	Low strength	1.00				
	Shrink-swell	0.50				
791B2:						
Rush--------	Very limited		Very limited		Not limited	
	Frost action	1.00	Cutbanks cave	1.00		
	Low strength	1.00				
	Shrink-swell	0.50				
802D:						
Orthents----	Somewhat limited		Somewhat limited		Somewhat limited	
	Shrink-swell	0.50	Depth to saturated zone	0.47	Slope	0.37
	Frost action	0.50				
	Slope	0.37	Slope	0.37		
			Cutbanks cave	0.10		
830:						
Landfills---	Not rated		Not rated		Not rated	
1107A:						
Sawmill-----	Very limited		Very limited		Very limited	
	Ponding	1.00	Ponding	1.00	Ponding	1.00
	Depth to saturated zone	1.00	Depth to saturated zone	1.00	Flooding	1.00
					Depth to saturated zone	1.00
	Frost action	1.00	Flooding	0.80		
	Flooding	1.00	Cutbanks cave	0.10		
	Low strength	1.00				

Table 14b.--Building Site Development--Continued

Map symbol and soil name	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
3107A:						
Sawmill-----	Very limited		Very limited		Very limited	
	Ponding	1.00	Ponding	1.00	Ponding	1.00
	Depth to saturated zone	1.00	Depth to saturated zone	1.00	Flooding	1.00
	Frost action	1.00	Flooding	0.80	Depth to saturated zone	1.00
	Flooding	1.00	Cutbanks cave	0.10		
	Low strength	1.00				
3132A:						
Starks------	Very limited		Very limited		Very limited	
	Frost action	1.00	Depth to saturated zone	1.00	Flooding	1.00
	Flooding	1.00	Cutbanks cave	1.00	Depth to saturated zone	0.88
	Low strength	1.00	Flooding	0.80		
	Depth to saturated zone	0.88				
	Shrink-swell	0.50				
3284A:						
Tice--------	Very limited		Very limited		Very limited	
	Frost action	1.00	Depth to saturated zone	1.00	Flooding	1.00
	Flooding	1.00	Flooding	0.80	Depth to saturated zone	0.48
	Low strength	1.00	Cutbanks cave	0.10		
	Shrink-swell	0.50				
	Depth to saturated zone	0.48				
3451A:						
Lawson------	Very limited		Very limited		Very limited	
	Frost action	1.00	Depth to saturated zone	1.00	Flooding	1.00
	Flooding	1.00	Flooding	0.80		
	Low strength	1.00	Cutbanks cave	0.10		
8077A:						
Huntsville--	Very limited		Somewhat limited		Somewhat limited	
	Frost action	1.00	Flooding	0.60	Flooding	0.60
	Flooding	1.00	Cutbanks cave	0.10		
	Low strength	1.00	Depth to saturated zone	0.05		
W:						
Water-------	Not rated		Not rated		Not rated	

Table 15a.--Sanitary Facilities

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Septic tank absorption fields		Sewage lagoons	
	Rating class and limiting features	Value	Rating class and limiting features	Value
56A:				
Dana	Very limited		Somewhat limited	
	Depth to saturated zone	1.00	Depth to saturated zone	0.56
	Restricted permeability	1.00	Seepage	0.53
56B2:				
Dana	Very limited		Somewhat limited	
	Depth to saturated zone	1.00	Seepage	0.53
			Slope	0.32
	Restricted permeability	1.00	Depth to saturated zone	0.25
154A:				
Flanagan	Very limited		Somewhat limited	
	Depth to saturated zone	1.00	Seepage	0.53
			Depth to saturated zone	0.01
	Restricted permeability	1.00		
234A:				
Sunbury	Very limited		Somewhat limited	
	Depth to saturated zone	1.00	Seepage	0.53
	Restricted permeability	1.00		
236A:				
Sabina	Very limited		Somewhat limited	
	Depth to saturated zone	1.00	Seepage	0.53
	Restricted permeability	1.00		
244A:				
Hartsburg	Very limited		Very limited	
	Ponding	1.00	Ponding	1.00
	Depth to saturated zone	1.00	Depth to saturated zone	1.00
	Restricted permeability	0.46	Seepage	0.53
291A:				
Xenia	Very limited		Somewhat limited	
	Depth to saturated zone	1.00	Seepage	0.53
			Depth to saturated zone	0.01
	Restricted permeability	1.00		

Table 15a.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields		Sewage lagoons	
	Rating class and limiting features	Value	Rating class and limiting features	Value
291B, 291B2:				
Xenia------------	Very limited		Somewhat limited	
	Depth to saturated zone	1.00	Seepage	0.53
	Restricted permeability	1.00	Slope	0.32
			Depth to saturated zone	0.01
330A:				
Peotone----------	Very limited		Very limited	
	Ponding	1.00	Ponding	1.00
	Depth to saturated zone	1.00	Depth to saturated zone	1.00
	Restricted permeability	1.00		
481A:				
Raub-------------	Very limited		Somewhat limited	
	Depth to saturated zone	1.00	Seepage	0.53
	Restricted permeability	1.00	Depth to saturated zone	0.01
618B2:				
Senachwine-------	Very limited		Somewhat limited	
	Restricted permeability	1.00	Seepage	0.53
			Slope	0.32
618C2, 618C3:				
Senachwine-------	Very limited		Very limited	
	Restricted permeability	1.00	Slope	1.00
			Seepage	0.53
618D2:				
Senachwine-------	Very limited		Very limited	
	Restricted permeability	1.00	Slope	1.00
	Slope	0.96	Seepage	0.53
618D3:				
Senachwine-------	Very limited		Very limited	
	Restricted permeability	1.00	Slope	1.00
	Slope	0.96	Seepage	0.53
618F, 618G:				
Senachwine-------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Restricted permeability	1.00	Seepage	0.53
622B2:				
Wyanet-----------	Very limited		Somewhat limited	
	Restricted permeability	1.00	Seepage	0.53
			Slope	0.18
622C2:				
Wyanet-----------	Very limited		Very limited	
	Restricted permeability	1.00	Slope	1.00
			Seepage	0.53

Table 15a.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields		Sewage lagoons	
	Rating class and limiting features	Value	Rating class and limiting features	Value
722A:				
Drummer----------	Very limited		Very limited	
	Ponding	1.00	Ponding	1.00
	Depth to saturated zone	1.00	Depth to saturated zone	1.00
	Restricted permeability	0.46	Seepage	0.53
Milford----------	Very limited		Very limited	
	Ponding	1.00	Ponding	1.00
	Depth to saturated zone	1.00	Depth to saturated zone	1.00
	Restricted permeability	1.00	Seepage	0.53
791A:				
Rush-------------	Very limited		Very limited	
	Filtering capacity	1.00	Seepage	1.00
	Restricted permeability	0.46		
791B2:				
Rush-------------	Very limited		Somewhat limited	
	Filtering capacity	1.00	Seepage	0.53
			Slope	0.32
	Restricted permeability	0.46		
802D:				
Orthents, loamy--	Somewhat limited		Very limited	
	Depth to saturated zone	0.94	Slope	1.00
			Depth to saturated zone	0.39
	Restricted permeability	0.78	Seepage	0.21
	Slope	0.37		
830:				
Landfills--------	Not rated		Not rated	
1107A:				
Sawmill----------	Very limited		Very limited	
	Flooding	1.00	Ponding	1.00
	Ponding	1.00	Flooding	1.00
	Depth to saturated zone	1.00	Depth to saturated zone	1.00
	Restricted permeability	0.46	Seepage	0.53
3107A:				
Sawmill----------	Very limited		Very limited	
	Flooding	1.00	Ponding	1.00
	Ponding	1.00	Flooding	1.00
	Depth to saturated zone	1.00	Depth to saturated zone	1.00
	Restricted permeability	0.46	Seepage	0.53

Table 15a.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields		Sewage lagoons	
	Rating class and limiting features	Value	Rating class and limiting features	Value
3132A:				
Starks-----------	Very limited		Very limited	
	Flooding	1.00	Flooding	1.00
	Depth to saturated zone	1.00	Depth to saturated zone	1.00
	Filtering capacity	1.00	Seepage	0.53
	Restricted permeability	0.46		
3284A:				
Tice-------------	Very limited		Very limited	
	Flooding	1.00	Flooding	1.00
	Depth to saturated zone	1.00	Depth to saturated zone	1.00
	Restricted permeability	0.46	Seepage	0.53
3451A:				
Lawson-----------	Very limited		Very limited	
	Flooding	1.00	Flooding	1.00
	Depth to saturated zone	1.00	Depth to saturated zone	1.00
	Restricted permeability	0.46	Seepage	0.53
8077A:				
Huntsville-------	Very limited		Very limited	
	Flooding	1.00	Flooding	1.00
	Restricted permeability	0.46	Seepage	0.53
	Depth to saturated zone	0.12		
W:				
Water------------	Not rated		Not rated	

Table 15b.--Sanitary Facilities

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
56A:						
Dana	Somewhat limited		Somewhat limited		Somewhat limited	
	Depth to saturated zone	0.95	Depth to saturated zone	0.95	Depth to saturated zone	0.68
	Too clayey	0.50			Too clayey	0.50
56B2:						
Dana	Very limited		Very limited		Somewhat limited	
	Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.86
	Too clayey	0.50			Too clayey	0.50
154A:						
Flanagan	Very limited		Very limited		Very limited	
	Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
	Too clayey	0.50			Too clayey	0.50
234A:						
Sunbury	Very limited		Very limited		Very limited	
	Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
					Too clayey	0.50
236A:						
Sabina	Very limited		Very limited		Very limited	
	Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
	Too clayey	0.50			Too clayey	0.50
244A:						
Hartsburg	Very limited		Very limited		Very limited	
	Depth to saturated zone	1.00	Ponding	1.00	Ponding	1.00
	Ponding	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
291A:						
Xenia	Very limited		Very limited		Very limited	
	Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
	Too clayey	0.50			Too clayey	0.50
291B, 291B2:						
Xenia	Very limited		Very limited		Very limited	
	Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
	Too clayey	0.50			Too clayey	0.50
330A:						
Peotone	Very limited		Very limited		Very limited	
	Depth to saturated zone	1.00	Ponding	1.00	Ponding	1.00
	Ponding	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
	Too clayey	0.50			Too clayey	0.50

Table 15b.--Sanitary Facilities--Continued

Map symbol and soil name	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
481A:						
Raub	Very limited		Very limited		Very limited	
	Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
	Too clayey	0.50			Too clayey	0.50
618B2, 618C2, 618C3:						
Senachwine	Not limited		Not limited		Not limited	
618D2, 618D3:						
Senachwine	Somewhat limited		Somewhat limited		Somewhat limited	
	Slope	0.96	Slope	0.96	Slope	0.96
618F, 618G:						
Senachwine	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
622B2, 622C2:						
Wyanet	Not limited		Not limited		Not limited	
722A:						
Drummer	Very limited		Very limited		Very limited	
	Depth to saturated zone	1.00	Ponding	1.00	Ponding	1.00
	Ponding	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
	Too clayey	0.50			Too clayey	0.50
Milford	Very limited		Very limited		Very limited	
	Depth to saturated zone	1.00	Ponding	1.00	Ponding	1.00
	Ponding	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
					Too clayey	0.50
791A:						
Rush	Very limited		Not limited		Somewhat limited	
	Seepage	1.00			Too clayey	0.50
	Too clayey	0.50				
791B2:						
Rush	Very limited		Not limited		Very limited	
	Seepage	1.00			Seepage	1.00
	Too clayey	0.50			Too clayey	0.50
802D:						
Orthents, loamy	Very limited		Very limited		Somewhat limited	
	Depth to saturated zone	1.00	Depth to saturated zone	1.00	Slope	0.37
	Slope	0.37	Slope	0.37		
830:						
Landfills	Not rated		Not rated		Not rated	
1107A:						
Sawmill	Very limited		Very limited		Very limited	
	Flooding	1.00	Flooding	1.00	Ponding	1.00
	Depth to saturated zone	1.00	Ponding	1.00	Depth to saturated zone	1.00
	Ponding	1.00	Depth to saturated zone	1.00	Too clayey	0.50
	Too clayey	0.50				

Table 15b.--Sanitary Facilities--Continued

Map symbol and soil name	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
3107A:						
Sawmill	Very limited		Very limited		Very limited	
	Flooding	1.00	Flooding	1.00	Ponding	1.00
	Depth to saturated zone	1.00	Ponding	1.00	Depth to saturated zone	1.00
	Ponding	1.00	Depth to saturated zone	1.00	Too clayey	0.50
	Too clayey	0.50				
3132A:						
Starks	Very limited		Very limited		Very limited	
	Flooding	1.00	Flooding	1.00	Depth to saturated zone	1.00
	Depth to saturated zone	1.00	Depth to saturated zone	1.00	Too clayey	0.50
	Seepage	1.00				
	Too clayey	0.50				
3284A:						
Tice	Very limited		Very limited		Somewhat limited	
	Flooding	1.00	Flooding	1.00	Depth to saturated zone	0.96
	Depth to saturated zone	1.00	Depth to saturated zone	1.00	Too clayey	0.50
	Too clayey	0.50				
3451A:						
Lawson	Very limited		Very limited		Somewhat limited	
	Flooding	1.00	Flooding	1.00	Depth to saturated zone	0.47
	Depth to saturated zone	1.00	Depth to saturated zone	1.00		
8077A:						
Huntsville	Very limited		Very limited		Not limited	
	Flooding	1.00	Flooding	1.00		
	Depth to saturated zone	1.00	Depth to saturated zone	1.00		
W:						
Water	Not rated		Not rated		Not rated	

Table 16.--Construction Materials

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.00 to 0.99. For potential source of reclamation, material, roadfill, and topsoil, the smaller the value, the greater the limitation. For potential source of sand, the smaller the value, the less likely the soil is a source. See text for further explanation of ratings in this table.)

Map symbol and soil name	Potential as source of reclamation material		Potential as source of roadfill		Potential as source of topsoil		Potential as source of sand	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class	Value
56A:								
Dana-----------	Fair		Poor		Fair		Poor	
	Carbonate content	0.92	Low strength	0.00	Depth to	0.76	Bottom layer	0.00
	Too clayey	0.98	Depth to	0.76	saturated zone		Thickest layer	0.00
	Too acid	0.99	saturated zone		Too clayey	0.76		
	Water erosion	0.99	Shrink-swell	0.97				
56B2:								
Dana-----------	Fair		Poor		Fair		Poor	
	Carbonate content	0.92	Low strength	0.00	Depth to	0.53	Bottom layer	0.00
	Too acid	0.95	Depth to	0.53	saturated zone		Thickest layer	0.00
	Too clayey	0.98	saturated zone		Too clayey	0.76		
	Water erosion	0.99	Shrink-swell	0.93				
154A:								
Flanagan-------	Fair		Poor		Fair		Poor	
	Too clayey	0.18	Low strength	0.00	Too clayey	0.13	Bottom layer	0.00
	Low content of	0.82	Depth to	0.14	Depth to	0.14	Thickest layer	0.00
	organic matter		saturated zone		saturated zone			
	Too acid	0.84	Shrink-swell	0.90				
	Water erosion	0.90						
	Carbonate content	0.92						
234A:								
Sunbury--------	Fair		Fair		Fair		Poor	
	Low content of	0.05	Depth to	0.04	Depth to	0.04	Bottom layer	0.00
	organic matter		saturated zone		saturated zone		Thickest layer	0.00
	Too clayey	0.18	Shrink-swell	0.88	Too clayey	0.11		
	Too acid	0.84			Hard to reclaim	0.94		
	Water erosion	0.90						
	Carbonate content	0.92						
236A:								
Sabina---------	Fair		Poor		Fair		Poor	
	Low content of	0.12	Low strength	0.00	Depth to	0.02	Bottom layer	0.00
	organic matter		Depth to	0.02	saturated zone		Thickest layer	0.00
	Too clayey	0.18	saturated zone		Too clayey	0.11		
	Too acid	0.54	Shrink-swell	0.96				
	Water erosion	0.68						
	Carbonate content	0.92						
244A:								
Hartsburg------	Fair		Poor		Poor		Poor	
	Low content of	0.18	Depth to	0.00	Depth to	0.00	Bottom layer	0.00
	organic matter		saturated zone		saturated zone		Thickest layer	0.00
	Water erosion	0.68	Low strength	0.00	Too clayey	0.82		
	Carbonate content	0.68						
	Too clayey	0.82						

Table 16.--Construction Materials--Continued

Map symbol and soil name	Potential as source of reclamation material		Potential as source of roadfill		Potential as source of topsoil		Potential as source of sand	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class	Value
291A:								
Xenia----------	Fair		Poor		Fair		Poor	
	Too acid	0.54	Low strength	0.00	Depth to saturated zone	0.14	Bottom layer	0.00
	Low content of organic matter	0.68	Depth to saturated zone	0.14	Too clayey	0.67	Thickest layer	0.00
	Water erosion	0.90	Shrink-swell	0.97	Too acid	0.98		
	Carbonate content	0.92			Hard to reclaim	0.99		
	Too clayey	0.98						
291B:								
Xenia----------	Fair		Poor		Fair		Poor	
	Low content of organic matter	0.68	Low strength	0.00	Depth to saturated zone	0.14	Bottom layer	0.00
	Too acid	0.74	Depth to saturated zone	0.14	Too clayey	0.67	Thickest layer	0.00
	Water erosion	0.90	Shrink-swell	0.94	Hard to reclaim	0.97		
	Carbonate content	0.92						
	Too clayey	0.98						
291B2:								
Xenia----------	Fair		Fair		Fair		Poor	
	Low content of organic matter	0.08	Depth to saturated zone	0.14	Depth to saturated zone	0.14	Bottom layer	0.00
	Water erosion	0.90	Shrink-swell	0.96	Hard to reclaim	0.35	Thickest layer	0.00
	Carbonate content	0.92			Too clayey	0.67		
	Too clayey	0.98						
	Too acid	0.99						
330A:								
Peotone--------	Fair		Poor		Poor		Poor	
	Too clayey	0.18	Depth to saturated zone	0.00	Depth to saturated zone	0.00	Bottom layer	0.00
	Water erosion	0.99	Low strength	0.00	Too clayey	0.18	Thickest layer	0.00
			Shrink-swell	0.12				
481A:								
Raub-----------	Fair		Poor		Fair		Poor	
	Carbonate content	0.80	Low strength	0.00	Depth to saturated zone	0.14	Bottom layer	0.00
	Too acid	0.95	Depth to saturated zone	0.14			Thickest layer	0.00
	Water erosion	0.99	Shrink-swell	0.99				
618B2:								
Senachwine-----	Fair		Good		Poor		Poor	
	Low content of organic matter	0.01			Hard to reclaim	0.00	Bottom layer	0.00
	Too acid	0.84			Carbonate content	0.92	Thickest layer	0.00
	Water erosion	0.90						
	Carbonate content	0.92						
618C2:								
Senachwine-----	Fair		Good		Poor		Poor	
	Low content of organic matter	0.01			Hard to reclaim	0.00	Bottom layer	0.00
	Too acid	0.84					Thickest layer	0.00
	Water erosion	0.90						
	Carbonate content	0.92						

Table 16.--Construction Materials--Continued

Map symbol and soil name	Potential as source of reclamation material: Rating class and limiting features	Value	Potential as source of roadfill: Rating class and limiting features	Value	Potential as source of topsoil: Rating class and limiting features	Value	Potential as source of sand: Rating class	Value
618C3:								
Senachwine-----	Fair		Good		Poor		Poor	
	Low content of organic matter	0.08			Hard to reclaim	0.00	Bottom layer	0.00
							Thickest layer	0.00
	Carbonate content	0.92						
	Too acid	0.95						
	Water erosion	0.99						
618D2:								
Senachwine-----	Fair		Good		Poor		Poor	
	Low content of organic matter	0.01			Hard to reclaim	0.00	Bottom layer	0.00
					Slope	0.04	Thickest layer	0.00
	Too acid	0.84						
	Water erosion	0.90						
	Carbonate content	0.92						
618D3:								
Senachwine-----	Fair		Good		Poor		Poor	
	Low content of organic matter	0.01			Hard to reclaim	0.00	Bottom layer	0.00
					Slope	0.04	Thickest layer	0.00
	Carbonate content	0.92						
	Water erosion	0.99						
618F:								
Senachwine-----	Fair		Poor		Poor		Poor	
	Low content of organic matter	0.01	Slope	0.00	Slope	0.00	Bottom layer	0.00
					Hard to reclaim	0.00	Thickest layer	0.00
	Too acid	0.74						
	Carbonate content	0.92						
	Water erosion	0.99						
618G:								
Senachwine-----	Fair		Poor		Poor		Poor	
	Low content of organic matter	0.01	Slope	0.00	Slope	0.00	Bottom layer	0.00
					Hard to reclaim	0.00	Thickest layer	0.00
	Too acid	0.54			Too acid	0.98		
	Water erosion	0.90						
	Carbonate content	0.92						
622B2:								
Wyanet---------	Fair		Good		Fair		Poor	
	Low content of organic matter	0.12			Hard to reclaim	0.10	Bottom layer	0.00
							Thickest layer	0.00
	Carbonate content	0.92						
	Too acid	0.99						
	Water erosion	0.99						
622C2:								
Wyanet---------	Fair		Good		Fair		Poor	
	Low content of organic matter	0.12			Hard to reclaim	0.84	Bottom layer	0.00
							Thickest layer	0.00
	Carbonate content	0.92						
	Too acid	0.99						
	Water erosion	0.99						
722A:								
Drummer--------	Fair		Poor		Poor		Fair	
	Too acid	0.92	Depth to saturated zone	0.00	Depth to saturated zone	0.00	Thickest layer	0.00
	Too clayey	0.98					Bottom layer	0.01
	Water erosion	0.99	Low strength	0.00	Too clayey	0.81		
			Shrink-swell	0.99				

Table 16.--Construction Materials--Continued

Map symbol and soil name	Potential as source of reclamation material: Rating class and limiting features	Value	Potential as source of roadfill: Rating class and limiting features	Value	Potential as source of topsoil: Rating class and limiting features	Value	Potential as source of sand: Rating class	Value
722A:								
Milford--------	Fair		Poor		Poor		Poor	
	Too clayey	0.18	Depth to saturated zone	0.00	Depth to saturated zone	0.00	Bottom layer	0.00
	Low content of organic matter	0.24	Shrink-swell	0.86	Too clayey	0.18	Thickest layer	0.00
	Water erosion	0.99						
791A:								
Rush-----------	Fair		Poor		Fair		Fair	
	Too acid	0.12	Low strength	0.00	Too clayey	0.51	Thickest layer	0.00
	Low content of organic matter	0.32	Shrink-swell	0.93	Hard to reclaim	0.68	Bottom layer	0.26
					Too acid	0.76		
	Too clayey	0.82						
	Water erosion	0.90						
791B2:								
Rush-----------	Fair		Fair		Fair		Fair	
	Too acid	0.12	Shrink-swell	0.87	Too clayey	0.51	Thickest layer	0.00
	Low content of organic matter	0.32			Too acid	0.76	Bottom layer	0.26
					Hard to reclaim	0.92		
	Too clayey	0.82						
	Water erosion	0.90						
802D:								
Orthents, loamy	Fair		Fair		Fair		Poor	
	Low content of organic matter	0.50	Shrink-swell	0.87	Slope	0.63	Bottom layer	0.00
							Thickest layer	0.00
	Water erosion	0.90						
830:								
Landfills------	Not rated		Not rated		Not rated		Not rated	
1107A:								
Sawmill--------	Fair		Poor		Poor		Poor	
	Too clayey	0.98	Depth to saturated zone	0.00	Depth to saturated zone	0.00	Bottom layer	0.00
							Thickest layer	0.00
			Low strength	0.00	Too clayey	0.98		
			Shrink-swell	0.87				
3107A:								
Sawmill--------	Fair		Poor		Poor		Poor	
	Too clayey	0.98	Depth to saturated zone	0.00	Depth to saturated zone	0.00	Bottom layer	0.00
	Too acid	0.99					Thickest layer	0.00
			Low strength	0.00	Too clayey	0.98		
			Shrink-swell	0.87				
3132A:								
Starks---------	Fair		Poor		Fair		Fair	
	Low content of organic matter	0.24	Low strength	0.00	Depth to saturated zone	0.07	Thickest layer	0.00
			Depth to saturated zone	0.07			Bottom layer	0.91
	Water erosion	0.68			Too clayey	0.51		
	Too clayey	0.82	Shrink-swell	0.93				
	Too acid	0.84						
3284A:								
Tice-----------	Fair		Poor		Fair		Poor	
	Low content of organic matter	0.88	Low strength	0.00	Depth to saturated zone	0.29	Bottom layer	0.00
			Depth to saturated zone	0.29			Thickest layer	0.00
	Too clayey	0.98			Too clayey	0.98		
			Shrink-swell	0.87				

Table 16.--Construction Materials--Continued

Map symbol and soil name	Potential as source of reclamation material: Rating class and limiting features	Value	Potential as source of roadfill: Rating class and limiting features	Value	Potential as source of topsoil: Rating class and limiting features	Value	Potential as source of sand: Rating class	Value
3451A:								
Lawson	Fair		Poor		Fair		Poor	
	Low content of organic matter	0.88	Low strength	0.00	Depth to saturated zone	0.89	Bottom layer	0.00
	Water erosion	0.99	Depth to saturated zone	0.89			Thickest layer	0.00
8077A:								
Huntsville	Fair		Poor		Good		Poor	
	Too acid	0.99	Low strength	0.00			Bottom layer	0.00
							Thickest layer	0.00
W:								
Water	Not rated		Not rated		Not rated		Not rated	

Table 17a.--Water Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
56A:						
Dana------------	Somewhat limited		Somewhat limited		Very limited	
	Seepage	0.72	Depth to saturated zone	0.95	Depth to water	1.00
			Piping	0.25		
56B2:						
Dana------------	Somewhat limited		Very limited		Very limited	
	Seepage	0.72	Depth to saturated zone	1.00	Depth to water	1.00
			Piping	0.12		
154A:						
Flanagan--------	Somewhat limited		Very limited		Very limited	
	Seepage	0.72	Depth to saturated zone	1.00	Depth to water	1.00
			Piping	0.42		
234A:						
Sunbury---------	Somewhat limited		Very limited		Very limited	
	Seepage	0.72	Depth to saturated zone	1.00	Depth to water	1.00
			Piping	0.59		
236A:						
Sabina----------	Somewhat limited		Very limited		Very limited	
	Seepage	0.72	Depth to saturated zone	1.00	Depth to water	1.00
			Piping	0.28		
244A:						
Hartsburg-------	Somewhat limited		Very limited		Somewhat limited	
	Seepage	0.72	Ponding	1.00	Slow refill	0.28
			Depth to saturated zone	1.00	Cutbanks cave	0.10
			Piping	0.34		
291A:						
Xenia-----------	Somewhat limited		Very limited		Very limited	
	Seepage	0.72	Depth to saturated zone	1.00	Depth to water	1.00
			Piping	0.33		
291B:						
Xenia-----------	Somewhat limited		Very limited		Very limited	
	Seepage	0.72	Depth to saturated zone	1.00	Depth to water	1.00
			Piping	0.60		
291B2:						
Xenia-----------	Somewhat limited		Very limited		Very limited	
	Seepage	0.72	Depth to saturated zone	1.00	Depth to water	1.00
			Piping	0.84		

Table 17a.--Water Management--Continued

Map symbol and soil name	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
330A:						
Peotone---------	Somewhat limited		Very limited		Somewhat limited	
	Seepage	0.04	Ponding	1.00	Slow refill	0.96
			Depth to saturated zone	1.00	Cutbanks cave	0.10
481A:						
Raub------------	Somewhat limited		Very limited		Very limited	
	Seepage	0.72	Depth to saturated zone	1.00	Depth to water	1.00
			Piping	0.67		
618B2, 618C2:						
Senachwine------	Somewhat limited		Very limited		Very limited	
	Seepage	0.72	Piping	1.00	Depth to water	1.00
618C3:						
Senachwine------	Somewhat limited		Somewhat limited		Very limited	
	Seepage	0.72	Piping	0.95	Depth to water	1.00
618D2, 618D3:						
Senachwine------	Somewhat limited		Very limited		Very limited	
	Seepage	0.72	Piping	1.00	Depth to water	1.00
	Slope	0.02				
618F:						
Senachwine------	Somewhat limited		Somewhat limited		Very limited	
	Seepage	0.72	Piping	0.95	Depth to water	1.00
	Slope	0.36				
618G:						
Senachwine------	Somewhat limited		Somewhat limited		Very limited	
	Slope	0.99	Piping	0.97	Depth to water	1.00
	Seepage	0.72				
622B2, 622C2:						
Wyanet----------	Somewhat limited		Very limited		Very limited	
	Seepage	0.72	Piping	1.00	Depth to water	1.00
722A:						
Drummer---------	Somewhat limited		Very limited		Somewhat limited	
	Seepage	0.72	Ponding	1.00	Slow refill	0.28
			Depth to saturated zone	1.00	Cutbanks cave	0.10
			Piping	0.43		
			Seepage	0.01		
Milford---------	Somewhat limited		Very limited		Somewhat limited	
	Seepage	0.72	Ponding	1.00	Slow refill	0.28
			Depth to saturated zone	1.00	Cutbanks cave	0.10
			Piping	0.74		
791A:						
Rush------------	Very limited		Somewhat limited		Very limited	
	Seepage	1.00	Piping	0.87	Depth to water	1.00
			Seepage	0.26		

Table 17a.--Water Management--Continued

Map symbol and soil name	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
791B2:						
Rush------------	Very limited		Somewhat limited		Very limited	
	Seepage	1.00	Piping	0.94	Depth to water	1.00
			Seepage	0.26		
802D:						
Orthents, loamy	Somewhat limited		Somewhat limited		Somewhat limited	
	Seepage	0.47	Piping	0.58	Depth to water	0.90
	Slope	0.01			Slow refill	0.53
					Cutbanks cave	0.10
830:						
Landfills-------	Not rated		Not rated		Not rated	
1107A:						
Sawmill---------	Somewhat limited		Very limited		Somewhat limited	
	Seepage	0.72	Ponding	1.00	Slow refill	0.28
			Depth to saturated zone	1.00	Cutbanks cave	0.10
			Piping	0.02		
3107A:						
Sawmill---------	Somewhat limited		Very limited		Somewhat limited	
	Seepage	0.72	Ponding	1.00	Slow refill	0.28
			Depth to saturated zone	1.00	Cutbanks cave	0.10
			Piping	0.02		
3132A:						
Starks----------	Very limited		Very limited		Very limited	
	Seepage	1.00	Depth to saturated zone	1.00	Cutbanks cave	1.00
			Seepage	0.91		
			Piping	0.79		
3284A:						
Tice------------	Somewhat limited		Very limited		Somewhat limited	
	Seepage	0.72	Depth to saturated zone	1.00	Slow refill	0.28
					Cutbanks cave	0.10
			Piping	0.16		
3451A:						
Lawson----------	Somewhat limited		Somewhat limited		Somewhat limited	
	Seepage	0.72	Depth to saturated zone	0.86	Slow refill	0.28
					Cutbanks cave	0.10
			Piping	0.70	Depth to water	0.06
8077A:						
Huntsville------	Somewhat limited		Somewhat limited		Very limited	
	Seepage	0.72	Piping	0.92	Depth to water	1.00
W:						
Water-----------	Not rated		Not rated		Not rated	

Table 17b.--Water Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Grassed waterways and surface drains		Terraces and diversions		Tile drains and underground outlets	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
56A:						
Dana	Not limited		Very limited		Very limited	
			Water erosion	1.00	Depth to saturated zone	1.00
			Depth to saturated zone	1.00	Cutbanks cave	0.10
56B2:						
Dana	Somewhat limited		Very limited		Very limited	
	Slope	0.36	Water erosion	1.00	Depth to saturated zone	1.00
			Depth to saturated zone	1.00	Cutbanks cave	0.10
			Slope	0.36		
154A:						
Flanagan	Not limited		Very limited		Very limited	
			Water erosion	1.00	Depth to saturated zone	1.00
			Depth to saturated zone	1.00	Cutbanks cave	0.10
234A:						
Sunbury	Not limited		Very limited		Very limited	
			Water erosion	1.00	Depth to saturated zone	1.00
			Depth to saturated zone	1.00	Cutbanks cave	0.10
236A:						
Sabina	Not limited		Very limited		Very limited	
			Water erosion	1.00	Depth to saturated zone	1.00
			Depth to saturated zone	1.00	Cutbanks cave	0.10
244A:						
Hartsburg	Not limited		Very limited		Very limited	
			Water erosion	1.00	Ponding	1.00
			Ponding	1.00	Depth to saturated zone	1.00
			Depth to saturated zone	1.00	Cutbanks cave	0.10
291A:						
Xenia	Not limited		Very limited		Very limited	
			Water erosion	1.00	Depth to saturated zone	1.00
			Depth to saturated zone	1.00	Cutbanks cave	0.10
291B, 291B2:						
Xenia	Somewhat limited		Very limited		Very limited	
	Slope	0.36	Water erosion	1.00	Depth to saturated zone	1.00
			Depth to saturated zone	1.00	Depth to dense layer	0.50
			Slope	0.36	Cutbanks cave	0.10

Table 17b.--Water Management--Continued

Map symbol and soil name	Grassed waterways and surface drains		Terraces and diversions		Tile drains and underground outlets	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
330A:						
Peotone----------	Not limited		Very limited		Very limited	
			Ponding	1.00	Ponding	1.00
			Depth to saturated zone	1.00	Depth to saturated zone	1.00
			Water erosion	0.17	Cutbanks cave	0.10
481A:						
Raub-------------	Not limited		Very limited		Very limited	
			Water erosion	1.00	Depth to saturated zone	1.00
			Depth to saturated zone	1.00	Cutbanks cave	0.10
618B2:						
Senachwine-------	Somewhat limited		Very limited		Somewhat limited	
	Slope	0.36	Water erosion	1.00	Cutbanks cave	0.10
			Slope	0.36		
618C2:						
Senachwine-------	Somewhat limited		Very limited		Somewhat limited	
	Slope	1.00	Water erosion	1.00	Cutbanks cave	0.10
			Slope	1.00		
618C3:						
Senachwine-------	Somewhat limited		Somewhat limited		Somewhat limited	
	Slope	1.00	Slope	1.00	Cutbanks cave	0.10
			Water erosion	0.89		
618D2:						
Senachwine-------	Very limited		Very limited		Somewhat limited	
	Slope	1.00	Water erosion	1.00	Slope	0.96
			Slope	1.00	Cutbanks cave	0.10
618D3:						
Senachwine-------	Very limited		Very limited		Somewhat limited	
	Slope	1.00	Slope	1.00	Slope	0.96
			Water erosion	0.89	Cutbanks cave	0.10
618F, 618G:						
Senachwine-------	Very limited		Very limited		Very limited	
	Slope	1.00	Water erosion	1.00	Slope	1.00
			Slope	1.00	Cutbanks cave	0.10
622B2:						
Wyanet-----------	Somewhat limited		Somewhat limited		Somewhat limited	
	Slope	0.25	Water erosion	0.89	Cutbanks cave	0.10
			Slope	0.25		
622C2:						
Wyanet-----------	Somewhat limited		Somewhat limited		Somewhat limited	
	Slope	0.99	Slope	0.99	Cutbanks cave	0.10
			Water erosion	0.89		
722A:						
Drummer----------	Not limited		Very limited		Very limited	
			Water erosion	1.00	Ponding	1.00
			Ponding	1.00	Depth to saturated zone	1.00
			Depth to saturated zone	1.00	Cutbanks cave	0.10

Table 17b.--Water Management--Continued

Map symbol and soil name	Grassed waterways and surface drains: Rating class and limiting features	Value	Terraces and diversions: Rating class and limiting features	Value	Tile drains and underground outlets: Rating class and limiting features	Value
722A:						
Milford	Not limited		Very limited		Very limited	
			Ponding	1.00	Ponding	1.00
			Depth to saturated zone	1.00	Depth to saturated zone	1.00
			Water erosion	0.89	Cutbanks cave	0.10
					Too clayey	0.02
791A:						
Rush	Not limited		Very limited		Very limited	
			Water erosion	1.00	Cutbanks cave	1.00
791B2:						
Rush	Somewhat limited		Very limited		Very limited	
	Slope	0.36	Water erosion	1.00	Cutbanks cave	1.00
			Slope	0.36		
802D:						
Orthents, loamy	Very limited		Very limited		Somewhat limited	
	Slope	1.00	Water erosion	1.00	Depth to saturated zone	0.47
			Slope	1.00	Slope	0.37
					Cutbanks cave	0.10
830:						
Landfills	Not rated		Not rated		Not rated	
1107A:						
Sawmill	Not limited		Very limited		Very limited	
			Ponding	1.00	Ponding	1.00
			Depth to saturated zone	1.00	Flooding	1.00
			Water erosion	0.56	Depth to saturated zone	1.00
					Cutbanks cave	0.10
3107A:						
Sawmill	Not limited		Very limited		Very limited	
			Ponding	1.00	Ponding	1.00
			Depth to saturated zone	1.00	Flooding	1.00
			Water erosion	0.56	Depth to saturated zone	1.00
					Cutbanks cave	0.10
3132A:						
Starks	Not limited		Very limited		Very limited	
			Water erosion	1.00	Flooding	1.00
			Depth to saturated zone	1.00	Depth to saturated zone	1.00
					Cutbanks cave	1.00
3284A:						
Tice	Not limited		Very limited		Very limited	
			Depth to saturated zone	1.00	Flooding	1.00
			Water erosion	0.89	Depth to saturated zone	1.00
					Cutbanks cave	0.10

Table 17b.--Water Management--Continued

Map symbol and soil name	Grassed waterways and surface drains: Rating class and limiting features	Value	Terraces and diversions: Rating class and limiting features	Value	Tile drains and underground outlets: Rating class and limiting features	Value
3451A:						
Lawson----------	Not limited		Very limited		Very limited	
			Depth to saturated zone	1.00	Flooding	1.00
			Water erosion	0.89	Depth to saturated zone	1.00
					Cutbanks cave	0.10
8077A:						
Huntsville------	Not limited		Somewhat limited		Somewhat limited	
			Water erosion	0.56	Flooding	0.60
					Cutbanks cave	0.10
					Depth to saturated zone	0.05
W:						
Water-----------	Not rated		Not rated		Not rated	

Table 18.--Engineering Index Properties

(Absence of an entry indicates that the data were not estimated.)

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
56A:												
Dana-------	0-12	Silt loam	CL, ML, CL-ML	A-4, A-6	0	0	100	97-100	95-100	85-100	24-37	5-15
	12-39	Silty clay loam	CL, ML	A-7-6, A-6	0	0	100	97-100	95-100	85-100	37-46	17-24
	39-49	Clay loam	CL, ML	A-6	0	0	95-100	85-98	70-95	50-80	33-39	13-18
	49-60	Loam	CL, CL-ML, ML, SC, SC-SM	A-4, A-6	0-1	0-3	85-100	80-95	70-90	45-70	22-33	4-14
56B2:												
Dana-------	0-7	Silt loam	CL, ML	A-6	0	0	100	97-100	95-100	85-100	29-37	10-16
	7-34	Silty clay loam	CL, ML	A-7-6, A-6	0	0	100	97-100	95-100	85-100	37-46	17-24
	34-53	Clay loam	CL, ML	A-6	0	0	95-100	85-98	70-95	50-80	33-39	13-18
	53-60	Loam	CL, CL-ML, ML, SC, SC-SM	A-4, A-6	0-1	0-3	85-100	80-95	70-90	45-70	22-33	4-14
154A:												
Flanagan---	0-18	Silt loam	CL, CL-ML, ML	A-4, A-6	0	0	100	100	95-100	90-100	24-37	4-14
	18-38	Silty clay loam, silty clay	CL, CH, MH	A-7-6	0	0	100	100	95-100	95-100	45-52	22-28
	38-45	Silty clay loam, silt loam	CL, ML	A-6	0	0	100	100	95-100	95-100	35-40	14-20
	45-49	Silt loam, loam	CL, ML	A-6, A-4	0	0-3	85-100	80-100	75-90	60-90	25-33	9-13
	49-60	Loam	CL, CL-ML, ML, SC-SM, SC	A-4, A-6	0-1	0-5	85-100	80-100	70-90	45-70	22-33	4-14
234A:												
Sunbury----	0-8	Silt loam	CL, CL-ML, ML	A-4, A-6	0	0	100	100	95-100	90-100	24-37	4-14
	8-15	Silt loam, silty clay loam	CL, CL-ML, ML	A-4, A-6	0	0	100	100	95-100	90-100	24-37	4-14
	15-36	Silty clay loam, silty clay	CL, CH, MH	A-7-6	0	0	100	100	95-100	95-100	45-52	22-28
	36-43	Silty clay loam, silt loam	CL, ML	A-6	0	0	100	100	95-100	95-100	35-40	14-20
	43-47	Silt loam, loam	CL, ML	A-6, A-4	0	0	100	90-100	75-90	60-90	25-33	9-13
	47-72	Loam	CL, CL-ML, ML, SC-SM, SC	A-4, A-6	0	0	100	90-100	70-90	45-70	22-33	4-13
236A:												
Sabina-----	0-7	Silt loam	CL, ML, CL-ML	A-6, A-4	0	0	100	100	97-100	95-100	24-37	6-15
	7-18	Silt loam	CL, ML	A-6, A-4	0	0	100	100	97-100	95-100	24-37	7-18
	18-30	Silty clay loam	CL, CH, MH	A-7-6	0	0	100	100	97-100	95-100	45-52	23-29
	30-45	Silty clay loam, silt loam	CL, ML	A-6, A-7-6	0	0	100	97-100	95-100	85-100	35-45	16-25
	45-51	Loam	CL, ML, SC	A-6, A-4	0	0	90-100	80-100	70-90	45-70	25-33	8-14
	51-60	Loam	CL, CL-ML, ML, SC, SC-SM	A-4, A-6	0-1	0-3	85-100	80-95	70-90	45-70	22-33	4-14

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
244A:												
Hartsburg--	0-17	Silty clay loam	CL, ML	A-7-6, A-7-5	0	0	100	100	97-100	95-100	40-46	15-19
	17-34	Silty clay loam, silt loam	CL, ML	A-7-6, A-6	0	0	100	100	97-100	95-100	37-46	16-24
	34-60	Silt loam	CL, ML	A-6, A-4	0	0	95-100	90-100	90-100	85-100	24-37	7-18
291A:												
Xenia------	0-8	Silt loam	CL, ML, CL-ML	A-4, A-6	0	0	100	97-100	95-100	85-100	24-37	5-15
	8-11	Silt loam	CL, ML, CL-ML	A-4, A-6	0	0	100	97-100	95-100	85-100	24-37	5-15
	11-39	Silty clay loam	CL, ML	A-7-6, A-6	0	0	100	97-100	95-100	85-100	37-46	17-24
	39-48	Clay loam, loam	CL, ML	A-6	0	0	90-100	85-99	75-95	55-85	33-39	12-18
	48-60	Loam	CL-ML, CL, ML, SC-SM	A-4	0-1	0-3	90-100	85-99	70-90	45-75	22-28	4-10
291B:												
Xenia------	0-4	Silt loam	CL, ML, CL-ML	A-4, A-6	0	0	100	97-100	95-100	85-100	24-37	5-15
	4-16	Silt loam	CL, ML, CL-ML	A-4, A-6	0	0	100	97-100	95-100	85-100	24-37	5-15
	16-37	Silty clay loam	CL, ML	A-7-6, A-6	0	0	100	97-100	95-100	85-100	37-46	17-24
	37-57	Clay loam, loam	CL, ML	A-6	0	0	90-100	85-99	75-95	55-85	33-39	12-18
	57-72	Loam	CL-ML, CL, ML, SC-SM	A-4	0-1	0-3	90-100	85-99	70-90	45-75	22-28	4-10
291B2:												
Xenia------	0-6	Silt loam	CL, ML, CL-ML	A-4, A-6	0	0	100	97-100	95-100	85-100	24-37	5-15
	6-11	Silt loam	CL, ML, CL-ML	A-4, A-6	0	0	100	97-100	95-100	85-100	24-37	5-15
	11-28	Silty clay loam	CL, ML	A-7-6, A-6	0	0	100	97-100	95-100	85-100	37-46	17-24
	28-50	Clay loam, loam	CL, ML	A-6	0	0	90-100	85-99	75-95	55-85	33-39	12-18
	50-80	Loam	CL-ML, CL, ML, SC-SM	A-4	0-1	0-3	90-100	85-99	70-90	45-75	22-28	4-10
330A:												
Peotone----	0-6	Silty clay loam	CL, MH, CH	A-7-6	0	0	100	100	97-100	95-100	45-52	22-28
	6-28	Silty clay loam	CL, MH, CH	A-7-6	0	0	100	100	97-100	95-100	45-52	22-28
	28-44	Silty clay loam, silty clay	CL, CH, MH	A-7-6	0	0	100	97-100	95-100	85-100	46-53	25-34
	44-60	Silty clay loam	CL, CH, MH	A-7-6, A-7-5, A-6	0	0	100	97-100	95-100	85-100	37-52	16-28
481A:												
Raub-------	0-18	Silt loam	CL-ML, CL, ML	A-4, A-6	0	0	100	97-100	95-100	85-100	24-37	4-14
	18-32	Silty clay loam	CL, ML	A-6, A-7-6	0	0	100	97-100	95-100	85-100	37-46	17-24
	32-50	Clay loam, loam	CL, ML	A-6	0	0	90-100	85-100	75-95	55-85	33-39	12-18
	50-60	Loam	CL-ML, CL, ML, SC, SC-SM	A-4, A-6	0-1	0-3	85-100	80-95	70-90	45-70	22-33	4-14
618B2:												
Senachwine	0-8	Silt loam	CL, ML	A-6	0	0	95-100	95-100	90-98	80-90	29-37	10-16
	8-15	Silty clay loam	CL, ML	A-6	0	0	95-100	95-100	85-95	75-90	33-39	13-18
	15-22	Clay loam	CL, ML	A-6	0	0	90-100	85-99	75-95	55-85	33-39	12-18
	22-30	Loam, clay loam	CL, ML, SC, SC-SM	A-6, A-4	0	0-2	90-100	85-99	70-90	45-75	25-33	8-14
	30-60	Loam	CL-ML, CL, ML, SC-SM	A-4	0-1	0-3	90-100	85-99	70-90	45-75	22-28	4-10

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				*Pct*	*Pct*					*Pct*	
618C2:												
Senachwine	0-6	Silt loam	CL, ML	A-6	0	0	95-100	95-100	90-98	80-90	29-37	10-16
	6-12	Silty clay loam	CL, ML	A-6	0	0	95-100	95-100	85-95	75-90	33-39	13-18
	12-27	Clay loam	CL, ML	A-6	0	0	90-100	85-99	75-95	55-85	33-39	12-18
	27-60	Loam	CL-ML, CL, ML, SC-SM	A-4	0-1	0-3	90-100	85-99	70-90	45-75	22-28	4-10
618C3:												
Senachwine	0-4	Clay loam	CL, ML	A-6	0	0	100	90-100	75-95	55-85	30-40	15-20
	4-33	Clay loam	CL, ML	A-6	0	0	90-100	85-99	75-95	55-85	33-39	12-18
	33-60	Loam	CL-ML, CL, ML, SC-SM	A-4	0-1	0-3	90-100	85-99	70-90	45-75	22-28	4-10
618D2:												
Senachwine	0-6	Silt loam	CL, ML	A-6	0	0	95-100	95-100	90-98	80-90	29-37	10-16
	6-15	Silty clay loam	CL, ML	A-6	0	0	95-100	95-100	85-95	75-90	33-39	13-18
	15-28	Clay loam	CL, ML	A-6	0	0	90-100	85-99	75-95	55-85	33-39	12-18
	28-34	Loam, clay loam	CL, ML, SC, SC-SM	A-6, A-4	0	0-2	90-100	85-99	70-90	45-75	25-33	8-14
	34-60	Loam	CL-ML, CL, ML, SC-SM	A-4	0-1	0-3	90-100	85-99	70-90	45-75	22-28	4-10
618D3:												
Senachwine	0-3	Clay loam	CL, ML	A-6	0	0	100	90-100	75-95	55-85	30-40	15-20
	3-25	Clay loam	CL, ML	A-6	0	0	90-100	85-99	75-95	55-85	33-39	12-18
	25-60	Loam	CL-ML, CL, ML, SC-SM	A-4	0-1	0-3	90-100	85-99	70-90	45-75	22-28	4-10
618F:												
Senachwine	0-11	Silt loam	CL, ML	A-6	0	0	95-100	95-100	90-98	80-90	29-37	10-16
	11-17	Silty clay loam	CL, ML	A-6	0	0	95-100	95-100	85-95	75-90	33-39	13-18
	17-32	Clay loam	CL, ML	A-6	0	0	90-100	85-99	75-95	55-85	33-39	12-18
	32-40	Loam, clay loam	CL, ML, SC, SC-SM	A-6, A-4	0	0-2	90-100	85-99	70-90	45-75	25-33	8-14
	40-60	Loam	CL-ML, CL, ML, SC-SM	A-4	0-1	0-3	90-100	85-99	70-90	45-75	22-28	4-10
618G:												
Senachwine	0-5	Silt loam	CL, ML	A-6	0	0	95-100	95-100	90-98	80-90	29-37	10-16
	5-11	Silt loam	CL, ML	A-6	0	0	95-100	95-100	90-98	80-90	29-37	10-16
	11-30	Clay loam	CL, ML	A-6	0	0	90-100	85-99	75-95	55-85	33-39	12-18
	30-38	Clay loam, loam	CL, ML, SC, SC-SM	A-6, A-4	0	0-2	90-100	85-99	70-90	45-75	25-33	8-14
	38-60	Loam	CL-ML, CL, ML, SC-SM	A-4	0-1	0-3	90-100	85-99	70-90	45-75	22-28	4-10
622B2:												
Wyanet-----	0-8	Silt loam	CL, ML	A-4, A-6	0	0	95-100	90-100	80-95	65-90	29-33	8-11
	8-16	Silty clay loam	CL, ML	A-6	0	0	90-100	85-100	75-95	65-90	33-39	13-18
	16-24	Clay loam	CL, ML	A-6	0	0	90-100	85-100	70-95	50-80	33-39	12-18
	24-32	Loam	CL, ML, SC	A-4, A-6	0	0	90-100	85-100	70-90	45-70	25-33	8-14
	32-60	Loam	CL-ML, CL, ML, SC, SC-SM	A-4	0	0-3	90-100	85-100	70-90	45-70	22-28	4-10
622C2:												
Wyanet-----	0-8	Silt loam	CL, ML	A-4, A-6	0	0	95-100	90-100	80-90	65-85	29-33	8-11
	8-26	Clay loam	CL, ML	A-6	0	0	90-100	85-100	70-90	50-80	33-39	12-18
	26-34	Loam	CL, ML, SC	A-6, A-4	0	0	90-100	85-100	70-90	45-70	25-33	8-14
	34-60	Loam	CL-ML, CL, ML, SC, SC-SM	A-4	0	0-3	90-100	85-100	70-90	45-70	22-28	4-10

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >10 inches	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
722A:												
Drummer----	0-14	Silty clay loam	CL, ML	A-7-6, A-7-5	0	0	100	97-100	95-100	85-100	40-46	15-19
	14-41	Silty clay loam	CL, ML	A-7-6, A-6	0	0	100	97-100	95-100	85-100	37-46	16-24
	41-47	Loam	CL, ML, SC	A-6, A-4	0	0	95-100	90-100	70-90	45-80	25-33	8-14
	47-60	Stratified loam to sandy loam	SC, CL, SM, CL-ML, SC-SM	A-4, A-2-4	0	0	95-100	80-100	55-95	30-65	22-28	4-10
Milford----	0-14	Silty clay loam	CL, ML	A-7-6, A-7-5	0	0	100	97-100	95-100	85-100	40-50	15-25
	14-25	Silty clay, silty clay loam	CL, ML	A-7-6, A-7-5, A-6	0	0	100	95-100	90-100	85-100	38-50	15-25
	25-45	Silty clay loam	CL, ML	A-6	0	0	95-100	85-97	80-95	70-95	33-39	12-17
	45-80	Silt loam	CL, CL-ML, ML	A-4, A-6	0	0	90-100	80-100	80-90	65-85	22-33	4-13
791A:												
Rush-------	0-10	Silt loam	CL, ML, CL-ML	A-6, A-4	0	0	100	97-100	95-100	95-100	24-37	6-15
	10-36	Silty clay loam	CL, ML	A-7-6, A-7-5, A-6	0	0	100	97-100	95-100	95-100	35-46	14-24
	36-47	Clay loam	CL, ML	A-6	0	0	95-100	90-100	75-95	55-85	33-39	12-18
	47-53	Sandy loam	SC, SC-SM, SM	A-2-4, A-2-6, A-4, A-6	0	0	85-100	80-100	50-95	15-50	20-30	3-12
	53-67	Gravelly sandy clay loam	SC, SM, SC-SM	A-2-6, A-6	0	0-1	70-85	55-75	35-65	25-45	28-38	10-16
	67-80	Gravelly sand	SP-SM, SM	A-1-b, A-2-4	0-2	0-5	65-100	55-75	35-65	5-15	9-12	NP-2
791B2:												
Rush-------	0-8	Silt loam	CL, ML, CL-ML	A-6, A-4	0	0	100	97-100	95-100	95-100	24-37	6-15
	8-30	Silty clay loam	CL, ML	A-7-6, A-7-5, A-6	0	0	100	97-100	95-100	95-100	35-46	14-24
	30-45	Clay loam	CL, ML	A-6	0	0	95-100	90-100	75-95	55-85	33-39	12-18
	45-60	Gravelly sandy clay loam	SC, SM, SC-SM	A-2-6, A-6	0	0-1	70-85	55-75	35-65	25-45	28-38	10-16
	60-80	Gravelly sand	SP-SM, SM	A-1-b, A-2-4	0-2	0-5	65-100	55-75	35-65	5-15	9-12	NP-2
802D:												
Orthents---	0-10	Clay loam	CL, ML	A-6	0-1	0-5	95-100	90-100	85-95	50-80	30-40	10-15
	10-60	Clay loam, silty clay loam, loam	CL, ML, SC	A-6	0-1	0-5	95-100	85-100	85-95	40-85	30-40	10-20
830:												
Landfills.												
1107A:												
Sawmill----	0-29	Silty clay loam	CL, ML	A-7-6	0	0	100	97-100	95-100	85-100	40-46	16-21
	29-38	Silty clay loam	CL, ML	A-7-6, A-6	0	0	100	97-100	85-100	80-95	37-46	16-22
	38-60	Silty clay loam	CL, ML	A-7-6, A-6	0	0	100	97-100	85-100	80-95	37-46	16-22
3107A:												
Sawmill----	0-10	Silty clay loam	CL, ML	A-7-6	0	0	100	97-100	95-100	85-100	40-46	16-21
	10-32	Silty clay loam	CL, ML	A-7-6	0	0	100	97-100	95-100	85-100	40-46	16-21
	32-58	Silty clay loam	CL, ML	A-7-6, A-6	0	0	100	97-100	85-100	80-95	37-46	16-22
	58-65	Silty clay loam	CL, ML	A-7-6, A-6	0	0	100	97-100	85-100	80-95	37-46	16-22
3132A:												
Starks-----	0-5	Silt loam	CL, ML, CL-ML	A-6, A-4	0	0	100	100	95-100	95-100	24-37	6-15
	5-16	Silt loam	CL, ML, CL-ML	A-6, A-4	0	0	100	100	95-100	95-100	24-37	6-15
	16-37	Silty clay loam	CL, ML	A-7-6, A-7-5, A-6	0	0	100	97-100	95-100	95-100	35-46	14-24
	37-67	Clay loam, loam	CL, ML	A-6	0	0	95-100	90-100	75-95	55-85	33-39	12-18
	67-80	Stratified sand	SP-SM, SM	A-2-4, A-1-b	0	0	95-100	80-100	40-80	5-15	9-15	NP-3

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
3284A:												
Tice-------	0-21	Silty clay loam	CL, ML	A-7-6	0	0	100	100	95-100	85-100	35-46	16-21
	21-66	Silty clay loam	CL, ML	A-7-6, A-6	0	0	100	100	85-100	80-95	35-46	16-22
	66-80	Silt loam	CL, CL-ML, ML	A-4, A-6	0	0	100	100	80-90	65-85	22-33	4-13
3451A:												
Lawson-----	0-8	Silt loam	CL, ML, CL-ML	A-4, A-6	0	0	100	97-100	95-100	85-100	20-40	5-15
	8-35	Silt loam,	CL, ML, CL-ML	A-4, A-6	0	0	100	97-100	95-100	85-100	20-40	5-15
	35-80	Stratified silt loam to loam	CL, ML	A-6	0	0	100	95-100	85-100	65-100	29-40	11-20
8077A:												
Huntsville	0-10	Silt loam	CL, ML, CL-ML	A-4, A-6	0	0	100	97-100	95-100	85-100	24-37	5-15
	10-27	Silt loam	CL, ML, CL-ML	A-4, A-6	0	0	100	97-100	95-100	85-100	24-37	5-15
	27-52	Silt loam	CL, ML	A-6, A-4	0	0	100	97-100	95-100	85-100	24-37	7-18
	52-80	Silt loam	CL, ML	A-6, A-4	0	0	100	97-100	95-100	85-100	24-37	7-18
W:												
Water.												

Table 19.--Physical Properties of the Soils

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Wind erodibility index" apply only to the surface layer. Absence of an entry indicates that data were not estimated.)

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	*Pct*					
56A:														
Dana------	0-12	2-15	58-84	15-27	1.25-1.50	0.6-2	0.20-0.24	0.0-2.9	3.0-5.0	.28	.28	5	6	48
	12-39	2-15	50-72	27-35	1.35-1.55	0.6-2	0.18-0.21	3.0-5.9	0.5-1.5	.37	.37			
	39-49	20-40	25-53	27-35	1.50-1.70	0.6-2	0.12-0.16	3.0-5.9	0.1-0.5	.24	.28			
	49-60	30-45	28-50	15-27	1.65-1.85	0.2-0.6	0.06-0.12	0.0-2.9	0.0-0.5	.37	.43			
56B2:														
Dana------	0-7	2-15	58-79	20-27	1.40-1.60	0.6-2	0.18-0.22	0.0-2.9	1.5-3.5	.37	.37	5	6	48
	7-34	2-15	50-72	27-35	1.35-1.55	0.6-2	0.18-0.21	3.0-5.9	0.5-1.5	.37	.37			
	34-53	20-40	25-53	27-35	1.50-1.70	0.6-2	0.12-0.16	3.0-5.9	0.1-0.5	.24	.28			
	53-60	30-45	28-50	15-27	1.65-1.85	0.2-0.6	0.06-0.12	0.0-2.9	0.0-0.5	.37	.43			
154A:														
Flanagan--	0-18	2-7	66-79	20-27	1.25-1.45	0.6-2	0.22-0.24	0.0-2.9	3.5-5.0	.28	.28	5	6	48
	18-38	2-7	53-64	35-40	1.30-1.50	0.2-0.6	0.17-0.21	6.0-8.9	0.5-1.5	.37	.37			
	38-45	3-15	50-72	25-35	1.30-1.50	0.6-2	0.17-0.21	3.0-5.9	0.1-0.5	.43	.43			
	45-49	15-30	45-65	20-27	1.40-1.60	0.6-2	0.10-0.17	0.0-2.9	0.1-0.5	.37	.37			
	49-60	30-50	28-50	10-27	1.65-1.85	0.2-0.6	0.10-0.14	0.0-2.9	0.0-0.5	.37	.37			
234A:														
Sunbury---	0-8	2-7	66-79	20-27	1.25-1.45	0.6-2	0.22-0.24	0.0-2.9	2.0-4.0	.28	.28	5	6	48
	8-15	2-7	66-79	20-30	1.25-1.45	0.6-2	0.22-0.24	0.0-2.9	0.5-1.0	.37	.37			
	15-36	2-7	53-64	35-42	1.30-1.50	0.2-0.6	0.17-0.21	6.0-8.9	0.1-0.5	.37	.37			
	36-43	3-15	50-72	25-35	1.30-1.50	0.6-2	0.17-0.21	3.0-5.9	0.1-0.5	.43	.43			
	43-47	15-30	45-65	20-27	1.40-1.60	0.6-2	0.10-0.17	0.0-2.9	0.1-0.5	.37	.37			
	47-72	30-45	28-50	20-27	1.65-1.85	0.2-0.6	0.10-0.14	0.0-2.9	0.0-0.2	.37	.37			
236A:														
Sabina----	0-7	2-7	66-83	15-27	1.35-1.55	0.6-2	0.19-0.24	0.0-2.9	1.0-3.5	.43	.43	5	6	48
	7-18	2-7	66-83	15-27	1.40-1.60	0.2-0.6	0.17-0.21	0.0-2.9	0.1-1.0	.49	.49			
	18-30	2-7	53-65	35-40	1.30-1.50	0.2-0.6	0.15-0.19	6.0-8.9	0.1-0.5	.37	.37			
	30-45	3-15	58-75	25-35	1.35-1.55	0.6-2	0.17-0.20	3.0-5.9	0.1-0.5	.37	.37			
	45-51	30-50	28-50	20-27	1.45-1.65	0.6-2	0.11-0.14	0.0-2.9	0.1-0.5	.32	.37			
	51-60	30-50	28-50	10-27	1.65-1.85	0.2-0.6	0.10-0.14	0.0-2.9	0.0-0.5	.37	.37			
244A:														
Hartsburg	0-17	2-7	58-71	27-35	1.20-1.40	0.6-2	0.19-0.22	3.0-5.9	4.5-6.0	.24	.24	5	6	48
	17-34	2-7	58-71	25-35	1.35-1.55	0.6-2	0.18-0.21	3.0-5.9	0.5-1.5	.37	.37			
	34-60	3-15	66-83	15-27	1.45-1.65	0.6-2	0.19-0.26	0.0-2.9	0.0-0.5	.49	.49			
291A:														
Xenia-----	0-8	2-15	58-84	15-27	1.25-1.50	0.6-2	0.19-0.22	0.0-2.9	1.0-3.0	.37	.37	5	6	48
	8-11	2-15	58-84	15-27	1.35-1.55	0.6-2	0.18-0.21	0.0-2.9	0.5-1.0	.43	.43			
	11-39	2-15	50-72	27-35	1.35-1.55	0.6-2	0.18-0.21	3.0-5.9	0.2-0.8	.37	.37			
	39-48	20-40	25-53	24-35	1.45-1.65	0.6-2	0.14-0.17	3.0-5.9	0.1-0.5	.24	.28			
	48-60	30-50	28-50	12-20	1.65-1.85	0.2-0.6	0.06-0.12	0.0-2.9	0.0-0.2	.37	.43			
291B:														
Xenia-----	0-4	2-15	58-84	15-27	1.25-1.50	0.6-2	0.19-0.22	0.0-2.9	1.0-3.0	.37	.37	5	6	48
	4-16	2-15	58-84	15-27	1.35-1.55	0.6-2	0.18-0.21	0.0-2.9	0.5-1.0	.43	.43			
	16-37	2-15	50-72	27-35	1.35-1.55	0.6-2	0.18-0.21	3.0-5.9	0.2-0.8	.37	.37			
	37-57	20-40	25-53	24-35	1.45-1.65	0.6-2	0.14-0.17	3.0-5.9	0.1-0.5	.24	.28			
	57-72	30-50	28-50	12-20	1.75-1.95	0.2-0.6	0.06-0.12	0.0-2.9	0.0-0.2	.37	.43			

Table 19.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permea-bility (Ksat)	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	*Pct*					
291B2:														
Xenia-----	0-6	2-15	58-84	15-27	1.25-1.50	0.6-2	0.19-0.22	0.0-2.9	1.0-3.0	.37	.37	5	6	48
	6-11	2-15	58-84	15-27	1.35-1.55	0.6-2	0.18-0.21	0.0-2.9	0.5-1.0	.43	.43			
	11-28	2-15	50-72	27-35	1.35-1.55	0.6-2	0.18-0.21	3.0-5.9	0.2-0.8	.37	.37			
	28-50	20-40	25-53	24-35	1.45-1.65	0.6-2	0.14-0.17	3.0-5.9	0.1-0.5	.24	.28			
	50-80	30-50	28-50	12-20	1.75-1.95	0.2-0.6	0.06-0.12	0.0-2.9	0.0-0.2	.37	.43			
330A:														
Peotone---	0-6	2-7	53-63	35-40	1.25-1.45	0.2-0.6	0.17-0.22	6.0-8.9	4.5-7.0	.24	.24	5	4	86
	6-28	2-7	53-63	35-40	1.35-1.55	0.2-0.6	0.17-0.22	6.0-8.9	4.0-6.0	.24	.24			
	28-44	3-15	53-65	35-40	1.30-1.50	0.2-0.6	0.16-0.19	6.0-8.9	1.5-3.5	.37	.37			
	44-60	3-15	53-73	27-40	1.30-1.50	0.2-0.6	0.18-0.21	6.0-8.9	0.1-1.0	.43	.43			
481A:														
Raub------	0-18	2-15	58-84	15-27	1.30-1.50	0.6-2	0.22-0.24	0.0-2.9	3.5-5.0	.28	.28	5	6	48
	18-32	2-15	50-72	27-35	1.35-1.55	0.6-2	0.18-0.20	3.0-5.9	0.5-1.5	.37	.37			
	32-50	20-35	25-53	26-35	1.50-1.70	0.6-2	0.12-0.16	3.0-5.9	0.1-0.5	.32	.32			
	50-60	30-50	28-50	20-30	1.65-1.85	0.2-0.6	0.06-0.12	0.0-2.9	0.0-0.5	.37	.37			
618B2:														
Senachwine	0-8	15-20	53-65	20-27	1.35-1.55	0.6-2	0.18-0.20	0.0-2.9	1.0-2.5	.43	.43	5	6	48
	8-15	15-21	45-60	27-35	1.45-1.65	0.6-2	0.14-0.17	3.0-5.9	0.1-0.5	.32	.32			
	15-22	20-40	25-53	27-35	1.45-1.65	0.6-2	0.14-0.17	3.0-5.9	0.1-0.5	.24	.28			
	22-30	30-50	28-50	20-27	1.45-1.65	0.6-2	0.11-0.14	0.0-2.9	0.1-0.5	.32	.37			
	30-60	30-50	28-50	10-20	1.65-1.85	0.2-0.6	0.06-0.12	0.0-2.9	0.0-0.5	.37	.43			
618C2:														
Senachwine	0-6	15-20	53-65	20-27	1.35-1.55	0.6-2	0.18-0.20	0.0-2.9	1.0-2.5	.43	.43	5	6	48
	6-12	15-21	45-60	27-35	1.45-1.65	0.6-2	0.14-0.17	3.0-5.9	0.1-0.5	.32	.32			
	12-27	20-40	25-53	27-35	1.45-1.65	0.6-2	0.14-0.17	3.0-5.9	0.1-0.5	.24	.28			
	27-60	30-50	28-50	10-20	1.65-1.85	0.2-0.6	0.06-0.12	0.0-2.9	0.0-0.5	.37	.43			
618C3:														
Senachwine	0-4	20-40	25-53	27-35	1.45-1.65	0.6-2	0.18-0.20	3.0-5.9	0.5-1.0	.32	.32	4	6	48
	4-33	20-40	25-53	27-35	1.45-1.65	0.6-2	0.14-0.17	3.0-5.9	0.1-0.5	.24	.28			
	33-60	30-50	28-50	10-20	1.65-1.85	0.2-0.6	0.06-0.12	0.0-2.9	0.0-0.5	.37	.43			
618D2:														
Senachwine	0-6	15-20	53-65	20-27	1.35-1.55	0.6-2	0.18-0.20	0.0-2.9	1.0-2.5	.43	.43	5	6	48
	6-15	15-21	45-60	27-35	1.45-1.65	0.6-2	0.14-0.17	3.0-5.9	0.1-0.5	.32	.32			
	15-28	20-40	25-53	27-35	1.45-1.65	0.6-2	0.14-0.17	3.0-5.9	0.1-0.5	.24	.28			
	28-34	30-50	28-50	20-27	1.45-1.65	0.6-2	0.11-0.14	0.0-2.9	0.1-0.5	.32	.37			
	34-60	30-50	28-50	10-20	1.65-1.85	0.2-0.6	0.06-0.12	0.0-2.9	0.0-0.5	.37	.43			
618D3:														
Senachwine	0-3	20-40	25-53	27-35	1.45-1.65	0.6-2	0.18-0.20	3.0-5.9	0.5-1.0	.32	.32	4	6	48
	3-25	20-40	25-53	27-35	1.45-1.65	0.6-2	0.14-0.17	3.0-5.9	0.1-0.5	.24	.28			
	25-60	30-50	28-50	10-20	1.65-1.85	0.2-0.6	0.06-0.12	0.0-2.9	0.0-0.5	.37	.43			
618F:														
Senachwine	0-11	15-20	53-65	20-27	1.35-1.55	0.6-2	0.18-0.20	0.0-2.9	1.0-2.5	.37	.37	5	6	48
	11-17	15-21	45-60	27-35	1.45-1.65	0.6-2	0.14-0.17	3.0-5.9	0.1-0.5	.32	.32			
	17-32	20-40	25-53	27-35	1.45-1.65	0.6-2	0.14-0.17	3.0-5.9	0.1-0.5	.24	.28			
	32-40	30-50	28-50	20-27	1.45-1.65	0.6-2	0.11-0.14	0.0-2.9	0.1-0.5	.32	.37			
	40-60	30-50	28-50	10-20	1.65-1.85	0.2-0.6	0.06-0.12	0.0-2.9	0.0-0.5	.37	.43			
618G:														
Senachwine	0-5	15-20	53-65	20-27	1.35-1.55	0.6-2	0.18-0.20	0.0-2.9	1.0-2.5	.37	.37	5	6	48
	5-11	15-20	53-65	20-27	1.35-1.55	0.6-2	0.18-0.20	0.0-2.9	1.0-2.0	.43	.43			
	11-30	20-40	25-53	27-35	1.45-1.65	0.6-2	0.14-0.17	3.0-5.9	0.1-0.5	.24	.28			
	30-38	30-50	28-50	20-30	1.45-1.65	0.6-2	0.11-0.14	0.0-2.9	0.1-0.5	.32	.37			
	38-60	30-50	28-50	10-20	1.65-1.85	0.2-0.6	0.06-0.12	0.0-2.9	0.0-0.5	.37	.43			

Table 19.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permeability (Ksat)	Available water capacity	Linear extensibility	Organic matter	Erosion factors Kw	Kf	T	Wind erodibility group	Wind erodibility index
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	*Pct*					
622B2:														
Wyanet----	0-8	15-30	50-65	20-27	1.40-1.60	0.6-2	0.14-0.22	0.0-2.9	1.5-3.5	.28	.28	5	6	48
	8-16	15-20	45-58	27-35	1.45-1.65	0.6-2	0.14-0.17	3.0-5.9	0.5-1.5	.32	.32			
	16-24	20-40	25-53	27-35	1.50-1.70	0.6-2	0.12-0.16	3.0-5.9	0.1-1.0	.32	.37			
	24-32	30-50	28-50	20-27	1.45-1.65	0.6-2	0.11-0.14	0.0-2.9	0.1-0.5	.32	.32			
	32-60	30-50	28-50	10-27	1.65-1.85	0.2-0.6	0.06-0.12	0.0-2.9	0.0-0.5	.37	.37			
622C2:														
Wyanet----	0-8	15-30	50-65	20-27	1.40-1.60	0.6-2	0.14-0.22	0.0-2.9	1.5-3.5	.28	.28	5	6	48
	8-26	20-40	25-53	27-35	1.50-1.70	0.6-2	0.12-0.16	3.0-5.9	0.5-1.5	.32	.37			
	26-34	30-50	28-50	20-27	1.45-1.65	0.6-2	0.11-0.14	0.0-2.9	0.1-0.5	.32	.32			
	34-60	30-50	28-50	10-27	1.65-1.85	0.2-0.6	0.06-0.12	0.0-2.9	0.0-0.5	.37	.37			
722A:														
Drummer---	0-14	3-15	50-70	27-35	1.20-1.40	0.6-2	0.19-0.23	3.0-5.9	4.5-7.0	.24	.24	5	6	48
	14-41	3-15	50-70	27-35	1.35-1.55	0.6-2	0.18-0.21	3.0-5.9	0.5-1.5	.37	.37			
	41-47	25-45	28-50	20-27	1.45-1.65	0.6-2	0.11-0.17	0.0-2.9	0.2-0.5	.32	.32			
	47-60	45-65	25-45	10-20	1.55-1.75	0.6-2	0.11-0.17	0.0-2.9	0.0-0.5	.28	.28			
Milford---	0-14	1-15	45-64	35-40	1.30-1.50	0.2-0.6	0.18-0.21	6.0-8.9	4.5-6.0	.20	.20	5	4	86
	14-25	3-15	40-62	35-45	1.35-1.55	0.2-0.6	0.15-0.18	6.0-8.9	0.5-1.5	.32	.32			
	25-45	5-20	45-68	27-35	1.50-1.70	0.6-2	0.14-0.18	3.0-5.9	0.1-0.5	.37	.37			
	45-80	15-30	50-65	20-27	1.50-1.70	0.6-2	0.09-0.14	0.0-2.9	0.0-0.5	.32	.49			
791A:														
Rush------	0-10	2-7	66-83	15-27	1.35-1.55	0.6-2	0.17-0.21	0.0-2.9	1.0-2.5	.37	.37	5	6	48
	10-36	2-7	58-71	25-35	1.35-1.55	0.6-2	0.17-0.20	3.0-5.9	0.1-0.5	.43	.43			
	36-47	20-40	25-53	27-35	1.50-1.70	0.6-2	0.12-0.16	3.0-5.9	0.1-0.5	.28	.28			
	47-53	52-80	5-35	10-20	1.50-1.70	2-6	0.07-0.10	0.0-2.9	0.1-0.5	.20	.20			
	53-67	45-70	0-35	20-35	1.55-1.75	0.6-2	0.10-0.13	3.0-5.9	0.1-0.5	.10	.15			
	67-80	90-97	0-10	0-10	---	6-20	0.02-0.05	0.0-2.9	0.0-0.2	.02	.05			
791B2:														
Rush------	0-8	2-7	66-83	15-27	1.35-1.55	0.6-2	0.17-0.21	0.0-2.9	1.0-2.5	.37	.37	5	6	48
	8-30	2-7	58-71	25-35	1.35-1.55	0.6-2	0.17-0.20	3.0-5.9	0.1-0.5	.43	.43			
	30-45	20-40	25-53	27-35	1.50-1.70	0.6-2	0.12-0.16	3.0-5.9	0.1-0.5	.28	.28			
	45-60	45-70	0-35	20-35	1.55-1.75	0.6-2	0.10-0.13	3.0-5.9	0.1-0.5	.10	.15			
	60-80	90-97	0-10	0-10	---	6-20	0.02-0.05	0.0-2.9	0.0-0.2	.02	.05			
802D:														
Orthents--														
	0-10	20-45	20-53	27-35	1.50-1.70	0.2-0.6	0.18-0.20	3.0-5.9	0.5-2.0	.43	.43	5	6	38
	10-60	15-50	20-63	22-30	1.40-1.75	0.06-2	0.15-0.20	3.0-5.9	0.0-1.0	.43	.43			
830:														
Landfills.														
1107A:														
Sawmill---	0-29	3-15	58-70	27-35	1.25-1.45	0.6-2	0.19-0.22	3.0-5.9	4.5-7.0	.28	.28	5	8	0
	29-38	5-20	45-68	27-35	1.30-1.50	0.6-2	0.17-0.20	3.0-5.9	1.5-3.5	.32	.32			
	38-60	5-25	40-70	25-35	1.30-1.50	0.6-2	0.17-0.20	3.0-5.9	1.5-3.5	.32	.32			
3107A:														
Sawmill---	0-10	3-15	58-70	27-35	1.25-1.45	0.6-2	0.19-0.22	3.0-5.9	4.5-7.0	.28	.28	5	6	48
	10-32	3-15	58-70	27-35	1.25-1.45	0.6-2	0.19-0.22	3.0-5.9	4.5-7.0	.28	.28			
	32-58	5-20	45-68	27-35	1.30-1.50	0.6-2	0.17-0.20	3.0-5.9	1.5-3.5	.32	.32			
	58-65	5-25	40-70	25-35	1.30-1.50	0.6-2	0.17-0.20	3.0-5.9	1.5-3.5	.32	.32			

Table 19.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi- bility group	Wind erodi- bility index
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	*Pct*					
3132A:														
Starks----	0-5	2-7	66-83	15-27	1.15-1.35	0.6-2	0.22-0.24	0.0-2.9	1.0-3.0	.37	.37	5	6	48
	5-16	2-7	66-83	15-27	1.35-1.55	0.6-2	0.17-0.21	0.0-2.9	0.8-2.2	.49	.49			
	16-37	2-7	58-71	25-35	1.35-1.55	0.6-2	0.17-0.20	3.0-5.9	0.1-0.5	.43	.43			
	37-67	20-40	25-53	25-35	1.50-1.70	0.6-2	0.12-0.16	3.0-5.9	0.1-0.5	.28	.28			
	67-80	88-95	2-9	1-8	1.50-1.70	6-20	0.02-0.04	0.0-2.9	0.1-0.2	.02	.02			
3284A:														
Tice------	0-21	3-15	58-70	27-35	1.25-1.45	0.6-2	0.19-0.22	3.0-5.9	2.0-4.0	.28	.28	5	6	48
	21-66	5-20	45-68	22-35	1.30-1.50	0.6-2	0.17-0.20	3.0-5.9	0.5-1.0	.32	.32			
	66-80	15-30	50-65	20-27	1.50-1.70	0.6-2	0.09-0.14	0.0-2.9	0.1-0.5	.32	.32			
3451A:														
Lawson----	0-8	3-15	58-81	18-27	1.25-1.45	0.6-2	0.22-0.24	0.0-2.9	3.5-7.0	.32	.32	5	6	48
	8-35	3-15	58-81	18-30	1.30-1.50	0.6-2	0.20-0.24	0.0-2.9	3.0-5.0	.32	.32			
	35-80	15-30	45-65	20-30	1.40-1.60	0.6-2	0.18-0.20	0.0-2.9	0.5-1.0	.37	.37			
8077A:														
Huntsville	0-10	2-15	58-81	18-27	1.30-1.50	0.6-2	0.19-0.23	0.0-2.9	2.5-4.0	.28	.28	5	6	48
	10-27	2-15	58-81	18-27	1.30-1.50	0.6-2	0.19-0.23	0.0-2.9	2.5-4.0	.28	.28			
	27-52	2-15	58-81	18-27	1.40-1.60	0.6-2	0.19-0.26	0.0-2.9	1.5-3.5	.28	.28			
	52-80	2-15	58-84	15-27	1.40-1.60	0.6-2	0.19-0.26	0.0-2.9	1.5-3.5	.28	.28			
W:														
Water.														

Table 20.--Chemical Properties of the Soils

(Absence of an entry indicates that data were not estimated.)

Map symbol and soil name	Depth	Soil reaction	Cation-exchange capacity	Calcium carbonate equivalent
	In	*pH*	*meq/100 g*	*Pct*
56A:				
Dana------------	0-12	5.6-7.3	14-30	0
	12-39	5.1-7.3	18-27	0
	39-49	5.6-7.3	12-24	0-5
	49-60	7.4-8.4	4.0-16	15-40
56B2:				
Dana------------	0-7	5.6-6.5	14-28	0
	7-34	5.1-7.3	18-27	0
	34-53	5.6-7.8	12-24	0-5
	53-60	7.4-8.4	4.0-16	15-40
154A:				
Flanagan--------	0-18	5.6-7.3	16-32	0
	18-38	5.6-7.3	22-35	0
	38-45	5.6-7.3	16-27	0
	45-49	6.1-7.8	6.0-18	0-10
	49-60	7.4-8.4	4.0-16	10-40
234A:				
Sunbury---------	0-8	5.6-7.3	16-32	0
	8-15	5.6-7.3	14-28	0
	15-36	5.6-7.3	22-35	0
	36-43	6.1-7.8	16-27	0
	43-47	6.1-7.8	6.0-18	0-10
	47-72	7.4-8.4	4.0-16	10-40
236A:				
Sabina----------	0-7	5.1-7.3	11-29	0
	7-18	4.5-7.3	9.0-24	0
	18-30	4.5-7.3	21-33	0
	30-45	4.5-7.3	15-25	0-5
	45-51	6.6-7.8	9.0-19	0-5
	51-60	7.4-8.4	4.0-16	15-40
244A:				
Hartsburg-------	0-17	6.1-7.8	27-40	0-5
	17-34	6.6-8.4	17-31	0-25
	34-60	7.4-8.4	9.0-23	15-40
291A:				
Xenia-----------	0-8	5.6-7.3	14-24	0
	8-11	5.6-7.3	12-20	0
	11-39	5.1-7.3	18-27	0
	39-48	5.6-7.3	11-22	0-5
	48-60	6.6-7.8	4.0-13	15-40
291B:				
Xenia-----------	0-4	5.6-7.3	14-24	0
	4-16	5.6-7.3	12-20	0
	16-37	5.1-7.3	18-27	0
	37-57	5.6-7.3	11-22	0-5
	57-72	7.4-8.4	4.0-13	15-40

Table 20.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Soil reaction	Cation-exchange capacity	Calcium carbonate equivalent
	In	*pH*	*meq/100 g*	*Pct*
291B2:				
Xenia-----------	0-6	5.6-7.3	14-24	0
	6-11	5.6-7.3	12-20	0
	11-28	5.1-7.3	18-27	0
	28-50	5.6-7.8	11-22	0-5
	50-80	7.4-8.4	4.0-13	15-40
330A:				
Peotone---------	0-6	5.6-7.3	30-38	0
	6-28	5.6-7.8	30-38	0
	28-44	6.1-7.8	29-40	0
	44-60	6.6-8.4	15-35	0-15
481A:				
Raub------------	0-18	5.6-7.3	16-32	0
	18-32	5.1-6.5	18-27	0
	32-50	6.1-7.8	12-24	0-5
	50-60	7.4-8.4	4.0-16	15-40
618B2:				
Senachwine------	0-8	5.6-7.3	14-27	0
	8-15	5.6-7.3	12-24	0
	15-22	5.1-7.3	11-22	0
	22-30	5.1-7.3	9.0-19	0-5
	30-60	7.4-8.4	4.0-13	15-40
618C2:				
Senachwine------	0-6	5.6-7.3	14-27	0
	6-12	5.6-7.3	12-24	0
	12-27	5.1-7.3	11-22	0
	27-60	7.4-8.4	4.0-13	15-40
618C3:				
Senachwine------	0-4	5.6-7.3	15-20	0
	4-33	5.1-7.3	11-22	0
	33-60	7.4-8.4	4.0-13	15-40
618D2:				
Senachwine------	0-6	5.6-7.3	14-27	0
	6-15	5.6-7.3	12-24	0
	15-28	5.1-7.3	11-22	0
	28-34	5.1-7.3	9.0-19	0-5
	34-60	7.4-8.4	4.0-13	15-40
618D3:				
Senachwine------	0-3	5.6-7.3	15-20	0
	3-25	5.1-7.3	11-22	0
	25-60	7.4-8.4	4.0-13	15-40
618F:				
Senachwine------	0-11	5.6-7.3	14-27	0
	11-17	5.6-7.3	12-24	0
	17-32	5.1-7.3	11-22	0
	32-40	5.1-7.3	9.0-19	0-5
	40-60	7.4-8.4	4.0-13	15-40
618G:				
Senachwine------	0-5	5.6-7.3	14-27	0
	5-11	5.6-7.3	14-27	0
	11-30	5.1-7.3	11-22	0
	30-38	5.1-7.3	9.0-19	0-5
	38-60	7.4-8.4	4.0-13	15-40

Table 20.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Soil reaction	Cation-exchange capacity	Calcium carbonate equivalent
	In	*pH*	*meq/100 g*	*Pct*
622B2:				
Wyanet----------	0-8	5.6-7.3	10-22	0
	8-16	5.6-7.3	12-24	0
	16-24	5.6-7.3	12-24	0
	24-32	7.4-8.4	9.0-19	0-15
	32-60	7.9-8.4	4.0-16	15-40
622C2:				
Wyanet----------	0-8	5.6-7.3	10-22	0
	8-26	5.6-7.3	12-24	0
	26-34	7.4-8.4	9.0-19	0-5
	34-60	7.9-8.4	4.0-16	15-40
722A:				
Drummer---------	0-14	5.6-7.3	27-40	0
	14-41	5.6-7.3	17-31	0
	41-47	6.1-7.8	9.0-19	0-5
	47-60	6.6-8.4	4.0-13	0-15
Milford---------	0-14	5.6-7.3	22-38	0
	14-25	6.1-7.8	15-30	0
	25-45	6.1-7.8	13-24	0-15
	45-80	6.6-8.4	4.0-16	0-15
791A:				
Rush------------	0-10	5.1-7.3	11-29	0
	10-36	4.5-6.5	15-29	0
	36-47	4.5-6.0	11-22	0
	47-53	4.5-6.0	6.0-17	0
	53-67	6.1-7.3	11-14	0-5
	67-80	7.4-8.4	1.0-5.0	5-20
791B2:				
Rush------------	0-8	5.1-7.3	11-29	0
	8-30	4.5-6.5	15-29	0
	30-45	4.5-6.0	11-22	0
	45-60	6.1-7.3	11-14	0-5
	60-80	7.4-8.4	1.0-5.0	5-20
802D:				
Orthents, loamy	0-10	5.6-7.3	14-22	0-10
	10-60	5.6-7.8	11-17	0-20
830:				
Landfills.				
1107A:				
Sawmill---------	0-29	6.6-7.3	23-36	0
	29-38	6.6-7.3	18-34	0
	38-60	6.6-7.3	18-34	0-5
3107A:				
Sawmill---------	0-10	6.1-7.8	23-36	0
	10-32	6.1-7.8	23-36	0
	32-58	6.1-7.8	18-34	0
	58-65	6.1-7.8	18-34	0-5

Table 20.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Soil reaction	Cation-exchange capacity	Calcium carbonate equivalent
	In	*pH*	*meq/100 g*	*Pct*
3132A:				
Starks----------	0-5	5.1-7.3	13-29	0
	5-16	5.1-7.3	11-25	0
	16-37	5.1-6.5	15-29	0
	37-67	5.1-7.3	11-22	0
	67-80	7.3-8.4	1.0-7.0	0-10
3284A:				
Tice------------	0-21	6.1-7.3	22-32	0
	21-66	5.6-7.3	18-30	0
	66-80	6.6-7.8	4.0-16	0
3451A:				
Lawson----------	0-8	6.1-7.3	13-34	0
	8-35	6.1-7.3	11-28	0
	35-80	6.6-7.8	13-26	0-3
8077A:				
Huntsville------	0-10	6.1-7.8	14-30	0
	10-27	6.1-7.8	14-30	0
	27-52	6.1-7.8	12-28	0
	52-80	6.1-7.8	9.0-23	0-5
W:				
Water.				

Table 21.--Water Features

(See text for definitions of terms used in this table. Estimates of the frequency of ponding and flooding apply to the whole year rather than to individual months. Absence of an entry indicates that the feature is not a concern or that data were not estimated.)

Map symbol and soil name	Hydro-logic group	Month	Water table			Ponding			Flooding	
			Upper limit	Lower limit	Kind	Surface water depth	Duration	Frequency	Duration	Frequency
			Ft	*Ft*		*Ft*				
56A, 56B2:										
Dana------------------	B	Jan	>6.0	>6.0	---	---	---	---	---	None
		Feb-Apr	2.0-3.5	3.3-5.0	Perched	---	---	---	---	None
		May-Dec	>6.0	>6.0	---	---	---	---	---	None
154A:										
Flanagan--------------	B	Jan-May	1.0-2.0	3.7-5.4	Perched	---	---	---	---	None
		Jun-Dec	>6.0	>6.0	---	---	---	---	---	None
234A:										
Sunbury---------------	B	Jan-May	1.0-2.0	3.7-5.4	Perched	---	---	---	---	None
		Jun-Dec	>6.0	>6.0	---	---	---	---	---	None
236A:										
Sabina----------------	B	Jan-May	1.0-2.0	3.3-5.0	Perched	---	---	---	---	None
		Jun-Dec	>6.0	>6.0	---	---	---	---	---	None
244A:										
Hartsburg-------------	B/D	Jan-May	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	None
		Jun-Dec	>6.0	>6.0	---	---	---	---	---	None
291A, 291B, 291B2:										
Xenia-----------------	B	Jan-May	1.5-2.5	2.5-5.0	Perched	---	---	---	---	None
		Jun-Dec	>6.0	>6.0	---	---	---	---	---	None
330A:										
Peotone---------------	C/D	Jan-Jun	0.0-1.0	>6.0	Apparent	0.0-1.0	Brief	Frequent	---	None
		Jul-Dec	>6.0	>6.0	---	---	---	---	---	None
481A:										
Raub------------------	B	Jan-May	1.0-2.0	3.3-5.8	Perched	---	---	---	---	None
		Jun-Dec	>6.0	>6.0	---	---	---	---	---	None
618B2, 619C2, 618C3, 618D2, 618D3, 618F, 618G:										
Senachwine-----------	B	Jan-Dec	>6.0	>6.0	---	---	---	---	---	None
622B2, 622C2:										
Wyanet----------------	B	Jan-Dec	>6.0	>6.0	---	---	---	---	---	None
722A:										
Drummer---------------	B/D	Jan-May	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	None
		Jun-Dec	>6.0	>6.0	---	---	---	---	---	None
Milford---------------	C/D	Jan-May	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	None
		Jun-Dec	>6.0	>6.0	---	---	---	---	---	None
791A, 791B2:										
Rush------------------	B	Jan-Dec	>6.0	>6.0	---	---	---	---	---	None
802D:										
Orthents, loamy-------	B	Jan	>6.0	>6.0	---	---	---	---	---	None
		Feb-Apr	3.3-6.0	>6.0	Apparent	---	---	---	---	None
		May-Dec	>6.0	>6.0	---	---	---	---	---	None

Table 21.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water table: Upper limit	Water table: Lower limit	Water table: Kind	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	*Ft*		*Ft*				
830:										
Landfills.										
1107A:										
Sawmill	D	Jan-Jun	0.0-0.5	>6.0	Apparent	0.0-0.5	Long	Frequent	Long	Frequent
		Jul-Oct	3.5-6.0	>6.0	---	---	---	---	---	---
		Nov-Dec	0.0-0.5	>6.0	Apparent	0.0-0.5	Long	Frequent	Long	Frequent
3107A:										
Sawmill	B/D	Jan-May	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	Brief	Frequent
		Jun	>6.0	>6.0	---	---	---	---	Brief	Frequent
		Jul-Oct	>6.0	>6.0	---	---	---	---	---	---
		Nov-Dec	>6.0	>6.0	---	---	---	---	Brief	Frequent
3132A:										
Starks	B	Jan-May	0.5-2.0	>6.0	Apparent	---	---	---	Brief	Frequent
		Jun	>6.0	>6.0	---	---	---	---	Brief	Frequent
		Jul-Oct	>6.0	>6.0	---	---	---	---	---	---
		Nov-Dec	>6.0	>6.0	---	---	---	---	Brief	Frequent
3284A:										
Tice	B	Jan-May	1.0-2.0	>6.0	Apparent	---	---	---	Brief	Frequent
		Jun	>6.0	>6.0	---	---	---	---	Brief	Frequent
		Jul-Oct	>6.0	>6.0	---	---	---	---	---	---
		Nov-Dec	>6.0	>6.0	---	---	---	---	Brief	Frequent
3451A:										
Lawson	B	Jan-May	1.0-3.0	>6.0	Apparent	---	---	---	Brief	Frequent
		Jun	>6.0	>6.0	---	---	---	---	Brief	Frequent
		Jul-Oct	>6.0	>6.0	---	---	---	---	---	---
		Nov-Dec	>6.0	>6.0	---	---	---	---	Brief	Frequent
8077A:										
Huntsville	B	Jan	>6.0	>6.0	---	---	---	---	Brief	Occasional
		Feb-Apr	3.5-6.5	>6.0	Apparent	---	---	---	Brief	Occasional
		May-Jun	>6.0	>6.0	---	---	---	---	Brief	Occasional
		Jul-Oct	>6.0	>6.0	---	---	---	---	---	---
		Nov-Dec	>6.0	>6.0	---	---	---	---	Brief	Occasional
W:										
Water.										

Table 22.--Soil Features

(See text for definitions of terms used in this table. Absence of an entry indicates that data were not estimated.)

Map symbol and soil name	Potential for frost action	Risk of corrosion	
		Uncoated steel	Concrete
56A, 56B2:			
Dana	High	High	Moderate
154A:			
Flanagan	Moderate	High	Moderate
234A:			
Sunbury	Moderate	High	Moderate
236A:			
Sabina	Moderate	High	High
244A:			
Hartsburg	High	High	Low
291A:			
Xenia	High	High	Moderate
291B, 291B2:			
Xenia	High	High	Moderate
330A:			
Peotone	High	High	Moderate
481A:			
Raub	High	High	Moderate
618B2, 618C2, 618C3, 618D2, 618D3, 618F, 618G:			
Senachwine	Moderate	Moderate	Moderate
622B2, 622C2:			
Wyanet	Moderate	Moderate	Moderate
722A:			
Drummer	High	High	Moderate
Milford	High	High	Moderate
791A:			
Rush	High	Moderate	High
791B2:			
Rush	High	Moderate	High
802D:			
Orthents, loamy	Moderate	High	Moderate
830:			
Landfills.			
1107A, 3107A:			
Sawmill	High	High	Low
3132A:			
Starks	High	High	Moderate

Table 22.--Soil Features--Continued

Map symbol and soil name	Potential for frost action	Risk of corrosion	
		Uncoated steel	Concrete
3284A:			
Tice-------------	High	High	Moderate
3451A:			
Lawson-----------	High	High	Low
8077A:			
Huntsville-------	High	Moderate	Low
W:			
Water.			

Table 23.--Engineering Index Test Data

(MAX means maximum dry density; OPT, optimum moisture; LL, liquid limit; PI, plasticity index; and UN, Unified.)

Soil name and location	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										
Sawmill silty clay loam, frequently flooded (sampled as Colo):	90IL-139-1-1	Ap	0-8	97	22	100	100	100	96	46	19	A-7-6(21)	ML
300 feet west and 40 feet south of	90IL-139-1-2	A	8-33	100	22	100	100	99	88	42	18	A-7-6(17)	CL
the northeast corner of sec. 5, T.	90IL-139-1-5	Bg1, Bg2	33-49	110	15	100	99	98	84	38	18	A-6(15)	CL
14 N., R. 5 E.	90IL-139-1-7	Bg3, Bg4	49-60	112	16	100	97	94	80	36	17	A-6(13)	CL
Wyanet silt loam, 2 to 5 percent slopes, eroded (sampled as Parr):	90IL-139-2-1	Ap	0-9	106	18	99	99	96	84	33	14	A-6(11)	CL
450 feet east and 1,200 feet south	90IL-139-2-2	Bt1, Bt2	9-24	107	14	97	95	91	70	36	16	A-6(10)	CL
of the northwest corner of sec. 1,	90IL-139-2-4	Bt3, Bt4, BC	24-57	118	13	97	95	88	69	30	13	A-6(7)	CL
T. 26 N., R. 5 E.	90IL-139-2-7	C	57-65	122	12	97	94	89	68	24	9	A-4(3)	CL
Sabina silt loam, 0 to 2 percent slopes:	90IL-139-3-1	Ap, E	0-9	106	16	100	99	96	90	28	5	A-4(4)	ML
1,275 feet west and 8,850 feet	90IL-139-3-3	Bt1, Bt2, Bt3	9-32	101	20	100	100	99	96	45	20	A-7-6(22)	CL
south of the northeast corner of	90IL-139-3-6	Bt4	32-43	112	16	100	100	99	93	33	14	A-6(13)	CL
sec. 17, T. 15 N., R. 5 E.	90IL-139-3-7	2Bt5	43-55	128	13	95	93	88	71	21	5	A-4(1)	CL-ML
	90IL-139-3-8	2C	55-65	121	13	97	95	91	71	22	7	A-4(0)	ML
Xenia silt loam, 2 to 5 percent slopes, eroded:	90IL-139-4-1	Ap	0-6	105	17	100	99	98	92	33	10	A-4(9)	CL
50 feet south and 1,050 feet west	90IL-139-4-2	Bt	6-28	101	20	100	100	99	94	38	15	A-6(15)	CL
of the northeast corner of sec.	90IL-139-4-5	2Bt	28-50	113	15	99	98	94	71	29	12	A-6(6)	CL
25, T. 13 N., R. 5 E.	90IL-139-4-7	2C	50-60	122	13	98	97	92	72	22	8	A-4(3)	CL